

# Operation & Maintenance Manual Rosenqvist SB60

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Original instructions



*The SB60 in the picture is equipped with Automaster (option).*

# PANDROL

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# Thank you for choosing SB60! You are now owner of a quality product from Rosenqvist Rail AB

## Preface

This manual is intended for people who handle and operate this machine.

This manual is originally written in Swedish and then translated into the local language by Rosenqvist Rail AB. Rosenqvist Rail AB reserves the right to change specifications, equipment, instructions and maintenance guidelines without prior notice.

The manual contains instructions about the following topics:

- Installation
- Operation
- Safety features and warnings
- Maintenance and troubleshooting

### IMPORTANT!

This manual contains ordered actions, e.g.

1. Do this
2. ...and then this...
3. ...and finally this

These actions must be done in the numerical order presented.

(1) refers to a component in a figure/illustration.

### REVISION NOTES

Date	Revision	Note
2018-02-19	14	New layout, revised manual

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# 1. Safety

Incorrect installation, operation and maintenance of this equipment may be dangerous and result in severe personal injuries.

Warnings and safety precautions described in this document shall only be considered as a minimum. National conditions, standards and regulations override conditions, standards and regulations described in this document.

Work with the machine is only to be carried out by qualified personnel, well-informed and educated in general railway workmanship and specifically in the conditions, standards and regulations on specific rail track.

The machine may only be used for its specified purpose. Any adjustments or service on the machine is only allowed to be done by qualified personnel that have read and understood this manual and have had training and information from Rosenqvist Rail AB.

## 1.2 Safety actions

- Read and understand all safety regulations and warnings before installation, operating or performing maintenance on this machine.
- Locate emergency stop buttons and fire extinguisher on the carrier before installation, operating or performing maintenance on this machine.
- It is essential that all use, maintenance and service is implemented by qualified personnel, trained by Rosenqvist Rail AB.
- The machine shall not be used as a transport vehicle for personnel or equipment.
- Make sure that unqualified persons are not in the operating area during installation, use or maintenance.
- Safety regulations regarding personnel in operating area for the SB60 are valid for this attachment.
- Improper operation of this equipment can be dangerous and result in personnel injury or death.
- Improper maintenance of this equipment can be dangerous and result in personnel injury or death.
- Use standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences).
- It is of great importance that all service, component replacements or other operations in the electronic or hydraulic systems are accomplished by qualified personnel only.
- The use of solvents as cleaning agents and the use of lubricants can involve health and/or safety hazards. The manufacturers of the solvents and lubricants should be contacted for safety data. The recommended precautions and procedures of the manufacturers should be followed.
- The use of an air jet, which must be less than 8 bar (116 psi), to blow parts clean or to blow them dry after being cleaned with a solvent will cause particles of dirt and/or droplets of the cleaning solvent to be airborne. These conditions may cause skin and/or eye irritation.
- When using an air jet do not direct it toward another person. Improper use of air jet could result in bodily injury.
- Personal eye protection must be worn when undertaking work.

## 1.3 Safety equipment

The machine is to be equipped with safety equipment according to national requirements.

## 1.4 Moving parts

When operated, some parts of the SB60 are moving. Moving parts can cause personal injury or death.

To avoid accidents, follow the guidelines below:

- Keep hands etc. away from moving parts when operating the machine.
- Make sure no unauthorized personnel are in the working area when working the machine, particularly when sleepers are carried by the S60.



**WARNING!** Moving parts - risk of crushing, injury or death

## 1.5 Pressurized hydraulic oil

High pressure fluid is present in operational hydraulic systems. Fluids under high pressure are dangerous and can cause serious injury or death.

To avoid accidents, follow the guidelines below:

- Only qualified technicians or engineers are allowed to make modifications, repairs or adjustments to the hydraulic system.
- Always wear appropriate personal-protection equipment.
- Shut off the engine and drain the hydraulic system.



**WARNING!** Pressurized hydraulic oil – risk of personal injuries

## 1.6 Live current

Contact with electric parts can damage the equipment if live current is present. To avoid accidents, follow the guidelines below:

If electricity needs to be connected for testing purposes. Keep hands, tools etc. away from all electrical parts.

In any other case:

1. Shut off the vehicle's engine.
2. Disconnect the battery terminals.



**WARNING!** Live current

## 1.7 Machine in operation

Special precautions must be taken to ensure that operation of the machine will not result in severe injury or death and/or damage to the equipment.

To avoid accidents, make sure no one is in the vicinity of the machine before operation is started.



**WARNING!** Machine in operation

## 1.8 Operator leaves the machine unattended

When the operator leaves the machine unattended, the machine must always be parked safely on the ground. This is to ensure that the machine don't fall on personnel or on infrastructure at any technical difficulties.



**WARNING!** Machine must always be parked safely on the ground

## 2. Risks

### 2.1 Introduction

An analysis shows that there are three distinct risk areas for this equipment:

- Operation, lift and handling
- Repair
- Maintenance

For each risk identified, there is a short explanation and the means of limiting this risk described. Most of the operating risks are also highlighted in other chapters in this manual.

Great emphasis is placed on the operators training to reduce the risk associated with the operation of this equipment.

It should be stressed that, whilst the risk assessment laid out in this chapter include some consideration of the risk of working the machine under on-site conditions, this should not be taken as a thorough risk assessment of the site operations, as other equipment and processes, not considered herein, may affect the overall risk profile of the operation.

### 2.2 Operating risk

#### Drop of sleepers

**During transport of sleepers there is a possibility that the operator unintentionally presses button for opening of grapple arms and thereby drops the sleepers.**

- Operators of the SB60 should get thorough training in how to operate the equipment.
- All personnel are to be kept at least 5 meters from machine when operating the equipment.
- Both hydraulic cylinders are equipped with hydraulic locks which prevents the cylinders to open in case a hose should break in the hydraulic system.
- Personnel working with handtools or with Automaster shall always wear protective helmet and shoes. Personnel shall not approach the SB60 until the operator gives visually and/or sound clear.

