

POINTER CONFIGURATION
(SHORTER POINTER FOR LIGHTED UNIT)

NOTE: DOTTED LINES AND PARENTHESES FIGURES ARE APPLICABLE TO BEZEL LIGHTED UNITS ONLY. (REFER TO BEZEL CONFIGURATION ON PAGE 2).

								PREP. BY	<i>J. Reed</i>	6/4/04
								APPR. BY	<i>T. Lawrence</i>	6/7/04
A	7/26/04	ADDED LIGHTED UNITS (P2) AND C. 197 DIAL CONFIG.						CHECKER	<i>[Signature]</i>	6/9/04
REV.	DATE		CHK.	REV.	DATE		CHK.	NAME		DATE

UNITED INSTRUMENTS, INC.



3625 COMOTARA AVE.
WICHITA, KS 67226

TITLE:

INDICATOR - VERTICAL SPEED
(METRIC)

SPEC. NO:

UI7000-M

ISSUE

A

PAGE 1 OF 6 PAGES

UNITED INSTRUMENTS, INC.		RANGE, METERS PER SECOND (Feet per Minute equivalent)	BEZEL CONFIGURATION
PART NO.	CODE NO.		
7000	C.192	0 – 10 (0 – 2,000)	Unlighted
7000	C.193P	0 – 10 (0 – 2,000)	Bezel Lighted, Plastic Wedge
7000	C.193H	0 – 10 (0 – 2,000)	Bezel Lighted, Glass Wedge, HEA
7030	C.194	0 – 15 (0 – 3,000)	Unlighted
7030	C.195P	0 – 15 (0 – 3,000)	Bezel Lighted, Plastic Wedge
7030	C.195H	0 – 15 (0 – 3,000)	Bezel Lighted, Glass Wedge, HEA
7040	C.196	0 – 20 (0 – 4,000)	Unlighted
7040	C.197P	0 – 20 (0 – 4,000)	Bezel Lighted, Plastic Wedge
7040	C.197H	0 – 20 (0 – 4,000)	Bezel Lighted, Glass Wedge, HEA
7060	C.198	0 – 30 (0 – 6,000)	Unlighted
7060	C.199P	0 – 30 (0 – 6,000)	Bezel Lighted, Plastic Wedge
7060	C.199H	0 – 30 (0 – 6,000)	Bezel Lighted, Glass Wedge, HEA

NOTES:

1. Code number ending with "P" represents a unit equipped with lighting bezel (plastic wedge type): BA3-006-003A. These units require light tray BA5-24-BW3 (5V), BA12-24-BW3 (12/14V), or BA28-24-BW3 (28V). The voltage requirement (5,14, or 28 volt) is to be specified by the customer after a UI code number ending with "P", otherwise the unit will be shipped without a light tray.
2. Code number ending with "H" represents a unit equipped with lighting bezel (HEA glass wedge type): BA3-006-003G-901. These units require light tray BA5-24-BW3G (5V), BA12-24-BW3G (12/14V), or BA28-24-BW3G (28V). The voltage requirement (5,14, or 28 volt) is to be specified by the customer after a UI code number ending with "H", otherwise the unit will be shipped without a light tray.

**CUSTOMER
ACCEPTANCE
SPECIFICATION
UNITED INSTRUMENTS, INC.**

TITLE:

INDICATOR – VERTICAL SPEED
(METRIC)

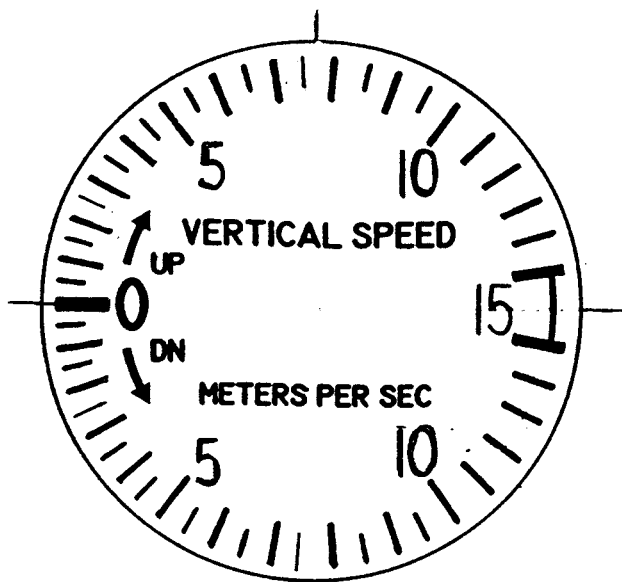
SPEC. NO:

