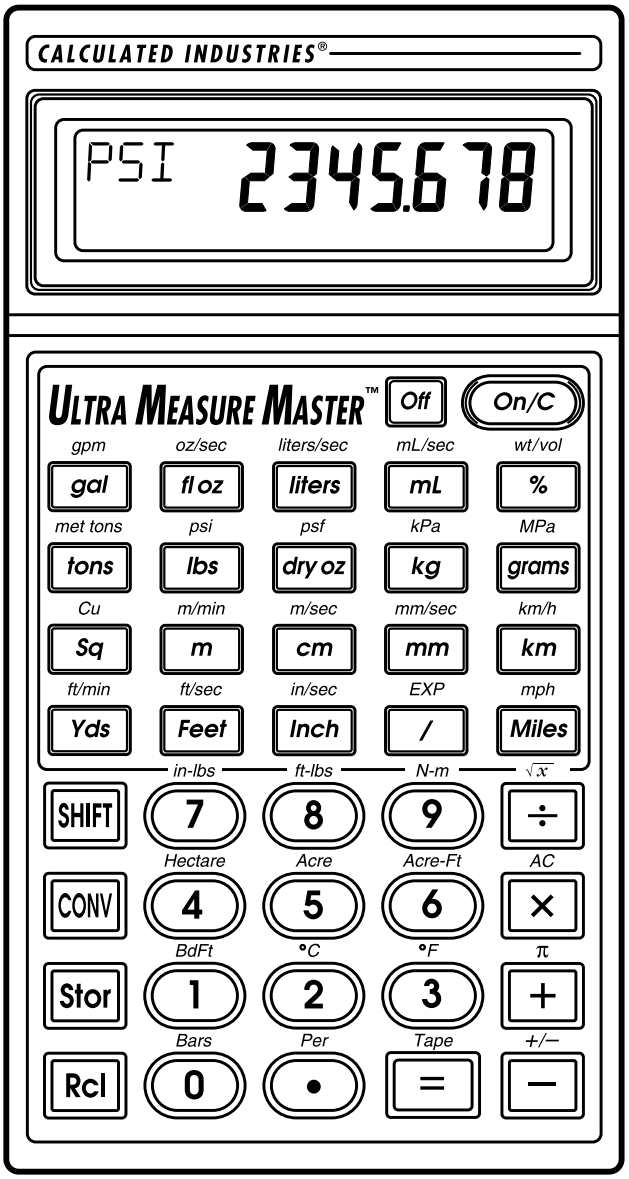
Ultra Measure Master®

Conversion Calculator



User's Guide

CALCULATED INDUSTRIES®

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Introducing Ultra Measure Master®

The *Ultra Measure Master*® calculator simplifies conversions between metric and English weights and measures. The *Ultra Measure Master* can convert the following types of dimensions:

- Linear
- Area
- Volume
- Weight
- Between Weight and Volume
- Temperature
- Linear Velocity
- Volumetric Velocity (Flow Rates)
- Pressure
- Bending Moment

In addition to the above, the *Ultra Measure Master* performs dimensional calculations with ease!

KEY DEFINITIONS

[+] [–] [x] [÷] [=]

Arithmetic operation keys.

[0] – [9] and [•]

Digits used for keying in numbers.

[Off] — Off Key

Turns all power off.

[On/C] — On/Clear Key

Turns on power. Pressing once clears the display. Pressing twice clears all temporary registers but does not clear scales.

[Stor] — Storage Key

Used to store values.

[Rcl] — Recall Key

Recalls values stored in registers.

[CONV] — Convert Key

Used with dimension keys to convert dimensions, or with other keys to access special functions.

[SHIFT] — Shift Key

Used with other keys to access units of measurement or other special functions.

[gal] — Gallon Key

Displays and enters value as gallons.

[fl oz] — Fluid Ounces Key

Displays and enters value as fluid ounces.

[liters] — Liter Key

Displays and enters value as liters.

[mL] — Milliliter Key

Displays and enters value as milliliters.

[%] — Percent Key

Four function percent key.

[tons] — Ton Key

Displays and enters value as tons.

[lbs] — Pounds Key

Displays and enters value as pounds.

[dry oz] — Dry Ounces Key

Displays and enters value as dry ounces.

[kg] — Kilograms Key

Displays and enters value as kilograms.

[grams] — Grams Key

Displays and enters value as grams.

[Sq] — Square Key

Defines a square dimension.

[m] — Meters Key

Displays and enters value as meters.

[cm] — Centimeter Key

Displays and enters value as centimeters.

[mm] — Millimeter Key

Displays and enters value as millimeters.

[km] — Kilometer Key

Displays and enters value as kilometers.

[Yds] — Yards Key

Displays and enters value as yards.

[Feet] — Feet Key

Displays and enters value as decimal feet; enters the feet portion of a feet-inch value.

[Inch] — Inch Key

Displays and enters value as decimal inches; enters the inch portion of a feet-inch value.

[/] — Fraction Key

Used to separate the numerator and denominator when entering fractions: 1 [/] 2

[Miles] — Miles Key

Displays and enters value as miles.

[SHIFT] [gal] — Gallons Per Minute

Displays and enters value as gallons per minute (gpm).

[SHIFT] [fl oz] — Fluid Ounces Per Second

Displays and enters value as fluid ounces per second (oz/sec).

[SHIFT] [liters] — Liters Per Second

Displays and enters value as liters per second (liters/sec).

[SHIFT] [mL] — Milliliters Per Second

Displays and enters value as milliliters per second (mL/sec).

[SHIFT] [%] — Weight Per Volume

Displays and enters weight per volume factor in permanent memory.

[SHIFT] [tons] — Metric Tons

Displays and enters value as metric tons (met tons).

[SHIFT] [lbs] — Pounds Per Square Inch

Displays and enters value as pounds per square inch (psi).

[SHIFT] [dry oz] — Pounds Per Square Foot

Displays and enters value as pounds per square foot (psf).

[SHIFT] [kg] — Kilopascals

Displays and enters value as kilopascals (kPa).

[SHIFT] [grams] — Megapascals

Displays and enters value as megapascals (MPa).

[SHIFT] [Sq] — Cubic Function

Defines a cubic dimension (Cu).

[SHIFT] [m] — Meters Per Minute

Displays and enters value as meters per minute (m/min).

[SHIFT] [cm] — Meters Per Second

Displays and enters value as meters per second (m/sec).

[SHIFT] [mm] — Millimeters Per Second

Displays and enters value as millimeters per second (mm/sec).

[SHIFT] [km] — Kilometers Per Hour

Displays and enters value as kilometers per hour (km/h).

[SHIFT] [Yds] — Feet Per Minute

Displays and enters value as feet per minute (ft/min).

[SHIFT] [Feet] — Feet Per Second

Displays and enters value as feet per second (ft/sec).

[SHIFT] [Inch] — Inches Per Second

Displays and enters value as inches per second (in/sec).

[SHIFT] [Miles] — Miles Per Hour

Displays and enters value as miles per hour (mph).

[SHIFT] [9] — Newton-meters

Displays and enters value as newton-meters (N-m).

[SHIFT] [8] — Foot-Pound

Displays and enters value as foot pounds (ft-lbs).

[SHIFT] [7] —Inch-Pounds

Displays and enters value as inch pounds (in-lbs).

[SHIFT] [6] — Acre-Feet

Displays and enters value as acre-feet.

[SHIFT] [5] — Acre

Displays and enters value as acres.

[SHIFT] [4] — Hectare

Displays and enters value as hectares.

[SHIFT] [3] — Fahrenheit

Displays and enters value as Fahrenheit (°F).

[SHIFT] [2] — Celsius

Displays and enters value as Celsius (°C).

[SHIFT] [1] — Board Feet

Displays and enters value as board feet (BdFt).

[SHIFT] [•] — Per Unit Function

Allows you to calculate total material cost, if you multiply the total amount of material by the per unit cost of the item.

[SHIFT] [–] — Change Sign

Toggles the sign of the displayed value. (Positive or negative.)

[SHIFT] [÷] — Square Root Function

Calculates and displays the square root of a number. You will get an error if you try to find the square root of a linear or volume value.

[CONV] [+] — Pi Constant (π)

An internal constant: 3.141593.

[CONV] [/] — Exponential Notation

Used to enter exponential values.

[CONV] [Rcl] — Memory Clear

Clears the value in memory without changing the display.

[CONV] [x] — All Clear

Resets calculator to default settings.

[Rcl] [x] — Metric Mode Toggle

Toggles between metric mode and Imperial-English mode.

Note: *This mode is not reset when you perform an all clear [Conv] [x].*

[Rcl] [=] — Paperless Tape Function

Accesses the "Paperless Tape" mode so you can check previous entries.

[Rcl] [%] — Weight Per Volume Recall

Recalls the weight per volume.

[Rcl] [/]— Preference Setting

Accesses user defined fractional and exponential settings.

[Rcl] [+] — Memory Clear

Clears all Memory registers (0 – 9) without clearing the display.

OPERATING BASICS

Power On & Off

Turn the calculator on by pressing the **[On/C]** key. To turn the calculator off, press **[Off]**.

Conventions & Units of Measure

Conventions	Units of Measure
Linear	meters
	centimeters
	millimeters
	feet
	inches
	yards
	miles
	kilometers
Area	square meters
	square yards
	square miles
	hectares
	square centimeters
	square feet
	square kilometers

Conventions	Units of Measure
Area Cont'd	square millimeters
	square inches
	acres
Volume	cubic meters
	cubic yards
	cubic miles
	gallons
	milliliters
	cubic centimeters
	cubic feet
	cubic inches
	cubic kilometers
	fluid ounces
	board feet
	cubic millimeters
	acre-feet
	liters
Temperature	Celsius
	Fahrenheit
Weight	dry ounces
	pounds
	tons
	grams
	kilograms
	metric tons

Conventions	Units of Measure
Linear Velocity	feet per minute
	feet per second
	inches per second
	meters per minute
	meters per second
	millimeters per second
	miles per hour
	kilometers per hour
Volumetric Velocity (*Flow Rate*)	fluidounces per second
	gallons per minute
	milliliters per second
	liters per second
Pressure	pound per square inch
	pounds per square foot
	kilopascals
	megapascals
	bars
Bending Moment	inch-pounds
	foot-pounds
	newton-meters

Fractional Settings

When your calculator is in a default condition (battery change or full reset), it is set to round fractional values to the nearest 1/64th of an inch. However, you may program your preference for six different accuracy levels and two different modes (Normal and Fixed), all of which remain in permanent memory until revised or reset.
The fractional level can be revised by using **[CONV]** as shown below:

[CONV] 1 = Fraction Set to 1/16

[CONV] 2 = Fraction Set to 1/2

[CONV] 3 = Fraction Set to 1/32

[CONV] 4 = Fraction Set to 1/4

[CONV] 6 = Fraction Set to 1/64

[CONV] 8 = Fraction Set to 1/8

If there is a value in the display, the accuracy level will be temporarily revised. If the display is cleared, then the accuracy will be permanently revised.