**Clamping force is set too low and the sleepers drop down.**

- Clamping force should be checked and adjusted if needed, before start, see chapter 5.6

#### Hydraulic leakage (personal injury)

**High pressure hydraulic systems are used on this equipment. Damage or failure of hoses and fittings may cause a high pressure jet of oil to be emitted from the system. This could be hazardous to eyes, skin etc. Pools of leaked oil could lead to an increased risk of slips, trips or falls. Connecting and disconnecting the supply and return hoses to the hydraulic systems of the carrier machine carries a risk that oil may be spilled. Hydraulic oil is frequently very hot and may cause burns and scalds.**

- All hoses fitted to the sleeper lifter have a burst pressure in excess of four times the specified working pressure. Regular monitoring of the dimensions of the ferrules fitted to the hoses, and careful training of the staff employed to make up hoses ensures that hose specifications are consistent.
- All components used in the hydraulic system are CE marked.

- Fast connections are used, which minimizes oil being spilled during connection or disconnection to the carrier machine.
- Operators and service personnel should wear appropriate protective equipment, such as gloves, goggles and overalls. Skin exposed to hydraulic oils should be washed immediately.
- All personnel should be made aware of the contents of the product data sheets relating to the oil used.
- Rosenqvist Rail AB recommends the use of biodegradable oils and greases, in order to minimize the environmental impact in case of an oil leakage.

### Noise (personal injury)

**Hearing loss may occur due to the high noise level that can occur when SB60 is excavating ballast.**

- All personnel who work with or near the SB60 must use hearing protection.

### Installing clips (personal injury)

During installation of clips the operator can make a wrong movement of the S60 and harm the personnel.

- The operator of the SB60 should exercise extra caution while the clips are installed on to the sleepers. All personnel must have good knowledge of how the S60 is used and have a good communication with the operator. Safety helmets must be used at all time. The personnel on hand to fasten the sleeper should remain at a safe distance from the Sleeper Replacer SB60 until the operator gives the all-clear sign.

## 2.3 Infrastructure risk assessment

### Damage to sleepers

The sleeper grips presses too hard on the sleepers so that the sleepers are damaged.

- Clamping force can be adjusted on the sleeper lifting tool, see chapter 5.6.

### Damage to fishplates, welded joints e.g.

Operator strikes in to obstacles

- When the SB60 is being operated on the track, the driver must exercise the utmost care to avoid the unit coming into contact with fishplates, welded joints or other related fittings. Such obstacles can seriously damage the SB60 and vice-versa and it is vital that the drivers acquaint themselves with the relevant stretch of track and if necessary take the machine off the track to avoid them.



## 2.4 Repair and maintenance

### Damage to the equipment

**Damage to the Sleeper Replacer during repair or overhaul may cause the equipment to malfunction and may increase risk for personnel when in service.**

Only competent staff should perform any repair or maintenance. For advice on maintenance or repair on the machine, please contact Rosenqvist Rail AB.

### Personnel injury

**High pressure hydraulic system may have stored pressure even when disconnected from the rail/road machine. Some parts of the machine are heavy and may cause personal injury if dropped.**

- Only competent staff should perform any repair or maintenance. For advice on maintenance or repair on the machine, please contact Rosenqvist Rail AB.
- Appropriate protective equipment should be used at all times.
- Careful consideration should be given to the handling of all parts before commencing repair operations.

### **Operator drops the SB60 or tools that are on the SB60**

- Machine must only be lifted in the machine bracket. Only properly trained personnel should attach and detach the equipment. Do not lift the machine with loose items lying on the machine. Keep all personnel clear of working area when lifting machine.

## 2.5 Qualified personnel

The Sleeper Replacer SB60 is only to be used by qualified personnel, thoroughly familiar with and trained in general railway workmanship and operation according to the conditions and standard regulations applying to the track they are working on.

The equipment must be serviced, maintained, or in any way modified only by qualified personnel who are familiar with the Operation & Maintenance Manual and have received training and information from Rosenqvist Rail AB.

The components in this unit and other components in the vicinity are powered by dangerous contact voltage.

Touching any parts, connected to such voltage, can cause serious injury.

In order to avoid personal injury or death and/or material damage, everyone involved with assembling, starting-up or overhaul must possess pertinent knowledge of the following:

- The automation technology sector
- Dealing with dangerous voltages
- Using standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences)



**WARNING!** All maintenance and service, or other operations on the electronic or hydraulic systems are to be carried out by qualified personnel.

## 2.6 Warning labels and information symbols

Below are warning labels and information symbols on the machine.

If any of these labels become damaged or lost, they are to be replaced with new original warning labels that are available from Rosenqvist Rail AB.

		
<p>710016 -Read manual</p>	<p>710048 -Wear safety goggles</p>	<p>710051 - Wear safety helmet</p>
		
<p>710052 - Wear ear protection</p>	<p>710020 - Warning Oil pressure</p>	<p>710019 - Warning Risk of crushing</p>
		
<p>710021 - Do not ride or stand on machine</p>		

### 3. Description

The Sleeper Replacer SB60 is designed and manufactured for use as a hydraulic attachment on rail-bounded excavators for efficient replacing of concrete and wooden sleepers. It is hydraulically rotating and tilting and can replace the sleepers both from the middle and from the side of the track.

It is also designed for effective movement and recessing of the ballast. The high performance Sleeper Replacer SB60 holds a key function in a versatile high output, cost efficient and safe working method.

The Sleeper Replacer SB60 has been rigorously developed, extensively tested and utilised with excellent results and high productivity.

Delivered CE-certified.

This is the machine identification plate with CE-marking and serial number.

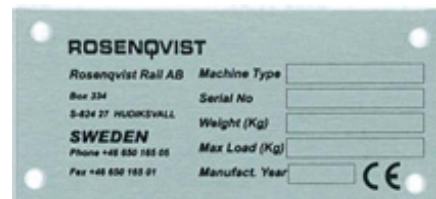


Fig 1.

