CP800 User Manual

FND

Contact:

Last Updated: 22/10/2022

Installation 3
Adjusting Screen contrast 4
Setting up 4
Connecting the plumbing loop: 4
Tank leveling: 4
Calibration of full tank sensor: 5
Calibration of flow out sensors: 7
Rotating clutch and rod: 8
Main Menu: 9
Loading Processing: 10
Load from script 10
Load from SD 10
Issues and Errors of SD loads: 11
Known Issue 1: 11
Errors: 11
Possible solution to solve each error: 11
Load from ROM 12
Processing Sequence: 12
Editing ROM Processing: 16
General control: 17
Editing mode control: 17
Saving ROM Processing: 18
Cleaning up 18
Maintenance 20
Flows Sensors: 20
Plumbing : 21
Solenoid Valves: 22
Part Lists: 28

Installation

Pre-setup:

Please check your package for parts/components against the following checklist, please refer to the "Part list" section for the components part code and names with a picture.

Checklist:

Received parts in package

Part code	Name	Condition	Qty	Check?
CP800-FULL	CP-800 Semi-automatic drum processor		1	
CPB00-TANK	Full dev tank		1	

The below list is the parts that are not provided in the package and the user is required to source themselves from local hardware shop

Sourcing list;

Part code	Name	Qty	Check?
	Local IEC Power cable	1	
	Sous Vide machine	1	
	10mm tubes – 10 meters	1	
	3mm Philips head screw driver	1	
	1mm Flat head screw driver	1	

Adjusting Screen contrast

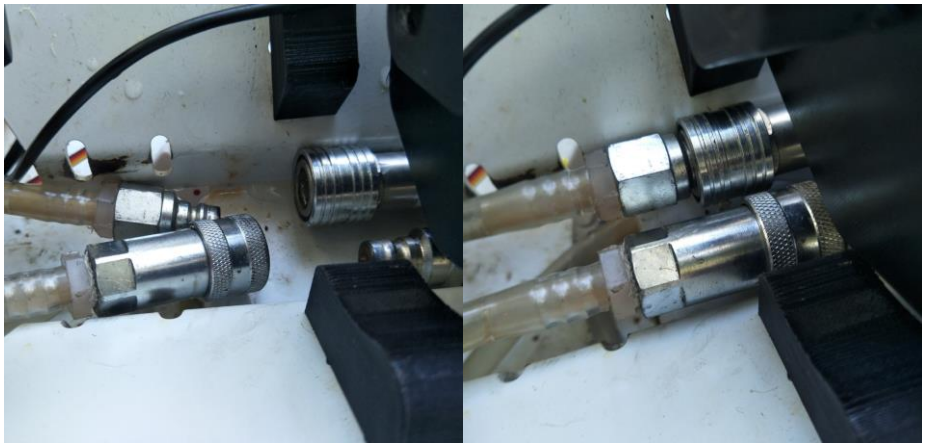
Once the machines all check and setup, and all parts and assembly are checked please use the 1mm Flat head screw driver to adjust the screen contrast if the contrast is out.

** insert photo**

Setting up

Connecting the plumbing loop:

The processing tank has to be connected before any plumbing can take place. The connectors between the valves and the processing tank only open when connected. Trying to pump without connecting the tank will result in pressure building up in the connector end, and the plumbing tube will likely to burst out.



The left picture shows the processing tank not connected; the right shows the tank is connected.

** update photo with nylon quick coupler**

Tank leveling:

The user is required to adjust the level of the fluid inside the processing tank. The fluid level inside the tank should reach the middle of the rotating shaft along its entire length. Leveling the required to ensure all film along the rotating shaft is developed uniformly.

It is known that the current design of the machine assembly doesn't guarantee rigidity to ensure the tank is installed horizontally, since the tank is simply resting on sleepers and the metal casing

underneath has an incline to drain any leaks.

The following procedure is recommended to level the fluid in the tank:

1. Keep the tank open and rest it on the stands
2. Fill the tank with water manually, the unpowered (turn off) machine should keep the water from draining
3. Place a spirit level meter on the casing of the processing tank
4. Adjust the spirit level to the center as much as possible by padding the height of legs on the left side of the machine as you are facing it (we been using plastic canister caps which works fine).
5. Double check the water level with dummy rolls to see that the water level covers the bottom half of all rolls along the rotating shaft, repeat from step 2 to 4 until all rolls are submerged properly at rest.
6. Keep the water in the tank, if you wish calibrate the full tank sensor, see section “Calibration of full tank sensor”

It is also important to place the machine on a flat surface, since the rotating shaft is only functional within a small angle from the shaft axis of the DC motor.

Calibration of full tank sensor:

Full level sensor is sensing the capacitive of the material against its sensing surface. Capacitive sensing is dependent on the temperature, moisture content, the density of the material and the humidity of the air.

It is recommended to calibrate the sensor at the beginning of each day after the chemicals have been heated up to the desired temperature for the processing. If the ambient temperature has changed

significantly during the day or a process operating with chemical at a different than previous processing, it is highly recommended to re-calibrate the full level sensor.

