

Conveyor line PEMA RC 5200

Instruction Manual

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1 INTRODUCTION

	 CAUTION  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 are 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

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2 SAFETY

2.1 General Information

Conveyor system is integrated with welding tables to feed plates through the system.

The roller conveyor consists motorized infeed and outfeed conveyors integrated to operate together with welding machine clamping table. Rollers are electrically driven drum roller elements, which are connected to each other by chains. The conveyor line is built of conveyor modules which can be controlled individually or synchronized.

PLC and Inverter controlled operations by manual push buttons.

Pema MCB magnetic table is designed for efficient plate joining, aligning and welding.

It has hydraulic operations for pre-positioning, aligning and pre-bending the plates for welding. Electrically controlled magnets are used for locking the plate to table during aligning and also keeping the plate together during root pass welding.

The machine is intended for industrial and for 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

	 DANGER  MOVING MACHINE – Crushing or impact hazard	
• Secure the working area before driving the machine! • Do not go near or under the moving machine!		

	 WARNING  NOISE – Excessive noise can damage hearing	
• When noise level emissions reach 85 dB (A) or above it can damage hearing. • Protect your ears. Use earmuffs or other hearing protection. • Warn bystanders of the risk.		

	 WARNING STAYING ON THE PRODUCTION LINE – Falling hazard	
• DO NOT stay on the production line! • 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  HOT WORK PIECE – can burn	
• The work piece can be hot after welding or cutting. • Use personal safety equipment.		

	 DANGER  MOVING MACHINE – Crushing, cutting or impact hazard!	
• Secure the working area before operating! • Do not go near or under the moving machine!		

	 WARNING 	
	MOVING WORK PIECE – entanglement and crushing hazard	
• Secure the working area before operating! • Do not go near or under the moving work piece!		

	 DANGER 	
	AUTOMATIC MACHINE – cutting hazard	
• Operation of the equipment includes automatic movement! • DO NOT wear loose-fitting clothes. • Secure the working area before operating the machine!		

	 DANGER 	
	HANGING WORK PIECE – crushing hazard!	
• Secure the working area before lifting work piece! • Observe the lifting regulations that apply to the work place. • Do not go near or under the work piece!		

	! WARNING ! Hydraulic leak – Skin injection hazard	
• Protect hands and body from high pressure fluids. • Check the condition of the hydraulic system regularly and repair all failures immediately. • Repair all damaged components and possible leaks immediately. • Relieve pressure before disconnecting hydraulic or other lines and tighten all connections before applying pressure. • In case of accidental skin injection, seek immediate "Surgical Treatment." • Failure to follow this warning can result in amputation or serious injury.		

	! WARNING ! 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!		

	 DANGER 	
	MAGNETIC FIELD – Medical hazard	
Follow the instructions of the supplier of the magnetic		

	 NOTICE 	
	Read and Understand the INSTRUCTION MANUAL before installing or operating	
Always mention the type, serial number and manufacturing year of the machine when ordering spare parts.		

2.3 Safety related functions

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

All emergency stop buttons have similar function and stop the whole line.

After clearing the reason the emergency stop can be reset with a push button in the main control panel.

3 TECHNICAL INFORMATION

3.1 Machine structure

Pema Conveyor line RC 5200 consists of the following main parts:

1. Conveyor rolls
2. Cross transport conveyors
3. Magnetic carriage
4. Magnetic clamping bed
5. Service platforms

Location of the main parts is shown in Figure 1

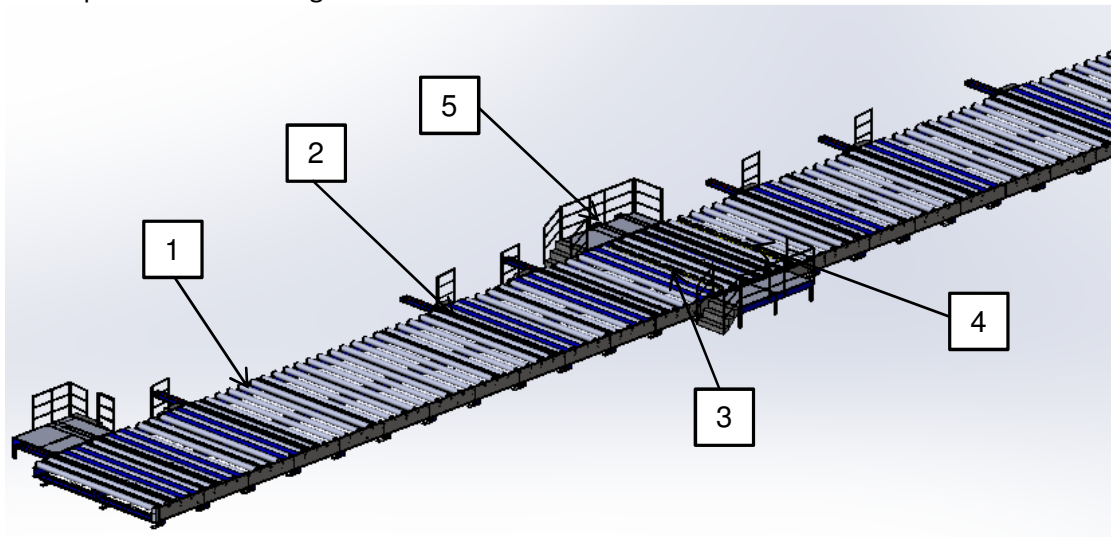


Figure 1 Main parts

3.2 Technical Data

3.2.1 Mechanical characteristics

Conveyor line

Number of conveyor rollers	110 pcs
Number of cross transport conveyors	10 pcs
Roller diameter	193,7 mm
Roller length	5200 mm
Conveying speed	adjustable; 1-7,8 m/min
Width	6 920 mm
Length	26 875 mm
Height	800 mm
Weight	63 595 kg

Magnetic clamping bed

Number of magnets	9 + 9 pcs
Size of magnets	250 x 450 mm
Lifting force	4 200 kg
Weight of the magnet	80 kg

3.2.2 Electrical characteristics

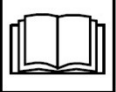
Main supply voltage	400 VAC / 50 Hz 3ph + N + PE
Power consumption	
- Main cabinet	45 kVA
- Magnet cabinet	10 kVA
- 2 x PW1000 SD	90 kVA
- Induction heater	127 kVA
- Chiller	10 kVA
Required fuse size	
- Main cabinet	80 A (Slow)
- Magnet cabinet	32 A (Slow)
- 2 x PW1000 SD	100 A (Slow)
- Induction heater	100 A (Slow)
- Chiller	32 A (Slow)
IP protection class	IP 54

3.2.3 Noise level

A-weighted sound power level	dB
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3.3 Machine plate

Machine plate is attached to the side of the main control cabinet.

 PEMAMEK OY FIN - 32200 Loimaa Finland www.pemamek.com	Type:		
	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

	! CAUTION !	
	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. • 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.

4.2 Installation and start-up

Installation of Pema PBW welding station is only allowed under the supervision of PEMA or its authorized representative. Installation must be carried out according to installation instructions in Pema lay-out and foundation drawings.

5 OPERATING INSTRUCTIONS

	! CAUTION !	
	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 a trained person is allowed to operate the machine. • In case of an emergency stop the operation with emergency stop button! • Ensure safe working conditions before starting operation after emergency stop! • 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!		

	! DANGER ! COLLISION – can break the equipment and cause injury!	
• Secure the working area before operating the machine! • In case of collision stop operation immediately and check possible damages.		

5.1 Safety functions

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

5.1.1 Emergency stop function

Emergency stop switches off all machine functions.
Emergency stop also switches off the welding equipment.

Note1: The control voltage (24VDC) is remains after emergency stop!

Note2: The power of the flux heating system remains after emergency stop!

5.1.2 Emergency stop reset

Before resetting the emergency stop all actuated emergency stop buttons must be released. Emergency stop button is released by turning it clockwise.

5.1.3 Control panel in MC1

In the door of the main control cabinet there is a control panel for controlling the main movements of the machine.

