Touch Screen Reflow Oven

User Manual

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1. General knowledge

Reflow principles:

The Reflow oven contains multiple zones, which can be individually controlled for temperature. Generally there are several heating zones followed by one cooling zone. The PCB moves through the oven on a conveyor belt, and is therefore subjected to a controlled time-temperature profile. The speed of the conveyor can also be controlled.

Heating Element:

The heat source is from ceramic heaters, which transfers the heat to the assemblies by means of convection, the oven will have fans to force heated air towards the PCB.

Conveyor:

The PCB will travel into the heating zones by means of mesh conveyor or chain driven conveyor (depending on your model) The conveyor can be program to move from left to right or right to left. The speeds are adjustable by software.

Profiler:

The reflow oven will come with a build-in three point profiler. Thermal profiling is the process of plotting temperature vs. time of the PCB as it travels through the oven. The PCB thermal profile is determined by temperature, time, and heat transfer rate.

Software User Interface:

When the oven ships from SMTmax, it will be configured to your models specifications. The software can be used for different reflow oven models, also listed down below.

Model	Heat zone quantity	Top heater quantity	lower heater quantity	Startup power	Work power
AE-R330 (N/A)	3	3 group	0 group	4kw	2.5kw
AE-R330A (N/A)	5	5 group	0 group	6kw	2.5kw
AE—F530C	5	3 group	2 group	7kw	2.5kw
WP-5500	10	5 group	5 group	10kw	3kw
F-6	12	12 group	12 group	11kw	3kw

Computer Communication:

The touch screen computer will communicate through an RS-485 communication cable that is already build in, if you do not use the touch screen computer that came with your oven you must be aware that the software will not communicate unless you have an RS-485 external cable. SMTmax sells the RS-485 cable separately if you wish to use your own desktop computer. The preferable port setting is port #5.

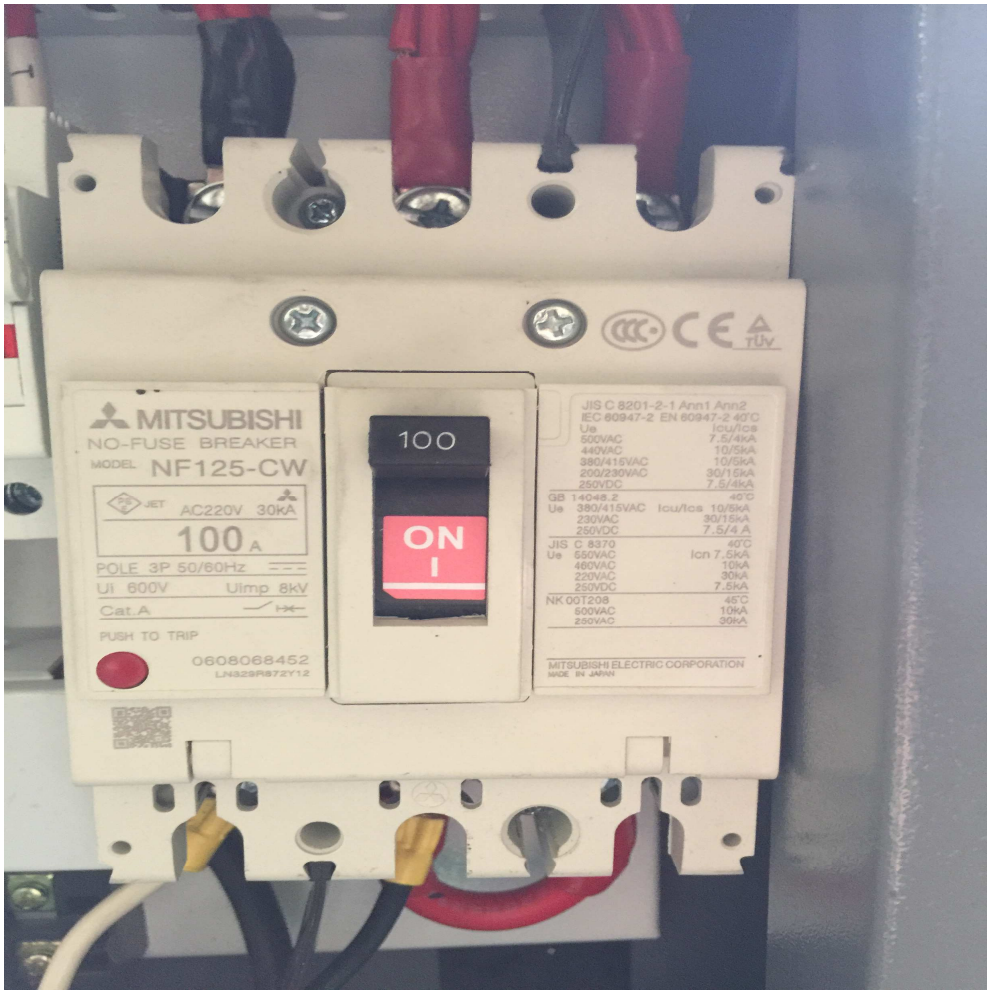
Power Requirements:

The oven will require a 220 volt single phase, depending on the model the amperage will vary. Special request can be made for 220 volt 3 phase or 380 volts. Each oven will be marked with the corresponding power requirements and location to connect power cables.

2. How to power the oven

Step 1

After correct power voltage is fed, you must turn the power breaker switch to the ON position as seen below.



Step 2

Make sure your touch screen computer is connected to your oven. You must connect the RS-485 serial port and 24volts power connector.

Step 3

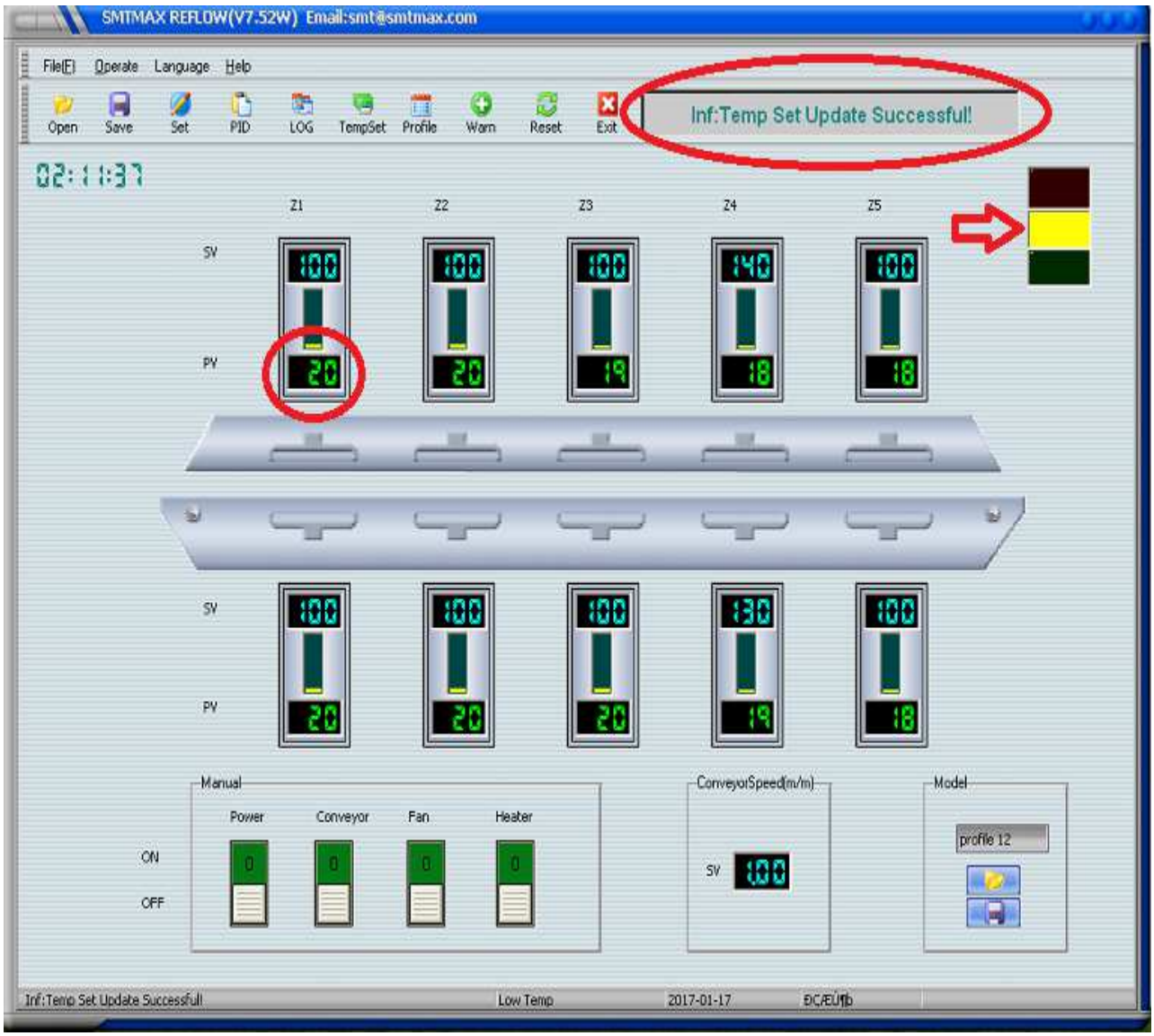
Make sure the emergency switch is not activated; turning clock wise will deactivate the emergency switch and pop outwards. Pushing in will activate.

Step 4

Now you can push the green power button located on the front of the reflow oven and both the oven and computer monitor will power on.

The tower light will show the color yellow, this means the oven is ready to begin controlling by the software.

The software will automatically open, you can verify if the touch screen computer is communicating with the oven by checking the following three things on the main user interface. The ambient temperature will be shown on the PV section; the tower light will match the color yellow. The information box on the top right corner will show successful.

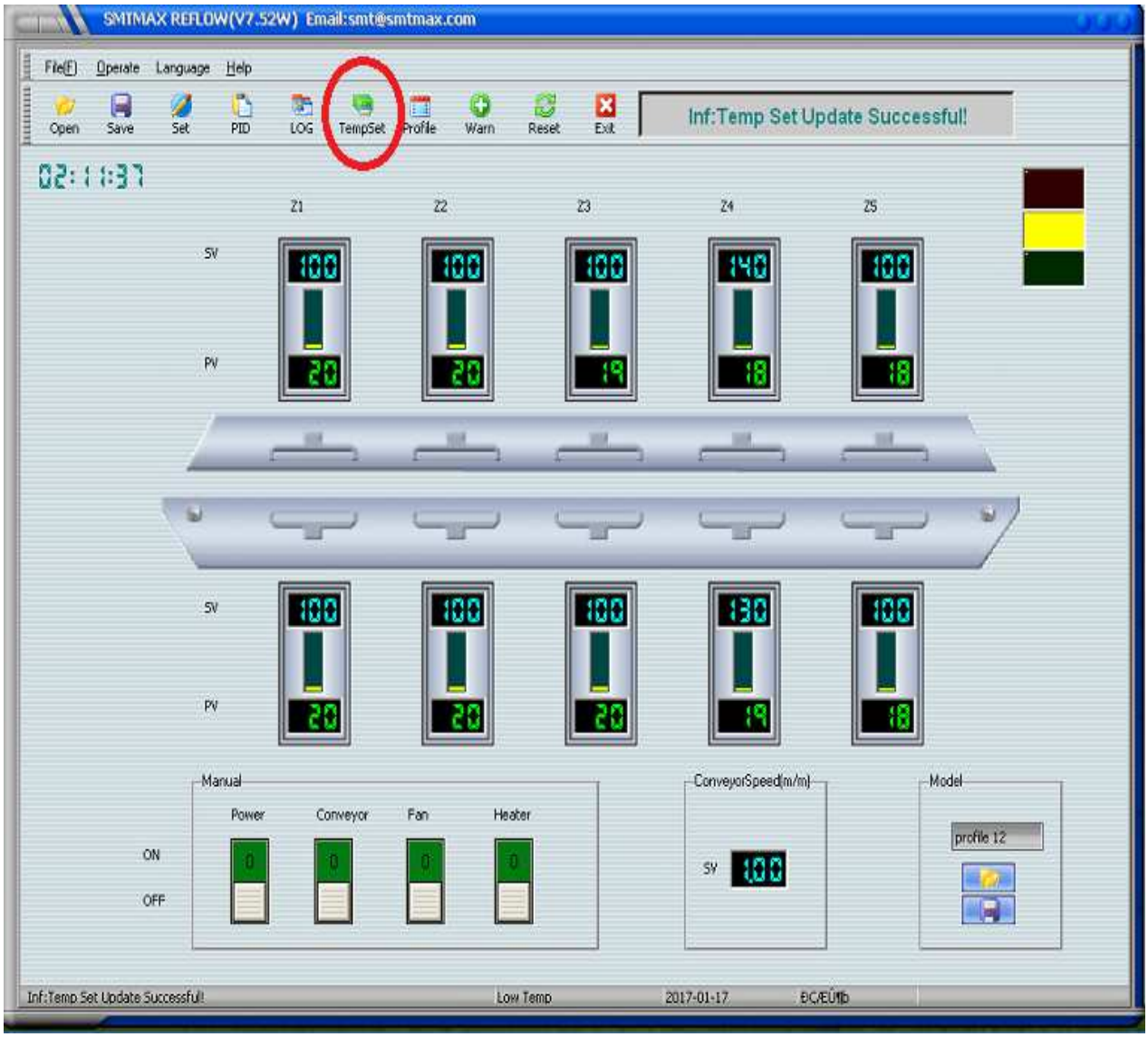


3. How to set temperatures

First make sure all your heating zones are on; this will depend on your model. For this manual we are operating the F6 reflow oven that has 6 heating zones on top and 6 heating zones on the bottom

