LAARMANN®

Innovators in Solids

LMFTM FLOTATION MACHINE USER MANUAL

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LMFTM FLOTATION MACHINE MANUAL

IMPORTANT

Please read this manual thoroughly before initial commissioning, and comply with the safety instructions!

The operating manual contains important information for operation, maintenance, Care and safety of the machine to guarantee the best possible preservation of your Investment.

Subject to changes in design, features and accessories in the interests of on-going developments. It is therefore not possible to derive any claims from the data, illustrations and descriptions contained in the manual.

Subject to errors.

Contents **Page**

1 Description

The **LAARMANN** Laboratory Flotation Machine has been designed to provide an accurate, reliable means of reproducing test results. It is ideally suited in duplicating plant processes and operations.

The machine is versatile and incorporates the following features.

A. Interchangeable impellers and cells with capacities of 0,2 up to 10,0 Litres

B. Fine adjustment of air flows within the cell.

C. Electronic digital read-out of impeller speed accurate to +- 2%.

D. Rugged 0.75kW, motor, with a solid state power inverter allowing connection to standard 220-240V, 10A single phase socket outlet.

E. Spindle speed variable between 100 and 2000RPM.

Several configurations are available for impeller style and diffuser arrangement. The Flotation Machine can also be used for attritioning, blending and agitating operations.

All wetted metal parts are of stainless steel (316) construction, cells are manufactured from clear acrylic with polyurethane/ steel impellers.

It is possible to increase the spindle speed above 2000rpm. Should this be necessary please contact **LAARMANN**.

2 Installation

CAUTION This equipment has exposed moving parts. Exercise care during operation.

2.1 The Flotation Machine requires a firm, level bench capable of securely supporting the weight of the machine.

2.2 The machine is supplied with a 2 pin plug/lead. A suitable single phase 220-240 V, 10 Amp outlet is required.

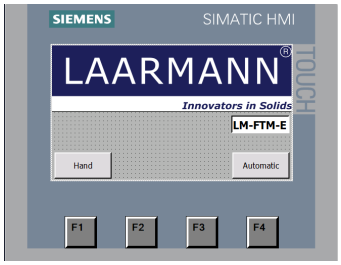
2.3 The machine requires a low pressure compressed air supply (5 -10 kpa is sufficient). It is recommended that a backup regulator is installed inline. Air is connected via a 1/4"BSP socket.

3 Operation

3.1 preparation and operation

- With the impeller in place within the deflector vanes, position the acrylic cell on the locating disc on the front apron of the machine.
- Introduce the impeller shaft end into the recess in the bottom of the drive shaft and secure this in place.
- Stabilise the impeller shaft with Allan key. Do not use excessive force particularly on those impellers with an acetal shaft.
- Fill the test cell to just below the outlet lip with the sample to be processed.
- Using the spindle speed and the flow controls on the touch screen panel ensure that the shaft speed is set at its minimum and that the air flow is off before switching the machine on.
- Adjust the speed control and air supply gradually until the desired degree of agitation is achieved. The shaft speed and rate of air-flow are indicated on the screen.
- Air pressure is set as required on the pressure gauge. Different combinations air supply pressure and air flow control may be necessary for different samples. The optimum combination is best found by experiment.
- The impeller speed can be varied from 100 - 2000 RPM. depending on the conditions required. It is unusual to run the machine above 1000 RPM. In practice however, difficult, heavy, or coarse ores may require higher speeds. Do not run at less than 200 RPM.
- The cell will handle materials ground to 750µ, however it is preferable to use material ground to 500µ.
- For high temperature flotation or attrition testing, a stainless steel cell must be used. Contact **LAARMANN** for details of these items.

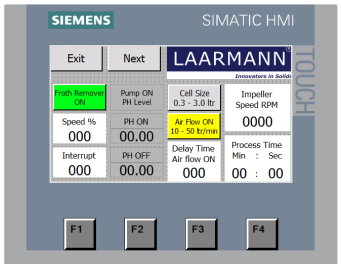
3.2 Program settings

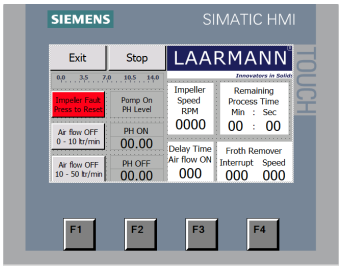


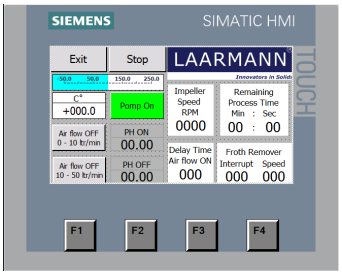
After switching the main power on wait until the touch screen is running and the screen will display picture 1 check to see that the emergency stop is not activated.

