LL MIP Setup & Operation

Geoprobe Systems®
December 2018

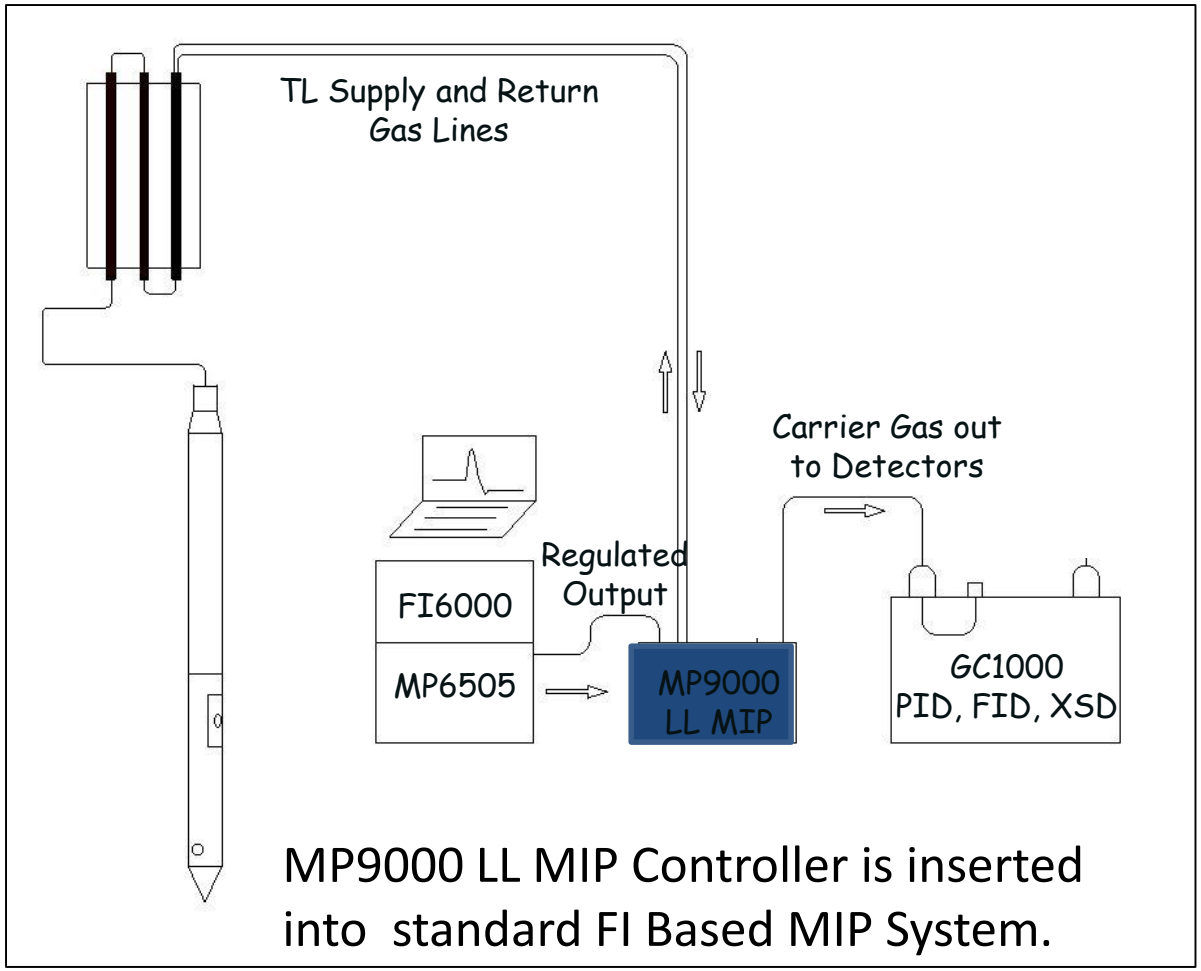
MP9000

Only additional piece of equipment needed to operate MIP in low level mode.

Add this controller to your existing FI based MIP system package.

The low level MIP controller (MP9000) handles all of the low level cycling of the trunkline flow and the valve switching which directs either clean carrier gas or the trunkline carrier gas to the detectors. This is all handled automatically by the DI acquisition low level software addition.

LL MIP System Setup



MP9000 LL MIP Controller is inserted into standard FI Based MIP System.

When the low level controller is set into the MIP system all of the gas lines are connected to this controller.

MP9000

Front Panel Switches

LL Cycle Status Lights (B)

Auto/Manual Mode Switch (A) and Indicator Lights

Sample Valve Switch (D)

TL Gas direction Indicator Lights

TL Flow Switch (E)

TL Flow on/off Indicator Lights

LL Cycle Start/Reset Buttons (C) - manually start or stop a low level cycle either using these buttons on the controller or from the software

MP9000

Front Panel Switches

Auto Mode Switch and Indicator Light

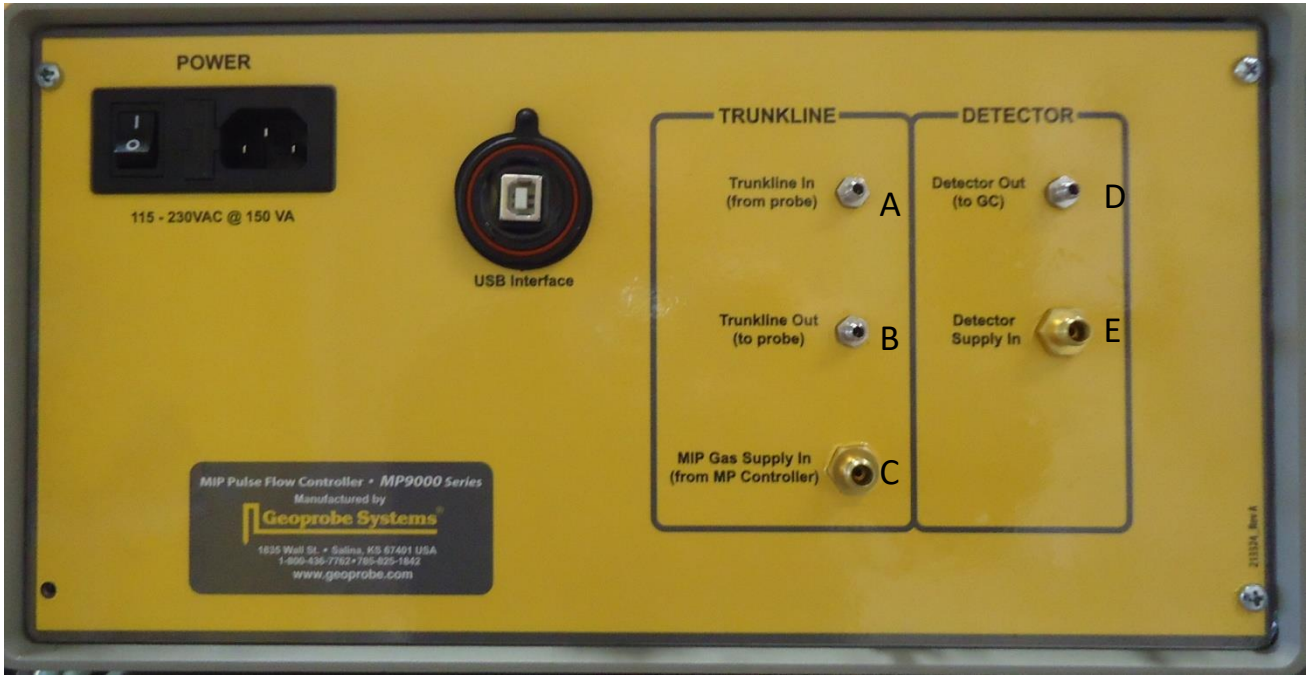
When the main switch is in auto(matic) mode, the low level MP9000 handles all of the low level cycling of the trunkline flow and the valve switching which directs either clean carrier gas or the trunkline carrier gas to the detectors.

