JetWeigh-5

Technical Manual

6190085 Rev. G

Aircraft Weighing System

Model JW-xxJ5, p/n 64001-xxJ5
Model JW-xxJ5-CE, p/n 64001-xxJ5-CE

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PRECAUTIONS

READ this manual BEFORE operation or servicing this equipment.

FOLLOW these instructions carefully.

SAVE this manual for future reference.

WARNING:

Only permit qualified personnel to install and service this instrument.

Exercise care when making check, test, and adjustments that must be made with power on.

Failing to observe these precautions can result in bodily harm.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with instrument.

DO NOT expose connectors or equipment in operation to water, grease or other conductive material that may cause shorting of the channel excitation voltage. This could lead to permanent circuit board damage.

DO NOT remove or pull out Jetweigh Control panel or meter indicator.

DO NOT remove or pull out the power switch inlet.

USE 1 amp SLOW BLOW FUSE for 110-120 VAC.

USE 2 amp SLOW BLOW FUSE for 220-240 VAC.

VERIFY that voltage selector fuse arrow is matched with power source voltage.

KIT CASE IP 20 shall be protected against water.

ONLY use earthed power socket.

DO NOT close lid when in operation.

THERE shall be a clearance around the power switch for easy operation.

IF equipment is used in any other way then written in this manual, then protection provided by the equipment may be impaired.

FLAMMABLE LIQUIDS must be handled with CARE.

ALL Applicable local Procedures and Precautions shall be followed when using any Aircraft Weighing System component in and around fueling stations or when using the components within the accessory kit to obtain fuel samples.

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TECHNICAL INFORMATION

The section is intended to support and expand on the information presented in this manual. The Jetweigh kit is not intended to be field maintained. Replacement of power cables or fuses will not affect accuracy. Other maintenance should be performed at a qualified depot or, preferably, the factory.

SPECIFICATIONS

Accuracy	0.1% of applied load or 0.02% of channel capacity, whichever is greater				
Calibration method	Dead weight calibration of load cells in factory				
MODEL	**JW-15J5**	**JW-20J5**	**JW-30J5**	**JW-40J5**	**JW-75J5**
PART NUMBER	**64001-00J5**	**64001-01J5**	**64001-02J5**	**64001-03J5**	**64001-04J5**
CE MODEL	**JW-15J5-CE**	**JW-20J5-CE**	**JW-30J5-CE**	**JW-40J5-CE**	**JW-75J5-CE**
CE PART NUMBER	**64001-00J5-CE**	**64001-01J5-CE**	**64001-02J5-CE**	**64001-03J5-CE**	**64001-04J5-CE**
No. of cells	3	4	3	4	3
Cell capacity (lbs)	5,000	5,000	10,000	10,000	25,000
Kit capacity (lbs)	15,000	20,000	30,000	40,000	75,000
Resolution (lbs.)	0.5	0.5	1	1	2
Kit weigh (lbs.)	72	78	72	78	72
Case kit dimensions	37” x 20” x 13” / 940 x 508 x 330 mm				
MODEL	**JW-100J5**	**JW-150J5**	**JW-200J5**	**JW-300J5**	**JW-400J5**
PART NUMBER	**64001-05J5**	**64001-06J5**	**64001-07J5**	**64001-08J5**	**64001-09J5**
CE MODEL	**JW-100J5-CE**	**JW-150J5-CE**	**JW-200J5-CE**	**JW-300J5-CE**	**JW-400J5-CE**
CE PART NUMBER	**64001-05J5-CE**	**64001-06J5-CE**	**64001-07J5-CE**	**64001-08J5-CE**	**64001-09J5-CE**
No. of cells	4	3	4	3	4
Cell capacity (lbs)	25,000	50,000	50,000	100,000	100,000
Kit capacity (lbs)	100,000	150,000	200,000	300,000	400,000
Resolution (lbs.)	2	5	5	10	10
Kit weigh (lbs.)	78	72	78	96	110
Case kit dimensions	37” x 20” x 13” / 940 x 508 x 330 mm				

Continue on next page

MODEL	JW-250J5	JW-425J5	JW-450J5	JW-500J5	JW-600J5
PART NUMBER	**64001-16J5**	**64001-12J5**	**64001-13J5**	**64001-14J5**	**64001-15J5**
CE MODEL	**JW-250J5-CE**	**JW-425J5-CE**	**JW-450J5-CE**	**JW-500J5-CE**	**JW-600J5-CE**
CE PART NUMBER	**64001-16J5-CE**	**64001-12J5-CE**	**64001-13J5-CE**	**64001-14J5-CE**	**64001-15J5-CE**
No. of cells	5	5	5	5	3
Cell capacity, mains (lbs)	50,000	100,000	100,000	100,000	200,000
Cell capacity, nose(lb)	50,000	25,000	50,000	100,000	200,000
Kit capacity (lbs)	250,000	425,000	450,000	500,000	600,000
Resolution (lbs.)	5	10	10	10	20
Kit weigh (lbs.)	85	125	125	140	190
Big case kit dimension	37" x 20" x 13" / 940 x 508 x 330 mm				
Small case kit dimension	23" x 16" x 10" / 584 x 406 x 254 mm				
Software features:	• On board automatic center of gravity calculation • Re-configurable load cell arrangement • 3 weights modes to meet different environmental conditions • Automatic latitude and altitude adjustment of weigh value • Automatic zero tracking • On-board library of up to 200 aircraft types and characteristics • Diagnostic algorithms check for system errors				
Data(displayed and printed):	• Gross weight • Individual load cell weights (kg, lb and %) • CG location (inches, cm, % MAC)				
Weighing save options:	• Internal memory • Serial interface to download (or synchronize) to a PC				
Power	• 100 W • 50-60 Hz • 110-120 VAC with 1 amp Slow Fuse • 220-240 VAC with 2 amp Slow Fuse				
Environmental protection	• Load cells – IP65 • Kit case – high-impact fiberglass carrying case				
Environmental conditions: **Operating temperature:** **Storage temperature:** **Humidity:**	• +14ºF to + 120ºF (-10º C to + 50ºC) • -4ºF to + 140ºF (-20º C to + 60ºC) • 95% RH, non-condensing				

System Content:

- 3 to 5 load cells
- Rugged weighing user terminal
- Thermal printer
- Power Supply and power cord
- Center-of-gravity accessory kit
- Rugged fiberglass carrying case

Center-of-gravity accessory kit content:

- Level and level bar
- Plumb bob assembly (2)
- Chalk and line
- Hydrometers (2)
- Fuel dipper
- Hydrometer jar and stand
- Leveling bar
- 50’ Steel tape
- Screwdriver
- 12” steel ruler

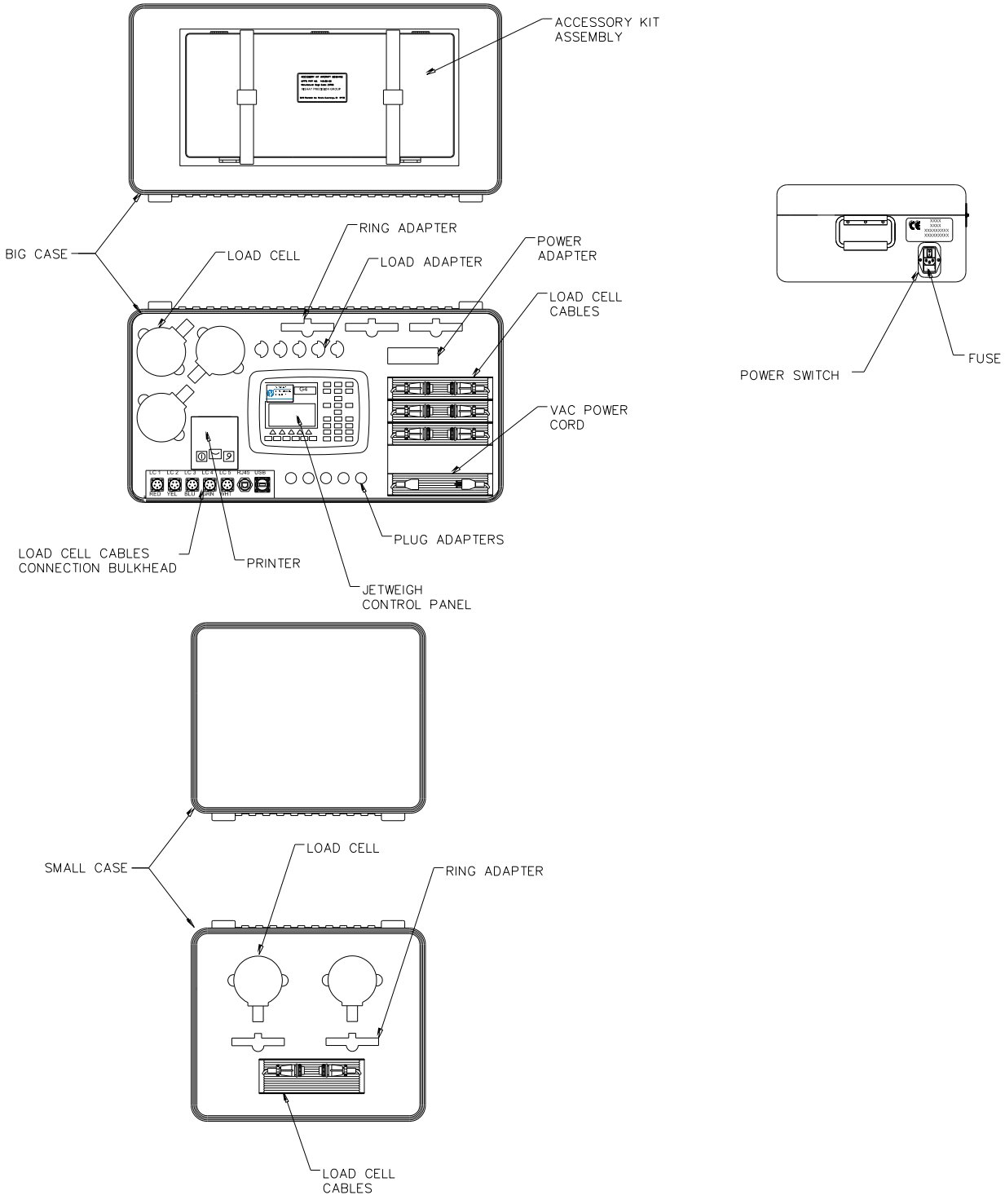
Load Cell Connectors: To connect Load cell to G4 Indicator WFIN / WF boards.

USB Connector: To connect external memories sticks / ASCII Keyboard to the G4 Indicator.

RJ45 Connector: To connect G4 Indicator to Internet.

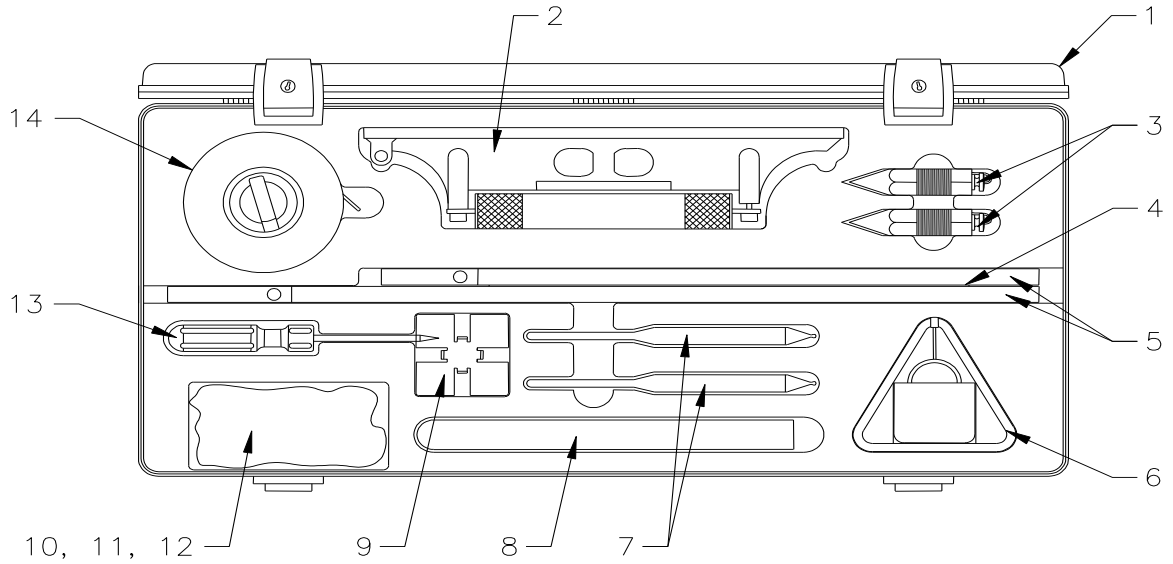
GENERAL CONFIGURATION

CONFIGURATION MAY VARY BASED ON CAPACITY AND MODEL.



ACCESSORY KIT CONFIGURATION

ITEM	PART NO.	DESCRIPTION	QTY
1	140439-00	Case Assembly	1
2	320131-00	Level	1
3	64990	Plumb Bob Assembly	2
4	320069-00	Rule, 1 Foot	1
5	145997-00	Leveling Bar	1
6	102104-00	Fuel Dipper	1
7	102113-01	Hydrometer	2
8	302112-00	Hydrometer Jar	1
9	102264-00	Hydrometer Base	1
10	320051-00	Bag	1
11	320049-00	Chalk	1
12	600398-00	Chalk Line	1
13	320134-00	Screw Driver, Standard	1
14	140283-00	Steel tape, 50 Foot	1



Section I - General Information

1.1 INTRODUCTION

This manual provides information on the operation of JetWeigh-5 (JW5) Aircraft Weighing System Kit manufactured by VPG ONBOARD. JetWeigh-5 Aircraft Weighing Systems (Figure 1-1) integrate state- of-the-art communication, digital weight processing, and high-accuracy hermetically sealed load cells. Precision technology from VPG Revere Transducers and VPG Onboard Systems results in an accurate, high- reliability, robust, and easy to use Aircraft Weighing System.

JetWeigh-5 kits are designed primarily for the weighing of aircraft and aerospace vehicles, but can be used for other precision weighing applications, as well as for the calibration of force generating machines. The kits have been calibrated using dead weight machines. These machines are maintained to better than ±0.002% with respect to the nominal weight value. The degree of uncertainty for all of the individual weights is 0.009%.

Gravity corrections are applied based on customer site Latitude and Elevation.

High capacity JetWeigh-5 (JW5) kits with load cell capacities of 200,000 lb are calibrated on VPG Revere's high capacity precision hydraulic transfer standard.

Maximum acceptable deviation between the transfer standard and dead weight data is ±0.05%. Both the dead weight machine and the transfer standard are secondary standards and are directly traceable to NIST.

It is recommended that the kit be returned to the factory for re-calibration every twelve (12) months.

The load imposed on a load sensor (cell) produces an output signal directly proportional to the load applied. The signal is transmitted through channel specific, color coded cables to the G4 Control Panel where the measurement is processed. Analog load cell signals are processed digitally to remove linearity errors, latitude and altitude effects. An integral printer provides a permanent record of all pertinent weighment information including any deviations that are accepted by the operator.

Figure 1-1. Typical JetWeigh-5 Aircraft Weighing System

1.2 SYSTEM COMPONENT DESCRIPTIONS

Each kit contains the necessary equipment for weighing an aircraft with the exception of specialized jacks. Kit contents include 3 to 5 load cells, a rugged "G4" user console, a tape printer, power adaptors and a power cord, and a rugged fiberglass carrying case.

1.2.1 JetWeigh-5 Control Panel

The Control Panel features a graphical color touch screen display, intuitive step-by-step operation, and advanced functions such as Center of Gravity calculations compensated for Latitude and Elevation. Cable connection is provided for up to 5 remote load cells.

Synchronized sampling of all load cells ensures correct weighing even under severe vibration, oscillations, and wind uplift conditions.

1.2.2 Hermetically Sealed Load Cells

Each kit contains from 3 to 5 hermetically sealed load cells. These cells are precision devices and will withstand 150% overload without damage. Dropping a load cell, however, could damage the electronic box, the diaphragm, or other components affecting its operation or accuracy.

Each cell has a tapped hole on the bottom to receive a plug or a ring jack adapter. The top surface has a 3/4" radius concave surface to receive either the spherical surface of an adapter or the aircraft jack pad directly.

NOTE: *Load cells of identical capacity are interchangeable. However, load cells and spherical adapters are color coded as matched sets. When changing load cell locations, make sure that the spherical adapter/load cell combination remains intact.*

1.2.3 Load Cell Adapters

For the purpose of mounting load cells under varying physical arrangements, several adapters are provided (See Figure 1-2):

a) Plug and ring adapters for securing the cell to the hydraulic jack.

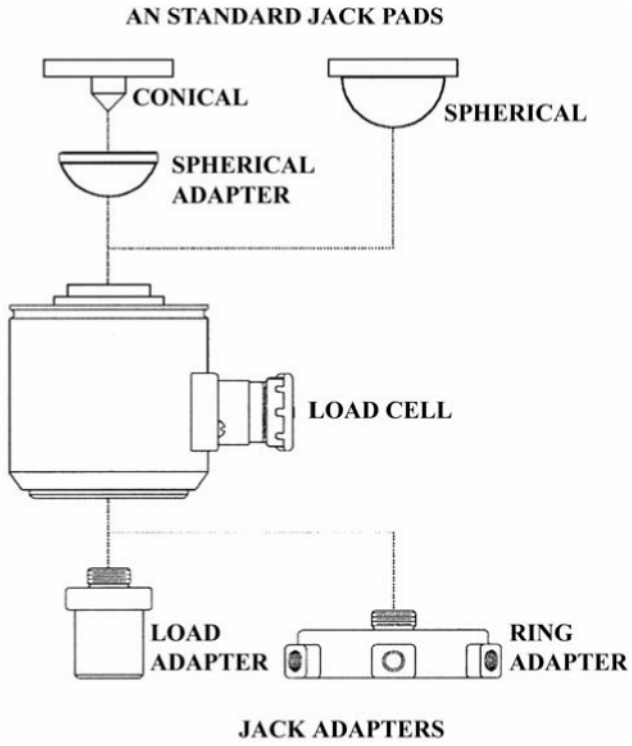


Figure 1-2. Jack Adapters

b) Spherical adapters to allow interfacing transition between the cells and conical jack pads or flat surfaces

c) Axle adapters which allow transition from the cell to the cylindrical surface of the axle.

1.2.4 Tape Printer

JetWeigh-5 systems ship with a high speed thermal printer. At the end of each weighment, aircraft specifications, resultant weight data, and all other calculations can be printed and stored for future reference. Data transfers to Desk Top computers are via an ether-net interface.

The printer is compact, easy to install, and requires minimal maintenance. A complete reference manual for the printer is included with the kit.

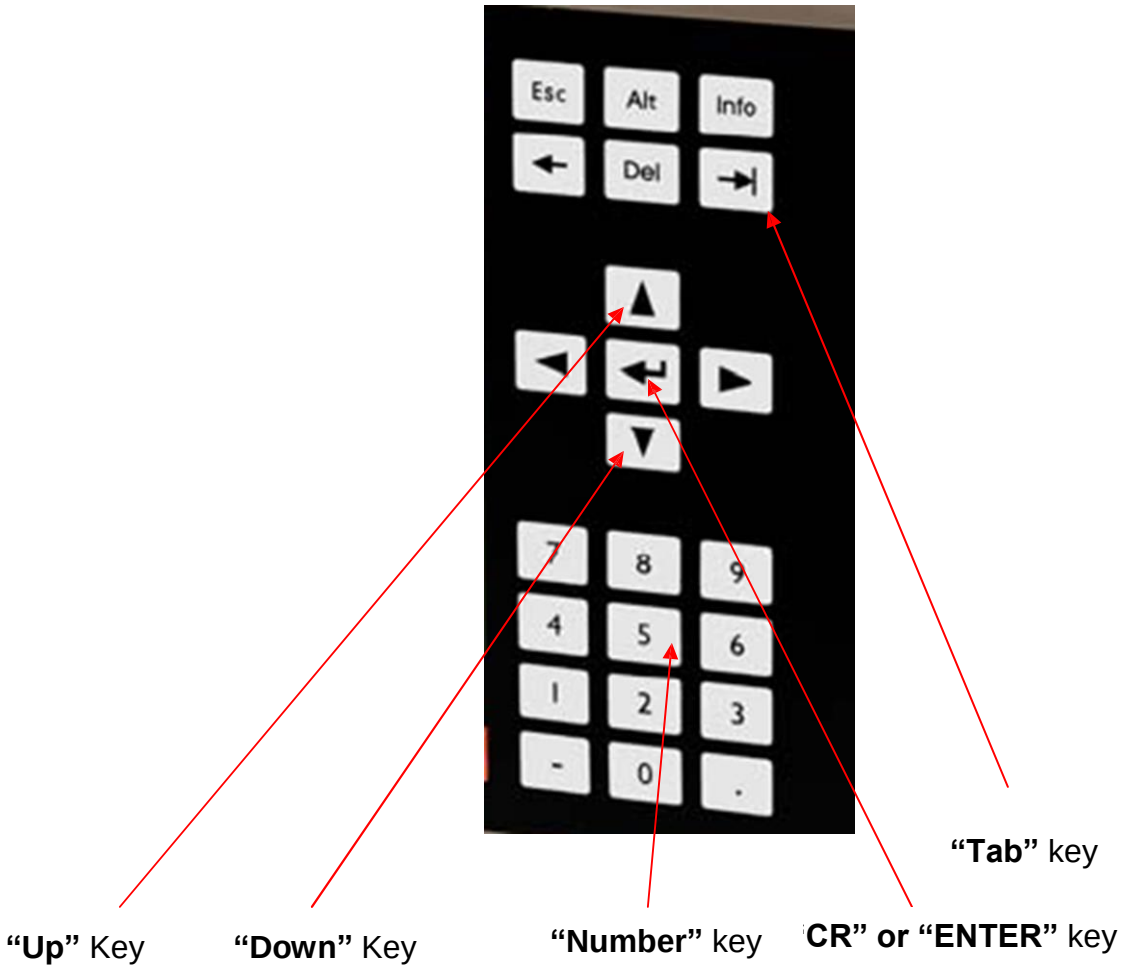
Text Conventions:

1. Membrane keys referenced in Bold straight type: example **"Info"**

2. Touch Screen buttons or commands referenced in Bold Italics: ***"Calc Cg"***

3. Displayed Text or Parametric entry forms referenced as encased in apostrophes and italicized: example *"General Parameters"*.

Membrane Keypad:



Section II - Pre-Operation

2.1 PRE-OPERATIONAL PROCEDURES

Place the JetWeigh-5 Kit in any convenient location within the length of the load sensor cables. Unreel the cables and connect them to the proper load cells, observing color codes; i.e., red to red, yellow to yellow, etc. It is important to insure that cables are never pinched, cut, or crushed, and that open connectors are never exposed to water, grease or other conductive material that may cause shorting of the channel excitation voltage. **It is essential that site Latitude and Elevation be setup correctly. If not sure, refer to Appendix section 1.0 for instructions on how to define the same. This is a restricted set-up procedure and a Password will be required.** NOTE: *Color coded load cells and cables are not interchangeable*

2.1.1 Load Cell Jack Point Configuration

JetWeigh-5 Systems accommodate jack point configurations for 3-point, 4-point (helicopter or fixed wing) and 5-point aircraft. Recommended deployment of the load cells is shown in Table 2-1. Make sure to match the load cells and the mechanical adapters to ensure precision and consistency of weighment values.

2.1.2 Preparation for Aircraft Weighing

1. Review the Equipment List of the aircraft being weighed. Update the list as required. Make sure the particular equipment, which will normally be installed, but is missing at the time of the weighing, is added in the later calculations.

2. Remove all equipment, which will not be included in the above list.

3. Clean the aircraft to remove accumulated dirt, grease and trapped water.

4. Fill the oil tanks to a known quantity. Fill all reservoirs, such as anti-icing fluid, to capacity.

5. Drain fuel tanks. If draining is not practical, fill the tanks to capacity. Add or account for unusable fuel.

6. Determine the unit weight of fuel. The user shall follow all applicable safety procedures specific to local regulations and procedures. Obtain a sample from the fuel tank with the supplied fuel dipper (CG kit) and pour the sample into the test tube. Using the hydrometers (CG kit), the weight of fuel in pounds per gallon can be observed. Variations in fuel weight, particularly in the case of jet aircraft, can cause appreciable difference in the final empty weight and CG determinations. Be alert for partially filled non-symmetrical fuel tanks.

7. With tricycle gear aircraft, it is often desirable to level the aircraft as closely as possible before lifting on the jacks. Changing oleo strut extensions can do this.

8. A stabilizing period of 20 minutes running concurrently with warm-up period is advisable. When using jack adapters, be sure the adapter is fully threaded into the cell. With ring adapters, make sure it is centered flush on the ram before tightening the set screws.

CAUTION

Use proper adapters to prevent jacks from slipping or buckling. Damage to the aircraft or inaccurate weight readings may result if improper adapters are used. Never apply load to the rim of the cell.

Color coded spherical adapters must be used in conjunction with color coded load cells.

(continued on following page)

Table 2-1. Jack Point Configuration

3 Load Cells		
Channel 1	**Red**	**Left**
Channel 2	**Yellow**	**Right**
Channel 3	**Blue**	**Nose**
4 Load Cells	**Helicopter**	**Fixed Wing**
Channel 1 Red	**Fwd Left**	**Left**
Channel 2 Yel	**Fwd Right**	**Right**
Channel 3 Blue	**Aft Left**	**Nose**
Channel 4 Green	**Aft Right**	**Spare**
5 Load Cells		
Channel 1	**Red**	**Left (1)**
Channel 2	**Yellow**	**Right (1)**
Channel 3	**Blue**	**Nose**
Channel 4	**Green**	**Left (2)**
Channel 5	**White**	**Right (2)**

9. It is recommended that the load sensors (cells) be exercised prior to performing an actual weighment. Exercise the load sensors 2 – 3 times by lifting the aircraft with the load sensors and jacking system in place.

10. The JetWeigh-5 has color coded cables. The identifiers for each color coded channel are clearly visible on the display. You must conform to the color schemes as indicated on the display. This ensures uniformity of measurements, as also introduces a great degree of reliability.

2.2 CONTROL PANEL CONFIGURATION

Figure 2-1 shows the default power up screen for the JW5 Control Panel. Touch ***"Set Up"*** on the lower right corner of the display screen to enter aircraft setup mode.

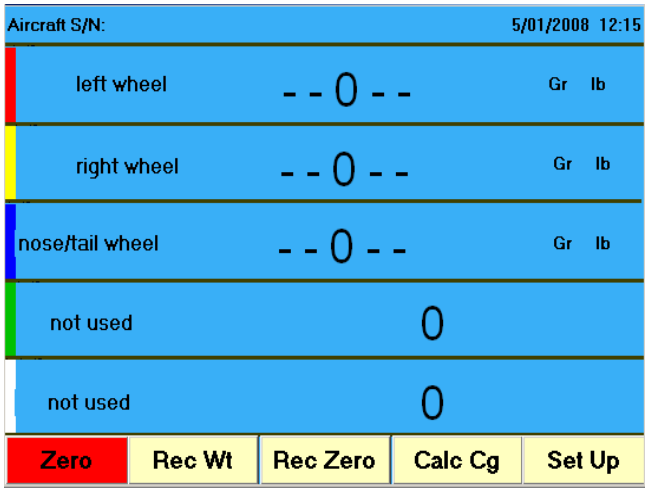


Figure 2-1. Initial Power Up Display after a "Zero".

2.2.1 Setup Screen Options

Setup mode consists of three aircraft reference parameter entry screens. Step through each entry screens equentially, starting with *Serial Number/Model Number* and proceeding to *Datum* (*the reference line that allows accurate, and consistent, measurements to any point on the aircraft*) and *MAC (mean aerodynamic chord)*. After entering valid parameters on each screen, the system is ready for "live" weighing operation.

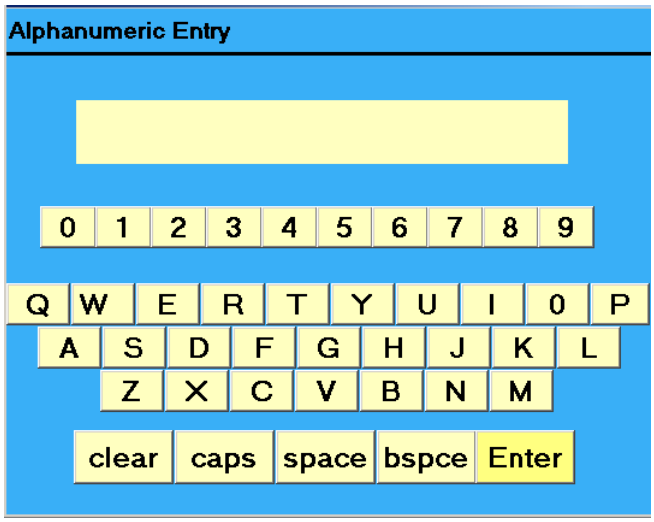


Figure 2-2. Ascii Keypad

NOTE: *For screens that require alpha character entry, touch the data text box (**Serial Number** or **Model Number** (figure 2-4)) and a **keypad** shall appear as shown in Figure 2-2. For entries requiring numeric data entry (figure 2-5), touch the **parameter** you want to change and a numeric **keypad** shall appear (Figure 2-3).*

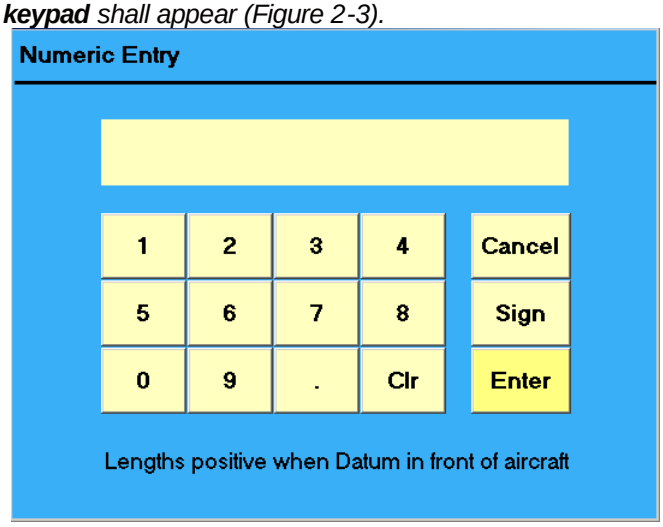


Figure 2-3. Numeric Entry Keypad

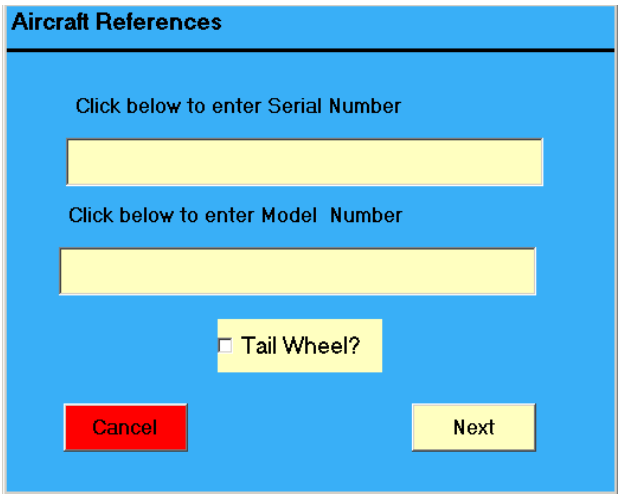


Figure 2-4. Serial and Model Number Entry

2.2.2 Serial Number/Model Number

Touch *Set Up* and the *Serial Number/Model Number* Screen will appear (Figure 2-4). Touch ***Cancel*** to return to live weighing screen. Touch ***SERIAL NUMBER*** text box to enter the serial number and ***MODEL NUMBER*** text box to enter the aircraft model number. Be sure to touch ***Tail Wheel?*** if the aircraft has a tail wheel installed. Touch ***Next*** to advance to the *Datum\MAC Screen*.

2.2.3 Datum Entry

Enter datum distances for each wheel by pressing associated screen box (Figure 2-5) and using the numeric keypad (Figure 2-3). In addition, enter measurements from Datum to LEMAC (Leading edge of the Mean Aerodynamic Chord), the MAC and the stated Empty weight of the Aircraft.

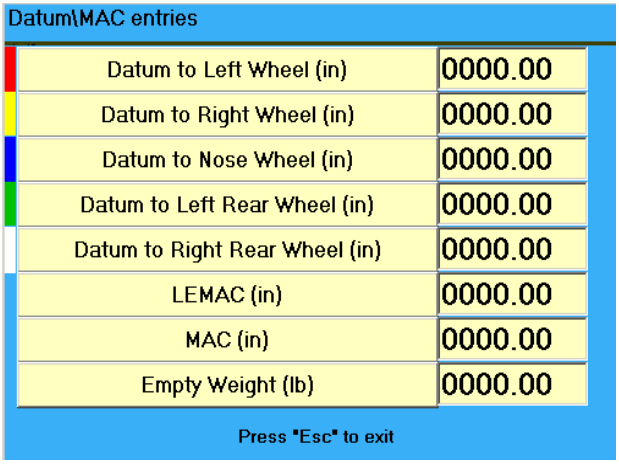


Figure 2-5. Datum Value Entry Screen

NOTE: *Datum values must be entered in units indicated.*

When finished push on the membrane key marked **Esc** to exit to Live Operators screen.

