

Installation and Operating Manual

(Translation of the original installation and operating manual)

T... (with GPK)

Turbo Coupling with Constant Fill, Connecting Coupling Type GPK (All-metal Disk Pack Coupling)

including design as per ATEX directives:

Directive 94/9/EC (valid until April 19, 2016), Directive 2014/34/EU (valid from April 20, 2016)

Version 9 , 2016-01-11

3626-011700 en, Protection Class 0: public

Serial No. ¹⁾		
Coupling type ²⁾		
Year of manufacture		
Mass (weight)		kg
Power transmission		kW
Input speed		rpm
Operating fluid	<input type="checkbox"/> mineral oil <input type="checkbox"/> water <input type="checkbox"/>	
Filling volume		dm ³ (liters)
Number of screws z ³⁾		
Nominal response temperature of fusible plugs		°C
Connecting coupling type	GPK	
Sound pressure level L _{PA,1m}		dB
Installation position	<input type="checkbox"/> horizontal (max. 7°)	
Drive via	<input type="checkbox"/> outer wheel	

- 1) Please indicate the serial number in any correspondence (→ Chapter 18).
- 2) T...: oil / TW...: water.
- 3) Determine and record the number of screws z (→ Chapter 10.1).

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

Contact

Voith Turbo GmbH & Co. KG
Division Mining & Metals
Voithstr. 1
74564 Crailsheim, GERMANY
Tel. + 49 7951 32 409
Fax + 49 7951 32 480
startup.components@voith.com
www.voith.com/fluid-couplings

3626-011700 en

This document describes the state of design of the product at the time of the editorial deadline on 2016-01-11.

Copyright © by
Voith Turbo GmbH & Co. KG.

This document is protected by copyright. It must not be translated, duplicated (mechanically or electronically) in whole or in part, nor passed on to third parties without the publisher's written approval.

Contents

1	Voith Turbo Coupling with Constant Fill	7
1.1	Function	7
1.2	Type designation	9
1.3	Constructional examples	10
2	Technical data	14
3	Tightening torques	16
3.1	Set screws	18
3.2	Fusible plugs, filler plugs, sight glasses, blind- and nozzle screws	18
3.3	Fastening screws	19
4	Declarations of Manufacturer	20
4.1	Declaration regarding assemblies and components	20
4.2	Conformity Declaration	21
5	User information	22
6	Safety	24
6.1	Safety information	24
6.1.1	Structure of safety information	24
6.1.2	Definition of safety symbols	25
6.2	Intended use	25
6.3	Unintended use	26
6.4	Structural modifications	26
6.5	General information as to dangerous situations	26
6.6	Remaining risks	31
6.7	What to do in case of accidents	31
6.8	Information with regard to operation	31
6.9	Qualification of staff	35
6.10	Product monitoring	35

7	Transport and Storage	36
<hr/>		
7.1	As delivered condition	36
7.2	Scope of supply	36
7.3	Transport	37
7.4	Lifting	38
7.5	Storage / Packing / Preservation	44
8	Installation and alignment	46
<hr/>		
8.1	Functioning of GPK (all-metal disk pack coupling)	46
8.2	Tools	47
8.3	Preparation	48
8.3.1	Keys	49
8.4	Mounting the input hub and output hub	50
8.4.1	Preconditions	51
8.5	Mounting and alignment of GPK, version without clamping hub	52
8.5.1	Mounting the input hub and output hub	52
8.5.2	Alignment	53
8.5.3	Turbo coupling installation	57
8.5.4	Check of alignment	59
8.6	Mounting and alignment of GPK-XP, version with clamping hub	61
8.6.1	Mounting the input hub and output hub	61
8.6.2	Alignment	62
8.6.3	Preparatory work on clamping hub and plug-in shaft	66
8.6.4	Turbo coupling installation	67
8.6.5	Check of alignment	69
9	Operating fluids	71
<hr/>		
9.1	Requirements to be fulfilled by the operating fluid 'mineral oil'	72
9.1.1	Usable operating fluids	72
9.1.2	Operating temperature frequently above 100 °C	72
9.1.3	Proposed operating fluids	73

9.2	Proposed operating fluids for special requirements	74
9.3	Requirements to be fulfilled by the operating fluid 'water'	75
9.3.1	Usable operating fluids	75
9.3.2	Water used as operating fluid for turbo couplings with centrifugal valves (types TW...F...)	76
10	Filling, Filling Check and Draining	78
10.1	Filling the turbo coupling	79
10.2	Level check	80
10.3	Draining the turbo coupling	80
10.3.1	Draining of turbo couplings without delay chamber installed in horizontal position	81
10.3.2	Draining of turbo couplings with delay chamber installed in horizontal position	81
11	Commissioning	82
12	Operation	85
13	Maintenance, Servicing	86
13.1	Outside cleaning	89
13.2	Connecting coupling types GPK and GPK-XP	90
13.3	Bearings	90
13.3.1	Bearing lubrication when mineral oil is used as operating fluid	90
13.3.2	Bearing lubrication when water is used as operating fluid	91
13.3.3	Replacement of bearings / re-lubrication	91
13.4	Fusible plugs	91
13.4.1	Fusible plugs in turbo couplings not suitable for use in potentially explosive atmospheres	92
13.4.2	Fusible plugs in turbo couplings suitable for use in potentially explosive atmospheres	94
14	Assembly Check-, Commissioning and Maintenance Report	96
14.1	Assembly check report	97
14.2	Commissioning report	99
14.3	Maintenance report for general maintenance	101

15	Disassembly of Turbo Coupling	102
<hr/>		
15.1	Preparation	102
15.2	Disassembly of type GPK (without clamping hub)	103
15.3	Reassembly of type GPK (without clamping hub)	103
15.4	Disassembly of type GPK-XP (with clamping hub)	103
15.5	Reassembly of type GPK-XP (with clamping hub)	103
16	Disposal	104
17	Malfunctions - Remedial Actions	105
18	Queries, Orders Placed for Service Engineers and Spare Parts	107
19	Temperature monitoring	108
<hr/>		
19.1	MTS mechanical thermal switch unit for pre-warning	109
19.2	BTS non-contacting thermal switch unit	110
19.2.1	BTS non-contacting thermal switch unit for pre-warning	110
19.2.2	BTS-Ex non-contacting thermal switch unit for limiting the maximum surface temperature	111
19.3	BTM non-contacting thermal measuring device for pre-warning	112
20	Spare parts information	113
<hr/>		
20.1	Components overview - Voith turbo coupling 366 – 1150	114
20.2	Spare parts for Voith turbo coupling 366 – 1150	115
20.3	Spare parts for connecting coupling type GPK (without clamping hub)	117
20.4	Spare parts for connecting coupling type GPK-XP (with clamping hub)	118
21	Representatives - Voith Turbo GmbH & Co. KG	119
22	Index	124
<hr/>		

1 Voith Turbo Coupling with Constant Fill

1.1 Function

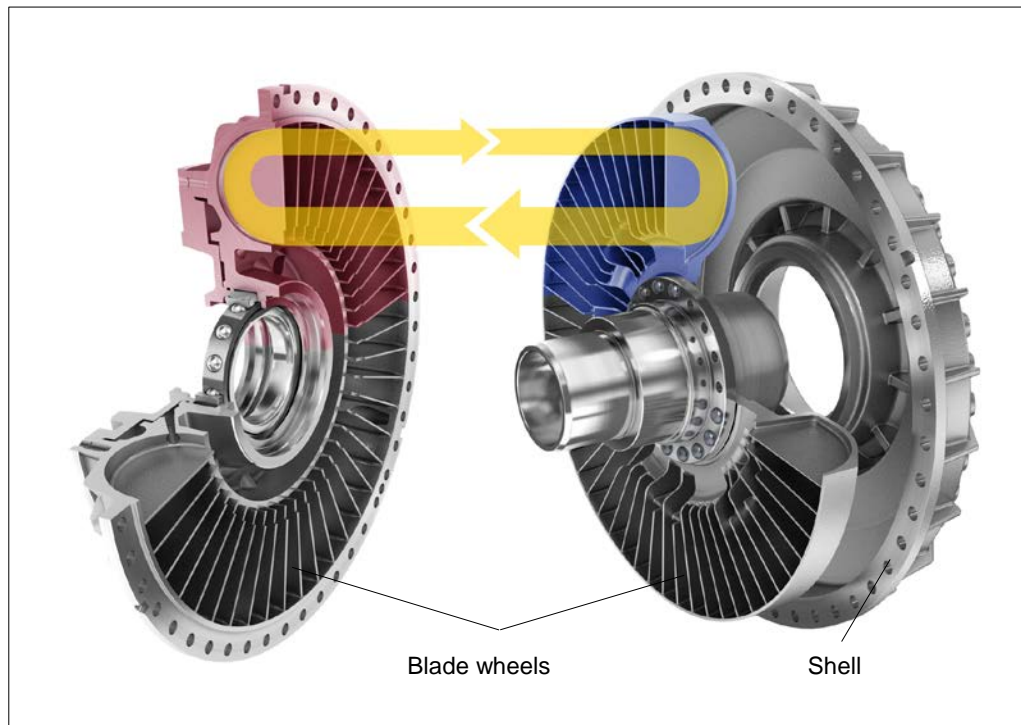


Fig. 1

The Voith turbo coupling is a hydrodynamic coupling working to the Föttinger principle. Its main elements consist of two blade wheels - the pump impeller and the turbine wheel - enclosed by a shell. Both wheels are provided with bearings relative to each other. The power is transmitted with hardly any wear, there is no mechanical contact between the power-transmitting parts. A constant amount of operating fluid is in the coupling.

The mechanical energy provided by the drive motor is converted into kinetic energy of the operating fluid in the connected pump impeller. In the turbine wheel, this kinetic energy is reconverted into mechanical energy.

Three conditions are to be considered with regard to the coupling function:

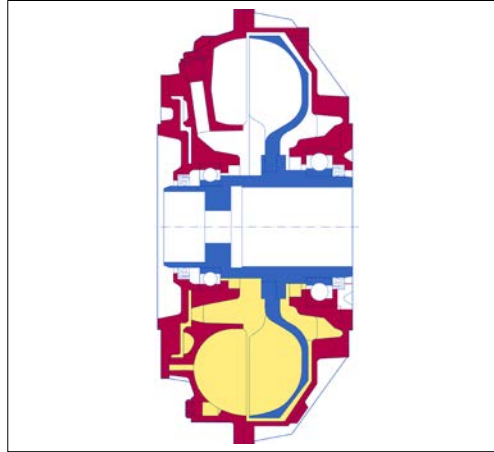


Fig. 2

Standstill

The whole operating fluid rests in the coupling.

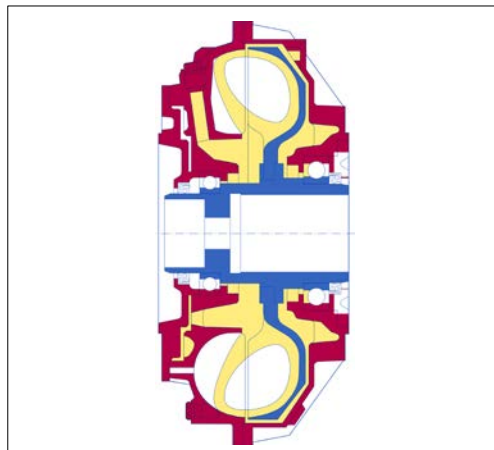


Fig. 3

Starting condition

The pump impeller accelerates the operating fluid with increasing motor speed causing a circulating flow in the working chamber. The whole blade space of the turbine wheel is flooded, and the turbine wheel starts to move as a result of the kinetic energy of the fluid flow. The coupling characteristic curve determines the torque curve during start-up.

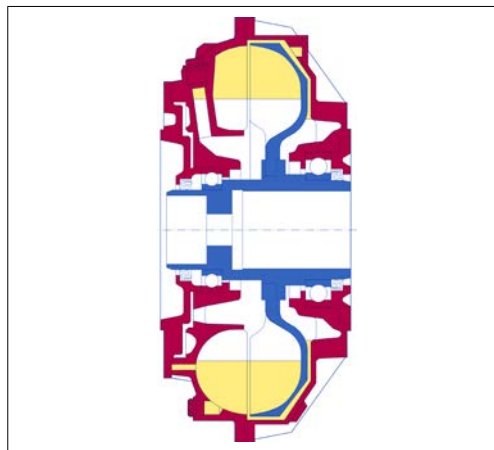


Fig. 4

Nominal operation

During nominal operation, only the torque required by the driven machine is transmitted. The low speed difference between pump impeller and turbine wheel (the so-called rated slip) results in a stationary flow condition in the coupling.

1.2 Type designation

For hydrodynamic couplings with constant fill, connecting coupling type: GPK, the type designation is determined as follows:

Type designation
→ **Cover sheet**

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

Example: 562 TVVSC

562	T			VV		S	C			
-----	---	--	--	----	--	---	---	--	--	--

1	<p>Coupling size (profile diameter in mm) Possible sizes: 366, 422, 487, 562, 650, 750, 866, 1000, 1150</p>
2	<p>Number of hydrodynamic circuits T: single-circuit coupling DT: double-circuit coupling</p>
3	<p>Material "no code letter": Silumin U: ferrous material</p>
4	<p>Operating fluid "no code letter": mineral oil W: water (please consult Voith regarding anti-freezing agent)</p>
5	<p>Delay chamber "no code letter": without delay chamber V: with delay chamber VV: with enlarged delay chamber</p>
6	<p>Draining of delay chamber "no code letter": time-dependent draining without dynamic refill F: with centrifugal valves (normally they are open on standstill) Y: with dynamic refill</p>
7	<p>Shell "no code letter" standard design S: designed as annular chamber</p>
8	<p>Design status "no code letter": first design old: A, B, C, E, G, H, J new: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, ...</p>
9	<p>Throttle plate "no code letter": without throttle plate D: with throttle plate</p>
10	<p>Design "no code letter": standard design X: special constructional design Z: special hydrodynamic design</p>
11	<p>Possible supplementary information in plain text</p>

1.3 Constructional examples

Illustration as an example, without clamping hub

Type T:

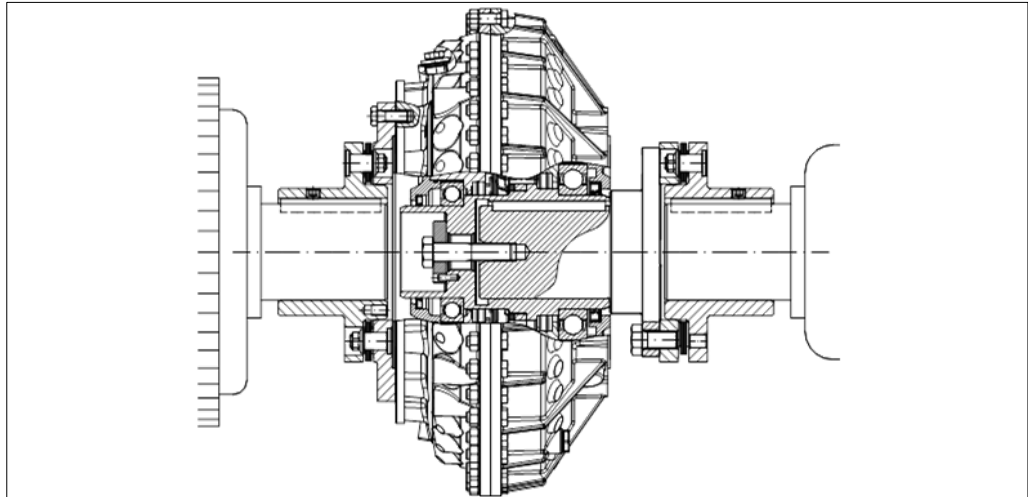


Fig. 5

Type TV:

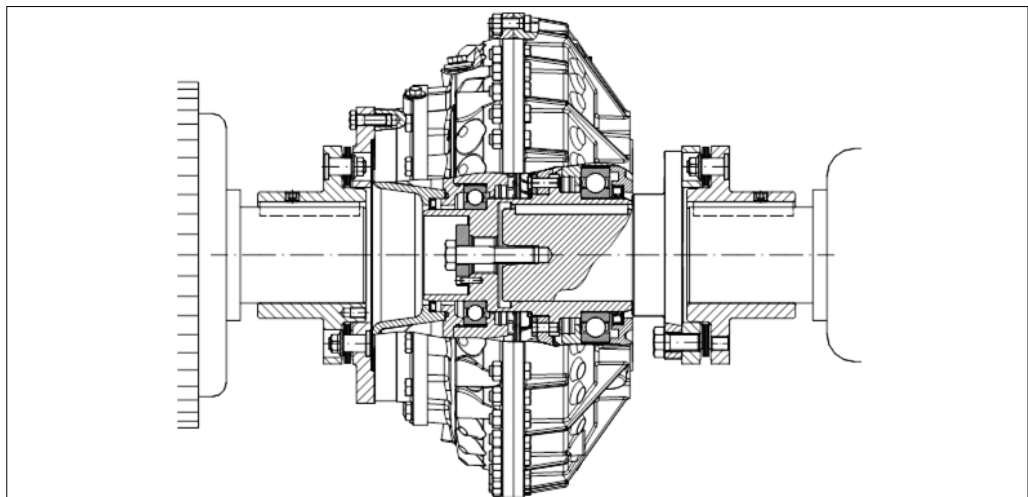


Fig. 6

Type TVV:

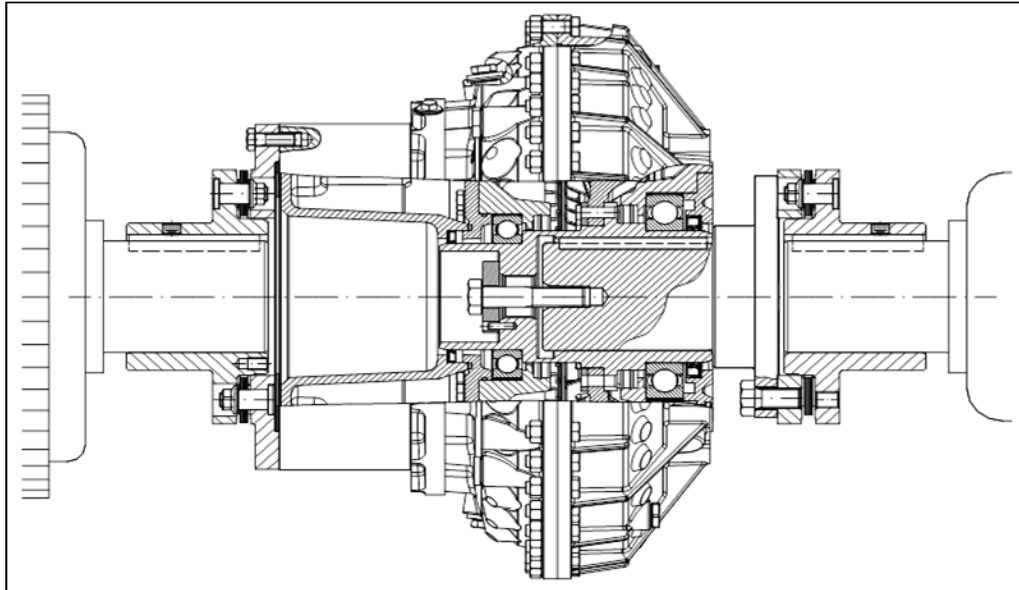


Fig. 7

Type TVVS:

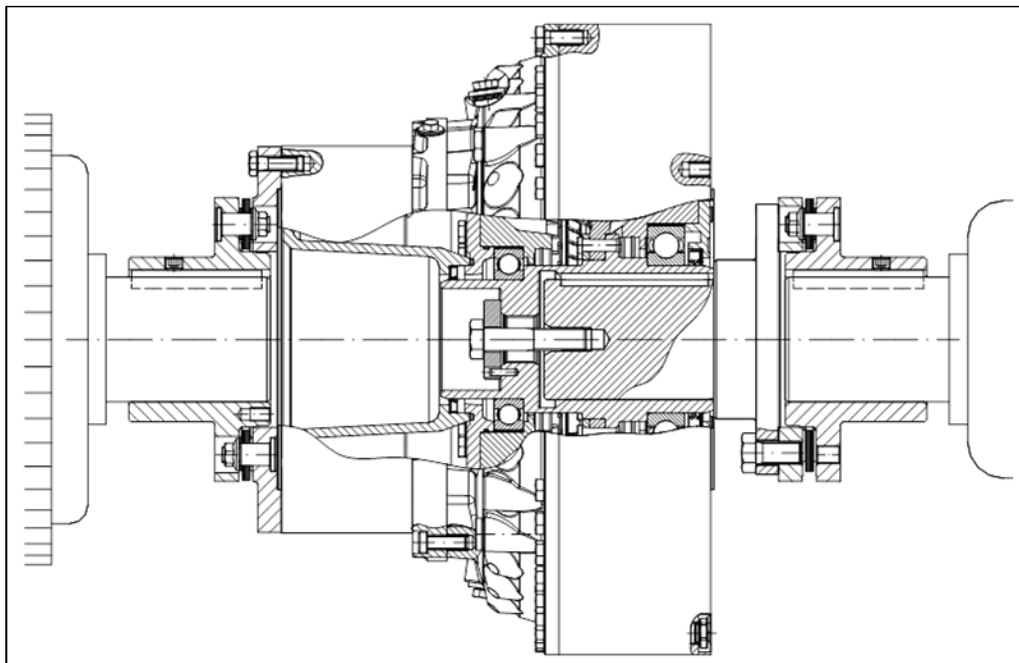


Fig. 8

Type DT:

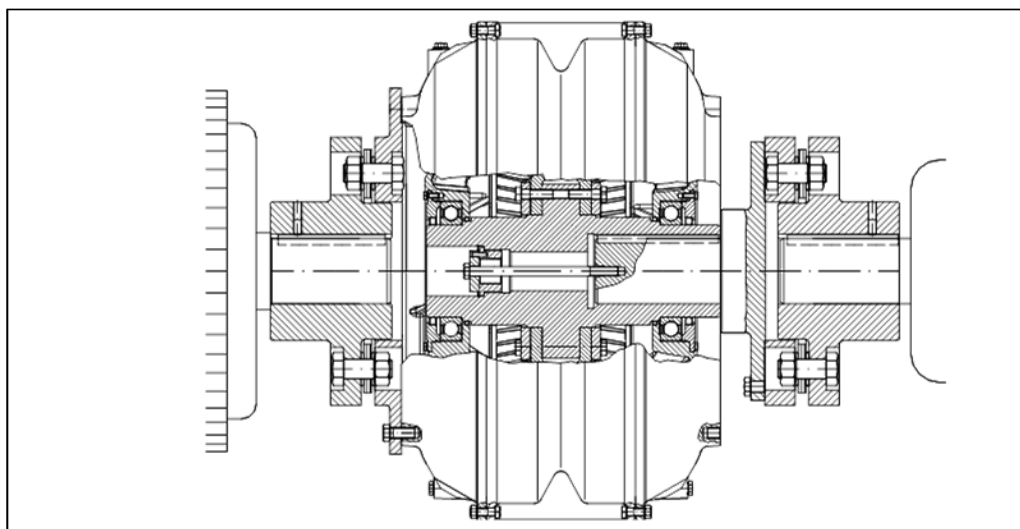


Fig. 9

Type DTV:

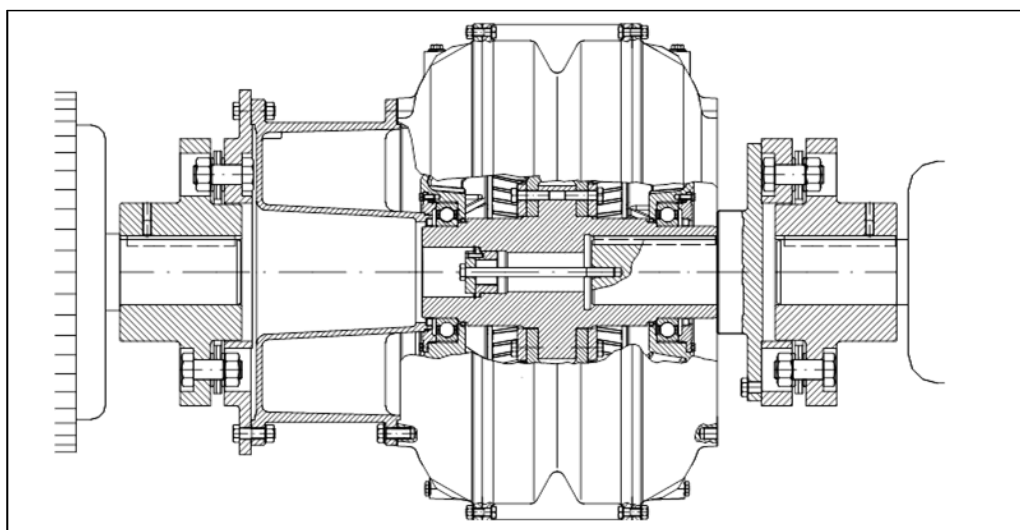


Fig. 10

Typ DTVVN:

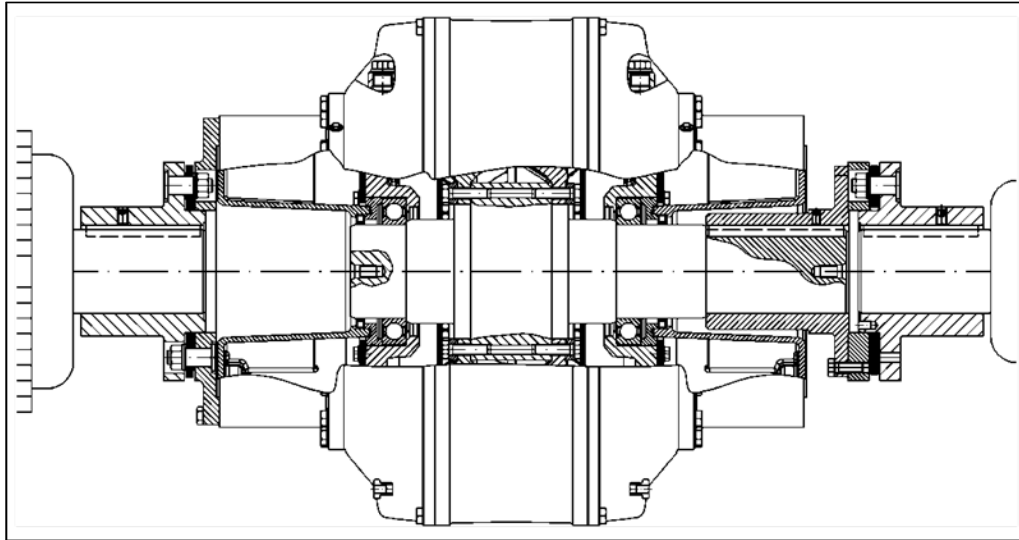


Fig. 11

2 Technical data



Information required for use in potentially explosive atmospheres:


CE  marking:		
Ambient temperature, if deviating from -25 °C T _a 40 °C		°C
max. surface temperature (T ₃ = 200 °C, T ₄ = 135 °C, or deviating)		°C
Temperature monitoring	<input type="checkbox"/> MTS ¹⁾ for pre-warning	
	<input type="checkbox"/> BTS ²⁾ for pre-warning	
	<input type="checkbox"/> BTS-Ex ²⁾ for limitation of the max. surface temperature for Voith turbo couplings acc. to ATEX Directive. Maximum permissible temperature of turbo coupling when switching on the motor:	°C
Nominal response temperature of temperature monitoring		°C
Max. permissible filling volume ³⁾		dm ³ (liters)
Overload (à Chapter 6.8), causing the thermal fuse (fusible plug/s and/or BTS-Ex) to respond, requires the power supply to be switched off after		s (sec)
An additional monitoring of the output speed is required to switch off the power supply before the fusible plugs respond.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
After switching on the motor, monitoring of output speed has to begin after		s (sec)
Diameter of input ⁴⁾		mm
Diameter of output ⁴⁾		mm
Replacement of ball and roller bearings after		h

Table 1

- 1) MTS: Mechanical thermal switch unit (→ Chapter 19.1).
- 2) BTS: Non-contacting thermal switch unit (→ Chapter 19.2).
- 3) Applies if filling volume is not indicated on the cover sheet.
- 4) Diameter and fit of hub or shaft to be joined by means of shaft-hub connection.

