

Rotating Station

PEMA LW 8000-80

Instruction manual

Original

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1. INTRODUCTION



Read and understand the INSTRUCTION MANUAL before installing or operating!

- Observe the following safety precautions in addition to the standard regulations that apply to the work place.
- Operator has the ultimate responsibility for ensuring that anyone who works with or near the equipment observes all the relevant safety precautions.
- All work must be carried out by trained personnel who is familiar with the operation of the equipment.
- Incorrect operation of the equipment may lead to a hazardous situation which can result in injury to the operator and damage to the equipment.
- Anyone who uses the equipment must be familiar with
 - its operation
 - the location of the emergency stop
 - its function
 - relevant safety precautions.
- Before starting the operation
 - make sure that no unauthorized person is stationed within the working area
 - appropriate fire extinguishing equipment is clearly marked and close at hand.
- The work place must
 - be suitable for the purpose
 - be free from draughts.
- Protect yourself and others!
- In case of malfunction call immediately for expert assistance!
- **Keep this manual for future reference.**

1.1. Contact information

Manufacturer:

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2. SAFETY

2.1. General information

Station is designed and manufactured for rotation of the symmetrical work pieces in demanding work environments. It provides even weight distribution and rotation plus adaptability to a wide range of diameters without separate adjustment. Two of the station's rollers are motorized.

Machine is intended for industrial and indoor use only.

In case you intend to use the equipment for any other purpose, please confirm the suitability from the manufacturer or his representative.

Any modification made to the construction of the machine can yield to a hazard and will terminate the warranty.

2.2. Safety instructions







MOVING MACHINE – Crushing hazard!

- Secure the working area before operating the machine!
- Obey preventive maintenance instructions!
- DO NOT stay under the work piece!







ARC WELDING AND CUTTING - Can be injurious!

- Take precautions when welding.
- Ask for your employer's safety practices which should be based on manufacturer's hazard data.
- Make sure the welding ground cable is connected securely.
- Read the safety instructions supplied with the welding equipment.
- DO NOT lubricate or service the welding equipment during the use.







ROTATING WORK PIECE - Entanglement hazard!

- DO NOT touch rotating work piece.
- DO NOT wear loose-fitting clothes.
- Secure the working area before operating the machine!

**WARNING**

ELECTRIC SHOCK - Can kill!

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the work piece.
- Ensure your working stance is safe.
- Disconnect main power before service or maintenance.

**WARNING**

NOISE - Excessive noise can damage hearing

- When noise level emissions reach 80 dB (A) or above it can damage hearing.
- Protect your ears. Use earmuffs or other hearing protection devices.
- Warn bystanders of the risk.

**WARNING**

HOT WORK PIECE – Can burn

- The work piece can be hot after welding or cutting.
- Use personal safety equipment.



WARNING



FUMES AND GASES – can be dangerous to health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from you breathing zone and the general area.



WARNING



ARC RAYS - Can injure eyes and burn skin

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.



WARNING



WELDING SPARKS – Fire hazard

- Ensure there is no inflammable material nearby.
- Ensure there is fire extinguishing equipment clearly marked and close at hand.

**WARNING**

MOVING WORK PIECE - Crushing Hazard!

- Work piece can move longitudinal direction during the rotation. Never leave machine unattended when operating!
- Be careful when loading or moving the workpiece. DO NOT leave yourself between the workpiece and the support roller.
- Secure the working area before operating the machine!

**WARNING**

IN CASE OF AN EMERGENCY – Stop the machine with emergency stop button!

- Emergency stop buttons are used in case of an emergency.
- Do not use emergency stop buttons for normal stopping of the machine.
- Ensure safe working conditions before starting operation after emergency stop!

2.3. Safety related functions

In case of an emergency the operation of the machine is stopped with emergency stop button. The reason for emergency must be solved before continuing operation.

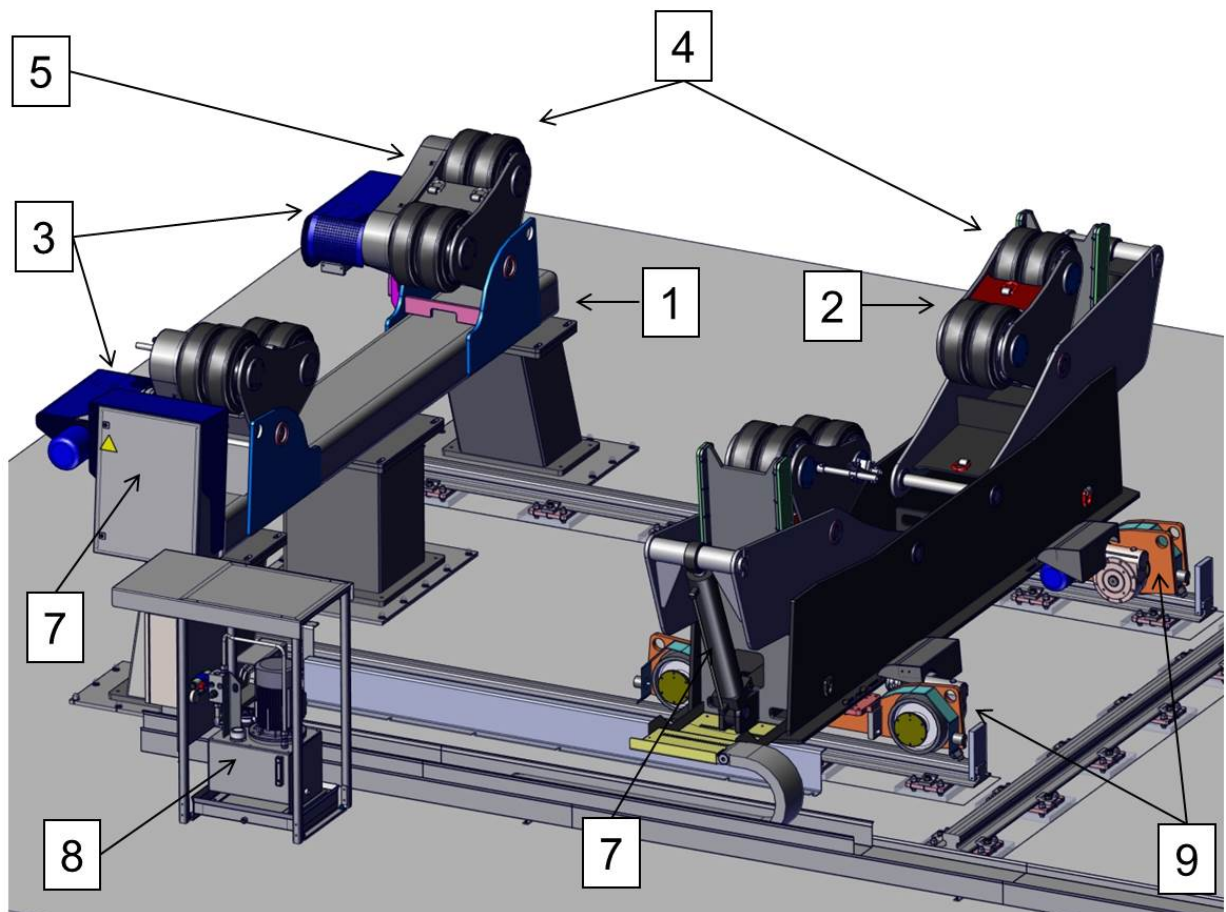
Please see further instructions in chapter Safety functions.

