# User's Manual

## Intelligent Positioner

## GIP-101B



Copyright 2018, SIGMAKOKI Co.,Ltd.

# Notes regarding these materials

- These materials are intended as a reference to assist our customers in the use of the SIGMAKOKI CO., LTD. Product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to SIGMAKOKI CO., LTD. or a third party.
- SIGMAKOKI CO., LTD. assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagram, charts, programs, or algorithms contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by SIGMAKOKI CO.,LTD. without notice due to product improvements or other reasons.
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithm, please be sure to evaluate all information and products. SIGMAKOKI CO., LTD. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
- SIGMAKOKI CO., LTD. products are not designed or manufactured for use in equipment or system that is used under circumstances in which human life is potentially at stake. SIGMAKOKI CO., LTD. products cannot be used for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of SIGMAKOKI CO., LTD. is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license Japanese government and cannot be imported into a country other than the approved destination.

  Any diversion or re-export contrary to the export control laws and regulations of Japan and/ or the country of destination is prohibited.


Copyright 2018, SIGMAKOKI Co.,Ltd.

# Contents





Copyright 2018, SIGMAKOKI Co.,Ltd.

## For Your Safety

Before using this product, read this manual and all warnings or cautions in the documentation provided.

Only Factory Authorized Personnel should be changes and/or adjust the parts of controller.

## The Symbols Used in This Manual

| ⚠ WARNING | ⚠ CAUTION |
|---|---|
| This symbol marks warnings that should be read and used to prevent serious injury or death. | This symbol indicates where caution should be used to avoid possible injury to yourself or others, or damage to property. |

The above indications are used together with the following symbols to indicate the exact nature of the warning or caution.

| Examples of Symbols Accompanying Warnings and Cautions | |
|---|---|
|  | △Symbols enclosed in a triangle indicate warnings and cautions. The exact nature of the warning or caution is indicated by the symbol inside (the symbol at left indicates risk of electrocution). |
|  | ○Symbols enclosed in a circle mark indicate prohibitions(actions that must not be performed).The exact nature of the prohibition is indicates by the symbol inside or next to the circle mark (the symbol at left indicates that the product must not be disassembled). |
|  | ●Symbols inside a black circle mark actions that must be performed to ensure safety. The exact nature of the action that must be performed is indicated by the symbol inside (the symbol at left is used in cases in which the AC adapter must be unplugged to ensure safety). |

## Symbols on the product

The symbol mark on the product calls your attention. Please refer to the manual, in the case that you operate the part of the symbol mark on the product.

| | |
|---|---|
|  | This symbol labeled on the portion calls your attention. |



Copyright 2018, SIGMAKOKI Co.,Ltd.

## Disclaimer of Liability

① SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product or the inability to use this product.

② SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product that deviates from that described in the manual.

③ SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product in extraordinary conditions, including fire, earthquakes, and other acts of God, action by any third party, other accidents, and deliberate or accidental misuse.

④ If the equipment is used in a manner not specified by the SIGMAKOKI CO., LTD., the protection provided by the equipment may be impaired.

## ! WARNING

- Do not use this product in the presence of flammable gas, explosives, or corrosive substances, in areas exposed to high levels of moisture or humidity, in poorly ventilated areas, or near flammable materials.
- Do not connect or check the product while the power is on.
- Installation and connection should be performed only by a qualified technician.
- Do not bend, pull, damage, or modify the power or connecting cables.
- Do not touch the products internal parts.
- Connect the earth terminal to ground.
- Should the product overheat, or should you notice an unusual smell, heat, or unusual noises coming from the product, turn off the power immediately.
- Do not turn on the power in the event that it has received a strong physical shock as the result of a fall or other accident.
- Do not touch the stage while operation.
- Use dry clothes only for cleaning the equipment.



Copyright 2018, SIGMAKOKI Co.,Ltd.

# Chapter 1: Before You Begin

## 1-1. Package Contents

Purchasers of the Stage Controller should find that the package contains the items listed below. Check the package contents using the following checklist. Contact your retailer as soon as possible in the event that you should find that any item is missing or damaged.

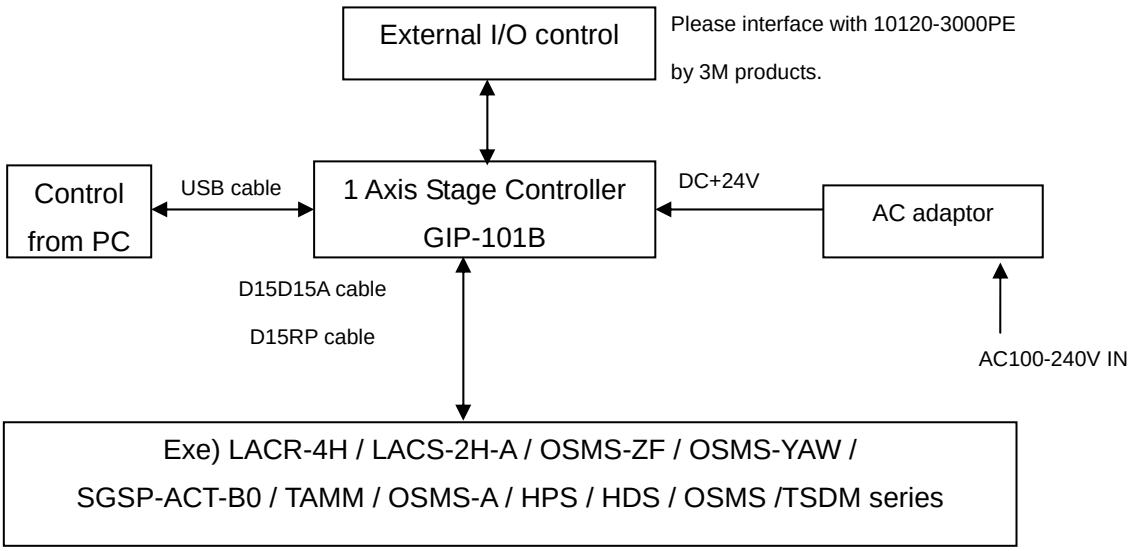
□GIP-101B Stage Controller :1
□User's Manual (This Manual) :1
□Dedicated AC adaptor :1

About the setting of the Memory Switch of this controller, you can set it by sample software.
You can download sample programs from our web page.
For the details of the samples, see the manual of each program.
View our home page **http://www.global-optosigma.com/en_jp/software/sample_en.html**

## 1-2. Overview

This controller is one axes stage controller, which has drivers for five-phase stepping motor.
Because this controller has a microstep driver built-in, the smooth movement in high resolving power is possible.
When the GIP-101B is connected to an ordinary personal computer via an USB interface, the stage can be accurately moved to the desired position by simple commands sent from the PC.

## 1-3. The GIP-101B System

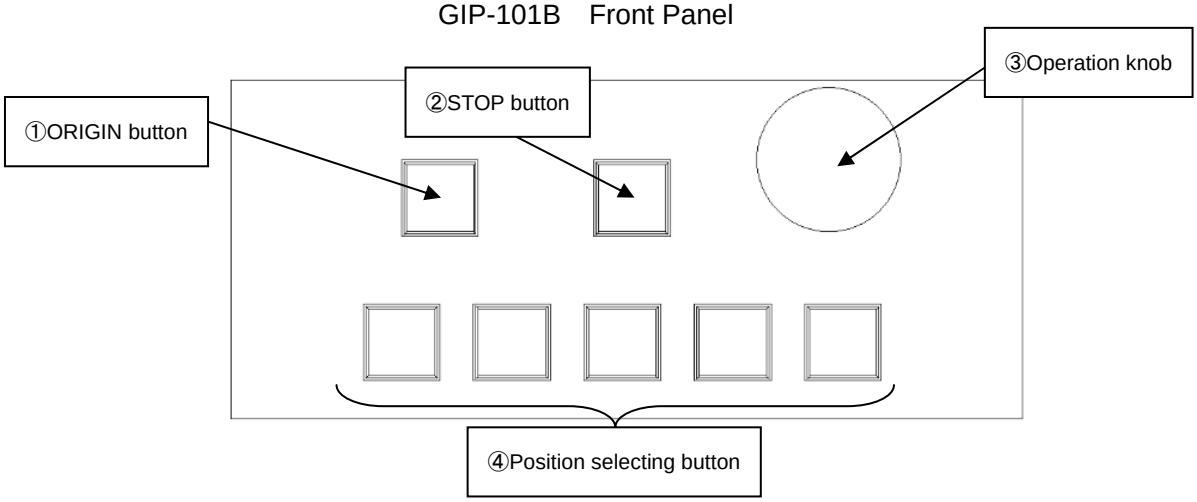




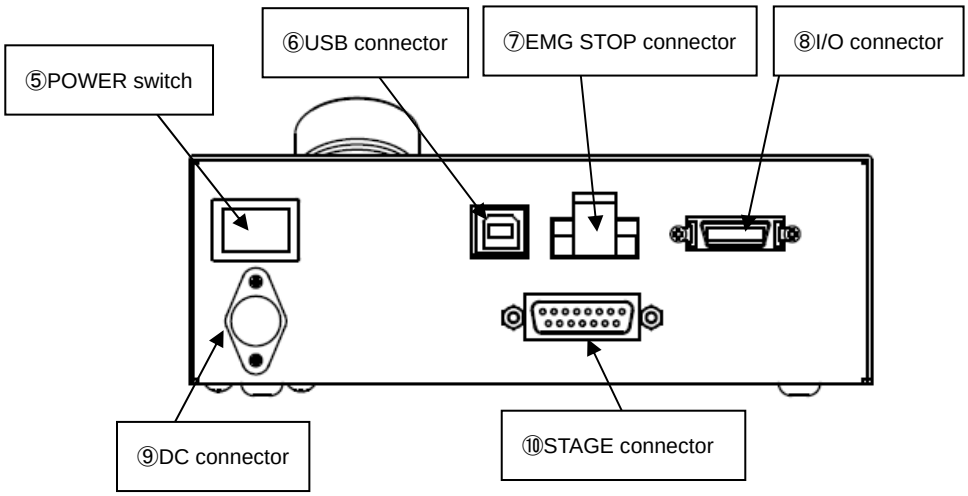
Copyright 2018, SIGMAKOKI Co.,Ltd.

## 1-4. Parts and Functions

GIP-101B Front Panel




GIP-101B Rear Panel




Functions:

① ORIGIN button : Button which returns to the machine origin.

② STOP button : Immediately stop the motorized stage.

③ Operation knob : Turn the knob to drive the motorized stage.
Motorized stage is driven according to angle of knob fast when turn from side to side while pushing operation knob.

④ Position selecting button : Used to drive the motorized stage to memorized position.

⑤ POWER switch : Product is on when the switch is set to ON.
Set the switch to OFF to turn the product off.



Copyright 2018, SIGMAKOKI Co.,Ltd.

⑥ USB connector : This connector is used when the device is controlled from the computer via an USB interface.

⑦ EMG STOP connector : Controller normally operates in “Short circuit” condition. Motorized stage immediately stops in “Open circuit condition”.

⑧ I/O connector : Motorized stage is driven to the memorized position according to I / O signals.

⑨ DC connector : Connect to the power source (+24V, 1.8A). Use a dedicated AC adapter.

⑩ STAGE connector : Connection for cable to the motorized stage

For your own safety, make sure POWER is OFF before connecting every cable.



Copyright 2018, SIGMAKOKI Co.,Ltd.

# Chapter 2: Basic Operations

## 2-1. GIP-101B Connection procedure

First, connect GIP-101B to the motorized stages.

① Please confirm the power switch of the GIP-101B is turning off.

② Connect a standard cable (D15RP-CA/D15D15A-CA) to the connector of the motorized stage.

③ Connect SK stage to connector to the STAGE connector of the GIP-101B controller.

## 2-2. Connecting to PC and peripheral device

Connect GIP-101B to PC.

USB interface is used for the connection between the PC and GIP-101B.

The USB interface communication parameter at the time of default Value is described below. Please set the configurations of the PC side according to the following table.

| Parameter | Descriptions |
|---|---|
| Baud rate | 9600bps |
| Delimiters | CR+LF |
| Parity | None |
| Data bits | 8bit |
| Stop bit | 1bit |
| Flow control | None |

① Please confirm the power switch of the GIP-101B is turning off.

② Use a genuine USB cable,

③ Insert of USB cable to the USB connector on the GIP-101B.

## 2-3. Connecting Power Cable

Connect the dedicated AC adapter to the DC connector of the GIP-101B and plug the power plug of the dedicated AC adapter into the outlet. (Ensure that it is grounded.)

## 2-4. USB Driver installation Method

please use after the installation of the USB-driver in the following content.

(In the case of Windows 7/ Windows 8/ Windows 8.1/ Windows 10) While the Internet is connected, when connected toGIP-101B, the installation of an automatic driver will start.

***) If unconnected to the Internet, from FTDI's website on a PC connected to the Internet, please download the driver from (VCP Drivers). The port the downloaded driver on unconnected PC and perform the installation of the driver to connect GIP-101B controller.**

**The FTDI website (http://www.ftdichip.com/index.html)**



Copyright 2018, SIGMAKOKI Co.,Ltd.

# Chapter 3: Settings

## 3-1. Change the Controller Setting

### 3-1-1 Checking the Controller Setting

Adjust the driver switches located on the bottom of the controller to set the current levels appropriate to the connected motorized stage as specified in the manual included with the motorized stage.

The switches can be accessed as shown in Fig. 3-1-1 by removing the panel's (4) screws at bottom of the controller (marked as ▼ ).

Please refer to the following explanations when setting the switches.

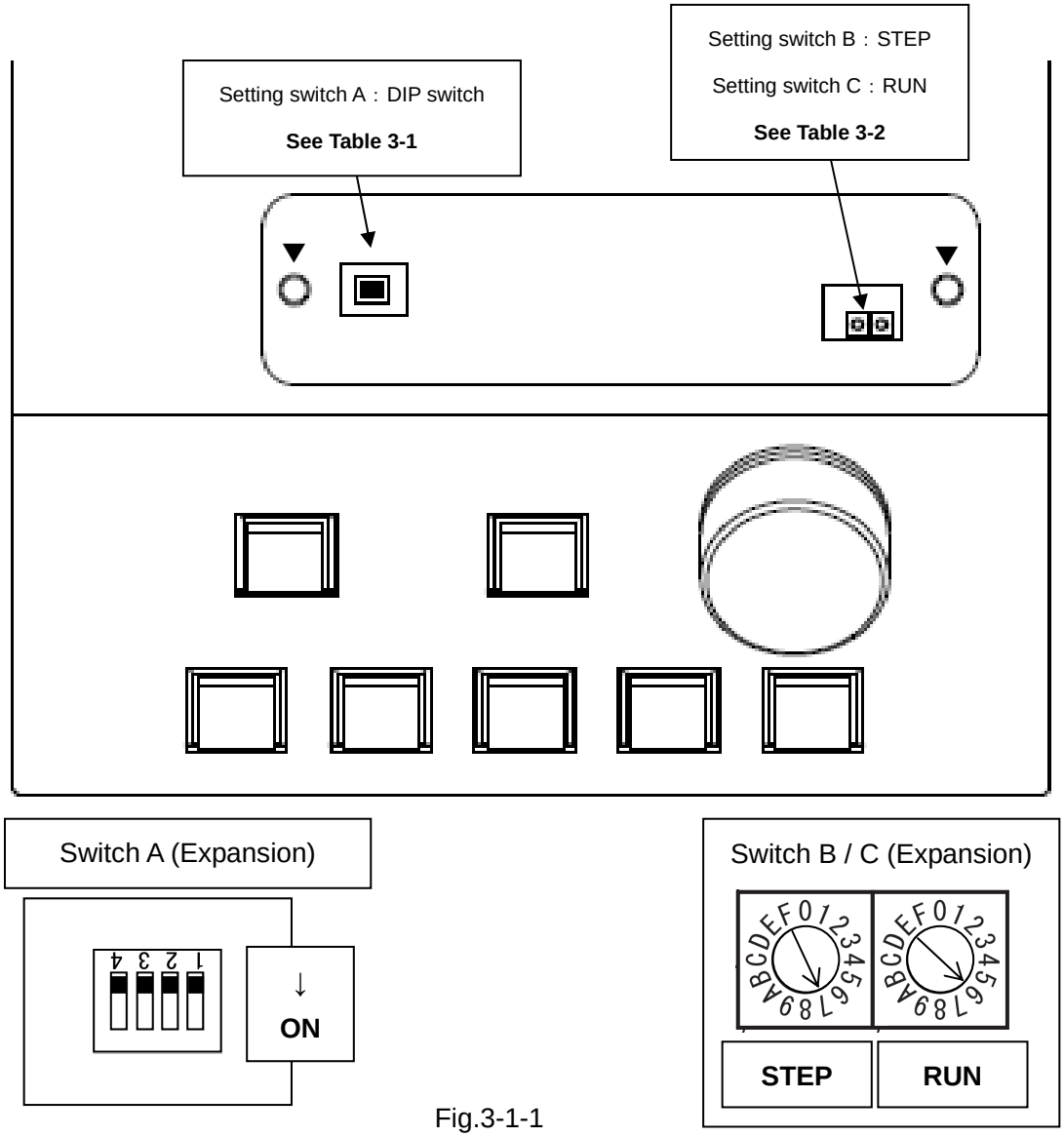



Fig.3-1-1



Copyright 2018, SIGMAKOKI Co.,Ltd.

