



Model 620 Portable Automatic Airflow Test Stand

EL, S, Low, Medium, High & XH Configurations

Dimensions: 16" H x 25" W x 15" D

GAS TURBINE AND JET ENGINE COMPONENT TESTING

Model 620 Mass Airflow Test Stand

For the Aerospace industry, CCDI has answered the call for over 30 years offering quality airflow test stands.

Our Airflow Test Stands were the first the industry to offer test equations for multiple manufacturers.

Flow test sequences, called "circuits" can automatically flow air with multiple test steps and with various airflow equations (such as specialized reduced airflow measurements)

Four Configurations: EL, S, L, M, H, XH

SYSTEM CHARACTERISTICS

- Accuracy: +/- 1% Standard
- Repeatability: +/- 0.25% Standard
- Simple WYSIWYG Windows Based Software
- Multiple Manufacturers Test Specs and Formulas
- Five Nozzle design with ability to combine nozzle brings maximum measuring range
- Very Small internal volume for lightening fast measurements
- Circuit Switching, pressure control and acceptance, fully automatic
- EDI feature for piping data to network systems
- Fully automatic and yet fits in a suitcase
- Will run on Notebook Computer or Small Computer system under MS Windows

A VERSATILE SOLUTION

CCDI has been developing Airflow Test Stands since 1976, automated units since 1986, these years of experience brought about a finely honed product that is fast and considers the needs of this industry. We continue to answer the call today, always add new test requirements from various turbine manufacturers. Some of our specifications come from ABB/Alstom Power and related, UTC P&W, P&W Canada, GE Aircraft, GE Power, Honeywell, Allison, Rolls-Royce, Solar Turbines, Snecma, Siemens and others.

WELL THOUGHT OUT



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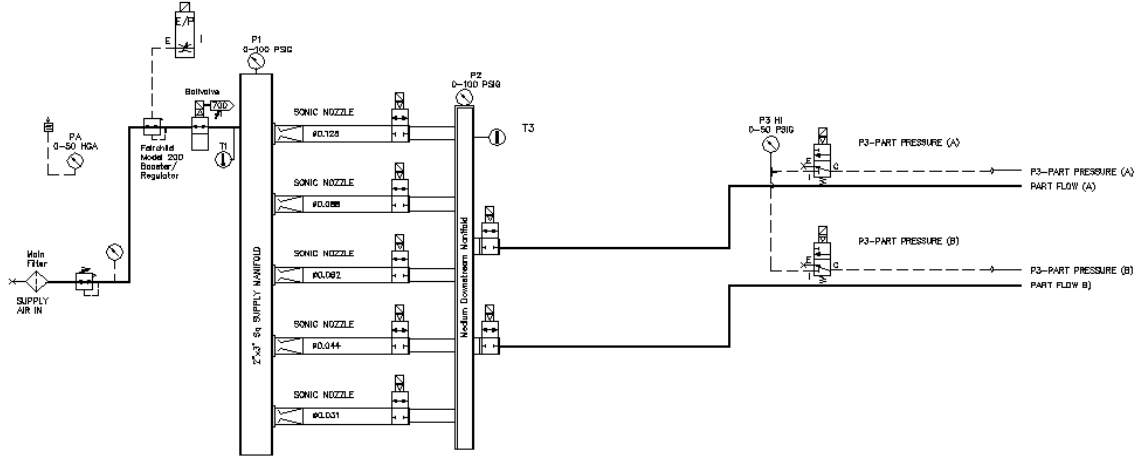
Ph: (513) 242-7300
Fax: (513) 242-5691

Model 620 Gauges and Power

Model 620 Flow Ports

The Model 620 offers two flow ports and fixture air regulator just like the larger machines do.

It includes up to five (5) Sonic Nozzles to measure Mass Airflow.



Sonic Nozzle P1/P2 pressures are monitored during testing and provide a real time "Not-Sonic" message if the nozzle is not in a "choked" state.

AIRFLOW OPERATION SCREENS

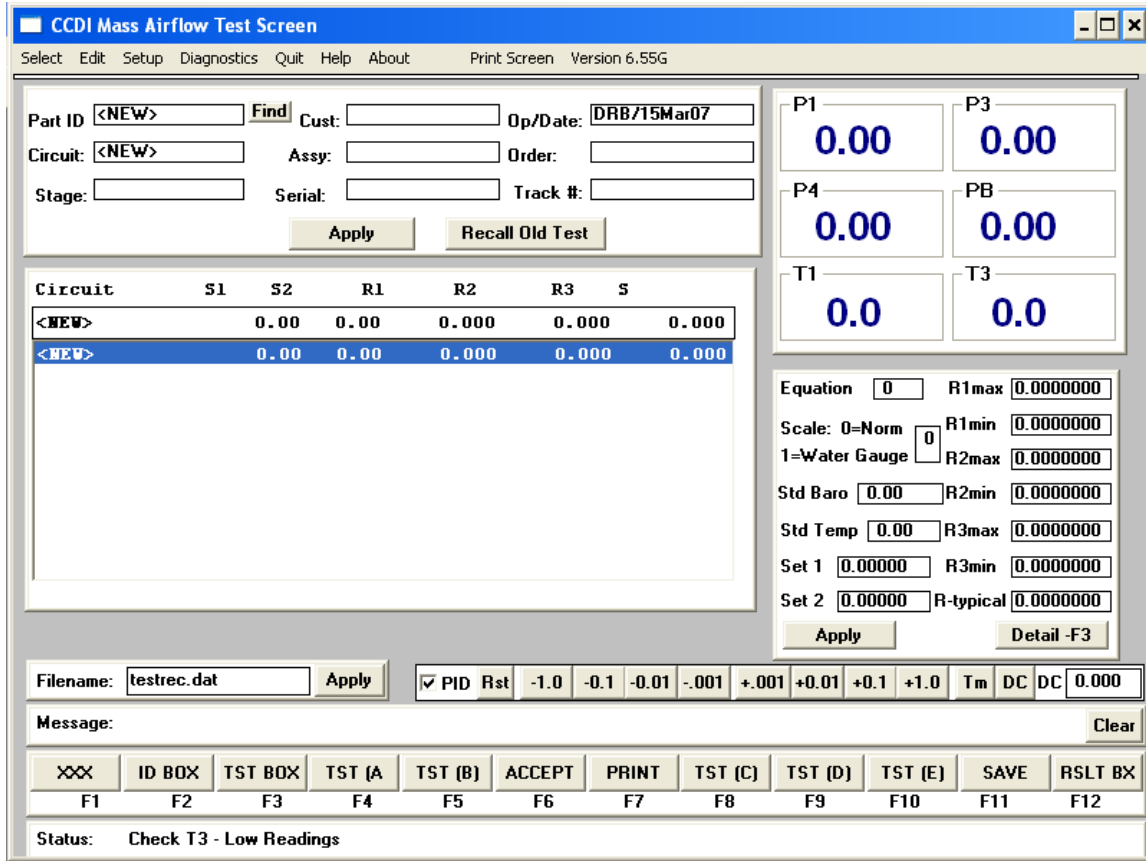
CCDI Airflow Test Stands have three basic operation screens and a calibration screen.

The Test Screen - Operators operate the machine from this screen

The Setup Screen - Carries the machine's configuration and calibration data.

The Diagnostic Screen - From this screen you can see what valves are open, what nozzles are selected.

The Test Screen



Menu Bar - This section allows navigation to other screens, selection of part test programs, finding information.

Identification Box - From the box in the upper left corner, you fill in details associated with the airflow test that gets recorded and printed out. This information is also keep with files that can be transmitted on a network.

Test/Log Box - CCDI machines can have up 64 test sequences (we can increase this if 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 gives you a scrollable summary of test data right before your eyes.

Gauge Displays - This is a readout of the gauge measurement. They are automatically convert to units that match the parts being measured. If you use a metric flow equation the result will be in metric units that match the spec.

