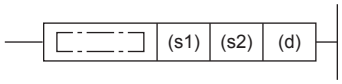
Scaling 16-bit binary data (point coordinates)

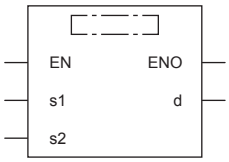
SCL(P)(_U)

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:=SCL(EN,s1,s2,d); ENO:=SCLP(EN,s1,s2,d);	ENO:=SCL_U(EN,s1,s2,d); ENO:=SCLP_U(EN,s1,s2,d);

FBD/LD



Setting data

■Descriptions, ranges, and data types

Operand		Description	Range	Data type	Data type (label)
(s1)	SCL(P)	Input value used in scaling or head device number storing the input value	-32768 to +32767	16-bit signed binary	ANY16_S
	SCL(P)_U		0 to 65535	16-bit unsigned binary	ANY16_U
(s2)	SCL(P)	Head device number where the scaling conversion data is stored	—	16-bit signed binary*1	ANY16_S
	SCL(P)_U			16-bit unsigned binary*1	ANY16_U
(d)	SCL(P)	Head device number storing the output value controlled by scaling	—	16-bit signed binary	ANY16_S
	SCL(P)_U			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.

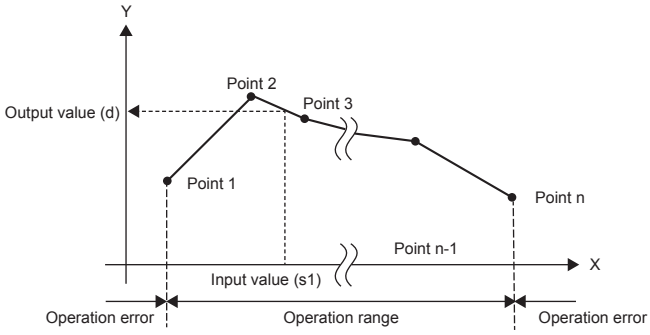
■Applicable devices

Operand	Bit	Word			Double word		Indirect specification	Constant			Others
	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

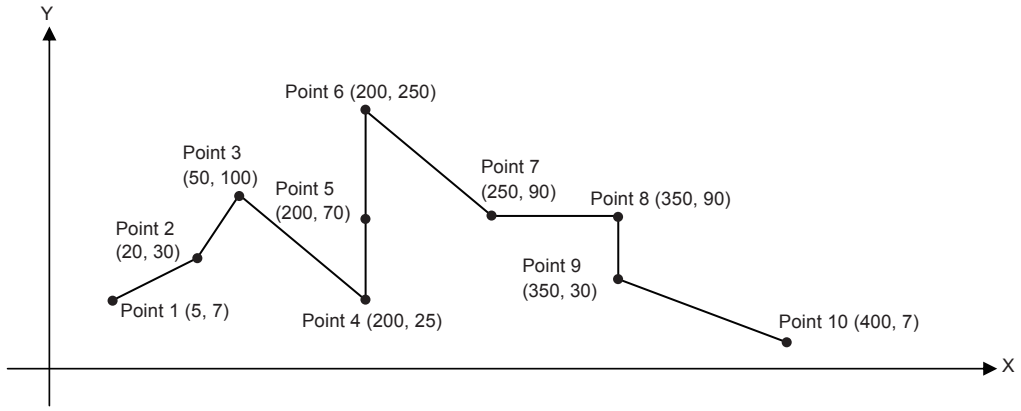
- These instructions process the scaling conversion data (in 16-bit data units) specified by (s2) by scaling it based on the input value specified by (s1), and store the operation result in the device number specified by (d). The scaling conversion is performed based on the scaling conversion data stored 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)
Point 1	X coordinate	(s2)+1
	Y coordinate	(s2)+2
Point 2	X coordinate	(s2)+3
	Y coordinate	(s2)+4
⋮		
Point n	X coordinate	(s2)+2n-1
	Y coordinate	(s2)+2n



- 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		
		When R0 is specified in (s2)		Setting details
Number of coordinate points		(s2)	R0	K10
Point 1	X coordinate	(s2)+1	R1	K5
	Y coordinate	(s2)+2	R2	K7
Point 2	X coordinate	(s2)+3	R3	K20
	Y coordinate	(s2)+4	R4	K30
Point 3*1	X coordinate	(s2)+5	R5	K50
	Y coordinate	(s2)+6	R6	K100

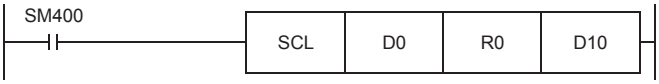
Setting item		Setting device and setting contents		
		When R0 is specified in (s2)		Setting details
Point 4*1	X coordinate	(s2)+7	R7	K200
	Y coordinate	(s2)+8	R8	K25
Point 5*1	X coordinate	(s2)+9	R9	K200
	Y coordinate	(s2)+10	R10	K70
Point 6	X coordinate	(s2)+11	R11	K200
	Y coordinate	(s2)+12	R12	K250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

*1 When coordinates are specified using three points, 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.

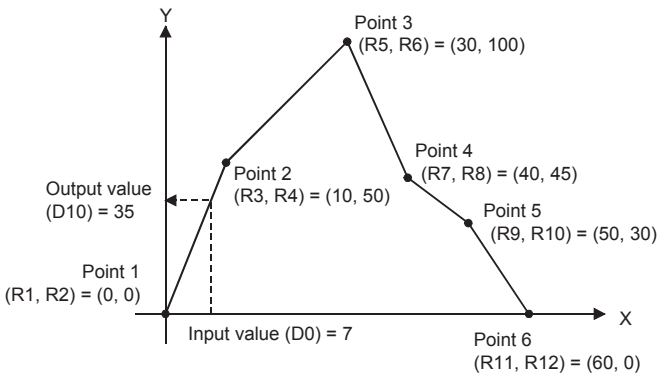
*2 When coordinates are specified using two points, the output value is the Y coordinate at the next point.
In this example, the output value is specified by the Y coordinate of the point 9.

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
Point 1	X coordinate	R1	K0
	Y coordinate	R2	K0
Point 2	X coordinate	R3	K10
	Y coordinate	R4	K50
Point 3	X coordinate	R5	K30
	Y coordinate	R6	K100
Point 4	X coordinate	R7	K40
	Y coordinate	R8	K45
Point 5	X coordinate	R9	K50
	Y coordinate	R10	K30
Point 6	X coordinate	R11	K60
	Y coordinate	R12	K0

Operation error

Error code (SD0/SD8067)	Description
3405H	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.
	The input value specified by (s1) is out of the range for the set scaling conversion data.
	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.
	The number of coordinate points from the device specified by (s2) is 0 or less.