Control panel in MC1 is shown in Figure 2 and it has the following functions:

1. Emergency stop button
2. Flux pressure tank on/off
 - a. Signal light is lit when pressure tank is enabled.
3. Emergency stop reset / PBW
4. Emergency stop reset / Conveyor

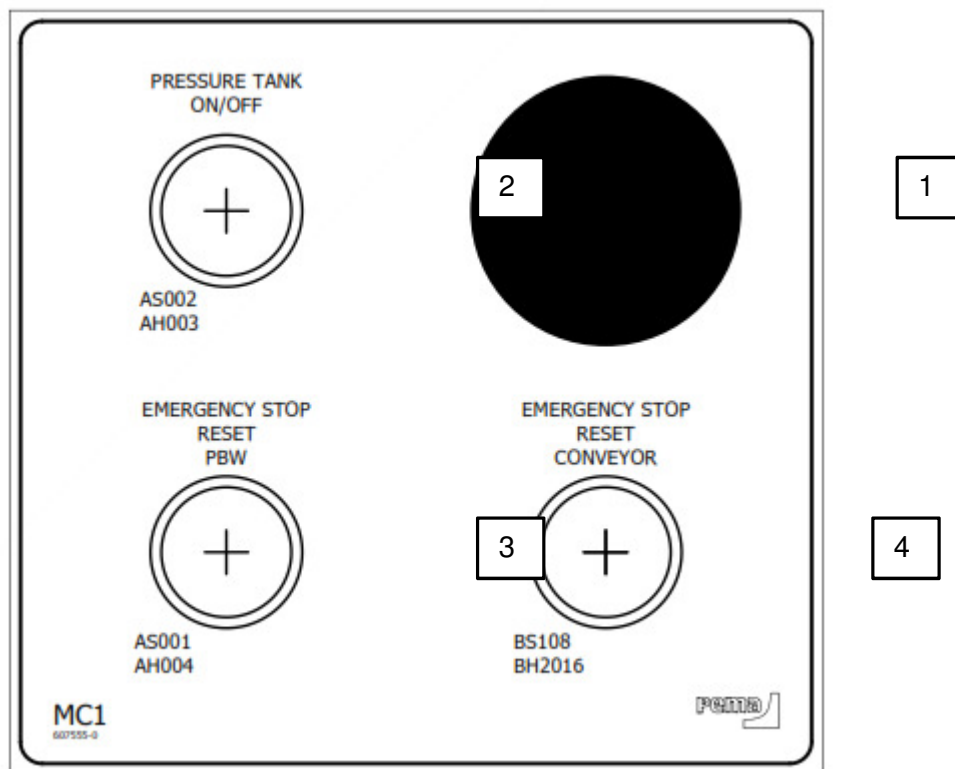
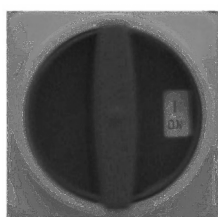


Figure 2 Control panel in MC1

5. Main switch
 - On; turn clockwise (green signal light is lit, reset light is lit in few minutes after start)
 - Off; turn counterclockwise (green signal light turns off)



5

5.1.4 Control panel OPB1

Control panel OPB1 is shown in Figure 3 and it has the following functions:

1. Touch panel
2. Emergency Stop, push button
3. Selected conveyors forward/backward
4. Selected device up/down
5. Positioner movements
6. Positioner movements
7. Speed for conveyors

