

**Smart Motion Driver**

For stepper motor 1/2-Axes

Integrated Motion Controller and Driver

**MD5130D/MD5230D**

**Communication Commands**

2015.07.02 Ver.1.0

**NOVA electronics**

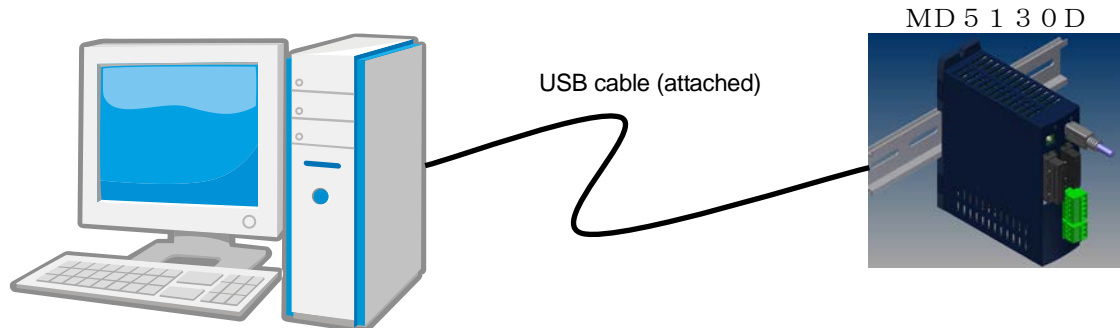
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## 1. Outline

These communication commands are prepared for controlling MD5130D/MD5230D using the user program in VC or VB when MD5130D/MD5230D is connected with PC by the cable (USB cable). Before connecting this unit, it is necessary to install the dedicated USB driver on PC. In communication control, it uses a virtual serial port on USB connection.



Before control by communication commands, driving parameters and modes of MD5130D/MD5230D must be configured in advance by MD Operation Tool in the accessory CD-ROM or available for download. And when executing a user program, the program must also be registered in advance by MD Operation Tool.

Please refer to chapter 5 for Sample Software in VC or VB.

## 2. How to Write Communication Commands

The specification of communication commands is subject to change without notice for updates and improvements. The latest version is available on our web site: <http://www.novaelec.co.jp/eng/>

- (1) Please send each command in uppercase. Responses are also returned in uppercase.
- (2) As Speed is set to default just after turning MD5130D/MD5230D on, write SAP and SPD commands to determine a drive speed.
- (3) The axis for MD5130D (1-axis) is "X", so select "X" in axis assignment.
- (4) Communication conditions in chapter 5 Sample Software are as follows:

Condition	Setting Value
Communication speed	115200
Data bit	8
Stop bit	1
Flow control	None
Parity bit	None

- (5) After writing each command, command execution result is returned.
- (6) Notes for command details.

Symbol	Description
String	Half-width 0-9, A-Z. Use alphanumeric characters in uppercase.
sp, Δ mark	Half-width space
[NULL]	0x00

### 3. Command Details

Command Type	Code	Command Name	Function	Supported Unit
Program Control Commands	PRG	Program execution start	Executes a registered program from the head of a specified label.	MD51/MD52
	PSP	Program pause	Pauses a running program.	MD51/MD52
	EDP	Program forced stop	Stops a running program forcibly.	MD51/MD52
	PRS	Program execution resume	Resumes a program temporarily stopped.	MD51/MD52
	PSE	Program single step execution	Executes single step at a specified line.	MD51/MD52
Drive Commands	ABS	Absolute position move	Moves to the absolute position by specified pulses.	MD51/MD52
	ABB	2-axis simultaneous absolute position move	Moves X and Y axes simultaneously to the absolute position by specified pulses.	MD52
	INC	Relative position move	Moves to the relative position by specified pulses.	MD51/MD52
	ICB	2-axis simultaneous relative position move	Moves X and Y axes simultaneously to the relative position by specified pulses.	MD52
	ABA	Absolute position move start	Starts to move to the absolute position by specified pulses.	MD51/MD52
	ICA	Relative position move start	Starts to move to the relative position by specified pulses.	MD51/MD52
	CNT	Continuous move start	Starts to move continuously to the specified direction.	MD51/MD52
	HOM	Home search	Starts a home search of a specified axis.	MD51/MD52
	HMB	2-axis simultaneous home search	Starts a home search of 2-axis (X and Y axes) simultaneously.	MD52
	SST	Deceleration stop	Stops motor rotation by deceleration.	MD51/MD52
	IST	Instant stop	Stops motor rotation instantly.	MD51/MD52
Interpolation Commands	LNI	Linear interpolation move	Performs linear interpolation from the current coordinates to the finish point coordinates.	MD52
	CWI	CW circular interpolation move	CW circular interpolation is performed by setting the center point coordinates of a circular arc and the finish point coordinates relative to the present point coordinates (start point).	MD52
	CCW	CCW circular interpolation move	CCW circular interpolation is performed by setting the center point coordinates of a circular arc and the finish point coordinates relative to the present point coordinates (start point).	MD52
Drive Setting Commands	SPD	Drive speed	Sets drive speed.	MD51/MD52
	HOF	Motor excitation OFF	Releases the motor excitation and stops a motor.	MD51/MD52
	HON	Motor excitation ON	Turns ON the motor excitation.	MD51/MD52
	SLP	Logical position counter setting	Sets a value to the logical position counter.	MD51/MD52
	SRP	Real position counter setting	Sets a value to the real position counter.	MD51/MD52
	SAP	Acceleration/deceleration pattern setting	Selects acceleration/deceleration pattern (1~4).	MD51/MD52
State Acquisition Commands	SPG	Current drive speed acquisition	Gets the drive speed (current value) during motor rotation.	MD51/MD52
	RLP	Logical position counter acquisition	Gets a value of the logical position counter.	MD51/MD52
	RRP	Real position counter acquisition	Gets a value of the real position counter.	MD51/MD52
	ROT	Output signal state acquisition	Gets the state of output signals set by output signal control.	MD51/MD52
	RIN	Input signal state acquisition	Gets the state of input signals.	MD51/MD52
	RDR	Drive status acquisition	Gets drive status and error.	MD51/MD52
	RPE	Program execution status acquisition	Gets program execution status.	MD51/MD52
RVR	Version information acquisition	Gets version information of a unit.	MD51/MD52	
Other Commands	OUT	Output signal control	Controls the level of a specified signal.	MD51/MD52
	OTP	Output port pulse control	Turns a specified output signal ON for the time specified by pulse width.	MD51/MD52
	SSP	Split pulse start	Starts to output split pulses according to a specified split pulse setting number.	MD51/MD52
	PST	Split pulse stop	Stops outputting split pulses.	MD51/MD52
	RST	Reset	Resets a unit, aborting all operations.	MD51/MD52
	ERS	Error reset	Releases the error.	MD51/MD52

### 3.1 Program Control Commands

#### 3.1.1 PRG Program execution start

[MD5130D/MD5230D]

[Function]

Executes a registered program from the head of a specified label.

[Extended command format]

**【1-axis】** Command Name△Processing Type△Axis Assignment△Program Label Number[NULL]

$$P R G \triangle S T A \triangle \begin{bmatrix} X \\ Y \end{bmatrix} \triangle P n n [NULL]$$

**【2-axis】** Command Name△Processing Type△X-axis△Program Label Number, Y-axis△Program Label Number[NULL]

$$P R G \triangle S T A \triangle X \triangle P n n, Y \triangle P m m [NULL]$$

└──────────┬──────────> Processing Type: S T A ... Sub command to make Program start request.

[Example]

```
PRG STA X P01
PRG STA Y P01
PRG STA X P01, Y P01
```

[Response format]

$$P R G \triangle \begin{bmatrix} X \\ Y \end{bmatrix} \triangle e e [NULL]$$

e e : Response error type code (Hexadecimal 2 digits). See chapter 3.6.7 Response error type code.

