SERVICE MANUAL

Industrex
M43ic / M43icN
NDT FILM PROCESSOR

AT600 v3.4e and up

ATTENTION!!!

TAKE CARE TO follow the safety Instructions
in capture 1 of the

INSTRUCTION MANUAL!

Achtung!!!

befolgen sie genau die Sicherheitshinweise
in Kapitel 1 von der

Bedienungsanleitung!

OBSERVANCE:

THIS SERVICE MANUAL CAN ONLY BE USED IN COMBINATION WITH THE CORRESPONDING INSTRUCTION MANUAL FOR THE PROCESSOR!

THE INDICES IN THIS SERVICE MANUAL ARE AN ADDITION OF THE CHAPTERS IN THE INSTRUCTION MANUAL!

ZUR BEACHTUNG:

Das Service Manual kann nur in Verbindung mit der
Bedienungsanleitung DER MASCHINE verwendet werden!

Die Inhalte in diesem Service Manual sind eine Erweiterung von den Kapiteln in der
Bedienungsanleitung!

Inhalt

1. BEFORE INSTALLATION

- Site preparation, e.g., water supply, drainage electrical supply must be completed prior Installation.

1.1. LOCATION

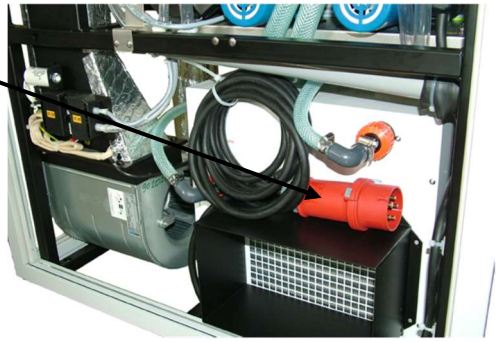
- Processor can be installed "through-the-wall" or completely in the darkroom.
  Required measurements can be taken from the processor specification sheet.
  For "through-the-wall", a purpose-built panel is required (optional accessory).

1.2. ELECTRICAL SUPPLY

- All electrical connections must meet national safety requirements. Correct fuses and electrical requirement can be taken from the processor specification sheet.

Main Switch

Power cord with plug
CEE 3P+N+PE 16-6h
415V 16A



1.3. WATER SUPPLY

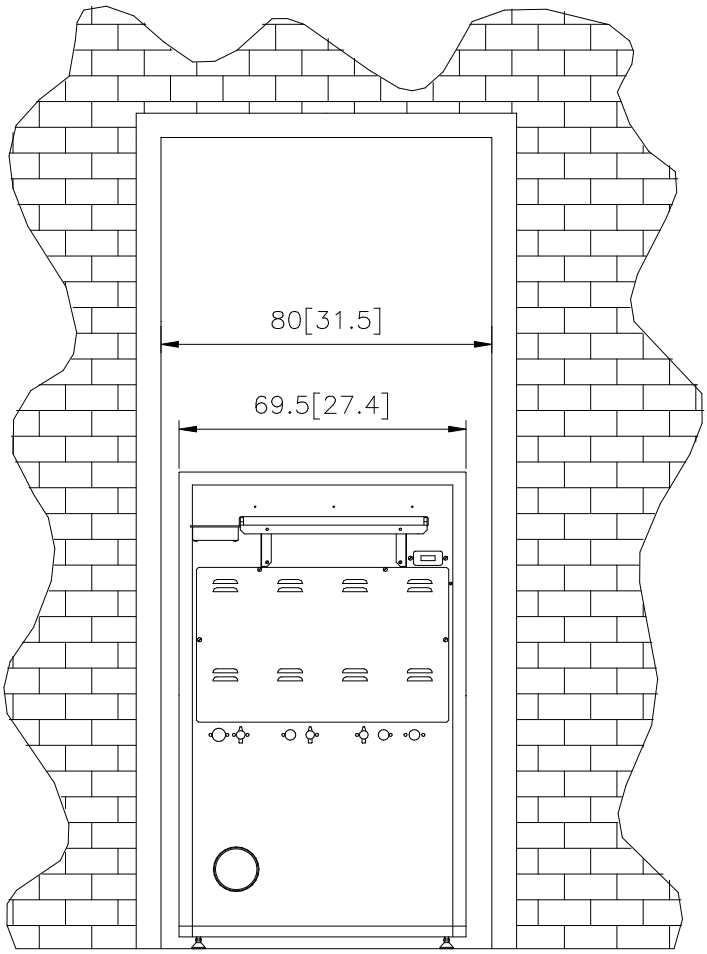
- The processor must be connected to the local water supply by using a DVGW-approved system separating device or pipe separating device.
- The cold-water supply pipe must have a stopcock fitted connection to the processor and should be done by using the 3/4" hose connector, supplied. Easy access to the stopcock should be provided as it has to be opened and closed daily.
- A built-in magnetic valve reduces water consumption to a maximum of 2.0 ltr. /minute using pressure and quantity control.
- It is recommended to run a second cold water supply with 2.5 meters of hosing to facilitate easy cleaning of the racks and tanks (water supply kit - optional accessory).

Water connection and drains in front of the processor

2. TRANSPORTATION ON SITE AND ASSEMBLING

The transport to the installation area can be done easily by two men.

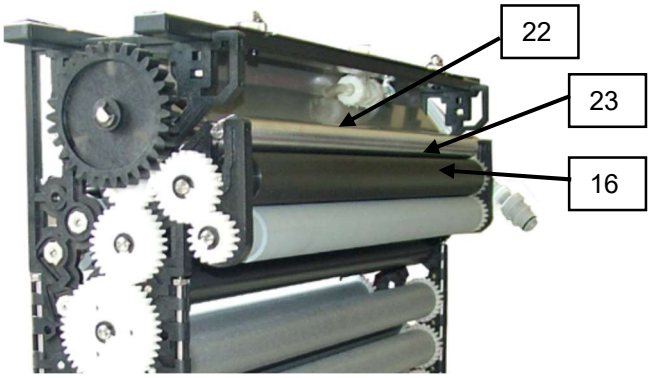
WARNING:
DURING TRANSPORT ALL RACKS AND DRYER MUST BE TAKEN OUT OF PROCESSOR!!

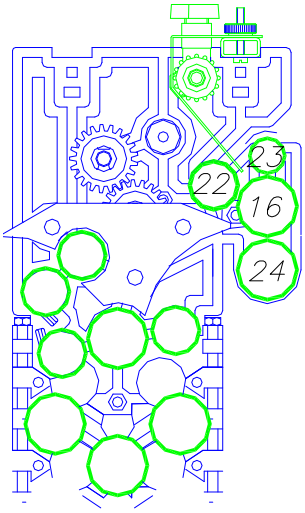


IMPORTANT:
The Processor must be installed leveled for optimum performance.

2.1. Assembly the FIX Tank with the Spraybar

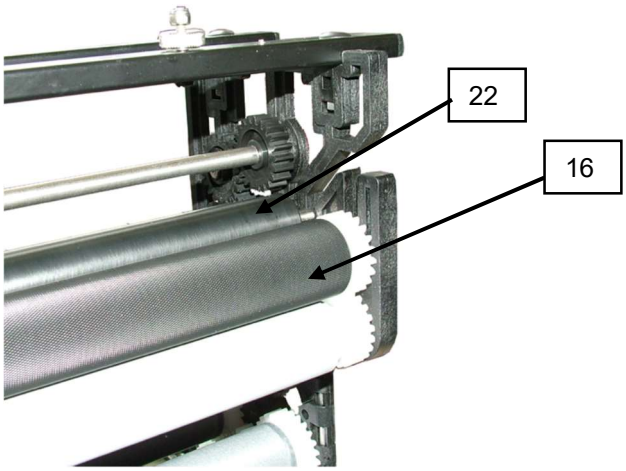
CAUTION:
Pay attention to the Roller configuration
about the FIX Rack!





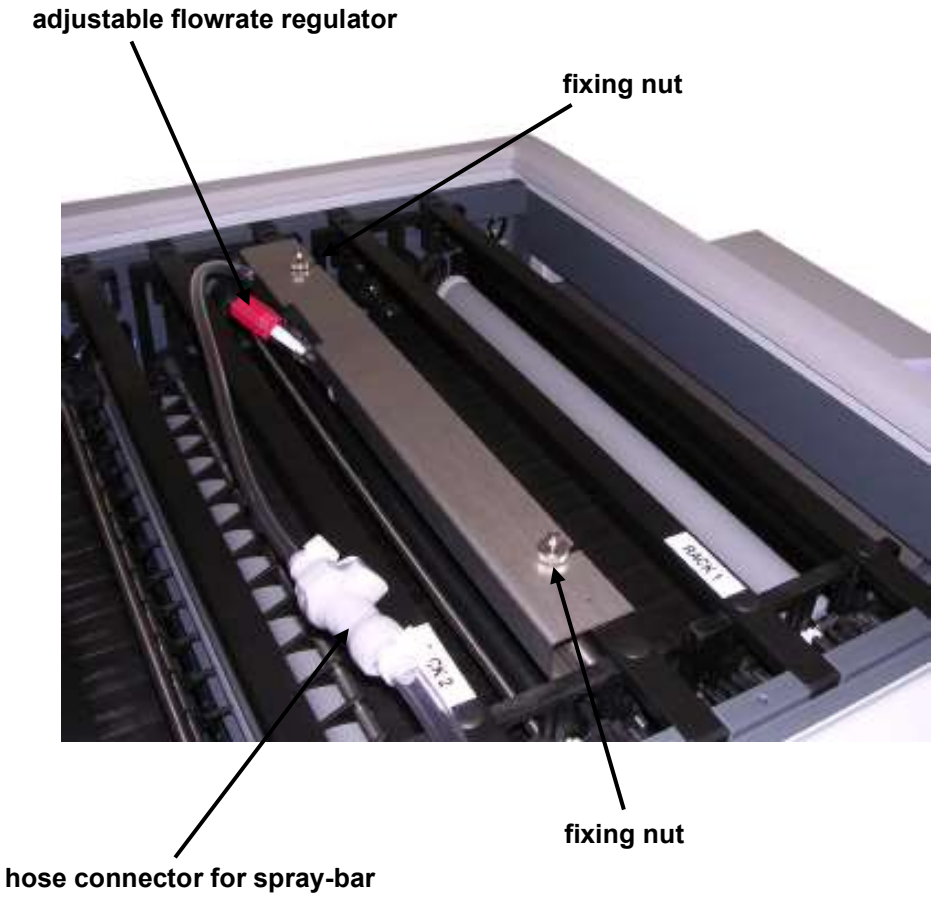
Position	*Part no.*	*Description*
16	90 16 606	Inputrollerfluted, PE32 heavy
22	90 17 425	Inputroller, PE25 heavy
23	90 15 179	Inputroller Fix, Steel 19

2.1.1. Mounting of the Rollers 16 and 22 in the correct order



2.1.2. Mounting of the Spraybar

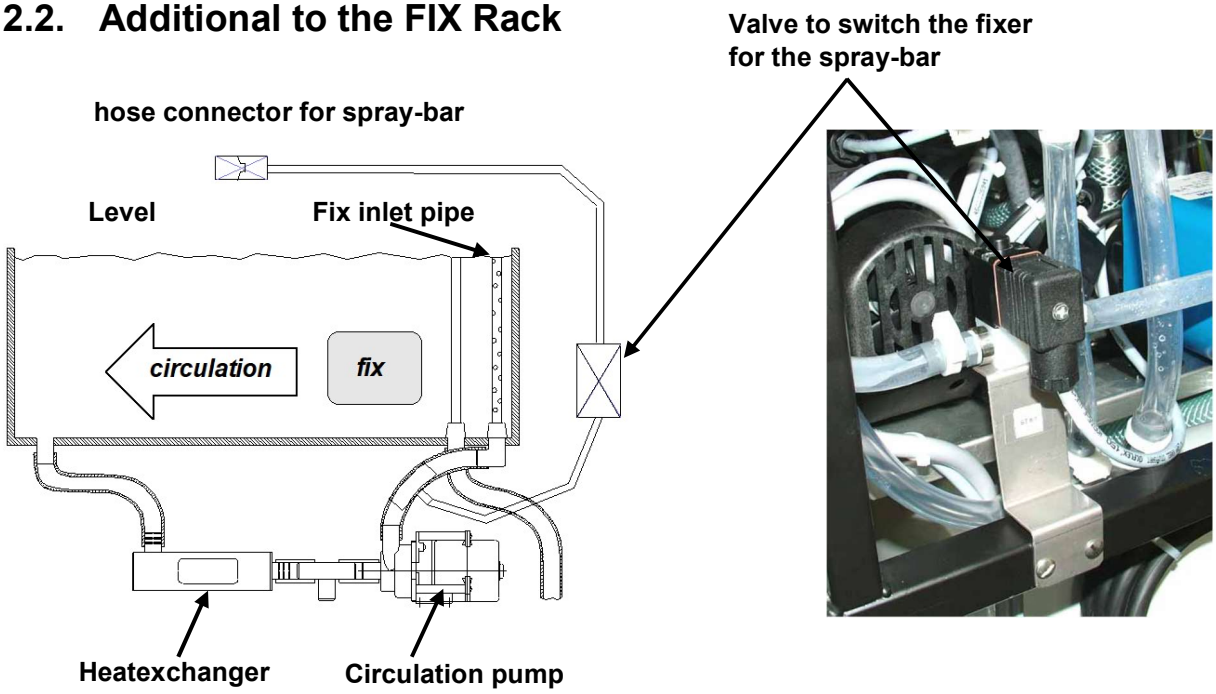
2.1.3. Adjustment of the Spraybar



2.1.4. Mounting of the Roller 23 in the correct order

Be sure, that the spray-bar sheet not contact the steel roller - not to shear of.

