

# 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                                     |
|----------------|-----------------------------------------------------|
|                | ENO:=DEMUL(EN,s1,s2,d);<br>ENO:=DEMULP(EN,s1,s2,d); |

| FBD/LD |
|--------|
|        |

## Setting data

### ■ Descriptions, ranges, and data types

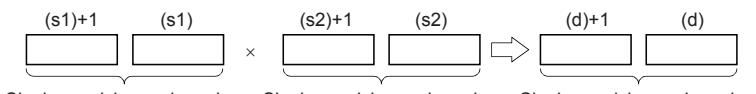
| Operand | Description                                                                                         | Range                                | Data type                    | Data type (label) |
|---------|-----------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------|-------------------|
| (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

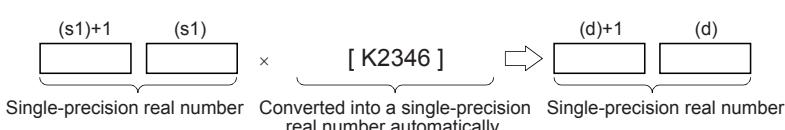
| Operand | Bit | Word                           |                              |       | Double word |    | Indirect specification | Constant |   |    | Others |
|---------|-----|--------------------------------|------------------------------|-------|-------------|----|------------------------|----------|---|----|--------|
|         |     | X, Y, M, L, SM,<br>F, B, SB, S | T, ST, C, D, W,<br>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).



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



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