ROAD RUNNER I
AIRCRAFT SCALE
With
PORTABLE WHEEL WEIGHER
w/ FULL FUNCTION INDICATOR

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Introduction

ROAD RUNNER WHEEL WEIGHERS are placed under the tires to weigh an aircraft. The aircraft may be rolled up the ramps onto the wheel weigher pads or the aircraft may be jacked up and the pads slid under the tires. Tire stops may be inserted into slots on the pads to prevent the plane from rolling off.

Although specifically designed for weighing aircraft, the wheel weighers may also be used to weigh race cars, ambulances, farm wagons or the other vehicles. They may also be used for taking inventory by weight or the determining weights of packages being shipped.

The system consists of WEIGHING PADS, a digital summing INDICATOR, COLORED CABLES and BATTERY CHARGER CABLE. RAMPS and TIRE STOPS are also included. TENSION LOAD CELLS are also available (optional) for weighing aircraft where one end must be hoisted to level the craft.

Individual pad capacities of 2,500 pounds (1136 kgs.) , 6000 pounds (2722 kgs.), 10,000 pounds (4536 kgs.), and 15,000 pounds (6804 kgs.) are available. Different capacity pads may be mixed withing the system.

The indicator displays weight on any individual pad or the total aircraft weight or the total of any combination of wheel weights.

Weights are displayed in 1 pound (or 1 kg.) increments. The totalizer is limited to 20,000 counts (20,000 pounds or 20,000 kgs.). Weights must be summed manually above 20,000.

Each channel is color coded. The weighing pad, indicator input connector, zero knob and cable for each channel are all marked with the same color.

An internal RECHARGEABLE BATTERY operates the scale for at least 18 hours without recharging. Adapter cables rated at 110 & 240 VAC are supplied with battery charger. Power is automatically turned OFF when all wheel weigher cables are disconnected from the indicator. This is a battery saving feature.

AC POWER PLUGS for most nations are available on the battery charger cable. Battery charger cables are not grounded.

INDICATOR (Figure 2)

The DIGITAL INDICATOR is housed in its own portable carrying case. It is powered by an internal sealed lead acid rechargeable battery. Weight is shown on a liquid crystal display of easy viewing, even in direct sunlight.

A CONNECTOR for each wheel weigher cable is mounted on the side of the indicator housing. Each connector is color coded to match a particular weighing pad and cable.

POWER is turned on with the Power ON-OFF toggle switch. Battery life is at least 18 hours when fully charge.

POWER is automatically turned off when all wheel weigher cables are disconnected from the indicator. This is a battery saving feature.

A GROUP OF CONTROLS on the front panel corresponds to each weighing channel. By turning the toggle switch for one channel ON (and the other other OFF) the weight on that particular pad will be displayed. Turning several channels ON simultaneously will display the sum of the weights on any combination of pads. The sum is limited to 20,000 digits in one pound (or 1 kg.) increments.

There is ZERO adjustment for knob on the front panel for each weighing pad. This is used to set each indicator channel to zero with no load on the pad.

The CALIBRATION adjustment for each channel is recessed behind the front panel under the calibration sticker. Calibration is set and sealed at the factory. The user should not break this seal or adjust the calibration screw since this would make the calibration certification invalid.