UI7000-M

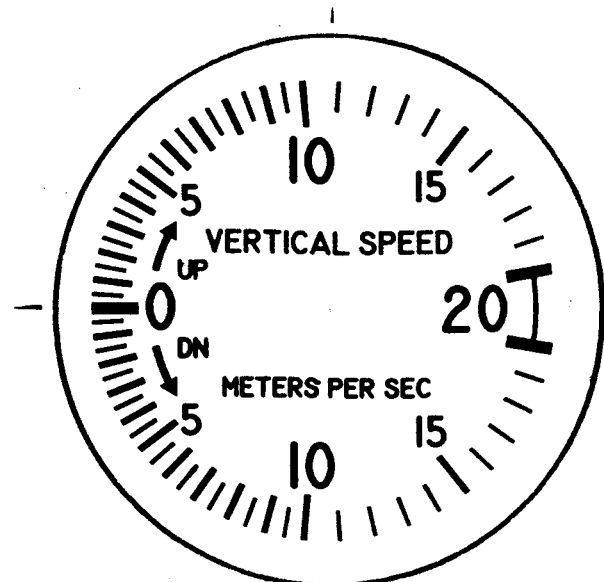
ISSUE

A

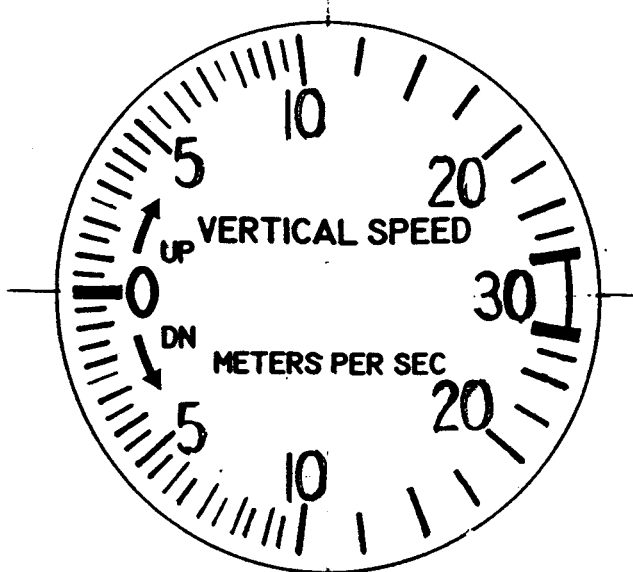
PAGE 2 OF 6 PAGES



DIAL CONFIG FOR P/N 7030



DIAL CONFIG FOR P/N 7040
(C.197 DIAL SHOWN)



DIAL CONFIG FOR 7060

NOTE: DIAL CONFIG FOR UNLIGHTED AND LIGHTED ARE SIMILAR EXCEPT FOR THEIR OUTER, GRADUATION DIAMETERS: 2.7-INCH FOR UNLIGHTED (C.192, C.194, C.196 AND C.198) AND REDUCED TO 2.4-INCH FOR LIGHTED (C.193, C.195, C.197 AND C.199).

CUSTOMER ACCEPTANCE SPECIFICATION UNITED INSTRUMENTS, INC.	TITLE: INDICATOR - VERTICAL SPEED (METRIC)	SPEC. NO. UI7000-M	ISSUE A
		PAGE 3 OF 6	PAGES

1. GENERAL

- 1.1. PURPOSE: This specification defines standards of minimum performance and conditions under which these standards apply for Model 7000 Rate of Climb Indicator supplied by United Instruments, Inc.
- 1.2. DESCRIPTION: The model 7000 Rate of Climb Indicator is for use on an aircraft to indicate the rate of ascent or descent. Changes in pressure due to changes in altitude are represented on the dial in meters per second, mps (feet per minute, fpm).
- 1.3. OPERATING LIMIT: The Model 7000 Rate of Climb Indicator operates through the calibrated ranges listed below.

