

# 32 bit binary pulse output

## DPLSY [For the FX3 compatible operand specification]

FX5S

FX5UJ

FX5U

FX5UC

This instruction outputs 32-bit pulse trains specified by the command speed (s) from the device specified by the output (d) for the amount of 32-bit pulses specified by the positioning address (n). Only CPU module is supported.

Ladder diagram	Structured text
	<pre>ENO:=DPLSY(EN,s,n,d);</pre>

FBD/LD

## Setting data

### ■Descriptions, ranges, and data types

Operand	Description	Range	Data type	Data type (label)
(s)	Command speed or word device number storing data	0 to 2147483647	32-bit unsigned binary	ANY32
(n)	Positioning address or word device number storing data	0 to 2147483647	32-bit unsigned binary	ANY32
(d)	Bit device number (Y) from which pulses are output	■FX5S/FX5U/FX5UC CPU module 0 to 3 ■FX5UJ CPU module 0 to 2	Bit	ANY_ELEMENTARY (BOOL)
EN	Execution condition	—	Bit	BOOL
ENO	Execution result	—	Bit	BOOL

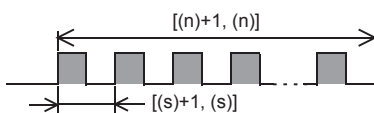
### ■Applicable devices

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)	○	○	○	○	○	○	○	○	—	—	—
(n)	○	○	○	○	○	○	○	○	—	—	—
(d)	○*1	—	—	—	—	—	—	—	—	—	—

\*1 FX5S/FX5U/FX5UC CPU module: Only Y0 to Y3 devices can be used.  
FX5UJ CPU module: Only Y0 to Y2 devices can be used.

## Processing details

- This instruction outputs 32-bit pulse trains specified by the command speed (s) from the device specified by the output (d) for the amount of 32-bit pulses specified by the positioning address (n).



- Set the value from 0 to 2147483647 (in user unit) to the command speed (s), so that the command speed is 200 kpps or less when the command speed is converted to frequency.

- Set the value from 0 to 2147483647 (in user unit) to the positioning address (n), so that the positioning address is within the range from 0 to 2147483647 when the positioning address is converted to number of pulses.
- Specify the following Y device number in (d).
  - FX5S/FX5U/FX5UC CPU module: Y0 to Y3
  - FX5UJ CPU module: Y0 to Y2
- The following tables show the special relays and special registers related to the DPLSY instruction.

[Special relays]

Axis number				Name	Descriptions
1	2	3	4		
SM5500	SM5501	SM5502	SM5503	Positioning instruction activation	ON: During activation, OFF: Not activated
SM5516	SM5517	SM5518	SM5519	Pulse output monitor	ON: During output, OFF: During stop
SM5532	SM5533	SM5534	SM5535	Positioning error occurrence	On: Error occurred, OFF: Error not occurred
SM5628	SM5629	SM5630	SM5631	Pulse output stop command	ON: Stop command is on, OFF: Stop command is off
SM5644	SM5645	SM5646	SM5647	Pulse deceleration stop command <sup>*1</sup>	ON: Deceleration stop command is on, OFF: Deceleration stop command is off
SM5660	SM5661	SM5662	SM5663	Forward limit	ON: Forward limit is on, OFF: Forward limit is off
SM5676	SM5677	SM5678	SM5679	Reverse limit	ON: Reverse limit is on, OFF: Reverse limit is off

<sup>\*1</sup> Because the DPLSY instruction does not have the acceleration/deceleration function, the operation is stopped immediately even though the pulse deceleration stop command is turned on.

[Special registers]

Axis number				Name
1	2	3	4	
SD5500, SD5501	SD5540, SD5541	SD5580, SD5581	SD5620, SD5621	Current address (in user unit)
SD5502, SD5503	SD5542, SD5543	SD5582, SD5583	SD5622, SD5623	Current address (in pulse unit)
SD5504, SD5505	SD5544, SD5545	SD5584, SD5585	SD5624, SD5625	Current speed (in user unit)
SD5510	SD5550	SD5590	SD5630	Positioning error error code

[Special relays (FX3 compatible area)]

Axis number				Name
1	2	3	4	
SM8029				Instruction execution complete flag
SM8329				Instruction execution abnormal end flag
SM8340	SM8350	SM8360	SM8370	Pulse output monitoring
SM8348	SM8358	SM8368	SM8378	Positioning instruction activation

[Special registers (FX3 compatible area)]

Axis number				Name
1	2	3	4	
SD8136, SD8137		—	—	Total number of outputs for axis 1 and 2 of DPLSY instruction
SD8140, SD8141	SD8142, SD8143	—	—	Total number of output pulses of DPLSY instruction
SD8340, SD8341	SD8350, SD8351	SD8360, SD8361	SD8370, SD8371	Current address (in pulse unit)

## Precautions

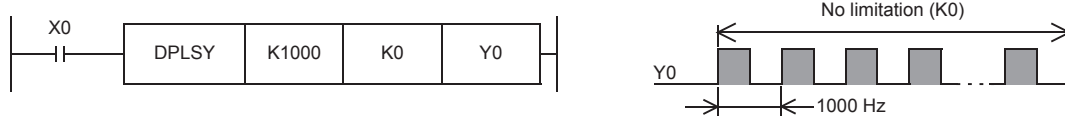
- The operation cannot be performed normally in an environment such as user program where the instruction cannot be executed at each scan or if the instruction is jumped by the CJ(P) instruction. However, the pulse output is continued.
- The same devices as the ones of position instruction, PWM output or general-purpose output cannot be used for the output in the DPLSY instruction.
- When the pulse output is stopped, the operation is stopped immediately by the DPLSY instruction. Note that the motor is stopped without deceleration and this may damage the system. For stopping method of the pulse output, refer to [MELSEC iQ-F FX5 User's Manual \(Application\)](#).
- If the positioning address is 0 when the DPLSY instruction is activated, pulses are output without limitation.
- Overwrite the positioning address during the pulse output to change the positioning address in operation. The written value is reflected at the first time that the instruction is executed after the device is overwritten. The positioning address becomes invalid if it is changed from 0 to a value other than 0 or from a value other than 0 to 0 during positioning operation.
- When the positioning address is changed during the pulse output, the operation is stopped immediately if the changed value is the number of pulses which have already been output or less.
- Overwrite the command speed during the pulse output to change the command speed in operation. The written value is reflected at the first time that the instruction is executed after the device is overwritten.
- When the numbers of pulses (by the pulses conversion) of the command speed and positioning address exceed the 32-bit range, an error occurs and the operation cannot be performed.
- The DPLSY instruction always increases the current address because the setting of rotation direction is disabled due to the absence of direction.
- When the output mode is CW/CCW mode, output is always performed from the device set to CW.
- If reverse limit is used, it operates as forward limit.
- Do not set the value of 200 kpps or more by the frequency conversion when changing the command speed during the pulse output.
- If the command speed is set to 0 when the DPLSY instruction is activated, the operation ends with an error and stops pulse output.
- If the command speed is changed to 0 during pulse output, the operation immediately stops without abnormal end flag. However, if the drive contact is not turned off, pulse output will restart when the command speed is changed.
- The command speed is changed to negative value during pulse output, it is the operation ends with an error.
- The following table shows the operation timing of the complete flag and abnormal end flag of the DPLSY instruction.

	Complete flag (SM8029)	Abnormal end flag (SM8329)
ON condition	<ul style="list-style-type: none"> <li>• From when the output of the specified positioning address is completed until the drive contact is turned off</li> <li>• Pulse decelerate and stop command (when unlimited pulses are being output)</li> </ul>	From the following stops until the drive contact is turned off <ul style="list-style-type: none"> <li>• The specified axis is already used<sup>*1</sup></li> <li>• Pulse output stop command</li> <li>• Pulse deceleration stop command (when unlimited pulses are not being output)</li> <li>• Drive direction limit</li> <li>• All outputs disabled (SM8034)</li> <li>• Write during RUN</li> <li>• Positioning address error</li> </ul>
ON→OFF condition	<ul style="list-style-type: none"> <li>• When the drive contact is turned off</li> </ul>	<ul style="list-style-type: none"> <li>• When the drive contact is turned off</li> </ul>

<sup>\*1</sup> The flag turns on only during one scan time when the activation contact of the instruction turns off and on.

## Program example

When (n) is set to K0, pulses are output without any limitation.



## Operation error

Error code (SD0/SD8067)				Description
Axis 1	Axis 2	Axis 3	Axis 4	
SD5510	SD5550	SD5590	SD5630	
1810H				The axis number specified by (d) is used by another instruction.
3405H				The value specified by (s) is outside the following range. 0 to 65535
				The value specified by (n) is outside the following range. 0 to 65535
				The value specified by (d) is outside the following range. 0 to 3
3600H				The axis number specified by (d) is not set by parameters. A function which is set to be not used by parameters (such as interrupt input signal 1 and zero return relations) is used.
3631H	3632H	3633H	3634H	The numbers of pulses (by the pulses conversion) of the positioning address specified by (n) exceed the 32-bit range.
3641H	3642H	3643H	3644H	The numbers of pulses (by the pulses conversion) of the command speed specified by (s) exceed the 32-bit range.
3651H	3652H	3653H	3654H	The operation decelerates and stops by the forward limit or reverse limit during the pulse output or at the activating of the positioning.
3661H	3662H	3663H	3664H	The operation decelerates and stops by the pulse output stop command or special relay whose all outputs are disabled during the pulse output or at the activating of the positioning.

## DPLSY [For the FX5 operand specification]

**FX5S**

**FX5UJ**

**FX5U**

**FX5UC**

This instruction outputs 32-bit pulse trains specified by the command speed (s) from the device specified by the output (d) for the amount of 32-bit pulses specified by the positioning address (n). Only CPU module is supported.

Ladder diagram	Structured text
	ENO:=DPLSY(EN,s,n,d);
FBD/LD	

### Setting data

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

Operand	Description	Range	Data type	Data type (label)
(s)	Command speed or word device number storing data	0 to 2147483647	32-bit signed binary	ANY32
(n)	Positioning address or word device number storing data	0 to 2147483647	32-bit signed binary	ANY32
(d)	Axis number from which pulses are to be output	■FX5S/FX5U/FX5UC CPU module K1 to K4 ■FX5UJ CPU module K1 to K3	16-bit unsigned binary	ANY_ELEMENTARY (WORD)*1
EN	Execution condition	—	Bit	BOOL
ENO	Execution result	—	Bit	BOOL

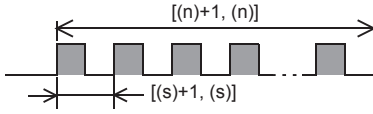
\*1 Digit specified bit type label cannot be used.

#### ■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)	○	○	○	○	○	○	○	○	—	—	—
(n)	○	○	○	○	○	○	○	○	—	—	—
(d)	—	○	○	○	—	—	○	○	—	—	—

## Processing details

- This instruction outputs 32-bit pulse trains specified by the command speed (s) from the device specified by the output (d) for the amount of 32-bit pulses specified by the positioning address (n).



- Set the value from 0 to 2147483647 (in user unit) to the command speed (s), so that the command speed is 200 kpps or less when the command speed is converted to frequency.
- Set the value from 0 to 2147483647 (in user unit) to the positioning address (n), so that the positioning address is within the range from 0 to 2147483647 when the positioning address is converted to number of pulses.
- Specify the axis number (K1 to K4) in which positioning parameters exist in (d).
- The following tables show the special relays and special registers related to the DPLSY instruction.

[Special relays]

Axis number				Name	Descriptions
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SM5500	SM5501	SM5502	SM5503	Positioning instruction activation	ON: During activation, OFF: Not activated
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SM5532	SM5533	SM5534	SM5535	Positioning error occurrence	On: Error occurred, OFF: Error not occurred
SM5628	SM5629	SM5630	SM5631	Pulse output stop command	ON: Stop command is on, OFF: Stop command is off
SM5644	SM5645	SM5646	SM5647	Pulse deceleration stop command <sup>*1</sup>	ON: Deceleration stop command is on, OFF: Deceleration stop command is off
SM5660	SM5661	SM5662	SM5663	Forward limit	ON: Forward limit is on, OFF: Forward limit is off
SM5676	SM5677	SM5678	SM5679	Reverse limit	ON: Reverse limit is on, OFF: Reverse limit is off

<sup>\*1</sup> Because the DPLSY instruction does not have the acceleration/deceleration function, the operation is stopped immediately even though the pulse deceleration stop command is turned on.

[Special registers]

Axis number				Name
1	2	3	4	
SD5500, SD5501	SD5540, SD5541	SD5580, SD5581	SD5620, SD5621	Current address (in user unit)
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SD5504, SD5505	SD5544, SD5545	SD5584, SD5585	SD5624, SD5625	Current speed (in user unit)
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SD8340, SD8341	SD8350, SD8351	SD8360, SD8361	SD8370, SD8371	Current address (in pulse unit)

## Precautions

- The operation cannot be performed normally in an environment such as user program where the instruction cannot be executed at each scan or if the instruction is jumped by the CJ(P) instruction. However, the pulse output is continued.
- The same devices as the ones of position instruction, PWM output or general-purpose output cannot be used for the output in the DPLSY instruction.
- When the pulse output is stopped, the operation is stopped immediately by the DPLSY instruction. Note that the motor is stopped without deceleration and this may damage the system. For stopping method of the pulse output, refer to  MELSEC iQ-F FX5 User's Manual (Application).
- If the positioning address is 0 when the DPLSY instruction is activated, pulses are output without limitation.
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- When the positioning address is changed during the pulse output, the operation is stopped immediately if the changed value is the number of pulses which have already been output or less.
- Overwrite the command speed during the pulse output to change the command speed in operation. The written value is reflected at the first time that the instruction is executed after the device is overwritten.
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- The DPLSY instruction always increases the current address because the setting of rotation direction is disabled due to the absence of direction.
- When the output mode is CW/CCW mode, output is always performed from the device set to CW.
- If reverse limit is used, it operates as forward limit.
- Do not set the value of 200 kpps or more by the frequency conversion when changing the command speed during the pulse output.
- If the command speed is set to 0 when the DPLSY instruction is activated, the operation ends with an error and stops pulse output.
- If the command speed is changed to 0 during pulse output, the operation immediately stops without abnormal end flag. However, if the drive contact is not turned off, pulse output will restart when the command speed is changed.
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ON→OFF condition	<ul style="list-style-type: none"> <li>• When the drive contact is turned off</li> </ul>	<ul style="list-style-type: none"> <li>• When the drive contact is turned off</li> </ul>

\*1 The flag turns on only during one scan time when the activation contact of the instruction turns off and on.

## Operation error

Error code (SD0/SD8067)				Description
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3405H				The value specified by (s) is outside the following range. 0 to 65535
				The value specified by (n) is outside the following range. 0 to 65535
				The value specified by (d) is outside the following range. 0 to 3
3600H				The axis number specified by (d) is not set by parameters. A function which is set to be not used by parameters (such as interrupt input signal 1 and zero return relations) is used.
3631H	3632H	3633H	3634H	The numbers of pulses (by the pulses conversion) of the positioning address specified by (n) exceed the 32-bit range.
3641H	3642H	3643H	3644H	The numbers of pulses (by the pulses conversion) of the command speed specified by (s) exceed the 32-bit range.
3651H	3652H	3653H	3654H	The operation decelerates and stops by the forward limit or reverse limit during the pulse output or at the activating of the positioning.
3661H	3662H	3663H	3664H	The operation decelerates and stops by the pulse output stop command or special relay whose all outputs are disabled during the pulse output or at the activating of the positioning.