Gate, Globe and Swing Check valves
Class 150 – 300
As per ASME B16.34, API 603

Type GTV

Type GLV

Type SCV

1 Declaration of Conformity

Herewith we, KSB Valves (Changzhou) Co., Ltd.
Registered Office:
No.68 Huanbao Four Road, Environment Protection Industrial Park,
Xinbei District,
Changzhou City
Jiangsu Province
P.R.China

Declare that the valves listed below satisfy the requirements laid down in the Pressure Equipment Directive 97/23/EC (PED).

Description of the valve – Type	**Gate, Globe and Swing Check Valves** - ECOLINE GTV 2”~12” Class 150 – 300 - ECOLINE GLV 2”~12” Class 150 – 300 - ECOLINE SCV 2”~12” Class 150 – 300
Suitable for	**Fluids in Group 1 and Group 2**
Conformity Assessment Procedure	**Module H**
Name and address of the authorizing and monitoring notified body	**TÜV Rheinland Industrie Service GmbH** **Am Grauen Stein, D-51105 Köln** **Germany**
Notified body identification no.	**0035**
Certificate no.	**01 202 CHI/Q-03 0068**
Reference standards and codes	**API 603 – Gate Valve** **ASME B16.34 – Globe Valve** **ASME B16.34 – Swing Check Valve** **API598 – Testing of Valves** **ASTM – Material**

This declaration also covers the conformity of the casting suppliers for ECOLINE as per the requirements of the Pressure Equipment Directive 97/23/EC (PED) including the “AD 2000-Merkblatt W 0” for those materials used for the pressure retaining parts.

Gorden Sheng
Head – Quality Management Date: 08.10.2012

2 General

These operating instructions apply to KSB gate, globe and swing check valves (see section 5.1 and 5.2).
Development and production of KSB valves are subject to a QA system according to DIN/ISO 9001.
Correct installation and maintenance or repair will ensure trouble-free operation of the valves.
The manufacturer does not assume any liability for these valves if the operating instructions are not being observed.
The valves are marked to ASME B16.34, if required, with an arrow indicating the flow direction, nominal size, Class, material of body, manufacturer.

Caution The valves must not be operated beyond the limits defined in the operating instructions/contractual documentation/type series booklet. Any use beyond the above conditions will lead to overload which the valves cannot withstand.

 Non-observance of this warning may lead to personal injury or property damage, e.g.:

- Injury caused by escaping fluids (cold/hot, toxic or under pressure…)
- Incorrect operation or destruction of the valve.

The descriptions and instructions in this manual refer to the standard versions but also apply to the related variants.
These operating instructions do not consider:

- incidents which may occur during installation, operation and maintenance.
- the local safety regulations. It is the user's responsibility to ensure that they are observed, also by the installation staff involved.

For actuated valves, the specified connection parameters and the installation and maintenance instructions, including the operating manual for the actuator **must** be observed.

Caution Handling a valve requires skilled and experienced personnel.

The personnel in charge of operation, maintenance and installation of this valve must be aware of the interaction between the valve and the plant.
Operator's errors concerning the valve may have serious consequences for the entire plant, e.g.:

- fluid may escape
- downtime of the plant/machine
- adverse effect/reduction/increase of the efficiency/function of a plant/machine.

For further questions or in case of damage to the valve, please contact your KSB sales office.
The specifications (operating data) of the valves are listed in the technical documentation & type series booklet of the related valve (see section 5.2).
When returning valves to the manufacturer, please refer to section 4.

3 Safety

This manual contains basic instructions to be complied with during operation and maintenance. It is therefore vital for the fitter and the operator/user to read this manual before installing/commissioning the valve. Also, this manual must always be available at the site where the valve is installed.
It is not enough to observe the general instructions listed in the section "safety", the specific safety instructions listed in the other sections should also be observed.

3.1 Safety symbol in these operating instructions

Safety instructions put forth in this instruction manual whose non-observance would involve the risk of personal injury are specially marked with the general hazard symbol:

in accordance with DIN 4844 (safety sign W9), or with the electric voltage warning sign:

In accordance with DIN 4844 (safety sign W8),
Safety instructions whose non-observance would involve hazard to the valve and jeopardize its operation have been marked with the word

Caution

Instructions directly attached to the valve, (e.g. nominal pressure) must be complied with and maintained in a legible condition.