PART NUMBER	RANGE Meters Per Second (Feet Per Minute equiv.)	TYPE
7000 Series	0 to 10 (0 to 2,000)	Type I
7030 Series	0 to 15 (0 to 3,000)	Type II
7040 Series	0 to 20 (0 to 4,000)	Type III
7060 Series	0 to 30 (0 to 6,000)	Type IV

- 1.4. ENVIRONMENTAL CONDITIONS: When installed in accordance with United Instruments, Inc. instructions, the Rate of Climb Indicator shall function and shall not be adversely affected in the following environmental ranges.

- 1.4.1. TEMPERATURE: -30°C to +50°C for operation
-65°C to +70°C for storage

- 1.4.2. HUMIDITY: 0% to 95% at approximately 32°C

- 1.4.3. VIBRATION:

Frequency	Maximum Double Amplitude	Maximum Acceleration
5 to 50 Hz	0.020 in	1.5 g

- 1.4.4. ALTITUDE: Pressure and temperature ranges equivalent to -1,000 to +40,000 feet standard altitude, per NACA Report Number 1235, except as limited by the application of Temperature, paragraph 1.4.1.

The instrument shall withstand an external case pressure of 50 inches of mercury absolute when vented to atmospheric pressure.

- 1.4.5. MAGNETIC EFFECT: The magnetic effect of the indicator shall not adversely affect the operation of other instruments installed in the same aircraft.

2. DETAIL REQUIREMENTS:

- 2.1. INDICATING METHOD: Ascent shall be indicated by a clockwise rotation of the pointer from the zero at the 9 o'clock position. Descent shall be indicated by a counter-clockwise rotation. Stops shall be incorporated to limit the pointer movement to not more than 178 degrees in each direction from zero.

- 2.2. GRADUATIONS: The graduation markings shall be at 0.5 mps (100 fpm) intervals up to 10 mps (2,000 fpm) with major graduations at 2.5 mps (500 fpm) intervals.

- 2.3. NUMERALS: Sufficient numerals shall be marked to positively and quickly identify all graduations. Numerals shall distinctly indicate the graduations to which each applies.

- 2.4. VISIBILITY: Pointer and dial markings shall be visible from any point within the frustum of a cone, the side of which makes an angle of not less than 30 degrees with the perpendicular to the dial and the small diameter of which is the aperture of the instrument case. The distance between the dial and the cover glass shall be a practical minimum and shall not exceed 0.25 of an inch.
- 2.5. ZERO SETTING SYSTEM: A zero adjustment screw is located on the front or rear side of the instrument which provides for a manual setting of the pointer at zero.
3. STANDARD TEST CONDITIONS: Unless otherwise specified, all tests for performance shall be conducted in the following conditions.
- 3.1. ATMOSPHERIC CONDITIONS: Atmospheric pressure of approximately 29.92 inches of mercury and ambient temperature of approximately 25°C.
- 3.2. VIBRATION (TO MINIMIZE FRICTION):

Frequency (Cycle Per Minute)	Double Amplitude (Inches)
1,500 to 2,000	0.002 to 0.005

- 3.3. POSITION: Normal operating position.