3. TECHNICAL INFORMATION

3.1. Machine structure

Machine consists of the following main parts:

- | | |
|------------------|------------------------|
| 1. Driving bogie | 6. Electric cabinet |
| 2. Idler bogie | 7. Hydraulic cylinder |
| 3. Gear motor | 8. Hydraulic aggregate |
| 4. Roller | 9. Rail car |
| 5. Drive chain | |



3.2. Technical Data

3.2.1. Rotating station technical specifications

		LW 8000 - 80
Max loading capacity	ton	80
	ton	2700 : 40
Diameter of the shell min/max	mm	2200 - 8000
Length of the shell	mm	< 4000
When adjusting the middle section, minimum length is	mm	1000
Max coning angle of the shell [D]	°	+/- 6
Rotation speed range	mm/min	500 - 10 000
Rollers pcs/section		8
Roller diameter / total width	mm / mm	440 / 310
Roller material		PU
Length [A]	power mm	4410
	idler mm	5000
Width [B]	power mm	1230
	idler mm	1880
Height [C]	power mm	2000
	idler mm	1830
Weight	power kg	3400
	idler kg	4400
Remote control		included
Mains supply connection	50 Hz	3*400V+N+PE
- Supply fuse A		15
Mains supply connection	60 Hz	3x380 - 480+PE
- Supply fuse A		16
A-weighted sound power level	dB(A)	n/a

3.2.2. Machine plate

Machine plate is attached to the side of the frame of the machine.

 Pemamek Oy Ltd. FIN-32200 Loimaa Finland www.pemamek.com	Type:		   701110-1
	Ser.No:		
	Art.No:		
	Man.Year:		
	Weight:		
	ph	Hz	
		V	
		A	
	kVA		

The machine plate contains the following important information:

Type:	Type of the machine
Ser. No:	Serial number of the machine
Art. No:	Article number of the machine
Man. Year:	Manufacturing year of the machine
Weight:	Weight of the machine
ph	Mains supply number of phases
Hz	Mains supply frequency
V	Mains supply voltage
A	Mains supply fuse size
kVA	Power consumption of the Machine




NOTICE




Read and Understand the INSTRUCTION MANUAL before installing or operating

- The weight in the machine plate does not include accessories!
- Always mention the type, serial number and manufacturing year of the machine when ordering spare parts.

4. INSTALLATION AND COMMISSIONING



Read and Understand the INSTRUCTION MANUAL before installing or operating

- Observe the following safety precautions in addition to the standard regulations that apply to the work place.
- Read all relevant manuals and safety precautions carefully before starting to unpack and install the equipment.
- Ensure installation is carried out by suitable trained personnel.
- Check the machine weight from the technical data before lifting the machine.
- Observe and obey the lifting instructions that apply to the work place.
- Use only the designated lifting loops to lift up the machine.
- Protect yourself and others!

4.1. Handling and storing

The machine parts are packed on a basis, suitable for lifting by crane and/or forklift. Use only the designated lifting loops to lift up the machine.

Unload the machine from the packing and check the outer condition. Do not store the machine outside or in damp places.

5. START-UP PROCEDURE



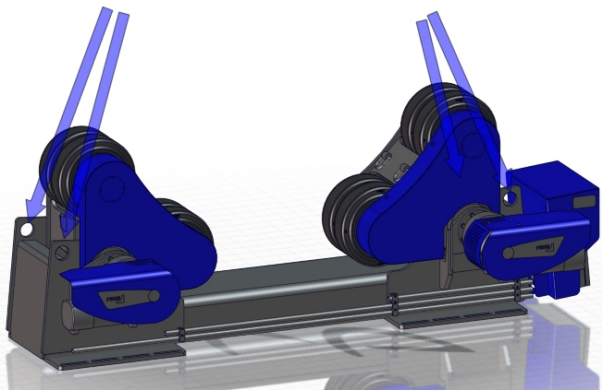
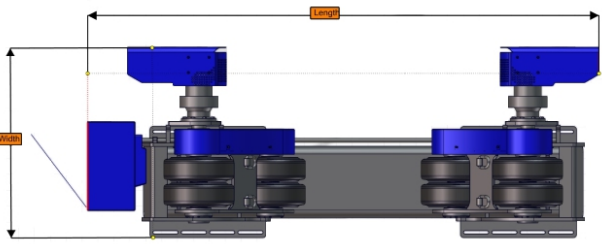
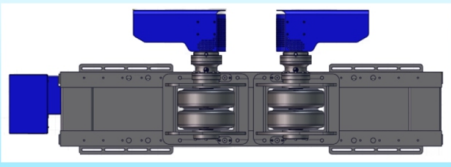


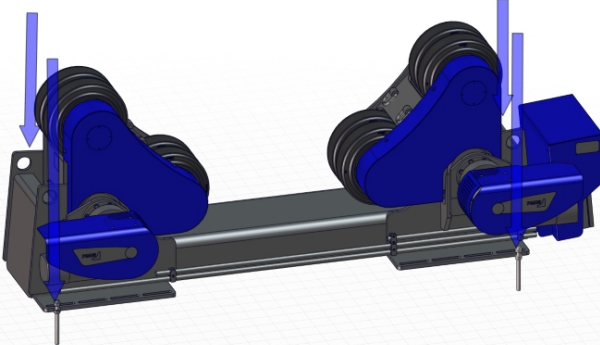
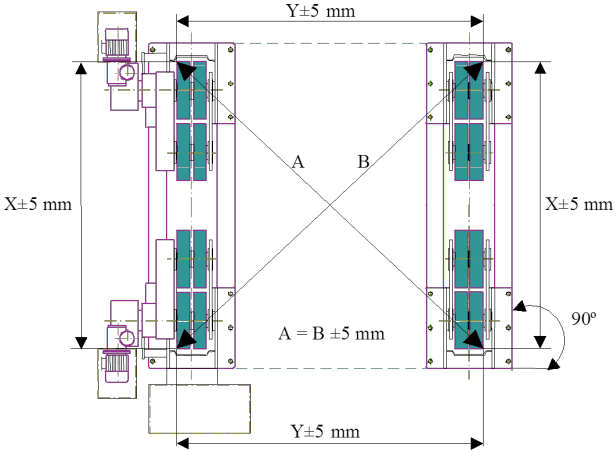
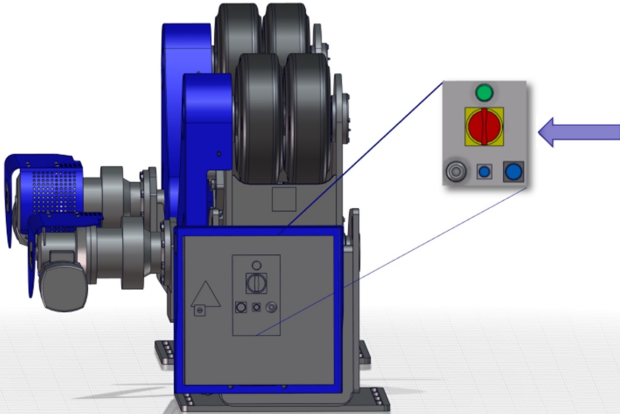
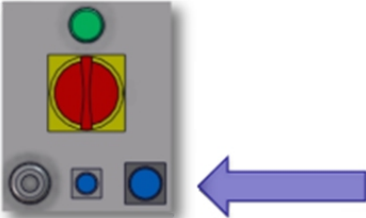
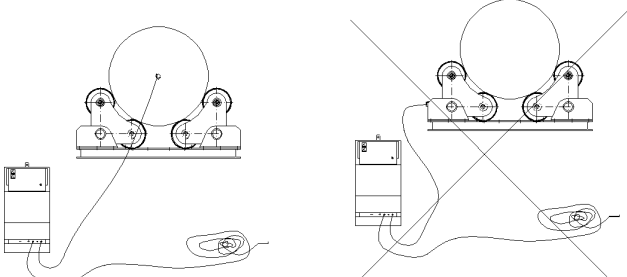


