18.2 Positioning Module

Restoring the absolute position

G.ABRST□

FX5S ~~(crossed out)~~ FX5UJ FX5U FX5UC

These instructions restore the absolute position of the specified axis.

Ladder diagram	Structured text
─[□.:□] (U) (s) (d) ─ ("G.ABRST1", "G.ABRST2" enters □.)	ENO:=G_ABRST1(EN,Un,s,d); ENO:=G_ABRST2(EN,Un,s,d);

FBD/LD
┌─[□.:□]─┐   │ EN   ENO │   │ Un   d │   │ s   │   └─────────┘   ("G_ABRST1, G_ABRST2" enters □.)

Setting data

■Descriptions, ranges, and data types

Operand	Description	Range	Data type	Data type (label)
(U)[1]	Position number of the module connected	■FX5UJ CPU module 1H to 8H ■FX5U/FX5UC CPU module 1H to 10H	16-bit unsigned binary	ANY16
(s)	Device where the control data is stored	☞ Page 1181 Control dataRefer to	Device name	ANY16_ARRAY[2] (Number of elements: 8)
(d)	Device which turns on when the execution of the instruction is completed and remains on for 1 scan. When the instruction completes with an error, (d)+1 also turns on.	—	Bit	ANYBIT_ARRAY (Number of elements: 2)
EN	Execution condition	—	Bit	BOOL
ENO	Execution result	—	Bit	BOOL

*1 In the case of the ST language and the FBD/LD language, U displays as Un.
*2 When specifying setting data by using a label, define an array to secure enough operation area and specify an element of the array label.
  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	$	(U)
(U)	—	○	—	—	—	—	○	○	—	—	○
(s)	—	○	—	—	—	—	○	—	—	—	—
(d)	○[1]	○[2]	—	—	—	—	—	—	—	—	—

*1 S cannot be used.
*2 T, ST, and C cannot be used.

■Control data

Device	Item	Description	Setting range	Set by
(s)+0	System area	—	—	—
(s)+1	Completion status	The instruction completion status is stored. • 0: Normal • Other than 0: Error (error code)	—	System
(s)+2	Signal received from the servo amplifier	Write the signal status, below, input from the servo amplifier to the CPU module or I/O module. • b0: ABS data bit 0 • b1: ABS data bit 1 • b2: Send data ready flag	0, 1	User
(s)+3	Signal to be sent to the servo amplifier	Performs the operation with this instruction by using the "Signal received from the servo amplifier" in (s)+2. The ON/ OFF state of the following data, output to the servo amplifier, is stored. • b0: Servo ON • b1: ABS transfer mode • b2: ABS request flag	—	System
(s)+4	Status	Status of communication with the servo amplifier • 0: Communication complete (set by the user at start of communication) • Other than 0: Now communicating (stored by the system)	0	User/ System
(s)+5 to (s)+7	System area	—	—	—

Processing details

• The positioning data of the following axis is read from the servo amplifier supporting the absolute position and the value with the unit converted is stored in the "Current feed value" and "Machine feed value" areas in the positioning module. For the absolute position detection system, restore the absolute position once when it is powered on or the CPU module is reset.

Instruction symbol	Target axis
G.ABRST1	Axis 1
G.ABRST2	Axis 2

• The following figure shows how the G.ABRST□instruction operates.
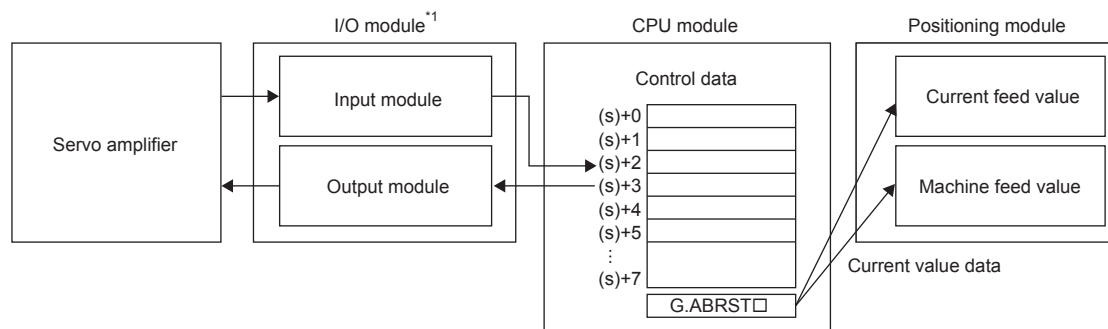

*1 The CPU module input/output can also be used.

