

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Report VE-38
CHECKED		Model PA-28-180
APPROVED		PAGE 1

REGISTRATION PARTICULARS

Nationality and Registration Marks :

Constructors Serial Number :

Designed and Constructed By :

PIPER AIRCRAFT CORPORATION
 Vero Beach, Florida
 U.S.A.

F.A.A. Certificate of
 Airworthiness for export:

Rev.
 2

This airplane shall be operated in accordance with the limitations given in Section III and any additional limitations contained in a supplement in Section VII.

~~This is the flight manual which forms part of
 Certificate of Airworthiness Number A8461."~~

~~"This is the flight manual which forms part of
 Certificate of Airworthiness Number 1761."~~

This is the Flight Manual which forms part of the
 Certificate of Airworthiness for aircraft

317.97

PREPARED	P I P E R A I R C R A F T C O R P . D E V E L O P M E N T C E N T E R , V E R O B E A C H , F L A .	Report VB-38
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SECTION I

INTRODUCTORY

THE DOCUMENT REFERENCE NUMBER OF THIS

FLIGHT MANUAL IS VB-38

This Flight Manual applies only to the aircraft having the constructors serial number shown on page 1. It is the responsibility of the pilot to be familiar with the contents of the manual including all amendments at the time of flight.

The current amendment state of this copy is given on the record sheets on pages 5 and 6. Amendments are of two kinds:

- a) F.A.A. approved revisions (page 5)
- b) C.A.A. approved revisions (page 6)

Amendments to the text will be indicated by a marginal vertical line together with the amendment number, except that when a considerable change has taken place or a completely new page has been issued the revision, together with the amendment number, will be denoted at the foot of the page. Changes to the weight and loading data (Section VI) are not associated with an amendment number.

A list of the approved supplements which have been embodied in Section VII of this copy is recorded on page 4. Supplements are published either by the manufacturer, or by an organization producing a modification to the aircraft, and approved by the Air Registration Board.

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UNITED STATES F.A.A.
AMENDMENT RECORD SHEET

REVISION NO.	DATE OF REVISION			REVISED BY	APPROVAL DATE (CAA)			REVISION TITLE	PAGES AFFECTED
	DAY	MO.	YR.		DAY	MO.	YR.		
1	25	9	64					Specifications for Serial Nos. 28-1761 and on Engine Type No. Correction	7,14,15,22 7,14,22
2	9	10	64					Editorial Landing Distance	1,3,8,9,11,13, 15,17,22,26, 28,29,30,31, 32,33,34,36 36,37
3	30	10	64					Position Error Flight over Water Airspeed	13,17,27 22
4	14	9	66					Airspeed Indicator Colour Markings Pitot System	13 26
5	4	11	66					Aerobatic Manoeuvres Centre-of-Gravity	12 15
6	18	4	67					Maximum Crosswind Component	17
7	10	10	67					Centre-of-Gravity	15
8	11	12	67					Electric Pitch Trim Installation	21
9	20	12	67					Centre-of-Gravity	15
10	14	1	69					Engine Specification Addition	7,14,22
11	6	5	69					Propeller Specification Addition	7,14,22
12	1	5	70					Oil Specification Revised C.G. Envelope Added page	14 15 6a
13	10	7	70					Manoeuvres Autocontrol III Added page	12 20a 20a

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UNITED STATES F.A.A.
AMENDMENT RECORD SHEET

REVISION NO.	DATE OF REVISION			REVISED BY	APPROVAL DATE (CAA)			REVISION TITLE	PAGES AFFECTED
	DAY	MO.	YR.		DAY	MO.	YR.		
14	13	10	72	TGG				Position Error for pitot head P/N 99057-4. Added pages Removed page Revised Amendment Record Sheets format FAA Approval of original and all revisions	13,17,18,18a,19,26,27,27a,30,32,34,36 5a, 27a, 18a 6a 4,5,5a,6,6a All
				<i>H. L. Barkhouse</i> DOA SO-1 APPROVED					
15	1	5	73		10	12	73	Deleted Revision No. 14 (Deleted Pages 6a, 18a, & 27a) Added Page Revised AMENDMENT record sheets format FAA Approval of original and all revisions Serial No. Effectivity Changed ARB to CAA Changed Categories Changed Serial Number Effectivity	13, 17, 18, 18a,19,26,27,27a,30,32,34,36, 5a,27a,18a,6a,4,5,5a,6 & 6a 5a 4,5,5a,6,6a ALL TITLE 3 12 15 & 22
				<i>H. L. Barkhouse</i> DOA SO-1 APPROVED					
16	25	2	77	RKK				Changed Serial Numbers Effectivity. Clarified Drawing	Title 26
				<i>Ward Evans</i> 14 4 77					
17	24	8	80	R.K.K.	13	3	80	Clarified Centre of gravity limits	15
				<i>Ward Evans</i> DOA SO-1 APPROVED					
18	17	3	80	RKK				Revised Baggage Limitations	15
19	3	1	86	LRM				Clarified Service Letter designation.	15
				<i>Ward Evans</i>					

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C.A.A. AMENDMENT RECORD SHEET

REVISION NO.	DATE OF REVISION			REVISED BY	APPROVAL DATE (CAA)			REVISION TITLE	PAGES AFFECTED
	DAY	MO.	YR.		DAY	MO.	YR.		
1 ISS 5- CSE CHANGE SHEET 1.	14	1	80	dl	17	1	80	CAA CHANGE SHEET 1 ISS 5. CHANGE SHEET 1 (ISS 2)	1 & 2 opposite page 12. Facing page 12.

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A.R.B. AMENDMENT RECORD SHEET

Amendment Number and Date of Approval	Title of Amendment	Pages Affected
12 1-5-70	Added page 6a	
12 1-5-70	Oil Specification	14
13 10-7-70	Added page Auto-Control III Manoeuvres	20a 20a 12

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SECTION II

DESCRIPTION

AEROPLANE PARTICULARS

CLASS

Land Plane

Low Wing Monoplane

ENGINE

Number

One

Manufacturer

Lycoming

Type

O-360-A3A or O-360-A4A

PROPELLER

Manufacturer

Sensenich

Type (A/C S/N 28-671 to 28-1760A)

M76EMM or M76EM8

(A/C S/N 28-1571, 28-1573,
28-1761 & On)

M76EMMS or M76EM8S5

Diameter

76 Inches

Pitch

60 Inches

LEADING DIMENSIONS

Figure II-1 on page 8 is a three view general arrangement drawing, and associated dimensions are shown below.

Span

30 ft. 0 inches

Length

23 ft. 5 inches

Height

7 ft. 3 inches

WING

Area

160.0 sq. ft.

Mean Chord

5.3 ft.

Aspect Ratio

5.7

Aileron Area (Total)

10.6 sq. ft.

Flap Area (Total)

14.6 sq. ft.

Flap Positions

0° Take-Off

10°

25°

40° Landing

TAIL UNIT

Tailplane Area

24.4 sq. ft.

Fin Area

7.5 sq. ft.

Rudder Area

4.1 sq. ft.

MISCELLANEOUS

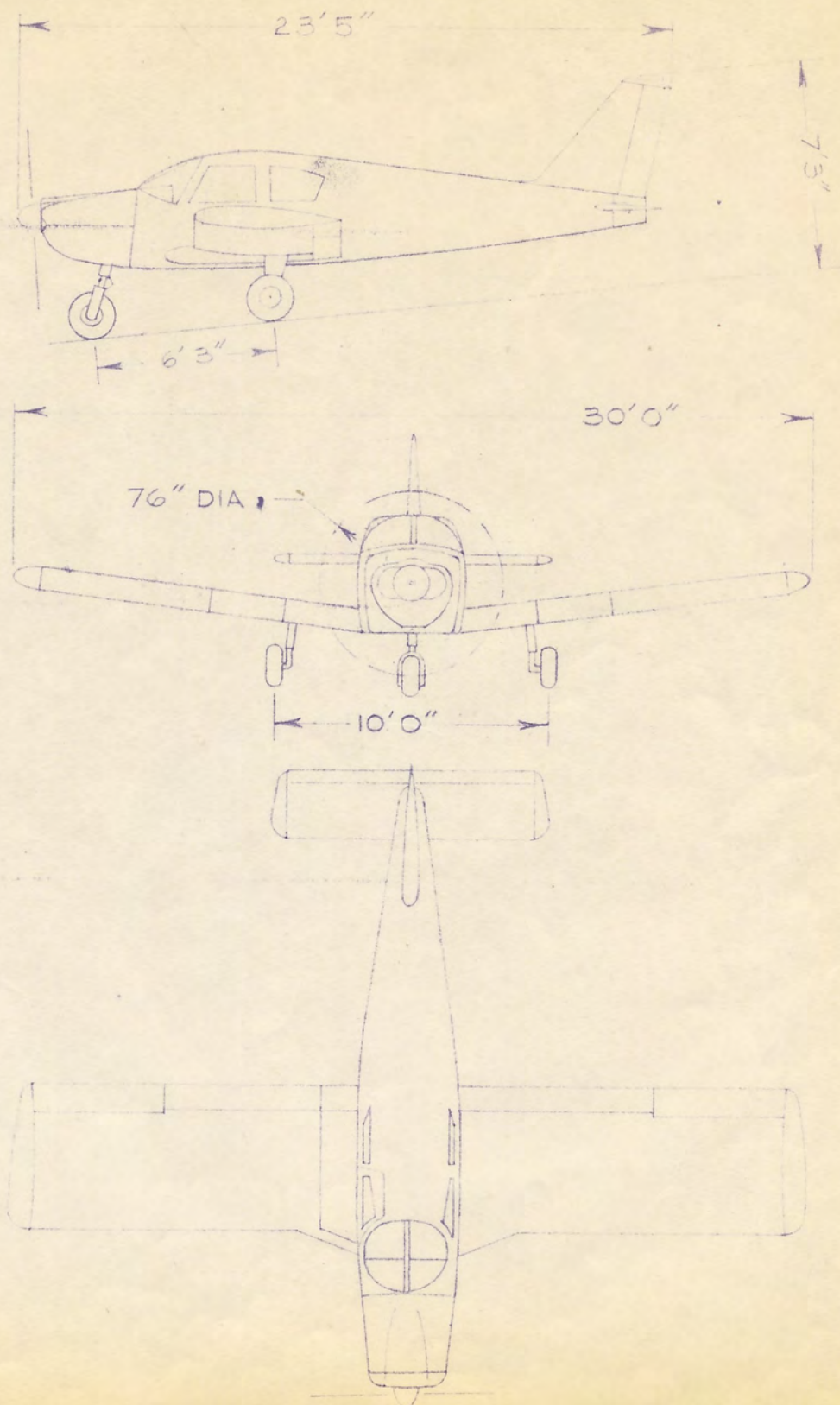
Under Carriage Track

10 ft. 0 inches

Wheel Base

6 ft. 3 inches

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GENERAL ARRANGEMENT DRAWING

FIG II-1

Rev. 2 Revised: 9-10-64

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DEFINITIONS

The following terms are used in various sections of this manual:

AIR TEMPERATURE: The temperature of the free air near to, but not influenced by, the aeroplane. This temperature may be a reported, forecast, or, when permitted by the Air Navigation Regulations, a declared temperature derived in accordance with an approved system.