4. TESTS:

- 4.1. ZERO SETTING RANGE: The range of movement of the pointer by means of the zero adjustment shall not be less than 2 mps (400 fpm) for the "Up" and "Down" positions.
- 4.2. SCALE ERROR: When subjected to the rates of change of pressure indicated in Table I for the altitude intervals shown, the errors shall not exceed the tolerances specified.
- 4.3. LAG: The natural lag of the instrument when timed between the following points shall be between 3 and 15 seconds.
- Type I and II: 9 – 1 mps (1,800 – 200 fpm)
Type III and IV: 10 – 1 mps (2,000 – 200 fpm)
- 4.4. FRICTION: A test shall be performed to ascertain friction. In the time intervals at which the lag times were measured, the pointer shall move smoothly towards zero (while no vibration is applied) and shall return to zero within 1.5 mps (300 fpm) of the initial reading.
- 4.5. LEAK: With a suction of 15 inches of mercury applied to the static pressure connection, the leakage shall not cause more than 0.05 inches of mercury pressure drop during a 1 minute period. With a pressure of 10 inches of mercury applied to the static connection, the leakage shall not cause more than 0.05 inches of mercury pressure drop during a 1 minute period.
- 4.6. POSITION ERROR: With atmospheric pressure applied to the instrument, the difference between the pointer indication when the instrument is in normal operating position and when it is in any other position shall not exceed 0.25 mps (50 fpm).
- 4.7. POINTER OSCILLATION: There shall be no more than 0.25 mps (50 fpm) pointer oscillation when the instrument is subjected to vibration, when mounted in normal operating position, at frequencies to be varied uniformly from 5 to 50 cycles per second at a double amplitude of .020 inches maximum and a maximum acceleration of 1.5 g's.

FUNCTIONAL TEST DATA

SCALE ERROR TOLERANCE

TABLE I-A

P/Nos. 7000 and 7030 Series
Range: 0-10 mps (0-2,000 fpm) and
0-15 mps (0-3,000 fpm)

STANDARD ALTITUDE TEST INTERVAL		TEST RATE ASCENT & DESCENT	TOLERANCE
meters	feet	mps (fpm equiv)	mps (fpm equiv)
600 to 750	2,000 to 2,490	2.5 (490)	.175 (35)
600 to 900	2,000 to 2,980	5.0 (980)	.38 (75)
600 to 1,050	2,000 to 3,480	7.5* (1,480*)	.76 (150)
600 to 1,200	2,000 to 3,970	10.0 (1,970)	1.2 (250)
4,600 to 5,050	15,000 to 16,480	7.5* (1,480*)	1.0 (200)
4,600 to 5,200	15,000 to 16,970	10.0 (1,970)	1.2 (250)
8,500 to 8,950	28,000 to 29,480	7.5* (1,480*)	1.0 (200)
8,500 to 9,100	28,000 to 29,970	10.0 (1,970)	1.2 (250)

*Maximum test point for P/N 7000 Series.

TABLE I-B

P/Nos. 7040 and 7060 Series
Range: 0-20 mps (0-4,000 fpm) and
0-30 mps (0-6,000 fpm)

STANDARD ALTITUDE TEST INTERVAL		TEST RATE ASCENT & DESCENT	TOLERANCE
meters	feet	mps (fpm equiv)	mps (fpm equiv)
600 to 750	2,000 to 2,490	2.5 (490)	0.5 (100)
600 to 900	2,000 to 2,980	5.0 (980)	1.0 (200)
600 to 1,200	2,000 to 3,970	10.0 (1,970)	1.5 (300)
600 to 1,500	2,000 to 4,950	15.0* (2,950*)	1.5 (300)
600 to 1,800	2,000 to 5,940	20.0 (3,940)	2.0 (400)
600 to 2,100	2,000 to 6,920	25.0 (4,920)	2.5 (500)
4,600 to 5,200	15,000 to 16,970	10.0* (1,970*)	1.5 (300)
4,600 to 5,800	15,000 to 18,940	20.0 (3,940)	2.0 (400)
8,500 to 9,100	28,000 to 29,970	10.0* (1,970*)	1.5 (300)
8,500 to 9,700	28,000 to 31,940	20.0 (3,940)	2.0 (400)

*Maximum test point for P/N 7040 Series.

CUSTOMER
ACCEPTANCE
SPECIFICATION
UNITED INSTRUMENTS, INC.

TITLE:
INDICATOR - VERTICAL SPEED
(METRIC)

SPEC. NO:
UI7000-M

PAGE 6 OF 6 PAGES

ISSUE
A