2.2. Additional to the FIX Rack



2.3. Additional to INSTALLATION OF THE RACKS

- The processor is delivered complete assembled, except the transport racks, dryer and film catch tray.
- Transport fixings must be removed before use.
- Insert each rack at the location indicated by reference number or label.
- Rinse the tanks with water and then fill it to the red marker on the tank wall.
- Insert the racks according the reference number or label
- Turn on the transport motor and check rotation
- Insert racks carefully and slowly, avoiding chemistry splashes.

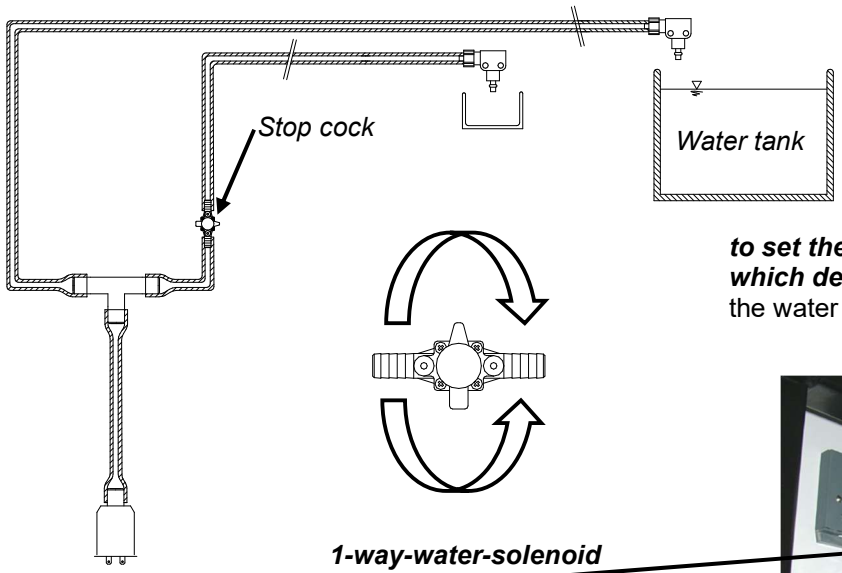
RACK 1 in the developer tank
RACK 2 in the fixer tank
RACK 3 in the water tank

2.4. Additional to INSTALLATION OF THE DRYER-RACK

Dryer Rack *in the dryer*

Sample photos

3. INTERNAL WATER CIRCUT

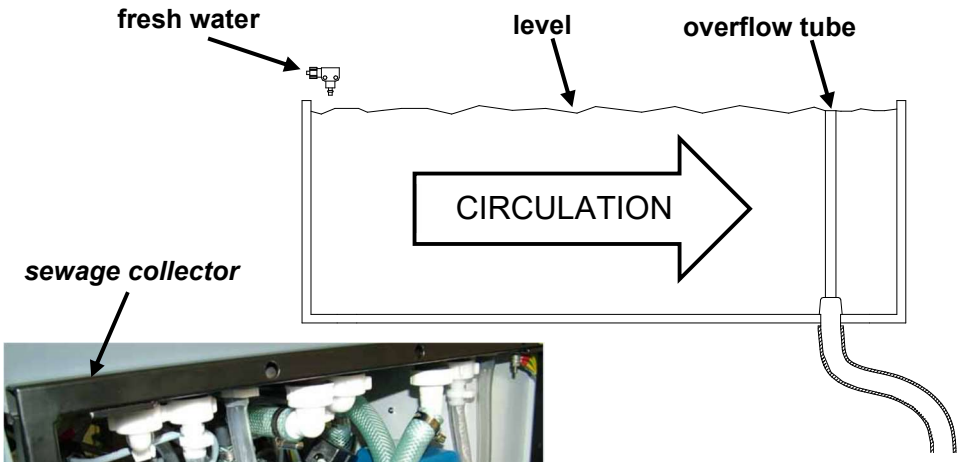


to set the flow trough,
which depends on the pressure of
the water supply line

1-way-water-solenoid
(watersupply)

3.1. WATER DRAIN

- The wash water should be drained separately according to local environmental regulations.
  The Processor comes with the suitable hose connections.
- The level of the water drain should be as low as possible with a minimum drainpipe diameter of Ø40 mm.



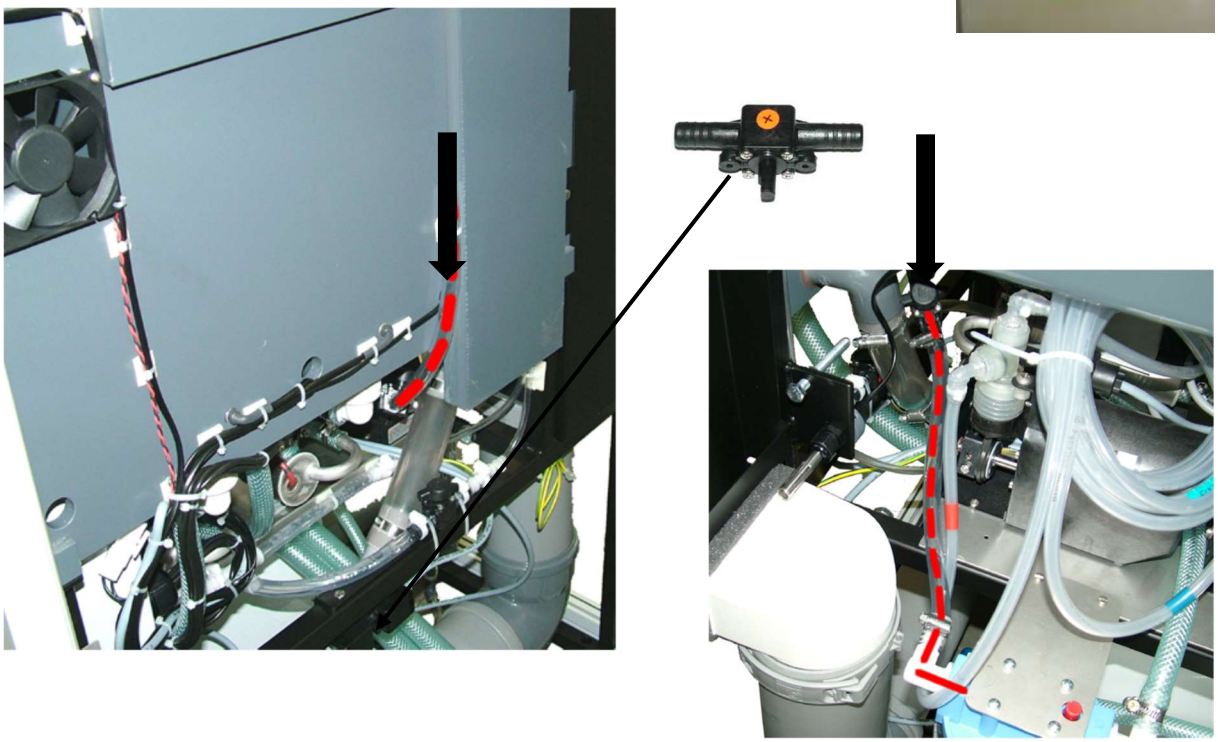
3.2. COOLING - SYSTEM of the Chiller Assy

If you want to change/add the Cooling liquid, follow the steps below:

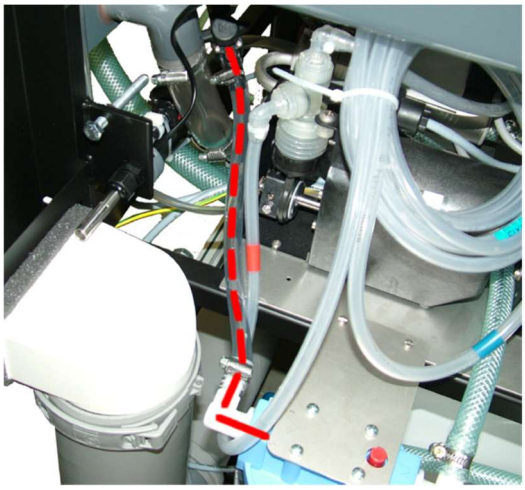
3.2.1. How to fill the Cooling Liquid

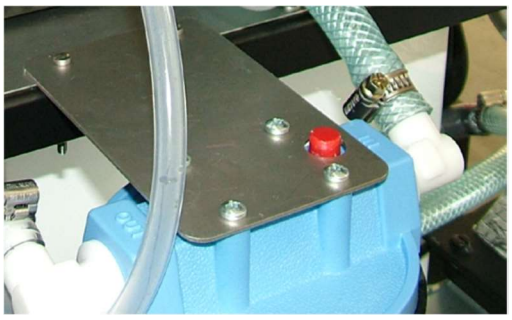
- Switch off the processor using the ***Main power switch***

- Open the marked Stop cock to the Chiller Assy



➢ Press the red button all the time during the filling!



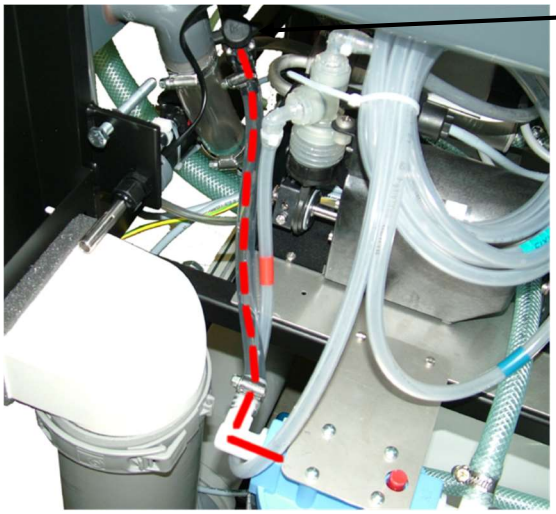


➢ Fill in Cooling Liquid carefully up to 3/4 of the Filter using a funnel, while pressing the red button!

CAUTION:
Do not fill in more than *up to 3/4* of the Cooling Liquid Tank!

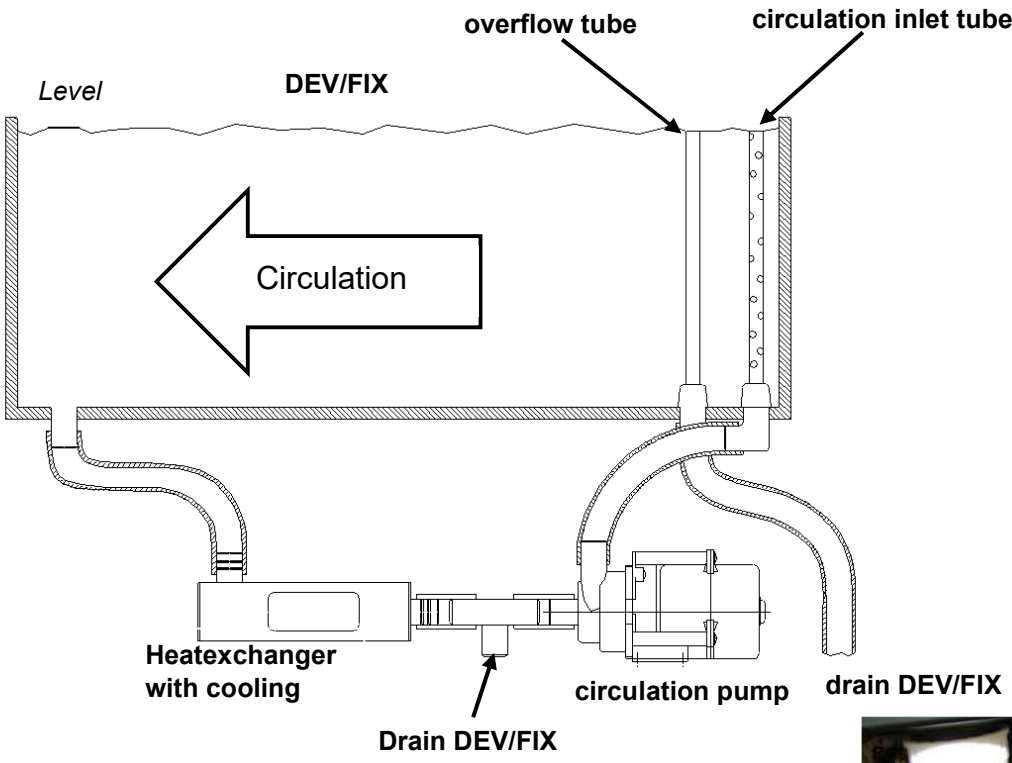
Fill up to 3/4
(about 2 litres)

➢ Close the marked Stop cock to the Chiller Assy



IMPORTANT:
After the first cooling cyclus, control the level of the cooling liquid.
Contingently fill up the cooling liquid to the right level.
Inspection glass should be filled 3/4.