Preference Feature

The *Ultra Measure Master* provides Preference Settings that allow you to set fractional accuracy and display features. The preference settings are displayed using **[Rcl] [/]**. Repeated presses of **[/]** toggle through the different settings while the **[+]** and **[–]** keys are used for revision. These settings remain set until they are changed or the calculator is reset.

Fractional Accuracy Settings

- Fraction Set to 1/64 (Default)
- Fraction Set to 1/2
- Fraction Set to 1/4
- Fraction Set to 1/8
- Fraction Set to 1/16
- Fraction Set to 1/32

Fraction Modes

- Normal Mode (Default)
- Fixed Mode

Exponent

- On (Default)
- Off

FLASHING FRACTION

- Off (Default)
- On

Whenever the fractional setting is other than 1/64 normal mode, a star (★) will appear in the bottom left of the display when the calculator is turned on. This indicates a special fractional setting is stored within.

Setting Fractional Accuracy

Keystrokes	Display
1. Enter the Preference Feature	
[Rcl] [/]	**NM 1/64** (Note "1/64" flashing)
2. Scroll through preference options:	
[/]	**NM 1/64 INCH** (Note flashing "NM")
[/]	**EXP ON**
[/]	**FLSH OFF**
3. Change fraction setting to 1/8:	
[/]	**NM 0-1/64 INCH**
[+]	**NM 0-1/2 INCH**
[+]	**NM 0-1/4 INCH**
[+]	**NM 0-1/8 INCH**
4. Reset to default settings:	
[CONV] [x] [Rcl] [/]	**NM 0-1/64 INCH**

Normal Mode

In Normal Mode, the fractional result is reduced to its lowest common denominator (i.e., 8/16 reduces to 1/2).

Fixed Mode

In Fixed Mode, fractional results are left in the defined accuracy level (i.e., 8/16 will be shown as 8/16). Entries of higher accuracy values will temporarily override the fixed fraction setting.

Using Exponential Notation

Your calculator is defaulted to have exponential notation set to "on." Therefore, any integer value exceeding 7 digits will display in exponential format. When exponential notation is deactivated, the calculator adjusts dimensioned values to the next higher unit when the display limit is exceeded (known as Auto-Ranging). i.e., "10,000,000 mm" exceeds the 7-digit display, so "10,000 m" is displayed. This auto-ranging also applies to other dimensional units, such as inches to feet, feet to yards, etc.

To enter an exponential value, enter the main value, press **[CONV] [/],** then enter the exponential power.

Entering Exponents

Enter $2.34x10^{-8}$ into the calculator.

Keystrokes	Display
2 [.] 34	**2.34**
[Conv] [/]	**2.34**
[Conv] [–] 8	**2.34–8**
[=]	**2.34000–08**

Setting Flashing Denominator

Your calculator can be set to flash the fractional denominator while fractions are entered. The flashing denominator displays the fractional accuracy level setting.

Basic Math Operations

Your calculator uses standard chaining logic which simply means that you enter your first value, the operator (+, –, x, ÷), the second value and then the equals sign ("=").

A. 3 [+] 2 [=] **5**
B. 3 [–] 2 [=] **1**
C. 3 [x] 2 [=] **6**
D. 3 [÷] 2 [=] **1.5**

This feature also makes the calculator simple to use for dimensional math.

Adding or Subtracting Dimensions

1) You can add or subtract two numbers when the first value entered is labeled with units of measurement and the other is just a whole number (no units of measurement).

2) You can add or subtract numbers whose units of measurement are within the same convention. For example, you can add or subtract kg and pounds).

3) You cannot add or subtract two numbers of different conventions, except for weight and volume.

4) The format of the first value you enter determines the format of the answer. However, you can use the **[CONV]** key to change to any format desired, provided that you maintain convention.

Examples:

1) Add 7 feet 3-1/2 inches to 11 feet 4 inches:

   7 [Feet] 3 [Inch] 1[/] 2 [+]
   11 [Feet] 4 [Inch]
   [=] **18 FEET 7-1/2 INCH**

2) Add 25 PSF to 12 PSI:

   25 [SHIFT] [dry oz] [+]
   12 [SHIFT] [lbs] [=] **1753 PSF**

3) Add 14 gallons to 52 liters:

   14 [gal] [+] 52 [liters]
   [=] **27.73695 GL**

4) Subtract 450 acres from 5 square km:

   5 [Sq] [km] [–] 450 [SHIFT] [5]
   [=] **3.178915 SQ KM**

5) Subtract 32 mm from 8 centimeters:

   8 [cm] [–] 32 [mm] [=] **4.8 CM**

Multiplying or Dividing Dimensions

1) You can multiply and divide two numbers when the first value entered is labeled with units of measurement and the other is just a whole number (no units of measurement).

2) You cannot multiply or divide two numbers that have different units of measurement or different conventions, except for weight and volume.

3) You can multiply and divide numbers when their units of measurement are within or between the linear and area conventions. For example, you can multiply kilometers by square feet, which will give you cubic kilometers.

4) The format of the first value you enter determines the format of the answer. However, with the **[CONV]** key you can change to any format you desire, provided that you maintain convention.

EXAMPLES:

1) Multiply 5 feet 3 inches by 8 feet 6-1/2 inches:

   5 [Feet] 3 [Inch] [x] 8 [Feet] 6 [Inch] 1[/] 2 [=] **44.84375** SQ FEET

2) Multiply 50 meters per minute by 12.5:

   50 [SHIFT] [m] [x] 12.5 [=] **625** M/M

3) Multiply 33.5 gallons by 2.031:

   33.5 [gal] [x] 2.031 [=] **68.0385** GL

4) Divide 20 feet 3 inches by 9:

   20 [Feet] 3 [Inch] [÷] 9 [=] **2** FEET **3** INCH

5) Divide 30 mph by 2.5:

   30 [SHIFT] [Miles] [÷] 2.5 [=] **12** MPH

Percent Calculations

The percent key **[%]** can be used to find a percentage of a number or for working add-on, discount or division percentage calculations.

355	[x]	15	[%]	**53.25**
250	[+]	6.5	[%]	**266.25**
25	[–]	5	[%]	**23.75**
100	[÷]	50	[%]	**200.**

Memory Operation

The *Ultra Measure Master* has ten storage registers (0 through 9). Memory 0 is a cumulative memory which operates similar to a standard **[M+]** key, while the other memories are used for storage only. A value can be stored in any format, but attempts to add mixed conventions will result in an error (the value in memory will not be revised). Memory 0 will keep its value until it is revised (as shown below), or the calculator is shut off. Memories **[1]** through **[9]** will keep their values even when the calculator is shut off. Keystrokes for operation are as follows:

Steps	Keystrokes
Store to Memory *x* (*x* = 0–9)	**[Stor] *x***
Subtract from Memory 0	**[CONV] [Stor] [0]**
Recall total in Memory *x*	**[Rcl] *x***
Recall & clear Memory 0	**[Rcl] [Rcl]**
Clear Memory 0, (not display)	**[CONV] [Rcl]**
Replace Memory 0	**[CONV] [Rcl] [Stor] [0]**
Clear Memory 0 thru 9	**[Rcl] [+]**
Reset calculator	**[CONV] [x]**

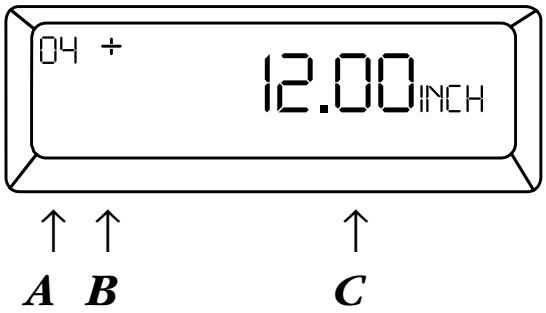
How to Use Memory 0 Functions

Steps	Keystrokes	Display
Enter in memory	355 [Stor] [0]	**355.**
Add to memory	255 [Stor] [0]	**255.**
Recall memory	[Rcl] [0]	**610.**
Subtract from memory	745 [CONV] [Stor] [0]	**745.**
Recall & clear	[Rcl] [Rcl]	**– 135.**

The memory function can also be used with dimensional units that are of the same convention (linear, area, volume, etc.). If you try to enter numbers of different conventions, "error" displays.

"Paperless Tape" Feature

The "Paperless Tape" feature allows the user to display the last 20 entries. While in this mode, the display looks similar to this:



A - the sequence number of entry (01 - 1st entry, 02 - 2nd entry, etc.)

B - the math operator (+,–,x,÷,%)

C - the entered or calculated value

How to Use the Paperless Tape

Keystrokes	Display
1. Clear calculator and enter a string of numbers:	
[On/C] [On/C]	**0.**
4 [Feet] [+]	**4 FEET 0 INCH**
5 [Feet] [+]	**9 FEET 0 INCH**
6 [Feet] [+]	**15 FEET 0 INCH**
7 [Feet] [=]	**22 FEET 0 INCH**

2. Access the Tape function:

[Rcl] [=]	**TTL= 22 FEET 0 INCH**

3. Scroll from first value to total:

[+]	**01 4 FEET 0 INCH**
[+]	**02+ 5 FEET 0 INCH**
[+]	**03+ 6 FEET 0 INCH**
[+]	**04+ 7 FEET 0 INCH**
[+]	**TTL= 22 FEET 0 INCH**

4. Scroll to last 2 values:

[–]	**04+ 7 FEET 0 INCH**
[–]	**03+ 6 FEET 0 INCH**

5. Exit Tape function and add more:

†[=]	**TTL= 22 FEET 0 INCH**
[+]	**22 FEET 0 INCH**
2 [Feet] [=]	**24 FEET 0 INCH**

† ***Note:*** *At this point, you can press any key besides **[Off], [+]** or **[–]**.*

When you press a key to exit the tape, the calculator will display the total value of the tape. The next key press will begin a new tape function.

Clearing the Paperless Tape

The paperless tape is cleared:

1) each time you press **[On/C] [On/C]** (clear);

2) each time you press **[CONV] [x]** (full reset/all clear);

3) when you begin entering numbers (for a new problem) after pressing the equals **[=]** key;

4) when you turn the unit off.

USING THE ULTRA MEASURE MASTER

Entering Dimensions & Units

When entering feet-inch dimensional values, you must enter the largest dimension first — feet before inches, inches before fractions. To enter fractions of an inch, enter the numerator (value above the line), press **[/]** (fraction bar key) and then enter the denominator (value below the line).

numerator	**3**
fraction bar	**—**
denominator	**16**

For all other units of measurement, you can only enter whole numbers or decimal numbers. You cannot enter combinations of units (for example, you cannot enter 12 meters 6 centimeters 4 millimeters).

Linear Conversions

The *Ultra Measure Master* can convert between these linear dimensions:

- Meters (**M**)
- Centimeters (**CM**)
- Millimeters (**MM**)
- Decimal Feet (**FEET**)
- Feet-Inch-fraction (**FEET INCH**)
- Decimal Inch (**INCH**)
- Yards (**YD**)
- Miles (**MI**)
- Kilometers (**kM**)

Note: *The bold letters in parentheses indi - cate the annunciator that displays when the unit is selected.*

The following examples show how linear dimensions are entered:

Dimension	Keystrokes
5 Feet	5 [Feet]
1/2 Inch	1 [/] 2
5 Feet 1-1/2 Inch	5 [Feet] 1 [Inch] 1 [/] 2
10 Yards	10 [Yds]
17.5 Meters	17.5 [m]

Any units of measurement other than inches must be entered as whole values (5 yards) or decimal values (5.5 meters), and not in combination with feet and inches or with themselves. For example, you cannot enter 12 meters 6 centimeters 4 millimeters.

To convert a linear value on your display, press the **[CONV]** key, then the key for the linear dimension to which you want to convert. For example, **[CONV] [mm]** converts to millimeters.

Convert 27 feet to other linear dimensional formats.

Step/Keystrokes	Display
1. Enter 27 feet:	
27 [Feet]	**27** FEET
2. Convert to inches:	
[CONV] [Inch]	**324** INCH
3. Convert to yards:	
[CONV] [Yds]	**9** YD
4. Convert to meters:	
[CONV] [m]	**8.2296** M
5. Convert to km:	
[CONV] [km]	**0.00823** KM
6. Convert to miles:	
[CONV] [Miles]	**0.005114** MI

Convert 65 meters to other linear dimensions.

Steps/Keystrokes	Display
1. Enter 65 meters:	
65 [m]	**65** M
2. Convert to cm:	
[CONV] [cm]	**6500** CM
3. Convert to yards:	
[CONV] [Yds]	**71.08486** YD
4. Convert to miles:	
[CONV] [Miles]	**0.040389** MI

Area Conversions

Your calculator can convert the following area dimensions:

- Square Meters (**SQ M**)
- Square Yards (**SQ YD**)
- Square Miles (**SQ MI**)
- Hectares (**HECT**)
- Square Centimeters (**SQ CM**)
- Square Feet (**SQ FEET**)
- Square Kilometers (**SQ kM**)
- Square Millimeters (**SQ MM**)
- Square Inch (**SQ INCH**)
- Acres (**ACRE**)

Note: *The letters in parentheses indicate the annunciator that displays when the units are selected.*

To convert an area value on your display, press the **[CONV]** key and then the keystrokes for the units of value to convert it to (for example, **[CONV] [m]** to convert to square meters).

Note: *You do not have to use the* ***[Sq]*** *square key to convert to other square units of value; the calculator automatically con - verts to a square unit of value.*

Units	Keystrokes
SQ M	[Sq] [m]
SQ YD	[Sq] [Yds]
SQ MI	[Sq] [Miles]
HECT	[SHIFT] [4]
SQ CM	[Sq] [cm]
SQ FEET	[Sq] [Feet]
SQ kM	[Sq] [km]
SQMM	[Sq] [mm]
SQ INCH	[Sq] [Inch]
ACRE	[SHIFT] [5]

EXAMPLES:

Convert 1.25 acres to other area dimensions:

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 1.25 acres:	
1.25 [SHIFT] [5]	**1.25 ACRE**
3. Convert to sq feet:	
[CONV] [Feet]	**54450 SQ FEET**
4. Convert to sq yards:	
[CONV] [Yds]	**6050 SQ YD**
5. Convert to meters:	
[CONV] [m]	**5058.571 SQ M**

Convert 252 square meters to other area dimensions:

Steps/Keystrokes	Display
1. Enter 252 sq m:	
252 [Sq] [m]	**252 SQ M**
2. Convert to sq feet:	
[CONV] [Feet]	**712.505 SQ FEET**

3. Convert to sq yards:
   [CONV] [Yds] **301.3895 SQ YD**

4. Convert to hectares:
   [CONV] [SHIFT] [4] **0.0252 HECT**

Volume Conversions

Your calculator can convert between the following volume dimensions:

- Cubic Meters (**CU M**)
- Cubic Yards (**CU YD**)
- Cubic Miles (**CU MI**)
- Gallons (**GL**)
- Milliliters (**ML**)
- Cubic Centimeters (**CU CM**)
- Cubic Feet (**CU FEET**)
- Cubic Kilometers (**CU kM**)
- Fluid Ounces (**F-OZ**)
- Board Feet (**B FEET**)
- Cubic Millimeters (**CU MM**)
- Cubic Inch (**CU INCH**)
- Acre-Feet (**ACFT**)
- Liters (**L**)

To convert a volume value on your display, press the **[CONV]** key and then the keystrokes for the volume dimension to convert it to (for example, **[CONV] [cm]** to convert to cubic centimeters).

