

# Dry Disconnect Coupling TX

Operating instruction



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## 1 Introduction

These operating instructions describe the safe installation and operation of the model TX dry disconnect coupling.

- ➔ Read through the operating instructions carefully prior to installation and operation.
- ➔ Keep the operating instructions during the entire service life of the dry disconnect coupling.
- ➔ Make sure that these operating instructions are accessible to the operator at all times.
- ➔ Pass on the operating instructions to every following owner or user of the dry disconnect coupling.
- ➔ Add every supplement received from the manufacturer.
- ➔ Observe other applicable documents.

### 1.1 Validity

These operating instructions apply exclusively to the installation and operation of the model TX dry disconnect coupling from Stäubli Hamburg GmbH.

### 1.2 Target group

These operating instructions for the TX series dry disconnect coupling are directed at users (operators and planners) of refueling systems. The dry disconnect coupling is a safety component in a hose/pipeline which leads from a refueling system to a mobile supply and disposal unit.

### 1.3 Standards, guidelines and directives

These operating instructions were prepared based on the following directive:

- Pressure Equipment Directive DGRL 2014/68/EU

The dry disconnect coupling has been developed, designed and manufactured based on the following standards, guidelines and directives:

- Pressure Equipment Directive DGRL 2014/68/EU (Category I and II)
- NATO STANAG 3756
- ATEX Product Directive 2014/34/EU
- ADR/RID/ IMDG

## 1 Introduction

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### 1.4 Warnings, symbols and markings

#### 1.4.1 Warnings in this documentation

Warnings are used in these operating instructions to prevent injuries or damage.

→ Read and observe warnings.

The warnings are marked with the following symbols and signal words:

 <b>DANGER</b>
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<b>Imminent threat of danger!</b>
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Upon non-compliance, death or very serious injuries are risked.
---

 <b>WARNING</b>
--

<b>Possible imminent danger!</b>
----------------------------------

Non-compliance could result in death or very serious injuries.
--

 <b>CAUTION</b>
--

<b>Dangerous situation!</b>
-----------------------------

Non-compliance could result in minor injuries or damage.
--

### 1.4.2 Symbols and markings

Symbols and markings are used in these operating instructions for simple, fast comprehension.

Symbol	Description
✓	Condition which must be met before you can begin an action.
→	Action with one or more steps for which the sequence is irrelevant.
1. 2. 3. ..	Action with several steps for which the sequence is relevant and is therefore specified.
•	List of first level
(see chapter xx)	Cross-reference to a position in these operating instructions

Table 1-1: Symbols and markings

 <b>NOTE</b>
<p>Important information for comprehending or for optimizing the work and installation processes.</p>

## 1 Introduction

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### 1.5 Applications

The model TX dry disconnect coupling is intended for use in hoses or pipelines.

#### 1.5.1 Industrial areas

- Plant engineering
- Power plant construction
- Chemical industry
- Pharmaceutical industry
- Food processing and beverage industry
- Process engineering and technology
- Tank cleaning
- Refueling systems for:
  - Rail tank cars
  - Road tank vehicles
  - Ships
  - Tank containers

#### 1.5.2 Fluids

- Alkaline solutions
- Acids
- Fuel and oil
- Pharmaceutical products
- Gases

As special couplings with corresponding approval also for:

- Food
- LPG
- Fluids presenting an environmental or water hazard
- Others on request

## 2 Safety Instructions

### 2.1 Proper use

The dry disconnect coupling is only intended for filling and transferring fluid fluids.

Any other use is considered improper. Improper use includes:

- Use outside the specified pressure and temperature ranges.
- Use in conjunction with fluids to which the material combination is not sufficiently resistant.

The dry disconnect coupling is not to be used as a safety coupling for pressure limitation.

Prior to commissioning, the resistance of the material combination must be ensured.

## 2 Safety Instructions

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### 2.2 Safety regulations

The operator of the dry disconnect coupling is responsible for compliance with all relevant legal regulations and directives.

