

Convert It!

Version 2.0

User's Guide

Convert It! User's Guide

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Introduction

About Convert It!

Convert It! is shareware program for Microsoft Windows 3.1 or greater. It is NOT FREE. You are granted a 30 day trial period to try Convert It!, to see if it fits your needs. If you continue to use it beyond the 30 day trial period you **MUST** license your copy from SMI Corporation. If you purchased diskette from a shareware vendor that contained Convert It!, you have only paid a disk duplication fee. You **must still** register Convert It! from SMI Corporation.

This version of Convert It! requires Windows 3.1. If it is installed on a Windows 3.0 system, it will not run. This manual was formatted on a Windows 3.1 system using the TrueType fonts Arial, Courier, and Symbol, for an HP LaserJet III. If you have a different system you may need to reformat this manual.

Convert It! contains several dialogs that allow you to convert from one set of units to another. We feel we have included the most used conversions in this release as well as the capability to add and change the supplied conversions. However, as we continue to upgrade the program, we would be glad to hear suggestions from you about new features you would like to see included in a future release. Thank you for choosing Convert It!.

Files in This Release

If you received Convert It! as a ZIP file, please unzip CV200.ZIP to a diskette and label it with the name:

CONVERT IT! INSTALLATION DISK

If you received Convert It! as a ZIP file, you should find the following files included. If you received Convert It! on diskette, you should check to see that the files listed are on the diskette.

| | |
|--------------|---|
| CV200.ZIP | Convert It! ZIP file |
| INSTALL.EXE | The installation program |
| INSTALL.BIN | An installation support file |
| INSTALL.BMP | An installation support file |
| INSTALL.INF | The installation script |
| CONVERT.EX\$ | Convert It! program |
| CONVERT.HL\$ | Convert It! help file |
| CONVERT.WR\$ | Convert It! Manual |
| CTL3D.DL\$ | Microsoft custom control library |
| ORDER.TXT | ASCII order form |
| UNPACK.EXE | A program to unpack individual files from the install disk(s) |

Files that end in a '\$' sign are packed. To copy them individually to your hard disk, you will need to use the UNPACK.EXE program provided on the Document Disk and in your installation directory.

There could also be a README.TXT file that will contain any late breaking information about the program.

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PLEASE NOTE:

=====

Several files in this application are compressed. If you don't use the installation program or you need to copy one of the original files onto your hard disk, use the UNPACK.EXE program located in your installation directory or on the install disk.

=====

Getting Started

To install Convert It!, be sure that all the above files are on a single floppy disk. Then from the RUN... menu command in either File Manager or Program Manager type and enter the following command line:

```
a:\install
```

The "a:" could also be "b:" or any other drive that contains the above files.

When the install is complete you can then either start Convert It! from either the File Manager or from a group within the Program Manager.

What's New in Convert It!

Version 2.0.

Added Force, Density, Velocity, Money, and Custom conversions. Also added ability to add, change or delete conversion factors and units.

Version 1.51.

An error in the Pressure conversion was discovered and fixed.

Version 1.50.

Conversions for Pressure and Time were added to Convert It!. Troy ounces were added to the Mass conversion dialogue.

Convert It! Commands

Below is a list of Convert It! commands.

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Conversion Menu Commands

The following are the commands available on the Conversion menu.

Temperature

Opens a dialog box showing an input area for the initial temperature you want to convert. It has a set of option buttons to indicate what units the initial temperature is in. Units provided are Fahrenheit, Celsius, and Kelvin. Once you have an initial temperature you can use the scroll bar to change the temperature displayed in the Equivalent Temperature box. The EXIT button will exit the dialog.

Distance

Opens a dialog box showing an input area for the initial length or distance you want to convert. It has a set of option buttons to indicate what units the initial length or distance is in. Units provided include inches, feet, yards, miles, centimeters, meters, kilometers, and light years. Once you have an initial length you can use the scroll bar to change the length displayed in the Equivalent Distance box. The EXIT button will exit the dialog.

Mass

Opens a dialog box showing an input area for the initial mass you want to convert. It has a set of option buttons to indicate what units the initial mass is in. Units provided include ounces, pounds, grams, kilograms, and tons. Once you have an initial mass you can use the scroll bar to change the mass displayed in the Equivalent Mass box. The EXIT button will exit the dialog.

Area

Opens a dialog box showing an input area for the initial area you want to convert. It has a set of option buttons to indicate what units the initial area is in. Units provided include square inches, square feet, acres, square centimeters, square meters, and hectares. Once you have an initial area you can use the scroll bar to change the area displayed in the Equivalent Area box. The EXIT button will exit the dialog.

Volume

Opens a dialog box showing an input area for the initial volume you want to convert. It has a set of option buttons to indicate what units the initial volume is in. Units included are fluid ounces, pints, gallons, and liters. Once you have an initial volume you can use the scroll bar to change the volume displayed in the Equivalent Volume box. The EXIT button will exit the dialog.

Angle

Opens a dialog box showing an input area for the initial angle you want to convert. It has a set of option buttons to indicate what units the initial angle is in. Some of the provided units are radians, degrees, revolutions, grades, and mils. Once you have an initial angle you can use the scroll bar to change the angle displayed in the Equivalent Angle box. The EXIT button will exit the dialog.

Power

Opens a dialog box showing an input area for the initial power you want to convert. It has a set of option buttons to indicate what units the initial power is in. Included units are horsepower (both metric and conventional), Watts, and calories per hour. Once you have

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an initial power you can use the scroll bar to change the power displayed in the Equivalent Power box. The EXIT button will exit the dialog.

Energy

Opens a dialog box showing an input area for the initial energy you want to convert. It has a set of option buttons to indicate what units the initial energy is in. Some of the units included are joules, electron-volts, calories, and Btu's. Once you have an initial energy you can use the scroll bar to change the energy displayed in the Equivalent Energy box. The EXIT button will exit the dialog.

Pressure

Opens a dialog box showing an input area for the initial pressure you want to convert. It has a set of option buttons to indicate what units the initial pressure is in. Units provided include, inches of mercury, atmospheres, pascals, and bars. Once you have an initial pressure you can use the scroll bar to change the pressure displayed in the Equivalent Pressure box. The EXIT button will exit the dialog.

Time

Opens a dialog box showing an input area for the initial time you want to convert. It has a set of option buttons to indicate what units the initial time is in. Some of the units provided are seconds, minutes, hours, days, months, and years. Once you have an initial time you can use the scroll bar to change the time displayed in the Equivalent Time box. The EXIT button will exit the dialog.

Force

Opens a dialog box showing an input area for the initial time you want to convert. It has a set of option buttons to indicate what units the initial time is in. Units used include dynes, newtons, and poundals. Once you have an initial time you can use the scroll bar to change the time displayed in the Equivalent Time box. The EXIT button will exit the dialog.

Density

Opens a dialog box showing an input area for the initial time you want to convert. It has a set of option buttons to indicate what units the initial time is in. A few of the included units are kilograms per cubic meter, grams per cubic meter, ounces per cubic foot and pounds per cubic foot. Once you have an initial time you can use the scroll bar to change the time displayed in the Equivalent Time box. The EXIT button will exit the dialog.

Velocity

Opens a dialog box showing an input area for the initial time you want to convert. It has a set of option buttons to indicate what units the initial time is in. Some of the units are meters per second, kilometers per hour, miles per hour, knots, and Mach number. Once you have an initial time you can use the scroll bar to change the time displayed in the Equivalent Time box. The EXIT button will exit the dialog.

Money

Opens a dialog box showing an input area for the initial time you want to convert. It has a set of option buttons to indicate what units the initial time is in. Provided units includes U.S. dollars, German marks, Japanese yen, and the British pound. Once you have an initial time you can use the scroll bar to change the time displayed in the Equivalent Time box. The EXIT button will exit the dialog.

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Custom

Opens a dialog box showing an input area for the value you want to convert. It has a set of option buttons to indicate what units the initial value is in. Once you have an initial value you can use the scroll bar to change the value displayed in the Equivalent box. You can use this group for any group of related conversions that you wish and are not included in the 14 standard ones. The EXIT button will exit the dialog.

Temperature Command

This dialog box has several controls.

Initial Temperature:

This text box shows the current temperature that is converted in the Equivalent Temperature box. By entering a new value here you can convert any temperature to its equivalent in another scale.

Initial Temp. is in:

This group of option buttons allows you to indicate what scale the value in the Initial Temperature text box is in. This allows the tool to properly convert to the other scales.

Equivalent Temps.:

This box contains an entry for each temperature scale. The scale indicated by the Initial Temp is in: option button is the one that is controlled by the Initial Temperature text box and the scroll bar.

Temperature Scroll Bar:

Using this scroll bar can change the temperature indicated by the Initial Temp. is in: option buttons. Pressing one of the scroll arrows will change the temperature by one degree. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the temperature by 10 degrees. Initially the scroll bar will top out at about 20000 degrees, however you can increase this limit by entering a new larger value in the Initial Temperature text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Temperature.

Distance Command

This dialog box has several controls.

Initial Distance:

This text box shows the current distance that is converted in the Equivalent Distance box.

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By entering a new value here you can convert any distance to its equivalent in another scale.

Initial Dist. is in:

This group of option buttons allows you to indicate what scale the value in the Initial Distance text box is in. This allows the tool to properly convert to the other scales.

Equivalent Distances:

This box contains an entry for each distance scale. The scale indicated by the Initial Dist. is in: option button is the one that is controlled by the Initial Distance text box and the scroll bar.

