


OPERATING/INSTALLATION INSTRUCTIONS

(Translation)



Container cleaning device ATEX Retractor System

TANKO®RT/TANKO®RTS

CE 0044		II 1/2G Ex IIB/IIC T6/T6...T3	Ga/Gb
		II 1G/2D Ex IIB/IIIC T6/T95°C...T140°C	Ga/Db
		II 1/2D Ex IIIC/IIIC T60°C...T70°C/T95°C...T140°	Da/Db
		II 1D/2G Ex IIIC/IIC T60°C...T70°C/T6...T3	Da/Gb
		BVS 10 ATEX H 006 X N3	

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NOTE



These instructions are an integral part of the device and must be available to operating and maintenance personnel at all times throughout its entire life cycle. The safety instructions contained therein must be observed.

If the device is resold, the instructions must always be passed on to the new owner.

Translation

The operating instructions must be written in an official European Community language acceptable to the manufacturer of the machinery in which the partly completed machinery will be assembled, or to his authorized representative. If there are any discrepancies in the translated text, the original operating instructions (German) must be consulted for clarification, or the manufacturer must be contacted.

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Abbreviations and Units

Abbreviations

ATEX	AT mosphère EX plosible; Synonym for the ATEX Directive of the European Union; comprises measures for explosion protection for explosive atmospheres
approx.	approximately
ASSY	Assembly
AU	Assembly group
AWH	Armaturenwerk Hötensleben GmbH
BetrSichV	Betriebssicherheitsverordnung (German industrial safety and health protection ordinance); ordinance concerning health and safety when using work equipment; German implementation of Directive 2009/104/EC of the European Parliament concerning the minimum safety and health requirements for the use of equipment by employees at work
CIP	Cleaning in Place; a local (automated) cleaning process without dismantling plant components. Refers to a procedure for cleaning processing plants, predominantly in sectors with particularly critical hygiene requirements, such as the pharmaceutical industry, food and beverage industry or biofuel plants.
DIN	Deutsches Institut für Normung e.V.; is a national standards organization in the Federal Republic of Germany; the standards of this organization are referred to as DIN standards.
DN	DIN nominal width
EN	European Standard (Norm)
EPL	Protection level of the device (Equipment Protection Level)
etc.	and so on
FDA	Food and Drug Administration (USA food and medication monitor regulation authority)
if nec.	if necessary
IP	Individual part
ISO	International Organization for Standardization
LE	Installation dimension; corresponds to the length from the lower edge of the process connection to the lower edge of the cleaning head.
$L_{EX,8h}$	Daily noise exposition level
L_{PA}	Emission noise pressure level at workplace
MC	Media connection In the context of these instructions, this term describes the interface used in cleaning technology for supplying cleaning medium from the supply line to the device.
max.	maximum
min.	minimum
NEUMO	NEUMO Armaturenfabrik-Apparatebau-Metallgießerei GmbH + Co KG
PC	Process Connection In the context of these instructions, this colloquial term describes the interface used in cleaning technology for the connection to the process from the device to the container.
Ra	Average roughness value (dimension for surface roughness)

SI	Systeme international d'unités; the most widely used international system of units for physical values
SN	Serial number
SW [AF]	Width across flats [wrench size]
TRBS	“Technische Regeln für Betriebssicherheit” (German technical rules for operational reliability and safety); these rules specify the details of the “Betriebssicherheitsverordnung” (BetrSichV = German industrial safety and health protection ordinance) with regard to the identification and assessment of hazards and the derivation of suitable measures.
TRGS	“Technische Regel für Gefahrstoffe” (German technical rules for hazardous materials); these rules reflect the state of the art, occupational medicine and occupational hygiene as well as other sound scientific knowledge for activities involving hazardous substances, including their classification and identification.
V_{eff}	effective vibration velocity
WA	Welded assembly
WP	Wear part

Units of Measure



The following factors given below are intended for orientation and the conversion of the SI units to common units of measure for the American market.

bar	Unit of measure for pressure p [bar] All pressure [bar] specifications stand for overpressure [bar o] = positive pressure [bar g], unless expressly described otherwise (e.g. absolute pressure [bar a]). Conversion: 1 bar = 14.50376... psi [pound-force per square inch]
°C	Unit of measure for temperature T [degrees Celsius] Conversion from Celsius to Fahrenheit: $^{\circ}\text{C} \times 1.8 + 32 = ^{\circ}\text{F}$ [degrees Fahrenheit]
h	Unit of measure for time t [hour]
K	Unit of measurement for temperature T and temperature differences ΔT [Kelvin] Conversion: 273.15 K = 0 °C
kg	Unit of measure for mass m [kilogram] Conversion: 1 kg = 2.20462 ... lb [Latin: libra; pound]
l/min	Unit of measure for volume flow rate V [liters per minute] Conversion: 1 l/min = 0.06 m ³ /h [cubic meters per hour] 1 l/min = 0.26417... gpm (US) [gallons per minute (US)] 1 m ³ /h = 4.40286... gpm (US) [gallons per minute (US)]
lx	Unit of measure for luminance intensity E _v [lux]
m	Unit of measure for length l [meter] Conversion: 1 m = 3.28083... ft [feet]
mm	Unit of measure for length l [millimeter] Conversion: 1 mm = 1/25.40005 in [inch] = 0.03937 in [inch]
Nm	Unit of measure for moment/torque M [newton meter] Conversion: 1 Nm = 0.737 lbft [pound-force feet]
rpm	Unit of measure for speed n [revolutions per minute] Conversion: 1 U/min = 1 rpm [revolutions per minute]
µm	Unit of measure for length l [micrometer]
MΩ	Unit of measure for electrical resistance R [Mega Ohm = 1 million ohms]
pS/m	Unit of measure for electrical conductivity of materials κ [picosiemens per meter]

1 Introduction

These operating/installation instructions (referred to hereinafter as the instructions) are a component part of the device. They provide you with all the information required for smooth operation of the TANKO®RT/RTS retractor system (referred to hereinafter as the device).

The instructions must be read, understood, and applied by all persons assigned to carry out installation and assembly, start-up, maintenance, cleaning and troubleshooting of the device. This applies in particular to the safety instructions listed.

After studying the instructions, you will be able to

- install and operate the device safely,
- clean and service the device correctly and
- take the correct action if a fault occurs.

In addition to these instructions, generally applicable, statutory and other binding regulations for the prevention of accidents and for environmental protection in the country of use must also be observed.

The instructions must be kept at the place of use of the device so that they are available in legible condition at all times. If the device is resold, the instructions must always be passed on to the new owner.

If necessary, download the instructions from the website: <http://www.awh.eu/de/downloads>.

1.1 Means of Representation

1.1.1 Explanation of Signal Words

The warnings are introduced by a signal word that describes the extent of the hazard. Their meaning and their classification in hazardous situations are explained in the following overview.

Signal Word	Meaning	Consequences of Failure to Observe
⚠ DANGER	Hazard with a high level of risk	Death or severe physical injury
⚠ WARNING	Hazard with a moderate level of risk	Death or severe physical injury
⚠ CAUTION	Hazard with a low level of risk	Minor or moderate physical injury
NOTE	Hazard with a low risk	Risk of material damage
NOTE ON EXPLOSION PROTECTION	Important note on explosion protection	Disables the explosion protection and resulting dangers

Table 1.1-1: Overview of Signal Words

1.1.2 Explanation of the Warnings

Section-related Warnings

The section-related warnings apply not only to one particular action, but to all actions within a section. In addition, the pictograms and symbols indicate a general or specific danger.



DANGER

This warning warns of a hazard with a high level of risk!

Failure to observe it can result in death or severe physical injury.

- Measure(s) to prevent the danger



WARNING

This warning warns of a hazard with a moderate level of risk!

Failure to observe it can result in death or severe physical injury.

- Measure(s) to prevent the danger



CAUTION

This warning warns of a hazard with a low level of risk!

Failure to observe it can result in minor or moderate injury.

- Measure(s) to prevent the danger

NOTE

This warning warns of a hazard with a slight level of risk!

Failure to observe it can result in material damage.

- Measure(s) to prevent the danger



NOTE ON EXPLOSION PROTECTION

This note contains instructions regarding explosion protection.

Non-compliance can disable the explosion protection, thus resulting in hazards.

Embedded Warnings

The embedded warnings apply to specific actions and are integrated directly into the action before the specific action step.

The embedded warnings are structured as follows.

⚠ SIGNAL WORD type and source of the danger

Possible consequences in case of failure to observe

- Measure(s) to prevent the danger

Further Means of Representation



The Information symbol provides useful information, additional tips and recommendations.

- Texts that follow this mark are bulleted lists.
 - Texts that follow this mark describe measures for avoiding the danger.
 - 1. Texts that follow this numbering describe the first step of a task, followed by further numbered steps that have to be performed in the specified order.
 - a) Texts that follow this lettering as subitems of a numbering (e.g. 1) describe the first step of a task of a higher-level task, followed by further lettered steps that have to be performed in the specified order.
 - (1) Numbers in parentheses reflect the item numbers in figures or parts lists.
 - “ “ Texts in quotation marks are (direct) quotes from documents (e.g. directives or standards) or words, word groups and parts of a text with a special meaning.
- Important, significant information is additionally highlighted in **bold type**, *italics* or CAPITAL LETTERS for individual words or phrases.

1.1.3 Pictograms and Symbols

The following pictograms and symbols are used as an additional measures in warnings to clarify the sources of dangers and measures. They can appear at all danger levels.



Warning of electrical voltage



Warning of a potentially explosive atmosphere



Warning of hand injuries



Warning of a hot surface



Warning of corrosive substances



Warning of magnetic field



Warning of automatic startup



Warning of trapping/entanglement hazard



Warning of substances that pose a water hazard



Unauthorized access prohibited



People with pacemakers must keep away



Wear protective work clothing



Wear safety shoes



Wear protective gloves



Wear safety goggles



Wear a hard hat



Wear hearing protection



Wear a welding mask



Isolate from power supply before work



Follow instructions



Protective grounding connection required



Secure against power supply being switched back on



Return for recycling



Operating equipment for Ex zone

1.2 Warranty and Liability

The obligations agreed in the contract of supply and delivery, the general terms and conditions and the terms of delivery of Armaturenwerk Hötensleben GmbH (referred to hereinafter as AWH) and the statutory regulations valid at the time the contract was concluded shall apply.

Warranty and liability claims in case of personal injury and material damage shall be ruled out, in particular if these can be attributed to one or more of the following causes:

- improper or incorrect use of the device,
- improper assembly and installation, start-up, operation and maintenance of the device,
- failure to observe the notes in the instructions regarding assembly and installation, start-up, operation and maintenance of the device,
- constructional modifications to the device (conversions or other modifications to the device must not be made without the previous written approval from AWH. In case of infringement, the device will lose its EC conformity and the operating permit.),
- use of spare parts that do not comply with the specified technical requirements,
- improperly performed repairs,
- disasters, the effects of foreign matter and force majeure.

Disclaimer

AWH reserves the right to make changes to this document at any time and without prior notice. AWH provides no guarantee (neither explicitly nor implied) with regard to all information in this document, including but not limited to the implied warranty of merchantability and suitability for a particular purpose. Furthermore, AWH does not guarantee the correctness or completeness of information, text, graphics or other parts in this document.

1.3 Product Names and Trademarks

The product names and trademarks included in these instructions are brands or registered trademarks of the respective owners.

TANKO® and AWH® are registered trademarks of Armaturenwerk Hötensleben GmbH.

1.4 Related Documents

The following documents may contain additional information to these instructions:

- Manufacturer's declaration and/or certificates of conformity,
- Certificates,
- Additional documents for any attached or upstream components, e.g. drawings, performance data and information on accessories, etc.,
- Supplements to these instructions (e.g. special versions),
- AWH catalog, product data sheet.

2 Safety

The device was built in accordance with state-of-the-art technology and the recognized safety rules. Nevertheless, the use of the device may still pose a danger to the life and limb of the user and third parties or a risk of impairments to the device and other objects of material value as a result of its function.

The following basic safety instructions are intended to prevent injury to personnel and material damage. The owner must ensure that the basic safety instructions are observed and adhered to.

These instructions contain basic notes on installation, operation, maintenance and servicing of the device that must be complied with.

Everyone involved in assembly, installation, operation, maintenance and servicing must have read and understood these instructions.

The safety systems and safety instructions described in these instructions must be adhered to.



WARNING



Failure to comply with these instructions, incorrectly performed installation and repair work or incorrect operation could lead to malfunctions at the device and to dangerous situations!

There is a risk of death or severe physical injury.

- *Have all work performed on the device carried out by an expert only and in compliance with*
 - *the corresponding detailed operating and installation instruction(s),*
 - *the warnings and safety signs on the device,*
 - *the regulations and requirements specific to the plant and*
 - *the national/regional regulations for safety and the prevention of accidents.*
- *Never install damaged devices or components.*



The figures in these instructions are intended to provide a basic understanding, and are primarily illustrations of the principles involved. They may deviate from the actual design of the device.



For maintenance and repairs, we recommend a training course provided by the manufacturer or by a person authorized by the manufacturer.



If you have questions or doubts about handling the cleaning device, please contact AWH.

Integrated Safety Systems

The integrated safety equipment used by the higher-level plant in which the device is installed is to be checked at regular intervals.



WARNING

Dangerous situations will result from modifying or disabling safety devices!

Only functioning safety equipment can ensure safe operation and prevent non-permissible operating conditions.

Modifying or disabling safety equipment can result in unforeseen and dangerous situations.

There is a risk of death or severe physical injury.

- *Disabling the safety equipment or changing the way it works is strictly prohibited.*

2.1 Intended Use



WARNING

Risk of hazardous situations caused by use other than the intended use and/or other types of use of the device!

There is a risk of death or severe physical injury.

- *Only use the device as intended.*
 - *Only use the device in accordance with the specifications contained in these instructions and the specifications on the device's type plate.*
 - *All specifications in these instructions must be adhered to at all times.*
 - *Always keep the operating instructions at the location where the device is used.*
 - *Keep all signs on the device in legible condition.*
 - *Only use original spare parts.*
- *Modifications or conversions to the device are NOT permitted.*

**WARNING*****Danger from incorrect use of materials/media!***

The materials/media to be used for operation of the device as intended are procured and utilized by the owner of the device.

If unsuitable materials/media are selected, strong chemical reactions could result in fatal injury or severe physical injuries.

- *The proper selection and handling of these materials/media is the sole responsibility of the owner.*
- *When selecting the materials/media, make sure that the permitted technical parameters of the device are NOT exceeded.*
- *The cleaning agents and media must be approved for all of the materials of the device (e.g. washers, bushings) and for the substances in the container to be cleaned which come into contact with them.*
- *Adhere to the specified chemical limits for use in the material data sheets.*
- *Adhere to the safety data sheets provided by the manufacturers of the materials and media, in particular for hazardous substances:*
 - *Comply with the hazard and disposal instructions.*
 - *Specify protective measures and compile operating instructions for hazardous substances.*
 - *This also applies to hazardous substances that may develop during work processes.*

Use of the retractor systems in potentially explosive areas is only permitted if the pneumatic actuator is operated using operating materials that are suitable for the application in question (for information on limit switches and temperature sensors, see [Table 7.5-1: Replacement Parts List \(Standard\), Wear Parts, Tightening Torques](#)) and that have been brought onto the market in accordance with Directive 2014/34/EU. A separate risk assessment must be performed with regard to the assembly of the retractor systems using operating materials not specified in these operating instructions.

The provisions of EN 60079-14 regarding the selection and setup of electrical operating materials must be observed.

Refer to the order confirmation/parts list from AWH for the materials used in the device.

The device is used for cleaning the interiors of containers with and without installed equipment.



The option of using retractor systems is useful, particularly in situations where there is little space available for a cleaning device, due to projecting agitators or other installations, or where critical products prevent permanent installation of the device.

For the purpose of these instructions the word container refers to **closed** tanks, silos, drums, containers, pipes, etc. that are provided with a drain that ensures that the supplied cleaning medium can drain freely.

When using the device, it is necessary to distinguish between the following operating states.

Operating state – cleaning process (cleaning > cleaning head extended)

In this case, flammable gases, vapors, mists or flammable dust may already be present in the container or are only added by the intended cleaning process in the form of sprayed fluid (aerosol).

Flammable vapors and mists must be expected as soon as flammable fluids with a flash point of 15 K above the cleaning medium temperature are sprayed, including those permitted in accordance with [Section 3.4 Cleaning Media](#). For this reason, both the conditions in the container and the type and temperature of the cleaning medium must be taken into account when defining the following three process conditions:

- A) During cleaning, no explosive mixture is present, nor is it possible for one to develop from the cleaning medium.** (Explosive mixtures consist of flammable gases, vapors, mists or stirred-up dust in the air or another oxidizing agent that reacts to a self-propagating flame when an ignition source becomes active, generally causing an abrupt increase in temperature and pressure).
- Pressure in the container: 0 to 0.5 bar (0 to 7.25 psi g)
 - Temperature of the cleaning medium: +5 °C to +95 °C
 - Ambient temperature in the container to be cleaned: +5 °C to +95 °C
 - Ambient temperature outside the container to be cleaned: +5 °C to +40 °C
- B) A potentially explosive atmosphere (ATEX conditions) is present during cleaning** (A potentially explosive atmosphere is a potentially explosive mixture with air as an oxidizing agent under atmospheric conditions (ambient temperature of -20 °C to +60 °C and absolute pressure of 0.8 bar a to 1.1 bar a, that is already present before the use of the device, or that develops when spraying a cleaning medium during the cleaning process)
- Pressure in the container: 0 to 0.1 bar (0 to 1.45 psi g)
 - Temperature of the NON-flammable cleaning medium: +5 °C to +60 °C
 - Temperature of the flammable cleaning medium: +5 °C to flash point $T_{\text{flash point}} - 15$ °C (max. +60 °C)
 - Ambient temperature in the container to be cleaned: +5 °C to +60 °C
 - Ambient temperature outside the container to be cleaned: +5 °C to +40 °C

C) A potentially explosive mixture is present during cleaning, but there is no explosive atmosphere.

Cleaning is PROHIBITED! If necessary, the process conditions must be changed before using the device so that process conditions exist in accordance with **A)** or **B)**.

For processes that are outside atmospheric conditions, the owner must make a differentiated assessment of the effects.

The necessary safety-related parameters must be determined and an additional hazard assessment must be created for explosion hazards in order to separately verify the suitability of the device used.

The cleaning process for the retractor systems is prohibited in operating conditions that lead to explosive mixtures outside atmospheric conditions (outside temperatures of - 20 °C to +60 °C and absolute pressures of 0.8 bar a to 1.1 bar a) in the container to be cleaned or in the presence of oxidizing agents other than air.

The cleaning process with the retractor systems is also prohibited in the presence of explosive mixtures with ignitable substances such as hydrogen, ethylene, acetylene, carbon disulfide, carbon monoxide, ethylene oxide and trichlorosilane.

Operating state – rest position (NO cleaning > cleaning head retracted)

- Pressure in the container: -1 to 3.0 bar (-14.5 to 43.5 psi g)
- Ambient temperature in the container to be cleaned:
 - 20 °C to +130 °C (O-Ring material EPDM)
 - 15 °C to +140 °C (O-Ring material FKM or FFKM)
- Ambient temperature outside the container to be cleaned: -10 °C to +40 °C

The device was developed, engineered and built exclusively for industrial and commercial use (food, chemical and pharmaceutical industries and low-germ processes). It must not be used for private purposes.

The device is constructed so that it can be operated safely within the specified technical parameters (see [Section 3.3 Technical Data](#)).

The TANKO-RT and TANKO-RTS retractor system is suitable for use in Zone 0 or Zone 20 (in the container) and Zone 1 or Zone 21 (outside the container / actuator unit) explosive atmospheres.

Please note the additional information on the type plate for the Ex labeling (see [Section 2.5.3 Identification for Explosion Protection](#)).

The owner must always check whether the device is suitable for his application.

**NOTE ON EXPLOSION PROTECTION**

The area of application of the device must always be adapted to the corresponding operating conditions and the materials in contact with the product. These materials must be selected so that there are no reactions between them and the cleaning medium or the substances in the container to be cleaned, which could impair explosion safety.

It must be ensured that no hybrid mixtures can develop in the container or in the environment (a hybrid mixture is a mixture of air with flammable substances in different aggregate states, e.g. gas / vapor and dust)

If this is not observed, the explosion protection could be disabled.

Locations for containers in which the device is to be installed are usually closed rooms. If the set-up is different, the owner is responsible for ensuring the device is protected against harmful weather and environmental influences in compliance with the specified operational limits / conditions (see [Section 3.3 Technical Data](#)).

Always observe the following:

- Only operate the device when installed in a closed container.
- Never direct the cleaning jet or torrent from the device at persons.
- Protect the device from freezing (e.g. risk of frost from possible residual water).
- Use a suitable filter system in the cleaning medium supply line.
- Operate the device only within the approved parameters (see [Section 3.3 Technical Data](#)).
If necessary, appropriate monitoring and limiting systems (e.g. for pressure and temperature) must be used.
- Only cleaning media that are compatible with the materials of the device (see [Section 3.4 Cleaning Media](#))
- The preferred installation position for the device is vertical with the cleaning head pointing downwards. Other installation locations (see [Section 5.2.2 Installation Position](#)) are possible.
- The device could vibrate while the container is being cleaned. Any other vibrations must be avoided (see [Section 7.4.1 Maintenance Intervals](#)).

Non-intended Use

The device is **NOT suitable** for the following applications:

- The device is NOT suitable for private use.
- The device is NOT suitable for use outside containers.
- Holding the device with your hand during operation is PROHIBITED.
- The device must NOT be immersed in the product of the production process (NOT even partially).
This could cause the product to penetrate the device. The spray holes/slits may become blocked.
The free movement of the actuator could be obstructed.
- The device must NOT be operated with gases (e.g. air) over a long period, as the cleaning medium is used for lubrication of the bearings.

This device is intended exclusively for the purpose outlined above. Any other use beyond that described here or any conversion of the device without a written agreement with the manufacturer is considered IMPROPER use.

The manufacturer accepts NO liability for damage arising from such improper use. The owner bears the sole risk.

The device must not be put into operation until it has been assured that all the safety devices are fully functional and the plant in which the device is installed meets the safety requirements of all relevant European directives (e.g. the Machinery Directive).

2.2 Spare parts, replacement parts and accessories



WARNING

Risk of damage, malfunction or complete failure of the device!

Incorrect or faulty spare/replacement parts and accessories will put the functional safety and reliability of the device at risk. This could result in the failure of components or a device malfunction, as well as material damage and consequential damage.

There is a risk of death or severe physical injury.

- *Only use the manufacturer's original spare parts.*

We expressly draw attention to the fact that spare parts and accessories NOT supplied by AWH have NOT been checked or approved by AWH. The installation and/or use of such products could therefore, under certain circumstances, result in changes with negative results to the properties of the device specified by its design and the higher-level plant.

AWH is not liable for any damage resulting from the use of non-original parts or non-original accessories. Standard parts can be obtained from specialist dealers.

2.3 Duties of the Owner

The device is used in the commercial sector. The owner is thus subject to the legal obligations regarding occupational safety.

In the EEA (European Economic Area), the national implementation of the Framework Directive (89/391/EEC) on taking measures for improving safety and protecting the health of employees during work, as well as the associated individual directives shall be observed and complied with in their current valid versions.

The Directive (2009/104/EC) on the minimum specifications for the safety and health protection of employees using equipment for their work is of particular importance in this context.

As a basic rule, in Germany the Industrial Safety and Health Protection Ordinance (BetrSichV) must be observed.

In other countries, the respective national guidelines, statutes and country-specific regulations regarding occupational safety and accident prevention must be complied with.

The following, non-exhaustive instructions apply in particular:

- The owner must ensure that the device is used only as intended (see [Section 2.1 Intended Use](#)).
- The owner must keep himself informed of the locally applicable occupational health and safety regulations and, in addition, use a hazard assessment to determine the hazards resulting from the specific working conditions at the location of use of the device. These must then be implemented in the form of operating instructions for operation of the device.
- When using hazardous materials, protective measures must be specified in accordance with the safety data sheets and operating instructions must be compiled for hazardous materials. Personnel must be instructed accordingly. This also applies to hazardous substances that may develop during work processes.

- A continuous hazard assessment must be carried out for workplaces, including temperature conditions for the medium and the place of use (falling). The measures are to be defined in operating instructions. Personnel must be instructed accordingly.
- Supervisors must monitor compliance with the measures specified in the operating instructions.
- Throughout the entire operating period of the device, the owner must check whether the operating instructions he has compiled reflect current legislation requirements and adapt them as necessary.
- The owner must clearly regulate and specify the responsibilities of personnel (e.g. for operation, maintenance and cleaning).
- The owner must allow only sufficiently qualified and authorized personnel to work on the device.
- The owner must ensure that all employees handling the device have read and understood the instructions.
Furthermore, he must provide personnel with training at regular intervals with certification and inform them of the hazards.
- The owner must provide sufficient workplace lighting at the plant in accordance with the locally applicable regulations for occupational health and safety, in order to prevent hazards occurring as a result of poor lighting.
- The owner must provide personnel with personal protective equipment and make sure that this is used (see [Section 2.4.1 Personal Protective Equipment](#)).
- The owner must make sure that the danger area of the higher-level plant in which the device is installed is not accessible to unauthorized persons.
- The owner must make sure that no one is permitted to work on the device whose ability to react is impaired by drugs, alcohol, medication or similar.
- The owner must take appropriate measures to inform groups of persons who are not intended to come into direct contact with the device (e.g. visitor groups), about the potential dangers involved.
- The owner is responsible for making sure that the device is only ever operated in perfect condition.
- Wherever high pneumatic pressures develop, there is a possibility of sudden failure of or damage to the lines and connections. This poses a hazard risk. The owner must instruct operating and maintenance personnel at least once a year on the possible hazards.
- The constructor of the overall plant must install the switching and safety devices required for setting up, inspection, shutting down (including emergency shutdown), operation, maintenance, cleaning and repairs.
- The owner must design the disconnection of the energy sources on the higher-level plant technically in such a way that the [Switch-Off Procedure](#) described in [Section 7.3](#) can be adhered to.
- The owner must define and adhere to the intervals for inspections and control measures in accordance with the environment and media used.
- The owner must provide fire safety devices, e.g. the appropriate quantity of suitable hand-held fire extinguishers of the appropriate size, in easily accessible places and provide employees with training in fire safety.

- Warnings in the documentation of externally supplied assembly groups must be adhered to and incorporated into the hazard assessments for the specific workplace.
- For installation of the device in a plant, the owner must guarantee safe access using steps, platforms and rails in accordance with EN 14122-1-3.

Connections:

Before operating the machine with the device, the owner must make sure that the local regulations are observed for assembly, installation and start-up, if these tasks are performed by the owner.

- Hydraulic connections must fulfill the requirements of EN ISO 4413.
- Pneumatic connections must meet the requirements of EN ISO 4414.
- The grounding measures must be implemented and checked prior to start-up of the device, including the container.



NOTE ON EXPLOSION PROTECTION

Any person working in a hazardous area must be regularly instructed with regard to the necessity of grounding measures and they should also be made aware of typical grounding faults (e.g. subsequent grounding of objects or devices that are already charged).



NOTE ON EXPLOSION PROTECTION

When operating the device on a container, the resulting ignition hazards “mechanically generated sparks” (see [Section 5.2 Installation](#)) and “static electricity” (see [Section 3.4 Cleaning Media](#)) must be considered by the user within the framework of a hazard/risk assessment.

2.4 Personnel Requirements

The device may only be operated, serviced and repaired by persons with the appropriate qualifications. These persons must be familiar with the instructions and act in accordance with them. The respective authorizations for personnel must be clearly defined.

The following qualifications are designated in the instructions for various fields of activity:

Expert/Specialist Personnel

An expert is a person whose professional training, knowledge, and experience and knowledge of the relevant standards and regulations enables him to carry out work on the device and identify and avoid potential risks independently.

Instructed Person

An instructed person has been instructed and, if necessary, trained by the owner or an expert in a briefing on the assigned tasks and possible hazards in the event of improper action, and instructed on the necessary safety equipment and protective measures.

Only personnel with the following expertise are permitted to perform work on the device:

- **Assembly/disassembly:** Industrial mechanic or similar training, practical experience in the assembly/disassembly of devices
The person must be familiar with the design, mechanical installation, maintenance and troubleshooting of the device and have the following qualifications:
 - Vocational training and final qualification in the field of mechanics (e.g. mechanic or mechatronics technician)
- **Welding work:** Welding training in pipeline engineering or similar training
- **Electrical work:** Qualified electrician; person with appropriate specialist training, knowledge and experience, enabling them to identify and avoid hazards caused by electricity
The person must be familiar with the electrical installation, start-up, troubleshooting and repair of the device and have the following qualifications:
 - Vocational training and final qualification in electrical engineering (e.g. electrician, electronics engineer or mechatronics technician)
 - Several years of professional experience in the field of electrical engineering
- **Cleaning:** Instructed person

Work performed in the other areas, i.e. **transport, storage, operation and disposal**, must be performed exclusively by personnel who have been given suitable instructions.

All persons listed above must wear protective clothing in accordance with their respective activities.

2.4.1 Personal Protective Equipment



NOTE ON EXPLOSION PROTECTION

Persons working in potentially explosive atmospheres must not be dangerously charged. The personal protective equipment must meet the explosion protection requirements.

If this is not observed, the explosion protection could be disabled.

- Observe TRGS 727 “Prevention of ignition hazards due to electrostatic charge” Chapter 7 “Electrostatic charging of persons and personal protective equipment (PPE)”.
- EN 1149-5 Protective clothing - Electrostatic properties - Part 5: Observe performance requirements relating to material and design.

Personal protective equipment must be used in accordance with the respective task when working on the device in order to minimize health hazards.



Protective work clothing

Protective work clothing is tight-fitting work clothing with low resistance to tearing, with tight-fitting sleeves and without protruding parts. It is mainly used for protection against becoming entangled in moving components. Do not wear any rings, necklaces or other jewelry.



Safety shoes

Wear slip-resistant safety shoes for protection against heavy, falling parts or for protection against slipping on slippery surfaces.



Protective gloves

Wear protective gloves to protect your hands against friction, grazes, getting pierced or deep cuts and for protection against coming into contact with hot surfaces or chemical substances.



Protective goggles

Wear protective goggles for protection against media escaping at high pressure and against flying parts.