**Table 3-1**

| SW No, | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Set vale | linear stages or rotation stages selection | | Use it with OFF | FRONT PANEL operation selection |

| No, | SW1 OFF | SW1 ON |
|---|---|---|
| SW2 OFF | Linear stages | 30,000 (one rotation / pls) |
| SW2 ON | 36,000 (one rotation / pls) | 72,000 (one rotation / pls) |

*) For rotation stages, set pulse number for one rotation at full-step operation. The value entered here multiplied by "the number of steps" become “total pulse per rotation” sent out to the built-in driver. For that reason, if the total pulse number is exceeded, the coordinate value is cleared. Also, when moving from the origin position (0 position) in the - direction, the value subtracted from the total number of pulses becomes the coordinate value. For rotation stages, the limit sensor does not stop except when returning to the origin.

For OSMS-YAW series, Choose 72,000.

For LACR-4H, Choose 36,000.

Default value：SW1：OFF SW2：OFF

**SW4** Front panel operated choice.

ON Front panel operation invalidation was selected.

OFF Front panel operation enabled was selected.

*)Default value：SW4：OFF

**Table 3-2**

*)Setting switch B：STEP

| SW No, | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| STEP | 1 | 2 | 2.5 | 4 | 5 | 8 | 10 | 20 | 25 |
| **SW No,** | 9 | A | B | C | D | E | F | | |
| STEP | 40 | 50 | 80 | 100 | 125 | 200 | 250 | | |

*)Default value
STEP：7 (20)

*)Setting switch C：RUN

| SW No, | 0 | 3 | 5 | 6 |
|---|---|---|---|---|
| RUN (A/phase) | 0.25 | 0.35 | 0.66 | 0.75 |

*)Default value RUN ：6 (0.75A/phase)



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 3-2. Memory Switch settings

The Memory Switches store the controller settings.

When changing Memory Switch settings use the Sample software (SGSample), which can be downloaded from **http://www.global-optosigma.com/en_jp/software/sample_en.html**

***) After changing Memory Switch, be sure to reboot the power GIP-101B.**

## 3-3. Memory Switch contents list and detailed settings

### 3-3-1 General

| No | Memory Switch contents | Setting Range / Select items | Default Value |
|---|---|---|---|
| 1 | SPD SEL | 1～4 | 4 |
| 2 | SPD 1 S | 1～500000 | 10000 |
| 3 | SPD 1 F | 1～500000 | 100000 |
| 4 | SPD 1 R | 0～1000 | 200 |
| 5 | SPD 2 S | 1～500000 | 30000 |
| 6 | SPD 2 F | 1～500000 | 300000 |
| 7 | SPD 2 R | 0～1000 | 200 |
| 8 | SPD 3 S | 1～500000 | 70000 |
| 9 | SPD 3 F | 1～500000 | 700000 |
| 10 | SPD 3 R | 0～1000 | 200 |
| 11 | SPD 4 S | 1～500000 | 100000 |
| 12 | SPD 4 F | 1～500000 | 1000000 |
| 13 | SPD 4 R | 0～1000 | 200 |
| 14 | EB_OUT | ON / OFF | OFF |
| 15 | POS_WRITE | ON / OFF | ON |
| 16 | CLICK_RATE | 1 ~ 60 | 30 |
| 17 | BACKLASH_VALUE | 0 ~ 1000 | 50 |



Copyright 2018, SIGMAKOKI Co.,Ltd.

1) SPD SEL：Speed selection at Power ON

Select the initial setting Speed No. at Power ON.

[Setting Range] 1 ~ 4

2)～13) Speed 1～4(S)(F)(R)：Speed Setting

Set 4 kinds of travel stage Speed (minimum S, maximum F, and acceleration/deceleration time R) at Power ON.

[Setting Range] S：1～500000 (Unit：PPS)

F：1～500000 (Unit：PPS)

R：0～1000 (Unit：mS)

***) Minimum S values should be set smaller than maximum F at Speed Setting.**

14) EB_OUT：Electromagnetic Brake Setting

Select when the brake is attached.

[Select item] ON：Enabled.

OFF：Disabled.

15) POS_WRITE：Memory protect

The memorized locations a prevent reset.

[Select item] ON：Memory write enabled.

OFF：Memory write disabled.

16) CLICK_RATE：Knob sensitivity

This parameter defines adjustment sensitivity of the operation knob at the front panel.

[Setting range] 1～60 (Unit：1pls)

17) BACKLASH_VALUE：Backlash compensation

0 values correspond to “no backlash compensation”. Make adjustment of this parameter by checking actual movement. The value set here multiplied by “the number of steps” become total compensation value sent out to the built-in driver.

[Select item] 0～1000 (Unit：1pls)



Copyright 2018, SIGMAKOKI Co.,Ltd.

### 3-3-2 INTERFACE

| No | Memory Switch contents | Setting Range / Select items | Default Value |
|---|---|---|---|
| 1 | BAUDRATE | 9600/38400/57600 | 9600 |

1) BAUDRATE：Baudrate setting

Set the data communication speed for the USB (Serial communication) Interface.

[Select item] 9600：9600bps

38400：38400bps

57600：57600bps

### 3-3-3 Axis

| No | Memory Switch contents | Setting Range / Select items | Default Value |
|---|---|---|---|
| 1 | DIVIDE | 1/2/2.5/4/5/8/10/20/25/40/50/80/100/125/200/250 | 20 |
| 2 | MOVE | POS/NEG | POS |
| 3 | ORG SEL | MINI/CENTER/ORGS/NORM/ZPM/ZPP | MINI |
| 4 | ORG OFFSET1 | 0～100000000 | 0 |

1) Divide: Divide setting

**Use same setting for "switch B：STEP".**

[Select range] 1/2/2.5/4/5/8/10/20/25/40/50/80/100/125/200/250

2) MOVE：Travel direction setting

Set + travel direction for axis.

[Select item] POS： Positive rotation

NEG： Negative rotation

**※ In LACR-4H / OSMS-YAW series, "NEG: Negative rotation " can not be used.**

3) ORG SEL：Origin reset method setting

Set Origin reset method for axis.

[Select item] MINI：ORG1

CENTER：ORG2

ORGS：ORG3

NORM：ORG4

ZPM：ORG5

ZPP：ORG6

*) Regarding each method, please refer to “Origin Reset Method”.



Copyright 2018, SIGMAKOKI Co.,Ltd.

4) ORG OFFSET：ORG offset setting

Set ORG offset value for axis (ORG1、ORG5、ORG6) at the ORG reset.

[Setting range] 0～100000000 (Unit：1pls)

*)When setting range is set [0], Division × 500 pulse move.

### 3-3-4 Speed

| No | Memory Switch contents | Setting Range / Select items | Default Value |
|---|---|---|---|
| 1 | ORG SPD S | 1～500000 | 5000 |
| 2 | ORG SPD F | 1～500000 | 50000 |
| 3 | ORG SPD R | 0～1000 | 200 |
| 4 | ORG SPD M | 1～500000 | 25000 |

1～4) ORG SPD(S)(F)(R)(M): ORG reset speed setting

Set mechanical ORG reset speed (minimum speed S, maximum speed F, acceleration time, ORG-reset speed M) for each axis.

[Setting Range] S：1～500000(Unit：PPS)

F：1～500000 (Unit：PPS)

R：0～1000(Unit：ms)

M：1～500000 (Unit：PPS)

***) Regarding Speed setting, minimum speed S should be set smaller than maximum speed F and ORG-reset speed M.**



Copyright 2018, SIGMAKOKI Co.,Ltd.

