

# Adding 32-bit binary data

D+(P)(\_U) instruction and DADD(P)(\_U) instruction can be used for addition of 32-bit binary data.

## D+(P)(\_U) [using two operands]

**FX5S    FX5UJ    FX5U    FX5UC**

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

Ladder diagram	Structured text
	Not supported Page 222 D+(P)(_U) [using three operands]

FBD/LD
Not supported. Page 222 D+(P)(_U) [using three operands]

## Setting data

### ■Descriptions, ranges, and data types

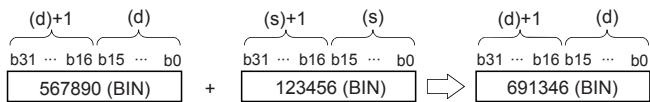
Operand		Description	Range		Data type		Data type (label)	
(s)	D+(P)	Addend data or the head device where the data that is added to another is stored	-2147483648 to +2147483647		32-bit signed binary		ANY32_S	
	D+(P)_U		0 to 4294967295		32-bit unsigned binary		ANY32_U	
(d)	D+(P)	Head device where the data to which another is added is stored	-2147483648 to +2147483647		32-bit signed binary		ANY32_S	
	D+(P)_U		0 to 4294967295		32-bit unsigned binary		ANY32_U	

### ■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		K, H	E	\$	
(s)	○	○	○	○	○	○	○	○	—	—	—
(d)	○	○	○	○	○	○	○	—	—	—	—

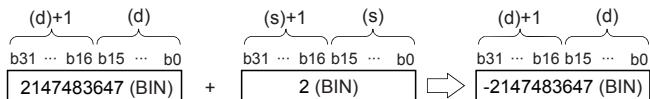
## Processing details

- These instructions add the 32-bit binary data in the device specified by (d) and the 32-bit binary data in the device specified by (s), and store the addition result in the device specified by (d).

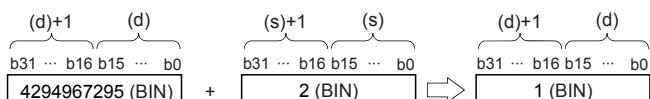


- When underflow or overflow occurs in the operation result, the following processing is executed. In this case, the carry flag (SM700, SM8022) does not turn ON.

In case of D+(P)



In case of D+(P)(\_U)



## Operation error

There is no operation error.

## D+(P)(\_U) [using three operands]

**FX5S    FX5UJ    FX5U    FX5UC**

These instructions add the 32-bit binary data in the device specified by (s1) and 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:=DPLUS(EN,s1,s2,d); ENO:=DPLUS_U(EN,s1,s2,d); ENO:=DPLUSP(EN,s1,s2,d); ENO:=DPLUSP_U(EN,s1,s2,d);
<b>FBD/LD</b>	

("DPLUS", "DPLUS\_U", "DPLUSP", "DPLUSP\_U" enters □.)

### Setting data

#### ■Descriptions, ranges, and data types

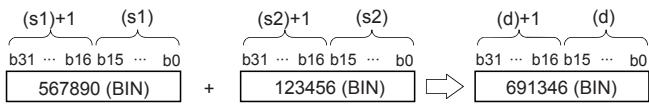
Operand		Description	Range		Data type		Data type (label)	
(s1)	D+(P)	Augend data or the head device where the data to which another is added is stored	-2147483648 to +2147483647		32-bit signed binary		ANY32_S	
	D+(P)_U		0 to 4294967295		32-bit unsigned binary		ANY32_U	
(s2)	D+(P)	Addend data or the head device where the data that is added to another 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	—		32-bit signed binary		ANY32_S	
	D+(P)_U		—		32-bit unsigned binary		ANY32_U	
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		K, H	E	\$	
(s1)	○	○	○	○	○	○	○	○	—	—	—
(s2)	○	○	○	○	○	○	○	○	—	—	—
(d)	○	○	○	○	○	○	○	—	—	—	—

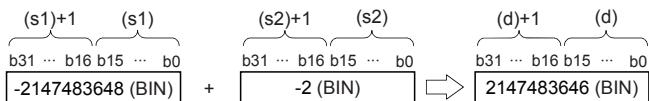
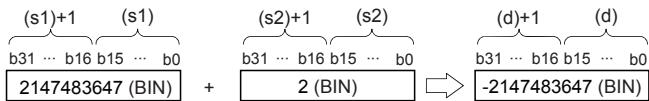
## Processing details

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

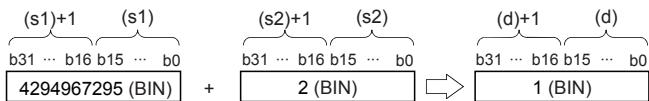


- When underflow or overflow occurs in the operation result, the following processing is executed. In this case, the carry flag (SM700, SM8022) does not turn ON.

