MASS

PC-Software

[Visiwin Software]

Vacuum Plugging Machine

VCP 5000-1

Serial No. # 1730

Version: 12.12.2012

Read operating instructions prior to commissioning

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MASS

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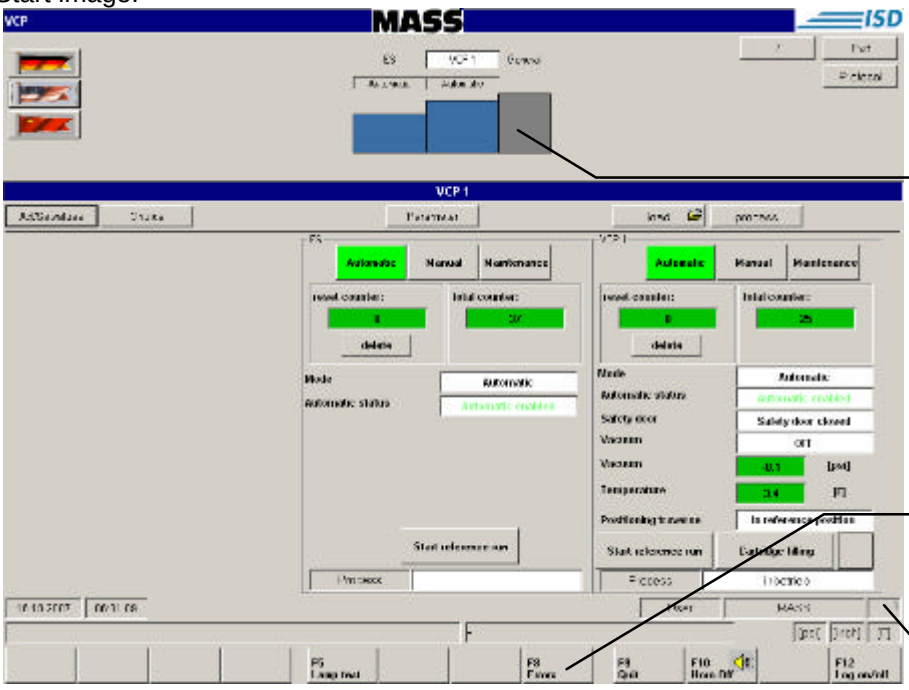
PC Operation Manual

Version of this document

Version : 1.0
Date : 12.12.2012

Basic menu

Start image:



Modules
select the relevant module to change settings

- VCP1
- ES
- VCP2 (Option)

Function keys F1 – F12

current password-level

Following computer boot-up, the start image appears.

Function keys (see page 18)
Some function keys are only active when in the proper menu.

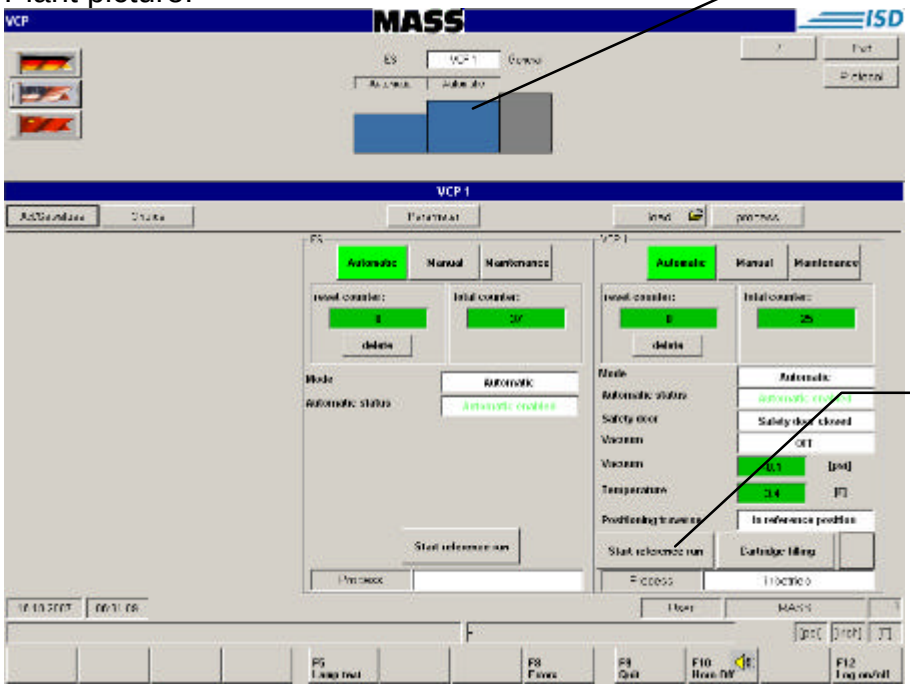
The system image shows the actual status.

Colors:
Red : Malfunction
Green : Ready for operation
Yellow : Warning

Equipment start up 1 (2)

1. **Main switch on control cabinet to be switched on.**
2. **On the control cabinet door turn the control voltage on with the luminous pushbutton “ON”.**
3. **Turn on PC, Visiwin-Software (Visualization) will load.**
4. **Log in PC by typing in password (see page 5).**
5. **Load a stored recipe.**

Plant picture:

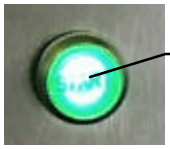


Interactive *Module*

- *VCP1*
- *ES*
- *(VCP2)*

select the relevant module to change settings

The traverse is not in home position. *Drive to home position manually with “Start reference run”*



Press START-Button on Machine
Status must be Automatic enabled

Precondition:

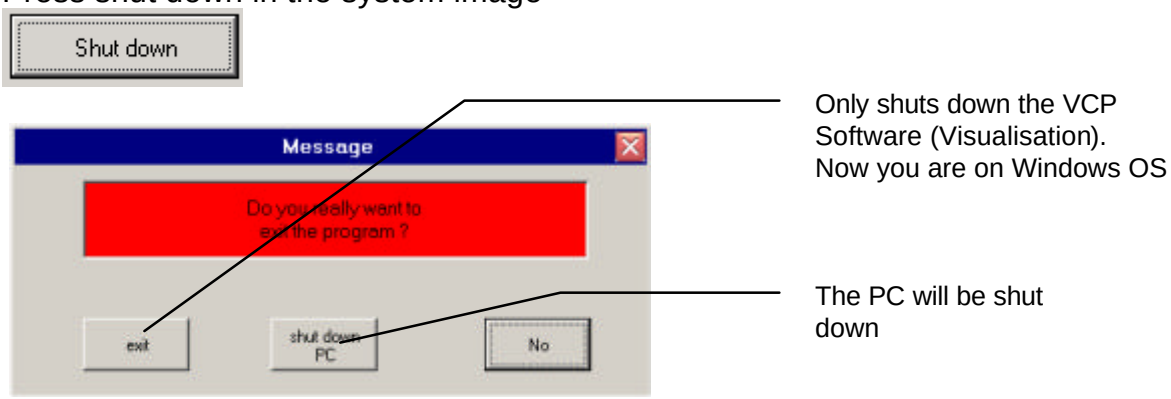
- VCP is in Home Position (see page 4)

If a malfunction occurs, the error shown in RED and an error message indicated.

After error correction press F9”Quit“ to delete the error message

Equipment shut down

Press shut down in the system image



The machine to be shut down as specified.

1. **Drive VCP and ES to home position***
3. **Shut down PC**
4. **Turn OFF PC**
5. **On the control cabinet door turn off the control voltage with the pushbutton "OFF".**
6. **Turn off main switch.**

Home position

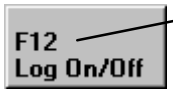
When the home position is not reached, the error message Positioning traverse: not in reference position is displayed on Monitor.

Definition Home position:

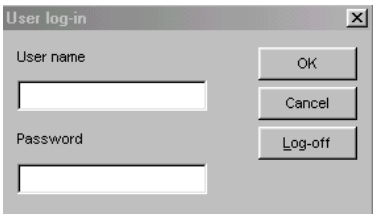
- Door in lower Position (opened)
- Traverse in lower Position on light fork sensor
- Squeegee is closed

Drive traverse now to Home position with Button Start reference run *(works only in Automatic mode VCP).* Automatic mode is now enabled.

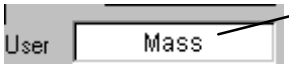
Login



Push key <F12 Log ON/OFF>



Key in user name and password (pay attention to capitalization and use of small letters).



the current logged in user is indicated here

Subject to password level you have different authorizations.
(see general area, button „User“)

Password-level	load recipes	create recipes	Maintenance function	Manual function	Create of new users	view machine - parameter
1	X					
2	X		only view			
3	X		only view	only view	X	
4	X		only view	only view	X	
5	X		change	change	X	
6	X	X	change	change	X	
7	X	X	change	change	X	X

Password level

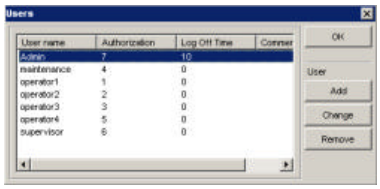
Password-level	**Person**
1	Apprentice
2	Maintenance
3	Master
4	Shift headman
5	Head of department
6	Process technician
9	Reserved for MASS

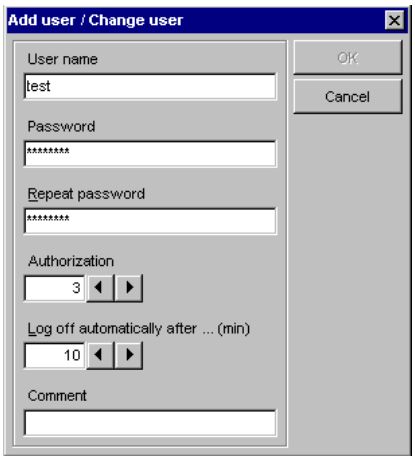
(see general area, menu level „user„).

Type in user name and password (**case sensitive**) and press the *F12 Log-On* button.

Users to create, add, change

To create new users, select the button “User” in the general module
This menu allows adding new users and to change authorizations and passwords.





Note!
New users can be added according to their user level only.

Information

Both the user name and the password must predefined by the department head (user level 4).

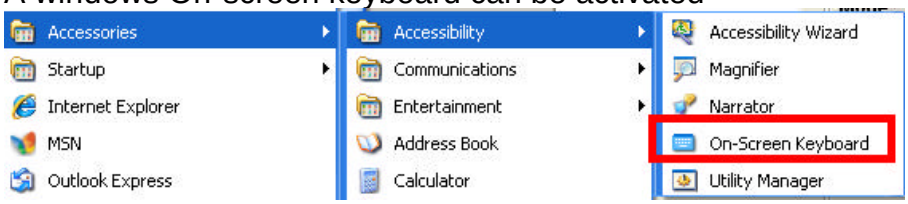
Automatic log-off after xx min.
The user is automatically logged off after xx minutes.

Change Language

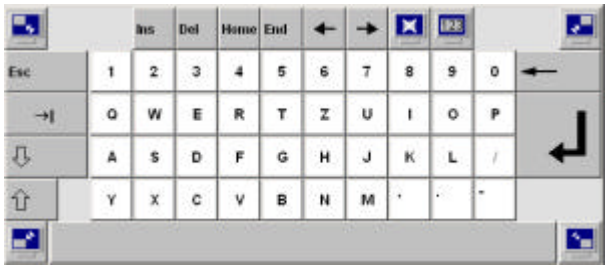
Use buttons in main picture or:
Press CTRL+Alt+1 or CTRL+Alt+2 to change English / German
Press CTRL+Alt+3 for next Language (chinese)
or go to module General / Parameter to change language.

The VCP is equipped with a touch panel with Windows XP.
Use the touch panel with tablet pen to key in values and letters.

A windows On-screen keyboard can be activated



picture: windows XP on screen keyboard

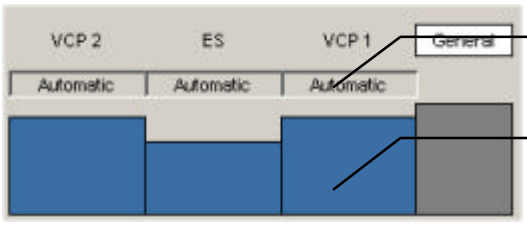


The visualization uses **this** keyboard for inputs in the Visu input boxes

Info !
Using tablet pen for touch panel
Simulate right mouse button function with tablet pen.
➔Click and hold down tablet pen. This simulates the right mouse button.

Module : General Parameter

This menu allows setting the functions of the general area.
Move to the module “ *General* “



active mode for each module

Modules

- VCP1
- ES
- VCP2 **(optional)**

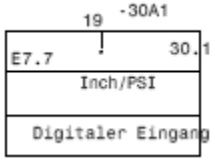
and then call up the menu “Parameter”

The menu level “Parameter” allows setting language and software settings

Click on the relevant button to change settings

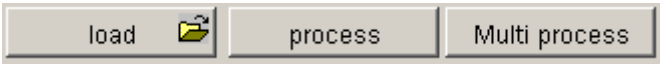
Info!
Check all values of the software **after changing** mm/inch / bar/psi/C°/F

mm/inch - bar/psi
On the plc controller there is a bridge to set the correct measurement.



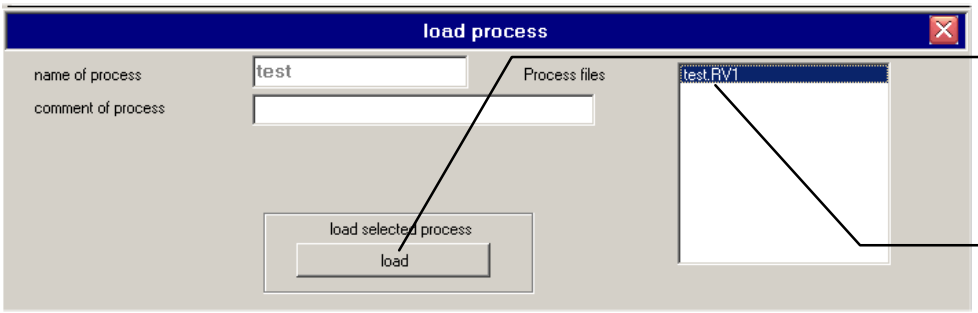
Picture: wiring diagram

Load process (recipe)



The <load 🗁> button is **only for loading** self-created processes (recipes) (not for change or creation of same).

The desired process for **selection** is in the right part of the window.



See next page for preparing the process (recipe).

Multi process (recipe)

You also can also use the new function multi process (Option).

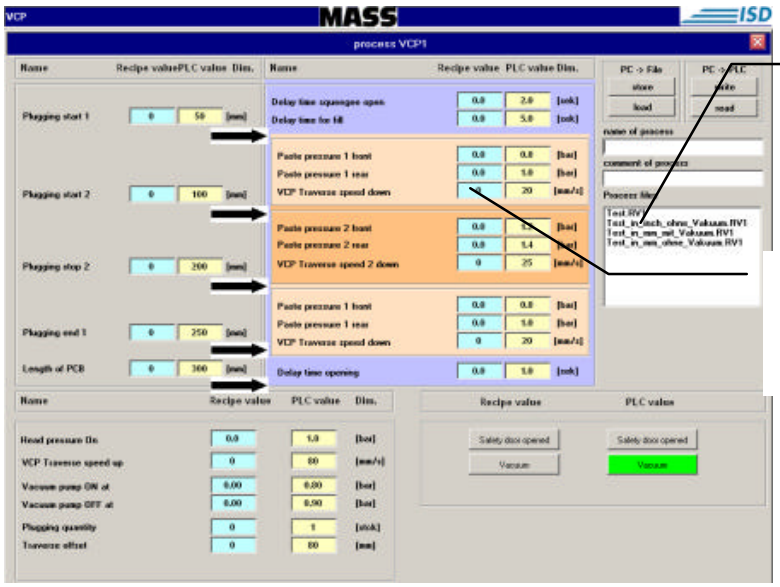
If Multi recipe function is activated, this new function is available for recipe creation.
Up to 10 recipes can be stored in one Multi recipe. These recipes are processed one after another. The new function multi process is optional!.

Process (recipe) to create, save, delete

In order to administrate processes, select the Button "*process*" for each module, VCP1/2/ES

Process button to click on

The window for "process VCP 1/2/ ES" appears



Available processes

Type in your values and **confirm with RETURN-Key**

(Consider that new process (recipe) can be created only from user level 6)

Select speed, position, paste pressure… and store these settings under a self-selected process name (corresponds to the file-name).