Hard hat

Wear a hard hat for protection against falling or flying parts.



Hearing protection

Wear hearing protection to protect yourself from an increased noise level (≥ 85 dB(A)).



Welding mask

Wear a welding mask to protect yourself from damage to the eyes or skin caused by the welding arc and to protect yourself against burns caused by flying particles during welding.

Personal protective equipment must be provided by the owner in accordance with the valid requirements. Furthermore, both the national regulations and, if necessary, internal instructions by the owner must be observed.

2.5 Identification

2.5.1 Type Designation

Example: Retractor system

- 1) Brand of the cleaning devices: **TANKO**
- 2) Type: **Retractor system (retractor system static)**
- 3) Stroke: **250 mm (100, 150, 500)**
- 4) **PA** (process connection): **Clamp 2" DIN 32676**
 - **Clamp 2.5" / 3"**
 - **Weld 2" / 2.5" / 3"**
 - **Combination adapter 3" / for BioControl® 65**
- 5) **MA** (media connection): **Clamp, DN25**
Clamp 1"
Groove flange 25
- 6) O-ring: **FKM (e.g. Viton®)**
 - **EPDM / FFKM**
- 7) Head type: **Clipon type A**
 - **Clipon type B / type C / type D / type S**
- 8) Version ATEX **ATEX**

TANKO - RT250 PA-C2" MA-C25 V CA EX



When selecting the O-rings, the limits of the application temperatures must be observed, see [Section 3.3 Technical Data](#).

2.5.2 Type Plate

Labeling is applied to the device according to the following illustration.

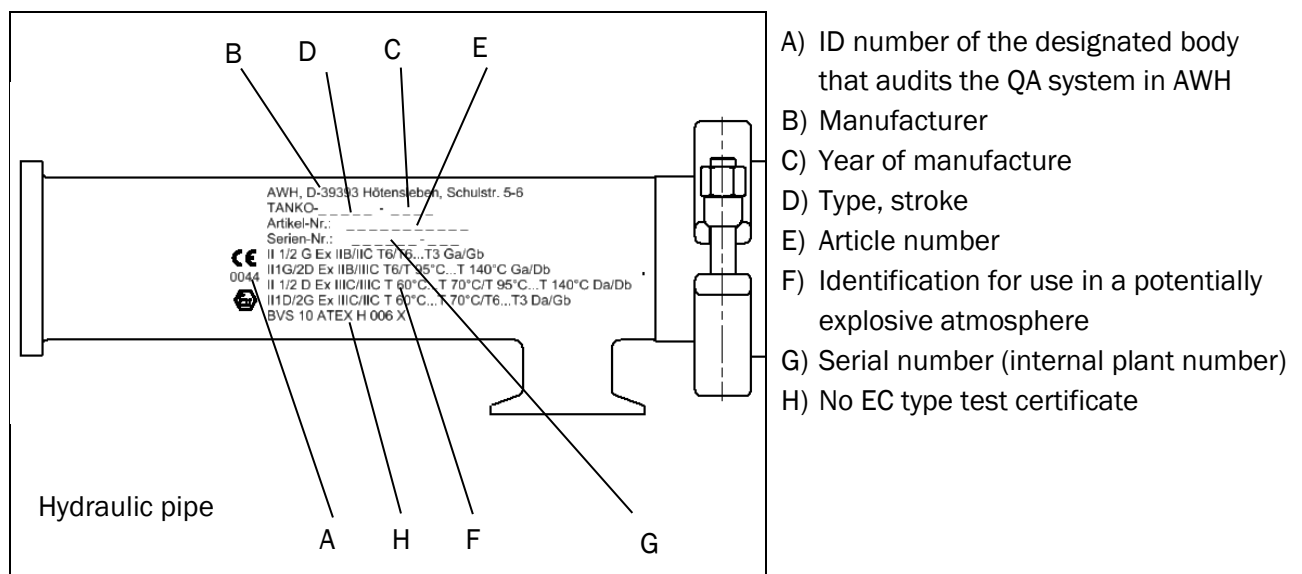


Figure 2.5-1: Type plate position



The labeling of the device or the inscription on the type plate must be permanently visible and legible.

2.5.3 Identification for Explosion Protection

Devices in explosion-proof design are identified by stating the device group, category, ignition protection type, explosion group, temperature class and EPL on the type plate. A CE and Ex mark confirms compliance of the device with ATEX Directive 2014/34 / EU.

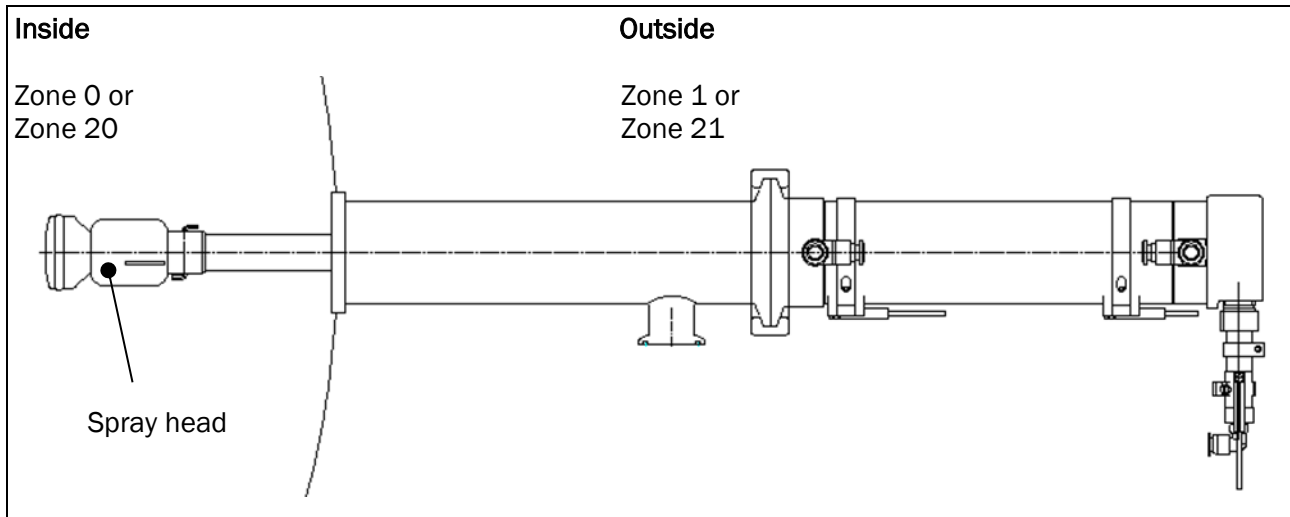


Figure 2.5-2: Zone separation

For the intended use of the devices in the respective zones, the devices must have an appropriate protection level.

The device protection levels specified in ISO 80079-36 are related to the corresponding device groups and device categories according to the following table.

IEC 60079-10-X		Directive 2014/34/EU			ISO 80079-36			
Zone		Device group	Device category		Group	EPL		
Gas Fumes Mist	0	II	1G	--	II	Ga	--	
	1			2G			--	
	2			3G			Gc	
Dust	20	II	1D	--	III	Da	--	
	21			2D			--	Db
	22			3D			Dc	

Table 2.5-1: Relationship between zones and device protection levels (EPL)



The owner is responsible for division into zones.

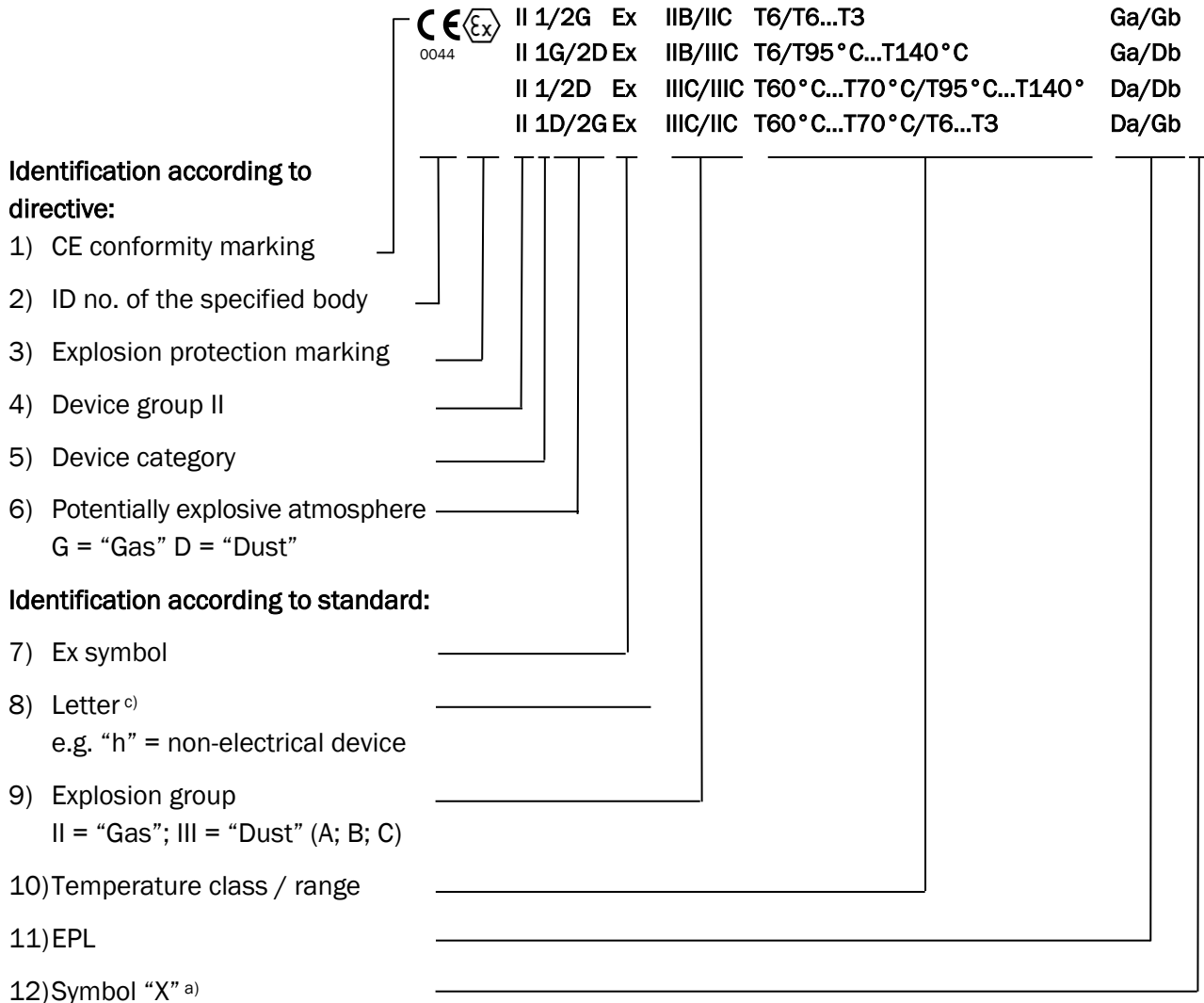
Identification of the Device:

CE II 1/2G Ex IIB/IIC T6/T6...T3 Ga/Gb
0044 II 1G/2D Ex IIB/IIIC T6/T95°C...T140°C Ga/Db
 II 1/2D Ex IIIC/IIIC T60°C...T70°C/T95°C...T140° Da/Db
 II 1D/2G Ex IIIC/IIC T60°C...T70°C/T6...T3 Da/Gb
 BVS 10 ATEX H 006 X

The type plate on the device also contains the information required for operation in a potentially explosive atmosphere according to the ATEX directive 2014/34/EU and related standards:

Explanation of Identification:

Certificate number: BVS 10 ATEX H 006 X ^{a)} N3 ^{b)}



^{a)} The symbol "X" means that the safe use of the device depends on specific operating conditions specified in the operating instructions. If the symbol "X" is included in the certificate number on the EC type test certificate, it is not included in this identification.

^{b)} The designation "N3" in the certificate after the certificate number stands for the 3rd supplement to the EU type test certificate BVS 10 ATEX H 006 X and is not included in the identification of the device.

^{c)} The letter "h" for non-electrical equipment was not included in the identification, since it is an assembly group consisting of non-electrical device (ignition protection type constructional safety "c" and ignition protection type ignition source monitoring "b") and electrical devices (ignition protection type intrinsic safety "I").



The zone separation inside and outside the container is represented by the symbol “/”. The EX markings of the device are in the [Table 2.5-2](#) and [Table 2.5-3](#) explained depending on the possible operating conditions.

Operating status			Flammable gases or vapors within the container to be cleaned				Flammable gases or vapors outside the container to be cleaned			
			II1/...G Ex IIB/... T6/... Ga/...				II .../2G EX .../IIC .../T6...T3 .../Gb			
	Temperature		Surface temperature of the device inside the container	Potentially explosive atmosphere in the container	Temperature class	EPL	Surface temperature of the device outside the container	Explosive atmosphere outside the container	Temperature class	EPL
	Operating temperature of cleaning medium	Inside the container								
Cleaning process	+5 °C to 60 °C	+5 °C to 60 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 70 °C.	Gases or vapors of explosion groups IIA or IIB. The cleaning process (spraying of fluids) in the presence of explosive mixtures with ignition-sensitive substances in accordance with Section 2.1 and Section 3.3 is not permitted. Group IIC gases are NOT permitted during cleaning.	T6	Ga	Heating to 60 °C is possible, plus 10 °C intrinsic heating results in a max. surface temperature of the non-electrical part of 70 °C. Ambient temperature outside max. 40 °C. The electrical equipment has temperature class T6. This results in temperature class T6.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T6	Gb
Cleaning process	greater than 60 °C up to 90 °C	greater than 60 °C up to 90 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 100 °C.	If potentially explosive mixtures outside atmospheric conditions are possible in the container, the cleaning process is not part of the intended use under these conditions and requires a separate hazard assessment.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 90 °C is possible, plus 10 °C of intrinsic heating results in a maximum surface temperature of the non-electrical part of 100 °C, which results in temperature class T5. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T5.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T5	Gb

Cleaning process	greater than 90 °C up to 95 °C	greater than 90 °C up to 95 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 105 °C.	If potentially explosive mixtures outside atmospheric conditions are possible in the container, the cleaning process is not part of the intended use under these conditions and requires a separate hazard assessment.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 95 °C is possible, plus 10 °C of intrinsic heating results in a maximum surface temperature of the non-electrical part of 105 °C, which results in temperature class T4. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T4.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T4	Gb
Idle state (no cleaning)	n/a	max. 60 °C	The device assumes max. the temperature of the container.	Gases or vapors of explosion groups IIA or IIB. Group IIC gases are permitted in the container, but must be completely removed for cleaning and the container must be suitable for this.	T6	Ga	Heating to 60 °C is possible, which results in a max. surface temperature of the device of 60 °C. Ambient temperature outside max. 40 °C. The electrical equipment has temperature class T6. This results in temperature class T6.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T6	Gb
Idle state (no cleaning)	n/a	greater than 60 °C up to 95 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 95 °C is possible, which results in a maximum surface temperature of the non-electrical part of 95 °C. This results in temperature class T5. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T5.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T5	Gb

Idle state (no cleaning)	n/a	greater than 95 °C up to 100 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 100 °C is possible, which results in a maximum surface temperature of the non-electrical part of 100 °C. This results in temperature class T5. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T5.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T5	Gb
Idle state (no cleaning)	n/a	greater than 100 °C up to 135 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 135 °C is possible, which results in a maximum surface temperature of the non-electrical part of 135 °C. This results in temperature class T4. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T4.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T4	Gb
Idle state (no cleaning)	n/a	greater than 135 °C up to 140 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 140 °C is possible, which results in a maximum surface temperature of the non-electrical part of 140 °C. This results in temperature class T3. Ambient temperature outside of max. 40 °C. The electrical equipment has temperature class T6. This results in the overall temperature class T3.	Gases or vapors of explosion group IIA, IIB or IIC The electrical equipment and the non-electrical part meet the requirements of explosion group IIC.	T3	Gb

Table 2.5-2: Explanation of EX marking – gas

Operating status			Flammable dust inside the container to be cleaned				Flammable dust outside the container to be cleaned			
			II 1/... D EX III C/... T60 °C ...T70 °C/... Da/...				II.../2D EX .../IIIC .../T95 °C...T140 °C .../Db			
	Temperature		Surface temperature of the device inside the container	Potentially explosive atmosphere in the container	Max. surface temperature	EPL	Surface temperature of the device outside the container	Explosive atmosphere outside the container	Max. surface temperature	EPL
	Operating temperature of cleaning medium	Inside the container								
Cleaning process	+5 °C to 60 °C	+5 °C to 60 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 70 °C.	Dusts of dust groups IIIA, IIIB or IIIC	T70 °C	Da	Heating to 60 °C is possible, plus 10 °C intrinsic heating results in a maximum surface temperature of the non-electrical part of 70 °C. Ambient temperature outside max. 40 °C. The electrical equipment has a max. surface temperature of T95 °C. This results in the maximum surface temperature of T95 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T95 °C	Db
Cleaning process	greater than 60 °C up to 85 °C	greater than 60 °C up to 85 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 95 °C.	If potentially explosive mixtures outside atmospheric conditions are possible in the container, the cleaning process is not part of the intended use under these conditions and requires a separate hazard assessment.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 85 °C is possible, plus 10 °C intrinsic heating results in a maximum surface temperature of the non-electrical part of 95 °C. Ambient temperature outside max. 40 °C. The electrical equipment has a max. surface temperature of T95 °C. This results in the maximum surface temperature of T95 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T95 °C	Db

Cleaning process	greater than 85 °C up to 95 °C	greater than 85 °C up to 95 °C	The device assumes max. the temperature of the cleaning medium or that of the container, plus 10 °C of intrinsic heating. The result is a max. surface temperature of the device of 105 °C.	If potentially explosive mixtures outside atmospheric conditions are possible in the container, the cleaning process is not part of the intended use under these conditions and requires a separate hazard assessment.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 95 °C is possible, plus 10 °C intrinsic heating results in a maximum surface temperature of the non-electrical part of 105 °C. Ambient temperature outside max. 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of 105 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T105 °C	Db
Idle state (no cleaning)	n/a	max. 60 °C	The device assumes max. the temperature of the container.	Dusts of dust groups IIIA, IIIB or IIIC	T60 °	Da	Heating to 60 °C is possible, which results in a maximum surface temperature of the non-electrical part of 60 °C. Ambient temperature outside max. 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of T95 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T95 °C	Db
Idle state (no cleaning)	n/a	greater than 60 °C up to 95 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 95 °C is possible, which results in a maximum surface temperature of the non-electrical part of 95 °C. Ambient temperature outside is maximum 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of T95 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T95 °C	Db

Idle state (no cleaning)	n/a	greater than 95 °C up to 100 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 100 °C is possible, which results in a maximum surface temperature of the non-electrical part of 100 °C. Ambient temperature outside maximum 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of T100 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T100 °C	Db
Idle state (no cleaning)	n/a	greater than 100 °C up to 135 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 135 °C is possible, which results in a maximum surface temperature of the non-electrical part of 135 °C. Ambient temperature outside maximum 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of T135 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T135 °C	Db
Idle state (no cleaning)	n/a	greater than 135 °C up to 140 °C	The device assumes max. the temperature of the container.	If potentially explosive mixtures in the container outside atmospheric conditions are possible, the device has no potential ignition source other than the hot surface with the temperature of the surrounding container when used as intended in idle state.	---	---	Temperature monitoring on the pneumatic cylinder necessary! Heating to 140 °C is possible, which results in a maximum surface temperature of the non-electrical part of 140 °C. Ambient temperature outside maximum 40 °C. The electrical equipment has a maximum surface temperature of T95 °C. This results in the maximum surface temperature of T140 °C.	Dusts of dust groups IIIA, IIIB or IIIC. The electrical equipment and the non-electrical part meet the requirements of explosion group IIIC.	T140 °C	Db

Table 2.5-3: Explanation of EX marking - dust

The maximum surface temperature of the device is determined by the ambient temperature in the system to be cleaned (container) and the temperature of the cleaning medium. Operation generates intrinsic heating of a maximum of 10 K, and the maximum surface temperature is thus obtained by adding the higher value of the cleaning medium temperature or the ambient temperature in the system (container) to be cleaned to 10 K.

The permitted temperatures must be taken into account (see [Section 3.3 Technical Data](#)).



NOTE ON EXPLOSION PROTECTION

According to EN 1127-1:2011, 6.4.2, the max. surface temperature in the container must not exceed 80% of the ignition temperature of the explosive gas/air mixture or 2/3 of the ignition temperature of the dust/air mixture (determined in accordance with the latest version of EN 50281-2-1).

In addition, the smoldering temperature of the dust (ignition temperature of the dust layer (determined in accordance with the latest version of EN 50281-2-1) must be at least 75 K above the max. surface temperature. The thickness of the dust layer may reach a maximum of 5 mm.

Where dust layers of > 5 mm are formed, the safety distance between the smoldering temperature and the maximum surface temperature of the device must be increased.

In this context, the requirements in accordance with the latest version of EN 60079-14 must be observed.



For processes that follow cleaning, the potentially increased surface temperature of the TANKO-RT/-RTS must be taken into account.

If necessary, the TANKO-RT/-RTS system must be left to cool down for sufficiently long for a safe temperature to be reached.



Before the start of processes in which potentially explosive mixtures may develop, the device and/or the ambient temperature in the container must cool down to a safe temperature that no longer poses an explosion hazard, see also the note on explosion protection above.

Possible hazards when spraying fluids must also be taken into account and considered in a separate hazard assessment by the owner.

3 Design and Function

Type TANKO-RT has a rotating spray head. The rotational movement of this ball-bearing spray head is achieved by the flow of the cleaning agent without additional mechanical drive energy. The speed at which the spray head rotates is regulated by the spray pressure of the cleaning fluid. The cleaning agent exits the nozzle openings of the spray head, covers the interior surfaces of the container to be cleaned, thereby enabling the cleaning.

Type TANKO-RTS has a rigid spray head. The rotation or radial movement of the spray head is prevented by a rail that is welded into the hydraulic pipe and combined with a groove in the centering adapter disk.

3.1 Design

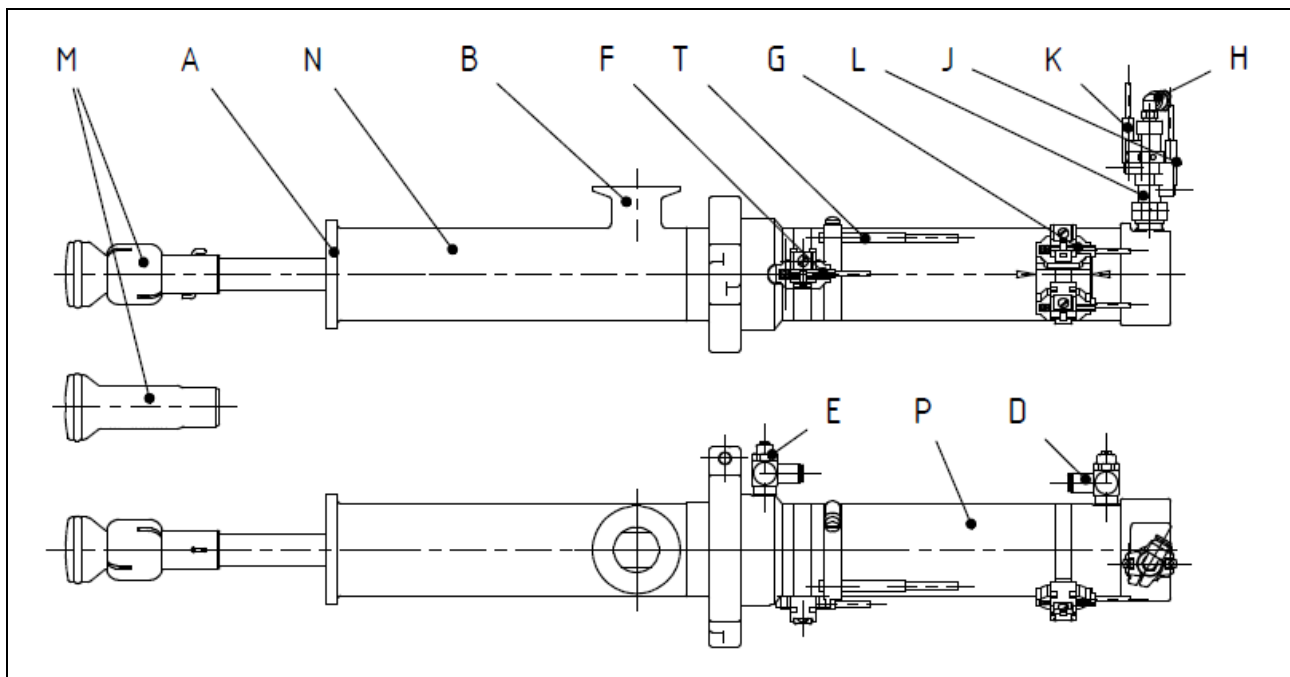


Figure 3.1-1: General Construction

The pneumatically driven cleaning devices TANKO-RT and TANKO-RTS (anti-twist version) consist of the following main components:

- A Process connection [PC]
- B Media connection [MC] (cleaning agent feed)
- D Power cylinder “extension” pneumatic connection
- E Power cylinder “retraction” pneumatic connection
- F Power cylinder “extended” limit switch (1x)
- G Power cylinder “retracted” limit switch (2x, G1 and G2)
- H Locking cylinder “unlock” pneumatic connection
- J Locking cylinder “unlocked” limit switch
- K Locking cylinder “locked” limit switch
- L Locking cylinder (pneumatic) with 2 limit switches
- M Spray head, rotating TYPE A, B, C, or D / alternative static spray head type S on TANKO-RTS anti-twist version
- N Hydraulic pipe for holding the spray head
- P Power cylinder, pneumatic actuator with 3 limit switches
- T Resistance Thermometer

Power cylinder and locking cylinder form the pneumatic part.

The compressed air supply to the power cylinder is via two throttle check valves. These are attached to the outside of the power cylinder.

The locking cylinder is supplied with compressed air using a plug-in connection, which is located on the end of the locking cylinder.

At the connection point between the pneumatic pipe / hydraulic pipe, there is a 2 ½" clamp connection to connect the two parts of the device.

The hydraulic section consists of the hydraulic pipe with process connection [PC] and media connection [MC]. The hydraulic pipe contains the centering adapter for holding the spray head and supplying the cleaning medium.

A clamp connection that enables the device to be connected to the media supply line is located on the hydraulic pipe of the device.

On the hydraulic pipe for mounting the spray head, there is a process connection [PC] that enables the device to be fastened to the intended container. The process connection [PC] is available in different variants (see [Table 3.3-6: Connection Variants](#))

The connection of the piston rod to the centering adapter is implemented with a threaded connection.

There are 5 variants of the spray head, type A, B, C, D and S. Types A, B, C and D are rotating spray heads and differ in the width of the spray slit and therefore in use. The spray angle of types A to D is 270° in the direction of the retractor system. Type S is a static spray head which, that is suitable for use in combination with the TANKO-RTS retractor system a targeted area of a specific area in the container. Due to the shape of the head and the closing function of the retractor system, the area in front of the spray head is not sprayed with cleaning agent.

Static Spray Head

The static spray head is shown in [Figure 3.1-2](#) as a blank without spray or drain holes. The number, position, alignment and diameter of the holes are to be specified by the user according to requirements. The number and diameter must be specified in such a way that the maximum flow rate of 10 m³/h is not exceeded at the maximum medium pressure of 6 bar (87 psi g).

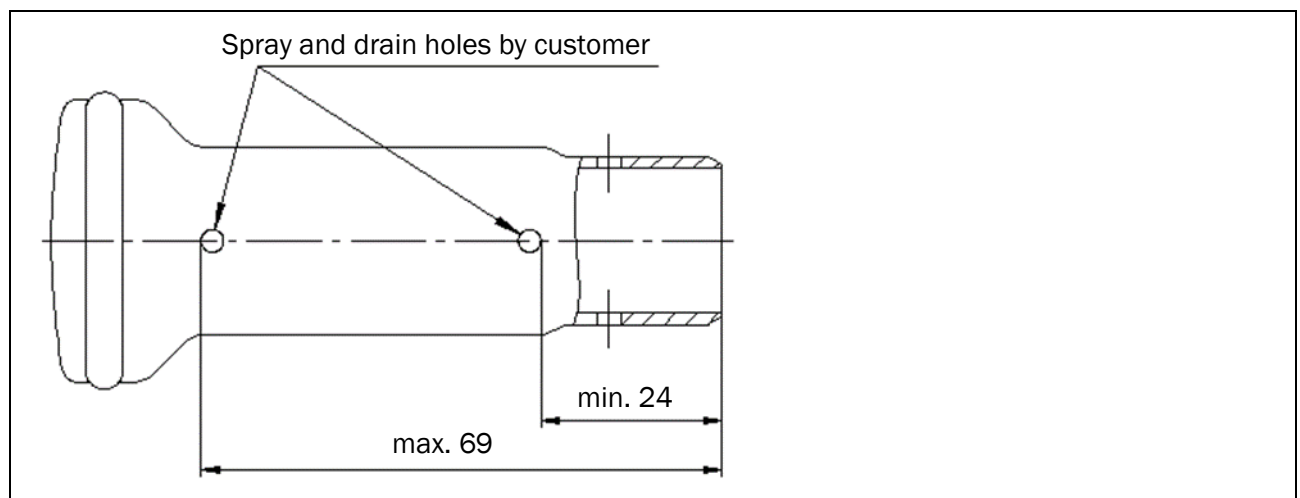


Figure 3.1-2: Static Spray Head

The spray head (all types) is connected to the piston rod by a disposable locking pin.

The device is made of stainless steel and has been developed, designed and built exclusively for industrial and commercial use. Several versions of the device are available for different applications and container dimensions.

3.2 General Function Description



The item numbers shown in brackets refer to the [Figure 7.5-1: Internal Construction](#); the letters in brackets refer to the [Figure 3.1-1: General Construction](#).

The basic principle of the retractor system is separation between the rest position (closed construction, the spray head M is located in the hydraulic pipe N and therefore outside the container to be cleaned) and cleaning mode (the spray head is extended into the container for cleaning). This movement is actuated by a pneumatic cylinder (power cylinder P).

The power cylinder is locked in its rest position by a locking cylinder (L).

At the central bearing, a seal to the piston rod and the housing wall ensures a complete separation of the actuator and cleaning areas.