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

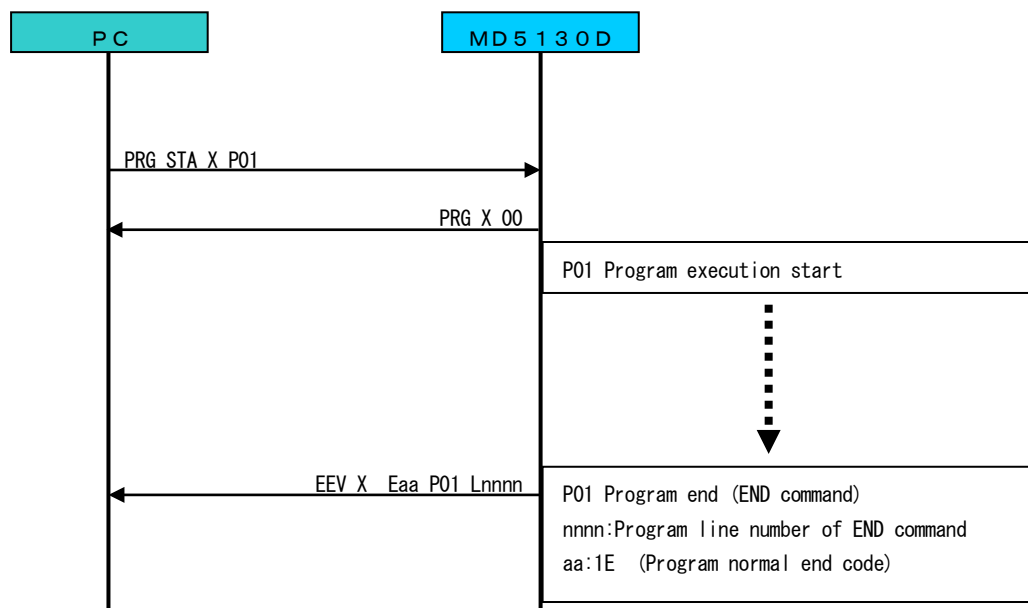
As for **【2-axis】** described above, responses of X and Y axes are returned.

[Description]

It executes a registered program from the head of a specified label. When the specified label does not exist in an internal program, an error is returned to the return value. Use 2 digits in decimal (0 1 ~ 6 3) to specify the program label number n n. And Program end (END command execution) notifies Program end event. For more details of Event Notification, see chapter 4.2 Event Code in Event Notification.

[Command sequence]

The following diagram is a start sequence of program label P01 in a user program in a unit.



### 3.1.2 P S P Program pause

[MD5130D/MD5230D]

## [Function]

Pauses a running program.

## [Command format]

**[1-axis]** Command Name△Axis Assignment [NULL]

$$P S P \Delta \begin{bmatrix} X \\ Y \end{bmatrix} [NULL]$$

**[2-axis]** Command Name△X-axis, Y-axis [NULL]

$$P S P \Delta X, Y [NULL]$$

## [Example]

PSP X

PSP Y

PSP X,Y

## [Response format]

$$P S P \Delta \begin{bmatrix} X \\ Y \end{bmatrix} \Delta e e [NULL]$$

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It pauses a running program.

While executing a command that starts axis driving (ABS/ABB/INC/ICB/HOM/HMB) and waiting for the stop of motor rotation in a user program, it pauses at next line when a motor stops.

When this PSP (Program pause) command is written during continuous driving by CNT command in a user program, a program pauses but a motor rotates.

When a motor is rotating, this command immediately returns a response without waiting for the stop of motor rotation.

If a program of the specified axis is not started, an error is returned.

### 3.1.3 EDP Program forced stop

[MD5130D/MD5230D]

## [Function]

Stops a running program forcedly.

## [Command format]

**[1-axis]** Command Name△Axis Assignment [NULL]

$$\text{EDP} \triangle \begin{bmatrix} \text{X} \\ \text{Y} \end{bmatrix} [\text{NULL}]$$

**[2-axis]** Command Name△X-axis, Y-axis [NULL]

$$\text{EDP} \triangle \text{X, Y} [\text{NULL}]$$

## [Example]

EDP X

EDP Y

EDP X,Y

## [Response format]

$$\text{EDP} \triangle \begin{bmatrix} \text{X} \\ \text{Y} \end{bmatrix} \triangle \text{e e} [\text{NULL}]$$

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It stops a running program forcedly. While rotating a motor, it stops by deceleration.

This command immediately returns a response without waiting for the stop of motor rotation when a motor is rotating.

If a program of the specified axis is not started, an error is returned.



### 3.1.4 PRS Program execution resume

[MD5130D/MD5230D]

[Function]

Resumes a program temporarily stopped.

[Command format]

**[1-axis]** Command Name $\Delta$ Axis Assignment [NULL]

$$P R S \Delta \begin{bmatrix} X \\ Y \end{bmatrix} [NULL]$$

**[2-axis]** Command Name $\Delta$ X-axis, Y-axis [NULL]

$$P R S \Delta X, Y [NULL]$$

[Example]

PRS X

PRS Y

PRS X,Y

[Response format]

$$P R S \Delta \begin{bmatrix} X \\ Y \end{bmatrix} \Delta e e [NULL]$$

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

[Description]

It resumes a program temporarily stopped and immediately returns a response.

If a program of the specified axis is not started, an error is returned.

### 3.1.5 PSE Program single step execution

[MD5130D/MD5230D]

## [Function]

Executes single step at a specified line.

## [Command format]

Command Name△Axis Assignment△Line[NULL]

PSE△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △L z z z [NULL]

z z z : Line number (0~999)

## [Example]

PSE X L10

PSE Y L10

## [Response format]

**[Normal case]** PSE△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △0 0△n n n [NULL]

n n n : Normal termination and next line number

**[Error case]** PSE△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e =other than 0 x 0 0 : Error termination

## [Description]

It executes single step at a specified line Lzzz (L0~L999). When the specified single step has completed, it returns the line number nnn executed next. And in the case of a command that starts axis driving with waiting for the stop of motor rotation, it returns the line number nnn executed next at the stop of motor rotation. This command can be used continuously. If a program of the specified axis is being executed, an error is returned.

This command makes a program run in a unit, so if the user needs to execute other commands such as drive commands, execute EDP command in 3.1.3. Program forced stop, and a running program will be released.

## 3.2 Drive Commands

In order to execute drive commands, it is necessary to select the acceleration pattern in advance. The acceleration pattern for drive commands can be selected by SAP command in 3.4.6 Acceleration/deceleration pattern setting.

### 3.2.1 ABS Absolute position move

[MD5130D/MD5230D]

[Function]

Moves to the absolute position by specified pulses.

[Command format]

Command Name  $\Delta$  Axis Assignment  $\Delta$  Absolute position by pulses [NULL]

ABS  $\Delta$   $\begin{bmatrix} X \\ Y \end{bmatrix}$   $\Delta$  n n n n [NULL]

n n n n : Absolute position by pulses (-2,147,483,646 ~ +2,147,483,646)

[Example]

ABS X -2000000000

ABS X 1000000000

ABS Y -2000000000

ABS Y 1000000000

[Response format]

ABS  $\Delta$   $\begin{bmatrix} X \\ Y \end{bmatrix}$   $\Delta$  e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

[Description]

It moves to the absolute position by specified pulses (n n n n).

This command returns a response at the end of absolute position move.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.2 ABB 2-axis simultaneous absolute position move****[MD5230D]****[Function]**

Starts to move X and Y axes simultaneously, and moves to the absolute position by specified pulses.

**[Command format]**

Command Name  $\Delta$ X-axis  $\Delta$ Absolute position by pulses, Y-axis  $\Delta$ Absolute position by pulses [NULL]

ABB  $\Delta$ X  $\Delta$ n n n n, Y  $\Delta$ n n n n [NULL]

n n n n : Absolute position by pulses (-2,147,483,646 ~ +2,147,483,646)

**[Example]**

ABB X -20000000, Y 1000000000

**[Response format]**

ABB  $\Delta$ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It moves to the absolute position by specified pulses (n n n n).

This command returns a response at the end of X and Y axes absolute position move.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.3 I N C Relative position move****[MD5130D/MD5230D]****[Function]**

Moves to the relative position by specified pulses.

**[Command format]**

Command Name△Axis Assignment△Relative position by pulses[NULL]

I N C △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ n n n n [NULL]

n n n n : Relative position by pulses (-2, 147, 483, 646 ~ +2, 147, 483, 646)

**[Example]**

INC X -2000000000

INC X 1000000000

INC Y -2000000000

INC Y 1000000000

**[Response format]**

I N C △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It moves to the relative position by specified pulses (n n n n).

This command returns a response at the end of relative position move.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.4 ICB 2-axis simultaneous relative position move****[MD5230D]****[Function]**

Starts to move X and Y axes simultaneously, and moves to the relative position by specified pulses.