Additional information/data required for use in potentially explosive atmospheres:



3 Tightening torques

NOTICE

Damage to property

The turbo coupling may be damaged by incorrectly tightened screws.

- Tighten all screws using a torque-adjustable torque wrench!

Type GPK (without clamping hub)

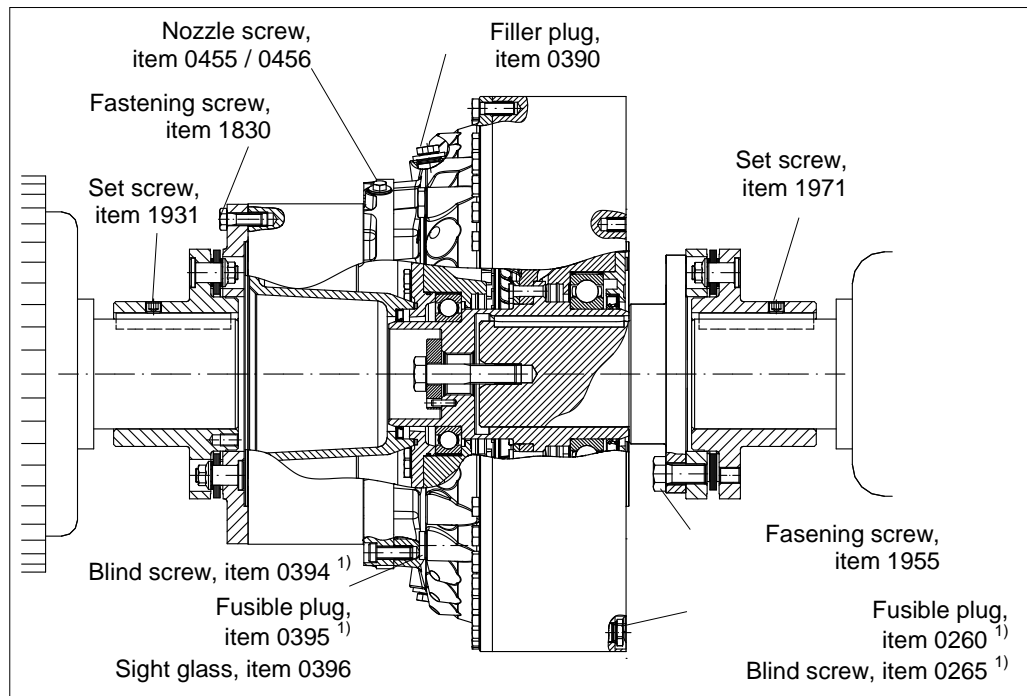


Fig. 12

1) For arrangement and quantity, → Chapter 13.4.

Type GPK-XP (with clamping hub)

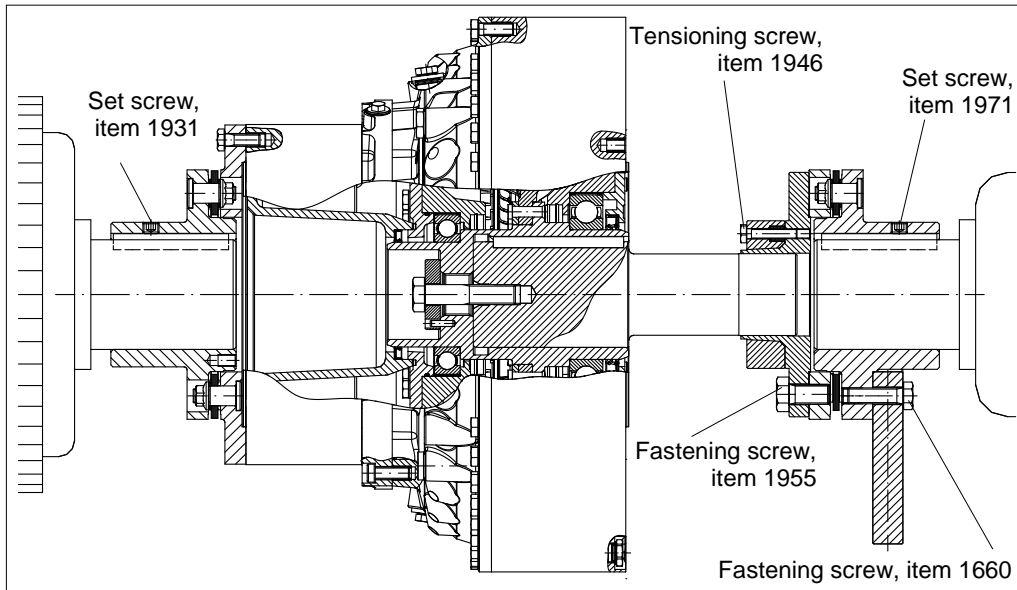


Fig. 13

3.1 Set screws

Thread	Tightening torque in Nm					
	M6	M8	M10	M12	M16	M20
Set screw, item 1931 / 1971	4	8	15	25	70	130

Table 2

The tightening torques for set screws apply to property classes as per EN ISO 898-5.

3.2 Fusible plugs, filler plugs, sight glasses, blind- and nozzle screws

Coupling size	Tightening torque in Nm (dimension of thread)				
	Fusible plug, item 0260, item 0395	Filler plug, item 0390	Blind screw, item 0265, item 0394	Sight glass, item 0396	Nozzle screw, item 0455, item 0456
366 to 650	50 (M18x1.5)	80 (M24x1.5)	50 (M18x1.5)	50 (M18x1.5)	48 (M16x1.5)
750 to 1150	144 (M24x1.5)	235 (M36x1.5)	144 (M24x1.5)	144 (M24x1.5)	48 (M16x1.5)

Table 3

3.3 Fastening screws

Coupling size and type	Tightening torque in Nm (dimension of thread)			
	Fastening screw, Item 1660	Fastening screw, Item 1830	Fastening screw, Item 1955	Tensioning screw, Item 1946
366 T	80 (M12)	68 (M12)	139 (M14)	26 (M8)
422 T	195 (M16)	68 (M12)	210 (M16)	26 (M8)
487 T	195 (M16)	68 (M12)	410 (M20)	52 (M10)
562 T	195 (M16)	68 (M12)	580 (M22)	52 (M10)
650 T	195 (M16)	135 (M16)	410 (M20)	90 (M12)
750 T	380 (M20)	135 (M16)	580 (M22)	90 (M12)
866 T	710 (M24)	250 (M20)	710 (M24)	216 (M16)
866 DT	380 (M20)	250 (M20)	615 ¹⁾ (M20)	424 (M20)
1000 T	380 (M20)	250 (M20)	615 ¹⁾ (M20)	424 (M20)
1000 DT	-	250 (M20)	615 ¹⁾ (M20)	730 (M24)
1150 T	-	580 (M27)	615 ¹⁾ (M20)	730 (M24)
1150 DT	-	580 (M27)	1060 ¹⁾ (M24)	730 (M24)

Table 4

Screws with property class 8.8 or higher as per EN ISO 898-1 are used.

- 1) Screws with property class 10.9 as per EN ISO 898-1 are required.

4 Declarations of Manufacturer

4.1 Declaration regarding assemblies and components

Since 29 December 2009, a new Machinery Directive 2006/42/EC has to be applied bindingly in the member states of the European Community.

Voith turbo couplings of Product Group "Start-up Components", as defined by the new Machinery Directive 2006/42/EC and the explanations of the guidelines published in December 2009 to implement the Machinery Directive, are neither "machines" nor "incomplete machinery", but rather assemblies or components.

As our products are no incomplete machinery, we do not issue a declaration of incorporation as per Machinery Directive 2006/42/EC.

An EC Declaration of Conformity must not be issued for these products either, nor CE marking be provided, unless specified by other EC directives or regulations.

Voith as certified company ensures that the basic safety and health requirements for their products are always met by internal quality management systems and by applying harmonized standards.

The technical documentation for Voith products is so comprehensive that they may be installed reliably into machinery or incomplete machinery. Safe operation of the complete machinery with regard to Voith products is also ensured at a later date when observing this documentation.

Issued in	Crailsheim, Germany
On	January 10, 2014
Name of the undersigned	Mr. J. Hagedorn, General Manager - Start-up Components

4.2 Conformity Declaration

EC Conformity Declaration as per Directive 94/9/EC (valid until April 19, 2016),

EU Conformity Declaration as per Directive 2014/34/EU (valid from April 20, 2016)

The manufacturer Voith Turbo GmbH & Co. KG,
Voithstraße 1, 74564 Crailsheim / Germany

hereby declares that the machinery described below:

Designation T... (with GPK)
Turbo coupling with constant fill,
Connecting Coupling type GPK
(all-metal disk pack coupling)

Serial number see shipping documents

complies with the provisions of the following harmonized standards in the version valid on the date of signature:

EN ISO 12100-1 / -2	Safety of machinery - basic concepts and general principles for design Part 1: Terminology, methodology Part 2: Technical principles
EN 1127-1 / -2	Explosive atmospheres, explosion prevention, basic concepts and methodology
EN 13463-1	Non-electrical equipment for use in potentially explosive atmospheres, Part 1: Basic method and requirements
EN 13463-5	Non-electrical equipment intended for use in potentially explosive atmospheres, Part 5: Protection by constructional safety 'c'
EN 13463-8	Non-electrical equipment for potentially explosive atmospheres, Part 8: Protection by liquid immersion „k“
EN 1710	Equipment and components intended for use in potentially explosive atmospheres in underground mines

as well as with the following European and national standards and technical specifications in the version valid on the date of signature:

TRBS 2153	Avoidance of ignition hazards resulting from electrostatic charging
-----------	---

Each modification by the customer on the parts supplied, invalidates the declaration.

Issued in	Crailsheim, Germany
On	November 25, 2015
Name of the undersigned	Mr. J. Hagedorn, General Manager - Start-up Components

5 User information

This manual will support you in using the turbo coupling with connection coupling **type GPK** in a safe, proper and economical way.

If you observe the information contained in this manual, you will

- increase the reliability and lifetime of the turbo coupling and installation,
- avoid any risks
- reduce repairs and downtimes

This manual must

- always to be available at the machine jobsite
- be read and used by every person who transports the turbo coupling, works on the turbo coupling or commissions the same.

The turbo coupling 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 unintended use.

Spare parts:

Spare parts must comply with the requirements determined by Voith. This is guaranteed when original spare parts are used.

Installation and/or use of non-original spare parts may negatively change the mechanical properties of the **Voith turbo coupling** and thus have an adverse impact on safety.

Voith is not liable for any damages resulting from the use of non-original spare parts.

Use only appropriate workshop equipment for maintenance. Professional maintenance and/or repair can only be guaranteed by the manufacturer or an authorized specialist workshop.

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

Voith Turbo GmbH & Co. KG
Division Mining & Metals
Voithstr. 1
74564 Crailsheim, GERMANY
Tel. +49 7951 32 409
Fax +49 7951 32 480
startup.components@voith.com
www.voith.com/fluid-couplings

© Voith Turbo 2016.

The distribution as well as the reproduction of this document and the utilization and communication of its contents are prohibited unless expressly permitted. Offenders will be held liable for the payment of damages. All rights reserved in case a patent is granted, or a utility model or design is registered.


Voith Turbo reserves the right for modifications.

6 Safety

6.1 Safety information

Safety information indicating the descriptions and symbols as described in the following are used in the operating manual.

6.1.1 Structure of safety information

 DANGER WORD
<p>Hazard consequences Source of hazard</p> <ul style="list-style-type: none"> • Warding off of danger

Danger word

The danger word divides the severity of the danger in several levels:




Danger word	Severity of danger
 DANGER	Death or serious injury (irreversible personal injury)
 WARNING	Death or serious injury possible
 CAUTION	Minor or moderate injury possible
<i>NOTICE</i>	Possibly damage to property of - the product - its environment
SAFETY INFORMATION	General applications details, useful information, safe job procedure and proper safety measures

Table 5

Hazard consequences

Hazard consequences indicate the kind of hazard.

Source of hazard

The source of hazard indicates the cause of hazard.

Warding off of danger

Warding off of danger describes the measures to be taken to ward off a danger

6.1.2 Definition of safety symbols


Symbol	Definition
	Danger of explosion Marking with the Ex-symbol indicates possible hazards which have to be observed for the use in potentially explosive atmospheres.

Table 6

6.2 Intended use

The turbo coupling with constant fill (type of connecting coupling **GPK**) is provided to transmit the torque from the drive motor to the driven machine in case of horizontal installation (**max. 7°**).

The **power** permitted during stationary operation at a specific **input speed** and a specific **coupling filling** (operating fluid and filling) is entered on the cover sheet of this manual. Any use beyond that is deemed unintended (→ Chapter 6.3 Unintended use).

Intended use also includes observing this installation and operating manual and complying with the inspection and maintenance conditions.

The manufacturer is not liable for any damages resulting from unintended use. The risk has to be borne solely by the user.

SAFETY INFORMATION

- If not indicated accordingly in → Chapter 2, it is not allowed to use this turbo coupling in potentially explosive atmospheres!
- Please check with reference to the marking whether the turbo coupling is approved for potentially explosive atmospheres.
- If the zonal classification changes, the operator has to check whether it is still allowed to operate the turbo coupling in that zone.



A marking according to ATEX Directive and EN13463 has been provided on the periphery of the turbo couplings. The marking specifies in what potentially explosive atmospheres and under what conditions the use is permitted.

Example: **CE**  II 2D c 180 C X

Industrial area in which during normal operation an explosive atmosphere may form occasionally in form of a cloud of combustible dust in the air. Mechanical explosion protection by constructional safety. Maximum surface temperature: 180 °C.

6.3 Unintended use

The power transmission permitted during stationary operation at a specific input speed and a specific coupling filling (operating fluid and quantity) is entered on the cover sheet of this manual.

Any use beyond that described herein, e.g. for higher powers, higher speeds, other operating fluids or operating conditions that have not been agreed upon, is considered unintended use.

Moreover, it is not permitted to use BTS-Ex non-contacting thermal switch units from third parties.

6.4 Structural modifications

WARNING

Risk of personal injuries and damage to property

Structural modifications not done properly on the turbo coupling may cause personal injury and damage to property.

- Modifications, attachments or conversions on the turbo coupling are only allowed with the approval of Voith Turbo GmbH & Co. KG, Crailsheim.

6.5 General information as to dangerous situations

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

Hazards while working on the turbo coupling:

WARNING

Risk of injury

While working on the turbo coupling, there is the risk of injury through cutting, crushing, burns and cold burns in case of minus degrees.

- Never touch the turbo coupling without wearing protective gloves.
- Start to work on the turbo coupling only after it has cooled down to below 44 °C!
- Ensure that there is sufficient light, a sufficiently large working space and good ventilation when working on the turbo coupling.
- Switch off the unit in which the turbo coupling is installed and secure the switch against inadvertent switch-on.
- For all work performed on the turbo coupling ensure that both the drive motor and the driven machine have stopped running and that a re-start is absolutely impossible!

Hot surfaces:**WARNING****Risk of burning**

The turbo coupling gets warm during operation.

- Please provide a guard for protection against contact with the turbo coupling!
However, ventilation of the turbo coupling must not be impaired.

NOTICE**Damage to property**

Thermal distortion or tensions if the warm turbo coupling is cooled down by means of fluids.

- Never use fluids to cool down the turbo coupling!
- Let the turbo coupling cool down at ambient temperature.

Rotating parts:**WARNING****Entanglement hazard**

Rotating parts, such as the turbo coupling itself and exposed shaft parts need to be protected by a protective cover against contact with and entry of loose parts.

- Never operate the turbo coupling without these protective covers.

Protective cover
→ Chapter 11

Noise:**WARNING****Hearing loss, permanent impairment of hearing**

The turbo coupling generates noise during operation. If the A-classified equivalent sound pressure level $L_{PA, 1m}$ exceeds 80 dB(A), this may cause impairment of hearing!

- Wear ear protection.

Sound pressure
level
→ Cover sheet

Electric shock:

 **DANGER**

Electric shock

On account of incorrectly mounted or incorrectly connected electrical components, and disconnected electric connections, persons could get an electric shock and be severely injured, possibly with fatal consequences.

Incorrectly mounted or incorrectly connected electrical components and disconnected electric connections may cause damages to the machine.

- A qualified electrician has to properly carry out the connection to the electric supply network considering the system voltage and the maximum power consumption!
- The system voltage has to be in conformity with the system voltage indicated on the nameplate!
- There has to be a corresponding electrical protection by a fuse on the network side!

 **DANGER**

Electrostatic processes

Electrostatic charging may injure persons by an electric shock.

- Allow only a qualified electrician to install the equipment into which the turbo coupling is installed.
- Machine and electric installation are provided with grounding connections.

Overspeed:

This refers only to installations where overspeed (exceeding the rated speed) is possible.

NOTICE

Damage to property

Non-recognition of overspeed, wrong direction of rotation or parameters outside the tolerance due to incorrect programming, may destroy the turbo coupling.

- Check whether the entire system is equipped with a device which safely prevents overspeed (for example brake or backstop).
- For rated speed, → cover sheet..

Extreme ambient temperatures:**WARNING****Risk of personal injuries and damage to property**

Extreme ambient temperatures may result in thermal overload of the turbo coupling, thus causing the fusible plugs to melt and seriously injure any persons in their immediate surroundings, and to cause damage to the turbo coupling.

- Observe the permissible ambient temperature.

Ambient temperature
→ Chapter 2

NOTICE**Damage to property**

The turbo coupling may be damaged by frozen operating fluid.

- The ambient temperature must be above the freezing point of the operating fluid.
- Adhere to the temperature limits indicated (→ Chapter 6.8).

Only when water is used as operating fluid

Operating fluid which sprays off or leaks out:**WARNING****Risk of losing sight due to operating fluid spraying off, risk of burning**

In case of thermal overload of the turbo coupling, the fusible plugs respond. Operating fluid leaks out through these fusible plugs.

- Persons close to the turbo coupling must wear safety goggles.
- Please make sure that the spraying-off operating fluid cannot get in contact with persons.
- If the fusible plugs spray off, switch off the drive immediately.
- Electrical devices located near the coupling need to be splash-guarded.

 **WARNING**

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.

- Make sure that spraying off operating fluid cannot get into contact with hot machine parts, heaters, sparks or open flames.
- Immediately switch off the driving machine when the fusible plugs respond.
- Please pay attention to the information contained in the safety data sheets.

 **CAUTION**

Danger of slipping

Slipping hazard due to spraying off solder of fusible plugs and leaking out operating fluid.

- Please provide a catch pan of sufficient size.
- Immediately remove any leaking out solder and operating fluid.
- Please pay attention to the information contained in the safety data sheets.

Checking the methane content before working on the turbo coupling:



Permissible limit values according to local regulations

 **WARNING**

Explosion hazard

For turbo couplings with housings made of aluminum alloys and when the protective cover was removed, if the permissible methane content is exceeded, there is the risk of explosion.

- Before and during all work performed on the turbo coupling, check the methane content around the turbo coupling.
- Should this permissible limit value be exceeded, the work has to be stopped until the value is again below the limit value.

6.6 Remaining risks



WARNING

Risk of personal injuries and damage to property

Unintended use or incorrect 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.

6.7 What to do in case of accidents

SAFETY INFORMATION

- In case of accidents, please observe the local regulations, the operating manuals and the operator's safety measures.

6.8 Information with regard to operation

SAFETY INFORMATION

- If irregularities are found during operation, immediately switch off the drive unit.

Power transmission:

The cover sheet of this manual indicates the possible power transmission at a specific input speed and a specific coupling filling (operating fluid and quantity).

These values describe a permissible working point for the stationary operation of the turbo coupling.

NOTICE

Damage to property

Deviations from the permissible working point cause damage the turbo coupling.

- Voith Turbo's approval is required for a stationary operation of the turbo coupling at a different working point.

Operating fluid:

NOTICE

Damage to property

Too little filling results in thermal overload of the turbo coupling, and in case of too much filling, the turbo coupling may be damaged by internal pressure.

- Operate the turbo coupling only with the filling quantity stated on the cover sheet of this manual.
- Use only the operating fluid indicated on the cover sheet of this manual.

Heating up during start-up:

NOTICE

Damage to property

During start-up, the turbo coupling heats up more than during stationary operation due to the increased slip.

- Please provide sufficient intervals between start-ups to avoid thermal overload.

Starting characteristic of turbo couplings with delay chamber:

On start-up, the operating fluid flows from the delay chamber into the turbo coupling working chamber. On standstill, the operating fluid returns into the delay chamber. Please provide sufficient intervals (a few minutes) between the starts to get a correct starting characteristic.

Coupling temperature:**WARNING****Explosion hazard**

Explosion hazard due to high temperature of turbo coupling.

- Make sure that the air surrounding the turbo coupling does not exceed the permissible value.

**NOTICE****Damage due to under temperature**

The turbo coupling may be damaged by under temperature.

- Please consult Voith Turbo if the turbo coupling shall be used at ambient temperatures
 - below -25 °C for operating fluid 'oil'
 - below 1 °C for operating fluid 'water'

Technical data
→ Chapter 2 and
order documents

NOTICE**Damage due to overheating**

Overheating (nominal temperature is exceeded) may damage the turbo coupling.

- Provide sufficient ventilation / aeration of the turbo coupling.

Fusible plugs:

The fusible plugs protect the turbo coupling against damage due to thermal overload.

NOTICE**Damage to property**

The turbo coupling will be damaged if operation is continued after a fusible plug responded.

- Switch off the drive motor immediately on response of one of the fusible plugs!
- Use original fusible plugs only with the response temperature indicated on the → cover sheet of this operating manual.

Technical data
→ Chapter 2

Monitoring devices:

Monitoring devices
→ Chapter 19

NOTICE

Damage to property

Damage to turbo coupling due to monitoring devices not ready for service.

- Check whether existing monitoring devices are in a state ready for service.
- Repair any defective monitoring device immediately.
- Never bypass safety devices.

Blocking:

NOTICE

Damage to property

Blocking of the driven machine may cause overheating of the turbo coupling and response of the fusible plugs thus endangering persons as well as the turbo coupling and environment.

- Immediately switch off the driving machine.



Overload of turbo coupling:

After the thermal fuse responded, switch off the power supply after the time required in → Chapter 2 at the latest.

In case of multi-motor drive, switch off the whole system!

If an additional monitoring of the overload is required, monitor the output speed.

If the output speed falls below the input speed by more than 10%, immediately switch off the power supply.

Permissible surface
temperature,
→ Chapter 2

It is necessary to switch off the power supply as otherwise the permissible surface temperature indicated cannot be met.

NOTICE

Overload of turbo coupling

The turbo coupling will be overloaded in cases where

- the driven machine blocks
- the driven machine is loaded excessively during nominal operation and/or during start-up.

Please consult Voith Turbo in case of unforeseeable turbo coupling overload.

6.9 Qualification of staff

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 operating manual 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. Qualification has to be ensured by performing training and giving instructions on the turbo coupling.

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 a professional manner.
- properly dispose of media and their components, e.g. lubricating grease.
- service and use safety devices in a manner that ensures compliance with safety standards.
- prevent accidents and provide first aid.

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

The staff in charge of any work to be done on the coupling must

- be reliable,
- have the legal age,
- be trained, instructed and authorized with regard to the intended work.

6.10 Product monitoring

We are under legal obligation to keep the performance of our products under observation, even after shipment.

Therefore, please inform us about anything that might be of interest to us. For example:

- Change in operating data,
- experience gained with the machine,
- recurring problems,
- problems experienced with this installation and operating manual.

**Our address,
→ Page 2**

7 Transport and Storage

7.1 As delivered condition

Packaging
→ Chapter 7.5

- The turbo coupling is delivered in ready-mounted condition.
- The turbo coupling is not filled. If the scope of supply includes the operating fluid, it will be delivered in a separate container.

Type GPK (without clamping hub):

Type GPK (without clamping hub):

The input and output hubs with disk packs will be supplied separately; the stub shaft is mounted.

The hex. screws (item 1942) of the transport protector to pretension the disk packs are screwed in and are not tensioned.

Spacer sleeves (item 1943) keep the disk packs at distance which are therefore not overstretched.

Type GPK-XP (with clamping hub):

The clamping hub, input and output hubs with disk packs, if necessary with brake disk / brake drum will be supplied separately; the plug-in shaft is mounted.

The hex. screws (item 1942) of the transport protector are screwed in.

Spacer sleeves (item 1943) keep the disk packs at distance which are therefore not overstretched.

7.2 Scope of supply

The turbo coupling will be supplied as indicated on the cover sheet.

A set of fusible plugs is supplied as spare one.

Additional parts belonging to the scope of supply, such as connecting coupling, fusible plugs, temperature monitoring, mounting and removal device, etc. will be stated in the order confirmation.

7.3 Transport



WARNING

Explosion hazard

For turbo couplings with housings made of aluminum alloys, there can be the risk of explosion when being transported in / through explosive atmospheres.

- In potentially explosive atmospheres it is only allowed to transport the turbo coupling in suitable packing.
- This transport packing has to meet the same minimum requirements as the protective cover.



Protective cover
→ Chapter 11



WARNING

Risk of injury

Falling parts may seriously injure or kill you.

- Secure the turbo coupling sufficiently.
- Pay attention to the center of gravity position.
- Use the provided lifting points.
- Use appropriate transportation means and slings (ropes, chains, etc.).



WARNING

Risk of crushing

Incorrect handling of the turbo coupling may cause bruising of upper and lower limbs and seriously injure persons.

- Skilled staff only is allowed to carry out transportation!

NOTICE

Damage to property

The turbo coupling is installed with a „flexible“ suspension. In mounted condition, a transport of the turbo coupling is permitted in horizontal position only. The turbo coupling may be damaged due to inclinations.

- In case of an inclination greater than 7°, it is necessary to secure the turbo coupling axially.

7.4 Lifting

Lifting appliances, load carrying attachments, lifting points

For weight of the Turbo coupling
→ Cover sheet
Weights of over 100 kg will be stamped on the turbo coupling.

Observe the turbo coupling weight!

Lifting appliances (e.g. crane, high-lift truck), slings (ropes, chains, etc.) and lifting points (swivels, thread size as for item 1830, → Chapter 3.3) need to be

- checked and approved
- sufficiently dimensioned and in sound condition,
- and may only be operated by authorized and trained persons.

It is not allowed to use eyebolts!

Read the operating instructions for lifting appliances, slings (ropes, chains, etc.) and lifting points!



WARNING

Risk of injury

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, → cover sheet).
 - sound condition.

Fixing the turbo coupling



WARNING

Risk of injury

Falling parts may seriously injure or kill you.

- Do not walk under suspended loads.