The housing of the retractor system (hydraulic pipe) is permanently installed on the container that needs to be cleaned. When closed (e.g. during the production process), the spray head (M) is in the housing and creates a seal together with the container wall and the connector.

To start cleaning, compressed air is applied to the locking cylinder (L), which unlocks the power cylinder (P). The operator's control system must ensure that the cleaning process can be started only if moving installations in the plant that could collide with the operating area of the spray head, are in their rest position outside the area of the spray head and are secured against being turned on again.

If this requirement is met, the power cylinder can retract the piston rod with the spray head attached to it to the end position (signal from limit switch F) in the container. The cleaning medium that subsequently flows into the hydraulic pipe is conveyed into the container via the spray heads.

This process uses the proven principle of the spate cleaner. The cleaning device sprays the interior surface of the container with the cleaning agent. The material to be disposed of is loosened, dissolved and drained away.

After completion of the cleaning process, the retractor system can be blown dry to remove any residual fluid. The blow-out time should be 0.5 - 1 minute, and should not exceed 1 minute. The maximum pressures for this (see [Table 3.3-3: Operating Parameter, Hydraulic Side](#)) may not be exceeded. The spray head then returns completely into the housing and an O-ring creates a complete seal to the interior of the container. When the power cylinder reaches its end position (signal from the two limit switches G1 and G2), the compressed air should be disconnected from the locking cylinder, which locks the power cylinder.

The plant can then be restarted if the power cylinder is in “retracted” position (signal from both limit switches G1 and G2) and the locking cylinder is in “locked” position (signal from limit switch K).

Locking cylinder L is single acting with spring return. This means that it is extended by compressed air (power cylinder released, signal from limit switch J “unlocked”, retractor system can extend) and is retracted by a spring when the compressed air is disconnected (power cylinder locked in top position, signal from limit switch K, retractor system cannot extend).

If the compressed air fails for a significant period, this ensures that the retracted power cylinder does not unintentionally lower into the container where it could collide with the internal fittings inside.

Before every movement of the power cylinder, the locking cylinder must first unlock it, i.e. compressed air must be applied using a valve. Once the relevant end position is reached, the compressed air should be disconnected and the locking cylinder moves to the locking position.

The program sequence for these movements must be defined in the customer control system.

When starting up the plant, including after a malfunction, it must be ensured that before extending or retracting the power cylinder the opposite side is vented (i.e. placed under pressure) and the locking cylinder is unlocked.

The owner must specify the control system (e.g. EMERGENCY STOP circuit) according to the specific operational requirements. The corresponding guidelines and safety guidelines must be observed.

The typical operating pressure range for the side of the TANKO-RT/-RTS with cleaning medium flowing through it is 3 - 6 bar (43.5 - 87 psi g), and the maximum pressure may not exceed 6 bar (87 psi g). The consumption of cleaning water is significantly lower than that of conventional spray heads.

If the retractor system is used within the operating area of internal fittings, i.e. if there is a possibility of collision between the extended spray head and moving internal fittings in the container, safe operation of the retractor system is only possible with additional protection measures. The operator should also conduct a hazard or risk assessment to identify and implement the functional requirements for the retractor system controller, and, if necessary, additional monitoring equipment on the container to prevent collisions between the spray head and any internal fittings. The following functions and associated monitoring must be ensured:

- Air pressure loss; the container with the retractor system must be removed for safety reasons.
- The rest position of moving internal fittings must be defined and monitored.
- When you switch off the cleaning medium, you should reckon with a run-on time of 1 minute until the spray head comes to a stop. The spray head should only be retracted after this time.
- The process may only be started again after completing a cleaning process if the power cylinder of the TANKO-RT/-RTS is in the retracted (closed) position and the locking cylinder has locked it.
- When the retractor system is in rest position (power cylinder in “retracted” position, G1 and G2 signal) and during operation of the plant, compressed air must be present at the pneumatic connection E on the power cylinder (retract power cylinder).
- The entire system for monitoring the position of the “retracted” power cylinder (two limit switches, G1 and G2) must comply with at least the ignition protection system b2, EN ISO 80079-37 in the currently applicable version, or equivalent.
- The entire system for monitoring the position of the locking cylinder (limit switches J and K) must comply with at least the ignition protection system b1, EN ISO 80079-37 in the currently applicable version, or equivalent.

Exceeding the temperature limit of 70 °C in the area of the limit switch can permanently endanger the functional reliability of the limit switch, as the manufacturer specifies a maximum permissible ambient temperature limit of 70 °C for the intended use. This can generally only be done on the limit switch near the hydraulic pipe. A surface resistance thermometer monitors whether this temperature is exceeded. At operating temperatures of over 70 °C, for the cleaning medium and/or the ambient temperature within the container, the supplied pneumatic resistance thermometer must be mounted on the pneumatic cylinder right next to the limit switch F, for power cylinder “extended”, and evaluated by the higher-level plant controller.

- As soon as the temperature monitoring system detects a temperature near the limit switch (F) of ≥ 66 °C, the retractor system must be placed in a safe state and all limit switches and throttle check valves must be replaced with original spare parts before restarting.
The cause of the excess temperature must be determined and eliminated immediately.
- The entire temperature monitoring system near the limit switch F “extended” must comply with the ignition protection system b1, EN ISO 80079-37 in the currently applicable version, or equivalent.
- The provisions of EN 60079-14 regarding the selection and setup of electrical operating materials must be observed.
- The temperature monitoring must be constantly and actively connected with the monitoring system, including during the system idle state, during cleaning mode and during non-operation of the retractor system (media and pneumatic connections closed with permanently sealed shut-off fittings). According to the operating instructions, this ensures that the safety devices (limit switches) required for explosive atmospheres are not exposed to damaging high temperature during intended use.

Apart from the monitoring described above, it must be ensured that cleaning mode can only be started if the moving internal fittings in the plant that move within the working area of the spray head are in their rest position and are secured against being turned on again. This system must guarantee a high level of safety.

Only plants (containers) with sufficient grounding and made of conductive material without an insulating inner coating may be cleaned. The container outlet must be open during a cleaning process, i.e. no accumulation of cleaning agent may occur.

For this, see [Section 3.2.1 Emergency Stop](#) and function diagram, as well as [Section 3.2.2 Functional Flow Chart](#).

When the retractor systems are not in operation, the media and pneumatic connections must be closed with permanently sealed shut-off fittings.

Application examples of the TANKO-RT and TANKO-RTS retractor systems

Tanks, silos, barrels, containers, pipes, dryers, centrifuges, agitators, vacuum tanks, spray towers, container washing plants, fermenters, filters, mixing containers and horizontal dryers.

Remark on the Cleaning Process

The result of a cleaning process with the device, like all other cleaning processes, depends on several parameters. According to the “Sinner's Circle”, the four most important parameters for cleaning are:

- Chemicals (cleaning medium, plus the product and its concentration)
- Mechanical system (removal of dirt, establishment of contact with the cleaning medium)
- Temperature and
- Time (reaction time of the cleaning medium and duration of the cleaning process).

All four factors are mutually dependent and variable in their size.

The desired cleaning result can only be achieved with a well-balanced combination of pressure, flow rate, reaction time, temperature and cleaning medium.

3.2.1 Emergency Stop

NOTE

Risk of damage to the device from collision of moving parts!

When the power cylinder is retracted into the housing and the cylinder continues to move to its end position after a power failure or emergency stop, there will be a collision between the bolt on the seal carrier and the locking bolt.

This results in damage to the safety-relevant parts.

- *The power cylinder must stop in position immediately in case of a power failure or emergency stop during the cleaning process and must not move to its end position.*
- *We recommend a control-system solution that fulfills the valve function of a 5/3-way valve with a blocked middle position.*

When the air pressure falls, the locking cylinder goes into locking position via spring control.

After an emergency stop or power failure with a fall in air pressure, when restarting the plant, the locking cylinder must first be supplied with compressed air (i.e. it must be unlocked, before the power cylinder may move to its end position).

3.2.2 Functional Flow Chart

Components	1x	Power cylinder (P), double acting
	1x	Locking cylinder (L), single acting, with spring return
Sensors	1x	End position power cylinder, "extended"
	2x	End position power cylinder (redundant), "retracted"
	1x	End position locking cylinder extended, "unlocked"
	1x	End position locking cylinder retracted, "locked"
	1x	At operating temperatures > 70 °C of the cleaning medium or the cleaning medium or in the container: Resistance thermometer for monitoring the temperature at the limit switch power cylinder F "extended"; constant monitoring of the temperature required in all operating states (cleaning and rest)!

Conditions for start of cleaning cycle (examples): Container empty
Product supply closed
Agitators etc. shut down
Drain for cleaning agent open etc.

Function Sequence

Condition	→	Action
() Temperature of 66 °C exceeded at temperature sensor T	→	Plant failure, transfer plant to a safe state
1 Conditions for cleaning cycle met	→	Start cleaning cycle
2 Cleaning cycle started	→	Locking cylinder extends "unlock"
3 Locking cylinder extended (J energized)	→	Power cylinder extends "extend"
4 Power cylinder extended (F energized)	→	Locking cylinder retracts, "lock", cleaning medium supply on, cleaning carried out
5 Cleaning finished, cleaning medium supply off, locking cylinder retracted "locked" (K energized, spring relief)	→	Start timer t1 = 60 s, locking cylinder extends "unlock"
6 Locking cylinder extended (J energized) and timer 1 elapsed	→	Power cylinder retracts "retract"
7 Power cylinder "retracted" (G1 and G2 energized)	→	Start timer t2 = 1 s
8 Power cylinder retracted (G1 and G2 energized) and timer t2 elapsed	→	Locking cylinder retracts "lock"
9 Power cylinder retracted (G1 and G2 energized) and locking cylinder retracted (K energized)	→	Release start of process

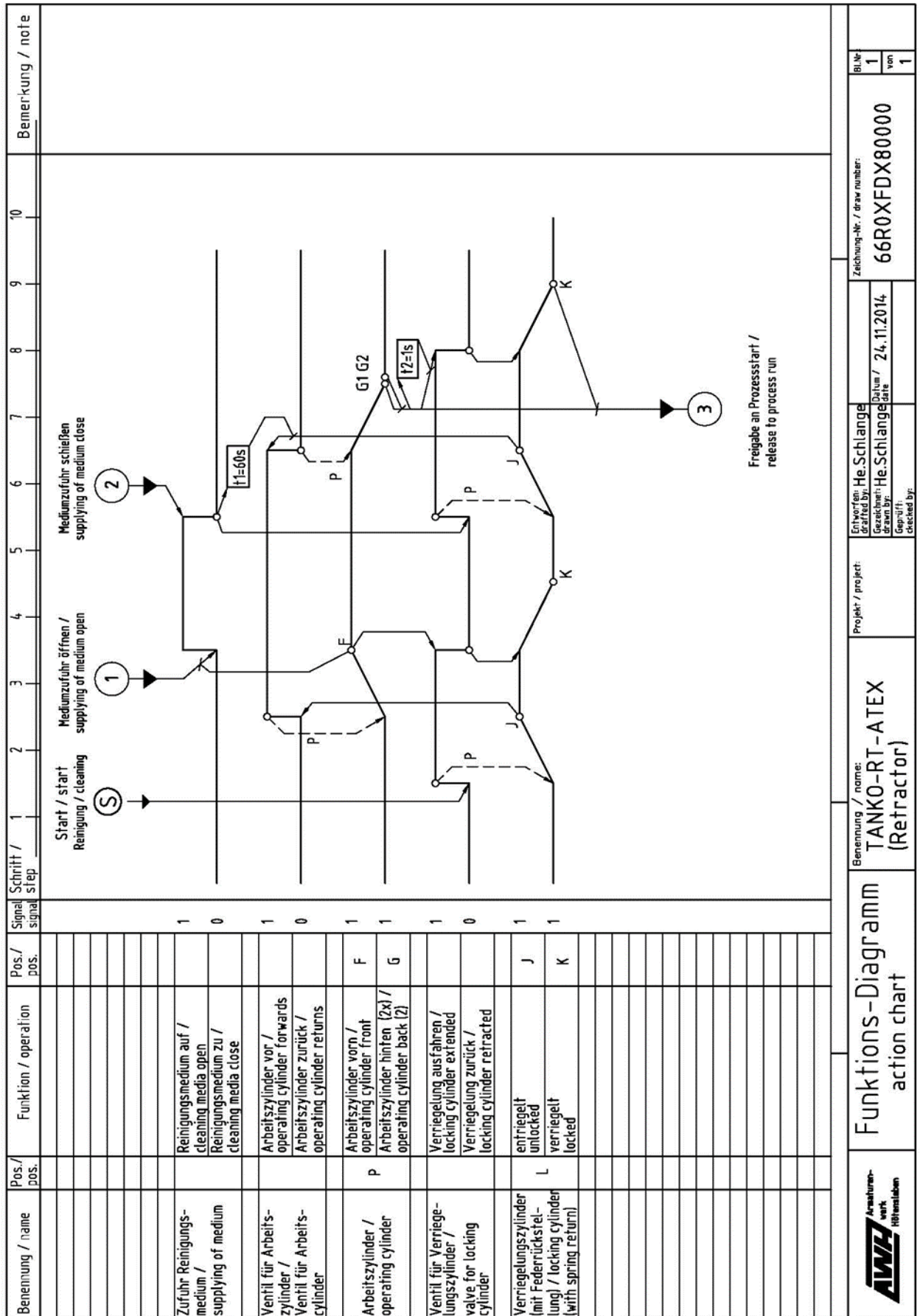


Figure 3.2-1: Function Diagram

3.3 Technical Data

The estimated safe service life of the device is 10 years with single-shift operation and the use of drinking water.

The prerequisites for this are that the device must be maintained properly at the intervals specified in [Section 7.4 Maintenance](#), and the wear parts must be replaced regularly.

All media other than tap water can reduce the service life of the device.



NOTE ON EXPLOSION PROTECTION

Restriction of the operating parameters of the device!

The maximum permitted operating parameters such as container size, operating pressure and flow rate must be taken into account due to electrostatic charge build-up when handling fluids.

If this is not observed, the explosion protection could be disabled.

- Comply with the notes in [section 3.4 Cleaning Media](#) before commissioning or recommissioning the device.

General Technical Data

Designation	TANKO-RT/RTS
Ambient temperature (permitted): outside the container	
- During the cleaning process	+5 °C (+41 °F) to +40 °C (+104 °F)
- In idle state	-10 °C (14 °F) to +40 °C (+104 °F)
Operating pressure range in the container to be cleaned	
- During the cleaning process	0.0 to 0.5 bar (0.0 to 7.25 psi g) There is no potentially explosive mixture in the container during cleaning. The cleaning medium must not even result in the development of potentially explosive mixtures during spraying.
	0.0 to 0.1 bar (0.0 to 1.45 psi g) There is a potentially explosive atmosphere in the container during cleaning
- In idle state	-1.0 to 3.0 bar (-14.5 to 43.5 psi g)
Installation dimensions:	see Figure 3.3-4 with Table 3.3-4 and Table 3.3-5
Plant noise level:	L _{pA} max. = 70 dB(A)
Materials: in contact with media	1.4401, 1.4430, 1.4435, PTFE-TMOF-0040, EPDM, optional: FKM (e.g. Viton®), FFKM (alternative materials in line with customer order, see supplementary “Special version” sheet)
- other	1.4301, 1.4404, PU, EPDM optional: FKM (e.g. Viton®), Al

Table 3.3-1: General Technical Data

Technical Data for Pneumatic Side

Designation	Retractor system TANKO-RT/RTS
Actuator:	Pneumatic (compressed air)
Drive medium:	Dry, oil-free compressed air (if necessary, install corresponding upstream maintenance unit)
Operating pressure – Range – Recommended	min. 5 bar (72.5 psi g) – max. 6 bar (87 psi g) 6 bar (87 psi g)
Connection: – Power cylinder – Locking cylinder	Internal thread G 1/8 ISO 228-1 throttle check valve for hose external $\varnothing = 6$ mm Internal thread M5 metric ISO thread Angled connector for hose external $\varnothing = 6$ mm

Table 3.3-2: Operating Parameter, Pneumatic Side

Power Supply, Limit Switch

The power supply for the 5 limit switches (on the power and locking cylinder) is provided by approved switch amplifiers (8.2 V).

The entire system for monitoring the position of the retracted or “retracted” power cylinder (two limit switches, G1 and G2) must comply with at least the ignition protection system b2, EN ISO 80079-37 in the currently applicable version.

The entire system for monitoring the position of the locking cylinder (limit switches J and K) must comply with at least the ignition protection system b1, EN ISO 80079-37 in the currently applicable version.



Recommendation:

Switch amplifier (2-channel) with ATEX-approval for Zone 1 of Hans Turck GmbH & Co. KG.

More detailed data can be found in the external data sheets or the manufacturer's operating instructions.

Power Supply and Evaluation of Resistance Thermometer

The power supply for the resistance thermometer (on the power cylinder) is performed via an approved supply isolator.

The entire temperature monitoring system near the limit switch “F” must comply with the ignition protection system b1, EN ISO 80079-37 in the currently applicable version.



Recommendation:

Intrinsically safe supply isolator type IS Barrier, transmitter T15; T32xS, T53 with appropriate approval from WIKA Alexander Wiegand SE & Co. KG.

More detailed data can be found in the external data sheets or the manufacturer's operating instructions.

Pneumatic Connection



NOTE ON EXPLOSION PROTECTION

Restriction on the travel speed of the pneumatic cylinder!

The speed for extending and retracting the pneumatic cylinder may not exceed 0.1 m/s. The throttle check valves whose position determines the speed are preset and sealed by the manufacturer of the retractor system.

If this is not observed, the explosion protection could be disabled.

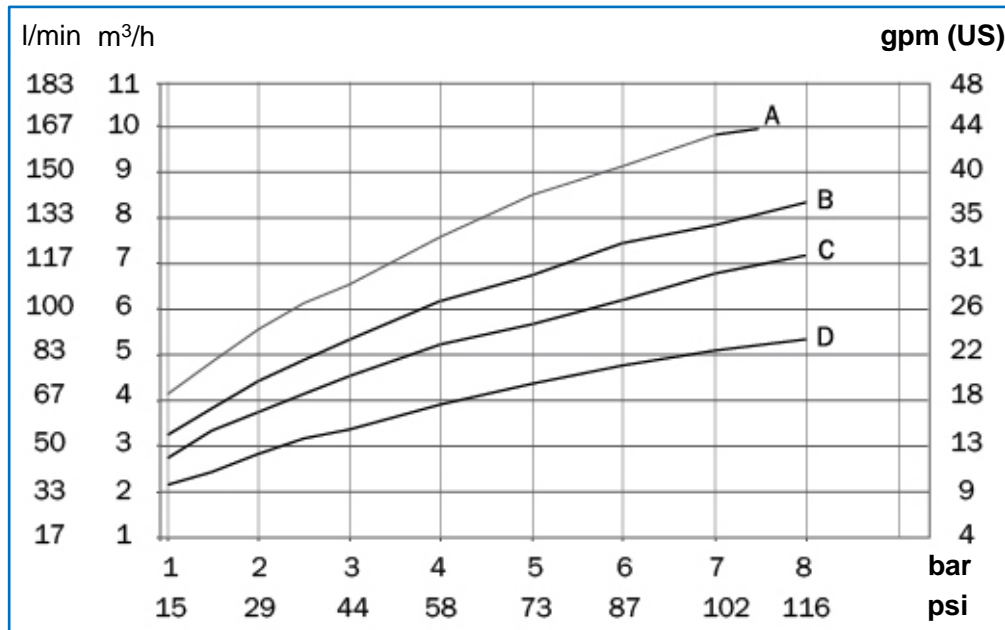
- *Preconfigured throttle check valves must NOT be changed.*
- *The throttle check valves are adjusted as follows (Figure 3.1-1: General Construction):*
 - *Position E: 4.0 turns from “closed” towards “open”*
 - *Position D: 4.0 turns from “closed” towards “open”*

Technical Data for Hydraulic Side

Designation	TANKO-RT/RTS
Range	see Figure 3.3-3: Diagram - Range
Operating temperature (permitted): – Cleaning medium	+5 °C (+41 °F) to +95 °C (+203 °F) There is no potentially explosive mixture in the container during cleaning. The cleaning medium must not even result in the development of potentially explosive mixtures during spraying.
	+5 °C (+41 °F) to +60 °C (+140 °F) There is a potentially explosive atmosphere in the container during cleaning and the cleaning medium is not flammable.
	+5 °C (+41 °F) to flash point $T_{\text{flash point}} - 15$ °C (max. 60 °C) There is a potentially explosive atmosphere in the container during cleaning and the cleaning medium is flammable and a flash point can be verified for this material.
Ambient temperature (permitted): In the container to be cleaned – During the cleaning process	+5 °C (+41 °F) to +95 °C (+203 °F) There is no potentially explosive mixture in the container during cleaning. The cleaning medium must not even result in the development of potentially explosive mixtures during spraying.
	+5 °C (+41 °F) to +60 °C (+140 °F) There is a potentially explosive atmosphere in the container during cleaning.
– Idle state O-Ring material EPDM O-Ring material FKM and FFKM	-20 °C (-4 °F) to +130 °C (+266 °F) -15 °C (+5 °F) to +140 °C (+284 °F)
Operating pressure, cleaning medium – Liquid medium – Gaseous medium (air or nitrogen)	< 1 – 6 bar (14.5 – 87 psi g) recommended 3 bar (43.5 psi g) 1 bar (14.5 psi g), max. 1 min 0.5 bar (7.25 psi g), max. 2 min
Volume flow rate (depending on spray head type)	see Figure 3.3-1 and Figure 3.3-2
Rotation speed: – with water – with air	500 – 2,000 rpm 900 – 2,000 rpm
Process connection [PC]:	see Table 3.3-6
Media connection [MC]:	Clamp DN25, DIN 32676 Adapter on clamp connection 1" series C DIN 32676 possible.

Table 3.3-3: Operating Parameter, Hydraulic Side

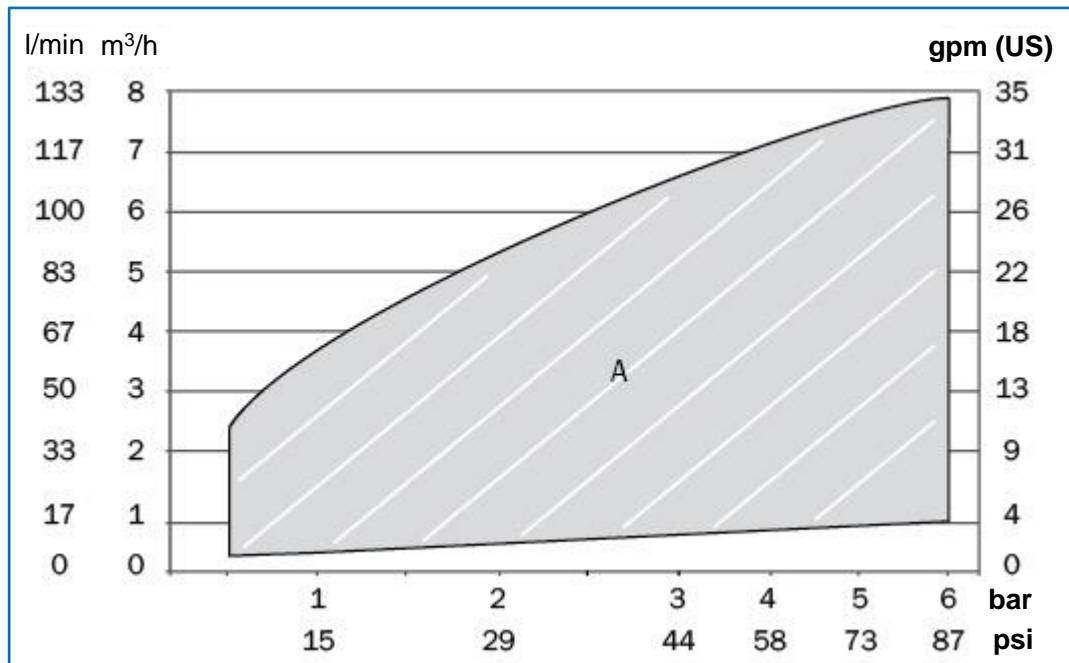
Consumption Data – Rotating Spray Head



- A – Head type “CD” 270°
- B – Head type “CC” 270°
- C – Head type “CB” 270°
- D – Head type “CA” 270°

Figure 3.3-1: Diagram - Flow Rate for Rotating Spray Head

Consumption Data – Static Spray Head “CS”



- A – Usable flow rate

Figure 3.3-2: Diagram - Flow Rate for Static Spray Head

Consumption Data and Operating Pressure for the Cleaning Process:

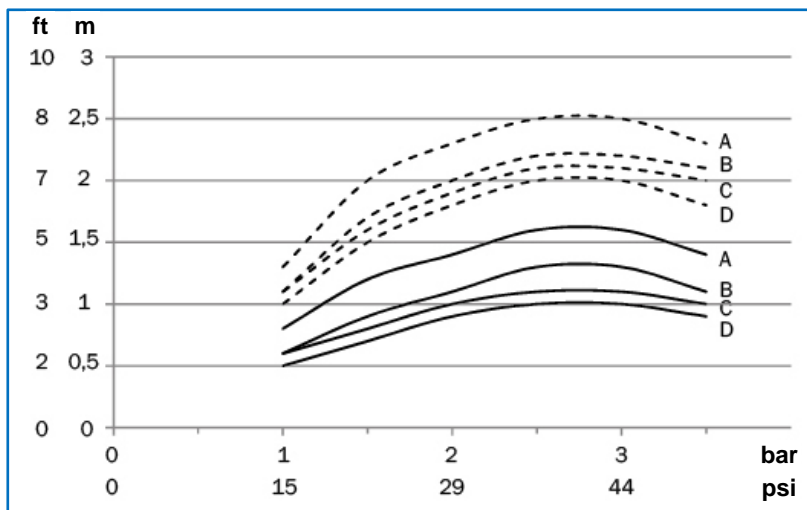
The specified values for consumption in the charts are average values and may fluctuate by approx. $\pm 10\%$ in normal operation. They apply to operation with clear water as the cleaning medium at a temperature of $+25\text{ }^{\circ}\text{C}$ / $+77\text{ }^{\circ}\text{F}$. The values may differ if a different cleaning medium is used and if the temperature is different.

The consumption of cleaning fluid in TANKO-RT/-RTS devices depends on multiple factors, e.g. the pressure of the cleaning fluid and the size of the spray openings. An increase in pressure leads to increased consumption (throughput). The permitted range for the operating pressure of the cleaning medium must be adhered to.



The recommended operating pressure for the device is 3 - 5 bar (43.5 - 72.5 psi g).

Range of the Cleaning Fluid



A – Head type “CD” 270°

B – Head type “CC” 270°

C – Head type “CB” 270°

D – Head type “CA” 270°

--- Wetting radius — Cleaning radius

Figure 3.3-3: Diagram - Range

Using multiple TANKO-RT/RTS units also allows cleaning of larger container diameters. However, the ignition hazards depending on the cleaning medium due to electrostatic charge set out in [Section 3.3](#) must be observed.

Dimensions and Weight

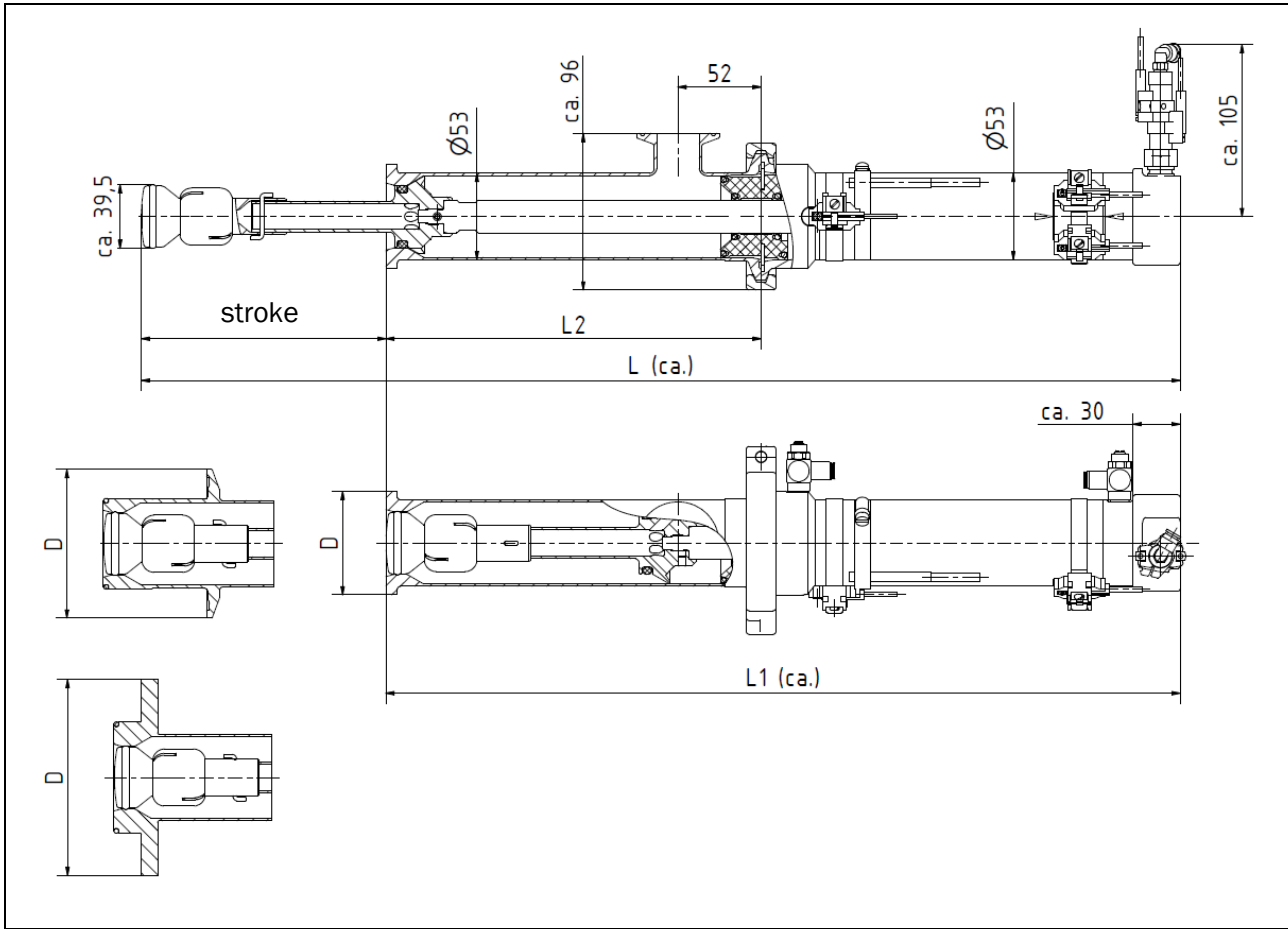


Figure 3.3-4: Example Display of PA weld, Combination Adapter C3 and BioControl®

Dimension [mm]	Stroke 100	Stroke 150	Stroke 250	Stroke 500
L	487	637	937	1,767
L1	387	487	687	1,187
L2	180	230	330	580

Table 3.3-4: Overview of Linear Dimensions

Process connection [PC]			Weights [kg] with stroke length in [mm]			
Designation	D [mm]	DN	Stroke 100	Stroke 150	Stroke 250	Stroke 500
Clamp (DIN 32676)	Ø 64.0	2"	3.9	4.2	4.9	6.7
	Ø 77.5	2.5"	4.0	4.3	5.0	6.8
	Ø 91.0	3"	4.1	4.4	5.1	6.9
Weld-in connector	Ø 50.7	2"	3.9	4.2	4.9	6.7
	Ø 63.4	2.5"	4.0	4.3	5.0	6.8
	Ø 76.1	3"	4.1	4.4	5.1	6.9
Combination adapter C3	Ø 91.0	3"	4.2	4.5	5.2	7.0
– Combination container connectors with clamp			1.9	1.9	1.9	1.9
Flange for NEUMO BioControl®	Ø 120.0	65	4.7	5.1	5.8	7.6

Table 3.3-5: Weights

Surfaces

Exterior surface	Metal bright/polished
Interior surfaces in contact with the product	Ra < 0.8 µm

Connection Variants

Process connection	Size	Stroke 100 mm		Stroke 150 mm		Stroke 250 mm		Stroke 500 mm	
		RT	RTS	RT	RTS	RT	RTS	RT	RTS
Clamp connection based on DIN 32676	2"	X	X	X	X	X	X	X	X
	2.5"	X	X	X	X	X	X	X	X
	3"	X	X	X	X	X	X	X	X
Weld-in connector	2"	X	X	X	X	X	X	X	X
	2.5"	X	X	X	X	X	X	X	X
	3"	X	X	X	X	X	X	X	X
Combination adapter C3	3" (DN65)	X	X	X	X	X	X	X	X
BioControl®	65	X	X	X	X	X	X	X	X

Table 3.3-6: Connection Variants

For the exact design of the device, refer to the order confirmation.

