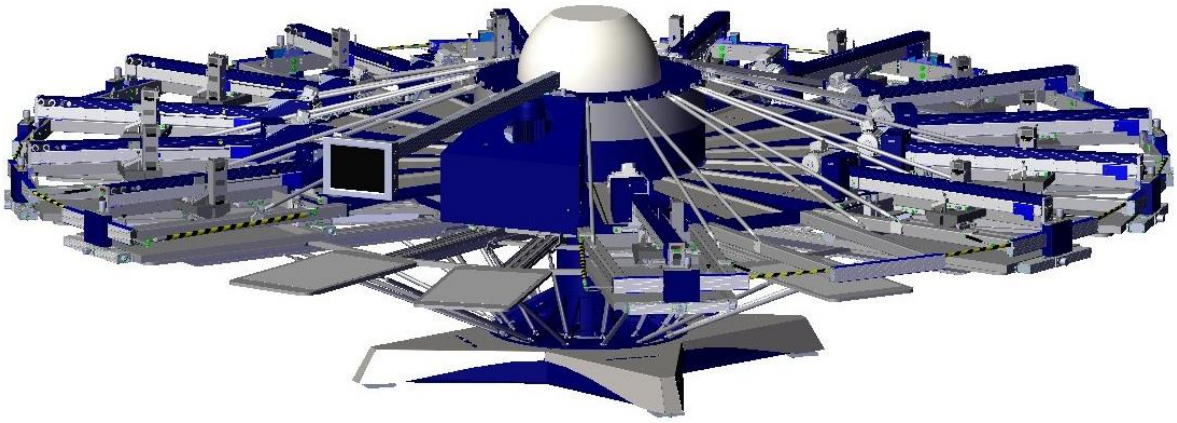
OPERATING INSTRUCTIONS



MHM SCREEN PRINTING MACHINE
OPTION LIFT STATION

Preface

Dear Customer,

Congratulations and thank you for choosing the option lift station. This machine is designed to provide the highest standards of performance and reliability during its guaranteed long operating life. Highly innovative and precise MHM technology provides a combination of the finest built quality along with optimal safety. We trust that these Operating Instructions will assist you in becoming familiar with the safe and efficient operation of the Lift Station.

Important Note:
Due to our policy of continuous improvement, we reserve the right to change specifications without prior notice. Therefore, certain individual fittings and components may differ slightly from the model detailed in this document. For any further questions regarding your Lift Station, please contact the MHM service team.

Wishing you every success with your future production…

MHM GmbH

Important Advice Regarding These Operating Instructions

These Operating Instructions form an integral part of the Lift Station and must be made available to all authorized personnel at all times. No particular sections or pages must be removed from these Operating Instructions, and any missing sections or pages should be replaced immediately, in particular with regard to section ***"1. Safety Instructions".***

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Erl, December 2016

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1. Safety Instructions

This section describes the safety instructions for the correct and safe operation of the Lift Station. In addition, this section also contains references to the European rules and regulations concerning the guarantee of industrial safety along with safety at the workplace. These rules and regulations provide the basis for these operating instructions.

These Operating Instructions include:

1. General safety instructions.
2. Special safety instructions, if they are relevant to a specific section, at the beginning of that respective section.
3. Special safety instructions, if they are important for detailed sequences of operation, before the description of that respective sequence of operation.
4. Indications to read such instructions included in the respective section.

1.1. Description of Key Words and Symbols in the Operating Instructions

In these operating instructions classified key words and symbols are used to identify dangers and items that require special attention. Particular attention is to be paid to the sections marked in this manner, because they contribute to personal safety as well as the prevention of damage to the Lift Station.

Symbol	Key word	Meaning
	DANGER	This symbol indicates possible risk to life.
	CAUTION	This symbol indicates danger of damage to property and/or environment.
	NOTE	This symbol indicates useful additional information and operating suggestions.

1.2. General Information

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

Installation, operation or maintenance of the Lift Station by persons who have not been suitably trained, introduced or acquainted with the system and informed regarding the possible dangers may result in:

1. Failure of essential functions on the Lift Station.
2. Danger to persons through electrical or mechanical actions.
3. Material damage to the Lift Station.

