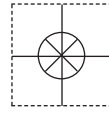
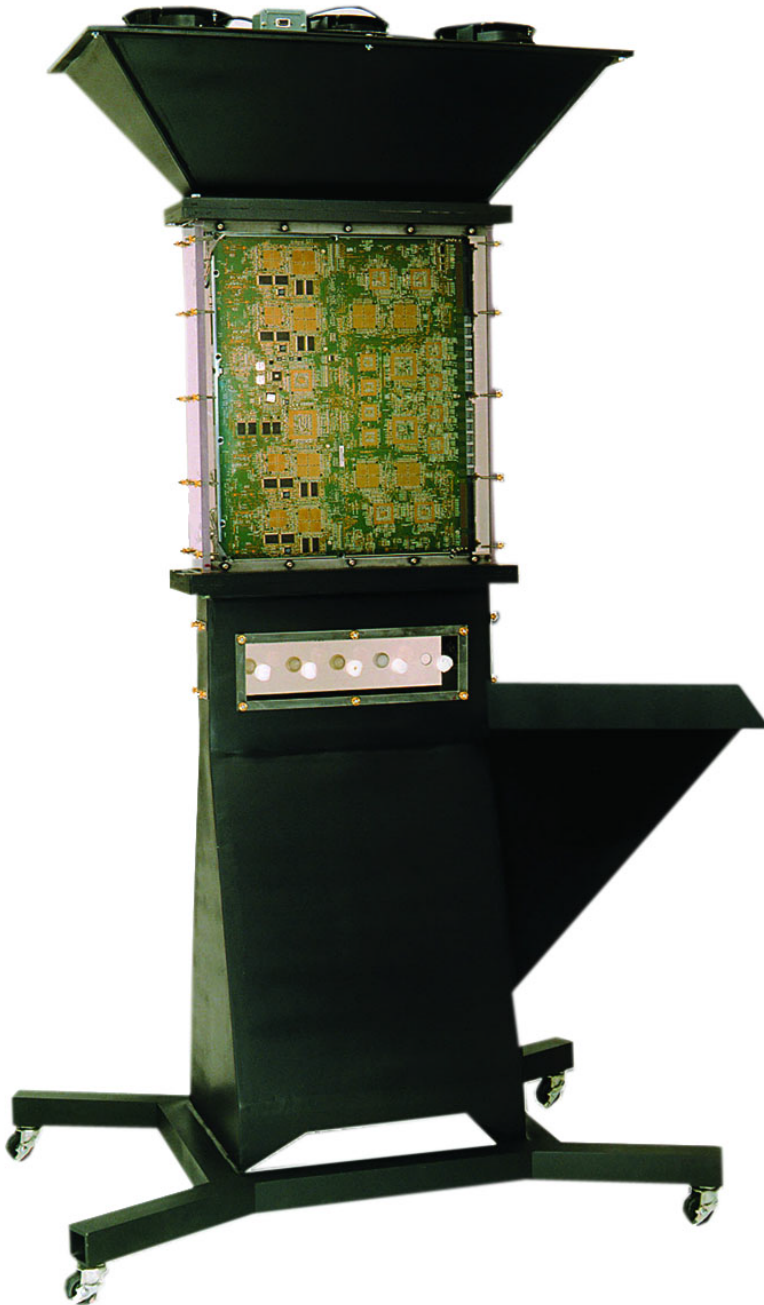


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User's Guide



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WT-3200

Controlled Research Quality Wind Tunnel



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WARNING: These products are not designed for use in, and should not be used for, human applications.

SYSTEM UTILITY

The WT-3200 is a unique, compactly designed open loop wind tunnel for thermal characterization of components, boards and heat sinks. The unit is made of Aluminum and Plexi-glass™ and produces flows up to 2000 ft/min (10 m/s) with the appropriate fans. The general characteristics of the WT-3200 are shown in the table below.

ITEM	SPECIFICATION	EXPLANATION
Length	70.5" (179cm)	
Width	18.75" (47 cm)	
Flow range	Up to 2000 ft/min (10 m/s)	Depending on the fan tray
Wall-to-wall spacing	3" (7.5 cm)	Designed to accommodate 3 PCBs

The WT-3200 test section can be accessed from the sides for mounting of the boards. Three unique internal card guides 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. The fan trays are equipped with 24 volt-DC fans, which are individually controlled to generate the flow inside the WT-3200. Instrument ports are provided throughout the test section (on the front and side-walls) for placement of temperature, velocity and pressure sensors. The electric 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-3200 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-3200 system. These part numbers are described below:

1. Instrument ports
2. Upstream test section covers
3. Side panels
4. Fan tray
5. Diffuser section
6. Fan box (on/off switches)
7. Nozzle Section
8. Controller
9. Fan connector



Figure 1: The WT-3200 System Components

SYSTEM OPERATION

General Testing:

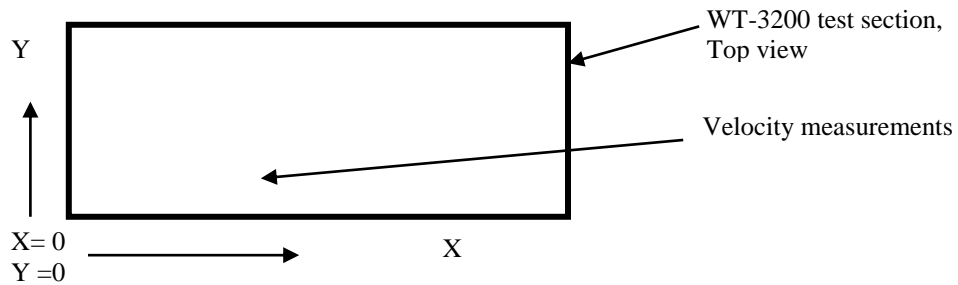
1. Unscrew the side panels to have access to the test section.
2. Mount your specimen (e.g., component, PCB or heat sink) in the test section.
3. Screw the side plate back on the WT-3200.
4. Place flow measurement instrument in the instrument port.
5. Connect the fan cable to the controller box.
6. Connect the fan controller box to a DC power supply or wind tunnel controller.
Important Note: Voltage to the fans cannot exceed 24 Volts-DC.
7. Adjust voltage until desired flow rate is attained.

Component and Heat Sink Testing:

1. Unscrew the side plates to open the test section side.
2. Mount your component(s) in the test section.
3. Screw the test section side plate back on the wind tunnel.
4. Connect the fans to a variable DC power supply. Voltage to the fans cannot exceed 24 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.

VELOCITY PROFILE

Velocity distribution at the inlet of the test section of the WT-3200 was obtained for 3 different velocities. The TVS-1100 (hot wire anemometer) system was used to map out the velocity profile at the inlet of the test section. The velocity was measured at 5 points in the x direction and at 17 points in the Y direction. The nominal velocities were chosen as 200, 300 and 600 ft/min.



X (inch)	Y(inch)	Velocity – nominal velocity, 200 (ft/min)	Velocity – nominal velocity, 300 (ft/min)	Velocity – nominal velocity, 600 (ft/min)
8.5	0.5	175	300	580
8.5	1	180	310	610
8.5	1.5	180	310	610
8.5	2	180	310	610
8.5	2.5	175	300	580

Velocity Profile in the Y direction and at midsection of the X direction

X (inch)	Y(inch)	Velocity – nominal velocity, 200 (ft/min)	Velocity – nominal velocity, 300 (ft/min)	Velocity – nominal velocity, 600 (ft/min)
0.5	1.5	170	300	580
1	1.5	190	310	610
2	1.5	190	310	610
3	1.5	190	310	610
4	1.5	190	310	610
5	1.5	190	310	610
6	1.5	190	310	610
7	1.5	190	310	610
8	1.5	190	310	610
9	1.5	190	310	610
10	1.5	190	310	610
11	1.5	190	310	610
12	1.5	190	310	610
13	1.5	190	310	610
14	1.5	190	310	610
15	1.5	190	310	610
16	1.5	190	310	610
16.5	1.5	170	300	580

Velocity Profile in the X direction and at midsection of the Y direction



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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