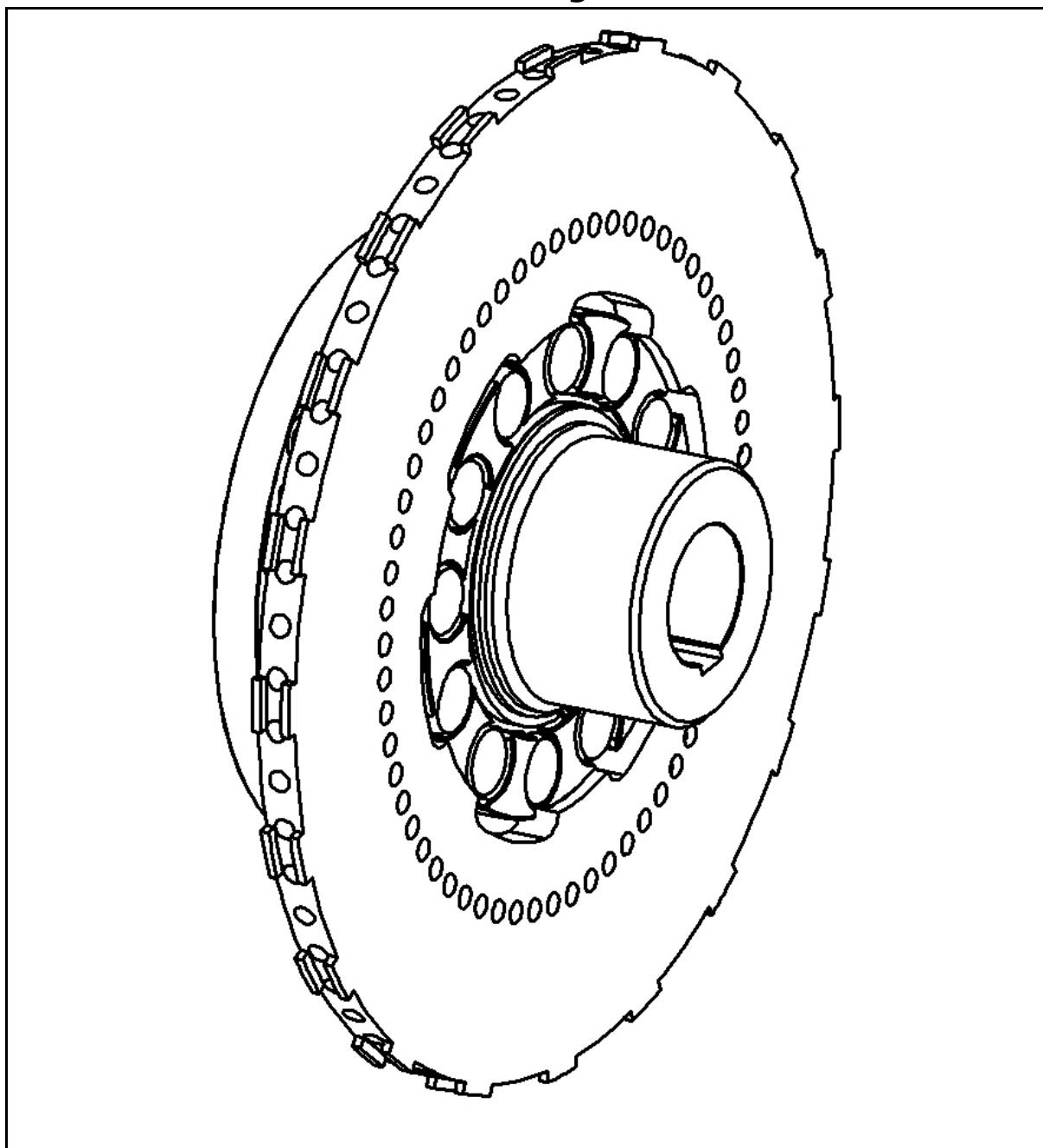




# tz-Claw Coupling

- SSV/SP (Simplex)
- torsionally Flexible



## Table of Contents

Index.....	2
Particular Safety Instructions and Symbols Used.....	4
1 General Information.....	5
1.1 Foreword, General Notes.....	5
1.1.1 Intended Use.....	5
1.1.2 Instructions and Notes for the Use of the Product in Explosive Atmospheres.....	6
1.2 General Safety Instructions.....	6
1.2.1 Work on the torsionally flexible tz-claw coupling SSV/SP.....	6
1.2.2 Protection against Rotating Parts.....	7
1.2.3 Protection against Thermal Radiation.....	7
1.2.4 Handling of Oils and Greases.....	7
1.2.5 Transportation, Assembly and Disassembly.....	7
1.2.6 Personnel.....	7
1.2.7 Operation, Maintenance and Servicing.....	8
1.2.8 Protection of the Environment.....	8
1.2.9 Residual Hazard.....	8
1.3 General Information.....	9
1.4 Device description.....	10
1.4.1 Design Size 230 to 360.....	10
1.4.2 Design Size 545.....	11
1.4.3 Operating Principle.....	11
1.4.4 Dimensions.....	12
1.4.5 Approximate Determination of the Coupling Size.....	13
1.4.6 Elastomer buffer ring.....	13
1.4.6.1 General Information on the elastomer buffer ring.....	13
1.4.6.2 VKB and VKG Buffer Rings.....	13
1.4.6.3 VKR Buffer Rings.....	13
2 Installation.....	14
2.1 To be Observed Prior to Installation.....	14
2.2 Assembling the torsionally flexible tz-claw coupling SSV/SP.....	14
2.3 Aligning the torsionally flexible tz-claw coupling SSV/SP.....	15
2.3.1 Angular Alignment.....	15
2.3.2 Radial Alignment.....	16
2.3.3 Axial Alignment.....	17
3 Commissioning.....	18
4 Service.....	19
4.1 Maintenance.....	19
4.1.1 Wear Inspection of the Elastomer Buffer Rings.....	19
4.1.2 Wear Inspection while the Overall Plant is at a Standstill.....	20
4.1.3 Servicing works and Transportation of Spare Parts.....	21
4.1.4 Storage of Elastomer Buffer Rings and Coupling Parts.....	21
4.1.5 Replacing the Elastomer Buffer Ring Size 230 to 360.....	22
4.1.6 Replacing the Elastomer Buffer Ring Size 545.....	22
4.1.7 Spare parts.....	23
4.2 Operation Faults and Possible Causes.....	24
4.3 Repair and inspection.....	25
4.4 Warnings.....	25
4.5 Safety Instructions.....	25

## Index of Illustrations

Figure 1: Torsionally Flexible Claw Coupling SVV/SP size 230 to 360.....	10
Figure 2: Torsionally Flexible Claw Coupling SVV/SP Size 545.....	11
Figure 3: Dimensions.....	12
Figure 4: Angular Alignment.....	15
Figure 5: Radial Alignment.....	16
Figure 6: Axial Alignment.....	17
Figure 7: Wear Inspection.....	20

## Index of Tables

Table 1: Symbols Used.....	4
Table 2: Handling of Oils and Greases.....	7
Table 3: General Information.....	9
Table 4: Dimensions.....	12
Table 5: Approximate Determination of the Coupling Size.....	13
Table 6: Angular Alignment - Dimensions.....	16
Table 7: Radial Alignment - Dimensions.....	17
Table 8: Wear Dimensions.....	20
Table 9: Spare Parts.....	23
Table 10: Operation Faults.....	24

## Index of Annexes

Marking.....	26
--------------	----

## Particular Safety Instructions and Symbols Used

In the following operating manual, concrete safety instructions are provided to advise against unavoidable residual hazards involved in the operation of the device. These residual hazards include danger posed to:

- persons
- product and machines
- environment

The symbols used in this operating manual are primarily intended to draw attention to the safety instructions!

The most important objective of the safety instructions is to avoid damage to persons. The respective symbol used cannot replace the text of the safety instructions. Therefore, the text must always be read completely!