1.3. Qualification of Operating and Service Staff

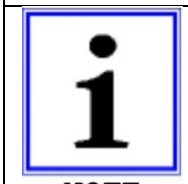
'Qualified personnel' refers to people who are able to carry out the required procedures and be able to recognize as well as prevent potential risks, as a result of their training and experience. Such personnel should have a good knowledge of any relevant standards, regulations, rules of accident prevention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

Every person instructed to perform any operation on the Lift Station must:

1. Be physically and mentally capable of coping with the respective tasks.
2. Be suitably instructed in operating the Lift Station.
3. Be familiar with the Operating Instructions, in particular the general safety instructions in the individual sections, and have read and understood them.
4. Be aware of any additional general safety regulations of any local authorities/associations.
5. Be aware of the principles of industrial hygiene and be able to demonstrate them.
6. Be aware of the contents of suppliers' safety instructions, should they affect his/her area of responsibility.
7. Be aware of any relevant safety devices at the workplace and be able to use them.
8. Be informed regarding the prevention of environmental damage in respect of his/her area of responsibility.
9. Be informed regarding the prevention of material damage in respect of his/her area of responsibility.

If casual workers are employed for assistance work they must be particularly informed regarding existing and potential dangers and instructed accordingly.

1.4. Safety Instructions for the Operating Staff

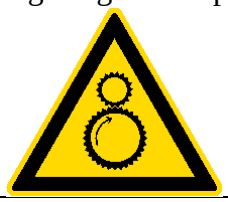
 DANGER	Covers on the Lift station must always be kept closed. Open covers are extremely dangerous as live electrical components are accessible.
	Mechanical or electrical failures must only be repaired by an MHM authorized/approved technician.
	On every occasion, the operator should check the correct functioning of the safety devices (Emergency STOP), before commencing use of the Synchroprint.
	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.
	Program modifications in the control program and changes of settings which may affect the Lift Station operation should only be carried out by an MHM authorized/approved technician.
 CAUTION	All working spaces, passageways, escape and emergency routes and exits must be kept clear.
	No tools or other objects must be kept or left in the area of the machine.
	Any modifications or changes on the Lift Station settings should only be carried out by an MHM authorized/approved technician.
	Always wear protective gloves and safety goggles during cleaning work, in particular when using solvents!
	Any remains of potentially harmful substances should be disposed of according to the legal requirements of the country or state in which the Lift Station is operated.
 NOTE	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.

1.5. 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.

1.6. Additional Risks

Even though the Lift Station 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
Electrical threats: Indirect contact (in case of defect) 	Danger of life-threatening electrical shock by indirect contact with defective parts carrying voltage (in particular in case of defective insulation).	Switch off the machine with the main switch and EMERGENCY STOP facilities. Isolate the mains supply.
Mechanical threats: Crushing 	Crushing of parts of the body - in particular arms and hands.	Be aware of moving parts whilst operating the machine. Wear protective clothing at all times.
Mechanical threats: Getting caught or trapped 	Danger through moving parts (linear or rotary drive systems).	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.
Mechanical threats: Slipping, stumbling and falling 	Danger of falling (e.g. obstacles on the floor).	The floor area around the machine must be kept free from any obstacles.
Danger through contact with or inhaling of substances 	Danger through contact with or inhaling substances or materials with harmful or toxic effects.	Observe the safety instructions for handling such substances.

1.7. Safety Signs on the Machine

The following safety signs are attached to the corresponding points of the machine:

Danger	Description
	Hands off! Don't reach into the machine!
	Warning against squashing of parts of the body, in particular arms or hands.
	Warning of dangerous voltage.

The adhesive labels must be replaced if illegible (due to dirt or damage).

1.8. Other Valid Rules and Regulations:

Regulations for accident prevention (UVV), in particular

- BGV A 1 — General provisions
- BGV A 2 — Electrical equipment and resources
- BGV A 8 — Workplace safety identifications
- VBG 5 — Power-driven tools

Rules and regulations

- EG directive 98/37/EG — Machine directive
- EG directive 89/336/EWG — EMC directive
- EG directive 2006/95/EG — Low voltage directive
- EN 12100-1 and EN 12100-2 — Machine safety
- EN 60204-1, VDE 0100 — Electrical machine equipment
- EN 61000 EMV — Electromagnetic compatibility (EMC)
- DIN-EN 775 — Industrial robots, safety
- DIN EN 842 — Optical caution signals, general requirements
- DIN 4844 — Definition of warning symbols
- EG directive 92/58/EWG — Workplace safety identification
- EG directive 89/686/EWG — Personal protection equipment
- EG directive 89/655/EWG — Directive for machine operators
- EG directive 75/442/EWG — Directive for the disposal and prevention of waste

The customer must comply with all regulations applicable in the country where the machine is located.