ALTITUDE: The altitude shown on the charts is pressure altitude which is the expression of atmospheric pressure in terms of altitude above mean sea level according to the interrelation of these factors in the International Standard Atmosphere (I.S.A.). This may be obtained by setting the sub-scale of an accurate pressure type altimeter at 1,013 millibars (29.92 inches or 760 millimeters of mercury).

I.S.A. : International Standard Atmosphere, which is the interrelationship of air temperature and pressure as shown in Figure II-2.

HEIGHT : The vertical distance between the lowest part of the aeroplane and the relevant datum.

WEIGHT : The total weight of the aeroplane, including fuel, oil, equipment, crew and payload.

I.A.S. : Indicated Air Speed, which is the reading obtained from an instrument having no calibration error. Because the permitted tolerances are small the Air Speed Indicator Reading (A.S.I.R.) may be taken as equal to I.A.S.

C.A.S. : Calibrated Air Speed, which is A.S.I.R. corrected for position and instrument error.

T.A.S. : True Air Speed, which is the C.A.S. corrected for altitude and temperature.

TAKE-OFF SAFETY SPEED : The minimum speed at which, following sudden and complete failure of the engine in the take-off configuration, adequate control exists to establish a glide at a safe margin above the stall.

V_{NO} : Normal operating limit - Maximum cruising speed.

MANEUVERING SPEED: Maximum speed for full application of primary flight controls.

HARD RUNWAY : A surface such as concrete or tarmac.

GRADIENT OF CLIMB : The ratio, in the same units and expressed as a percentage, of:

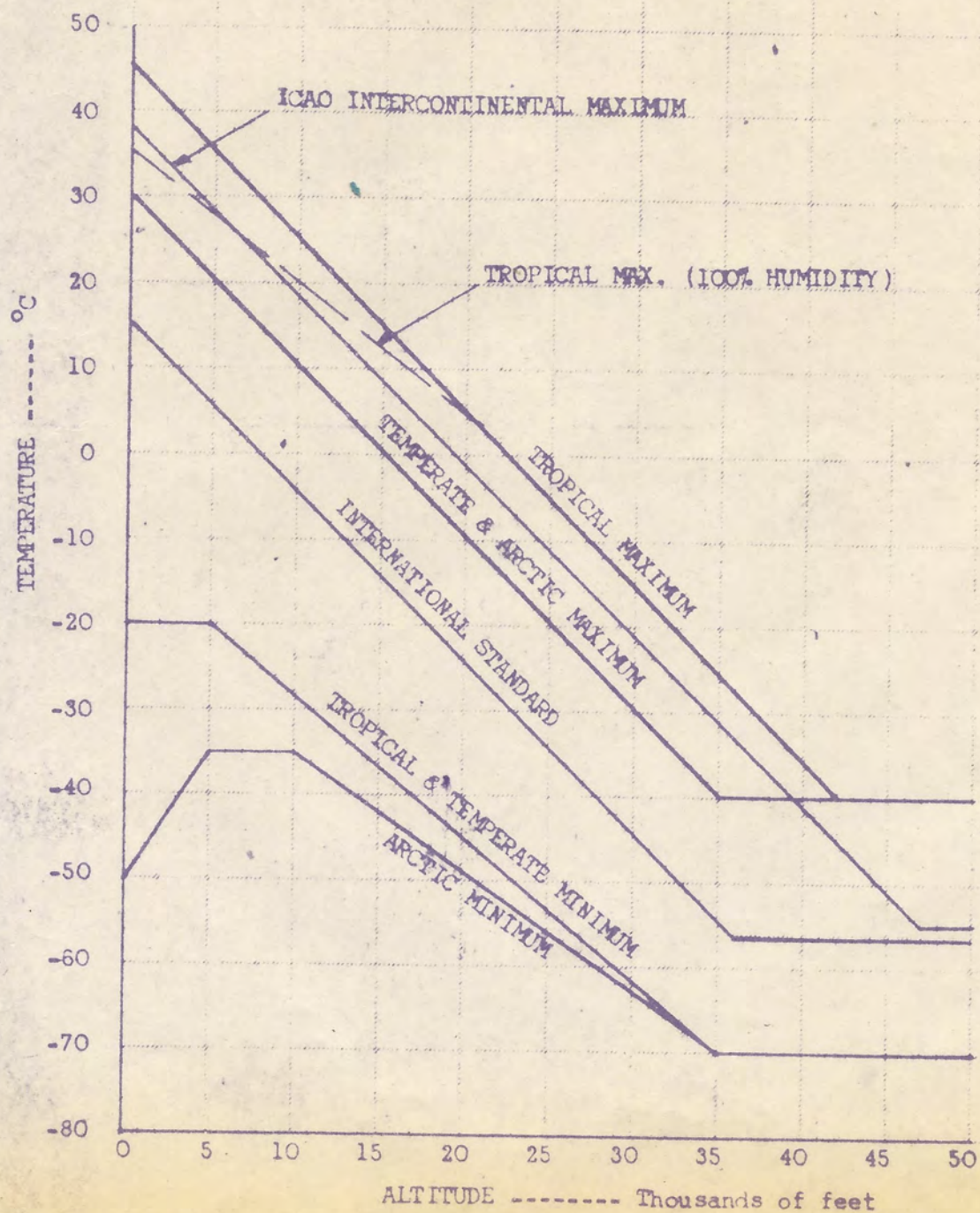
$$\frac{\text{Change in Height}}{\text{Horizontal Distance Travelled}}$$

The gradients of climb shown on the charts are true gradients, i.e., they are derived from true (not pressure) rates of climb.

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GROSS PERFORMANCE: The average performance which a fleet of aeroplanes can be expected to achieve if satisfactorily maintained and flown in accordance with the associated techniques described in the manual.

NET PERFORMANCE: Net performance is the "gross" performance, diminished by the amounts specified in British Civil Airworthiness Requirements to allow for various contingencies which cannot be directly accounted for operationally, e.g., the need to manoeuvre, unavoidable variations in piloting technique, temporary below-average performance, etc. It is extremely improbable that the net performance will not be achieved in operation, provided the aeroplane is flown in accordance with the recommended techniques.



~~PIPER 001-02-90~~

Applicable to Piper PA-28 series aircraft fitted with a Curtis fuel strainer drain valve, including those modified in accordance with CSE Service Bulletin No 6/75.

Compliance is required not later than 2 weeks from the effective date of this Directive which is 7 February 1990.

Modify by installing a placard adjacent to the fuel strainer drain valve stating:

WARNING

ENSURE FUEL DRAIN IS CLOSED AFTER USE

NOTE: Letters to be clear and at least 4 mm high on a contrasting background.

Insert a copy of this Directive into the Limitations Section of the Pilot Operating Handbook/Flight Manual.

PIPER 005-02-90

Applicable to PA-28-140 aircraft Serial Nos. 28-20000 through 28-7325459, PA-28-150/160 aircraft Serial Nos. 28-01 through 28-4377, PA-28-180 aircraft Serial Nos. 28-671 through 28-7305433, PA-28-235 aircraft Serial Nos. 28-10001 through 28-7310155, PA-32-260 aircraft Serial Nos. 32-1 through 32-7300041 and PA-32-300 aircraft Serial Nos. 32-4000 through 32-7340130.

Compliance is required at the next 150 hour or Annual Check, whichever is the sooner, from the effective date of this Directive which is 5 March 1990.

Modify by installing aft inboard wing access panel in accordance with Service Bulletin 789A.

PIPER 003-04-90

Applicable to PA-34-200, PA-34-200T and PA-34-220T aircraft.

Compliance is required at the next 150 hour or Annual Check whichever is the sooner from the effective date of this Directive which is 4 May 1990.

Inspect nose landing gear steering channel assembly Part No. 95394-00 for cracks or other signs of distress paying special attention to the welds.

REPLACE any cracked nose landing gear steering channel assemblies.

INSPECT nose landing gear operation to ensure correct engagement of the spherical roller into the steering channel guide. REPEAT INSPECTION of the nose landing gear steering channel assembly at every 150 hour or Annual Check whichever is the sooner.

CIVIL AVIATION AUTHORITY

CAA Change Sheet No.1 issue 5 to FAA approved Model PA28-180 Airplane Flight Manual report no.VB-38.

Piper
PA28-180

Constructor's
Serial No. [REDACTED]

Registration
Marks [REDACTED]



CAA ADDITIONAL LIMITATIONS FOR UNITED KINGDOM CERTIFICATION

The aeroplane must be operated in accordance with the following limitations in addition to those contained in the approved Flight Manual VB-38 and those contained in any relevant supplement. If there is disagreement between the manual and this change sheet, the change sheet must be taken to override the flight manual.

LIMITATIONS

CLASS

Aeroplane (landplane).

CATEGORY AND USE OF AIRCRAFT

The Piper PA28-180 type of aircraft is eligible for certification in the United Kingdom in the Transport Category (Passenger). This aeroplane may however be restricted to another category and to a particular use and this will be stated in the certificate of airworthiness.

When flown for the purpose of public transport, the aeroplane is classified in performance group D.

BAGGAGE

Notwithstanding the limitation on page 15 of the flight manual, the maximum weight of baggage that may be carried in aircraft of serial no.28-1761 and up to 200 lb (91 kg).

The baggage compartment must be placarded with the maximum permissible baggage weight.

AUTOPILOT

When a Mitchell Century IIB autopilot is fitted, it shall not be used when the aeroplane is flying at a height less than 1,000 feet above the terrain, except during an approach when it shall not be used at a height less than 200 feet above the terrain.

To be inserted in the approved flight manual VB-38 to face page 12

LIMITATIONS Continued

CENTRE OF GRAVITY

The permissible centre of gravity range for aircraft of constructor's serial no.28-671 through 28-5859 inclusive is:

+84.0 inches	to	+95.9 inches	at	1650 lb or less
+85.9 inches	to	+95.9 inches	at	1975 lb
+89.2 inches	to	+95.9 inches	at	2200 lb
+92.1 inches	to	+94.5 inches	at	2400 lb

The permissible centre of gravity range for aircraft of constructor's serial no.28-7105001 through 28-7205318 inclusive is:

+84.0 inches	to	+95.9 inches	at	1650 lb or less
+87.0 inches	to	+95.9 inches	at	2150 lb
+87.8 inches	to	+95.9 inches	at	2200 lb
+91.0 inches	to	+94.5 inches	at	2400 lb

When the manoeuvres given on page 12 of the flight manual are performed, the centre of gravity of the aeroplane shall not lie outside the range

+84.0 inches	to	+86.5 inches	at	1650 lb or less
+85.8 inches	to	+86.5 inches	at	1950 lb

Linear interpolation is applicable between the points given.

Insert in the flight manual to face page 12.

C.S.E. (Aircraft Services) Ltd.,

CHANGE SHEET No.1 (ISSUE 2.)

TO

Piper Report No.VB-39.

This change sheet shall be inserted in the Manual to face page 12.

LIMITATIONS.

USE OF INSTRUMENT FLYING VISOR.

When the Instrument Flying Visor is fitted according to C.S.E.
Minor Modification No.PA.28-308, A.R.B.Serial No.OSS/CHELT/309,
the aeroplane shall not be flown for public transport of passengers.

2nd February 1968.

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SECTION III

L I M I T A T I O N S

THE AEROPLANE MUST BE OPERATED SO THAT THE LIMITATIONS AND INSTRUCTIONS IN THIS SECTION ARE OBSERVED.

CATEGORY:

Rev. 15 Aircraft of this type are eligible for certification in the General Purpose Category. However, this aeroplane may be restricted to particular use or to some other category, and this will be stated in the Certificate of Validation.

MANOEUVRES:

Rev. 13 The following aerobatic manoeuvres are permitted, provided the aeroplane is loaded within the approved weight and centre-of-gravity limits up to a gross weight of 1950 lbs.

Spins, steep turns, lazy eights, and chandelles.

Rev. 5 All aerobatic manoeuvres, including spins are prohibited above a gross weight of 1950 lbs.

Inverted manoeuvres are prohibited.

FLIGHT LOAD FACTORS:

The structure has been designed to withstand positive accelerations of 4.4 g flaps up and 2.0 g flaps down and negative accelerations of 1.76 g flaps up without permanent deformation up to a gross weight of 1950 lbs.

The structure has been designed to withstand positive accelerations of 3.8 g flaps up and 2.0 g flaps down up to a gross weight of 2400 lbs. without permanent deformation.

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A I R S P E E D L I M I T A T I O N S

NEVER EXCEED SPEED *

The never exceed speed is 175 MPH I.A.S. (152 knots).

NORMAL OPERATING LIMIT SPEED *

During normal cruising flight the aeroplane should not be flown at a speed greater than 144 MPH I.A.S. (125 knots). The aeroplane shall only be flown at speeds between the normal operating limit speed and the never exceed speed at the discretion of the pilot, having due regard to the prevailing and atmospheric conditions.

MANOEUVERING SPEED

Manoeuvres involving an approach to the stall or full application of aileron or rudder control shall not be undertaken at a speed greater than 133 MPH I.A.S. (116 knots).

NOTE:

Although the aeroplane is strong enough for steady application of full rudder at this speed, a violently checked manoeuvre might over-stress it. For example, any violent yaw must not be checked with sudden application of opposite rudder.

WING FLAPS EXTENDED SPEED *

The wing flaps should not be extended when the aeroplane is flying at a speed greater than 118 MPH I.A.S. (103 knots).

A I R S P E E D I N D I C A T O R C O L O U R M A R K I N G S

Flaps Up:	Normal Operating Range	67 to 140 MPH (Green Arc)
	Caution Range	140 to 171 MPH (Yellow Arc)
	Never Exceed Speed	171 MPH (Red Radial Arc)
Flaps Extended:	Normal Operation Range	57 to 115 MPH (White Arc)
	Never Exceed Speed	115 MPH

These speeds are C.A.S., that is I.A.S., corrected for position error.

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POWERPLANT LIMITATIONS

The following are the limitations for the installed Lycoming O-360-A3A or O-360-A4A Engine with the Sensenich 76 inch diameter, 60 inch pitch M76EMM, M76EM8, M76EMMS or M76EM8S5 propeller.

FUEL:

The minimum grade of fuel approved for use of this engine is 91/96 octane, D. Eng. R.D. 2485 with a maximum limit of 5.5 MLS. TEL/Imperial Gallon.

OIL:

The oil approved for the use of this engine is to specification D.ENG. R.D. 2472 B/O and the latest issue of Lycoming Service Instruction 1014.

OIL TEMPERATURE:*

Normal	60°F to 245°F (Green Arc)
Maximum	245°F (Red Line)

Minimum Oil Temperature for take-off is established when oil pressure remains steady as the engine is accelerated.

OIL PRESSURE:*

Normal Operating range	60 to 90 psi (Green Arc)
Maximum	90 psi (Red Line)
Minimum in flight	60 psi (Red Line)
Caution Range	25 to 60 psi (Yellow Arc)

FUEL PRESSURE:*

Normal operating range	$\frac{1}{2}$ to 6 psi (Green Arc)
Maximum	6 psi (Red Line)
Minimum	$\frac{1}{2}$ psi (Red Line)

Electric fuel pump must be on for both take-off and landing.

ENGINE SPEED LIMITATIONS:*

The maximum permissible rotational speed for all conditions of flight is 2700 RPM (Red Line). The normal operating range is 500 to 2700 RPM (Green Arc).

USE OF MIXTURE CONTROL:

The mixture control is used to maintain best power weak mixture for cruising at or below 75% power. To avoid rough running in climb due to over-richness, mixture may be weakened for smooth engine operation above 5000 feet.

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WEIGHT AND LOADING

WEIGHT:

The maximum permissible take-off and landing weight is 2400 lbs. This is the maximum weight and lower weights may in particular circumstances be advised or enforced by operational performance considerations.

CENTRE OF GRAVITY:

The load is to be distributed so that the centre-of-gravity for approved aerobatic manoeuvres lies always between;

A forward limit of
 84.0 ins. aft of datum at 1650 lbs. with straight line variation
 85.8 ins. aft of datum at 1950 lbs. between points given

and an aft limit of 86.5 aft of datum at all weights.
 Baggage and aft passengers are also prohibited.

For non-aerobatic operation, the centre-of-gravity limits are:

Serial Numbers 28-671 to 28-3072
 84.0 in. aft of datum at 1650 lbs.
 85.9 in. aft of datum at 1975 lbs.
 92.1 in. aft of datum at 2400 lbs.

Serial Numbers 28-671 to 28-3072 when in compliance with Piper Service Letter 567 and Serial Numbers 28-3073 to 28-5859
 84.0 in. aft of datum at 1650 lbs.
 87.0 in. aft of datum at 2150 lbs.
 91.0 in. aft of datum at 2400 lbs.

and an aft limit of 94.5 ins. aft of datum at 2400 lbs. and 95.9 ins. aft of datum at 2200 lbs., or less with a straight line variation between points given.

C.G. DATUM:

The C.G. Datum is defined at 78.4 ins. ahead of wing leading edge outboard of the intersection of straight and tapered sections.

BAGGAGE: *

The maximum weight of baggage in the baggage compartment must not exceed 125 lbs. A maximum of 200 lbs. is permitted for aircraft s/no. 28-1 through 28-1760A in accordance with the Piper service spares letter SP242, and for aircraft s/no. 28-1761 through 28-7205318.

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M I S C E L L A N E O U S L I M I T A T I O N S

MINIMUM CREW :

The minimum crew is one pilot.

NUMBER OF OCCUPANTS :

The number of persons carried must not in any circumstances exceed four, nor exceed the number of seats installed. Children under the age of three, carried in the arms of passengers, are excluded from this count.

FLIGHT BY NIGHT :

Night flying is permitted when the required equipment is installed, and when allowed by the Air Navigation Legislation.

FLIGHT IN ICING CONDITIONS :

The aeroplane is not approved for flight in icing conditions.

CLIMATIC CONDITIONS :

The operating suitability of the aeroplane has been established for temperatures up to the range defined by the I.C.A.O. Tropical Maximum Atmosphere (I.S.A. + 30°C). This temperature range is shown on Figure II-2 on page 11.

No minimum temperature range has yet been established.

AUTOCONTROL II AUTOPILOT : *

(When installed)

The Autocontrol II must be off during take-off and landing.

PLACARDS :

Items marked * must either be placarded in the cockpit or the appropriate instruments colour marked.

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SECTION IV

HANDLING

Rev. MAXIMUM CROSSWIND COMPONENT:

The maximum crosswind component in which the aeroplane has been demonstrated to be safe for take-off and landing is 17 knots at a tower height of 33 feet.

HANDLING ON ROUGH GROUND:

Rev. 6 The aeroplane has been demonstrated to be safe when operating from rough grass surfaces.

TAKE-OFF TECHNIQUE:

With flaps retracted and the engine at full throttle, liftoff should be initiated at the take-off safety speed of 80 MPH I.A.S. (70 knots). This speed should be maintained until all obstacles have been cleared.

EN ROUTE PERFORMANCE:

The enroute performance in section V for climb and glide is based on 85 MPH I.A.S.

Rev. 3 ROUGH AIR SPEED:

Rev. 2 133 MPH I.A.S. with flaps retracted is recommended for flight in extreme turbulence.

STALLING:

There is no aerodynamic stall warning. A stall warning light is installed on the instrument panel to provide warning at a uniform 5 to 10 MPH speed increment above the stall in all configurations. Recovery from the stall is normal in all configurations. The variation of power off stalling speed with weight is shown in Figure IV-1.