**[Command format]**

Command Name  $\Delta$ X-axis  $\Delta$ Relative position by pulses, Y-axis  $\Delta$ Relative position by pulses [NULL]

ICB  $\Delta$ X  $\Delta$ n n n n, Y  $\Delta$ n n n n [NULL]

n n n n : Relative position by pulses (-2,147,483,646 ~ +2,147,483,646)

**[Example]**

ICB X -200000000, Y 1000000000

**[Response format]**

ICB  $\Delta$ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It moves to the relative position by specified pulses (n n n n).

This command returns a response at the end of X and Y axes relative position move.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.5 ABA Absolute position move start****[MD5130D/MD5230D]****[Function]**

Starts to move to the absolute position by specified pulses.

**[Command format]**

Command Name△Axis Assignment△Absolute position by pulses[NULL]

ABA△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △n n n n [NULL]

n n n n : Absolute position by pulses(, 147, 483, 646 ~ +2, 147, 483, 646)

**[Example]**

ABA X -2000000000

ABA X 1000000000

ABA Y -2000000000

ABA Y 1000000000

**[Response format]**

ABA△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It moves to the absolute position by specified pulses (n n n n).

This command returns a response immediately when receiving.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.6 ICA Relative position move start****[MD5130D/MD5230D]****[Function]**

Starts to move to the relative position by specified pulses.

**[Command format]**

Command Name△Axis Assignment△Relative position by pulses[NULL]

ICA△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △n n n n [NULL]

n n n n : Relative position by pulses(-2,147,483,646 ~ +2,147,483,646)

**[Example]**

ICA X -2000000000

ICA X 1000000000

ICA Y -2000000000

ICA Y 1000000000

**[Response format]**

ICA△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It moves to the relative position by specified pulses (n n n n).

This command returns a response immediately when receiving.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).



**3.2.7 CNT Continuous move start****[MD5130D/MD5230D]**

## [Function]

Starts to move continuously to the specified direction.

## [Command format]

**[1-axis]** Command Name△Axis Assignment△Moving Direction[NULL]

$$\text{CNT} \triangle \begin{bmatrix} \text{X} \\ \text{Y} \end{bmatrix} \triangle d \text{ [NULL]}$$

**[2-axis]** Command Name△X-axis△Moving Direction, Y-axis△Moving Direction[NULL]

$$\text{CNT} \triangle \text{X} \triangle d, \text{Y} \triangle d \text{ [NULL]}$$

d : + ..... + direction

d : - ..... - direction

## [Example]

CNT X -

CNT X +

CNT Y -

CNT Y +

CNT X -, Y +

## [Response format]

$$\text{CNT} \triangle \begin{bmatrix} \text{X} \\ \text{Y} \end{bmatrix} \triangle e e \text{ [NULL]}$$

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It starts to move continuously to the specified direction. When setting +, it moves continuously in the + direction (CW rotation) and when setting -, it moves continuously in the - direction (CCW rotation). This command returns a response immediately when receiving.

When executing this command during motor rotation, an error is returned.

For drive speed, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP) and 3.4.1 Drive speed (SPD).

**3.2.8 HOM Home search****[MD5130D/MD5230D]**

---

## [Function]

Starts a home search of a specified axis.

## [Command format]

Command Name△Axis Assignment[NULL]

HOM△ $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]

## [Example]

HOM X

HOM Y

## [Response format]

HOM△ $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It starts a home search according to the procedures set by home search mode.

Before executing this command, it is necessary to configure home search mode and parameters for driving by MD Operation Tool in advance.

This command returns a response at the end of home search.

When executing this command during motor rotation, an error is returned.

### 3.2.9 HMB 2-axis simultaneous home search

**[MD5230D]**

---

**[Function]**

Starts a home search of 2-axis (X and Y axes) simultaneously.

**[Command format]**

Command Name△X-axis, Y-axis[NULL]

HMB△X, Y[NULL]

**[Example]**

HMB X, Y

**[Response format]**

HMB△e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It starts a home search of 2-axis simultaneously according to the procedures set by home search mode. Before executing this command, it is necessary to configure home search mode and parameters for driving by MD Operation Tool in advance.

This command returns a response at the end of X and Y axes home search.

When executing this command during motor rotation, an error is returned.

**3.2.10 SST Deceleration stop****[MD5130D/MD5230D]**

## [Function]

Stops motor rotation by deceleration.

## [Command format]

**[1-axis]** Command Name△Axis Assignment[NULL]

$$SST\triangle\begin{matrix} X \\ Y \end{matrix} [NULL]$$

**[2-axis]** Command Name△X-axis, Y-axis[NULL]

$$SST\triangle X, Y [NULL]$$

## [Example]

SST X

SST Y

SST X,Y

## [Response format]

$$SST\triangle\begin{matrix} X \\ Y \end{matrix} \triangle ee [NULL]$$

ee : Response error type code (Hexadecimal 2 digits)

ee = 0 x 0 0 : Normal termination

ee = other than 0 x 0 0 : Error termination

## [Description]

Driving by motor rotation stops by deceleration. It decelerates and stops according to the acceleration/deceleration pattern of the axis. However, if acceleration/deceleration pattern is constant speed driving, it stops instantly. And if the drive speed is lower than the initial speed, it stops instantly. For acceleration/deceleration pattern, see chapter 3.4.6 Acceleration/deceleration pattern setting (SAP). This command returns a response after the stop of motor rotation.

If executing this command during motor stop, a response is returned as normal termination.

**3.2.11 I S T Instant stop****[MD5130D/MD5230D]**

---

## [Function]

Stops motor rotation instantly.

## [Command format]

**[1-axis]** Command Name△Axis Assignment [NULL]I S T △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]**[2-axis]** Command Name△X-axis, Y-axis [NULL]

I S T △ X, Y [NULL]

## [Example]

I S T X

I S T Y

I S T X, Y

## [Response format]

I S T △ X △ e e [NULL]

I S T △ Y △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

Driving by motor rotation stops instantly.

This command returns a response after the stop of motor rotation.

If executing this command during motor stop, a response is returned as normal termination.

### 3.3 Interpolation Commands

There are 3 kinds of interpolation commands, Linear interpolation move, CW circular interpolation move and CCW circular interpolation move commands.

In order to execute interpolation commands, it is necessary to select the acceleration pattern in advance. The acceleration pattern for interpolation commands can be selected by SAP command in 3.4.6

Acceleration/deceleration pattern setting.

Circular interpolation move commands need to be set to the acceleration pattern with Constant mode, modes other than the constant mode cannot be used.

All interpolation commands cannot use S-curve acceleration / deceleration mode.

#### 3.3.1 L N I Linear interpolation move

[MD5230D]

[Function]

Performs linear interpolation from the current coordinates to the finish point coordinates.

[Command format]

Command Name  $\Delta$ X-axis  $\Delta$ Finish Point, Y-axis  $\Delta$ Finish Point [NULL]

L N I  $\Delta$ X  $\Delta$ n n n n, Y  $\Delta$ n n n n [NULL]

n n n n : Finish Point (-134, 217, 728 ~ +134, 217, 728)

[Example]

LNI X -20000, Y 20000

[Response format]

L N I  $\Delta$ e e  $\Delta$ b b [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

b b : System information (Don' t Care)

[Description]

It moves from the current coordinates to the finish point coordinates by linear interpolation. Please set the finish point coordinates by incremental value to the current position.

This command returns a response immediately when receiving.

The user can check the termination of interpolation driving by the parameter d (Drive) in 3.5.6 Drive status acquisition (RDR).

### 3.3.2 CWI CW circular interpolation move

[MD5230D]

## [Function]

CW circular interpolation is performed by setting the center point coordinates of a circular arc and the finish point coordinates relative to the present point coordinates (start point).

## [Command format]

Command Name  $\Delta$ X-axis  $\Delta$ Center Point  $\Delta$ Finish Point, Y-axis  $\Delta$ Center Point  $\Delta$ Finish Point [NULL]

CWI  $\Delta$ X  $\Delta$ c c c c  $\Delta$ n n n n, Y  $\Delta$ c c c c  $\Delta$ n n n n [NULL]

c c c c : Center Point (-268, 435, 455 ~ 268, 435, 455)

n n n n : Finish Point (-268, 435, 455 ~ 268, 435, 455)

## [Example]

CWI X 10000 -20000, Y 10000 20000

## [Response format]

CWI  $\Delta$ e e  $\Delta$ b b [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

b b : System information (Don' t Care)

## [Description]

It moves from the current coordinates to the finish point coordinates based on a center point in the clockwise direction by circular interpolation. The center and finish point coordinates must be set by incremental value to the present point coordinates (start point). When the finish point is set to (0, 0), a full circle in the clockwise direction will come out.

