Model DA40T

User Manual

DA40T User Manual
Rev 1.0
11-Aug-2007

Pacer Instruments, Inc
www.pacer-instruments.com
Phone: 1-800-283-1141

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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.

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INTRODUCTION

Pacer's model DA40T digital thermometer-anemometer is a versatile instrument for measuring air velocity and temperature of airflow from HVAC ducts or process air flow.

The heavy, all metal (except electronics) probe can be used for airstreams which have a wide range of humidity, temperature and contaminants without compromising accuracy. Temperature sensor is a Platinum Resistance Element (RTD).

Features include choice of probe diameters, custom cable lengths, tolerance of temperatures up to 210˚F (98.9˚C) at the probe, and durability. Optional special-purpose temperature-only probes may be purchased from factory.

SECTION 1 - SPECIFICATIONS

Range:
APT275 probe:	40 – 7800 FPM (0.2 - 40.0 MPS)
APT100 probe:	60 – 6800 FPM (0.3 – 35.0 MPS)

Temperature – Either velocity probe:
$-22°$ to $212°F$ ($-30°$ to $100°C$)

Temperature – Optional temperature-only probes:
$-139°$ to $392.0°F$ ($-95°$ to $200.0°C$)

Accuracy:
Air Velocity:	±1.0% of reading ±1 digit
Temperature:	±0.3% of Reading ±1 digit

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

Operating Temperature:
Instrument:	32 to $125°F$ (0 to $50°C$)
Probes:	$-4°$ to $210°F$ ($-20°$ to $98.9°C$)

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"
APT275 probe:	2 ¾" diameter
APT100 probe:	1" diameter

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Options:

Model CG-4 charger:	PN 3303 (with 4 NiMH batteries)
Additional probe:	APT100 (1") or APT275 (2 ¾")
Cable longer than 5':	Model 3836, specify length
Extra extension rod:	PN 5001 rigid, PN 5002 flexible

Special-purpose temperature probes:

PT201T:	PN 6332 GP immersion probe
PT202T:	PN 6334 air temperature probe
PT203T:	PN 6335 surface probe

Included:

1 piece:	probe head, choice of APT100 or APT275
3 pieces:	PN 5001 rigid extension rod
1 piece:	PN 5002 flexible extension rod
1 piece:	PN 3836 5 ft. connection cable (attached to the APT100 probe)
2 pieces:	AA 1.5V alkaline batteries
1 piece:	PN 6004 hard-shell carrying case
1 piece:	Operation manual

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SECTION 2 – SWITCH FUNCTIONS

DIGITAL
THERMOMETER
ANEMOMETER
MODEL DA40T

FPM / MPS	MAX / MIN
2 SEC.	16 SEC.
ºF / ºC	HOLD / RESET
	ON / OFF
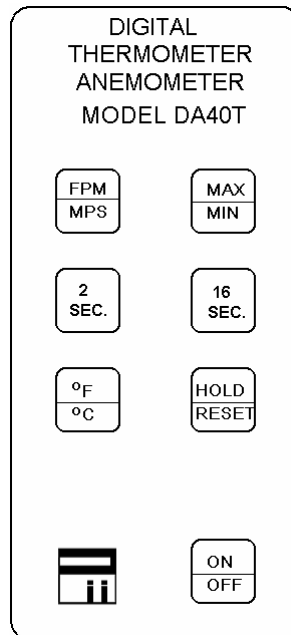
ON/OFF   Pressing "ON/OFF" key switches unit ON. Pressing the key a second time turns it OFF.

FPM/MPS   Pressing "FPM/MPS" key toggles unit from FPM (1 FPM resolution) to MPS (0.01 MPS resolution).

ºF/ºC   Pressing the "ºF/ºC" key displays temperature in degrees Fahrenheit (ºF); pressing key a second time changes display to Celsius (ºC).

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 for air velocity or temperature. Pressing key a second time will display lowest reading since turn-on.
<u>Air Velocity:</u> 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.
<u>Temperature:</u> Maximum is indicated by "H tP" followed by reading. Minimum is indicated by "L tP" followed by reading.

Clear the internal memory by turning unit OFF. Clear the "MAX/MIN" mode by pressing any other key (except "HOLD"). See APPENDIX B for description of algorithm that determines MAX and MIN.

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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.
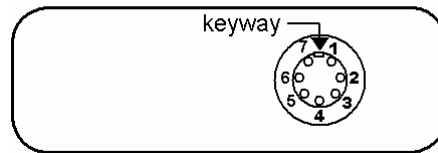
SECTION 3 – OPERATION

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 by aligning the keyway(s), inserting connector(s) and turning collar(s) to tighten (see APPENDIX A for wiring diagram).

3) Press the "ON/OFF" key to turn unit ON. The display will show all its elements (see APPENDIX C) followed by the remaining battery capacity ("bA85" means the battery is at 85% capacity) followed by "2.75" or "1.00" indicating that the APT275 or APT100 probe, respectively, is attached.
Replace batteries if symbol shows during usage.

4) 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) Press "°F/°C" key to display temperature in °F; press again to display in °C. 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, also see APPENDIX B.

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

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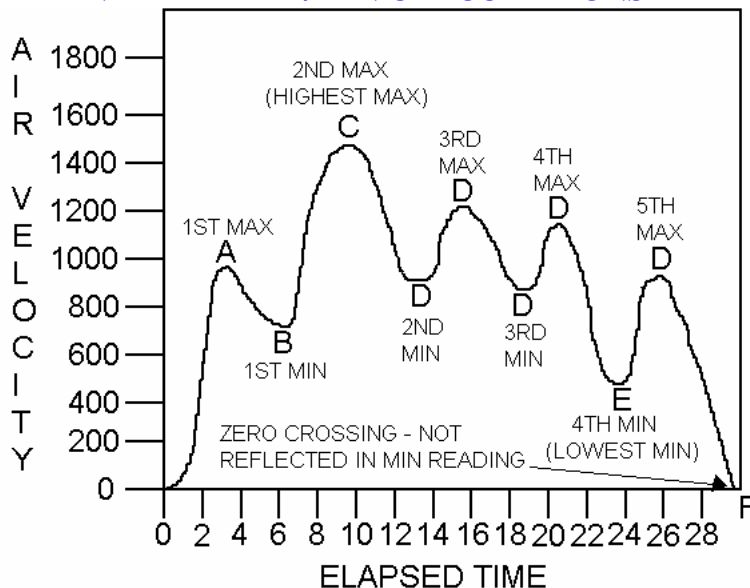
APPENDIX A – CONNECTOR DIAGRAM

Connector Pinout/Wire Code
(top view)

keyway

Air Velocity Connector
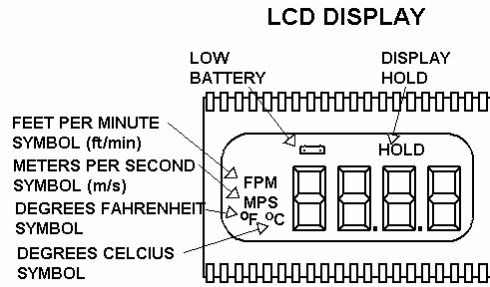Pin 1 Large/Small Probe Bit Gra
Pin 2 Velocity Input Pulse   Brn
Pin 3 V+ (5VDC power)   Red
Pin 4 Ground   Blk
Pin 5 RTD1a   Yel
Pin 6 RTD2a   Grn
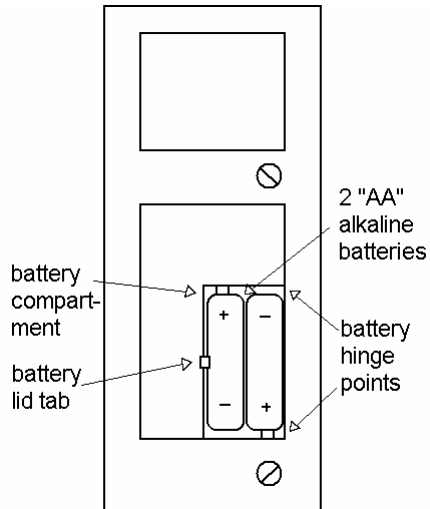Pin 7 RTD2b   Blu

APPENDIX B – 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.

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APPENDIX C – LCD DISPLAY SYMBOLS

APPENDIX D – CHANGING BATTERIES

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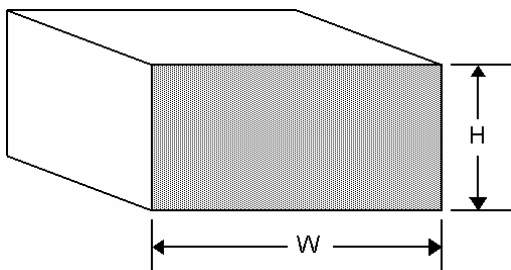sales@pacer-instruments.com

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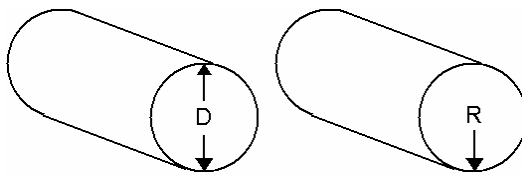
Volume Flow (CFM) = Velocity (FPM) X Area (sq ft).

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

W x H=A (cross-sectional area)

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

R x R x 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-08 Temperature lower than -95.0ºC or -139ºF
E-09 Temperature higher than 205.0ºC or 401.0ºF

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