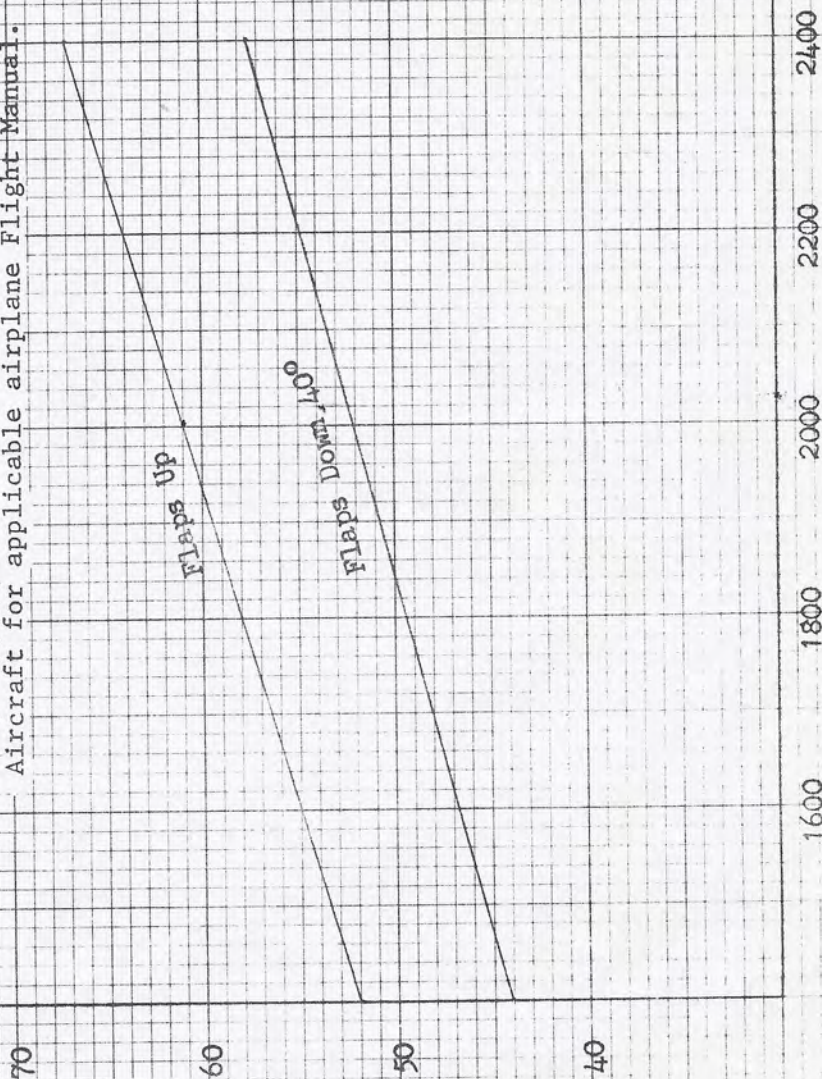
NOTE:

The stall warning system is inoperative with the master switch off.

Figure IV-1
PA-28 Stalling Speeds
Power Off

Note:
If original equipment Pitot-Static
Mast is replaced, contact Piper
Aircraft for applicable airplane Flight Manual.

Stalling Speed, MPH I.A.S.



Gross Weight - lb.

ev.
14
15

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BALKED LANDING :

In the event of a balked landing, apply full throttle, allow the speed to increase to 80 MPH I.A.S., then raise the flaps to 0° setting gradually.

FUEL SYSTEM :

The fuel is contained in two 25 U.S. Gallon (20.8 Imperial Gallons) main tanks. Either tank may be used in any condition or configuration of flight, including take-off and landing.

Fuel is supplied to the engine by an engine driven fuel pump which may be augmented by an electric fuel pump. The electric fuel pump should be used on take-off and landing or in case of failure of the engine driven pump.

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OPERATION OF PIPER AUTOCONTROL II AUTOPILOT

(When Installed)

LIMITATIONS :

The Autocontrol II must be disengaged during take-off and landing.

OPERATION :

The Roll Engage Knob turns on Autocontrol II and engages its servo with the aileron controls when it is pushed in. If this knob resists full travel, rock the control wheel slightly to allow the gears to mesh. When this knob is pulled fully aft, it turns off Autocontrol II and completely disconnects it from the control system.

The Turn Trim Knob must be centered when the Roll Engage Knob is pushed in. When the Heading Lock is out, a full 90° right or left rotation of the Turn Trim Knob will give a turn with a bank of up to 25°. When the Heading Lock is in, the Turn Trim Knob acts as a trim control to provide minor corrections of the directional Gyro Heading.

The Heading Lock Button serves to connect the directional Gyro into the circuit and have it control the aircraft, or to cut it out of the circuit. This is a "Push-In, Push-Out" Button; When it is first pushed in, it will remain in, connecting the directional Gyro into the circuit. The next time it is pushed, it will release and pop out, exposing a white groove on its shank and disconnecting the directional Gyro.

If a Zero Heading Directional Gyro is installed, set it to 0° heading before pushing the Heading Lock Button "in". The Autocontrol II will then hold this heading. Turns up to 180 may be made by resetting the Gyro.

If a Course Selector Directional Gyro is installed, set the directional Gyro with the magnetic compass and the Course Selector Dial to the desired heading. Turns may be made by resetting the Course Selector Dial.

The angle of bank during turns with the Directional Gyro may be increased or decreased by the use of the Turn Trim Knob.

EMERGENCY PROCEDURES :

The Autocontrol II may be overpowered by the pilot at any time by a force of 16 lbs. on the control wheel. In the event any component of the Autocontrol II fails during flight, the system may be completely disengaged by pulling out the Roll Engage Knob. If the Directional Gyro should fail and precess excessively, the Heading Lock Button should be pushed to the "Out" position and the heading of the Aircraft controlled with the Turn Trim Knob.

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OPERATION OF PIPER AUTOCONTROL III AUTOPILOT

(When Installed)

LIMITATIONS

Automatic Pilot must be off during takeoff and landing..

OPERATION

The Autocontrol III Console contains the ON/OFF switch, the Bank Command knob, and the Heading Lock switch. The Directional Gyro incorporates the course Selector "bug" which supplies the heading information to the autopilot.

Before engaging the autopilot the airplane should be trimmed for hands-off level flight with the skid/slip ball of the turn and bank centered and the directional gyro set to agree with the magnetic heading.

Set the Course Selector "bug" on the directional gyro to the desired heading. Depress the Heading Lock switch to the ON position then depress the ON/OFF switch to the ON position. If the heading of the A/C is other than that selected the A/C will immediately roll into a bank in the direction of the "bug". The bank angle will be no more than 18 to 20 degrees. Subsequent heading changes are now made by setting the Course Selector "bug" to the desired heading.

With the Heading Lock ON the Bank Command knob is inoperative. In order to employ this function the Heading Lock must be OFF. Banks up to 18 to 20 degrees can be directed by the full movement of the knob.

EMERGENCY PROCEDURES

The Autocontrol III may be overpowered by the pilot at any time by a force of 12 to 15 pounds on the control wheel. In the event of any component malfunction the autopilot is disengaged by turning OFF the ON/OFF switch.

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ELECTRIC PITCH TRIM INSTALLATION ONLY (When Installed)

The following emergency information applies in case of electric pitch trim malfunction.

- a. In case of malfunction, disengage electric pitch trim by pulling out circuit breaker on instrument panel.
- b. In emergency, electric pitch trim may be overpowered using manual pitch trim.
- c. In cruise configuration, malfunction results in 10° pitch change and 30 ft. altitude variation.

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SECTION V - PERFORMANCE

Use of the data in this section is only mandatory when required by the Air Navigation Order or Regulations; otherwise its use, although most desirable on the grounds of safety, is at the discretion of the pilot in command of the aeroplane.

CONDITION OF AEROPLANE:

The information in this section relates to a standard Piper PA-28-180 Aeroplane, as shown on figure II-1, powered by a Lycoming O-360-A3A or O-360-A4A engine fitted with a Sensenich 76 inch DIA, 60 inch pitch M76EMM or M76EM8 propeller for serial numbers 28-671 to 28-1760A or a Sensenich 76 inch DIA, 60 inch pitch M76EMMS or M76EM8S5 for serial numbers 28-1571, 28-1573, 28-1761 and on.

COMPLIANCE WITH THE AIR NAVIGATION ORDER AND GENERAL REGULATIONS

(1) This aeroplane is classified in performance group D

(2) For compliance with the regulations governing flight over water, the true air speed is 125 MPH.

VALIDITY OF PERFORMANCE INFORMATION:

The performance information is not valid if:

(a) The total loaded weight exceeds the relevant maximum take-off and landing weight appropriate to the altitude and temperature, see page 28.

(b) The aeroplane is flown when the outside air temperature exceeds the appropriate maximum temperature for which operational suitability has been established. (See page 16).

(c) Readings from the charts are obtained by extrapolation (i.e., using values of parameters outside the ranges given on the charts) except as and when specifically permitted. At temperatures below the lowest range scheduled the performance shall be assumed to be not better than that appropriate to the lowest temperature scheduled.

(d) A propeller of a type differing from that stated above is fitted.

(e) External modifications causing a significant increase in the aerodynamic drag are incorporated.