3.2 Qualification of personnel and training

The personnel for operation, maintenance, Inspection and Installation must be adequately qualified for the work involved. The personnel's responsibilities, competence and supervision must be clearly defined by the user. If the personnel in question is not already in possession of the requisite know-how, appropriate training and instructions must be provided. If deemed necessary, the manufacturer/supplier will provide such training and instructions at the user's request. In addition, the user is responsible for ensuring that the contents of these operating instructions are fully understood by the personnel in question.

3.3 Danger or non-observance of the safety Instructions

Non-observance of the safety instructions may lead to personal injury and also to danger for the environment and the valve itself. Non-observance of these safety instructions will also forfeit the user's warranty.
Non-observance could, for example, result in:
- failure of essential functions of the valve/plant
- failure of prescribed maintenance and repair practices
- hazard to people by electrical, mechanical or chemical effects
- hazard to the environment due to leakage of hazardous substances

3.4 Safety awareness

The safety instructions contained in this manual, the applicable national accident prevention regulations and any of the user's own applicable internal work, operation or safety instructions must be fully complied with.

3.5 Safety instructions for the user/operator

Any hot or cold parts of the valve (e.g. body or handwheel) that could pose a hazard must be protected by the user against accidental contact.
Leakage (e.g. at the stem seal) of hazardous substances (e.g. explosive, toxic, hot) must be drained so as to avoid all danger to people or the environment. All relevant laws must be observed.
Electrical hazards must be effectively prevented. (For details, please refer to the VDE standards and/or the local energy supply utility regulations).

3.6 Safety instructions for maintenance, inspection and installation work

The user is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorized, adequately qualified staff who are thoroughly familiar with this instruction manual.
All work on a valve may only be performed when the valve is unpressurized and has cooled down. This means that the temperature of the medium in all the valve's chambers must be lower than the vaporization point of the medium.
All work on actuated valves may only be done after the actuator has been disconnected from its energy supply. The procedure described in the operating instructions to shut down the actuator must be observed.
Valves in contact with hazardous media must be decontaminated.
Immediately following completion of the work, all safety relevant and protective devices must be reinstalled and/or reenabled.
Prior to recommissioning, refer to the points listed under section 7, Commissioning.

3.7 Unauthorised modification and manufacturing of spare parts

The equipment shall not be altered or modified in any way prior to consultation with the manufacturer. Genuine spare parts and accessories authorized by the manufacturer will ensure operational safety. The manufacturer cannot be held responsible for damage resulting from the use of non-genuine parts or accessories.

3.8 Inadmissible modes of operation

Operational safety and reliability of the valve supplied is only warranted for its designated use as defined in section 2, "General", of the operating instructions. The limits stated in

the technical documentation must not be exceeded under any circumstances.

4 Transport & interim storage

4.1 Transport

The valves in the as-supplied condition are ready for operation.
For transport and storage, the valves must always be maintained in the closed position and the connection ends must be plugged using suitable means (e.g. covers, plastic sheets, etc.) to prevent damage to the seats.
To prevent damage, do not suspend the valve by its handwheel or the actuator.
For valve weights, please refer to Section 10.
After delivery or prior to installation, the valve should be checked for damage during transit.

4.2 Interim storage

The valves must be stored in such a way that correct operation is assured even after prolonged storage. This comprises:
- Storing in the closed position (to protect the seats from damage).
- Suitable measures against contamination, frost and corrosion (e.g. by using plastic sheets or end covers).

5 Description / Related Documents

The sectional drawings shown below are examples for the general design of KSB valves. For drawings and other information pertaining to a specific valve series, please refer to the relevant type series booklet.

5.1 Marking - for CE requirements

The valves are marked to PED 97/23/EC
In particular the marking contains at least the following:
- Manufacturer
- Year of production
- Valves type model or order No.
- NPS (DN) / (Inch)
- Pressure class

Class	PN	DN						
		2”	2.5”	3”	4”	5”	6”	>=8
		50	65	80	100	125	150	200
150	10							
	16							
300	25							
	>=40							