- ➔ The dry disconnect couplings may only be commissioned, operated and serviced in compliance with the following regulations and standards:
  - Operating instructions
  - Other applicable documents (national regulations on pressure equipment, operating safety, hazardous goods and environmental protection)
  - Regulations on hazardous fluids and highly inflammable or combustible fluids
  - Regulations on systems in potentially explosive atmospheres  
This applies in particular to avoidance of sparking caused by static electricity, for the grounding of system parts and for the contact resistance of the conductive hose line.
  - System-specific regulations and requirements
  - Equipment and Product Safety Act for Pressure Equipment
  - Valid international, national and regional regulations
  - Accident prevention regulations
  
- ➔ Have dry disconnect coupling approved by qualified persons (experts, skilled personnel due to professional training/professional experience) and document approval.
  
- ➔ Comply with all approval procedures, required test regulations and inspection periods.
  
- ➔ Have testing conducted prior to commissioning and after maintenance work only by qualified persons (experts, skilled personnel, professional training/professional experience). Take the obligation to employ a specialist company according to Section 62 of the German Water Resources Act (WHG) into account when doing so.

- Inspect the dry disconnect coupling regularly for proper condition and absence of leaks. Document the results of the tests.
- If the dry disconnect coupling is part of a system requiring inspection, in case of an initial inspection and periodic inspections of the system, have the dry disconnect coupling checked by an expert.
- Carry out all necessary measures for inspection, maintenance and repair in agreement with the national regulations of the country of installation, the specifications of the monitoring body for the system and, if necessary, in coordination with the manufacturer.

### 2.3 Personnel qualification

The operator is responsible for repair and maintenance work only being carried out by skilled personnel, who have been trained by Stäubli Hamburg GmbH.

- The obligation to employ a specialist company according to Section 62 of the German Water Resources Act (WHG) and the regulations of the German Employers' Liability Insurance Association (BG) must be observed.
- Make sure that the personnel have read and understood these repair and maintenance instructions and can implement them.
- Make sure that the personnel knows and observes the applicable accident protection and safety regulations.
- Make sure that the personnel uses suitable protective clothing/equipment.

### 2.4 Safe handling

- Check the dry disconnect coupling for proper function and absence of leaks before putting it into operation.
- When using the dry disconnect coupling in a raised position, make sure that no persons are injured by falling parts of the dry disconnect coupling.
- When using the dry disconnect coupling, small residual quantities of the carried fluid are released. Take fluid-specific safety precautions and comply with the safety regulations.

### 2.5 Maximum permissible axial additional load

It must be ensured that the maximum permissible axial additional load on the TX dry disconnect coupling is not exceeded.

Nominal diameter	Additional load at p = 0 bar	Additional load at PN
DN 25	7000 N	5448 N
DN 50	10000 N	6535 N
DN 65	20000 N	13910 N
DN 80	25000 N	15315 N
DN 100	37000 N	21718 N

*Table 2.5-1: TX nominal diameter with maximum permissible axial additional load*

### **3 Storage and Transport**

- Only transport or store the dry disconnect coupling in cleaned condition.
- Cover the openings with threaded protective caps/plugs to prevent damage to the surfaces/sealing surfaces and to protect them from soiling.
- Make sure that no damage can occur due to corrosion or extreme temperatures at the storage location.

### **4 Scope of Delivery**

The model TX dry disconnect coupling is delivered ready to use.

### **5 Tools**

For installing the dry disconnect coupling:

- Open-end wrench with suitable wrench size (see chapter 6.4.1).  
The open-end wrench is not included in the scope of delivery.

## 6 Design and Function

### 6.1 Design

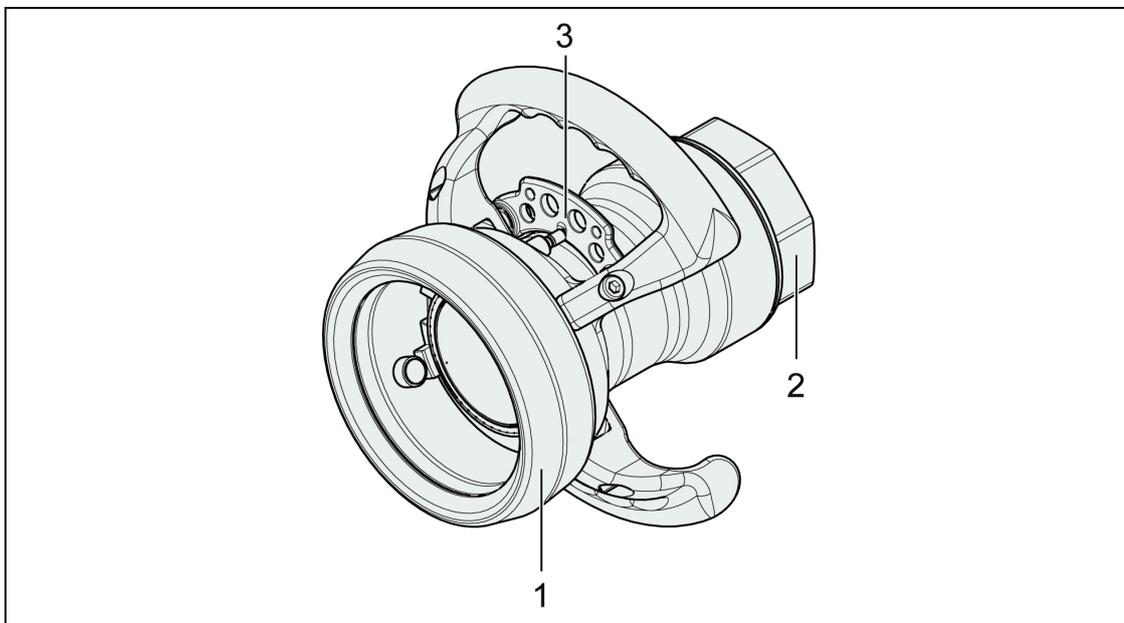


Figure 6-1: Design of dry disconnect coupling, hose unit (HU)

- |   |   |   |                           |
|---|---|---|---------------------------|
| 1 | Connection side of coupling                     | 3 | Locking device (optional) |
| 2 | Pipe/hose/tank connection<br>incl. swivel joint |   |                           |

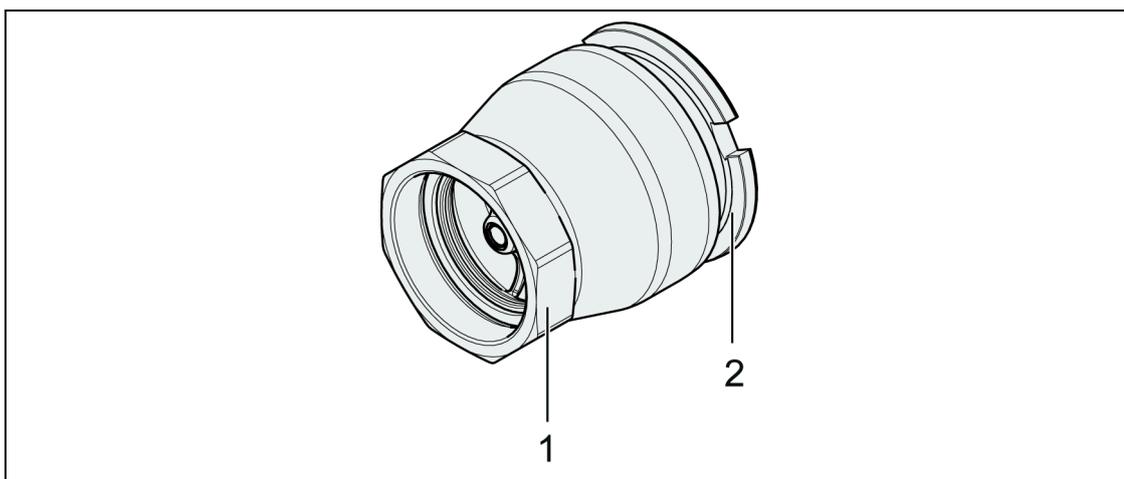


Figure 6-2: Design of dry disconnect coupling, tank unit (TU)

- |   |                           |   |                             |
|---|---------------------------|---|-----------------------------|
| 1 | Pipe/hose/tank connection | 2 | Connection side of coupling |
|---|---------------------------|---|-----------------------------|

## 6.2 Function

The model TX dry disconnect coupling consists of two coupling halves referred to as tank unit (TU) and hose unit (HU). Each part is closed off with a shut-off valve in the decoupled state. The two coupling halves are connected with a bayonet catch. A pressure-tight connection is produced by automatic centering and by turning the HU by 120° onto the TU and the valves are opened to release the flow area.

