- TRANSLATION OF THE ORIGINAL -

OPERATING INSTRUCTIONS

Vessel Cleaning Device

- ATEX - Jet Cleaner -

TANKO®JX70-2
TANKO®JX75-2
TANKO®JX80-2

II 1/2 G c TX

II 1/3 G c TX

⚠ WARNUNG

Before commissioning the device, carefully read these instructions in order to avoid injuries or damage to property!

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2014 / 04 Rev. 3
Operating Instructions

ATTENTION

These instructions are an essential part of the device and must be available to the operation and maintenance personnel *at all times throughout its entire life cycle*. The safety instructions must be followed!

Translation

The operating instructions are to be translated into the official Community language of the European Community acceptable to the manufacturer of the machine in which the partly completed machinery will be assembled, or to his authorized representative. In case any discrepancies should occur in the translated text, the original operating instructions (German) are to be consulted for clarification or the manufacturer is to be contacted.

CONTENT

1 General Notes

The terms performed on the cover and title page such as operating instructions, assembly instructions, installation instructions and user instructions are hereinafter referred to as „instructions“ in accordance with this document.

1.1 Reading the Instructions

These instructions are an integral part of the device and contain important notes corresponding to the operation and service that are to be adhered to. In the event of resale of the device the instructions of this device have to be supplied at all times. These instructions are intended for staff responsible for the assembly, installation, startup and maintenance of the device.

The instructions must be made available in a legible condition during the entire lifecycle of the device. The operator has to ensure that the staff responsible for the plant and operation, as well as persons working independently on the device, have read and understood these instructions in their entirety.

If anything is unclear or there is a need for additional information, please contact Armaturenwerk Hötensleben GmbH.

For maintenance and repair we recommend training by the manufacturer or the manufacturer’s authorized representative.

1.2 Structure of the Safety Notes

1.2.1 Description of the signal words

The safety instructions in this manual are indicated by symbols and headed by a signal word expressing the severity of the danger or hazard.

The following table shows the severity and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal Word	Meaning	Consequences for Non-Observance
⚠ **DANGER**	Imminent danger at high risk	Death or serious bodily injuries
⚠ **WARNING**	Potentially dangerous situation at medium risk	Death or (severe) bodily injuries
⚠ **CAUTION**	Potentially dangerous situation at low risk	Minor or moderate physical injuries or damage to property
ATTENTION	Possible damage to property	Damage to the device or the environment
NOTE	Additional notes, tips and recommendations for action: facilitate handling the device.	
NOTE ON EXPLOSION PROTECTION	Important details on explosion protection	Termination of Ex-protection and resulting hazards and risks

1.2.2 Pictograms

The following icons are used to identify the danger sources and safety measures to complement this manual. The icons can appear at all security levels.


General warning sign (risk of injury)


Warning of dangerous electrical voltage

Warning of explosive atmosphere


Warning of magnetic field


Warning of hand injuries


Warning of hot surface


Warning of automatic start / restart


Warning of acid and corrosive substances


Warning of environmental pollution


Access denied to unauthorized persons


Prohibition for persons with cardiac pacemakers


Oberserve instructions


Disconnect prior to works


Use hearing protectors


Use safety gloves


Wear protective clothing


Protective earthing required


Conformity symbol

Ex-certified equipment


Return for recycling


Useful notes or tips


Secure power supply against unintentional reconnection / restart

1.2.3 Structure of section-related safety notes

The section-related safety notes do not apply to a specific action, but to several actions pertaining to one subject. Additionally the icons indicate a general or specific hazard or danger.

The section-related safety notes are structured as follows.

General danger

⚠ SIGNAL WORD

Type and source of the danger.

Possible consequence(s) of non-observance.

- Measure(s) to avoid the danger

1.2.4 Structure of the embedded safety notes

The embedded safety notes are information that is relevant to the safety, which are directly integrated into the instruction prior to the description of the dangerous action.

The embedded safety notes are structured as follows.

- ⚠ **Signal word** Type and Source of the danger.

  Possible consequence(s) of non-observance.

  - Measure(s) to avoid the danger

1.3 Liability Claims

As a prerequisite to fault-free operation and fulfillment of warranty claims, you must adhere to the information in these instructions. Therefore, please read the operating instructions before you start operating the device!

1.4 Exclusion of Liability

Compliance with this manual is a basic requirement for safe operation of the devices and for achieving the stipulated product features and performance characteristics.

Armaturenwerk Hötensleben GmbH is not liable for personal injury, property damage and financial losses resulting from human error, failure to comply with these instructions or IMPROPER use of the device. In such cases, any liability for defects is excluded.

The manufacturer reserves the right to change technical data or the instructions in the framework of further development and improvement of the device's properties at any time without prior notice.

1.5 Spare and Wear Parts

⚠ WARNING

Incorrect or faulty parts can compromise safety and cause damage, malfunctions or complete failure.

Death or (severe) injuries.

- Use only original spare parts from the manufacturer!

We must expressly point out that only the spare parts and accessories supplied by us have also been inspected and approved by us. The installation and / or use of such products can therefore possibly negatively change the constructional properties of the device.

Armaturenwerk Hötensleben GmbH accepts no liability whatsoever for damages caused by using of non-original parts and / or non-original accessories. Standard parts can be obtained from specialist retailers.

A list with all spare parts can be found in chapter 7.5 Spare Parts.

1.6 Copyright Notice

Unauthorized reproduction, copying, distribution or any other use of the whole or any part of this documentation is strictly prohibited, unless explicitly permitted. Violations incur an obligatory payment of damages.

All rights reserved with regard to patent claims or submission of design or utility patent.

1.7 Product Name and Trademark

All product names or brands referenced herein are trademarks or registered trademarks of their respective owners.
TANKO® is a registered trademark of Armaturenwerk Hötensleben GmbH.

2 Safety

The device is manufactured in accordance with state of the art technology and approved safety regulations. Nevertheless, when operating the device there remains a risk of fatal and personal injury to the user and third parties as well as impairment of the device and other property damage.

The following basic safety notes are intended to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed.

If anything is unclear or there is a need for additional information, please contact Armaturenwerk Hötensleben GmbH.

2.1 Basic Safety Instructions

These instructions contain basic information on the installation, operation, inspection and maintenance of the device. All persons involved in the installation, operation, servicing and maintenance of this device must have read and understood the instructions.

The safety systems and safety advice described herein are to be observed.

⚠ WARNING

Failure to comply with these instructions or improperly executed installation, repair work or inappropriate use can lead to serious faults in the plant, giving rise to hazardous situations as well as damage to property!

Death or (severe) bodily injuries.

- All tasks related to transport, storage, installation / assembly, connection, startup, service and maintenance may only be performed by qualified technical personnel while strictly adhering to:
  - ➢ the relevant detailed operating instructions,
  - ➢ the warning and safety signs on the device,
  - ➢ all other documents, instructions for commissioning and circuit diagrams pertaining to the drive,
  - ➢ the plant-specific regulations and requirements,
  - ➢ the national and regional regulations for safety and accident prevention.
- Never install damaged devices or components.

Further details can be found in these instructions.

NOTE

The illustrations in these instructions are provided for the basic understanding and preferably illustrations of the principles. Deviations from the actual construction of the device are possible depending on the model!

2.2 Applicable Documents

The following safety instructions refer primarily to the operation of the cleaning device described herein.

When using these devices the supplementary safety instructions in the respective chapters of this manual as well as the safety instructions in the additional documents are to be observed:

- Operating manual of the drives:
  - Electric drive motor
  - Compressed air motor
- Supplement to this manual (e.g. special designs)
- Additional documents of eventually attached or upstream components (e.g. frequency converters).

2.3 Target Group

All works described in these operating instructions are provided in a comprehensible way for trained specialist personnel. Hence, any mechanical work may only be performed by adequately qualified personnel.

A **specialist**for the purpose of these instructions is who, on the basis of his training, knowledge, experience and awareness of relevant regulations and standards, can carry out the work assigned to him and recognize possible hazards. They have to be familiar with the mechanical installation, maintenance and trouble shooting fort his device and provide the following qualifications:

- They are educated in the mechanics field (e.g. mechanical or mechatronic engineers) having successfully passed a final exam
- They are familiar with these operating instructions

Any electronic work may only be performed by adequately qualified electricians.

Qualified electricians in the context of these instructions are persons who are familiar with the electronic installation, startup, trouble shooting and maintenance for this device. Further, they are qualified as follows:

- They are educated in the electronics field (e.g. electronic or mechatronic engineers) having successfully passed a final exam
- They are familiar with these operating instructions

All work in further areas of transportation, storage, operation and waste disposal may only be carried out by persons, who have been adequately trained.

Trained personnel in the context of these instructions are persons, who have been instructed and trained by a specialist person on the duties with which they are entrusted and the risks which may arise from incorrect behavior, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

All persons mentioned above are obliged to wear appropriate protective clothing.

2.4 Intended Use

The TANKO-JX is a cleaning device with an external drive and belongs to the product group of the jet cleaners. The device is suitable for the internal cleaning of vessels with and without installations.
Vessels in the context of these instructions are **closed, pressureless** tanks, silos, drums, containers, pipelines etc. that provide an outlet, which allows free discharge of the supplied cleansing media.

The **pressure in the vessel**, to which the device is attached, may not exceed **the maximum of 0.5 bar**.

The device has been developed, designed and produced exclusively for industrial or professional use. Private use should be excluded!

Intended use also includes compliance with instructions specified by the manufacturer concerning operation, servicing and maintenance.

⚠ WARNING

Any use other than for the intended purpose and / or other type of use of the device can lead to dangerous circumstances!

Death or (severe) bodily injuries.

Use the equipment only for its intended purpose!

- The device may only be used in accordance with the information provided in these instructions and the information given on the type plate!
- All information in these instructions shall generally be adhered to!
- The operating manual must be stored in a suitable place at the usage location of the device at all times.
- Always keep all signs and markings on the device clean and in well readable condition.
- Use original parts only!
- Changes or conversions of the device are NOT permissible.

⚠ DANGER

Using the device in **potentially explosive areas** (explosive atmosphere) **is PROHIBITED**, unless it is expressly intended for such use!

Death or severe bodily injuries.

- The **type plate of the device** (see chapter 2.6.2 Type plate) **and** the **associated operating instructions** have to be **observed.**

In compliance with the operating limits (see chapter 3.3 Technical Data) the device can be operated inside and outside buildings.

In this context, the following instructions shall generally be heeded:

- ✓ The device is to be protected against freezing!
- ✓ The device may NOT be immersed (NOT even partially) in the product!
- ✓ Within the feed line of the cleansing medium a suitable filter system (A) has to be installed by the operator!
- ✓ Only cleaning media (A) that comply with the materials of the device and on which the materials of the device are resistant may be applied!
- ✓ The device may only be operated within the approved parameters (A), such as pressure, temperature, speed and direction of rotation!
- ✓ The device may NOT be used in the absence of cleansing media (A)!

  Basic requirements:

  - ➢ *When switching on - First switch on the cleaning fluid, then the drive!*
  - ➢ *When switching off - First switch off the drive, then the cleaning fluid!*

Note (A): For further information please see chapter 3.3 Technical Data.

- ✓ The preferred installation position of the device is vertically with the cleaning head directed downwards. No other installation positions (B) are possible.
- ✓ During the cleaning process of the device vibrations can be generated, which CANNOT be excluded. The occurrence of additional vibrations (B) should be avoided.

Note (B): Deviations from the mentioned permissible application coniditions reduce the given maintenance intervals, see chapter 7.4.1 Maintenance intervals of the device.

This device is exclusively intended for the above-mentioned purpose. Modifying or using the device for other purposes without the written consent of the manufacture is considered as not being in compliance with the intended use.

The manufacturer shall NOT be responsible for any damages that may result thereby. The risk is borne solely by the user.

The device must only be operated when it has been confirmed that all safety devices are fully functional and comply with the current EU-regulations and standards (e.g. machinery directive, EMC-directive).

2.5 Operator's Obligations

Within the EEA (European Economic Area) the national implementation of the framework directive (89/391/EEC) on the introduction of measures to encourage improvements in the safety and health of workers at work as well as the corresponding single directive and hereof particularly the guideline (89/655/EEC) on the minimum regulations for safety and health protection for the working appliances by employees at work, in the prevailing, valid version, have to be observed and adhered to.

In principle the operator in Germany has to adhere to the regulations on health and safety at work (BetrSichV).

Other countries shall comply with their appropriate national regulations, laws as well as the country-specific regulations on industrial safety and prevention of accidents.

⚠ WARNING

Danger due to application of wrong materials / media!

The material / media required for the intended use of the device are procured and applied by the operator of the device. The selection of materials / media is the responsibility of the operator.

Death or (severe) bodily injuries.

- When selecting the materials / media, please take into consideration that the permissible technical parameters of the device may NOT be exceeded.
- The cleansing media, cleaning agents have to be approved for all materials of the device (e.g. seals, bushings) and the substances to be cleaned in the vessel, they come into contact with.
- The chemical and operation limits indicated in the material data sheets have to be taken into account.
- Proper handling of these materials / media is the sole responsibility of the operator.
- The safety data sheets of the material and media suppliers, particularly for hazardous goods, shall be observed.
  - ➢ Hazard warnings and disposal instructions have to be adhered to!
  - ➢ Safety measures are to be defined and Hazardous Substance Operating Instructions have to be drawn up.
  - ➢ This also applies to hazardous substances, which can be created during the process.

Please find the materials applied in the device in the order confirmation / parts list of Armaturenwerk Hötensleben GmbH.

2.6 Device Identification

2.6.1 Type designation

Example: Jet cleaner

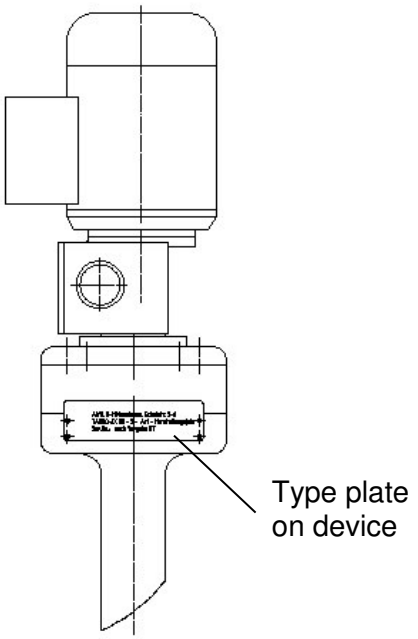
TANKO - JX80-2 - 0500

1. Brand of the cleaning devices
2. Type: **J**et with e**X**ternal drive
3. Size: Cleaning head ≈ 80 mm
4. Variant: Encapsulated magnetic coupling
5. Installation dimension [LE]: ≈ 500 mm

2.6.2 Type plate

The following information applies only to device types, which are listed on the front page of these instructions.

The type plate is attached to the device according to the following illustration.



To ensure correct and quick processing of inquiries, the following information imprinted on the type plate are required:

- Manufacturer
- Type designation
- Year of manufacture (Mfrd.)
- Serial-No. [SN]

Figure 2.6-1 Position of the Type Plate

2.6.3 Marking for explosion protection

The marking on the type plate of the explosion proof jet cleaners includes the group, category, ignition class and temperature class. A CE and EX-sign confirms the conformity of the device with the European directive 94/9/EG (ATEX 95).

NOTE ON EXPLOSION PROTECTION

The ATEX-jet cleaner type TANKO-JX corresponds to device group II and is intended for use in potentially explosive atmosphere "gas" (G):

- ZONE 0 (inside the vessel)
- ZONE 1 and Zone 2 (outside the vessel / drive unit)

⚠ **WARNING** For use in **dust explosive areas** is the jet cleaner **NOT** suitable!

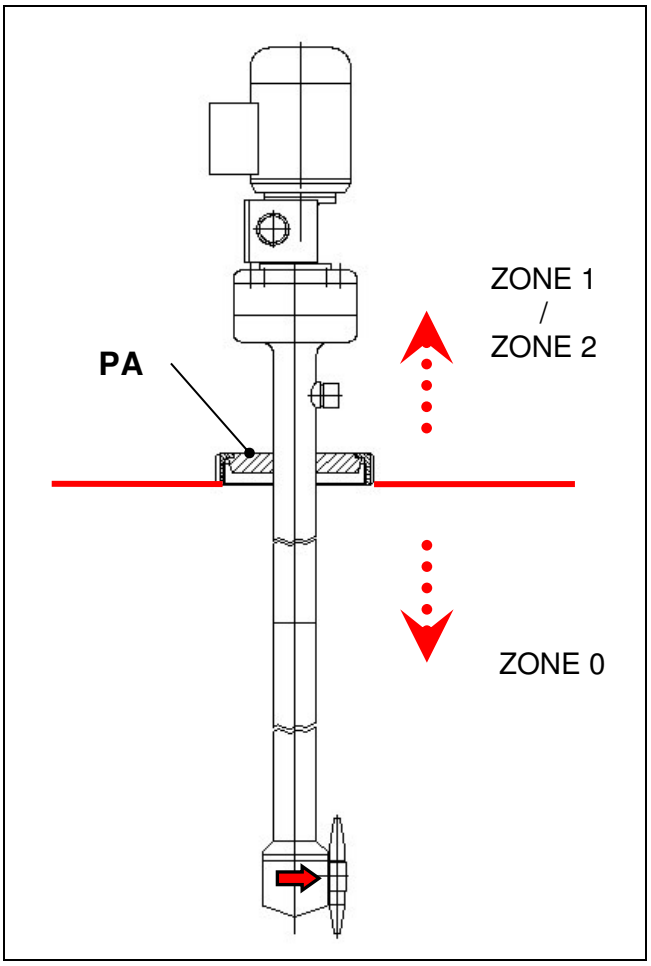


Figure 2.6-2 Illustration of the ZONES – classification

ZONE 0 requires the use of category 1G devices.

ZONE 1 requires the use of at least category 2G devices.

ZONE 2 requires the use of at least category 3G devices.

ATTENTION The operator is responsible for the classification of zones!

The type plate on the device contains the information required for operation and additionally all necessary information for operation in potentially explosive atmospheres according to ATEX directive.

- Identification of ignition protection class
- Number of the EC-type examination certificate

Figure 2.6-3 Example Type Plate (ATEX)

Identification of Ignition Protection Class:

CE Ex II 1/2 G c TX

- CE marking of conformity
- Ex device marking „ATEX”
- II group
- 1/2 category
- G potentially explosive atmosphere "gas"
- c type of protection „constructional safety“
- TX temperature class

The symbol "X" indicates that safe operation of the device depends on particular operating conditions, which are specified in the operating instructions.

- The maximum permissible surface temperature is determined by the ambient temperature in the vessel to be cleaned and / ort he temperature of the cleansing medium.
- **ATTENTION** The permissible temperatures have to be taken into account (see chapter 3.3.1 Operating parameter)!
- **ATTENTION** The maximum surface temperature of the device can exceed these limits outside the vessel depending on the drive system (e.g. electric drive motor).
  - The marking of the temperature classes of the drive have to be observed!

3 Construction and Technical Data

3.1 Construction of the Device

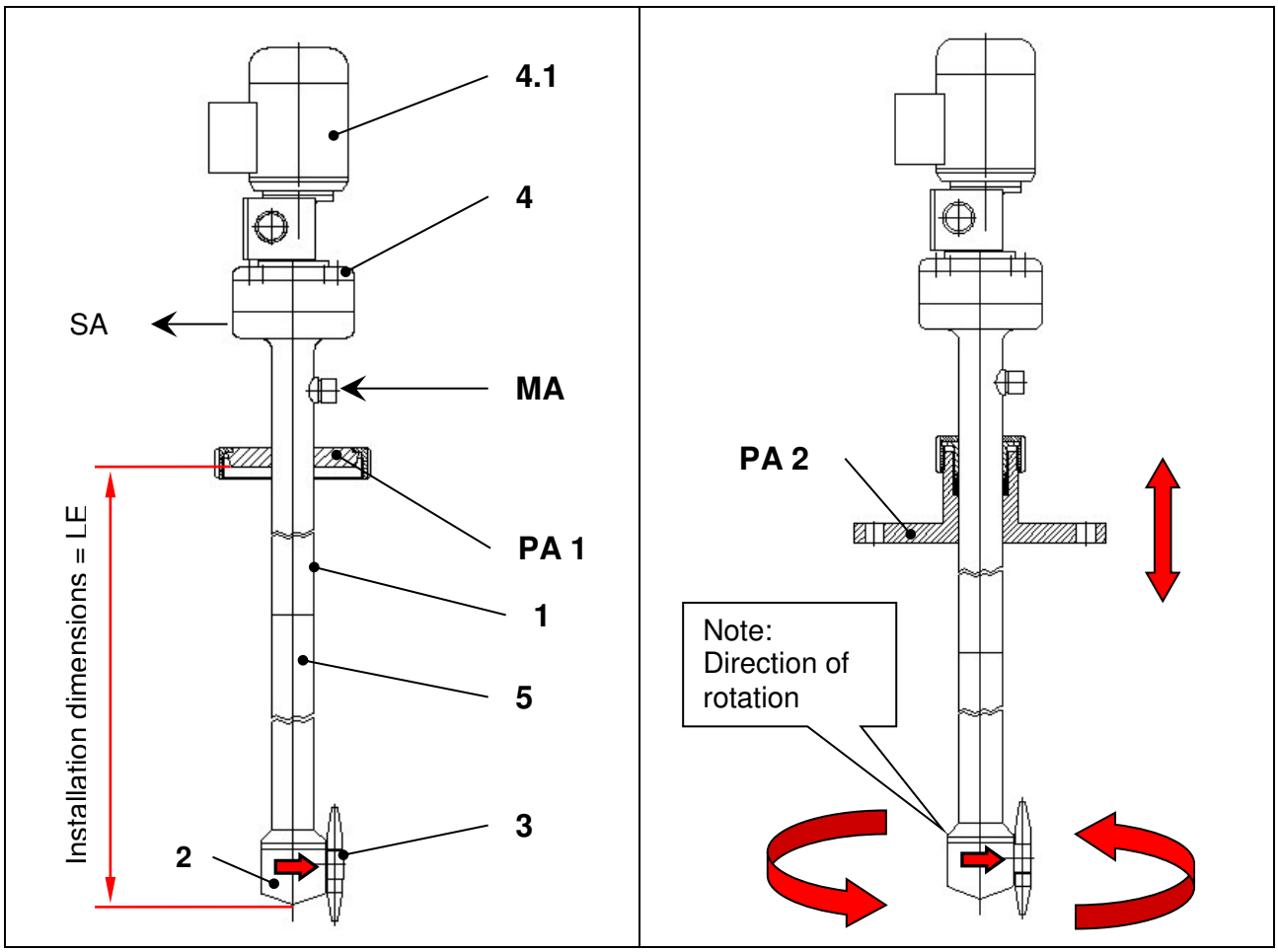


Figure 3.1-1 Basic Construction of the Device

Jet cleaners (with external drive) Type TANKO-JX70, JX75 and JX80 consist of the following main components:

1 BG-Downpipe (with magnetic holder)
PA 1 = Process connection 1 > permanently welded to downpipe [DP]
PA 2 = Process connection 2 > moveable on downpipe [DP] (special design)

MA = Media connection . > stubs with BSP-male thread
SA = Rinsing connection > optional

2 BG-head without nozzle holder

3 BG-nozzle holder

4 BG-motor connection (with magnetic holder)
4.1 BG-drive (e.g. electric drive motor)

5 BG-DPV = downpipe extension > optional

3.2 General Functional Characteristics

- The jet cleaner TANKO-JX is a cleaning device equipped with an external drive. Generally, an electric drive motor or compressed air motor serve as actuator.
- The device is equipped with a magnetic coupling, consisting of two magnetic holders. It provides a permanent contactless torque transmission, thus providing full separation (zones / areas) of the drive against the cleansing area.
- The magnetic coupling acts as overload protection. In case of overload the power flow is automatically interrupted.
- The transmission of the torque from the drive unit to the cleaning head of the device is achieved through a magnetic coupling onto a shaft. This shaft is connected to the cleaning head via a fork coupling.
- A bevel gear is integrated inside of the cleaning head. The gear consists of a fixed and a rotating cone gear wheel. The rotating cone gear wheel drives the nozzle carrier (with nozzles).
- The rotation of the rotating cone gear wheel around the own axis of the fixed cone gear wheel and the forced rotation around the own axis result in the orbital rotation of the nozzles around the cleaning head.
- By means of the nozzle the cleansing medium is bundled according to the jet principle, thus generating a jet with high energy.
- The orbital movements of the jet create a cleaning pattern on the interior surface of the vessel. Its mesh size depends on the number of teeth on the gear, the number of nozzles and the distance to the vessel wall.
- The mechanical cleaning effect depends on the outlet speed, the mass and the angle of impact of the cleansing medium.
- The intensive cleaning jets ensure that the depositions on the vessel's wall are detached, rinsed off with high speed and removed.
- The jet cleaner achieves very good results for soluble substances in vessel sizes that correspond to the appropriately applied jet cleaner.
- According to the demands and vessel sizes we provide various sizes of this device, variations of the head sizes, the number of nozzles and the nozzle bore.
- The DP-extension, which was exclusively developed for particular sizes of the TANKO-JX, offers the ability to extend the installation length [LE] of existing vessels subsequently.

Application examples for the jet cleaner type TANKO-JX:
Tanks, silos, drums, containers, pipelines, dryers, centrifuges, agitators, vacuum containers, spray towers, container cleaning systems, fermenters, filters, mixing containers and horizontal dryers.

3.3 Technical Data

The service life of the device is estimated at 10 years with single-shift operation and when using drinking water.

This is subject to professional maintenance of the device in the intervals indicated in 7.4 Maintenance and the wear parts are exchanged regularly.

Corrosive media can shorten the service life of the device.

3.3.1 Operating parameters

NOTE ON EXPLOSION PROTECTION

Restriction on the operating parameters of the device!
The maximum permitted operating parameters such as container size, operating pressure and flow rate depend on the electrostatic charge build-up when handling fluids.

Death or (severe) bodily injuriess.

- *Comply with the notes in chapter 3.4 Cleansing Media before commissioning or recommissioning the device.*

Table 3.3-1: Operating parameters of the device (standard)

Designation	TANKO-JX70	TANKO-JX75	TANKO-JX80
Vessel diameter: - permissible - recommended	max. 3 m 1 - 3 m	max. 14 m 3 - 8 m	max. 17 m 8 - 10 m
Vessel size: - recommended	bis 25 m^3	bis 500 m^3	bis 1000 m^3
Operating temperature (permissible): - Cleansing medium	max. 95 °C	max. 95 °C	
Ambient temperature (permissible): - inside the vessel	max. 110°C	max. 110°C	
- outside the vessel	**ATTENTION** risk of freeze! -20 °C to +40 °C		
Working pressure: - Cleansing medium	2 - 20 bar	2 - 20 bar	2 - 20 bar
Flow rate: - 2-jet	3 - 75 l/min 0,2 - 4,5 m^3/h ≈ 3,3 - 40 l/min ≈ 0,2 - 2,4 m^3/h	5 - 200 l/min 0,3 - 12 m^3/h ≈ 10 - 120 l/min ≈ 0,6 - 7,2 m^3/h	5 - 200 l/min 0,3 - 12 m^3/h ≈ 10 - 120 l/min ≈ 0,6 - 7,2 m^3/h
Process connection [PA] :	Pipe screw connection DIN 11851 - DN 80	Pipe screw connection DIN 11851 - DN100	Pipe screw connection DIN 11851 - DN125
Medium inlet [MA]:	DIN ISO 228 - G½" (BSP) outside	DIN ISO 228 - G ¾“ (BSP) outside	

Installation dimensions [LE]:	300 / 500 /1000 mm	485 / 735 / 985 mm	500 / 750 /1000 mm
Adjustable installation dimensions [LE]:	No (Special versions on request)		
Downpipe extension [DPV]:	----------	500 /1000 mm	
Number of nozzles: - optional	2 1; 3 oder 4	2 1; 3 oder 4	
Nozzle bore:	1 - 4 mm	2 - 6 mm	2 - 8 mm
Orbital nozzle stroke:	ball-Ø 100 mm	ball-Ø 190 mm	ball-Ø 240 mm
Jet movement:	360° orbital	360° orbital	
Drive:	See annex chapter 9.1 Overview Drives for applicable drives.		
Emissions sound pressure level: *- Electric motor* *- Pneumatic motor*	*1 m distance in anechoic room* *(device idling / operation without cleansing medium):* $L_{pA\ max}$ *<= 70 dB(A)* $L_{pA\ max}$ *= 79 dB(A) with silencer*		
Transmission: - Drive: cleaning head	1:1	1:1	
Rotation speed of the cleaning head around the downpipe [DP]: - permissible - recommended - Standard	5 - 60 rpm 10 - 20 rpm ≈ 14 rpm	5 - 60 rpm 10 - 20 rpm ≈ 14 rpm	
Cleaning time (standard):	≈ 103 s/cycle	≈ 133 s/cycle	
Installation opening min.: - *Stationary device*	Ø 60 mm (2-jet) Ø 75 mm (3-jet) Ø 70 mm (4-jet)	Ø 100 mm (2-jet) Ø 125 mm (3-jet) Ø 120 mm (4-jet)	Ø 115 mm (2-jet) Ø 155 mm (3-jet) Ø 145 mm (4-jet)
- *Mobile device*	Ø 85 mm	Ø 145 mm	Ø 190 mm
Materials (base device without drive) - media affected - others	1.4571 (AISI 316Ti) PTFE; PEEK, EPDM; iglidur X 1.4301 (AISI 304); 1.4401 (AISI 316); 1.4404 (AISI 316L); 1.4408 (AISI 316L); 1.4435 (AISI 316L); 1.4568 (AISI 301) FKM (VITON); FKM with FEP-sheathing		

ATTENTION Operating pressure
Other media connections, for example connections via an adapter, are effectively possible, however this might require reduction of the permissible operating pressure for the cleansing medium!

NOTE Media [MA] and process connections [PA]:
Other connections are possible (e.g. flange or tri-clamp).
Comply with the interface note in chapter 5.1.3 Installation of the device!

⚠ **WARNING Cleansing medium:**
So as NOT to impair the functional performance of the device due to contamination or foreign bodies, a suitable filter system has to be installed in the media supply tubes!

It is recommended to apply a filter with a filter effect corresponding to a mesh width of 50µm.

Operation without cleansing medium: ➢ In potentially explosive atmosphere (Ex-area)! ➢ In NON-hazardous atmosphere.	**PROHIBITED!** max. 5 minutes
Operation with non-flammable, gaseous medium (e.g. air), to blow-drying the device: ➢ In potentially explosive atmosphere (Ex-area)! ➢ In NON-hazardous atmosphere	**PROHIBITED!** max. 5 minutes

For more information on cleaning media see chapter 3.4 Cleansing Media!

ATTENTION Orbital nozzle stroke:
For instructions regarding the interface please observe chapter 5.1.3 Installation of the device!

NOTE Installation opening!:
The indicated installation dimensions are recommended minimum sizes for the installation opening, in order to install the device in assembled condition (with the BG-head) into the vessel. The required size of the opening varies according to the number of nozzles on the cleaning head.

Smaller installation opening for the *usage* of the device are possible! The notes on the interface in the chapter 5.1.3 Installation of the device are to be observed!

Table 3.3-2: Comparison of Weights (examples)

Description	TANKO-JX70	TANKO-JX75	TANKO-JX80
Installation dimensions [LE]	300 mm	1.000 mm	1.000 mm
Weight*: electric drive: **SEW** Type SF 37	approx. 35 kg	approx. 44 kg	approx. 45 kg
Weight* pneumatic drive: **Atlas Copco** Type LZB 34 RL LR10-11 Type LZB 34 RL LR44-11	 approx. 12 kg approx. 12 kg	 approx. 21 kg approx. 21 kg	 approx. 22 kg approx. 22 kg

* The indicated dimensions and weights are approximate values.

3.4 Cleansing Media

Due to the versatility of practical application and use of the cleansing device, the manufacturer CANNOT recommend particular cleansing media to the operator.

⚠ **WARNING** The selection of the type of cleansing media as well as the appropriate handling and use of the product are the sole responsibility of the operator!

For this reason the manufacturer can **only provide precautionary** (for a device inside a vessel) **indications and advice**, which should be observed and taken into account for the risk assessment by the operator.

⚠ DANGER

Danger of explosion by ignition!

Existing potentially explosive atmosphere can be ignited.

Death or severe bodily injuries.

- The cleansing medium and the material to be cleaned may not cause a chemical reaction that could constitute a potential ignition source.
- Observe electrostatic charge when handling liquids!

NOTE ON EXPLOSION PROTECTION

The following **technical regulations on industrial safety (TRBS)** are compulsory to comply with prior to the application of the device and have to be integrated in the assessment of the risk of explosion.

- **TRBS 2152** „Hazardous explosive atmosphere - General -“
- **TRBS 2153** „Avoiding ignition risks due to electrostatic charges “

Excerpt from **TRBS 2153** „ Avoidance of ignition hazards due to electrostatic charges“

Chapter 4 Electrostatic charges when handling liquids

„Filling and discharging vessels with liquids, by means of pumping, stirring, mixing or spraying the liquids, but also during measuring and sampling as well as for cleaning processes, the liquids or the inside of the containers can become electrostatically charged. The generated charge quantity and the high charge depend on the properties of the liquids, the flow velocity, the working methods as well as the size and geometry of the vessel and the vessel materials.“.

- When cleaning metallic surfaces of vessel that have been exposed to hydrocarbons the vessel diameter may not exceed 3 m. For larger vessel diameters dangerous electrical charging can occur.
- For cleansing media such as isolating liquids or liquids containing hydrocarbons (e.g. solvents), the vessel diameter of 3 m and the share of the two phases (e.g. water) of 1% may not be exceeded.
- The cleansing media must be kept in a closed-loop cycle, if the contamination is kept below 1%. Avoid the collection of liquid in the vessel.

- When cleaning metallic vessels with solvents containing hydrocarbons the maximum operating pressure of 50 bar may not be exceeded and the liquid flow rates must be below 60 liters / minute.
- Steam cleaning vessels with a volume of > 100 m³ is not permitted. With larger vessel volumes dangerous electrical charging can occur.

⚠ WARNING

Warning of corrosive und aggressive cleansing media!

Death or (severe) bodily injuries.

- Observe the provisions and specification given in the safety data sheets of the cleansing media (e.g. vapors or hazardous substances).

NOTE The following restrictions for cleansing media result from the material resistance of the applied materials of the device.

⚠ CAUTION

Danger arising from use of wrong cleansing media!

The cleansing media, cleansing agents must be approved for all materials of the device (e.g. seals, bushings) as well as for the substances to be cleaned inside the vessel coming into contact with them.

Minor or moderate bodily injuries or damage of property.

The following cleansing media are NOT permissible:

- Cleansing media containing solids or liquids with solid content (e.g. abrasives) that may lead to increased wear and / or blockages of the nozzles.
- Cleansing media that can enter an exothermic reaction with the materials of the cleaning device, the vessel or the plant.
  - Containing chlorine and chlorine ions
  - Saline liquids (no resistance to sea water)
  - Containing medium to high-concentration organic acids
  - Containing strong acids, particularly nitric acid and sulfuric acid (with an acidity above 65%)
  - Containing aliphatic, aromatic and chlorinated hydrocarbons
  - Containing phenols
  - Containing fluorine compounds

The following media can be applied to clean the vessel:

- Clean sprayable fluids (e.g. water with alkaline cleaning additives and similar).

4 Delivery, Transport and Storage

NOTE ON EXPLOSION PROTECTION

Transport and storage of the device is PROHIBITED in the presence of a potentially explosive atmosphere!

All products from Armaturenwerk Hötensleben GmbH are carefully checked before dispatch. They are packed in packaging appropriate for transportation and storage. However, damages that occurred during transport CANNOT be excluded.

In case of damage (also for spare and wear parts) due to shipping please contact Armaturenwerk Hötensleben GmbH for a notification of claim.

4.1 Delivery

4.1.1 Scope of supply

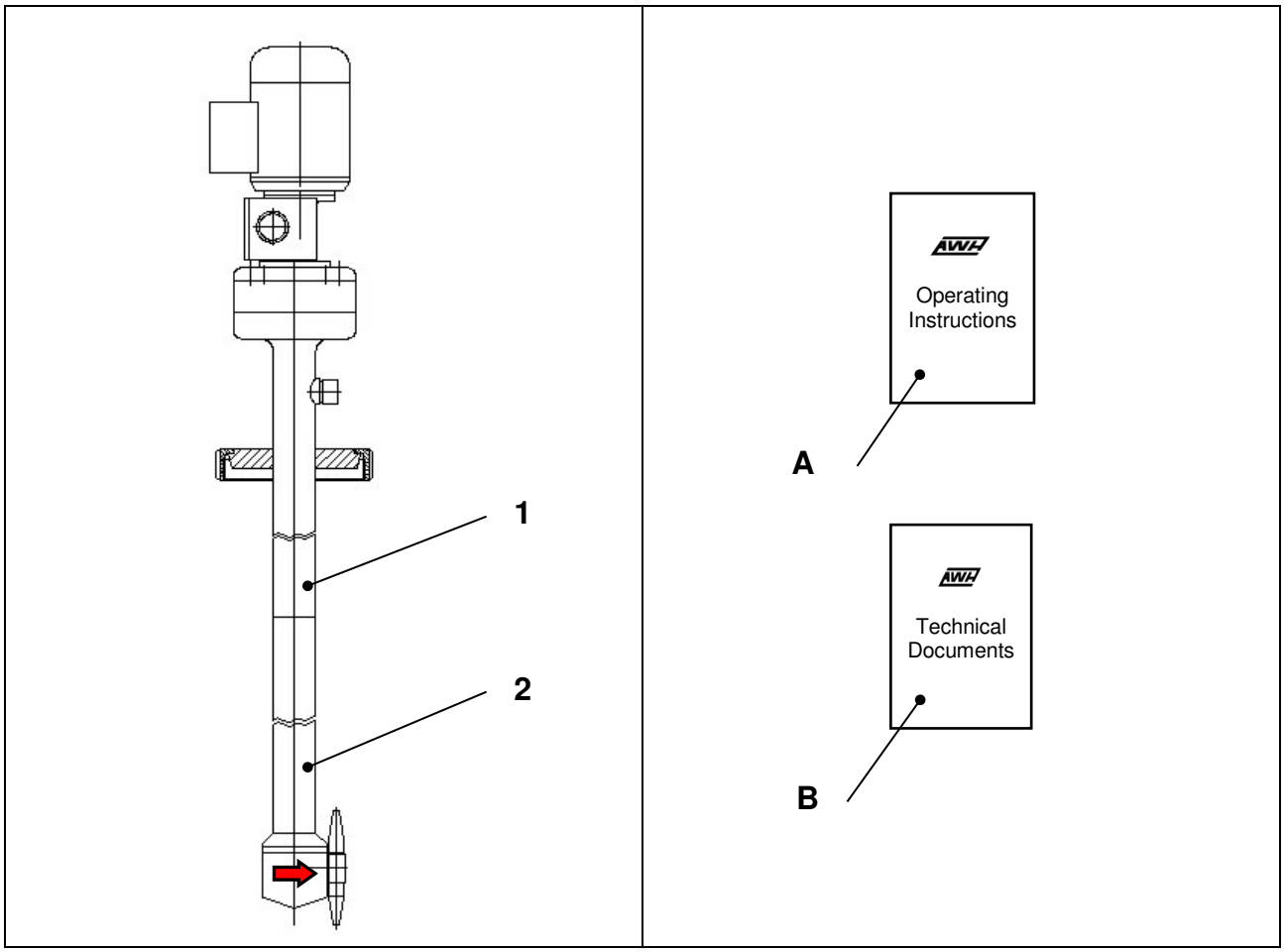


Figure 4.1-1 Scope of Supply

The scope of supply includes:

1 ZB-tank cleaning device type TANKO-JX
2 BG-downpipe extension (optional, delivered upon request in separate order)
A Operating and Assembly Instructions
B Technical documents (e.g. Instructions for the motor)

The scope of supply ends at the interfaces of the device (see chapter 5.1.1 Interfaces of the device)!

The following items are NOT included in the scope of supply:

- Connectors required to fasten the device to the vessel (e.g. screws, screw nuts, clamps)
- Sealings
- Energy supply (e.g. cables, tubes, adapter)
- Electrical or pneumatic components for the control system

NOTE

Please find the detailed scope of supply in the delivery note.

Reception inspection:

Please check the consignment for potential shipping damages and completeness immediately upon receipt on the basis of the delivery note!

Claims:

- Please submit a complaint to the shipping company immediately in the event of damaged and / or incomplete deliveries!
- Retain the packaging for eventual inspection by the shipping company or for return of the consignment.

Return shipment:

For an eventual return, the device parts are to be packed in a way that any damages are excluded during appropriate transport. For questions please contact the company Armaturenwerk Hötensleben GmbH.

4.1.2 Packaging

The device is delivered completely assembled. The packaging is tailored to the requirements to be expected during transport. The required accessories, spare parts, operating and assembly instructions as well as the technical documentation are generally packed separately and enclosed with the delivery.

The packaging shall protect the device from transport damages, corrosion and other damages until assembly. Therefore, remove the packaging only immediately before installation.

ATTENTION Environmental damage caused by incorrect disposal of the packaging! Packaging materials are valuable raw materials and can continue being used in many cases or sensibly reconditioned and recycled.

Pollution of the environment.

- Dispose packaging material environmentally friendly.
- Adhere to the valid local regulation for disposal.

4.2 Transport

NOTE ON EXPLOSION PROTECTION

Transport damages may result in a loss of explosion protection.

- Do NOT operate the device in the event of recognizable transport damages!
- Contact the manufacturer of the device.

ATTENTION Improper transportation can cause material damage!

Damages to the device.

- Observe the symbols and notes on the packaging.
- Transport the device only in dry condition!
- Transportation of the device below - 20°C is NOT permitted!
- Protect the device from shock impact! Exercise caution when unloading and during in-house transport.
- Use only the provided attachment points, if available.
- Remove packaging only immediately before installation.

4.3 Storage

The packaging of the device, the components and the spare and wear parts is designed for storage duration of 3 months.

If possible, the device should be stored in its original packaging. Storage should be executed in a clean place at stable ambient conditions. Avoid large temperature fluctuations, as condensation can form.

The device may only be placed and stored on a rest (e.g. planks or timber saddles) that is adapted to the contour of the device. Punctual loading of the device may cause deformations and must be avoided.

Storage conditions:

- Closed, dry and dust-free room
- Room temperature + 10 °C to + 45 °C
- Relative humidity max. 60 %
- Temperature fluctuations max. 10° C per day
- Occurrence of vibrations V_{eff} < 0,2 mm/s
- Cover unpacked devices or components in a dust-proof manner.

ATTENTION

The requirements of the engine manufacturers may exceed the above mentioned storage conditions. For storage of the device they have to be observed and adhered to additionally according to the motor or the separate motor respectively (e.g. as spare part)!

5 Installation

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ WARNING

Accident risk caused by improper installation!

In case of improper installation, if components are dropped or non-observance of the safety instruction contained herein can cause accidents or damage to property.

Death or (severe) bodily injuries.

- Works on the device may only be executed by **qualified personnel.**
- Only skilled **electrical personnel** may work on the electric unit.
- Carry out work on the device only in electrical voltage free, depressurized and cooled condition!
- Ensure an adequately sized safety clearance when working on the device. We recommend a free space of 1 m (Meter) around the device or the vessel respectively.
- Use only approved lifting gear and attach the device with approved slings to the lifting equipment (e.g. by tying a rope loop around).

NOTE The control system is NOT supplied by the manufacturer. The following instructions for the control and connection conditions are to be observed by the operator:

- The the standard DIN EN 60204-1 Safety of Machinery - Electrical Equipment of Machines - Part 1“, in particular section 5, has to be observed.
- Monitoring and adjustment of the plant is made means of the hardware or security software.
- Any failure of a safety device must be detected quickly by appropriate measures to ensure that there is only a minimal likelihood that dangerous situations will occur.
- In the event of a safety device failure the system must be rendered safe.
- The electrical equipment must be protected against overload.
- The control system must comply with the category 3 of the DIN EN ISO 13849-1 „Safety of Machinery - Safety-related Parts of Control systems“.

⚠ **WARNING** The engine of the device may only be operated when cleaning fluid flows through the device (e.g. flow meters)!

- The operating steps listed in chapter 6.2 Start-Up Procedure and chapter 7.2 Shut-Down Procedure must be ensured.

5.1 Mechanical Installation

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

5.1.1 Interfaces of the device

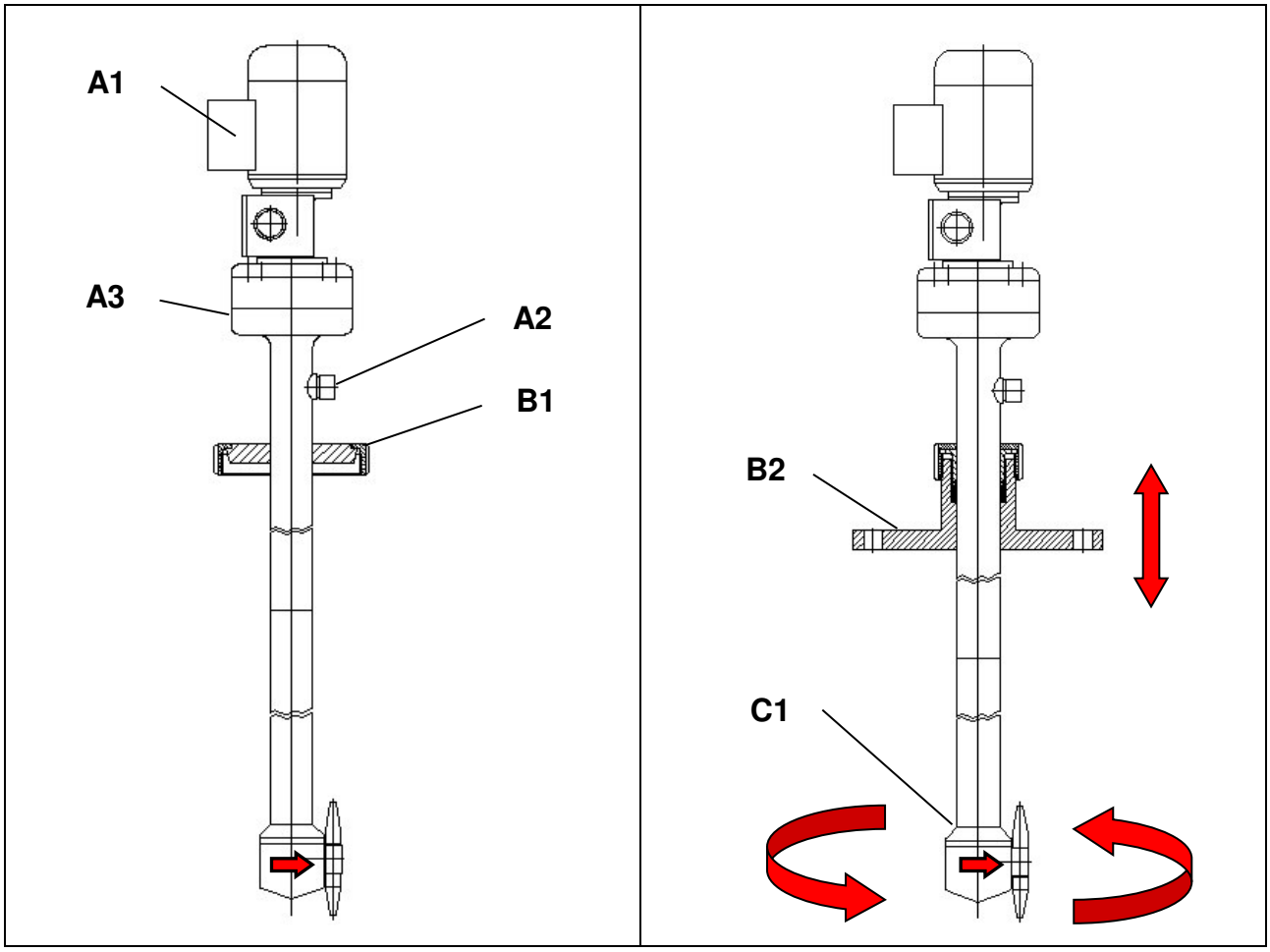


Figure 5.1-1 Interfaces of the Device

A Drive / Energy Supply:

A1 - Terminal box (Electric drive) or pneumatic connection (compressed air drive)
A2 - Media connection [MA]
A3 - Rinsing connection [SA] - optional

B Device / Vessel:

B1 - Process connection [PA] - Standard design permanently welded
B2 - Process connection [PA] - Special design slidable

C Free space / Mounting space:

C1 - cleaning head with nozzles

5.1.2 Installation position of the device

Installation position of the device:

1 **Vertical with the cleaning head directed downwards (standard):**
This installation position enables self-draining particularly in the area of the magnetic coupling and the cleaning head.

2 **Deviations from installation position 1:**
For any other installation position self-draining particularly in the area of the magnetic coupling and the cleaning head is NOT possible. In this case we recommend a special rinse connection [SA] for cleaning and draining (see chapter 3.1 Construction of the Device).

Please note the following:

- Reduction of maintenance intervals of the device (see chapter 7.4.1 Maintenance intervals of the device):
- Check spatial location of alternative drives (see chapter 9.1 Overview Drives).

5.1.3 Installation of the device

⚠ CAUTION

Malfunction due to contamination, foreign bodies or damage of the device!

Minor or medium bodily injuries or damage to property.

Please observe the following measures prior to initial assembly of the device as well as subsequently to assembly refitting work in the plant into which the device should be installed.

- Before installation of the device all feed and return lines of the cleansing medium have to be rinsed thoroughly with clear water in order to remove any possible impurities, foreign bodies or residues in the lines (e.g. lime, chips, weld particles etc.).
- Any kind of contamination and entrance of foreign matter via the interfaces of the device are to be prevented by appropriate measures.
  A filter has to be installed into the feed line [MA] of the cleansing medium prior to media connection (see chapter 3.3 Technical Data).
- Regarding the installation position of the device, please retain a safety distance to the vessel's inner wall as well as to neighbored components, to avoid rubbing and chipping during operation.
  - ➢ Observe area above the orbital nozzle stroke (see chapter 3.3.1 Operating parameter).
  - ➢ During simultaneous operation and movements of the cleaning head and the neighboring components (e.g. agitators) possible collisions shall be excluded.
- Ensure that the device has been installed free from mechanical stress.
- Do not apply paint to the surface of the device.
- For the installation dimensions please refer to the device drawing.

⚠ ***WARNING*** For assembly you must ensure that no dirt and no foreign bodies are in the device (e.g. small parts, sealing material)!

⚠ ***DANGER Interface A and B*** *NON-screw on media- [MA] and process connections [PA], such as separable connections in clamped or detent configuration, can come disconnected inadvertently!*

Penetration or spraying out of liquids (compromising zone boundaries)!

Medium- [MA] and process connections [PA] in clamped or detent configuration must:

- *be self-locking (e.g. mechanical locking of a lever arm coupling with safety lock) or*
- *provided with an additional securing mechanism to prevent inadvertent release.*

ATTENTION Interface A:
Attach the connection for power supply tightly and firmly to the device.

A1 - The connections for the electric or the pneumatic drives have to be executed according to the instructions given in the documentation provided by the appropriate manufacturer.
The notes in chapter 5.2 Connection of the Drive shall be observed!

A2 - *The supply pipe connection must be configured to be compatible with the media connection [MA] of the device.*
The feed line of the cleansing medium as to be attached tightly and firmly to the media connection [MA].

A3 - *The rinsing connection [SA] must always be securely and tightly sealed using the supplied original blanking plugs.*

⚠ ***CAUTION*** *An incorrect flow direction is NOT permitted when using the rinsing connection [SA]!*

Damage to the device or its surroundings.

- *Remove the blanking plug and attach the drainage pipe firmly and tightly to the rinsing connection [SA].*
- *The flow direction from the media connection [MA] to the rinsing connection [SA] must be complied with!*

ATTENTION Interface B:

The connection to the vessel has to be designed compatible with the process connection [PA] of the device. The device is attached with the process connection [PA] tightly and firmly to the connection of the vessel (e.g. screwing or clamping) and secured against loosening.

NOTE Fastening material and gaskets are NOT included in the scope of supply!

B1 - Devices designed according to B1 provide a permanently welded process connection [PA] at the downpipe [DP] of the device.

B2 - Please observe the notes on the deviating mounting methods of the device to the vessel in chapter 5.1.4 Installation of special designs.

ATTENTION Interface C:

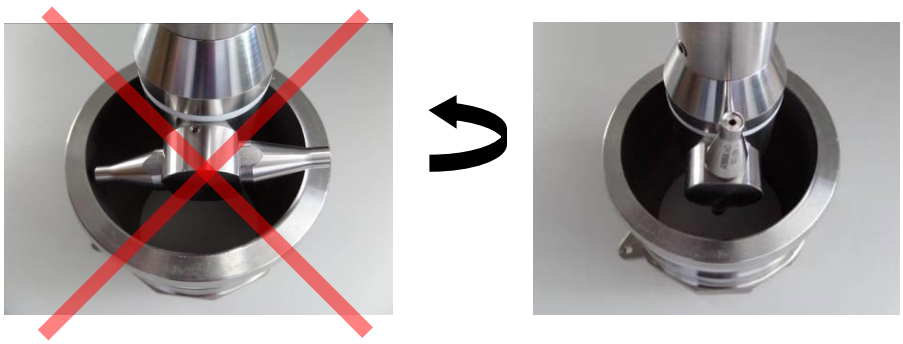
C1 - ⚠ ***CAUTION*** *Inadequately sized installation opening in the container or components (e.g. agitators) in the container! Nozzles collide during installation.*

Beschädigung des Gerätes. Der Düsenträger kann sich lösen.