This command returns a response immediately when receiving.

The user can check the termination of interpolation driving by the parameter d (Drive) in 3.5.6 Drive status acquisition (RDR).

### 3.3.3 CCW CCW circular interpolation move

[MD5230D]

## [Function]

CCW circular interpolation is performed by setting the center point coordinates of a circular arc and the finish point coordinates relative to the present point coordinates (start point).

## [Command format]

Command Name  $\Delta$ X-axis  $\Delta$ Center Point  $\Delta$ Finish Point, Y-axis  $\Delta$ Center Point  $\Delta$ Finish Point [NULL]

CCW  $\Delta$ X  $\Delta$ c c c c  $\Delta$ n n n n, Y  $\Delta$ c c c c  $\Delta$ n n n n [NULL]

c c c c : Center Point (-268, 435, 455 ~ 268, 435, 455)

n n n n : Finish Point (-268, 435, 455 ~ 268, 435, 455)

## [Example]

CCW X 10000 -20000, Y 10000 20000

## [Response format]

CCW  $\Delta$ e e  $\Delta$ b b [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

b b : System information (Don' t Care)

## [Description]

It moves from the current coordinates to the finish point coordinates based on a center point in the counterclockwise direction by circular interpolation. The center and finish point coordinates must be set by incremental value to the present point coordinates (start point). When the finish point is set to (0, 0), a full circle in the counterclockwise direction will come out.

This command returns a response immediately when receiving.

The user can check the termination of interpolation driving by the parameter d (Drive) in 3.5.6 Drive status acquisition (RDR).



### 3.4 Drive Setting Commands

#### 3.4.1 SPD Drive speed

[MD5130D/MD5230D]

## [Function]

Sets drive speed.

## [Command format]

Command Name△Axis Assignment△Drive Speed[NULL]

SPD△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △n n n n [NULL]

n n n n : Drive Speed (1 ~ 500000[pps])

## [Example]

SPD X 35000

SPD Y 100000

## [Response format]

SPD△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It sets motor speed to a specified drive speed (n n n n). If this command is executed during the stop of driving or driving, drive speed is changed to a specified drive speed.

This command returns a response immediately when receiving.

However, while accelerating / decelerating by motor rotation in S-curve mode, or while rotating a motor by circular interpolation move command, an error is returned.

This command cannot change the speed while rotating a motor by interpolation commands.

(○ : can change, × : cannot change, △ : can change at constant speed area)

Mode	CNT Drive	ABS, INC, ABA, ICA, ABB, ICB Commands	Other Driving Commands
Constant	○	○	×
Trapezoid 1	○	×	×
Trapezoid 2	○	×	×
Trapezoid 3	○	×	×
S-Curve 1	△	×	×
S-Curve 2	△	×	×

**3.4.2 H O F Motor excitation OFF****[MD5130D/MD5230D]**

---

## [Function]

Releases the motor excitation.

## [Command format]

Command Name△Axis Assignment[NULL]

H O F △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]

## [Example]

H O F X

H O F Y

## [Response format]

H O F △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It breaks the supply current to a motor, and the motor excitation is released.

Excitation OFF operation cannot be performed during motor rotation, and motor rotation commands cannot be executed when the excitation is OFF.

**3.4.3 HON Motor excitation ON****[MD5130D/MD5230D]**

---

## [Function]

Turns ON the motor excitation.

## [Command format]

Command Name△Axis Assignment[NULL]

HON△ $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]

## [Example]

HON X

HON Y

## [Response format]

HON△ $\begin{bmatrix} X \\ Y \end{bmatrix}$  △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It supplies the current to a motor, and the motor excitation is turned ON.

**3.4.4 S L P Logical position counter setting****[MD5130D/MD5230D]**

## [Function]

Sets a value to the logical position counter.

## [Command format]

Command Name△Axis Assignment△Logical Position[NULL]

S L P △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ n n n n [NULL]

n n n n : Logical Position (-2,147,483,648 ~ +2,147,483,647)

## [Example]

SLP X -500000000

SLP X 100000000

SLP Y -500000000

SLP Y 100000000

## [Response format]

S L P △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It sets a value (pulses) to the logical position counter.

When executing this command during motor rotation, an error is returned.

**3.4.5 SRP Real position counter setting****[MD5130D/MD5230D]**

## [Function]

Sets a value to the real position counter.

## [Command format]

Command Name△Axis Assignment△Real Position[NULL]

SRP△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △n n n n [NULL]

n n n n : Real Position (-2,147,483,648 ~ +2,147,483,647)

## [Example]

SRP X -500000000

SRP X 100000000

SRP Y -500000000

SRP Y 100000000

## [Response format]

SRP△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It sets a value (pulses) to the real position counter.

When executing this command during motor rotation, an error is returned.

**3.4.6 S A P Acceleration/deceleration pattern setting****[MD5130D/MD5230D]**

## [Function]

Selects acceleration/deceleration pattern (1~4).

## [Command format]

**[1-axis]** Command Name $\Delta$ Axis Assignment $\Delta$ Acceleration Pattern Number[NULL]

$$S A P \Delta \begin{bmatrix} X \\ Y \end{bmatrix} \Delta n [NULL]$$

**[2-axis]** Command Name $\Delta$ X-axis $\Delta$ Acceleration Pattern Number,  $\Delta$ Y-axis $\Delta$ Acceleration Pattern Number[NULL]

$$S A P \Delta X \Delta n, Y \Delta m [NULL]$$

n, m : 1 ~ 4

## [Example]

SAP X 1

SAP Y 1

SAP X 1, Y 2

## [Response format]

$$S A P \Delta \begin{bmatrix} X \\ Y \end{bmatrix} \Delta e e [NULL]$$

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It selects Acceleration/deceleration pattern number (1~4). The acceleration/deceleration pattern number is the settings of Speed1~4 set in Configuration in a unit.

Before the move command, execute this command.

Do not execute this command during motor rotation.

### 3.5 State Acquisition Commands

#### 3.5.1 SPG Current drive speed acquisition

[MD5130D/MD5230D]

---

[Function]

Gets the drive speed (current value) during motor rotation.

[Command format]

**[1-axis]** Command Name△X-Axis Assignment[NULL]  
S P G △ X [NULL]

**[2-axis]** Command Name[NULL]  
S P G [NULL]

[Response format]

**[1-axis]** S P G △ X △ n n n n [NULL]

**[2-axis]** S P G △ X △ n n n n , Y △ n n n n [NULL]

n n n n : Current Drive Speed (0 ~ 500000) [pps]

[Response Example]

SPG X 500000

SPG X 500000,Y 30000

[Description]

It gets the drive speed (current value) during motor rotation.

When the driving stops, the return value is set to 0.

Do not use this command in interpolation driving.

**3.5.2 R L P Logical position counter acquisition****[MD5130D/MD5230D]**

---

## [Function]

Gets a value of the logical position counter (current value).

## [Command format]

**【1-axis】** Command Name△X-Axis Assignment[NULL]  
R L P △ X [NULL]

**【2-axis】** Command Name[NULL]  
R L P [NULL]

## [Response format]

**【1-axis】** R L P △ X △ n n n n [NULL]

**【2-axis】** R L P △ X △ n n n n, Y △ n n n n [NULL]

n n n n : Logical Position (-2,147,483,648 ~ +2,147,483,647)

## [Response Example]

R L P X -2000000000

R L P X -2000000000, Y 100000000

## [Description]

It gets a value (pulses) of the logical position counter.



**3.5.3 RRP Real position counter acquisition****[MD5130D/MD5230D]**

---

## [Function]

Gets a value of the real position counter.

## [Command format]

**【1-axis】** Command Name $\Delta$ X-Axis Assignment[NULL]  
RRP $\Delta$ X[NULL]

**【2-axis】** Command Name[NULL]  
RRP[NULL]

## [Response format]

**【1-axis】** RRP $\Delta$ X $\Delta$ nnnn[NULL]

**【2-axis】** RRP $\Delta$ X $\Delta$ nnnn, Y $\Delta$ nnnn[NULL]

nnnn : Real Position (-2,147,483,648 ~ +2,147,483,647)

## [Response Example]

RRP X 2100000000

RRP X 2100000000,Y 100000000

## [Description]

It gets a value (encoder value) of the real position counter.

### 3.5.4 ROT Output signal state acquisition

[MD5130D/MD5230D]

## [Function]

Gets the state of output signals.

## [Command format]

**【1-axis】** Command Name△X-Axis Assignment[NULL]  
ROT△X[NULL]

**【2-axis】** Command Name[NULL]  
ROT[NULL]

## [Response format]

**【1-axis】** ROT△X△a△b△c△d△e△f[NULL]

**【2-axis】** ROT△X△a△b△c△d△e△f, Y△a△b△c△d△e△f[NULL]

The signal state &lt;ON:1 / OFF:0&gt; is set in the return value.

## [X-Axis]

a : X-axis connector OUT0 signal ..... 1:ON / 0:OFF  
 b : X-axis connector OUT1 signal ..... 1:ON / 0:OFF  
 c : X-axis control connector DRIVE/ENDP signal .... 1:ON / 0:OFF  
 d : X-axis control connector ERROR signal ..... 1:ON / 0:OFF  
 e : X-axis LED0 (POWER) ..... 1:ON / 0:OFF  
 f : X-axis LED1 (DRIVE/ERROR) ..... 1:ON / 0:OFF

## [Y-Axis]

a : Y-axis connector OUT0 signal ..... 1:ON / 0:OFF  
 b : Y-axis connector OUT1 signal ..... 1:ON / 0:OFF  
 c : Y-axis control connector DRIVE/ENDP signal ... 1:ON / 0:OFF  
 d : Y-axis control connector ERROR signal ..... 1:ON / 0:OFF  
 e : Unused ..... 1:Fixed  
 f : Y-axis LED1 (DRIVE/ERROR) ..... 1:ON / 0:OFF

## [Response Example]

ROT X 1 0 1 0 1 1  
 ROT X 1 0 1 0 1 1, Y 0 0 0 0 1 0

## [Description]

It gets the state of output signals.

### 3.5.5 R I N Input signal state acquisition

[MD5130D/MD5230D]

## [Function]

Gets the state of input signals.

## [Command format]

Command Name [NULL]

R I N [NULL]

## [Response format]

R I N  $\Delta$  w w  $\Delta$  w c  $\Delta$  w x  $\Delta$  w y [NULL]

See [Input Signal List] shown below for input signals.

w w : Reservation signal (Hexadecimal 4 digits: Fixed to 0000)

w c : Control connector (Hexadecimal 4 digits)

w x : X-axis input signal (Hexadecimal 4 digits)

w y : Y-axis input signal (Hexadecimal 4 digits)※Fixed to 0000 in MD5130D.

## [Response Example]

RIN 0000 0003 0010 0000

RIN 0000 0003 0010 0010

## [Description]

It gets the state of input signals. See [Input Signal List] shown below.

Input signal Low is short-circuited with GEX and Hi is Open.

## [Input Signal List]

Preliminary	External Input Signal	Bit Position	Value
w w	Reservation signal	0~15	0:Low, 1:Hi

Control Connector	External Input Signal	Bit Position	Value
w c	HOME signal	0	0:Low, 1:Hi
	START signal	1	
	STOP signal	2	
	PGSELO signal	3	
	PGSEL1 signal	4	
	PGSEL2 signal	5	
	PGSEL3 signal	6	
	PGSEL4 signal	7	
	PGSEL5 signal	8	
	MODE0 signal	9	
	MODE1 signal	10	
	Reservation signal	11~15	

X-axis Input Signal	Bit Position	Value	
w x	X-axis ZP (Basic excitation position)	0	0:Low, 1:Hi
	X-axis HOME signal	1	
	X-axis ECZ signal	2	
	X-axis ECA signal	3	
	X-axis ECB signal	4	
	X-axis IN0 signal	5	
	X-axis IN1 signal	6	
	X-axis LMT+ signal	7	
	X-axis LMT- signal	8	
	X-axis EMG signal	9	
	Reservation signal	10~15	

Y-axis Input Signal		Bit Position	Value
w y	Y-axis ZP (Basic excitation position)	0	0:Low, 1:Hi
	Y-axis HOME signal	1	
	Y-axis ECZ signal	2	
	Y-axis ECA signal	3	
	Y-axis ECB signal	4	
	Y-axis INO signal	5	
	Y-axis INI signal	6	
	Y-axis LMT+ signal	7	
	Y-axis LMT- signal	8	
	Y-axis EMG signal	9	
	Reservation signal	10~15	

**3.5.6 RDR Drive status acquisition****[MD5130D/MD5230D]**

## [Function]

Gets drive status and error.

## [Command format]

**【1-axis】** Command Name△X-Axis Assignment[NULL]  
RDR△X[NULL]

**【2-axis】** Command Name[NULL]  
RDR[NULL]

## [Response format]

**【1-axis】** RDR△X△d△h△e△p△s△l△a [NULL]

**【2-axis】** RDR△X△d△h△e△p△s△l△a, Y△d△h△e△p△s△l△a△i△b [NULL]

The drive status are as follows.

d : Drive··········0: Stopped / 1: Rotating  
h : Home search··········0: Stopped / 1: Running  
e : Error··········0: Normal / 1: Error  
p : Program execution ·········0: Stopped / 1: Running  
s : Split pulse operation ·········0: Stopped / 1: In operation  
l : Parallel drive ·········0: Stopped / 1: Driving by parallel control signals  
a : Selected number of Speed setting··1~4  
i : System information (Don' t Care)  
b : System information (Don' t Care)

## [Response Example]

RDR X 1 0 0 0 1 0 1  
RDR X 1 0 0 0 1 0 1,Y 0 0 0 0 0 0 1 1 0

## [Description]

It gets drive status and error.

**3.5.7 RPE Program execution status acquisition****[MD5130D/MD5230D]**

## [Function]

Gets program execution status.

## [Command format]

Command Name△Axis Assignment[NULL]

RPE△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ [NULL]

## [Response format]

RPE△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e△n n n△mmm[NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Program running

e e = 0 x 0 1 : Program stopped

n n n : P/S label number at the execution line (3 characters)

mmm : Line number at the execution line (3 characters)

## [Response Example]

[Example 1] Program running

RPE X 00 P01 010

RPE Y 00 P01 010

[Example 2] Error occurred (program stopped)

RPE X 01

RPE Y 01

## [Description]

It gets program execution status.

This sets the program execution status, the label and line number of the execution line to the return value.

However, when an error occurs, the P/S label and line number are not returned.

**3.5.8 RVR Version information acquisition****[MD5130D/MD5230D]**

## [Function]

Gets version information of a unit.

## [Command format]

Command Name [NULL]

RVR [NULL]

## [Response format]

**[MD 5 1 3 0 D]**

RVR△i d△u△n.n.n n.n n△n a m e [NULL]

**[MD 5 2 3 0 D]**

RVR△i d△u△n.n.n n.n n n△n a m e [NULL]

i d ..... Unit ID Number (Hexadecimal 2 digits : 0 x 0 0 ~ 0 x 0 F)

u ..... Number of axes (1 digit)

MD 5 1 3 0 D : u = 1

MD 5 2 3 0 D : u = 2

n . n . n n . n n ..... Version number of MD 5 1 3 0 D ( n : 0 ~ 9 )

n . n . n n . n n n ..... Version number of MD 5 2 3 0 D ( n : 0 ~ 9 )

n a m e ..... Unit name [alphanumeric] (up to 32 characters, variable length)

## [Response Example]

RVR 0A 1 5.1.00.00 MD5130D

RVR 01 2 5.2.00.000 MD5230D

## [Description]

It gets version and ID information of a unit.

## 3.6 Other Commands

### 3.6.1 OUT Output signal control

[MD5130D/MD5230D]

## [Function]

Turns the specified output signal ON/OFF.

## [Command format]

Command Name△Axis Assignment△Signal Designation△Signal Setting[NULL]

OUT△X△a a△n [NULL]

OUT△Y△b b△n [NULL]

a a / b b : Signal Designation (2 characters)

a a : 0 1 ..... X-axis connector OUT0 signal

a a : 0 2 ..... X-axis connector OUT1 signal

b b : 1 1 ..... Y-axis connector OUT0 signal

b b : 1 2 ..... Y-axis connector OUT1 signal

n : Signal Setting (1 character)

n : 1 ..... ON

n : 0 ..... OFF

## [Example]

OUT X 01 1

OUT Y 11 1

## [Response format]

OUT△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It turns the specified output signal ON (turn open collector transistor ON) and OFF (turn open collector transistor OFF).