MP9000

Back Panel Gas Connections

1/16” Tube Connection for TL Return Gas Line (A)

1/16” Tube Connection for TL Supply Gas Line (B)



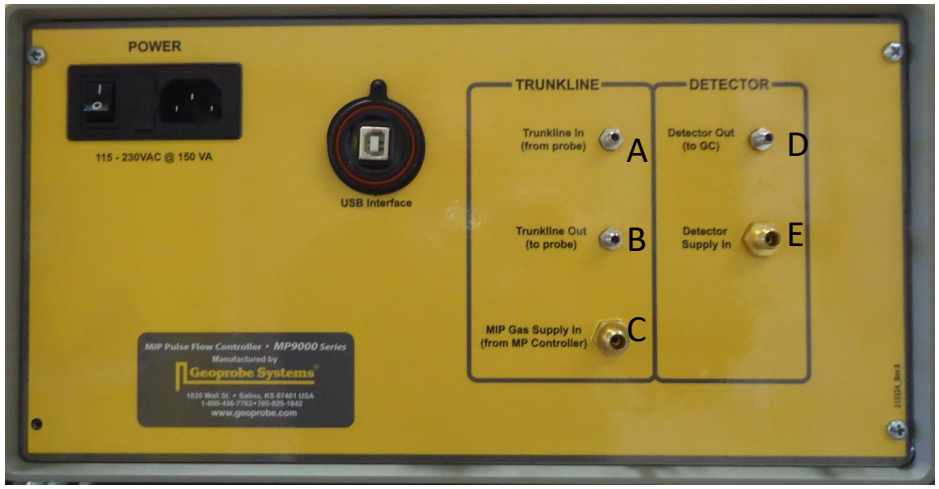
1/16” Tube Connection to detectors (D)

1/8” tube fitting – TL gas supply (C) from the regulated gas output from MP6505

1/8” Tube fitting (E) from the Nitrogen supply tank

MP9000

Back Panel Gas Connections



In the trunkline (TL) section of the MP9000 rear panel, an 1/8” line from the regulated output of the MP6505 MIP controller connects to the trunkline supply gas (C). Connect both of the 1/16” trunkline gas lines – supply (B) and return (A) above the trunkline supply input. In the detector section an 1/8” detector gas supply line (E) is to the nitrogen supply tank. Above the detector gas supply is a 1/16” fitting (D) for the transfer line which takes the carrier gas over to the detectors.

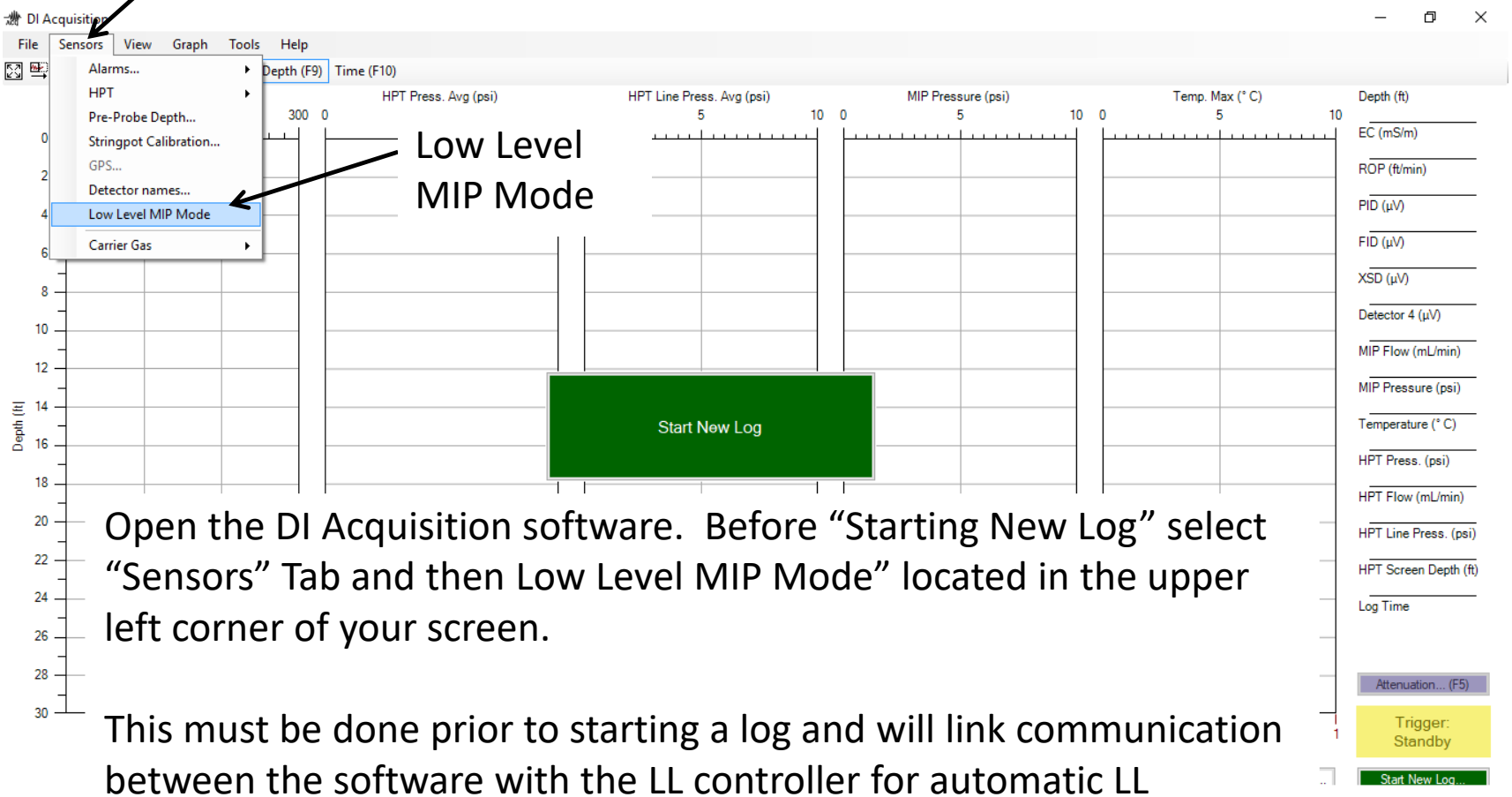
MP9000

MP9000 USB to field laptop

The first time the MP9000 is connected to the field laptop using the USB cable there must be no other instrument connected to that laptop. This is to allow the USB drivers to properly load. This will take ~1 minute.

