# BELL HELICOPTER
# MODEL 206B
# 250-C20B/C20J ENGINE

## FAA APPROVED
## FLIGHT MANUAL SUPPLEMENT
## FOR
## CABIN COOLING, CABIN HEATING, OR
## ENVIRONMENTAL CONTROL SYSTEM

**206-0100 or 206-0102**

The information contained is this document is FAA approved material, which must be carried in the basic Flight Manual, dated July 1, 1977, after the rotorcraft has been modified by installation of Cabin Cooling, Cabin Heating, or the ECS system in accordance with Keith Products, Inc. STC SH1504NM.

The information in this document supplements or supersedes the basic manual only in the items contained herein. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Flight Manual.

Revised: August 3, 1995





LOG OF PAGES

Original. . . . . 0 . June 23, 1982

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FAA APPROVED DATE: June 23, 1982

Approved: J. P. Chudy for
Mark E. Baldwin, Manager
Denver-Aircraft Certification Field Office
Northwest Mountain Region, Aurora, Colorado

Revised: August 3, 1995

## LOG OF REVISIONS

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|---|---|---|---|
| 0 | June 23, 1982 | Orig. Issue | J.P. Chudy |
| 1 | November 1, 1982 | All | J.P. Chudy |
| 2 | December 21, 1982 | All | George H. Meyers III |
| 3 | March 20, 1984 | All | George H. Meyers III |
| 4 | March 21, 1985 | 2,3,4,5,10 | George H. Meyers III |
| 5 | May 5, 1989 | 1,2,3,6 | Richard S. Adler |
| 6 | October 24, 1990 | 1,2,3 | Larry M. Kelly |
| 7 | March 9, 1992 | 1,2,3,5,6 | Gary B. Roach |
| 8 | April 10, 1995 | 1,2,3 | James R. Arnold |
| 9 | April 18, 1995 | 2,3,6 | James R. Arnold |
| 10 | August 3, 1995 | All | |

NOTE: Revisions are indicated by a black vertical line.





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## 250-C20B/C20J ENGINE

### CABIN COOLING, CABIN HEATING or ECS

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The Environmental Control System consists of a vapor cycle air conditioner for cabin cooling and cabin heating provided by engine bleed air. Cabin cooling and/or heating only may also be installed. Operating instructions contained herein are given separately for cabin cooling and/or heating and apply to the system installed.

The air conditioner system consists of an engine driven compressor, a condenser and evaporator(s), each of the latter using electric motor driven blowers. AIR COND or FAN may be selected. In the AIR COND mode, the evaporator blower(s) is(are) automatically activated, distributing cold air. The FAN mode permits cabin air circulation only, either in a HI or LO blower speed as selected by the second switch. Temperature control is accomplished through a rheostat to set desired cooling air temperature.

The heater control consists of a single (OFF/MAX) rotary control. The desired temperature is selected by a proportional adjustment of cabin heat (OFF/MAX) knob. When heater is on, the environmental control switch must be turned to FAN.

Defogging is best accomplished by simultaneous operation of the air conditioning and/or fresh outside air as heat is applied.

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For 206B models designated TH67 with Two Pilot IFR Configuration: The air conditioning equipment is powered by the non-essential bus and is protected by a 50 amp current limiter. A relay has been installed to automatically disconnect the air conditioning system in the event of a main generator failure.





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**SECTION I: OPERATING LIMITATIONS**

ELECTRICAL LOAD LIMITATIONS

Maximum - 70% on Load meter as stated in basic Flight Manual.

For 206B models designated TH67 with the two pilot IFR Configuration only: the air conditioning system should not be selected to "Air Cond" when load meter exceeds 46%.

WEIGHT/CG LIMITATIONS

Weight change shall be calculated after kit is installed and ballast readjusted, if necessary, to return empty weight CG within allowable limits.