4. INTERNAL CHEMISTRY CIRCUIT

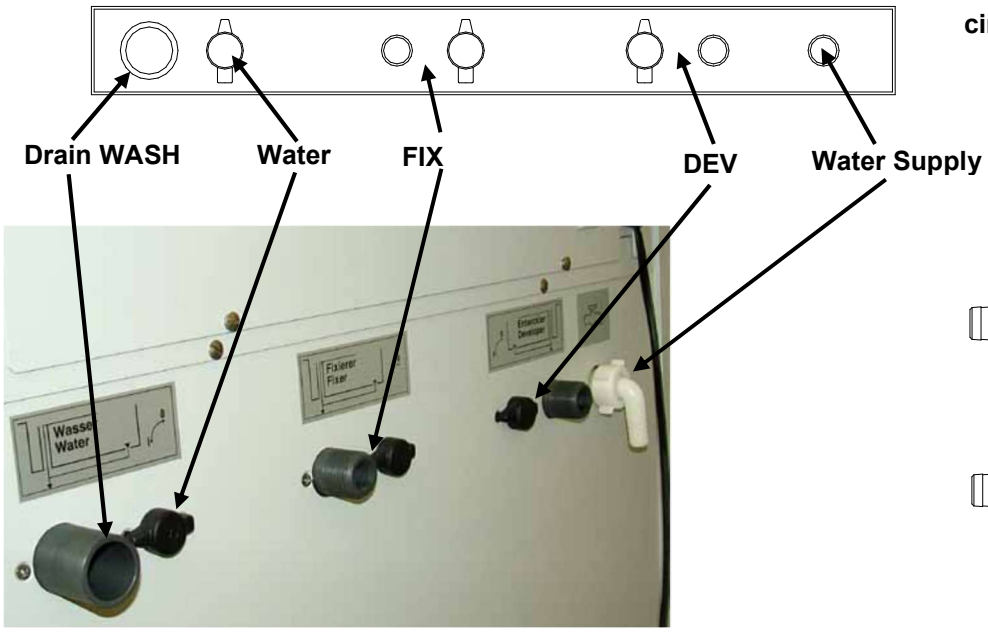


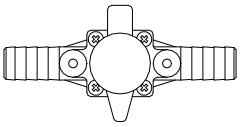
NOTE:
for the DEV there is additional a filter installed. See more in chapter 10.1.1 "Filter System for Developer"

Heatexchanger

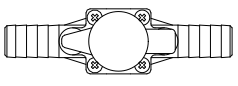
circulation pump

4.1.1. Chemistry Drains





Closed

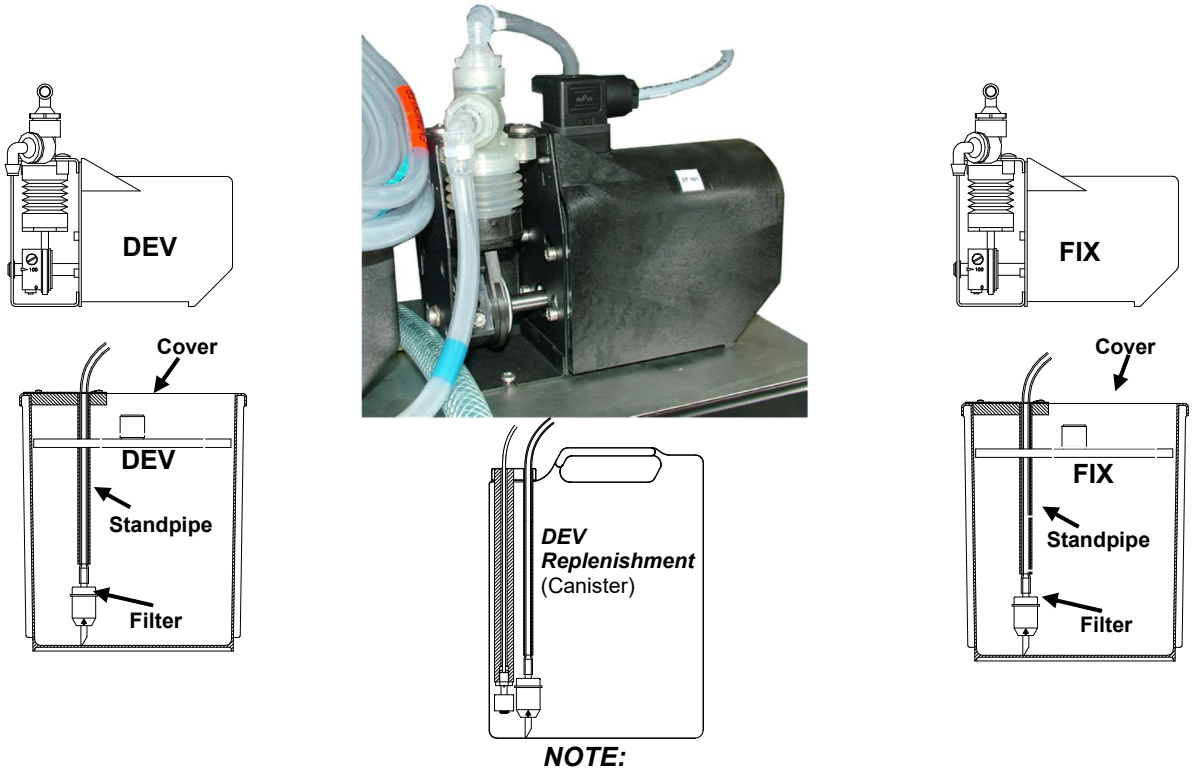


Open

5. CHEMICAL REPLENISHMENT SYSTEM

When operating a processor which uses chemicals for the continuous production of plate/film it is very important that the chemicals within the machine are kept in good working order to provide consistent processing quality.
To achieve this consistency we use replenishment solutions, which are formulated by the chemical manufacturer and injected into the processor precisely for the area of material being produced.
Replenishment of the chemical tanks is done automatically using infra-red sensors located at the entrance to the processor. These sensors accurately monitor the width of material entering the processor, this information is then used by the microprocessor (CPU) control software to calculate the surface area for each plate loaded into the processor.
Each sensor, when covered, will generate a pulse, which is then recorded on a decoder and counted. The more sensors that are covered then the faster the count. When the count reaches the programmed value of pulse counts it triggers the start of a replenishment cycle.
During each replenishment cycle the replenishment pumps inject fresh solution from small storage bottles/tank and into the corresponding "working" tank solutions for a pre-set time.

Replenishment Pump



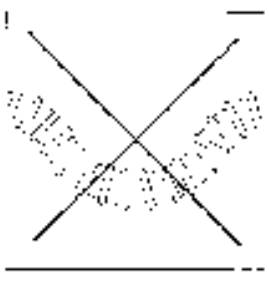
NOTE:

A Level control device for replenisher tank is optional available on request.

USE THE FLOADING LID TO PROTECT DEVELOPER AGAINST OXYDATION

WARNING:

- **Do not use brass or copper in the drainage system.**
- **Chemistry disposal must be in accordance with local environmental regulations.**
- **To avoid back pressure in the drain, the hoses should be free of bends and with a constant downward gradient.**



6. FILTER SYSTEM FOR DEVELOPER

During working, the filter has to be installed inside the processor.
If you want to change/replace the filter insert, mount the filter on the frame like in the pictures.

CAUTION:
To change the filter cartridge, it is necessary that the filter system is fixed

NOTE:
Mount the side panel to the processor and fix it with the mounting screws.

6.1. How to replace the Filter insert

- Switch off the processor using the **main power switch**

- Open the closing sheet

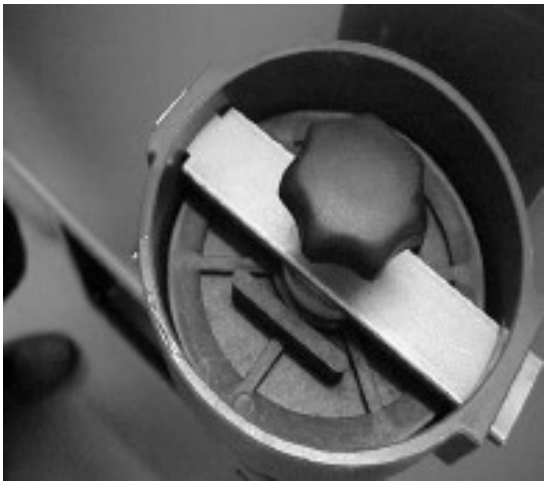
- Remove the Filter Cover

- Take out the used filter cartridge

- Check position of the O-ring inside filter housing

- Put in the new filter cartridge slowly and carefully

- Close the filter system in the reversed sequence as described before



CAUTION:
After the insert has been replaced,
place the filter inside the processor again.

IMPORTANT:
After the filter has been replaced, reset the filter log.
Go to programming mode menu Options/Filter/Log and clear the processed area to 0000.

7. THE FIRST STEPS

WARNING:
Separate the Film Processor from mains. To do so, switch the main power switch of the Filmprocessor to "0" position.
Wear safety goggles, protection gloves and clothing!

7.1. Additional to the First Steps

We recommend that the machine is fully water tested on installation before filling with chemistry – this is just a safety procedure in case of transport damage.

- Thoroughly clean processor ensuring no packing materials restricts the free running of the processor. Pay special attention to the racks and inside of the tanks.
- Close the drain taps for the developer, fixer and wash tanks.
- Fill the tanks (Dev, Fix and Wash) with water to the markers on the tank wall.
- Switch on the processor
- Check for signs of leakage.

7.2. USING THE CHEMISTRIES

- Only use chemistry suitable for roller transport systems.
- Follow instructions of chemistry manufacturers.

FIXER BATH:

- Empty fixer tank by opening the fix drain tap.
- Remove the Fixer-rack.
- Check fixer tank is free of alien material.
- Close fix drain tap.
- Fill fixer tank with ready-to-use-fixer solution to the red marker on the tank wall. Insert the Fixer-rack very carefully and slowly, add hardener solution if advised by the chemistrymanufacturer.

DEVELOPER BATH:

- Empty developer tank by opening dev drain tap.
- Remove the Developer-rack.
- Check developer tank is free of alien material.
- Close dev drain tap.
- Fill developer tank with ready-to-use-developer solution to the red marker on the tank wall. Insert the developer-rack very carefully and slowly. Replenishment tanks may be used to mix the chemistry. Any remaining can be used for replenishment.

WARNING:
Even the smallest quantity of fixer could contaminate the developer solution.
Therefore, always fill with fixer first.
When removing the fixer rack, always cover the developer tank.
For removing the fixer rack use rack carrier tray (optional accessory).

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Even the smallest quantity of fixer could contaminate the developer solution.
Therefore, always fill with fixer first.
When removing the fixer rack, always cover the developer tank.
For removing the fixer rack use rack carrier tray (optional accessory).

8. PROCESSOR FUNCTIONS

Programming:

Automatic processing parameters, e.g., temperature, speed and replenishment rates, can be stored in 9 different programmes.

Warm-Up Time:

Once programmed, temperature settings are accurately controlled. Constant solution temperatures are maintained in the processing tanks. Temperatures tolerances +/- 0.2 °C are achieved by the microprocessor control unit while the solutions are circulated by circulation pumps. When temperature has reached PRE-SET levels, the processor enters STANDBY mode and is ready for use.

Standby:

In case no film is in process - after a fixed period of time and when, after the last plate leaves the dryer, the processor transport, dryer and water supply is switched off automatically. The processor goes to standby mode. During standby, the processor activates two important features:
ANTI-OXIDATION and ANTI-CRYSTALIZATION programmes.

Anti-Oxidation:

During STANDBY mode - and in long periods of no production, a preprogrammable ANTI-OXIDATION cycle (replenishment cycle) is initiated. The additional replenishment compensates the impact of air oxidation of the chemistry during standby mode and maintain chemistry levels in the tanks, in order to compensate evaporation of the water in the solutions.

Anti-Crystallization:

During STANDBY mode - within a programmable cycle period - the transport rollers and the gum pump are activated - this helps to prevent crystallization build-up on the rollers.

Automatic Replenishment:

The processor is equipped with a film area measuring system. Infrared sensors scan the incoming plate area and when the preprogrammed amount of plate (area) enters the processor, a replenishment cycle will be activated.

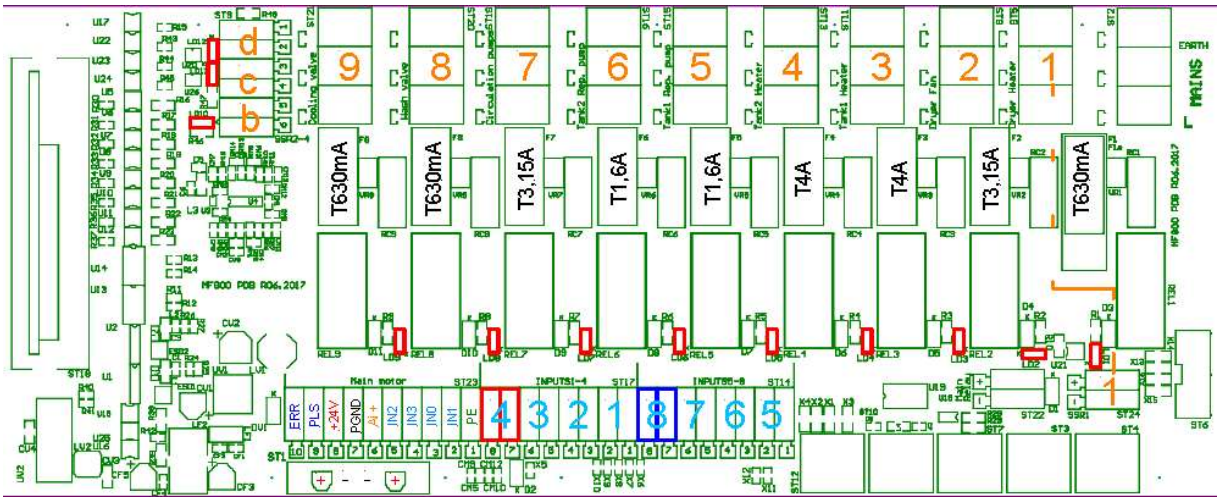
Automatic (Start-Stop):

Infrared sensors also automatically control the start cycle of the filmprosessor. The filmprocessor changes from STANDBY to RUN once a film has interrupted the light barrier. As the rollers turn, water is supplied to the wash tank and to the intermediate rinse bath system. Once the last film has passed through, the filmprocessor reverts to STANDBY. The film can be taken out of the receiving basket or top cover lid.

8.1. Additional SAFETY DEVICES

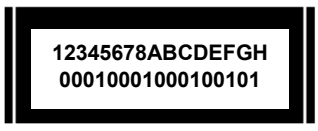
- Thermostatically controlled solution heater with overheating CUT-OUT and AUTO-RESET.
- Thermostatically controlled dryer heater with overheating CUT-OUT and MANUAL-RESET.
- All electric motors are equipped with thermal CUT-OUT and AUTO-RESET.
- Each electrical component is protected by a fuse on the power distribution board (PDB).

8.2. Power distribution board

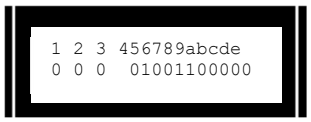


8.2.1. Inputs:

The Inputs of the board are connected to the Power distribution Board via the connectors ST14 and ST17. They can be accessed by pressing 3 then enter Options ->Service ->Inputs. The Inputs 1 – 8 correspond the Inputs on the board. An opened input is displayed as 0, a closed input is displayed as 1.

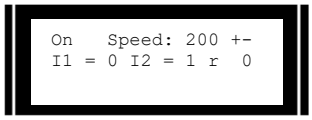


8.2.2. Outputs:



The Outputs of the board are switching the on-board relays (1 - 9) and the external relays (b, c, d). They can be controlled by pressing 3 then enter Options -> Service -> Outputs. The Inputs 1 - 9 correspond the relays mounted on the board, b, c, d control the external relays - normally used for dryer control. When entering all Outputs are off, changing to 1 switches on the Output immediately. Check the electrical drawings, to avoid forbidden states (dryer heaters without fan - circulation without water,)

8.2.3. Main drive Motor:



The main drive motor is a self-monitoring BLDC drive motor. To test the motor independedly from the set program / setup parameter press3 then enter Options -> Service -> Motor: Use ON / OFF to switch on / off the motor Check if the motor reacts accordingly. Use +/- to increase / decrease the speed of the motor. The possible speed range is between 0 and 200 (0 no speed / 200 is the maximum) I1 and I2 represent the Error State and the Motor Speed pulse signal. r shows the actual motor speed.

NOTE:
Outputs and Main drive motor will be inoperable if the emergency stop / cover open state is active.
When testing Motor / Outputs make sure, the safety system in active state.

8.2.4. Bus System:

The bus System connects several components of the processor to interchange their data. On the used I2C bus, all members are on the same hierachy level. This means, any bus member can be connected to any free bus plug - the information
flow is automatically organized.
If any bus component has a total electrical failure, it can cause the bus to stop, and therefore the unit to fail - or not to start up - Follow the start-up recovery procedure to locate the problem.

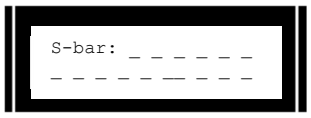
8.2.5. Temperature Sensors:

Temperature sensors are colour coded. Each code MUST only be used once to avoid malfunction. Refer to the technical documentation coming with the unit to see which code is used for which tank and the dryer.
A connected sensor will lead to a appropriate reading on the main pages of the display.
If the shown temperature is correct, there is no issue with the sensor.
A constant reading of 0.0°C indicates that the sensor has been shut down due to internal sensor failure. In this case replace the sensor.
A constant reading „no probe “indicates that the sensor is not connected / defective. In this case reconnect the sensor and check for bad plug contacts - if the problem cannot be solved by replugging - replace the sensor / board where the sensor is connected.

8.2.6. Display:

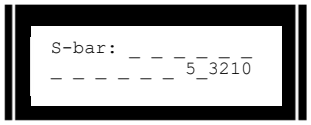
The Display is also a bus member - if both lines of the display show text, and every button pressed causes a short beep - all electronical functions are OK.
Pressing 1 also will toggle the backlight.
If the display has the backlight on, the first line is black, the second one blank, then the bus communication failed - or the CPU card does not start up.
Follow the Start-up recovery procedure to locate the problem.

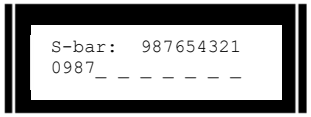
8.2.7. Sensor bar:

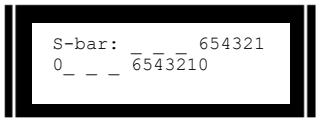


The sensorbar is a member of the bus system. To check the sensorbar press 5 to enter the manual menu.
Select Monitor, then scroll down with 8 until the S-bar: ------ page is shown.
The maximum amount of sensors is 20 - 2 decoders with 10 sensors each. Refer to the electrical drawings to see the type of installed sensorbar.

To check the sensorbar, move film underneath the single sensors and check if they are activated.
Active sensors will show their number.
For example - Decoder 1 has sensor 5,3,2,1,0 active.
For example -Decoder 2 has all 10 sensors active, Decoder 1 has sensor 9,8,7 active.
On some sensor bars, Decoder 1 and 2 do have less than 10 sensors, for example Decoder 1 and 2 have only 7 sensors.
A full reading then will show as following:







If a sensor is always active - or never active check the sensorbar for dirt accumulation as a first step - then remove the calibration coverage screw and increase / decrease sensitivity. If the problem can´t be solved replace the sensorbar / sensorbar components.

Sensorcode: 5 4 3 2 1 0+Decoder

8.2.8. CPU card

The unit's software is stored on the CPU card.
When changing the software for the processor, this can be done either by changing the CPU card - or by loading the new software via USB interface.

To get access to the software installation menu, the flash memory protection has to be disabled.
To do so, remove the CPU cover and locate the protection pins, then install the update jumper.

To activate the software update function, with the installed bridge press 3, then select Options -> Service -> DFU
Select Yes to activate the update function.

Follow the firmware update procedure documentation coming with the units documentation to install a new software into the processor.

8.2.9. I2C distribution board

The I2C distribution board allows to attach components to the I2C bus.
The normal version has 5 or 6 plug - oriented in the same direction.
Every plug can be used for each connection.
It is part - but not member of the I2C bus - it has no address and only distributes / reinforces the signals beeing transfered over the bus.

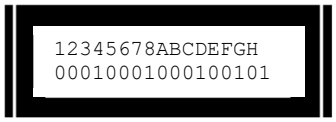
The „buffered “version of this board - identifiable on the 90° rotatet plug ST1 is used to connect bus members via a longer wire to the main board. The signals over the connection wire to the main board are reinforced. This cable has to be connected to ST1 - all other plugs can be used for each connection.

Non buffered version

Buffered version ST1

8.2.10. Input extension board

The input extension board is available with 8 or 16 digital inputs. An opened contact means no signal, closed contact is used for active signal like low level, night cover, ...
The input extension board is member of the I2C bus. There are different versions, having different addresses. This allows to install more of them in the same processor.
If ordered always mention the version - which is marked on the board f. eg. V1.
To check the inputs of the board press 3 then enter Options ->Service ->Inputs.
The Inputs a -h correspond the Inputs on the board.
An open input is displayed as 0, a closed input is displayed as 1.



8.2.11. Safety Circuit

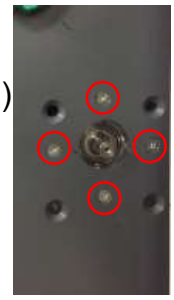
The processor is equipped with a Safety relais - monitoring the cover switches and if installed the emergency stop button(s). If the safety circuit gets interrupted, the safety relays deactivates the main power relais and disables the drive motor - as well as generates the Cover open signal. Refere to the electrical wiring diagram coming with the unit - page safety to have a complete overview of the safety system of your processor.

8.2.12. Motor assemble/disassemble

The main drive motor is a low voltage brushless DC type, which has no maintainable parts in it.
It has an independent monitoring electronics - protecting it from overcurrent, mechanical damage due to high torque, overtemparture and voltage fluctuations. The motor electronics comunicates with the processor, and problems with the motor are shown as error message on the user interface.

DANGER:
Switch off processor and disconnect from mains supply for this service task!

To access the motor following steps are required:



- remove the electronic box and rest on a solid stand (40cm to 80cm)
- remove the chain/belt protection cover plate
- loosen and swivel out the chain/belt tensioner
- remove the screw holding the main drive sprocket in place

Fitting key

- lift off the chain from upper sprockets - then pull off the main drive sprocket from motor axle
- take care not to lose the fitting key which is plugged into the nut of the motor shaft

- remove the 4 screws which fixate the motor onto the tank body - when removing the last screw - secure the motor with one hand, to prevent it from falling down
- remove the motor trough the lower service cover on the left side (when viewed in transport direction of film)
- disconnect the motor and replace

To reinstall the motor, follow the removing procedure in reverse order.

9. SERVICE FUNCTIONS OF THE DISPLAY

During service, several functions of the processor can be used to check components of the unit and help to identify defective components.
Also several settings can be adopted to customize processor functions to the need of the user. When processor functions seem to be abnormal, check the settings and if in doubt set back to the factory settings - coming with the processor documentation.

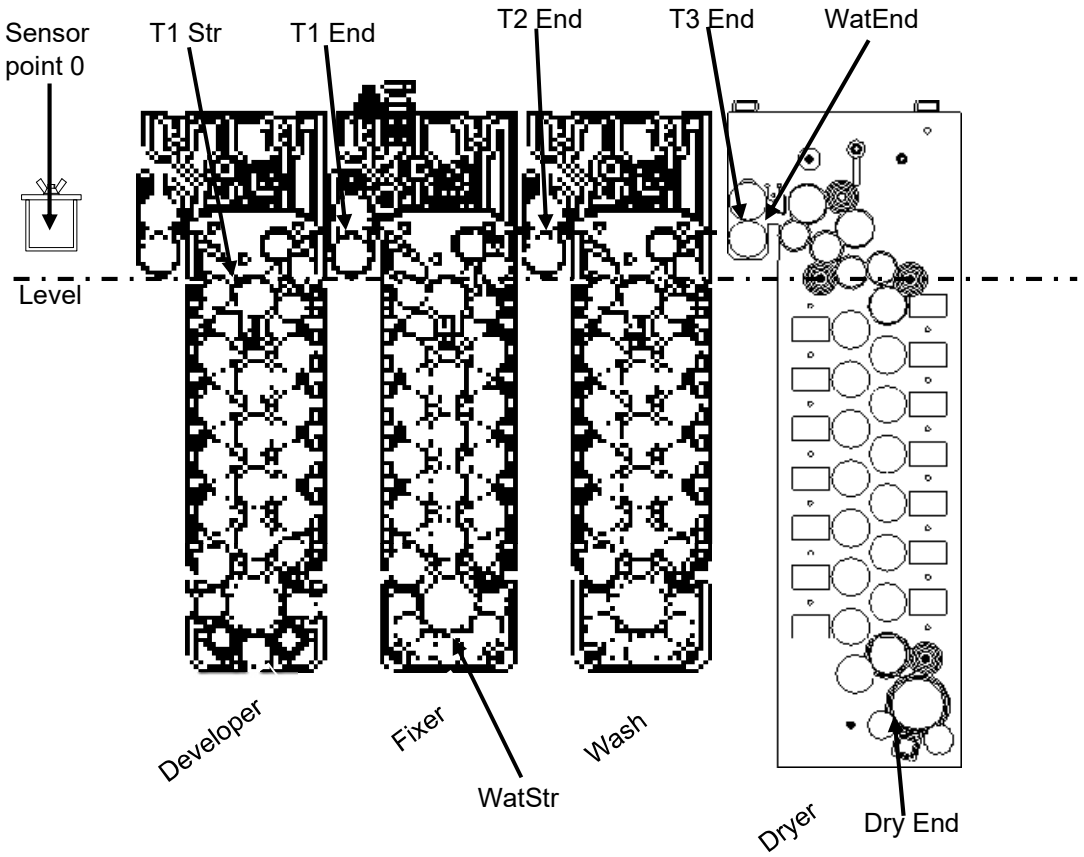
The functions related to service are:

- Setup - for changing and adopting the parameter of the processor
- Option - Inputs to see the input states up the processor
- Option - Outputs to drive any output of the processor directly
- Option - Motor to check motor functionality
- Option - DFU to reinstall / update the Software of the processor
- Monitor - to check processor behaviour and functions during testing / operation

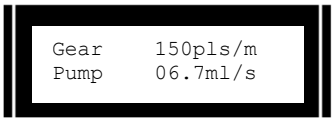
9.1. Setup

Following description explains the setup values, the factory settings for your unit can be found in the machine documentation coming with the processor.

9.1.1. The before mentioned values are defined as following

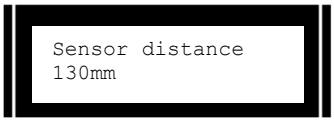


Gear factor: (Pulses per meter)
Is used for internal speed / area calculation.
it represents the number of motor pulses generated
for running 1 meter of material.

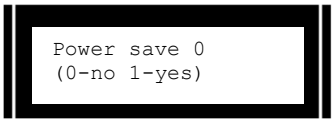


Pump: (Millilitre / Second)
Calibration for replenishment pumps - in ml/second. This value is used to calculate the required runtime for the replenishment pumps according the needed amount.

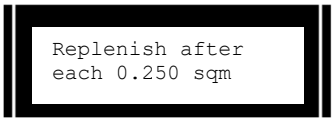
Sensor distance: (Millimetre)
Distance between 2 sensors of the film input sensorbar.
This value is needed to calculate the correct area of film.



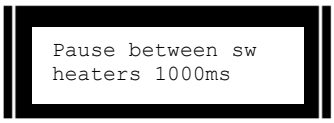
Power save: (Yes / No)
Limits the peak power consumption by heating tanks
one after each other. If set to yes, heat up time is at least
twice as long as normal.



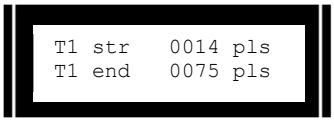
Replenish after each: (Square meter)
After the set area of film has been processed,
a replenishment cycle is started.



Pause between sw heaters: (Milliseconds)
Time delay between switching on / off heating
stages for dryer. This to reduce stress on the power supply.

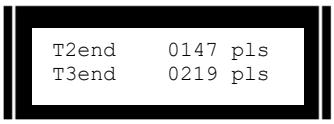


T1str: (Motor Pulses)
Tank 1 start position in motor pulses - counted
from Sensorbar.



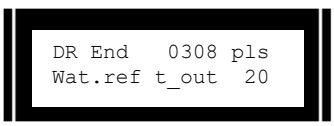
T1end: (Motor Pulses)
Tank 1 end position in motor pulses - counted from Sensorbar. Together with T1str, the motor speed is calculated in accordance to the set developement time.

T2 end: (Motor Pulses)
Tank 2 end position in motor pulses.



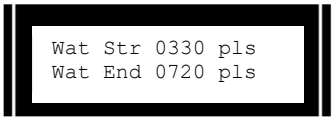
T3 end: (Motor Pulses)
Tank 3 end position in motor pulses.

DR End: (Motor Pulses)
Dryer end position in motor pulses - this is the point,
where the film leaves the processor.



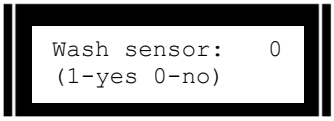
Water refill time-out: (Minutes)
If filling of water tank takes longer than this time,
filling is stopped and the „Cant fill water“message appears.

Wat str: (Motor Pulses)
Position in motor pulses - counted from Sensorbar when Wash Valve is switched on.

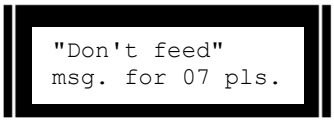


Wat end: (Motor Pulses)
Position in motor pulses - counted from Sensorbar when Wash Valve is switched off.

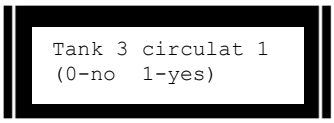
Wash sensor: (Yes / No)
Defines if a temperature Sensor for the Wash Water is installed.



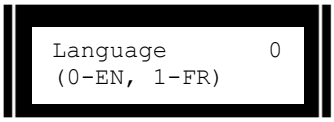
"Don't feed" msg.: (Motor Pulses)
Amount of Motor Pulses to extend the "Don't feed" Film Message.



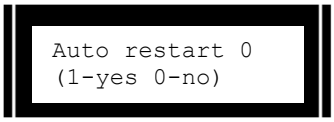
Tank3 circulat. (Yes / No)
Defines if a water circulation pump is installed in the processor



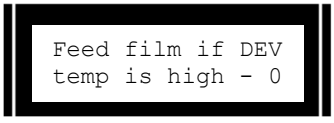
Language: (EN / FR)
Defines the display language English or French.



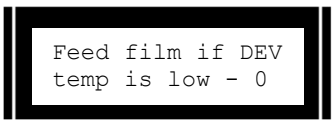
Auto restart: (Yes / No)
When the function is activated, the processor does restart automatically after an emergency stop. If this function is deactivated, the user has to confirm the restart.



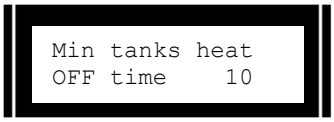
Feed fillm if DEV temp is high: (Yes / No)
Decides if the unit accepts film during a Developer too warm state.



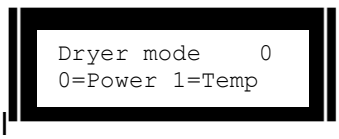
Feed fillm if DEV temp is low: (Yes / No)
Decides if the unit accepts film during a Developer too cold state.



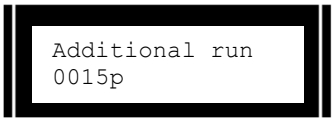
Min Tanks heat OFF time: (seconds)
Defines the minumum on delay for the tank heaters since the last switch on.



Dryer Mode: (Power / Temp)
Selects the operation mode of the dryer.
Power - keeps a constant drying power - allowing the dryer temperature to fluctuate according environmental conditions.
Temp - keeps the dryer at a set temperature - if environmental conditions change, the drying power adopts. This may cause drying issues if the room temperature gets too warm.

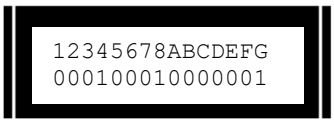


Additional run: (Motor Pulses)
After the last film left the processor, the unit continues to run for this number of pulses.



9.2. Option Inputs

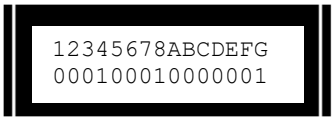
The Option Input page shows the actual input sensor values connected to the electronics. In the upper line the number of the Input is shown, in the lower number the State of the input is shown as 0 (open) and 1 (closed).
Refere to the Inputs description coming with the units documentation „Testwerte“- where each input is referenced to the according function.

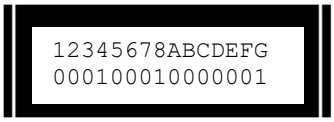


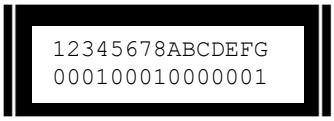
9.3. Option Outputs

CAUTION:
Never operate dryer heating elemnts without dryer fans. Operating dryer heating without fans will result in burned heating elements immediately!
Do not operate tank heating elements without circulation, due to this will damage the heating elements within short time.
Do not operate circulation pumps dry, due to the pump bearing will get damaged within short time.

The Option Output pages allow to switch on and off the outputs of the electronics. In the upper line the number of the Output is shown, in the lower number the State of the Output is shown as 0 (inactive) and 1 (active). Refere to the Outputs description coming with the units documentation „Testwerte“where each output is referenced to its according function.

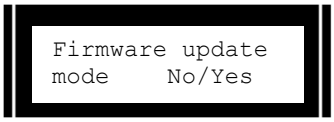




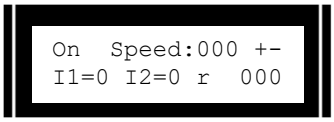


9.4. DFU

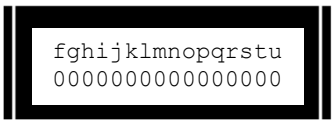
If the firmware of the device needs to be changed, install the protection bridge on the CPU card. With this bridge installed, the Firmware update can be initialized.
Refere to the procedure Device firmware update, to conduct a software change.



9.5. Motor



The Option Motor pages can be used to check the motor and motor electronic functions.
With On/Off the motor Enable signal can be activated / deactivated. Note that On means, that the Signal is off actually - and OFF means, that the signal is on, and the motor is allowed to run. With +/- the speed can be set from 0 to 200 - where 0 means stop and 200 means 100% speed. I1 and I2 represent the feedback signals Error and Pulses. r shows direction and 0 gives a speed indication.



On the second page with CH1 value the output voltage of the DAC can be set manually for testing, the motor will not run during this
page is active.

9.6. Start up recovery procedure

If the unit gets powered up, but does not start - besides CPU and Software issues, a problem with the I2C bus might be the reason.
Following procedure helps to identify I2C issues - followed by corrective actions.

Identification of a not starting unit:

- After switch in, the backlight of the display is ON,
- the first line shows black squares
- the second line of the display is blank
- No reaction to display buttons, all outputs on the main board off

Recovery procedure:

- Switch off the unit
- disconnect ALL I2C connectors from main board
- connect a service display instead of the original display (if not available proceed without any display connected)
- with a spare display connected switch on the unit and check for initialization message (with no display connected make sure, all levels in the tanks are ok and the cover switch is closed - and if installed the emergency stop button is NOTpressed)
- If the unit now starts up and runs the circulation pumps, a bus problem caused the problem
- Switch off again, and reconnect one after another bus component, beginning with the original display - disconnect the service display before switching on
- Switch on again after each component and check which one caused the problem.

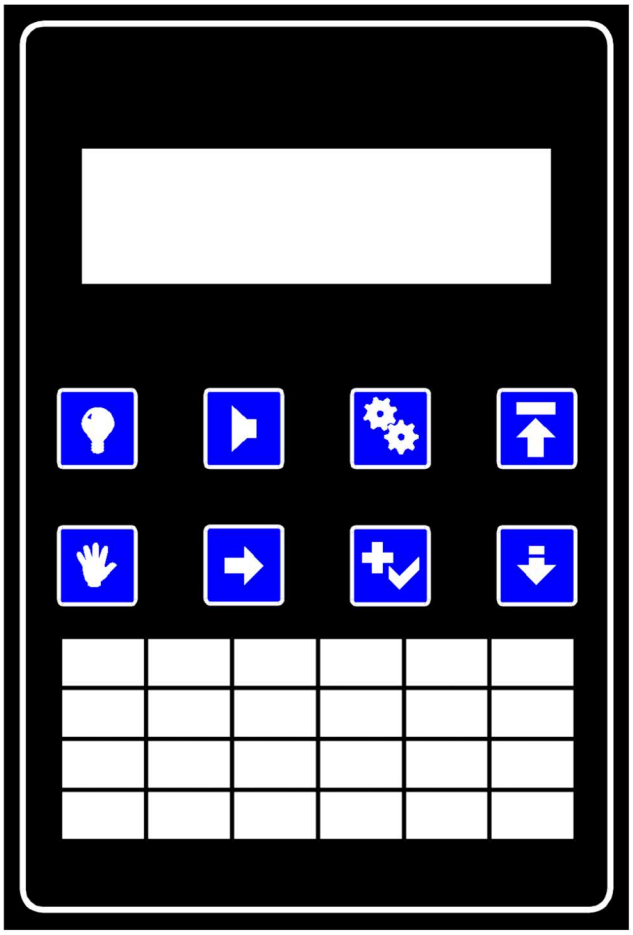
If after reconnecting all original components the unit starts up normal, most likely chemical deposits on the I2C plugs caused a short circuit between the Clock or Data signal and caused the unit not to start up.
Check all I2C plugs for deposits and gently clean if required.

If the unit still does not start up, connect to the Service PC and Start the Software FLIPS.
Check if the unit can be accessed via USB connection - If yes reinstall the firmware.

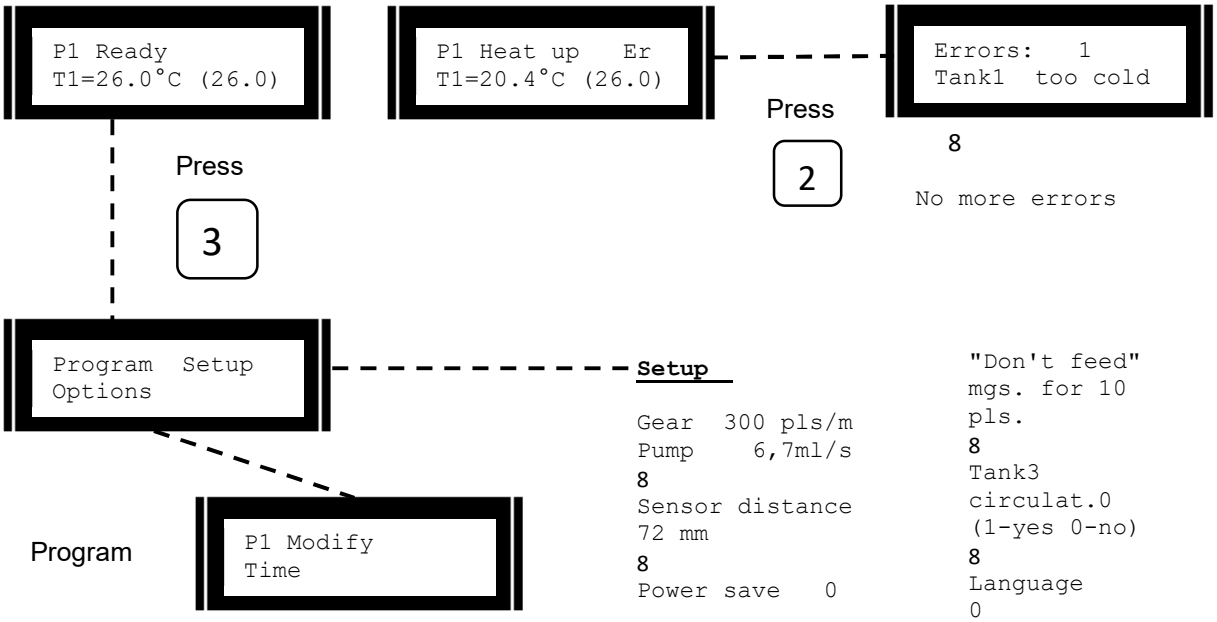
To do so follow the Firmware update procedure - coming with the unit documentation.
If the unit still does not start up, change the CPU card.

