20.47 Converting STRING to REAL

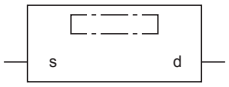
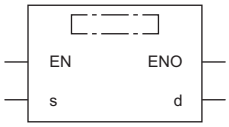
STRING_TO_REAL(_E)

FX5S FX5UJ FX5U FX5UC

These functions convert STRING type data to REAL type data.

Ladder diagram, FBD/LD		Structured text

[Without EN/ENO]	[With EN/ENO]	[Without EN/ENO]
		d:=STRING_TO_REAL(s);
		[With EN/ENO]
		d:=STRING_TO_REAL_E(EN,ENO,s);

Setting data

■Descriptions, types, and data types

Argument	Description	Type	Data type
EN	Execution condition (TRUE: Execution, FALSE: Stop)	Input variable	BOOL
s(IN)	Input	Input variable	STRING(24)
ENO	Output status (TRUE: Normal, FALSE: Abnormal)	Output variable	BOOL
d(STRING_TO_REAL(_E))	Output	Output variable	REAL

Processing details

■Operation processing

- These functions convert the STRING type (in the decimal format or exponent format) data input to (s) to REAL type data and output from (d).

(s)

	High-order byte	Low-order byte
+0	ASCII code for 1st character	Sign data
+1	ASCII code for 3rd character	ASCII code for 2nd character
+2	ASCII code for 5th character	ASCII code for 4th character
+3	ASCII code for 7th character	ASCII code for 6th character
+4	ASCII code for 9th character	ASCII code for 8th character
+5	ASCII code for 11th character	ASCII code for 10th character
+6	00H (Indicates the end of the character string.)	

(d) → REAL

- The conversion source STRING type data can be in the decimal format or exponent format.
  - Decimal point format

(s)

	High-order byte	Low-order byte
+0	31H (1)	2DH (-)
+1	33H (3)	2EH (.)
+2	30H (0)	35H (5)
+3	34H (4)	33H (3)
+4	00H	

"-1.35034"

(d) → -1.35034 → REAL

• Exponent format

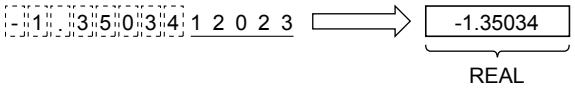
(s)

	High-order byte	Low-order byte
+0	31H (1)	2DH (-)
+1	33H (3)	2EH (.)
+2	30H (0)	35H (5)
+3	34H (4)	33H (3)
+4	2DH (-)	45H (E)
+5	30H (0)	31H (1)
+6	00H	

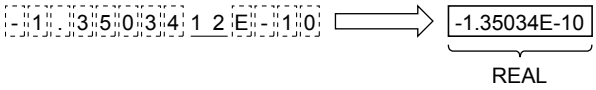
(d) → -1.35034E-10 (REAL)

-1.35034E-10

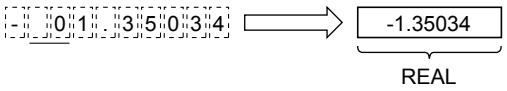
- With regard to STRING type data, six digits excluding the sign, decimal point and exponent part are valid, and the 7th and later digits are discarded during conversion.
  - Decimal point format



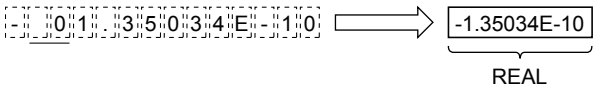
  - Exponent format



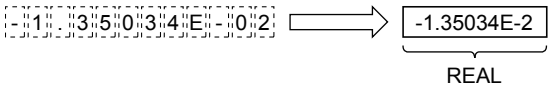
- When 2BH (+) is specified as the sign in the floating point format or when the sign is omitted, a character string is converted into a positive value. It is handled as negative value during conversion when the sign is set to 2DH (-).
- String data in the exponent format is handled as positive value during conversion when the sign of the exponent part is set to 2BH (+) or when the sign is omitted. When 2DH (-) is specified as the sign, a character string is converted into a negative value.
- When 20H (space) or 30H (0) exists between numbers except the first 0 in STRING type data, 20H or 30H is ignored during conversion.
  - Decimal point format



  - Exponent format



- When 30H (0) exists between a number and "E" in STRING type data (exponent format), 30H is ignored during conversion.



- When 20H (space) is contained in character string, 20H is ignored during conversion.
- Up to 24 characters can be input as STRING type data. 20H (space) and 30H (0) in a character string are counted as one character respectively.
- A value input to (s) is the STRING type data value and within the following range.
  - Within the range of "30H" to "39H", "45H", "2BH", "2DH", "2EH", "20H" and "00H" in ASCII code

■Operation result

1. Function without EN/ENO

The following table lists the operation results.

Operation result	(d)
No operation error occurred	Operation output value
An operation error occurred	Indefinite value

2. Function with EN/ENO

The following table lists the execution conditions and operation results.

Execution condition	Operation result	
EN	ENO	(d)
TRUE (Executes operation)	TRUE (Operation error did not occur)	Operation output value
	FALSE (Operation error occurred)*1	Indefinite value
FALSE (Stops operation)	FALSE*1	Indefinite value

*1 When FALSE is output from ENO, data output from (d) is undefined. In that case, modify a program so that the data output from (d) is not used.

Operation error

Error code (SD0/SD8067)	Description
2820H	00H does not exist in the corresponding device range starting from (s)
3401H	Invalid data which cannot be converted to (s) are set. • Any character other than "30(0)" to "39(9)" exists in the integer part or decimal part. • 2EH (.) exists in two or more positions in the specified character string. • Any character other than 45H (E), 65(e), 2B(+) , or 2D(-) exists in the specified exponent part. • Two or more exponent parts of 45H (E) or 65(e) exist in the specified character string. • Three or more digits of numerical values in the exponent parts are described in the specified character string. • Two or more signs of exponent parts of 2B(+) or 2D(-) exist in the specified character string. • Two or more signs of 2B(+) or 2D(-) exist in the integral part for the decimal point format and exist in the mantissa part for the exponent format in the specified character string. • The number of characters after (s) is 0 or more than 24
3403H	(d) exceeds the following range. (An overflow has occurred.) $\|(d)\|<2^{128}$