

EASY MIX

BI-COMPONENTS MIXING MACHINE

MST1000



Dear Customer,

Thank you for choosing our products and we hope that this equipment will bring you satisfaction.

All our products were designed, taking in consideration not only our experience but also innovations in mechanical science, therefore constructed with the most advanced materials and techniques, then carefully tested considering your work necessity.

While we are glad to offer you our Technical Assistance, we would like to thank you in advance for choosing our products.

With Esteem

**ANEST IWATA EUROPE
TORINO - ITALY**

Company The Anest Iwata European Group of companies recognise their primary company mission to provide to all European users and dealers of Paint Spray Equipment and products, the STATE OF THE ART spray technology and constant innovation in order to permit them to achieve better finishing at a reasonable cost .

Our products range should offer to users the perfect balance between the use of energy and the effect of the use of energy in order to help them to preserve and to ameliorate the world around us.

All the members of Anest Iwata European Group will use their knowledge and their capabilities to offer our customers an excellent service and high quality products in order to satisfy them through high quality, reliability, a good reputation and constant innovation.

Our activities, like many other industries, are now based on many European Directives (Safety and Environmental) and International Directives (ISO - Quality and Environmental).

The reference for **SAFETY** Regulations, to which our product range complies, is the Regulation CE CE 89/382 and following; all our products in question are CE marked and have a Technical File consultable on request and are dispatched with an Instruction manual in the users own language. Moreover there exists some specific Safety Regulation that are the EN 1953, relative to the Paint Spray Guns, and the **pr EN 12626** relative to the Pressure Pump Systems.

These Regulations are consultable or can be bought through UNI.

As for the **QUALITY Directive (ISO 9000)**, ANEST IWATA EUROPE has obtained the ISO 9002 Certification. Our company philosophy foresees to put at the disposal of our distributors and users, all the information they may need, for the product utilization, for the environmental protection and operators safeguarding.

CONTENTS	3
1. THE MISSION OF THE MST1000.	4
2. INSTRUCTIONS FOR THE INSTALLATION OF THE MST1000	5
3. SERVICE OF THE MST1000	7
4. MAINTENANCE	7
5. DESCRIPTION OF EQUIPMENT	8
6. VARIATION IN ARMAMENT, OPTIONS	14
7. OPERATING GUIDE	15
8. THE OPERATOR TERMINAL E300	16
9. ALARMS AND MEASURES	24
10. REVISION HISTORY	25

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1. THE MISSION OF THE MST1000.

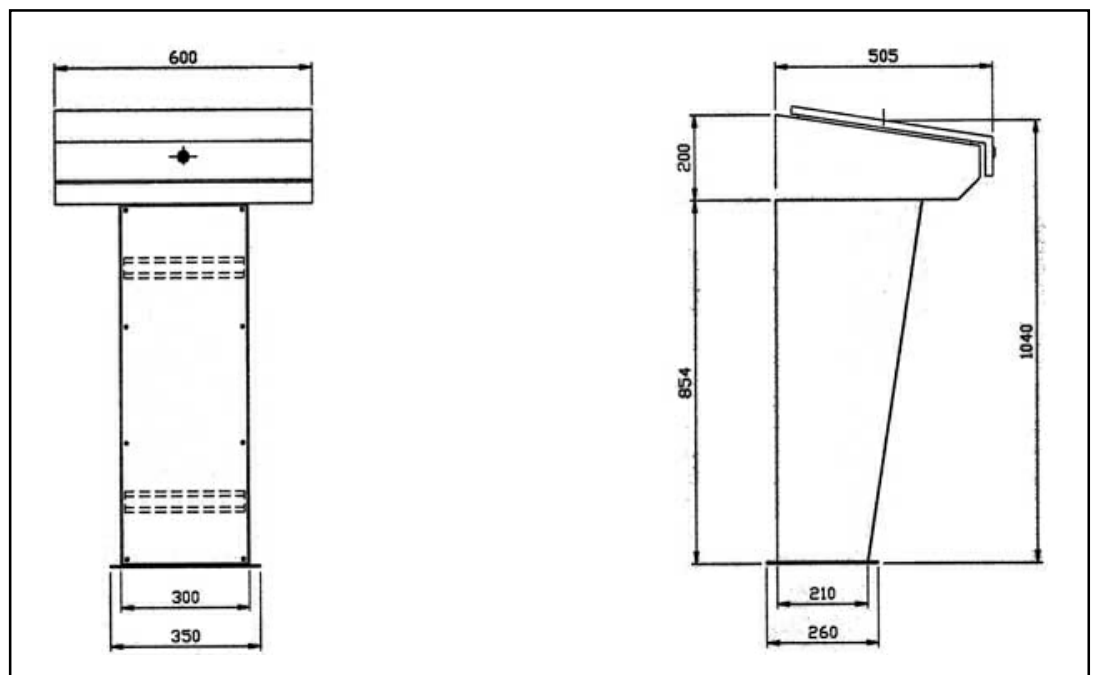
The mission of the MST1000 is to mix and feed two component paints and lacquers with high accuracy and reliability. The system has security functions to avoid the hardening of paint in the system and to avoid hose explosions if the system is clogged up.