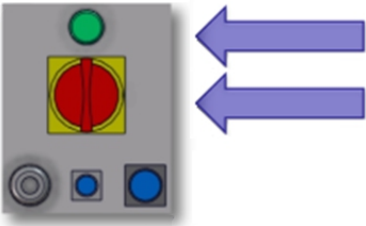
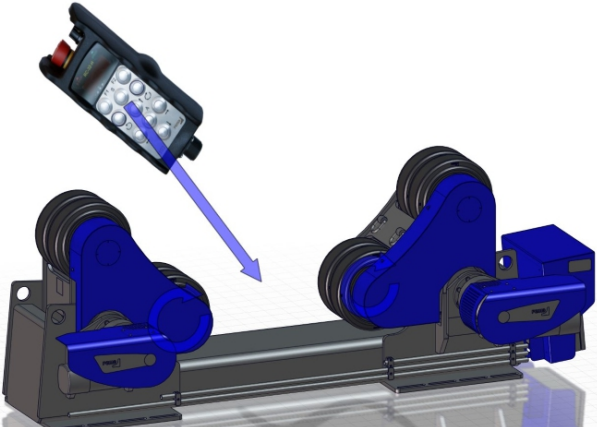
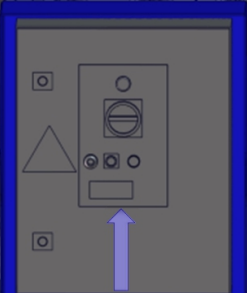
Read and undrestand the **INSTRUCTION MANUAL** before installing or operating!

- Observe the following safety precautions before starting up the equipment.
- Do not ground through the frame of the machine.

The following steps will guide you through the start-up procedure of the machine:

Start-up procedure	
	Use only the designated lifting loops to lift up the machine.
	Check the required space from the dimensional drawing / assembly drawings and ensure that the electric cabinet can be opened freely. Take also into consideration the shape and dimensions of work piece.
	Take care that the basement is flat and made of non cracked concrete. Ensure the foundation strength. Minimum requirement is 30 N/mm ² .

	Use anchor bolts to fasten the machine to the foundation.
	The various roller bed units must be aligned with each other in parallel $X = X$, $Y = Y$ (as in the diagram).
	Before connecting the main supply cable: 1. ensure the connection voltage is correct 2. ensure that the main switch is in OFF position
	Connect the remote control. – NOTE!! Plug fits only in one position.
	Do not ground through the frame of the machine. It might damage the bearings and the control.

	Switch on power with main switch. – The signal lamp should be lit.
	Connect the remote control function (see chapter: Remote control).
	Test rotation and speed control of roller bed in both directions.
	Connect foot pedal and test the action. (Option)
	If the hydraulic aggregate is on but the cylinders do not have function, main system's phase rotation may be incorrect. It should be changed from the feeding mains central.

6. OPERATING INSTRUCTIONS



Read and Understand the INSTRUCTION MANUAL before installing or operating

- Observe the following safety precautions in addition to the standard regulations that apply to the work place
- Operator has the ultimate responsibility for ensuring that anyone who works with or near the equipment observes all the relevant safety precautions.
- Only trained persons are allowed to operate the machine.
- Before operation:
 - Secure working area
 - Ensure proper fastening of work piece
 - Ensure the connection of welding ground cables.
 - Check the program parameters.
 - Check the condition and location of welding torch.
- Never leave machine unattended when operating!
- Protect yourself and others!



IN CASE OF AN EMERGENCY – Stop machine with emergency stop button!

- Emergency stop buttons are used in case of an emergency.
- Do not use emergency stop buttons for normal stopping of machine.
- Ensure safe working conditions before starting operation after emergency stop!

6.1. Safety functions

In case of an emergency the operation of the machine is stopped with emergency stop button. The reason for emergency must be solved before continuing operation.

6.1.1. Proceeding after emergency stop; release and reset

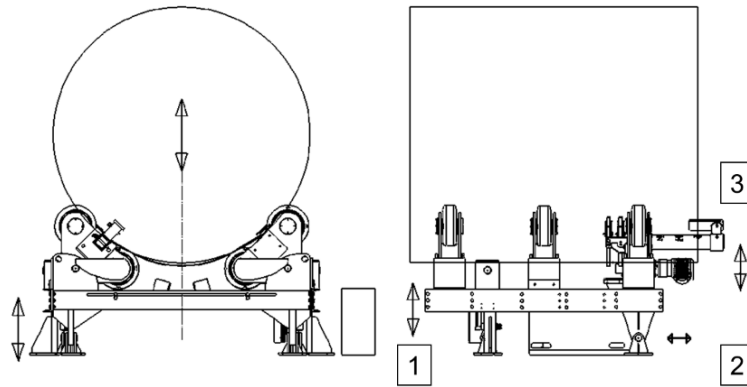
Before resetting the emergency stop actuated emergency stop buttons must be released.

Releasing and resetting the machine is done as follows:

- Release the emergency stop button by turning it clockwise.
- Reset the machine by pushing the Rotation stop button on remote control for 5 seconds.