PC -> file

The "*process"* (recipe) always goes through the PC:

1. File to load: loads a self-created process from hard disk
2. To change on PC: desired changes to make
3. File to store : to save the process on the hard disk
4. PLC to write*: Now the process is active in the plc-controller

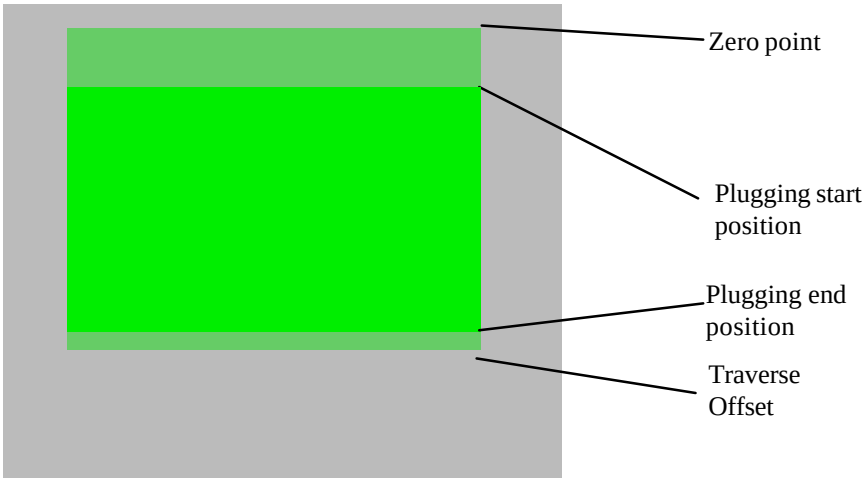
*To **activate** the process, it must also be written into the PLC-control.

PC -> PLC

read: Reading of the current values from PLC-control.
write*: store the current values into PLC-control.
*The changes are then immediately effective!!

Processes can be created during the current operation and existing processes changed.

Drawing: Plugging area values



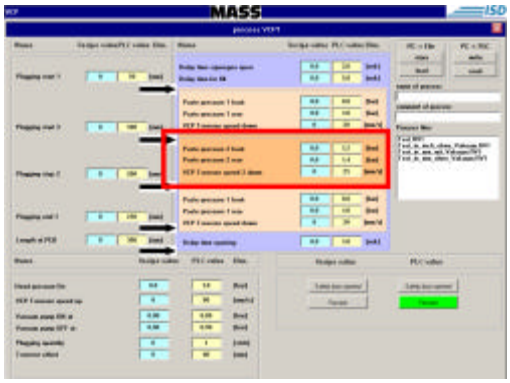
Traverse actual position
The actual position of the Traverse measured from top position at the clamps
Plugging start 1position
Start point of the plugging position = Traverse upper position
Plugging end 1position
Stop point of plugging = Traverse lower position

Plugging quantity
Value for one Job, replug with the same values (door is keeping closed)
Length of PCB
Key in the overall length of the PCB

Delay time squeegee open
Traverse is at point "*Plugging start 1"* position". Paste pressure is turned on. The delay time **"***Delay time squeegee open"* runs off, with opened squeegee´s, to fill the complete head´s with paste.

Delay time for fill
Both squeegees are pneumatically moved to the PCB (closed). The delay time **"** *Delay time for fill "* runs off, before the Traverse drives down to next position *"Plugging Start 2* position".

Create process (recipe) 3



Plugging start/stop 2
In the middle area you can drive with different values for pressure and traverse speed.

Delay time opening
Squeegee is at the lower point “Plugging *end 1 position”*. Paste pressure is turned off.
Now the Time “*Delay time opening ”* runs off before the Squeegee is opened.

Traverse offset
Bottom position of the traverse. In order to be able to hang the pcb in and out with more ease after plugging, the traverse is moved to the following bottom position.
>>Length of PCB + Traverse Offset >>
This offset is required for the PCB not being clamped in the bottom position.

Traverse speed up/down
Speed of Traverse to drive up / down max speed 84 mm/sec.

Vacuum pump On at [psi]
The pump is turned on again if the vacuum goes under this point.

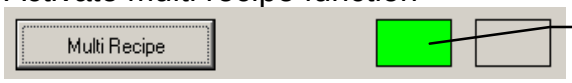
Vacuum pump OFF at [psi]
If this point is reached, the pump is turned off. The vacuum is maintained. Due to unavoidable leakage losses the pump will possibly be turned on again if the pressure drops below the V*acuum Pump On* value.

ES Wiper pressure
Use the input field for setting the wiper touch pressure on External Scavenger ES.
Rear squeegee is opened/closed with adjusted system pressure.

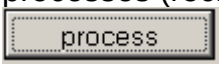
Create multi process (option)

Go to Choice in module VCP 1 or VCP 2 (option)

Activate multi recipe function



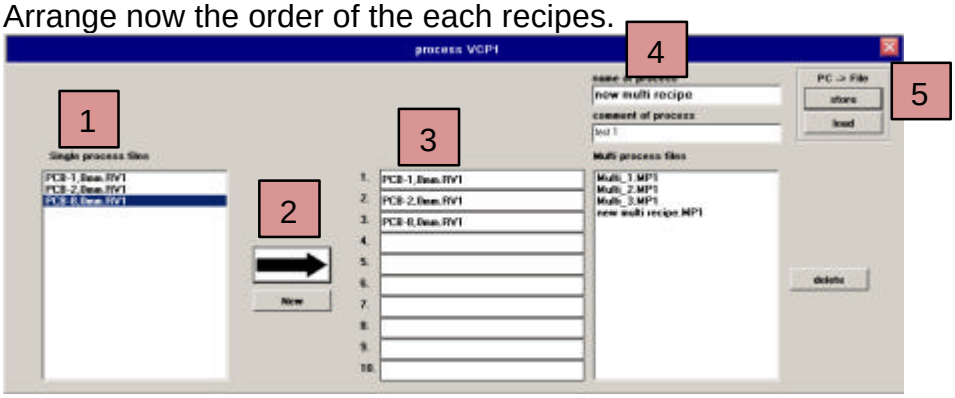
Use the normal process function, create your processes (recipes) and store the processes (recipes) under a file name.



Now click the Multi process button.

Vacuum function, heating and multi recipe function are active in automatic mode.

Arrange now the order of the each recipes.



Multi recipe function

1. select one single process file
2. press the arrow to move this recipe in the multi recipe (order 1-10)
3. order of the each single process files
4. after finished, key in a multi recipe file name
5. press store to write the multi recipe to hard disc of computer

Up to 10 recipes can be stored in one Multi recipe. These recipes are processed one after another.

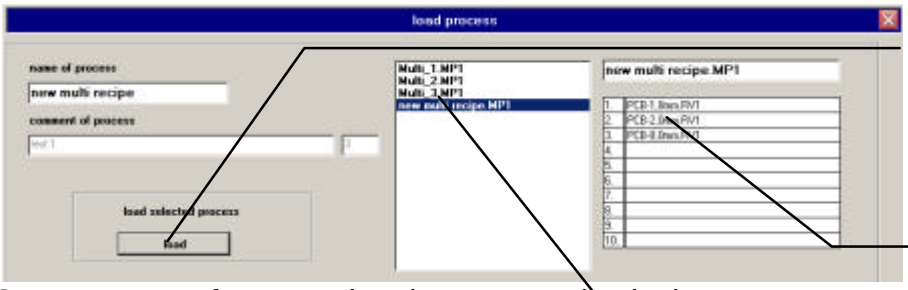
Button new: use new button to create a new multi process file.
Load: to load a multi recipe file and see the order of each single recipe file.

Info!
The processes for VCP 2 (second VCP module) have to created in module **VCP 1.** The files are copied to the module VCP 2 automatically. So you can use the recipes from VCP1 in the second VCP2 module.

Load multi process (recipe)

The <load 🗁> button is **only for loading** self-created multi processes (recipes) (not for change or creation of same).

The desired process for **selection** is in the right part of the window.



Use <load> to load the stored process

each single process files in this multi process

See next page for preparing the process (recipe).

list of available multi process files

1. select a multi process file name
2. use load button to load the multi process file

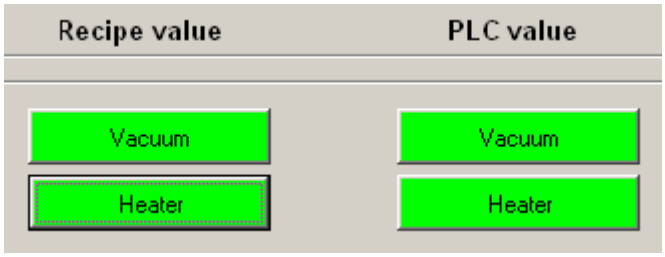
The actual multi process is displayed in the main picture.

Create process (recipe) 4

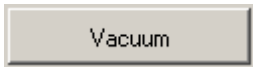
Head pressure On
Use the input field for setting the touch pressure of the front squeegee.
Rear squeegee is opened/closed with system pressure.

Paste pressure
Use the input field for setting the Paste pressure.

Work without vacuum



Use vacuum ON (button is green) for working with vacuum.



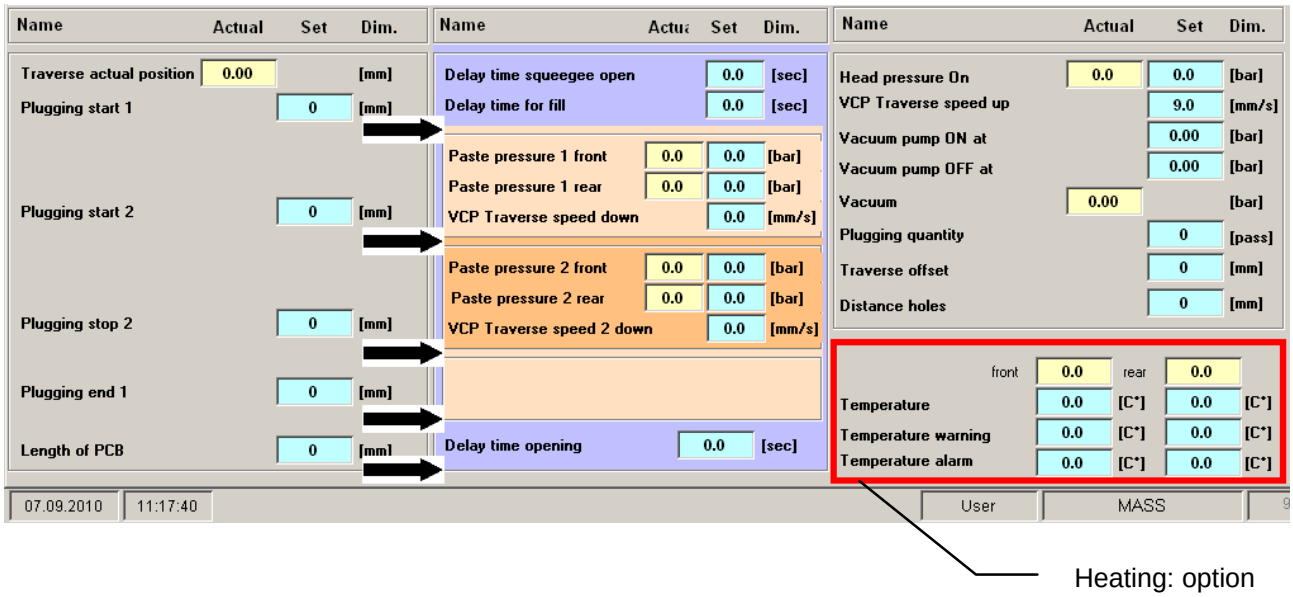
Use vacuum OFF when working without vacuum.
The vacuum pump is OFF now
Recipe value: setting : setting in the recipe file on the computer
Plc value : setting in the plc controller (this value is active now)

Warning!
There is the risk of injuring hands and arms.
Keep your fingers and arms clear from the machine while in operation.

Act/Setvalues

General to : Actual/set values

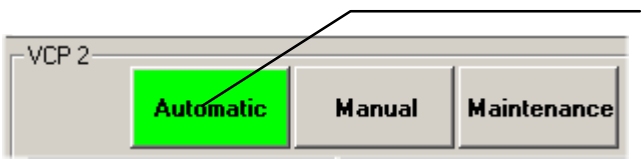
The menu level “Act/Set values” allows setting of positions, pressure, temperatures and speeds of each module. These values are active in automatic mode



Heating: option

Change values:

For doing so, key in the desired value at “Set”, and **confirm** WITH THE RETURN-Key.



Automatic mode must be selected

Automatic mode:

Click on the button “Automatic” to go to Automatic mode.

Manual mode:

The Manual mode allows manually starting motions and drives.

Maintenance mode:

The Maintenance mode is suitable for moving the traverse and door during cleaning.

Warning:

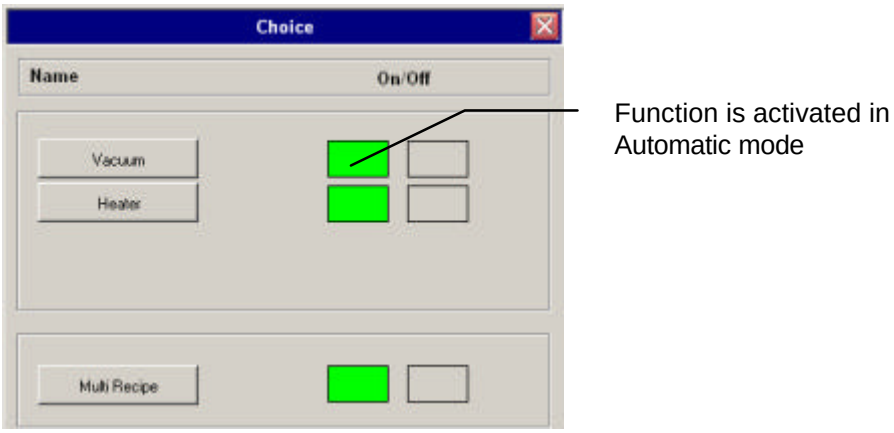
The Manual mode allows the moving of all drives and motors **without** a specific **monitoring**. For that reason, the most extreme caution is to be paid to the drives and motors when being switched on in manual mode

Better use Maintenance mode for the most functions.

Automatic mode VCP

general to : Choice

When starting the **automatic mode** the selected functions are **automatically started**.



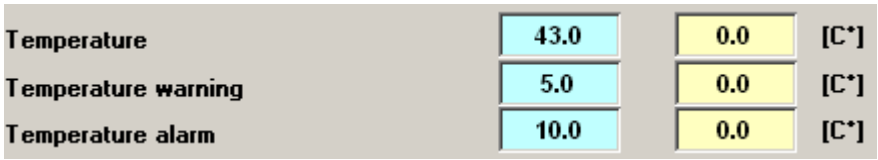
Vacuum function, heating and multi recipe function are active in automatic mode.

Multi recipe function
If Multi recipe is activated, this new function is available for recipe creation.
Up to 10 recipes can be stored in one Multi recipe. These recipes are processed one after another.

Heating for fill head 1

Set temperature

This menu is to set the temperature and warning/alarm limits of the heating (if build in).



Temperature : Set: Setting of the temperature for the heatable head.

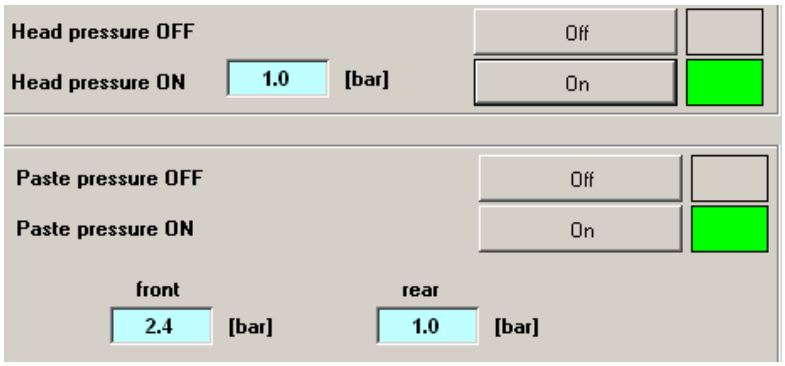
Temperature warning 5.0 [°C]*
means that a **warning** is given if the temperature differs by +5 or -5 from the set temperature of 43 [°C]*

Temperature alarm 10.0 [°C]*
means that an **alarm** is given if the temperature differs by +10 or -10 from the set temperature of 43 [°C]*

*These values are preset by the company MASS and must in general not be changed.

Heating for fill head 2

Set Head / paste pressure



Window for Automatic mode

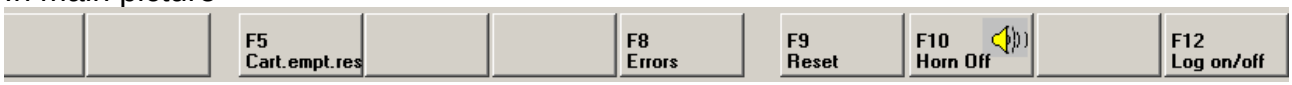
Head pressure “On”
Use the input field to set the front-squeegee touch pressure.
Use the button “ON” to turn on head pressure.

Paste pressure
Use the input field to set the paste pressure.
Use the button “ON” to turn on paste pressure.

