



# ***ExpressCube***<sup>™</sup> **Model 165R / 265R** **User Guide**

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# Important

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Please address any comments or suggestions regarding this user guide to:

Global Sensor Systems  
400 Brunel Road,  
Mississauga, Ontario  
Canada L4Z 2C2

Attention: Documentation

For additional product information refer to our web site: [www.expresscube.com](http://www.expresscube.com) or e-mail us: [products@expresscube.com](mailto:products@expresscube.com)

For additional technical assistance please e-mail: [support.expresscube@expresscube.com](mailto:support.expresscube@expresscube.com)

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# 1. General

## 1.1. Introduction

The ExpressCube™ countertop unit will quickly and accurately dimension and weigh cuboidal packages. The ExpressCube countertop unit will calculate dimensional weight based on the acquired measurements and preprogrammed dim factors.

**Note:** ExpressCube Resolution models 165R & 265R incorporate fundamental changes in both hardware and software design. This manual does not apply to previous 150/250/165/265 models.

## 1.2. Specifications

MODEL	EC-265R
<b>Physical Characteristics</b>	
Dimensions: (Inches)	25.7 x 23.5 x 43.2 [L x W x H]
(Centimeters)	63.5 x 60 x 110 [L x W x H]
Weight : (lbs)	40
(kg)	18
Operating Environment	14° to 104° F (-10° to 40° C) 0 to 90 % N.C. Humidity
<b>Imperial Measurements</b>	
Max Dimensional Capacity (in)	23.8 x 25.8 x 37 [L x W x H]
Resolution/Min Dimensional (in)	0.2 / 2.4
Maximum Weight (lb)	<b>155</b>
Weight Resolution (lb)	0.1
<b>Metric Measurements</b>	
Max Dimensional Capacity (cm)	60 x 65.5 x 94 [L x W x H]
Resolution/Min Dimensional (cm)	0.5 / 6.0
Maximum Weight (kg)	70
Weight Resolution (kg)	0.05
<b>Features</b>	
Printer Port (RS-232) <sup>1</sup>	Standard
Hand Scanner Port (RS-232) <sup>2</sup>	Standard
USB Computer Port <sup>3</sup>	Standard
Sizelt Software	Optional
ExpressCube Controller	Optional
ExpressCube Customer Display	Optional

Feature Notes: <sup>1</sup> Printer not included; <sup>2</sup> Hand Scanner not included; <sup>3</sup> Computer not included

WMS/NTEP – WMS is a software configuration that removes many of the commercial NTEP constraints dimensional measurements. All specifications are identical with the exceptions listed below:

Specification	NTEP	WMS
Minimum Dimensional Height	2.4 in / 6.0 cm	1.5 In / 4.0 cm
Minimum Dimensional Length	2.4 in / 6.0 cm	2.4 in / 6.0 cm
Minimum Dimensional Width	2.4 in / 6.0 cm	1.5 In / 4.0 cm
Dimensional Increment	0.2 in / 0.5 cm	0.1 in / 0.1 cm
Weight Increment	0.1 lb / 0.05 kg	0.01 lb / 0.01 kg

## 2. Equipment Setup

### 2.1. Unpacking

The ExpressCube countertop unit is shipped with the back of the unit folded onto the platform. Carefully remove the unit from the packing material and place the unit in the final location.

Unscrew the leveling feet until approximately one-half inch is extended from the bottom of the unit. This will allow maximum flexibility in leveling the unit.

The ExpressCube countertop unit may be provided with optional display and connecting hardware. It is important to review the equipment list provided in the shipping container to ensure that all items have been removed prior to disposal of the shipping container.



### 2.2. Location and Placement

Refer to the specifications to obtain the outside dimensions of this model of ExpressCube countertop unit. This unit should be placed on a countertop or table that has a surface area that is equal or greater to the physical dimensions referred to in the specifications. It is important for accurate weight measurements that the surface is reasonably level, flat and stable.

Ensure that the area selected for the ExpressCube countertop unit is free from objects that could touch the unit and that there is adequate space to place and measure packages without obstruction.

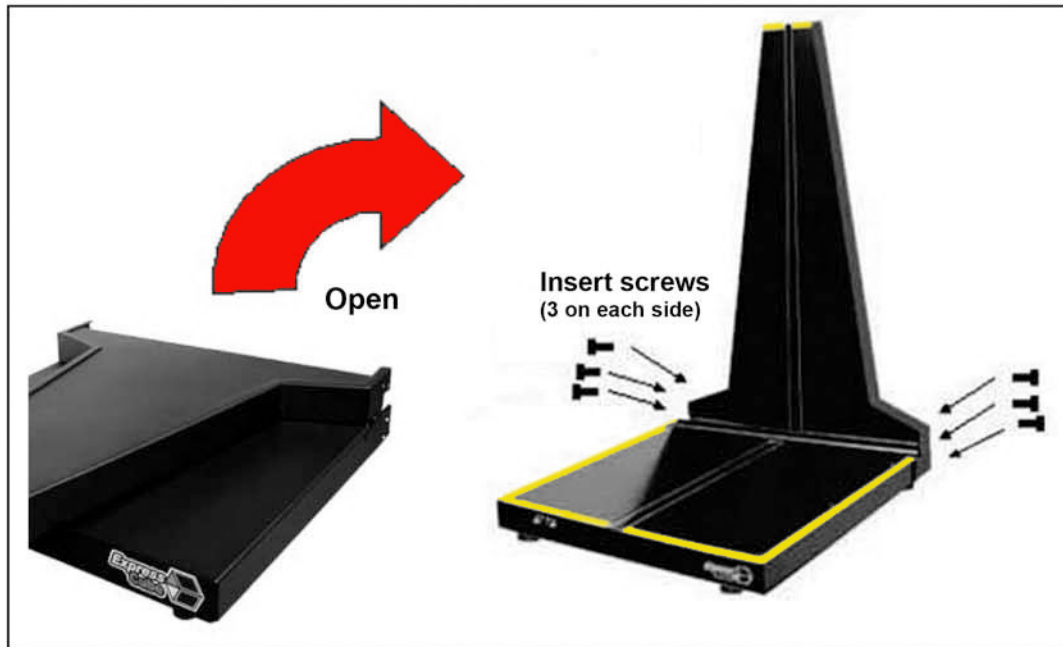
The ExpressCube countertop unit should be located within four feet of a power source. Verify with the specifications and the power adapter shipped that the power source and the ExpressCube power adapter are compatible.

#### IMPORTANT:


- Do not place the ExpressCube 265R on the floor. The unit is very susceptible to damage from collisions and dropped packages.
- If the LCD Controller is used, place the cable and the unit away from the platform.
- Check that the cables connected to the back panel are not collected or group such that they can inhibit the movement of the platform.
- It is not necessary but it is recommended that there is a surface area adjacent to the platform that measured parcels can be moved on or off.

### 2.3. Opening And Securing The Back Sensor Array

Refer to the diagram below to raise and secure the back sensor array from the shipping / storage position. Inspect the device before starting the procedure to ensure that all bindings and/or shipping restraints have been removed.



- Carefully lift up the rear sensor panel 90° to the surface of the platform until the holes at the rear of both parts of the assembly line up.
- Insert the supplied four/ six [depends on model] locking bolts into the back assembly and tighten.


 *It is important to put the locking bolts in without cross threading. Although the back assembly requires little effort to be held in place, it is recommended that one person hold the back sensor panel in place while a second person installs the locking bolts.*

\* **Best to Install lower screws first** (slightly move vertical section to help align screws).

### 2.4. Performing Lens Calibration

Wipe dust and any debris from empty platform before proceeding.

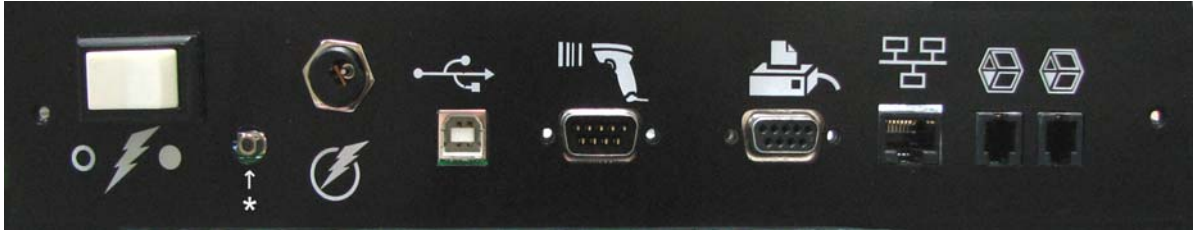
- Press “**PROG**”
- Press menu 5 button “**CALIBRATE DIMENSIONAL BANKS**”
- Press 1 button “**CALIBRATE DIMENSIONAL BANKS**” to start procedure.
- Wait until calibration is complete (~ 50 seconds) when LED’s stop flashing.
- When finished – Press 6 “**EXIT**” or “**PROG**” to return to the idle display.

 *For dimensioning peak efficiency, it is recommended that the platform is cleaned and a lens calibration procedure is performed as part of a daily routine.*




### 3. Electrical Connections

#### 3.1. Rear Connecting Panel Layout Summary



Symbol	Function	Description
	<b>Power Switch</b>	Switches ExpressCube unit ON / OFF
* (unmarked)	<b>Calibration</b>	<b>*Authorized Personnel Only*</b> Removal or damage to the calibration seal voids certification approvals
	<b>Power Adapter</b>	The ExpressCube™ universal power adapter includes 4 power connections and has the following world safety approvals: UL / ULC, CE, PSE, BS, GS, FCC, SAA
	<b>USB</b>	This USB port can be used by a local PC to Operate and collect data from the ExpressCube™ unit.
	<b>Hand Scanner</b>	Connect to handheld scanner (not supplied). The port is a male RS-232 serial interface.
	<b>Printer</b>	RS-232 male port provides ASCII data output for either a printer or direct data logging onto a hard drive via a local PC application (not supplied).
	<b>LAN</b>	Not Available
	<b>External Devices</b>	These connectors are used to connect ExpressCube™ external devices such as the customer display or control box.