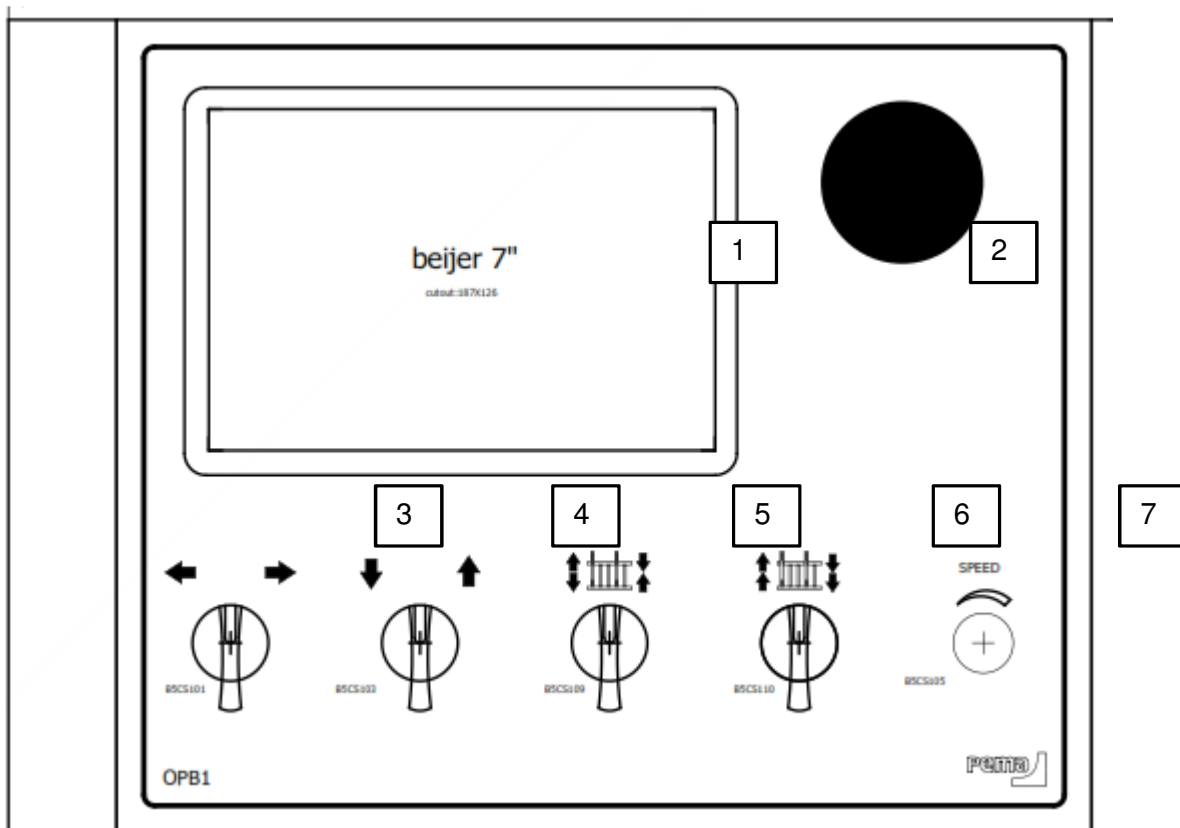


Figure 3 Control panel OPB1

5.1.4.1 Touch panel screens

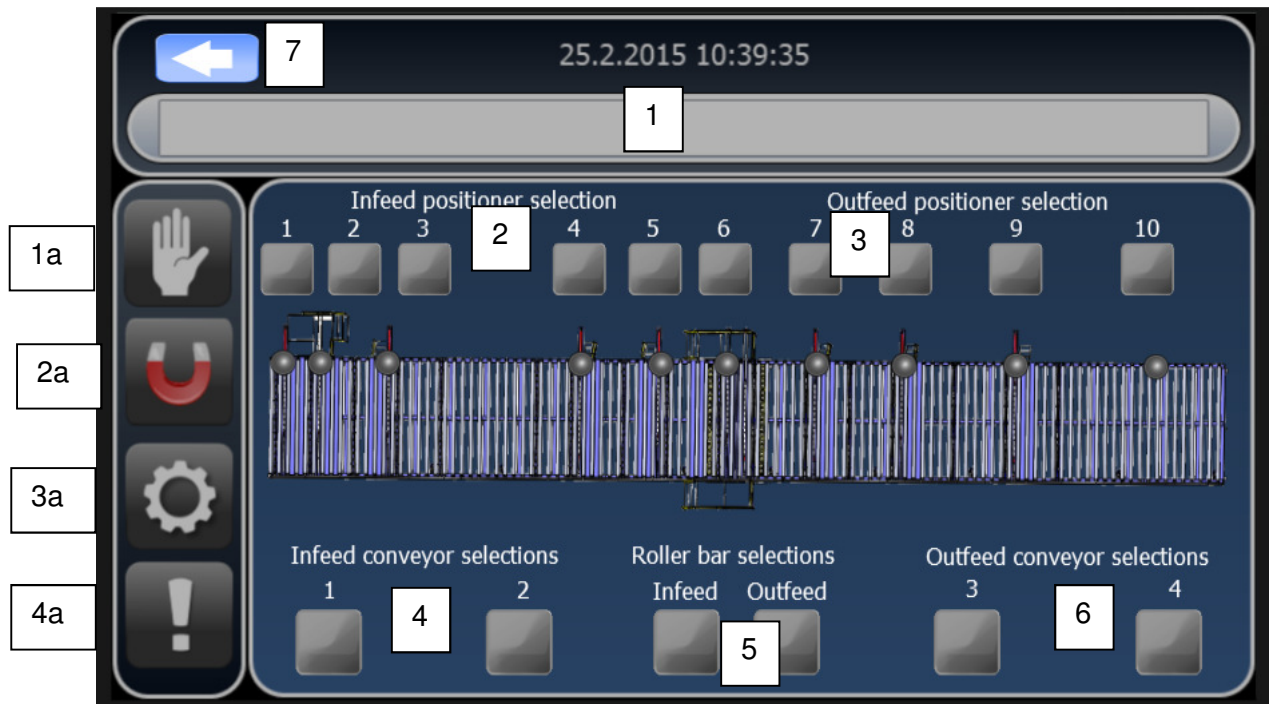


Figure 4 Main screen

1. **Active alarms**, shows active alarms and errors
2. **Selections for infeed positioners (1-6)**
 - Selection for roller conveyors
3. **Selections for outfeed positioners (7-10)**
 - Selection for roller conveyors
4. **Infeed conveyor selections**
5. **Infeed/outfeed roller bar selections**
6. **Outfeed conveyors selections**
7. **Go to root support page –button**

Screen navigation buttons

- 1a. Main screen
- 2a. Magnets control screen
- 3a. Service screen
- 4a. Alarm screen



Figure 5 Root support control screen

1. **Active alarms**, shows active alarms and errors
2. **Root support position memory slots**
 - 10 slots for saving positions
 - Root support drives automatically selected position
3. **Memory slot selections**
4. **Save –button**, saves position to selected slot
5. **Auto positioning –button**, drives root support to selected position
6. **Manual drive for master**
7. **Manual drive for slave**
8. **Manual drive for both ends**
9. **Actual position master**
10. **Actual position slave**
11. **Go to previous page –button**