Consider calibrating the sensor in the following situation:

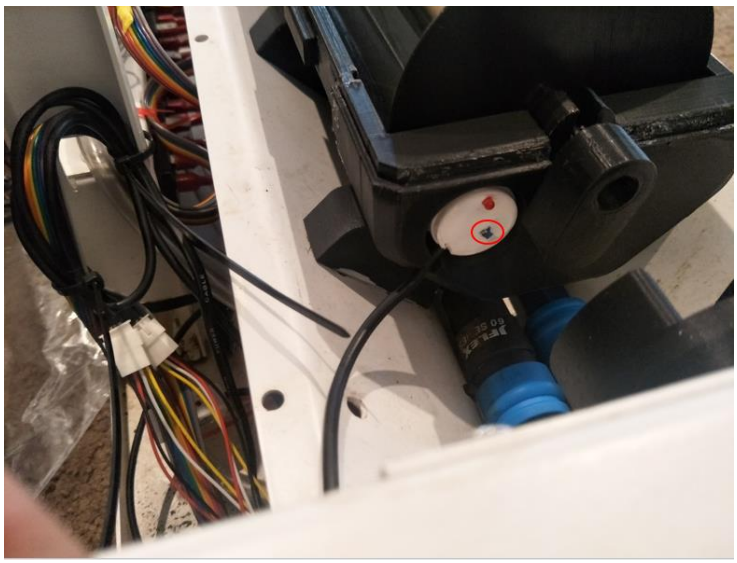
1. Before the first processing on a new day
2. If the operating ambient temperature change dramatically more than 5 °C (degrees Celsius)
3. If you are swapping over to use different processing chem (from BW 20 °C to C41 38 °C, or vice versa).

NOTE: when tuning the sensor, **clockwise turning decreases the sensitivity** of the sensor, and **counter clockwise increases it.**

The following procedure is recommended to calibrate the sensor:

1. Fill and level the fluid level of the tank, see section “Tank leveling”
2. Remove the cap of the sensor and have the nod exposed, you can remove by pitching the top bit of the sensor or use a flat head screw driver to rub it repeatably until the lid come off

3. Connect the sensor and power on the machine.
4. Turn the nod using a flat head screw driver (circled red in the picture below), so the LED is just turned on at the desired water levels.



5. Remove the water content so the tank is empty, and the sensor should be off
6. Place the tank at the horizontal position on the sleeper and keep the machine powered
7. Refill the tank until you see the water level raised high enough to trigger the sensor's light
8. If the sensor turned on at the desired level, the calibration is now completed, if not, repeat step 5 to 7 until the sensor's light turned on at the desired level.

Calibration of flow out sensors:

There are two outlets flow out sensors. They are to detect water flowing through the tube when the process is emptying the tank. The signal of both sensors is joint electrically to one port on the motherboard, so both sensors have to switch off together to indicate the entire flow out tube is empty thus the tank is empty. This arrangement is made to reduce the chance that a false positive for empty tank when there are air bubbles in the tube. The reason for that is the situation toward the end of the emptying the tank, the water level in the tank will be low enough that the pump will suck air in before the fluid is drained down by gravity on the other side of the tank.

These sensors sense the capacitance within the clip. Thus, consider calibrating the sensor in the same situation as the full tank sensor, which are:

1. When you are about to operate CP800 in a different temperature
2. Before the first processing on a new day
3. In the morning, afternoon and night without air-conditioning and operating in a climate where the temperature changes vastly during the day

The following procedure is recommended to calibrate each sensor:

1. Ensure all plugs are secured, the socket on the PCB for flow out sensor is connected to the splitter wires with two inline sockets and one inline plug

2. The splitter wires should act as AND gate for the pull-down signal of the sensor.
3. Check the signal is working properly by holding the sensor bare handed on the metal clip, the LED on the sensor should turned on
4. On the LCD Navigate to the output check menu: Main menu > (down button X 6) > setting > (down button once) > Output check
5. Pump in fluid to the tank from any input , using any addChem valve.
6. Pump out some fluid (using removeChem valve) and stop while the tube has water content in it.
7. Turn the nod on the sensor with a small flat head screw driver to adjust the sensitivity, make sure section with actual water content should trigger the sensor, the nod is circled in red in the picture below

8. Pump the rest to check if the sensor light turned off too quickly before the tank is low in level
9. Test trial a processing cycle with water to see if the tuning allows a good drainage of the water content inside the tank.
10. Repeat step 5 to 9 if tank not drained, given the tank is physically leveled, else FINISH

Rotating clutch and rod:

Just need to make sure the clutch is not loose and it's connected to the motor properly by clamping on to the D-shaft with a bolt/grubscrew, the 3D printing hole of that could be a bit big, so might need to glue or put some paper to increase the friction.

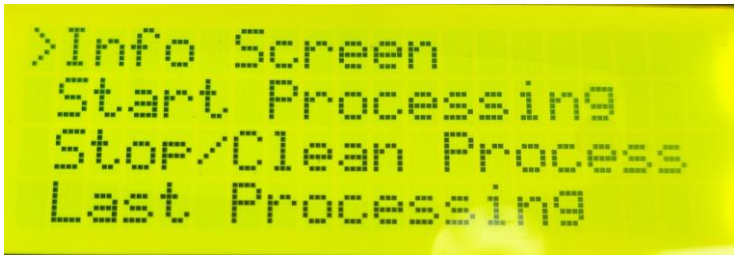
Main Menu (on LCD screen):

Navigate the menu using the instructions below:

- Up button: to move cursor upward
- Down button: to move the cursor downward
- B button: return to previous page
- A button: confirm or to go into the next page based on the option where the cursor is

There are 6 rows to select:

1. Info Screen: display information of processing or not processing
2. Start Processing: display option for starting a process
3. Stop/Clean Process: to stop a current process or conduct a cleaning process (cleaning process NOT implemented yet)
4. Last Processing: to recall and rerun the previous processing (NOT implemented)
5. Edit Processing: to select and edit processing saved in the ROM
6. Setting: to select and inspect the input and output of the machine

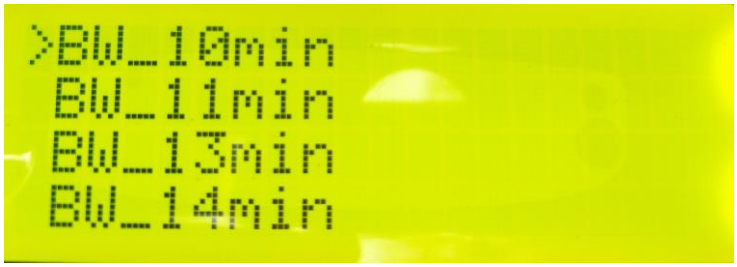


Loading Processing:

There are three ways to start film processing:

1. Load from sketch (there could be typo), max up to 6 programs
2. Load from SD, due to the limitation of dynamics memory, max up to 12 programs
3. Load from ROM, max up to 6 programs

After selecting the method of loading, there should be a list of programs on display:



Load from sketch

There is a default of 6 programs loaded to the script of the machine from FND. This is the easiest way to start processing, since these programs are stored together with the firmware and can be read many times. Programs from sketch can be reused multiple times without rebooting machine. However, these programs cannot be edited, so the configuration of the machine has to follow the standard FilmNeverDie setup for those processes. Eg, Kodak D76 1+1 dilution at 20°C for BW and C41 with Fujifilm / Champion C41- N1, N2 , N3 + Stabiliser at 38°C set up.

Load from SD

Users can upload their own program via the SD card module. However, Reboot is required to refresh the SD files to rerun any further program from the SD card.

NOTE that the SD card has to be FAT32 format.

Issues and Errors of SD loads:

Commented [GW1]: add trouble shooting at the end.

Known Issue 1:

The machine froze after selecting “load from SD” in the menu after it has been loaded from SD card once before.

Cause:

The firmware doesn’t allow the SD card module to be reloaded, when there is already an existing module.

Solution:

Reboot the machine before starting a new process from SD card after a previous load

If a user is trying to “load from SD”, there are 5 types of error when the operation is unsuccessful.

Errors:

1. Card failed, or not present
2. Program file has an unmatched number of programs
3. Process step has unmatched size with program header
4. Program file missing
5. Can't open program file from SD card

Possible solution to solve each error:

Error 1:

1. Make sure the SD card is inserted properly, you should hear a ‘click’ when you push the SD card, and the SD card is not bouncing back.
2. Make sure the format of the SD is FAT32

Error 2:

1. Make sure the number of programs within the file matches the actual number of programs stored in the file
2. It is recommended to regenerate the Programs.txt again with the official version of the generator from FilmNeverDie.
3. Users could also contact FilmNeverDie with their custom programs to get a properly generated file

Error 3:

1. Make sure the number of steps within the program matches the actual number of steps stored in the program
2. It is recommended to regenerate the Programs.txt again with the official version of the generator from FilmNeverDie.

3. Users could also contact FilmNeverDie with their custom programs to get a properly generated file

Error 4:

1. Make sure there is a file named “programs.txt” (none case sensitive) in the SD card

Error 5:

1. Make sure the file named “programs.txt” is not opened by another software
2. Make sure the file named “programs.txt” is not corrupted

Load from ROM

Selected load from ROM will allow users to choose the program they had edited and saved to the EEPROM.

NOTE that the ROM processing is only loaded upon startup of the firmware, and any changes to the ROM programs could only be reflected in the Load from ROM menu after restarting the machine.

There is the possibility that extra characters in the process name are accidentally saved to the ROM from the editing menu. This is caused by the dynamical memory used in the editing menu, and extra char might be present when saving the data array with undefined characters. This WILL NOT cause any operation issue to the processing itself.

