

AERO-WEIGH MA8120-2X Weigh Kit

Digital Display & Load Cell System User Manual & Parts List

Revision J – 03/14/2016



Unit shown in its protective case

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General Information:

The Morgan Aero model MA8120-2X Weigh Kit is a combination of a custom crafted pin type load cell and the Morgan "Aero-Weigh" precision display which comes calibrated as a unit from Morgan Aero Products. It does NOT need to be calibrated before each use. The load cell reader may merely be connected, using the custom cable to the pin type load cell and turned on to begin. The Morgan "Aero-Weigh" is designed to provide an accurate, lightweight display of load weights. In conjunction with a Morgan Aero load cell and cables one operator is able to accurately observe and manage loads and applied stress on various pieces of equipment. The "Aero-Weigh" has been designed for durability and use in rugged conditions. However, it should be treated as an electronic device: Avoid pulling, tearing, or cutting the cables. Avoid damaging the connectors in the cable connector plugs. Avoid dropping the load cell pin, reader, or any part of the Weigh Kit. Avoid immersing the reader, cable or pin in water. To reduce the potential for damage the Aero Weigh is shipped in a protective case (figure page 2 of 13). It should always be stored in the case provided. If the 'S' option specified: part number MA8120-2S the set includes a 16K-lb shackle for operation with alternate mounted components. This shackle can also be used as an aid in calibration. Each load cell reader, cable set, and load cell pin is a matched set. The load cell readers or load cell pins from other sets should not be exchanged without contacting Morgan Aero. (See Parts page & page 9 of 13) The "Aero-Weigh" electronics, batteries and display are enclosed in a weather resistant NEMA 4 enclosure with sealed MS style connections. Controls on the display are used to turn the "Aero-Weigh" on and off, and set other functions of the "Aero-Weigh" (see Display section for details). ***The load cell reader and load cell pin must be connected prior to turning on the load cell reader.*** If the load cell reader is turned on before it is connected, the reader may indicate an overload or other fault code. It may also damage the load cell reader. The load cell pin cables are sealed with a durable coating. They connect to the load cell pin and load cell reader using the MS style connector. The load cell pin is a strain gage device which is imbedded in a metal pin. Electrical current is transmitted via a cable to the load cell reader. Changes in this current provide the changes in load which are displayed on the digital readout of the load reader. The pin, cable and reader are all calibrated as a system.

IMPORTANT NEW BATTERY INFORMATION

MA8120-2X System Power

Unlike earlier models the current configuration of the Weigh Kit is now powered only by six (6) easily, user replaceable AA cell batteries with a 20 hour continuous working time. This change was made to bring the unit in line with Boeing Aircraft requirements and to give the operator a quicker way to return the Weigh Kit to operation without the necessity of waiting for rechargeable batteries to be charged.

MA8120-2X with replaceable batteries.

The battery only powered Weigh Kit is **identical** in usage to the previous model MA8120-2. The only difference is the source of power. This unit has six (6) replaceable batteries (Fig. 6) contained within the Display. Figure 5 shows the Display bottom with battery cover in place. Figure 6 shows the battery cover removed and the

placement of the batteries. When batteries need replacement 'BATT LO' will show on the display.



Fig. 5



Fig. 6

When replacing the batteries use only six (6) new, high quality alkaline type size AA batteries. Batteries **MUST** be replaced with the same polarity or damage to the Weigh Kit may occur. All Weigh Kits with a serial number beginning with the letter 'B' will be supplied with replaceable batteries only.

Set-Up and Activation of the Load Cell Reader System

The Morgan Aero Products load cell reader comes calibrated and ready to use from the factory. The load cell reader does NOT need to be calibrated before each use. The device may merely be assembled and turned on to begin. Each load cell reader and load cell pin is a matched set. The Load cell readers from other sets should not be exchanged without contacting Morgan Aero.

The load cell reader and load cell pin should be connected prior to turning on the load cell reader. If not damage to the reader or calibration may occur.

- 1) Remove the load cell reader from the protective storage case
- 2) If you are going to perform an engine change, install the load cell pin in the location of the engine change equipment as specified in the Airplane Maintenance Manual (AMM).
- 3) Prior to turning on the load cell reader connect the cable from the load cell pin to the connector on the top of the "Aero-Weigh" load cell reader (see last figure page 11 of 13). **If load cell reader is turned on without the load cell pin connected the reader could be damaged.**
- 4) Push and hold the "ON" button on the face of the load cell reader for 2 seconds. (last figure page 11 of 13)(The reader backlight should illuminate and the reader should indicate "0" – meaning zero load is applied) (last figure page 11 of 13)
- 5) If the reader indicates a value other than "0", push the "Enter/Zero" button to set the value to "0". The reader will now indicate the correct weight on the reader display when a load is applied.
- 6) Press the 'Off' button to turn the unit off.

Note that the "Aero -Weigh" is programmed to go into a standby battery saving mode after a period of non-use (see Display section for setting the length of non-use). If the reader goes into standby mode, simply press the 'On' button to turn the display on and show the currently applied weight if any had been applied when the battery saving feature was activated.

See the Fault Isolation section of this manual for any operation assistance.

Load Cell Keyboard Functions & Operation

There are six (6) buttons on the keyboard which surrounds the load cell display. (Figure 1)

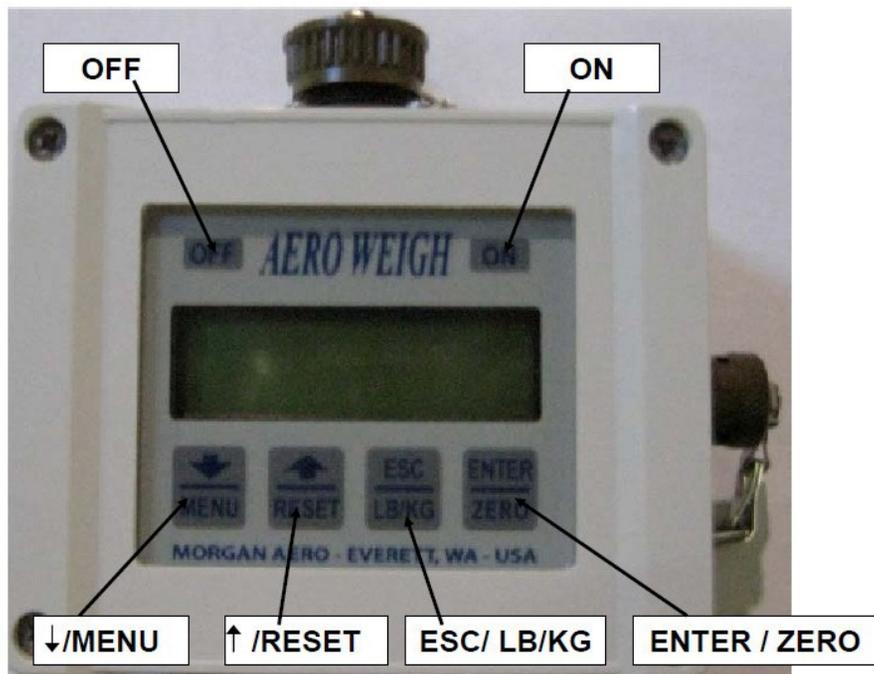


Figure 1

ON – Turns the load cell reader on. Press button for 2 seconds and release.

OFF - Turns the load cell device off. Press button for 2 seconds and release.

DOWN ARROW / MENU – This is a dual function button. While in 'Menu' mode the down arrow is functional. This button is used

to enable the 'Menu' mode when Customizing load cell reader functions (The functions in the "Menu" mode are described in the Customizing the Load Cell Reader Functions section below.) UP ARROW / RESET – This is a dual function button. While in 'Menu' mode, the Up Arrow is functional. If 'Peak' is enabled in setup mode, the Up Arrow doubles as the 'Re-Arm Peak' button. While in normal operating mode this button functions as a load reset button.