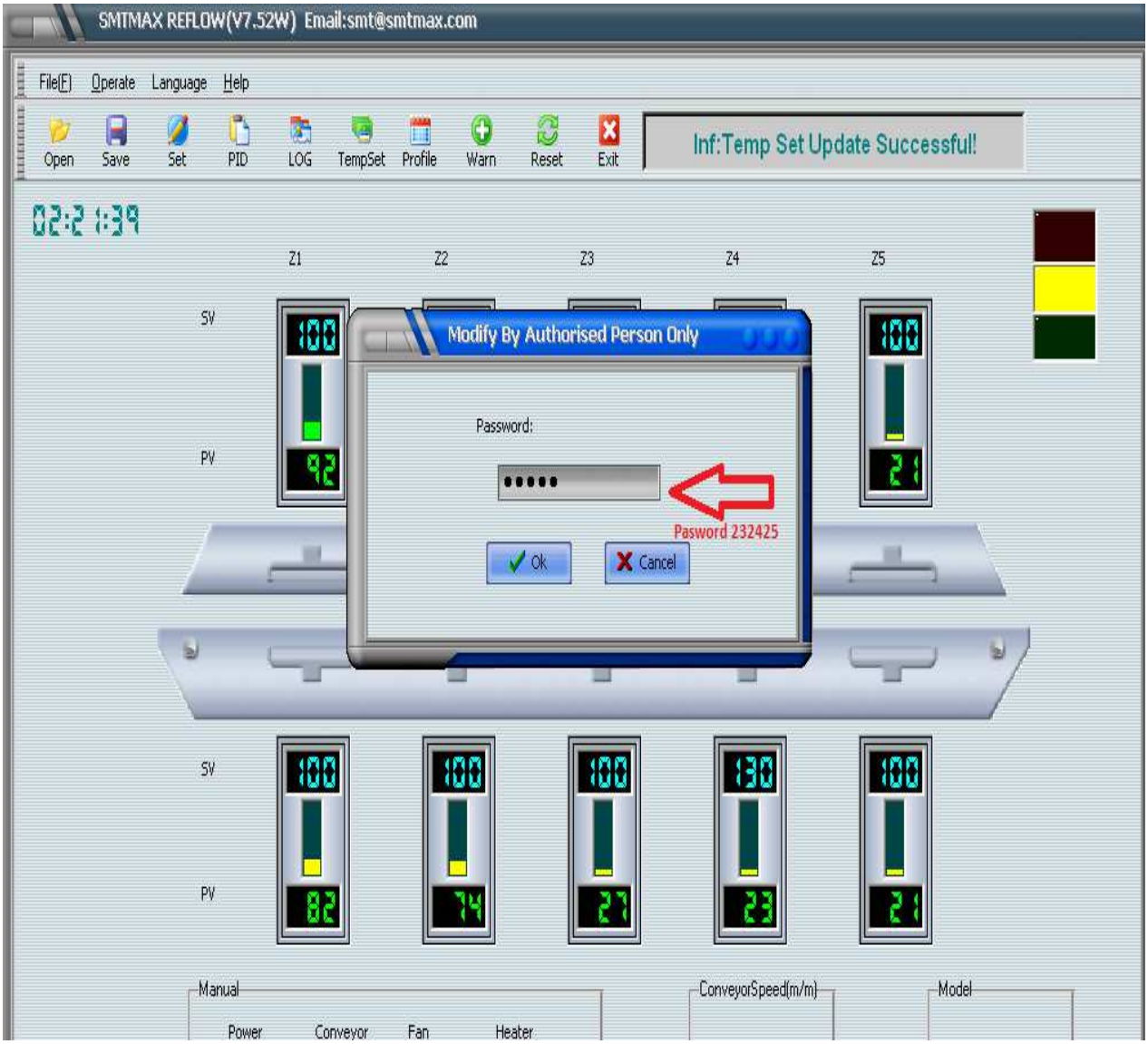
Step 1

Click the button “Temp Set”



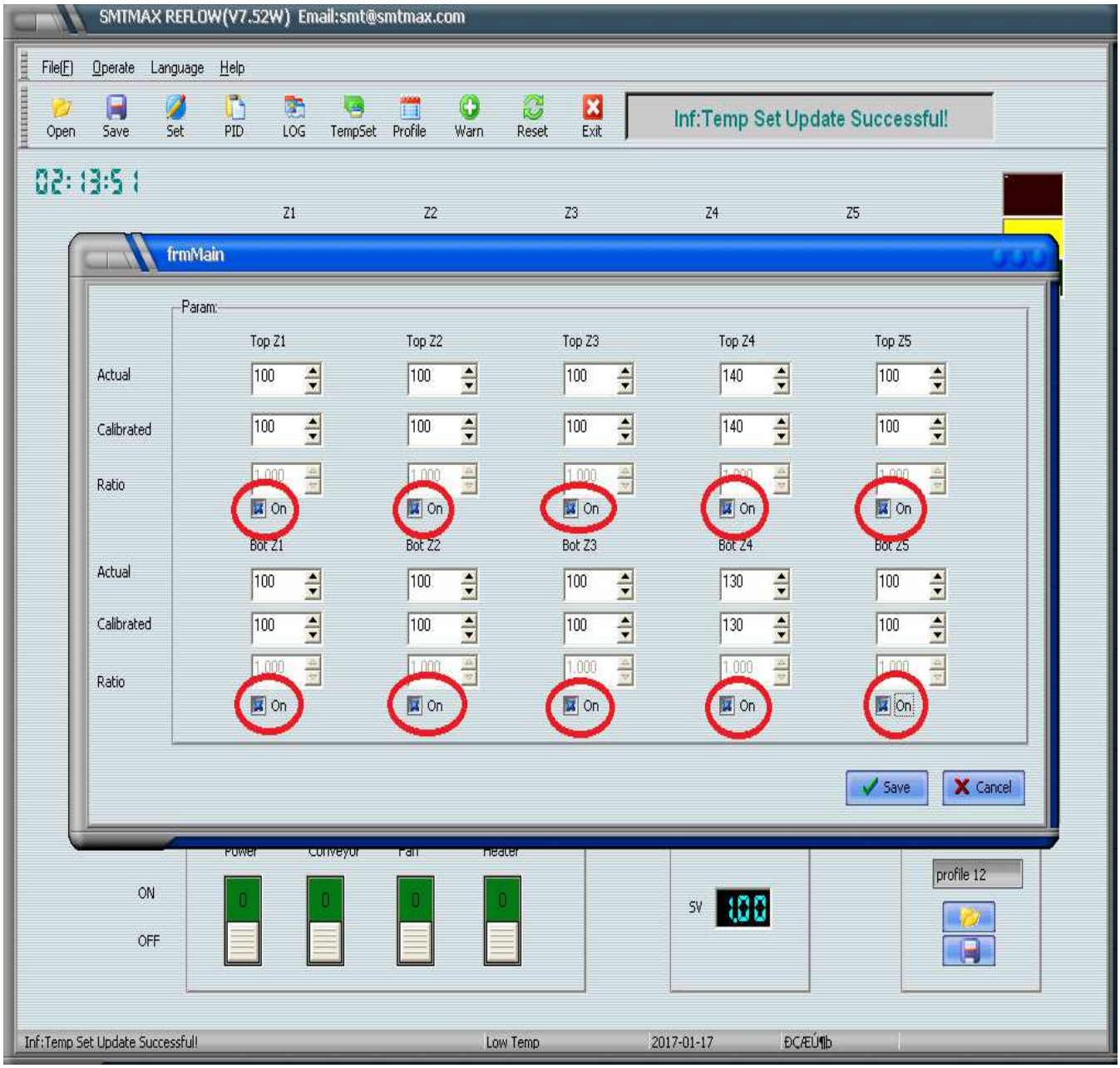
Step 2

It will ask you to input the password; it is factory set for 232425



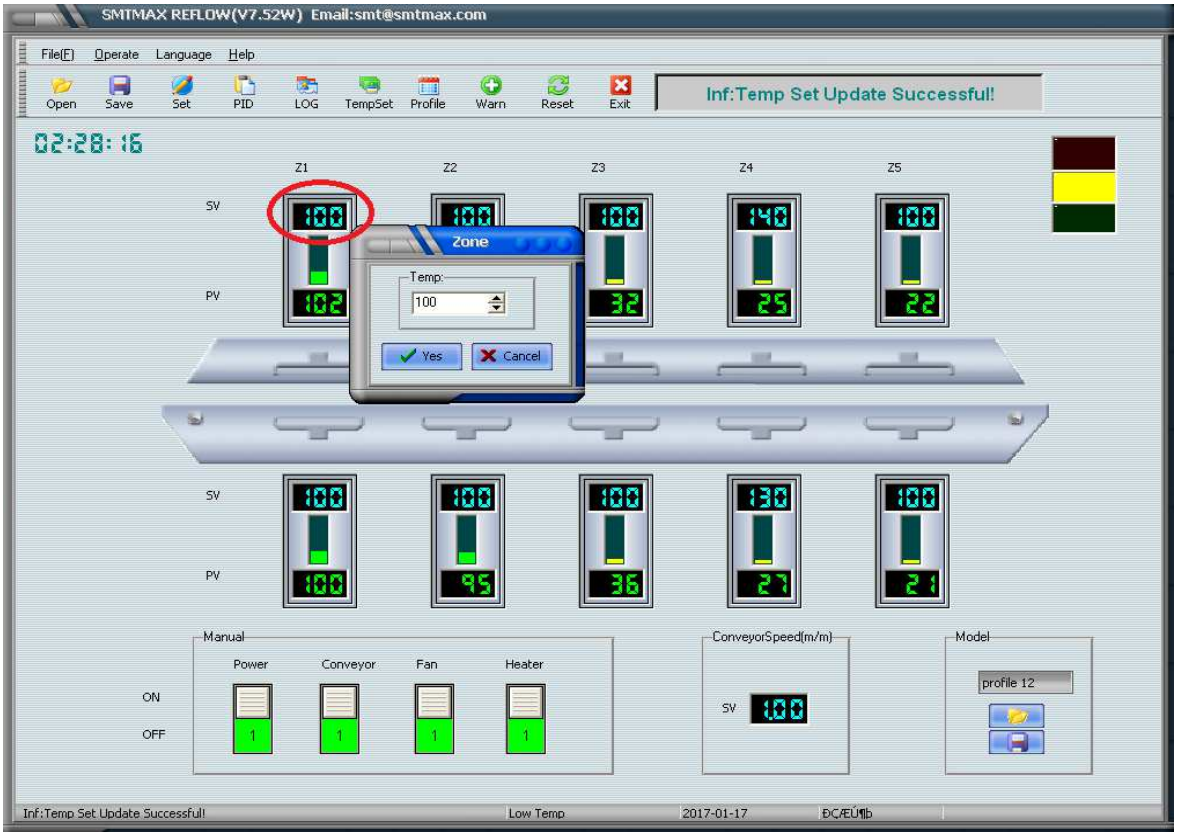
Step 3

Make sure each zone has a blue “X” marked and save.

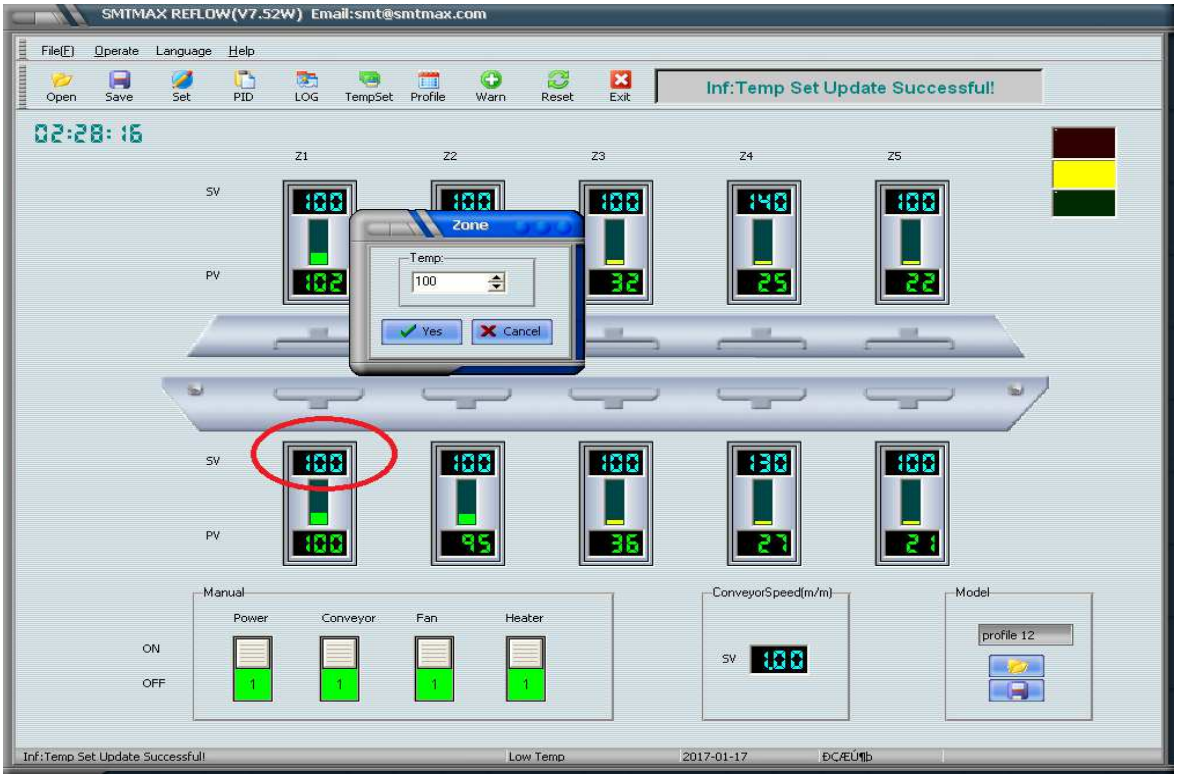


Step 4

Now you can click on the SV section of each zone to change temperatures.



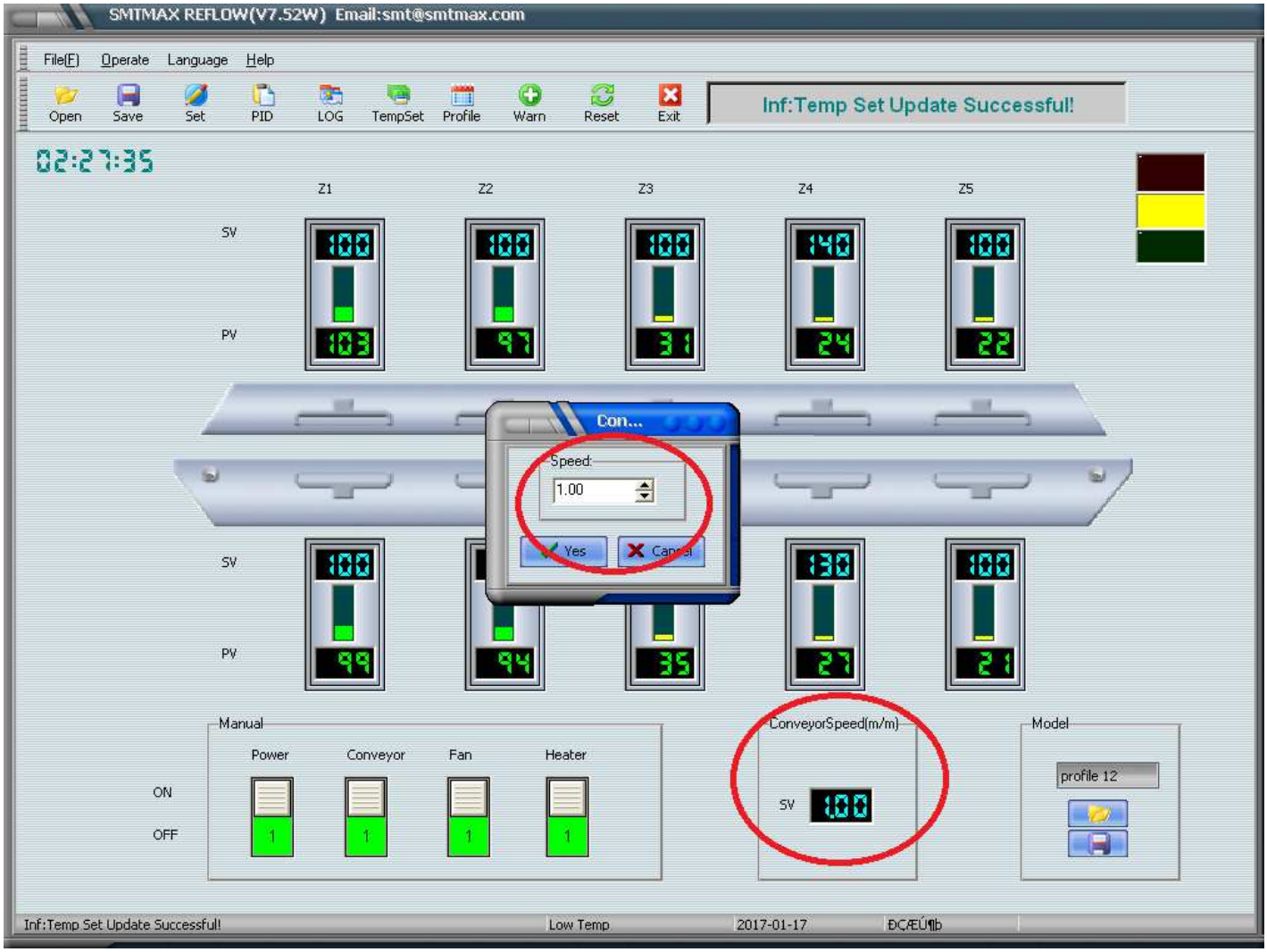
Both from top and bottom zones marked under SV section.