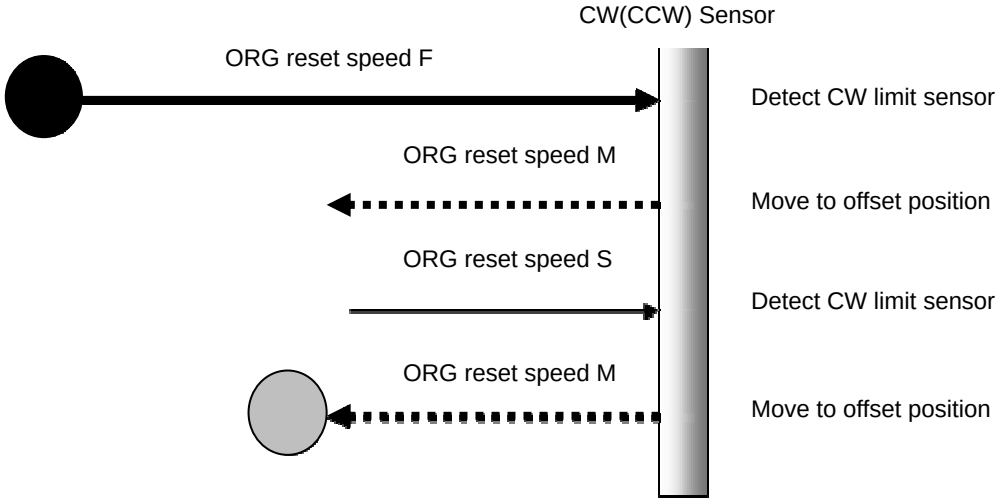
## 『Origin Reset Method』

There are six types in Origin Reset setting. Select optimal Origin Reset setting for stage in use depending upon software. There are two parameters to do with Origin Reset, which are Origin Reset Speed (S, F, R, M) and Origin offset (ORG OFFSET). Parameters of each axis can be individually set. Select the optimum value according to the software. In case of when PGO (Z pulse) is used as an Origin sensor, (ORG5 or ORG6), Origin sensor is not in need at stage since Excitation Reset of motor driver is used.

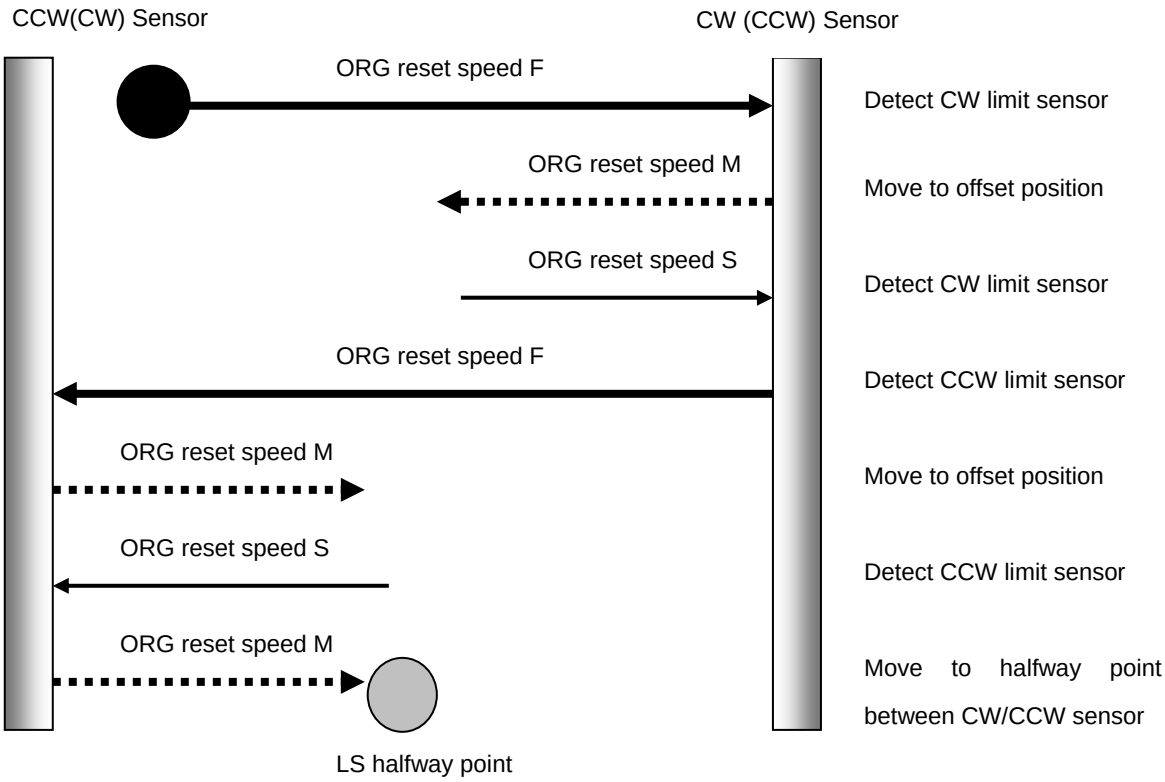
**1, ORG1 (MINI method compatible, however stage moves to ORG offset value)**

**ORG OFFSET default value is 0. Division × 500 pulse move**

.




**2, ORG2 (CENTER method)**

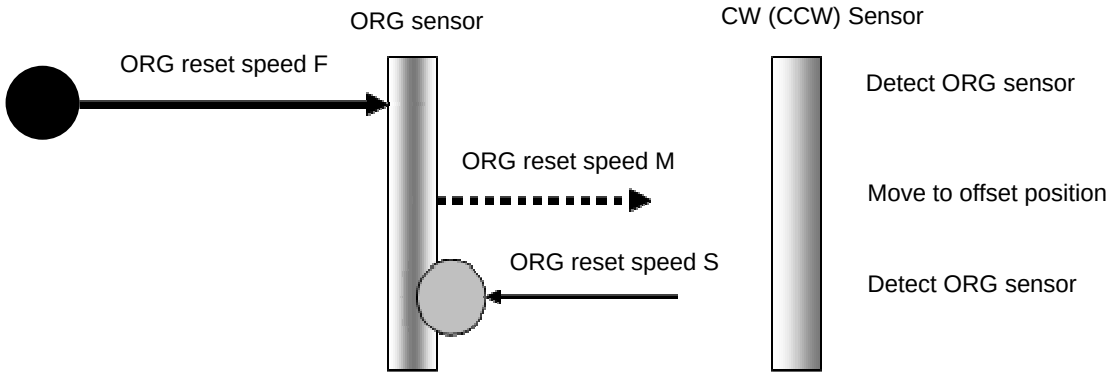




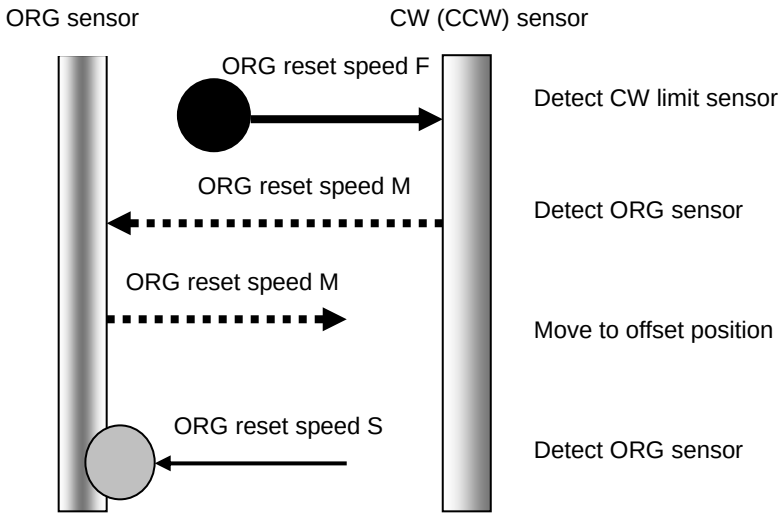

Copyright 2018, SIGMAKOKI Co.,Ltd.

**3, ORG3 (for 3 sensor use (LS + ORG))**

3-1) In case that ORG sensor is set on the inside of CW(CCW) sensor




3-2) In case that ORG sensor is set beyond limit SW toward CW direction.



