

Laser Auto-Collimator

H400-C / H400-CS / H600CS

Instruction Manual Ver1.2



Suruga Seiki Co.,Ltd.

OST Department

1.Introduction

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1.2 Preface

Thank you for choosing SURUGA'S production in this time.

Please read this instruction manual and use this system correctly. And keep this manual carefully and read again in case you need this manual.

Regarding peripherals equipments like image processing unit, please refer to manuals that attached with each system.

In case of missing or damaging this manual, please inquiry to us on referring <Inquiry/Contact> (refer to Page26)

Please be careful, configuration and accessories depend on the purchasing contract.

Caution

Unauthorized reproduction or duplication of this manual in part or in all is strictly prohibited.

Information in this manual is subject to change without prior notice.

This manual has been prepared carefully; however, please contact us if you have questions or suggestions.

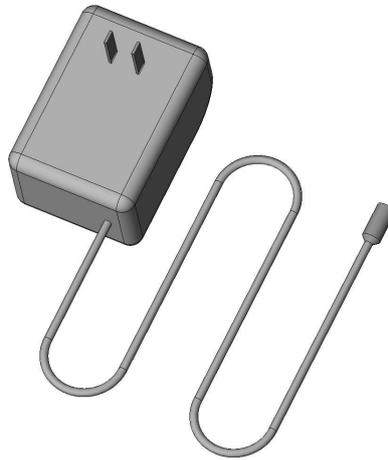
In case of paging disorder and missing page, we would like to replace it.

1.3 Components and Accessories

This production consists of bellow components and accessories. Please check them.

■ Laser Auto Collimator Configuration in case purchasing only system

Optical Head Main Body	1 Qty
AC Adaptor (12V 300mA)	1Qty(Length 1.9m)
Beam diameter switching plate*	1Qty
ND filter holder	1Qty
Instruction Manual	1Qty



AC Adaptor 1Qty (Length 1.9m)

Laser Auto Collimator Configuration in case of set purchasing

Set Configuration Table

Set name	Monitor	Monitor bracket	Stand	Tilt	Image Processor
Main body +LCD Monitor	VCPM-5656W	—	—	—	—
Half Set	VCPM-5656W	HA10-MB	HA10	HB10/HB11	—
Full Set 500	VCPM-5656W	HA10-MB	HA10	HB10/HB11	HIP-500
Full Set 1000	VCPM-5656W	HA10-MB	HA10	HB10/HB11	HIP-1000
High rigidity Set 500	VCPM-5656W	HA11-MB	HA11N	HB10/HB11	HIP-500
High rigidity Set 1000	VCPM-5656W	HA11-MB	HA11N	HB10/HB11	HIP-1000

Configuration/Accessory

Optical head

Optical head main body	1 Qty
AC Adaptor (DC12V 300mA, Length 1.9m)	1 Qty
Beam diameter switching plate	1 Qty
ND filter holder (H400-CS/H600-CS only)	1 Qty

Accessory

LCD Monitor

LCD Monitor body	1 Qty
AC Adaptor for LCD Monitor (DC12V 1.25A)	1 Qty
Converting connector (RCA plug – BNC plug)	1 Qty
Monitor Bracket	1 Qty

Stand

HA10 (half / Full set)	1 Qty
Screw M3-12 (For installing stand-tilt)	4 Qty
HA11 (high rigidity set)	1 Qty
Screw M3-12 (For installing stand-tilt)	4 Qty
M5-15 (For installing base plate rod)	4 Qty

2 Axis tilting stage

HB10 (H400-C)	1 Qty
Screw M3-8 (For installing tilt head)	4 Qty
HB11 (H400-CS/H600-CS)	1 Qty
Screw M3-12 (For installing tilt head)	4 Qty

1.4 Introduction of Options

We line up following option and please purchase as your requirements.

