



# SHED Simulator

## Design Principle

The SHED Simulator is a computer-controlled device that uses a mass flow controller to inject a known quantity of sample gas into a SHED. The timed injections may be performed as a single shot or as multiple shots on an hourly basis for a 24, 48, or 72 hour diurnal test. The injections may vary in length from hour to hour and may also vary in rate with each injection. The actual injection will be within 0.5% of the intended injection on a mass flow basis. Additionally the MFC is capable of up to 14 separate gas calibrations.

## Compact Packaging

The system is housed in a suitcase type enclosure for ease of portability. Small wheels and a carrying handle will allow for the system to be moved from cell to cell with ease. Lightweight and portable, the case includes storage for detachable external tubing, connectors, solenoid and power cord.

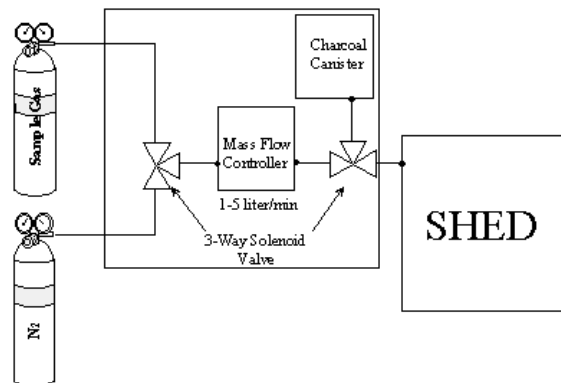
## Control Computer

The SHED Simulator is controlled by a mini-computer housed within the case. The computer specifications are as follows:

- 6.4" TFT LCD display
- Resistive touchscreen
- Two serial ports (COM1 for touchscreen and COM2 for MFC)
- ECA embedded CPU card, DX4-100MHz CPU with 32MB RAM
- Windows 98 operating system
- 4GB hard drive
- Ethernet port - 10BaseT LAN
- Parallel printer port
- Resolution: 640x480 pixels
- Isolated digital I/O lines (4 input, 4 output)
- Watch dog timer
- Remote start control TTL input

## Tubing and Connections

- 7 foot long, 1/4" OD flexible tubing for connecting the simulator to the N<sub>2</sub> and sample gas cylinders
- 7 foot long, 1/4" OD flexible tubing for connecting the simulator to the SHED
- Color coded, keyed quick connects for all external tubing connections



## Application Software

The Microsoft Visual Basic® based application software includes up to 10 pre-built user profiles, which are editable in Notepad. This profile defines the following variables:

- Sample gas flow rate (SLPM)
- Sample gas injection Time (either 24, 48, or 72 hours with each hour having its own injection rate)
- Nitrogen purge time (Minutes)
- Sample gas line fill time (Minutes)
- Total number of test cycles

## Test Configuration

The software allows for the following information to be entered and logged to the report:

- Start time and date
- Operator name (up to 16 characters)
- Sample gas (up to 16 characters)(defaults to last sample gas used)
- Sample gas concentration (ppm Propane)
- Cell code for test
- Unique sequential simulator assigned test run number (up to 1 million)
- Number of days to run test (1 to 3 days)

## Report Logging

In addition to logging the above information, the SHED simulator also logs the following:

- State changes (ex: solenoid 1 changes from open to closed)
- Mass flow deviations greater than +/- 1% of full scale (logs one record for the deviation and one record when back in tolerance)
- Temperature, pressure and flow rate for each injection

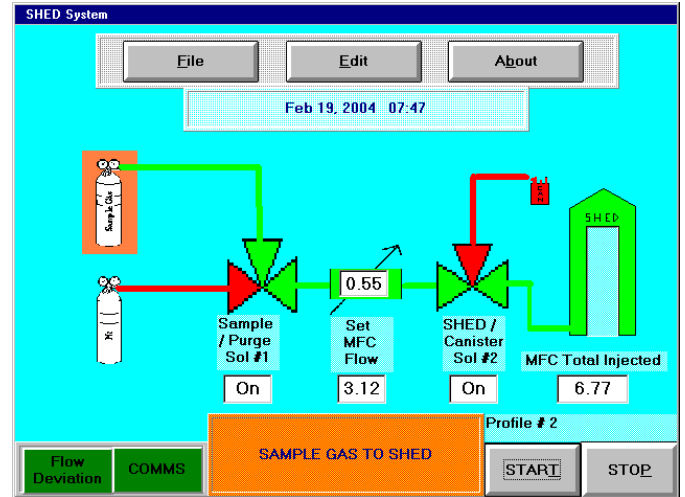
## Software Screens

Main menu - displays system status, set point, and process variables

Diagnostic screen - use to manually energize the individual I/O's

Configuration set-up screen - set the test configuration

File/Copy screen - copy profile and data files



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