Note: *When converting volume dimensions, you do not have to use the* ***[SHIFT] [Sq]*** *cubic function to convert to other cubic units of value; the calculator automatically converts to a cubic unit of measurement.*

Units	Keystrokes
CU M	[SHIFT] [Sq] [m]
CU YD	[SHIFT] [Sq] [Yds]
CU MI	[SHIFT] [Sq] [Miles]
GL	[gal]
ML	[mL]
CU CM	[SHIFT] [Sq] [cm]
CU FEET	[SHIFT] [Sq] [Feet]
CU kM	[SHIFT] [Sq] [km]
F-OZ	[fl oz]
CU MM	[SHIFT] [Sq] [mm]
CU INCH	[SHIFT] [Sq] [Inch]
ACFT	[SHIFT] [6]
L	[liters]

EXAMPLES:

Convert 45.75 board feet to other volume dimensions.

Steps/Keystrokes	Display
1. Clear calculator:	
[On/C] [On/C]	**0.**
2. Enter 45.75 board feet:	
45.75 [SHIFT] [1]	**45.75 B FEET**
3. Convert to cubic feet:	
[CONV] [Feet]	**3.8125 CU FEET**
4. Convert to cubic yards:	
[CONV] [Yds]	**0.141204 CU YD**
5. Convert to cubic inch:	
[CONV] [Inch]	**6588 CU INCH**

Find the volume of a rectangular container 3 feet by 1 foot 9-5/8 inches by 2 feet 4 inches then convert to centimeters and yards.

Steps/Keystrokes	**Display**
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter length and multiply by width and depth:	
3 [Feet] [x] 1 [Feet]	**3 FEET**
9 [Inch] 5[/]8	**1 - 9 5/8 FEET INCH**
[x] 2 [Feet] 4 [Inch]	
[=]	**12.61458 CU FEET**
3. Convert to Cu Cm:	
[CONV] [cm]	**357205.2 CU CM**
4. Convert to Cu Yds:	
[CONV] [Yds]	**0.467207 CU YD**

Convert 126 liters to other volume dimensions.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 126 liters:	
126 [liters]	**126 L**
3. Convert to gallon:	
[CONV] [gal]	**33.28568 GL**
4. Convert to fluid oz:	
[CONV] [fl oz]	**4260.567 F-OZ**

Weight Conversions

Your calculator can convert between the following weight measures:

- Dry Ounces (**D-OZ**)
- Pounds (**LB**)
- Tons (**TON**)
- Grams (**GRAM**)
- Kilograms (**kG**)
- Metric Tons (**TON M**)

Note: *The letters in parentheses indicate the annunciator that displays when the units are selected.*

To convert a weight value on your display, press the **[CONV]** key, then the keystrokes for the weight unit to which you want to convert.

Units	Keystrokes
D-OZ	[dry oz]
LB	[lbs]
Ton	[tons]
GRAM	[grams]
kG	[kg]
MET Ton	[SHIFT] [tons]

EXAMPLES:

Convert 150 pounds to kilograms.

Steps/Keystrokes	Display
1. Clear Calculator. [On/C] [On/C]	**0.**
2. Enter 150 pounds: 150 [lbs]	**150** LB
3. Convert to kilograms: [CONV] [kg]	**68.03886** KG

If your car has a 12 gallon tank, how many liters of gas will it take to fill it? What is the cost if 1 liter is $0.75? Use the per unit function to find the total cost of the gas.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 12 gallons:	
12 [gal]	**12** GL
3. Convert to liters at $0.75 per liter:	
[CONV] [liters]	**45.42494** L
[x] .75 [SHIFT] [•]	**$ 34.07** PER

You have received a shipment of 23,000 kg of fill. How many tons is this?

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 23000 kg:	
23000 [kg]	**23000** KG
3. Convert to tons:	
[CONV] [tons]	**25.35316** TON

Weight/Volume Conversions

The *Ultra Measure Master* can convert between weight and volume. The default weights per volume factor is:

- 1.5 tons per cubic yard
- 3000 lbs per cubic yard
- 111.1111 lbs per cubic feet
- 1.779829 metric tons per cubic meter
- 1779.829 kg per cubic meter
- 1.779829 grams per cubic centimeter

To recall weight per volume factor press **[Rcl] [%]**. Continue pressing **[%]** to display as pounds or kilograms.
To change the weight per volume factor, enter the value then press **[SHIFT] [%]**. The first press will enter the weight as tons per cubic yard. The second and third press of **[%]** will enter the weight as pounds or kilograms.

EXAMPLES:

Find the total volume of concrete needed to pour five 24 inch by 12 inch footings, each 2 feet deep. Then find the weight of the concrete (use the default weight factor of 1.5 tons per cubic yard).

Steps/Keystrokes	Display
1. Clear Calculator:	
[On/C] [On/C]	**0.**
2. Enter weight per cubic yard:	
1.5 [SHIFT] [%]	**1.5 Ton Per CU YD**
Step 1 — Find Volume for One Footing	
3. Enter depth and multiply by length and width:	
2 [Feet]	**2 FEET**
[x] 24 [Inch]	**24 INCH**
[x] 12 [Inch] [=]	**4 CU FEET**
4. Convert to yards:	
[CONV] [Yds]	**0.148148 CU YD**
Step 2 — Find Volume for All 5 Footings	
5. Multiply by 5 footings:	
[x] 5 [=]	**0.740741 CU YD**
Step 3 — Find the Weight of Concrete	
6. Find wt in tons then kilogram:	
[CONV] [tons]	**1.111111 TON**
[kg]	**1007.983 KG**

Find the weight of 15 cubic yards at 1.75 tons/cu yd, & convert to other weights.

Steps/Keystrokes	Display
1. Enter 1.75 factor:	
1.75 [SHIFT] [%]	**1.75** TON PER CU YD
2. Enter15 cu yds:	
15 [SHIFT] [Sq] [Yds]	**15** CU YD
3. Convert to lbs then kg:	
[CONV] [lbs]	**52500** LB
[CONV] [kg]	**23813.6** KG

Temperature Conversions

To convert a displayed temperature value, press **[CONV]** then the keystrokes for either Fahrenheit or Celsius.

Units	Keystrokes
°C	[SHIFT] [2]
°F	[SHIFT] [3]

EXAMPLES:

Convert 78 °F to a °C temperature.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 78 °F and convert to Celsius:	
78 [SHIFT] [3]	**78 °F**
[CONV] [SHIFT] [2]	**25.55556 °C**

Convert 11 °C to a °F temperature.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 11 °C and convert to °F:	
11 [SHIFT] [2]	**11 °C**
[CONV] [SHIFT] [3]	**51.8 °F**

Linear Velocity Conversions

The *Ultra Measure Master* can convert between the following linear velocities:

- Feet per minute (**FPM**)
- Feet per seconds (**FPS**)
- Inch per second (**IPS**)
- Meters per minute (**M/M**)
- Meters per second (**M/S**)
- Millimeters per second (**MM/S**)
- Miles per hour (**MPH**)
- Kilometers per hour (**KM/H**)

Note: *The letters in parentheses indicate the annunciator associated with the unit.*

Units	Keystrokes
FPM	[SHIFT] [Yds]
FPS	[SHIFT] [Feet]
IPS	[SHIFT] [Inch]
M/M	[SHIFT] [m]
M/S	[SHIFT] [cm]
MM/S	[SHIFT] [mm]
MPH	[SHIFT] [Miles]
KM/H	[SHIFT] [km]

To convert a linear velocity on your display, press the **[CONV]** key and then the keystrokes for the linear velocity to convert it to.

EXAMPLES:

Convert 55 MPH to kilometers per hour.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 55 mph then convert to kmh:	
55 [SHIFT] [Mile]	**55** MPH
[CONV] [SHIFT] [km]	**88.51392** KM/H

Convert 8 inches per second (IPS) to millimeters per second (mm/s).

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 8 IPS:	
8 [SHIFT] [Inch]	**8** IPS
3. Convert to mm/s:	
[CONV] [SHIFT] [mm]	**203.2** MM/S

Volumetric Velocity Conversions

This calculator can convert between the following volumetric velocities:

- Fluid ounces per second (**OPS**)
- Gallons per minute (**GPM**)
- Milliliters per second (**ML/S**)
- Liters per second (**L/S**)

Note: *Letters in parentheses represent the annunciator associated with the unit. When the unit is selected, the annunciator appears on the display screen.*

Units	Keystrokes
OPS	[SHIFT] [fl oz]
GPM	[SHIFT] [gal]
ML/S	[SHIFT] [mL]
L/S	[SHIFT] [liters]

To convert a volumetric velocity on your display, press the **[CONV]** key and then the keystrokes for the volumetric velocity to convert it to.

EXAMPLES:

Convert 48 fluid ounces per second to liters per second.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 48 oz/s then convert to l/s:	
48 [SHIFT] [fl oz]	**48 OPS**
[CONV] [SHIFT] [liters]	**1.419529 L/S**

An aqueduct should be sloped so that water travels less than 10 feet per minute. After a heavy rainfall, the water traveled at an approximate velocity of 1.72 inches per second. Is the aqueduct sloped correctly?

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 1.72 ips then convert to ft/min:	
1.72 [SHIFT] [Inch]	**1.72 IPS**
[CONV] [SHIFT] [Yds]	**8.6 FPM**

The faucet in a house should provide 4.5 gallons of water per minute. If you have a 2 liter bottle that filled up in 12 seconds, is the faucet within code?

Steps/Keystrokes	Display
1. Clear Calculator. [On/C] [On/C]	**0.**
2. Divide liters/sec: 2 [÷] 12 [=]	**0.166667**
3. Enter as liters/sec.: [SHIFT] [liters]	**0.166667** L/S
4. Convert to gal/min: [CONV] [SHIFT] [gal]	**2.641721** GPM

Pressure Conversions

This calculator can convert between the following pressures:

Note: *The letters in parentheses indicate the annunciator that displays when the unit is selected.*

- Pounds per square inch (**PSI**)
- Pounds per square foot (**PSF**)
- Kilopascals (**KPA**)
- Megapascals (**MPA**)

Units	Keystrokes
PSI	[SHIFT] [lbs]
PSF	[SHIFT] [dry oz]
kPA	[SHIFT] [kg]
MPA	[SHIFT] [grams]

The following examples show how to convert a pressure value.

EXAMPLES:

A water line is reading a pressure of .5 psi, what would the pressure be in psf, kpa and mpa?

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter psi	
.5 [SHIFT] [lbs]	**0.5 PSI**
3. Convert to psf:	
[CONV] [SHIFT] [dry oz]	**72 PSF**
4. Convert to kpa:	
[CONV] [SHIFT] [kg]	**3.447379 KPA**
5. Convert to mpa:	
[CONV] [SHIFT] [grams]	**0.003447 MPA**

Convert 24 pounds per square foot to kilopascals.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter 24 psf:	
24 [SHIFT] [dry oz]	**24 PSF**
3. Convert to kpa:	
[CONV] [SHIFT] [kg]	**1.149126 KPA**

Bending Moment Conversions

The calculator can convert between the following bending moment units:

Note: *The letters in parentheses indicate the annunciator that displays when the units are selected.*

- Inch-pounds (**LB INCH**)
- Foot-pounds (**LB FEET**)
- Newton-meters (**N-M**)

Units	Keystrokes
LB INCH	[SHIFT] [7]
LB FEET	[SHIFT] [8]
N-M	[SHIFT] [9]

To convert a bending moment value on your display, press the **[CONV]** key and then the keystrokes for the bending moment value to convert it to.

EXAMPLES:

Convert 120 inch-lb to newton-meters.

Steps/Keystrokes	Display
1. Enter 120 in/lb:	
120 [SHIFT] [7]	**120** LB INCH
2. Convert to N-m:	
[CONV] [SHIFT] [9]	**13.55818** N-M

Convert 700 newton-meters to ft-lb.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter N-m:	
700 [SHIFT] [9]	**700** N-M
3. Find ft/lbs:	
[CONV] [SHIFT] [8]	**516.2936** LB FEET

Your metric-based plan says that the bridge rail bolt must be tightened to 30 n-m but your torque wrench only shows ft-lb. Find the ft-lb setting required to set up the wrench.

Steps/Keystrokes	Display
1. Clear Calculator.	
[On/C] [On/C]	**0.**
2. Enter N-m:	
30 [SHIFT] [9]	**30 N-M**
3. Find ft/lbs:	
[CONV] [SHIFT] [8]	**22.12687 LB FEET**

APPENDIX

Accuracy/Errors

Accuracy/Display Capacity — Your calculator has an eleven digit display. This is made up of seven digits (normal display) and four digits for the fraction. In a standard calculation, each calculation is carried out internally to 10 digits and rounded to a 7-digit standard display. A 5/4 rounding technique is used to add 1 to the least significant digit in the display if the next non-displayed digit is five or more. If this digit is less than five, no rounding occurs.

Errors — When you make an incorrect entry, or the answer is beyond the calculator's ability, it displays the word "**ERROR.**" To clear an error, press the **[On/C]** button twice. At this point you must determine what caused the error and re-key the entry. An error also occurs if you enter a mathematical impossibility such as division by zero.

Auto-Range — If an "overflow" is created because of an input and calculation with small units that are out of the standard 7-digit range of the display, the answer will be automatically expressed in the next larger units (instead of showing "ERROR") — i.e.,

"10,000,000 mm" cannot be displayed because it is out of the 7-digit display, so "10,000 m" will be displayed instead. This auto-ranging also applies to other dimensional units, such as inches to feet, and feet to yards, etc.

Battery Information

Your calculator is powered by a single 3-Volt Lithium CR-2032 battery. This should last upwards of 800 hours of actual use (1 year plus for most users). Should the display become very dim or erratic, replace the battery. ***WARNING:*** *Please use caution when disposing of your old batteries as they contain hazardous chemicals.*

Specifications

DIMENSIONS:

2.88 x 5.50 x 0.38"

73mm x 140mm x 10mm

WEIGHT:

4 oz. (114 g)

ACCURACY:

10 digits (internal)

Warranty Repair Service — USA

Calculated Industries, Inc. ("CII") warrants this product against defects in materials and workmanship for a period of one (1) year from the date of original consumer purchase in the U.S. If a defect exists during the warranty period, CII at its option will either repair (using new or remanufactured parts) or replace (with a new or remanufactured unit) the product at no charge.

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To obtain warranty service in the U.S., ship the product postage paid to the CII Authorized Service Provider listed on the back page of the User's Guide. Please provide an explanation of the service requirement, your name, address, day phone number and dated proof of purchase (typically a sales receipt). If the product is over 90 days old, include payment of $6.95 for return shipping and handling within

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FCC Class B

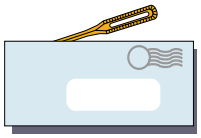
This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules.

Looking for New Ideas

Calculated Industries, a leading manufacturer of special function calculators and digital measuring instruments, is always looking for new product ideas in these areas.

If you have one, or if you have any suggestions for improvements to this product or its User's Guide, please call or write our Product Development Department. Thank you.

How To Reach CII Headquarters



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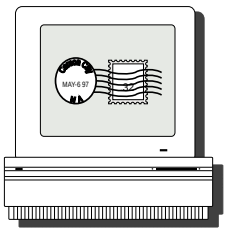

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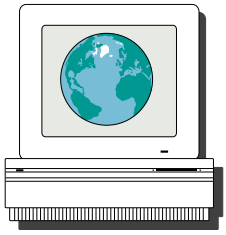

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