Software Setup

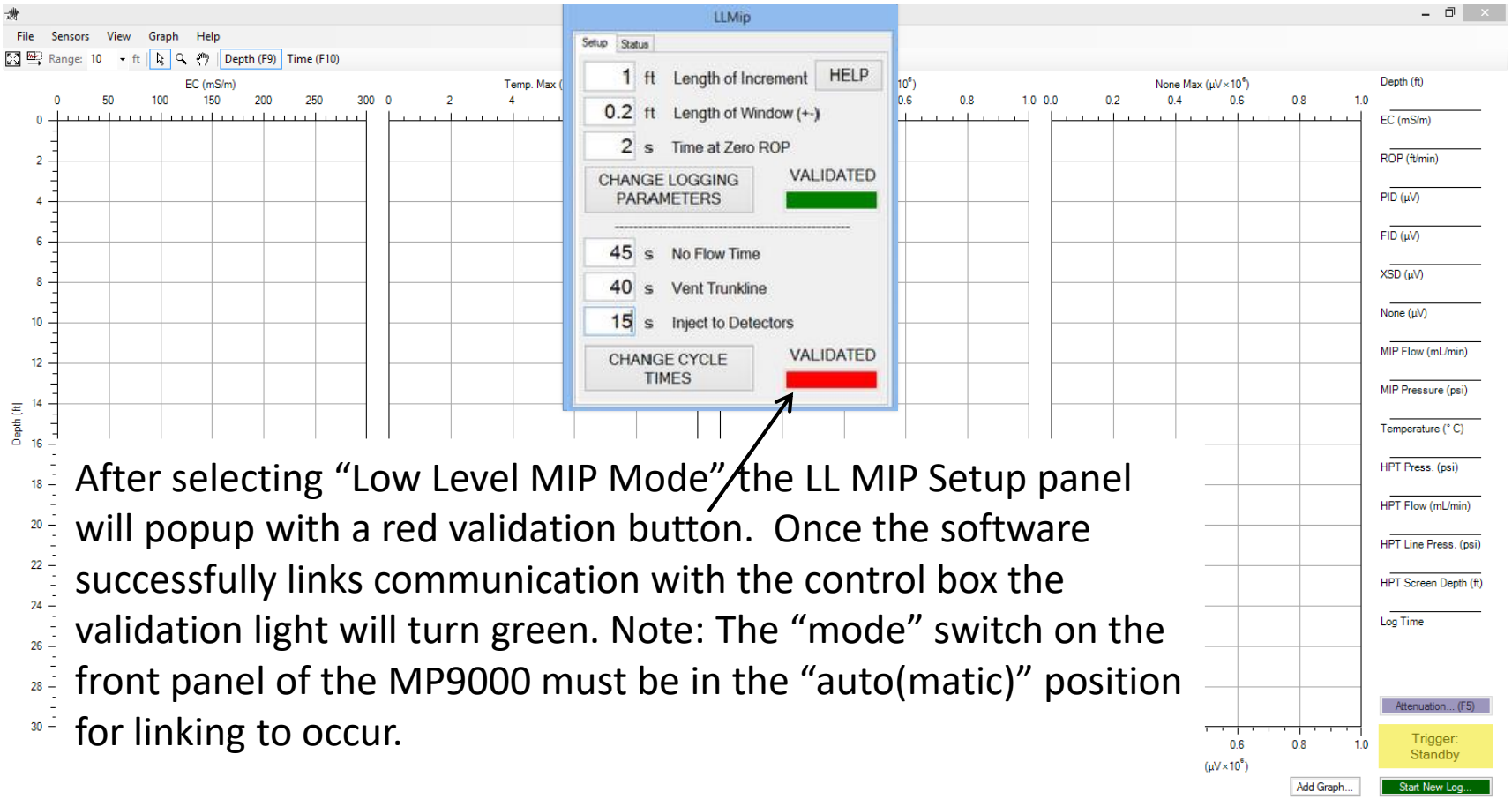
Sensors Tab



Open the DI Acquisition software. Before "Starting New Log" select "Sensors" Tab and then Low Level MIP Mode" located in the upper left corner of your screen.

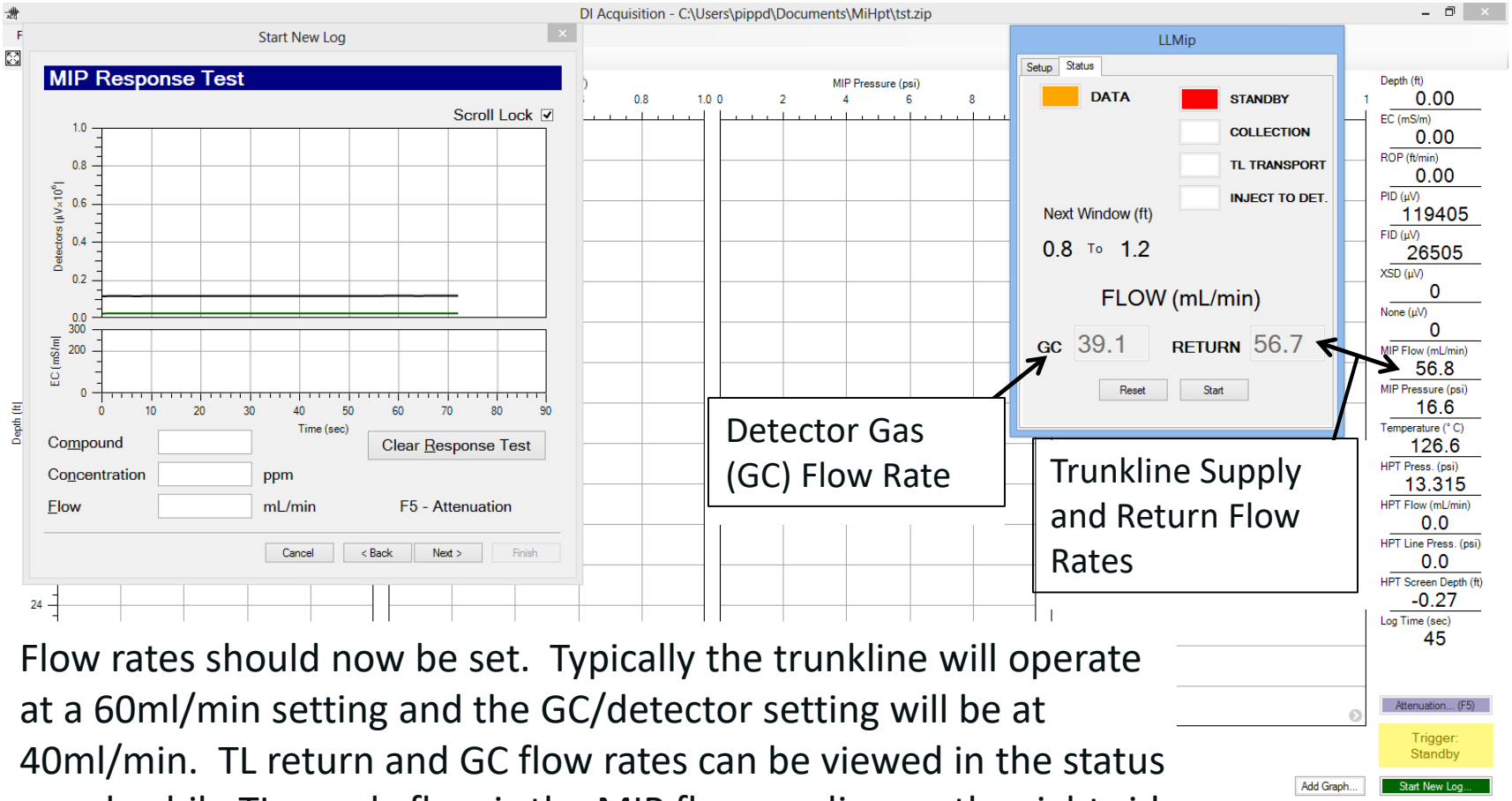
This must be done prior to starting a log and will link communication between the software with the LL controller for automatic LL operation.

