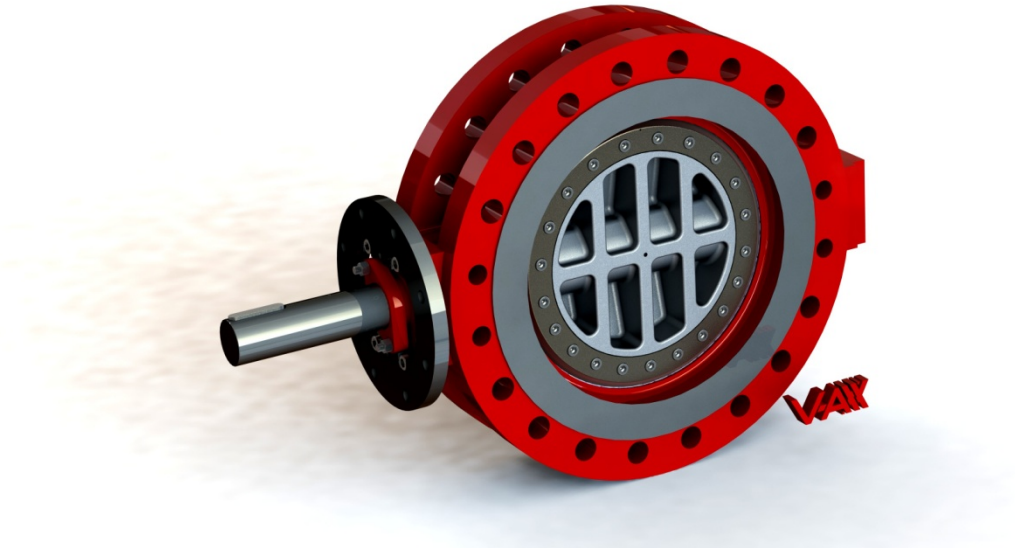
OPERATING INSTRUCTIONS

BUTTERFLY VALVE V-AXX®

10/2021



KU V-AXX® Sp.z o.o. Polska

Instruction nr: VX- UNI-10 / 2021

Declaration regarding Directives 2014/68 / EU and 94/9 EC ATEX

Manufacturer	**KU V-AXX® Sp.z o.o., Ściborzyce Małe 94, 48-100 Głubczyce / Polen**
Declares taht:	**Valves V-AXX®** **• equipped with a worm gear and handwheel,** **• supplied bare shaft for installing a worm gear with handwheel** **• equipped with pneumatic or electric actuators**
1. Are a pressure element within the meaning of the European Directive 2014/68 / EU (PED) and meet its conditions, 2nd instruction manual VX - M - 1/2019 will be followed.	

Technical standards applied

2014/68/UE **EN 593** **EN 12516 (DIN3840)** **94/9 EC**	**PED** **Butterfly valve standard** **Valve body design** **"ATEX"**

Technical Specifications

Catalog: <Butterfly Valves series V-AXX®>

Customization method used:

Annex II to the pressure equipment directive 2014/68/EU category III, module H

Certifying body:	*Iden number of certyfiying body:*
TÜV Thüringen	**0090**

Any modifications

Any modifications to the valve and / or actuator that change the design and / or use of the valve to other than those specified in Part 1 (Purpose of the Valve) invalidate this declaration.

Głubczyce 12/2018

Dr. Gregor Gaida, General Manager

0 Introduction

These operating instructions are designed to offer the user of butterfly valves from the V-AXX® series support in terms of installation, operation and maintenance and warn of any hazards in particular

⚠ Attention	**Non-adherence to the following caution and warning notices may lead to hazards, which in turn may cause the warranty to become invalid.** Please contact the manufacturer for any questions. For addresses please refer to final section

1 Intended use

Butterfly valves from the V-AXX® series are only to be used - following the installation of a pipeline system (between flanges or by welding) and following the connection of the actuator to the controls - to close off or pass on media or to regulate flow within the permitted pressure and temperature limits. These butterfly valves are not recommended for media with more than just a low amount of solid particulates, they are especially not recommended for wear-causing solid media.