### 3.6.2 O T P Output port pulse control

[MD5130D/MD5230D]

## [Function]

Turns the specified output signal ON for the time specified by pulse width.

## [Command format]

Command Name△Axis Assignment△Signal Designation△Pulse Width[NULL]

O T P △ X △ a a △ n n n n [NULL]

O T P △ Y △ b b △ n n n n [NULL]

a a / b b : Signal Designation (2 characters)

a a : 0 1 ..... X-axis connector OUT0 signal

a a : 0 2 ..... X-axis connector OUT1 signal

b b : 1 1 ..... Y-axis connector OUT0 signal

b b : 1 2 ..... Y-axis connector OUT1 signal

n n n n : 1~65535 ..... Pulse Width (msec)

## [Example]

OTP X 01 1000

OTP Y 11 1000

## [Response format]

O T P △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It turns the specified output signal ON for the time (msec) specified by pulse width.

This command returns a response immediately when receiving.

### 3.6.3 SSP Split pulse start

[MD5130D/MD5230D]

[Function]

Starts to output split pulses according to a specified split pulse setting number.

[Command format]

Command Name△Axis Assignment△Split Pulse Number[NULL]

SSP△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △n [NULL]

n: 1 ~ 4

[Example]

SSP X 1

SSP Y 4

[Response format]

SSP△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

[Description]

If executed before starting motor rotation, the split pulse is output from the timing of the start of motor rotation.

Split pulse settings are the values set in Split Pulse 1~4 in Configuration window.

**3.6.4 P S T Split pulse stop****[MD5130D/MD5230D]**

---

## [Function]

Stops outputting split pulses.

## [Command format]

Command Name  $\Delta$  Axis Assignment [NULL]P S T  $\Delta$   $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]

## [Example]

PST X

PST Y

## [Response format]

P S T  $\Delta$   $\begin{bmatrix} X \\ Y \end{bmatrix}$   $\Delta$  e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It stops outputting split pulses.

### 3.6.5 RST Reset

[MD5130D/MD5230D]

**[Function]**

Resets a unit, aborting all operations.

**[Command format]**

Command Name [NULL]

R S T [NULL]

**[Example]**

RST

**[Response format]**

R S T  $\Delta$  e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

**[Description]**

It aborts all operations and resets a unit.

When a step out error occurs, be sure to release the error by this RST command.

When the user wants to stop motor rotation urgently, the user can immediately stop by RST command.

■ The body is reset as follows.

- X and Y axes motor rotation stops instantly.
- X and Y axes user program operation stops.
- The logical/real position counters of X and Y axes are cleared to 0.
- The Speed Select of X and Y axes is set to 1.
- The Drive/Error of X and Y axes is cleared.
- The excitation of X and Y axes is turned ON.
- The split pulse of X and Y axes is disabled.

**3.6.6 ERS Error reset****[MD5130D/MD5230D]**

---

## [Function]

Releases the error.

## [Command format]

【1-axis】 Command Name△Axis Assignment [NULL]

E R S △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  [NULL]

【2-axis】 Command Name△X-Axis Assignment, Y-Axis Assignment [NULL]

E R S △ X, Y [NULL]

## [Example]

ERS X

ERS Y

ERS X,Y

## [Response format]

E R S △  $\begin{bmatrix} X \\ Y \end{bmatrix}$  △ e e [NULL]

e e : Response error type code (Hexadecimal 2 digits)

e e = 0 x 0 0 : Normal termination

e e = other than 0 x 0 0 : Error termination

## [Description]

It clears error signals (parallel control signals: XERROR/YERROR), and turns the light OFF that is blinking by the error.

### 3.6.7 Response error type code

Response Code	Description
Hexadecimal 2 digits	
00h	The command is normally executed.
02h	The operation is refused due to program stop.
03h	The command execution cannot be accepted.
04h	The operation is refused due to motor rotation.
06h	Parameter error.
07h	The operation is refused due to motor stop.
08h	The operation is refused due to program running.
0Bh	Failed to read data. <Unit failure>
0Ch	The registered program cannot be found.
0Dh	No response.
0Eh	Speed cannot be set during motor rotation in S-curve acceleration/deceleration.
0Fh	Motor excitation OFF.
50h	Step out error occurs.
51h	STOP signal is being inputted.
52h	STOP signal is being inputted.
53h	Mode is not Constant in Speed setting in interpolation driving.

## 4. Event Notification

This is notified when the hard/software limit error, EMG error or Step out error occurs during driving.

If an error occurs during program running, the program is aborted and the event corresponding to the error is notified.

### 4.1.1 EEV Event notification

[MD5130D/MD5230D]

[Function]

Notifies changes of the state occurred in a unit.

[Event format]

Command Name△Axis Assignment△Event Code△Label Information△Notification Parameter[NULL]

EEV△ $\begin{bmatrix} X \\ Y \end{bmatrix}$ △E a a △ t v v △ d d d d △[NULL]

E a a : Event code(a a : Hexadecimal 2 digits)

a a =Event Code

t v v : Label information (half-width 3 characters) [Pvv, Svv]

t v v : 0 0 0 ... No label information

t : Label type

P ... Program label

S ... Subroutine label

v v : Label number

P v v : v v = 0 1 ~ 6 3 (Program label number)

S v v : v v = 0 1 ~ 1 9 (Subroutine label number)

d d d d : Notification Parameter (half-width 5 characters)

L m m m m : Program line number (L 0 0 0 0 ~ L 0 9 9 9)

0 0 0 0 0 : No notification parameter

[Example]

EEV X E14 P01 L0020

EEV Y E14 P05 L0030

EEV Y E10 000 00000

[Description]

This information is not a request from PC but to notify changes of the state occurred irregularly in a unit.

For more details, see chapter [4.2 Event Code in Event Notification].

## 4.2 Event Code in Event Notification

Event Code	Event Data		Description
	Hexadecimal 2 digits	Label Information	
10h	000	00000	Step out error occurs.
11h	Pnn/Snn	Lmmmm	Driving stopped by Waiting position passage [WTP], or driving has already stopped.
13h	Pnn/Snn/000	Lmmmm/00000	Program stopped by STOP signal.
14h	Pnn/Snn/000	Lmmmm/00000	Motor rotation command was executed in user program during motor rotation.
15h	Pnn/Snn/000	Lmmmm/00000	Internal abnormality occurs.
16h	Pnn/Snn/000	Lmmmm/00000	Parameter error.
17h	Pnn/Snn/000	Lmmmm/00000	Invalid command was executed in user program during motor stop.
18h	Pnn/Snn	Lmmmm	Jump destination label [IJP, PJP, JMP, JSR] error occurs.
19h	Pnn/Snn	Lmmmm	Input port number is undefined by input condition jump [IJP].
1Bh	000	Lmmmm,00000	Failed to read data. <Unit failure>
1Ch	Pnn/Snn	Lmmmm	Stack overflow in [JSR, REP, RED] execution hierarchy.
1Eh	Pnn/Snn	Lmmmm	End command was executed in user program.
1Fh	Pnn/Snn	Lmmmm	Command execution error occurs.
20h	Pnn/Snn/000	Lmmmm/00000	SLMT+ limit has become active.
21h	Pnn/Snn/000	Lmmmm/00000	SLMT- limit has become active.
22h	Pnn/Snn/000	Lmmmm/00000	HLMT+ limit has become active.
23h	Pnn/Snn/000	Lmmmm/00000	HLMT- limit has become active.
25h	Pnn/Snn/000	Lmmmm/00000	EMG signal has become active.
26h	Pnn/Snn/000	Lmmmm/00000	Encoder Z-phase signal is already active when abnormality occurs during automatic home search or when Step 3 starts.
27h	Pnn/Snn/000	Lmmmm/00000	Motor rotation command was executed in user program during motor excitation OFF.
28h	000	00000	Cleared SLMT and HLMT limit errors.
30h	000	00000	Event for Operation Tool
31h	Pnn/Snn	Lmmmm	SPD command cannot be accepted in user program during acceleration/deceleration of S-curve mode.
32h	Pnn/Snn	Lmmmm	Passing position has already passed through in Waiting position passage [WTP].
33h	Pnn/Snn	Lmmmm	TIM command times out during program suspend.
34h	Pnn/Snn	Lmmmm	PAS command execution notification.
35h	000	00000	Motor rotation or program stopped by STOP signal.
36h	000	00000	Limit error occurs at the start of Step 3 during automatic home search.
40h	000	00000	The program cannot be found when program driving is operated by parallel control signals.
42h	000	00000	STOP signal is being inputted.
43h	Pnn/Snn	Lmmmm	Mode is not Constant in Speed setting in interpolation driving.
45h	Pnn/Snn	Lmmmm	System information (Don' t Care)



## 5. Sample Software

### 5.1 Outline

Sample software shows how to use these communication commands. For example, sending and receiving control data from/to MD5230D. Please refer to sample software for designing an application.

