

**OPERATOR'S
MANUAL
H44-1**

OPERATOR'S MANUAL

AUTOMATIC COATING MACHINE

HARLACHER H44-1

Serial No.	44.6627	
max. Frame size (outer)	1600 mm x 1400 mm (width x height)	
Date of manufacturing	03.2007	
Software	SPS V 02.03 / Display V 01.04	
Electrical connection	1 x 230 V (+6/-10%) + N + PE	50 / 60 Hz
Power consumption / current	0.5 kW / 3.5 A	
Compressed air connection (dry)	5 to 8 bar, max. 5 litre / min.	
Noise emission	below 70 dB	
Colours	white RAL 9010 / blue RAL 5017	
Options	none	

Observe

Before connecting and / or using the above mentioned machine, you must read this manual completely and carefully to avoid any injuries!

HARLACHER Ltd.
Kammistrasse 11
CH - 3800 Interlaken
Switzerland
Tel +41 33 827 02 10
Fax +41 33 827 02 15
info@harlacher.ch
www.harlacher.ch

Register

Valid from
Serial No. 44.6464

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1 General information

1.1 Range of application

This machine is intended to coat flat screen printing stencils vertically with photo-emulsion. It will coat coarse to fine mesh made of polyester, nylon or stainless steel, attached to suitable printing frames. With max. specified dimensions (outside) shown on the front page of the manual. The min. screen tension for photo-emulsion is approx. 10 N/cm.

1.2 Correct length of coating troughs

The standard lengths of coating troughs can be obtained from the table below. The troughs are usually delivered as a pair, where the front trough (squeegee side, SS) has red end caps and is always 20 mm longer than the rear (printing side, PS) with black end caps. Whenever possible, do not use trough pairs with less difference and always mount the red trough at the front of the machine.

Frame size A (Inside dimension)	100 - 500 mm 4" - 20"	501 - 1000 mm 21" - 40"	1001 - 2000mm 41"- 80"
Trough length front (RS, red)	A - 40 mm A - 1 1/2"	A - 50 mm A - 2"	A - 70 mm A - 2 3/4"
Trough length back (PS, black)	A - 60 mm A - 2 1/3"	A - 70 mm A - 2 3/4"	A - 90 mm A - 3 1/2"

When using large frames the bending of the frame needs to be considered, therefore the frame should always be measured in the middle.

2 Safety regulations

2.1 Introduction

All HARLACHER Machines are designed for maximum safety of personnel, machine and material. They conform to the provisions of the significant directives and standards.



WARNING This machine is determined for industrial use and must be operated by trained staff only.

The OPERATORS MANUAL, especially the safety regulations and danger signs must be obeyed at all times!

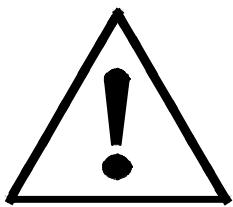
2.2 Warning and danger signs



DIRECTIONS	Information about technical requirements. Disobeying directions may lead machine failure or loss of material
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CAUTION	Points of danger which may lead to damage of the machine and / or light to medium injuries
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WARNING	Points of danger which may lead to serious injuries and / or permanent physical damages
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3 Installations and commissioning tests

3.1 Location of the machine

The location of the machine should be determined according to the following aspects:

- Room without direct sun light or with covered windows
- yellow light
- hard, vibration free floor
- short distance between the coating machine and the drying compartment
- dust free environment, constant room temperature and humidity

The required space for the machine depends on its size and type.

- The space between the rear side of the machine and a wall must be at least 500 mm.
- on both sides of the towers, a space of 650 mm must be kept free for maintenance access.
- there should be about 200 mm of free space above the machine for erection and maintenance
- The space left free in front of the machine should be enough to operate the machine and for easy handing of the frames.

3.2 Transport and unpacking



WARNING

Suitable equipment must be used for lifting and transporting the crates and heavy machine parts!

Move the crates as close as possible to the final location of the machine. Carefully open the wide front side of the crate and carefully check the contents for damage. In case of shipping damages or losses, immediately stop unpacking and contact HARLACHER Ltd. or its agent, the transport company, transport insurance to get further instructions.

Remove the H44-1 carefully with the fork lift. To ensure that the machine does not tip over, we recommend that the upper console be fixed to the fork lift. Place some packing material, bubble plastic or a blanket on the fork lift to avoid damage to the H44-1. If there are damages or missing parts, please contact HARLACHER or its agent as soon as possible.

3.3 Installation and assembly



WARNING

Suitable equipment must be used to transport heavy machine parts.

The HARLACHER H44-1 is delivered fully assembled. After unpacking and adjusting, the machine can be connected and the commissioning tests may be started.

Place the machine in its final location. The screw feet can be used to compensate for slight unevenness in the floor and to level the machine.

Test if the coating carriage is level in both sides and adjust the screw feet appropriately.

Connect the cable for the foot pedal (12) under the lower frame holder, to the appropriate plug at the back control tower.

Now the machine must be connected electrically and pneumatically by an appropriately qualified person.

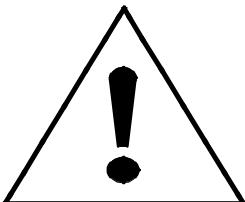
3.4 Electrical connection



WARNING

The electrical connection must be done by a licensed electrician in accordance with the supplied diagram and the specifications on page 1 of the manual.

3.5 Compressed air connection



CAUTION

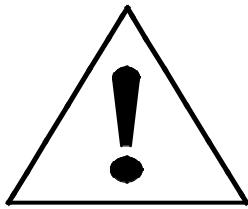
Shut off the air supply hose before the pneumatic plug and socket is connected and secured with the clasps. The hose can now be connected at the back of the control tower. Please note that the main switch has no effect on the compressed air supply. It is vital that the compressed air is unplugged from the machine before any work on the pneumatics is undertaken.

Connect only clean and dry compressed air, with a minimal pressure of 5 bar (ideal approx. 6-8 bar) to the inlet. Check for adjusted pressure with the manometer on the inside of the control tower and correct to a min. of 5 bar if necessary. A water collector is mounted under the regulator (to empty; press the button). A pressure switch is also found in this unit, this stops the machine if the pressure drops below 4 bar.

Coating trough pressure: coating troughs are pressed against the mesh individually by means of a pressure regulator and pneumatic cylinders. This force can be adjusted to suit the application.

In general: the longer the troughs are, the higher the pressure used should be. Suggested bandwidth: 3 - 5 bar

3.6 Performance test



CAUTION

All limit switches have been factory adjusted and tested. Due to safety regulation, all the functions must be checked carefully prior to operating the machine!

Mount the magnet rod low in its holder, on the front of the left side plate of the upper frame holder, then turn the magnet to face the right tower.

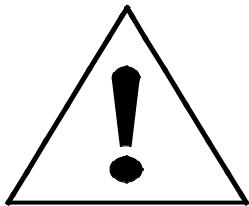
Check the limit switch functions for the following positions carefully, by short movements near them (only manually, not in a program):

Coating carriage	Drive down manually until the end switch stops the movement. Drive up again until the first magnet switch stops the carriage. The upper frame holder may not sit on the upper limit switch for this. Attention: the magnet should only be a distance of 3-4 mm away from the magnet switch (otherwise the rod may bend)
Upper frame holder	The clamps must always be open for this function. Drive manually until the end switch stops the upper frame holder. Attention: The machine can not be started, when the upper frame holder sits on the limit switch, in the automatic mode. A built-in free-wheel prevents damage when placing the frame in the machine.

If required, adjust all the magnets and or switches until they function correctly. The rest of the magnet switches can only be tested during a running program.

Important: Allow the test program to be run without coating troughs so that all the functions can be tested!

4 Setting up and preparation



CAUTION	Correct adjustment of the machine to the frame size is important to avoid damage to machine and material as well as to maintain perfect coating results.
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Before coating any screens, the machine needs to be prepared as follows:

4.1 Centring the screens

The frames must be centred sideway in the lower guide rail of the machine. At the top, the frame is supported by means of the clamps in the upper frame holder, after opening the clamps, they can be shifted to suite any frame size. For this, the screws need to be loosened. In the case of more than two clamps, the clamps can be distributed symmetrically over the frame with. Tighten the screws to fixate the clamps but make sure not tighten them too much.

For coating a series of screens with the same format, the supplied stopper can be positioned on the upper fame holder. In this way, the screens in one series can be centred easily and time effectively.

Hold the frame, centred and upright, with the mesh facing the rear end of the machine, . Now the upper frame holder can be driven down carefully. The clamps are to be closed with the foot pedal.

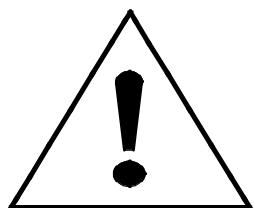
4.2 Setting up the utilizable coating area, avoiding collisions

To determine the desired coating area and to avoid collisions with the coating troughs, the following instructions must be followed carefully.

Two, height adjustable magnet switches are mounted on the front left side of the coating carriage. The rear one, in cooperation with the movable magnets on the tower, is responsible for the coating start position (bottom). The adjusting range of the switch is limited, for this reason the magnet can be moved up and down for shorter coatings or for use with bulky frame profiles.

The front magnet switch, in cooperation with both magnets in the magnet rod, situated on the upper frame holder, is for the upper stop position and scrape off. The magnet rod can be moved down and fixed for bulky frame profiles. For fine adjustments to thin frame profiles, the scale on the magnet switch can be used.

For basic adjustments, the pressure regulator for the squeegee side, can be turned down to zero, in the control unit. Now the red coating trough can be attached and a program with coating on the squeegee side can be run. After reaching the start position press F4 to stop the program. Now, the trough can be pushed to the screen to check if the trough is parallel to the screen and the position of the coating trough can be tested. Drive the carriage to the upper magnet switch and press F4 to stop. The process for positioning of the troughs (as with the start position) must be repeated.

**WARNING**

When the clearance (set by the scale on the magnet switches) is too small, the trough on the squeegee side may collide with the frame, causing damage. Always make sure the frame is positioned so that the mesh faces the rear of the machine.

4.3 Coating trough selection / filling with emulsion

Select the appropriate coating troughs and fix these to the supporting profiles (red in front / black at the back). Remove the edge protectors of the troughs before filling them with emulsion. The edge protectors can be replaced after the troughs have been cleaned.

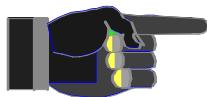
Fill the troughs with enough emulsion. The max. capacity of the troughs is approx. 0,6 litre per meter length. Contact the emulsion supplier or read the emulsion data sheets to obtain best coating results.

5 Manual mode



WARNING All keys that take direct action are generally protected against operator errors. The coating carriage is protected from overload by a slip clutch. It is none the less important to check the situation before taking any action. Never stay close to the yellow / black marked area.

5.1 Screen fixation



DIRECTIONS Always insert the screens with the mesh facing the rear. Wherever possible user portrait rather than landscape format.

The upper clamps are activated by means of the foot pedal. Each following impulse opens or closes the clamps again. The upper frame holder can only be moved while the clamps are open. A program can only be started if the clamps are closed.

5.2 Upper frame holder

up:

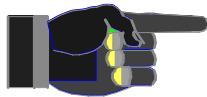
Press the appropriate foot switch. The clamps must be open. The upper frame holder can also be moved at the control unit by following these steps: Press “F2” (set-up / man.), press “F2” (manual mode) again, then “F2” (frame holder) and “F1” (up) or “F2” (down). The upper frame holder moves as long as the appropriate key is pressed. To return to the menu for selection of carriage and frame holder, press “F3”. To return to the main menu, press “F3” again.

5.3 Coating carriage

carriage up/down In the main menu, press "F2" (set-up) then "F2" (man. mode) again, then "F1" (carriage) and "F1" (up) or "F2" (down). The coating carriage moves as long as the appropriate key is pressed. To return to the menu for selection of carriage and frame holder, press "F3". To return to the main menu, press "F3" again.

6 Manual pneumatic functions (for maintenance only)

6.1 General



DIRECTIONS	This function may only be carried out when the coating carriage is approx. 500 mm above the start position (to avoid collision with lower frame support). After this function the carriage can be moved down again. Before this is done, all pneumatic cylinders must be reset. Never use both coating troughs together when there is no screen in the machine (this may cause scratches)
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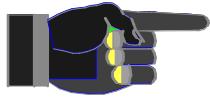
Press "F2" (set-up) and then "F6" ("F6" does not show in the display because it is a service function). Press "F1" (service). Select "F1" (adjustments).

The display shows "in and tilt troughs". Starting or ending the desired function is done by pressing the key directly beneath the words "start" or "stop". The movement within the selected function is activated by means of the left foot pedal.

7 Programming

7.1 General

There are 20 automatic, individually adjustable programming positions available. Parameters selected remain in the program until they are rewritten. The only non programmable values are the individually adjustable coating trough pressures. These can be adjusted by utilising the 2 pressure regulators at the control unit.

**DIRECTIONS**

For your own safety and comfort, it is recommended to store the parameters to each program separately.

7.2 Entering a program

In the main menu, press the “**F2**” (set-up) key. Thereafter, press the “**F1**” (program), now the program menu is displayed.

By pressing the “**F6**” (enter) key once, the program number is assigned. The program number can be altered with the “**F3**” and “**F4**” keys. “**F3**” is to select the position and “**F4**” is to raise the number. After the desired program number has been selected, it needs to be confirmed by pressing “**F6**”. Press “**F1**” (next).

PS (Coating printing side)

The number of coatings on the printing side can now be determined. This is done in the same way as selecting a program no. Then press “**F1**” (next).

SS (Coating squeegee side)

Now select the number of coatings on the squeegee side. This is done in the same way as selecting a program no. then press “**F1**” (next).

Coating speed

The coating speed can now be determined. This is done in the same way as selecting a program no. Then press “**F1**” (next).

Delay Start:

Finally the delay time between tilting the coating troughs and starting the coating can be determined. Delay time is necessary so that the emulsion has enough time to move to the mesh when the troughs are tilted. This is done in the same way as selecting a program no.

It is important to note that every entry is confirmed with “**F6**”, if not the existing values will remain programmed.

By pressing “**F1**” (next), you return to the programming menu and can program the parameters of the next program.

When “**F2**” is pressed, you return to the previously used step. To return to the main menu from the programming menu, press “**F3**”.

7.3 Language selection

Press the “**F2**” (set up) key in the main menu, then press “**F6**” (“F6” does not appear in the display as this is a basic function). Press “**F1**” (service), then press “**F2**” (options). The menu for language selection now appears.

By pressing “**F6**” (enter) once, the language selection is activated. By pressing “**F3**” and “**F4**”, the program number can be altered. “**F3**” is to select the position and “**F4**” raises the figure. After the desired program no. has been selected, it must be confirmed by pressing “**F6**”. After selecting the desired language, “**F3**” will return you to the main menu.

Number 0 and 1 are for German

Number 2 for English

Number 3 for French

By entering any other number, or by making an incorrect entry, the display text will be in English

The display shows “**in and tilt troughs**”. Turning the function on or off is done by pressing the button directly the displayed word, “**on**” or “**off**”. The function is then carried out by using the foot pedal.

7.4 Activating / deactivating option multiple coating

Press “**F2**” (set up) in the main menu, then “**F6**” (“F6” does not appear in the display as this is a basic function). Press “**F1**” (service), then press “**F2**” (options). The menu for language selection now appears. By pressing “**F1**” once, the first selection of options appears, by pressing “**F1**” once more, the second selection appears. “**F6**” will bring you back to the previously used page.

Turning the function on or off is done by pressing the button directly the displayed word, “**on**” or “**off**”.

Since multiple coating for 2 frames (HP2) or respectively 3 frames (HP3) is the only option available for the H44-1, all other functions should be turned off. The option “**HP2**” (second Holding Pair), can be turned on if the H44-1 is equipped with this option. If not, the programs can not be run.

8 Program cycles

8.1 General

Before starting any program, all preparations in point 4 (and possibly further preparation, depending on the program) must be completed.

The following requirements need to be met before starting a program, otherwise the program will not run and "machine not ready" will be displayed:

- all clamps must be closed
- the upper frame holder may not rest on the end switch
- the coating carriage must be on the end switch
- the options must activated or deactivated correctly
- there may be no error messages in the display

8.2 Coating

Press "**F1**" (automatic) in the main menu. Select the program no. and press "**F1**" (start). The program now runs in the following steps:

- Coating carriages drives up and returns to rest at the magnet switch "start"
- one or both of the coating troughs move to the mesh and are tilted
- during the programmed "delay time start", the emulsion moves towards the mesh
- When the delay time is through, coating begins with the programmed speed
- the coating carriage stops at the first magnet at the console, the troughs tilt back. During the programmed waiting time, the emulsion moves right back into the coating trough.
- the coating troughs are slowly scraped off the mesh until the upper magnet at the frame holder is reached
- the troughs move out to the start position
- the carriage moves with maximal speed to the "start magnet", starts a new coating or at the end of the program, moves slowly to the lower magnet at the resting
- an acoustic signal marks the end of the program, by pressing "**F1**", the same program can be started again

While a program is being run, the remaining coatings on each side, as well the exact coating speed is indicated.

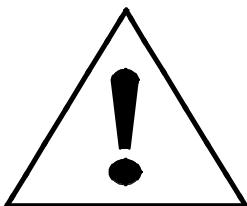
9 Interrupting a running program

- by pressing “**F6**”: the coating carriage stops, the troughs tilt back. The display shows program interrupted. By pressing “**F6**” again, the troughs move out to their start position. When “**F6**” is pressed again, the carriage moves down to the bottom again
- by **EMERGENCY STOP** the coating carriage stops, the troughs tilt back. The entire electricity supply is cut off and can only be switched on by turning the emergency stop back. Thereafter the troughs move out and the coating carriage needs to be moved to the start position manually

10 Function monitoring and error messages

The following functions are always monitored and a message is displayed in case of an error

- **error: 1 pressure decrease in the pneumatics**
entry pressure gas dropped below 4 bar. Test entry pressure at the manometer an the inside of the back wall of the control tower
- **error: 2 overload / error in the frequency converter**
test the display on the frequency converter in the control tower. If “**oL3**” is indicated, press “**stop/reset**” and then “**F6**” on the control unit
- **error: 3 replace CPU battery**
can be temporarily corrected by pressing “**F6**”. The battery should be replaced as soon as possible otherwise the data in the CPU can be lost
- **error: 5 upper frame holder rests on end switch**
at the start of a program, the upper frame holder may rest on the magnet switch
- **error: 6 coating carriage not on lower end switch**
at the start of a program, the coating carriage must be at the lower position
- **error 7 open clamps**
at the start of a program, all clamps need to be closed



WARNING

**When an error occurs, test the cause
carefully before continuing to work!**

11 Maintenance

11.1 General



DIRECTION	If the maintenance instructions are followed carefully, the machine will work satisfactorily over a long period of time. Disregarding these instructions may lead to a guarantee regress.
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The machine should always be kept clean and dry, especially after spilling emulsion. The spilled emulsion should be cleaned immediately and thoroughly dried. Blank metal pieces need to be lightly oiled or greased.

11.2 Periodic controls, cleaning and greasing roster

daily:

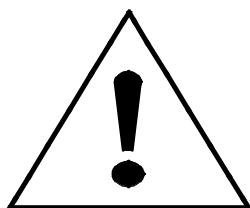
- wash coating troughs immediately after use

weekly:

- control water separator in the control tower and if necessary empty it by pressing the button
- Visually check all movable parts, the tension of the toothed belt and the horizontal position of the carriage and frame holder

monthly:

- all guiding rails must be cleaned and greased with "Molykote grease Longterm W2"
- Piston rods of the pneumatic cylinders as well the linear guides to the coating trough holder must be greased slightly with e.g. "WD 40"



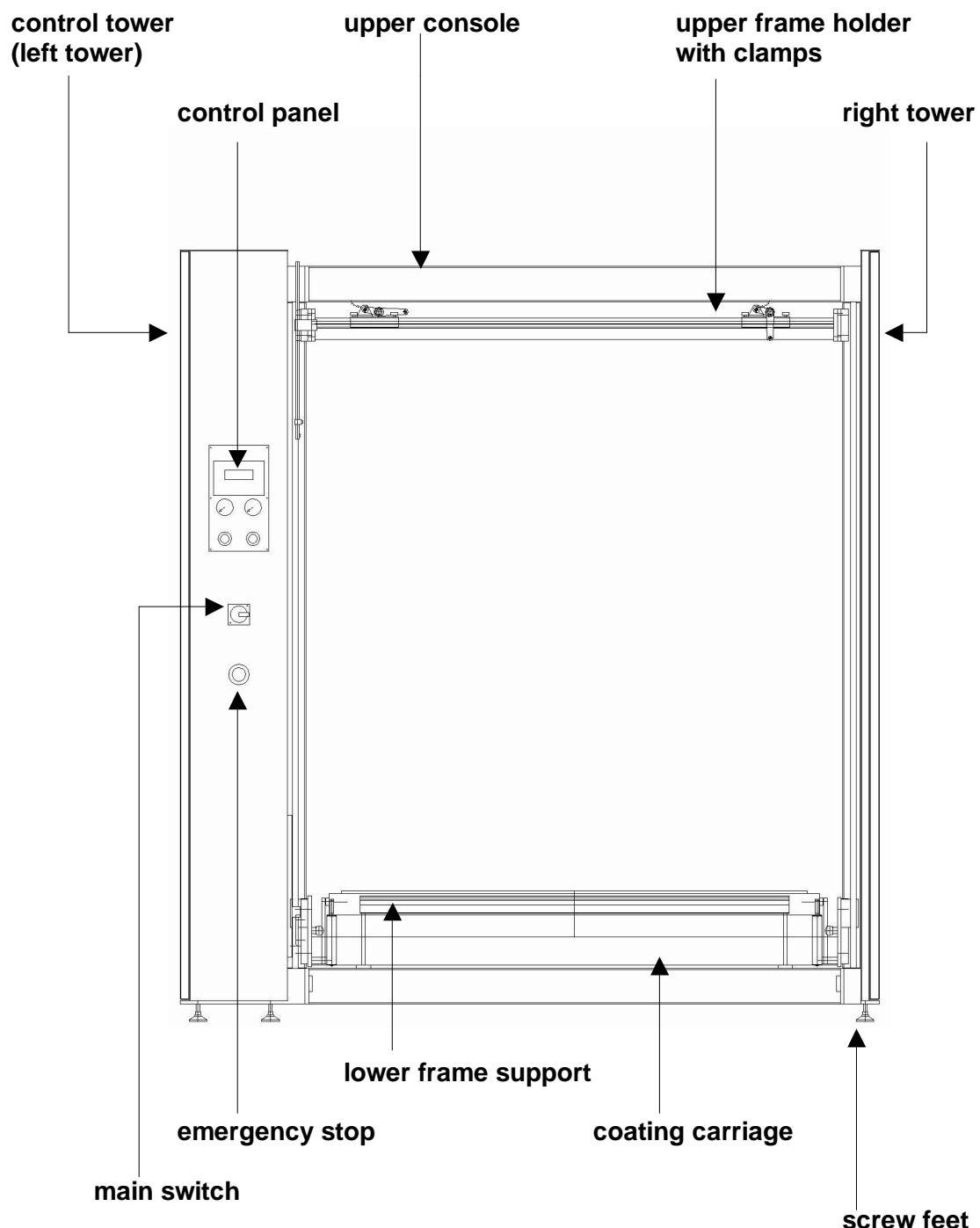
WARNING	Collision damages have to checked and repaired immediately. If you are in doubt, please contact HARLACHER Ltd. or their agents for assistance.
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11.3 Software Information

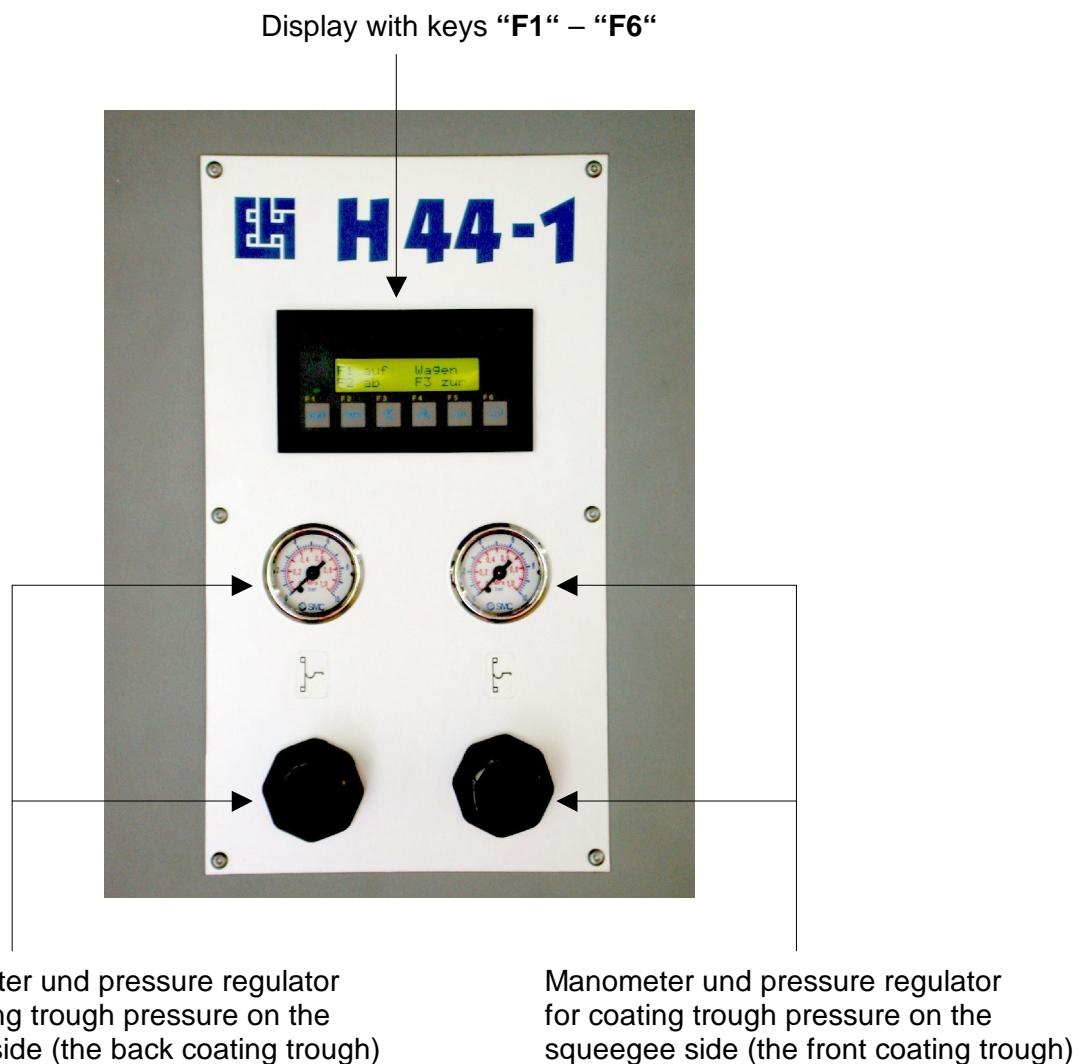
To determine the software version for the CPU and the display, press “**F3**”, to return to the main menu, press “**F3**” again.

12 Annotated diagrams

12.1 Overview H44-1



12.2 Operating panel



WIRING DIAGRAM

H44-1

Automatic Coating Machine

HARLACHER Ltd.
Kammistrasse 11
CH - 3800 Interlaken
Switzerland
Tel +41 33 827 02 10
Fax +41 33 827 02 15
info@harlacher.ch
www.harlacher.ch