NOTICE**Personal injury and damage to property**

Improper fixing and lifting of the turbo coupling may cause personal injury and damage to property

- It is only allowed to lift the turbo coupling at the lifting points provided for this purpose (see the following pictures).
 - When fastening and lifting the turbo coupling, do not damage the ribbing of the turbo coupling through lifting appliances or load carrying attachments.
 - Damaged ribs may result in unbalance of the turbo coupling, thus causing uneven running of the machine.
-
- Screw suitable swivels (thread size as for item 1830, → Chapter 3.3) into the turbo coupling.
Do not unscrew existing screws for this purpose; please use the threads provided.
 - Fix the slings (ropes, chains, etc.).



Fig. 14



WARNING

Risk of injury

Danger to life and risk of injury caused by falling load, tilting or sliding of the turbo coupling.

- Slings (ropes, chains, etc.) must not be slung around the turbo coupling for lifting.
- Always use at least 2 slings (ropes, chains, etc.) for fixing.
- Do not walk under suspended loads.
- Observe the general guidelines for the prevention of accidents.
- Secure the turbo coupling against tilting and sliding as long as it is not mounted between the driving and driven machine.

Turning the turbo coupling

- Screw suitable swivels (thread size as for item 1830, → Chapter 3.3) into the turbo coupling.
Do not unscrew existing screws for this purpose; please use the threads provided.
- Fix the slings (ropes, chains, etc.).

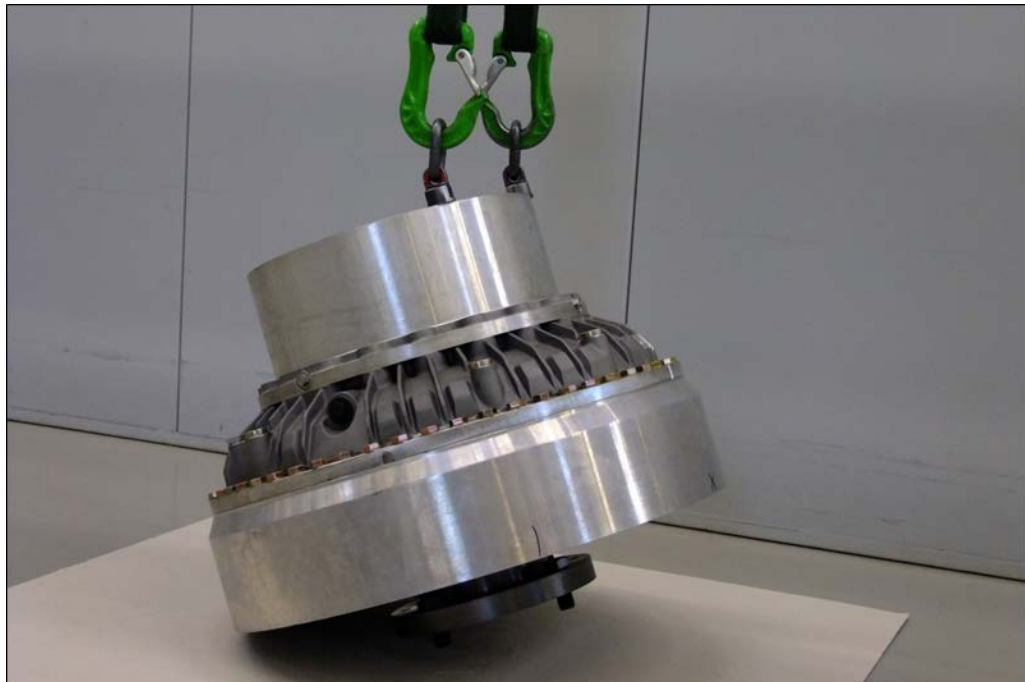


Fig. 15

**WARNING****Risk of crushing**

Incorrect handling of the turbo coupling may cause bruising of upper and lower limbs and seriously injure persons.

- Always use at least 2 slings (ropes, chains, etc.) for fixing.
 - For turning, please use 2 slings (ropes, chains, etc.) on each side.
-
- On the opposite side, screw suitable swivels (thread size as for item 1830, → Chapter 3.3) into the turbo coupling.
Do not unscrew existing screws for this purpose; please use the threads provided.
 - Fix the turbo coupling to the second slings.



Fig. 16

- Align the turbo coupling horizontally using the two lifting appliances.

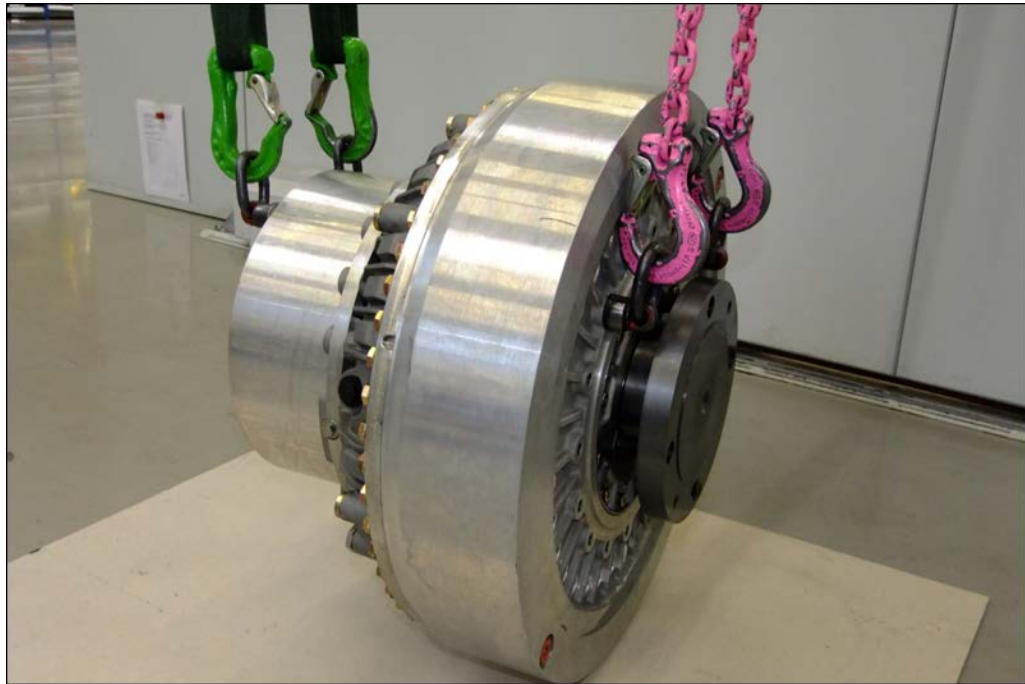


Fig. 17

- Carefully set the turbo coupling down on a wooden board / pallet, and secure it against tilting.
The turbo coupling has been turned.

Fastening of a turbo coupling with GPK stub shaft (item 1950) for mounting between the input and output hubs (items 1932 and 1972):

⚠ WARNING

Risk of crushing

Incorrect handling of the turbo coupling may cause bruising of upper and lower limbs and seriously injure persons.

- Use hooks for fixing.
- When a rope is used for fixing, secure the rope against slipping.

- Screw suitable swivels (thread size as for item 1830, → Chapter 3.3) into the turbo coupling in the coupling shell (item 0190).
Do not unscrew existing screws for this purpose; please use the threads provided.

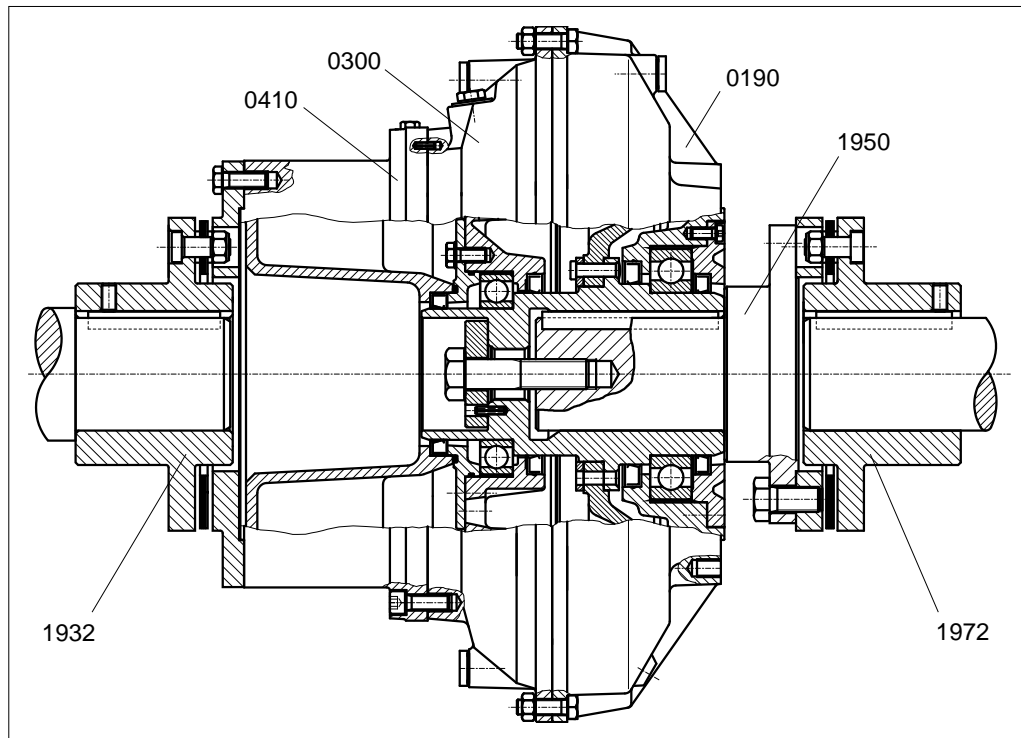


Fig. 18

- Sling a rope around the turbo coupling on the delay chamber cover (item 0410) and the outer wheel (item 0300) (→ Chapter 8.5.3 and Chapter 8.6.4).

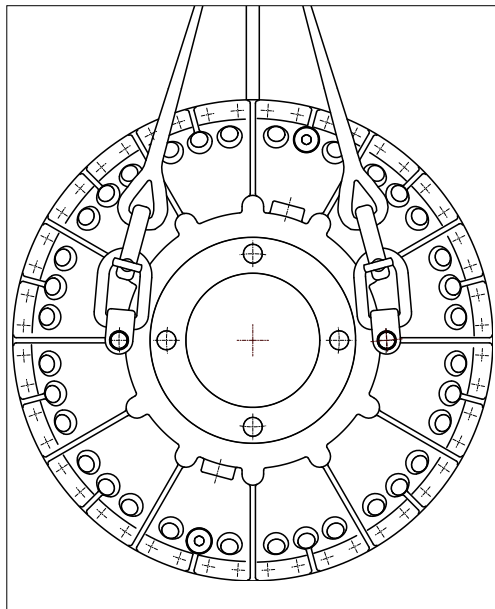


Fig. 19

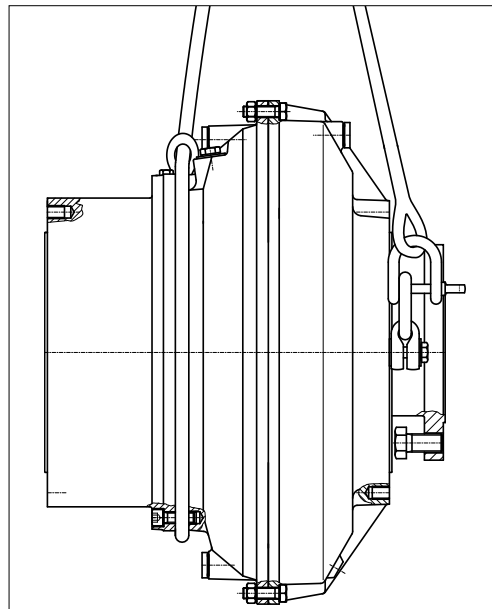


Fig. 20

- Fix the load carrying attachment to the rope and the two swivels.
- Lift the turbo coupling on these three lifting points.
- Turbo coupling with GPK stub shaft (item 1950) ready for mounting between the input and output hubs (items 1932 and 1972).

7.5 Storage / Packing / Preservation

As delivered condition

The as delivered condition of the Voith Turbo Couplings depends on the mode of transport and the storage period:

Condition No. 1 represents the delivered standard, for deviations, → ordering documents.

Condition No.	- Transport - Admissible storage period	Packing / Measures taken
1	- Overland / air transport - Storage up to 6 months indoors (building)	- Device to suit transportation - Weather protection provided by the means of transport - Packed in PE foil
2	- Sea transport - Storage up to 6 months indoors (building)	- Device to suit transportation - Sharp edges protected - Shrink-wrapped in PE foil - Desiccant according to DIN 55473 / 55474 - Water-proof cardboard or wooden box/crate - Line the inside of the crate lid with sealed ribbed PE sheets (Akylux). Put PVC foil underneath at butt joints
3	- Sea transport - Storage up to 12 months indoors (building)	- As for Condition No. 2 - Improved preservation
4	- Sea transport - Storage up to 24 months indoors (building)	- As for Condition No. 2 - Shrink-wrapped in aluminum sandwich foil instead of PE foil

Table 7

Opening of the packaging

Foils that have been opened for inspection upon receipt are to be re-closed airtight for further storage. Use a new desiccant, if necessary.

Notes on disposal
 → Chapter 16

Disposal of the packaging

Dispose of packaging material according to the local regulations.

Extension of storage period

The allowable storage period may be extended maximal three times according to the following descriptions. To do so, it is necessary to check the packaging and to possibly replace it.

After replacing the desiccant, close the foil packings airtight.

External preservation / re-preservation

Renew the external preservation according to the allowable storage period. Spray bright metal parts (hub bores, brake disks, etc.) with Houghton Ensis DWG2462.

Internal preservation / re-preservation:

Renew the internal preservation annually (for Condition No. 4: every 2 years). Wet the turbo coupling inside with an oil selected from the selection list.

Selection list for internal preservation agents

Producer	Designation
ARAL	Aral Oil KONIT SAE 20W-20
Mobil	Mobilarma 524 (SAE 30)
Houghton	Ensis Engine Oil 20
Wintershall	Wintershall Antikorrol 20W-20

The recommended operating fluids may also be used for preservation.

Table 8

Turbo coupling on bearings or mounted (turnable)

For re-preservation, fill the turbo coupling with oil above the axis of rotation center and rotate the turbo coupling input and output at least once.

Turbo coupling mounted (not turnable)

Fill the turbo coupling up to the upper fusible plug.

Then drain the oil and close the plug on the turbo coupling according to the specified procedure. The oil may remain in the turbo coupling for another scheduled re-preservation if it is ensured that prior to commissioning, the turbo coupling is filled with fresh oil (oil quantity according to design documents).

Protect the turbo coupling against weather and environmental influences if it is installed in a machine that is not set into operation. Renew the external re-preservation every 6 months, internal re-preservation once a year.

If necessary, clean the turbo coupling outside before performing re-preservation. Proceed for external and internal re-preservation as described above.

Outside cleaning
→ Chapter 13.1

NOTICE**Damage to property**

Danger of frost

- When storing turbo couplings of type "TW" below 1°C, drain the water.

8 Installation and alignment

WARNING

Risk of injury

Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

NOTICE

Damage to property

Disk pack is damaged due to improper fixing of the turbo coupling.

- If one or both hubs are removed, the weight of the turbo coupling needs to be borne by suitable slings (ropes, chains, etc.).

8.1 Functioning of GPK (all-metal disk pack coupling)

Type GPK (without clamping hub):

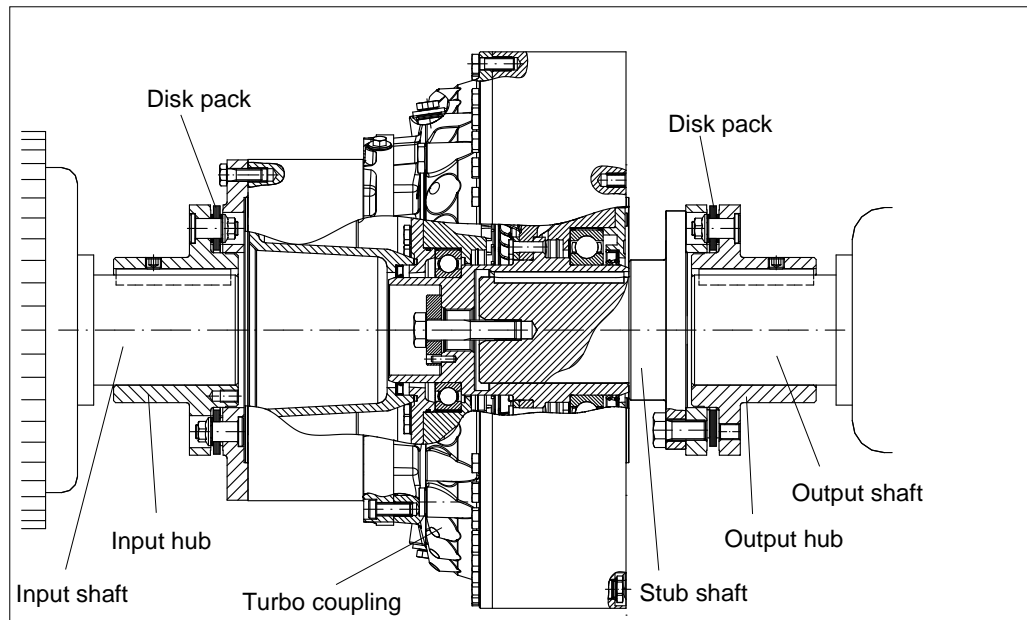


Fig. 21

Type GPK-XP (with clamping hub):

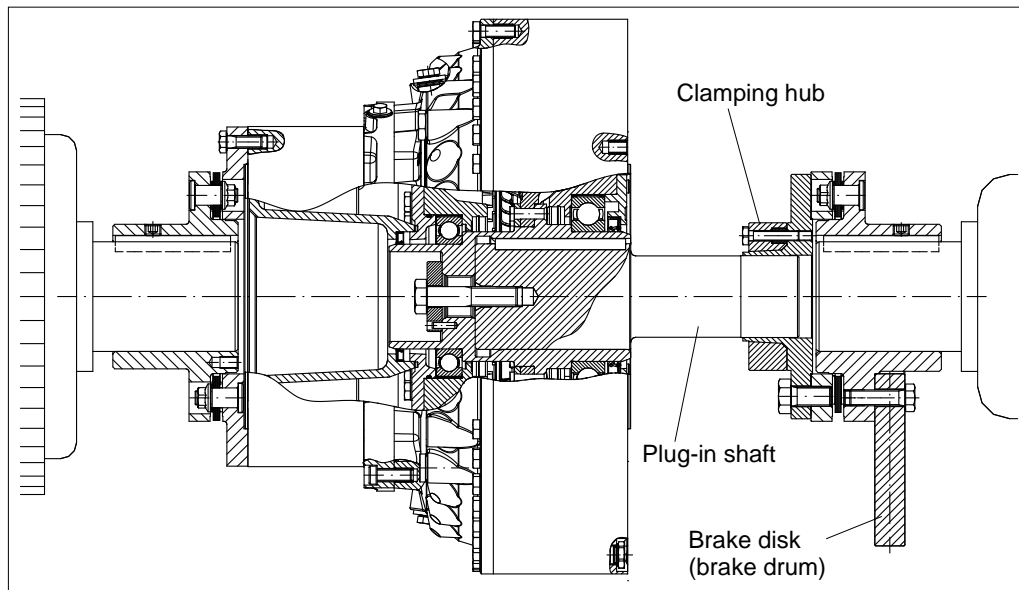


Fig. 22

General

- In case of horizontal installation, the turbo coupling weight is distributed on the input and output shaft by means of two disk packs.
- Permissible inclination of the turbo coupling without taking special measures is 7° (consult Voith Turbo, if necessary).
- The completely mounted disk packs form together with the hubs the GPK (all-metal disk pack coupling).
- The disk packs act torsionally stiff in circumferential direction, are flexible in angular and axial direction.
- Shaft displacements are compensated by this flexibility.

8.2 Tools

⚠ WARNING

Explosion hazard

There is the risk of explosion when using unsuitable tools.

- When using or assembling an Ex-coupling, use only tools approved for application in potentially explosive atmospheres.
- Observe the locally applicable regulations.
- Avoid formation of sparks.



The following tools are required; check in detail with the assembly plan.

Dimension of thread
→ Chapter 3

Tools:

Set of open-end wrenches
Set of ring spanners
Socket wrench box (containing hexagon spanners, ratchet, etc.)
Set of Allan keys
Screwdrivers
Torque wrenches
Hammer, rubber mallet
Set of files
Wire brush

Dial gauges
→ Chapter 8.5.2.3

Measuring equipment:

Dial gauge with holder
Caliper gauge
External screw-type micrometer according to shaft diameter
Inside micrometer according to hub diameter

Mounting auxiliaries:

Auxiliaries for alignment of motor and gearbox (fastening screws), e.g. shims for motor and gearbox feet (0.1 - 0.3 - 0.5 - 1.0 - 3.0mm).
Grinding cloth, graining 100, 240.

Lifting appliances and load carrying attachments:

Crane.
Two shackles with appropriate slings (ropes, chains, etc.) for lifting the coupling.
Observe the pictures → Chapter 8.5.3!
Adjustable chains or ropes with sufficient tensile strength (see individual weights).

For swivel sizes,
→ Chapter 3.3,
Item 1830

8.3 Preparation

Weight of turbo coupling
→ Cover sheet
Weights of more than 100 kg are stamped on the turbo coupling.

- Prepare suitable tools and lifting appliances.
- Observe the turbo coupling weight.
- Check the shaft journals of drive motor and driven machine for true radial running.
- Clean fitting surfaces on shaft journals and hubs using emery cloth.
- Apply a thin film of lubricant to the shaft journals.
- Degrease flanges which will be bolted.
- Clean all preserved surfaces.
- Slightly oil the threads of bolts.

SAFETY INFORMATION

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:

Producer	Designation	Note
Dow Corning	Molykote G-N Plus Paste Molykote G-Rapid Plus Paste Molykote TP 42	
Fuchs	Gleitmo 815	
Liqui Moly	LM 48 Montagepaste	
Dow Corning	Molykote D 321 R Anti-Friction Coating	Hazardous substance! Observe the data sheet for hazardous substances!
Castrol Optimol	Molub-Alloy Paste White T Molub-Alloy Paste MP 3	

Table 9

8.3.1 Keys

Requirement

Keys must

- have sufficient back clearance,
- be axially fixed and
- move easily in the grooves.

Marking

When using a shaft-hub connection with key, the hub is marked at the face side according to DIN ISO 8821:

- H: Half-key convention
- F: Full-key convention

This mark should comply with the mark on the shaft.

Inserting keys

SAFETY INFORMATION

Remove the key to avoid an unbalance in case of a shaft-hub connection with:

- one key
- balancing according to half-key convention
- and if the key is longer than the hub.

- Clean the keyway.
- Insert the key straight into the keyway.
- Do not cant the key.
- If necessary, secure the inserted key against falling out.

8.4 Mounting the input hub and output hub

The mounting process of the input hub and of the output hub is the same.

Qualification
→ Chapter 6.9



WARNING

Risk of crushing, injuries by cuts

During mounting and assembly, manual turning and positioning the turbo coupling, persons could bruise fingers or cut themselves on sharp edges thus getting seriously injured!

- Sufficiently qualified, instructed and authorized persons only are allowed to mount the turbo coupling!
- Proceed carefully.

NOTICE

Damage to property

The use of unsuitable working means or methods may cause damage to property.

- Only use tools suitable for mounting:
 - Mounting spindle, screw
 - thrust plate
- For mounting, **do not** use:
 - hammers
 - welding torches

SAFETY INFORMATION



Record the mounting process

For use in areas with potentially explosive atmosphere, it is mandatory to record the mounting process of the turbo coupling.

We recommend recording the process also for all other applications.

- For required records, → Chapter 14.

8.4.1 Preconditions

If designed with brake drum, the brake drum has to be mounted on the output hub.

Cleaning of external preservation
→ Chapter 13.1

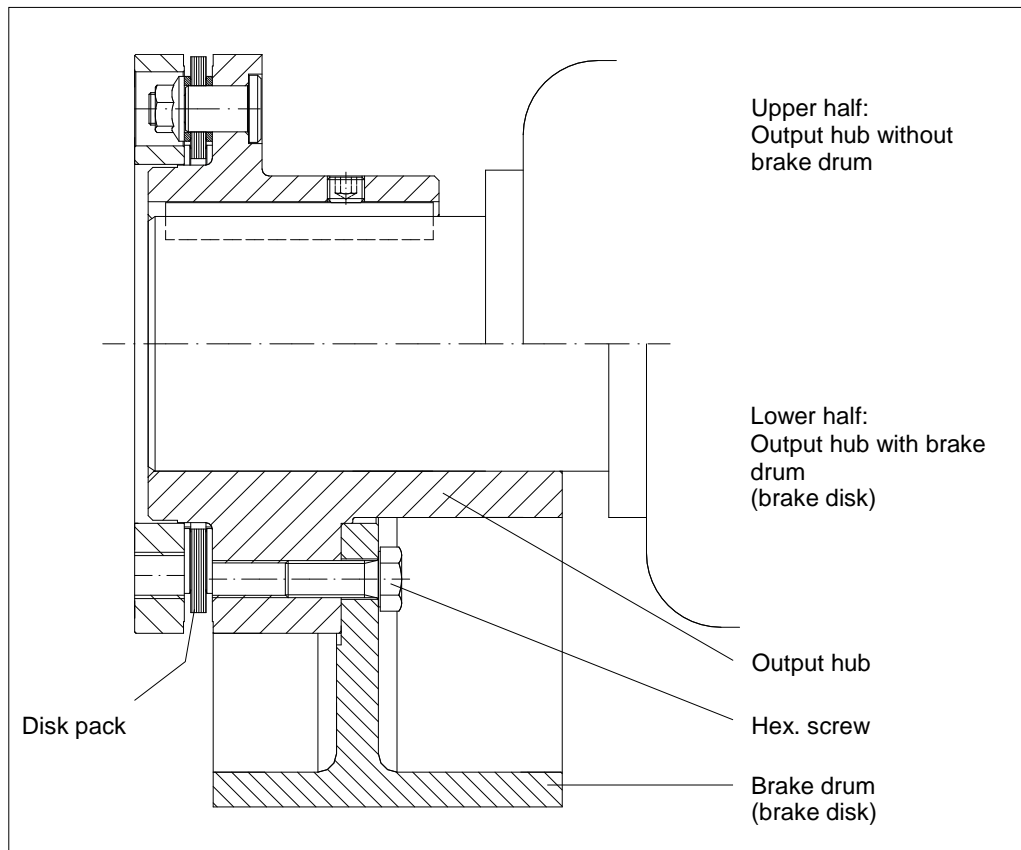


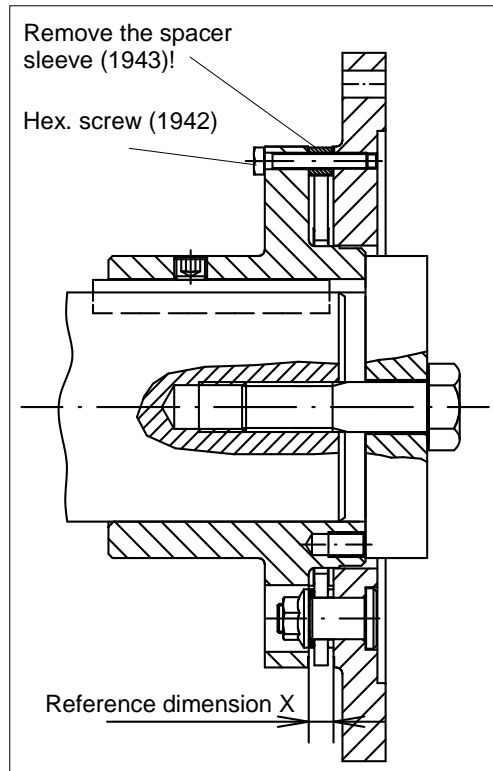
Fig. 23

Bolt the brake drum using hexagon screws (item 1660).

Tightening torque
→ Chapter 3.3

8.5 Mounting and alignment of GPK, version without clamping hub

8.5.1 Mounting the input hub and output hub



- Do not release the disk packs from the hubs!
- Remove the spacer sleeves (item 1943)^{*)} and the warning labels
- (4x each on the input and output side).
- Keep the spacer sleeves for later use.
- Pretension the disk packs to the reference dimension X using the hex. screws (Pos. 1942)^{*)} (→ Chapter 8.5.2.1).
- When mounting the hub, do not introduce any forces through the disk pack.

*) Transport protector consists of hex. screw (1942) and spacer sleeve (1943).

Fig. 24

- Fix the hub to a suitable lifting appliance.

WARNING

Risk of burning

The surface is hot due to getting warm.

- Do not touch the hub.

- Warm up carefully the hub to approx. 80 °C (facilitates mounting).
- Mount the hub on the relevant shaft journal.
- Ensure that shaft journals do not protrude.
- Secure the hub using the set screw.

8.5.2 Alignment

8.5.2.1 Laid lengths

NOTICE

Damage to property

Axial constraining forces.

- Pay attention and adhere to laid lengths.
- In particular, observe any displacements due to changes in temperature.

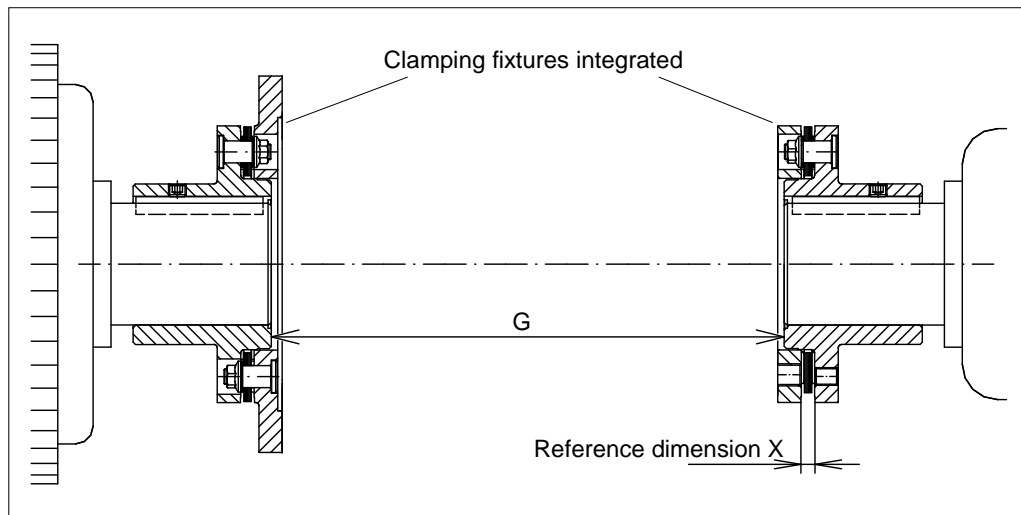


Fig. 25

Coupling size	GPK Laid lengths G in mm						Reference dimension X *)
	DT	DTV	DTVV	T	TV	TVV / TVVS	
366	-	-	-	254 + 0.5	281 + 0.5	351.5 + 0.5	6.8 + 0.2
422	-	-	-	282.5 + 1	321.5 + 1	399.5 + 1	7.6 + 0.2
487	-	-	-	318.5 + 1.5	369.5 + 1.5	454.5 + 1.5	9.7 + 0.3
562	-	-	-	357 + 2	421 + 2	516 + 2	10.3 + 0.3
650	-	-	-	399 + 2	466 + 2	576 + 2	13.2 + 0.3
750	-	-	-	450.5 + 2	524.5 + 2	651.5 + 2	14.1 + 0.3
866	-	-	-	527 + 2	599 + 2	747 + 2	14.8 + 0.4
	796 + 4	1016 + 4	1256.5 + 4	-	-	-	16.1 + 0.4
1000	-	-	-	572 + 4	678 + 4	817 + 4	16.1 + 0.4
	923.5 + 5	1168.5 + 5	-	-	-	-	19.2 + 0.5
1150	-	-	-	676 + 5	841 + 5	1054 + 5	19.2 + 0.5
	1013 + 5	1391 + 5	-	-	-	-	20.0 + 0.5

Table 10

*) Reference dimension X → Chapter 8.5.1 and Chapter 8.5.2.

The laid lengths indicated in Table 10 apply to the standard designs of the GPK without connection for a brake.

For customer-specific laid lengths and for versions with connection for a brake, the data indicated on the assembly plan have to be met.

8.5.2.2 Displacement values

⚠ WARNING

Explosion hazard
Explosion hazard due to damage to the material caused by excessive misalignments.

- Keep within the permissible tolerances for true radial and axial running during all operating conditions.
- In particular, observe any displacements due to changes in temperature.



SAFETY INFORMATION

Misalignments
The smaller the alignment error, the

- the higher the lifetime and reliability of the machine.
- the smoother the operation.

The maximum permissible **displacement values** apply to:

- the **radial run-out** according to the illustration in → Chapter 8.5.2.3 (maximum permissible radial dial gauge deflection!).
- the **axial run-out** according to the illustration in → Chapter 8.5.2.3 (maximum permissible axial dial gauge deflection!).

GPK - maximum permissible displacement values in mm		
Coupling size	Radial dial gauge deflection	Axial dial gauge deflection
366, 422	0.6	0.1
487	0.8	0.4
562	1.2	0.6
650, 750, 866	2.0	0.8
1000	2.0	0.8
1150	2.0	0.8

Table 11

8.5.2.3 Alignment

Alignment can be performed using the LASER-optical methods or manually using dial gauges (→ schematic sketch below). More precise results are normally obtained using the LASER-optical methods.

For alignment, support the motor feet using shims or foil sheets. It is advantageous to use claws for the adjusting screws on the foundation for lateral movement of the drive unit.

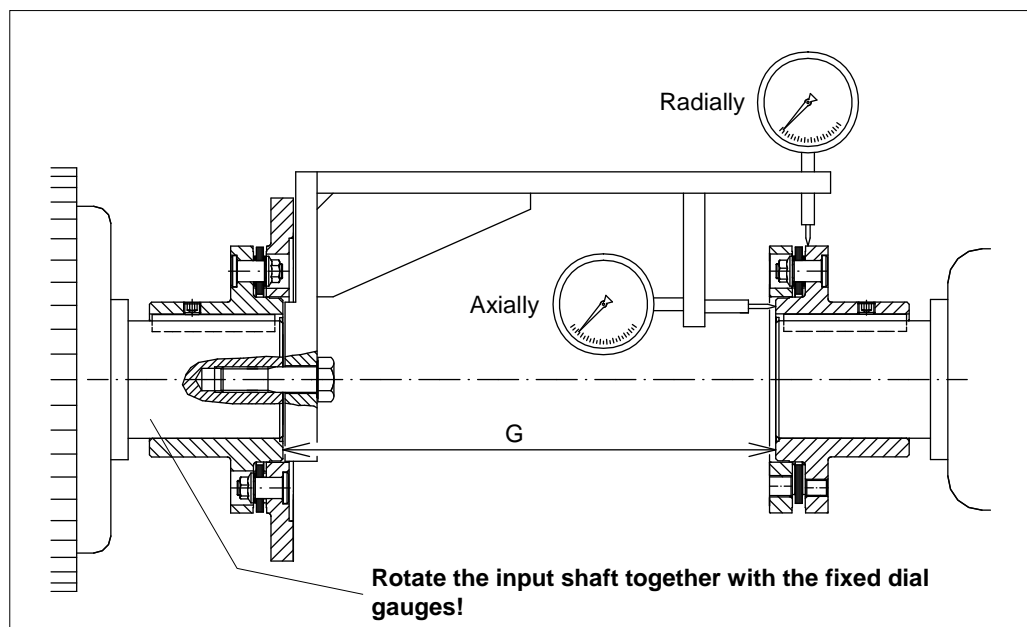
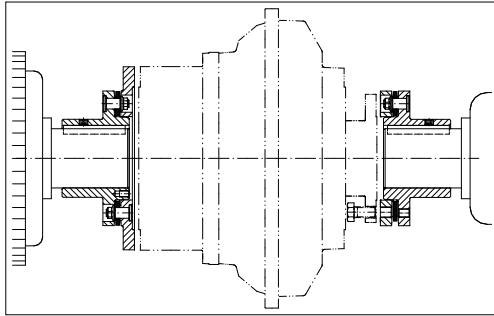


Fig. 26

Disk pack
For illustration →
Page 51

- Pretension the disk packs to the **reference dimension X** using the hex. screws (item 1942) (→ Table 10, page 54).
Do not fall below the **reference dimension X**.
- Provide the correct **distance G** between the input and output unit.
- Align the input and output shaft with each other according to the above schematic sketch (above).
The displacement values of → Chapter 8.5.2.2 apply.
- Securely fix the motor and gearbox (input and output unit) to the foundation.
Stability depends on the whole unit and has to be guaranteed!
- Tighten all screws.
- Check the alignment, and correct, if necessary.

8.5.3 Turbo coupling installation



There is sufficient space for radial installation due to the axially pre-tensioned disk packs.

Fig. 27

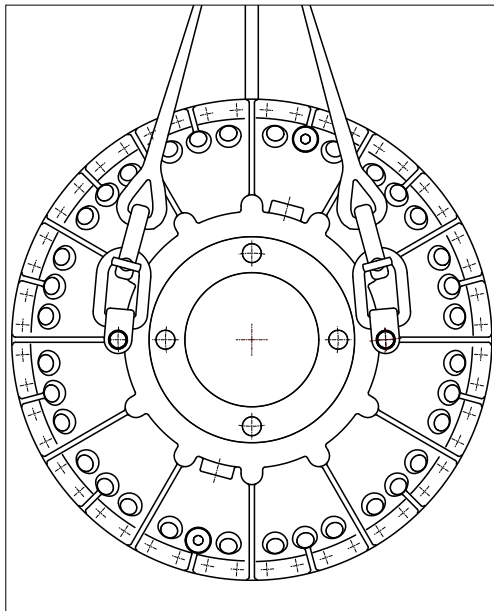


Fig. 28

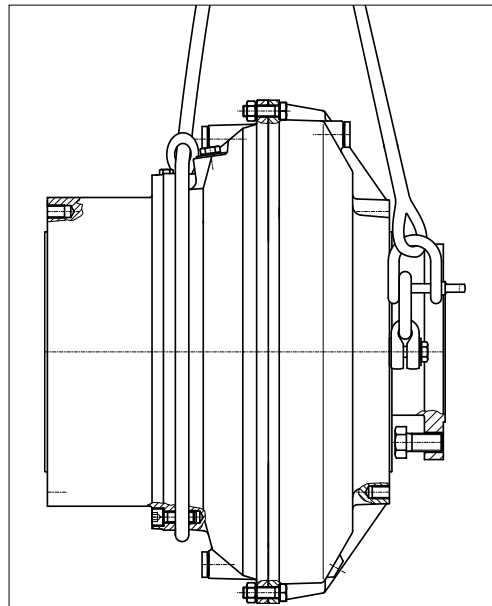


Fig. 29

- Ensure that the spacer sleeves (item 1943) of the transport protector and the warning labels have been removed.
- Fix the turbo coupling with suitable slings to a respective appliance and move it to the input unit (→ Chapter 7.4).

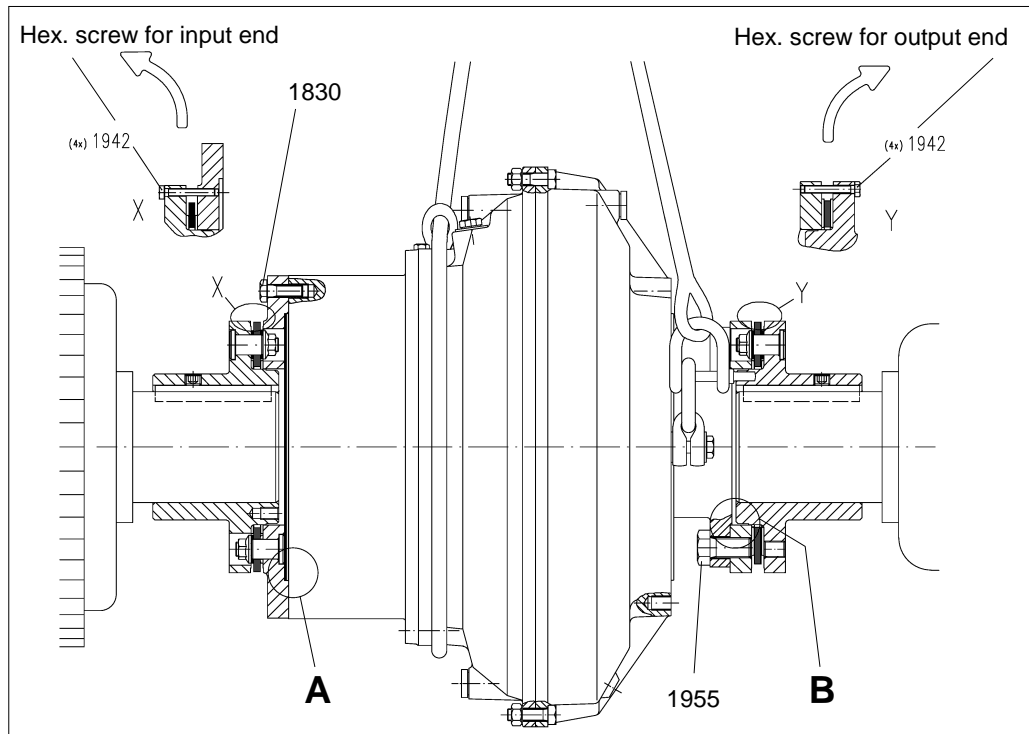


Fig. 30

NOTICE

Damage to property

Fits A / B could be damaged in case of improper assembly.

- Do not tilt/cant the turbo coupling when mounting it.

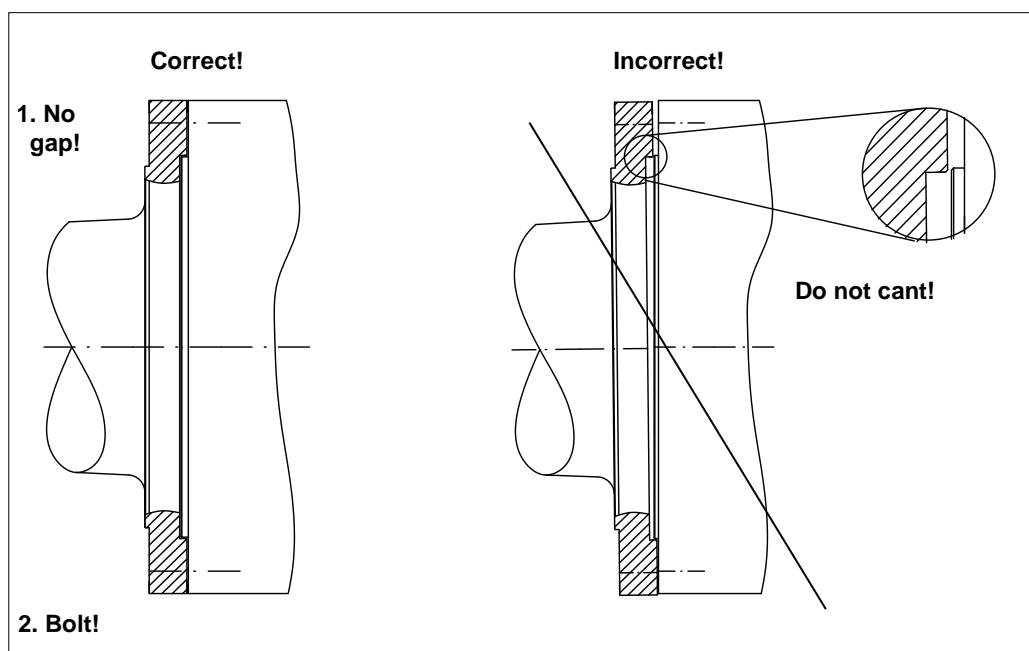


Fig. 31

- Position the turbo coupling carefully between the disk packs.
Pay attention to fits A and B when inserting.
- Loosen the hex. screws (item 1942) to release the disk packs.
- Insert the screws (items 1830 and 1955), but do not tighten them.
- **Completely** remove **all 4** hex. screws (item 1942) on each side.
- Keep the hex. screws (item 1942) for later use (disassembly).
- Tighten the screws (items 1830 and 1955) uniformly, and observe the tightening torques!

Tightening torques
→ Chapter 3.3

8.5.4 Check of alignment

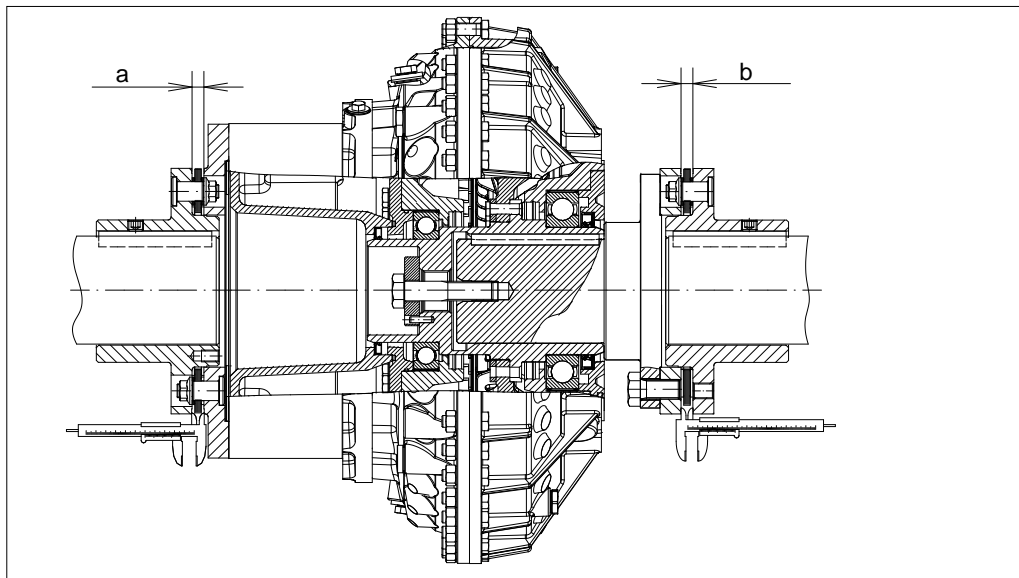


Fig. 32

- a:** Distance between the flanges of the input side disk pack.
b: Distance between the flanges of the output side disk packs.

a_{min} , b_{min} : minimum value of a or b.
a_{max} , b_{max} : maximum value of a or b.

Δa: **a_{max} - a_{min} .**
Δb: **b_{max} - b_{min} .**

- Measure a and b going around the whole periphery of the respective disk pack in 45° steps, without rotating the shafts or the turbo coupling.
- Compare the measured values with the following table:

Coupling size and type	GPK - dimensions to check the alignment in mm	
	a = b	$\Delta a = \Delta b$
366 T...	9.50 ... 10.15	≤ 0.4
422 T...	10.40 ... 11.30	≤ 0.4
487 T...	12.75 ... 14.65	≤ 1.2
562 T...	13.25 ... 15.95	≤ 1.7
650 T...	16.20 ... 19.70	≤ 2.5
750 T...	17.50 ... 21.00	≤ 2.5
866 T...	19.00 ... 22.50	≤ 2.5
866 DT...	20.50 ... 24.80	≤ 2.3
1000 T...	20.50 ... 25.00	≤ 2.5
1000 DT...	24.00 ... 29.00	≤ 2.5
1150 T...	24.00 ... 29.10	≤ 2.6
1150 DT...	25.00 ... 30.00	≤ 2.5

Table 12

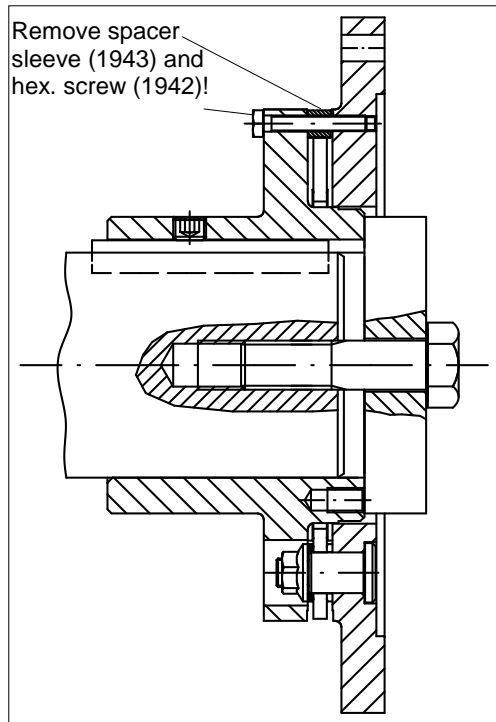
Observe the dimensions a, Δa , b and Δb for all operating conditions!

Protocols/reports
 → Chapter 14

- Fill in the assembly check report.

8.6 Mounting and alignment of GPK-XP, version with clamping hub

8.6.1 Mounting the input hub and output hub



- Do not release the disk packs from the hubs!
- Remove spacer sleeves (1943)^{*)}, hex. screws (1942)^{*)} and warning labels (4x each on the input and output side).
- Keep the spacer sleeves for later use.
- When mounting the hub, do not introduce any forces through the disk pack.

^{*)} Transport protector consists of hex. screw (1942) and spacer sleeve (1943).

Fig. 33

- Fix the hub to a suitable lifting appliance.



WARNING

Risk of burning

The surface is hot due to getting warm.

- Do not touch the hub.

- Warm up carefully the hub to approx. 80 °C (facilitates mounting).
- Mount the hub on the relevant shaft journal.
- Ensure that shaft journals do not protrude.
- Secure the hub using the set screw.

8.6.2 Alignment

8.6.2.1 Laid lengths

NOTICE

Damage to property

Axial constraining forces.

- Pay attention and adhere to laid lengths.
- In particular, observe any displacements due to changes in temperature.

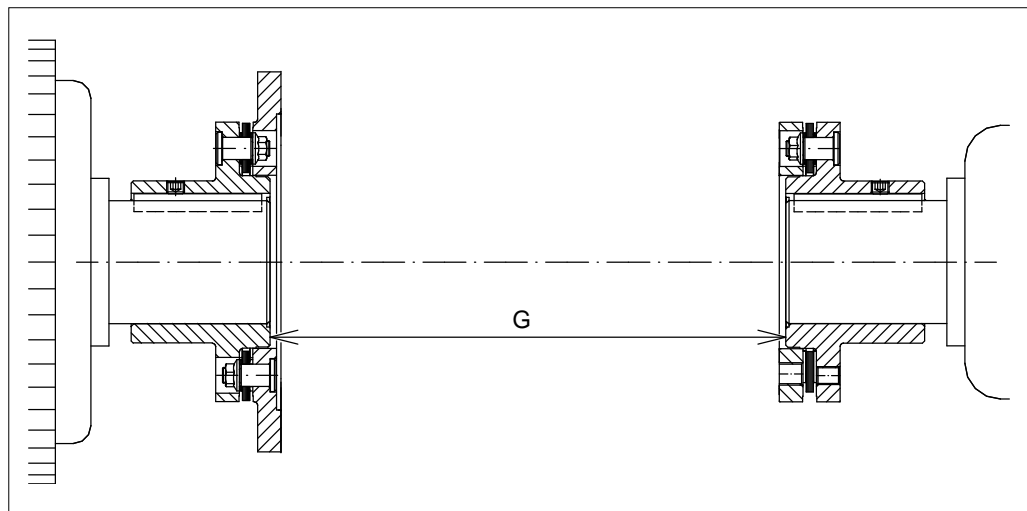


Fig. 34

Coupling size	GPK-XP Laid lengths G in mm				
	DT	DTV	T	TV	TVV / TVVS
366	-	-	321.5 + 6	348.5 + 6	419 + 6
422	-	-	396 + 6	435 + 6	513 + 6
487	-	-	440 + 6	491 + 6	576 + 6
562	-	-	480 + 6	544 + 6	639 + 6
650	-	-	544 + 6	611 + 6	721 + 6
750	-	-	660 + 6	734 + 6	861 + 6
866	-	-	747 + 6	819 + 6	967 + 6
1000	-	-	819 + 6	925 + 6	1064 + 6
1150	-	-	812 + 6	977 + 6	1190 + 6
	1162 + 6	1540 + 6	-	-	-

Table 13

The laid lengths indicated in Table 13 apply to the standard designs of GPK-XP without connection for a brake.

For customer-specific laid lengths and for versions with connection for a brake, the data indicated on the assembly plan have to be met.

8.6.2.2 Displacement values



WARNING

Explosion hazard

Explosion hazard due to damage to the material caused by excessive misalignments.

- Keep within the permissible tolerances for true radial and axial running during all operating conditions.
- In particular, observe any displacements due to changes in temperature.



NOTICE

Misalignments

The smaller the alignment error, the

- the higher the lifetime and reliability of the machine.
- the smoother the operation.

The maximum permissible **displacement values** apply to:

- the **radial run-out** according to the illustration in → Chapter 8.6.2.3 (maximum permissible radial dial gauge deflection!).
- the **axial run-out** according to the illustration in → Chapter 8.6.2.3 (maximum permissible axial dial gauge deflection!).

GPK-XP - maximum permissible displacement values in mm

Coupling size	Radial dial gauge deflection	Axial dial gauge deflection
366, 422	1.0	0.4
487	2.0	0.4
562	2.0	0.6
650, 750, 866	2.0	0.8
1000	2.0	0.8
1150	2.0	0.8

Table 14

8.6.2.3 Alignment

Alignment can be performed using the LASER-optical methods or manually using dial gauges (→ schematic sketch below). More precise results are normally obtained using the LASER-optical methods.

For alignment, support the motor feet using shims or foil sheets.

It is advantageous to use claws for the adjusting screws on the foundation for lateral movement of the drive unit.

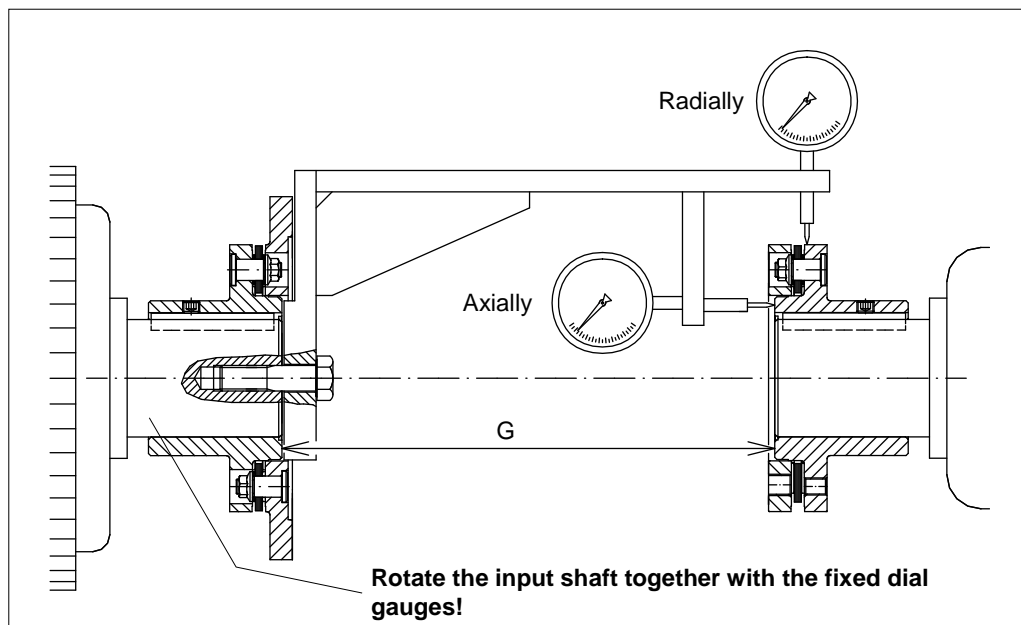


Fig. 35

- Provide the correct **distance G** between the input and output unit.
- Align the input and output shaft with each other according to the above schematic sketch (above).
The displacement values of → Chapter 8.6.2.2 apply.
- Securely fix the motor and gearbox (input and output unit) to the foundation.
Stability depends on the whole unit and has to be guaranteed!
- Tighten all screws.
- Check the alignment, and correct, if necessary.

8.6.3 Preparatory work on clamping hub and plug-in shaft

Sketch showing clamping hub (locking device)

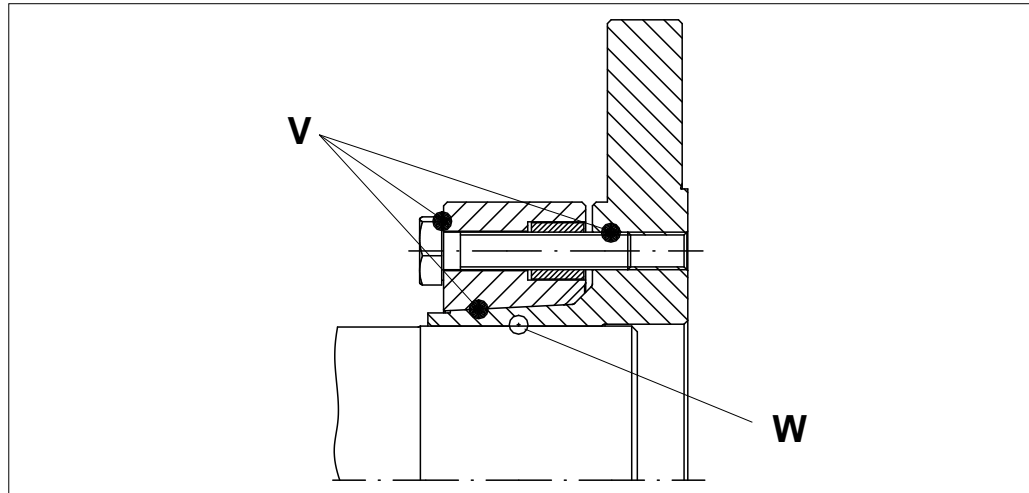


Fig. 36



SAFETY INFORMATION

1. As delivered condition

The clamping hubs are supplied ready greased. For relubrication, proceed according to → Chapter 15.5 (Reassembly).

2. Check

Check the dimensions of the shaft as well as of the hub bore. It is vital to ensure that the joint surfaces are not damaged and the workpiece chamfers are free from burrs.

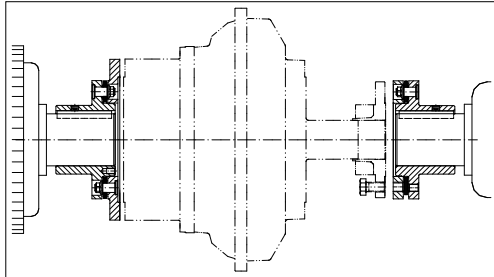
3. Degreasing

Degrease the hub bore and the plug-in shaft on the **joint surfaces (W)**.

Residuals of lubricant on the joint surfaces (hub-shaft) may limit the torque transmission capability.

8.6.4 Turbo coupling installation

Prior to mounting, slide the clamping hub on the plug-in shaft.



There is sufficient space for radial installation by the axially put back clamping hub.

Fig. 37

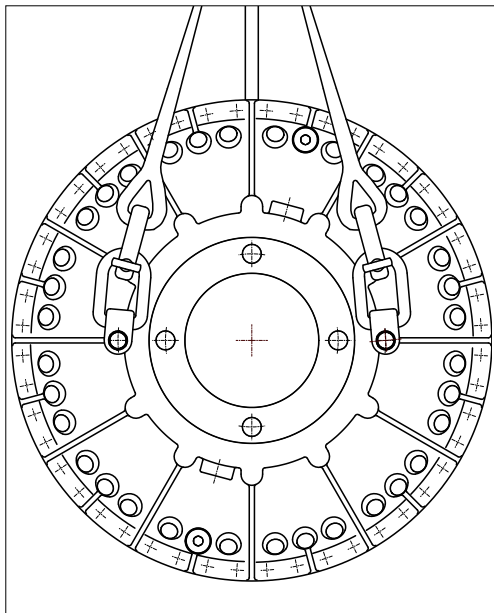


Fig. 38

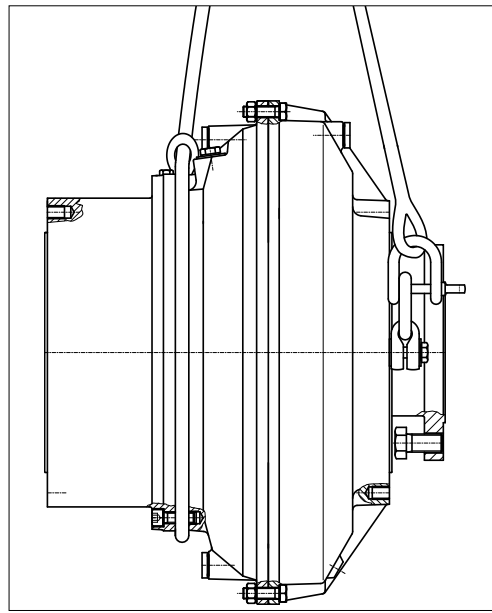


Fig. 39

- Ensure that all hex. screws (1942), spacer sleeves (item 1943) of the transport protector and the warning labels have been removed.
- Fix the turbo coupling with suitable slings to a respective appliance and move it to the input unit (→ Chapter 7.4).

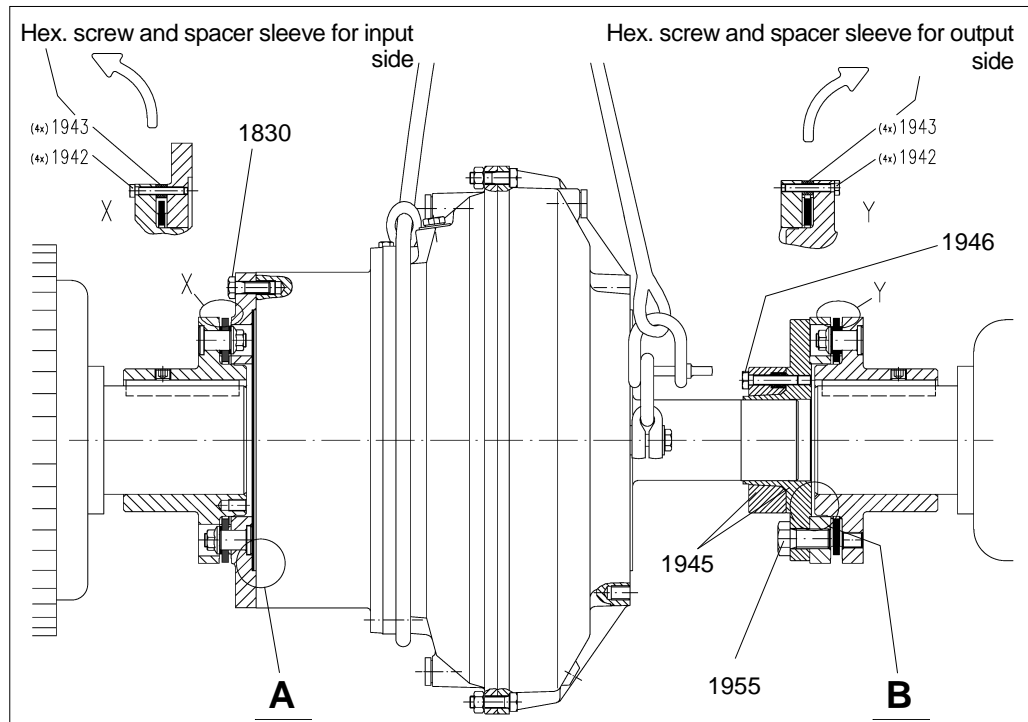


Fig. 40

NOTICE

Damage to property

Fits A / B could be damaged in case of improper assembly.

- Do not tilt/cant the turbo coupling when mounting it.

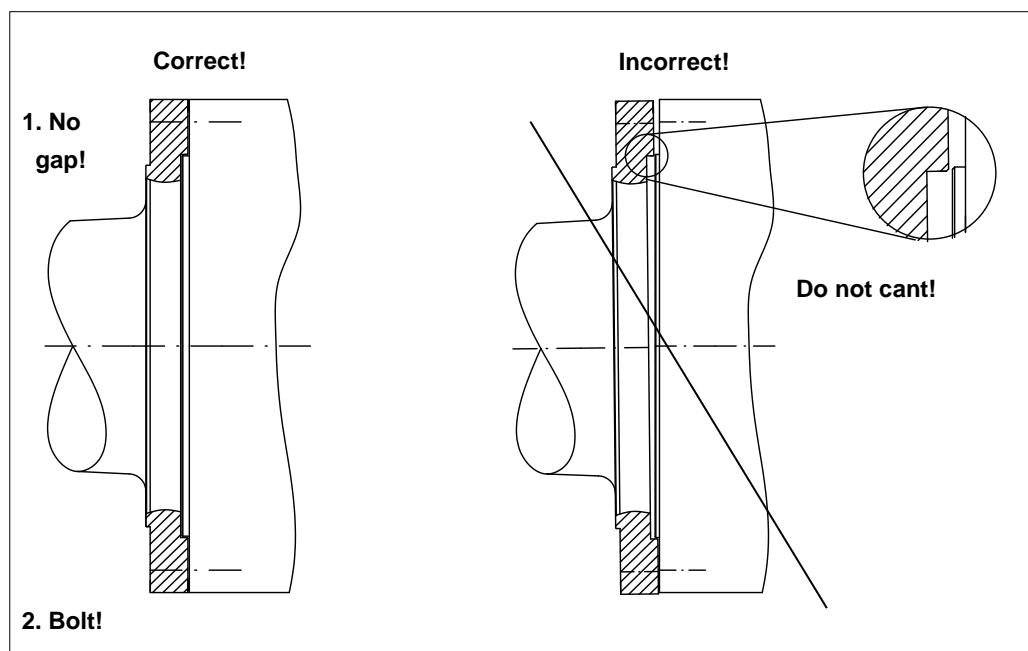


Fig. 41

- Carefully position the turbo coupling between the input and output hubs.
When doing so, pay attention to fit A.
- Insert the screws (item 1830), but do not tighten.
- Axially displace the clamping hub (item 1945) and pay attention to fit B on the flange.
- Ensure that the clamping hub is in the right position on the shaft.
- Insert the screws (item 1955), but do not tighten.
- Tighten the screws (items 1830 and 1955) uniformly, and observe the tightening torques!

Tightening torques
→ Chapter 3.3

WARNING

Explosion hazard

Friction heat occurs when the clamping hub slips. Please observe the following instructions:

- Tighten the tensioning screws (item 1946) using a torque wrench to about 10% of the tightening torque specified in the table until the clamping hub is centered.
- Use a torque wrench to tighten the tensioning screws one after the other - NOT criss-crossing - with increasing torque, starting with about 10% of the tightening torque specified in the table, until all screws were tightened with 10% of the torque.
- Then repeat the procedure applying the 20%, 40%, 60%, 80% tightening torque.
- The tightening procedure is finished when all screws were tightened with the torque specified in the table.



8.6.5 Check of alignment

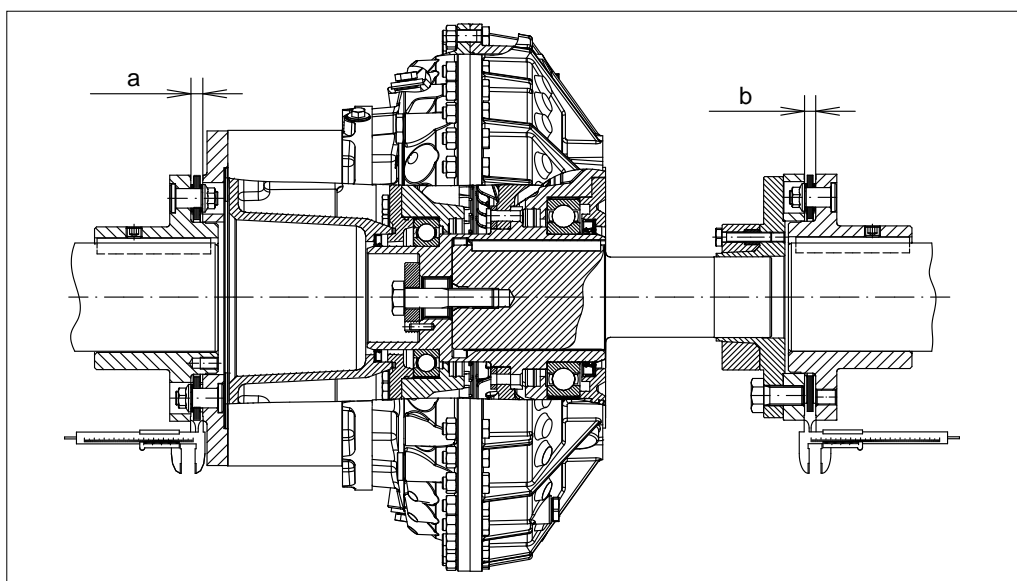


Fig. 42

- a:** Distance between the flanges of the input side disk pack.
- b:** Distance between the flanges of the output side disk packs.

a_{min} , b_{min} : minimum value of a or b.
a_{max} , b_{max} : maximum value of a or b.

Δa: **a_{max} - a_{min} .**
Δb: **b_{max} - b_{min} .**

- Measure a and b going around the whole periphery of the respective disk pack in 45° steps, without rotating the shafts or the turbo coupling.
- Compare the measured values with the following table:

GPK-XP - dimensions to check the alignment in mm		
Coupling size and type	a = b	Δa = Δb
366 T...	8.50 ... 9.60	≤ 1.1
422 T...	9.50 ... 10.60	≤ 1.1
487 T...	12.00 ... 13.40	≤ 1.4
562 T...	13.00 ... 14.80	≤ 1.8
650 T...	16.20 ... 18.50	≤ 2.3
750 T...	17.50 ... 19.80	≤ 2.3
866 T...	18.50 ... 20.80	≤ 2.3
1000 T...	20.50 ... 22.80	≤ 2.3
1150 T...	24.00 ... 26.60	≤ 2.6
1150 DT...	25.00 ... 27.40	≤ 2.4

Table 15

Observe the dimensions a and b, Δa and Δb for all operating conditions!

- Fill in the assembly check report.

Protocols/reports
 → Chapter 14

9 Operating fluids



WARNING

Risk of injury

Hot operating fluid could spray off from defective components or fusible plugs, seriously injuring persons!

- Maintain the turbo coupling regularly!
- Experts only are allowed to work on the turbo coupling!

NOTICE

Damage to property

Use only the operating fluid for the turbo coupling which is indicated on the cover sheet!

- Unsuitable operating fluids may damage the turbo coupling permanently!
- Consult Voith Turbo if you want to use an operating fluid not mentioned.

NOTICE

Environmental pollution

Operating fluids are detrimental to health and may pollute the environment.

- Dispose of used operating fluid via an authorized collecting station in accordance with the national statutory provisions.
- Make sure that no operating fluid gets into the ground or water!


SAFETY INFORMATION

The values mentioned for the pour point, flash and fire point are approximate values and data originating from the oil suppliers. These may vary and Voith Turbo does not assume any warranty!

Country-specific production of the basic oil may result in different values.

- We recommend comparing the data with our specifications at any rate.
- In case of deviations, we urgently recommend consulting the respective oil producer.

9.1 Requirements to be fulfilled by the operating fluid 'mineral oil'

Requirement to	
Viscosity class	ISO VG 32 acc. to DIN ISO 3448 ^{*)}
Viscosity on start-up	less than 15000 mm ² /s (cSt)
Pour point	4 °C below the minimum ambient temperature or lower
Flash point	greater than 180 °C and at least 40 °C above the nominal response temperature of the fusible plugs
Resistance to aging	aging-resistant refined product
Cleanliness grade	Minimum requirements: 21/19/16 acc. to ISO 4406
Sealing compatibility	NBR (Nitril-Butadien caoutchouc) and FPM/FKM (fluor caoutchouc)
Fire point 	at least 50 °C above the max. surface temperature (→ Chapter 2)



*) In special cases, ISO VG 10 - 46 can be used

Advantageous additional qualities

Check for	Abrasion of rolling elements	< 30 mg
FE 8: D7,5 / 80-80	Abrasion of cage	<100 mg

9.1.1 Usable operating fluids

- Hydraulic oils HLP 32 to DIN 51524, Part 2 ^{*)}
- Lubricating oils CLP 32 to DIN 51517, Part 3
- Steam turbine oils LTD 32 to DIN 51515, Part 1 ^{*)}
- HD engine oils SAE 10 W
- ATF type A Suffix A (TASA) and type Dexron II, IID, IIE, III, MERCON
- M 891205 and M 921253

*) In special cases, ISO VG 10 - 46 can be used

9.1.2 Operating temperature frequently above 100 °C

FPM/FKM is recommended as sealing material; when selecting the mineral oil, ensure that it provides excellent oxidation resistance.

This is ensured if original Voith sealings are used.

9.1.3 Proposed operating fluids

Producer	Designation	Pour point in °C	Flash point in °C	Fire point in °C	Class	FE8 Test fulfilled
Addinol	Hydraulic oil HLP 32	-21	195	-	HLP	-
Agip	Agip Oso 32 Agip Blasia 32	-30 -29	204 215	260 265	HLP CLP	-
Avia	Avia Fluid RSL 32 Gear RSX 32 S	-27 -33	214 210	237 231	HLP CLP	-
Castrol	Alpha EP 32 Alpha VT 32 Hyspin ZZ 32 Hyspin AWS 32	-27 -42 -30 -27	218 234 216 200	250 252 238 -	CLP CLP HLP HLP	JA JA JA -
Cepsa	HIDROSIC HLP 32 EP 125	-24 -30	204 206	316 316	HLP HLP	- -
Exxon Mobil	DTE 24 Mobilfluid 125 Mobil SHC 524	-27 -30 -54	220 225 234	- - 234	HLP CLP/HLP HLP	- - -
Fuchs	Renolin MR10 Renolin B10	-30 -24	210 205	- -	HLP HLP	- -
Klüber	Lamora HLP 32	-18	200	-	HLP	-
Kuwait Petroleum	Q8 Haydn 32 Q8 Holst 32	-30 -30	208 208	232 234	HLP HLP	- -
Ravenol	Hydr. oil TS32	-24	220	-	HLP	-
Shell	Tegula V32 Tellus S3 M 32 Tellus S4 ME 32	-33 -39 -54	211 236 240	- - -	HLP HLP HLP	JA - -
SRS – Salzbergen	Wintershall Wiolan HS 32 Wintershall Wiolan HF 32	-24 -27	220 200	240 240	HLP HLP	- JA
Texaco	Rando HD 32	-30	196	246	HLP	-
Total	Azolla ZS 32 Azolla VTR 32 Preslia GT	-27 -36 -15	210 230 225	220 - -	HLP CLPD LTD	- JA JA

Table 16

The above oil list is a recommendation and does not claim to be complete.

9.2 Proposed operating fluids for special requirements

Operating fluid suitable for the use in the food industry

Producer	Designation	Pour point in °C	Flash point in °C	Class
Klüber	Summit HySyn FG 32	-45	>230	HLP

Table 17

Note: USDA H1-Registration satisfies the FDA requirements.

High-flash point operating fluid

Producer	Designation	Pour point in °C	Flash point in °C	Fire point in °C	Class
Fuchs	Renosafe DU 46	-33	305	354	HFD-U

Table 18

Note: Fuchs Renosafe DU 46 is a high-flash point pressure fluid of viscosity class ISO VG 46 and contains neither chlorinated hydrocarbons nor phosphorus acid ester. The density of the fluid is lower than the density of water.

Biodegradable operating fluid

Producer	Designation	Pour point in °C	Flash point in °C	Fire point in °C	Class
Fuchs	Plantosyn 3268	-36	230	-	HEES

Table 19

Note: Fuchs Plantosyn 3268 is a quickly biodegradable fluid of viscosity class ISO VG 46 corresponding to VDMA 24568. The water risk class is 1 and the density of this fluid is lower than the density of water.

9.3 Requirements to be fulfilled by the operating fluid 'water'

Requirement to	
Sealing compatibility	NBR (Nitril-Butadien caoutchouc)
ph value	5...8

The water used should

- to the greatest possible extent, be free from solid matters,
- contain only a low amount of salt,
- contain only a low concentration of other additives.

9.3.1 Usable operating fluids

Normally, drinking water satisfies these requirements.

9.3.2 Water used as operating fluid for turbo couplings with centrifugal valves (types TW...F...)

NOTICE

Damage to property

Insufficient lubrication of turbo couplings with centrifugal valve (types TV...F...).

- Observe the respective type!
- It is allowed to fill in water only in a turbo coupling of type TW.
- When refilling turbo couplings with centrifugal valves (types TW...F...), it is necessary to add the indicated amount of grease to the water.

Type designation
 → Cover sheet

For turbo couplings with centrifugal valves it is necessary to add a low amount of grease to the water. The grease guarantees a permanent functioning of the centrifugal valves.

In the as delivered condition, the corresponding amount of grease is already in the working chamber of the turbo coupling.

Amount of grease required:

Coupling size	366	422	487	562	650	750	866
Amount of grease	80 g	100 g	120 g	150 g	180 g	210 g	240 g

Table 20

Requirements to be fulfilled by the grease:

Requirement to	
Consistency class	2 to NLGI
Thickeners	Lithium complex Calcium complex
Service temperature	-20 °C ... 120 °C
Material compatibility	NBR (Nitril-Butadien caoutchouc)

Proposed greases:

Producer	Designation
Avia	Lithoplex 2 EP
BP	Energrease HTG 2
Castrol	Tribol GR 4020/220-2 PD Tribol GR 4747/220-2 HT
ExxonMobil	Mobilith SHC 220
Fuchs	Renolit CXI 2
Klüber	Petamo GHY 133N
Shell	Gadus S2 V220 2 Gadus S5 V220 2
Total	Multis Complex MV 2 Multis Complex SHD 220

Table 21

The above grease list is a recommendation and does not claim to be complete.

10 Filling, Filling Check and Draining

The quantity and type of operating fluid used substantially determines the performance of the turbo coupling.

- A too high quantity stresses the drive motor more on start-up and results in a higher stall torque.
- A too low quantity thermally loads the turbo coupling more and results in a lower stall torque.

WARNING

Risk of burning

The turbo coupling gets warm during operation.

- Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!
- Start to work on the turbo coupling only after it has cooled down to below 44 °C.

CAUTION

Danger to health

Operating fluids may cause irritations or inflammation if coming into contact with skin and mucous membranes.

- Please pay attention to the information contained in the safety data sheets.
- Please always wear safety goggles when working with the operating fluid!
- Should you get any operating fluid in your eyes, rinse them immediately using plenty of water and consult a physician without delay!
- After finishing work, carefully clean your hands with soap.

NOTICE

Damage to property

Insufficient lubrication

- When refilling turbo couplings with centrifugal valves (types TW...F...), it is necessary to add the indicated amount of grease to the water.

Impurities in the operating fluid cause higher wear on the coupling as well as damages to bearings so that explosion protection can no longer be guaranteed.



- Make sure that any containers, funnels, filling tubes, etc. used for filling the coupling, are clean.

NOTICE

Damage to property

Non-compliance with specifications.

- Observe the quantity to be filled in that is indicated on the cover sheet of this operating manual.
- An overfilling is not permitted! This would lead to an undue high internal pressure in the coupling, which may destroy the coupling.
- An underfilling is not permitted! This will result in an improper operation of the coupling.
- Do not mix different types of operating fluids.
- Use only the operating fluid indicated on the cover sheet of this manual.
- Ensure that the original sealing rings used are in sound condition.

10.1 Filling the turbo coupling

SAFETY INFORMATION

Turbo couplings are shipped unfilled.

- If operating fluid is included in the scope of supply, it is shipped in a separate container.

- Turn the turbo coupling until the filler plug (item 0390) that is closest to the sight glass (item 0396) is on top.
- Remove the filler plug.
- Remove the top fusible plug (item 0395 or item 0260) for pressure compensation.
- For turbo couplings with centrifugal valves (type TW...F...), fill in the specified amount of grease into the working chamber of the turbo coupling.
- Fill in the specified quantity of operating fluid (→ Chapter 9) through a fine strainer
 - mesh size $\leq 25 \mu\text{m}$ for turbo couplings using oil and operating medium (type T...)
 - mesh size $\leq 50 \mu\text{m}$ for turbo couplings using water as operating medium (type TW...)
 via the opening in the filler plug.
- Tighten the filler plug.
- Tighten the fusible plug.

Amount of grease
→ Chapter 9.3.2

Operating fluid and
filling volume
→ Cover sheet

Tightening torques
→ Chapter 3.2

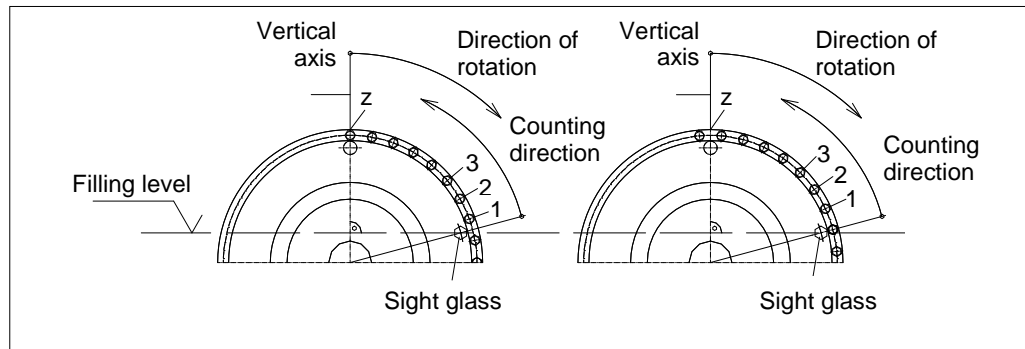


Fig. 43

z = _____

Assembly check report
 → Chapter 14.1 or cover sheet

- Turn the turbo coupling until the operating fluid is just visible on the sight glass.
- Determine the **number z** of the flange screws from the sight glass to the vertical axis. The first screw is the one which center line is in counting direction, after the intersection line through the sight glass.
- For later filling level checks, record the **number z** of screws determined. In addition, mark the turbo coupling or the protective cover.
- Check the coupling for leaks during a test run (with protective cover!).

10.2 Level check

Number z
 → Chapter 10.1

- Turn the turbo coupling until the operating fluid is just visible on the sight glass.
- Determine the **number z** of the flange screws from the sight glass to the vertical axis. The first screw is the one which center line is in counting direction, after the intersection line through the sight glass.
- Compare the number of screws determined with the number of screws determined during filling. Please observe the marking provided additionally on the coupling or guard.
- Correct the quantity filled in, if necessary.
- Check the coupling for leaks during a test run (with protective cover!).

10.3 Draining the turbo coupling

NOTICE

Environmental pollution

Improper disposal of operating fluid may cause damages to the environment!

- On disposal, please observe the applicable laws and the producer's or supplier's instructions.
- Provide suitable containers to collect the operating fluid.

Notes on disposal
 → Chapter 16

10.3.1 Draining of turbo couplings without delay chamber installed in horizontal position

- Put a catch pan underneath.
- Turn the turbo coupling until one fusible plug is at the bottom.
- Remove this fusible plug.
- For aeration, remove one opposite filler of fusible plug.
- The operating fluid flows out from the turbo coupling.
- Wait until no more operating fluid comes out.
- Only use original seals.
- Re-tighten all screws.

Tightening torques
→ Chapter 3.2

10.3.2 Draining of turbo couplings with delay chamber installed in horizontal position

- Put a catch pan underneath.
- Turn the turbo coupling until one fusible plug is at the bottom.
- Remove this fusible plug.
- For aeration, remove one opposite filler of fusible plug.
- The operating fluid flows out from the working chamber of the turbo coupling.
- Wait until no more operating fluid comes out.
- Remove the nozzle screw (item 0455 / 0456).
- Turn the turbo coupling until the opening of the nozzle screw is at the bottom.
- The operating fluid flows out from the delay chamber of the turbo coupling.
- Wait until no more operating fluid comes out.
- Only use original seals.
- Tighten the nozzle screw.
- Turn the turbo coupling until the opening of the fusible plug is at the bottom.
- The remaining operating fluid flows out from the working chamber of the turbo coupling.
- Wait until no more operating fluid comes out.
- Only use original seals.
- Re-tighten all screws.

Tightening torques
→ Chapter 3.2

11 Commissioning



WARNING

Risk of injury

Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

- Before beginning with commissioning, ensure that the transport protectors (hex. screw (1942) and spacer sleeve (1943)) have been removed!
- A commissioning not performed properly could cause injury to persons, or harm to property and the environment!
- Experts only are allowed to perform commissioning, in particular, first starting of the turbo coupling!
- Secure the machine against unintentional switching on!



Marking
→ Chapter 6.2

Explosion hazard

- Please check with reference to the marking whether the turbo coupling is approved for use in potentially explosive atmospheres.
- Provide the turbo coupling with a protective cover (e.g. perforated sheet, size of holes approx. 10 – 12 mm). This protective cover has to
 - prevent intrusion of damaging foreign particles (stones, corrosive steels, etc.).
 - withstand expected impacts without any major damages, thus preventing contact of the turbo coupling with the protective cover. Especially turbo couplings with outer parts made of aluminum must not get in contact with corrosive steel or iron.
 - collect spraying solder of fusible plugs.
 - collect any operating fluid leaking out to prevent contact with parts (motor, belt) that might ignite or catch fire.
 - provide sufficient ventilation to maintain the maximum surface temperature specified.
A perforated sheet with 65% hole cross section enclosing the coupling on all sides does not reduce the ventilation (consult Voith Turbo, if necessary).
 - guarantee safety distances to prevent hazard zones from being reached (DIN EN ISO 13857).

For constructional proposals for protective covers, please contact Voith Turbo.

- The turbo coupling is not equipped with insulated ball and roller bearings! The passage of current and stray currents may come from connected machines (e.g. VFD motor).
- In order to avoid electrostatic charging, it is not allowed to install the turbo coupling with an insulation on both sides.
- Provide an equipotential bonding between the input and output end.
- Provide machines on which overspeed is possible, with a device preventing reliably overspeed (e.g. brake or backstop).

**WARNING****Hazard by being pulled in**

Slack clothing, long hair, necklaces, rings or loose parts may get caught and be drawn in or wound up causing serious injuries or damage to the turbo coupling and the environment.

- Only wear close-fitting clothes when working!
- Cover long hair with a hair net!
- Do not wear any jewelry (e.g. necklaces, rings, etc.)!
- Never operate the turbo coupling without protective cover!

**WARNING****Explosion hazard**

Explosion hazard due to frictional heat or overheating.

- Ensure that the disks of the connecting coupling (type GPK) do not touch the flanges.
- If you use a BTS-Ex to limit the maximum surface temperature, make sure not to exceed the maximum permissible temperature of the turbo coupling when switching on the motor.



Technical data
→ Chapter 2

Information with regard to commissioning

- The turbo coupling may be used for any direction of rotation.
- The direction of rotation of the driven machine may be specified! The direction of rotation of the motor must be in accordance with the specified direction of rotation of the driven machine!
- If the motor is started with star/delta connection, switch over from star to delta after 2...5 seconds at the latest.
- In case of a multi-motor drive, you should determine the load of the individual motors. Great differences regarding motor load may be balanced by an appropriate adjustment of the respective coupling filling volumes. **However, do not exceed the maximum permissible coupling filling level!**

Operating fluid and
filling volume
→ Cover sheet

Commissioning

- Perform all commissioning work according to the commissioning report.
Pay special attention to:
 - a normal machine operation
 - normal noise
- Record the commissioning process.

Commissioning
report
→ Chapter 14.2

12 Operation



WARNING

Risk of injury

Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

- An operation presupposes the successful commissioning according to → Chapter 11.

Information with regard to operation

- Never operate the turbo coupling without operating fluid!
- On account of the type of bearings used for standard turbo couplings, at least one standstill is required within three months.

During normal operation, no operator actions on the turbo coupling are required.

Perform the necessary maintenance work time-/operating time-based according to → Chapter 13.

If malfunctions occur, eliminate such according to → Chapter 17.

13 Maintenance, Servicing

Definition of the maintenance work described in the following (as per IEC 60079):

Maintenance and Servicing: A combination of all activities conducted in order to maintain an object in a condition or to re-store it to such a condition which meets the requirements of the respective specification and ensures performance of the required functions.

Inspection: An activity involving the thorough examination of an object in order to provide a reliable statement as to the condition of said object, performed without disassembly or, if necessary, with only partial disassembly, supplemented by measures such as the taking of measurements.

Visual inspection: A visual inspection is an inspection in which visible defects, such as missing screws or bolts, are identified without the use of access equipment or tools.

Close-up inspection: An inspection in which, in addition to the areas covered by the visual inspection, defects such as loose bolts, that can only be detected by using access equipment, e.g. mobile stair steps (if required) and tools are identified. For close-up inspections, usually a housing does not need to be opened or the power to the equipment be cut off.

Detailed inspection: An inspection in which, in addition to the areas covered by the close-up inspection, defects such as loose connections, that can only be detected by opening housings and/or using tools and test equipment (if required) are identified.

⚠ WARNING

Risk of injury
Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

- Please always keep access paths free to the turbo coupling!

- Skilled and authorized persons only are allowed to carry out maintenance and repair work! Qualification is ensured by performing training and giving instructions on the turbo coupling.
- Possible consequences of improper servicing and maintenance could be death, serious or minor injuries, damage to property and harm to the environment.
- Switch off the unit in which the turbo coupling is installed and secure the switch against inadvertent switch-on.
- For all work performed on the turbo coupling ensure that both the drive motor and the driven machine have stopped running and that a re-start is absolutely impossible!
- Components may only be replaced by original spare parts.

Qualification
→ Chapter 6.9

Re-mount all protective covers and safety devices in their original position immediately after completion of the servicing and maintenance work. Check them for proper functioning.

Maintenance schedule:

Time	Maintenance work
About 1 hour after commissioning	Check the tightening torques of fastening screws, items 1830 and 1955.
After the first 500 operating hours	<p>Check the tightening torques of fastening screws, items 1830 and 1955.</p> <p>Check the steel disks of the connecting coupling (→ Chapter 13.2).</p> <p>Check the reference dimensions a and b (→ Chapters 8.5.4 and 8.6.5), compare them with the commissioning report and re-align them in case of deviations and impermissible values.</p> <p>For type GPK-XP (with clamping hub): Check the tightening torques of the tensioning screws, item 1946.</p>

Tightening torques
→ Chapter 3.3

Time	Maintenance work
Routine inspection after 500 operating hours, every 3 months at the latest.	<p>Inspect the machine for irregularities (visual inspection: for leaks, noise, vibrations).</p> <p>Check the foundation bolts of the machine, and if necessary, re-tighten them with the specified torque.</p>
3 months after commissioning, at the latest, then every year	Check the electrical system for sound condition if temperature monitoring is required in Chapter 2 (detailed inspection).
Every 12 / 6 / 4 months for 1 / 2 / 3-shift operation	Check of disks for deformation, fractures and cracks as well as for flatness, freedom from distortion, homogeneity of pack.
When mineral oil is used as operating fluid: After every 15000 operating hours	<ul style="list-style-type: none"> - Change the operating fluid or check it for aging and - determine the remaining service life (see records → Chapter 14)! <p>Consult the operating fluid supplier with regard to the permissible values (see Chapters 9 and 10).</p>
On response of a fusible plug	<p>Replace all fusible plugs and change the operating fluid (→ Chapter 13.4).</p> <p>Check the operating conditions (→ Chapter 2).</p> <p>Check the devices provided for temperature monitoring (see Chapter 19: MTS, BTS(ex), BTM).</p>
In case of leaks	On the occasion of an overhaul of the turbo coupling, have shaft sealing rings, sealing rings and flat seals replaced by skilled persons authorized by Voith.
In case of noise, vibrations	Have the cause determined and eliminated by skilled persons authorized by Voith.
In case of impurities	Cleaning (→ Chapter 13.1).

Table 22

Report samples
 → Chapter 14.3

- Carry out any maintenance work and routine inspections according to the report.
- Record the maintenance work carried out.

For explosion-proof turbo couplings, the following maintenance work needs to be carried out in addition:



Maintenance intervals	Maintenance work
<p>In case of impurities or dusting: Clean the turbo coupling when used in potentially explosive atmospheres in regular intervals. The intervals are specified by the operator according to the environmental impact to which the equipment is exposed on the jobsite, e.g. in case of a dust accumulation of approx. 0.2 ... 0.5 mm or more.</p>	Cleaning (→ Chapter 13.1).
Maintenance interval → Chapter 2	Replacement of ball and roller bearings (→ Chapter 13.3.3).

Table 23

WARNING

Explosion hazard
Explosion hazard due to maintenance work not performed according to schedule. It is vital to carry out all maintenance work according to the schedule in order to guarantee proper operation within the meaning of explosion-protection.

- Immediately remove any combustible layers of dust on the turbo couplings.
- To ensure a good aeration of the turbo coupling, it is vital to check and clean the protective cover in regular intervals.
- If a fusible plug has responded, immediately cover or close the opening that occurred in order to prevent the ingress of combustible dust into the turbo coupling.



13.1 Outside cleaning

NOTICE

Damage to property
Damage to the turbo coupling due to an improper, unsuitable outside cleaning.

- Please ensure that the cleaning agent is compatible with the sealing materials used, NBR and FPM/FKM!
- Do not use high-pressure cleaning equipment!
- Be careful with gaskets. Do not apply a water and compressed-air jet.

- Clean the turbo coupling with a grease solvent, as and when required.

13.2 Connecting coupling types GPK and GPK-XP

- When inspecting the machine, check the connecting coupling for heavily deformed disks compared to the initial installation condition, for disk fractures or signs of corrosion on disks.
- The sum of all gaps (between individual disks) must not exceed 50% of the air gap between the flange or hub and the disk pack (without torque application). Measure the gap between the flange or hub and disk pack around the washers and without torque application.



WARNING

Explosion hazard

Explosion hazard due to overload or faulty alignment.

Disks deformed compared to the initial installation condition, disk fractures or signs of corrosion may be an indication for overload or faulty alignment!

- Replace the complete coupling half (item 1932 or 1972)!
- It is not allowed to replace individual disks. Professional maintenance or repair can only be guaranteed by the manufacturer!

13.3 Bearings

13.3.1 Bearing lubrication when mineral oil is used as operating fluid

Please observe the following in order to guarantee lubrication of the bearings:

NOTICE

Damage to property

Danger of bearing damage.

- On account of the type of bearings used for standard turbo couplings, at least one standstill is required within three months.

SAFETY INFORMATION

Lifetime grease filling

- Turbo couplings can be provided with special bearings that allow continuous operation and contain a lifetime grease filling.

13.3.2 Bearing lubrication when water is used as operating fluid

The turbo coupling bearings are filled with lifetime grease when water is used as operating fluid. Re-lubrication is not necessary.

13.3.3 Replacement of bearings / re-lubrication



SAFETY INFORMATION

On the occasion of an overhaul of the turbo couplings, have the bearings replaced / re-lubricated by skilled persons authorized by Voith.

Replacement interval of ball and roller bearings
→ Chapter 2

13.4 Fusible plugs

- The fusible plugs protect the turbo coupling against damage due to thermal overload.
- When the nominal response temperature is reached, the solder core of the fusible plugs melts and the operating fluid leaks out.

Nominal response temperature of fusible plugs
→ Cover sheet

Fusible plugs are identified by

- the engraved nominal response temperature in °C,
- a color coding:

Nominal response temperature	Color coding	Operating fluid Oil	Operating fluid Water
95 °C	without (tinned)	X	X
110 °C	yellow	X	X
125 °C	brown	X	-
140 °C	red	X	-
160 °C	green	X	-
180 °C	blue	X	-

Table 24

Design
→ Chapter 2

SAFETY INFORMATION

- Use only original fusible plugs SSS-X with the required nominal response temperature!
- Do not replace any fusible plugs by blind screws!
- Do not alter the arrangement of the fusible plugs.
- When water is used as operating fluid, only fusible plugs with a max. nominal response temperature of 110 °C are permitted!
- Never operate the turbo coupling without fusible plugs!

SAFETY INFORMATION

Switching elements, unbalance

- There is a MTS and/or BTS switching element or a blind screw opposite the sight glass (position is marked by an arrow).
- Insert a weight-tolerated BTM blind screw opposite the BTM switching element. Do not insert the BTM switching element opposite a sight glass, blind screw or fusible plug having a lighter weight.

Tightening torques
→ Chapter 3.2

On response of a fusible plug:

- Replace all fusible plugs.
- Change the operating fluid.

13.4.1 Fusible plugs in turbo couplings not suitable for use in potentially explosive atmospheres

SAFETY INFORMATION

- The fusible plugs for turbo couplings of type "TW" and sizes 422, 487, 562, 650, 750, 866 and 1150 are arranged in the outer wheel.
- If a brake is used, select the position of the fusible plugs so that they do not spray onto the brake. Please check that and, if necessary, change the fusible plugs for the opposite blind screws.

Number and position of fusible plugs, blind screws and switching elements:

Shell (item 0190)			
Coupling size and type	Fusible plug Item 0260	Blind screw Item 0265	MTS, BTS switching element ¹⁾
366 T...	1	1	-
366 TW...	-	2	-
422 T...	2	-	-
487 T...	2	-	-
562 T...	2	-	-
650 T...	3	1 ⁴⁾	-
750 T...	2	2	-
866 T...	3	1 ⁴⁾	-
866 DT...	-	-	-
1000 T...	4	-	-
1000 TW...	-	4	1
1000 DT...	-	-	-
1150 T...	4	-	-
1150 DT...	-	-	-

Outer wheel (item 0300)				
Coupling size and type	Fusible plug item 0395	Blind screw item 0394	MTS, BTS, BTM ²⁾ - switching element ¹⁾	Sight glass ³⁾ Item 0396
366 T...	-	5	1	1
366 TW...	2	3	1	1
422 T...	-	7	1	1
487 T...	-	7	1	1
562 T...	-	7	1	1
650 T...	-	5	1	1
750 T...	-	5	1	1
866 T...	-	5	1	1
866 DT...	6	5	1	1
1000 T...	-	3	1	1
1000 TW...	3	-	-	1
1000 DT...	6	1	1	1
1150 T...	-	5	1	1
1150 DT...	8	3	1	1

Table 25

- 1) The MTS, BTS or BTM switching element is inserted instead of a blind screw.
- 2) The blind screw opposite the BTM has to be replaced by the counterweight.
- 3) Position is marked by an arrow.
- 4) Only for annular chamber (type T...S...).



13.4.2 Fusible plugs in turbo couplings suitable for use in potentially explosive atmospheres



WARNING

Fire hazard

If a brake is used, select the position of the fusible plugs so that they do not spray onto the brake.

- This needs to be checked. In case of any deviation, please consult Voith Turbo.

SAFETY INFORMATION

Thermal monitoring devices

- A thermal monitoring system can prevent that operating fluid is sprayed off (→ Chapter 19).
- Thermal monitoring systems are available at Voith Turbo as accessories.

Number and position of fusible plugs, blind screws and switching elements for outer wheel drive (inner wheel drive):

Coupling size and type	Shell (item 0190)			
	Fusible plug Item 0260	Blind screw Item 0265	MTS, BTS switching element ¹⁾	
366 T...	- (-)	2 (2)	-	
422 T...	- (-)	2 (2)	-	
487 T...	- (-)	2 (2)	-	
562 T...	- (-)	2 (2)	-	
650 T...	- (-)	3 (3)	-	
650 T...S...	- (-)	4 (4)	-	
650 T... ²⁾	3 (-)	- (3)	-	
650 T...S... ²⁾	3 (-)	1 (4)	-	
750 T...	- (2)	2 (-)	-	
866 T...	- (3)	3 (-)	-	
866 T...S...	- (3)	4 (1)	-	
866 T... ²⁾	3 (3)	- (-)	-	
866 T...S... ²⁾	3 (3)	1 (1)	-	
866 DT...	- (-)	- (-)	-	
1000 T...	4 (4)	- (-)	-	
1000 DT...	- (-)	- (-)	-	
1150 T...	- (4)	4 (-)	-	
1150 DT...	- (-)	- (-)	-	

Coupling size and type	Outer wheel (item 0300)			
	Fusible plug item 0395	Blind screw item 0394	MTS, BTS switching element ¹⁾	Sight glass ³⁾ Item 0396
366 T...	2 (2)	3 (3)	1	1
422 T...	4 (4)	3 (3)	1	1
487 T...	2 (4)	5 (3)	1	1
562 T...	2 (4)	5 (3)	1	1
650 T...	3 (2)	2 (3)	1	1
650 T...S...	3 (2)	2 (3)	1	1
650 T... ²⁾	- (2)	5 (3)	1	1
650 T...S... ²⁾	- (2)	5 (3)	1	1
750 T...	2 (-)	3 (5)	1	1
866 T...	3 (-)	2 (5)	1	1
866 T...S...	3 (-)	2 (5)	1	1
866 T... ²⁾	- (-)	5 (5)	1	1
866 T...S... ²⁾	- (-)	5 (5)	1	1
866 DT...	6 (6)	5 (5)	1	1
1000 T...	- (-)	3 (3)	1	1
1000 DT...	6 (6)	1 (1)	1	1
1150 T...	4 (-)	1 (5)	1	1
1150 DT...	8 (8)	3 (3)	1	1

Table 26

- 1) The MTS or BTS switching element is inserted instead of a blind screw.
- 2) Applies only if a BTS-Ex switch unit is used.
- 3) Position is marked by an arrow.

14 Assembly Check-, Commissioning and Maintenance Report



WARNING

Risk of injury

Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

Document all assembly work performed in the assembly check report (→ Chapter 14.1).

Document the commissioning process in the commissioning report (→ Chapter 14.2).



SAFETY INFORMATION

Document all **maintenance work** performed on the

- GPK type connecting coupling and
- the turbo coupling

in the maintenance report for the general maintenance (→ Chapter 14.3).

Use copies of the samples, if necessary.

14.1 Assembly check report

Confirm the check or performance of the work by an "X" and/or enter the respective values.

Voith turbo coupling

Size / type (→ Chapter 18):

Serial No. (→ Chapter 18):

Turbo coupling approved for potentially explosive atmospheres yes / no

Operating fluid of turbo coupling

Filling: |

Producer:

Designation:

Motor

Serial No.

Input speed rpm

Rated power kW

Assembly work was performed by:

Name:

Date:

Signature:

Driven machine / gearbox

Serial No.

Mounting - check step	Explanations	Completion notice / dimensions
Check that the inclination of the whole arrangement is within 7° of the horizontal position.	Cover sheet	Desired: ≤ 7° [°] ACTUAL: [°]
Rundlauf Antriebsmaschine messen.	Manufacturer's specification	Desired: [mm] ACTUAL: [mm]
Measurement of shaft diameter - driving machine.	Manufacturer's specification	Desired: [mm] ACTUAL: [mm]
Measurement of true radial running (concentricity) of driven machine.	Manufacturer's specification	Desired: [mm] ACTUAL: [mm]
Measurement of shaft diameter - driven machine.	Manufacturer's specification	Desired: [mm] ACTUAL: [mm]
Diameter of input hub.	Chapter 2	Desired: [mm] ACTUAL: [mm]
Diameter of output hub.	Chapter 2	Desired: [mm] ACTUAL: [mm]
Check of back clearance of key (input side).	Chapter 8.3	<input type="checkbox"/>
Check of back clearance of key (output side).	Chapter 8.3	<input type="checkbox"/>
Key moves easily in the keyway of the input hub.	Chapter 8.3	<input type="checkbox"/>
Key moves easily in the keyway of the output hub	Chapter 8.3	<input type="checkbox"/>
Check of the input side shaft-hub connection. Balancing method corresponds to DIN ISO 8821 and ISO 8821.	Chapter 8.3	Method applied: <input type="checkbox"/> half-key convention <input type="checkbox"/> full-key convention
Check of output side shaft-hub connection. Balancing method corresponds to DIN ISO 8821 and ISO 8821.	Chapter 8.3	Method applied: <input type="checkbox"/> half-key convention <input type="checkbox"/> full-key convention
Cleaning of input side shaft and hub and application of lubricant.	Chapter 8.3	<input type="checkbox"/>
Cleaning of output side shaft and hub and application of lubricant.	Chapter 8.3	<input type="checkbox"/>
Tightening with torque of connecting couplings type GPK or GPK-XP, with set screw (item 1931, item 1971).	Chapter 3.1	<input type="checkbox"/>

Mounting - check step	Explanations	Completion notice / dimensions	
Measurement of installation dimension "G".	Chapters 8.5.2.1 and 8.6.2.1	Desired: [mm] ACTUAL: [mm]	
Measurement of reference dimension "X" (for type GPK only).	Chapter 8.5.2.1	Desired: [mm] ACTUAL: [mm]	
Check of connecting coupling type GPK or GPK-XP for true radial and axial running.	Chapters 8.5.2.2 and 8.6.2.2	<input type="checkbox"/>	
Foundation bolts were tightened.	Chapter 8.5.2.3 or 8.6.2.3	<input type="checkbox"/>	
Mounting of coupling Tightening of screws (item 1830, item 1955).	Chapters 3.3, 8.5.3 and 8.6.4	<input type="checkbox"/>	
Removal of hex. screw (item 1942) and spacer sleeve (item 1943)	Chapter 8.5 and 8.6	<input type="checkbox"/>	
<u>For type GPK-KP (with clamping hub) only:</u> Degrease of hub bore and shaft at point ", tightening with torque of the tensioning screws (1946) of the clamping hub	Chapter 8.6.3	<input type="checkbox"/>	
Check of reference dimension of distance a / b.	Chapters 8.5.4 and 8.6.5	<input type="checkbox"/> a min. <input type="checkbox"/> a max. <input type="checkbox"/> Δ a	<input type="checkbox"/> b min. <input type="checkbox"/> b max. <input type="checkbox"/> Δ b
MTS / BTS / BTM (if required) Installation position was checked according to operating manual.	Chapter 2 Chapter 19	<input type="checkbox"/>	
MTS / BTS / BTM (if required) Electrical functioning was checked.	Chapter 2 Chapter 19	<input type="checkbox"/>	
A guard was mounted as recommended.	Chapter 11	<input type="checkbox"/>	
Equipotential bonding between input and output was realized.	Chapter 11	<input type="checkbox"/>	
Operating fluid was filled into the coupling.	Chapter 10	<input type="checkbox"/>	
Number of screws "z" for filling was determined.	Chapter 10.1	z =	screws
Alignment of turbo coupling was checked.	Enter alignment values	<input type="checkbox"/>	
Radial running of motor shaft is OK		<input type="checkbox"/>	
Entry of displacement values (→ Chapters 8.5.2.2 and 8.6.2.2):			
Viewing from the motor towards driven machine	RADIAL (true radial running)	AXIAL (true axial running)	
Please tick where applicable - Data from dial gauge <input type="checkbox"/> - Data from shaft center offset <input type="checkbox"/> - AXIAL values measured on Ø:mm			
Check of alignment (→ Chapters 8.5.4 and 8.6.5)	Values within measuring range	Values	
a min.	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
a max.	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
b min.	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
b max.	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
Δa	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
Δb	<input type="checkbox"/> yes <input type="checkbox"/> no	ACTUAL:	[mm]
Displacements during operation (are to be indicated by the machine manufacturer): Observe displacements resulting from an increase in temperature or from mechanical movements. Enter only those values that change the above-ascertained alignment values.			
- Radially (e.g. different thermal expansion of input / output) mm		
- Axially (e.g. through angular displacements) mm		
- Längenwachstum (für Einbautoleranz Maß "G", z. Bsp. Wellenausdehnung) mm		

14.2 Commissioning report

Confirm the check or performance of the work by an "X" and/or enter the respective values.

Voith turbo coupling

Size / type (→ Chapter 18):

Serial No. (→ Chapter 18):

Turbo coupling approved for potentially explosive atmospheres yes / no

Commissioning was performed by:

after Oper. hrs.

Name:

Date:

Signature:

Commissioning - check step	Explanations	Completion notice
Checks prior to switching on the drive motor:		
Assembly/mounting check steps were carried out. Fill in the assembly check report.	Chapter 14.1	<input type="checkbox"/>
Removal of hex. screws (item 1942) and spacer sleeves (items 1943)	Chapters 8.5.3 and 8.6.4	<input type="checkbox"/>
Applies only to turbo couplings that are used in potentially explosive atmospheres: Check according to the marking whether the turbo coupling is approved for the use in potentially explosive atmospheres.	Chapter 6.2	<input type="checkbox"/>
Check of filling level / determination of number of screws "z" for filling	Chapter 10.2	<input type="checkbox"/> / z = screws
Fix a guard over the turbo coupling (for design, → Chapter 11).	Chapter 11	<input type="checkbox"/>
Check whether the machine was earthed with a grounding cable (16mm²).		<input type="checkbox"/>
Applies only to installations where overspeed is possible: Provide the unit with a device that reliably prevents overspeeds (e.g. brake or backstop).	Chapter 8.1	<input type="checkbox"/>
Determine the next standstill of coupling for maintenance services.	Chapter 13	<input type="checkbox"/>
Applies only when a BTS-Ex is used as temperature monitoring system: Make sure that the maximum permissible turbo coupling temperature is not exceeded when switching on the motor!	Chapter 2	<input type="checkbox"/>
Check of disks for deformation, fractures and cracks, as well as for flatness, freedom from distortion, homogeneity of pack.	Chapter 8.4.1, Chapter 13.2	<input type="checkbox"/>
Check of reference dimension of distance a / b.		<input type="checkbox"/> a min. <input type="checkbox"/> b min. <input type="checkbox"/> a max. <input type="checkbox"/> b max. <input type="checkbox"/> Δ a <input type="checkbox"/> Δ b
Check of foundation bolts.		<input type="checkbox"/>

Commissioning - check step	Explanations	Completion notice
Checks during the test run:		
Motor run-up is normal.		<input type="checkbox"/>
Turbo coupling is tight. Check of floor and environment for oil moistening, oil did not leak out.		<input type="checkbox"/>
Machine operation is normal.		<input type="checkbox"/>
Noises are normal.		<input type="checkbox"/>
Checks after switching off the drive motor:		
Turbo coupling is tight. Check of floor and environment for oil moistening, oil did not leak out.		<input type="checkbox"/>
Check of disks for deformation, fractures and cracks, as well as for flatness, freedom from distortion, homogeneity of pack.	Chapter 8.4.1, Chapter 13.2	<input type="checkbox"/>
Check of switch units for temperature monitoring ¹⁾, if applicable:		
Performance of a visual inspection.	1)	<input type="checkbox"/>
Removal of dust deposits.	1)	<input type="checkbox"/>
Check of electrical system.	1)	<input type="checkbox"/>

1) See separate operating manual / → Chapter 19

14.3 Maintenance report for general maintenance

Confirm the check or performance of the work by an "X" and/or enter the respective values.