Distance Scroll Bar:

Using this scroll bar you can change the temperature indicated by the Initial Dist. is in: option buttons. Pressing one of the scroll arrows will change the distance by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the distance by 10 units. Initially the scroll bar will top out at about 20000 units, however you can increase this limit by entering a new larger value in the Initial Distance text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Length and Distance.

Mass Command

This dialog box has several controls.

Initial Mass:

This text box shows the current mass that is converted in the Equivalent Mass box. By

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entering a new value here you can convert any mass to its equivalent in another scale.

Initial Mass is in:

This group of option buttons allows you to indicate what scale the value in the Initial Mass text box is in. This allows the tool to properly convert to the other scales.

Equivalent Mass:

This box contains an entry for each mass scale. The scale indicated by the Initial Mass is in: option button is the one that is controlled by the Initial Mass text box and the scroll bar.

Mass Scroll Bar:

Using this scroll bar can change the mass indicated by the Initial Mass is in: option buttons. Pressing one of the scroll arrows will change the mass by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the mass by 10 units. Initially the scroll bar will top out at about 20000 units, however you can increase this limit by entering a new larger value in the Initial Mass text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Weight and Mass.

Volume Command

This dialog box has several controls.

Initial Volume:

This text box shows the current volume that is converted in the Equivalent Volume box. By entering a new value here you can convert any volume to its equivalent in another scale.

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Initial Volume is in:

This group of option buttons allows you to indicate what scale the value in the Initial Volume text box is in. This allows the tool to properly convert to the other scales.

Equivalent Volume:

This box contains an entry for each volume scale. The scale indicated by the Initial Volume is in: option button is the one that is controlled by the Initial Volume text box and the scroll bar.

Volume Scroll Bar:

Using this scroll bar can change the volume indicated by the Initial Volume is in: option buttons. Pressing one of the scroll arrows will change the volume by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the volume by 10 units. Initially the scroll bar will top out at about 20000 units, however you can increase this limit by entering a new larger value in the Initial Volume text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Volume and Capacity.

Area Command

This dialog box has several controls.

Initial Area:

This text box shows the current area that is converted in the Equivalent Area box. By entering a new value here you can convert any area to its equivalent in another scale.

Initial Area is in:

This group of option buttons allows you to indicate what scale the value in the Initial Area text box is in. This allows the tool to properly convert to the other scales.

Equivalent Area:

This box contains an entry for each area scale. The scale indicated by the Initial Area is in: option button is the one that is controlled by the Initial Area text box and the scroll bar.

Area Scroll Bar:

Using this scroll bar can change the area indicated by the Initial Area is in: option buttons. Pressing one of the scroll arrows will change the area by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the area by 10 units. Initially the scroll bar will top out at about 20000 units, however you can increase this limit by entering a new larger value in the Initial Area text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by

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pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Surface or Area.

Angle Command

This dialog box has several controls.

Initial Angle:

This text box shows the current angle that is converted in the Equivalent Angle box. By entering a new value here you can convert any angle to its equivalent in another scale.

Initial Angle is in:

This group of option buttons allows you to indicate what scale the value in the Initial Angle text box is in. This allows the tool to properly convert to the other scales.

Equivalent Angle:

This box contains an entry for each angle scale. The scale indicated by the Initial Angle is in: option button is the one that is controlled by the Initial Angle text box and the scroll bar.

Angle Scroll Bar:

Using this scroll bar can change the angle indicated by the Initial Angle is in: option buttons. Pressing one of the scroll arrows will change the angle by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the angle by 10 units. The scroll bar will top out at about 20000 units, however you can increase this limit by entering a new larger value in the Initial Area text box. The scroll range will be increased to two times the value entered.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted

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into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Angular Measurements.

Power Command

This dialog box has several controls.

Initial Power:

This text box shows the current power that is converted in the Equivalent Power box. By entering a new value here you can convert any power to its equivalent in another unit.

Initial Power is in:

This group of option buttons allows you to indicate what units the value in the Initial Power text box is in. This allows the tool to properly convert to the other units.

Equivalent Power:

This box contains an entry for each power unit. The unit indicated by the Initial Power is in: option button is the one that is controlled by the Initial Power text box and the scroll bar.

Power Scroll Bar:

Using this scroll bar can change the power indicated by the Initial Power is in: option buttons. Pressing one of the scroll arrows will change the power by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the power by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the

changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Power Measurements.

Energy Command

This dialog box has several controls.

Initial Energy:

This text box shows the current energy that is converted in the Equivalent Energy box. By entering a new value here you can convert any energy to its equivalent in another unit.

Initial Energy is in:

This group of option buttons allows you to indicate what unit the value in the Initial Energy text box is in. This allows the tool to properly convert to the other units.

Equivalent Energy:

This box contains an entry for each energy unit. The scale indicated by the Initial Energy is in: option button is the one that is controlled by the Initial Energy text box and the scroll bar.

Energy Scroll Bar:

Using this scroll bar can change the energy indicated by the Initial Energy is in: option buttons. Pressing one of the scroll arrows will change the energy by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the energy by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window.

Pressing the Help button will get you this help topic.

For background information see Energy Measurements.

Pressure Command

This dialog box has several controls.

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Initial Pressure:

This text box shows the current pressure that is converted in the Equivalent Pressure box. By entering a new value here you can convert any pressure to its equivalent in another unit.

Initial Pressure is in:

This group of option buttons allows you to indicate what unit the value in the Initial Pressure text box is in. This allows the tool to properly convert to the other units.

Equivalent Pressure:

This box contains an entry for each pressure unit. The scale indicated by the Initial Pressure is in: option button is the one that is controlled by the Initial Pressure text box and the scroll bar.

Pressure Scroll Bar:

Using this scroll bar can change the pressure indicated by the Initial Pressure is in: option buttons. Pressing one of the scroll arrows will change the pressure by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the pressure by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Pressure Measurements.

Time Command

This dialog box has several controls.

Initial Time:

This text box shows the current time that is converted in the Equivalent Time box. By entering a new value here you can convert any time to its equivalent in another unit.

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Initial Time is in:

This group of option buttons allows you to indicate what unit the value in the Initial Time text box is in. This allows the tool to properly convert to the other units.

Equivalent Time:

This box contains an entry for each time unit. The scale indicated by the Initial Time is in: option button is the one that is controlled by the Initial Time text box and the scroll bar.

Time Scroll Bar:

Using this scroll bar can change the time indicated by the Initial Time is in: option buttons. Pressing one of the scroll arrows will change the time by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the time by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Time Measurements.

Force Command

This dialog box has several controls.

Initial Force:

This text box shows the current time that is converted in the Equivalent Force box. By entering a new value here you can convert any time to its equivalent in another unit.

Initial Force is in:

This group of option buttons allows you to indicate what unit the value in the Initial Time text box is in. This allows the tool to properly convert to the other units.

Equivalent Force:

This box contains an entry for each force unit. The scale indicated by the Initial Force is in: option button is the one that is controlled by the Initial Force text box and the scroll bar.

Force Scroll Bar:

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Using this scroll bar can change the force indicated by the Initial Force is in: option buttons. Pressing one of the scroll arrows will change the force by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the force by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Force Measurements.

Density Command

This dialog box has several controls.

Initial Density:

This text box shows the current time that is converted in the Equivalent Density box. By entering a new value here you can convert any time to its equivalent in another unit.

Initial Density is in:

This group of option buttons allows you to indicate what unit the value in the Initial Density text box is in. This allows the tool to properly convert to the other units.

Equivalent Density:

This box contains an entry for each density unit. The scale indicated by the Initial Density is in: option button is the one that is controlled by the Initial Density text box and the scroll bar.

Density Scroll Bar:

Using this scroll bar can change the density indicated by the Initial Density is in: option buttons. Pressing one of the scroll arrows will change the density by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the density by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Density Measurements.

Velocity Command

This dialog box has several controls.

Initial Velocity:

This text box shows the current velocity that is converted in the Equivalent Velocity box. By entering a new value here you can convert any velocity to its equivalent in another unit.

Initial Velocity is in:

This group of option buttons allows you to indicate what unit the velocity in the Initial Velocity text box is in. This allows the tool to properly convert to the other units.

Equivalent Velocity:

This box contains an entry for each time unit. The scale indicated by the Initial Velocity is in: option button is the one that is controlled by the Initial Velocity text box and the scroll bar.

Velocity Scroll Bar:

Using this scroll bar can change the velocity indicated by the Initial Velocity is in: option buttons. Pressing one of the scroll arrows will change the velocity by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the time by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by

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pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Velocity Measurements.

Money Command

This dialog box has several controls.

Initial Money:

This text box shows the current money that is converted in the Equivalent Money box. By entering a new value here you can convert any monetary value to its equivalent in another unit.

Initial Money is in:

This group of option buttons allows you to indicate what unit the value in the Initial Money text box is in. This allows the tool to properly convert to the other units.

Equivalent Money:

This box contains an entry for each money unit. The scale indicated by the Initial Money is in: option button is the one that is controlled by the Initial Money text box and the scroll bar.

Money Scroll Bar:

Using this scroll bar can change the money indicated by the Initial Money is in: option buttons. Pressing one of the scroll arrows will change the time by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the money by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No

data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For background information see Money Measurements.

Custom Command

This dialog box has several controls.

Initial Value:

This text box shows the current value that is converted in the Equivalent Value box. By entering a new value here you can convert any value to its equivalent in another unit.

Initial Value is in:

This group of option buttons allows you to indicate what unit the value in the Initial Value text box is in. This allows the tool to properly convert to the other units.

Equivalent Values:

This box contains an entry for each unit. The scale indicated by the Initial Value is in: option button is the one that is controlled by the Initial Value text box and the scroll bar.