2. Intended usage of the machine

The Lift Station is serves for lifting the printing heads on the back side of the machine to bring up and pull off the substrates (usually textiles such as T-shirts, but also paper or similar materials) on two areas.

3. Transportation and packaging

This section provides an overview of the proper transportation of the Lift Station.

3.1. General Notes with Regard to Transportation and Danger Warnings

Danger of falling objects!
The following instructions must be observed

1. Never stand or walk under hanging loads!
2. Transportation must be carried out by qualified staff observing all safety instructions.
3. The Lift Station must only be lifted at the dedicated lifting points.
4. Only the lifting/handling devices and equipment indicated in this document must be used for the movement of the Lift Station. Non-compliance may lead to serious damage of the Lift Station and result in cancellation of the warranty.

Upon delivery of the Lift Station the consignment must be examined for external damage immediately. In the case of any damages, they must be documented and reported to MHM GmbH within 24 hours.

3.2. Packaging

The Lift Station will be packed and delivered in several wooden crates. The crates' exact number, weight and dimensions will vary slightly according to each model/type of machine. Contact customer service for more information about individual orders.

3.3. Unloading of the crates

The Lift Station is to be unloaded by the customer. A forklift truck with adequate fork length and lifting capacity (see 3.2 Packaging) will be required.

Danger of mechanical damage!
The Lift Station must be lifted carefully and only at the dedicated lifting points at the middle of the base unit. Lifting the Lift Station at/by any other point, especially the turntables, may result in serious damage. Be sure to maintain an adequate and safe distance during lifting.

3.4. Packaging material

After unpacking the machine, the packaging material must be disposed of according to local regulations.

4. Assembly

This section describes the external supply/connection ports of the Lift Station and the points to be observed during assembly.

4.1. General Assembly Instructions

The Lift Station must only be installed / assembled by an authorized MHM service technician or by an authorized service technician from an official MHM dealer/agent. Any assembly/installation by any third party not listed above will result in immediate cancellation of the warranty.

The customer should have a minimum of two persons available to assist the technician with the installation and assembly of the machine.

4.2. Positioning of the Synchroprint

The machine must be mounted on a bed with sufficient load-bearing capacity. In case of doubt this capacity is to be examined by a structural engineer.

In order to guarantee perfect installation and smooth operation of the lift station, the machine must be installed at a sufficient distance from adjacent elements of the building (walls, columns, etc.) and/or other machines. The distance required in each case depends on the screen size, and must be chosen so as to allow the operator to replace the screens without any problems. The dimensions of the respective machine are indicated in Chapter ***"****Fehler! Verweisquelle konnte nicht gefunden werden.* **Fehler! Verweisquelle konnte nicht gefunden werden.*****"*** in the user manual of the machine**.**

4.3. Ambient Conditions

For the electrical equipment on the Synchroprint, ambient conditions according to standard IEC 60204 "Electrical Equipment of Industrial Machines" should be observed.

The following points should be observed in order to achieve efficient running and an optimum level of production with the Synchroprint:

1. The premises, where the Synchroprint is to be operated, must be kept clean, dry and well-aired.
2. The ambient temperature must not fall below +5° C or exceed +45° C.
3. Relative air humidity must not exceed 80 %.
4. The mains supply must not exceed or fall below a tolerance of +/- 5 % of the required voltage for the Synchroprint. If this voltage stability cannot be guaranteed, the customer must install a constant-voltage regulator to protect the Synchroprint against such fluctuations.
5. The compressed air must be clean, filtered and dry.
6. Compressed air supply must be sufficient in terms of pressure, volume and consistency.
7. Electricity supply should be sufficient with adequate fuse protection.

4.4. Safety Devices

The safety devices serve as emergency stop facilities to avoid accidents and to guarantee safe operation of the machine. The Synchroprint has the following safety devices:

Safety device	Description
EMERGENCY STOP (push button)	Push button located at the main control panel. In case of emergency, pressing the EMERGENCY STOP will stop all movements of the machine. The function of the push button is cancelled by unlocking the switch (turning it to the right).
Safety bars	Yellow/black bars located at the right and the left of the 'load/unload' area. Pressing any one of these bars will result in an immediate EMERGENCY STOP of the machine. The location of these bars ensures that the EMERGENCY STOP function is activated automatically should a person become trapped between print station and pallet.
Safety barrier	Yellow/black barriers located between the print stations which serve to cordon off the danger zone. As soon as they are opened by a person passing through, an immediate EMERGENCY STOP is activated.

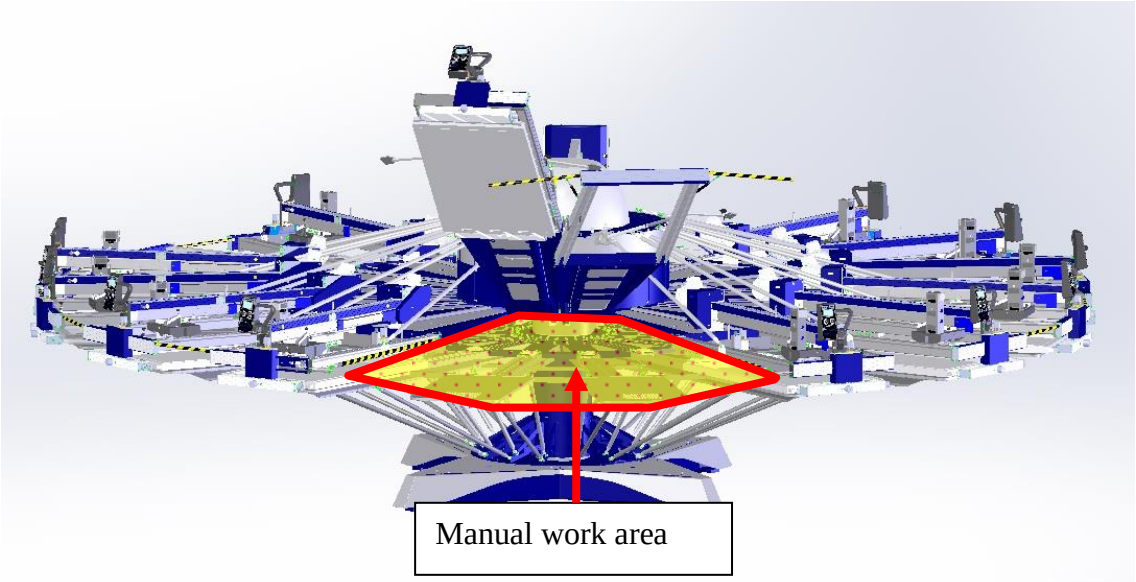
These safety devices must not be used to switch off the machine under normal operation. Any EMERGENCY STOP presents an exceptional loading to the servo-motor and transmission etc. Excessive use will result in damage to the machine along with subsequent cancellation of the warranty.

5. Danger Zones

Danger zones are the areas of the machine which during operation involve a certain risk for people owing to mechanical movement. This comprises all areas of the machine which involve rotary motion, clamping or other movements.

In this connection we indicate the following danger zones:

- Manual Work Area with Locating Surface and Unloading Point
  The manual work area is located on the left-hand side and the right-hand side of the control panel and is used for applying the substrate to the pallet as well as unloading it from the latter. When applying or unloading substrates, operators must always stand in front of and not between the pallets, in order to prevent getting caught between pallet and print station or control panel in case of a rotary motion of the carrousel (index).
- Area between Two Print Stations
  Access to the area between two print stations is barred by safety barriers. This area also involves the risk of getting caught between a pallet and a print station.
- Working/Printing Area
  The working/printing area involves the risk of getting limbs jammed between the squeegee carriage and rigid mechanical parts. Do not reach into these zones during the printing movement.



If any work is to be carried out with or on the machine that requires entering or placing one's hands into any of the danger zones, one of the following conditions must be met:

1. The main control switch has been switched OFF.
2. The EMERGENCY STOP push button has been pressed.
3. One of the respective safety barriers has been pushed and engaged.