 **Connect all the appropriate connectors prior to connecting the power adapter and activating the device.**

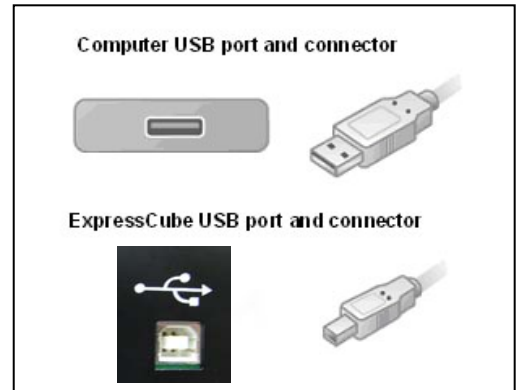
 **The ExpressCube™ countertop unit is designed such that there is space to connect and run the cables from the rear connector panel. Do not use this space to bunch and store excess cable as the movement of the platform could be restricted by cable contact.**




### 3.2. USB Connection

The ExpressCube™ countertop series of dimensioning devices are equipped with a USB connection to interface to a local computer. The USB connection allows the computer to control and capture data from the dimensioning device. The USB is fully compatible with USB 2.0 computer ports. A USB driver is sent out as part of the User Guide CD contents. It is also installed with the Sizelt software.


Connect the cable as indicated in the diagram.



 **ExpressCube™ Sizelt™ must be installed in the computer before the USB interface can be used. Refer to the ExpressCube™ Sizelt™ installation section for more details.**


### 3.3. Connection of a Handheld Bar Code Scanner

The ExpressCube™ countertop unit has a dedicated male RS-232 serial port for use with a handheld bar code scanner. [Handheld scanner not supplied] The RS-232 connector should be securely connected to the appropriate connector on the ExpressCube™ countertop.

 **There are two RS-232 connectors on the connector panel but each one serves different purposes. Be sure to use the connector identified for the hand scanner.**



Sample RS-232 Hand Scanner


 **The ExpressCube™ countertop unit has programming options that can utilize the trigger of the handheld scanner to activate data collection and processing. Refer to the Operators Program Menu for more details.**

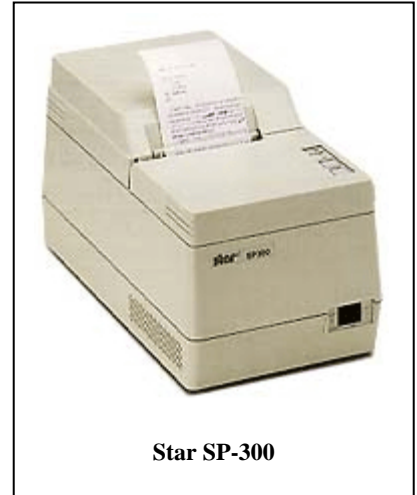
#### **Connection settings for hand scanners:**

- 1) Connection port – RS-232
- 2) Baud rate - 9600
- 3) Parity – none
- 4) Data bits – 8
- 5) Stop bit – 1 and add a suffix of a CR LF (Carriage Return Line Feed)

### 3.4. Printer Connection

The ExpressCube™ countertop unit is equipped with a female RS-232 serial printer port. The port is activated when the ExpressCube™ countertop unit has acquired data through a successful measurement. Upon receiving a 'Print' command, the printer port will deliver the data in an ASCII format that is terminated with a line feed and carriage return. The RS-232 connector should be securely connected to the appropriate connector on the ExpressCube™ countertop.

 **The ExpressCube countertop unit has been specifically set up using the Star SP-300 Series ASCII model. While most ASCII RS-232 printers follow virtually identical data formats, the user is responsible to assure their selected printer is compatible to the Star-300 series format.**



 **For detailed description of the data format to the printer, refer to the Technical Data Summary in the appendix of this manual.**

### 3.5. ExpressCube™ External Device Ports

The ExpressCube™ external ports are high-speed data and power ports that are used to connect to optional ExpressCube™ equipment. There are two external device ports on the rear connector panel. The two ExpressCube™ external devices supported by these ports are the control unit and the customer display unit as illustrated below.



The ExpressCube™ Controller has a reversible mounting plate that allows the controller to be converted from a desk mount (as shipped) to a wall mount. To change the configuration, remove the four screws holding the bracket. Rotate the mounting bracket 180° and secure with the same four screws.

The ExpressCube™ external device ports use RJ-11 four wire connectors. Place or mount the device to be connected in the location that it will be used. Insert the RJ connector until an audible click is heard. Carefully route the cable and insert the RJ-11 connector into either one of the two ExpressCube™ external device ports.

***☞ The RJ-11 is a popular jack used by manufacturers for a variety of different devices and purposes. DO NOT INSERT ANY OTHER MANUFACTURED DEVICE EQUIPPED WITH A RJ-11 INTO THE EXPRESSCUBE DEVICE PORT. The attempted use of this RJ-11 port for any device other than an ExpressCube™ device can cause internal damage and void the warranty.***

***☞ The ExpressCube™ external device ports provide low voltage power to operate the circuits and backlit LCD displays of the external devices. Care should be taken to ensure that no foreign objects are inserted into these ports.***

### **3.6. Power Adapter Connection**

After connecting the appropriate connectors as detailed in Sections 3.1 to 3.7, insert the power adapter plug into the ExpressCube countertop rear connector panel.

The cable from the rear of the unit to the adapter should be free from obstruction and located to prevent accidental removal from ExpressCube or the outlet. Securely connect the power plug into an electrical outlet.



***☞ Use only ExpressCube power adapters with the ExpressCube countertop unit.***

***☞ The power adapter must have unrestricted airflow around it. Do not wrap or enclose the power adapter.***

## 4. User Control Selection for the ExpressCube™ System


The ExpressCube™ Countertop system must have an operator controller to perform the measurement functions. The ExpressCube™ Countertop system can be controlled either by a desktop computer using the USB interface or by using the ExpressCube™ LCD Controller. If a display is required to monitor the ExpressCube operation, it is recommended to use the customer display.


### 4.1. **ExpressCube™ LCD Controller**

The use of the ExpressCube™ LCD Controller only requires the appropriate electrical connection as described in the section above. The installation of the Sizelt™ software is not required. Proceed to the power-up section of this user guide.

### 4.2. **Computer Control**

The use of a computer to control the ExpressCube™ Countertop system will require the installation and use of the Sizelt™ software. Connect the USB cable as previously described and follow the instructions outlined in the ExpressCube™ Sizelt™ Software Installation section of this guide.

 ***In this User Guide, the term 'control panel' [underlined] will reference the device used to control the ExpressCube™ Countertop System. ( i.e. ExpressCube™ LCD Controller OR local computer running Sizelt™ software)***

 ***When the ExpressCube™ LCD Controller is used to control the ExpressCube™ Countertop system, the USB port is still active and should not be connected to a PC. In the event that a USB port is connected to the computer, the LCD Controller keypad will become inoperable. This is done to prevent two sources of control from operating the ExpressCube simultaneously.***

## 5. ExpressCube™ Sizelt™ Software Installation

### 5.1. Summary

The ExpressCube™ Sizelt™ software allows a local computer to operate and gather data from the ExpressCube™ countertop unit with the USB port. This software must be installed and the USB connected prior to powering-up the ExpressCube™ countertop unit. The software is not required if the ExpressCube™ controller is used to control the countertop unit.

### 5.2. Minimum Computer Requirements

- Minimum 512 meg of available RAM
- Pentium IV or better @ 2.0 GHz or better
- Windows XP operating system
- CD-ROM drive
- Java version 1.5.0\_06 or later

### 5.3. Software Installation

1. Close down all applications currently running on the PC.
2. Insert the CD program disk into the CD-ROM drive of the computer.
3. Click the Windows 'START' button and select 'RUN'
4. Use the browse key to locate and select the 'set-up' file on the CD-ROM drive
5. Run the selected file.

**Note** - if you encounter recurring problems with the operation of the program, un-install Size-It and re-install.

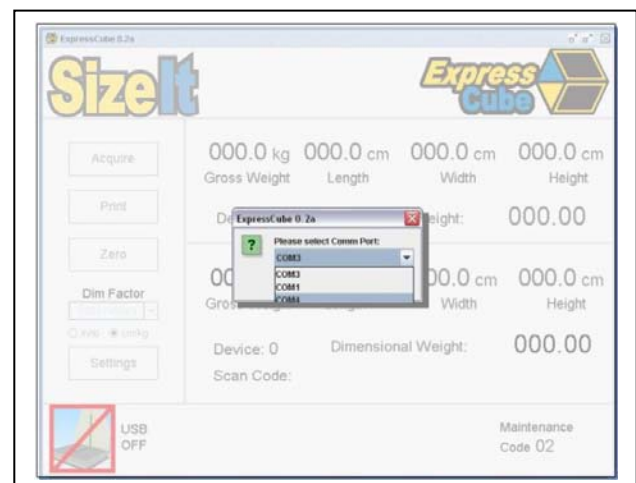


*The person installing the software should have the appropriate system permissions to install the software, this will vary for the system & location, and this can be especially critical for Windows XP.*

### 5.4. Running the Software

Use the Start / Program or Desktop menus to begin the Sizelt™ program. The program will open the control page as illustrated to the right. Select the highest "com number" on the drop menu to engage the USB (choice shown as 'com 7' in example at right).

The USB port will remain off when the ExpressCube™ countertop unit is not powered. The 'Set-up' key will not work until communications is established on the USB link.



## 6. ExpressCube™ Countertop Power-up

### 6.1. **Power-up**

Locate and activate the power switch located on the rear panel. Almost instantly, the power [RED] indicator LED will begin to flash and then remain lit. During the brief time that the LED is flashing, power has been applied to the main computer and it has started its program initiation. The steady LED indicates that the power is on, the sensors are calibrated and the main computer is operating properly.



***The four indicator LEDs on the front of the ExpressCube countertop unit are intended to give the user a quick summary of the current operation of the unit. These LEDs are controlled by the measuring device and are not affected by the controller ( including third party software ). Always refer to the control panel display for detailed operational status.***

### 6.2. **Initial Power-up System Check**

The motherboard enters a self-diagnostic routine in which errors are reported in a diagnostic log. The results of the diagnostic routine contain a summary of the polling the different subsystems of the ExpressCube™

This section just briefly describes the system checks carried out by the motherboard as it is powered up. It is carried out almost instantly and has no visible effect on the operation of the unit.

**1) SYSTEM CHECK** – The system verifies the proper operation of on-board components.

**2) CONFIGURATION** – Each power up cycle, the motherboard polls and assigns addresses to the Integrated Transceiver Array that performs the package measurements.

**3) LOAD CELL** – The motherboard verifies the operation of the load cells and programs the filters used in the digital interface.

Any irregularities are recorded as maintenance codes and can only be accessed by a software header in the motherboard.



