

# Package ‘udunits2’

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**Type** Package

**Title** Udunits-2 Bindings for R

**Version** 0.13

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**Description** Provides simple bindings to Unidata's udunits library.

**URL** <https://github.com/pacificclimate/Rudunits2>  
<https://www.unidata.ucar.edu/software/udunits/>

**SystemRequirements** udunits-2

**License** GPL-2

**LazyLoad** yes

**Depends** R (>= 2.10.0)

**NeedsCompilation** yes

**Repository** CRAN

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## R topics documented:

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udunits2-package      *udunits-2 bindings for R*

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## Description

This package provides simple bindings to version 2 of Unidata's udunits library

## Details

Package:      udunits2  
Type:          Package  
Version:      0.6  
Date:          2011-02-11  
License:      GPL-2  
LazyLoad:    yes

This package provides simple bindings to the version 2 API of Unidata's udunits library. While the entire API is not supported, we have chosen to boil it down to a few simple functions to be able to exploit the most useful functionality that the library provides. This package provides the following functions:

- `ud.is.parseable`
- `ud.get.name`
- `ud.get.symbol`
- `ud.are.convertible`
- `ud.convert`

Please see the respective function help pages for further details and usage.

## Author(s)

James Hiebert <hiebert@uvic.ca>

Maintainer: James Hiebert <hiebert@uvic.ca>

## References

Unidata's udunits web page: <http://www.unidata.ucar.edu/software/udunits/>

## See Also

[ud.is.parseable](#) [ud.get.name](#) [ud.get.symbol](#)      [ud.are.convertible](#) [ud.convert](#)

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ud.are.convertible      *Determine whether two units may be converted between each other*

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### Description

This function takes udunits compatible strings and determines whether or not it is possible to convert between them.

### Usage

```
ud.are.convertible(u1, u2)
```

### Arguments

u1                    A character string which is parseable into a udunits compatible unit.  
u2                    Another character string which is also parseable into a udunits compatible unit.

### Details

Even if two units are parseable and recognized by the udunits library, it may or may not be possible to convert from one to another. For example, it makes sense to convert from celsius to kelvin, however not from celsius to kilograms. This function allows the user to check if two units are of the same system and if there exists a defined conversion between the two.

### Value

Returns a logical: True if the units can be converted between each other, False if either of the arguments is not parseable by udunits, or if no conversion is possible.

### Author(s)

James Hiebert <hiebert@uvic.ca>

### References

See the udunits function `ut_are_convertible`: [http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#ut\\_005fare\\_005fconvertible\\_0028\\_0029](http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#ut_005fare_005fconvertible_0028_0029) and the main unidits webpage: <http://www.unidata.ucar.edu/software/udunits/>

### See Also

[ud.is.parseable](#)

### Examples

```
ud.are.convertible("miles", "km")            # TRUE  
ud.are.convertible("grams", "kilograms")    # TRUE  
ud.are.convertible("celsius", "grams")     # FALSE  
ud.are.convertible("not", "parseable")     # FALSE
```

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ud.convert	<i>Convert numeric types from one unit to another</i>
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### Description

This function takes the numeric argument `x`, quantified in units `u1` and converts it to be of units `u2`.

### Usage

```
ud.convert(x, u1, u2)
```

### Arguments

<code>x</code>	Some argument which is convertible to a numeric type by <code>as.double</code> .
<code>u1</code>	A character string which is parseable into a udunits compatible unit.
<code>u2</code>	Another character string which is also parseable into a udunits compatible unit and for which there exists a defined transformation from the units represented by <code>u1</code> .

### Details

This function uses the udunits function `cv_convert_doubles` to convert the argument from one set of units to another.

### Value

Returns a numeric type having converted from one unit to another. The attributes of the original argument `x` (e.g. class, dimensions, etc.) are preserved and then re-applied to the return value of the transformation as such: `attributes(rv) <- attributes(x)` If either of unit `u1` or `u2` is unparseable, or there does not exist a conversion from one to the other the function raises an error.

### Author(s)

James Hiebert <hiebert@uvic.ca>

### References

Unidata's udunits reference: <http://www.unidata.ucar.edu/software/udunits/> API guide for `cv_convert_doubles`: [http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-cv\\_005fconvert\\_005fdoubles-39](http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-cv_005fconvert_005fdoubles-39)

### See Also

[ud.are.convertible](#)

## Examples

```
x <- seq(10)
ud.convert(x, "miles", "km")           # c(1.609344, 3.218688, 4.828032, ...)
x <- c(-40, 0, 100)
ud.convert(x, "celsius", "degree_fahrenheit") # c(-40, 32, 212)
err <- try(ud.convert(100,"miles", "grams")) # Error
err <- try(ud.convert(NA, "not", "parseable")) # Error
```

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ud.get.name	<i>Retrieve the udunits name or symbol from the database for a given units string</i>
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## Description

Retrieve the udunits name or symbol from the database for a given units string.

## Usage

```
ud.get.name(unit.string)
```

## Arguments

`unit.string` A character string which is parseable into a udunits compatible unit.

## Details

This function retrieves the udunits name or symbol from the udunits database and returns it. It uses the udunits functions `ut_get_name` and `ut_get_symbol` respectively.

## Value

Returns a character string stating the udunits's name/symbol for the given unit, or an empty character string if the unit does not map to a name/symbol for the default character set. If the unit is unparseable, the function raises an error.

## Note

More often than not units do not have names or symbols that are returned by the base functions. This depends entirely on what is defined in the units data base, which is—as of API version 2—an XML database which ships with the library. See Unidata's website for more information about the XML database: <http://www.unidata.ucar.edu/software/udunits/udunits-2-units.html>. All in all, don't put too much stock in them, for they are for convenience only. If your application *requires* certain names and symbols to be present, the XML database is local and editable.

## Author(s)

James Hiebert <hiebert@uvic.ca>

## References

Unidata's udunits reference: <http://www.unidata.ucar.edu/software/udunits/> API guide for ut\_get\_name: [http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut\\_005fget\\_005fname-66](http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut_005fget_005fname-66) API guide for ut\_get\_symbol: [http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut\\_005fget\\_005fsymbol-67](http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut_005fget_005fsymbol-67)

## Examples

```
units.to.display <- c("celsius", # has no name, messed up symbol (maybe a bug in R?)
                     "kg",
                     "hr",      # has no symbol
                     "K",
                     "degrees",
                     "m",
                     "ohm")

for (u in units.to.display) {
  print(ud.get.name(u))
  print(ud.get.symbol(u))
}
```

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ud.have.unit.system     *Determine whether udunits has loaded its units database*

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## Description

This function check whether or not udunits has successfully found and loaded its run-time XML units database.

## Usage

```
ud.have.unit.system()
```

## Details

At package load time, Rudunits attempts to load a unit system from an XML units database from the file system. This might be installed with the system library (e.g. through apt or yum), or the user can use their own. The file-system location is configured using the UDUNITS2\_XML\_PATH environment variable.

This package will attempt to load the path contained in UDUNITS2\_XML\_PATH. If it's empty, it will attempt to load it from the system library. Failing that it will attempt to load its own XML database that ships with the package (from udunits source).

One can call `ud.have.unit.system` to confirm that the units database has been loaded successfully.

## Value

Returns a logical: `True` if udunits has successfully found and loaded the XML units database, `False` otherwise.

**Author(s)**

James Hiebert <hiebert@uvic.ca>

**Examples**

```
ud.have.unit.system() # TRUE
```

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ud.is.parseable	<i>Determine whether a unit string is parseable by the udunits library</i>
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**Description**

Determine whether a unit string is parseable and recognized by the udunits library.

**Usage**

```
ud.is.parseable(unit.string)
```

**Arguments**

unit.string	A character string representing a type of units which may be parseable by the udunits library
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**Details**

ud.is.parseable uses udunit's function ut\_parse to determine whether or not the given unit string is parseable. If ut\_parse returns NULL, then ud.is.parseable will return FALSE.

**Value**

Returns a logical: True if the units is parseable and recognized by the udunits library, False otherwise.

**Note**

There is a note in the ut\_parse docs about how the argument string must have no leading or trailing whitespace. We make sure in this package to always call ut\_trim on any strings before they are passed to ut\_parse. The package user need not strip whitespace before-hand.

**Author(s)**

James Hiebert <hiebert@uvic.ca>

**References**

Unidata's udunits reference: <http://www.unidata.ucar.edu/software/udunits/> API guide for ut\_parse: [http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut\\_005fparse-43](http://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#index-ut_005fparse-43)

**See Also**[ud.are.convertible](#)**Examples**

```
ud.is.parseable("K")           # TRUE
ud.is.parseable(" K ")        # TRUE
ud.is.parseable("miles")      # TRUE
ud.is.parseable("Not parseable") # FALSE
```

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ud.set.encoding	<i>Set the udunits package level encoding type</i>
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**Description**

This function sets the encoding type parameter which is global to the R udunits2 package.

**Usage**

```
ud.set.encoding(enc.string)
```

**Arguments**

enc.string	A character string representing the encoding type. Valid strings are <code>utf8</code> , <code>ascii</code> , <code>iso-8859-1</code> , and <code>latin1</code> (an alias for ISO-8859-1).
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**Details**

Encoding type is a parameter to nearly all of the functions in the udunits library. By default, the R udunits2 package sets the encoding type to UTF-8, however this package allows the user to set other encoding types which are supported by the udunits library. It presently supports UTF-8, ASCII, and ISO-8859-1

**Value**

Returns no value. Raises an error if it is not given a valid encoding string.

**Author(s)**

James Hiebert <hiebert@uvic.ca>

**References**

Unidata's udunits reference: <http://www.unidata.ucar.edu/software/udunits/> API guide chapter on data types: <https://www.unidata.ucar.edu/software/udunits/udunits-2.1.24/udunits2lib.html#Types>

**Examples**

```
valid.enc.strings <- c('utf8', 'ascii', 'iso-8859-1', 'latin1')
lapply(valid.enc.strings, ud.set.encoding)
err <- try(ud.set.encoding("This will fail"))
```

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