It is a low-pressure system for excellent control and low paint consumption.

- Mixing ratio from 1:1 to 30:1.
- Mixing ratio deviation below +/- 1%.
- The MST1000 is easy to operate depending on the layout of the operator terminal.
- Servomotor technology for safe and reliable functionality.
- All parts, which come in contact with the components, are in stainless steel.
- The system contains functions such as Pot Life control, easy calibration and pressure alarms for components and for air.

Customised gearpumps in different sizes can be offered as an option for different materials and viscosity.

The system is prepared for handgun and automatic spraying.



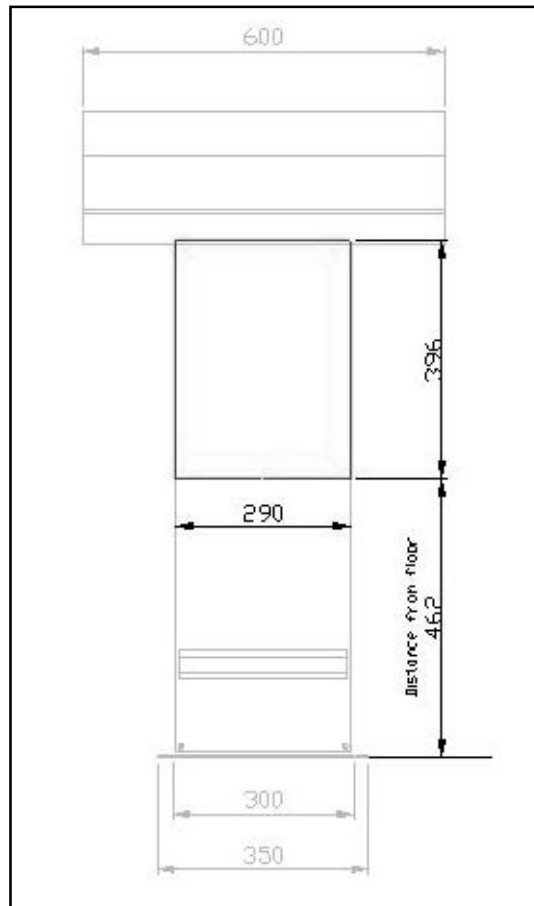
2.1 Desk and spraybooth

Make a hole in the spraybooth wall according to the dimensions shown in the picture "Dimensions for hole in spraybooth-wall". Control that the wall does not contain any beams or cables before making the hole.

The skirting board has to be notched to the desk.

Fasten the desk to the floor with bolts to avoid movements.

Seal the gap between the wall and the pump table.



2.2 Air

A connection for an 8mm airhose is located on the left hand side of the desk. The required air supply is 200 NI, 6 bar or more.

2.3 Paint and solvent

On the pumptable there are connections for:

Component A: 3/8" to the right

Component B: 1/4" to the left

Solvent for pot-life flush 1/4" over the component connections.

Connected components and solvents must be over-pressurised with 0.5 –1 bar.

Solvents for pot-life flush must be connected with 2C paint. Make sure that a relevant Pot-Life time is chosen.

The solvent for the component-cleaning before mixing has to be connected to the corresponding component connection before cleaning.

To obtain correct results, a calibration with the actual components has to be made before spraying.

2.4 Electricity

Electric supply is 230VAC 10 A. The system must be connected to Earth. An EC-standard 1-phase connection glove is required for the electrical connection.



3.1 Cleaning

Flushing the system

Enter the settings for the flushparameters in the operator terminal. Connect the solvent to the paint hoses and run the cleaning program.

Cleaning the outside of the desk

Remove all paint from the desk immediately. Do not use solvent on the operator panel.

Cleaning the inside of the desk

Always turn the power off before doing any work inside the desk. Do not damp wipe any electrical components. Ensure that the desk is normally closed to avoid dust. Remove any dust found inside the desk. Make sure that pressure-transmitters are tightened to avoid any form of leaks in the desk.

Cleaning the pumptable

All parts in contact with paint are resistant to most solvents and can be cleaned with these. Just be careful with gaskets and with the plastic parts of the solenoid valve-block.

4. MAINTENANCE

4.1 Every day

Inspect the system and remove all visible rests of paint and block any paint leaks if detected. (See Cleaning)

Listen for leaking air and tighten if any leaks are detected. All air equipment is standard and can be replaced with equivalent parts.