#### 3.1 Functions

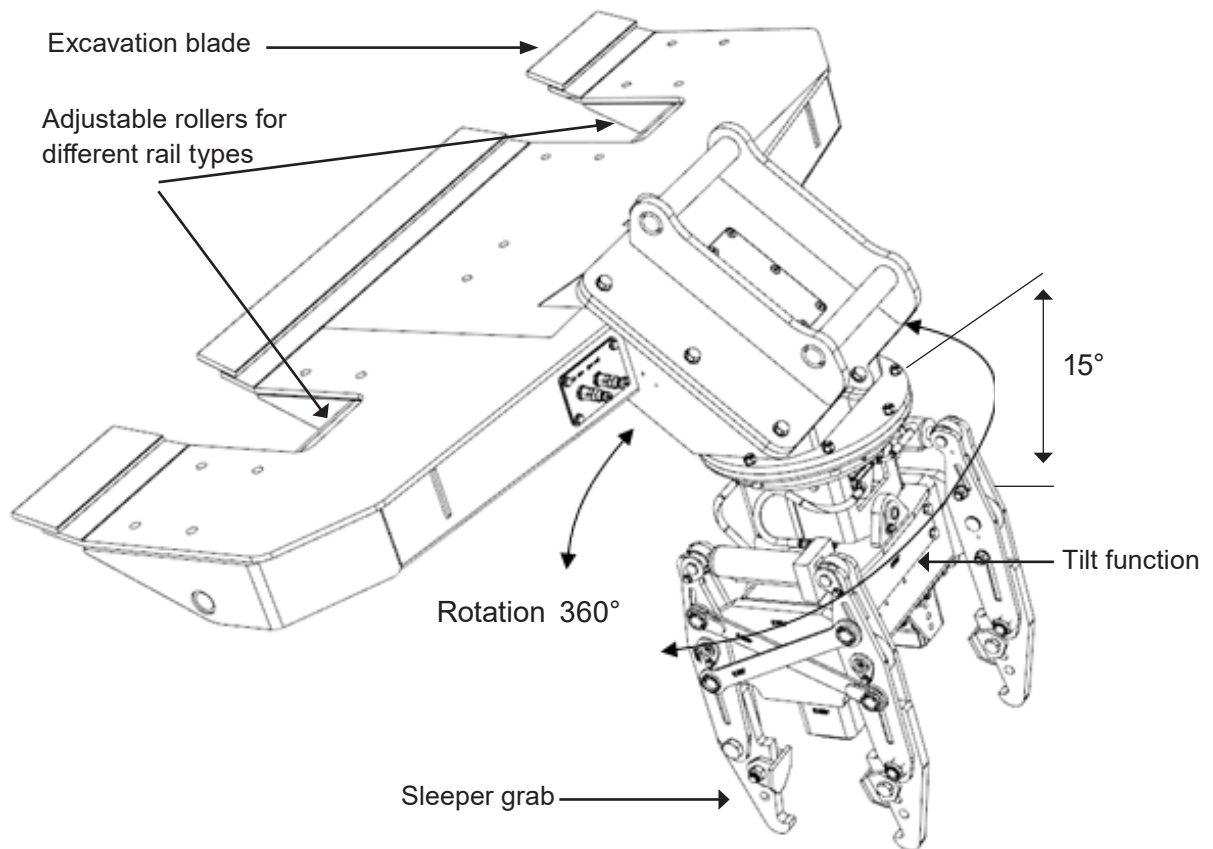


Fig 2.

### 3.2 Configurations

SB60 is modular built and different options are available as below.

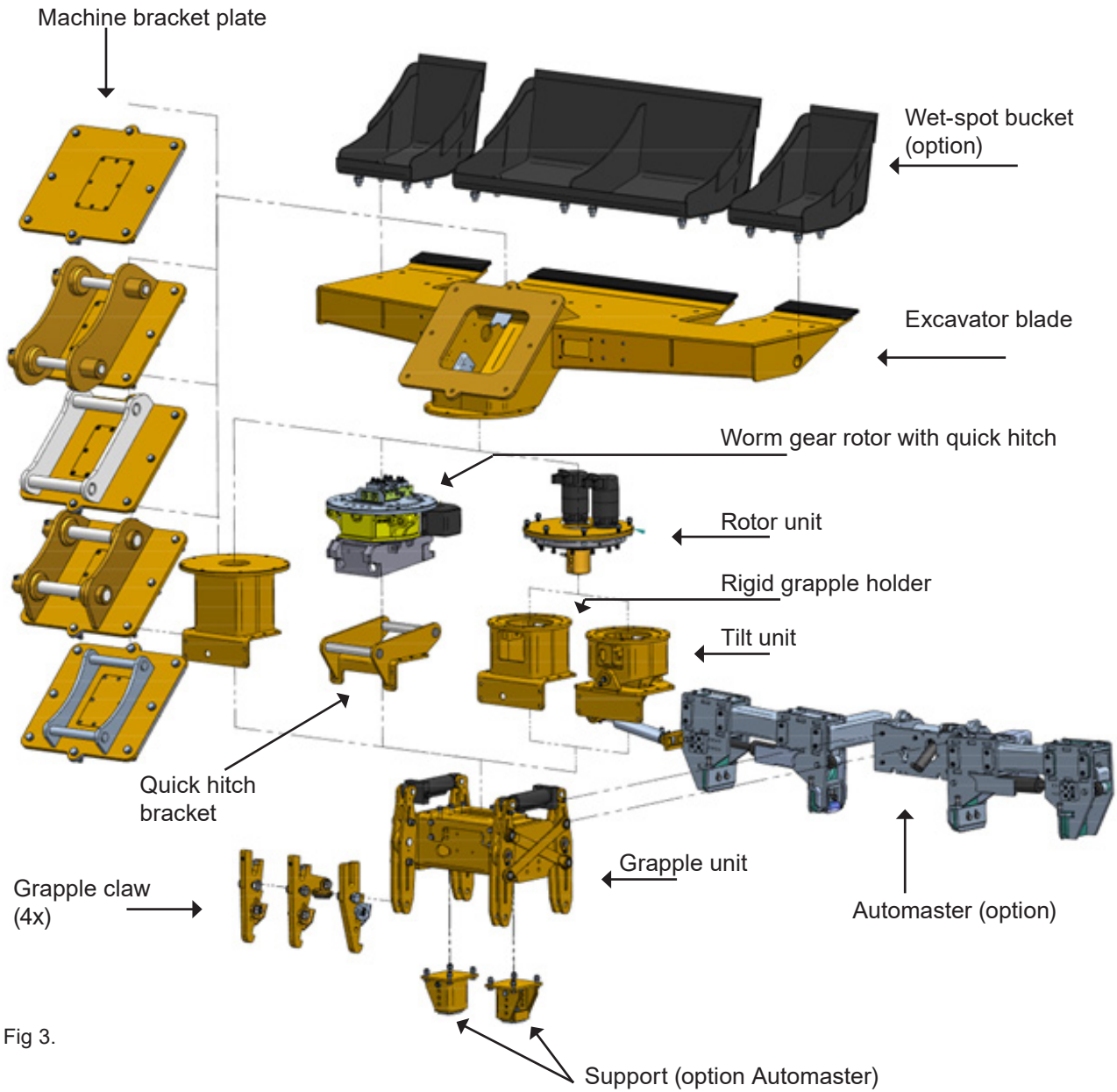
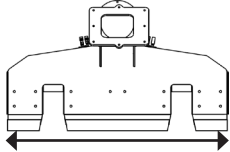