Test Parameters Box - Right Hand Corner box allow the test parameters and limits to be entered. More information can be entered by clicking "Detail" to bring up the detail box.

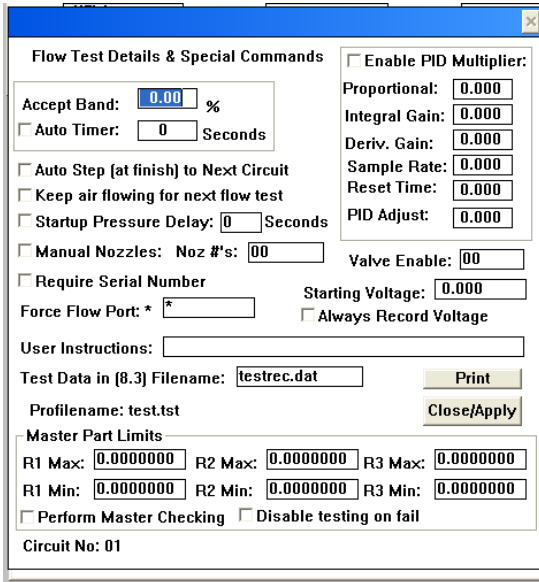
Filename - This allow selection of a filename for the test data. The filename can be store in the parts "profile" - a file 'recipe' stored on the hard drive for the next time you test.

PID Control Box - This shows the activity of the pressurization control and allows user adjustments as well.

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

Function key Menu - Our test screen can be operated by mouse or function key. Less computer savvy operators find the pushbuttons as less intimidating.

Our Detail Box:



From this screen, you can set the Percent of Error allowed on setpoints, you can set the "Auto Timer" to shut off the air and end the test after the pressure is report good for '10' seconds for example.

Auto-step, allows the next flow sequence to proceed automatically.

Startup Delay, gives time at the beginning of the test to stabilize.

Manual Nozzle selection puts you in command of choose the nozzles - if you don't select it, the system will choose for you using the setpoint and flow limit information.

Master Parts - Limits for your masters can be stored here

Pressurization Control - PID Control 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. One test can have up to 32 sequences.

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

Two-stage cancel button can temporarily stop a test and restart, a second cancel can dump the results to start over.

Beginning of test can be paused for a specified number of seconds to allow pressure to catch up.

Test Results record all gauges and K values making analysis simple for auditing.

Flow Restriction Test, PID control can be turned off in order to monitor for flow restriction caused by external tooling.

Leak Testing - We have various leak tests that check for internal leaks at various stages and external leaks

- Our leak testing sequences can be automated
- Volume based leak tests allow for fixed volume entry in testing parameters.
- Software can be set up to force production floor to perform leak check and master part.

Maintenance - The Diagnostic screen is great tool for technicians and makes understanding of the equipment comfortable.

The Setup Screen

Setup Screen - CCDI Mass Airflow

Utilities Save Setup Return to Test Screen Print Screen Change Password

Sonic Nozzle K Form

Nozzle 1	Dia:	PSIA	K
41.009	0.021	0.000187164	
42.990		0.000187296	
44.974		0.000187572	
50.000		0.000187926	
55.004		0.000188645	
60.005		0.000188912	
64.980		0.000189519	
74.991		0.000190227	
84.993		0.000190812	
89.998		0.000191529	

Date: 12-Sep-06
Calib. By: .
Sonic Ratio: 1.50
S/N: 644-27-021
Prev Next Apply

System Configuration Machine SN: 644-01-1234

Max. Shop Press: 85.00 Leak Test Delay: 08
 Accept Band %: 0.30 Nozzle Count: 09
 Xducer Input/Range: 10+100 System Series: 622
 Acquisition Device: 5141 Display COM: 1
 PID Reset Time: 10 Acquis. COM: 2

Dual Nozzle Selection: High Speed 232:
 Disable PID Control: Master Checking
 Invert Digital Outputs: PID 2level Disable
 Audit Flow Test: P3 Low Option:
 Blank Serial on Save: Don't forget to Save Apply
 Separate DATA Folder Already Mastered
 Record Starting Voltage Part Recall Reset

Printout Title:
 Printout 2nd: CCDI Mass Airflow Stand - SN: 644-34-1920

Pressurization PID Control

PID Control for: P3 - Nozzle 1

Prop. Gain: 0.250
 Int. Gain: 0.100
 Der. Gain: 0.010
 Samp. Rate: 0.500
 Next Apply

Sensor/Transducer Calib.

P1 Sensor Read

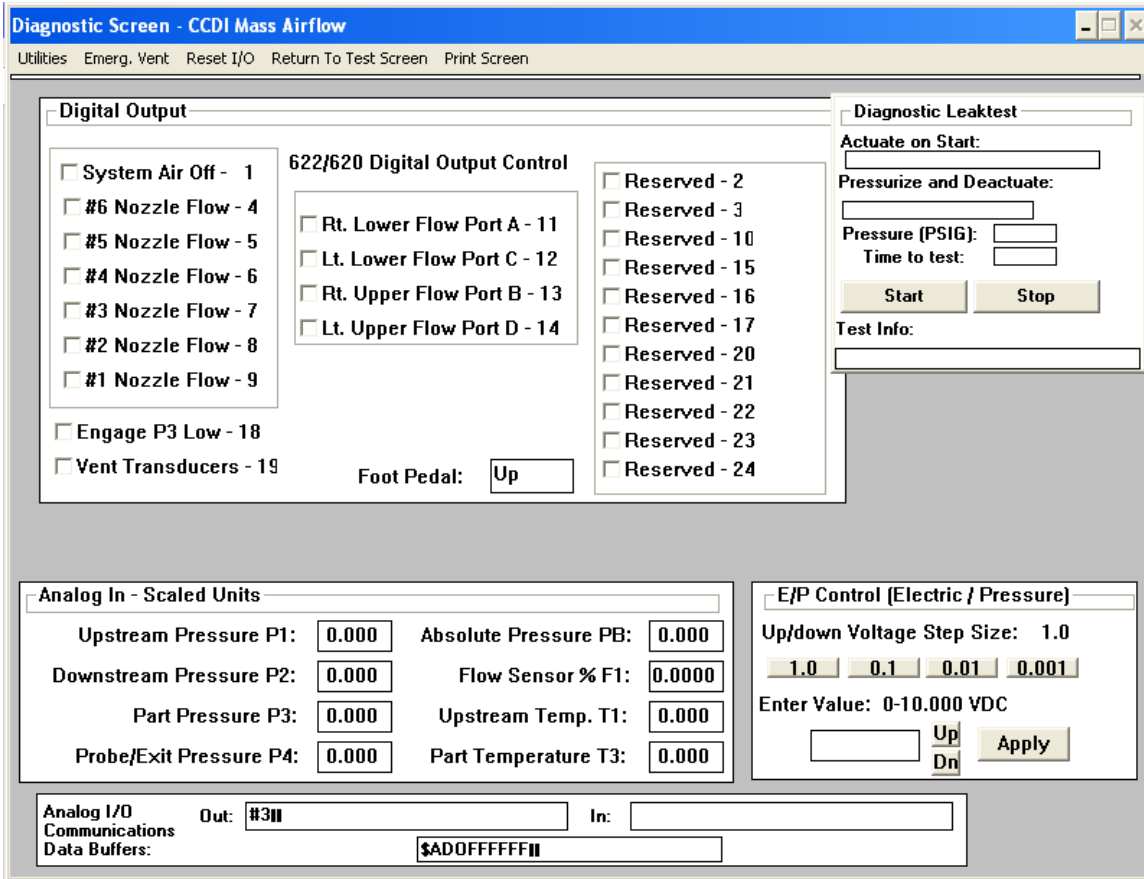
PSIG	% F.S.	
0.00	0.000	C
10.00	27.500	C
20.00	35.410	C
30.00	43.340	C
40.00	51.280	C
50.00	59.200	C
60.00	67.120	C
70.00	75.070	C
85.00	86.940	C
100.00	98.810	C

Date: 11-Dec-06
 Cal. By: cls
 S/N: 1095159
 Prev Next Apply

Setup Errors / Notes / Warnings

The setup screen contains the nozzle calibration, transducer calibration, system configuration data and built-in pressurization tuning information.

The Diagnostic Screen



From the Diagnostic Screen, you can operate the valves, take pressure measurements, check data-communications and control output pressure, which is greatly useful in diagnosing any problem that might arise.

Model 620 System Specifications:

FLOW CAPABILITIES:

- 620 EL: 0.000143 to 0.095 lbs/sec
- 620 S: 0.000077 to 0.004765 lbs/sec
- 620 L: 0.0003 to 0.0208 Pound-mass per Second
0.00043 to 0.0326 P&W Flow Parameter
- 620 M: 0.0006 to 0.042 Pound-mass per Second
0.00012 to 0.0658 P&W Flow Parameter
- 620 H: 0.0012 to 0.084 Pound-mass per Second
0.00189 to 0.132 P&W Flow Parameter
- 620 XH: 0.002438 to 0.1543 lbs/sec

PART PRESSURE RANGE

0.5 to 50 PSIG - Standard
 0-50 Inches Water (2 PSIG) Gauge - Optional

SPECIFICATIONS:

NIST Traceable Airflow Measurement, ANSI/NCSLZ540
 Flow Measurement Accurate to +/- 1.00% - Typical Mass Flow Uncertainty: 0.57%
 Flow Measurement Repeatable to +/- 0.25% - based on 50 flow measurement samples
 GE, P&W, ABB, Honeywell, Siemens, Rolls-Royce, Solar and other Part Testing formulas
 10 to 45 Seconds per Part Test
 Fully Automatic Operation and Pressurization
 Sonic Nozzles (5) – with Automatic Size Selection Single or Dual Sonic Flow Nozzle Operation
 Part Test Profiles Available for Hundreds of Engine Parts
 English and SI Units
 Uses Laptop Computer or Small Industrial Computer (sold together or separate)
 Windows XP operation
 QC Report, Label and Data Acquisition File, software “hooks” for external application programs.
 Free Operator Training, Testing and Certification at CCDI
 One-Year Warranty on Parts and Labor
 Standard 'off-of-shelf' components.
 Can also flow small Effective Flow Area measurements, Inches², Millimeters², and Centimeters²

Six Models Available:

Model 620-EL Nozzles 0.011” to 0.044”
 Model 720-S Nozzles 0.015 to 0.062”
 Model 620-L Nozzles 0.021" to 0.088"
 Model 620-M Nozzles 0.031" to 0.125"
 Model 620-H Nozzles 0.044" to 0.177"

POWER AND AIR REQUIREMENTS:

100-250 VAC Single Phase, 50-60 Hz, 5A Service
 Pressurized air at 100 psig, dry to 0° F Dewpoint

AIR CFM Requirements:

~225 CFM for 620H

TRANSDUCER PRESSURE RANGES:

P1 Upstream Pressure	0-100 PSIG	0.10% FS
P2 Downstream Pressure	0-100 PSIG	0.25% FS
P3 Part Pressure	0-50 PSIG	0.10% FS
P4 Probe Pressure	0-30 PSIG	0.10% FS (Optional)
PB Barometric Pressure	26-32"HgA	0.10% FS

TEMPERATURE RANGES

T1 Upstream Temperature	46-120°F
T3 Part Downsteam Temperature	46-120°F

TEST CYCLE TIME

Typical Flow Test single cycle in 10-30 seconds

Airflow Flow Test Stand Flow Ranges (see nozzle sizes on previous page)

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

Model 620 Box closes up for transport

On wheels for quick relocation



Nozzles and ports in use are clearly indicated

Fixture air for pneumatically clamped tooling



Easy maintenance access – New Models pull out entire system from case for easy access.