Listen for unusual noises in general to find incidents before they cause any problems. (See description for the single parts)

4.2 Every 600 run hours

Read the instructions for the dismantling of Gearpumps. Then separate the gearpumps and dip the gearwheel and gearwheelhouse in a suitable solvent for the paint used for a while to solve coatings. Inspect the axis bearing and O-rings and change if needed. Pay attention when re-mounting the pump to ensure that all the pieces are in the right place and direction.

Give the incoming air regulator some exercise.

Inspect the pumps' clutches to ensure that they rotate smoothly.

Inspect all cables, tubes and hoses to find any damages.

Inspect paint-valves and change if they are obliterated by paint or damaged.

Open the mixingblock and check that the balls, springs and channels are in order. Be careful with the topgasket for the mixingblock. A new gasket can be made from a common tubetape.

Dismantle the static mixer and clean the parts with solvent.

Calibrate the system (see operator guide). Calibration can be needed more often (sometimes each day) depending on the need for tolerance in feeding and mixing ratios, the quality of paint used and on the environment in the spraybooth.

5. DESCRIPTION OF EQUIPMENT

5.1 Pumtable

Calibrate the system (see operator guide). Calibration can be needed more often (sometimes each day) depending on the need for tolerance in feeding and mixing ratios, the quality of paint used and on the environment in the spraybooth.

Paint and solvent inlets

On the pumtable there are connections for

Component A: 3/8" to the right

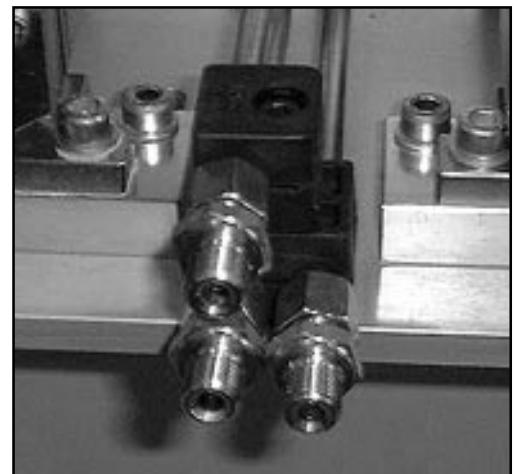
Component B: 1/4" to the left

Solvent for pot-life flush 1/4" on the top of the component connections.

Connected components and solvent must be over-pressurised with 0.5 –1 bar. Use pressurised paintvessels or membrane pumps for example to produce this pressure.

The solvent for the pot-life flush must be connected with 2C paint. Make sure that a relevant Pot-Life time is chosen. This is a security function to avoid the paint to anneal inside the system.

Solvents for the components' cleaning before mixing have to be connected to the corresponding component inlets before cleaning. It can occasionally be a good idea to flush with the component used.



5.2 Gearpumps

The gearpumps are precision instruments, designed to give an accurate and controlled material feeding.

The pumps are mounted on an adapter. This makes it possible to change pumps if there is a demand for a special pump size or performance. For example pumps with oilsealing for low viscosity paints, pumps in special material for components with low pH and pumps in sizes between 0.1 – 6.0 cc/rev can be ordered as an option.

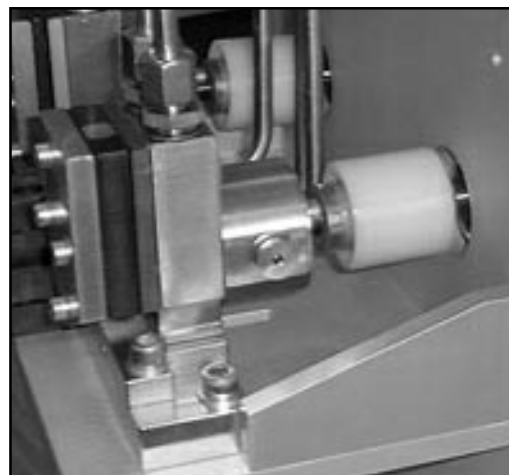
It is also possible to get pumps with the inside covered with ADLC (Amorph Diamond Like Carbon).

To ensure that pumps and motors are aligned they are mounted on the same board.

Arrows on the pump show the direction in which the pump is allowed to turn.

All gearpump parts have to be mounted in the correct position. Be careful when the pump is dismantled so the pieces can be placed correctly again.

See gear pump part-list for more details.



5.3 Pressure transmitter

After the gearpump there is one pressure transmitter for each component. The transmitter is digital and gives signals to the system to stop if the pressure exceeds 7 bar. The transmitter set point can not be changed.

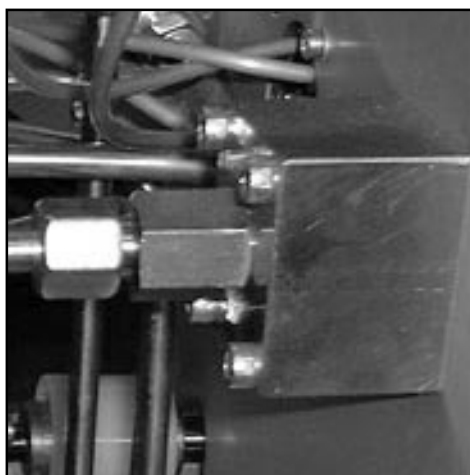
This is a security function to minimise the risk of hose-explosion e.g. if the spraygun does not open.

If the sensor is removed, attention must be paid when re-mounting it to ensure that the sealing is on place. Always check that no leaks are detected inside the cabinet!

The membrane on top of the sensor is easily damaged. Be careful and try not to touch it.

The transmitters need a 1k-ohm resistor between supply and signal to be functional. This is mounted inside the cable house.

The blocks for pressure sensors are individual for the left and the right side. They are also designed to fit the actual size of the tube-connector.



5.4 Mixerblock

The gearpumps are precision instruments, designed to give an accurate and controlled material feeding.

The pumps are mounted on an adapter. This makes it possible to change pumps if there is a demand for a special pump size or performance. For example pumps with oilsealing for low viscosity paints, pumps in special material for components with low pH and pumps in sizes between 0.1 – 6.0 cc/rev can be ordered as an option.

It is also possible to get pumps with the inside covered with ADLC (Amorph Diamond Like Carbon).

To ensure that pumps and motors are aligned they are mounted on the same board.

Arrows on the pump show the direction in which the pump is allowed to turn.

All gearpump parts have to be mounted in the correct position. Be careful when the pump is dismantled so the pieces can be placed correctly again.

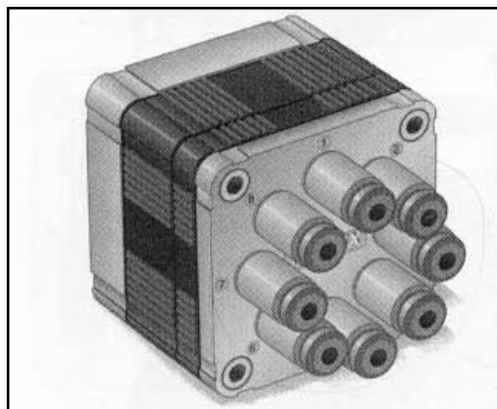
See gear pump part-list for more details.



5.5 Solenoid valve block

Compact, rapid, solenoid valve-blocks are used to operate the CCV-valves and to give opening signals to the spraygun-cylinder. The solenoid-valves are of flip type and are electrically connected with a standard 15 pin DIN-connection. The inlet for air is an 8mm air-hose. The solenoid valves need 5 bar to open (6 bar is recommended).

Output signals are given to 4mm air-hose connections.



5.6 Drive-system

The servomotor system makes it possible to have total control of the pumps down to the position of the single pumpwheel-tooth. Acceleration and deceleration parameters are set in the E-300 terminal in general settings. Servo-alarms are displayed on The E-300 terminal (and as a code on the amplifier) and most servo-settings can be set here.

5.7 Servomotors

An individually controlled 200-Watt Yaskawa AC-servomotor drives each gearpump. With twenty thousand pulses per revolution this motor is totally controlled to optimise acceleration and to keep a constant speed.

Overcurrent and heat control and other features are built into the servomotor-system.

This kind of servomotors cannot take any pressure. Damageable electronics are placed there so be careful.

A Planet gearbox with gearing 14:1 is mounted directly on the motor. Normally the servomotors and the gearboxes are free from maintenance.

There is one signal and one power cable for each motor. Both have to be correctly connected to run.



5.8 Servo amplifiers and filters

The servoamplifier controls the servomotor and receives information from the PLC regarding speed, direction and zero-position. It is important that the connected cables are in the right place otherwise alarms will be set off.

Information about the status of the servo-system is given on the amplifier display. In normal cases "run" is displayed, otherwise an alarm-code describes the problem.

The manufacturer's manual is attached in appendix X (PDF-file).

An EMC-filter protects the environment from electromagnetic disturbance. This filter is placed beside servo-amplifiers.



5.9 ST2

A ST2 module makes it possible to use rapid-connections to the servo-amplifiers. Some diodes on the module ensure that the current goes in the right direction. The ST2 module needs 24V supply to function. The green ST2 module is placed at the top of the desk. See electrical drawings for connections.

5.10 Clutches

Tooth-wheel clutches transfer the rotation from the motor unit to the pump. The clutches can take up small angle problems if the pumps and motors are not aligned. Make sure that the clutch can easily move 1-2 mm when re-mounting it.

5.11 The desk

Cabinet

The desk is specially designed to give an aesthetic enclosure of all the components. The desk has a straight rear side so it can be placed against the spraybooth wall. This design makes it possible to avoid a purging-system.