Processing Sequence:

After selecting processing from the menu, you will have to confirm and start the processing

- Confirmation page:
    - Up button: +1 for pushing (increase dev time for 20%)
    - Down button: -1 for pushing (increase dev time for 20%)
    - Left button: +1 for dummy rolls in processing
    - Right button: -1 for dummy rolls in processing
    - B button: return to previous menu
    - A button: confirm and start

Info page shows:

Line 1: Process Name (Proc Name: ----)

Line 2: Estimated Time of the processing (Est. Time: --: --)

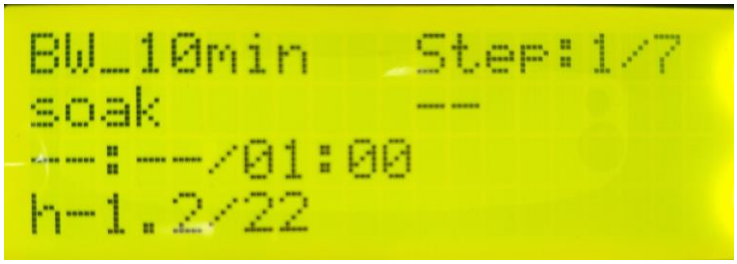
Line 3: Push or pull value (+/-: ---) followed by Dummy rolls numbers (D: -)

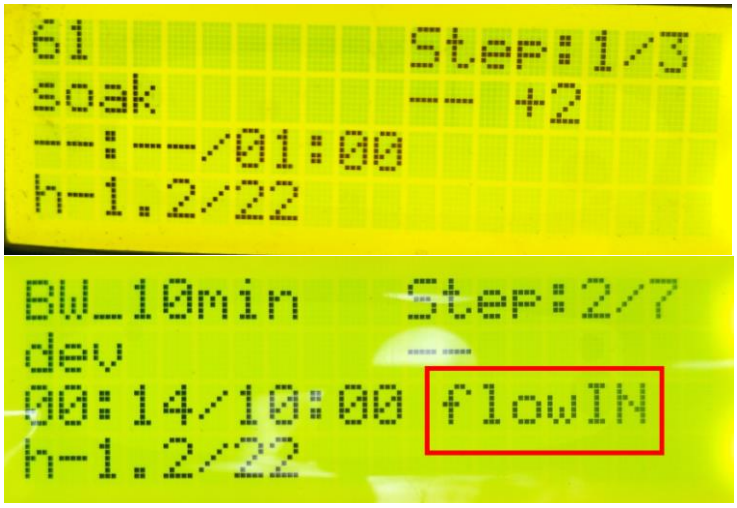
Line 4: message to inform user to press A (yes) to start

Dummy rolls have greater water displacement than regular rolls, and will reduce chemical usage. More on this later.

After starting the process there are option to further control and assist the machine to ensure the processing is up to standard.

- Info page during processing
    - **Up** button: flow IN : this is an overwrite toggle to continue pumping in (same input valve as the current step)
    - **Down** button: SKIP: skip from add to remove / skip remove to next step
    - **Left** button: change to alternative info page (whilee in changing processing mode page, up / down will change from Sensor-based to Time-based processing based on Dummy rolls) More on this later.
    - **B** button: return to previous menu
    - **A** button: emergency flow OUT toggle (it will use removeChem 6 / output valve 6 only)
    - Others: does nothing





Info page shows:

Line 1: the processing selected, and the step progress

Line 2: The step name on the left, and the push/pull value and number of dummy rolls for the process on the right

Line 3: The time eclipsed out of the time in the step, and the flowIN/flowOUT msg

Line 4: heater temperature out of the target temperature (temperature function is not implemented)

The Red box highlights the location on the display where “flowIN”, “flowOUT” is visible when flow in and flow out toggle is active, respectively. “flowIN” has a high priority and will be on display when both toggles are active.

FlowIN and flowOUT toggle allows user to manually control the fluid level manually. Flow In adds the current chemical of the step into the tank, whereas the flow out will pump the fluid inside the tank via removeChem 6 or 6th out valve..

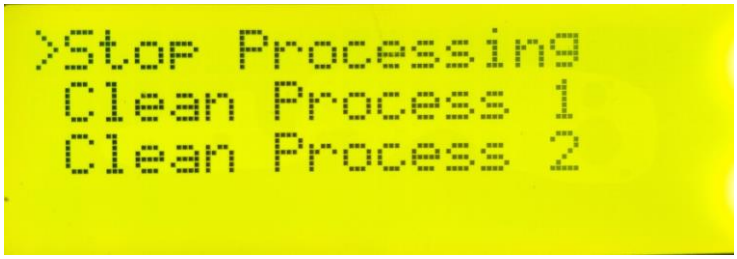
TRY NOT to use flowOUT if not necessary, it is designed as a backup flow out port in case the original port is blocked for some reason, also ensure removeChem 6 is always a back up , if possible.

- Alternative Info page during processing – when left is press to change processing mode.
    - Up button: switch between sensor-based or fixed timer-based mode
    - Left button: return to original info page
    - Others: does nothing

In sensor-based mode, the processing of adding and or removing the chemical depends on the signal from the sensors with basic hold-on and hold-off timing

In fixed timer-based mode, each stage of a processing step is based purely on timer, the adding and removing chemical stage is only dependent on the time. During this step is very important to ensure there is always liquid to pump in (chem tank is full) and also out valve is not obstructed to ensure the timer mode works perfectly. (From time to time you might also need to adjust the time for each dummy roll, please contact us so can assist you in doing that).

