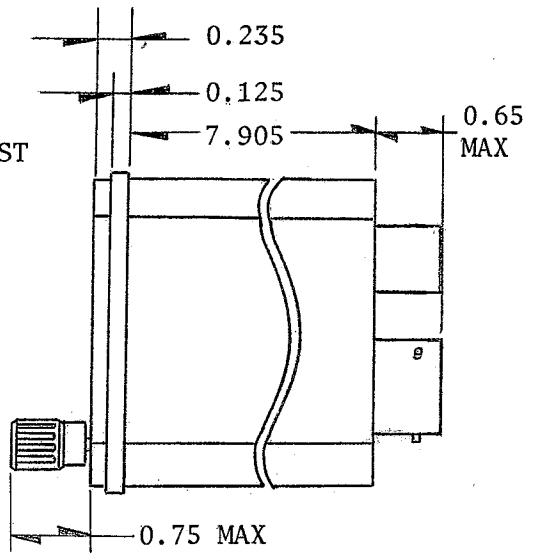
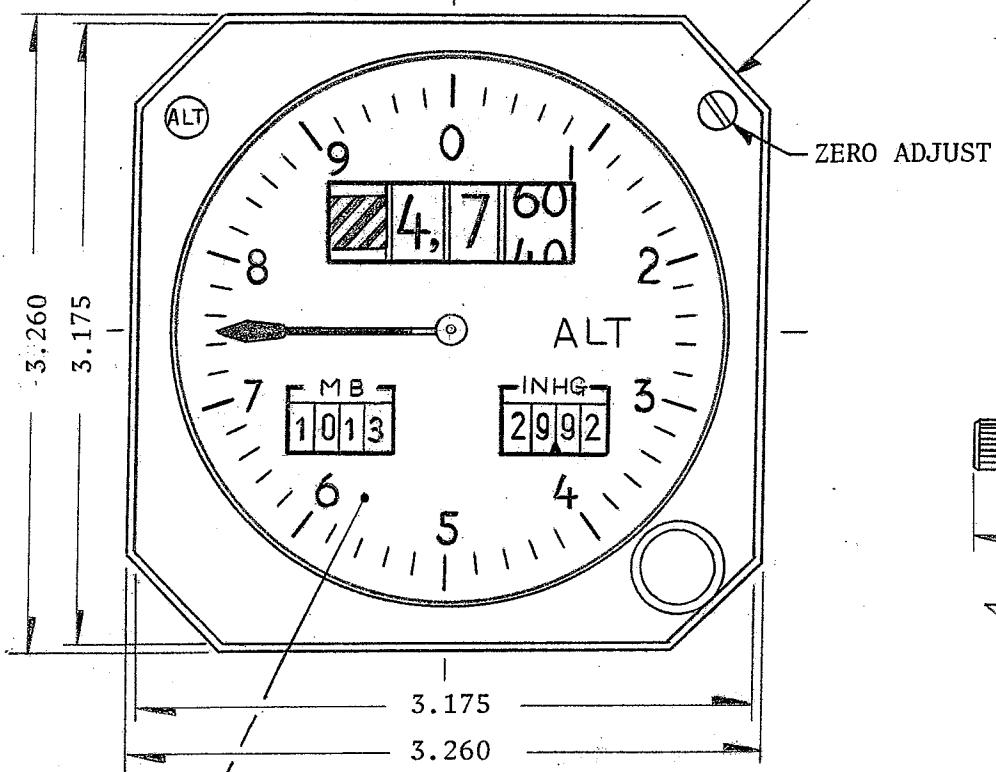


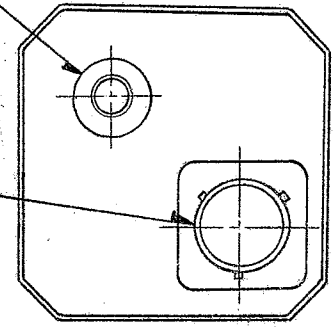
CASE PER ARINC 408A3ATI CLAMP MOUNTING



COVER GLASS COATING PER MIL-C-14806

CONNECTOR AS LISTED, OR EQUIV., ON PAGE 1A

STATIC PORT AS LISTED ON PAGE 1A



- 1. RANGE: -1,000 TO +50,000 FEET
- 2. WEIGHT: 3.2 LBS.

				C.	3-9-89	ADD P/N (-Y-4 & -Y4), Pg. 1A	JK	PREP. BY	Haluk Parviz	8/19/86
E	1-17-08	CORRECTED WIRING '21 & 1' FOR S1 & S3 (R3)	JK	B.	8-22-87	ADD S. 55-8-58 & W/T, CHNG. Conn. P/N TO M5 (P.1), CHNG WIRE (P.2), ADD 1 (P.4)	JK	APPR. BY	T. Parviz	8-19-86
D	11-11-89	ADD BARO CORRECT O/P FCN	JK	A	12-1-86	Relocated " " in P/N (Pg. 1) Corrected Hys Regt (Table III)	JK	CHECKER	JK	
REV.	DATE		CHK.	REV.	DATE		CHK.	NAME		DATE

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UNITED INSTRUMENTS PART AND CODE NUMBERS

<u>UNITED INSTRUMENTS INC.</u> <u>PART NO.</u>	<u>CODE NO.</u>	<u>BEZEL</u> <u>COLOR</u>	<u>LIGHTING</u> <u>(VDC)</u>	<u>CONNECTOR</u>	<u>STATIC</u> <u>PRESS. PORT</u>	<u>BARO. CORRECT.</u> <u>OUTPUT</u>
5506-S	S.39	BLACK	28	MS3112E20-39PZ	MS33639-6	NO
5506-SG	S.40	GRAY	28	MS3112E20-39PZ	MS33649-6	NO
5506-S5	S.41	BLACK	5	MS3112E20-39PZ	MS33639-6	NO
5506-SG5	S.42	GRAY	5	MS3112E20-39PZ	MS33649-6	NO
5506-S-Y	S.55	BLACK	28	MS3470L20-39PY	MS33649-6	NO
5506-SG-Y	S.56	GRAY	28	MS3470L20-39PY	MS33649-6	NO
5506-S5-Y	S.57	BLACK	5	MS3470L20-39PY	MS33649-6	NO
5506-SG5-Y	S.58	GRAY	5	MS3470L20-39PY	MS33649-6	NO
5506-S-4	S.31	BLACK	28	MS3112E20-39PZ	MS33649-4	NO
5506-SG-4	S.32	GRAY	28	MS3112E20-39PZ	MS33649-4	NO
5506-S5-4	S.33	BLACK	5	MS3112E20-39PZ	MS33649-4	NO
5506-SG5-4	S.34	GRAY	5	MS3112E20-39PZ	MS33649-4	NO
5506-S-Y4	S.35	BLACK	28	MS3470L20-39PY	MS33649-4	NO
5506-SG-Y4	S.36	GRAY	28	MS3470L20-39PY	MS33649-4	NO
5506-S5-Y4	S.37	BLACK	5	MS3470L20-39PY	MS33649-4	NO
5506-SG5-Y4	S.38	GRAY	5	MS3470L20-39PY	MS33649-4	NO
5506-S3	S.67	BLACK	28	MS3112E20-39PZ	MS33649-6	YES
5506-SG3	S.68	GRAY	28	MS3112E20-39PZ	MS33649-6	YES
5506-S53	S.69	BLACK	5	MS3112E20-39PZ	MS33649-6	YES
5506-SG53	S.70	GRAY	5	MS3112E20-39PZ	MS33649-6	YES
5506-S3-Y	S.71	BLACK	28	MS3470L20-39PY	MS33649-6	YES
5506-SG3-Y	S.72	GRAY	28	MS3470L20-39PY	MS33649-6	YES
5506-S53-Y	S.73	BLACK	5	MS3470L20-39PY	MS33649-6	YES
5506-SG53-Y	S.74	GRAY	5	MS3470L20-39PY	MS33649-6	YES
5506-S3-4	S.75	BLACK	28	MS3112E20-39PZ	MS33649-4	YES
5506-SG3-4	S.76	GRAY	28	MS3112E20-39PZ	MS33649-4	YES
5506-S53-4	S.77	BLACK	5	MS3112E20-39PZ	MS33649-4	YES
5506-SG53-4	S.78	GRAY	5	MS3112E20-39PZ	MS33649-4	YES
5506-S3-Y4	S.79	BLACK	28	MS3470L20-39PY	MS33649-4	YES
5506-SG3-Y4	S.80	GRAY	28	MS3470L20-39PY	MS33649-4	YES
5506-S53-Y4	S.81	BLACK	5	MS3470L20-39PY	MS33649-4	YES
5506-SG53-Y4	S.82	GRAY	5	MS3470L20-39PY	MS33649-4	YES

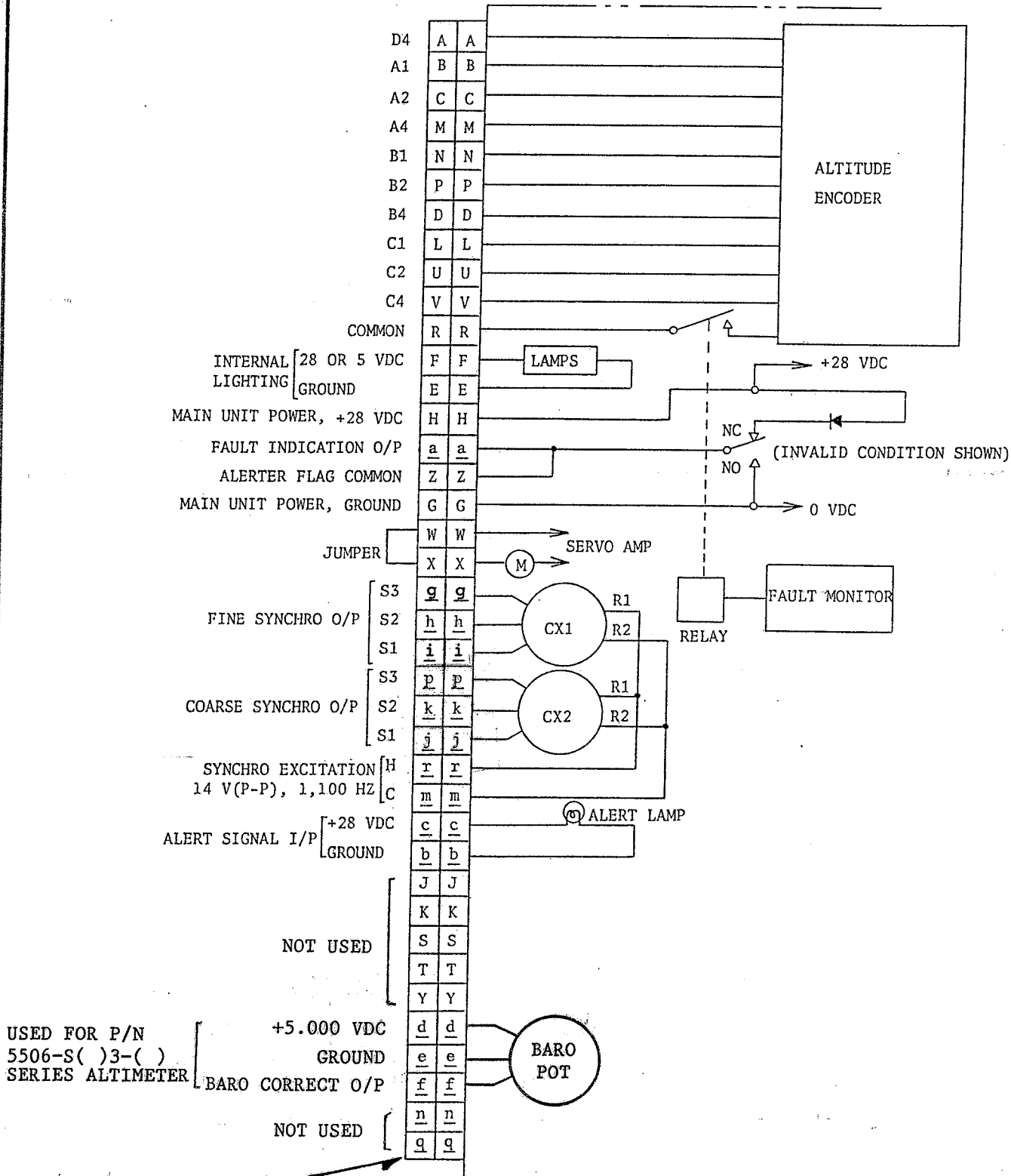
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WIRING DIAGRAM



P/N 5506-S SERIES
SERVOED ENCODING ALTIMETER

MATING CONNECTOR:

- MS3126F20-39SZ, OR EQUIV., FOR ALTIMETER WITH MS3112E20-39PZ EQUIVALENT CONNECTOR.
- MS3476L20-39SY, OR EQUIV., FOR ALTIMETER WITH MS3470L20-39PY EQUIVALENT CONNECTOR.

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1. GENERAL:

1.1. Purpose:

This specification defines standards of minimum performance and conditions which these standards apply for any part number 5506-S series, Servoed Encoding Altimeter.

1.2. Scope:

This specification covers the types of Altimeters listed in Servoed Encoding Altimeter Part Numbers, page 1.

1.3. Applicable Specifications:

TSO-C10b	Aircraft Altimeter, Pressure Actuated, Sensitive Type
TSO-C88	Automatic Pressure Altitude Digitizer Equipment
I.C.A.O.	International Civil Aviation Organization
ARINC 408A	Air Transport Indicator Cases and Mounting
DO-160A	Environmental Conditions and Test Procedures for Airborne Equipment

2. STRUCTURE, FUNCTION, AND MATERIAL:

2.1. External appearances and dimensions shall be as shown on Page 1.

2.2. Zero Setting System:

A zero setting system shall be provided which will permit the altimeter to be set to show field elevation at any existing ground level barometric pressure. The zero setting system shall show the barometric pressure in inches of mercury and millibars at sea level throughout the range of at least 28.1 to 31.0 inches of mercury (945 and 1050 millibars). A safety feature shall be provided which will prevent incorrect reading of the pressure scale if the zero setting mechanism exceeds its barometric pressure limits. The barometric pressure readings in inches of mercury and millibars shall increase when the zero setting knob is turned clockwise.

2.3. Pressure Altitude Indication:

2.3.1. Analog Indication:

The indicating method shall be such that, for indicating an ascent in barometric corrected altitude, the sensitive pointer shall move in a clockwise direction completing one revolution (360°) for each 1,000 feet of altitude change. Dial markings shall be provided at intervals of 20 feet of altitude with major increment markings at 100 feet intervals.

2.3.2. Digital Indication:

A five-digit drum counter, in which the units and tens digits are to rotate in unison, shall be provided for altitude indication in feet. The ten-thousand feet digit shall have black and white strips in place of the "0" for an altitude range of under 10,000 feet and above sea-level, and waveform marking with characters "NEG" for below sea level.

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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 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 inch.

2.5. Input:

2.5.1. Pneumatic:

Aircraft Static Pressure

2.5.2. Electrical:

- A. Main Unit Power: 28 vdc/0.25 amp
- B. Internal Lighting: 28 vdc/0.1 amp or 5 vdc/0.5 amp
- C. Synchro Excitation: 14 v(p-p)ac/0.025 amp, 1,100 Hz
- D. Alert Lamp: 28 vdc/0.025 amp
- E. Barometric Potentiometer Excitation: 5.000 +/-0.001 vdc (Applicable to P/N 5506-S()3-() Series Altimeter only)

2.5.3. The altimeter shall properly operate with the rated main unit power plus or minus 15 percent.

2.6. Output:

2.6.1. Barometric Corrected Analog Altitude:

The altimeter shall include two synchros, fine and coarse, of which excitation shall be from an external AC power supply. The synchro output shall change linearly with the indicated altitude:

- Fine Synchro: 360 degrees/5,000 feet
- Coarse Synchro: 360 degrees/135,000 feet

2.6.2. Digital Encoder Altitude:

The encoded altitude output, referenced to 29.92 inches of mercury, shall be in accordance to the International Civil Aviation Organization (I.C.A.O.) code.

2.6.3. Barometric Correction Output(Applicable to P/N 5506-S()3-() series Altimeter):

Barometric correction potentiometer output shall be consistent with the barometric setting manually adjusted.

2.7. Materials:

Materials shall be of a quality which experience and/or tests have demonstrated to be suitable and dependable for use in aircraft instruments.

2.7.1. Metals used shall anticorrosive or be protected appropriately with anticorrosion treatment under normal operating conditions.

2.7.2. The use of such a material that may stimulate the generation or the growth of fungus shall be avoided. In case of the use of such a material as stated above, the material shall be treated with a germicide.

2.8. Workmanship:

Workmanship shall be consistent with high grade aircraft instrument manufacturing practice.

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2.9. Warning Flag:

Whenever an invalid condition is presented in the altimeter or in the main unit power, a warning flag shall cover the digital altitude display digits. The warning flag shall be dull black with red diagonal markings.

2.10. Alert Lamp:

An orange alerting lamp shall be incorporated flush with the bezel. The lamp shall utilize a 28 vdc lamp electrically connected as shown on page 2.

2.11. Weight:

The weight of the instrument shall not exceed 3.5 lbs.(1.59 kg).

2.12. Environmental Conditions:

The following conditions have been established as design requirements only. Tests shall be conducted as specified in Section 3.

2.12.1. Temperature:

When installed in accordance with the instrument manufacturer's instructions, the instrument shall function over the range of ambient temperature of -30° C to 55° C and shall not be adversely affected by exposure to temperature of -65° C to 85° C.

2.12.2. Altitude:

The instrument shall function and shall not be adversely affected when subjected to a pressure and temperature range equivalent to -1,000 to 50,000 feet standard altitude, per NACA Report Number 1235 except as limited by the application of paragraph 2.12.1. The indicator shall withstand external case pressure of 50 and 3 inches of mercury absolute, when installed properly and vented to an atmospheric pressure of approximately 29.92 inches of mercury absolute.

2.12.3. Vibration:

When installed in accordance with the instrument manufacturer's instructions, the instrument shall function and shall not be adversely affected when subjected to vibrations of the following characteristics:

<u>Instrument Location in Airframe</u>	<u>Cycles Per Sec.</u>	<u>Maximum Double Amplitude (In.)</u>	<u>Maximum Acceleration</u>
Instrument Panel or Vibration	5-50	0.020	1.5G
Isolated Mount	50-500	----	0.5G

2.12.4. Humidity:

The instrument shall function and shall not be adversely affected when exposed to any relative humidity in the range from 0 to 95% at a temperature of approximately 32°C.

2.12.5. Radio Noise Interference:

The altimeter shall not adversely affect the operation of other instruments installed in the same aircraft.

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2.12.6. Magnetic Effect:

The magnetic effect of the altimeter shall not adversely affect the operation of other instruments installed in the same aircraft.

2.12.7. Shock:

The instrument shall function and shall not be adversely affected after exposure to the shock of 6 G.

2.13. Zero Adjustment:

An external zero adjustment shall be provided to allow fine adjustment of approximately 80 feet total without affecting other functions of the instrument. The adjustment, covered with a screw, is located at upper right-hand corner of the bezel as shown on page 1.

3. TESTS:

3.1. Test Conditions:

3.1.1. Atmospheric Conditions:

Unless otherwise specified, all tests required in this specification shall be conducted at an atmospheric pressure of approximately 29.92 inches of mercury, at an ambient temperature of approximately 25°C and at a relative humidity of less than 85%. When tests are conducted with the atmospheric pressure or the temperature substantially different from these values, allowance shall be made for the variation from the specified condition.

3.1.2. Vibration (to minimize friction):

Unless otherwise specified, all tests for performance may be conducted with the instrument subjected to a vibration of 0.002 to 0.005 inch double amplitude at a frequency of 1500 to 2000 cycles per minute, or light tapping by hand. The term double amplitude as used herein, indicates the total displacement from positive maximum to negative maximum.

3.1.3. Vibration Equipment:

Vibration equipment shall be used which will provide frequencies and amplitudes consistent with the requirements of paragraph 2.12.3. with the following characteristics:

3.1.3.1. Linear Motion Vibration:

Vibration equipment shall be such as to allow vibration to be applied along each of three mutually perpendicular axes of the instrument.

3.1.3.2. Circular Motion Vibration:

Vibration equipment shall be such that a point on the instrument case will describe, in a plane inclined 45 degrees to the horizontal plane, a circle, the diameter of which is equal to the double amplitude specified.

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3.1.4. Standard Pressures:

The standard pressures used in calibrating the altimeter shall be as specified in Table I.

3.1.5. Position:

Unless otherwise specified, all tests shall be made with the instrument mounted in its normal operating position.

3.2. Functional Tests:

All instruments shall meet the requirements of the tests listed below.

3.2.1. Examination of Products:

Each altimeter shall be inspected to determine conformance with the requirements shown on page 1.

3.2.2. Scale Error:

For a period of not less than twelve hours prior to this test the altimeter shall not have been operated at other than the pressures specified in paragraph 3.1.1. The rated electric power shall be supplied to the instrument, and the barometric pressure scale shall be set at 29.92 inches of mercury (1,013.2 millibars) and the scale error recorded. Without changing the setting, the altimeter shall be subjected successively to the pressures specified in Table I. The reduction in pressure shall be made at a rate not in excess of 20,000 feet per minute to within approximately 2,000 feet of the test point. The test point shall be approached at a rate compatible with the test equipment. The altimeter shall remain at the pressure corresponding to each test point for at least one minute but not more than ten minutes before a reading is taken. The error at all test points shall not exceed the tolerance specified in Table I. The movement of the pointer shall be free from backlash in irregular motion when the pressure is changed uniformly.

3.2.3. Altitude Code:

Pressure shall be supplied to the static port in order to approach to each test point slowly, decreasing pressure for increasing altitude and vice versa, until a transition to the test point value occurs in the digital output. Record altimeter reading at the instant of transition in the digitizer. At all test points specified in Table II, the difference between altimeter reading and transition point shall not exceed ± 50 feet.

3.2.4. Synchro Output:

The altimeter shall be subjected to the pressure corresponding to the altitudes in the order listed in Table III. Synchro output at each altitude shall be within the tolerances specified. The readings obtained while decreasing the altitude shall not differ from the first readings recorded while increasing the altitude by more than the tolerances specified in Table III.

When the altimeter is tested with United Instruments Altitude Alerter, P/N 5506L-S series, the altimeter pointer indication shall not differ

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from the altitude alerter setting by more than 25 feet within the entire operating range.

3.2.5. Hysteresis:

Not more than 15 minutes after the altimeter's initial exposure to the pressure corresponding to the upper limit of the scale, and while the subject instrument is still at this pressure, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude approximately (but not exceeding) 20,000 feet per minute until within 3,000 feet of the first test point, then the test point shall be approached at a rate of approximately 3,000 feet per minute within 10 seconds after the pressure has been stabilized at the test point, the instrument indication shall be within 100 feet of the scale error reading. The altimeter shall remain at this pressure for at least five minutes but not more than 15 minutes before the test reading is taken. After the reading has been taken, the pressure shall be further increased at the above rate until the pressure corresponding to the second test point is reached. The altimeter shall remain at this pressure for at least one minute but not more than ten minutes before the test reading is taken. After the reading has been taken, the pressure shall be further increased as specified above, until atmospheric pressure is reached. The reading of the altimeter at either of the two test points shall not differ from the reading of the altimeter for the corresponding altitude in the scale error test by more than the tolerance specified in Table IV.

3.2.6. After Effect:

Not more than five minutes after the completion of the hysteresis test, the pointer shall have returned to its original reading, corrected for any change in atmospheric pressure within the tolerance specified in Table IV.

3.2.7. Friction:

The altimeter shall be subjected to a steady rate of decrease of pressure equivalent to about 750 feet per minute. The change in reading of the pointer due to a light tapping of the instrument noted at the altitude specified in Table V shall be recorded as friction and shall not exceed the tolerances listed in Table V.

3.2.8. Case Leak:

A pressure equivalent to 18,000 feet within the case shall not result in leakage exceeding the tolerance shown in Table IV during a period of 1 minute.

3.2.9. 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 the tolerance specified in Table IV.

3.2.10. Barometric Scale Error:

3.2.10.1. Barometric Scale Error:

With the ambient pressure constant, various settings of the barometric

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pressure scale within its range shall cause the pointer to indicate the equivalent altitude differences shown in Table VI-I within a tolerance of 25 feet.

3.2.10.2. Barometric Correction Output (Applicable to P/N 5506-S()3-() series Altimeter only):
 With application of specified power input, the output readings obtained at corresponding barometric settings, in the order listed, shall not exceed the tolerances specified in Table VI-II. The test shall be repeated at each test point marked with an asterisk, in the reverse order.

3.2.11. Slew Rate:
 The altimeter subjected to pressure, equivalent to 25,000 feet or higher, shall have its electrical power turned off, and then the pressure changed to atmospheric pressure. When the power is turned back on, the time required for the pointer to travel from 20,000 feet to 10,000 feet indications shall be within 30 seconds.

3.2.12. Threshold and Resolutions:
 The pressure change equivalent to the difference in altitudes specified in Table VII shall cause the pointer to move in the direction the pressure is changed.

3.2.13. Flag Operation:
 When the input supplied to the altimeter is 16 vdc or less, the warning flag in red and black stripes shall cover the digital altitude indication. The altimeter shall operate and no part of the flag shall be visible over the altitude counter when the power being supplied is in the range of 22 vdc and the upper limit of the rated voltage.

3.2.14. Power Malfunction Signal:
 The altimeter shall be subjected to pressure equivalent to 50,000 feet altitude at which the electrical power shall be tuned off, and then the pressure changed to atmospheric pressure. When the electrical power is turned back on, the following indications shall be observed while the pointer returns toward zero.

Function	After Power On	After Mechanism Stablization
Warning Flag on Dial	Covers digital Altitude indication	Moves away from digital altitude indication
Code Output	Each code bit goes off	Indicates altitude equivalent to atmospheric pressure
VSI Flag Output and Alerter Flag Output	28 vdc	0 vdc

3.2.15. Alert Lamp:
 The alert lamp shall light when the rated power is supplied to the electrical connector as shown in Wiring Diagram, Page 2.

3.2.16. Internal Lighting:

The dial of the altimeter shall be lighted evenly when the rated power is supplied to the electrical connector as shown in Wiring Diagram, page 2.

3.2.17. Overpotential Tests:

The instrument shall not be damaged by the application of a test potential between electrical circuits and between electrical circuits and the metallic frame. The test potential shall be a sinusoidal voltage of a commercial frequency with an rms value of 200 volts. The potential shall start from zero and be increased at a uniform rate to its test value. It shall be maintained at this value for 5 seconds and then reduced at a uniform rate to zero.

3.2.18. Insulation Resistance:

The insulation resistance measured at 200 vdc for 5 seconds between all electrical circuits connected together and the metallic frame shall not be less than 5 megohms.

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TABLE I

ALTITUDE VS PRESSURE, AS PER NACA REPORT 1235

Altitude (ft)	Equivalent Pressure (in. Hg)	Tolerance (\pm ft)	
		Room Temp.	*Low/High Temp.
-1,000	31.0185	20	---
0	29.9213	20	40
500	29.3846	20	---
1,000	28.8557	20	---
1,500	28.3345	25	---
2,000	27.8210	30	---
3,000	26.8167	30	---
4,000	25.8418	35	---
6,000	23.9782	40	60
8,000	22.2249	60	---
10,000	20.5769	80	---
12,000	19.0293	90	90
14,000	17.5773	100	---
16,000	16.2164	110	---
18,000	14.9421	120	120
20,000	13.7501	130	---
22,000	12.6363	140	---
25,000	11.1035	155	155
30,000	8.8854	180	---
35,000	7.0406	205	205
40,000	5.5380	230	---
45,000	4.3550	255	---
50,000	3.4247	280	280

* Allowable change from room temperature scale error test indication.

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TABLE II

ALTITUDE CODE OUTPUT
AT ROOM, LOW AND HIGH TEMPERATURE

Altitude Code Output (ft)	Altitude Code Transition		Tolerance Room, Low & High Temp. (\pm ft)
	Increasing Alt. (ft)	Decreasing Alt. (ft)	
0	-50	50	50
1,000	950	1,050	50
2,000	1,950	2,050	50
3,000	2,950	3,050	50
4,000	3,950	4,050	50
6,000	5,950	6,050	50
8,000	7,950	8,050	50
10,000	9,950	10,050	50
16,000	15,950	16,050	50
20,000	19,950	20,050	50
25,000	24,950	25,050	50
30,000	29,950	30,050	50
35,000	34,950	35,050	50
40,000	39,950	40,050	50
45,000	44,950	45,050	50
50,000	49,950	50,050	50

TABLE III

SYNCHRO OUTPUT
AT ROOM, LOW AND HIGH TEMPERATURE

Altitude (ft)	Fine Synchro (deg.)			Coarse Synchro (deg.)		
	Output	Tolerance	Hysteresis	Output	Tolerance	Hysteresis
0	0	± 0.8	0.4	0	± 1.5	0.5
1,000	72	± 0.8	0.4	2.667	± 1.5	0.5
2,000	144	± 0.8	0.4	5.333	± 1.5	0.5
3,000	216	± 0.8	0.4	8.000	± 1.5	0.5
4,000	288	± 0.8	0.4	10.667	± 1.5	0.5
5,000	0	± 0.8	0.4	13.333	± 1.5	0.5
10,000	0	± 0.8	0.4	26.667	± 1.5	0.5
20,000	0	± 0.8	0.4	53.333	± 1.5	0.5
30,000	0	± 0.8	0.4	80.000	± 1.5	0.5
35,000	0	± 0.8	0.4	93.333	± 1.5	0.5
40,000	0	± 0.8	0.4	106.667	± 1.5	0.5
50,000	0	± 0.8	0.4	133.333	± 1.5	0.5

NOTE: Fine synchro tolerance of ± 0.8 degree is equivalent to ± 11 feet in altimeter's pointer indication .

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TABLE IV

TOLERANCES

<u>Tests</u>	<u>Tolerance (± ft)</u>
Hysteresis	
First Test Point: 25,000 feet	
Within 10 seconds	100
Between 5 and 15 minutes	75
Second Test Point: 20,000 feet	75
After Effect Test	30
Case Leak Test	100
Position Error Test	20

TABLE V

FRICITION

<u>Altitude (ft)</u>	<u>Tolerance (± ft)</u>
1,000	70
2,000	70
3,000	70
5,000	70
10,000	80
15,000	90
20,000	100
25,000	120
30,000	140
35,000	160
40,000	180
50,000	250

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TABLE VI-I

BAROMETRIC SCALE

Barometric Scale (in.Hg)	(mb)	Altitude Correction (ft)
28.20	955.0	-1,630
28.60	968.5	-1,244
28.94	980.0	-920
29.92	1,013.2	0
30.15	1,021.0	+211
30.77	1,042.0	+776
30.98	1,049.0	+965

TABLE VI-II

BAROMETRIC CORRECTION OUTPUT

Pressure (In.Hg)	Output (Volt)	Tolerance (+/- Volt)
28.10	0.484	+0.020, -0.0195
28.50	1.029	0.020
* 29.00	1.701	0.020
29.50	2.364	0.020
* 29.92	2.916	0.020
30.06	3.098	0.020
* 30.50	3.664	0.020
30.90	4.174	0.020
30.99	4.288	0.020

TABLE VII

THRESHOLD

Altitude (ft)	Pressure Change (ft)
0	10
10,000	10
20,000	20
30,000	20
35,000	20
40,000	20
50,000	20

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