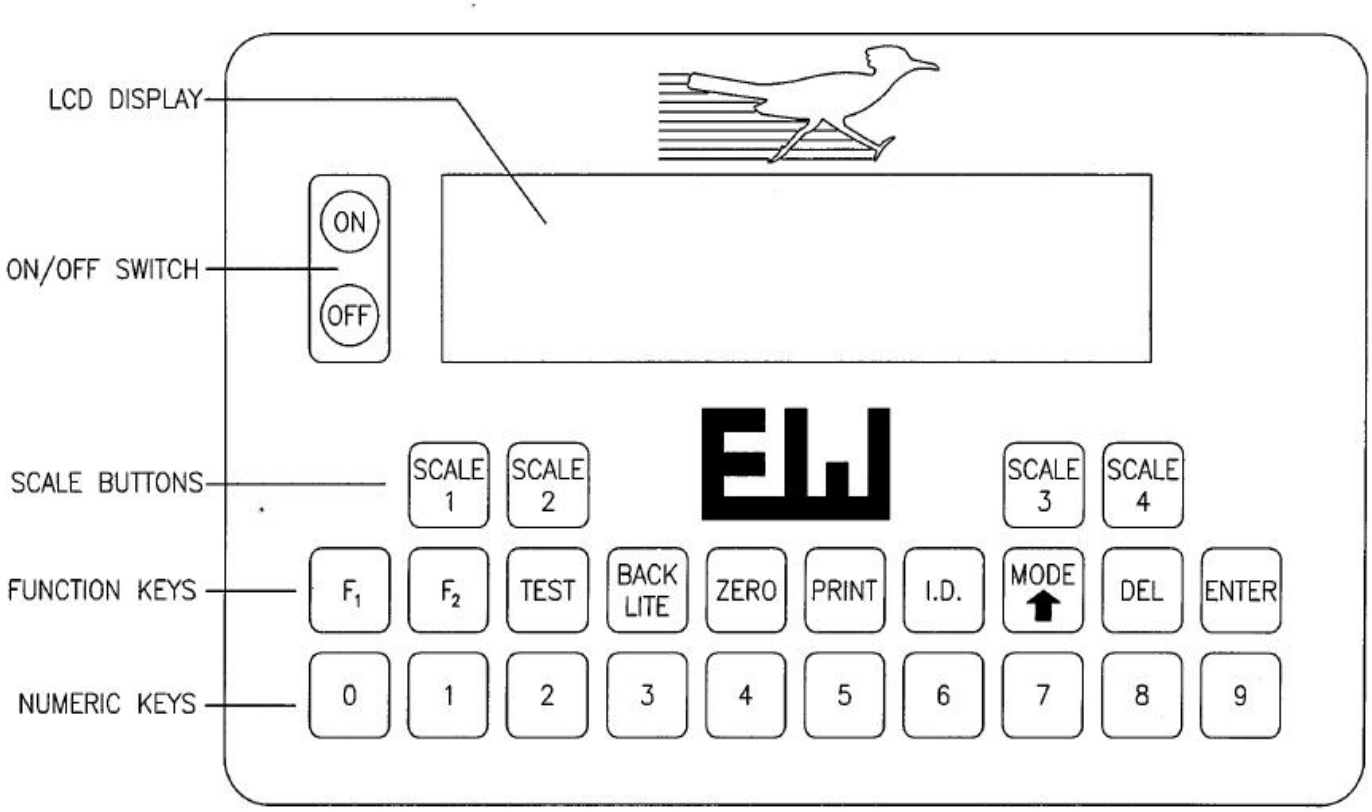

LCD DISPLAY
ON/OFF SWITCH
SCALE BUTTONS
FUNCTION KEYS
NUMERIC KEYS
ON
OFF
SCALE 1
SCALE 2
SCALE 3
SCALE 4
F1
F2
TEST
BACK LITE
ZERO
PRINT
I.D.
MODE
DEL
ENTER
0
1
2
3
4
5
6
7
8
9

Figure 2

BATTERY CHARGER CABLE

The internal sealed lead acid battery built into the indicator will operate the system for at least 18 hours without recharging. To recharge the battery, the BATTERY CHARGER CABLE is connected to the POWER connector on the side of the indicator and plugged into AC power source. The scale system MUST BE DISCONNECTED while the battery is being charged.
The battery charges rapidly when it is low. During charging phase, orange light will turn ON. When meter is fully charged, green light will appear on LED battery charger. Battery charging is usually completed overnight. The battery should not be allowed to discharge completely. This may reduce the life of the battery.

Standard power plugs are available for most stations.
Battery charge cables are not grounded.

WHEEL WEIGHER CABLES

A twenty-five foot CABLE is provided to connect each wheel weigher pad with the corresponding indicator channel. These cables have tough polyurethane jackets and will withstand substantial abuse without damage. Each cable is color coded to match a wheel weigher and indicator channel. Any cable can be used with any wheel weigher and indicator channel but observing the color codes makes it easier to identify which wheel weigher is connected to which indicator channel.

APPENDIX A: CALIBRATION

IMPORTANT: This appendix is provided for customers that may require frequent calibration and/or specialized scale system set-up. Proper calibration requires the use of one or more accurately known weights, and involves partial disassembly of the indicator case.
Do not attempt to calibrate this scale system if accurate weights are not available or if disassembly is not possible.
Factory re-calibration is recommended.
Please contact Vishay Transducers Ltd. for details.

Scale System Calibration:

Calibration should be performed using a weigh which is as near to the typical amount you will be weighing as possible. This will usually be between 50 and 75% of the platform's capacity.

If the scale system will be used to weigh vehicles in two or more weight ranges, a multiple point calibration is recommended. Up to four different weights can be used for a multiple point calibration, and will result in more accurate readings in each weight range. Using a multiple point calibration on a system used to weigh vehicles in one weight range, however, will not increase the system's accuracy.

The indicator can be set up to display weights in four different units: pounds(lbs), kilograms(kg), tons(TN), and long tons (LT). Be sure that each weight is known accurately in the unit that you wish to be displayed.

APPENDIX A: CALIBRATION

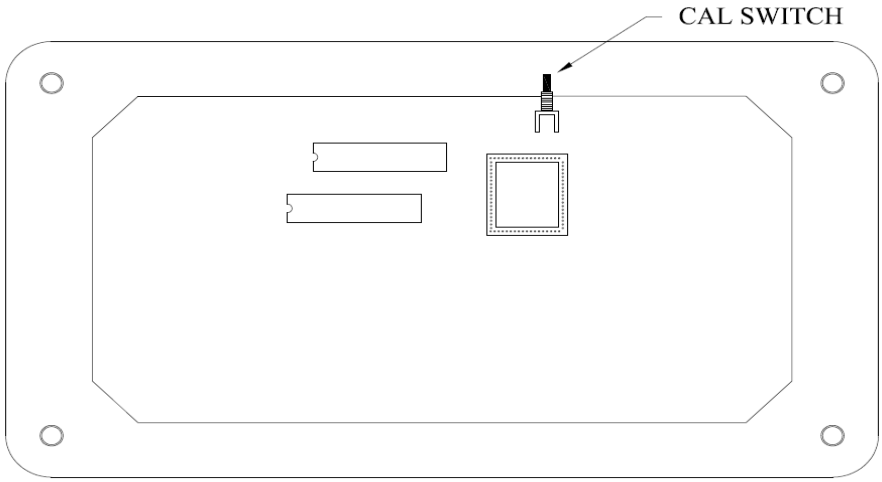
Press the **MODE** key until the indicator says

CALIBRATION MODE

Now press the **ENTER** key. The indicator will display:

PRESS INTERNAL CAL SWITCH

Remove all flathead screws from the top of the indicator face plate. Lift the face plate, being careful not to damage the wiring or short the internal circuitry on the metal case. Turn the faceplate around and then press the CAL SWITCH once (see diagram below for switch location).



The indicator will display:

DECIMALS 0
USE ARROW, ENTER

The DECIMALS, DUMMY ZEROS, and COUNTBY settings determine the display format of the indicator. The DECIMALS and DUMMY ZEROS settings together determine the smallest weight reading that the indicator can display and the largest possible platform capacity. For almost all platform scale applications, the

DECIMALS should be set to “0” and DUMMY ZEROS set to “0” or “1”. The next table summarized all possible settings and the resulting display format:

APPENDIX A: CALIBRATION

Calibration Settings		Display Format	
DECIMALS Setting	DUMMY ZEROS Setting	Minimum Weight Reading	Maximum Platform Capacity
0.00	0	0.01	300.00
0.0	0	0.1	3000.0
0	0	1	30,000
0	1	10	300,000
0	2	100	3,000,000

The COUNTBY setting determines the increments that weight readings are rounded to when displayed. For example setting the COUNTBY to “2” will result in the indicator rounding
2347 lb. to the nearest 2 pound increment 2346 lb.
Setting the COUNTBY to “5” will result in the indicator rounding 2347 lb. to the nearest
5 pound increment: 2345lb. A COUNTBY value of “1” results in effectively no rounding, and the format of the display will be based only on the DECIMALS and DUMMY ZEROS settings.

NOTE: Since all calibrations are done in pounds, setting the indicator to read in kilograms will result in COUNTBY increments of 0.5, 1, and 2. This is a result of the conversion into kilograms and preserves the accuracy and resolution of the scale system.

Enter in the DECIMALS, COUNTBY, and DUMMY ZEROS settings using the **MODE** key to select the appropriate value and then press the **ENTER** key. The indicator will now display:

UNITS = lbs
USE ARROW, ENTER

Press the **MODE** key to select unit of measure that the indicator will use to display weights, and then press the **ENTER** key. The indicator will now display:

ENTER CAPACITY
WEIGHT = 0

The indicator will display:

CAL POINTS
NUMBER = 1

Type in the number of calibration points to be used (1-4), and then press the **ENTER** key.
The indicator will display:

CAL POINT 1
SCALE 1 = 0

APPENDIX A: CALIBRATION

Enter in the exact weight to be used for the first calibration point, and then press the **ENTER** key. Repeat for each calibration point. The indicator will display:

DO CALIBRATION ?
1=Y 0=N 0

To perform the calibration, press "1" and then **ENTER**.
To skip the calibration, press "0" and then **ENTER**. The calibration settings (e.g. COUNTBY, CAPACITY) will be saved to the indicator's memory and put into effect, but at the actual calibration of the system will be skipped, and the indicator will return to WEIGH MODE.

WARNING: DO NOT SELECT 1=Y IF YOU ARE NOT PREPARED TO CALIBRATE.

After completing the calibration setup on the previous pages, the indicator will display

ENTER SCALE #
1,2,3,4

Each platform will be calibrated individually, and can be done in any order.
Press the scale button corresponding to the first scale you wish to calibrate.

Press **ENTER** key. The display will read

REMOVE ALL WT.
RAW A/D = XXX

Be sure that all weight has been removed from the scale platform, and then press the **ENTER** key. The display will read:

APPLY XXX LB
RAW A/D = XXX

Apply this Load to scale, let A/D reading stabilize and press **ENTER**.
Continue this procedure for each of the weighs. After the last weight, the indicator will ask if you wish to calibrate another scale. Press "1" to calibrate another scale, or "0" to exit the calibration mode. Press the **ENTER** key.

APPENDIX A: CALIBRATION

Using CAL FACTOR MODE:

A second calibration mode has been provided which serves two purposes:

- Each time the scale system is calibrated, it is recommended that CAL FACTOR MODE be used to print out the indicator's calibration data. This way, a permanent record of calibration can be maintained.

- If the calibration information has been accidentally changed, CAL FACTOR MODE CAN BE USED to restore the data, so that a recalibration will not be necessary.

Entering CAL FACTOR MODE:

Press the **MODE** key until the indicator displays:

CAL FACTOR MODE

Press the **ENTER** key. The indicator will prompt you to "PRESS THE INTERNAL CAL SWITCH". Again, refer to page 12 for the location of this switch. Press the switch, and the indicator will display:

ENTER SCALE # 1,2,3,4

Viewing and Printing Calibration Data:

After entering CAL FACTOR MODE, press the scale button corresponding to the channel you wish to view data for. The indicator will display the first calibration parameter. Press the **ENTER** key to proceed to the next parameter. Repeat this procedure until the indicator displays:

ANOTHER SCALE ?
1=Y 0=N 0

Press "1" and then ENTER to view another channel data, or "0" and then **ENTER** if you are finished viewing. The indicator will display:

PRINT CAL FTR ?
1=Y 0=N 0

APPENDIX A: CALIBRATION

Press “1” and then **ENTER** to print out the calibration data, or “0” and then ENTER to exit CAL FACTOR MODE without printing. On the printout, data from all four channels will be listed so it is not necessary to repeat this procedure for each channel.