The screen is a choice of **Hand** and **Automatic**

Hand control will directly activate the settings while using automatic the settings are defined beforehand







Automatic control

Froth remover
can only be used when the froth remover is installed. Insure that the magnet is placed at the correct height. Select the **Speed %**. Then confirm with enter. The maximum is 100rpm(100%).
Interupt is the waiting time for the Froth remover that it pauses between 180˚ rotations (1-100) seconds

Delay Time Air flow on. Means the rotor start immediately and the Air flow start after 1 seconds for example.
Activate **Air flow** by pressing the symbol. The display shows Air flow on. Please chose the expected airflow, either 0-10L/min or 10-50L/min. Then you can regulate it further using the indicator on each corresponding side. The **Impeller speed** can be set from 100 to 2000 rpm

Overview of running automatic program

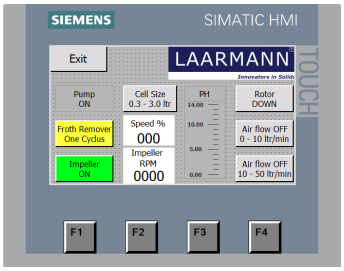
While running the curent overview of the running program is shown. Press “stop” to stop the running program

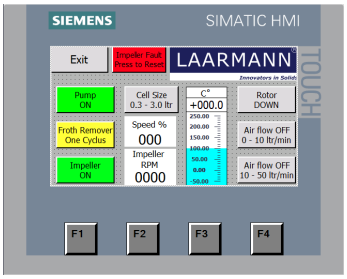
PH meter

The PH levels of the materials can be seen on the display if the optional PH meter is installed

Temprature meter

The temprature of the materials can be seen on the display if the optional temprature meter is installed





Hand control

Press **rotor up** to move up the rotor and **rotor down** to move it down

Activate **Air flow** by pressing the symbol. The display shows Air flow on. Please chose the expected airflow, either 0-10L/min or 10-50L/min. Then you can regulate it further using the indicator on each corresponding side.

Froth remover

Only use this when the froth remover is installed. Insure that the magnet is placed at the correct height. Only connect he froth remover when the rotor is in down position otherwise you can brake this part. The **Impeller speed** can be set from 100 to 2000 rpm

PH meter

The PH levels of the materials can be seen on the display if the optional PH meter is installed

Temprature meter

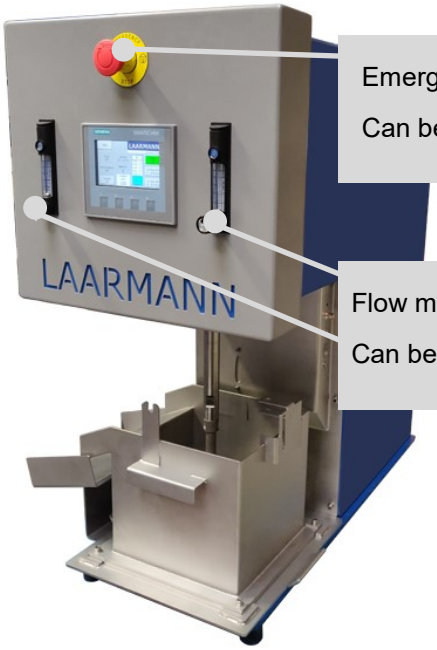
The temprature of the materials can be seen on the display if the optional temprature meter is installed

3.3 Addionation operation information

When the impeller is not in operation the inner housing is up and lift the impeller

Fill the test cell to just below the outlet lip with the sample to be processed

When the impeller is in operation the inner housing is down and the impeller is in the cell



Emergency switch:

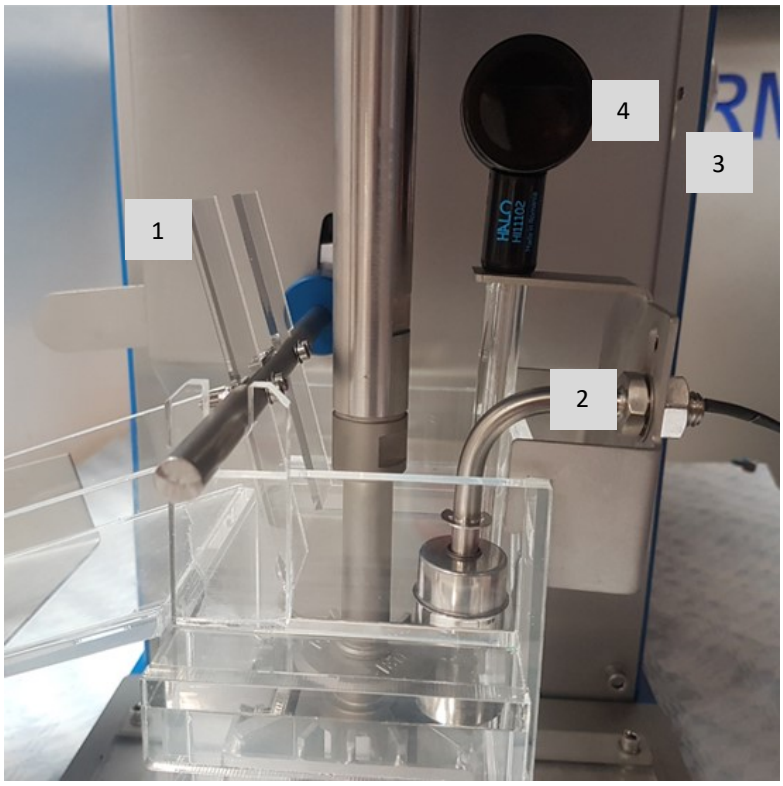
Can be activated by pressing

Flow meters:

Can be adjusted by turning the knob

After pressing the start button the impeller will be moved down to the cell and the Flotation process is started. The stainless Froth collection vessel is located on the left hand side (front view of the machine) and be taken out for easy collection and cleaning.

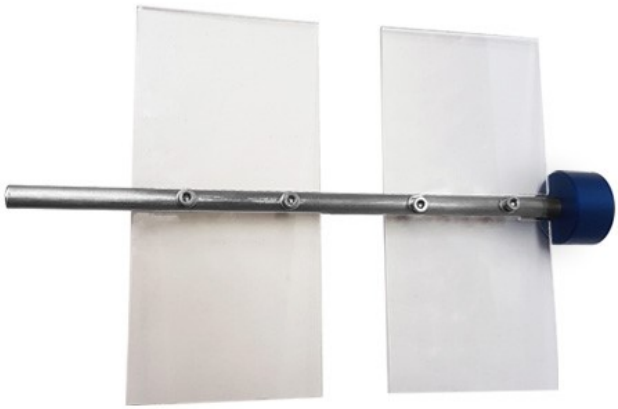
4 Accessories



The Image shows a full setup including.

- Froth remover (1)
- Level indicator (2)
- Peristaltic pump (3)
- PH indicator (4)

4.1 Froth remover

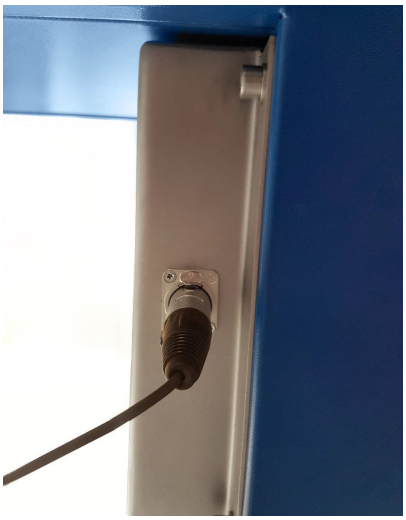


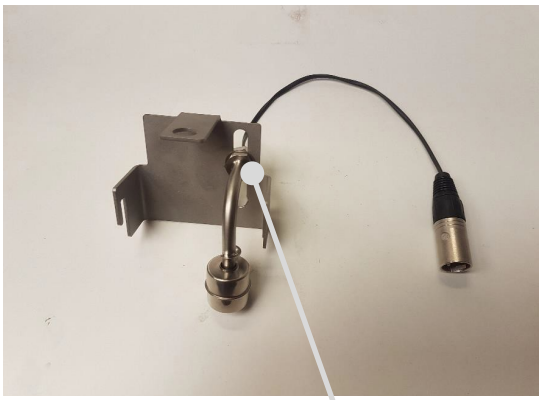
The froth remover is connected with a blue magnet (see above on the remover and below on the machine) which corresponds with the magnet on the machine.

The froth remover needs to be set in the right setting

The lower position is for the cells with an volume up to 2ltr. Please use the handle to change the position to the correct height.

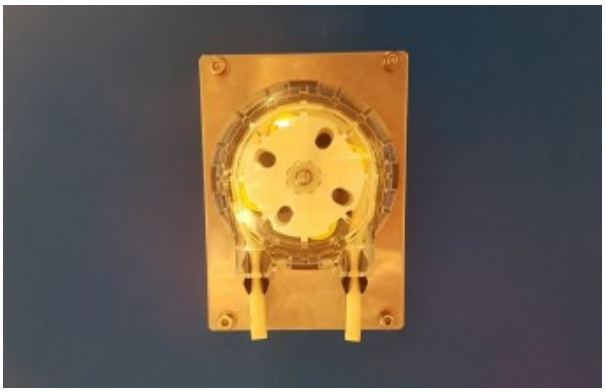
4.2 Level indicator with peristaltic pump





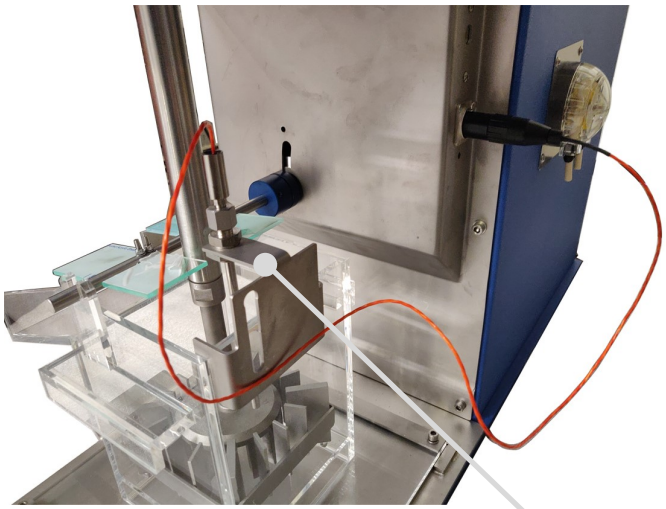
unscrewing the connecting points

Please connect the level indicator as shown above. Please place the holder inside the cell, specific heights can be set by unscrewing the connecting points as seen above.



The level indicator is connected to the peristaltic pump (see below, on the side of the machine) and will not work when either is not connected.

4.3 PH-Meter / Temprature meter



Temprature meter

The meter can be installed together with the frame of the level indicator or manually by hand. Place the meter inside the cell and read the display,

5 Maintenance

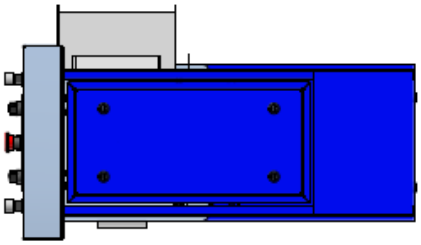
4.1 Inspection

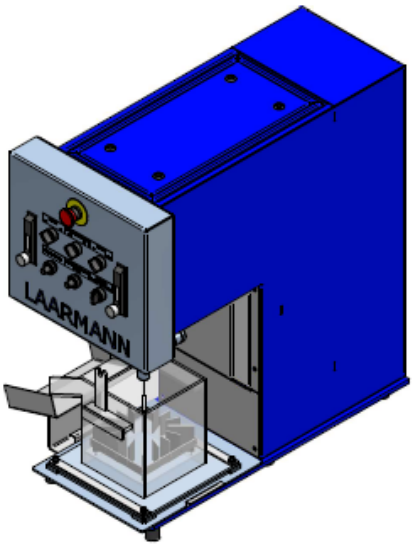
Regular inspections of the entire machine will prolong the life of parts considerably. Regularly check the timing belt tension and adjust as required. Regularly inspect the shaft bearings and rotary union for wear or excessive play.

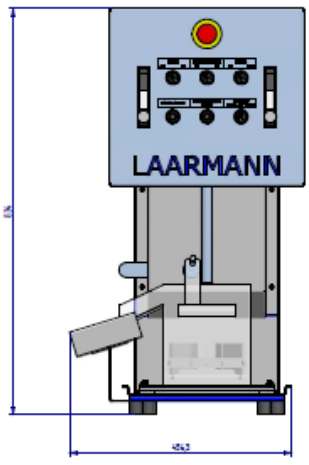
4.2 Lubrication

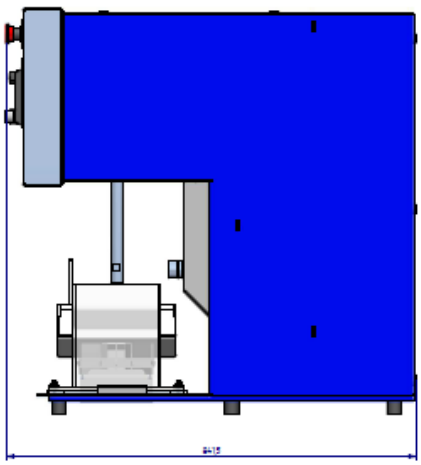
Grease each nipple every 80 running hours with Castrol EPL2 extreme pressure multi purpose grease.

4.3 Machine overview









6 Spare parts

Description	Part number	Quantity	Avaiblility
Power inventer	615065	1	4 weeks
Tachometer	605817	1	4 weeks
Air pressure regulator	340215	1	4 weeks
Lower shaft – Stainless Steel	140508	1	4 weeks
Lower shaft – Acetal plastic	140758	1	4 weeks
Bearing housing	221106	1	4 weeks
Bearing housing	222199	1	4 weeks
Bearing	221107	2	4 weeks
Timing belt	225507	1	4 weeks
Motor	614104	1	4 weeks
0.5 litre cell complete	140760		4 weeks
1.75 litre cell complete	140511		4 weeks
3.5 litre cell complete	140512		4 weeks
7 litre cell complete	140513		4 weeks
0.5 litre base plate	140761		4 weeks
0.5 litre diffuser	140762		4 weeks
0.5 litre cell	140763		4 weeks
0.5 litre impeller	140768		4 weeks
1.75 litre base plate	140556		4 weeks
1.75 litre diffuser	140557		4 weeks
1.75 litre cell	140558		4 weeks
1.75 litre impeller	140501		4 weeks
3.5 litre base plate	140741		4 weeks
3.5 litre diffuser	140742		4 weeks
3.5 litre cell	140743		4 weeks
3.5 litre impeller	140502		4 weeks
5 litre base plate	140744		4 weeks
5 litre diffuser	140745		4 weeks
5 litre cell	140746		4 weeks
5 litre impeller	140504		4 weeks

LAARMANN

CE Declaration of Conformity

Product	Flotation Machine
Model	Touch screen
Power supply	220V/50/60Hz

This declaration of conformity confirms compliance of the above mentioned equipment to the relevant sections of the following European Directives:

91/368EWG	European machine guideline
73/23/EWG EC	Low Voltage Guidelines
EN 292, 294, 418	Safety guidelines
VBG 1,4,5 en 22	General electrical facitilies
89/336/EEC	Electromagnetic Compatibility Directive (EMC)
EN 5008-1-1992	Emissions
EN 50082-1-1992	Immunity
EN 60204-1 Part 1	Safety of Machinery – Electrical Equipment of Machines

WARNING:
This equipment is required to be operated strictly in accordance with the instructions given in the operating manual supplied with the product. All supply voltages and frequencies as stated on the rating plate must be used. External power cables and connectors must be supplied by LAARMANN. Any additional equipment used must be of a type approved by LAARMANN.

This conformity certificate will lose its validity in case of:

- Usage of unlicensed spares
- Usage of unlicensed accessories
- Any self made modifications of the machine

LAARMANN GROUP B.V. Roermond, April 2018