Function keys

The function keys on the keyboard have the following allocation:

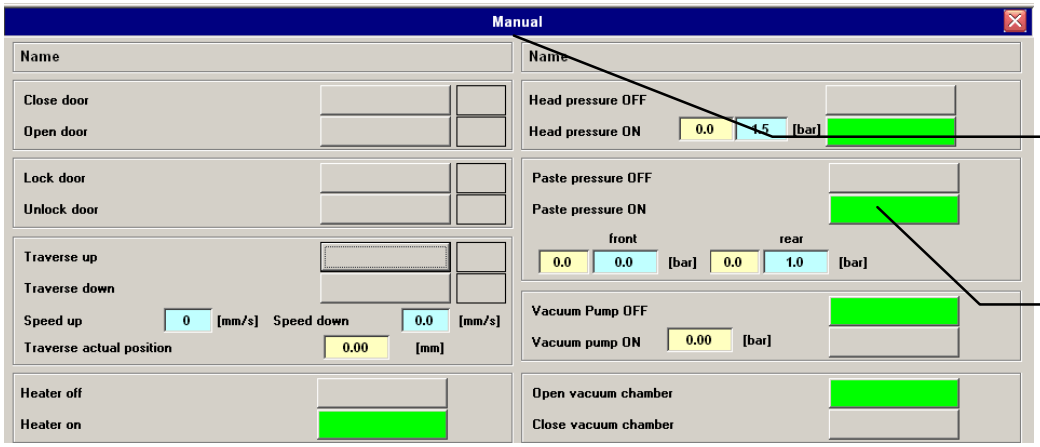
In main picture



F5	Cartridge empty reset	reset message *“Cartridge is empty”*
F8	Errors	displays the actual current troubles
F9	Quit	acknowledges a current error message
F10	Horn OFF	to silence the horn
F12	Log ON/OFF	login with username and password

The Manual mode VCP

Click on the relevant module and then on manual button.



Window Manual mode VCP

Open vacuum chamber
Use this function to open vacuum chamber (pneumatic valve).

Vacuum pump ON/OFF
Start vacuum pump manually.

Warning:
The Manual mode allows moving all drives and motors **without** a specific **monitoring**. For that reason, the most extreme caution is to be paid to the drives and motors when being switched on in <manual mode>.
Better use <Maintenance mode> for the most functions.

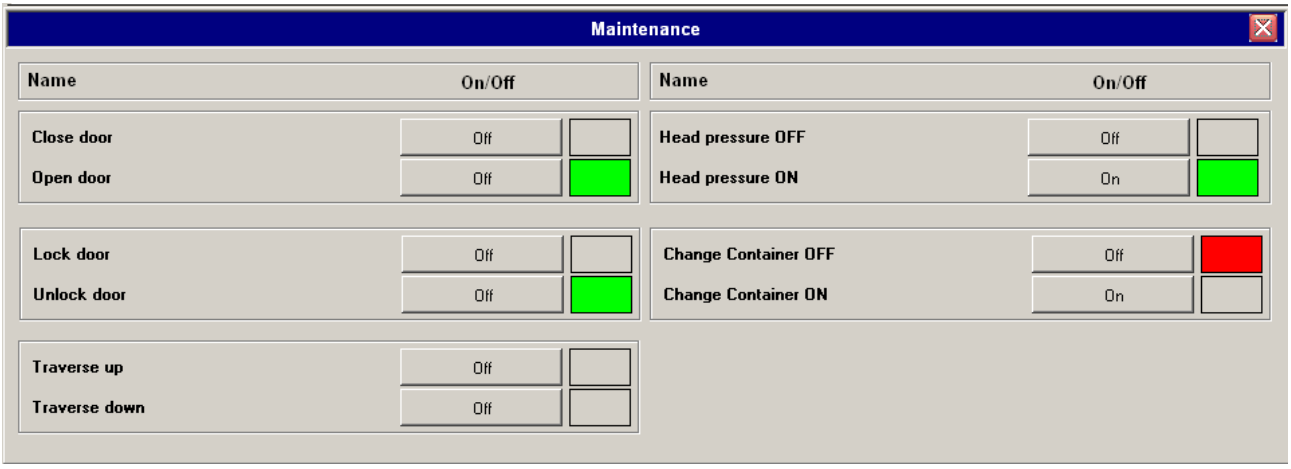
For example, Traverse Up:
Press down and hold the "Traverse up" Button, and the Traverse drives to the upper position. The green indicator next to the button will light up once the position is reached. In the <manual mode>, the traverse moves up to the limit switch.

The <manual mode> should be used by authorized and skilled staff only.

The Maintenance mode VCP

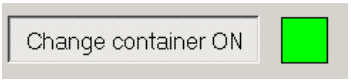
The Maintenance mode is suitable for moving the traverse and door during cleaning.

Click on module VCP and then click on 



Info:
If the grippers clamping the pcb are still open, the traverse cannot move upwards in maintenance and manual mode.

LCS – change container (Option)



Press the Button <*Change container*> *ON* to change the paste container in the large container system. Now you can move the motor of the large container system (up & down) by the two buttons on the operating panel LCS. The buttons are illuminated during movement. After filling is finished, click < *Change container*> *OFF* to turn OFF this function.

Cartridge empty (only with large container system - LCS)

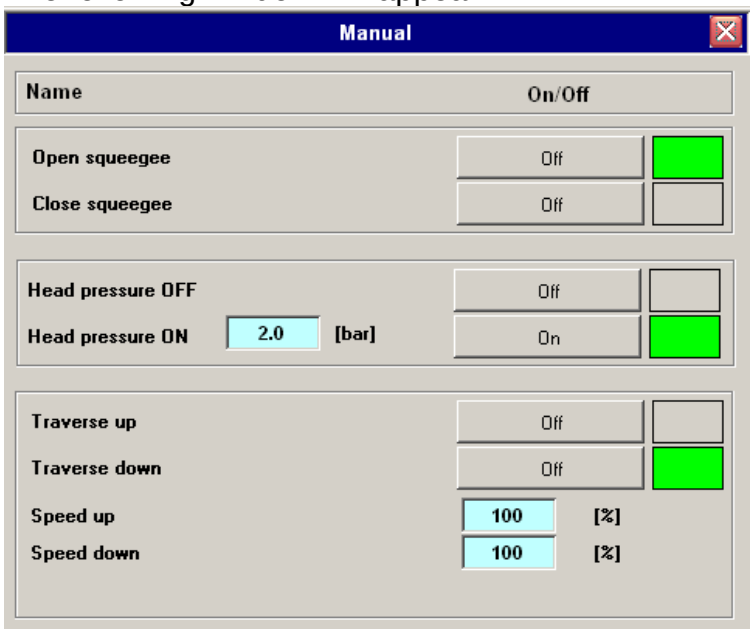
When the Warning message "*Cartridge empty"* is displayed, the cartridge in the VCP machine must be refilled with the LCS system.
Now the cartridge in the VCP machine is filled by the large container system.

This message can by resetted by <Cart. empty reset>

Manual Mode ES

Select the ES module, then click on <Manual mode>.

The following window will appear:



Open squeegee / Close squeegee
The squeegees on the External Scavenger ES are opened and closed.
The rear squeegee is always triggered with system pressure (88 psi) and the front one with set Head pressure.
For allowing the front wiper to be opened and closed in manual mode, squeegee *pressure "ON"* must be **activated**.

Head pressure

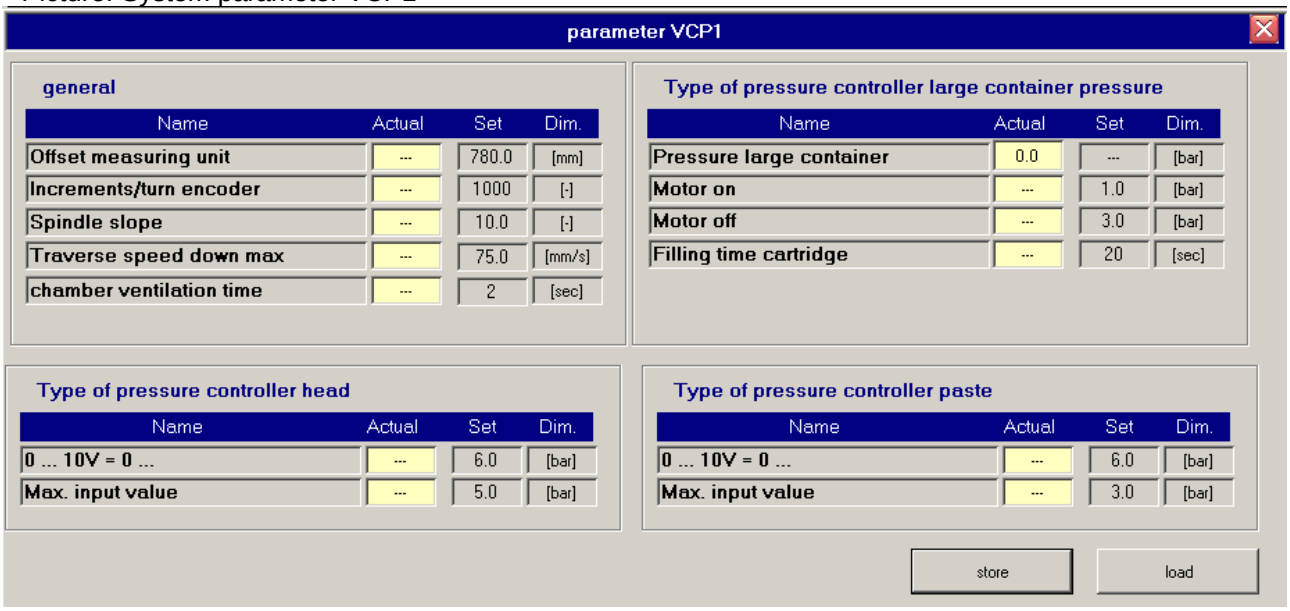
Use the input field for setting the wiper touch pressure on External Scavenger ES.

The menu System Parameter allows setting of all Software parameters.
The menu is password protected (level 7 - only view).

Click on module VCP

Parameter Go to System parameter window.

Picture: System parameter VCP1

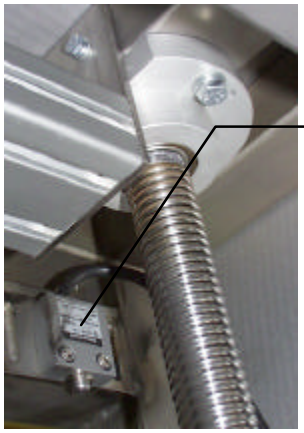


Offset measuring unit
This is the distance between the forked light sensor (at the bottom) and the maximum upper position of the traverse. The forked light sensor is the reference point.
By increasing the value "***Offset measuring unit "*** *, the traverse will go to a higher upper position.*

The value is only allowed to be moved in 0.1" steps!!!
The upper position of the traverse must be checked after each 0.1" incremental increase. It is okay for the knob on the traverse to touch the top limit switch (see Photo below).

However, the knob of the traverse cannot completely compress the limit switch (danger of the traverse crashing into the frame of the machine, if the traverse is moving too fast to the upper position!).

System Parameter (Software) 2



Limit Switch at Top

Forked light sensor bottom

Limit switch at bottom

general

Name	Actual	Set	Dim.
Offset measuring unit	---	780.0	[mm]
Increments/turn encoder	---	1000	[-]
Spindle slope	---	10.0	[-]
Traverse speed down max	---	75.0	[mm/s]
chamber ventilation time	---	2	[sec]

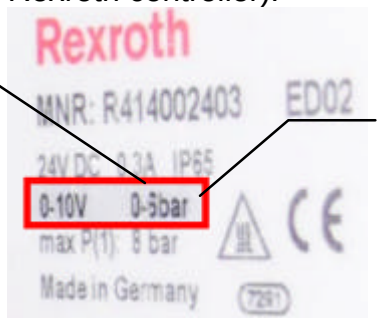
Type of pressure controller head

Name	Actual	Set	Dim.
0 ... 10V = 0 ...	---	6.0	[bar]
Max. input value	---	5.0	[bar]

Increments/turn encoder
The encoder has 1000 increments/rotation.

Spindle slope
10 mm pitch / rpm of the spindle

6 bar [head pressure]
max. pressure of controller (value see on type plate of Rexroth controller).



Rexroth type plate
0-10V = 0-6 bar

Chamber ventilation time
2 Sec: after each plugging process the door is unlocked and waits for 2 sec. before the door is opened completely.

max input value = 5,5 / 3,0 bar
Info: Values are **only checked during** input in the **input field.**
The operator must check the inputs for plausibility and assure that only correct values are entered.

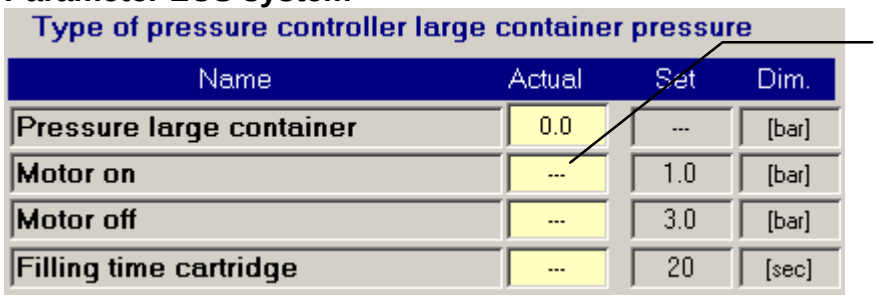
Type of pressure controller head

Name	Actual	Set	Dim.
0 ... 10V = 0 ...	---	6.0	[bar]
Max. input value	---	5.5	[bar]

Type of pressure controller paste

Name	Actual	Set	Dim.
0 ... 10V = 0 ...	---	6.0	[bar]
Max. input value	---	3.0	[bar]

Parameter LCS system



Picture : Parameter for LCS system

Pressure large container
Actual: displays the actual measured pressure on the sensor in LCS system

Motor Off
The motor is switched off when the paste pressure is higher than 3 bar. Now the pressure falls. When the paste pressure goes under 1 bar, the motor is cut in again during the 20 sec filling time.

Motor On
When the paste pressure goes under 1 bar, the motor is cut in again.
The filling process ends always, when the 20 sec. are expired.

Filling time cartridge
The filling process is starting. Now the Motor is ON for 10 sec.

To switch off the new function use following settings

Name	Actual	Set	Dim.
Pressure large container	0.0	---	[bar]
Motor on	---	0.1	[bar]
Motor off	---	10.0	[bar]
Filling time cartridge	---	20	[sec]

Motor OFF: 10 bar, so the motor is only switched off when the paste pressure is higher then 10 bar.

Data backup

The Visiwin-software is installed under C:\PC_Visu\Mass\VCP.
VCP.exe is the main visual start file.

Via the windows-explorer the relevant directory* to save.

Software reinstall / configure

The Visiwin software needs a dongle on the parallel port or USB port.
If the dongle is not present, the software runs in demo mode.

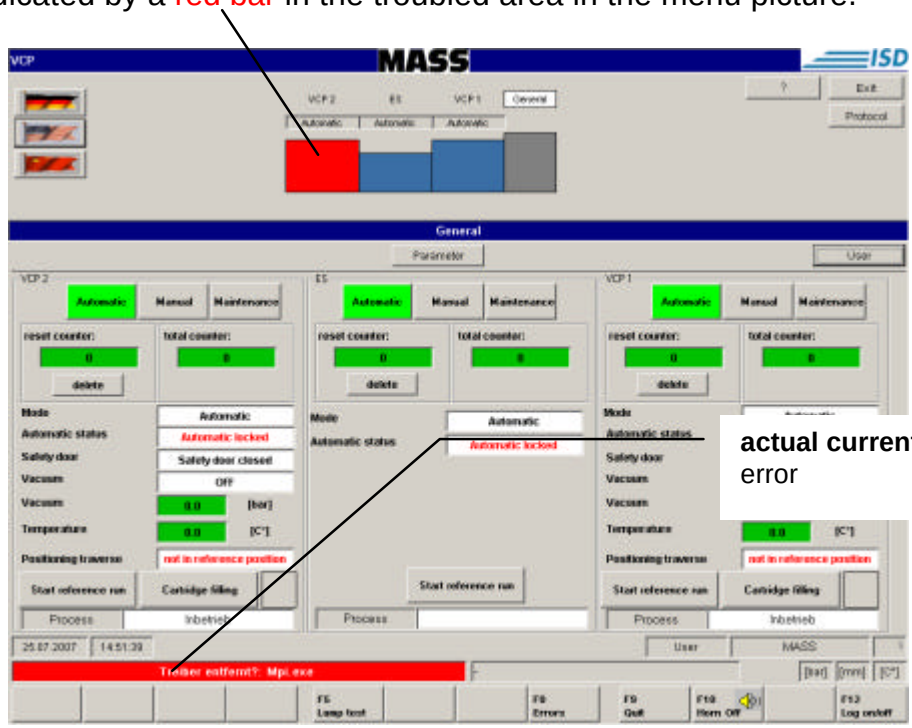
Software reinstallation on a new PC
Install Windows XP and all drivers for the PC.
Open control panel, change network TCP/IP address of PC.
Use the following TCP/IP network address.

