

## SQL DATE Type Type Conversion MySQL Edition

### SQL DATE Type

MySQL offers three data types to represent date and time values: DATE, TIME and DATETIME.

MySQL expects values of these three types to be represented as *string constants* in specific formats. The default formats of data for each data type are specified below.

MySQL Type	Default expected format
DATE	'YYYY-MM-DD'
	'YYYY/MM/DD'
TIME	'HH:MM:SS'
DATETIME	'YYYY-MM-DD HH:MM:SS'

Here, the following format abbreviations are used:

Abbreviation	Explanation	Examples
YYYY	Four digit year	1999, 2015
MM	Two-digit month number	01, 02, ..., 12
DD	Two-digit day of month	01, 02, ..., 31
HH	Two-digit hour of day	00, 01, 02, ..., 23
MM	Two-digit minute of the hour	00, 01, ..., 59
SS	Two-digit second of the minute	00, 01, ..., 59

In general, MySQL is *strict* about the order of components in the DATE, TIME and DATETIME types, but is *relaxed* about the delimiters between the components. Under most circumstances, any delimiter symbol can be consistently used in a date.

**Example.** Here are some date formats and MySQL's interpretation of them.

```
mysql> CREATE TABLE dtest ( id INT PRIMARY KEY, day DATE, t TIME, dt DATETIME );
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO dtest VALUES(1, '1999-12-20', '12:34:23', '1999-12-20 12:34:23');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO dtest VALUES(2, '1999:12:20', '12:34:23', '1999:12:20 12%34%23');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO dtest VALUES(3, '1999/12/20', '12:34:23', '1999/12/20 12-34-23');
Query OK, 1 row affected (0.00 sec)

mysql> select * from dtest;
+---+---+---+-----+
| id | day      | t      | dt          |
+---+---+---+-----+
| 1 | 1999-12-20 | 12:34:23 | 1999-12-20 12:34:23 |
| 2 | 1999-12-20 | 12:34:23 | 1999-12-20 12:34:23 |
| 3 | 1999-12-20 | 12:34:23 | 1999-12-20 12:34:23 |
+---+---+---+-----+
3 rows in set (0.00 sec)
```

### Date and Time Built-in Functions

MySQL has a wide range of built-in functions available for manipulation of values of types DATE, TIME and DATETIME. Some of these functions are discussed below.

**DATE\_FORMAT(date, format)** : format the date according to the format string. The format string can use the following specifiers (all specifiers must be prefaced with the '%' character).



specification	explanation	examples
%m	Numeric month	01, ..., 12
%c	Numeric month	1, ..., 12
%M	Full month name	'January', ..., 'December'
%d	Day of the month	01, ..., 31
%e	Day of the month	1, ..., 31
%Y	4-digit year	..., 1998, 1999, 2000, 2001, ...
%y	Last 2 digits of the year	01, ..., 99
%h	Twelve-hour hour of day	01, ..., 12
%H	Twenty-four-hour hour of day	00, ..., 23
%l	Twelve-hour hour of day, no leading zeros	1, ..., 12
%i	Minute	0, ..., 59
%S, %s	Second	0, ..., 59
%p	Meridian indicator	'AM', 'PM'
%T	time, 24 hour (hh:mm:ss)	'15:34:23'
%f	Microseconds	000000, ..., 999999
%w	Day of week	'Monday', ..., 'Sunday'
%w	numeric day of week	0 (Sunday), ..., 6 (Saturday)
%a	Abbreviated day of week	'Mon', ..., 'Sun'
%b	Abbreviated month name	'Jan', ..., 'Dec'
%j	Day of the year	1, 2, ..., 366
%U	Week, assuming Sunday is first day	00, 01, ..., 53
%u	Week, assuming Monday is first day	00, 01, ..., 53
%%	The '%' literal (character)	'%'

### Examples.

```
mysql> SELECT DATE_FORMAT('1999-12-20', '%d/%m/%Y'), DATE_FORMAT('1999-12-20', '%M %e, %Y');
+-----+-----+
| DATE_FORMAT('1999-12-20', '%d/%m/%Y') | DATE_FORMAT('1999-12-20', '%M %e, %Y') |
+-----+-----+
| 20/12/1999 | December 20, 1999 |
+-----+-----+
```

This function is applicable to DATE and DATETIME values only. For TIME values, use TIME\_FORMAT(time, format) function, which can only contain format information for hours, minutes, seconds, milliseconds and the meridian.

```
mysql> SELECT TIME_FORMAT('12:34:23', '%H h %i m %S s'), TIME_FORMAT('12:34:23', '%h:%i %p');
+-----+-----+
| TIME_FORMAT('12:34:23', '%H h %i m %S s') | TIME_FORMAT('12:34:23', '%h:%i %p') |
+-----+-----+
| 12 h 34 m 23 s | 12:34 PM |
+-----+-----+
```

CURRENT\_DATE() : returns current date.

```
mysql> SELECT CURRENT_DATE(), DATE_FORMAT(CURRENT_DATE(), '%d, %m, %y');
+-----+-----+
| CURRENT_DATE() | DATE_FORMAT(CURRENT_DATE(), '%d, %m, %y') |
+-----+-----+
| 2015-02-10 | 10, 02, 15 |
+-----+-----+
```

This function also has synonyms: CURDATE() and CURRENT\_DATE.

CURRENT\_TIME(), CURRENT\_TIME, CURTIME(): all these functions return current time.

```
mysql> SELECT CURRENT_TIME(), CURTIME(), CURRENT_TIME;
+-----+-----+-----+
| CURRENT_TIME() | CURTIME() | CURRENT_TIME |
+-----+-----+-----+
| 16:11:45 | 16:11:45 | 16:11:45 |
+-----+-----+-----+
```

NOW() : returns current date and time as a DATETIME value.

```
mysql> SELECT NOW();
+-----+
| NOW() |
+-----+
| 2015-02-10 16:17:24 |
+-----+
```

DATEDIFF(date1, date2) : returns the difference between two dates (date1 - date2) in days.

```
mysql> SELECT DATEDIFF('2015-02-15', '2015-02-14'), DATEDIFF('2015-02-14','2015-02-15');
+-----+
| DATEDIFF('2015-02-15', '2015-02-14') | DATEDIFF('2015-02-14','2015-02-15') |
+-----+-----+
| 1 | -1 |
+-----+
1 row in set (0.00 sec)

mysql> SELECT DATEDIFF('2015-02-15', '2014-08-12');
+-----+
| DATEDIFF('2015-02-15', '2014-08-12') |
+-----+
| 187 |
+-----+
```

**Date-Time Components.** MySQL has a series of built-in functions that return directly individual components of DATE, TIME and DATETIME values. The effects of each of these functions can also be simulated using DATE\_FORMAT function, but these functions are easier to use.

MySQL Function	Returns	DATE_FORMAT equivalent
YEAR()	Year	DATE_FORMAT( _, '%Y' )
MONTH()	Month	DATE_FORMAT( _, '%c' )
DAY()	Day of month	DATE_FORMAT( _, '%e' )
HOUR()	Hour of the day	DATE_FORMAT( _, '%h' )
MINUTE()	Minute of the hour	DATE_FORMAT( _, '%i' )
SECOND()	Second within the minute	DATE_FORMAT( _, '%s' )
DAYOFWEEK()	Day of week (numeric)	DATE_FORMAT( _, '%w' )
DAYNAME()	Day of week (name)	DATE_FORMAT( _, '%W' )
DAYOFYEAR()	Day of year (1 – 365)	DATE_FORMAT( _, '%j' )

For example:

```
MySQL> SELECT NOW();
+-----+
| NOW() |
+-----+
| 2023-04-20 17:10:04 |
+-----+
1 row in set (0.01 sec)

MySQL [DEMOS]> SELECT YEAR(NOW()), MONTH(NOW()), DAY(NOW()), HOUR(NOW()), MINUTE(NOW()), SECOND(NOW()), DAYOFWEEK(NOW());
+-----+-----+-----+-----+-----+-----+-----+
| YEAR(NOW()) | MONTH(NOW()) | DAY(NOW()) | HOUR(NOW()) | MINUTE(NOW()) | SECOND(NOW()) | DAYOFWEEK(NOW()) |
+-----+-----+-----+-----+-----+-----+-----+
| 2023 | 4 | 20 | 17 | 10 | 55 | 5 |
+-----+-----+-----+-----+-----+-----+-----+
```