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NET DATA :

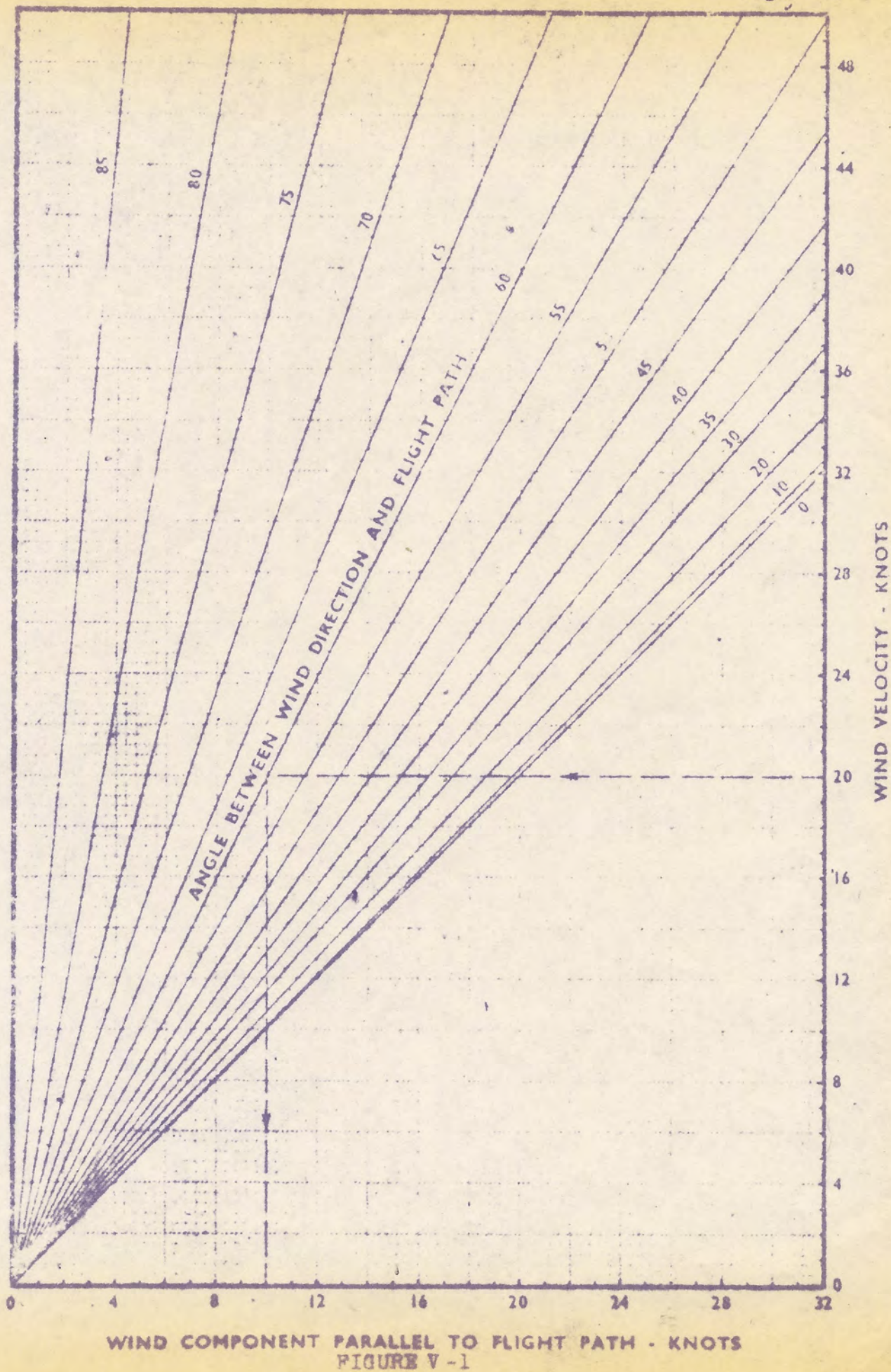
The majority of the performance information scheduled (for example, the take-off distance required) is "net data". This means that some margin has been included in the charts for the loss of performance due to various factors for which it is difficult to make an allowance operationally, such as small and unavoidable variations from the correct airspeed, and variations from the average airframe drag and engine powers, etc. Where necessary a note in the text indicates those charts or portions of charts which are "net data".

CONVERSION CHARTS :

Charts to convert wind velocity into wind component, °C and altitude into I.S.A. , and °F to °C are given in Figures V-1 and V-2. Arrowed example lines illustrate their use.

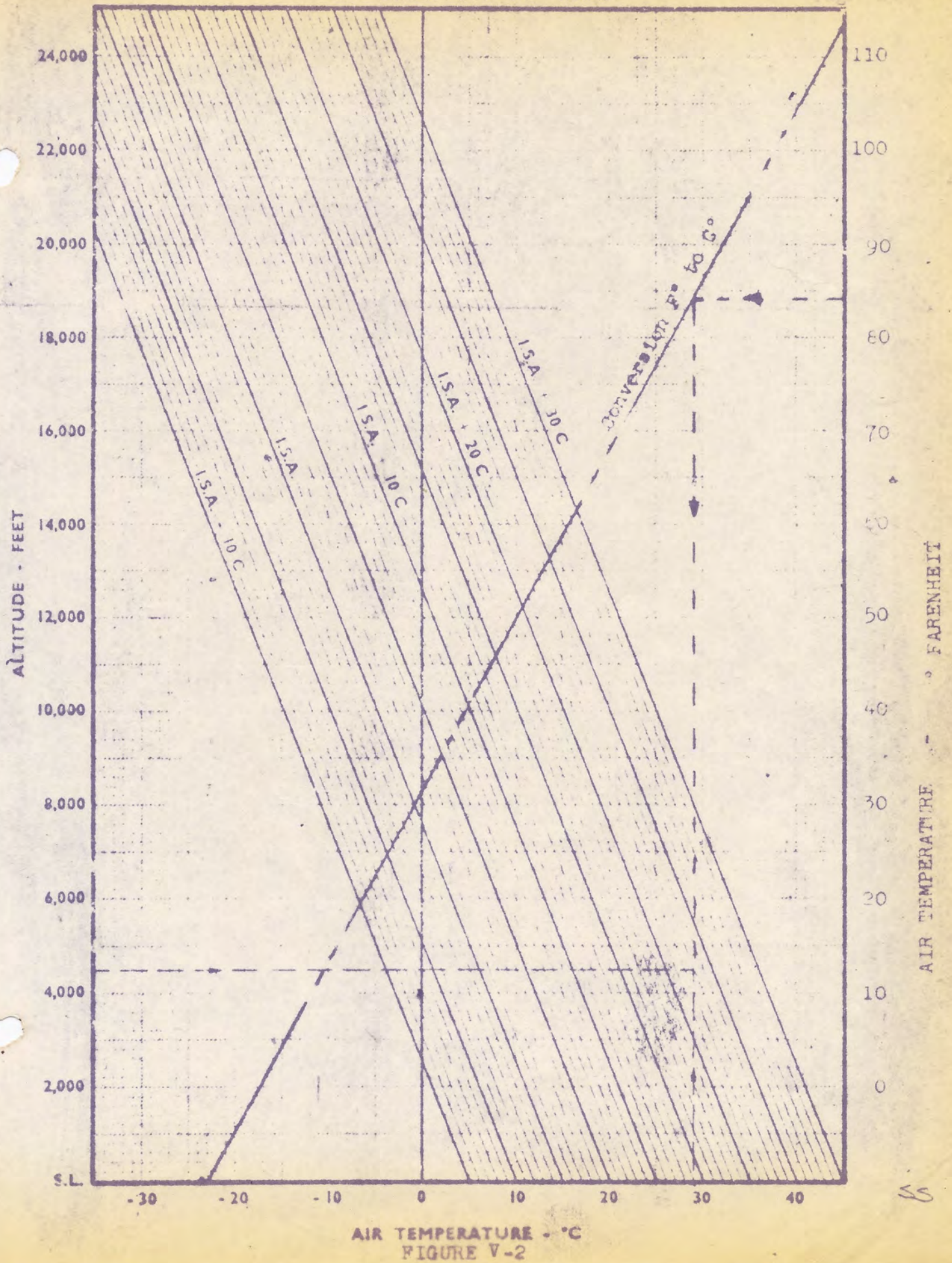
WIND COMPONENT

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DETERMINATION OF TEMPERATURE IN RELATION TO I.S.A.

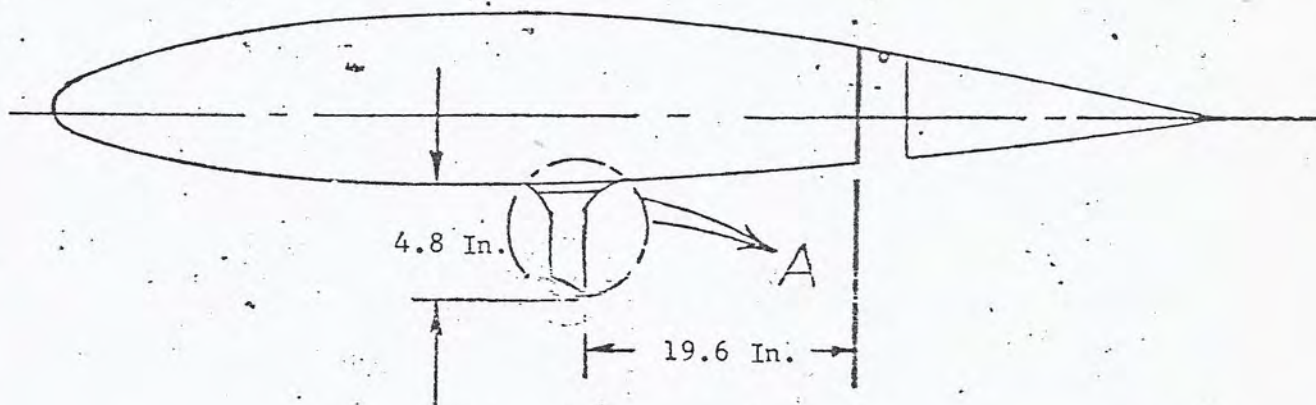
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POSITION ERROR CORRECTIONS

The position error corrections to be applied to the I.A.S. to obtain E.A.S. are shown in Figure V-3. Corrections are based on a weight of 2400 lb. and the variation of the correction at other weights is small.

The static error correction applicable to the altimeter is less than 50 feet in all conditions.



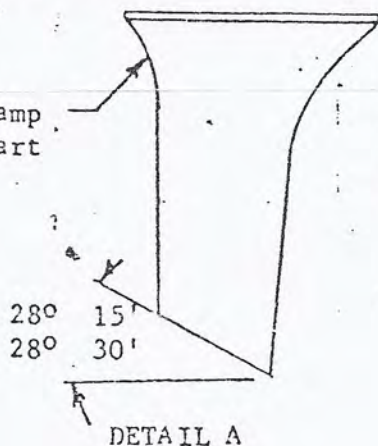
Left Wing, Station 107.4

The pitot head is parallel to centerline of airplane.

A static vent is located in the bottom of the pitot head.

-0 Impression Stamp
on Replacement Part

NOTE: If other than -0 mast
is installed contact Piper
Aircraft for proper AFM.



