1 YEAR
WARRANTY

User's Guide

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WT-3104

Research Quality Benchtop Wind Tunnel

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SYSTEM UTILITY

The WT-3104 is a unique open loop wind tunnel for thermal characterization of components, boards and heat sinks. The unit is made of Aluminum, stainless steel and Plexi-glass™ and produces flows up to 1200 ft/min (10 m/s) with the appropriate fans. Its unique polynomial shape nozzle creates uniform flow in the test section. The general characteristics of the WT-3104 are shown in the table below.

ITEM	SPECIFICATION	EXPLANATION
Overall length	36" (91.5cm)	
Test section length	20” (50.8cm)	
Width	17.25" (44 cm)	
Flow range	Up to 1200 ft/min (6 m/s)	Depending on the fan tray
Wall-to-wall spacing	4.00” (10cm)	Designed to accommodate PCBs

The WT-3104 test section can be accessed from the front door for mounting of the boards. A unique internal rail guides (Upon request) provide mechanisms for installation of test specimen of different sizes (e.g., PCB, heat sink). Installation of different fan trays can be provided with the system to accommodate a broad range of velocities that maybe required for different testing applications. However the standard fan tray in conjunction with the control ON/OFF box provides adequate flow range for most applications. The fan trays are equipped with 24 volt-DC fans, which are individually controlled to generate the flow inside the WT-3104. Instrument ports are provided throughout the test section (on the front and side-walls) for placement of temperature, velocity and pressure sensors. The ON/OFF control box is provided to turn the fans on/off for the purpose of controlling the airflow inside the tunnel. Sensors to measure the flow parameters are also supplied by Omega as optional accessories. A wind tunnel controller can also be supplied by Omega for controlling the flow automatically.

The WT-3104 can be used for the following applications:

- ***Heat Sink Testing-*** Characterize a variety of heat sink sizes for natural and forced convection cooling.
- ***Heat Sink Comparison-*** Test two heat sinks side by side and compare their thermal performance in the same environment.
- ***Component Testing-*** Test vehicle for component characterization.
- ***PCB Testing-*** Test actual or simulated PCBs for thermal and flow distribution.
- ***Flow Visualization-*** Observe flow distribution when a PCB or test object is placed in the tunnel by smoke or buoyant bubbles through the all Plexi-glass™ test section.
- ***Variable Speed-*** Change the flow rate by controlling the fan RPM.
- ***Flow Direction-*** Test the effect of flow direction (fan failure simulation) by controlling the fans (either variable RPM or on/off).
- ***Quick Access-*** Quickly change the test specimen through the side panel.
- ***Sensor Port-*** Measure pressure, velocity and temperature through the ports at the entrance and exhaust of the test section.
- ***Data Center-*** View data and monitor events at the data center (optional accessory)

SYSTEM COMPONENTS

The part numbers identified in Figure 1 show the system components of the WT-3104 system. These part numbers are described below:

1. Test Section
2. Instrument ports
3. Fan tray
4. Diffuser section
5. Fan box (0n/off)
6. Nozzle section
7. Controller
8. Fan connector
9. Test door
10. Honeycomb
11. Screens
12. Rails (optional)

