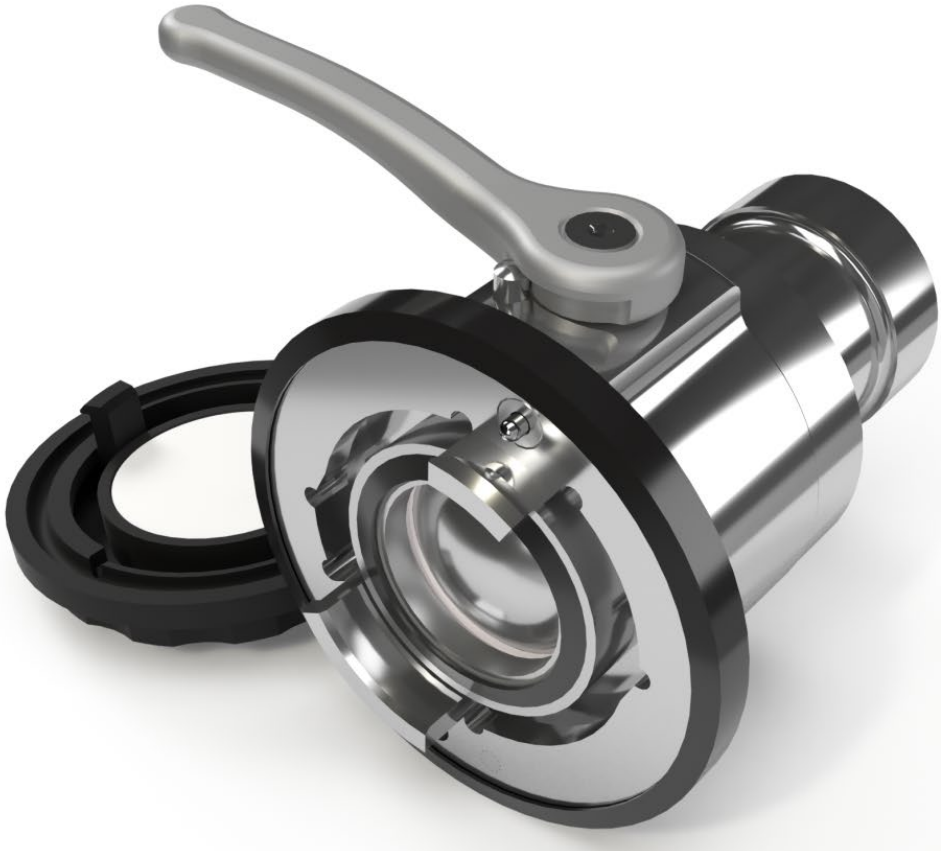
Dry Disconnect Coupling TKU

Operating instruction



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1 Introduction

These instructions for the Stäubli Hamburg GmbH Dry Disconnect Coupling Type TKU are intended for planners and operators of hose supply lines, as well as for hose line workshops and their maintenance technicians.

The dry disconnect coupling is a pressure accessory in the hose supply line that prevents uncontrolled drainage of hoses and thereby hazards to people and to the environment. The coupling valves on both hose lines must be closed before the coupling can be disconnected.

The TKU dry disconnect coupling from Stäubli has special benefits:

- Full flow cross-section
- High flow rate, low pressure losses
- Low residual quantity
- No damage to the environment / consequential costs
- Integrated locking function
- More safety for staff
- Integrated swivel joint
- No torsion damages to hoses
- Identical coupling halves
- Supports any flow direction
- Optimised feed process
- Maintenance friendly

The Coupling comes in two versions:

TKU – Series

This is a unisex coupling. That means both coupling halves are completely symmetrical. The interface sealing is a FKM lip seal. The TKU is only available in FKM.

TKM – Series

This coupling has a hose unit and a tank unit. The interface is sealed with an O-Ring. This O-Ring is placed in the hose unit. The tank unit is equipped with an according sealing surface.

1.1 Areas of application

Industrial fields

- Plant construction
- Power plant construction
- Chemical industry
- Foodstuffs industry
- Process and chemical engineering
- Tank cleaning

Media

- Acids and alkalis
- Fuels and oils
- Gases
- Substances hazardous to the environment and to a body of water

Filling systems

- Airfield
- Railroad tank wagons
- Tanker trucks
- Ships
- Tank containers

The dry disconnect coupling must NOT be used for:[1]

- Temperatures below - 20 °C
- Temperatures above 110 °C

1.2 Additionally valid documents

- ATEX 2014/34/EU
- Pressure Equipment Directive 2014/68/EU
- Data sheet T 002 - BGI 572 of the BG RCI

[1] A contact guard is intended when the coupling is heated up.

