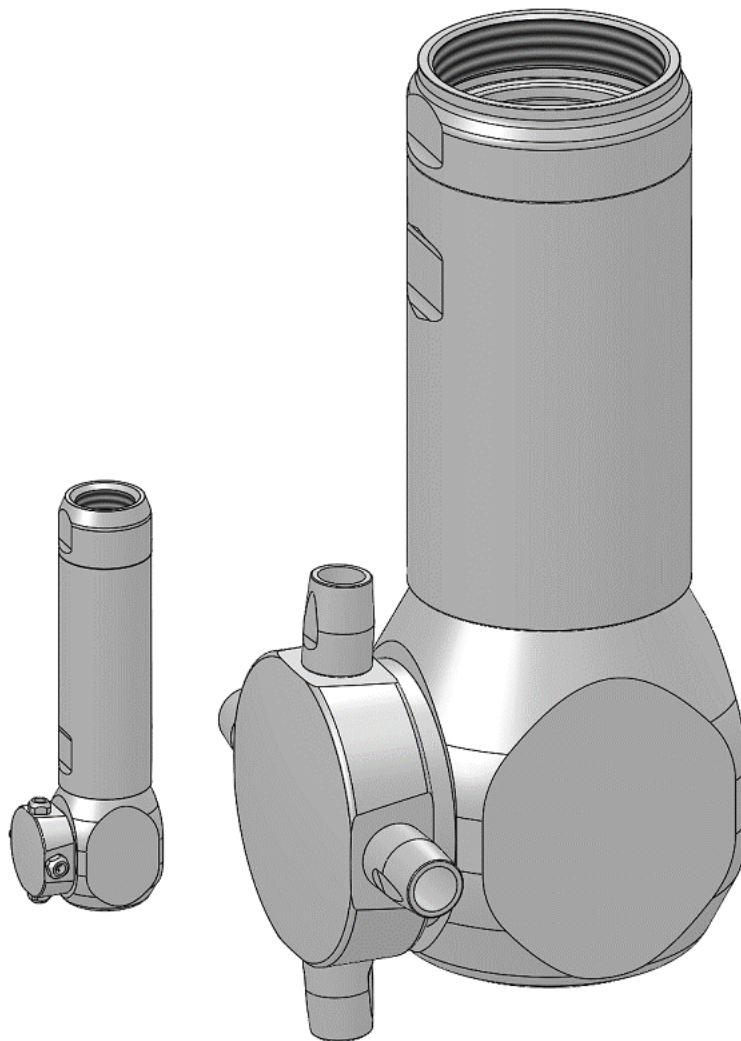


Original
Operating manual
Target Jet Cleaner
DO-S F - EX



Contents

1	<i>Introduction</i>	3
1.1	Impressum	3
1.2	Warnings	4
1.2.1	Explanation of signal words	4
1.2.2	Chapter-specific warnings	4
1.3	Limitation of liability	5
1.4	Copyright	5
1.5	Applicable documents	5
2	<i>Safety</i>	6
2.1	Proper use	6
2.2	ATEX area	6
2.3	Operating conditions	7
3	<i>Delivery, transport, storage</i>	8
3.1	Scope of delivery	8
3.2	Transportation	8
3.3	Storage	8
4	<i>Function</i>	9
5	<i>Mounting</i>	10
6	<i>Commissioning</i>	11
7	<i>Integration into a plant, operation</i>	12
7.1	Automatic control	12
7.2	Manual control	12
7.3	Emergency shutdown of the plant	12
8	<i>Faults</i>	12
9	<i>Technical data</i>	13
9.1	General	13
9.2	Designation	13
9.3	Permissible temperature ranges	14
10	<i>Maintenance</i>	14
11	<i>Disposal</i>	15
12	<i>EU declaration of conformity</i>	16

1 Introduction

This operating manual is a component of the ATEX cleaner and provides all the information required for operating the target jet cleaner.

The operating manual must be read and understood by all persons involved in:

- transport,
- assembly, dismantling,
- commissioning, operation,
- maintenance and inspection,
- occurrence of a malfunction,

in connection with the target jet cleaner.

The operating manual must be kept at the place of use of the target jet cleaner at all times. If the target jet cleaner changes ownership, the operating manual must also be passed on. In addition to this operating manual, general relevant rules, laws and regulations for accident and health protection must be observed.

1.1 Impressum

Dunos O-S - ATEX

Date September 2021

Revision 00

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1.2 Warnings

1.2.1 Explanation of signal words

Signal word		Meaning
	DANGER	Hazard with a high degree of risk. Failure to observe will result in serious or even fatal injuries.
	WARNING	Hazard with a medium degree of risk. Failure to observe may result in serious or even fatal injuries.
	CAUTION	Hazard with a low degree of risk. Failure to observe may result in minor / moderate injury.
	NOTICE	Hazard with a limited degree of risk. Failure to observe may lead to damage to property.

1.2.2 Chapter-specific warnings



DANGER

Warning of hazard with a high degree of risk. Failure to observe will result in serious or even fatal injuries.

- Measures to avoid the danger.



WARNING

Warning of hazard with a medium degree of risk. Failure to observe may result in serious or even fatal injuries.

- Measures to avoid the danger.



CAUTION

Warning of hazard with a low degree of risk. Failure to observe may result in minor / moderate injury.

- Measures to avoid the danger.

NOTICE

Warning of hazard with a limited degree of risk. Failure to observe may lead to damage to property.

- Measures to avoid the danger.

1.3 Limitation of liability

The legally prescribed liability conditions apply. Excluded from liability are:

- failure to observe this manual
- improper use
- use of untrained staff
- use of unauthorised replacement parts
- conversions performed by the operator, which have not been discussed with and authorised by the manufacturer.

Furthermore, the general terms and conditions also apply.

1.4 Copyright

Copyright applies to this manual.

© Copyright by AquaDuna GmbH & Co. KG (2021)

The transfer of this manual to third parties, reproduction in any way - even in the form of excerpts - as well as the use and/or disclosure of the contents without written permission is not allowed.

In individual cases, for in-house use by the operator or for the purposes of training, it is permissible to distribute the manual to third parties or to reproduce it.

1.5 Applicable documents

Technical data, dimensions, volume flows and pressures can be found in the data sheets of the individual types. Acceptance test certificates 3.1 and certificates on the FDA conformity of the plastics are supplied on request, subsequent delivery of the test certificates and FDA certificates is not possible.

2 Safety

2.1 Proper use

The target jet cleaners may only be operated in closed containers. Operation outside of a container can lead to severe injury from the highest impact of the emerging liquid jets. The cleaning agent would additionally be widely dispersed into the environment. Manual operation is generally prohibited! The target jet cleaner must be firmly mounted on the closed container, operation suspended from a hose is prohibited. No persons are allowed inside the closed container in which the cleaner is operated.



DANGER

Danger when operating beyond the intended use!

Failure to observe will result in serious or even fatal injuries.

- Operation only in closed containers.
- No persons may be present in containers in which the cleaners are operated under any circumstances.
- Operate only after the cleaner has been securely mounted.
- Never operate the cleaner manually.
- Never operate outside the limits specified in the ATEX designation.
- Never operate outside the limits specified in the 'Technical Data'.
- The chapters 'Assembly' and 'Commissioning' must be observed.
- Only trained personnel should be used.

2.2 ATEX area

In potentially explosive areas of zone 0, 1, 2 & 20, 21, 22, only appliances that are approved and marked for this purpose may be used.

The EX target jet cleaners are designed for use in the ATEX zones described and are therefore suitable for gas or dust environments.

The personnel for commissioning and inspection must be appropriately qualified for work in hazardous areas. Furthermore, the operator must ensure that the contents of the operating manual are fully understood by all persons involved in the installation, commissioning and operation of the EX target jet cleaners described.

Conversions, as well as modifications, to the EX target jet cleaners are forbidden and will always lead to the termination of ATEX approval.

Another or derived usage is not deemed to be approved usage and AquaDuna GmbH & Co. KG is not liable for the arising damage.

The Ex target jet cleaners have been constructed according to the state of the art and are safe to operate. From faulty operation or improper installation, hazards to life and limb of persons can arise, to the EX target jet cleaners themselves and to the operator's equipment.

2.3 Operating conditions

The following conditions must be observed in order to use the EC target jet cleaners in accordance with the operating conditions:

- The prevention of ignition sources caused by the cleaning process is the responsibility of the operator. (TRGS 727)
- The EX target jet cleaners must be integrated into the local equipotential bonding system. All conductive parts must be earthed or connected to other conductive parts. The leakage resistance must be lower than $10^6 \Omega$.
- After exchange of the EX target jet cleaner or the mounting for the supporting pipe (lance), the leakage resistance must be measured and a value of $10^6 \Omega$ must not be exceeded.
- The instructions in the chapter 'Assembly' must be observed!
- When installing the EX target jet cleaner inside a container, e.g. a tank, it should be observed that the distance of the EX target jet cleaner to the wall of the container or fittings is sufficient, so that any contact may be excluded.
- The cleaning medium with which the EX target jet cleaner is operated must have an ignition temperature that is at least 50 K above the maximum surface temperature (according to IEC 60079-20-1); the behaviour of the ignition temperature at the pressures applied must be taken into account!
- If the EX target jet cleaner is operated in a dust explosive atmosphere, then a maximum of 2/3 of the minimum ignition temperature of the dust cloud may be attained. Attention, the operator must consider the behaviour of the ignition temperature at the pressures applied!
- The minimum conductivity value of the cleaning agent must not be below 1000 pS/m.
- The Ex target jet cleaner must not be powered by gas or steam, as otherwise a hazardous electrostatic charge within the Ex target jet cleaner can potentially arise. In order to exclude operation with gas also with the start-up of the pump, the shut-off device must be situated directly before the Ex target jet cleaner. The piping volume between the shut-off device and the Ex target jet cleaner must be as small as possible. All piping must be ventilated.
- The EX target jet cleaners must be operated with a pre-filter with a minimum mesh size of 500 μm .
- The maximum permissible temperatures for the operation of the EX target jet cleaners are described in chapter 'Technical Data'.



DANGER

Danger in case of violations of the operating conditions!

Failure to observe will result in serious or even fatal injuries.

- Compliance with all points of the conditions described above is the responsibility of the operator.

3 Delivery, transport, storage

3.1 Scope of delivery

The scope of delivery includes the EX target jet cleaner, these operating instructions and the applicable data sheet.

3.2 Transportation

Our products are manufactured, assembled and checked with the greatest diligence. However, should there be any grounds for complaint, we will of course rectify these in the context of our warranty. Even after the warranty period, we will be glad to assist you. For all deliveries, it is fundamental that the delivery note be compared with the scope of delivery. After establishing that everything is present, the goods are to be checked for damage.

Should damage be evident, then a note made on the delivery papers is vital. The damage must be counter-signed by the carrier. For returns, either the packaging is to be retained or such packaging is to be chosen, so that the equipment does not risk becoming damaged.



CAUTION

Danger when unpacking!

Failure to observe may result in minor / moderate injury.

- By being careful when unpacking the target jet cleaner, bruising of fingers between the nozzle disc and the nozzles can be avoided.

3.3 Storage

We recommend that the product and the storage conditions be checked regularly in case of prolonged storage. No objects should be stored on the products and the target jet cleaners should be protected from moisture, dust and dirt.

The products should be stored in a dry, well-ventilated room at a constant temperature (optimum room temperature 25°C ±5° and room humidity 70% ±5%). Protect sealing elements, sliding bearings and plastic parts from UV light and ozone.

NOTICE

Damage due to incorrect storage

Failure to observe may lead to damage to property.

- Damage to the target jet cleaner can be avoided by observing the storage recommendations.

4 Function

Target jet cleaners, also called orbital cleaners, are used to clean dirty containers, for example in the food, pharmaceutical, plastics or paint industries.

The cleaners are inserted into the containers to be cleaned, either stationary or mobile.

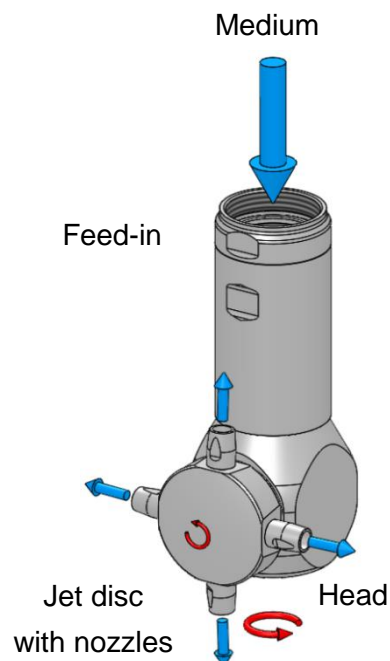
The target jet cleaners are driven by the cleaning medium. The medium is fed via a turbine drive, which drives the head and thus the nozzle disc via a planetary gear.

The cleaning medium is directed through the nozzles and brought onto the container wall at high speed.

The rotating head and the orbital rotating nozzle disc on the head create a jet pattern that hits every part of the container after a certain number of revolutions.

Due to high impact forces and the rinsing effect of the medium constantly flowing off the container wall, the container is effectively cleaned.

The selection of the cleaning medium and the duration of the cleaning is up to the operator.



WARNING

Danger from the cleaning medium!

Failure to observe may result in serious or even fatal injuries.

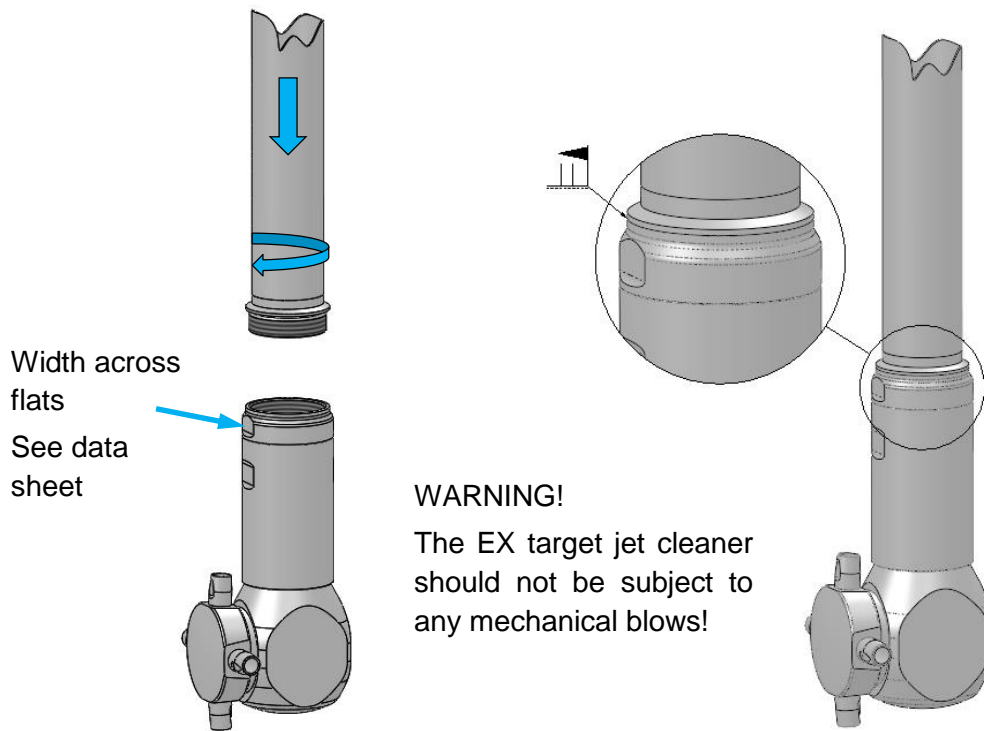
- The operator is responsible for the type and handling of the cleaning media. Safety data sheets
- The operator is responsible for observing the materials used for the target jet cleaner and their resistance to the medium.

5 Mounting

Observance of operating conditions is to be ensured. If the EX target jet cleaners are mounted by the operator on a support tube (lance), the interface between the customer support tube and the EX target jet cleaner must be fixed with a safety weld seam. The cleaner may only be tightened at the upper spanner flat marked by the arrow! The width across flats can be found in the data sheet.

The securing seam must be applied in such a way that an O-ring inserted for sealing is not damaged.

During assembly inside a container, e.g. a tank, it should be observed that the distance of the Ex target jet cleaner to the wall of the container or fittings is sufficient, so that any contact may be excluded.



DANGER

Danger in case of assembly errors!

Failure to observe will result in serious or even fatal injuries.

- Careful assembly prevents the cleaner from detaching from the support tube and falling into the container under certain circumstances.
- Collisions are avoided by observing the distances between the EX target jet cleaner and the container wall or container installations.
- The installation of the target jet cleaners is to be entrusted exclusively to trained persons who have been adequately trained for this purpose.

6 Commissioning

Before commissioning, the target jet cleaner must be properly installed and the container and media connections must be checked.

The EX target jet cleaners must be integrated into the local equipotential bonding system. All conductive parts must be earthed or connected to other conductive parts. The leakage resistance must be lower than $10^6 \Omega$.

The filter with the fineness prescribed in the technical data must be checked and the media lines must be free of impurities. Welding residues, if they get into the cleaner, can lead to its destruction.

The media line must be vented to ensure that the cleaner is not operated with gas or steam.

The points in the chapter 'Operating conditions' must be observed!

Manually operated valves must be opened slowly to avoid pressure surges.

For operation in automated facilities, operators must be familiar with the shutdown process or the emergency stop procedure for the facility.

Local regulations, rules and laws must be observed.



DANGER

Danger in case of violations of the operating conditions and proper use!

Failure to observe will result in serious or even fatal injuries.

- Compliance with all points of the conditions described is the responsibility of the operator.
- Commissioning is to be entrusted exclusively to trained persons who have been adequately trained for this purpose.



CAUTION

Danger when operating!

Failure to observe may result in minor / moderate injury. Depending on the type and design of the system or the container, the legally prescribed sound level may be exceeded.

- The operator shall ensure that noise-reducing measures are taken.

7 Integration into a plant, operation

7.1 Automatic control

If the EX target jet cleaners are integrated into an automatically running facility, then it is to be ensured that the cleaner can be monitored during its functioning. This must be done by visual inspection. The function check must be documented.

7.2 Manual control

If the EX target jet cleaners are to be controlled by hand-guided means, then it must be observed that pressure shocks are avoided. The servicing elements are thus to be opened and closed slowly. If steam is applied to the cleaner externally, it must be ensured that the temperature does not exceed the specified limits.

7.3 Emergency shutdown of the plant

To be able to bring about an emergency shutdown of the EX target jet cleaner, it is essential that the operators of the facility are familiar with the facility's design.

It is vital, that training in emergency shutdown be given and the necessary elements for emergency shutdown be known. The training of those entrusted with cleaning is to be documented.

The manufacturer's liability for the consequences of incorrect plant operation is excluded.



DANGER

Danger in case of violations of the operating conditions and proper use!

Failure to observe will result in serious or even fatal injuries.

- Compliance with all points of the conditions described is the responsibility of the operator.
- The operation of the EX target jet cleaners is to be entrusted exclusively to trained persons who have been adequately trained for this purpose.

8 Faults

If faults occur, e.g. cleaner does not rotate, medium does not come out,

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should be informed.

9 Technical data

9.1 General

Technical data for standard design	
Ambient temperature	Maximum 135°C
Agent temperature	Maximum 97°C
Agent conductance	>1000 pS/m
Filter size	500 µm
Materials	Stainless steel 1.4404; PEEK; PEEK TF10; TFM 1600; EPDM, zirconium oxide. special seals in FKM and FFKM on request.

Maximum pressures Standard designs	
Type	P _{max.} [bar]
DO-S 050	12
DO-S 065	12
DO-S 080	12
DO-S 100	15
DO-S 125	15
DO-S 150	15
DO-S 200	15

Other sizes and connections are available in addition to the standard thread sizes of the media connections listed. Special designs in various stainless steels on request.

NOTICE



Danger due to the use of unsuitable cleaning media!