Fig 3.

## 4. Technical data

Item	Standard gauge 1435 mm	5008730
	<i>Customized gauge 1520 mm</i>	<i>5007246</i>
	<i>Customized gauge 1067 mm</i>	<i>5007245</i>
	<i>Customized gauge 1000 mm</i>	<i>5007244</i>
Width 	Standard gauge 1435 mm	2578 mm
	<i>Customized gauge 1520 mm</i>	<i>2746 mm</i>
	<i>Customized gauge 1067 mm</i>	<i>2290 mm</i>
	<i>Customized gauge 1000 mm</i>	<i>2223 mm</i>
Weight	Standard gauge 1435 mm	1050 kg
Rail type	Europe standard	60 kg/m, 50 kg/m
Clamping force		6000 kg
Torque		295 dNm (180 bar)
Electrics	Standard	24 volt DC, negativ ground
	<i>Customer adjusted</i>	<i>12 volt DC, negativ ground</i>
Hydraulics	2 outlets with two-way function required (4 hoses) + one drainage line direct to tank	Rec. flow from hydraulic pump: 20–50 litres/min (5,3 - 13,2 gal/min)
		Recommended oil pressure: 180 bar (2610 psi) Min. 160 bar (2320 psi) Max. 220 bar (3190 psi)
<i>Option</i>	<i>Automaster attachment for Pandrol FASTCLIP</i>	
<i>Option</i>	<i>Buckets</i>	
<i>Option</i>	<i>Fastening tool for screw fastening</i>	

## 5. Installation

### 5.1 Main functions

The Sleeper Replacer SB60 is manoeuvred hydraulically from the carrying vehicle.

Please observe that the carrying vehicle should incorporate two 2-way hydraulic outlets.

The Sleeper Replacer SB60 performs the following operations:

- **Gripping:** The unit incorporates a load holding facility, pressure relief valve, as well as an accumulator to maintain grip on the sleeper.
- **Turning:** The unit can rotate the sleeper 360 degrees, with the speed adjusted by a flow control valve.
- **Tilting:** Within a range of +/- 15 degrees, with the speed adjusted by a flow control valve.
- **Excavating:** The excavating blade enables digging operations.

### 5.2 Manoeuvring buttons and cables

1. Connect the charger plug, with or without adapter, see figure 4 and 5 to the 24-volt DC charger plug connector in drivers cabin, see figure 6.



Fig 4. With adapter



Fig 5. Without adapter



Fig 6. Examples of charger plug connector in driver's cabin

2. Mount the manoeuvring buttons on the joystick.



Fig 7. Example of placement of the maneuver buttons.



Fig 8. Example of maneuvering cables.

2. Draw in the cable via the cabin floor. Install it along the digging arm, or on one of the lifting arms, and fasten it with plastic ties.
3. Fasten the other end with the electrical contact on the digging arm, close to the hydraulic outlets or the machine coupling.
4. Connect the electrical contact with the equivalent contact on the SB60.



**WARNING!** Ensure that the cable is long enough for the excavator arm to be able to move freely without damaging the cable.

### 5.3 Installation to carrier

The SB60 shall be equipped with a machine bracket appropriate to the specific carrier and welded onto the installation plate placed on the SB60.

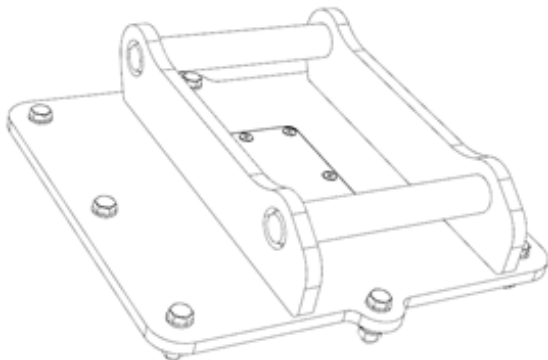


Fig 9. Machine bracket



**WARNING!** Bracket must be welded on the B60 installation plate by qualified personnel and in accordance with the carrier manufacturer's recommendations.

1. Connect the SB60 machine bracket to the coupling on the carrier's digging arm. Make sure the SB60 is positioned so that the excavation blade is pointing towards the driver's cabin.
2. Close the engine and all hydraulic power outlets.



