

Operating manual



DUNOS_R - ATEX

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DUNOS_R operating manual

1. General

1.1. Information about this manual

This manual contains important information on the ability to operate retractors safely in confined, potentially explosive areas. The operator must ensure that this manual has been carefully read and understood by all persons charged with installation, operation and maintenance of the appliance. The basis of working in safety is the observance of all safety notices provided.

The manual is an essential part of the product and must be kept freely available at all times to every person handling the product.

In addition to the notices in this manual, the local accident prevention regulations and national workplace safety requirements also apply.

1.2. Symbols used



This symbol indicates an imminent danger, which can lead to severe injuries or death.



This symbol indicates a potential danger, which can lead to severe injuries or death.



This symbol indicates a potential danger, which can lead to mild to severe injuries.



This symbol indicates a potential danger, which can lead to damage to property.

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 (2020)

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. Warranty

The legally prescribed warranty period of one year shall apply. Supplementary warranty conditions may be referred to in the sales documentation.

2. Safety

2.1. ATEX area



In potentially explosive areas of zone 0, 1, 2 & 20, 21, 22, only appliances may be implemented for the application purposes of the design and certified, authorised and designated by ATEX.

The application area of the rotation cleaner has been designed for the prescribed ATEX zones and thereby suitable for a gaseous and dusty environment.

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

Repairs may only be carried out by AquaDuna GmbH & Co.KG, the operator is not entitled to do so. ATEX approval is withdrawn following unauthorised manipulation of the rotation cleaners.

The rotation 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 rotation cleaners themselves and to the operator's equipment.

2.2. Proper use

Rotation cleaners are intended for the internal cleaning of enclosed containers.



Operation outside of a container can lead to severe injury from the high impact of the emerging liquid. The cleaning agent would additionally be widely dispersed into the environment.

The pre-conditions for safe operation of the rotation cleaner may be found in the following chapter, Operating conditions!

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

2.3. Operating conditions



For the proper use of the rotation cleaner, the observance of the following conditions is essential, with non-observance carrying the threat of severe injury.

The avoidance of ignition sources, that are caused by the cleaning process, such as, for example, hazardous electrostatic charges from the spraying of liquids, lies within the operator's range of responsibility. (TRGS 727)

- The rotation cleaner must be subject to local equipotential bonding. All conductive parts must be permanently earthed or connected to other conductive parts. The leakage resistance must be lower than $10^6 \Omega$.
- After exchange of the rotation 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 minimum conductivity value of the cleaning agent must not be below 1,000 pS/m, measured in accordance with DIN 50412.
- The cleaning agent, used for operating the rotation cleaner, must attain at most 80% of its ignition temperature, whose maximum value is 97°C!
- If the rotation cleaner is operated in a dust explosive atmosphere, then a maximum of 2/3 of the minimum ignition temperature of the dust cloud should ever be attained.
- The rotation cleaner should be operated with a 500µm prefilter.
- Rotation cleaners should not be used for the cleaning of containers in which explosive atmospheres of ignition group IIC are situated.
- Cleaning agents other than water, e.g. hydrocarbon containing solvents, are only permissible, if the cleaning agents do not contain more than 1% fluid content, which may build to a second phase. Operating pressure in this case must be lower than 50 bar, the fluid throughput per cleaning agent <60 L/min and the container diameter must be a maximum of 3m.
- The rotation cleaner must not be powered by gas or steam, as otherwise a hazardous electrostatic charge within the rotation cleaner can potentially arise. In order to exclude operation with gas also with the start-up of the pump, the shut-off device should be situated directly before the rotation cleaner. The piping volume between the shut-off device and the rotation cleaner should be as small as possible. All piping should be ventilated.
- When installing the rotation cleaner inside a container, e.g. a tank, it should be observed that the distance of the rotation cleaner to the wall of the container or fittings is sufficient, so that any contact may be excluded.

- All mechanical connections should be secured against self-loosening. Before commissioning, the rotation cleaner should be checked for smooth running and firm positioning.
- The maximum permissible temperature of the cleaning agent is 97°C.

The operator is responsible for observance of the conditions.

2.4. Staff qualifications

The operator of the rotation cleaners is obliged to train the assembly and operating staff. All persons handling rotating and spraying devices in the ATEX area must have been instructed on the hazards connected with these appliances.



Persons who are not registered as operating staff should not linger within the operating area of the appliances. The operator must assure the necessary measures.

3. Technical data

3.1. Function


The DUNOS_R rotation cleaner is intended for the cleaning of containers and tanks. The cleaning agent flows through the cleaner and causes the rotational movement through slotted nozzles. Simultaneously a hydrodynamic bearing of the cleaner's housing occurs, which stays almost wear-free during operation.

The cascades emerging from the slotted nozzles extensively strike the wall of the container. The thereby emerging washing-down forces remove deposits from the container wall and potentially the fittings. According to the deposit for cleaning away, a cleaning agent is to be added, whose type and dosage is to be set by the operator.