***The control panel will be ready for operation after the system check is performed [approximately 10 -15 seconds from power-up]. If the display or system does not appear to be functioning, please refer to the troubleshooting section. DO NOT ATTEMPT TO OPEN THE SYSTEM.***

## 7. User Programming

### 7.1. Summary

The ExpressCube™ countertop has a simple programming menu that allows the user to program the following characteristics:

- Program dimensional weight factors.
- Handheld bar code scanner Acquire & Print synchronization.
- Adjust audible (beep) Note: Not Used in Resolution Models
- Set device number.

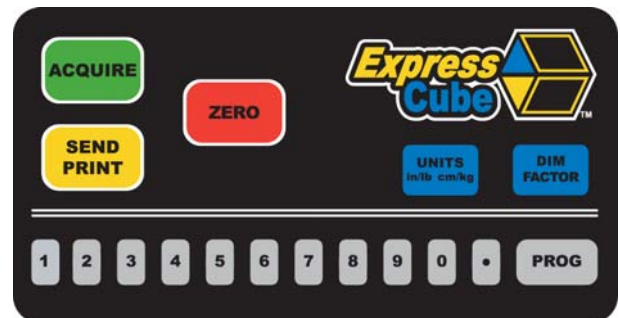
Generally the user programming is set once and rarely requires adjustment. All programmed selections are stored and will remain until changed through the user programming.

 **User programmed features and data is stored on non-volatile memory and will be retained even if the ExpressCube countertop system is not powered.**

### 7.2. Using the ExpressCube™ Controller Keypad for Programming

The ExpressCube™ Controller keypad has been designed to easily make adjustments using the user-programming feature. Respond on the numeric keys as directed by the display to make a menu selection.

Use the **UNITS** key to toggle between in/lb and cm/kg. Use the **ACQUIRE** button to enter a typed numerical value.



### 7.3. Using the PC running ExpressCube™ Sizelt™ for Programming

The programming menu can be easily accessed from the PC running Sizelt™ software program by clicking the Settings [Prog] key using the mouse cursor. All menu selections can be selected by the mouse and normal PC keyboard functions can be used to edit data entries.



## 7.4. Main Programming Menu


### 7.4.1. Alter Dimensional Weight [DIM] Factors


Selecting this menu allows the user to review or change any of the four dimensional factors used by the ExpressCube™ countertop computer to calculate dimensional weight.

Sub-menu:

1. (Dim Factor) [Units]
2. (Dim Factor) [Units]
3. (Dim Factor) [Units]
4. (Dim Factor) [Units]
5. BACK

Select the dim (dimensional weight) factor that you wish to change and verify the correct units before entering the new value.

 ***The dimensional weight factors can only have four digits with the last digit representing units or tenths. (e.g. 000.0 to 9999) Any entry of four or less digits will be assumed whole numbers unless a decimal is used. The maximum dim factor setting is 276 in<sup>3</sup>/lb***


 ***The Dim Factors are displayed in the units that they were originally input but the ExpressCube™ countertop computer will convert the dimensional weight factors to match the units that are used. The dimensional factor displayed and output from the unit will always match the units that the measurements were taken.***

## 7.4.2. Manual / Automatic Operation

This selection provides an option for an automatic recording of the measurement data after the data is collected. The automatic operation can significantly speed the measurement process and is used when there is no requirement to review acquired measurements before recording them.

Manual Operation: If the ExpressCube™ is in a ready state to record the measurement, the user will press the Acquire key or (if equipped) the trigger of the handheld scanner. The acquired measurement data will be displayed but the user must activate the **SEND / PRINT** key to record the data. Removal of the package from the platform will clear any acquired measurements and prepare the device for a new measurement sequence.

Automatic Operation: If the ExpressCube™ is in a ready state to record the measurement, the user will press the trigger of the handheld scanner (if equipped). The ExpressCube™ will record the measurements and automatically send the acquired data with the bar code as if the **SEND** button had been pushed. All acquired data will remain in the display until the parcel is removed from the ExpressCube™ platform.

 ***In Operating Software Versions 4.0.20 and later [manufactured after Jan/2011] the automatic operation will also permit the Acquire Button to Acquire & Send data in one operation.***

Sub-menu:

### MANUAL / AUTOMATIC OPERATION

1. MANUAL <SELECTED>
2. AUTOMATIC
3. GO BACK
4. EXIT

Press the appropriate number to select the desired operation mode. The current selection will be indicated by the <SELECTED> beside it. After verifying the correct selection, use EXIT function to return to the main menu.

## 7.4.3. Adjust Beep Duration

This selection displayed but the beep tone is not used in the 265R model.

#### 7.4.4. Set Device Number

This selection allows the user to set a device number for the ExpressCube™ countertop unit. The device number is sent with each data message of acquired data. This device number can be used to track a box through a facility.

Sub-menu

CURRENT DEVICE NUM XXX (000-999)

If device number requires change from the current number, type in the three-digit new device number. When the new device number is confirmed on the display, the program will automatically exit to the main menu.

Pressing the PROG key will exit the menu without changing the device number.

#### 7.4.5. Calibrate Lenses

- 1) Remove any boxes from the platform and gently wipe any accumulated dust from the surface of the lens with a cloth, towel, etc.
- 2) From under the machine, turn the machine OFF by toggling the white power switch.
- 3) Disconnect the USB connector (located beside the power cable).
- 4) From under the machine, turn the machine ON by toggling the white power switch. The lights on the top of the machine will flicker with the red power indicator becoming steady.
- 5) ON the LCD Controller located by the machine, press the PROG button. A menu will appear.
- 6) Press the number 5 key "Calibrate Dimensional Banks"
- 7) Verify that the platform is empty, then press number 1 key "Calibrate Dimensional Banks"
- 8) During the calibration process the Blue light will flash, then the Yellow, then the Green and finally the Blue light will flash. When the flashing has stopped, the lens has finished calibrating.
- 9) Hit the PROG key to quickly return to normal operation.
- 10) From under the machine, turn the machine OFF by toggling the white power switch.
- 11) Reconnect the USB connector (located beside the power cable).
- 12) From under the machine, turn the machine ON by toggling the white power switch. The lights on the top of the machine will flicker with the red power indicator becoming steady.

 **Note: It is not necessary to power the ExpressCube Off & ON if the USB cable is not used.**

## 8. Operation

### 8.1. Summary

The ExpressCube™ countertop is a very accurate MDMD (Multi-Dimensional Measuring Device) that is capable of measuring cuboidal (rectangular/square) boxes with great precision. The ExpressCube™ countertop has built in controls to prevent erroneous readings. Even with these built in controls, the user must exercise care to follow these guidelines:





- Boxes cannot exceed the dimension and weight listed in the specifications.
- Boxes must be cuboidal ( i.e. rectangular or square).
- Severely damaged packages or packages covered by excessive mud or ice can cause errors for both dimensions and weight.
- Both the platform and the package being measured must be free from physical contact with surrounding objects.
- Place objects on the platform – do not drop packages onto the platform.

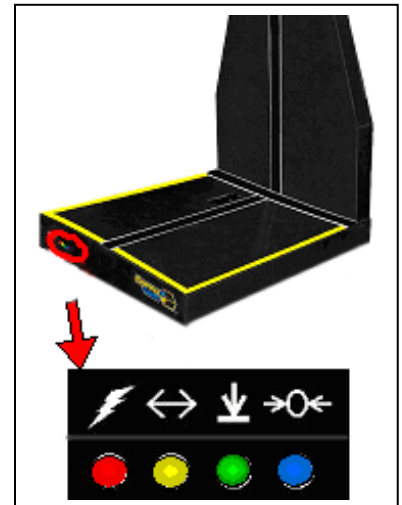


**Keep the platform clean and free of dust build up to ensure optimum operating performance.**

### 8.2. Main unit LED indicators

The main unit LED indicators are a set of four LEDs mounted on the front of the main platform of the ExpressCube™ countertop. They give an accurate status of the ExpressCube™ countertop main computer and are unaffected by third party software.

- Red – Power  – A steady illumination indicates that the unit has power.
- Yellow – Valid Dimension  – A steady illumination indicates that the ExpressCube™ countertop has measured a parcel placed on the platform.
- Green – Valid Weight  – A steady illumination indicates that the ExpressCube™ countertop has weighed a parcel placed on the platform.
- Blue – Zero  – A steady illumination indicates that the ExpressCube™ countertop is in a zero (no-load) condition.



**The ExpressCube™ countertop programmed for NTEP will not attempt any new measurement until the unit has reached a zero condition after the removal of the previous package. The Yellow and Green LED indicators will remain in the ACQUIRED state until a zero condition is achieved after the last recorded measurement.**

### 8.3. Preparation for Measurements

The ExpressCube™ countertop unit should be powered up and the ExpressCube™ control panel display finished the initial system check. Prior to starting measurements, it is recommended that the platform and sensors be wiped with a damp rag to remove any accumulated dirt and/or debris. It is also recommended that the lens is calibrated as described in Section 2.4

Select the units and dimensional factor (if used) for measuring the parcel.

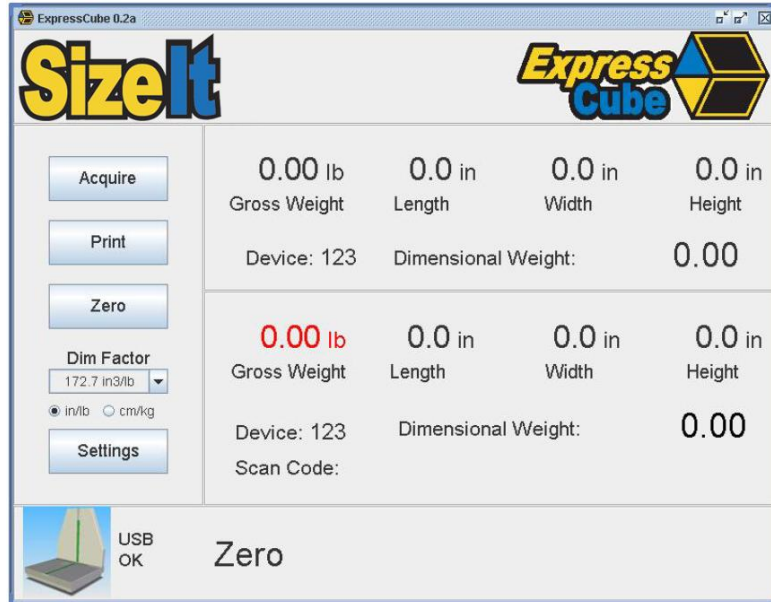
### 8.4. Zeroing the ExpressCube Countertop

The ExpressCube Countertop will not record any measurements unless the platform has recorded the Zero condition (weight of the platform in an idle condition) prior to a package being placed on the platform. After verifying that the measurement platform is empty, press the 'ZERO' function button on the ExpressCube™ control panel.