Rev. 16, 25 Feb. '77

Rev. 14 Revised 13-10-72

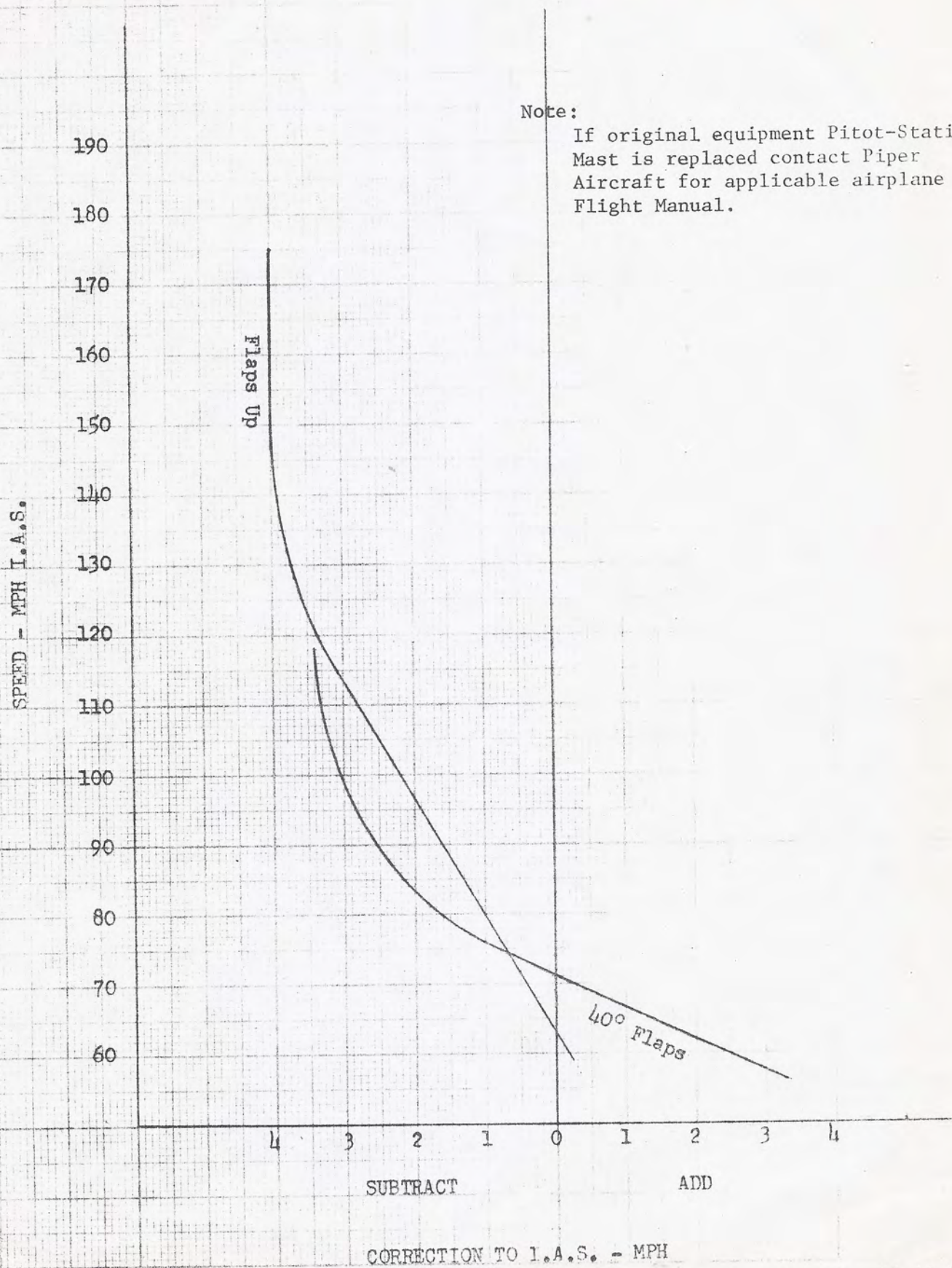
Rev. 15 Revised 1-5-73

Rev. 4 Revised: 14-9-66

Rev. 2 Revised: 9-10-64

FIGURE V-3
 POSITION ERROR
 Correction to Indicated Airspeed

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MAXIMUM TAKE-OFF AND LANDING WEIGHT FOR ALTITUDE AND TEMPERATURE

The maximum permissible take-off and landing weight for varying altitudes and temperatures is shown in Figure V-4.

The example given by the arrowed dashed line shows that for an aerodrome at an altitude of 4000 feet at 32°C (I.S.A. + 25°C) the maximum permissible take-off weight is 2060 lb.

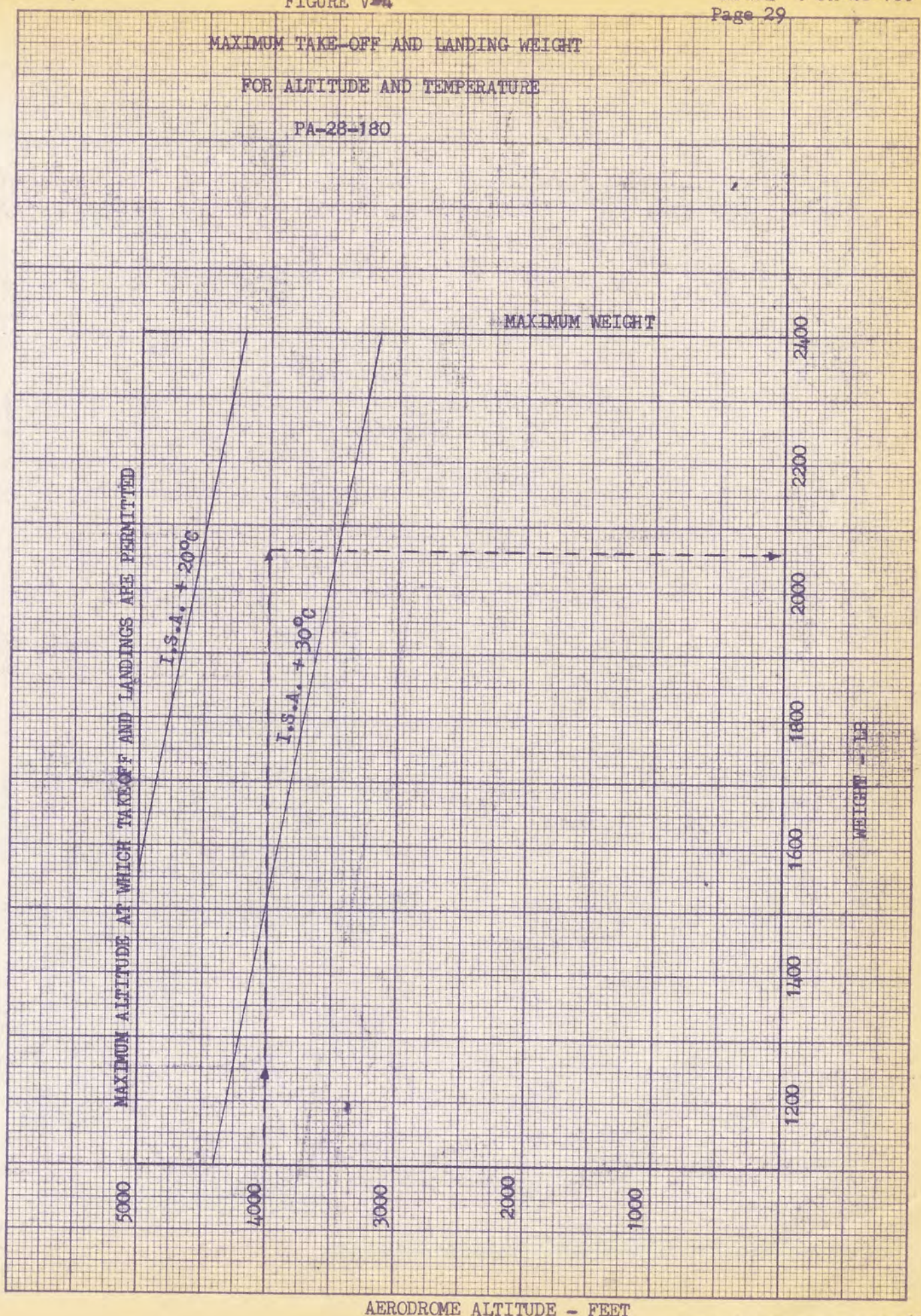
NOTE:

At a particular aerodrome the actual weight may have to be limited by other operational considerations (such as take-off distance) becoming critical.

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FIGURE V-4

MAXIMUM TAKE-OFF AND LANDING WEIGHT
FOR ALTITUDE AND TEMPERATURE
PA-28-180



K&E
20 X 20 TO THE INCH 359-10 1/2 G
KUFFEL & ESSER CO.
MADE IN U.S.A.

AERODROME ALTITUDE - FEET

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TAKE-OFF RUN AND TAKE-OFF DISTANCE REQUIRED

The take-off distance required from rest to the 50 ft. height point is shown in Figure V-5 for varying air temperatures, aerodrome altitudes, weights, reported wind components, and uniform runway slopes.

ASSOCIATED CONDITIONS :

Engine	Full throttle
Wing Flaps	Retracted
Technique	Lift-off should be initiated at the take-off safety speed of 80 MPH I.A.S. (70 knots). This speed should be maintained until all obstacles have been cleared.
Runway	Dry Tarmac runway (See Note 2).

The example given by the arrowed dashed line shows that with an air temperature of 25°C (I.S.A. + 13°C) at an aerodrome altitude of 500 ft., and a weight of 1800 lb., with a reported headwind component of 10 knots and a uniform uphill runway slope of 1%, the take-off distance required is 1700 feet.

NOTES :

- (1) The take-off run will not exceed, and must be taken as, 64% of the take-off distance required.