3.4 Cleaning Media

Due to the wide variety of practical cases of application and use for the cleaning device, it is NOT possible for AWH to recommend specific cleaning agents for the owner.

The owner bears the sole responsibility for the type of cleaning media, their use and handling.

For this reason, AWH can provide the owner with **a few reference points and notes** (for a device in a container) **but only as a precautionary measure**, which must be observed and integrated into the owner's hazard assessments.



NOTE ON EXPLOSION PROTECTION

Before using the device in an Ex area, the technical rules for avoiding the dangers of potentially explosive atmospheres must be observed.

If this is not observed, the explosion protection could be disabled.

- *TRBS 2152/TRGS 720 "Hazardous, potentially explosive atmosphere - General -"*
- *TRBS 2152 Part 1/TRGS 721 "Hazardous, potentially explosive atmosphere - Assessment of the explosion hazard -"*
- *TRBS 2152 Part 2/TRGS 722 "Hazardous, potentially explosive atmosphere - Avoidance or restriction of hazardous potentially explosive atmosphere-"*
- *TRGS 727 "Avoidance of ignition hazards due to electrostatic charge", Chapter 4.12 "Cleaning containers"*
- *IEC/TS 60079-32-1, Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance, Chapter "Spraying liquids and tank cleaning"*

Excerpts from **TRGS 727** "Prevention of ignition hazards due to electrostatic charge"

Chapter 4 Electrostatic charges when handling fluids

When filling and emptying containers with fluids, when recirculating, stirring, mixing and spraying fluids and also when implementing measuring, sampling and cleaning work, the fluids themselves or the interior of the container can be provided with a hazardous charge. The size and intensity of the resulting charge depend on the properties of the fluid, its flow rate, the procedure, the size and geometry of the container as well as its material."

Section 4.12 Cleaning Containers

(1) When cleaning containers, particularly during blast cleaning, high electrostatic charges can occur.

(2) The resulting amount of charge is influenced by various factors, including:

- the properties of the blasting material,
- further additives to the blasting material,
- the phase condition of the blasting material,
- the phase condition of the contaminated blasting material,
- the flow rate during fluid jet cleaning,
- the shape and number of jet nozzles,
- the operating pressure,
- the size and geometry of the container,
- the fluid properties in the container,
- the residual fluid and
- the fluid level.

(3) Ignitable mixtures (e.g. carbon disulfide / air mixtures) require additional measures.

(4) Impacting cleaning jets form droplets or mists when they disintegrate that are normally charged and generate electrical charges in the container. Existing turbulence distributes the charged mist throughout the container, thus generating a high space charge density with high field strengths.

Note 1: The electric potential generated by the mist has its maximum value in the middle of the container and is dependent upon the type of cleaning liquid (e.g. water, oil or the use of additive substances) and the parameters of the jet cleaner used (e.g. fluid pressure, flow rate and nozzle diameter).

Note 2: Furthermore, isolated conductors can develop when cleaning with a water jet. Falling water clusters can be charged by impact on the potential in the center of the tank. Ignitable discharges can occur when the water clusters approach grounded conductive objects or the ground.

To prevent dangerous charges, appropriate measures must be taken for the design and equipment to ensure with a very high level of reliability according to category 1 as per Directive 2014/34/EU, that the relevant process variables

- Type of cleaning medium
- Conductivity of cleaning medium
- Operating pressure of cleaning medium
- Volume flow rate of cleaning medium
- Proportion of a 2nd phase in cleaning medium
- Container size
- Maximum number of retractor systems per container
- Temperature in the container to be cleaned and temperature of the cleaning medium

are complied with in accordance with the Technical Specification IEC/TS 60079-32-1 and TRGS 727 in the valid version and as described in the operating instructions.

 **DANGER*****Danger due to development of a potentially explosive atmosphere!***

Splashing or spraying flammable fluids to clean the container can create a potentially explosive atmosphere.

There is a risk of death or severe physical injury.

- *Avoid the creation of a hazardous potentially explosive atmosphere and the activation of ignition sources.*

Explosions with dangerous effects may occur if the following four conditions are met simultaneously:

- *High level of dispersion of flammable substances,*
- *Concentration of flammable substances in the air within the explosive limits,*
- *Hazardous quantity of potentially explosive atmosphere,*
- *Effective ignition source*
- *Adhere to the regulations and specifications in the safety data sheets for the cleaning media (e.g. ignition temperature; flash point; explosive limits).*
- *When using flammable cleaning media, the maximum operating temperature of the cleaning medium must be 15 K below the flash point of the cleaning medium and must not exceed 60 °C.*
- *The following are **PROHIBITED** for use as cleaning media:*
 - *Corrosive or explosive fluids, fluids with solid content (e.g. abrasives) and substances that can undergo exothermic reactions with the material of the container or the plant (e.g. chlorine, substances containing chlorine ions or saline substances) may not be used for cleaning purposes.*
 - *Conductive solvents (hydrocarbons) as cleaning media ($\kappa > 10,000$ pS/m), such as alcohols, ketones, glycols, glycol ethers, ethers, ethyl acetate and isopropyl acetate.*
- *To ensure fault-free operation, an upstream filter system with a mesh width of 50 μ m should be fitted.*

 **DANGER*****Explosion hazard due to ignition source!***

An existing explosive atmosphere could be ignited.

There is a risk of death or severe physical injury.

- *The cleaning medium and the material to be cleaned must not cause a chemical reaction that might cause an ignition.*
- *Be aware of electrostatic charges when handling fluids.*

**WARNING****Danger due to corrosive and irritant cleaning medium!**

When handling the cleaning medium, it is **IMPOSSIBLE TO EXCLUDE** the risk of inhalation, swallowing, contact with the skin, eyes and mucous membranes.

There is a risk of death or severe physical injury.

- Adhere to the regulations and specifications in the safety data sheets for the cleaning media (e.g. vapors or hazardous substances).

**CAUTION****Danger as a result of using incorrect cleaning media!**

Due to their material resistance, the materials used in the device impose certain restrictions on the cleaning media used.

Failure to observe these restrictions can result in the failure of components or a device malfunction, causing material damage and consequential damage.

- The cleaning media must be approved for all of the materials of the device (e.g. seals, bushings) and for the substances to be cleaned in the container that come into contact with it.
- Cleaning media containing the following (corrosive) substances must **NOT** be used:
 - chlorine and chlorine ions
 - substances containing salt (no resistance to seawater)
 - moderately to highly concentrated organic acids
 - strong acids, in particular nitric acid and sulfuric acid (with acid content >65%)
 - aliphatic, aromatic and chlorinated hydrocarbons
 - phenols
 - fluorine compounds

NOTE**Risk of damage to the device from the cleaning medium!**

Dirt or foreign matter in the cleaning medium can have a negative effect on the functional availability of the device.

There is a risk of material damage and consequential damage.

- Use a suitable filter system in the cleaning medium supply line. The use of a filter with a filtration effect corresponding to a mesh width of 50 µm is recommended.
- Adhere to the instructions on the supply and return lines in [Section 5.2 Installation](#).

The Following Media are Permitted for Use for Container Cleaning:

Only clean, sprayable fluids may generally be used.

The process of spraying and blasting with fluids always requires individual consideration by the owner.

The only permitted cleaning media are solvents with low and medium conductivity ($k \leq 10,000$ pS/m, flash point $T_{\text{Flash point}} > 20^\circ$, where the maximum working temperature must be 15 K below the flash point, and water is allowed in the following conditions:

- When cleaning with solvents with low and moderate conductivity, the cleaning medium must not contain any components of a second phase, e.g. water or solid. Cleaning media may only be applied in a closed circuit if the level of contamination is kept below 0.5%.
- When cleaning with water jets, a maximum of 20 cleaning nozzles may be used in one container. When calculating this, all spray heads of the retractor system must be taken into account, including the nozzles of other devices. The container volume must not exceed 10 m³. The water flow rate must not exceed 7 l/s per container.
- When spraying or misting aqueous solutions (e.g. water with alkaline cleaning additives and similar), they must not generate electrostatic charges that are stronger than those that would be generated when using water without additives (see TRGS 727 Annex A 1.3).

4 Transport and Storage

AWH products are checked carefully before they are dispatched, and are packaged in accordance with the respective transport and storage conditions. However, it is NOT possible to rule out the possibility of damage during transportation completely.



NOTE ON EXPLOSION PROTECTION

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

If this is not observed, the explosion protection could be disabled.



CAUTION



Risk from protruding sharp edges on the device!

Depending on the design, the device may have protruding sharp edges that can be dangerous when handling it.

There is a risk of minor cuts.

- *Wear protective gloves when working on the device.*
- *When handling, e.g. unpacking, transportation without packaging, assembly/disassembly and maintenance work, beware of protruding sharp edges.*

In the event of damage (including cases involving spare and wear parts), please contact AWH immediately with a damage report.

Scope of Delivery

- Container cleaning device

Retractor system TANKO-RT with rotating spray head (alternatively, also static spray head) or **retractor system TANKO-RTS** with static spray head (alternatively also with rotating spray head),

- equipped with
 - 5 limit switches incl. mounts, 2 throttle check valves for the power cylinder and 1 plug connection for the locking cylinder, 1 resistance thermometer
- The scope of delivery of the combination adapter C3 process connection continues to include 1 combination vessel connector C3 or container adapter 30 plus bracket
- Operating and/or installation instructions (including Declaration of Conformity)
- Technical documents in accordance with the order (e.g. Instructions for sensors, certificates and reports)

NOT included in the scope of delivery:

- Fasteners required for fastening the device to the container (e.g. screws, nuts, clamps)
- Seals

The scope of delivery ends at the interfaces of the device (see [Section 5.2.1 Interfaces](#)).



Refer to the delivery note and the order confirmation for full details of the scope of delivery.

Inspection on Receipt of Goods:

- Immediately check the delivery against the delivery note and the order confirmation on receipt to make sure that it is complete.
- Check the delivery for any transport damage (visual inspection).

Claims:

- Register any claims for damaged and/or incomplete deliveries with the transport company immediately.
- Keep the packaging for a possible inspection by the transport company or for return delivery.

Return Delivery:

In the event of a possible return delivery, pack the device parts so that they cannot become damaged during transport. If possible, use the original packaging and the original packaging material. If neither is available anymore, request a packaging company with specialist personnel.

- Consult AWH if you have any questions regarding packaging and transport safety.

4.1 Packaging

The device is supplied fully assembled. The packaging is adapted to the transport conditions. Required accessories, spare parts, operating or installation instructions and technical documents are packed separately and enclosed with the delivery.

The packaging should protect the device up until the time of installation against transport damage, corrosion and other damage. Therefore, do not remove the packaging until shortly before installation.

NOTE



Hazard as a result of incorrect disposal of the packaging!

Packaging materials are valuable raw materials and can frequently be re-used or processed and recycled practically.

Improper disposal can cause environmental damage.



- *Dispose of packaging materials in an environmentally friendly manner and have them recycled.*
- *Adhere to the locally valid disposal regulations.*

4.2 Transport



NOTE ON EXPLOSION PROTECTION

Transport damage can result in the loss of the explosion protection.

- *In the event of signs of transport damage, do NOT put the device into operation!*
- *Contact the manufacturer of the device.*

NOTE Improper transport can result in damage to the device.

The functional safety and reliability of the device may be impaired.

- Observe the symbols and instructions on the packaging.
- Always transport the device in dry condition.
- Protect the device from impact.
- If possible, use the original packaging for transport.
- Proceed with care when unloading the device and when transporting it on your premises.
- Do not remove the packaging until shortly before installation.
- Use only the intended attachment points (e.g. Transportation straps), if present.

4.3 Storage



NOTE ON EXPLOSION PROTECTION

Incorrect storage can result in the loss of the explosion protection.

- *In the event of signs of storage damage, do NOT operate the device!*
- *Contact the manufacturer of the device.*

The packaging used for the device, the components and the replacement/wear parts is designed to be stored for 3 months.

NOTE Risk of damage to the device as a result of incorrect storage!

Incorrect storage can cause damage to the device and its components and lead to premature aging (e.g. plastic parts).

The failure of components or a device malfunction can cause material damage and consequential damage.

- Adhere to the following storage conditions:
 - Store the device in the original packaging wherever possible.
 - Store the device in a clean and dry place (e.g. enclosed, dust-free room).
 - Store the device in steady environmental conditions.
 - Avoid major temperature fluctuations in order that condensation does not develop.
 - Prevent dirt and moisture from entering the device.
 - Protect the device from the elements (e.g. formation of condensation in the device, sunlight).
 - Protect unpacked devices or components with dust-tight covers. Condensation must not be allowed to develop beneath the cover.
 - Store the device without the original packaging, solely on a support suitable for the contour of the device (e.g. wooden planks or wooden saddle).

Parameters for Storage (Recommended):

- Closed, dry, dust-free room
- Room temperature +10 °C – +55 °C (+50 °F – +131 °F)
- Relative humidity max. 60% (non-condensing)
- Temperature fluctuations max. 10 °C (18 °F) per day
- Occurrence of vibrations $v_{\text{eff}} < 0.2 \text{ mm/s}$

5 Installation

5.1 Safety instructions for installation



NOTE ON EXPLOSION PROTECTION

Work on the device in a potentially explosive atmosphere is **PROHIBITED!**

If this is not observed, the explosion protection could be disabled.

- Only allow instructed personnel to work in potentially explosive atmospheres.
- The personal protective equipment must meet the explosion protection requirements.
- Do not use a tool that could create sparks.



DANGER



Danger of ignition in potentially explosive atmosphere due to potential differences!

When filling and emptying containers with fluids, when recirculating, stirring, mixing and spraying fluids and also when measuring, sampling and cleaning, the fluids themselves or the interior of the container could be charged in a dangerous manner.

Differences in potential (e.g. electrostatic charge) can cause igniting sparks or heat, which can act as an ignition source.

There is a risk of death or severe physical injury.

- Only clean electrically conductive containers.
- Make sure that any electrostatic charge is prevented. Also make sure that all electrically conductive parts on the device and the container are grounded for potential equalization to the same potential using grounding cables with a sufficient diameter.
- Grounding must always be carried out before start-up of the device. Avoid grounding faults (e.g. subsequent grounding of already charged objects or equipment).
- Do not secure or seal mechanical connections with electrically insulating materials (such as sealing tape, sealant, adhesive, etc.), if it impairs the grounding of the device on the container.

Within potentially explosive areas, potential equalization is required. “All conductive parts of the device (and the container) must be arranged so that the occurrence of a dangerous potential difference between these parts is unlikely. If there is a possibility that insulated metal parts can be recharged and thereby act as an ignition source, grounding connections must be provided” (*Excerpt from EN ISO 80079-36 “Non-electrical equipment intended for use in potentially explosive atmospheres - Part 1 Basic concepts and requirements”, section 6.7.2 Grounding connections for conductive parts*).


WARNING

Risk of accidents due to incorrect installation!

Incorrect installation, falling components or failure to comply with the indicated safety instructions can result in accidents or material damage.



This could result in death, serious injuries and/or burns.



- Only have experts perform work on the device.
- Only allow work on the electrical system to be carried out by **qualified electricians**.
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).
- Wear protective work clothing, protective gloves and safety shoes for work.
- Do not work on the device unless it is disconnected from the power supply, depressurized and in cold condition.
- Maintain a safe distance when working on the device. We recommend that you provide 1 m space for free movement around the device and container.
- Use only approved lifting gear and attach the device to the lifting gear with approved lifting devices (e.g. by wrapping a rope belt around it).


WARNING

Risk of falling when working at heights!

When carrying out assembly/disassembly work on parts of the plant at height, there is a risk of falling.



There is a risk of death or severe physical injury.



- Do not perform any work at heights except with a safety platform with cage or suitable fall protection (e.g. safety rope and safety harness).
- If you are using a harness for fall protection, it is essential that the rescue concept is observed for a person in the harness.
- A person must not remain suspended in the harness for longer than 15 min as there is otherwise a risk of shock or even death.
- Wear protective work clothing, safety shoes, protective gloves and a hard hat for work at heights.



**CAUTION*****Risk from protruding sharp edges on the device!***

Depending on the design, the device may have protruding sharp edges that can be dangerous when handling it.

There is a risk of minor cuts.

- *Wear protective gloves when working on the device.*
- *When handling, e.g. unpacking, transportation without packaging, assembly/disassembly and maintenance work, beware of protruding sharp edges.*

**CAUTION*****Insufficient lighting in the work environment!***

The device is NOT equipped with any lighting. Insufficient lighting when working on the device can cause accidents.

There is a risk of minor or moderate injuries.

- *Make sure that there is sufficient and even lighting in all areas of the plant in which the device is used when work is performed on the device.*
- *In Germany, the technical rules for workplaces apply - ASR A3.4. A luminance intensity of **300 lx (lux)** is recommended (maintenance value).*

5.2 Installation

The safety notes in [Section 5.1 Safety instructions for installation](#) must be adhered to before installation of the device in the container.



NOTE ON EXPLOSION PROTECTION

The o-ring gasket on the spray head does not represent a permanent technical seal to the inside of the container. Zone carryover is possible.

If this is not observed, the explosion protection could be disabled.

- *Additional measures are necessary to limit the spread of explosive atmosphere at the media and pneumatic connection when operation is not in progress, e.g. by using permanently leak-proof shut-off fittings.*



CAUTION

Fault due to incorrect installation position/location of the device!

Any installation of the device NOT performed correctly can cause damage to the device which puts the functional safety and reliability at risk during start-up.

That can result in hazards.

There is a risk of minor or moderate injuries.

- *The installation position of the retractor system in the container must be chosen so that even in the event of rare fault conditions or the occurrence of two faults simultaneously (very high degree of safety) in the container to be cleaned, a minimum spacing of at least 5 cm is maintained*
 - *between spray head and the plant inner wall*
 - *between the spray head and the permanently installed components*
 - *between the spray head and the working area of the installed moving parts that may move during cleaning*
 - *between the spray head and the resting position of the installed moving parts that are not permitted to move during cleaning*

In order to prevent grinding or collisions between device components during operation of the retractor system.

- *Ensure that self-draining [Figure 5.2-2](#) is assured and that the combination vessel connector [Figure 5.2-5](#) is properly welded.*
- *Install the device free of mechanical tension.*
- *Refer to [Section 3.3 Technical Data](#) for the installation dimensions.*

**CAUTION*****Fault as a result of soiling, foreign matter or damage to the device!***

Foreign matter, such as scale, burrs, chips, etc. can restrict the flow or enter the pipe system and cause malfunctions or damage to components, including gaskets. That can result in hazards that endanger the functional safety of the device.

There is a risk of minor or moderate injuries.

The following measures must be observed before installing the device for the first time, and also when installing it after retooling work on the plant in which the device is installed:

- *All supply and return lines for the cleaning medium must be flushed with clear water in order to remove any contamination, foreign objects or residue in the supply line (e.g. scale, chippings, welding particles etc.).*
- *Prevent dirt and foreign matter from entering the device through appropriate measures. Install a filter upstream of the media connection [MC] in the supply line for the cleaning medium (see [Section 3.4 Cleaning Media](#)).*
- *Protect the sealing element from damage.*
- *Protect the weld-on ends with end caps.*
- *Protect the clamp connection from contamination.*
- *Protect the locking cylinder against shocks.*
- *Do not apply any paint to the surface of the device.*

Please also note:

- If the device is used outdoors or in rooms where there is a risk of frost, it must be protected against freezing.
- The devices must not be equipped with thermal isolation.
- The pipe or hose connections and the cleaning media connection [MC] must be firmly fastened and have a permanently tight design (hazard due to fluid being expelled in the event of leaks).
- After assembly, it must be ensured that all parts of the device have a conductive connection with the container and are grounded (leak resistance versus ground RE < 10⁶ Ohm).
- The spray heads may only be operated with the corresponding locking pins from the manufacturer. When replacing a spray head, a new locking pin must be used.

5.2.1 Interfaces

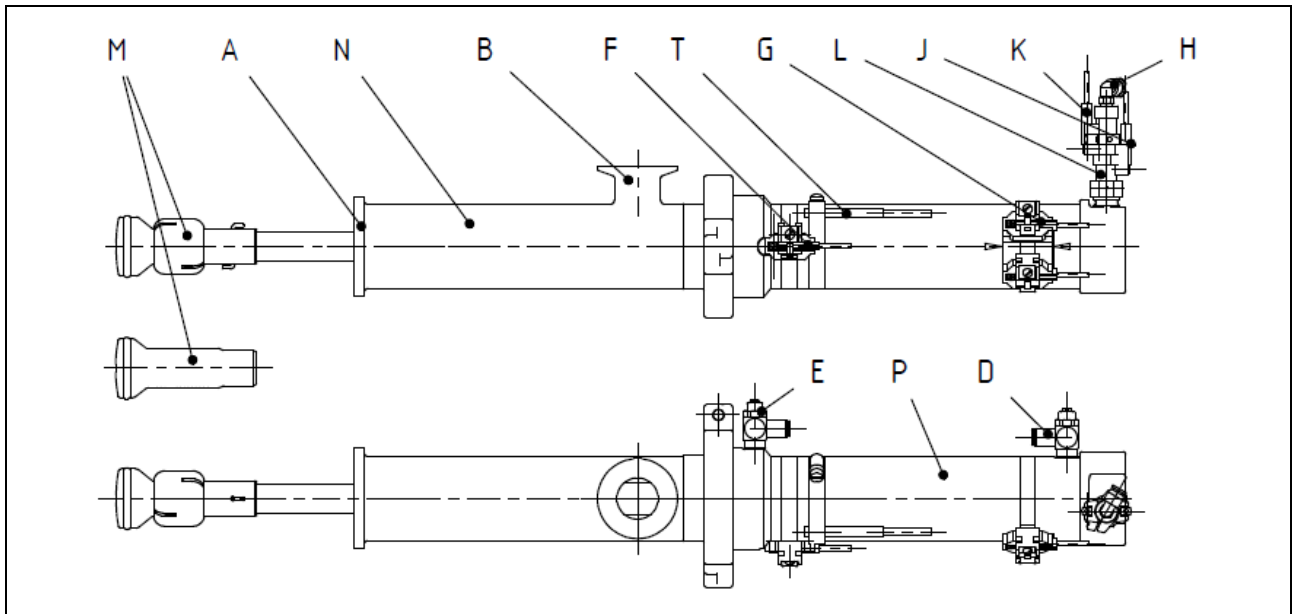


Figure 5.2-1: Device Interfaces

The following interfaces are located on the cleaning device:

- A Process connection [PC], (design based on order)
- B Media connection [MC], cleaning medium supply (design based on order)
- D Compressed air feed on power cylinder for extending the spray head
- E Compressed air feed on power cylinder for retracting the spray head
- F Power cylinder "extended" limit switch
- G Power cylinder "retracted" limit switch 2x (G1 and G2)
- H Compressed air feed on locking cylinder "unlock"
- J Locking cylinder "unlocked" limit switch
- K Locking cylinder "locked" limit switch
- M Spray head, (design based on order)

5.2.2 Installation Position

The installation position of the device can be freely selected.



If the device is not installed in a vertical position, the retractor systems must be held in place/supported by suitable pipe clamps (see AWH catalog, “Pipes & Assembly Accessories” at <http://www.awh.eu>); this is recommended for stroke lengths greater than 250 mm. The pipe clamp should be secured close to the compressed air connection at the rear end of the pneumatic cylinder, otherwise there is a risk of damage to the pneumatic pipe.

Self-Draining

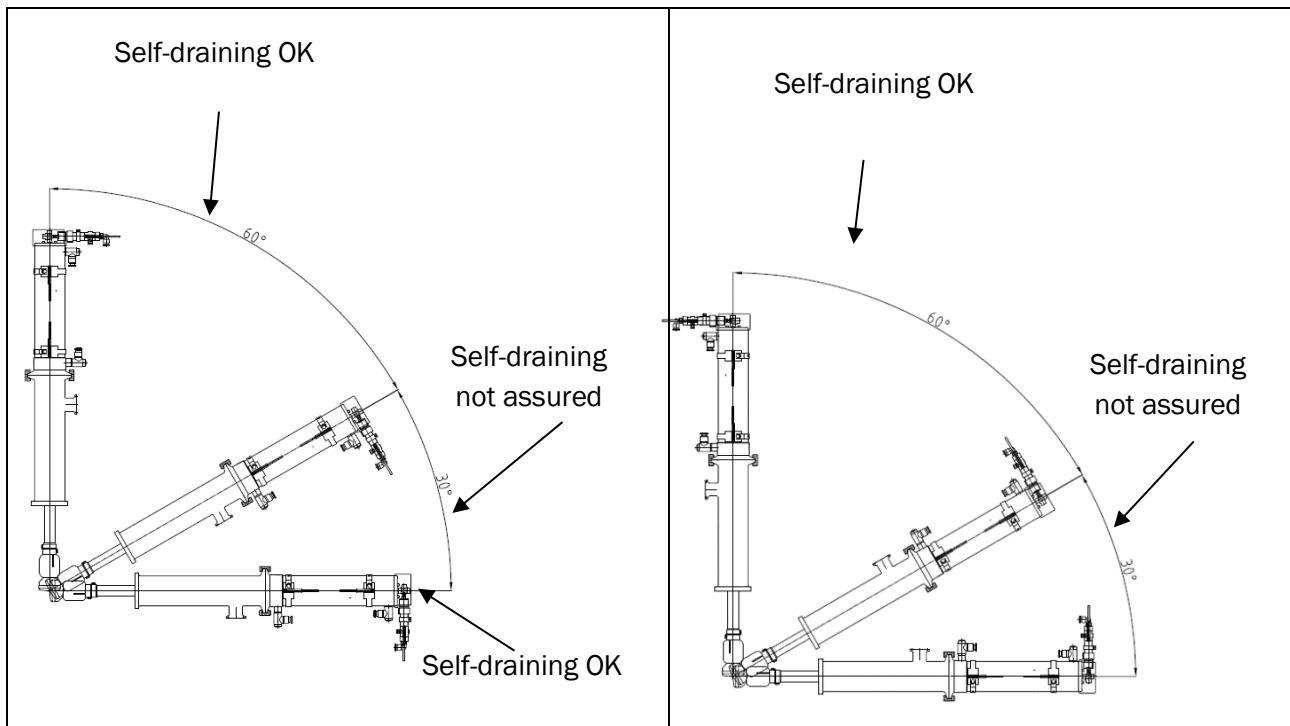
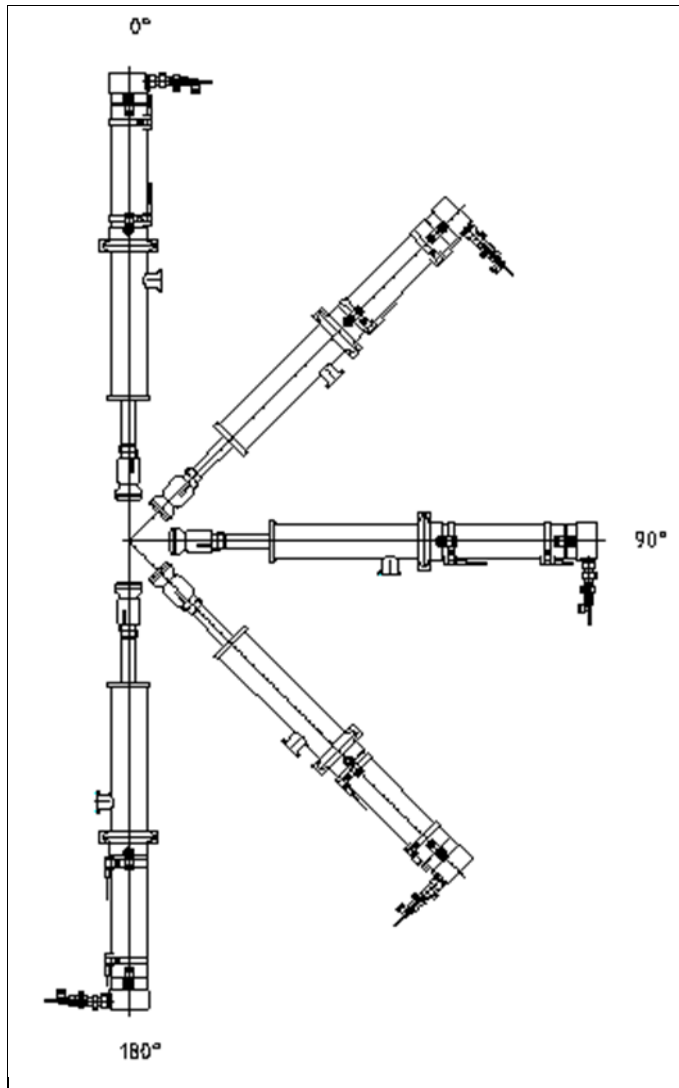


Figure 5.2-2: Self-Draining of the Device, Depending on the Installation Position



Compressed air escapes through the locking cylinder while the power cylinder is extended.