Failure to observe may lead to damage to property.

- The units may only be operated with media to which the listed materials are chemically resistant in the specified temperature and pressure ranges!

9.2 Designation

EX target jet cleaners are marked as equipment according to:

 II 1 G Ex h IIB T6...T4 Ga
 II 1 D Ex h IIIC T85°C...T135°C Da

the marking is engraved on the EX target jet cleaner.

The EU type examination certificate number is: **TPS 21 ATEX 051981 0023 X**

9.3 Permissible temperature ranges

The surface temperature of the cleaner depends largely on the ambient and media temperature. The permissible values can be found in the following table.

Permissible ambient temperature range	Temperature class (gas)	Permissible surface temperature (dust)	Maximum temperature of the cleaning medium in °C ¹
$4\text{ °C} \leq T_a \leq 108\text{ °C}$	T4	T135°C	97
$4\text{ °C} \leq T_a \leq 80\text{ °C}$	T5	T100°C	80
$4\text{ °C} \leq T_a \leq 68\text{ °C}$	T6	T85°C	68

¹ Incl. safety margin according to DIN EN ISO 80079-36

10 Maintenance

Depending on the operating conditions, the EX target jet cleaner must be checked visually for external damage, rotation function and spray pattern at regular intervals.

Maintenance of the EX target jet cleaner by the manufacturer is recommended after a **maximum of 300 operating hours**. Depending on the prevailing operating conditions, such as operating pressure, temperature, properties of the medium or influence on the operator's plant, it may be necessary to carry out maintenance at an earlier point in time.

Maintenance and installation of the EX target jet cleaner can only be carried out at the manufacturer's works, as defined safety welding seams must be applied after assembly.

The ATEX approval expires after dismantling of the EX target jet cleaner by the operator or third parties.



DANGER

Danger in case of unauthorised disassembly!

Failure to observe will result in serious or even fatal injuries.

- Only the manufacturer is authorised to dismantle the cleaner, replace wear parts and assemble the cleaner. A functional test is carried out according to specified criteria before delivery of the EX target jet cleaners.

11 Disposal

All materials used for the production of the EX target jet cleaner are not harmful to the environment. These are stainless steel 1.4404, PEEK, PEEK TF10, TFM 1600 (PTFE), EPDM, possibly zirconium oxide, FKM and FFKM.

These materials are able to be disposed of in the manner intended for them.

WARNING!

It is to be ensured that no contamination from substances during operation is still present. In this regard, corresponding substances are to be used in rinsing those parts to be disposed of.

12 EU declaration of conformity

We hereby declare that the

Equipment: DO-S

Series: 050 / 065 / 080 / 100 / 125 / 150 / 200

of the DIRECTIVE 2014/34/EU OF THE EUROPEAN PARLIAMENT AND COUNCIL of 26th February 2014 for the harmonisation of the laws of the member states relating to equipment and protective systems intended for use in potentially explosive atmospheres.



II 1 G Ex h IIB T6...T4 Ga



II 1 D Ex h IIIC T85°C...135°C Da

EU type examination was carried out by the stated body, TÜV SÜD Product Service 0123, under certificate number **TPS 21 ATEX 051981 0023 X**. The above-described subject of the declaration fulfils the relevant harmonisation of laws of the Union, where the following harmonised standards are used:

DIN EN 1127-1, Explosive atmospheres - Explosion prevention and protection – Basic concepts and methodology.

EN ISO 80079-36, Explosive atmospheres - Non-electrical equipment for explosive atmospheres - Basic method and requirements.

EN ISO 80079-37, Explosive atmospheres - Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"

The associated operating manual contains important safety-related notices and instructions for commissioning of the said equipment, according to Directive 2014/34/EU (ATEX).

Modifications and repairs to the said equipment are not permissible, without the express, written consent of the manufacturer.

Should the said equipment be installed within superior machinery, then the new risks arising from the installation must be assessed by the manufacturer of the new machinery.

The sole responsibility of the production of this declaration of conformity remains with the manufacturer.

AquaDuna GmbH & Co. KG, Sternenfels, September 2021



Sebastian Vogel,

Managing Director