

***Operating manual***

***Bleeding and Venting Valves***

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## 0 Introduction

This manual is intended to assist users of a MANKENBERG bleeding and venting valve during installation, operation and maintenance. Read the manual thoroughly before installing or putting this valve into service.

 caution	<b>Failure to follow the following instructions – particularly the cautionary and warning notes – may lead to hazards and may invalidate the manufacturer's warranty.</b> MANKENBERG is at your service for any assistance and queries. See Section 11 <Further information> for the addresses. Technical information is also available at <a href="http://www.mankenber.de">www.mankenber.de</a>
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## 1 Intended use

A **MANKENBERG bleeding and venting valve** is a float controlled valve that, after installation, bleeds accumulated air or other gases from high points of vessels or pipelines or ventilates the system as the liquid level decreases, thus avoiding water shocks and underpressure.

This is an automatic function (without any additional electrical/pneumatic energy).

Depending on the liquid level, the float opens or closes a bleeding or venting valve directly or via lever transmission.

A **MANKENBERG continuous bleeding and venting valve (EB 1.10 to EB 1.48)** is a device for bleeding gases accumulating from liquids during continuous operation.

If venting has to be avoided, a back-pressure valve can be delivered. The back-pressure valve has to be installed in the venting pipe by the customer if not already integrated in the armature in the factory.

A **MANKENBERG continuous bleeding and venting valve (EB 1.57, EB 1.59)** is a device for bleeding gases accumulating from liquids during continuous operation. For underpressure protection, a vacuum venting valve is integrated.

A **MANKENBERG start-up bleed valve (EB 3.50, EB 3.51, EB 3.52)** removes air from the system during start-up or the filling process. Therefore valve seat and ventilation opening are proportioned larger than for continuous bleeding valves. Due to the larger seat, start-up bleeding valves vent the system very effectively at suddenly appearing vacuum.

A **MANKENBERG twin bleed valve (EB 1.74, EB 1.75, EB 1.84, EB 1.85, EB 6.54)** is a combination of continuous and start-up bleed valve and is equipped with two according valve seats.

MANKENBERG planning documents are available to give users precise assistance in selecting and designing the appropriate fitting, e.g.:

In the (catalogue) section <EB: Level control valves>

<Know how bleeding and venting valves>

<Type sheet EB...> with technical data and tables of the dimensions.

 note	These valves are no shut-off elements ensuring a tight closing of the valve. In accordance with DIN EN 60534-4 and/or ANSI FCI 70-2 they may feature a leakage rate in closed position in compliance with the leakage classes III or V: Leakage class III (metal sealing cone) = 0.1 % $K_{Vs}$ value Leakage class V (soft seal cone) = $1.8 \times 10^{-5} \times \Delta p \times D^*$ [l/h] *D=seat diameter
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MANKENBERG fittings are supplied as standard for screw-mounted or flange-mounted pipeline/vessel connections – also for special connections if required.

The upper limit of the permitted operating data for pressure and temperature is permanently marked on each fitting supplied.

In the following sections three valve types are combined under the heading of “bleeding and venting valves” apart from a few sections that only apply to the construction types mentioned.

## 2 Marking of the fitting

Each fitting bears the following markings as a minimum:

For	Marking	Remark
Manufacturer	MANKENBERG	See Section 11 <Further information> for the address
Fitting design	<b>Continuous bleeding and venting valve + type or twin bleeding valve + type or start-up bleeding valve + type</b>	Design name as per accompanying MANKENBERG data sheet
Nominal diameter	e.g. DN or G and numerical value	Numerical value for DN in [mm], for G in [inches], DN given 2x for inlet and outlet side
Rated pressure	PN or Class and numerical value	Numerical value for PN in [bar], for Class in [lbs/square inch] pressure data are displayed as overpressure above the atmospheric pressure values of upper and lower limits
Work pressure	Operating pressure range and numerical values	
Max. permitted temp	Temperature and numerical value	Temperatures above 50 °C entail a reduced pressure resistance. This must be considered for the corresponding material in accordance with the DIN EN 1092 standard
Body material	e.g. CrNiMo steel	CrNiMo steel = high-alloy austenitic steel
Flow direction	Indicated by an arrow	

The markings (in the case of fittings made of deep-drawn stainless steel, they are etched into the body) should neither be covered nor painted over, so that the fitting remains identifiable.

## 3 Safety instructions

### 3.1 General precaution

The same safety regulations apply to a fitting as to the system into which it is installed. These instructions only give those safety recommendations that have to be additionally observed for the fitting.

### 3.2 Special safety instructions for the plant operator

The following requirements for the intended use of a fitting are not the responsibility of the manufacturer but have to be guaranteed by the user:

- The fitting may only be employed for the purpose described in Section 1 <Intended use>.
- Only competent specialist personnel may install, operate and service the fitting. Competent as defined in these instructions refers to persons who, because of their training, specialist knowledge and professional experience, are capable of correctly assessing and properly executing the work with which they are entrusted and of recognizing and rectifying hazards.
- The pipeline system must be properly designed and installed so that the fitting can be mounted and operated without any tension.
- The fitting and the bleeding pipe must be properly installed in the correct mounting position. The bleeding/venting pipe must be adequately dimensioned and discharge into a pressureless surrounding.
- The usual flow rates should not be exceeded in the pipeline section during continuous operation, and abnormal operating conditions such as vibrations, water shocks and cavitation should be avoided or – if unavoidable – clarified with the manufacturer in advance.
- The prevailing operating conditions must comply with the limits of the design data stated in the MANKENBERG order confirmation.
- Only operate the device at a steady system liquid level. The float must not "jitter". Rough and/or foaming surfaces cause functional faults of the device.
- For strongly impurified systems, adequate bleeding and venting valves are to be installed (e.g. EB 1.11, EB 1.84, EB 1.85).

- The corrosion protection for the fitting must be adapted to the local environmental conditions.
- The fitting must not be coated with thermal insulation.

Detailed notes are provided on some of these prerequisites in the following sections.

### 3.3 Special hazards

 <b>danger of fatalities</b>	<p>Before a fitting is removed from the system or before a fitting is dismantled but partially remains in place, <b>the pressure in the system on both the inlet and outlet side must be completely reduced</b> so that there is no uncontrolled flow of the medium out of the system.</p> <p>In the case of toxic or hazardous media, the system must be completely drained before the fitting is removed.</p> <p><b>Caution is required with residues that might continue flowing.</b></p>
 <b>caution</b>	<p><i>If a fitting is removed from a system with a toxic medium and is taken out of the plant:</i></p> <p><b>it must be properly decontaminated before repair.</b></p>

## 4 Transport and storage

A fitting must be handled, transported and stored with care:

- The fitting must be transported and stored in its protective packaging until it is installed.

 <b>caution</b>	<p>The fitting has moving internal parts.</p> <p><b>Even packaged fittings should be transported smoothly without any shocks.</b></p>
 <b>caution</b>	<p>In the case of a fitting that can no longer be transported by hand, the lifting gear must be attached to a suitable position on the housing (branches).</p> <p><b>Under no circumstances may the lifting gear be affixed to any attachments or external floats or float lever.</b></p>
 <b>caution</b>	<p>Especially the continuous bleeding and venting valve EB 1.11 (with external float) is very sensitive to transportation damage.</p> <p><b>Take care that the protection packaging of the external float is not damaged.</b></p>

- When storing prior to installation, the device has to be stored in a closed room and protected against damaging influences such as dirt, moisture and frost.
- In special cases, the fitting is supplied free of oil, grease or silicone and is marked accordingly. A fitting such as this must not come into contact with oil/grease/silicone during storage and handling (particularly when subsequently unpacked).
- A MANKENBERG fitting generally has functional and/or sealing parts made of elastomer materials. These cannot be stored for an unlimited period.

 <b>note</b>	<p>ISO 2230 describes the storage conditions for elastomers in detail and specifies the permissible storage period.</p> <p><b>Functional and sealing parts must be replaced well before the storage period expires.</b> They are available from MANKENBERG as a “service set”. See also Section 10 &lt;Troubleshooting help&gt;.</p>
 <b>note</b>	<p>MANKENBERG fittings of small and medium nominal diameters are largely made of stainless steel (high-alloy CrNiMo steel). If, under exceptional circumstances, fittings are stored in an unpacked state, <b>they must be protected against ferritic dust</b> to avoid corrosion.</p>

 <b>note</b>	<p><i>The fitting is generally not capable of standing alone:</i></p> <p>Handle with care so that the fitting does <b>not tip over during transport/storage</b>.</p>
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## 5 Installation

### 5.1 General notes

The same installation regulations apply to a fitting as to the system into which it is installed. The following **additional notes** apply:

- Section 4 <Transport and storage> should also be observed during transport to the installation site.
- The installation site to allow perfect functioning of a fitting should be a section of pipe without any flow disruptions, without any angles and without any restrictors or shut-off devices close to the fitting, either upstream or downstream. If this does not apply, the installation situation should be checked with the plant operator and/or MANKENBERG.

