

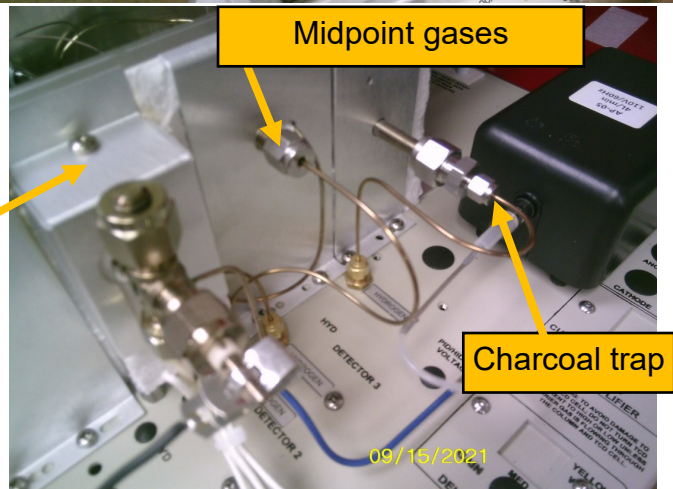
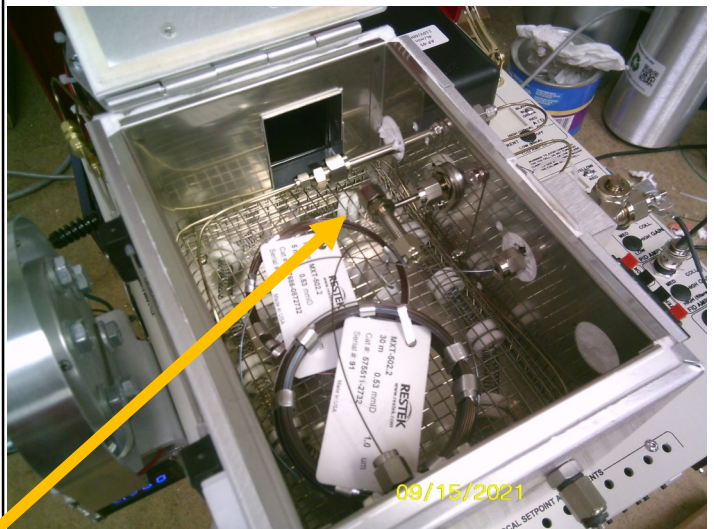
SRI Model 310MM Edibles Cannabis and Hemp Gas Chromatograph

The SRI Model 310MM Edibles Cannabis and Hemp Gas Chromatograph (GC) part # 0310-0095 (\$12,896.00 as of January 2022, pricing subject to change, please consult most recent price list) is nearly-identical looking to the Model 310MM Cannabis and Hemp GC, both of which are configured for cannabis and hemp analysis. The Edibles GC includes extra hardware which allows a pre-column to be backflushed at any time. This means that sample matrixes like MCT oils, olive oils, etc. do not require special sample preparation before injecting into the GC. This feature makes this GC extremely useful for anyone seeking to analyze edible cannabis or hemp samples.

The Pre-Column Backflush traps the oils but lets the cannabinoids through. The pre-column flow is reversed during the analysis through a charcoal trap in order to vent.

This photo shows the two columns in the column oven joined together at the “midpoint junction.”

On the right side of the column oven is the FID detector, the gas connections to the “midpoint junction” and the charcoal trap.



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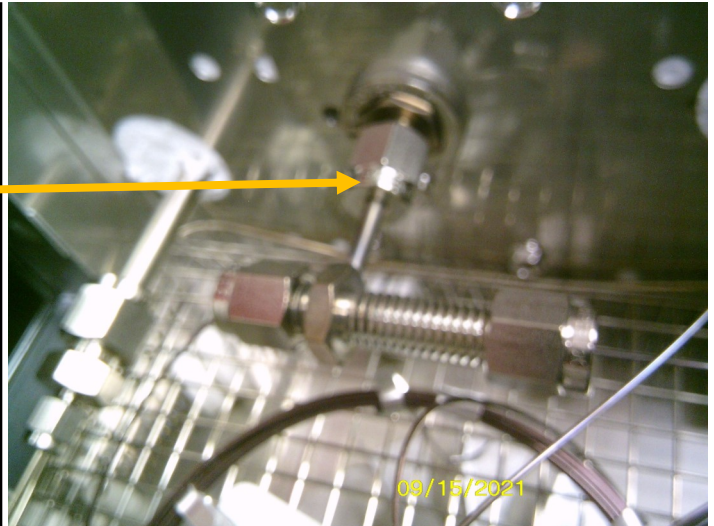
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The midpoint fitting can easily be removed so the two columns can be pre-assembled on a flat surface.