To save compressed air during a long cleaning cycle, the power cylinder can be depressurized. However, this is only possible at installation positions from 0° - 90° (see adjacent figure), as the cleaning medium present holds the power cylinder in its extended position.

In the range 90° - 180°, the pressure should not be disconnected.

The owner must take this into account when using the TANKO-RT/-RTS in areas with a risk of dust explosions, where dust can be stirred up.

Figure 5.2-3: Installation Position for Compressed Air Disconnection

5.2.3 Installing the Device

⚠ WARNING Risk of the device falling down accidentally!

The device may hit personnel when falling.

There is a risk of severe physical injury.

- Hold the device firmly when installing/removing it.
- There must be nobody beneath the device when installing/removing it.



We recommend using two people for assembly/disassembly.

NOTE Dirt and foreign matter in the device!

Functional safety and reliability may be impaired.

- During installation, make sure and check that there is no dirt or foreign objects in the device (e.g. small particles, sealing material).

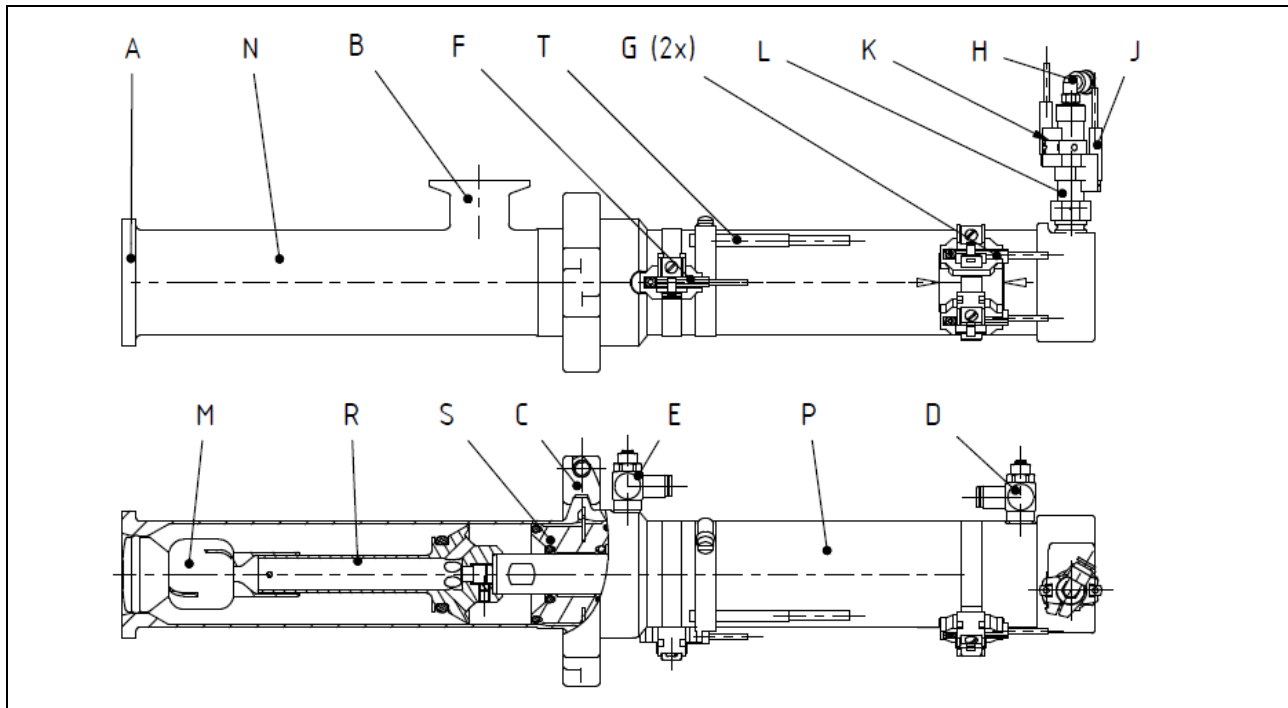


Figure 5.2-4: Overview of Assembly Units

- A Process connection [PC]
- B Media connection [MC] (cleaning agent feed)
- C Connection between hydraulic pipe and pneumatic pipe (power cylinder P)
- D Power cylinder “extension” pneumatic connection
- E Power cylinder “retraction” pneumatic connection
- F Power cylinder “extended” limit switch (1x)
- G Power cylinder “retracted” limit switch (2x, G1 and G2)
- H Locking cylinder “unlock” pneumatic connection
- J Locking cylinder “unlocked” limit switch
- K Locking cylinder “locked” limit switch
- L Locking cylinder (pneumatic) with 2 limit switches
- M Spray head, rotating TYPE A, B, C, or D / alternative static spray head type S on TANKO-RTS anti-twist version
- N Hydraulic pipe for holding the spray head
- P Power cylinder, pneumatic actuator with 3 limit switches
- R Centering Adapter
- S Central bearing
- T Resistance Thermometer

The retractor system comprises 3 main components:

- Pneumatic section: Power cylinder (P) with locking cylinder (L)
- Hydraulic section: Hydraulic pipe with process connection and cleaning fluid connection including centering adapter for holding the spray head and supplying the cleaning medium
- Spray head: (M) attached to centering adapter (R)

During assembly, it is important to differentiate between the following process connection versions:

- Clamp connection (clamp connections for stainless steel pipes)
The size and version of the clamp gasket on the process connection [PC] is determined by the clamp connection on the container.
- Welded connection
- Connection using combination adapter C3 and combination vessel connector C3
- BioControl® connection

5.2.3.1 Installation of the Device with Process Connection: Clamp



The sealing points are the crucial part of the clamp connection and have been manufactured and packed by AWH with the utmost care and precision.

When handling the clamp connection, the sealing elements can very easily suffer damage. Protect sealing elements from damage and contamination during transportation, storage, assembly and cleaning!



The gasket and bracket for the process connection and media connection are not supplied; they are available on request from AWH.

1. Take the retractor system out of the packaging and perform a visual inspection for damage.
2. Install the retractor system on the vessel connector with an appropriate gasket and bracket.
3. Cleaning medium supply (standard: Clamp DN25 in accordance with DIN 32676) on the media connection (hydraulic pipe) with suitable gasket and clamp.

5.2.3.2 Installation of the Device with Process Connection: Welding Joint



The gasket and bracket for the medium connection are not supplied; they are available on request from AWH.

1. Take the retractor system out of the packaging and perform a visual inspection for damage.
2. **Installation status**
Before welding, remove the hydraulic pipe by removing the bracket that connects the pneumatic cylinder and the hydraulic pipe.
Pull the pneumatic cylinder out of the back of the hydraulic pipe.
Ensure that the piston rod remains connected to the centering adapter and the spray head to the pneumatic cylinder.
3. **Preparing for welding**
Clean all parts to be welded before assembly
Welding distortion must be avoided by choosing suitable welding parameters.

Base material	Suitable filler material
1.4435	1.4430, 1.4440
2.4602	2.4607

Table 5.2-1: Recommended Filler Materials

The owner is responsible for the selection of the correct welding filler and for the correct execution of the welding joint.

Before welding, connect the forming gas.

4. Welding

Align the hydraulic pipe to the container and affix 3 to 4 tack weld-ons.

Weld the hydraulic pipe to the container without distortion.

5. Welding after-treatment

An acid cleaning treatment is recommended in the interior area after the welding.

The surface of accessible points can be improved by grinding.

The exterior can be treated afterwards by staining, brushing, grinding and polishing.

6. Check the sealing surface in the hydraulic pipe for contamination and clean, if necessary.
7. Push the pneumatic section with centering adapter and spray head into the hydraulic pipe. Connect the pneumatic pipe and hydraulic pipe with the clamp (1.22) and secure with the nut (1.23). Pay attention to the tightening torques in [Table 7.5-1](#).
8. Cleaning medium supply (standard: clamp DN25 in accordance with DIN 32676) on the cleaning fluid connection (hydraulic pipe) with an appropriate gasket and fastener.

5.2.3.3 Welding the Combination Vessel Connector

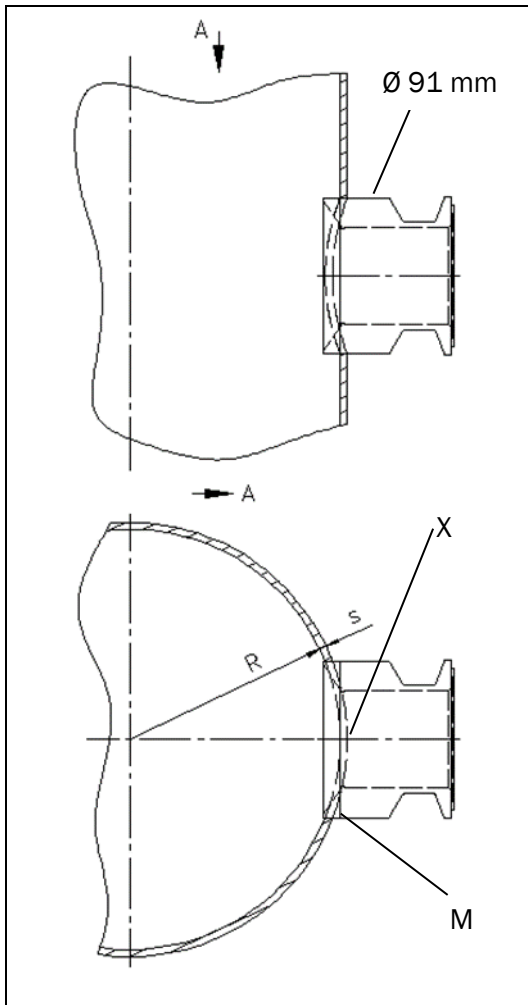


The gasket and bracket for the medium connection are not supplied; they are available on request from AWH.



If the internal diameter of the container ($2 \times R$) is known, the combination vessel connector can be ordered with a corresponding radius at an additional cost, or it can be modified by the customer. For more information, please consult AWH.

1. Take the combination vessel connector out of the packaging and perform a visual inspection for damage.
2. **Preparing for welding**
Drill hole (see [Figure 5.2-5](#)) for combination vessel connector in the container.
Clean all the parts to be welded prior to assembly.



The combination vessel connector has a circumferential marking [M]. This circumferential marking should form an intersection with the interior wall of the container and not protrude any deeper into the container.

For easier assembly, it is useful to make a second marking at a distance equivalent to the wall thickness [s] from the existing exterior marking onto the combination vessel connector in the direction of the clamp.

Insert the combination vessel connector far enough into the container and align it until this marking matches the outer \emptyset at its outermost position, point [X].

Welding the combination vessel connector to the container. Weld distortion must be avoided by choosing suitable welding parameters.

Before welding, connect the forming gas.

Before welding, affix 3 to 4 tack weld-ons.

Figure 5.2-5: Combination Vessel Connector Standard Connection

3. Welding

Recommended welding filler materials, see [Table 5.2-1](#).

The owner is responsible for the selection of the correct welding filler and for the correct execution of the welding joint.

Weld combination vessel connector in container

4. Welding Post-Treatment

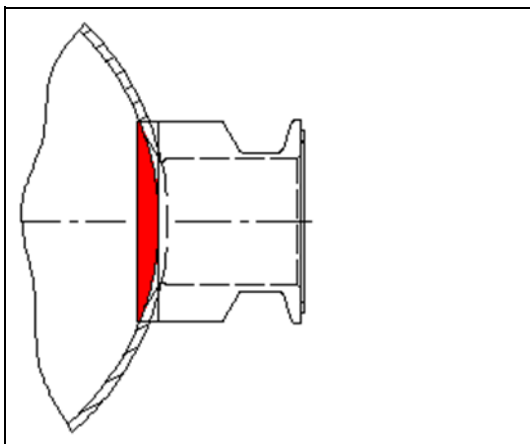


Figure 5.2-6: Grinding

In the interior area, an acid cleaning treatment is recommended after the welding.

The surface of accessible points can be improved by grinding.

The exterior can be treated afterwards by staining, brushing, grinding and polishing.

After welding, the combination vessel connector can be ground with the interior wall of the container (see [Figure 5.2-6](#)).

5. Take the retractor system out of the packaging and perform a visual inspection for damage. Ensure that the O-ring that seals the hydraulic pipe of the TANKO-RT from the combination vessel connector is not damaged and store it safely.
6. Check the sealing surfaces in the combination vessel connector for contaminations. Keep the O-ring, O-ring groove and interior plant surface in the combination vessel connector clean. Place the O-ring correctly into the O-ring groove of the hydraulic pipe. The contact surfaces of the clamp connection between combination vessel connector and retractor system (hydraulic pipe) must be kept clean.

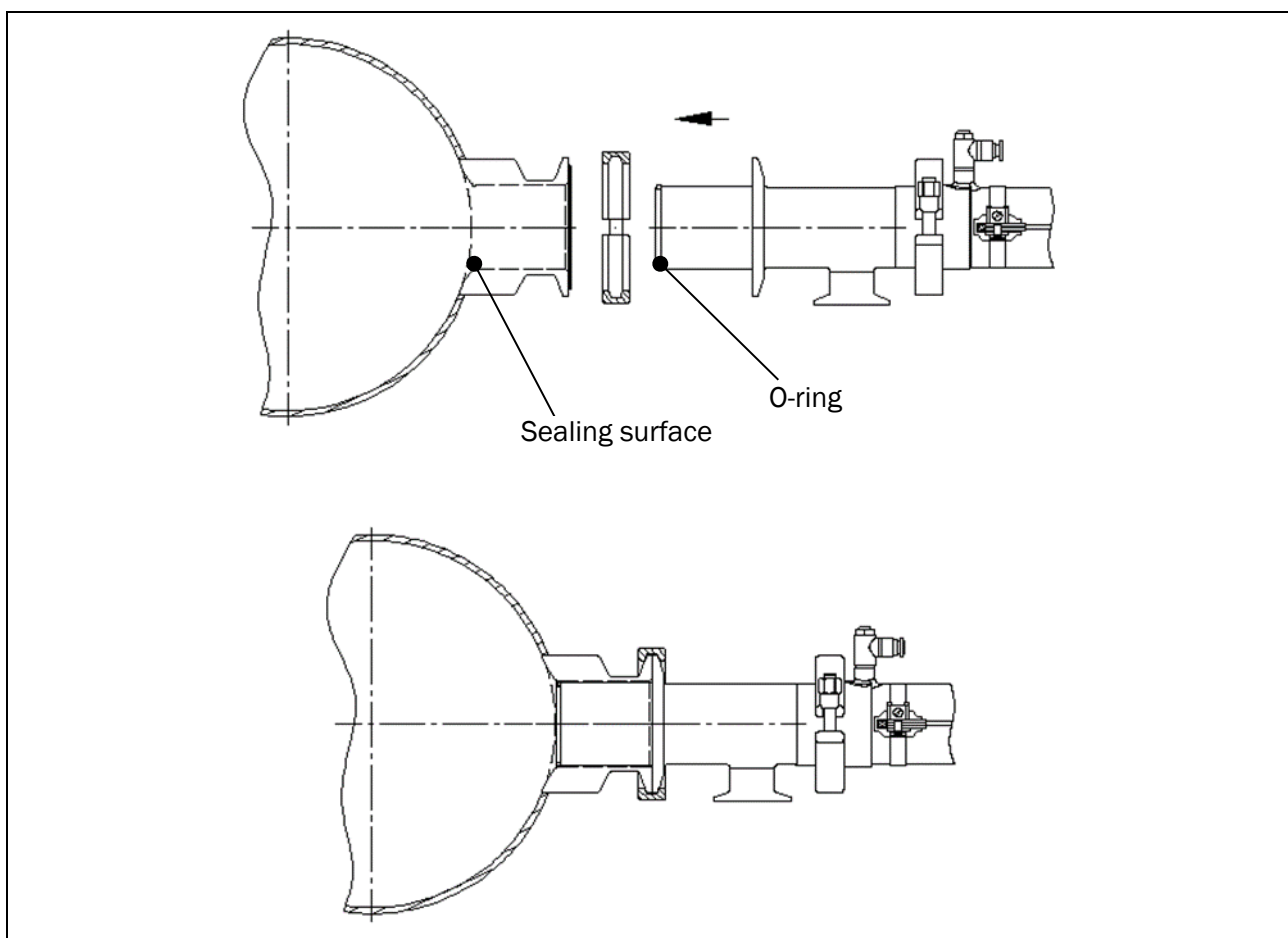


Figure 5.2-7: Container Seal

7. Carefully push the retractor system into the combination vessel connector until the liner of the combination vessel connector is inserted into the groove in the clamp flange on the retractor system (centering). The two clamp flanges are tightened as far as they go with the aid of the clamp bracket. The O-ring (on the outside of the hydraulic pipe) seals the retractor system from the inside of the combination vessel connector and thus from the container.



The clamp flange is only used to secure the TANKO-RT and has no sealing function.

8. Cleaning medium supply (standard: Clamp DN25 in accordance with DIN 32676) on the media connection (hydraulic pipe) with suitable gasket and clamp.

Special Vessel Combination Adapter

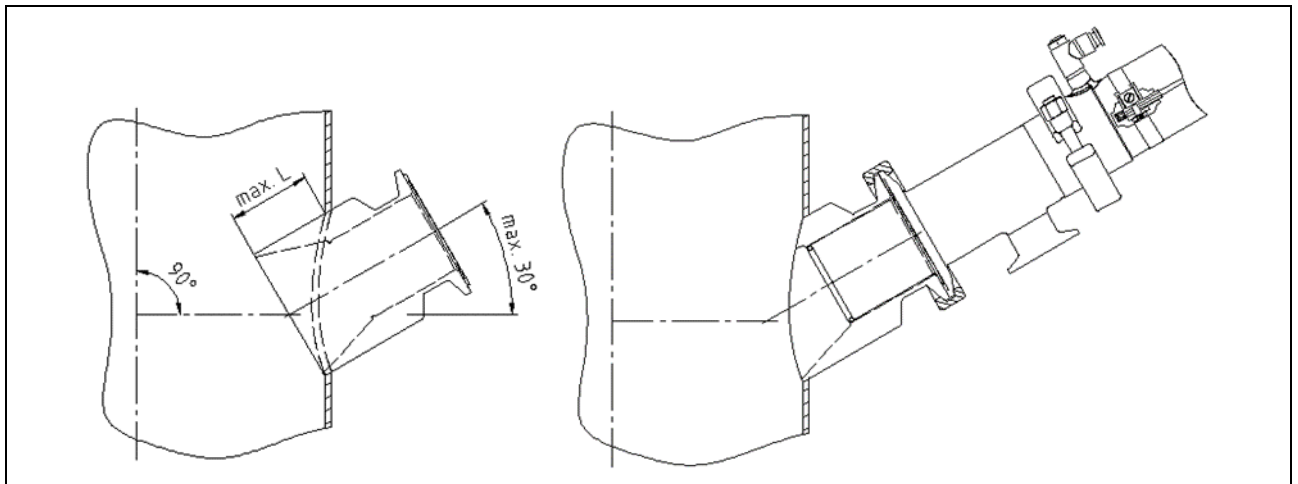


Figure 5.2-8: Special Connection

A special vessel connector is available for different TANKO-RT installation angles from a horizontal position to a maximum of 30°.

For welding in, the connector may not be inserted deeper than a maximum of L (52 mm) into the container (see [Figure 5.2-8](#)).

The connector can be prepared for the intended angle at additional cost.

More detailed information is available from the ordering documents; if you have any questions, please consult AWH.

5.2.3.4 Installation of the Device with Process Connection: BioControl®



The sealing points are the crucial part of the BioControl® connection and have been manufactured and packed by AWH with the utmost care and precision.

When handling the BioControl® connection, the sealing elements can very easily suffer damage.

Protect sealing elements from damage and contamination during transportation, storage, assembly and cleaning!



The block flange BioControl® B65 and the O-ring 60 x 3 for process connection, as well as gasket and bracket (or screws for a screwed flange, special design) for media connection are not included in the scope of delivery; please request gasket and bracket from AWH, request block flange, O-ring and 4x screws M10x18 from NEUMO.

1. Take the retractor system out of the packaging and perform a visual inspection for damage.
2. **NOTE** Careless installation of the O-ring can negatively affect its sealing and hygienic functionality. Observe the installation instructions for BioControl® from NEUMO!
In accordance with the installation instructions from NEUMO, pull the O-ring for the block flange forwards onto the hydraulic pipe, keeping the O-ring and O-ring groove clean.

3. Install the retractor system on the block flange with the 4 screws M10 x 18. It is imperative to follow the installation instructions and torques of the block flange manufacturer NEUMO.
4. Cleaning medium supply (standard: Clamp DN25 in accordance with DIN 32676) on the media connection (hydraulic pipe) with suitable gasket and clamp.

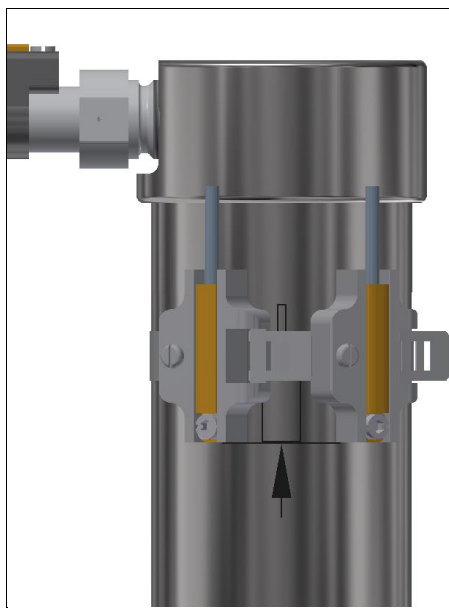
5.2.4 Connection of Pneumatic Actuator

When the device has been mechanically installed, the pneumatic actuator is connected as follows.



The owner must ensure that the locking cylinder is actuated and connected according to the locking function to be guaranteed.

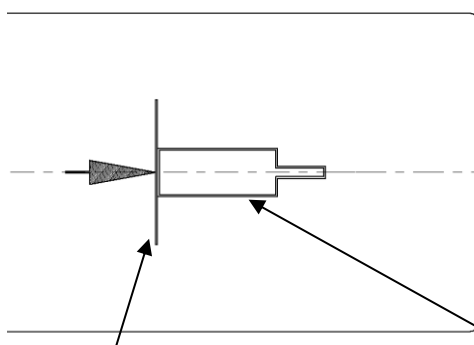
1. Mount the air hoses on the power and locking cylinders.



2. Mount the limit switches on the pre-assembled mounts provided on the power and locking cylinder. Push the limit switch sensor into the mount up to the front edge and then secure it in the mount using the retaining screw on the limit switch sensor.
Ensure that both limit switches are connected and evaluated by the higher-level control (see Section 3.2).

The mount for the 2 “power cylinder retracted” sensors (idle position, “closed”) is fixed by the manufacturer. If the mount has moved out of position despite being fixed in place at the factory, it should be positioned within the marking (indicating by arrows) and glued onto the cylinder pipe using Loctite “454”.

During assembly, it is essential to ensure that the integrated function display (LED) for the limit switch can be seen from the operator position. If necessary, ensure this by turning the pneumatic pipe to an appropriate position on the hydraulic pipe.



Position of the limit switch

Figure 5.2-9: Position of Power Cylinder Retracted Limit Switch

The mounts for the locking cylinder limit switches are also fixed in place by the manufacturer. If the mounts have moved out of position despite being fixed in place at the factory, they should be positioned within the markings (Figure 5.2-10) and glued onto the cylinder pipe using Loctite “454”.

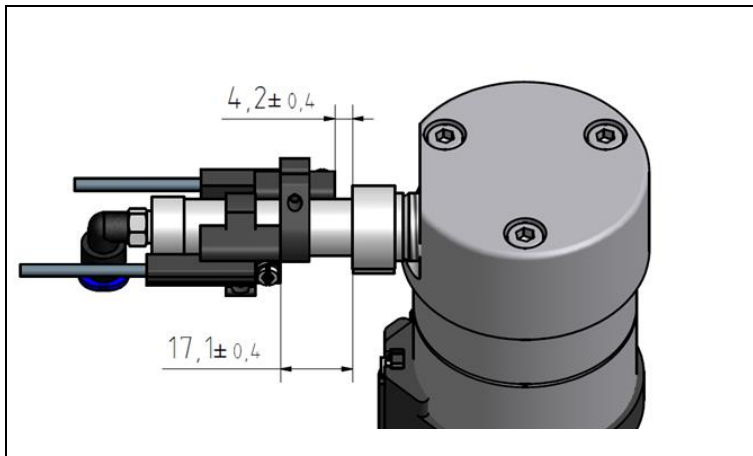


Figure 5.2-10: Position of Locking Cylinder Limit Switch



A switch amplifier must be used for the limit switches, which is not supplied (see Power Supply Section 3.3 Technical Data).

3. Mount the cable of the limit switch of the working and locking cylinder on the switch amplifier.
4. **⚠ WARNING** Limit switch temperature exceeded!

Exceeding the temperature may endanger the functional security of limit switch “F”.

In order to maintain the functional safety of limit switch “F” and throttle check valve “E” at operating temperatures $> 70\text{ °C}$, the following measures must be carried out in order to maintain the ambient temperature within the container and/or the temperature of the cleaning medium:

Mount the supplied resistance thermometer in the position in the indicated position (see Figure 5.2-11: Resistance thermometer position).

- Connect the resistance thermometer to the switch amplifier and transmitter after specifying the manufacturer of the resistance thermometer. See the manufacturer documentation (WIKA Alexander Wiegand SE & Co. KG.).
- Evaluation of the signal 66 °C by higher-level controller (see 3.2 General Function Description)



On delivery, the resistance thermometer is not installed on the device and is supplied with the device. Follow the manufacturer documentation (WIKA Alexander Wiegand SE & Co. KG.).

The resistance thermometer must be used to monitor the temperature on the limit switch “F”. If additional temperature monitoring is necessary, this must be procured and connected by the owner.

The resistance thermometer must be mounted as follows:

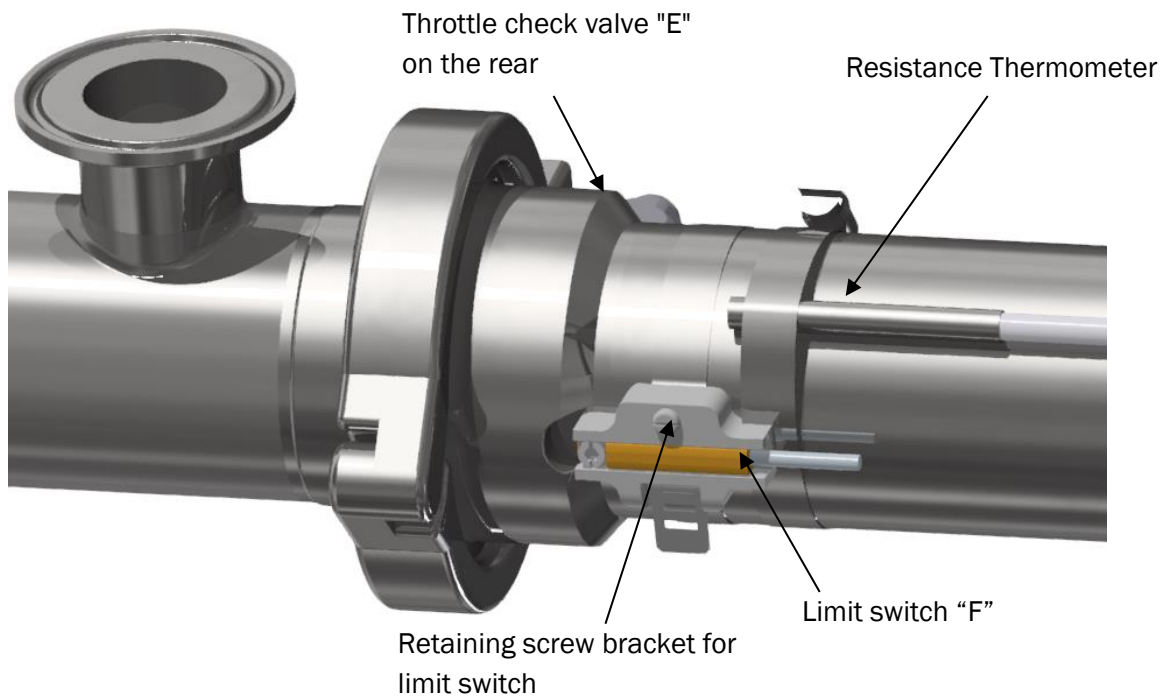


Figure 5.2-11: Resistance thermometer position

- Release the retaining screw of the bracket for the limit switch
- Mount the hose clamp with the resistance thermometer on the pneumatic pipe
- Push the hose clamp with the resistance thermometer up to the clamp band of the limit switch
- Tighten the hose clamp of the resistance thermometer
- Tighten the retaining screw of the bracket for the limit switch
- Connect the resistance thermometer to the switch amplifier and transmitter (not supplied, see note "i" at the end of the section)

5. Check the function!

6 Start-up

Before starting up the device in Germany, the owner of the plant must observe the Industrial Safety and Health Protection Ordinance (BetrSichV).

In other countries, the respective national guidelines, statutes and country-specific regulations regarding occupational safety and accident prevention must be complied with.



WARNING

Hazardous situations as a result of incorrect installation of the device!

If the device is not installed properly, unforeseen situations may develop during start-up or during operation.

There is a risk of death or severe physical injury.

