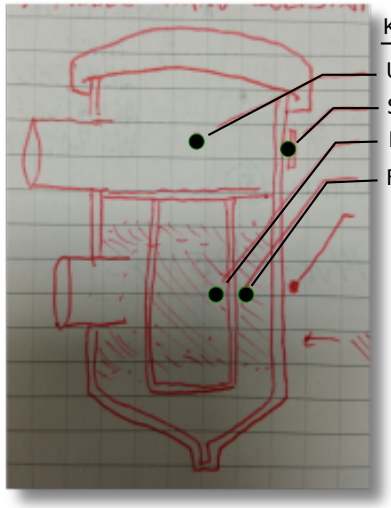


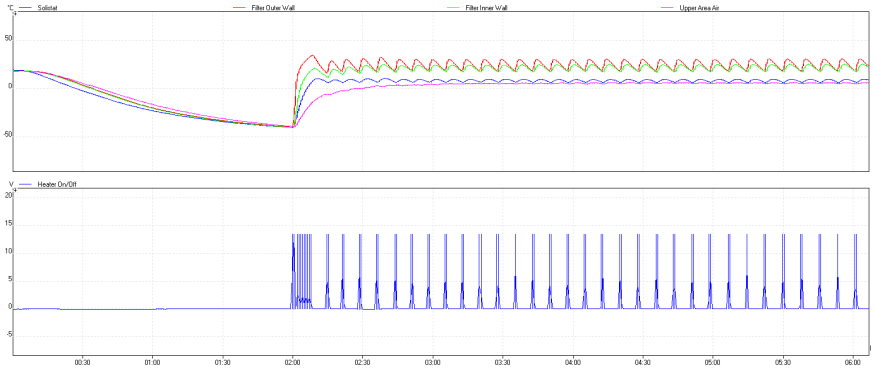
K Type Thermocouples

- Upper Chamber Air
- Solistat
- Filter Inner Wall
- Filter Outer Wall

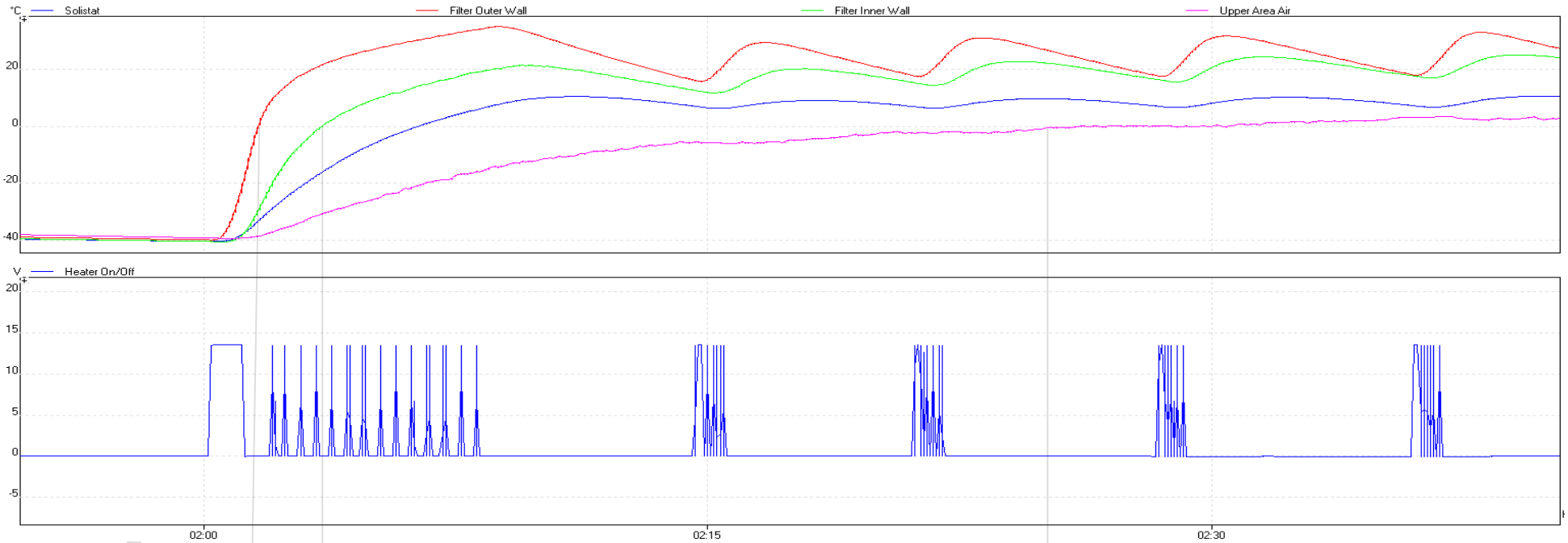
Kapton Heater
14 VDC 13.6 Amps

1/2" thick
Closed Cell
Insulation

Chamber Temperature setpoint at -50 C
Let the Unit Soak until internal temperature reached - 40 C, then apllied power
Test ran for 20+ Hours, averaging a 5.7% Duty Cycle



(Zoomed in when power applied)



Time elapsed
from -40 to 0 C

Filter Outer Wall
1:31 seconds

Filter Inner Wall
3:23 Seconds

Upper Chamber Air
25:57 Seconds

Summary Data

200 l/min blow by rate

Chamber Temp -10			-30			-50		
	seconds	h:mm:ss		seconds	h:mm:ss		seconds	h:mm:ss
Total Time	22847	6:20:47	Total Time	8604	2:23:24	Total Time	17839	4:57:19
Heater On	486	0:08:06	Heater On	361	0:06:01	Heater On	916	0:15:16
Heater Off	22361	6:12:41	Heater Off	8243	2:17:23	Heater Off	16923	4:42:03
Duty Cycle	2.13%		Duty Cycle	4.20%		Duty Cycle	5.13%	
Avg Temps			**Avg Temps**			**Avg Temps**		
Filter Out	18.44°C		Filter Out	24.24°C		Filter Out	26.54°C	
Filter In	12.98°C		Filter In	13.79°C		Filter In	12.93°C	
Air Temp	4.46°C		Air Temp	-2.97°C		Air Temp	-7.97°C	
Internal wall	-1.38°C		Internal wall	-12.98°C		Internal wall	-22.52°C	
Exterior Wall	-1.98°C		Exterior Wall	-13.83°C		Exterior Wall	-23.57°C	