ESC / LB/KG – This is a dual function button. ESC is used to exit the 'Menu' mode. When LB/KG is active the button changes the readout between pounds and kilograms.

ENTER / ZERO – This is a dual function button. If pressed when reader is in 'Menu' mode it will select the currently displayed menu item. When pressed during a load measuring operation it will zero the scale – any additional load will be measured from that zero point. (This is a "Tare" function). If this button is depressed when no load is applied the display will show "0".

Customizing Load Cell Reader Functions:

The functions of the load cell reader can be changed using the two (2) Menu modes described below:

Using the Menu Mode:

To enter the Menu Mode when the unit is on press and hold the 'DOWN ARROW / MENU' button for 5 seconds then release it. Within the Menu Mode four (4) items are selectable: (When you have selected the item you want by pressing the DOWN ARROW / MENU' or 'UP ARROW / RESET' buttons. Press the 'ENTER / ZERO' button to enable it). (Note: After 2 minutes of inactivity in this mode the load cell will return to normal mode and display will read "0")

1. FILTER – This mode sets the filter band averaging of the load cell pin signal that is entering the unit. Any weight changes within this band will be displayed as an average. This helps maintain a steady reading with a load that might be in motion. If the band is set at 20 any weight readings with +/- 20 pounds will be displayed as an Average.

To set the filter band

After the 'ENTER / ZERO' button has been pushed and the unit is in

"Filter" mode the display shows 'FLT XX' (Filter and value in pounds or Kg). Press the 'DOWN ARROW / MENU' or 'UP ARROW / RESET' buttons to adjust the band. Press the 'ENTER / ZERO' button to save the value. The display will now show "0".

2. SETPOINT – This mode allows you to indicate a maximum load you do not wish to exceed. This will be a visual

warning that a pre-selected weight has been exceeded. When it is exceeded the display will alternate between the applied weight and 'WT OVER'.

To set the setpoint:

After the 'ENTER / ZERO' button has been pushed and the unit is in "Set point" mode the display shows 'SP1 XXXXX' (setpoint1 and a load value in pounds or Kg). Press the 'DOWN ARROW / MENU' or 'UP ARROW / RESET' buttons to adjust the weight. Press the 'ENTER / ZERO' button to save the value. The display will now show "0".

3. POWER – This reduces the battery power used by 1) turning the backlight off after a set time the time, or 2) turning the entire load cell off after a set time. When 'ENTER / ZERO' button is pushed, the unit may be programmed to save power:

To set a backlight turnoff time:

After the 'ENTER / ZERO' button has been pushed and the unit is in "power save" mode the display shows 'BL YES' or 'BL NO' (backlight Yes or backlight No) ; (Note: if "BL NO" is displayed and the ENTER / ZERO button is pressed, the load cell will now move on to the power turnoff mode, and the display shows "PWTO YES" or 'PWTO NO'). (see load cell power turnoff time below for instructions in this mode).

Press the DOWN ARROW / MENU button until 'BL YES' displays. Press the ENTER / ZERO button. The display shows 'BLTO YES'. Press the ENTER / ZERO button. The display shows 'BLM X.XX' (backlight turnoff time in minutes). Press the

DOWN ARROW / MENU or 'UP ARROW / RESET' buttons to set the turnoff time. Press the ENTER / ZERO button. The load cell will now move on to the power turnoff mode, and the display shows "PWTO YES" or 'PWTO NO' (see load cell power turnoff time below for instructions in this mode).

To have no back light turnoff time:

After Enter has been pushed and the unit is in "power save" mode the display shows 'BL YES' or 'BL NO' (back light Yes or back light No) ; Pressing the DOWN ARROW / MENU button until 'BL YES' displays. (Note: if "BL NO" is displayed and the ENTER / ZERO button is pressed, the load cell will now move on to the power turnoff mode, and the display shows "PWTO YES" or 'PWTO NO') (see load cell power turnoff time below for instructions)

Press the ENTER / ZERO button. The display shows 'BLTO NO'. Press the ENTER / ZERO button. The load cell will now move on to the power turnoff mode, and the display shows "PWTO" (see load cell power turnoff time below for instructions).

To set a load cell power turnoff time

When unit is in Power Turnoff Mode (PWTO), the display will read "PWTO YES" or 'PWTO NO'. Press the DOWN ARROW / MENU button until 'PWTO YES' displays. Press the ENTER / ZERO button. The display will show "TOM X.X" (turnoff Minutes). Press the ENTER / ZERO button. The load cell is now set to turn off after the set amount of minutes. The display will read "0".

To have no load cell turnoff time:

When unit is in Power turn-off Mode (PWTO) the display will read the display will read "PWTO YES" or 'PWTO NO'. Press the DOWN ARROW / MENU button until 'PWTO NO' displays. Press the ENTER / ZERO button. The load cell is now set to turn off after the set amount of minutes. The display will read "0".

4. DIAGNOST (diagnostics) – This mode is used to diagnose problems with the reader or the battery. In this mode the reader will display raw load data (R= XXXX) and load cell reader battery voltage (BV = XX.X).

To view the diagnostics

After the 'ENTER / ZERO' button has been pushed and the unit is in "Diagnostic" mode. The display shows 'R= XXXX' (this is a raw data value) and a load value in pounds or Kg). Press the Press the DOWN ARROW / MENU button until 'BV= XX.X' (battery voltage). Press the ENTER / ZERO button.

The load cell is now in normal operating mode. The display will read "0".

Using the Setup Menu Mode:

There are two functions that can be carried out in the Setup Menu Mode: 1) "Setup" and 2) "Calibration". To enter the Setup Menu Mode, start with the unit turned off. Press and hold the 'UP ARROW / MENU' button down. Press the 'ON' button until the display comes on. Release 'ON' button and in three seconds release the 'UP ARROW / MENU' button. The display should now read 'SET UP'. Now press the 'ENTER / ZERO' button to begin 'SET UP' functions. (Note: After 2 minutes of inactivity in this mode the load cell will return to normal mode and display will read "0")

1. SET UP (setup) – This mode allows the user to change increments of load displayed and to change the units of loads displayed on the load cell from Pounds (LBS) to Kilograms (KG).(Only make these changes if they are absolutely necessary)

To change the increments of units displayed:

After the 'ENTER / ZERO' button has been pushed and the unit is in Setup Menu Mode. The display will read 'INC XXXX' (Increments of load to be displayed). Press the 'UP ARROW / MENU' button or the 'DOWN ARROW / RESET' button to select the incremental load reading. (For normal usage 1500 should be selected). The available increments are: 1000 1500 2000 2500 3000 5000 10000. When the desired value is selected, press 'ENTER/ ZERO'. The display will

now read 'CTBY =XX' (count by a set load range). Press the 'UP ARROW / MENU' button or the 'DOWN ARROW / RESET' button to select the desired incremental Count-by. When the desired Count-by is selected press the 'ENTER / ZERO' button and 'FS=XXXXX' will display, press the 'ENTER / ZERO' button. The load cell will now move to the load value unit display mode (see section below)

To change the units displayed to Kilograms or Pounds:

After the above steps have been performed, the display will read 'L>K YES' (pounds to Kilogram change? Yes) or 'L>K NO' (pounds to Kilogram change? No). If 'L>K YES' is chosen, the display will now read in pounds,

If the display is 'L>K NO' is chosen it will read in kilograms. Press the 'UP ARROW / MENU' button or the 'DOWN ARROW / RESET' button to select the desired value. Press 'ENTER / ZERO' to enter the setting.

To enable the peak hold function:

After the above steps have been performed, the display will read 'PEAK YES' (set peak value? Yes) or 'PEAK NO' (set peak value? No). If 'PEAK YES' is chosen a peak load value for the reader is set. If the display is 'PEAK NO' is chosen, no peak value is set. Press the 'UP ARROW / MENU' button or the 'DOWN ARROW / RESET' button to select the desired value. Press 'ENTER / ZERO ' to enter the setting.

