



# **Operating Instructions**

**Cryogenic valve from the Cryaxx series  
(with manual drive)**

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## 0 Introduction

These instructions are intended to support users of coaxial valves from the CRYAXX series when installing, operating and doing maintenance work on fittings.

 <b>Caution</b>	<p>If the following caution and warning notes are not followed, hazards may be generated and the manufacturer's guarantee will cease to apply. The manufacturer is available for queries. Please see section 9 for addresses.</p>
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### 1 Use according to the intended purpose

Coaxial valves from the CRYAXX series with manual drive are exclusively intended for blocking off or guiding media within the permitted pressure and temperature limits, or for regulating flow rates after installation in a pipeline system (between flanges or having been welded or screwed in). These coaxial valves are not recommended for media containing solid particles; in particular solid particles which can cause wear.

The permitted pressure and temperature range is described in the planning documentation CO-AX data sheet <Coaxial valves, CRYAXX> (see section 9 <Information>).

Section 2.2 < Safety guidelines for the operator> must be observed when using fittings.

 <b>Caution</b>	<p>If fittings are used for regulation with differential pressures larger than 0.15 bar (fluid media at approx. 20°C) in continuous operation, the application limits must be coordinated with the manufacturer. Cavitation must be avoided!</p>
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#### 1.1 Fittings for oxygen

With the goods inwards inspection it is to be checked whether the fittings supplied are furnished with appropriate certificates for the oxygen cleaning and whether the fittings have packaging suitable for oxygen (see identification oxygen "Clean for Oxygen Service"). The packaging is to be checked for damage. If there is damage, such fittings may not be employed for oxygen applications as there is a strong suspicion that the fittings are contaminated which could lead to an oxygen combustion.

When it is assured that the packaging has suffered absolutely no damage during transport then the fittings are to be removed from the packaging in a room suitable for this purpose. The room must be free of oxygen and grease and it must also be ensured that the room has no aliphatic atmosphere. Staff, who remove the fittings from the packaging and also install the fittings in the pipeline, must have suitable protective clothing (grease- and oil-free gloves, grease- and lubricant-free clothing etc.).

The fittings removed from the packaging are to be checked once again for damage. An optical visual check under UV light is the minimum requirement. The fittings, which have been checked for possible contamination, whose perfect condition has been established, are to be taken without delay to the place of installation whereby it is to be ensured there that the fittings during this transportation route have not come into contact with oil and grease or been contaminated in any other way.

With the installation of the fittings, the normal safety regulations and the instructions of this operation and maintenance manual are to be followed. In this connection attention is additionally to be paid that, in particular, also the pipelines, the adaptors face to face with the fitting and also, in particular, the seals, are suitable for oxygen and that there is also absolutely no contamination, in particular due to oil and grease, apparent.

	<p>Disregard of this instruction can represent a danger to life and limb because oxygen combustion equates to an explosion!</p>
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## 2 Safety guidelines

### 2.1 General safety guidelines

Fittings are subject to the same safety guidelines as the pipeline systems into which they are built. These instructions provide only those safety guidelines which **additionally** apply for fittings.

### 2.2 Safety guidelines for the operator

The manufacturer CO-AX is not responsible for the following. Therefore when using the fittings, you yourselves must ensure that:

⇒ The fittings are only used according to their purpose as described in section 1.

 <b>Danger of death</b>	<p>No fittings may be operated if their permitted pressure / temperature range (= rating) is insufficient for the operating conditions: this permitted range is defined in the CO-AX data sheet &lt;Coaxial valves, CRYAXX&gt;. It is absolutely necessary that materials or pressures or temperatures which are not stated in the data sheet shown above are approved in terms of the permitted pressures above room temperature by the manufacturer.</p> <p><b>Ignoring this specification can mean danger of bodily injury and death and can cause damage to the pipeline system.</b></p>
 <b>Danger</b>	<p>It must be ensured that the materials selected for those parts of the fittings which come into contact with the media are suitable for the media used. The manufacturer cannot be held liable for damage occurring due to corrosion by aggressive media.</p> <p><b>Ignoring this specification can mean danger of bodily injury and death and can cause damage to the pipeline system.</b></p>

- ⇒ A gearbox is provided which is to be retrofitted onto the fittings and adapted to these fittings. The fittings must be correctly aligned in both end positions. In closed position, the limit stop must be positioned in the fittings seat. Stroke limitations in the gearbox must either be prevented or rendered ineffective.
- ⇒ The pipeline system has been professionally laid. The wall thickness of the housing for the fittings is calculated so that, in professionally-laid pipelines, an additional load  $F_z$  to the usual amount ( $F_z = \pi/4 \cdot DN^2 \cdot PS$ ) can be taken into account. Any transverse forces applied to the fittings must not exceed 10% of the forces named above.  
(*PS = maximum permitted design pressure at room temperature*),
- ⇒ The coaxial valves have been professionally installed into the pipeline system; in particular fittings which are welded to the pipeline.
- ⇒ The usual flow rate speeds (e.g. 4 m/s for fluids) are not exceeded in permanent operation and abnormal operating conditions such as vibrations, water impacts, erosion (e.g. due to wet steam), cavitation and more than minimal proportions of solid particles in the media, in particular wearing particles, have been clarified with the manufacturer.
- ⇒ Fittings which are operated at operating temperatures of  $>50^\circ\text{C}$  or  $<-20^\circ\text{C}$  and pipeline connections are protected against contact.
- ⇒ Expert personnel are available who can operate and do maintenance work on the fittings.

### 2.3 Particular hazards

 <b>Danger of death</b>	<p>The shaft is sealed with a gland. Before the central nut on the gland is loosened or unscrewed, <b>the pipeline must be completely depressurised</b> so that no media comes out of the gland.</p>
	<p>Before the fittings are removed from the pipeline, <b>the pipeline must be completely depressurised</b> so that no media comes out of the pipeline in an uncontrolled manner.</p>

<b>Danger of death</b>	It must be ensured <b>that the fittings are open at least a little</b> so that pressure can escape on both sides of the fittings. The gearbox can, if necessary, be disassembled after the fittings have been opened for this purpose, and <b>have been left open</b> .
 <b>Danger</b>	<i>For fittings which are used as end fittings :</i> For normal operation, in particular for gaseous, hot and/or dangerous media, <b>a blank flange or a filler cap must be installed on the free connection pieces</b> , or (only for short-term use!) the fitting must be securely locked in "CLOSED" position. Be careful when closing such fittings: danger of crushing!
 <b>Danger</b>	If fittings used as end fittings have to be opened in a pressurised line, this must be undertaken extremely carefully so that the <b>media which will spray out</b> does not cause any damage. Be careful when closing such fittings: danger of crushing!
 <b>Danger</b>	<i>If fittings have to be removed from a pipeline:</i> Media may leak out of the line or the fittings. The pipeline must be completely emptied of media which is hazardous to health or dangerous media before the fittings are removed. Be careful with <b>residues which will flow out of dead zones in the fittings or the pipeline</b> , or which may have remained <b>in the fittings (under pressure)</b> .

## 2.4 Valve markings

Every valve is marked with the following data (Type tag):

For	Marking	Notes
Manufacturer	<b>www.co-ax.com</b>	For address see section 9 <Information>
Type code	e.g.: <b>LCS100254XXXXXBXXX XXXX3 XXXXX</b>	Code No.: Fittings identification
Serial number	e.g.: <b>251896.1-AA</b>	Equals: Order number and production number
KNA No.	e.g.: <b>850001</b>	Neutral customer article number
Type / DN	<b>CRYAXX DNXXX (X")</b>	Numerical value in mm, e.g. DN200 or in inches, e.g. 8"
PN / class	<b>Numerical value</b> for PN / class	PN / class = Standard for flanged coaxial valves
CWP / PS	<b>Numerical value</b> in bar or PSI	= Pressure, upper limit of use at 20°C
Max. T / TS	<b>Numerical value</b> in °C or °F	= Temperature, upper limit of use
Year of construction	e.g.: <b>43/09</b>	= Week of delivery/year of construction

The materials used for the fittings, the parts which will come into contact with the media and the parts which have to withstand pressure are clearly encoded in the type code. The date of manufacture is clearly traceable via the serial number. The type tag must never be removed or damaged so that the fittings remain identifiable.

## 3 Transport and storage

Fittings must be carefully handled, transported and stored:

- ⇒ The fittings must be stored in their original packaging and/or with protective caps on the flange connections/welding ends.
- ⇒ If the fittings are stored prior to installation, they must be kept in a closed space and protected against influences which may cause damage such as dirt or damp.
- ⇒ The metal bracket in the fittings and the flange connection surfaces/welding ends in particular may not be damaged mechanically or in any other way.
- ⇒ The fittings must be stored as delivered. The gearbox must not be operated.

 <b>Danger</b>	<i>Fittings which are delivered without a gearbox.</i> These fittings must be transported particularly carefully: the closing element (cone) which is not safe-guarded can open up from closed position due to outer influences (e.g. vibration).
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## 4 Installation into the pipeline

### 4.1 General

When installing fittings into a pipeline, the same instructions apply as for the connection of pipes and similar pipeline elements. The following instructions apply **in addition** for fittings. Section 3 (above) must also be observed during transport to the installation site.

 <b>Caution</b>	<p>Coaxial valves – must be <b>transported and installed with the closing element (cone) closed</b>. Otherwise foreign matter be may caught in the valve, damaging it.</p>
 <b>Caution</b>	<p>If the fittings are intended as end fittings in a pipeline section, either an end cap must be mounted onto the outlet or (for temporary use only!) the gearbox must be locked securely against unauthorised access.</p>
 <b>Guideline</b>	<p><i>The valve is adjusted by the manufacturers for a well-sealed closed position:</i>          In closed position, the gearbox limit stop must be positioned in the fittings seat. Stroke limitations in the gearbox must either be prevented or rendered ineffective.  <b>This limit stop "CLOSED" position may not be altered.</b></p>
 <b>Danger of death</b>	<p><i>If – in exceptional cases – fittings or a gearbox have to be installed:</i>          Please ensure that such fittings <b>are not pressurised</b>.          If a gearbox is retrofitted, the nominal torque, rotational direction and the adjustment of the limit stops "OPEN" and "CLOSED" must be adapted to the fittings and the operating conditions.  <b>Ignoring this specification can mean danger of bodily injury and death and can cause damage to the pipeline system.</b></p>

### 4.2 Working steps

- ⇒ Transport the fittings to the installation site in their protective packaging and unpack it there.
- ⇒ Inspect the fittings and gearbox for damage sustained during transport. Do not install damaged fittings.
- ⇒ When beginning installation, carry out a function test. The fittings must close and open properly. Recognisable malfunctions must be removed before commissioning. See also section 7 <Help during malfunctions>. The position indicator on the gearbox must comply with the position of the closing element.
- ⇒ Ensure that only those fittings are installed which comply with the operating conditions in terms of pressure class, connection type and connection dimensions. See the type tag on the fittings.

 <b>Danger of death</b>	<p>No fittings may be installed if their permitted pressure / temperature range (= rating) is insufficient for the operating conditions: this permitted range is defined in the CO-AX data sheet &lt;Coaxial valves, CRYAXX&gt;. It is absolutely necessary that materials or pressures or temperatures which are not stated in the data sheet shown above are approved by the manufacturer in terms of the permitted pressures above room temperature.  <b>Ignoring this specification can mean danger of bodily injury and death and can cause damage to the pipeline system.</b>          Please contact the manufacturers if in doubt.</p>
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- ⇒ Before installation, the fittings and the connecting pipeline must be cleaned of dirt, in particular of solid foreign matter.
- ⇒ The fittings must be installed so that the **direction arrow marked** on the housing complies with the direction **in which the pressure is applied to a closed fitting**. This direction may be against the direction of flow when the coaxial valve is open!
- ⇒ The recommended installation position is with the shaft placed vertically and the gland above the pipeline.

- ⇒ The coaxial valve must be installed so that the gearbox is not damaged or rendered unusable by temperatures which are too low or too high. If necessary, insulate the pipeline. The gearbox must lie outside the insulation.

 <b>Danger</b>	An assembled gearbox must be supported if it causes unplanned bending strain due to its weight and/or its installation position.
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- ⇒ When pushing the fittings (and the flange seals) into the pre-assembled pipeline, that distance between the pipeline ends must be measured so that all connecting surfaces (and seals) remain undamaged.  
However, the gap must not be larger than necessary so that no additional tensions are generated in the pipeline.

**Only coaxial valves with flanges:**

- ⇒ The pipeline counterflanges must align and be plane-parallel.

 <b>Caution</b>	<p><i>Coaxial valves with flange ends</i></p> <p>The seal surfaces on housings with coaxial valve flange ends are formed so that flange seals acc. EN1514-1 or ANSI B16.21 have to be used. Counterflanges must have smooth sealing strips, e.g. C, D or E shapes acc. standard EN 1092, or stock finish acc. ANSI B 16.5. Other flange shapes must be coordinated with the manufacturers CO-AX.</p>
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- ⇒ Flange coaxial valves must be centred during installation using the flange screws on the counterflange before the screws are tightened.

 <b>Caution</b>	Coaxial valves require in part different screw lengths for connection to the counterflanges. See CO-AX planning documents for the flange screw dimensions.
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**Only coaxial valves with welding ends:**

- ⇒ The welding ends on the fittings must align, be plane-parallel and of the same type of material as the pipe - see material information on the fittings type tag. Welding ends lying opposite each other must match in terms of diameter and joint shapes.
- ⇒ Welding cables must not be clamped to the fittings, but rather onto the pipeline.
- ⇒ Professional welding must be carried out to ensure that no tensions worthy of mention are generated in the pipeline section or are transferred onto the fittings, nor that the coaxial valve can be damaged by the effects of heat. Only temperatures <300°C are permitted, measured on the housing wall.

**5 Pressure test and commissioning**

The fittings have already been subjected to a pressure test by the manufacturer. Please observe the following for the pressure test on a pipeline section with installed fittings:

- ⇒ Newly-installed line systems must first be carefully rinsed in order to remove any foreign matter.
- ⇒ **Fittings open:** The test pressure must not exceed the **value 1.5 x PS** (acc. type tag). (*PS = maximum permitted operating pressure at 20°C*).
- ⇒ **Fittings closed:** The test pressure must not exceed the **value 1.1 x PS** (acc. type tag).

If a leak occurs on fittings, please observe section 7 < Help during malfunctions>.

## 6 Normal operation and maintenance

**Fittings which were delivered ex-works with a gearbox have been precisely adjusted and should not be readjusted as long as the fittings work perfectly.**

Normal manual force is sufficient to activate the hand wheel on the gearbox. The use of extensions in order to increase the actuation torque is not permitted. Regular maintenance work is not required on the fittings, but if a pipeline section is checked, the fittings should not leak outwards. In such cases, please observe section 7 < Help during malfunctions>.

**We recommend that you actuate fittings which remain fixed in one position 1x to 2x per year.**

 <b>Danger</b>	<p>A coaxial valve is not normally self-locking:          The gearbox must not be mounted <b>as long as the coaxial valve is pressurised.</b></p>
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## 7 Help during malfunctions

**You must observe section 2 <Safety guidelines> when removing malfunctions.**

Type of malfunction	Measure	Notes
Leakage at a connection to the pipeline flange	Re-tighten the flange screws. <i>If the leak cannot be removed in this way:</i> Repairs are required: replace seal. Observe guidelines from section 2.3. <Particular hazards> and request the appropriate instructions from CO-AX.	
Leakage in the seat seal	Check whether the fittings are 100% closed. <i>If the fittings are closed:</i> Check whether the gearbox closes with full torque. <i>If the gearbox closes with full torque:</i> Open/close the fittings several times under pressure. <i>If the fittings are still leaking:</i> Repairs are required: replace seat seal. Observe guidelines from section 2.3. <Particular hazards> and request spare parts and appropriate instructions from CO-AX.	<u><b>Guideline 1:</b></u> <b>Spare parts must be ordered stating all information in the type tag. Only original CO-AX-parts are to be installed.</b>
Leakage at the gland	Re-tighten the central nut in the gland clockwise in small steps. <i>If the leakage cannot be removed in this way:</i> Repairs are required: request spare parts and appropriate instructions from CO-AX. <i>If the nuts on the gland have to be loosened or screwed off (counter-clockwise):</i> <div style="text-align: center;">   <b><u>Danger of death</u></b> </div> To protect operating personnel, please ensure that the line on both sides of the fittings have been depressurised in advance. Observe section 2.3 <Particular hazards>.	<u><b>Guideline 2:</b></u> <i>If, after removal, you see that the housing and/or interior parts are not sufficiently resistant to the medium, please select parts made of suitable materials.</i>

Malfunction	<p>Check the gearbox function.</p> <p><i>If the gearbox and controls are OK:</i> Remove the fittings (observe guidelines from section 2.3 &lt;Particular hazards&gt;) and inspect them.</p> <p><i>If the fittings are damaged:</i> Repairs are required: request spare parts and appropriate instructions from CO-AX.</p>	
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## 8 Warnings

### Source of danger

### Measures

**Generation of an explosive atmosphere**  
**Sparks during commissioning / installation**

Operating instructions: watch for leaks, otherwise an explosive atmosphere may be generated  
Operating instructions: Installation / deinstallation / service only permitted if the atmosphere is not explosive

**Electrostatic loading on individual components**

Please make sure that the CRYAXX valve is grounded. Proceed with any mounted parts acc. manufacturer's instructions.

**Usage**

Heating of the fittings parts due to hot media must remain below the ignition temperature.  
Sonic energy may be produced by any mounted parts or flow noises.  
Closing times below the rule of thumb (closing time in s = nominal width in mm / 100) are not permitted.  
Proceed with any mounted parts acc. manufacturer's instructions.

**Generation of ignition sources**

When mounting additional parts which have not been mounted by the manufacturer or expressly released for mounting, such as aluminium signs or other equipment such as electrical position feedback signals, please carry out the risk analysis AGAIN.

**Corrosion**

Corrosion over 1.5mm can lead to weakening of the pressure-bearing parts and influence the fittings functions or lead to their failure.

## 9 Further information

These instructions, the CO-AX data sheets named and further information and advice - also in other languages - can be obtained here:

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