<p>This symbol shows that dangers to persons are primarily to be expected. (Danger of death, risk of injury)</p>	
<p>This symbol shows that dangers regarding hand injuries are primarily to be expected.</p>	
<p>This symbol shows that dangers regarding hand injuries from hot surfaces are primarily to be expected.</p>	
<p>This symbol warns of dangers that can affect the explosion protection or cause a danger of explosion.</p>	

Table 1: Symbols Used

# 1 General Information

## Copyright

Tüschen & Zimmermann holds the copyright for all documents bearing the signature of Tüschen & Zimmermann (tz) and which you received together with the product or otherwise from Tüschen & Zimmermann. Such documents may neither be made available to third parties nor otherwise improperly used without the prior written approval by Tüschen & Zimmermann.

## In-house Use of the Documentation

Tüschen & Zimmermann allows you to use the documentation only for your own in-house use.

## 1.1 Foreword, General Notes

This installation and operating manual is intended to aid you in safely, correctly and economically using the torsionally flexible tz-claw coupling SSV/SP. Observing the instructions given in this manual will help you

- to increase the reliability and service life of the brake system,
- avoid dangers,
- avoid repairs and downtimes.

This manual must be kept at hand at all times while installation, maintenance and repair works are carried out and it must be read and observed by every person carrying out work on the brake system.

The torsionally flexible tz-claw coupling SSV/SP has been built in accordance with state-of-the-art technology and in compliance with the generally accepted regulations on technical safety. Nevertheless, there still may be possible risks to the life and limb of the user or third persons and/or risks of damage to the machine or other property if the product is used or handled incorrectly.

In addition to this operating manual, the relevant country-specific statutory provisions and regulations on accident prevention must be observed. Comply with the safety and accident prevention regulations of

- the mine,
- the mining authority,
- the Bergbauberufsgenossenschaft (professional mining association) or other competent professional associations.

Furthermore, read attentively and carefully the operating manual on the components required for the operation, such as those belonging to the gearbox, the electric motor, the conveyor, etc. Clarify any questions that may arise before starting work.

The manufacturer reserves the right to make changes to improve the product properties without providing any particular announcement.

### 1.1.1 Intended Use

**Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .**

The torsionally flexible tz-claw coupling SSV/SP is solely intended to connect gearbox and motor shafts that are almost in alignment.

Any different use or use in excess of this is not regarded as intended use.

The coupling is suitable for operation in potentially explosive atmospheres under RL 2014/34/EC. The coupling is classified for device groups I and II in device categories 2 and 3, and hence for use in zones where explosive atmospheres can occur as a result of gases, vapours or dust-air mixes. The temperature classes are dependent on the maximum permitted ambient temperatures in the vicinity of the coupling, at 80°C, 45°C and 30°C for T4, T5 and T6. This applies on the condition that the temperature of the machine shaft also does not exceed these values during operation.



In order to ensure the long and trouble-free operation of the coupling, the coupling must be designed with an operating factor that is appropriate to the operating conditions, in compliance with the design specifications, e.g. DIN 740, Part 2 (or also the tz data sheet).

Apart from drilling a finish-bore with a keyway, no other changes to the coupling are permitted.

The coupling must only be used and operated within the framework of the conditions specified in the service and delivery contract.

Each change to the operating conditions or operating parameters necessitates the review and verification of the coupling design.

Intended use also includes compliance with this operating manual and adherence to the inspection and maintenance instructions and/or intervals and the measures of the relevant ATEX regulations.

**The measures are within the operator's area of responsibility and must be verified by the installation company of the plant.**

Damage resulting from any use other than the intended use shall not be the responsibility of the manufacturer. The risk is solely borne by the user/operator. Spare parts must comply with the technical requirements stipulated by tz. This is always ensured when original spare parts are used as they are subject to continuous quality control.

## 1.1.2 Instructions and Notes for the Use of the Product in Explosive Atmospheres

- The devices may be installed in underground mines for the danger zone "potentially explosive atmosphere" according to DIN EN 1127-2 (required design of the device according to Group I, Category M2) and must be included in the cut-off circuit in case of a CH4 hazard.
- The EC type examination certificates and any 'special instructions', which may be contained in these certificates must be complied with.
- The applicable installation and assembly regulations must be complied with.

### **ATTENTION!**

**The torsionally flexible tz-claw coupling SSV/SP is an aluminium/steel combination. Aluminium and steel parts are not allowed to collide in potentially explosive atmospheres. The particular conditions during the operation, maintenance, servicing and transport of the product must be strictly observed.**



## 1.2 General Safety Instructions

### 1.2.1 Work on the torsionally flexible tz-claw coupling SSV/SP

#### **DANGER!**

While working on the torsionally flexible tz-claw coupling SSV/SP, make sure that the drive motor and driven machines are at a standstill and that they cannot be accidentally started again under any circumstances.



### 1.2.2 Protection against Rotating Parts

**WARNING!**

The torsionally flexible tz-coupling must be secured by the customer with suitable protective devices (at least IP2X) in order to exclude all risk of physical contact with the operator.



### 1.2.3 Protection against Thermal Radiation

**CAUTION!**

Depending on the application, the temperatures at the tz-coupling of the plant as well as in its vicinity can reach up to 150°C during operation. Appropriate measures must be taken by the customer in order to prevent contact with hot parts.



### 1.2.4 Handling of Oils and Greases

**ATTENTION!**

Follow the applicable safety regulations when handling oils, greases and other chemical substances.



Skin contact:	Avoid longer and repeated contact; after contact clean affected part of the body with soap and water. Use skin protection products during work. Possibly wear oil-resistant protective clothing (e.g. safety gloves, safety goggles). Do not wash hands with petroleum, solvents or emulsions.
Eye contact:	Rinse eyes with plenty of water. If eye irritation remains, seek medical advice.
Ingestion:	Do not induce vomiting. Seek medical aid immediately.
Environment:	The environment can be polluted by operating media. Therefore, they must not get into air, soil or water.
Safety data sheets:	They contain details on health, accident and environmental protection and can be obtained from the manufacturer.

Table 2: Handling of Oils and Greases

### 1.2.5 Transportation, Assembly and Disassembly

**ATTENTION!**

During transportation, installation and removal work, the transport units, sub-assemblies or individual parts must be carefully attached and secured to lifting appliances and load-lifting equipment with sufficient load-carrying capacity, and secured against tipping and rolling.



You can be severely injured or killed by falling objects. Only use appropriate load-lifting equipment.

If the fully installed tz-couplings have to be transported attached to other parts or systems, they must be protected against mechanical damage (e.g. impacts) by means of the appropriate protective hoods.

### 1.2.6 Personnel

The personnel working on the brake system must be familiar with the operating manual, and in particular, with Chapter 1. The generally accepted technical regulations must be observed when assembling and disassembling the product. The specific safety regulations must be complied with in particular while carrying out any work on electrical, pneumatic or hydraulic equipment. In Germany, the current version of the "Sicherheitslehrbrief für Handwerker (Safety Requirements for Craftsmen)" must be complied with.

## 1.2.7 Operation, Maintenance and Servicing

**Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .**

The safety and accident prevention regulations apply during operation.

This device coupling has been equipped with protective equipment. Modifications, attachments to and/or conversions of the torsionally flexible tz-claw coupling SSV/SP may affect safety and must never be performed without the approval of tz.



### ATTENTION!

The torsionally flexible tz-claw coupling SSV/SP must be checked for mechanical damage and other defects at least once per month. If necessary, operation of the plant has to be stopped immediately and secured against unauthorised restart. Spare parts must comply with the technical requirements specified by tz. This is always ensured when original spare parts are used.



Appropriate workshop equipment must be used when performing repair or work. The rules and regulations for electrical installations must be complied with. Failure to comply with the relevant safety regulations and instructions when using, operating, servicing or repairing the equipment may cause serious and/or fatal injuries.

While working on the torsionally flexible tz-claw coupling SSV/SP, make sure that the drive motor and driven machines are at a standstill and that they cannot be accidentally started again under any circumstances.

## 1.2.8 Protection of the Environment

### ATTENTION!

Operating resources, auxiliaries and replaced parts must always be disposed of in a safe and environmentally compatible manner. The relevant country-specific regulations must be observed. When handling oils, greases and other chemical substances, the safety instructions and regulations for this product must be complied with.



## 1.2.9 Residual Hazard

In order to avoid these residual hazards, the respective safety instructions contained in this operating manual must be strictly observed!

This section contains a summary of residual hazards which may occur during the transportation, storage, installation, operation, maintenance and repair works.

### Mechanical hazards:

- Crushing or shearing in between the moving parts of the torsionally flexible tz-claw coupling SSV/SP and the surrounding area
- Slipping off the torsionally flexible tz-claw coupling SSV/SP
- Insufficient stability

### Thermal hazard:


Burns due to contact with hot parts. Ignition due to sparks.

### Hazard due to the temporary failure of protective devices:

Temporarily missing protective devices or bridging of control devices or similar items. During repairs or servicing.

**The hazards that may be caused by the consequences of the failure of electrical, pneumatic or hydraulic energy must be taken into account by the builder of the main plant through appropriate measures, and must be included in his risk analysis.**



Coupling SSV/SP	 Tüschen & Zimmermann
General Information	

### 1.3 General Information

The torsionally flexible tz-claw coupling SSV/SP has been designed and built for use as a connecting coupling between the motor and the driven machine.

The device corresponds to:

- the CE Guidelines (see EC declaration of conformity for the product)
- the applicable EC declarations of conformity for the components
- the regulations for potentially explosive areas according to Directive 2014/34/EC (ATEX) and is suited for work below ground, Device Group I, Category M2, and Device Group II, Categories 2 and 3.




<b>ATEX-Marking:</b>	 I M2  II 2G T4 / T5 / T6 -20°C ≤ Ta ≤ 80 / 45 / 30°C  II 2D T130°C	
<b>Manufacturer:</b>	Tüschen & Zimmermann GmbH & Co. KG (Address: see cover sheet)	
<b>Definition:</b>	torsionally flexible tz-claw coupling SVV/SP	
<b>Product Identification:</b>	see label	
<b>Technical Data:</b>	Weight:	see Table 5
	Dimensions:	see Figure 1, 2, 3 see Table 4
	for torques:	see Table 5
	Ambient temperature:	-20 °C to +30 °C
	Mounting position:	any
	additional information	see Annexes
<b>Scope of delivery:</b>	1 pc. torsionally flexible tz-claw coupling SSV/SP 1 pc. Installation and Operating Manual 1 pc. Declaration of conformity Coupling	
© Copyright tz 2009		Protection mark according to DIN 34

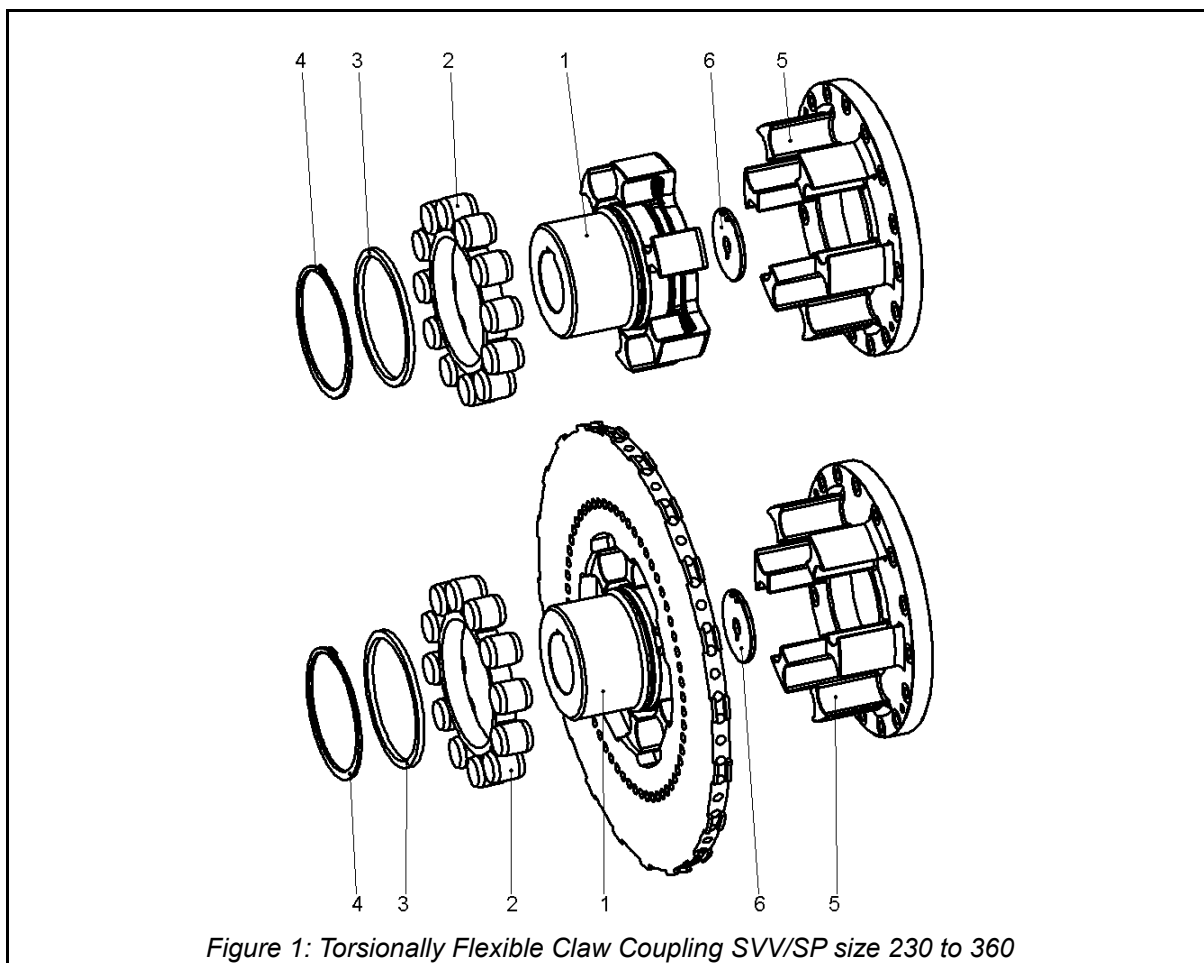
Table 3: General Information

## 1.4 Device description

### 1.4.1 Design Size 230 to 360

The torsionally flexible tz-claw coupling size 230 to 360 SSV/SP consists of:

- Coupling hub (1, without brake disc at the top, with brake disc at the bottom)
- Elastomer buffer ring (2)
- tz-lock ring (3)
- Lock ring (4)
- Bolt-on flange (5)
- tz-lock washer (6)



### 1.4.2 Design Size 545

The torsionally flexible tz-claw coupling Size 545 SSV/SP consists of:

- Coupling hub (1, without brake disc at the top, with brake disc at the bottom)
- Elastomer buffer ring (2)
- tz lock ring (3)
- Hexagon screws (4)
- Bolt-on flange (5)
- tz lock washer (6)

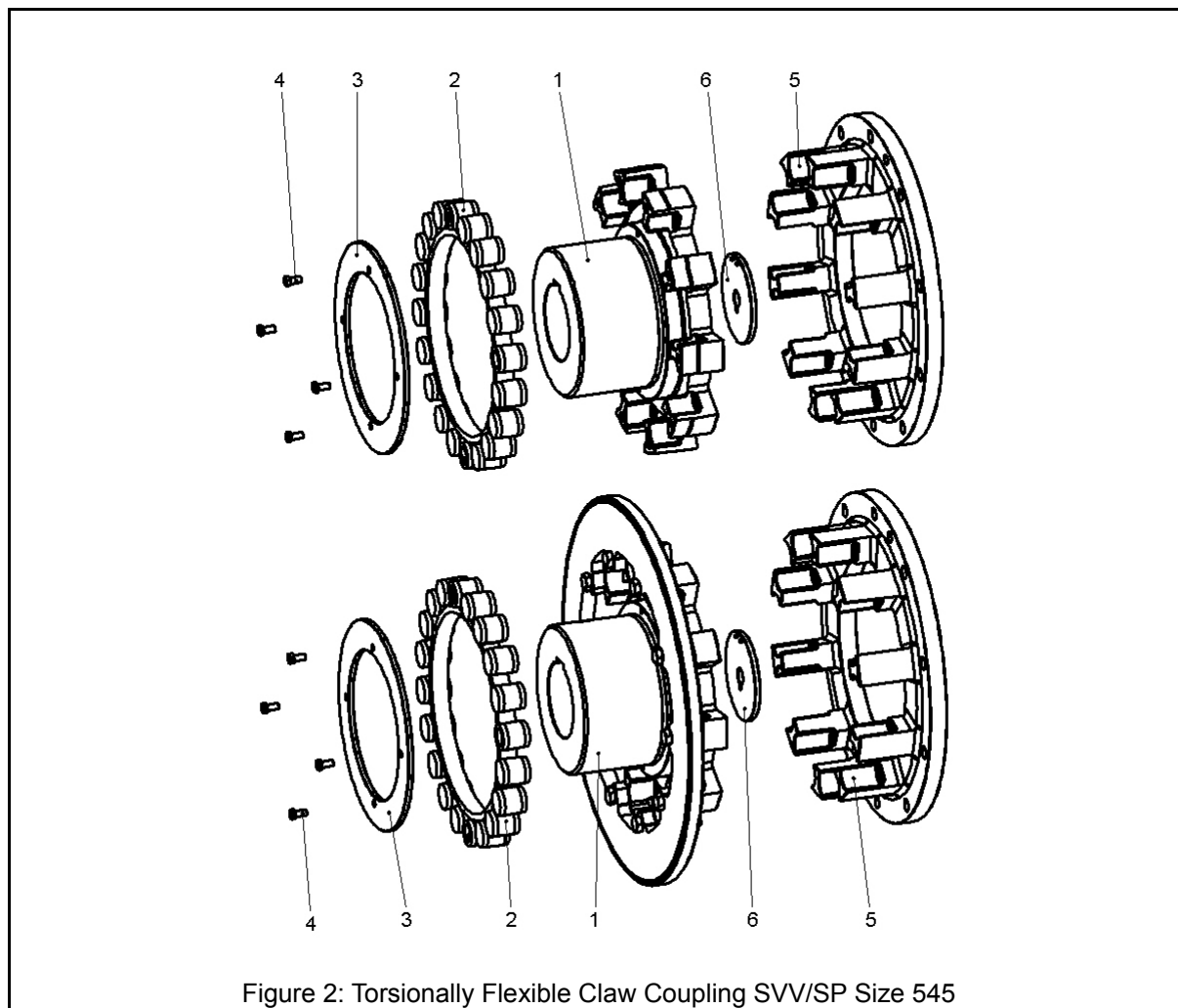


Figure 2: Torsionally Flexible Claw Coupling SSV/SP Size 545

### 1.4.3 Operating Principle

The torsionally flexible tz-claw coupling SSV/SP is a coupling with rotation flexibility and is puncture-proof. It compensates for angular, radial and axial shaft misalignment within defined tolerances. The torque is transmitted through an elastomer buffer ring loaded in compression. The elastomer buffer ring dampens shocks and torsional vibrations, is resistant to oil and is largely insensitive to temperature.

The tz claw coupling SSV/SP can be fitted with a brake disc if required.

### 1.4.4 Dimensions

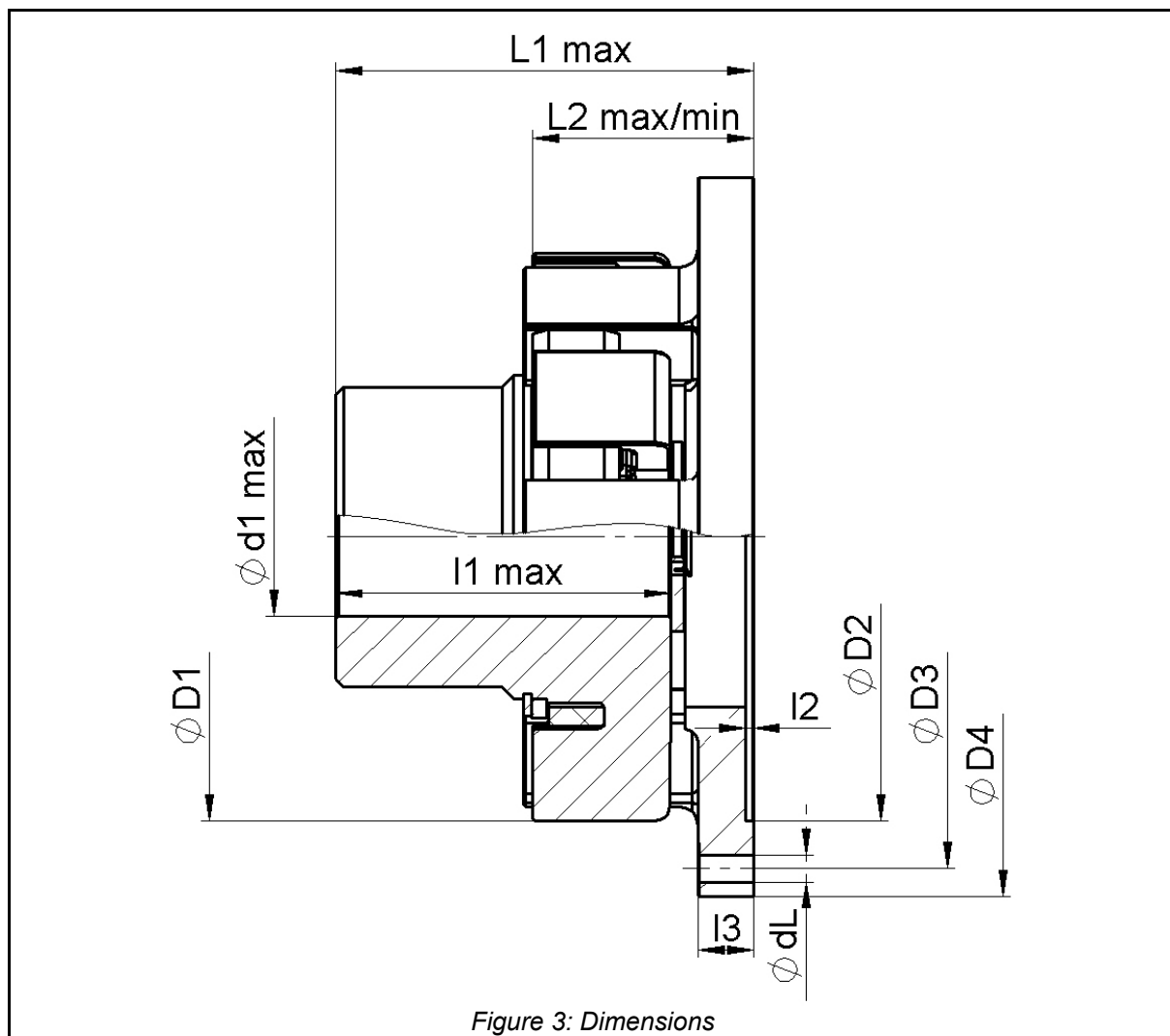


Figure 3: Dimensions

Size	Dimensions											
	d1max [mm]	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	z x dL [mm]	L1max [mm]	L2max [mm]	L2min [mm]	l1max [mm]	L2 [mm]	L3 [mm]
230SSV/SP	75	230	220	265	290	8x13	180.5	90	76	142	4	20
260SSV/SP	90	260	265	310	345	12x14	213	103.5	88.5	172	4	22
300SSV/SP	100	300	315	360	385	16x14	263.5	123	108	212	4	30
360SSV/SP	125	360	360	420	455	16x18	271	146.5	131.5	212	5	35
545SSV/SP	200	565	560	610	660	10x25	372,5	160,5	140,5	302	6	35

Table 4: Dimensions

As standard, all couplings are manufactured with a keyway according to DIN 6885 and bores of the tolerance class G6.

Refer to the tz catalogue for information and data on brake discs.

### 1.4.5 Approximate Determination of the Coupling Size

Size	Torque (VKB)		Torque (VKG)		Torque (VKR)		Speed <sup>2</sup>	Mass <sup>1</sup> unbored
	T <sub>KN</sub> [Nm]	T <sub>K max</sub> [Nm]	T <sub>KN</sub> [Nm]	T <sub>K max</sub> [Nm]	T <sub>KN</sub> [Nm]	T <sub>K max</sub> [Nm]	n <sub>max</sub> [rpm]	m [kg]
230SSV/SP	980	2940	1700	5150	1700	5150	3250	17.5
260SSV/SP	1530	4590	2650	7950	2650	7950	3000	28.5
300SSV/SP	2280	6840	3900	11700	3900	11700	2500	46
360SSV/SP	3760	11280	6500	19500	6500	19500	2150	82.5
545SSV/SP	10520	31570	18000	54000	-	-	1500	257

- 1) The stated total weight refers to I<sub>1max</sub> without brake disc
- 2) Depending on the diameter of the brake disc, the admissible speed may vary. Consult tz when using brake discs and a speed greater than 1500 rpm.

VKB = polyurethane buffer ring / blue (for all applications below and above ground)  
VKG = polyurethane buffer ring / green (for all applications below and above ground)  
VKR = polyurethane buffer ring / red (only Zone 2/22)

Table 5: Approximate Determination of the Coupling Size

### 1.4.6 Elastomer buffer ring

#### 1.4.6.1 General Information on the elastomer buffer ring

The suitability for use in potentially explosive atmospheres has been attested by the type examination certificate BVS 03 H 030 X according to Directive 2014/34/EC.

For mass greater than 0.5 kg and when using below ground, the user must check whether fire protection and/or hygiene provisions of the respective country of the operator are met.

#### 1.4.6.2 VKB and VKG Buffer Rings

The polyurethane buffer ring (VKB) or (VKG) allows the reduction of the surface resistance "R<sub>0</sub>", which is responsible for the electrostatic charge, to a value of:

VKB: 1.8 x 10<sup>8</sup> Ω  
VKG: 7.0 x 10<sup>8</sup> Ω

The suitability for use in potentially explosive atmospheres has been attested by the type examination certificate BVS 03 H 030 X according to Directive 2014/34/EC.

#### 1.4.6.3 VKR Buffer Rings

The VKR buffer ring is flame-resistant but not electrostatically conductive. The VKR buffer ring may be used on all machines that only use one buffer ring.

The use of two buffer rings is not permitted in Zone 1 / 21 (Category 2GD) and within Danger Zone 2 (Category M2) if the isolated metallic intermediate part has not been additionally earthed.

## 2 Installation

### 2.1 To be Observed Prior to Installation

Make sure that the intended speeds and torques (see 1.4.5 ) and the operating temperatures (see general notes) do not exceed the permissible values.

Standard tolerances for finish-bores are designed in accordance with ISO tolerance G6 (DIN ISO2862).

Standard keyways are designed in accordance with DIN 6885.

Set screws as required.

#### **WARNING!**

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.

#### **Note!**

In order to make installation easier, the tz-coupling hub SSV/SP (Item 1, Figure 1) can safely be heated to a uniform 80°C to 120°C. Before heating, always remove the elastomer buffer ring (Item 2, Figure 1).

Allow the tz-coupling hub SSV/SP to cool down to ambient temperature before inserting the buffer ring.

#### **WARNING!**

Always wear gloves to protect against hot parts.

### 2.2 Assembling the torsionally flexible tz-claw coupling SSV/SP

(see Figure 1)

When assembling the torsionally flexible tz-claw coupling SSV/SP, appropriate assembly aids must be used.

The borehole of the tz-coupling hub SSV/SP (Item 1, Figure 1) and the shaft end must be cleaned before assembly.

Slide the fully assembled tz-coupling hub SSV/SP (Item 1, Figure 1) with elastomer buffer ring (Item 2, Figure 1) tz-lock ring (Item 3, Figure 1) and lock ring (Item 4, Figure 1) onto the shaft up to the shaft collar.

Secure the tz-coupling hub SSV/SP (Item 1, Figure 1) with a lock washer or set screw. Attach the bolt-on flange (Item 5, Figure 1) and secure it with appropriate fitting material.

Insert the complete tz-coupling hub (Items 1 to 4 and Item 6, Figure 1) with assembled shaft end into the bolt-on flange (Item 5, Figure 1).

#### **ATTENTION!**

When inserting the fully assembled tz-coupling hub SSV/SP (Items 1 to 4 and Item 6, Figure 1) into the bolt-on flange (Item 5, Figure 1), observe the claw position of the bolt-on flange (Item 5, Figure 1) in order to avoid damage.



## 2.3 Aligning the torsionally flexible tz-claw coupling SSV/SP

### WARNING!

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.

### Note!

Precise alignment of the torsionally flexible tz-claw coupling SSV/SP prolongs the service life of the elastomer buffer ring.

The maximum permissible misalignment values specified in Table 6 and Table 7 are general guideline values. During the initial alignment process, the misalignment values should not exceed 50% of these tolerances.

In special circumstance with high requirements concerning the smoothness of running or higher speeds, alignment accuracies of less than 0.1 mm may be required.



### 2.3.1 Angular Alignment

#### WARNING!

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.

- Always measure one complete rotation (360°).
- In doing so, determine the largest deviation  $z_1$  as well as the smallest deviation  $z_2$ . The angular misalignment  $\Delta z$  is then calculated ( $\Delta z = z_1 - z_2$ ).
- When aligning, the maximum permissible angular misalignment  $\Delta z_{max}$  for the respective coupling size according to Table 6 must be complied with.
- The values under Table 6 are valid for a reference speed of 1500 rpm.

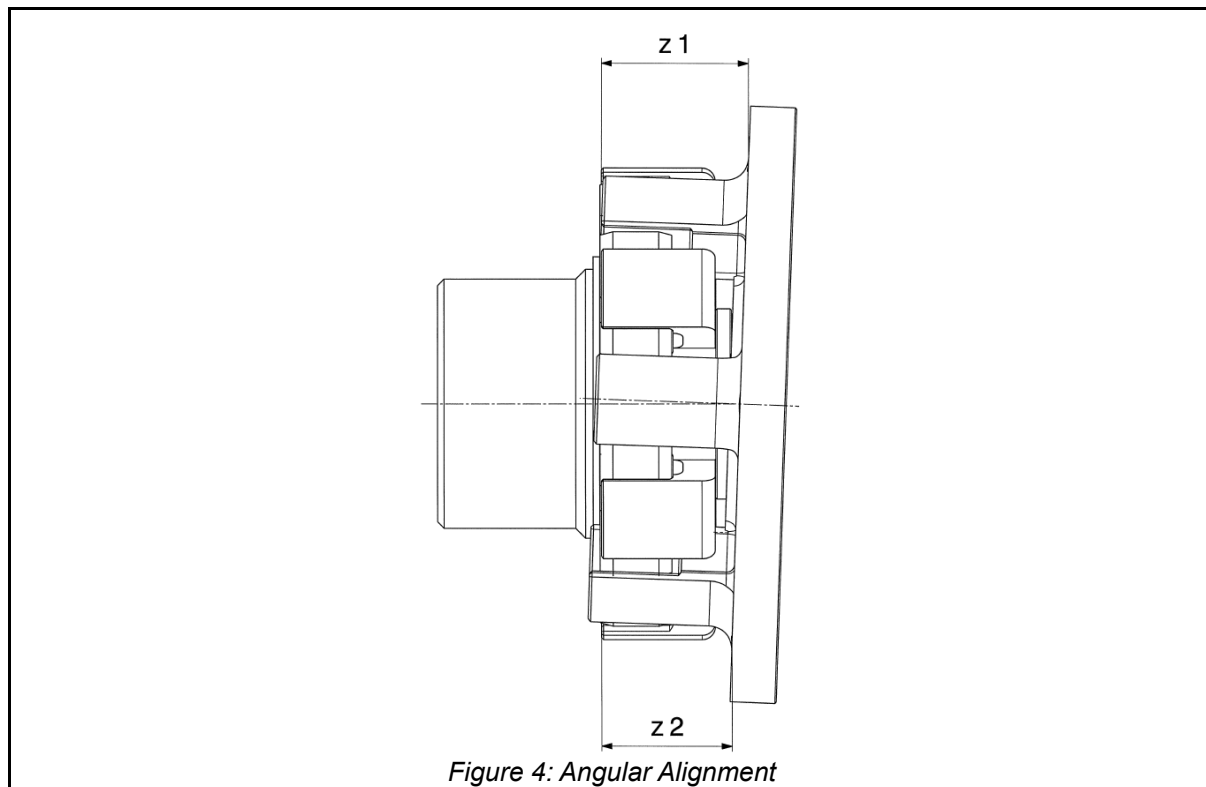


Figure 4: Angular Alignment

Size	Angular misalignment $\Delta z_{\max}$ [mm]
230SSV/SP	0.6
260SSV/SP	0.6
300SSV/SP	0.6
360SSV/SP	0.6
545SSV/SP	0.6

Table 6: Angular Alignment - Dimensions

### 2.3.2 Radial Alignment

#### WARNING!

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.



- Always measure one complete rotation (360°).
- The largest deviation  $y_1$  and the smallest deviation  $y_2$  must be calculated. From this, the radial misalignment  $\Delta y$  is calculated [ $\Delta y = 0.5 \times (y_1 - y_2)$ ].
- When aligning, the maximum permissible radial misalignment  $\Delta y_{\max}$  for the respective coupling size according to Table 7 must be complied with.
- The values under Table 7 are valid for a reference speed of 1500 rpm.

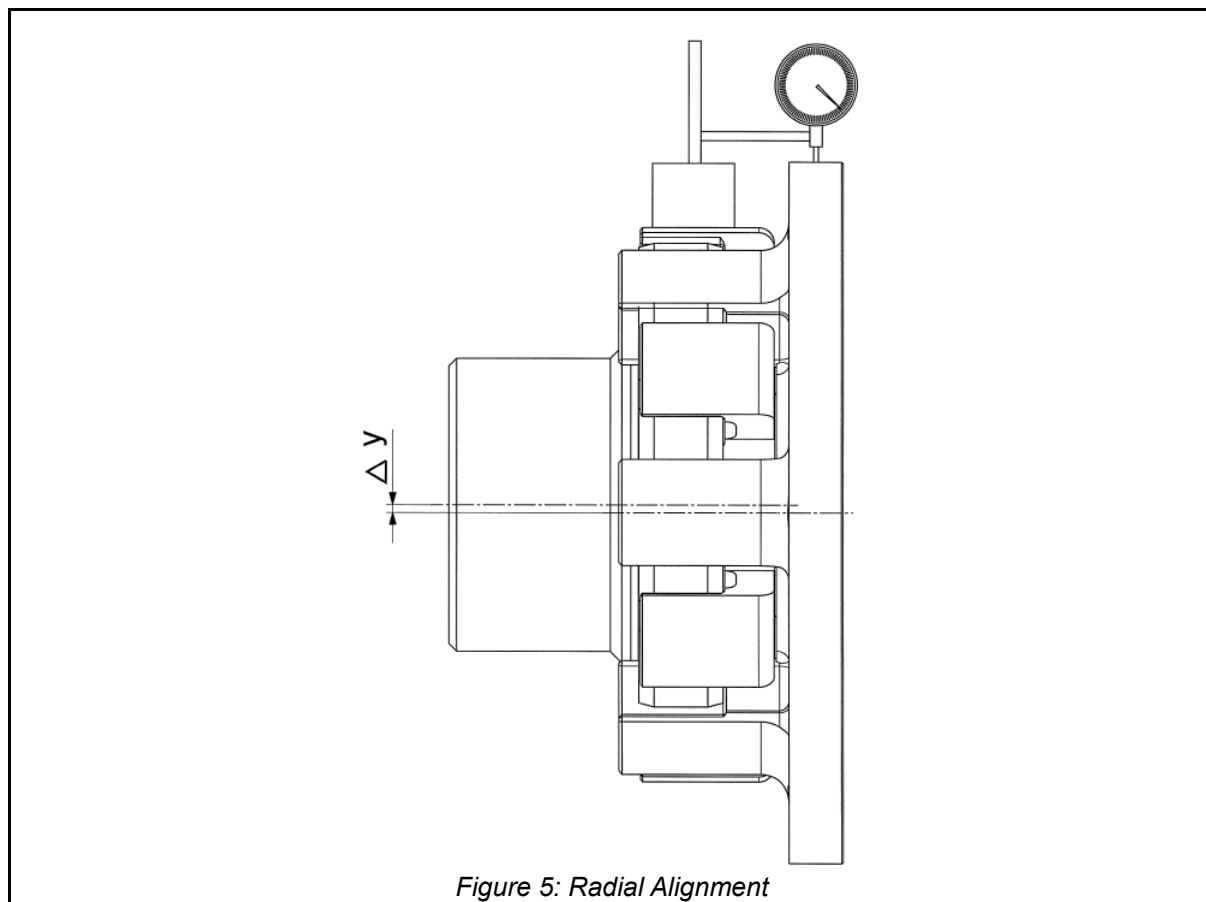


Figure 5: Radial Alignment



Size	Radial misalignment $\Delta y_{\max}$ [mm]
230SSV/SP	0.8
260SSV/SP	0.9
300SSV/SP	0.9
360SSV/SP	1.0
545SSV/SP	1,0

Table 7: Radial Alignment - Dimensions

### 2.3.3 Axial Alignment

The torsionally flexible tz-claw coupling SSV/SP is a coupling with length compensation. The permissible tolerances for length compensation are indicated in Table 4.

The elastomer buffer ring (Item 3, Figure 6) must be properly seated in its full width in the claw ring pockets of the bolt-on flange (Item 2, Figure 6).

After axially aligning the torsionally flexible tz-coupling SSV/SP, the tz-claw coupling hub SSV/SP (position 1, Figure 6) and the claw ring of the bolt-on flange (Item 2, Figure 6) must not be touching.

Secure the tz-coupling hub SSV/SP (Item 1, Figure 6) against axial displacement. A radially arranged set screw or a lock washer can be used for this purpose.

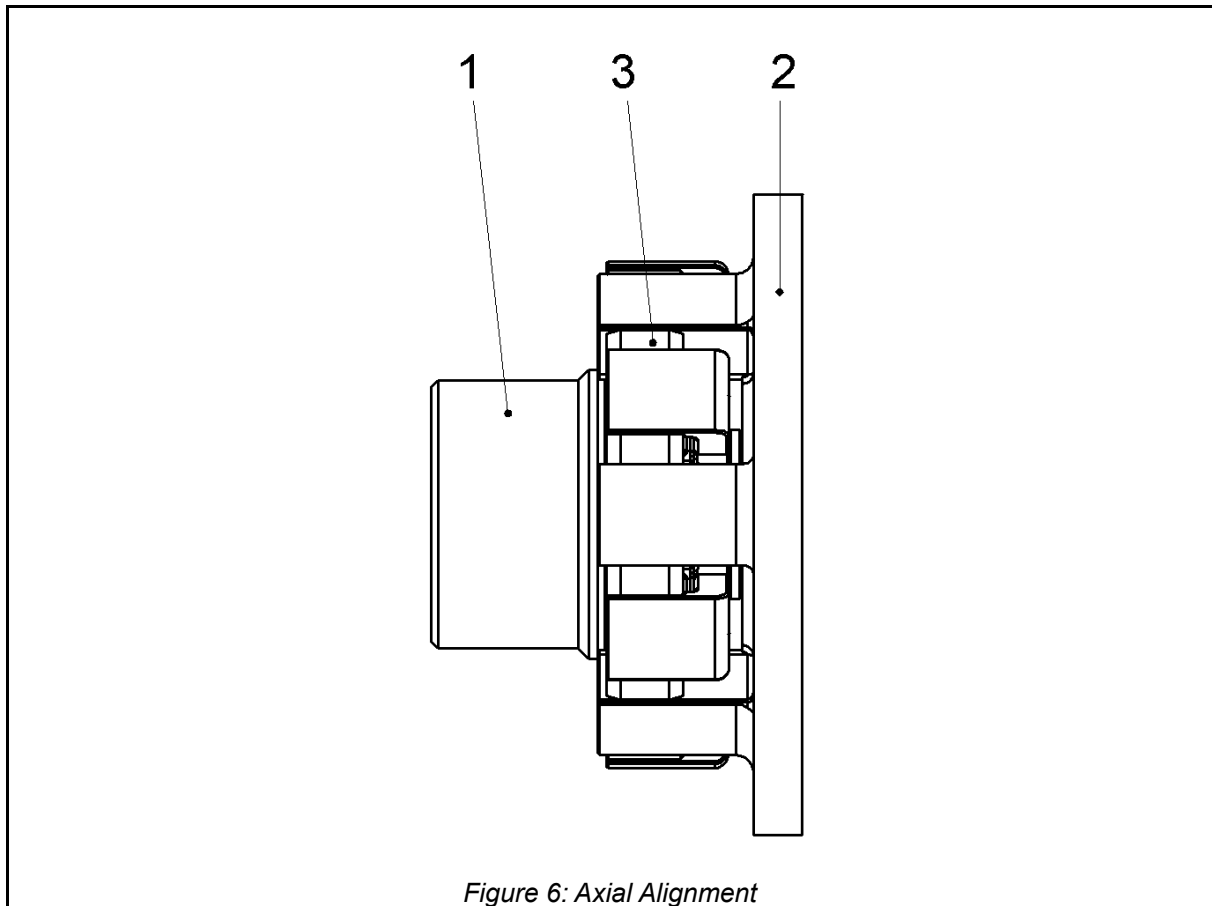


Figure 6: Axial Alignment

### 3 Commissioning

When using the tz-claw coupling SSV/SP, its characteristic data must be observed (see 1.4.4 , 1.4.5 and 1.4.6 ). The technical data must never be exceeded without prior written approval from Tüschen & Zimmermann.

In order to ensure a long and trouble-free operation of the tz-claw coupling SSV/SP, the coupling must be designed with an operating factor that is appropriate to the operating conditions, in compliance with the design specifications, e.g. DIN 740, Part 2 (or also the tz data sheet).

Every change in operating conditions or operating parameters necessitates a review of the coupling design.

#### **WARNING!**

- Before commissioning, check the alignment of the torsionally flexible tz-claw coupling SSV/SP and all screwed connections for the prescribed tightening torque and firm fitting.
- Before commissioning, all moving or freely rotating parts must be protected against unintentional contact and falling objects by means of permanently installed guards (enclosures).
- The guards (enclosures) must at least comply with the requirements of the protection type IP2X.
- The covers should be designed to prevent dust from being deposited on the torsionally flexible tz-claw coupling SSV/SP.
- If you discover irregularities during operation of the torsionally flexible tz-claw coupling SSV/SP, turn off the drive system immediately. There may be danger of explosion.



In the event of faults, take into account specific safety measures, and use Table 10 to determine and correct the cause of the fault.

## 4 Service

### 4.1 Maintenance

#### **WARNING!**

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.



The torsionally flexible tz-claw coupling SSV/SP is low-maintenance during operation. The time in which the wear limit of the elastomer buffer ring is reached depends on the operating parameters and operating conditions.

During routine inspections of the drive system:

- the alignment of the torsionally flexible tz-claw coupling SSV/SP must be checked.
- the condition of the elastomer buffer ring must be checked.
- dust deposits must be removed from the torsionally flexible tz-claw coupling SSV/SP and the elastomer buffer ring.
- the elastomer buffer ring must be replaced at the latest after 3 years, or sooner in the case of heavy wear.

#### 4.1.1 Wear Inspection of the Elastomer Buffer Rings

After initial commissioning, the elastomer buffer ring must be visually inspected and checked for wear after 200 hours, at the latest however after 14 days.

If only minor wear or no wear of the buffer rings is found during this first inspection, further inspections can be carried out at regular intervals of 2000 hours, but every 3 months at the latest, provided that the operating states do not change.

If disproportionately high wear is discovered at the first inspection, it must be examined whether the high wear may be the result of a cause described in Table 10.

The inspection intervals must then be adapted to the prevailing operating conditions (inspection and replacement intervals must be shortened).

If the wear limit has been reached or exceeded, replace the elastomer buffer ring immediately, irrespective of the inspection intervals for the overall plant.

It is recommended that the elastomer buffer ring should be replaced during maintenance work on the output side.

#### 4.1.2 Wear Inspection while the Overall Plant is at a Standstill

##### **WARNING!**

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.



In order to examine the buffer for wear while the plant is switched off and unloaded, turn the tz-coupling parts in such a manner that the claws rest against the elastomer buffer ring without clearance.

As shown in Figure 7 the claw clearance  $V$  is measured in a circumferential direction over the buffers that the claws are touching on both sides. The adjacent buffers are not in contact with the claws.

Repeat this measurement on the adjacent buffers after the tz-coupling parts have been turned in opposite directions from one another.

If the dimension  $V$  reaches or falls below the value for the respective tz-coupling size stated in Table 8  $V_{min}$ , the elastomer buffer ring must be replaced immediately.

After the wear inspection, all safety devices must be remounted before operation is resumed.

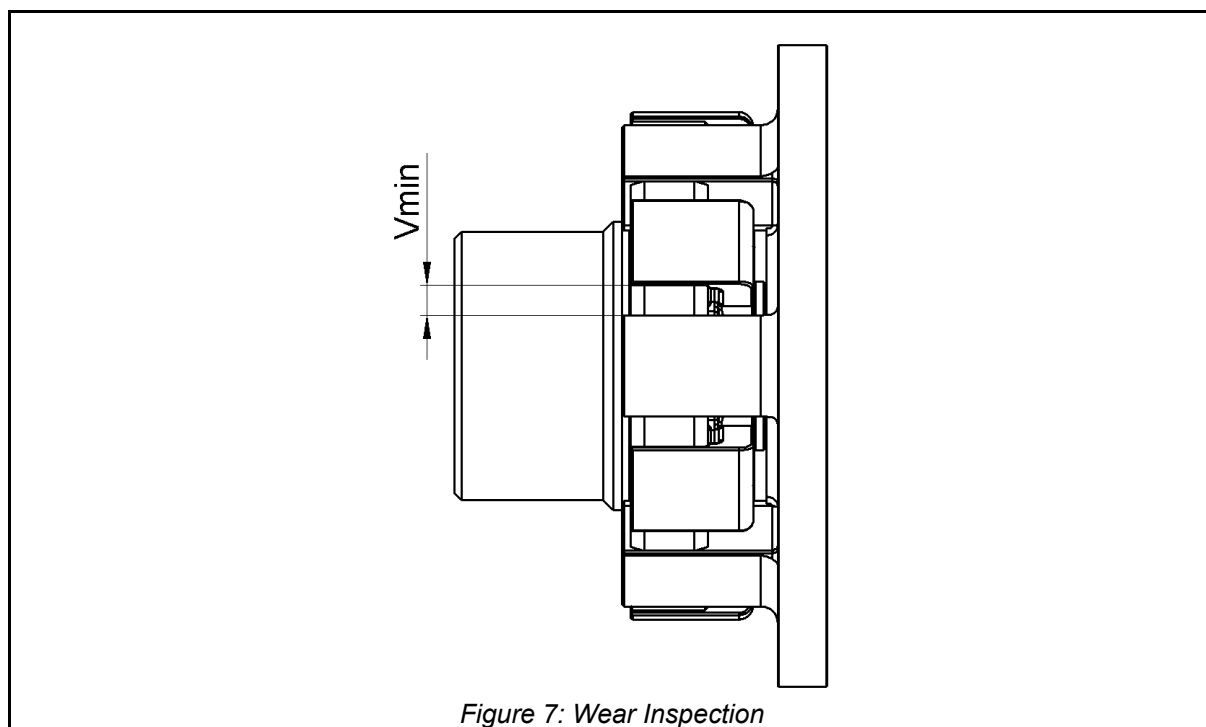


Figure 7: Wear Inspection

Size	Wear dimensions $V_{min}$ [mm]
230SSV/SP	15.4
260SSV/SP	15.3
300SSV/SP	12.1
360SSV/SP	12.1
545SSV/SP	12,1

Table 8: Wear Dimensions

### 4.1.3 Servicing works and Transportation of Spare Parts

Servicing works should only be carried out in a specialist company.

Professional maintenance and repair can only be guaranteed by tz.

Interventions carried out on the plant by a third party may alter specified characteristics and may lead to faults and malfunctions for which tz does not assume any liability.

#### ATTENTION!

If repairs in potentially explosive atmospheres are unavoidable, proceed as follows:

- The personnel assigned to work on the torsionally flexible tz-claw coupling SSV/SP must be familiar with the operating manual, and in particular with Chapter 1 . Approval to start the maintenance work is given by the supervisors in charge after they have convinced themselves that there is no explosive atmosphere present which might represent a hazard when the work is carried out.
- The coupling parts to be replaced must be transported to the site of installation in suitable transport containers. They must only be taken out of the transport container immediately before being used. The dismantled coupling parts must be removed from the danger zone immediately following repair work.
- When transporting entire couplings or coupling-brake systems, the coupling parts must be protected in such a manner that they do not constitute a source of danger in potentially explosive atmospheres.



### 4.1.4 Storage of Elastomer Buffer Rings and Coupling Parts

The following storage conditions have been defined to retain the quality and to achieve as long a service life as possible:

The coupling parts can be stored in their condition as delivered in a dry and roofed area at normal ambient temperatures for a period of 6 months. Storage for a longer period requires the application of a long-term preservation product, for which tz should be contacted in advance.

Do not expose the elastomer buffer rings to an atmosphere containing ozone. Ozone-generating devices such as all light sources which emit ultraviolet radiation and high-voltage electrical systems have a harmful effect on the elastomer buffer rings. Dimmed light should be used. The storage areas must not be exposed to direct sunlight. Windows are to be coated with a red or orange protective paint (never use blue paint). The relative air humidity should not exceed 65%. If properly stored, the characteristics of the elastomer buffer rings remain almost unchanged for up to three years.

#### 4.1.5 Replacing the Elastomer Buffer Ring Size 230 to 360

**WARNING!**

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.



The procedure for replacing the elastomer buffer ring is described below.

- 1) Remove covers or coupling guard.
- 2) Use tz-lock ring pliers to open the tz-lock ring (Item 4, Figure 1) and slide the same as much as possible to the end of the tz-coupling hub (Item 1, Figure 1).
- 3) Slide the tz-lock ring (Item 3, Figure 1) also to the end of the tz-coupling hub (Item 1, Figure 1).
- 4) Using a lever, press the split elastomer buffer ring (Item 2, Figure 1) out of the claws of the tz-coupling hub (Item 1, Figure 1) and remove.
- 5) Apply appropriate lubricant (e.g. commercially available roll bearing grease for polyurethane Vk) to the new split elastomer buffer ring (Item 2, Figure 1) and reinstall it in the reverse order.
- 6) Reinstall cover or coupling guard.

#### 4.1.6 Replacing the Elastomer Buffer Ring Size 545

**WARNING!**

The motor must always be switched off prior to any work on the torsionally flexible tz-claw coupling SSV/SP.

Make sure that the motor is secured against unintentionally re-starting.



The procedure for replacing the elastomer buffer ring is described below.

- 1) Remove covers or coupling guard.
- 2) Loosen hexagon screws (Item 4, Fig. 2) using an open-end wrench.
- 3) Move the tz lock ring (Item 3, Fig. 2) to the end of the tz coupling hub (Item 1, Fig. 2).
- 4) Using a lever, push the divided elastomer buffer ring (Item 2, Fig. 2) out of the claws of the tz coupling hub (Item 1, Fig. 2) and remove.
- 5) Equip the new divided elastomer buffer ring (Item 2, Fig. 2) with suitable lubricant (e.g. commercially available roller bearing grease for polyurethane Vk) and reinstall in reverse order. Secure the hexagon screws (Item 4, Fig. 2) with Loctite 243 (intermediate strength).
- 6) Reinstall cover or coupling guard.

#### 4.1.7 Spare parts

Spare part	Size	Spare Part Article No.:
VKB elastomer buffer ring	230SSV/SP	900230VB000G
VKG elastomer buffer ring		900230VG000G
VKR elastomer buffer ring		900230VR000G
VKB elastomer buffer ring	260SSV/SP	900260VB000G
VKG elastomer buffer ring		900260VG000G
VKR elastomer buffer ring		900260VR000G
VKB elastomer buffer ring	300SSV/SP	900303VB000G
VKG elastomer buffer ring		900303VG000G
VKR elastomer buffer ring		900303VR000G
VKB elastomer buffer ring	360SSV/SP	900363VB000G
VKG elastomer buffer ring		900363VG000G
VKR elastomer buffer ring		900363VR000G
VKB elastomer buffer ring	545SSV/SP	900545016339
VKG elastomer buffer ring		900545015578

Table 9: Spare Parts

## 4.2 Operation Faults and Possible Causes

### ATTENTION!

Turn off drives immediately in case of operation faults. Correct fault immediately, since otherwise there is an ignition hazard due to hot surfaces and possible spark formation.



Fault	Cause	Correction
Irregular running noises / vibrations	Alignment fault	<ul style="list-style-type: none"> <li>• Correct cause of alignment fault</li> <li>• Realign coupling</li> <li>• Inspect the elastomer buffer ring for wear</li> </ul>
	Elastomer buffer ring worn out	<ul style="list-style-type: none"> <li>• Inspect coupling parts for damage – replace parts if necessary</li> <li>• Replace elastomer buffer ring</li> </ul>
	Imbalance	<ul style="list-style-type: none"> <li>• Check balance state of plant components and correct the same, if necessary</li> <li>• Inspect the elastomer buffer ring for wear</li> </ul>
	Loose screwed connection	<ul style="list-style-type: none"> <li>• Inspect coupling parts for damage – replace parts if necessary</li> <li>• Check alignment of the coupling</li> <li>• Tighten screws with the stipulated tightening torque and secure them against working loose automatically if necessary</li> <li>• Inspect the elastomer buffer ring for wear</li> </ul>
Premature wear of the elastomer buffer ring	Alignment fault	<ul style="list-style-type: none"> <li>• Correct cause of alignment fault</li> <li>• Realign coupling</li> <li>• Inspect the elastomer buffer ring for wear</li> </ul>
	Impermissible temperature	<ul style="list-style-type: none"> <li>• Replace elastomer buffer ring</li> <li>• Realign coupling</li> <li>• Adjust ambient temperature</li> </ul>
	Contact with aggressive media	<ul style="list-style-type: none"> <li>• Inspect coupling parts for damage – replace parts if necessary</li> <li>• Replace elastomer buffer ring</li> <li>• Check alignment of the coupling</li> <li>• Prevent contact with aggressive media</li> </ul>
	Torsional vibrations in the drive train	<ul style="list-style-type: none"> <li>• Analyse and correct cause of torsional vibrations</li> <li>• Inspect coupling parts for damage – replace parts if necessary</li> <li>• Replace elastomer buffer ring</li> <li>• Consult tz concerning possible use of another Shore hardness</li> <li>• Check alignment of the coupling</li> </ul>
Claw breakage	Buffer ring worn out → Claw contact	<ul style="list-style-type: none"> <li>• Replace coupling</li> <li>• Shorten wear inspection intervals</li> </ul>
	Overload due to too high torque	<ul style="list-style-type: none"> <li>• Inspect coupling design in cooperation with tz</li> <li>• Replace coupling</li> <li>• Introduce larger coupling if necessary</li> </ul>

Table 10: Operation Faults



### 4.3 Repair and inspection

**ATTENTION!**

Repairs and adjustment operations to the torsionally flexible tz-claw coupling SSV/SP that exceed the scope of normal inspection operations may only be carried out at the manufacturer's factory.

Professional repair or reconditioning can only be guaranteed by the manufacturer.

Interventions carried out on the plant by a third parties may alter specified characteristics and may lead to significant faults and malfunctions for which tz shall not assume liability.



### 4.4 Warnings

**ATTENTION!**

All screwed connections released must be properly tightened before operating the equipment again.



### 4.5 Safety Instructions

**ATTENTION!**

Maintenance and repair work must always be performed when the plant is at a standstill. Always turn off the motor prior to any work on the torsionally flexible tz-claw coupling SSV/SP. Make sure that the motor is secured against unintentionally re-starting.



Annex	 Tüschen & Zimmermann
Marking	


**TÜSCHEN & ZIMMERMANN**

**D-57368 Lennestadt**

**Definition: .....**

**TZ art. no.: .....**

**Year of construction: .....**

**CE 0158 **

**II 2G T4/T5/T6  $-20^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$  / 45°C / 30°C**

**II 2D T130 °C**

**I M2**