6.2. Loading and unloading of the workpiece

- When selecting a roller bed the range of weights and diameters of the work piece must be ascertained. Normally, the rolling capacity of the power section equals the loading capacity of three sections. In the case of asymmetric objects, the rolling capacities need to be calculated and compared to the roller bed's capacity.
- Before loading, it is important to ensure that the diameter of work piece is within the maximum and minimum limits shown in the plate and you do not exceed the maximum load.
- Ensure, that the rotation moment is sufficient (weight of work piece / eccentricity).
- Take into consideration the weight distribution of the work piece.
- Loading of the work piece has to be done by using slow and cautious movements and the work piece has to be set on top of the rollers as centrally as possible.
- The heavier end of the work piece has to be always on top of the driving rollers.
- Always drive the frame of the roller bed as horizontal position before loading.
- Fall the earth arms in the down position before placing the work piece on top of the rollers.
- Adjust the suitable distance of the creeping resist unit and the driving bogie according to work piece length.
- The work piece has to be loaded near the creeping resist unit.
- Adjust the support roller to the right height. Tilt the frame carefully and drive by rotating the work piece stick to the support roller.
- It is recommended to connect two narrow work pieces together before they are loaded onto the roller bed.
- Ground directly through the workpiece.
- When you are lifting the work piece, observe general lifting instructions.



1. Tilting of the frame
2. Distance adjustment of the resist for creeping
3. Lifting and lowering of the support arm

The rotating station's function is to rotate a symmetric work piece at which time it is possible to weld the seam between the work piece and flange. Thanks to the bogie structure the weight distribution targeted at a work piece is even and the bogies adjust automatically according to the diameters of different work pieces ($\varnothing 2,0 - 6,5$ m). Two of the station's rollers are motorized.

Before placing a work piece on the station, it should be driven to a horizontal position (1). The distance of the resist of creeping can be adjusted according to the work piece's length (2) or it can be driven to an external position.

The work piece should be lowered on the station in a centralized and controlled manner. The work piece should be placed so that its centre of gravity is clearly between the supporting rollers. The supporting arm should be adjusted to a correct height (3) and then it should be driven attached to the flange.

The frame should be lifted (1) carefully and only as much as needed so that the work piece rests against the supporting arm and does not fall. Rotation can be started after this.




CAUTION

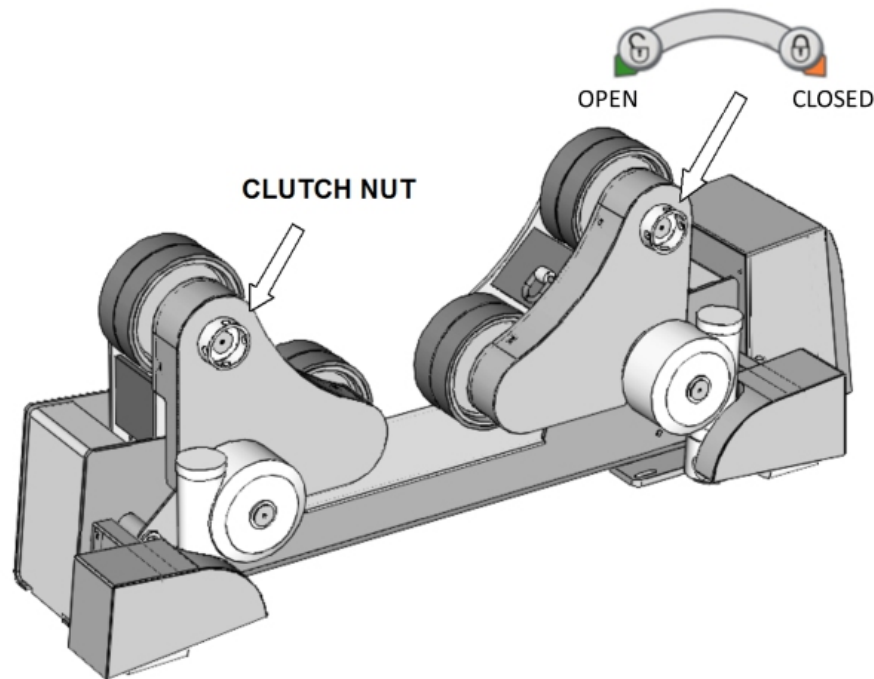



Read and understand the INSTRUCTION MANUAL before loading!

- Before using the roller bed, ensure that the rotation capacity is sufficient for your work piece.
- Be careful when loading or moving the workpiece. DO NOT leave yourself between the workpiece and the support roller.

6.2.1. Coupling nut (model 4D)

When loading the series A roller bed, open the coupling nut with the coupling lever (delivered with the machine) before placing the workpiece on the roller bed. When the workpiece has been installed in place, tighten the coupling nut. If the workpiece is installed in place while the coupling nut is tight, the driving chains may be damaged.

**CAUTION**

**Read and understand the INSTRUCTION
MANUAL before loading!**

- If the workpiece is installed in place while the coupling nut is tight, the driving chains may be damaged.

6.2.2. Work piece setting and adjustment instructions

**WARNING**

FALLING WORK PIECE - Crushing hazard

- Danger of falling work piece when rotating a narrow work piece.
- USE crane and chain to support a work piece.

Workpieces that are narrow and have large diameter, need special measures. Use always crane and chain as precaution. The slack chain can be inside the workpiece during the whole working cycle (see the figure example 1).

With the narrow workpieces avoid the extreme positions of the rotating station.

Always ensure that the centre of gravity is inside of the load-bearing rollers (see the figure example 2).

Minimum mass of the workpiece:

- workpiece is in contact with 8 rollers → min mass 1000 kg
- workpiece is in contact with 12 rollers → min mass 1600 kg

- If the mass is less than the required value, the rotation symmetrical workpiece does not rotate.

Recommendations for minimum length of the rotating symmetrical workpiece (without the flange)

- Ø 2,0-3,5 m L= 1,2 m

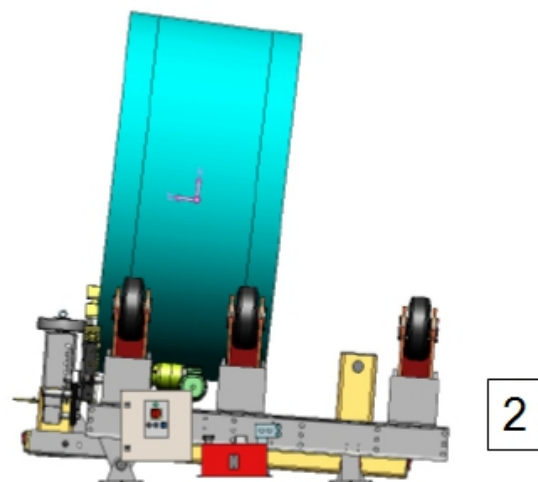
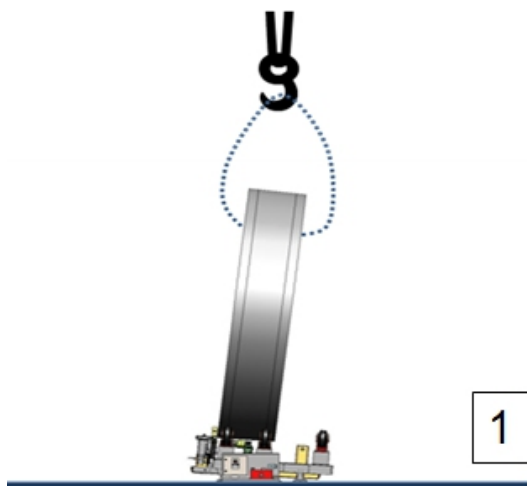
- Ø 3,5-5,5 m L= 1,6 m

- Ø 5,5-6,5 m L= 2,1 m

When rotating continuously the last one of roller bogie has to be lifted up enough.