VCP (computer)	192.168.65.200	
(Siemens CP 343 lean	192.168.65.104	in control cabinet)

After this, install the Visu software from MASS CD-Rom
The software goes to “C:\PC_Visu\Mass\VCP\...”
Copy all parameter files and recipes from your backup to the right folders.

Errors

Trouble is indicated by a red bar in the troubled area in the menu picture.



1. Clearing of faults indicated.

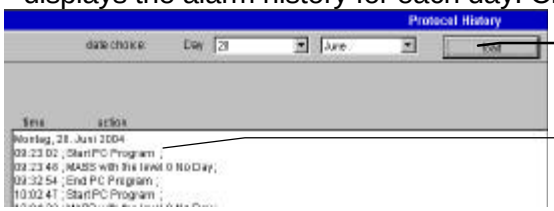
2. press key F9 “Quit“ to delete the trouble message.

<F8 Errors>

F8 Errors — for calling up the window indicating the **current** errors.

< History >

displays the alarm history for each day. Choose day/month and press load.



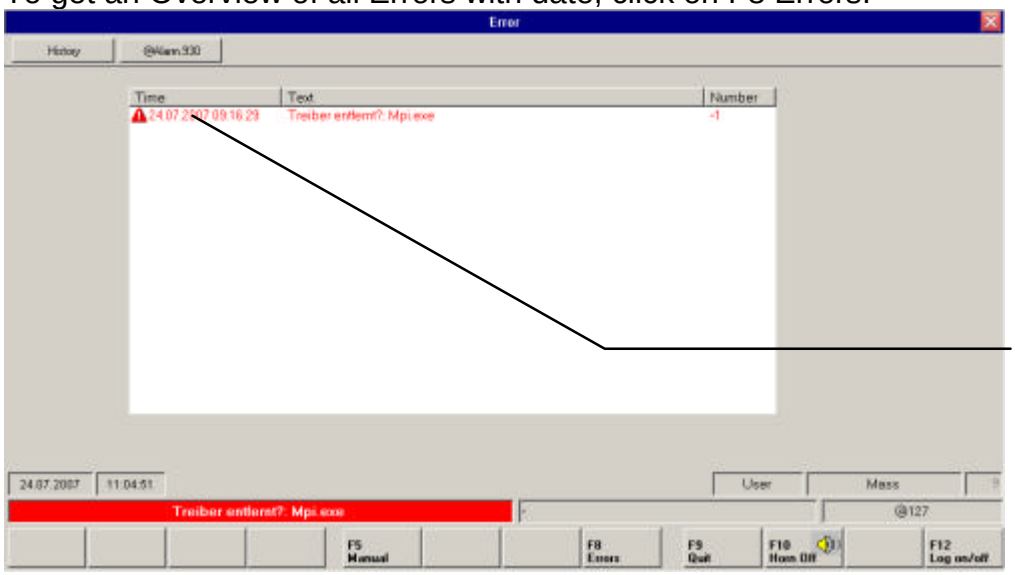
Load:
The selected alarm file is loaded and indicated.

Alarm file:
Example here: Alarm file of 20 this month
Alarm files are logged for 30 days.

Use <F10 Horn off> to cut off the horn (not build in)

Errors

To get an Overview of all Errors with date, click on F8 Errors.



<F8 Errors>

F8 Errors — for calling up the window indicating the **current** errors.

Error messages

An error is indicated on the control cabinet with the respective signal lamp lighting up (option) . The error cannot be acknowledged before eliminating the **cause of that error.**

Error message	Error cause	Error remedy
VCP safety switch rear door activated	Rear door is open and safety switch on rear door activated	Close door Check safety switch on rear door
VCP safety switch front door activated	Front door is open or safety switch on front door activated	Close door Check safety switch on front door
VCP safety light curtain interrupted	The safety light curtain on VCP was hit	Remove obstacle, check alignment and LED´s on safety light curtain see manual from Keyence on MASS CD-Rom
Switch fault door open/closed	Sensor (reed contact) on cylinder open front door is defective	Check sensor (reed contact) on cylinder
Switch fault door locking	Sensor (reed contact)on cylinder lock door is defective	Check sensor on cylinder
ES switch fault traverse top/bottom	limit switch on ES is actuated	Check position of traverse ES and limit switch for function
ES switch fault wiper open/closed	Sensor on cylinder (squeegee) is defective	Check sensor on cylinder
ES switch fault clamping	Sensor on cylinder (squeegee) is defective	Check sensor on cylinder
ES fault safety light curtain	The safety light curtain on VCP was hit	Remove obstacle, check alignment and LED´s on safety light curtain see manual from Keyence on MASS CD-Rom
VCP switch fault rakel open/closed	Sensor on cylinder (open/closed squeegee) is defective	Check sensor on cylinder
emergency stop activated	emergency stop is active	emergency-stop key to release
VCP limit switch door fault	The limit switch (top and bottom position of door) is actuated	Check limit switch and position of door. Drive traverse in correct position in manual mode.

Error message	Error cause	Error remedy
ES rear door is open	(only for ES with door) The rear glass door is open	Close door and check magnet switch on rear door
	Warning message Cartridge filled now in automatic mode	Sensor on cartridge is actuated  Cartridge must be filled in 45 seconds. This message can be resetted by button <F5 Cart. empty reset>  Reset function
VCP broken wire PT100 Sensor head front/back	(optional with heatable heads) The wire from the pt100 sensor for temperature is broken	Check PT 100 sensor and cable. If no heatable heads are build in, you have to switch OFF heating to eliminate the error message Maybe an assembly group of the PLC controller is in troubled
Warning Temperature max/min	(optional heatable heads) The temperature has reached the warning limit	Warning limits for temperature on PC to check Check heating
Alarm Temperature max/min	(optional heatable heads) The temperature has reached the alarm limit	Alarm limits for temperature on PC to check
VCP start position automatic is missing, door open	Automatic mode is started, but door is not open	Drive door in manual mode to **top** position
VCP Pressure min/max during filling cartridge	The paste pressure has reached the warning limit	Limit values to check
ES start position automatic missing	ES is not in lower position	Drive ES traverse down in manual mode

Error messages

Error message	Error cause	Error remedy
Watchdog vacuum pump	The Pressure switch has not reached the vacuum in time (60 Seconds)	Check pressure switch and Vacuum-pump Leakage in vacuum chamber? Check door sealing
Vacuum pump fault	The Vacuum pump is not running	Check vacuum pump and motor circuit breaker in control cabinet
Fault servo controller	Servo controller defective	Check servo controller in control cabinet, see manual from Lenze on MASS CD-Rom
Slip control Traverse	Encoder did not catch the change of traverse position	Check Servo motor, Servo controller and Encoder, maybe timing belt is defective?
Compressed air fault	No compressed-air installed or pressure low, Pressure switch defective	Check Pressure switch on service unit and compressed air pressure. Minimum 88 psi (6bar)
VCP1/2 exhaust blower not run	The blower for exhaust air is not running	If an exhaust air blower is preset: Check blower and signal
VCP switch fault clamping	The signal transmitter is defective	Check signal transmitter on cylinder
Automatic locked	The Automatic mode can not be started: Door is not in lower position or Traverse not in home position or Fault Servo controller or EMERGENCY-STOP is actuated.	Open door Drive Traverse to home position <start reference run>
After startup PC: *No connection to plc*	There is no connection between PC and Siemens plc-controller in VCP control cabinet	Check Network cable between PC and PLC. Is PLC in RUN Mode?

Error messages

Error message	Error cause	Error remedy
Error messages with large container system (Option)		
VCP large container empty	The large container/ paste container is empty	Replace empty paste container in LCS Limit switch „piston on bottom position" is actuated, check sensor
	Warning message Cartridge filled now in automatic mode	Sensor on cartridge is actuated  Cartridge must be filled in 45 seconds. This message can be resetted by button <F5 Lamp test>  Reset function
VCP leakage large container	The container is filled automatically, but the piston in the container has not reached the position in time (45 Seconds)	Check tube for paste. Is the sensor on container switched on? (LED is ON)
VCP safety door large container opened	The door on large container is open	Close door, check sensor on door
VCP motor protection FQ LCS	The motorprotection has released motor could be overloaded	Short-circuit or excess current on motor, cable, motor and motor protection to check

General information about Errors

Runtime errors:
A cylinder or drive has not reached its home position within the expected time.
That could be caused by the following reasons.

- No compressed-air or the cylinder got jammed
- The drive is sluggish
- The cylinder switch (signal transmitter, reed contact) is defective*

* The position of air cylinders is inquired by signal transmitters.

If the signal transmitter is defective, despite of the function of the air cylinder, the position change is not identified and a error message indicated on the screen.

Warnings:
A warning is indicated when getting to a critical situation but without a direct danger, if, for instance the heating temperature is for a short while below the warning limit. However, the operator must not intervene. If after a short while the temperature returns to the normal range. The warning goes out.

Alarm:
An alarm is indicated when getting to a very critical situation and the fault causing the machine not being able to continue running in automatic mode, if, for instance a printed circuit board got jammed and is blocking the slewing arm. The printed circuit board must of course be removed and the error message acknowledged, it does not go out by itself. That means, the operator is always required to intervenee.

MASS

Operating Manual

Vacuum Plugging Machine

VCP 5000-1

Serial No. # 1730

Version: 12.12.2012

Read operating manual prior to commissioning

MASS GmbH-Wilhelm-Lorenz-Str. 13 , 59590 Geseke, Germany- Tel.:+49 2942 9702-0 Fax: -30

Contents

Info

Safety information

The equipment described is intended for use in industrial electrical drive systems.

This equipment can endanger life through rotating machinery and high voltages, therefore it is essential that guards for both electrical and mechanical parts are not removed.

The following points should be observed for the safety of the personnel:

- Only qualified personnel familiar with the equipment are permitted to install, operate and maintain the devices.
- System documentation must be available and observed at all times.
- All non-qualified personnel are to be kept at a safe distance from the equipment.
- The system must be installed in accordance with local regulations.

A qualified person is a person who is familiar with all safety notes and established safety practices, with the installation, operation and maintenance of this equipment and the hazards involved. For more detailed definitions see IEC 364.

It is recommended that anyone who operates or maintains electrical or mechanical equipment see IEC 364.
It is recommended that anyone who operates or maintains electrical or mechanical equipment should have a basic knowledge of First Aid. As a minimum, they should know where the First Aid equipment is kept and the identity of the official First Aiders.

These safety notes do not represent a complete list of the steps necessary to ensure safe operation of the equipment. If you wish further information, please contact MASS GmbH.

The specifications in this manual describe the features of the products, without guarantee.

MASS GmbH personnel has carefully checked this manual and the equipment, but cannot be held responsible for its accuracy.

Technical alternatives reserved

Warning!!
When operative, the paste container is under pressure.
Do not open when under pressure. Be careful when opening or dismounting.
Vacuum chamber is under vacuum during operation.
Prior to starting maintenance works, machine first to be made unpressurized.

Warning!!
When handling the paste, the safety instructions of the manufacturer are to be followed.
When closing the door, keep the hands off the working area. Failure to so may result in contusions.

General

- The low-voltage recommendation applies to all electrical equipment used with a nominal voltage between 50V and 1000V of alternating current, a direct current between 75 and 1500V and usual ambient conditions, save the use of electrical equipment in explosive atmospheres and electrical parts of passenger and freight elevators.

- The low-voltage recommendation is directed at using only such electrical equipment neither exposing to danger the safety of human beings and domestic animals nor threatening the conservation of tangible property.

Safety and operation instructions

- During the operation, according to their system of protection, drive power converters can have live, bare or mobile or rotating parts and elements as well as hot surfaces.

- Inadmissible removing of the required cover, improper use, wrong installation or operation could result in serious personal injury or material damages. Further information to be learned from the documentation.

- All transport, installation, start-up and repairing works are to be performed by qualified staff only (IEC 364 and/or CENELEC HD 384 or DIN VDE 0100 and IEC-report 664 or DIN VDE 0110 and national safety regulations to be observed).

- Prior to working on the machine, the supply power must be switched off!

- The operating instructions must be available and on hand.

- MASS GmbH refuses any liability for improper and inappropriate use.

WARNING!
There is the risk of squashing hands and arms. Take a great deal of care when opening/closing the door and the squeegees.

Danger!
Subject to the load, the servomotor for traverse is getting hot. There is the risk of burns Prior to starting the maintenance works, check the temperature of the motor.

Safety instructions

The safety-consciousness of staff working procedures based on the operating manual should be checked at least occasionally.

Personnel must not be allowed to wear long hair, loose clothing or ornaments including rings, as these may get caught or entangled and lead to injuries.

Personal protective equipment must be worn where necessary or required by the regulations.

All safety notices and warnings on the plant must be observed.

All labels on the machine which display safety and operating instructions must always be kept legible. Worn or damaged labels must be replaced immediately.

No modifications, additions or conversions of the machine which might impair safety may be undertaken without the permission of the supplier. This also applies to the installation of safety devices and valves, as well as to welding work on supporting components.

Such interventions or modifications by the user will also lead to the loss of guarantee claims.

Before starting

Familiarise yourself sufficiently with

- the machine's operating and control elements
- the machine's fittings
- how the machine works
- the immediate environment of the machine
- the machine's safety installations
- measurements in case of an emergency

The following activities must be performed prior to starting the machine each time:

- Check to make sure that all safety devices are fitted and functioning.
- Check the machine for visible damage; any defects found must be corrected immediately or reported to the supervisor — the machine may only be operated if it is free of faults.
- Make sure that only authorised persons remain within the operating area of the machine and that no other persons are endangered when the machine is started up.
- All objects and other materials which are not required for operation of the machine must be removed from the machine's operating area.

Field of application and correct utilization

The VCP machine is designed to fill holes in printed circuit boards with conductive or non-conductive paste under vacuum.

Any other operation is considered as not being in line with the rules. The manufacturer cannot be held responsible for neither physical injuries nor plant or other asset damages resulting from inexpert operation.

The plant must be operated and fitted by **skilled** and **authorized** staff only.
The staff must be **trained** and **versed** with the operation instructions.
Any modifications or amendments to this plant are to be made in consultation with the manufacturer only.

Unauthorized actions will exclude any guarantee and affect the manufacturer to be immediately released from the guarantee contract

Service, conversion works and manipulations on the plant construction must be made by skilled, trained and qualified staff only with observing the relevant public rules and provisions.

Irrespective of the following instructions, the local safety rules for the operation of the plant to apply in any case.
Please observe the local rules and laws (e.g. workplace regulations, VDE, safety regulations etc.) as well as the principles and guideline for the safety of machines of the EN 50009 part 1.

	**Danger!**
	Operational safety of the machine is only guaranteed if it is used as intended!
	The machine is only to be used for its intended purpose and when in perfect condition from a safety engineering point of view.

Requirements of personnel

Warning
Danger of injury caused by inadequate skills of the operating personnel
Improper handling of the machine can lead to significant personal injury and damage to property. Therefore: Only have any work carried out by qualified personnel.

The instruction manual is aimed at trained operating personnel and at specially trained maintenance and service personnel.
Prior to start-up and before maintenance and service work, it is extremely important to read the instruction manual!

Operating personnel are considered to be any persons instructed to operate the machine by the operator of the product. Regarding operating personnel, a difference needs to be made between the following qualifications.

Trained person

has been trained in training sessions provided by the operator about the tasks assigned to him and possible dangers in the event of improper behaviour.

Expert personnel

because of their professional training, know-how and experience as well as knowledge of the relevant regulations, are in a position to carry out the work entrusted to him and to independently recognise and avoid potential dangers.

This in particular includes maintenance and service personnel.

Qualified electrician

because of his professional training, know-how and experience as well as knowledge of the relevant rules and regulations, is in a position
to carry out the work on electrical systems and to independently recognise and avoid potential dangers.

The qualified electrician is trained for the specific site of operation he is working in and is familiar with the relevant standards and regulations.

Electrotechnically trained person

An electrotechnically trained person is considered to be a person trained by a qualified electrician to carry out certain work who has been instructed on the assigned work and the dangers and has been informed about the necessary safety devices and protective measures.

Training

The personnel must receive regular training from the operator. This should be recorded as evidence of the training.

Training records				
Date	**Name** **Trainee**	**Type of Training**	**Trained by**	**Signature** **Trainee**

Figure: Example of a training record

Unauthorised person

Warning

Danger for unauthorised persons!

Unauthorised persons who do not meet the above described criteria, are not aware of the dangers of the machine and of the work area.

Therefore:

- Keep unauthorised persons away from the machine
- Speak to unauthorised persons and instruct them to move away from the work area
- In an emergency, discontinue work, if necessary switch off machine until unauthorised persons have been removed from the work area.

Operator responsibility

The machine is used in the commercial sector. Therefore the operator of the machine is subject to the legal obligations pertaining to safety at work.
The operator (contractor / company) is considered to be who operates the product and applies it as intended or has it operated by suitable and trained persons.

Apart from the occupational health and safety information in this manual, the safety, accident prevention and environmental protection regulations valid for the scope of application of the machine must be adhered to. The following apply in particular:

- The operator must inform himself about the applicable occupational health and safety regulations and must carry out a risk assessment including risks resulting from the special working conditions at the place the machine is being used. This then has to be converted into an instruction manual for operating the machine.
- During the entire operating time of the machine, the operator must check whether the instruction manual prepared by him still meets current rules and regulations and must adapt it where necessary.
- The operator must clearly regulate and define the responsibilities for installation, operation, maintenance and cleaning.
- The operator must ensure that all employees who work with the machine have read the instruction manual and have understood it.
  Apart from that, he must provide personnel with regular training and inform them about the dangers.

Furthermore, the operator is responsible for always keeping the machine in perfect condition. Therefore, the following applies:

- The operator must ensure that the service intervals described in this instruction manual are kept to.
- The operator must have all safety devices regularly checked to make sure that they work and that they are complete.
- The operator must provide the personnel with the necessary protective equipment.
- The operator must nominate a machine supervisor who is responsible for safe operation and the coordination of all work.

Instructions, particularly safety instructions provided in the instruction manual, provide the user with information which ensures that the product works safely and functionally.

	**Warning**
	Risk of injury by not paying attention to the safety information
	If such information is disregarded, this can lead to malfunctions or disruptions! In the worst case, this can have a detrimental effect on the health of the user

1. Personal protective equipment

While working, it is necessary to wear personal protective equipment to minimise any health risks.

- Always wear the protective equipment necessary for the respective work.
- Comply with any notices on personal protective equipment displayed in the work area.

	**Protective clothing** is close-fitting work clothing with low tear resistance, close-fitting sleeves and no protruding parts. It serves mainly to protect against getting caught on moving parts. Do not wear any rings, chains or other jewellery.

	**Protective gloves** to protect hands from friction, abrasion, pricking or deep wounds or from touching hot or cold surfaces.

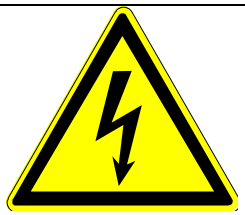
	**Safety shoes** to protect from heavy, falling parts and against slipping on slippery ground.

Particular dangers

In the following section, residual risks are listed which have been ascertained on the basis of a risk assessment.

Attention must be paid to the safety information given here and the warning signs in the following chapters of this manual to reduce health risks and to avoid dangerous situations.

Electric current



Danger

Acute danger from electrical voltage

There is acute danger caused by touching live parts.

Damage to the insulation or to individual components can be life-threatening.

Therefore:

- If the insulation is damaged, immediately switch off the power supply and effect a repair.
- Work on the electrical systems may only be carried out by qualified electricians.
- For all work on the electrical system, switch off the current and check that it is off.
- Before carrying out any maintenance, cleaning and repair work, switch off the power supply and secure it against being switched on again.
- Do not bridge any fuses or disable them. When replacing fuses, keep to the correct ampere number.
- Keep moisture away from parts carrying a current. This could lead to a short-circuit.

Danger!

Danger of being crushed / pinched / dragged in by moving parts

Therefore:

- If the drive power is being applied, never reach into the feed inlet or discharge outlet or into an unlocked maintenance opening.

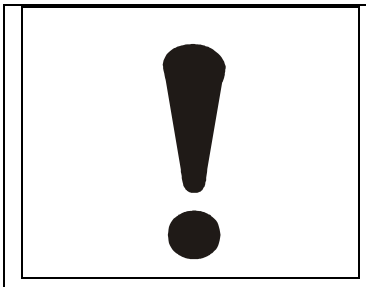
Secure against being switched on again:

1. Switch off power supply.
2. If possible, secure the switch with a lock and attach a sign like the one shown in the following picture to be clearly visible on the switch.
3. The key should be stored by the employee named on the sign.
4. If it is not possible to secure the switch with a lock, set up a sign like the one in the second picture.
5. Once all the work has been carried out, **make sure that no people are in the danger zone any more.**
6. Make sure that all safety devices have been installed and are fully functional.
7. Now you can remove the sign.

	**Danger!** **Do not switch on!** Switch secured with lock on the: .....at .....o'clock. The lock may only be removed by: . once measures have been taken to ensure nobody is in the danger zone any more.

	**Danger!** **Do not switch on!** Switched off on the: .....at .....o'clock. May only be switched on by by: ..... . once measures have been taken to ensure nobody is in the danger zone any more.

Environmental protection

	**Caution!** **Environmental hazard!** If environmentally hazardous materials are handled incorrectly, in particular if disposed of incorrectly, significant damage to the environment can be the result. Therefore: • If material that is hazardous to the environment accidentally gets into the environment, then take suitable measures immediately. If in doubt, inform the responsible local authority about the damage.

The following materials that are hazardous to the environment are used:

- Lubricant
- Grease
- Paste
- Oil (vacuum pump and air service unit)

EMERGENCY-STOP

In the event of danger press the EMERGENCY-STOP-Button immediately.

Do not dismount or manipulate the safety equipment.
In case the safety equipment requires to be dismounted for set-up, repair or maintenance works, it must be remounted prior to production start.

EMERGENCY-STOP
The plant is fitted with EMERGENCY-STOP buttons to be activated in the event of emergencies only.

Warning!

There is the risk of physical injury caused by electrical shock. The machine is not idle once the EMERGENCY-STOP button has been released.
Prior to control box works, make the complete plant idle by turning the main switch off. Even if the main disconnector is switched off, the main terminals are under voltage.

Transport and assembly

Transport

The Vacuum Plugging Machine only to be transported by fork lift truck or elevating truck.

The machine is only to be lifted on the bottom and transported to the desired installation place. The weight data are indicated in the shipment papers.

The machine is to be unloaded by experienced and skilled staff only being familiar with the handling of hoists and auxiliary tools.

After the transport the machine is to be checked for damages and proper condition.

In the event of damages, both the responsible forwarder and the machine manufacturer, MASS GmbH are to be advised immediately.

The four feet of the machine are to be set such as to make the machine level.
Connect the compressed air and electrical connections.

Assembly / alignment

The adjustable feet of the machine are to be aligned such that the machine is level.
Then, the counternuts are to be tightened.

Installation instructions
Check oil level of vacuum pump.
Check rotating direction of Pump and Motors

Attention!
The machine must be installed and put in operation by qualified and skilled staff only!
Connect the compressed air and electrical connection
The electric connection is made via a 3x400 V socket.

Check the operating voltage for being identical to the mains voltage.
Prior to starting up, all the supply terminals in the control box are to be checked and tightened, if required.

Note!
The machine must be installed and put into operation by qualified staff only.

Technical Data

Machine designation:	: Vacuum Plugging Machine
Machine type:	: VCP 5000-1
Serial No.	: **#1730**
Panel size (wxh):	: max. 610 x 760 mm (24x30”)
Dimension (wxdxh):	: 2500mm x 630mm x 2100mm
Free space around the machine	: 800 mm
Panel thickness:	: 0,25 – 7,5 mm
Compressed air pressure:	: about 90 psi (6 bar)
Operating voltage	: 3x400 V,/N/ PE
Frequency:	: 50 Hz
Total load:	: 5 kW
Max. speed traverse	: 84 mm/sec.
Room temp	: 72 F +- 3,6 F 22 +- 2°C
Room humidity	: 50 +- 10 %
Weight	: 950 kg

More details see technical drawings.

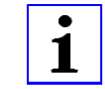
Version of manual

Version : 1.0
Datum : 12.12.2012

Application

This machine is designed to fill holes in printed circuit boards with conductive or non-conductive paste. The hole filling can be applied in via and in blind holes. The filling from blind holes is possible in a double side mode in one step. The machine is equipped with doors for visual quality control on both panel sides.
The front door is automatically opened/closed. The rear door allows to be slewed open for inspection purposes.

INFO!
We recommend the installation of an exhaust-system for the VCP machine.

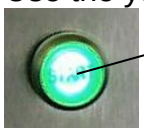

Information

3.0 General functional description

Contents

Function:

PCB to be hanged up by hand in the notches and the automatic mode started by pressing the green button on the machine (with *Automatic Mode* started on PC).
Use the yellow foot switch to lock pcb.



Press START in automatic mode

The door is closed and locked.
The vacuum chamber is evacuated (if vacuum is active in recipe).
Both the squeegees are opened and the traverse moves quickly upwards to the upper set position (adjustable by software "*Plugging start 1*").
Now wait until vacuum set point is reached.
Paste pressure is cut in with set values for paste pressure.
The *delay time squeegee open* runs off, with opened squeegees.
Both the squeegees are pneumatically moved to the pcb ►|◄ with fixed pressure 0,8 bar. The *delay time for fill* runs off to fill the squeegee completely with paste and press out potential air bubbles.
Once expired the time *delay time for fill* it is switched over to the squeegee pressure as set in the recipe.

Then the traverse moves down at the speed set and the pcb is plugged with the set recipe values.

Function: Second speed (option)

From position *Plugging Start 2* it is changed over to the recipe values for the central second section.
This second section is left with *Plugging Stop 2* and the recipe values of the first upper section apply again.
The paste pressure is switched off at the bottom position *Plugging end 1*
The *delay time opening* runs off and the squeegees are opened.

The traverse moves to position "Length of pcb" + minimal offset.

Should multiple plugging (plugging quantity) be stored, the pcb is once more run off with the same recipe values at continuous vacuum.

The vacuum chamber is aired. The door opens.

Use the yellow foot switch to unlock pcb.
If there are still some hole voids, the operator can replug the same printed circuit board. That's the great advantage when "*plugging under vacuum*".

The paste is kept in refillable cartridges.
Subject to the printed circuit format, different squeegee sizes are available.

Now bring the pcb to the External Scavenger ES, lock the pcb with the yellow foot switch and press start button on External Scavenger ES.
See also chapter 9 External Scavenger ES

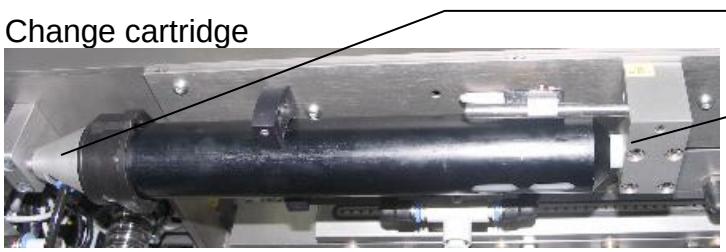
3.1 Equipment start up

1. Main switch to be switched on
2. Press white „ON“ button, control voltage switches on
3. Start PC, log in
4. Load a stored recipe
5. Go to *Automatic mode*
6. PCB to be hanged up and clamped via foot switch
7. Start process by pressing the green START-Button
8. Once finished plugging pcb to hold on and foot switch to actuate again (to release clamping).

Start the process
Press again to Pause (the traverse stops)

3.2 Preparations:

Change cartridge



quick change adapter

block with sealing face

The VCP is equipped with a quick changing adapter.

TS adapter

Loose knurled screw and push the TS adapter to the left side.
Now the TS adapter is free and you can easily change the cartridge inside.
Pull TS adapter out of the holder.

To fasten the knurled screw after changing only use 2 fingers.
Do not give too much power.

Paste filling

Paste to be filled into the cartridges and cartridge placed into the holder.

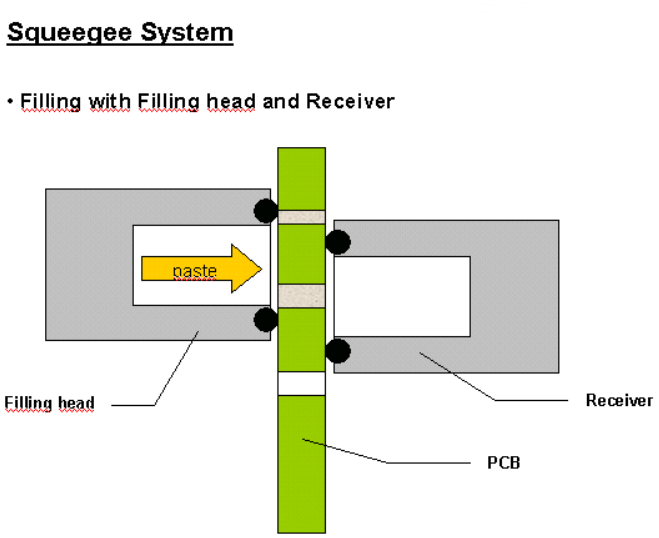
Provided air hoses to be connected.
The compressed air acts on a piston, which presses the paste into the hose of the filling squeegee.

This makes the paste not to have a direct contact with the compressed air.
Select „Paste Pressure ON„ in Maintenance mode and press the paste into the squeegee.

Wait until the squeegee* is completely filled.

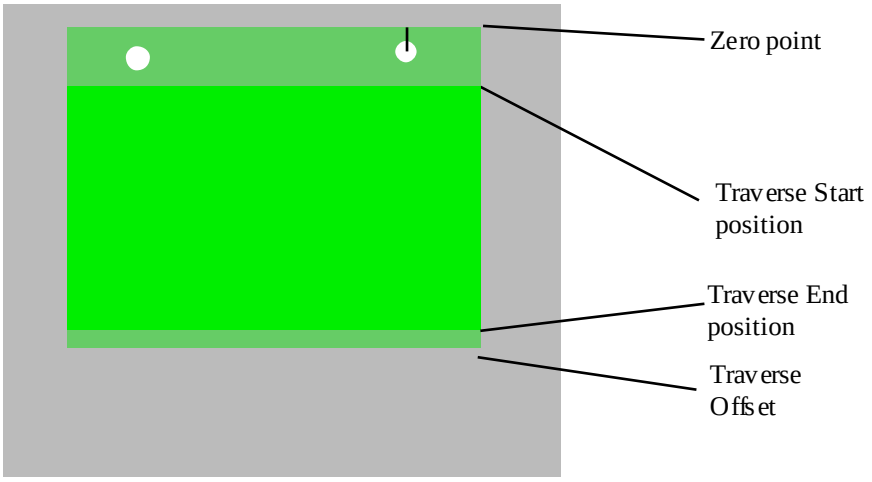
* Different sizes of squeegees are available depending on your panel size.

3.2.1 Squeegee system

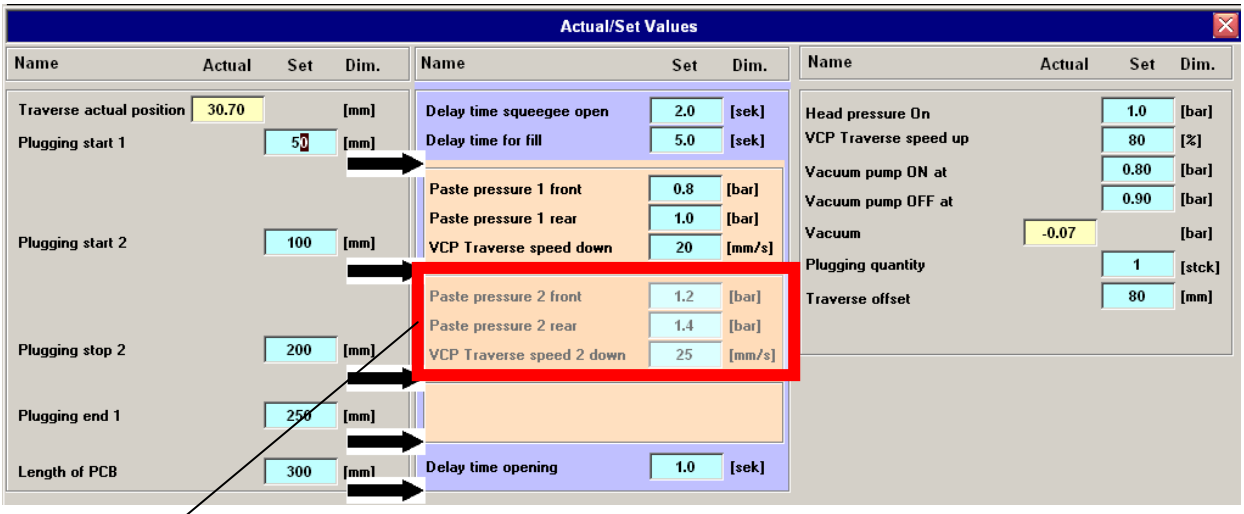


3.3 Setting of the start and stop point of the plugging

Drawing: Plugging area values



Key in the desired values (confirm with return-key)

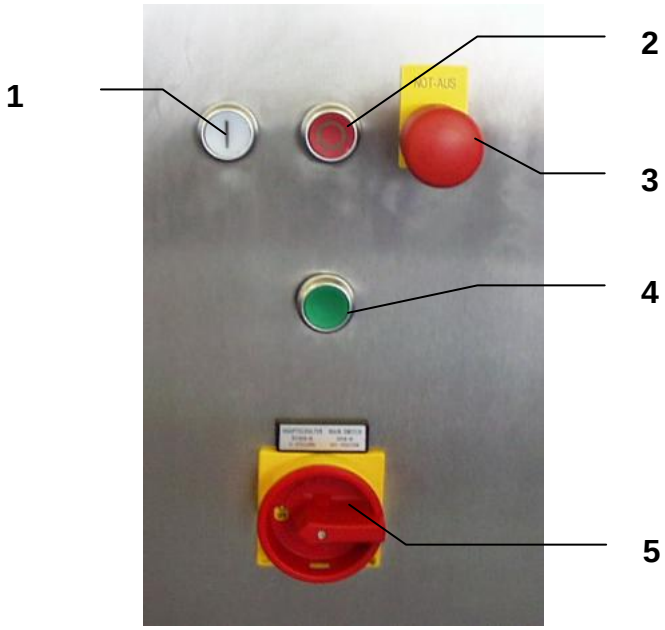


In the middle plugging area you can use different values for pressure and speed.

Start and stop point of the plugging area can be set by software *Plugging start/end Position*.

More details see description of PC-Software Visiwin

3.4 Operating panel

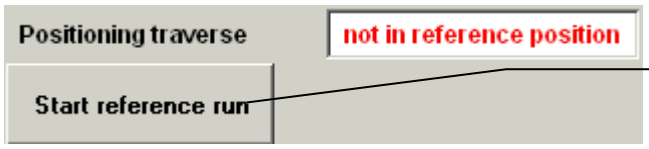


1. **Button : Control voltage ON**
2. **Button : Control voltage OFF**
3. **Button : EMERGENCY-STOP**
4. **Button : Start Automatic process**
5. **Main switch ON/OFF**

3.5 START automatic mode

Automatic mode:

The plugging machine passes a fully automatic coating process.
Press Green Start Button in Automatic Mode.
Automatic status must be "Automatic enabled"



Drive to home position (works only in Automatic mode)

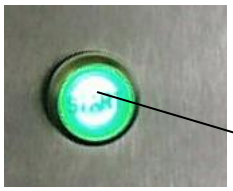
Manual mode: (for qualified service personnel only with level 3).
Drives and movements allow to be selected manually.

Warning:
The Manual mode allows to move all drives and motors without a specific monitoring. For that reason, the most extreme caution is to be paid to the drives and motors when being switched on in <F2 Manual mode>.

Maintenance mode:
Drives and movements allow to be selected manually
The traverse allows to be moved **only within preset limits**

Example:

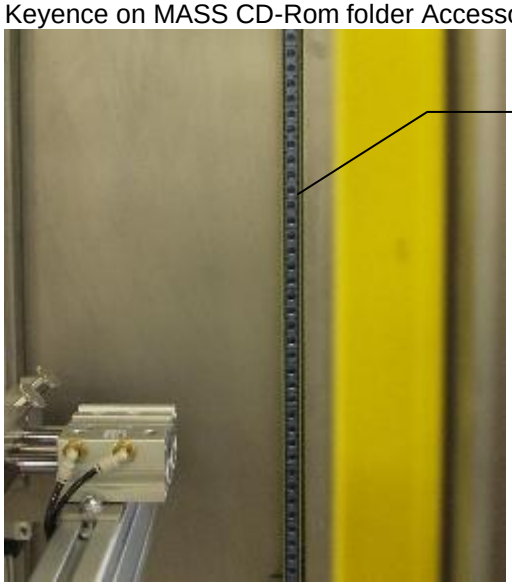
- The Traverse must be in home position (reference position).
- Door is open
- Automatic mode is now enabled.



Start with plugging process

3.6 Safety Light Curtain on door

Safety light curtain consists of an emitter and a receiver. More details see Operating manual from Keyence on MASS CD-Rom folder Accessories/Keyence.



If somebody puts his hands into the light curtain, the traverse stops. Press the green START-key again and the traverse moves further to the final position.

Error. „Limit switch actuated“

If a faulty function causes the traverse to move on and to actuate the limit switch, the drive is immediately switched off

Drive the Traverse up in manual mode.

Info!
Do not change Position of limit switch and U-shaped light barrier.

3.7 Tower light (Option)

Green light : Everything is OK
Green light blinking : Container filling is active (only with large container)
Yellow light : Plugging is active
Red light : There is an error

Tower light is only for Errors on VCP module.
Errors of ES are not displayed. (only on PC-Monitor)

Pneumatics

There is both an oil-free and oiled pressure circuit.
Oil-free compressed air is only used for the cylinders within the vacuum chamber while the compressed air outside the vacuum chamber is oiled.
The compressed air supply is initiated in the control cabinet via an air-servicing unit. The air-servicing unit consists of pressure regulator, oiler and water separator.

Air servicing unit
The air-servicing unit is located easily accessible next to the operating field behind the cladding of the centering unit. A pressure of appr. 6 bar has been set on the pressure regulator.

The compliance with the individually indicated limit values for pressures and temperatures, and the observation of instructions is a prerequisite for the proper function and must be guaranteed by the user.

Ensure that operation takes place with properly prepared compressed air without aggressive media. Furthermore, the individual environmental conditions at the installation site must be taken into consideration.

When used in a safety area, the respective regulations of the Employers Liability Insurance and the Technical Control Association or the appropriate national ordinances must be observed.

Water separator

The following points must be observed for the perfect function of the unit!

- *Drain condensate on time*
  The condensate is drained under pressure by opening the drain plug on the filter shell.

- The filter cartridge must be cleaned or changed when it is heavily clogged (to avoid drop in power)

Cleaning the filter cartridge:
After removing the filter shell, turn the support spring to the left and remove the sintered filter. The filter cartridge may be washed using Tri, Petroleum or Gasoline (must not come in contact with the filter shell). Subsequently, blow dry from inside to outside.

Cleaning the filter shell:
Switch off air pressure, turn shell 45° (bayonet catch) and remove by pulling down. Only use water for cleaning.

Pressure control valve

Set the operating pressure from the top on the pressure setting knob.

In arrow direction + pressure increase
In arrow direction - pressure reduction

The pressure setting knob is locked by tightening the locking screw.

Compressed air oiler

When the oil is at the minimum level, it must be topped up with oil. This is possible during operation!
Actuate the vent valve to vent the oil shell.
During the venting process, turn the shell 45° (bayonet catch) and remove by pulling down. Clean oil shell and refill with oil. Only use water for cleaning.
Press the vent valve when reassembling the shell.
Setting the number of drips:
Control the number of drips on the setscrew above the oiler.
In praxis, 1 to 12 drips to 1000 l air, is sufficient.

Suitable oil types	**Viscosity**
Festo Spezialöl Avia Avilub RSL 10 BP Energol HLP 10 Esso Spinesso 10 Shell Telus oil C10 Mobil DTE 21 Blaser Blasol 154	9 to 11 mm>>/s at 40°C

Trouble shooting

- *No pressure display*

Main valve closed	Open main valve
Pressure not set	Set pressure by means of pressure setscrew
Defective pressure gauge	Replace pressure gauge

- *Low flow-through (the operating pressure breaks down with air* consumption)

Filter cartridge is clogged,	Clean filter cartridge
Narrowing between main valve and air servicing unit	Check line

- *Pressure exceeds the preset operating pressure*

Valve cone defective at seal seating	Replace valve cone

- *Audible blow off at the setting knob*

O-ring defective in hole at the top section of the valve cone	Remove valve cone and replace O-ring
Defective piston seal	Replace seal

- *Audible blow off on the drain plug*

Leaking drain plug	Tighten or replace

- *No oil flow*

Oil set screw closed	Open oil set screw
Oil level too low	Top up with oil

General maintenance instructions
Mechanics, Electrics

Mechanics

Mechanical work must be made by skilled and qualified staff only.
The instructions given in these guidelines and in the annex are to be observed.
To avoid troubles and machine breakdowns, regular checks and preventative maintenance must to be carried out.
When working on or in the area of movable parts (cylinder, belt drive) the machine is to be cut off.
Turn the main switch on the control box to „0“ and lock it by padlock against unauthorized reswitching on.

To be checked in particular:

- Fastening screws, drive motors
- Belt tensions
- Function of the sensors
- Filter compressed air supply to be checked for condensate, replace filter if required

Defective components must be immediately replaced. Only original parts are to be used !

Protective equipment removed for repair purposes must be remounted prior to turning machine back on.

Electrics

Electrical work must be made by skilled and qualified staff only.
Since special electric elements require the manufacturer to prepare special instructions, they cannot be listed here in detail.

The instructions of the foreign manufacturers form part of this technical documentation.

In the event of trouble or maintenance work, please use these instructions for fault correction.

Do not dismount or manipulate the safety equipment.
In the event the safety equipment requires to be dismounted for set-up, repair or maintenance work, it must be remounted prior to production start.

Cleaning of the machine

Once finished the work, paste and dirt should be removed for preventing from baking.

Spare part orders

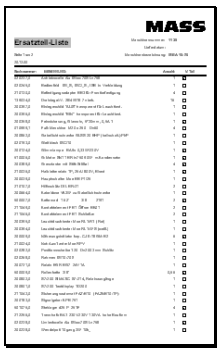
The following data must be included on spare part orders:

1. Machine type and Serial-Number (see typeplate)
2. Required spare part with **name, item number and quantity**

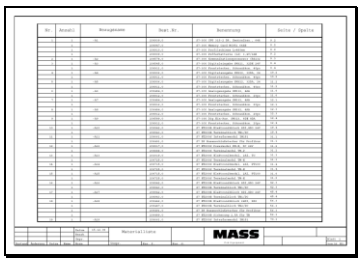
The relevant data to be learnt from the technical documentation

Spare part identification

Spare part list



Material list



Example of illustration

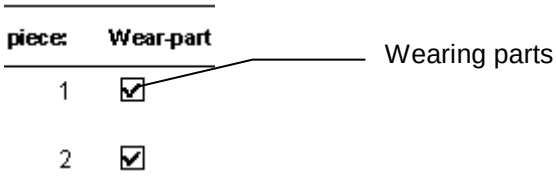
1. Spare part identification

   Digital photos: Important parts to be seen here with order number

2. Spare part list (all parts)

   All parts with order number to be seen here.

   Wearing parts which we cannot guarantee for are accordingly marked in the list.



3. Material list (only electric components)

   The material list to be found in the chapter: “wiring diagram“

   All electric components can be seen there.

   The wiring diagram is divided in:

   1. Wiring diagram
   2. Terminal diagram
   3. Material list*

*The identification listed under reference (e.g. -S47) corresponds to the resource identification (sticker beside the component).

MASS

Preventative Maintenance List

Maintenance Issues	Frequency			
	Daily	Weekly	Monthly	6 Month
Electric				
Check all lamps		X		
Check emergency stop	X			
Check safety switches for function			X	
Check grounding				X
Tighten screws - terminal strip (The first time after 20 service hours)				X
Check tower light for function (if build in)		X		
Check safety equipment (light curtains) for function	X			
Check all sensors for function		X		
Visual inspection	X			
Motors/Drive unit				
Grease thread spindle ES Use vacuum-suitable special grease Part- No. 490024,0		X(1)		
Check Timing belts tension and gear wheels		X		
Check motors and gears (visual inspection)			X	
Vacuum pump www.becker-international.com				
Check Vacuum pump (visual inspection)	X			
Check oil level daily (inspection glass) while the pump is switched off	X			
Oil change (The first time after 100 service hours) next time 500-2000 hours At least twice a year More details see manual from "*Becker*"				X(1)
Pneumatics				
Check air cylinders, valves and tubes for function	X			
Check oil level (service unit)	X			
Drain condensate		X		
Change the filter cartridge in service unit				X(1)
Replace tubes for paste (tubes are affected by the paste)				X
Check air pressure 88 psi (6 bar)	X			
Generally				
Visual inspection	X			
Tighten all screws (The first time after 20 service hours)				X
Machine and guides to be cleaned from excess and paste.		X		
Clean acrylic panes (front and rear door) only with a mixture of soap and water			X	
Check brake of G-Motor ES Check adjustable braking torque, ventilation gap see manual of Ruhrgetriebe RGM				X
The acrylic panes (door) should daily be checked for crackings.	X			
Defective parts immediately to be replaced!!				

Maintenance Issues	Frequency			
	Daily	Weekly	Monthly	6 Month
General visual inspection	X			
Check function of ES light curtain	X			
Oil change interval on bevel helical gearbox from Vogel, www.vogel-online.de First time after approx 200 operating hours Further oil changes are necessary after every 3000 operating hours. See manual on MASS CD-Rom folder Accessories				
Check oil level		X		
Spindle in vacuum Chamber				
Use an injection with 3-5 ccm vacuum-suitable special grease and grease the mother inside Part- No. 490024,0		X(1)		
				
Re-insert plug				
with Large ContainerSystem (optional)				
Gearbox on LCS from Alltec Grease the spindle in regular intervals! **see manual from Alltec gear** every 5 years or after 1000 operating hours / disassemble the gear, clean from old grease and re-fill with new grease		X(1) **5 years**		
Touch panel from Janz Clean touch panel surface in regular intervals Do not use aggressive solvents or scouring powder. The touch panel is equipped with a protective foil. The self-adhesive protective foil prevents the screen from being scratched and soiled. Replace protective foil if damaged. More details of Touch panel see Janz on MASS CD-Rom in folder		X		
Sensor and quick connector (coupling): clean every 1-2 weeks Clean sensor and quick connector coupling **completely** from paste every 1-2 weeks. The paste will be hardening and the parts can damage.		X		

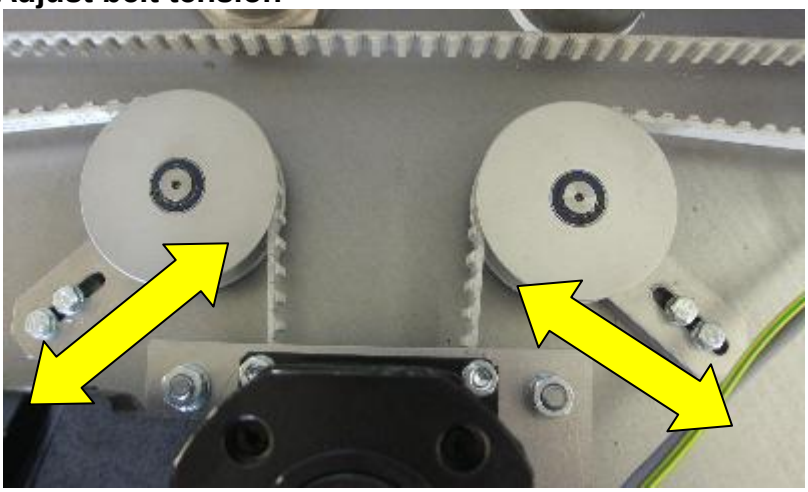
CAUTION !
Make sure that no water gets into the operating-area while cleaning. Risk of destroying electronics !
- Check the mechanical parts for wear and replace, if required.

(1)

Subject to operating conditions and degree of dirt, replacement possibly to be done more often than indicated in the maintenance intervals.

Maintenance work

Adjust belt tension



Loosen the screw.
Set tension of the toothed belt and retighten screw.

Warning !
There is the risk of squashing hands and arms. Take a great deal of care when working in the machine.

LCS: quick connector

Clean coupling **completely** from paste every 1-2 weeks. The paste will be hardening and the coupling cannot be removed anymore.

Clean sensor every 1-2 Weeks

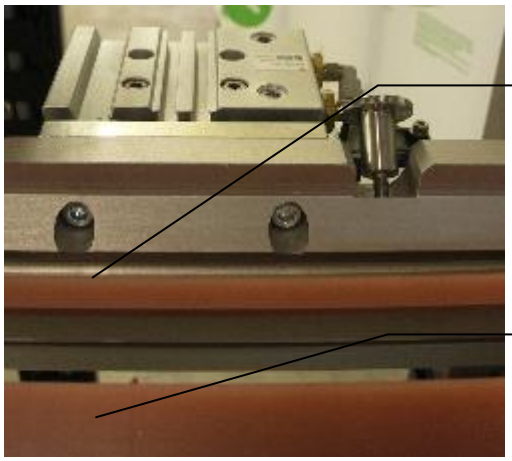
ES External Squeegee

Function:

The external squeegee ES External Squeegee is designed for cleaning the printed circuit boards from excess paste after finishing the plugging process.
The external squeegee is made up of a rack and a squeegee pair fitted with linear guides and designed for cleaning the suspended printed circuit boards. The squeegee rubbers have a hardness of 90 Shore and are contact-pressed by pneumatic cylinders. The contact pressure of the front squeegee rubber is adjusted by a pressure regulator (adjust in Software). The angle of the squeegee rubbers is adjustable by threaded rods on the pneumatic cylinders.

Operation sequence:

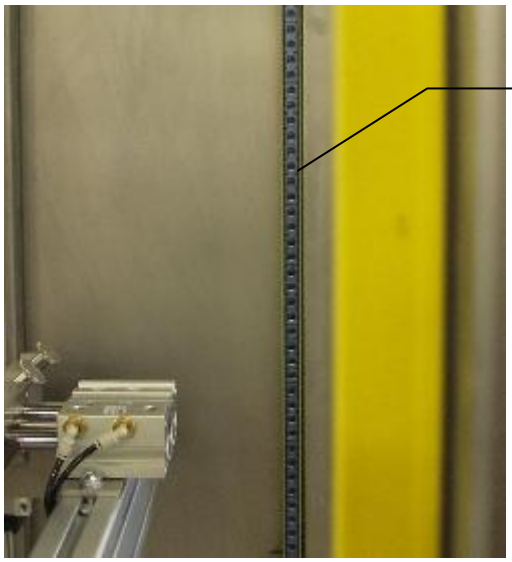
- PCB to be hanged up and clamped via foot switch
- Press the green start button.
- The squeegee pair is lift up with max speed
- Before end position is reached, speed switches to slow speed
- The squeegee pair is contact-pressed with the adjusted pressure.
- 2 sec. delay time runs off.
- Then, the traverse drives down.
- Remove the printed circuit board after releasing the clamping system via foot switch.



Info!
Both wiper must be reground in regular intervals, for instance on a MASS Plane Raze Device SV 100.

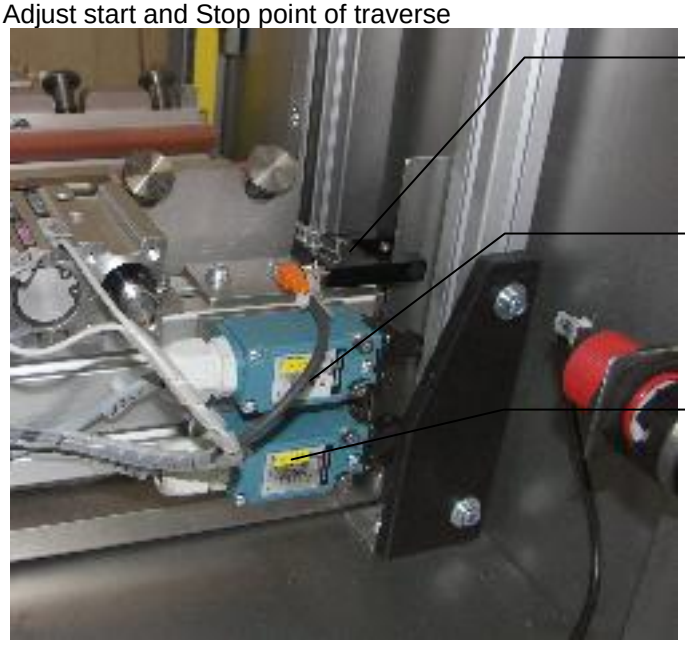
Safety Light Curtain on ES module

Safety light curtain consists of an emitter and a receiver. More details see Operating manual from Keyence.



If somebody puts his hands into the light curtain, the traverse stops. Press the green START-key again and the traverse moves further to the final position.

Adjust start and Stop point of traverse



Light fork sensor:
Drive with slow speed at top position

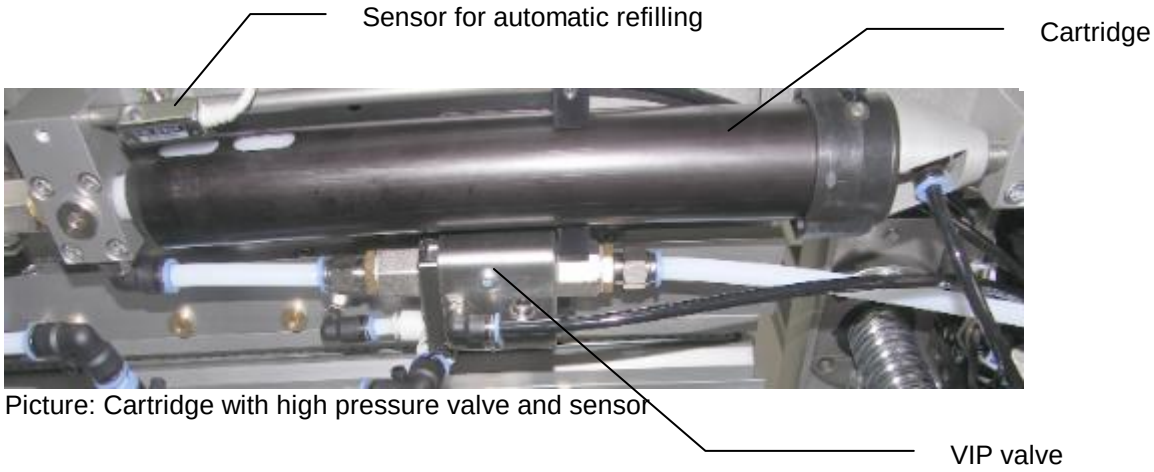
Limit switch Stop point at Top position

Limit switch: Stop point at Bottom position

Adjust Position of Stop point at top position

Large container System LCS (o*ptional*)

The large container system LCS is an option for the VCP Plugging Equipment.
Advantage of this system is that cartridges are refilled automatically.
The container of the LCS System is containing 8 times more than the cartridge, approx. 2.5 kg.
The LCS System with the paste is set-up outside of the VCP.
A VIP valve for dispending the paste is located under the traverse within the vacuum chamber of plugging machine VCP.



Picture: Cartridge with high pressure valve and sensor

Process description of the large container:

The piston is pressed into the paste container with a frequency controlled gear motor. At the bottom of the container, the paste is pressed through a tube into the cartridge. The 12 oz (330 ml) cartridge is filled continually by the signal of the sensor, when the actual filling process is completed.

Picture: large container system LCS

With Large Container System the cartridges are **refilled automatically.**
The filling time depends on the paste viscosity, typ. 15 to 45 seconds.

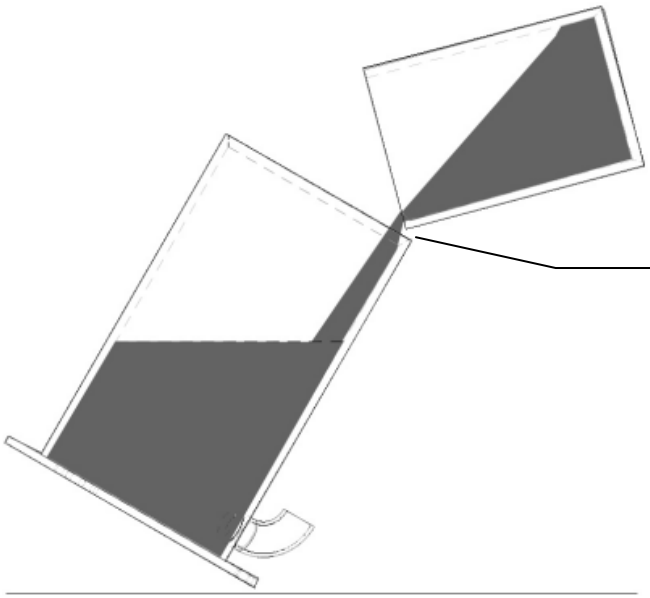
When cartridge is filled, the paste is pressed into the fill heads of the Plugging machine VCP.

Process description for filling the cartridges

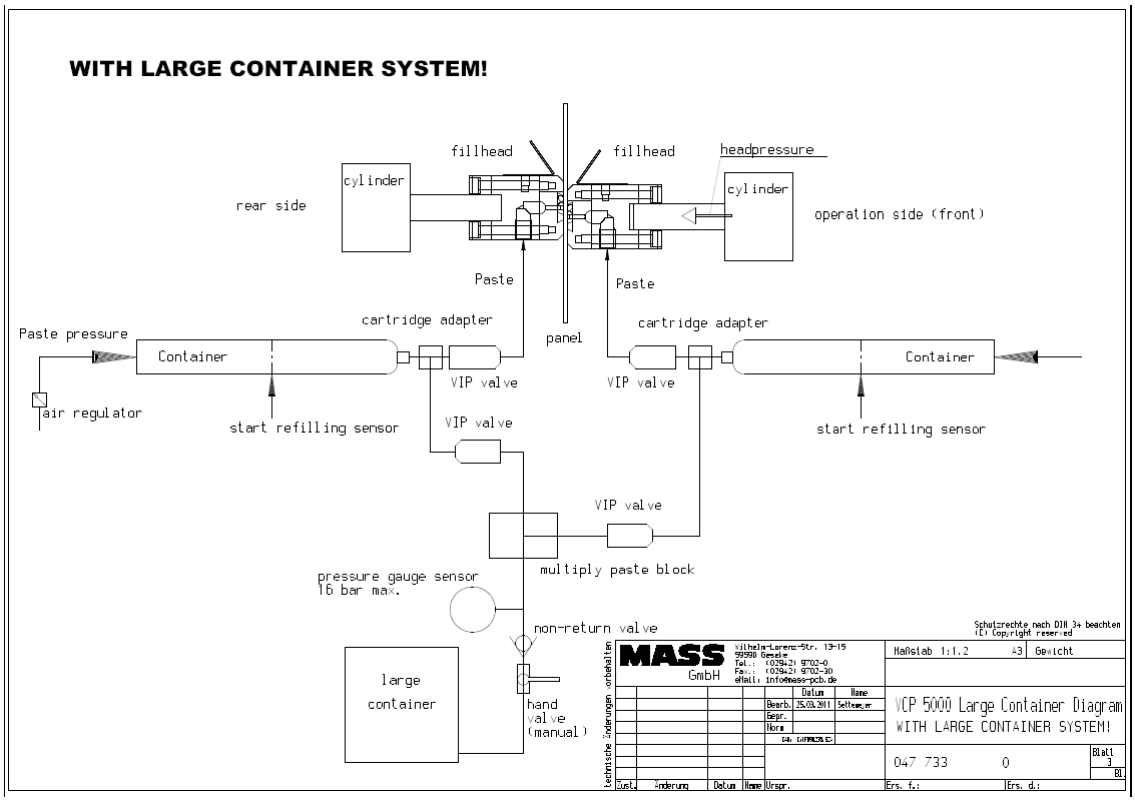
LCS system

The cartridges in the machine are automatically filled using the large container system LCS. The paste is pressed from the cartridge into the fill heads of the machine.
When the cartridge is almost empty (Refilling-sensor) a signal is sent to the PC, to start the refilling process when the active pluggingprocess has finished.

Picture: paste container



Picture: Fill large container



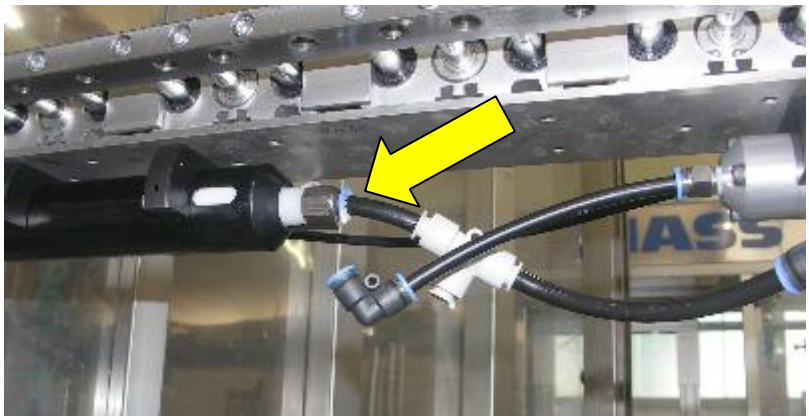
Picture: paste diagram

Start up LCS system

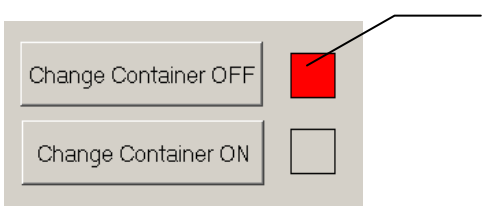
- Fill container with paste. (fill the paste paste slowly over the edge of the container to avoid air inclusions)
- Close door of LCS.
- Start Visiwin Software and go to <F3 maintenance> mode.
- Press the button *change container ON* **to work with buttons up/down** on LCS.
- Move down piston with valve on LCS opened.
- STOP as soon as paste comes out from the valve and close the valve.
- Now go on moving down; the paste is pressed through the hose towards the high-pressure valve.

First filling with paste

Hose on the marked point (see arrow) to loosen.
To fill until paste escapes out of the hose.
Hose to remount.
Now to continue filling until cartridge is full.
The remaining air to get escaped by removing the vent plug in piston (via tool supplied) and screw to retighten.



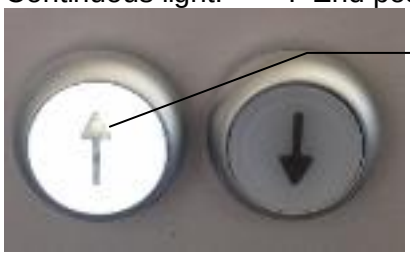
Software settings



Change large container system is **OFF** now
ON: work with buttons on large container system

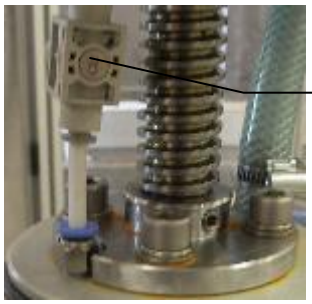
Buttons on LCS system

Blinking : During movement of piston
Continuous light: : End position of piston is reached



Button UP
Press 1x to drive up
Press again to release button

More details see operating manual PC-Software [Visiwin]



Valve to vent
Paste container

Info!
If paste container is empty, open the valve first to move up.

Switch for LCS system

in control cabinet

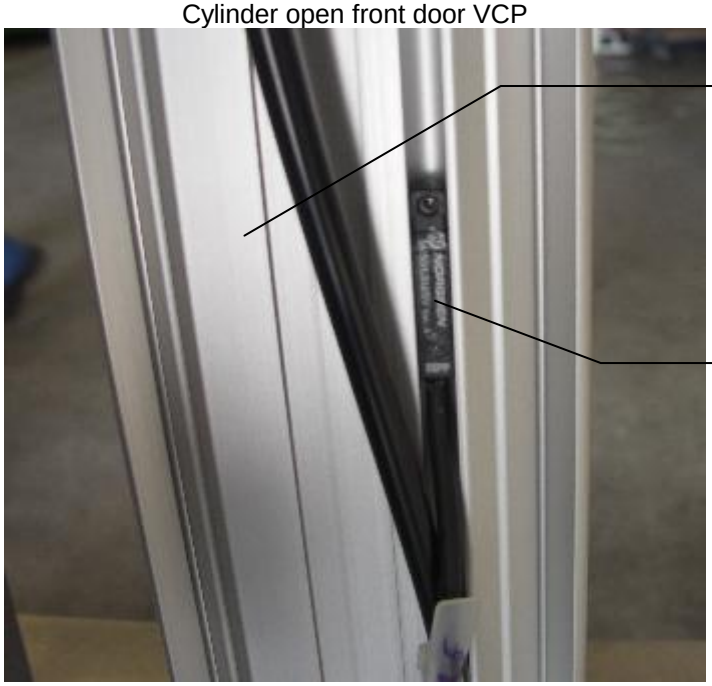
1 – The detection of LCS is activ
0 – The detection of LCS is not activ

If no LCS system is connected, the switch is not relevant.

Spare-part Identification
VCP 5000

Vacuum-Pump
U 4.100 SA/K;
No.: 420106,0

Cylinder open front door VCP



Pressure cylinder
ksl d50x800
M/46050/M/800
No. 410418,0

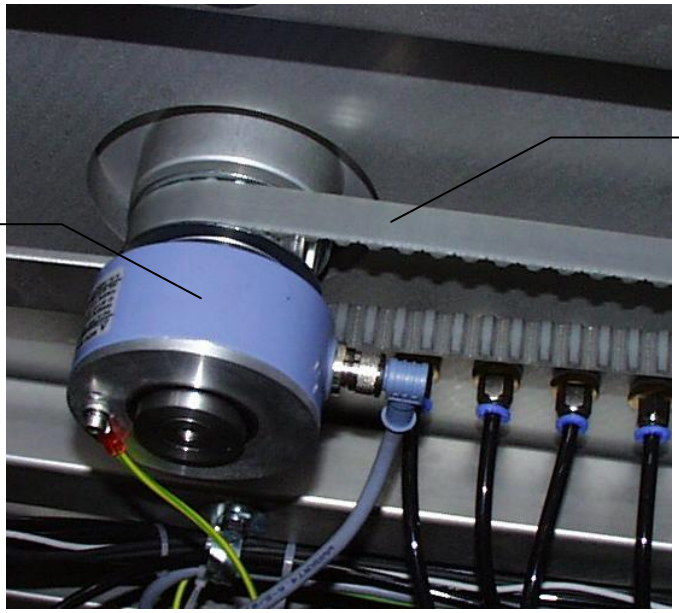
Reedcontact
M/50/LSU/5V
No. : 410141,0

Spare-part Identification
VCP 5000

Motor for Traverse

Servomotor
MCS
No.: 510205,0

Servo gear
SK050
No.: 510210,0



Timing Belt
16T10/ 1780
flex
No.: 502106,0

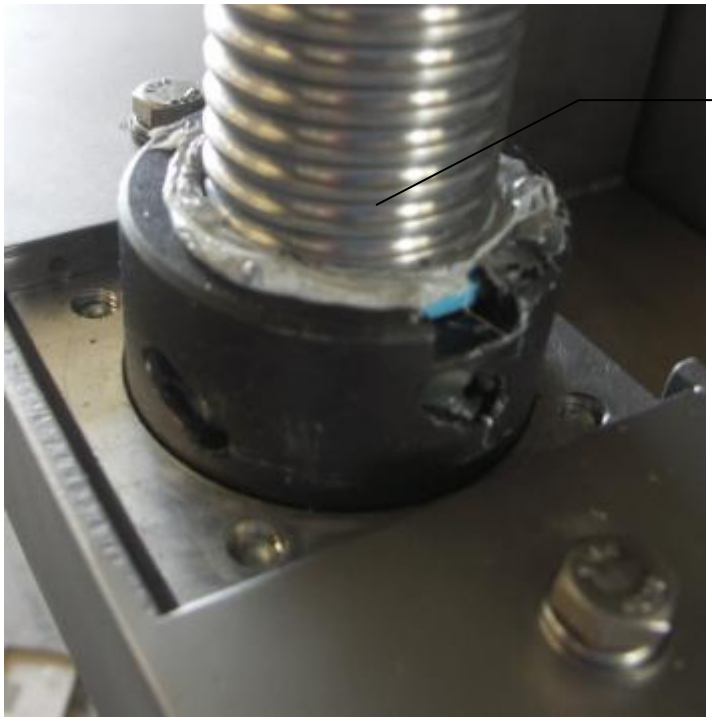
Encoder
WDG 80H
No.:200804,0

Spare-part Identification
VCP 5000

Lock front door

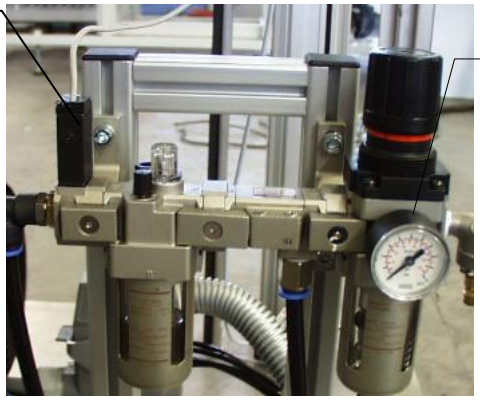
Pressure cylinder
kompact CDUK
25-10D
No.: 410427,0

Reed contact
D-A 93L
No.: 410139,0



Threaded spindle
32x10
1x No: 047313,2
1x No: 047317,2

Pressure
switch
IS1000E-3F03
No.: 410166,0



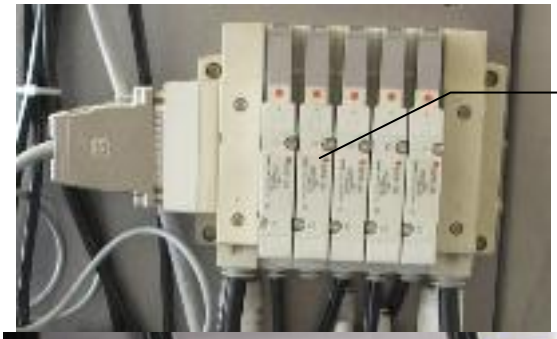
Service unit
EAC/3010 3/8"
No.: 410159,0

Spare-part Identification

VCP 5000

seal for door

SEAL d=10mm
No.: 500443,0

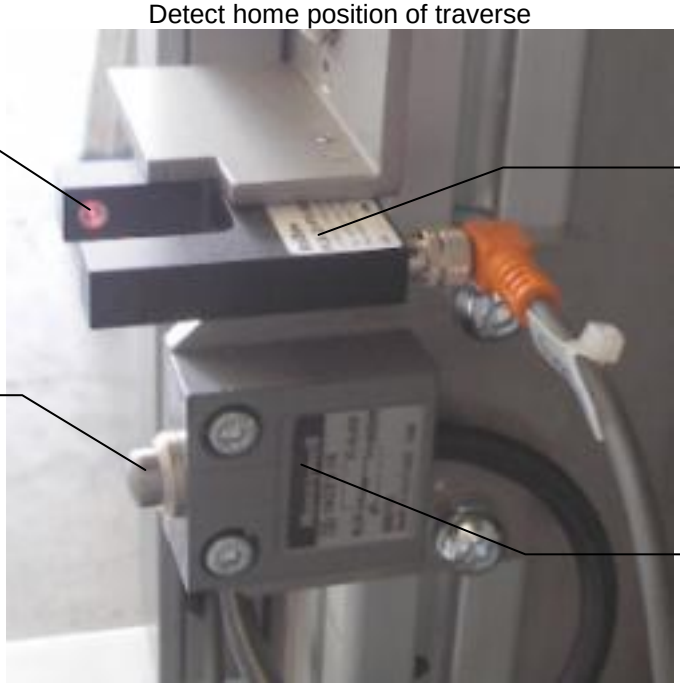


Mounting valve
Details see
pneumatic diagram

Pressure
regulator ED 02
No.: 420202,0

Spare-part Identification
VCP 5000

Detect home position of traverse



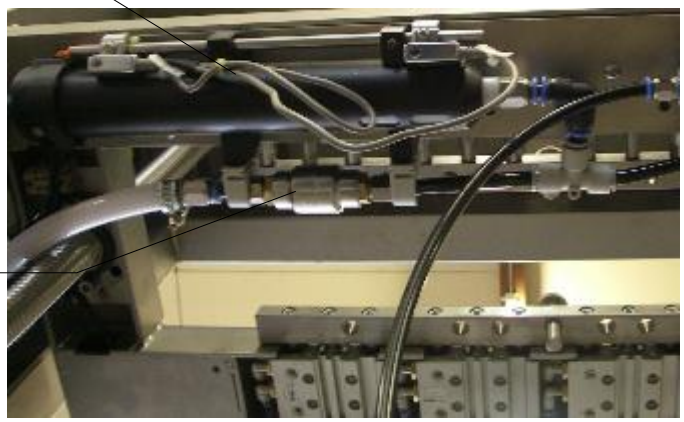
bottom position of traverse

U-shaped light barrier
No.: 200816,2

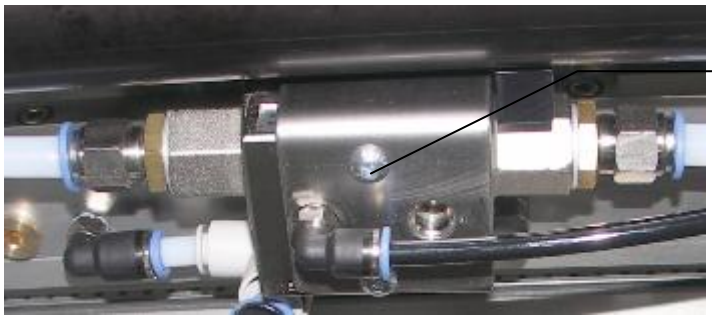
Safety switch

Limit switch with pin
No.: 200274,0

Cartridge
Dosing equipment for paste compl.
No.: 420070,2



Non return calve
No.: 190086,0
(Option)

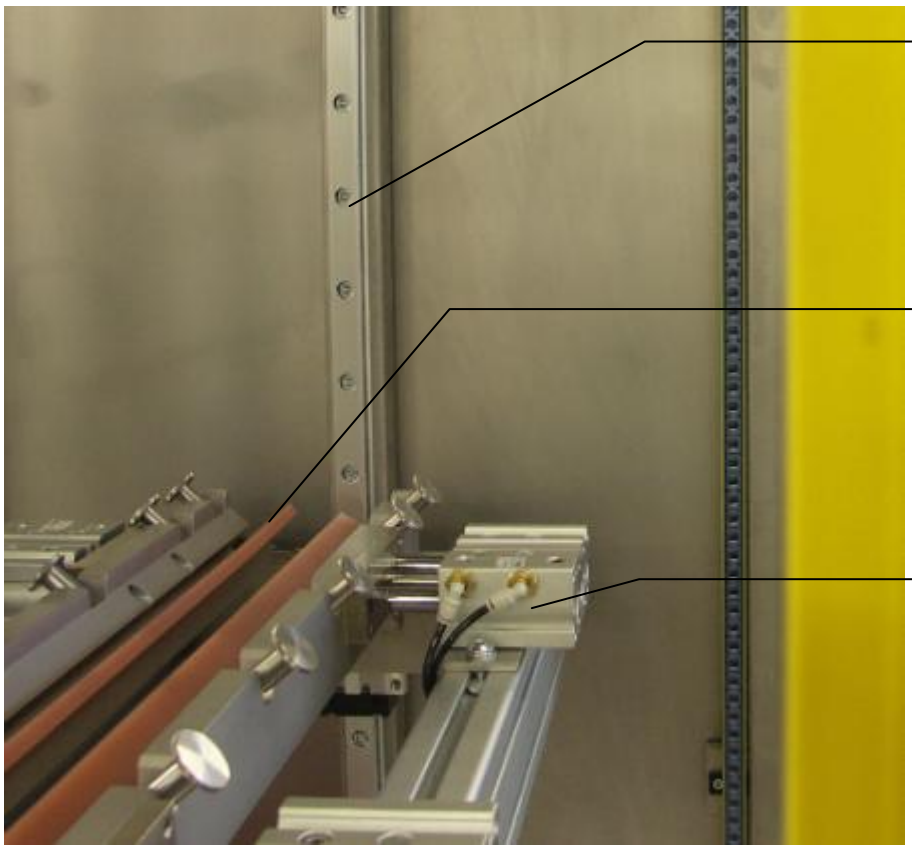


VIP valve

MASS

Spare-part Identification
VCP 5000

ES Module



Guide Gr.25,
N L=956mm
No.:500546,0

Wiper stripe PU
650x40x8
90 Shore
No.: 170080,0

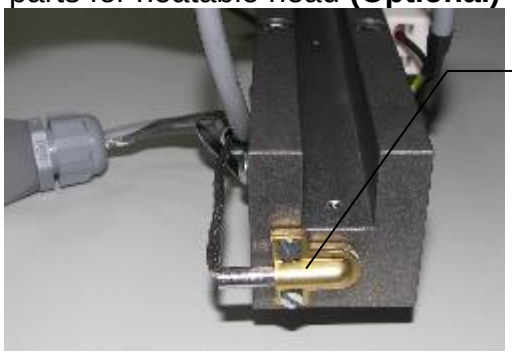
Pressure cylinder
compact MGPL
D25-H30
No.:410371,0

Motor for Traverse ES (with brake implemented))

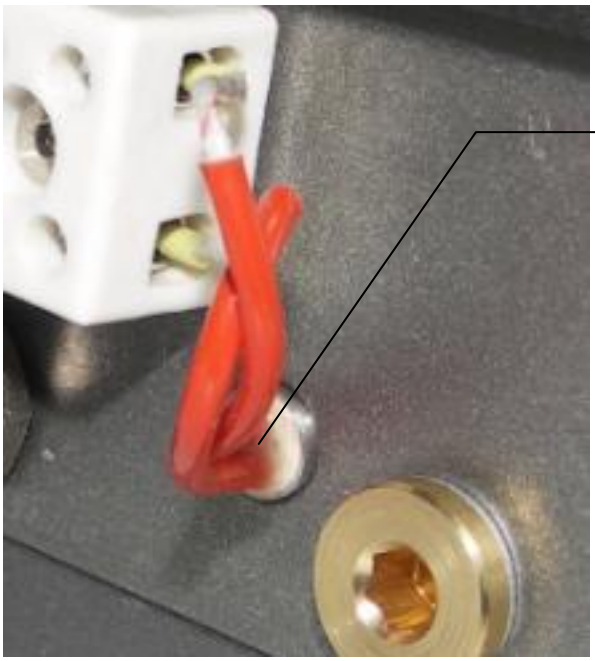
Gear Motor SN 3
BFH i=3,5 180W
No.: 510273,0

Spare-part Identification
VCP 5000

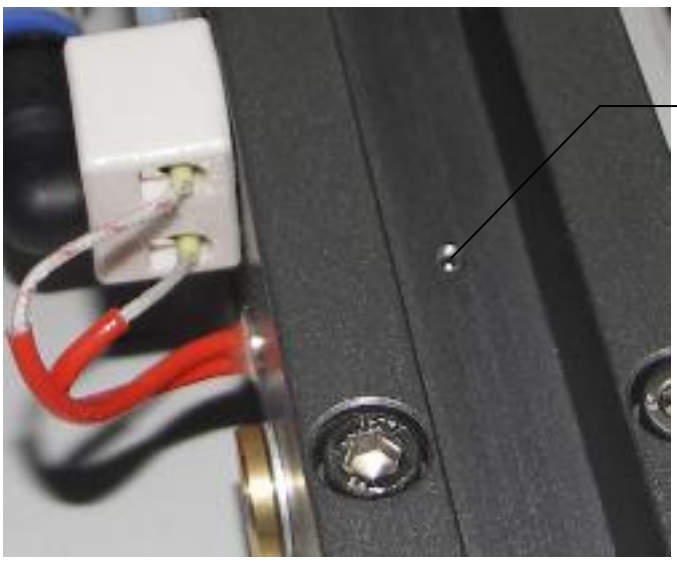
parts for heatable head **(Optional)**



Temp. probe
PT 100
No.: 250169,0



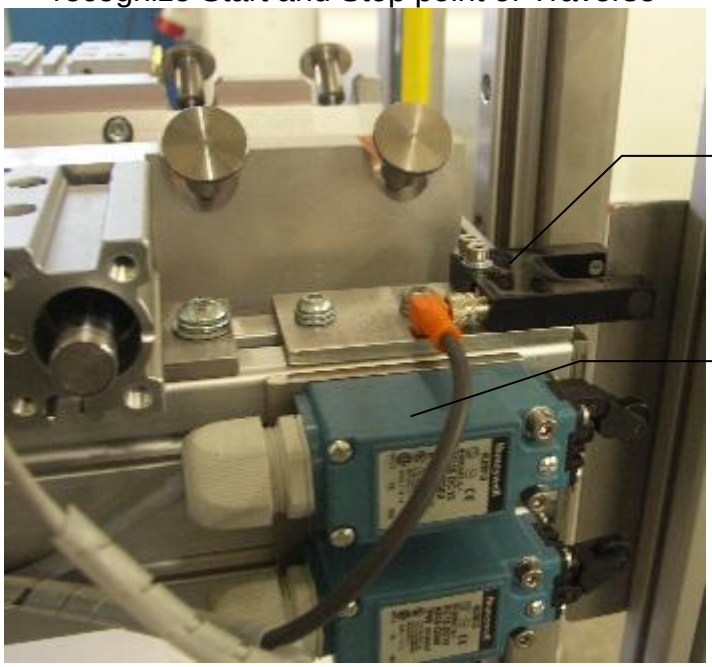
heating element,
48 V, 25W
No.: 250180,0



Screw to loose
heating element

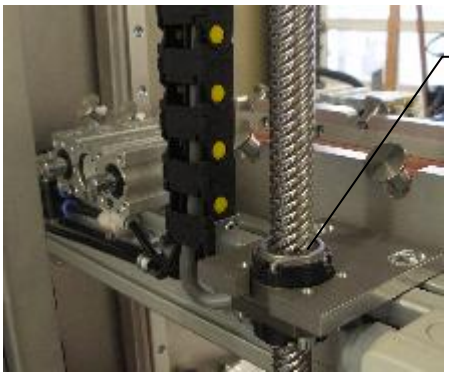
Spare-part Identification
VCP 5000

ES-Module
recognize Start and Stop point of Traverse



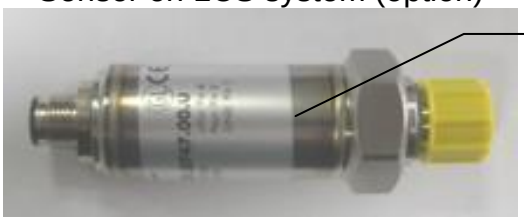
U-shaped light barrier
No.: 200816,2

Limit switch with roller pin short
No.: 200369,0



ball screw spindle
20x20x1225
No: 047616,0

LCS-Module
Sensor on LCS system (option)



Sensor: Pressure transmitter