3.2. Designation

The designation for the approved ATEX area rotation cleaner is:

 **II 1 G Ex h IIB T4 Ga**

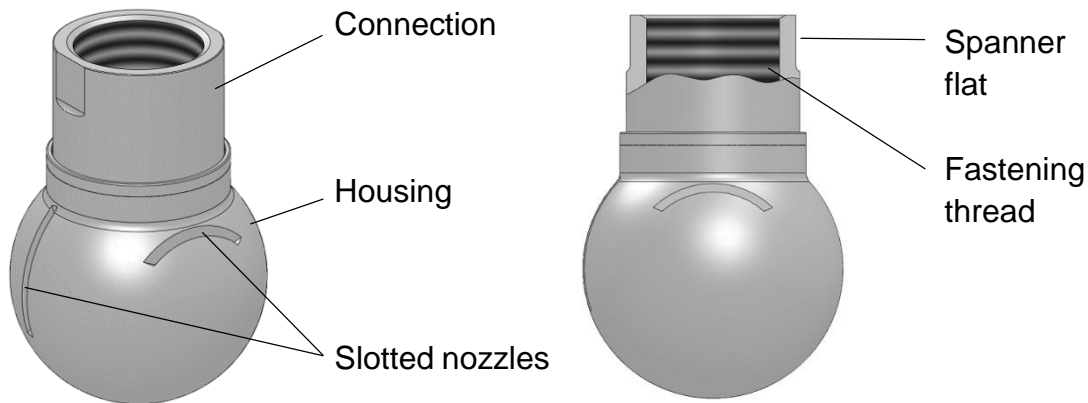
 **II 1 D Ex h IIIC 135°C Da**
4°C ≤ Ta ≤ 97°C

The designation is engraved on the rotation cleaner. The EU type examination certificate number is: **TPS 19 ATEX 0511981 0017 X**

3.3. Operating values

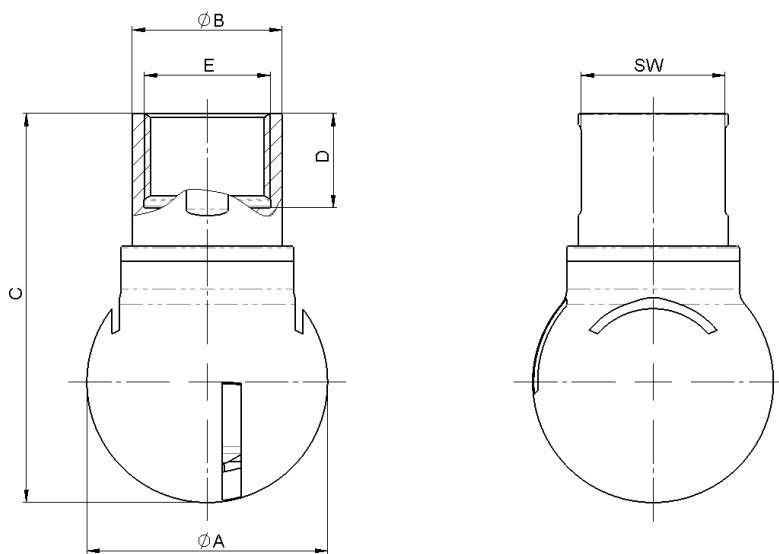
Agent temperature:	max. 97°C
Pressure:	max. 12 bar
Filter:	500µm

3.4. Structure



The DUNOS_R rotation cleaners for the ATEX area are deliverable in the standard versions of DR15, DR32, DR40, DR60 and DR90. The form and arrangement of the slotted nozzles are variable, the range of types is described as follows.

3.5. Measurements

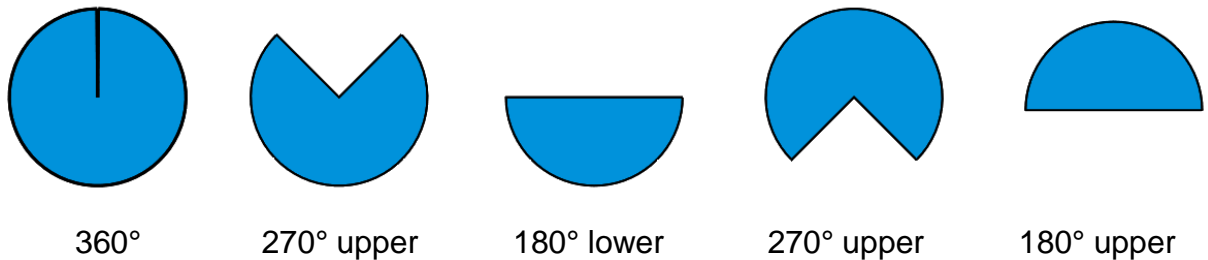


Standard measurements						
TYPE	Ø A [mm]	Ø B [mm]	C [mm]	D [mm]	E [INCHES]	SW [mm]
DR 15	15.8	10.8	28	5	1/8	10
DR 32	31.8	19.8	51	12.5	3/8	19
DR 60	59.8	39.8	88	20	¾ and 1	38
DR 90	94.8	63.8	124	18.5	2	62

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3.6. Arrangement of the slotted nozzles

From the arrangement of the slotted nozzles, the following spraying angles may be achieved:



At the customer's request, variations to spraying angles may be made.