6. Control of the Machine

This section explains the control features of the machine with lift station.

This section illustrates the most important of the command screens, not all of which may be illustrated due to the very complex software. The command screens not illustrated in particular are those of a self explanatory nature.

6.1. Stopping the Machine in the event of an Emergency

There is an **EMERGENCY STOP** push button located on the main control panel and on the printing stations by the left and right side of the lift station's . The operating staff must be aware of its location in order to stop the machine in the event of an emergency as quickly as possible.

If the operator detects any danger to personnel or the Synchroprint, he can immediately shut down the machine by pressing the **EMERGENCY STOP** push button.

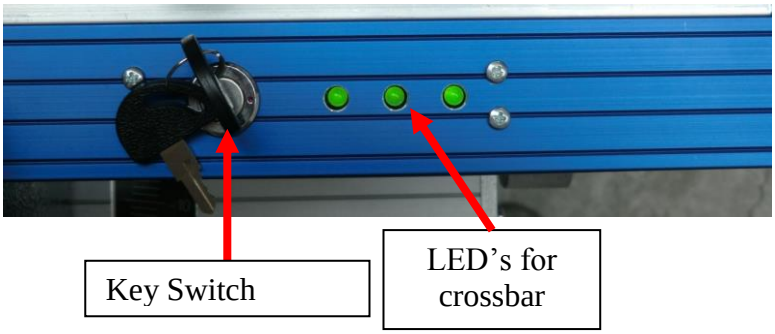
On both the left and right hand side of the load/un-load stations there are two safety bars marked yellow/black, which stop the machine immediately when actuated.

Between each print station there are safety barriers marked yellow/black. If any one of these barriers is opened the machine will stop immediately.

When having dangerous electrical problems the main power switch must be used to disconnect the machine from the main supply voltage immediately.

These safety devices must not be used to switch off the machine under normal operation. Any EMERGENCY STOP presents an exceptional loading to the servo-motor and transmission etc. Excessive use will result in damage to the machine along with subsequent cancellation of the warranty.

7. Lift up and down of lift station



7.1. Lifting up of station

Dislodge the crossbar on the printing station and move it to the position sensor.
When properly position the LED's light up. Turn the key switch to lifting up the lift station.

7.2. Lifting down of station

Check that there are no persons or objects in the danger zone. Turn the key switch to lower the lift stations. Install the crossbar on the printing heads.

8. Machinery operation with two foot switches

8.1. Operating in MANUALLY MODE with lifted stations

If the stations are lifted up, both foot switches must be connected. The first start command must always be given at the control panel. The index starts when both foot switches are actuated. After index both foot switches must be to the start position before these can activated again.

8.2. Operating in MANUALLY MODE with lowered stations

If the stations are lowered, may only one foot switch be connected. The first start command must always be given at the control panel. By actuating the foot switch, the index is started.

8.3. Operating in AUTOMATIC MODE with lifted stations

If the stations are lifted up, both foot switches must be connected. The first start command must always be given at the control panel. By actuating one of the foot switch the index are stopped.
After index both foot switches must be to the start position to start next index.

8.4. Operating in AUTOMATIC MODE with lowered stations

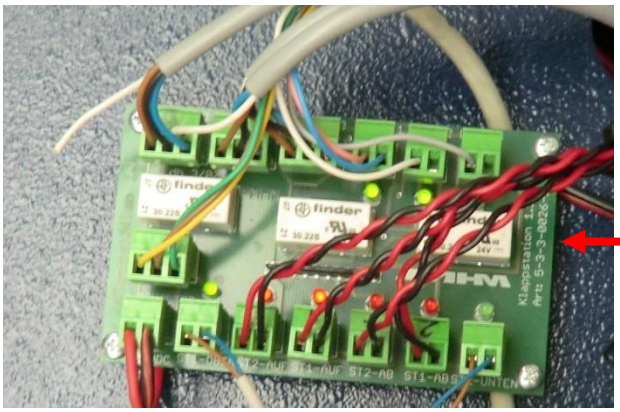
If the stations are lowered, may only one foot switch be connected. The first start command must always be given at the control panel. By actuating the foot switch, the index is stopped.