- Stop process
    - Navigate to Stop processing from the main menu
    - Select Stop Processing



    - Press A to confirm Stopping

Editing ROM Processing:

Entering the selection menu of edit processing would show the list of ROM programs that the user could edit, max of programs is 6.

NOTE that the editing is done in a buffer on the menu, and the changes reflected on the menu do not mean it is saved to the EEPROM.

After selecting a program to edit you can browse the parameters of the process using the general control. Saving is done automatically when you make a change in any parameter and return back to the editing selection menu.

Line 1 shows you are editing and the step number you are viewing/editing, process header also displayed as step 1.

Line 2 shows the name of the process you are viewing /editing

Line 3 shows the parameter you are viewing /editing

Line 4 shows the value of the parameter you are viewing /editing

General control:

- Left button: go to the previous parameters
- Right button: go to the next parameters
- B button: return to previous menu and save to ROM if changes had been made
- A button: toggle viewing/editing mode for the current parameters

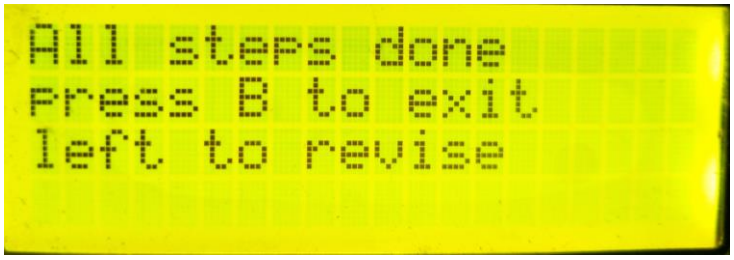
If editing mode is active, the top left corner of the screen will have a flashing black block, where the blue square is in the picture above

Editing mode control:

- Up button: increase the value of parameter by 1
- Down button: decrease the value of parameter by 1
- Left button: select the previous character (for process Name only), or decrease the value of parameter by 10 (for all other parameters)
- Right button: select the next character (for process Name only), or increase the value of parameter by 10 (for all other parameters)
- B button: exit editing mode without changes
- A button: exit editing mode with changes made on the editing menu

*NOTE: if you select 5 steps for your program, then you need make sure you edit all 5 steps before you can save it properly on the rom.

A saved message is displayed for 1 second when A is pressed to confirm the changes made and exist editing mode for the parameter



After you programmed the last step parameter, "Pushable" for the last step, a message will inform you that you had programed the last parameter, and this message stay on screen for 5 seconds. This message also occur when you press the right button, because there are no more parameters to edit.

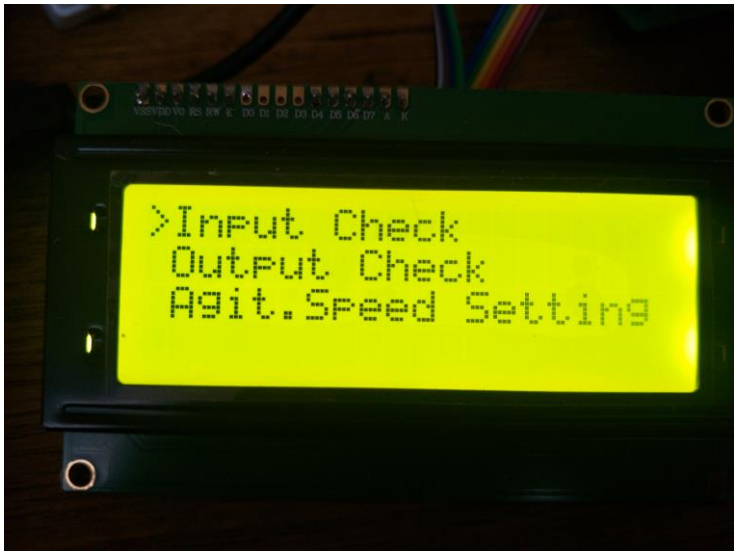
Saving ROM Processing:

Saving is done automatically when you make a change in the parameters and return back to the editing selection menu.

Cleaning up

It is recommended to perform a cleanup at the end of the day, and after a long time without running it. The cleanup procedure is using clear water and relying on the pump to rinse inside the machine. All outlet water should be discarded as waste.

1. Go to "output check" menu: Main > Setting > Output Check



2. Press right to reach the first input tanks, addChem 1

3. Prepare a container fille with water
4. Put one end of both tubes into the container filled with water if you intend to reuse the water, if not, put one output tube in another container which will be discarded as waste later
5. Prepare two pumping tubes and connect one on the first input valve (addChem 1) and the other on the first output valve (removeChem 1)
6. Using the menu to turn on the input by pressing the “Up” button and start filling the processing tanks

7. Once water is checked to be pumping in properly at the desired flow rate, skip to the first output valve, remove chem 1, on the menu
8. Turn on the output using the menu by pressing the “Up” button and let all the water drain
9. Detach both tubes on the valves and attach them to the next input/output valves
10. Repeat step 5 to step 9 for all the other valves until no more valves are untested, and refill the input container if needed
11. To clear the inside of the valve from water as much as possible, go back to addChem1 from the menu
12. Turn on the input valve in order and let it pump in air for around 5-10 seconds each valve, WD40 can be sprayed into the valve to repent the water out of it
13. Repeat step 12 for all the inputs and outputs
14. Finally, also please use WD40 to repent water in the Male and Female Nylon Quick Connector as there are metal ball bearing there which would rust and cause the connection to be not as smooth and need a 'pull up’ to connect them properly.

If any valve has a significant difference in flow rate, and the water has become dirty from flowing through it. It could indicate there is a blockage or corrosion inside the valve. It is recommended to take the valve apart and clean it thoroughly.

Maintenance

Flows Sensors:

The full and empty flow sensor should be tested regularly. Full level sensor on the processing tank should be calibrated so the LED on the sensor is turned on at the desired level by the user. Similarly, the

flow out sensors should be tested during a manual pump cycle so that the operation would guarantee proper pumping for each process. Due to the moisture and chemicals of film processing, the contact of the sensor may be affected over time. Please do keep the contact clean when the machine is not being used and apply WD40 regularly to keep moisture out of the contact.

Plumbing :

The machine should be pumping the hose and the valves dry before the machine is switched off overnight. Emptying the inlet can be done by manually actuator each valve into the processing tank, as for the full tanks. It shouldn't be too much fluid inside the pumping. It could also be empty by manually actuate the pump with each valve from the processing tank. WD40 should be applied to keep moisture from building up inside the solenoid valves.

Procedure:

1. Disconnected all the tubes from the both 6-ways solenoid stainless steel valve manifold blocks in for the input and output tanks
2. Navigate the menu -> settings -> output check referring to the “Main menu” Section of this document, if not sure how to navigate the menu.
3. Navitgate to addChem 1

4. Press the Up button to activate the pump with the valve

5. Wait a few seconds to ensure air is sucked into the processing tanks
6. Press down to stop the pumping
7. Press right to select the next valve
8. Repeat step 4 to 7 for all inputs and outputs (addChem 1 to removeChem 6)

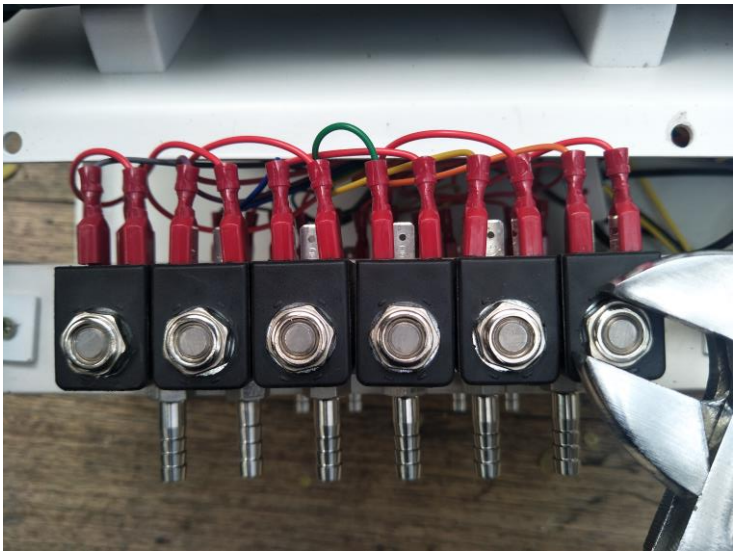
6-ways solenoid stainless steel valve manifold block

We recommended at least open up and clean the solenoid valves **ONCE a month**. The springs inside the valve can easily trap aggregate in the chemical and other impurity, and this would accelerate the rusting or just simple accumulate the aggregate inside the solenoid, which will eventually hinder the solenoid ability to retract thus blocking the valve and the port. Recommended use WD40 to repent and clean up the accumulated gung and rust.

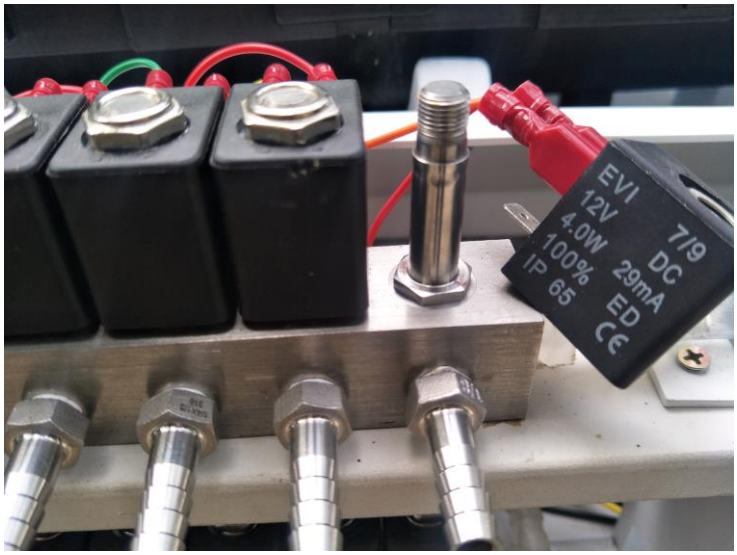
You will need an adjustable spanner/wrench, a cleaning brush, a thread seal/plumber tape.

