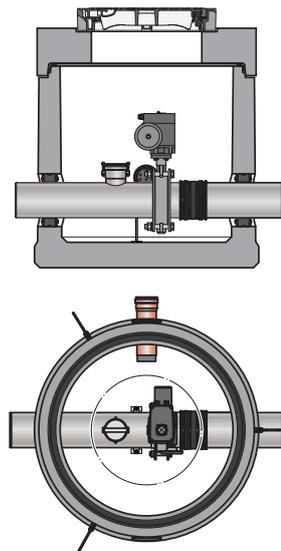


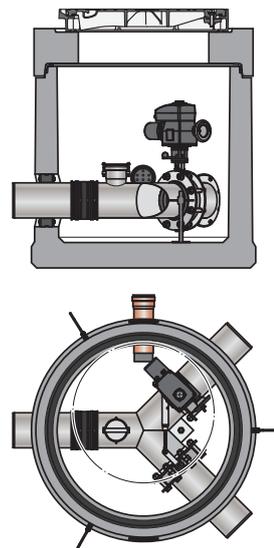
Flowshut-C and Flowswitch-C

Shaft system for below ground installation

Flowshut-C Shut-off shaft



Flowswitch-C Diversion shaft



For safe and proper use, read carefully through the instructions for use and all other documents enclosed with the product, pass them on to the end user and keep them until the end of the product's life.

Introduction

ACO Tiefbau Vertrieb GmbH (referred to as ACO in the following) thanks you for your trust and hands over to you a product which is state-of-the-art and has been tested for proper condition as part of quality controls carried out before delivery.



Figures in these instructions for use are provided for basic understanding and may differ, depending on the product version and the installation situation.

ACO Service

Accessories, see "Product catalogue":  <http://katalog.aco-tiefbau.de>

For further information on the retaining system, ordering spare parts and services, e.g. maintenance contracts, general inspections, please contact ACO Service.

ACO Service Tel.: + 49 (0) 36965 819-444

Im Gewerbepark 11c Fax: + 49 (0) 36965 819-367

36457 Stadtlengsfeld, Germany service@aco.com

Target group

The target group for these operating instructions is technically trained skilled personnel.

The personnel must have the appropriate qualifications,  Chap. 1.3 "Personnel qualifications". Areas of responsibility, competence and monitoring of the personnel must be closely regulated by the operator. Any lack of knowledge in the personnel must be rectified through training and instruction by adequately trained skilled personnel. Training on the system shall be carried out only under the supervision of technical skilled personnel.

Guarantee

For information on the guarantee, see General Terms and Conditions of Business ("Allgemeine Geschäftsbedingungen"),

 <http://www.aco-tiefbau.de/agb>

Symbols used

Certain information in these instructions for use is marked as follows:



Tips and additional information, which make the work easier

■ Bullet points

→ Actions to be carried out in the specified order

 References to other information in these instructions for use and other documents

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1 For your safety



Read the safety instructions before installation and commissioning, in order to prevent personal injuries and damage to property.

1.1 Intended use

1.1.1 Flowshut-C

In order to avoid the introduction of water-polluting substances into the sewage network in the event of damage, the ACO Flowshut-C (shut-off shaft) closes the pipeline electrically via a motor-operated check flap when the emergency switch is pressed. The water-polluting substance is retained in the pipeline and on the damage surface. Even during normal operation, pipes with the shut-off shaft can be safely closed for operational reasons. The materials of the installation parts, the piping and the check flap must be designed to be resistant to water-polluting liquids,  Chap. 1.1.3 "Resistance testing".

1.1.2 Flowswitch-C

The ACO Flowswitch-C (diversion shaft) ensures the separate drainage of different polluted wastewater substreams. The diversion takes place using two check flaps with an electric swivel drive.

For example: Diverting a water-bearing pipeline to two different receiving devices:

- Drainage of surfaces on which water-polluting substances can accrue
- Drainage of a transshipping station either into the sewage system (only surface water – with events that are not subject to safety standby) or into a collecting basin for water-polluting liquids (with safety standby)

The materials of the installation parts, the piping and the check flap must be designed to be resistant to water-polluting liquids,  Chap. 1.1.3 "Resistance testing".

1.1.3 Resistance testing

The following versions of Flowshut-C or Flowswitch-C with differentiating product features are available as standard (complete feature comparison  Chap. 2.1 "Product features"):

	Flowshut-C or Flowswitch-C	
	A*	B*
Flap disc	Stainless steel/NBR** coated	Stainless steel/NBR** coated
Sealing sleeve	NBR**	NBR**
Swivel drive	Without Ex-protection	With Ex-protection
Piping	Stainless steel	Stainless steel
* Design code letter		
** Acrylonitrile butadiene rubber		



Further combinations upon request!

The following substances may be introduced to the various versions (differentiation per code letter,  table above) of the Flowshut-C or Flowswitch-C:

No.	Substance to be introduced	A	B
1	Petrol fuel, 'Super' and 'Normal' (per DIN EN 228: 2004) with max. 5% by vol. bio-alcohol	+	+
1a	Petrol fuel, 'Super' and 'Normal' (per DIN EN 228: 2004) with max. 20% by vol. bio-alcohol	+	+
2	Aviation fuel	-	-
3	<ul style="list-style-type: none"> ■ Heating oil EL (per DIN 51 603-1) ■ Unused combustion engine oils ■ Unused motor vehicle transmission oils ■ Mixtures of saturated and aromatic hydrocarbons with aromatics content of $\leq 20\%$ by weight and a flashpoint $> 60^{\circ}\text{C}$ 	+	+
3b	Diesel fuel (per DIN EN 590: 2004) with max. 20% by vol. bio-diesel (per DIN EN 14214 2003-11)	+	+
4	All hydrocarbons as well as mixtures containing benzene with max. 5% by vol. benzene	-	-
4a	Benzene and mixtures containing benzene	-	-
4b	Crude oils	+	+
4c	Used combustion engine oils and used motor vehicle transmission oils with a flashpoint $> 55^{\circ}\text{C}$	-	-
5	Monohydric and polyhydric alcohols (up to max. 48% by vol. methanol), glycol ethers	-	-
5a	All alcohols and glycol ethers (e.g. brake fluids, ethylene glycol monobutyl ether (EGMBE), diethylene glycol monobutyl ether (DGMBE), ethylene glycol monoethyl ether (EGEE), propylene glycol-n-butyl ether (PnB), propylene glycol methylether (PGME))	+	+
5b	Monohydric and polyhydric alcohols $\geq \text{C}2$ (e.g. ethylene glycol (frost protection), glycerine, isopropanol)	-	-

No.	Substance to be introduced	A	B
6	Halogenated hydrocarbons $\geq C_2$ (e.g. DDE, DDD, chlordane)	-	-
6b	Aromatic halogenated hydrocarbons (e.g. DDT, chlorobenzene, 2-chlorobenzene, CS gas, eosin, merbromin, tetrabrombisphenol, decabromdiphenylether (flame retardant), fluorobenzene, bromobenzene, chlorobenzene, iodobenzene)	-	-
7b	Bio-diesel (per DIN EN 14214: 2003-11)	-	-
8	Aqueous solutions aliphatic aldehydes up to 40% (e.g. formaldehyde, acetaldehyde)	-	-
8a	Aliphatic aldehydes and their aqueous solutions	-	-
9	Aqueous solutions of organic acids (carbonic acids: acetic acid, citric acid, acrylic acid, oxalic acid, fumaric acid, benzoic acid, nicotinic acid, abietic acid) up to 10% as well as their salts (in aqueous solution)	-	-
10	Mineral acids up to 20% as well as acid hydrolizing, inorganic salts in aqueous solution (pH < 6), except for hydrofluoric acid and oxidising acids and their salts (e.g. sulphuric acid, z. B. nitric acid, phosphoric acid, hydrochloric acid, silicic acid, boric acid)	-	-
11	Inorganic alkalis as well as alkali hydrolizing, inorganic salts (e.g. sodium chloride, calcium chloride) in aqueous solution (pH > 8), with the exception of ammonia solution and oxidising salt solutions (e.g. hypochlorite)	-	-
12	Aqueous solutions of inorganic salts (e.g. ammonium chloride, zinc chloride, potassium chloride, barium chloride) with a pH value between 6 and 8	-	-
14	Aqueous solutions of organic tensides, tensides of natural origins (e.g. soaps that have been made through the saponification of natural raw materials) fatty alcohol polyglycol ethers (FAE), fatty alcohol sulphates (FAS), fatty alcohol ether sulphates, fatty alcohol polyglycol ethers, methyl ester sulphonates, fatty acid methyl esters, alkyl polyglycosides	+	+
+ = Suitable - = Unsuitable			

Other possible uses and changes are not allowed. Installation of unapproved parts impairs safety and excludes any guarantee from ACO. In the event of replacement, only use original ACO parts or spare parts approved by ACO.

1.2 Special provisions for Flowshut-C

Design and dimensioning

- The installation of the retaining system must be expertly planned.
- Design documentation for the installation of the retaining system must be generated. In doing so, the regulations and provisions relating to water legislation must be taken into account along with the anticipated loads.

- Any buoyancy safeguard required is incorporated into every new planning.
- The planning of the system will include the verification that the components of the retaining system are resistant to the water-polluting liquids.

Installation

The installation of the retaining system shall be undertaken only by companies that are considered qualified contractors for such tasks in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.

Operation

- According to § 46 (AwSV) of the ordinance dealing with systems for handling water-polluting liquids, the system operator is obligated to carry out continuous monitoring for leaks and the functional capability of the retaining system.
- The retaining system shall be operated only by persons who have been trained for this purpose. The relevant health and safety regulations must be observed during all work.
- For the maintenance, repair and cleaning of the retaining system, the system operator is obligated to commission only those companies that are qualified contractors for such work in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.

Checks

- A final commissioning check of the retaining system installed, to ensure that it complies with water-related legislation, is carried out by an expert by means of a functioning test and visual inspection of all areas of the retaining system.
- The retaining system is to be checked every six months or after every fifth filling procedure with regard to its protective function. ACO Service would be pleased to undertake the servicing and maintenance work professionally. Maintenance contract request ✉ tiefbau@aco.com.
- A statement should be made with regard to the results of the testing within the scope of the certificates to be issued in accordance with occupational safety or water-related legislation.

Operating log

The operating log (can also be acquired from ACO as an option) must be maintained.

1.3 Personnel qualifications

Activities	Person	Knowledge
Layout, operational changes	Planners	Knowledge in the sense of § 17 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.
Below ground installation	Skilled persons	Qualified contractors in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.
Installation	Skilled persons	Qualified contractors in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.
Electrical installation	Electrician	Work on electrical connections to power supply must be carried out by qualified electricians only
Commissioning, operational monitoring and checking	Qualified persons	Expert in the sense of § 47 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.
Maintenance, repair	Qualified persons	Qualified contractors in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.
Disposal	Skilled persons	Qualified contractors in the sense of § 62 (AwSV) of the ordinance dealing with systems for handling water-polluting substances.

1.4 Personal protective equipment

Personal protective equipment must be made available to the personnel and supervisors must check that it is used or worn.

Mandatory sign	Meaning
	Safety footwear provides good slip resistance, especially in wet conditions, as well as a high degree of penetration resistance (e.g. in case of nails) and protects the feet from falling objects (e.g. during transport).
	Protective gloves protect hands from infections (moisture-tight protective gloves) and minor bruises and cuts, especially during transport, installation, maintenance and dismantling and contact with water-polluting liquids*.
	Protective clothing protects the skin from minor mechanical effects and infections.
	A safety helmet protects against head injuries, e.g. in case of falling objects or knocks in the event of low room heights.
	Safety glasses and goggles protect eyes, especially during commissioning, maintenance and repair.
*  Safety datasheet for the water-polluting liquids	

1.5 Warnings

Warnings are identified through the following warning signs and signal words.

Warning symbols and signal words		Meaning	
	DANGER	Personal injuries	Hazard with a high degree of risk which, if not prevented, results in death or severe injuries.
	WARNING		Hazard with a moderate degree of risk which, if not prevented, can result in death or severe injuries.
	CAUTION		Hazard with a low degree of risk which, if not prevented, can result in minor or moderate injuries.
	IMPORTANT	Damage to property	Hazard which, if not prevented, can result in the damage of products and their functions or an item/property in the surrounding area.