The Blue LED under the platform will light and a zero condition will be indicated by the word 'ZERO' on the display of the ExpressCube™ control panel. The Zero condition display for both of the ExpressCube™ control panels is illustrated below:



ExpressCube™ Controller Display



ExpressCube™ SizeIt™ Display

### 8.5. Placement of the Box for Measurement

Place the box to be measured flush against the back of the ExpressCube™ countertop such that one side of the box is in contact with the rear face. The orientation of the box is arbitrary as long as it:

- Sits over the center array
- Is flush (contact) to the back
- Sits within the yellow guide lines

The illustration shows an example of a box ready for measurement and indicates how the dimensions will be recorded.



☞ **GS1 (a global standards organization) has released GDSN Package Measurement Rules that specify Height, Width and Length as assigned by the dimensions. Using this standard, the orientation of the box on the platform has no effect on the height, width and length dimensions that are recorded.**

**ExpressCube Resolution systems has an option that will label dimensions according to the GSDN rules as defined in Section 5.2 Issue 1.11 [Oct 2010]. This option must be set by a qualified service technician. This option affects the data output and does not affect the standard displayed dimension labels.**



## 8.6. Verifying That the Parcel is Ready to Measure

Once the box is in place, the ExpressCube countertop unit will resolve the weight and dimensions. A successful measurement is indicated by the steady illumination of the yellow LED (valid dimension) and the green LED (valid weight) on the front of the platform. The ExpressCube control panel will also have valid measurement indicators with the actual measurements displayed.

If the weight has not been resolved, the problem could be caused by:


- The box weight exceeds specifications. Weight will read 'OVER'
- The ExpressCube countertop was not in a zero condition prior to the box placement on the platform.
- The ExpressCube countertop is vibrating or moving that is preventing weight resolution.

*Commercial [NTEP] System:* If any dimensions cannot be resolved, all dimensions will read 'N / A'.

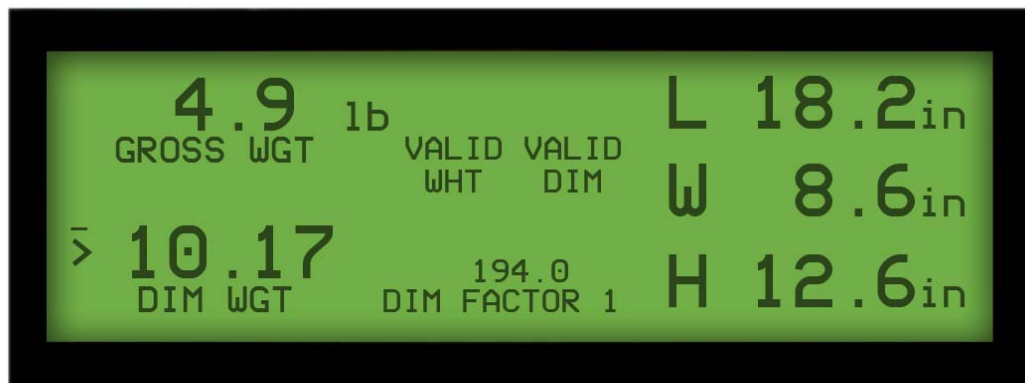
*Warehouse [WMS] System:* Any resolved dimensions will be displayed. Only unresolved dimensions will display 'N/A'.

If a cuboidal package is placed within the yellow guidelines and there is not a valid dimension obtained, the problem could be caused by:

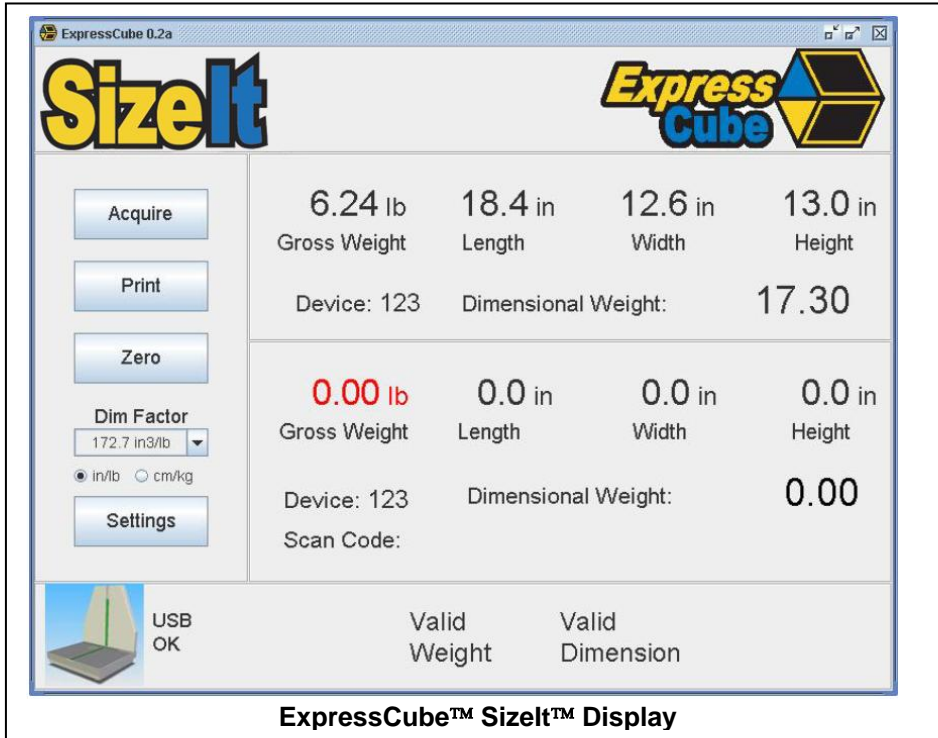
- The box dimension does not fall between the minimum and maximum the specifications.
- The box is not flush against all three dimensional arrays.
- There is excessive dirt or an object blocking the measuring arrays.

 **If the ExpressCube™ countertop is unable to resolve a valid dimension, it will behave as a weigh scale. In this condition, acquiring a measurement will only record the weight and a scan code (hand scanner optional).**

The ready to acquire condition (valid measurements) display for both of the ExpressCube™ control panels is illustrated below:



ExpressCube™ Controller Display

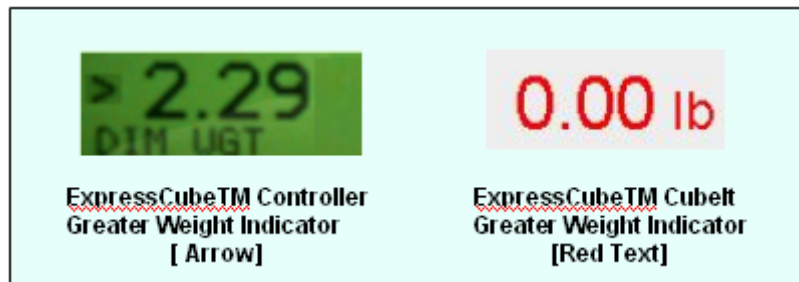


### 8.7. Dimensional Weight and The Greater Weight Indicator

The ExpressCube™ countertop can measure both dimensions and weight which it then calculates the Dimensional Weight based on the user selected Dim Factor. It is important to realize that Dimensional Weight is meaningless unless the Dim Factor used to obtain it is known. For this reason, Dimensional Weight that is acquired will be recorded with the Dim Factor used to calculate it. Similarly, the Dimensional Weight and Dim Factor will be sent with the data that accompanies the measured data and scan code (optional). **Since Dimensional Weight is a calculated weight; units are not displayed to prevent confusion with actual weight. Dimensional Weight is always the same units as actual weight.**

The greater weight indicator on the ExpressCube™ control panel is a visual aid to the user to quickly identify the greater of measured or calculated Dimensional Weight. The indicator is not sent with the acquired data.


The greater weight indicator for each of the ExpressCube™ control panel is illustrated below:




## 8.8. Acquiring the Measurement Data (Manual Operation)

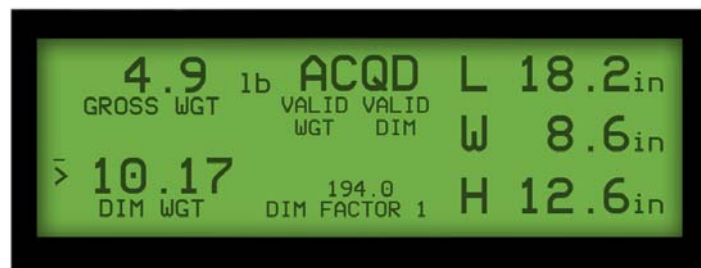
To record the measurement of the box on the ExpressCube™ countertop, activate the **ACQUIRE** button on the ExpressCube™ control panel. Alternatively (if equipped), the handheld scanner will activate the Acquire sequence while reading the bar code on the package. The acquired data will be displayed on the ExpressCube™ control panel display.

If the data is not recorded, the user should refer to Section 8.7. and verify that the box is properly positioned for measurement.

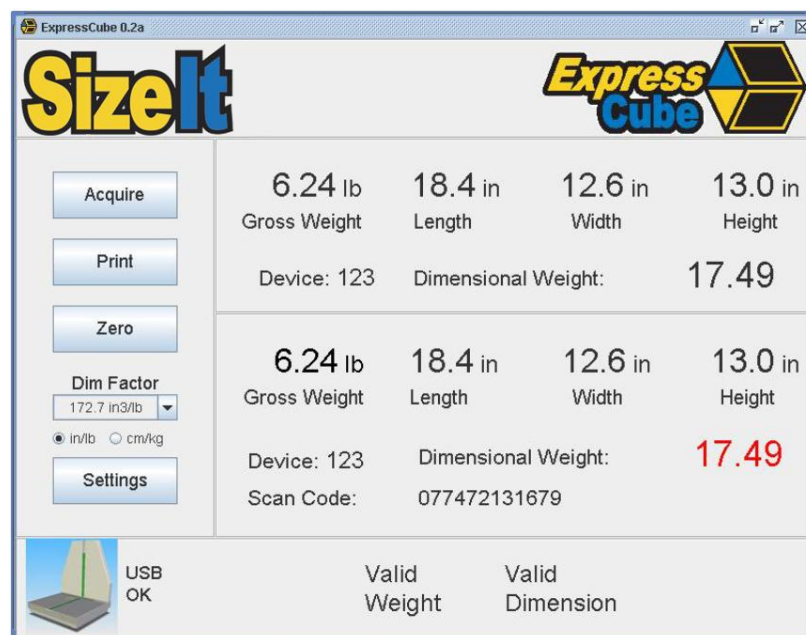
 ***If the box is removed from the platform without the SEND/PRINT button activated, the acquired data will be lost and the ExpressCube™ countertop must return to the zero condition to start a new measurement.***

 ***After a successful measurement is acquired, the valid measurement indicators both on the front panel of the main unit and the ExpressCube™ control panel are held until a new measurement procedure is started.***

Displayed below is the successful acquired measurement (ACQD) for both control panels.



ExpressCube™ Controller Display





ExpressCube™ Sizelt™ Display

## 8.9. SEND/PRINT the Acquired Measurement Data (Manual Operation)

The acquired measurement data can be sent to the printer and any other devices or ports connected to the ExpressCube™ countertop by activating the SEND/PRINT button on the ExpressCube™ control panel. The **SEND / PRINT** button will only respond once for every measurement taken.

The ExpressCube™ countertop will attempt to successfully send the acquired measurement data through the various data ports until the ExpressCube™ countertop returns to a zero condition. Any measurement data that has not been sent or printed will be cleared from the transmission buffer when the ExpressCube™ countertop is in the zero condition.

 **The ExpressCube™ Commercial [NTEP] System: control panel display will continue to hold the acquired data until the box is removed [i.e. Zero].**

 **The ExpressCube™ Warehouse [WMS] System: control panel display will continue to hold the acquired data until the weight on the platform changes.**


## 8.10. Automatic (ACQUIRE & SEND / PRINT) Operation

This feature can be used when the AUTOMATIC OPERATION option is selected in the user program (Section 7.5.2). The ExpressCube countertop must be ready for acquiring a measurement (as described in Section 8.6.). To acquire and record the measurement of the box on the ExpressCube™ countertop, the handheld scanner will activate the Acquire and **SEND / PRINT** sequence while reading the bar code on the package. The ExpressCube countertop will receive the data from the handheld scanner and append it with the acquired measurement data. The acquired data will be displayed on the ExpressCube™ control panel display.

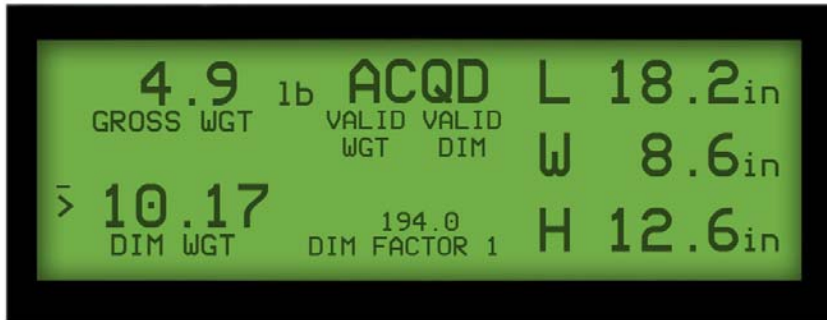
The ExpressCube™ countertop will attempt to successfully send the acquired measurement data through the various data ports until the ExpressCube™ countertop returns to a zero condition. Any measurement data that has not been sent or printed will be cleared from the transmission buffer when the ExpressCube™ countertop returns to a zero condition.

If the measurement data is not acquired, the user should refer to Section 8.6. and verify that the box is properly positioned for measurement.

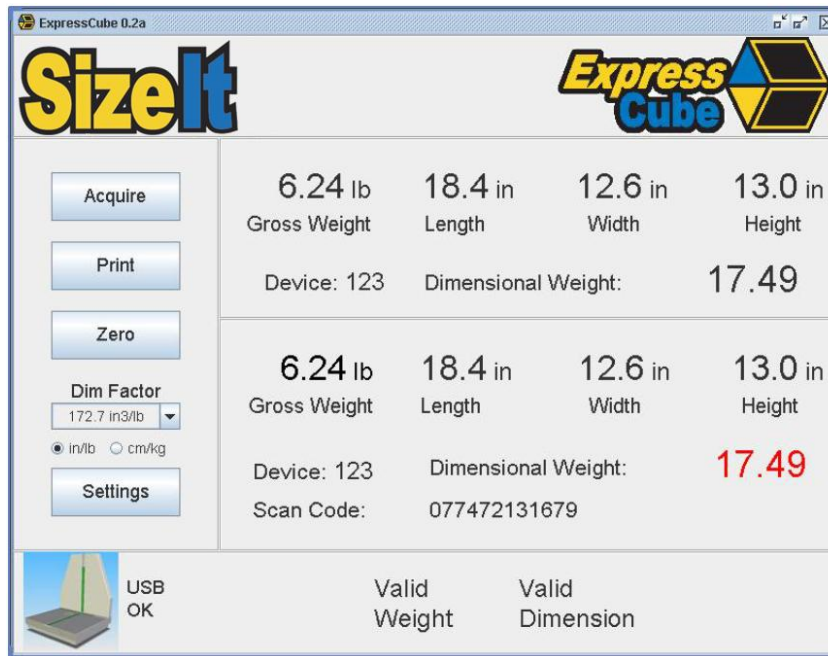
 **The ExpressCube™ control panel display will continue to hold the acquired data until the box is removed.**

 **After a successful measurement is acquired and sent, the valid measurement indicators both on the front panel of the main unit and the ExpressCube™ control panel are held until a new measurement procedure is started.**

The successful acquired and sent measurement display for both of the ExpressCube™ control panels is illustrated below:



ExpressCube™ Controller Display



ExpressCube™ SizeIt™ Display

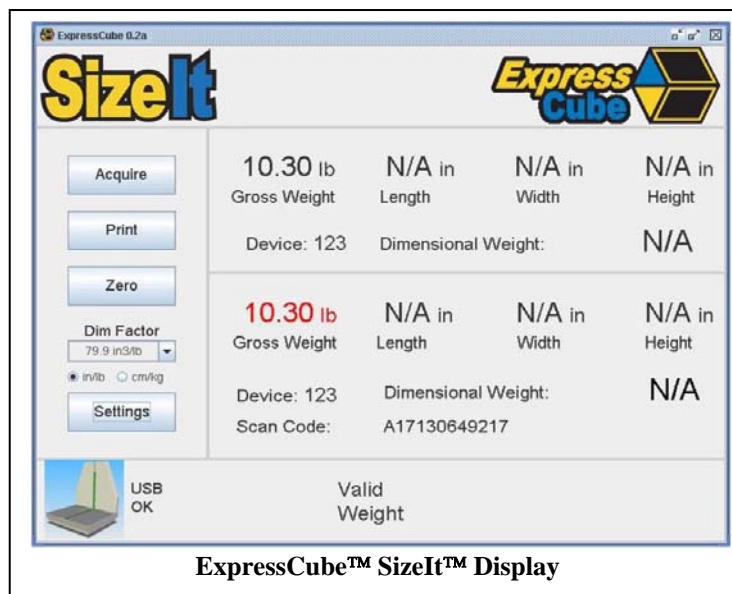
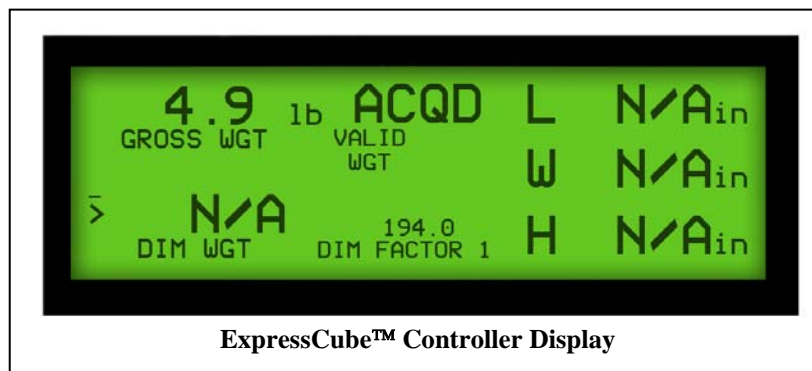
### 8.11. Using the ExpressCube™ Countertop as a Weigh Scale Only

The ExpressCube™ countertop can be used to measure the weight of non-cuboidal objects or cuboidal objects that physically exceed the dimensioning specifications of the machine. This feature allows the user to determine weight on courier documentation packs, odd package shapes including shipping cylinders, etc.

Place the package on the ExpressCube™ countertop platform to physically limit as much package over-hang as possible. The ExpressCube™ countertop will automatically reconfigure itself as a weigh scale when an object is detected on the platform that cannot be accurately dimensioned.

The ExpressCube™ countertop unit acting as a weigh scale will indicate 'N / A' on all measurements and calculations based on dimensional measurements. (See illustrations below). Only the device number, weight and scan code (optional) are recorded during the Acquire sequence.

To acquire and record a weight, use the same procedure and options as described in the previous sections for obtaining and recording dimensions.



## 8.12. ExpressCube™ Print Out Format (RS-232C Port)

### 8.12.1.Data Format

Data from printer is set as follows:

9600 b/sec  
8 bit  
No Parity  
1 Stop Bit

No flow control is provided and there is no buffer. The print out can be easily monitored by using HyperTerminal on windows.

### 8.12.2. Sample Outputs

#### Weight and All Dimensions Resolved

-----  
Device Number: 1  
Height 10.0 in  
Width: 9.9 in  
Length: 12.4 in  
Gross Weight: 4.03 lb  
Dimensional Weight: 6.33  
Dimensional Factor: 194.0  
Barcode: 051047K004  
-----


#### Weight and **Any** Dimension Unresolved ExpressCube Commercial [NTEP] System

-----  
Device Number: 1  
Gross Weight: 4.03 lb  
Barcode: 051047K004  
-----



-----  
Device Number: 1  
Height 4.1 in  
Length: 12.1 in  
Gross Weight: 4.03 lb  
Barcode: 051047K004  
-----

\*ExpressCube Warehouse [WMS] System will print any resolved dimension.

 ***If a hand scanner is not used with The ExpressCube 265R, the print out is identical to those indicated above except the 'Barcode:' line is not printed.***

## 9. Recording ExpressCube 265R Data

### 9.1. **General**


There are two locations that data is available from the ExpressCube 265R. The printer RS-232 port provides an ASCII text data output when the ExpressCube 265R performs a measurement. The data can be read through the USB interface by use of a defined protocol of communication to retrieve the data.

### 9.2. **RS-232 Port**

The data can be captured from the ExpressCube 265R RS-232 Printer port by using a null modem cable to modify the data protocol between two DTE [Master} devices. Note that control leads are not used. The ExpressCube Null Modem Cable Part # ECP-NUL-A is recommended.

