

Assembly and maintenance manual

Type S200



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General safety instructions






	WARNING	<p>Risk of injury due to moving components! Rotating driven components can cause the most severe injuries. Therefore, during operation:</p> <ul style="list-style-type: none"> ➤ It is strictly forbidden for persons to loiter in the danger zone or in its immediate vicinity. ➤ Do not disable, render unusable or circumvent safety equipment and / or safety functions. <p>Prior to entering the danger zone:</p> <ul style="list-style-type: none"> ➤ Switch off the power supply and secure it against being switched on again. ➤ Wait for lagging components to come to a standstill.
	DANGER!	<p>Danger due to improper operation!</p> <ul style="list-style-type: none"> ➤ Modifications to the one-way clutch are not permitted and may impair safety. ➤ All tasks may only be performed by personnel with the requisite training and expertise. ➤ Repairs and maintenance tasks may only be performed when the machine is at a standstill. To this end, the machine is to be secured against a restart!
	WARNING	<p>Risk of injury due to the one-way clutch falling down or tipping over! The weight of the one-way clutch can injure people and cause severe crushing. Therefore:</p> <ul style="list-style-type: none"> ➤ Use a suitable lifting gear for lifting (slings, etc.) which is able to support the weight of the one-way clutch.
	WARNING	<p>Risk of injury due to incorrect assembly! Faulty installation and maintenance can cause severe property damage and personal injury. Installation, maintenance and repair work may only be performed by personnel with the requisite training and expertise!</p>
	WARNING	<p>Risk of injury for insufficiently qualified personnel! Improper handling can cause significant personal injury and property damage. Therefore:</p> <ul style="list-style-type: none"> ➤ Only ever have tasks performed by those persons to whom the tasks have been assigned.

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1 General

1.1 Information relating to the assembly and maintenance manual

This assembly and maintenance manual provides important information regarding the installation and commissioning of the one-way clutch of type S200.






Prerequisite for safe operation is compliance with all of the stated safety and handling instructions.

Moreover, the relevant local accident protection guidelines and general safety provisions for the field of application of the one-way clutch are to be complied with.

Read the assembly and maintenance manual carefully prior to installation and commissioning. It is a product component and must be kept in the immediate vicinity of the installation site and be accessible to personnel at all times. Furthermore, all safety instructions stated in the assembly and maintenance manual are to be observed.

1.2 Explanation of symbols

Warnings are marked throughout this assembly and maintenance manual by symbols. These warning symbols are introduced by signal words which indicate the extent of the danger. Comply with these warning symbols under all circumstances and act with due care and attention to avoid accidents, personal injury and property damage.

	Danger!	...indicates an imminently dangerous situation which can be fatal or cause severe injuries if it is not averted.
	WARNING	...indicates a potentially dangerous situation which can be fatal or cause severe injuries if it is not averted.
	ATTENTION	...indicates a potentially dangerous situation which can cause minor or light injuries if it is not averted.
	CAUTION	...indicates a potentially dangerous situation which can cause property damage if it is not averted.
	NOTE	... highlights helpful tips and recommendations as well as information for efficient and fault-free operation.

1.3 Manufacturer

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1.4 Labeling

Front face of the outer race

- Manufacturer's name
- Type designation

1.5 Environmental protection

Energy: The one-way clutch does not use any electrical energy

Materials: Steel

Recycling: Steel parts are up to 100% recyclable

2 Safety

2.1 Intended use

One-way clutches of type S200 are directional clutches, engaged and disengaged automatically.

They can be used as overrunning clutches, one-way clutch or indexing clutches in machinery and equipment.

One-way clutch may only be operated within the limitations of use outlined in section 2.5.

All of the specifications stated in the assembly and maintenance manual must be strictly adhered to.

Any claims due to damage arising from improper use are excluded. The operator carries sole liability for all damage arising from improper use.

Driving operation of an overrunning clutch:

When operating in torque transmission mode the driving machine element and the driven member are connected in a force-locking manner. In this operating state, power will be transferred.

Overrunning operation of an overrunning clutch:

The overrunning clutch automatically releases the frictional connection between the driving machine element and the driven machine element if the driven machine element has a higher speed than the driving machine element.

Lockout mode of a backstop:

When operating in the locking direction of the clutch coupling, the machine shaft and the torque bracing to the machine element are connected in a force-locking manner.

In this operating state, torque will be transferred.

Overrunning mode of a backstop:

The clutch coupling disengages automatically the force-locked connection between the machine shaft and the torque bracing to the machine element, when the machine shaft runs in clutch coupling direction.

Driving operation of an indexing clutch:

When operating in torque transmission mode the driving machine element and the driven member are connected in a force-locking manner. In this operating state, power will be transferred.

Overrunning operation of an indexing clutch:

The overrunning clutch automatically disengages the non-positive connection between the machine shaft and the driven machine element when the machine shaft is operated in the freewheeling direction.


2.2 Responsibility of the operator

The operator of the machine, in which the one-way clutch is installed, is subject to the legal obligations concerning occupational safety.

The valid provisions for the site of operation as well as the safety and accident prevention regulations of the trade associations are to be observed. This, in particular, means that the operator:

- is aware of the valid occupational safety provisions.
- implements the necessary behavioral requirements for operation of the machine, in which the one-way clutch is installed, at the site of operation.
- clearly defines responsibilities for installation, operation, maintenance and cleaning of the machine in which the one-way clutch is installed.
- ensures that all staff members, who work at or with the machine in which the one-way clutch is installed, are employed and have read and understood the operating manual. Moreover, he must, at regular intervals, provide training for personnel on how to handle the machine, in which the one-way clutch is installed, and inform them of the potential dangers. In addition, the operator is responsible for ensuring that the machine in which the one-way clutch is installed:
 - is always in perfect technical condition.
 - is maintained in accordance with the specified maintenance intervals.
 - has all its safety equipment checked regularly for completeness and functionality.

2.3 Assembly and maintenance personnel

	WARNING	Risk of injury for insufficiently qualified personnel! Improper handling can cause significant personal injury and property damage. Therefore: ➤ Only ever have tasks performed by those persons to whom the tasks have been assigned.
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Qualified personnel are those persons who, owing to their training, experience and instruction as well as their knowledge of relevant standards, provisions, accident prevention regulations and operating conditions, have been authorized by the person responsible for the safety of the plant to perform the requisite tasks and are able to recognize and avoid potential dangers in doing so. Knowledge of first-aid measures and on-site emergency equipment must also be included.

2.4 Personal protective equipment

It is necessary to wear personal protective equipment when handling the machine, in which the one-way clutch is installed, to minimize health risks.

The necessary protective equipment such as work shoes, gloves, safety goggles etc. is to be put on prior to all tasks and kept on during the task.

2.5 Limitations of use


- Maximum allowable overrunning speeds and maximum torque capacity:

Type	Size	$d^{+0 \text{ } ^{-0,025}}$ [mm]	T_{\max} [Nm]	n_{\max} Inner race [min ⁻¹]	n_{\max} Outer race [min ⁻¹]	Drag torque T_R [Ncm]	Weight [kg]
S200	203	16,510	90	2400	500	0,01	0,25
	204	18,796	120	2400	500	0,01	0,35
	205	23,622	200	1800	400	0,02	0,45
	206	32,766	480	1800	350	0,02	0,70
	207	42,088	760	1800	300	0,02	0,80
	208	46,761	1120	1800	200	0,02	0,90
	209	46,761	1120	1800	200	0,02	0,95
	210	56,109	1700	1200	200	0,03	1,00

* Required shaft diameter

Table1 Specifications Type S200

- Limits for ambient temperature: from 5°C to +60°C.
- Maximum operating temperature: 90°C.
- The types S200 are designed to mount directly on shafting which forms the inner race.
- The surface hardness of the shaft is HRC 60 to 62 with an case depth of at least 0.6 mm.
- The required core hardness is between HRC 35 and 45.
- The surface roughness must not exceed the quality Rz 6.3.

	NOTE	For installation of the one-way clutch , mount the cone-way clutch with bearings at both sides or on one side in order to obtain concentricity between the shaft and the outer race and to take up radial or thrust loads which may work on the outer race or the shaft!
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- The shaft taper is within 0.01 mm on 50 mm.
- The concentricity of the housing bore and the shaft should be within 0.05 mm.
- The required shaft diameters for the individual one-way clutches are given in Tab.1 under "d".
- For S200 types, we recommend all ATF oils and gear oils (e.g. SAE10 to SAE80) with a kinematic viscosity of approx. 10 to 40 cSt at operating temperature.

The bore tolerance of the overrunning clutch housing, should be within the range shown in the table below:

Type	Housing bore tolerance
S 203, S 204	-0,014 bis -0.039
S 205, S 206, S 207, S 208	-0,017 bis -0.042
S 209, S 210	-0,020 bis -0.045

Tab.2 The bore tolerance of the overrunning clutch housing

3 Structure and function

3.1 Structure

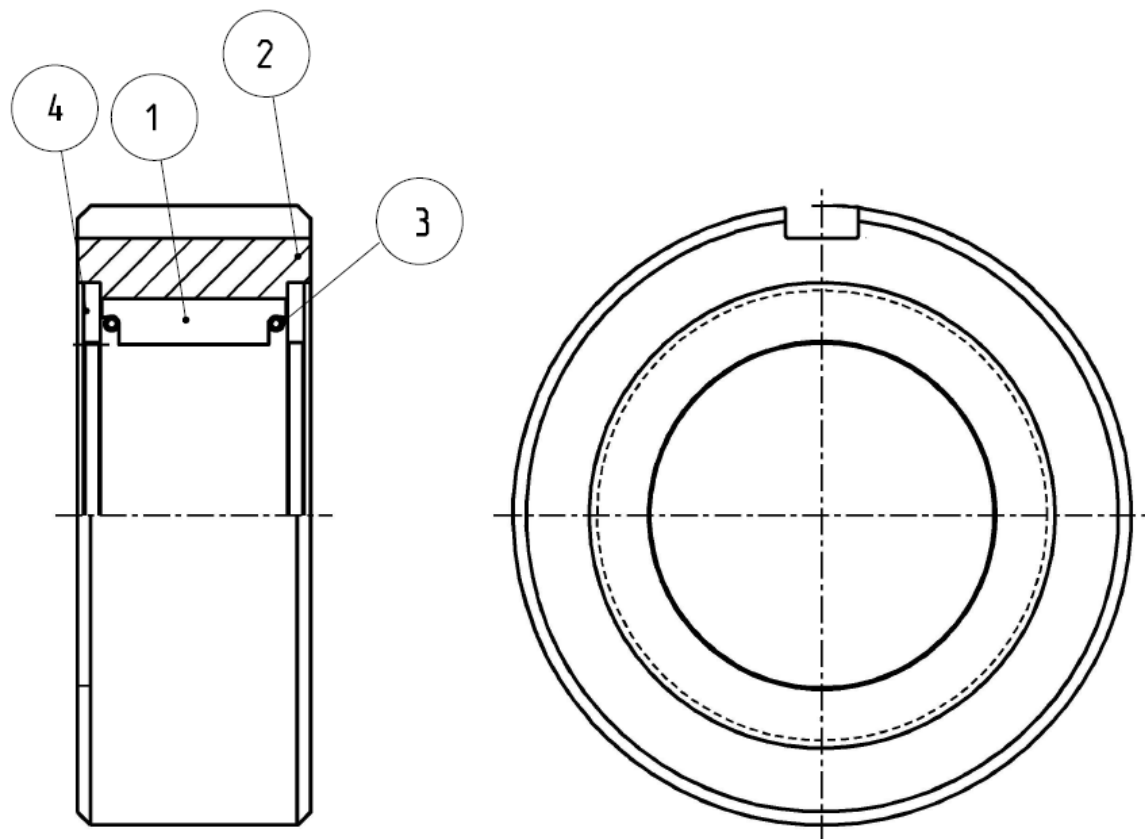


Fig.2 Structure S200

3.2 Function

Type S200 is a sprag freewheel without an inner race with spring-loaded sprags which are synchronously guided by two springs. Depending on the movement, the sprags enable driving or overrunning operation.

When turning the inner or outer clutch race (see Fig. 3a) in the torque transmission direction, the sprags create a frictional connection between the inner and outer race so that a torque or output can be transmitted.

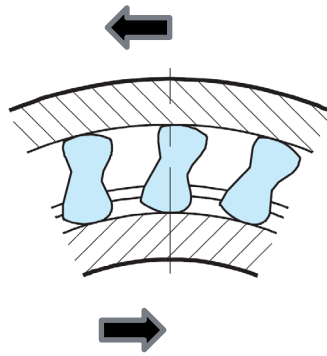


Fig.3a Torque transmission

Overrun operation is carried out if the inner race or outer race is turned in the overrun direction. This interrupts the frictional connection (see Fig. 3b) between the inner and outer race. In overrun operation the speeds of the inner race and outer race are different.

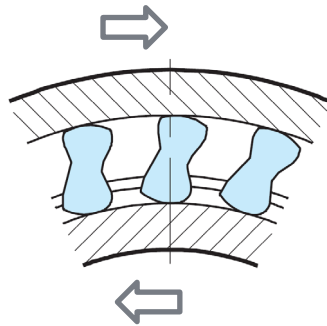


Fig.3b Overrun operation

4 Transport and packaging



NOTE

The local provisions regarding the disposal of transport and packaging materials are to be observed!

The one-way clutches is wrapped in anti-corrosion paper and shipped in a carton.

Transport damage to the packaging and / or the one-way clutch is to be reported to the respective transit company! The one-way clutch must be unpacked in a clean and dry environment!

5 Storage

5.1 Short-term storage

The type S200 is packed in VCI bubble wrap. The VCI bubble wrap is to be checked at regular intervals. The frequency of these intervals is dependent on the environmental conditions (temperature, moisture, salt content of the air, etc.) at the storage site.

The maximum storage period (short-term storage) is 6 months. Moreover, the one-way clutch must have long-term storage corrosion protection applied to it.

Store packages under the following conditions:

- Do not keep outdoors
- Keep dry and free from dust
- Do not expose to aggressive media
- Keep away from direct sunlight
- Avoid mechanical shocks and vibrations
- Storage temperature: -10 to +60°C
- Relative humidity: max. 95%, non-condensing

5.2 Long-term storage




For long-term storage, the one-way clutch must be shrink-wrapped with a desiccant and provided with a hygroscope. The corrosion protection must be checked after a period not exceeding one year or else depending on the environmental conditions (temperature, moisture, salt content of the air, etc.) at the storage site.

Store packages under the following conditions:

- Do not keep outdoors
- Keep dry and free from dust
- Do not expose to aggressive media
- Keep away from direct sunlight
- Avoid mechanical shocks and vibrations
- Storage temperature: -10 to +60°C
- Relative humidity: max. 95%, non-condensing

6 Installation

6.1 Checking the direction of rotation

	WARNING	Risk of injury due to incorrect assembly! Faulty installation and maintenance can cause severe property damage and personal injury! Installation, maintenance and repair work may only be performed by personnel with the requisite training and expertise!
	WARNING	Risk of injury due to moving components! Rotating driven components can cause the most severe injuries. Therefore, during operation: <ul style="list-style-type: none"> ➤ It is strictly forbidden for persons to loiter in the danger zone or in its immediate vicinity. ➤ Do not disable, render unusable or circumvent safety equipment and / or safety functions. Prior to entering the danger zone: <ul style="list-style-type: none"> ➤ Switch off the power supply and secure it against being switched on again. ➤ Wait for lagging components to come to a standstill.
	WARNING	Risk of injury for insufficiently qualified personnel! Improper handling can cause significant personal injury and property damage. Therefore: <ul style="list-style-type: none"> ➤ Only ever have tasks performed by those persons to whom the tasks have been assigned.

The direction of rotation must be checked prior to installation.

6.2 Lubrication

Lubricant selection is carried out as described in chapter (2.5 Limitation of Use).



First oil must be changed safter approx. 10 operating hours. Subsequent oil changes must be done after approx. 2000 operating hours, or approx. 1000 operating hours in a heavily contaminated environment. If the freewheel is connected to the lubricating oil supply, e.g. of a gear unit, the oil change instructions of the gear unit apply to the freewheel.

Oil lubrication is to be used at high idle speeds or high switching frequency.

Before commissioning, the freewheels must be filled with 1/3 oil by the customer or an appropriate oil level must be ensured.

Oil mist, splash oil or grease lubrication are possible.

For grease lubrication, fill the free space in the freewheel approx. 30 to 40% with grease.

	NOTE	Overgreasing can lead to malfunction of the overrunning clutch. Observe the grease quantity!
	NOTE	At temperatures below minus 20°C and above plus 100°C lubricant selection after consultation with specialist engineers of the lubricant suppliers!




6.3 Before assembly


The inner diameter of the outer race and outer diameter of the inner race with tolerance must be checked, as well as the concentricity error between the clamping surfaces of the outer and inner race.

The surfaces must not show any damage.

If circulating oil lubrication is provided for the freewheel, the free passage of the oil through the supply holes must be checked.

6.4 Assembly


	WARNING	Risk of injury due to incorrect assembly! Faulty installation and maintenance can cause severe property damage and personal injury! Installation, maintenance and repair work may only be performed by personnel with the requisite training and expertise!
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	WARNING	Risk of injury due to falling down components! Falling down components can cause serious injuries! Prevent the one-way clutch from falling down!

	WARNING	Risk of injury for insufficiently qualified personnel! Improper handling can cause significant personal injury and property damage. Therefore: ➤ Only ever have tasks performed by those persons to whom the tasks have been assigned.
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The installation is carried out on a shaft (see chapter 2.5 Application limits), which forms the inner race. The shaft on which the freewheel is mounted must be supported by a bearing. S200 series overrunning clutches are to be used with standard 200 series bearings. Lubrication and sealing must be provided.

Procedural steps:

- Remove the freewheel from the package until shortly before assembly and only assemble them in a clean and dry environment.
- Slowly turn the shaft in the direction of rotation indicated by the arrow on the overrunning clutch disc and push the outer race into the housing.

	NOTE	Do not hit the overrunning clutch with a hammer!
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- Parallel key groove is to be aligned such that the drillings of the housing are almost congruent.
- Insert feather key.

	NOTE	Both the housing and the shaft must be clean and free of metal particles before installation!
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- Secure the freewheel against axial displacement.
- Check whether the freewheel can be turned in the required direction without increased force.

6.5 Changing the direction of rotation

The direction of rotation is changed by reversing the freewheel by 180 °.

6.6 Installation example

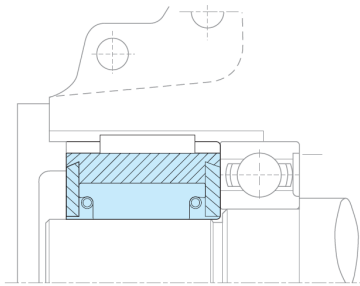




Fig.4 Installation example


7 Start-up


Fill the freewheel with oil or grease before startup!


8 Maintenance

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	WARNING	Risk of injury due to falling down components! Falling down components can cause serious injuries. Prevent the one-way clutch from falling down.
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	WARNING	Risk of injury for insufficiently qualified personnel! Improper handling can cause significant personal injury and property damage. Therefore: ➤ Only ever have tasks performed by those persons to whom the tasks have been assigned.
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	WARNING	Risk of scalding from hot surfaces! There is a risk of sustaining burns or scalds on hot surfaces during operation. Therefore: ➤ Do not touch the one-way clutch during operation!
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Check lubrication conditions from time to time, flush with thin flushing oil if necessary and change oil.

9 Disassembly

	WARNING	Risk of injury due to incorrect assembly! Faulty installation and maintenance can cause severe property damage and personal injury! Installation, maintenance and repair work may only be performed by personnel with the requisite training and expertise!
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**WARNING****Risk of injury due to falling down components!**

Falling down components can cause serious injuries!
Prevent the one-way clutch from falling down!

**WARNING****Risk of scalding from hot surfaces!**

There is a risk of sustaining burns or scalds on hot surfaces during operation. Therefore:

- Do not touch the one-way clutch during operation!

Procedural steps:

- Remove the axial fixing.
- Remove the key.
- Press the freewheel out of the clamping gap between the outer race and shaft by hand according to the required direction of rotation while turning it slightly in the freewheeling direction.

10 Disposal**NOTE**

The local provisions regarding the disposal of metallic components and any lubricants present are to be observed!

The one-way clutch is comprised of metallic materials which are coated with grease or oil. Metallic materials are fully recyclable. Lubricants and anticorrosive agents are to be disposed of separately. The local disposal provisions are to be observed in this regard.

11 Faults

The manufacturer is to be contacted immediately should any faults arise.

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