

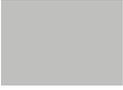


evoqua
WATER TECHNOLOGIES



WALLACE & TIERNAN[®] GAS FEEDER S10K

INSTRUCTION MANUAL



Please note

Original manual!

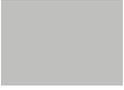


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1. Introduction

1.1 Documentation

1.1.1 Target groups

This instruction manual is intended to provide assembly, operating, and maintenance personnel with the information they need for running and servicing the S10k remote vacuum gas metering system.

This instruction manual contains important information which will enable the operator to run the system in a safe, reliable, trouble-free, and economical way. Carefully observing these instructions will help to avoid dangers, reduce repair costs and down times, improve the system's reliability, and prolong its service life.

The entitled „Installation“, „Commissioning“ and „Maintenance by specialists“ chapters are intended exclusively for Evoqua-authorized technicians or specialists trained and authorized by Evoqua. These sections contain important information on assembling, configuring, and commissioning the system and on maintenance and repair work.

All persons working with the system must have read and understood the instruction manual, in particular the safety instructions it contains.

Please consult the table of contents to quickly find the information you require.

1.2 Conventions

Notes This Instruction manual contains a number of notes with different priorities marked with symbols.

Picto-gram	Note	Meaning
	<i>Warning!</i>	Danger to life and limb! If the situation is not handled properly, death or serious injury may be the result.
	<i>Caution!</i>	If this warning is not observed, medium or slight injury or damage to the equipment may be the result.
	<i>Warning!</i>	Electrical hazard.
	<i>Note</i>	These notes assist in the operation of the system.

2. Safety

2.1 Intended use

The S10k gas feeder is the central item of a disinfection system which doses chlorine gas, sulphur dioxide or carbon dioxide gas into a flow of water. Other use is prohibited without permission from Evoqua.

The vacuum demand valve is designed to fit directly to a chlorine or sulphure dioxide gas cylinder. For the use with carbon dioxide the gas pressure must be reduced to 13.5 bar.

Action time is up to 100%.

The operational safety of the system can only be guaranteed if it is used in accordance with its intended purpose. It may only be used for the purpose defined in the contract and under the installation, operating and environmental conditions stated in this operating manual. No substances (chemicals) may be used other than those described in this instruction manual. All inspection and maintenance work must be carried out at the prescribed intervals.

Compliance with the intended use also includes reading this operating manual and observing all the instructions it contains.

The operator bears full and sole responsibility if this unit is put to any use which does not comply strictly and exclusively with this intended use.

Not intended use

Not intended use is especially

- use of other media (other gases)
- gas supply under pressure above 13.5 bar.

2.2 General safety instructions

Evoqua attaches great importance to the safety of all work relating to the system. This was already taken into account in the design of the system, by the integration of safety features.

<i>Safety instructions</i>	The safety instructions in this documentation must always be observed. These do not affect the validity of any additional national or company safety instructions.
<i>Safety instructions printed on the system</i>	All safety instructions attached to the system must be observed. They must always be complete and easily legible.
<i>Technical standard</i>	The system has been constructed using the best available technology and according to the accepted safety regulations. However, danger to the life and limbs of users or third parties or damage to the system or other property cannot be ruled out if the system, if the system is used by unqualified persons. Installation and maintenance, as well as any work that is not described in this operating manual may only be performed by authorized personnel.
<i>Personnel</i>	The operator of the overall system must ensure that only authorized and qualified technicians can work on or with the system, and within their specified area of responsibility. "Authorized and qualified personnel" include:
<i>Operation</i>	Personnel of the operator who have been trained and instructed by Evoqua or a service partner.
<i>Installation, Commissioning and Maintenance level 2</i>	Only Evoqua service personnel or personnel who have been trained and authorized by Evoqua.
<i>Electrical work</i>	Authorized and qualified electrical technicians
<i>Spare parts/components</i>	The trouble-free operation of the system can only be guaranteed, if original spare parts and components are used in the combination described in this instruction manual. Otherwise there is a danger of malfunction or damage to the system.
<i>Modifications and extensions</i>	Never attempt to rebuild, modify or extend the system without written approval from the manufacturer!
<i>Electrical power</i>	During normal operation, the control cabinet must remain closed. Connect cables in accordance with the wiring diagram.
<i>Waste disposal</i>	Ensure safe and environmentally-friendly disposal of agents and replaced parts.

2.3 Safety instructions specific to the S10k system



Warning!

Danger due to chlorine gas/sulphur dioxide!
Chlorine gas or sulphur dioxide gas irritates the respiratory tracts. Contact with chlorine or sulphur dioxide gas in high concentrations irritates and damages the membranes, respiratory system and the skin. In extreme cases death can result due to suffocation.



Note

In this manual the use of the S10k system with chlorine gas is described. When sulphur dioxide or carbon dioxide is used refer to the safety information of the gas supplier (e.g. the safety data sheet).

- This unit may only be installed and serviced by qualified personnel who are familiar with the contents of the operating instructions, works directives and regulations for handling chlorine.
- The operators of the gas feed system must be instructed in safe use of the unit.
- All personnel coming in contact with the unit must be in full knowledge of the site operation and emergency procedures and also regulations for accident prevention.
- The discharge of chlorine gas from chlorine containers should not exceed one percent of the nominal container contents per hour, as otherwise there is the risk that the chlorine container and the vacuum control valve become iced. Therefore ensure that a sufficient number of chlorine containers are connected and open at the same time.
- When using chlorine barrels the connection valve must be heated.
- When changing the gas cylinders always wear a suitable and functional gas mask. Practice use of the mask regularly. If chlorine gas is discharged, only use a breathing system which is independent of ambient air!
- Do not tolerate any leakages in the chlorine system. Leakage points must be sealed immediately as they will become larger with time if they remain unattended. When inspecting the system for leakage always keep your gas mask to hand.
- All connections and system components must be carefully inspected for leaks during commissioning, when chlorine pipes have been released and re-connected and also regularly during routine daily inspection, and any leaks must be sealed correctly. If there are any traces of chlorine in the air the cause must be determined and remedied immediately.
- When locating leaks with ammonia, never pour, spray or drip

liquid ammonia over metal components (corrosion).

- One of the most common causes for leaks on chlorine pipes are seals which have been used more than once. For this reason never re-use seals which have been removed from the system, but dispose of these immediately (also when changing the gas cylinders!). Ensure that a sufficient supply of new seals of the right size and correct material is always available (refer to overhaul kits or spare parts).
- Gaskets must always be stored in a dry place! Damp seals lose their stability permanently, increase the danger of corrosion and should never be re-used!
- If a gas pipe is interrupted or opened, close the openings immediately with a rubber plug or similar material to prevent the ingress of moisture. Moisture must be kept away from all parts of the system which only come in contact with dry chlorine during operation. Dry chlorine is not corrosive below 100°C. However, chlorine in combination with moisture is extremely corrosive and corrodes most metals such as bronze or steel.
- Before servicing the system the gas supply must be closed off directly on the gas cylinders or tank and the chlorine gas in the system must be consumed completely (exception: leakage location or calibration).
- Only use original spare parts. Employment of non-specified parts can cause faults which can have dangerous consequences. Evoqua does not accept any liability in such cases.
- After installation always keep this instruction manual in a safe, easily accessible place. It is important for safe operation and correct servicing.
- Secure loose warning signs and replace when illegible.
- Safety inspection once annually by a competent technician.
- Servicing of the system at least once annually by a competent technician. We recommend concluding a servicing contract with Evoqua to this purpose.

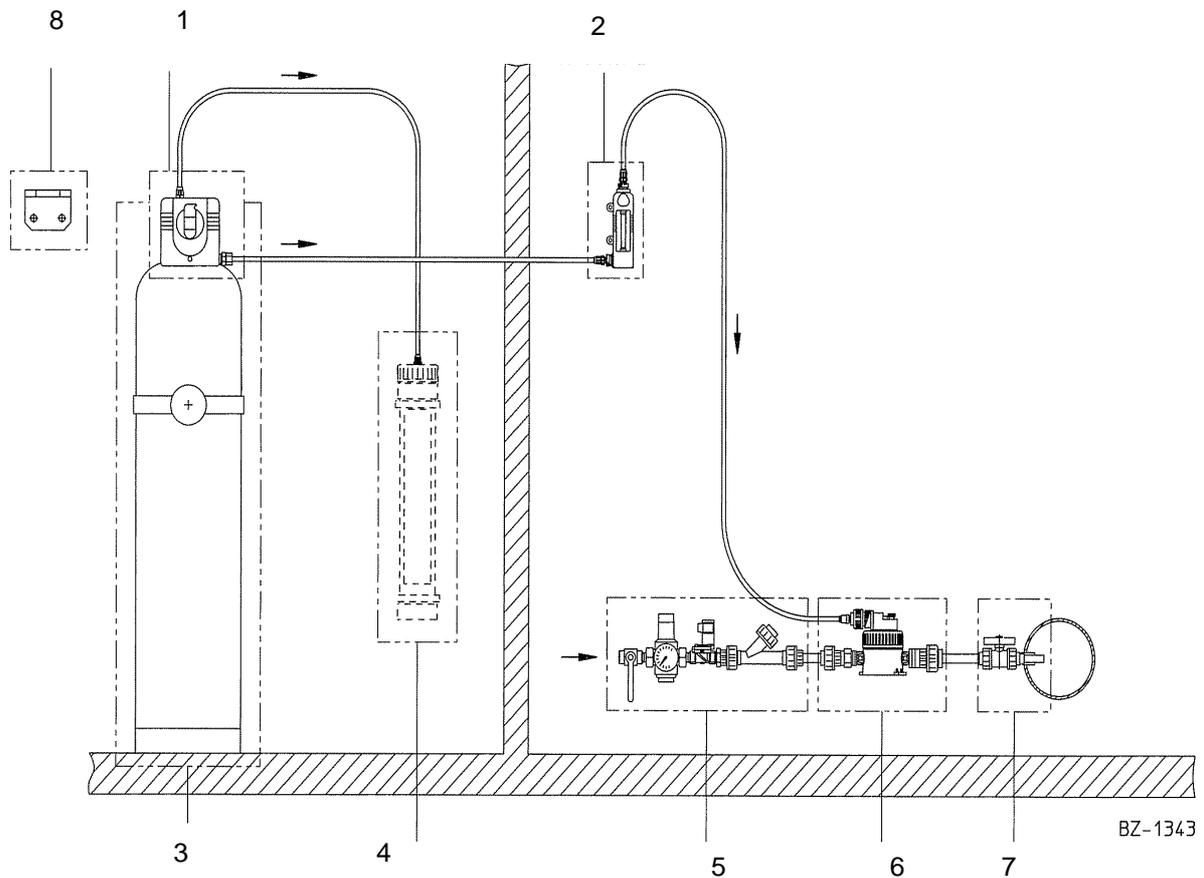
3. Description

3.1 Design

The system consists of the following main components:

- The separately mounted injector (6) for the generation of the operating vacuum and for the mixing of the gas with the water.
- The vacuum demand valve (1) is connected directly to the Cl₂ or SO₂ gas cylinder or to the gas manifold. It only opens when the vacuum created by the injector is sufficient.
For the use with carbon dioxide a pressure reducing valve to 13.5 bar (g) is necessary.
- The gas dosing unit (2) connected to the vacuum demand valve via the vacuum line.
It includes the flowmeter to display the gas flow and the V-notch plug to adjust the gas flow.

Dosage can be switched on and off by solenoid valves in the water supply line or by booster pump.



- 1 Vacuum demand valve
- 2 Gas dosing unit
- 3 Gas cylinder with bracket
- 4 Activated carbon filter (recommended for chlorine)
- 5 Operating water supply
- 6 Injector
- 7 Point of application
- 8 Support

3.2 Principle of operation

Operating water passes through an injector (6) and creates a vacuum. This vacuum makes the vacuum demand valve (1) on the chlorine tank open. Chlorine gas enters the control unit (2) under the influence of the vacuum and passes through the flowmeter and further to the injector. There it mixes with the operating water which then passes to the solution distribution system.

If the operating water is shut off, the vacuum breaks down and the vacuum demand valve interrupts the chlorine flow. The check valve in the injector prevents water from entering the gas line. In case of a leak in the tubing from the regulating valve to the injector or in the chlorinator, only air can enter into the system, but no chlorine can escape. If the vacuum demand valve leaks and pressurized chlorine flows into the vacuum lines, a relief valve (6) blows the chlorine into the vent line and into an activated carbon filter (5).

It is highly recommended to have the sensor of a gas monitoring system installed in the chlorine room.

3.3 Vacuum demand valve

The standard vacuum demand valve is supplied for use with chlorine, sulphur dioxide or carbon dioxide gas.



Warning!

Danger when using other gases!

The standard vacuum demand valve must not be used for ammonia. Severe personal injury or damage to plant can occur if a vacuum demand valve is used with a gas for which it is not designed. The vacuum demand valve must be connected in a way that only gaseous gas can enter the valve, never liquid gas.

The function of the vacuum demand valve is to ensure that gas can only flow from the storage cylinder into the vacuum line when the vacuum created by the injector is present throughout the pipework.

The vacuum demand valve is supplied in the following assemblies:

- with screw connection for chlorine gas cylinders according to DIN 477
- with screw connection for SO₂ gas cylinders
- with nipple for CO₂ pressure hose connection

in the versions

- Shut-off valve (non switch-over), withdrawal from one gas cylinder or gas manifold.
 - Switch-over valve, withdrawal from two gas cylinders or gas manifolds alternatingly.
-



Warning!

Danger due to liquid gas!

The vacuum demand valve must not be connected directly to a drum valve. Liquid gas must be prevented from entering the valve. Connection to a drum is described in chapter 4.4.2

Automatic switchover capability is provided (when ordered) by two vacuum demand valves fitted with mechanical detents machined into the operating lever. One valve feeds gas until its cylinder is depleted (down to approximately 1 bar). The resulting rise in vacuum to a higher than normal level provides sufficient force to unlatch the operating lever in the second unit which then takes over the gas supply function.

The vacuum demand valve consists of:

- Operating lever
- Valve housing
- Relief valve
- Cylinder connection
- Heater (optional)
- Pressure gauge, contact pressure gauge (optional)

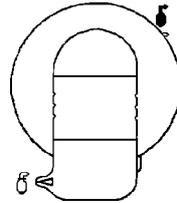
The discharge of chlorine gas from chlorine containers should not exceed one percent of the nominal container contents per hour, as otherwise there is the risk that the chlorine container and the vacuum demand valve become iced. Therefore connect each chlorine container to a vacuum demand valve. Alternatively connect several gas cylinders to a gas manifold and connect a vacuum demand valve to the manifold.

3.3.1 Operating knob

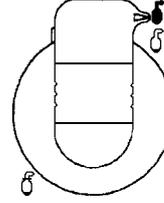
The front cover houses the control mechanism and the front face is provided with symbols, which indicate the operating condition of the unit as follows.

*Standard version
(non switch-over)*

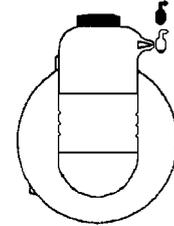
closed



operating



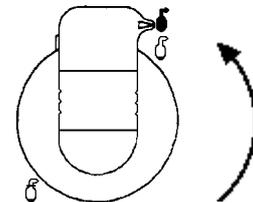
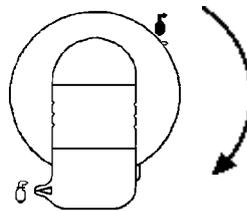
empty



Operation:

To close the valve:
Move the knob downwards
and turn clockwise.

To open the valve:
Turn the knob anti-clockwise
and move to the top.



Switch-over version

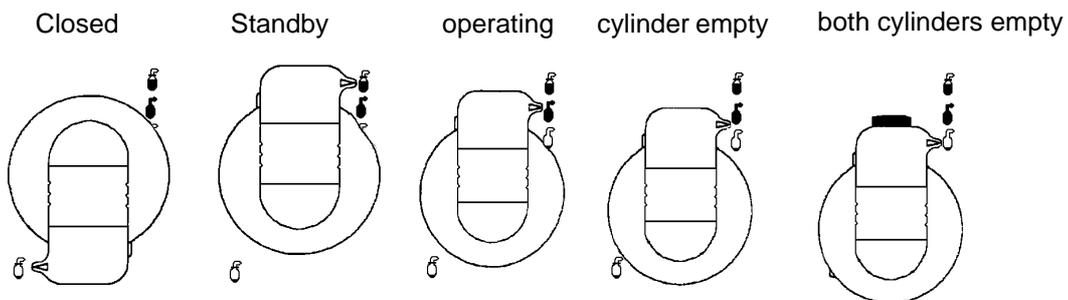
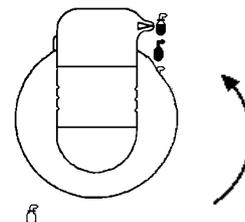
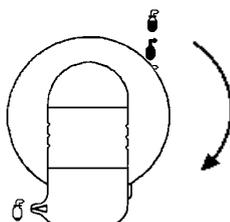
Closed

standby
(The valve is closed. It opens when the other gas cylinder is empty and the vacuum rises.)

Operating

One cylinder empty or valve closed.
The pressure gauge shows 0 bars.Both gas cylinders are empty.
The pressure gauge of both gas cylinders show 0 bars.
The red OUT OF GAS warning indicator, located above the knob, is uncovered.

After the changing of the gas cylinder and the opening of the cylinder valve move the knob in position „Standby“ or „Closed“.

**Operation:**To close the valve:
Move the knob downwards and
turn clockwise.To open the valve:
Turn the knob anti-clockwise and
move to the

3.3.2 Heater (optional)

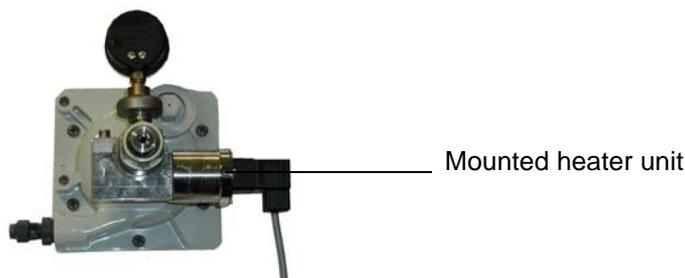
An optional heater unit (W3T162239) is available for installations where reliquefaction of the gas within the valve is a problem due to low external temperatures. Reliquefaction can occur if the temperature in the vacuum demand valve is below the temperature in the gas cylinder.

This unit comprises a bolt on capsule which attaches to the check valve housing of the vacuum demand valve. The thermostatically controlled heater is designed to operate on any single phase supply of 115 volts or over, up to a maximum of 230 volts.

Electric connections must be made by electric specialists according to the corresponding rules, e.g. EN 60204.

The LED on the unit is on when the unit is under tension.

The unit can be hot (ca. 60°C).



3.3.3 Pressure relief valve

The pressure relief valve fits into a recess in the back housing of the regulating valve. The relief valve comprises a spring, stem and diaphragm. The face of the diaphragm is spring loaded against two openings, one opening connects into the main chamber of the valve and the other connects to the vent line. Should either of the check valve stems fail to seat when the operating vacuum is shut off, gas will pass into the main chamber of the valve where its pressure acts against the underside of relief valve diaphragm. The relief valve diaphragm is forced against its spring until it unseats at which point gas is allowed to pass to atmosphere via the vent line.

3.3.4 Flowmeter assembly

The flowmeter assembly is fitted with a graduated glass tube and a control knob. The tubes inner surface is tapered towards the bottom and contains a free moving float. The gas forces the float up the tube until it can flow round it thus indicating gas flow by the position of the float in relation to the graduations. The control knob screws a variable orifice V-notch plug in or out to adjust the volume of gas passing through the assembly.

Control of the gas feedrate is achieved by turning the control knob

- in the anti-clockwise direction to increase the flowrate or
- in the clockwise direction to decrease the flowrate.

If the float touches the upper stop, the range is exceeded and the reading is not valid.

3.4 Injector

Standard injectors

W3T171367 : size 1" up to 10 kg/hour
W3T171369: size 3/4" up to 4 kg/hour

The injectors are fitted with check valves to prevent a back flow of water into the gas feeder if the injector is subject to positive back pressure when it is shut down or if the solution discharge line becomes blocked.

Anti-syphon injectors

W3T171368: size 1" up to 10 kg/hour
W3T171370: size 3/4" up to 4 kg/hour

Anti-syphon versions of both injectors are available and are basically as described above but are fitted with a second, spring loaded, diaphragm assembly to provide a positive shut-off against negative back pressure at the injector.

Both the standard and anti-syphon injectors are mounted remotely from the demand valve and the flowmeter assembly.

3.5 Technical Data

Dosing accuracy	class 4 (according to VDI/VDE 3513 Bl. 2)
Flowmeters for chlorine	3" version: 24 g/h to 4 kg/h 5" version: 60 g/h to 10 kg/h also refer to chapter 7.3
V notch plug	24 g/h to 10 kg/h Cl ₂
Control range	20 : 1
Operating water	max. 16 bars at 38°C max. 10 bars at 55°C
Minimum operating vacuum	minus 540 mbar at the injector at maximum gas flow
Inlet pressure at the vacuum demand valve	minimum 1.4 bar, maximum 13.5 bar
Ambient temperature	+2° to +50°C
Airborne noise emission	does not exceed 70dB(A)
Contact pressure gauge	0...12 bar (g), resistant up to 19.2 bar (g) contact closed without pressure contact opens at 2.4 bars (g) with rising pressure contact closes at 1.5 bar (g) with falling pressure max. load 6...24 VDC/VAC 5...100 mA, max 3 W
Heating (optional)	operating temperature 60 °C protection IP 65 power consumption 20 W at 230 V, 5 W at 115 V

4. Installation



Warning!

Risk of severe personal injury!

This equipment should be installed, operated and serviced only by trained qualified personnel who are thoroughly familiar with the entire contents of this instruction book.



Warning!

Risk of severe personal injury!

Piping for the chlorine (or sulphur dioxide) gas supply, where the gas is under pressure, should conform to national regulations. Plastic tubing and pipe are not recommended and should not be used.

4.1 Unpacking

- Unpack the equipment in a clean, dry area, preferably at the installation site.
- To prevent damage during transport the flowmeter glass is packed separately. Handle this glass tube very carefully. Cracks make the glass tube useless. Preferably mount the flowmeter just before commissioning.
- Check all items against the packing note to ensure that none is discarded with the packing materials.
- Retain the packing until the system has been completely installed.
- Hand-over the manual to the operator.

4.2 Location requirements

For drawings of typical installations refer to 7.1

The vacuum demand valve is designed to be mounted directly to the Cl₂ or SO₂ gas cylinder.

Mount the optional wall support so that the vacuum demand valve

can be attached to it during changing of the cylinder.

In case of a pressure gas manifold the vacuum demand valve is fixed to the end of the manifold.

In case of a CO₂ dosing plant the vacuum demand valve is connected to the pressure reducing valve via a pressure hose and mounted to a wall.

Also refer to „Typical installations“.

- Unauthorized persons must be excluded from the installation.
- Adequate access should be available to permit ease of operation and maintenance of all plant items.
- The flowmeter assembly should be mounted at eye's height.
- The ambient temperature around the gas control unit should be at least 0°C (install a heater if necessary) with a maximum at 50°C (preferably 15 - 20°C).
- The system shall be protected against direct exposure to sun and moisture.
- Gas containers are heavy and the location should be chosen to give the shortest possible gas supply line, consistent with safe handling of the containers.
- Position and equipment of the chlorine storage and operation room must correspond to the resp. regulations.



Warning!

Risk of personal injury by chlorine gas!
Install the equipment so that in case of a fault chlorine gas may escape within the storage room only. Those parts of the chlorine system that may be under pressure (such as tanks, regulating valves, relief valve, relief line and activated carbon filter) may be installed in the storage room only. Refer to the national or regional regulations.



Caution!

When a heater is installed, take care that the temperature of the gas cylinder doesn't rise above ambient temperature. Otherwise there is risk of reliquefaction of Cl₂ and SO₂.

4.3 Flowmeter assembly



Warning!

Risk of severe personal injury or equipment damage!
The flowmeter/plug assembly is designed to operate under vacu-

um only. To avoid possible severe personal injury or equipment damage, do not connect it to a source of gas under pressure.

The flowmeter is mounted remote from the demand valve, on a vertical surface (such as a wall or a column) at the height convenient for reading by the operator.

If the flowmeter assembly is bolted to an uneven wall, shims must be added to prevent the flowmeter assembly from twisting when the bolts are tightened. The axis of the flowmeter assembly must be vertical when mounted. Use a spirit level to check this.

4.3.1 Mounting the flowmeter



Note

For protection in shipment, the flowmeter and associated parts were removed after the flowmeter assembly was factory tested. These parts are separately packaged and should be assembled and installed as indicated.

Install the flowmeter as follows:-

- 1 Insert a coin or similar into the slot in the bottom of the flowmeter jackscrew. Unscrew it counter-clockwise from the bottom. Remove it. (Refer to 7.3.3 or 7.3.4)
 - 2 Insert one gasket in the top of the flowmeter frame.
 - 3 Insert lower stop and float and top stop into the flowmeter tube.
 - 4 Carefully raise the flowmeter tube with its parts into the frame.
 - 5 Insert the O-ring on top of the flowmeter jackscrew.
 - 6 Engage the flowmeter jackscrew in its threaded opening and tighten by hand.
 - 7 Tighten the flowmeter jackscrew gently until a firm seal is achieved.
-



Caution!

Do not overtighten as this may break the flowmeter tube.

4.4 Installing the vacuum demand valve



Caution!

When the vacuum demand valve is used with carbon dioxide,

pressure valves, reducing valves, pressure relief valves and all related pipework and fittings between the gas supply and the vacuum demand valve, must be obtained from the gas supplier; they must be installed in accordance with his recommendations.

Not all drawings and text in this book are applicable to carbon dioxide systems.

Gas supply pressure must be reduced to between 1.4 and 13.5 bars g to prevent overpressurization of the vacuum demand valve. A pressure relief device, set at a maximum of 15.8 bar g should be installed between the pressure reducing valve and the vacuum demand valve.



Warning!

Danger when using other gases!

The standard demand valve must not be used for ammonia service. Severe personal injury or damage to plant can occur if a vacuum demand valve is used with a gas for which it is not designed.



Warning!

To avoid gas leakage and severe personal injury or equipment damage, always use a new lead gasket when installing a vacuum demand valve and each time a supply cylinder is changed.

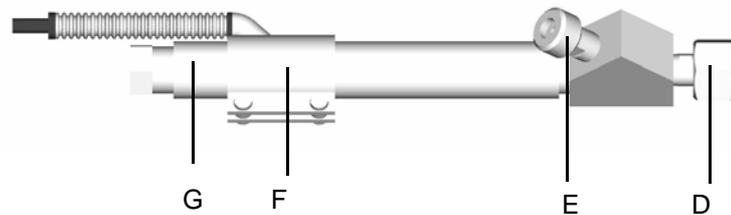
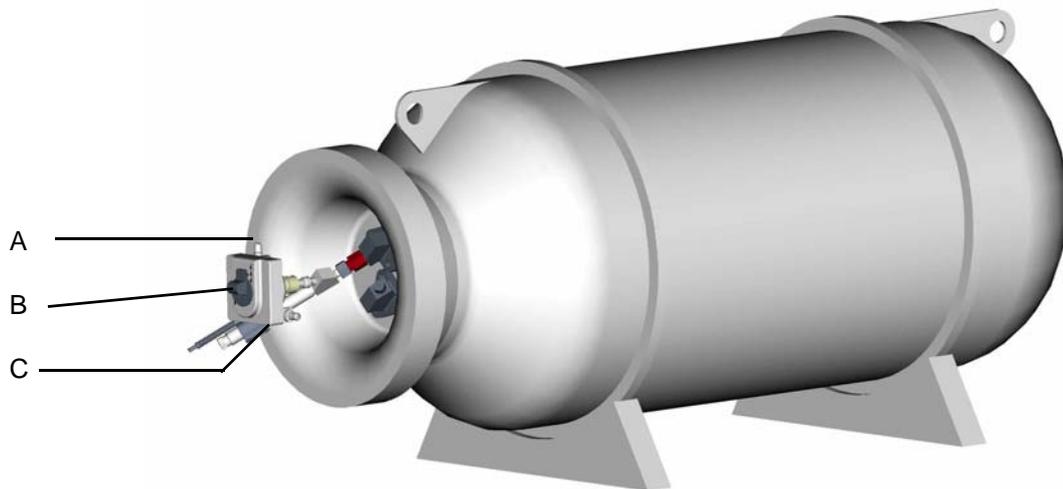
4.4.1 Connection to a gas cylinder

Usually the vacuum demand valve is mounted directly to the thread of the cylinder valve (Cl_2 or SO_2 gas cylinders) or fixed to a gas manifold.

The cylinder must be in the upright position with the cylinder valve on top.

The support mounted to the wall is used to hold the vacuum demand valve during changing of the gas cylinder (Cl_2 or SO_2). The support should be mounted besides or above the gas cylinder, so that the vacuum line and the relief line are not stressed when the vacuum demand valve is attached to the support.

4.4.2 Connection to a chlorine drum



- A Relief line
 B Operating knob (to close the valve turn clockwise)
 C to the flowmeter assembly and the injector
 D Connection to the drum valve (gasket W3T172026)
 E Connection to the vacuum demand valve S10k
 (gasket W3T172027 + filter W3T167914)
 F Heater
 G Adaptor W3T166148

- Connect only to the drum valve "Gaseous Chlorine", never to the drum valve "Liquid chlorine".
- Always use the adaptor W3T166148 to connect the S10k to a chlorine drum.
- Open the drum valve slowly.
- When changing the drum:
 - Close the operation knob, close the drum valve.
 - Put on your gas mask.
 - Remove the from the adaptor, replace the gasket W3T172027 and the filter W3T167914.
 - Connect the adaptor to the valve of a new drum using a new flat gasket W3T172026.

4.5 Relief line

- Do not terminate the safety vent line in areas frequented by personnel - external work areas, footpaths etc., or adjacent to windows or ventilation system intakes.
- The line must run on a continuous down gradient, without low traps, to a point outside the building. Where traps are unavoidable or a down gradient is not possible, provision for condensate removal (i.e. drip leg) must be installed at all low points.
- The safety vent line is an essential feature of any gas control system. The vent line should be supported over its entire length. We recommend to install an activated carbon filter at the end of the chlorine vent line. Otherwise the free end of the vent line must be turned down to prevent the ingress of moisture. Mount the screen W3T159424 to the end to prevent the entry of insects and possible blockage of the line.
- It is recommended that a suitable warning notice be affixed adjacent to the vent outlet, eg. 'WARNING - CHLORINE FUMES'.
- Safety vent lines from components handling the same gas may be commoned up to a single point but provision must be made for plugging off any one line when the associated flowmeter is shut down for maintenance purposes.
- When a relief valve is installed in the vacuum line, close the vent outlet of the vacuum demand valve.

4.6 Activated carbon filter

Absorbs small amounts of chlorine gas.

As soon as the activated carbon is saturated, chlorine gas is discharged from the underside of the filter housing. Chlorine gas odour is then detectable and the gas detector (option) installed in the room is triggered.

In this case, and regularly once a year, replace the activated carbon filter (refer to the instructions on the plate on the filter housing, the servicing instructions and spare parts).

4.7 Mounting the injector



Note

Never shorten the tailway.

The tube connected to the tailway must be straight for at least 0.30 m more. Otherways the flow in the pressure-recovery zone will be interrupted and prevent normal performance.

Do not direct the tailway downwards. Otherwise air or gas bubbles can accumulate in the tailway and impair the function of the injector.

When installed with rigid pipes the injectors need not to be fixed elsewhere. Care for stressfree mounting.

When connected to flexible tubes the injectors have to be fixed.

Nozzle (with stamped number) and tailway (with stamped letter) are supplied loose.

1 Place the 'O'-rings on both and apply some silicone grease (do not use vaseline or mineral grease).

2 When assembling nozzle and tailway into the injector body pay attention to the flow direction (see arrows on the injector body). Turn only by hand up to the stop.

For measuring the injector vacuum a 1/4" connection is provided.

Operation range:

Up to 4 kg/h:

standard injector W3T171369 (3/4") or
anti syphon injector W3T171370

Above 4 kg/h:

standard injector W3T171367 (1") or
anti syphon injector W3T171368

The anti syphon injectors are necessary, when depression can occur in the water pipe, e.g. by water flowing downwards.

Injector W3T171369 / W3T171370

Connection at the throat:

3/4" hose or tube inner diameter

If connected to 3/4" rigid tube, the part of the nozzle that is prepared for accepting flexible tube can be removed.

The gas connection can be turned in 45° steps after loosening the union nut. Lock before tightening the union nut. Tighten only by hand!

Injector W3T171367 / W3T171368

Connection at the throat:
PVC tube DN 25 (Ø32 mm)

Connection at the tailway:
PVC tube with 3/4" inner Ø

The gas connection can be turned in 60° steps.
To do so remove the 6 bolts, remove the upper part of the housing and fix again in the desired position. Tighten the bolts.



Note

The nozzle and the tailway are sealed to the injector body by O-rings. Hand tightening of the retaining nut is sufficient.

4.8 Point-of-application

If the point-of-application is a pressurized main or is higher than the injector, the solution line should incorporate a check valve and terminate in a solution injection tube assembly.

It is recommended that all solution delivery lines be fitted with a suitable valve and drain pipe to enable any pressure build up to be safely released prior to maintenance work.

Behind the point-of-application a pipe length of at least 10...15 x pipe diameter is necessary for a homogenous mixing of the solution into the main water. After that, samples can be taken for residue control etc.

If the point-of-application is into a basin, channel etc. a diffusor can be supplied (refer to the project documentation).

4.9 Water supply

There must always be sufficient operating water available at an adequate supply pressure. The operating water must not contain any particulates (potable water quality).

Water pressure and quantity depend on the maximum dosing capacity, the counterpressure at the point of application, the difference in geodetic altitude between chlorinator and point of application and the friction in the dosage line. On these values depend the selection of the injector.

If the operating water pressure is too low, a booster pump is required

The water line should include a suitable shut-off valve, strainer, pressure gauge, pressure reducing valve check-valve and solenoid valve (see chapter 7.1).

It is recommended that all solution delivery lines be fitted with a suitable valve and drain pipe to enable any pressure build up to be safely released prior to maintenance work.

4.10 Gas supply line



Warning!

Danger due to chlorine gas!

The flowmeter assembly must be connected to a vacuum gas supply between vacuum demand valve and injector only.

Do not open the cylinder or drum valve until the system has been fully installed and the pre-start checks are being carried out.

Refer to the safety information of the gas supplier and the safety data sheet!

4.10.1 Gas suction line

As a standard the vacuum gas lines between vacuum demand valve, flowmeter assembly and injector are designed for hoses Ø 6.35 x 1.6.

For long distances between regulating valve, control unit and injector the diameter of the suction line depends on the the gas flow and the distance (see table below).

If more than one flowmeter assembly are connected, the sum of

the gas flows has to be considered.



Caution!

When using polyethylene pipes don't install them in narrow, badly vented protection pipes or in the ground to prevent the pipe from fast embrittling under the influence of Cl_2 or SO_2 .

The following table shows the maximum length of pipe run, in metres, that can be used between its supply cylinder and a flowmeter and injector for a given $\text{Cl}_2/\text{SO}_2/\text{CO}_2$ feedrate.

Max.tube/pipe length between vacuum demand valve and flowmeter assembly

Feed of CO ₂ in g/h	Feed of Cl ₂ , SO ₂ in g/h	PE hose 6,35 mm (1/4")	PE hose 9,5 mm (3/8")	PE hose 12 mm (1/2")	PVC pipe DN 15	PVC pipe DN 20	PVC pipe DN 25
160	200	250 m	1200 m	3000 m	-	-	-
320	400	146 m	670 m	1510 m	3600 m	-	-
800	1000	24 m	88 m	852 m	1710 m	-	-
1600	2000	6 m	33 m	107 m	320 m	1094 m	-
2400	3000	3 m	16 m	53 m	179 m	607 m	1853 m
3200	4000	-	9 m	28 m	91 m	364 m	1042 m
4800	6000	-	5 m	15 m	43 m	145 m	479 m
6400	8000	-	2 m	8 m	25 m	98 m	294 m
8000	10000	-	1,5 m	5 m	16 m	73 m	206 m

Max.tube/pipe length between flowmeter assembly and injector

Feed of CO ₂ in g/h	Feed of Cl ₂ , SO ₂ in g/h	PE hose 6.35 mm (1/4")	PE hose 9.5 mm (3/8")	PE hose 12 mm (1/2")	PVC pipe DN 15	PVC pipe DN 20	PVC pipe DN 25
160	200	415 m	2000 m	-	-	-	-
320	400	243 m	1115 m	2515 m	-	-	-
800	1000	40 m	146 m	1420 m	2850 m	-	-
1600	2000	10 m	55 m	178 m	532 m	1748 m	-
2400	3000	5 m	26 m	88 m	298 m	1010 m	3088 m
3200	4000	-	15 m	46 m	151 m	606 m	1736 m
4800	6000	-	7 m	25 m	71 m	240 m	798 m
6400	8000	-	4 m	13 m	40 m	163 m	490 m
8000	10000	-	2,5 m	8 m	26 m	121 m	343 m

4.11 Checking the installation

4.11.1 Preparation



Note

Chlorination plants should be checked by a specialist for condition according to the rules before being taken into operation. Especially the chlorine parts of the plant must be checked for leaks.

When all the connections have been made, the following pre-start checks must be carried out before the plant can be taken into operation.

4.11.2 General check

- 1 Ensure the gas supply lines from the cylinders are securely connected and that all valves in the system are closed.
- 2 Check that the water inlet line from the source of supply to the injector is securely connected.
- 3 Ensure the safety vent line is securely connected to the vacuum demand valve and that it terminates correctly, e.g. outside the building.
- 4 Ensure the injector vacuum line is correctly fitted to the flowmeter assembly gas outlet and to the injector.
- 5 Check the solution line from the injector to the point-of-application. If the point-of-application is into a main through a corporation cock, the cock must be opened and the tube pushed in as far as possible and secured on the bayonet fitting.
- 6 Check the installation of any accessories fitted. Ensure the check valve is fitted correctly (the arrow indicates the direction of flow); ensure a drain line is fitted to the anti-siphon valve, terminating above a suitable drain.

4.11.3 Injector vacuum and leak check

- 1 Keep the valves on the chlorine cylinders closed.
- 2 Open the valves in the water supply line to the injector and at the point-of-application.
Open the solenoid valve, start booster pump, if installed.
- 3 Adjust the injector water pressure at the reducing valve.
- 4 Check for leaks.
- 5 Switch the vacuum demand valve to „operation"  .
Open the control knob at the flowmeter assembly.

The operating knob at the vacuum demand valve must go to

„Empty" 

- 6 Check that the float rests on the bottom stop of the flowmeter. Any movement of the float indicates an ingress of air on one of the following locations:
 - through the pressure relief valve
 - through the 'O' ring on the bottom of the flowmeter
 - through cracks in the flowmeter
 - through the 'O'-rings at the pipe connections
 - through any incorrectly cemented joints or slack unions in the pipework.
- 7 Repair all leaks before going any further.

4.11.4 Check for gas leaks



Warning!

Danger due to chlorine gas!
Dangerous chlorine gas (SO₂ or CO₂) can escape during the following steps. Keep your gas mask to hand. In case of carbon dioxide care for sufficient fresh air.



Note

Before commencing this procedure, ensure that the injector associated with the gas feed system is operational, i.e. that the injector is operating correctly and can be started immediately a gas leak is detected. If a leak of gas is detected, close the storage cylinder or header valves and start-up the injector immediately. Open all other valves in the gas supply line, including the vacuum demand valve, to evacuate any gas from the system. Rectify the leak and re-start the procedure.

- 1 Activate the gas warning device.
- 2 Make sure the vacuum demand valve is set to 'OFF'  and that all valves in the gas supply system are closed.
- 3 Ensure the auxiliary cylinder valve (if used) is closed and crack open the main cylinder valve. Test for leaks around the valve assembly as detailed in the NOTE above. If there are no leaks, open the main cylinder valve one turn.
- 4 Open the auxiliary cylinder valve (if used) and then close it again and test for leaks, to the next valve in the system. If there are no leaks, fully open the auxiliary cylinder valve.

- 5 Continue until each valve up to the vacuum demand valve is tested.



Caution!

Testing for chlorine (or SO₂) gas leaks is accomplished by introducing ammonia fumes to the area under test. Any escaping gas will combine with the ammonia to form dense white clouds of ammonium chloride. Liquid ammonia solution must not be applied directly to the part being tested. Hold a bottle of 25% ammonia solution in the vicinity of the part under test. Ammonia must not be inhaled, splashed, or spilled.



Note

When testing for CO₂ use e.g. leak spray.

4.11.5 Check of the vacuum demand valve

- 1 Keep the valves on the chlorine cylinders closed.
Open the valves in the water supply line to the injector and at the point-of-application.
Open the solenoid valve, start booster pump, if installed.

- 2 Switch the vacuum demand valve to „operation"  or to

„Standby" .

Open the control knob at the flowmeter assembly four turns. The operating knob at the vacuum demand valve must go to

„Empty" . In this position the red OUT OF GAS warning indicator, located immediately above the top of the knob, is uncovered. Then the vacuum is sufficient.

If the vacuum is not sufficient, refer to the chapters „Fault finding" and „Maintenance".

4.12 Commissioning

The following procedures assume that all preparatory steps and leak tests have been completed satisfactorily.

- 1 Set the vacuum demand valve to „operation" .
- 2 Turn on the water supply to the injector and open the V-notch

plug part-way.

If there are two valves (automatic switchover system) select one cylinder as the 'duty' supply and set its demand valve to 'operation'. This should create a vacuum which will uncover the red OUT OF GAS indicator on the front of the vacuum demand valve.

- 3 Turn on the gas at the supply cylinder. This should cause the red OUT OF GAS indicator to disappear.
- 4 If there are two vacuum demand valves, open the gas cylinder valve on the standby cylinder approximately one turn and set the control knob of the valve to the STANDBY  position.
- 5 Adjust the gas feed at the adjusting knob of the flowmeter assembly.



Warning!

To avoid possible severe personal injury or equipment damage, do not open the gas supply container valve more than one turn approximately. This will permit maximum discharge and also can be turned off quickly in the event of a gas leak.

5. Operation

5.1 Starting operation

- 1 Check the gas monitoring system.
- 2 Turn on the water supply to the injector.
- 3 Turn on the gas at the supply cylinder.
- 4 Set the vacuum demand valve to „operation"  .
If there are two valves (automatic switchover system) select one cylinder as the 'duty' supply and set its demand valve to 'operation'.
- 5 If there are two vacuum demand valves, open the gas cylinder valve on the standby cylinder approximately one turn and set the control knob of the valve to the STANDBY  position.
- 6 Adjust the gas feed at the adjusting knob of the flowmeter assembly.



Warning!

To avoid possible severe personal injury or equipment damage, do not open the gas supply container valve more than one turn approximately. This will permit maximum discharge and also can be turned off quickly in the event of a gas leak.

5.2 Shut-down

5.2.1 Shut-down for short periods

- 1 Turn off the gas at the supply cylinder or turn off the water supply to the injector.

For re-starting turn on the gas at the supply cylinder or turn on the water supply to the injector. Check the gas feed.

5.2.2 Shutdown for extended periods

also for servicing and repair

The following procedure must be carried out before servicing any gas feeder system.



Warning!

Danger due to chlorine gas (gas escape)!
The gas line is disconnected with a possible release of gas. It is recommended that breathing apparatus are worn.

- 1 Isolate the vacuum demand valve from its gas supply (i.e. shut the main cylinder valve for a cylinder mounted regulator or the appropriate header valve for multiple demand valve arrangements).

Wait until the OUT-OF-GAS indicator shows all red and the float rests on the bottom stop of the flowmeter.

- 2 Set the vacuum demand valve to „closed“  .

Slacken the connection at the outlet of the vacuum demand valve. Air is now drawn through the flowmeter and the injector to purge any remaining gas. The float in the flowmeter should be in the middle of the flowmeter or higher.

- 3 After 10 seconds re-tighten the connection and turn off the water supply to the injector.
- 4 Release any pressure build up in the solution delivery line. If need be protect against frost by draining the water supply and solution delivery pipelines (refer to chapter 5.7.6).

For recommissioning refer to chapter 5.1.

5.3 Intermittent Start/Stop Operation

Intermittent start/stop of the gas feed system is achieved with a solenoid operated water shut-off valve. The valve is installed in the injector water supply line and used to control the disinfection process. If appropriate the valve can be connected to operate in conjunction with a booster pump or similar item of equipment.

To protect the flowmeter from hard gas shocks when the solenoid valve opens and shuts it is recommended to install a solenoid valve with delayed opening and closing.

It is recommended to install the inlet line to the injector at least for the last meter before the injector using PE hose or PE pipe. This reduces corrosion in metal pipes and plant components (valves,

pump impellers etc.) caused by the influence of the solution during times of standstill.

5.4 Changing Gas Cylinders



Warning!

Risk of severe personal injury or equipment damage!
Prior to performing this operation you must be completely familiar with this manual and your local plant operating and emergency procedures.

Put on your gas mask.

Gas cylinders must be secured in such a manner (e.g. chain) as to prevent their being knocked over.

When a cylinder is depleted, as shown by the red OUT OF GAS indicator on the front of the vacuum demand valve or by a weigh scale showing depletion of contents, place a full cylinder ready for service.

If the gas feeder is operating, the injector need not be shut off. If the system has two vacuum demand valves for automatic switchover, the in-use unit need not be shut off. Replace the empty gas cylinder before the other cylinder is empty.

Proceed as follows:

- 1 Bring a full cylinder to the point of use.
- 2 Close the main supply valve on the depleted cylinder.
- 3 Turn the vacuum demand valve control knob all the way to

„closed"  .



Caution!

When any connection is broken even for a short time, immediately plug the resultant openings with a rubber stopper or equivalent to prevent the entrance of moisture.

- 4 Disconnect the empty cylinder from the supply line. If the vacuum demand valve is mounted directly on the cylinder, loosen the nut and remove the vacuum demand valve from the depleted cylinder. Rest the valve on the support.



Caution!

Do not permit the demand valve to hang by its tubing as this prac-

tice may loosen or damage the tubing at the connectors.

- 5 Mount the cap.
 - 6 Release the chain and move the depleted cylinder aside.
 - 7 Move the full cylinder into place, secure with chain and check the cylinder valve packing nut has not worked loose.
 - 8 Remove the old gasket (37) and the filter (40) from the supply line connection or demand valve inlet nipple and discard it. Replace it with a new lead gasket. Pay attention to the filter holder (39).
 - 9 Position the demand valve on the cylinder valve and tighten securely.
Refer to Section 4.4.2 for connection to a gas drum.
 - 10 Check for leaks as detailed in Section 4.11.4.
 - 11 Check the gasket joint and packing nut for leaks. Correct as indicated.
-



Warning!

Risk of severe personal injury or equipment damage!
Do not tolerate leaks. Leaks always get progressively worse and must be corrected promptly.

- 12 Open cylinder by turning its valve handle approximately one turn.
- 13 After correcting leaks, turn demand valve knob fully to 'operation'.
- 14 Move empty cylinder to the storage area after replacing its cap and hood and tearing the tag (designating an empty cylinder).

5.5 Multiple Points of Application

If there are several flowmeter units in the system, these may be started and stopped at will, independent of each other as long as the gas supply is turned on. The operation of the injector associated with each flowmeter assembly determines whether or not it will feed gas.

5.6 Maintenance and inspection plan

Maintenance and inspection plan for S10k

Interval	Maintenance level	Work to be performed	resources	o.k.	not o.k.	remedied
daily	1	<ul style="list-style-type: none"> Visual check for function and leaks 				
weekly	1	<ul style="list-style-type: none"> Check the chlorine lines for leaks Check the function of the system 				
monthly	1	<ul style="list-style-type: none"> Clean the strainer in the operation water line. Check the water level in the syphon of the sink 				
every 3 months	1	<ul style="list-style-type: none"> Check the function of the individual components 				
every 6 months	1	<ul style="list-style-type: none"> Check the gas monitoring system, replace the electrolyte 				
	1	<ul style="list-style-type: none"> Clean the flowmeter, vacuum demand valve and injector 				
yearly	2	<ul style="list-style-type: none"> Replace the parts according to the maintenance kits Replace the filling of the activated carbon filter 				
2-yearly	2	<ul style="list-style-type: none"> Replace the copper pipes 				
3-yearly	2	<ul style="list-style-type: none"> Replace the auxiliary valves 				
5-yearly	2	<ul style="list-style-type: none"> Replace the pressure gauges at the vacuum demand valve (optional) 				

* Maintenance level 1 can be performed by the operator/operating personnel.
 Maintenance level 2 must be performed by specialist technicians trained by Evoqua or the Evoqua customer service technicians.
 Any work over and above this may only be performed subject to prior consultation with Evoqua customer service.

5.7 Maintenance by the operator

The following maintenance instructions include works that are necessary for the safe operation of the system. Frequency and extent of the works have to be adapted to the operating conditions.

When any connection is broken even for a short time, immediately plug the resultant opening with a rubber stopper or equivalent to prevent the entrance of moisture.

Gaskets must always be stored in a dry place! Damp seals lose their stability permanently, increase the danger of corrosion and should never be re-used!

5.7.1 Daily check

Visual check, with special attention to leaks.

5.7.2 Monthly check

- Check the flexible connections in the gas supply system for signs of deterioration and renew as necessary. Deterioration exists if a salmon pink colour develops on the end fittings (de-zincification owing to a minute leak), if dents or kinks are present or if the tubing squeaks when handled (a sure sign of internal stress corrosion).
- Check the strainer in the operating water supply, clean if necessary.

5.7.3 Check every three months

To ensure that all elements of your system are functioning normally, check the following at approximately three monthly intervals. These checks are easily performed and require no tools.

- 1 With the gas cylinder valve open, the vacuum demand valve turned on and the injector operating, vary the feed of the flowmeter assembly through its full range. The gas should feed steadily and hold any rate set from the maximum flowmeter setting, down to 1/20 th of the maximum setting. The flowmeter float should not stick or behave erratically at any point.
- 2 With the injector still operating, turn off the gas supply at the cylinder valve. In a few moments the red indicator should appear on the front cover of the vacuum demand valve. After initially rising, the flowmeter float will sink until it finally rests on the bottom stop. Decrease the feed rate if necessary to prevent the float from bouncing violently and damaging the glass tube. Failure of the float to settle down indicates an air leak upstream of the flowmeter.

- 3 When the indicator is red and the flowmeter float has settled on the bottom stop turn off the injector operating water. A rapid decrease in vacuum indicates an air leak somewhere in the system.
- 4 If the system is equipped with automatic switchover vacuum demand valves, operate the gas feeder with only one valve turned on. Set the second valve to standby and then close the gas cylinder valve of the first valve. The vacuum level should momentarily increase and then decrease and the knob on the second valve should be seen to snap down about 3/8 inch as it assumes the feeding function. Repeat the procedure to ensure the other valve also works automatically. If either valve does not switch on automatically it is an indication that its detent mechanism needs servicing.
- 5 Close the gas supply cylinder valve(s). Shut down the injector and let normal back pressure remain. Remove the tubing from the connection at the injector. No water should drip from the end of the disconnected tubing. Leave the tubing disconnected for approximately 10 minutes. Note if any water appears at the outer end of the connection fitting on the injector. Appearance of water is an indication that the injector backchecks should be serviced.
- 6 With the injector shut off and the gas supply cylinder valve closed, turn the vacuum demand valve off. Remove the vacuum tubing from the valves outlet. Crack the gas cylinder open about 1/8th of a turn and use the ammonia puffer bottle near the outlet of the unit to verify that the valves seats shut off tightly (no white vapours). Close the gas cylinder valve. A slight trace of vapour at the moment of disconnection may be ignored but any continuing vapour formation is an indication of gas passing the valve seat. If this is observed, service the stem and seat parts.

For SO₂, CO₂: Remove the vacuum line at the outlet of the vacuum demand valve. Apply a short hose to the outlet and hold the other end in a glass of water.

Open the cylinder valve 1/8 turn for a short time. If the vacuum demand valve is untight, bubbles will rise.

5.7.4 Further maintenance

- Yearly maintenance of the vacuum demand valve (by specialists).
- Flowmeter and V-notch plug:
When deposits are visible of the float sticks.
- Injector: Clean the inlet and outlet every half year.



Note

The actual frequency of cleaning will depend on calendar time, the feed rate and amount of gas fed, the care exercised in cylinder changing, the source of gas, and on the quality of the operating water.

The above maintenance schedule provides recommended cleaning intervals. However, your own operating experience is the best guide to preventative maintenance and may result in significant variations from the recommended schedule.

5.7.5 Changing the activated carbon filter

Replace the carbon when smelling to chlorine or when lumped. To do so, unscrew the activated carbon filter and open carefully. If there is no smell of chlorine (or sulphur dioxide), stir the carbon powder and the included ceramic rings and check for lumps. If the carbon powder is ok, screw the filter in place.



Warning!

Danger due to possible generation of hydrochloric acid!
Chlorine loaded carbon reacts with water generating hydrochloric acid. Don't pour into water or pour water on it, but neutralize first!
Wear breathing equipment, eye protection and protecting clothing!

Neutralizing of the carbon powder:

Cl₂ loaded carbon

- 1 Carry the filter to the open air.
- 2 Mix 300 g sodium thiosulphate with 8 l of water.
- 3 Remove upper cover of the filter.
- 4 Pour the carbon carefully into the solution.
- 5 Dilute with more water and pour away.
- 6 Dispose off the ceramic rings.
- 7 Fill the filter with new carbon and ceramic rings (part no. W3T161729) and put in place.

SO₂ loaded carbon

As above, but use caustic soda solution.

5.7.6 Preparation for Winter Shut-Down

If the gas feeder is to be shut down for an extended period during freezing weather, the following procedure must be followed.

- 1 Shut down the gas feed system evacuate all gas and release any pressure in the discharge line (see Section 5.2.2).
- 2 Drain the discharge line, and prevent any water flow into it.
- 3 Drain any water in the injector.



Note

If the equipment is to be removed for storage, seal all fittings and all gas lines with rubber stoppers to prevent the entrance of atmo-

spheric moisture during the storage period. If a pump is being used, follow the pump manufacturers instructions for extended shut-down.

5.8 Fault finding

No.	Symptoms	Probable cause	Remedy
1	Gas control unit will not feed	Chlorine supply exhausted	Change chlorine container
		Chlorine supply is turned off	Open valves
		Clogged solution tube at point of application	Open or clean both corporation cock and solution tube
		Leakage in the pipe lines	Check pipes and unions for leaks.
		Insufficient injector vacuum	Check operating water pressure. Check pressure at point of application.
		Clogged injector	Clean injector parts. Replace injector parts when worn or damaged.
		Clogged strainer in operating water line	Clean stainer insert.
		Gas filter in the vacuum demand valve clogged	Replace the filter
		Diaphragm in the vacuum demand valve broken	Repair the valve (specialist)
		V-notch orifice clogged	Clean orifice
2	Chlorine residual too low in spite of sufficient chlorine feed rate indication	Air is sucked into the chlorine gas stream	Check for leakage upstream of flowmeter. Change and grease O-rings on flowmeter.
		Increased chlorine demand	Check chlorine demand
		Pressure relief valve not tight	Check valve.

No.	Symptoms	Probable cause	Remedy
3	Gas control unit will not run up to full capacity	Insufficient injector vacuum	See 1.
		Injector does not meet requirements	Change injector parts
		Gas filter in vacuum demand valve clogged	Replace the filter
4	Flowmeter float moves erratically	Deposits on flowmeter parts	Clean flowmeter
5	Odour of chlorine in chlorinator room or vicinity	Pressure relief valve blows	Clean resp. replace vacuum demand valve. Replace the filling of the activated carbon filter.
6	Water in flowmeter	Defective check valve in injector	Dry the system, check injector
7	Gas feed rate cannot be adjusted properly	V-notch stem worn	Replace V-notch stem
		V-notch orifice worn	Replace orifice
		Vacuum demand valve defective	Replace vacuum demand valve

6. Maintenance

6.1 General



Warning!

Danger due to chlorine gas!

Chlorine gas irritates the respiratory tracts. Contact with chlorine gas in high concentrations irritates and damages the membranes, respiratory system and the skin. In extreme cases death can result due to suffocation.

- Before carrying out any maintenance operations involving dismantling, the system should be cleared of gas. Follow procedure at chapter 5.2.2. When disassembling the system always put on your gas mask.
- Maintenance of the gas control unit is simplified if the following general precautions are taken. These are easily followed and will reduce costly maintenance and repairs by providing good operating conditions.
- Chlorine and sulphur dioxide gas, when moist, are extremely corrosive. All metal parts which normally come into contact with moist gas are made from materials which will withstand the corrosive action; common metals are used only where the part is exposed to dry gas. All connections should be checked daily for signs of leaks. Every leak must be rectified as soon as it is discovered.
- The presence of a leak of chlorine or sulphur dioxide will be indicated by odour and/or fume detection equipment, if supplied. The exact location may be determined by ammonia vapour. Dense white clouds of ammonium chloride form near the leak in the presence of ammonia.
- When a connection is broken, if only for a short time, the opening should be plugged immediately to prevent the ingress of moisture which should be excluded from any part of the equipment normally exposed only to dry gas.
- Water leaks must not be tolerated and should be rectified as soon as they are discovered.
- Whenever threaded plastic parts are assembled, silicone type grease should be used to prevent the parts locking together. In general, tools should not be used to make up plastic connections, this type of connection should be made up by hand only.
- If the flowmeter tube, float, V-notch plug or any valve seat

becomes contaminated with impurities sometimes found in gases, it should be removed and cleaned.

- Replace all chlorine lines made of copper every 2 years.
- Replace the auxiliary valves at least every 3 years.
- Replace the pressure gauge of the vacuum demand valves at least every 5 years.
- Replace chlorine lines including the unions when they are damaged or corroded.
- Check the chlorine lines for leaks at least every 6 months.
- Replace all o-rings and gaskets of the chlorine system at least every year.
- Store the gaskets in a dry place. Wet gaskets lose their solidity forever and must not be used again.

6.2 Cleaning the parts

Most of the residue which accumulates can usually be removed with warm water and a soft brush, deposits can usually be removed by watering.

- Plastic and hard rubber parts should be cleaned only with warm water (not over 40°C). If necessary add ethyl alcohol.
- To clean the flowmeter tube use clean cloth strips.



Warning!

Danger due to chemicals!

Carbon tetrachloride is a satisfactory cleaning agent, but its use is not recommended because of the possible toxic effect of exposure to its fumes. Do not use wood alcohol, petrol or petroleum distillates. Do not use pvc solvent to clean the cover.

All traces of moisture must be removed from parts which come in contact with the gas before being returned to service. Do not use heat on plastic or hard rubber parts.

All cleaning should be carried out in an open area or in a well ventilated room.

Whenever threaded plastic parts are assembled, silicone type grease should be used to prevent the parts locking together. In general, tools should not be used to make up plastic connections, this type of connection should be made up by hand only.

6.3 Checking the injector performance

Good injector performance is necessary for proper gas feeder operation. The gas feeder is tested to ensure that it will deliver the required amount of gas when used at the correct hydraulic conditions. If the injector performance is poor check the following:

- **Dirty Water Strainer**
A strainer is required in the water line prior to the injector to prevent foreign matter from blocking the injector throat ports. If sufficient material is allowed to build up on the strainer surface, the resultant pressure drop across the strainer reduces the injector operating water pressure. If the pressure drop is excessive, the injector will not be able to pull the required gas flow. Regular periodic inspection and cleaning of the strainer will minimise the possibility.
- **Installation of Throat and Tailway**
The throat and tailway must be assembled as shown on the parts drawing. If faulty injector action is suspected, inspect the gaskets and replace them if necessary.
- **Blocking of the Injector Ports**
The injector will not operate satisfactorily unless all its ports are clear. The quality of the injector water supply is easily checked by visual inspection after the throat has been removed. If the water supply contains appreciable quantities of manganese or iron, these may deposit in the throat or tailway over a long period and eventually interfere with the injector action. Such deposits are readily recognisable by their black or reddish colour. They may be removed by immersing the throat in a dilute (10%) solution of hydrochloric acid (known commercially as muriatic acid).

6.4 Yearly Maintenance

- 1 Strip down the gas feed system, clean all pipe-lines and the components in accordance with the Section 6.1.
- 2 Replace the parts according to the maintenance parts kit „Yearly“
- 3 On completion of the overhaul, carry out the Preparation for Initial Operation at Section 4.11.
- 4 Thoroughly check and inspect all solution delivery pipework.
- 5 Replace the filling of the activated carbon filter.

6.5 Two-yearly maintenance

- 1 Replace the parts according to the maintenance parts kit „Two-yearly“
- 2 Replace all flexible metal tubes even if they do not show corrosion.



Note

It is recommended to have a schedule fixed to all the flexible metal tubes showing the date of the next replacement.

6.6 Preventive maintenance kits

Parts that have to be replaced after 1, 2 or 5 years are supplied in preventive maintenance kits. In the parts lists (chapter 10) these parts are marked. The standard kit includes parts to be replaced after one year of operation, the 2-years kit for replacement within 2 years etc.

Replace the gaskets of the system at least every year to have troublefree operation for a long time. We recommend to have a complete set of gaskets at hand to be able to replace single gaskets if necessary.

	Sets of gaskets	Preventive maintenance kits 1 year	Preventive maintenance kits 2 years	Preventive maintenance kits 5 years
for vacuum demand valve S10k	W3T158515	W3T158516	W3T158517 (incl. W3T158516)	W3T158518
for flowmeter assembly S10k 3"	W3T159940	-	-	-
for flowmeter assembly S10k 5"	W3T159976	-		
for injector U-96273	W3T167500	W3T167501	W3T167029	W3T167030
for injector U-96274	W3T167500	W3T167502	W3T167031	W3T167032
for injector U-96275	W3T167496	W3T167497	W3T167025	W3T167026
for injector U-96276	W3T167498	W3T167499	W3T167027	W3T167028

Spare plugs (to close the connecting nipple during changing of gas cylinders or during standstill)

for Cl₂ connection according to DIN 477: W3T167227

**6.6.1 Set of gaskets W3T158515
for vacuum demand valve S10k**

Pos.	Part-No.	Description	Quant.
0007	W3T161109	O-ring d 113.89 x 3.53	1
0008	W3T161340	O-ring d 69.44 x 3.53	1
0009	W3T161105	O-ring d 50.39 x 3.53	1
0012	W3T161120	O-ring d 7.65 x 1.78	2
0020	W3T172592	O-ring d 23.47 x 2.62	2
0099	W3T165077	Silicone grease KORASILON Paste MV, 35 g	1

**6.6.2 Maintenance kit W3T158516
for vacuum demand valve S10k, 1 year**

Pos.	Part-No.	Description	Quant.
0007	W3T161109	O-ring d 113.89 x 3.53	1
0012	W3T161120	O-ring d 7.65 x 1.78	2
0020	W3T172592	O-ring d 23.47 x 2.62	2
0023	W2T506127	Screw	1
0032	W3T171794	Valve seat	1
0034	W3T160881	Spring	1
0039	W3T167913	Screen	1
0040	W3T167914	Filter	1
0099	W3T165077	Silicone grease KORASILON Paste MV, 35 g	1

6.6.3 Maintenance kit W3T158517 for vacuum demand valve S10k, 2 years

Pos.	Part-No.	Description	Quant.
0001	W3T158516	Maintenance kit VR S10k, anually	2
0005	W3T161119	Operating diaphragm	1
0006	W3T160334	Diaphragm 126.44 x 64	1
0008	W3T161340	O-ring d 69.44 x 3.53	2
0009	W3T161105	O-ring d 50.39 x 3.53	2
0028	W3T167992	Diaphragm, d 37.53	1
0037	W3T172027	Flat gasket	2

6.6.4 Maintenance kit W3T158518 for vacuum demand valve S10k, 5 years

Pos.	Part-No.	Description	Quant.
0005	W3T161119	Operating diaphragm	1
0006	W3T160334	Diaphragm 126.44 x 64	1
0007	W3T161109	O-ring d 113.89 x 3.53	5
0008	W3T161340	O-ring d 69.44 x 3.53	1
0009	W3T161105	O-ring d 50.39 x 3.53	1
0012	W3T161120	O-ring d 7.65 x 1.78	4
0020	W3T172592	O-ring d 23.47 x 2.62	10
0028	W3T167992	Diaphragm, d 37.53	2
0030	W3T161098	Spring	1
0032	W3T171794	Valve seat	5
0033	W3T160740	Valve stem	1
0034	W3T160881	Spring	5
0039	W3T167913	Screen	5
0040	W3T167914	Filter	5
0099	W3T165077	Silicone grease KORASILON Paste MV, 35 g	1

**6.6.5 Set of gaskets W3T159940
for flowmeter assembly S10k, 3”**

Pos.	Part-No.	Description	Quant.
0011	W3T169197	O-ring d 9,25 x 1,78	3
0012	W3T165448	O-ring d 12,42 x 1,78	1
0013	W3T161107	O-ring d 10,69 x 3,53	1
0014	W3T165188	O-ring d 25,07 x 2,62	1

**6.6.6 Set of gaskets W3T159976
for flow meter assembly S10k, 5”**

Pos.	Part-No.	Description	Quant.
0011	W3T169197	O-ring d 9.25 x 1.78	3
0012	W3T168911	O-ring d 16.6 x 5.1	2
0013	W3T165449	O-ring d 21.89 x 2.62	1
0014	W3T165188	O-ring d 25.07 x 2.62	1

**6.6.7 Set of gaskets W3T167500
for Injector W3T171367 and
Injector W3T171368**

Pos.	Part-No.	Description	Quant.
0001	W3T161480	O-ring d 13 x 2	1
0002	W3T172921	O-ring d 10 x 4	1
0003	W3T172822	O-ring d 15.54 x 2.62	2
0004	W3T172899	O-ring d 23.47 x 2.62	1
0005	W3T168917	O-ring d 75.87 x 2.62	1
0006	W3T168867	O-ring d 40 x 3	1
0007	W3T161434	O-ring d 8 x 2	1
0008	W3T172724	O-ring d 20.22 x 3.53	1
0009	W3T167439	Set of O-rings	1
0010	W3T169066	O-ring d 12.37 x 2.62	1
0011	W3T172796	O-ring d 15.54 x 2.62	1

**6.6.8 Maintenance set W3T167501
for Injector W3T171367, 1 year**

Pos.	Part-No.	Description	Quant.
0001	W3T159661	Valve seat	1
0002	W3T161480	O-ring d 13 x 2	1
0003	W3T172921	O-ring d 10 x 4	1
0004	W3T172822	O-ring d 15.54 x 2.62	2
0005	W3T172899	O-ring d 23.47 x 2.62	1
0007	W3T172902	Diaphragm	1
0008	W3T168917	O-ring d 75.87 x 2.62	1
0009	W3T159664	Valve stem	1
0010	W3T168867	O-ring d 40 x 3	1
0012	W3T161434	O-ring d 8 x 2	1
0013	W3T172724	O-ring d 20.22 x 3.53	1
0014	W3T167439	Set of O-rings	1
0015	W3T169066	O-ring d 12.37 x 2.62	1
0016	W3T172796	O-ring d 15.54 x 2.62	1

**6.6.9 Maintenance kit W3T167029
for Injector W3T171367, 2 years**

Pos.	Part No.	Description	Quant.
0001	W3T159661	Valve seat	2
0002	W3T161480	O-ring d 13 x 2	2
0003	W3T172921	O-ring d 10 x 4	2
0004	W3T172822	O-ring d 15.54 x 2.62	4
0005	W3T172899	O-ring d 23.47 x 2.62	2
0007	W3T172902	Diaphragm	2
0008	W3T168917	O-ring d 75.87 x 2.62	2
0009	W3T159664	Valve stem	2
0010	W3T168867	O-ring d 40 x 3	2
0012	W3T161434	O-ring d 8 x 2	2
0013	W3T172724	O-ring d 20.22 x 3.53	2
0014	W3T167439	Set of O-rings	2
0015	W3T169066	O-ring d 12.37 x 2.62	2
0016	W3T172822	O-ring d 15.54 x 2.62	2
0017	W3T170187	Valve seat	1
0018	W3T159656	Valve stem	1

**6.6.10 Maintenance kit W3T167030
for Injector W3T171367, 5 years**

Pos.	Part-No.	Description	Quant.
0001	W3T159661	Valve seat	5
0002	W3T161480	O-ring d 13 x 2	5
0003	W3T172921	O-ring d 10 x 4	2
0004	W3T170187	Valve seat	2
0005	W3T172822	O-ring d 15.54 x 2.62	10
0006	W3T172899	O-ring d 23.47 x 2.62	5
0007	W3T161113	Spring	1
0008	W3T159663	Clamping nut M 16 x 1.5	1
0009	W3T172902	Diaphragm	5
0010	W3T168917	O-ring d 75.87 x 2.62	5
0011	W3T159664	Valve stem	5
0012	W3T168867	O-ring d 40 x 3	5
0013	W3T168914	Spring d .,3 x 11.9	1
0014	W3T161434	O-ring d 8 x 2	5
0015	W3T159656	Valve stem	1
0016	W3T172724	O-ring d 20.22 x 3.53	5
0017	W3T163614	Set of O-rings	5
0018	W2T506089	Injector throat, No. 140 W 3.57 mm	1
0019	W2T507416	Injector tailway 'F'	1
0020	W3T169066	O-ring d 12.37 x 2.62	5
0021	W3T172796	O-ring d 15.54 x 2.62	5

**6.6.11 Maintenance kit W3T167502
for Injector W3T171368, 1 year**

Pos.	Part No	Description	Quant.
0001	W3T159661	Valve seat	1
0002	W3T161480	O-ring d 13 x 2	1
0003	W3T172921	O-ring d 10 x 4	1
0004	W3T172822	O-ring d 15.54 x 2.62	2
0005	W3T172899	O-ring d 23.47 x 2.62	1
0007	W3T172902	Diaphragm	1
0008	W3T168917	O-ring d 75.87 x 2.62	1
0009	W3T159664	Valve stem	1
0010	W3T168867	O-ring d 40 x 3	1
0012	W3T161434	O-ring d 8 x 2	1
0013	W3T172724	O-ring d 20.22 x 3.53	1
0014	W3T159674	Diaphragm	2
0015	W3T173063	Snap ring d 12	1
0016	W3T167439	Set of O-rings	1
0017	W3T169066	O-ring d 12.37 x 2.62	1
0018	W3T172822	O-ring d 15.54 x 2.62	1

**6.6.12 Maintenance kit W3T167031
for Injector W3T171368, 2 years**

Pos.	Part-No.	Description	Quant.
0001	W3T159661	Valve seat	2
0002	W3T161480	O-ring d 13x 2	2
0003	W3T172921	O-ring d 10 x 4	2
0004	W3T172822	O-ring d 15.54 x 2.62	6
0005	W3T172899	O-ring d 23.47 x 2.62	2
0007	W3T172902	Diaphragm	2
0008	W3T168917	O-ring d 75.87 x 2.62	2
0009	W3T159664	Valve stem	2
0010	W3T168867	O-ring d 40 x 3	2
0012	W3T161434	O-ring d 8 x 2	2
0013	W3T172724	O-ring d 20.22 x 3.53	2
0014	W3T159674	Diaphragm	4
0015	W3T173063	Snap ring	2
0016	W3T167439	Set of O-rings	2
0017	W3T169066	O-ring d 12.37 x 2.62	2
0018	W3T172822	O-ring d 15.54 x 2.62	2
0019	W3T170187	Valve seat	1
0020	W3T159656	Valve stem	1
0021	W3T172796	O-ring d 15.54 x 2.62	2

**6.6.13 Maintenance kit W3T167032
for Injector W3T171368, 5 years**

Pos.	Part-No.	Description	Quant.
0001	W3T159661	Valve seat	5
0002	W3T161480	O-ring d 13 x 2	5
0003	W3T172921	O-ring d 10 x 4	2
0004	W3T170187	Valve seat	2
0005	W3T172822	O-ring d 15.54 x 2.62	10
0006	W3T172899	O-ring d 23.47 x 2.62	5
0007	W3T161113	Spring TANTALOY 61, D24	1
0008	W3T159663	Clamping nut M 16 x 1.5	1
0009	W3T172902	Diaphragm	5
0010	W3T168917	O-ring d 75.87 x 2.62	5
0011	W3T159664	Valve stem	5
0012	W3T168867	O-ring d 40 x 3	5
0013	W3T168914	Spring d 6.3 x 11.9	1
0014	W3T161434	O-ring d 8 x 2	5
0015	W3T159656	Valve stem	1
0016	W3T172724	O-ring d 20.22 x 3.53	5
0017	W3T159674	Diaphragm	8
0018	W3T172903	Spring	1
0019	W3T173063	Snap ring	5
0020	W3T159880	Antisiphon unit	1
0021	W3T163614	Set of O-rings	5
0022	W2T506089	Injector throat, No. 140 W 3.57 mm	1
0023	W2T507416	Injector tailway 'F'	1
0024	W3T169066	O-ring d 12.37 x 2.62	5
0025	W3T172796	O-ring d 15.54 x 2.62	5

**6.6.14 Set of gaskets W3T167496
for Injector W3T171369**

Pos.	Part-No.	Description	Quant.
0001	W3T168861	O-ring d 25 x 2,5	1
0002	W3T161434	O-ring d 8 x 2	1
0003	W3T169066	O-ring d 12.37 x 2.62	2
0004	W3T168988	O-ring d 68 x 2	1
0005	W3T172921	O-ring d 10 x 4	1
0006	W3T172724	O-ring d 20.22 x 3.53	1
0007	W3T169068	O-ring d 13.94 x 2.62	2
0008	W3T172720	O-ring d 28.17 x 3.53	1
0009	W3T172721	O-ring d 32.92 x 3.53	1

**6.6.15 Maintenance kit W3T167497
for Injector W3T171369, 1 year**

Pos.	Part No.	Description	Quant.
0001	W3T168861	O-ring d 25 x 2,5	1
0002	W3T161434	O-ring d 8 x 2	1
0003	W3T169066	O-ring d 12.37 x 2.62	2
0004	W3T168988	O-ring d 68 x 2	1
0005	W3T172921	O-ring d 10 x 4	1
0006	W3T172724	O-ring d 20.22 x 3.53	1
0007	W3T169068	O-ring d13.94 x 2.62	2
0008	W3T172720	O-ring d 28.17 x 3.53	1
0009	W3T172721	O-ring d 32.92 x 3.53	1
0010	W3T161483	Diaphragm	1
0013	W3T159657	Valve stem	1
0014	W3T171695	Diaphragm D 74.5 x d 12.7	1
0015	W3T158460	Valve seat	1

**6.6.16 Maintenance kit W3T167025
for Injector W3T171369, 2 years**

Pos.	Part No	Description	Quant.
0001	W3T168861	O-ring d 25 x 2.5	2
0002	W3T161434	O-ring d 8 x 2	2
0003	W3T169066	O-ring d 12.37 x 2.62	4
0004	W3T168988	O-ring d 68 x 2	2
0005	W3T172921	O-ring d 10 x 4	2
0006	W3T172724	O-ring d 20.22 x 3.53	2
0007	W3T169068	O-ring d 13.94 x 2.62	4
0008	W3T172720	O-ring d 28.17 x 3.53	2
0009	W3T172721	O-ring d 32.92 x 3.53	2
0010	W3T161483	Diaphragm	2
0013	W3T159657	Valve stem	2
0014	W3T159656	Valve stem	1
0015	W3T158460	Valve seat	2
0016	W3T171695	Diaphragm d 74.5 x 12.7	2
0022	W2T503995	Special grease BARRIERTA L25DL, 9 gr	1

**6.6.17 Maintenance kit W3T167026
für Injector W3T171369, 5 years**

Pos.	Article-No.	Description	Quant.
0001	W3T159655	Inlet screw	1
0002	W3T168861	O-ring d 25 x 2,5	5
0003	W3T161434	O-ring d 8 x 2	5
0004	W3T159656	Valve stem	1
0005	W3T158460	Valve seat	5
0006	W3T169066	O-ring d 12.37 x 2.62	10
0007	W3T168988	O-ring d 68 x 2	5
0008	W3T161483	Diaphragm	5
0009	W3T158461	Clamping nut	1
0010	W3T165194	Spring	1
0011	W3T168914	Spring	1
0012	W3T159657	Valve stem	5
0013	W3T172921	O-ring d 10 x 4	5
0014	W3T172724	O-ring d 20.22 x 3.53	5
0015	W3T169068	O-ring d 13.94 x 2.62	10
0018	W3T172720	O-ring d 28.17 x 3.53	5
0019	W3T172721	O-ring d 32.92 x 3.53	5
0022	W2T503995	Special grease BARRIERTA L25DL, 9 gr	1
0023	W3T171695	Diaphragm	5
0024	W3T173060	Injector nozzle, No. 140	1
0025	W2T507600	Tailway 'F'	1

**6.6.18 Set of gaskets W3T167498
for Injector W3T171370**

Pos.	Part-No.	Description	Quant.
0001	W3T168861	O-ring d 25 x 2,5	1
0002	W3T161434	O-ring d 8 x 2	1
0003	W3T169066	O-ring d 12.37 x 2.62	3
0004	W3T168988	O-ring d 68 x 2	2
0005	W3T172921	O-ring d 10 x 4	1
0006	W3T169065	O-ring d 6.07 x 1.78	2
0007	W3T172724	O-ring d 20.22 x 3.53	1
0008	W3T169068	O-ring d 13.94 x 2.62	2
0009	W3T169073	O-ring d 21.89 x 2.62	1
0010	W3T172720	O-ring d 28.17 x 3.53	1
0011	W3T172721	O-ring d 32.92 x 3.53	1

**6.6.19 Maintenance kit W3T167499
for Injector W3T171370, 1 year**

Pos.	Part. No.	Description	Quant.
0001	W3T168861	O-ring d 25 x 2,5	1
0002	W3T161434	O-ring d 8 x 2	1
0003	W3T169066	O-ring d 12.37 x 2.62	3
0004	W3T168988	O-ring d 68 x 2	2
0005	W3T161483	Diaphragm	3
0008	W3T159657	Valve stem	1
0009	W3T172921	O-ring d 10 x 4	1
0010	W3T169065	O-ring d 6.07 x 1.78	2
0011	W3T172724	O-ring d 0.22 x 3.53	1
0012	W3T169068	O-ring d 13.94 x 2.62	2
0013	W3T169073	O-ring d 21.89 x 2.62	1
0014	W3T172720	O-ring d 28.17 x 3.53	1
0015	W3T172721	O-ring d 32.92 x 3.53	1
0016	W3T171695	Diaphragm	1
0017	W3T158460	Valve seat	1

**6.6.20 Maintenance kit W3T167027
für Injector W3T171370, 2 years**

Pos.	Part-No.	Description	Quant.
0001	W3T168861	O-ring d 25 x 2.5	2
0002	W3T161434	O-ring d 8 x 2	2
0003	W3T169066	O-ring d 12.37 x 2.62	6
0004	W3T168988	O-ring d 68 x 2	4
0005	W3T161483	Diaphragm	6
0008	W3T159657	Valve stem	2
0009	W3T172921	O-ring d 10 x 4	2
0010	W3T169065	O-ring d 6.07 x 1.78	4
0011	W3T172724	O-ring d 20.22 x 3.53	2
0012	W3T169068	O-ring d 13.94 x 2.62	4
0013	W3T169073	O-ring d 21.89 x 2.62	2
0014	W3T172720	O-ring d 28.17 x 3.53	2
0015	W3T172721	O-ring d 32.92 x 3.53	2
0016	W3T159656	Valve stem	1
0017	W3T158460	Valve seat	2
0018	W3T171695	Diaphragm	2
0019	W2T503995	Special grease BARRIERTA L25DL, 9 gr	1

**6.6.21 Maintenance kit W3T167028
for Injector W3T171370, 5 years**

Pos.	Part-No.	Description	Quant.
0001	W3T159655	Inlet screw	1
0002	W3T168861	O-ring d 25 x 2.5	5
0003	W3T161434	O-ring d 8 x 2	5
0004	W3T159656	Valve stem	1
0005	W3T158460	Valve seat	5
0006	W3T169066	O-ring d 12.37 x 2.62	15
0007	W3T168988	O-ring d 68 x 2	10
0008	W3T161483	Diaphragm	15
0009	W3T158461	Clamping nut	1
0010	W3T165194	Spring	1
0011	W3T168914	Spring	1
0012	W3T159657	Valve stem	5
0013	W3T172921	O-ring d 10 x 4	5
0014	W3T158545	Guide pin	2
0015	W3T169065	O-ring d 6.07 x 1.78	10
0018	W3T161484	Spring d 21.3	1
0019	W3T172724	O-ring d 20.22 x 3.53	5
0020	W3T169068	O-ring d 13.94 x 2.62	10
0021	W3T169073	O-ring d 21.89 x 2.62	5
0022	W2T503995	Special grease BARRIERTA L25DL, 9 gr	1
0024	W3T172720	O-ring d 28.17 x 3.53	5
0025	W3T172721	O-ring d 32.92 x 3.53	5
0026	W3T171695	Diaphragm	5
0027	W3T171257	Injector nozzle No.140 antisiphon	1
0028	W2T507600	Tailway 'F'	1

6.7 Necessary tools



Note

The specified positions refer to the chapter drawings.

- Screw driver
 - Size PH2 for screw pos. 23
 - Size PH3 for screw pos. 21
- Allen key size 5 mm for pos. 45
- Open end wrench
 - Size 14 mm for pos. 36
 - Size 32 mm for pos. 41
- Socket wrench size 39 mm for pos. 18
- Strap wrench
 - For vacuum demand valve S10k pos. 10
 - For injector $\frac{3}{4}$ pos. 15
- Mounting tool W3T162490 for seat pos. 32
- Disassembly tool W3T162491 for seat pos. 32

6.8 Service Notes

6.8.1 Servicing the main components

Servicing the S10k Gas Feeder system consists of cleaning the main components to remove deposits that hinder their efficiency.



Warning!

Risk of severe personal injury or equipment damage!
Except when detecting leaks or making calibration adjustments, to avoid possible severe personal injury or equipment damage, the system **MUST** be shutdown as detailed in Section 5.2.2 before breaking any connections.

6.8.2 Cleaning the flowmeter

If a milky white, powdery white, green slimy or brown oily deposit is visible inside the flowmeter tube or if the float has particles clinging to it or tends to stick to the tube wall at lower feedrates, clean the flowmeter.

Do not drop the glass tube or float.

Have a clean cup (such as a coffee cup or small beaker) and a pair of tweezers at hand before starting.

Proceed as described in the following steps.

- 1 Shut down the gas feed system, evacuate all gas and release any pressure in the discharge line (see Section 5.2.2).
- 2 Insert the curved edge of an open wrench or similar into the slot in the flowmeter jackscrew and remove the jackscrew by turning it in a counter clockwise direction. Carefully remove the flowmeter tube from its housing. Take care not to lose the end stops, the float and the gaskets.
- 3 Place the end stops and float into the cup mentioned above.
- 4 Many gas contaminants are soluble in water and can be flushed out under running warm water (45 to 50° C).
Submerge the tube for about 30 seconds; hold the tube (half full with water) capping the ends and shake vigorously end-wise for a few seconds. Discharge the water and repeat until clean. Use a common pipe cleaner to scrub the interior. A detergent will promote cleaning action.



Warning!

Do not use hydrocarbons or alcohol because residual solvent may react with gas. Solvents can produce serious physiological effects unless used in strictest compliance with the solvent manufacturer's

safety recommendations.

- 5 Drain and let dry. Do not use a pipe cleaner for drying because the lint from it will stick to the tube interior. Place the tube at an angle between a horizontal and vertical surface (as between a shelf and a wall) with both ends open so that air can flow through. Do not blow through the tube as moisture from the breath will condense on the tube walls.
- 6 To clean the float, pour about an inch of warm to hot water (55 to 65° C) into the cup containing the float. Grasp the float with tweezers and shake it from side to side for a few seconds while keeping it submerged. Release the float. Repeat the action several times so that all surfaces are washed. Hold the float with the tweezers, discard the wash water and repeat the above. A few drops of detergent will improve the process. Do not hold the float with your fingers.
- 7 Allow the float to dry on a clean surface and then, with tweezers place it in a clean dry cup.



Note

Do not attempt to dry the float with a piece of rag or with paper towel as electro static forces will make lint and other particles stick to the float.

- 8 Clean the float stops with water as necessary. These may be handled with the fingers. Dry thoroughly before reassembly.
- 9 When the tube, float and float stops are clean and dry, reassemble the flowmeter as described in Section 4.3.1.

6.8.3 Cleaning the V-notch plug

The same contaminants seen in the flowmeter are in the gas stream flowing through the V-notch orifice and may also be deposited at this point. When the flowmeter is cleaned, clean the V-notch plug at the same time. If at any time float movement is not proportional to V-notch plug adjustment (a sudden marked rise or drop for a small amount of plug adjustment), the V-notch plug needs cleaning.

- 1 Shut down the gas feed system, evacuate all gas and release any pressure in the discharge line (see Section 5.2.2).
- 2 On manually controlled flowmeters remove the V-notch assembly completely from the flowmeter housing.
- 3 Using running water or a cup full of water and a small, stiff brush (such as a tooth brush) scrub out the V-notch groove and the shank of the plug. Do not use a knife, scraper or file to clean out the groove. Dissolving action and scrubbing are all that are required.
- 4 Dry the plug with a clean cloth or paper towel and refit to unit.

6.8.4 Cleaning the injector

Water containing carbonates, manganese or iron will frequently leave a deposit in injector tailways. As this deposit increases in thickness it can become scaly or rough and adversely affect pressure recovery or increase back pressure so that the injector fails to develop adequate operating vacuum. If the upstream strainer becomes corroded or perforated and passes a small pebble or other material, such particles can partially obstruct the throat and prevent adequate flow. Water containing suspended silt or sand particles can erode the opening in the throat. As the opening becomes larger, the velocity developed is reduced and the vacuum decreases.

Deposits may be removed by immersing the throat in dilute (10%) hydrochloric acid, known commercially as muriatic acid.



Warning!

Danger due to hydrochloric acid!

Hydrochloric acid is corrosive. Observe all safety precautions recommended by the acid manufacturer/supplier.

The injector should develop a dynamic vacuum of at least 540 negative mbar at the maximum flowmeter indicated feedrate. Lower gas feed rates tend to be higher for the same hydraulic conditions. With the gas supply shut off the static vacuum should be 840 to 940 negative mbar.

If the gas feeder fails to operate, inadequate vacuum is the most common reason and the injector is the first place to check. Proceed as described in Troubleshooting.



Note

Removing the O-rings: Pick with a needle and pull the O-ring out, don't damage the tightening surfaces! Apply some acid-free grease (silicon grease W3T165077) to the new O-rings and to the threads.

6.8.5 Injector W3T171369 (3/4")

The position numbers refer to the drawing W3T171369.

- 1 Put the chlorinator out of service, remove all the chlorine gas out of the tubing.
- 2 Drain the operation water tubes.
- 3 Remove gas tubes from the injector. Remove operation water tubes as far as necessary for removing tailway and nozzle from the injector.
- 4 Screw out tailway and nozzle.
- 5 Replace O-rings.
- 6 Screw out inlet screw (1), remove valve stem (4), replace O-ring (3) and spring (12).
Every two years replace the valve stem (4)
- 7 Unscrew union nut (15), if necessary use a strap wrench.
On this injector the thread of the union nut and the corresponding thread on the body must not be greased. Remove existing grease with alcohol.
- 8 Remove upper body (5).
- 9 Replace valve stem with ball head (13). Pay attention not to damage the ball head!
- 10 Remove diaphragm assembly (6, 9, 10)
- 11 Unscrew clamping nut (10) from the valve seat (6), replace diaphragm (9), O-rings (7 and 14) and spring (11).
Replace the valve seat (6).
Assemble (10, 6, 9, 7, 14, and 11), tighten slightly with tongs
- 12 Replace O-ring (8)
- 13 Place spring (11) on the clamping nut (10) and place together with the diaphragm assembly (6, 7, 9, 10, 14) into the body (16).
- 14 Place upper body (5) and union nut (15). Tighten slightly.
- 15 Turn upper body (5) with the gas inlet to the desired direction, lock and tighten the union nut.
- 16 Place the valve stem with spring (4 with 3 and 12), place O-ring (2) and screw the inlet screw (1) in.
- 17 Screw in the nozzle (black with number) and tailway (white with letter), pay attention for the flow direction!
- 18 Connect operation water lines.
- 19 Replace the O-ring (19) in the gas inlet.
Connect the gas line.
- 20 Check for tightness and function.

6.8.6 Injector W3T171370 (3/4")

The position numbers refer to the drawing W3T171370.

- 1 Put the chlorinator out of service, remove all the chlorine gas out of the tubing.
- 2 Drain the operation water tubes.
- 3 Proceed with actions described in 6.8.5. Injector U-96275 up to 12. incl.
- 4 Unscrew lower union nut (15), if necessary use a strap wrench.
- 5 Remove bottom cover (20) and spring (21).
- 6 Pull out diaphragm assembly with guide pins (16), if necessary press equally on both pins from the opposite side.
- 7 Replace O-rings (17)
- 8 Unscrew lower clamping nut (10) from the disk (22).
- 9 Replace diaphragms (9, 2x) and O-ring (7)
- 10 Assemble diaphragms with O-ring, disk and clamping nut. Every 5 years or when worn out or stiffly replace the pins (16).
- 11 Replace O-ring (8, between 20 and 23).
- 12 Place spring (11) on the clamping nut (10) and place together with the diaphragm assembly (6, 7, 9, 10, 14) into the body (23).
- 13 Place upper body (5) and union nut (15). Tighten slightly.
- 14 Turn upper body (5) with the gas inlet to the desired direction, lock and tighten the union nut by hand..
- 15 Place the valve stem with spring (4 with 3 and 12), place O-ring (2) and screw the inlet screw (1) in.
- 16 Place diaphragm assembly (9, 10, 7) with disk (22) and pins (16) into the body.
- 17 Place spring (21) and bottom cover (20) and screw on lower union nut (15) by hand.
- 18 Screw in the nozzle (black with number) and tailway (white with letter), pay attention for the flow direction!
- 19 Connect operation water lines
- 20 Replace the O-ring (25) in the gas inlet.
Connect the gas line
- 21 Check for tightness and function.

6.8.7 Injector W3T171367 (1")

The position numbers refer to the drawing W3T171367.

- 1 Put the chlorinator out of service, remove all the chlorine gas out of the tubing.
- 2 Drain the operation water tubes.
- 3 Remove gas tubes from the injector. Remove operation water tubes as far as necessary for removing the tailway from the injector. Screw out the tailway (marked with a letter)
- 4 Replace both O-rings. If necessary, screw away the die from the tip of the tailway and tighten again.
- 5 Loosen the 6 bolts (width 13 mm, Pos. 15), take away the cover (13) and put aside, the bolts still in the holes.
- 6 Remove diaphragm (11) with clamping nut (10, 7, 6) and spring (9).
- 7 Unscrew the clamping nut (10) from the valve seat (6).
- 8 Replace the diaphragm (11), spring (9) and the O-rings (5 and 7). Every two years replace the valve seat (6), every 5 years replace the clamping nut (10).
- 9 Assemble diaphragm, valve seat and clamping nut, place spring. Put aside on a clean cloth.
- 10 Replace O-ring (12)
- 11 Replace valve stem with ball head (16) and O-ring (7). Pay attention not to damage the ball head!
- 12 Place the diaphragm assembly with spring over the bolts (15) of the cover and press down to the body (3), turn the gas inlet to the desired direction and make the bolt holes fit. Insert the bolts and tighten equally (6 Nm).
- 13 Turn out the plug (17), replace the O-ring (18).
- 14 Take out the valve stem (21), replace spring (19) and O-ring (20), every 2 years replace also stem (21).
- 15 Turn out plug (22) with large screw driver. Replace O-ring (8).
- 16 Press out valve seat (1), replace together with O-ring (2). Press in new seat with O-ring to the stop using a round rod or plastic tube $\varnothing 16$ mm with even front, pay attention that the cone is on the side of plug (17).
- 17 Place the stem (21) into the plug (17) and screw the plug in. Check the stem for free movement.
- 18 Screw in the plug (22) with O-ring (8).
- 19 Replace the O-ring (27) in the gas inlet.
- 20 Screw in the tailway and connect to the operation water tube. Connect the gas line.
- 21 Check for tightness and function.

6.8.8 Antisyphon-injector W3T171368 (1")

The position numbers refer to the drawing W3T171368.

- 1 Put the chlorinator out of service, remove all the chlorine gas out of the tubing.
- 2 Drain the operation water tubes.
- 3 Proceed with actions described in 6.8.7 Injector W3T171367 up to 12. incl.
- 4 Screw out the clamping nut (17) with the parts connected.
- 5 Remove the valve stem (21), replace the O-ring (20).
- 6 Replace the valve stem (21) every 2 years.
- 7 Remove the securing clip (47).
- 8 Remove the clamping screw (17) and spring (43).
- 9 Remove the clamping disc (44) and replace O-ring (18)
- 10 Replace diaphragm assembly (41, 46, 40, 42, 45).
Assemble with clamping screw (17) and spring (43) and secure with clip (47).
- 11 Remove plug (22), replace O-ring (8).
- 12 Press out valve seat (1) using a round rod, replace together with O-ring (2).
Press in new seat with O-ring to the stop using a round rod or plastic tube Ø16 mm with even front, pay attention that the cone is on the side of plug (17).
- 13 Place the stem (21) into the valve stem guide (42) and screw in the clamping screw (17) with assembled parts.
- 14 Screw in plug (22).
- 15 Replace the O-ring (27) in the gas inlet.
- 16 Screw in the tailway and connect to the operation water tubing.
Connect the gas line.
- 17 Check for tightness and function.

6.8.9 Cleaning the vacuum demand valve

Every year clean the vacuum demand valve. The standard and automatic switchover units are both cleaned in the same manner.



Warning!

Risk of severe personal injury or equipment damage!
Shut the gas supply container valve; evacuate all gas from the system and release any pressure in the solution discharge line as detailed in Section 5.2.2. After assembly, check the system for leaks.



Warning!

Danger due to chlorine gas/condensate!
Any vertical section of the vent tube may contain chlorine gas/condensate. Pinch the vent tube at its lowest point and then disconnect it from the demand valve.
Remove and plug the open end. If necessary clear the vent tube by blowing through it using an inert gas, or allow tube to drain/vent into room under controlled conditions.

Refer to the drawing in chapter 7.3

- 1 Loosen the union nut and disconnect the vacuum tubing from the demand valve outlet. Plug the tube with a rubber stopper to prevent the entrance of air and moisture while the demand valve is being cleaned.
- 2 Loosen the yoke screw and remove the entire vacuum demand valve to a location where the work is to be done. Cap the gas supply container valve outlet while not in use.
- 3 Remove inlet nipple (36). Pay attention not to loosen the valve body (47), e.g. clamp in a vise.
- 4 Remove retainer (45) (5 mm key).
- 5 Remove the spring (34) and stem (33) and hold them under warm running water to soften and flush away any deposits. Dry thoroughly.
- 6 Clean the housing (47) with a towel or cotton stick.
- 7 Remove the seat (32), refer to next page.
- 8 Thoroughly dry all parts, reassemble as soon as possible:
Clamp the valve housing (47) with the inlet on top.
Carefully place the stem (33) (needle in front) into the seat (32).
Place the spring (34).
Place the retainer (45) and screw to the stop.

German version:

Mount the new filter (40), filter holder (39) and ring (125)

Mount the nipple (36) by using a new teflon tape (turn the tape

1½ turns around the nipple).

Tighten the conical thread with a 13 mm fork wrench, without extension.

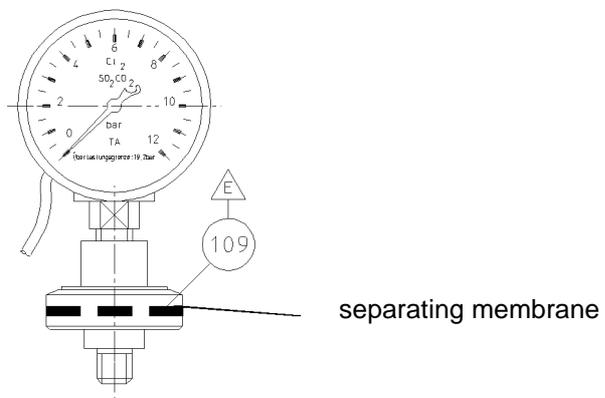
French version:

Mount the new filter (40) and filter holder (39).



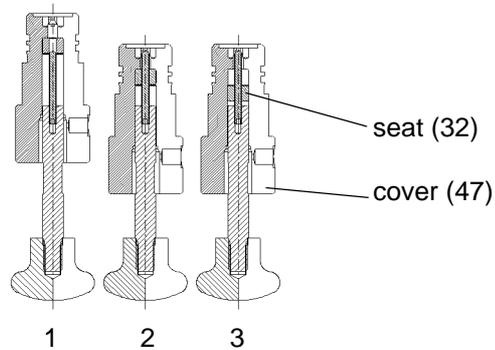
Caution!

The pressure gauge (108, 109) includes a separating membrane. Do not damage this membrane. A gas leak could arise.



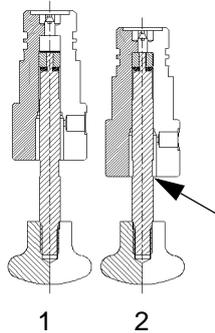
Remove the seat pos. 32

- 1 Enter the disassembly tool (W3T162491) into the valve housing (47).
- 2 Screw the thread of the tool into the seat (32).
- 3 Continue to turn the tool and pull it out of the housing:



Mount the seat pos. 32:

- 1 Place the seat onto the mounting tool (W3T162491) and push it into the housing (47).
- 2 The seat is in place when the mark (indicated here by the arrow) is even with the housing.



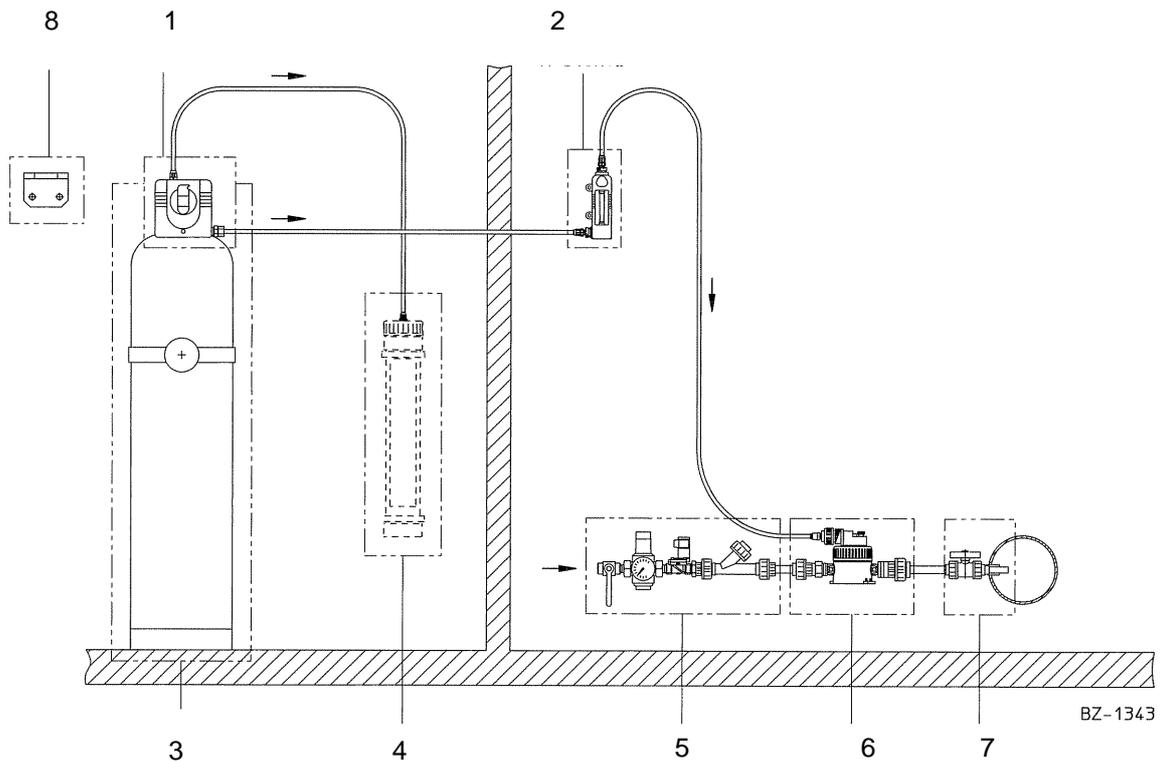
7. Drawings

7.1 Typical installations

The gas monitoring system is not displayed.

7.1.1 Basic installation for Cl₂ or SO₂

Gas supply by one gas cylinder



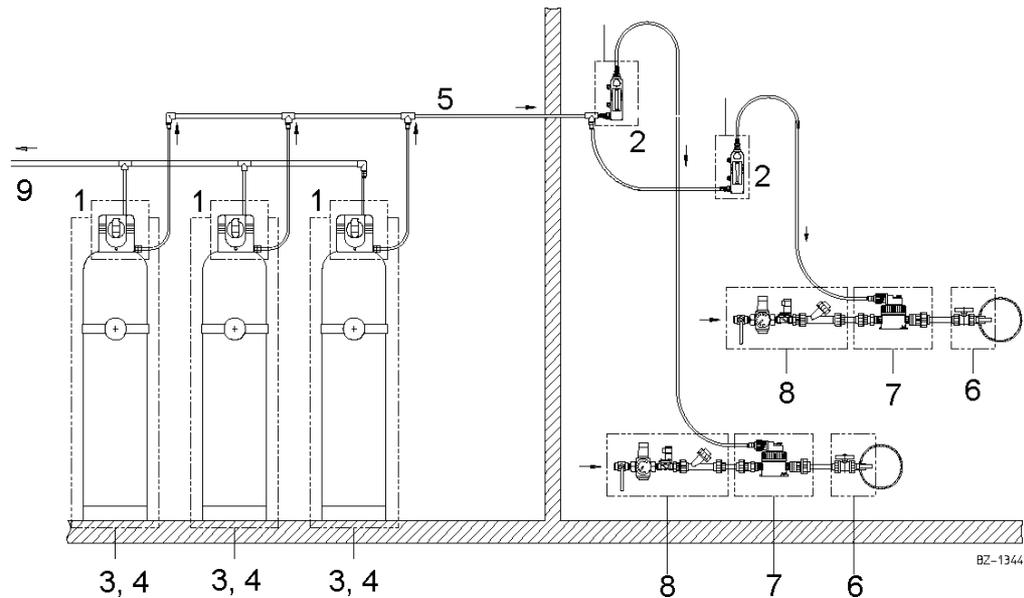
BZ-1343

- 1 Vacuum demand valve
- 2 Flowmeter assembly
- 3 Chlorine gas cylinder (or SO₂ gas cylinder) with bracket
- 4 Activated carbon filter (recommended for chlorine gas) or filter W3T159424
- 5 Operating water supply
- 6 Injector
- 7 Point of application
- 8 Support for the vacuum demand valve

7.1.2 Installation with remote vacuum manifold

for Cl₂ or SO₂

Supply by two or more gas cylinders



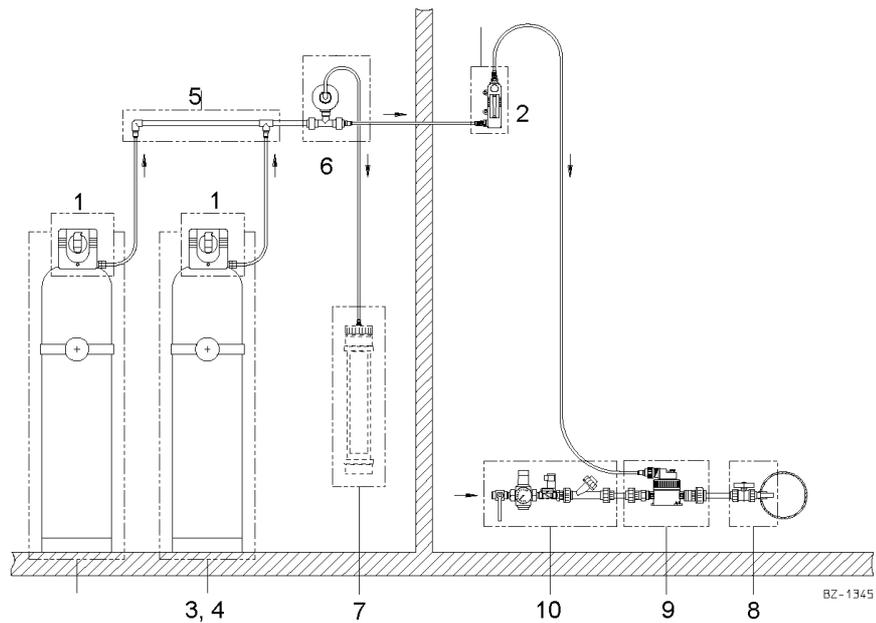
- | | |
|---|---|
| 1 | Switch-over vacuum demand valve |
| 2 | Flowmeter assembly |
| 3 | Chlorine gas cylinder (or SO ₂ gas cylinder) |
| 4 | Bracket |
| 5 | Vacuum gas manifold |
| 6 | Point of application |
| 7 | Injector |
| 8 | Operating water supply |
| 9 | Vent line with activated carbon filter or filter |
- Support for the vacuum demand valve refer to 7.1.1

7.1.3 Installation with switch-over function

for Cl₂ or SO₂

gas supply by 2 gas cylinders (alternating)

Vent line with separate relief valve

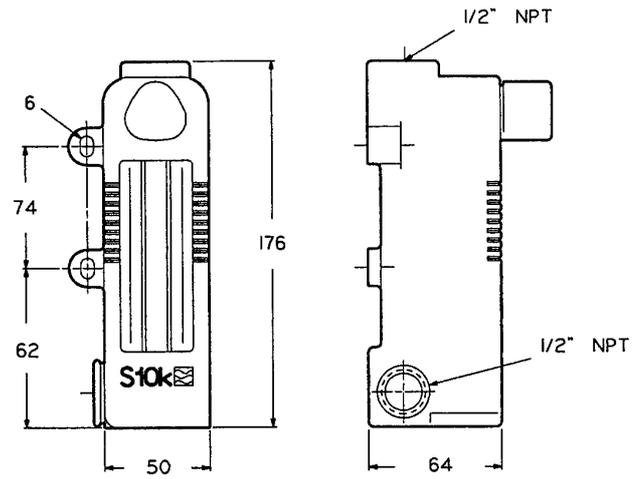


- | | |
|----|--|
| 1 | Switch-over vacuum demand valve |
| 2 | Flowmeter assembly |
| 3 | Chlorine gas cylinder (or SO ₂ gas cylinder) |
| 4 | Bracket |
| 5 | Vacuum gas manifold |
| 6 | Relief valve |
| 7 | Activated carbon filter (recommended for chlorine gas) or filter P-47803 |
| 8 | Point of application |
| 9 | Injector |
| 10 | Operating water supply |
| | Support for the vacuum demand valve refer to 7.1.1 |

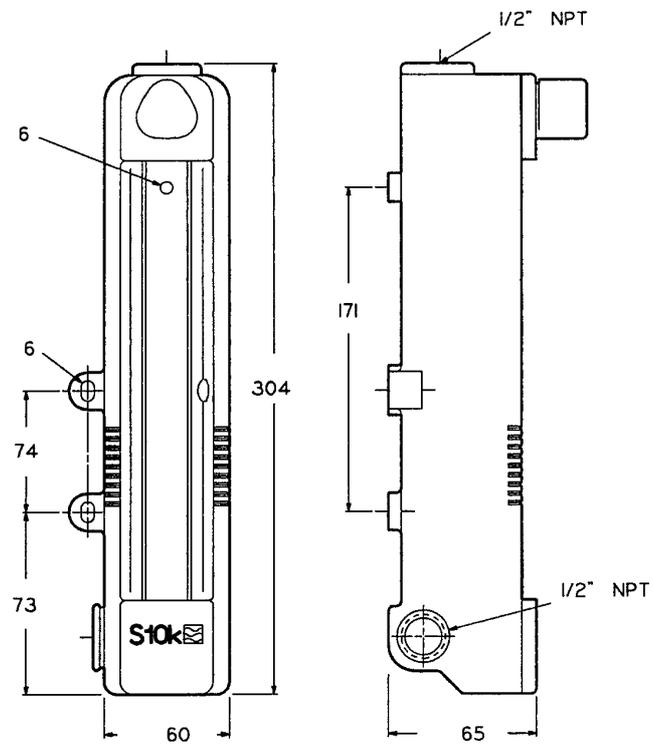
7.2 Mounting drawings

7.2.1 Mounting of flowmeter assembly

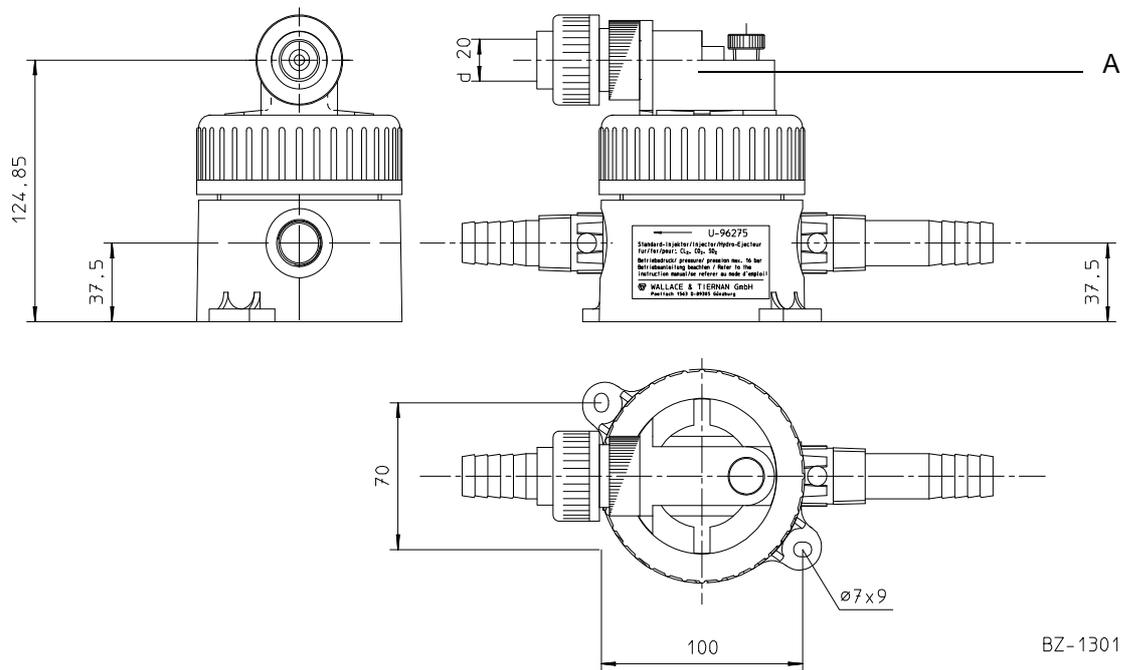
3" version



5" version



7.2.2 Mounting of injector 3/4" W3T171369



A Gas inlet can be turned in 45° steps



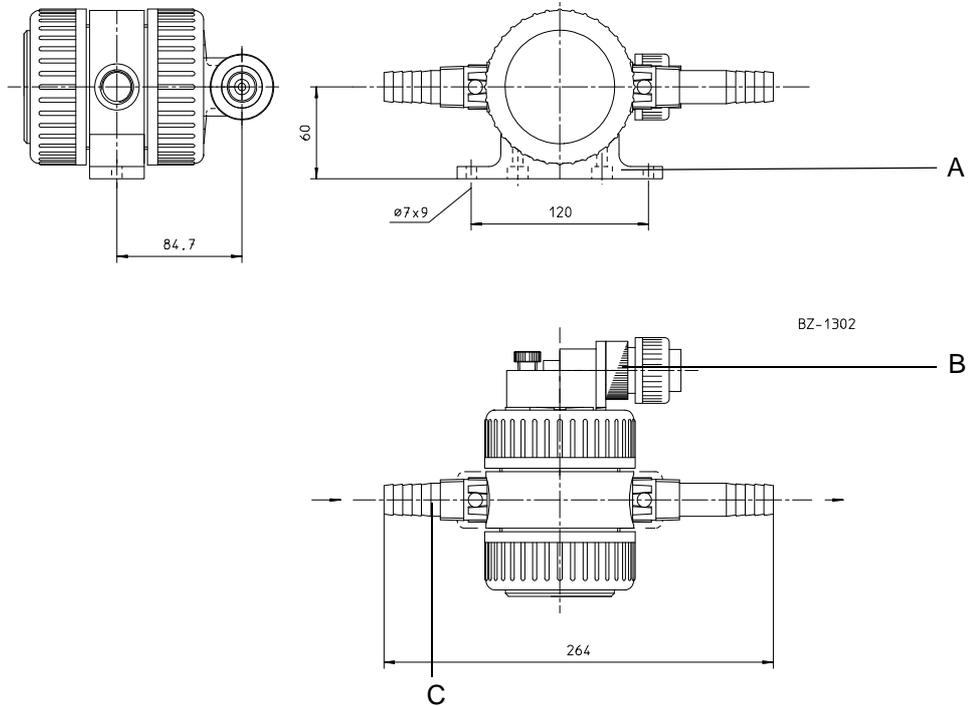
Please note

Install the injector vertically (direction of flow upward!) or horizontally. Do not install hanging overhead!

Nozzle and tailway for injector W3T171369

Nozzle		Tailway	
99	W3T161564	D	W2T507599
140	W3T173060	E	W2T507618
193	W3T173078	F	W2T507600
242	W3T173080	G	W2T507601
70	W3T172990	H	W2T507602
120	W2T507210	J	W2T507603
165	W3T173070	S	W3T173099
		C	W2T507614

7.2.3 Mounting of antisyphon injector 3/4" W3T171370



- A Console (W3T161479), screws (2x W2T504542)
(not included in W3T171370)
- B Gas inlet can be turned in 45° steps
- C Nozzle with cross-hole!



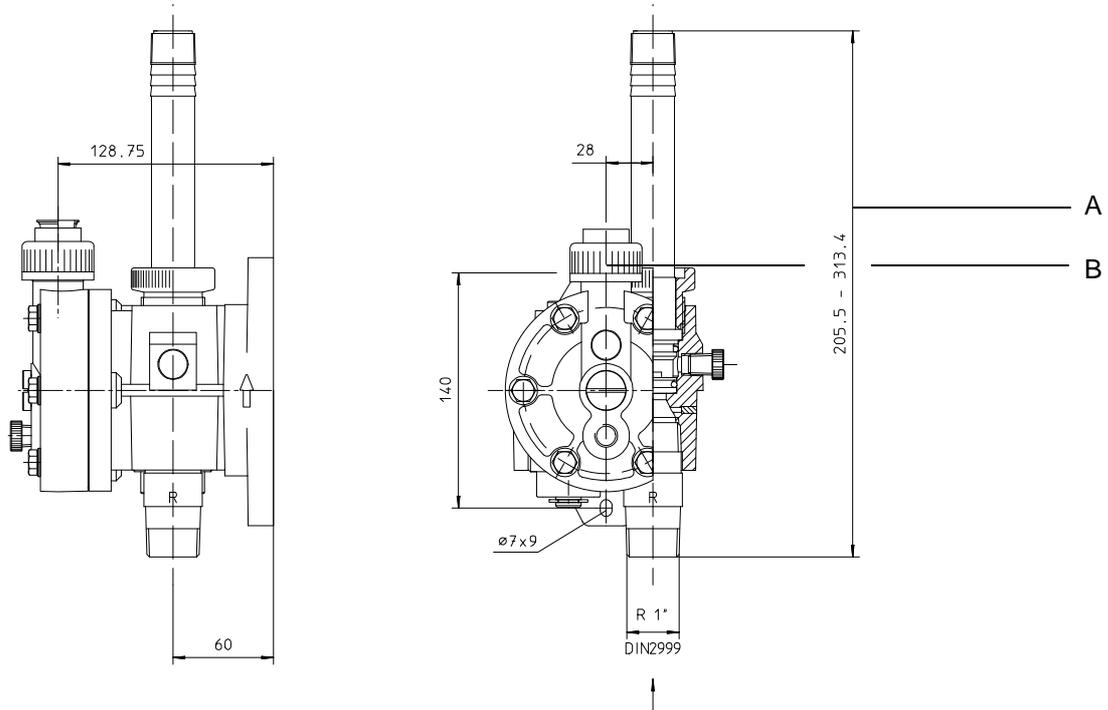
Please note

Install the injector vertically (direction of flow upward!) or horizontally. Do not install hanging overhead!

Nozzle and tailway for injector W3T171370

Nozzle		Tailway	
99	W3T171246	D	W2T507599
140	W3T171257	F	W2T507600
193	W3T171271	G	W2T507601
242	W3T171273	H	W2T507602
		J	W2T507603
		S	W3T173099

7.2.4 Mounting of injector 1" W3T171367 / W3T171368



A Total length depending on tailway
 B Gas inlet can be turned in 60° steps



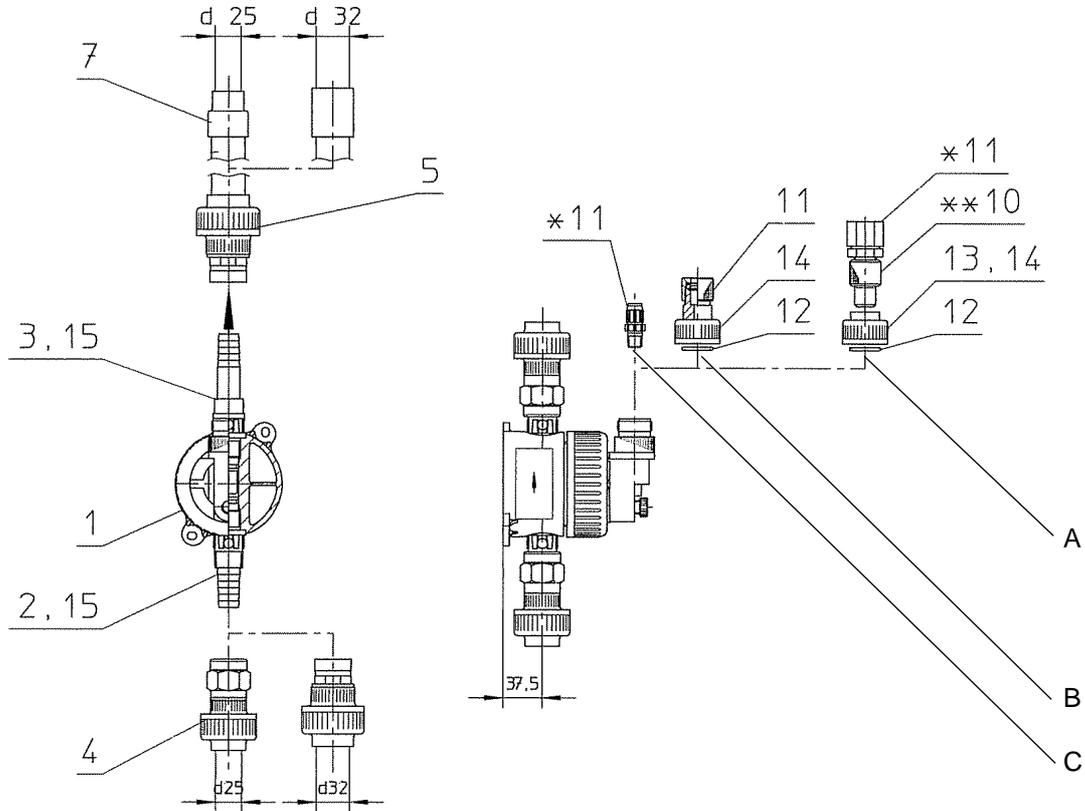
Please note

Install the injector vertically (direction of flow upward!) or horizontally. Do not install hanging overhead!

Throat and tailway for injector W3T171367 and W3T171368

Throat		Tailway	
99	W2T506230	C	W2T507414
120	W2T506088	D	W3T165389
140	W2T506089	E	W2T507415
165	W2T506090	F	W2T507416
193	W2T506091	G	W2T507417
242	W2T506092	H	W2T507418
312	W2T506093	J	W2T507419
70	W2T506229	K	W2T507420
		L	W2T507421
		B	W3T165342

7.2.5 Injector 3/4" with accessories (N.101.A)



A for hose ID 6.35 x 1.6 (W2T505671).

B for hose ID 9.5 x 1.6 (W2T505672).

C for hose ID 12 x 2 (W2T505677).

Pos. 4 and 5 tightened with teflon tape.

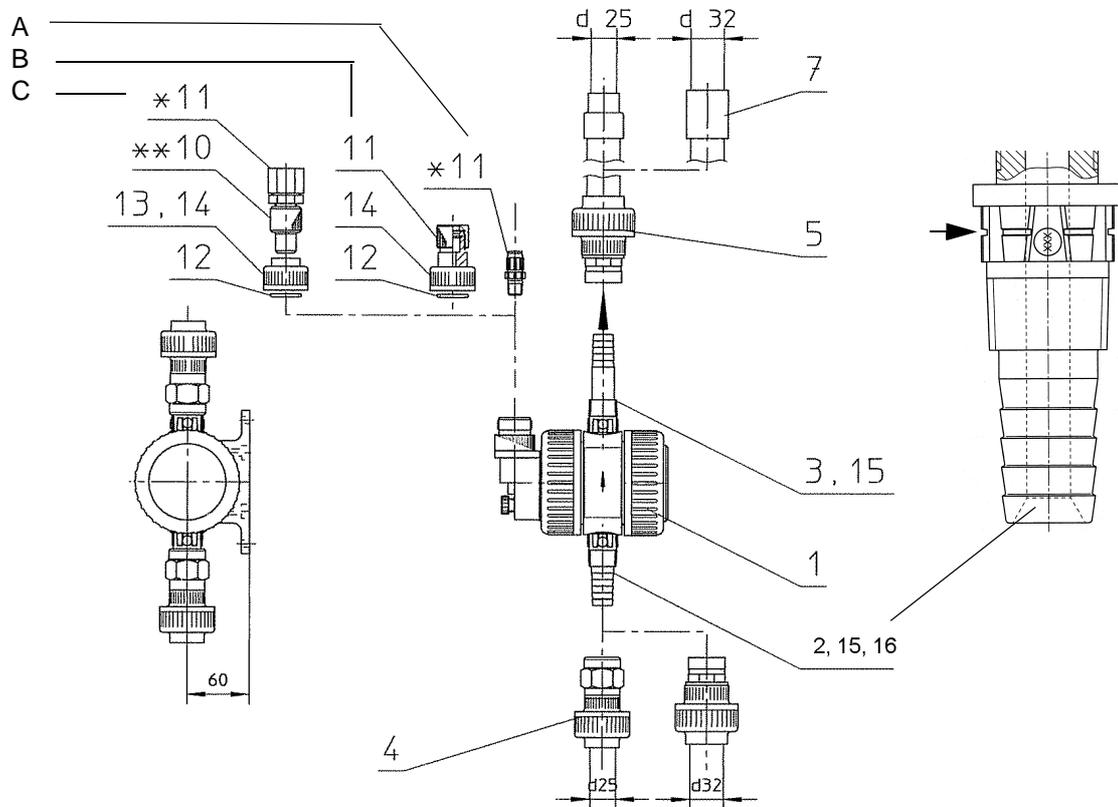
* tightened with silicone grease (W3T165077).

** cemented (PVC)

Injector 3/4" with accessory

Pos	Part no.	Description	Qty.	
1	W3T171369	Injector 3/4" PVC-U	1	each
2		Nozzle	1	each
3		Tailway	1	each
4	W3T167396	Adaptor union incl. O-ring W3T172721	1	each
	W3T163750	Adaptor union incl. O-ring W3T172720	1	each
5	W3T163705	Adaptor union incl. O-ring W3T172721	1	each
7	W2T505599	Reduction	1	each
	W2T507634	Socket	1	each
	W2T505442	Reduction	1	each
	W2T505599	Reduction	1	each
10	W3T167194	Reduction nipple	1	each
11	W3T171372	Connector	1	each
	W3T161698	Connector	1	each
	W3T171353	Connector	1	each
12	W3T172724	O-ring	1	each
13	W2T507291	Union end	1	each
14	W2T506920	Union end	1	each
15	W3T169068	O-ring	2	each
20	W3T171383	Fixing set	1	each

7.2.6 Anti-syphon-injector 3/4" with accessory



A for hose ID 6.35 x 1.6 (W2T505671).

B for hose ID 9.5 x 1.6 (W2T505672).

C for hose ID 12 x 2 (W2T505677).

Pos. 4 and 5 tightened with teflon tape.

* tightened with silicone grease (W3T165077).

** cemented (PVC)



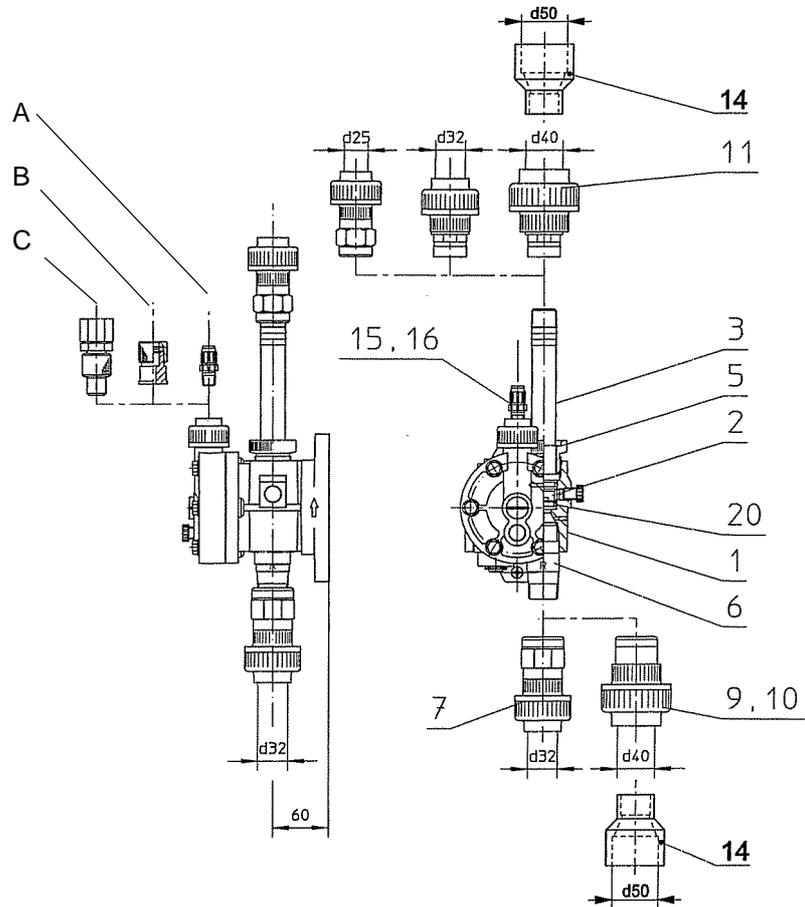
Please note

Pos. 2: Only use nozzle with groove (see arrow)!

Anti-Syphon-Injector 3/4" with accessory

Pos	Part no.	Description	Qty.	
1	W3T171370	Injector 3/4" PVC-U	1	each
2		Nozzle	1	each
3		Tailway	1	each
4	W3T167396	Adaptor union incl. O-ring W3T172721	DN 25-R 3/4" d32.92 x 3.52	1 each
	W3T163750	Adaptor union incl. O-ring W3T172720	DN 20-R 3/4" d28.17 x 3.52	1 each
5	W3T163705	Adaptor union incl. O-ring W3T172721	DN25-R 3/4" d28.17 x 3.52	1 each
7	W2T505599	Reduction	d32+40-20+25	1 each
	W2T507634	Socket	PVC-U;d32	1 each
	W2T505442	Reduction	d32+40-25+32	1 each
	W2T505599	Reduction	d32+40-20+25	1 each
10	W3T167194	Adaptor nipple	PVC, 1/2"NPTxDN15	1 each
11	W3T171372	Connector	for hose 3/8 x 1/2"	1 each
	W3T161698	Connector	1/2-14NPT	1 each
	W3T171353	Connector	for hose D3/8" d1/4"	1 each
12	W3T172724	O-ring	d20.22 x 3.53/FPM	1 each
13	W2T507291	Union end	PVC-U; d20	1 each
14	W2T506920	Union end	PVC-U; d20	1 each
15	W3T169068	O-ring	d13.94 x 2.62/FPM	1 each
16	W3T169073	O-ring	d21.89 x 2.62/FPM	1 each
20	W3T163692	Console		1 each

7.2.7 Injector 1" with accessory



A for hose ID 6.35 x 1.6 (W2T505671).

B for hose ID 9.5 x 1.6 (W2T505672).

C for hose ID 12 x 2 (W2T505677).

Pos. 6, 7, 9, 10, 11 tightened with teflon tape.

Pos. 15, 16 tightened with silicone grease (W3T165077).

Pos. 14 supplied loose

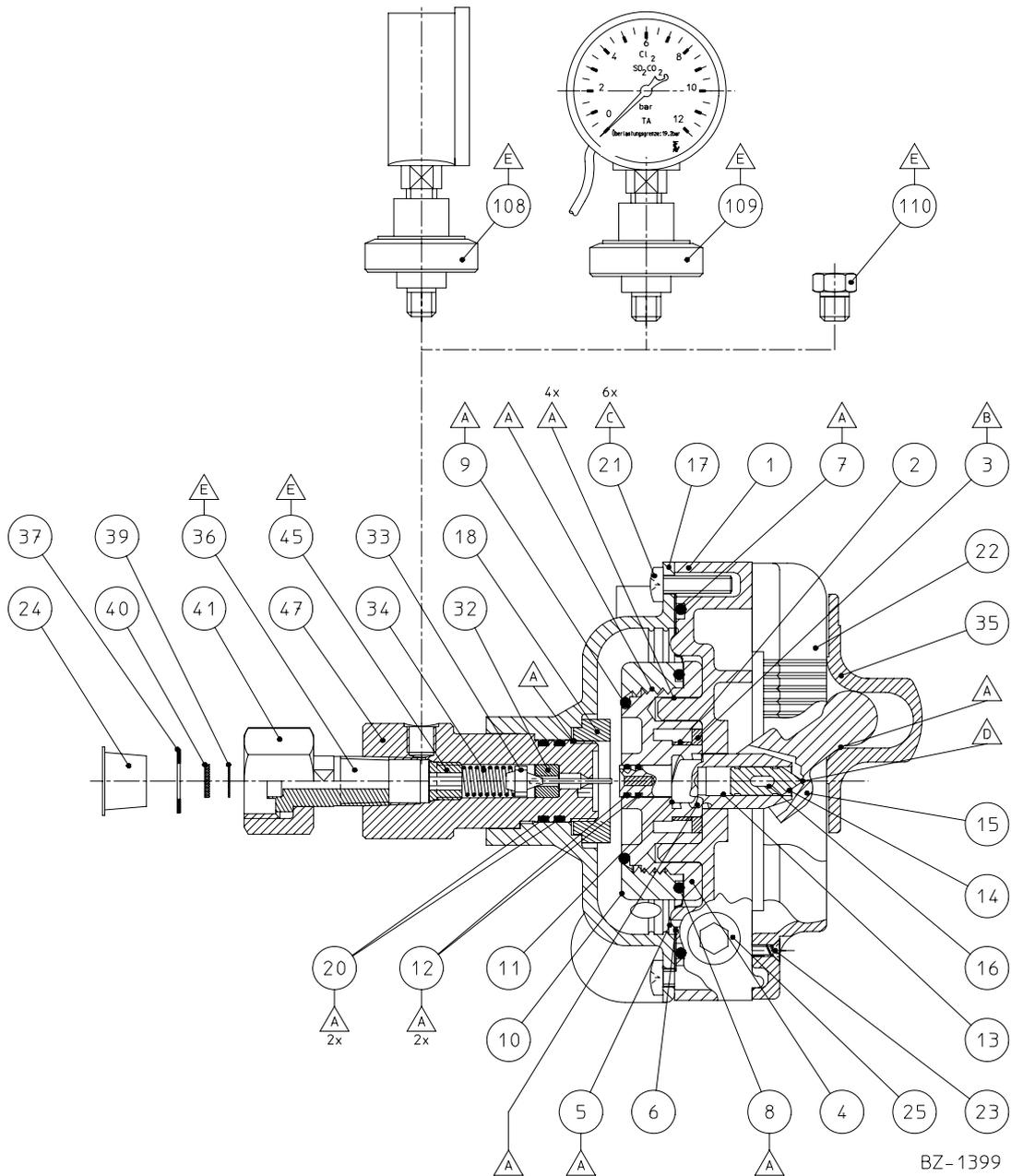
Injector 1" with accessory

Pos	Part no.	Description	Qty.	
1	W3T171367	Injector 1" PVC/PTFE/FPM	1	each
	W3T171368	Anti-syphon injector 1" PVC/PTFE/FPM	1	each
2		Injector throat	1	each
3		Tailway	1	each
5	W3T170897	Clamping screw PVC	1	each
6	W3T159484	Adaptor nipple PVC;R1"x1"NPT;80lg.	1	each
7	W3T163793	Adaptor union incl. O-ring W3T172721 DN 25-R 1 d32.92 x 3.53	1	each
8	W2T506782	Reducing bush PVC; d32-25	1	each
9	W2T505893	Reducing bush PVC-U; d40-Rp1	1	each
10	W2T504882	Union incl. O-ring W2T507049 PVC-U; d40 d40.64 x 5.33	1	each
11	W2T505689	Reducing bush PVC-U; d32-Rp3/4	1	each
	W3T163749	Adaptor union incl. O-ring W3T172720 DN 20-R 3/4 d28.17 x 3.53	1	each
	W3T167396	Adaptor union incl. O-ring W3T172721 DN25-R 3/4" d32.92 x 3.53	1	each
	W2T505689	Reducing bush PVC-U; d32-Rp3/4	1	each
12	W2T506786	Reduktion kurz PVC; d40-32	1	each
13	W2T504882	Union incl. O-ring W2T507049 PVC-U; d40; d40.64 x 5.33	1	each
14	W2T505446	Reducing bush d50+63-32+40	1	each
15	W3T167194	Reducing bush PVC, 1/2"NPT x DN 15	1	each
	W3T172961	Threaded socket 1/4-18NPT; d20; PVC	1	each
16	W3T161698	Clamping union 1/2-14NPT;	1	each
	W3T171353	Clamping union for hose D3/8" d1/4"	1	each
	W3T171372	Clamping union for hose 3/8 x 1/2"	1	each
20	W3T163614	Set of O-rings CSM	1	each
25	W3T171383	Fixing set	1	each

7.3 Spare parts of the chlorinator

7.3.1 S10k Vacuum demand valve

Connection to a french gas cylinder for Cl₂ and SO₂



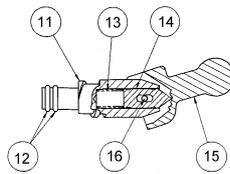
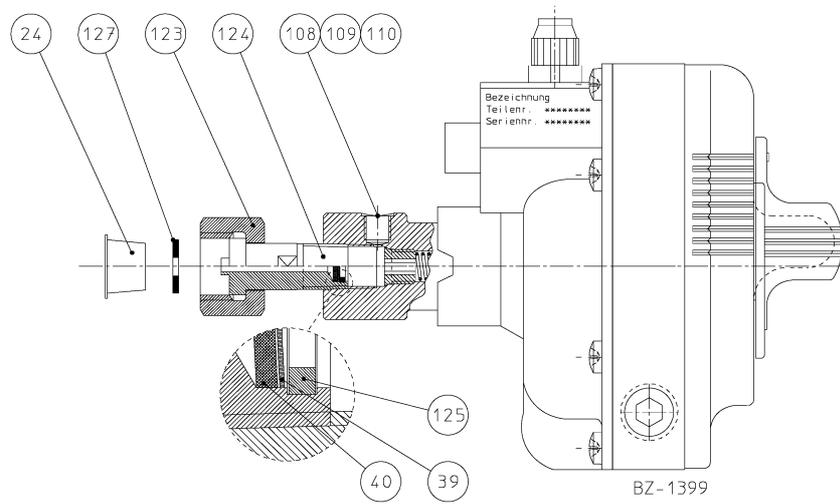
A, D: Before assembly: Slightly grease with special grease W3T165077

B: cemented

C: Tighten with 2 Nm

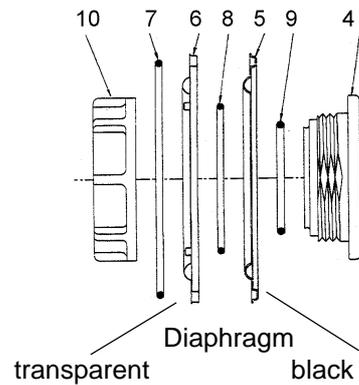
E: Sealed with teflon tape

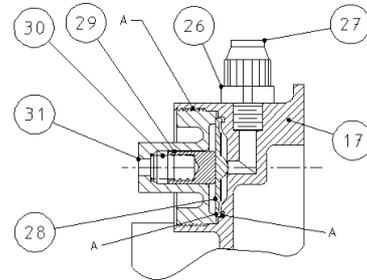
Connection to a german gas cylinder for Cl₂ and SO₂



Grease the moving parts with W3T165077

Detail





Built-in relief valve

A Grease the thread slightly with special grease W3T165077

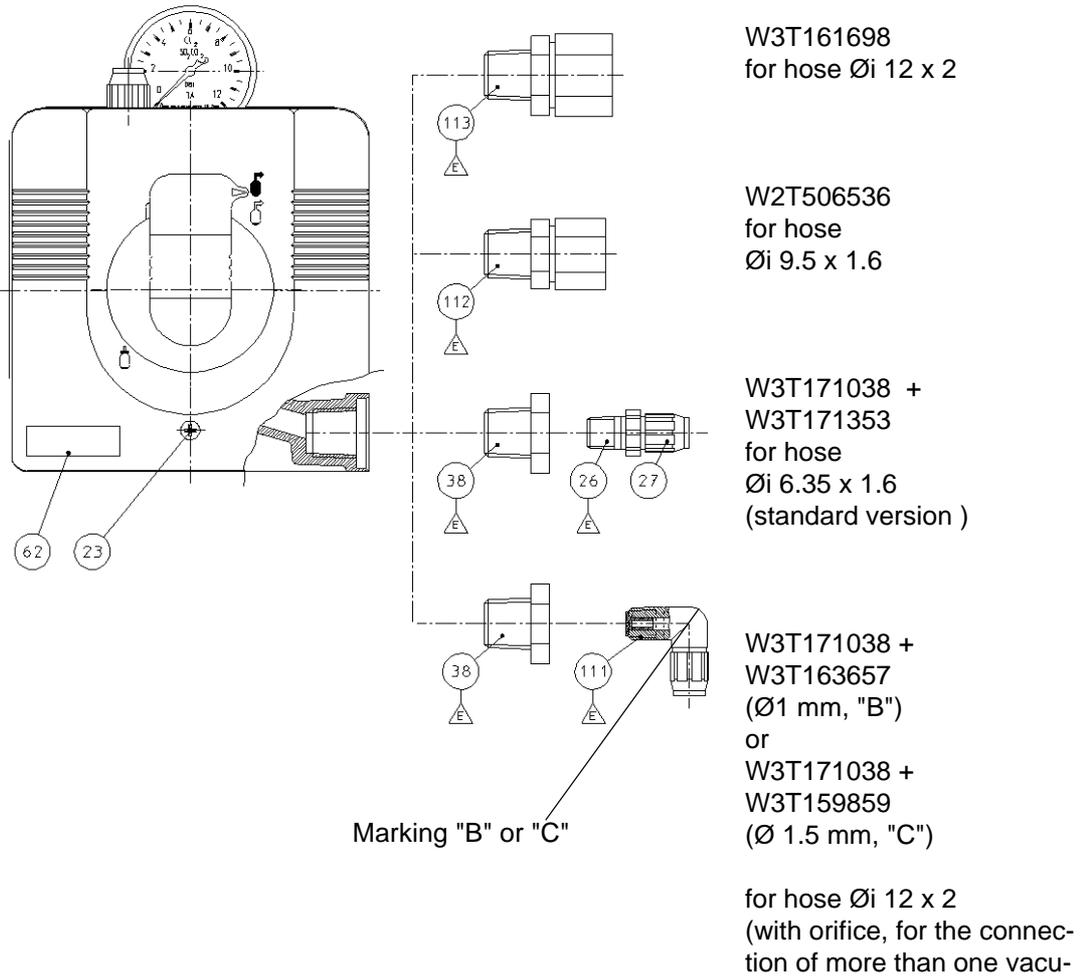
Pos	Part no.	Description	Qty.	
1	W3T172594	Housing	1	each
2+3 +4	W3T164186	Plate incl. spring and ring, pre-assembled	1	each
5	W3T160334	Operating diaphragm, black (2y, 5y)	1	each
6	W3T161119	Backing diaphragm, transp. (2y, 5y)	1	each
7	W3T161109	O-ring (1y, 2y, 5y)	1	each
8	W3T161340	O-ring (2y, 5y)	1	each
9	W3T161105	O-ring (2y, 5y)	1	each
10	W3T172603	Nut, backing plate	1	each
11	W3T167991	Shaft. operating	1	each
12	W3T161120	O-ring (1y, 2y, 5y)	2	each
13	W3T172779	Spring	1	each
14	W3T167953	Pawl, operating lever	1	each
15	W3T172587	Operating lever (2)	1	each
	W3T172591	Operating lever (1)		
16	W3T167933	Pin	1	each
17	W3T167952	Housing, back	1	each
18	W3T167951	Nut	1	each
20	W3T172592	O-ring (1y, 2y, 5y)	2	each
21	W2T505592	Screw	6	each
22	W3T172590	Cover, front (2)	1	each
	W3T172586	Cover, front (1)		
23	W2T506127	Screw (1y)	1	each

Pos	Part no.	Description	Qty.	
24	W3T161278	Cap	1	each
25	W3T160383	Plug	1	each
26	W3T172759	Union	2	each
27	W3T169111	Union nut	2	each
28	W3T167992	Diaphragm (2y, 5y)	1	each
29	W2T507678	Spring cup	1	each
30	W3T161098	Spring (5y)	1	each
31	W3T172596	Plug, safety valve	1	each
32	W3T171794	Seat (1y, 5y)	1	each
33	W3T160740	Stem (5y)	1	each
34	W3T160881	Spring (1y, 5y)	1	each
35	W3T172602	Knob	1	each
36	W3T169942	Nipple (8)	1	each
37	W3T172027	Gasket (to be replaced when changing the gas cylinder)	1	each
38	W3T171038	Plug	1	each
39	W3T167913	Filter holder (1y, 5y)	1	each
		for gas cylinders to DIN 477: replace annually		
40	W3T167914	Filter (1y, 2y, 5y)	1	each
		for gas cylinders to DIN 477: replace annually		
41	W3T163338	Union nut (3)	1	each
42	W3T164210	Warning label	1	each
43	W3T164211	Warning label	1	each
45	W3T169940	Retainer	1	each
47	W3T169939	Valve housing	1	each
108	W3T169366	Pressure gauge (optional) (9)	1	each
109	W3T167038	Contact pressure gauge (optional) (9)	1	each
110	W3T160740	Plug (7, 9)	1	each
111	W3T163657	Elbow (optional) with orifice Ø1 mm ("B")	1	each
	W3T159859	Elbow (optional) with orifice Ø1,5 mm ("C")		
112	W2T506536	Union	1	each

Pos	Part no.	Description	Qty.	
113	W3T161698	Union	1	each
123	W3T170947	Union nut (3)	1	each
124	W3T158534	Nipple (3)	1	each
125	W3T158535	Ring (3)	1	each
127	W3T165271	Gasket (3) (replace when changing the gas cylinder)	1	each
		Heating (optional, not shown):		
	W3T160348	Heating element	1	each
	W2T506383	Temperature switch	1	each
	W3T169364	Plug with cable	1	each

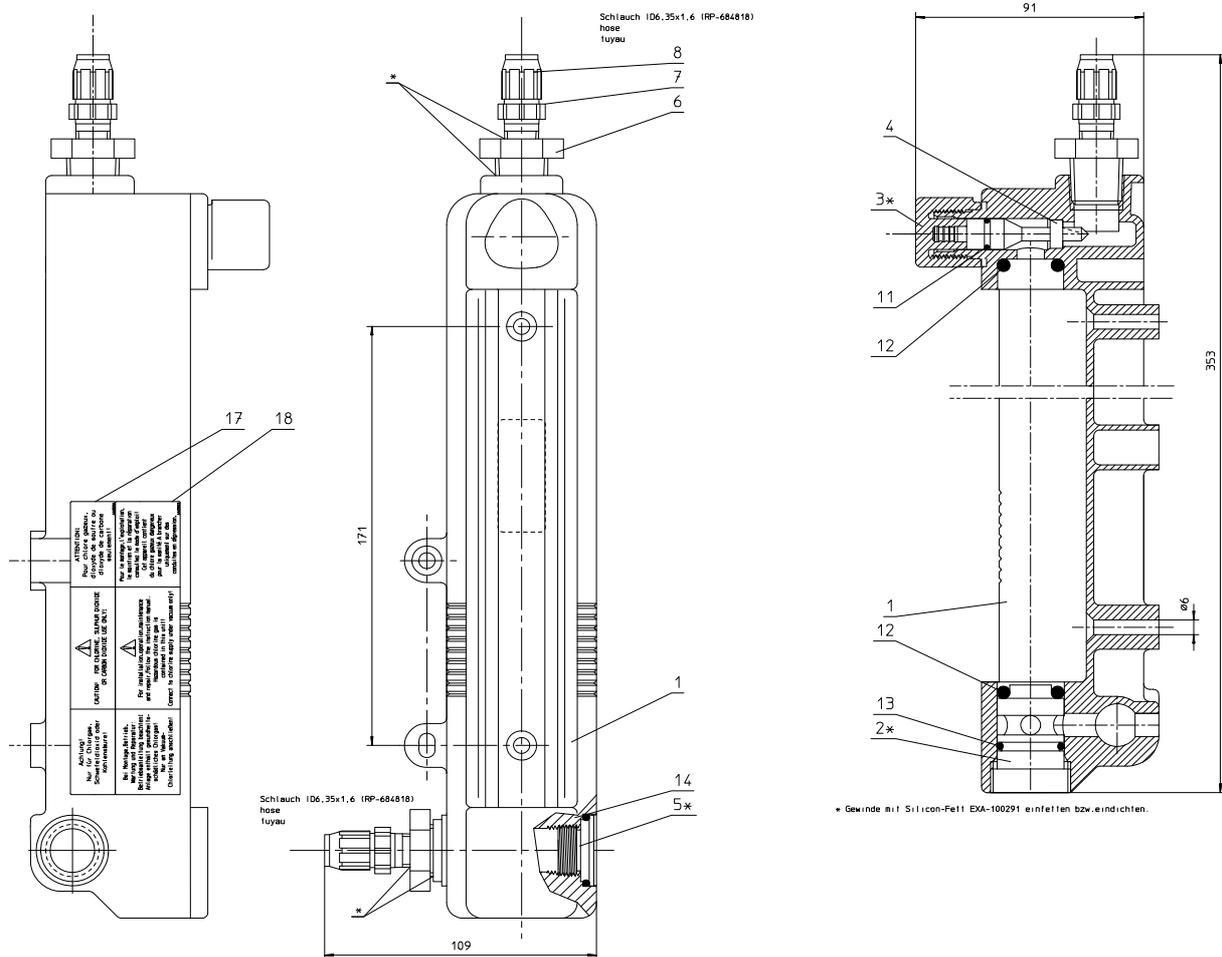
- (1) for vacuum demand valves without switch-over function only
- (2) for vacuum demand valves with switch-over function only
- (3) for connection to chlorine or SO₂ gas cylinders to DIN 477
- (5) for connection to SO₂ gas cylinders
- (7) only without pressure gauge
- (8) torque 35-40 Nm
- (9) torque 20-25 Nm
(position of the pressure gauge must be reached at 25 Nm)
- (1y) replace annually
- (2y) replace every 2 years
- (5y) replace every 5 years

7.3.2 Hose connections



E: Sealed with Teflon tape

7.3.3 Flowmeter assembly 5" (W3T162278)



* Grease the thread slightly with special grease W3T165077

Pos	Part no.	Description	Qty.	
1	W3T165007	Housing	1	each
2	W3T165008	Jack-screw-glass	1	each
3	W3T164997	Knob	1	each
4	W3T163300	Orifice	1	each
5	W3T164999	Plug	1	each
6	W3T171038	Reducing bush	2	each
7	W3T169110	Union nipple	2	each
8	W3T169111	Union nut	2	each
11	W3T169197	O-ring	1	each
12	W3T168911	O-ring	2	each
13	W3T165449	O-ring	1	each

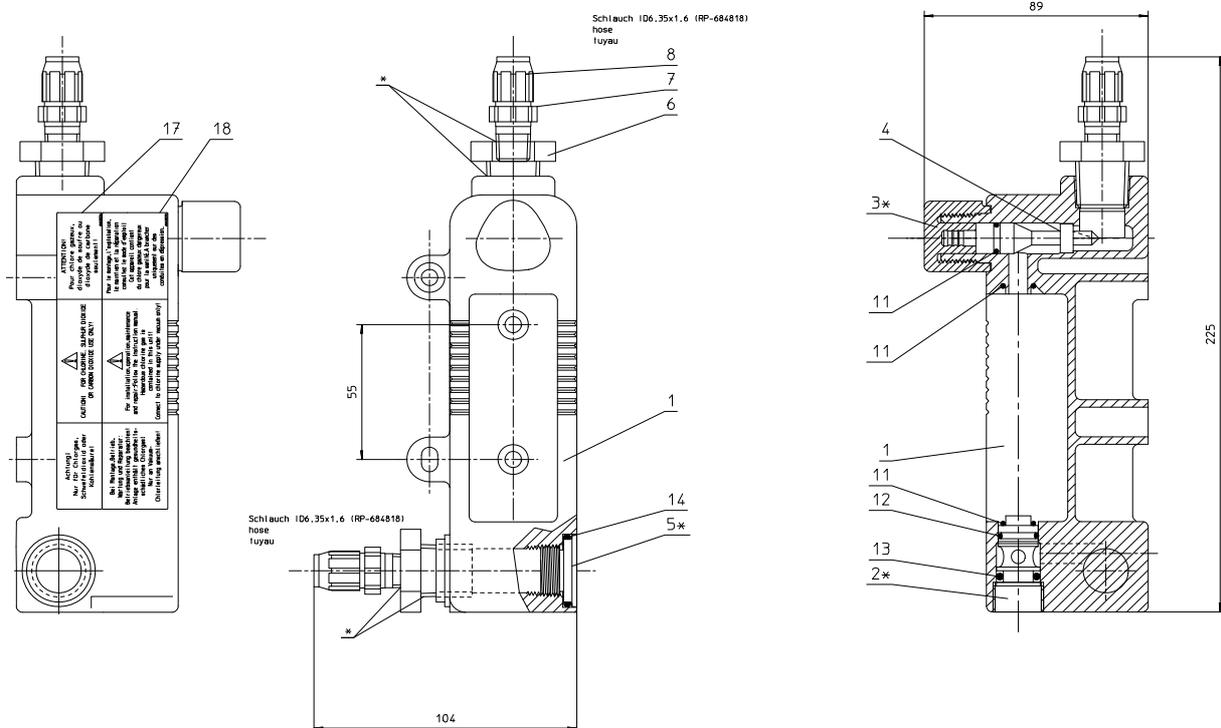
Pos	Part no.	Description	Qty.	
14	W3T165188	O-ring	1	each
17	W3T164211	Warning label	1	each
18	W3T164210	Warning label	1	each
	W3T163768	Fixing set	1	set

Flowmeter 5"

Cl ₂		CO ₂		SO ₂	
Measuring range	Part no.	Measuring range	Part no.	Measuring range	Part no.
5-25 g/h	W3T173096				
3-60 g/h	W3T165334	2.4-48 g/h	W3T164192	3.0 - 60 g/h	W3T171714
10 - 200 g/h	W3T165357	8.0-160 g/h	W3T164193	10 - 200 g/h	W3T171715
20 - 400 g/h	W3T165381	16-320 g/h	W3T164194	20 - 400 g/h	W3T171716
30 - 600 g/h	W3T165402	24 - 480 g/h	W3T164195	30 - 600 g/h	W3T171717
50 - 1000 g/h	W3T165418	40 - 800 g/h	W3T164196	50 - 1000 g/h	W3T171718
75 - 1500 g/h	W3T165433	60 - 1200 g/h	W3T164197	75 - 1500 g/h	W3T171719
100 - 2000 g/h	W3T165444	80 - 1600 g/h	W3T164198	0.1 - 2.0 kg/h	W3T171720
0.15 - 3 kg/h	W3T165459	0.12 - 2.4 kg/h	W3T164199	0.15 - 3.0 kg/h	W3T171721
0.20 - 4 kg/h	W3T165462	0.16 - 3.2 kg/h	W3T171696	0.20 - 4.0 kg/h	W3T171722
0.25 - 5 kg/h	W3T165470	0.20 - 4.0 kg/h	W3T171697	0.25 - 5.0 kg/h	W3T171723
0.3 - 6 kg/h	W3T165476	0.24 - 4.8 kg/h	W3T171698	0.3 - 6.0 kg/h	W3T171724
0.4 - 8 kg/h	W3T165480	0.32 - 6.4 kg/h	W3T171699	0.4 - 8.0 kg/h	W3T171726
0.5 - 10 kg/h	W3T165484	0.4 - 8.0 kg/h	W3T171700	0.5 - 10.0 kg/h	W3T171725

including flowmeter glass, float and stops

7.3.4 Flowmeter assembly 3" W3T166029



* slightly grease and tighten the thread with special grease
W3T165077

Pos	Part no.	Description	Qty.	
1	W3T165010	Housing	1	each
2	W3T165016	Jack-screw-glass	1	each
3	W3T164997	Knob	1	each
4	W3T163300	Orifice	1	each
5	W3T164999	Plug	1	each
6	W3T171038	Reducing bush	2	each
7	W3T169110	Union nipple	2	each
8	W3T169111	Union nut	2	each
11	W3T169197	O-ring	3	each
12	W3T165448	O-ring	1	each
13	W3T161107	O-ring	1	each
14	W3T165188	O-ring	1	each
17	W3T164211	Warning label	1	each
18	W3T164210	Warning label	1	each
	W3T163768	Fixing set	1	set

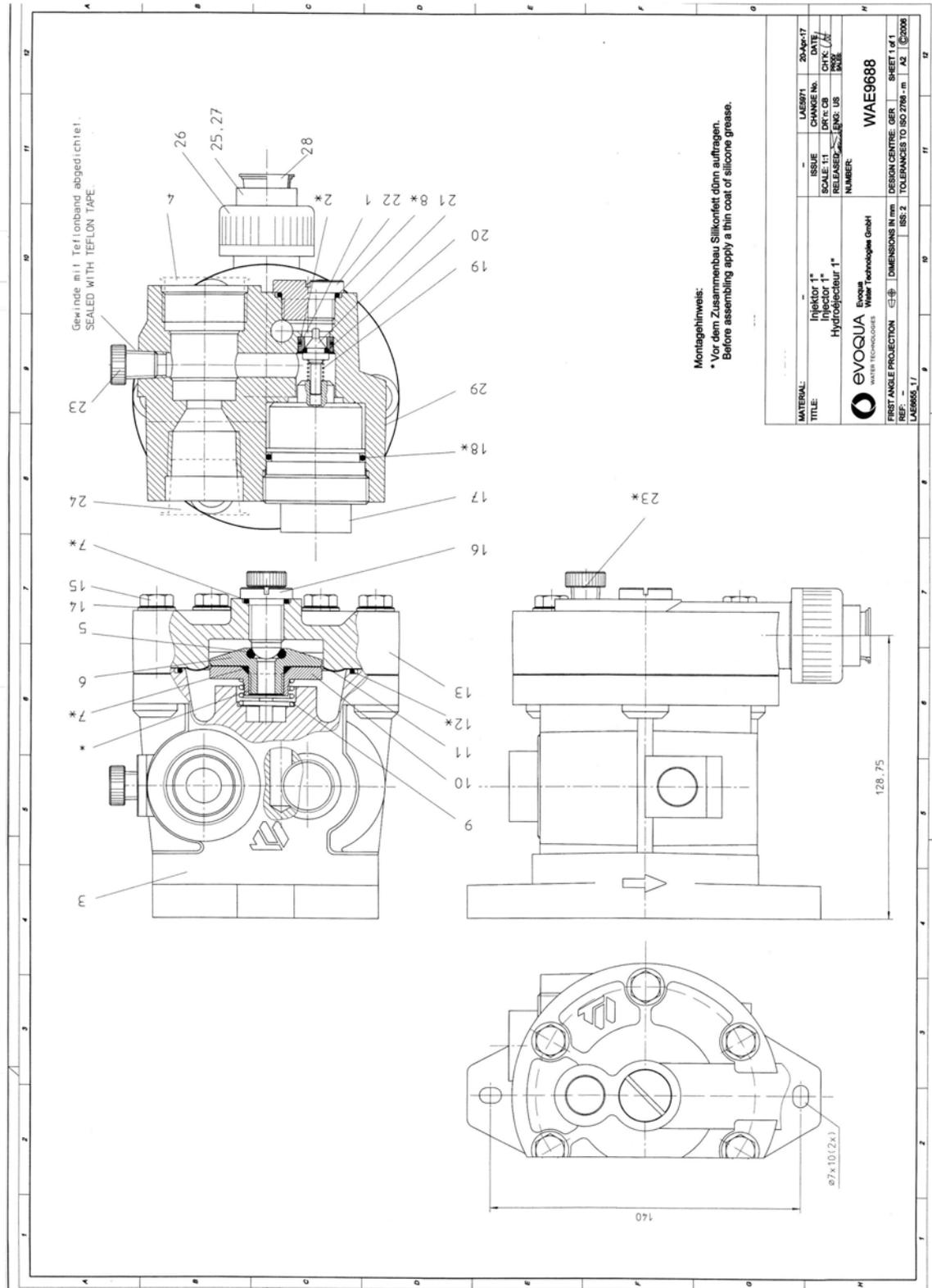
Flowmeter 3"

Cl ₂		CO ₂		SO ₂	
Measuring range	Part no.	Measuring range	Part no.	Measuring range	Part no.
1 - 10 g/h	W3T161985	1.0 - 20 g/h		1.2 - 24 g/h	W3T171731
2 - 25 g/h	W3T161773	2.4 - 48 g/h		3.0 - 60 g/h	
3 - 60 g/h	W3T171738	8.0 - 160 g/h		10 - 200 g/h	
5 - 100 g/h	W3T161838	16 - 320 g/h	W3T171727	20 - 400 g/h	
10 - 200 g/h	W3T171739	24 - 480 g/h	W3T171728	30 - 600 g/h	
15 - 300 g/h	W3T161949	40 - 800 g/h		50 - 1000 g/h	
20 - 400 g/h	W3T171740	60 - 1200 g/h		75 - 1500 g/h	
25 - 500 g/h	W3T161877	80 - 1600 g/h	W3T171729	0.1 - 2.0 kg/h	
30 - 600 g/h	W3T171741	0.12 - 2.4 kg/h		0.15 - 3.0 kg/h	
50 - 1000 g/h	W3T161914	0.16 - 3.2 kg/h		0.2 - 4.0 kg/h	
75 - 1500 g/h	W3T171742				
0.1 - 2.0 kg/h	W3T161935				
0.15 - 3.0 kg/h	W3T161962				
0.2 - 4.0 kg/h	W3T161974				

including flowmeter glass, float and stops

7.4 Spare parts for the injectors

7.4.1 Injector W3T171367 (1")



Injector W3T171367 (1")

Pos	Part no.	Description	Qty.	
1	W3T159661	Seat PVC, 1" Injector	1	each
2	W3T161480	O-ring d13 x 2/FPM	1	each
3	W3T171124	Body PVC, 1"Injector	1	each
4	W3T161296	Plug GPN 610 U 28	1	each
5	W3T172921	O-ring d10 x 4/75FPM602	1	each
6	W3T170187	Seat PVC, 1" Injector	1	each
7	W3T172822	O-ring d15.54 x 2.62/FPM	2	each
8	W3T172899	O-ring d23.47 x 2.62/75FPM602	1	each
9	W3T161113	Spring TANTALOY 61.d24	1	each
10	W3T159663	Clamping nut PVC, M16 x 1.5 , 1" Injector	1	each
11	W3T172902	Diaphragm PTFE, 1" Injector	1	each
12	W3T168917	O-ring 75FPM602, \varnothing 75.87 x 2.62	1	each
13	W3T171119	Cover PVC, 1" Injector	1	each
14	W3T172900	Washer DIN 125 A, 8.4 mm, Monel	6	each
15	W3T172901	Screw DIN 931/M8 x 40/Monel	6	each
16	W3T159664	Valve stem PVC, 1" Injector	1	each
17	W3T159665	Plug PVC, 1" Injector	1	each
18	W3T168867	O-ring d40 x 3/FPM	1	each
19	W3T168914	Spring	1	each
20	W3T161434	O-ring d8 x 2/75FPM602	1	each
21	W3T159656	Valve stem PVC, 1" Injector	1	each
22	W3T159666	Plug PVC, 1" Injector	1	each
23	W3T168893	Plug PVC-U; 1/4-18NPTx21	2	each
24	W3T161279	Plug GPN 610 U 25	1	each
25	W2T507291	Union end PVC-U; d20	1	each
26	W2T506920	Union nut PVC-U; d20	1	each
27	W3T172724	O-ring d20.22 x 3.53/FPM	1	each
28	W3T161278	Plug GPN 610 U 18	1	each
29	W2T507548	Name plate	1	each

*) Silicone grease W3T165077; pos.23 sealed with teflon tape.

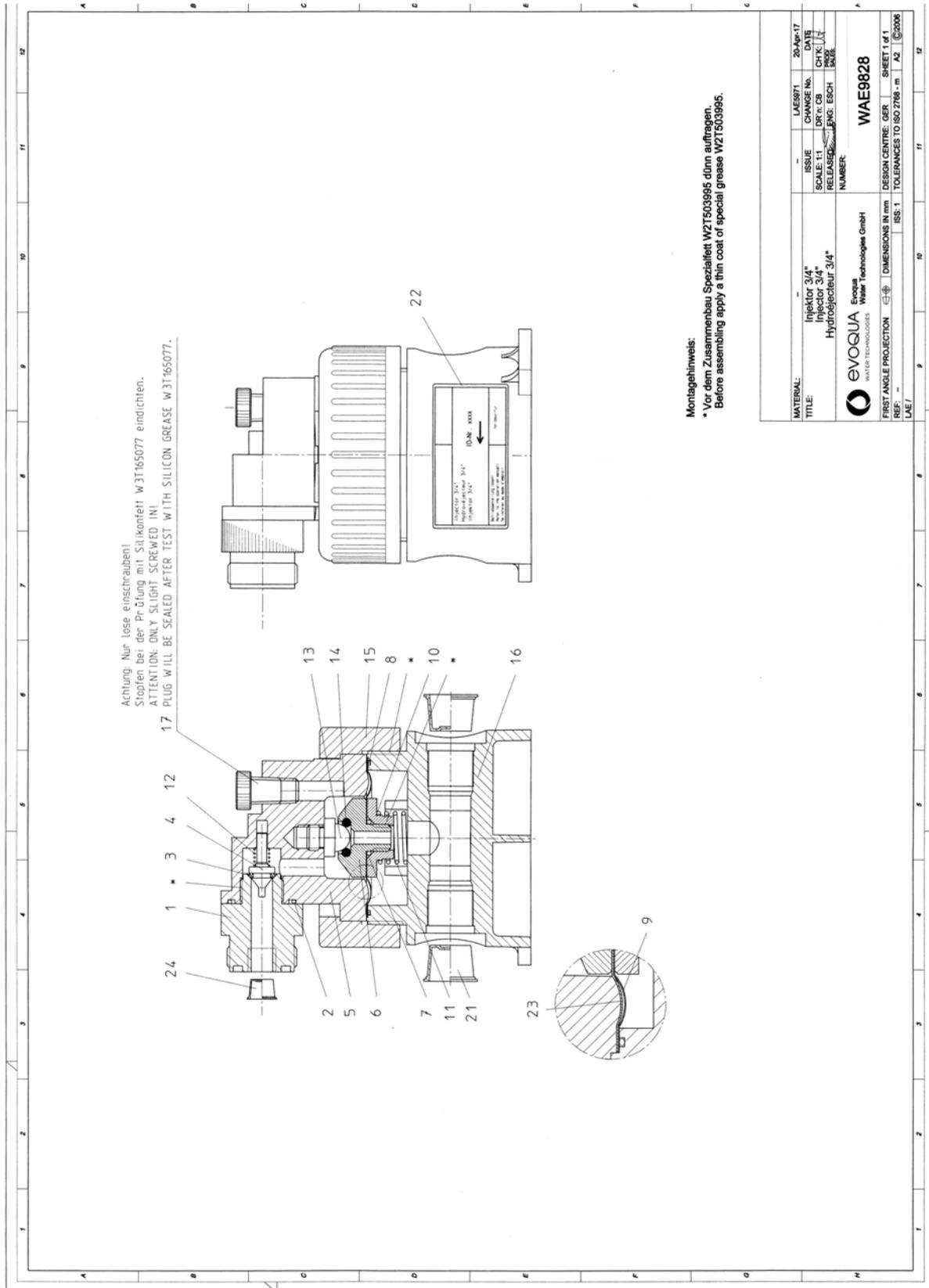
Injector W3T171368 (1")

Pos	Part no.	Description	Qty.	
1	W3T159661	Seat PVC, 1" Injector	1	each
2	W3T161480	O-ring d13 x 2/FPM	1	each
3	W3T171118	Body PVC, 1" Inj., Antisyph.	1	each
4	W3T161296	Plug GPN 610 U 28	1	each
5	W3T172921	O-ring d10 x 4/75FPM602	1	each
6	W3T170187	Seat PVC, 1" Injector	1	each
7	W3T172822	O-ring d15.54 x 2.62/FPM	2	each
8	W3T172899	O-ring d23.47 x 2.62/75FPM602	1	each
9	W3T161113	Spring TANTALOY 61, d24	1	each
10	W3T159663	Clamping nut PVC, M16 x 1.5 , 1" Injector	1	each
11	W3T172902	Diaphragm PTFE, 1" Injector	1	each
12	W3T168917	O-ring 75FPM602, \varnothing 75.87 x 2.62	1	each
13	W3T171119	Cover PVC, 1" Injector	1	each
14	W3T172900	Washer DIN 125 A, 8.4 mm, Monel	6	each
15	W3T172901	Screw DIN 931/M8 x 40/Monel	6	each
16	W3T159664	Valve stem PVC, 1" Injector	1	each
17	W3T159667	Clamping screw	1	each
18	W3T168867	O-ring d40 x 3/FPM	1	each
19	W3T168914	Spring	1	each
20	W3T161434	O-ring d8 x 2/75FPM602	1	each
21	W3T159656	Valve stem PVC, 1" Injector	1	each
22	W3T159666	Plug PVC, 1" Injector	1	each
23	W3T168893	Plug PVC-U; 1/4-18NPT x 21	2	each
24	W3T161279	Plug GPN 610 U 25	1	each
25	W2T507291	Union end PVC-U; d20	1	each
26	W2T506920	Union nut PVC-U; d20	1	each
27	W3T172724	O-ring d20.22 x 3.53/FPM	1	each
28	W3T161278	Plug GPN 610 U 18	1	each
29	W2T507548	Name plate	1	each
40	W3T159669	Collet	1	each
41	W3T159674	Diaphragm	2	each

Pos	Part no.	Description	Qty.	
42	W3T159670	Valve stem guide PVDF, 1" Injector	1	each
43	W3T172903	Spring d18.2, V2A	1	each
44	W3T159671	Clamping disk PVC, 1" Injector	1	each
45	W3T159672	Diaphragm holder PVDF, 1" Injector	1	each
46	W3T159668	Separator PVC, 1" Injector	1	each
47	W3T173063	Securing clip POM-s; d12	1	each

*) Silicone grease W3T165077
Pos. 23: sealed with teflon tape.

7.4.3 Injector W3T171369 (3/4")



Injector W3T171369 (3/4")

Pos	Part no.	Description	Qty.	
1	W3T159655	Inlet screw PVC, 3/4" Injector	1	each
2	W3T168861	O-ring d25 x 2.5/FPM	1	each
3	W3T161434	O-ring d8 x 2/75FPM602	1	each
4	W3T159656	Valve stem PVC, 1" Injector	1	each
5	W3T171120	Body PVC, 3/4" Injector	1	each
6	W3T158460	Valve seat PVC, UNF½"-20Gg	1	each
7	W3T169066	O-ring d12.37 x 2.62/FPM	1	each
8	W3T168988	O-ring d68 x 2/FPM	1	each
9	W3T161483	Diaphragm PTFE, 3/4" Injector	1	each
10	W3T158461	Clamping nut PVC, UNF½"-20Gg	1	each
11	W3T165194	Spring d = 1.6;Tantaloy 61	1	each
12	W3T168914	Spring	1	each
13	W3T159657	Valve stem PVC, 3/4" Injector	1	each
14	W3T172921	O-ring d10 x 4/75FPM602	1	each
15	W2T506923	Union nut PVC-U; d63	1	each
16	W3T159654	Body PVC, 3/4" Injector	1	each
17	W3T168893	Plug PVC-U; 1/4-18NPT x 21	1	each
21	W3T161278	Plug GPN 610 U 18	2	each
22	W2T507548	Name plate 68 x 35	1	each
23	W3T171695	Diaphragm d74.5 x d12,7/67FPM581	1	each
24	W3T161275	Plug GPN 610 U 7	1	each

*) Silicone grease W2T503995

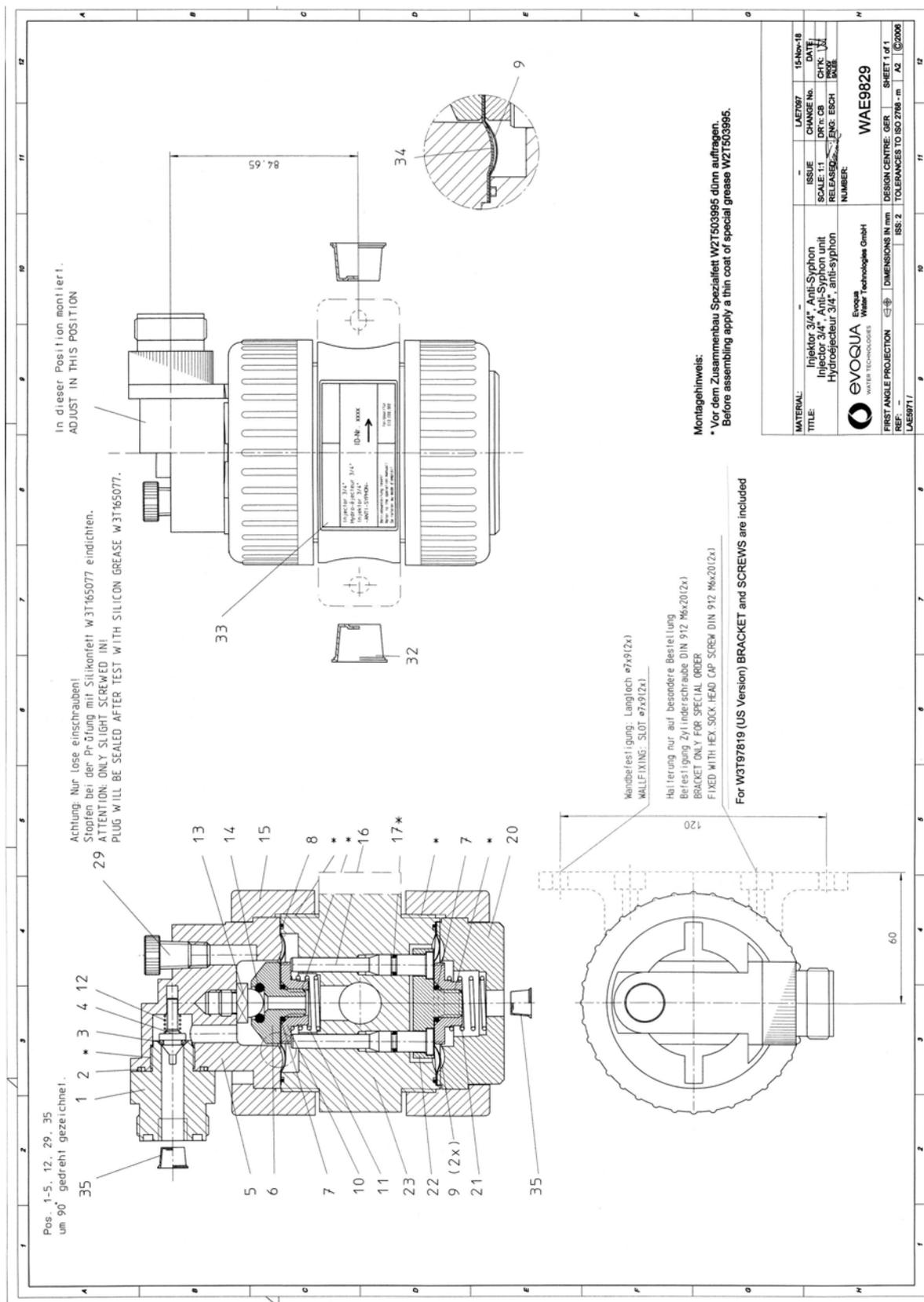
Pos. 17: seal with special grease W3T165077

D: Set of gaskets;

1: Preventive maint. kit for 1 year;

2: Recommended spares for 2 years etc.)

7.4.4 Antisyphon-Injektor W3T171370 (3/4")

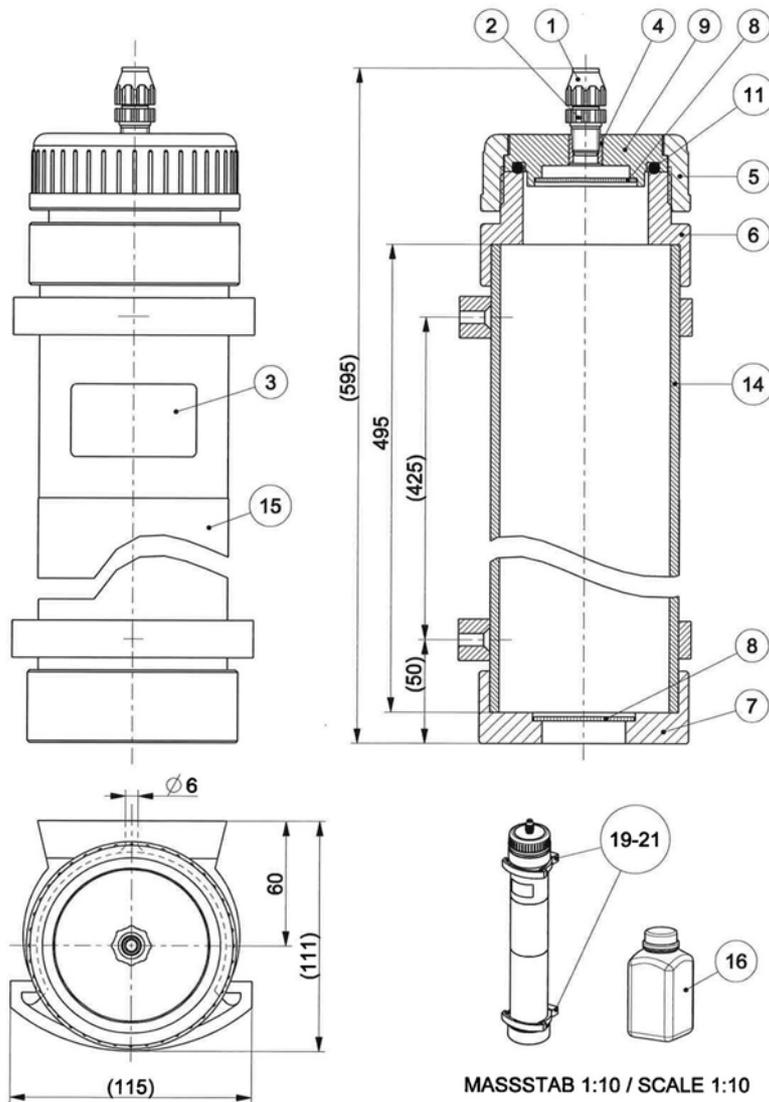


Anti-syphon-Injector W3T171370 (3/4")

Pos	Part no.	Description	Qty.	
1	W3T159655	Inlet screw PVC, 3/4" Injector	1	each
2	W3T168861	O-ring d25 x 2.5/FPM	1	each
3	W3T161434	O-ring d8 x 2/75FPM602	1	each
4	W3T159656	Valve stem PVC, 1" Injector	1	each
5	W3T171120	Body PVC, 3/4" Injector	1	each
6	W3T158460	Valve seat PVC, UNF $\frac{1}{2}$ "-20Gg	1	each
7	W3T169066	O-ring d12.37 x 2.62/FPM	2	each
8	W3T168988	O-ring d68 x 2/FPM	2	each
9	W3T161483	Diaphragm PTFE, 3/4" Injector	3	each
10	W3T158461	Clamping nut PVC, UNF $\frac{1}{2}$ "-20Gg	2	each
11	W3T165194	Spring d=1.6;Tantaloy 61	1	each
12	W3T168914	Spring	1	each
13	W3T159657	Valve stem PVC, 3/4" Injector	1	each
14	W3T172921	O-ring d10 x 4/75FPM602	1	each
15	W2T506923	Union nut PVC-U; d63	2	each
16	W3T158545	Guide pin PVDF, 3/4" Injector	2	each
17	W3T169065	O-ring d6.07 x 1.78/FPM	2	each
20	W3T159658	Bottom cover PVC, 3/4" Injector	1	each
21	W3T161484	Spring d21.3 3/4" Injector	1	each
22	W3T158546	Disk PVC, 3/4" Injector	1	each
23	W3T159673	Body PVC, 3/4" Injector	1	each
29	W3T168893	Plug PVC-U; 1/4-18NPT x 21	1	each
32	W3T161278	Plug GPN 610 U 18	2	each
33	W2T507548	Name plate 68 x 35	1	each
34	W3T171695	Diaphragm d74.5 x d12,7/67FPM581	1	each
35	W3T161275	Plug GPN 610 U 7	2	each

*) Silicone grease W2T503995
Pos. 29: seal with special grease W3T165077

7.5 Activated carbon filter W3T159902



Pos	Part no.	Description	Qty.
1	W3T169111	Union nut PVC; 1/2-20UNF-2B	1
2	W3T169110	Union nippel PVC; 1/4NPT x 1/2-20UNF-2A	1
3	W2T507548	Type plate 68 x 35	1
4	W3T167287	Threaded socket 1/4-18 NPT; d16; PVC-U	1
5	W2T506923	Union nut PVC-U; G2-3/4; PN16	1
6	W3T167181	Upper part ; PVC-U; DN 80; G2-3/4"	1
7	W3T163345	Lower part PVC	1

Pos	Part no.	Description	Qty.
8	W3T163510	Sieve	2
9	W3T170976	Adapter cover PVC-U; 1/4" NPT	1
11	W3T172722	O-ring d59, 69 x 5.33/EPDM	1
14	W2T506634	Pipe DIN 8062 d90 x 4.3; PVC-U; PN10	495 mm
15	W3T161206	Caution label	1
16	W3T161729	Activated carbon mixture 2500 ml	1
19	W3T165741	Pipe clamp PP; d90	2
20	W3T172833	Chipboard screw count 6 x 60; A2	2
21	W2T507639	Dowel Nylon 8 x 40	2

8. Manufacturer declaration



Einbauerklärung für eine unvollständige Maschine Declaration of incorporation of partly completed machinery Déclaration de montage d'une machine incomplète

No. MAE1016

Ausgabe/issue/édition 03

(nach EG-Maschinenrichtlinie 2006/42/EG, Anhang II 1.B.)
(according to EC Machinery Directive 2006/42/EC, Annex II 1.B.)
(selon la directive machine CE, 2006/42/CE, annexe II 1.B.)

Hersteller/Manufacturer/Constructeur: Evoqua Water Technologies GmbH
Anschritt/Address/Adresse: Auf der Weide 10, D-89312 Günzburg
Produktbezeichnung:
Product description:
Description du produit: Gasdosiersystem S10k
Gas metering system S10k
Système de dosage de gaz S10k
Baujahr/Year of manufacture/
Année de fabrication 2010...

Das bezeichnete Produkt ist eine unvollständige Maschine im Sinne Art. 2 g der Richtlinie 2006/42/EG. Sie ist ausschließlich zum Einbau in eine andere Maschine bzw. zum Zusammenbau mit (einer) anderen Maschine(n) bestimmt.

The identified product is an uncompleted machinery in the sense of Art 2g) of Directive 2006/42/EC. It is exclusively intended to be incorporated into or assembled with other machinery or other partly completed machinery.

Le produit désigné est une machine incomplète au sens de l'art. 2 g de la directive 2006/42/CE. Celle-ci est prévue exclusivement pour le montage dans une autre machine, le cas échéant pour l'assemblage avec une/plusieurs autre(s) machine(s).

Die relevanten, angewendeten und eingehaltenen Sicherheits- und Gesundheitsschutzanforderungen nach Anhang I der Richtlinie 2006/42/EG sind in der Nachweisdokumentation aufgeführt.

The relevant, applied and fulfilled essential requirements of Annex I of Directive 2006/42/EC are listed in the relevant technical documentation.

Les exigences de santé et de sécurité importantes, utilisées et respectées selon l'annexe I de la directive 2006/42/CE sont mentionnés dans la documentation technique correspondante.

Die speziellen technischen Unterlagen nach Anhang VII, B der Richtlinie 2006/42/EG wurden erstellt und werden den Behörden auf begründete Anforderung in elektronischer Form oder in Papierform zur Verfügung gestellt.

The relevant technical documentation according to Annex VII, B has been compiled and will be provided to authorities upon request either in electronic or paper form.

Les documents techniques spéciaux selon l'annexe VII, B de la directive 2006/42/CE ont été établis et seront mis à disposition des autorités sous forme électronique ou papier sur demande justifiée.

Benannte Person für technische Unterlagen:

Authorized person for the technical file:

Personne désignée pour la documentation technique:

Name / name / nom: Evoqua Water Technologies GmbH

Adresse / address / adresse: Auf der Weide 10, D-89312 Günzburg

Ersteller : SR
Ausgabe : 10.03.2016
Dokument: VD130-2_CE_Einbauerklärung.doc

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Seite 1 von 2

Die bei der Entwicklung und Herstellung des oben bezeichneten Produktes verwendeten Normen/sonstigen Vorschriften und Regeln sind in der Nachweisdokumentation aufgelistet. Wir bestätigen die Konformität des Produkts in der von uns in Verkehr gebrachten Ausführung mit diesen Normen/sonstigen Vorschriften und Regeln.
For design and manufacture of the identified machinery the standards, other directives and rules as listed in the relevant documentation have been applied. We attest conformity of the designated product in the state as delivered with these standards, other directives and rules.
Les normes, autres directives et règlements listés dans la documentation technique correspondante ont été utilisés pour la conception et la fabrication du produit susmentionné. Nous confirmons que le produit est conforme, dans la version que nous avons mise en circulation, avec ces normes, autres directives et règlements.

Bevor das Endprodukt, in das die hier beschriebene unvollständige Maschine eingebaut bzw. mit der sie zusammengebaut werden soll, in Betrieb genommen wird, muss sichergestellt sein, dass dieses mit der Richtlinie 2006/42/EG konform ist.

Before the final machinery into which the designated uncompleted machinery is to be incorporated is put into service, it must be assured that it complies with Directive 2006/42/EC.

Avant que le produit fini, dans lequel doit être incorporée ou combinée la machine incomplète, puisse être mis en service il convient de s'assurer que celui-ci est conforme avec la directive 2006/42/CE.

Günzburg, den / the 2016-06-23

Evoqua Water Technologies GmbH



Klaus Andre
Technischer Leiter / Director Engineering

Unterschrift
signature / signature



Helmut Fischer
Leiter QM / Quality Manager

Unterschrift
signature / signature

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the conformity to the specified directives but does not imply any warranty for properties. The safety documentation accompanying the product shall be considered in detail.

La présente déclaration atteste de la concordance avec les directives citées, elle n'offre cependant pas de garantie quant à la nature ou la durabilité selon l'article 443 du code civil allemand. Les consignes de sécurité de la documentation du produit fournie sont à respecter.



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