In case of D+(P)



In case of D+(P)(\_U)



## Operation error

There is no operation error.

## DADD(P)(\_U)

**FX5S    FX5UJ    FX5U    FX5UC**

These instructions add the 32-bit binary data in the device specified by (s1) and 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:=DADD(EN,s1,s2,d); ENO:=DADDP(EN,s1,s2,d);
<b>FBD/LD</b>	

### Setting data

#### ■ Descriptions, ranges, and data types

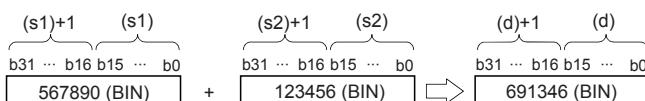
Operand		Description	Range		Data type		Data type (label)	
(s1)		Addend data or the head device where the data that is added to another is stored	-2147483648 to +2147483647		32-bit signed binary		ANY32_S	
			0 to 4294967295		32-bit unsigned binary		ANY32_U	
(s2)		Addend data or the head device where the data that is added to another is stored	-2147483648 to +2147483647		32-bit signed binary		ANY32_S	
			0 to 4294967295		32-bit unsigned binary		ANY32_U	
(d)		Head device for storing the operation result	—		32-bit signed binary		ANY32_S	
			—		32-bit unsigned binary		ANY32_U	
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		K, H	E	\$	
(s1)	○	○	○	○	○	○	○	○	—	—	—
(s2)	○	○	○	○	○	○	○	○	—	—	—
(d)	○	○	○	○	○	○	○	—	—	—	—

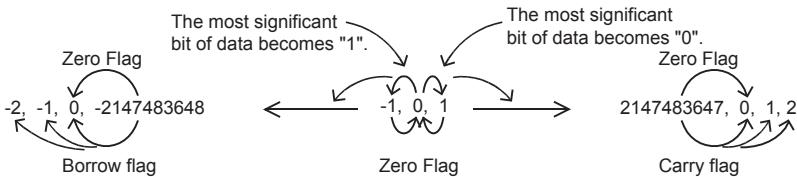
### Processing details

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



#### ■Relationship between the flag operation and the sign (positive or negative) of a numeric value

Device	Name	Description
SM700, SM8022	Carry	When the operation result exceeds the upper limit of the data setting range, the carry flag is turned ON.
SM8020	Zero	When the operation result is 0, the zero flag is turned ON.
SM8021	Borrow	When the operation result is less than the lower limit of the data setting range, the borrow flag is turned ON.



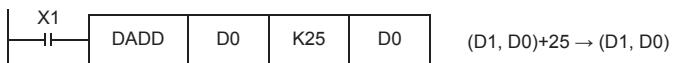
## Precautions

### ■ When DADD instruction is used

When specifying word devices, a device for the lower-order 16-bits is specified first, and then a word device with the next device number is set for the higher-order 16 bits. To prevent number overlap, it is recommended to always specify an even number.

#### ■When specifying the same device in the source and destination

The same device number can be specified for both the source and the destination. In this case, note that the addition result changes in every operation cycle if a continuous operation type ADD instruction is used.



#### ■Difference between DADD(P) instruction, D+(P) instruction, and DINC(P) instruction in a program for adding "+1"

When DADD(P) instruction is used to add 1 to the contents of D0 every time X1 turns from OFF to ON, DADD(P) instruction is similar to D+(P) instruction and DINC(P) instruction described later except for the contents shown in the table below.

		<b>DADD(P) instruction</b>	<b>D+(P) instruction, DINC(P) instruction</b>
Flag (zero, borrow or carry)		Operates	Does not operate
Operation result	(s)+1=d	+2147483647 → 0 → +1 → +2 →...	+2147483647 → -2147483648 → -2147483647 →...

## Operation error

There is no operation error.