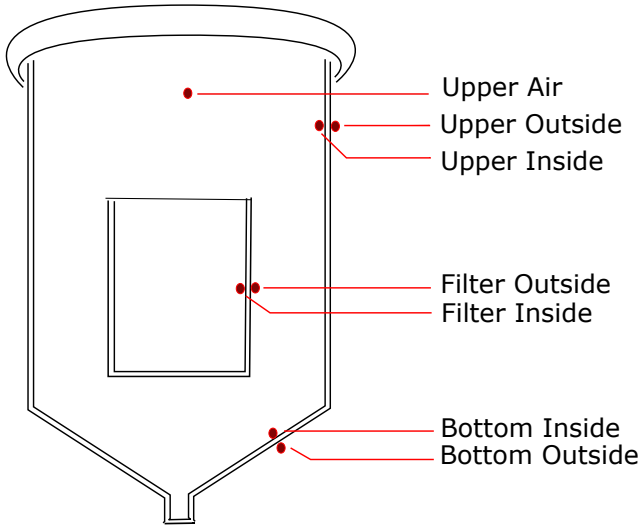
400 l/min blow by rate

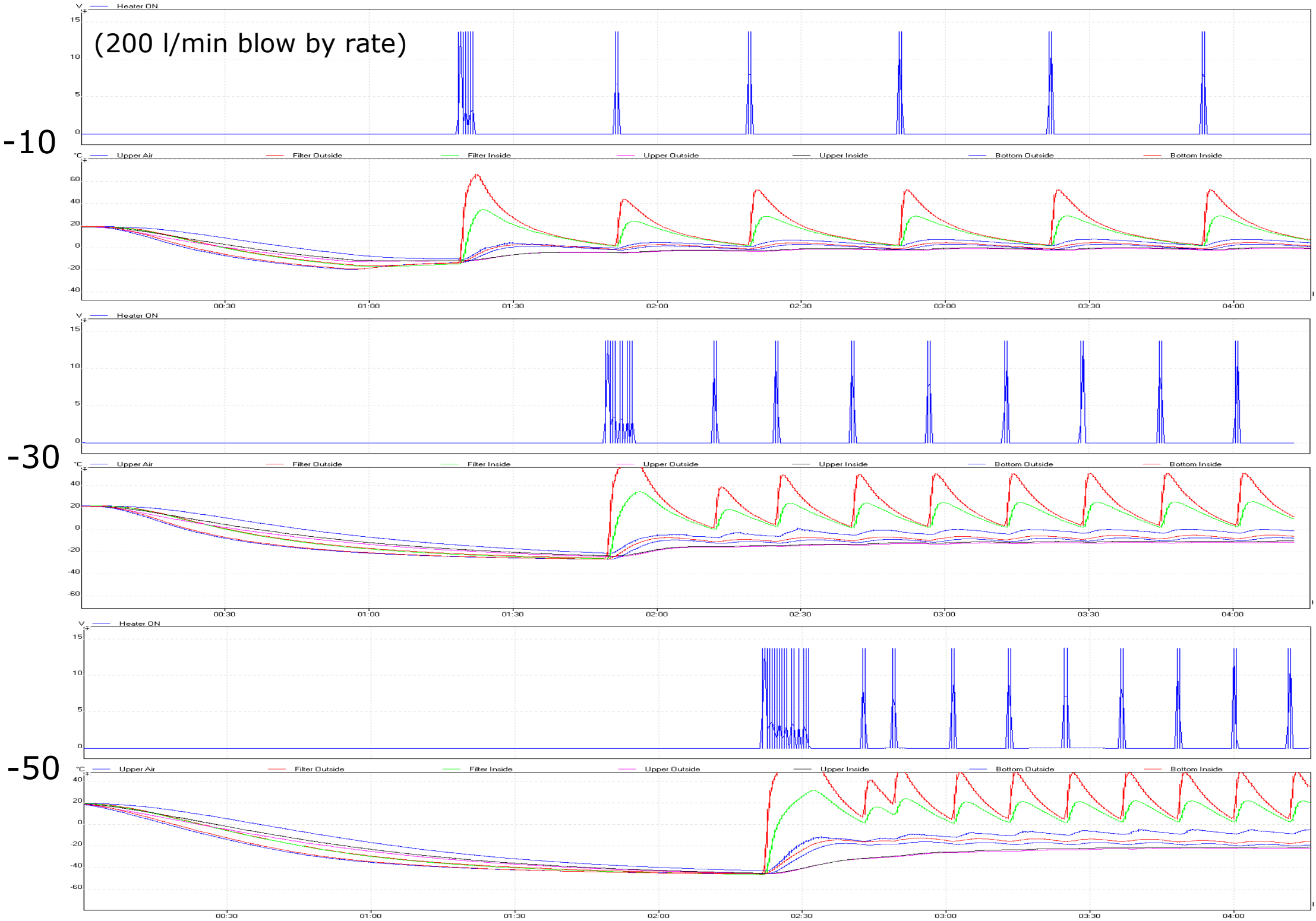
Chamber Temp -10			-30			-50		
	seconds	h:mm:ss		seconds	h:mm:ss		seconds	h:mm:ss
Total Time	13207	3:40:07	Total Time	16362	4:32:42	Total Time	17327	4:48:47
Heater On	630	0:10:30	Heater On	1354	0:22:34	Heater On	2037	0:33:57
Heater Off	12577	3:29:37	Heater Off	15008	4:10:08	Heater Off	15290	4:14:50
Duty Cycle	4.77%		Duty Cycle	8.28%		Duty Cycle	11.76%	
Avg Temps			**Avg Temps**			**Avg Temps**		
Filter Out	10.07°C		Filter Out	6.22°C		Filter Out	4.34°C	
Filter In	6.66°C		Filter In	2.11°C		Filter In	-0.97°C	
Air Temp	8.93°C		Air Temp	5.54°C		Air Temp	5.69°C	
Internal wall	8.97°C		Internal wall	6.55°C		Internal wall	7.40°C	
Exterior Wall	3.49°C		Exterior Wall	-6.12°C		Exterior Wall	-10.79°C	

200w Heater - 14v , 13.6 Amps

(x3) 100w Heaters - 10v , 15 Amps

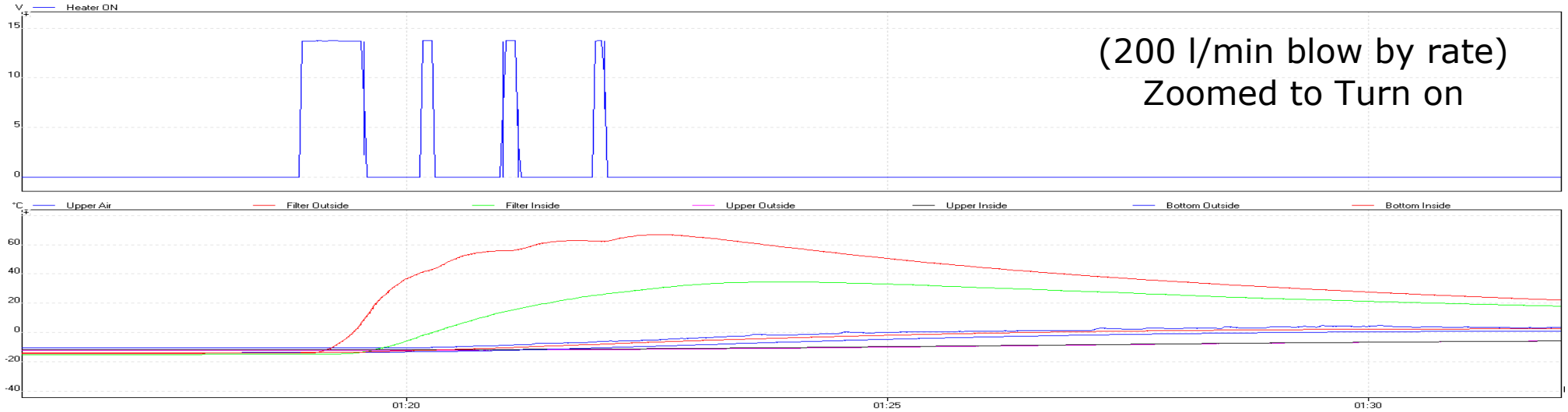
Thermocouple Locations for Both 200/400




(200 l/min blow by rate)
-10
-30
-50
Heater ON
Upper Air
Filter Outside
Filter Inside
Upper Outside
Upper Inside
Bottom Outside
Bottom Inside
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00

(200 l/min blow by rate)
Zoomed to Turn on

-10



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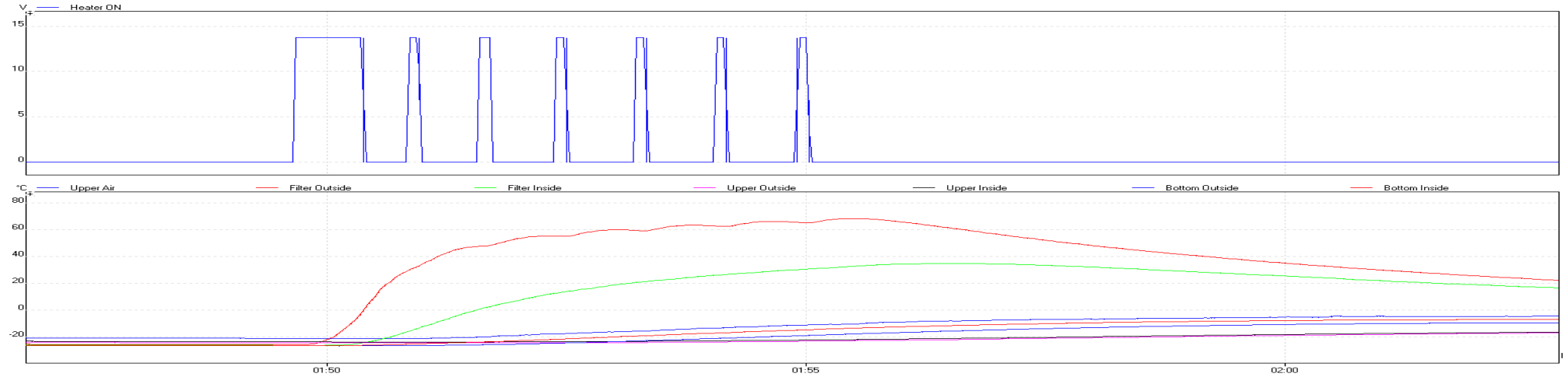

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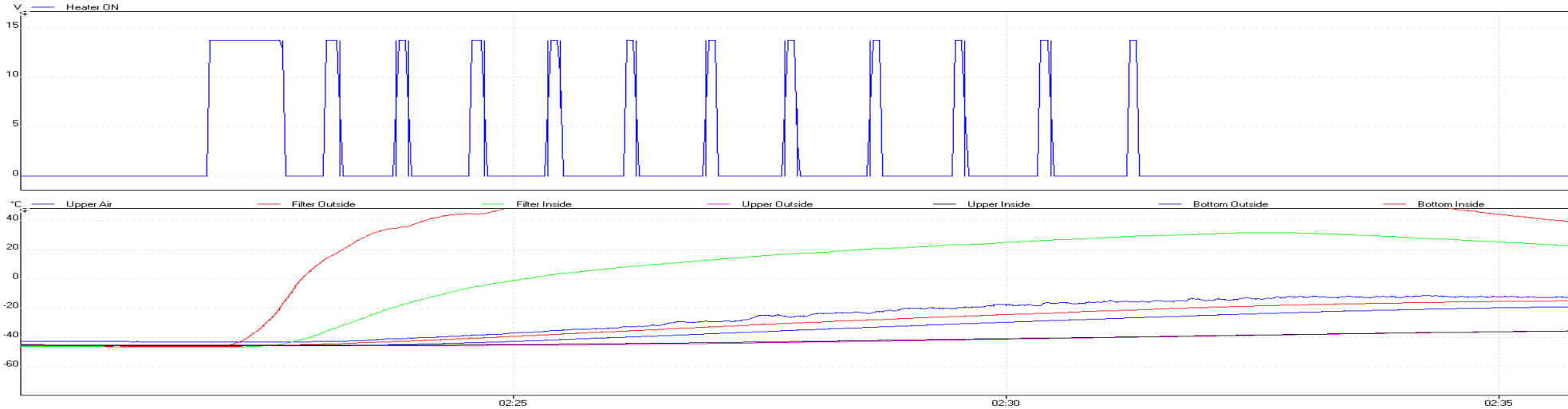
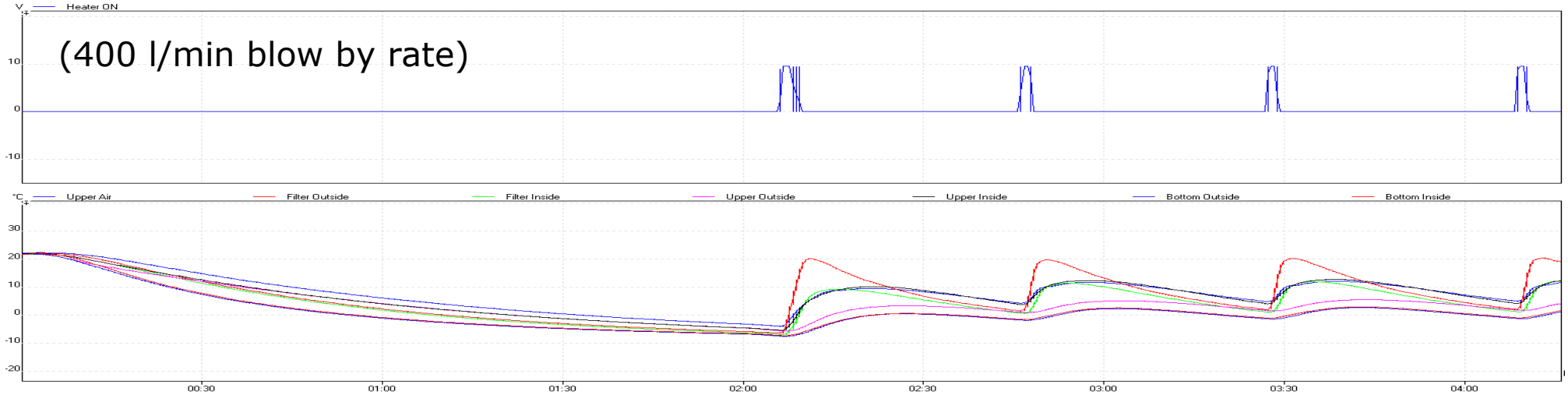


