



Model 611
 Mass Airflow 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

Mass Airflow Capacity

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 Mass Airflow Capacity. 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 mass airflow capacity of one or two turbine engine components. The portable automatic test stand is one of the few machines to measure multiple components simultaneously, thus improving the efficiency of part testing.

FEATURES

- Mass Flow Measurement Accurate to +/- 1.00%
- Mass Flow Measurement Repeatable to +/- 0.25%
- Ideal for Production Cells and Special Applications
- Configurations Available: 611, 611XH

SYSTEM SPECIFICATIONS

NIST Traceable Air flow Measurement, can also be used for EFA (inches H₂O option)
 15 to 30 Seconds per Part Test, Fast response
 Manual Flow Valve Operation (Automatic Pressurization optional)
 Flow Range Determined by Nozzle Size
 Interchangeable Flow Nozzles (choice of 11)
 Single/Dual Sonic Flow Nozzles (1 or 2)
 Low Pressure Option: 0-2 PSIG (0-14 kPa), 0-50"H₂O or High Pressure Testing: 0-50 PSIG (0-345 kPa)

English and SI Units
 IBM Pentium Computer
 MS Windows Based Part Test Software
 QC Report, Label and Data Acquisition File
 Free Operator Training, Testing, Certification, and One-Year Warranty on Parts and Labor
 Can also flow small Effective Flow Areas measurements (using Low Press. Option)
 High Range Model Available for 0.353-0.707" (0.9-1.8 cm) dia. Sonic Nozzles

Flow Capabilities

0.000119 to 0.102682 Pounds per Second (0.000054 to 0.046575 kg/s), varies with nozzles purchased
 0.000189 to 0.163089 Flow Parameter

Airflow Flow Test Stand Flow Ranges (see nozzle sizes)

NOZZLE	Min Flow	Max Flow	Min	Max	Min	Max	Min	Max
DIA.IN.	lbs/sec	lbs/sec	FP	FP	EFA	EFA	EFA	EFA
					@5"H2O	@5"H2O	@10"H2O	@10"H2O
0.015	0.00014	0.00041	0.000222	0.000643	0.0018	0.0052	0.0013	0.0037
0.021	0.0003	0.0008	0.000437	0.001260	0.0035	0.0102	0.0025	0.0072
0.025	0.0004	0.0011	0.000619	0.001785	0.0050	0.0145	0.0036	0.0102
0.031	0.0006	0.0017	0.000951	0.002745	0.0077	0.0223	0.0055	0.0157
.021+.031	0.0009	0.0025	0.001388	0.004004	0.0113	0.0325	0.0080	0.0230
.025+.031	0.0010	0.0029	0.001571	0.004530	0.0127	0.0367	0.0090	0.0260
0.044	0.0012	0.0035	0.001917	0.005530	0.0155	0.0448	0.0110	0.0317
.021+.044	0.0015	0.0043	0.002354	0.006790	0.0191	0.0551	0.0135	0.0389
.025+.044	0.0016	0.0046	0.002537	0.007316	0.0206	0.0593	0.0146	0.0420
.031+.044	0.0018	0.0052	0.002868	0.008275	0.0233	0.0671	0.0165	0.0475
0.062	0.0024	0.0069	0.003807	0.010980	0.0309	0.0890	0.0218	0.0630
.062+.031	0.0030	0.0086	0.004759	0.013726	0.0386	0.1113	0.0273	0.0787
.062+.044	0.0036	0.0104	0.005724	0.016510	0.0464	0.1339	0.0328	0.0947
0.088	0.005	0.014	0.007668	0.022120	0.0622	0.1794	0.0440	0.1269
.088+.044	0.0060	0.0174	0.009585	0.027651	0.0777	0.2242	0.0550	0.1586
.088+.062	0.0072	0.0208	0.011475	0.033102	0.0931	0.2684	0.0658	0.1899
0.125	0.010	0.028	0.015473	0.044633	0.1255	0.3619	0.0888	0.2560
.125+.062	0.013	0.037	0.020232	0.058359	0.1641	0.4732	0.1161	0.3348
.125+.088	0.015	0.042	0.023141	0.066754	0.1876	0.5413	0.1327	0.3829
0.177	0.02	0.06	0.031024	0.089491	0.2516	0.7257	0.1780	0.5133
.177+.088	0.026	0.074	0.040609	0.117143	0.3293	0.9499	0.2329	0.6720
.177+.125	0.029	0.084	0.046497	0.134125	0.3770	1.0876	0.2667	0.7694
0.250	0.04	0.11	0.061891	0.178532	0.5019	1.4477	0.3550	1.0241
.250+.125	0.052	0.149	0.082123	0.236891	0.6659	1.9209	0.4711	1.3589
.250+.177	0.059	0.169	0.092915	0.268023	0.7534	2.1733	0.5330	1.5374

Notes: FP = Flow Parameter lbs/sec * Sqrt(Temperature) / Room Pressure
 EFA = Square Inch Area Measurement - Requires Inches of water gauge option

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)

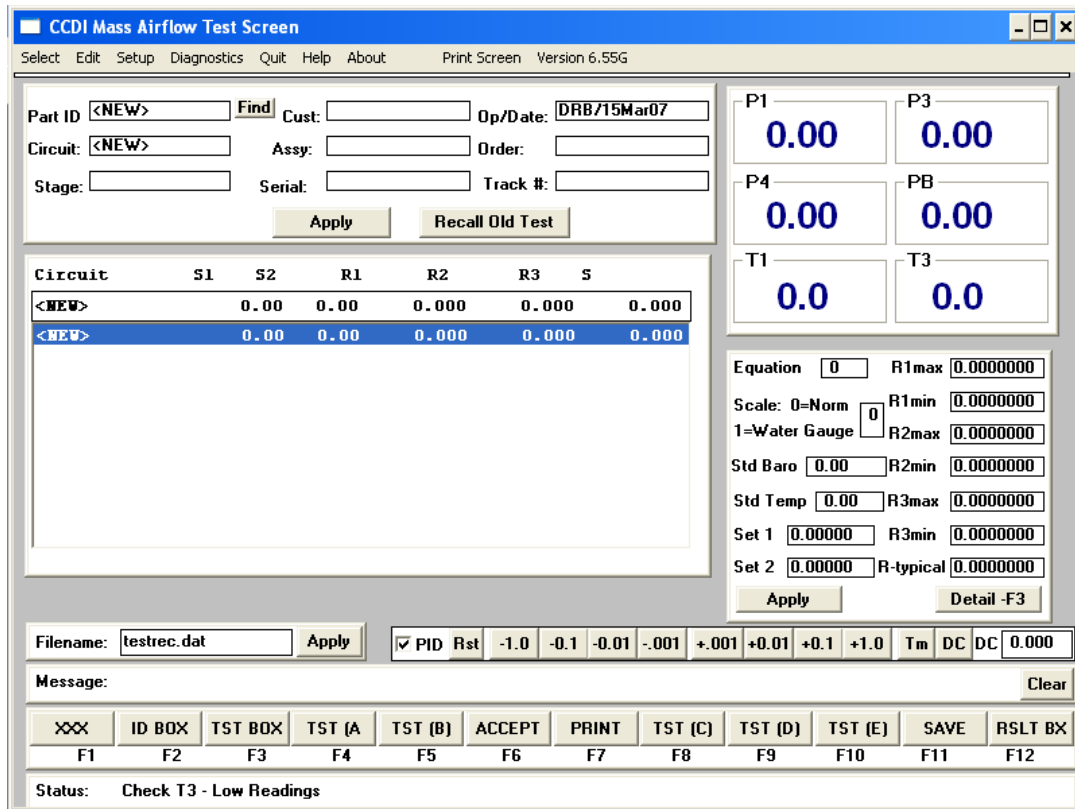
SOFTWARE

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 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.

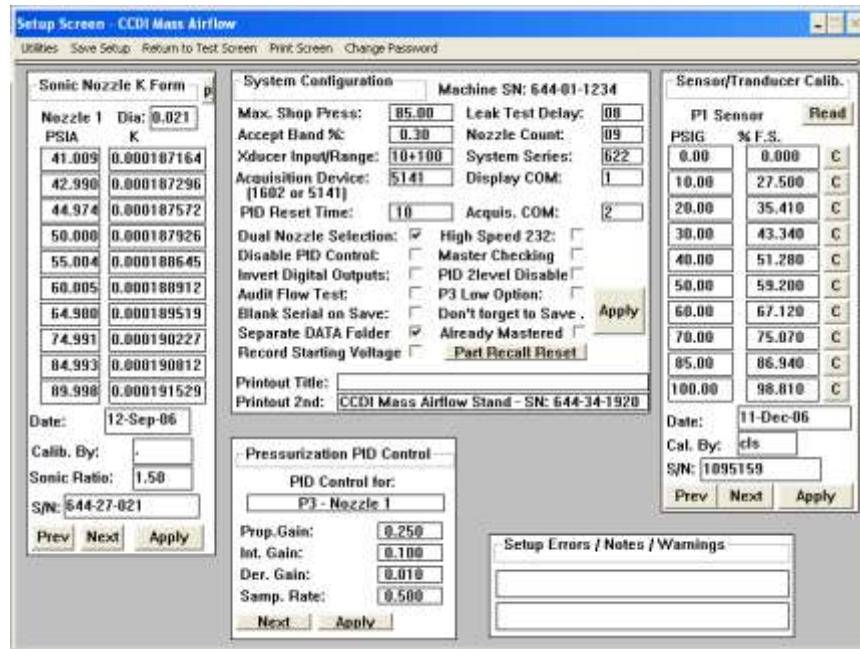
Manual Nozzle allows the user to select the nozzles. The system defaults to setpoint and flow limit information. The Master Parts Limits section is to be completed by the user as well.

The PID Control (Pressurization) can be finely tuned for the most demanding production lines.

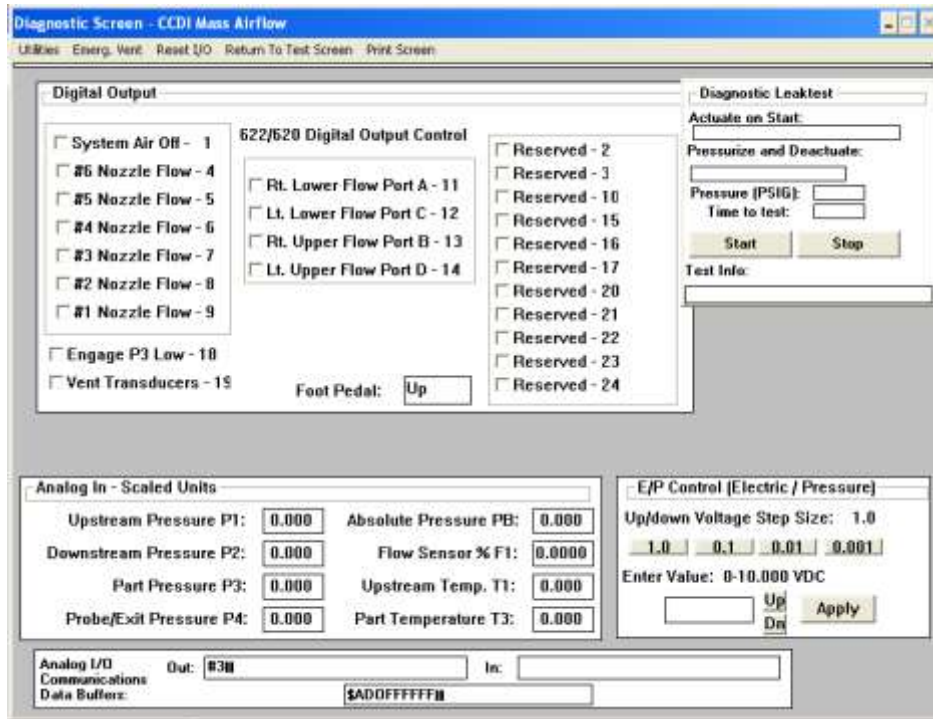
Note: Fixtures/Tooling varies in volume. These parameters are adjustable to achieve the best response

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. Very useful for troubleshooting.