

Real number data (floating-point data)

Data size and data range

Real number data includes single-precision 32-bit real number data.

Real number data can be stored only in devices other than bit devices or in single-precision real data type labels.

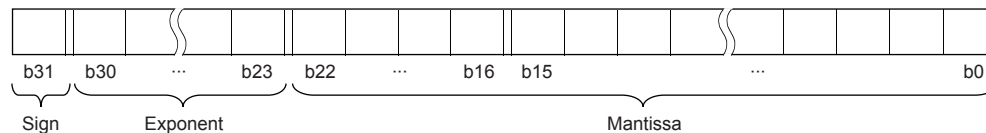
Data name		Data size	Value range
Single-precision real number data (single-precision floating-point data)	Positive number	32 bits (2 word)	$2^{-126} \leq \text{real number} < 2^{128}$
	Zero		0
	Negative number		$-2^{128} < \text{real number} \leq -2^{-126}$

Configuration of single-precision real number data

Single-precision real number data consists of a sign, mantissa, and exponent, and is expressed as shown below.

$$\boxed{\text{Sign}} \quad 1. \quad \boxed{\text{Mantissa}} \times 2^{\boxed{\text{Exponent}}}$$

The following figure shows the bit configuration of the internal expression of single-precision real number data and the meaning of each part.



■Sign (1 bit)

This bit represents the positive or negative sign of a numerical value. "0" indicates a positive number or 0. "1" Indicates a negative number.

■Mantissa (23 bits)

A mantissa means XXXXX... of $1.XXXXX \times 2^N$ representing a single-precision real number in binary.

■Exponent (8 bits)

An exponent means N of $1.XXXXX \times 2^N$ representing a single-precision real number in binary. The following table shows the relationships between the exponent value and N of a single-precision real number.

Exponent (b23 to b30)	FFH	FEH	FDH	...	81H	80H	7FH	7EH	...	02H	01H	00H
N	Not used	127	126	...	2	1	0	-1	...	-125	-126	Not used

Precautions

■When setting an input value of single-precision real number from the engineering tool

The number of significant digits is about 7 because the engineering tool processes single precision real number data in 32-bit single precision.

When the input value of single-precision real number data exceeds 7 digits, the 8th digit is rounded off.

Therefore, if the rounded-off value goes out of the range from -2147483648 to 2147483647, it will not be an intended value.

Ex.

When "2147483647" is set as an input value, it is handled as "2147484000" because 8th digit "6" is rounded off.

Ex.

When "E1.1754943562" is set as an input value, it is handled as "E1.175494" because 8th digit "3" is rounded off.