Restoring Calibration Data:

After entering CAL FACTOR MODE, press the scale button corresponding to the channel you wish to restore calibration data for. The indicator will list each calibration parameter. Type in the parameter exactly as it appears on the last calibration data printout, and then press the **ENTER** key. Repeat for each parameter listed. After the last entry, the indicator will display:

ANOTHER SCALE	**?**
1=Y 0=Y	**0**

Press “1” and then **ENTER** to enter calibration for another channel, or “0” and then **ENTER** if you are finished. The indicator will display:

PRINT CAL FTR	**?**
1=Y 0=N	**0**

Press “1: and then **ENTER** to print out the calibration data, or “0” and then ENTER to exit CAL FACTOR MODE without printing. Compare the new printout with the previous one to confirm that the calibration data has been entered correctly. Any error can seriously affect the accuracy of the scale system.
Store the printout in a safe place and carefully reassemble the indicator, being sure to replace all front panel screws.

APPENDIX B: TAPE PRINTER

INSTALLATION and SETUP:

- Plug power cable on PRINTER into AC outlet.
- Connector interface cable from PRINTER to the RS-232 connector on the side panel of the indicator.

OPERATION:

- Press the ENTER key at any time during WEIGH MODE to activate the printer.
- The current time and date will be printed at the top of all printouts. See page 7 for instructions on setting the correct time and date.
- There is one additional feature which is only available if the PRINTER has been installed:
  Press the **I.D.** key. The indicator will display:

I.D. **NUMBER = 0**

Type in a number between 1 and 999999999, and then press ENTER key.
This I.D. number will be added to the top of all printouts, and can be used as an auxiliary tag when needed. For example, I.D. numbers could be used to identify different vehicles or operators.

To clear the I.D. from the printouts, press the I.D. key and then enter "0" as the I.D. number.

MAINTENANCE:

- Call service hotline to order replacement ribbons and paper.
- Check interface cable or cuts. Any damage should be repaired and sealed against moisture.

TROUBLESHOOTING:

PROBLEM	POSSIBLE CAUSE	SOLUTION
Printer does not print.	Power cable not connected.	Check power cable connection.
	Printer is not turned on.	Turn PRINTER on using power switch
	Interface cable is damaged.	Check cable for damage, repair and seal cable to protect against moisture.
Letters are faint or unreadable.	Printer ribbon needs replacement.	Contact Service Hotline for ordering information.

APPENDIX C: COMPUTER INTERFACING

The indicator is capable of transmitting data directly to a computer or terminal providing a convenient means of collecting and storing weight data. Communication between indicator and computer is via standard RS-232 interface.

INSTALLATION and SETUP:

- Connect the RS-232 connector on the side panel of indicator to the serial port of the computer or terminal. Check the owner's manual for your computer to determine which type of RS-232 connector your computer is equipped with. Cable schematics for the standard types of connector are diagrammed on next page. Vishay PG can provide custom cables. Contact factory for details.

- Set up the computer or terminal to received data at 9600 baud, 8 data bits, NO parity, 1 stop bit, with no handshaking.

OPERATION:

- All data sent to the PRINTER is also sent to the computer interface. Data is formatted identically to the PRINTER output. ASCII delimited by carriage return/line feed.

- In WEIGH MODE, data can be requested from the indicator by sending an ASCII "P"(50 hex) to the indicator. ASCII data returned by the indicator is formatted identically to the TAPE PRINTER output, including the time and date information.
  NOTE: Sending a request for data while the indicator is in any other mode will have no effect.

APPENDIX C: COMPUTER INTERFACING

TROUBLESHOOTING:

PROBLEM	POSSIBLE CAUSE	SOLUTION
Computer does not receive data from the indicator, or data is garbled or unreadable.	Interface cable is damaged	Inspect cable for damage, replace or repair if necessary.
	Communications protocol is incorrect.	Check communications protocol.
	Interface cable is too long.	RS-232 signals can travel 200-300 ft. without additional amplification. Check the length of the cable.
Indicator does not transmit weight data when transmit code is sent.	Indicator is in the wrong mode.	Switch indicator to WEIGH MODE.

CABLE SCHEMATICS: