



Motorized Stage

Instruction manual

Thank you for purchasing our product.

Please read this instruction manual carefully and use the product correctly and safely.

Please keep it even after reading and please use it upon necessity.

■ about this manual

- The installation and connection procedure is differ depending on the model.
- As a representative example, sentences and explanatory diagrams of similar models are used.
- For details of the product, please refer to our website.

From the top right page of the homepage "SEARCH"

Accessories

The accessories differ depending on the model. Please check when opening the package.

If the number of items is insufficient, contact the vendor.

- Installation bolts

(The size and number of the product are described in detail on the web site.)

- Inspection certificate

※For additional accessories, please see the product details on the web site.

Table of Contents

1	Precautions on usage.....	2
2	How to set up	5
2 - 1	Installation precautions	5
2 - 2	Installation of the stage (excluding XY stage with scale).....	5
2 - 2 - 1	X/XY/Gonio Stage	5
2 - 2 - 2	Z stage.....	5
2 - 2 - 3	Rotary stage	5
2 - 3	About moving the table when installing	6
3	Motor used	7
3 - 1	Specification of the motor	7
3 - 2	Motor internal wiring	7
4	Specification of the connector	8
5	Sensors	10
5 - 1	About the home sensor, pre-home sensor, limit sensor	10
5 - 2	Sensor specifications	11
5 - 3	Sensor logic of the stage.....	12
5 - 4	Adjustment of sensor position.....	12
6	Warranty and repairs.....	14

1 Precautions on usage

Avoid bumping

This product configured by the precision parts. Please do not use it where it receives shock or vibration from other equipment. Will not be able to guarantee precision in motion.

Do not dismantle or modify

Do not disassemble or modify for this product has been precisely adjusted. Becomes the cause of malfunction. If you encounter failure and loss of precision due to dismantle or modifying the warranty will no longer be applied.

When installing an instruments on the table ①

When installing an instruments on the table of this product, pay attention to the length of the mounting screw. If it is too short, the stage cannot be completely fixed. If it is too long, the stage may be damaged. Please be careful.

When installing an instruments on the table ②

When installing an instruments to the table of this product, please fix the moving part firmly and pay attention not to apply unreasonable force to the moving part. If a force is applied without fixing the moving part, it may adversely affect accuracy or the moving part may be damaged.

Keep away from magnetic recording media

The stage uses a powerful magnet motors. Please keep away magnetic recording media from the stage. May corrupt data.

Note that environment used

Do not use in environment in excessive high or low temperature, severe temperature changes, excessive dust. Please use this product within ambient temperature: 10~40°C humidity 20~80% RH.

Do not touch the moving stage

During controller operation, please avoid touching the moving stage and manual handle. No longer working correctly, it can cause malfunction. In addition, it can cause injuries such as dragging in fingers. The motor used generates heat. There is a danger of burns do not touch motor.

Once you have abnormality

If abnormal noise, smell, smoke, or other abnormalities occur during use, stop using it immediately, turn off the power to the controller and driver, disconnect the power plug from the outlet, and contact the dealer.

■ Attention

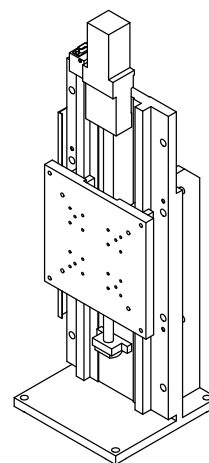
Motor current

It cannot be driven with controllers with different current specifications. There are two kinds of motor current specifications, 0.35 A / phase and 0.75 A / phase.

Please be aware that if the product of 0.35A/phase specification is mistakenly driven by the controller of 0.75A/phase specification, the motor of the product may heat up.

Load capacity

Please do not apply more load than load capacity. There is a possibility of lowering accuracy. Also, the table of the Z stage may fall. If the motor is out of synchronization, there is a possibility of falling even if the load is less than the load capacity. Due to the fall of the table, this product and your equipment may be damaged or yourself may be injured, so please never load more than the load capacity.



Electromagnetic brake

Depending on the product, there are stages with electromagnetic brakes. Electromagnetic brakes prevent the table from dropping during power outages or when the motor is de-energized. If the electromagnetic brake is released without energizing the motor, the table may fall even if the load is less than its bearing capacity. If there is some gap between the ON/OFF timing of the motor excitation and the ON/OFF timing of the electromagnetic, the table may fall even if the load is less than its bearing capacity.

