



Model 611XHS
Mass Airflow Machine Test Stand
 Dimensions: 33" H x 24" W x 36" 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 50 years by offering quality airflow test equipment and part testing to GE, Honeywell, Pratt and Whitney, Solar Turbine, and others.

EFFICIENT TESTING SOLUTION

The Model 611 Extra High Flow is a system designed for higher mass airflow capacity testing of turbine engine and gas turbine 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
- Designed for TOBI Duct Testing and similar components

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)
 Three Sonic Flow Nozzles: two 0.707" diameter and one 0.500" diameter
 Low-Pressure Option: 0-2 PSIG (0-14 kPa), 0-50"H₂O or High-Pressure Testing: 0-50 PSIG (0-345 kPa), 0-15 PSIG (103 kPa)
 English and SI Units
 Microsoft Windows PRO Based Part Test Software
 QC Report, Label and Data Acquisition File
 High Flow Configuration: two 0.707" diameter sonic nozzles and one 0.500" diameter sonic nozzle

HIGH FLOW NOZZLE CONFIGURATION

This high-flow version is configured with three calibrated sonic nozzles: two 0.707" diameter nozzles and one 0.500" diameter nozzle. The nozzles may be selected individually or in combination to extend the usable mass-flow range. The total installed sonic throat area with all three nozzles selected is approximately 0.981 in².

Nozzle Combination	Min Flow lb/s	Max Flow lb/s	Min FP	Max FP	Min EFA @5 inH ₂ O	Max EFA @5 inH ₂ O	Min EFA @10 inH ₂ O	Max EFA @10 inH ₂ O
0.5	0.160	0.440	0.248	0.714	2.008	5.791	1.42	4.096
0.707	0.320	0.880	0.495	1.428	4.014	11.578	2.839	8.19
0.707 + 0.500	0.480	1.320	0.743	2.142	6.022	17.369	4.259	12.287
0.707 + 0.707	0.640	1.759	0.990	2.856	8.028	23.156	5.678	16.381
0.707 + 0.707 + 0.500	0.800	2.199	1.238	3.570	10.036	28.947	7.098	20.477

* Based on 85 PSIG Supply Pressure

Preliminary engineering estimates: high-flow values are scaled by total sonic-nozzle throat area from the published Model 611XHS flow table. Final certified ranges depend on individual nozzle calibration K-values, available upstream pressure and air supply, plumbing losses, and required sonic pressure ratio.

FACILITY REQUIREMENTS

Electrical Power	100 - 240 VAC 5 Amp 1-phase
Inlet Air Reserve Capacity	2000 Gallons
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.

Part Identification

Part ID: Customer: Op/Date: **DRB/28Apr25**

Circuit: Assembly: Order:

Stage: Serial: Track #:

Profile Filename: **1234.TSI** Revision: OEM: **General Electric**

☐ Increment Serial Number

Test Results

Line	Circuit	SetPT 1	SetPT 2	Result 1	Result 2	Result 3	Status
1	LEAD_FLOW	0.00	0.00	0.00	0.00	0.00	X

Completed Test Result Log:

1	LEAD_FLOW	0.00	0.00	0.00	0.00	0.00	X
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Gauges

P1 Sensor (PSIG) **0.00** P3 Sensor (HIGH) (inHg) **-0.37**

P4 Sensor (HIGH) (inHg) **-0.19** PB Sensor (inHgA) **29.59**

T1 Sensor (Fahrenheit) **67.94** T3 Sensor (Fahrenheit) **69.15**

Test Parameter Summary

Operator Instructions:

Line No: 1 Units: inHgG

Set Point: 0.00 inHgG

Max Limit: 0.00 lb/s

Min Limit: 0.00 lb/s

Flow Port: A

Mins since Last Rezero: 67.3

Test Results Output Filename **1234.DAT**

PID Pressurization Control

☐ PID-Auto VDC: 0.0000

Function Key Menu

F1 Cancel F2 Load F3 ReZero **F4 Start** F5 F6 Done F7 Print F8 F9 F10 Probe F11 Save F12 Exit

Test/Operational Information

Status: Messages: Work Flow: 0

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 Nozzle Selection Available; supports individual and combined operation of three sonic nozzles
- 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

Machine Setting (Setup Screen)

Sonic Nozzle Definitions

Nozzle 1	
PSIA	K
20.000	0.0002440
30.000	0.0002469
40.000	0.0002485
50.000	0.0002495
60.000	0.0002503
70.000	0.0002509
80.000	0.0002514
90.000	0.0002518
100.000	0.0002521
110.000	0.0002523

Verified By: CJH
Ver. Date: 25-Sep-24
Serial No: 8055-025A
Throat Dia: 0.025

Ver. Due:
Lab. Date: 0
Lab. Rpt#:

Graph
Browse Prev. **Browse Next**

System Configuration

Machine Serial Number: 644-08-8055
Max System PSIG Available: 85.00
Default Acceptance Band: % 0.30
Default PID Reset Time: (sec) 10
ReZero Time Interval: (min) 60
Machine Model: 644MS
Valve Rotation Time: (sec) 4
Addl. Leak Test Time: (sec) 25
Qty of Nozzles Installed: 9
Dewpoint Limit: (deg F) 0

Current CCDI Calibration Report: 2020-8055-2

Software Version: 10.11

Edit Machine Configuration
Edit Passwords Table
Edit Security

PID Defaults and Status

PID Values for: P3 - Nozzle 1

Proportional Gain: 0.250
Integral Gain: 0.100
Derivative Gain: 0.010
Sample Rate: 0.500

Edit Selected PID
Browse Prev. **Browse Next**

Transducer Calibration Table

P1 Sensor	
PSIG	0-100 %Meas.
0.000	19.820
10.000	27.800
20.000	35.820
30.000	43.820
40.000	51.800
50.000	59.810
60.000	67.810
70.000	75.820
85.000	87.830
100.000	99.810

Calib. By: CLS
Cal. Date: 31-Mar-25
Cal. Due: 31-Mar-26
Serial No: 1887744
Instrument ID: P1
Min Range: 0.000
Max Range: 100.000

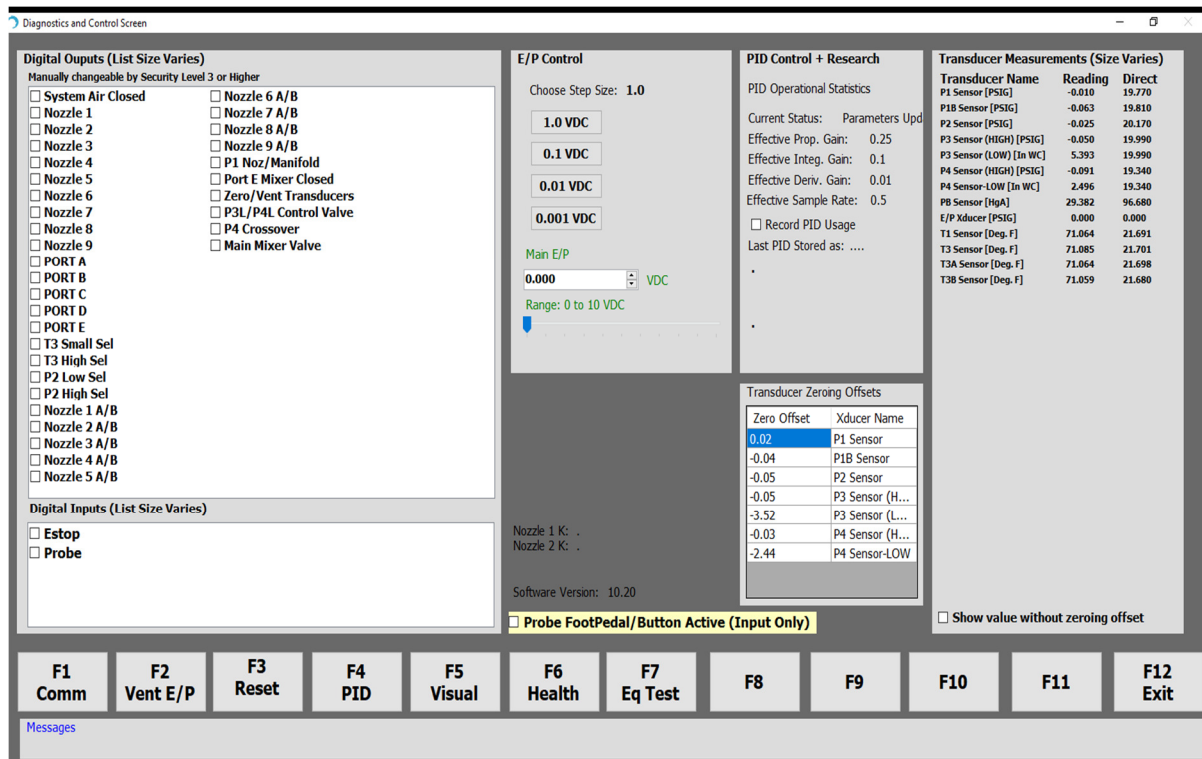
View Zero Table
Transducer Zero: 0.0376
Graph Xducer ☐ Absolute Device
Browse Prev. **Browse Next**

F1 **F2** **F3 Calib** **F4** **F5** **F6** **F7** **F8** **F9** **F10** **F11 Save** **F12 Exit**

Messages
Text

Setup Screen

The 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.