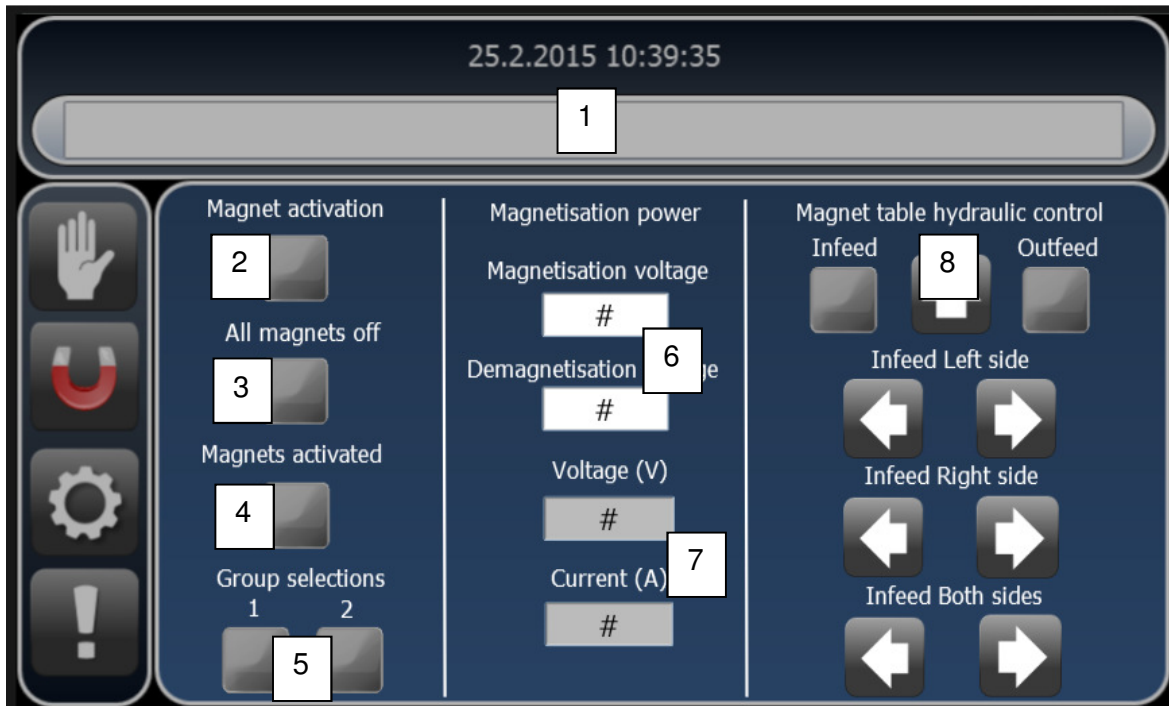


Figure 6 Magnets control screen

1. **Active alarms**, shows active alarms and errors
2. **Magnet activation –button**, activates selected magnet groups
3. **Magnets off –button**, turns magnets off after 3 second pressing
4. **Magnets activated indicator**
5. **Magnet group 1/2 selections**
6. **Magnetisation an demagnetisation voltage setting**
7. **Magnets actual voltage and current**
8. **Magnet table hydraulic control**
 - Selections for infeed and outfeed table
 - Infeed table movements forward and backward

Using magnet table

1. Set magnetisation and demagnetisation voltage
2. Select magnet group to operate
3. Activate selected group
4. Activate infeed or outfeed side
5. Drive magnet table up against work piece

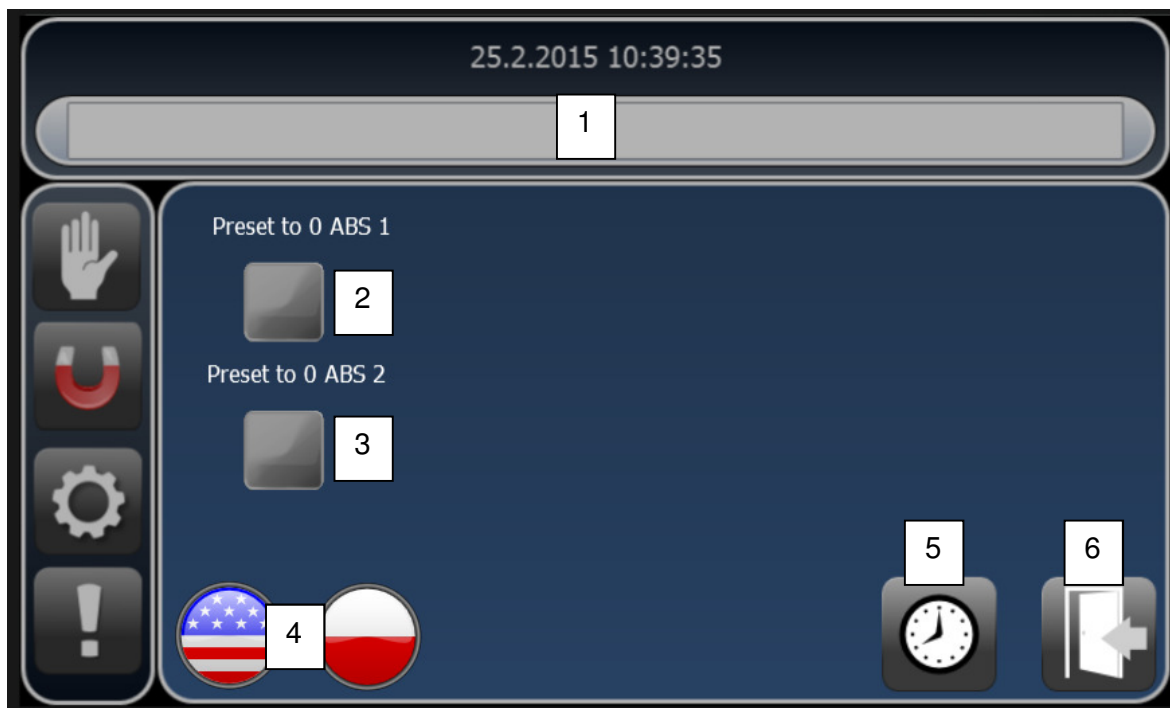


Figure 7 Service screen

1. **Active alarms**, shows active alarms and errors
2. **Resets master absolut encoder to 0**
3. **Resets slave absolut encoder to 0**
4. **Language selection**
5. **Time setting**
6. **Close application**



Figure 8 Alarm screen

1. **Alarm window**
2. **Go to Alarm history –page**
3. **Alarm and error reset**



