



Model DA40H



User Manual

Warranty

This product is fully warranted against defective materials and/or workmanship for a period of one year after purchase, provided it was not improperly used. For your protection, please use this product as soon as possible. If returned, it must be securely wrapped, sent prepaid and insured to:

Pacer Industries, Inc.
1450 First Avenue
Chippewa Falls, WI 54729
PH: 715-723-1141
FX: 715-723-7890

Please include a note with name, address, telephone number and description of the problem. Although we provide assistance on Pacer products both personally and through our literature, it is still the total responsibility of the customer to determine the suitability of the product for use in their application.

This manual is provided by Pacer Industries without any kind of warranty. Precautions have been taken in accurately preparing this manual; however, we neither assume responsibility for any omissions or errors that may appear nor assume liability for any damages that result from the use of the products in accordance with the information contained in the manual.

INTRODUCTION

Pacer's model DA40H digital hygro-thermometer-anemometer is a versatile instrument for measuring and logging air velocity, relative humidity and temperature of airflow from HVAC ducts or process air flow.

The heavy, all metal air velocity probe can be used for airstreams that have a wide range of humidity, temperature and contaminants without compromising accuracy. Temperature sensors are Platinum Resistance Elements (RTD) and the humidity sensor is a fast, accurate, capacitive thin-film ceramic model.

Features of the air velocity probe include choice of diameters, custom cable lengths, tolerance of temperatures up to 210°F (98.9°C), and durability. A sintered metallic filter is available for the RH probe to protect it from dust. Optional special-purpose temperature-only probes may be purchased from factory.

SECTION 1 - SPECIFICATIONS

Range:

AP275 probe:	40 – 7800 FPM (0.2 - 40.0 MPS)
AP100 probe:	60 – 6800 FPM (0.3 – 35.0 MPS)
Temperature – RH probe:	-4° to 176°F (-20° to 80°C)
Temperature-only probes (optional):	-139 to 392.0°F (-95 to 200.0°C)
Relative Humidity:	5% to 95% RH

Accuracy:

Air Velocity:	±1.0% of reading ±1 digit
Temperature:	±0.3% of Reading ±1 digit
Relative Humidity:	±2%RH

Resolution:

Air Velocity:	1 FPM or 0.01 MPS
Temperature:	0.1°F or °C (1°F below -99.9°F)
%RH:	0.1%RH

Response time:

Temperature:	Approximately 60 seconds
%RH:	Up to 90% of change in 15 sec.

% RH temperature drift: ±0.5%RH per 10°C (18°F)

Operating temperature:

Instrument:	32 to 125°F (0 to 50°C)
Air probe:	-4° to 210°F (-20° to 98.9°C)
%RH probe:	-4° to 176°F (-20° to 80°C)

Power supply: 2 AA alkaline batteries, E91 Eveready or equivalent

Battery life: Approximately 200 hours

Battery check: Automatic low battery display

Display: 0.5" LCD, 4 digits

Weight: 8 ounces with batteries

Dimensions:

Instrument:	7.1" x 3.0" x 0.8"
AP275 probe:	2 3/4" diameter
AP100 probe:	1" diameter
HTP201 %RH probe:	7" length x 1" diameter

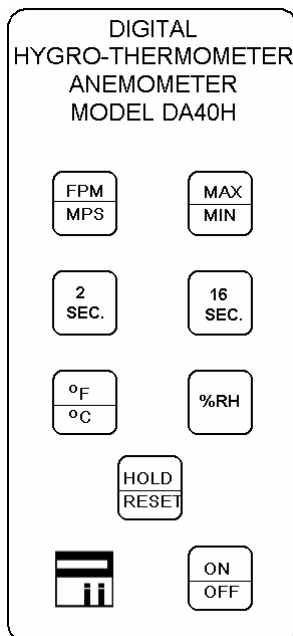
Options:

Model CG-4 charger:	PN 3303 (with 4 NiMH batteries)
Additional velocity probe:	AP100 (1") or AP275 (2 3/4")
Extension cables:	PN 3835 air velocity probes (Specify length) PN 3833 HTP201 probe
Extra extension rod:	PN 5001 rigid, PN 5002 flexible
Special-purpose temperature probes:	
PT201T:	PN 6332 GP immersion probe
PT202T:	PN 6334 air probe
PT203T:	PN 6335 surface probe

Included:

1 Air Velocity probe:	Choice, AT100 or AT275
1 %RH probe:	HTP201
3 pieces:	PN 5001 rigid extension rod
1 piece:	PN 5002 flexible extension rod
1 piece:	PN 3836 5 ft. air velocity cable (attached to the APT100 probe)
2 pieces:	AA 1.5V alkaline batteries
1 piece:	PN 6004 hard-shell carrying case
1 piece:	M2943 Operation manual