### 9.3. **ExpressCube Data Logger Software**

ExpressCube Data Logger is a free Windows software written in visual basic that collects data from the ExpressCube 265R and stores it on the host computer in a text file that can be imported into a variety of software programs. The user can set up the text file to be recorded including the file name, data fields and the delimiters used. A null modem cable (e.g. ExpressCube part ECP-NUL-A) is used to connect the RS-232 ports of the ExpressCube and host computer.

 ***A copy of ExpressCube™ Data Logger with a user guide is included with each User Guide CD shipped with the ExpressCube™ system.***

## 9.4. Automatic Data Capture Using Hand Scanner & Printer RS-232 Ports

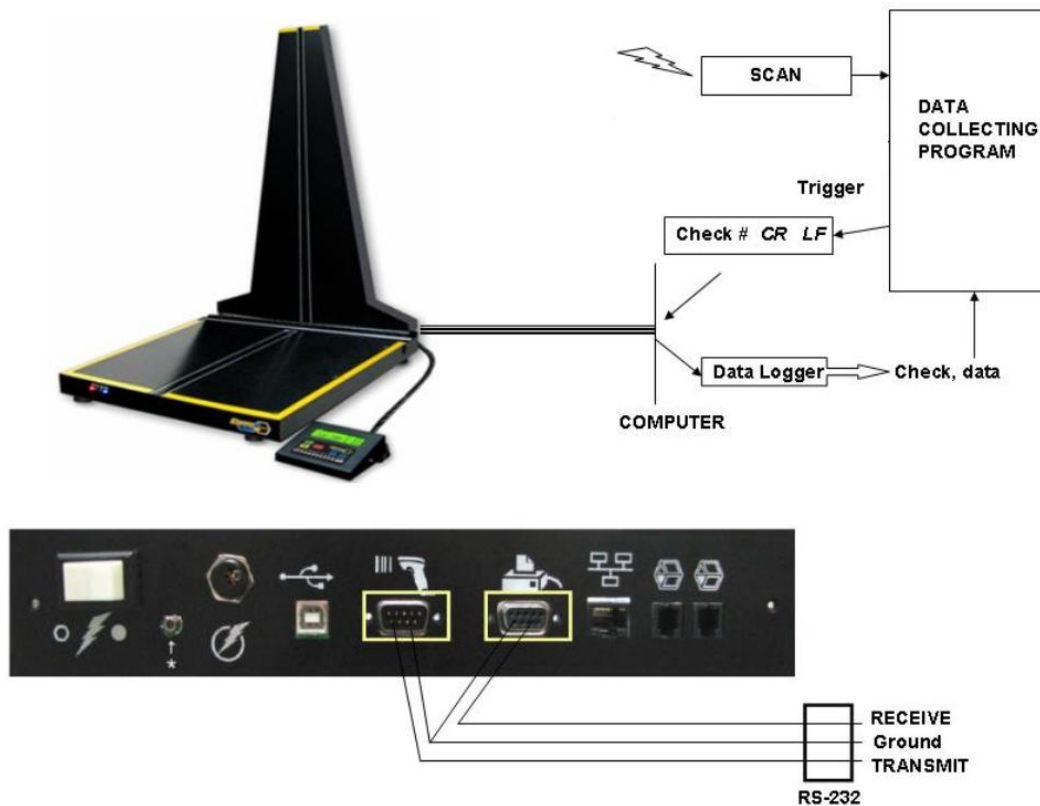
A simple method of initiating an ExpressCube 265R measurement can be achieved by using the hand scanner port to initiate a measurement (ExpressCube 265R must be in Automatic mode - see Section 7.4.2). This method is very popular among users that do not want to develop the more complex USB interface to control the machine and capture data.

A third party software (ExpressCube does not provide this application) is developed/ modified to control a RS-232 port that is connected to the ExpressCube 265R. Any data transmitted on the RS-232 port is delivered to the hand scanner port of the ExpressCube 265R. The data measurements from the ExpressCube 265R is received on the data receive of the same RS-232 computer port.

The user inputs the related information required by the third part software (e.g. destination, type, transportation, etc) and when completed either hits a key or uses a hand scanner connected to the third party software to start a measurement. The third party software sends a CR/LF (Carriage Return/ Line Feed) to the Rs-232 port to initiate the measurement cycle from the ExpressCube 265R. The data is received from the same RS-232 port.

ExpressCube sells a modem cable specifically designed for this application: Dual End Null Modem Cable part # ECP-DUL-A

A sample of this application is included in the illustration below:



## **9.5. Third Party Software Development for ExpressCube 265R USB Port**

There is third party proprietary software available that uses the ExpressCube USB port to both control and collect data from the ExpressCube 265R. These are the same protocols that is used by the ExpressCube SizeIt software to control and display data.

ExpressCube provides the protocol and related engineering libraries to software developers free of charge. ExpressCube does not provide any other support, testing or certification for third party applications.

For more details and access to ExpressCube USB protocol information, please send an e-mail that includes your name and company details to: [xsoftware.interface@expresscube.com](mailto:xsoftware.interface@expresscube.com)



***When diagnosing a problem with ExpressCube operation with a third party software, always remove the software and verify normal manual operation to prevent unnecessary service charges.***



***ExpressCube does not provide support for any third party applications that are used with the ExpressCube 265R. All support questions should be directed to the software vendor.***


## 10. Maintenance


### 10.1. *General*

The ExpressCube™ countertop unit is a sealed certified device that does not require any internal periodic maintenance. In the event that the unit has incurred physical damage that may affect the operation of the unit, it should be sent back to an authorized service center for repair and re-calibration.

### 10.2. *Cleaning (Excluding the Sensor Lenses)*


To maintain the optimum performance of the ExpressCube™ countertop, the unit should be periodically cleaned to remove any build-up of dust and dirt. The black metal areas should be cleaned separately from the sensing strips. Use a damp cloth with a mild detergent and rinse with a clean damp cloth. Hand pumped sprayers can be used. Apply a non-corrosive cleaner to stubborn areas but care should be exercised to keep spray from the sensor strips.

 ***Do not use any volatile liquids to clean the surface. This is an electronic device and trapped fumes in the enclosure could be ignited by the electronic circuitry.***

 ***Do not use any pressurized liquid source (e.g. water hose, steam jet, etc) to clean the unit.***

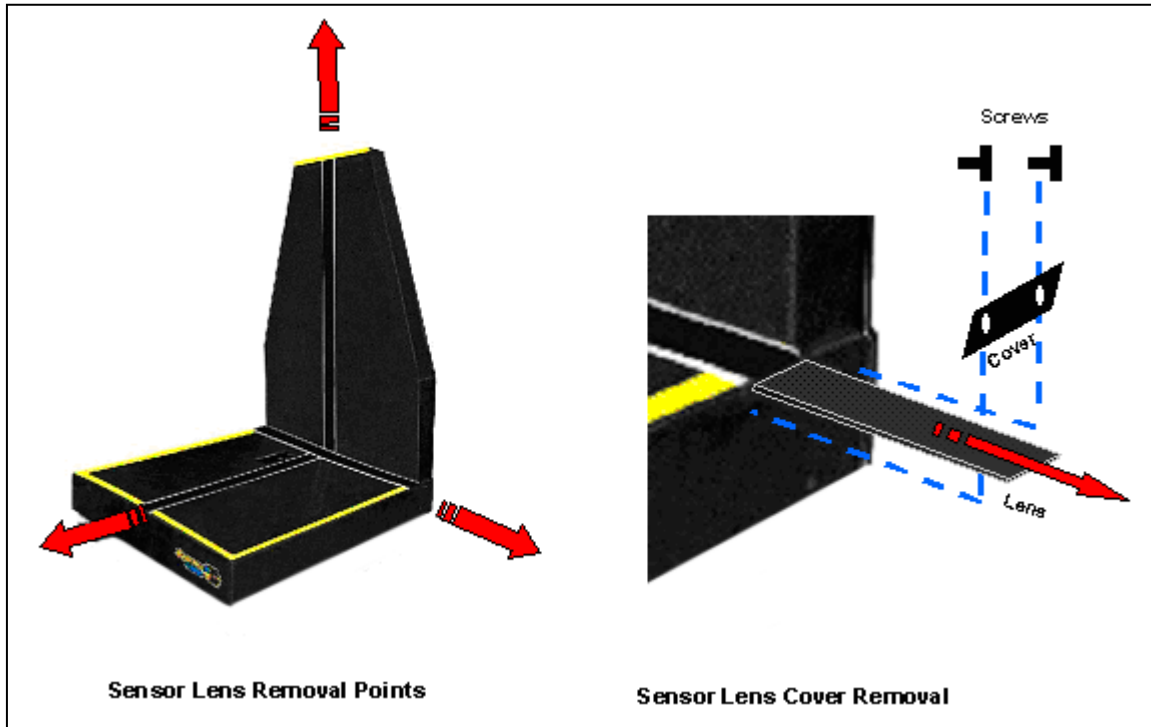
### 10.3. *Cleaning the Sensor Lens*

It is important to keep the sensor lenses clean and free from any debris that may obscure the package from sensors. Use a soft clean cloth with commercial glass cleaner to clean the surface of the lens.

 ***Do not use abrasive or dry cleaners on the lens.***

## 10.4. Replacing the Sensor Lens


If a sensor lens becomes foggy (opaque) from wear, cracked or broken it should be replaced. All three lenses have a cover to permit safe and quick replacement of the lens. The covers are held on by two screws and their locations are illustrated below.




## 11. Troubleshooting

### 11.1. Summary

The ExpressCube™ countertop is a multi-dimensional precision instrument designed to work in a variety of working environments. The internal assembly is sealed to preserve the integrity of this measuring instrument. There are a number of problems that may arise that can be addressed without tampering with the seals which are reviewed in this section along with problems involving possible parts replacement.

 ***This section addresses problems that are occurring in lieu of the device being properly installed, cleaned and operated as per the above sections.***

 ***Only authorized technicians may break the seals to perform repairs on the ExpressCube countertop unit. Unauthorized personnel breaking the seals for any reason will void the government certification and possibly void the warranty on the unit.***

### **11.2. ExpressCube™ Countertop will not power up**

Symptom: The unit is connected to the power supply that is connected to power but the operation of the OFF-ON switch has no affect. The red LED on the front of the platform is off.

Check (in numerical sequence):

1. Physically verify the connections of the power adapter to the power outlet and the ExpressCube™ countertop power connector.
2. Verify the power outlet by connecting a lamp or other known operational device.
3. (Technician only) Remove the power adapter from the ExpressCube™ countertop unit and verify that the voltage to the ExpressCube™ countertop is present [15 VDC]. If the voltage is not present, contact your sales representative for a new power adapter.
4. Contact your service center to arrange repair by a qualified service representative.

### **11.3. ExpressCube™ Countertop Controller LCD display is not working**

Symptom: The LCD display on the Controller either does not display any intelligent characters or cannot control the ExpressCube™ Countertop.

Check (in numerical sequence):

1. Check that the red LED on the front panel of the ExpressCube™ Countertop is steady. If not steady, turn off the unit and remove power cord for 30 seconds. Reconnect the power and turn the power ON. If LED continues to flash, contact your service center to arrange repair by a qualified service representative.
2. Physically check the cable (authentic ExpressCube™ part) and the connections to both the ExpressCube™ Countertop connector panel and the Controller.
3. Switch the connecting cable to the alternative external connector on the ExpressCube™ Countertop connector panel.
4. (Technician only) Use an Ohm meter to verify the cable conductivity and visually inspect the RJ connectors for physical damage.
5. Contact your service center to arrange repair by a qualified service representative.

#### 11.4. ExpressCube™ Countertop PC Controller Sizelt is not working

Symptom: The Sizelt software program running on the PC is not communicating with the ExpressCube™ Countertop.

Check (in numerical sequence):

1. Check that the red LED on the front panel of the ExpressCube™ Countertop is steady. If not steady, turn off the unit and remove power cord for 30 seconds. Reconnect the power and turn the power ON. If LED continues to flash, contact your service center to arrange repair by a qualified service representative.
2. Turn off the program in the computer and remove the USB cable until a tone is heard from the computer. Put in the USB and wait for a computer tone again. Restart the Sizelt software.
3. If the Sizelt program is still indicating that there is not USB connection; physically check the USB cable connections to both the ExpressCube™ Countertop connector panel and the Controller.
4. If the Sizelt program is still indicating that there is not a USB connection, replace the USB cable.
5. (IT Technician only) Verify proper hardware and software operation of personal computer (PC). ExpressCube™ warranty only relates to the ExpressCube™ provided products as outlined in the Warranty in Appendix 1.
6. Contact your service center to arrange repair by a qualified service representative.





## 12. Appendix 1 : ExpressCube™ Warranty

### GLOBAL SENSOR SYSTEMS INC. NEW PRODUCT LIMITED WARRANTY

#### **12.1. Statement of Warranty.**

Subject and according to the Terms and Conditions set forth below, Global Sensor Systems Inc. warrants to the Buyer that the new ExpressCube Countertop multi-dimensioning device (the “Product”) is in accordance with the manufacturer’s published specifications at the time of sale and that such Product shall be free from manufacturing defects in material and workmanship for a period of **one year** from, as applicable: the date of sale or the Commencement Date of use when installed by an authorized service representative (the “Warranty Period”). For purposes of this warranty, the term “Buyer” shall mean and refer only to the party which originally – whether from Global Sensor Systems Inc. directly, or from a distributor, agent or reseller authorized by Global Sensor Systems Inc. – purchases the Product as the end user which is the subject of this warranty.

#### **12.2. Terms and Conditions of Warranty.**

This warranty is applicable exclusively to the original Product and components (if any) delivered with the Product as part thereof which were acquired from the manufacturer and resold by Global Sensor Systems Inc. Except as specifically warranted herein, Global Sensor Systems Inc. does not warrant, for any purpose, any part or component manufactured by another manufacturer. This warranty does not apply to any part or component which is used or rebuilt. Global Sensor Systems Inc. obligation and liability under this warranty is expressly limited to repair or replacement (at its option) of the warranted equipment or components within the Warranty Period. A purchase by Buyer of equipment first leased or rented from an authorized Global Sensor Systems Inc. agent shall not start a new Warranty Period.

In the event of the occurrence of a claim under this warranty, the Buyer shall have a duty to promptly notify Global Sensor Systems Inc. in writing of the nature and specifics of the claimed defect. Failure to so notify shall void this warranty. Any claim of a warranted defect is subject to inspection and analysis by Global Sensor Systems Inc. to conclusively identify or confirm the nature and cause of failure and application of this warranty. Any defective components, mechanical or electrical, will be repaired or replaced, at the discretion and authorization of Global Sensor Systems Inc., at Global Sensor Systems Inc.’s facilities in Mississauga, Ontario, Canada or at an authorized agent facility. It shall be the Buyer’s responsibility to return the faulty equipment or components to Global Sensor Systems Inc. at Buyer’s expense. Global Sensor Systems Inc. obligation shall not include transportation charges, nor labour, material, or service charges involved in the removal, return or installation of equipment or components.

Except as provided herein, Global Sensor Systems Inc. shall have no other obligation or liability due to defective equipment or components. Accordingly, but without limitation, Global Sensor Systems Inc. shall not be liable for: losses, injury or damage caused to persons or property by Global Sensor Systems Inc. products or their failure; indirect, special or consequential damages of any nature including but not limited to loss of profit, delays or expenses, such as those arising from the use of or inability to use the products; nor any incidence of personal injury or property damage arising from the negligence or willful act of anyone.

Global Sensor Systems Inc., for itself and the manufacturer, reserves the right to incorporate improvements in material and design applicable to the type or model of products to which the covered Product relates without notice and without any obligation or duty, whatsoever, to incorporate the same improvements in equipment previously manufactured.

### **12.3. Conditions Which Void Warranty.**

This agreement shall not apply to equipment or components which has/have:

- A. Been the subject of repairs or modifications not authorized by Global Sensor Systems Inc.
- B. Not been operated under normal use and service according to that for which it was intended.
- C. Not been operated or maintained in accordance with printed instructions.
- D. Been subject to misuse, damaged, negligent handling, improper installation, accident, damage by fire, submersion, or act of God.
- E. Had serial numbers altered, defaced or removed.
- F. Been sold, loaned, leased, subleased or in any other way transferred to or placed within the control of any party other than the Buyer.
- G. Been operated beyond capacity.

THE FOREGOING IS IN LIEU OF ALL OTHER REMEDIES, GUARANTEES, LIABILITIES OR WARRANTIES. GLOBAL SENSOR SYSTEMS INC. MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

This statement sets forth the full extent of Global Sensor Systems Inc. liability for breach of any warranty or deficiency in connection with the sale or use of the Product. No employee or representative of Global Sensor Systems Inc. is authorized to change this warranty in any way or grant any other warranty.

## 13. Appendix 2: Dimensional Weight & DIM FACTOR

### 13.1. *The Importance of Volume and Weight of Cargo for Transportation*

All cargo space involved in transporting goods has physical limits based on the volume of the cargo and the weight. Once a cargo has reached a limit in either volume or weight – the container (trailer, train, plane or shipping container) is transported. Weight has traditionally been the measurement which the transportation costs of individual packaged freight has been calculated.

The difference in weight and volume costs can be appreciated if one considered the expense of transporting a large volume with little weight (e.g. large boxes of Styrofoam drinking cups). Transportation companies have recognized these variables and most have allocated a volume per weight standard in their billing to capture cargo of light density.

### 13.2. *Dimensional (Volume) Weight*

The dimensional weight (also known as volume weight) is the minimum weight that a package a given size may have that is handled by a carrier. A carrier may state that any package of one cubic foot (12"x12"x12") will have a minimum weight allowance of 10 pounds. If the cubic foot package actually weighs 8 pounds – it will be invoiced for 10 pounds. This is a ***minimum*** weight allowance – if the cubic foot package weighs 12 pounds – the charges will be based on 12 pounds.



***There are no international or domestic standards concerning values of dimensional weight. A significant number of courier companies use the dimensional weight standard set by the International Air Transport Association (IATA) but many define their own dimensional weights.***

The value of dimensional weights will probably change as the nature of shipments change over time. Organizations such as the International Air Transport Association (IATA) have produced studies that suggest the density of packaging is changing as the commodities become more high tech. As a result the IATA itself has already passed a resolution (Resolution 501) to change the IATA dimensional weight.

### 13.3. DIM Factor (Dimensional Weight Factor)

The DIM factor is a mathematical factor used to calculate the dimensional weight of an object. The DIM factor represents the volume of a package allowed per unit of weight. Although mathematically related, the DIM factor is different for measurements in units of inches/pounds and for measurements in centimeters/ kilograms.

All major courier companies now apply the DIM Factor to every cuboidal (rectangular/ square) parcel that they handle to determine the dimensional weight. They then adjust customer invoicing to reflect charges based on the greater weight between actual weight and dimensional weight.

#### Finding a DIM Factor using in/lb

Find the DIM factor if each cubic foot (12"x12"x12") has a minimum weight allowance of 10 pounds:

$$\frac{1 \text{ cu ft}}{10 \text{ lbs}} \quad \frac{12'' \times 12'' \times 12''}{10 \text{ lbs}} \quad \frac{1728 \text{ in}^3}{10 \text{ lbs}} \quad \boxed{172.8 \text{ in}^3/\text{lb}}$$

#### Finding a DIM Factor using cm/kg

Find DIM factor if each cubic meter (100cm x 100cm x 100cm) has a minimum weight allowance of 200 kg:

$$\frac{1 \text{ m}^3}{200 \text{ kg}} \quad \frac{100\text{cm} \times 100\text{cm} \times 100\text{cm}}{200 \text{ kg}} \quad \frac{1000000 \text{ cm}^3}{200 \text{ kg}} \quad \boxed{5000 \text{ cm}^3/\text{kg}}$$

### 13.4. Using DIM Factor (Dimensional Weight Factor)

The DIM Factor provides a quick determination of the dimensional weight of any cuboidal package. The best way to describe this application is by an example of the application and use of the DIM Factor by a courier company:

What is the billing rate of a 10"x 12"x 14" package that weighs 8 lbs by a courier that has a minimum dimensional weight of 10 lbs per cubic foot (i.e.: DIM Factor = 172.8 in<sup>3</sup>/lb) ?

$$\frac{\text{Volume}}{\text{DIM Factor}} \quad \frac{\text{Volume}}{\text{Volume / lb}} \quad \frac{10 \times 12 \times 14 \text{ in}^3}{172.8 \text{ in}^3/\text{lb}} \quad \frac{1680 \text{ in}^3 \text{ lb}}{172.8 \text{ in}^3} \quad \boxed{9.7 \text{ lb}}$$

The courier company will invoice based on 9.7 lbs – the dimensional weight.



***This is an example. Some courier companies always round dimensional weight up to the next pound, which in this sample would make the billing weight 10lbs.***

### 13.5. Dim Factor Conversion Between in<sup>3</sup>/lb and cm<sup>3</sup>/kg

The ExpressCube Countertop will automatically adjust the selected DIM Factor to correspond to the units selected by the user. The mathematical relationship between DIM Factors can be expressed as follows:

$$\text{Dim Factor [cm}^3\text{/kg]} = \text{Dim Factor [in}^3\text{/lb]} \times 36.12728079$$

$$\text{Dim Factor [in}^3\text{/lb]} = \text{Dim Factor [cm}^3\text{/kg]} \times 0.027679913$$



***Some DIM Factors maybe provided in both units such as the IATA value of Dim Factor 166 in<sup>3</sup>/lb or Dim Factor 6000 cm<sup>3</sup>/kg. These have been slightly modified for ease of application. The ExpressCube countertop will correctly convert a user-selected input of Dim Factor 166 in<sup>3</sup>/lb to Dim Factor 5997 cm<sup>3</sup>/kg. This 0.05% difference is not large enough to affect dimensional weight readings. The user can input another DIM Factor of 6000 cm<sup>3</sup>/kg if desired and choose from two different Dim Factor selections depending on the units selected.***

## 14. Appendix 3: ExpressCube Tips and Techniques

### 14.1. Dimensional Weight

Virtually every courier company is now calculating an allowable (dimensional) weight for the size of the package that you are shipping. If your dimensional weight exceeds the actual weight, you will be charged based on the dimensional weight<sup>1</sup>.

It is important that you understand how dimensioning equipment works, how your courier company determines the dimensional weight and the impact of proper packaging to minimize shipping costs.

<sup>1</sup> For a detailed description of the mathematics of dimensional weight and DIM factors, read *Understanding Dimensional Weight and DIM FACTORS* included in your ExpressCube Operators Guide or obtain a free copy from the ExpressCube website ( [www.expresscube.com](http://www.expresscube.com) )

### 14.2. How ExpressCube Measures Packages

The ExpressCube product line obtains dimensions by measuring the dimensions of three faces of the package placed on the machine. Each measurement is taken 90° from the axis of the other two measurements.

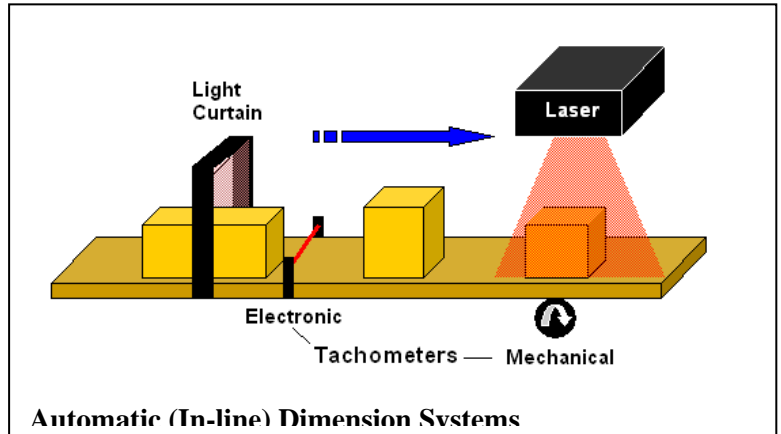
One measurement axis (length) is fixed on an edge but the other two axis do allow the operator to determine the point of measurement (illustrated in red). This is useful when measuring irregular packages as explained later in this document.



### 14.3. How Laser & Light Curtain Conveyor Systems Measures Packages

Many large courier companies use automated (in-line) conveyor dimensioning systems to arrive at a dimensional weight. These systems may use a speed-based tachometer to measure the length of the parcel traveling on the conveyor and either a laser scanner or a light curtain (emitters/receivers) to determine height and width.

These automatic dimensioning systems are able to provide dimensions quickly. Without human intervention, automated devices measure the largest dimension on each axis irrespective if it is an actual part of the box, a fat packet of documents or a bulging flap. On a recent visit to a large courier depot, this author was able to change the chargeable weight indicated on a Laser dimensioning system by placing a pencil on top of the parcel.



Appreciating the nature of the automatic systems allows shippers to package wisely and predicts the effect of the deformed boxes using the ExpressCube countertop unit (detailed below).

### 14.4. Know Your Courier's Method of Calculating Dimensional Weight

*It is possible for two different courier companies to use the same DIM factor on the same package and arrive at two different dimensional weights for calculating courier charges.*

The mathematical formula for determining dimensional weight for a package using a set DIM Factor is equal to volume (LxWxH) divided by the DIM Factor. The ExpressCube dimensional weight calculation utilizes straight mathematics obtained by multiplying the displayed dimensions and dividing by the DIM Factor.

The mathematical dimensional weight of a package 12¼ " x 18½ " x 24¼ "  
 DIM Factor = 194:

Volume	Volume	12.25x18.5x24.25 in <sup>3</sup>	5496 in <sup>3</sup> lb	<b>28.3 lb</b>
DIM Factor	Volume / lb	194 in <sup>3</sup> /lb	194 in <sup>3</sup>	

There are some courier companies that round up measurements before they are used in calculations. This can have a significant cost impact, particularly on smaller packages. These courier companies would calculate the dimensional weight as follows:

The rounding up method to calculate dimensional weight of a package  
 13 (12¼) " x 19 (18½) " x 25 (24¼) " DIM Factor = 194:

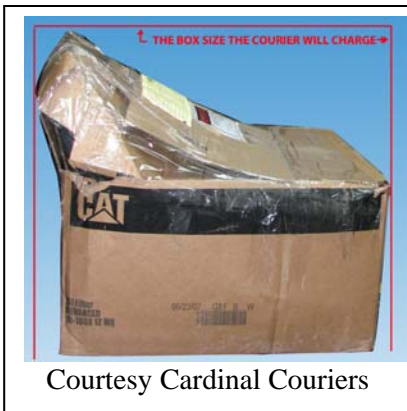
Volume	Volume	13x19x25 in <sup>3</sup>	6175 in <sup>3</sup> lb	<b>31.8 lb</b>
DIM Factor	Volume / lb	194 in <sup>3</sup> /lb	194 in <sup>3</sup>	

In this example, subtle differences currently in use by two major couriers to calculate the dimensional weight of the same package would result in one charge based on 28.3 lb and another charge based on 31.8 lb.

### 14.5. Minimizing Package Size

Long gone are the days when a small item is thrown in an oversized carton and then surrounded in foam chips. It is possible to quickly surpass the value of the protected item with excessive shipping cost if a careful analysis is not used to determine the appropriate insulation required to protect an item.

While it is important to keep the size of the carton to a minimum, it is also important to find boxes that fit the item to be shipped properly. If an irregular item is presented to most courier companies, they will calculate the dimensional weight based on *'the minimum dimensions of a carton that would contain the irregular package'*. Loosely translated, the maximum measurements obtained by the automatic dimensioning systems will be used to determine the dimensional weight for invoicing.



These actual photos illustrate how sloppy packaging can incur extra shipping costs from dimensional weight. If the item pictured in the left photo was placed flat in a fitted box there could have been a 35% savings in shipping costs. Furthermore, irregular packaging is harder to handle and store making it much more vulnerable to damage.





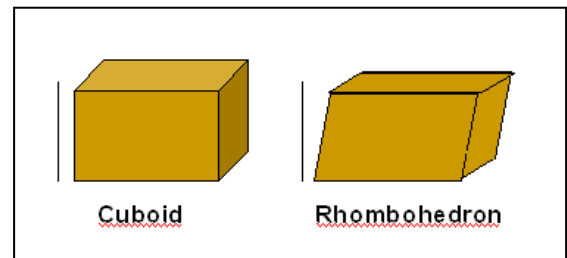
Remember that box manufacturers quote inside dimensions. The outside dimension used to calculate your dimensional weight will depend on the thickness of the cardboard, how it is folded and taped, the thickness of documentation, and, how a courier company treats fractional measurements in their calculations (as detailed above).

#### **14.6. Measuring Packages on ExpressCube Dimensioning Systems**

To acquire accurate measurements, the box should be placed such that the back surface of the box is in full contact with the rear height surface of the ExpressCube unit. The box must cover the three sensor arrays completely.

If the box is relatively light (e.g. pharmaceuticals, electronic components, etc), keep the top and bottom sealed flaps away from the ExpressCube surfaces (i.e. to the left and right sides of the operator). This procedure will negate any slight bulge on the openings that can cause the box to 'rock' on the surface due to the light weight of the box.

It is possible from box assembly or the contents that the box can become 'skewed' (some angles are not 90°) causing the box to change shape from a cuboid to a rhombohedron. Because two sides are 'skewed', there are two or more surfaces that will not rest flush against the ExpressCube height measuring array. To obtain an accurate measurement, rotate the box 90° to place a full contact surface against the height measuring array.



Note: The volume obtained by the ExpressCube for a rhombohedron for calculating dimensional weight will be accurate but as the box becomes more 'skewed', there will be a point that the courier company will treat the rhombohedron as an irregular shape and assess a volume based on the minimum size cuboidal box that could contain it. (If the edge of one side is 'skewed' 2" from the 90° axis, the courier company will calculate dimensional weight based on a box 2" larger in that dimension.)

## 14.7. Measuring Irregular Cartons<sup>1</sup> With ExpressCube

ExpressCube systems are designed and rated for the measurement of cuboidal boxes. As illustrated above, understanding the method used by courier companies to determine the dimensional weight of an irregular shaped package allows an operator to obtain similar measurements on the ExpressCube by orienting the package on the platform to obtain the maximum dimensions.

<sup>1</sup>The irregular carton measured on the ExpressCube must consist of flat surfaces of which at least two must be at 90° angles. Curved surfaces such as cylinders, liquid containers, bags, and pouches cannot be measured and such articles must be quoted by the courier/shipping company to determine the final cost.

To obtain the dimensional weight of an irregular carton, rotate the object on the measurement platform such that the largest portions of the carton cover the sensor arrays. Remember that the length, width and height designations of the carton are arbitrary axis assignments to obtain a volume measurement – that is – freely rotate the carton on any axis to allow a measurement to be taken. Samples of measurement techniques are illustrated in the photos below.



## Points Summary

- **Dimensional Weight calculations using identical measurements can vary with different carriers. Check with each carrier for calculation method.**
- **Carton dimensions quoted by manufacturers describe the inside dimensions. The dimensions used by carriers will depend on package thickness, etc.**
- **Automatic (in-line) dimensioning systems generally measure the largest dimension in a direction including packaged invoices, tape bulges, skewed shapes, etc.**
- **Use proper fitting cartons to minimize dimensional weight and avoid damage.**
- **ExpressCube systems can be used to measure maximum dimensions on most irregular cartons by rotation and placement location on the measuring surface. (See detailed description above).**