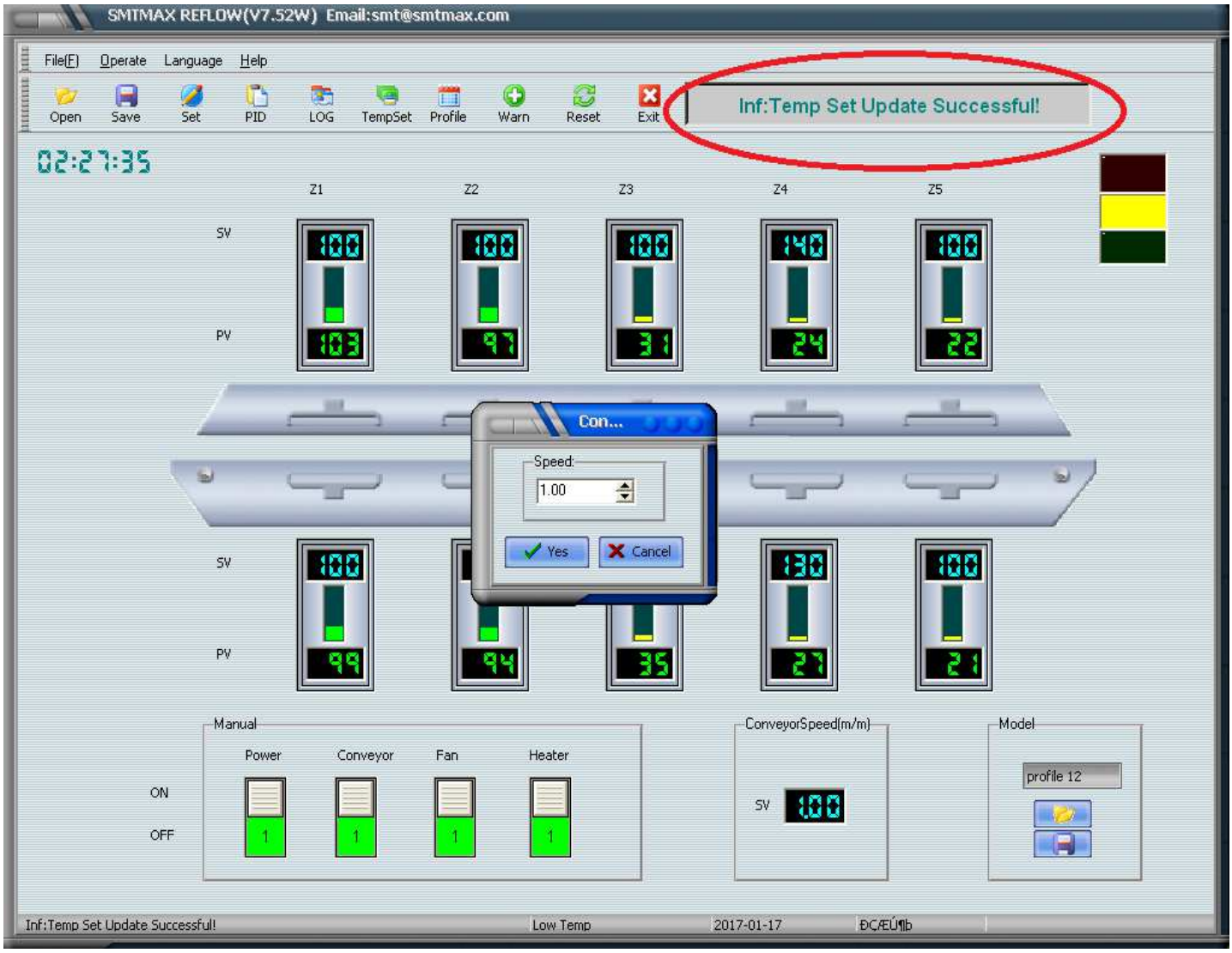
4. How to set conveyor speed

Step 1

On the bottom left you will notice a box that shows “conveyor speed m/m” click on the number box, it will then ask you to input the factory password of 232425, afterwards you can use the arrows to increase or decrease the speeds. As seen down below we changed the speed from 1.60 to .80

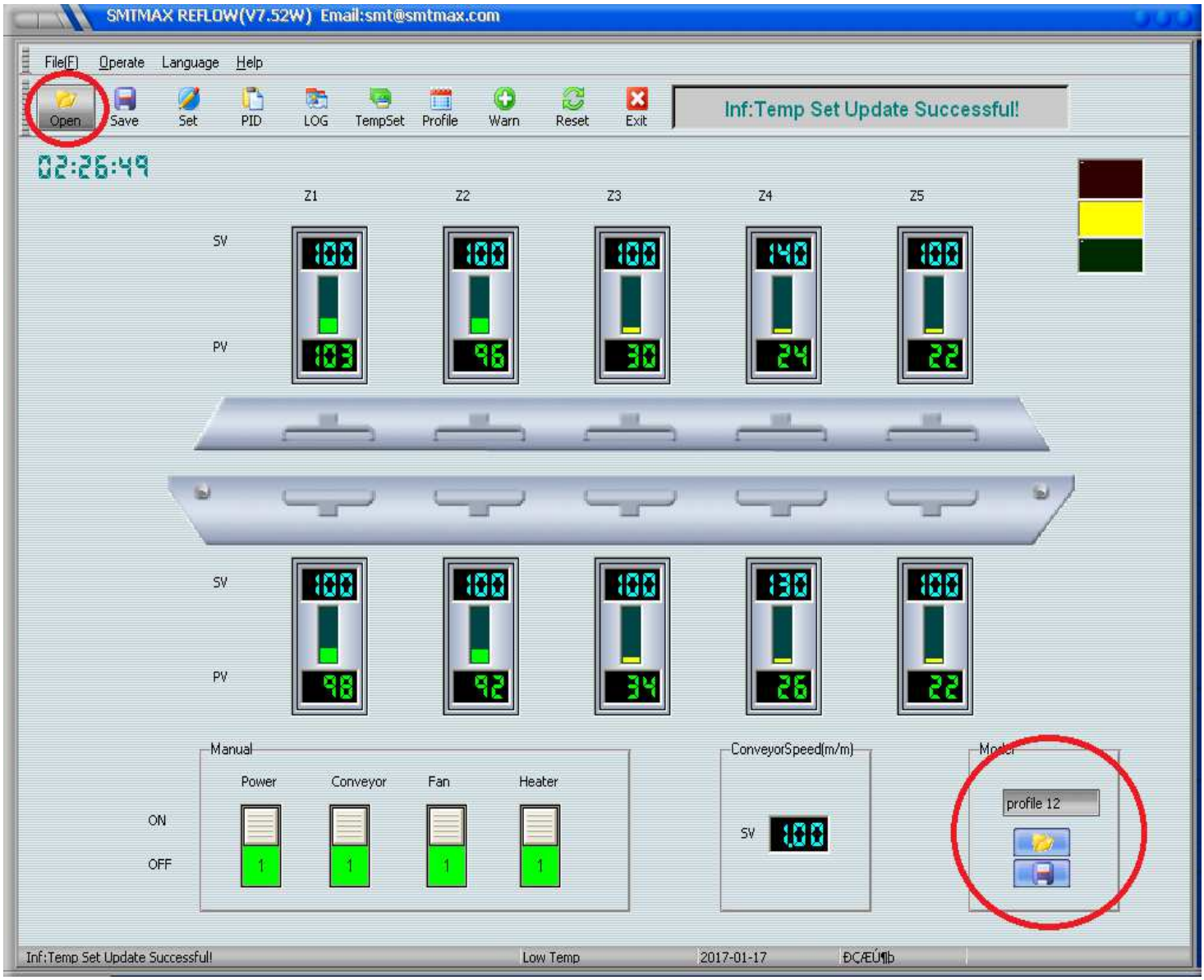


After you click the Yes button, the speed of the conveyor will slow down (in this example) you will also notice the window on the top right corner will mention “Inf: Conveyor set update Successful” and the new 80 m/m set point will be represented on the conveyor box. As seen down below.

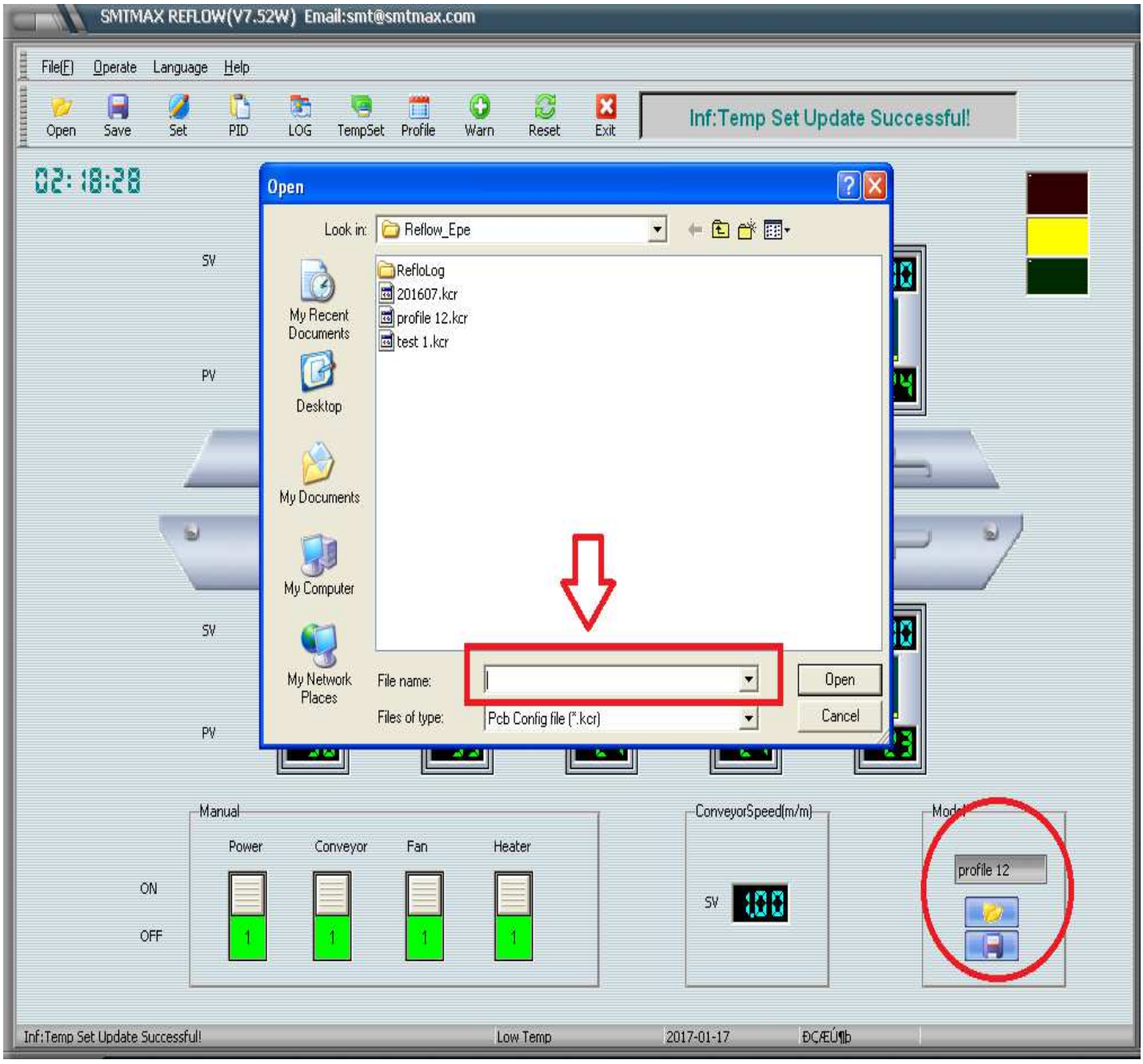


5. How to save your data

There will be two locations where you can save your new settings, one is located on the top left corner and the other is located at the bottom right corner. You can give it any name and save it.



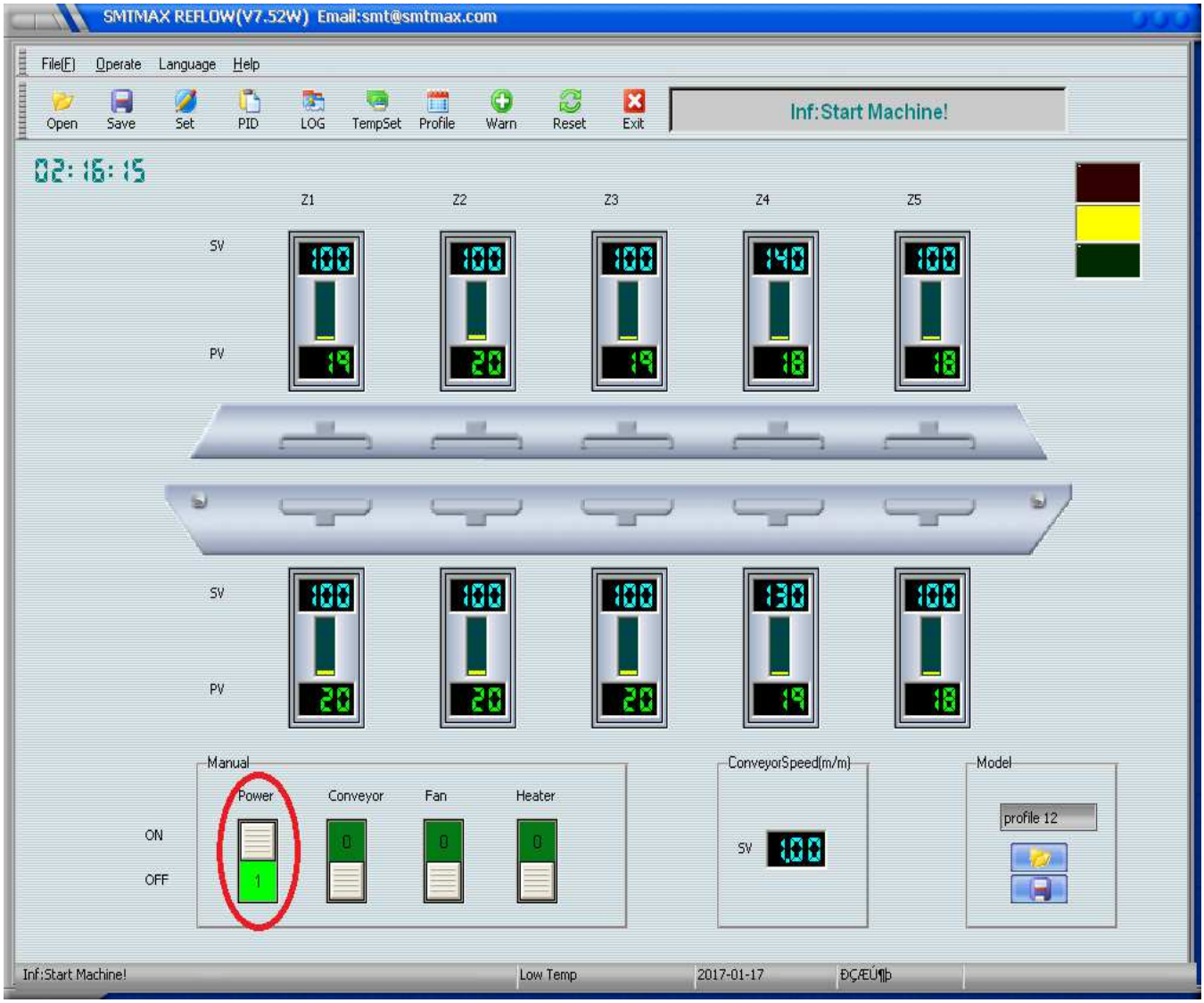
The name you saved it under will appear on the bottom right corner window as seen below.



6. How to turn on the key functions

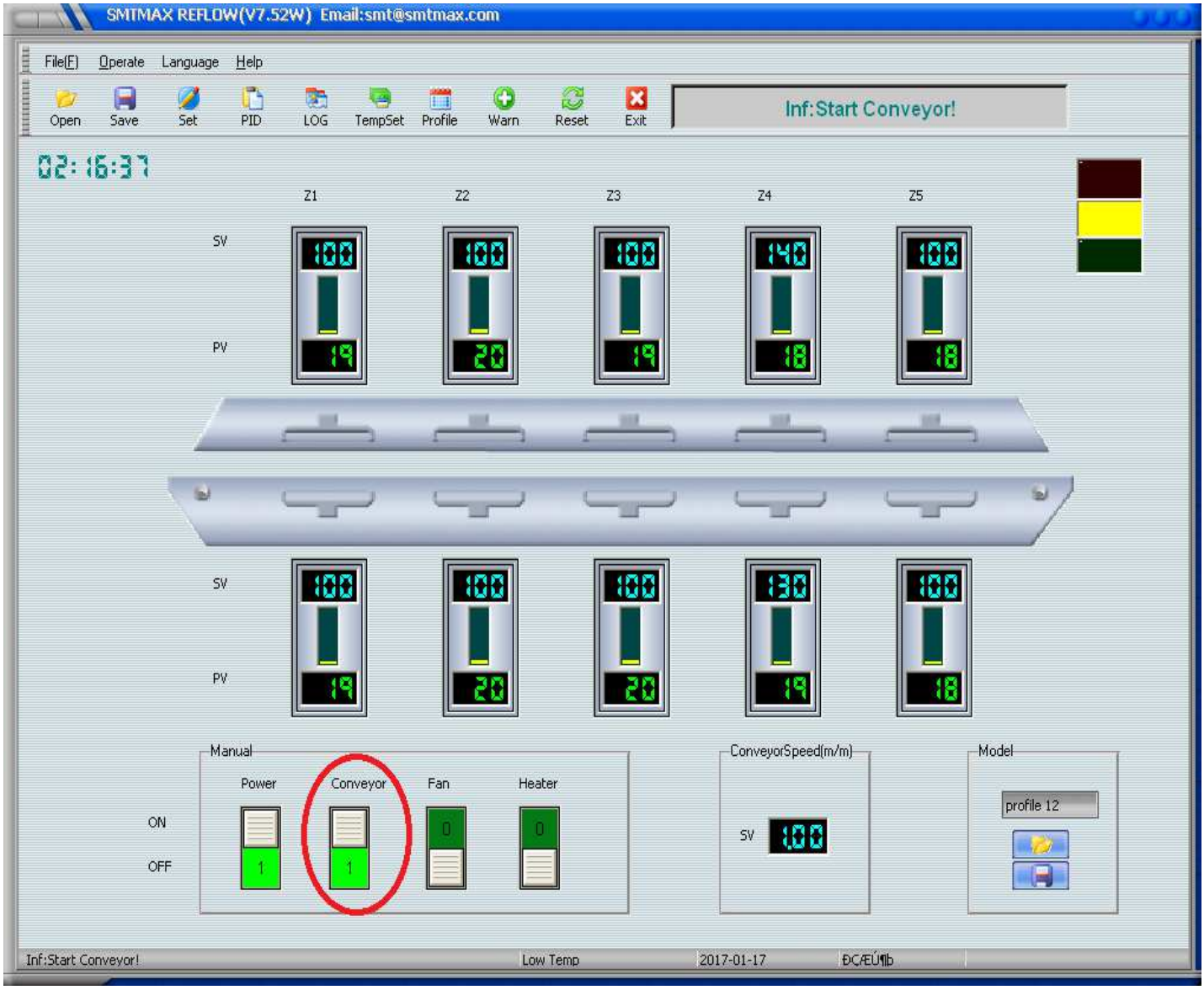
Step 1

You must turn the following buttons in sequence from left to right. First click the power button on. You will notice the message window show “Inf: Start Machine”



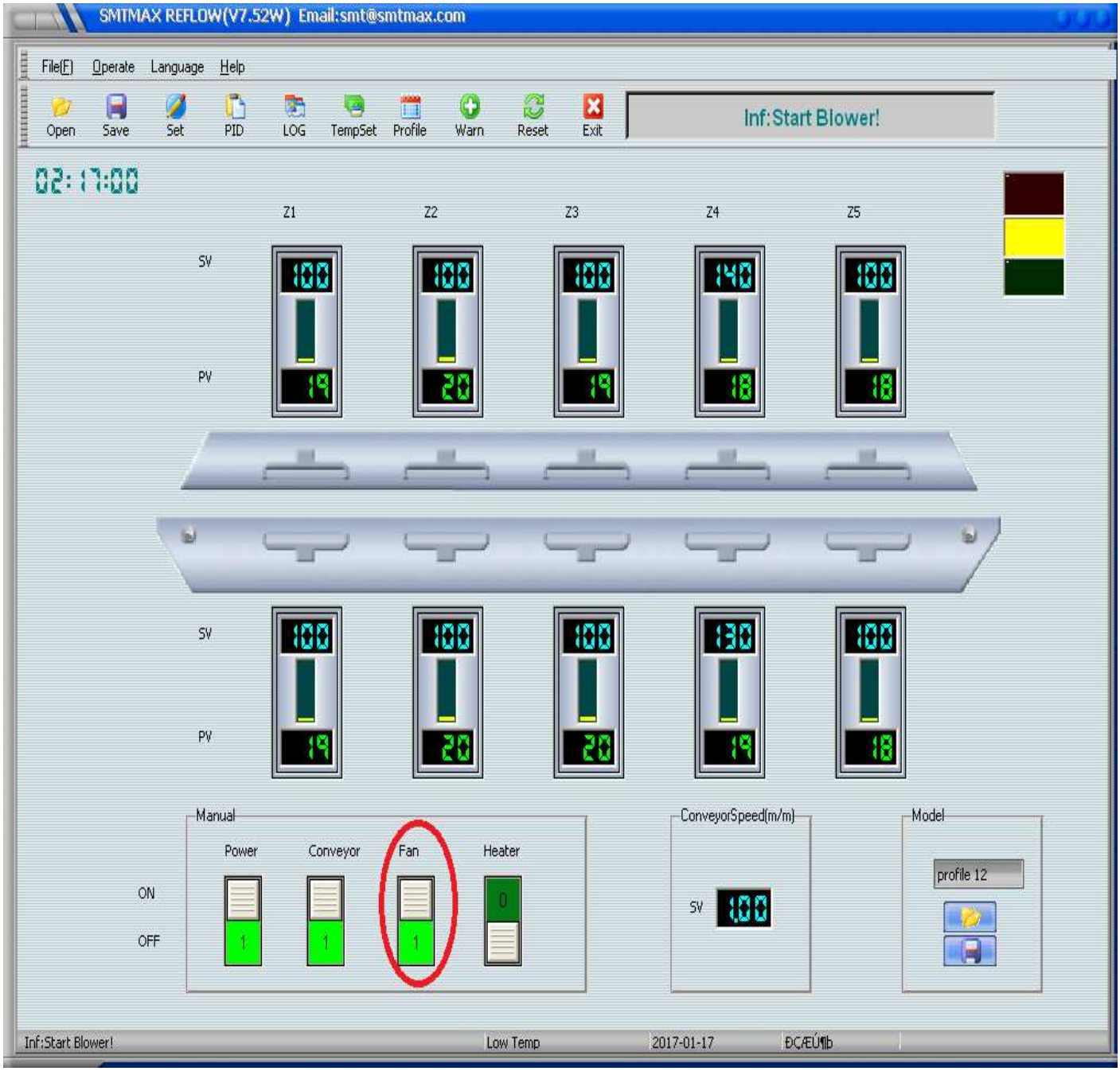
Step 2

Now click the conveyor button ON. You will notice the conveyor starts moving and the message window will show “Inf: Start Conveyor”



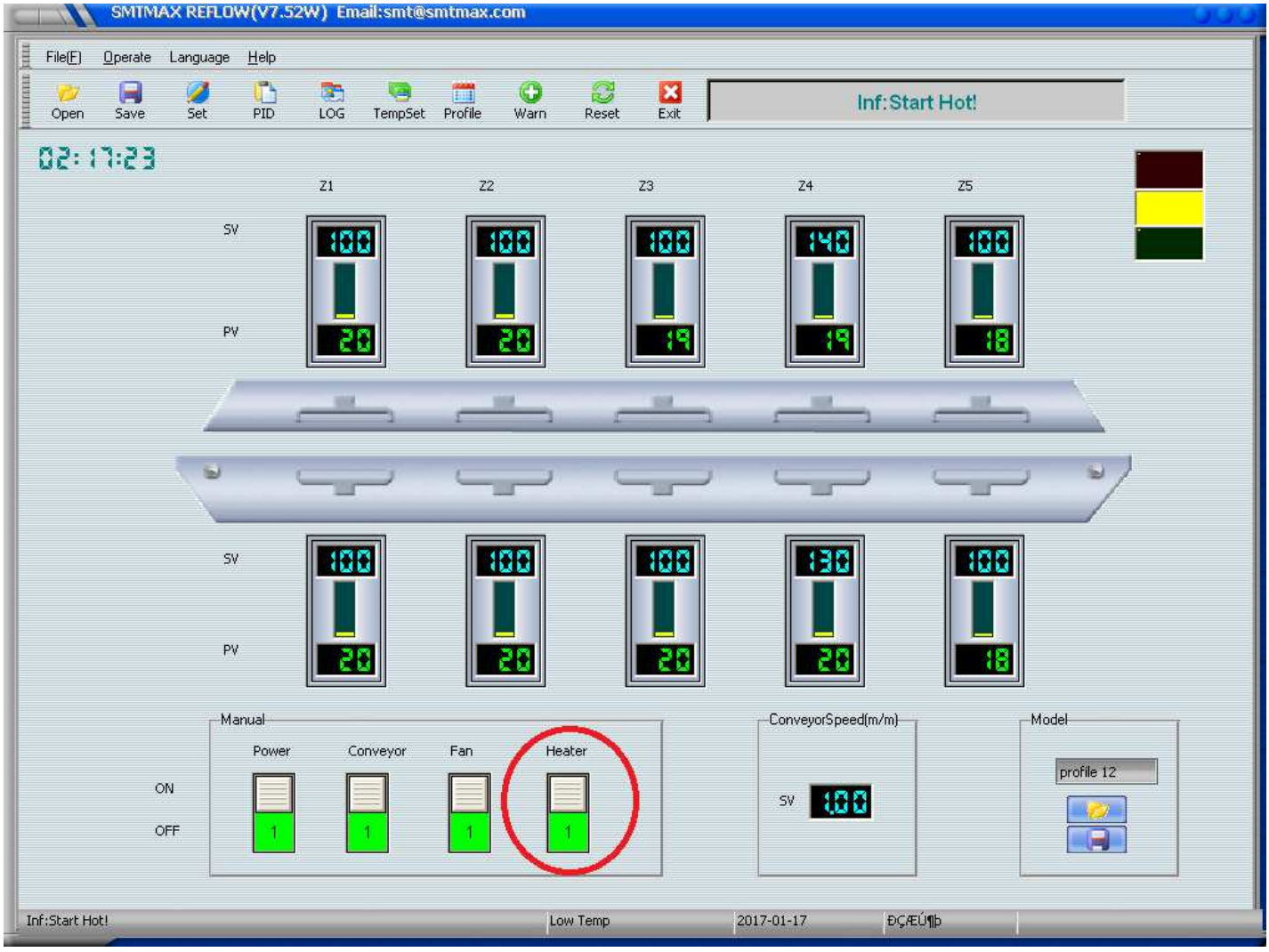
Step 3

Now click the Fan button ON. The internal heat blowing fans will be activated. You will not be able to see them, unless you open the first top cover. The message window will show “Inf: Start Blower”