SECTION 2 – SWITCH FUNCTIONS



- ON/OFF** Pressing “ON/OFF” key switches unit ON. Pressing the key a second time turns it OFF.
- FPM/MPS** Pressing “FPM/MPS” key toggles unit from FPM (1 FPM resolution) to MPS (0.01 MPS resolution).
- °F/°C** Pressing the “°F/°C” key displays temperature in degrees Fahrenheit (°F); pressing key a second time changes display to Celsius (°C).
- %RH** Pressing “%RH” key displays relative humidity with 0.1%RH resolution.
- 2 SEC.** Pressing “2 SEC.” key sets measurement period to two seconds. The display will show “2 SEC.”, then a measurement value. It will update every two seconds with average of the preceding two seconds.
- 16 SEC.** Pressing “16 SEC.” key sets measurement period to sixteen seconds. The display will show “16 S” for 16 sec., then a measurement value. It will update every two seconds with average of the preceding sixteen seconds.
- MAX/MIN** Pressing “MAX/MIN” key displays the highest reading since turn-on. Pressing key a second time will display lowest reading since turn-on. See APPENDIX C for description of algorithm that determines MAX and MIN.
Air Velocity: In “2 SEC.” mode display reads “H 2” (“L 2”) followed by reading. In “16 SEC.” mode display reads “H 16” (“L 16”) followed by reading.

Temperature: Maximum is indicated by “H tP” followed by reading. Minimum is indicated by “L tP” followed by reading.

%RH: Maximum is indicated by “H rH” followed by reading. Minimum is indicated by “L rH” followed by reading.

Clear the internal memory by turning unit OFF. The “MAX/MIN” mode is cleared by pressing any other key (except “HOLD”).

HOLD/RESET Pressing “HOLD/RESET” key will freeze the reading on the display; “HOLD” is displayed and the reading is held. Pressing “HOLD/RESET” key a second time frees the display.

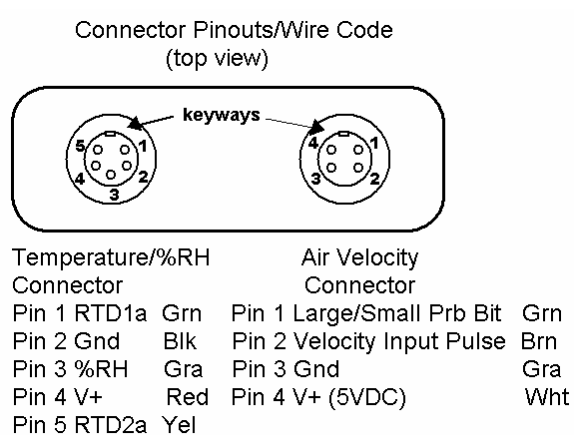
SECTION 3 – OPERATION

NOTE: Unit should be “OFF” before changing batteries or attaching probe.

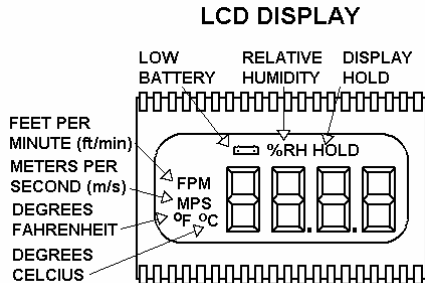
- 1) Remove battery compartment lid and insert batteries; replace lid (see APPENDIX D).
- 2) Attach the probe cable(s) by aligning the keyway(s), inserting connector(s) and turning collar(s) to tighten. You may use either probe by itself or both simultaneously. If no RH probe is attached, unit will display error codes for temperature or %RH when pressing those keys. (See APPENDIX A for unit’s connector wiring diagram).
- 3) Press the “ON/OFF” key to turn unit ON. The display will show all its elements (see APPENDIX B) followed by the remaining battery capacity (“bA85” means the battery is at 85% capacity), followed by “1.00” if an AP100 probe is attached. “2.75” shows if an AP275 probe is attached or if no air velocity probe at all is attached.
NOTE: If the battery symbol appears during normal usage, replace the batteries.
- 4) To view airspeed, press “FPM/MPS” key, if needed, to display desired units. Place probe in the air stream with the axis or direction arrow (if present) in the direction of the airflow. To calculate CFM see APPENDIX E.
- 5) To correctly measure the air velocity from a large duct, set unit to “16 SEC.” mode and move probe about the area of the opening. After 16 seconds, the unit will display the velocity for the preceding 16 seconds, updating after that every 2 seconds by adding the latest 2 second measurement and dropping the oldest 2 second measurement.
- 6) To view temperature or %RH, press “°F/°C” or “%RH” keys respectively, and place probe in area to be measured. See APPENDIX F if “E-xx” is displayed.
- 7) To get maximum readings since turn-on, press “MAX/MIN” key; to get minimum readings, press “MAX/MIN” key a second time. For explanation of the displayed views, see “MAX/MIN” paragraph in SECTION 2. For explanation of algorithm which calculates MAX and MIN see APPENDIX C.

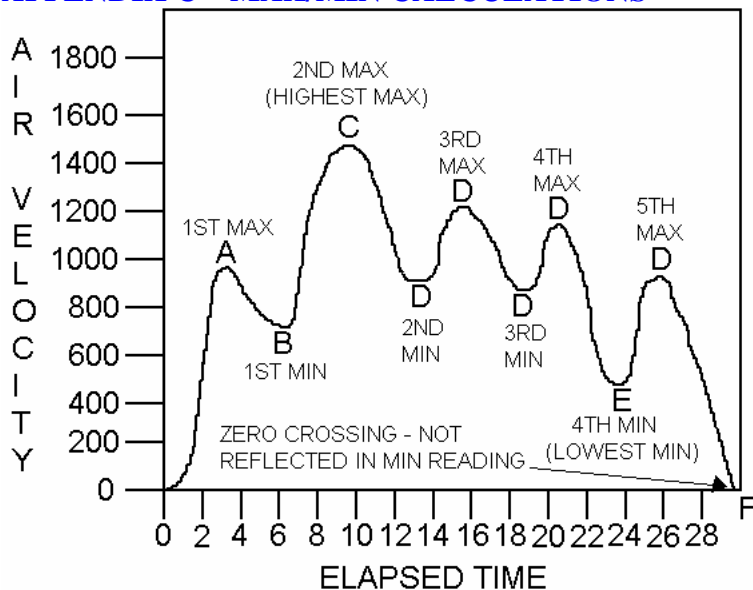
- 8) To HOLD the displayed reading, press the “HOLD/RESET” key. Press key again to clear the HOLD condition.

APPENDIX A – CONNECTOR DIAGRAM



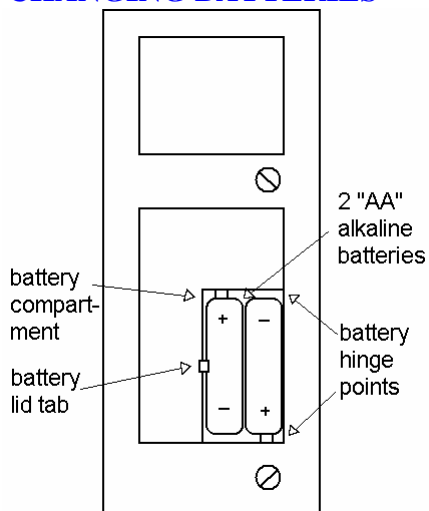
APPENDIX B – LCD DISPLAY SYMBOLS



APPENDIX C – MAX/MIN CALCULATIONS

- A) 1st MAX reading; also first minimum reading, to be replaced at B.
- B) 1st MIN at B is the lowest yet and will be registered as velocity increases.
- C) This 2nd, higher MAX at C will register as the velocity decreases, replacing 1st MAX.
- D) This 2nd MIN at D is higher than the MIN already registered and will be ignored.
- E) This 4th MIN at E is lower than the 1st MIN, registered at B, and will replace it.
- F) The zero crossing at F does not form a MIN and will be ignored. This protects against false MIN readings when the probe is withdrawn from the air stream.

APPENDIX D – CHANGING BATTERIES

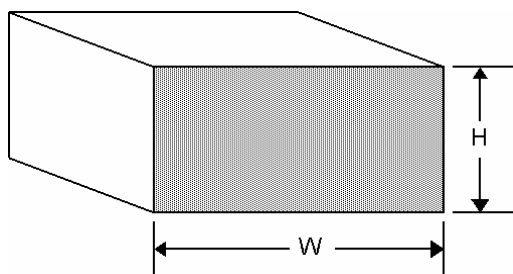


APPENDIX E – AIRFLOW VOLUME CALCULATIONS

Theory: To calculate cubic feet per minute (CFM) from a measured air velocity (FPM), you need the calculated cross-sectional area of the airflow stream:

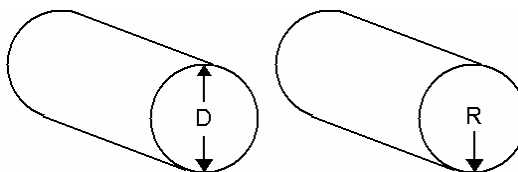
Volume Flow (CFM) = Velocity (FPM) X Area (sq ft).

In rectangular ductwork this cross sectional area equals the Width times the Height.



$W \times H = A$ (cross-sectional area)

In circular duct work this cross section area equals the radius squared times π (3.14).



$R \times R \times 3.14 = A$ (cross-sectional area)

To convert an area calculated in square inches to an area calculated in square feet (which is required for the Volume Flow equation above) divide by 144: (area in sq in.)/144 = (area in sq ft.).

Example: The air duct is rectangular, the width is 24 in. and the height is 12 in. The air velocity reading through the duct is 450 FPM. Calculate the Volume Flow.

Step 1: Cross-sectional area = 24 in. x 12 in. = 288 sq in.

Step 2: 288 sq in /144 = 2 sq ft.

Step 3: Volume flow = Air Velocity x Area, therefore, Volume flow rate = 450 FPM x 2 sq ft. = 900 CFM.

APPENDIX F – ERROR CODES

- E-06** Humidity less than 3.0%RH
- E-07** Humidity greater than 97.0%RH or RH probe not connected
- E-08** Temperature less than -95.0°C (-139°F)
- E-09** Temperature greater than 205.0°C (401.0°F) or RH probe not connected

Notes: