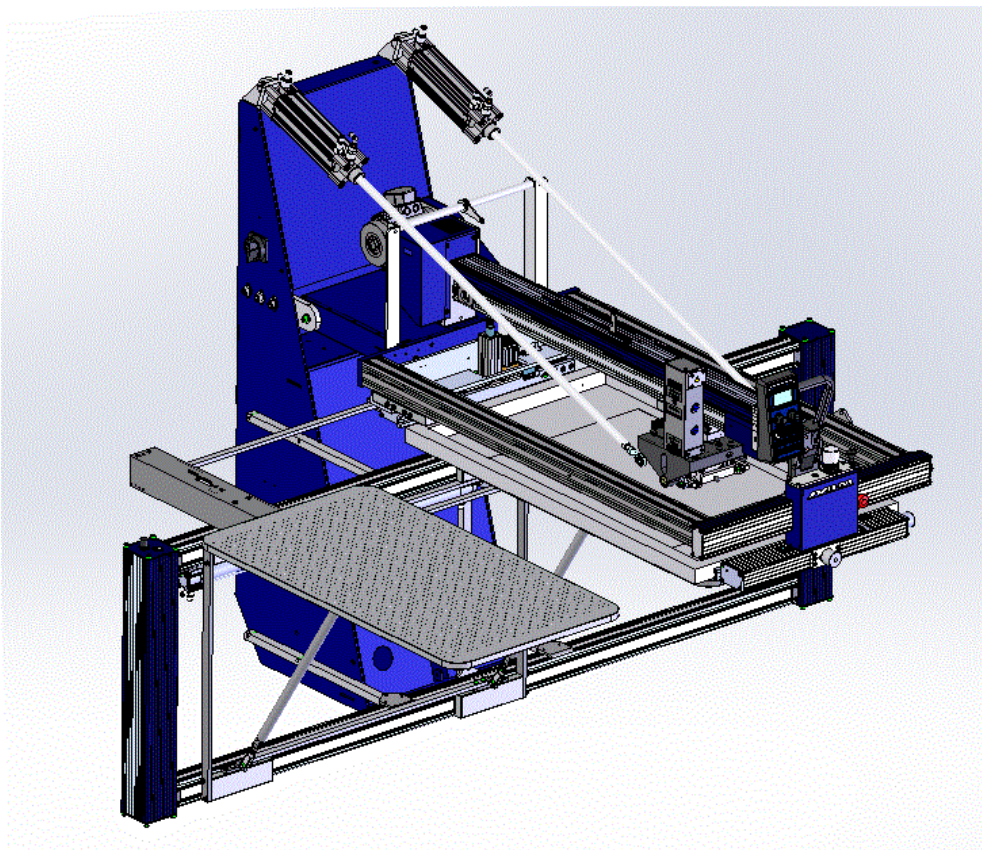


Operating instructions single print

(Translation of the original instructions)



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1. Safety instructions




The printing machine is built in accordance to all appropriate safety regulations. Owing to its complex design, the Printing machine must only be operated and maintained by suitably skilled staff.

‘Qualified personnel’ refers to people who are able to carry out the required procedures and be able to recognize as well as prevent potential risks, as a result of their training and experience. Such personnel should have a good knowledge of any relevant standards, regulations, rules of accident prevention and internal conditions etc.

1.1. Personal Protective Equipment






Personal protective equipment must be used at work. This equipment comprises close-fitting working clothes with tight sleeves and high tearing resistance without any protruding parts. These features prevent operators from getting caught by moving machine parts.

