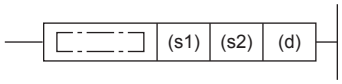
Scaling 32-bit binary data (point coordinates)

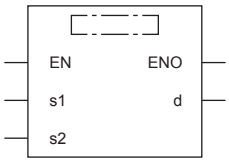
DSCL(P)(_U)

FX5S FX5UJ FX5U FX5UC

These instructions process the scaling conversion data (in 32-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:=DSCL(EN,s1,s2,d); ENO:=DSCLP(EN,s1,s2,d);	ENO:=DSCL_U(EN,s1,s2,d); ENO:=DSCLP_U(EN,s1,s2,d);

FBD/LD



Setting data

■Descriptions, ranges, and data types

Operand		Description	Range	Data type	Data type (label)
(s1)	DSCL(P)	Input value used in scaling or head device number storing the input value	-2147483648 to +2147483647	32-bit signed binary	ANY32_S
	DSCL(P)_U		0 to 4294967295	32-bit unsigned binary	ANY32_U
(s2)	DSCL(P)	Head device number where the scaling conversion data is stored	—	32-bit signed binary*1	ANY32_S
	DSCL(P)_U			32-bit unsigned binary*1	ANY32_U
(d)	DSCL(P)	Head device number storing the output value controlled by scaling	—	32-bit signed binary	ANY32_S
	DSCL(P)_U			32-bit unsigned binary	ANY32_U
EN		Execution condition	—	Bit	BOOL
ENO		Execution result	—	Bit	BOOL

*1 The numbers of coordinate points of (s2)+1 and (s2) are 32-bit unsigned binary data.

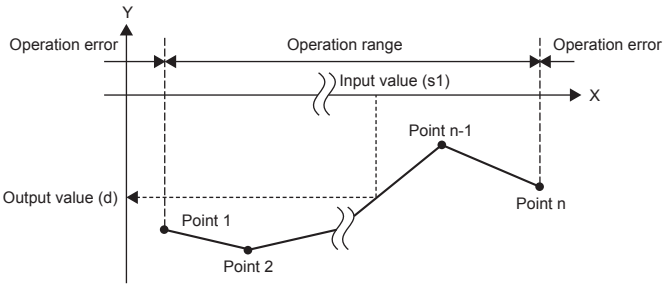
■Applicable devices

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

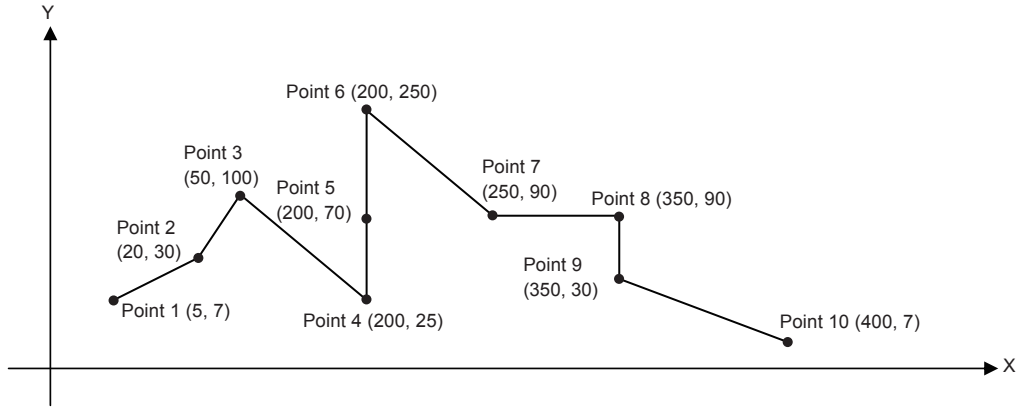
- These instructions process the scaling conversion data (in 32-bit data units) specified by (s2) by scaling it based on the input value specified by (s1), and store the operation result in the device number specified by (d). The scaling conversion is performed based on the scaling conversion data stored 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)+1, (s2)
Point 1	X coordinate	(s2)+3, (s2)+2
	Y coordinate	(s2)+5, (s2)+4
Point 2	X coordinate	(s2)+7, (s2)+6
	Y coordinate	(s2)+9, (s2)+8
⋮		
Point n	X coordinate	(s2)+4n-1, (s2)+4n-2
	Y coordinate	(s2)+4n+1, (s2)+4n



- 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 values of (s2) and (s2)+1).
- 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 4294967295.
- 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)+1, (s2)	R1, R0	K10
Point 1	X coordinate	(s2)+3, (s2)+2	R3, R2	K5
	Y coordinate	(s2)+5, (s2)+4	R5, R4	K7
Point 2	X coordinate	(s2)+7, (s2)+6	R7, R6	K20
	Y coordinate	(s2)+9, (s2)+8	R9, R8	K30
Point 3	X coordinate	(s2)+11, (s2)+10	R11, R10	K50
	Y coordinate	(s2)+13, (s2)+12	R13, R12	K100

Setting item		Setting device and setting contents		
		When R0 is specified in (s2)		Setting details
Point 4*1	X coordinate	(s2)+15, (s2)+14	R15, R14	K200
	Y coordinate	(s2)+17, (s2)+16	R17, R16	K25
Point 5*1	X coordinate	(s2)+19, (s2)+18	R19, R18	K200
	Y coordinate	(s2)+21, (s2)+20	R21, R20	K70
Point 6*1	X coordinate	(s2)+23, (s2)+22	R23, R22	K200
	Y coordinate	(s2)+25, (s2)+24	R25, R24	K250
Point 7	X coordinate	(s2)+27, (s2)+26	R27, R26	K250
	Y coordinate	(s2)+29, (s2)+28	R29, R28	K90
Point 8*2	X coordinate	(s2)+31, (s2)+30	R31, R30	K350
	Y coordinate	(s2)+33, (s2)+32	R33, R32	K90
Point 9*2	X coordinate	(s2)+35, (s2)+34	R35, R34	K350
	Y coordinate	(s2)+37, (s2)+36	R37, R36	K30
Point 10	X coordinate	(s2)+39, (s2)+38	R39, R38	K400
	Y coordinate	(s2)+41, (s2)+40	R41, R40	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.

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.