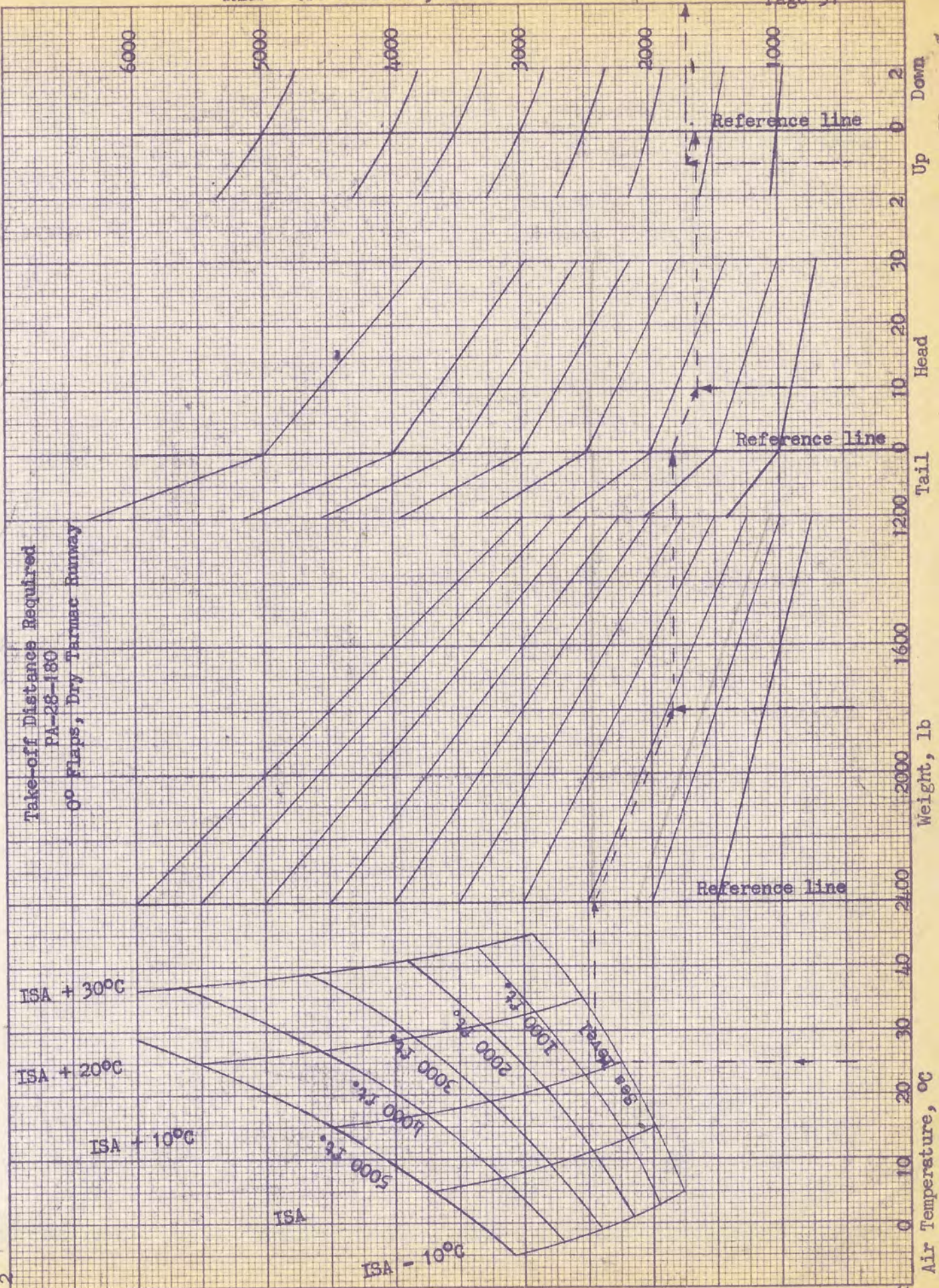
The measured take-off distance has been factored by 1.25, to obtain the scheduled take-off distance required, and the measured take-off run by 1.15.
- (2) For operation from a short, dry grass runway, the distances for a dry tarmac runway should be increased by 6.5%.
- (3) The wind correction grids are factored so that 50% of headwinds and 150% of tailwinds are obtained. Reported winds may therefore be used directly in the grids.

TAKE - OFF DISTANCE, FEET

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Figure V-5

Take-off Distance Required
PA-28-180
0° Flaps, Dry Tarmac Runway



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NET TAKE-OFF FLIGHT PATH

NET GRADIENT OF CLIMB

The net gradient of climb between 50 ft. height and 1000 ft. height is shown in figure V-6 for varying air temperatures, aerodrome altitudes, weights, and reported wind components.

ASSOCIATED CONDITIONS:

Engine	Full throttle
Wing Flaps	Retracted
Airspeed	80 MPH I.A.S.

The example given by the arrowed dashed lines shows that with an air temperature of 21°C (I.S.A. + 10°C) at an aerodrome altitude of 2000 ft. and a weight of 1800 lb. with a reported headwind component of 15 knots the net gradient of climb is 7.3%.

NOTES:

- (1) The data given in figure V-5 has been derived from gross performance reduced by a margin of 2.0% gradient.
- (2) The wind correction grids are factored so that 50% of headwinds and 150% of tailwinds are obtained. Reported winds may therefore be used directly in the grids.

RADIUS OF A STEADY TURN:

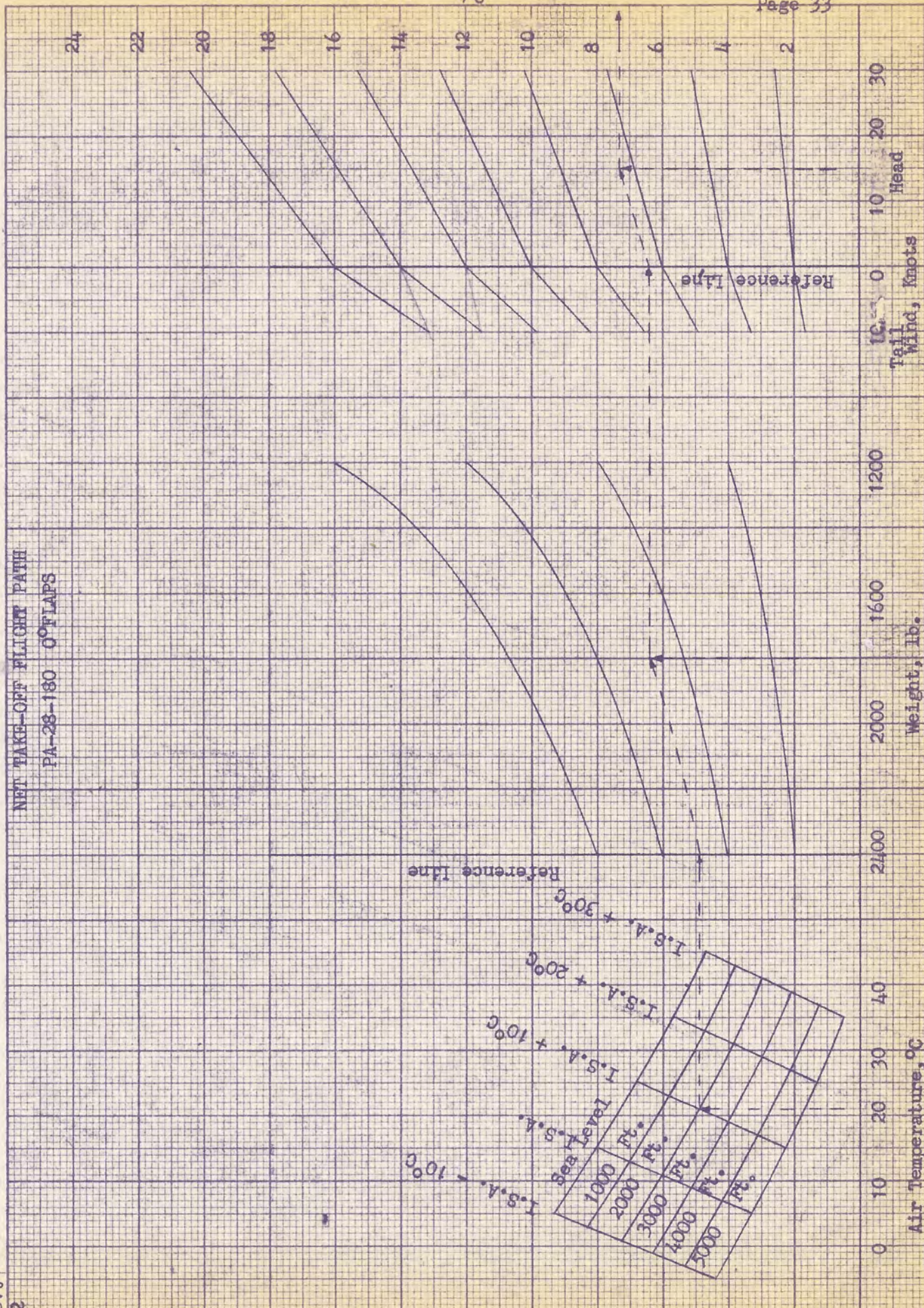
The radius of a steady "Rate One" turn (180°/ minute) may be taken as 2510 ft. (for the maximum ambient conditions of 5000 ft. and I.S.A. + 30°C).

NET GRADIENT OF CLIMB - o/o

FIGURE V-6

NET TAKE-OFF FLIGHT PATH

PA-28-180 0° FLAPS



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EN ROUTE PERFORMANCE

EN ROUTE PERFORMANCE CEILING AND GROSS RATE OF CLIMB

The performance ceiling may be obtained from Figure V-7 for varying weights, altitudes, and air temperatures. The chart may also be used to determine the gross pressure rates of climb.

ASSOCIATED CONDITIONS:

Engine	Full throttle
Wing Flaps	Retracted
Air Speed	85 MPH I.A.S.

The example A given by the arrowed dash lines shows that for a weight of 1700 lb. in an atmosphere of I.S.A. + 10° C the performance ceiling is 10,800 feet.

The example B shows that at an altitude of 5400 feet in an atmosphere of I.S.A. + 20°C at a weight of 1900 lb., the gross pressure rate of climb is 380 ft./min.