Software Setup



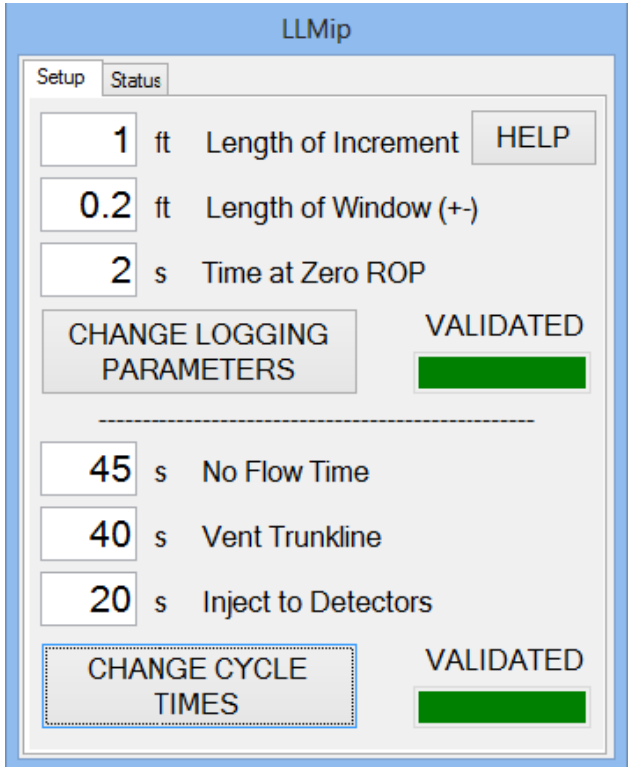
After selecting “Low Level MIP Mode” the LL MIP Setup panel will popup with a red validation button. Once the software successfully links communication with the control box the validation light will turn green. Note: The “mode” switch on the front panel of the MP9000 must be in the “auto(matic)” position for linking to occur.

LL Setup



Flow rates should now be set. Typically the trunkline will operate at a 60ml/min setting and the GC/detector setting will be at 40ml/min. TL return and GC flow rates can be viewed in the status panel, while TL supply flow is the MIP flow reading on the right side digital readout. If there is too much baseline noise when the valve switches bring the GC and TL flow values closer together.

LL Setup



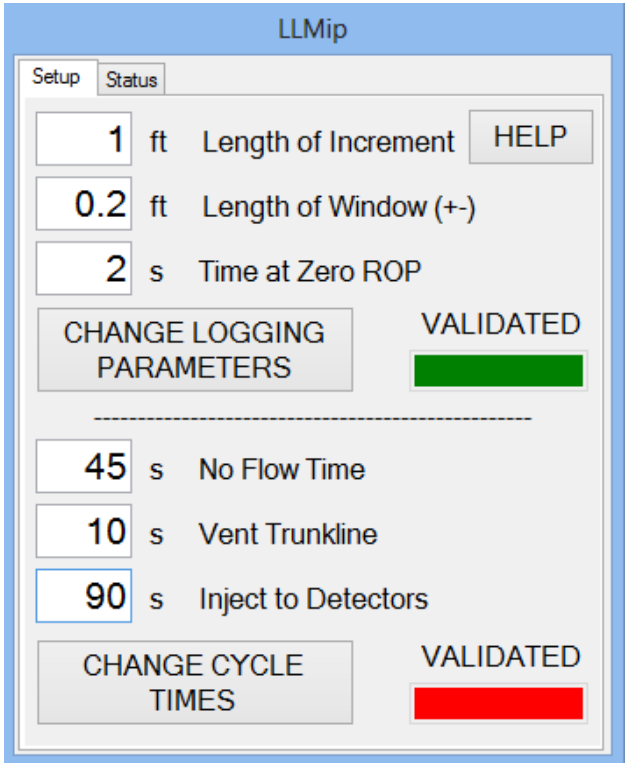
The logging parameters in the setup menu determine the frequency and requirements of the automatic start of the LL Cycles.

In this case sampling will occur every foot within a ± 0.2 window and with the rod advancement stopped for 2 seconds. So when we begin this log and the probe is stopped between 0.8'-1.2' for 2 seconds the LL cycle will automatically start.

You will want to keep the "Time at Zero ROP" low since the longer the time is the more contaminant is lost prior to the cycle starting.

Changing a value on the setup panel will require validation to the communicate the change with the controller.

LL Setup – Cycle Timing

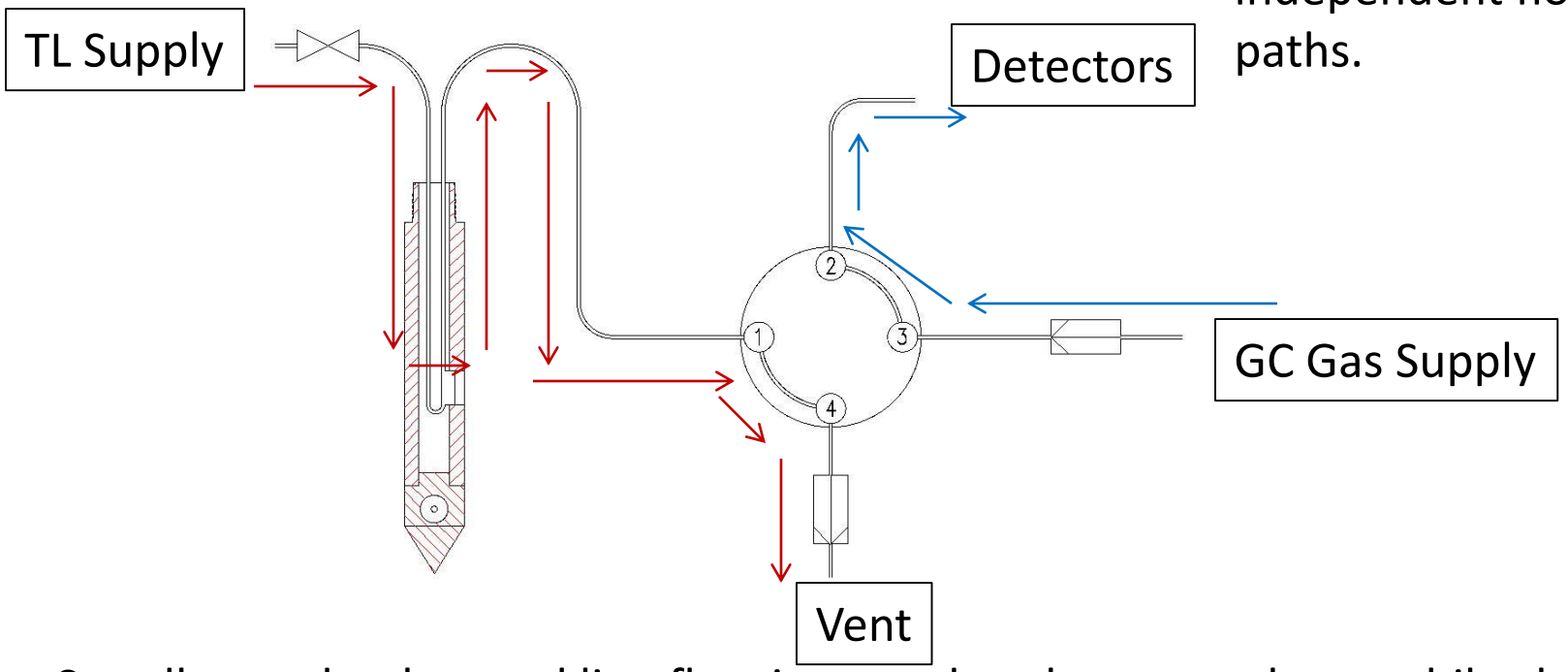


The cycle times in the setup menu determines the length of timed events of the sample collection, how long to vent the trunkline and how long to inject the trunkline gas to the detectors.

When unsure of the times you need because you have connected a new trunkline length or changed flows we recommend inputting a low "Vent" time such as 10 seconds and a long "Inject to Detector" time. This should ensure that the response will be seen at the detector. After making these changes click on "Change Cycle Times" to validate the values with the controller which is confirmed by the "Validated" bar changing from red to green.

LL MIP Operation

The multi-port valve allows us to have 2 independent flow paths.



Standby mode: the trunkline flow is vented to the atmosphere, while clean carrier gas from the GC flows thru the valve and back to the detectors.

LL MIP Operation

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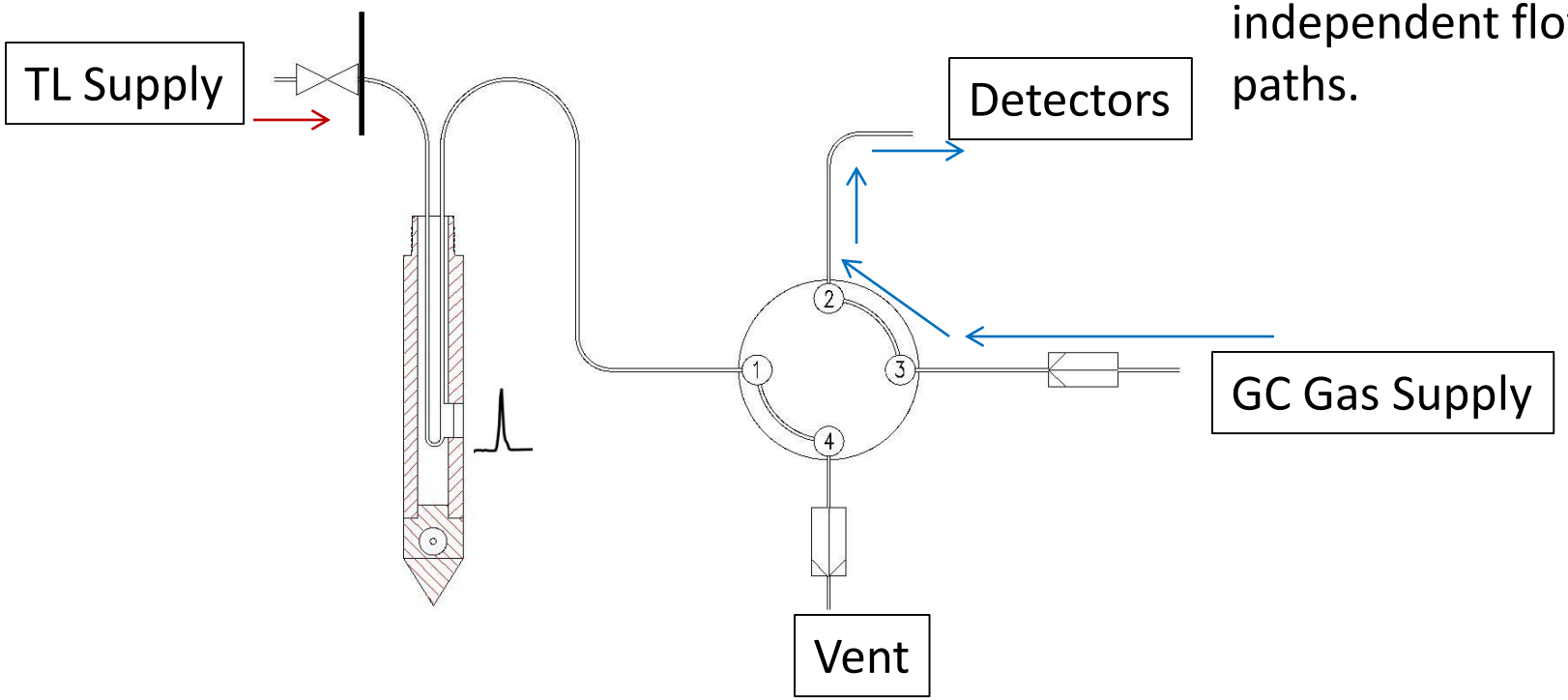

Collection mode: the trunkline flow is blocked at the surface using a shut-off valve which allows contaminants to build behind The membrane. Clean GC supply gas flows thru the valve and onto the detectors.

LL MIP Operation

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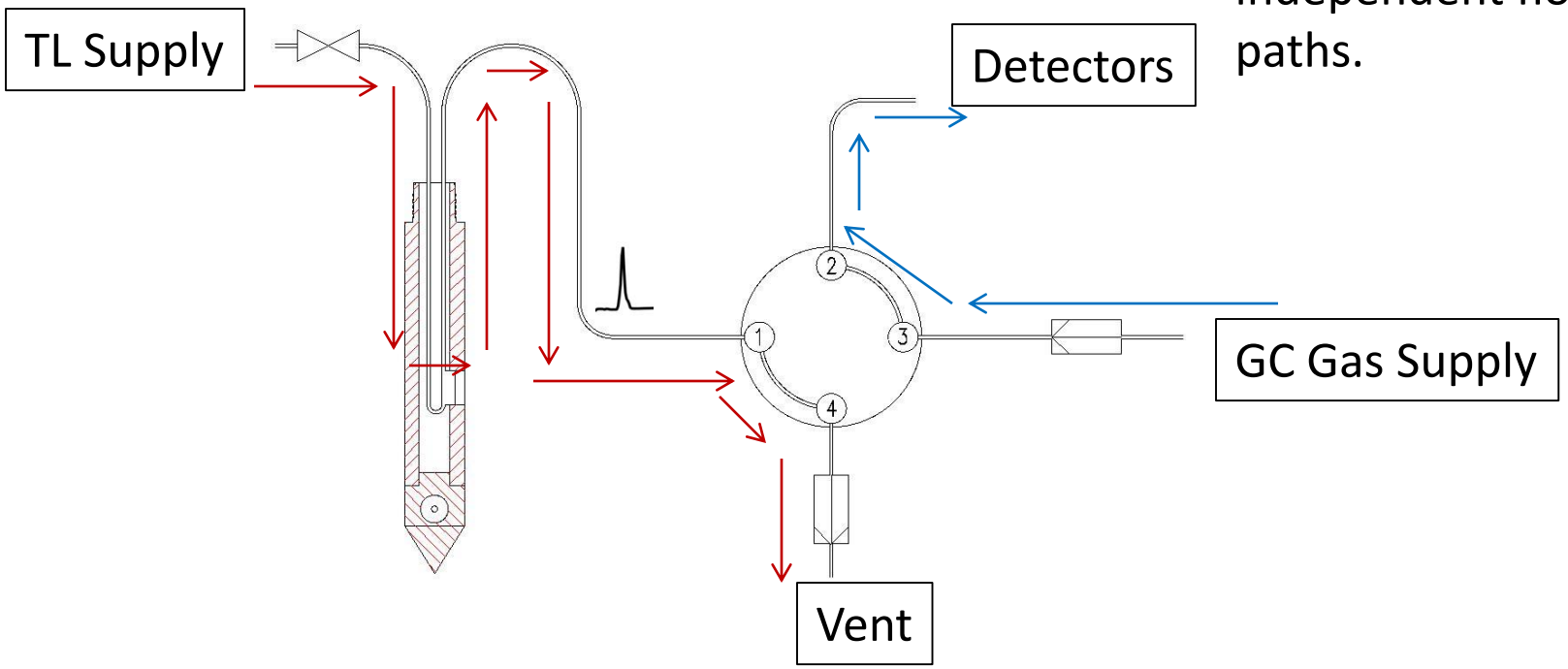

Transport mode: the trunkline flow is released, bringing the sample to the surface on a path that leads to the vent, while clean GC supply gas flows thru the valve and to the detectors.

LL MIP Operation

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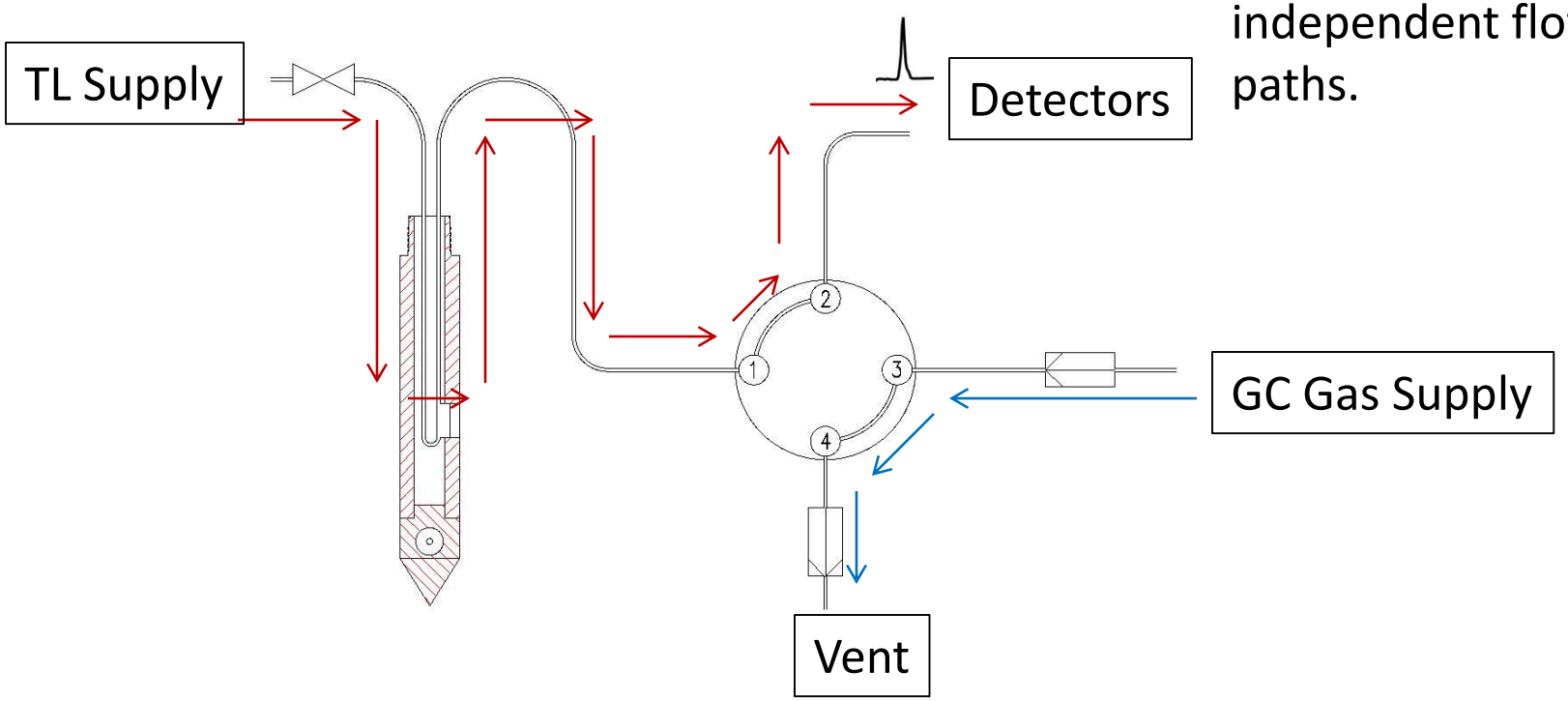
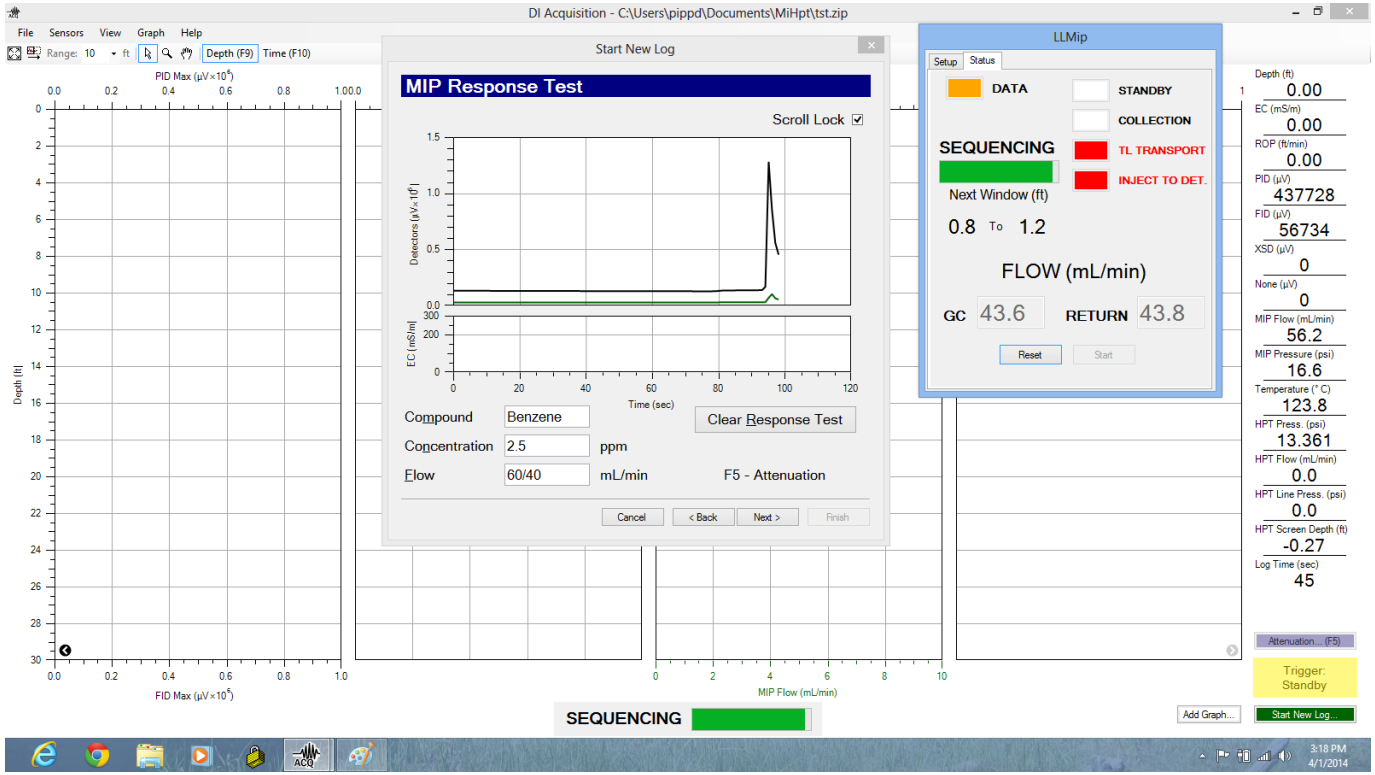


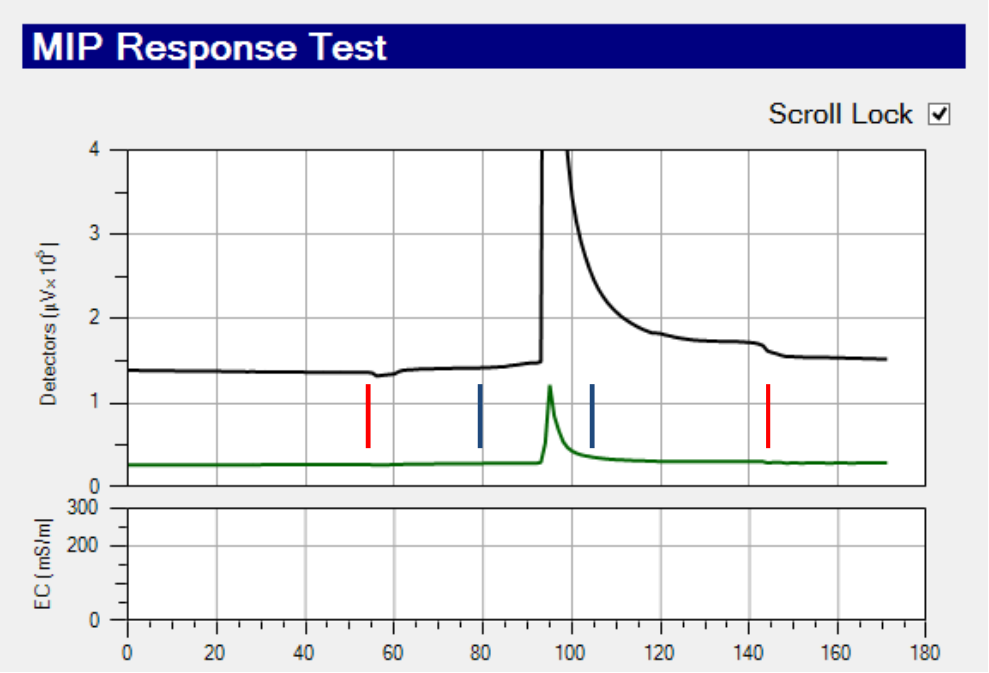
Inject-Transport mode: This combined mode has the valve switching to redirect the sample peak over to the detectors. The GC supply gas now flows thru the valve and onto the vent.

LL Setup – Cycle Timing



Here is the response test which shows the contaminant peak showing up in the response test. The LL Status panel display shows both the TL Transport and Inject lights on as the TL carrier is directed to the detectors.

LL Setup – Cycle Timing



LL Times Adjustments:

- > Vent by 25sec so it ends ~10seconds prior to the top of the peak
- Inject will = 20 Seconds

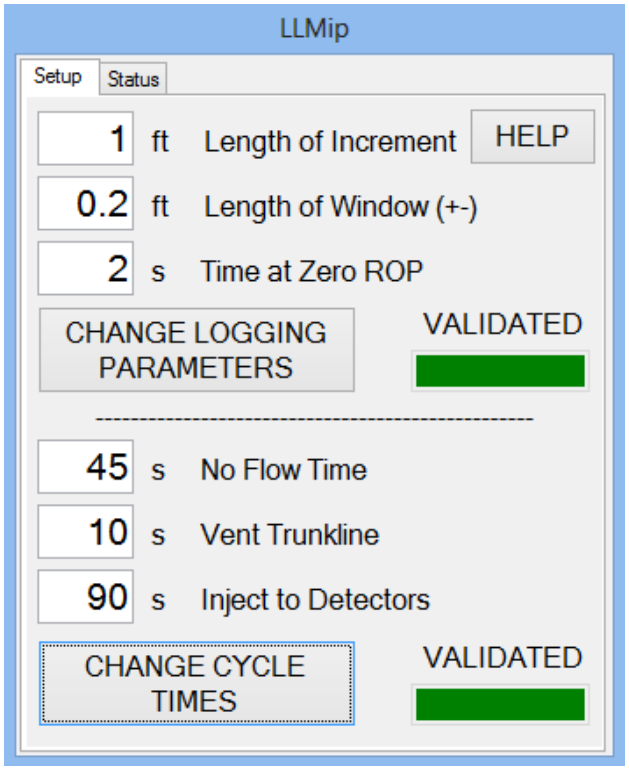
TL is injecting to the detectors between 55 and 145 seconds. This can be confirmed by evaluating the response baselines or by use of a stopwatch, start when the valve switches to inject and back to standby and compare how far off the peak response is from each valve switch event.

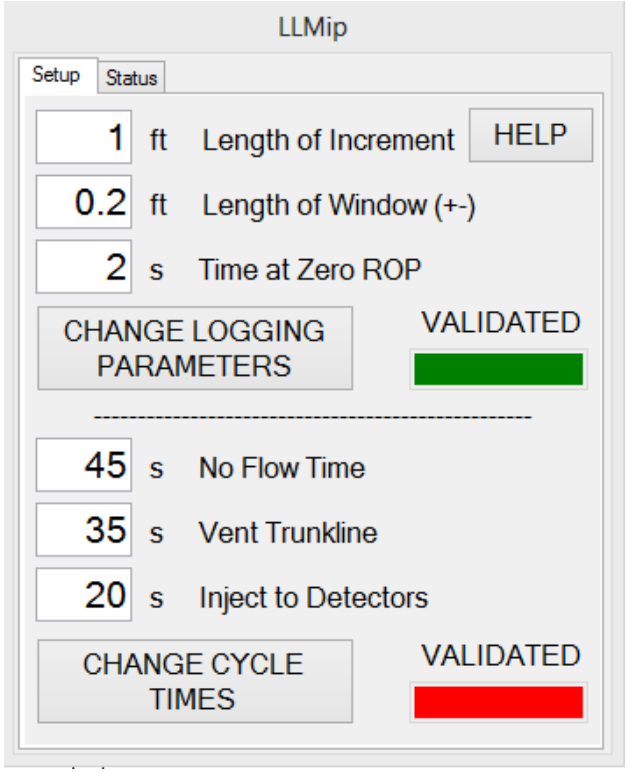
The operator needs to narrow the inject time window to allow the ability to better monitor the carrier gas recovery in the TL.

LL Setup – Cycle Timing

LL Times Adjustments:

- > Vent by 25sec so it ends ~10seconds prior to the top of the peak
- Inject will = 20 Seconds



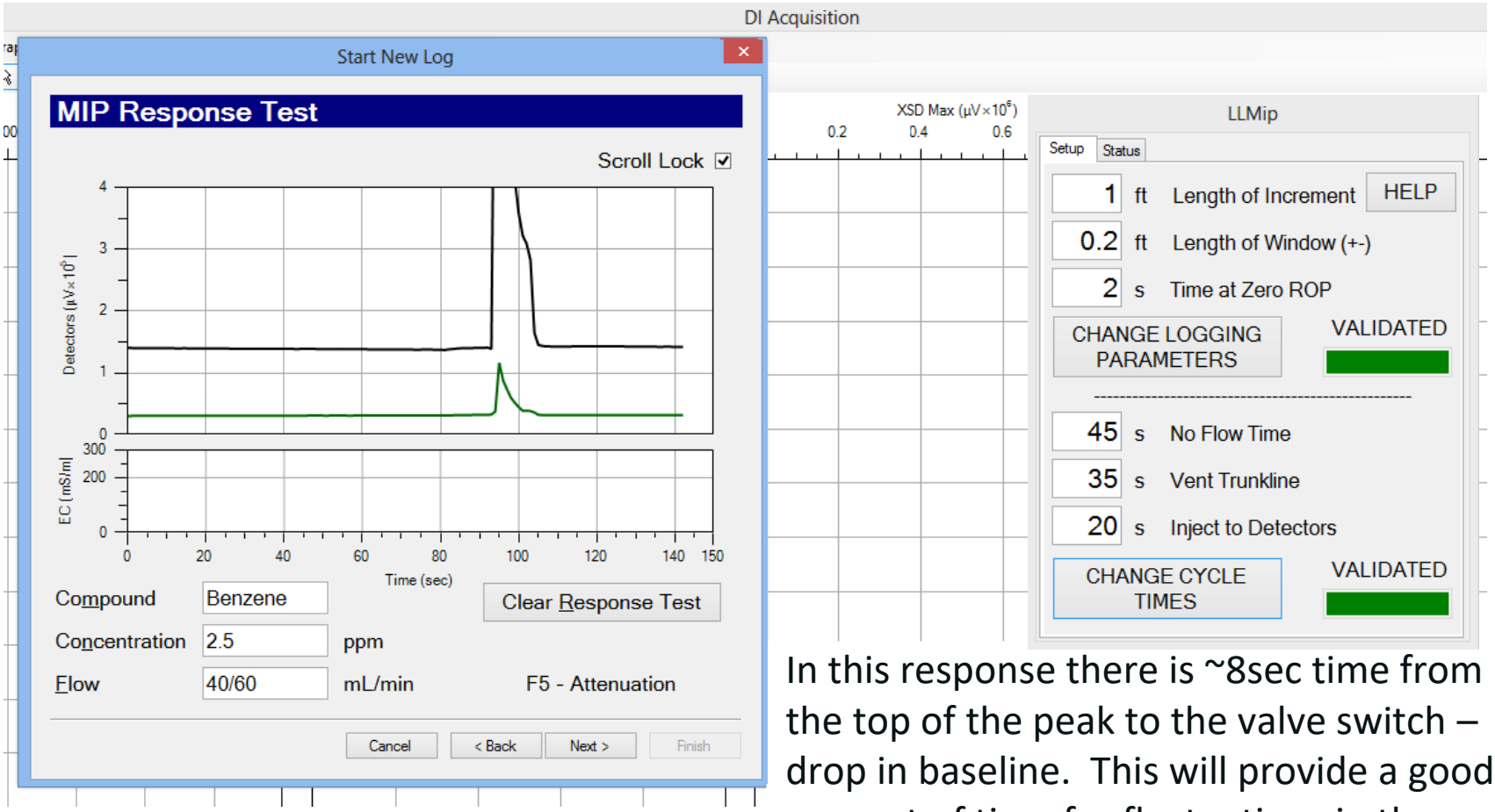


No Flow time should be between 30 and 45 seconds. This will be determined by required detection limits and responses.

The Vent time will be determined by the TL length and flow rate.

Inject to Detector time is recommended to be approximately 20 seconds. This allows for fluctuations in system flows and provides for adequate viewing of TL flow recovery.

LL Setup – Cycle Timing



In this response there is ~8sec time from the top of the peak to the valve switch – drop in baseline. This will provide a good amount of time for fluctuations in the system.

LL Setup and Tool Advancement

Contaminant Trip Time:
Enter the total time that flow TL flow was on. For the previous example that would be 35 + 20 = 55 seconds

Probe Advancement:
If the probe is advanced at 2 cm/sec then the operator can advance the probe to the next sampling interval when there is ~15 seconds left in the LL time sequence.
LL Times → 45+35+20 = 100 seconds
The rig operator can advance every 85 seconds