PLACARDS AND MARKINGS:

**HEAT**
**CONTROL**
**OFF**
**+**
**MAX**

(Located on overhead next to circuit breaker panel when ECS or Heating only is installed)

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**SECTION I:** (Cont'd) **OPERATING LIMITATIONS**

PLACARDS AND MARKINGS (Cont'd)

**MAGNETIC COMPASS**
**IS UNRELIABLE**
**WITH AIR COND**
**OR FAN ON**

(When forward blower(s) installed)

**MAX BAGGAGE 170 LBS. (ECS ONLY)**
**MAX BAGGAGE 241 LBS. (CABIN HEATING ONLY)**
**MAX BAGGAGE 176.5 LBS. (CABIN COOLING ONLY)**

(Located on the inner surface of baggage compartment door when installed.)

**AIR CONDITIONER**
**+ +**
**A/C FAN**

(For 206B models: Located in circuit breaker panel area when ECS or Cabin Cooling only is installed.) (For 206B models designated TH67 with 2 pilot IFR configuration: Located in center cockpit pedestal on two seat IFR Aircraft when cabin cooling is installed)



KEITH PRODUCTS, INC. DALLAS, TEXAS

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**SECTION I:** (Cont'd) **OPERATING LIMITATIONS**

PLACARDS AND MARKINGS (Cont'd)

**NOTE: FOR AIRCRAFT EQUIPPED WITH GROUND SEEKING ANNUNCIATOR PANEL THE FOLLOWING CIRCUIT BKR NOT REQUIRED.**

**HTR.**
**+**
**DUCT LT**

(Located in the circuit bkr. panel area or at the aft cabin buss when ECS or Cabin Heating only is installed.)

**DUCT TEMP HIGH**

(Located on instrument panel in caution light panel when ECS or Cabin Heating only is installed.)

**DO NOT SWITCH AIR COND.**
**ON WHEN LOAD METER**
**EXCEEDS 46%**

(Located on center cockpit pedestal on for 206B model designated TH67 with two pilot IFR configuration when cabin cooling is installed.)

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**SECTION 2: NORMAL PROCEDURES**

PREFLIGHT CHECK (EXTERIOR)

5. Fuselage - Aft Left Side
Compressor - check security
Compressor drive belt - check general condition and security

(When ECS or Cabin Cooling only is installed.)

ENGINE PRESTART CHECK

Environmental Control Switch - OFF
Cabin Heat Valve - OFF

NOTE:
The heat control pilot valve is a continuously variable one turn valve. The OFF position is fully counterclockwise.

ENGINE RUN-UP CHECK, BEFORE TAKE-OFF, or IN-FLIGHT OPERATIONS

NOTE:
TOT increases with the bleed air heater and/or cabin cooling operating. Observe turbine outlet temperature limitations.





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**SECTION 2:** (Cont'd) **NORMAL PROCEDURES**

CABIN COOLING
Environmental Control Switch - AIR COND
Cabin heat Valve - OFF (if installed)
Fan Switch - HI or LO (as desired)
Outlets - Close overhead windshield outlets and bottom outlets on instru. panel side ducts.
- Open overhead outlets and aft outlet on instru. panel ducts as desired.

CABIN HEAT
Environmental Control Switch - FAN (if installed)
Cabin Heat Valve - ON (adjust to desired level)
Fan Switch - HI or LO (as desired, if installed)

CABIN DEFOGGING
Environmental Control Switch - AIR COND
Cabin Heat Valve - ON (adjust to desired level)
Fan Switch - HI or LO (as desired)
Outlets - Open overhead windshield outlet and bottom outlet on instru. panel side duct.

ENGINE SHUTDOWN
Environmental Control Switch - OFF
Cabin Heat Valve - OFF

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### SECTION 3: EMERGENCY PROCEDURES

Environmental Control Switch - OFF
Cabin Heat Valve - OFF
For any of the following emergencies:

- Fuel control and/or governor failure
- Engine Failure
- Engine Over Temperature
- Insufficient Power
- Generator Failure

Note: For 206B model designated TH67 with Two Pilot IFR: In the event of a main generator failure the air conditioning system is automatically disconnected.

### SECTION 4: MALFUNCTION PROCEDURES

Caution Light (Amber) Segments (when heating is installed)

Duct (Temp High) - ON

1. Environmental Control Switch - FAN
2. Fan Switch - "LO" or "HI"
3. If light continues - Decrease heat or turn OFF. (This step only when Heater only is installed.)

(When ECS or Cabin Heating only is Installed.)



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### SECTION 5: PERFORMANCE DATA

Environmental Control Switch - AIR COND

NOTE:

Reduce the performance data in the basic flight manual by the amount given below when the Air Conditioning is operating and the intersection of the operating pressure altitude and the OAT is above the application curve shown below. The Hover Ceiling Gross Weight is reduced by the amount given below when applicable in all conditions.

| | |
|---|---|
| Rate of Climb | 95 ft/min. |
| Hover Ceiling Gross Weight | 68 lbs. |

EXAMPLE:

What reduction in Rate of Climb could be expected under the following conditions:

Pressure Altitude - 4,000 feet
OAT - 20°C

Enter at an OAT of 20°C, move vertically to the 4,000 ft. Pressure Altitude line. This intersection is below the curve, therefore, no rate of climb change applies.

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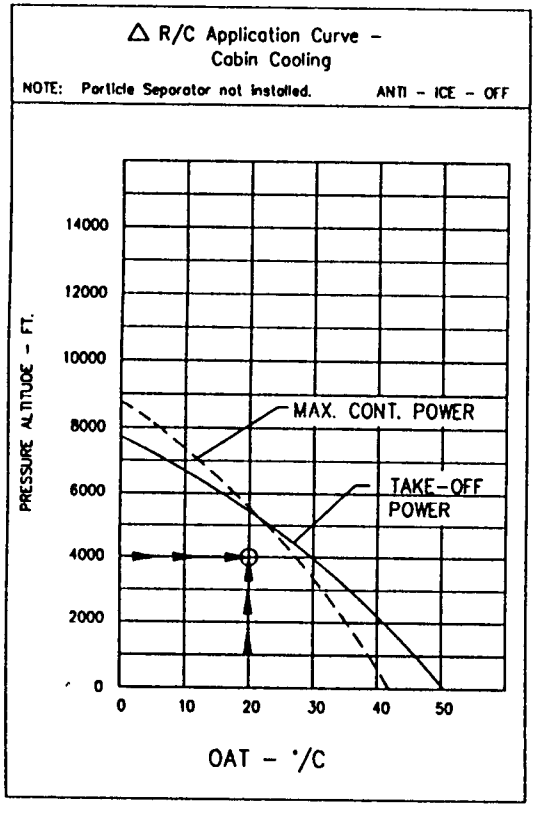


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**SECTION 5:** (Cont'd) **PERFORMANCE DATA**

Cabin Heating Valve - ON

NOTE:

Reduce the performance data in basic flight manual or optional equipment supplement with the following charts when the bleed air heater is operating. Performance decrements are shown for the standard engine air inlet and for the particle separator induction system.

Complete hover performance is presented herein for the snow deflector, which includes losses due to the particle separator.

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**SECTION 5:** (Cont'd) **PERFORMANCE DATA**

EXAMPLE:

What gross weight loss in hover performance could be expected under the following conditions:

Standard engine inlet — Standard skid gear
IGE hover — Takeoff power
Outside air temp = -15°C — Anti-ice off
Pressure Altitude = 14,000 feet

Using the appropriate IGE chart, enter at OAT (-15°C), move vertically to intersect pressure altitude curve (or outermost curve, whichever comes first), then proceed horizontally to obtain the gross weight loss (170 pounds). Apply this weight loss to the weight obtained from appropriate hover performance chart in basic flight manual or supplement.

There is no loss in hover performance when the outside air temperature is to the left of the pressure altitude curve. It can be seen on the chart covering the above conditions that at -15°C there is no loss in IGE hover performance from sea level to 12,000 feet. Similarly, it can be seen that there is no hover loss below 11,000 feet on a standard day (OAT = -6.8°C).





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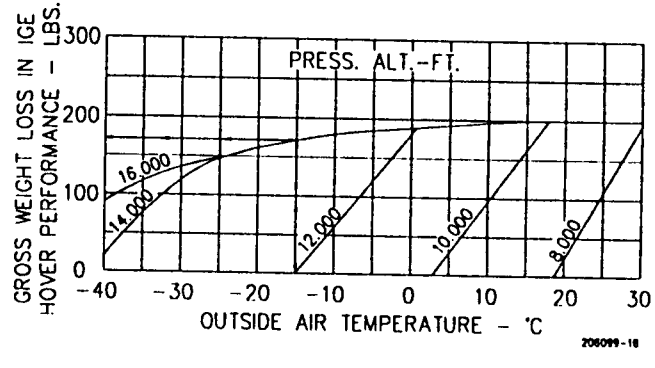
HOVER CEILING DECREASE
DUE TO BLEED AIR HEATER OPERATION
STANDARD INLET WITH STANDARD SKID GEAR

IN GROUND EFFECT — TAKEOFF POWER
-40° TO 30°C
GENERATOR 22.3 AMPS — ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) — ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM BASIC MANUAL OR APPROPRIATE SUPPLEMENT

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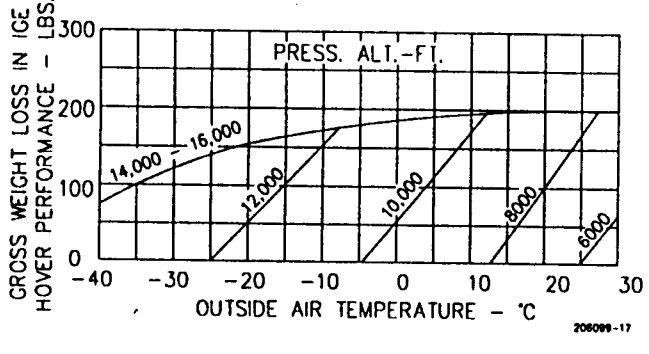
CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING DECREASE
DUE TO BLEED AIR HEATER OPERATION
STANDARD INLET WITH HIGH SKID OR ANY FLOAT GEAR

IN GROUND EFFECT TAKEOFF POWER
-40° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM APPROPRIATE SUPPLEMENT

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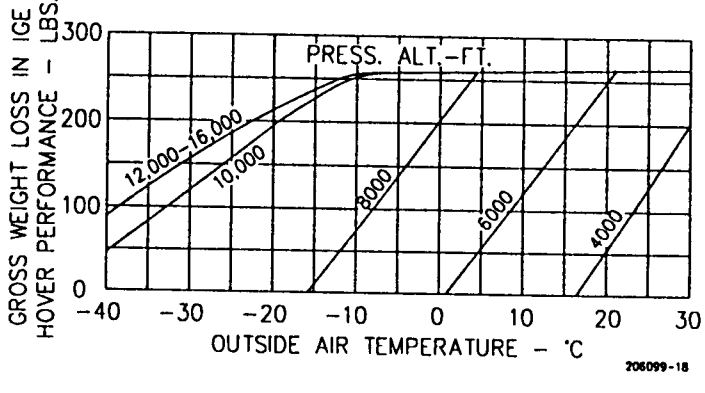
HOVER CEILING DECREASE
DUE TO BLEED AIR HEATER OPERATION
STANDARD INLET WITH ANY SKID OR FLOAT GEAR

OUT OF GROUND EFFECT TAKEOFF POWER
-40° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 40 FT (12.2 METERS) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM BASIC MANUAL OR APPROPRIATE SUPPLEMENT

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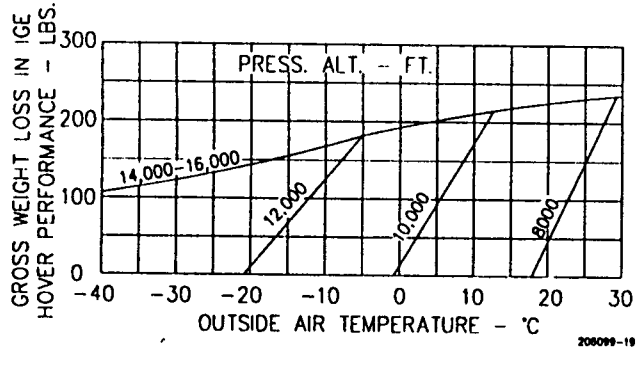
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING DECREASE
DUE TO BLEED AIR HEATER OPERATION
PARTICLE SEPARATOR WITH STANDARD SKID GEAR
IN GROUND EFFECT TAKEOFF POWER
-40° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM PARTICLE SEPARATOR SUPPLEMENT

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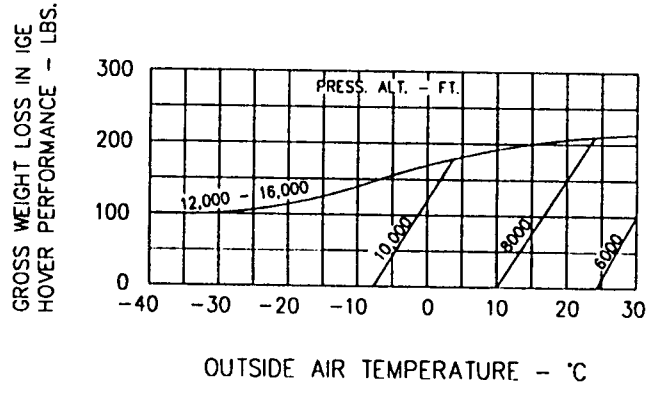
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING DECREASE
DUE TO BLEED AIR HEATER OPERATION
PARTICLE SEP. WITH HIGH SKID OR ANY FLOAT GEAR
IN GROUND EFFECT TAKEOFF POWER
-40° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM PARTICLE SEPARATOR SUPPLEMENT

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## 206B FLIGHT MANUAL SUPPLEMENT
## 250-C20B/C20J ENGINE

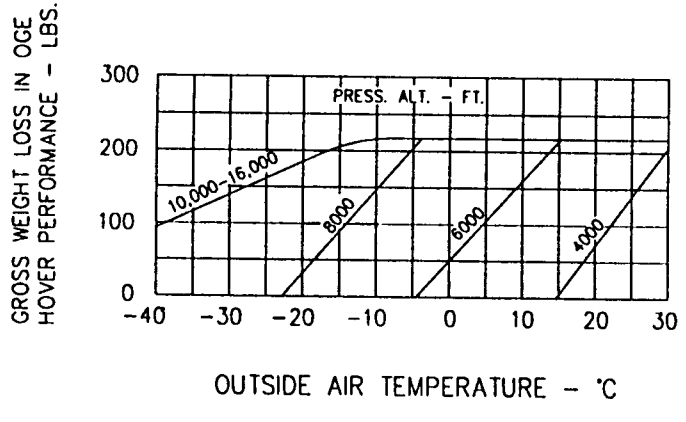
CABIN COOLING, CABIN HEATING or ECS

### HOVER CEILING DECREASE
### DUE TO BLEED AIR HEATER OPERATION
### PARTICLE SEPARATOR WITH ANY SKID FLOAT GEAR

OUT OF GROUND EFFECT TAKEOFF POWER

-40° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 40 FT (12.2 METERS) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM PARTICLE SEPARATOR SUPPLEMENT