9.7. FlowChart

AT600 v3.4e and up



1 Keyboard lock enable/disable
2 check errors / mute alarm
3 program mode
4 back to top menu
5 manual operation
6 move cursor
7 select menu item / change value
8 scroll page down



Px

P1 Modify
7
P2 Modify
7
P3 Modify
7
...
P7 Modify

Time

Date: dd.mm.yy
Time: hh:mm:ss
8
Save Cancel

Modify

Tank1 time 100s
T1 26.0 C
8
T2 28.0 C
T3 max 50.0 C
8
Dryer power 20

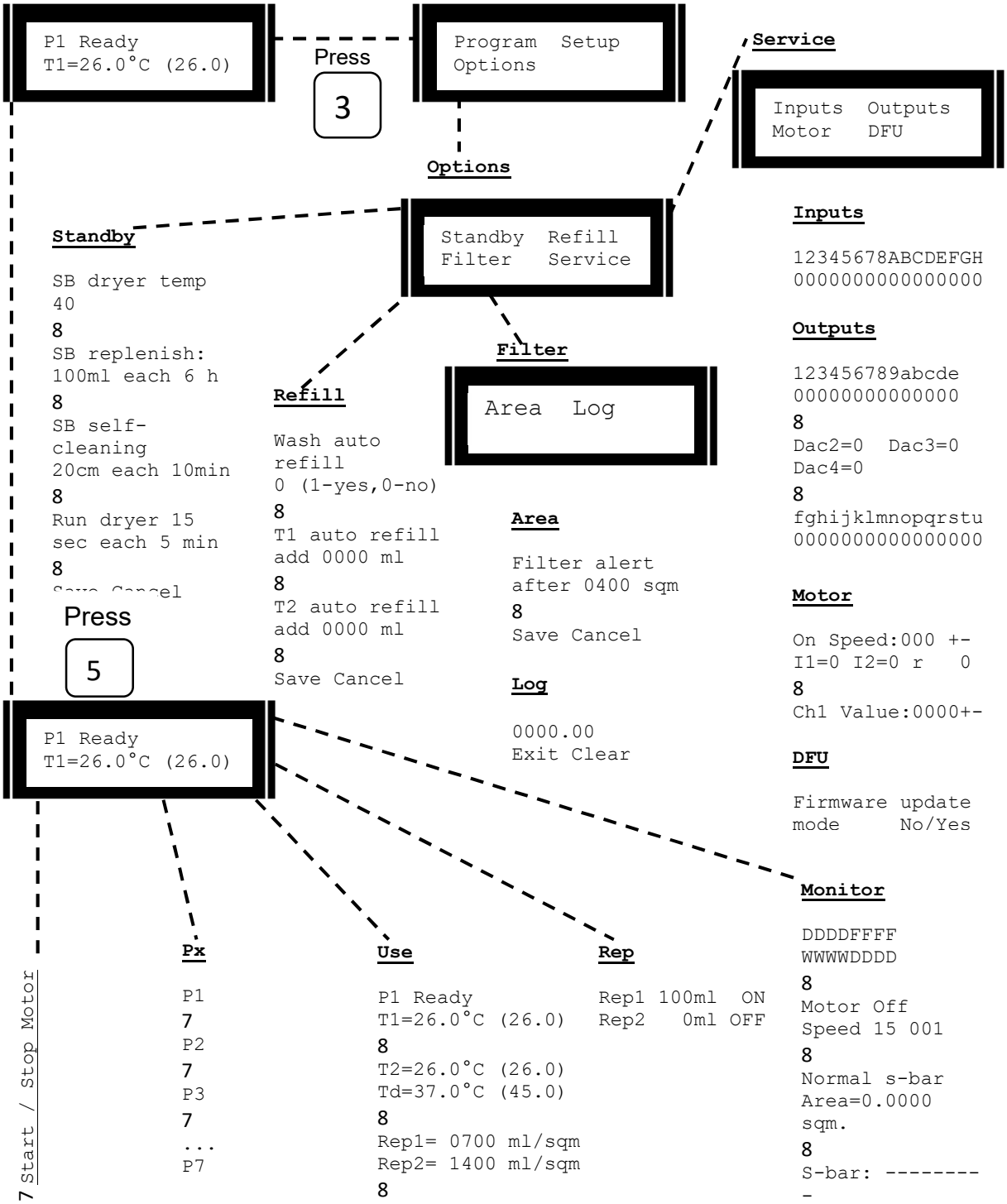
8
R1 0700ml/sqm
R2 1400ml/sqm
8
Save Cancel

Setup

Gear 300 pls/m
Pump 6,7ml/s
8
Sensor distance
72 mm
8
Power save 0

8
Replenish after
each 0.125 sqm
8
Pause between
sw
heaters 1000 ms
8
T1Str 0031 pls
T1End 0229 pls
8
T2End 0447 pls
T3End 0668 pls
8
Dr End 0826 pls
Wat.ref t_out
20
8
Wat Str 0330
pls
Wat End 0720
pls
8
Wash sensor: 0
(1-yes 0-no)
8

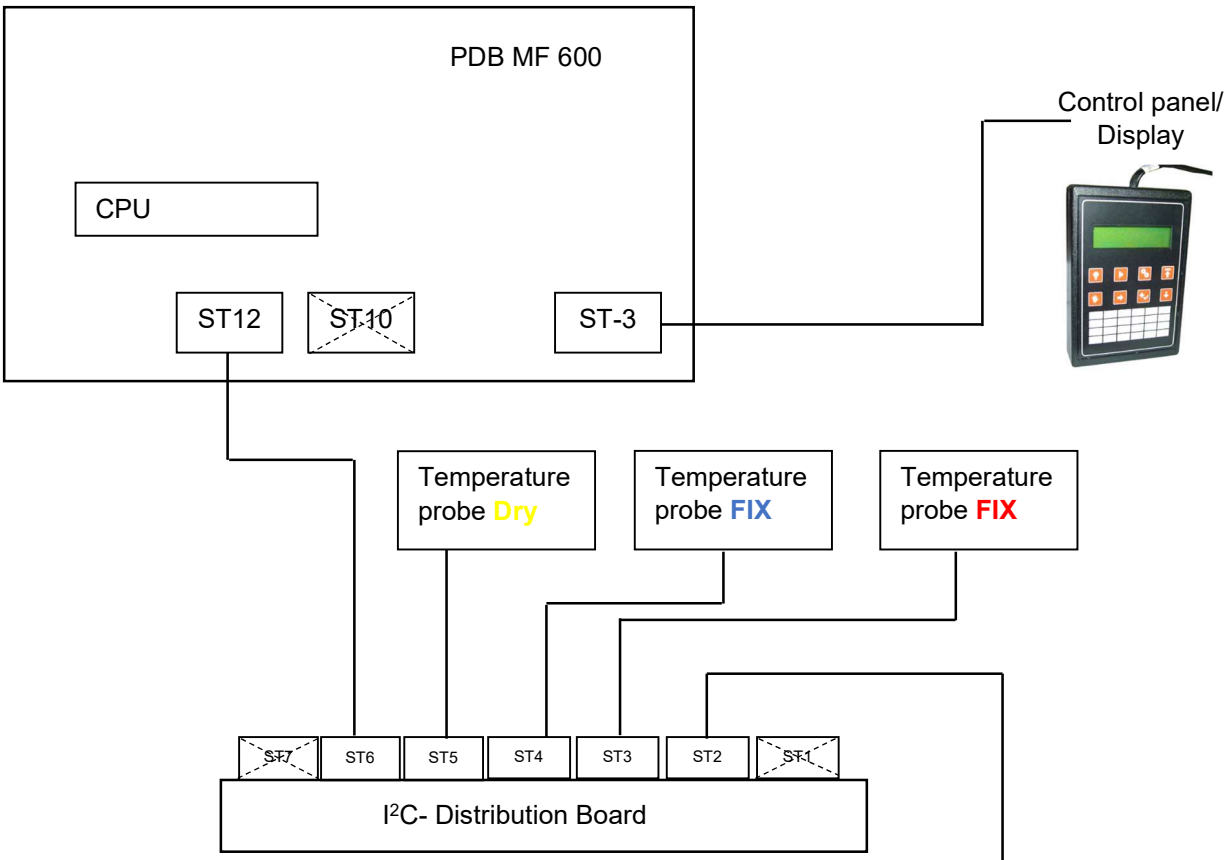
"Don't feed"
mgs. for 10
pls.
8
Tank3
circulat.0
(1-yes 0-no)
8
Language
0
(0-EN, 1-FR)
8
Auto restart 0
(1-yes 0-no)
8
Feed film if
DEV
temp is high -
1
8
Feed film if
DEV
temp is low -
0
8
Min tanks heat
OFF time 10
sec.
8
Dryer mode 0
0=Power 1=Temp
8
Additional
run 0015 pls
8
Save Cancel

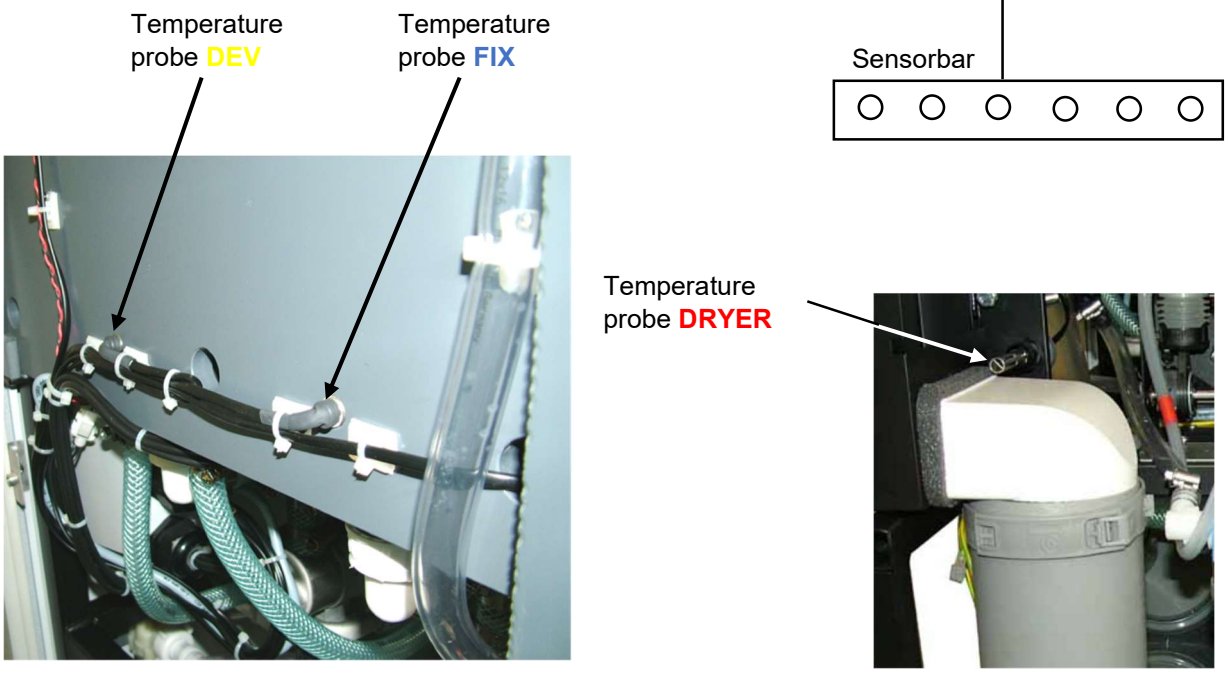

P1 Ready
T1=26.0°C (26.0)
Press
3
Program Setup
Options
Service
Inputs Outputs
Motor DFU
Options
Standby
Standby Refill
Filter Service
Inputs
12345678ABCDEFGH
0000000000000000
Outputs
123456789abcde
00000000000000
8
Dac2=0 Dac3=0
Dac4=0
8
fghijklmnopqrstu
0000000000000000
Motor
On Speed:000 +-
I1=0 I2=0 r 0
8
Ch1 Value:0000+-
DFU
Firmware update
mode No/Yes
Standby
SB dryer temp
40
8
SB replenish:
100ml each 6 h
8
SB self-
cleaning
20cm each 10min
8
Run dryer 15
sec each 5 min
8
Save Cancel
Refill
Wash auto
refill
0 (1-yes,0-no)
8
T1 auto refill
add 0000 ml
8
T2 auto refill
add 0000 ml
8
Save Cancel
Filter
Area Log
Area
Filter alert
after 0400 sqm
8
Save Cancel
Log
0000.00
Exit Clear
Press
5
P1 Ready
T1=26.0°C (26.0)
7 Start / Stop Motor
Px
P1
7
P2
7
P3
7
...
P7
Use
P1 Ready
T1=26.0°C (26.0)
8
T2=26.0°C (26.0)
Td=37.0°C (45.0)
8
Rep1= 0700 ml/sqm
Rep2= 1400 ml/sqm
8
Tank 1 time 110s
Dry to dry 425s
8
Speed 22 cm/min
USB not conn.
8
Dryer pwr=26 65%
R1=1 R2=0 SSr=60%
8
123456789abcde
00100010100000
Rep
Rep1 100ml ON
Rep2 0ml OFF
Monitor
DDDDFFFF
WWWWDDDD
8
Motor Off
Speed 15 001
8
Normal s-bar
Area=0.0000
sqm.
8
S-bar: --------
-

8
H1=0 H2=0
Hd1=0
Hd2=0 Ws=0
8
Refill1 0000
Refill2 0000
8
Filter area sqm
xxxx.xx
8
Total area sqm
xxxx.xx
8
Date: dd.mm.yy

9.8. I2C-BUS - Overview

Probes positioned under solution levels precisely monitor all solution tank temperatures. These temperature probes are continuously supplying information to the microprocessor on actual solution temperatures within the tanks. The microprocessor then compares these actual temperatures to the required programmed ”set” temperatures and controls the relevant heaters/cooling systems accordingly. To transfer this information, a i²C-Bus System is installed.





9.9. Test Instruction for the I2C-Bus System

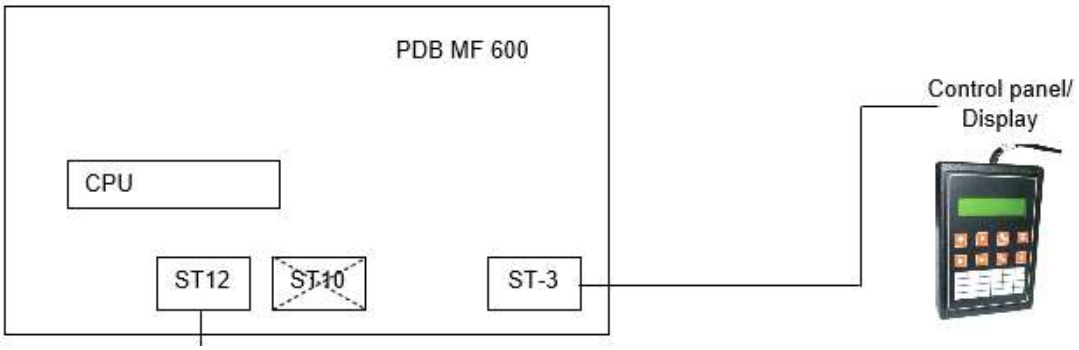
Testing of the I² C-Bus is easy!