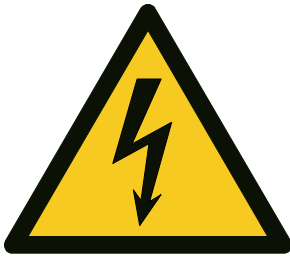
Figure 9 Alarm history screen

1. Alarm history window
2. Go to Alarm –page

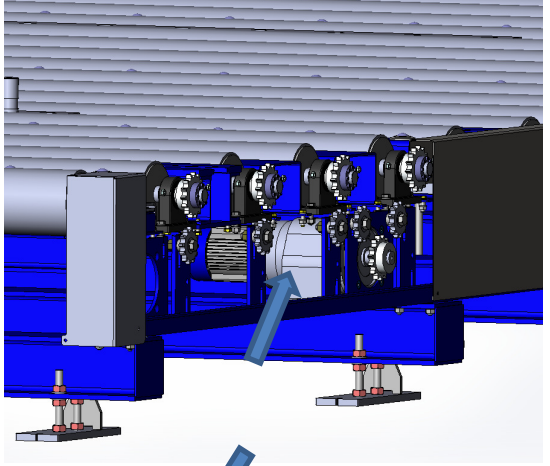
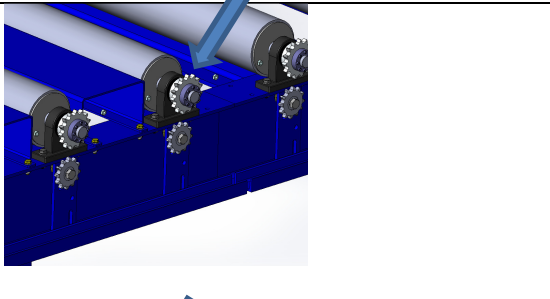
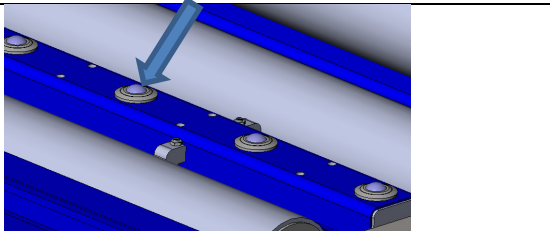
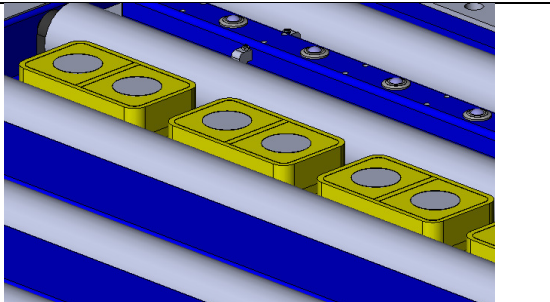
6 MAINTENANCE AND SERVICE INSTRUCTIONS

6.1 Introduction

	! CAUTION ! 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.		

	! WARNING ! ELECTRIC SHOCK - can kill	
• Only authorised 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.		

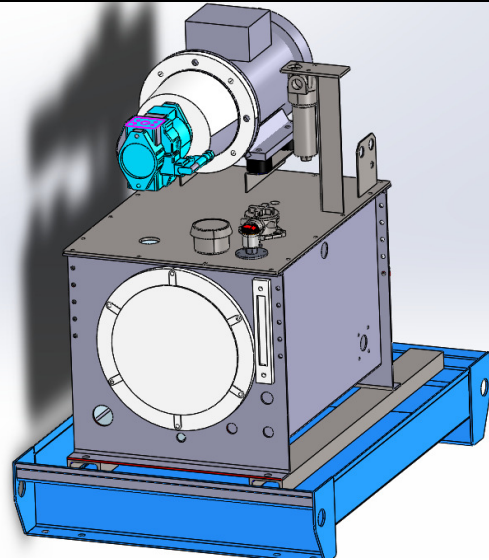
6.2 Lubrication instructions

Gear motor AMF1 80/3 Gear oil ISO VG 320-460 320-460 cSt / 40 °C Longlife lubricated. Gear does not require maintenance. Check the oil level periodically. Restore proper quantity if necessary. Change oil after period of 20000 working hours.	
Bearings UCPH 209 Lubricant: Lithium type soap base Vaseline NLGI2 Period: 3-4 months	
Ball rolls Keep the ball rolls clean and in good condition! Change a broken roll immediately.	
Magnet The magnet surface must be cleaned daily. The attachments must be checked during every magnet maintenance operation. For more information look at magnet's own service and maintenance manual.	