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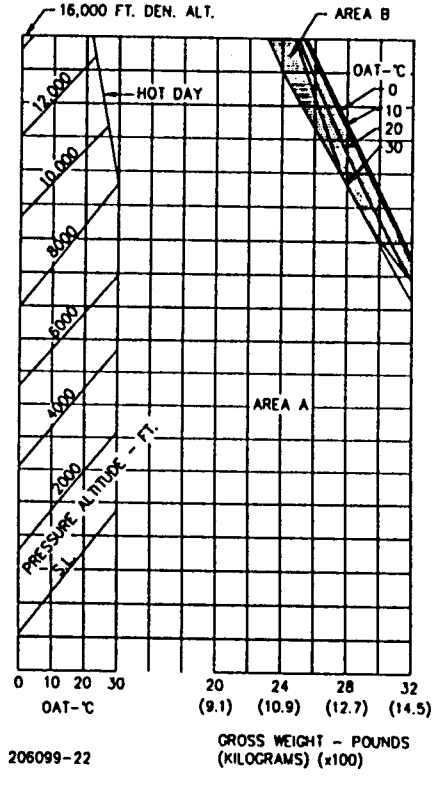
## 206B FLIGHT MANUAL SUPPLEMENT
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

### HOVER CEILING
### SNOW DEFLECTOR WITH STANDARD SKID GEAR
IN GROUND EFFECT TAKEOFF POWER

0° TO 30°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 245 LBS (111.1Kg) LESS

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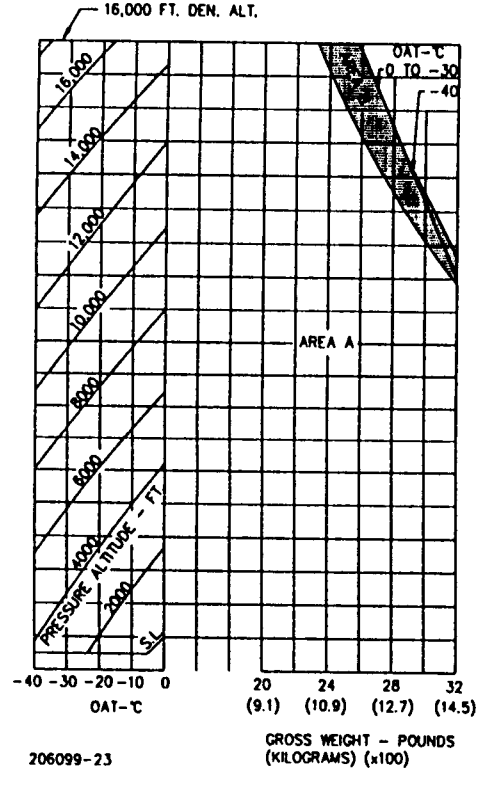
## 206B FLIGHT MANUAL SUPPLEMENT
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING
SNOW DEFLECTOR WITH STANDARD SKID GEAR
IN GROUND EFFECT TAKEOFF POWER
0° TO -40°C
GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 245 LBS (111.1 Kg) LESS

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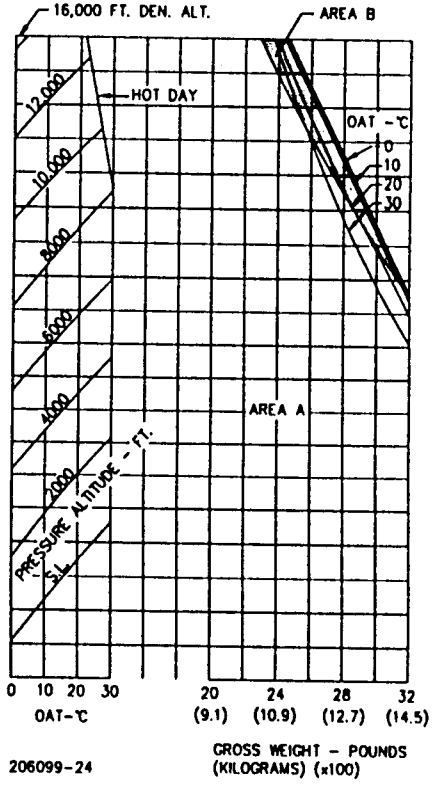
CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING
SNOW DEFLECTOR WITH HIGH SKID OR ANY FLOAT GEAR
IN GROUND EFFECT TAKEOFF POWER
0° TO 30°C
GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 225 LBS (102.1 Kg) LESS

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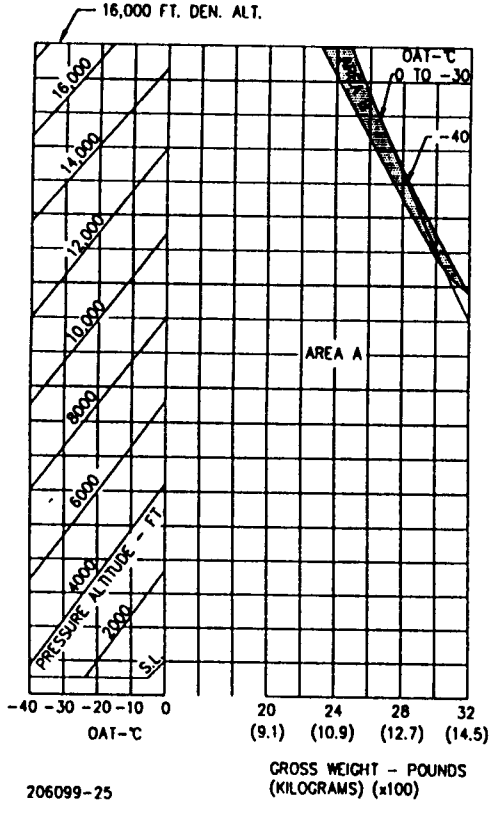
HOVER CEILING
SNOW DEFLECTOR WITH HIGH SKID OR ANY FLOAT GEAR
IN GROUND EFFECT TAKEOFF POWER
0° TO -40°C
GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 2.0 FT (0.6 METER) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 225 LBS (102.1 Kg) LESS

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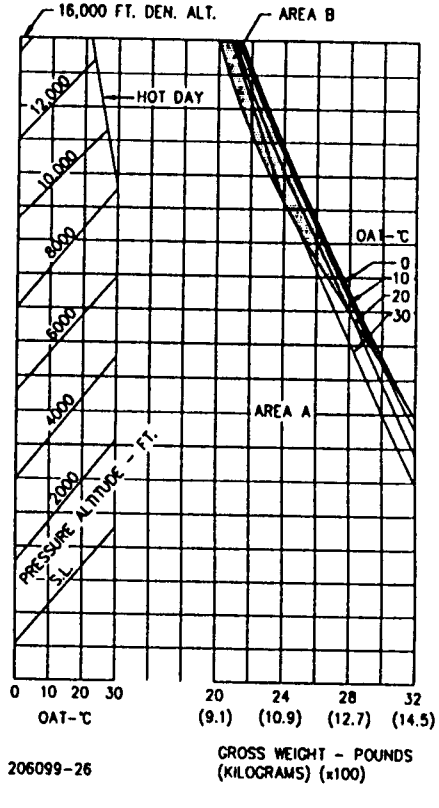
CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING
SNOW DEFLECTOR WITH ANY SKID OR FLOAT GEAR
OUT OF GROUND EFFECT TAKEOFF POWER
0° TO 30°C
GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 40 FT (12.2 METERS) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 260 LBS (117.9 Kg) LESS

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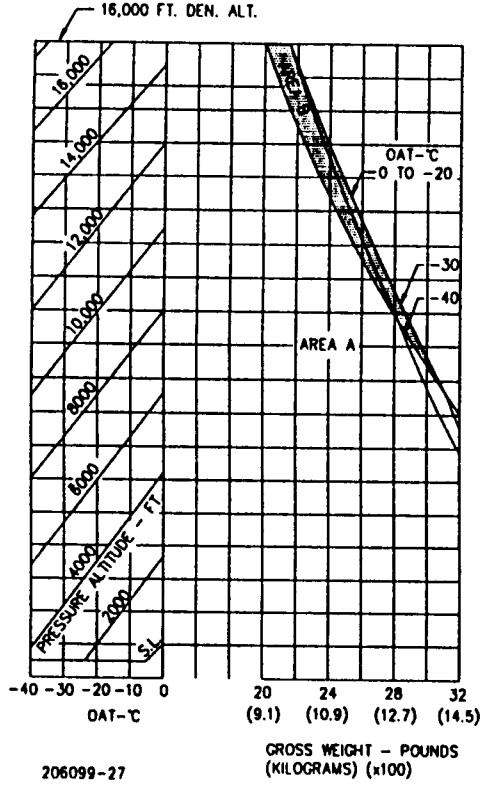
CABIN COOLING, CABIN HEATING or ECS