Prior to the test disconnect all elements of the I²C-Bus System and follow the necessary working steps:

- Connect the Display to the Main Board PDB (ST3)
- Install the Cable between Main Board PDB (ST12) and the Distribution Board (ST-6)
- Connect the Temperature sensor DRYER to the Distribution Board (ST-5)
- Connect the Temperature sensor FIX to the Distribution Board (ST-4)
- Connect the Temperature sensor DEV to the Distribution Board (ST-3)
- Install the Sensorbar to the Distribution Board (ST-2)

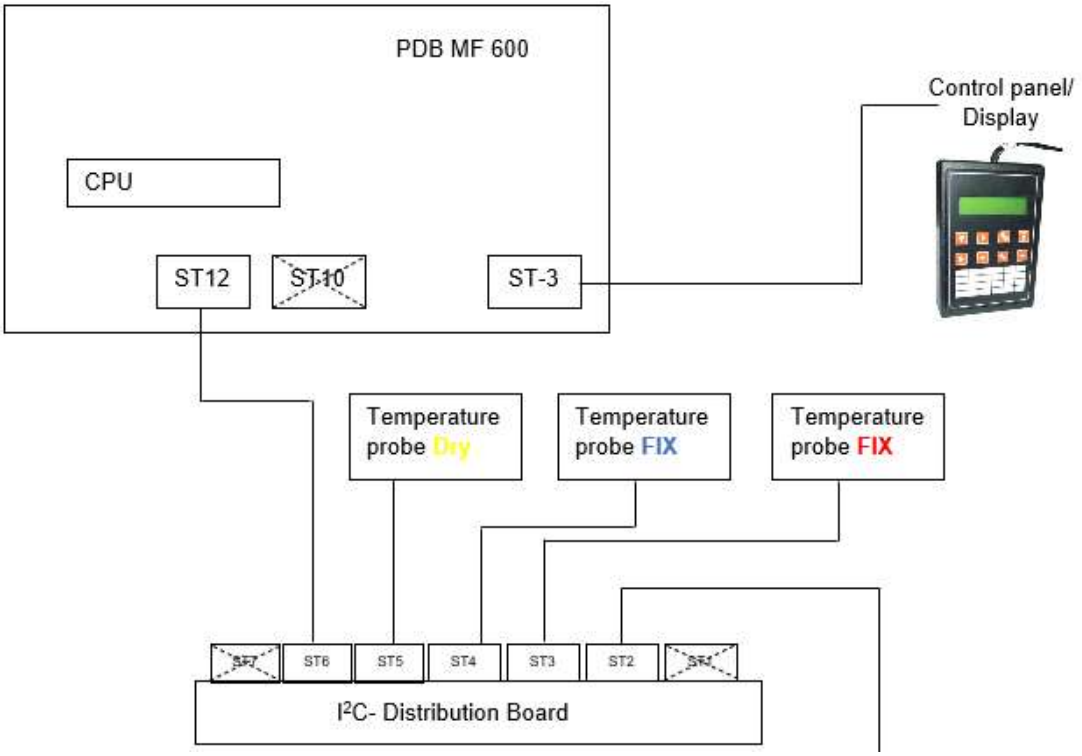
9.9.1. Connect the Display to the PDB (ST3)

If it's O.K. it will show the Software identification and the electronic will go in operation mode.



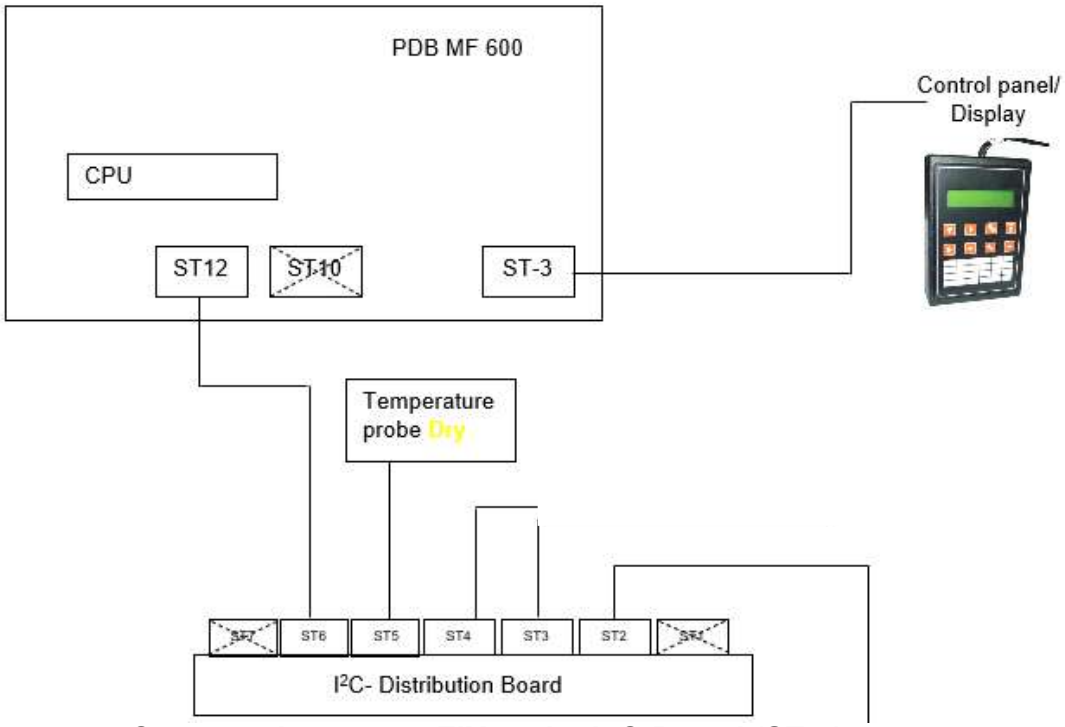
9.9.2. 9.9.2 Install a Cable between PDB (ST12) and the I2C-Board (ST-6)

If no trouble is shown, the connection Cable + the Distribution Board will be O.K.



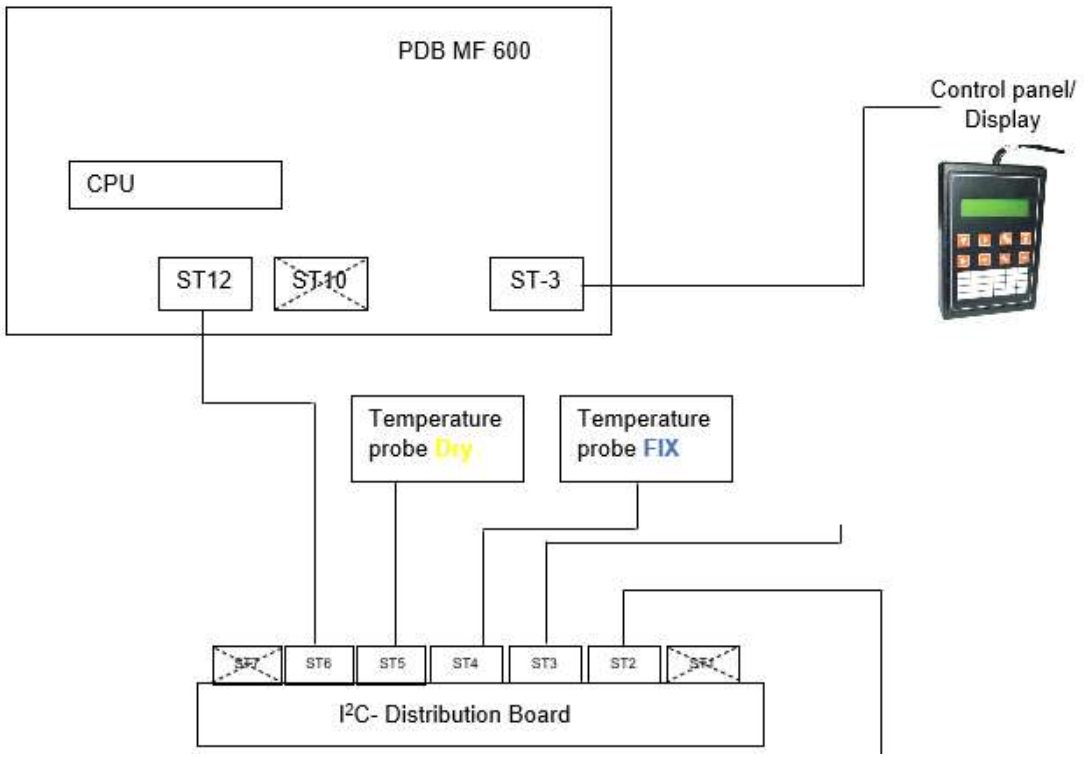
9.9.3. Connect the sensor DRYER to the I2C-Board (ST-5)

Press 8 to see T2 (FIX) and T3 (DRYER)also. If no trouble is shown, then the sensor will be O.K. On the Display will be shown the actual measured temperature +/- 1 °C. If "???" or some other indefinable signs are shown the temperature sensor is defective!



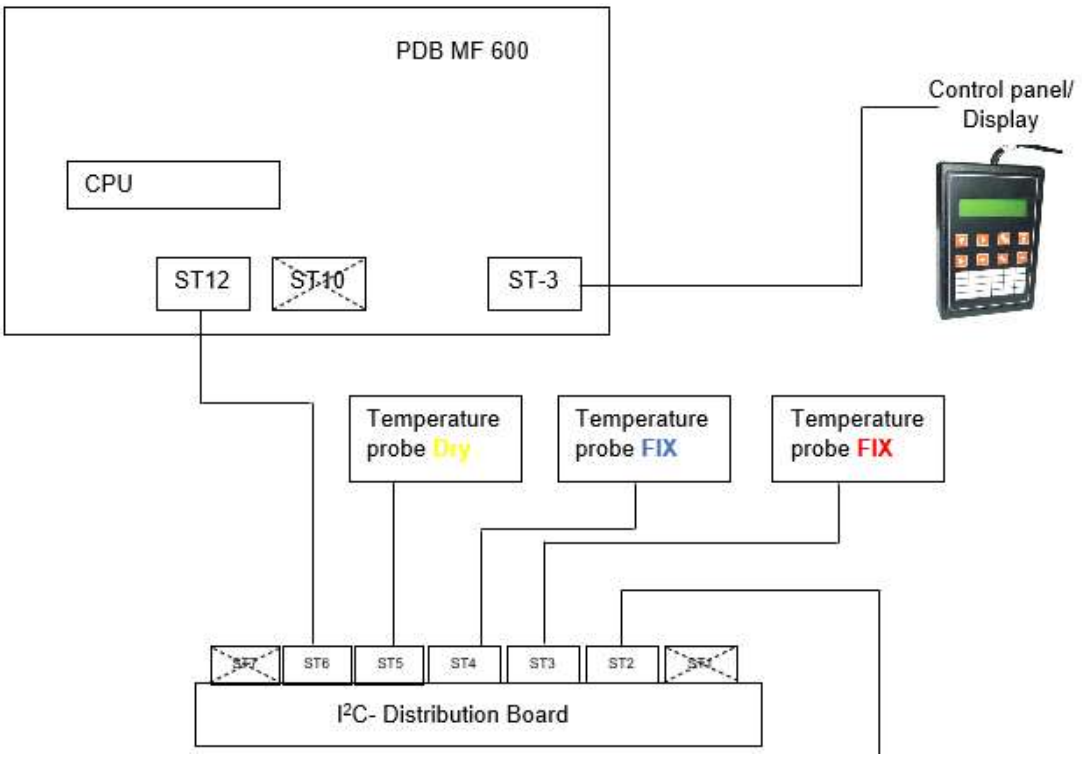
9.9.4. 9.9.4 Connect the sensor FIX to the I2C-Board (ST-4)

If no trouble is shown, then the sensor will be O.K.
On the Display will be shown the actual measured temperature +/- 1 °C.
If "???" or some other indefinable signs are shown the temperature sensor is defective!



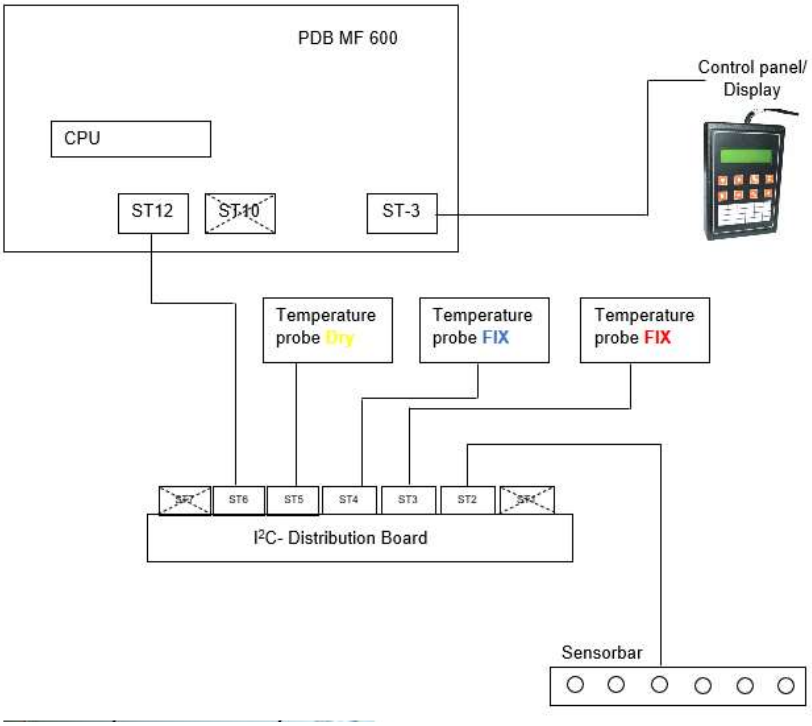
9.9.5. Connect the sensor DEV to the I2C-Board (ST-3)

Press 8 to see T2 (FIX) and T3 (DRYER). If no trouble is shown, then the sensor will be O.K.
On the Display will be shown the actual measured temperature +/- 1 °C.
If "???" or some other indefinable signs are shown the temperature sensor is defective!



9.9.6. Install the Sensorbar to the I2C-Board (ST-2)

If no trouble is shown, then the sensor will be O.K. If all sensors are O.K. you can see in the monitor program.



10. TROUBLE SHOOTING

Problem	Possible Cause	Correction
1. Tank too cold The Developer temperature is more than 1° C below the programmed value	a) Developer bath temperature is too low	a) Check the Heat up time, check Developer temperature in 2-3 minutes, 1°C temperature increase
	b) Heater problem	b) Check in the Monitor mode H1, check the LD3 on main board and check the Fuse F3
	c) No circulation in the bath	c) Check the Circulation pump, check the LD7 on Main board and check the Fuse L7
2. Tank1 too warm The Developer temperature is more than 1°C above the programmed value	a) Chiller doesn´t work	a) Check the Cooling assembly, check the LD9 on Main board and check the Fuse F9
	b) Cooling Pump	b) Check the Cooling Circulation Pump
	c) to less Cooling Fluid	c) Check the fill level of the Cooling Fluid using the inspection glass
3. Tank2 too cold The Fixer temperature is more than 1°C below the programmed value	see point 1	see point2, check the Fuse F9/LD9
4. Tank2 too warm the Dryer temperature is more than 1°C above the programmed value	see point 2	see point 2, check the Fuse F9/LD9
5. Dryer to warm The Dryer temperature is more than 1°C above the programmed value	a) Set temperature is too law (lower than room temperature)	a) Change the Set temperature
	b) main board defective	b) Change main board
	c) Solid State	c) Solid State Relays defective
6. Motor overload The Drive motor did not reach, it´s Set-speed	a) Main Drive assembly blocked	a) Check the main drive for easy running
	b) Main drive chain to much tension	b) Check the chain
	c) Film Jam in the racks	c) Check the racks

7. Cover opened The cover of the machine is not closed	a) The cover of the machine is not closed correctly	a) Check the machine cover
	b) The cover switch is demaged	b) Check function of the cover switch
8. Main Drive and Dryer run continuously	a) Main Drive started in “manual mode”	a) Check in the manual program if “STOP” is shown; stop the transport with the button. CAUTION: If also an automatic cycle is started by the sensor bar this cycle will end first.
	b) Material always under the sensor bar. Material not transported/pulled into the processor.	b) Check the Input rubber roller, check if a film is on the film table under the sensor bar.
	c) Senor/s at the sensor bar is/are wet or dirty.	c) Clean the sensor bar.
	d) Main board defective.	d) Change the Main board
9. Material wet when exiting processor.	a) Dryer temperature is too low.	a) Increase the Dryer temperature (max. 60°C)
	b) Transport speed to high.	b) Lower the Transport speed.
	c) Unusable or wrong Developer or Fixer.	c) Increase the Replenishment rate or change the chemicals.
	d) Dryer blows only cold air.	d) Fuse F9 of the Heater Dry defective or solid state relays defective, or dryer heating elements defective, or thermoswich from heating element is open.
10. Temperature problems Temperature is shown incorrect	The Temperature probes has to be positioned according their code.	a) The Temperature probes are colour coded. Developer yellow Fixer Blue Dryer Red

11. No fresh water supply	a) Water tap is closed	a) Open the Water tap
	b) Water valve is blocked or faulty	b) Clean the small Filter in the valve, or exchange it
	c) Main board defective	c) Check the Fuse F8/LD8
12. Circulation pump don´t work	a) Pump wheel is blocked by dirt	a) Clean the Pump wheel and make shure easy running
	b) No electrical power	b) Check the Fuse F7/LD7
13. Level in water tank to high, Water tank Overflows	a) Water drain/overflow blocked	a) Clean the Water tank and clean the Overflow and the Water drain.
	b) Worse water drain installation	b) Modify the Water drain installation.
14. Lever in Developer or Fixertank to low.	a) Tank leaks	a) Seal the Tank leak
	b) Too low Replenishment rate or too long Anti-Oxid. cycle	b) Increase the Replenishment rate or decrease the Anti-Oxid. cycle time.
	c) Replenishment container empty.	c) Fill up the Replenishment containers
	d) No electrical power on the Replenishment pump	d) Check the Fuse F5/F6, check the Fuse LD5/LD6 and clean the Replenishment pump or exchange it.
15. Chemical temperature can't be reached	a) Incorrect temperature	a) Program the temperature correctly
	b) Temperature sensor is faulty	b) Replace the temperature sensor
	c) The processor was started without liquid in tanks. The safety fuses at the heating element have interrupted the current supply	c) Reset the safety Fuse
16. Scratches or pressure marks	a) PDB is faulty	a) Replace PDB
	b) Unsuitable handling of the processing materials	b) Handle material carefully
	c) Cross over rollers are dirty	c) Clean all rollers above the fluid level
	d) Bent guide bars	d) Clean and check guide bars. If nesessary, replace it

17. Material remains in the Processor	a) Material fed incorrectly	a) The material must be fed in straight
	b) Material has excessive curl	b) Fold leading edges and feed in the processor
	c) Material is too thin	c) Use a leader to process
	d) Rollers are not rotating	d) Check gears and the position of the loose rollers.
18. Processor could not be switched on	a) Main cable isn´t plugged	a) Plug in main cable correctly
	b) Main Fuse us faulty	b) Check the Main Fuse F1
19. Paper of Film too dark	a) Developer temperature is too high	a) Decrease developer temperature
	b) Processing time is too slow	b) Increase processing time
	c) Exposure time is too long	c) Reduce exposure time
	d) After new chemistry: starteris missing	d) Add starter according to instructions
20. Paper of Film too light	a) Bath temp too low	a) Adapt the bath temperature to the recommended process or change chemistry
	b) Transport speed is too high	b) Decrease transport speed.
	c) Exposure time is too short	c) Increase exposure time
	d) Bath level is too deep (no heating and circulation	d) Fill bath to the right level and check Replenish-tanks
	e) Developer exhausted	e) Replenish or change chemistry
	f) Fixer getting into developer (Dev becomes cloudy)	f) Carefully clean the tank and replace chemistry
	g) Exposure settings are incorrect or machine is faulty	g) Adjust setting or repair faults

21. Paper or Film is fogged	a) Light leak in darkroom or cassette	a) Seal off light leak
	b) Incorrect darkroom light	b) Check the Filter, wattage and distance from the darkroom lamp to the required level
	c) Material is outdated	c) Check the date of maturity
22. Paper or Film has yellow-green surface	a) Unsuitable hand processing material is used	a) Only use material suitable for roller processing
	b) Fixer is exhausted	b) Replenish or change chemistry
	c) Level of fixer bath has dropped (Temperature safety fuse has been activated)	c) Check level of the Replenishment containers and fill up the bath to the required level
	d) Circulation pumps have failed	d) Check the pump motor and eventually replace it

11. SERVICE REPORT

This Service-Report may use only by an qualified Service-Technican!

CAUTION:

All listed points in this Service-Report must be conducted professionally!
The listed points must be tested in a specified sequence as below.

If there are any deficiencies found, the qualified Service-Technican must repair the defects accordingly!

After the trouble shooting and remedy of all deficiencies a new Service-Report must be created.
All listed points in this Service-Report must be conducted again till the Processor is working correctly!

The Safety Inspector must record each Testing-Step on the Service-Report!
The measured test values and the general information about the test equipment must be recored also in the Service-Report.
The Safety Inspector confirm with the notes "Location, Date and Signature" the data of each Testing-Step.

WARNING:
Prior to all actions, the Power Supply of the Processor must be disconnected!

***Direct Connection:*** Turn the Main Switch of the Processor (installation side) to the position "0".Secure the Main switch against switching on and check the voltage-free parts.

***Plug Connection:*** Disconnect the Power Plug of the Processor.

PROZESSOR: .....
Serial Number: .....
Software-Revision: .....

11.1. Testing the Grounding Conductor

The ***voltage resistor value*** between all grounded components of the Processor and the Power Plug
must be ***less than 300 m (mOhm)***

Processor:

- Terminal clamp of the grounding in the processor ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Main switch - mounting plate ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- E-Box-Cover ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Mounting plate of the Solid-State-Relais ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Main filter Corcom 20VB6 F7354 ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- E-Box-Housing ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Printed circuit board track (ST21) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Exhaust Fan (Plug ST34) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Heating Tank 1 (Housing) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Heating Tank 2 (Housing) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Replenishment pump Tank 1 (ST15/1) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Replenishment pump Tank 2 (ST16/1) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Dryer Fan ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Dryer-Housing (Heating) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Magnet valve Spraybar Fixer (ST8/1) ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Processor-Frame ..... m ☞ ☐ O.K. ☞ ☐ not O.K.
- Processor-Mounting Plate ..... m ☞ ☐ O.K. ☞ ☐ not O.K.

Feeder:

- Grounding Screw Power Supply Side panel ..... m☐ ☞☐ O.K.☞☐ not O.K.
- Fan ..... m☐ ☞☐ O.K.☞☐ not O.K.
- Power Supply-Mountingflnge ..... m☐ ☞☐ O.K.☞☐ not O.K.
- Feeder-Construction ..... m☐ ☞☐ O.K.☞☐ not O.K.
- Feeder-Cover ..... m☐ ☞☐ O.K.☞☐ not O.K.
- Film Infeed Giude ..... m☐ ☞☐ O.K.☞☐ not O.K.

Safety Tester: .....
ID-No. Tester: .....
Calibration Date: .....
Safety Inspector: .....
Location, Date: .....

11.2. Isolation Resistor

The ***Isolation voltage resistor value*** between the grounding conductor of the Processor and all electrical components (L/N) must be ***less than 2 m☐ (mOhm)!***

Processor:

- Main Switch to the position "1" ..... m☐ ☞☐ O.K. ☞☐ not O.K.

Safety Tester: .....
ID-No. Tester: .....
Calibration Date: .....
Safety Inspector: .....
Location, Date: .....

11.3. Leakage current (Ersatz-Ableitstrom)

Only the measure of the "Backup-Leakage Current" value is possible with the Safety Tester!
The Leakage Current must be less than 4 mA (mAmpere)!

Processor:

- Main Switch to the position "1" ..... mA ☞☐ O.K .☞☐ not O.K.

Safety Tester: .....
ID-No. Tester: .....
Calibration Date: .....
Safety Inspector: .....
Location, Date: .....

11.4. Visual Inspection

The Safety Inspector must make a visual check of all surfaces and assembled components!

a) Are the electrical conduction/cables installed in the E-Box accordingly? .....☞☐ O.K.☞☐ not O.K.
- It is not allowed that Primarylines are in touch with the blanc Secundary Parts.
- It is not allowed that Sekundarylinesare in touch with the blanc Primary Parts.

b) Are the ground conductor connections installed professionally and safe? ..... ☞☐ O.K.☞☐ not O.K.

c) Is the Strain/Pull Relief of the Power Cord correct? (Hand test) ..... ☞☐ O.K.☞☐ not O.K.
- Strain/Pull Relief of the Processor
- Strain/Pull Relief of the Power Plug

d) Check the Power Cable und the Power Plug for damages! ..... ☞☐ O.K.☞☐ not O.K.

e) Exist the Nameplate/Typelabel on the Processor and is it completely? ..... ☞☐ O.K.☞☐ not O.K.

f) Are all Covers mounted in the right position check of the surfaces? .....☞☐ O.K.☞☐ not O.K.

g) Are all protective conductor connections connected and installed safety? ..... ☞☐ O.K.☞☐ not O.K.

h) Are all Processor Side Panels fix and screwed on correctly? ..... ☞☐ O.K.☞☐ not O.K.

i) Are all Feeder Side Panels and the Top Cover fix and screwed on correctly? .☞☐ O.K.☞☐ not O.K.

j) The Processor Dryer Rack with the Support Bracket on the left side,
must be secured against mechanical extraction! ..... ☞☐O.K. ☞☐ not O.K.

Safety Inspector: ***.....***

Location, Date: .....

11.5. Check of the interlock switch

The Safety Inspetor must make sure that the Covers are mounted correctly!

Processor:

- Interlock Switch is fix and safety ☞ ☐ O.K. ☞ ☐ not O.K.

Safety Inspector: .....
Location, Date: .....

11.6. Acceptance Testrun of the Processor

The Safety Inspetor must make a Testrun as described in the Instruction Manual and have to check the full function!

Processor:

- minimum 1 Heat-up phase of the Heating components checked ☞ ☐ O.K. ☞ ☐ not O.K.
- Testrun like in the Instruction Manual described done and completed ☞ ☐ O.K. ☞ ☐ not O.K.

Safety Inspector: .....
Location, Date: .....

11.7. Test for Leaks

The Safety Inspector must check the whole Hose-System and must test the Processor for leaks!

Processor:

- Internal and external Piping and Hose-System ☞ ☐ O.K. ☞ ☐ not O.K.

Safety Inspector: .....
Location, Date: .....

ACCEPTANCE BILL:

A complete technical inspection has been carried out and specific problems has been discussed with the customer.