• For communication with the servo amplifier corresponding to the absolute position (data read/write), the input/output of CPU module or the I/O module is used. To use the G.ABRST□ instruction, prepare the following number of points to communicate with servo amplifier per axis.

 • Input: 3 points
 • Output: 3 points

- Whether the execution of the G.ABRST□ instruction has been completed normally or with an error can be checked with the completion device (d) or completion status indication device (d)+1.

Device	Description
Completion device (d)	This device turns on during the END processing of the scan where the G.ABRST□ instruction completed, and turns off during the next END processing.
Completion status indication device (d)+1	This device turns on or off depending on the completion status of the G.ABRST□ instruction. When completed normally: Unchanged from off. When completed with an error: Turns on during the END processing of the scan where the G.ABRST□ instruction completed, and turns off during the next END processing.

- The following figure shows the operation at completion of the G.ABRST□ instruction.
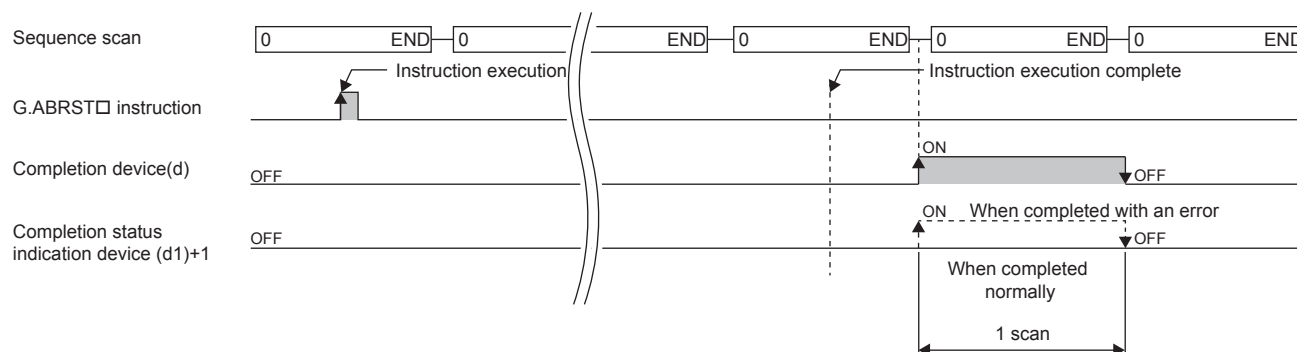
- Completion of absolute position restoration can be checked with the (s)+4 status.
- The G.ABRST□ instruction performs absolute position restoration by following procedure.

1. Output data from ((s)+3).

Servo on, ABS transfer mode, and ABS request flag are output by using the program.

2. Set data in ((s)+2).

ABS data bit 0/bit 1 and the send data ready flag are set using the program.

3. Execute the G.ABRST□ instruction.

4. Check whether the value in ((s)+4) is 0 or not.

When the value is other than 0, the processing returns to step 1.

When the value is 0, the processing ends.

- For details of the function, refer to 🕮MELSEC iQ-F FX5 Positioning Module User's Manual.

Precautions

- If the absolute position detection system has been constructed, absolute position restoration must be performed once after the power is turned on or reset. The servo does not turn on until the absolute position restoration completes.
- Absolute position restoration must be performed while the [Cd.190] PLC READY signal is off. While [Cd.190] PLC READY signal is ON, if the G.ABRST□ instruction is executed, "Dedicated instruction error (Error code: 1870H)" occurs in the positioning module and absolute position restoration cannot be executed.
- The absolute position can be restored (the G.ABRST□ instruction can be executed) while a servo amplifier is operable. Note that when the absolute position is restored, the Servo on signal may turn off (servo off) for the period of the scan time plus approximately 60 ms and the motor may move. To restore the absolute position during the servo off state, install an electromagnetic brake separately so that signals are output to the electromagnetic brake while the G.ABRST□ instruction is being executed.
- The following instructions cannot be executed simultaneously to a single axis. For different axes, any of the following can be executed concurrently with a G.ABRSTo instruction.
  - Positioning start instruction (GP.PSTRT□)
  - Absolute position restoration instruction (G.ABRST□)
  - Teaching instruction (GP.TEACH□)
- If this instruction is executed in an interrupt program with the priority 1, operation error (3580H) occurs. This instruction operates in an interrupt program with the priority 2 or 3.

Operation error

Error code ((s)+1)	Description
1860H	A value other than 0 was set in "Status" of (s)+4 (at start of communication with the servo amplifier).
1861H	"Status" of (s)+4 was changed during absolute position restoration (i.e. during communication with the servo amplifier).
1865H	An instruction was specified for an undefined axis.

18