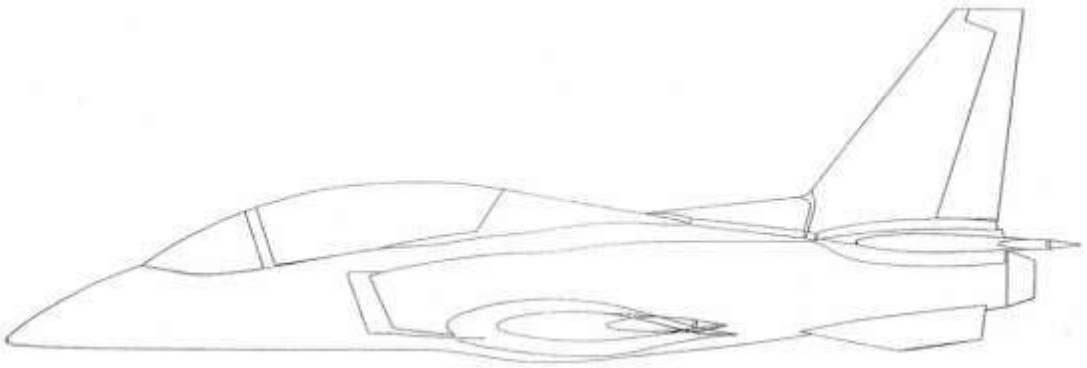

Viperjet MK II

PILOT'S OPERATING HANDBOOK

Viper Aircraft

VIPER AIRCRAFT CORPORATION
VIPERJET MK II
PILOT'S OPERATING HANDBOOK

BUILDER/OWNER: THOMAS AEROSPACE CORPORATION

REGISTRATION NUMBER: N886AK

SERIAL NUMBER: 008

VIPER AIRCRAFT CORPORTATION

4020 N STEARMAN AVENUE

PASCO, WA 99301

PHONE 509.543.3570

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REVISION	DATE
Revision 1—Original Printing	June 1, 2008
Revision 2:	
Air Conditioning System	
Bleed Air Operation	
Pressurization System	
Oxygen System	
Minimum Equipment List (MEL)	
Angle-of-Attack Push to Test	
Drag Chute Deployment	May 6, 2016

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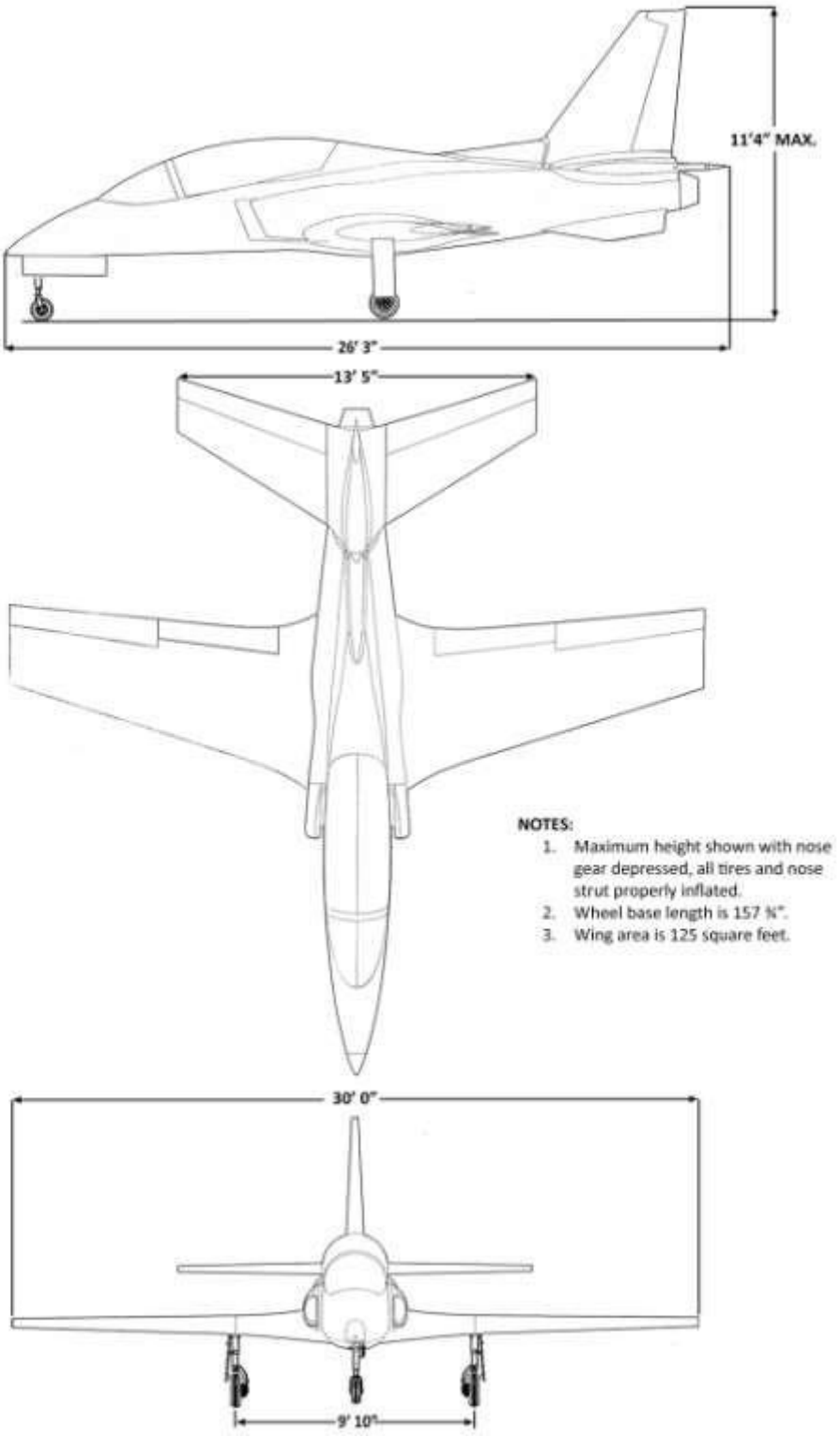

ViperJet MK II Three View

SECTION 1 – GENERAL

INTRODUCTION

This handbook contains 6 sections and includes the material required to be furnished to the pilot by FAR §21.5.

Section 1 provides basic data and information of general interest. It also contains definitions of explanations of symbols, abbreviations, and terminology commonly used.

DESCRIPTIVE DATA

ENGINE

Number of Engines: 1
Engine Manufacture: Viper Aircraft Corporation (Experimental)
Engine Model Number: VA J-85-17A
Engine Type: Turbojet

FUEL

Approved Fuel Grades: Jet A, JP-4
Fuel Capacity:

Center fuel tank: 96 gallons
(to be filled in by Builder/Owner)

Wing tanks: 142 gallons
(to be filled in by Builder/Owner)

OIL

Oil Grade (Specification): BP 2380 TURBINE OIL (or equivalent)

MAXIMUM CERTIFICATED WEIGHTS

Takeoff: 5500 lbs.
Landing: 5500 lbs.
Weight in Baggage Compartment: 50 lbs.

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight: 3158 lbs.
(to be filled in by Builder/Owner)
Maximum Useful Load: 2342 lbs.
(to be filled in by Builder/Owner)

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS	**Knots Calibrated Airspeed is** indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.
KIAS	**Knots Indicated Airspeed is** the speed shown on the airspeed indicator and expressed in knots.
KTAS	**Knots True Airspeed is** the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.
V_A	**Maneuvering Speed** is the maximum speed at which you may use abrupt control travel.
V_{FE}	**Maximum Flap Extended Speed is** the highest speed permissible with wing flaps in a prescribed extended position.
V_{LE}	**Maximum Landing Gear Extended Speed i**s the highest speed permissible with the landing gear in a prescribed extended position.
V_{NO}	**Maximum Structural Cruising Speed is** the speed that should not be exceeded except in smooth air, then only with caution.
V_{NE}	**Never Exceed Speed** is the speed limit that may not be exceeded at any time.
V_S	**Stalling Speed or the minimum steady flight speed** at which the airplane is controllable.
V_{SO}	**Stalling Speed or the minimum steady flight speed** at which the airplane is controllable in the landing configuration at the most forward center of

gravity.

V_X	**Best Angle-of-Climb Speed** is the speed which results in the greatest gain of altitude in a given horizontal distance.
V_Y	**Best Rate-of-Climb Speed** is the speed which results in the greatest gain in altitude in a given time.

METEOROLOGICAL TERMINOLOGY

OAT	**Outside Air Temperature** is the free air static temperature. It is expressed in either degrees Celsius or degrees Fahrenheit.
Standard Temperature	**Standard Temperature** is 15°C (59° F) at sea level pressure altitude and decreases by 2°C for each 1000 feet of altitude.
Pressure Altitude	**Pressure Altitude** is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inches of mercury (1013 mb).

ENGINE POWER TERMINOLOGY

EGT	**Exhaust Gas Temperature** is the temperature the exhaust gases exiting the combustion chamber
N_1	Revolutions per Minute (RPM) of the Turbine Fan expressed as a % of maximum.
% Power	Percent of total thrust.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	**Reference Datum** is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	**Station** is a location along the airplane fuselage given in terms of the distance from the reference datum.
Arm	**Arm** is the horizontal distance from the reference datum to the center of gravity (CG) of an item.
Moment	**Moment** is the product of the weight of an item multiplied by it arm.
Center of Gravity (CG)	**Center of Gravity** is the point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
CG Arm	**Center of Gravity Arm** is the arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.

CG Limits	**Center of Gravity Limits** are the extreme center of gravity locations within which the airplane must be operated at a given weight.
Standard Empty Weight	**Standard Empty Weight** is the weight of a standard airplane, including unusable fuel, full operating fluids and full engine oil.
Useful Load	**Useful Load** is the difference between maximum takeoff weight and the standard empty weight.
Maximum Takeoff Weight	**Maximum Takeoff Weight** is the maximum weight approved for the start of the takeoff run.
Maximum Landing Weight	**Maximum Landing Weight** is the maximum weight approved for the landing touchdown.

SECTION 2 – LIMITATIONS

INTRODUCTION

Section 2 includes operating limitations, instrument markings and basic placards necessary for the safe operation of the airplane, its engine, systems and equipment.

OPERATING LIMITATIONS

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are show in figure 2-1.

	SPEED	KIAS	REMARKS
V_{NE}	Never Exceed Speed	390 KCAS	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed SL – 10,000 ft 10 – 15,000 ft 15 – 20,000 ft 20 – 28,000 ft	 375 360 340 325	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed	250	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: 12° Flaps 20° Flaps 45° Flaps	 175 165 150	Do not exceed this speed with flaps down.
V_{LE}	Maximum Landing Gear Extended Speed	175	Do not exceed this speed with the landing gear down.

Figure 2-1 Airspeed Limitations

POWERPLANT LIMITATIONS

Engine Manufacturer: Viper Aircraft Corporation (Experimental)
Engine Model Number: VA J-85-17A
Engine Operating Limits for Takeoff and Continuous Operations:
Maximum Thrust: 2850 lbs.
Maximum N_1: 101.2%
Maximum EGT (START): 800° C.
Maximum EGT (TAKEOFF): 704° C.
Normal Oil Temperature Operating Range: 60 – 185° C
Normal Oil Pressure Operating Range: 20 – 60 PSI

WEIGHT LIMITS

Maximum Takeoff and Landing Weight: 5500 lbs.
Maximum Weight in Baggage Compartment: 50 lbs.

CENTER OF GRAVITY LIMITS

Center of Gravity Range:
Forward: Appx. 158.0 inches aft of datum (15% of Mean Aerodynamic Cord)
Aft: Appx. 162.50 inches aft of datum (25% of Mean Aerodynamic Cord)
Reference Datum: Nose of aircraft at base of pitot tube (if bayonet pitot installed).

MANEUVER LIMITS

This airplane is designed in the aerobatic category; however, all maneuvers must first be performed in the flight testing period and signed off in the aircraft logbook in accordance with the Operating Limitations prescribed therein. The following are suggested entry speeds and do not constitute an endorsement for any aerobatic maneuvers which are performed. All maneuvers are subject to the Flight Load Factor Limits contained herein.

MANEUVER	RECOMMENDED MINIMUM ENTRY SPEED (95% POWER)
Barrel Roll	200 KIAS
Aileron Roll	200 KIAS
½ Cuban Eight	250 KIAS
Loop	250 KIAS

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors (Maximum Takeoff Weight – 5500 lbs):

*__Flaps Up__ ..... +6.0g, -3.0g
*__Flaps Down__ ..... +3.0g

*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR and may be equipped for night VFR and/or IFR operations. FAR Part 91 establishes the minimum required instrumentation and equipment for these operations. See page 2-4 Minimum Equipment List (MEL).

FUEL LIMITATIONS

Center Fuel Tank: 96 Gallons total.
(to be filled in by Builder/Owner)

Wing Fuel Tanks: 142 Gallons total
(to be filled in by Builder/Owner)

Approved Fuel Grades: Jet A, JP4

Minimum Equipment List (MEL)

INOPERATIVE INSTRUMENTS AND EQUIPMENT FAR 91.213

No person may take off an aircraft unless the inoperative equipment is deactivated and marked "inoperative" and is not part of the minimum equipment required for day or night VFR or IFR flight, as applicable.

INSTRUMENTS REQUIRED FOR VFR DAY FAR 91.205

Gas gauge
Oil pressure gauge
Oil temperature gauge
Seat belts and shoulder straps.
Emergency locator transmitter
Altimeter
Compass
Air speed indicator
Tachometer

*Note: Only 1 Aerosonic EFIS PFD required to meet the above

INSTRUMENTS REQUIRED FOR VFR NIGHT FAR 91.205

Anti-collision light system
Position lights
Energy source

*Note: Only 1 Aerosonic EFIS PFD required to meet the above.

INSTRUMENTS REQUIRED FOR IFR FAR 91.205

2 Way radio communication and Nav equipment for route flown
Gyroscopic rate-of-turn indicator
Slip-skid indicator
Sensitive altimeter adjustable for barometric pressure
Clock displaying hours, minutes and seconds, or digital
Generator
Gyroscopic pitch and bank indicator (artificial horizon)
Gyroscopic direction indicator (directional gyro)

*Note: Only 1 Aerosonic EFIS PFD and Garmin COM Radio required

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SECTION 3 – EMERGENCY PROCEDURES

INTRODUCTION

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem(s).

OPERATIONAL CHECKLISTS

GROUND EMERGENCIES

FALSE START/HUNG START

1. THROTTLE.....OFF
2. IGNITION SWITCH .....OFF
3. START SWITCH .....OFF
4. FUEL DRAIN PERIOD.....30 SECONDS
   ..... (IF STARTER WAS ON LESS THAN 30 SEC)
5. START SWITCH .....START
6. PURGE PERIOD .....15 SECONDS
7. START SWITCH .....OFF

   AFTER 3 MINUTES
8. START PROCEDURE .....REPEAT

ENGINE FIRE ON START

1. THROTTLE.....OFF
2. IGNITION SWITCH .....OFF
3. START SWITCH ..... ON (WINDMILL ENGINE)
4. FUEL PUMP .....OFF
5. FUEL CUTOFF.....UP (RAISE GUARD)

IF FIRE PERSISTS

6. THROTTLE.....OFF
7. START SWITCH .....OFF
8. BATTERY MASTER.....OFF

9. EXIT AIRCRAFT

FIRE ON THE GROUND AFTER START

1. THROTTLE.....OFF
2. FUEL PUMP .....OFF
3. FUEL CUTOFF.....UP (RAISE GUARD)

4. EXIT AIRCRAFT

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1. DRAG BRAKES..... APPLY
2. THROTTLE.....OFF
3. BRAKES .....MAXIMUM

(IF LESS THAN 3000 FT REMAINING)

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. AIRSPEED..... MAINTAIN 100 KIAS MINIMUM
2. LANDING AREA..... CHOOSE BEST OPTION WITH MINIMUM HEADING CHANGE
3. LANDING GEAR .....UP IF LANDING WILL BE ON UNPREPARED SURFACE
4. THROTTLE.....OFF
5. FUEL CUT OFF..... UP (RAISE GUARD)
6. FLAPS..... AS NECESSARY TO FLARE

IN FLIGHT EMERGENCIES

ENGINE FIRE IN FLIGHT

1. THROTTLE.....OFF
2. AIRSPEED..... MAINTAIN 100 KIAS MINIMUM
3. BOOST PUMP .....OFF
4. L & R TRANSFER PUMP .....OFF
5. FUEL CUTOFF.....UP (RAISE GUARD)

IF FIRE PERSISTS

6. BATTERY MASTER.....OFF
7. STARTER/GENERATOR .....OFF

IF FIRE PERSISTS

8. BAILOUT

IF FIRE EXTINGUISHES OR BAILOUT NOT POSSIBLE

9. AIRSPEED..... MAINTAIN 100 KIAS MINIMUM
10. LANDING AREA.....CHOOSE BEST OPTION
11. LANDING GEAR .....UP IF LANDING WILL BE ON UNPREPARED SURFACE
12. FLAPS..... AS NECESSARY TO FLARE

ELECTRICAL FIRE IN FLIGHT

1. ELECTRICAL EQUIPMENT .....UNNECESSARY EQUIPMENT OFF

IF FIRE PERSISTS

2. BATTERY MASTER.....OFF
3. STARTER/GENERATOR .....OFF

IF FIRE PERSISTS

4. THROTTLE.....OFF
5. AIRSPEED..... MAINTAIN 100 KIAS MINIMUM
6. FUEL PUMP .....OFF
7. FUEL CUT OFF..... UP (RAISE GUARD)

IF FIRE PERSISTS

8. BAILOUT

IF BAILOUT NOT POSSIBLE

9. AIRSPEED..... MAINTAIN 100 KIAS MINIMUM
10. LANDING AREA.....CHOOSE BEST OPTION
11. LANDING GEAR .....UP IF LANDING WILL BE ON UNPREPARED SURFACE

12. FLAPS..... AS NECESSARY TO FLARE

IF FIRE EXTINGUISHES

13. AIRSTART..... ATTEMPT

ENGINE FLAMEOUT

IF ENGINE IS ABOVE 45% N_1

1. THROTTLE..... IDLE
2. IGNITION SWITCH .....ON
3. EGT .....MONITOR

WHEN RELIT (>47% N_1)

4. IGNITION SWITCH .....OFF
5. THROTTLE..... AS REQUIRED

****LAND AS SOON AS PRACTICAL****

IF ENGINE IS BELOW 45% N_1

1. THROTTLE.....OFF
2. AIRSTART.....PERFORM

AIRSTART

1. AIRSPEED..... 100 KIAS MINIMUM
2. THROTTLE.....OFF
3. BOOST PUMP .....ON
4. IGNITION SWITCH .....ON

IF ENGINE IS WINDMILLING < 10% N_1

5. STARTER/GENERATOR .....START

AT 10% N_1

6. THROTTLE..... IDLE
7. EGT .....MONITOR

AT 47% N_1

8. IGNITION SWITCH .....OFF
9. THROTTLE..... AS REQUIRED

****LAND AS SOON AS POSSIBLE****

IF NO RELIGHT WITHIN 10 SECONDS

10. THROTTLE.....OFF
11. AIRSTART PROCEDURES .....REPEAT

LOW OIL PRESSURE

****LAND AS SOON AS POSSIBLE USING MINIMUM POWER SETTINGS****

HIGH OIL PRESSURE

****LAND AS SOON AS POSSIBLE USING MINIMUM POWER SETTINGS****

HIGH OIL TEMPERATURE / HIGH EGT

1. POWER SETTING ..... REDUCE AS NECESSARY

****LAND AS SOON AS PRACTICAL****

EMERGENCY LANDING GEAR EXTENSION

1. AIRSPEED..... < 125 KIAS
2. LANDING GEAR HANDLE .....DOWN
3. LANDING GEAR LIGHTS PTT .....PRESS (VERIFY LIGHTS WORKING)
4. HYDRAULIC PUMP CIRCUIT BREAKER ..... PULL
5. EMERGENCY GEAR HANDLE..... ROTATE COUNTER CLOCKWISE

   IF LANDING GEAR DOES NOT INDICATE DOWN
6. AIRCRAFT..... YAW / PITCH TO ASSIST GEAR

ICING—INADVERTENT ICING ENCOUNTER

1. PITOT HEAT .....ON
2. ALTITUDE.....CHANGE TO TEMP. LESS CONDUCIVE TO ICING
3. DIRECTION.....TURN BACK TO TEMP. LESS CONDUCIVE TO ICING
4. CABIN HEAT.....ON
5. DEFROST.....ON
6. OBSERVE.....SIGNS OF INTAKE ICING

   ****LAND AS SOON AS PRACTICAL****
7. APPROACH .....120 KIAS
8. LAND ..... LEVEL ATTITUDE

STATIC SOURCE BLOCKED

1. ALTERNATE STATIC SOURCE VALVE .....ON
2. AIRSPEED.....CLIMB AND APPROACH 10 KTS FASTER THAN NORMAL
3. ALTITUDE..... CRUISE AND APPROACH 25 – 50 FEET HIGHER THAN NORMAL

SECTION 4 – NORMAL PROCEDURES

INTRODUCTION

Section 4 provides checklist and amplified procedures for the conduct of normal operation.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 5500 pounds and may be used for any lesser weight.

Takeoff Flaps Up: ..... 85-90 KIAS
Enroute Climb, Flaps Up
- Normal ..... 200 KIAS
- Best Rate of Climb, Sea Level..... 200 KIAS
- Best Rate of Climb, 10,000 Feet..... 190 KIAS
- Best Angle of Climb, Sea Level ..... 175 KIAS
- Best Angle of Climb, 10,000 Feet ..... 160 KIAS

Landing Approach
- Normal Approach, Flaps Up ..... 120 KIAS
- Normal Approach, Flaps Full Down ..... 95 – 100 KIAS

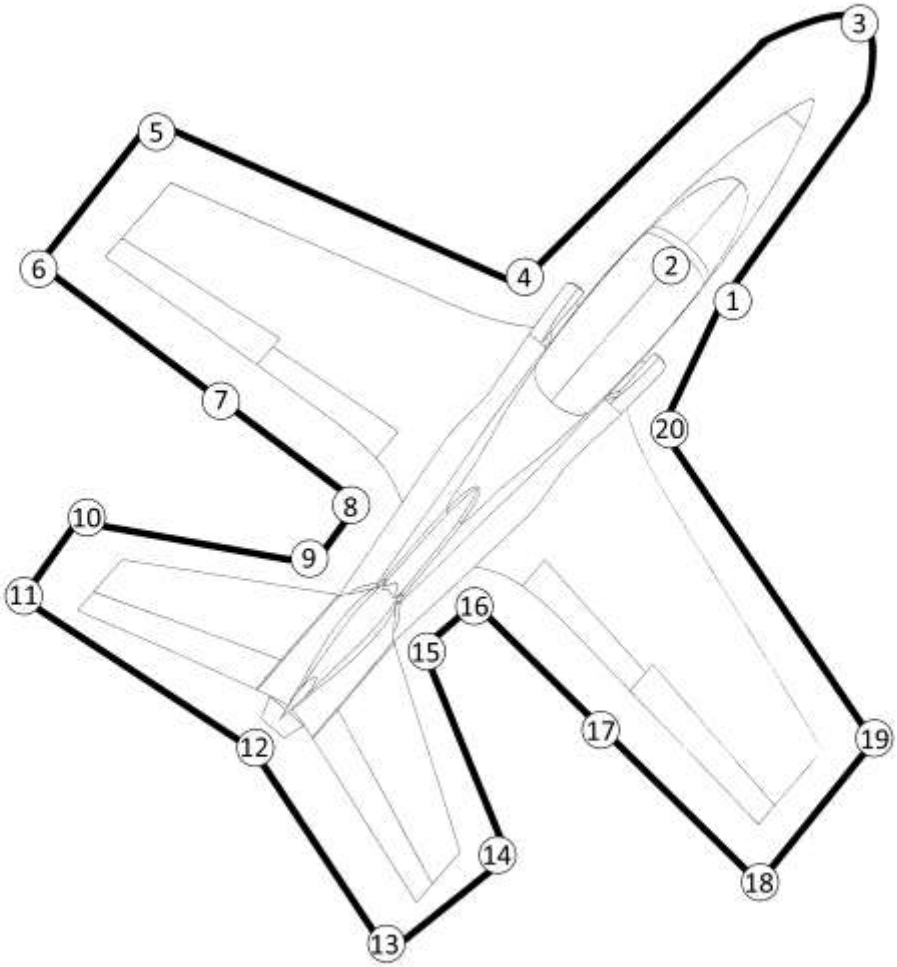

Figure 4-1 Preflight Inspection

NOTE:

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater is warm to touch within 30 seconds with battery and pitot switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

OPERATIONAL CHECKLISTS

PREFLIGHT INSPECTION

1 open canopy

1. LATCHING MECHANISM..... OBSERVE FOR PROPER OPERATION
2. WINDSCREEN ..... CHECK FOR DAMAGE & CLEANLINESS

2 CABIN

1. **A**IRWORTHINESS CERTIFICATE.....AVAILABLE IN THE AIRPLANE
2. **R**EGISTRATION.....AVAILABLE IN THE AIRPLANE
3. PILOT'S **O**PERATING HANDBOOK .....AVAILABLE IN THE AIRPLANE
4. **W**EIGHT & BALANCE .....AVAILABLE IN THE AIRPLANE
5. OPERATING LIMITATIONS .....AVAILABLE IN THE AIRPLANE
6. STARTER/GENERATOR SWITCH .....OFF
7. AVIONICS MASTER .....OFF
8. LANDING GEAR HANDLE .....DOWN
9. BATTERY MASTER.....ON
10. FUEL QUANTITY INDICATORS..... CHECK QUANTITY
11. FLAP SWITCH..... FULL DOWN
12. TRIM CONTROLS .....NEUTRAL
13. BATTERY MASTER.....OFF

3 NOSE

1. PITOT TUBE ..... REMOVE COVER, INSPECT FOR STOPPAGE
2. STATIC SOURCE ..... CHECK FOR STOPPAGE
3. NOSE WHEEL STRUT & TIRE ..... CHECK FOR PROPER INFLATION
4. NOSE WHEEL WELL ..... INSPECT FOR DEBRIS/DAMAGE

4 LEFT ENGINE INLET

1. INLET .....REMOVE COVER, INSPECT FOR DEBRIS AND/OR DAMAGE
2. BOTTOM OF FUSELAGE..... INSPECT ANTENNAS AND FOR LEAKING FLUIDS
3. FUEL QUANTITY..... CHECK VISUALLY FOR DESIRED LEVEL
4. LEFT WING FUEL CAP ..... SECURE
5. LEFT WING TANK SUMP .....SAMPLE FUEL W/ SAMPLE CUP
6. CENTER FUEL TANK SUMP ..... SAMPLE FUEL W/ SAMPLE CUP

5 LEFT WING/WINGTIP/LEFT MAIN LANDING GEAR

1. LEFT MAIN WHEEL STRUT & TIRE ..... CHECK FOR PROPER INFLATION
2. WING TIE-DOWN.....DISCONNECT
3. LEFT WING LEADING EDGE ..... INSPECT FOR DAMAGE
4. LEFT WINGTIP ..... INSPECT LIGHTING LENSES FOR SECURITY
5. ANGLE-OF-ATTACK PUSH TO TEST.....WING PRESSURE PORTS, PITOT/STATIC PORTS, AIR/WATER SEPARATOR

6 LEFT WING TRAILING EDGE

1. TRAILING EDGE .....CHECK FOR DAMAGE

7 LEFT AILERON & FLAP

1. AILERON .....CHECK FOR FREEDOM OF MOVEMENT & SECURITY
2. FLAP..... CHECK FOR SECURITY

8 LEFT FORWARD ENGINE COMPARTMENT COVER

1. ENGINE COVER.....REMOVE
2. HYDRAULIC FLUID RESERVOIR .....CHECK LEVEL
3. ENGINE COVER..... SECURE

9 LEFT REAR ENGINE COMPARTMENT COVER

1. ENGINE COVER..... CHECK FOR SECURITY

10 LEFT HORIZONTAL STABILIZER LEADING EDGE

1. LEADING EDGE .....CHECK FOR DAMAGE

11 LEFT ELEVATOR TRAILING EDGE

1. TRAILING EDGE .....CHECK FOR DAMAGE
2. ELEVATOR..... CHECK FOR FREEDOM OF MOVEMENT AND SECURITY

12 EXHAUST NOZZLE & RUDDER

1. EXHAUST NOZZLE..... REMOVE COVER & CHECK FOR DEBRIS
2. RUDDER.....CHECK FOR FREEDOM OF MOVEMENT & SECURITY
3. TAIL TIE-DOWN .....DISCONNECT

13 RIGHT ELEVATOR TRAILING EDGE

1. TRAILING EDGE .....CHECK FOR DAMAGE
2. ELEVATOR..... CHECK FOR FREEDOM OF MOVEMENT AND SECURITY

14 RIGHT HORIZONTAL STABILIZER LEADING EDGE

1. LEADING EDGE .....CHECK FOR DAMAGE

15 RIGHT REAR ENGINE COMPARTMENT COVER

1. ENGINE COVER..... CHECK FOR SECURITY

16 RIGHT FORWARD ENGINE COMPARTMENT COVER

2. ENGINE COVER.....REMOVE
3. ENGINE OIL.....CHECK LEVEL
4. ENGINE COVER..... SECURE

17 RIGHT AILERON & FLAP

1. AILERON .....CHECK FOR FREEDOM OF MOVEMENT & SECURITY
2. FLAP..... CHECK FOR SECURITY

18 RIGHT WING TRAILING EDGE

1. TRAILING EDGE .....CHECK FOR DAMAGE

19 RIGHT WING/WINGTIP/RIGHT MAIN LANDING GEAR

1. RIGHT MAIN WHEEL STRUT & TIRE..... CHECK FOR PROPER INFLATION
2. WING TIE-DOWN.....DISCONNECT
3. RIGHT WING LEADING EDGE..... INSPECT FOR DAMAGE
4. RIGHT WINGTIP..... INSPECT LIGHTING LENSES FOR SECURITY

20 RIGHT ENGINE INLET

1. INLET .....REMOVE COVER, INSPECT FOR DEBRIS AND/OR DAMAGE
2. BOTTOM OF FUSELAGE.....INSPECT FOR LEAKAGE AND ANTENNAS
3. FUEL QUANTITY..... CHECK VISUALLY FOR DESIRED LEVEL
4. RIGHT WING FUEL CAP ..... SECURE
5. RIGHT WING TANK SUMP .....SAMPLE FUEL W/ SAMPLE CUP

BEFORE ENGINE START

1. EXTERNAL STEP ..... REMOVE & STOW
2. CIRCUIT BREAKERS ..... CHECK
3. AVIONICS MASTER .....OFF
4. ANTI ICE.....OFF
5. FUEL CUT OFF..... DOWN (GUARDED)
6. LANDING GEAR HANDLE .....DOWN
7. BATTERY MASTER.....ON
8. LANDING GEAR .....3 GREEN (& 3 YELLOW)
9. EXT POWER LIGHT..... ON (IF EXT PWR START)
10. EXT POWER MASTER..... ON (IF EXT PWR START
11. ANNUNCIATOR PTT..... PUSH
12. L & R TRANSFER PUMPS..... OFF (YELLOW LIGHTS)
13. L & R TIP PUMP .....OFF

ENGINE START

1. THROTTLE.....CUT-OFF
2. BOOST PUMP .....ON
3. IGNITION .....ON
4. STARTER/GENERATOR .....START

   AT 10% N_1
5. THROTTLE.....IDLE STOP
6. LIGHT OFF..... 10 SEC MAX

   IF FUEL FLOW EXCEEDS 50 GPH < 30%, HOT START POSSIBLE
7. EGT .....800° C MAX

   AT 37% N_1
8. STARTER/GENERATOR .....OFF
9. IDLE .....47% - 49% (WITHIN 40 SEC MAX)
10. OIL PRESSURE..... 5 – 25 PSI
11. IGNITION .....OFF
12. BOOST PUMP .....OFF
13. EXT POWER MASTER..... OFF (IF EXT PWR START)
14. EXT POWER CABLE ..... DISCONNECT (IF EXT PWR START)
15. STARTER/GENERATOR ..... GEN

BEFORE TAKEOFF

1. CONTROLS .....FREE AND CORRECT
2. CANOPY.....LATCHED & LOCKED
3. RADIO ..... SET
4. TRANSPONDER..... SET
5. DRAG BRAKES..... RETRACTED
6. FLAPS.....TAKE OFF
7. TRIM ..... SET
8. L & R TRANSFER PUMPS..... OFF (YELLOW LIGHTS)
9. L & R TIP PUMP .....OFF
10. BOOST PUMP .....ON
11. ANNUNCIATOR LIGHTS ..... CHECK

TAKE OFF

1. N_1..... 101.2% (MAX)
2. EGT .....704° C (5 MINUTE LIMIT)
3. ROTATE..... 85 – 90 KIAS
4. GEAR UP ..... < 150 KIAS
5. FLAPS UP ..... < 150 KIAS

CLIMB / CRUISE

1. N_1..... 100%
2. EGT ..... 677° C (MAX)
3. OIL PRESSURE..... 20 – 60 PSI
4. OIL TEMPERATURE..... 65° – 185° C
5. BOOST PUMP .....OFF
6. L & R TRANSFER PUMP ..... AS DESIRED
7. L & R TIP PUMP ..... AS DESIRED

RECOMMENDED MAXIMUM SPEED PROFILE

ALTITUDE	KIAS	MACH
SL – 10,000 FT	375	.72
10,000 – 15,000 FT	360	.74
15,000 – 20,000 FT	340	.75
20,000 – 28,000 FT	325	.77

Table 4-1. Max Speed Profile

LANDING

1. L & R TRANSFER PUMPS..... OFF (YELLOW LIGHTS)
2. L & R TIP PUMP .....OFF
3. BOOST PUMP .....ON
4. DRAG BRAKES..... AS DESIRED
5. FLAPS.....140 KIAS
6. LANDING GEAR .....140 KIAS
7. PATTERN / FINAL..... 120 KIAS / 95-100 KIAS++
8. DRAG CHUTE DEPLOMENT (as needed) .....NOSE WHEEL ON RWY

* CB IN, RED SWITCH COVER UP, PUSH AND RELEASE YELLOW BUTTON.

** EMERGENCY RELEASE - PUSH SILVER BUTTON AND PULL UP ON T-HANDLE (Located bottom left side of Pilot Stick)

ENGINE SHUTDOWN

1. AVIONICS.....OFF
2. BOOST PUMP .....OFF
3. STARTER/GENERATOR .....OFF
4. THROTTLE..... CUT OFF

AT 10% N_1

5. LIGHTS .....OFF
6. BATTERY MASTER.....OFF

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SECTION 5 – PERFORMANCE

INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

It should be noted that the performance information presented in the range and endurance profile charts allows for 45 minutes reserve fuel base on low (≈ 80% power) power settings. Some indeterminate variables such as fuel metering characteristics, engine condition and air turbulence may account for variations of 10% or more in range and endurance. Furthermore, winds aloft will increase or decrease range and endurance accordingly. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight.

GENERAL SPECIFICATIONS

SPEED: Maximum at Sea Level	375 KIAS
SPEED: Maximum Cruising at 28,000 feet	390 KTAS
RATE OF CLIMB AT SEA LEVEL (4800 LB GROSS WEIGHT)	10,000 FPM
SERVICE CEILING (RVSM LIMITED)	28,000 FT
TAKEOFF PERFORMANCE: Ground roll	1200 FT
TAKEOFF PERFORMANCE: Total Distance Over 50-ft Obstacle	1600 FT
LANDING PERFORMANCE: Ground roll	2800 FT
LANDING PERFORMANCE: Total Distance Over 50-ft Obstacle	3500 FT
STALL SPEED—CLEAN (KIAS)	96 KTS
STALL SPEED—LANDING CONFIGURATION (KIAS)	85 KTS
MAXIMUM WEIGHT: Takeoff or Landing	5500 LBS
EMPTY WEIGHT	3158 LBS
USEFUL LOAD	2342 LBS
OIL CAPACITY	4 QUARTS

NOTE: ALL PERFORMANCE NUMBERS ARE BASED IN ISO STANDARD TEMPERATURES (59°F).

CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft and the airplane's performance. Power setting selection for cruise must be determined based on several considerations. These include the cruise performance characteristics presented in Figure 5-1. The relationship between power and range is illustrated by the Cruise Performance Chart. Considerable fuel savings and longer range result when lower power settings and higher cruise altitude are used.

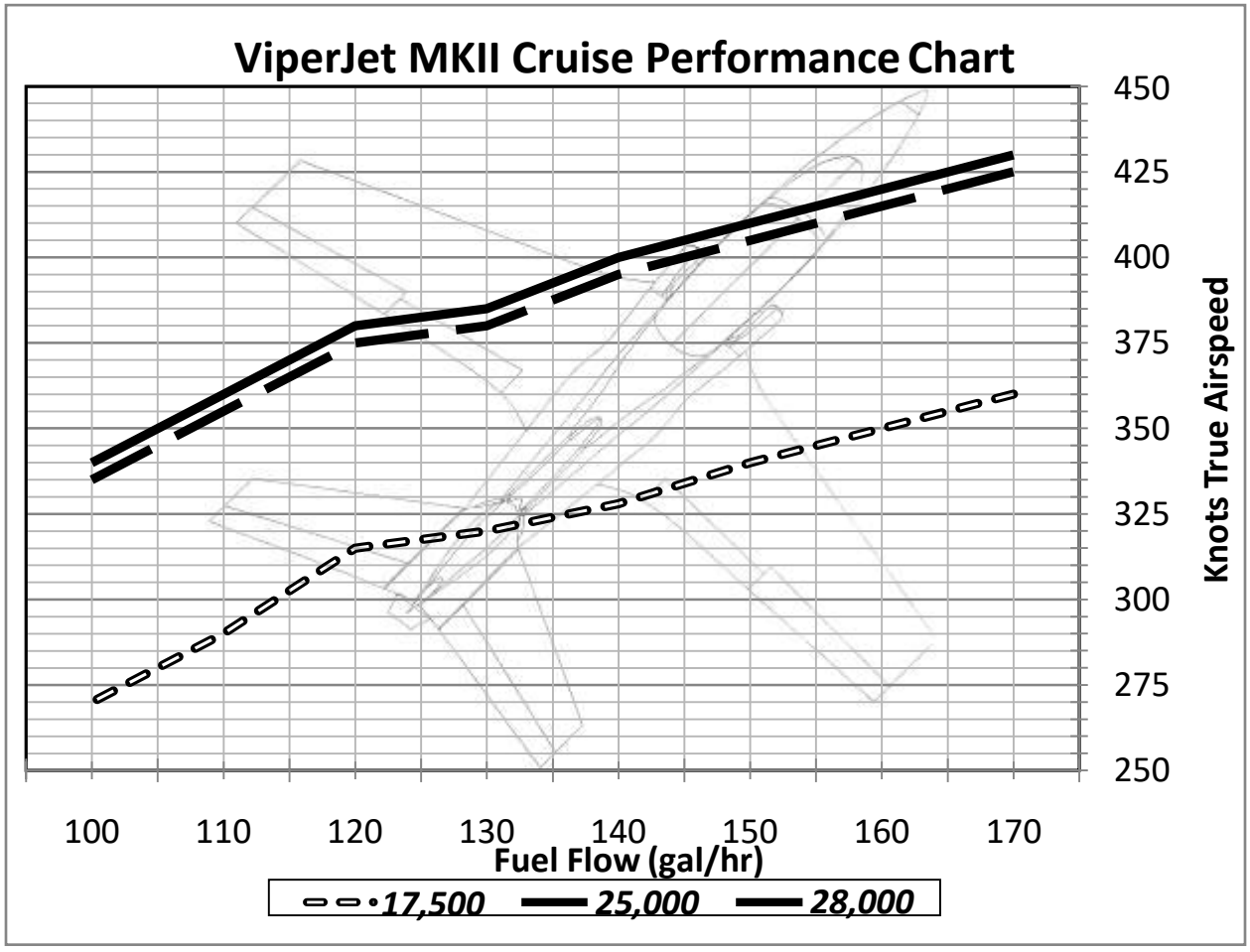

Figure 5-1. Cruise Performance

STALL SPEEDS

STALL SPEED CLEAN (4600 LBS.) ..... 96 KIAS
STALL SPEED LANDING CONFIGURATION (4600 LBS.) ..... 85 KIAS

WEIGHT LBS	G LOADING				
	1G	2G	3G	4G	5G
4600	88 KIAS	120 KIAS	154 KIAS	178 KIAS	210 KIAS
Aircraft is configured with landing gear and flaps up.					

MAXIMUM DEMONSTRATED CROSSWIND COMPONENT…… 17 KTS.

NOTE: RECOMMEND HOLDING NOSE GEAR OFF THE RUNWAY ON LANDING……..< 75 KTS.

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SECTION 6 – WEIGHT AND BALANCE

INTRODUCTION

Section 6 describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided.

It should be noted that specific information regarding the weight, arm, moment and installed equipment list for this airplane can only be found in the appropriate weight and balance records carried in the airplane.

It is the responsibility of the pilot to ensure that the airplane is loaded properly.

AIRPLANE WEIGHING PROCEDURES

1. Preparation:
    a. Inflate tires to recommended operating pressures.
    b. Remove the fuel tank sumps' quick-drain fittings to drain all fuel.
    c. Move sliding seats to the most forward position.
    d. Raise flaps to the fully retracted position.
    e. Place all control surfaces in neutral position.
2. Leveling:
    a. Place scales under each wheel (minimum scale capacity, 500 pounds nose, 1500 pounds each main).
    b. Deflate the nose tire and/or lower or raise the nose strut to properly center the bubble in the level (see Figure 6-1)
3. Weighing:
    a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.
4. Measuring:
    a. Obtain measurement **A** by measuring horizontally (along the airplane center line) from a line stretched between the main wheel center to a plumb bob dropped from the nose of the aircraft.

b. Obtain measurement **B** by measuring horizontally and parallel to the airplane center line, from center of nose wheel axle left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and average the measurements.

5. Using weights from item 3 above and measurement from item 4 above, the airplane weight and CG can be determined.
6. Basic Empty Weight may be determined by completing Figure 6-2.

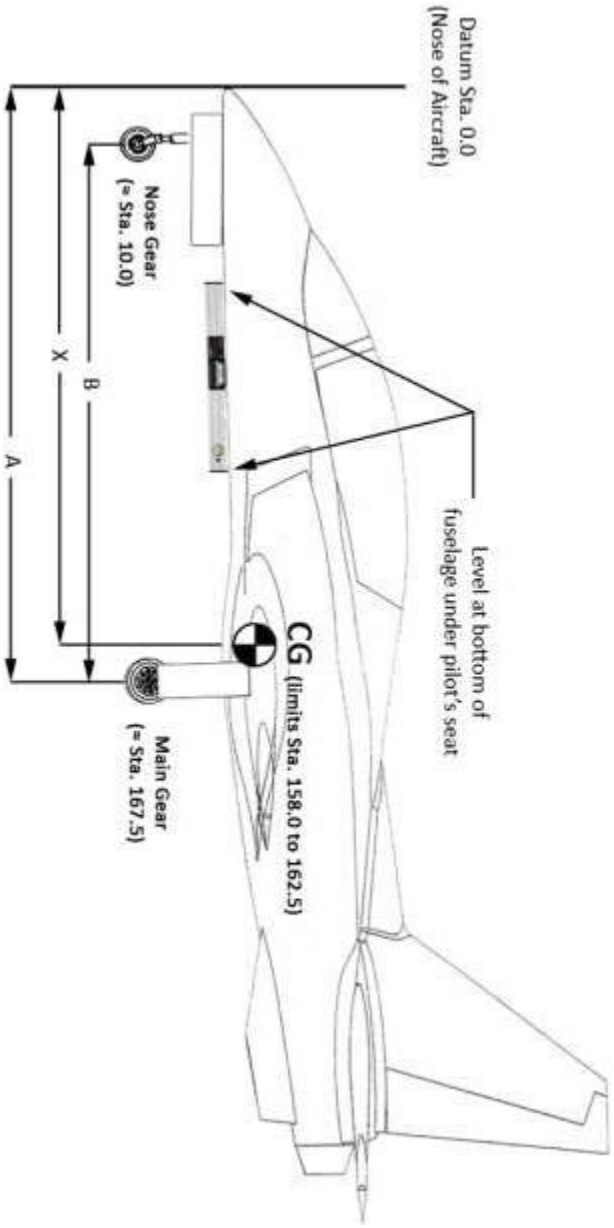

Figure 6-1. Aircraft Leveling & CG

***NOTE: Nose Weight: 20 lbs.** ***As of 1 March 2016**

Scale Position	Scale Reading	Tare	Symbol	Net Weight
Left Wheel	1540		**L**	1540
Right Wheel	1551		**R**	1551
Nose Wheel	67		**N**	67
Sum of Net Weights (As Weighed)			**W**	3158

$X = CG\ ARM = (A) - \frac{(N) \times (B)}{W}$; ⇨ $X\ (167) - \frac{(67)\ X\ (147)}{(3158)} = (169.3)$ IN.

A=167.0 in. B= 147.0 in.

ITEM	0 Weight (Lbs.)	X CG Arm (In.) =	Moment/100 (Lbs.-In.)
Airplane Weight (From Item 5 Page 6-2)	3158	163.9	517,596.2
Equipment Changes			
Airplane Basic Empty Weight	3158	163.9	517,596.2

Figure 6-2. Sample Aircraft Weighing

WEIGHT AND BALANCE

The following information will enable you to operate your ViperJet Mk II within the prescribed weight and center of gravity limitations. To figure weight and balance, use the Sample Loading Problem and Center of Gravity Moment Envelope Table as follows:

CG Range: 15% to 25% MAC (Mean Aerodynamic Chord), or Fuselage Station (as measured aft of the Datum) 158.0 inches to 162.5 inches.

Maximum Gross Weight: 5500 Lbs.

Pilot Station: 82.0 In.

Co-Pilot Station: 129.5 In.

Baggage Station: 142.0 In.

Center Fuel Tank: 160.0 In.

Wing Fuel Tank: 164.5 In.

SAMPLE LOADING PROBLEM	VIPERJET MK II PROTOTYPE		YOUR AIRPLANE	
	Weight (lbs.)	Moment (lb. - ins.)	Weight (lbs.)	Moment (lb. - ins.)
1 Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil)……	2877	479146.2	3138	517137.0
2 Usable Fuel (at 6.8 Lbs./Gal.) Center Tanks (Station 160.0 at 96.0 Gal. Maximum)	731	116960.0	653	104480.0
Wing Tanks (Station 164.6 at 142 Gal. Maximum)	1095	180204.1	966	159003.6
3 Pilot (Station 82.0)	170	13940.0	190	15580.0
4 Co-Pilot (Station 129.5)	170	22015.0	220	28490.0
5 Baggage (Station 142.0 at 50 Lbs. Maximum)	50	7100.0	50	7100.0
6 TAKEOFF WEIGHT AND MOMENT	5093	819365.3	5217	831790.6
7 CG Location (Divide Total Moment by Total Weight	160.9		159.4	
8 Compare to Fuselage Station CG limits (158.0 to 162.5 In.), since this point falls within the range, the loading is acceptable.				

Figure 6-3. Sample Loading Problem

Center Tank: 96 Gal. Maximum
Wing Tanks: 142 Gal. Maximum
Total Fuel: 238 Gal. Maximum
Unusable: 8 Gal.

Total Usable: 230 Gal.

*Fuel Burn: 80 - 120 Gal. / hour

**2 - 2.5 hours Flight Time with 30 mins. Reserve

SECTION 7 – SYSTEMS OPERATIONS

INTRODUCTION

Section 7 describes the additional systems that have been added to the aircraft to ensure safe operation and crew comfort for high altitude operations. These systems include; Bleed air pressurization, heat and defrost for the cockpit cabin compartment, air conditioning and oxygen system. Angle-of-Attack Push to Test Check equipment and drag chute deployment operations will be included. It is the responsibility of the pilot to ensure all aircraft systems are functioning properly.

BLEED AIR PRESSURIZATION

The Viperjet pressurization comes from engine bleed air cooled through a heat exchanger and directed to the cockpit cabin. The Bleed air provides the cabin heat and front windshield defrost at the front of the glare shield. Two heat vents are located on the right side, below both pilot and co-pilot seats. The black vents slide open and closed.

The pressurization is for 5.5 psi differential after engine start. Close the canopy and lock. Move the canopy seal yellow switch up to the close position. Turn on canopy seal pump by moving the white switch up to the pump on position to inflate canopy seal. This opens the bleed air valve to allow bleed air into the cockpit for heat and pressurization. To reverse the process for escape or shutdown, move the white switch to the down position to shut off the bleed air valve and the yellow switch to the down position to release the air from the canopy seal. The canopy seal air must be released in order to open the canopy.

As you takeoff and climb, set your cruising altitude with the pressurization dial indicator on the right front side console. The dial indicator will be lit in blue. Make sure the pressurization circuit breaker (CB) is in. As you descend set your airport elevation on the dial indicator.

AIR CONDITIONING

The air conditioning systems contains a compressor located in the nose of the aircraft with condenser fan in the right engine compartment and evaporator with blower fan in the cockpit center console. Adjustable vents blow air forward and aft. Air Conditioner, Engine Fan and Cabin Fan circuit breakers must all be in on the right side pilot circuit panel to operate the system. All AC switches are located on the lower pilot center console. The white condenser fan switch must be in the up on position for the AC to work. The blue cabin fan switch has a low and high position setting to blow air from the center console. The AC Temp rheostat switch is turned to the right to start AC compressor and can be regulated from high to lower settings for cabin comfort. The AC should be off for Takeoff and Landing Operations. The cabin air blower fan can be on during all operations.

The AC system cools to approximately 50 – 55 degrees Fahrenheit measured by thermometer place in center console vents. Extremely warm conditions may not cool to this level. Failure to cool below outside temperature requires servicing, or may need charging with AC R 341/a refrigerant per directions with AC recharge gauges.
The system takes 3- 4 refrigerant 12 0z. cans depending on level needed. Failure to maintain charge will require servicing of hoses, connectors and other AC components.

OXYGEN SYSTEM

The aircraft oxygen system is a Mountain High EDS Pulse-Demand O2D2 innovative oxygen control technology that allows the Pilot and Co-Pilot to fly with safely and comfort, knowing it will automatically give the exact oxygen required at the various altitudes. The 4.15-liter oxygen cylinder located under the right side of the Co-Pilot seat can be accessed through a removal panel. A refill port is located on the right Co-Pilot side panel. The maximum pressure is 2,015 psi for the system and monitored by a pressure gauge next to the refill port. Quick connect oxygen ports are located on the Pilot and Co-Pilot right side panels, but give constant flow only for Nasal cannulas and face mask with or without inline flow meters. The MH EDS O2D2 Pulse-Demand oxygen controller is located on the Pilot right side panel at seat level. This controls both front and back oxygen through a pulse demand oxygen flow set for desired altitudes. The oxygen system is turned on by a switch located on the Pilot right side panel. The power switch is turned on and makes an audible beep to signal system ready. The Pilot #1 outlet and Co-Pilot #2 outlet must be connected with either nasal cannula or face mask. The mode switch is set for the desired altitude as follows (see next page inserted from Mountain High Instruction Manual);

The oxygen tank flight duration usage is;

Single – 4.3 hours @ 25,000 ft.
Dual – 2.0 hours @ 25,000 ft.

Reference Mountain High manuals and online safety precautions for proper oxygen use, maintenance and refill procedures. **DO NOT use any type of oil or grease on any of the fitting, valves or cylinders. DO NOT smoke while in use. DO NOT operate near an open flame.**

ANGLE-OF-ATTACK

The AOA (Angle -of-Attack) is an Advanced Flight Systems, Inc. Pro Instrument display with four color liquid crystal display located on the left front instrument panel. The Angle of Attack CPU is located under to front glare shield left side and connected to four 1/8" OD color coded pressure tubing. The red tubing is connected to Pitot air, the clear tubing to static air, the green tubing to low pressure and blue tubing to high pressure air from the left wing tip pressure ports. Initial hangar and then inflight calibration is required to function properly. Reference the operating manual for post installation test, calibration procedures and trouble shooting.

The Preflight Check list and Before Take-off Check list must be conducted to verify the AOA system is working properly. The Angle-of-Attack Push to Test check located in this Pilot Operating Handbook after page 4-2 must be faithfully executed prior to each flight.

DRAG CHUTE DEPLOYMENT

Thomas Aerospace Corporation designed, fabricated and installed the Landing Drag Chute System for the Viperjet MK II. The Viperjet can take off in 1,500 ft. and land in 2,500 to 3,500 ft. depending on pilot technique. The rational for using a drag chute system is to have an added safety buffer for take-off and landing from shorter municipal airports.

Generally, a drag chute will decrease landing roll distance 25% to 30% of the normal landing distance. This is an added safety buffer if the pilot makes a faster than normal landing to prevent running off the end of the runway. The drag chute can be deployed to abort a take-off roll in an emergency to prevent running off the end of the runway. In high crosswind landings, a drag chute provides a stabilizing force to keep the jet tracking down the center of the runway. Landing on wet or icy runways with a deployed drag chute keeps the jet tracking down the runway center line when heavy braking would be ineffective and unsafe. Loss of braking would be another reason to deploy the drag chute.

The yellow 10-foot cross drag chute is deployed from a hatch that drops down between the strakes. A yellow electrical push button with a red guard labelled Drag Chute is located on the left front Pilot side panel. The circuit breaker labelled Drag Chute is next to the button. Do not push the drag chute button while APU power is connected or the 2 drag chute solenoids may overheat from high amperage.

NOTE: Nose landing gear must be on runway prior to deploying drag chute to prevent damage.

A Black T-handle with silver button located left of the Pilot flight control stick on floor releases the drag chute by pushing on the silver button and pulling the handle up. This is used for release after landing, or emergency release in flight. A added safety feature is a 3-ring release attaching the drag chute to the release cable. If the force on the rings exceeds 3,000 pounds the ring will break and release in case of inadvertent deployment in flight.

Viper Aircraft

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THE INFORMATION CONTAINED IN THIS PILOT'S OPERATING HANDBOOK IS BELIEVED TO BE ACCURATE AT THE TIME OF PRINTING, HOWEVER, SPECIFICATIONS CAN AND WILL CHANGE OVER TIME. PLEASE CONTACT VIPER AIRCRAFT FOR ANY REVISIONS TO THIS PILOT'S OPERATING HANDBOOK.