**WARNING!** Machine engine and hydraulics must be turned OFF before proceeding with the next step.

3. Connect 4 hydraulic hoses from the Sleeper Replacer SB60 to the hydraulic inlet and outlet on the digging arm. Drain line connected to (L)

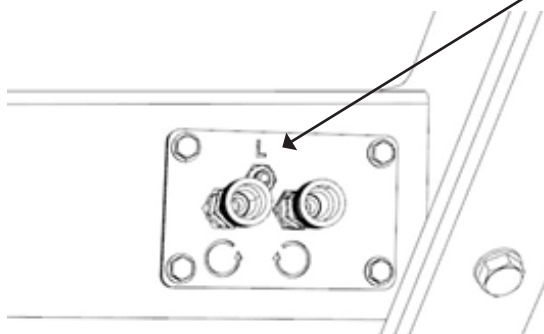


Fig 10. Female connection for turning function. L for drain

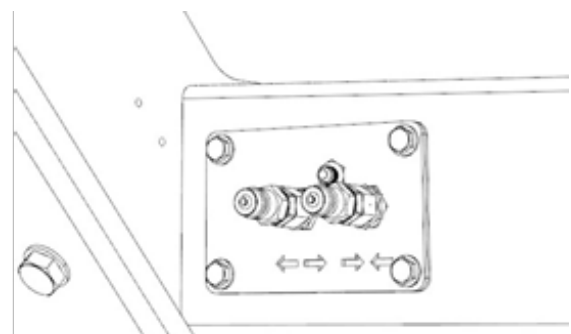


Fig 11. Male connection for sleepergrab



**WARNING!** Make sure that the hoses are properly secured and connected before proceeding with the next step.



## 5.4 Connection of electricity

The power to the rotation, tilting and gripping features are connected on to the side where the female fittings to hydraulics is located.

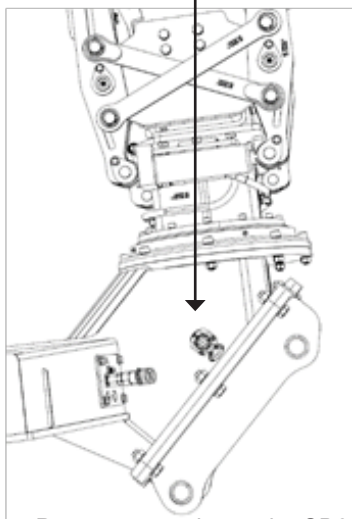
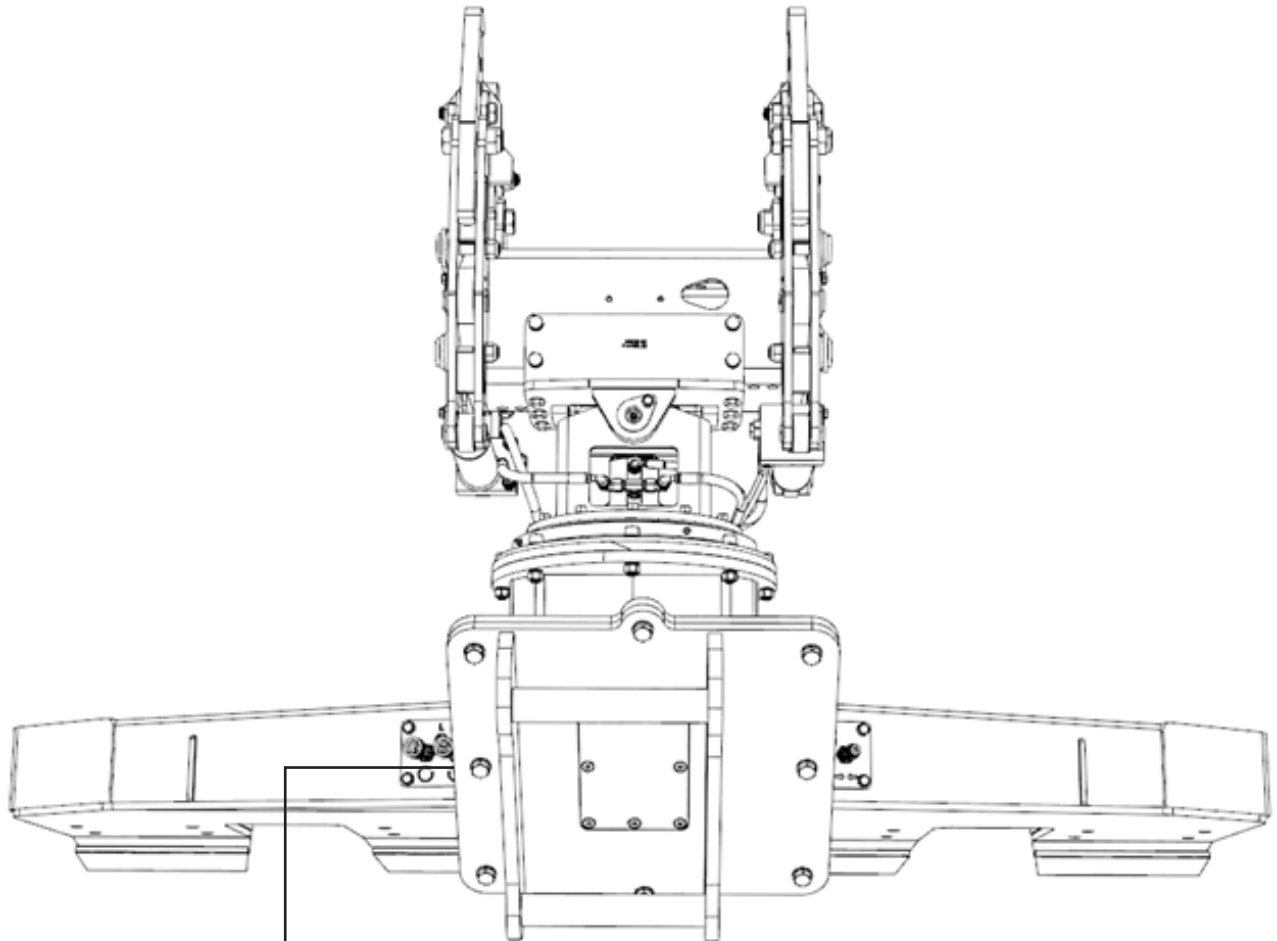


Fig 12. Power connection to the SB60

Fig 13.

## 5.5 Function test controlsystem

Start the engine and activate the hydraulics for the Sleeper Replacer SB60.

### Test functions:

- Sleeper grabber – two way function no. 1.
- Rotation function – two way function no. 2.
- Tilt function – two way functions no 1 together with extra tilt buttons on joystick (see figure 7-8).

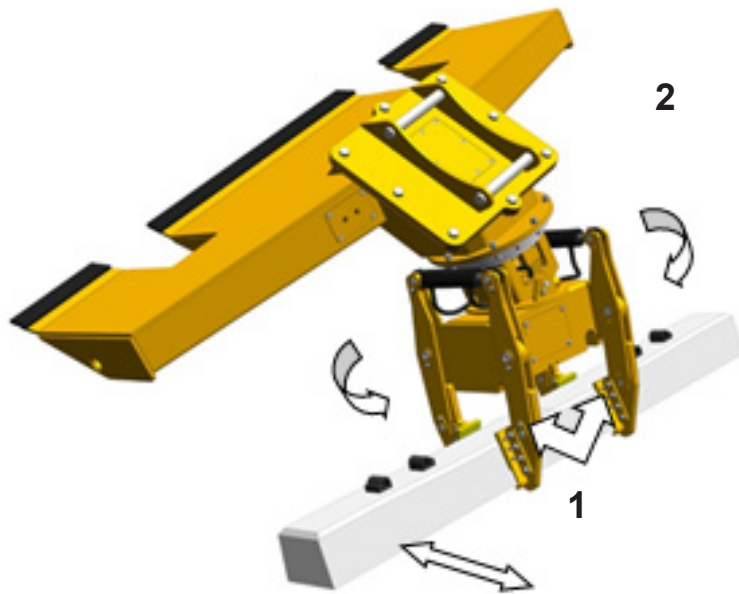


Fig 14. Functions on the SB60

## 5.6 Adjustment of oil pressure

### Adjustment of clamp force

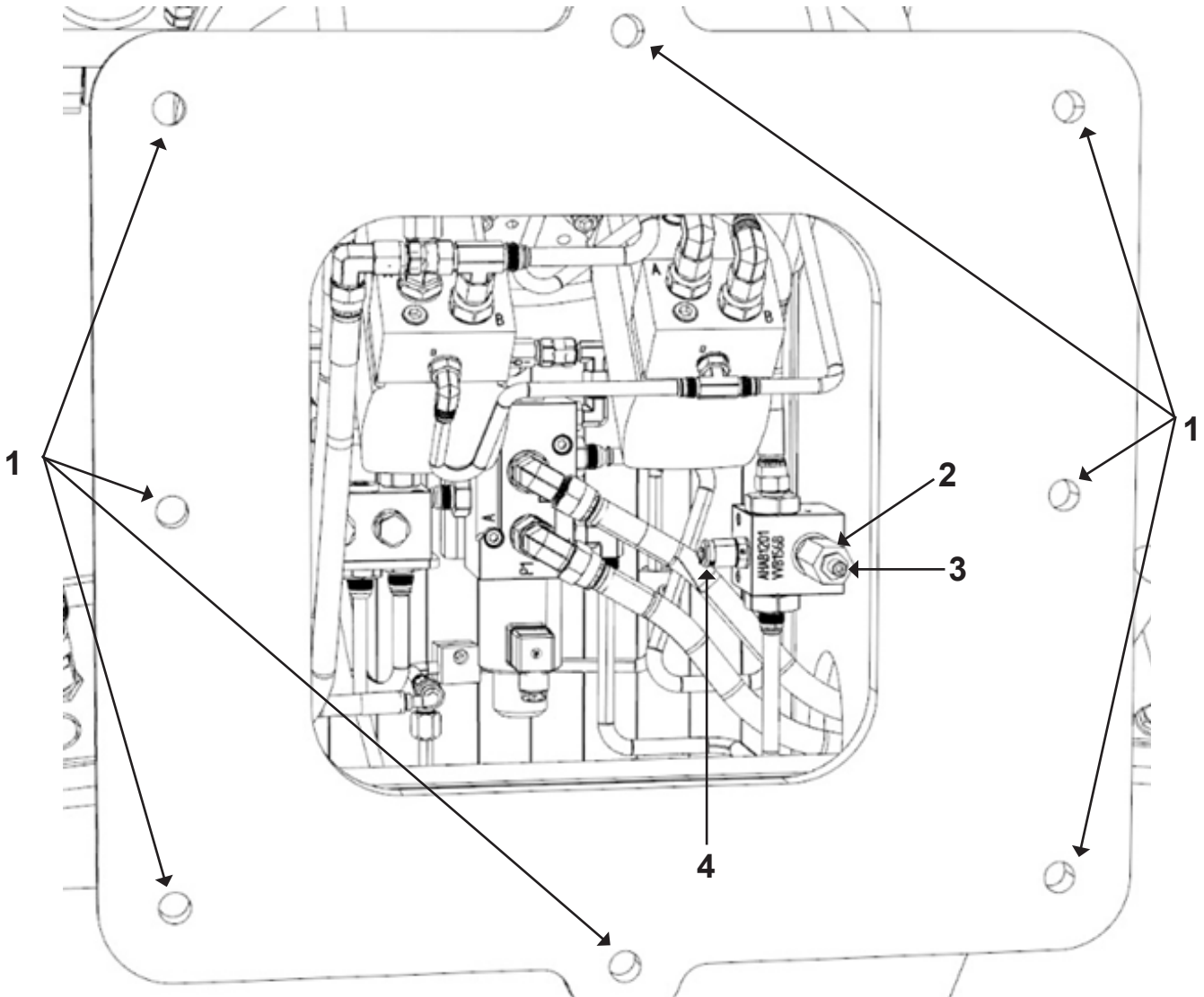


Fig 15. Adjustment of clamp force

If reduced clamping force when grabbing sleepers is required, the oil pressure can be regulated.

1. Loosen the 8 screws (1) with a 6 mm allen key.
2. Loosen (2) then adjust the oil pressure (3) by using a 5 mm allen key and a 17 mm U-key.
3. The oil pressure can be measured with a manometer at measure point (4).

**Correct pressure is 100 Bar.**

## 5.7 Adjustment of pit depth

Depending on the variety and amount of ballast the pit depth can be set for a more efficient work procedure. There are three different sizes of support rollers mounted on to the SB60. When the operator excavates, the support roller rolls on the rail head, see Figure 19.

Depending on which support roller is mounted, the blade excavates at different depths. Excavation depth is adjusted by changing the blade support rolls. To change rolls you need two 24 mm spanners. See fig below.



Fig 16.



Fig 17. Support roller on rail head



Fig 18. Support roller mounted



Fig 19. There are three support roller mounted on the SB60



Fig 20. Three support rollers

Depending on the driver and how much the smaller rollers are used it could be difficult to mount the bigger rollers back because of deformation of the smaller used roller.

Depending on how worn or deformed the smaller roller is it can be easily fixed by grinding the deformed surface. New rollers are available and can be ordered from Rosenqvist Rail AB. See contact information on the last page.

## 5.8 Use

The following points should be observed and followed when using the S60:

- The SB60 must always be handled with the utmost care, in all aspects of its operation or maintenance. Failure to do so entails risk of mishaps that could result in serious or even fatal injuries.
- The Sleeper Replacer SB60 is only to be used on a railway by qualified and experienced personnel.
- The carrier must adhere to the standards, terms and general conditions laid out by the track owners or railway administrators. The user of the equipment must observe and comply with the appropriate safety precautions.
- The user of the equipment must take all the necessary precautions to ensure safe operation of the equipment. The driver is responsible for ensuring that nobody interferes with the machine and equipment whilst it is in use.
- The personnel on hand to fasten the sleeper should remain at a safe distance from the SB60 until the operator gives the all-clear sign. The personnel shall at all time use hearing protection and safety helmet.
- The operator shall make sure not to damage the sleeper when grabbing it.
- When the SB60 is being operated on track, the operator must exercise the utmost care to avoid the unit coming into contact with fishplates, welded joints or other related fittings. Such obstacles can seriously damage the SB60 and vice-versa and it is vital that the drivers acquaint themselves with the relevant stretch of track and if necessary take the machine off the track to avoid them.

## 6. Maintenance

*IMPORTANT! FOR UK MARKET USE Maintenance Manual DOC ID "ENG\_MM\_SB60".*

MAINTENANCE AND OVERHAUL IS TO BE CARRIED OUT BY QUALIFIED PERSONNEL ONLY.

The Sleeper Replacer SB60 is designed for the absolute minimum of maintenance. All its components have been chosen for a long working-life and are of high quality.

The Sleeper Replacer SB60 requires:

- A minor maintenance before every working shift
- A more thorough overhaul once a year

*Warranty applies on consumable parts and spares delivered by Rosenqvist Rail AB.*



**WARNING!** Machine engine and hydraulics must be turned OFF before all service and overhaul work. Failure to do so could lead to fatal injury.

### 6.1 Ocular inspection, before and after use

- Check for leakage from the hydraulic components or hoses. If necessary, tighten the couplings or replace damaged parts.
- Check that the gripping pads and installation arms are not damaged and adjust or replace if necessary.
- Check that the sleeper grab plates, pistons and hydraulic motor are not damaged and adjust or replace if necessary.
- Make sure that all screws and nuts are tightened, use a spanner if necessary. Some screws on the SB60 may require tightening after a period of use due to vibration. Note! Also check bolt connection for rotation motor inside the unit.
- See to that the machine is kept clean to prevent corrosion. Wash with warm water and washing up liquid or similar cleaning solutions. Grease and lubricate when the Sleeper Replacer is dry again.

### 6.2 Annual overhaul

Once a year, dismantle the SB60 and inspect:

- Shafts
- Bearings
- Hydraulic cylinders
- Motor seals and pistons
- Wear parts such as pads, rubber and plastics

Repair damaged paintwork by applying original paint (RAL 1004) to prevent rust.

### 6.3 Lubrication

The Sleeper Replacer has several moving parts that require to be lubricated daily. Lubricate with multipurpose grease after every 8 hour shift or more frequently if necessary. There are totally 10 lubrication points.

