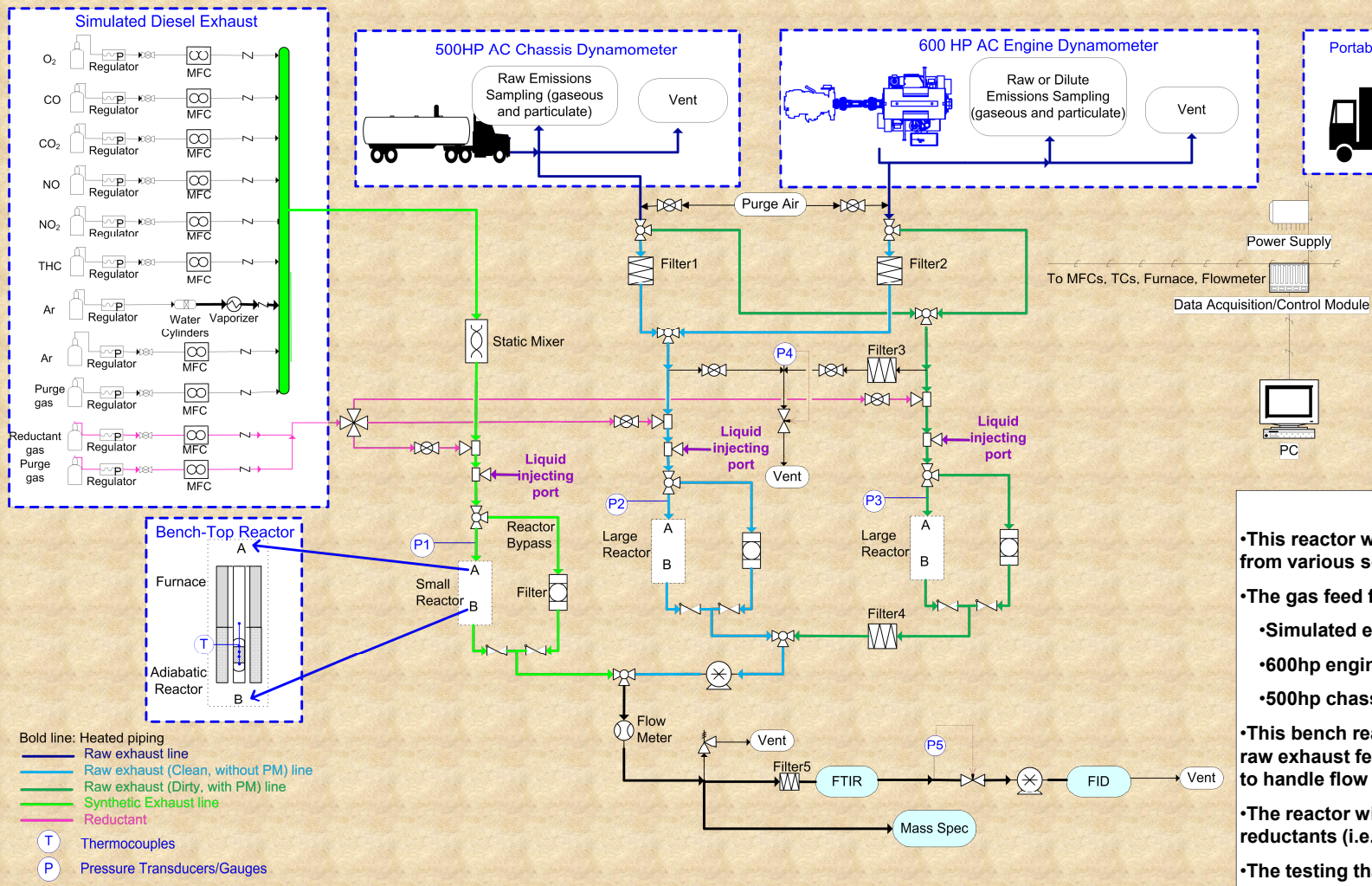
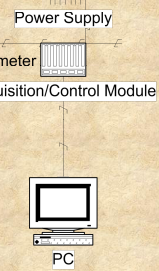
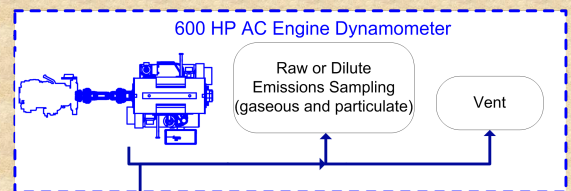
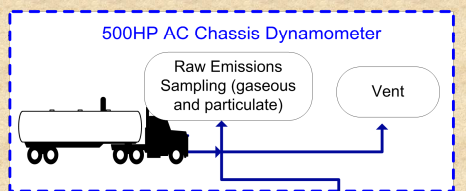
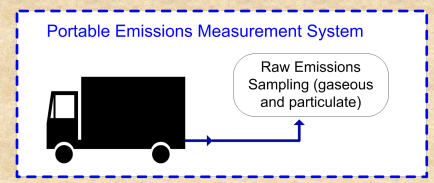


Design of Integrated Laboratory and Heavy-Duty Emissions Testing Center

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Bold line: Heated piping
Blue line: Raw exhaust line
Light blue line: Raw exhaust (Clean, without PM) line
Green line: Raw exhaust (Dirty, with PM) line
Red line: Synthetic Exhaust line
Pink line: Reductant
T Thermocouples
P Pressure Transducers/Gauges



Bench-Top Reactor

- This reactor was designed to allow exhaust sampling from various sources
- The gas feed for the bench-top reactor may be from:
 - Simulated exhaust using compressed gases
 - 600hp engine dynamometer cell
 - 500hp chassis dynamometer cell
- This bench reactor will have the capability to sample raw exhaust feeds (without pre-filtering) and will be able to handle flow rates up to 40 liters per minute.
- The reactor will have the capability of injecting reductants (i.e. hydrocarbons or urea) into the feed.
- The testing that will be done using this system will be applied research of SCR, LNT and DPF (and hybrids thereof).
- Technologies tested in the bench-top reactor will then be able to be scaled up and tested on a full scale heavy-duty engine (engine dynamometer) and a full scale heavy-duty vehicle (chassis dynamometer). Finally, a technology may be tested in real world conditions using a portable emissions measuring system.

Portable Emissions Measurement System

- Semtech DS measures NO/NO₂, O₂, CO₂, CO, and THC
- Semtech PPMD measures PM using Quartz Crystal Microbalance.

500HP AC Chassis Dynamometer

- 500HP AC Chassis Dynamometer (Burke Porter), simulates up to 80,000 lbs.
- Raw exhaust sampling
- Raw Emissions Bench (Horiba MEXA 7100) – NO_x, O₂, CO₂, CO, and THC
- FTIR (MKS 2030)
- Partial Flow Dilution Tunnel (Horiba MDLT 1302)

600HP AC Engine Dynamometer

- 600HP AC Engine Dynamometer
- Raw and Dilute exhaust sampling
- Full flow dilution tunnel
- Partial flow dilution tunnel
- Dilute Emissions Bench
- FTIR (raw, pre and post catalyst)