HOVER CEILING
SNOW DEFLECTOR WITH ANY SKID OR FLOAT GEAR
OUT OF GROUND EFFECT TAKEOFF POWER
0° TO -40°C

GENERATOR 22.3 AMPS ANTI-ICE OFF
SKID HEIGHT 40 FT (12.2 METERS) ENGINE RPM 100%
WITH ANTI-ICE ON GROSS WEIGHT IS 260 LBS (117.9 Kg) LESS

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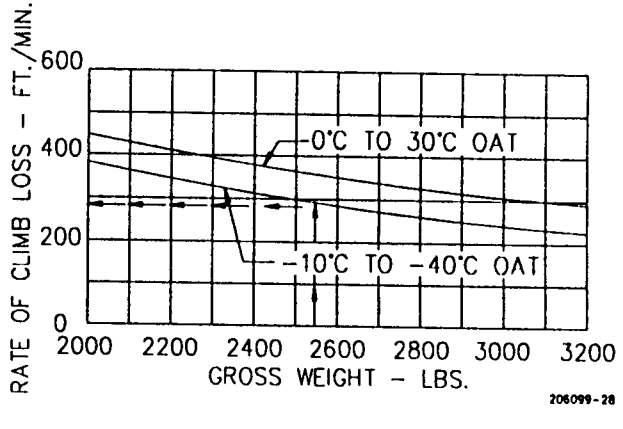
## 206B FLIGHT MANUAL SUPPLEMENT
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

RATE OF CLIMB DECREASE
DUE TO BLEED AIR HEATER
ANY INLET WITH ANY SKID OF FLOAT GEAR

TAKEOFF POWER

GENERATOR 22.3 AMPS ANTI-ICE OFF
V IND 60 MPH (52 KNOTS) ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM
BASIC MANUAL OR APPROPRIATE SUPPLEMENT

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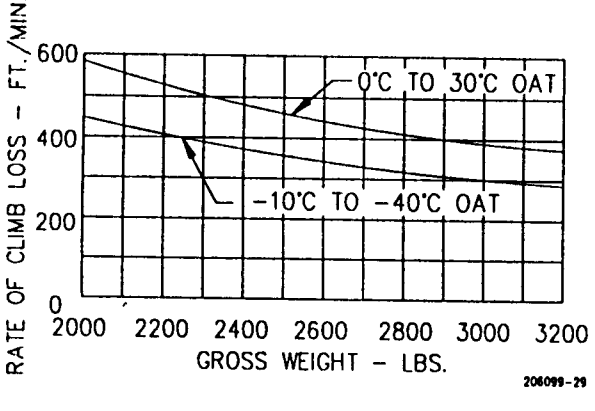
## 250-C20B/C20J ENGINE

CABIN COOLING, CABIN HEATING or ECS

### RATE OF CLIMB DECREASE
### DUE TO BLEED AIR HEATER OPERATION
### ANY INLET WITH ANY SKID OR FLOAT GEAR

### MAXIMUM CONTINUOUS POWER

GENERATOR 22.3 AMPS — ANTI-ICE OFF
V IND 60 MPH (52 KNOTS) — ENGINE RPM 100%
WITH ANTI-ICE ON APPLY ADDITIONAL DECREMENT FROM BASIC MANUAL OR APPROPRIATE SUPPLEMENT

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