- *As a basic rule, start-up of the device (with cleaning medium) must not be performed until the following have been checked:*
 - *Correct mechanical installation of the device on/in the container*
 - *Correct hydraulic, electrical and/or pneumatic connection.*
 - *Safe and reliable functioning of the device*

6.1 Safety Instructions for Start-Up

Before operating the device, the owner must ensure that local regulations are observed during start-up.



We recommend that you document start-up and the corresponding operating conditions in a report.



NOTE ON EXPLOSION PROTECTION

Work on the device in a potentially explosive atmosphere is PROHIBITED!

If this is not observed, the explosion protection could be disabled.

- *Only allow instructed personnel to work in potentially explosive atmospheres.*
- *The personal protective equipment must meet the explosion protection requirements.*
- *Do not use a tool that could create sparks.*

**NOTE ON EXPLOSION PROTECTION**

Temperatures over 70 °C on the pneumatic cylinder in the area of the limit switch result in the limit switch malfunctioning.

If this is not observed, the explosion protection could be disabled.

- If the cleaning medium and/or container temperatures exceed 70 °C, the supplied resistance thermometer must be installed on the pneumatic cylinder, see [Figure 5.2-11: Resistance thermometer position](#).
- Connect, calibrate and evaluate the resistance thermometer according to the manufacturer's instructions.
- The signal that corresponds to a temperature of 66 °C must be set as a limit value. All values from 66 °C must trigger a fault and the retractor system must be placed in a secure state.
- The cause of the temperature increase must be determined and solved immediately.
- Before reactivation and confirmation of the fault, all limit switches and all throttle check valves (see [Figure 5.2-1: Device Interfaces](#)) must be replaced by original spare parts.

**NOTE ON EXPLOSION PROTECTION**

The device must have a flow resistance between the piston rod and the housing.

If this is not observed, the explosion protection could be disabled.

- A flow resistance of $\leq 1 \text{ M}\Omega$ between the piston rod and the housing must be guaranteed on the TANKO-RT/RTS. This must be ensured by appropriate measurements (see [Figure 7.4-1 maintenance point G](#)).

 **DANGER*****Danger of ignition in potentially explosive atmosphere due to potential differences!***

When filling and emptying containers with fluids, when recirculating, stirring, mixing and spraying fluids and also when measuring, sampling and cleaning, the fluids themselves or the interior of the container could be charged in a dangerous manner.

Differences in potential (e.g. electrostatic charge) can cause igniting sparks or heat, which can act as an ignition source.

There is a risk of death or severe physical injury.

- *Only clean electrically conductive containers.*
- *Make sure that any electrostatic charge is prevented. Also make sure that all electrically conductive parts on the device and the container are grounded for potential equalization to the same potential using grounding cables with a sufficient diameter.*
- *Grounding must always be carried out before start-up of the device. Avoid grounding faults (e.g. subsequent grounding of already charged objects or equipment).*
- *Do not secure or seal mechanical connections with electrically insulating materials (such as sealing tape, sealant, adhesive, etc.), if it impairs the grounding of the device on the container.*

 **DANGER*****Explosion hazard due to ignition source!***

An existing explosive atmosphere could be ignited.

There is a risk of death or severe physical injury.

- *The cleaning medium and the material to be cleaned must not cause a chemical reaction that might cause an ignition.*
- *Be aware of electrostatic charges when handling fluids.*

 **DANGER*****Explosion hazard due to ignition source!***

Existing explosive atmosphere can be ignited by sparks resulting from collisions.

There is a risk of death or severe physical injury.

- *Plant components, such as agitators in the container to be cleaned in whose working area the spray head moves, may only be started once the spray head is completely retracted into the housing (hydraulic pipe) and locked, and this condition is confirmed by the limit switches.*
- ***Continuous monitoring of the limit switches*** must be guaranteed in order to prevent damage to the device or to the container / internal fittings.

 **DANGER****Explosive atmosphere within the device due to connection with the container!**

During the cleaning process, an explosive atmosphere is to be expected inside the hydraulic pipe due to the connection to the container to be cleaned.

There is a risk of death or severe physical injury.

- All parts of the device must have a conductive connection with the grounded container to be cleaned.
- Ensure that there is no risk of ignition from the media connection [MC] and from the compressed air connection.
- Exclude foreign bodies (e.g. rust particles) in the cleaning media.
- There may only be an open connection for the cleaning medium from the supply line (pump) to the medium connection [MC] during the cleaning process. An appropriate shut-off valve must be provided upstream of the device.

 **WARNING****Danger due to hot surfaces!**

The device is delivered without additional protective measures against hot surfaces and may NOT be equipped with thermal insulation.



The device may heat up significantly as a result of the cleaning medium or heat transfer from the container. Contact with the device can cause burns to the skin.

There is a risk of burns from the cleaning medium at temperatures of above +60 °C (+140 °F).

- Safeguard hot surfaces with a guard or barriers.
- Put up warning signs in the direct vicinity of the hot surfaces.
- Wear protective work clothing and protective gloves when working.

 **WARNING****Danger resulting from negative pressure/vacuum in the container!**

A cold cleaning process in hot, closed containers can generate negative pressure, which may result in damage to the container.

There is a risk of death or severe physical injury.

- Take precautions to allow gases or vapors to escape during operation (e.g. install devices for ventilation).

As a result of the variety of practical applications and uses for the cleaning device, AWH CANNOT specify a noise level for the device under load, i.e. installed in the container and operating with cleaning fluid.

For this reason, the manufacturer can only offer the owner as a **precautionary measure, a few points of reference and some notes** to be observed and to be integrated into the owner's hazard assessment.

**CAUTION*****Risk of hearing damage due to an increased noise level!***

The device emits a noise pressure level of $L_{pA} < 70$ dB(A).

When the device is operated in a container, the noise level may exceed the maximum permitted exposure value of $L_{EX,8h} = 85$ dB(A) and varies depending on the properties of the container in the plant and the existing operating conditions of the device.

Hearing damage could be the result.

- *The plant noise level must always be measured and documented by the owner.*
- *Keep the plant noise level within the legal range:*
 - *Perform noise reduction measures (e.g. sound insulation).*
 - *Delimit and mark the noise area (e.g. with mandatory sign “Wear hearing protection”).*
 - *Use effective hearing protection (e.g. ear muffs or ear plugs).*

Comply with the technical health and safety rules relating to noise and vibration protection (called TRLV Lärm in Germany). State-of-the-art technology must be used to implement the measures to provide protection from exposure to noise based on the hazard assessment. In this case, noise emissions must be prevented at their source, or reduced as far as possible.

**CAUTION*****Insufficient lighting in the work environment!***

The device is NOT equipped with any lighting. Insufficient lighting when working on the device can cause accidents.

There is a risk of minor or moderate injuries.

- *Make sure that there is sufficient and even lighting in all areas of the plant in which the device is used when work is performed on the device.*
- *In Germany, the technical rules for workplaces apply - ASR A3.4. A luminance intensity of **300 lx (lux)** is recommended (maintenance value).*

The following conditions must be met before the device can be started up in an Ex area:

- The details on the type plate of the device must comply with the requirements of the local explosion area on-site (device group, Ex category, Ex zone, temperature class)!
- The ambient temperature during later use is within the permitted range!
- The device and the container are properly grounded and have equalized potential.
- The distances from the device to the on-site plant components have been checked and comply with the explosion protection requirements.
- All connections at the interfaces of the device are securely fastened and tightly sealed (zone carryover).
- All required protective devices are installed.
- The sensors are correctly positioned, fixed, connected, operational, and integrated with the controller in accordance with the functional description [Section 3.2](#).

6.2 Function Check/Trial Run

All the screw connections on the device are firmly tightened in the factory. Nevertheless, a trial run should be carried out to check that the device functions safely and reliably, and that it is tight once installed.



Only operate the device in perfect condition.

The container to be cleaned must be emptied and depressurized.

⚠ WARNING Persons in the container. A person could be hit by a jet from the cleaning head!

There is a risk of death or severe physical injury.

- Do NOT start the cleaning process while there are persons in the container.

Function check

1. Close all of the openings on the container (e.g. inspection openings).
2. Switch off all moving parts in the container (e.g. agitators) and secure them to prevent them from being inadvertently switched back on or set in motion.
3. Check to ensure that there is a safe distance around the container and to the surrounding components.
4. Switch on the device (see [Section 6.3 Switch-On Procedure](#)).
5. Check the interfaces on the device for impermeability.
6. Make sure that there are no unusual vibrations.
7. Check the device to make sure that it running smoothly.
8. Switch off the device (see [Section 7.3 Switch-Off Procedure](#)).

6.3 Switch-On Procedure

In accordance with the type of device activation and how it is integrated (e.g. manual or automatic) on the cleaning plant, the switch-on procedure must be integrated and the following instructions must be observed when switching on.



WARNING

Risk from sudden, unforeseeable or unauthorized activation of the device (e.g. triggering of a start command as a result of incorrect operation of a start-up control device)!

There is a risk of death or severe physical injury.

*During start-up of the device, it is essential to perform the following **work steps** in the specified order.*

Switch-on procedure

1. *Firmly close all openings on the container (e.g. inspection openings).*
2. *Empty and depressurize the container.*
3. *Switch on the electrical power supply.*
 - *Check to make sure that the electrical power supply is NOT interrupted and that there is voltage available at the sensors.*
 - *Take suitable measures to secure the electrical power supply to prevent it from being switched off suddenly, unexpectedly or without authorization.*
4. *Switch on the compressed air supply to the pneumatic cylinder.*
 - *Check that the compressed air supply is NOT interrupted and that the air pressure on the device is established.*
 - *Take suitable measures to secure the compressed air supply to prevent it from switching off suddenly, unexpectedly or without authorization.*
5. *Follow the function sequence for the device in accordance with the diagram.*
6. *Switch on the cleaning medium supply (e.g. slowly open the shut-off valve or ball cock).*
 - *Check that the supply of cleaning medium is NOT interrupted and the media pressure is established at the device.*
 - *Take suitable measures to secure the supply of cleaning medium to prevent it from being switched off suddenly, unexpectedly or without authorization.*

NOTE***Risk of breakage due to material overload!***

Pressure surges when switching the cleaning medium on or off, in particular pressure surges that exceed the operating pressure, and gas components in the cleaning medium may result in hammering in the cleaning device.

There is a risk of material damage or destruction of plant parts, (e.g. leakage in the pipe system or on connected devices).

- *Prevent pressure surges (“water hammers”) and gas components in the cleaning medium, e.g. caused by:*
 - *Installing a water hammer arrester or pressure relief valve in the supply line,*
 - *Slowly starting/stopping the pump and*
 - *opening/closing the shut-off fitting slowly (e.g. valve or ball cock).*

The term “water hammer” denotes a pressure surge in a fluid line which is generated by opening/closing a shut-off fitting (e.g. valve or ball cock) quickly at the end of a pipeline.

Pressure hammers/pressure surges can also be caused by quick changes in the flow rate (pressure increase or pressure drop), or by sudden changes in the direction of flow of fluids. This effect is particularly common in pump systems with long pipelines when starting up, stopping or changing the speed of pumps.

6.4 Operation

Once it has been started up and inspected, the device can be put into operation, observing the following instructions.

**WARNING*****Danger of collisions with moving parts!***

When the production process starts, there is a risk of collision if the spray head of the retractor system is not completely retracted and if movable and movable components in the container are in motion. This can lead to damage to the spray head and the components.

There is a risk of death or severe physical injury.

- *The production process may only be started when the spray head is completely retracted and locked.*

WARNING**Risk when used outdoors!**

If the device is used outdoors, there is a risk of lightning in the case of a storm.

There is a risk of death or severe physical injury.

- The devices are usually operated in an enclosed factory hall and are thus protected from the **risk of lightning**.
- In case of use outdoors and in case of storms or the risk of lightning, stop work immediately.

WARNING**Risk if the operating/working area is accessed by unauthorized persons!**

Unauthorized persons are NOT familiar with the hazards in the working area as described in these instructions.

There is a risk of death or severe physical injury.

- Permit only authorized specialist personnel who are qualified and trained for the operation to operate the cleaning device.
- Keep unauthorized persons away from the working area of the plant/machine in which the device is installed.
If in doubt, address these persons and order them to exit the working area.
- Stop the work for as long as there are unauthorized persons in the working area.

WARNING**Risk of chemical burns and heat burns when opening the container!**

The supply line is pressurized. The person could be hit by cleaning jets or come into contact with residual fluid from the supply line and device. There may also be hot vapors in the container.



There is a risk of death or severe physical injury.



- **Do NOT open the container** during the cleaning process.
- Before starting work, adhere to the **working steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).
- Before opening the container, observe the **cooling and draining time**.
- Use personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).

 **WARNING*****Danger due to hot surfaces!***

The device may heat up significantly as a result of the cleaning medium or heat transfer from the container. Contact with the device can cause burns to the skin.



There is a risk of burns from the cleaning medium at temperatures of above +60 °C (+140 °F).

- *Comply with the warning signs and do NOT touch the marked areas.*
- *Do NOT remove the insulation from protected hot surfaces.*
- *Maintain a safety distance from existing protective equipment or barriers.*
- *Use protective equipment (e.g. protective gloves; cloths) to provide protection from the hot surface.*
- *Do not touch the device until after a sufficient cooling time.*

 **WARNING*****Danger caused by ejection of the cleaning medium!***

If the cleaning medium returns after a system failure (e.g. pressure drop due to interruption of the pressure supply) there is a risk of accident.

There is a risk of death or severe physical injury.

- *Do NOT remove the device if the cleaning medium has failed.*
- *Always follow the work steps of the **switch off procedure** (see [Section 7.3 Switch-Off Procedure](#)).*

 **WARNING*****Danger caused by ejection of the compressed air!***

If the compressed air is ejected after a system failure (e.g. pressure drop due to interruption of the pressure supply) there is a risk of accident.

There is a risk of death or severe physical injury.

- *Do NOT remove the device if the compressed air supply has failed.*
- *Always follow the work steps of the **switch off procedure** (see [Section 7.3 Switch-Off Procedure](#)).*

When operating the device, adhere to the following additional instructions:

 **WARNING** Persons in the container. A person could be hit by a jet from the cleaning head!

There is a risk of death or severe physical injury.

- Do NOT start the cleaning process while there are persons in the container.
- NEVER point the cleaning jet or surge at persons.

⚠ WARNING Incorrect operation of the device!

There is a risk of death or severe physical injury.

- Only operate the device in perfect condition.
- Only operate the device installed inside a closed container.
- Drain and depressurize the container to be cleaned.
- Close all openings on the container (e.g. inspection openings) firmly.
- When operating the device, **adhere to the switch-on and switch-off procedures** (see [Sections 6.3 Switch-On Procedure](#) and [7.3 Switch-Off Procedure](#)).
- There is no need for the device to be run in.
- The following operating states of the device are NOT permitted:
 - Operation of the device without cleaning medium.
 - Immersing the device in the product of the production process.
 - Operation of the device outside the permitted parameters (see [Section 3.3 Technical Data](#)).
- Immediately stop operation in the event of any leaks outside the container.
- Refrain from any type of work which compromises the safe and reliable function of the device.
- Immediately inform the owner of any changes to the device or the plant that could impair its safety.

If you notice vibrations on the plant that are NOT caused by the device during start-up of the device, these must be prevented by suitable measures so that the vibrations CANNOT be transferred to the device.

If this is NOT possible, the maintenance intervals must be shortened in accordance with [Section 7.4.1 Maintenance Intervals](#).

During normal operation of the device, you must make sure that the mixture of supplied cleaning medium and dissolved substances can flow freely out of the container.

NOTE Any clogging in the drain of the container is to be eliminated at once in order that:

- no large quantities of dirt can accumulate in the container,
- there is NO impermissible filling of the container with cleaning medium,
- the device is NOT immersed in the rising fluid level.

For cleaning agent in circulation:

Run the final cleaning step with clean water to remove any suspended matter that may have been introduced.

7 Maintenance

The following safety instructions apply to all work on the device listed and described in this chapter, and must be observed at all times.

Only use **original spare parts** when replacing parts of the device. A **functional check** must be performed after every repair (see [Section 6.2](#)).



If you have questions or doubts about handling the cleaning device, please contact AWH.

7.1 Safety Instructions for Maintenance



NOTE ON EXPLOSION PROTECTION

Work on the device in a potentially explosive atmosphere is PROHIBITED!

If this is not observed, the explosion protection could be disabled.

- *Only allow instructed personnel to work in potentially explosive atmospheres.*
- *The personal protective equipment must meet the explosion protection requirements.*
- *Do not use a tool that could create sparks.*



DANGER



Danger of ignition in potentially explosive atmosphere due to potential differences!

When filling and emptying containers with fluids, when recirculating, stirring, mixing and spraying fluids and also when measuring, sampling and cleaning, the fluids themselves or the interior of the container could be charged in a dangerous manner.

Differences in potential (e.g. electrostatic charge) can cause igniting sparks or heat, which can act as an ignition source.

There is a risk of death or severe physical injury.

- *Only clean electrically conductive containers.*
- *Make sure that any electrostatic charge is prevented. Also make sure that all electrically conductive parts on the device and the container are grounded for potential equalization to the same potential using grounding cables with a sufficient diameter.*
- *Grounding must always be carried out before start-up of the device. Avoid grounding faults (e.g. subsequent grounding of already charged objects or equipment).*
- *Do not secure or seal mechanical connections with electrically insulating materials (such as sealing tape, sealant, adhesive, etc.), if it impairs the grounding of the device on the container.*


DANGER

Risk of fatal injury from electric shock through contact with live parts!

Activated electrical components are live with dangerous electrical voltage and may perform uncontrolled movements.

There is a risk of death or severe physical injury.

- Allow only **qualified electricians** to perform work on the electrical system.
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).
- Cover adjacent live parts to prevent contact.
- Beware of the hazards caused by electrical current (e.g. warnings).


WARNING

Risk of falling when working at heights!

When carrying out assembly/disassembly work on parts of the plant at height, there is a risk of falling.

There is a risk of death or severe physical injury.



- Do not perform any work at heights except with a safety platform with cage or suitable fall protection (e.g. safety rope and safety harness).
- If you are using a harness for fall protection, it is essential that the rescue concept is observed for a person in the harness.
- A person must not remain suspended in the harness for longer than 15 min as there is otherwise a risk of shock or even death.
- Wear protective work clothing, safety shoes, protective gloves and a hard hat for work at heights.


WARNING
Risk of accident caused by incorrectly performed maintenance and repair work!

Improper maintenance, falling components or failure to adhere to the listed safety instructions can cause accidents.

There is a risk of death or severe physical injury.

- Only have **experts** perform work on the device.
- Do not work on the device unless it is disconnected from the power supply, depressurized and in cold condition.
- Maintain a safe distance when working on the device.
We recommend that you provide 1 m space for free movement around the device and container.

WARNING



Risk of chemical burns and heat burns when opening the container!

The supply line is pressurized. The person could be hit by cleaning jets or come into contact with residual fluid from the supply line and device. There may also be hot vapors in the container.



There is a risk of death or severe physical injury.



- **Do NOT open the container during the cleaning process.**
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).



- Before opening the container, observe the **cooling and draining time**.
- Wear personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).

WARNING



Danger due to hot surfaces!

The device may heat up significantly as a result of the cleaning medium or heat transfer from the container. Contact with the device can cause burns to the skin.



There is a risk of burns from the cleaning medium at temperatures of above +60 °C (+140 °F).

- Do not remove the devices unless they are in cold condition.
- Allow the device to cool down before starting work.
- Beware of hot surfaces (e.g. warning signs).
- Use protective equipment (e.g. protective gloves; cloth) against hot surfaces.

WARNING



Risk of crushing during maintenance, cleaning and repair work!

The container and the interfaces of the device (e.g. media connections) may be pressurized.



There is a risk of death or severe physical injury.

- Before starting work, depressurize the container and all lines.
- Switch off all moving parts in the container and secure them to prevent them from being inadvertently switched back on or set in motion.
- Only remove the device if it has been depressurized.
- Wear protective gloves.

7.2 Removal

The safety instructions in [Section 7.1 Safety Instructions for Maintenance](#) must be observed before removing the device from the container.



WARNING



Risk of chemical burns and heat burns when opening the container!

The supply line is pressurized. The person could be hit by cleaning jets or come into contact with residual fluid from the supply line and device. There may also be hot vapors in the container.



There is a risk of death or severe physical injury.



- **Do NOT open the container** during the cleaning process.
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).



- Before opening the container, observe the **cooling and draining time**.
- Use personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).



CAUTION

Fault as a result of soiling, foreign matter or damage to the device!

Foreign matter, such as scale, burrs, chips, etc. can restrict the flow or enter the pipe system and cause malfunctions or damage to components, including gaskets. That can result in hazards that endanger the functional safety of the device.

There is a risk of minor or moderate injuries.

- Implement suitable measures to prevent soiling and foreign objects from entering via the interfaces of the device.
- Before starting work, make sure that all necessary tools, auxiliary materials and information are available and observe the instructions for the interfaces.
- When lifting the device out of the container, maintain a distance from the inner wall of the container and surrounding components (e.g. agitators), to avoid scraping or knocking.
- Place the device on a firm surface after removing it.

7.3 Switch-Off Procedure

In accordance with the type of device activation and how it is integrated (e.g. manual or automatic) on the cleaning plant, the switch-off procedure has to be integrated and the following instructions have to be observed when switching off.



WARNING



Risk from sudden, unforeseeable or unauthorized reactivation of the device

(e.g. triggering of a start command as a result of incorrect operation of a start-up control device)!



There is a risk of death or severe physical injury.

Before performing any disassembly, maintenance, repair or cleaning work on the device, it is essential to carry out the following **work steps** in the specified order:

Switch-off procedure

1. Interrupt the supply of cleaning medium (e.g. slowly close the shut-off valve or ball cock).
 - Check that the supply of cleaning medium is stopped and there is no media pressure at the device.
2. Safeguard the supply of cleaning medium to prevent sudden, unforeseeable or unauthorized reactivation (e.g. lockable switch/shut-off elements).
 - Check that any supply of media is reliably prevented and insert dummy disks if necessary.
Comply with a cooling phase for media temperatures above 80 °C.
 - Make sure that the cleaning device and supply line for the cleaning medium have been completely drained (waiting time see [Section 3.2.2 Functional Flow Chart](#)).
3. Retract the cleaning head and secure the device with locking cylinder.
4. Stop the supply of compressed air (e.g. slowly close the shut-off valve or ball cock).
 - Check that the compressed air supply is interrupted and that there is no air pressure on the device.
 - Safeguard the compressed air supply to prevent sudden, unforeseeable or unauthorized reactivation (e.g. lockable switch/shut-off elements).
5. Disconnect the power supply to the higher-level plant/the device.
 - Check to make sure that the power supply is interrupted and that there is no voltage at the sensors.
 - Safeguard the power supply to prevent sudden, unforeseeable or unauthorized reactivation (e.g. lockable switches)
6. Depressurize the container against the ambient pressure.
 - Safeguard the supply of steam or other media that affect the pressure to prevent sudden, unforeseen or unauthorized reactivation (e.g. lockable switches/shut-off elements).
 - Make sure that the pressure inside the container matches the ambient pressure.

NOTE**Risk of breakage due to material overload!**

Pressure surges when switching the cleaning medium on or off, in particular pressure surges which exceed the operating pressure, and gas components in the cleaning medium can cause hammering in the cleaning device.

There is a risk of material damage, e.g. leakage in the pipe system or on connected devices.

- Prevent pressure surges (“water hammers”) and gas components in the cleaning medium, e.g. by:
 - Installing a water hammer arrester or pressure relief valve in the supply line,
 - Slowly starting/stopping the pump and
 - Slowly opening/closing the shut-off fitting (e.g. valve or ball cock).

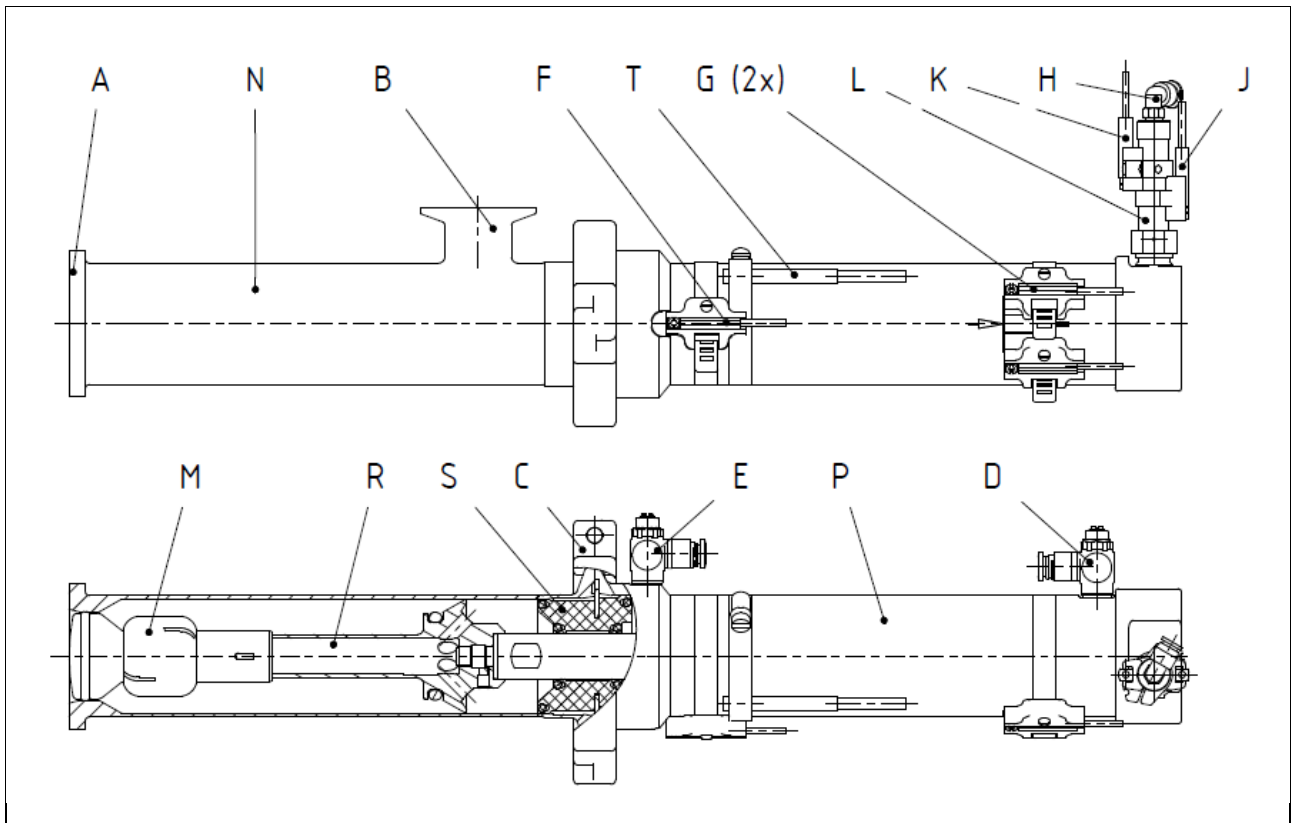
7.3.1 Removing the Device

Figure 7.3-1: Overview of Assembly Units

- | | |
|---|---|
| A | Process connection [PC] |
| B | Media connection [MC] (cleaning agent feed) |
| C | Connection between hydraulic pipe and pneumatic pipe (power cylinder P) |
| D | Power cylinder “extension” pneumatic connection |
| E | Power cylinder “retraction” pneumatic connection |
| F | Power cylinder “extended” limit switch (1x) |
| G | Power cylinder “retracted” limit switch (2x, G1 and G2) |
| H | Locking cylinder “unlock” pneumatic connection |
| J | Locking cylinder “unlocked” limit switch |
| K | Locking cylinder “locked” limit switch |
| L | Locking cylinder (pneumatic) with 2 limit switches |

M	Spray head, rotating TYPE A, B, C, or D / alternative static spray head type S on TANKO-RTS anti-twist version
N	Hydraulic pipe for holding the spray head
P	Power cylinder, pneumatic actuator with 3 limit switches
R	Central bearing
S	Power cylinder
T	Resistance Thermometer

⚠ WARNING Risk of the device falling accidentally!

The device may hit personnel when falling.

There is a risk of severe physical injury.

- Hold the device firmly when installing/removing it.
- There must be nobody beneath the device when installing/removing it.

NOTE During removal, the device should be in the rest position, i.e. with the spray head retracted into the hydraulic pipe to create a seal. If this is not possible due to a fault, the spray head will protrude into the container.

The small installation opening for the container and components (e.g. agitators) in the container cause obstructive contours! The spray head may collide with obstructions during removal.

Damage to the device.

- The spray head must NOT collide with obstructive contours!

Interfaces F, G and T

NOTE The limit switch and the resistance thermometer are electrical components. The electrical connection values are not included in these instructions; they must be obtained from the instructions/data sheet provided by the sensor manufacturer.

The limit switches and the resistance thermometer may be damaged if connected incorrectly or subjected to excessive voltage.

- Follow the manufacturer instructions for the limit switch and resistance thermometer!
1. Check and ensure that the power supply to the limit switches and to the resistance thermometer is switched off (see [Section 7.3 Switch-Off Procedure](#)).
 2. Disconnect the electrical power supply from the limit switches and the resistance thermometer, or
 3. remove the limit switches and the resistance thermometer from the retractor system. (See installation instructions/data sheet provided by manufacturer).

Interfaces D and E

1. Check to ensure that the compressed air supply is interrupted (see [Section 7.3 Switch-Off Procedure](#)).
2. Detach the compressed air hoses from the screw connections on the device
3. Unscrew the throttle check valve position E.

NOTE Danger of damage to the piston ring

This can result in malfunctions in the pneumatic cylinder.

- Before disconnecting the hydraulic and pneumatic pipe, the throttle check valve must be removed. It can only be screwed in again after the pneumatic pipe and the hydraulic pipe have been reconnected!

Interface B

The supply line for the cleaning medium has to be disconnected at the media connection [MC]. The media connection [MC] has to be sealed with a screw cap.

1. Check and ensure that the media supply is interrupted (see [Section 7.3 Switch-Off Procedure](#)).
2. Undo the screw connection on the heavy duty clamp.
3. Remove the heavy duty clamp.
4. Keep the gasket in a safe place.

Interface A

NOTE When removing the device after a fault that has prevented the spray head from retracting into the hydraulic pipe, the spray head will protrude into the container. The small installation opening for the container and components (e.g. agitators) in the container cause obstructive contours! The spray head may get knocked during removal.