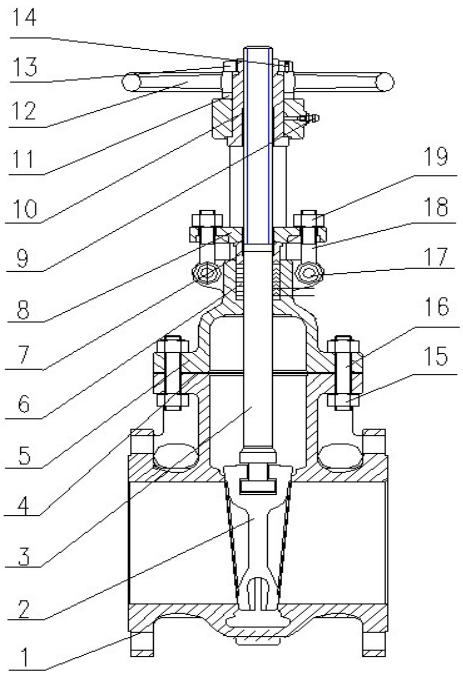
5.2 Functioning principle

Cast gate, globe and swing check valves
All cast valves have been designed according to the following standard and specifications:
ASME B16.34, API 603

5.2.1 Overview of Documents – Gate Valve

Type	Size	Class	Leaflet No.
ECOLINE GTV	2” – 12”	150	7255.51
	2” – 12”	300	

5.2.1.1 Sectional Drawing – Gate Valve



5.2.1.2 List of Components – Gate Valve

Part No.	Description
1	Body
2	Flexible wedge
3	Stem
4	Gasket
5	Yoke
6	Gland packing
7	Lower gland section
8	Gland follower
9	Lubricating nipple
10	Threaded bush
11	Washer
12	Handwheel
13	Handwheel nut
14	Grub screw
15	Nut
16	Stud
17	Pin
18	Eyebolt
19	Nut

5.2.1.3 Gate valves (Class 150,300)

The valves mainly consist of body, yoke as well as wedge, stem and actuating unit.

Stem seal area: The gland packing which seals the stem is tightened by the eyebolts and nuts at the gland follower. The yoke is equipped with an integral back seat, which seals the valve while stem is in uppermost position.

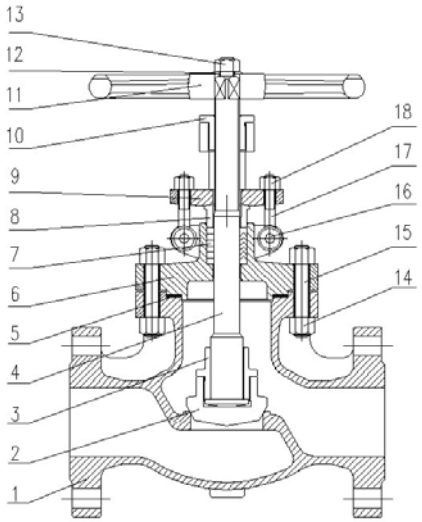
Flow seal area: The seat rings are integrated with the body. The wedge of gate valves is connected to the stem by a “T” joint. The wedge is guided by lateral rails in the body.

Yoke seal area: Body and yoke are connected to each other by studs and nuts. Tightness is assured by means of the gasket.

5.2.2 Overview of Documents-Globe valves

Type	Size	Class	Leaflet No.
ECOLINE GLV	2”-12”	150	7255.52
	2”-12”	300	

5.2.2.1 Sectional Drawing – Globe Valve



5.2.2.2 List of Components – Globe Valve

Part No.	Description
1	Body
2	Disc
4	Stem
5	Gasket
6	Yoke
7	Gland packing
8	Lower gland section
9	Gland follower
10	Threaded bush
11	Handwheel
12	Washer
13	Handwheel nut
14	Nut
15	Stud
16	Pin
17	Eyebolt
18	Nut

5.2.2.3 Globe valves (Class 150,300)

The valves mainly consist of body, yoke as well as disc, stem and actuating unit.

Stem seal area: The gland packing which seals the stem is tightened by the eyebolts and nuts at the gland follower. The yoke is equipped with an integral back seat, which seals the valve while stem is in uppermost position.