5.12 Operator terminal

The E-300 terminal is placed on the top of the desk.

Instructions for handling the E-300 terminal are given in "Operating guide".

A manual for the E-300 is attached in appendix (PDF-file).

The E-300 terminal is a graphical terminal with built in functions such as alarm handling, authority levels and communication possibilities.

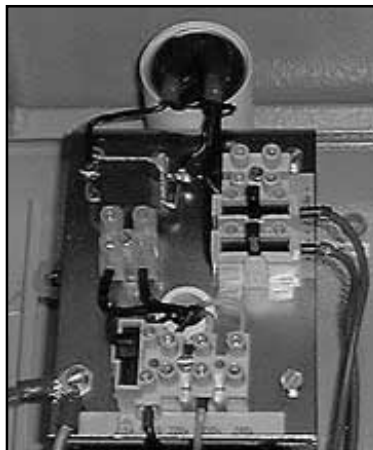


5.13 Stop-button

By pushing the red stop-button one cuts off the power to the servomotors and gives a stop signal to the PLC. This can be used as an emergency-stop and as a normal stopping device.

5.14 Transformer

Transformer for 230/24 V DC. The transformer is safe to touch.
On top of the transformer there is a black holder for a small fuse. If this fuse blows the 24V will disappear.



5.15 PLC

PLC, FX1N, contains 14 inputs and 10 outputs. Two of the outputs are specially made for delivering pulses (20k pulses/sec). LED-indicators show the status of the I/O. For technical specification see manual in appendix X (PDF-file).

5.16 Airunit

The air unit contains a regulator, a manometer and a pressure-transmitter for pressurised air. The system needs 6 bar air pressure. To set the regulator pull up the knob on the top, turn it to the right value, then push it back again to lock the setting.

If there is not enough air, the pressure sensor sets off an alarm.



5.17 Sound alarm

A small beeper is placed inside the front. It will produce a sound when the pot lifetime has expired and 10 seconds later the pot life flush will commence. The output for this beeper can be used for external sirens if a stronger warning is needed.

The standard MST1000 is constructed to be mounted outside a spraybooth wall. The standard MST1000 is not intrinsically safe. If the desk is going to be in an Ex –area it can be equipped with overpressure-systems, purging and safe electrical connections.

It is possible to have a handgun function as an option. The system will then start and stop on the trigger-signal from the handgun.

6.1 Calculations for gearpumps

In the table below one can see the different pump sizes and their capacity.

To calculate the correct pump size, the mixing ratio and the required amount of paint has to be known. For example:

Required amount of paint: 500 cc

Mixing ratio: 10:1

Capacity pump comp A $250/11 \cdot 10 = 455$ => minimum pump capacity 2,4 cc

Capacity pump comp B $250/11 \cdot 1 = 45$ => minimum pump capacity 0,3 cc

Usually the pump chosen is one size up from the required one. This gives freedom to increase the paint feed and to change the mixing ratio.

cc/rev	cc/min max
0,1	20
0,3	60
0,6	120
1,2	240
2,4	480
3	600
6	1200

The dimensions of the tubes on the pumptable and the paint hose leading to the spraygun are critical points in some applications. If the hose is too large, the control of spraying parameters is lost and if it is too small, enough of paint is not let out.

To guarantee a mixing ratio deviation below 1% the system has to be correctly dimensioned.

GENERAL



WARNING

IF IGNORING THIS INFORMATION, A PERSONAL INJURY OR AN EXTENSIVE DAMAGE TO YOUR PROPERTY MAY BE CAUSED.



CAUTION

IF IGNORING THIS INFORMATION, A MINOR PERSONAL INJURY OR A LESSER INJURY ON YOUR PROPERTY WILL OR MAY BE CAUSED.



NOTE

IF IGNORING THIS INFORMATION, AN UNINTENTIONAL INCIDENT MAY BE CAUSED.

7.1 Introduction



WARNING

PERSONNEL WITH ADEQUATE TRAINING AND EXPERIENCE IN HANDLING THE SPECIFIC APPLICATION MAY ONLY USE THE EQUIPMENT.

This manual is meant as a support to the operator terminal E300 for MST1000, EasyMIX-system.

The operator guide only includes functions concerning the operator terminals, and the manual can therefore not be used for training purposes to explain the entire function of the application.

