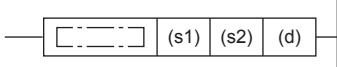
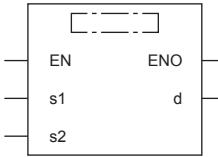


# Scaling 16-bit binary data (XY coordinates)

## SCL2(P)(\_U)

FX5S FX5UJ FX5U FX5UC

These instructions process the scaling conversion data (in 16-bit data units) specified by (s2) by scaling it based on the input value specified by (s1), and store the operation result in the device specified by (d).

Ladder diagram	Structured text
	ENO:=SCL2(EN,s1,s2,d); ENO:=SCL2P(EN,s1,s2,d); ENO:=SCL2P_U(EN,s1,s2,d);
FBD/LD	
	

### Setting data

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

Operand	Description		Range	Data type	Data type (label)
(s1)	Input value used in scaling or head device number storing the input value		-32768 to +32767	16-bit signed binary	ANY16_S
	0 to 65535		16-bit unsigned binary	ANY16_U	
(s2)	Head device number where the scaling conversion data is stored		—	16-bit signed binary <sup>*1</sup>	ANY16_S
				16-bit unsigned binary <sup>*1</sup>	ANY16_U
(d)	Head device number storing the output value controlled by scaling		—	16-bit signed binary	ANY16_S
				16-bit unsigned binary	ANY16_U
EN	Execution condition		—	Bit	BOOL
ENO	Execution result		—	Bit	BOOL

\*1 The number of coordinate points of (s2) is 16-bit unsigned binary data.

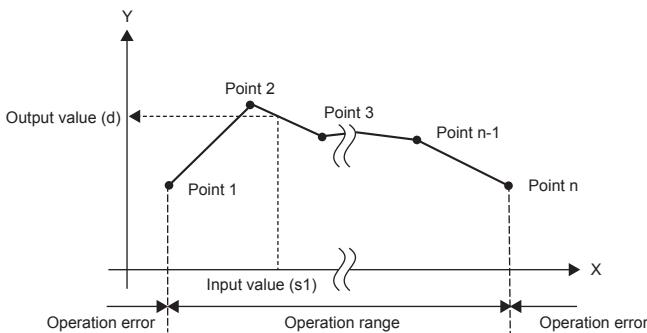
#### ■ Applicable devices

Operand	Bit	Word			Double word		Indirect specification	Constant			Others
		T, ST, C, D, W, SD, SW, R	U□\G□	Z	LC	LZ		K, H	E	\$	
(s1)	○	○	○	○	—	—	○	○	—	—	—
(s2)	—	○	—	—	—	—	○	—	—	—	—
(d)	○	○	○	○	—	—	○	—	—	—	—

## Processing details

- These instructions process the scaling conversion data (in 16-bit data units) specified by (s2) by scaling it based on the input value specified by (s1), and store the operation result in the device number specified by (d). The scaling conversion is performed based on the scaling conversion data stored in the device specified by (s2) and later.

Setting item ("n" indicates the number of coordinate points specified by (s2).)		Device assignment
Number of coordinate points		(s2)
X coordinate	Point 1	(s2)+1
	Point 2	(s2)+2
	:	:
	Point n	(s2)+n
Y coordinate	Point 1	(s2)+n+1
	Point 2	(s2)+n+2
	:	:
	Point n	(s2)+2n

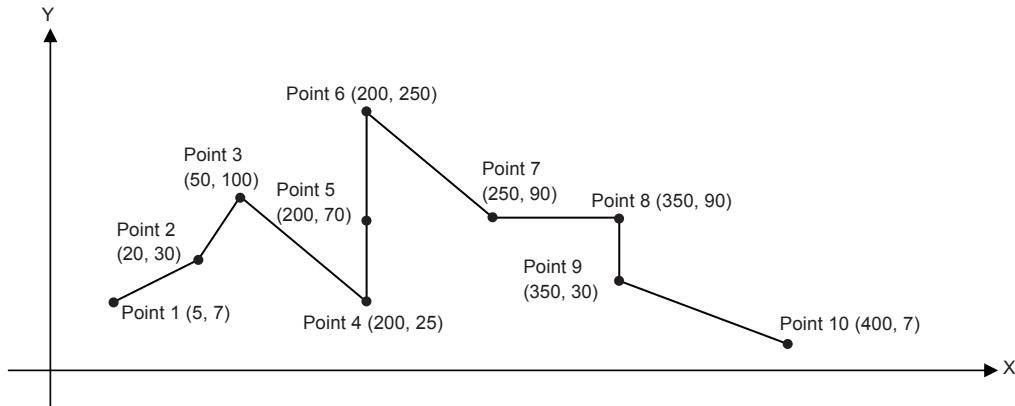


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- If the operation result is not an integer, the number in the first decimal place is rounded off.
- Set the X coordinate data of the scaling conversion data in the ascending order.
- Set (s1) within the scaling conversion data range (device value of (s2)).
- If the same X coordinate is specified by multiple points, the Y coordinate value of the point whose number is the largest is output.
- Set the number of coordinate points for the scaling conversion data within the range of 1 to 65535.

- Setting example of the conversion table for scaling

In the case of the conversion characteristics for scaling shown in the figure below, set each value as shown in the following data table.



Setting item		Setting device and setting contents		Setting details
		When R0 is specified in (s2)		
Number of coordinate points		(s2)	R0	K10
X coordinate	Point 1	(s2)+1	R1	K5
	Point 2	(s2)+2	R2	K20
	Point 3	(s2)+3	R3	K50
	Point 4*1	(s2)+4	R4	K200
	Point 5*1	(s2)+5	R5	K200
	Point 6*1	(s2)+6	R6	K200
	Point 7	(s2)+7	R7	K250
	Point 8*2	(s2)+8	R8	K350
	Point 9*2	(s2)+9	R9	K350
	Point 10	(s2)+10	R10	K400
Y coordinate	Point 1	(s2)+11	R11	K7
	Point 2	(s2)+12	R12	K30
	Point 3	(s2)+13	R13	K100
	Point 4*1	(s2)+14	R14	K25
	Point 5*1	(s2)+15	R15	K70
	Point 6*1	(s2)+16	R16	K250
	Point 7	(s2)+17	R17	K90
	Point 8*2	(s2)+18	R18	K90
	Point 9*2	(s2)+19	R19	K30
	Point 10	(s2)+20	R20	K7

\*1 When coordinates are specified using three points as shown in the points 4, 5 and 6, the output value can be set to an intermediate value.

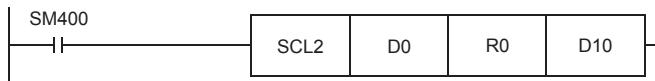
In this example, the output value (intermediate value) is specified by the Y coordinate of the point 5.

Even if the X coordinate is the same at three points or more, the value at the second point is output.

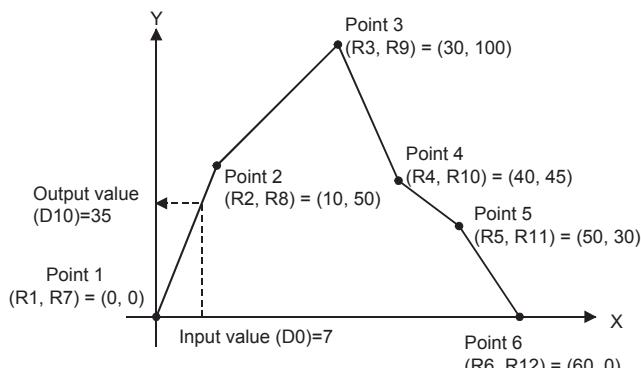
\*2 When coordinates are specified using two points as shown in the points 8 and 9, the output value is the Y coordinate at the next point. In this example, the output value is specified by the Y coordinate of the point 9.

## Program example

In the program example shown below, the value input to D0 is processed by scaling based on the conversion table for scaling set in R0 and later, and output to D10. It is assumed that the values for the conversion table for scaling are set in R0 and later beforehand.



### • Operation



### • Conversion table for scaling

Set item		Device	Setting contents
Number of coordinate points		R0	K6
X coordinate	Point 1	R1	K0
	Point 2	R2	K10
	Point 3	R3	K30
	Point 4	R4	K40
	Point 5	R5	K50
	Point 6	R6	K60
Y coordinate	Point 1	R7	K0
	Point 2	R8	K50
	Point 3	R9	K100
	Point 4	R10	K45
	Point 5	R11	K30
	Point 6	R12	K0

## Operation error

Error code (SD0/SD8067)	Description
3405H	<p>The Xn data is not set in the ascending order in the data table. However, the instructions before the occurrence of an error are executed.</p> <p>The input value specified by (s1) is out of the range for the set scaling conversion data.</p> <p>The value in the middle of operation exceeds the 32-bit data range. In this case, verify that the distance between points is not "65535" or more. If the distance is "65535" or more, reduce the distance between points.</p> <p>The number of coordinate points from the device specified by (s2) is 0 or less.</p>