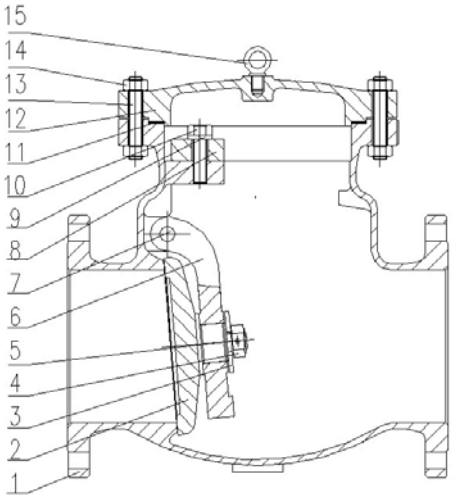
Flow seal area: The seat ring is integrated with the body. The seat face of the disc is machined integrally.

Yoke seal area: Body and yoke are connected to each other by studs and nuts. Tightness is assured by means of the gasket.

5.2.3 Overview of Documents – Swing Check Valve

Type	Size	Class	Leaflet No.
ECOLINE SCV	2”-12”	150	7255.53
	2”-12”	300	

5.2.3.1 Sectional Drawing – Swing Check Valve



5.2.3.2 List of Components – Swing Check Valve

Part No.	Description
1	Body
2	Disc
3	Washer
4	Nut
5	Pin
6	Hanger arm
7	Hinge pin
9	Spring lock washer
10	Bolt
11	Gasket
12	Cover
13	Stud
14	Nut
15	Lifting eyebolt

5.2.3.3 Swing Check Valves (Class 150,300):

The valves mainly consist of body, cover as well as the disc.

Flow seal area: The seat ring is integrated with the body. The seat face of the flat disc is machined integrated with the disc. The disc is connected to a hanger arm by means of a nut and pin. The hanger arm is mounted to the body by means of an internal hinge pin.

Cover seal area: Body and cover are connected to each other by studs and nuts. Tightness is assured by means of a gasket.

6 Installation

6.1 General

Caution To avoid leakage, deformation or rupture of the body, the piping should be laid out in such a way that no thrust or bending forces act on the valve bodies when they are installed and operational.

Caution Only remove the covers from the connection ends just before installation. The sealing faces of the flanges must be clean and undamaged.

The gaskets at the connecting flanges must be precisely centered. Use only joints and gaskets of approved materials. All holes provided in the flanges must be used for the flange connection.

When painting the pipes, do not apply paint to bolts and stem. If construction work is still in progress, the valves must be protected against dust, sand and building material etc. (cover with suitable means).
Do not use valve handwheels as footholds!

Valves and pipes used for high (>50℃) or low (<0℃) temperatures must either be fitted with a protective insulation, or there must be warning signs installed showing that it is dangerous to touch these valves.

If a valve is used as end valve in a pipe, this valve should be protected against unauthorized or unintentional opening to prevent personal injury or damage to property.

6.2 Installation position

The valve bodies are marked with an arrow indicating the flow direction. Valves should always be installed in such a way that the actual flow direction of the medium matches the arrow on the body.

6.2.1 Gate valves

In general flow may pass a gate valve in either direction. High-pressure valves with pressure relief arrangement are unidirectional, however. When installing a gate valve in a horizontal pipe, the stem should be vertical, i.e. the handwheel or actuator is on top. Inclined or horizontal stem position (e.g. in a vertical pipe) is also possible, in this case, however, the actuator must be supported by some suitable means.

6.2.2 Globe valves

Flow may pass a globe valve in either direction if not indicated otherwise. Installing a globe valve in a horizontal stem position (e.g. in a vertical pipe) is also possible, in this case, however, the actuator must be supported by some suitable means.

6.2.3 Swing Check valves

Swing check valves should preferably be installed in horizontal pipes. When installing them in vertical pipes, make sure that the flow direction is upward, so that in the unpressurized condition, the disc will be closed by its own weight.

6.3 Welding instructions / installation of pipe

Responsibility for welding the pipes lies with the piping installation contractor.

Caution When welding valves into the piping or when welding pipes after the valves have been installed, the welder must make sure that no foreign particles, e.g. weld beads, enter the valve body and remain there, because these will cause damage to the valve seats and/or the valve stem.

6.4 Actuated valves

Read the instruction manual of the actuator before installation.
Electrical cables may only be connected by qualified personnel.
The applicable electrical regulations (e.g. VDE), also for equipment in hazardous locations, must be observed.
All electrical equipment such as actuator, switchboard, magnetic valve drive, limit switch etc. must be installed in floodproof dry locations.
Voltage and frequency must match the values stated on the name plate.

7 Commissioning / Decommissioning

7.1 Commissioning

7.1.1 General

Prior to commissioning the valve, the pressure, temperature and material data stated on the valve should be compared to the actual operating conditions in the piping system to check whether the valve can withstand the loads occurring in the system.
Possible pressure surges (water hammer) must not exceed the highest admissible pressure. Adequate precautions should be taken.
In new pipe systems and especially after repair work, the system should be flushed with the valves fully open to remove solids, e.g. weld beads, which may damage the seats.

7.1.2 Operation

The valves are closed by turning the handwheel in clockwise direction (top view) and opened in counter-clockwise direction.
Using additional levers when turning the handwheel is not admissible because excessive force may damage the valve.

7.1.3 Functional Check

The following functions should be checked:
Before commissioning, the shut-off function of the valves should be checked by repeated opening and closing.
The gland packing should be checked when it is subjected to the full operating pressure and temperature for the first time. If necessary, retighten the nuts at the gland follower evenly.
The cover/bonnet bolting and the gasket should be checked for tightness after the first temperature rise at the valves. In case of leakage at the gasket, the connection should be tightened crosswise, evenly and in a clockwise direction.
Open the gate and globe valve by one or two turns of the handwheel prior to retightening the nuts to prevent jamming of the seat.
Retightening of the nuts of the cover/bonnet bolting especially applies to valves used in heat transfer systems to DIN 4754.

7.1.4 Actuated valves

On valves with electric/pneumatic/hydraulic actuator, the strokes/forces must be limited.
Electric actuators should be wired as follows:
Always use suitable spare parts and tools, even in emergencies, because otherwise correct operation of the valves cannot be assured.

Caution Switches are factory-set. Do not tamper with settings. To readjust settings refer to the instruction manual provided by the actuator manufacturer and / or contact your nearest KSB office.
For setting of the actuator, please refer to the instruction manual which will be kept in the wiring side compartment/cover of actuator.

7.2 Decommissioning

During extended shutdowns periods, liquids liable to change their condition due to polymerization, crystallization, solidification etc. must be drained from the piping system. If necessary, the piping system should be flushed with the valves fully open.

8 Maintenance/Repair

8.1 Safety Instructions

Maintenance and repair work may only be carried out by skilled and qualified personnel.
For all maintenance and repair work, the safety instructions listed below and also the general notes in section 2 must be observed.
Always use suitable spare parts and tools, even in emergencies, because otherwise correct operation of the valves can not be assured.

8.1.1 Dismantling of valves

 Before removing the complete valve from the pipe, or before repair or maintenance work on the valve itself, i.e.

- before removing cover or bonnet from the body
- before removing the gland follower and lower gland section to replace packing rings

- before removing an actuator bolted directly to the yoke head

the entire valve must be unpressurized and must have cooled down sufficiently so that the temperature of the medium in all the valve's chambers is lower than the vaporization point of the medium, to prevent scalding.

Opening pressurized valves will cause danger to life and limb!

If toxic or highly inflammable substances or liquids whose residues may cause corrosion by interaction with the air humidity were handled by the valve, then the valve should be drained and flushed or vented.

If necessary, wear safety clothing and a face guard/mask.

Depending on the installation position, any liquid remaining in the valve may have to be removed.

Prior to possible transport, the valves must be flushed and drained carefully.

If you have any questions, please contact your KSB sales office.

8.1.2 Removing Actuators

If actuators powered by an external source of energy (electric, pneumatic, hydraulic) need to be removed from the valves or dismantled, the energy supply must be shut down prior to starting any repair work and the instructions in the sections 3, 8.1.1 and the operating instructions of the actuator must be observed.

Valve actuators with integrated spring-loading feature cannot be removed.

Caution Springs under tension!

If you have any questions, please contact your KSB sales office.

8.2 Maintenance

Our valves are largely maintenance-free, materials of sliding parts were selected to keep wear to a minimum. To ensure reliable operation and to reduce repair costs, all valves - especially those which are seldom operated or where access is difficult - should be checked periodically.

The user is responsible for defining appropriate intervals for checks and maintenance, depending on the application of the valve.

The service life of non-maintenance-free valves can be extended by:

- lubricating movable parts such as stem and gland bolts (not for oxygen valves) using suitable lubricants to DIN 51825 / equivalent
- timely changing of the packing rings
- timely replacing of the cover/bonnet gasket

The safety instructions in sections 3, 8.1 and the notes in section 9 must be observed.

9 Troubleshooting

9.1 General

All repair and service work must be carried out by qualified personnel using suitable tools and genuine spare parts.

The safety instructions in sections 3 and 8 must be observed.

9.2 Faults & Remedies

Fault - **Leakage at the seat**

Remedy - Remachine the seat on wedge/disc and body using suitable regrinding equipment after dismantling the valve. Regrinding of body and disc seats should be continued until the seats show a smooth and even ring.

Fault - **Leakage at the cover/bonnet gasket**

Remedy - Retighten the cover/bonnet bolting

Remedy - Replace the gasket after removing the cover/bonnet bolts. Clean the surfaces carefully before inserting a new gasket.

On gaskets (graphite/other asbestos-free types), no additional sealing agents may be used. When using anti-adhesive coatings, use sealing agents explicitly recommended by the manufacturer of the sealing material.

If you have any further questions please contact your nearest KSB sales office.

Fault - **Leakage of the gland packing**

Remedy - Retighten the gland packing with the nuts at the gland follower. Make sure that the friction forces at the stem do not increase too much.

Remedy - Replace the packing rings of the gland packing; Unscrew the nuts and lift the gland follower. Clean the

stuffing box chamber thoroughly before inserting new packing rings. Split packing rings should be inserted in such a way that the cut edges are offset by 120° to 180°.

Caution Do not replace packing while the valve is pressurized. The back seat bushing is not intended to maintain a seal during replacement.

10 Valve weights: (kg)

Size	Class	Gate Valve	Globe Valve	Swing Check Valve
		RF	RF	RF
2”	150	11	11	8.5
	300	16	16	14
2.5”	150	16	25	21
	300	28	16.2	23.5
3”	150	19.5	34	25
	300	40	39	34
4”	150	31.5	56	45
	300	60	64	56
6”	150	57.5	97	73
	300	108	138	105
8”	150	90	165	122
	300	199	273	161
10”	150	139	285	181
	300	282	468	285
12”	150	227	450	309
	300	425	692	423

Annex I

DO's

1. Observe the safety instructions.
2. Employ skilled, trained and experienced personnel to handle the valve.
3. Align the pipe correctly in position before mounting a valve on line.
4. Use a correct type of flange gasket.
5. Ensure the correct direction of flow on the valve.
6. Ensure the valve is unpressurised before any work is carried out.
7. Decontaminate valves in contact with hazardous fluids before any work is carried out.
8. Lubricate the valves periodically.
9. Protect the threads with a metal/leather jacket if the working conditions are abrasive.
10. Allow clearance for raising stem type valve to open fully.
11. Flush the valves in fully open condition to remove foreign material like welding flux, spatter, slag, dust etc. to avoid damage of seats.
12. Check shut-off function by repeatedly opening and closing before commissioning.
13. Check the frequency and voltage of actuators to match with the line voltage and frequency.
14. If gasket leak is observed, tighten gasket bolts crosswise evenly in a clockwise direction.
15. After attaining the full operating pressure and temperature, check and if necessary, tighten the nuts at the gland follower and at the cover/bonnet.
16. When a gate valve is fully opened, screw it down 1/4 turn to prevent sticking.
17. During storage position the valve such that the stem is upright.
18. For globe valve follow the instructions carefully for direction of installation.

DON'Ts

1. Don't expose the valves to dust, sand, building material etc. during storage.
2. Don't use unauthorised spares.
3. Don't remove end protective covers before installation.
4. Don't use valve handwheels as footholds.
5. Don't exceed the limits stated in technical documentation.
6. Don't store the valve in open condition.
7. Don't attempt to dismantle the pressurised valve.
8. Don't use a valve to pull an unsupported and badly aligned pipe into position.
9. Don't leave a gate valve in crack open condition.
10. Don't use a gate valve for throttling.
11. Don't force a gate valve closed with a wrench.
12. Don't use a flat disc globe valve for start-up / vent application.
13. Once the valve is installed and commissioned do not tamper with the torque & limit switches of valves with electrical actuator.

KSB Aktiengesellschaft
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0 • Fax +49 6233 86-3476
E-Mail: valves@ksb.com • www.ksb.com