Damage to the device.

- The spray head must NOT collide with obstructive contours!
- Be extremely careful to avoid collisions during removal.

Process connection clamp and combination container connector

1. Check the following before pulling the device out of the container:
 - Device in “rest position”, i.e. spray head in hydraulic pipe
 - Check for interfering contours on surrounding components in the container.
2. The device must be supported/held securely in place during removal.
3. Undo the additional fastenings on the retractor system.
4. Undo the heavy duty clamp on the process connection and set it to one side.
5. Remove the device from the clamps or the container adapter on the container.
6. Keep the gasket in a safe place.
7. Seal the process connection using a suitable screw cap.
8. If necessary, close the clamps or combination container connectors on the container.



To close off the combination vessel connector, a blind plug can be obtained from AWH.

Material	Blind plug for combination container connector, article number
1.4435	66R0000004Z30
2.4602	66R0000004Z80

BioControl® process connection

1. Check the following before pulling the device out of the container:
 - Device in “rest position”, i.e. spray head in hydraulic pipe
 - Check for interfering contours on surrounding components in the container.
2. The device must be supported/held securely in place during removal.
3. Undo the additional fastenings on the retractor system.
4. Undo the block flange and set it to one side.
5. Remove the device from the block flange on the container.
6. Keep the gasket in a safe place.
7. Seal the process connection using a suitable screw cap.
8. If necessary, close the block flange on the container.



To close off the block flange, a BioControl® blanking plate can be obtained from NEUMO.

Weld Process Connection

9. Check the following before pulling the device out of the container:
 - Device in “rest position”, i.e. spray head in hydraulic pipe
 - Check for interfering contours on surrounding components in the container.
10. The device must be supported/held securely in place during removal.
11. Undo the additional fastenings on the retractor system.
12. Undo the heavy duty clamp at the connection between the hydraulic pipe and the pneumatic pipe and set aside.
13. Carefully remove the pneumatic pipe from the hydraulic pipe. The piston rod with centering adapter, spray head and all attachments is held in place by the locking cylinder on the pneumatic pipe and is also pulled out of the hydraulic pipe.
14. Close off the hydraulic pipe with blind clamp connector 2 1/2" DIN 32676.

7.4 Maintenance

To ensure the trouble-free operation, high operational safety and long service life of the cleaning device, it is essential to have it cleaned and maintained at regular intervals.



NOTE ON EXPLOSION PROTECTION

Work on the device in a potentially explosive atmosphere is PROHIBITED!

If this is not observed, the explosion protection could be disabled.

- Only allow instructed personnel to work in potentially explosive atmospheres.
- The personal protective equipment must meet the explosion protection requirements.
- Do not use a tool that could create sparks.



We recommend that you document the maintenance work in a report.

The safety instructions in [Section 7.1 Safety Instructions for Maintenance](#) must be adhered to when carrying out cleaning, maintenance and repair work.



WARNING



Danger from the magnetic field (magnetic ring in pneumatic cylinder) during assembly and disassembly of the device!

Magnets generate a wide-ranging, strong magnetic field. Among other things, they can damage devices (e.g. televisions, laptops, computer hard drives, data carriers, credit and EC cards, clocks, hearing devices and loudspeakers).



Magnets can cause malfunctions for individuals with cardiac pacemakers and/or serious endangerment of their health.

There is a risk of death or severe physical injury.

- Assembly or disassembly must not be carried out by persons with pacemakers.
- Maintain a minimum safety distance of at least 0.5 m between magnet carriers/magnets in the device and objects and technical devices whose function can be impaired by magnetic fields.



CAUTION



Danger of catching/entanglement in rotating components!

Failure to observe it can result in minor or moderate injury.

- Beware of moving parts whenever working with the device.
- Wear tight-fitting work clothing.

NOTE***Danger due to leaks at the connections!***

The sealing elements of the process connection [PC] and media connection [MC] are manufactured in accordance with the technical requirements for sealing surfaces.

Incorrect operation of the device can cause damage to the sealing elements (e.g. scratches and tears).

This can result in the penetration or emergence of media (zone carryover) at the connections.

This can result in leaks and the corresponding dangers.

- *Protect sealing elements from damage and contamination during transportation, storage, assembly and cleaning!*
- *Check them regularly for impermeability*
- *Replace the seal in the event of leaks*
- *If these measures are not successful, contact the manufacturer.*

NOTE***Risk of damage to the device due to improper assembly/disassembly work!***

Assembly/disassembly of the device which is NOT performed properly can cause damage to the device which puts the functional safety and reliability at risk when re-commissioning.

The failure of components or a device malfunction can cause material damage and consequential damage.

- *Use a vice with protective jaws, e.g. of plastic or light metal, for clamping.*
- *Only use suitable tools that do not damage the surface.*
- *During assembly, observe the specified tightening torques (see [Section 7.5 Spare Parts and Customer Service](#)).*

NOTE***Dirt and foreign matter in the device!***

Dirt or foreign matter can impair the functional safety of the device.

- *During installation, make sure and check that there is no dirt or foreign objects in the device (e.g. small particles, sealing material).*

NOTE**Edge pressure in the area of the flats!**

If workpieces are NOT grasped without play and in a protective manner by the flats during assembly/disassembly, then they are at risk of damage.

- For gentle, protective assembly/disassembly work, use an adjustable or pliers wrench with parallel, smooth clamping jaws.
- Apply the clamping jaws of the adjustable wrench or pliers wrench to the flats without play so that they rest evenly across the surface and loosen or tighten the screwed part.

7.4.1 Maintenance Intervals

NOTE**Component failure due to vibration damage!**

During operation, vibrations can cause screw and clamp connections to become loose or the device to be exposed to severe strain, thus possibly resulting in a component failure.

The failure of components or a device malfunction can cause material damage and consequential damage.

- Check the installed device for loose connections at regular intervals.
- Pay attention to vibration damage during maintenance and inspection.
- Adapt the maintenance intervals according to the operating conditions of the plant. After start-up, start with short maintenance intervals at first. If no damage occurs, the maintenance intervals can be adapted incrementally until the intervals specified in the instructions are reached.

NOTE Foreign objects impair the functional safety of the device!

This can cause damage, mechanical sparks and/or hot surfaces in the device.

- Ensure that no foreign objects enter the device while you are working with it.

Maintenance Intervals and Methods



Reduce the maintenance intervals by 30% in the event of:

- Deviation from the preferred installation position of the device (see [Section 5.2.2 Installation Position](#))
- Vibrations that occur in the plant that are NOT caused by the device and CANNOT be prevented.

If the device is NOT operated for a longer period, we recommend that you check the device completely before re-commissioning to make sure that it is fully functional (see [Section 6.2 Function Check/Trial Run](#)).



The specified times of the maintenance intervals are based on single-shift operation (8 hours per working day, 12 months per year) of the device and operation with

- Cleaning medium: Water
- Media pressure: 3 bar (43.5 psi g)
- Media temperature: +25 °C (+77 °F)

Interval:	h ₀ = operating hours of the device t = daily w = weekly m = monthly ¼ y = quarterly ½ y = every six months y = annually	Method:	S = visual inspection F = function check M = measurement R = cleaning*
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*The cleaning intervals are to be defined by the owner in accordance with operating conditions.

Overview of Maintenance Points

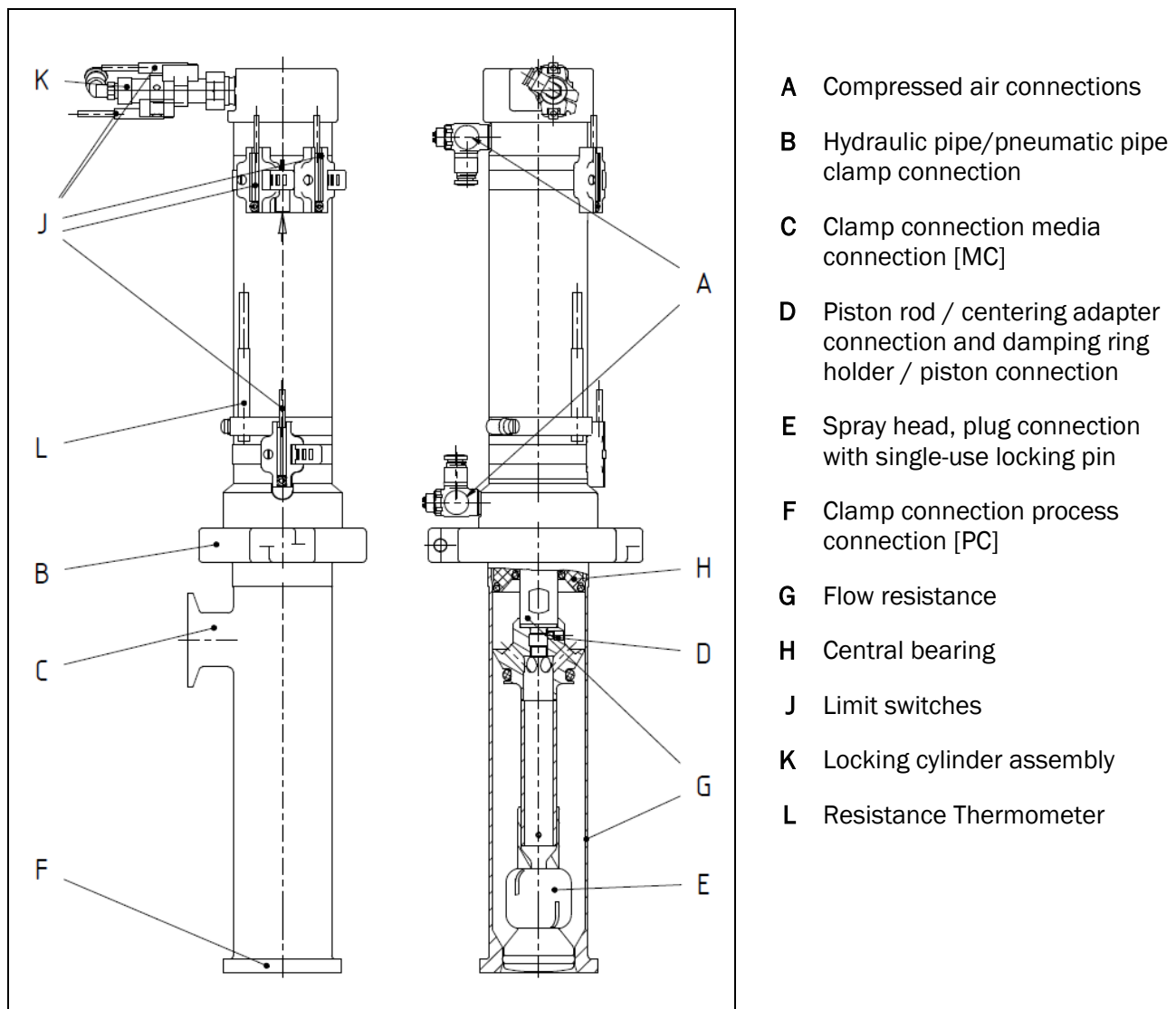




Figure 7.4-1: Maintenance Points

 The tightening torque values required for the thread connections are listed in [Table 7.5-1](#).

 The item numbers shown in brackets refer to [Figure 7.5-1: Internal Construction](#).

Point	Inspection and Maintenance Work	Interval	Method
A	Check compressed air hoses for damage and signs of age. Replace them if necessary.	m	S, F
B	Check that the clamp connection and its screw connections are securely fitted.	¼ y	S, F
C	Check the clamp connection and its screw connection for tight fitting and impermeability.	m	S, F
D	Check that the threaded connection and threaded locking rod are securely fastened (for the tightening torque, see Table 7.5-1). Check the O-ring seal and inspect the O-ring for wear (Item 1.19 Centering adapter). Check that the screws between the damping ring holder and the piston are securely fastened. This screw connection is secured with Loctite "243".	H1000 or ¼ y	S, F
E	Check that the locking pin is securely fastened. Check the rotation of the spray head by hand. Check the O-ring (Item 2.05) for wear. When disassembling the spray head from the centering adapter, replace the locking pin.	1. and 2. H500 then H1000 or ¼-j	S, F
F	Check the clamp connection and its screw connection for tight fitting and impermeability.	m	S, F
G	Measure the flow resistance between the piston rod and the housing. The flow resistance must be < 1 MΩ (see Chapter 6 Start-up) Contact from other components, e.g the centering adapter on the housing, must be prevented.	H1000	M
H	Replace the central bearing, depending on the stroke length Stroke length = 100 - 250 mm Stroke length = 500 mm	H10000 H5000	A
J	Check that the limit switch is functioning and in the correct position. If necessary, replace it and glue to the specified position (Figure 5.2-9 and Figure 7.5-1).	t	S, F
K	Check the locking bolt for wear. At the corresponding level of wear, replace the locking cylinder assembly.	H5000	S, A
L	Check the functioning of the resistance thermometer according to the manufacturer instructions (see also Section 5.2.4 Connection of Pneumatic Actuator).	See manufacturer information	F
L	Check the correct position (Figure 5.2-11) of the resistance thermometer	t	S

Table 7.4-1: Inspection and Maintenance Work

The presence and legibility of information and warning signs must be checked regularly.

7.4.2 Tools and Tightening Torques

Use only proper tools that are required for performing the required work and approved for use.

Normal workshop equipment is sufficient for the mechanical work on the device. The following tools are required:

- Hexagon socket wrench (size 4)
- Open-end wrench (WAF 10 mm, WAF 12 mm, WAF 14 mm; WAF 17 mm; WAF 24 mm)
- Torque wrench with socket shaft □ 14 x 18
- Torque screwdriver with inserts and accessories



Figure 7.4-2: Tool for TANKO-RT/-RTS

Recommended assembly tools:

The following assembly tools can be purchased from AWH to facilitate assembly:

- Assembly tool for wire locking pin, size A, Art. no. 664MW01010050
- Assembly anvil for central bearing, Art. no. 664MW03020020
- Assembly cone for central bearing, Art. no. 664MW03010020



Figure 7.4-3: Assembly tool 664MW01010050

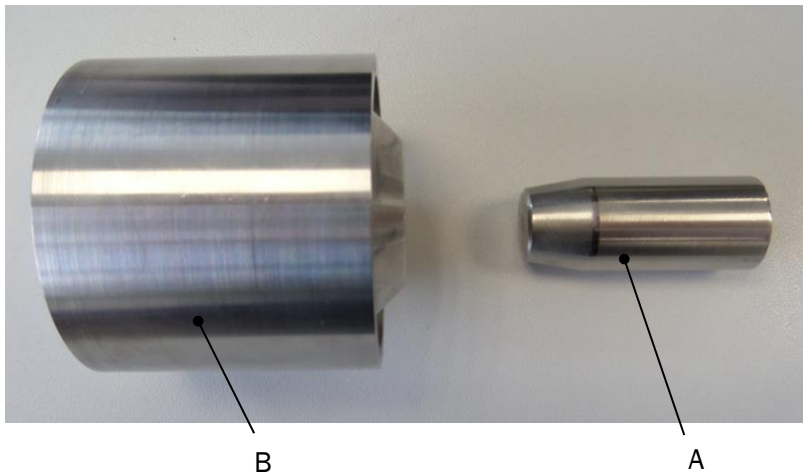


Figure 7.4-4: Assembly Tools, Assembly cone (A) and Assembly Anvil (B)

All the screw connections on the device are tightened to the appropriate tightening torque in the factory in order to ensure the necessary clamping force between the components that need to be connected, even when the maximum operating forces are applied.



All the relevant tightening torque valued for the screw connections are listed in [Section 7.5 Spare Parts and Customer Service](#) in [Table 7.5-1](#).

7.4.3 Replacing the O-rings, the central bearing, the piston ring and the damping ring



The tools required for assembly/disassembly work are listed in [Section 7.4.2 Tools and Tightening Torques](#).



The item numbers shown in brackets refer to [Figure 7.5-1: Internal Construction](#).



[Table 7.5-1](#) includes a list of spare parts.

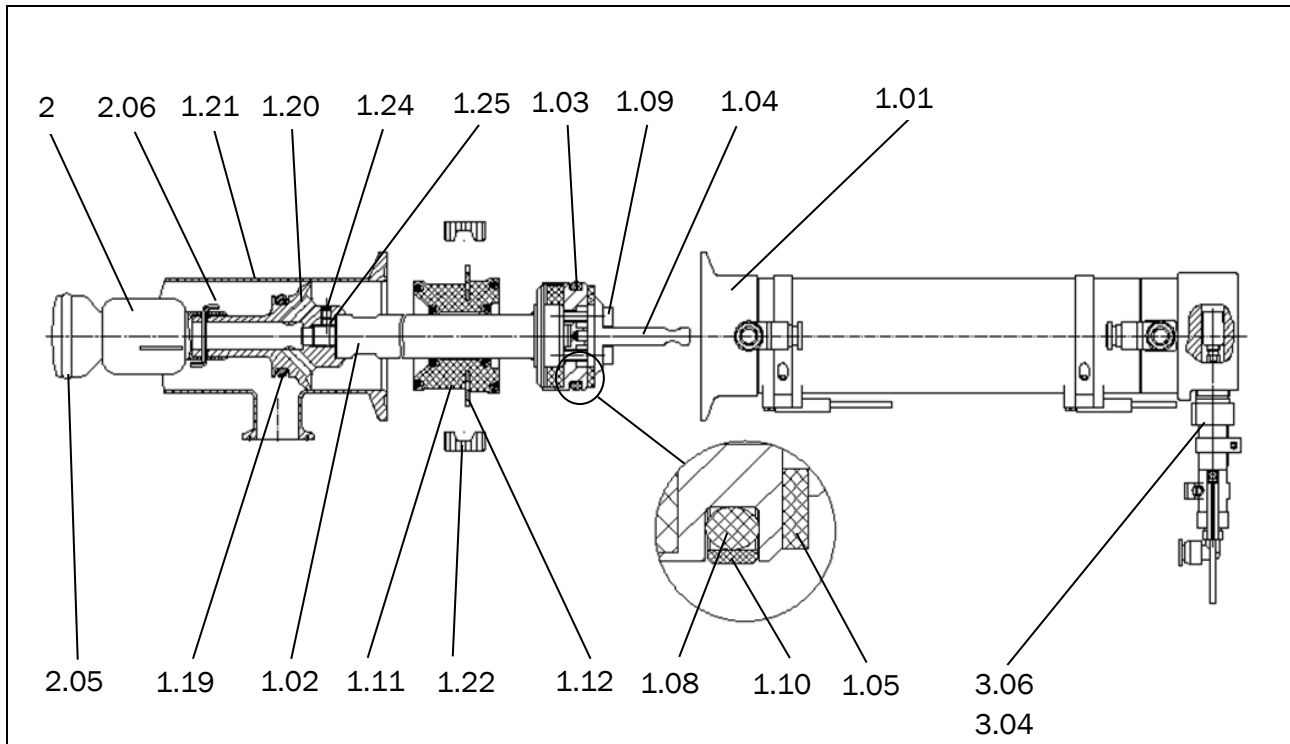


Figure 7.4-5: Replacing Consumables

Item	Qty.	Designation	Article number.	Material
1.05	1	Damping ring	66R01000005PO	Polyurethane
1.10	1	Piston ring	66R01000024LO	TOMF-0040 PTFE
1.11	1	Central bearing	66R01000012LO	TOMF-0040 PTFE
1.19	1	O-Ring 27 x 5	see Table 7.5-4	see Table 7.5-4
2	1	Spray head	see Table 7.5-8	1.4435
2.05	1	O-Ring 27 x 5	see Table 7.5-4	see Table 7.5-4
3.06	1	Locking cylinder assembly group	66R0100003220	1.4404
3.04	1	O-Ring 15 x 1.5	1060500001556	EPDM

Table 7.4-2: Wear Parts O-Rings, Central Bearing, Piston Ring and Damping Ring

When replacing the O-rings, the central bearing, the piston ring and the damping ring, perform the following work steps:

NOTE Damage to the sealing surfaces must be prevented during disassembly and assembly.

- 1 Loosen the bracket (1.22) on the retractor system that connects the hydraulic pipe (1.21) to the pneumatic cylinder (1.01). Carefully pull the two parts apart.
2. **NOTE** Do not damage the outer sealing surfaces of the central bearing (1.11)!
 - Pull the piston rod out of the hydraulic pipe at the rear, towards the pneumatic cylinder.

3. **NOTE** The cleaning device can be damaged if not set down in a safe place!
 - During subsequent work, take particular care to ensure that the disassembled pneumatic section of the cleaning device is stored safely, particularly the centering adapter (1.20).
4. Check that the spray head is able to rotate smoothly. If replacement of the spray head is necessary, follow the procedure set out in [Section 7.4.4](#) points 2) to 5).
5. Remove the O-rings from the spray head (2.05) and the centering adapter (1.19).
6. Install the new O-rings according to [Figure 7.4-5](#).
Make sure the new O-ring is undamaged and pay attention to correct material allocation (see [Table 7.4-2](#) or order).
7. To replace the piston ring (1.10) remove the old piston ring.
Do not damage the O-ring (1.08) beneath it.
7. **NOTE** Burning hazard
To make it easier to fit the new piston ring, it should be heated first, e.g. in a water bath (70 °C – 90 °C / +158 °F – 194 °F).
8. To replace the damping ring (1.05), loosen the retaining screws (1.09) and then the damping ring holder (1.04).
10. Replace the damping ring (1.05) and reassemble on the piston (1.03) with the damping ring holder (1.04) and retaining screws (1.09). When doing so, secure the threads with Loctite “243” (for tightening torques, see [Table 7.5-1](#)).
11. **When replacing the central bearing, carry out the following work steps:**
 - a) Loosen the set screw (1.24) with the PTFE washer (1.25) and detach the centering adapter (1.20) from the piston rod (1.02) by turning it counterclockwise.
 - b) Pull the central bearing (1.11) off the piston rod (1.02) and remove the 2 central bearing retaining plates (1.12).
 - c) Mount these in the new central bearing.
 - d) Install the new central bearing (1.11) with the central bearing retaining plates (1.12) on the piston rod (1.02).
To prevent damage to the central bearing, the use of an assembly cone (A) and assembly anvil (B) is recommended when assembling the central bearing on the piston rod.

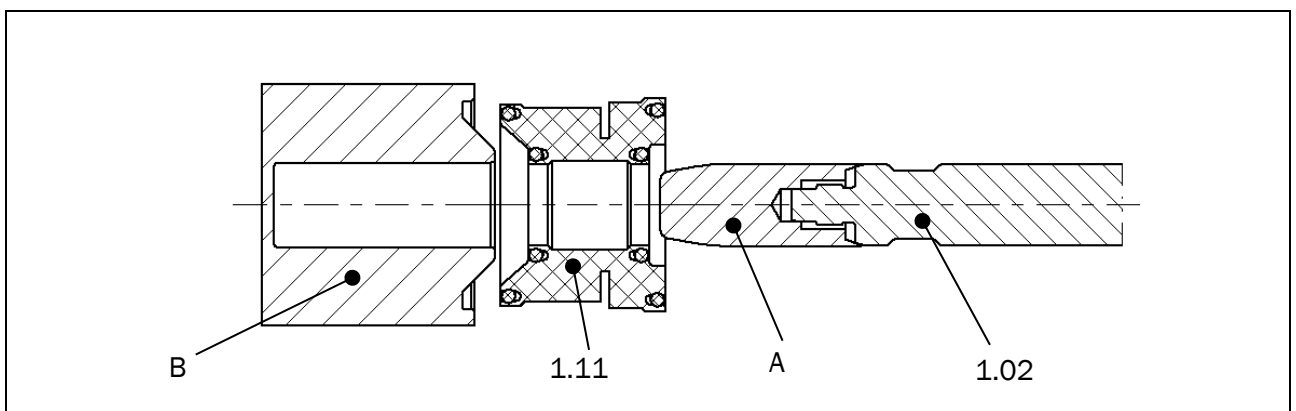


Figure 7.4-6: Overview of Assembly of Central Bearing with Assembly Cone

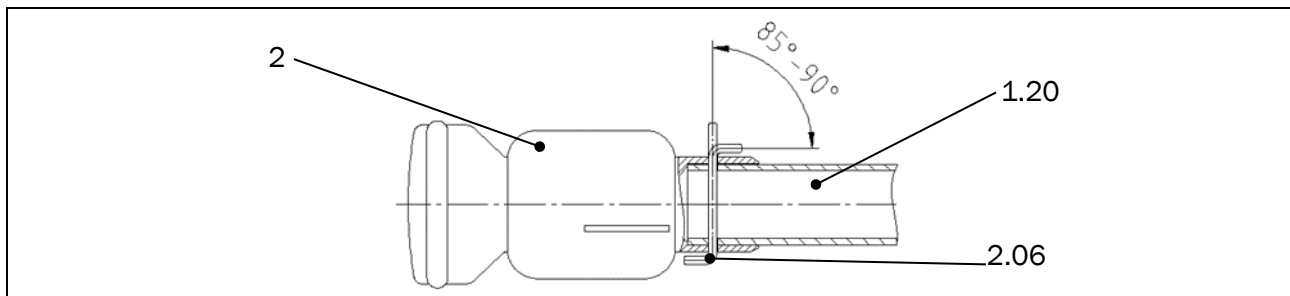
- e) Turn the centering adapter clockwise to screw it onto the piston rod. Tighten the set screw (1.24) with the PTFE washer (1.25), see [Table 7.5-1](#) for tightening torques.
If the PTFE washer is damaged or lost, replace it.

11. Fit the piston rod with the centering adapter and spray head into the hydraulic pipe, with the spray head first.
12. Press the central bearing into the hydraulic pipe as far as it will go (central bearing retaining plate, 1.12).
13. Push the pneumatic pipe onto the piston rod and secure the pneumatic pipe and hydraulic pipe with the clamp (1.22) and nut (1.23). Pay attention to the tightening torques in [Table 7.5-1](#).
14. For the process connection combination adapter C3 or BioControl®, if the O-ring (1.26 for C3 or 8 for BioControl®) that is located on the outside on the hydraulic pipe is deformed or damaged, you should replace it.
See [Figure 7.5-1](#) and [Table 7.5-1](#) If it is dirty, it should be cleaned.

7.4.4 Replacing the Spray Head



[Table 7.5-1](#) includes a list of spare parts.



[Figure 7.4-7: Locking Pin Representation](#)

1. [Section 7.4.3](#) Follow points 1) to 2).
2. Bend the locking pin (2.06) open or pinch off a bent end. Remove the locking pin. Pull the spray head (2) off the centering adapter (1.20).
3. Install the new spray head (2) on the centering adapter (1.20). Turn the spray head until the holes for the locking pin are aligned with the holes in the centering adapter.
4. Insert the new locking pin, which is included with the new spray head, through the holes as far as it will go and bend the 2nd side of the locking pin using pliers.
NOTE Bend the locking pin far enough that it does not grind at any point when retracting into the hydraulic pipe (1.21).
5. The new spray head is now installed. Carry out the subsequent work steps (see [Section 7.4.3](#) from point 4), or, if no further action is necessary from point 11) to point 13).

7.4.5 Replacing the Locking Cylinder Assembly Group

1. Release the cable from the limit switches (plug connection with union nut) and pull the pneumatic hose out from the plug connection.
2. Uninstall the locking cylinder assembly group (locking cylinder complete with bolt, 3.06) by unscrewing it from the locking adapter and pulling it completely out of the locking adapter.
3. Screw the new locking cylinder assembly group (3.06) with O-ring 15 x 1,5 (3.04) back into the locking adapter (3.01) and save with Loctite "243".
4. Reinsert the cable and pneumatic hose. Screw in the cable with limit switches. Check that the correct cables have been connected to the corresponding limit switches!
Check that the limit switches are in the correct position and are glued on.
5. Before recommissioning, check the correct functioning of the locking mechanism and the end position sensors.

7.4.6 Notes on Cleaning



NOTE ON EXPLOSION PROTECTION

Cleaning work on the device is PROHIBITED in a potentially explosive atmosphere!

If this is not observed, the explosion protection could be disabled.

- Only allow instructed personnel to work in potentially explosive atmospheres.
- The personal protective equipment must meet the explosion protection requirements.
- Do not use a tool that could create sparks.

It is recommended for the device to be cleaned during maintenance.

Follow the following safety instructions prior to cleaning.



WARNING



Hazard from corrosive or irritant cleaning agents!

There is a risk of death or severe physical injury.



- Adhere to the regulations and specifications in the safety data sheets for the cleaning agents (e.g. vapors or hazardous substances).
- Use personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).
- Avoid excessively strong concentration of the cleaning agent.
- Only use clean and chlorine-free water as a diluting agent.
- Rinse the device with plenty of clean water after cleaning.
- Store cleaning agent in accordance with the applicable safety guidelines.

NOTE***Risk of damage to the device during cleaning!***

The use of an incorrect cleaning agent or sharp objects can damage the device.

The functional safety and reliability of the device may be impaired.

- *The cleaning agents must be approved for all materials in the device (e.g. gaskets, bushings).*
- *Do not use sharp objects (e.g. knives) or tools.*

Before commencing cleaning work, the working steps of the switch-off procedure must be carried out (see [Section 7.3 Switch-Off Procedure](#)).

Prior to cleaning, the device must have been removed from the container by an **expert** and disassembled into its individual parts. The safety instructions in [Section 7.1 Safety Instructions for Maintenance](#) must be observed.

Cleaning is carried out when disassembled by simply washing the surfaces that come into contact with media or using an ultrasonic bath.

Cleaning media: e.g. 3% caustic soda

Temperature: max. 70 °C

- Only use clean and chlorine-free water as a diluting agent.
- Measure carefully to avoid overly strong concentrations of cleaning agent.
- Rinse with plenty of clean water after cleaning.
- When cleaning the parts of the device outside the container, make sure that dust and adhering materials (e.g. grease and oil residues) are removed.

Cleaning of the device in a disassembled state can be carried out by **instructed persons**. After cleaning, the device must be assembled, checked and reinstalled in the container by an **expert** (see [Section 5.2 Installation](#)).

NOTE***Environmental damage in case of improper disposal!***

Cleaning agents, consumables and lubricants must NOT be allowed to get into the groundwater, waterways or sewer system.

There is a risk of environmental damage.