1.2. Safety Instructions for the Operating Staff

 DANGER	<p>All cabinets and covers on the Printing machine must always be kept closed. Open cabinets and covers are extremely dangerous as live electrical components are accessible.</p>
	<p>Mechanical or electrical failures must only be repaired by an MHM authorized/approved technician.</p>
	<p>On every occasion, the operator should check the correct functioning of the safety devices (Emergency STOP), before commencing use of the Printing machine.</p>
	<p>No modifications to any part of the machine or its assembly system that may adversely affect safety must be carried out without the prior approval of MHM.</p>
	<p>Program modifications in the control program and changes of settings which may affect the Printing machine's operation should only be carried out by an MHM authorized/approved technician.</p>
 CAUTION	<p>All working spaces, passageways, escape and emergency routes and exits must be kept clear.</p>
	<p>No tools or other objects must be kept or left in the area of the machine.</p>
	<p>Any modifications or changes to the Printing machine's settings should only be carried out by an MHM authorized/approved technician.</p>
	<p>Always wear protective gloves and safety goggles during cleaning work, in particular when using solvents!</p>
	<p>Any remains of potentially harmful substances should be disposed of according to the legal requirements of the country or state in which the Printing machine is operated.</p>
 NOTE	<p>All accessories for service and maintenance work (e.g. cleaning agents) must be collected in suitable containers and disposed of according to any relevant regulations.</p>

1.3. Additional Risks

Even though the Printing machine has been designed and built according to the most stringent safety criteria, as with all machinery we have to anticipate certain additional risks, which are detailed below:

Danger	Description	Behaviour/Action
<p>Electrical threats: Indirect contact (in case of defect)</p> 	<p>Danger of life-threatening electrical shock by indirect contact with defective parts carrying voltage (in particular in case of defective insulation).</p>	<p>Disconnect the machine from power supply by switching of the “main power switch”.</p>
<p>Mechanical threats: Crushing</p> 	<p>Crushing of parts of the body - in particular arms and hands.</p>	<p>Be aware of moving parts whilst operating the machine. Wear protective clothing at all times.</p>
<p>Mechanical threats: Getting caught or trapped</p> 	<p>Danger through moving parts (linear or rotary drive systems).</p>	<p>Danger in reaching into, under or over the machine. Only reach into the machine from the indicated points. Wear suitably fitting clothing, particularly in the area of the arms.</p>
<p>Mechanical threats: Slipping, stumbling and falling</p> 	<p>Danger of falling (e.g. obstacles on the floor).</p>	<p>The floor area around the machine must be kept free from any obstacles.</p>
<p>Danger through contact with or inhaling of substances</p> 	<p>Danger through contact with or inhaling substances or materials with harmful or toxic effects.</p>	<p>Observe the safety instructions for handling such substances.</p>

2. Intended usage of the machine

The machine is intended for the printing of substrates (usually textiles such as T-shirts, but also paper or similar materials) by means of screen printing. The substrates are conveyed linearly by means of a pneumatic cylinder. With the use of optional accessories the substrate can also be dried or treated with other finishing techniques (e.g. flocking).



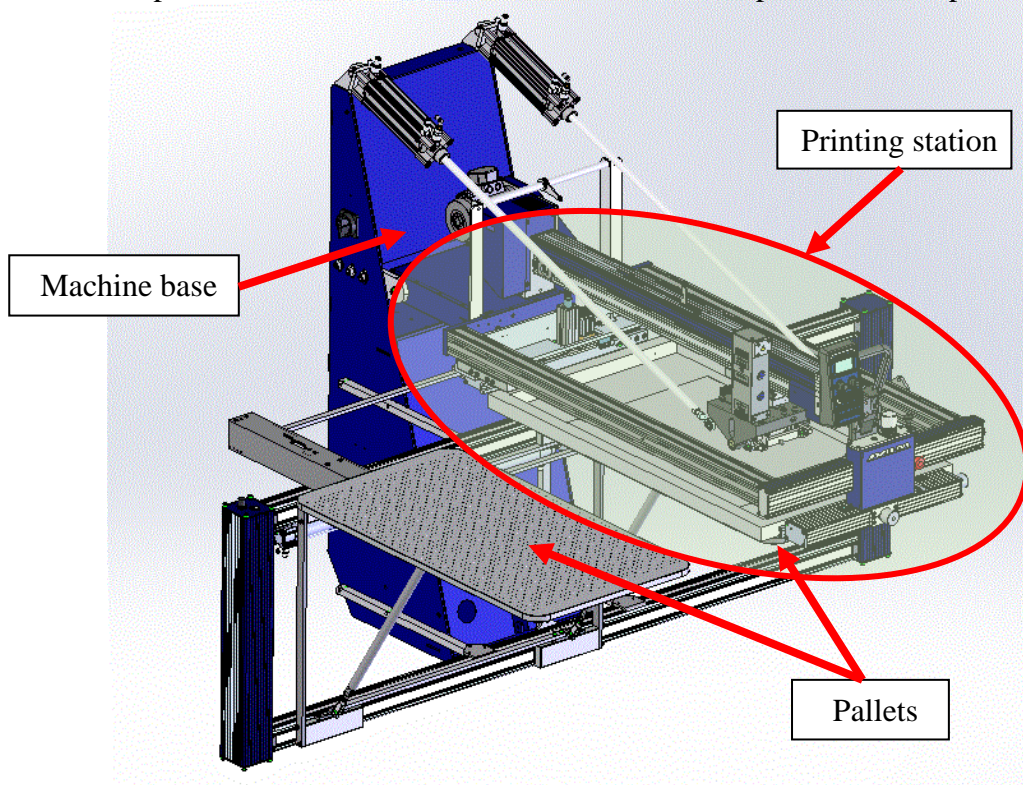
Any other use of the machine than described above may result in danger to persons or material damage and is therefore forbidden.

3. Specifications

Description	value
Electrical supply	1x 230V; 50/60Hz; ±5%
Power consumption	1500VA
Minimum air pressure	6 bar (filtered, dry air only)
Air consumption	150 l/min
Dimensions (W/D/H)	200/220/175cm
Machine weight	275kg
Print area	50x70cm

4. Construction

The main components of the machine are the base frame, the pallets and the print station.



4.1. Machine base

The machine base is needed for the following functions:

- Carrier for the printing station. The printing station can be lifted.
- Carrier for the moveable pallets. The pallets are powered by a pneumatic cylinder.
- Main power switch to turn off the machine and disconnect it from the main supply.
- On-/Off-switch for the vacuum pump.
- Two connectors for foot switches to turn off the vacuum on both sides.
- Signal lamp for actual state indication. The following states are possible:

Light	State
OFF	Machine ready, waiting for start signal.
Flashing	Machine active.
ON	Error state. Emergency stop button pressed or incorrect signal from squeegee carriage or pallet position sensors.

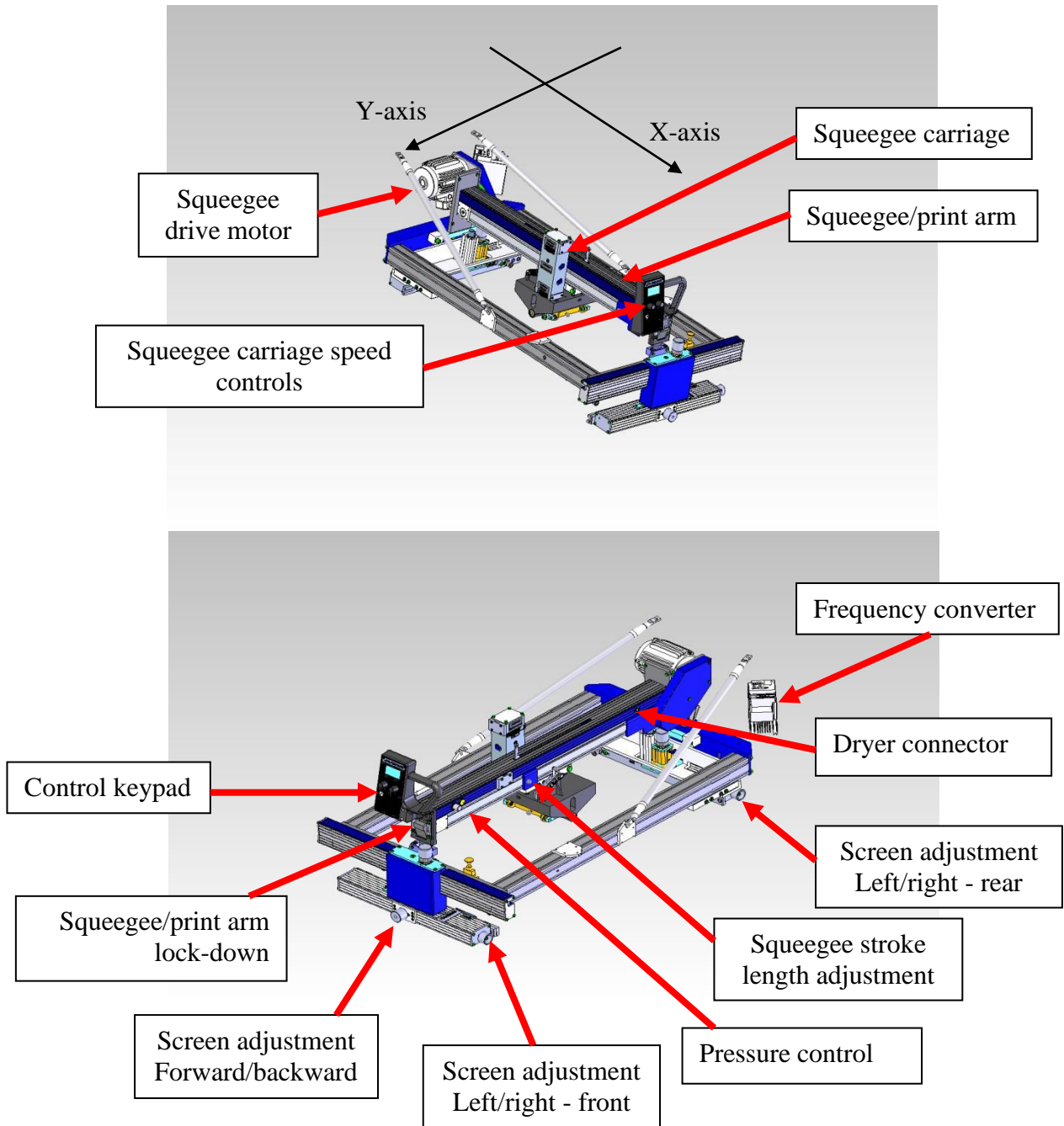
4.2. Pallets

There are two pallets with vacuum function. The vacuum can be turned off individually by using one of the two foot switches. The pallets are powered by a pneumatic cylinder. For position detection two sensors are mounted on the left and the right end position.

4.3. Print station

The print station is used for printing on the substrate. The following sections include a detailed description of the individual components.

4.3.1. Overview



4.3.2. Squeegee Arm Motor

The squeegee/print arm motor is used to drive the squeegee carriage back and forth, controlled precisely by the frequency converter.

4.3.3. Frequency Converter

The frequency converter controls the squeegee drive motor. The motor and frequency converter have already been adjusted by MHM, and no further adjustment should be necessary.

4.3.4. Squeegee/print arm

The squeegee carriage, squeegee stroke length adjustment, the control keypad and the pressure control are all located on the squeegee arm.

4.3.5. Dryer connector

The dryer connector is used to control an external dryer.

4.3.6. Screen Adjustment/Micro-Registration

The screen adjustment/micro-registration is used for the precise positioning of the screens. Each screen may be positioned forwards/backwards by means of a single hand wheel adjuster located at the front of each individual print station. For left/right adjustment there are two hand wheel adjusters located at the front and rear of each individual print station. Adjustment is free from play and self-locking, therefore no additional clamping is required.

4.3.7. Squeegee stroke length adjustment

The squeegee stroke length adjustment may be used to adjust the precise travel of the squeegee carriage. There are individual sensors on each print station to adjust the front and rear positions. Minimising the travel of the squeegee carriage helps to reduce printing times and increase production.

4.3.8. Squeegee/print arm lock-down

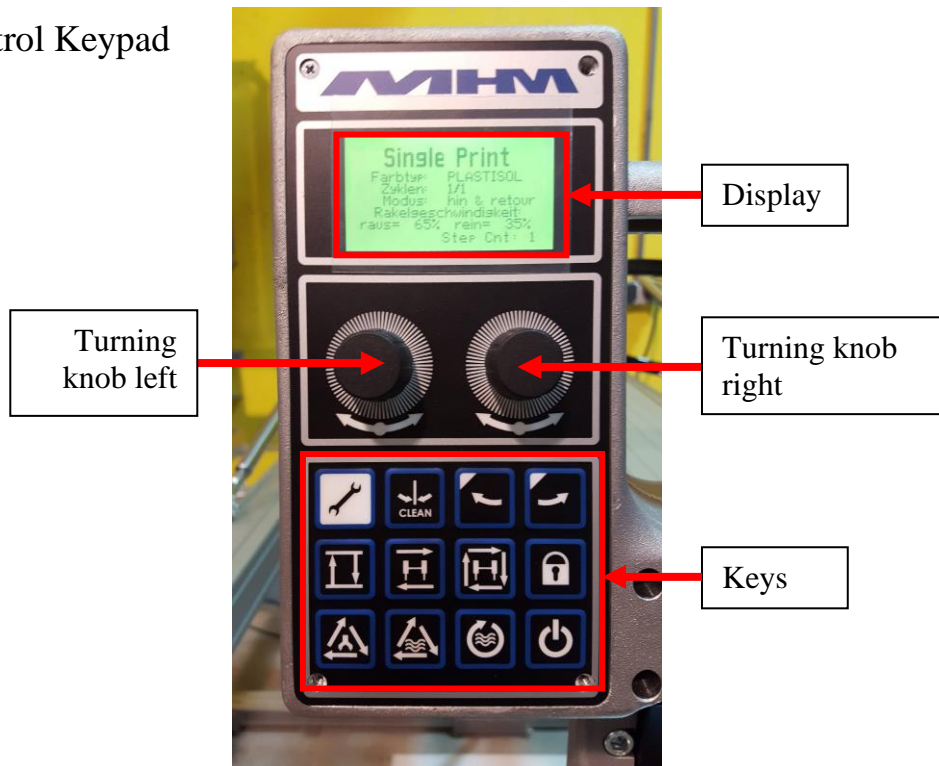
Pressing the squeegee/print arm lock raises the entire squeegee/print upwards, providing unobstructed access to the screens.

4.3.9. Pressure control

Squeegee pressure adjustment (with clear display gauge).





4.3.10. Control Keypad












The control keypad is used to operate the printing machine. The following informations are indicated:

Indication	Function
Ink type:	Indication of the actual adjusted color type.
Sequence:	Indication of the actual adjusted printing cycle.
Print mode:	Indication of the actual adjusted printing mode.
Stroke Speed Out:	Indication of the actual adjusted stroke speed for outward movement.
Stroke Speed In:	Indication of the actual adjusted stroke speed for inward movement.
Pieces:	Actual count of the piece counter. After power off/on the counter is set back.
Step:	Actual program step for programmer.

The following functions are available from the control keypad:

Key	Function
	ADJUST is used to exit the submenu.
	Press CLEAN for two seconds to set back the piece counter.

Anzeige	Funktion
	Moves the pallets to the left.
	Moves the pallets to the right.
	Raise and lower the screen depending on its initial position.
	The printing station makes a single print stroke.
	Starts a complete printing cycle as adjusted.
	Changes the color type. The adjustment will not be stored. After a power reset the default value is loaded again. Use submenu for permanent setting.
	Changes the printing cycle. The adjustment will not be stored. After a power reset the default value is loaded again. Use submenu for permanent setting.
	Changes the printing mode. The adjustment will not be stored. After a power reset the default value is loaded again. Use submenu for permanent setting.
	Lowers or lifts up the printing station depending on its initial position.

The turning knobs are used to adjust the squeegee carriage speed. The left turning knob adjust the outward speed, the right turning knob the inward speed.

4.3.11. Submenu

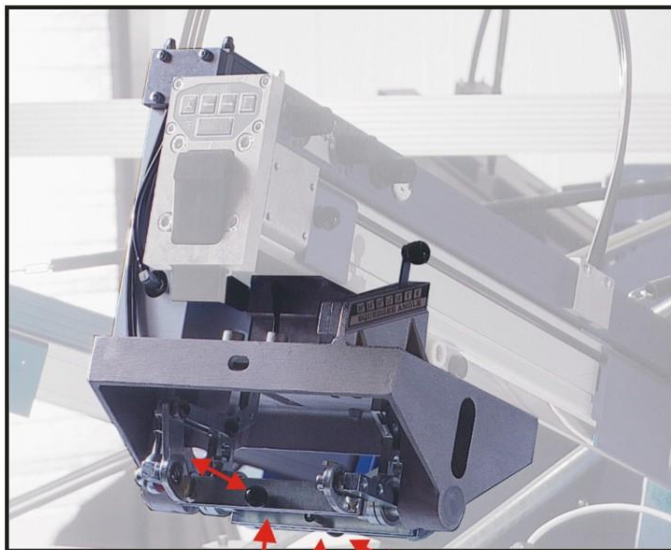
The submenu is used to adjust all parameters permanently. To activate the sub-menu the right turning knob has to be held and the left turning knob has to be pushed. After power on the parameters from the submenu are loaded automatically.

To change a parameter value, first scroll to the respective parameter with the left turning knob and select it by pressing the left turning knob. Turn the right knob to change the value. To save the value press the right turning knob, pressing the left turning knob interrupts the value change without saving it. Use the ADJUST key to exit the parameter menu.

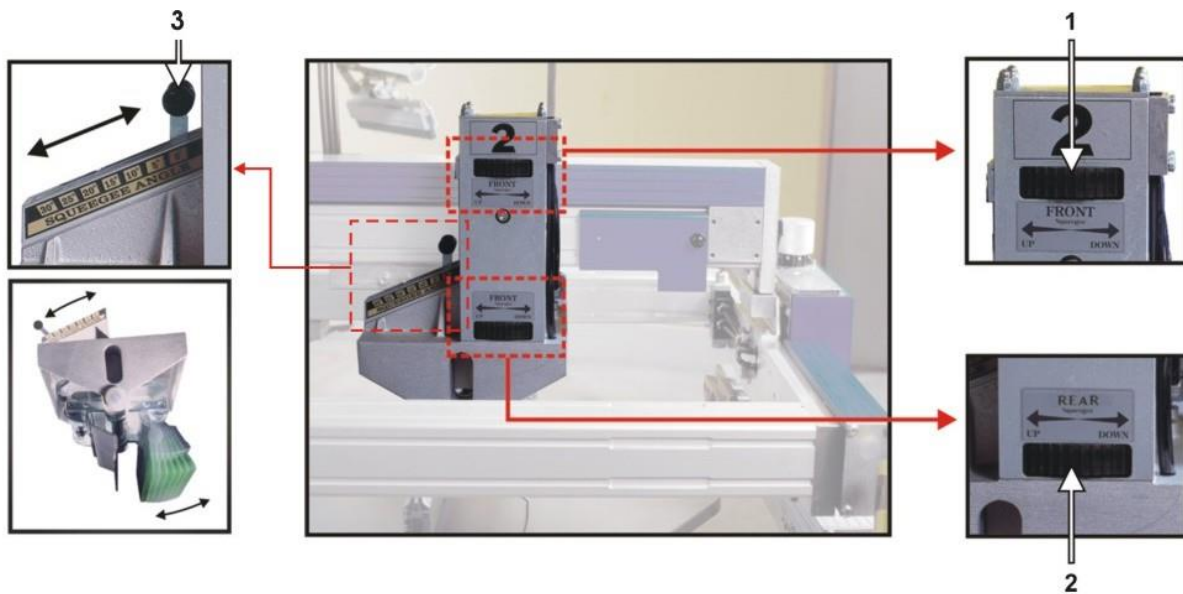
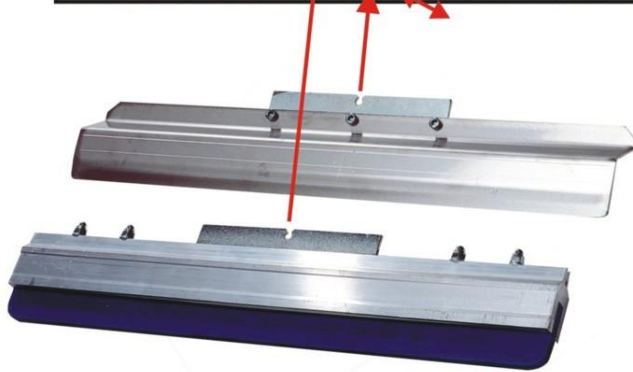
The following parameters can be edited in the submenu:

Parameter	Range	Default	Description
Speed inward	0-100	50	Squeegee carriage speed inwards in %.
Speed outwrđ	0-100	50	Squeegee carriage speed outwards in %.
Stroke delay	0-100	20	Delay time for carriage movement (necessary because of screen lift). Input in 1/100s.
Sensor delay	0-100	20	Delay time for pallet positions sensors and station down sensor. Input in 1/100s.
Tilt time	0-100	12	Time for squeegee mid-position. Input in 1/100s.
Ink Type	0-1	0	0...Plastisol ink 1...Waterbased ink
Sequence	0-4	0	0...1 Print- and 1 Flood-Stroke 1...2 Print- and 2 Flood-Stroke 2...3 Print- and 3 Flood-Stroke 3...2 Print- and 0 Flood-Stroke 4...4 Print- and 0 Flood-Stroke
Print Mode	0-2	1	0...move & stop: Moves the pallet below the print station, prints and stops there. 1...move & back: Moves the pallet below the print station, prints and moves the pallet back to the initial position. 2...up & down. Prints without pallet movement, station will be lifted at the end.
Max. time [s]	0-100	30	Maximum permitted time for complete print cycle. Input in seconds.
Pal. time [s]	0-100	10	Maximum permitted time for pallet movement. Input in seconds.
LCD Contrast	25-55	40	
LCD Color	0-7	3	

4.3.12. Squeegee Carriage



The squeegee carriage is equipped for two squeegees. Pulling the black 'quick release' knob (*pic. opposite*) will release the respective squeegee. Make sure that these locking knobs engage fully when loading the squeegee. The maximum permitted squeegee width must be observed.



Squeegee height may be adjusted individually by the hand wheels (*pic. 1 + 2*). Squeegee angle may also be adjusted individually by the sliding levers (*pic. 3*). Squeegee pressure may be adjusted by an adjusting knob located on the squeegee arm.

4.4. Emergency stop push button

Push buttons located in the front of the printing station. In case of emergency, pressing the EMERGENCY STOP will stop the squeegee carriage and the pallet movements. The function of the push button is cancelled by unlocking the switch and pressing the reset button afterwards.

4.5. Start buttons

By pressing one of the two start buttons a complete print cycle is started. The buttons are located on the left and on the right side of the printing machine.

5. Automatic print cycle

First move the squeegee carriage and the pallet to the requested positions. Adjust the requested print sequence, ink type and print mode. The automatic print cycle must be started with one of the start buttons. Depending on the setting the print cycle runs automatically.

6. Shutting Down the Printing machine

6.1. Temporary shutdown

Use the main power switch on the left side of the machine base to turn off the machine and disconnect it from the main supply.

6.2. Permanent Shutdown of the Machine

If the printing machine is to be permanently shut down or decommissioned (e.g. disposed of/scrapped), upon disassembly all individual parts must be disposed of according to their class and substance, and in accordance with any respective regulations in effect at that time in the machine's particular location/country, and by a suitably reputable and authorized waste-disposal company.

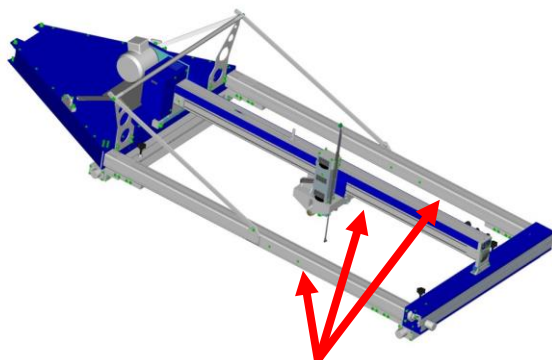
7. Maintenance of the printing machine



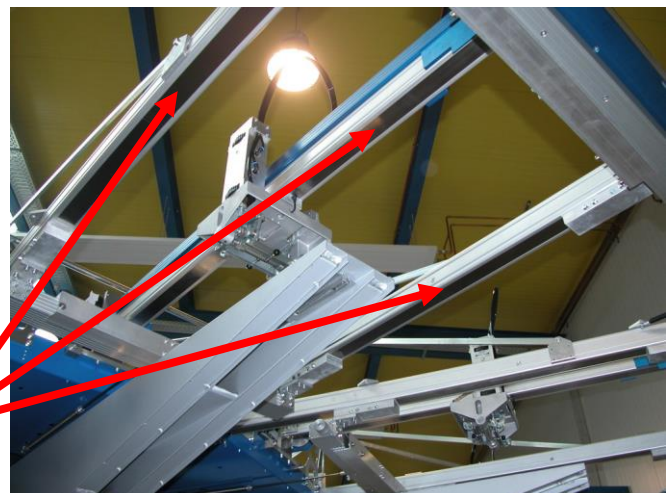
Before doing maintenance work the machine must be cut off from the supply voltage using the main power switch.

The printing machine has been designed to operate ‘maintenance-free’ as far as possible. Only a few important service measures are necessary by the operator.

Task	Frequency	Comment/Action
Daily cleaning	Daily	Remove all residues from the printing machine remaining from production materials such as inks and adhesives etc. Clean, tidy and sweep the printshop area.
Weekly cleaning	Weekly	Wash off all anodized parts of the Printing machine with an appropriate cleaner. Clean all inspection glasses and displays.
Cleaning the control keypad	Weekly	The surface must only be cleaned with a dry cloth or appropriate monitor-cleaning cloth. If any aggressive cleaners or solvents are applied, the surface of the touch screen will be damaged or destroyed, resulting in cancellation of the warranty.
Wipe clean the sealing band on the underside of all the linear profiles	Weekly	The sealing band on the underside of the linear profiles must be wiped clean thoroughly and lubricated with an oil-soaked cloth.



Sealing band on the underside of the linear profiles



8. Terms of the Guarantee

The terms of the guarantee are detailed in the General Terms and Conditions of Machines Highest Mechatronic GmbH.

9. Limitation of liability

Warranty and liability claims for personal injury and material damage are **excluded** if they can be attributed to or are a result of one or several of the following:

- Improper use of the Printing machine.
- Incorrect assembly, operation or maintenance of the Printing machine by the operator.
- Operation of the machine with defective safety devices and/or safety devices which are missing/removed or not in correct working order.
- Failure to comply with the safety instructions in this document with regard to transportation, assembly, start-up, installation, operation, control and maintenance of the Printing machine.
- Failure to comply with the Operating Instructions.
- Unauthorised modifications to the Printing machine (e.g. disassembly of original MHM components and/or use of any non-original MHM components)
- Unauthorised modifications to any part of the drive or control systems (e.g. change of control components or frequency converters).
- Lack of monitoring and maintenance of machine parts/components subject to wear and tear.
- Repair measures, maintenance or service work carried out by unauthorised persons.
- Use of lubricants other than those recommended by MHM.
- Operation of the machine under technical conditions other than those specified by MHM (e.g. excessive power supply voltage and/or excessive air pressure).
- Damage by any foreign object and/or force majeure.
- Omission of specified maintenance, service measures and procedures.
- Operation of the Printing machine by untrained personnel.

10. Support, Customer Service and Hotline

In case of any problems or additional questions please turn to your appropriate service partner.