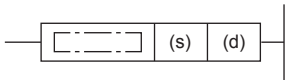
Converting 16-bit binary data to decimal ASCII

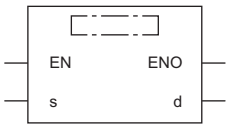
BINDA(P)(_U)

FX5S FX5UJ FX5U FX5UC

These instructions convert 16-bit binary data specified by (s) into decimal ASCII codes, and store the converted data in the device specified by (d) and later.

Ladder diagram	Structured text	
	ENO:=BINDA(EN,s,d); ENO:=BINDAP(EN,s,d)	ENO:=BINDA_U(EN,s,d); ENO:=BINDAP_U(EN,s,d)

FBD/LD



Setting data

■Descriptions, ranges, and data types

Operand		Description	Range	Data type	Data type (label)
(s)	BINDA(P)	Binary data to be converted into ASCII codes	-32768 to +32767	16-bit signed binary	ANY16_S
	BINDA(P)_U		0 to 65535	16-bit unsigned binary	ANY16_U
(d)		Head device number storing conversion result	—	Character string	ANYSTRING_SINGLE
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	$	
(s)	○	○	○	○	—	—	○	○	—	—	—
(d)	—	○*1	—	—	—	—	○	—	—	—	—

*1 T, ST, and C cannot be used.

Processing details

- These instructions convert 16-bit binary data specified by (s) into decimal ASCII codes, and store the converted data in the device specified by (d) and later.
- The format of the decimal ASCII data to be stored in (d) depends on the status of SM705 (Number of conversion digits selection).

Status of SM705*1	Storage format of (d)	Reference
OFF	Data is stored in a fixed number of digits (a sign + 5 digits).	Page 602 Operation of when SM705 (Number of conversion digits selection) is off
ON	Each digit is stored left-justified depending on the value of (s).	Page 602 Operation of when SM705 (Number of conversion digits selection) is on

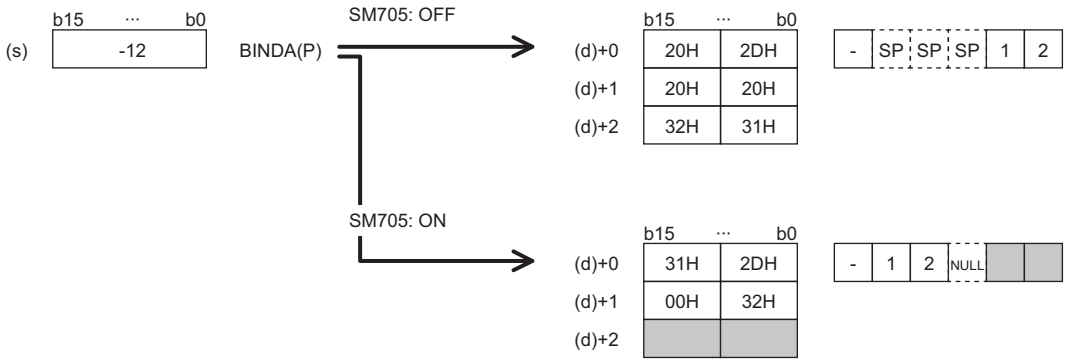
*1 For the firmware version of the CPU module supporting SM705, refer to the following.
MELSEC iQ-F FX5 User's Manual (Application)
A CPU module which does not support SM705 operates in the same way as SM705 is off even if it is turned on.

■Operation overview

The following figure shows the operations when SM705 (Number of conversion digits selection) is off and on.

Ex.

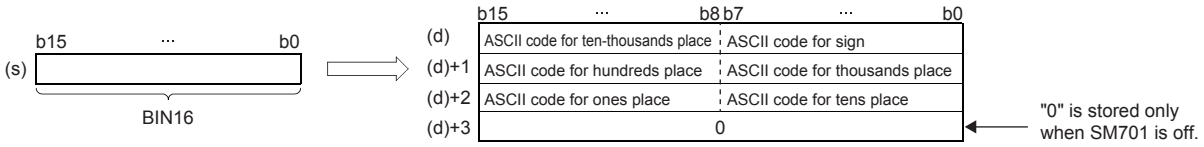
When the BINDA(P) instruction is executed with the numeric value "-12" stored in (s)



- When SM705 is off, the number of digits is fixed. The first character is a sign and it is 2DH(-) in the above example. (If (s) is 0 or positive, the first character is 20H (space).) The numeric part is right-justified. When the length of the numeric part is less than 5 digits, the ASCII code 20H (space) is stored for the ASCII code of the upper digit(s).
- When SM705 is on, data is left-justified. When the length of the numeric part is less than 5 digits, 00H is stored in the end.

■Operation of when SM705 (Number of conversion digits selection) is off

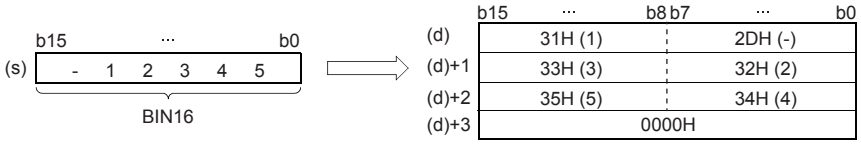
Decimal ASCII data is stored in a fixed number of digits in (d) to (d)+2.



- The following shows the operation result to be stored in (d).
  - As sign data, "20H" is stored if the binary data is positive, and "2DH" is stored if the data is negative.
  - "20H" is stored for "0" on the left side of the valid digits (zero suppression). For "00325", 20H is stored for "00", and the number of digits is 3 based on "325".
  - In the device specified by (d)+3, 0 is stored when SM701 (Output characters selection) is off, and the original data remains when SM701 is on.

Ex.

When -12345 is specified in (s) (when signed data is specified)



■Operation of when SM705 (Number of conversion digits selection) is on

Decimal ASCII data is stored right-justified in (d).

The following figures show an example of a value of (s) and a value stored in (d).

Value of (s)	Data of (d) to (d)+2	Value of (s)	Data of (d) to (d)+2
• 0 • Positive value (1 digit in numeric part)	• The upper byte of (d) is filled with 00H. • Data in (d)+1 and (d)+2 remains unchanged. b15 ··· b8 b7 ··· b0 (d) 00H | ASCII 10^0 (d)+1 (d)+2	• Positive value (2 digits in numeric part) • Negative value (1 digit in numeric part)	• (d)+1 is filled with 00H. • Data in (d)+2 remains unchanged. b15 ··· b8 b7 ··· b0 (d) ASCII 10^0 | ASCII 10^1 / 2DH (-) (d)+1 00H (d)+2
⋮			
• Positive value (5 digits in numeric part) • Negative value (4 digits in numeric part)	• The upper byte of (d)+2 is filled with 00H. b15 ··· b8 b7 ··· b0 (d) ASCII 10^3 | ASCII 10^4 / 2DH (-) (d)+1 ASCII 10^1 | ASCII 10^2 (d)+2 00H | ASCII 10^0	• Negative value (5 digits in numeric part)	• (1): (d)+3 is filled with 00H only when SM701 (Output characters selection) is off. b15 ··· b8 b7 ··· b0 (d) ASCII 10^4 | 2DH (-) (d)+1 ASCII 10^2 | ASCII 10^3 (d)+2 ASCII 10^0 | ASCII 10^1 (d)+3 00H (1)

ASCII 10^4: ASCII code for the ten-thousands place
ASCII 10^3: ASCII code for the thousands place
ASCII 10^2: ASCII code for the hundreds place
ASCII 10^1: ASCII code for the tens place
ASCII 10^0: ASCII code for ones place

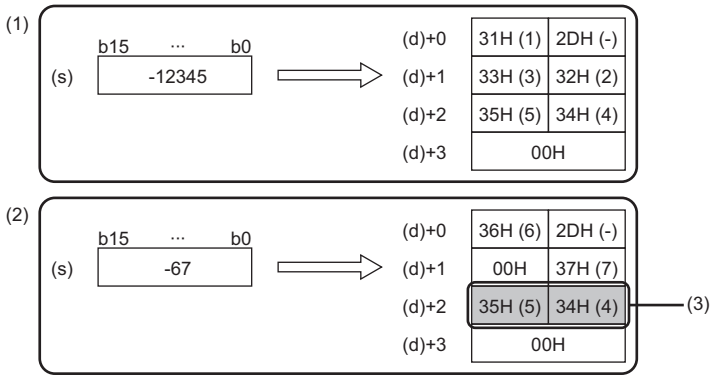
- When the number of operation digits is less than the maximum number of digits (sign + 5 digits), 00H is stored in the end of the string regardless of the status (on/off) of SM701 (Output characters selection). If the end of the string is the lower byte, 00H is also stored in the upper byte.
- When the number of operation digits is equal to the maximum number of digits (a sign + 5 digits), 00H is stored in (d)+3 when SM701 is off. (d)+3 remains unchanged if SM701 is on.

Precautions

- The number of occupied points of (d) is 3 when SM701 is on, and 4 when SM701 is off.
- When SM705 (Number of conversion digits selection) is on, the operation result is stored in (d) for the effective number of digits. Therefore, when the BINDA(P)(_U) instruction is executed successively and the operation result for each execution is stored in the same device, a part of the previous operation result may not be overwritten by the succeeding result and can remain in (d).

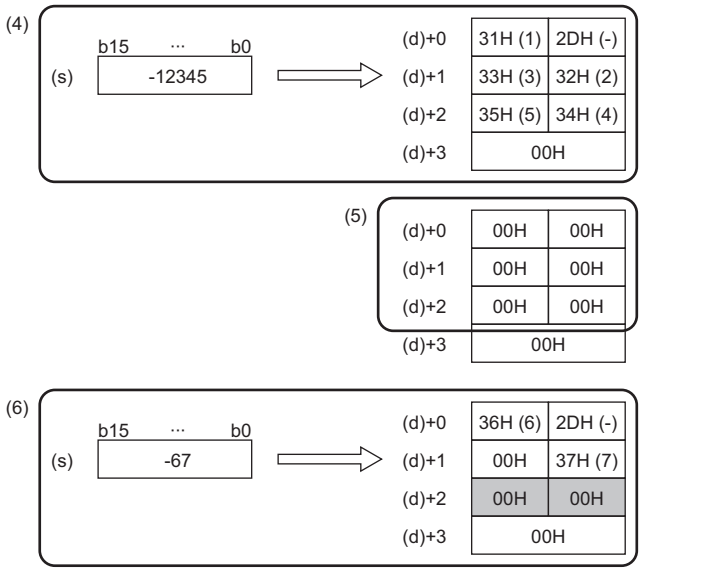
Ex.

Executing the BINDA(P) instruction when (s) is "-12345" and then executing another BINDA(P) instruction when (s) is "-67"



(1) "-12345" is converted into a string.
(2) "-67" is converted into a string.
(3) A part of the previous conversion result remains in (d)+2.

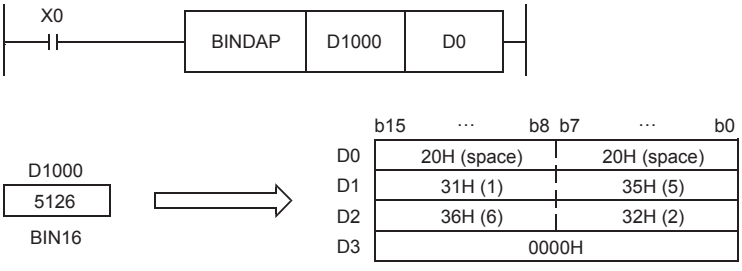
To avoid this, create a program to clear the entire data storage areas (d)+0 to (d)+2 before executing the BINDA(P)(_U) instruction.



(4) "-12345" is converted into a string.
(5) (d)+0 to (d)+2 are cleared.
(6) "-67" is converted into a string.

Program example

In the program below, the value of 16-bit binary data D1000 is converted into decimal ASCII codes when X0 is set to ON.



Operation error

Error code (SD0/SD8067)	Description
2820H	The device specified by (d) exceeds the corresponding device range.