- *Dispose of any cleaning agents, lubricants and consumables (e.g. brushes and cloths) which have been used for cleaning in accordance with the local regulations and in accordance with the information in the manufacturer's safety data sheets.*
- *Dispose of packaging materials in an environmentally friendly manner and have them recycled.*

7.5 Spare Parts and Customer Service

Spare Parts and Wear Parts



Subject to technical modifications in the interest of further development and improvement of the properties of the device. The article no., dimensions or materials may differ from those of the supplied device.

The following data is important when requesting spare parts and for all inquiries:

Device

- Type
- Serial number

Spare part

- Designation
- Article No.

Customer Service



For technical questions or spare part requests, you can contact Customer Service as follows:

Armaturenwerk Hötensleben GmbH

Schulstr. 5-6,
D-39393 Hötensleben, Germany

Telephone: +49 39405 92-0

Fax: +49 39405 92-111

E-mail: info@awh.eu

Internet: <http://www.awh.eu>

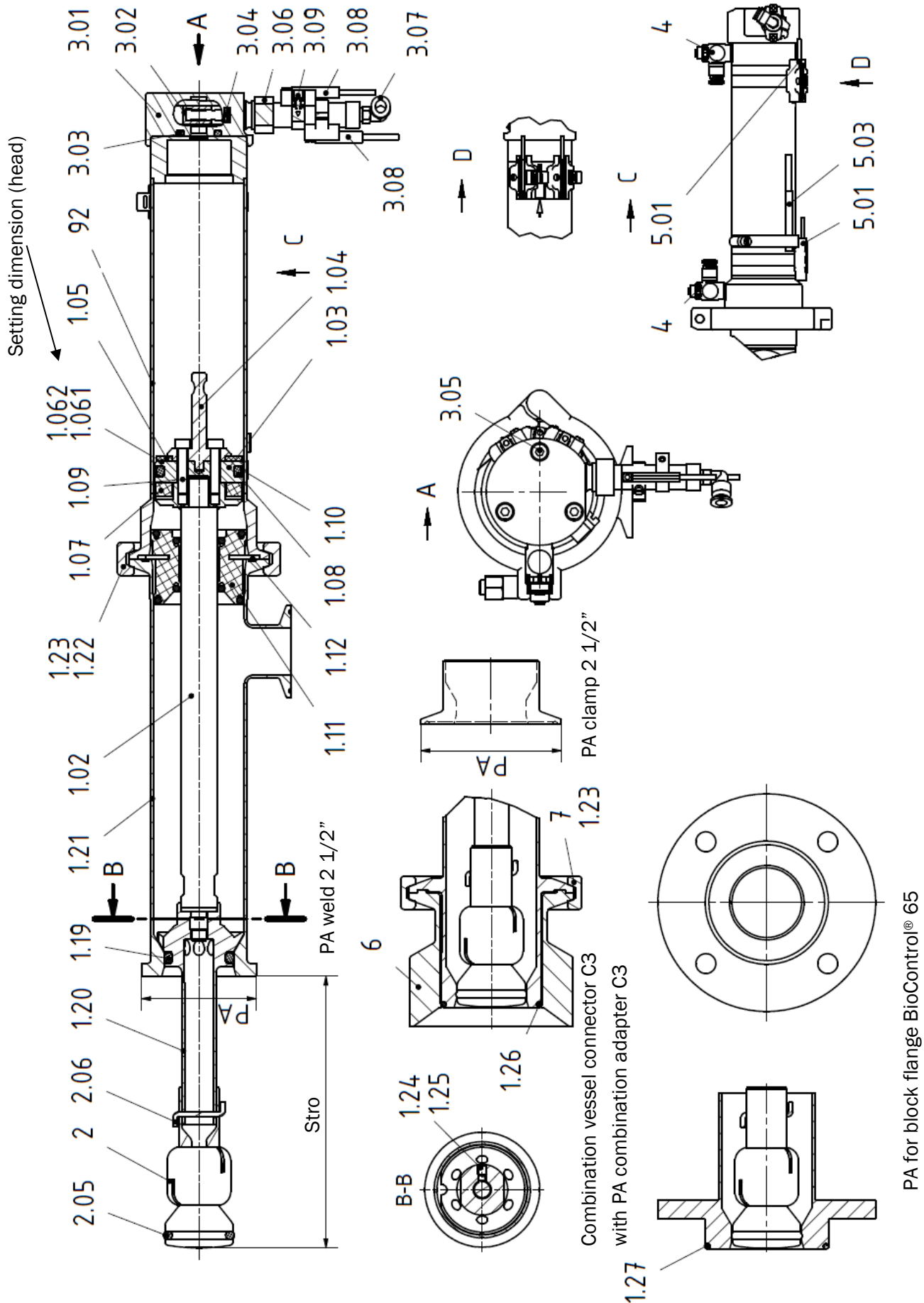


Figure 7.5-1: Internal Construction

Remark: The items marked “X” or “■” are included in the wear parts package and can be ordered. The items marked “■” are required for replacing wear parts [WP].

Item	Qty.	Designation	Tightening torque [Nm]	Article number	Material	[WP]
1.01	1	Pneumatic cylinder pipe	—	see Table 7.5-2.	1.4404	
1.02	1	Piston rod	44	see Table 7.5-3.	1.4435	
1.03	1	Piston SMF	—	66R0100200320	1.4404	
1.04	1	Damping ring holder	—	66R0100002320	1.4404	
1.05	1	Damping ring	—	66R01000005P0	PU	X
1,061	As needed	Spacer disk 0.5	—	66R01000000850	1.4571	
1,062	As needed	Spacer disk 1.0	—	66R01000000950	1.4571	
1.07	2	Magnet ring 47 x 30 x 4	—	390136	Flexor W45S	
1.08	1	O-Ring 37.47 x 5.33	—	10605325BE70S1	EPDM	
1.09	4	Hexagon socket-head screws M5 x 25	3.5	540132	A4	
1.10	1	Piston ring	—	66R01000024L0	PTFE-TMOF-0040	X
1.11	1	Central bearing	—	66R01000012L0	PTFE-TMOF-0040 with EPDM	X
1.12	2	Central bearing retaining plate	—	66R0100001720	1.4404	
1.19	1	O-Ring 27 x 5	—	see Table 7.5-4.		X
1.20	1	Centering Adapter	44	see Table 7.5-6.	1.4435	
1.21	1	SG hydraulic pipe FT	—	see Table 7.5-7.	1.4435	
1.22	1	Heavy duty clamp 2 1/2"	—	111100591	1.4301	
1.23	2/3	Hex nut M8 high-shaped	5	570139	1.4301	
1.24	1	Set screw M5 x 6	1.5	430182 430186	1.4571 1.4435	
1.25	1	Washer Ø 4 x 3	—	66300000250K0	PTFE	
1.26	1	O-Ring 45 x 3	—	see Table 7.5-5.		
1.27	1	BioControl O-ring G/U65 60 x 3	—	Not in the scope of delivery!	EPDM	
2	1	Spray head	—	see Table 7.5-8.	1.4435	X
2.05	1	O-Ring 27 x 5	—	see Table 7.5-4.		X
2.06	1	Locking pin	—	667000006020540	1.4430	
3.01	1	Locking adapter	—	66R0100002120	1.4404	
3.02	1	Locking bolt	2	66R0100002220	1.4404	
3.03	1	O-Ring 17 x 4	—	1060500001701	EPDM	X

3.04	1	O-Ring 15 x 1.5	—	1060500001556	EPDM	X
3.05	3	Hexagon socket-head screws M5 x 25	3.5	540132	A4	
3.06	1	Locking cylinder	—	014121		X
3.07	1	Angled plug connection M5 to Ø 6	1.5	420077		
3.08	2	Limit switch without cable	—	393012503		
3.09	2	Fastening set Ø 12	—	390038		
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5.03	1	Resistance Thermometer	—	390068		
6	1	Combination vessel connector C3	—	66R0000004N30	1.4435	
7	1	Heavy duty clamp 3"	5	111100092	A2	
8	1	O-Ring 60 x 3	—	1060500006000	EPDM	

Table 7.5-1: Replacement Parts List (Standard), Wear Parts, Tightening Torques



For deviations from the standard, see the supplementary sheet “Special version”.

Item 1.01 Pneumatic cylinder pipe	
Stroke	Article number
100	66R011011002X
150	66R011511002X
250	66R012511002X
500	66R015011002X

Table 7.5-2: Pneumatic Cylinder Pipe Depending on Stroke

Item 1.02 Piston rod	
Stroke	Article number
100	66R0110020030
150	66R0115020030
250	66R0125020030
500	66R0150020030

Table 7.5-3: Piston Rod Depending on Stroke

Item 1.19 + 2.05 O-ring Ø 27 x 5		
Material	Article No.	Permitted operating temperature in the TANKO-RT ATEX
EPDM	106050253	-20 °C (-4 °F) to +130 °C (+266 °F)
FKM (e.g. VITON®)	1060500002706	-15 °C (+5 °F) to +140 °C (+284 °F)
FFKM	1060500002707	-15 °C (+5 °F) to +140 °C (+284 °F)

Table 7.5-4: O-Rings for Centering Adapter and Head

Item 1.26 O-ring Ø 45 x 3		
Material	Article No.	Permitted operating temperature in the TANKO-RT ATEX
EPDM	1060500004501	-20 °C (-4 °F) to +130 °C (+266 °F)
FKM (e.g. VITON®)	1060500004503	-15 °C (+5 °F) to +140 °C (+284 °F)
FFKM	1060500004506	-15 °C (+5 °F) to +140 °C (+284 °F)

Table 7.5-5: O-Rings for Process Connection [PC]

Item 1.20 Centering adapter	
Stroke	Article number
100	66R011013103X
150	66R011513103X
250	66R012513103X
500	66R015013103X

Table 7.5-6: Centering Adapter

Item 1.21 SG hydraulic pipe FT			
		Article number	
Stroke	PA = Process connection in accordance with DIN 32676	MA = Media connection clamp DN25, DIN 32676	
		Standard	Anti-twist
100	Clamp 2"	66R0110042130	66RS110042130
	Clamp 2.5"	66R0110042230	66RS110042230
	Clamp 3"	66R0110042330	66RS110042330
100	Weld 2"	66R0110043130	66RS110043130
	Weld 2.5"	66R0110043230	66RS110043230
	Weld 3"	66R0110043330	66RS110043330
150	Clamp 2"	66R0115042130	66RS115042130
	Clamp 2.5"	66R0115042230	66RS115042230
	Clamp 3"	66R0115042330	66RS115042330

Item 1.21 SG hydraulic pipe FT			
		Article number	
Stroke	PA = Process connection in accordance with DIN 32676	MA = Media connection clamp DN25, DIN 32676	
		Standard	Anti-twist
150	Weld 2"	66R0115043130	66RS115043130
	Weld 2.5"	66R0115043230	66RS115043230
	Weld 3"	66R0115043330	66RS115043330
250	Clamp 2"	66R0125042130	66RS125042130
	Clamp 2.5"	66R0125042230	66RS125042230
	Clamp 3"	66R0125042330	66RS125042330
250	Weld 2"	66R0125043130	66RS125043130
	Weld 2.5"	66R0125043230	66RS125043230
	Weld 3"	66R0125043330	66RS125043330
500	Clamp 2"	66R0150042130	66RS150042130
	Clamp 2.5"	66R0150042230	66RS150042230
	Clamp 3"	66R0150042330	66RS150042330
500	Weld 2"	66R0150043130	66RS150043130
	Weld 2.5"	66R0150043330	66RS150043330
	Weld 3"	66R0150043230	66RS150043230
100	Combination adapter C3	66R0110044730	66RS110044730
150		66R0115044730	66RS115044730
250		66R0125044730	66RS125044730
500		66R0150044730	66RS150044730
100	BioControl®	66R0110045530	66RS110045530
150		66R0115045530	66RS115045530
250		66R0125045530	66RS125045530
500		66R0150045530	66RS150045530

Table 7.5-7: Hydraulic Pipe Depending on Stroke and Process Connection

Spray head		
Type	Article number	
	With EDPM O-ring	With FKM O-ring
A	667233016020031	667233016020032
B	667434216020031	667434216020032
C	667435216020031	667435216020032
D	667436216020031	667436216020032
S	6676X0X06020231	6676X0X06020232

Table 7.5-8: Spray Head Overview

8 Faults

8.1 Safety Instructions for Troubleshooting

Before rectifying a fault, the following safety instructions must always be adhered to:



NOTE ON EXPLOSION PROTECTION

Work on the device in a potentially explosive atmosphere is PROHIBITED!

If this is not observed, the explosion protection could be disabled.

- Only allow instructed personnel to work in potentially explosive atmospheres.
- The personal protective equipment must meet the explosion protection requirements.
- Do not use a tool that could create sparks.



DANGER



Danger of ignition in potentially explosive atmosphere due to potential differences!

When filling and emptying containers with fluids, when recirculating, stirring, mixing and spraying fluids and also when measuring, sampling and cleaning, the fluids themselves or the interior of the container could be charged in a dangerous manner.

Differences in potential (e.g. electrostatic charge) can cause igniting sparks or heat, which can act as an ignition source.

There is a risk of death or severe physical injury.

- Only clean electrically conductive containers.
- Make sure that any electrostatic charge is prevented. Also make sure that all electrically conductive parts on the device and the container are grounded for potential equalization to the same potential using grounding cables with a sufficient diameter.
- Grounding must always be carried out before start-up of the device. Avoid grounding faults (e.g. subsequent grounding of already charged objects or equipment).
- Do not secure or seal mechanical connections with electrically insulating materials (such as sealing tape, sealant, adhesive, etc.), if it impairs the grounding of the device on the container.

 **WARNING**

Risk of chemical burns and heat burns when opening the container!

The supply line is pressurized. The person could be hit by cleaning jets or come into contact with residual fluid from the supply line and device. There may also be hot vapors in the container.



There is a risk of death or severe physical injury.



- **Do NOT open the container during the cleaning process.**
- Before starting work, observe the **working steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).



- Before opening the container, observe the **cooling and draining time**.
- Use personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).

 **WARNING**
Hazardous situations caused by performing work on the device incorrectly!

There is a risk of death or severe physical injury.

- Have repairs and troubleshooting work performed only by qualified specialist personnel who have knowledge of the “Technische Regeln für Betriebssicherheit (TRBS)” (German technical rules for operational reliability and safety).
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).
- Before rectifying any fault, observe the safety instructions in [Chapter 7 Maintenance](#).
- In case of any uncertainty or doubt, contact AWH.

 **WARNING**
Danger caused by ejection of the cleaning medium!

If the cleaning medium returns after a system failure (e.g. pressure drop due to interruption of the pressure supply) there is a risk of accident.

There is a risk of death or severe physical injury.

- Do NOT remove the device if the cleaning medium has failed.
- Always follow the work steps of the **switch off procedure** (see [Section 7.3 Switch-Off Procedure](#)).

**WARNING*****Danger caused by ejection of the compressed air!***

If the compressed air is ejected after a system failure (e.g. pressure drop due to interruption of the pressure supply) there is a risk of accident.

There is a risk of death or severe physical injury.

- Do NOT remove the device if the compressed air supply has failed.
- Always comply with the switch-off procedure (see [Section 7.3 Switch-Off Procedure](#)).

**CAUTION*****Danger of catching/entanglement in rotating components!***

Failure to observe it can result in minor or moderate injury.

- Beware of moving parts whenever working with the device.
- Wear tight-fitting work clothing.

8.2 Faults and Remedial Action

Fault	Cause	Remedy
Spray head/pneumatic cylinder does not extend/retract.	Compressed air not switched on.	Switch on compressed air or control system.
	Compressed air hose kinked.	Remove any kinks in the placement of the compressed air hoses.
	Throttle check valves closed/set incorrectly.	Configure the throttle check valve (see Section 3.3 Technical Data).
	Severe soiling of the spray head in the area of the container connection.	Clean the area Attention: Do not damage sealing surfaces.
	Limit switch or cable defective.	Replace limit switch or cable.
	Item 1.08 O-ring and/or 1.10 piston ring defective.	Replace item 1.08 and/or item 1.10.
Spray head does not turn and/or no fluid comes out.	Cleaning fluid pressure and flow rate too low.	Configure the pressure and throughput to standard values.
	Strainer in filter is contaminated.	Check the flow rate of the unit with the spray head removed. Clean the strainer/filter.
	Nozzle holes/slits clogged.	Disassemble the unit and check for deposits / check whether the nozzle slits are clogged. If necessary, clean or replace the spray head.

Fault	Cause	Remedy
Effectiveness of cleaning is not sufficient.	Connection pressure too low.	Check connection pressure, adjust it.
	Connection pressure is too high.	Check connection pressure, adjust it.
	Spray slits blocked.	Clean the spray slits.
Spray head does not rotate.	Bearing worn.	Replace the spray head.
Pneumatic cylinder does not retract.	Locking cylinder does not extend because: <ul style="list-style-type: none"> - Air supply is interrupted - Limit switch or cable on locking cylinder is defective - Locking bolt stuck 	<ul style="list-style-type: none"> - Check air inlet hose for kinks and for correct fitting at lock. - Replace limit switch or cable. - Check locking bolts for dirt or damage. Replace locking cylinder, if necessary.
Resistance thermometer (item 5.03) indicates a temperature of $\geq 66\text{ °C}$	Temperatures in the environment or processes are too high: <ul style="list-style-type: none"> - inside the container, outside the container - Temperature of the cleaning medium - Resistance thermometer (item 5.03) defective 	Determine the cause of the exceeded temperature immediately and switch off! <ul style="list-style-type: none"> - Replace all limit switches - Replace all throttle check valves. - Check resistance thermometer (item 5.03) according to manufacturer's instructions and replace, if necessary.

Table 8.2-1: Operational Disruptions – Cause and Remedy

If the specified measures are NOT successful, please contact AWH.



If the device is sent back (e.g. repair/service/return), it is necessary for a hazardous substances declaration to be enclosed with the device in compliance with the German Ordinance on Hazardous Substances (GefStoffV).

Request the form for the hazardous substance declaration from AWH.

8.3 What to do in an Emergency

If a hazardous situation occurs, or if you need to avert a potential danger, quickly switch the device to a safe state.

The type of EMERGENCY STOP circuit used for the device is to be determined depending on the hazards and operating conditions and is the sole responsibility of the owner.

It is for this reason that AWH can offer the owner, solely as a precautionary measure, a few points of reference and notes to be observed and to be integrated into the owner's hazard assessments.

- The work steps for switching off the device listed in [Section 7.3 Switch-Off Procedure](#) must be adhered to.
- The EMERGENCY STOP circuit must be designed in such a way that the machine or system operator can actuate it immediately in the event of an emergency.
- Switching off in an emergency (“EMERGENCY STOP”) is intended to disconnect the entire machine from the power supply without delay in order to eliminate the risks caused by electrical voltage immediately.
- Shutting down in an emergency (“EMERGENCY STOP”) is intended to prevent risks that cause hazardous movements as soon as possible.
- The EMERGENCY STOP must have priority over all other functions and actuations in all operating modes.
- Resetting must not cause the plant/machine to start up again.



Source:

- EN 60204-1 / VDE 0113-1 “Safety of machinery – Electrical equipment of machines – Part 1: General requirements”
- EN ISO 13850: “Safety of machinery - Emergency stop - Principles for design”

In an Emergency:

Trigger the EMERGENCY STOP function at the higher-level plant/machine.

- Actuate the **EMERGENCY STOP** switch
- Interrupt the drive energy supply
 - Disconnect the power supply (e.g. electric actuator)
 - Switch off higher-level main switch
 - Pull out the power plug
 - Close the compressed air shut-off valve (e.g. pneumatic actuator)
- Disconnect the supply of cleaning medium (actuator energy)
 - Close the shut-off valve

9 Putting the Device Out of Service

Once the device has reached the end of its service life, it must be removed from the container, dismantled and disposed of in an environmentally friendly manner. Disposal must be performed in accordance with the respective valid local, national and international regulations.



NOTE ON EXPLOSION PROTECTION

Work on the device in an explosive atmosphere is PROHIBITED!

If this is not observed, the explosion protection could be disabled.

- Only allow instructed personnel to work in potentially explosive atmospheres.
- The personal protective equipment must meet the explosion protection requirements.
- Do not use a tool that could create sparks.



WARNING



Danger due to incorrect shutdown / disposal!

There is a risk of intoxication or chemical burns when using harmful or toxic media, or media that is hazardous in any other way.

There is a risk of death or severe physical injury.



- Have the work carried out by an expert only.
- Before starting work, observe the **work steps of the switch-off procedure** (see [Section 7.3 Switch-Off Procedure](#)).



- Use protective work clothing, protective gloves and safety goggles when carrying out the work.
- In case of any uncertainty or doubt, contact AWH.

Removal

Only experts are permitted to perform the removal from the container and the disassembly of the device for disposal. [Section 7.2 Removal](#) contains information on the removal of the devices and its interfaces. The safety instructions in [Section 7.1 Safety Instructions for Maintenance](#) must be observed.

9.1 Disposal



CAUTION



Danger from harmful fluids which are a health hazard!

During disposal, there is a risk of injury from contact with harmful fluids.

There is a risk of minor or moderate injuries.



- *Use personal protective equipment (e.g. protective gloves, safety shoes, safety goggles).*

NOTE



The cleaning device is made predominantly of stainless steel. Stainless steel is a valuable raw material and can easily be recycled.

After removal, for the correct disposal of the complete device

- Clean it (see [Section 7.4.6 Notes on Cleaning](#)) and
- Disassemble it into assembly groups and individual parts.

Unless other arrangements have been made for return or disposal, disassembled components should be recycled:

- Scrap any parts made of metal
- Recycle any parts made of plastic

If necessary, contact a specialist company to arrange for disposal.

Comply with the locally applicable health, safety, disposal and environmental protection regulations.

NOTE



Danger due to improper disposal!

Cleaning agents, consumables and lubricants must NOT be allowed to get into the groundwater, waterways or sewer system.

There is a risk of environmental damage.

- *Dispose of any cleaning agents, lubricants and consumables (e.g. brushes and cloths) which have been used for cleaning in accordance with the local regulations and in accordance with the information in the manufacturer's safety data sheets.*
- *Dispose of packaging materials in an environmentally friendly manner and have them recycled.*

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Change Record

Issue 2020 / 01 Rev.1

Significant changes from Issue 2020 / 01 Rev. 0

- Layout in cover page, header and footer of current pages and last page changed
- No changes to the content

Annexes

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Annex 1: Declaration (Translation)

Armaturenwerk Hötensleben GmbH
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 39393 Hötensleben
 Telephone: +49 39405 92-0
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Declaration for incorporation pursuant to the EU declaration of conformity pursuant to the EC Machinery Directive 2006/42/EC, Annex II B EC directive relating to Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres 2014/34/EC (ATEX)

We hereby declare that the container cleaning device

Designation: Retractor system with pneumatic actuator air/air

		Stroke				with head type				
		100	150	250	500	A	B	C	D	S
Type:	TANKO-RT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Type:	TANKO-RTS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Serial number:	See cover sheet									



is consistent with the following essential health and safety requirements according to the appendix of the Directive 2006/42/EC: no. 1, no. 1.1.2 (a + b), 1.1.3, 1.1.5, 1.3.2, 1.3.3, 1.3.4, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.7, 1.5.8, 1.5.13, 1.6.1, 1.6.3, 1.7.1, 1.7.3

The specific technical documents have been compiled in accordance with Directive 2006/42/EC, Annex VII, Part B.

The supplied version of the device corresponds to the following directives and standards:

Directive/Standard	Title	Version	Remarks
2006/42/EC	EC Machinery Directive	2006	
DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction	2011-03	Harmonized standard
	Correction of DIN EN ISO 12100:2011-03	2013-08	
DIN EN ISO 4414	Pneumatic fluid power - General rules and safety requirements for systems and their components	2011-04	Harmonized standard
2014/34/EU	EU Directive relating to Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres	2014	
DIN EN 1127-1	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology	2011-10	Harmonized standard
DIN EN ISO 80079-36	Explosive atmospheres - Part 36: Non-electrical devices for use in potentially explosive atmospheres - Basics and requirements	2016-12	Harmonized standard
DIN EN ISO 80079-37	Explosive atmospheres - Part 37: Non-electrical devices for use in potentially explosive atmospheres - Protection through constructional safety "c", ignition source monitoring "b", fluid encapsulation "k"	2016-12	Harmonized standard
DIN EN 60079-0	Potentially explosive atmospheres - Part 0: Equipment - General requirements	2014-06	Harmonized standard

Marking according to ATEX directive 2014/34 / EU and applied standards:


 II ½G Ex IIB/IIC T6/T6...T3 Ga/Gb
0044 II 1G/2D Ex IIB/IIIC T6/T95°C...T140°C Ga/Db
 II ½D Ex IIIC/IIIC T60°C...T70°C/T95°C...T140° Da/Db
 II 1D/2G Ex IIIC/IIC T60°C...T70°C/T6...T3 Da/Gb
 BVS 10 ATEX H 006 X

3. Supplement (N3) to the EC type test certificate BVS 10 ATEX H 006 X from the designated body DEKRA Testing and Certification GmbH, Certification department, code number 0158, Dinnendahlstraße 9, 44809 Bochum, Germany.

Quality assurance system according to DIN EN ISO/IEC 80079-34, certified by the designated body TÜV NORD CERT GmbH, identification number 0044, Langemarckstrasse 20, 45141 Essen, Germany.

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

Commissioning is prohibited until it is determined that the overall plant fulfills the provisions of the directives.

Hötensleben, 14. January 2021


Thomas Erhorn (CEO)

Person authorized to compile the technical documentation:
Armaturenwerk Hötensleben GmbH, Schulstr. 5-6; 39393 Hötensleben, Germany

Appendix 2: Corrosion Resistance of Steels (Excerpts from Data Sheets)

Material number 1.4301 (AISI 304) as a component that does not come into contact with the medium (e.g. clamp on the clamp connection).

Stainless austenitic chrome-nickel steel

1.4301 is the standard for austenitic chrome-nickel steels. It is used in numerous areas, because of its high corrosion resistance and ease of processing, as well as its attractive appearance in a high-gloss polished, ground or brushed condition. Because 1.4301 is not resistant to intergranular corrosion when welded, if large parts have to be welded and subsequent solution annealing is not possible, 1.4307 should be used.

The moderate carbon content of 1.4301 means that this grade tends to be sensitive. The formation of chromium carbides and the associated areas of depleted chrome around these depositions make this steel susceptible to intergranular corrosion. Although there is no risk of intergranular corrosion in the condition supplied (solution-annealed), it can set in after welding or when used at high temperatures. It exhibits good corrosion resistance in natural environmental media (water, rural and urban atmospheres) in the absence of significant chlorine and salt concentrations. 1.4301 is not suitable for applications involving contact with seawater, nor is it suitable for use in swimming pools.

Material no. 1.4401 (AISI 316)

The corrosion resistance of 1.4401 is significantly better than that of stainless steel grades 1.4301 and 1.4307, particularly when chlorides are also present, thanks to the addition of 2 - 3% molybdenum.

1.4401 has excellent corrosion resistance in natural environmental media (water, rural and urban atmospheres), as well as in industrial sectors with moderate chlorine and salt concentrations, in the food industry and the agricultural food sector.

Due to its relatively high carbon content it must be taken into account that 1.4401 is not resistant to intergranular corrosion.

Furthermore, it should also be pointed out that 1.4401 is not resistant to sea water.

Material no. 1.4404 / 1.4408 (AISI 316L)

The corrosion resistance of 1.4404 is significantly better than that of stainless steel grades 1.4301 and 1.4307, particularly when chlorides are present, thanks to the addition of 2–3% molybdenum.

1.4404 exhibits excellent corrosion resistance in natural environmental media (water, rural and urban environments), as well as in industrial sectors with moderate chlorine and salt concentrations, in the food and pharmaceutical industries and in the agricultural food sector. Due to its low carbon content 1.4404 is even resistant to intergranular corrosion after welding.

1.4404 is not resistant to sea water!

Material no. 1.4430

Austenitic TIG welding rod for similar types of stabilized and non-stabilized CrNi and CrNiMo steels, particularly in chemical plant construction. Resistant to heat and scaling up to 800 °C, and can be used with wet corrosion up to 400 °C. Not sufficiently resistant to nitric acid attack.

Used for base materials including: 1.4404; 1.4435 and 1.4571.

Material no. 1.4435 (AISI 316L)

1.4435 has excellent corrosion resistance in natural environmental media (water, rural and urban environments), in industrial sectors with moderate chlorine and salt concentrations, as well as in the food industry and the agricultural food sector. In addition, this grade is also resistant to various acidic media. As this material is also resistant to intergranular corrosion after welding, it complies with the following standardized test procedures:

DIN EN ISO 3651-2

The higher proportion of molybdenum in 1.4435 compared to 1.4404 makes it significantly more resistant to reducing acids and chloride media.

Material no. 1.4571 (AISI 316Ti)

1.4571 has good resistance to corrosion in most natural waters (urban and industrial), provided that the concentrations of chloride, salt, hydrochloric acid and organic acids are low to medium. 1.4571 has excellent corrosion resistance both in the food and beverage industry, as well as in the agricultural food sector.

As this grade is also resistant to intergranular corrosion after welding, it complies with the following standardized test procedures:

DIN EN ISO 3651-2

Material no. 2.4607

2.4607 is the filler material for the base material 2.4602, 2.4610, 2.4819

Stainless with high corrosion resistance in reducing media and above all oxidizing media

Material no. 2.4610 (HASTELLOY® C-4 alloy)

HASTELLOY® C-4 alloy belongs to the group of highly corrosion resistant nickel-chrome-molybdenum alloys and has good corrosion resistance even at higher temperatures.

HASTELLOY® C-4 alloy provides good resistance in reducing and oxidizing conditions, for example in hot, contaminated media such as sulfuric acid, nitric acid, dry chlorine, formic acid, acetic acid, solvents, chlorine and chloride media. This material is characterized by its low tendency for intergranular corrosion, stress corrosion cracking and pitting corrosion. Due to its excellent thermal stability HASTELLOY® C-4 alloy is extremely suitable for welding and is generally used in a welded state.

Material no. 2.4819 (HASTELLOY® C-276 alloy)

Nicrofer 5716 hMoW can be used in numerous chemical processes with both oxidizing and reducing media. Its high chrome and molybdenum content make the alloy resistant to attack by chloride ions. The tungsten content further improves this resistance. Nicrofer 5716 hMoW is one of the few materials that is resistant to damp chlorine gas, hypochlorite and chlorine dioxide solutions. The alloy has excellent resistance to concentrated solutions of oxidizing salts (such as iron III and copper chloride).

Notes



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