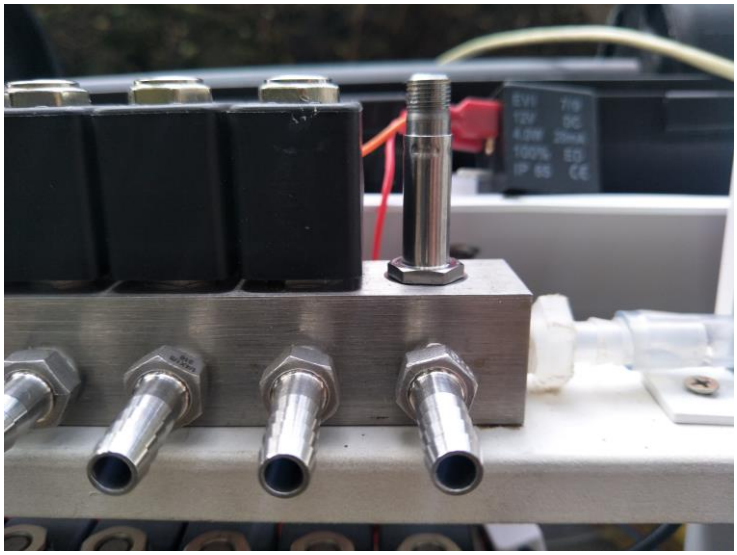
Procedure:

1. Ensure the power to the machine is disconnected, and there is no electricity nearby, in case the fluid in the valve spilled out unintentionally during the dis-assembly process.
2. Disconnected all the tubing to the manifolds
3. Unscrew the top nut of each solenoid from one side to the other, there is only enough room for the spanner to turn from the side. The spanner may not fit into the middle ones.

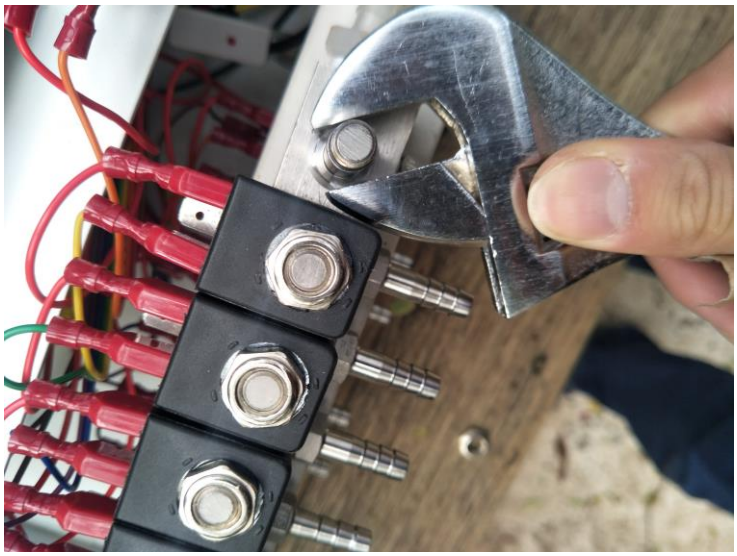


4. Before lift off the solenoid block, please label them 1 –6 so you will remember the sequence to reassemble them. Once you lift off the block you should see core inside now. You can leave the blocks, which are connected to the wires, inside the machine. If you want to keep them stored, you should disconnect the spade connectors.

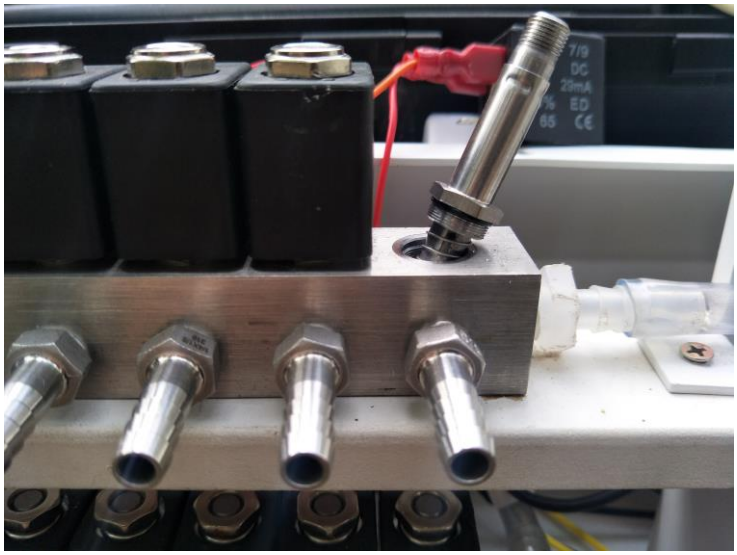




5. Unscrew core from one side to the other, again, there may not be enough room for turning for the middle ones.



6. As you unscrew the core, the spring inside should push the core out, if not, lift the core out. It should reveal the piston/plunger and the spring around it.