1.6 Transport and storage

IMPORTANT Note during storage and transport:

- Store the system parts in frost-proof premises.
- If intermediate storage is required, the bottom part of the shaft must be protected from water ingress.
- Never drive the forks of a fork-lift truck or lift truck directly under the system parts.
- Where possible, do not remove the packaging and transport restraints until the components are at their installation site.
- If transporting the unit parts using a crane or crane hook:
 - Comply with the accident prevention regulations
 - Check the working load limit of the crane and the slings
 - Never stand under the suspended load
 - Prevent other persons from entering the entire danger zone
 - Avoid oscillating motion (swinging) during transport

1.7 Decommissioning and disposal

IMPORTANT Improper disposal is a hazard for the environment. Comply with the regional disposal regulations.

- Completely drain and clean the system when decommissioning.
- Separate the unit parts according to their material and hand them over for recovery or recycling.
- Electrical equipment must never be disposed of in household waste.

2 Product Description

2.1 Product features

	Flowshut-C	Flowswitch-C
Types	Nominal widths/DN: 100, 150, 200, 250, 300 or 400	Nominal widths/DN: 100, 150, 200, 250, 300 or 400
Technical features	<ul style="list-style-type: none"> ■ Joint-free shaft bottom section made from reinforced concrete (DIN 4281) with type-approved statics ■ Piping DN 100 – 400 made from stainless steel (1.4571) with a check flap ■ Through-piping DN 100 – 400 made from stainless steel (1.4571) with check flap incl. electrical swivel drive ■ Check flap: <ul style="list-style-type: none"> □ Flap disc made from stainless steel / NBR-coated □ Sealing sleeve made from NBR ■ Swivel drive with or without Ex-protection, with manual emergency actuation ■ Position switch for electrical swivel drive (optional) ■ DN 100 connection (in the bottom part of the shaft) for ventilation lines fitted on-site ■ DN 100 connection (in the bottom part of the shaft) for blank cable pipe fitted on-site with sealing stoppers for sealing the cable feed-through ■ Shaft components (optional) and adapter plate made from concrete for creating the minimum installation depth: <ul style="list-style-type: none"> □ Sleeve formation per DIN 4034 part 1 □ Joint sealing by means of circular rotating mechanical seal with integrated load relief ■ Odour-proof screwed cover 	<ul style="list-style-type: none"> ■ Joint-free shaft bottom section made from reinforced concrete (DIN 4281) with type-approved statics ■ Piping DN 100 – 400 made from stainless steel (1.4571) <ul style="list-style-type: none"> □ 1x supply pipe □ 2x drain pipes, each with a check flap ■ Check flap: <ul style="list-style-type: none"> □ Flap disc made from stainless steel / NBR-coated □ Sealing sleeve made from NBR ■ Swivel drive with or without Ex-protection, with manual emergency actuation: <ul style="list-style-type: none"> □ Direct drive of the check flap in drain pipe 1 □ Drive of the check flap in drain pipe 2 via mechanical locking device ■ Position switch for electrical swivel drive (optional) ■ DN 100 connection (in the bottom part of the shaft) for ventilation lines fitted on-site ■ DN 100 connection (in the bottom part of the shaft) for blank cable pipe fitted on-site with sealing stoppers for sealing the cable feed-through ■ Shaft components (optional) and adapter plate made from concrete for creating the minimum installation depth: <ul style="list-style-type: none"> □ Sleeve formation per DIN 4034 part 1 □ Joint sealing by means of circular rotating mechanical seal with integrated load relief ■ Odour-proof screwed cover

	Flowshut-C	Flowswitch-C
Operating signals	<ul style="list-style-type: none"> ■ Manual shut-off of the sewerage connection during the filling process ■ Automatic retaining of any water-polluting liquid that may arise 	<ul style="list-style-type: none"> ■ Manual shut-off of one of the two pipelines ■ Automatic diversion of wastewater substream 1 or 2

 Further versions upon request.

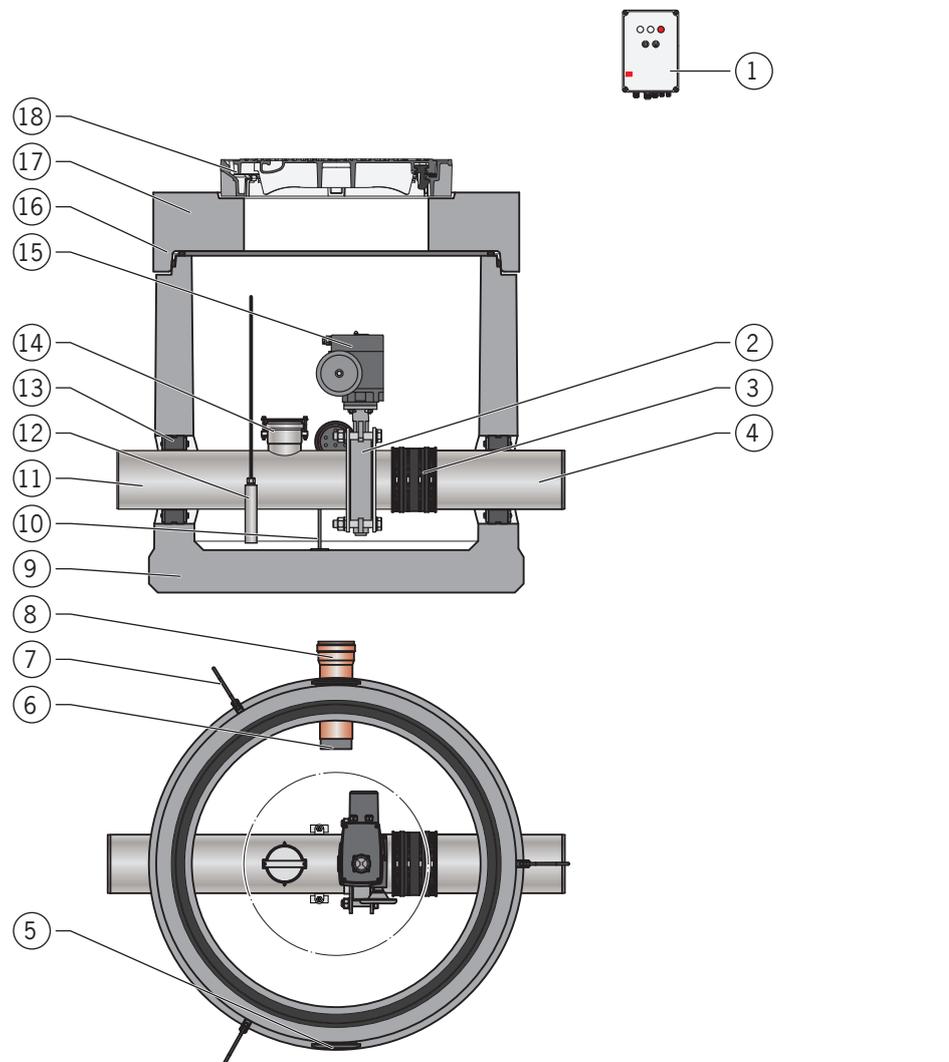
2.2 Product identification (type plate)

A type plate is attached to the shaft construction, underneath the cover. The following data must be copied from there for information and made available in the event of any enquiries:

- Name and type
- Manufacturer
- Date of manufacture
- Pipeline material
- Information on the check flap:
 - Flap disc material
 - Sealing sleeve material
- Sealing material

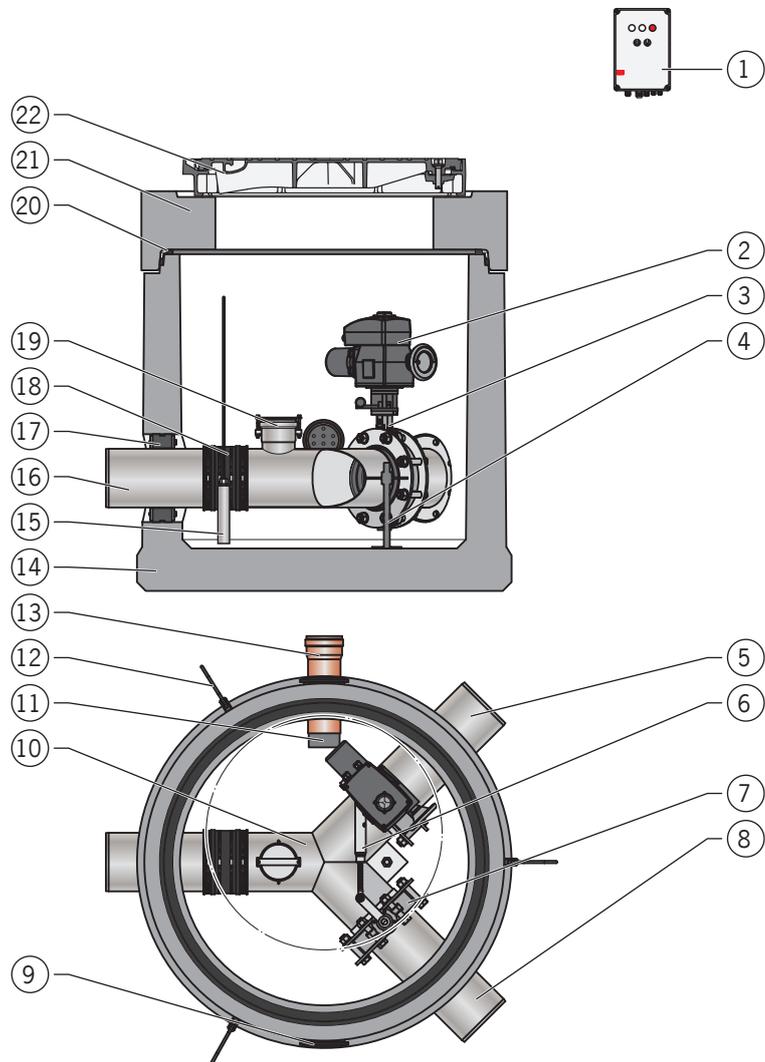
2.3 Equipment or components

2.3.1 Flowshut-C



- | | |
|---|--|
| 1 = Position switch (optional) | 11 = Supply pipe |
| 2 = Check flap | 12 = Build-up sensor (optional) |
| 3 = Pipe connector | 13 = Pipe feed-through (sealing insert) |
| 4 = Drain pipe | 14 = Suction opening (sealed leak-tight and secured) |
| 5 = Connection for on-site ventilation line | 15 = Electrical swivel drive with manual emergency actuation |
| 6 = Sealing stopper (cable feed-through) | 16 = Circular rotating mechanical seal |
| 7 = Lifting eyes | 17 = Adapter plate |
| 8 = On-site blank cable pipe connection | 18 = Cover |
| 9 = Bottom part of shaft | |
| 10 = Support | |

2.3.2 Flowswitch-C



- | | |
|---|--|
| 1 = Position switch (optional) | 13 = On-site blank cable pipe connection |
| 2 = Electrical swivel drive with manual emergency actuation | 14 = Bottom part of shaft |
| 3 = Check flap 1 | 15 = Build-up sensor (optional) |
| 4 = Support | 16 = Supply pipe |
| 5 = Drain pipe 1 | 17 = Pipe feed-through (sealing insert) |
| 6 = Mechanical actuation (check flap 2) | 18 = Pipe connector |
| 7 = Check flap 2 | 19 = Suction opening (sealed leak-tight and secured) |
| 8 = Drain pipe 2 | 20 = Circular rotating mechanical seal |
| 9 = Connection for on-site ventilation line | 21 = Adapter plate |
| 10 = Distribution pipe | 22 = Cover |
| 11 = Sealing stopper (cable feed-through) | |
| 12 = Lifting eyes | |

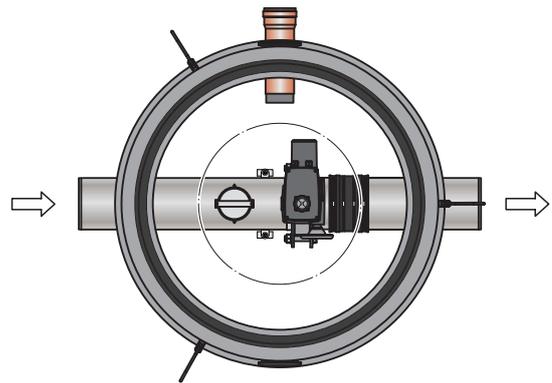
2.4 Function

2.4.1 Flowshut-C

No diversion of water-polluting liquids

Check flap is open:

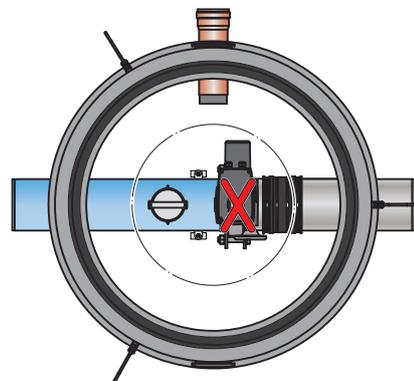
Any surface water arising runs unimpeded through the "through-piping" of the "Flowshut-C" shut-off shaft and into the sewage system.



Diversion of water-polluting liquids

Check flap is closed:

Any water-polluting liquids arising (e.g. in the event of leaks) and any surface water arising is retained in the supply pipe and the on-site inlet line.

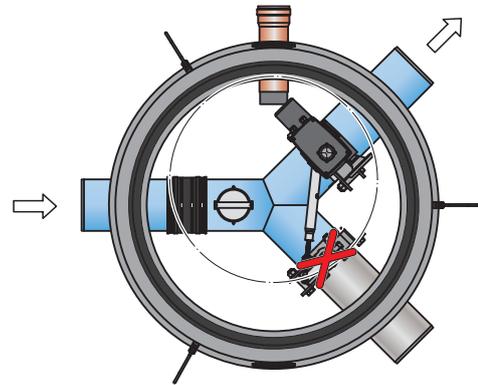


2.4.2 Flowswitch-C

Diversion of substream 1

Check flap 1 open / check flap 2 closed:

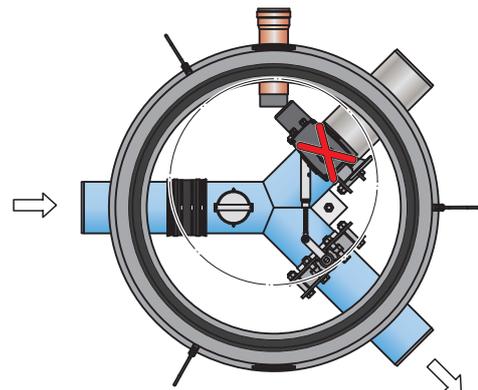
Any surface water arising is diverted into drainage line 1.



Diversion of substream 2

Check flap 2 open / check flap 1 closed:

Depending on the pollution, the wastewater substream is diverted into drainage line 2 and subjected to wastewater treatment there if required.



3 Installation

IMPORTANT Assure required qualifications of personnel, 📖 Chap. 1.2 "Special provisions" and chapter 1.3 "Personnel qualifications".

3.1 Installation example (schematic diagram)

3.1.1 Flowshut-C

The example shows the installation of a Flowshut-C retaining system. The components used can differ, depending on the installation situation.

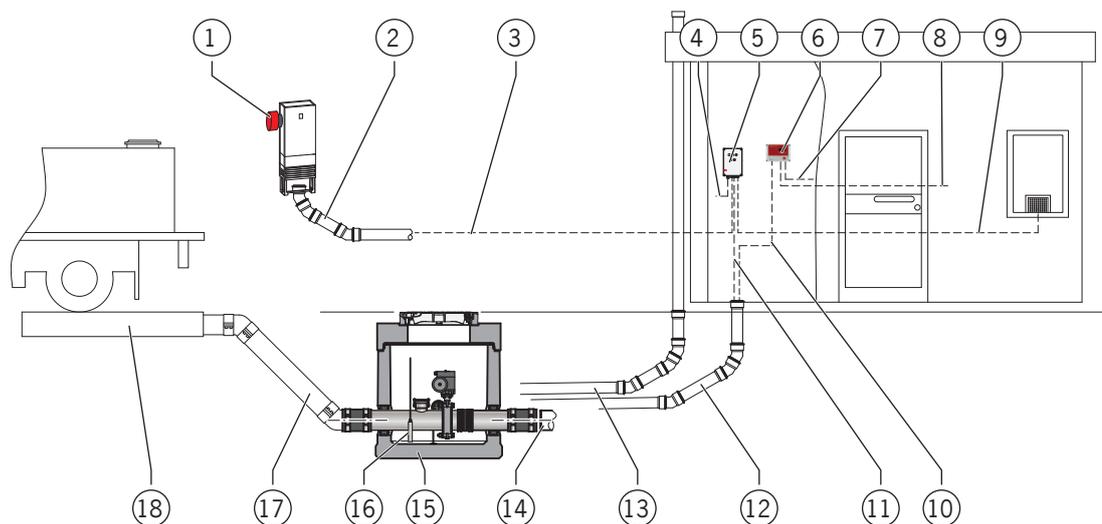


Illustration: Transshipment station for water-polluting liquids

- | | |
|---|---|
| 1 = On-site external control contact for controlling the swivel drive | 9 = On-site cable 10 x 1.5 mm ² (NYY-J or NYM-J), position switch potential-free contact connection |
| 2 = On-site blank pipe (deflection ≤ 45° bend) with draw-wire | 10 = ACO sensor cable, blue 2 x 0.75 mm ² , connection of build-up sensor to alarm device (optional) |
| 3 = On-site cable 3 x 1.5 mm ² (NYY-J or NYM-J), connection of external control contact to position switch | 11 = On-site cable 7 x 1.5 mm ² (NYY-J), connection of swivel drive to position switch |
| 4 = On-site cable 3 x 1.5 mm ² (NYM-J), position switch power supply, max. 10 A protection | 12 = On-site blank cable pipe DN 100 (deflection ≤ 45° bend) with draw-wire |
| 5 = Position switch (optional) | 13 = On-site ventilation line DN 100 |
| 6 = Procurat alarm device (optional) | 14 = On-site outlet pipe |
| 7 = On-site cable 3 x 1.5 mm ² (NYM-J), alarm device (optional) power supply, max. 10 A protection | 15 = Flowshut-C |
| 8 = On-site cable, alarm device potential-free contact connection | 16 = Build-up sensor (optional) |
| | 16 = On-site inlet line |
| | 17 = On-site transshipment station for water-polluting liquids |

3.1.2 Flowswitch-C

The example shows the installation of a Flowswitch-C diversion shaft. The components used can differ, depending on the installation situation.

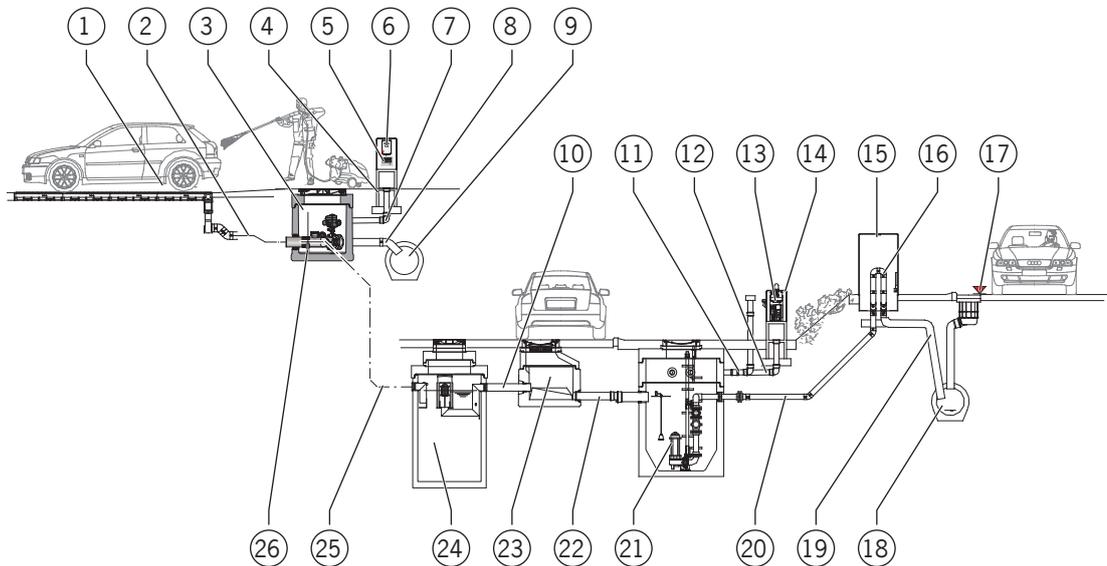


Illustration: Wash area with diversion of two wastewater substreams

- | | |
|---|--|
| 1 = Wash area | 14 = Outdoor cabinet (optional) |
| 2 = On-site inlet line | 15 = Outdoor cabinet (optional) |
| 3 = Flowswitch-C | 16 = On-site backflow loop |
| 4 = Outdoor cabinet (optional) | 17 = Backflow level |
| 5 = Position switch | 18 = Sewage channel |
| 6 = Procurat alarm device (optional) | 19 = On-site outlet pipe |
| 7 = On-site blank cable pipe DN 100 (deflection $\leq 45^\circ$ bend) with draw-wire | 20 = On-site pressure line |
| 8 = Substream 1 / diversion of surface water: on-site connection line | 21 = Pump station (optional) |
| 9 = Sewage channel | 22 = On-site connection line |
| 10 = On-site connection line | 23 = Sampling shaft (optional) |
| 11 = On-site ventilation line | 24 = Light liquid separator with coalescence unit |
| 12 = On-site blank cable pipe DN 100 (deflection $\leq 45^\circ$ bend) with draw-wire | 25 = Substream 2 / diversion of polluted wastewater: on-site connection line |
| 13 = Pump station control (optional) | 26 = Build-up sensor (optional) |

3.2 Earthworks

3.2.1 Specifications

Installation site

Load class D 400: truck trafficable – the safe solution for heavy goods vehicles and storage areas and side strips (hard shoulders) of carriageways.



Other installation situations upon request.

Installation depth

In Germany, the minimum depth for frost-free earthworks is regulated in DIN 1054. In this standard, the depth is cited as min. 80 cm, but can be stipulated even higher due to supplementary regional ordinances or empirical meteorological values.

Installation in groundwater

If the constructional prerequisites necessitate a buoyancy safeguard, observe the following:

We would be happy to calculate adequate reinforcement (incl. reinforcement drawing) for you for a processing fee. The reinforcement must be approved by a structural engineer to comply with construction principal liability. We would be happy to carry this out for a fee.

Excavated pit

- Excavation and back-filling per DIN 18300
- Embankment / work space / shoring per DIN 4124
- With normal ground conditions, a profile-following, compacted sand or gravel bed with levelling accuracy will suffice.
- Max. ground pressure is 15.5 N/cm²
- Works are to be carried out such that the system and the lines are not damaged and that they remain in place. Subsequent settlement of system parts must be prevented by appropriate measures.
- If the levelling is created using concrete, a 5 cm thick sand layer must be established on top of this in order to guarantee uniform load distribution and to be able to compensate for any manufacturing tolerances that may arise.
- A foundation earthing electrode or earthing strip shall be provided for potential compensation during the construction phase.

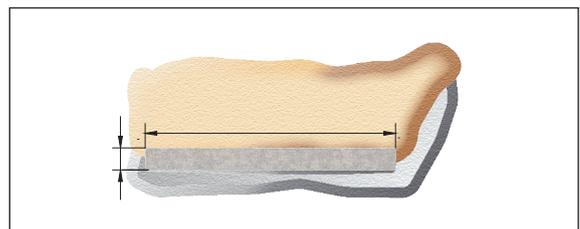
Slings for transport using lifting gear

- Bottom part of shaft: Use 3-part harness with at least 5 m long strands of chain or cables with load hooks and NG 5 shackles per DIN 82101
- Cover, adapter plate and manhole rings: Use shaft ring harness with claws

3.2.2 Digging the excavation

Requirement: Excavations shall have a diameter at least 1,500 mm larger than the external diameter of the bottom part of shaft.

- Excavate the pit and secure.
- Establish underfill,  order-specific design documentation.



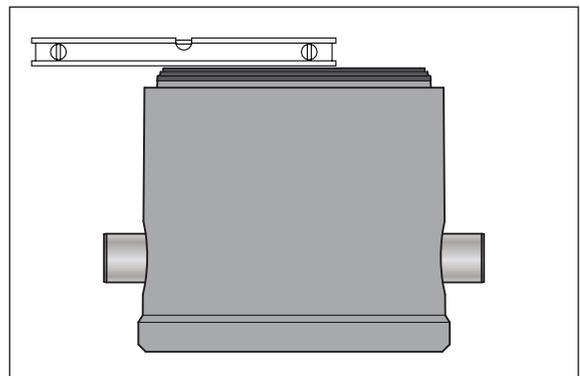
3.2.3 Installation of the bottom part of shaft

IMPORTANT Transport eyebolts are designed for the load of the bottom part of the shaft. Do not transport with shaft components placed on top.

- Place bottom part of shaft in the pit and align horizontally.

Complete weights of the bottom parts of shaft:

Type	Flowshut-C	Flowswitch-C
DN 100	1,430 kg	1,440 kg
DN 150	1,435 kg	1,455 kg
DN 200	1,445 kg	1,470 kg
DN 250	2,920 kg	2,950 kg
DN 300	2,900 kg	3,875 kg
DN 400	3,870 kg	3,885 kg



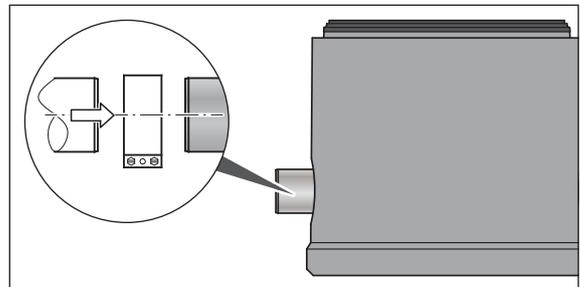
3.2.4 Laying and connecting the on-site inlet line

IMPORTANT Before the inlet line is connected, the excavations must be filled up to this level,  Chap. 3.2.10 "Backfill excavations".

Specifications:

- Pipe nominal size DN 100/OD = 110 mm, DN 150/OD = 160 mm, DN 200/OD = 200 mm, DN 250/OD = 250 mm, DN 300/OD = 315 mm or DN 400/OD = 400 mm
- Lay pipes to be frost resistant.
- The pipe cross-section must not reduce in the direction of flow.
- Make flexible pipe joints.
- Lay up to the bottom part of shaft with a free slope of at least 1.5 – 2%.
- Use materials resistant to any water-polluting liquids that may arise.

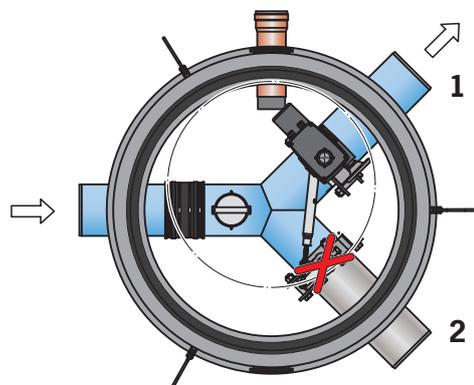
→ Connect on-site inlet line (e.g. with pipe connector).



3.2.5 Laying and connecting the on-site drainage pipe

IMPORTANT

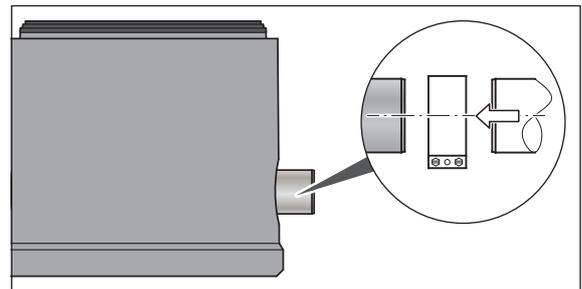
- Before the on-site drainage pipe inlet pipe (Flowshut-C) or the two drainage pipes (Flowswitch-C) are connected, the excavation must be filled up to this level,  Chap. 3.2.10 "Backfill excavations".
- Flowshut-C: Swivel drive is mounted on the check flap in drainage pipe 1 as standard. For this reason, the drainage of unpolluted wastewater (wastewater that requires no wastewater treatment, e.g. surface water from a wash area) should be connected to drainage pipe 1.



Specifications:

- Pipe nominal size DN 100/OD = 110 mm, DN 150/OD = 160 mm, DN 200/OD = 200 mm, DN 250/OD = 250 mm, DN 300/OD = 315 mm or DN 400/OD = 400 mm
- Lay up to the sewage system with a free slope of at least 1.5 – 2%.
- If the bottom of the drainage line pipe lies underneath the backflow level (highest level up to which the water in a drainage system can rise), drainage should be implemented via a downstream lifting system,  DIN 1986–100.

→ Connect on-site drainage line (e.g. with pipe connector).



3.2.6 Laying and connecting the on-site ventilation line

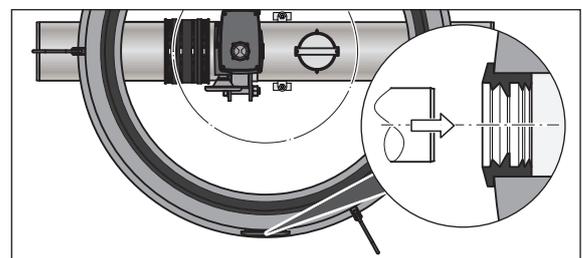
IMPORTANT Before the on-site ventilation pipe is connected, the excavations must be backfilled up to this level,  Chap. 3.2.10 “Backfill excavations”.

Specifications:

- Pipe nominal size DN 100, OD = 110 mm
- Lay the vent stack so that it rises continuously. Do not reduce the stack cross-section.
- The end of the vent stack must be routed to above the roof or, for example, in the ground, where it does not cause any odour nuisance.
- Use materials resistant to any vapours that may arise from the water-polluting liquids.

The connection to the bottom part of shaft must be formed as a socket.

- Use acid-free lubricant to grease the spigot of the ventilation line and the sealing lips of the socket seal.
- Push the spigot into the socket.

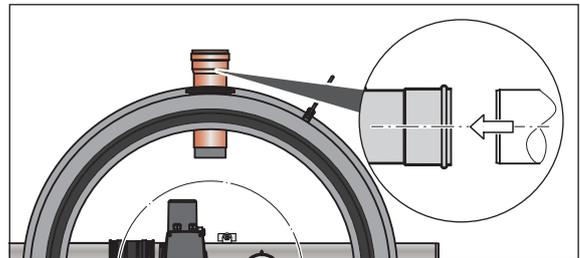


3.2.7 Laying and connecting the on-site blank cable pipe

IMPORTANT Before the on-site blank cable pipe is connected, the excavations must be backfilled up to this level,  Chap. 3.2.10 “Backfill excavations”.

Specifications:

- Pipe nominal size DN 100, OD = 110 mm
 - The blank cable pipe must be laid from the place in which the position switch is installed (plant room) up to the bottom part of shaft with a gradient of at least 1.5 – 2 %.
 - Use $\leq 45^\circ$ pipe bends.
 - Insert good quality draw-wire directly into the blank pipe or lay the swivel drive connection cable (cable 7 x 1.5 mm²) at the same time.
 - Protect the connection cable ends against water ingress.
- Use acid-free lubricant to grease the spigot of the blank cable pipe and the sealing lip of the socket seal.
- Push the spigot into the socket.



3.2.8 Installation of shaft components

Adapter plate and cover are supplied loose.

-  ■ Shaft components delivered by ACO in accordance with or based on DIN 4034-1 have an ACO circular rotating mechanical seal for joint sealing. The circular rotating mechanical seal is a compression circular rotating mechanical seal with a wedge-shaped cross section and a factory-made, closed, pre-lubricated slide sleeve. A load-distributing tube filled with fine quartz sand is permanently attached to the sealing ring.
- The circular rotating mechanical seal is pre-fitted at the factory to the spigot of the bottom part of shaft or the shaft component.



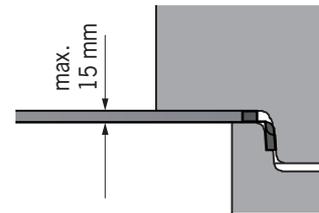
If the circular rotating mechanical seal slips out of place, e.g. during transportation or on-site, this should be tightened again as follows:

- On cold days, pre-heat the sealing, e.g. construction container.
- Clean spigot.

- Fit the circular rotating mechanical seal to the spigot such that the slide sleeve of the circular rotating mechanical seal faces outwards and the load-distributing tube lies centrally on the spigot.
- Position the circular rotating mechanical seal on the shoulder and spread the pre-tensioning evenly.

IMPORTANT

- Transport eyes on the shaft components are designed for their own weight load. Do not transport with other shaft components placed on top.
- After placement, there must be a max. gap of 15 mm present in the interior.



- Observe max. installation depth of the Flowshut-C or Flowswitch-C,  Chap. 8 "Technical data".

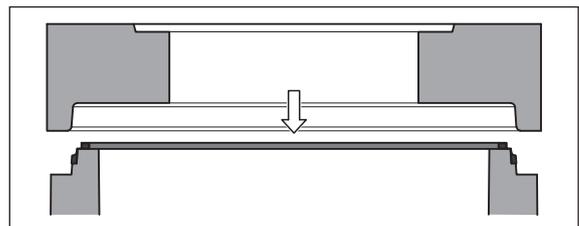
Manhole rings

-  Manhole rings of nominal size 1,000 or 1,500 per DIN 4034-1 can be installed between the bottom part of shaft and the adapter plate to adapt the installation depth. Manhole rings can be acquired from ACO as an option.

Adapter plate based on DIN 4034-1

IMPORTANT With Flowswitch-C: Arrange eccentric opening of the cover plate above the swivel drive.

- Arrange adapter plate centrally over the transition plate or the manhole ring, fit plumb and allow to slide on. If canted, carefully push back.



Complete weights for the adapter plate with cover:

Type	Flowshut-C	Flowswitch-C
DN 100	590 kg	760 kg
DN 150	590 kg	760 kg
DN 200	590 kg	760 kg
DN 250	1,200 kg	1,280 kg
DN 300	1,200 kg	1,280 kg
DN 400	1,200 kg	1,280 kg

Supporting rings

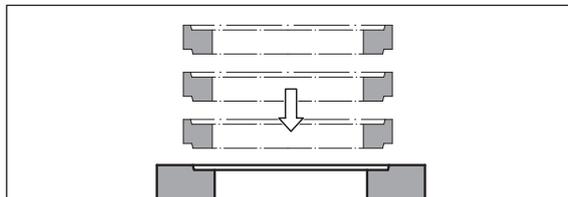


Standard supporting rings can be installed between the cover and the adapter plate to adjust to the ground level.

IMPORTANT Compensate out max. 300 mm of height difference with supporting rings.

Specifications:

- The mortar joint shall not be less than 1 cm or more than 3 cm.
 - Use MG III mortar per DIN 1053. Alternatively, use non-shrinking shaft-grouting mortar, e.g. Ebralit or equivalent. In doing so, the manufacturer's processing instructions must be complied with.
- Clean and moisten the adapter plate rebate and the underside of the supporting ring.
 - Apply mortar bed on the surface of the rebate.
 - Insert the supporting ring into the "retainer".



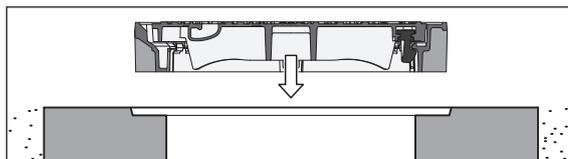
Cover

IMPORTANT

- Before the cover is installed, the excavations must be backfilled up to this level, Chap. 3.2.10 "Backfill pit".
- Release for traffic is only permitted after an adequate bonding time has passed, once the mortar has reached a compressive strength of at least 10 N/mm².
- When installing in asphalt surfaces, it is not permitted to tar over the cover.