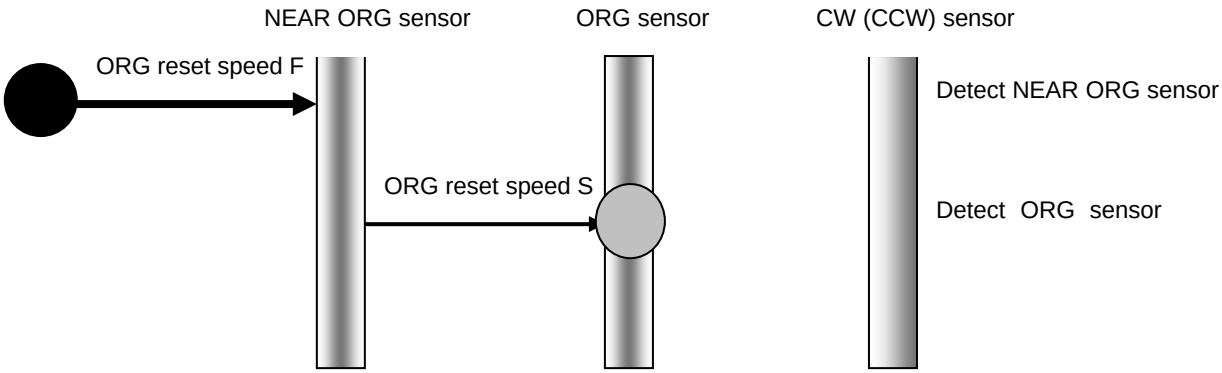

Caution1) In case that after detect CW (CCW) sensor, stage move toward CCW direction and then can not detect ORG sensor (in case of no ORG sensor), stage stop at CCW (CW) sensor position.



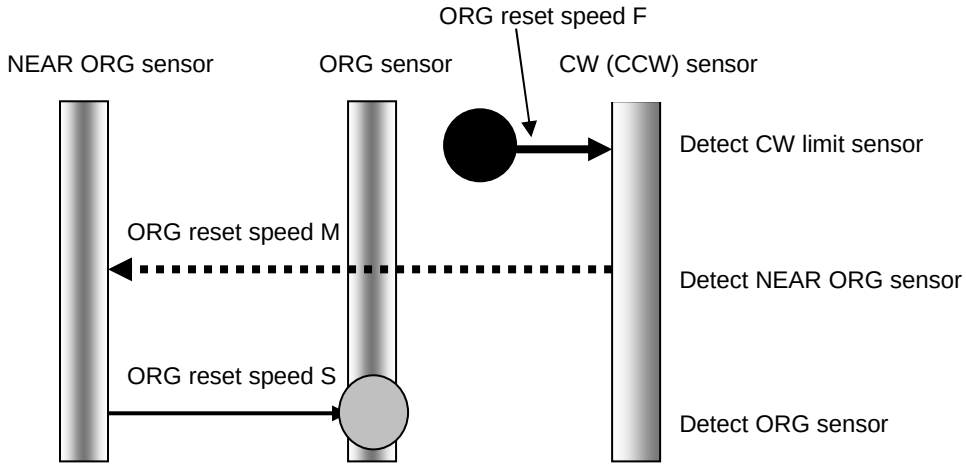
Copyright 2018, SIGMAKOKI Co.,Ltd.

**4, ORG4 (for 4 sensor (LS+SD+ORG) use.)**

4-1) In case that NEAR ORG sensor is on the inside of CW(CCW) sensor.




4-2) In case that ORG sensor is beyond NEAR ORG sensor toward CW(CCW) direction.



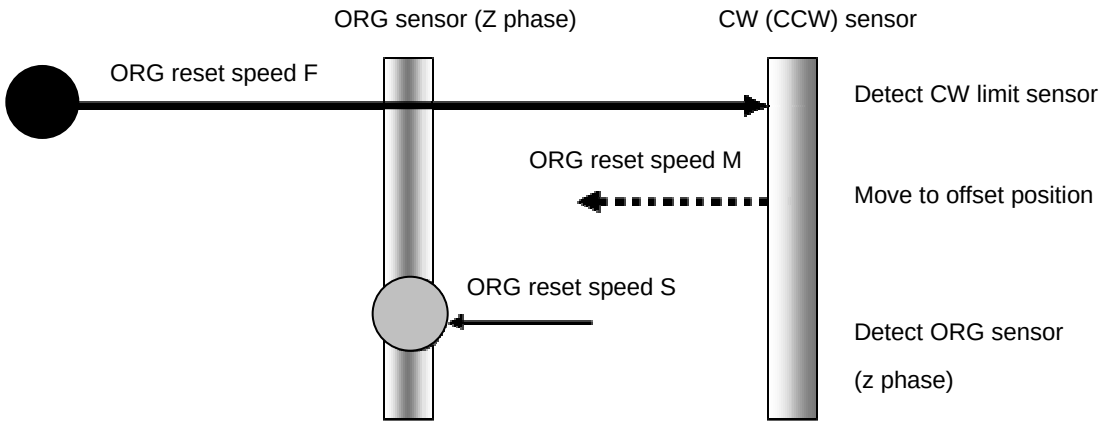

Caution1) In case that after detect CW (CCW) sensor, stage move toward CCW direction and then can not detect NEAR ORG sensor (in case of no NEAR ORG sensor), stage stop at CCW (CW) sensor position.

Caution 2) In case that after detect NEAR ORG sensor, stage move toward CW direction and then can not detect ORG sensor (in case of no ORG sensor), stage stop at CW (CCW) sensor position.

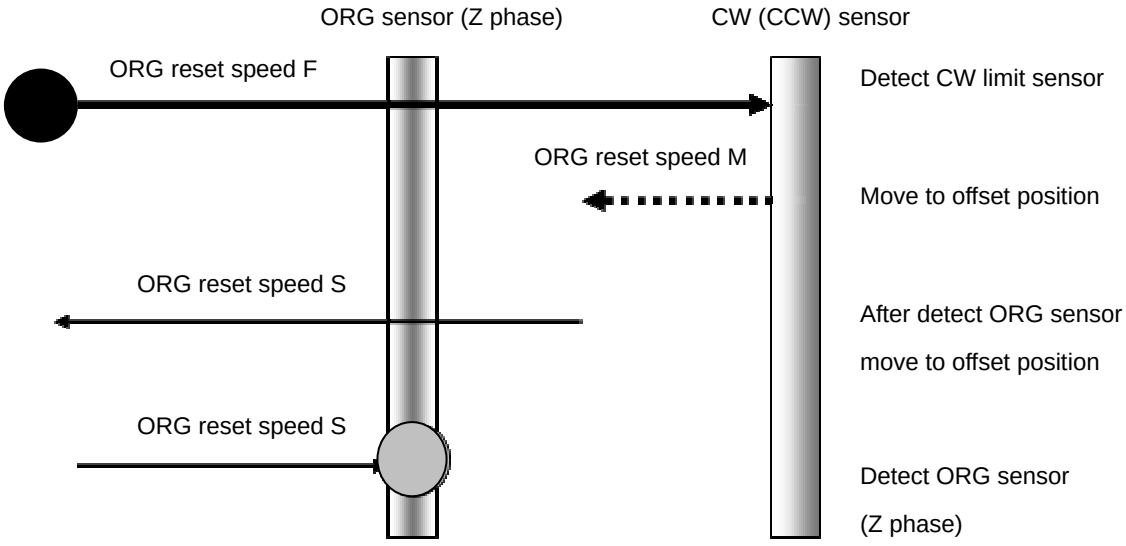


Copyright 2018, SIGMAKOKI Co.,Ltd.

**5, ORG5 (for 3 sensor use (LS+ORG(Z phase)))**




**6, ORG6 (for 3 sensor use (LS+ORG(Z phase)))**






Copyright 2018, SIGMAKOKI Co.,Ltd.

# Chapter 4: Using GIP-101B to position Motorized Stages

## 4-1. Operated by buttons placed in front panel.

Operate the connected automatic stage.

For each operation button, it becomes as follows.

### 4-1-1 ORIGIN button：Move to origin

Press Return to ORIGIN button. ORIGIN button will blinking the stage will move to origin position and stop. (Lamp of origin button will light up.) Coordinate value is cleared by 0.

### 4-1-2 Operation knob：Using the Operation knob

Turn left or right Operation knob to move the motorized stage Motorized stage will move according to angular degree when you turn left or right while pressing Operation knob at the same time.

When you turn left or right while pressing Operation knob With the memory switch setting speed (F) as the upper limit, depending of angular degree of knob, driving is performed with the speed varying from 1/10 of the setting speed to 10 steps.

Also, when changing the moving speed with the D command, the upper limit of the changed moving speed (F) is set, depending of the angular degree of the knob, while varying from 1/10 of the set speed to 10 steps according to the rotation angle of the knob.

### 4-1-3 Position select button：Movement using the Position selecting buttons

［Move to a position］

After pressing a position button, Position button will blinking the motorized stage will move to the position that was memorized and stop. (Lamp of position button will light up.)

***) At factory shipment, position selecting buttons 1 to 5 All 0 positions (origin) are memorized.**

［Memorizing a position］.

Move the stage to the location to be memorized using the manual operation knob.

Press a Position selecting button (1-5) and hold it until it stops blinking.

When the light changes from blinking to on, the position is memorized.

*) If the motorized stage is a linear type, do not make memorize a position close to a limit sensor. The motorized stage might reach to limit sensor due to backlash correction function and the motorized stage will not stop at correct position.

If it is necessary to set a position near limit sensor, minimize the backlash correction value in order to avoid the motorized stage reaching to limit sensor.



Copyright 2018, SIGMAKOKI Co.,Ltd.

#### 4-1-4 STOP button：Stop movement

Pressing the STOP button will immediately stop any stage motion. If the stage is moving when the STOP button is pressed, the stored location will no longer be accurate. A move to ORIGIN will need to be performed before normal operation can continue. Note that pressing a Position selecting button after pressing the STOP button will perform the move to ORIGIN, after which the Position selecting button will operate normally.

## 4-2. Feature

The controller can be connected to a computer using an USB interface. Motorized stages can then be precisely controlled by commands (strings) transmitted from the computer.

And command format of GIP-101B, will be compatible with our controller (GIP-101).

## 4-3. Command

### 4-3-1 Format of command

General format is shown below. But, please refer each command details as there may be a little different point in some commands.

code：axis±Pnum

code Use a string to represent a command.

： Command separation(Colon(：))

Axis 1 or W

± Specify the movement direction

P delimiter letter to moveing distance

num Spexcify the moving distance by puls numbers.

This value should not be decimal. If it is decimal, it will be returned NG due to devious command.

Capital or lower case characters can used. Example: h and H are both valid for the Home command.

Backspace is available to delete one character adjacent.

Command string must not have leading or trailing spaces.

Otherwise, the command string will not be accepted and NG will be returned as a command error.

If commands which are Q, ?, ! are issued, correspondent status will be retured.

In case of other commands, it will be returned OK (correct acceptance) or NG (Reject cceptance due to devious commands)

In case of command use like drive commands which are B, M, A and J except H, it needs to be activate command (G).



Copyright 2018, SIGMAKOKI Co.,Ltd.

### 4-3-2 Command list

| Command | Movement | Detail |
|---|---|---|
| H | Return to mechanical origin | Detect mechanical origin |
| B | Position No. | Set movement to position No. |
| M | Set number of pulses for relative movement | Setting of Axis of movement, direction, number of pulses with relative coordinate |
| A | Set number of pulses for absolute movement | Setting of Axis of movement, direction, number of pulses with absolute coordinate |
| J | Jog command | Move by minimum speed (S) |
| G | Execute command for moving | Start to move |
| L | Stop | Stop or reduce speed |
| R | Set electronic (logical) origin | Set the electronic (logical) origin to the current position |
| D | Speed settings | Set S, F, and R of M and A command |
| C | Free motor | Excitation ON/OFF |
| P | Set position memory | Set position memory |
| Q | Status1 | Return current position etc. |
| **!** | Status2 | Return B(Busy) or R (READY) |
| **?** | Internal information | Return by internal information |


Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-3 H command (Return to mechanical origin command)

**(1) Function**

This command indicates detect the mechanical origin for a stage and set the position as the origin.

Coordinate value is cleared by 0.

***) Limit sensor's detection unplanned in the sequence during the homing operation suspends the operation.**

**Deceleration is not available if the limit sensor is activated.**

**The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

| | |
|---|---|
| **H：1** | Detect the mechanical origin |
| **H：W** | Detect the mechanical origin |

**(3) Return**

Normal "OK"

Error "NG"

## 4-3-4 B command (Set movement to position No. command)

**(1) Function**

This command to set movement to position No.

***) The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

**B:n**

**(3) Parameter**

| | |
|---|---|
| **n：'1' to '5'** | Button number |

**(4) Return**

Normal "OK"

Error "NG"

| | | |
|---|---|---|
| Example) | B：1 | Set movement to button number 1. |
| | B：3 | Set movement to button number 3. |



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-5 M command (Relative movement command)

**(1) Function**

This command is to specify the axis of travel, direction, and the travel (number of pulses).

This command must always be followed by a drive (G) command. Travel is by means of acceleration/deceleration driving.

***) Controller enables to output number of pulse (-134217728 to +134217727).**

**In case of the over number, NG will be returned and will is not acceptable during.**

**The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

**M：nmPx**

**(3) Parameter**

| | |
|---|---|
| **n：'1' or 'W'** | Name of axis to operate |
| **m：'+' or '-'** | +:Moves the axis in the positive direction, -: Moves the axis in the negative direction |
| **x：Moving pulse** | Set a number from -134217728 to +134217727 |

**(4) Return**

Normal "OK"

Error "NG"

Example) M：1+P1000 Sets 1000pulse move in the positive direction.

M：W-P5000 Sets 5000pulse move in the negative direction.

## 4-3-6 A command (Absolute movement command)

**(1) Function**

This command is to specify the axis of travel, direction, and the travel distance (number of pulses). This command must always be followed by a drive (G) command. Travel is by means of acceleration/deceleration driving.

***) Controller enables to output number of pulse (-134217728 to +134217727).**

**In case of the over number, NG will be returned and will is not acceptable during.**

**The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**



Copyright 2018, SIGMAKOKI Co.,Ltd.

**(2) Example**

**A：nmPx**.

**(3) Parameter**

| | |
|---|---|
| n：‘1’ or ‘W’ | Name of axis to operate |
| m：‘+’ or ‘-’ | +: Moves the axis in the positive direction, -: Moves the axis in the negative direction |
| x：Moving pulse | Set a number from -134217728 to +134217727 |

**(4) Return**

Normal “OK”

Error “NG”

| | |
|---|---|
| Example) A：1+P1000 | Set a move to coordinate 1000. |
| A：W-P5000 | Set a move to coordinate –5000. |

## 4-3-7 J command (Jog command)

**(1) Function**

This command is to continue the movement with start-up speed (S speed). During command operation, stage will move non-stop until the detection of limit sensor or receipt of Stop command (L command). Activation command (G:) is necessary after execution of this command.

**The excitation OFF of motor, it will be responded by “NG” as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by “NG” as error and command will not acceptable during.**

**(2) Example**

**J：nm**

**(3) Parameter**

| | |
|---|---|
| n：‘1’ or ‘W’ | Name of axis to operate |
| m：‘+’ or ‘-’ | +: Moves the axis in the positive direction, -: Moves the axis in the negative direction |

**(4) Return**

Normal “OK”

Error “NG”

| | |
|---|---|
| Example) J：1+ | Set jog operation in the positive direction |



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-8 G command (Driving command)

**(1) Function**

The command to perform the driving operation of the stage. The stage is driven according to the B,M,A and J command run immediately before. On detecting a limit, the stage being driven stops immediately without acceleration/ deceleration.

Running this command without running a moving command (B,M,A and J command) generates a command error.

**The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

**G：** Drive

**(3)Return**

Normal "OK"

Error "NG"

Example) M：1+P1000

G： Moves 1000pulse in the positive direction

## 4-3-9 L command (Decelerate and stop command)

**(1) Function**

It decelerates and terminates stage.

**(2) Example**

**L：1** Decelerate and stop

**L：W** Decelerate and stop

**(3) Return**

Normal "OK"

Error "NG"

## 4-3-10 L:E command (Emergency stop (Immediate stop) command)

**(1) Function**

It terminates stage immediately.

**(2) Example**

**L：E** means to stop stages of immediately.



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-11 R command (Electrical (logical) origin settings command)

**(1) Function**

Clear the coordinate value by setting current position of the stage to coordinate origin.