(400 l/min blow by rate)

-10



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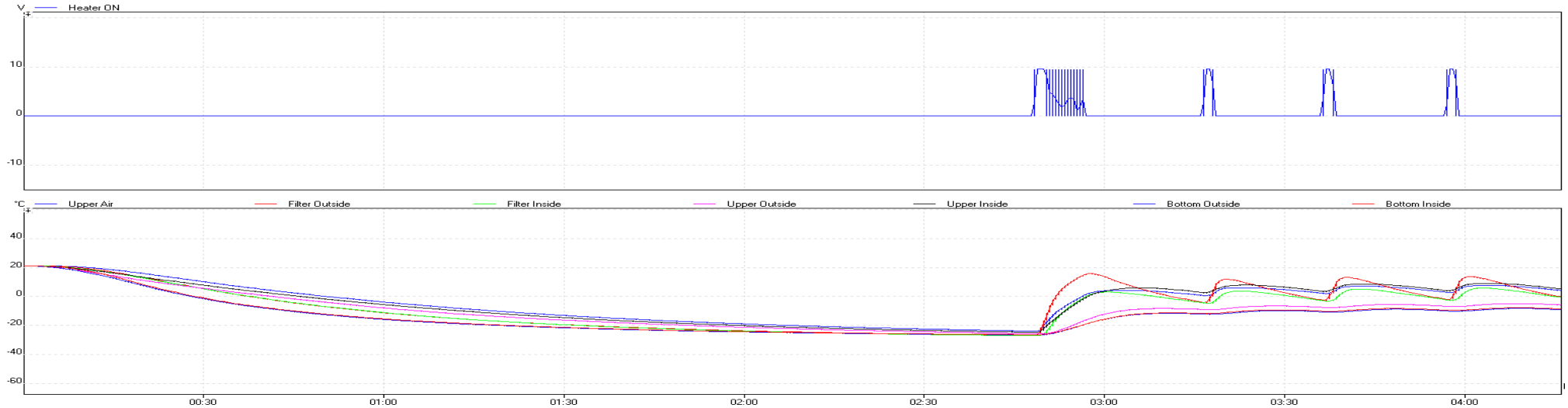

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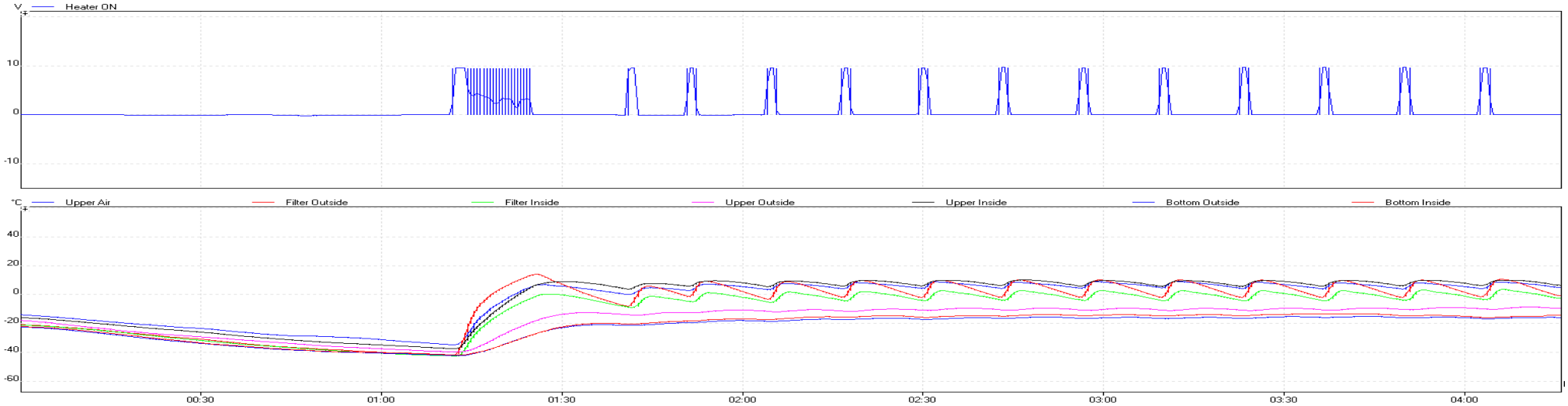
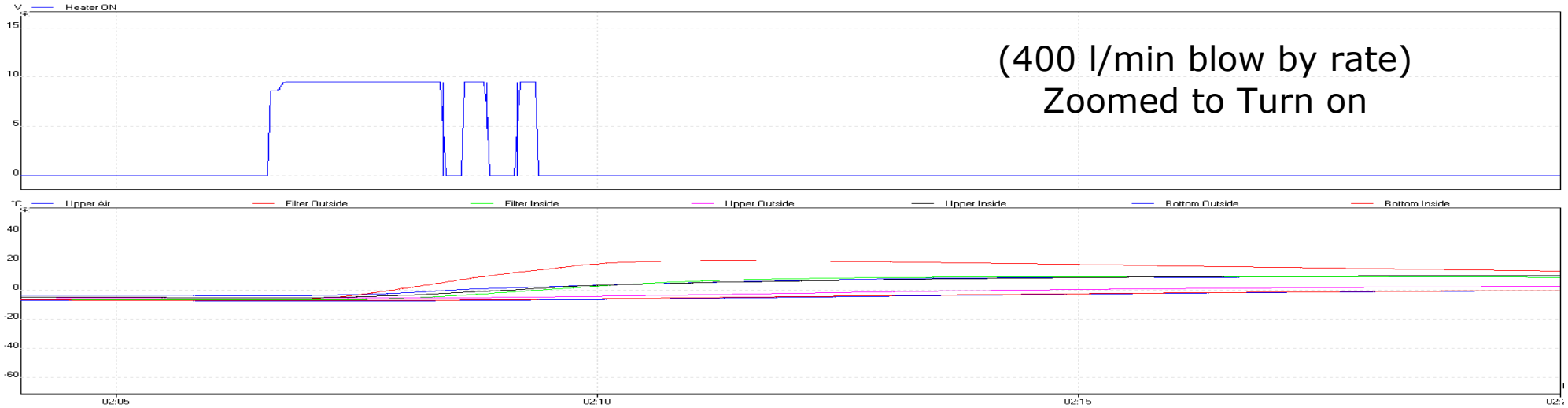


(400 l/min blow by rate)
Zoomed to Turn on

-10



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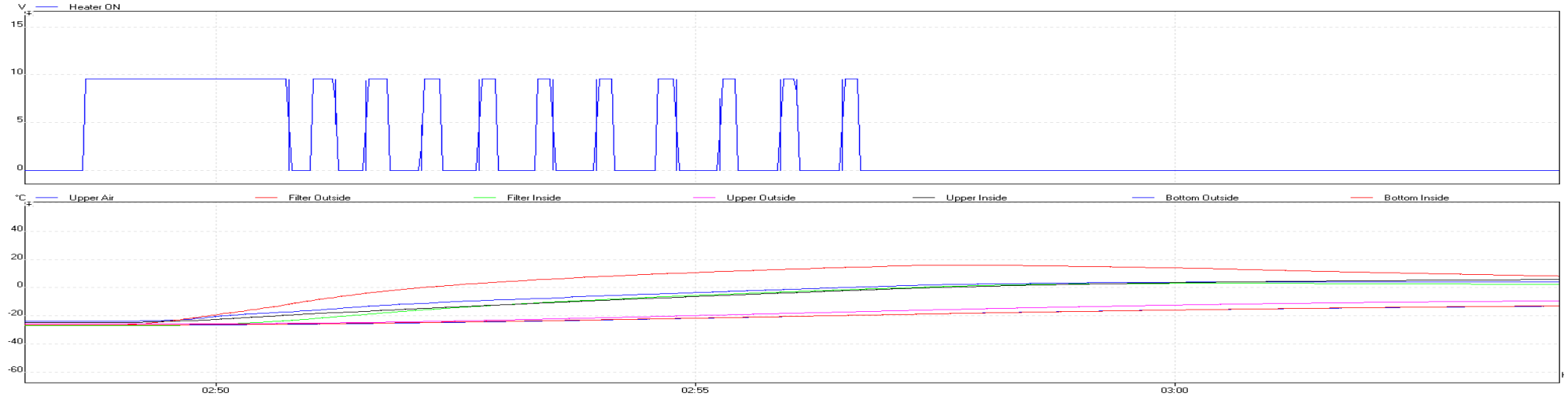
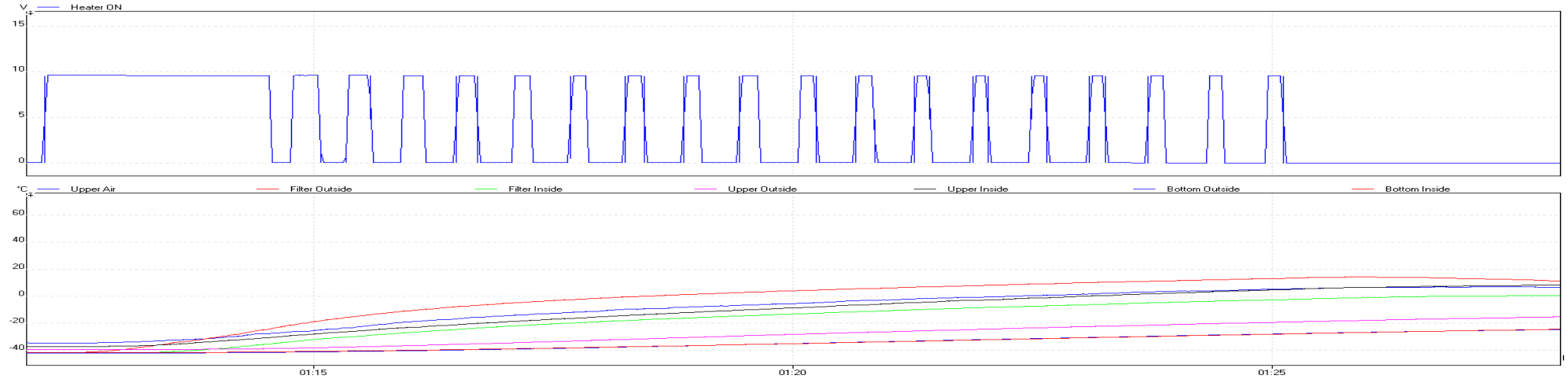


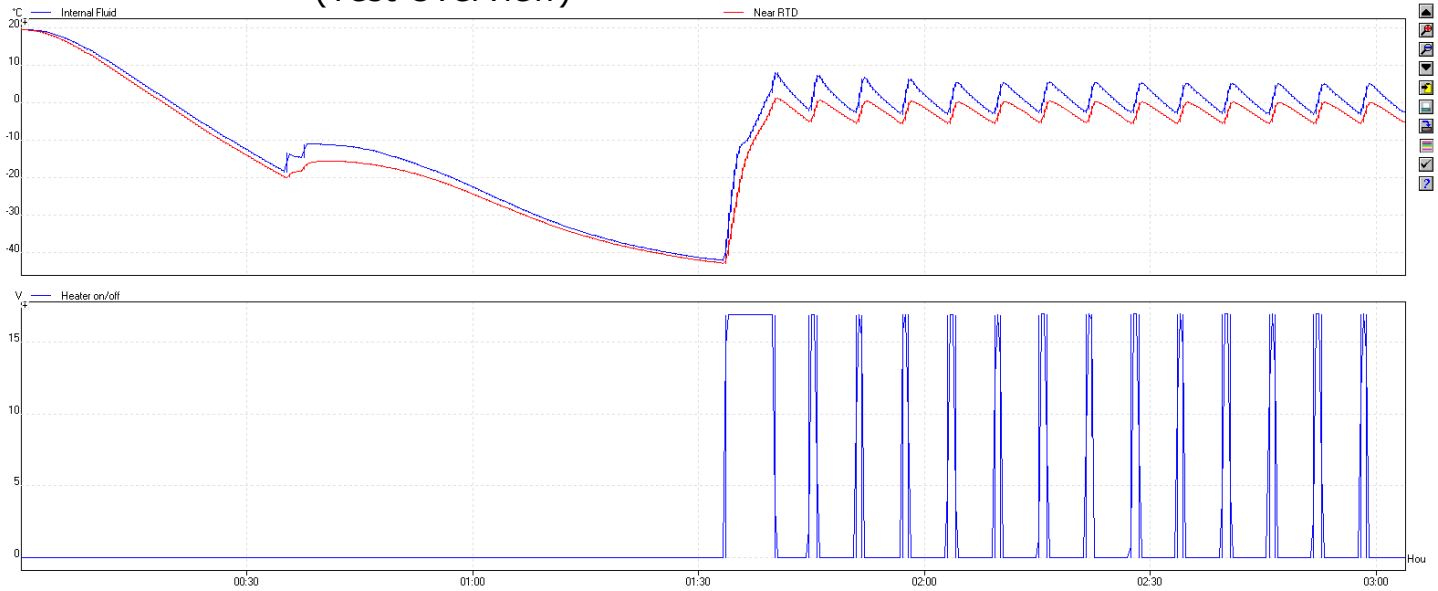
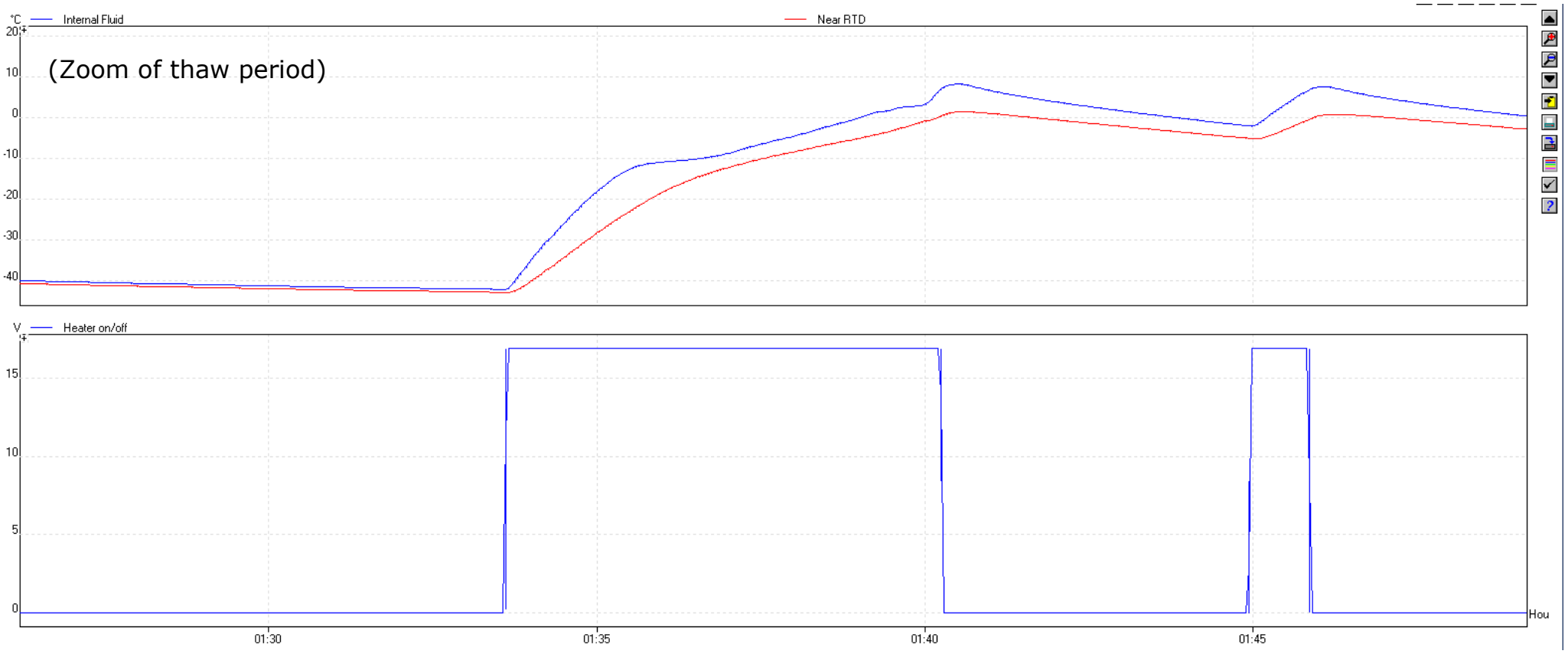
-50



Solistat Set Points **On -6.6°C Off -3.8°C**
Chamber Temp -50°C

Time From -42°C to	-11	-10	-9	-8	-7	-6
seconds	137	177	199	213	226	240
Minutes	02:17	02:57	03:19	03:33	03:46	04:00

After Thaw:	sec	hh:mm
Total Time	16045	4:27:25
Heater On	2451	0:40:51
Heater Off	13594	3:46:34
Duty Cycle	18.03%	
Amps	2.4	
Amphours	0.43272	

Average Temps	
DEF Fluid	1.4°C
Outside Hose	-2.5°C

(Test Overview)