Hydraulic aggregate HPU 160

Keeping the oil of the hydraulic system clean is the basic condition for faultless operation of hydraulics.
In a hydraulic system the oil acts as lubricator and transfers the power.
Therefore only high class oils should be used.

Check aggregate's maintenance instruction also in chapter 6.1.3 Hydraulic aggregate maintenance table



Chains

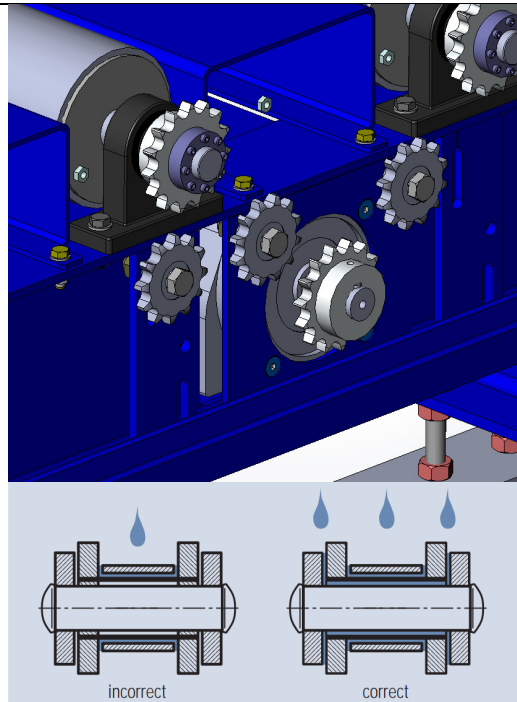
Oil or liquid grease.
Lubrication cycle 800 hours.

Chain tightening

Check appropriate chain tightness once a month and tighten if necessary.

Tightening:

- release the locking nut
- turn adjustment screws on each side of the wheel until the good tension of the chain is obtained.



* 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.

6.2.1 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

6.2.2 Hydraulic aggregate maintenance table

General

The hydraulic oil in a hydraulic system transmits energy and serves as a lubricant. Therefore it is essential for the correct operation and durability of the system that the oil is clean and of the correct grade.

Studies show that approx. 70% of system malfunctions are due to dirty, low-quality or unsuitable oil.

For these reasons, hydraulic systems must always be topped up using a filter. Use 10 µm filters for standard systems and 3 µm filters for servo systems. Cleanliness is of utmost importance at every stage. No open containers or cotton waste must be used in connection with servicing or oil handling.

Regular service

Daily checks

- oil level
- oil temperature
- filter condition indicator
- replacement of filter inserts when necessary
- checking components and pipework for leaks and repairing when necessary
- operating noise
- visual inspection of hoses (abrasions, cracking, etc.)

After 50 operation hours

- Drain the oil tank into clean containers using a filtering pump.
- Clean the oil tank.
- Replace the filter inserts.
- Pump the oil back into the tank using the filtering pump.
- Top up with oil of the same grade if necessary.
- Tighten the connectors and component fixing screws.
- Clean the outside of the hydraulic aggregate.

After 500 operating hours

- Replace the filter inserts if necessary.
- Check the pipe and component fastenings.
- Check the oil quality visually and/or determine its purity with a particle counter.
- If necessary, change the oil or send a sample to the oil company laboratory for analysis.
- Check the air filter inserts and replace when necessary.
- If the system includes suction filters, they must be replaced or cleaned if reusable.
- Clean the outside of the aggregate.

After 5000 operating hours (annual service)

- All hydraulic systems must be serviced at least once a year, including those with few operating hours.
- Annual service must be planned in advance. When planning the service operation, take account of defects and malfunctions found in daily checks as well as the need for repairs and replacement according to the service life of individual components.
- Drain the tank into clean containers if the oil is to be reused.
- If the system is small, change the oil.
- With large system, it is advisable to send an oil sample to the oil company laboratory for analysis to determine the need for oil change.
- Clean the inside of the tank with care and check the paint finish.
- Replace filter inserts and air filters.
- Clean the water cooler and check its condition.

Servicing the components

All defective components should be replaced. Disassembly and cleaning of parts

- Check the parts for wear and replace when necessary.
- Always replace seals and check valve centering springs and bearings when necessary.
- Wash the cylinders, dismantle them and check the parts. If the parts are OK, assemble the cylinders using new seals. Carry out a pressure and leak test.