

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.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair or calibration,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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Correction Factors

For Hot Wire Anemometers:

If the environmental conditions are other than the standard conditions (70°F and 29.92 inches of Hg), you need to correct for them. Here is the correction factor equation:

$$K1 = (29.92 / P) \times (460 + T) / 530$$

where...

P is the Barometric pressure in inches of Hg

T is the ambient temperature in Degree

There is a second correction factor which is a function of the air probe geometry (K2).

The following table lists K2 for different air probes. So, the actual air velocity is as follows:

Actual Value = Measure Value (average value over one minute time) x K1 x K2

For Vane Type Anemometers:

You only need to correct for the air probe geometry (K2). The actual air velocity is as follows:

Actual Value = Measured Value (Average value over one minute time) x K2

Model No.	Description	Correction Factor - K2			
		@ 2.5 m/s	@ 5 m/s	@ 10 m/s	@ 15 m/s
FPM-904	Hot Wire 0-2000 FPM	1.04	1.00	1.01	N/A
FMA-905	Hot Wire 0-5000 FPM	1.00	1.00	1.01	1.04
HHF42	Hot Wire 40-3940 FPM	1.04	1.00	1.06	1.07
HHF801	Vane Type 160-2358 FPM	1.08	1.12	1.17	N/A
HHF802	Vane Type 80-4930 FPM	0.90	0.96	1.04	1.07
HHF803	Vane Type 160-4930 FPM	0.94	1.00	1.09	1.06
HHF91	Vane Type 125-4900 FPM	0.86	0.92	1.00	1.03
HHF92A	Vane Type 80-6900 FPM	0.92	0.97	1.05	1.04
HHF81	Vane Type 80-5910 FPM	1.03	1.06	1.13	1.12
HHF82	Vane Type 80-5910 FPM	1.14	1.18	1.24	1.22
HHF11	Vane Type 80-6900 FPM	0.88	0.90	0.99	1.01

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Correction Factor Example:

An FMA-904 Hot wire anemometer is being checked in the Wind Tunnel at 2.5 m/s (492 FPM) air speed.

The environmental conditions are:

Barometric Pressure = 27.88 inches of Hg

Ambient Temperature = 80°F

The FMA-904 measures 442 FPM. Calculate the actual air speed:

Actual Air speed = Measured Value (Average value over one minute) x K1 x K2

$$K1 = (29.92 / P) \times (460 + T) / 530$$

$$K1 = (29.92 / 27.88) \times (460 + 80) / 530$$

$$K1 = 1.093$$

From Correction Factor - K2 Chart, K2 for FMA904 @ 2.5 m/s is 1.04

Actual Air speed = 442 x 1.093 x 1.04

Actual Air speed = 502 FPM

Specifications

Accuracy: ±1% of setting or ±0.1 m/s, whichever is larger

Test Chamber: 10 cm (4") diameter

Flow Rates: 2.5 m/s (492 fpm), 5.0 m/s (984 fpm), 10 m/s (1969 fpm), 15 m/s (2953 fpm)

Remote Option: Use an external 5K, 10-turn potentiometer to vary air speed

DC Motor: 24 Vdc @ 1.1 A (26 W)

Power: 90 to 250 Vac @ 50/60 Hz

Operating Temperature: 5 to 45°C (41 to 113°F)

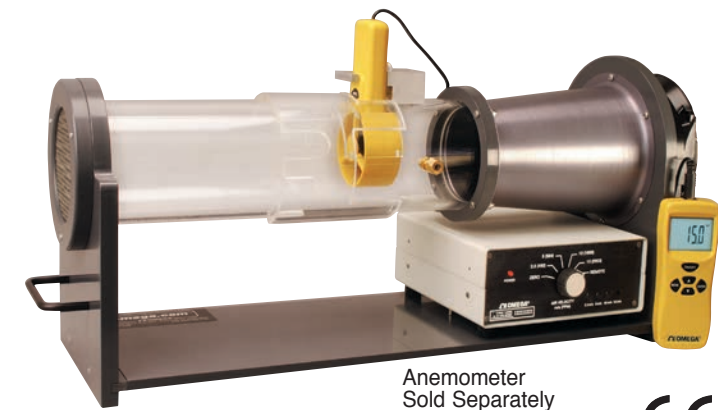
Operating Relative Humidity: 80% RH max without condensation

Size: 68.5 L x 20.3 W x 29.2 cm H (27 x 8 x 11.5")

Weight: 8.2 kg (18 lb)

QUICK START

For complete product manual:
www.omega.com/manuals/manualpdf/M4360.pdf



Anemometer Sold Separately



WTM-1000 Laboratory Grade Bench Top Mini Wind Tunnel

Ω OMEGA®

omega.com info@omega.com

Servicing North America:

U.S.A.: OMEGA Engineering, Inc., One Omega Dr.
P.O. Box 4047, Stamford, CT 06905-0047 USA
Toll-Free: 1-800-826-6342 (USA & Canada Only)
Customer Service: 1-800-622-2378 (USA & Canada Only)
Engineering Service: 1-800-872-9436 (USA & Canada Only)
Tel: (203) 359-1660 Fax: (203) 359-7700
e-mail: info@omega.com

For Other Locations Visit omega.com/worldwide

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

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

Using This Quick Start Manual

Use this Quick Start Manual with your WTM-1000 Laboratory Grade, Bench Top Mini Wind Tunnel for quick installation and basic operation. For detailed information, refer to the User's Guide (Manual M4360).

General Information

The Mini Wind Tunnel Model WTM-1000 is designed to give a highly uniform flow rate over a 10cm (4") diameter test chamber. The Wind Tunnel has an electronic control unit where it controls the DC Fan speed and provides four selectable fixed air speeds. The fixed air speeds are:

- 2.5 m/s (492 FPM)
- 5 m/s (984 FPM)
- 10 m/s (1969 FPM)
- 15 m/s (2953 FPM)

In addition, there is a REMOTE selection on the electronic control unit selector switch. This will allow connecting an external potentiometer to control the DC fan speed and be able to vary the speed from 0 to 15 m/s. A cable to connect an external potentiometer to the control unit is included in the shipping box.

NOTE:

Use an external 5K, 10-turn potentiometer.

Setting Up the Mini Wind Tunnel

Precautions:

A wind tunnel's performance can be severely diminished if not used properly. Please follow the following tips:

- Do not use the wind tunnel in small rooms. The air flow creates currents that undermine the wind tunnel's accuracy.
- Avoid locating the intake and exhaust toward open windows, doorways or corridors where people are walking. The effect of air current changes across the intake has a severe effect on the flow rate changing in the wind tunnel.
- There should be at least 1.5 m (5 feet) clear space in front of and behind the wind tunnel. No obstacles, moving objects, open doors or windows.

- Locate the exhaust towards the largest open area of the room to minimize room air currents. The higher the flow rate, the more chance of creating currents.
- Air Probe geometry affects the readings. There is a correction factor table for different types of air probes (Hot wire & Vane type).
- The air flow rate of the wind tunnel depends on the air temperature and barometric pressure. Adjust it accordingly.
- This instrument should only be used for its intended purpose in accordance to the instruction manual.

Operating the Wind Tunnel

Before operating the wind tunnel, please follow all the precautions stated in the previous section and then proceed as follows:

1. Connect the cable from the DC Fan to the back of the Control unit box labeled 'Fan Control'. Make sure the power switch in the back of the control unit is off.
2. Connect the AC input of the Control unit to a line voltage (90 to 250 VAC @ 50/60 Hz) with the Power cord provided.
3. Set the air speed selector switch on the front of the control unit to Zero position (Meaning Zero air velocity). Turn on the Power switch in the back. You will see the power LED indicator on the front of the control box turns on.

The air speed selector switch can be set to four fixed air speeds. The wind tunnel has been calibrated at these four air speeds. The standard conditions are at 70°F (21.2°C) ambient temperature and 29.92 inches of Hg of Barometric pressure. There are four plugs in front of the control unit box. Removing the plugs, you will have access to potentiometers that will allow you to adjust the air speed at the four settings.

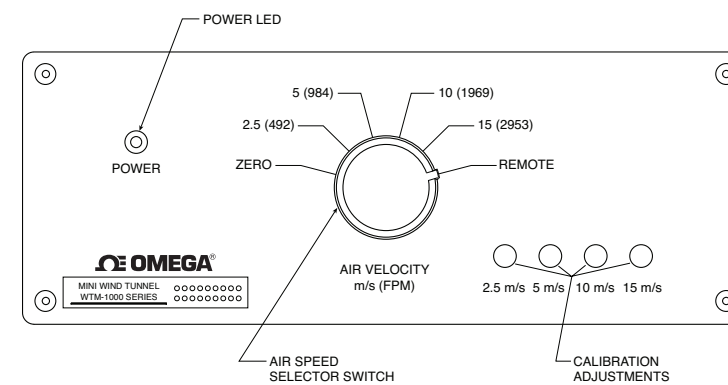
For Hot Wire Anemometers:

1. Use the Chamber Door (Solid) to cover the test chamber.
2. Insert the air probe into Port #1. Port #2 is used to insert a reference air probe if desired. Refer to Front View of WTM1000 for location of ports.
3. Align the air probe sensor to the center of the chamber using the scribed line on the outside of the chamber.
4. Use the Teflon Ferrules and "hand-tighten" the probe in place. Do not use tools or wrenches.

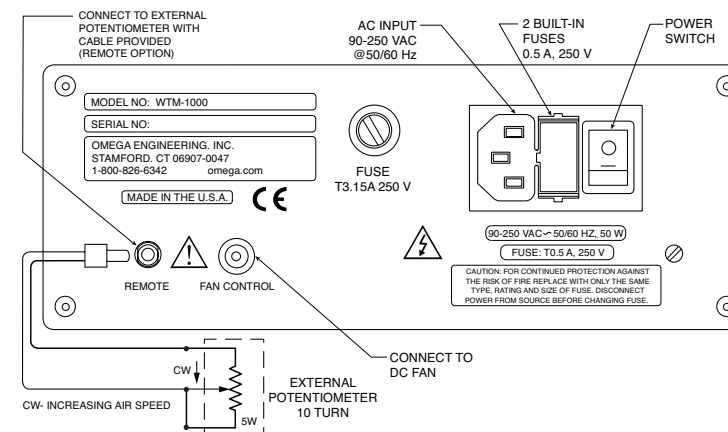
For Vane Type Anemometers:

1. Remove the chamber door. Open the clamp in the adjustable mounting block by turning the wheel.
2. Place the vane propeller inside the chamber. Make sure it is in the center of the chamber.
3. Place the vane window door.
4. Secure the vane propeller in place by tightening the clamp using the wheel.
5. Slide the Vane Clamp sleeve over the vane window door and up against the vane probe to minimize any air leaks.

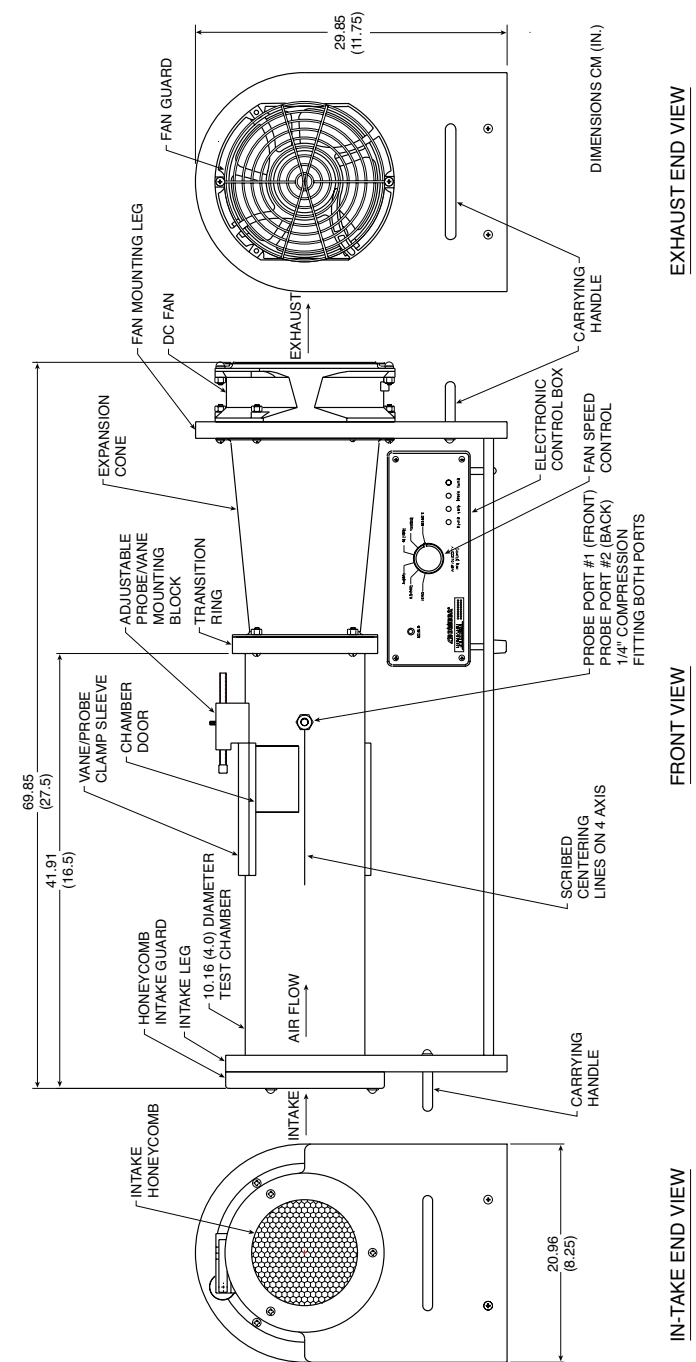
Once the air probe is in place (either Hot Wire or Vane Type), turn the air speed selector switch from 2.5 m/s (492 FPM) up to 15 m/s (2953 FPM). Check the air probe reading vs. the switch setting on the wind tunnel.



Front Panel, Control Unit Box



Rear Panel, Control Unit Box



Important Components of Mini Wind Tunnel and Overall Dimensions