Value Scroll Bar:

Using this scroll bar can change the value indicated by the Initial Value is in: option buttons. Pressing one of the scroll arrows will change the values by one unit. Clicking on the gray area to the right or left of the scroll box (or pressing page up or page down) will change the values by 10 units.

Copy button:

This button allows you to copy the currently marked value to the clipboard. From there it can be pasted into many different applications. You can also perform this same function by pressing Ctrl-Ins when the cursor is on one of the fields.

Paste button:

This button allows you to paste the contents of the clipboard into the Initial value field. No data validation is performed. The Initial value field is the only field which can be pasted into. When the cursor is on any other field this button will be disabled. The button will also be disabled whenever there is nothing in the clipboard.

Factors button:

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This button allows you change the conversion factors for any combination of units shown in the dialog. If you do change any conversion factors, when you try to exit the dialog, Convert It! will remind you that you made a change and ask if you wish to save the changes.

When you have finished you can press the Exit button to return to the main window. Pressing the Help button will get you this help topic.

For conversion factors to use here see General Conversion Factors.

File Menu Commands

The following are the commands available on the File menu.

Exit

This command will exit the Convert It! application. You may also press F3 to activate this command.

About

This command will display a dialog box showing the name of the application, its icon, its author, and how to register the program.

Exit Command

If this button is clicked on the main Convert It! window, the Convert It! window will be closed and Convert It! will be removed from memory.

If this button is clicked on one of the Conversion Tools, the conversion tool dialog will be closed and you will return to the main Convert It! window.

Help Command

If this button is clicked on the main Convert It! window, Convert It! will display a help topic about the available conversion tools.

If this button is clicked on one of the Conversion Tools, the conversion tool will display a help topic about the specific conversion tool.

Units Menu Commands

The following are the commands available on the Units menu.

Distance Mass

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Volume
Area
Angle
Power
Energy
Pressure
Time
Force
Density
Velocity
Money
Custom

These commands will display a Units dialog box. This dialog will allow you to add, change, or delete the conversion unit names used by the corresponding Conversion Tool. These changes will be saved in the Convert It! INI file. For more information see Changing Conversion Units in the Procedures section.

Convert It! and Windows Keys

Choose from the following list to get help with the keys used in Convert It! and Windows:

Convert It!

25 Convert It! Keys

Windows

25 Dialog Box Keys

26 Editing Keys

26 Help Keys

26 Menu Keys

27 System Keys

28 Text Selection Keys

29 Window Keys

Convert It! Keys

| <u>Key(s)</u> | <u>Function</u> |
|----------------------|---|
| Tab | Moves from one control to the next |
| direction keys | Moves between options in a group box |
| Alt+F4 | Exits the current window |
| Enter | Performs the action of the current control |
| Spacebar | Presses the current command button |
| Alt+T | Activates the Temperature Convert Tool |
| Alt+D | Activates the Distance Convert Tool |
| Alt+M | Activates the Mass Convert Tool |
| Alt+V | Activates the Volume Convert Tool |
| Alt+A | Activates the Area Convert Tool |
| Alt+N | Activates the Angle Convert Tool |
| Alt+P | Activates the Power Convert Tool |
| Alt+E | Activates the Energy Convert Tool |
| Alt+R | Activates the Pressure Convert Tool |
| Alt+I | Activates the Time Convert Tool |
| Alt+F | Activates the Force Convert Tool |
| Alt+S | Activates the Density Convert Tool |
| Alt+L | Activates the Velocity Convert Tool |
| Alt+O | Activates the Money Convert Tool |
| Alt+C | Activates the Custom Convert Tool |
| D | Activates the Unit change dialog for Distance |
| M | Activates the Unit change dialog for Mass |
| V | Activates the Unit change dialog for Volume |
| A | Activates the Unit change dialog for Area |
| N | Activates the Unit change dialog for Angle |
| P | Activates the Unit change dialog for Power |
| E | Activates the Unit change dialog for Energy |
| R | Activates the Unit change dialog for Pressure |
| I | Activates the Unit change dialog for Time |
| F | Activates the Unit change dialog for Force |
| S | Activates the Unit change dialog for Density |
| L | Activates the Unit change dialog for Velocity |
| O | Activates the Unit change dialog for Money |
| C | Activates the Unit change dialog for Custom |
| F3 | Exits Convert It! or the current tool |
| F1 | Starts the Help System |
| Shift+F1 | Activates Help Mode |

Dialog Box Keys

Use the following keys within dialog boxes.

| <u>Key(s)</u> | <u>Function</u> |
|----------------------|---|
| Tab | Moves from one control to the next |
| Shift+Tab | Moves from one control to the next in reverse order |

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| | |
|-----------------------------|--|
| Alt+letter direction key | Moves to the option whose underlined letter matches the one you type Moves the selection cursor from option to option in a group of options. Or moves the cursor left, right, up, or down within a list or text box. |
| Home | Moves to the first item or character in a list or text box |
| End | Moves the last item or character in a list or text box |
| PgUp or PgDn | Scrolls up or down in a list box, one window at a time |
| Alt+Down Arrow | Opens a drop-down list box |
| Alt+Up or Down Arrow | Selects an item in a drop-down list box |
| Spacebar | Selects or cancels a selection in a list box or selects Or clears a check box |
| Ctrl+Slash(/) | Selects all the items in a list box |
| Ctrl+Backslash(\) | Cancels all selections except the current selection |
| Shift+direction key | Extends the selection in a text box |
| Shift+Home | Extends the selection to the first character in a text box |
| Shift+End | Extends the selection to last character in a text box |
| Enter | Executes a <u>command button</u> Or chooses the selected item in a list box and executes the command |
| Esc or Alt+F4 | Closes a dialog box without completing the command(same as the Cancel button) |

Editing Keys

Use the following keys to edit text.

| <u>Key(s)</u> | <u>Function</u> |
|----------------------|--|
| Backspace | Deletes the character to the left of the <u>insertion point</u> . Or deletes selected text. |
| Del | Deletes the character to the right of the insertion point. Or deletes selected text. |
| Shift+Del | Deletes the selected text and places it on Clipboard. |
| Shift+Ins | Inserts text from Clipboard to the active window. |
| Ctrl+Ins | Makes a copy of the selected text and places it on Clipboard. |
| Alt+Bksp | Undoes the previous editing operation. |

Help Keys

Use the following keys to get Help.

| <u>Key(s)</u> | <u>Function</u> |
|-------------------------------|---|
| F1 | Gets Help and displays the Help Index for the application. If the Help window is already open, pressing F1 displays the index to Using Help |
| In some Windows applications, | pressing F1 displays a Help topic on the selected command, dialog box option, or system message. |
| Shift+F1 | Changes the pointer to a question mark with an arrow so you can get Help on a specific command, screen region, or key. You can then choose the command, click the screen region, or press the key |

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or key combination you want to know more about.
This feature is only available on the main window.

Menu Keys

Use the following keys to select menus and choose commands.

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| <u>Key(s)</u> | <u>Function</u> |
|----------------------|---|
| Alt or F10 | Selects the first menu on the menu bar |
| Letter key | Chooses the menu or menu item whose underlined letter matches the one you type. |
| Left or Right Arrow | Moves among menus. |
| Up or Down Arrow | Move among menu items. |
| Enter | Chooses the selected menu item. |
| Esc | Cancels the selected menu. |

System Keys

Use the following keys can be used from any window, regardless of the application you are using.

| <u>Key(s)</u> | <u>Function</u> |
|----------------------|--|
| Ctrl+Esc | Switches to Task List |
| Alt+Esc | Switches to the next application window or minimized icon, including full-screen programs. |
| Alt+Tab | Switches to the next application window, restoring applications that are running as icons. |
| PrtSc | Copies an image of the screen contents onto Clipboard |
| Alt+PrtSc | Copies an image of the active window onto Clipboard |
| Alt+F4 | Closes the active application window. |
| Ctrl+F4 | Closes the active document window. |
| F1 | Gets Help and displays the Help Index for the application. (See Help Keys.) |

Text Selection Keys

The following keys can be used in the Conversion tool dialogs. However, the only fields that will allow these keys to be used are the Initial Value and Equivalent value fields.

| <u>Key(s)</u> | <u>Function</u> |
|---------------------------|---|
| Shift+Left or Right Arrow | Selects text one character at a time to the left or right. Or, if the character is already selected, cancels the selection. |
| Shift+Home | Selects text to the beginning of the line. |
| Shift+End | Selects text to the end of the line. |

Window Keys

| <u>Key(s)</u> | <u>Function</u> |
|----------------------|--|
| Alt+Spacebar | Opens the Control menu for an application. |
| Alt+Hyphen | Opens the Control menu for a document window. |
| Alt+F4 | Closes a window. |
| Alt+Esc | Switches to the next application window or minimized icon, |

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including full-screen programs.

Alt+Tab Switches to the next application window, restoring applications that are running as icons.

Alt+Enter Switches a non-Windows application between running in a window and running full screen.

direction key Moves a window when you have chosen Move from the Control menu.

Or, changes the size of a window when you have chosen Size from the Control menu.

Convert It! Procedures

This index lists all procedure topics available for Convert It!.

- 30 Changing Conversion Factors
- 30 Changing Conversion Units
- 31 Command Buttons
- 31 Control Menu Commands
- 31 Entering an Initial Value
- 32 Exiting Convert It!
- 32 Moving Within a Conversion Tool
- 32 Opening the Control Menu
- 33 Option Buttons
- 33 Quitting a Conversion Tool
- 33 Starting a Conversion Tool
- 33 Using Scroll Bars

Changing Conversion Factors

All Conversion Tools, except the Temperature conversion tool, allow you to change the conversion factors that are used in its calculations. You can get to the Conversion Factor dialog either from the Conversion Tool dialog or from the Conversion Unit dialog.