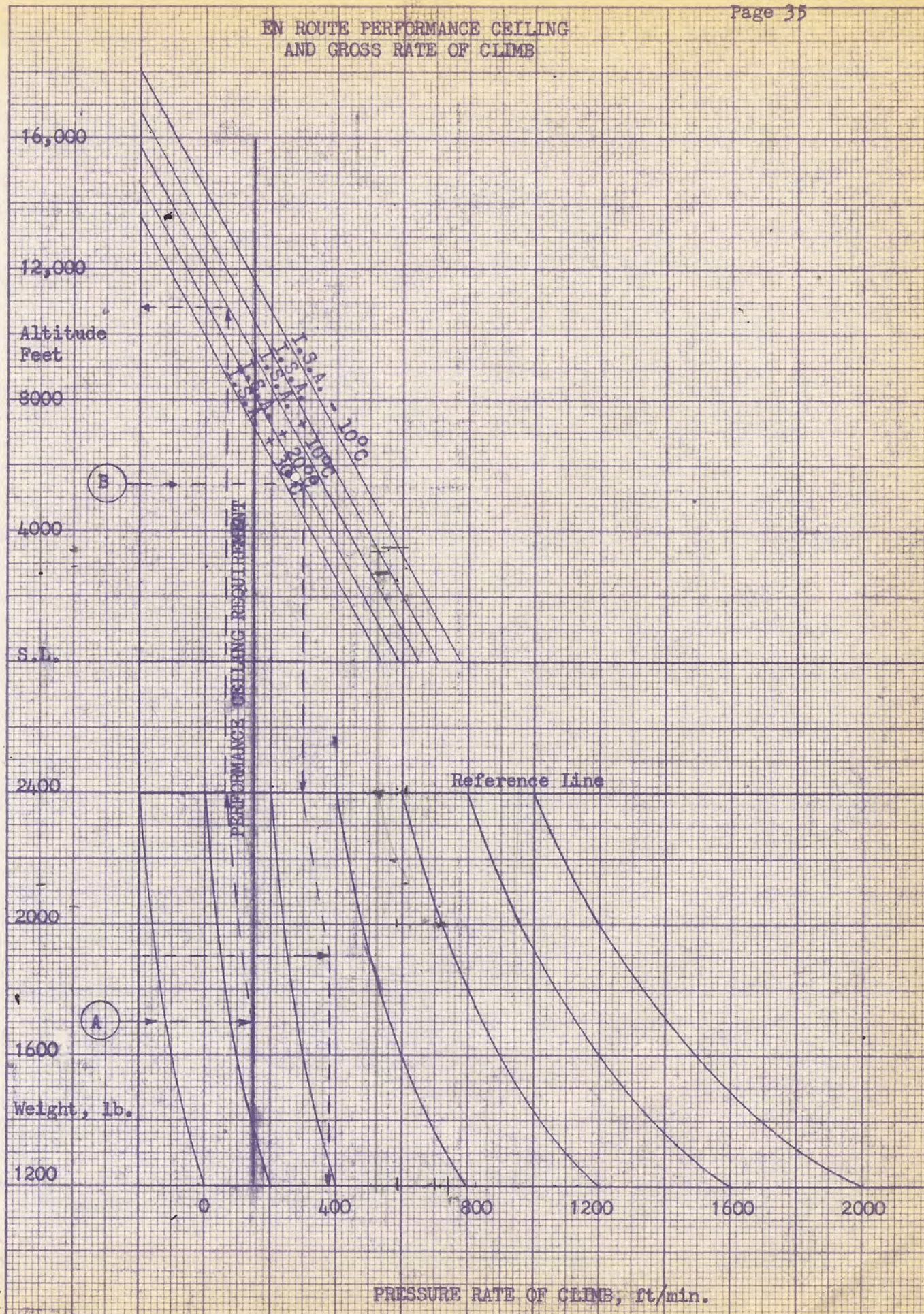
NOTE:

The performance ceiling is the maximum altitude which may be assumed when establishing compliance with the operating regulations dealing with en route flight. It does not prohibit flying at a higher altitude (although at some altitudes the operating regulations may require oxygen to be carried) but it is unlikely that the performance ceiling will be achieved unless full throttle and the air speed quoted are used towards the end of the climb.

GLIDE

With the engine inoperative and flaps fully retracted and 85 MPH I.A.S., the aeroplane has a net glide of 1.66 nautical miles per 1,000 feet of altitude loss, or a loss of 602 feet per nautical mile traveled. This net glide is 1% gradient steeper than the gross glide.

FIGURE V-7



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LANDING DISTANCE REQUIRED

The landing distance required is shown in Figure V-8 for varying air temperatures, aerodrome altitudes, weights, forecast wind components and uniform runway slopes.

ASSOCIATED CONDITIONS :

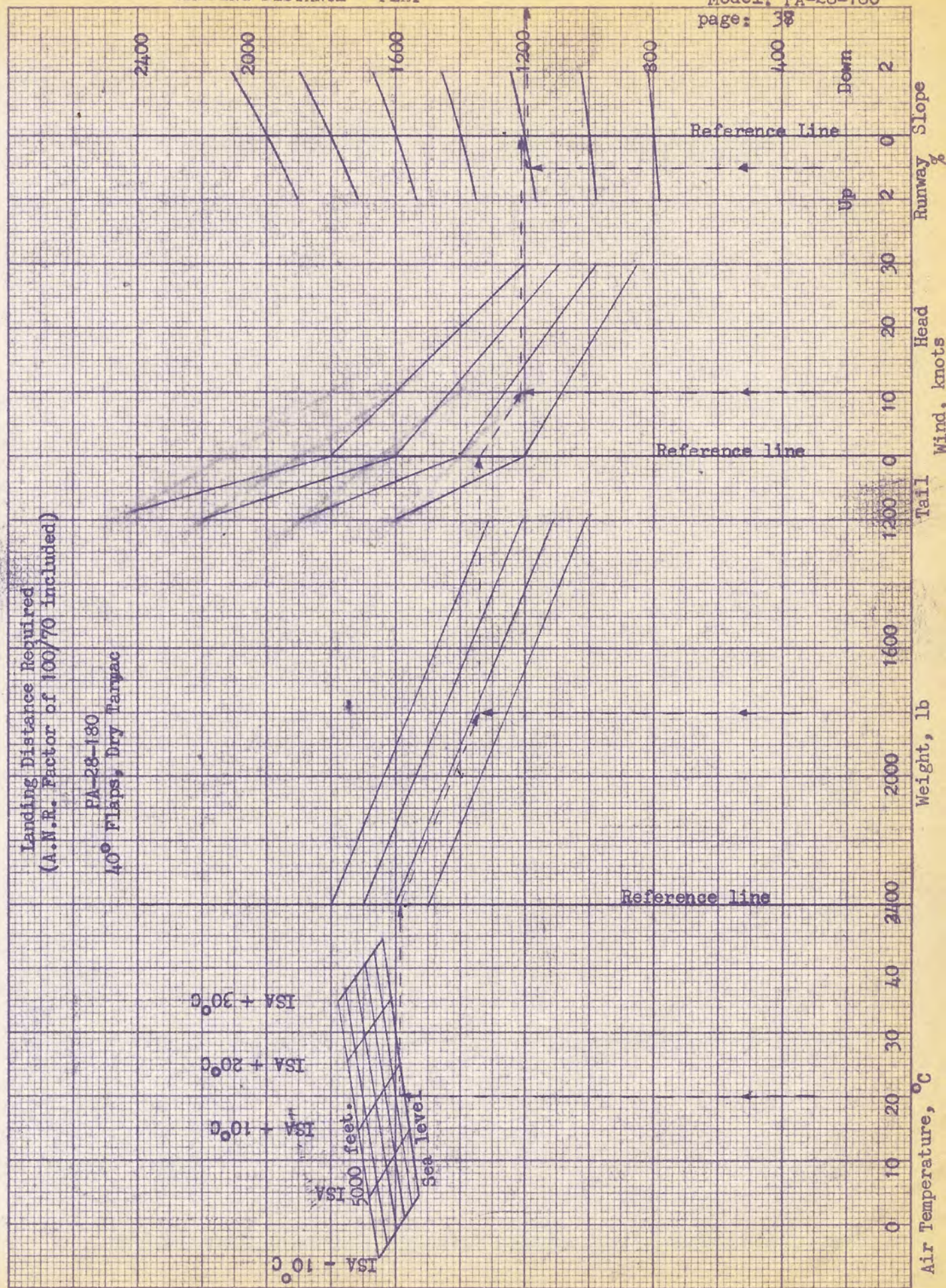
Engine	Idling
Wing Flaps	40° (fully extended)
Technique	Approach speed 1.3 V_{SO} . This is 65 knots I.A.S. (75 MPH) at 2400 lb. decreasing linearly to 56 knots I.A.S. (64 MPH) at 1800 lb. Maximum wheel braking is applied immediately after touchdown.
Runway	Dry Tarmac runway

The example given by the arrowed dotted lines shows that at an altitude of 500 feet at a temperature of 20°C (I.S.A. + 6°C) at a weight of 1800 lb. with a forecast headwind component of 10 knots and with a uphill runway slope of 1.0% the landing distance required is 1190 feet.

NOTE :

- (1) The landing distance required includes the Air Regulation field length factor 100/70. This means that distances obtained from Figure V-8 may be equated directly to the landing distance available.
- (2) For operations from dry grass runways with freshly cut grass and firm subsoil, the distances for a dry tarmac should be increased by 8%.
- (3) The wind grids are factored so that 50% of headwinds and 150% of tailwinds are obtained. Reported winds may therefore be used directly in the grids.

Figure V-8



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SECTION VI

WEIGHT AND LOADING DATA

The weight and centre of gravity schedule shall be inserted to follow this page.

This section is not subject to the approval of the Air Registration Board.

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SECTION VII

SUPPLEMENTS

INTRODUCTION :

This section contains supplements covering items affected by installations designed by the manufacturer of the aeroplane or by other organizations, but which do not normally form part of the basic specification of the aeroplane.

APPENDIX TO PILOT'S OPERATING HANDBOOK

Aircraft Type: PA 28-180

Aircraft Registration: [REDACTED]

AIRWORTHINESS NOTICE NO.88

A low volts warning light is fitted which will illuminate if the generator/alternator fails and the battery supplies power to the bus-bar.

Before engine start

Check low-volts warning light - ON (steady or flashing)

After engine start

Check low-volts warning light - OFF (within 5 seconds)

* If warning light illuminates in flight

Reduce electrical load to essential services only

Land as soon as possible

Battery duration, approx 35 minutes

* Warning may illuminate at low engine rpm but should extinguish with increased rpm

Prepared by:

CAA Surveyor:

Date:

P. Jennings

Whum

10/6/88



~~Insert this appendix opposite Page 3 ? of Section 3 of POH
(Emergency Procedures)~~

Insert this page after page 39 of Flight Manual VB-38