The maximum pressure (Ps), that may not be exceeded, is specified on the type plate, as is the temperature range (Ts) that may not be exceeded. The precise relation between pressure and temperature can be requested from the manufacturer. When using the valve please ensure that section 2.2 < Safety instructions for the operator> is observed.

⚠ **Warning**	If there is a pressure difference larger than 0.4 bar (liquid media) for valves used for uninterrupted operation for controlling, please discuss the respective application limits with the manufacture. Cavitations must be avoided.

2. SAFETY INSTRUCTIONS

2.1 General safety instructions

The same safety instructions apply to valves as to the remaining piping system in which it is installed, as well as the control system to which the actuator is connected. These instructions only offer safety instructions that should be observed additionally for valves.

For actuator assemblies please refer to the additional safety instructions in the instructions of the assembly manufacturer.

2.2 Safety instructions for the operator

It is not the responsibility of the manufacturer V-AXX® and, it should therefore be ensured prior to use of the valve that the valve is only used as intended, as described in section 1.

⚠ **Danger**	No valve may be operated, whose permissible pressure/temperature range (= "rating") is insufficient for operating conditions: The permissible range can be requested from the manufacturer. For materials, pressures or temperatures that have not been approved by the manufacturer during the offer phase, permissible pressures above room temperature must be released by the manufacture. **Non-observance of these instructions can endanger life and limb and may cause damage to the pipe system.**
⚠ **Danger**	**It must be ensured that the selected materials for the parts of the valve that come into contact with media must be suitable for the media used. The manufacturer assumes no liability for damages that have been caused by corrosion or aggressive media.** **Non-observance of these instructions can endanger life and limb and may cause damage to the pipe system.**

→ An actuating unit which was subsequently mounted on the valve, which was adjusted to the valve and in both end positions correctly adjusted. In the closed position, the end stop must be in the seat of the valve. A stroke limitation in the actuating unit for the closed position should either be reset or made ineffective.

→ The pipe system and the control system must be professionally mounted. The wall thickness of the valve body is dimensioned so that in such professionally routed pipelines an axial pipe force Fz as per Barlow's formula ($Fz = \pi/4 \cdot DN^2 \cdot PS$) is considered. With butterfly valves for clamping even higher values for Fz can be permitted. Any shear forces applies to the valve may not exceed 10% of the aforementioned forces.

(PS = maximum permissible rated pressure at room temperature),

→ The number of pressure changes, such as from P=0 up to the maximum allowable pressure must never exceed the number of 1000 changes during the whole life of the butterfly valve.

→ The number of pressure chenges is not limited as long as the pressure changes never exceed 10% of the maximum allowable pressure

→ The life time of the butterfly valve is designed by the manufacturer for 20 years (200.000h)

→ The valve must be professionally connected to the piping systems, especially such valves which are connected to the pipeline by welding,

→ The operating time of a pneumatic/hydraulic actuator is adjusted to the system parameters. Using of actuators which are faster than T(90°)=DN(mm)/100 must be approved by the manufacturer. For example, a butterfly valve DN300 must never be opened faster than 3s.

→ In this pipe system the usual flow rates (e.g. 4 m/s for liquids) in continuous operation are not exceeded and abnormal operating conditions such as vibrations, water hammers, temperature shocks, cavitations, wet steam with a high water content and more than insignificant portions of solids in the medium - particularly abrasive ones - are cleared with the manufacturer,

→ Valves which are operated at operating temperatures of >50°C or <-20°C are protected against contact together with the pipe connections,

→ The valves are only operated and maintained by specialized and trained personnel.

→ Regulating valves must be mounted with the shaft in horizontal position. Butterfly valves which cycle number will exceed more than 10.000 cycles should be mounted hoizontaly too.

→ The valves must be installed in accordance to the arrow on the name plate (the closed disc is on side of the higher pressure), except in cases when the valve and its actuator is designed to be used in both directions

2.3 Particular hazards

⚠ **Danger - Life threatening**	The valve shaft is sealed by a stuffing box. Before the nuts on the stuffing box gland are loosened or unscrewed, **the pressure in the pipeline has to be completely reduced and the pipe system empty,** so that no medium escapes from the stuffing box.
⚠ **Danger - Life threatening**	Before loosening the plug (or the cover) on the body or before removing the valve from the pipeline **the pressure in the pipeline has to be completely reduced** so that no medium can escape from the line uncontrollably**.** It must be ensured **that the valve is opened 5°-10,** so that any pressure can escape from both sides of the valve. The actuator may – if required – be disassembled only once the valve has been opened for for this purpose and that **it remains in this opened position**.
⚠ **Caution**	*For valves used as terminal valves:* With normal operation, especially with gaseous, hot and/or hazardous media **a blind flange or a sealing cover has to be mounted on the free connecting socket** or (only for short-term use!) the valve has to be securely locked in "CLOSED" position. Caution when closing such as valve: Danger of crushing!
⚠ **Caution**	If a valve has to be opened in a pressurized line as a terminal valve, this must be accomplished with utmost caution so that **spurting medium** does not cause any damage. Caution when closing such as valve: Danger of crushing!
⚠ **Caution**	*If a valve has to be removed from a pipeline:* Medium may escape from the line or the valve. In the case of media which are harmful to health or hazardous the pipeline has to be completely empty before the valve is removed. Please be careful with **residues which continue to flow from dead spaces of the valve or line** or **which remain in the valve (under pressure).** Depending on the length of the valve, the disc of the opened valve extends into the bordering pipeline. As a security measure, V-AXX valve with actuator should be removed from the pipeline in the closed position. A disc which is not held by the actuator may unintentionally open and thus lead to damages or injuries.

2.4 Labeling of the butterfly valve

Each butterfly valve is labeled with the following data (type plate):

	Marking	Comment
Manufacturer	**KU V-AXX®**	Adress
Model:	Example.: **VXK1 0150 4 XFFF...**	Valve coding -> manufacturer
S.- No.	2019/03/500 001	Year / Month / Serial number
Size	**DN (+ Wert)**	Nominal size [mm], for example.. DN200 ; or inch 8"
PN or #	**Value** PN or Class	PN / class = Connection for standard flanges
CWP / PS	**Value in** [Bar] or [PSI]	= Never exceed Pressure
max. T / TS	**Value** in [°C] or [°F]	= Never exceed Temperature
Arrow	⟶	Preferred flow direction

The materials used in the valve, as well as parts that come into contact with the media, as well as pressure parts are uniquely coded in the type code. The manufacturing date can be uniquely traced via the serial number. In order to be able to identify the valve, the type plate may not be removed nor damaged.

3. 3 Transport and storage

Valves have to be handled, transported and stored with care:

→ The valve is to be kept in its original packaging and/or with the protection caps on the flange connections/weld ends. The valve should be stored and transported (also to the installation site) on a pallet (or supported in a similar way).

→ If stored prior to installation, valve and actuator are to be stored in a closed room and to be protected against harmful influences such as dirt or moisture.

→ Especially the actuator and the flange connection faces/weld ends must not be damaged by mechanical or any other influences. The seat and the seal are very important too.

→ Valves must be stored in the same way they were delivered. The actuator must not be activated.

 **Caution**	*Values delivered without an actuator:* The valve must be transported carefully: The unsecured valve disc may open from closing position due to external effects (e.g shaking).

 **Caution**	*Valves with actuator type "safety position OPEN"* The valve disc of short valves protrudes from the housing on both sides. **The transport of such valves is only permitted with disassembled actuator and closed valve disc!**

4. INSTALLATION

4.1 4.1 General

The same instructions apply to the installation of valves in a pipeline as for the connection of pipes and similar piping elements. The following instructions additionally apply to valves. For the transport to the installation site please also observe section 3 (above).

⚠ **Attention**	Butterfly valves – especially those with short face-to-face dimensions – must be **transported and installed with a closed valve disc**. Otherwise the discs might be damaged. Leak tightness may no longer be ensured.
⚠ **Attention**	*Danger of crushing for non-installed butterfly valves:* The actuator may only be closed and activated **once the butterfly valve has been installed in the pipeline.** If the valve is intended to be used as an end flap, either the closing lid has to be mounted at the outlet or the actuator must be securely shielded against unauthorized operation, in order to prevent any risk of crushing.
⚠ **Note**	*The butterfly valve must be adjusted by the manufacturer for a sealed closed position:* In the closed position, the end stop of the valve/actuator unit must be in the base of the butterfly valve. A stroke limitation in the actuator should either be reset or made ineffective. **The "CLOSED" position of the end stop** may not be changed.
⚠ **Danger - Life threatening**	*If – in an exceptional case – a valve has to be mounted without actuator:* It must be ensured that such a **valve is not pressurized**. If an actuating unit is retrofitted, torque, direction of rotation, actuating angle and the setting of the end stops “OPEN” and “CLOSED” of the valve have to be adjusted to the operating conditions. It must be ensured that the valve is sealed in a clockwise direction! **Non-observance of these instructions can endanger life and limb and may cause damage to the pipe system.**
⚠ **Attention**	*Valves with electric actuator:* It must be ensured that the valve is shut off in the **"Closed"** position **by the signal of the torque switch**. In the **"Open"** position, the valve must be shut off **with the signal of the limit switch** . *For further information, please refer to the operating instructions for the electric actuator.*

4.2 Installation

→ Transport valve in the protective packaging to the installation site and unpack it only there.

→ Inspect valve and actuator for any damages that may have occurred during transport.

Damaged valves or actuators may not be installed.

→ Ensure that only valves are installed with the pressure class, the connection type and connection dimensions which meet the application requirements. Observe the type plate on the valve. The connection data for the actuator has to correspond to the data of the controls. Make sure the installation coresponds to the data on the type plate.

⚠ **Danger**	No valve may be installed, whose permissible pressure/temperature range (= "rating") is insufficient for operating conditions: This permitted range is described in the V-AXX®.brochure < V-AXX® butterfly valves> - see section 9 <Information>. For materials, pressures or temperatures that have not been specified in the above brochure, permissible pressures above room temperature must be released by the manufacture. **Non-observance of these instructions can endanger life and limb and may cause damage to the pipe system. If in doubt, please contact the manufacturer.**

→ Butterfly valve with short face-to-face dimension:

Counter flanges and/or pipe ends have to have a clear span allowing for sufficient space for the opened valve disc, so that the latter is not damaged when being swiveled out.

→ Prior to installation the valve and the downstream pipeline have to be thoroughly cleaned of any contamination, especially of hard foreign substances.

→ Butterfly valves of the series V-AXX® can generally be installed irrespective of the flow direction. To benefit from the optimum function of the butterfly valves:

it is recommended to install the valve so that an arrow direction marked on the type plate corresponds to the direction that the pressure exerts on the closed disc. This direction may well be opposite to the flow direction with opened butterfly valve!→ Die Absperrklappe sollte so montiert werden, dass sich die Antriebswelle optimalerweise in einer horizontalen Position befindet.

The preferred installation position is the one with horizontal valve shaft. If this is not possible, the shaft should be installed as much as possible from vertical position. If possible, the actuator should not be mounted directly below the valve. Stuffing box leakage could damage the actuator. If possible, the actuator should not be mounted directly above the valve: Air heated by the pipeline may damage the actuator.

⚠ **Danger**	A subsequently mounted actuator must be supported if, as a result of its weight and/or the mounting position on the mounting kit, a non-scheduled bending load occurs between the valve and the actuator.

→ When inserting the valve (and the flange seals) in an already mounted pipeline the distance between the pipeline ends has to be dimensioned in such a way that all connecting surfaces (and seals) remain undamaged.

The gap, however, must not be larger than necessary so that no additional stress is generated in the pipeline during installation.

Danger	*Butterfly valves with a short face-to-face dimension and actuator safety position OPEN":* It´s only allowed to mount such an actuator on th evalve after the valve was installed in the piping system.

For all butterfly valves:

→ When inserting the valve (and the flange seals) in an already mounted pipeline the distance between the pipeline ends has to be dimensioned in such a way that all connecting surfaces (and seals) remain undamaged.

The gap, however, must not be larger than necessary so that no additional stress is generated in the pipeline during installation. The counter flanges or ends of the pipeline have to be flush, level and parallel.

Caution	*Butterfly valves with flange ends:* *The sealing surfaces on bodies with flange ends of the butterfly valve are designed in such a way that flange seals according to EN1514-1 or ANSI B16.21 are to be implemented. Counterflanges must have smooth sealing strips, e.g. shape C, D or E in line with EN 1092 or stock finish as per Ansi B16.5. Other flange shapes are to be agreed with the manufacturer V-AXX®.*
Caution	Butterfly valves with a short face-to-face dimension must be inserted in the gap between the pipeline ends with a closed valve disc; otherwise the valve disc may be damaged and the valve no longer seals.

→ Flanged butterfly valves are to be centered on the counterflange during installation by means of the flange screws before the screws are tightened. The bolts must be tightened X – wise to spread the load all around the flande. The bolts must be never tightened stronger than in accordance to the formula: $Fz=\pi/4xDN^2xPS$.

Caution	Butterfly valves with a short face-to-face dimension partly require screws of a varying length for the connection to the counterflanges. For the measurements for the flange screws please refer to V-AXX planning documentation

Only butterfly valve with weld ends:

→ The weld ends of the valve have to be flush, level and parallel and of the same material as the pipes - see type plate of the valve.

→ Opposite weld ends have to fit to one another in terms of diameter and shape.

→ Welding cables must not be connected to the valve but to the pipeline.

→ By professional welding it has to be ensured that neither considerable tensions are generated in the pipe section or transferred to the valve nor that the butterfly valve is damaged by heat effect; only temperatures of <300°C measured on the body wall next to the bearing socket, are permissible.

→ Especially valves with sizes DN400 and above :

⚠ **Caution**	When welding the valve into the pipeline, the welding process has to be controlled so that the supplied thermal energy is limited and a distortion of the valve body is avoided. For example, the weld end should be "crossed" in order to prevent tension to the valve housing. Non-compliance with these constructions may lead to a distortion of the valve housing. A lasting distortion of 1/10 mm in the seat area (around the bearing sockets) can render the valve useless.

5. PRESURE TEST

The pressure test of the valves has already been performed by the manufacturer. For the pressure test of the pipe section with installed valves, the following should be taken into consideration:

→ First thoroughly flush newly installed line systems in order to flood out all foreign substances and fill the pipe slowly.

→ **Valve opened:** The testing pressure must not exceed the value 1.5 x PS (according to type plate). (PS = maximum permissible rated pressure at 20°C).

→ **Valve closed:**

The testing pressure must not exceed the value 1.1 x PS (according to type plate).

If any leakage occurs from a valve, please refer to section 7 <Troubleshooting>.

6. Normal operation and maintenance

The valves are to be operated with the signals of the control. Valves which were delivered ex works with the actuator are adjusted for correct operation and should not be re-adjusted as long as the valve is in perfect working order.

For the manual emergency actuation on the actuator (if available) normal manual forces are sufficient; the use of extensions to increase the actuation torque is not permitted.

Regular maintenance work on the valves is not required; however, when the line section is inspected no leakage may escape to the outside on any valve. In such cases, please refer to section 7 < Troubleshooting>.

It is recommended to actuate valves remaining in one position once or twice a year.

The prospective switching cycles of the valve are being calculated with the following formula: (4,000,000 / DN(mm)). If the actual amount of switching cycles exceeds the calculated number, please review with the manufacturer.

 **Danger**	A butterfly valve is normally not self-locking: The actuator may not be removed as long as the butterfly valve is pressurized.
 **Danger**	During first cooling down of a cryogenic valve, the stuffing box nuts must be tightened continously during the cooling proces.

7. TROUBLESHOOTING

When remedying faults, it is imperative that section 2 <Security notes> is observed.

Issue	Solution	Notes
Leakage on the flange connection or plug or housing cover	Retighten flange screws. If the leakage cannot be remedied in this manner: repair required: replace seal. Observe section 2.3. <Particular hazards> and request spare parts and necessary manual from V-AXX®.	***Note 1:*** *Spare parts must be ordered based on all data contained on the type plate. Only original V-AXX® spare parts can be installed.* ***Note 2:*** *If after the removal it is discovered that the body and/ or the inner parts are not sufficiently resistant to the medium, parts made of a suitable material are to be selected*
Leakage in the seat seal	Check whether the valve is 100% sealed. If the valve is sealed: Check whether the actuator closes with full torque. If this is the case: Open/ close valve repeatedly under pressure. If the valve still leaks: Increase torque in the "CLOSED" position to max. 1.1. x nominal torque. If the valve continues to leak: repair required: Replace seat seal. Observe section 2.3. <Particular hazards> and request spare parts and necessary manual from V-AXX®.	
Leakage on the stuffing box	Retighten both nuts on the stuffing box gland alternately and in small steps of quarter turns each clockwise. *If the leakage cannot be remedied in this manner:* repair required: Request spare parts and necessary instructions from V-AXX®. *If the nuts on the stuffing box gland have to be loosened or unscrewed (counterclockwise):* **Danger! Life threatening!** In order to protect the operating personnel against any danger, please ensure that the line has been depressurized on both sides of the valve. Please observe section 2.3 <Particular hazards>.	

Malfunction	Check actuating unit and control commands. If actuator and control are ok: Remove and inspect valve (in observance of the notes from section 2.3, <Particular hazards>). If the valve is damaged: Repair required: Request spare parts and necessary instructions from V-AXX®.	

8. WARNINGS

Source of danger	**Warnings**
Flammable explosive atmosphere	Connect the valve to the ground.
Sparks in explosive atmosphere	Operating instructions: Please watch out for leakages, as a flammable atmosphere may otherwise develop
Sparks during commissioning / assembly	Operating instructions: Assembly / disassembly / service only allowed for a non-flammable atmosphere Working in accordance to general safety rules is important and necessary. Moving or transport of heavy parts, please follow th egeneral safety rules..
Static loading of components	The elevated temperature of the valve due to flowing hot meadia through the valve must be lower than the ignition temperature of the atmosphere. Sound energy can be caused by attachment parts or flow noise Closing times below the rule of thumb are not allowed (Closing time in s = nominal width in mm / 100) not allowed
Generating of ingnition sources	When installing additional parts which have not been installed by the manufacturer or have not been explicitly approved for installation, such as aluminum plates or other fittings, e.g. electric position feedback, a NEW hazard analysis has to be performed. The ATEX manufacturer declaration is not valid.
Corrosion	Corrosion exceeding 1.0 mm may lead to a weakening of pressure parts and impair the functionality of the valve or may even lead to breakdown.

9. 9 Further information

These operating instructions, the so-called V-AXX® brochures and further information – also in other languages – can be obtained here:

KU V-AXX® Sp. z o.o.

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