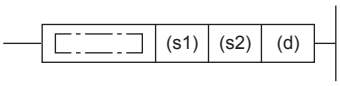
Dividing 32-bit binary data

D/(P)(_U) instruction and DDIV(P)(_U) instruction can be used for division of 32-bit binary data.

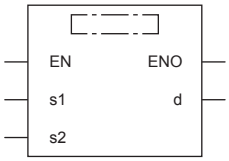
D/(P)(_U)

FX5S FX5UJ FX5U FX5UC

These instructions divide the 32-bit binary data in the device specified by (s1) by the 32-bit binary data in the device specified by (s2), and store the result in the device specified by (d).

Ladder diagram	Structured text*1	
	ENO:=DDIVISION(EN,s1,s2,d); ENO:=DDIVISIONP(EN,s1,s2,d);	ENO:=DDIVISION_U(EN,s1,s2,d); ENO:=DDIVISIONP_U(EN,s1,s2,d);

FBD/LD



("DDIVISION", "DDIVISIONP", "DDIVISION_U", "DDIVISIONP_U" enters □.)

*1 Supported by engineering tool version "1.035M" and later.

Setting data

■Descriptions, ranges, and data types

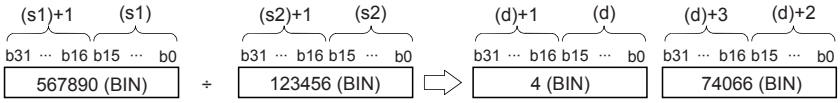
Operand		Description	Range	Data type	Data type (label)
(s1)	D/(P)	Dividend data or the head device where the data to be divided by another is stored	-2147483648 to +2147483647	32-bit signed binary	ANY32_S
	D/(P)_U		0 to 4294967295	32-bit unsigned binary	ANY32_U
(s2)	D/(P)	Divisor data or the head device where the data by which another is to be divided is stored	-2147483648 to +2147483647	32-bit signed binary	ANY32_S
	D/(P)_U		0 to 4294967295	32-bit unsigned binary	ANY32_U
(d)	D/(P)	Head device for storing the operation result	—	64-bit signed binary	ANY32_ARRAY (Number of elements: 2)
	D/(P)_U			64-bit unsigned binary	
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 divide the 32-bit binary data in the device specified by (s1) by the 32-bit binary data in the device specified by (s2), and store the division result in the device specified by (d).



- For the division result of word device, 64-bit binary is used to store the quotient and remainder. For bit device, 32-bit binary is used to store quotient only.

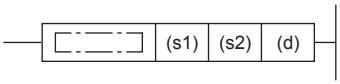
Operation error

Error code (SD0/SD8067)	Description
2820H	The device range specified by (d) exceeds the corresponding device range.
3400H	0 is specified for (s2) value.

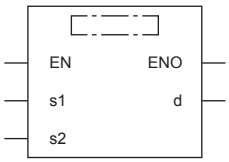
DDIV(P)(_U)

FX5S FX5UJ FX5U FX5UC

These instructions divide the 32-bit binary data in the device specified by (s1) by the 32-bit binary data in the device specified by (s2), and store the result in the device specified by (d).

Ladder diagram	Structured text	
	ENO:=DDIV(EN,s1,s2,d); ENO:=DDIVP(EN,s1,s2,d);	ENO:=DDIV_U(EN,s1,s2,d); ENO:=DDIVP_U(EN,s1,s2,d);

FBD/LD



Setting data

■Descriptions, ranges, and data types

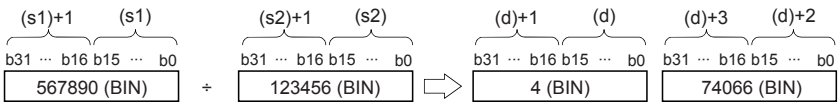
Operand		Description	Range	Data type	Data type (label)
(s1)	DDIV(P)	Dividend data or the head device where the data to be divided by another is stored	-2147483648 to +2147483647	32-bit signed binary	ANY32_S
	DDIV(P)_U		0 to 4294967295	32-bit unsigned binary	ANY32_U
(s2)	DDIV(P)	Divisor data or the head device where the data by which another is to be divided is stored	-2147483648 to +2147483647	32-bit signed binary	ANY32_S
	DDIV(P)_U		0 to 4294967295	32-bit unsigned binary	ANY32_U
(d)	DDIV(P)	Head device for storing the operation result	—	64-bit signed binary	ANY32_S_ARRAY (Number of elements: 2)
	DDIV(P)_U			64-bit unsigned binary	ANY32_U_ARRAY (Number of elements: 2)
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 divide the 32-bit binary data in the device specified by (s1) by the 32-bit binary data in the device specified by (s2), and store the division result in the device specified by (d).



■Related flag

Device	Name	Description
SM700	Carry	When the operation result of the signed operation exceeds 32767, the carry flag is turned ON.
SM8304	Zero	When the operation result is 0, the zero flag is turned ON.
SM8306	Carry	When the operation result of the signed operation exceeds 32767, the carry flag is turned ON.

Precautions

■Operation result

- The most significant bit of the quotient and remainder indicates the sign (positive: 0, negative: 1), respectively.
- The quotient is negative when either (s1) or (s2) is negative. The remainder is negative when the (s1) is negative.

■Device specified by (d)

- The remainder is not obtained when a bit device is specified with digit specification.

Program example

Operation error

Error code (SD0/SD8067)	Description
2820H	The device range specified by (d) exceeds the corresponding device range.
3400H	0 is specified for (s2) value.
3403H	Signed operation is performed and the operation result exceeds 2147483647.