Voith turbo coupling

Size / type (→ Chapter 18):

Serial No. (→ Chapter 18):

Turbo coupling approved for potentially explosive atmospheres yes / no

The maintenance work was performed by:

after Oper. hrs.

Name:

Date:

Signature:

Maintenance - check step	Explanations	Completion notice
Check for irregularities (every 500 h , every 3 months at the latest)		
- Turbo coupling is tight. Check of floor and environment for oil moistening, oil did not leak out.		<input type="checkbox"/>
- Machine operation is normal.		<input type="checkbox"/>
- Noises are normal		<input type="checkbox"/>
- Check of protective cover.	Chapter 11	<input type="checkbox"/>
- Check of foundation bolts.		<input type="checkbox"/>
Check for irregularities (every 12 / 6 / 4 months for 1 / 2 / 3-shift operation)		
- Check of disks for deformation, fractures and cracks, as well as for flatness, freedom from distortion, homogeneity of pack.	Chapter 8.4.1, Chapter 13.2	<input type="checkbox"/>
- Check of reference dimension of distance a / b.		<input type="checkbox"/> a min. <input type="checkbox"/> b min. <input type="checkbox"/> a max. <input type="checkbox"/> b max. <input type="checkbox"/> Δ a <input type="checkbox"/> Δ b
Only for type GPK-XP (with clamping hub): (every 12 / 6 / 4 months for 1 / 2 / 3-shift operation)		
- Check of tightening torque of tensioning screws (item 1946).	Chapter 3.3	<input type="checkbox"/>
Check of switch units for temperature monitoring ¹⁾ , if applicable (every 3 months)		
- Performance of a visual inspection.	1)	<input type="checkbox"/>
- Removal of dust deposits.	1)	<input type="checkbox"/>
- Check of electrical system (after 3 months , then every year).	1)	<input type="checkbox"/>
Operating fluid (every 15000 h)		
- Check of operating fluid.		<input type="checkbox"/>
- Determination of remaining operating time.		<input type="checkbox"/> / hours
- Change of operating fluid.	Chapter 10	<input type="checkbox"/>
Ball and roller bearings (for the intervals, → Chapter 2)		
- Replacement of ball and roller bearings.	Chapter 13.3.3	<input type="checkbox"/>
Cleaning of turbo coupling (after every contamination)		
- Cleaning was performed.	Chapter 13.1	<input type="checkbox"/>

1) See separate operating manual / → Chapter 19

15 Disassembly of Turbo Coupling

WARNING

Risk of injury

Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

- 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 that a re-start is absolutely impossible!

NOTICE

Damage to property

Disk pack is damaged due to improper fixing of the turbo coupling.

- If one or both hubs are removed, the weight of the turbo coupling needs to be borne by suitable slings (ropes, chains, etc.).

15.1 Preparation

Weight of turbo coupling
→ Cover sheet
Weights of more than 100 kg are stamped on the turbo coupling.

- Prepare suitable tools and lifting appliances.
Observe the turbo coupling weight!

WARNING

Risk of injury

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, → cover sheet),
 - sound condition.

**WARNING****Risk of injury**

Falling parts may seriously injure or kill you.

- Do not walk under suspended loads.

- Fix the turbo coupling to a suitable lifting appliance.

Lifting appliances
→ Chapter 7.4

15.2 Disassembly of type GPK (without clamping hub)

For disassembly, proceed according to → Chapter 0, in reverse order. Removal devices are not required as the turbo coupling can be installed and removed radially.

15.3 Reassembly of type GPK (without clamping hub)

Procedure for reassembly of the turbo coupling is described in → Chapter 8.5.

15.4 Disassembly of type GPK-XP (with clamping hub)

On account of the constructional features of the clamping hub system, the tensioning screws (item 1946) also serve a puller spindles.

Apply the respective torque to the initial loosening.

Then turn back all screws until there is a resistance.

Following that, apply increasing torque to the screws, one after the other, as described in → Chapter 8.6.4, until the clamping ring loosens.

15.5 Reassembly of type GPK-XP (with clamping hub)

Procedure for reassembly of the clamping hub is described in → Chapter 8.6. If a lack of lubricant is found on one of the surfaces marked with (V), relubrication with grease (for grease type → Chapter 8.3) becomes necessary.

Surface/point V
→ Chapter 8.6.3

SAFETY INFORMATION

Make sure that the joint surfaces (**W**) on the shaft and hub bore are clean (free from grease).

If there is a grease film on the joint surfaces, there is the risk of slipping with the consequence of friction heat.



16 Disposal

Disposal of the packaging

Dispose of packaging material according to the local regulations.

How to dispose of operating fluids

On disposal, please observe the applicable laws and the producer's or supplier's instructions.

How to dispose of the turbo coupling

Clean the turbo coupling carefully to ensure a purity of material.

Dismantle the turbo coupling, if necessary.

Dispose of the turbo coupling according to the local regulations.

For special information on the disposal of the substances and materials used, please see the following table:

Material / substance	Kind of disposal		
	Reuse	Residual waste	Special waste
Metals	x	-	-
Cables	x	-	-
Seals	-	x	-
Plastics	x ¹⁾	(x)	-
Operating media	-	-	x ^{1), 2)}
Packaging	x	-	-

Table 27

- 1) If possible
- 2) Disposal according to the safety data sheet or the manufacturer's instructions

17 Malfunctions - Remedial Actions

WARNING

Risk of injury
Please observe, in particular, → Chapter 6 (Safety) when working on the turbo coupling!

The following table is intended to help finding the cause of malfunctions or problems quickly and to take remedial action, if necessary.

Malfunction	Possible cause(s)	Remedial action	See
Starting behavior of driven machine is not as expected.	Turbo coupling is not filled with the correct quantity of operating fluid.	Check and correct the quantity filled in.	Chapter 10.1
	The operating conditions have changed.	Please consult Voith Turbo.	Chapter 18
Driven machine does not reach the specified speed.	Driven machine is blocked or overloaded.	Eliminate blocking or the cause of overload.	
	Turbo coupling is not filled with the correct quantity of operating fluid.	Check and correct the quantity filled in.	Chapter 10.1
Drive motor does not reach normal operation within the expected time.	Changeover from star to delta too late.	Changeover from star to delta should be made after 2...5s at the latest.	
	Drive motor is electrically or mechanically not in order.	Have the drive motor checked by authorized personnel.	
Operating fluid leaks out of the turbo coupling.	A fusible plug responded due to overload (excess temperature).	Clarify the cause for the overload. Replace all fusible plugs and change the operating fluid.	Chapter 13.4

Malfunction	Possible cause(s)	Remedial action	See
Operating fluid leaks out of the turbo coupling.	The turbo coupling is leaky.	Eliminate the leak, check, in particular, tightening torques and seal rings of fusible and filler plugs as well as sight glasses and, if necessary, check the switching element of the thermal switch unit. If the leak cannot be eliminated, please consult Voith Turbo.	Chapter 3
			Chapter 18
An existing thermal monitoring unit (MTS, BTS or BTM) has responded.	The turbo coupling was overloaded.	Clarify the cause for the overload, and avoid another overload. Check and correct the quantity filled in.	Chapter 19 Chapter 10.2
	Thermal monitoring unit (MTS, BTS or BTM) is defective.	Check the monitoring unit.	Chapter 19
Uneven running of the machine (increased vibration).	Foundation fixing is loose.	Retighten the foundation fixing. Align the machine.	
	The machine is not aligned.	Align the machine.	Chapter 8.5.2 and 8.6.2
	Machine is not balanced.	Clarify the cause and eliminate the unbalance.	
	The disk packs of the connecting coupling are defective.	Replace the disk packs, consult Voith Turbo.	Chapter 13.2 Chapter 18
	Bearings are damaged.	Eliminate the bearing damage; consult Voith Turbo in case of a bearing damage on the turbo coupling.	Chapter 18
	Loose screw connections.	Check the coupling components for damages, and replace the same, if necessary. Check the alignment of the machine. Tighten the screws and bolts with the specified tightening torque.	Chapter 3

Please consult Voith Turbo (→ Chapter 18), in case of a malfunction which is not included in this table.

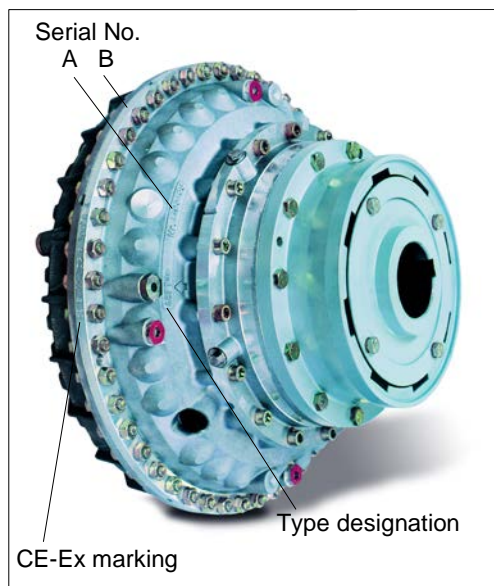
Table 28

18 Queries, Orders Placed for Service Engineers and Spare Parts

For

- Queries
- Ordering a service engineer
- Spare parts orders
- Commissionings

we need:



the **serial number** and **type designation** of the turbo coupling.

- You will find the serial number and type designation either on the outer wheel / coupling shell (A) or on the turbo coupling periphery (B).
- The serial number is stamped in with figure stamps.
- For turbo couplings, intended for the use in potentially explosive atmospheres, you will find the CE-Ex marking on the turbo coupling periphery.

Fig. 44

When placing an order for a **service engineer**, **commissioning** or a **service**, we need, in addition

- the turbo coupling installation site,
- the name and address of a contact person,
- details of the malfunction/problem occurred.

When placing a **spare parts order**, we need, in addition,

- the destination for the spare parts shipment.

Please contact the local Voith representative (outside business hours: the emergency hotline).

Representatives
→ Chapter 21

19 Temperature monitoring



SAFETY INFORMATION

The thermal switch units MTS and BTS can be used in potentially explosive atmospheres to monitor the temperature. The signals serve for pre-warning. The MTS or BTS do not limit the maximum surface temperature.

The BTS-Ex is available as safety device to limit the maximum surface temperature, and it can be used as thermal switch-off device.

Also in this case, it is not allowed to replace the existing fusible plugs by fusible plugs with different nominal response temperatures or by blind screws.

Never bypass safety devices!

DANGER

Electric shock

Electric voltage may kill or severely injure you

- A qualified electrician has to properly carry out the connection to the electric supply network considering the system voltage and the maximum power consumption!
- The system voltage has to be in conformity with the system voltage indicated on the nameplate!
- There has to be a corresponding electrical protection by a fuse on the network side.

The temperature in the turbo coupling can be monitored by means of a limit switch or a temperature instrument.

The following systems are available as limit switch:

- a mechanical MTS system
- an electronic BTS system

. These limit switches serve to monitor the temporarily permissible peak temperature, and to prevent a response of the fusible plugs provided the overload is eliminated promptly (e.g. by switching off the drive).

The BTM can be used as temperature measuring device. This way, not only the temporarily permissible peak temperature can be monitored, but also the nominal operation.

19.1 MTS mechanical thermal switch unit for pre-warning

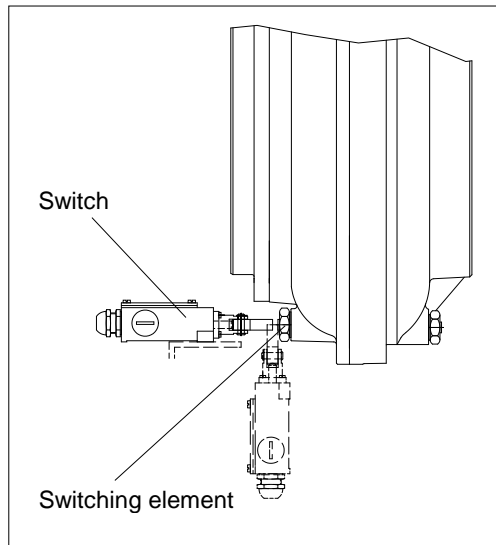


Fig. 45

Functioning:

On excess temperature, the switching element releases a pin. The pin activates a switch on coupling rotation. This signal, for example, may trip an alarm or switch off the drive motor. The switching element needs to be replaced.

In case of inner wheel drive and blocking of driven machine, the function is no longer guaranteed!

For the MTS, Operating Manual 3626-011800 is available at Voith Turbo. Or download it at www.voith.com/fluid-couplings.

The MTS is available for turbo couplings of all sizes.

For arrangement, see the table in → Chapter 13.4.1.

The switch is available in two designs:

- enclosed [protection IP 65],
- suitable for use in potentially explosive atmospheres
type of protection: Ex II 2G EEx d IIC T6 (PTB 03 ATEX 1067 X).
 Ex II 2D IP65 T 80 C (PTB 03 ATEX 1067 X).

For the BTS,
Operating Manual
3626-011500 is
available at Voith
Turbo.
Or download it at
www.voith.com/fluid-couplings

19.2 BTS non-contacting thermal switch unit

19.2.1 BTS non-contacting thermal switch unit for pre-warning

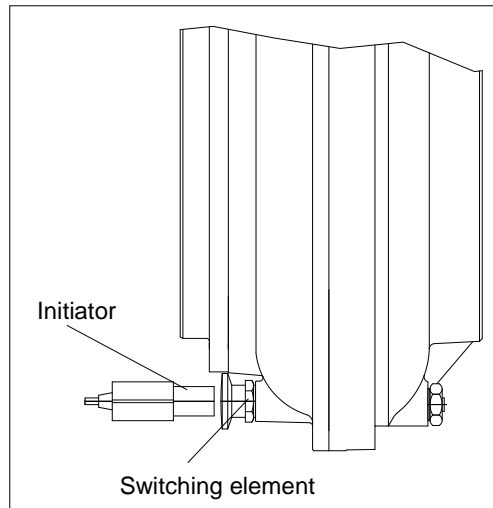


Fig. 46

Functioning:

On excess temperature, the switching element gives a specific signal to the initiator. This signal is transferred to an evaluator and may, for example,

- trigger an alarm
- or switch off the drive motor.

After the turbo coupling has cooled down, the switching element is again ready for service; it does not have to be replaced.

The BTS is provided for turbo couplings of all sizes.

For arrangement, see the table in → Chapter 13.4.1.

Switching element and initiator are

- cast in plastic,
 - insensitive to dirt,
 - suitable for use in potentially explosive atmospheres
- type of protection: Ex II 2G EEx ia IIC T6 (PTB 00 ATEX 2048 X).
 Ex II 1D Ex iaD 20 T... C (ZELM 03 ATEX 0128 X).



SAFETY INFORMATION

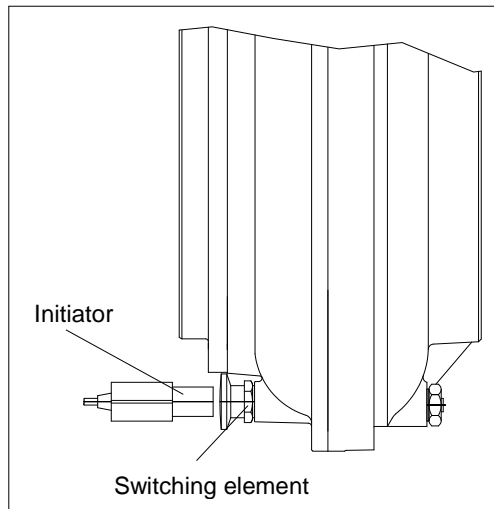
As the control circuit of the evaluator is **not** intrinsically safe, provide an appropriate isolating switch amplifier between evaluator and initiator!

- Isolating switch amplifier type KFD2-SOT2-Ex2 (24 V DC)
type of protection: Ex II (1) GD [EEx ia] IIC (PTB 00 ATEX 2035).
- Isolating switch amplifier type KFA6-SOT2-Ex2 (230 V AC)
type of protection: Ex II (1) G [EEx ia] IIC (PTB 98 ATEX 2164).

19.2.2 BTS-Ex non-contacting thermal switch unit for limiting the maximum surface temperature



For the BTS-Ex, Operating Manual 3626-019600 is available at Voith Turbo. Or download it at www.voith.com/fluid-couplings



Functioning:

On excess temperature, the switching element gives a specific signal to the initiator. This signal is sent to an isolating switch amplifier and has to enforce the switch-off of the drive motor.

Use a BTS-Ex approved by Voith for this application.

After the turbo coupling has cooled down, the switching element is again ready for service; it does not have to be replaced.

Fig. 47

The BTS-Ex is provided for turbo couplings of all sizes.

For arrangement, see the table in → Chapter 13.4.2.

The BTS-Ex is provided for use in potentially explosive atmospheres as per ATEX Directive in Equipment Group II, Equipment Category 2G and 2D (Ex II 2GD).

SAFETY INFORMATION

The BTS-Ex for limiting the maximum surface temperature is approved only in connection with the components supplied by Voith according to BTS-Ex operating manual.

Use of original Voith spare parts is imperative in case of a replacement demand.

The evaluator serves to transmit control commands from potentially explosive atmospheres into non-explosive areas and to safely isolate intrinsically safe and non-intrinsically safe circuits.

- Make sure not to exceed the maximum permissible temperature of the turbo coupling when switching on the motor.



Technical data
→ Chapter 2

For the BTM, Operating Manual 3626-019800 is available at Voith Turbo. Or download it at www.voith.com/fluid-couplings

19.3 BTM non-contacting thermal measuring device for pre-warning

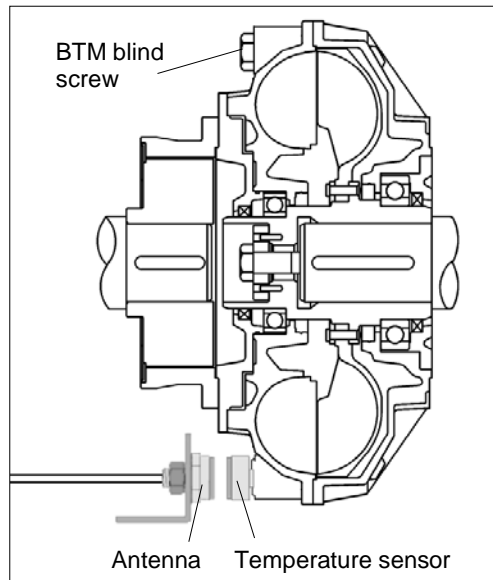


Fig. 48

Functioning:

The temperature sensor permanently transmits a measuring signal to the antenna. This signal is sent to an evaluator with 4 channels.

The measured temperatures of every channel are indicated on the evaluator. In addition, the measured temperatures are output as 4-20 mA signals.

Furthermore, two relay outputs are available per measuring channel with switching thresholds (e.g. pre-warning, switch-off) adjustable via the keyboard on the evaluator.

The BTM is provided for turbo couplings of all sizes.

For arrangement, see the table in → Chapter 13.4.1.



SAFETY INFORMATION

The BTM is not provided for use in potentially explosive areas as per ATEX Directive.

20 Spare parts information

SAFETY INFORMATION

Variety of variants

Considering the great variety, please find in the following only the basic design of turbo couplings with constant fill (connecting coupling type **GPK**).

- Spare parts must comply with the technical requirements determined by Voith. This is guaranteed when original spare parts are used. Installation and/or use of non-original spare parts may negatively change the mechanical properties of the **Voith turbo couplings**, and may thus impair safety. Voith is not liable for any damages resulting from the use of non-original spare parts.
 - You will find the type of your turbo coupling on the cover sheet of this operating manual.
 - Observe → Chapter 1.2 (type designation) and → Chapter 18 (Queries, Orders places for Service Engineers and Spare Parts).
 - The customer is only allowed to perform the following work:
 - Replacement of fusible pluts (item 0395 / 0260) (→ Chapter 13.4).
 - Work according to maintenance report (→ Chapter 14.3).
 - Change of operating fluid (→ Chapter 10).
 - Mounting of parts for which tightening torques are indicated (→ Chapter 3).
- All remaining work may be performed by Voith staff only.**

NOTICE

Unauthorized changes or retrofits are not allowed to be performed on the coupling!

Do not retrofit accessories or equipment originating from other manufacturers!

Any changes or conversions performed without the prior written consent of Voith Turbo will result in the loss of any warranty! Any claims will forfeit!

- Professional maintenance or repair can only be guaranteed by the manufacturer!

SAFETY INFORMATION

If the turbo coupling is used in potentially explosive atmospheres (as per ATEX Directive), the use of original parts that have been released for use in hazardous areas is allowed only.



20.1 Components overview - Voith turbo coupling 366 – 1150

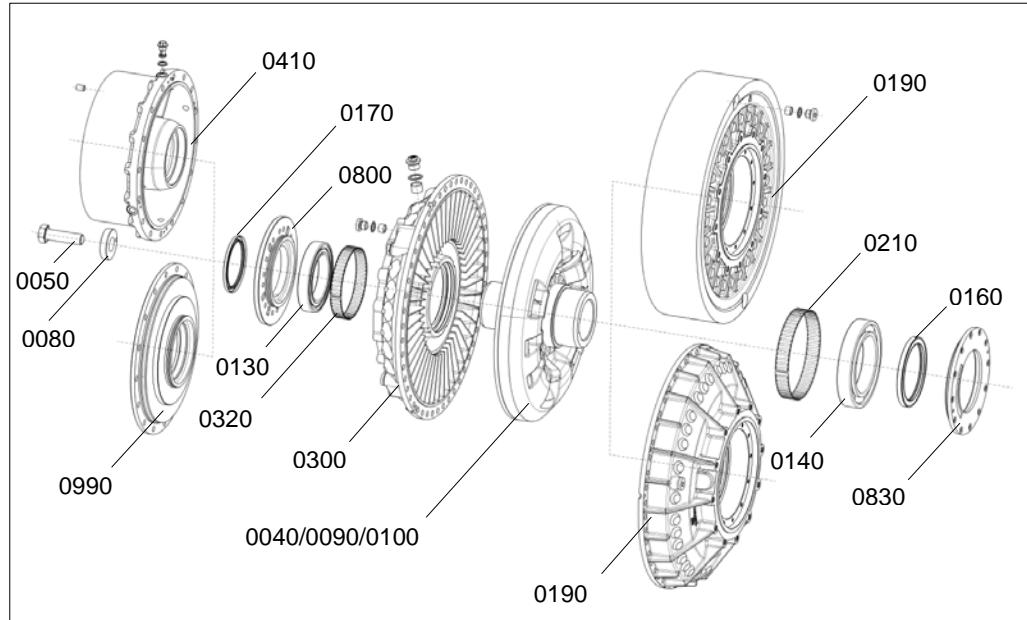


Fig. 49

Item No.	Description	Item No.	Description
0040	Coupling hub	0190	Coupling shell
0050	Fixing bolt	0210	Tolerance ring
0080	Holding disk	0300	Outer wheel
0090	Inner wheel	0320	Tolerance ring
0100	Riveting ring/threaded ring/clamping ring	0410	Delay chamber cover
0130	Grooved ball bearing	0800	Bearing support cover
0140	Grooved ball bearing	0830	Sealing ring cover
0160	Radial shaft sealing ring	0990	Connecting cover
0170	Radial shaft sealing ring		

Table 29

Spare parts for Voith turbo coupling, → Chapter 20.2.