The entries for the aircraft are now defined and saved.

Section III - Operation

3.1 LOAD CELL/JACK PLACEMENT

Place load cell equipped jacks in position beneath aircraft jack points as shown in Figure 3-1. Be sure that the load cell cables are routed so that they will not be crushed or pinched when the aircraft is raised/lowered. Connect the cables to their color coded receptacles at the cable connection bulkhead (Figure 3-2).

3.2 TERMINAL POWER UP

Figure 3-2 shows the G4 Control Panel within the JetWeigh-5 Kit. Power the Kit up and observe the initial screen as depicted in Figure 3-3.

Figure 3-1. Aircraft with Jacks Positioned

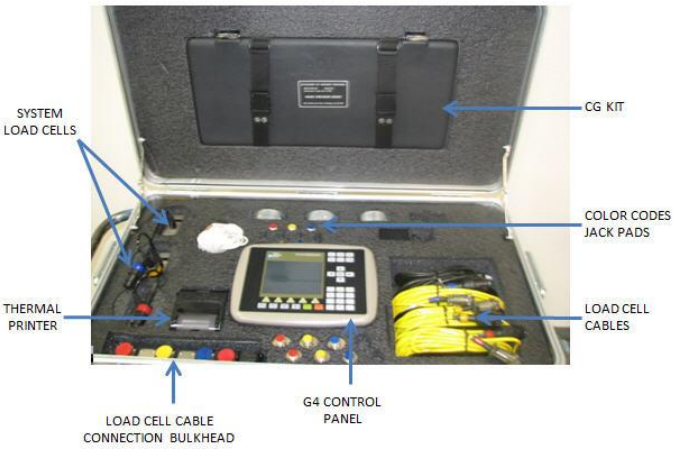


Figure 3-2. JetWeigh-5 Kit

3.3 AIRCRAFT WEIGHING CYCLE

Prior to weighment, Vishay recommends that the aircraft be raised and lowered 2 or 3 times ("dry runs") to acclimate system load cells. Actual weighing is accomplished in six steps; Zeroing, Lifting, Weighing, Removing, Rezeroing, and Reporting using the weighing menu. Each step must be performed sequentially and successfully before proceeding to the next step.

NOTE: *During aircraft weighing, the* **Fl**, **F2**, **F3**, **F4** *membrane keys may be used in lieu of the Touch Screen buttons.*

3.3.1 Zeroing

Under ideal conditions, with the Kit powered up and in a no load condition (no jack contact with aircraft jack points) the reading for each channel should be zero. However, in reality, it is often necessary to "zero out" minor variances in any or all of the system cells. Touch the "***Zero"*** **(Red)** key on the lower left corner of the screen to zero all cells simultaneously.

3.3.2 Lifting

At this juncture, the aircraft must be jacked up so that it is resting exclusively on the load cell based jacks. Jacking should be done in accordance with aircraft manufacturer specifications, if provided. During the jacking or lifting phase, wheel weight values will appear inside of a red bar, indicating that weight is unstable. (Figure 3-3). When jacking is complete, the red bar will disappear (stable state) and weight readings for the cell should appear as depicted in Figure 3-4 (next page).

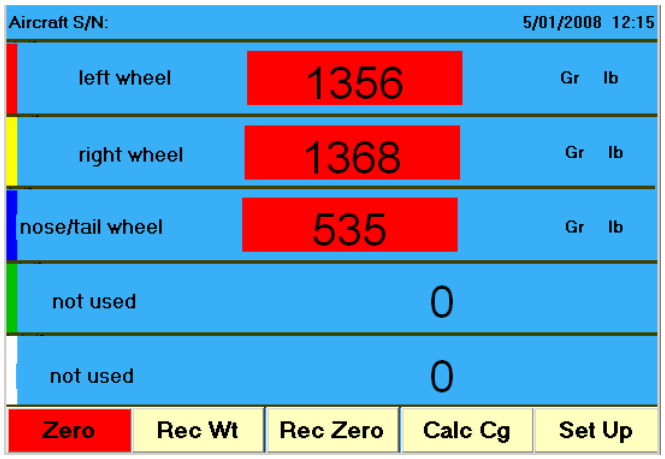


Figure 3-3. Force data changing during "lift" or "jacking" phase of the weighing operations. Notice Red background.

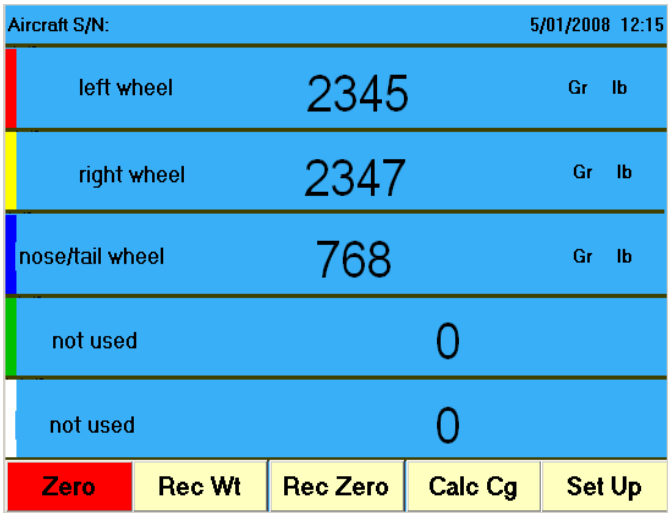


Figure 3-4. Stable Weights

3.3.3 Weighing

When the aircraft is fully jacked up (Figure 3-5) and readings are stable (no red bar weight indicators), touch ***Rec Wt*** on the screen. A pop-up window will appear acknowledging that the weight data has been successfully recorded. This window also instructs the operator to unload the jack points. Touch ***OK*** and begin lowering the jacks under the aircraft.

NOTE: *The operator must be satisfied that the weighment is valid and stable. Operator acceptance takes into consideration factors such as: the aircraft is completely clear of the ground (floor) and all items aboard are accounted for. The fully jacked aircraft may not enter a "stable" condition regardless of the amount of load applied. The operator is free to change the loading or simply wait until a final weighment is acceptable on the display i.e. no data changing red bars showing. Any outside force, wind on control surfaces, vibration, etc., may keep the system from reaching a "stable" condition. It is important for the operator to exercise good judgment at this point. Jet Weigh-5 systems only recognize applied weight and have no ability to confirm that loading is complete and acceptable.*

3.3.4 Removing

Removing is the reverse of lifting. At this time, lower the aircraft to its original resting position and make sure there is no contact between the load cells and the jack points.

DO NOT REMOVE ANY INTERFACE HARDWARE.

NOTE: *It is important that all load cells are clear of the aircraft to provide a good zero return. The Jet-Weigh-5 performs automatic checks to assure a good zero return (zero tracking if selected) and compensate for minor tolerance variations during zero return. If the return is not satisfactory for any reason, an error condition will result. The weighmaster must review all error messages and the data on the printout tape to decide if the weighment can be accepted or the aircraft must be re-weighed.*

3.3.5 Return to Unloaded State.

With the load cell/jacks in the pre-weighing position (Figure 3-1) check for stable weight readings at each wheel. All readings should be zero or relatively close to zero at this point. Touch ***Rec Zero*** to record the return to zero data for this weighment. A pop-up window will acknowledge the successful recording of the return to zero data. Touch ***OK*** to complete the weighment.

Figure 3-5. Aircraft Fully Jacked Up

3.3.6 CG Calculation and Weighment Report Touch **Calc Cg** on the front panel. Table 3-1 simulates the printout format for a typical aircraft weighment report. CG calculations, aircraft identifiers, and weighment results are available for visual review and hard copy printout. To print weighment results, touch ***Print Wt/Cg Record.*** Once printing is complete, a dialog box appears asking if you want to save the results. If you choose ***Yes*** the data record is saved as a text file. This **Wt/Cg data file** can be later retrieved using FTP. (Refer Wt\Cg Data File retrieval manual. for details Doc. No: 6190085-01).

The system automatically returns to the Live Operator screen.

NOTE: *the **Calc CG** key is disabled until all previous functions have been completed (zeroing, lifting, etc.). Once Calc CG is clicked, the function is disabled until the next set of recordings are ready.*

At this point, the weighment and documentation cycle is complete. If no further aircraft weighing is required, power down the JetWeigh-5 Kit, remove the load cells from the jacks, roll up the cables, and carefully repack the JetWeigh-5 Kit.

Table 3-1. Weighment Data Printer Format

1.	Date and Time
2.	Serial Number of Aircraft
3.	Aircraft Model
4.	Units of Force
5.	Units of Length
6.	User Site Latitude
7.	User Site Elevation
8.	Gravitational Correction Factor
9.	Datum to Left Wheel (Red Channel)
10.	Datum to Right Wheel (Yellow Channel)
11.	Datum to Nose Wheel (Blue Channel)
12.	Datum to Left Rear Wheel (Green Channel)
13.	Datum to Right Rear Wheel (White Channel)
14.	LEMAC
15.	MAC
16.	Tail Wheel or Nose Wheel
17.	Force on Left Wheel (Red Channel)
18.	Stable or Forced
19.	Force on Right Wheel (Yellow Channel)
20.	Stable or Forced
21.	Force on Tail or Nose Wheel (Blue Channel)
22.	Stable or Forced
23.	Force on Left Rear Wheel (Green Channel)
24.	Stable or Forced
25.	Force on Right Rear Wheel (White Channel)
26.	Stable or Forced
27.	Unloaded Force Left Wheel (Red Channel)
28.	Stable or Forced
29.	Unloaded Force Right Wheel (Yellow Channel)
30.	Stable or Forced
31.	Unloaded Force Nose/Tail Wheel (Blue Channel)
32.	Stable or Forced
33.	Unloaded Force Left Rear Wheel (Green Channel)
34.	Stable or Forced
35.	Unloaded Force Right Rear Wheel (White Channel)
36.	Stable or Forced
37.	Stated Empty Weight
38.	Empty Weight of Aircraft
39.	Total Moment around Datum
40.	Cg from Datum
41.	Percentage MAC

Section IV Trouble Shooting

4.1 TROUBLESHOOTING OVERVIEW

In case of a malfunction, we highly recommend a thorough visual inspection of Load Cells, Cables, Bulkhead connectors, Power cables, etc. Often a visual inspection alone reveals the source of the problem. Customer support can then be called upon to send replacements for damaged parts. The system will generate diagnostic messages indicating a resulting abnormality resulting from broken components. Table 4-2 lists some typical messages and a possible source of the problem.

Table 4-2. JetWeigh-5 Problems and Solutions

Error 003:	**Weight is not valid**. Display unit failure. Power "Off" and restart. If problem persists, call VISHAY Customer Service.
Error 004:	**Overload**. Overload means that the highest allowed value that is specified in the set-up parameters is exceeded.
Error 005:	**Over Range**. The Input signal from the Load Cell exceeds the operating range. Damaged or Overloaded load cell.
Error 006:	**Under load**. Force readings are below the lowest allowed limit. Damaged or Overloaded load cell.
Error 007:	**Under range**. Input signal from the Load Cell is less than the operating range. Damaged or Overloaded Load Cell.
Error 010:	**Excitation Short circuit**. Load Cell, and\or Load Cell cable damage.
Error 011:	**Sense Voltage Error**. Excitation sense is invalid. Check wiring.
Error 020:	**Too many digits**. Weight value exceeds 6 digits. Call VISHAY Customer Service.

MAINTENANCE

Equipment should be kept free of dirt and grease. Dust caps should be kept on the electrical receptacles of the load cells when not is use.
Only routine maintenance is recommended on the aircraft weighing kits.
Calibration of the kits requires highly specialized equipment including standards and/or dead weight testing facilities. It is recommended that the kits be returned to the factory on an annual basis for calibration and re-certification or sooner if trouble is observed or erroneous readings are suspected.

The fuse can be replaced by removing the black plastic clip outward from the power switch inlet

Use 1 Amp SLOW fuse (p/n 4300011- McMaster 7085K85) for 110-120 VAC.
Use 2 Amp SLOW fuse (p/n 4300006 – McMaster 6978k749) for 220-240 VAC.

PRINTER

Field maintenance consists of changing printout tape and ribbon. Both are accessible by removing the plastic covers on the printer.

To replace the printer ribbon, press down on both sides of the paper tape exit slot in the area of the small marked squares. The forward edge of the tape cover will pop up. Grasp the front edge and gently lift to remove the cover. The ribbon cartridge is identified by its black color. It is removed by pressing down on the right edge over the word "push". The left side will pop up allowing gentle removal. To install a replacement, reverse the process. The exposed ribbon goes on top of the paper tape. The exposed end of the paper tape may be pulled out longer to facilitate passing the ribbon in front of it. **DO NOT TRY TO REWIND THE PAPER ON THE ROLL OR THE PRINTER WILL BE DAMAGED.**

If the printer continues to print illegibly after ribbon replacement, the new ribbon may be defective. A simple test will determine this. Remove the ribbon cartridge, hold the left side with one hand, gently turn the notched wheel in the direction of the arrow by pressing a rubber pencil eraser on the notched area and turning. The exposed portion of the ribbon should move.

It is suggested that replacement ribbons be obtained locally

With Weightronix Printer	With Thermal Printer:
Printer Ribbon Cartridge - Epson ERC-09 Printer Paper Roll Texas Inst. PL-52 (3 roll box)	Thermal Paper rolls EXW for printer SP-MPT-III

or contact Vishay Customer Service.

To replace the paper tape, grasp the clear plastic cover by the front center and rear face center. Pull gently upwards.

Remove the tape cover as described above. Cut the remaining roll and pull the paper remaining in the printer forward. **NEVER PULL THE PAPER BACKWARD OR THE PRINTER WILL BE DAMAGED.**

Trim the new paper roll straight. Insert and hold in the paper compartment feed slot. Push the "paper feed" button on the printer to feed paper into printer. Twelve (12) line feeds will result. Guide the paper between the ribbon and the ribbon cartridge. Insert through the slot in the tape cover and reinstall the tape cover. Reinstall the clear plastic cover. See Table III for paper roll replacement information. It is suggested that paper supplies be obtained locally.

APPENDIX

A.1 Set Up Site Latitude and Elevation.

1.0 Gravity varies with Latitude and Elevation of the site where a weighment is taking place. To compensate for this variation it is necessary that the site Latitude and Elevation be specified as a parametric entry into the Jetweigh-5 system. The procedure to do so is detailed below:

1.1 Press the **"Info"** key on the membrane keypad. See Fig 1 below.

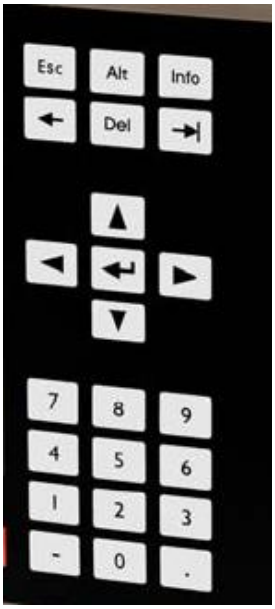


Fig. A.1-1
Membrane Key Pad

1.2 An alphanumeric keypad will now be displayed (Fig. A.1-2). Carefully enter the password supplied and touch the **Enter** key.

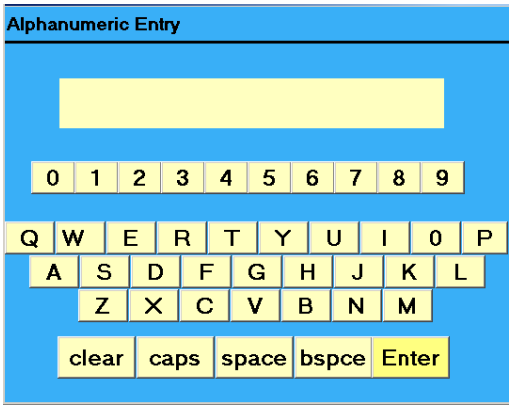


Fig. A.1-2
Ascii Keypad

1.3 If the password entry is correct, then a *"Main Menu"* (Fig. A.1-3) is displayed on the screen.

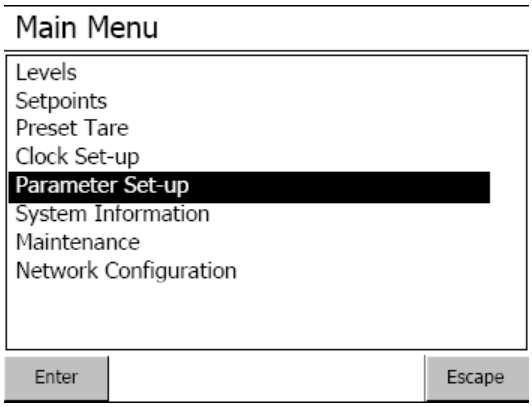


Fig. A.1-3
Main Menu

1.4 Use the **down** membrane key to navigate to *"Parameter Set-up"* and then push on the **Enter** membrane key.

1.5 A new *"Parameter Set-up"* (Fig. A.1-4) screen will now display. Navigate using the **down** membrane key to *"General* **.**

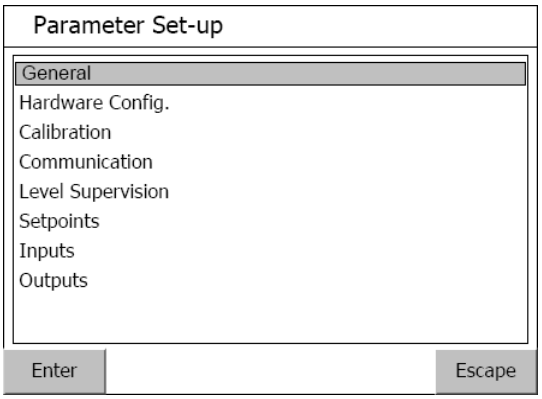


Fig. A.1-4
Parameter Set-up

1.6 Select the menu item *"General"* by pressing on the **Enter** membrane key. This action opens a new screen (Fig. A.1-5).

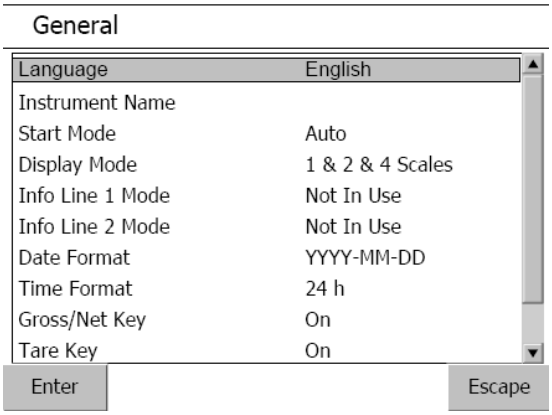


Fig. A.1-5
General Parameter List

1.7 Press and release the **down** key until you reach a menu item *"G Correction"*. Push on the **Enter** membrane key. A new screen displays the following four options:
"Calib Site Lat"
"Calib Site Elev"
"User Site Lat"
"User Site Elev".
Navigate using the **down** membrane key to the menu item *"User Site Lat"* and push on the **Enter** membrane key. *A screen requesting the entry of the user site Latitude will display. The prompts will also indicate the maximum legal value of this parameter.* Use the **numeric** membrane keys to enter a value and then push on the **Enter** membrane key. This action will move the value of the site Latitude to the data base. You will now be back to the screen displaying the Latitude and Elevation parameters.

1.8 Use the **down** membrane key to navigate to ***"User Site Elev"*** menu item. Press on the **Enter** key to select. A screen requesting the entry of the user site Elevation will display. **(If your system indicates force in kgf, then enter the elevation in meters. Otherwise, enter the elevation in feet.)** The prompts will also indicate the maximum legal value of this parameter. Use the **numeric** membrane keys to enter a value and push on the **Enter** membrane key. This action will move the value of the site Elevation to the data base. You will now be back to the screen displaying the Latitude and Elevation parameters.

Restart the Jetweigh-5 system by powering "Off" and then "On".

APPENDIX

A.2 DATE/TIME SET UP

1.0 A correct setting of time and date is important for documentation purposes. All data sets generated by the JetWeigh-5 system are Time and Date stamped. Follow the procedure below to set up the current Time and Date.

1.1 Press the **"Info"** key on the membrane keypad. See Fig A.2-1 below.

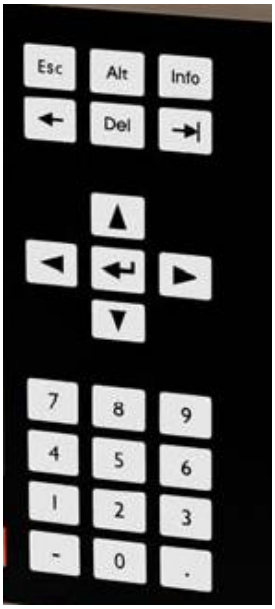


Fig. A.2-1
Membrane Key Pad

1.2 An alphanumeric keypad will now be displayed (Fig. A.2-2). Carefully enter the password supplied and press the **Enter** key on the membrane keypad.

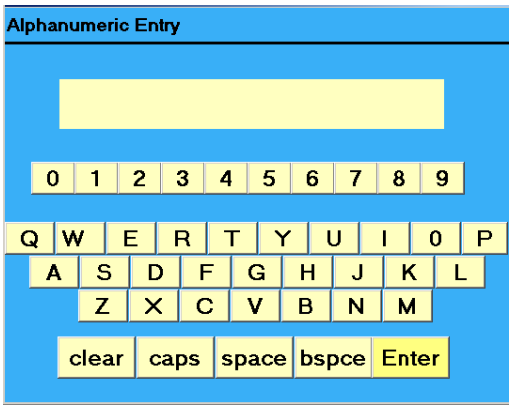


Fig. A.2-2
Ascii Keypad

1.3 If the password entry is correct, then a *"Main Menu"* (Fig. A.2-3) is displayed on the screen.

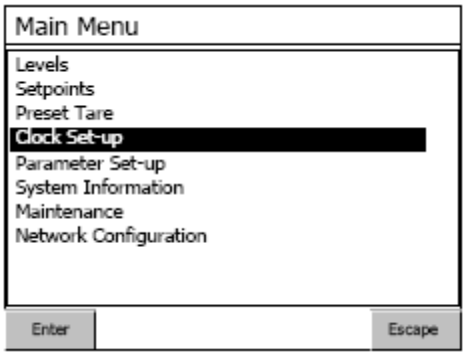


Fig. A.2-3
Main Menu

1.4 Use the **down** membrane key to navigate to *Clock Set-up*, and then push on the **Enter** membrane key.

1.5 A new *Parameter Set-up* (Fig. A.2-4) screen will now display. Navigate using the **down** membrane key to *Clock Set-up*.

Next page please

1.6 Select the menu item *Clock Set-up* by pressing on the **Enter** membrane key. This action opens a new screen (Fig. A.2-3).

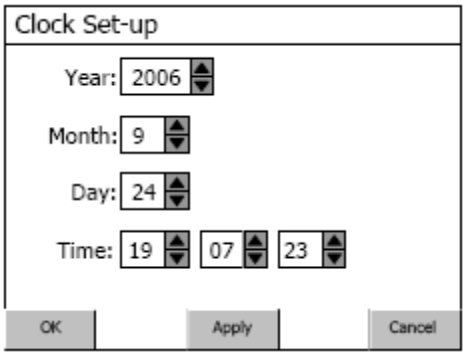


Fig. A.2-5
Set Up Time and Date

1.7 You will observe a flashing cursor at the text field *Year.*
Use the **Up** and **Down** arrow keys to edit the value in the field. Use the Tab membrane key to move from field to field. When all the necessary changes have been performed, touch the ***OK*** button on the touch screen.

Restart the Jetweigh-5 system by powering "Off" and then "On".

APPENDIX :

A.3 Empty Aircraft Weight Data

Aircraft Manufacturer	Model/Designation		Average Empty Weight KG	Average Empty Weight lb	Operating Empty KG	Operating Empty Lbs
AEA	Explorer 350R		1360kg	3000lb		
	Explorer 500T		1723kg	3800lb		
Aermacchi	SF-260A		700kg	1543lb		
Aero Boero	AB-95		400kg	882lb		
	AB-115 Trainer		556kg	1226lb		
	AB-180RVR		602kg	1327lb		
Aeronca	11 Chief	11AC	329-340kg	725-750lb		
	11 Chief	11CC	372kg	820lb		
	7 Champion	7AC	325kg	740lb		
Aerospatiale FRANCE	SA-313B Alouette II		895kg	1973lb		
	SA-315B Lama		1020kg	2250lb		
	SA-316B		1122kg	2474lb		
	SA-319B		1140kg	2513lb		
	Fregate -N262		6200kg	13,668lb		
	Mohawk 298		7030kg	15,498lb		
	SA-330J		3766kg	8305lb		
	SA-330G/F		7400kg	16,315lb		
	SA-342 -		975kg	2149lb		
	SA-360		1555kg	3428lb		
	SA-365C		1806kg	3980lb		
	SN-601 CORVETTE		3510kg	7738lb		
Agusta	A-109A Mk.II		1418kg	3126lb		
	A-109E		1570kg	3461lb		
Airbus	A300-600	CF6	90,115kg	198,665lb		
	A300-600	PW-4000s	90,065kg	198,565lb		
	A300-600R	CF6	91,040kg	200,700lb		
	A300-600R	PW-4000s	90,965kg	200,550lb		
	A300-600F	CF6	78,335kg	172,700lb		
	A300B2-200		85,910kg	189,400lb		
	A300B4-200		88,500kg	195,109lb		
	A310-200	CF6-80C2A2s	80,142kg	176,683lb		
	A310-300	CF6-80C2A8s	81,205kg	179,025lb		
	A318		38,375kg	84,600lb		
	A319		39,884kg	87,930lb		
	A320-200	V2500s	42,220kg	93,079lb		
	A320-200	CFM56s	42,175kg	92,980lb		
	A321-100		47,776kg	105,330lb		
	A321-200	CFM-56-5B3s	48,024kg	105,875lb		

	A321-200	V-2533-A5s	48,139kg	106,130lb		
	A330-200	CF6	120,150kg	264,875lb		
	A330-200	PW4168s	120,750kg	266,200lb		
	A330-300	CF6	121,870kg	268,675lb		
	A330-300	PW-4000s	122,460kg	269,975lb		
	A330-300	Trents	121,970kg	268,900lb		
	A340-200		126,000kg	277,775lb		
	A340-300		129,800kg	286,150lb		
	A340-300E		129,300-130,200kg	285,050-287,050lb		
	A340-500		170,400kg	375,665lb		
	A340-600		177,000kg	390,220lb		
	A380-800		277,000kg	610,700lb		
	A380-800F		252,000kg	555,600lb		
Air Tractor	AT-301		1656kg	3650lb		
	AT-502		1870kg	4123lb		
	AT-802		2860kg	6300lb		
American Champion & Bellanca	7GCBC		544kg	1200lb		
	8GCBC		595kg	1315lb		
Antonov	An-12		28000kg	61730lb		
	Shaanxi Y-8		35490kg	77237lb		
	An-124 Ruslan		175000kg	385800lb		
	An-140-100		12810kg	28240lb		
	An-22 Antei		114000kg	251325lb		
	An-24V		13300kg	29320lb		
	Y-7-100		14900kg	32850lb		
	An-38-100		5300kg	11684lb		
	An-72/74		19050kg	-		
	An-2P		3450kg	7605lb		
	An-28		3900kg	8598lb		
	M28		3917kg	8635lb		
ATR	ATR-42-300				10285kg	22674lb
	ATR-42-320				10290kg	22685lb
	ATR-42-500				11250kg	24802lb
	ATR-72-200				12400kg	27337lb
	ATR-72-210				12450kg	27447lb
	ATR-72-500				12950kg	28550lb
Auster	J/1		477kg	1052lb		
	J/5B		605kg	1334lb		
	J/5G		620kg	1367lb		
	J/5F		600kg	1323lb		
AVIAT	A-1 Husky		540kg	1190lb		
Aviation Traders	ATL-98 Carvair		18762kg	41365lb		
Ayres	Ayres Thrush & Rockwell Thrush Commander	600	1678kg	3700lb		

	Ayres Thrush & Rockwell Thrush Commander	S2RT34	1633kg	3600lb		
BAC	Bac111	Srs 200	21,049kg	79,000lb		
		Srs 400	22,493kg	49,857lb		
		Srs 500			24,758kg	54,582lb
Beagle B-121 Pup	100		482kg	1063lb		
	150		522kg	1151lb		
Beagle B-206	B.206C		2381kg	5250lb		
Beech BE	Super H18		2650kg	5845lb		
	Super H18	Turboliner	2993kg	6600lb		
	A23A		624kg	1375lb		
	B19		630kg	1390lb		
	C23		681kg	1502lb		
	C24R		777kg	1713lb		
	2000 Starship1		4484kg	9887lb		
	2000A		4574kg	10,085lb		
	D35		760kg	1675lb		
	P35		841kg	1855lb		
	V35TC		907kg	2000lb		
	60		1860kg	4100lb		
	B60		1987kg	4380lb		
	65		2324kg	5123lb		
	B80		2394kg	5277lb		
	76		1110kg	2446lb		
	77		500kg	1103lb		
	B99		2620kg	5777lb		
Bell	204B		2085kg	4600lb		
	205A1		2414kg	5323lb		
	206 JET RANGER	206B	660kg	1455lb		
	206 JET RANGER	206B3	737kg	1635lb		
	206L LONG RANGER	206L	844kg	1861lb		
	206L LONG RANGER	206L1	980kg	2160lb		
	206L LONG RANGER	206L3	998kg	2200lb		
	206L LONG RANGER	206L4	1031kg	2274lb		
	206LT TWINRANGER & TRIDAIR GEMINI ST	206LT			1246kg	2748lb
	206LT TWINRANGER & TRIDAIR GEMINI ST	206L3ST			1175kg	2590lb
	212 TWIN TWOTWELVE				2765kg	6097lb
	212ST SUPER TRANSPORT				4300kg	9481lb
	222 & 230	222B			2076kg	4577lb
	223 & 230	230			3472kg	8250lb
	407				1178kg	2598lb
	412	412			2753kg	6070lb
	412	412HP			3066kg	6759lb
	412	412SP			3001kg	6616lb
	427				1743kg	3842lb

	430				2406kg	5305lb
	47G3B2A				858kg	1893lb
	AGUSTA BA609				4765kg	10,400lb
Beriev Be200	BE200		37,200kg	79,365lb		
	Be-30		5860kg	12,920lb		
	Be-32		4760kg	10,495lb		
	Be-32K		7300kg	16,090lb		
Boeing	707-120B		55,589kg	122,533lb		
	707-320B		66,406kg	146,400lb		
	717-200BGW		31,674kg	69,830lb		
	717-200HGW		32,110kg	70,790lb		
	720B		51,203kg	112,883lb		
	727-100		36,560kg	80,602lb		
	727-200		45,360kg	100,000lb		
	737-100		25,878kg	57,000lb		
	737-200		27,448kg	60,600lb		
	737-300		32,881kg	72,490lb		
	737-400		34,564kg	76,200lb		
	737-500		31,983kg	70,510lb		
	737-600		37,104kg	81,800lb		
	737-700		38,147kg	84,100lb		
	737-800		41,145kg	90,710lb		
	737-900		42,493kg	93,680lb		
	747-100		162,386kg	358,000lb		
	747-200	JT9Ds	169,960kg	374,400lb		
	747-200	CF680C2s	172,730kg	380,800lb		
	747-200	RB211s	174,000kg	383,600lb		
	747-100SR		162,430kg	358,100lb		
	747-200F	JT9Ds	155,220kg	342,200lb		
	747-300	JT9Ds	174,134kg	383,900lb		
	747-300	CF6-50s	175,721kg	387,400lb		
	747-300	CF6-80s	176,901kg	390,000lb		
	747-300	RB211s	178,171kg	392,800lb		
	747-400	PW-4056s	80,985kg	399,000lb		
	747-400	CF6-80-C2B1Fs	180,755kg	398,500lb		
	747-400	RB-211s	181,755kg	400,700lb		
	747SP		147,420kg	325,000lb		
	757-200	P&W engines	57,840kg	127,520lb		
	757-200	RB211s	57,975kg	127,810lb		
	757-300	RB-211s	64,590kg	142,400lb		
	757-300	PW-2043s	64,460kg	142,110lb		
	767-200	JT9Ds	74,752kg	164,800lb	80,920kg	178,400lb
	767-200	CF6s	74,344kg	163,900lb	80,510kg	177,500lb
	767-200ER	PW4056s	76,566kg	168,800lb	84,415kg	186,100lb
	767-200ER	CF680C2B4s	76,476kg	168,600lb	84,370kg	186,000lb
	767-300	PW-4050s	79,560kg	175,400lb	87,135kg	192,100lb
	767-300	CF6-80C2B2s	79,379kg	175,000lb	86,955kg	191,700lb
	767-300ER	PW-4060s	81,374kg	179,400lb	90,535kg	199,600lb
	767-300ER	CF6-80C2B4s	80,603kg	177,700lb	90,175kg	198,800lb
	767-400	PW4062s			103,145kg	227,400lb
	767-400	CF6-80C2B8Fs			103,100kg	227,300lb
	777-200		139,025kg	306,500lb		

	777-200ER	374kN/84,000lb engines	142,430kg	314,000lb		
	777-200ER	400kN/90,000lb engines	143,015kg	315,300lb		
	777-300				160,120kg	353,600lb
	B-17		14,855kg	32,720lb		
	KC-97G		37,450kg	82,500lb		
	Commercial Chinook LR -		11,748kg	25,900lb		
Bombardier	BD-100 Challenger 300		10,140kg	22,350lb		
	BD-700 Global Express		22,135kg	48,800lb		
	Learjet 45		5466kg	12,050lb		
	Learjet 55		5832kg	12,858lb		
	Learjet 60		6282kg	13,850lb		
Brantly	B2		463kg	1020lb		
Bristol	Type 170	Mk31	12,247kg	27,000lb		
British Aerospace	ATP				14,193kg	31,290lb
	RJ70				23,900kg	52,690lb
	RJ85				24,600kg	54,239lb
	RJ100				25.600kg	56,438lb
	146-100				23,288kg	51,342lb
	146-200				23,882kg	52,651lb
	146-300				24,878kg	54,848lb
	146-300QT				23,126kg	50,985lb
	J31				4360kg	9613lb
	Super 31				4578kg	10,992lb
	Jetstream 41		6350kg	14,000lb		
Britten-Norman	BN-2 Islander	BN-2A	1627kg	3588lb		
	BN-2B-20		1925kg	4244lb		
	BN-2A MK.3 Trislander		2650kg	5843lb		
Canadair	CL-215		12,220kg	26,941lb		
	CL-415 firebomber				12,333kg	28,353lb
	CL-44D-4				40,345kg	88,952lb
	Cl-600 Early build				10,353kg	22,825lb
	Cl-600 Later build		8369kg	18,450lb	10,285kg	22,675lb
	601-3A		9049kg	19,950lb	11,605kg	25,585lb
	601-3R		9292kg	20,485lb	11,605kg	25,585lb
	604		9806kg	21,620lb	12,079kg	26,630lb
	CRJ-100		13,236kg	29,180lb	13,653kg	30,100lb
	200LR		13,740kg	30,292lb	13,740kg	30,292lb
	CRJ-700		19,595kg	43,200lb		

CAP	CAP-10/20/21/230/231/231	CAP-10B	550kg	1213lb		
		CAP-21	500kg	1103lb		
		CAP-232	590kg	1300lb		

Casa	C212		3700kg	8157lb	4560kg	10,053lb
	IPTN CN235		9800kg	21,605lb		
Cessna	150		447k	985lb		
	150M		458kg	1010lb		
	A152		513kg	1131lb		
	170		554kg	1220lb		
	170B		547kg	1205lb		
	172		572kg	1260lb		
	175A		607kg	1339lb		
	172F		599kg	1320lb		
	172N		649kg	1430lb		
	R172		710kg	1565lb		
	172R		726kg	1600lb		
	172SP		730kg	1610lb		
	177		608kg	1340lb		
	177B		680kg	1495lb		
	177RG		800kg	1671lb		
	180		690kg	1520lb		
	180G		692kg	1525lb		
	A185F		783kg	1727lb		
	182		735kg	1621lb		
	TR182		837kg	1845lb		
	182S		854kg	1882lb		
	AgTruck		1015kg	2235lb		
	AgHusky		1045kg	2305lb		
	207A		951kg	2095lb		
	206H		974kg	2146lb		
	T206H		1011kg	2227lb		
	208A		1725kg	3800lb		
	208B Super Cargomaster		2073kg	4570lb		
	208B Grand Caravan		2250kg	4965lb		
	210L		1015kg	2238lb		
	T210M		1022kg	2250lb		
	P210R		1120kg	2470lb		
	310B		1436kg	3166lb		
	T310P		1493kg	3292lb		
	310R		1480kg	3260lb		
	337D		1204kg	2655lb		
	T337G		1444kg	3184lb		
	340A		1780kg	3921lb		
	335		1800kg	3963lb		
	404 Titan		2192kg	4834lb		
	411A		1973kg	4350lb		
	402C		1845kg	4069lb		
	421A		2132kg	4700lb		
	414A		1976kg	4356lb		

	Citation		2455kg	5408lb		
	Citation I		3008kg	6631lb		
	CitationV		4004kg	8828lb		
	Ultra		4196kg	9250lb		
	Ultra Encore		4526kg	9977lb		
	560XL Citation Excel		5402kg	11,910lb		

	Citation S/II		3655kg	8060lb		
	Bravo		3970kg	8750lb		
	Citation III & VI		5357kg	11,811lb	5534kg	12,200lb
	Citation VII		5316kg	11,720lb		
	Citation X		9705kg	21,400lb		
	CitationJet		2794kg	6160lb		
	425		2210kg	4870lb		
	441		2588kg	5706lb		
	T303 Crusader		1526kg	3364lb		
Cirrus	SR-20		932kg	2050lbs		
Commander	Commander 114B		927kg	2044lb		
	114TC		1018kg	2245lb		
Convair	240		12,520kg	27,600lb		
	340		13,375kg	29,486lb		
	580		13,732kg	30,275lb		
	640		13,733kg	30,275lb		
	5800		15,043kg	33,166lb		
Curtiss	C46		14,970kg	33,000lb		
	C46R		13,290kg	29,300lb		
Dassaut	Falcon 2000		9405kg	20,735lb		
	Falcon 50		9150kg	20,170lb		
	Falcon 50EX		9603kg	21,270lb		
	Falcon 900B		10,255kg	22,611lb		
	Falcon 900EX		10,830kg	23,875lb		
	Falcon 10		4880kg	10,760lb		
	Falcon 100		5055kg	11,145lb		
	Falcon 20		7530kg	16,600lb		
	Falcon 200		8250kg	18,290lb		
DeHavilland	100				12,560kg	27,690lb
	150				12,465kg	27,480lb
	DHC-4A		8293kg	18,260lb		
	DHC6-100		2653kg	5850lb		
	DHC6-300				3363kg	7415lb
	DHC8-100A				10,250kg	22,600lb
	DHC8-100B				10,273kg	22,648lb
	200A & 200B				10,434kg	23,004lb
	DHC8-300				11,657kg	25,700lb
	DHC8-300B				11,719kg	25,836lb
	DHC8-400				16,580kg	36,520lb
	DHC1				526kg	1158lb
	Mk I				1293kg	2850lb
	Mk III				1175kg	2590lb
	DHC3-Landplane		2010kg	4431lb		
	DHC3- Floatplane		2219kg	4892lb		
	Dove 1		2563kg	5650lb		
	Dove 8		2869kg	6325lb		
	DH-114		3848kg	8484lb		
	DH.82A		506kg	1115lb		

Diamond	DA-40 Diamond Star	DA-40-180	700kg	1543lb		
	DA-40D		750kg	1653lb		
	DA-42 Twin Star		1030kg	2270lb		
Dornier	Do 27H2		1170kg	2580lb		
	Do 27Q5		1130kg	2490lb		
	Do 28D2		2328kg	5132lb		
	1286		2540kg	5600lb		
EH Industries	Heliliner		8933kg	19,695lb		
Embraer	EMB110P		3515kg	7751lb		
	EMB110P2A/41		3590kg	7915lb		
	EMB120		7100kg	15,655lb		
	EMB120ER		7140kg	15,741lb		
	Xingu I		3620kg	7984lb		
	Xingu II		3500kg	7716lb		
	ERJ-135ER		10,684kg	23,554lb		
	ERJ-135LR				11,420kg	25,176lb
	ERJ-140LR				11,740kg	25,882lb
	ERJ-145ER				11,667kg	25,722lb
	ERJ-145LR				12,007kg	26,470lb
	ERJ-170		20,150kg	44,422lb		
	ERJ-195		27,100kg	59,744lb		
Endtrom	F-28A		657kg	1450lb		
	280FX		719kg	1585lb		
	480		760kg	1675lb		
ERCO	415C		364kg	802lb		
	F-1		404-422kg	890-930lb		
	A-2		422kg	930lb		
	M-10		430kg	950lb		
Eurocopter	AS 332L		4370kg	9635lb		
	AS-350B-2		1171kg	2582lb		
	AS-350D		1070kg	2359lb		
	AS-350B-3		1175kg	2590lb		
	AS-355F		1305kg	2877lb		
	AS-355N		1436kg	3166lb		
	AS-365N-2		2240kg	4940lb		
	EC-155		2353kg	5187lb		
	BO 105 CBS-4		1300kg	2868lb		
	EC-120		895kg	1973lb		
Empty with Arrius 2B1s	EC-135		1465kg	3230lb		

with PW-206s	EC-135		1480kg	3263lb		
	BK 117 A		1520kg	3350lb		
	BK 117 B2		1745kg	3846lb		
Extra	230		440kg	970lb		
	300		630kg	1389lb		
Fairchild	(Swearingen) Merlin	IIB			2926kg	6452lb
	(Swearingen) Merlin	IIIC			3695kg	8150lb

	Aerospace 228	100			3235kg	7132lb
	Aerospace 229	212			3258kg	7183lb
	Aerospace 328	328110			8920kg	19,665lb
	Aerospace 328JET & 428JET	328JET			9200kg	20,282lb
	Aerospace 328JET & 428JET	Envoy 3			9421kg	20,770lb
	Aerospace Metro II, III & 23	II			3380kg	7450lb
	Aerospace Metro II, III & 24	23			4309kg	9500lb
	Dornier 728	728			35,990kg	79,343lb
	Dornier 729	Envoy 7			39,500kg	87,082lb
FFA	AS-202/15		630kg	1388lb		
	AS-202/18A-4				710kg	1565lb
Fokker	Fokker-100	Tay 620			24,375kg	53,738lb
	Fokker-100	Tay 650s			24,541kg	54,103lb
	Fokker-50	Series 100 & 300			12,520kg	27,602lb
	Fokker-70				22,673kg	49,985lb
	F-27 Mk 500		12,243kg	26,992lb	12,684kg	27,964lb
	F-27 FH-227				10,398kg	22,923lb
	F-28 3000				16,965kg	37,400lb
	F-28 4000				17,645kg	38,900lb
Fuji	FA200160		620kg	1366lb		
	FA200180		650kg	1433lb		
Gaf	N22B		2150kg	4741lb		
	N24A		2377kg	5241lb		
Gippsland	GA-200		770kg	1698lb		
	Gippsland Aeronautics		862kg	1900lb		
Grob	G 115A		590kg	1300lb		
	G 115D		660kg	1455lb		
	GF 200		600kg	1323lb		
Grumman	AA-1A		442kg	975lb		
	AA-1C		485kg	1066lb		
	AA-5		545kg	1200lb		
	AG-5B		595kg	1310lb		
	G-II				16,740kg	36,900lb
	G-III		14,515kg	32,000lb		
	G-159C	I	9942kg	21,900lb		
		IC	10,747kg	23,639lb		

	G-164A		1220kg	2690lb		
		Super B Turbine	1429kg	3150lb		
	G21A		2460kg	5425lb		
	G-111				10,660kg	23,500lb
	G44A		1470kg	3240lb		
	Super Widgeon		1724kg	3800lb		
	G-73		4240kg	9350lb		
	G-73T		3970kg	8750lb		

Gulfstream	Aerospace G-IV Gulfstream IV	G-IV			16,102kg	35,500lb
	Aerospace G-IV Gulfstream IV	G-IV-SP			33,838kg	74,600lb
	Aerospace G-V Gulfstream V				21,228kg	46,800lb
	Gulfstream Aerospace Jetprop & Turbo Commander	690A			2778kg	6126lb
	Gulfstream Aerospace Jetprop & Turbo Commander	1000			3307kg	7289lb
Handley					11,700kg	25,800lb
Harbin Aircraft			2050kg	4520lb		
			2505kg	5250lb		
Hawker Siddeley					5557kg	12,260lb
					12,159kg	26,806lb
			6676kg	14,720lb		
Helio Courier			890kg	1960lb		
			943kg	2080lb		
Hiller			750kg	1650lb		
			798kg	1759lb		
Hindustan	Army version		2500kg	5511lb		
			2500kg	5511lb		
Honda Motor			4173kg	9200lb		
IAI-Israel	ARAVA				4000kg	8816l
	WestWind 1123				5330kg	11,750lb
	WestWind 1124A				6010kg	13,250lb
	IAI-1125 Astra	1125	5747kg	12,670lb		
	SPX		6214kg	13,700lb		
	Gulfstream G200		8709kg	19,200lb		
Ilyushin	Il-103		900kg	1984lb		
	Il-114				15,000kg	33,070lb
	Il-14M		12,600kg	27,780lb		
	Il-18	with 90 seats	35,000kg	77,160lb		
	Il-62		66,400kg	146,390lb		
	Il-62M				71,500kg	157,360lb
	Il-76T		170,000kg	374,785lb		
	76TD		190,000kg	418,875lb		
	76MF				101,000kg	222,665lb
	Il-86		208,000kg	208,000kg		
	Il-96-300		121,500kg	267,860lb		
	Il-96M				132,400kg	291,887lb
Kaman	K-1200 K-Max				2334kg	5145lb
Kamov	Ka-26		1950kg	4300lb		

	Ka32T		6500kg	14,330lb		
Kestrel	K250A		624kg	1375lb		
Lake	LA4		715kg	1575lb		
	LA4200		705kg	1555lb		
	Turbo 270		875kg	1930lb		
Lancair	300		998kg	2200lb		
Learjet	23		2974	6550lb		
	25D		3465kg	7640lb		
	29		3730kg	8224lb		
	35A and 36A		4590kg	10,120lb		
	31A		4651kg	10,253lb		
Let	L-200A		1275kg	2810lb		
	L-200D		1330kg	2932lb		
	40 MetaSokols		520kg	1147lb		
	L 410 UVPE		3920kg	8720lb		
	L 420		4065kg	8962lb		
	L 610G		8950kg	19,713lb		
Lockheed	JetStar		8376kg	18,450lb	10,967kg	24,178lb
	L-100 Hercules	L-100-30			35,260kg	77,736lb
	L-1011 TriStar 1/50/100/150/200/250	L-1011-1			109,045kg	240,400lb
	L-1011 TriStar 1/50/100/150/200/251	L-1011-200			112,670kg	248,000lb
	L-1011 TriStar 500				111,310kg	245,500lb
	L-188 Electra	L-188C			27,895kg	61,500lb
Luscombe	8A		302kg	665lb		
	8F Special		395kg	870lb		
	Spartan 185		612kg	1350lb		
	Spartan 210		658kg	1450lb		
Maule	M-4C		500kg	1100lb		
	MX-7-235		669kg	1475lb		
McDonnell Douglas	DC-10 & BOENING MD-10	DC-10-30			121,198kg	267,197lb
	DC-10 & BOENING MD-10	DC-10-40			122,951kg	271,062lb
	DC-9-10/20/30	10			22,635kg	49,900lb
	DC-9-10/20/30	30			25,940kg	57,190lb
	DC-9-40/50	40			26,612kg	58,670lb
	DC-9-40/50	50			28,068kg	61,880lb
	MD-11	MD-11			130,165kg	286,965lb
	MD-11	MD-11F			113,920kg	251,150lb
	MD-11	MD-11C			131,035kg	288,885lb
	MD-11	MD-11CF			131,525kg	289,965lb
	MD-11	MD-11ER			285,989kg	630,500lb
	MD-81/82/83/88	MD-81			35,329kg	77,888lb
	MD-81/82/83/88	MD-88			35,369kg	77,976lb
	MD-87				33,237kg	73,274lb

	MD-90	MD-90-30			39,915kg	88,000lb
	MD-500C				493kg	1088lb
	MD-530F				722kg	1591lb
	MD-520N				742kg	1636lb
	MD-600N				952kg	2100lb
Mili	Mi-8T		7149kg	15,760lb		
	Mi-17-1		7055kg	15,555lb		
	Mi26		28,200kg	62,170lb		
	Mi34		950kg	2094lb		
Millicer	M10-140				550kg	1210lb
	M10-160				580kg	1280lb
Mooney	M-20C		692kg	1525lb		
	M20E		714kg	1575lb		
	M-20M		995kg	2194lb		
	Bravo		1028kg	2268lb		
NAMC	YS11A200				15,419kg	33,993lb
Noorduyn Norseman	Norseman	v	2007kg	4420lb		
North American Rockwell	Darter		580kg	1280lb		
	Lark		658kg	1450lb		
North American Aviation	Super 260		1293kg	2850lb		
Pacific Aerospace	CT-4A		690kg	1520lb		
	Fletcher FU-24-954		1188kg	2620lb		
	08-750		1315kg	2900lb		
Partenavia	P.68B		1200kg	2645lb		
	P.68TC		1300kg	2866lb		
Piaggio	P-166		2350kg	5180lb		
	P-166DL		2688kg	5926lb		
	P.180		3400kg	7500lb		
Pitts	S-1S		326kg	720lb		
	S-2B		520kg	1150lb		
	S-2C		520kg	1150lb		
PZL Swidnik	Mi2		2402kg	5295lb		
	Kania		2000kg	4410lb		
	Allison engine		850kg	1874lb		
	W3A				3850kg	8488lb
	35A		870kg	1918lb		
	2000		900kg	1984lb		
	M-18A		2690kg	5930lb		
	160A		607kg	1337lb		
	235A		705kg	1553lb		
Raytheon	Model 390		3626kg	7996lb		
	90		2412kg	5318lb		

	B100		3212kg	7092lb		
	C90B		3040kg	6702lb		
	Beech 1900		4327kg	9540lb		
	1900D		4831kg	10,650lb		
	Beech Baron B55		1468kg	3236lb		
	Beech Baron 58		1619kg	3570lb		
	Beech Bonanza C33		807kg	1780lb		
	Beech Bonanza A36		1040kg	2295lb		
	Beech Bonanza B36TC		1104kg	2433lb		
	King Air 200		3318kg	7315lb		
	King Air B200		3675kg	8102lb		
	King Air 300		3850kg	8490lb		
	King Air 350		4096kg	9030lb		
	Beechjet 400		4225kg	9315lb		
	Beechjet 400A				4819kg	10,625lb
	Hawker 1000		7810kg	17,220lb		
	Hawker 800	HS-125-700	5825kg	12,845lb		
		800XP	7075kg	15,600lb		
	Hawker Horizon		1607kg	3570lb		
Robin	DR-400-120		535kg	1180lb		
	DR-400-180		600kg	1320lb		
	HR 200		500kg	1100lb		
	2160		550kg	1213lb		
	R 3000/100		580kg	1280lb		
	R 3000/160		650kg	1433lb		
Robinson Helicopter	R-44		635kg	1400lb		
	R22		361kg	796lb		
	R22 Beta		379kg	835lb		
Rockwell	685		2742kg	6046lb		
	500S		2102kg	4635lb		
	112B		804kg	1773lb		
	114		885kg	1885lb		
	Sabreliner	40	5102kg	11,250lb		
	Sabreliner	75A	5990kg	13,200lb		
Ruschmeyer	R 90230 RG		898kg	1980lb		
Saab	Saab 2000		13,800kg	30,423lb		
	Saab 340	340A			7810kg	17,215lb
		340B			8140kg	17,945lb
Schweizer	Hughes/Schweizer	300C	474kg	1046lb		
		330SP	517kg	1140lb		
Scottish Aviation	Twin Pioneer	Series 3	4630kg	10,200lb		
Short	Short 330	330100	6577kg	14,500lb		
		330200			6697kg	14,764lb
	Short 360	360			7350kg	16,600lb
		360300			7870kg	17,350lb
	Short's Belfast				59,020kg	130,000lb
	Short Skyvan	Srs 3	3331kg	7344lb		
	Short Skyliner	Srs 3	4055kg	8940lb		

SIAI-Marchetti	S-205		760kg	1677lb		
	S-208		827kg	1823lb		
Sikorsky	S-55C		2245kg	4950lb		
	S-55T		2132kg	4700lb		
	S76 Mk II		2540kg	5600lb		
	S76C+		3691kg	8138lb		
	S-92 Helibus	S-92A	7030kg	15,500lb		
	S58		3461kg	7630lb		
	S58T		3355kg	7400lb		
	S61N Mk II		5595kg	12,336lb		
	S61L Mk II		5,308kg	11,701lb		
	S62A		2175kg	4789lb		
	S62C		2205kg	4860lb		
Sino Swearingen	SJ-30-2		3493kg	7700lb		
Slingsby	T-67 Firefly	T-67B	610kg	1345lb		
		T-67C-3	685kg	1510lb		
Socata	GY-80 Horizon	GY-80-160	620kg	1365lb		
		ST-10	723kg	1594lb		
	Rallye	MS-880B	450kg	990lb		
		235GT	695kg	1530lb		
	Tangara.	GA7/TB 360	1174kg	2588lb		
	"Caribbean" TB	TB-9	647kg	1426lb		
		TB-20	800kg	1763lb		
		TBM-700	1860kg	4101lb		
Sud SE-210 Caravelle	Caravelle	Caravelle 10B			30,055kg	66,260lb
Sukhoi	Su29		735kg	1620lb		
	Su31T		670kg	1480lb		

Taylor	BC-12D		304kg	670lb		
	F-21		450kg	990lb		
Technoavia Finist	Technoavia Finist		1430kg	3153lb		
Transavia	Airtruk and Skyfarmer	PL12U	830kg	1830lb		
		T300A	955kg	2100lb		
Tupolev	Tu-134				27,500kg	60,627lb
	Tu-134A				29,050kg	64,045lb
	Tu-154				43,500kg	95,900lb
	Tu-154M				55,300kg	121,915lb
	Tu-204				58,300kg	128,530lb
	Tu-204220				59,000kg	130,070lb
	Tu-334100				30,050k	66,250lb
	Tu-334100D				34,375kg	75,785lb
VICKER	VC10				66,670 kg	146,980lb
	Vicker's Viscount	700D	17,200kg	37,918lb		
		810			19,959kg	43,200lb

	Victa Aircruiser				680kg	1500lb
	115		490kg	1080lb		
	T4		528kg	1165lb		
VisionAire	Vantage		1950kg	4300lb		
Weatherly	Agricultural 201	201C	1157kg	2550lb		
		620	1270kg	2800lb		
		620TP	1135kg	2500lb		
Yakovlev	Yak-18T		1217kg	2683lb		
	Yak-40		9400kg	20,725lb		
with 104 seats	Yak-42		34,500kg	76,058lb		
Zlin	Z 226		570kg	1257lb		
	Z 526F		665kg	1465lb		
	Z 43		730kg	1609lb		
	Z 242 L		730kg	1609lb		
	Z 143		830kg	1830lb		

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