The current collectors have to be adjusted according to diameter. Earth unit must always fall in the down position before loading.

It is recommended to connect two narrow workpieces together before they are loaded onto the roller bed.



6.3. Control devices

6.3.1. Control panel

1. Mains signal lamp (Power on)
2. Mains switch
3. Mains connection (Supply)
4. Automatic start/stop-connection / Connection for foot pedals (FP)
5. Remote control connection (RC)
6. Connection for external equipment (option)
7. Coupling for Ethercat cable



6.3.2. Remote control

All machines are equipped with a low voltage 24 V remote control unit. The electrical functions are controlled by the remote control unit.



1. Emergency stop button
2. Speed control potentiometer; rotation speed is steplessly adjustable
3. LCD speed display (see chapter LCD display)
4. Function 1–push button (rapid speed)
5. Function 2–push button (no function with standard roller beds)
6. Rotation start to the anti-clockwise (locked function)
7. Rotation start to the clockwise (locked function)
8. a) Rotation stop (pulse to stop), b) Emergency stop / fault reset (press for 5 seconds)
9. Hydraulic tilting up
10. Hydraulic tilting down
11. No function
12. No function
13. Automatic start/stop function on/off

The drive switch can also be synchronized to operate automatically with the welding machine (=Ext.start function) or with the foot pedal. Function will be activated by pushing continuously the button until the signal lamp A lights. This function needs the machine's connection to the welding machine or to the foot pedal with FP-connection.

6.3.3. LCD display

LCD display shows the actual rotating speed of the machine. Setting is only needed if the speed on the remote control's display is not correct!

The LCD display of remote control is set up according to the following steps:

1. Switch on the main power.
2. Start rotation and set the potentiometer to maximum value (max speed).
3. Press combination "F1" and "F2" about 5 seconds until the display starts to blink.
4. Use "↑" and "↓" buttons (buttons 9 and 10) to set the correct rotation speed. Please refer to the section Technical specifications for the maximum rotation speed of the machine.
5. Press "stop" button.

In case of an error "–ERR–" text is shown on the LCD display.

6.4. Accessories (option)

6.4.1. Synchronization

The parallel driving of two or more - up to ten – roller bed power units with a single remote control unit. The power units must have the same capacity when they are synchronized. If this is not the case, contact the manufacturer or manufacturer's representative to ensure the units' compatibility.

The unit to which the remote control unit is connected acts as the master unit, and gives current and speed references which are followed by the slave units.

Connection is explained in the figure A

Each power unit requires a separate mains supply (Figure B)

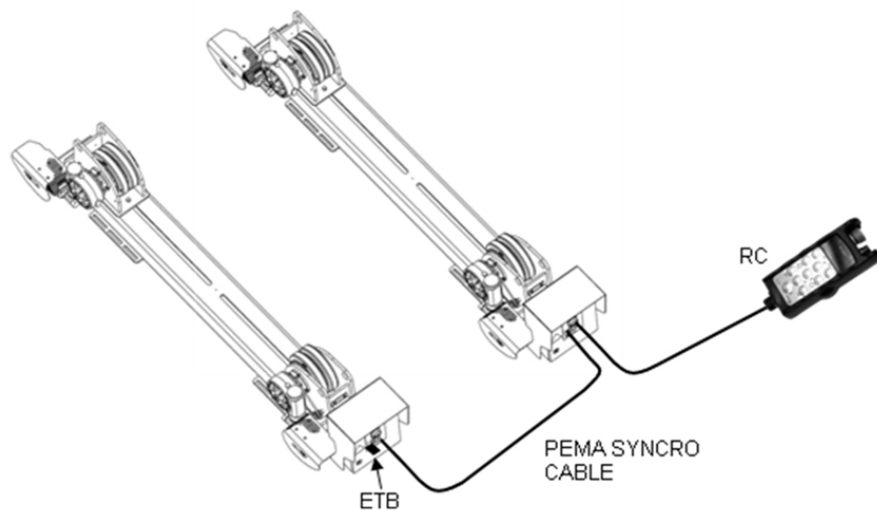


Figure A: The roller bed synchronization connection

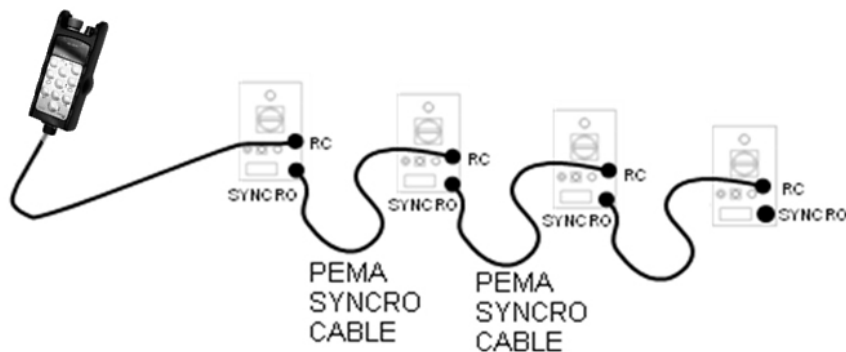


Figure B: Synchronization connections with multiple power units



**Read and understand the INSTRUCTION
MANUAL before installing or operating!**

- Ensure that the roller units rotate in the same direction.
- When you are lifting the roller bed or workpiece, observe the general lifting instructions.

6.4.2. Anti-creep

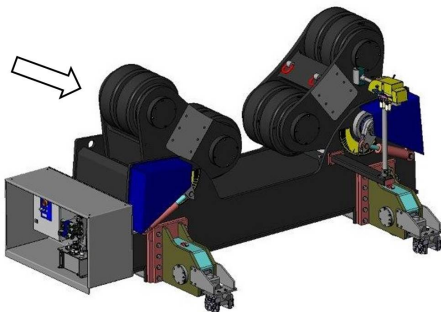
Anti-creep unit prevents axial movement of the workpiece during rotation.

The anti-creep unit is installed on the roller bed idler unit.

There are three different models of anti-creeps.

If there are several anti-creep units in the rotator system, ensure that all the roller bed units rotate on the same direction.

The unit next to control cabin is the leading unit.



The leader unit of the anti-creep



Read and understand the INSTRUCTION MANUAL before installing or operating!

- Anti-creep needs always a certain mass for its function. A general rule is 12 % of total mass of the roller bed.
- With all anti-creep models the loading distribution has to be equally with both roller bed units. If this is not possible, the heavier part has to be on the anti-creep unit.
- Ensure that all the roller bed units rotate on the same direction.

6.4.3. Rail cars

Check the maximum load from the table below.