**The excitation OFF of motor, it will be responded by "NG" as error and command will not acceptable during.**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

| | |
|---|---|
| **R：1** | Set the electronic (logical) origin |
| **R：W** | Set the electronic (logical) origin |

**(3) Return**

Normal "OK"

Error "NG"

## 4-3-12 D command (Speed setting command)

**(1) Function**

When power is on, start-up speed (S), final speed (F) and acceleration and deceleration time (R) of speed number designated by SPEED SEL in memory switch are set within.

The travel speed can be altered according to this command.

**Setting range**

| | |
|---|---|
| Start-up speed | (S) 1 - 500000pps |
| Final speed | (F) 1 - 500000pps |
| Acceleration and deceleration time | (R) 0 - 1000ms |

***)S should be equal to F or smaller**

**When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

**D：nSspd1Fspd2Rspd3**

**(3)Parameter**

| | |
|---|---|
| **n：'1' or 'W'** | Name of axis to operate |
| **spd1：Minimum Speed S** | Set a number from 1-500000. [PPS] |
| **spd2：Maximum Speed F** | Set a number from 1-500000. [PPS] |
| **spd3：Acceleration/ Deceleration time** | Set a number from 0-1000. [mS] |

**(4) Return**

Normal "OK"

Error "NG"

Example) D：1S500F5000R200 Set the minimum speed to 500[PPS], the maximum speed to 5000[PPS],and the acceleration/ deceleration time to 200[mS].



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-13 V command (Setting of returning origin speed command)

**(1) Function**

This command indicates the setting of returning origin speed to the designated. When this command is sent under condition of busy and unconnected of axis, it will be responsed by NG as a command error and all command will stop to operate. When the power is turned on, it will be the setting speed of the memory switch.

**(2) Example**

**V : 1,s,f,r,m**

**(3)Parameter**

| | |
|---|---|
| **s :** | Start-up speed (Initial speed) range of setting: 1-500000 (unit : PPS) |
| **f :** | Maximum speed range of setting: 1-500000 (unit : PPS) |
| **r :** | Acceleration/deceleration time range of setting:0-1000 (unit : ms) |
| **m :** | ORG reset speed range of setting: 1-500000 (unit : PPS) |
| | ***)Note : the condition of s≦m≦f** |

**(4) Return**
**Normal "OK"**
**Error "NG"**

| | |
|---|---|
| Example) V:1,500,10000,200,5000 | Set the minimum speed to 500[PPS], the maximum speed to 10000[PPS],and the acceleration/ deceleration time to 200[mS] and ORG reset speed by 5000[PPS]. |

## 4-3-14 C command (Excitation On/OFF command)

**(1) Function**

This command indicates an Excitation On/OFF of motor. The stage is able to move (rotate) manually when the excitation OFF of motor. When this command is sent under busy condition of motorized stage, it will be responded by NG as error and command will not acceptable during.

***) When this command is sent under condition of busy and unconnected of axis, it will be responded by "NG" as error and command will not acceptable during.**

**(2) Example**

**C : nm**

**(3) Parameter**

| | |
|---|---|
| **n : '1' or 'W'** | Name of axis to operate |
| **m : '0' or '1'** | 0: free motor, 1: hold motor |

**(4) Return**
**Normal "OK"**
**Error "NG"**

| | |
|---|---|
| Example) C : 10 | Free motor |



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-15 P command (Position Memory command)

**(1) Function**

By this command, the position is memorized. All buttons can be set a position memory by absolute coordinate.

***) When "POS_WRITE" of the memory switch is off, it will be responded by “NG” as error and command will not acceptable during.**

**(2) Example**

**P：BnmPy**

**(3)Parameter**

| | |
|---|---|
| n：1 to 5 | Button number |
| m：‘+’ or ‘-’ | +: Moves the axis in the positive direction, -: Moves the axis in the negative direction |
| x：position memory | Set a number from 0 to 100000000 |

**(4) Return**

**Normal “OK”**

**Error “NG”**

| | |
|---|---|
| Example) P：B1+P1000 | Set coordinate 1000 is memorized to button number 1. |
| P：B3-P500 | Set coordinate -500 is memorized to button number 3. |

## 4-3-16 Q command (Status 1 command）)

**(1) Function**

On receipt of this command, the controller returns the coordinate and the current state.

**(2) Example**

**Q：**

**(3) Return**

**- 1000, ACK1, ACK2, ACK3**

**Coordinate**

| | | |
|---|---|---|
| **ACK1：** | **X** | **Command error** |
| | **K** | **Command accepted normaly** |
| **ACK2：** | **L** | **LS stop** |
| | **K** | **Normal stop** |
| **ACK3：** | **B** | **Busy status** |
| | **R** | **Ready status** |

***) Coordinate value has a fixed length of ten digits, including symbols.**

**(symbols are left-aligned, coordinates value right-aligned).**



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-3-17 ! command (Reading status command)

**(1) Function**

On receipt of this command, the controller returns the stage operating status.

**(2) Example**

**! :**

**(3)Return**

| | |
|---|---|
| B | Busy status |
| R | Ready status |

## 4-3-18 ? command （Reading internal information command）

**(1) Feature**

This command indicates to return controller information.

**(2) Example**

**? : Paxis**

**P** above represents by string parameter is shown as table below.

**Axis** above represents axis number. Note: axis no must be written only when D or H string parameter is applied.

| String parameter | Returned data | Example of returned data |
|---|---|---|
| 1 | Memory represent value of Position number 1 | +1000 |
| 2 | Memory represent value of Position number 2 | +2000 |
| 3 | Memory represent value of Position number 3 | +3000 |
| 4 | Memory represent value of Position number 4 | +4000 |
| 5 | Memory represent value of Position number 5 | +5000 |
| N | Device name | GIP-101B |
| V | Version | V1.00 |
| R | Pulse number per one rotation | +72000<br>*) Returned data with the value that multiplied "DIVIDE" on the number of 1 rotation pulse chose with DIP switch.<br>**linear stages : +0** |
| D | Travel speed | S100F1000R200 |
| H | Returning origin speed | S500F5000R200M2500 |
| BT | Position specified value information | 1 (= Position 1) |
| ORG | Checking status of origin | 1(= After origin) |



Copyright 2018, SIGMAKOKI Co.,Ltd.

## 4-4. Using I/O signal

GIP-101B has following I/O signal functions.

・Busy signal output-1 point

・Input-6 point (photo-coupler input)

①READY signal output

This is output. It is output when in the "READY" state

②M-ORG input

This is input port. Signal to return to mechanical origin

③POS1 to 5 input

This is input port. It is used to drive the motorized stage to memorized position.

④+24V_EX

I / O power supply DC24 V output.

⑤GND_EX

I / O power supply GND.

***) The controller built-in power supply is not usable other than the I/O signal.**

***) The pulse width of the I / O signal should be 10 ms or more.**

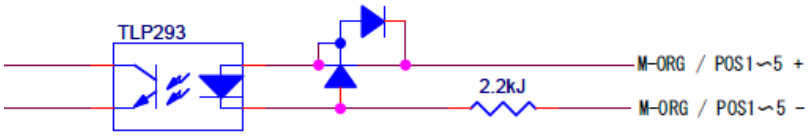



Fig4-1 Input circuits (M-ORG / POS1 to 5)


Fig4-2 Output circuits (READY)



Copyright 2018, SIGMAKOKI Co.,Ltd.

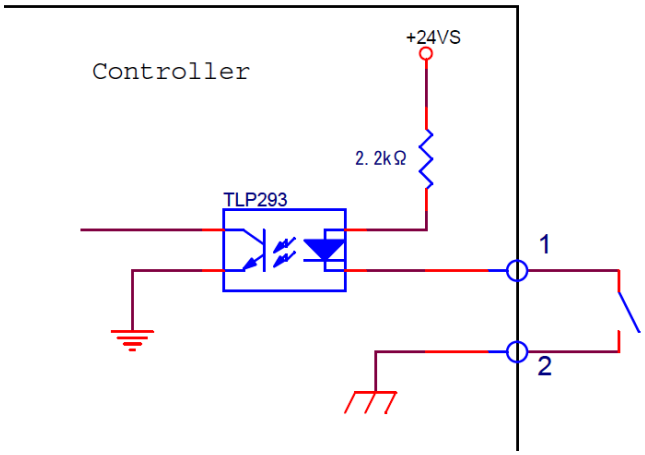
# Chapter 5: Emergency STOP

The connector model “MSTB2,5/2-GF-5,08” (PHOENIX CONTACT Inc.) is used.

When in use, connect a plug component “MSTB2,5/2-STF-5,08” (PHOENIX CONTACT Inc.) that attached to the product.

The EMG_STOP signal operates in the logic of “Normal Close”. Attach a jumper wire while normal operation.

Please note that “EMG STOP” is triggered at the rising edge from CLOSE to OPEN. It is not triggered by the signal level.




Emergency Stop Switch (B type)

Switch Close ⇒ Normal

Switch Open ⇒ Stop



Copyright 2018, SIGMAKOKI Co.,Ltd.

# Chapter 6: Specifications

## 6-1. Specifications

**1. General Specifications**

| | |
|---|---|
| Power source | DC24V 1.8A |
| (Dedicated AC adaptor) | AC100-240V 50/60HZ |
| Operating temperature | 5～40℃ |
| Storage temperature | -20～60℃ |
| Altitude | up to 2000m |
| Indoor use only | |
| Installation category | Ⅱ |
| Pollution degree | 2 |
| Ambient humidity | 20 to 80%RH (no condensation) |
| External dimensions | 175W×165D×55H(excluding projections) |
| Weight | 1.2kg |

**2. Performance**

| | |
|---|---|
| Controlling axis | 1 axis |
| Maximum driving speed (F) | 1～500000PPS |
| Minimum driving speed (S) | 1～500000PPS |
| Maximum No.of travel pulse | -134217728 (Pulse) ~ +134217727 (Pulse) |
| Acceleration/deceleration time (R) | 0~ 1000ms |

Sensor Input: Origin sensor / Proximity sensor / CW (-) Limit / CCW (+) Limit
(Memory switches can be used to change input logic for sensors.)

Interface: USB Interface (Serial communication)

Communication Parameters

| | |
|---|---|
| ・Baud Rate | 9600/38400/57600 bps |
| ・Data Bits | 8bit |
| ・Parity | None |
| ・Stop Bit | 1bit |
| ・Flow Control | None |
| ・Delimiters | CR+LF |

I/O: Input 6-pin (Photo-coupler Input, Internal Resistance 2.2kΩ)

・Return-to-origin command -1 point

・Position number 1 to 5 -5 point

Output 1-pin (open-collector output, maximum use conditions DC24V 20mA)

・READY signal -1point



Copyright 2018, SIGMAKOKI Co.,Ltd.

**3. Driver Specifications**

| | |
|---|---|
| Driver type | Bi-polar pentagon micro-steps system |
| Driving electric current (output current) | 0.75 A/phase (0.35 to 0.75 A/phase) |
| Current down (stop current) | 0.375 A/phase (0.175 to 0.375 A/phase) |
| Division (micro-step) settings | 1, 2, 2.5, 4, 5, 8, 10, 20, 25, 40, 50, 80, 100, 125, 200, 250 divisions |

## 6-2. Connector Pin Assignments

### ▪ 6-2-1. I/O Connector

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | M-ORG+ | 11 | POS5+ |
| 2 | M-ORG- | 12 | POS5- |
| 3 | POS1+ | 13 | READY+ |
| 4 | POS1- | 14 | READY- |
| 5 | POS2+ | 15 | GND_EX |
| 6 | POS2- | 16 | 24V_EX |
| 7 | POS3+ | 17 | GND_EX |
| 8 | POS3- | 18 | 24V_EX |
| 9 | POS4+ | 19 | GND_EX |
| 10 | POS4- | 20 | 24V_EX |

Connector 10220-52A2PL (by 3Mproducts) used

### ▪ 6-2-2. STAGE1,2 Connector

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Blue: motor wiring | 9 | GND : Electromagnetic Brake |
| 2 | Red: motor wiring | 10 | +24V : Electromagnetic Brake |
| 3 | Orange: motor wiring | 11 | LS (+): limit detection on + |
| 4 | Green: motor wiring | 12 | LS (-): limit detection on- |
| 5 | Black: motor wiring | 13 | GND: common sensor |
| 6 | GND: common sensor | 14 | NEAR: proximity detection |
| 7 | ORG: mechanical origin detection | 15 | +24V: sensor power supply |
| 8 | +24V: sensor power supply | | |

Female XM3B-1522 connector (OMRON products) used



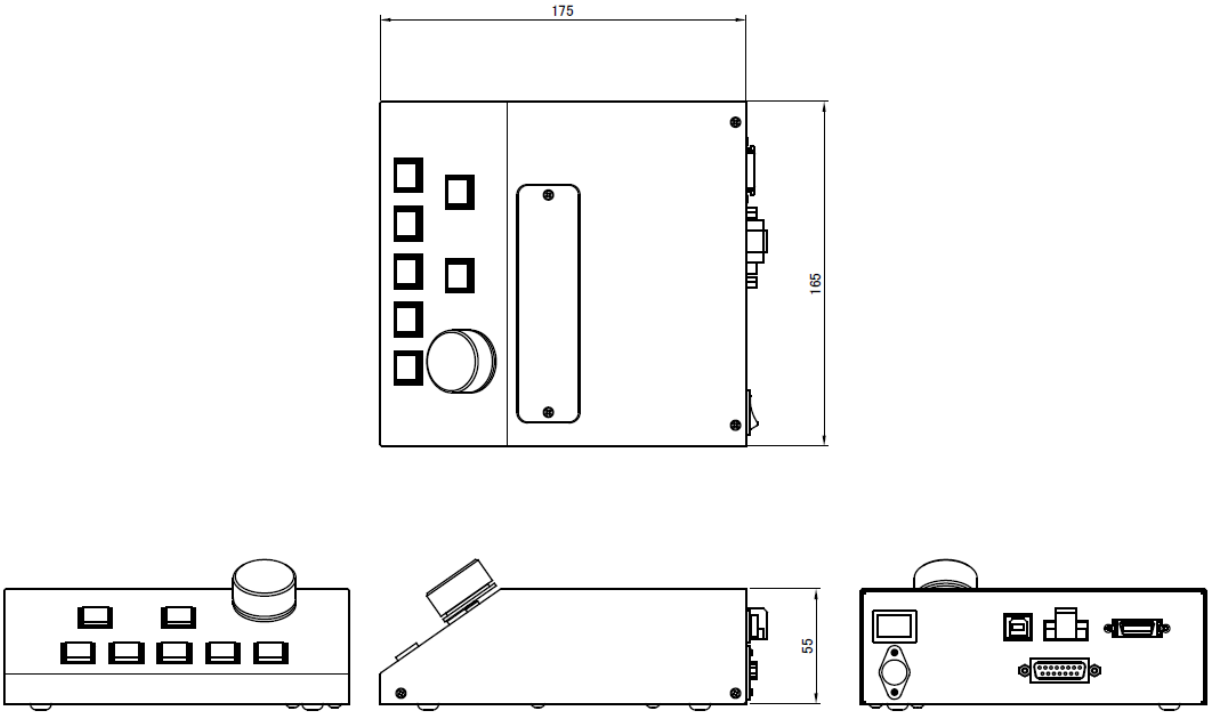
Copyright 2018, SIGMAKOKI Co.,Ltd.

### ・6-2-3. USB Connector

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | - | 3 | DATA+ |
| 2 | DATA- | 4 | GND |

Connector XM7B-0442 (By Omron) used

## 6-3. Outlines






Copyright 2018, SIGMAKOKI Co.,Ltd.

**SIGMAKOKI CO., LTD.**

**http://www.global-optosigma.com**

**Tokyo Head Office** SIGMAKOKI Tokyo Head office 19-9, Midori 1 chome, Sumida-ku, Tokyo 130-0021, JAPAN
TEL+81-3-5638-8228 FAX+81-3-5638-6550 E-mail:international@sigma-koki.com

**Osaka office** 9-28, Nishi-Nakajima 4 chome, Yodogawa-ku, Osaka 532-0011, JAPAN
TEL+81-6-6307-4835 FAX+81-6-6307-4834 E-mail:sales.osaka@sigma-koki.com

**Kyushu office** 3-17,hiemachi, hakata-ku, Fukuoka 812-0014
TEL+81-92-481-4300 FAX+81-92-481-4310 E-mail:sales.kyushu@sigma-koki.com

**Technology Center** 1-1Yatsukaho, Hakusan-shi, Ishikawa 924-0838, JAPAN



Copyright 2018, SIGMAKOKI Co.,Ltd.