3.7. Special versions



At the customer's request, the thread connections specified may be replaced with customised welding ends. (→ Illustration)

Thread connections may also be equipped with non-standard threads.

In all cases, when the standard measurements are customised, a construction check by us of the desired geometrics is necessary.

3.8. Material

Standard material: for stainless steel parts 1.4404,
for the PEEK TF10 bearings.

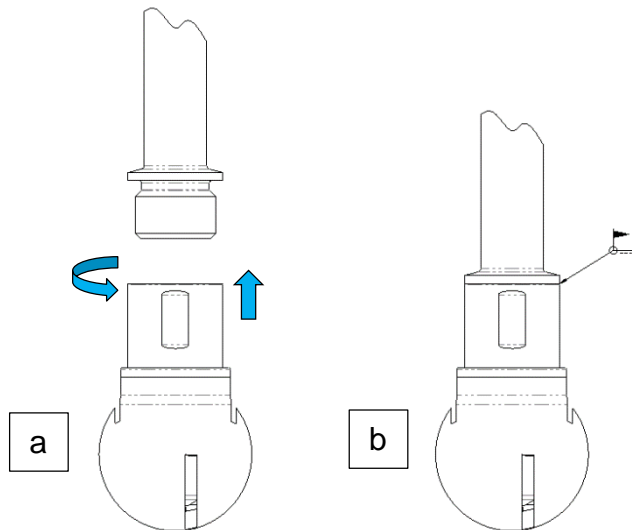
At the customer's request, special materials may be used, for example, 1.4435, 1.4571 or hastelloy.

4. Installation and commissioning

4.1. Mounting

After unpacking the rotation cleaner, the cleaner should then be checked over for outer damage.

Should no supporting pipe (lance) be delivered ready-mounted, the following mounting instructions should be observed:



WARNING!

The rotation cleaner should not be subject to any mechanical blows

- a) Screw the cleaner onto a suitable connection, using spanner flats.
- b) Weld cleaner and supporting pipe with safety joints.



The locking weld prevents potential loosening (from vibrations), thereby ensuring that the rotation cleaner cannot fall inside the tank or container. Any potential risk of ignition can thereby be excluded. Insecure cleaners must not be brought into service!

4.2. Bringing into service



Before commissioning, the agent supply piping to the rotation cleaner is to be rinsed through. Metallic impurities and welding residue may lead to damage to the rotation cleaner.

The prefilter in the agent supply piping to the rotation cleaner must be checked for proper function and the filter body (500µm) must be installed. (Chap. 3.3.)

During commissioning, it must be ensured that the agent supply piping to the rotation cleaner is ventilated. (Chap. 2.3.)

For hand-guided fittings, these are not to be opened abruptly in order to avoid pressure shocks.

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5. Operation

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



Observance of operating conditions (Chap. 2.3.) is to be ensured.



The rotation cleaner should not be subject to any mechanical blows, it is essential to avoid any pressure shocks.

Fundamentally, rotation cleaners are maintenance-free. Any potentially necessary servicing work is only permissible by the manufacturer. The warranty is void following servicing work carried out by the operator.



After each application, the cleaner is to be cleansed of cleaning agent residue by rinsing with a neutralising detergent. Then a visual inspection as well as a check of the cleaner for damage are to be carried out. Only undamaged rotation cleaners should be implemented.

6. Integration and activation

6.1. Integration into a cleaning facility

If the rotation cleaner is integrated into an automatically running facility, then it is to be ensured that the rotation cleaner can be monitored visually during its functioning. The function check is to be documented during such inspections.

6.2. Activation using hand-guided controls

If the rotation cleaner is 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.

7. Emergency shutdown

In order to bring about an emergency shutdown of the rotation 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.

8. Transportation

8.1. Scope of delivery

Included within the scope of delivery are the complete rotation cleaner and this operating manual.

For optional versions, please extract these from the delivery paperwork.

8.2. Transportation and packaging

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 become damaged.

9. Quality assurance

Quality of construction, manufacture, assembly, final inspection and checking are second nature to us. It represents an absolute precondition for the enduring, efficient and high-value production of our sophisticated products.

All our products undergo a final functional test (100% check). We thereby ensure that only reliable products are allowed to leave our premises.

10. Disposal

All materials, stainless steels and PEEK used in production of the EX rotation cleaner are not harmful to the environment. These materials are able to be disposed of in the manner intended for them.



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

11. Masthead

Original operating manual

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12. EU Declaration of conformity

We hereby declare that the

Equipment: DUNOS_R

Series: DR15 / DR32 / DR40 / DR60 / DR90

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 T4 Ga



II 1 D Ex h IIIC 135°C Da

4°C ≤ Ta ≤ 97°C

EU type examination was carried out by the stated body, TÜV SÜD Product Service 0123, under certificate number **TPS 19 ATEX 051981 0017 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, November 2021



Sebastian Vogel,

Managing Director

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