The procedure for operating the stage with electromagnetic brake is as follows:

<Starting procedure>

- (1) Stage power ON (excitation to stepping motor)
- (2) Power supply to the electromagnetic brake control output (power ON)
- (3) Ready to use

<Termination procedure>

- (1) Motor Stop (Power ON Continued)
- (2) Electromagnetic brake OFF
- (3) Stage power OFF

2 How to set up

2-1 Installation precautions

- Please fix the stage to the solid workbench with the screw included in the accessory.
- There is a stage where the motor part is out from the bottom side. Please install this stage on another stage or install it on the workbench using a spacer.
- If the installation flatness surface of the stage is not good enough, not only it cannot show its ability but also can cause malfunction. Be sure of on the accuracy of the mounting surface.
- Note that on the surface and on the back stage dust adhesion and scratches.
- When manually moving the table during stage installation, be sure to return the table near the center manually after completion of installation. In moving condition, limit sensor might be out of detection range, motor driven can cause failure or malfunction. (Excluding rotary stage)
- To install a stage other than the rotary stage, it is necessary to move the table to expose the mounting hole. For details on moving the table, see "**2-3 About moving the table when installing**".

2-2 Installation of the stage (excluding XY stage with scale)

2-2-1 X/XY/Gonio Stage

Mounting holes for installing X, XY and Gonio stage are hidden under the table. Please move the table in the procedure of "**2-3 About moving the table when installing**" and install the stage.

2-2-2 Z stage

When installing, please use the hole in the bracket.

2-2-3 Rotary stage

Please insert the screws from the holes (3 places) on the top of the stage and fix the stage.

2-3 About moving the table when installing

When installing the stage, please do as follows.

1. Move the table and stop it where the mounting holes are visible.
2. Insert the mounting screw into the mounting hole, tighten lightly and fix it temporarily.
3. Move the table in the opposite direction to step 1 and stop at the side where the mounting hole on the opposite side is visible.
4. Insert the mounting screws into the mounting holes and tighten them securely.
5. Return the table to the position of step 2 and tighten securely the screw tightened lightly.

The table can be moved manually by turning the handle or automatically under the control of the controller (driver). However, please note the following points.

- Be sure to turn off the controller and driver to move the table manually. Turning the manual handle while turning on the controller and driver may cause failure or malfunction.
- Please be careful not to pinch fingers and tools when you decide to move the stage automatically. Not only would cause malfunction but also may cause injuries.
- There are some of stages that the mounting hole may not be visible even if the table is moved automatically. In such a case, turn the controller off and move the table manually.

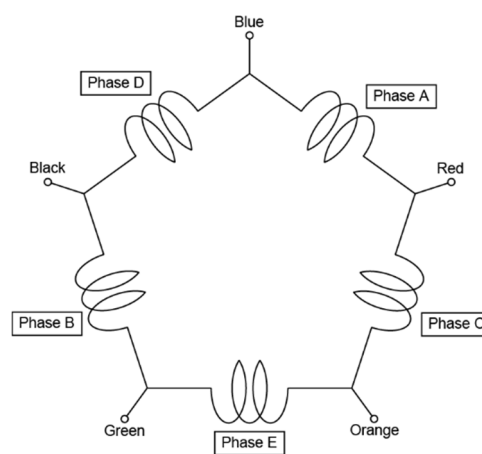
3 Motor used

3-1 Specification of the motor

Please refer to the product details of the homepage.

3-2 Motor internal wiring

Internal wiring of the motor has 5 wire resistive pentagon connection. Be careful when selecting a driver.



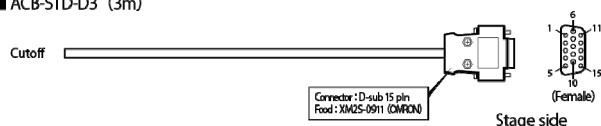
4 Specification of the connector

There are three types of connector connection specifications depending on the model. After checking the model of the product, refer to each connector connection table on the homepage and wire it correctly.

ACB-STD-D3 (Food : XM2S-0911(OMRON))

Pin No.	contents	line color
1	motor line (blue)	brown
2	motor line (red)	blue
3	motor line (orange)	gray
4	motor line (green)	orange
5	motor line (black)	pink
6	sensor Vcc (※1)	light blue
7	CW direction limit sensor OUT (※2)	purple
8	CCW direction limit sensor OUT (※2)	green
9	Common for sensor (GND)	yellow
10	home sensor OUT (※2)	red
11	pre-home sensor OUT (※2)	white
12	for maintenance	
13	Electromagnetic brake (+) (※3)	白/red
14	Electromagnetic brake (-) (※3)	白/緑
15	FG for maintenance	

■ ACB-STD-D3 (3m)



※1 : Voltage is different between photo sensor and Hall IC

※2 : Some of products don't have this. In this case it is for maintenance.

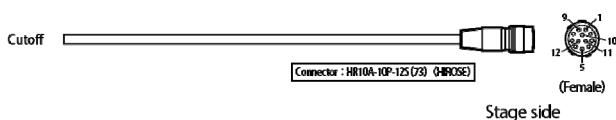
※3 : For maintenance for the stage without electromagnetic brake

ACB-STM-D3

(Connector : HR10A-10P-12S(73) (HIROSE))

Pin No.	contents	line color
1	motor line (blue)	brown
2	motor line (red)	blue
3	motor line (orange)	gray
4	motor line (green)	orange
5	motor line (black)	pink
6	sensor Vcc (※1)	light blue
7	CW direction limit sensor OUT (※2)	purple
8	CCW direction limit sensor OUT (※2)	green
9	Common for sensor (GND)	yellow
10	home sensor OUT (※2)	red
11	pre-home sensor OUT (※2)	white
12	FG for maintenance	

■ ACB-STM-D3 (3m)



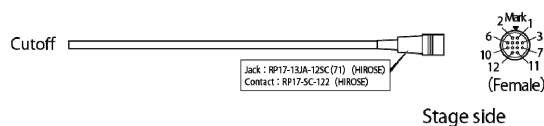
ACB-STC-D3

(Jack : RP17-13JA-12SC(71) (HIROSE))

(Contact : RP17-SC-122 (HIROSE))

Pin No.	contents	line color
1	motor line (blue)	pink/red
2	motor line (red)	orange/black
3	motor line (orange)	orange/red
4	motor line (green)	orange/black
5	motor line (black)	yellow/red
6	sensor Vcc (※1)	yellow/black
7	CW direction limit sensor OUT (※2)	gray/red
8	CCW direction limit sensor OUT (※2)	gray/black
9	Common for sensor (GND)	white/red
10	home sensor OUT (※2)	white/black
11	for maintenance	
12	FG for maintenance	

■ ACB-STC-D3 (3m)



The built-in sensor differs depending on the stage. If there is no sensor, its pin doesn't need to connect. Please check on the homepage, whether the product with the sensor or not.

For sensor specifications, please check "**5 sensors**".

■ **Attention**

- It is recommended to isolate each sensor of limit OUT, home OUT, and pre-home OUT with a photocoupler etc. on the controller side.

5 Sensors

Please control the origin return operation and the limit stop operation from the controller side. Since the sensor only outputs a signal when it reaches its position, the controller needs to sense the signal and control processing after sensing. If the limit sensor is detected, stop the operation immediately.

After understanding this, connect the controller. The existence of each sensor and the sensor position differ depending on the stage. Please check the product details of the homepage.

5-1 About the home sensor, pre-home sensor, limit sensor

Home, pre-home and limit are detected by sensor. However, depending on the model, there are stages without these sensors.

Home sensor

Home sensor is used to detect the home of the stage. The sensor position cannot be changed by construction.

The home sensor is detected once per revolution of the motor shaft.

Pre-home sensor

This is a sensor required to return to the home point. Since the home sensor is detected once per revolution of the motor shaft, a sensor for determining the actual home point is required. This is the pre-home sensor. This actual home point is called the origin return position. The origin return position can be set to a different home sensor position than if the pre-home sensor position is moved (limited to a movable stage). In order to correctly detect the origin return position, there is a determination of the direction in which the sensor is to be detected. The starting position to return home is the front of the pre-home sensor (CCW side). And the motor shaft is rotated in the CW direction to move the table. The position at which the home sensor detected in this direction after the pre-home sensor detected is the origin return position.

