

# Package ‘readwritesqlite’

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**Title** Enhanced Reading and Writing for 'SQLite' Databases

**Version** 0.0.2

**Description** Reads and writes data frames to 'SQLite' databases while preserving time zones (for POSIXct columns), projections (for 'sfc' columns), units (for 'units' columns), levels (for factors and ordered factors) and classes for logical, Date and 'hms' columns.  
It also logs changes to tables and provides more informative error messages.

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**Depends** R (>= 3.4)

**Imports** err, checkr, dtr2, hms (>= 0.5.0), DBI, RSQLite, sf, tibble, units

**Suggests** covr, testthat, knitr, rmarkdown

**URL** <https://github.com/poissonconsulting/readwritesqlite>

**BugReports** <https://github.com/poissonconsulting/readwritesqlite/issues>

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**R topics documented:**

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---

check\_sqlite\_connection  
*Check SQLite Connection*

---

**Description**

Checks whether an R object is a SQLite Connection.

**Usage**

```
check_sqlite_connection(x, connected = NA, x_name = substitute(x),
  error = TRUE)
```

**Arguments**

|           |  |
|-----------|--|
| x         | The object to check.   |
| connected | A flag specifying whether x should be connected.   |
| x_name    | A string of the name of the object.  |
| error     | A flag indicating whether to throw an informative error or immediately generate an informative message if the check fails. |

**Value**

An invisible copy of the original object.

## Examples

```
conn <- rws_connect()
check_sqlite_connection(conn)
rws_disconnect(conn)
check_sqlite_connection(conn, error = FALSE)
check_sqlite_connection(conn, connected = TRUE, error = FALSE)
```

---

|             |   |
|-------------|---|
| rws_connect | <i>Opens SQLite Database Connection</i> |
|-------------|---|

---

## Description

Opens a `SQLiteConnection` to a SQLite database with foreign key constraints enabled.

## Usage

```
rws_connect(dbname = ":memory:", exists = NA)
```

## Arguments

|        |   |
|--------|---|
| dbname | The path to the database file. SQLite keeps each database instance in one single file. The name of the database <i>is</i> the file name, thus database names should be legal file names in the running platform. There are two exceptions: <ul style="list-style-type: none"><li>• "" will create a temporary on-disk database. The file will be deleted when the connection is closed.</li><li>• ":memory:" or "file::memory:" will create a temporary in-memory database.</li></ul> |
| exists | A flag specifying whether the table(s) must already exist.  |

## Value

A `SQLiteConnection` to a SQLite database with foreign key constraints enabled.

## See Also

```
rws_disconnect()
```

## Examples

```
conn <- rws_connect()
print(conn)
rws_disconnect(conn)
```

---

 rws\_data

*Example Data*


---

**Description**

An sf tibble of example data.

**Usage**

```
rws_data
```

**Format**

An object of class `sf` (inherits from `tbl_df`, `tbl`, `data.frame`) with 3 rows and 7 columns.

**Examples**

```
rws_data
```

---

 rws\_describe\_meta *Add Descriptions to SQL Meta Data Table*


---

**Description**

Add Descriptions to SQL Meta Data Table

**Usage**

```
rws_describe_meta(x, ..., conn)
```

**Arguments**

|                   |  |
|-------------------|--|
| <code>x</code>    | An object specifying the descriptions.         |
| <code>...</code>  | Not used.                                      |
| <code>conn</code> | A <code>SQLiteConnection</code> to a database. |

**Value**

An invisible copy of the updated meta table.

**See Also**

Other `rws_describe_meta`: `rws_describe_meta.character`

---

`rws_describe_meta.character`*Add Descriptions to SQL Meta Data Table*

---

## Description

Add Descriptions to SQL Meta Data Table

## Usage

```
## S3 method for class 'character'  
rws_describe_meta(x, column, description, ..., conn)
```

## Arguments

|                          |  |
|--------------------------|--|
| <code>x</code>           | A character vector of table name(s).           |
| <code>column</code>      | A character vector of column name(s).          |
| <code>description</code> | A character vector of the description(s)       |
| <code>...</code>         | Not used.                                      |
| <code>conn</code>        | A <code>SQLiteConnection</code> to a database. |

## Value

An invisible copy of the updated meta table.