The dialog shows you a grid in which is displayed the conversion factors currently in use. You can change a conversion factor simply by typing over an existing one. The way you read the grid is as follows. If you have a value of unit x and you want to convert it to unit y, you look for row x then scan across to column y. Where the row and column meet is the value you need to multiply value x by to get value y.

For example, if you are converting inches to centimeters, find the row for inches move across for the column for centimeters. Where they meet will be your conversion factor. Multiply inches by this number and you will have centimeters.

If you don't see the unit you are looking for use the scroll bars to scroll around the grid.

You do not need to enter a value into all the cells shown. It is sufficient to only have values entered for a complete row, a complete column or a complete diagonal from upper left to lower right. You can then press the Calculate button. Convert It! will inform you if it cannot calculate a value for a cell with the information you have given.

One point to keep in mind when you allow Convert It! to calculate a conversion factor for you, is that of accuracy. If a conversion factor you enter is accurate to 5 significant digits and another is accurate to 7 significant digits then any new conversion factor Convert It! creates using these two factors will only be significant to 5 digits even though Convert It! will create a factor that may have up to 10 digits. Therefore the fewer conversion factors that Convert It! has to create, the more accurate those conversions will be.

If you have made some changes but do not wish to keep them press the Cancel button. Otherwise press the OK button. However, your changes will not be written to the INI file until you exit the dialog you were in when you started the Factors dialog.

Changing Conversion Units

Use the Unit menu to choose the category of conversion in which you want to change units. This will display a dialog box that lists all the current units for the group you selected. To change the spelling of a unit or give it a new name/abbreviation just type over the existing name.

If you want to add a unit you can move down to an empty cell and enter a new unit there. If you want it to appear in a certain order you can place the cursor on a field and press the Insert button. This will insert a blank cell above the current cell. If all fifteen cells are filled you will have to delete a cell before you can add or insert a new one.

To delete a cell just click on a cell then press the Delete button. This will delete the current cell. **Note:** You must have at least two units in each category.

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Once you have selected your units, you can press the Factors button to get the Conversion Factors dialog where you can define the conversion factors for the new units.

If you make any changes, either in this dialog or in the Conversion Factors dialog, when you press OK you will be asked to verify that you want your changes saved to the INI file. If you press YES then the next time you use that conversion it will use your new units and conversion factors.

If you have made changes when you press the Cancel button, Convert It! will remind you that you have made some changes. It will ask if you are sure that you want to discard them. If you respond YES, it will not save your changes.

Command Buttons

Command buttons initiate an immediate action. Like menu commands, command buttons use the following conventions.

Convention **What it means**

Dark border The currently selected default button.

Dimmed button The button is unavailable at this time.

Ellipsis(...) Opens another dialog box so you can provide more information.

You can close a dialog box without completing any commands by choosing Cancel (or Esc).

To choose a command button:

* Click the command button.

Or

1. Press Tab to select the command button you want. A selection cursor around the button text marks the selected button.

2. Press Spacebar (or Enter) to choose the button. Or hold down Alt and type the underlined letter in the button name (if the button has an underlined letter) to choose the button in one step.

Control Menu Commands

The following table defines the Control menu commands.

| Command | Action |
|----------------|---|
| Restore | Restores the window to its former size after it has been enlarged or shrunk to an icon. |
| Move | Lets you use the keyboard to move the window to another position on the desktop. |
| Minimize | Shrinks the window to an icon. |
| Close | Closes the window. |
| Switch To | Starts Task List, which lets you switch among running applications and rearrange their windows and icons on your desktop. |

Entering an Initial Value

The Initial Value field in each Conversion Tool is a text box. A text box is a rectangle into which you type information.

When you move to an empty text box, an insertion point appears at the left side of the box. The text you type starts at the insertion point.

If the box already contains text when you move to it, all the text in the box is automatically selected and any text you type replaces it. Or you can erase the existing text by pressing Del or Backspace.

To select text in a text box:

* Drag the pointer across the text you want to select. Or double-click to select one word at a time.

Or

1. Use the direction keys to move to the first character you want to select.
2. Hold down Shift and press a direction key to extend the selection. Press Shift+Home to extend the selection to the first character in the box. Press Shift+End to extend the selection to the last character in the box.

Exiting Convert It!

You may exit Convert It! in one of six ways:

1. Choose Close from the Control menu.
2. Press the Alt+F4 key combination.
3. Double click on the Control-menu box.
4. Choose Exit from the File Menu.
5. Press F3.
6. Press the Exit button.

Moving Within a Conversion Tool

Often you need to move around within a Conversion Tool to make several selections. Since a Conversion Tool is a dialog box, the methods are the same. The current option is marked by a selection cursor around the name of the option.

To move within a Conversion Tool (dialog box):

* Click the option or group you want to move to.

Or

1. Press Tab to move forward (left to right and top to bottom) or Shift+Tab to move in the opposite direction. Or hold down Alt and type the underlined letter in the option or group name.
2. Within a group of options, use the direction keys to move from one option to another.

Opening the Control Menu

Application windows, document windows, application icons, group icons, and some dialog boxes have Control menus (also called System menus).

To open the Control menu for an application window or application icon:

* Click the Control-menu box in the upper left corner of the window. Or click the icon. Be careful not to double-click, or you will close the window or open the icon.

Or

1. Press Alt+Esc until the application window or icon is selected.
2. Press Alt then the Spacebar. Press Alt to close the menu without choosing a menu item.

To open the Control menu for a dialog box:

* Click the Control-menu box in the dialog box.

Or

Press Alt and then Spacebar. Press Alt to close the menu without choosing a menu item.

Option Buttons

Option buttons, also called radio buttons, provide lists of mutually exclusive items. You can select only one option from the list at a time. The selected option button contains a black dot. Unavailable options are dimmed.

To select an option button:

* Click the option button.

Or

1. Press Tab to move into the option group.
2. Use the direction keys to select the option button. Or hold down Alt and press the underlined letter if the option name contains an underlined letter.

Quitting a Conversion Tool

You may exit a Conversion Tool in one of five ways:

1. Choose Close from the Control menu.
2. Press the Alt+F4 key combination.
3. Double click on the Control-menu box.
4. Press Esc.
5. Press the Exit button.

Starting a Conversion Tool

You may start a Conversion Tool in one the following ways:

* Click the proper tool button. Or use the menu to choose the Conversion menu and select a tool.

Or

Press Tab to move to the tool button. Then press Spacebar. Or press Alt and use the direction keys to select the Conversion menu then select the tool. Or use one of the keys listed in Convert It! Keys.

Using Scroll Bars

The Conversion Tools have scroll bars you can use to change the value to be converted.

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Mouse techniques:

| To scroll | Do this |
|---------------------|---|
| Up or down 1 unit | Click one of the scroll arrows. |
| Up or down 10 units | Click the scroll bar to the left or right of the scroll box. |
| Continuously | Point to one of the scroll arrows and hold down the mouse button until the value you want is displayed. |
| To any position | Drag the scroll box left or right on the scroll bar to a place you choose. |

Keyboard techniques:

| To scroll | Do this |
|----------------------------|--|
| Up or down 1 unit | Press the direction key that points in the direction you want to scroll. |
| Up or down 10 units | Press Ctrl+PgUp or Ctrl+PgDn. |
| To the bottom of the scale | End |
| To the top of the scale | Home |

Weights and Measures

Weights and Measures are the standards used to find the size of things. People in the United States and a few other countries use standards that belong to the customary, or English, system of measurement. This system was developed in England from older measurements standards, beginning about the 1200's. People in nearly all other countries -- including England --, and all scientists, now use a system of measurement called the metric system. The metric system was created in France in the 1790's. Its official name is *Système Internationale d'Unités* (International System of Units).

In the related topics and unit conversion tables numbers that would be given in scientific notation (i.e. 1.345×10^5) are given in a notation used by many programming languages. The notation would make the example given above look like 1.345e5. In this notation the 'e' with its following digits indicate the power of 10 to multiply by the rest of the number.

Length and Distance

Lengths and distances are measured from one point to another, usually along a straight line. Length usually refers to the measurement of an object. Distance usually refers to the measurement of the space between two places. Below is a table showing the customary and metric units for length and distance.

| Customary | Metric | Metric | Customary |
|------------------|---------------|---------------|-------------------|
| 1 inch | 2.54 cm | 1 nanometer | 0.00000003937 in. |
| 1 foot | 30.48 cm | 1 micron | 0.00003937 in. |
| 1 yard | 0.9144 m | 1 millimeter | 0.03937 in. |
| 1 rod | 5.0292 m | 1 centimeter | 0.3937 in. |
| 1 furlong | 201.168 m | 1 decimeter | 3.937 in. |
| 1 mile | 1.6093 km | 1 meter | 39.37 in. |
| 1 dekameter | 393.7 in. | | |
| 1 hectometer | 328.0833 ft. | | |
| 1 kilometer | 0.62137 mi. | | |

Ancient peoples measured length by comparing the length of one thing with the length of the thing they wanted to measure, such as comparing a stick with an animal. Ancient people also based measurements on parts of the body. The Romans use the *uncia* for the width of a thumb. The English word inch comes from that word. Twelve uncia equaled a foot, which was roughly the length of a person's foot. Three feet equaled a yard, which was about the distance from a person's nose to the tip of the middle finger of an outstretched arm.

