

# Multiplying single-precision real numbers

## DEMUL(P)

FX5S

FX5UJ

FX5U

FX5UC

These instructions multiply the single-precision real number in the device specified by (s2) to the single-precision real number in the device specified by (s1), and store the result in the device specified by (d).

| Ladder diagram | Structured text   |
|----------------|---|
|                | <pre>ENO:=DEMUL(EN,s1,s2,d); ENO:=DEMULP(EN,s1,s2,d);</pre> |
| FBD/LD         |   |
|                |   |

## Setting data

### ■Descriptions, ranges, and data types

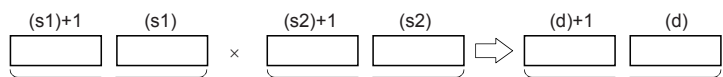
| Operand | Description   | Range                                  | Data type                    | Data type (label) |
|---------|---|--|------------------------------|-------------------|
| (s1)    | Multiplicand data or head device number where the data to be multiplied by another is stored        | $0, 2^{-126} \leq  (s1)  \leq 2^{128}$ | Single-precision real number | ANYREAL_32        |
| (s2)    | Multiplier data or head device number where the data by which another is to be multiplied is stored | $0, 2^{-126} \leq  (s2)  \leq 2^{128}$ | Single-precision real number | ANYREAL_32        |
| (d)     | Head device number for storing the operation result   | —                                      | Single-precision real number | ANYREAL_32        |
| EN      | Execution condition   | —                                      | Bit                          | BOOL              |
| ENO     | Execution result  | —                                      | Bit                          | BOOL              |

### ■Applicable devices

| Operand | Bit                         | Word                      |       |   | Double word |    | Indirect specification | Constant |   |    | Others |
|---------|-----------------------------|---------------------------|-------|---|-------------|----|------------------------|----------|---|----|--------|
|         | X, Y, M, L, SM, F, B, SB, S | T, ST, C, D, W, SD, SW, R | U□\G□ | Z | LC          | LZ |                        | K, H     | E | \$ |        |
| (s1)    | —                           | ○                         | ○     | — | ○           | —  | ○                      | ○        | ○ | —  | —      |
| (s2)    | —                           | ○                         | ○     | — | ○           | —  | ○                      | ○        | ○ | —  | —      |
| (d)     | —                           | ○                         | ○     | — | ○           | —  | ○                      | —        | — | —  | —      |

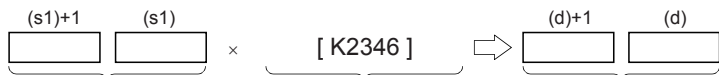
## Processing details

- These instructions multiply the single-precision real number in the device specified by (s2) to the single-precision real number in the device specified by (s1), and store the result in the device specified by (d).



Single-precision real number    Single-precision real number    Single-precision real number

- When the constant (K or H) is specified in (s1) and (s2), these instructions convert values into single-precision real number automatically.



Single-precision real number    Converted into a single-precision real number automatically.    Single-precision real number

- The table below shows the related devices.

| Device | Name   | Description  |  |
|--------|--------|--|--|
|        |        | Condition  | Operation  |
| SM700  | Carry  | The absolute value of the operation result $\geq 2^{128}$        | The value of (d) is the maximum value ( $2^{128}$ ) of 32-bit real numbers and the carry flag SM700 turns on.    |
| SM8020 | Zero   | The operation result is true "0".<br>(The mantissa part is "0"). | The zero flag SM8020 turns on.   |
| SM8021 | Borrow | The absolute value of the operation result $< 2^{-126}$          | The value of (d) is the minimum value ( $2^{-126}$ ) of 32-bit real numbers and the borrow flag SM8021 turns on. |
| SM8022 | Carry  | The absolute value of the operation result $\geq 2^{128}$        | The value of (d) is the maximum value ( $2^{128}$ ) of 32-bit real numbers and the carry flag SM8022 turns on.   |

## Operation error

| Error code (SD0/SD8067) | Description   |
|-------------------------|---|
| 3402H                   | The specified device value is -0, denormalized number, NaN (not a number), or $\pm\infty$ .   |
|                         | The value stored in specified device is outside the following range<br>$0, 2^{-126} \leq  \text{specified device value}  < 2^{128}$ |