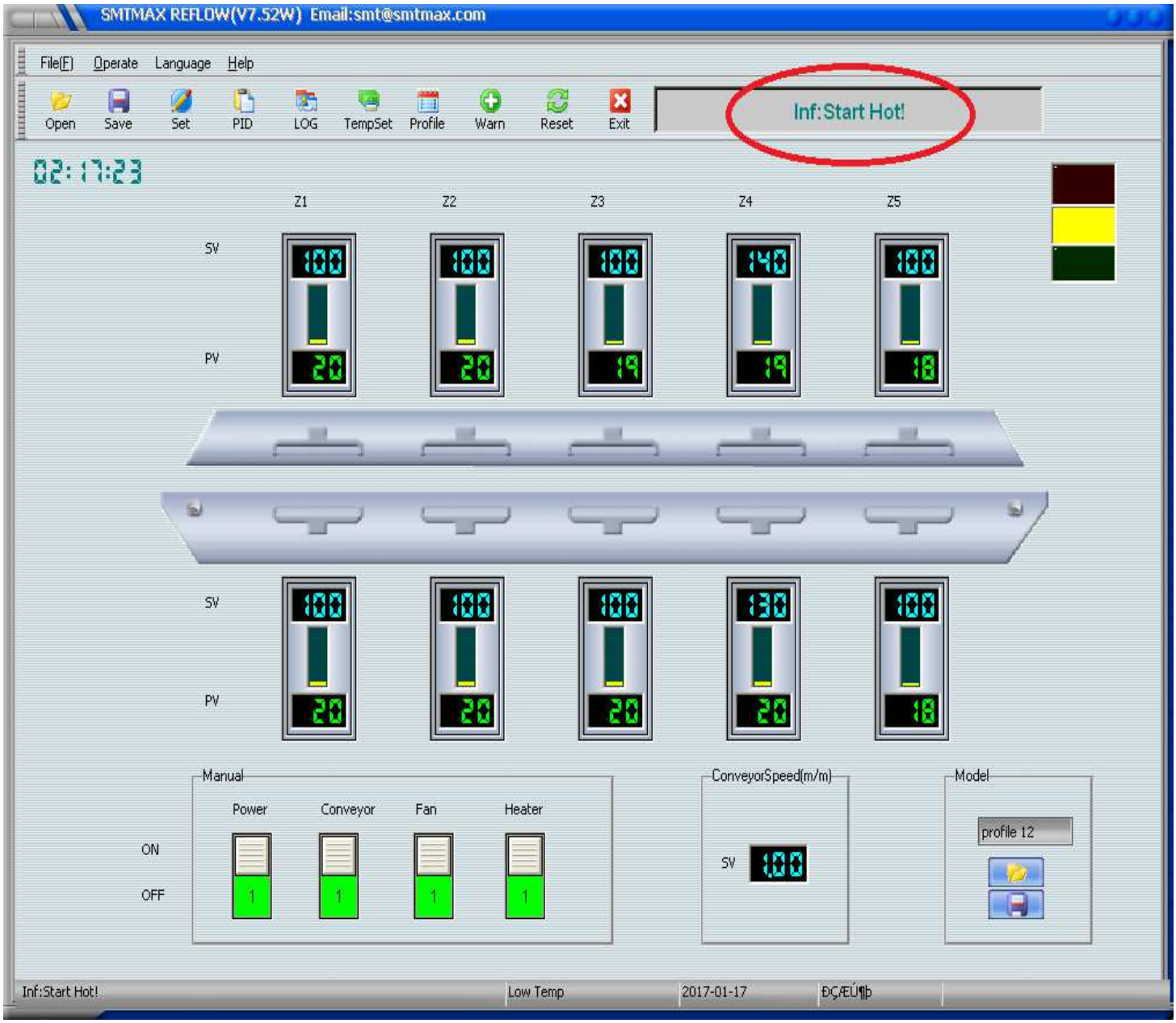


Step #4:

Click the Heater button ON. This will activate all the heating elements to turn on at once. You will be able to hear the connector switch trigger on. The message window will show “Inf: Start Hot”

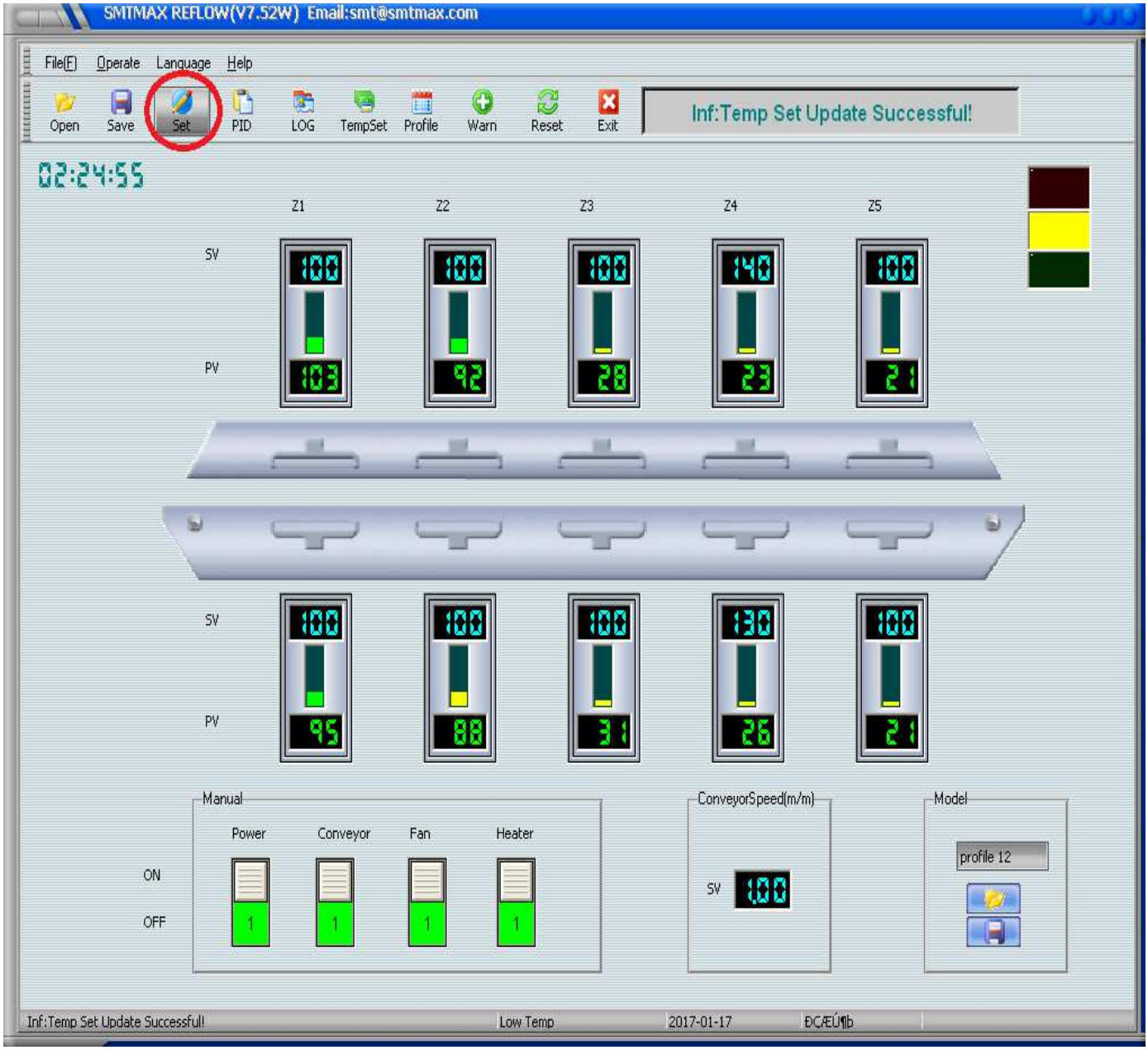


Depending on the quantity of zones your oven has, it will take 20-55 minutes in order for all the zones to heat up within +/- 10 degrease of the set temperature. Once each individual zone hits the targeted temperature (+/-10) the tower light will turn green as seen down below.

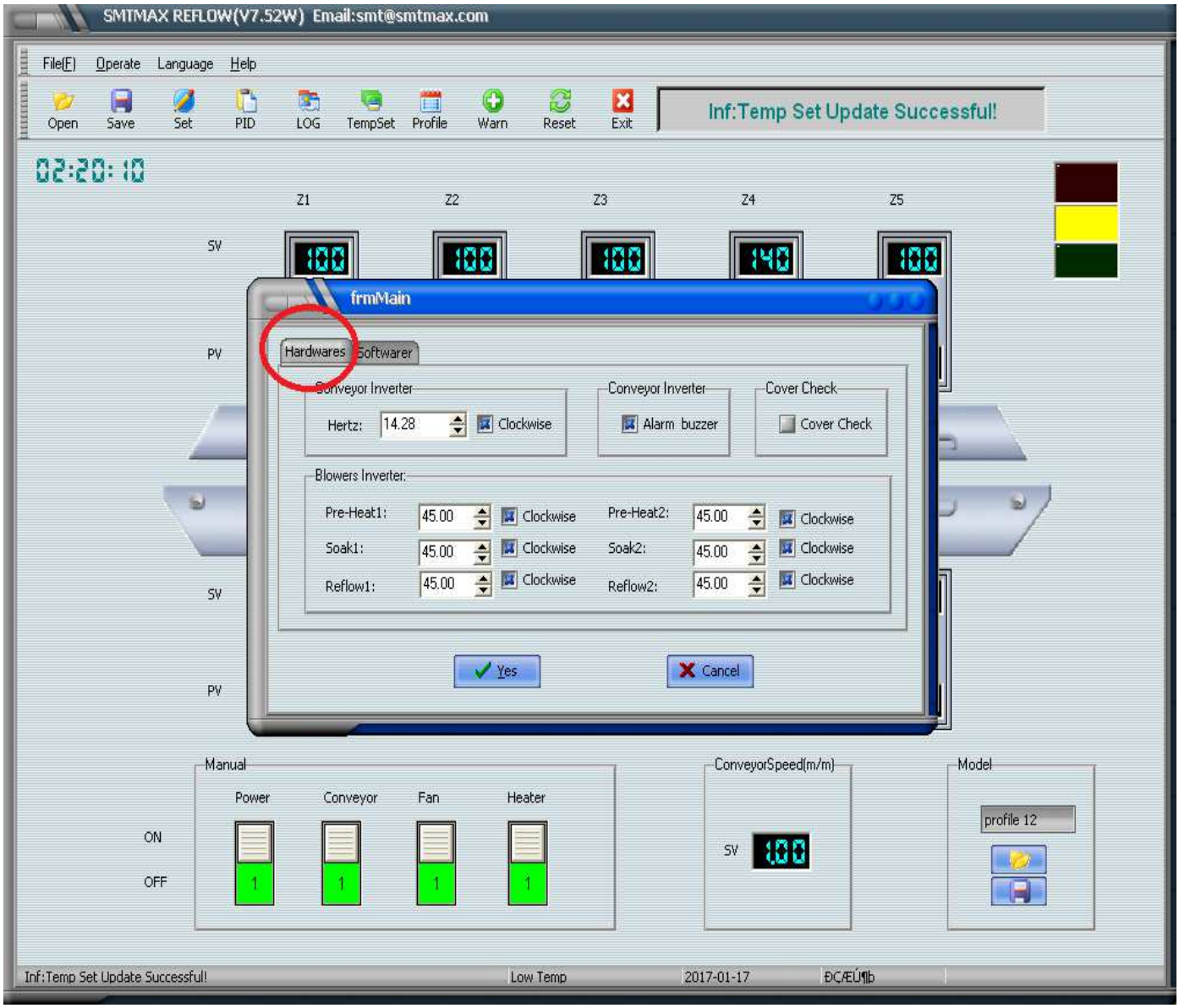


7.Settings

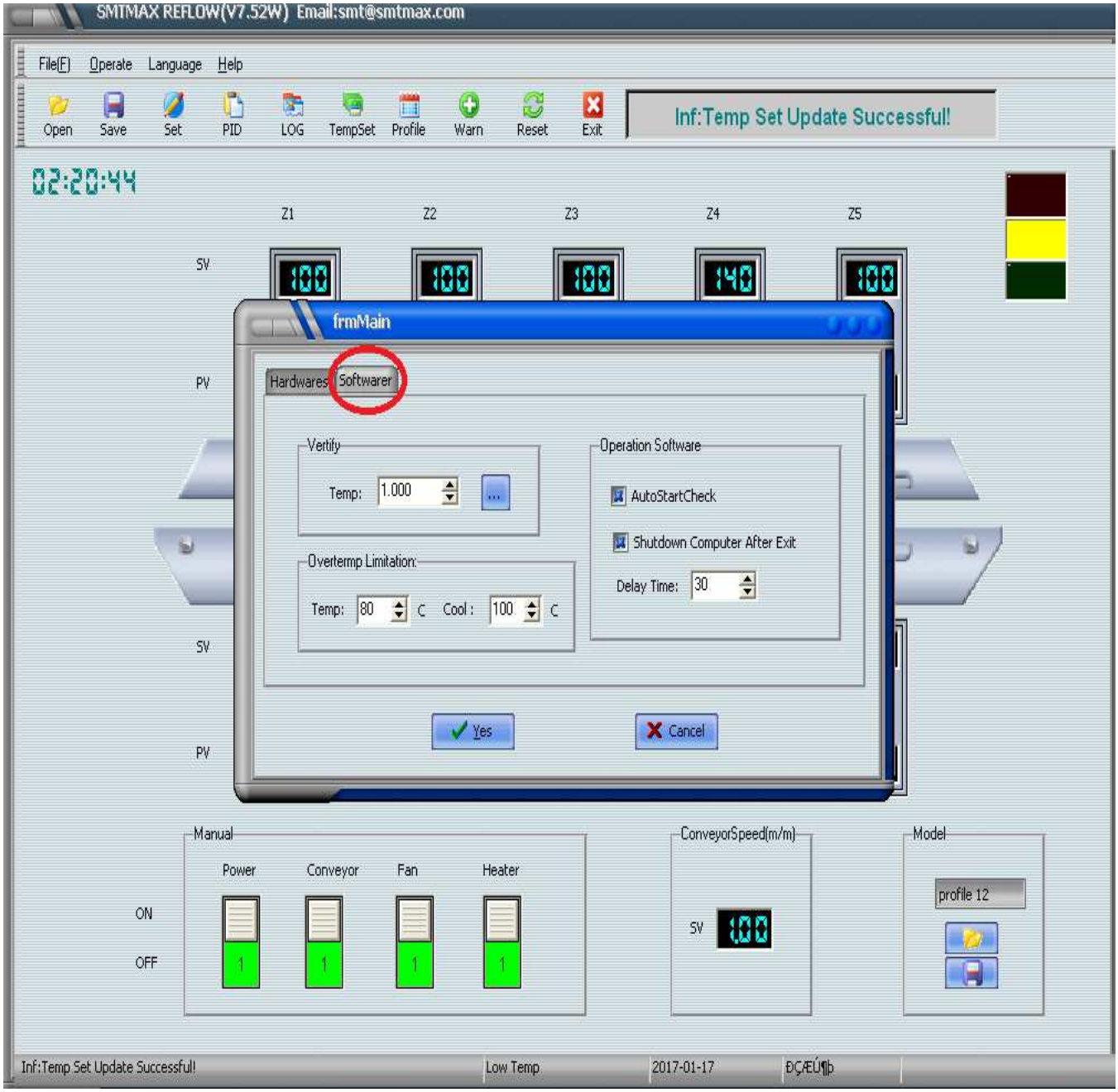
On the top of the user interface you will notice the button shown as “Set” when you click on the button it will ask you for the factory password of 232425.