2 Safety instructions

The dry disconnect coupling as well as its connected hose lines must be documented and are subject to inspection and approval. All approval procedures, required inspection regulations and inspection periods must be observed. The results of the inspections must be documented. Inspection before start-up after repairs must be made by qualified persons (experts, specialists, professionally trained persons, those with professional experience). All required inspection, maintenance and repair measures must be carried out compliant to the national regulations of the country in which the equipment is installed.

The operator must write-up a hazard analysis for the system and the conveyed media (observe the data sheet of the BG Chemie). The operator must himself check to ensure that the unit is suitable for transporting the product. This applies in particular to aggressive or abrasive media which, due to chemical reaction, corrosion or erosion are capable of damaging the dry disconnect coupling or parts of a hose line. The relevant, valid determinations of the German Machinery Regulation for Pressure Equipment must be observed (see www.druckgeraete-online.de).

Regulations on systems used within explosive zones must be observed. This applies in particular to avoidance of arcing from static electricity for earthing system parts and for the contact resistance of the conductive hose line.

2.1 Correct use in accordance to the instructions

The TKU dry disconnect coupling is mainly used to protect from environmental pollution caused by uncontrolled escape of fluid from hoses after disconnecting the hose connection. It may only be put into operation by skilled persons after perfect installation within the hose line and after a leak test. The user must ensure that the system is safe and that the relevant, valid regulations for hazardous substances and easily flammable or flammable media have been observed.

WARNING: Hazard from conveyed media if the dry disconnect coupling is disconnected!

The volume between the valves may escape on disconnecting the dry disconnect coupling.

- The operator must ensure that no hazard is caused by any escaping media by providing suitable catchment containers and barriers.

3 Description/Functional principle

The TKU dry disconnect coupling comprises two coupling halves. When disconnected they are each closed by a shut off valve (ball valve) and protected against soiling by an undetachable cover. Connection of both coupling halves by tappets ensures a secure connection. The connected halves of the coupling are connected by turning a full 90° up to the metal stop of the tappet. No torsional forces are transferred to the hose due to the integrated swivel joint. Each ball valve must be opened by a lever after coupling. The full flow cross section is released.

The lever movement when opening the valve is transferred by a gearbox to the interlock pin, which moves into the safety borehole of the other half of the case.

The locking function of both interlock pins prevents disconnection when the conduit is opened, and thereby prevents uncontrolled drainage of the hose line or container.

Both coupling ball valves must be completely closed before the connection can be terminated. An additional locking device prevents unintentional opening of the valves when the coupling is disconnected.

WARNING: Use of force can damage the gearbox!

If a 90° counter-rotation is not made after plugging the dry disconnect coupling together (metallic stop of tappet) then the interlock pin cannot move into the borehole of the opposite side. Using too much force on the lever can damage the gearbox for the interlock pin!

3.1 Design and function

1 Impact ring
2 Swivel joint connection
3 Lever
4 Case
5 Ball valve
6 Interlock pin

3.2 Storage and transport

The protective caps must be placed on before transporting the coupling or the hose line. The TKU dry disconnect coupling may only be transported or stored after it has been cleaned. Suitable sealing of the openings must be made to ensure that the surfaces/sealing surfaces cannot be impaired. These seals may only be removed by expert personnel. The storage location must be selected to ensure that no damages can occur due to corrosion or extreme temperatures.

3.3 Identification

An identification is engraved in the case on each half of the coupling.
The following information always has to be given on the case:

- Manufacturer ID: Stäubli Hamburg
- Article no.
- Consecutive no.
- Factory No.
- PN / DN
- Material
- CE (DN38); CE 0575 (DN50 or bigger)
- Ex II 2G T(x)

3.4 Scope of delivery

The TKU dry disconnect coupling is delivered ready for use with undetachable protective cap and the connection ordered.

3.5 Accessories

We recommend you use a wrench with wrench width 50 to install the TKU dry disconnect coupling. The wrench must be supplied by the user.