Measuring units based on body parts failed because not all people were the same size. Modern systems of measurement are based on units called measurement standards that are of a size agreed upon by the users of the system. Both the customary and the metric system use the same standard for length -- the meter. Scientists have defined the length of a meter as 1,650,763.73 wave lengths of light emitted from energized atoms of krypton-86. It is about 39 1/3 inches.

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Other Length and Distance units:

| | |
|---------|---------------------------------------|
| 1 meter | = 1.0e10 Angstroms [Å] |
| | = 3.937007874e7 microinch [μin] |
| | = 3.937007874e4 mil |
| | = 4.970969538 link |
| | = 0.05468066491 fathom |
| | = 4.970969538e-2 chain [ch] |
| | = 3.280839895e-2 Engineer's chain |
| | = 5.399568034e-4 nautical mile [n mi] |
| | = 1.057020998e-16 light year [ly] |

Surface or Area

An area of land or the surface of an object is measured in square units. These units result from multiplying the length of the area or object by its width. The square units of both the customary and metric systems are based on units of length and distance. Many times a small 2, placed the right and above the abbreviation of a metric unit (a superscript), indicates a square unit.

| Customary | Metric | Metric | Customary |
|-----------------|------------------------|------------------|-----------------|
| 1 sq. inch | 6.4516 cm ² | 1 sq. millimeter | 0.00155 sq. in. |
| 1 sq. foot | 0.0929 m ² | 1 sq. centimeter | 0.155 sq. in. |
| 1 sq. yard | 0.8361 m ² | 1 sq. decimeter | 15.5 sq. in. |
| 1 sq. rod | 25.293 m ² | 1 sq. meter | 1550 sq. in. |
| 1 acre | 0.4047 ha | 1 sq. dekameter | 119.6 sq. yd. |
| 1 sq. mile | 2.590 km ² | 1 sq. hectometer | 2.4711 acres |
| 1 sq. kilometer | 0.3861 sq. mi. | | |

Other Area units:

| | |
|------------------|--|
| 1 m ² | = 1.0e28 Barn |
| | = .01 Are [a] |
| | = .0001 Hectare [ha] |
| | = 1.5500031e9 mil ² |
| | = 24.71053815 square link |
| | = 2.471053815e-3 square chain [ch ²] |
| | = 3.953686103e-2 square rod [rod ²] |
| | = 1.072505996e-8 Township |

Volume and Capacity

Volume refers to the amount of space occupied by an object. Capacity is the amount of a substance that a container can hold. Volume and capacity are both measured in cubic units. Cubic units combine length, width, and depth. But the names of many common cubic units, such as liter and quart, do not include the word cubic. A small 3, placed to the right and above the abbreviation of a metric unit (a superscript), indicates a cubed unit.

| Customary | Metric | Metric | Customary |
|-----------|--------|--------|-----------|
|-----------|--------|--------|-----------|

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| | | | |
|--------------|------------------------|--------------|----------------|
| 1 cubic inch | 16.387 cm ³ | 1 milliliter | 0.0610 cu. in. |
| 1 cubic foot | 0.0283 m ³ | 1 centiliter | 0.6103 cu. in. |
| 1 cubic yard | 0.7646 m ³ | 1 liter | 61.025 cu. in. |
| 1 pint | 473.2 ml | 1 kiloliter | 264.179 gal. |
| 1 US bushel | 35.238 l | | |
| 1 US peck | 8.809 l | | |

Other Volume and Capacity units:

| | |
|------------------|---|
| 1 m ³ | = 1.0e9 cubic millimeter [mm ³] |
| | = 1.0e6 cubic centimeter [cm ³ or cc] or milliliter [ml] |
| | = 1.0e3 cubic decimeter [dm ³] or liter [l] |
| | = 270512.1816 US fluid drams [US fl dr] |
| | = 33814.0227 US fluid ounces [US fl oz] |
| | = 202884.1362 US teaspoon [US tsp.] |
| | = 8453.505675 US gill [US gi] |
| | = 4226.752838 US cup |
| | = 2113.376419 US pint [US pt] |
| | = 1056.688209 US quart [US qt] |
| | = 264.1720523 US gallon [US gal] |
| | = 8.38641436 US barrel |
| | = 6.28981077 US barrel petroleum |
| | = 0.275898338 cord |
| | = 35195.07973 UK fluid ounce [UK fl oz] |
| | = 7039.015945 UK gill |
| | = 1759.753986 UK pint [UK pt] |
| | = 879.8769932 UK quart [UK qt] |
| | = 219.9692483 UK gallon [UK gal] |
| | = 0.3531466672 Register ton [RT] |

Weight and Mass

The customary system measures the weight of various materials. The metric system measures mass (amount of material something contains). An object's mass does not change, but its weight decreases with altitude. These two measurement units are equal at sea level on the earth, and the comparisons in this table are based on that location.

| Customary | Metric | Metric | Customary |
|--------------|------------|--------------|--------------|
| 1 grain | 0.0648 g | 1 milligram | 0.0154 gr. |
| 1 ounce | 28.3495 g | 1 centigram | 0.1543 gr. |
| 1 pound | 0.45359 kg | 1 gram | 15.4324 gr. |
| 1 ton | 0.9072 t | 1 kilogram | 2.2046 lb. |
| 1 Troy ounce | 31.103g | 1 metric ton | 2,204.62 lb. |

Other Weight and Mass units:

| | |
|------|---------------------------------|
| 1 kg | = 1.0e9 micrograms [µg] |
| | = 5000 metric carat [Kt] |
| | = 771.6179176 scruple |
| | = 643.0149314 pennyweight [dwt] |

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= 257.2059725 dram apothecaries[dr ap]
= 2.679228881 troy pound [lb t]
= 564.3833912 dram [dr]
= 0.1574730444 stone
= 7.873652221e-2 quarter [qr]
= 6.852176585e-2 slug
= 2.204622622e-2 short hundredweight [sh cwt]
= 1.968413055e-2 long hundredweight [l cwt]
= 9.842065276e-4 long ton [ton or UK ton]

Temperature

The customary system measures temperature in Fahrenheit degrees. The metric system measures temperatures in Celsius degrees. The Kelvin scale is based on absolute zero being 0 degrees Kelvin. In theory nothing can get colder than absolute zero.

On the Fahrenheit scale water freezes at 32° and boils at 212° under normal atmospheric pressure. On the Celsius scale, water freezes at 0° and boils at 100°. Because there are 100° between freezing and boiling on the Celsius scale it is sometimes called the centigrade scale. Absolute zero, 0° Kelvin, is -273.15° Celsius, otherwise the two scales are graduated the same. In other words 1° Kelvin measures the same temperature difference as 1° Celsius. Only their respective 0 points are different.

There is no single measurement standard for temperature. Various temperatures are used to standardize thermometers. One of these is 0.01° C, which is the triple point of water (the temperature at which water can exist as a liquid, a gas, and a solid at the same time).

Angular Measurements

There are several units used to measure angles.

The degree is 1/360 of the way around a circle. Degrees are sometimes further divided into minutes and seconds. Usually called minutes of arc, a minute is 1/60 of a degree. Similarly a second of arc is 1/60 of a minute of arc. Therefore a circle contains 360 degrees or 21600 minutes of arc or 1296000 seconds of arc.

Radians are also used to measure angles of arc. A complete circle contains 2π radians. One radian is the angle at the center of a circle that cuts off an arc on the circumference equal in length to the radius. One radian is equal to 57.2957795 degrees.

Mils are also sometimes used to measure angles. A mil is 1/6400 of a circle. Mils are mainly used in aiming artillery. One complete circle is 6400 mils. One mil is equal to 0.05625 degrees

A grade, or gon, is one-hundredth of a right angle. A circle contains 400 grades. The grade was developed in 1792. It is a metric measurement of angle. One grade is equal to 0.9 degrees. A centigrade, sometimes called a centesimal minute (cg) is 1/100th of a grade. A hundredth of a centigrade, sometimes called a centesimal second (cc), is 1/100,000th of a grade.

Quadrants are some times used to measure angles. A circle contains four quadrants. One quadrant is equal to 90 degrees.

A revolution is also used to measure angular distance. One revolution is 360 degrees, 2π radians (approx. 6.28318512), 6400 mils, 400 grades, and four quadrants.

Power Measurements

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Power is a measure of the amount of energy spent over certain period of time. The units used in this program are the Watt, kilowatt, and the metric horsepower for the metric system. The customary power unit used is the horsepower.

The watt is the power provided when one joule is used for one second.

The British horsepower is the power needed to raise 550 pounds one foot in one second. The metric horsepower is the power needed to raise 75 kilograms one meter in one second.

| | |
|---------------|---------------|
| 1 horsepower | = 745.7W |
| 1 hp (metric) | = 735.3W |
| 1 Watt | = 0.001341 hp |
| 1 kilowatt | = 1000 W |

Other Power units:

| | |
|-----|--|
| 1 W | = 1.0e7 dyne centimeter per second [dyn cm/s] or erg per second [erg/s] |
| | = 1 joule per second [J/s] |
| | = 1.0e-6 megawatt [MW] |
| | = 0.1019716213 kilogram force meter per second [kg m/s] |
| | = 0.2388458966 calorie per second [cal/s] |
| | = 859.8452278 calorie per hour [cal/h] |
| | = 2.388458966e-4 kilocalorie per second [kcal/s] |
| | = 0.8598452278 kilocalorie per hour [kcal/h] |
| | = 8.598452278e-4 megacalorie per hour [Mcal/h] |
| | = 35.5292376 liter atmosphere per hour [l atm/h] |
| | = 9.478171203e-4 British thermal units per second [Btu/s] |
| | = 3.412141633 British thermal units per hour [Btu/h] |
| | = 5.265650668e-4 centigrade heat units per second [CHU/s] |
| | = 1.8956342406 centigrade heat units per hour [CHU/h] |
| | = 0.7375621493 foot pound force per second [ft lbf/s] |
| | = 2655.223737 foot pound force per hour [ft lbf/h] |
| | = 23.7303604 foot poundal per second [ft pdl/s] |
| | = 85429.29745 foot poundal per hour [ft pdl/h] |
| | = 2.843451361e-4 ton of refrigeration per hour [ton/h] |

Energy Measurements

Energy is defined as the equivalent of or the capacity to do work. The units used in this program are the joule, erg, calorie, and the Calorie for the metric system. The customary energy unit used is the Btu.

The joule (J), or Newtonmeter (Nm), or Wattsecond (Ws), is the amount of energy needed to move a mass of one kilogram through one meter with an acceleration of one meter per second per second.

The erg is the amount of energy needed to move one gram through one centimeter with an

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acceleration of one centimeter per second per second.

The calorie (cal) is the amount of energy needed to raise the temperature of one gram of water by one degree Celsius from 14.5° Celsius to 15.5° Celsius. A kilocalorie is equal to 1000 cal.

The British thermal unit (Btu) is the energy needed to raise the temperature of one pound of water from 60° Fahrenheit to 61° Fahrenheit.

| | |
|---------------|-----------------|
| 1 joule | = 1.0e7 erg |
| 1 erg | = 2.3892e-7 cal |
| 1 cal | = 4.1855 J |
| 1 kilocalorie | = 1000 cal |
| 1 Btu | = 1054.8 J |

Other Energy units:

| | |
|-----|---|
| 1 J | = 6.241460122e18 electron-volt [eV] |
| | = 9.869232667 cubic centimeter atmosphere [cm ³ atm] |
| | = 9.869232667e-3 liter atmosphere [l atm] |
| | = 1.0e-6 megajoule [MJ] |
| | = 2.777777778e-4 Watt hour [Wh] |
| | = 2.777777778e-7 kilowatt hour [kWh] |
| | = 0.1019716213 kilogram force meter [kgf m] |
| | = 3.776726715e-7 horsepower hour (metric) [HP h] |
| | = 3.72506136e-7 horsepower hour [hp h] |
| | = 5.265650668e-4 centigrade heat units [CHU] |
| | = 9.478171203e-9 therm |
| | = 8.850745791 inch pound force [in lbf] |
| | = 0.7375621493 foot pound force [ft lbf] |
| | = 23.7303604 foot poundal [ft pdl] |
| | = 3.485286624e-4 cubic foot atmosphere [ft ³ atm] |
| | = 5.12195937e-3 cubic foot pound force per square inch [ft ³ lbf/in ²] |
| | = 3.291031668e-9 ton of refrigeration [ton] |

Pressure Measurements

In physics, pressure is Force measured in terms of its distribution over an area of opposing force. This is expressed as force **F** divided by unit area **A** of the surface area to which the force is applied, or **F / A**. Pressure usually refers to a force exerted uniformly in all directions. Absolute pressure is pressure measured with respect to zero pressure. Gauge pressure is pressure measured with respect to air pressure (the weight of the atmosphere).

The units used in this program are inches of mercury, (in of Hg) centimeters of mercury (cm of Hg), pounds per square inch (psi), atmospheres (atm), kilopascals (kPa) (also known as piece), pascals (Pa) (also known as newton per square meter), bars, millibars (mbars) (also known as hectopascals), and microbars (dynes per square centimeter).

| | |
|-------|---------------------------|
| 1 atm | = 14.7 psi |
| | = 23.9292 in. of mercury. |

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= 76 cm of mercury.
= 101.325 kPa
= 1013.25 mbars
1 Pa = 1 Newton per sq. meter
1 mbar = 1000 dynes per sq. cm

Other Pressure units:

1 Pa = 1.0e-5 bar
= 1.0e-6 megapascal [MPa]
= 0.1019716213 kilogram force per square meter [kgf/m²]
= 1.019716213e-5 kilogram force per square centimeter [kgf/cm²]
= 1.019716213e-7 kilogram force per square millimeter [kgf/mm²]
= 7.500616827e-3 Torriceli [Torr]
= 4.014630759e-3 inches of water [inH₂O]
= 0.6719689751 poundal per square foot [pdl/ft²]
= 2.088543423e-2 pound force per square foot [lbf/ft²]
= 2.320603803e-3 ounce force per square inch [ozf/ft²]
= 1.450377377e-4 pound force per square inch [psi]
= 7.251886886e-8 short ton force per square inch [sh tonf/in²]
= 6.474899006e-8 long ton force per square inch [l tonf/in²]

Time Measurements

From the earliest times the rotation of the Earth or the apparent location of the Sun in the sky has been used to establish a uniform time scale. In order to specify a date, days must be counted from some reference date. In addition, a clock is used to measure fractions of a day.

Time derived from the apparent position of the Sun in the sky is called apparent solar time. Because of the eccentricity of the Earth's rotation axis to the orbital plane, apparent solar time is not a uniform time scale. These effects can, however, be calculated and corrections made to obtain a more uniform time scale called mean solar time. **Universal Time (UT0)** is equivalent to mean solar time at the Greenwich Meridian, also known as Greenwich Mean Time or GMT. Another time scale, which is obtained by observations of the apparent motion of a distant star, is used in astronomy and called sidereal time.

The accuracy of time keeping today has improved many times since the time of the Greeks. The invention of the quartz crystal oscillator and of the **Atomic Clock** makes possible the measurement of time and frequency more accurately than any other physical quantity. This makes possible other time scales such as atomic time (**AT**), which is based on the microwave resonances of certain atoms in a magnetic field. This provides the most accurate and stable clocks known. Atomic time scales obtained by counting the cycles of an electromagnetic signal in resonance with cesium atoms have an accuracy of a few billionths of a second over short intervals of a minute or less.

Since about 1960 a number of laboratories around the world have cooperated in comparing

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their atomic time scales, leading to the formation of a weighted average of the various atomic time scales, which is now disseminated to the public as **Universal Coordinated Time (UTC)**. In order to keep **UTC** in agreement with the length of the day, *leap seconds* are occasionally added to or deleted from the atomic time scale.

The advancement of precision in time measurement has resulted in the adoption of new, more precise, definitions of the second.

Prior to 1956, one second was defined as the fraction 1/86,400 of the mean solar day. From 1956 to 1967, it was the ephemerical second, defined as the fraction 1/31556925.9747 of the tropical year at 00h 00m 00s December 31,1899.

The second is currently defined as the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium-133 atom.

| | |
|---------------|---------------------|
| 1 millennium | = 1000 years |
| 1 century | = 100 years |
| 1 year | = 12 months |
| 1 week | = 7 days |
| 1 day | = 24 hours |
| 1 hour | = 60 minutes |
| 1 minute | = 60 seconds |
| 1 second | = 1000 milliseconds |
| 1 millisecond | = 1000 microseconds |
| 1 microsecond | = 1000 nanoseconds |
| 1 nanosecond | = 1000 picoseconds |

Force Measurements

Physicists measure a force by the change in velocity that is produced on a known mass in a given time. For example, in metric units, 1 newton of force acting on 1 kilogram of mass can change its velocity by 1 meter per second. This change in velocity is the acceleration of that mass. In customary units, 1 poundal of force acting on 1 pound of mass can change its velocity by 1 foot per second.

In the table below the unit abbreviation is shown in square brackets.

| | |
|--------------|---------------------------------------|
| 1 newton [N] | = 1,000,000 micronewtons [μ N] |
| | = 100,000 dyne [dyn] |
| | = 1000 millinewton [mN] |
| | = 0.001 kilonewton [kN] |
| | = 0.000001 meganewton [MN] |
| | = 101.9716213 gram·force [gf] |
| | = 0.1019716213 kilogram·force [kgf] |
| | = 1.019716213e-4 megagram·force [Mgf] |
| | = 7.233013851 poundal [pd] |
| | = 1573.662601 grain·force [grf] |

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= 3.596943089 ounce·force [ozf]
= 0.2248089431 pound·force [lbf]
= 0.0001124044715 Ton·force (short) [sh tnf]
= 0.0001003611353 Ton·force (long) [tonf]

Note that a kilonewton is also known as a Sthène [sn]. A gram·force is also known as a pond [p]. A megagram·force is also known as a ton·force (metric).

Density Measurements

The density of a substance is the amount of mass it contains for each unit of its volume. The density is calculated by dividing its mass by its volume. In the metric system it is usually in terms of grams per cubic centimeter or kilograms per cubic meter. For example, a piece of iron with a mass of 780 grams and a volume of 100 cubic centimeters has a density of 7.8 grams per cubic centimeter. In the customary system, density is measured in pounds per cubic foot.

Note that the abbreviations for the units below are shown in square brackets.

| | |
|---|--|
| 1 kilogram per cubic meter [kg/m ³] | = 1000 grams per cubic meter [g/m ³] = 10 grams per cubic centimeter [g/cm ³] = 0.001 megagrams per cubic meter [Mg/m ³] = 436.9957240 grains per cubic foot [gr/ft ³] = 0.9988473692 ounces per cubic foot [oz/ft ³] = 0.06242796057 pounds per cubic foot [lb/ft ³] = 3.6127292e-5 pounds per cubic inch [lb/in ³] = 8.345404452e-3 pounds per US gallon [lb/USgal] = 1.002241285e-2 pounds per UK gallon [lb/UKgal] = 1.940320331e-3 slug per cubic foot [slug/ft ³] |
|---|--|

Specific Volume units:

| | |
|---|--|
| 1 cubic meter per kilogram [m ³ /kg] | = 1000 cubic meter per megagram [m ³ /Mg] = 0.001 cubic meter per gram [m ³ /g] = 0.00228835191 cubic foot per grain [ft ³ /gr] = 1.001153961 cubic foot per ounce [ft ³ /oz] = 16.01846337 cubic foot per pound [ft ³ /lb] |
|---|--|

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= 27679.90471
cubic inch per pound [in³/lb]
= 119.8264273 US
gallon per pound [USgal/lb]
= 99.77637266 UK
gallon per pound [UKgal/lb]
= 515.3788184
cubic foot per slug [ft³/slug]

Velocity Measurements

Velocity is the rate at which a body moves in space in a given direction. Velocity is expressed in terms of distance and time, such as miles per hour or meters per second. There is an important difference between speed and velocity. Speed indicates the rate in any given direction. Velocity indicates the rate in one fixed direction. Mathematically it is a vector quantity since it possesses both speed and direction.

Note that the abbreviations for the units below are shown in square brackets.

1 meter per second [m/s]

- = 100 centimeters per second [cm/s]
- = 60 meters per minute [m/min]
- = 3600 meters per hour [m/h]
- = 0.001 kilometers per second [km/s]
- = 0.06 kilometers per minute [km/min]
- = 3.6 kilometers per hour [km/h]
- = 39.37007874 inches per second [in/s]
- = 2362.204724 inches per minute [in/min]
- = 141732.2834 inches per hour [in/h]
- = 3.280839895 feet per second [ft/s]
- = 196.8503937 feet per minute [ft/min]
- = 11811.02362 feet per hour [ft/h]
- = 1.093613298 yard per second [yd/s]
- = 65.6167979 yard per minute [yd/min]
- = 3937.007874 yard per hour [yd/h]
- = 6.213711922e-4 miles per second [mi/s]
- = 0.03728227153 miles per minute [mi/min]
- = 2.236936292 miles per hour [mi/h]
- = 1.943844492 knots [kn]
- = 3.016955289e-3 Mach number [Ma]

Note that Mach number varies with temperature. The conversion value given is for dry air at 0°C

Money Conversions

An American car dealer who buys Japanese cars gets yen to pay for them by buying them from a bank at the current exchange rate. An exchange rate is the price of one nation's currency expressed in terms of another country's currency. If the exchange rate were 140 yen to the dollar, for example, the American would have to buy \$8571.43 in yen to pay for a Japanese car that cost 1.2 million yen.

Exchange rates are determined in foreign exchange markets. The rates vary from day to day in relation to international demand for various currencies. This is known as a floating exchange rate. However, most countries do not allow their currencies to float freely. Each country has holdings of foreign currency. If the exchange rate falls too low, the government will use some of its foreign holdings to buy enough of its own currency to stabilize the exchange rate.

Other Measurements

Measurement units for length, temperature, time, and mass are called basic measurements. These units can be combined into other measurements called derived measurements. For example, area is one length times another to form square units.

Some measurements combine different units. The measurement of speed is derived by dividing distance traveled by time to travel. It tells the distance traveled in a certain time. For example, miles per hour or meters per second. Another derived measurement is pressure, which is the force acting on a unit of area. Pressure units include pounds per square inch and dynes per square centimeter.

Convert It! Tables

This index lists all tables available for Convert It!.

- Metric System
- Temperature Conversions
- Metric to Customary Conversion Factors
- Customary to Metric Conversion Factors
- General Conversion Factors

Metric System Unit Tables

Metric System Base Units

| Quantity measured | Unit | Abbreviation |
|---------------------|---------------|--------------|
| Length | meter | m |
| Mass | kilogram | kg |
| Time | second | s |
| Electric current | ampere | A |
| Temperature | degree Kelvin | K |
| Luminous intensity | candela | cd |
| Amount of substance | mole | mol |

Metric Decimal Multiples and Sub multiples

| Multiples and sub multiples | Prefixes | Symbols |
|-----------------------------|----------|---------|
| 1.0e18 | exa | E |
| 1.0e15 | pecta | P |
| 1.0e12 | tera | T |
| 1.0e9 | giga | G |
| 1.0e6 | mega | M |
| 1.0e3 | kilo | k |
| 1.0e2 | hecto | h |
| 10 | deca | da |
| 1.0e-1 | deci | d |
| 1.0e-2 | centi | c |
| 1.0e-3 | milli | m |
| 1.0e-6 | micro | μ |
| 1.0e-9 | nano | n |
| 1.0e-12 | pico | p |
| 1.0e-15 | femto | f |
| 1.0e-18 | atto | a |

Temperature Conversions

Temperature Formulas

$$^{\circ}\text{F} = 9/5 (^{\circ}\text{C}) + 32$$

$$\text{Fahrenheit temperature} = 1.8 (\text{temperature in Kelvin}) - 459.67$$

$$^{\circ}\text{C} = 5/9 [(^{\circ}\text{F}) - 32]$$

$$\text{Celsius temperature} = \text{temperature in Kelvin} - 273.15$$

$$\text{Fahrenheit temperature} = 1.8 (\text{Celsius temperature}) + 32$$

Metric to Customary Conversions Factors

| To obtain | Multiply | by |
|---------------|------------------|----------------|
| Inches | Centimeters | 0.3937007874 |
| Feet | Meters | 3.280839895 |
| Yards | Meters | 1.093613298 |
| Miles | Kilometers | 0.6213711922 |
| Ounces | Grams | 3.527396195e-2 |
| Pounds | Kilograms | 2.204622622 |
| Gallons | Liters | 0.2641720524 |
| Fluid ounces | Milliliters (cc) | 3.381402270e-2 |
| Square inches | Sq. Centimeters | 0.1550003100 |
| Square feet | Square meters | 10.76391042 |
| Square yards | Square meters | 1.195990046 |
| Cubic inches | Milliliters (cc) | 6.102374409e-2 |
| Cubic feet | Cubic meters | 35.31466672 |
| Cubic yards | Cubic meters | 1.307950619 |

Customary to Metric Conversions Factors

| To obtain | Multiply | by* |
|------------------|---------------|--------------------|
| Microns | Mils | 25.4 |
| Centimeters | Inches | 2.54 |
| Meters | Feet | 0.3048 |
| Meters | Yards | 0.9144 |
| Kilometers | Miles | 1.609344 |
| Grams | Ounces | 28.34952313 |
| Kilograms | Pounds | 0.45359237 |
| Liters | Gallons | 3.785411784 |
| Milliliters (cc) | Fluid ounces | 29.57352956 |
| Sq. Centimeters | Square inches | 6.4516 |
| Square meters | Square feet | 0.09290304 |
| Square meters | Square yards | 0.83612736 |
| Milliliters (cc) | Cubic inches | 16.387064 |
| Cubic meters | Cubic feet | 2.831684659e-2 |
| Cubic meters | Cubic yards | 0.764554858 |

* Boldface numbers are exact; others are given to 10 significant digits.

General Conversions Factors

* Boldface numbers are exact.

| To obtain | Multiply | by* |
|------------------|-------------------|----------|
| Pressure: | | |
| Atmospheres | Ft. of water @4°C | 2.950e-2 |

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| | | |
|-----------------------------|----------------------|-----------------|
| Atmospheres | In. of mercury @ 0°C | 3.342e-2 |
| Atmospheres | Pounds per sq. inch | 6.804e-2 |
| Ft. of water @4°C | Atmospheres | 33.90 |
| In. of mercury @0°C | Pounds per sq. inch | 2.036 |
| Force and Energy: | | |
| BTU | Foot-pounds | 1.285e-3 |
| BTU | Joules | 9.480e-4 |
| Joules | BTU | 1054.8 |
| Joules | Foot-pounds | 1.35582 |
| Ergs | Foot-pounds | 1.356e7 |
| Foot-pounds | Horsepower-hours | 1.98e6 |
| Foot-pounds | Kilowatt-hours | 2.655e6 |
| Power: | | |
| Foot-pounds per min. | Horsepower | 3.3e4 |
| Horsepower | Foot-pounds per sec | 1.818e-3 |
| Watts | BTU per min. | 17.5796 |
| Kilowatts | BTU per min. | 1.758e-2 |
| Kilowatts | Foot-pounds per min. | 2.26e-5 |
| Kilowatts | Horsepower | 0.745712 |
| Length and Distance: | | |
| Feet | Miles | 5280 |
| Miles | Feet | 1.894e-4 |
| Nautical miles | Miles | 0.86897624 |
| Angular: | | |
| Degree (angle) | Radians | 57.2958 |
| Radians | Degrees (angle) | 1.745e-2 |
| Luminance: | | |
| Candela/square cm | Candela/square meter | 0.0001 |
| Candela/square in | Candela/square meter | 0.00064516 |
| Candela/square ft | Candela/square meter | 0.09290304 |
| Candela/square yd | Candela/square meter | 0.83612736 |
| Apostilb (Blondel) | Candela/square meter | 3.141592654 |
| Lambert | Candela/square meter | 0.0003141592654 |
| Foot Lambert | Candela/square meter | 0.2918635079 |

Note that a Candela per square centimeter (cd/cm²) is called a Stilb (sb) and a Candela per square meter (cd/m²) is called a Nit (nt).

Luminous Flux:

| | | |
|-----------------|--------------------|------------|
| Lumen/square cm | Lumen/square meter | 0.0001 |
| Nox | Lumen/square meter | 1000 |
| Lumen/square in | Lumen/square meter | 0.00064516 |
| Lumen/square ft | Lumen/square meter | 0.09290304 |
| Lumen/square yd | Lumen/square meter | 0.83612736 |

Note that a Lumen per square centimeter (lm/cm²) is called a Phot (ph), a Lumen per square meter (lm/m²) is called a Lux (lx) and a Lumen per square foot (lm/ft²) is called a Foot candle.

Mass Flow Rate:

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| | | |
|----------------------|----------------------|---------------|
| Grams per second | Kilograms per second | 1000 |
| Grams per minute | Kilograms per second | 60000 |
| Grams per hour | Kilograms per second | 3600000 |
| Kilograms per minute | Kilograms per second | 60 |
| Kilograms per hour | Kilograms per second | 3600 |
| Megagrams per sec | Kilograms per second | 0.001 |
| Megagrams per minute | Kilograms per second | 0.06 |
| Megagrams per hour | Kilograms per second | 3.6 |
| Pounds per second | Kilograms per second | 2.204622622 |
| Pounds per minute | Kilograms per second | 132.2277357 |
| Pounds per hour | Kilograms per second | 7936.641438 |
| Ounces per second | Kilograms per second | 35.27396195 |
| Ounces per minute | Kilograms per second | 2116.437717 |
| Ounces per hour | Kilograms per second | 126986.263 |
| Slugs per second | Kilograms per second | 0.06852176585 |
| Slugs per minute | Kilograms per second | 4.111305951 |
| Slugs per hour | Kilograms per second | 246.678357 |
| Tons per second | Kilograms per second | 9.84206527e-4 |
| Tons per minute | Kilograms per second | 0.05905239165 |
| Tons per hour | Kilograms per second | 3.543143499 |

Volume Flow Rate:

| | | |
|-----------------------|------------------------|-------------|
| Cubic cm per second | Cubic meter per second | 1000000 |
| Cubic cm per minute | Cubic meter per second | 60000000 |
| Cubic cm per hour | Cubic meter per second | 3600000000 |
| Liter per second | Cubic meter per second | 1000 |
| Liter per minute | Cubic meter per second | 60000 |
| Liter per hour | Cubic meter per second | 3600000 |
| Cubic meter per min | Cubic meter per second | 60 |
| Cubic meter per hour | Cubic meter per second | 3600 |
| Cubic inch per second | Cubic meter per second | 61023.74409 |
| Cubic inch per minute | Cubic meter per second | 3661424.645 |
| Cubic inch per hour | Cubic meter per second | 219685478.7 |
| Cubic foot per second | Cubic meter per second | 35.31466672 |
| Cubic foot per minute | Cubic meter per second | 2118.880003 |
| Cubic foot per hour | Cubic meter per second | 127132.8002 |
| US gallon per second | Cubic meter per second | 264.1720523 |
| US gallon per minute | Cubic meter per second | 15850.32314 |
| US gallon per hour | Cubic meter per second | 951019.3884 |
| UK gallon per second | Cubic meter per second | 219.9692483 |
| UK gallon per minute | Cubic meter per second | 13198.15489 |
| UK gallon per hour | Cubic meter per second | 791889.2939 |

Acceleration:

| | | |
|---------------------------------|--------------------------------|-------------|
| Centimeters/second ² | Meter per second ² | 100 |
| Kilometers/(hr sec) | Meter per second ² | 3.6 |
| Feet per second ² | Meters per second ² | 3.280839895 |
| Feet per hour ² | Meters per second ² | 42519685.04 |
| Miles per hour per sec | Meters per second ² | 2.236936292 |

Angular Velocity:

| | | |
|-----------------------|--------------------|--------------|
| Revolution per second | Radians per second | 0.1591549431 |
| Revolution per minute | Radians per second | 9.549296585 |

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| | | |
|------------------------------------|---------------------------------|--------------|
| Degrees per second | Radians per second | 57.29577951 |
| Grades per second | Radians per second | 63.66197723 |
| Angular Acceleration: | | |
| Revolution per second ² | Radians per second ² | 0.1591549431 |
| Rev per min per sec | Radians per second ² | 9.549296585 |
| Degrees per second ² | Radians per second ² | 57.29577951 |
| Grades per second ² | Radians per second ² | 63.66197723 |

How to Register Convert It! 2.0

Convert It! 2.0 Registration Form/Invoice. Please send to:

SMI Corp., P.O. Box 582221, Tulsa, OK 74158

Ordering by check: You can order by sending a check and this order form to the address above. To print this order form, click on Print Topic in the File pull-down menu. Alternately, you can print the ASCII text file ORDER.TXT (distributed with Convert It!).

Credit card ordering: You can order with Master Card or Visa from SMI Corp. by calling (918) 560-9536 from 8:00 am to 5:00 PM central time Monday through Friday. You can also mail credit card orders by filling out this order form and mailing it to the above address.

Site licenses: Site licenses are available for Convert It!. Call (918) 560-9536 to find out about the details.

Convert It! 2.0 quantity _____ @ \$10.00 ea. = _____
Upgrade from prior version _____ @ \$5.00 ea. = _____
License number _____
use back of form for additional numbers.
Disk (optional) __ 3.5" __ 5.25" add \$2.50 + _____
Oklahoma residents add 7.5% sales tax + _____
Orders outside US or Canada add \$5.00 + _____
Total payment _____

Payments must be in US dollars drawn on a US bank. Prices are subject to change without notice.

Name: _____ Date: _____
Company: _____
Address: _____

City, State, Zip: _____ Country: _____
Day Phone: _____ Evening Phone: _____
Electronic mail address: _____

For credit card orders, please fill out the following:

___ VISA ___ MasterCard
Name on card: _____
Card number: _____
Exp. date: _____ Signature: _____
Comments:

Convert It! Glossary

absolute zero

a temperature characterized by a complete absence of heat. No molecular motion. - 217.15°C or -459.67°F

application

a computer program used for a particular kind of work, such as word processing. This term is often used interchangeably with "program".

command button

a large button in a window or dialog box that carries out or cancels the selected action. Two common command buttons are OK and Cancel. The button that carries out the action will often have a label that describes the action (for example, open, create, install). Choosing a command button sometimes causes another dialog box to appear.

control menu

The menu farthest to the left in the title bar, indicated by a Spacebar icon. The Control menu appears on every application that runs in a window and on some non-Windows applications. Document windows, icons, and some dialog boxes also have Control menus.

For application windows, document windows, icons, and dialog boxes, Control menu commands move, size, and close windows. You can also switch to Task List by using the Control menu. For non-Windows applications, the Control menu commands transfer information and perform other functions, depending on the application.

control-menu box

The icon (symbolized Spacebar) that appears farthest to the left in the title bar and that opens the Control menu for the window.

default button

The command button in some dialog boxes that is automatically selected or chosen by Windows as the most logical or safest choice. The default button has a bold border, indicating that it will be chosen if you press enter. You can override a default button by choosing Cancel or another command button.

dialog box

A rectangular box that either requests or provides information. Many dialog boxes present options for you to choose among before Windows or the application can carryout the command. Some dialog boxes present warnings or explain why a command can't be completed.

direction keys

The four arrow keys on your computer keyboard. These keys move the cursor or pointer to locations you choose on screen. Each direction key has an arrow on it to show which direction the cursor or pointer will move. Each arrow key is named for the direction the key points: the Up Arrow key, the Down Arrow key, the Left Arrow key, and the Right Arrow key.

drag

Hold down the mouse button and move the mouse.

icon

A graphical representation of a disk drive, a directory, a group, an application, a document, and so on. You can enlarge an application icon to a window when you want to use the application.

insertion point

The place where text will be inserted when you type. The insertion point usually appears as a flashing vertical bar in an application's window or dialog box. The text you type appears to the left of the insertion point which is pushed to the right as you type.

mass

The property of a body that is a measure of its inertia, that is commonly taken as a measure of the amount of material it contains and causes it to have weight in a gravitational field.

menu

A list of available commands in a application window. Menu names appear in the menu bar near the top of the window. You may use a command on a menu by selecting the menu name, then choosing the command you want.

non-Windows application

Applications that were not designed to run in Windows. Non-Windows applications do not necessarily conform to Windows user interface standards.

option buttons

A small round or diamond shaped button. That appears in a dialog box and is used to select an option within a group of related options. You can select only one option.

scroll arrow

An arrow on either end of a scroll bar, that is used to change the contents of a window or list box or change a value. Clicking the arrow moves the contents one line or one unit. Pressing a scroll arrow scrolls the contents continuously.

scroll bar

A bar that may appear in a dialog box that will allow a value to be changed within a certain range. Or may also appear to allow you to scroll through a window that has more lines than can be shown in the window.

scroll box

A small box in a scroll bar that shows the position of what is currently in the window or list box or value.

selection cursor

The marking device that shows where you are in a window menu or dialog box and what you have selected. the selection cursor can appear as a highlight or as a dotted rectangle around the text in a dialog box option.

shrink

To reduce a window to an icon at the bottom of the desktop using the Minimize button or the Minimize command. The document or application remains open (or running), and can be the

active application or document.

task list

A window that shows all the applications you have running and lets you switch among them. You can open the Task List window by choosing Switch To from the Control menu or by pressing Ctrl+Esc.

text box

A type of box within a dialog box where you type information needed to carry out a command. When the dialog box appears, the text may be blank or it may contain text.

title bar

The horizontal bar at the top of the window that contains the title of the window or dialog box. On many windows, the title bar also contains a Control-menu box and Maximize and Minimize buttons.

weight

The force with which a body is attracted in a gravitational field which is equal to the product of the mass by the local gravitational acceleration.

window

A rectangular area on your screen in which you view an application or document. You can open, close, and move windows, and change the size of most windows. You can open several windows on the desktop at the same time and you can shrink windows to icons or enlarge them to fill the entire desktop.