



Safety Breakaway Coupling ABV-S

Operating Instruction

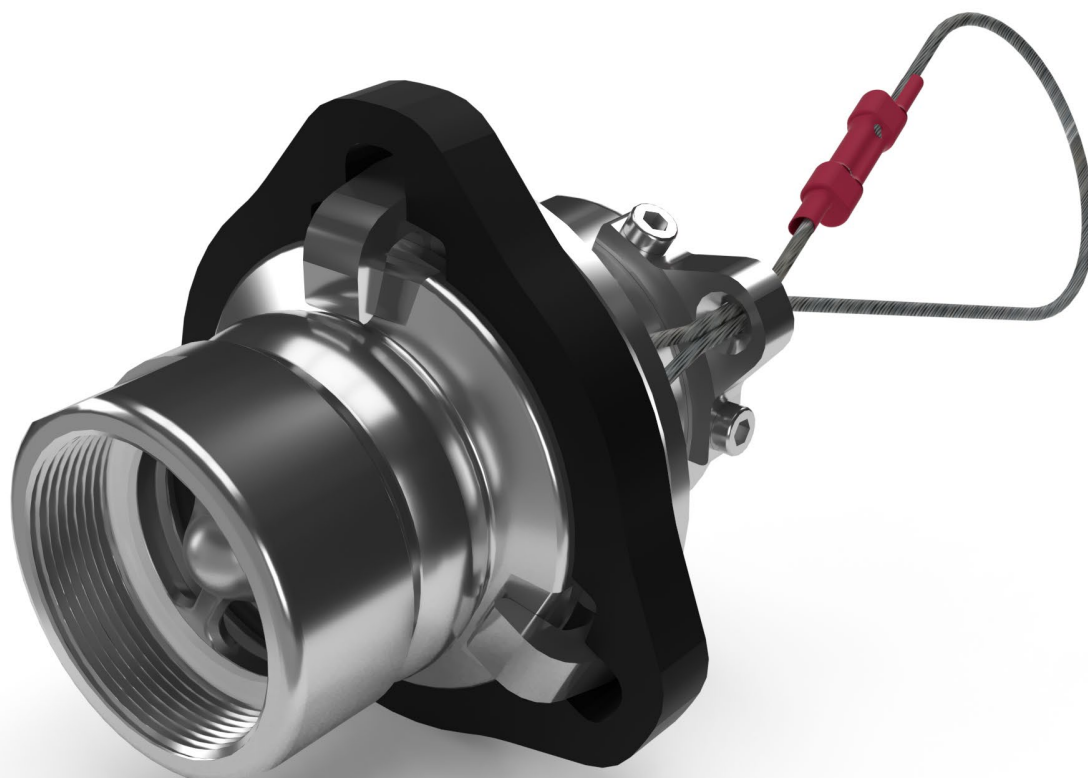




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1 Introduction

This guide for safety breakaway couplings ABV-S is intended for operators and planners of tankers and tank systems as well as for hose assembly workshops and hose assembly workshop maintenance engineers. The safety breakaway coupling acts as a safety component in the supply line of mobile refuelling systems, preventing damage to the environment whenever the supply pipe bursts during filling or emptying due to a change in location of the tank. The coupling valves on the tank and on the supply line immediately close whenever the housing halves break away.

ABV-S safety breakaway couplings of Stäubli Hamburg GmbH include special features:

- High quality processing,
- sturdy design,
- low wear,
- tamper-proof, safe operation,
- release angle up to 90° through three pressure clamps on activation mechanism,
- maintenance-friendly,
- approved by TÜV (German Technical Inspection Authority),
- meets ATEX standards for Zone 1,
- wide spectrum of application.

1 Introduction

1.1 Range of applications

Industrial

- Plant engineering
- Power plant construction
- Chemical industry
- Food processing industry
- Process technology
- Tank cleaning

Media

- Lyes and acids
- Fuels and oils
- Gases
- LPG/LNG, CNG
- Materials hazardous to the environment and water

Filling systems for:

- airfields
- railroad tank wagons
- tank trucks
- ships
- tank containers
- liquefied gas

The coupling may NOT¹ be used for:

- Temperatures below -40°C
- Temperatures above 150°C

1.2 Applicable documents

Guidelines for pressure devices 2014/68/EU

German Act for pressure devices (14. GPSGV)

Facts sheet T 002 (09/2014) BGI 572 of BG Chemie

GGVSE (ADR, RID); IMDG, ICAO

¹ Dependent on the used metallic and sealing materials!

2 Safety notes

The safety breakaway coupling, the tank and the supply line are subject to documentation and acceptance. All approval procedures, required test specifications and test dates must be observed and results of tests must be documented. Tests before commissioning and subsequent to repair must be conducted by qualified persons (competent specialist staff with suitable training and experience). All required measures for inspection, maintenance and repair must be carried out in accordance with the national regulations of the country where the system is installed.

WARNING: Injuries or damage are possible when safety breakaway coupling is triggered!

When safety breakaway coupling is triggered, injuries or damage may be caused by the fluid being pumped. When the safety breakaway coupling is triggered, minimal quantities of the fluid may spurt out (the volume between the valves and the fluid that is emitted until the valve is closed).

- The operator must ensure that suitable drip pans and locks are provided to prevent any danger from the fluid that is emitted.

Operators must always carry out a risk analysis for the machine and the fluid being pumped (see BG Chemie facts sheet). Operators must always themselves check whether the equipment is suitable for transferring the product. This particularly applies for aggressive or abrasive fluids that are likely to damage the safety breakaway coupling or the components of a supply line as a result of chemical reaction, corrosion or erosion. Relevant legal regulations for safety of pressure devices must be observed at all times.

Regulations for plants in explosive areas must always be observed. This particularly applies for prevention of sparks due to static electricity for the grounding of plant parts and for the volume resistances of the supply line.

2 Safety notes

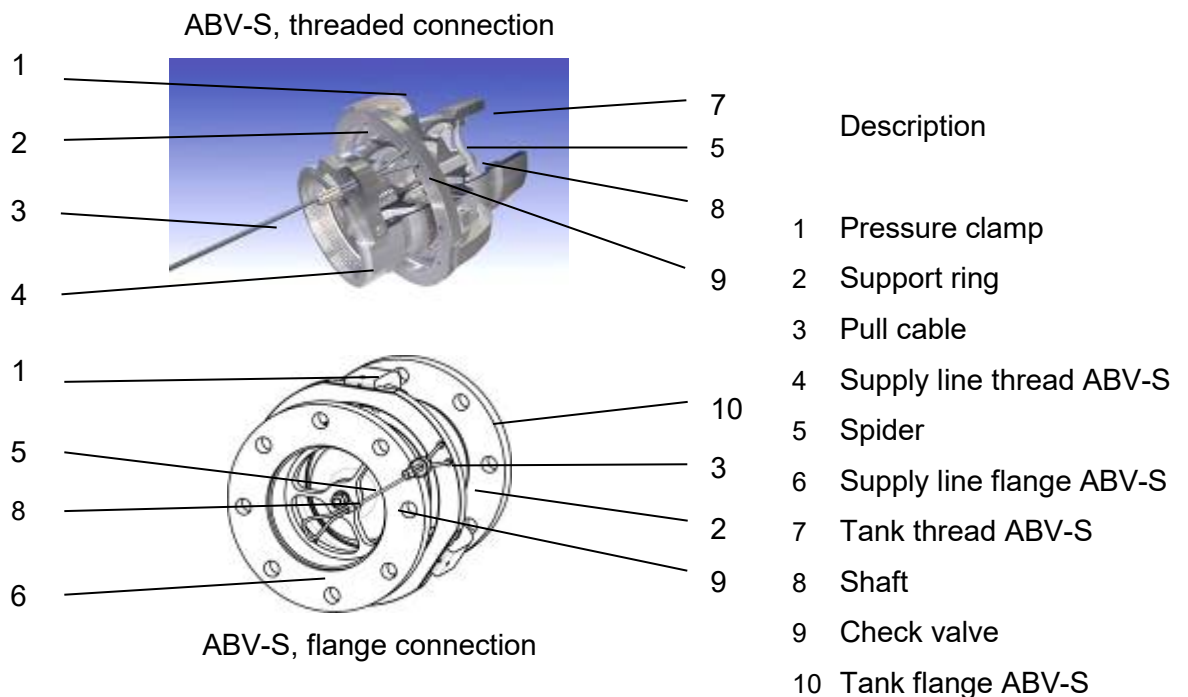
2.1 Intended use

The main purpose of safety breakaway coupling ABV-S is to prevent environmental damage caused by hose connections bursting on tankers. The coupling may only be operated by qualified persons (qualifications: experts, technicians, vocational training, and/or job experience) after it has been mounted on the tank and hosepipe in the proper manner and once a leak test has been conducted. Operators bear full responsibility for the safety of the plant and are obliged to comply with the applicable regulations for hazardous substances and highly inflammable or combustible fluids.