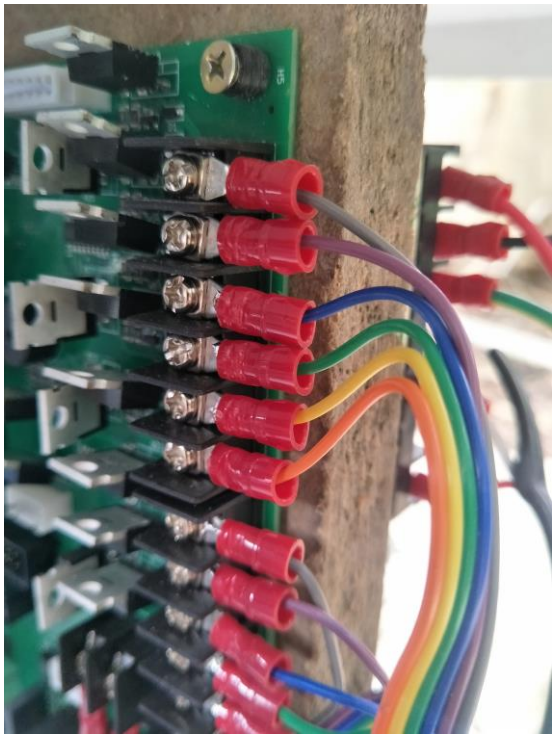


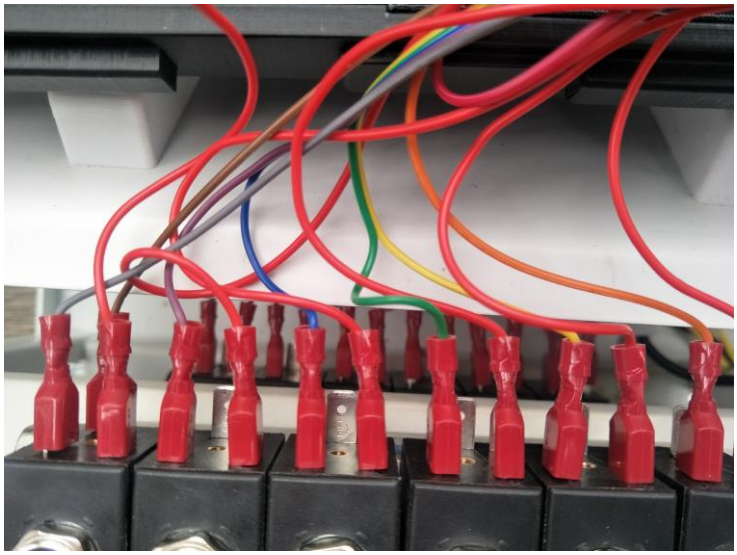
7. Remove the piston and the spring, keep them secured with the rest of the piece before, so you don’t lose them. The small stainless-steel solenoid has the spring round the piston at the bottom, see picture below

8. Next remove the all the threaded male barbs from each of the port and the common port on the side, you should have the manifold on its own.

9. Remove all the used/damaged thread seal tapes on the components
10. Give all barbs, spring, piston, core tube, and manifold a good cleaning with the brush and/or with water
    a. apply rust removal if need, please follow the instruction on your rust removal agent/product
    b. Replace components if they are worn out or badly damaged
11. Let the parts dry if needed, and blow off any dust remaining on the surface and apply a layer of WD40 for protection.
12. Assembly the valves in this order, and apply thread seal tape on the threaded parts: bards on manifolds -> piston + spring in core tube, and fit onto manifold all together-> solenoid block on core tube -> secured solenoid with top nuts.
13. If you want to reconnect the wires to the blocks from one side to the other, please do it in order that it is connected to the motherboard from top to bottom. The top terminal is the inputs, and the bottom one is the outputs. Port / Valve 1 is the top position of each terminal. Picture 1

below shows the wire colors from grey to orange on the board, matching the order from left to right on the solenoids (pay attention to the rainbow color wire)





NOTE: if the wires are swapped, the port / valve number will be swapped in the programs, it could allow further customization in your programs and your setup but generally it causes more confusion between processes.

NOTE: inputs and outputs can be swapped if the pumped terminals on the other side of the motherboard are also swapped

NOTE: the most important thing is to keep the electrical terminal consistency between the inputs and output for the pump and the valves.

Part Lists:

Commented [GW2]: lets put the part list at the back

This section lets you check all the parts required to build the machine and it allows the user to learn the naming of each part, so that the readers would understand which parts are being referred to in the instructions of this document hereafter.

This section is now in a separate document.