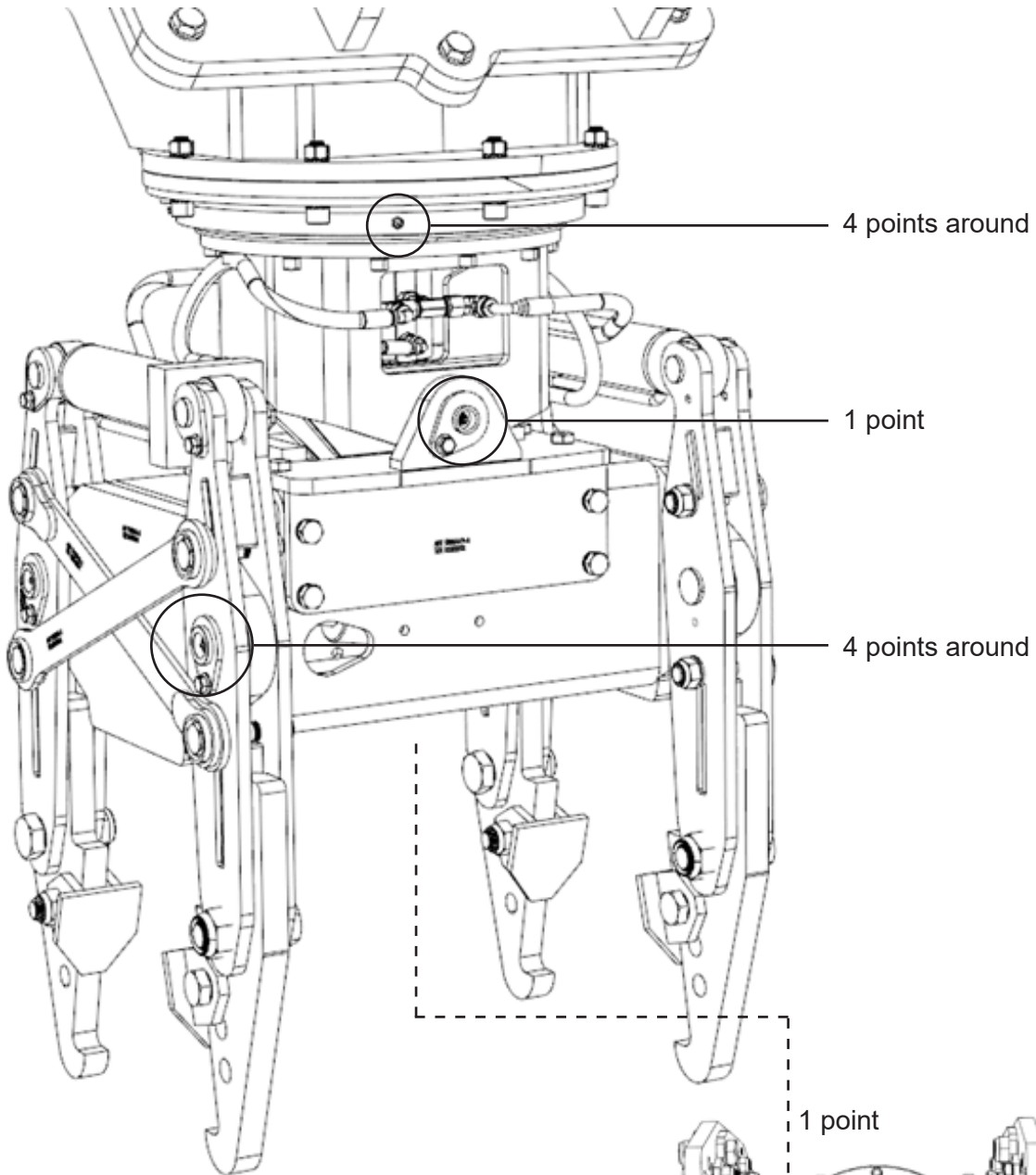


Fig 21.

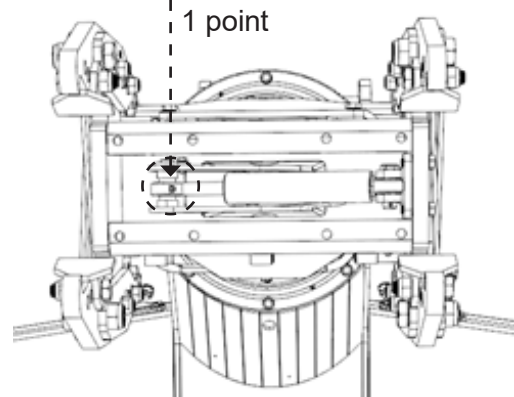


Fig 22.

## 7. Worm gear rotator (option)

As an option a worm gear rotator can be mounted on the SB60. The rotator is mounted between the blade and the sleeper replacer.

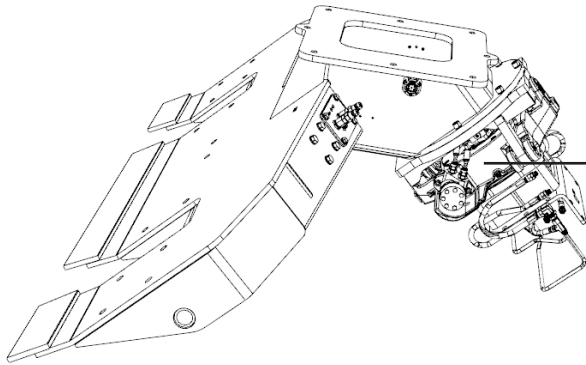


Fig 23.

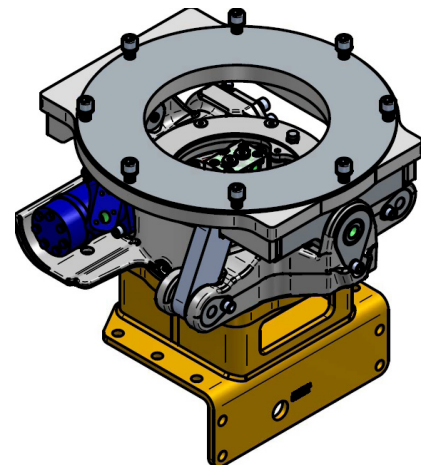


Fig 24.

The SB60 can be disconnected from the rotator by using the hydraulic outlets. Plugged from factory, fig 25.



Fig 25.

### 7.1 Lubrication

The rotator has several lubrication points. Lubricate with multipurpose grease after every 8 hour shift or more frequently if necessary. There are totally 3 lubrication points.

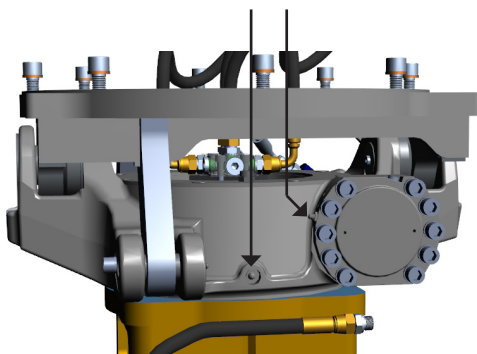


Fig 26.

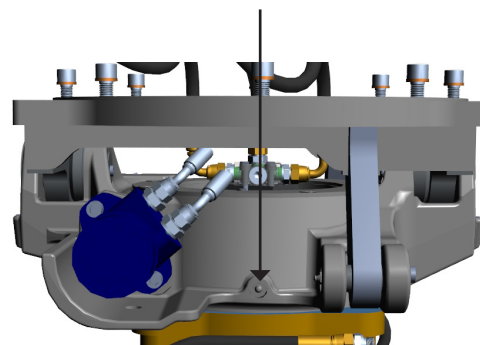


Fig 27.



## 8. Guarantee and service

### Guarantee

All products from Rosenqvist Rail AB have a 12 month guarantee.

The guarantee does not apply if the product defect or flaw in question exists because of or is a result of improper use, tampering, or unauthorized modification, or if the product has been exposed to fire, electrical storms or excessive voltage.

Warranty applies to consumable items and spare parts supplied by Rosenqvist Rail AB.

### Service

Service is offered after the expiration of the guarantee. Please contact Rosenqvist Rail AB.

### Disclaimer

Rosenqvist Rail AB exempts itself from liability in the event of usage that deviates from that recommended in this manual.

## 9. Contact

**Address:**

Rosenqvist Rail AB  
Hyggesvägen 4  
824 34 Hudiksvall  
SWEDEN

**Phone:**

Phone +46(0) 650 165 05

**Internet och e-mail**

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