20.2 Spare parts for Voith turbo coupling 366 – 1150

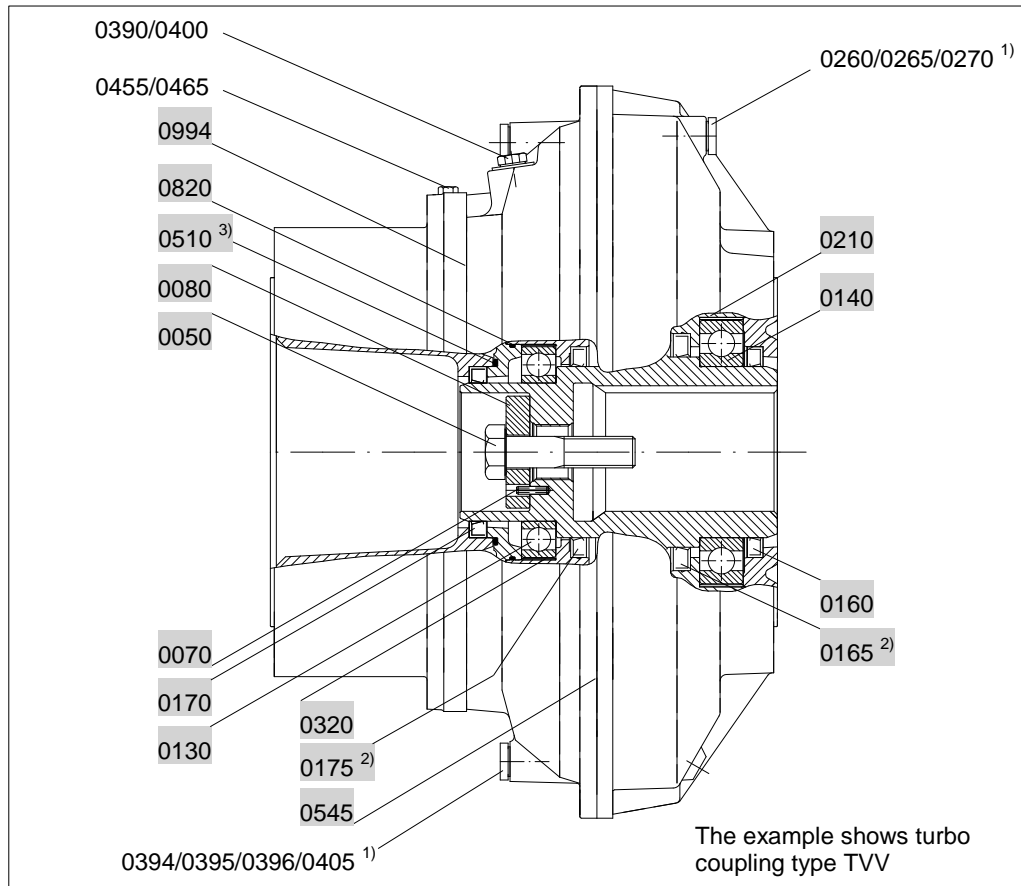


Fig. 50

- 1) For arrangement and quantity, see the tables → Chapter 13.4
- 2) Only for continuous operation or operating fluid 'water' (TW...).
- 3) For sizes 366 and 422 inserted in the delay chamber groove.

xxxx Nonrepairable items (→ the following table)

xxxxx Repair parts / wearing parts (V) (→ the following table)

Item No.	Nonrepairable items	Item No.	Repair parts / wearing parts (V)
0260	Fusible plug	0050	Fixing bolt
0265	Blind screw	0070	Roll pin
0270	Sealing ring	0080	Holding disk
0390	Filler plug	0130	Grooved ball bearing (V)
0394	Blind screw	0140	Grooved ball bearing (V)
0395	Fusible plug	0160	Radial shaft sealing ring (V)
0396	Sight glass	0165	Radial shaft sealing ring (V)
0400	Sealing ring	0170	Radial shaft sealing ring (V)
0405	Sealing ring	0175	Radial shaft sealing ring (V)
0455	Nozzle screw	0210	Tolerance ring (V)
0465	Sealing ring	0320	Tolerance ring (V)
		0510	O-ring (V)
		0545	Sealing tape (V)
		0820	O-ring (V)
		0994	Sealing tape (V)

Table 30

20.3 Spare parts for connecting coupling type GPK (without clamping hub)

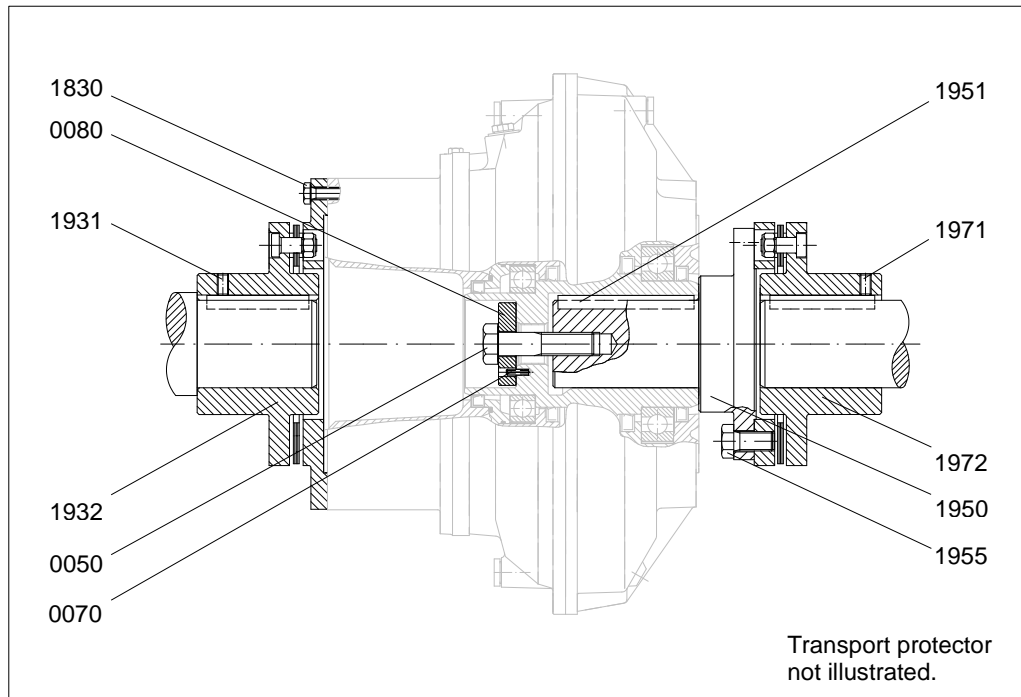


Fig. 51

Item No.	Screws and standard parts	Item No.	Connecting coupling parts
0050	Fixing bolt	0080	Holding disk
0070	Roll pin	1932	Input, assembly
1830	Hex. screw	1950	GPK stub shaft
1931	Set screw	1972	Output, assembly
1951	Key		
1955	Set of screws		
1971	Set screw		

Table 31

Item No.	Transport protector
1942	Hex. screw for transport protector
1943	Spacer sleeve for transport protector

Table 32

Transport protector
→ Chapter 8.5,
Chapter 8.5.3

20.4 Spare parts for connecting coupling type GPK-XP (with clamping hub)

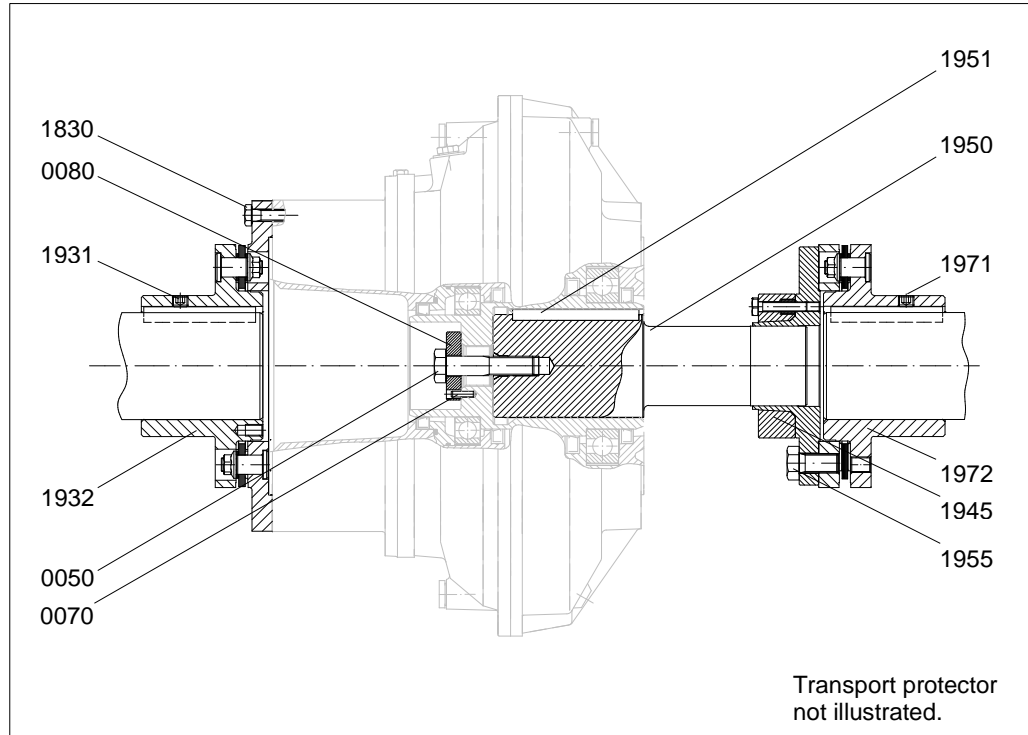


Fig. 52

Item No.	Screws and standard parts	Item No.	Connecting coupling parts
0050	Fixing bolt	0080	Holding disk
0070	Roll pin	1932	Input, assembly
1830	Hex. screw	1945	Clamping hub
1931	Set screw	1950	GPK stub shaft
1951	Key	1972	Output, assembly
1955	Set of screws		
1971	Set screw		

Table 33

Transport protector
→ Chapter 8.6,
Chapter 8.6.4

Item No.	Transport protector
1942	Hex. screw for transport protector
1943	Spacer sleeve for transport protector

Table 34

21 Representatives - Voith Turbo GmbH & Co. KG

Westeuropa:

Deutschland (VTCR):
Voith Turbo GmbH & Co. KG
Division Mining & Metals
Voithstr. 1

74564 CRAILSHEIM
GERMANY
Tel.: +49-7951 32-409
Fax: +49-7951 32-480
e-mail:
startup.components@voith.com
www.voith.com/fluid-couplings

Service:

Tel.: +49 7951 32-1020
Fax: +49 7951 32-554
e-mail:
vtcr-ait.service@voith.com
Notfall Hotline (24/7):
Tel.: +49 7951 32-599

Belgien (VTBV):
Voith Turbo S. A. / N. V.
Square Louisa 36
1150 BRÜSSEL
BELGIUM
Tel.: +32-2-7626100
Fax: +32-2-7626159
e-mail: voithturbo.be@voith.com

Dänemark (VTDK):

Voith Turbo A/S
Egegårdsvej 5
4621 GADSTRUP
DENMARK
Tel.: +45-46 141550
Fax: +45-46 141551
e-mail: postmaster@voith.dk

Färöer Inseln:
siehe Dänemark (VTDK)

Finnland (Masino):

Masino Oy
Kärkikuja 3
01740 VANTAA
FINLAND
Tel.: +358-10-8345 500
Fax: +358-10-8345 501
e-mail: sales@masino.fi

Frankreich (VTFV):
Voith Turbo S. A. S.
21 Boulevard du Champy-
Richardets
93166 NOISY-LE-GRAND
CEDEX
FRANCE
Tel.: +33-1-4815 6903
Fax: +33-1-4815 6901
e-mail: voithfrance@voith.com

Griechenland:
siehe Deutschland (VTCR)

Grönland:
siehe Dänemark (VTDK)

Großbritannien (VTGB):
Voith Turbo Limited
6, Beddington Farm Road
CRO 4XB CROYDON, SURREY
GREAT BRITAIN
Tel.: +44-20-8667 0333
Fax: +44-20-8667 0403
e-mail: Turbo.UK@voith.com
Notfall Hotline (24/7):
Tel.: +44-20-8667 0333

Irland:
siehe Großbritannien (VTGB)

Italien (VTIV):
Voith Turbo s.r.l.
Via G. Lambrakis 2
42122 REGGIO EMILIA
ITALY
Tel.: +39-05-2235-6714
Fax: +39-05-2235-6790
e-mail: info.voithturbo@voith.com

Liechtenstein:
siehe Deutschland (VTCR)

Luxemburg:
siehe Belgien (VTBV)

Niederlande (VTNT):
Voith Turbo B.V.
Koppelstraat 3
7391 AK TWELLO
THE NETHERLANDS
Tel.: +31-571-2796-00
Fax: +31-571-2764-45
e-mail:
voithnederland@voith.com

Norwegen (VTNO):
Voith Turbo AS
Lahaugmoveien 30A
2013 SKJETTEN
NORWAY
Tel.: +47 6384 7020
Fax: +47 6384 7021
e-mail:
info.turbo.norway@voith.com

Österreich:
Indukont Antriebstechnik GmbH
Badenerstraße 40
2514 TRAIKIRCHEN
AUSTRIA
Tel.: +43-2252-81118-22
Fax: +43-2252-81118-99
e-mail: info@indukont.at

Portugal:
siehe Spanien (VTEV)

Schweden (VTSN):
Voith Turbo AB
Finspångsgatan 46
16353 SPÅNGA-STOCKHOLM
SWEDEN
Tel.: +46-8-564-755-50
Fax: +46-8-564-755-60
e-mail:
voithturbo.sweden@voith.com

Schweiz:
siehe Deutschland (VTCR)

Spanien (VTEV):
Voith Turbo S. A.
Avenida de Suiza 3
P.A.L. Coslada
28820 COSLADA (MADRID)
SPAIN
Tel.: +34-91-6707816
Fax: +34-91-6707841
e-mail:
voithturboSpain@voith.com

Osteuropa:

Albanien:
siehe Ungarn (VTHU)

Bosnien-Herzegowina:
siehe Ungarn (VTHU)

Bulgarien:
siehe Ungarn (VTHU)

Estland:
siehe Polen (VTPL)

Kosovo:
siehe Ungarn (VTHU)

Kroatien:
siehe Ungarn (VTHU)

Lettland:
siehe Polen (VTPL)

Litauen:
siehe Polen (VTPL)

Mazedonien:
siehe Ungarn (VTHU)

Polen (VTPL):
Voith Turbo sp.z o.o.
Majków Duży 74
97-371 WOLA
KRZYSZTOPORSKA
POLAND
Tel.: +48-44 646 8848
Fax: +48-44-646 8520
e-mail:
voithturbo.polska@voith.com

Notfall Hotline (24/7):
Tel.: +48-44 646 8519

Rumänien (VTRO):
Voith Turbo S.R.L.
Strada Barbu Vacarescu nr. 13
etaj 3 si 4
020271 BUCHAREST
ROMANIA
Tel.: +40-31-22 36100
Fax: +40-31-22 36210
e-mail:
voith.romania@voith.com

Russland (VTRU):
Voith Turbo O.O.O.
Branch Office Moskau
Nikolo Yamskaya ul. 21/7, str. 3
109240 MOSKAU
RUSSIA
Tel.: +7 495 915-3296 ext. 122
Fax: +7 495 915-3816
Mobil Herr Balanzev:
+7 919 108 2468
e-mail:
voithmoscow@Voith.com

Voith Turbo
Branch Office Novokusnetsk
(Shcherbinin, Anatoliy)
Skorosnaya ul. 41, Liter B1
654025 NOVOKUSNETSK
Kemerovskaya oblast
RUSSIA
Tel./Fax: +7 3843 311 109
Mobil: +7 9132 802 110
e-mail: voith22@bk.ru

Serbien:
siehe Ungarn (VTHU)

Slowakische Rep.:
siehe Tschechien (VTCZ)

Slowenien:
siehe Ungarn (VTHU)

Tschechien (VTCZ):
Voith Turbo s.r.o.
Hvezdoslavova 1a
62700 BRNO
CZECH REPUBLIC
Tel.: +420-543-176163
Fax: +420-548-226051
e-mail: info@voith.cz

Ukraine (VTUA):
Voith Turbo Ltd.
Degtyarivska Str. 25, Building 1
04119 KIEV
UKRAINE
Tel.: +380-44-581 4760
Fax: +380-44-581 4761
e-mail:
Dmitriy.Kalinichenko@Voith.com

siehe auch Polen (VTPL)

Ungarn (VTHU):
Voith Turbo Kft.
Felvég Útca 4
2051 BIATORBÁGY
HUNGARY
Tel.: +36-23-312 431
Fax: +36-23-310 441
e-mail: vthu@voith.com

Nordamerika:

Kanada (VTC):
Voith Turbo Inc.
171 Ambassador Drive, Unit 1
L5T 2J1 MISSISSAUGA,
ONTARIO
CANADA
Tel.: +1-905-670-3122
Fax: +1-905-670-8067
e-mail: Info@voithusa.com

Notfall Hotline (24/7):
Tel.: +1-905-738-1829

Mexico (VTX):
Voith Turbo S.A. de C.V.
Alabama No.34
Col. Nápoles Delg. Benito Juarez
C.P. 03810 MÉXICO, D.F.
MÉXICO
Tel.: +52-55-5340 6970
Fax: +52-55-5543 2885
e-mail: vtx-info@voith.com

USA (VTI):
Voith Turbo Inc.
25 Winship Road
YORK, PA 17406-8419
UNITED STATES
Tel.: +1-717-767 3200
Fax: +1-717-767 3210
e-mail:
VTI-Information@voith.com

Notfall Hotline (24/7):
Tel.: +1-717-767 3200
e-mail:
VTIServiceCenter@vti.com

Süd- + Mittelamerika:

Brasilien (VTPA):
Voith Turbo Ltda.
Rua Friedrich von Voith 825
02995-000 JARAGUÁ, SÃO PAULO - SP
BRAZIL
Tel.: +55-11-3944 4393
Fax: +55-11-3941 1447
e-mail:
info.turbo-brasil@voith.com

Notfall Hotline (24/7):
Tel.: +55-11-3944 4646

Chile (VTCI):
Voith Turbo S. A.
Av. Pdte.Eduardo Frei Montalva
6115
8550189 SANTIAGO DE CHILE (CONCHALI)
CHILE
Tel.: +56-2-944-6900
Fax: +56-2-944-6950
e-mail:
VoithTurboChile@voith.com

Ecuador:
siehe Kolumbien (VTKB)

Kolumbien (VTKB):
Voith Turbo Colombia Ltda.
Calle 17 No. 69-26
Centro Empresarial Montevideo
110931 BOGOTÁ, D.C.
COLOMBIA
Tel.: +57 141-17664
Fax: +57 141-20590
e-mail:
voith.colombia@voith.com

Peru (VTPE):
Voith Turbo S.A.C.
Av. Argentina 2415
LIMA 1
PERU
Tel.: +51-1-6523014
e-mail:
Lennart.Kley@Voith.com

siehe auch Brasilien (VTPA)

Venezuela:
siehe Kolumbien (VTKB)

Afrika:

Ägypten:
Copam Egypt
33 El Hegaz Street,
W. Heliopolis
11771 CAIRO
EGYPT
Tel.: +202-22566 299
Fax: +202-22594 757
e-mail: copam@datum.com.eg

Algerien:
siehe Frankreich (VTFV)

Botswana:
siehe Südafrika (VTZA)

Elfenbeinküste:
siehe Frankreich (VTFV)

Gabun:
siehe Frankreich (VTFV)

Guinea:
siehe Frankreich (VTFV)

Lesotho:
siehe Südafrika (VTZA)

Marokko (VTCA):
Voith Turbo S.A.
Rue Ibnou El Koutia, No. 30
Lot Attawfiq - Quartier Oukacha
20250 CASABLANCA
MOROCCO
Tel.: +212 522 34 04 41
Fax: +212 522 34 04 45
e-mail: allal.elfassi@voith.ma

Mauretanien:
siehe Spanien (VTEV)

Mozambique:
siehe Südafrika (VTZA)

Namibia:
siehe Südafrika (VTZA)

Niger:
siehe Frankreich (VTFV)

Senegal:
siehe Frankreich (VTFV)

Südafrika (VTZA):
Voith Turbo Pty. Ltd.
16 Saligna Street
Hughes Business Park
1459 WITFIELD, BOKSBURG
SOUTH AFRICA
Tel.: +27-11-418-4000
Fax: +27-11-418-4080
e-mail: info.VTZA@voith.com

Notfall Hotline (24/7):
Tel.: +27-11-418-4060

Swaziland:
siehe Südafrika (VTZA)

Tunesien:
siehe Frankreich (VTFV)

Zambia:
siehe Südafrika (VTZA)

Zimbabwe:
siehe Südafrika (VTZA)

Naher- +

Mittlerer Osten:

Bahrain:

siehe Vereinigte Arabische
Emirate (VTAE)

Irak:

siehe Vereinigte Arabische
Emirate (VTAE)

Iran (VTIR):

Voith Turbo Iran Co., Ltd.
1st Floor, No. 215
East -Dastgerdi Ave.
Modares Highway
19198-14813 TEHRAN
IRAN
Tel.: +98-21-2292 1524
Fax: +98-21-2292 1097
e-mail: voithturbo.iran@voith.ir

Israel (VTIL):

Voith Turbo Israel Ltd.
Tzvi Bergman 17
Segula Ind. Zone
49279 PETACH-TIKVA
ISRAEL
Tel.: +972-3-9131 888
Fax: +972-3-9300 092
e-mail: TPT.Israel@voith.com

**Jemen,
Jordanien,
Kuwait,
Libanon,
Oman,
Qatar,
Saudi Arabien,
Syrien:**

siehe Vereinigte Arabische
Emirate (VTAE)

Türkei (VTTR):

Voith Turbo Güç Aktarma Tekniği
Ltd. Şti.
Armada İş Merkezi Eskişehir
Yolu No: 6 A-Blok Kat: 13
06520 SÖĞÜTÖZÜ-ANKARA
TURKEY
Tel.: +90 312 495 0044
Fax: +90 312 495 8522
e-mail: voith-turkey@voith.com

**Vereinigte Arabische Emirate
(VTAE):**

Voith Middle East FZE
P.O.Box 263461
Plot No. TP020704
Technopark, Jebel Ali
DUBAI
UNITED ARAB EMIRATES
Tel.: +971-4 810 4000
Fax: +971-4 810 4090
e-mail:
voith-middle-east@voith.com

Australien:

Australien (VTAU):

Voith Turbo Pty. Ltd.
Building 2,
1-47 Percival Road
2164 SMITHFIELD NSW
AUSTRALIA
Tel.: +61-2-9609 9400
Fax: +61-2-9756 4677
e-mail: vtausydney@voith.com
Notfall Hotline (24/7):
Tel.: +61-2-9609 9400
e-mail:
vtau_spare_parts@voith.com

Neuseeland (VTNZ):

Voith Turbo NZ Pty. Ltd.
295 Lincoln Rd.
Waitakere City
0654 AUCKLAND
NEW ZEALAND
Tel.: +11 64 9838 1269
Fax: +11 64 9838 1273
e-mail: VTNZ@voith.com

Südostasien:

Brunei:

siehe Singapur (VTSG)

Bangladesh:

siehe Singapur (VTSG)

Indien (VTIP):

Voith Turbo Private Limited
Transmissions and Engineering
P.O. Industrial Estate
**500 076 NACHARAM-
HYDERABAD**
INDIA
Tel.: +91-40-2717 3561+3592
Fax: +91-40-27171 141
e-mail: info@voithindia.com
Notfall Hotline (24/7):
Tel.: +91-99-4906 0122
e-mail: vtip.service@voith.com

Indonesien (VTID):

PT Voith Turbo
Jl. T. B. Simatupang Kav. 22-26
Talavera Office Park
28th Fl.
12430 JAKARTA
INDONESIA
Tel.: +62 21 7599 9848
Fax: +62 21 7599 9846

Malaysia:

siehe Singapur (VTSG)

Myanmar:

siehe Singapur (VTSG)

Philippinen:

siehe Singapur (VTSG)

Singapur (VTSG)

Voith Turbo Pte. Ltd.
10 Jalan Lam Huat
Voith Building
737923 SINGAPORE
SINGAPORE
Tel.: +65-6861 5100
Fax: +65-6861-5052
e-mail:
sales.singapore@voith.com

Thailand:

siehe Singapur (VTSG)

Vietnam:

siehe Singapur (VTSG)

Ostasien:**China:**

siehe Hongkong (VTEA)

Voith Turbo Power Transmission
(Shanghai) Co., Ltd. (VTCT)
Beijing Branch
18 Floor, Tower F, Phoenix Place
5A Shuguang Xili, Chaoyang
District

100028 BEIJING

P.R. CHINA

Tel.: +86-10-5665 3388

Fax: +86-10-5665 3333

e-mail:

VT_Industry_China@Voith.com

Voith Turbo Power Transmission
(Shanghai) Co. Ltd. (VTCN)
Representative Office Shanghai
No. 265, Hua Jin Road
Xinzhuang Industry Park
201108 SHANGHAI

P.R. CHINA

Tel.: +86-21-644 286 86

Fax: +86-21-644 286 10

e-mail: VTCN@Voith.com**Service Center (VTCT):**

Voith Turbo Power Transmission
(Shanghai) Co. Ltd.
Taiyuan Branch
No. 36 Workshop, TISCO,
No. 73, Gangyuan Road
030008 TAIYUAN, SHANXI

P.R. CHINA

Tel.: +86 351 526 8890

Fax: +86 351 526 8891

e-mail:

VT_Industry_China@Voith.com**Notfall Hotline (24/7):**

Tel.: +86 21 4087 688

e-mail:

Hongjun.Wang@voith.com**Hongkong (VTEA):**

Voith Turbo Ltd.

908, Guardforce Centre,

3 Hok Yuen Street East,

HUNGHOM, KOWLOON

HONG KONG

Tel.: +85-2-2774 4083

Fax: +85-2-2362 5676

e-mail: voith@voith.com.hk**Japan (VTFC):**

Voith Turbo Co., Ltd.

9F, Sumitomo Seimei Kawasaki Bldg.

11-27 Higashida-chou, Kawasaki-Ku,

Kawasaki-Shi,

210-0005 KANAGAWA

JAPAN

Tel.: +81-44 246 0555

Fax: +81-44 246 0660

e-mail: Satoshi.Masuda@Voith.com**Korea (VTKV):**

Voith Turbo Co., Ltd.

Room No. 1717, Golden Tower

Officetel 191

Chungjung-Ro 2-Ka

Seodaemooon-Ku

120-722 SEOUL

SOUTH KOREA

Tel.: +82-2-365 0131

Fax: +82-2-365 0130

e-mail: sun.lee@voith.com**Macau:**

siehe Hongkong (VTEA)

Mongolei (VTA-MON):

Voith Turbo GmbH & Co. KG

2nd Floor Serkh Bogd Co. Ltd.

Office Building United Nations

Street 4, Khoroo Chingeltei District

ULAANBAATAR

MONGOLIA

Tel.: +976 7010 8869

e-mail: Daniel.Bold@Voith.com**Taiwan (VTTI):**

Voith Turbo Co. Ltd.

Taiwan Branch

No. 3 Taitang Road,

Xiaogang District.

81246 KAOHSIUNG

TAIWAN, R.O.C.

Tel.: +886-7-806 1806

Fax: +886-7-806 1515

e-mail: sue.ou@voith.com

22 Index

A

Accident, What to do in case of an accident	31
Alignment	56
As delivered condition	36

B

Bearing lubrication	90
Bearings	90
Blocking	34
BTM	112
BTS	110
BTS-Ex	111

C

Catch pan	30
Check of alignment	69
Check report	97
Clamping hub	52, 61
Commissioning	82
Commissioning report	99
Components overview	114
Connecting coupling types GPK and GPK-XP	90
Constructional examples	10

D

Data, additional	15
Declaration of incorporation	20, 21
Direction of rotation	84
Disassembly	102
Displacement values	55, 64
Draining	
Horizontal position with delay chamber	81
Horizontal position without delay chamber	81

E

Electrical components	28
-----------------------	----

F

Fastening screw	19
Filling the turbo coupling	79
Fire hazard	30
Fire point	72

Flash point	72
Function	7
Functioning of GPK	46
Fusible plugs	33, 36, 91
Fusible plugs for normal use	93
Fusible plugs suitable for use in potentially explosive atmospheres	94

G

Grease, Requirements	76
Greases, proposed greases	77

I

Information as to dangerous situations	26
Installation and alignment	46, 85, 87, 96, 102, 105
Intended use	25

K

Keys	49
------	----

L

Laid lengths	62
Level check	80
Lifting	38
Lifting appliances	38

M

Maintenance	86
Bearings	90
Fusible plugs	91
Maintenance report	101
Maintenance schedule	87
Malfunction - remedy	105
Manufacturer's declaration	20, 21
Methane content, Check of methane content	30
Mineral oils	72
Monitoring devices	34
BTM	112
BTS	110
BTS-Ex	111
MTS	109
Mounting	51

Mounting and alignment for version without clamping hub	52
Mounting and alignment of version with clamping hub	61
MTS	109
Multi-motor drive	84

N

Noise	27
-------	----

O

Oil list	73
Operating fluid	32
Operating fluids	36
Proposed operating fluids	73
Requirements	72, 74
water	75
Operation	85, 96, 102
Order	107
Ordering a service engineer	107
Overload	34

P

Packaging	44
Pour point	72
Power transmission	31
Preparation	48, 102
Preservation	44
Product monitoring	35

Q

Qualification	35
Queries	107

R

Re-lubrication	91
Remaining risks	31
Repair	113
Replacement of bearings	91
Report / Protocol	97, 99, 101
Representatives	119

S

Safety	24
Safety information	24
Scope of supply	36
Sealing material for an operating temperature above 100 °C	72
Selection and qualification of staff	35
Serial No.	107
Servicing, Maintenance	86
Sound pressure level	27
Spare parts	22
Spare parts for connecting coupling type GPK (without clamping hub)	117
Spare parts for connecting coupling type GPK-XP (with clamping hub)	118
Spare parts for Voith turbo coupling	115
Spare parts information	113
Spare parts orders	107
Star / delta connection	84
Starting characteristic	32
Storage	36
Structural modifications	26, 29
Switching off in case of turbo coupling overload	34

T

Technical data	14
Temperature monitoring	14
Tightening torques	18, 19
Tools	47
Transport	36, 37
Transport protectors	117, 118
Turbo coupling installation	57, 67
Type designation	9

U

Unintended use	26
----------------	----

W

Warming up	27, 32
What to do in case of accidents	31
Working on the turbo coupling	26

Voith Turbo GmbH & Co. KG
Division Mining & Metals
Voithstr. 1
74564 Crailsheim, GERMANY
Tel. + 49 7951 32 409
Fax + 49 7951 32 480
startup.components@voith.com
www.voith.com/fluid-couplings

VOITH
Engineered Reliability