Note that if the home return speed is too fast, the home signal may not be sensed and the home return may not be performed properly. In this case, slow down the return home point speed.

Limit sensor

The limit sensor is installed at both ends of the movable range of the stage.

There is no limit sensor on the rotary stage.

5-2 Sensor specifications

- Photosensors or Hall ICs are used to detect the point of home, pre-home, or limit.
- Hall IC works with magnetic field. Please note that may malfunction generated by a magnetic field around the stage.
- The controller controls the operation of returning the stage to the home point and stopping the limit. Since the sensor only outputs a signal when it reaches its position, the controller needs to sense the signal and control processing after sensing. If the limit sensor is detected, stop the operation immediately.
- Be sure to insert a pull-up resistor. The resistance is chosen so that I_o does not exceed the maximum current (see table below). If the maximum current (see table below) is exceeded, the sensor will be damaged.

Example : If $V_{DD}=24V$ for the photosensor, then $R < V_{DD} \div I_o = 24 \div 0.03 = 800[\Omega]$

Considering individual variability, please select a larger resistance.

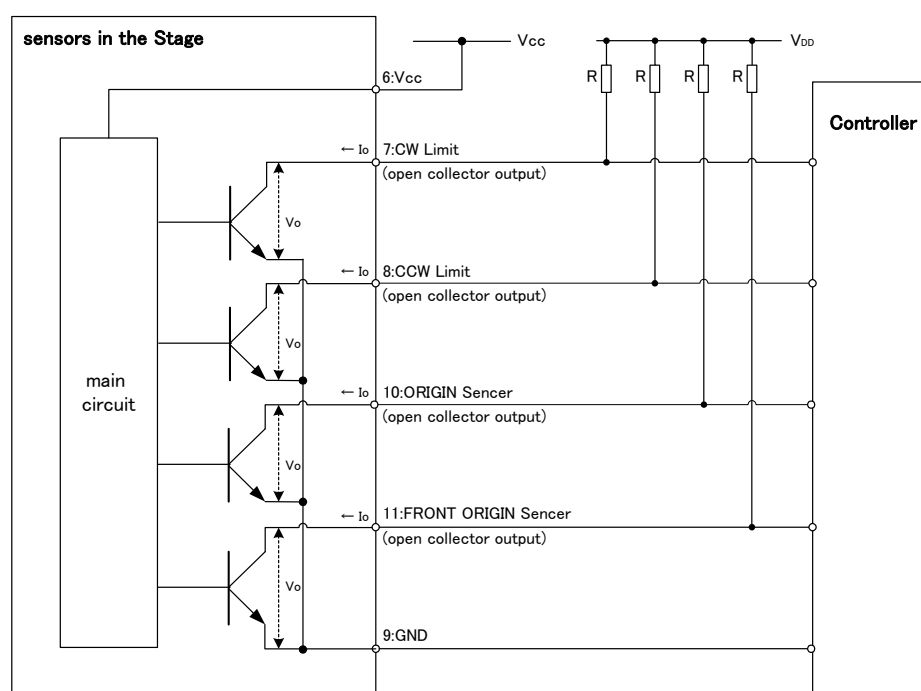


	Photo sensor	Hall IC
output form	open collector	
Power supply voltage of the sensor (Vcc)	5-24V	4.5-16V
Current consumption of the sensor (Icc) (Per piece)	30mA	10mA
Maximum voltage (Vo)	30V	16V However, do not exceed the power supply voltage of the sensor (Vcc)
Maximum current (Io)	30mA	20mA

5-3 Sensor logic of the stage

It depends on model. Please refer to the product details of the homepage. Each signal operation logic of limit OUT, home OUT, and pre-home OUT are described on the website.

5-4 Adjustment of sensor position

The detection position of pre-home sensor and limit sensor can be changed by moving the dog. When moving the dog, follow the adjustment procedures and notes below.

Some stages may not be able to move the position of the sensor. And the home position cannot be changed. Refer to the product details of the homepage for the adjustable range of the home sensor, pre-home sensor and limit sensor.

Removing the sensor cover

To adjust the sensor position, the sensor cover must be removed. Please check the drawing for the sensor cover position.