8.1 General functions

There are some common functions, which are always executed, regardless of which menu your are located in:



- If an alarm is activated, this is indicated with a red flashing light emitting diode (LED) in the upper right hand corner of the terminal. The LED flashes as long as the list contains active or not acknowledged alarms. By pressing the **LIST** key (2) the alarm list, where the activated alarms are presented will appear. For further information see the chapter Alarm List.
- The **MAIN** key (6) always takes you to the start menu (i.e. the menu that appears when switching on the power).
- Regardless of where you are located, a press on the **PREV** key (3) will take you to the previous menu.
- The cursor is moved by using the cursor keys.
- Changeable digital objects (objects that can have two values only, for example YES/NO, TO/FROM) are manoeuvred by placing the cursor (by using the cursor keys) on the object you want to change and then pressing the \emptyset key (7), which also is defined as **ENTER**.
- Changeable analogue objects (objects that can have many values, for example a set point) are manoeuvred by moving the cursor to the object you want to change, entering a new value and finally pressing **ENTER**. To erase an entered character, press **BACKSPACE** (4).

- To minimise the number of keys, the numeric keys also have alphabetical functions. Depending on how many times the key is pressed, the result will differ. Example: The key "7" has ABCD written right below the figure. This means that by pressing the key once, the figure 7 is obtained, twice gives an A in capital, three times gives a B in capital etc. The sequence for the key "7" looks as follows: 7-A-B-C-D-a-b-c-d (thereafter it starts again at A in capital).
- Text strings are changed by placing the cursor on the text string you want to change, thereafter typing a text and finally pressing ENTER.
- The pictures connected to the function keys at the bottom of the operator terminal (1) are local, which means that their functions vary depending on which menu one is located in.

8.2 Authority levels (log in/out)

A menu can be given a higher authority level, which would make it non-accessible without a password. This procedure is called login and is executed by pressing the Login key in the main menu. The password is changeable in the parameter menu. To log out (return to general authority, level 0), press the Log out key. If located in a protected menu, one will return to the start menu. After 10 minutes the user is automatically logged out if the operator terminal has not been used.

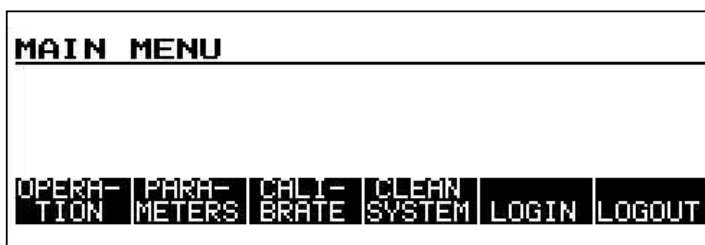
8.3 Operator menus

Start menu



When switching on the power or pressing the MAIN key, the picture above will appear for two seconds. Thereafter the main menu for the selected language will be presented.

8.4 main menu



The options for the different functions are made here.

The following functions are available in this menu:

- Operation** Takes the user to the operation menu where the current values for colour feed volume and mixing ratio are presented.
- Parameters** Takes the user to the menu to change the parameter settings. This key has a password protection.

Parameters	Takes the user to the menu to change the parameter settings. This key has a password protection.
Calibrate	Takes the user to the menu where the calibration of the pumps is executed. This key has a password protection.
Clean system	Takes the user to the menu where the current values for the cleaning of the system are presented.
Login	Login to desired authority level.
Logout	Logout.

8.5 Operation menu

```

OPERATION                               Page 1 of 1
Feed volume:  --0.00 cc/min
Mixing ratio:  --0:--0 A:B
<BACK  START  -  +  STOP  NEXT>
  
```

Here, the current operation data is presented and the paint feed can be started and stopped.

The following functions are available in this menu:

<Back	Takes the user to the previous menu.
Start	Starts a paint-feed with the feed volume and mixing ratio above.
Stop	Stops the paint feed.
Next>	Goes to the next menu.

The following status information is available in this menu:

Feed volume	The current paint feed volume in cc per minute. This can be changed in the parameter menu.
Mixing ratio	The current mixing ratio. This can be changed in the parameter menu.

8.6 Parameter menu (page 1 of 3)

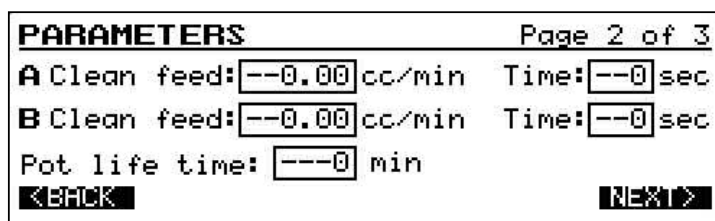
```

PARAMETERS                               Page 1 of 3
Feed volume:  --0.00 cc/min
Mixing ratio:  --0:--0 A:B
+/- step:     --0 %
<BACK                                NEXT>
  
```

The following functions are available in this menu:

Feed volume	Desired paint-feed volume (0-500).
Mixing ratio A/B	Desired mixing ratio (0-100).
Pot life time	The time before an automatic cleaning of the system is executed (1-1440). This is done to prevent the hardening of mixed paints in valves, hoses and spray gun.

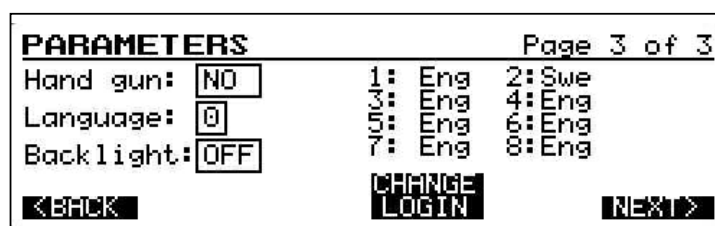
8.7 Parameter menu (page 2 of 3)



The following functions are available in this menu:

- A/B Clean feed** Desired feed volume for the cleaning of component A/B (0-500).
- Time** The duration of the cleaning for respective components (0-120). can be changed in the parameter menu.

8.8 Parameter menu (page 3 of 3)



The following function is available from this menu:

- Change login** Possibility to change the passwords accessible from the current authority level.

The following status presentation is available in this menu.

- Handgun** Select if the handgun shall be used (YES/NO). The paint-feed is then started/stopped with an external pressure switch.
- Language** Select desired language (1-8).
- Backlight** Select if the background light of the display shall be lit or not (ON/OFF).

8.9 Calibration menu (page 1 of 2)

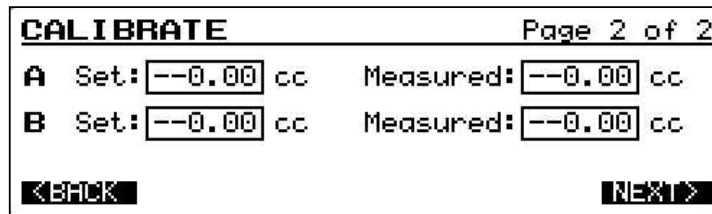


Here the calibration of pump A and B is executed to adjust any deviations.

The following functions are available from this menu:

- Start A/B** Start a calibration for component A/B with the feed volume and time above.
 - Stop** Stop the calibration for both A and B.
- The following status information is available from this menu:
- A/B Feed** Here the desired feed volume for component A/B (0-500) is defined.
 - A/B Time** The duration of the paint feed for respective components (0-240).

8.10 Calibration menu (page 2 of 2)



The speed of the pumps is adjusted after the ratio between set and measured.

The following status information is available from this menu:

- A/B Set** Desired volume for component A/B (0-500).
- A/B Measured** Measured volume for component A/B (0-600).

8.11 Cleaning menu



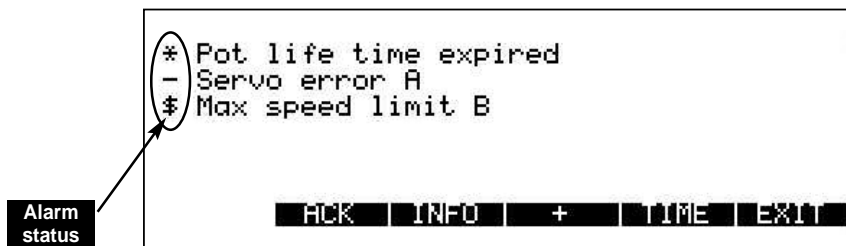
The following functions are available from this menu:

- Start** Starts a cleaning of both components A and B, with the feed volume above.
- Stop** Stops the cleaning of components A and B.

The following status information is available in this menu:

- A/B Feed** Here, the desired feed volume for component A/B is defined. This can be changed in the parameter menu.
- A/B Time left** Remaining time for the cleaning of component A/B.

8.12 Alarm list



The alarms can have the following conditions:

- * Indicates that the alarm is active and not acknowledged.
- Indicates that the alarm is acknowledged, but still active.
- \$ Indicates that the alarm is no longer active, but still not acknowledged.



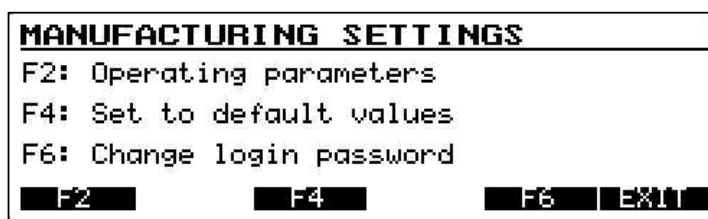
WARNING

TO ACKNOWLEDGE AN ALARM YOU CAN EITHER PRESS THE BUTTON ABOVE MARKED ACK, OR YOU CAN USE THE KEY ACK (,) (SEE THE E300 PICTURE, KEY NO. 5).

8.13 The manufacturer's operator menus

These settings are only available for the manufacturer. These menus are therefore provided with a password of the highest level

Manufacturing section

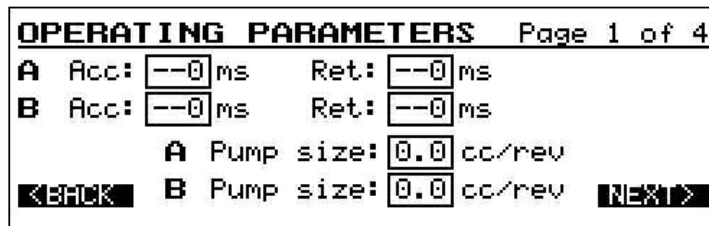


To go to this menu the function key F8 is used (the key to the right under the display).

The following functions are available in this menu:

- F2 Go to the menu to change the settings.
- F4 Set all parameters to default values.
- F6 Change password.
- Exit Go to the main menu for selected language

8.14 Operation parameters (page 1 of 4)

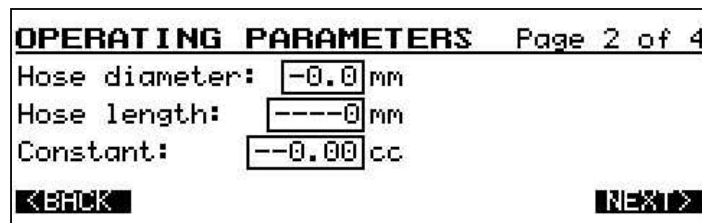


The following status presentation is available in this menu:

- A/B Acc** The acceleration time in milliseconds for pump A/B (5-200).
- A/B Ret** The retardation time in milliseconds for pump A/B (5-200).
- A/B Pump size** The pump size in cc per revolution for pump A/B (0.6-6.0).

8.15 Operating parameters (page 2 of 4)

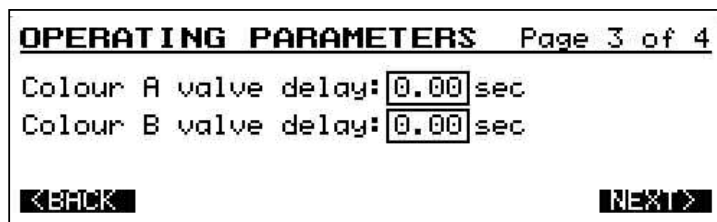
These parameters are included in the calculation for when an automatic cleaning of the system shall be executed.



The following status presentation is available in this menu:

- Hose diameter** Diameter of the hose between the valve and the handgun (2.0-10.0).
- Hose length** The length of the hose between the valve and the handgun (0-10000).
- Constant** The volume of the valve package (0-100).

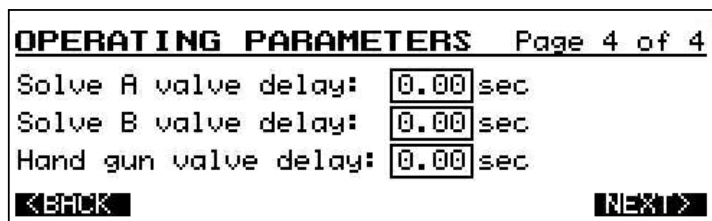
8.16 Operating parameters (page 3 of 4)



The following status presentation is available in this menu:

Colour A/B valve delay Operation delay for colour valve A/B (0.01-0.50).

8.17 Operating parameters (page 4 of 4)



The following status presentation is available in this menu:

Solve A/B valve delay Operation delay for coil valve A/B (0.01-0.50).

Handgun valve delay Operation delay for handgun valve (0.01-0.50).

Pot lifetime expired

An automatic cleaning of the system has been activated. Let the time expire and thereafter acknowledge the alarm.

Air pressure low

The air pressure to the system is too low. Examine the reasons and make the necessary changes. No acknowledgement of the alarm is required.

Pressure comp A/B high

The pressure for component A/B is too high, which is probably caused by a circuit breaker in the system. Examine the reason and make the necessary changes. No acknowledgement of the alarm is required.

Servo ready A/B, not OK

The servo ready signal from the servo amplifier is missing. This is probably caused by a released automatic fuse. Examine the reason and make the necessary changes. No acknowledgement of the alarm is required.

Servo error A/B

An alarm is activated from the servo amplifier. Read the error code on the display of the servo amplifier and check this against the enclosed error code table. Examine the reason and thereafter acknowledge the alarm.

Max speed limit A/B

Max speed for pump A/B is exceeded (200 rpm). Change the feed volume and/or the mixing ratio. Thereafter acknowledge the alarm.

PLC: Low battery

The power level for the battery in the PLC is too low. Contact the distributor for an immediate change of the battery, to avoid losing the parameter settings. No acknowledgement of the alarm is required as the PLC is reset after battery exchange.

PLC: Hardware error, code XXXX

A hardware error in the PLC has occurred. Contact the distributor.



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