

Model 22/44 EFA Scientific Comparator Test Stand Dimensions: 68.125" H x 36.25" W x 61.375" D 1730mm H x 921mm W x 1559mm D

GAS TURBINE AND JET ENGINE COMPONENTS

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. CCDI has satisfied manufacturers for over 30 years by offering quality airflow test equipment and part testing to GE, Garrett, Pratt and Whitney, Solar Turbine, and others.

SOLUTION: TIME PROVEN DESIGN

The Model 22 and 44 takes measurements of Barometric Pressure, Air Temperature, and Humidity to reliably measure Effective Flow Area (EFA). Continuous improvement has been made on the technology for over 15 years as the design was refined to optimize performance, making both the Model 22 and 44 accurate and stable EFA instruments ideal for area airflow measurements of vane rings and segments.

FEATURES

- Repeatability: +/- 0.1%*
- Step-by-Step Operator Software option
- Various configurations such as 22-10H, 22-15H and others
- Uses Orifice Plates, ASME Nozzles, ASME Arrays
- Choice of NIST Traceable or dimensionally calibrated Orifices

* Conditions: Orifice plate at conditions of 70 Deg +/- 2 Deg F, 5"WC, less than 14 Sq. In. typical, depends on Model configuration. Call for additional repeatability details.



ASME Calibration Nozzles

SYSTEM SPECIFICATIONS

- NIST Traceable EFA
- All parameters of air density are measured
 - Room and Plenum Temperatures
 - Barometric and Plenum Pressures
 - Dew Point (Humidity)
- 10 or 15 H.P. AC Blower Motor Optional Blower Range Configurations
- No reference blower needed
- AC Motor No brushes to wear out
- Vector Motor Controller with 1.0 to 4,999.9 RPM
- Automatic Software Controlled Clutch Mechanism for choosing single or dual blower operation
- Large blower can be disengaged by clutch (software controlled for small part measurement)
- Less Than One Minute per EFA Measurement
- Takes Pressure or Vacuum Measurements and Displays in Square Inches or Square Millimeters
- NIST Traceable Calibration Orifice Plates and ASME Subsonic Area Masters
- Customer Correlation Table for Each Part
- Four QC Reports and Data Acquisition File
- Windows based report generation
- Automatic Data Acquisition, can be transferred over network
- Multiple Manufacturers Test Specs and Formulas
- GE, Garrett, P&W, Honeywell and Solar Turbine Part Testing
- One-Year Warranty on Parts and Labor
- Pressure from 0.5 to 20 H_2O , not limited to 0.5, 1 and 5" like other units

Flow Capabilities

0.5 to 24 sq. in. Measurements (3.23 to 193.55 cm²) at 5" H_2O (Water Column) Pressure Range: 0 to 20" H_2O (Water Column), 1 to 1.049 pressure ratio, 0-20" H_2O Vacuum optional

FACILITY REQUIREMENTS

Electrical Power	380 - 460 VAC 3-phase 30 to 100 Amps, depending on power requirements for testing
Inlet Air Connection Pressure Range	30 to 100 PSIG (207 to 690 kPa) Pressurized Air Supply (filtered, compressed air at ambient temperature)
Temperature Range	50 - 100°F (10 - 38°C)

SOFTWARE

The Model 22/44 EFA Test Stand has one main operation screen, a calibration screen, and two sub screens used for diagnostics and hardware detail.

Test Screen - Users operate machine and test parts on this screen.

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

Test Detail Screen - Measurement stability indicators regarding temperature and pressure as well as PID parameters and other testing details are selected on this screen.

Hardware Information Screen - Displays the current detailed information for the blowers and other necessary hardware.

1	A	
CCD1I - Model 88 EFA Test Screen Edit Setup Diagnostics Quit Help About Print Screen		×
MEASURED EFA	CUSTOMER AF	REA
0.000	0	.000
-PART PRESSURE	BLOWER STD	
O.OO TEMP LMT, P-P% 0.00 > 0.00 : 0.00 > 0.		0.000
Identification Part ID: Engine: N/A Order: Oper/Date: Dper/Date:	Test Parameters Plenum Pressure: 5.00 RPM: 400.0 #/Blowers: 1 Operation Mode C Vacuum C Pressure	Blower Efficiency Calibration Print Edit Info Apply 5SABC EFA STD-RPM EFF Low: [- [2500] 200.00 [1.000000] C] Med: M- [3.000] 300.00 [1.000000] C] Hinb: [H- [3.500] 1000000 C]
Serial: Apply Conments:	Apply Details Intertest Delay: 0	High: H- 3.500 400.00 1.000000 C Coef's - Ofs: 0.0000000 Slope: 1.0000000 Curv: 0.0000000 Customer Area Correlation TEST Edit Info Apply
Transducers Plenum Press: 0.000 "H20 Actual InletTemp: 69.95 F Barometer: 30.011 "Hg Virtual Inlet Temp: 71.38 F	Number of Tests: 0 No. Warm-up Tests: 0 # MEAS EFA CUST AREA	Itest RPM MARKED MEAS L: LOW 200.0 2.780 2.891 C M HIGH 400.0 3.270 3.882 C M H: BLANK 0.0 0.000 C.000 C M
Exit Temp: 71.89 F Dewpoint Temp: 19.00 F Message: Updated		Coel's - Ofs: 1.350545 Slope: 0.494451 Curv: 0.000000 Cust-EFA Adjust: 1.000000
Status: Insert Test Information, APPLY and Begin Testing Software Vers : 7.10 File: CT=5SABC		PID Rst -100 -1 -0.1 +0.1 +1 +100 Activity Ind. RPM:
XXX ID B0X TST B0X RUN F1 F2 F3 F4 F5	F6 F7	F8 F9 F10 F11 F12
/	н	G

Test Screen

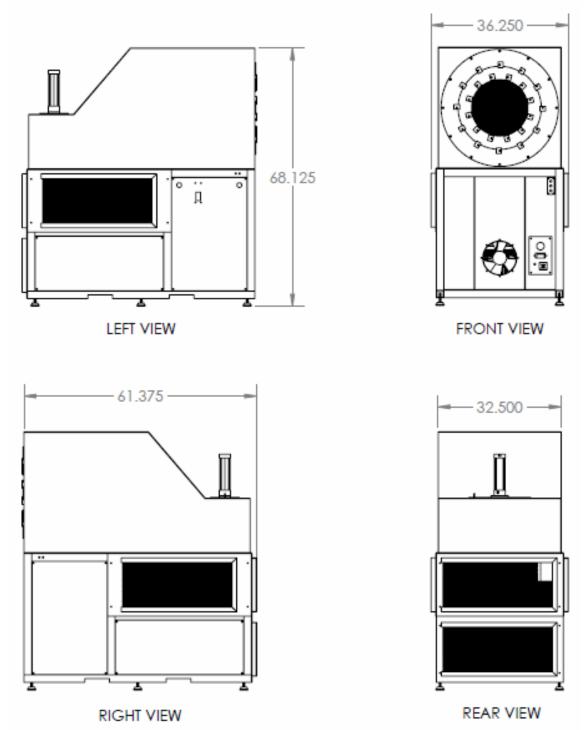
- A. Menu Bar Screen changes, help, and exit functions.
- B. Gauge Display Show the results during a test.
- C. Peak-to-Peak Mini Gauges Shown during a test to indicate stability of measurements.
- D. Identification Section
- E. Blower Efficiency Calibration Table Holds the orifice plate baseline calibration data.
- F. Customer Area Correlation Table Contains information about your master parts.
- G. PID Speed Control bar Allows user to adjust RPM during a test.
- H. Function Key Bar
- I. **Test Parameters** Indicates what pressure to use, number of blowers, mode of operation, and number of tests.
- J. Status Box Program Version, Alerts, storage file names.
- K. Straight Transducer Measurements Table

lel 88 Setup Screen				
ties ⊻iew Setup Print Setup Save Setup F	Return to Test Screen Change Passwords			
lower & hardware Info	System Defaults		Sensor/Transducer Calibr 🛛 🔀	Same and succession
lumber of Blowers Installed: 2	System Defaults		Inlet Temp	
Automatic Clutch: (88 only) 🔽	Timing-		Device: D1451 Ch.1	
est to Test RPM Limit %: 25	Measurement Stability Time: (sec)	7	Deg F Deg F	
1st Blower: Cubic Inch/Rev	Stability		49.600 49.680 C	and the second second
Displacement: 411 💌	Plenum Press within Setpoint: %	1.00	58.000 58.020 C	
S/N: 123	Pressure Meas. Stable: %	1.00	65.500 65.520 C	
	Temperature Stable: %	0.10	72.900 73.000 C	
2nd Blower: Cubic Inch/Rev	Blower EFF & Cust Area Calib.		79.900 79.880 C	
Displacement: 775 💌	Repeats between Runs: %	0.05	89.200 89.320 C	
S/N: 456			96.200 96.370 C	
Vector Drive (Motor)	PID Parameters - Pressurization Cor	ntrol	104.700 104.900 C	in the second second
Model: BALDOR 🚽	PID Pressure On: (Typ 5-25) %	25	112.200 112.410 C	
Drive COM Port #: 1	Proportional Gain:	2.00	120.300 120.290 C	
Simulate (Not for Testing)	Integral Gain: Derivative Gain:	0.10	Date: 19-Jan-08	States States
Max RPM: 4500	PID Update Interval: (sec)	2	Cal By: CLS	
Reverse: (some units)	PID Reset Interval: (sec)	10	S/N: N/A	
VCD Del.Rate: (ticks) 250			Simulate Transducer	
	Apply			
Transducers (Press & Temp)			Next Apply	
Gauge COM Port #: 2				
Invert Digital Outputs				
Internal Tick Rate: 15				
10000.00 Transducer Scale 🗹				
Apply				

Setup Screen







Space Requirement				
	Ideal	Minimum(longer Stabilization Time)		
Front(ft.)	20	10		
Rear(ft.)	10	5		
Sides(ft.)	8 on either side	5 on either side		
Top(ft.)	3	3		