After you input the password you will see a window that shows hardware and software. The software section allows you to adjust the conveyor frequency and the air blower frequency; some models will not have an air blower frequency adjustor so it will not be activated.



If you click on the “software” window it will show you the factory settings for maximum temperature overload set for 80C. It will also show you the option to have a shutdown timer; this is very import to activate and must be set for 30 minute shut down. Once you are done for the day, you can click exit button and the timer will automatically start counting down and it’s the only method of shutting the oven off, otherwise you will risk damaging the touch screen computer.

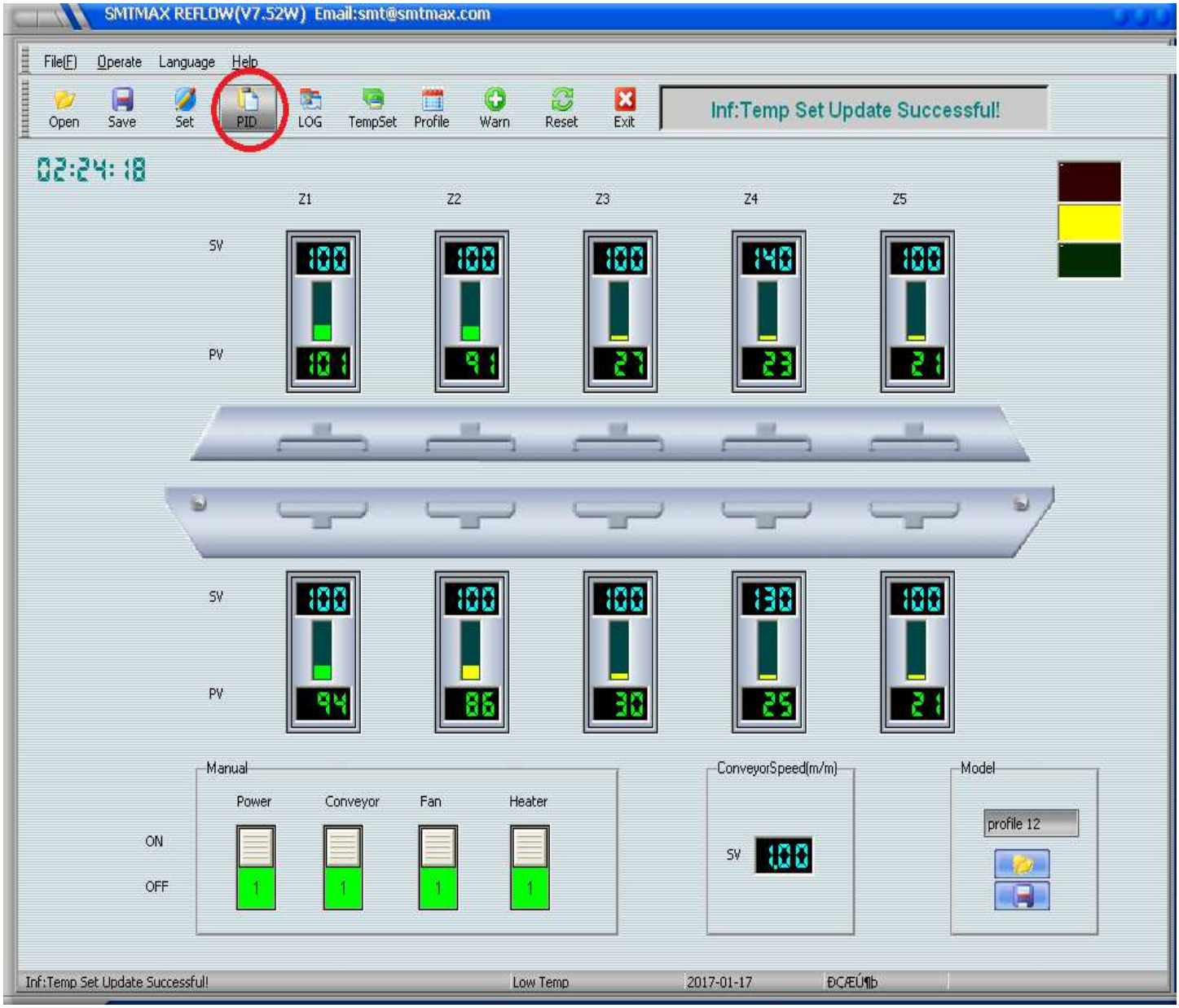


8. How to calibrate (PID)

The PID allows you to calibrate your heating elements in case they do not fall within range of your temperature set for. Before doing the following steps please have the oven ON with all the heaters turned ON and the temperatures must not exceed 75C. (Let all the zones heat up for about 1-2 minutes then do the flowing steps.) +

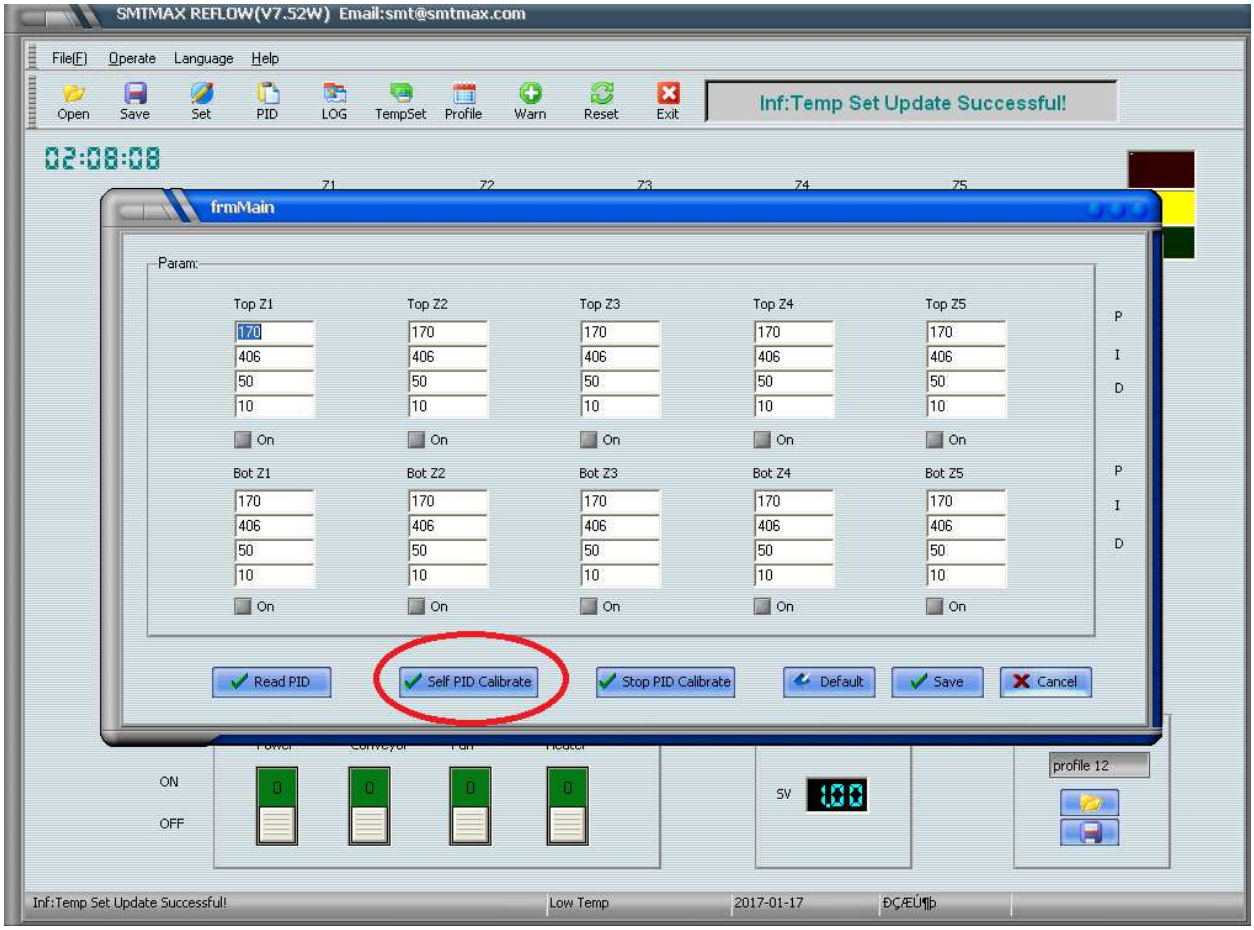
Step 1

Click the PID button (it will ask you to input the factory password 232425)



Step 2

The PID window will open, now you will see three box's with a green check marks and PID, click on the middle box. (This will start the calibration process)

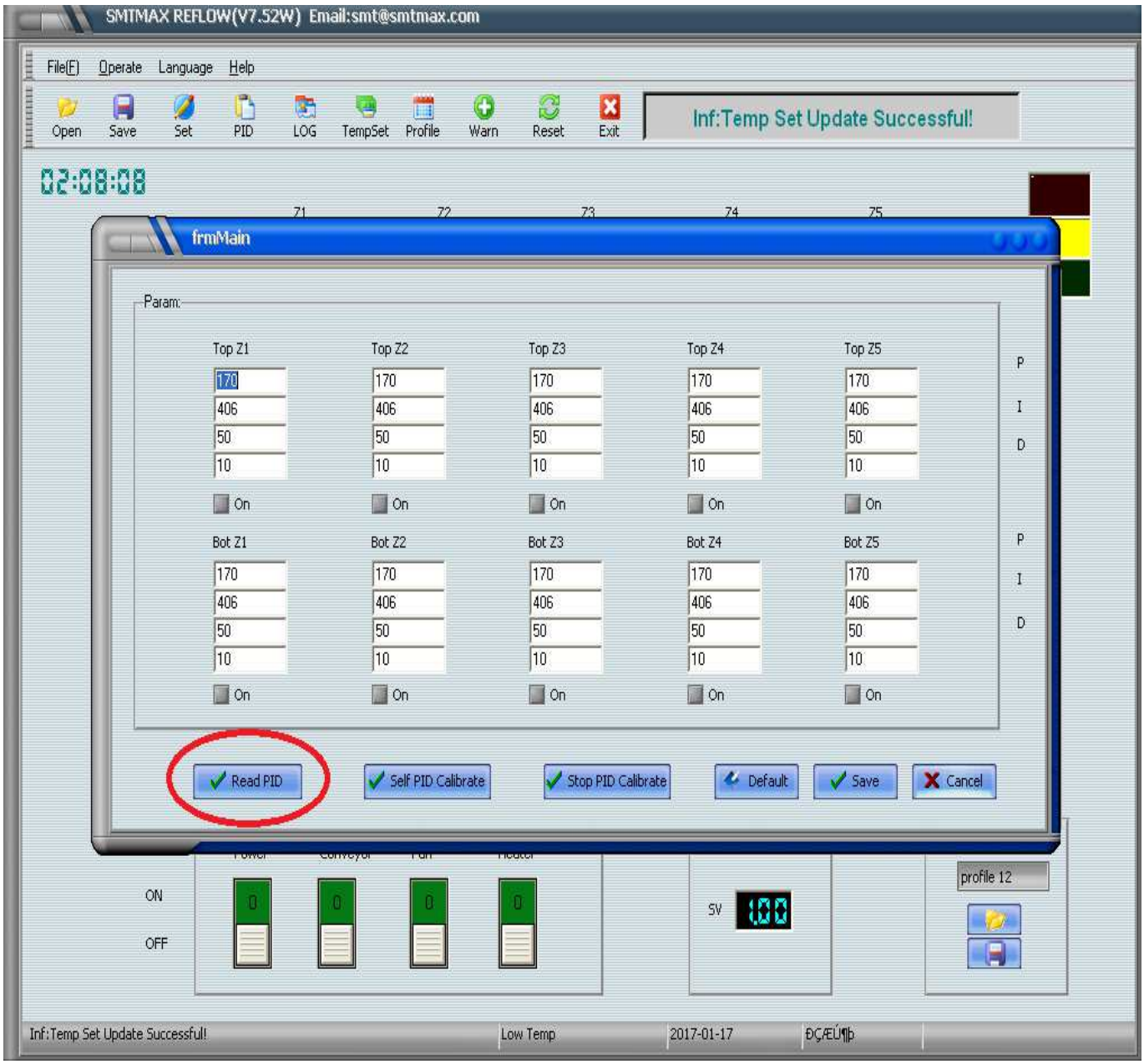


Step 3

Now leave the oven alone until it has completed calibrating, it should bring all the Temperatures within the set temp and they will all turn green after completed, also you Will see the "ON" box of each zone get a checked off (don't be surprised if during the Calibration, the temperatures will exceed the set temp, triggering the red warning light and the sound buzzer to come on, eventually the temperatures will come down and be stabilize This step can take from 1-2 hours depending on how many zones you have.

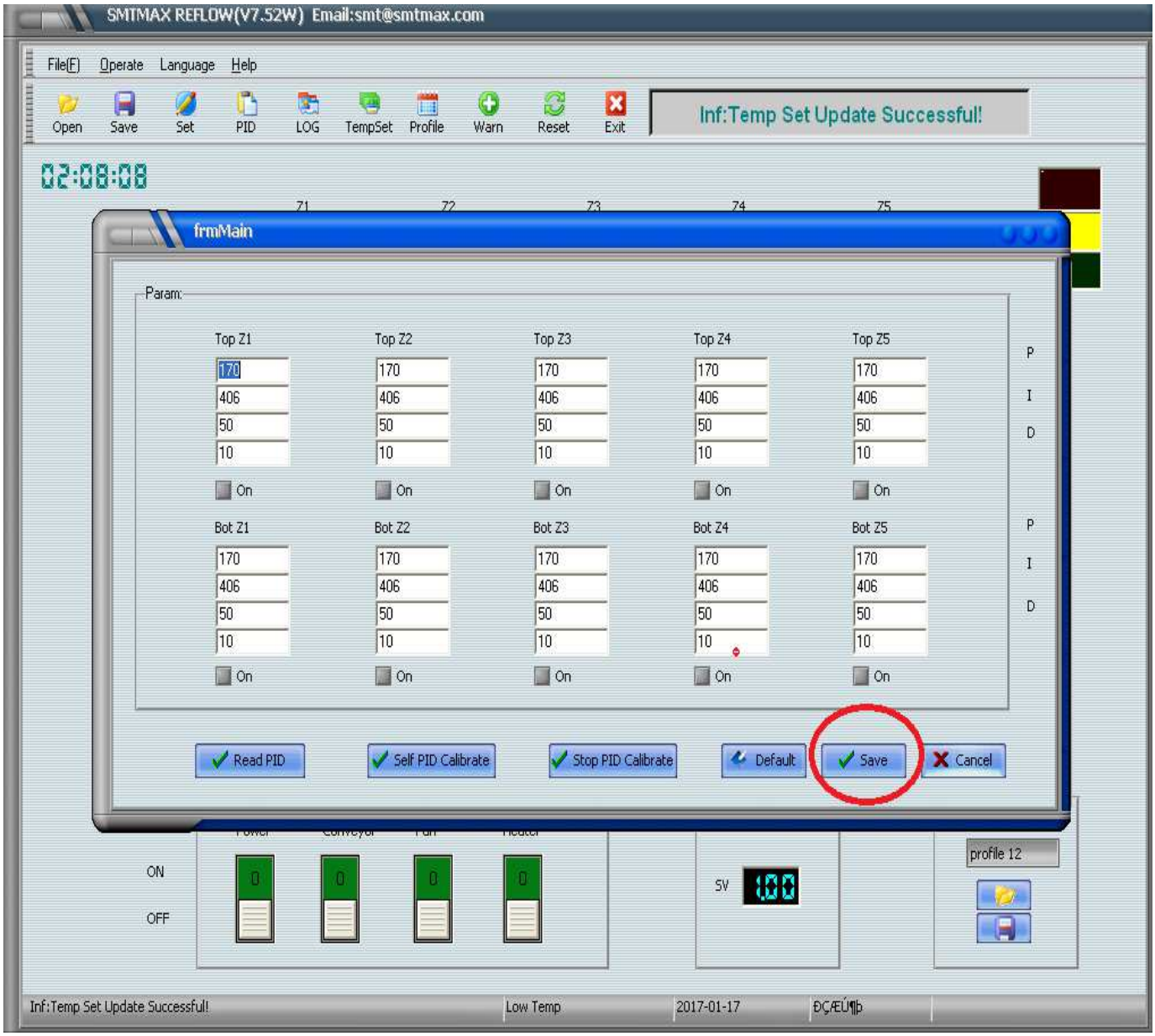
Step 4

Once it's done calibrating and the all the "ON" box's are checked and all the zones are green you will click on the box that is all the way to the left side (also shown down below) this will apply the calibration.



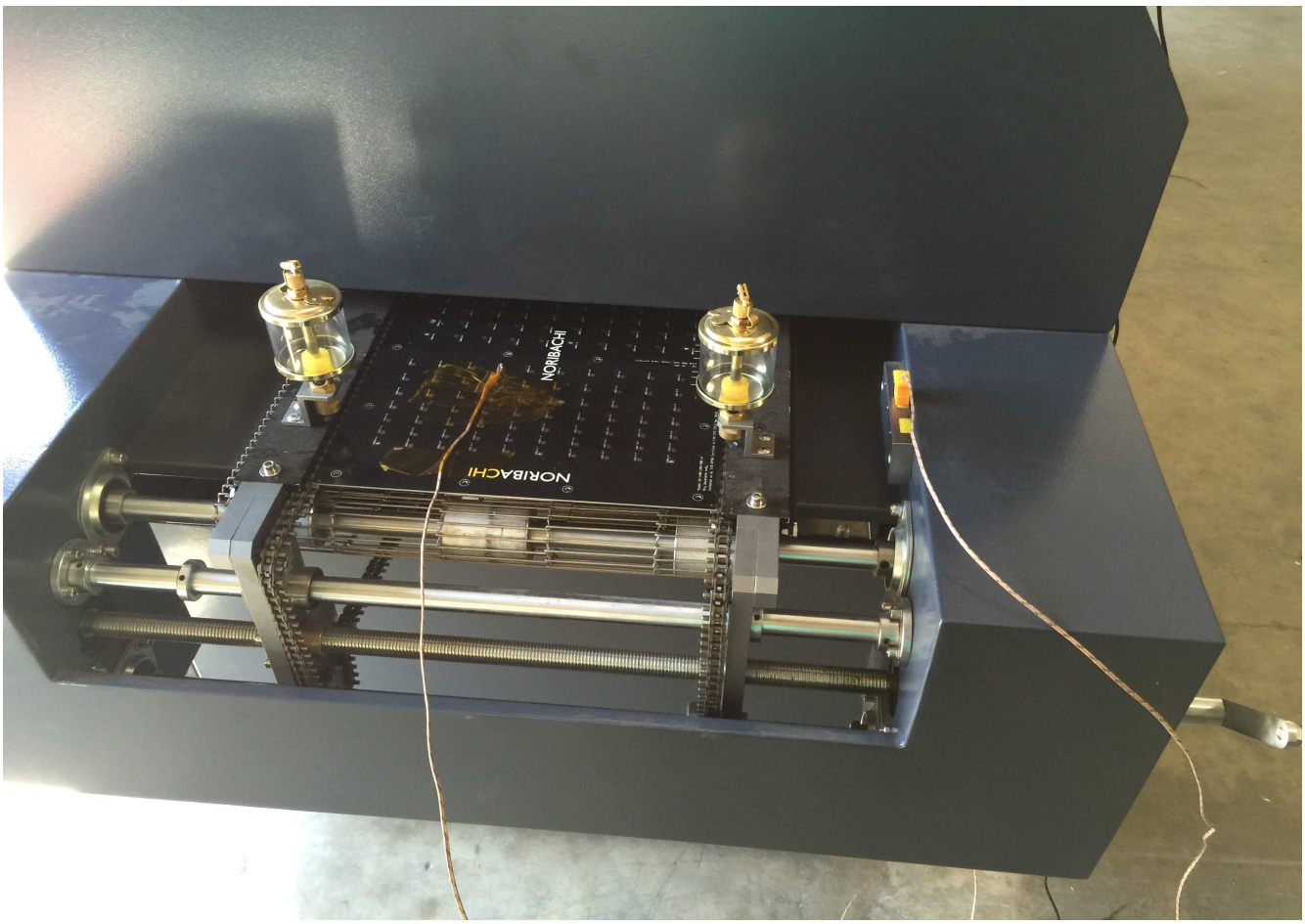
Step 5

The last step is to click Save and you are done calibrating.



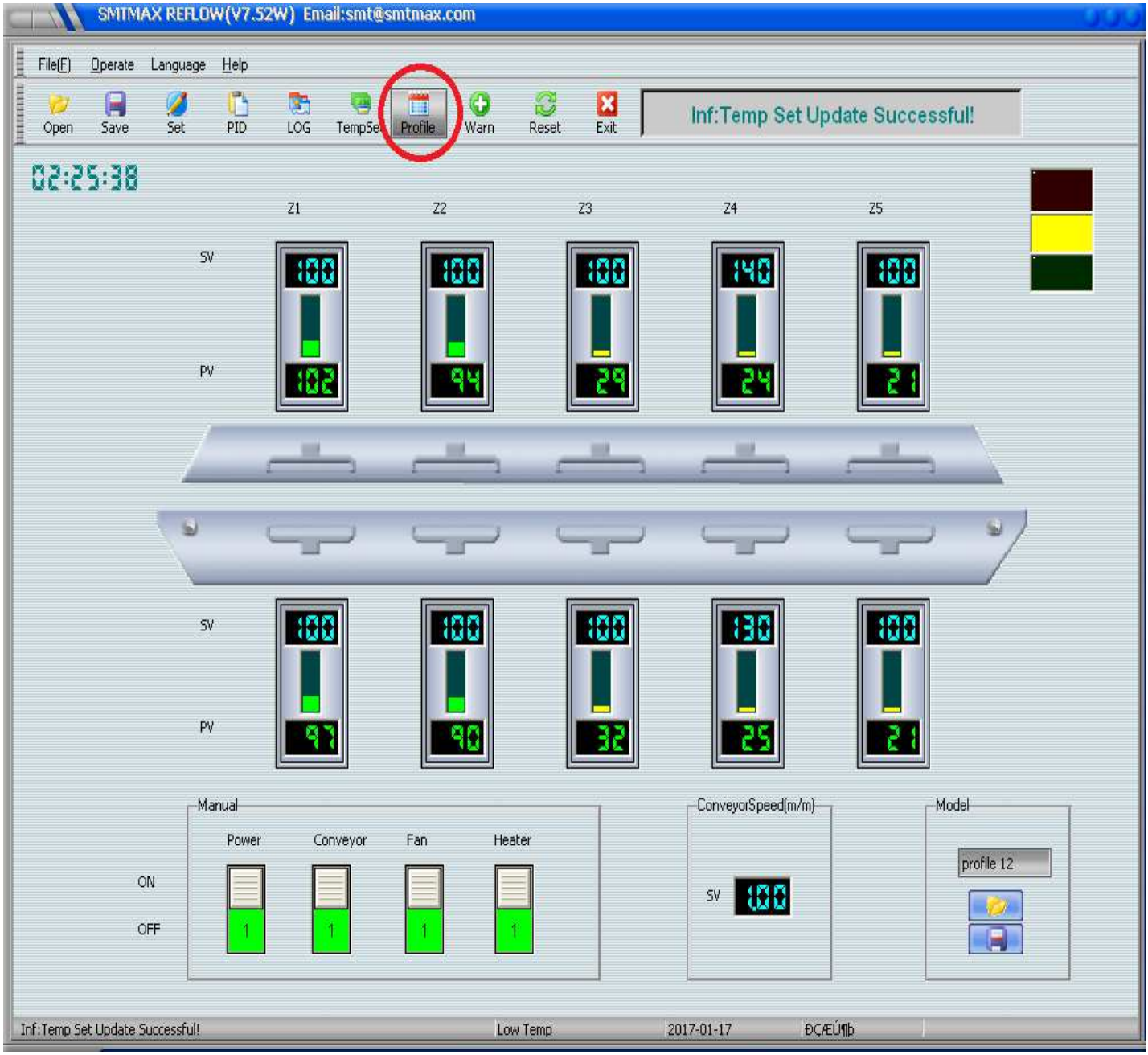
9. Profiler

The oven will come with a build in profiler, a profiler allows you to figure out your reflow solder curve. The oven comes with three K-type sensors that you can tape onto your PCB with special heat resistant tape (tape not included) as seen down below



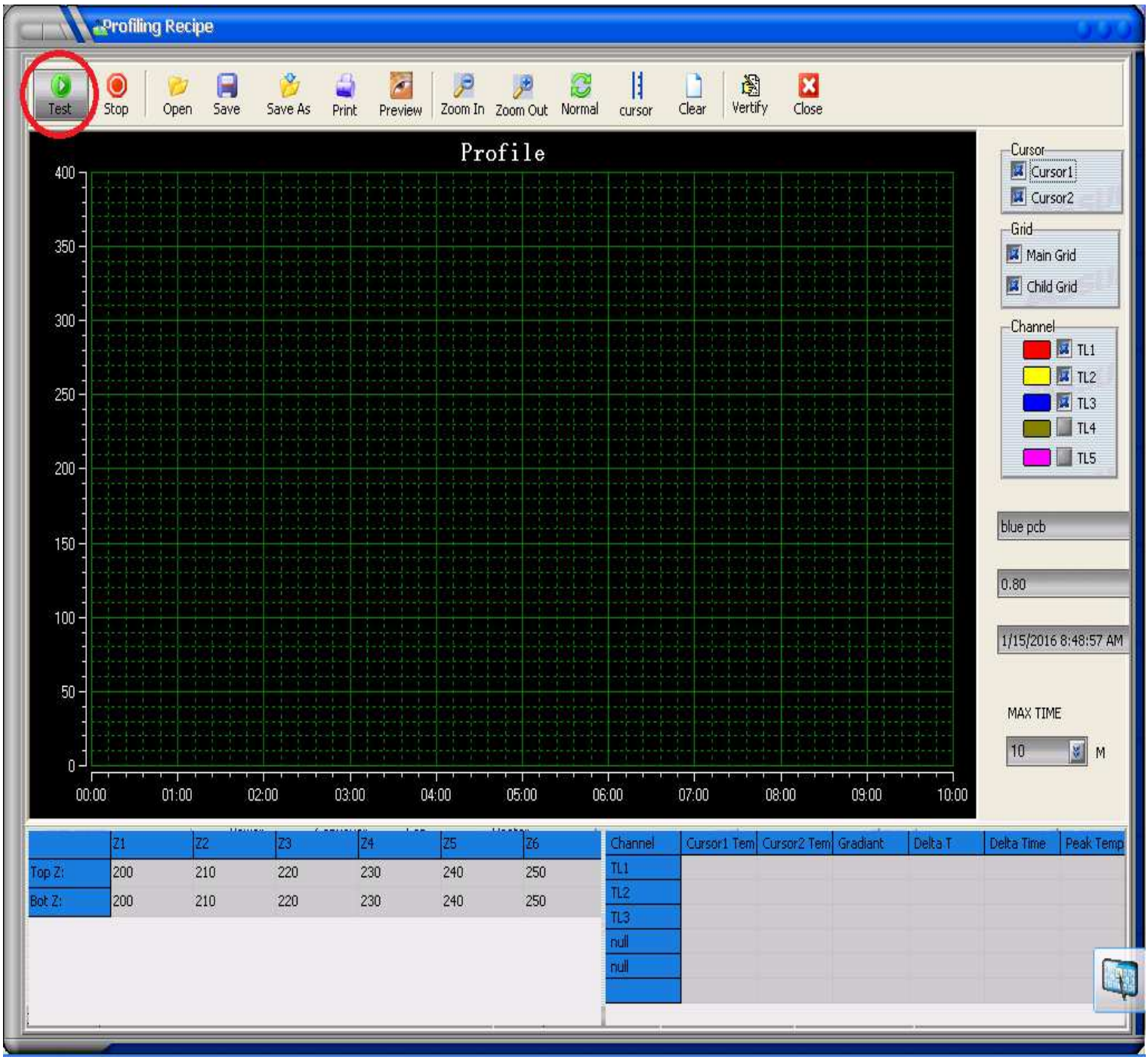
Step 1

Make sure all your heating zones have heated up and the oven indicates the green tower light, you will click the profile button.



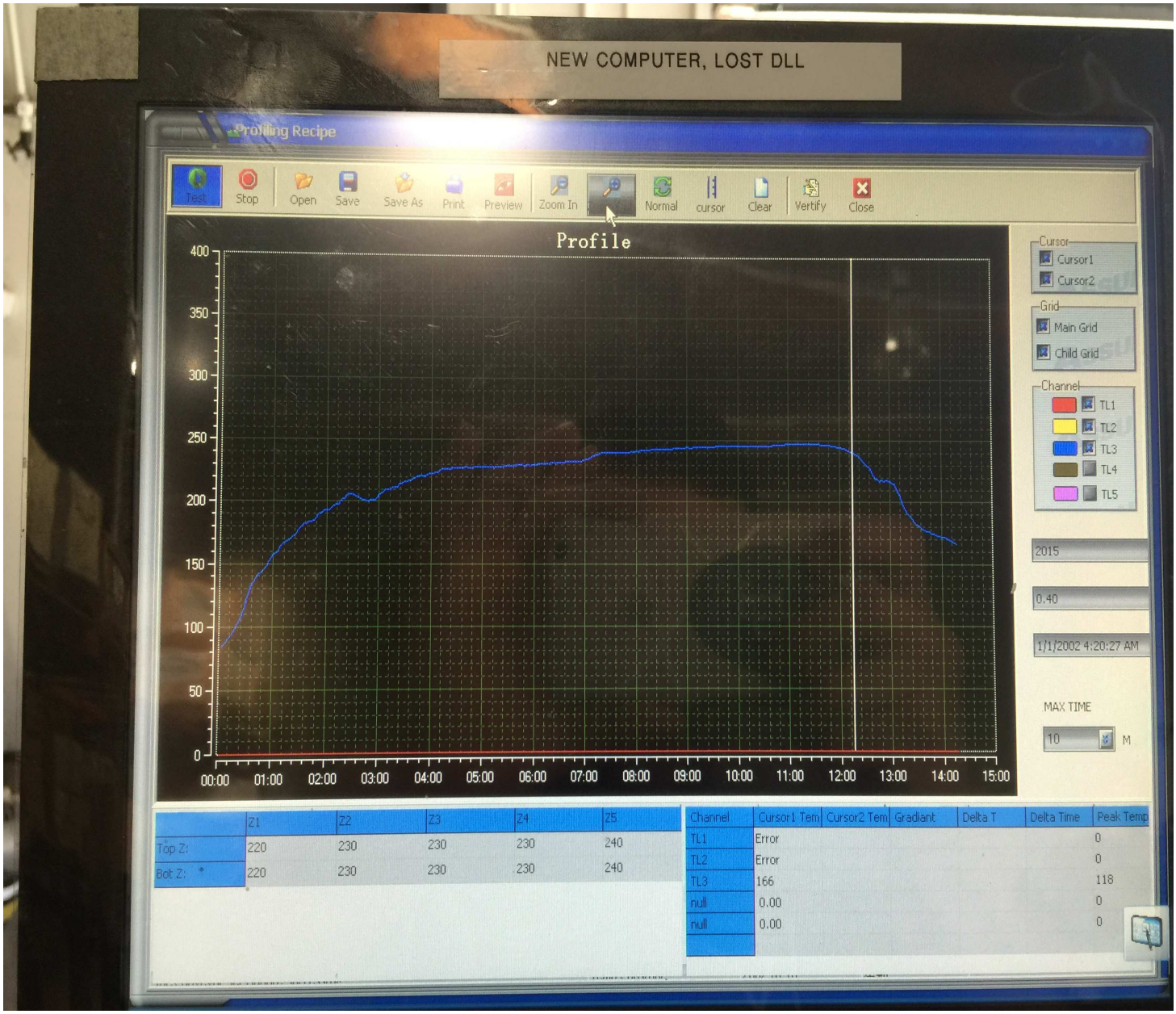
Step 2

The profiler widow will open, assuming you already have the 3 K-type thermocouples attached to your PCB, you can place your PCB on the conveyor and once you notice your PCB enter the first zone you will click the start button.



Step 3

You will notice a three point curve appear on your profile screen, this will help you determine if you have the correct conveyor speed and temperatures for your solder paste. Once the board comes out you can click the stop button.



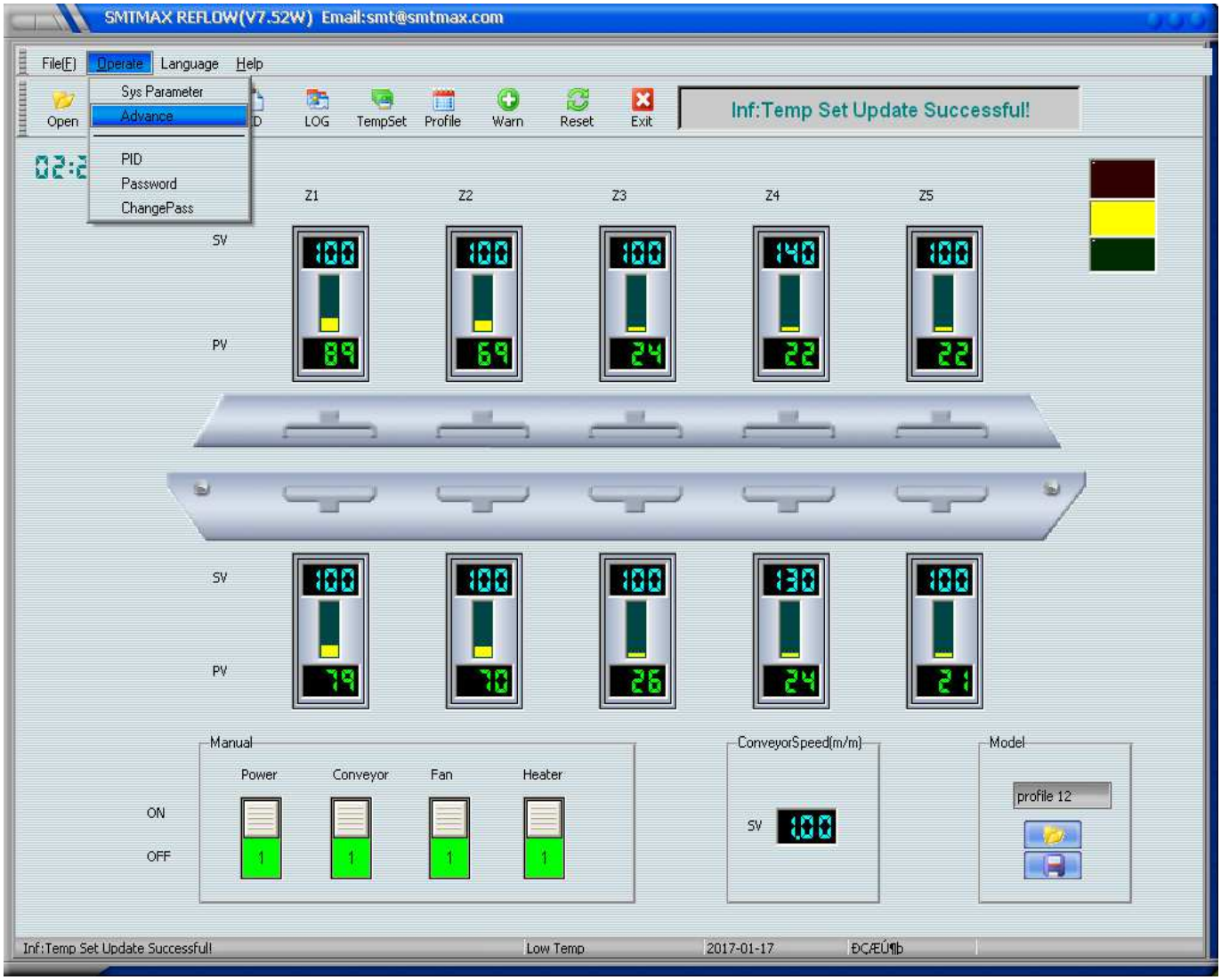
10. Troubleshooting

If your reflow oven is not communicating with the touch screen, it could be because of a bad PLC, bad RS-485 cable, bug in the software (might need to reinstall software) or port settings is incorrect. We recommend you use port #5 for communication port.

How to verify port settings.

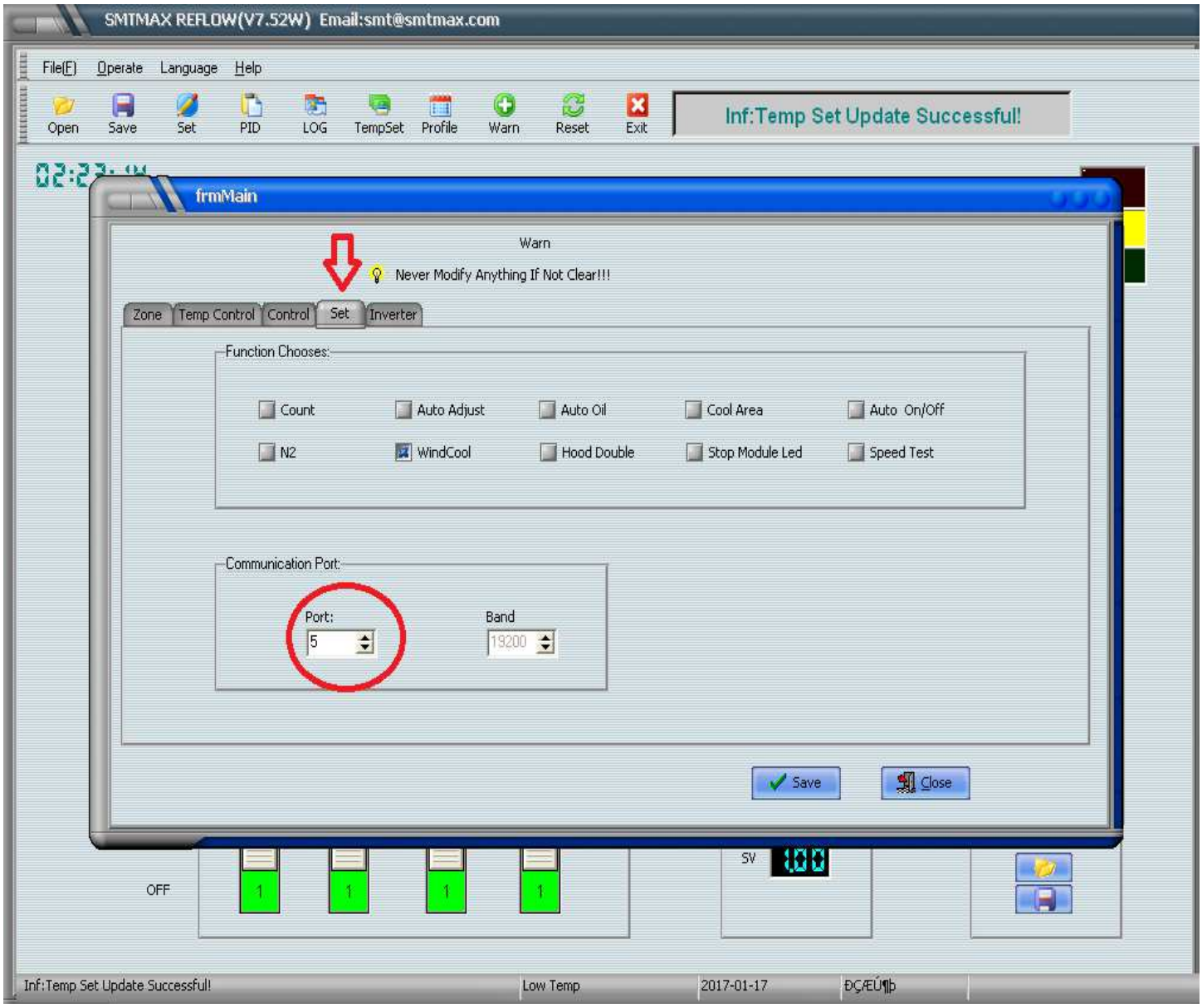
Step 1

Click on operate, and then click on advance. It will ask you to input password that is factory set for; LF427



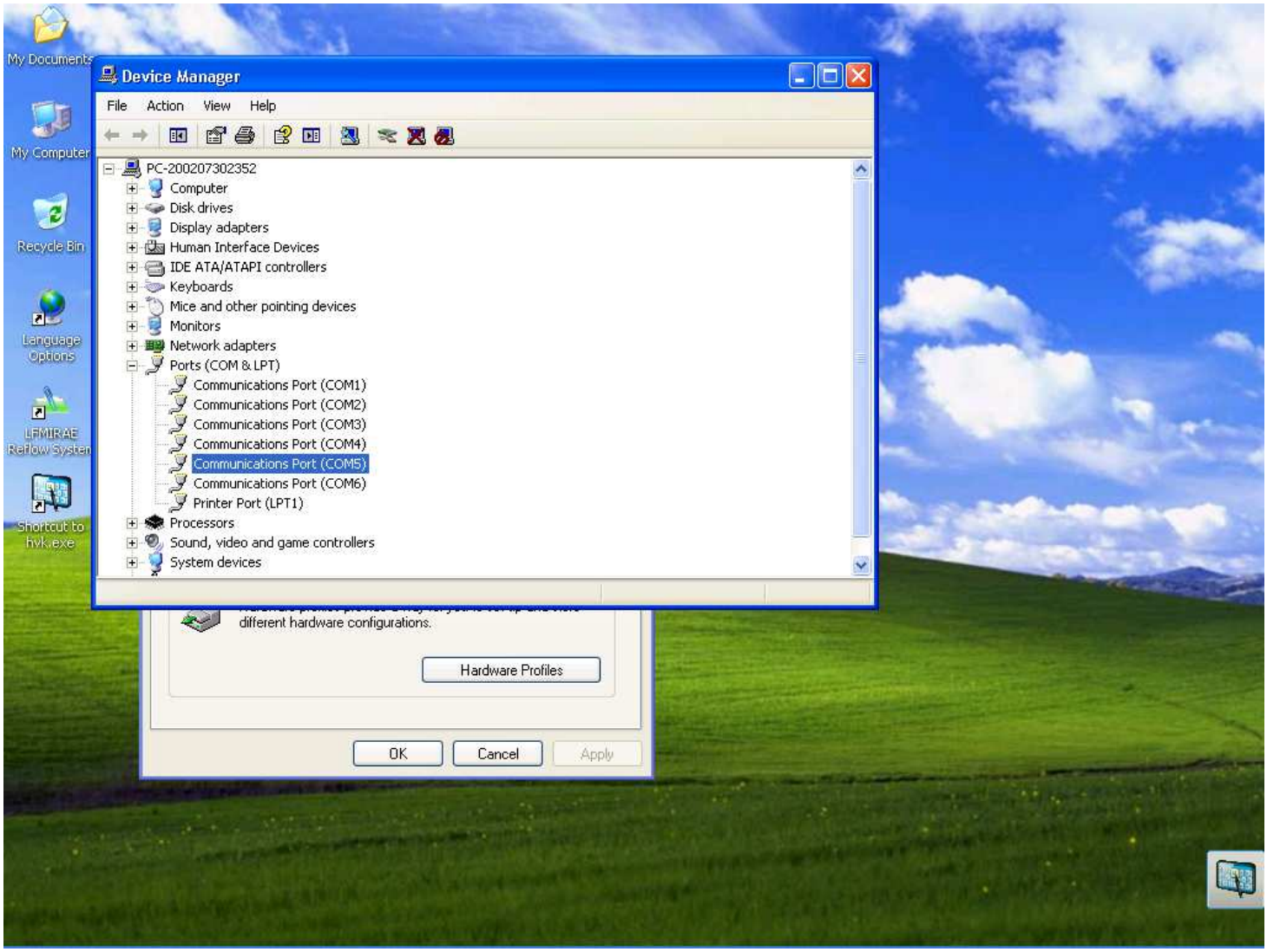
Step 2

Once the advance settings box pops up, click on “set” and verify it is set for port #5
Also your touch screen computer might have several serial port connecters, keep in mind only one port will work; make sure you use the port that is labeled by us.



Step 3

Make sure your computer is also set for communications port #5 under device manager.



If you require more information feel free to give us a call directly.

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