 <b>danger of fatalities</b>	<p>Under some conditions, small amounts of liquid may escape during the bleeding process. Therefore, for toxic or dangerous media a discharge pipe has to be installed at the bleeding outlet for safely discharging escaping media (also recommended for other media).</p>
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- The statics of the pipeline must match the weight of the device, especially of those with off-centered mass. If required the pipeline may have to be properly supported on both sides next to the fitting (or at the fitting itself) – particularly in the case of fittings with a substantial mass and especially if vibrations are to be expected in the system.

When the fitting is supported, it is important to check that all functioning parts (levers, floats) remain capable of moving freely and are not blocked.

- The fitting must not be coated with thermal insulation.

 <b>caution</b>	<p>A fitting that is operated at a medium temperature above 130°C needs undisrupted removal of heat if it is to function perfectly.</p> <p><b>Failure to observe this instruction may cause damage to the fitting and hence in the pipeline system as well.</b></p>
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- To protect internal functional parts (e.g. the seat) against damage and/or blockages, it may be necessary to install a strainer and/or filter upstream of the fitting.

 <b>note</b>	<p>The mesh size of the sieve/filter for protecting against aggregates in the pipe section should be selected by the plant operator according to the operating conditions.</p> <p><b>Failure to observe this instruction may impair the function of the fitting and lead to damage.</b></p>
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### 5.2 Installation preparations

- It is necessary to ensure that a fitting is not installed unless it matches the operating conditions in terms of function, pressure and temperature, range, body material as well as connection type and dimensions.

 <b>danger of fatalities</b>	<p>No fitting may be operated that does not have a sufficient pressure and temperature range for the operating conditions – see Section 1 &lt;Intended use&gt; and markings on the fitting. The manufacturer MANKENBERG should be consulted in the case of any applications outside of this range.</p> <p><b>Failure to observe this regulation may mean danger to life and limb and may cause damage to the pipeline system.</b></p>
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- Newly installed tanks and pipeline sections must be thoroughly rinsed and cleaned before commissioning.

- The corrosion protection for the fitting must be adapted to the local conditions:

 <b>important note</b>	<p>As a general rule, bleeding and venting valves must be installed in a way, that the inlet nozzle is vertical.</p> <p>The MANKENBERG planning (catalogue) documents EB describe that, for perfect operation, the installation site has to be a high point of liquid filled vessels or pipelines – for vessels a bleeding pin should be preferred.</p> <p>The MANKENBERG planning documents EB &lt;Knowhow bleeding and venting valves&gt; give information in which cases a baffle has to be installed in the vessel for avoiding functional faults of the bleeding and venting valve at high flow in speed.</p>
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### 5.3 Installation steps

- Fittings should only be finally unpacked at the installation site and inspected for damage prior to assembly. Damaged fittings must not be installed.

 <b>caution</b>	<p>When unpacking (especially EB 1.11 with external float) check that the float is not damaged (without dents) and the lever system is not bent and moving easily.</p> <p><b>A bleeding and venting valve with transportation damage must not be installed.</b></p>
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- It is necessary to ensure that the covers have been removed from all the connection branches before installation.
- The fitting should be inspected to ensure that it is clean. Interior parts must be free of liquid (e.g. condensate): if necessary, connecting branches should be cleaned before installation with clean compressed air.
- The type and dimensions of the line or tank connections must match the fitting to be installed and be flush with the connecting surfaces of the fitting as well as in a parallel plane to the fitting itself.
- The fitting must be installed without any tension. In the case of an already installed system, the geometry of the pipeline must match the face-to-face length of the fitting.

 <b>note</b>	<p>It is necessary to ensure that even under operating conditions</p> <p><b>no tension from the pipeline is transferred to the fitting.</b></p>
 <b>note</b>	<p>A MANKENBERG fitting made of "high grade" or "high grade pure" stainless steel (austenite, e.g. 1.4404 or 1.4435) does not need any surface protection for normal environmental atmosphere and for normal weather conditions.</p> <p>External parts of the fitting made of low-alloy or non-alloy materials that are supplied ex-works with a primer have to be provided with a suitable coating by the customer.</p> <p>Caution:</p> <p>Never paint over the marking(s) of the fitting (either etched into the body or on nameplate).</p>

In addition, the following applies to the pipeline connection:

with flanges:

 <b>note</b>	<p>The sealing surfaces on the body of the fitting are formed in accordance with the MANKENBERG order confirmation. The accompanying flange seals are generally <b>not included in the MANKENBERG supply schedule.</b></p>
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- During installation, centre the fitting by means of the flange screws on the mating flange before the screws are tightened.

*with screw-mountings:*

 note	The connecting surfaces on the body of the fitting are formed in accordance with the MANKENBERG order confirmation. The required seals are generally <b>not included in the MANKENBERG supply schedule</b> .
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- If present, connect drain pipe to the bleeding outlet (see section 5.1).

**Only continuous bleeding valve (EB 1.10 to EB1.48):**

If venting has to be avoided, a back-pressure valve can be delivered. The back-pressure valve has to be installed in the venting pipe by the customer if not already integrated in the armature in the factory.

 note	For the EB 1.11 the supplied float rod guide is to be installed in such a way that the float rod will be vertically guided. It must not obstruct the lift movement of the float.
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## 6 Pressure testing the pipeline section

The fitting has already been pressure-tested by the manufacturer. The following points should be observed when conducting a pressure test on a pipeline section with a bleeding and venting valve installed:

According to EN 12266-1, the test pressure **may under no circumstances exceed 1.5 times the value indicated on the body with “PN” or “Class”**.

If any leakage occurs on the fitting, Section 10 <Troubleshooting help> should be observed.

 caution	Completely fill the system with test liquid to ensure that the bleeding and venting valve is closed and sealed during pressure testing. <b>Fill slowly, so that the float (and lever system) are not damaged by pressure surge.</b> <b>Failure to observe this instruction may cause damage to the bleeding and venting valve.</b>
 note	If the pipe section is flushed and/or dried after assembly or pressure testing, it is necessary to make sure that the fitting has not been damaged by corrosion or excessively high temperature.

## 7 Initial start-up

 danger of fatalities	No fitting may be operated that does not have a sufficient pressure and temperature range for the operating conditions – see Section 1 <Intended use> and markings on the fitting. The manufacturer MANKENBERG should be consulted in the case of any applications outside of this range. <b>Failure to observe this regulation may mean danger to life and limb and may cause damage to the pipeline system.</b>
 note	For perfect operation, the system pressure must lie within the operating pressure range that is marked at housing of the bleeding and venting valve. See also the MANKENBERG catalogue section EB <Knowhow> and <Operating pressure range>. In cases of doubt contact MANKENBERG service. See Section 11 <Further information> for the addresses.
 caution	<i>If the vessel / the pipeline section is not completely filled with liquid:</i> <b>Fill slowly</b> , so that the float (and the lever system) are not damaged by pressure surge. <b>Failure to observe this instruction may cause damage to the bleeding and venting valve.</b>

 <b>danger</b>	<p>At the beginning of or shortly after the initial start-up, the sieve or the filter insert of any installed strainer/filter should be cleaned in order to avoid blocking the strainer/filter.</p>
 <b>caution</b>	<p><i>After the initial start-up:</i>  Check the seals on screw-mounted parts of the body and reseal if necessary.  Ask MANKENBERG for tightening torque, if necessary.  <b>Observe the relevant notes in Section 10 &lt;Troubleshooting help&gt;.</b></p>
 <b>caution</b>	<p><i>After the initial start-up:</i>  Control the leakage line for leaking medium.  Observe the relevant notes in Section 10 &lt;Troubleshooting help&gt;.</p>

## 8 Normal operation

A properly designed bleeding and venting valve works automatically and does not need any form of auxiliary energy.

 <b>danger of fatalities</b>	<p>It is necessary to ensure that the materials selected for the parts of the fitting in contact with media are suitable for the media in use. The manufacturer accepts no liability for any damage due to corrosion by aggressive media on parts made of unsuitable materials.  <b>Failure to observe this regulation may mean danger to life and limb and may cause damage to the pipeline system and to the fitting.</b></p>
 <b>caution</b>	<p>The fitting has functional parts that have to remain capable of moving easily. Make sure that parts in contact with the medium neither can freeze nor become blocked by dirt or deposits (especially the float). Observe the maintenance intervals.  <b>Failure to observe this instruction may cause damage to the pipeline system and to the fitting.</b></p>

It is recommended that the fitting should be inspected to ensure that it is functioning correctly after each new start-up.

## 9 Maintenance

The automatic function of the fitting requires maintenance to ensure that it continues to operate perfectly. It is important for maintenance work to take place **in a planned manner at periodic intervals**.

The maintenance plan in Table 1 is a recommendation by the manufacturer MANKENBERG, which should be supplemented by practical experience gained by the user under the prevailing operating conditions. MANKENBERG shall assume no liability resulting from **improper maintenance and/or repairs**.

**Table 1: Sample plan for maintenance work**

Type of maintenance	Work to be performed	Period <sup>1)</sup>
Check function	Check whether function is fulfilled as per Section 1) <Intended use>	at least 1x per week
Check seals on the body and the pipe connection	Visual inspection	at least 1x per month
Preventive maintenance	disassemble armature, see section 10 <Troubleshooting help> visual inspection functional parts, check float and lever system for cleanliness, mechanical damage and free movement. Replace all parts of the maintenance kit <sup>2)</sup>	at least 1x per year
<p><sup>1)</sup> See comment at the beginning of this section: The time intervals are guides which should be adapted to match the prevailing operating conditions, the properties of the medium in the system and the user's experience.</p> <p><sup>2)</sup> Request maintenance set and replacement instructions from MANKENBERG.</p>		

 <b>danger</b>	<p>During maintenance work (apart from visual inspections) the relevant recommendations and warning notes in Section 10 &lt;Troubleshooting help&gt; should be observed.</p> <p><b>Failure to observe this warning may mean danger to life and limb and may cause damage to the pipeline system and to the fitting.</b></p>
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When a fitting that has previously been dismantled is being put back into service, the fitting should be checked for proper sealing capacity and function as well as correct adjustment of the functional components!

## 10 Troubleshooting help

Be sure to observe Section 3 <Safety instructions> when rectifying faults.

Spare parts must be ordered with all the details on the nameplate.

**Only original parts from the manufacturer MANKENBERG may be installed.**

MANKENBERG experts are available to help in rectifying faults as quickly as possible.

See Section 11 <Further information> for the addresses.

 <b>note</b>	<p><i>If functional or corrosion damage is detected during maintenance or after a fault: consult MANKENBERG to find out whether a more suitable fitting is available or whether the damaged part can be supplied in a better-suited material.</i></p>
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Type of fault	Action
<p>Leakage at a connection body parts (flange or clamp ring):</p> <p><b>reseal connection</b></p>	<p>Tighten the screws <b>clockwise</b> (tighten flange screws crosswise).</p> <p><i>If the screws of the body connection have to be loosened or removed (= unscrewing in the <b>anticlockwise</b> direction):</i></p> <p style="text-align: center;">   <b><u>danger of fatalities</u></b> </p> <p>To prevent any risk for operating personnel, make sure that this repair measure is only carried out on a section of pipe that is not under pressure. Take note of Section 3.3 &lt;Special hazards&gt; and then Section 5 &lt;Installation in the pipeline&gt;.</p>
<p>Functional fault:</p> <p>leakage of the seat drains liquid from the bleeding pipe</p> <p><b>Clean and check functional parts</b></p>	<p>Possible reasons:</p> <ul style="list-style-type: none"> <li>- A foreign object may be jammed in the seat and be preventing proper sealing.</li> <li>- The lever system is moving to heavy due to dirt or corrosion</li> <li>- The float is too heavy due to deposits</li> </ul> <p>Cleaning is necessary: The bleeding and venting valve must be disassembled.</p> <p style="text-align: center;">   <b><u>danger of fatalities</u></b> </p> <p>To prevent any risk for operating personnel, make sure that this repair measure is only carried out on a valve that is not under pressure. Take note of Section 3.3 &lt;Special hazards&gt;.</p> <p>When the armature is pressureless, disassemble the bleeding and venting valve by loosening the flange or clamp connection, take out and clean float and lever system. Here all parts of the maintenance set should be renewed.</p> <p>After that, reassemble the armature, make sure that float and levers are moving easily</p>

<p>Functional fault: Cleaning alone – see above – cannot rectify the fault: <b>The fitting must be repaired</b></p>	<p><i>If during cleaning it is found out that the seat sealing and/or the float (and/or the lever system) or other functional parts are damaged:</i> Repair necessary: damaged parts have to be replaced  <i>If the repair is to be carried out in the customer's workshop:</i> make a note of all data according to the markings on the fitting and order the spare parts and necessary instructions from MANKENBERG. See Section 11 &lt;Further information&gt; for addresses.  or:  Send the fitting to the manufacturer for repair. See Section 11 &lt;Further information&gt; for the addresses</p>
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## 11 Further information

You can obtain these instructions, the MANKENBERG data sheets quoted as well as further information – including English language versions – from the following addresses:

**Mankenberg GmbH  
Spenglerstrasse 99  
D-23556 Lübeck**

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Fax +49-451 -8 79 75 99  
Email [info@mankenberg.de](mailto:info@mankenberg.de)  
[www.mankenberg.de](http://www.mankenberg.de)**