- *The nozzles are NOT allowed to collide!*
- *Check the following before putting the device in the container:*
  - *Minimum dimension of the installation opening (see chapter 3.3.1 Operating parameters),*
  - *Presence of interference contours on surrounding components in the container and*
  - *firm seating of the nozzle carrier with nozzles on the cleaning head.*
- *Put the cleaning head and downpipe [DP] through the installation opening into the container with the greatest of care.*

NOTE Installation opening - stationary device:

- *If necessary, align the nozzles by:*
  - *Powerfully rotating the "bottom of the housing" on the cleaning head in the direction of the arrow,*
  - *Briefly starting up the drive.*



- *Alternatively, unscrew the cleaning head from the downpipe [DP] and screw back on again after installing the device inside the container (see chapter 7.4.6 Exchanging the wear parts and nozzles).*
  - Assuming assembly and disassembly of the device's cleaning head within the vessel is ensured and
  - if the diameter of the installation opening on the vessel is at least 5 mm larger than the outer diameter of the downpipe [DP].

NOTE Installation opening - mobile devices:

Smaller installation openings on the container ***for mobile use*** *of the device,* as specified in *chapter 3.3.1 Operating parameters, are only permitted:*

- *If the cleaning head fits through the installation opening with the nozzles in any position during installation and removal of the device (e.g. by using shorter nozzles), and*
- *There is a safety distance of at least 5 mm to the installation opening.*

ATTENTION A cleaning jet that is too strong might exert strong forces and cause damages to the vessel, the surrounding components in the vessel or to the device itself!

Damage to property due to strong cleaning jet.

- Maintain sufficient distance to the surrounding components so that during operation the power of the cleaning jet:
  - ➢ does not create vibrations of the surrounding components,
  - ➢ does NOT influence the rotary motion of the cleaning head due to recoil and
  - ➢ does not cause vibrations of the device itself (see chapter 7.4.1 Maintenance intervals of the device).

The same applies to the installation of more than one device into a vessel!

5.1.4 Installation of special designs

For the devices with special designs of the following interfaces these additional safety notes are to be observed.

B2 Device with displaceable process connection [PA]

⚠ CAUTION

For a device **with displaceable process connection**, which is mounted to the vessel, there is a risk of collision when loosening the force-based connection of the process connection by displacing the device.

Damages to the device ort he environment.

- Ensure that no interfering contours exist within the immediate installation space of the final positions as well as in the scope of relocation of the device.
- The process connection [PA] has to be secured additionally against relocation (e.g. with a tension clamp).

5.2 Connection of the Drive

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ WARNING

The technical data, the connection values for energy supply (electric or pneumatic) as well as the required quality of compressed air (e.g. filtered / dry compressed air) for pneumatic operation, depend on the type of the installed drive!

Death or (severe) bodily injuries.

- Observe the type plate of the drive!
- Compare the information given on the type plate of the drive with the corresponding documentation provided by the manufacturer of the drive.
- Observe the safety notes of the drive!

⚠ DANGER

Risk of fatal injury from electric shock by contact with live components!

Exercise caution when connecting electrical components (e.g. electric motor).

Death or severe bodily injuries.

- Only **specialist electricians** may work on electric components!
  - ➢ Before starting the work disconnect the system from the mains.
  - ➢ Secure the plant from being switched back on.
  - ➢ Cover the adjacent, live parts safe from touch.

NOTE The installation altitude for devices with electric drives (e.g. electric motor) at locations up to maximum 1,000 m above sea level (NN) is permitted.

Drives for the device see annex chapter 9.1 Overview Drives.

5.2.1 Rotation direction of the cleaning head

⚠**CAUTION** wrong rotation direction of the cleaning head!

Due to wrong connection of the drive the cleaning head of the device can rotate in the wrong direction. As a result parts of the device may become loose during operation.

Minor bodily injuries or damage to property

- The connection parameters for the drive of the device can basically be found and observed on / in:
  - ➢ the type plate of the drive and
  - ➢ the documentation provided or the operating instructions, respectively, by the manufacturer of the drive.
- The specified direction of rotation of the cleaning head, when looking from the engine towards the cleaning head, is "left".
  (Left rotation = counterclockwise rotation).
  - ➢ Ensure that the cleaning head is rotating in the correct direction.
    A mark "direction of rotation arrow" can be found on the cleaning head of the device (see chapter 3.1 Construction of the Device)!
  - ➢ In case of wrong rotation direction of the cleaning head, the rotation direction has to be changed (e.g. reverse polarity of electric motor).

5.2.2 Speed control

Electric connection:

ATTENTION For frequency converter operation the permissible motor temperatures and bearing loads might be exceeded.

Damage of the electric motor.

- Observe the operating instructions of the control and appliance manufacturer!
- Variations of the rotational speed may NOT lead to exceeding the permissible motor temperatures and bearing loads.
- Do NOT exceed the permissible rotational speed of the device.
- Adhere to the currently valid EMC-Directive.

NOTE a motor with additional protective winding contact and / or an external fan might be required. Motor and converter have to be located as close together as possible. Cables must be sheathed and screened. Cables, cable ends, frequency converter and motor have to be earthed. It is recommended to apply all-pole sine wave filters.

Pneumatic drive:

The rotational speed is continuously adjustable by regulating the pressure and air volume. The air motors can work within a certain speed range.

The compressed air motors can be operated oil-free without special measures at a power reduction of approximately 15 %. All external parts are made from high-grade non-corrosive steel.

6 Commissioning

The Ordinance on Industrial Safety and Health (BetrSichV) shall be observed by the operator of the plant in Germany prior to commissioning.

In other countries the appropriate national guidelines, laws and country-specific regulations on work safety and accident prevention have to be adhered to.

⚠ WARNING

Dangerous situations in case of commissioning with incorrect installation of the device!

Death or (severe) bodily injuries.

Commissioning of the device (with cleaning medium) may only be performed, if the following parameters have been checked.

- The professional mechanical installation of the device to / into the vessel.
- The professional electric / pneumatic connection of the drive.
- The installation conditions.
- The safe function of the device.

6.1 Safety Prior to Commissioning

Before operating the device the user has to ensure that the local regulations have to be adhered to for commissioning.

It is recommended to document the commissioning in a protocol.

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

6.1.1 Safety measures

⚠ DANGER

Risk of life due to dangerous touch voltage and electric shock in case of faults!

Due to defective parts electrically conductive parts of the device, which do NOT belong to the operating circuit may be under voltage!

Death or severe bodily injuries.

- The device has to be connected to the grounded conductor system of the plant via a PE-conductor, in order to prevent high touch voltage in case of faults via the ground potential and / ort he power supply shuts down automatically (e.g. overcurrent-protection fuse).
- Earthing has to be carried out prior to commissioning!
- Observe correct connection of the protective conductor.

⚠ WARNING

Risk of burns due to hot surfaces!

The device is delivered without additional safety measures against hot surfaces! The device may heat up due to the cleansing medium or the heat transmission of the vessel! Touching the device can result in burns of the skin.

Death or (severe) severe bodily injuries.

- Exercise suitable measures at temperatures of > 60 °C by for instance:
  - Isolate hot surfaces and areas.
  - Establish a safety distance by protection structures or exclusion zones.
  - Set up warning signs within the immediate vicinity of the hazardous area.

As a result of the variety of practical applications and uses for the cleaning device, the manufacturer CANNOT specify a sound level for the device under load, i.e. installed in the container and operating with cleaning fluid (see chapter 3.3.1 Operating parameters).

*For this reason, the manufacturer can **only provide the owner with some preventive reference points and information** which must be observed and integrated into its risk assessment.*

⚠ CAUTION

Danger posed by high sound level!

The sound level of *a device* can exceed the permissible value of L_{pA} = 70 dB(A) and varies depending on the properties of the vessel in the plant and the existing operating conditions of the device.

Minor or medium injuries

- The sound level of the plant has to be identified and documented by the operator at all times!
- The sound level of the plant has to be kept within the legislative standard by:
  - *Noise reduction measures (e.g. sound insulation); encapsulation of the compressed air motor and discharging the waste air; attaching acoustic shields and container insulation).*
  - *Place barriers around the noise area and mark it accordingly (e.g. with mandatory sign "Wear hearing protection").*
  - *Use effective hearing protection (e.g. ear plugs or shells)!*

Comply with the technical health and safety rules relating to noise and vibration. The protective measures against noise exposure based on the risk assessment shall be implemented by state-of-the-art means. In this case, noise emissions must be prevented at source, or reduced as far as possible.

⚠ CAUTION

Inadequate illumination *of the surrounding area!*

The device does NOT have illumination.

Slight or moderate injury due to inadequate illumination.

- *The owner must ensure that adequate and even illumination is provided in all areas of the plant in which the device is used, during work on the device.*
- *The technical rules for workplaces apply in Germany – ASR A3.4. An illumination level of **300 lx (lux)** is recommended (maintenance value).*

All screws on the device are firmly tightened from the factory. Nevertheless, a test run should be carried out to verify safe function and seal tightness of the device after installation.

Functional testing / trial run:

1. Operate the device only in perfect condition.
2. The vessel to be cleaned has to be empty and depressurized.
3. All openings at the vessel (e.g. inspection openings) are closed.
4. Mobile parts in the vessel are shut down and secured against unintentional switching on or moving.
5. Check the safety distance to the vessel and surrounding components.
6. Switch on the device (see chapter 6.2 Start-Up Procedure)
7. ⚠ **CAUTION** Wrong rotation direction of the cleaning head!
   - ➢ Check the rotation direction of the cleaning head according to the rotation direction arrow on the cleaning head!
   - ➢ In case of wrong rotation direction of the cleaning head, the rotation direction of the drive has to be changed (see chapter 5.2.1 Rotation direction of the cleaning head).
8. Check the interfaces of the device for leakage *(visual check e.g. for streaks, icing as well as odour and noise due to leaks)!*
9. **ATTENTION** Risk of collision with mobile parts! In case components in the vessel have to rotate during the cleaning process, then:
   - ➢ observe the area of the orbital nozzle stroke of the cleaning head (see chapter 3.3.1 Operating parameter).
   - ➢ approach adjacent parts **gradually.**
   - ➢ check carefully that the cleaning head and the adjacent parts (e.g. agitators) do NOT collide during simultaneous movement!
10. Ensure that no extraordinary oscillations and vibrations occur.
11. Check device for smooth running.
12. Check motor for untypical noises.
13. Shut down the device (see chapter 7.2 Shut-Down Procedure)

6.1.2 Safety measure for the Ex-zone

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ DANGER

Ignition hazard in potentially explosive atmosphere by potential differences!

Due to potential differences ignitable sparks (e.g. electrostatic charge) or heating can be generated.

Death or severe bodily injuries.

- All electrically conductive parts of the device and the vessel have to be earthed for equipotential bonding by a ground cable of sufficient diameter!
- Only electrically conductive vessels may be cleaned.

Equipotential compensation is required within the potentially explosive areas. “All conductive parts of the device and the vessel have to be attached in such a way that no hazardous potential differences can occur among each other. In case there is the possibility that isolated metal parts are charged, thus function as an ignition source, grounding connections have to be provided” *(Excerpt from DIN EN 13463-1:2009 Non-electrical equipment for use in potentially explosive atmospheres – Part 1: Basic method and requirements chapter 6.7.2 Grounding connections for conductive parts)*

Safeguard the following conditions prior to commissioning of the device:

- ✓ The indications on the type plate of the device are consistent with the demands of the on-site explosion application (equipment group, Ex-category, Ex-zone, temperature class)!
- ✓ The ambient temperature is within the permissible range for later application!
- ✓ The device and the vessel are properly grounded and provide equipotential bonding.
- ✓ The distances from the device to the other parts of the installation on-site have been checked and comply with the requirements of explosion protection.
- ✓ All connections at the interfaces of the device are safely tightened and executed leakage-proof (zone entrainment).
- ✓ The device is NOT operated in a dusty environment and no unacceptable levels of dust can gather on the device.
- ✓ All required protective devices have been installed.

6.2 Start-Up Procedure

⚠ DANGER

For commissioning of the device the following **work steps** must be performed in the order listed below, otherwise there is risk.

Death or (severe) bodily injury.

Start-up procedure

1. Switch on / open the feed line of the cleansing medium.
   Check that the feed line of the cleansing medium is NOT interrupted, the media pressure acts at the device and that the device is secured against unauthorized shut down by appropriate measures.
2. Switch on the power supply to drive (electric energy or compressed air) the device.
   Check that the power supply is NOT interrupted and energy is supplied.

6.3 Operation and Handling

After commissioning and successful inspection the device can be operated while taking to the following notes into account.

⚠ DANGER

The devices are normally operated in a closed workshop, thus protected against the **danger of lightning**.

Death or severe bodily injuries.

- For outdoor use the operation must be stopped immediately if there is a risk of thunderstorms or lightning!

⚠ DANGER

Danger when **unauthorized persons** enter the operation or work area.
Unauthorized persons do NOT know the hazards for the working area described in these instructions!

Death or severe bodily injuries.

- The cleaning device may only be operated by authorized qualified personnel that is qualified and trained for the operation.
- Keep unauthorized persons away from the work area of the plant / machine in which the device has been installed. If in doubt, address the persons and direct them to leave the work area.
- Stop working until all unauthorized persons have left the work area.

⚠ WARNING

Risk of burns due to hot surfaces!

The device may heat up due to the cleansing medium or the heat transmission of the vessel. Touching the device can result in burns of the skin.

Death or (severe) severe bodily injuries.

- Observe the existing warning signs and do NOT touch the marked areas!
- No NOT remove isolation from protected hot areas and surfaces!
- Keep a safety distance to the existing protection devices or exclusion zones.
- Use protective equipment (e.g. protective gloves; cloth) against hot surfaces.
- Touch the device only after sufficient cooling time.

⚠ CAUTION

Risk of breakage due to material overload!

Pressure surges while feeding with the cleansing medium, particularly surges exceeding the operating pressure as well as gaseous constituents in the cleansing medium can lead to shocks in the cleaning device.

Possible damage to property!

- Pressure surges as well as gaseous constituents in the cleansing medium have to be excluded.

When operating and during operation of the device the following notes have to be observed.

⚠ **WARNING** incorrect operation of the device!

Death or (severe) bodily injuries

✓ Operate the device only in perfect condition.

✓ The vessel to be cleaned has to be empty and depressurized.

✓ All openings at the vessel (e.g. inspection openings) are closed.

✓ Adhere to the **start up and shut down procedures** when operating the device. (see chapter 6.2 Start-Up Procedure and 7.2 Shut-Down Procedure)

✓ No running-in of the device required.

✓ Unauthorized operation of the device is NOT permitted!

- ➢ Operation of the device without cleansing medium.
- ➢ Immerse the device into the product.
- ➢ Operation of the device outside of the admissible parameters (see chapter 3.3 Technical Data).

✓ Stop operation immediately if leakages should occur outside the vessel!

✓ Report any changes on the device or the plant, which might impair safety, immediately to the operator.

In the event of vibrations that are observed during commissioning of the device, which are NOT caused by the device, they have to be prevented by appropriate measures, so that the vibrations are NOT transferred onto the device.

If this is NOT possible, the maintenance intervals are to be reduced according to chapter 7.4.1 Maintenance intervals of the device!

Ensure that the mixture of introduced cleansing medium and the detached substances can flow freely out of the vessel during normal operation of the device.

ATTENTION Blockages in the drain tubes of the vessel must be removed immediately, in order to

- avoid the accumulation of larger quantities of dirt in the vessel,
- ensure that the vessel does NOT fill up with impermissible amounts of cleansing medium
- safeguard that the device does NOT immerse into the rising liquid level.

As for circulating cleansing media the final cleaning step should be executed with clean water in order to remove eventually introduced suspended particles.

7 Maintenance

The following safety notes apply to and have to be taken into account for all works on the device described and listed in this chapter.

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

Only use the **original spare parts** when exchanging parts of the device! Conduct a **functional check** after every repair *(see chapter 6.1.1 Safety measures)*.

⚠ WARNING

Risk of accident due to improper maintenance and repair works!

In case of improper maintenance, dropping of components or non-observance of the described safety notes accidents or material damage may result.

Death or (severe) bodily injuries.

- Works on the device may only be executed by **qualified personnel**.
- Only skilled **electrical personnel** may work on the electric unit.
- Carry out work on the device only in electrical voltage free, depressurized and cooled condition!
- Ensure an adequately sized safety clearance when working on the device. We recommend a free space of 1 m (Meter) around the device or the vessel respectively.
- Use only the approved lifting gear and attach the device with approved slings to the lifting equipment (e.g. by tying a rope loop around).

7.1 Disassembly for Maintenance and Cleaning

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ DANGER

Risk of fatal injury from electric shock by contact with live components!

Electrical components, which are switched on, are under a potentially dangerous electrical voltage and can carry out uncontrolled movements causing serious injuries.

Death or severe bodily injuries.

- Only **specialist electricians** may work on electric components (e.g. electric motor)!
- Disassemble the device only in non-powered condition only!
- Prior to works on the device the **work steps of the shut down procedures** have to be executed (see chapter 7.2 Shut-Down Procedure)!
- Cover adjacent, live parts safe from touch.
- Observe danger by electric current (e.g. warning signs)

⚠ WARNING

Risk of burns due to hot surfaces!

The device may heat up due to the cleansing medium or the heat transmission of the vessel. Touching the device can result in burns of the skin.

Death or (severe) severe bodily injuries.

- Disassemble the devices only in cool condition!
- Allow the device to cool down before starting to work on it!
- Be aware of hot surfaces (e.g. warning signs)!
- Use protective equipment (e.g. protective gloves; cloth) against hot surfaces.

⚠ WARNING

Risk of contusion and entanglement due to unintended starting of the drive.

Shut down the energy supply (e.g. electric or compressed air) prior to all maintenance, cleaning and repair works. A hazard can occur related to sudden and unforeseeable recurrence of the power supply (e.g. unauthorized restoration).

Death or (severe) bodily injuries.

- The **work steps shut down procedure** have to be carried out prior to disassembly / demounting of the device from the vessel (see chapter 7.2 Shut-Down Procedure).

⚠ WARNING

Risk of contusion during maintenance, cleaning or repair works!

The vessel and the interfaces of the device, such as the process, medium and rinse connection might be under pressure!

Death or (severe) bodily injuries.

- Depressurize the vessel and all lines before starting the works!
- Disassembly the device only in depressurized condition.
- Shut down mobile parts in the vessel and secure against unintentional restart or movement.
- Wear protective gloves.
- It is recommended to employ two persons for disassembly.

7.2 Shut-Down Procedure

⚠ DANGER

Risk due to sudden, unforeseeable or unauthorized restart of the device!
The following **work steps** must strictly be adhered to prior to all disassembly, maintenance, repair and cleaning works on the device.

Death or (severe) bodily injuries.

Shut-down procedure

1. **Interrupt the energy supply** (electric energy or compressed air) **to drive the device.**
   Check that the energy supply is interrupted and no energy (also no residual energy) acts on the device anymore, thus the device is de-energized and de-pressurized.
2. **Secure against power supply to start up against** sudden, unforeseeable and unauthorized **restart** by means of appropriate measures (e.g. lockable switches / shut off elements).
3. **Interrupt supply of cleansing medium.**
   Check that the supply of cleansing medium is interrupted and no media pressure acts on the device.
4. Ensure that the **supply of cleansing medium is secured against** sudden, unforeseeable or unauthorized **restart** by means of appropriate measures (e.g. lockable switches / shut off elements).

7.3 Mechanical dismounting

The safty instructions of chapter 7 Maintenance and chapter 7.1 Disassembly for Maintenance and Cleaning must be observed before the removal of the device from the vessel.

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ CAUTION

Malfunction due to contamination, foreign bodies or damage of the device!

Minor or medium bodily injuries or damage to property.

- An entry by contamination and foreign bodies through the interfaces of the device must be prevented by appropriate measures.
- Before starting work, have all necessary auxiliary materials, tools and information ready and follow the instructions of interfaces.
- *After being removed, the device must be placed on a support with a suitable contour (e.g. beams of wood or wooden saddle) or holder.*
- When lifting the device out of the vessel, please retain a distance to the inner wall of the vessel as well as to neighboring components (e.g. agitators) in order to avoid rubbing and chipping.

⚠ **WARNING** Foreign bodies influence the reliability of the device!
Damage, mechanical sparks and / or hot surfaces in the device.

- When working on the device, no foreign bodies in the device must enter!

ATTENTION Interface A:

A1 - The connections for the electric or the pneumatic drives have to be loosed according to the instructions given in the documentation provided by the appropriate manufacturer.
The comments in chapter 5.2 Connection of the Drive shall be observed!

A2 - The feed line of the cleansing medium must be loosed on the media connection [MA]. The media connection [MA] must be sealed with a suitable sealing cap.

A3 - If the rinse connection [SA] is connected, the return line has to be removed and connection [SA] has to be sealed (e.g. blind plug).

ATTENTION Interface B:

ATTENTION Too small installation openings at the vessel!Damage to the device or the environment.

- Before loosening the interface "B", it must be checked, whether the device can be lifted out through the installation opening of the vessel with the cleaning head (see chapter 3.3.1 Operating parameters).
- If the installation opening is too small, comments of the interface "C" are to be observed.

B1 - The device is to be loosed at the process connection [PA] of the vessel.

B2 - The comments to the deviating mounting methods of the device at the vessel in chapter 5.1.4 Installation of special designs are to observed.
The device is to be loosed at the process connection [PA] of the vessel.

ATTENTION Interface C:

C1 - ⚠ ***CAUTION*** *Inadequately sized installation opening in the container or components (e.g. agitators) in the container! Nozzles collide during removal.*

Damage to the device. The nozzle carrier can work loose.

- *The nozzles are NOT allowed to collide.*
- *Check the following before pulling the device out of the container:*
  - *Minimum dimension of the installation opening (see chapter 3.3.1 Operating parameters) and*
  - *presence of interference contours on surrounding components in the container.*
- *Lift the downpipe [DP] and cleaning head through the installation opening out of the container with the greatest of care.*

NOTE Installation opening - stationary device:

- *If necessary, align the nozzles by:*
  - *Powerfully rotating the "bottom of the housing" on the cleaning head in the direction of the arrow,*
  - *briefly starting up the drive.*

Alternatively, unscrew the cleaning head from the downpipe [DP] inside the container and screw back on again after disassembly of the device (see chapter 7.4.6 Exchanging the wear parts and nozzles).

7.4 Maintenance

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

In order to grant a trouble-free operation, excellent operational reliability and long service life it is absolutely vital to exercise cleaning and maintenance works on the device on a regular basis.

⚠ WARNING

Risk posed by the magnetic field of the magnetic holder during installation and disassembly of the device!
Magnets generate a far-reaching, strong magnetic field. They can damage devices (e.g. televisions, laptops, computer hard disks, data media, credit or EC-cards, hearing aids and loudspeakers).

Magnets can cause malfunctions or a serious threat to health to persons with pacemakers!

Death or severe bodily injuries.

- Persons with pacemakers may NOT mount or demount the device!
- Keep a safety distance of at least 0.5 meters to magnetic holders / magnets of the device from object and technical devices with functions that can be affected by magnetic fields!

⚠ WARNING

Risk of contusion for maintenance works on the device in the area of the magnetic coupling!

Death or (severe) bodily injuries.

- Particular caution must be exercised when mounting and demounting the device in the area of the magnetic coupling with tools providing special magnetic properties!
- Ensure that the magnetic holder / magnets are NOT placed near substances or objects that provide magnetic properties!
- Always store magnetic holders / magnet separately with a safety distance of 0.5 m!

7.4.1 Maintenance intervals of the device

ATTENTION

The inspection intervals and inspection methods for maintenance and cleaning of the drives as well as single purchased components can deviate from the indicated data or exceed these!

- Please find detailed information in the documentation provided by the appropriate manufacturer.
- For inquiries regarding maintenance or uncertainties, please contact Armaturenwerk Hötensleben GmbH.

⚠ **WARNING** Foreign bodies influence the reliability of the device!
Damage, mechanical sparks and / or hot surfaces in the device.

➢ When working on the device, no foreign bodies in the device must enter!

ATTENTION component failure due to vibration damages!

During operation the screw and clamp connections can loosen or the device can be prone to heavy strains due to oscillations and vibrations caused hereby, which may result in component failure.

- Check the installed device for loose connections on a regular basis!
- Check for vibration damage during maintenance inspection!
- Adjust maintenance intervals according to the plant-specific operating conditions!

In order to avoid damages it is standard practice to start with short maintenance intervals after commissioning. If no damages occur, the maintenance intervals are adjusted to the quoted intervals stepwise as indicated in the instructions.

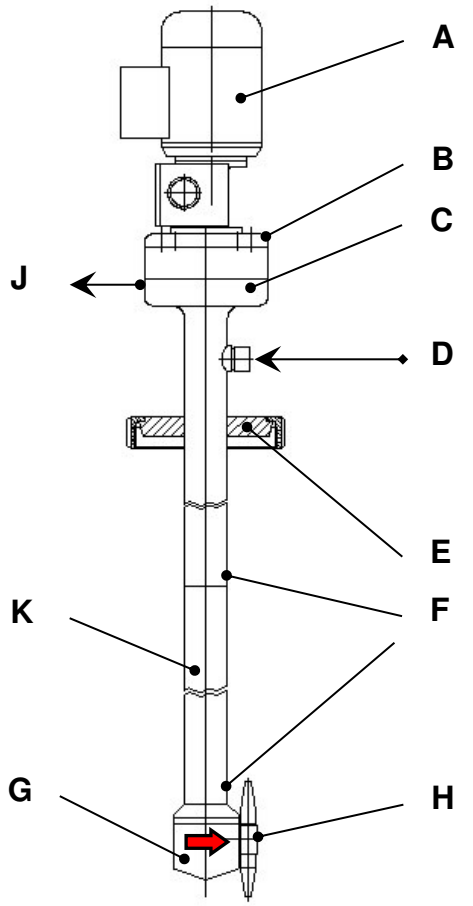
NOTE The maintenance intervals are to be reduced by 30% if there are:

- Deviations from the preferred position of installation of the device (see chapter 5.1.2 Installation position of the device)
- Vibrations that are identified in the plant, which are NOT generated by the device and CANNOT be avoided.

If the device is NOT operated for a longer period of time we recommend conducting a complete check for functionality of the device prior to re-commissioning.

⚠ ***WARNING*** *Pay attention to the functional safety of the device during installation of the device!*

- *All screw connections on the device must be tightened correctly and checked for firm seating (e.g. tightening torque).*



Maintenance points

- **A** BG-drive
- **B** BG-motor connection (with magnetic holder)
- **C** BG-downpipe (with magnetic holder)
- **D** Media connection [MA]
- **E** Process connection [PA]
- **F** Securing screws
- **G** BG-head without nozzle holder
- **H** BG-nozzle holder (nozzle carrier with nozzles)
- **J** Rinse connection [SA] optional
- **K** BG-downpipe extension [DPV]

Figure 7.4-1 Maintenance Points of the Device

NOTE

The temporal indications of the maintenance intervals are based on one shift operation
(8 hours per working day for 12 months per year) and operation with:
Cleaning medium:.....water
Media pressure:.....8 bar
Media temperature:.....24°C.

Methode		Intervall	
S	= Visual inspection	**h**	= operating hours of the device
F	= Functional test	**t**	= daily
M	= Measurement	**w**	= weekly
		m	= monthly
		¼ j	= quarterly
		½ j	= half-yearly
		j	= yearly
		R	= clean*

*According to the operating conditions the intervals for cleaning are to be defined by the operator.

Table 7.4-1: Maintenance Points

	Inspections	Method	Interval
A	Check for correct and firm installation of the BG-drive, particularly the connection of the energy supply (Electric or compressed air). **ATTENTION** Observe instructions of the manufacturer of the drive! When renewing the energy supply please ensure correct rotation direction of the cleaning head (see chapter 5.2.1 Rotation direction of the cleaning head)!	**S F**	**m**
B	Check for correct and firm application of all screw connections of the BG-motor connection. Loosened screw connections have to be fastened professionally.	**S F M**	**m**
C	Check the O-ring between the sealing flange and the downpipe flange of the BG-downpipe with regards to leakage.	**S F**	**½ j**
	Check the ball bearing*, thrust washer and retaining ring* for wear and damages.	**S**	**100 h**
	Exchange the ball bearings at the latest after a runtime of	**F**	**400 h**
D	Check the media connections [MA] for leakage, wear and contaminations. Check the upstream filter for functionality and contaminations.	**S F**	**m**
E	Check the process connection [PA] for leakage, wear and contaminations as well as correct and firm installation.	**S F**	**m**
F	Check for firm installation of the securing screws between the BG-downpipe <> (BG-DPV optional) <> BG-head.	**F M**	**m**
G	Check the plastic bearings (bushings and plate liners) for wear and damages. Exchange, if required.	**S**	**200 h**
	Check yoke coupling (setting nut, shaft with slot and driver pin of the SG-shaft) for wear and damage.	***S F***	***½ j***
H	Check the screws for correct and firm installation as well as the function of the BG-head and the BG-nozzle holder.	**S F M**	**m**
J	**Optional:** Check the blind plugs or output lines of the rinse connection [SA] for leakage, wear and contaminations as well as correct and tight installation.	**S F M**	**m**
K	**Optional:** Maintenance has to be exercised for the BG-DPV in the same intervals as for the basic device (see maintenance points C, F and G).		

NOTE Please find the required torques of screw connections that are necessary for maintenance works in chapter 7.5 *Spare Parts Table 7.5-1: Spare Parts List (Standard)*.

7.4.2 Tools and tightening torques

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

Apply only appropriate tools that are required for carrying out the work and that provide approval for their use.

For mechanical works on the device the common workshop equipment is sufficient. You require at least the following tools:

- ✓ Screw driver set (slotted-head / cross-head)
- ✓ wrench set
- ✓ Open end spanner and ring spanner set
- ✓ Allen key
- ✓ Circlip pliers *for inner ring (hole diameter Ø 22 mm)*
- ✓ pliers wrench
- ✓ Face spanner *(Adjustable pin spacing; pin diameter Ø 4 mm)*
- ✓ torque wrench
- ✓ *Torque driver (with inserts and accessories)*
- ✓ *Adjustable wrench*
- ✓ *Strap wrench with fabric strap*

***NOTE** Once the bushings have been changed, it may be necessary to use reamers for smoothing down:*

- ✓ *Reamer H7 (Ø 10 mm or Ø 18 mm, depending on device)*

All screwed connections on the device are fastened with an appropriate torque by the factory, in order to guarantee the required clamping force between the components to be connected also during application of maximum operating forces.

***ATTENTION** All relevant tightening torques are listed in the chapter 7.5 Spare Parts Table 7.5-1: Spare Parts List (Standard).*

For the electric or pneumatic connections of the drive the tightening torques can be found in the documents of the appropriate manufacturer!

7.4.3 Exchanging the O-ring

NOTE A list of spare parts is listed in chapter 7.5 Spare Parts.

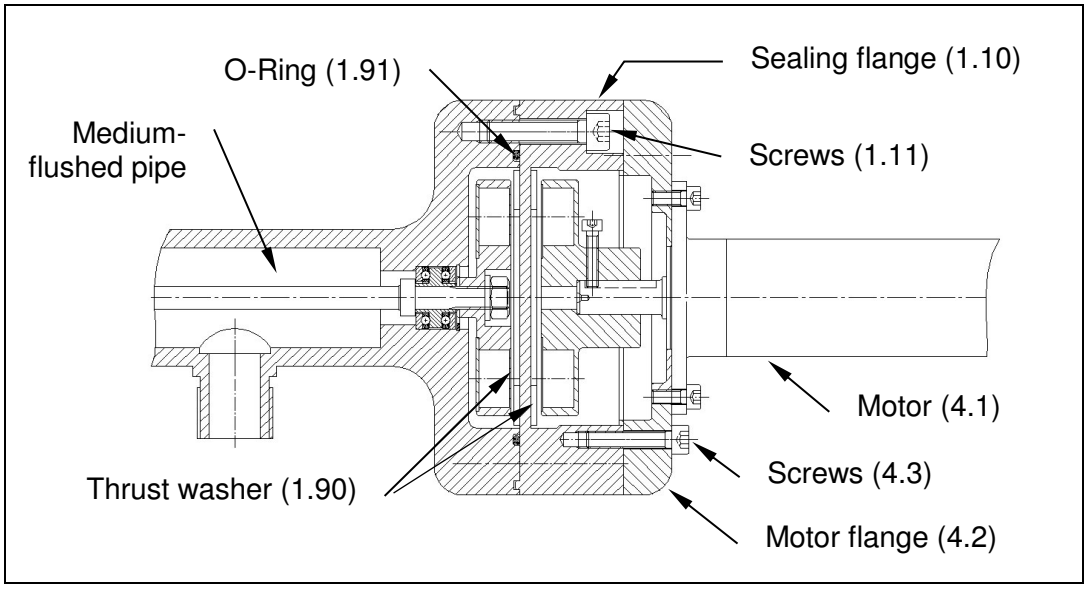


Figure 7.4-2 Exchanging the O-ring

Work steps for exchanging the O-ring:

Disassembly:

1. Loosen screws (4.3) and turn them out
2. ⚠ **WARNING** Danger due to magnetic field of the magnetic holders!

   Death or (severe) bodily injuries.

   - Observe safety instructions in chapter 7.4 Maintenance for handling of the magnetic holders!

Detach motor (4.1) with motor flange (4.2)

3. Remove thrust washer (1.90)
4. Loosen screws (1.11) and turn them out
5. Take off sealing flange (1.10)
6. Remove thrust washer (1.90)
7. Exchange O-ring (1.91)

Assembly:

⚠ **WARNING** Foreign bodies influence the reliability of the device!
Damage, mechanical sparks and / or hot surfaces in the device.

- When working on the device, no foreign bodies in the device must enter!

Assembly is performed in reverse order of disassembly starting with work step 7 to 1!

ATTENTION (work step 6 and 3):
Due to missing thrust washers (1.90) emergency running properties are NOT guaranteed!

Damages to the device.

- For assembly please take into account that the thrust washers (1.90) have been inserted.

7.4.4 Exchange of the ball bearing

NOTE A list of spare parts is listed in chapter 7.5 Spare Parts.

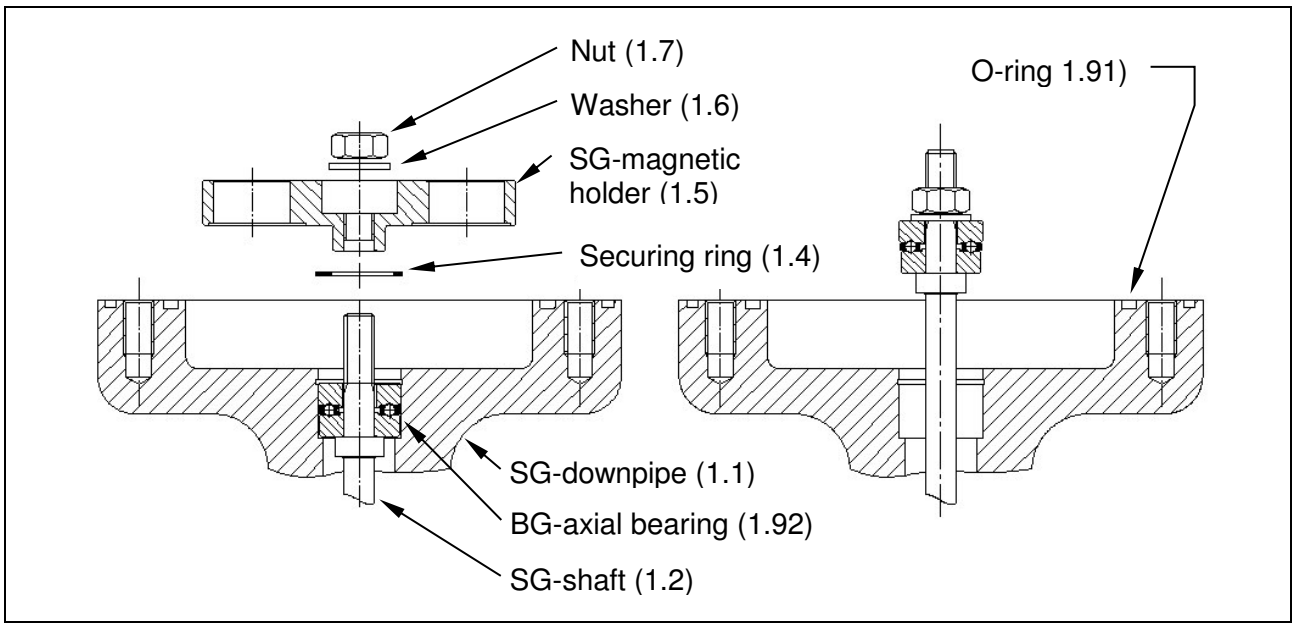


Figure 7.4-3 Assembly / Disassembly of the Ball Bearing

NOTE The bearing does NOT need to be additionally lubricated!
During operation, the balls of the BG-axial bearing (1.92) are lapped through the cleaning medium and thereby lubricated and cooled at the same.

Work steps to exchange the BG-axial bearing:

Disassembly:

1. Remove BG-motor connection (4.0)
   (see the procedure chapter 7.4.3 Exchanging the O-ring).
2. *Threaded pin (1.3) unscrew and housing top (2.10) loosen.*
3. Turn out the BG-head (2) from the SG-downpipe (1.1)
4. **NOTE** use protective jaws for clamping!
   Clamp the SG-downpipe (1.1) firmly. The groove for the o-ring (1.91) is showing upwards.
5. ⚠ ***CAUTION*** *Danger due to magnetic field from magnet carriers!*

   Damages of the device or minor bodily injuries.

   - *Carefully insert the face spanner into the holes in SG-magnet holder (1.5) and hold it tight.*
   - *Unscrew nut (1.7) from SG-shaft (1.2) using a socket wrench.*
   - *Remove the washer (1.6).*
6. ⚠ **CAUTION** SG-shaft (1.2) can fall out!

   Damages of the device or minor bodily injuries.

   - Secure the SG-shaft (1.2) against falling out and screw off the SG-magnetic holder (1.5).
7. Remove the securing ring (1.4) *with locking ring pliers*.
8. Screw on the nut (1.7) for securing the BG-axial bearing (1.92) again hand tight onto the SG-shaft (1.2).

9. **NOTE** Complete extraction of the SG-shaft (1.2) upwards through the SG-downpipe (1.1) is NOT possible!
   Lift up the SG-shaft (1.2) with the BG-axial bearing (1.92) slightly and secure against falling down.

10. **NOTE** The balls of the bearing can fall out and get lost!
    Remove nut (1.7) and take out BG-axial bearing (1.92).

Assembly:

⚠ **WARNING** Foreign bodies influence the reliability of the device!

Damage, mechanical sparks and / or hot surfaces in the device.

- When working on the device, no foreign bodies in the device must enter!

ATTENTION Observe the sequence of installation of the bearing disks!

Damage to the device.

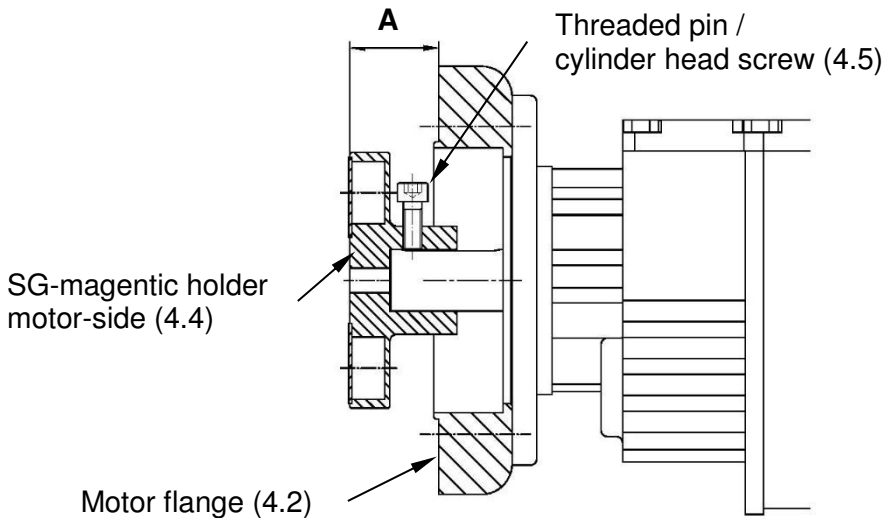
- The bearing disks of the BG-axial bearing (1.92) with the smaller outer diameter have to meet the bearing stop of the SG-shaft (1.2)!

Assembly is carried out in reverse order of disassembly starting with working step 10 to 1!

NOTE (working step 5): BG-axial bearing (1.92) should be able to move freely.
*For single-row BG-axial ball bearings (1.92) is a*fter having screwed the SG-magnetic holders (1.5) onto the SG-shaft (1.2):

- the SG-magnetic holders (1.5) are loosened again by a quarter to half a turn and
- tightened and securely locked with the washer (1.6) and nut (1.7).

7.4.5 Adjustment aid for the magnetic holder



TANKO-JX	A = [mm]
70	25 ±0.5
75	29 ±0.5
80	29 ±0.5

Figure 7.4-4 Adjustment aid for magnetic holders (motor side)

7.4.6 Exchanging the wear parts and nozzles

NOTE A list of spare parts is listed in chapter 7.5 Spare Parts.

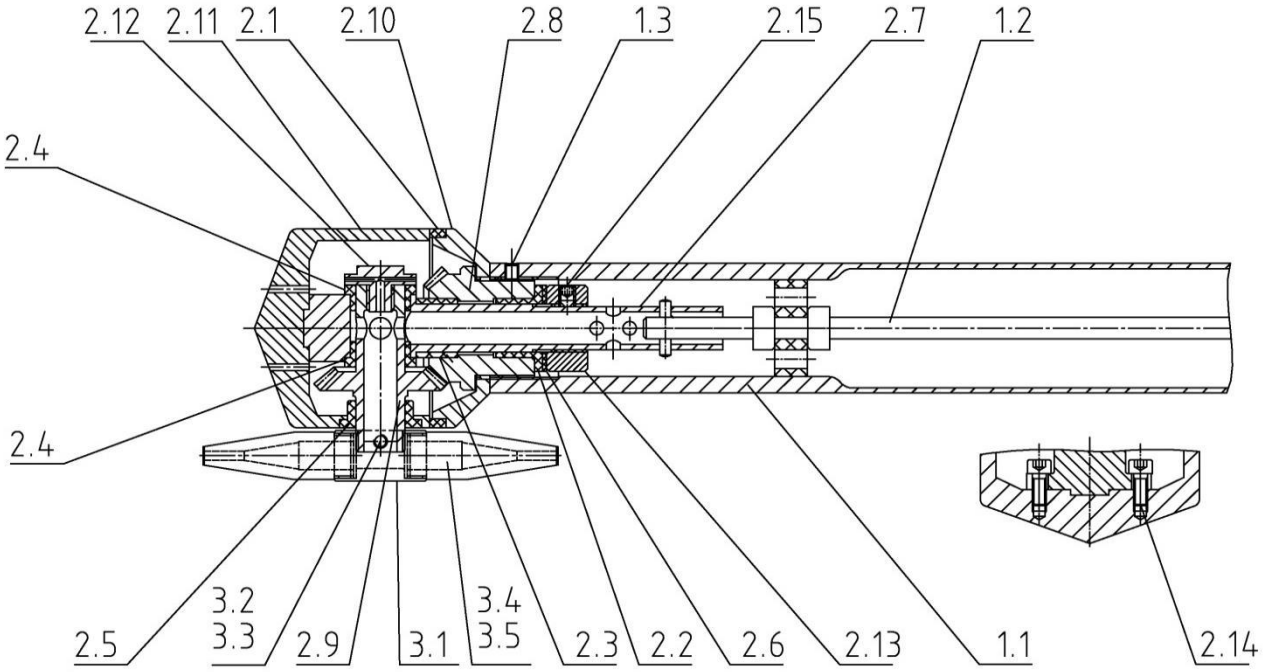


Figure 7.4-5 Cleaning head with components (example TANKO-JX80)

NOTE The bushings do NOT need to be additionally lubricated!
The bushings are self-lubricating and are wetted by the cleaning medium during the operation and thereby lubricated as well as cooled at the same time.

Work steps to exchange the bearing bushings and gears of the BG-head:

Disassembly:

1. *Unscrew and remove threaded pin (1.3) and release housing top (2.10).*
2. *Unscrew BG-head (2) from SG-downpipe (1.1).*

   ***NOTE** A tactile skip of the magnetic coupling is normal with attached drive while unscrewing the BG-head (2).*
3. ***ATTENTION** Scratches and indentations by clamping in the vice!*

   Damage to the cleaning head!

   - *Use protective jaws when clamping!*
   - *Clamp BG-head (2) firmly with BG-nozzle holder (3).*
4. ***ATTENTION** Edge compression in the area of the wrench flat!*

   Damage to the nozzles!

   - *The wrench flat of nozzle (3.5) must protrude beyond the protective jaws.*
   - *Use an adjustable wrench to remove nozzle (3.5) without damaging it!*
   - *Place the jaws of the adjustable wrench in full contact with the wrench flats without play, unscrew nozzle (3.5) from nozzle carrier (3.1) and remove it.*

NOTE *Repeat steps 3 and 4 according to the number of nozzles.*

Figure 7.4-6
Loosen the nozzle (3.5)
(TANKO-JX70)

5. *Unscrew and remove threaded pin (3.2) from nozzle carrier (3.1).*

Figure 7.4-7
Loosen the the threaded pin (3.2)
(TANKO-JX70)

6. *Remove BG-head (2) with nozzle carrier (3.1) from the protective jaws.*
7. *Unscrew housing top (2.10) and remove housing bush (2.1).*
8. ***ATTENTION*** *Scratches and indentations by clamping in the vice!*

   Damage to the thread!

   - *Use protective jaws when clamping!*
   - *Clamp BG-head (2) in area of shaft gear (2.8).*
   - *Secure adjustment nut (2.13) respectively shaft (2.7) with an open-end wrench to prevent turning.*
   - *Unscrew nozzle carrier (3.1).*

Figure 7.4-8
Loosen the nozzle carrier (3.1)
(TANKO-JX70)

9. *Unscrew threaded pin (2.15) from adjustment nut (2.13).*

Figure 7.4-9
Loosen the threaded pin (2.15)
(TANKO-JX70)

10. *Remove BG-head (2) from the protective jaws.*

11. *Unscrew adjustment nut (2.13) from shaft (2.7).*

12. *Pull shaft gear (2.8) with bushing / flange bushing (2.2), bushing (2.3) and thrust washer (2.6) from shaft (2.7).*

13. *Unscrew and remove retaining screw (2.14) from housing bottom (2.11).*

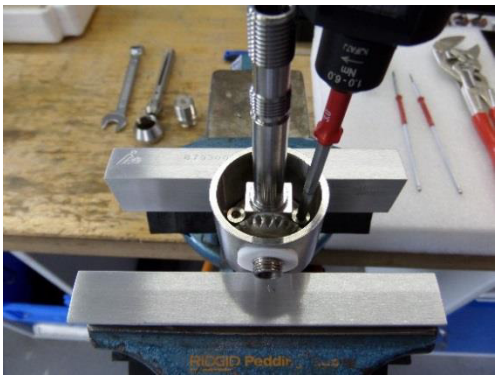


Figure 7.4-10
Loosen the retaining screw (2.14)
(TANKO-JX70)

14. *Push flange bushings (2.5) out of the housing bottom (2.11).*

15. *Remove shaft (2.7) with SG-nozzle gear (2.9) and flange bushings (2.2) from housing bottom (2.11) by tilting slightly.*

16. ***ATTENTION*** *Left-hand thread flush screw (2.12)!*

Damage to the device

- *Note the direction of rotation of flush screw (2.12).*
- *Block SG-nozzle gear (2.9) using shaft gear (2.8).*
- *Loosen flush screw (2.12).*

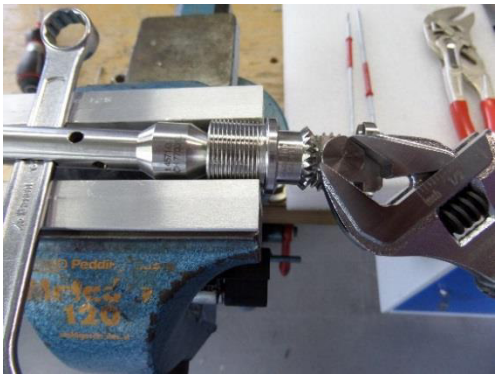


Figure 7.4-11
Loosen the flush screw (2.12)
(TANKO-JX70)

17. *Pull the SG-nozzle gear (2.9) out the shaft (2.7).*

18. *Replace bushings (2.1, 2.2, 2.3 and 2.4), thrust washer (2.6) and shaft gear (2.8) by new parts.*

    ***NOTE** So the shafts can move freely, if necessary lightly rub the renewed bushings with a reamer when installed to smoothen them. Avoid excessive smoothing, because it leads to increased leakage.*

Assembly:

⚠ **WARNING** Foreign bodies influence the reliability of the device!

Damage, mechanical sparks and / or hot surfaces in the device.

- When working on the device, no foreign bodies in the device must enter!

The assembly is executed in reverse order of the disassembly starting with work step 18 to 1!

***NOTE (work step 11 bis 9):** When the shaft gear (2.8) is fixed, the housing bottom (2.11) has to be able to move freely!*

- Screw adjustment nut (2.13) onto shaft (2.7) and tighten hand-tight. Then loosen the adjustment nut (2.13) by approximately a quarter or half a turn.
- *Tighten threaded pin (2.15) with torque tool.*

***NOTE (work step 2 to 1):** That the cleaning head can rotate freely, is note the following:*

- Conduct a functional test of the rotations of the BG-head (2).
  - ➢ Hold the housing (2.11) tight at the bottom and turn the BG-nozzle holder (3).
- *Screw BG-head (2) into the SG-downpipe tube (1.1).*
- *Without tools housing top (2.10) tighten hand-tight.*
  - ➢ *Adjust the gap width of 0,1 to 0,2 mm between housing bushing (2.1) and housing top (2.10)!*
- *Tighten threaded pin (1.3) with torque tool.*

Work steps to exchange the Nozzles and the Jet concentrators:

To change nozzles (3.5), carry out the same working steps 1 bis 4, as described in this chapter.

Then jet concentrators (3.4) can be pulled out of nozzles (3.5) as well, and replaced by new ones.

7.4.7 Cleaning the device

NOTE ON EXPLOSION PROTECTION

Cleaning the device in the presence of a potentially explosive atmosphere is PROHIBITED!

It is recommended to carry out cleaning of the device in the context with maintenance works.

Observe the provided documentation for the drive and the following safety instructions prior to cleaning.

⚠ WARNING

Warning of acid and corrosive cleaning agents!

Death or (severe) bodily injuries.

- Observe the provisions and specifications of the safety datasheets of the cleansing agents (e.g. vapors or hazard substances).
- Wear protective equipment (e.g. protective gloves, protective footwear, protective glasses).
- Avoid too high concentration of the cleaning agent.
  Use only clean and chlorine free water as diluents.
- Rinse the device thoroughly with clear water after cleaning.
- Store the cleaning agents according to the valid safety guidelines
- Dispose of cleaning waste and cleaning materials in an environmentally acceptable manner.

ATTENTION The cleaning agents must be approved for all the materials of the device (e.g. sealing, bushings)!

NOTE Do not use any sharp objects (e.g. knives) or tools.

Cleaning in disassembled condition:
Prior to cleaning the device has to be removed and disassembled by **qualified personnel**. Please observe the safety instructions in chapter 7.1 Disassembly for Maintenance and Cleaning!

Cleaning in disassembled condition of the device may only be carried out by **appropriately trained persons**. After the cleaning process the device has to be assembled, inspected and re-installed into the vessel by a **specialist**.

Cleaning in assembled condition:

Basically the cleaning of the device's components that are located **inside the vessel** is NOT necessary, as self-cleaning (CIP-cleaning) is carried out during the cleaning process.

Before starting the cleaning works the **work steps of the shut down procedure** have to be carried out (see chapter 7.2 Shut-Down Procedure).

When cleaning the device's components **outside the vessel** please take care to remove dust and buildups (e.g. fat and oil residues).

As for the electric motor for instance the cooling fins and the grille of the fan have to be cleaned, in order to prevent overheating of the motor.

7.5 Spare Parts

ATTENTION Technical modifications are subject to change within the scope of the further development and improvement of the device's properties!

- The Item-No. (dimensions / materials) may differ from the delivered device.
- For devices in special designs the supplements to the operating manual are to be observed.

For the order of spare parts for the device please quote the following details:

- Device:
  - Type
  - Serial number
- Spare part:
  - Designation
  - Article-No.

Table 7.5-1: Spare Parts List (Standard)

NOTE Wear parts are marked with a „X“ and can be ordered as wear parts package.

Pos. Item	Anz. QTY	Bezeichnung Description	Norm Norm	Abmessung Dimension	Anzugsmoment tight. torques [Nm]	Abmessung Dimension			Werkstoff Material	[VT]
						TANKO-JX70	**TANKO-JX75**	**TANKO-JX80**		
1	1	BG-Downpipe BG-downpipe	AWH	nach Auftrag upon order	------	66C2_00092_00 66C2_00093_00	66A3_00092_00 66A3_00093_00		------	---
1.1	1	SG-Downpiperohr SG-downpipe tube	AWH	nach Auftrag upon order	------	66C2_00051052	66A3_00051052		1.4571	---
1.2	1	SG-Welle SG-shaft	AWH	nach Auftrag upon order	------	66C0_00081050	66A0_00081050		1.4571 PTFE	---
1.3	*2*	Gewindestift Threaded pin	EN ISO 4026 (DIN 913)	M 5x 6	*2,9 - 3,1*	430182	430182		1.4571	---
1.4	1	Sicherungsring für Bohrung Retaining ring for bore	DIN 472	*J* 22	------	450286	450286		1.4568	---
1.5	1	SG-Magnetträger Wellenseite SG-magnetic holders shaft-side	AWH	*Ø 58 - 21*	------	66C0000032052	------		1.4571	---
				Ø 83 - 19	------	------	66A0000032052		1.4571	---
1.6	1	Unterleg-Scheibe Washer	DIN EN ISO 7089 (DIN 125)	Ø 6,4	------	450063	------	------	1.4571	---
				Ø 8,4	------	------	450060		1.4571	---
1.7	1	Sechskant-Mutter Hexagon nut	DIN EN ISO 4032 (DIN 934)	M 6	*5,0 - 5,4*	570145	------	------	1.4571	---
				M 8	*13,0 - 14,4*	------	570144		1.4571	---
1.8	---	------	------	------	------	------	------	------	------	---
1.90	1	Anlaufscheibe Thrust washer	FDA	Ø 54x 32 - 1,5	------	1105	------	------	iglidur A500	---
				Ø 90x 62 - 2,0	------	------	1089			
			ATEX	Ø 54x 32 - 1,5	------	1079	------	------	iglidur X	---
				Ø 90x 62 - 2,0	------	------	1073			---
1.91	1	O-Ring O-ring		Ø 70,0 x 3,0	------	1060500007003	------	------	EPDM	---
				Ø 98,0 x 3,0	------	------	1060500009803		EPDM	---
1.92	1	BG-Axiallager 1 BG-axial bearing 1	AWH	*Ø 22x 8 - 14,0*	------	66A0000065004	66A0000065004		1.4571 PEEK	---
		BG-Axiallager 2 (alternativ) *BG-axial bearing 2 (alternative)*	*AWH*	*Ø 22x 8 - 14,6*	------	*66B0000065004*	*66B0000065004*		*1.4571* *PEEK*	---
1.10	1	Dichtflansch Sealing flange	AWH	*Ø102,0 - 32,0*	------	66C0000074052	------	------	1.4571	---
				Ø139,0 - 36,5	------	------	66A0000074052		1.4571	---

1.11	8	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4026 (DIN 912)	M 6x 30	*5,0 - 5,4*	540035 / 540129	------	------	A2 / A4	---
				M 8x 35	*13,0 - 14,4*	------	540091 / 540171	540091 / 540171	A2 / A4	---
2	1	BG-Kopf ohne Düsenstock BG-head without nozzle holder	AWH	nach Auftrag upon order	------	66C0_00029052	66D0_00029051	66A0_00029051	------	---
2.1	1	Gehäusebuchse Housing bushing	AWH	*Ø 40x 34 - 2,5*	------	66C00000010K0	------	------	PTFE	X
					------	66C00000010M0	------	------	PEEK	---
				Ø 74x 67,5 - 6	------	------	66D00000010K0	------	PTFE	X
					------	------	66D00000010M0	------	PEEK	---
				Ø 80x 73,5 - 6	------	------	------	66300000010K1	PTFE	X
					------	------	------	66300000010M1	PEEK	---
2.2	1	Buchse / Bundbuchse Bushing / Flange bushing	AWH	*Ø 14x 10 -12*	------	66C00000070K0	------	------	PTFE	X
					------	66C00000070M0	------	------	PEEK	---
				Ø 32x 18 -17	------	------	66300000020K1		PTFE	X
					------	------	66300000020M1		PEEK	---
2.3	1	Buchse Bushing	AWH	*Ø 13x 10 -10,5*	------	66C00000030K0	------	------	PTFE	X
					------	66C00000030M0	------	------	PEEK	---
				Ø 18x 22 -15,2	------	------	66300000030K1		PTFE	X
					------	------	66300000030M1		PEEK	---
2.4	2	Bundbuchse Flange bushing	AWH	*Ø 15x 10 - 4,5*	------	66C00000040K0	------	------	PTFE	X
					------	66C00000040M0	------	------	PEEK	---
				Ø 26x 18 - 9,5	------	------	66300000040K1		PTFE	X
					------	------	66300000040M1		PEEK	---
2.5	1	Bundbuchse Flange bushing	AWH	*Ø 20x 10 - 5,8*	------	66C00000060K0	------	------	PTFE	X
					------	66C00000060M0	------	------	PEEK	---
				Ø 30x 18 -10,0	------	------	66300000050K1		PTFE	X
					------	------	66300000050M1		PEEK	---
2.6	1	Anlaufscheibe Thrust washer	~~FDA~~	Ø 18x 10 - 1,0	------	~~1101~~	------	------	~~iglidur A500~~	X
				Ø 32x 18 - 1,5	------	------	~~1087~~			
			ATEX	Ø 18x 10 - 1,0	------	1102	------	------	iglidur X	X
				Ø 32x 18 - 1,5	------	------	1091			
2.7	1	Achse Shaft	AWH	*M10x 1,0*	------	66C0000009051	------	------	1.4571	---
				M18x 1,0	------	------	66D0000009050	------	1.4571	---
				M18x 1,0	------	------	------	6630000009051	1.4571	---

2.8	1	Achsenzahnrad Shaft gear	AWH	*z = 32*	------	66C0000011050	------	------	1.4571	---
				z = 29	------	------	66D0000011050	------	1.4571	---
				z = 29	------	------	------	6630000011051	1.4571	---
2.9	1	SG-Düsenzahnrad SG-nozzle gear	AWH	*z = 31*	------	66C0000012051	------	------	1.4571	---
				z = 31	------	------	66D0000012050	------	1.4571	---
				z = 31	------	------	------	6630000012051	1.4571	---
2.10	1	Gehäuse-oben Housing top	AWH	*M26x 1,5*	*Handfest ohne Werkzeug.* *Hand-tight without tools.*	66C0000013051	------	------	1.4571	---
				M38x 1,5		------	66D0000013050	------	1.4571	---
				M38x 1,5		------	------	6630000013051	1.4571	---
		BG-Adapter für JX80/70 BG-adapter for JX80/70	AWH	*M38x 1,5*		~~------~~	~~66B0000003050 (für BG-Kopf TANKO-JX70)~~		~~1.4571 PTFE~~	---
2.11	1	Gehäuse-unten Housing bottom	AWH	------	------	66C0000014051	66D0000014050		1.4571	---
2.12	1	Spülschraube Flush screw	AWH	*M 6x 0,75 LH*	*4,6 - 4,8*	66C0000015050	------		1.4571	---
				M10x 1,0 LH	*19 - 21*	------	6630000015051		1.4571	---
2.13	1	Einstellmutter Adjustment nut	AWH	*M10x 1,0*	------	66C0000016051	------		1.4571	---
				M18x 1,0	------	------	6630000016051		1.4571	---
		Einstellmutter lang Adjustment nut long	AWH	*M10x 1,0*	------	66C0000016052	~~66C0000016052 (für BG-Kopf TANKO-JX70)~~		1.4571	---
2.14	2	Halteschraube Retaining screw	AWH	M 4x 12	*1,3 - 1,5*	66C0000024051	------		1.4571	---
				M 5x 12	*2,9 - 3,1*	------	6630000024051		1.4571	---
2.15	2	Gewindestift Threaded pin	EN ISO 4027 (DIN 914)	M 5x 6	*2,0 - 2,2*	430174	------	------	1.4571	---
				M 6x 6	*2,6 - 2,8*	------	430175		1.4571	---

3	1	BG-Düsenstock BG-nozzle holder	AWH	Nach Auftrag upon order	------	66C00__095052	66D00__095051	66A00__095051	------	---
3.1	1	Düsenträger Nozzle carrier	AWH	*M10x 1,0*	*12 - 14*	66C00_0017051	------	------	1.4571	---
				M18x 1,0	*26 - 28*	------	66D00_0017050	------	1.4571	
				M18x 1,0	*26 - 28*	------	------	66300_0017051	1.4571	---
3.2	*2*	Gewindestift Threaded pin	*EN ISO 4027* *(DIN 914)*	*M 3x 8*	*0,8 - 1,1*	*430046*	------	------	1.4571	---
				M 5x 10	*2,9 - 3,1*	------	*430047*	------	1.4571	---
				M 5x 16	*2,9 - 3,1*	------	------	*430048*	1.4571	---
3.3	---	*entfallen / cancelled*	------	------	------	------	------	------	------	---
3.4	n.A. u.o.	Strahlkonzentrator Jet concentrator	AWH	Nach Auftrag upon order	------	66C0000020051	66D0000020050	6630000020050	1.4571	---
3.5	n.A. u.o.	Düse Nozzle	AWH	*M10x 1,0*	*26 - 28*	66C000_021050	------	------	1.4571	---
				G 3/8 “	*33 - 35*	------	66D000_021051	------	1.4571	---
				G 1/2 “	*44 - 46*	------	------	66A000_021051	1.4571	---
	1	Verschleißteilepaket Wear parts package	FDA-Standard	------	------	~~66C0F0E029051~~	~~66D0F0E029051~~	~~66A0F0E029051~~		X
			ATEX-Standard	------	------	66C0X0E029051	66D0X0E029051	66A0X0E029051		X

Pos. Item	Anz. QTY	Bezeichnung Description	Norm Norm	Abmessung Dimension	Anzugsmom. tight. torques [Nm]	Artikel-Nr. / Article-no.				
						TANKO-JX70				
4	1	BG-Motoranbindung BG-motor connection	AWH	n. Auftrag upon order	------	66CVBGMR00000	66CVBGMS00000		66CVBGMA00000	66CVBGMD00000
4.1	1	Antrieb / Motor drive / motor	------	n. Auftrag upon order	------	RGM	SEW Stirnradgetriebe Helical gear motor	SEW Schneckengetriebe Worm gear motor	Atlas Copco	DEPRAG
4.2	1	Motorflansch motor flange	AWH / 1.4571	*Ø110 / 70*	------	66C0000071350	------		------	------
				Ø120 /100	------	------	66C0000071250		------	------
				Ø102 / 70	------	------	------		66C0000071550	
				Ø102 / 34	------	------	------		------	66C0000071650
4.3	2	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 5x 14	*2,9 - 3,1*	------	------	------	540101	------
	4			M 5x 10	*2,9 - 3,1*	------	------	------	------	540083
				M 6x 12	*5,0 - 5,4*	540030	------	------	------	------
				M 6x 16	*5,0 - 5,4*	------	540031		------	------
4.4	1	SG-Magnetträger Motorseite SG-magentic holder motor-side	AWH / 1.4571	------	------	66C0000035352	66C0000035252		66C0000035552	66C0000035652
4.5	1	Gewindestift Threaded pin	DIN EN ISO 4029 (DIN 916)	M 4x 12	*1,3 - 1,5*	430164	------	------	430164	------
		Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 5x 16	*2,9 - 3,1*	------	------	------	------	540114
				M 6x 16	*5,0 - 5,4*	------	540031		------	------
4.6	3	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 6x 20	*5,0 - 5,4*	540032	------	------	------	------
	4			M 6x 25	*5,0 - 5,4*	------	540034		------	------
				M 6x 30	*5,0 - 5,4*	------	------	------	540035	540035

Pos. Item	Anz. QTY	Bezeichnung Description	Norm Norm	Abmessung Dimension	Anzugsmom. tight. torques [Nm]	Artikel-Nr. / Article-no.				
						TANKO-JX80 / TANKO-JX75				
4	1	BG-Motoranbindung BG-motor connection	AWH	n. Auftrag upon order	------	66AVBGMR00000	66AVBGMS00000		66AVBGMA00000	66AVBGMD00000
4.1	1	Antrieb / Motor drive / motor	------	n. Auftrag upon order	------	RGM	SEW Stirnradgetriebe Helical gear motor	SEW Schneckengetriebe Worm gear motor	Atlas Copco	DEPRAG
4.2	1	Motorflansch / motor flange	AWH / 1.4571	*Ø139 / 70*	------	66A0000071350	------	------	------	------
				Ø139 /100	------	------	66A0000071250		------	------
				Ø139 / 70	------	------	------	------	66A0000071550	
				Ø139 / 34	------	------	------	------	------	66A0000071650
4.3	2	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 5x 14	*2,9 - 3,1*	------	------	------	540101	------
	4			M 5x 10	*2,9 - 3,1*	------	------	------	------	540083
				M 6x 12	*5,0 - 5,4*	540030	------	------	------	------
4.4	1	SG-Magnetträger Motorseite SG-magentic holder motor-side	AWH / 1.4571	------	------	66A0000035352	66A0000035252		66A0000035552	66A0000035652
4.5	1	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 4x 20	*1,3 - 1,5*	540022	------	------	540022	------
				M 5x 16	*2,9 - 3,1*	------	------	------	------	540114
				M 6x 16	*5,0 - 5,4*	------	540031		------	------
4.6	3	Zylinderschraube mit Innen-Skt. Hex.-socket head cap srew	EN ISO 4762 (DIN 912) / A2	M 6x 25	*5,0 - 5,4*	540034	------	------	------	------
	4			M 6x 30	*5,0 - 5,4*	------	------	------	540035	540035
		Stiftschraube stud bolt	DIN 939 / A2	M 6x 40	*5,0 - 5,4*	------	*49013*		------	------
4.7	4	Skt.-Mutter hex nut	DIN EN ISO 4032 (DIN 934) / A2	M 6	*5,0 - 5,4*	------	*570007*		------	------

7.6 Malfunctions

Prior to elimination of the fault (e.g. power outage or pressure drop) or other malfunctions, basically the following safety instructions have to be observed.

NOTE ON EXPLOSION PROTECTION

Working on the device in the presence of a potentially explosive atmosphere is PROHIBITED!

⚠ DANGER

Dangerous situations due to improper use of the device!

Death or severe bodily injuries.

- Repairs may only be executed by qualified specialists providing knowledge on the „technical regulations for safety in the workplace“ (TRBS).
- Prior to eliminating each and any fault the safety instructions in chapter 7 Maintenance shall be observed!
- In case of uncertainties or if further information is required please contact Armaturenwerk Hötensleben GmbH.

⚠ WARNING

Risk of contusion and entanglement due to unintended startup of the drive.

A hazard can occur related to sudden and unforeseeable recurrence of the power supply (e.g. unauthorized restoration).

Death or (severe) bodily injuries.

- The **work steps shut down procedure** have to be carried out prior to disassembly / demounting of the device from the vessel (see chapter 7.2 Shut-Down Procedure)!

Table 7.6-1: Operational Disruptions - Cause and Remedy

Problem	Cause	Remedy
The device does not work or the motor does not start.	No electric energy supply. No supply of compressed air. The compressed air filter is blocked. The motor is defective.	Check connections / fuses Switch on main switch Connect mains plug to the mains socket. Open stopcock for compressed air. Clean compressed air filter. Exchange motor
Cleaning head is not rotating or rotating unevenly.	Pressure of the cleaning medium is too high. Bushings and / or bearings got stuck. Magnetic holder is loose. Cleaning head contaminated. Cleaning head hits other components	Reduce pressure Check bushings and / or bearings for wear, clean or exchange them. Screw on magnetic holder tightly. Clean cleaning head. Eliminate interfering contours
Efficiency of cleaning is not sufficient.	Nozzles are contaminated or blocked. Pressure of the cleansing medium is too low. Flow rate is too low. Filter is blocked.	Clean nozzles or exchange them. Increase pressure (observe permissible max. pressure!). Increase flow rate Clean filter or exchange it
Jet pattern is not optimal.	Jet concentrators in nozzles are missing. Nozzles are contaminated. *Nozzles are damaged.*	Retrofit jet concentrators. Clean nozzles. *Replace nozzles.*
Noise at the magnetic coupling.	Nozzles are blocked mechanically by interference contours High media pressure (recoil) Jet is too close to adjacent components. Magnetic coupling is loose.	Check position in the vessel Increase distance to adjacent components. Screw on magnetic holder tightly.
Process or media connection is leaking.	Sealing is defective Connections have loosened.	Exchange sealings. Check tightening torques of screw connections.
Excessive flow rate.	*Bushings in cleaning head heavily worn.*	*Replace bushings.*

NOTE: If the indicated measures FAIL, please contact the company Armaturenwerk Hötensleben GmbH.

In case of return shipment (e.g. repair / service / return) a hazardous substance declaration is required in accordance with the Hazardous Substance Regulation (GefStoffV).

The form can be provided upon request with Armaturenwerk Hötensleben GmbH.

7.7 Emergency

In case of danger or in order to prevent imminent danger the device has to be brought into a safe state very quickly!

⚠ **WARNING** The type of the emergency stop circuit for the device has to be determined according the application conditions and is the sole responsibility of the operator *(see notes to control system chapter 5 Installation)!*

For this reason the manufacturer can only provide precautional advice and instructions for the operator, which should be observed and integrated into the risk assessment of the operator.

Follow the working steps listed in chapter 7.2 Shut-Down Procedure for switching off the device.

The emergency stop circuit must be designed to ensure immediate release / access in case of emergency by the machine or plant operator.

In case of emergency:

- Presse the **emergency stop** switch!
  - ➢ Interrupt supply of driving energy!
    - Interrupt power supply (e.g. electric drive)!
    - Switch off higher level main switch
    - Pull power plug
    - Close stop cock of the compressed air (e.g. pneumatic drive)
  - ➢ Shut down supply of cleansing medium supply!
    - Close stop cock

8 Decommissioning

Once the period of use of has expired, the device must be removed, disassembled and disposed of in an environmentally friendly manner. The disposal must be performed in accordance with the appropriate, valid and local or national and international regulations.

8.1 Disassembly

⚠ **CAUTION** Removal from the vessel and the required disassembly for disposal of the device may only be carried out by **qualified personnel**.

More information about the dismounting and the interfaces of the device are listed in chapter 7.3 Mechanical dismounting.

Please observe the safety instructions in chapter 7.1 Disassembly for Maintenance and Cleaning!

8.2 Disposal

NOTE

The cleaning device is predominantly made of stainless steel (except electric equipment). Stainless steel is a valuable raw material and can be recycled by simple measures.

After disassembling the entire device it has to be professionally processed for disposal as follows:

- cleaned (see chapter 7.4.7 Cleaning the device) and
- dismantled into its components and single parts.

If no return or disposal agreement was made, the dismantled components are recycled as follows:

- Scrap metal parts,
- Recycle plastic parts appropriately,
- Sort and dispose of the other parts according to their material properties.
- As required, assign a specialized waste disposal company for disposal.

Compliance with the locally valid occupational health and safety, the waste disposal and the environment protection regulations is required.

ATTENTION

Damage to the environment due to improper disposal of the device!

Damage to the environment

- Auxiliary materials or lubricants may NOT enter the ground water, any aquatic environments or sewer system.
- Lubricants, cleansing agents and auxiliary material (e.g. paint brushes or cloths) that have been used to clean the device must be disposed of in compliance with the locally valid regulations and in accordance with the instructions provided in the safety data sheets of the manufacturer.

9 Annex

9.1 Overview Drives

⚠ WARNING

The technical data, the connection values for the energy supply (electric or pneumatic) as well as the required quality of the compressed air (e.g. filtered / dry compressed air) for the compressed air drive depend on the type of the drive installed!

Death or (severe) bodily injuries.

- Observe type plate on the drive!
- Verify the specifications on the type plate of the drive with the corresponding documentation provided by the manufacturer of the drive.
- Observe safety instruction for the drive!

9.1.1 Electric drive motors

The following drives can be applied:

ZONE 1

Manufacturer SEW-EURODRIVE

➢ Worm gear motor: Weight: approx. 24 kg	SF37/II2GD BD71L-8/II2GD T4(135°C), T120°C
➢ Spiroplan gear motor: WF30/II2GD EDT71C6/TF/C Weight: approx. 13 kg	WF30/II2GD EDT71C6/TF T4(135°C), T120°C
➢ Helical gear motor: Weight: approx. 9 kg RF37/II2GD EDT71D4/TF Weight: approx. 17 kg	RF17/II2GD EDR63S4/TF T3(200°C), T120°C T3(200°C), T120°C
➢ Worm gear motor: (FI-operation) Weight: approx. 23 kg	 SF37/II2GD CD63L-4/II2GD T4(135°C), T120°C
➢ Helical gear motor: (FI-operation) Weight: approx. 25 kg Weight: approx. 21 kg	 RF37/II2GD CD63L-4/II2GD T4(135°C), T120°C RF27/II2GD CD63L-4/II2GD T4(135°C), T120°C

ZONE 2

Manufacturer SEW-EURODRIVE

➢ Worm gear motor: Weight: approx. 12 kg	SF37/II2GDDR63S4/II3GD T3(200°C), T120°C

NOTE *Drives for ZONE 1 can also be used in ZONE 2.*

ATTENTION

The drives may only be set up / mounted in the indicated spatial positions. In case of non-observance gearbox oil leakage may result.

Damage to the drive and its environment.

- Please indicate the spatial position of the drive motor (construction form M1…M6) when placing your order.
- When ordering a deviating spatial position the operating instructions of the manufacturer of the drive must be observed.
  - ➢ Check the position of the oil level plug, the oil drain plug and the vent valve and
  - ➢ Observe the appropriate spatial position of the oil filling depending on the construction form.

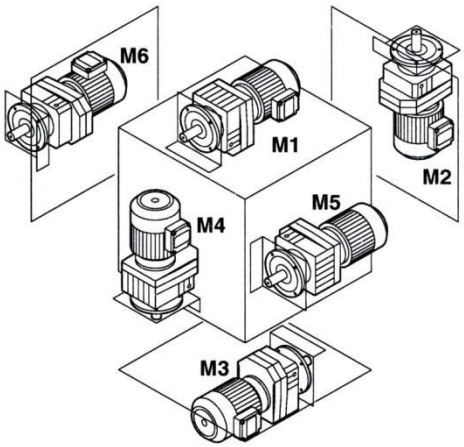
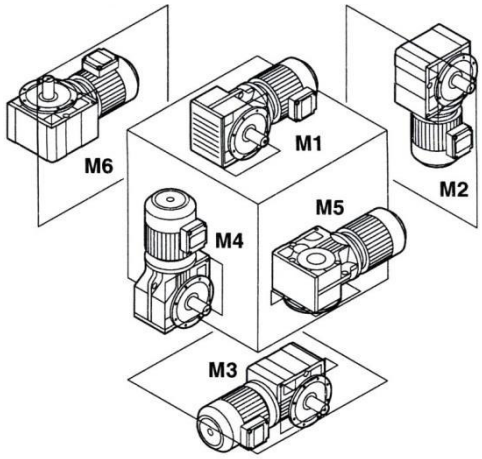
Helical gear motor R...	Spiroplan gear motor W... Worm gear motor S...
	

Figure 9.1-1 Spatial positions of the gear motors (example SEW-EURODRIVE)

9.1.2 Compressed air motors

The following compressed air motors are applied for the jet cleaner:

Atlas Copco:

- Type LZB 34RL LR10-11 ATEX-certificate Ⓔx II 2G T5 IIC D 85°C
- Type LZB 34RL LR44-11 ATEX-certificate Ⓔx II 2G T5 IIC D 85°C

DEPRAG:

- Type 67-2931 ATEX-certificate Ⓔx II 2 GD c IIC T6 (80°C)

The specifications on the performance data in the following table are excerpts from the documentation of the appropriate manufacturer and correspond for Atlas Copco compressed air motors to 6.3 bar and for DEPRAG compressed air motors to 6.0 bar operating pressure.

Table 9.1-1: Overview Compressed Air Motors

Manufacturer		**Atlas Copco**		**DEPRAG**
Designation	**Type**	**LZB 34RL LR10-11**	**LZB 34RL LR44-11**	**67-2931**
Rated power	W	230	230	280
Free speed / idle speed	rpm	10	44	50
Air consumption at idle speed	l/s m^3/min	9,90 0,59	9,90 0,59	7,90 0,47
Weight	kg	2	1,75	1,25
Lamella type	------	Oil-free		Oil-free
Material (outside)	------	Stainless steel		Stainless steel
Tube width	mm	8		10

9.2 Corrosion Resistance of Steels (Excerpts from the Data Sheets)

Material-No. 1.4016 (AISI 430)
Stainless ferritic chromium steel

The corrosion resistance of 1.4016 is relatively low compared to stainless austenitic grades, but its ferritic microstructure makes this material resistant to impacts of stress corrosion cracking, which is a form of corrosion that most conventional austenitic stainless steels are very sensitive to. Despite this outstanding property, the application of 1.4016 is limited, due to its poor weldability. 1.4016 is a ferritic steel grade, which owes its corrosion resistance to the higher chromium content compared to 1.4003 or any other chromium steel with a minimum of 13% chromium. Good corrosion resistance is proven in media with low aggressiveness and low chlorine ion concentration, as in domestic areas, natural water and solvents.

It has to be emphasized that 1.4016 is not resistant to seawater. 1.4016 is resistant to intercrystalline corrosion in delivery condition, but not after welding or processing at higher temperatures.

Material-No. 1.4104 (AISI 430F)
Stainless ferritic chromium steel with sulfur addition

Compared to the ferritic steel 1.4016 the machinability of 1.4104 is far higher-level due to the controlled sulfur addition. The addition of sulfur however reduces the resistance to corrosion, and as such 1.4016 is significantly more resistant to corrosion than 1.4104, despite their similar chromium contents. This particularly becomes obvious in chlorine containing media. Due to the carbon content an improvement of the mechanical properties is possible by means of annealing. 1.4104 belongs to the order of chromium steels with 17% chromium, but the sulfur addition reduces the corrosion resistance, particularly in media that cause pitting or crevice corrosion.

Material-No. 1.4301 (AISI 304)
Stainless austenitic chrome nickel steel
As a component discontiguous to the medium (e.g. cap nut at the taper lock)

1.4301 is the standard of the austenitic chrome nickel steels. Thanks to its high corrosion resistance and the good processability and the attractive appearance in a highly polished, ground or brushed condition, it is applied in various areas. Since 1.4301 is not corrosion resistant against intercrystalline corrosion in welded condition, it is recommended to use 1.3407 if larger parts are welded and subsequent solution annealing cannot be provided.

Due to the moderate carbon content of 1.4301, this grade tends to sensitivity. The formation of chrome carbides and the resulting chrome-depleted areas in the environment of this formation makes this steel rather sensitive for intercrystalline corrosion. Although the risk of intercrystalline corrosion is not given upon delivery condition (solution annealed), this can occur after welding or application at high temperatures. A good corrosion resistance is proven for natural environmental media (water, rural and urban environment) in the absence of relevant chlorine and salt concentrations. 1.4301 is not suitable for application areas that provide contact to seawater, neither for application in natatoriums.

Material-No. 1.4307 (AISI 304L)
Stainless austenitic chrome nickel steel
As a component discontiguous to the medium (e.g. cap nut at the taper lock).

Thanks to the low carbon content of 1.4307 it hardly tends to form chrome carbides or the resulting chrome-depleted areas. This material is significantly more resistant against intercrystalline corrosion compared to the grades with higher carbon content, such as 1.4301. 1.4307 proves good corrosion resistance in natural environmental media (water, rural and urban environment) in the absence of relevant chlorine and salt concentrations. 1.4307 is not suitable for application areas such as natatoriums or their environment. The resistance against reduced acids is limited to low concentrations or temperatures, respectively.

Material-No. 1.4401 (AISI 316)

The corrosion resistance of 1.4401 is significantly better than for the stainless steel grades 1.4301 and 1.4307, thanks to the addition of 2 - 3% Molybdenum, particularly also in the absence of chlorides.

In natural environmental media (water, rural and urban environment) as well as in industrial areas with moderate chlorine and salt concentrations, in the area of the food industry and the agricultural food sector, 1.4401 features an excellent corrosion resistance.
Due to the relatively high carbon content it has to be observed that 1.4401 is not resistant against intercrystalline corrosion. Furthermore it has to be emphasized that 1.4401 is not sea water resistant!

Material-No. 1.4404 / 1.4408 (AISI 316L)

The corrosion resistance of 1.4404 is significantly higher compared to the stainless steel grades 1.4301 and 1.4307, thanks to the addition of 2 - 3 % Molybdenum, particularly in the absence of chlorides.

In natural environmental media (water, rural and urban environment) as well as in industrial areas with moderate chlorine and salt concentrations, in the field of food and pharmaceutical industry and also for the agricultural food sector 1.4404 features an excellent corrosion resistance.

Due to its low carbon concentration, 1.4404 is even resistant against intercrystalline corrosion after welding.1.4404 is not sea water resistant!

Material-No. 1.4435 (AISI 316L)

In natural environmental media (water, rural and urban environment), in industrial areas with moderate chlorine and salt concentrations as well as in the area of food and the agricultural food sector 1.4435 features an excellent corrosion resistance. Furthermore this grade is resistant against various acidic media. Since this material is also resistant against intercrystalline corrosion after welding, it complies with the following standardized test methods:

AFNOR NF 05-159 / ASTM A262-75. Practice E / DIN 50914

The higher Molybdenum addition compared to 1.4404 makes 1.4435 significantly more resistant against reduced acids and chloride containing media.

Material-No. 1.4568

NIROSTA® 4568 provides a strong peen hardening and is therefore applied for objects that are used for cases of high mechanical load. These are, among others, springs, which should retain their good elastic properties also at temperatures of up to 350° C.

NIROSTA® 4568 is delivered in finally annealed or in peen hardened, spring-hard condition. The material features high strength properties and at the same time satisfactory corrosion resistance for peen hardened as well as for the peen hardened and tempered condition after additional pickling and passivating.

Acids, strong lye, ammonium compounds, chlorides and chlorine compounds have negative effects regarding the corrosion resistance.

Material-No. 1.4571 (AISI 316Ti)

1.4571 reveals a good corrosion resistance in most natural waters (urban and industrial), provided that the chloride, salt and hydrochloric acids concentrations as well as the concentrations of organic acids are low or medium. For the food and beverage industry, as well as for the agricultural food sector 1.4571 features an outstanding corrosion resistance.

Since this grade is also resistant against intercrystalline corrosion after welding, it complies with the following standardized test methods:

AFNOR NF 05-159 / ASTM A262-75. Practice E / DIN EN ISO3651-2

10 Table of Figures

11 Table Overview

12 Abbreviations and Terms

- BG Construction Group
- BRG Vessel Cleaning Device
- DP Downpipe
  For the purpose of these instructions this term is a colloquial expression in cleaning technology for a pipeline or connection between a medium interface and the cleaning head.
- DPV Downpipe extension
  An extension to expand the utilizable installation dimensions [LE] of the device.
- ET Single part
- Jet Cleaning jet
  For the purpose of these instructions this term is a colloquial expression in cleaning technology for a cleaning jet of a jet cleaner [ZSR].
- *JX* ***J****et with e****X****ternal drive*
- LE Installation dimensions = effective length of the downpipe [DP]
  The installation dimensions correspond to the length of the bottom edge of the process connection to the upper edge of the cleaning head (see chapter 3.1 Construction of the Device).
- MA Media connection
  For the purpose of these instructions this term is a colloquial expression in cleaning technology of an interface to introduce the cleansing medium from the feed line to the device.
- PA Process connection
  For the purpose of these instructions this term is a colloquial expression in cleaning technology to describe the interface of a process connection from the device to the vessel.
- SA Rinse connection (optional)
  The rinsing connection is **only used for removing or draining** the cleansing medium (e.g. water) required for self-cleaning of the device *in the area of the magnetic coupling*, in the flow direction from the media connection [MA] to the rinse connection [SA]!
- SG Welding group
- SN Serial number
- VT Wear part
- ZB Assembly
- ZSR Jet cleaner

Stationary device:
The device remains fitted on the container for a long period, even during the production process.

Mobile device:
The device is mounted on and removed from the container several times in a short period, and can also be used for cleaning several vessels.

13 INDEX

14 Revision mark

Revision 2014 / 04 Rev. 2

Significant changes from Edition 2012 / 09 Rev. 1

- *Chapter 3.3.1 Operating parameters*
  Note to the emission sound pressure level added.
- *Chapter 5.1.3 Installation of the device*
  Interfaces „A3 - Rinsing connection" and „C1- cleaning head with nozzles" overworked.
- *Chapter 6.1.1* Safety measures
  Note to the sound pressure level L_{pA} of the device overworked.
- *Chapter 7.3 Mechanical dismounting*
  Interfaces „C1- cleaning head with nozzles" overworked.
- *Chapter 7.4.1 Maintenance intervals of the device*
  Table 7.4-1: Maintenance Points „C" and „G" updated.
- *Chapter 7.4.2* Tools and tightening torques
  Table 7.4-2: Tightening Torques removed and referenced to the chapter 7.5 Spare Parts.
- *Chapter 7.4.4 Exchange of the ball bearing*
  Work steps of dismounting and installation overworked.
- *Chapter 7.4.6 Exchanging the wear parts*
  Work steps of dismounting and installation overworked.
- *Chapter 7.5 Spare Parts*
  Table 7.5-1: Spare Parts List (Standard) overworked and tightening torque added
- *Chapter 7.6 Malfunctions*
  Table 7.6-1: Operational Disruptions - Cause and Remedy extended
- *Chapter 7.7 Emergency*
  Note to the control system added.
- *Chapter 9.1.2 Compressed air motors*
  Table 9.1-1: Overview Compressed Air Motors Row "Direction of rotation" removed.
- *Chapter 12 Abbreviations and Terms*
  Definition „stationary and mobile device" added.
- *Chapter 13 INDEX added.*

Revision 2014 / 04 Rev. 3

Significant changes from Edition / 04 Rev. 2

- *Declaration updated.*

Declaration (Translation)

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Declaration of incorporation in accordance with
- **EC-Directive - Machinery 2006/42/EC, Annex II B**

Manufacturer's declaration in accordance with
- **EU-Directive - EMC 2014/30/EU**

EU-Declaration of Conformity in accordance with
- **EU-Directive - Equipment and protective systems intended for use in potentially explosive atmosphere 2014/34/EU**

We hereby declare that the tank cleaning device

Description: **Jet Cleaner**
Type: **TANKO-JX70 / TANKO-JX75 / TANKO-JX80**
Year of manufacture: see type plate
Serial no.: see type plate

is consistent with the following essential health and safty requirements of directive 2006/42/EC, Annex I:
1.1.2 – 1.1.7, 1.3, 1.5.2 – 1.5.9, 1.5.15, 1.5.16, 1.6, 1.7.1 – 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2, 1.7.4.3.

The specific technical documents were compiled in accordance with directive 2006/42/EC, Annex VII B.

The device is consistent with the following directives and standards in its delivered version:

Directive / Standard	Title	Version	Remarks
2006/42/EC	**EC-Directive - Machinery**	**2006**	
DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction Revision to DIN EN ISO 12100: 2011-03	2011-03 2013-08	Harmonized Standard
The standard EN 12100 is made in addition to the following applicable standards:			
DIN EN ISO 4414	Pneumatic fluid power - General rules and safety requirements for systems and their components	2011-04	Harmonized Standard
2014/30/EU	**EU Directive - EMC**		
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments - Corrigendum 1 to DIN EN 61000-6-2	2006-03 2011-06	Harmonized Standard
DIN EN 61000-6-4	Electromagnetic compatibility. Generic standards - Emission standard for industrial environments -	2011-09	Harmonized Standard
2014/34/EU	**EU-Directive - Equipment and protective systems intended for use in potentially explosive atmosphere**	**2014**	
DIN EN 1127-1	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology	2011-10	Harmonized Standard
DIN EN 13463-1	Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements	2009-07	
DIN EN 13463-5	Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety 'c'	2011-10	

One or more of the standards mentioned here in the associated type test certificate and in the product documentation have been replaced by new harmonized editions. The manufacturer has compared these standards and declares that the product continues to comply with the requirements of Directive 2014/34/EU, as the transition from EN 13463-1ff to EN ISO 80079-36ff does not entail any significant technical change with respect to essential safety requirements and the "state of the art" is still satisfied. The "Essential Health and Safety Requirements" of Directive 2014/34/EU continue to be met.

Designation in accordance with directive 2014/34/EU: Ex **II 1/2 G c TX**

EC-type test certificate EX5 07 03 55073 003 and EX5 07 03 55073 004 from the notified body
TÜV SÜD Product Service GmbH, certification body, identification number 0123, Ridlerstrasse 65, 80339 München

Quality assurance system in accordance with DIN EN ISO/IEC 80079-34, certified by notified body
TÜV NORD CERT GmbH, identification number 0044, Langemarckstraße 20, 45141 Essen.

If any modifications are made to the device without our consent, this declaration shall lose its validity.

Commissioning is prohibited until it is proven that the entire machine complies with the prevailing regulations of the applicable guidelines.

Hötensleben, November 11, 2019

Person authorized to compile the technical documentation:

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