We currently use a 5 meter MXT 502 column .25 micron film as the pre-column, and a 30 meter MXT502 1 micron film as the main column.

The columns butt together in the midpoint fitting which has a short adapter the same size as the .53mm column and holds the two columns in alignment to minimize the dead volume. This same adapter is used in the on-column injector.

A small amount of carrier gas also flows into the fitting continuously to sweep the small amount of dead volume that does exist.



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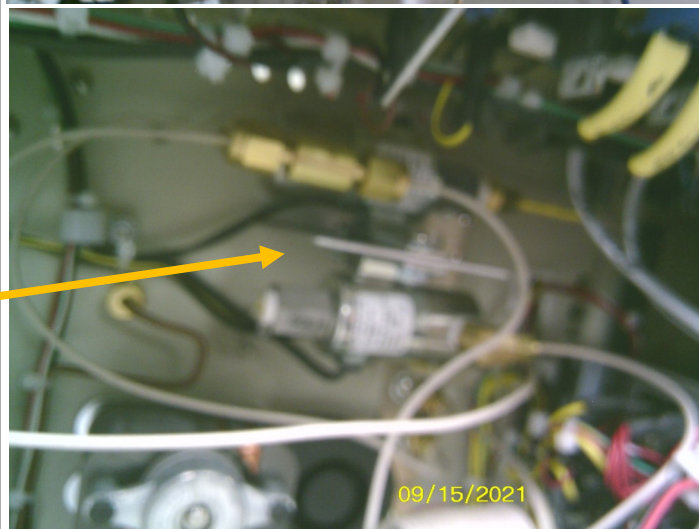
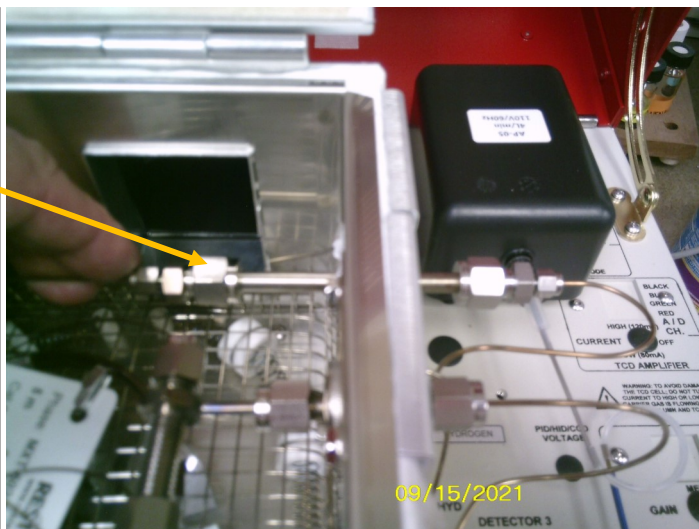
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The large tube in the right rear of the oven is the charcoal trap. When the pre-column backflushes, the gas flows through the bed of charcoal powder which is hot at the beginning (left side) and cool at the end, so somewhere in that tube the MCT/Olive oil high boiling molecules condense and get stuck on the charcoal. The charcoal trap should last for years, but it can be re-packed with new charcoal easily, as required.

Inside the GC are two solenoid valves controlled by Relay A and Relay B which, under control of the software, directs the flow of gases. The gas flow changes during the analysis to make the backflush happen.

When the pre-column is backflushed the gas goes through the charcoal trap and then out this tube (vent) on the GC's left side. When Relays A and B are ON at the same time there should be gas coming out of this tube.

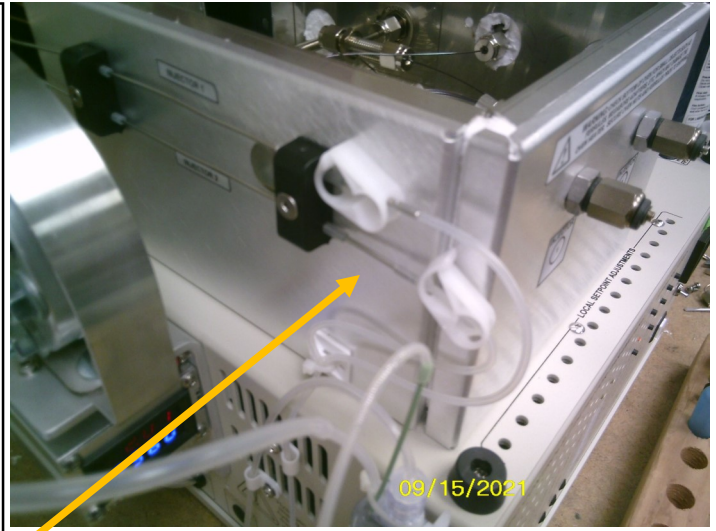


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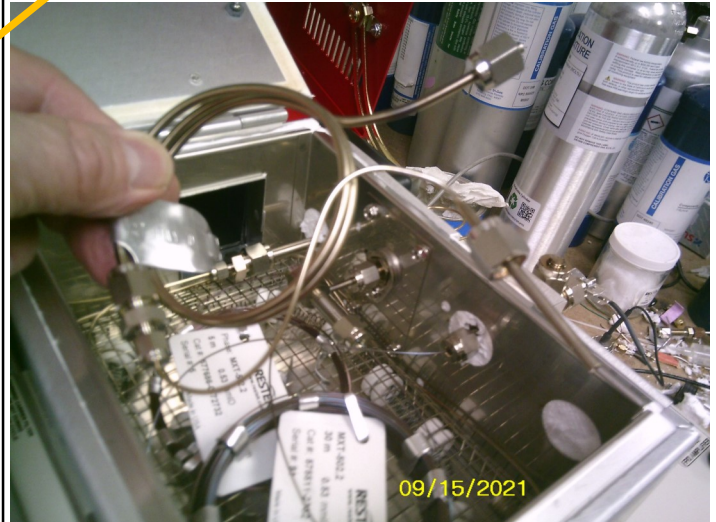
There are two on-column injection ports (injectors) on the Edibles GC.



The hydrogen gas produced by the built-in H₂ generator is directed to one injector or the other by the two plastic clips

Normally the capillary column set attached to the left side injector would be used for biomass, concentrate, oils and terpene measurement. We supply a two foot Haysep D packed column for residual solvent analysis also, but it is not necessary to install it if you are not doing residuals.

If you wish to install it, connect the column to injector #2, optionally, without removing the capillary column set. Switch the columns at the FID detector inlet and clip the white clips so the H₂ carrier is directed to injector #2. The Haysep D column has a maximum temperature of 280C so make sure you don't exceed that limit.

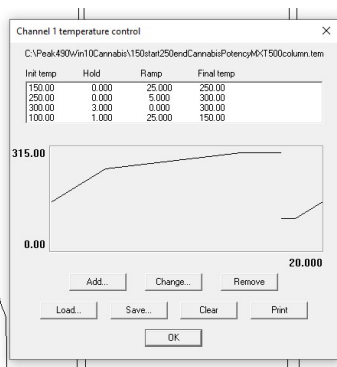


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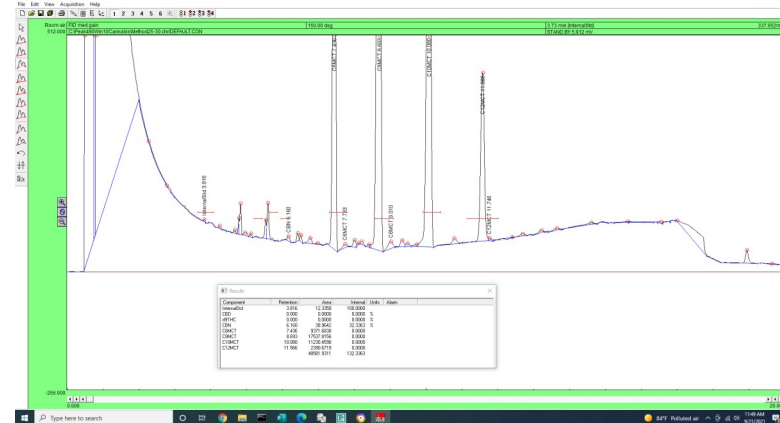
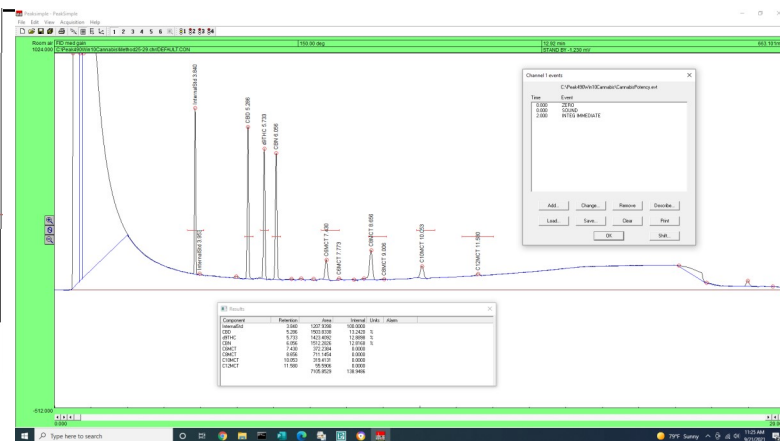
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This chromatogram shows the 333ng/ul calibration standard (333) injected into the capillary column set with no backflush.

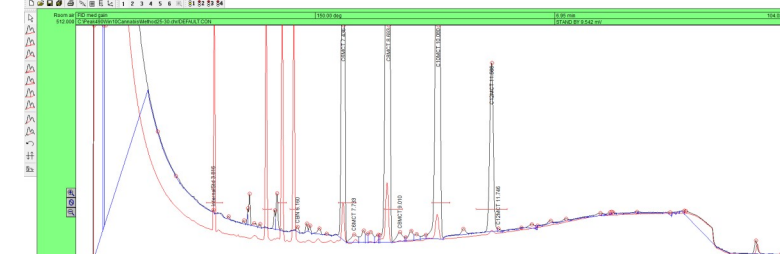


There are 4 peaks after the big solvent peak, the internal standard, CBD, delta-9-THC and CBN.

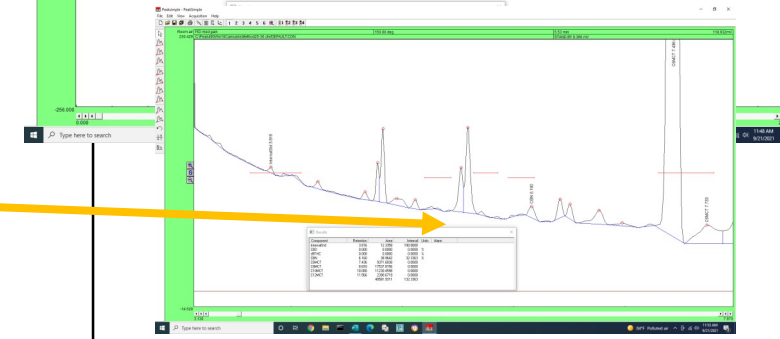
This chromatogram shows the four peaks in more detail.



This chromatogram is an injection of just MCT oil. You can see four big MCT peaks which come out later than the cannabinoids (overlaid in red).



This zoom shows that the MCT oil contains some small amount of mole-cules which elute in the same time frame as the cannabinoids. Fortu-nately there is no interference with the delta-9-THC peak, but there is some MCT interference with the delta-8-THC peak.

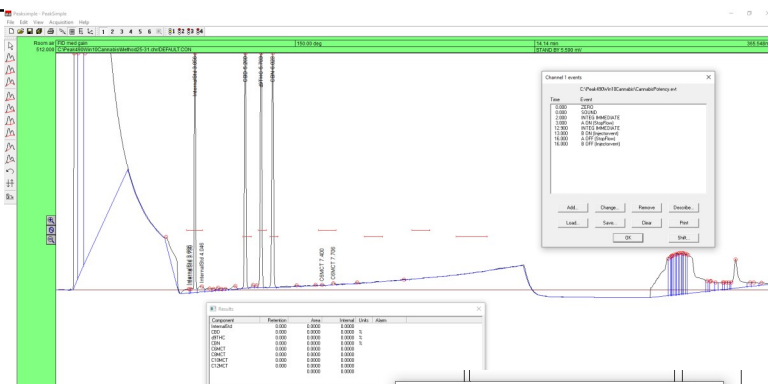


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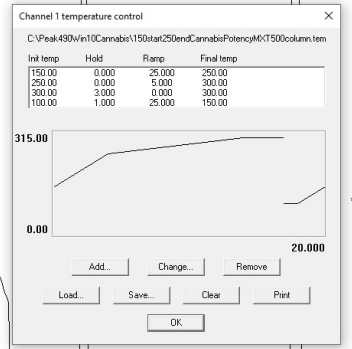
This chromatogram shows the 333ng/ul standard injected with Relay A switched to the ON position at 3.00 minutes after the start of the run. See the Events table.



Channel 1 events

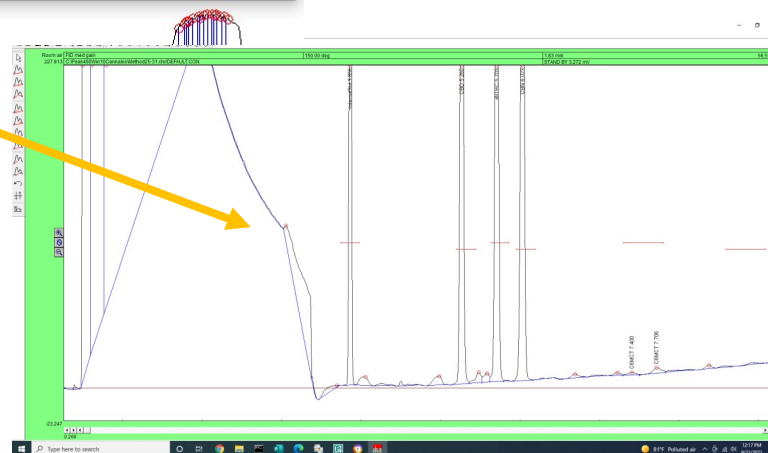
C:\Peak490v\in10Cannabis\CannabisPotency.evt

Time	Event
0.000	START
0.000	START
2.000	INTEG IMMEDIATE
3.000	A ON (StopFlow)
12.900	INTEG IMMEDIATE
13.000	B ON (injectorvent)
16.000	A OFF (StopFlow)
16.000	B OFF (injectorvent)



You can see the sudden shift in the detector signal at this time.

The pre-column now has the same pressure at its injector port end as it does at the midpoint junction fitting so the flow through that column stops, but the flow through the main column continues. Any peaks that have not eluted from the pre-column onto the main column by 3.00 minutes remain trapped in the pre-column until later in the run.



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This chromatogram shows the dip in the detector signal from 13 to 16 minutes after Relay B turns on.

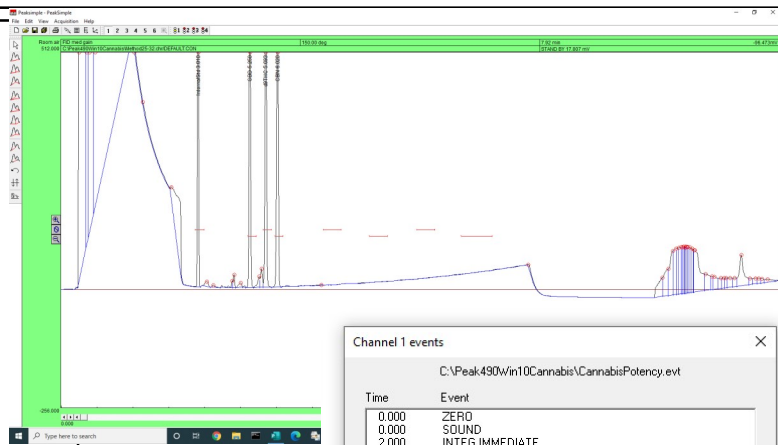
During this time the carrier gas flow through the pre-column is backwards and exiting out the charcoal trap. Since the column is then at its hottest the heavy MCT/Olive oils are easy to flush out.

The FID flame may go out during this period since most of the carrier gas flow will go to the pre-column.

This chromatogram shows the 333 standard injected with Relay A ON at 2.5 minutes instead of 3.00 minutes.

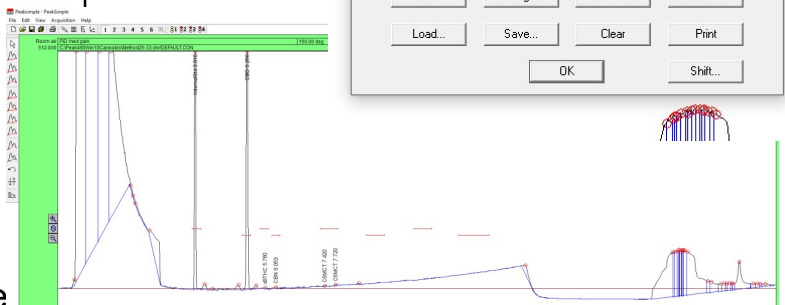
You can see only the CBD peak made through the pre-column in time. The other peaks are missing. So in this case, Relay A was turned ON too early.

The time which Relay A turns ON is determined by trial and error, but ideally the sudden signal shift should not interfere with the measurement of any peaks of interest.



Channel 1 events	
C:\Peak490W\in10Cannabis\CannabisPotency.evt	
Time	Event
0.000	ZERO
0.000	SOUND
2.000	INTEG IMMEDIATE
3.000	A ON (StopFlow)
12.900	INTEG IMMEDIATE
13.000	B ON (Injectvent)
16.000	A OFF (StopFlow)
16.000	B OFF (Injectvent)

Relay A on at 3.00 minutes



Channel 1 events	
C:\Peak490W\in10Cannabis\CannabisPotency.evt	
Time	Event
0.000	ZERO
0.000	SOUND
2.000	INTEG IMMEDIATE
2.500	A ON (StopFlow)
12.900	INTEG IMMEDIATE
13.000	B ON (Injectvent)
16.000	A OFF (StopFlow)
16.000	B OFF (Injectvent)

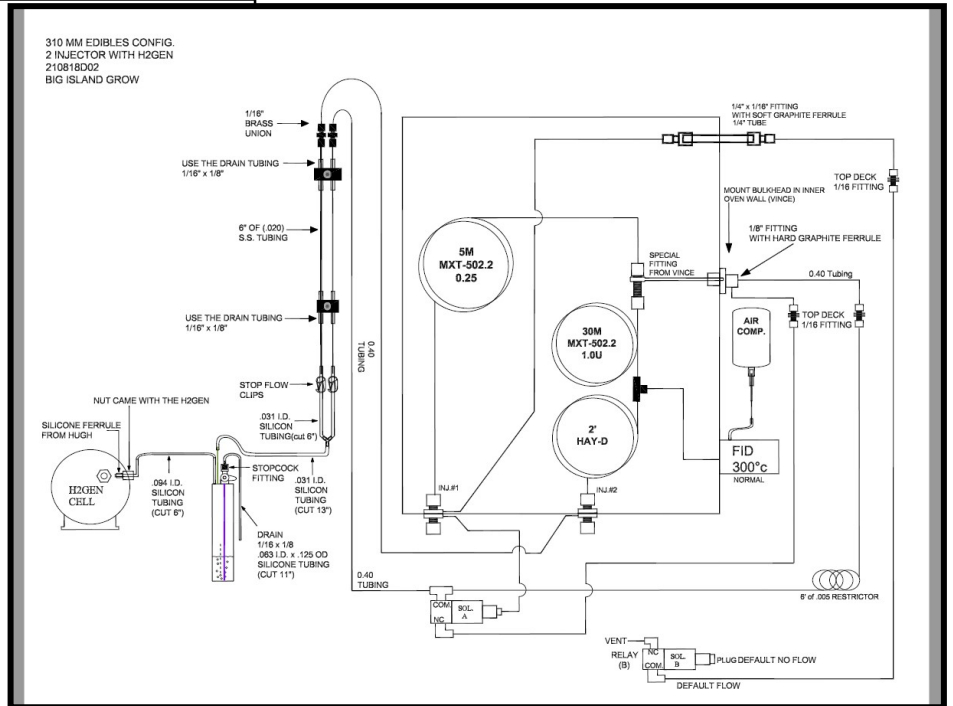
Relay A on at 2.5 minutes



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This diagram shows the connections and components that make up the SRI Model 310MM Edibles Cannabis and Hemp GC configuration.



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