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1 Preventive Maintenance General



Warning!

Always study the **056786 Safety** section BEFORE maintenance. Inadequate knowledge can cause damage on personnel and machines.

Always keep clean and tidy around the machine.

The following section describes the preventive maintenance that shall be carried out by trained and experienced personnel.

Operator Maintenance is found in a separate section of the manual. See document **056789 Operator Maintenance**.

For maintenance repair instructions outside of the preventive maintenance stated in this manual, please see document **056791 Maintenance**.

It is recommended to keep a diary of performed service and preventive maintenance.

When maintenance is performed, lock the machine and put up a "Maintenance" sign.

1.1 Intervals

Note!

Intervals may need to be adjusted depending on operational situation and wear. The stated intervals are an assessment based on the presumptions at delivery.

The intervals for preventive maintenance are stated in the maintenance schedule.

Intervals "When necessary" and "Depending on environment" are determined by the machine owner. Please contact EuroMaint at uncertainty.

1.2 Cleaning

- Make sure the machine is shut off before starting to clean.
- Use a soft brush, clean textile cloths (possibly slightly damp) and drying felt when cleaning the machine.
- Never use chemicals (possibly a neutral soap solution) when cleaning the machine. This especially applies to sensors, reflectors, light beams, light curtains and image screens.
- Never use compressed air or high pressure water when cleaning, if this is not specially stated in the instructions.
- Cleaning of electrical equipment can never be made with water.

1.3 Lubrication

Always study the safety instructions for lubricating and hydraulic oils. See manufacture's instructions.

Collect and handle residue/used lubricants according to applicable instructions. See document **056792 Handling**, chapter **8.1 Table For Waste Management**.

1.4 Special instructions for machines with electrical equipment



Warning!

Repair and maintenance in electrical cabinets and equipment can only be performed by authorized, experienced and licensed electricians.

Maintenance on electrical equipment shall be performed by personnel according to document **056786 Safety**.

When conducting maintenance on electrical equipment the following shall be considered:

- Fasten all loose connections.
- Change damaged cables/wires immediately.
- Make sure the electrical cabinet is locked.

1.5 Special instructions for machines with pneumatic and/or hydraulic equipment

When performing maintenance on pneumatic and hydraulic equipment please consider the following:

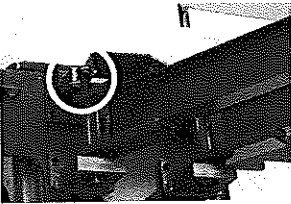
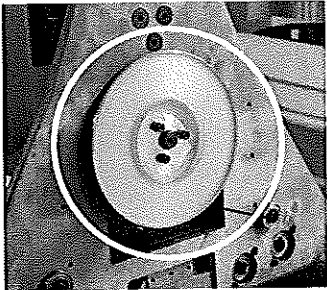
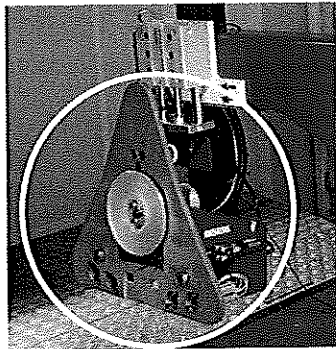
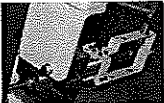
- Before repair and maintenance is started all equipment must be made pressureless.
- The settings of the safety components (such as pressure limiting valves) regarding, for example, speed and times can NOT be changed.
- Make sure all safety equipments work properly.
- Wipe up any residue fluids.
- Change filters when required.

2 Maintenance Schedule

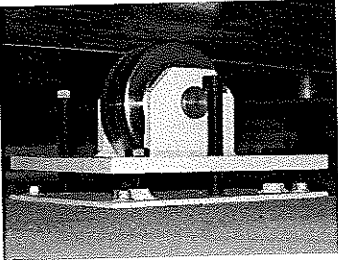
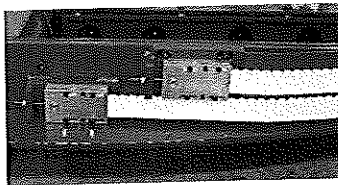
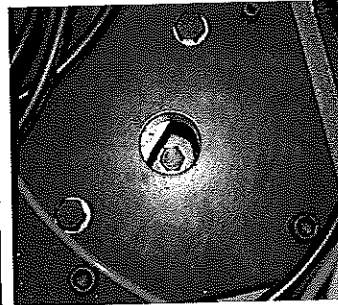
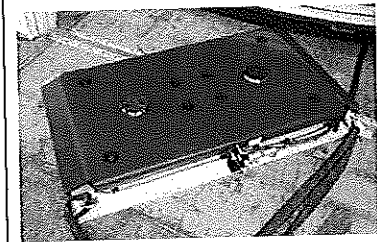
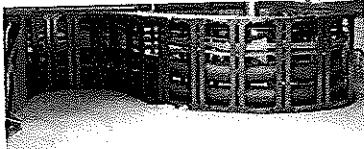
2.1 General

No	Action	Instructions	Frequency
1	General functionality and mechanical noise	Check that the equipment operates as normal. If the action of the equipment is abnormally slow or noisy. Take action if required.	Monthly

2.2 Inspection Points - Repair, Adjust and Replace if needed

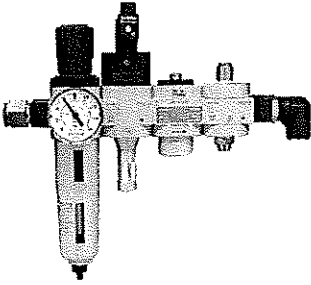
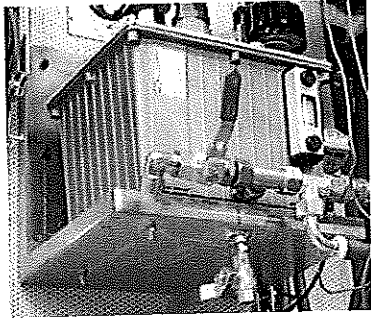
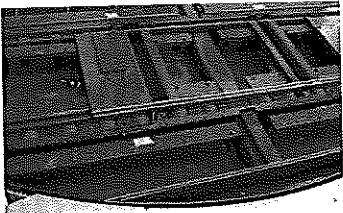
No	Action	Instructions	Frequency
Hose Management System			
1	Check rubber stops for arms 	Check for wear or if missing. Replace if missing or worn out.	Monthly
2	Check Spring Balancers	Check functionality. Check wire for wear.	Monthly
Torsional Measuring Unit			
1	Check Torsional Rubber Plate 	Check for wear or damage. Change if required. For instructions on changing the plate, see chapter 3.2 <i>Change of Torsional Rubber Plate</i>	Weekly
2	Check Torsional Triangle Plate 	Check for wear or damage. Change if required. For instructions on changing the plate, see chapter 3.3 <i>Change of Torsional Triangle Plate</i>	Weekly
Turntable Drive Unit			
1	Check flexible movement 	If the turntable stop positions start to deviate the sensors will alarm. Make sure the reason for the movement is not a mechanical issue or malfunctioning wheel(s) on Turntable. For instructions on change of springs, see chapter 3.4 <i>Change of Drive Unit Springs</i>	Monthly

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WEST Station

Turntable			
1	Check Turntable wheels 	In case of abnormal mechanical noise, check the wheels for wear or malfunction. For instructions on change of wheels, see chapter 3.5 Change of Turntable Wheel	Weekly
2	Check drive belt 	Check the belt for wear and slack. For instructions on tightening or changing belt, see chapter 3.6 Change of Drive Belt	Monthly
3	Check central bearing for mechanical noise 	Listen for abnormal mechanical noise and check for sluggish movement of the table. Take measures if required. For instructions on changing the central bearing, see 3.7 Change of Central Turntable Bearing	Monthly
4	Check cylinders	Check function visually. Please refer to manufacturer's manual.	Weekly
5	Check Turntable Lifting Unit 	Check function visually. For instructions on changing/repairing the lifting unit, please see document 057631 Maintenance , paragraph 7.2 Change of Turntable Lifting Unit .	Weekly
6	Check for power steering oil leakage	Check for oil leakage, drain or absorb if required.	Daily
7	Check hoses	Check for incorrect values and leakage	Daily
Roof, cable train			
1	Check movable cable train (on roof) 	Check the condition of the cables and connectors and fix any loose connections. Check for leakage. Take measures if required. <div style="text-align: center;"> WARNING! Maximum load capacity on roof 200 kg /440 lbs </div>	6 months

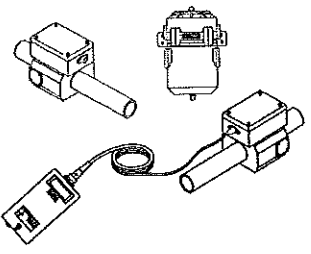
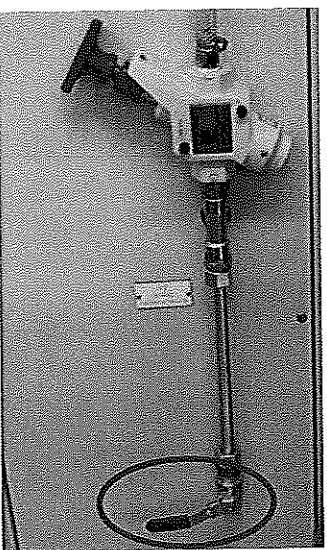
PREVENTIVE MAINTENANCE

WEST Station

Electrical			
1	Check electrical enclosure	<p>Make sure the fans, if any, function properly and that the filters are not clogged. Clean/change if required.</p> <p>Make sure the electrical cabinet is free of dust.</p> <p>Make sure all protective housings, if any, are in place.</p> <p>Check all, if any, cables to units in the cabinet door. Take action if required.</p> <p>Make sure the electrical enclosure is closed.</p>	6 months, depending on environment
2	Electrical connections	Inspect electrical connections and check for bent or damaged pins.	6 months
3	Motors	Check according to manufacturer's manuals.	-
Media Supply			
1	Change filters in the media panel 	<p>Change at alarms or once a year.</p> <p>See further information in chapter 3.11 Change of Filters.</p>	Yearly
2	Clean day tanks (power steering oil + diesel) 	<p>Clean the tank.</p> <p>See further information in chapter 3.10 Cleaning Of Day Tank.</p>	Yearly
3	Check for oil leaks	Check motors, hydraulic connections and hoses. If the through contains residue oil, empty or absorb.	Daily
4	Check oil drip pan 	Remove skid plates and clean drip pan.	Monthly

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Pneumatics			
1	Check filter incoming air	If the pressure is too low the filter may need to be changed. See instructions in paragraph 3.8 <i>Change of Filters</i> .	
2	J-Tec Flow Meter 	Clean the inside of the flow tube. If the meter produces erratic readings a cleaning schedule should be implemented. See further information in chapter 3.8 <i>Cleaning the J-Tec Flow Meter</i> .	Monthly
3	Drain the pneumatic drip leg of the main pneumatic valve 	Drain the pneumatic drip leg by turning the handle and letting out residue water.	Monthly

Carbon Dioxide Tank			
1	Check carbon dioxide container	Weigh the container to make sure it is full. After engagement of Emergency Stop the carbon dioxide container needs to be weighed and checked. After the killswitch has been activated the CO ₂ container must be replaced.	Yearly When appl.

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WEST Station

2.3 Safety Related Items

No	Action	Instructions	Frequency
1	Check protective glass	Make sure the glass is clean and undamaged. Change if necessary.	6 months
2	Inspect safety doors/gates/fences	Make sure that the safety fence and other mechanical protections around the machine are functional, closed (locked) and in its place. Pay special attention to doors, gates and parts which can be demounted. Make sure gate locks that should be sealed are sealed.	6 months
3	Check Emergency Stops	Under settled conditions, check the emergency stop function. The emergency stops are connected to surrounding equipments.	6 months
4	Check safety locks and protective stops	Under settled conditions, check the function of safety locks and protective stops.	6 months
5	Check Light Curtains	Make sure light curtains operate correctly. Make sure the light beam has no physical damage.	6 months


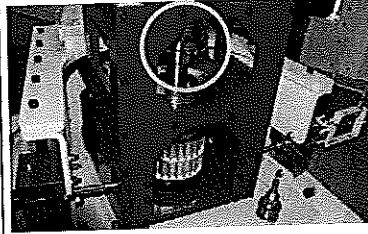
2.4 Calibration and Accuracy Verification

Instructions for calibration can be found in the *Maintenance* manual.

No	Designation	Action	Instructions	Frequency
1	B508.5 A side B509.5 B side B508.7 A side B509.7 B side B508.3 A side B509.3 B side -- Starter Power Supply (12V + 24V) -- Microphones	Verification and Calibration. -- Oil Pressure Transducer -- Oil Pressure Transducer -- Manifold Pressure Transducer -- Manifold Pressure Transducer -- Crank case Blow by Flow meter -- Crank case Blow by Flow meter -- Starter Power Supply (12V + 24V) -- Microphones	Verification and Calibration of all analog inputs to the IPV3000. For Verification and Calibration procedures, see chapter <i>056791 Maintenance</i> , chapter <i>6.4 Signal Conditioning System</i> .	At suspected measuring deviations, or at least once every 6 months. at suspected measuring deviations, or at least once every 6 months. at suspected measuring deviations, or at least once every 6 months 3 months -----
2		Verification/Calibration of all analogue inputs to the SA3000	End to end calibration of analogue device signal conditioning modules. See document <i>056791 Maintenance</i> , chapter <i>6 Calibration</i> .	6 months

PREVENTIVE MAINTENANCE
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2.5 Lubrication Diagram

Pos	Name	Action	Volume		Lubricator	No	Interval
1	Turntable Alpha gear 	Change When changing oil the gears must first be flushed out before new oil is applied. Alt. The gears are flushed out when needed.	xxx	cm ³	Oil: Tribol 800/220	x	xx hours
2	Rollers motor/gear (brand: Siemens)	?	0.4	Liter	Oil: CLP PG VG460	?	?
3	Drive Unit Tooth Coupling 	Lubricate One pump stroke, or until new grease is pressed out of the tooth coupling	1	Pump stroke	SKF LGMT 2/0.2 NOTE! For ETP-Express torque information, see paragraph 3.9 ETP-Express Fitting		Yearly

3 Maintenance Mechanical Components



Warning!

Before any type of maintenance it is of the outmost importance that the personnel involved in the maintenance work carefully studies paragraph **3.1.1 Before Maintenance** and all other safety regulations and warnings.

Use ONLY original spare parts.

Motors can become hot during operation – risk of burns!

3.1 General Maintenance Information

3.1.1 Before Maintenance

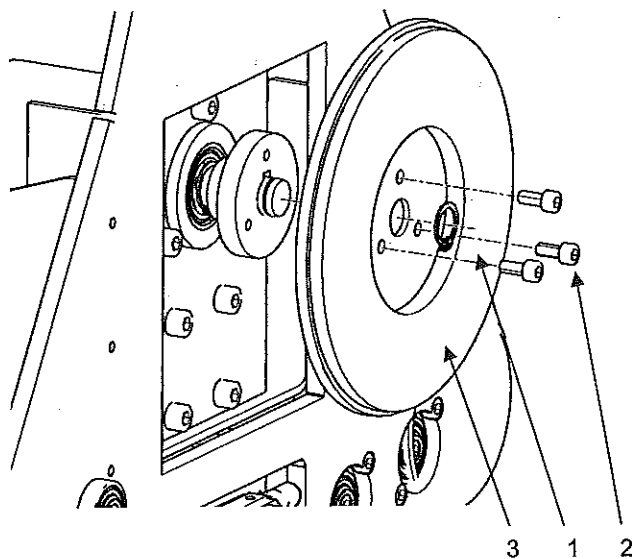
- Remove any engines, racks or other heavy load off any lifting tables, linear units, turntable affected by the maintenance.
- Lifting tables must be set to their lowest position, or safely blocked up, to avoid bodily harm.
- Before maintenance, shut down the machine according to document **057638 Operator Instructions**, chapter **12.1 Shut Down Of The Machine** and **12.2 Long Term Shut Down/Maintenance**.

3.1.2 After Maintenance

- Remove any trestles, safety devices, tools, jacks etc.
- Reset and remount all safety equipment, plates, covers etc.
- After change of motor and/or gear box the servo must be reset.
- Start-up the equipment according to document **057638 Operator Instructions**, chapter **5. Start-Up**.

3.2 Change of Torsional Rubber Plate

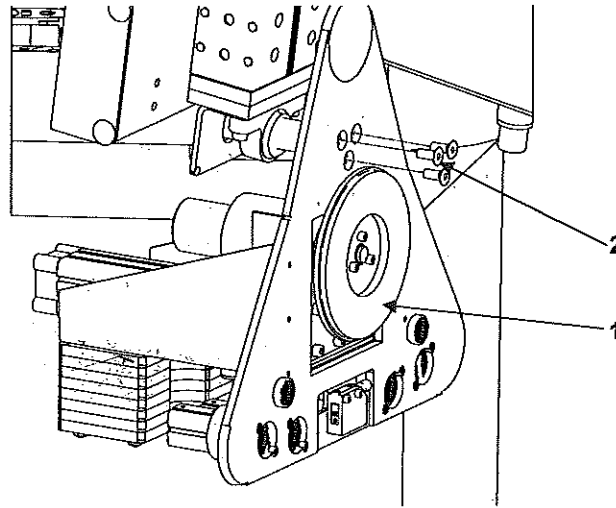
NOTE! Before maintenance – study the paragraph **3.1.1 Before Maintenance**.



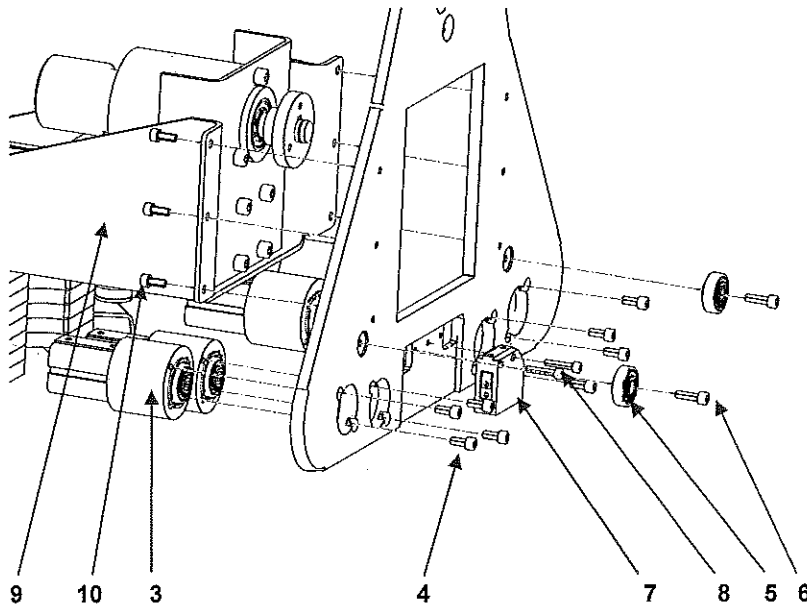
1. Remove the lock ring (1)
2. Remove the three screws (2)
3. Remove and change the plate (3)
4. Reassemble in reversed order.
5. After maintenance, see paragraph **3.1.2 After Maintenance**.

3.3 Change of Torsional Triangle Plate

NOTE! Before maintenance – study the paragraph 3.1.1 *Before Maintenance*.



1. Remove the Torsional rubber plate (1) according to chapter 3.2 *Change of Torsional Rubber Plate*.
2. Remove the three plate attachment screws (2) and lift off the plate.

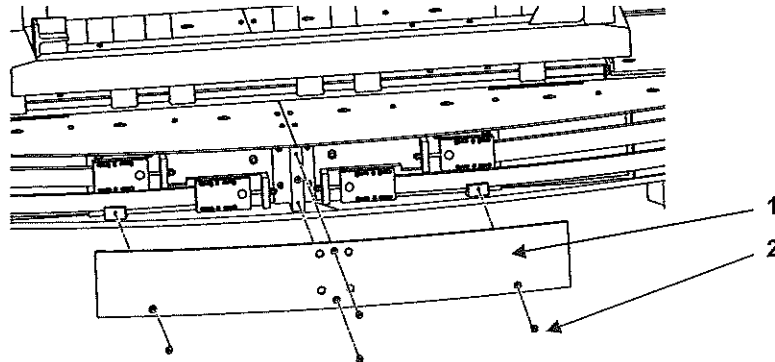


3. Disassemble the plate accordingly:
 - a. Loosen the four cylinders (3), attached with two screws each (4)
 - b. Remove the two guide bearings (5) by removing the screws (6)
 - c. Remove the valve (7) by dismounting the two screws (8)
 - d. Remove the plate from the bracket (9) by unscrewing the six screws (10)
4. Replace the plate and assemble in reversed order.
5. After maintenance, see paragraph 3.1.2 *After Maintenance*.

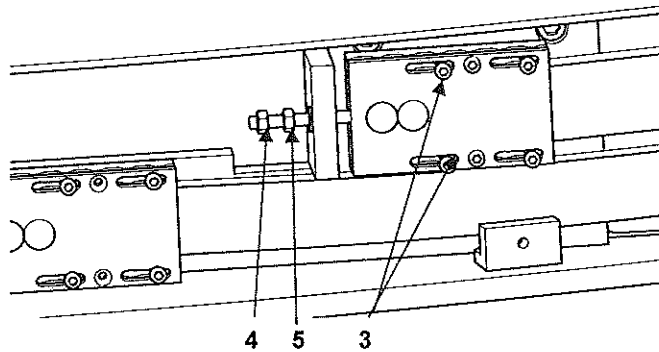
3.4 Change of Drive Belt

NOTE! Before maintenance – study the paragraph 3.1.1 *Before Maintenance*.

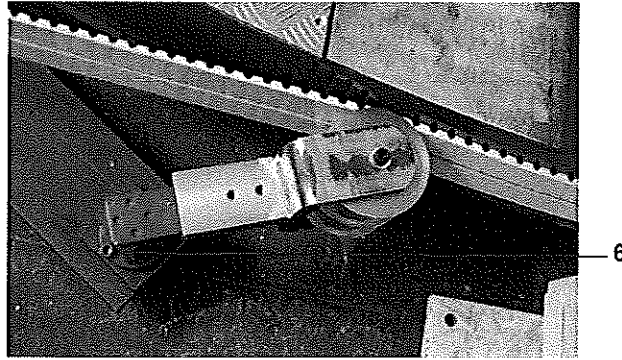
1. Manually rotate the table to the position where the belt attachments are inside the WEST station (how??). Then run it another 20-30 centimeters to allow for a person to pass in and out between the rotating and fixed walls.



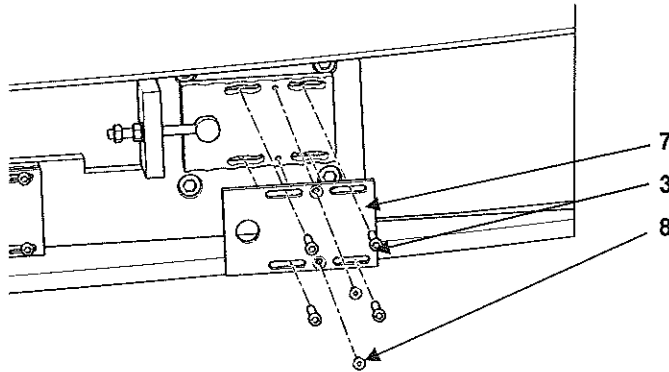
2. Remove the cover plate (1) by unscrewing the locking screws (2)



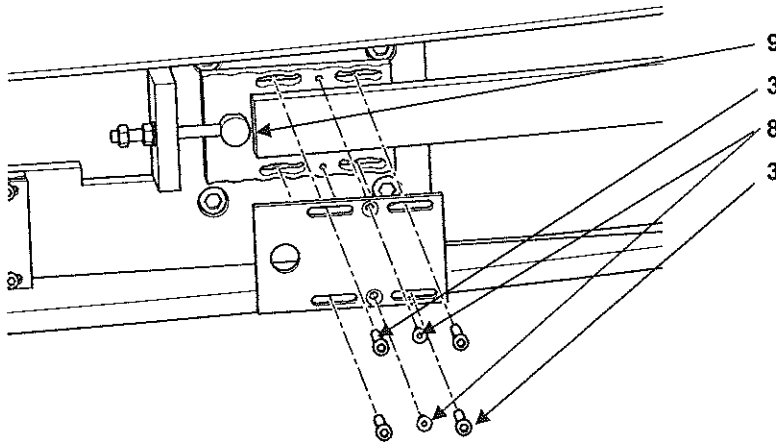
3. To remove the broken/worn out belt, first loosen the four adjustment screws (3), the locking nut (4) and the adjustment nut (5) until the belt is slack.



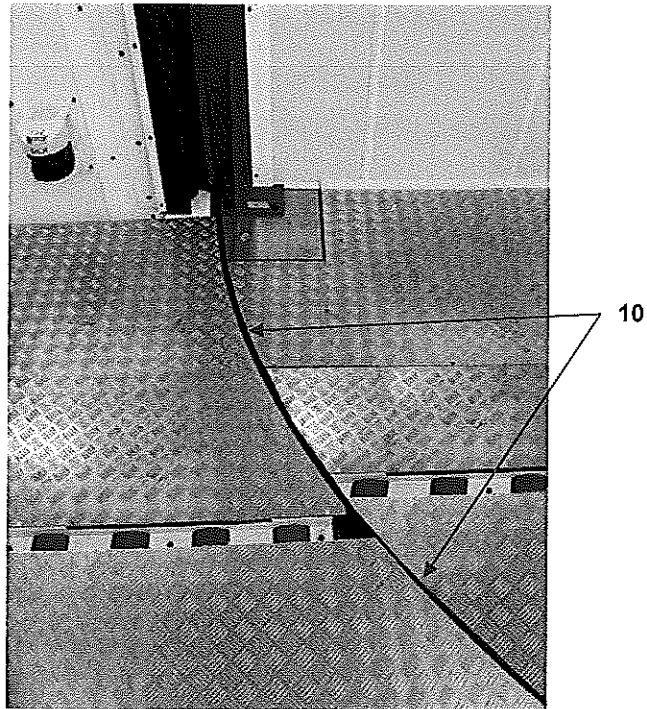
4. Remove the belt tension roller by removing the lock screw (6).



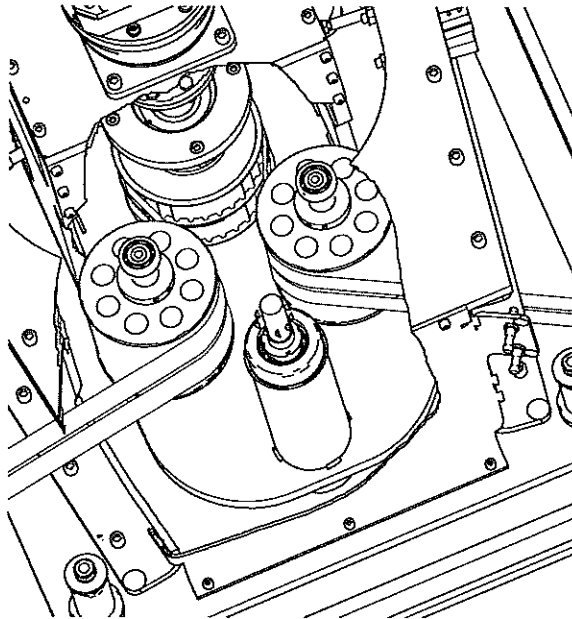
5. Remove the belt lock lid (7) by removing the two locking screws (8) and the four adjustment screws (3). Remove the belt.



6. Mount one end of the new belt in the belt lock and make sure the belt is placed all the way into the bracket according to the above picture (9). Attach and tighten the locking screws (8).
7. Attach, but do not tighten, the adjustment screws (3).



8. Drag the belt around the turntable and gently push it into place through the slot between the floor plate and the table (10). If required, some floor plates may need to be loosened or removed.



9. Thread the belt into the drive unit according to the above drawing.