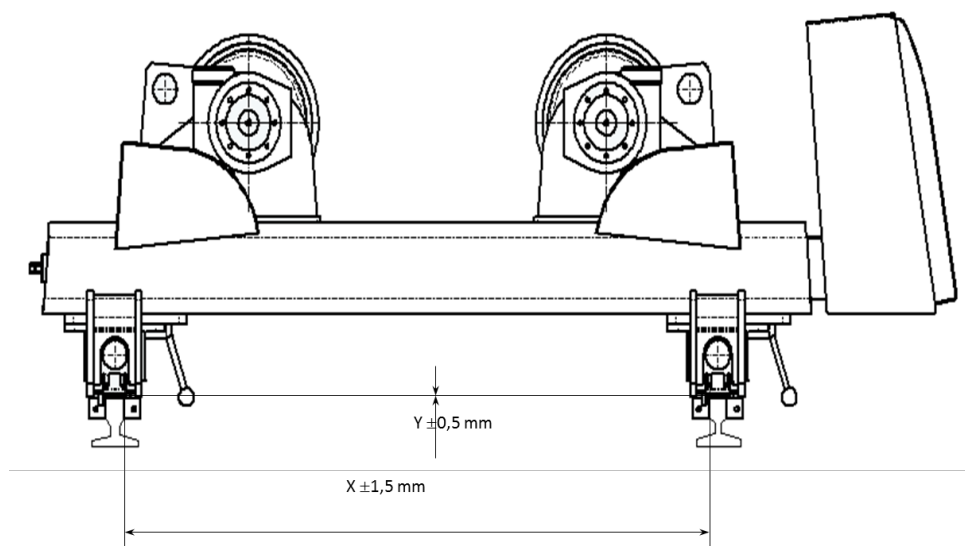
		RBIA 10* RBPA 10**	RBIA 25 RBPA 25	RBIA 40 RBPA 40	RBIA 70 RBPA 70	RBIA 100 RBPA 100	RBIA 150 RBPA 150	RBIA 200 RBPA 200	RBIA 300 RBPA 300
Max load ton/section		5	12,5	20	35	50	75	100	150
Rail wheel dia mm		246	246	310	310	370	370	370	370
Rail width mm		45-65	55-75	55-75	55-75	55-75	55-75	55-75	55-75
Recommended rail type		A 55	A 55	A 55	A 55	A 65	A 65	A 75	A 75
Adj.rail width i-to-i mm		1425-1825	1425-1825	1375-1875	1375-1875	1730-2515	1730-2515	1730-2300	1730-2300
Travel speed mm/min		2300	2300	1350	1350	1350	1350	1350	1350
Height mm		191	191	223	223	375	375	375	375
Length mm		1450	1450	1910	1910	2320	2320	2610	2610
Width mm	power	603	603	720	720	720	720	770	770
	idler	300	300	340	340	400	400	340	340
Weight kg	power	200	200	380	380	880	880	860	860
	idler	180	180	340	340	720	720	700	700

*Freely moving RBIA-model roller beds with power and/or idler unit.

**Motorized RBPA-models with stepless speed adjustment, standard delivery with motorized power.

Adjustment of the rail distance:

- Lift the roller bed up and support it well so that the roller bed is not able to fall and drop on anyone.
- Take off / loose the screws of the rail car and adjust the wanted distance of the rails.
- Fast / tighten the screws (the rail cars back to the roller bed) and make the needed fine adjustment of the distance (see the picture).



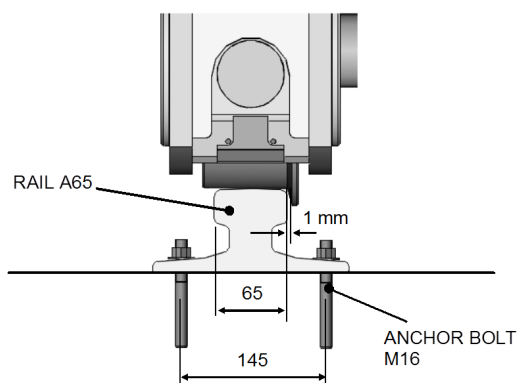
Straightness of the rails

Straightness of the rails has to be according to the above picture.

- Rail distance $\pm 1,5$ mm
- Level difference of the rails $\pm 0,5$ mm

Rail bogie locking is made by locking hooks. (Open the locking hook nuts, drive the rail car to its place and tight the nuts again.)

Mounting of the rail and running clearance of the wheel:





Read and understand the INSTRUCTION MANUAL before installing or operating!

- Notice the free movement of the rail bogie.
- Keep the rails clean.

6.4.4. Pedals



With the foot pedal you can start and stop the rotation that has been adjusted by the remote control.

You have to press remote control's A button and select the rotation direction before foot pedal is working. To change back to remote control you need to press A button couple of seconds to get it working (there is red led light on, when A is activated).



With the speed control foot pedal you can control the rotation that has been adjusted by the remote control.

Connect the speed control foot pedal to FB-plug and act like with the normal foot pedal.

7. MAINTENANCE AND SERVICE INSTRUCTIONS

7.1. Introduction



Read and understand the INSTRUCTION MANUAL before maintaining or servicing the machine!

- Observe the following safety precautions before servicing or maintaining the equipment.
- Read manufacturer's service instructions before servicing electric motors.
- Tripped thermal relay or circuit breaker indicate interference, failure or overload.
- In order to prevent any further damages eliminate the source of the failure before restarting the machine or before changing any parts.
- Warranty does not cover damages caused by faulty, improper unauthorized service, use, storage or handling, overloading or carelessness of equipment.
- DO NOT service the machine, while it is used.
- For the optimum and safe welding result keep all the welding equipment clean.



ELECTRIC SHOCK - Can kill

- Only authorized electrician may service electrical devices.
- Follow the service instructions and safety instructions.
- Disconnect main power supply before removing any protecting cover.
- Disconnect main power before service or maintenance.
- Relieve feeding fuses before service or maintenance.

7.2. Service-, checking- and cleaning procedures

Check before starting operation

Checking area	Checking point	Description	Functions
Electrical	Grounding	Function of grounding	Ensure proper grounding of work piece before welding