Position of the home sensor, pre-home sensor and limit sensor varies depending on the model. Please check the product details of the homepage. Please remove the fixing screw of the sensor cover and remove the cover.

Notes on Adjustment

- Please adjust within the adjustment range.
- Please be careful to handle precision parts such as sensor, dog, dog guide when adjusting the sensor position.
- Please be careful not to pinch hands, fingers and tools in sensor, dog, dog guide when changing sensor position. If you pinch your hands or fingers, it may not only cause of trouble or malfunction, but also may cause injury.
- Do not loosen or remove screws or parts unnecessary for adjustment.
- The factory default limit position is set at both ends of the total travel distance. Limit adjustment should be done inside this range. If the position of the limit sensor is set outside this range, the limit cannot be detected and the stage may be damaged.
- If the position of the dog is changed, please make sure the dog is correctly fixed to the dog guide. After completing the adjustment of the sensor position, move the stage manually and check that the dog does not hit the sensor.

Adjustment procedure

(1) Pre-home sensor adjustment

1. Turn off the controller and driver
2. Loosen the screw and remove the sensor cover
3. Loosen the dog fixing screw, move the dog to the desired position, tighten the screw and fix it
4. Turn on the power supply of the controller and the driver, and perform home positioning
5. Fine-adjust 1, 3, and 4 repeatedly until the desired home position is reached.
 - ※Since the home sensor is detected once per rotation of the motor shaft, no adjustment can be made below this range.
6. Return the sensor cover to the original position and screw it

(2) Limit sensor adjustment

1. Turn off the controller and driver
2. Loosen the screw and remove the sensor cover
3. Loosen the dog fixing screw, move the dog to the desired position, tighten the screw and fix it
4. Turn on power to the controller and driver, operate the stage, and check the limit stop position
5. Fine-adjust 1, 3, and 4 repeatedly until the desired limit position is reached.
6. Adjust the limit sensor position on the other side as well if necessary
7. Return the sensor cover to the original position and screw it

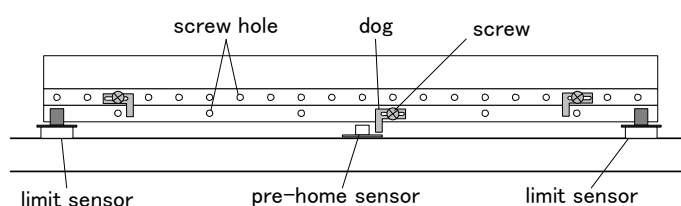


Figure) Example of limit adjustment position ①

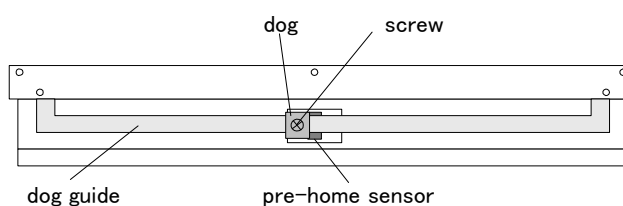


Figure) Example of limit adjustment position ②

6 Warranty and repairs

■ The warranty period

If a malfunction occurs in the normal use condition based on the instruction manual, specification sheet, notes on the label attached to the main body, cautions on handling described in the catalog, the product will be repaired free of charge for the following period.

1 year from delivery date

However, damages induced after delivery will be excluded from this coverage. Please note that even within the warranty period will be repaired for a fee in the following situations.

- due to misuse, or repairs or modifications
- damage and failure due to falling after purchase
- failure and malfunction due to fire, earthquake, flood, lightning or other disasters, pollution and extreme voltage
- performance degradation due to the deterioration of supplies or abnormal operation
- predetermined out of warranty in our products and components

■ Repair within the warranty period

Please contact the dealer you purchased.

■ Repairs when the warranty period has expired

Please contact your dealer even if the guarantee period has expired. By the degree of malfunction you will be liable for the cost of repair. In order to ensure faster time to repair, repair information, please inform the following

- purchased date, product name, product number, serial number
- the customer's specific usage
- detailed description of the problem
- the reason thought that caused malfunction

■ Contact us

Please contact us below if you have questions on our products.

- Note that it may change the contents of this instruction manual without prior notice. Also, please be sure that products subject to change for improvement without prior notice.

Motorized stage instruction manual Ver.1.1

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