9. Trouble shooting

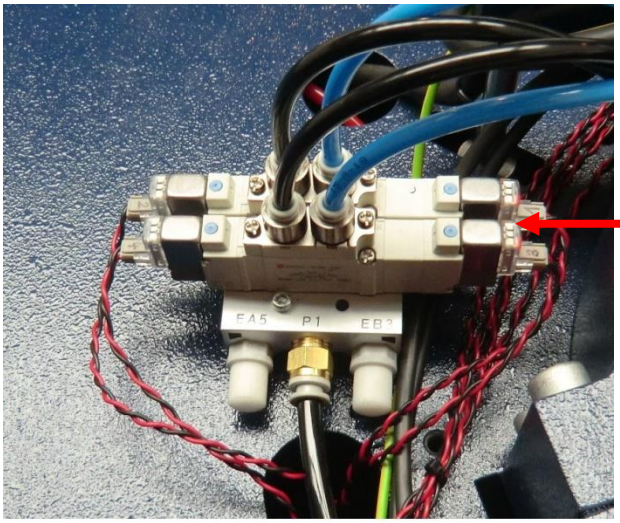
Before trying to locate any fault, it must be made sure that the machine may not move unintentionally. Before entering the danger zones, one of the machine's safety facilities/devices must be actuated; in case of required work on current-carrying parts, the machine must be cut off from the supply voltage (using the main power switch).

9.1. Basic errors (without error message)

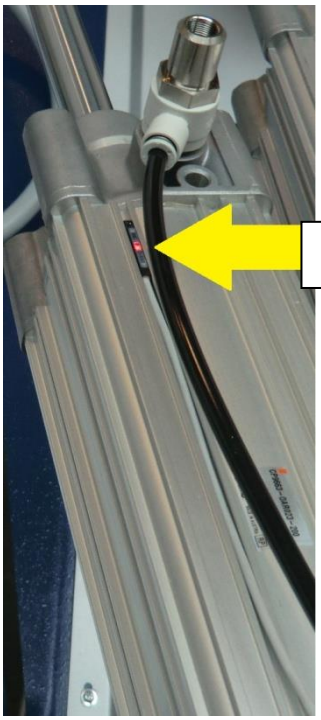
Error description	Possible reason	Fault clearance
Printing head don't lift up or down with key switch.	The air line is not connected.	Check the air power on the air preparation unit.
	Crossbar printing head is mounted.	Check the three LED's at the key switch. All three are on. If no, check the crossbar, check the sensor's on the crossbar.
	Power supply is missing.	Check the 24VDC on the *Klappstation PCB*.
	Reed contact broken.	Remove the reed contact on the cylinder and hold it on a magnet. The LED lights up.
Machine does not start by foot switch.	One of the foot switch is not connected.	Check the connection of both foot switch.



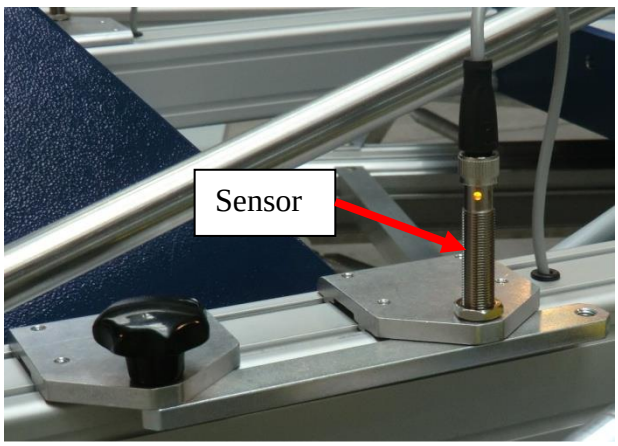
Klappstation PCB



Magnet valve lifting station



Reed contact



Sensor

10. Terms of the Guarantee

The terms of the guarantee are detailed in the General Terms and Conditions of MHM GmbH.

11. 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 lift station.
- Incorrect assembly, operation or maintenance of the lift station 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 lift station.
- Failure to comply with the Operating Instructions.
- Unauthorised modifications to the lift station (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 lift station by untrained personnel.

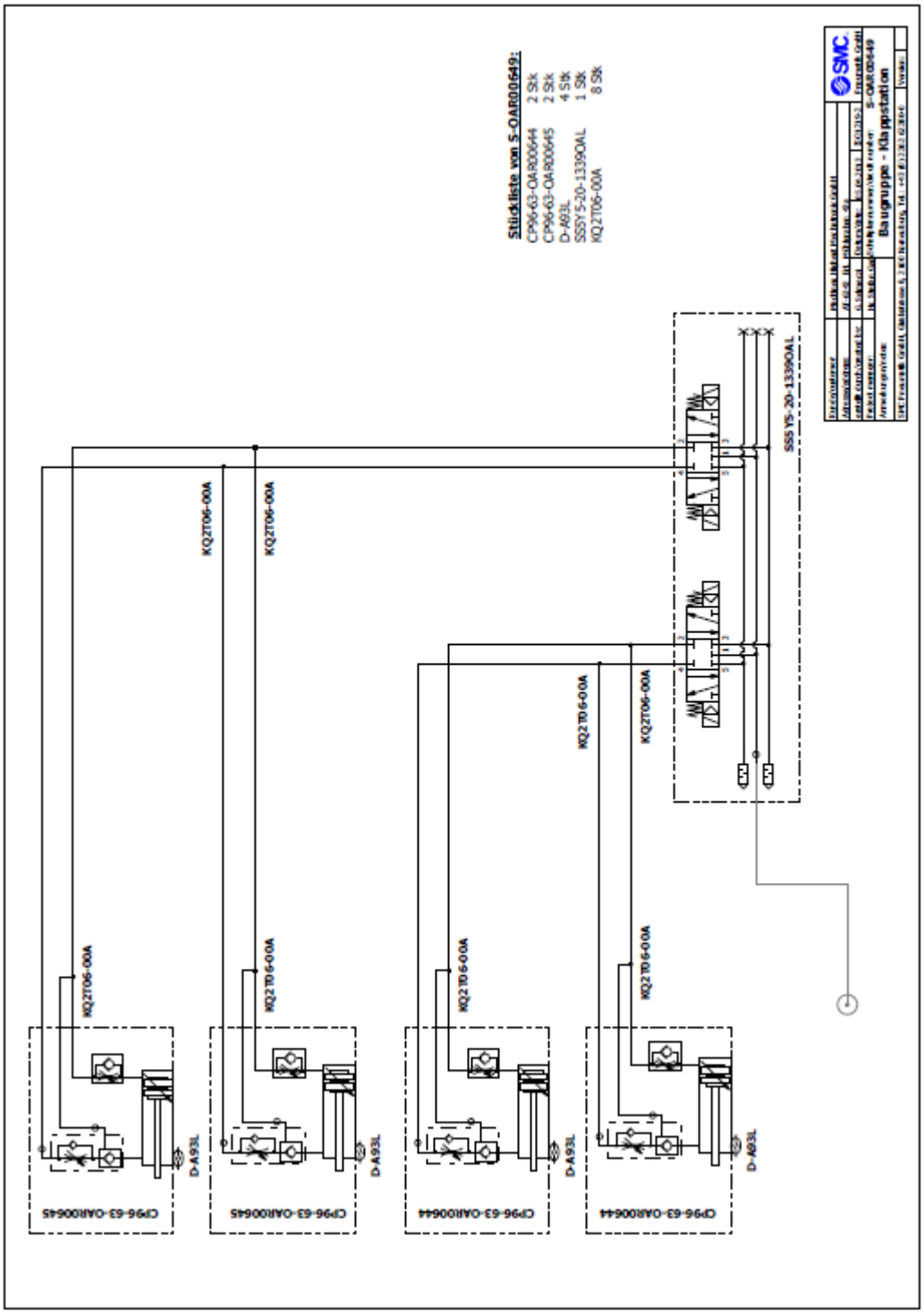
12. Support, Customer Service and Hotline

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

13. Spare part list

part#	description German	description English
05-3-3-0029-0	PCB Klappstatus 1.0	Flap status PCB 1.0
05-3-3-0026-1	PCB Klappstation 1.1	PCB flip station 1.1
07-0-0-0454-0	Initiator Klappstation M12	Sensor flip station
20-0-0-0799-0	Anschlusskabel 3m Initiator Klappstation kpl	sensor cable flip station
20-0-0-10005-0	Sonderventilblock für SY5*20, 2 Stationen	special valve block SY5*20, 2 stations

14. Pneumatic diagram



15. Wiring diagram