The safety breakaway coupling ABV-S may be used only in the temperature range -40°C to 150°C , dependent on the used metallic and sealing materials. Before filling or emptying tanks, the pull cable must be fastened to a suitable anchor point close to the filling station. Pull cable and fastening anchor must be checked to ensure they are firm and have sufficient tensile strength.

3 Description/structure

The safety breakaway coupling ABV-S consists of two housing halves with a check valve in each. The housings are held together by three pressure clamps and a support ring during normal operation. The two check valves support each other during normal operation and keep the conduit open.



3.1 Function

In case the tank wagon rolls away or someone forgot to disconnect the supply line before the truck drives off, the ABV-S is activated as follows:

Before the supply line is stressed by undue external forces the support ring is pulled out by a pull cable running parallel to the supply line which releases the pressure clamps. The case halves are separated from each other and the spring-loaded check valves instantaneously close both ends of the line. One half of the coupling remains firmly connected to the tank wagon while the other half of the coupling remains connected to the supply line. This prevents the outflow of liquids or gases from both product carrying ends of the line.

3 Description/structure


3.2 Storage and transport

The safety breakaway coupling ABV-S may only be transported or stored when absolutely clean. Suitable sealing must be used for the openings to ensure no damage occurs to the surfaces/sealed areas. The seals may only be removed by trained personnel. The storage location must guarantee adequate protection from corrosion or extreme temperatures.

3.3 Identification

Identification is engraved in the housing on each half of the coupling.

The following information is always available:

- TÜ.AGG.214-94
- CE 0575  II 2G T(x)
- Manufacturer ID: Stäubli Hamburg
- Art.no.:556.400400.12109-xx or 553.600600.720-xx
- Serial number / Year ,manufactured
- Consecutive no. / material name (housing)
- Ü-Sign according to the building inspection approval certificate no. Z-38.4-173
- DN PN

3.4 Scope of delivery

The safety breakaway coupling ABV-S will be delivered ready to use with caps for both openings and transportation lock for pull cable.

3.5 Accessories

When assembling safety breakaway coupling ABV-S, use of an open-jawed wrench with suitable width across flats is recommended. The open-jawed wrench must be provided by the user.

For servicing purposes, seal sets for valves and spiders may be ordered from Stäubli Hamburg at authorized hose assembly workshops. A special wrench for the spider can also be delivered.

3.6 Technical data
Special features:

- Modular design, expandable with additional screw-on parts, e.g. flange threaded nipples with different flange sizes
- Connection side BSP foll. ISO 228 IG, G2", G3", G4". Flat-packed thread runs to tank. This must not be sealed with PTFE tape.
- release angle up to 90° through three pressure clamps on activation mechanism
- Impact ring, protects against impacts
- Bellow cover, catches spray water during breakaway, can protect against formation of ice during winter
- approved by TÜV (German Technical Inspection Authority)
- meets ATEX standards for Zone 1
- Housing: In standard stainless steel 1.4571, other materials can be selected by manufacturer or operator
- Seals: O-rings FKM or FEP sheathed, IG PTFE flat packing
- Pressure level: PN25, max. rated pressure 25 bar (except DN 300: PN 10, max. 10 bar nomin. Pressure)

Nominal width, Weight and Dimensions [mm]

| Nominal width | Connection | kg | d | l |
|---------------|---|------|-------|-------|
| DN 25 | G1" | 1,06 | 100 | 108,5 |
| DN 25 | NPT 1" | 1,27 | 100 | 140,5 |
| DN 50 | G2" | 2,42 | 125 | 123,5 |
| DN 80 | G3" | 7,92 | 188 | 174,5 |
| DN 100 | G4" | 13,8 | 242,5 | 208,5 |
| DN 150 | Flange PN25/40 | 50,8 | 318 | 306,5 |
| DN 200 | Flange PN25 ANSI 150 PSI ANSI 300 PSI | 96,8 | 423 | 364 |
| DN 300 | Flange PN 10 | 266 | 592 | 600 |

3 Description/structure

Materials

| Components | Material no. | Material | Operating temperature |
|-------------------|----------------|-------------------------------|-----------------------|
| Body Spider | 1.4408 | GX6CrNiMo18-10 | -40°C bis 150°C |
| Body Valve Spider | 1.4571 | X6CrNiMoTi17122 (AISI 316 Ti) | |
| | 2.4602, 2.4600 | NiCr21Mo14W (Hastelloy C22) | |
| | 2.4610 | NiMo16Cr16Ti (Hastelloy C4) | |
| Spring / ball | 1.4401 | X12CrNi177 | |
| | 2.4602, 2.4600 | NiCr21Mo14W | |

Seals

| Component | Material | Designation | Temp. range |
|-------------|---------------------------------------|---------------------|--------------|
| O-ring | NBR | Perbunan | -20 / +100°C |
| | Ethylene-Propylene-Diene-Monomer EPDM | Buna AP | -40 / +150°C |
| | Perfluoroelastomer FFKM | Kalrez™ Chemraz™ | -40 / +150°C |
| | Fluoroelastomer FKM | Viton | -20 / +150°C |
| Thread seal | PUR | Vulkollan | -40 / +150°C |
| | PTFE | Teflon | -40 / +150°C |

Kalrez, Viton, Teflon = registered Trademarks of DuPont

Release force and residual amounts

| Nominal width | Release force at 25 bar nominal pressure | | Residual amount cm ³ |
|--------------------|--|-------------------|---------------------------------|
| | 0° release angle | 90° release angle | |
| DN 25 | 0,4 kN | 0,5 kN | 100 |
| DN 50 | 0,3 kN | 0,6 kN | 160 |
| DN 80 | 0,5 kN | 0,9 kN | 630 |
| DN 100 | 1,5 kN | 1,8 kN | 1090 |
| DN 150 | 2,4 kN | 4,9 kN | 3830 |
| DN 200 | 3,0 kN | 6,3 kN | 10050 |
| DN 300 (at PN 10!) | 3,0 kN | k. A. | 21890 |

The system-side cable connection must be designed with 5-fold safety.

Values for the maximum leakage, including 2-fold safety.

4 Installation and Initial Start-Up

The ABV-S may be installed by qualified personnel only (qualifications: experts, technicians, vocational training, and job experience). We would like to point out the professional obligations in acc. to German law §62 WHG. The safety breakaway coupling must be connected to the nozzles and connections provided. Avoid application of any additional forces, bending moments or vibrations at connection nozzles. Strong cross forces should be kept by fixing supports.

The safety breakaway coupling can be installed directly in the product line and is ready for use after removing the transport protection. The installation is as follows:

- a. Remove the packaging and the tread protection caps
- b. Check the coupling for damages before mounting.
- c. To prevent damages during mounting a suitable wrench should be used for the intended nut flats on the coupling
- d. Connect the end of the coupling without the pull cable guide to the tank wagon and connect the hosepipe end firmly to the coupling end with the pull cable guide (the hose may not be twisted). The thread must not be sealed with PTFE tape.
- e. Connect a suitable pull cable to the release cable of the coupling. The pull cable has to be shorter than the supply line and must be firm enough (Stretching, pulling power).
- f. Connect the pull cable to a tie rod. The tie rod of the pull cable may be positioned in a way that in any thinkable situation the pull cable is stretched earlier than the supply line. A safe release is possible in the range of 0° to 90° for the pull cable. Observe the minimal tensile strength of the entire cable connection. Please note that the minimum tensile strength of the entire cable connection must be at least 5 times greater than the maximum release force and the local conditions.
- g. Remove the transport protection: DN25 – DN 80: release two hexagon screws and remove red ring from release ring. DN 100 – DN 300: release three hexagon screws und remove three red separators.

4.1 Initial start-up

The start-up may take place only when the safety breakaway coupling has been mounted as instructed and the necessary function tests and leak tests have been conducted by the approved authorities. Operators are obliged to provide trained personnel to check the sealing of the connections, the correct condition of the pull cable and its fitting.

5 Operation

5 Operation

5.1 General notes

Operators are obliged to provide qualified and trained personnel familiar with the handling of supply pipes, safety breakaway couplings, any fluid being pumped as well as its danger potential. Such staff must also be familiar with the applicable safety regulations and the regulations of the employer's liability association.

The pull cable must be shorter than the supply line and must always be tight and attached in such a way that the safety breakaway coupling can be safely triggered.

5.2 For the operator

The safety breakaway coupling ABV-S has to be checked once a month for proper condition. The results of the inspection have to be documented.

In so far as the safety breakaway coupling ABV-S is part of a mandatory inspected system, the safety breakaway coupling ABV-S has to be checked by a technical expert during the first as well as all repeating inspections.

Only qualified personnel may be assigned with assembling the ABV-S (qualifications: experts, technicians, vocational training, and/or job experience).

We would like to point out the professional obligations in accordance to German law § 62 WHG.

5.3 Start-ups

CAUTION: When released, the safety breakaway coupling disconnects using considerable force! During disconnection, the fluid being pumped may suddenly spurt out. Ensure suitable protective measures are therefore in place!

The following points should be checked before any start-up:

- Condition of the pull cable.
- Pull cable connection and fitting.
- Proper fit of support ring and the clamps.
- Check the coupling for leaks.
- Check the connections of the coupling's seals to the system.
- Check the conductivity of the entire supply line.
- The electric contact resistance of $R \leq 10 \Omega$ needs to be kept.

5.4 Cleaning

Check the seal of the connections before every cleaning.

In case the coupling is used for materials that harden, stick, etc., the coupling has to be cleaned of residues after every use.

Before dismantling, the coupling always has to be cleaned with a suitable cleaning agent (regardless of the product carried).

5 Operation

5.5 Disassembly

After releasing the safety breakaway coupling and on opening the locks, there is a danger that the fluid will spurt out. Special protective measures such as personal protection equipment must therefore be adopted. Always ensure system is cleaned in the proper manner. After cleaning, remove any residue from the cleaning agent.

How to disassemble:

- a. Wear suitable personal safety equipment.
- b. Make sure that the coupling halves are depressurized and empty.
- c. Clean coupling before disassembly (use cleaning agent suitable for the pumped fluid).
- d. Unscrew both coupling halves with a fitting wrench.

5.6 Improper use

The equipment should never be used in the case of visible damage or where there is prior knowledge of damage that may lead to malfunction.

5.7 Maintenance / repair

Maintenance should be done regularly; at least once in the year. Maintenance must always be carried out after the safety breakaway coupling ABV-S has been triggered. Maintenance and repair of the safety breakaway coupling may be carried out only by Stäubli Hamburg GmbH or by companies technicians authorized by Stäubli Hamburg GmbH.

5.8 Miscellaneous

The operator is solely responsible for the installation, operation, and maintenance of the coupling. Stäubli Hamburg GmbH accepts no responsibility for damages due to faulty installation, faulty handling, as well as negligent or incorrect maintenance.

6 Inspection after Release

WARNING: Malfunction may occur due to incorrect assembly!

Whenever the system is released, it must be cleaned and sent in for assembly, otherwise the guarantee for perfect functioning will be rendered invalid. Stäubli Hamburg GmbH also changes the seal(s) in safety breakaway couplings that are sent in.

The safety breakaway coupling ABV-S is a safety component. Maintenance tasks may be performed only by trained personnel from an authorised professional workshop. All measures necessary for inspection, maintenance and repair must be carried out in accordance with the national regulations of the country where the system is installed.

7 Maintenance and Repair

7.1 General information

The safety breakaway coupling must be serviced regularly by qualified personnel to ensure it is always in proper working order in the event of any mechanical, chemical and thermal loads caused by the designated operating method. According to operating conditions and experiences, the operator must stipulate the measures to be adopted, together with intervals for inspection and maintenance in an operator's guide (see recommendation of Stäubli Hamburg GmbH, chapter 5.2 and 5.7). These include, for instance, visual inspection for leaks, function checks, water pressure checks with 1.5 fold excess pressure. All inspections and their results must be documented. In addition, during maintenance, the implemented measures must be documented. Any faults ascertained must be rectified immediately, else use of the equipment discontinued permanently.

7.2 Periodic tests by approved test centres

In Germany, the owner must send the equipment for a safety test at regular intervals in compliance with §15 of the health and safety guidelines when using equipment in the workplace (BetrSichV). In other countries, appropriate regulations also exist.



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