## See Also

Other `rws_describe_meta`: `rws_describe_meta`

## Examples

```
conn <- rws_connect()  
rws_write(rws_data, exists = FALSE, conn = conn)  
rws_read_meta(conn)  
rws_describe_meta("rws_data", "Units", "The site length.", conn = conn)  
rws_describe_meta("rws_data", "POSIXct", "Time of the visit", conn =conn)  
rws_read_meta(conn)  
rws_disconnect(conn)
```

---

```
rws_describe_meta.data.frame
```

*Add Data Frame of Descriptions to SQL Meta Data Table*

---

### Description

Add Data Frame of Descriptions to SQL Meta Data Table

### Usage

```
## S3 method for class 'data.frame'
rws_describe_meta(x, ..., conn)
```

### Arguments

|      |   |
|------|---|
| x    | A data frame with columns Table, Column, Description. |
| ...  | Not used.   |
| conn | A <code>SQLiteConnection</code> to a database.        |

### Value

An invisible character vector of the previous descriptions.

### See Also

Other `rws_read`: `rws_read.SQLiteConnection`, `rws_read.character`, `rws_read`

---

```
rws_disconnect
```

*Close SQLite Database Connection*

---

### Description

Closes a `SQLiteConnection` to a SQLite database.

### Usage

```
rws_disconnect(conn)
```

### Arguments

|      |  |
|------|--|
| conn | An object generated by <code>SQLite()</code> , or an existing <code>SQLiteConnection</code> . If an connection, the connection will be cloned. |
|------|--|

### See Also

```
rws_connect()
```

**Examples**

```
conn <- rws_connect()
rws_disconnect(conn)
print(conn)
```

---

|                 |                    |
|-----------------|--------------------|
| rws_list_tables | <i>Table Names</i> |
|-----------------|--------------------|

---

**Description**

Gets the table names excluding the names of the meta and log tables.

**Usage**

```
rws_list_tables(conn)
```

**Arguments**

conn            A SQLiteConnection to a database.

**Value**

A character vector of table names.

**Examples**

```
conn <- rws_connect()
rws_list_tables(conn)
rws_write(rws_data, exists = FALSE, conn = conn)
rws_list_tables(conn)
rws_disconnect(conn)
```

---

|           |                              |
|-----------|------------------------------|
| rws_query | <i>Query SQLite Database</i> |
|-----------|------------------------------|

---

**Description**

Gets a query from a SQLite database.

**Usage**

```
rws_query(query, meta = TRUE, conn)
```

**Arguments**

`query`            A string of a SQLite query.  
`meta`             A flag specifying whether to preserve meta data.  
`conn`             A `SQLiteConnection` to a database.

**Value**

A data frame of the query.

**Examples**

```

conn <- rws_connect()
rws_write(rws_data, exists = FALSE, conn = conn)
rws_query("SELECT date, posixct, factor FROM rws_data", conn = conn)
rws_disconnect(conn)

```

---

`rws_read`                    *Read from a SQLite Database*

---

**Description**

Read from a SQLite Database

**Usage**

```
rws_read(x, ...)
```

**Arguments**

`x`                    An object specifying the table(s) to read.  
`...`                Not used.

**Value**

A named list of data frames.

**See Also**

Other `rws_read`: `rws_describe_meta.data.frame`, `rws_read.SQLiteConnection`, `rws_read.character`



---

rws\_read.character *Read Tables from a SQLite Database*

---

## Description

Read Tables from a SQLite Database

## Usage

```
## S3 method for class 'character'  
rws_read(x, meta = TRUE, conn, ...)
```

## Arguments

|      |  |
|------|--|
| x    | A character vector of table names.               |
| meta | A flag specifying whether to preserve meta data. |
| conn | A SQLiteConnection to a database.                |
| ...  | Not used.  |

## Value

A named list of the data frames.

## See Also

Other rws\_read: rws\_describe\_meta.data.frame, rws\_read.SQLiteConnection,  
rws\_read

## Examples

```
conn <- rws_connect()  
rws_write(rws_data, exists = FALSE, conn = conn)  
rws_write(rws_data[c("date", "ordered")], x_name = "data2",  
  exists = FALSE, conn = conn)  
rws_read(c("rws_data", "data2"), conn = conn)  
rws_disconnect(conn)
```

---

```
rws_read.SQLiteConnection
```

*Read All Tables from a SQLite Database*

---

**Description**

Read All Tables from a SQLite Database

**Usage**

```
## S3 method for class 'SQLiteConnection'
rws_read(x, meta = TRUE, ...)
```

**Arguments**

|                   |  |
|-------------------|--|
| <code>x</code>    | A <code>SQLiteConnection</code> to a database.   |
| <code>meta</code> | A flag specifying whether to preserve meta data. |
| <code>...</code>  | Not used.  |

**Value**

A named list of the data frames.

**See Also**

Other `rws_read`: `rws_describe_meta.data.frame`, `rws_read.character`, `rws_read`

**Examples**

```
conn <- rws_connect()
rws_write(rws_data, exists = FALSE, conn = conn)
rws_write(rws_data[c("date", "ordered")],
  x_name = "data2", exists = FALSE, conn = conn)
rws_read(conn)
rws_disconnect(conn)
```

---

```
rws_read_init
```

*Read Initialization Data table from SQLite Database*

---

**Description**

The table is created if it doesn't exist.

**Usage**

```
rws_read_init(conn)
```

**Arguments**

conn            A SQLiteConnection to a database.

**Value**

A data frame of the init table

**Examples**

```
conn <- rws_connect()
rws_read_init(conn)
rws_write(rws_data, exists = FALSE, conn = conn)
rws_read_init(conn)
rws_disconnect(conn)
```

---

rws\_read\_log            *Read Log Data Table from SQLite Database*

---

**Description**

The table is created if it doesn't exist.

**Usage**

```
rws_read_log(conn)
```

**Arguments**

conn            A SQLiteConnection to a database.

**Value**

A data frame of the log table

**Examples**

```
conn <- rws_connect()
rws_read_log(conn)
rws_write(rws_data, exists = FALSE, conn = conn)
## Not run:
rws_read_log(conn)

## End(Not run)
rws_disconnect(conn)
```

---

rws\_read\_meta      *Read Meta Data table from SQLite Database*

---

**Description**

The table is created if it doesn't exist.

**Usage**

```
rws_read_meta(conn)
```

**Arguments**

conn              A `SQLiteConnection` to a database.

**Value**

A data frame of the meta table

**Examples**

```
conn <- rws_connect()
rws_read_meta(conn)
rws_write(rws_data, exists = FALSE, conn = conn)
rws_read_meta(conn)
rws_disconnect(conn)
```

---

rws\_read\_table      *Read A Table from a SQLite Database*

---

**Description**

Read A Table from a SQLite Database

**Usage**

```
rws_read_table(x, meta = TRUE, conn)
```

**Arguments**

x                  A string of the table name.  
meta               A flag specifying whether to preserve meta data.  
conn               A `SQLiteConnection` to a database.

**Value**

A data frame of the table.

**Examples**

```

conn <- rws_connect()
rws_write(rws_data, exists = FALSE, conn = conn)
rws_write(rws_data[c("date", "ordered")],
  x_name = "data2", exists = FALSE, conn = conn)
rws_read_table("data2", conn = conn)
rws_disconnect(conn)

```

rws\_write

*Write to a SQLite Database***Description**

Write to a SQLite Database

**Usage**

```

rws_write(x, exists = TRUE, delete = FALSE, replace = FALSE,
  meta = TRUE, log = TRUE, commit = TRUE, strict = TRUE,
  x_name = substitute(x), silent = getOption("rws.silent", FALSE),
  conn, ...)

```

**Arguments**

|         |   |
|---------|---|
| x       | The object to write.  |
| exists  | A flag specifying whether the table(s) must already exist.  |
| delete  | A flag specifying whether to delete existing rows before inserting data. If meta = TRUE the meta data is deleted.       |
| replace | A flag specifying whether to replace any existing rows whose inclusion would violate unique or primary key constraints. |
| meta    | A flag specifying whether to preserve meta data.  |
| log     | A flag specifying whether to log the table operations.  |
| commit  | A flag specifying whether to commit the operations (calling with commit = FALSE can be useful for checking data).       |
| strict  | A flag specifying whether to error if x has extraneous columns or if exists = TRUE extraneous data frames.              |
| x_name  | A string of the name of the object.   |
| silent  | A flag specifying whether to suppress messages and warnings.  |
| conn    | A SQLiteConnection to a database.   |
| ...     | Not used.   |

**Value**

An invisible character vector of the name(s) of the table(s).

**See Also**

Other rws\_write: `rws_write.data.frame`, `rws_write.environment`, `rws_write.list`

**Examples**

```
conn <- rws_connect()
rws_write(rws_data, exists = FALSE, conn = conn)
rws_disconnect(conn)
```

---

```
rws_write.data.frame
```

*Write a Data Frame to a SQLite Database*

---

**Description**

Write a Data Frame to a SQLite Database

**Usage**

```
## S3 method for class 'data.frame'
rws_write(x, exists = TRUE, delete = FALSE,
  replace = FALSE, meta = TRUE, log = TRUE, commit = TRUE,
  strict = TRUE, x_name = substitute(x),
  silent = getOption("rws.silent", FALSE), conn, ...)
```

**Arguments**

|                      |  |
|----------------------|--|
| <code>x</code>       | A data frame.  |
| <code>exists</code>  | A flag specifying whether the table(s) must already exist.   |
| <code>delete</code>  | A flag specifying whether to delete existing rows before inserting data. If <code>meta = TRUE</code> the meta data is deleted.       |
| <code>replace</code> | A flag specifying whether to replace any existing rows whose inclusion would violate unique or primary key constraints.              |
| <code>meta</code>    | A flag specifying whether to preserve meta data.   |
| <code>log</code>     | A flag specifying whether to log the table operations.   |
| <code>commit</code>  | A flag specifying whether to commit the operations (calling with <code>commit = FALSE</code> can be useful for checking data).       |
| <code>strict</code>  | A flag specifying whether to error if <code>x</code> has extraneous columns or if <code>exists = TRUE</code> extraneous data frames. |
| <code>x_name</code>  | A string of the name of the object.  |
| <code>silent</code>  | A flag specifying whether to suppress messages and warnings.   |
| <code>conn</code>    | A <code>SQLiteConnection</code> to a database.   |
| <code>...</code>     | Not used.  |

**See Also**

Other rws\_write: `rws_write.environment`, `rws_write.list`, `rws_write`

**Examples**

```
conn <- rws_connect()
rws_list_tables(conn)
rws_write(rws_data, exists = FALSE, conn = conn)
rws_write(rws_data, x_name = "moredata", exists = FALSE, conn = conn)
rws_list_tables(conn)
rws_disconnect(conn)
```

---

`rws_write.environment`

*Write the Data Frames in an Environment to a SQLite Database*

---

**Description**

Write the Data Frames in an Environment to a SQLite Database

**Usage**

```
## S3 method for class 'environment'
rws_write(x, exists = TRUE, delete = FALSE,
  replace = FALSE, meta = TRUE, log = TRUE, commit = TRUE,
  strict = TRUE, x_name = substitute(x),
  silent = getOption("rws.silent", FALSE), conn, all = TRUE,
  unique = TRUE, ...)
```

**Arguments**

|                      |  |
|----------------------|--|
| <code>x</code>       | An environment.  |
| <code>exists</code>  | A flag specifying whether the table(s) must already exist.   |
| <code>delete</code>  | A flag specifying whether to delete existing rows before inserting data. If <code>meta = TRUE</code> the meta data is deleted.       |
| <code>replace</code> | A flag specifying whether to replace any existing rows whose inclusion would violate unique or primary key constraints.              |
| <code>meta</code>    | A flag specifying whether to preserve meta data.   |
| <code>log</code>     | A flag specifying whether to log the table operations.   |
| <code>commit</code>  | A flag specifying whether to commit the operations (calling with <code>commit = FALSE</code> can be useful for checking data).       |
| <code>strict</code>  | A flag specifying whether to error if <code>x</code> has extraneous columns or if <code>exists = TRUE</code> extraneous data frames. |
| <code>x_name</code>  | A string of the name of the object.  |

|        |  |
|--------|--|
| silent | A flag specifying whether to suppress messages and warnings.                             |
| conn   | A <code>SQLiteConnection</code> to a database.   |
| all    | A flag specifying whether all the existing tables in the data base must be represented.  |
| unique | A flag specifying whether each table must be represented by no more than one data frame. |
| ...    | Not used.  |

**See Also**

Other `rws_write`: `rws_write.data.frame`, `rws_write.list`, `rws_write`

**Examples**

```
conn <- rws_connect()
rws_list_tables(conn)
atable <- readwritessqlite::rws_data
another_table <- readwritessqlite::rws_data
not_atable <- 1L
rws_write(environment(), exists = FALSE, conn = conn)
rws_list_tables(conn)
rws_disconnect(conn)
```

---

`rws_write.list`

*Write a Named List of Data Frames to a SQLite Database*

---

**Description**

Write a Named List of Data Frames to a SQLite Database

**Usage**

```
## S3 method for class 'list'
rws_write(x, exists = TRUE, delete = FALSE,
  replace = FALSE, meta = TRUE, log = TRUE, commit = TRUE,
  strict = TRUE, x_name = substitute(x),
  silent = getOption("rws.silent", FALSE), conn, all = TRUE,
  unique = TRUE, ...)
```

**Arguments**

|                     |  |
|---------------------|--|
| <code>x</code>      | A named list of data frames.   |
| <code>exists</code> | A flag specifying whether the table(s) must already exist.   |
| <code>delete</code> | A flag specifying whether to delete existing rows before inserting data. If <code>meta = TRUE</code> the meta data is deleted. |



|         |   |
|---------|---|
| replace | A flag specifying whether to replace any existing rows whose inclusion would violate unique or primary key constraints. |
| meta    | A flag specifying whether to preserve meta data.  |
| log     | A flag specifying whether to log the table operations.  |
| commit  | A flag specifying whether to commit the operations (calling with commit = FALSE can be useful for checking data).       |
| strict  | A flag specifying whether to error if x has extraneous columns or if exists = TRUE extraneous data frames.              |
| x_name  | A string of the name of the object.   |
| silent  | A flag specifying whether to suppress messages and warnings.  |
| conn    | A SQLiteConnection to a database.   |
| all     | A flag specifying whether all the existing tables in the data base must be represented.                                 |
| unique  | A flag specifying whether each table must be represented by no more than one data frame.                                |
| ...     | Not used.   |

### See Also

Other rws\_write: `rws_write.data.frame`, `rws_write.environment`, `rws_write`

### Examples

```
conn <- rws_connect()
rws_list_tables(conn)
rws_write(list(somedata = rws_data, anotheortable = rws_data), exists = FALSE, conn = conn)
rws_list_tables(conn)
rws_disconnect(conn)
```