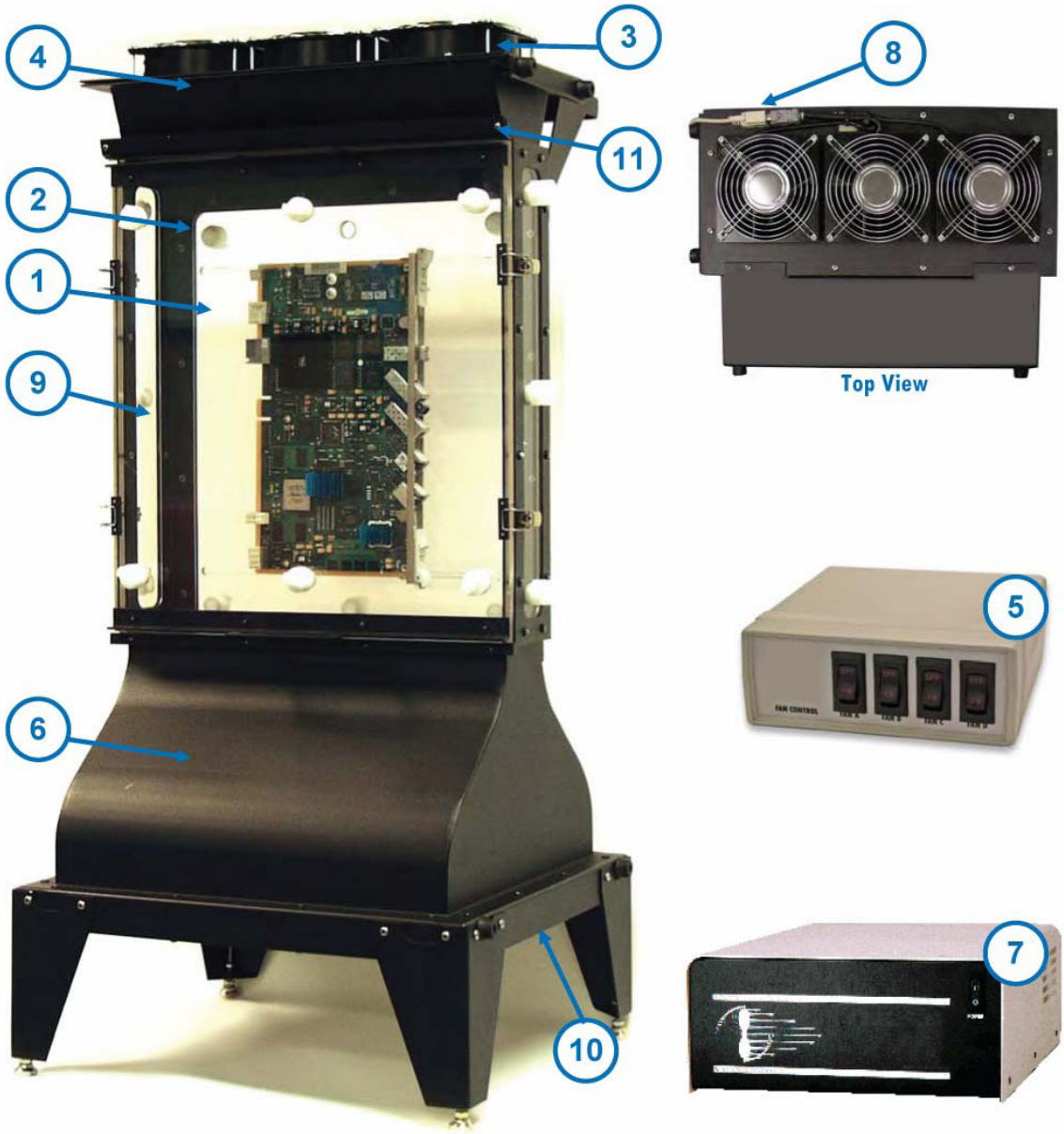

Figure 1: WT-3104 System Components

SYSTEM OPERATION

General Testing:

1. Release the clamps on front door to have access to the test section.
2. Mount your specimen (e.g., component, PCB or heat sink) in the test section.
3. Clamp the door back on the WT-3104
4. Place flow measurement instrument in the instrument port.
5. Connect the fan cable to the controller box.
6. Connect the fan controller box to a DC power supply wind tunnel controller if equipped. **Important Note**: Voltage to the fans cannot exceed 26 Volts-DC.
7. Adjust voltage until desired flow rate is attained.

Component and Heat Sink Testing:

1. Release the clamps on front door to have access to the test section.
2. Mount your component(s) in the test section.
3. Clamp the door back on the WT-3104
4. Connect the fans to a variable DC power supply. Voltage to the fans cannot exceed 26 Volts-DC. Adjust voltage until desired flow level is attained.
5. Insert the velocity and temperature probes into the instrument ports provisioned in upstream of the test section.
6. Turn on the power supplies and start the experiment.

Wind tunnel characterization:

In order to characterize the velocity profile in tunnel there are two ways of doing that. In the first approach multiple velocity measuring sensors such as a TVS- 1100 series sensor or any hot wire anemometer sensor can be used at equal spacing from each other across the width of the wind tunnel. The second approach is to use a single velocity measuring sensor and measure the flow at equal distances. In either approach the velocity should be measured away from the walls about ¾". The velocity measured close to the walls can be affected by boundary layer and the reading will be different than the reading at the center of the tunnel.

MADE IN USA

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