Specifications:

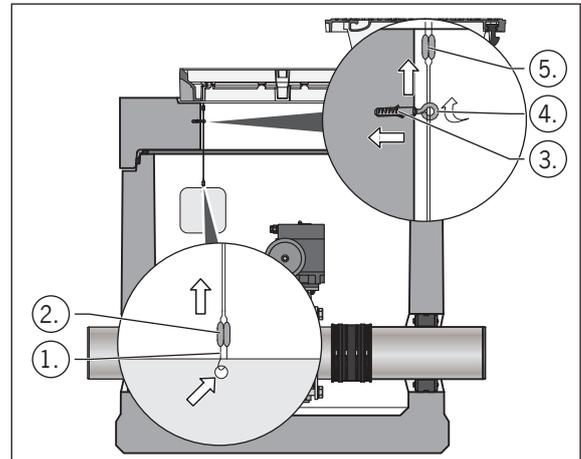
- The mortar joint shall not be less than 1 cm or more than 3 cm.
 - Use MG III mortar per DIN 1053. Alternatively, use non-shrinking shaft-grouting mortar, e.g. Ebralit or equivalent. In doing so, the manufacturer's processing instructions must be complied with.
 - Installation, product-accompanying documentation: Instruction "Multitop manhole cover".
- Clean and moisten the supporting ring or adapter plate rebate and the underside of the cover.
 - Apply mortar bed on the surface of the rebate.
 - Insert the cover in the "Retainer" and align.



3.2.9 Mounting the type plate

The type plate (with cable, wall/floor plugs, eyebolt and seal) is delivered loose and should be fitted underneath the cover during the shaft construction.

- Feed a cable end through the bore hole on the type plate and then feed both ends of the cable through the lead seal (1).
- Compress seal with pliers (2).
- Fit wall plug into the shaft part underneath the cover (3).
- Screw eyebolt into the wall plug (4).
- Feed both ends of the cable through the eye of the eyebolt, then through the seal and then compress the seal with pliers (5).



3.2.10 Backfilling the excavation

Specifications:

- The construction materials used and installation method must not cause any harmful deformations, damage or unfavourable load cases for the housing and raising system.
- Bed the housing all round (≥ 0.50 m) with a fine-grained sand-gravel or sand-crushed rock mixture of the soil groups GW or GI as per DIN 18196.
- The backfill material must be placed in layers (≤ 30 cm high) and compacted with lightweight compacting equipment to a Proctor density of $D_{pr} \geq 97\%$.
- The frame of the cover should never be higher than the surfacing, rather the surfacing should be slightly higher and drawn up at the edge of the frame.
- On laying the surfacing (e.g. asphalt surface) the cover must not be moved.
- The raising system may not be loaded until the excavated pit has been completely backfilled and the materials used have cured sufficiently.

3.2.11 Leak test

All drainage systems on private ground must be leaktight (only applies to Germany. Provisions in other countries can vary).

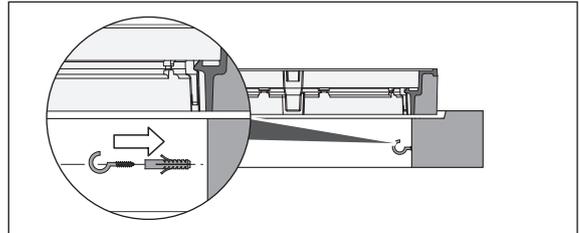
The requirements and provisions for the leak test sequence must be enquired about for each individual country.

3.3 Installation work

3.3.1 Fitting cable holder

The cable holder (eyebolt) and wall/floor plug are delivered loose.

- Fasten cable holder onto the shaft part underneath the cover.



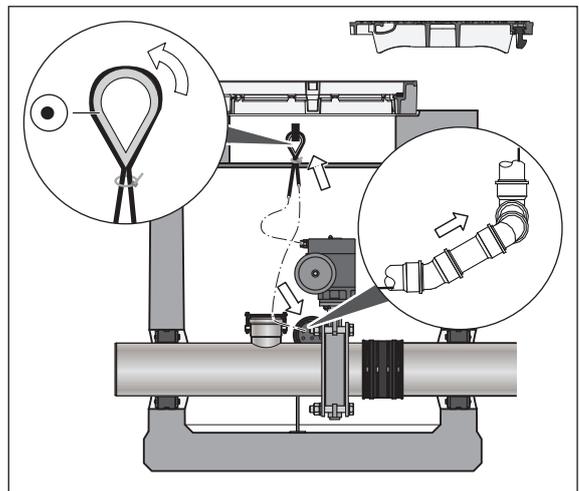
3.3.2 Laying the swivel drive connection cable on site

A cable sleeve for extending and a cable eye are delivered loose.

Specifications:

- Use 7 x 1.5 mm² cable. With a length greater than 40 m, the cable cross section must be calculated anew by an electrician in accordance with the voltage drop or per VDE 0100 part 430.
- Keep sufficient excess length of connecting cable (ca. 1 m), to protect the wiring in the •swivel drive's terminal compartment.

- Pull the connecting cable upwards (not whilst live) until it reaches the cable holder.
- Place the loop around the cable eye (●) and fasten with cable tie.
- Hang the cable eye on the cable holder.
- Pull the connecting cable through the blank cable pipe with the draw-wire until the position switch is reached.



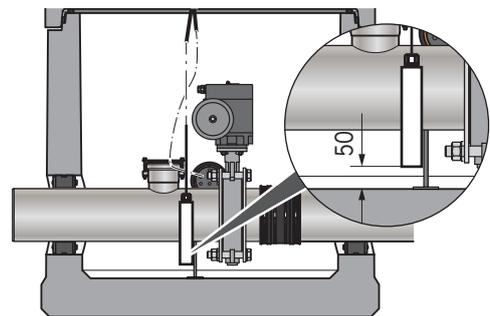
3.3.3 Laying the build-up sensor connecting cable (optional)

An alarm device with build-up sensor can be obtained from ACO as an option. Connecting cable $2 \times 0.75 \text{ mm}^2$ is 5 m long and is connected to and potted in at the build-up sensor. A cable gland for extending and a cable eye are delivered loose.

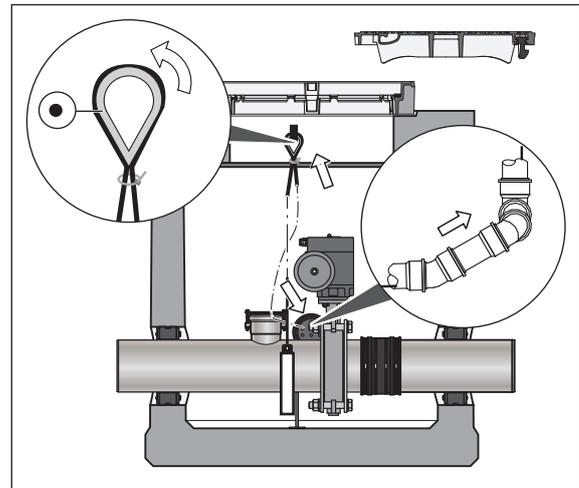
IMPORTANT Max. cable length = 200 m.

Requirement: Keep sufficient excess connecting cable length (approx. 1 m), to enable the wiring in the terminal compartment of the evaluating unit.

IMPORTANT Observe 50 mm clearance to the floor of the chamber.



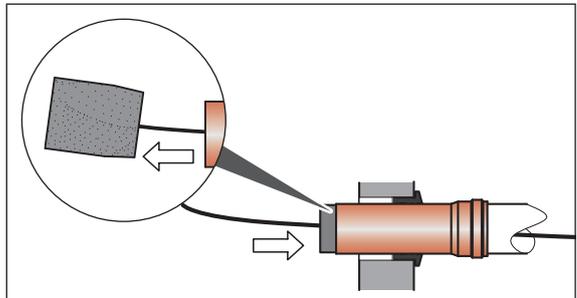
- Place the loop around the cable eye (●) and fasten with cable tie.
- Hang the cable eye on the cable holder.
- Pull the connecting cable through the blank cable pipe with the draw-wire until the evaluating unit of the alarm device is reached.



3.3.4 Fitting sealing stopper

A sealing stopper for sealing the cable feed-through is delivered loose.

- Open the bore hole in the sealing stopper and feed the connecting cable through.
- Fill the entire length of unneeded bore holes with sealant (silicone).
- Slide sealing stopper as deep as possible into the socket tube.



3.4 Electrical installation



WARNING

Electric shock risk in case of improper electrical installation

- The position switch must not be connected to the power supply until after all installation work has been completed.
- Work on electrical connections to power supply must be carried out by qualified electricians only.
- Carry out electrical connections in accordance with circuit diagrams.



Electrical installation to the Procurat alarm device (optional),  Instructions "Procurat" (delivered with the alarm device).

3.4.1 Fastening the position switch (optional)

Specifications:

- Flood-proof and clear wall surface of at least 300 mm x 400 mm (width x height)
- Observe 40 m max. distance between swivel drive and position switch.

→ Mount the position switch to the wall with the site materials.

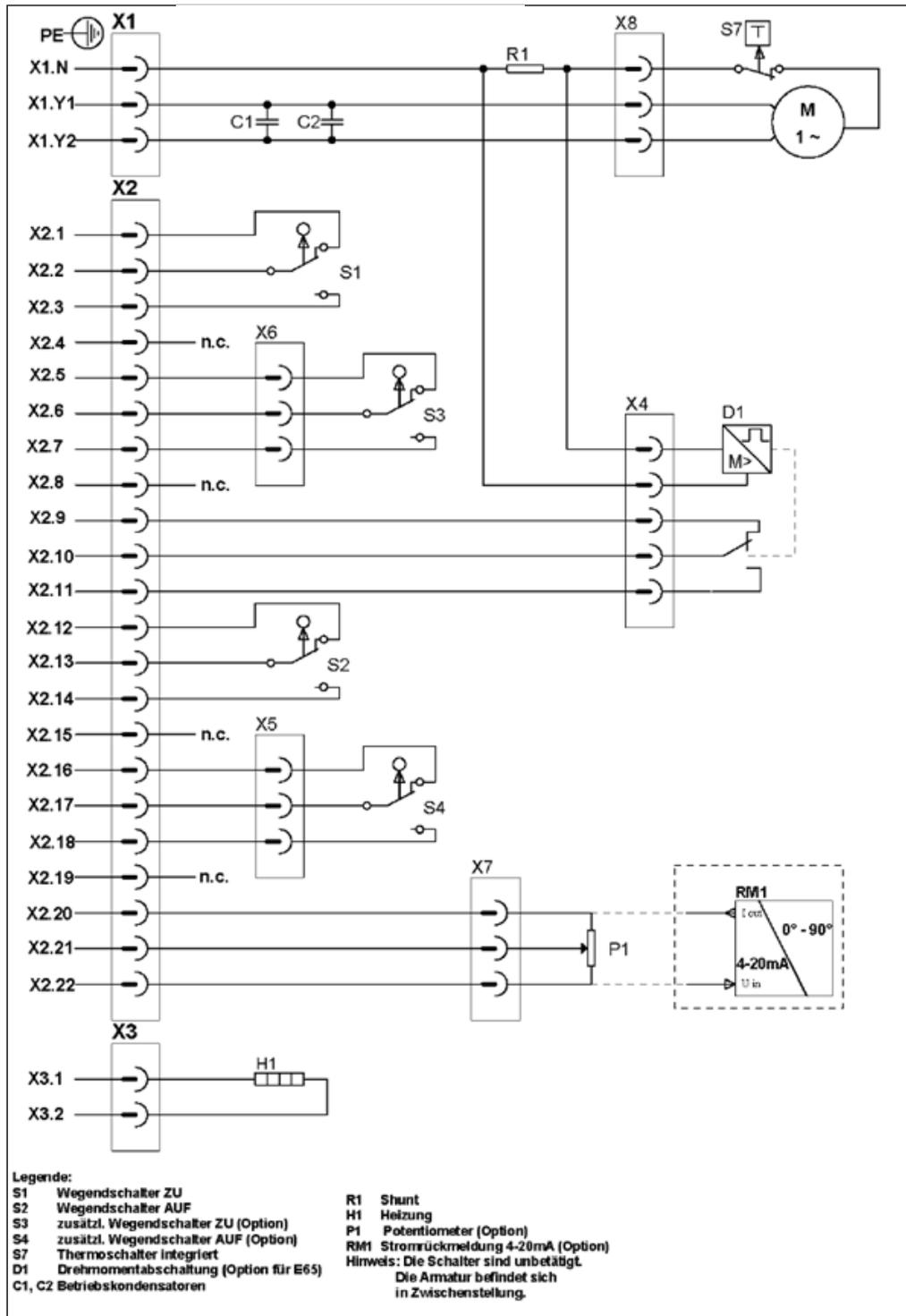
3.4.2 Connecting the position switch (optional) to the power supply

Observe the connection values for the position switch when carrying out the electrical installation,  Chap. 8.5 "Position switch".

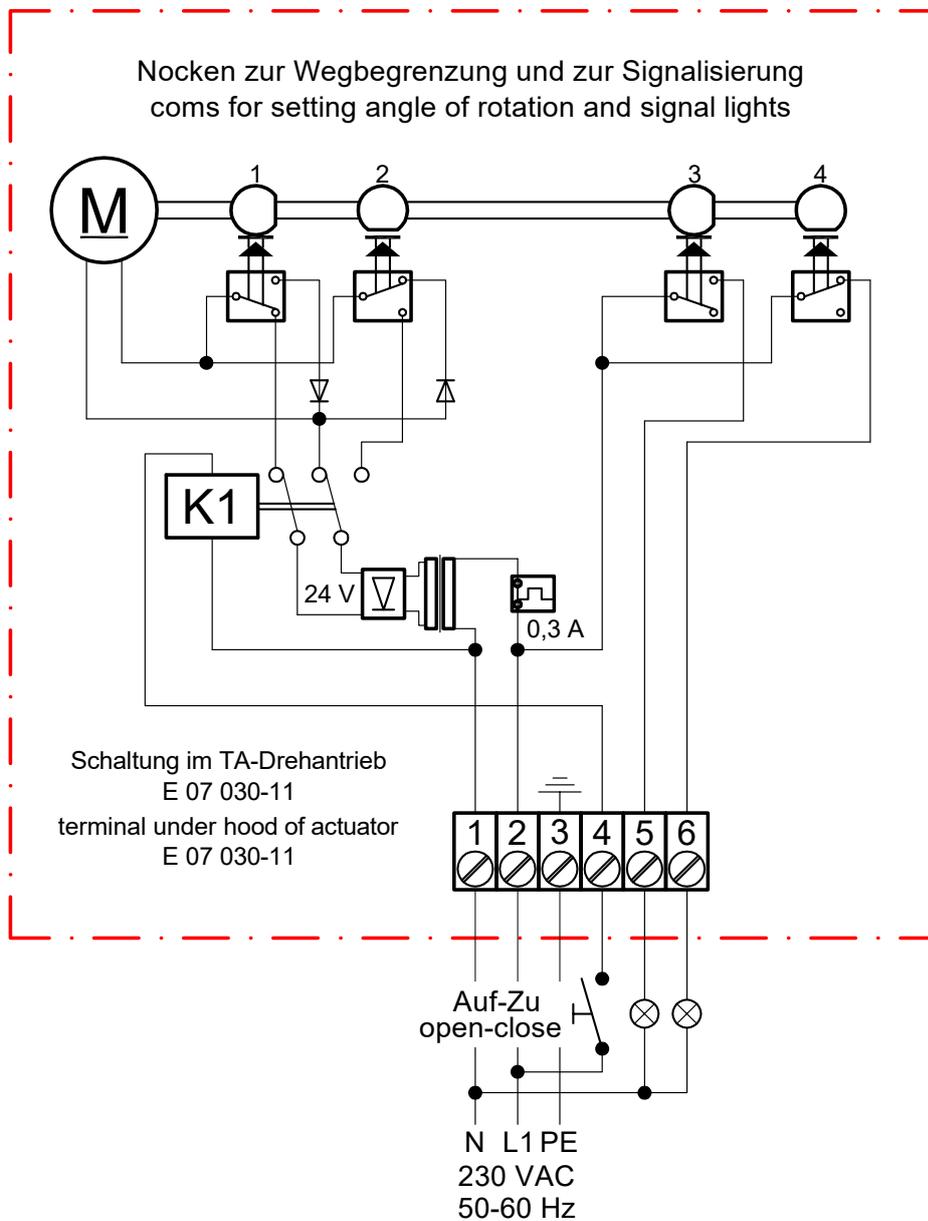
3.4.3 Connecting the swivel drive

→ Insert the connection cable into the terminal compartment of the swivel drive and connect to the electrical system,  circuit diagram:

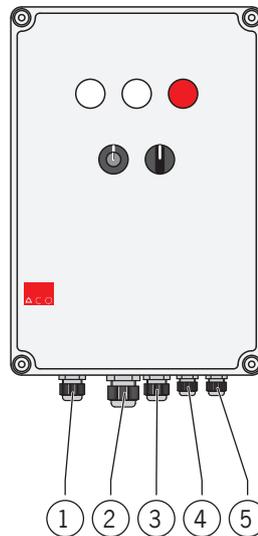
Swivel drive without Ex-protection



Swivel drive with Ex-protection



3.4.4 Position switch connections



- | | |
|--|--|
| 1 = Power supply connection, cable 3 x 1.5 mm ² (NYM-J), max. 10 A protection | 4 = External control contact connection (optional), cable 3 x 1.5 mm ² (NYY-J or NYM-J) |
| 2 = Potential-free alarm signal connection or position signals (optional), cable 10 x 1.5 mm ² (NYY-J or NYM-J) | 5 = External "Not close" contact connection (optional), cable 3 x 1.5 mm ² (NYY-J or NYM-J) |
| 3 = Swivel drive connection, cable 7 x 1.5 mm ² (NYY-J) | |

→ Insert the on-site connection cable into the terminal compartment of the position switch and connect to the electrical system,  circuit diagram (accompanies the position switch).

4 Flowshut-C operation



DANGER

Explosion hazard due to the formation of an explosive atmosphere

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".
- Before working on the system, ensure that there is an adequate gas exchange from above (ventilation by opening the cover) and check the gas concentration.

CAUTION

Hazard for personnel in the event of contact with water-polluting liquids

- Observe manufacturer's safety datasheet.
- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".

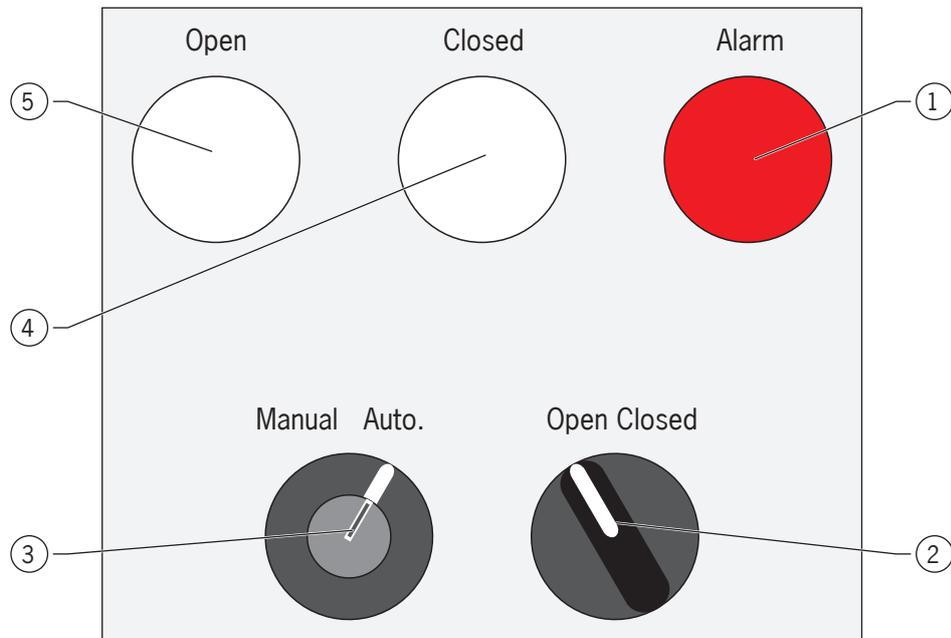
IMPORTANT Assure required qualifications of personnel,  Chap. 1.2 "Special provisions" and chapter 1.3 "Personnel qualifications".



Commissioning and operation of the Procurat alarm device (optional),  Instructions "Procurat" (delivered with the alarm device).

4.1 Position switch (optional)

4.1.1 Controls and display elements



- 1 = Red light: Display "Alarm"
- 2 = Switch: Manual operation of check flap
- 3 = Switch: Manual or automatic mode
- 4 = White light: Display "Check flap closed"
- 5 = White light: Display "Check flap open"

4.1.2 Function of the controls

Item	Element	Function	Explanation
3		Manual operation of check flap	"Manual operation of check flap" switch is activated.
		Automatic operation of check flap	"Manual operation of check flap" switch is not activated. External contact is actuated and check flap can be closed via this.
2		Open check flap	Check flap will be manually opened via the electrical swivel drive.
		Automatic operation of check flap	Check flap will be manually closed via the electrical swivel drive.
All switch positions have detents			

4.1.3 Explanation of the display elements

Item	Element	Meaning	Explanation
5		Check flap open	Light illuminates in manual mode: Check flap has been manually opened
			Light illuminates in automatic mode: External contact is not activated
4		Check flap closed	Light illuminates in manual mode: Check flap has been manually closed
			Light illuminates in automatic mode: External contact has been actuated
1		Check flap closed	Light illuminates in automatic mode: External contact is activated and has closed the check flap
		Malfunction	Light illuminates in automatic mode: Swivel drive or check flap is blocked

4.2 Commissioning

Initial commissioning to be documented,  Appendix 1 "Commissioning report/Flowshut-C".

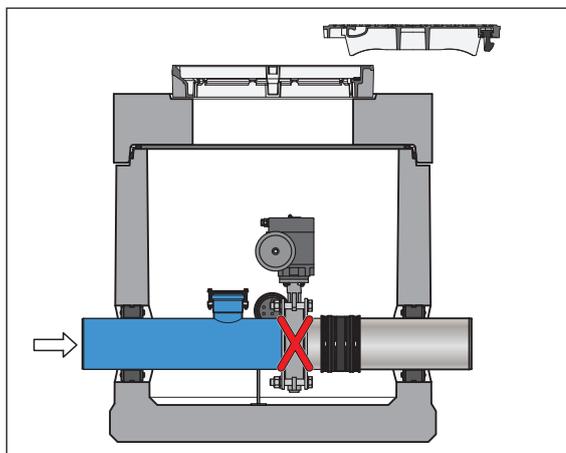
Requirements:

- All installation work is complete.
- A final commissioning check (functional check and visual inspection) of the retaining system installed is to be carried out by an expert in accordance with water-related legislation.

4.3 Checking protective function

IMPORTANT Check "Check flap closed" protective function during the initial commissioning.

→ Fill pipeline with water via the inlet line.



4.4 Manual operation (emergency operation)

Check flap can be closed or opened through manual actuation of the swivel drive.

Swivel drive without Ex-protection

The swivel drive can be moved manually to the "open" or "closed" position in non-electrical operation (at any time and without changeover) by means of the handwheel (ca. 15 turns).

Swivel drive with Ex-protection

The swivel drive can be moved manually to the "Open" or "Closed" position in non-electrical operation (at any time and without changeover) by means of the hand lever:

Press hand lever downwards and unlatch the hand lever. Hold this position and move the lever to the desired position, "Open" or "Closed".

IMPORTANT If the swivel drive has been moved manually, when re-commissioning the system, a closing or opening procedure must be carried out initially via the position switch. Upon running past the 90° control angle, the lever receiver latches back into place.

4.5 Operating via the position switch

The check flap can be controlled with the position switch (manual operation or automatic operation).

4.5.1 Manual drive

Shutdown – Check flap open

→ Connect the position switch with the electrical power supply:

- Switch on pre-fuse.
- Insert into the Schuko plug into the Schuko receptacle.

→ Turn the "Manual or automatic mode" switch to the Manual position  .

→ Turn the "Manual operation of check flap" switch to the Open position  .

Operation (transshipping) – Check flap closed

- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn the "Manual or automatic mode" switch to the Manual position  .
- Turn the "Manual operation of check flap" switch to the Close position  .

4.5.2 Automatic mode

Shutdown – Check flap open

- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn the "Manual or automatic mode" switch to the Automatic position  .

Operation (transshipping) – Check flap closed

- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn the "Manual or automatic mode" switch to the Automatic position  .
- Activate or actuate the external contact, e.g.  .

4.6 Filling or transshipping procedure

IMPORTANT Before starting with a filling or transshipping procedure with water-polluting liquids, the pipe feed-through check flap must be closed.

4.7 Disposal of the content of the inlet line

IMPORTANT If there are leaks during the filling or transshipping procedure, the water-polluting liquids are retained in the inlet line. Immediate disposal by an approved disposal contractor (qualified contractor in the sense of § 62 of the ordinance dealing with systems for handling water-polluting substances) is required.



- If an alarm device with build-up sensor (optional) is installed, the leakage volume is indicated at the evaluation device of the alarm device.
- The disposal volume arising depends on the volume of the inlet line.
- Ensure that the disposal vehicle is large enough.
- The disposal code for the water-polluting liquids must be requested from the manufacturer or supplier.

Disposal procedure

- Vacuum the contents of the inlet line into the suction vehicle via the access point on the transshipment station.
- Open the inspection opening (lift cover out of frame and set to the side) and secure.
- Open the suction opening on the inlet pipe in the bottom part of shaft.
- Vacuum the residual content out of the inlet line and into the suction vehicle.
- Close the suction opening on the inlet pipe in the bottom part of shaft again.
- Fill the inlet line (e.g. via the channel for the connected drainage surface) with cleaning water.
- Vacuum the cleaning water out of the inlet line into the suction vehicle via the access point on the transshipment station.
- Open the suction opening on the inlet pipe in the bottom part of shaft.
- Vacuum the residual content out of the inlet line and into the suction vehicle.
- Close the suction opening on the inlet pipe in the bottom part of shaft again.
- Close the inspection opening.
- Enter the date of the disposal and the address of the disposal contractor in the operating log.

4.8 Checks during operation

Checks by the operator

IMPORTANT The retaining system is to be checked every six months or after every fifth filling with regard to its protective function,  Chap. 4.3 "Checking protective function".

Checks by experts

The system operator is responsible for ensuring that the repetitive tests stipulated in the regulations pertinent to the location of the system are implemented by qualified personnel * or specialists, in accordance with water legislation § 46 of the ordinance dealing with systems for handling water-polluting substances.

Insofar as the country's system regulations do not stipulate specialist testing, the operator must commission a specialist ** with the repetitive testing of the retaining system.

* Definition "Qualified persons":

Qualified persons are employees of companies independent of the operating company/owner, experts or other institutions, who verifiably have the required technical knowledge to operate, maintain and check retaining systems to the scope named here and have the equipment required to retaining systems. In individual cases, in larger operational units, these tests and inspections can also be carried out by internal personnel of the operator who are properly qualified technicians, independent with regard to their area of responsibility and who are not bound by instructions, and who have the same qualification and technical equipment.

** Definition "Specialist persons":

Specialist personnel are personnel of the operator or designated third parties, who by virtue of their training, knowledge and practical experience ensure that they carry out assessments or tests and inspections in the respective field properly.

The following checks are to be carried out repeatedly and entered into the operating log (checking carried out by means of visual inspection of all areas of the retaining system):

Pipeline and the check flap are considered leak-tight and fully functioning if there is no mechanical damage

- No bubbles forming or blistering
- No cracks on the surface
- No dirt entrapment or corrosion that could impair the protective function
- No softening, hardening or embrittlement of the surface or roughening of the surface detected.

Operating log

To be entered into the operating log:

- Time of the filling or transshipping procedure
- Results of the checks after the filling or transshipping procedure is finished
- Checks for the retaining system:
 - Time
 - Results of the checks of the pipe feed-through and the fitting (particularly the sealing sleeve)
 - Defects found
 - Information for the persons responsible for rectifying defects
- Name of the company carrying out the work and name and signature of the responsible party

5 Flowswitch-C operation



DANGER

Explosion hazard due to the formation of an explosive atmosphere

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".
- Before working on the system, ensure that there is an adequate gas exchange from above (ventilation by opening the cover) and check the gas concentration.

CAUTION

Risk of infection in the event of contact with wastewater

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".

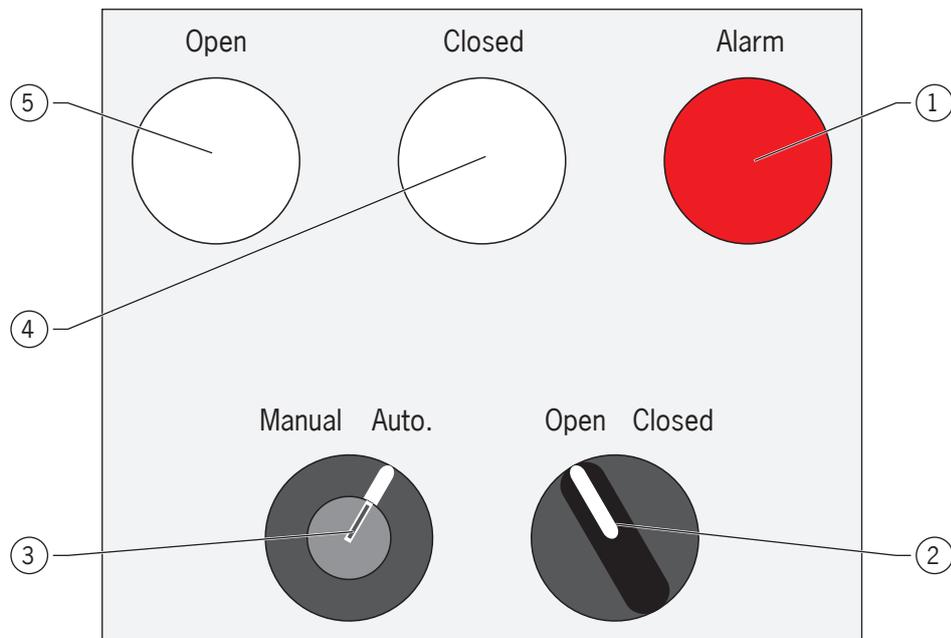
IMPORTANT Assure required qualifications of personnel,  Chap. 1.3 „Personnel qualifications“.



Commissioning and operation of the Procurat alarm device (optional),  Instructions "Procurat" (delivered with the alarm device).

5.1 Position switch (optional)

5.1.1 Controls and display elements



- 1 = Red light: Display "Alarm"
- 2 = Switch: Manual operation of check flaps
- 3 = Switch: Manual or automatic mode

- 4 = White light: Display "Check flap 1 closed and check flap 2 open"
- 5 = White light: Display "Check flap 1 open and check flap 2 closed"

5.1.2 Function of the controls

Item	Element	Function	Explanation
3		Manual operation of check flaps	"Manual operation of check flaps" switch is activated.
		Automatic operation of check flaps	"Manual operation of check flaps" switch is not activated. External contact is activated and check flaps can be operated via this.
2		Open or close check flaps	Check flap 1 will be opened manually via the electrical swivel drive and check flap 2 closed via the mechanical locking device.
		Open or close check flaps	Check flap 1 will be closed manually via the electrical swivel drive and check flap 2 opened via the mechanical locking device.
All switch positions have detents			

5.1.3 Explanation of the display elements

Item	Element	Meaning	Explanation
5		Check flap 1 open, check flap 2 closed	Light illuminates in manual mode: Check flap 1 has been manually opened and check flap 2 manually closed
			Light illuminates in automatic mode: External contact is not activated
4		Check flap 1 closed, check flap 2 open	Light illuminates in manual mode: Check flap 1 has been manually closed and check flap 2 manually opened
			Light illuminates in automatic mode: External contact has been actuated
1		Check flap closed	Light illuminates in automatic mode: External contact is activated, has closed check flap 1 and opened check flap 2
		Malfunction	Light illuminates in automatic mode: Swivel drive or check flap 1 is blocked

5.2 Commissioning

Initial commissioning to be documented,  Appendix 2 "Commissioning report/Flowswitch-C".

Prerequisite: All installation work is complete.

5.3 Manual operation (emergency operation)

Check flaps can be closed or opened through manual actuation of the swivel drive.

Swivel drive without Ex-protection

The swivel drive can be moved manually to the "open" or "closed" position in non-electrical operation (at any time and without changeover) by means of the handwheel (ca. 15 turns).

Swivel drive with Ex-protection

The swivel drive can be moved manually to the "Open" or "Closed" position in non-electrical operation (at any time and without changeover) by means of the hand lever:

Press hand lever downwards and unlatch the hand lever. Hold this position and move the lever to the desired position, "Open" or "Closed".

IMPORTANT If the swivel drive has been moved manually, when re-commissioning the system, a closing or opening procedure must be carried out initially via the position switch. Upon running past the 90° control angle, the lever receiver latches back into place.

5.4 Operating via the position switch

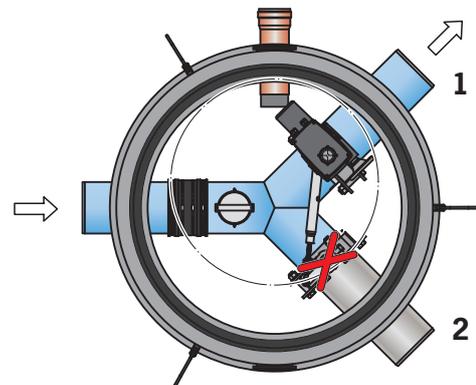
The check flaps can be controlled with the position switch (manual operation or automatic operation).

5.4.1 Manual drive

Diversion of substream 1 via drainage line 1 – check flap 1 open / check flap 2 closed

Wash area example: Surface water is fed into the sewerage channel connected to drainage line 1.

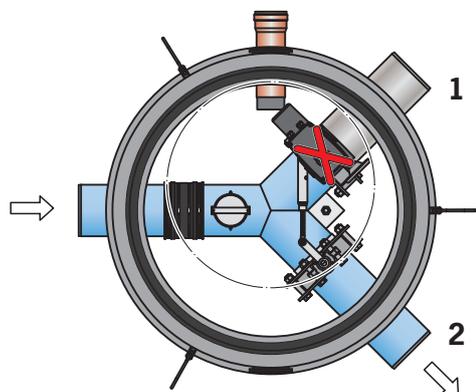
- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn "Manual or automatic mode" switch to Manual  position.
- Turn "Manual operation of check flap" switch to Open  position.



Diversion of substream 2 via drainage line 2 – check flap 1 closed / check flap 2 open

Wash area example: Polluted wastewater from washing process is fed into the wastewater treatment system connected to drainage line 2.

- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn "Manual or automatic mode" switch to Manual  position.
- Turn "Manual operation of check flap" switch to Closed  position.

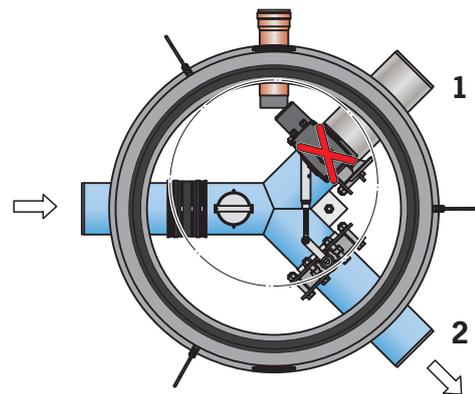


5.4.2 Automatic mode

Diversion of substream 2 via drainage line 2 – check flap 1 closed / check flap 2 open

Wash area example: Polluted wastewater from washing process is fed into the wastewater treatment system connected to drainage line 2.

- Connect the position switch with the electrical power supply:
 - Switch on pre-fuse.
 - Insert into the Schuko plug into the Schuko receptacle.
- Turn "Manual or automatic mode" switch to Automatic  position.
- Activate  or actuate the external contact, e.g. .



IMPORTANT After unlocking the external contact, check flap 1 will be opened and check flap 2 closed automatically.

6 Flowshut-C troubleshooting



DANGER

Explosion hazard due to the formation of an explosive atmosphere

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".
- Before working on the system, ensure that there is an adequate gas exchange from above (ventilation by opening the cover) and check the gas concentration.

WARNING

Electric shock

- Work on electrical connections must be carried out by qualified electricians only.
- Disconnect the position switch from the power supply before troubleshooting.

CAUTION

Hazard for personnel in the event of contact with water-polluting liquids

- Observe manufacturer's safety datasheet.
- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".

Burns due to hot surfaces

- Allow the swivel drive to cool.

Faults

Malfunction	Cause(s)	Actions	
Pipeline not closed	Check flap soiled	Clean check flap	
	Check flap blocked (red "Alarm" light illuminates)	Clear blockage	
	Automatic mode is switched off	Switch on automatic mode	
	Swivel drive defective	Swivel drive repair required (ACO Service)	
	Power supply interrupted		Check the electrical connections to power supply
			Reinstate the power supply
	Internal position switch microfuse defective	Replace position switch microfuse	

7 Flowswitch-C troubleshooting



DANGER

Explosion hazard due to the formation of an explosive atmosphere

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".
- Before working on the system, ensure that there is an adequate gas exchange from above (ventilation by opening the cover) and check the gas concentration.

WARNING

Electric shock

- Work on electrical connections must be carried out by qualified electricians only.
- Disconnect the position switch from the power supply before troubleshooting.

CAUTION

Risk of infection in the event of contact with wastewater

- Wear protective equipment,  Chap. 1.4 "Personal protective equipment".

Burns due to hot surfaces

- Allow the swivel drive to cool.

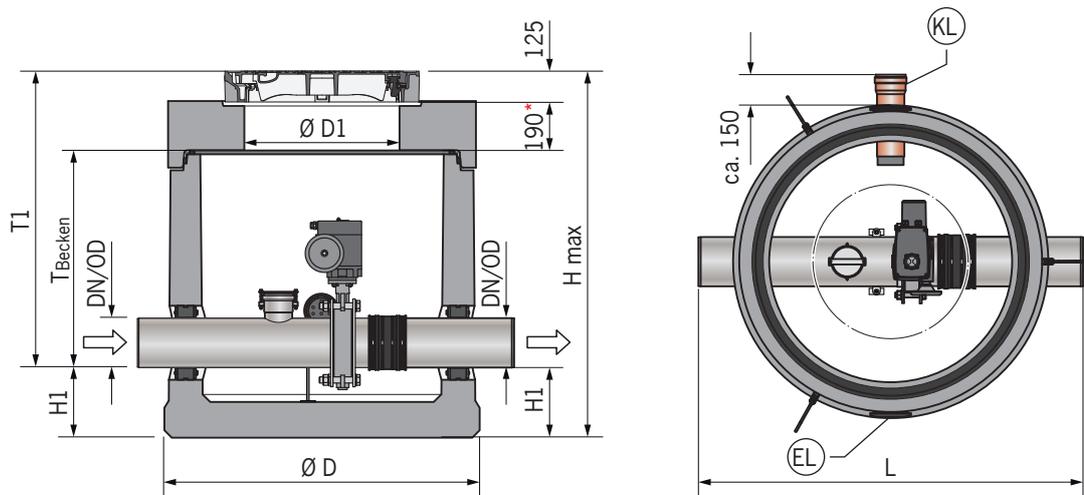
Faults

Malfunction	Cause(s)	Actions
Pipeline 1 or 2 not closed	Check flap soiled	Clean check flap
	Check flap 1 blocked (red "Alarm" light illuminates)	Clear blockage
	Automatic mode is switched off	Switch on automatic mode
	Swivel drive defective	Swivel drive repair required (ACO Service)
	Mechanical locking device defective	Locking device repair required (ACO Service)
	Power supply interrupted	Check the electrical connections to power supply Reinstate the power supply
	Internal position switch microfuse defective	Replace position switch microfuse

8 Technical Data

8.1 Flowshut-C

Key data and dimensions



Type	Dimensions [mm]							
DN	OD	Ø D	Ø D1	H1	H max	Tbasin	T1	L
100	110	1,270	600	290	5,600	875	1,190	1,570
150	160	1,270	600	290	5,600	875	1,190	1,570
200	200	1,270	600	290	5,600	875	1,190	1,570
250	250	1,740	800	615	5,900	950	1,265	2,040
300	315	1,820	800	585	5,900	1,225	1,540	2,120
400	400	1,820	800	660	5,950	1,150	1,465	2,120

T_{Basin} and T1 = Construction height with joints for circular rotating mechanical seal (15 mm) or mortar (10 mm)

H max = Max. installation depth of the bottom part of shaft relative to the bottom part base

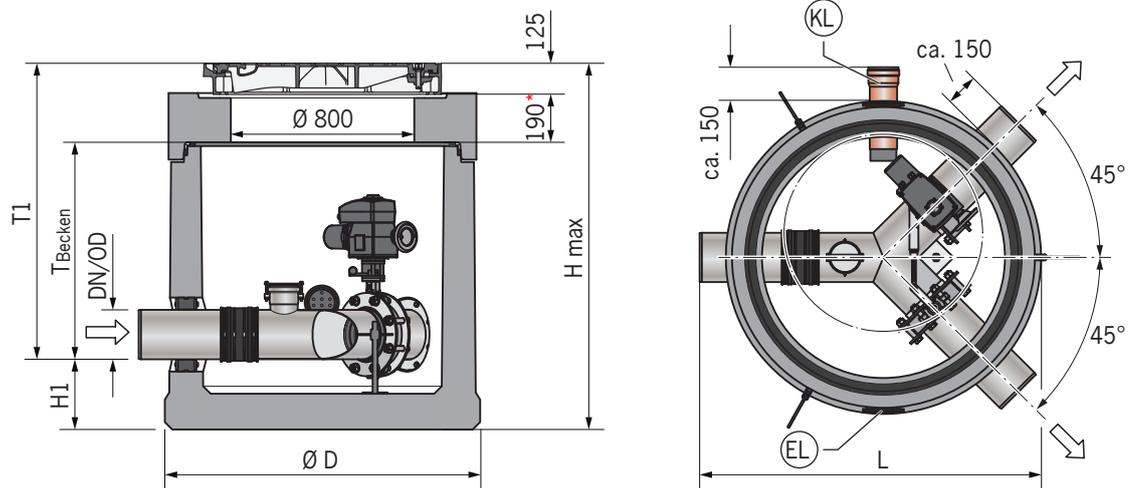
EL = Ventilation line connection: Pipe base = H1 + OD + ca. 100 mm

KL = Blank cable pipe connection: Pipe base = H1 + OD + ca. 100 mm

* = Construction height with joint for mortar (10 mm)

8.2 Flowswitch-C

Key data and dimensions



Type DN	Dimensions [mm]						
	OD	D	H1	H max	Tbasin	T1	L
100	110	1,270	290	5,600	875	1,190	1,420
150	160	1,270	290	5,600	875	1,190	1,420
200	200	1,270	290	5,600	875	1,190	1,420
250	250	1,740	615	5,900	950	1,265	1,890
300	315	1,820	585	5,900	1,225	1,540	1,970
400	400	1,820	660	5,950	1,150	1,465	1,970

T_{Basin} and T1 = Construction height with joints for circular rotating mechanical seal (15 mm) or mortar (10 mm)

H max = Max. installation depth of the bottom part of shaft relative to the bottom part base

EL = Ventilation line connection: Pipe base = H1 + OD + ca. 100 mm

KL = Blank cable pipe connection: Pipe base = H1 + OD + ca. 100 mm

* = Construction height with joint for mortar (10 mm)

8.3 Swivel drive

Key data	Without Ex-protection	With Ex-protection
Operating voltage:	~ 230 V, 50 Hz	~ 230 V, 50 Hz
Power consumption:	160 W	84 W
Protection type:	IP 67	IP 68 (submersion duration max. 48 h with 1m WS)
Closing time:	ca. 6 seconds	ca. 12 seconds
Explosion protection:	–	Ex-d3n D5

8.4 Check flap

Key data	Material
Flap disc:	Stainless steel / acrylonitrile butadiene rubber (NBR) coated
Sealing sleeve:	Sealing sleeve made from acrylonitrile butadiene rubber (NBR)

8.5 Position switch (optional)

Key data	Values
Operating voltage:	~ 230 V, 50 Hz
Connected load:	90 W
Protection type, controller:	IP 65
Internal pre-fuse:	3.15 A
External pre-fuse:	Max. 10 A
Potential-free contacts:	Max. load 3A 250V~
Dimensions:	200 mm x 300* mm x 160 mm (W x H x D)
* incl. cable glands	

Appendix 1: Commissioning report/Flowshut-C

Commissioning and instruction of a qualified person takes place in the presence of the authorised acceptance inspection representative and the plant operating company.

Commissioning date: _____

Handover date: _____

Flowshut-C

Type	Art. no.	Serial No.	Year of construction

Use location

Surface: _____

Use: Commercial operation Other _____

Street: _____

Town/city: _____

Responsible persons

	Qualified person	Authorised acceptance representative	Plant operating company
Name:			
Phone No.:			
Fax No.:			
Email:			
Address:			

Checklist for commissioning (Qualified person)

Checks	OK	Not OK
Electrical fusing of the plant in accordance with the IEC regulations or national and local regulations	<input type="radio"/>	<input type="radio"/>
Operating voltage and frequency	<input type="radio"/>	<input type="radio"/>
Check flap with swivel drive: Functioning test (protective function), leak-tightness	<input type="radio"/>	<input type="radio"/>
Pipe feed-through: Leak-tightness	<input type="radio"/>	<input type="radio"/>
Manual operation: Functioning test	<input type="radio"/>	<input type="radio"/>
Automatic operation: Functioning test	<input type="radio"/>	<input type="radio"/>
External triggering of closing: Functioning test	<input type="radio"/>	<input type="radio"/>
Fault signal at position switch: Functioning test	<input type="radio"/>	<input type="radio"/>

Instruction (by installer company)

Instruction	Remarks	Yes	No
Instruction:	Functions, position switch (control), operating information, checking obligations, troubleshooting, maintenance obligations	<input type="radio"/>	<input type="radio"/>
Handover:	Instructions for Use	<input type="radio"/>	<input type="radio"/>

Remarks:

Signature of Qualified person: _____

Signature of authorised acceptance _____

inspection representative: _____

Appendix 2: Commissioning report/Flowswitch-C

Commissioning and instruction of a qualified person takes place in the presence of the authorised acceptance inspection representative and the plant operating company.

Commissioning date: _____

Handover date: _____

Flowswitch-C

Type	Art. no.	Serial No.	Year of construction

Use location

Surface: _____

Use: Commercial operation Other _____

Street: _____

Town/city: _____

Responsible persons

	Qualified person	Authorised acceptance representative	Plant operating company
Name:			
Phone No.:			
Fax No.:			
Email:			
Address:			

Checklist for commissioning (Qualified person)

Checks	OK	Not OK
Electrical fusing of the plant in accordance with the IEC regulations or national and local regulations	<input type="radio"/>	<input type="radio"/>
Operating voltage and frequency	<input type="radio"/>	<input type="radio"/>
Check flap with swivel drive: Functioning test, leak-tightness	<input type="radio"/>	<input type="radio"/>
Check flap with mechanical locking device: Functioning test, leak-tightness	<input type="radio"/>	<input type="radio"/>
Pipe feed-through: Leak-tightness	<input type="radio"/>	<input type="radio"/>
Manual operation: Functioning test	<input type="radio"/>	<input type="radio"/>
Automatic operation: Functioning test	<input type="radio"/>	<input type="radio"/>
External triggering of closing: Functioning test	<input type="radio"/>	<input type="radio"/>
Fault signal at position switch: Functioning test	<input type="radio"/>	<input type="radio"/>

Instruction (by installer company)

Instruction	Remarks	Yes	No
Instruction:	Functions, position switch (control), operating information, checking obligations, troubleshooting, maintenance obligations	<input type="radio"/>	<input type="radio"/>
Handover:	Instructions for Use	<input type="radio"/>	<input type="radio"/>

Remarks:

Signature of Qualified person: _____
 Signature of authorised acceptance inspection representative: _____

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