#### 【Note】

We do not provide any support for the sample software. The sample software shown on this manual is freely available; however, please use it at your own risk.

### 5.2 Development Environment

Environment Specification	Description
Platform (OS)	Windows7 (64-bit)
Framework	.NET Framework 3.5
Programming Language	VB.NET / VC++ (MFC)
Programming Tool	Microsoft Visual Studio 2008

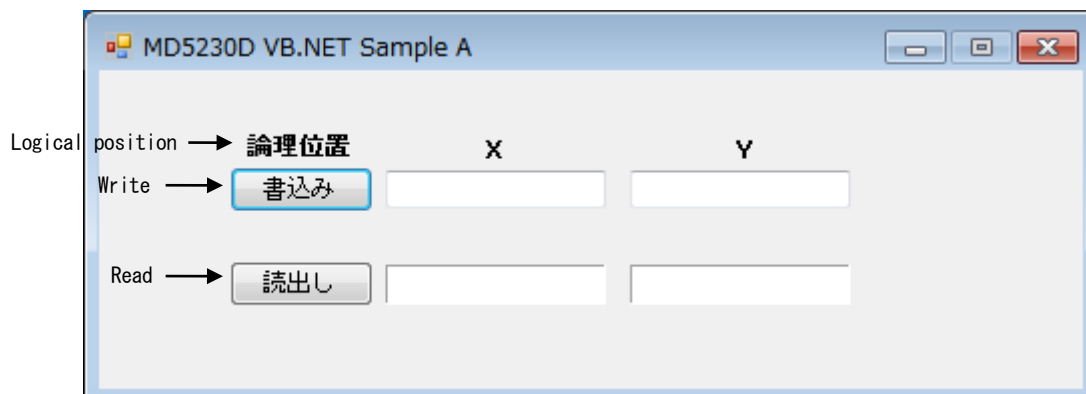
### 5.3 Sample Software A

This sample software shows how to write and read logical position data.

#### 5.3.1 VB.NET File Configuration

MD5230D_VB.NET_Sample_A_vJ5_2_0_0	
MD5230D_VB.NET_Sample_A	
MD5230D_AP_Sample_main.vb	VB file for [MD5230D VB NET Sample A] window.
MD5230D_ComPort.vb	VB file for opening virtual serial port and sending commands.
MD5230D_VbStrings.vb	VB file for string operations.
MD5230D_VB.NET_Setup_A	
Debug	
Release	
MD5230D_VB.NET_Setup_A.msi	Windows installer package
MD5230D_VB.NET_Setup_A.vdproj	Visual Studio Deployment Project
MD5230D_VB.NET_Sample_A.sln	Microsoft Visual Studio Solution
MD5230D_VB.NET_Sample_A.suo	Visual Studio Solution User Options

#### 5.3.2 MD5230D VB.NET Sample A Start-up Window



- Logical Position [Write] button

Logical position counter setting command "SLP△X△n n n n, Y△n n n n" is sent by [Write] button. n n n n indicates the logical position inputted on the window.

- Logical Position [Read] button

Logical position counter acquisition command "RLP" is sent by [Read] button. Then, "RLP△X△n n n, Y△n n n n" response is returned. n n n n indicates the logical position read out.

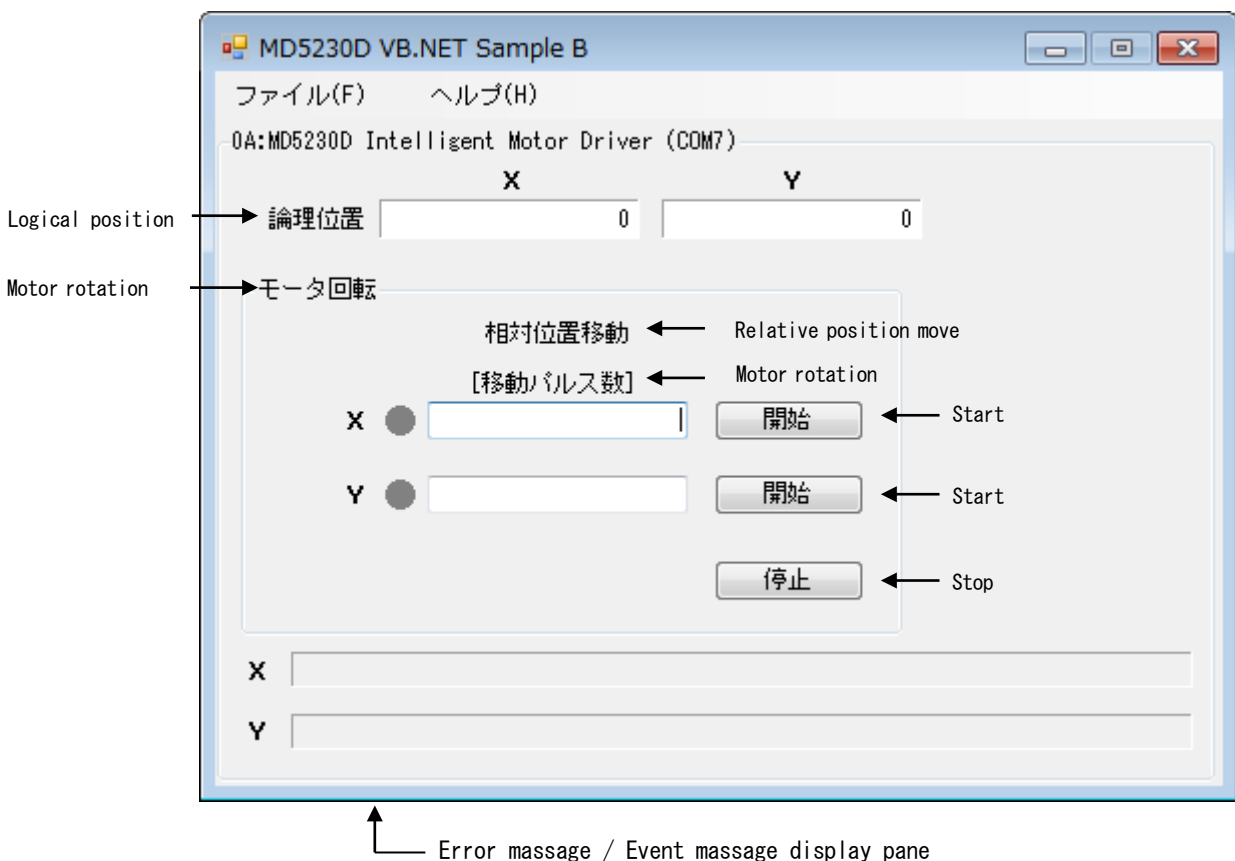
## 5.4 Sample Software B

This sample software shows how to read logical position data periodically, and how to start and stop the relative position move.