2. CALIBRATION (Calibration) – This mode allows the user to change the preset calibration of the load cell system when performing a periodic calibration. This should only be done by calibration certification personnel. The load cell system comes pre-calibrated from the manufacturer. (Please see Appendix A. for Calibration instructions).

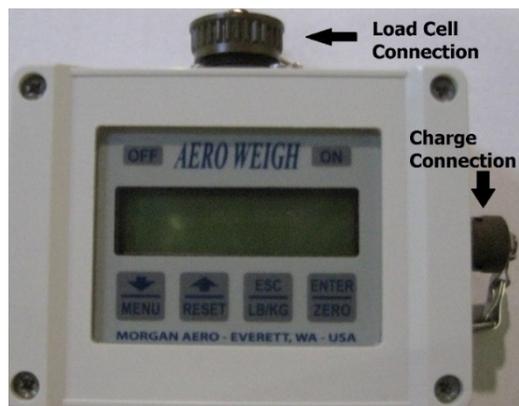
WARNING DO NOT ENTER THE CALIBRATION MODE UNLESS YOU ARE GOING TO CALIBRATE THE UNIT AND HAVE BEEN PROPERLY TRAINED OR CERTIFIED IN THIS PROCEDURE (See Appendix A)

Parts List Display/Controller & Load Cell

Item.	Description	Part Number	Quantity Req.
1	Keeper Pin	MA8203	1
2	Load Cell	MA8192	1
3	Display/Controls (processor board only)	MA8173	1
	load cell cable, complete MA9267 (Not Shown) dash equals length in ft.	MA9267-XX	1
	Replacement box only	MA6149	1



Load cell and keeper



Display

Load Cell Specifications

Max. Excitation (V-Acor DC	15
Storage Temp. Range (*F)	-58 to 185
Operation Temp. Range (*F)	-58 to 185
Insulation resistance (MΩ@	
Input resistance (ΩNominal)	>500
Output resistance (ΩNominal)	>750
Temp. effect on output (% FSO/*F)	<.008%
Temp effect on zero (% FSO/*F)	<.015%
Output mV/V	2mV/V (+-)20%
Accuracy	(+-) .5
Safe Load Limit (%capacity)	150
Wiring Code	Excitation (+) Pin A Excitation (-) Pin B Signal (+) Pin C Signal (-) Pin D

General Safety Information

1. Always connect the load cell above the load to be weighed.
2. Always ensure that the display has been calibrated with the load cell it is to be used with.
3. Make sure all cables are securely tightened.
4. Follow all instructions provided in the aircraft manufactures instructions for the task being performed. In all instances they will take precedence over any instructions provided within.
5. Prior to any use of any lifting equipment check be familiar with the following:

The operator shall:

1. NOT operate beyond the limits of the load Cell
2. NOT leave supported load unattended unless specific precautions have been taken.
3. NOT operate unless load attachments are seated properly.
4. NOT operate unless all persons are and remain clear of the supported load.
5. REPORT malfunctions or unusual performance and do not re-use until checked by qualified persons.
6. BE familiar with operation controls, procedures, and warnings.
7. MAINTAIN a firm footing or be otherwise secured when operating.
8. USE only recommended parts when repairing the unit.
9. NOT allow attention to be diverted from proper operation.
10. NOT adjust or repair unless qualified to perform such adjustments or repairs.

WARNING!
IMPROPER OPERATION OF ANY HOIST OR
LIFTING DEVICE CAN CREATE A
POTENTIALLY HAZARDOUS SITUATION
WHICH, IF NOT AVOIDED, COULD RESULT
IN DEATH OR SERIOUS INJURY. TO AVOID
SUCH A POTENTIALLY HAZARDOUS
SITUATION

Troubleshooting Guide:

The following is a list of the faults and fault messages which may occur and how to resolve them.

