



Model 611 NIST  
EFA Machine Test Stand  
Dimensions: 33" H x 24" W x 22" D  
838mm H x 610mm W x 559mm D

## GAS TURBINE AND JET ENGINE COMPONENT TESTING

### Effective Flow Area Measurement

#### PRODUCT REQUIREMENTS

Accurately analyzing airflow through jet engine and gas turbine components has been critical in the success of the aerospace industry. Multiple manufacturers required Airflow Test Stands to calculate Effective Flow Area. CCDI has made a positive impact on the industry for over 30 years by offering quality airflow test equipment and part testing to GE, Garrett, Pratt and Whitney, Solar Turbine, and others.

### EFFICIENT TESTING SOLUTION

The Model 611 is a system designed to test the Effective Flow Area of turbine engine components. The Model 611 Area NIST is ideal for dedicated cells and comes available in two sizes: 611 Regular Unit (up to 9 nozzle sizes) and the 611XH Extended Range (11 nozzle sizes).

#### FEATURES

- EFA Measurement Accurate to +/- 0.2% (Also usable for Internal cooling Mass flow)
- EFA Measurement Repeatable to +/- 0.1%
- Ideal for Production Cells and Special Applications
- Configurations Available: 611, 611XH

#### SYSTEM SPECIFICATIONS

NIST Traceable airflow measurement  
ANSI/NCSLZ540 Calibration  
External Plenum for fixture hookup. Can also do mass air flow measurements on blade and vane cooling holes  
15 to 30 Seconds per part test with manual flow valve operation  
EFA Range by external nozzle size.  
Interchangeable sonic nozzle - choice of 11 Single or dual sonic flow nozzle (1 or 2)  
English and SI units  
Networkable, test results can be transferred to external programs in a CSV file format  
Microsoft Windows based computer  
Production oriented Windows based part test software  
Automatic data acquisition  
QC Report, label and data acquisition file  
Free operator training, testing and certification  
One-year warranty on parts and labor

#### Flow Capabilities

0.031 to 2.9 Sq. In. Area (5 Sq. In. with XH Option)  
20 to 1870 Sq. mm Area

**FACILITY REQUIREMENTS**

Electrical Power	100 - 240 VAC 5 Amp 1-phase
Inlet Air Connection Pressure Range	Typically 100 PSIG (690 kPa) Pressurized Air Supply (filtered, compressed air at ambient temperature)
Temperature Range	50 - 100°F (10 - 38°C)

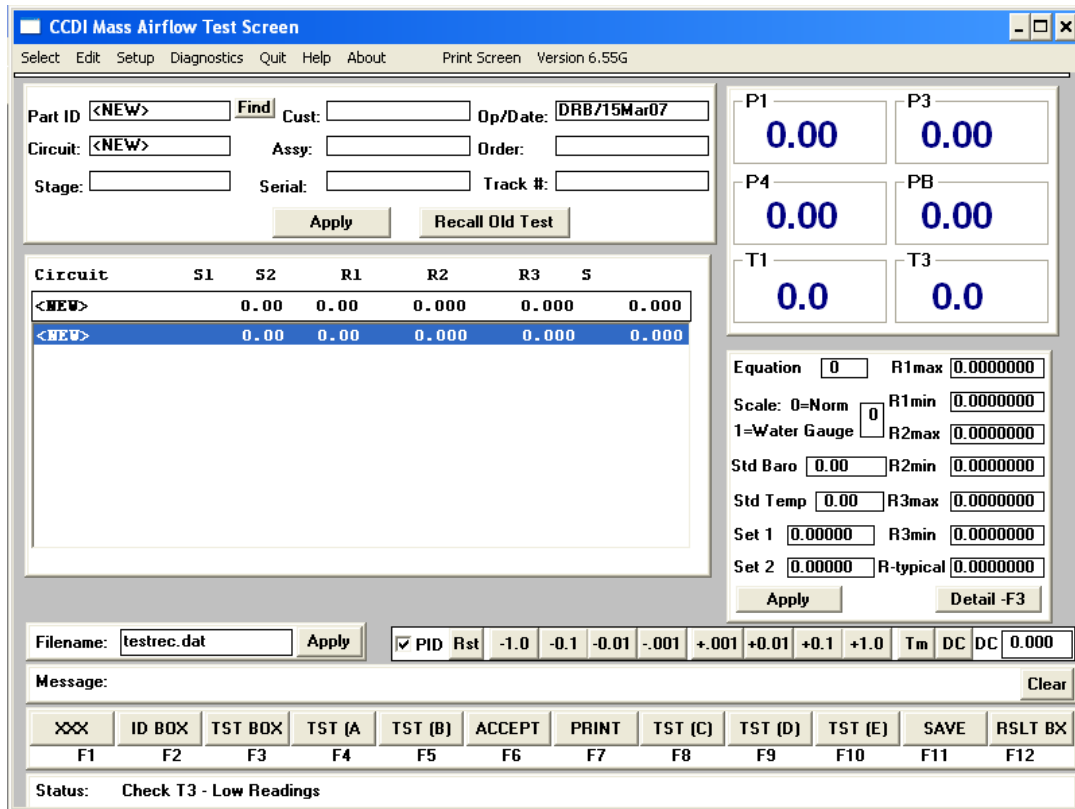
**SOFTWARE**

CCDI Airflow Test Stands have basic operation screens and a calibration screen.

Test Screen - Users operate the machine from this screen.

Setup Screen - Contains the machine configuration and calibration data.

Diagnostic Screen - Displays state of valves and nozzles used.



**Test Screen**

**Menu Bar** - Allows navigation to other screens, selection of part test programs, finding information.

**Identification Box** - In the upper left corner box, fill in details associated with the airflow test that gets recorded and printed. This information is also kept with files that can be transmitted to a network.

**Test/Log Box** - CCDI machines can have up to 64 test sequences (or increased as needed) for a single part. The first box (short) is the real time results box that shows the test data in operation. The second box (long) is the log of the test results. Some software versions have three result boxes for parts that use "Exit Flow" measurements. The log provides a summary of test data.

**Gauge Displays** - Gauge measurement readings. They are automatically converted to units that match the parts being measured.

**Test Parameters Box** - Right corner box allows the test parameters and limits to be entered. More information can be entered by selecting "Detail," which will prompt the detail box.

**Filename** - This allows selection of a filename for the test data. The filename can be stored in the part "profile" - A file recipe in the hard drive for the next time you test.

**PID Control Box** - Displays activity of the pressurization controller and allows user to adjust values.

**Message and Status Boxes** - Messages from the system and operator instructions can be posted here.

**Function Key Menu** - Our test screen can be operated by mouse or function key.

**Detail Box**

From this screen, you can adjust percent error allowed on setpoints and the "Auto Timer" to shut off the air for a certain period of time. This will end the test after the pressure is consistent for the selected time interval.

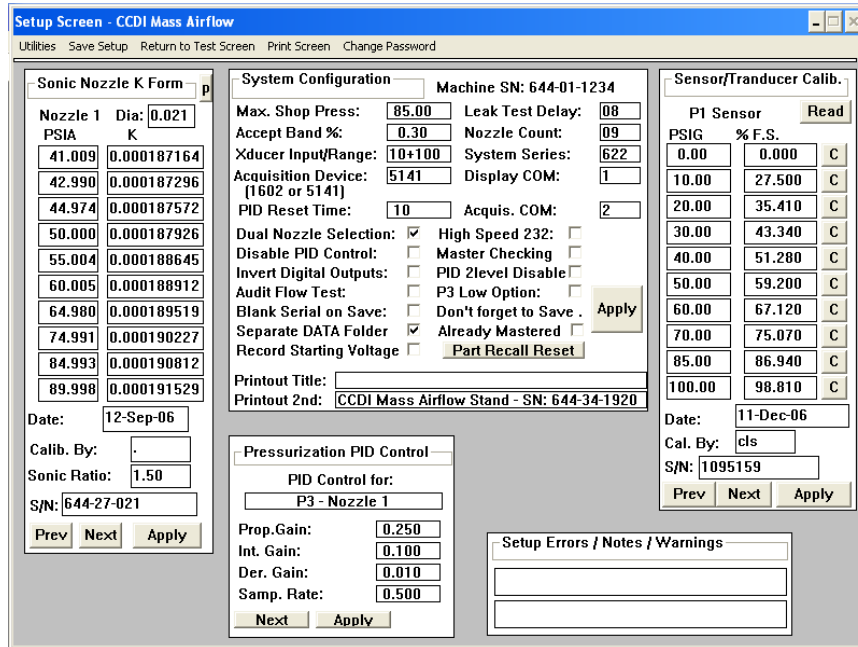
Auto-step allows the next flow sequence to proceed automatically. The Startup Delay makes time at the beginning of the test to stabilize.

Manual Nozzle allows the user to select the nozzles. The system defaults to setpoint and flow limit information. The Master Parts Limits section is to be completed by the user as well.

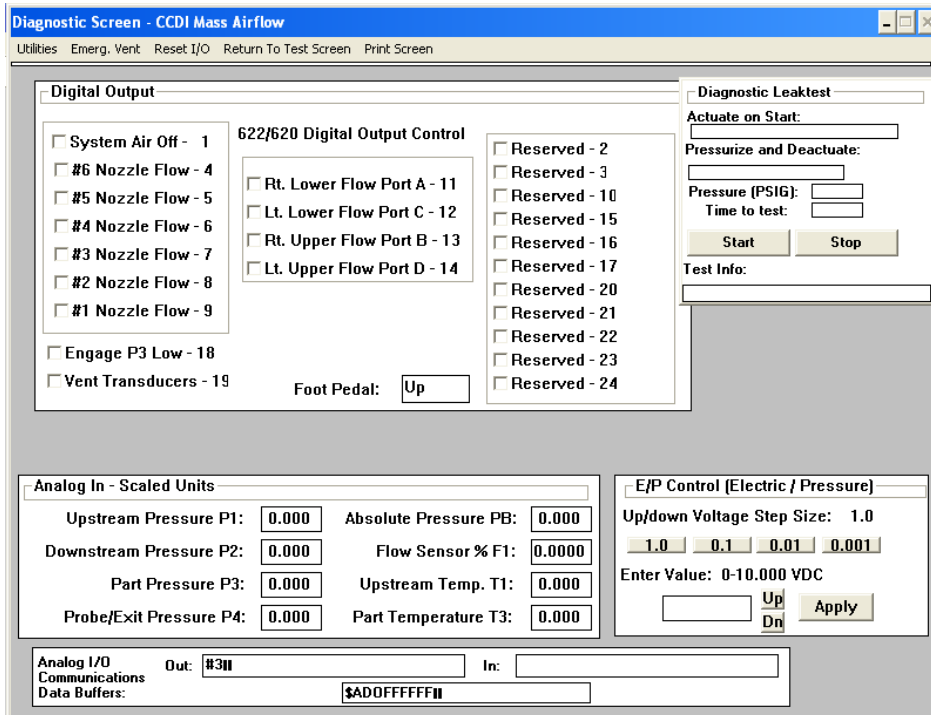
The PID Control (Pressurization) can be finely tuned for the most demanding production lines. Note: Fixtures/Tooling varies in volume. These parameters are adjustable to achieve the best response.

### **Flow Testing Features**

- CCDI Airflow machines were the first machines on the market with automatic sequencing.
- If you test a part in various manufacturing stages, the old data can be recalled at a later time to fill-in the blanks.
- Automatic or Manual, Single or Dual Nozzle Selection Available
- Two-stage cancel button can temporarily stop a test and restart; a second cancel can discard the results to start over.
- Beginning of a test can be paused for a specified number of seconds.
- Test results record all gauges and K values making analysis simple for auditing.
- In a Flow Restriction Test, the PID control can be turned off in order to monitor for flow restriction cause by external tooling.
- The program has leak tests that check for internal and external leaks at various stages
  - Our leak testing sequences can be automated
  - Volume based leak tests allow for fixed volume entry in testing parameters.
- The Diagnostic screen is great tool for technicians and makes understanding of the equipment easy for maintenance



**Setup Screen:** Contains nozzle calibration, transducer calibration, system configuration data, and built-in pressurization tuning information.



**Diagnostic Screen**

From the Diagnostic Screen, you can operate the valves, take pressure measurements, check data-communications, and control output pressure. It's very useful for troubleshooting.