### 5.4.1 VB.NET File Configuration

MD5230D_VB.NET_Sample_B_vJ5_2_0_0	
MD5230D_VB.NET_Sample_B	
MD5230D_AP_Sample_main.vb	VB file for [MD5230D VB NET Sample B] window.
MD5230D_ComPort.vb	VB file for opening virtual serial port and sending commands.
MD5230D_VbStrings.vb	VB file for string operations.
MD5230D_Version_Information.vb	VB file for [Version Information] window.
MD5230D_VB.NET_Setup_B	
Debug	
Release	
MD5230D_VB.NET_Setup_B.msi	Windows installer package
MD5230D_VB.NET_Setup_B.vdproj	Visual Studio Deployment Project
MD5230D_VB.NET_Sample_B.sln	Microsoft Visual Studio Solution
MD5230D_VB.NET_Sample_B.suo	Visual Studio Solution User Options

### 5.4.2 MD5230D VB.NET Sample B Start-up Window



- Logical Position  
Logical position counter acquisition command "RLP" is sent periodically, and "RLP△X△n n n n, Y△n n n n" response is returned. The logical position data returned as a response is displayed. n n n n indicates the logical position read out.
- X/Y-axis Relative Position Move [Start] button  
Relative position move command "INC" is sent by [Start] button.  
While the relative position is moving, the lamp indicating motor rotation lights in red.
- X/Y-axis [Stop] button  
Deceleration stop command "SST" is sent, and motor rotation decelerates and stops. The lamp indicating motor rotation is put out.
- Drive Status  
Drive status acquisition command "RDR" is sent periodically. Then it checks the drive status returned as a response and controls lighting of the lamp indicating motor rotation.
- Error message / Event message display pane  
An error message is displayed when an error code is returned by sending a command. And an event message is displayed when the event from a unit is notified.  
For more details of messages, see chapter 「3.6.7 Response error type code」 or 「4.2 Event Code in Event Notification」.

## 5.5 Sample Software C

This sample software shows how to read logical/real position data and the current drive speed periodically. And also it shows how to start/stop driving and set the drive speed.

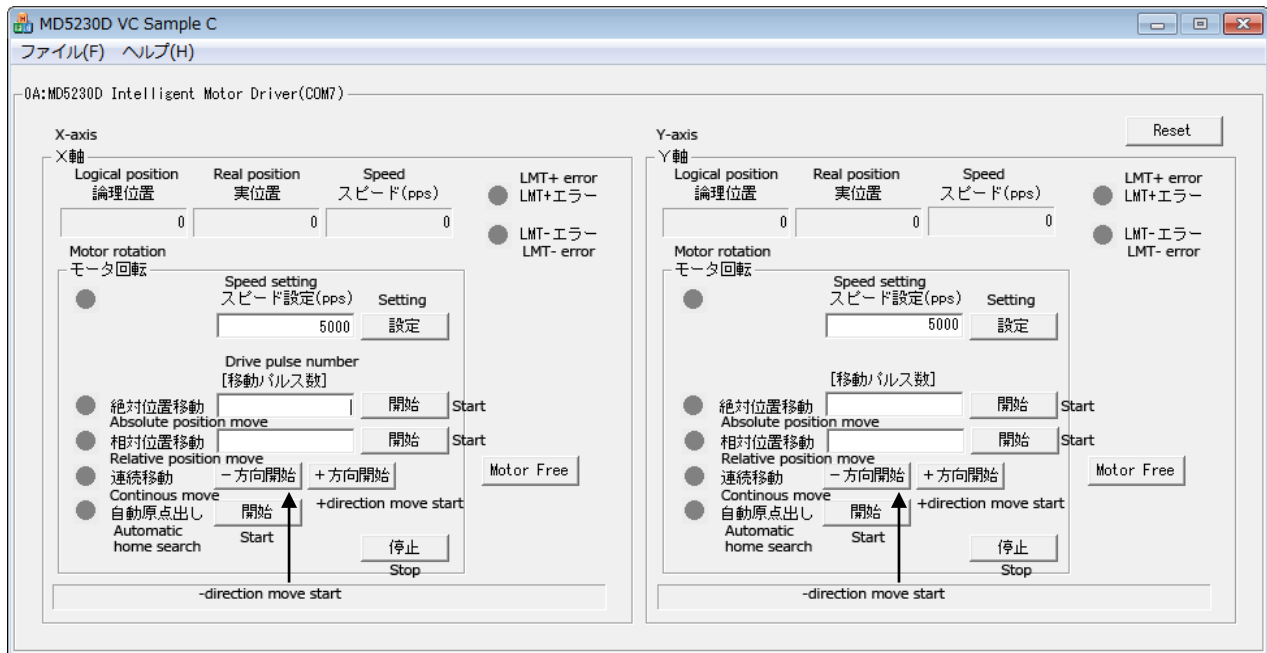
### 5.5.1 VB.NET File Configuration

MD5230D_VB.NET_Sample_C_vJ5_2_0_0	
MD5230D_VB.NET_Sample_C	
MD5230D_AP_Sample_main.vb	VB file for [MD5230D VB.NET Sample C] window
MD5230D_ComPort.vb	VB file for opening virtual serial port and sending commands.
MD5230D_VbStrings.vb	VB file for string operations.
MD5230D_Version_Information.vb	VB file for [Version Information] window
MD5230D_VB.NET_Setup_C	
Debug	
Release	
MD5230D_VB.NET_Setup_C.msi	Windows installer package
MD5230D_VB.NET_Setup_C.vdproj	Visual Studio Deployment Project
MD5230D_VB.NET_Sample_C.sln	Microsoft Visual Studio Solution
MD5230D_VB.NET_Sample_C.suo	Visual Studio Solution User Options

### 5.5.2 VC.MFC File Configuration

MD5230D_VC_Sample_C_vJ5_2_0_0	
MD5230D_VC_Sample_C	
MD5230D_VC_Sample_C.cpp	[MD5230D VC.MFC Sample C] main file
MD5230D_VC_Sample_C_Dlg.cpp	File for [MD5230D VC.MFC Sample C] window
MD5230D_VC_Sample_C_SCI.cpp	File for opening virtual serial port and sending/receiving commands.
MD5230D_VC_Sample_C_Ver.cpp	File for [Version Information] window
Sample_C_Setup	
Debug	
Release	
MD5230D_VC_MFC_Setup_C.msi	Windows installer package
Sample_C_Setup.vdproj	Visual Studio Deployment Project
MD5230D_VC_Sample_C.sln	Microsoft Visual Studio Solution
MD5230D_VC_Sample_C.suo	Visual Studio Solution User Options

### 5.5.3 MD5230D VC++.MFC Sample C Start-up Window



Error message / Event message display pane

- Logical Position  
Logical position counter acquisition command "RLP" is sent periodically, and the logical position data returned as a response is displayed.
- Real Position  
Real position counter acquisition command "RRP" is sent periodically, and the real position data returned as a response is displayed.
- Speed (pps)  
Current drive speed acquisition command "SPG" is sent periodically, and the current drive speed returned as a response is displayed.
- Error message / Event message display pane  
An error message is displayed when an error code is returned by sending a command. And an event message is displayed when the event from a unit is notified.  
For more details of messages, see chapter 「3.6.7 Response error type code」 or 「4.2 Event Code in Event Notification」.
- Speed (PPS) [Set] button  
Drive speed command "SPD△x△nnnn" is sent by [Set] button.  
x indicates the axis code of "X" or "Y".  
nnnn indicates the speed setting value inputted on the window.
- Absolute Position Move [Start] button  
Absolute position move command "ABS△x△nnnn" is sent by [Start] button.  
While the absolute position is moving, the lamp lights in red. And the lamp indicating motor rotation lights in red.  
x indicates the axis code of "X" or "Y".  
nnnn indicates the absolute position by pulses inputted on the window.

- Relative Position Move [Start] button  
 Relative position move command "INC△x△n n n n" is sent by [Start] button.  
 While the relative position is moving, the lamp lights in red. And the lamp indicating motor rotation lights in red.  
 x indicates the axis code of "X" or "Y".  
 n n n n indicates the driving pulses inputted on the window.
- Continuous Move Start buttons  
 Continuous move start command "CNT△x△d" is sent by the following buttons.  
 While moving continuously, the lamp lights in red. And the lamp indicating motor rotation lights in red.  
 x indicates the axis code of "X" or "Y".  
 [Start in - direction] button: Moving Direction d="-"(CCW rotation)  
 [Start in + direction] button: Moving Direction d="+"(CW rotation)
- Home Search [Start] button  
 Home search command "HOM△x" is sent by [Start] button.  
 While performing home search, the lamp lights in red. And the lamp indicating motor rotation lights in red.  
 x indicates the axis code of "X" or "Y".
- [Stop] button  
 Deceleration stop command "SST△x" is sent, and motor rotation decelerates and stops. The lamp indicating motor rotation is put out.  
 x indicates the axis code of "X" or "Y".
- [Motor Free] button  
 Motor excitation ON command "HON△x" is sent with turning ON. And Motor excitation OFF command "HOF△x" is sent with turning OFF.  
 x indicates the axis code of "X" or "Y".
- [Reset] button  
 Unit reset command "RST" is sent.
- LMT+ / LMT- Signal Lamps  
 The lamp lights when a hardware/software limit signal becomes active.