When decoupled, the spring-loaded valve in the tank unit and the restraint guided valve in the hose unit are sealed off fluid-tight.

The hose unit is available with an optional locking device.

### For the operator:

Only qualified persons may be commissioned with the installation of the TU/HU. Qualified persons are experts and skilled personnel through professional training and/or professional experience.

## 6.3 Marking

Each coupling half is provided with a marking.

The marking contains the following information:

Marking (exemplary)	Meaning
Manufacturer's abbreviation: Stäubli Hamburg	Manufacturer's identification
TXHU.050200.xxxxxxxx	Article number for identifying the product
No. 1038/19	Serial number/Year of manufacture
1.4408/EN AC-42000	Material designation of housing
FPM/NBR/EPDM/FFPM	Material designation of seal
DN PN	Nominal diameter, pressure rating
CE 0575	CE marking with identification number of notified body
II 2G T(x)	Ex marking

Table 6-1: Marking on the housing

## 6 Design and Function

### 6.4 Technical data

#### 6.4.1 Nominal diameters and pressure ratings

##### Hose unit TXHU

Connections

- thread BSP ISO 228-G 2
- thread NPT ANSI B2.1
- flange DIN EN 1092-1
- flange ANSI B 16.5

Connection	Nominal diameter	Wrench size	Stainless steel	Aluminum
1"	DN 25	46	PN 25 (Cat. II)	PN 16 (Cat. I)
2"	DN 50	65	PN 25 (Cat. II)	PN 16 (Cat. I)
2 ½"	DN 65	85	PN 25 (Cat. II)	PN 16 (Cat. I)
3"	DN 80	100	PN 25 (Cat. II)	PN 16 (Cat. II)
4"	DN 100	125	PN 25 (Cat. II)	PN 16 (Cat. II)

*Table 6-2: TXHU nominal diameters, pressure ratings and categories according to PED*

##### Tank unit TXTU

Connections

- thread BSP ISO 228-G 2
- thread NPT ANSI B2.1
- flange DIN EN 1092-1
- flange ANSI B 16.5

Connection	Nominal diameter	Wrench size	Stainless steel	Aluminum
1"	DN 25	46	PN 25 (Cat. II)	PN 16 (Cat. I)
2"	DN 50	65	PN 25 (Cat. II)	PN 16 (Cat. I)
2 1/2"	DN 65	85	PN 25 (Cat. II)	PN 16 (Cat. I)
3"	DN 80	100	PN 25 (Cat. II)	PN 16 (Cat. II)
4"	DN 100	125	PN 25 (Cat. II)	PN 16 (Cat. II)

Table 6-3: TXTU nominal diameters, pressure ratings and categories according to PED

Customer-specific nominal diameters and pressure ratings are available on request.

### 6.4.2 Materials

The couplings are available in the following materials:

- 1.4408
- EN AC-42000

### 6.4.3 Sealings

Component	Material abbreviation	Designation
O-ring	FKM	Fluorine rubber
	EPDM	Ethylene-propylene-diene-monomer rubber
	NBR	Acrylonitrile butadiene rubber
	FFKM	Perfluoroelastomer
Thread seal	AU	Polyester urethane rubber
	PTFE	Polytetrafluoroethylene

Table 6-4: Sealings

### 6.4.4 Temperature ranges

The permissible temperature range is defined by the combination of materials for the coupling components and sealing materials. The use of the dry disconnect coupling outside the temperature range is not permitted.

#### Casing components made of stainless steel A4 or hastelloy:

Materials	Temperature ranges
FKM	-20°C until +180°C
FKM/FEP	-50°C until +180°C
EPDM	-50°C until +150°C
NBR	-20°C until 100°C
FFKM	-20°C until +180°C
KALREZ 0040	-40°C until +180°C

*Table 5: Temperature ranges stainless steel A4 or hastelloy*

#### Casing components made of ENAW 5083 or ENAC 42000:

Materials	Temperature ranges
FKM	-20°C until +80°C
FKM/FEP	-40°C until +80°C
EPDM	-50°C until +80°C
NBR	-20°C until +80°C
FFKM	-20°C until +80°C
KALREZ 0040	-40°C until +80°C

*Table 6: Temperature ranges ENAW 5083 or ENAC 42000*

## 7 Installation/Assembly

Required tools for installation:

- Use suitable tools for the wrench surfaces provided for this purpose on the dry disconnect coupling.
- See the tables in chapter 6.4.1 for the connections.

### 7.1 Installing dry disconnect coupling

 <b>CAUTION</b>
<p><b>Danger of injury caused by sharp edges!</b></p> <p>→ Wear protective gloves.</p>

 <b>CAUTION</b>
<p><b>Danger of injury caused by escaping fluids and danger of environmental damage!</b></p> <p>→ Wear protective equipment.</p> <p>→ Completely drain lines carrying product.</p> <p>→ Use catch containers.</p>

 <b>CAUTION</b>
<p><b>Danger of injury with larger nominal diameters of the dry disconnect coupling!</b></p> <p>→ Use suitable lifting devices.</p> <p>→ Carry out installation together with a second person.</p> <p>→ Wear protective equipment.</p>

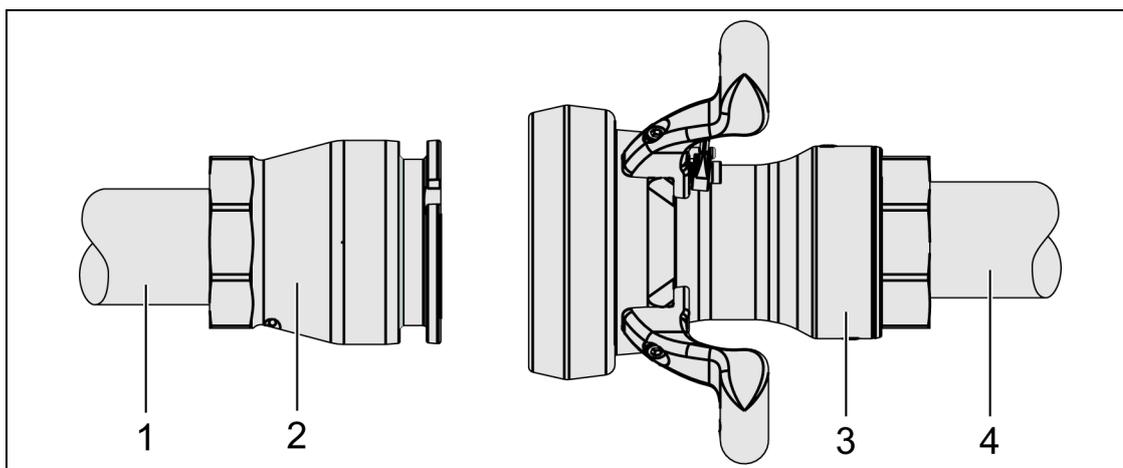


Figure 7-1: Fastening hose line

1. Remove the packaging and thread protection caps.
2. Check the dry disconnect coupling for damage.
3. Screw tank unit the of dry disconnect coupling (2) onto the end of the tank connection (1), e.g. on a pipeline.
4. Screw hose unit of the dry disconnect coupling (3) onto the hose connection (4).
5. Check the connections for leaks.
6. Check the pipe/hose in accordance with the system specifications.

Grounding the dry disconnect coupling:

Make sure that the dry disconnect coupling is connected conductively to the tank/hose/pipe.

### 7.2 Setup

Operating and leak test:

- ➔ Check conductivity according to the system specifications. The electrical volume resistance of  $R < 10$  ohms must be maintained.
- ➔ Before the coupling is put into operation for the first time, depressurize it and check its operation without fluid. Connect the HU to the TU for this purpose. At the start and the end of the coupling procedure, an increased torque must be applied.
- ➔ Check the connections of the coupling to the system for leaks before putting it into operation.
- ➔ Conduct a visual inspection for contamination.

## 8 Operation

 **WARNING**

**Danger caused by release volume of dangerous fluids!**

- Take fluid-specific safety precautions and comply with the safety regulations.
- Use personal protective equipment.

 **WARNING**

**Danger of injury caused by falling coupling parts!**

- Wear safety shoes and a helmet.

 **CAUTION**

**Danger of damage!**

- Remove contaminants prior to the coupling procedure.
- Never use rags, cloths, etc.
- Do not use external devices.
- Do not use force.

- Conduct a visual inspection for leaks, cleanliness and damage before each operation.
- Follow the safety precautions and instructions on handling the carried dangerous goods.

### Coupling procedure

1. Raise the hose unit (HU) by the handles (DN25 handles are optional) and place it on the tank unit (TU).
2. Turn the hose unit until the pulleys of the hose unit grip into the grooves of the tank unit.
3. Turn the hose unit further until the coupling noticeably engages.

 **CAUTION**

**Danger of damage!**

Sluggish coupling can result from dirt or an excessively high line pressure.

- Do not continue coupling if resistance is considerably increased.
- Never couple with external devices.
- Draining and Depressurizing of the lines if malfunctions occur.

## 9 Cleaning

 **WARNING**

**Danger caused by residual quantities of dangerous fluids escaping!**

→ Take fluid-specific safety precautions and comply with the safety regulations.

- Always check the dry disconnect coupling and connections for leaks before cleaning.
- Use a lint-free cloth and dishwashing liquid for cleaning.  
Only use compressed air in the absence of any fluids.
- Clean the dry disconnect coupling before removing (regardless of the fluid carried).

### 10 Maintenance/Repair

- ➔ The operator specifies the measures and the intervals for performing maintenance and repairs in accordance with the operating conditions. These include:
  - Check dry disconnect coupling for damage or defects.
  - Check the operating condition and absence of leaks of the dry disconnect coupling.
  - Conduct water pressure tests with 1.5x maximum working pressure (MWP).
- ➔ Do not use damaged dry disconnect couplings.
- ➔ Perform maintenance regularly, however at the latest after the system inspection interval expires. Yearly maintenance is recommended.
- ➔ Only have maintenance and repair work performed on the dry disconnect coupling by Stäubli Hamburg GmbH or by persons authorized by Stäubli Hamburg GmbH.
- ➔ Conduct a visual inspection at regular intervals.
  - Check dry disconnect coupling for damage or defects.
  - Check the operating condition and absence of leaks of the dry disconnect coupling.
- ➔ Eliminate any faults determined immediately or permanently remove the dry disconnect coupling from service.
- ➔ Comply with the specified maintenance intervals and document the maintenance measures performed.

 **NOTE**

**Damage to the dry disconnect coupling can be caused by personally conducted repair measures.**

- ➔ Do not carry out repairs yourself.
- ➔ Only have a defective dry disconnect coupling repaired by Stäubli Hamburg GmbH or by persons authorized by Stäubli Hamburg GmbH.

## 11 Removing

 **WARNING**

**Danger caused by release volume of dangerous fluids!**

- ➔ Take fluid-specific safety precautions and comply with the safety regulations.
- ➔ Use personal protective equipment.

1. Wear suitable personal protective equipment.
2. Make sure that the coupling halves are depressurized and free of fluids.
3. Clean the coupling with a lint-free cloth and dishwashing liquid before removal. Only use compressed air in the absence of any fluids.
4. Screw off the hose and tank unit with a suitable open-end wrench.
5. Clean the connection sides of the coupling halves.

## 12 Disposal

- ➔ Comply with the national and regional regulations when disposing of or recycling the dry disconnect coupling or its components.
- ➔ If you have questions on the disposal of the dry disconnect coupling, please contact the manufacturer or an authorized expert.

## 13 Liability Disclaimer

Stäubli Hamburg GmbH shall assume no liability for consequential damage due to faulty installation, incorrect handling and negligent or incorrect maintenance work.

The operator bears the sole responsibility for the installation, operation and maintenance of the dry disconnect coupling.



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