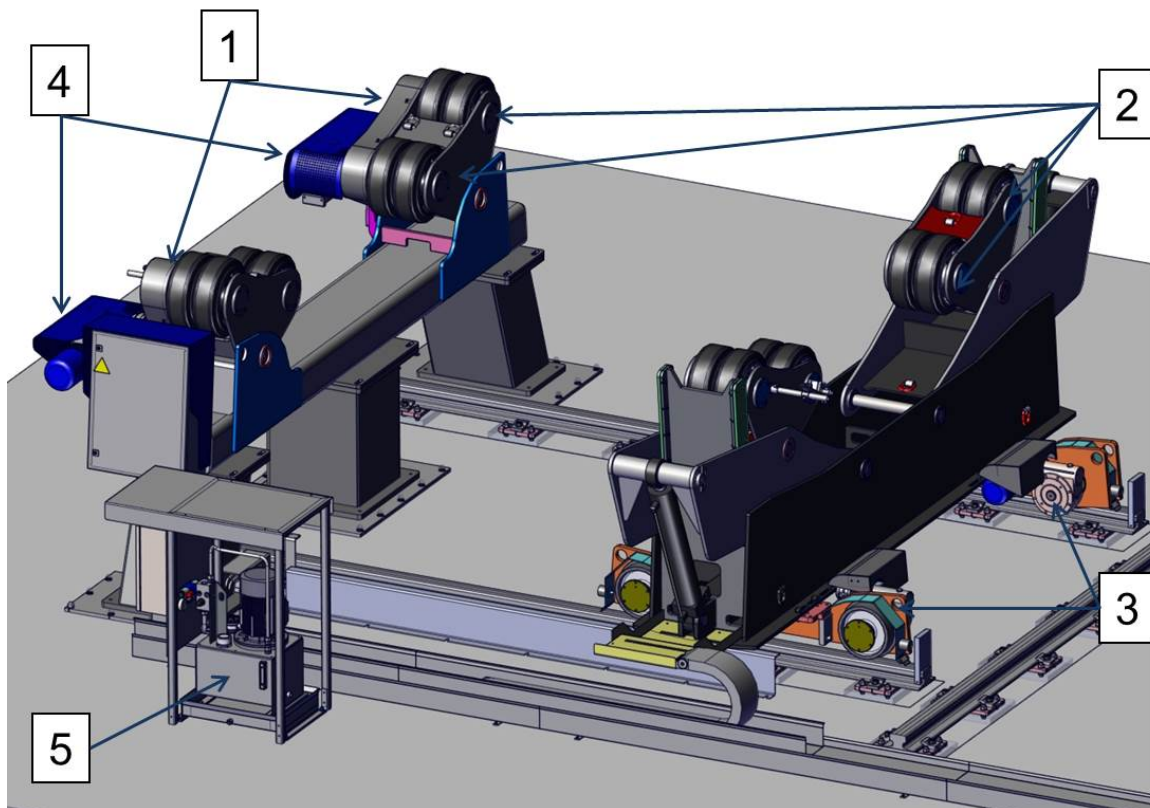
Check daily

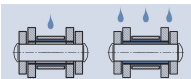
Checking area	Checking point	Description	Functions
General	Working area	Working area must be suitable for work	Visual checking
	Whole machine	Abnormal vibration, noise and heating	Visual checking (make immediately all the needed repairs)
		General condition of machine	Visual checking
Mechanical	Cover and safety equipment	Must be in their places and in proper condition	Visual checking (make immediately all the needed repairs / changes)
	Motors	Function of the motors	Clear the reason for abnormal temperature or noise
Electrical	Remote control	Check condition of cables	Visual checking (change when needed)
		Emergency stop button has to be unbroken	Check the function
Hydraulics	General	Leaks	Oil leaks must be repaired immediately
	Oil tank	Amount and quality of oil	Add oil when needed or change it according to lubrication instructions
	Components	Machine must be clean for secure the proper function	Visual checking (cleaning when needed)

Check every six months

Checking area	Checking point	Description	Functions
General	Fastening bolts	Fastening bolts have to be tight	Tight all fastening bolts
Mechanical	Transmission mechanism	Check general condition of the transmission mechanism	Visual checking
		Chains have to be lubricated and clean	Take off the chain covers. Clean, lubricate and check the condition of the chains.
		Checking of the gear oil	Add oil or change it according to lubrication instructions
Electrical	Electric cabin	Electric cabin has to be clean	Vacuum the cabin
	Connections	Screw and plug contacts have to be tight and in good condition	Tight and check all connections
	Remote control	General function	Check all the functions and repair when needed
	Cables and sensors	Cables and sensors must be unbroken	Visual checking (broken cables and sensors must be changed immediately)
	Components	Check relays, contactors and fuses	Visual checking (check tips and change when needed)
Hydraulics	General	Function	Test all functions
	Hoses	Hoses must be in good condition	Visual checking (change immediately cracked and broken hoses)

7.3. Lubrication instructions



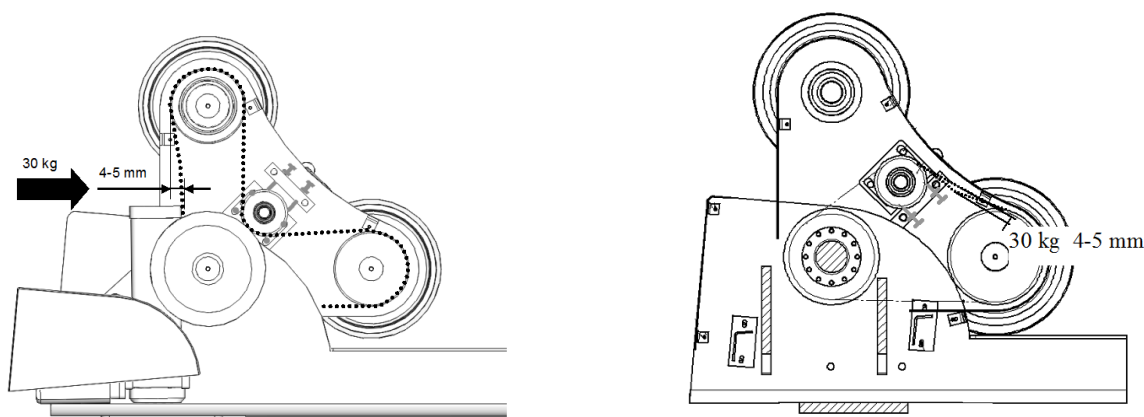
Nr	Lubrication object	Lubricant	Period**
1	Driving chains	Fluid mineral oil or liquid grease Oil ISO VG 100 (SAE 30)	500 hours 
		Tightening***/checking	First: 10 hours Second: 50-100 hours Others: 800 hours
2	Bearings	Maintenance free	Lubricated for life
	Bearings with nipple	Vaseline NLGI 2 based on Litium soap	Every six month. (Before lubrication take off the motor covers, clutch nuts and chain covers. Put the covers back after lubrication!)

Nr	Lubrication object	Lubricant	Period**
3	Worm gears (small ones) - 86*	Recommended Synthetic oil Shell Tivela Oil SC, viscosity 320 cSt or similar	Lubricated for life Check the oil level periodically. Restore proper quantity if necessary. Oil change 25000 hours
	Worm gear (big ones) 100 -*	Recommended Synthetic oil Shell Tivela Oil SC, viscosity 320 cSt or similar	Lubricated for life Check the oil level periodically. Restore proper quantity if necessary Oil change 25000 hours
	Planetary gears	Recommended Synthetic oil Shell Tivela Oil SC, viscosity 320 cSt or similar	Lubricated for life Check the oil level periodically. Restore proper quantity if necessary Oil change 25000 hours
4	Hydraulic aggregate	Special hydraulic oil, viscosity: 20-40 cSt (3E-5,5E) Max cold start viscosity: 800 cSt (100 E) Max oil temperature +60°C Filter grade 25-30 µm ATF-oil is recommended for frequent use	Once a year Look at aggregate's own service and maintenance instructions manual.

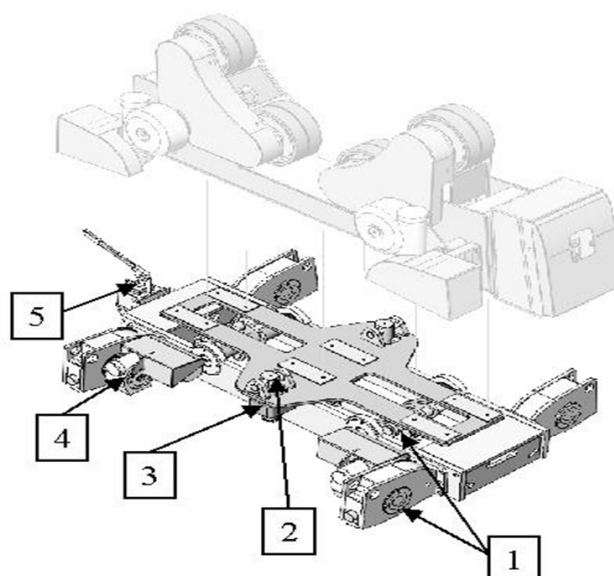
* Check the gear size from the part list or from the gear.

** The re-lubrication period will depend on the operating conditions of the machine: speed, load, number of working cycles per day etc. The adjacent table gives recommended values (operating temperatures not exceeding +70° C). At higher temperatures the re-lubrication intervals should be shorter.

*** Tightening of the chains (see the picture)



7.3.1. Lubrication instructions for accessories (Fit-up, Rail car, Autom. anti-creep)



Nr	Lubrication object	Lubricant	Period*
1	Roller bearings	Vaseline NLGI 2 based on Litium soap	Once a year
2	Shaft	Vaseline NLGI 2 based on Litium soap	500 hours
3	Sliding bearing	Vaseline NLGI 2 based on Litium soap	500 hours
4	Worm gear (small ones) RMI 63 - 86*	(If needed: Synthetic greasing oil: Shell Tivela Oil SC, viscosity 320 cSt or similar)	Lubricated for life (8000 hours)
	Worm gear (big ones) RMI 110 - *	Gear oil ISO VG 320-460 320-460 cSt / 40° C	First: 500 hours Others: 4000 hours
5	Hydraulic hand pump	Hydraulic oil ISO VG 32 1000 cSt / 25° C 10 cSt / + 65° C	Once a year

* Check the gear size from the part list or from the gear.

** The re-lubrication period will depend on the operating conditions of the machine: speed, load, number of working cycles per day etc. The adjacent table gives recommended values (operating temperatures not exceeding +70° C). At higher temperatures the re-lubrication intervals should be shorter.

7.3.2. Table for gear oil selection

ISO VG		MINERAL OIL			SYNTHETIC OIL			
		460	320	220	460	320	220	150
Amb. temp. [°C]		10° ÷ 45°	0° ÷ 35°	-5° ÷ 25°	10° ÷ 60°	0° ÷ 50°	-5° ÷ 35°	-10° ÷ 25°
MANUFACTURER	ARAL	Degol BG 460	Degol BG 320	Degol BG 220	Degol GS 460	Degol GS 320	Degol GS 220	
	BP	Energol GRXP 460	Energol GRXP 320	Enerol GRXP 220	Enersyn HTX 460	Enersyn EPX 320	Enersyn EPX 220	Enersyn MTX 150
	ESSO	Spartan EP 460	Spartan EP 320	Spartan EP 220				
	AGIP	Blasia 460	Blasia OIL 320	Blasia OIL 220		AGIP Telium VSF 320		AGIP Telium VSF 150
	KLÜBER	Lamora 460	Lamora 320	Lamora 220	Syntheso D460 EP	Syntheso D320 EP	Syntheso D220 EP	Syntheso D150 EP
	MOBIL	Mobilgear 634	Mobilgear 632	Mobilgear 630	Glygoyle 80		Glygoyle 30	
					SHC 634	SHC 632	SHC 630	SHC 629
	SHELL	Omala OIL 460	Omala OIL 320	Omala OIL 220	Tivela OIL SD	Tivela OIL SC	Tivela OIL WB	Tivela OIL SA
	TEXACO	Meropa 460	Meropa 320	Meropa 220	Synlube CLP 460	Synlube CLP 320	Synlube CLP 220	
	CASTROL	Alpha SP 460	Alpha SP 320	Alpha SP 220	Alpha Synt 460	Alpha Synt 460	Alpha Synt 220	Alpha Synt 150

7.4. RC-32, Inverter and drive PLC

7.4.1. General

Installation and basic settings;

Components are pre-set already at the manufacturer and only mechanical installation is needed. If components need replacing, please contact the manufacturer and inform of product type, needed components and programming will be done by manufacturer.

If only remote controller RC-32 is changed, any settings are not needed. Positioner (or rollerbed) has to be powered OFF during changing.

Function of the keypad-panel, installation and setting of the parameters are explained on mounting instructions of the inverter.

- Roller bed has two inverters and own software for Drive PLC.
- Positioner has one inverter and own software for Drive PLC.

7.4.2. Reset and errors

On a case of fault, display of the RC-32 shows "ERR". Before any reset procedure, open electric cabinet door and check the status of the inverter and Drive PLC. If those are on normal mode (both have a green led on), reset the error by pressing stop button from RC-32 until "ERR" disappears from display.

NOTE! Reset procedure from RC-32 is needed also after emergency stop function.

If inverter or Drive PLC are not equipped with keypad, errors are shown by slowly blinking red led. In this case take power OFF and wait few minutes before restart. If keypad is used, read the error code from display and check the fault from mounting instruction of the inverter.

Inverter and Drive PLC status display:

LED		Operating status
Red	Green	
off	on	Controller enabled
on	on	Mains switched on and automatic start inhibited
off	slowly blinking	Controller inhibited
off	fast blinking	Motor parameter identification
fast blinking	off	Undervoltage switch-off
slowly blinking	off	Fault/error active, check under C0161 (keypad)

Possible problems and hints;

Hydraulic machinery rotates but tilting or lifting does not work

- Hydraulic machinery rotates to wrong direction, change phase order from supply (eg. from main switch).

Motor stops during a rotation or does not start rotation;

- Check the fuses and supply voltage
- Check the inverter for possible faults, if keypad is installed check the fault code.
- Measure/check all the motor cables and motor, especially if you get overcurrent problems.
- If you get problems with maximum speed start (100%), try to start rotation eg. with 50% from maximum and slowly increase speed to maximum 100%.
- Check the gears!! Do those have mechanical problems, oil leaks etc. Tighten the gear bolts if those are loosen.
- Check the chains and chain wheels.

NOTE! Sometimes only procedure for fault reset could be totally "power down" → Take power OFF and wait about 5 minutes, and put power on again.