Installation and Operating Manual
(Original installation and operating manual)

91800268710 en

Hydraulic Removal Device for
Voith Turbo Couplings with constant fill
Sizes 422 - 1150

ATTENTION!
Please read this manual, at any rate, prior to installation and commissio-
ning, and keep it for further use!

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>Size of puller thread</th>
<th>Material No. of puller spindle</th>
</tr>
</thead>
<tbody>
<tr>
<td>422 – 487 T</td>
<td>G 1 ¼ (zylindrisches Whitworth-Rohrgewinde)</td>
<td>TCR.10063480</td>
</tr>
<tr>
<td>562 – 650 T</td>
<td>G 1 ½ (zylindrisches Whitworth-Rohrgewinde)</td>
<td>TCR.10450060</td>
</tr>
<tr>
<td>750 – 1150 T</td>
<td>G 2 ¼ (zylindrisches Whitworth-Rohrgewinde)</td>
<td>TCR.10668200</td>
</tr>
</tbody>
</table>

Issued by: amded-Hipp
Checked by: amde - MPre

2015-02-09

Please consult Voith Turbo in case that the data on the cover sheet are incomplete.

1) Please indicate the material number in any correspondence.
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1 Preface

1.1 General Information

This manual will support you in using the removal device with pulley in a safe and proper way. If you observe the information contained in this manual, you will
– increase the reliability and lifetime of the removal device,
– avoid any risks
– reduce repairs and downtimes

This manual must
– always be available at the removal device site,
– be read and used by every person who transports the coupling, works on the coupling or commissions the same.

The removal device has been manufactured according to the latest design standard and approved safety regulations. Nevertheless, the user’s or third party’s life may be endangered or the machine or other property impaired in case of improper handling or use.

This manual has been issued with the utmost care. However, in case you need any further information, please contact:

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Voith Turbo reserves the right for modifications.
2 Safety

2.1 Notes and Symbols

The safety notes contained in this operating manual are particularly marked with safety symbols according to DIN 4844.

<table>
<thead>
<tr>
<th>Damage/harm to...</th>
<th>Signal word</th>
<th>Definition</th>
<th>Consequences</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons, Property</td>
<td>EX-PROTEC- TION!</td>
<td>Notes to Ex-protection</td>
<td>Danger of explosion</td>
<td><img src="Ex.png" alt="Ex" /></td>
</tr>
<tr>
<td>Persons</td>
<td>DANGER!</td>
<td>Imminent danger</td>
<td>Fatal or serious injuries (crippling)</td>
<td><img src="Exclamation.png" alt="Exclamation" /></td>
</tr>
<tr>
<td>Persons</td>
<td>WARNING!</td>
<td>Potentially dangerous situation</td>
<td>Fatal or serious injuries possible</td>
<td><img src="Exclamation.png" alt="Exclamation" /></td>
</tr>
<tr>
<td>Persons</td>
<td>CAUTION!</td>
<td>Less dangerous situation</td>
<td>Minor or moderate injuries possible</td>
<td><img src="Exclamation.png" alt="Exclamation" /></td>
</tr>
<tr>
<td>Persons, Property</td>
<td>Suspended loads!</td>
<td>Potentially dangerous situation</td>
<td>Fatal or serious injuries possible</td>
<td><img src="Exclamation.png" alt="Exclamation" /></td>
</tr>
<tr>
<td>Persons</td>
<td>Duty to wear a helmet!</td>
<td>Potentially dangerous situation</td>
<td>Head injury</td>
<td><img src="Helmet.png" alt="Helmet" /></td>
</tr>
<tr>
<td>Persons</td>
<td>Use a face shield!</td>
<td>Potentially dangerous situation</td>
<td>Face injury</td>
<td>![Face Shield](Face Shield.png)</td>
</tr>
<tr>
<td>Material</td>
<td>ATTEN- TION!</td>
<td>Potentially harmful situation</td>
<td>Possible damage to – the product – its environment</td>
<td><img src="Exclamation.png" alt="Exclamation" /></td>
</tr>
<tr>
<td>–</td>
<td>Note! Information!</td>
<td>Application details and other useful information</td>
<td>Efficient in operation</td>
<td><img src="Info.png" alt="Info" /></td>
</tr>
</tbody>
</table>

Marking with the Ex-symbol (Ex) indicates possible hazards which have to be observed only for the use in potentially explosive atmospheres.
2.2 Proper use

The removal device serves to remove the turbo coupling from the shaft and must not be used for other purposes.
Proper use also includes observing the installation and operating manual of the turbo coupling.
The manufacturer is not liable for damages resulting from improper use. The risk has to be borne solely by the user.

2.3 Improper use

Please see the corresponding information as to dangerous situations in the respective chapters.

2.4 Constructional modifications

DANGER!
It is not allowed to do constructional modifications on the removal device as these may cause personal injury and damage to property!

2.5 General information with regard to dangerous situations

For all work performed on the turbo coupling, please observe the local regulations for the prevention of accidents!

DANGER!

- **Hazards while working on the turbo coupling:**
  There is the risk of injury by cutting, squeezing and cold burns in case of minus degrees.
  Never touch the turbo coupling without wearing protective gloves!
  Start to work on the coupling only after it has cooled down to below 40 °C, as otherwise there is a risk of burns!
  Ensure that there is sufficient light, a sufficiently big working space and good ventilation when working on the turbo coupling.
  Switch off the system in which the coupling is installed and secure the switch against inadvertent switch-on.
  For all work performed on the turbo coupling ensure that both, drive motor and driven machine have stopped running and startup is absolutely impossible!
– Operating fluid which leaks out:
If operating fluids leak out of the turbo coupling, immediately remove the same to prevent hazards (e.g. risk of slipping, risk of fire)!
Collect operating oil leaking out to prevent contact with parts (motor, belt) which might ignite or catch fire.
Please provide a catch pan of sufficient size, if required!
Please pay attention to the information contained in the safety data sheets!

– Fire hazard:
After the fusible plugs responded, spraying off oil may ignite on hot surfaces causing fire, as well as releasing toxic gases and vapor. There is a risk of burning and intoxication, as well as a risk of harm to machines, environment and property.
Immediately switch off the driving machine when the fusible plugs respond.
Please pay attention to the information contained in the safety data sheets!

– Checking the methane content before working on the turbo coupling:
In order to guarantee the safety during underground installation, maintenance and removal when working on the turbo coupling with a housing of aluminum alloy and the protective cover removed, the methane content has to be checked locally using appropriate instruments. Before starting and while performing this work, the methane content in the area of the turbo coupling must not exceed the permissible limit value (e.g. 1 % vol. in Russia). Should this value be exceeded, the work has to be stopped until the value falls again below the limit value.

– Spindle breakage:
Be careful if the thrust bolt has to be turned with great force.
Very high hydraulic pressures occur that may result in a component failure (spindle thread) in case of mal-operation or defective spindle.
In case of a spindle breakage, the spindle fraction may be thrown out.
Wear helmet, face shield and safety goggles!

2.6 Remaining risks

DANGER!
Improper use or mal-operation may cause death, serious injuries or minor injuries as well as damage to property and the environment.
Only persons who are sufficiently qualified, trained and authorized are allowed to work on or with the turbo coupling!
Please observe the warnings and safety information!
2.7 What to do in case of accidents

WARNING!
Please observe the local codes of practice!

2.8 Staff qualification

Only qualified and authorized professional staff are allowed to perform work, such as transportation, storage, installation, electrical connection, commissioning, operation, maintenance, servicing and repair.

Qualified professional staff in the sense of this basic safety information are persons who are familiar with transportation, storage, installation, electrical connection, commissioning, maintenance, servicing and repair and who have got the necessary qualifications relevant to their job performed.

This staff must be trained, instructed and authorized to:
– operate and service machines in a professional manner in accordance with the technical safety standards
– use lifting appliances, slings (ropes, chains, etc.) and lifting points in an expert manner
– professionally dispose of media and their components, e.g. lubricating grease
– service and use safety devices in a manner ensuring compliance with safety standards
– prevent accidents and provide first aid.

Staff to be trained may only perform work on the turbo coupling under supervision of a qualified and authorized person.

The staff in charge of any work to be done on the coupling must
– be reliable,
– be of the legal minimum age,
– be trained, instructed and authorized with regard to the intended work.

3 Lifting, Transport and Storage of the Turbo Coupling

In this connection, please refer to the respective chapters in the manual for turbo coupling 3626-011000.

DANGER!

Do not walk under suspended loads!

After removal, carefully set the coupling down on a wooden board / pallet, and secure it against tilting.

ATTENTION!
When storing couplings of type "TW" below 0°C, drain the water! Danger of frost!
4 Working principle

The new hydraulic removal device works hydrostatically, i.e. a very high pressure is generated in the housing of the removal device with a small piston that then acts on a bigger piston and thus presses off the turbo coupling.

5 Design

The removal device consists of the following main components:

- Thrust bolt with wrench
- Cylindrical housing
- Pressure medium
- Piston with piston rod and pressure cap

Except for the wrench which is attached as loose part, all components are connected and sealed with lead with each other. In order to ensure a troublefree functioning of the removal device, it is not allowed to arbitrarily open the removal device.

6 Application of the removal device

The puller thread of the removal device on the bottom end of the housing is:

<table>
<thead>
<tr>
<th>Size of puller thread</th>
<th>Usable for coupling size</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 ¼ (cylindrical Whitworth pipe thread)</td>
<td>422 – 487 T</td>
</tr>
<tr>
<td>G 1 ½ (cylindrical Whitworth pipe thread)</td>
<td>562 – 650 T</td>
</tr>
<tr>
<td>G 2 ¼ (cylindrical Whitworth pipe thread)</td>
<td>750 – 1150 T</td>
</tr>
</tbody>
</table>

Press-off procedure of turbo coupling is as follows:

See Chapter 7.2 Removal.
7 Coupling Disassembly

DANGER!
Please observe, in particular, Chapter 2 (Safety) when working on the turbo coupling!

Unauthorized or unintentional switching on of the machine could result in death or serious injury!

Before beginning to work on the turbo coupling, switch off the main switch of the drive motor and secure it against being switched on!

For all work performed on the turbo coupling ensure that both, the drive motor and the driven machine have stopped running and a start-up is absolutely impossible.

Note!
This chapter describes the disassembly of turbo couplings of basic type T. Couplings of basic type TN are disassembled in reverse order according to Installation and Operating Manual 3626-011000_Rev.9, Chapter 9, Page 37.

7.1 Preparation

- Prepare suitable tools and lifting appliances; observe the turbo coupling weight!

Note!
The weight of the turbo coupling is indicated on the cover sheet. The weight is also stamped with figure stamps on the outer diameter of the coupling flange, if it exceeds 100 kg.

WARNING!
Damaged load carrying attachments or those with insufficient carrying capacity may break under load, with the consequence of serious or even fatal injuries!

Check the lifting appliances and load carrying attachments for
- sufficient carrying capacity (for weight, see cover sheet),
- sound condition.

Do not walk under suspended loads!

- Fix the coupling to a suitable lifting appliance.
7.2 Removal

CAUTION!
It is not allowed to use an impact screwdriver to apply the torque!

→ For removal devices, see Chapter 7.2.1

Fig. 1

7.2.1 Removal using the hydraulic removal device

Very high forces with a low torque can be applied with the hydraulic removal device so that no substructure below the removal device (Fig. 1) is necessary for absorbing the force.
Hydraulic removal devices available at Voith Turbo for turbo couplings of basic type T:

**Fig. 2**

<table>
<thead>
<tr>
<th>A: Puller spindle</th>
<th>L: Total length</th>
</tr>
</thead>
<tbody>
<tr>
<td>C: Coupling hub</td>
<td>Q: Dimension of puller spindle thread</td>
</tr>
<tr>
<td>D: Thrust bolt</td>
<td>S\textsubscript{max}: maximum insertion of thrust bolt</td>
</tr>
<tr>
<td>H: Stroke</td>
<td>SW1: Width across flats (spindle)</td>
</tr>
<tr>
<td>K: Piston</td>
<td>SW2: Width across flats (thrust bolt)</td>
</tr>
</tbody>
</table>

**Coupling sizes**

<table>
<thead>
<tr>
<th>Coupling sizes</th>
<th>L in mm</th>
<th>H in mm</th>
<th>Q in inch</th>
<th>SW1 in mm</th>
<th>SW2 in mm</th>
<th>S\textsubscript{max} in mm</th>
<th>Material No. of puller spindle</th>
</tr>
</thead>
<tbody>
<tr>
<td>422, 487</td>
<td>406</td>
<td>15</td>
<td>G 1-1/4</td>
<td>36</td>
<td>24</td>
<td>66</td>
<td>TCR.10063480</td>
</tr>
<tr>
<td>562, 650</td>
<td>580</td>
<td>15</td>
<td>G 1-1/2</td>
<td>36</td>
<td>–</td>
<td>125</td>
<td>TCR.10450060</td>
</tr>
<tr>
<td>750, 866, 1000, 1150</td>
<td>1161</td>
<td>15</td>
<td>G 2-1/4</td>
<td>36</td>
<td>36</td>
<td>310</td>
<td>TCR.10668200</td>
</tr>
</tbody>
</table>

**Procedure:**

1. Loosen and unscrew the fixing bolt (50) of the turbo coupling.
2. Unscrew the thrust bolt (D) until reaching the maximum removal dimension S\textsubscript{max} (by hand only, do not use an impact wrench!).
3. Check the spindle thread (Q) for dirt and damages.
4. Apply lubricant to the thread of puller spindle (A) and to the thread of thrust bolt (D).
5. Screw the puller spindle (A) via SW1 hexagon, up to the stop, into the thread of coupling hub (C), i.e. until the piston rests on the gear shaft or puller disk.

**WARNING!**

If the dimension 5 mm is not observed, there is the risk of seizing of the thread (wear).

The pressure chamber of the hydraulic removal device is subject to high pressure and must not be opened!

6. Screw in the thrust bolt (D), stop 5 mm before the limit stop. This generates the pressure required for pressing off the turbo coupling and the turbo coupling is pressed off.
7. Unscrew the thrust bolt (D).
8. Screw the puller spindle (A) via SW1 hexagon, up to the stop, into the thread of coupling hub (C).
9. Repeat steps 6 to 8 until the coupling can be easily removed with SW1.

After pressing off, turn back the thrust bolt and the piston into the outer end position (by hand only, do not use an impact wrench!).

→ **For lubricants, see Chapter 7.3**
7.3 Lubricants

Note!
Use a lubricant with the following characteristics:
- Operating temperature range: -20 °C…+180 °C,
- water and wash-out resistant,
- protection against fretting corrosion and corrosion.

- Proposed lubricants:

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Designation</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Corning</td>
<td>Molykote G-N Plus Paste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Molykote G-Rapid Plus Paste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Molykote TP 42</td>
<td></td>
</tr>
<tr>
<td>Fuchs</td>
<td>gleitmo 815</td>
<td></td>
</tr>
<tr>
<td>Fuchs</td>
<td>Fuchs gleitmo 815</td>
<td></td>
</tr>
<tr>
<td>Liqui Moly</td>
<td>LM 48 Montagepaste</td>
<td></td>
</tr>
<tr>
<td>Dow Corning</td>
<td>Molykote D 321 R Anti-Friction Coating</td>
<td>Hazardous substance!</td>
</tr>
<tr>
<td>Castrol Optimol</td>
<td>Paste White T</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paste MP 3</td>
<td></td>
</tr>
</tbody>
</table>
## 8 Drawings - Hydraulic Removal Devices

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>Drawing No.</th>
<th>Puller thread - size</th>
<th>Maximum compressive force</th>
</tr>
</thead>
<tbody>
<tr>
<td>422 - 487</td>
<td>91500842010</td>
<td>G 1 ¼ (cylindrical Whitworth pipe thread)</td>
<td>30 t</td>
</tr>
<tr>
<td>562 - 650</td>
<td>91500842110</td>
<td>G 1 ½ (cylindrical Whitworth pipe thread)</td>
<td>50 t</td>
</tr>
<tr>
<td>750 - 1150</td>
<td>91500842210</td>
<td>G 2 ¼ (cylindrical Whitworth pipe thread)</td>
<td>90 t</td>
</tr>
</tbody>
</table>
Anfangsstellung (vor dem Drücken)
INITIAL POSITION (PRIOR TO PRESSING)

Endstellung (nach dem Drücken)
END POSITION (AFTER PRESSING)

Druckkraft max. 30t
FORCE OF PRESSURE max. 30t

VTK 422 u. 487

Hydraulische
Abdrueckvorrichtung

VOITH
Anfangsstellung (vor dem Druecken)
INITIAL POSITION (PRIOR TO PRESSING)

Endstellung (nach dem Druecken)
END POSITION (AFTER PRESSING)

Druckschraube
PRESSURE SCREW

Druckkolben
PRESSURE PISTON

Druckkappe
PRESSURE CAP

Druckkraft max. 50t
FORCE OF PRESSURE max. 50t

VTK 562 u. 650

Hydraulische
Abdrueckvorrichtung

VOITH
Druckkraft max. 80t
FORCE OF PRESSURE max. 80t

Anfangsstellung (vor dem Drücken)
INITIAL POSITION (PRIOR TO PRESSING)

Endstellung (nach dem Drücken)
END POSITION (AFTER PRESSING)

Druckschraube
PRESSURE SCREW

Druckkolben
PRESSURE PISTON
drehbare Druckkoppe
turnable PRESSURE CAP

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HOUSING
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