- 1) The display is blank after initial setup and power up: Press the "OFF" button and then press the "ON" button for 2 seconds. (See the start instructions at the beginning of this document). If the display is still blank the battery charge may be too low for it to operate, replace the batteries).
- 2) "OVRD" – the load cell reader is receiving an input voltage out of its expected range. (This may occur when the load cell is started and it has a previous signal input stored): Press the "ENTER /ZERO" button to clear the memory. The display should now read "0".
- 3) "-----"–Weigh Kit may have low batteries, or the cable from the load cell reader to the load cell pin may not be connected or may be shorted. Check the cable connections for proper pin alignment and attachment to the couplings, check the cables for damage, check the load cell reader batteries. If none of these solutions works return the entire Weigh Kit directly to Morgan Aero Products.

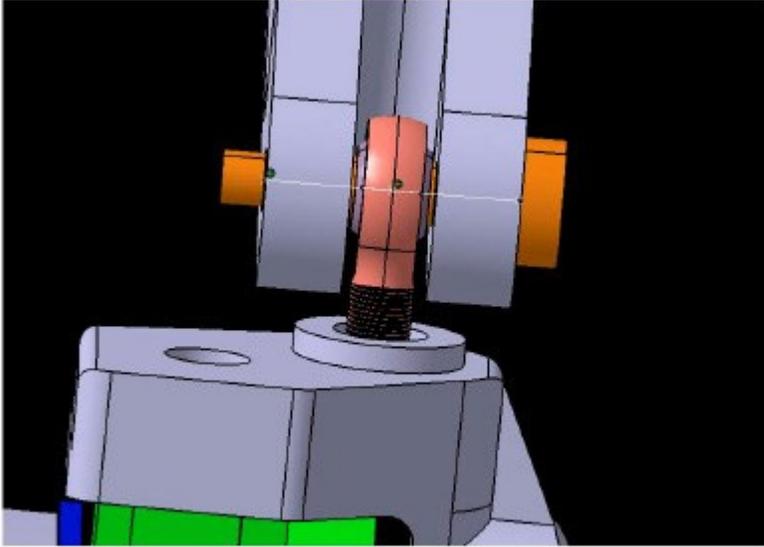
APPENDIX A

Load Cell System Calibration

Calibration of the "Aero-Weigh" is a simple menu driven operation. The load cell and the display should always be used as a matched set. When either component is replaced they must be re-calibrated as a set. Calibration should only be carried out by a qualified technician.

CALIBRATION SET-UP

Initial set-up of the load cell is critical in performing accurate and repeatable calibrations. During normal operation of the load cell system the load cell is used in either the machined fixture end of the boot-strap arm or with an 8.5T shackle and centering spool. When used with the boot-strap arm the load cell is held in the same position every time it is used and the load is always centered under the load cell. It will also be noted that when properly installed on the boot-strap arm the flat on the plug end of the load cell is retained in the up position. This insures that the load applied will always be in the same place on the load cell. This placement insures accuracy and repeatability.



When ordered with the 8.5T shackle a centering spool and small keeper are supplied so that when used the load cell load is again centered in the same location. (See below.)



A-Incorrect

B-Incorrect

C-Correct

In order to ensure that your load cell and display always display an accurate reading when used it is important to make sure it is always calibrated and used with the load cell in the same position and the load bearing on the center portion of the load cell. When used on the bootstrap tool or with the optional



Load Cell & Shackle Part



Parts As Used

shackle and spool the proper configuration for use and calibration is maintained. If calibration is performed without the use of the optional shackle and spool always maintain the load cell as shown in picture 'C' below. Also ensure that the flat on the load cell connector end is on top and at a right angle to the load being applied.

WARNING
FAILURE TO PROPERLY CONFIGURE THE LOAD CELL OR THE DISPLAY DURING CALIBRATION OR USE MAY RESULT IN INACCURATE READINGS THAT CAN CAUSE SEVERE PERSONNEL INJURY, DEATH OR DAMAGE TO EQUIPMENT.