Authorised hose workshops can order spare parts and sealing kits for couplings and valves from Stäubli.

3.6 Technical data

Special design features of the TKU dry disconnect coupling:

- Rated width: DN25, DN38, DN 50, DN80
- Modular design: Various methods of connection by replacing the swivel joint connection
- Integrated swivel joint
- Symmetrically designed coupling halves
- Impact ring made of NBR, protects from impact damages
- Integrated locking function by means of interlock pin and locking pin
- ATEX, TA-Luft
- Materials: Stainless steel case 1.4571/1.4408
- Seals: FKM, EPDM, FFKM; PTFE cone/thread sealing
- Pressure level: PN25

Types of connection

Type	Connection
Thread female	ISO 228 – G
	ANSI B1.20.1
Flange	DIN EN 1092-1
	ASME B16.5 (150; 300)
Welding end	AE ISO 1127 R1
	AE ISO 11830 R3
	AE ASME B 36.19 M
Triclamp	DIN 32676 A
	DIN 32676 B
	DIN 32676 C

Seals

Part	Material	Permissible oper. temp. [2]
O-ring	FKM	-20 °C to 110 °C
	EPDM	-20 °C to 110 °C
	FFKM	-20 °C to 110 °C
Lip seal	FKM	-20 °C to 110 °C
Thread seal Ball seal	PTFE	-20 °C to 110 °C

All parts in the coupling are in contact with media and must be suitable for the medium conveyed.

Materials

Part	Material No.	Material
Body Connection	1.4408 1.4571	G-X6 CrNiMo 1810 X6 CrNiMoTi 17122
Ball valve	1.4571	X6 CrNiMoTi 17122
Latching device (interlock)	1.4404 elec.polished and kolsterised	X90 CrMoV 18
Small parts (springs, screws, etc.)	1.4401	X5 CrNiMo 17122
Protective cap	PA6.6-GF30	Polyamide with 30% glass fibre
Impact ring	NBR	Nitrile rubber

[2] The temperature-resistance of the sealing material used must be taken into account in each case.

4 Installation and initial start-up

The TKU dry disconnect coupling may only be installed by a qualified person (expert, specialist, professionally trained persons, those with professional experience). We draw your attention to the fact that only special companies are approved as defined in §62 WHG (German Water Resources Act). The dry disconnect coupling must be connected at the appropriate coupling connections. Force, bending torque or vibration should be avoided at the coupling connections.

The TKU dry disconnect coupling can be installed directly within a hose line and is then ready for operation after removing the protective cover. To install, proceed as follows:

a. Remove the packaging and the thread protection caps.
b. Check the coupling for transport damages before mounting.
c. To prevent damages during mounting a suitable wrench (width 50) should be used for the intended nut flats on the coupling.
d. Screw the coupling tightly onto its respective hose line (the integrated swivel joint protects the hose from twisting). Do not use any additional sealing aids (such as, e.g. Teflon tape).

4.1 Initial start-up

Start-up may only be carried out after the TKU dry disconnect coupling has been correctly assembled on the hose and the required functional checks and leak tests have been carried out. The correct state of the hose connection must be checked by the operator's expert personnel.

If the TKU dry disconnect coupling is part of a system that is subject to mandatory inspection then the TKU dry disconnect coupling system must be checked by an expert inspector during initial inspection and all subsequent periodic inspections.

5 Operation

5.1 General instructions

The operator must ensure that only expert and trained personnel handle hose lines, dry disconnect couplings, as well as the medium conveyed in each case. These persons must be acquainted with the potential hazards, the relevant, valid safety regulations and the occupational-safety regulations.

5.2 Handling

Special attention should be paid to the following when handling the TKU dry disconnect coupling:
Transport the coupling or the hose line with the protective cap placed on
Dirt in the area around the ball sealing (e.g. solid particles) can damage the ball seat when opening/closing the coupling. You should also make sure that there is no soiling in the area of the coupling disconnection point. This results in leaks to the coupling.
Soiling in the area around the safety pin may damage the drive when opening/closing the coupling.
The conduit can only be opened after the coupling has been completely disconnected.
Never open the conduit when the cap is placed on; otherwise there is a danger of damaging the gearbox for the interlock pin.

5.3 Start-up

CAUTION: The valve seal of the TK dry disconnect coupling can be damaged by soiling!

After disconnecting, immediately close both coupling halves using the undetachable protective cap!

The following must be checked before each start-up:

- Condition of hose line
- Tightness of coupling and swivel joint in the coupling
- Tightness of connection between hose and coupling
- The conductivity of the complete product line.
- The electrical antistatic discharge capability must not exceed 10 Ω.

5.4 Cleaning

Check the tightness of the coupling and the connections before cleaning.
If the coupling is used for products that harden or that are adhesive then it must be cleaned of product residue each time after using it.

5.5 Removal

Before disassembly, the coupling must always (independent of product) be thoroughly cleaned using suitable cleansant. Any residue form the cleansant must be removed after cleaning. If there is a risk that medium might escape when disassembling the dry disconnect coupling then special protective measures must be taken, e.g. wear personal protective equipment.

Disassembly procedure:

a. Wear suitable personal protective equipment.

b. Make sure that the coupling halves are depressurised and that the hose line has been completely emptied.

c. Clean the coupling before disassembly (use cleansant appropriate to the medium conveyed).

d. Place the undetachable protective cap onto the coupling and tighten it by turning a quarter turn.

e. Unscrew both coupling halves using a suitable wrench (width 50).

f. Protect the coupling at the hose end from soiling with a suitable cover/cap.

5.6 Improper use

If damages are visible or there is any known pre-damage then the unit must not be put into operation if there is a risk of malfunction due to these damages.

5.7 Check by operator and maintenance

The TKU dry disconnect coupling must be checked for correct condition at least once a month. The maintenance intervals are shortened if used in particularly raw environments. The results of the inspections must be documented. Repairs should be carried out according to the wear to the TKU dry disconnect coupling.
Maintenance and repair of the dry disconnect coupling may only be carried out by Stäubli Hamburg GmbH or by a company/person authorised by Stäubli Hamburg GmbH.

The following areas of the coupling must be checked during maintenance:

1. Tightness when disconnected:
   - Between swivel joint connection and case
   - Between the seal insert and the case
   - Between the cone and the seal-ball seat-case
   - Between the seal insert and the seal-ball seat-case
   - Between the ball adjustment and the case
   - Between the interlock pin or the locking pin and the case

2. Tightness when connected:
   - Between swivel joint connection and case
   - Between the ball adjustment and the case
   - Sealing ring between the case halves
   - Between the interlock pin or the locking pin and the case
   - Between the locking pin and the case
   - Between the seal insert and the case

3. Correct function of the following components:
   - End-position latch or end-position stop of the manual lever
   - Reset spring of locking pin
   - Free movement of the ball valve when switching

- Free movement of the safety pin
- Axial play of safety pin
- Free movement of the swivel joint connections

Additionally, the hose and coupling must be electrically conductive.

ATTENTION: Check the sealing for wear!

Have the seals checked by an experienced staff member for wear, cracks and imprint from particles.

Maintenance work may only be carried out by expert personnel from an authorised workshop. All required inspection, maintenance and repair measures must be carried out compliant to the national regulations of the country in which the equipment is installed.

WARNING: Malfunction due to incorrect assembly!

If the system is defective then it must be cleaned and sent in for repair; otherwise, there is no guarantee of perfect function. RS replaces the seal(s) of dry disconnect couplings sent to it.

5.8 Miscellaneous

The operator alone is responsible for correct installation, operation and repair/maintenance of the coupling. Stäubli Hamburg GmbH does not accept any liability for consequential damages due to incorrect assembly, incorrect handling or neglected/incorrect maintenance.

6 Maintenance and repair

6.1 General details

The dry disconnect coupling must be maintained at regular intervals by expert personnel in such a way that it safely functions on a continuous basis within the intended operating mode with regard to its mechanical, chemical and thermal loads. According to the operating conditions and experience of the user, the operator must write-up operating instructions containing the inspection and maintenance measures that have to be taken, and at which intervals. This includes, e.g. visual inspection of tightness, functional tests, water pressure tests at 1.5 times overpressure. Each inspection and its results must be documented; furthermore, the measure taken must be documented for each maintenance measure. Any errors determined must be remedied immediately or the unit must be put out of operation permanently.

6.2 Periodic inspections from approved inspection agencies

In Germany, the operator must make a check of the unit at regular intervals according to §15 of the German BetrSichV. The corresponding regulations in other countries must be observed.

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