Optical Components

Name	Angle Unit: deg (Min)	Angle Tolerance	Model	Remark
Optical Parallel	0	± 5 sec	HS-0	$\phi 30, t=10$ One face is AL coating
Wedge Substrate	1 (60)	± 10 sec	HS-100	$\square 40$ $t=10$ Non Coating
	0.5 (30)		HS-050	
	0.25 (15)		HS-025	
	0.2 (12)		HS-020	
	0.1 (6)		HS-010	

Aperture Adaptor

Name	Angle	Model	Remark
90° Folded Adaptor	90°	HT-90	
Beam branch Adaptor	2 Branch	HT-20	
	3 Branch	HT-30	

1.5 Safety Instruction

Please make sure that read following safety precaution before using.

⊘ Symbol means prohibit.



Please make sure that keep safety precautions in this manual. In case of negligence, it may cause injury or damage physically.

*Precaution on safety and usage

This production corresponds to class2 laser equipment. This system should be installed and run by the people who have knowledge of safety for laser equipments.

Don't look in the beam directly or observe beam by optical methods.

Don't touch to beam output by fingers or hit an object. Negligence may cause measurement precise lower.

*Cable connection

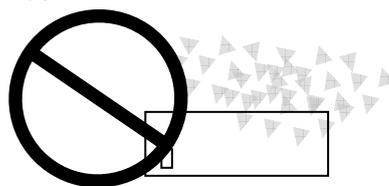
AC Adaptor is attached with H400. This adaptor should connect before turning power on and operation should be done under correct connection.

*Don't use adaptor without attached AC adaptor.

*Environment

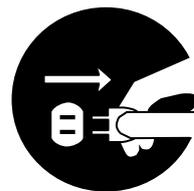
Avoid using this system in following environment

- Many dust and powder dust (especially metal powder)
- Direct sunlight
- Fire and heated place
- Vibrating place
- Splash water and oil
- Inclining and stable place



*Safekeeping/Storage

In case of no usage for long time or transferring this system, make sure unplug from the outlet to prevent unexpected fire or electric shock.





Caution

*Power Source

The standard attached AC adaptor is for only AC100 voltages therefore don't connect AC Adaptor to without AC 100voltage plug outlet. If you would like to run this system without AC100 voltage then please contact our sale person.

*Disassembly/Modification

Make sure that don't disassemble, modify and irregular repair the system.

Negligence may cause the electric shock and dangerous.

If your find something wrong then

please contact Our OST department sales Group.(0120-789-446 tall free)



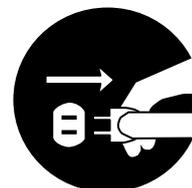
*Repair

In following case, unplug the power cable promptly

After that, please ask the repair for OST department sales Group

After that going on running the system, it may cause fire, electric shock and injury.

- In case of irregular situation like irregular sound, smell bad, smoking
- In case of power code is injured
- Drop the water on this system and foreign objects come into.
- Fall down this system or break the cabinet



*Inquiry/Contact us refer to Page26

1.6 Notification

*Semiconductor laser

The built-in semiconductor laser has own life.

If you find the output light become extremely weak then we recommend replacement of laser and please inquiry and contact us.

Refer to 4.3 Warranty and Service (Page25)

2. System overview

2.1 Main feature

Laser auto collimator is an angle displacement measuring equipment.

It outputs the parallel light that collimates built-in light source. If illuminating the light to reflection mirror that is located small distance from the collimated light, then in case of inclining surface, returned image is misaligned. This distance that the image transfer is proportional to focus distance of built-in lens and inclined angle eventually angle measurement is completed.

Main Feature

- * Detecting small angle displacement by the built-in CCD Camera and video output the input angle displacement from BNC connector of the main body.
- * Due to semiconductor laser, excellent for orientation and stability.
- * Switching aperture mechanism allows being variable output beam diameter therefore it is possible to select the beam diameter to measurement objects.
- * LD power and CCD shutter speed is adjustable. Please refer to basic specification about built-in light source wavelength and sight range.

2.2 Components name and function

2.2.1 H400-C

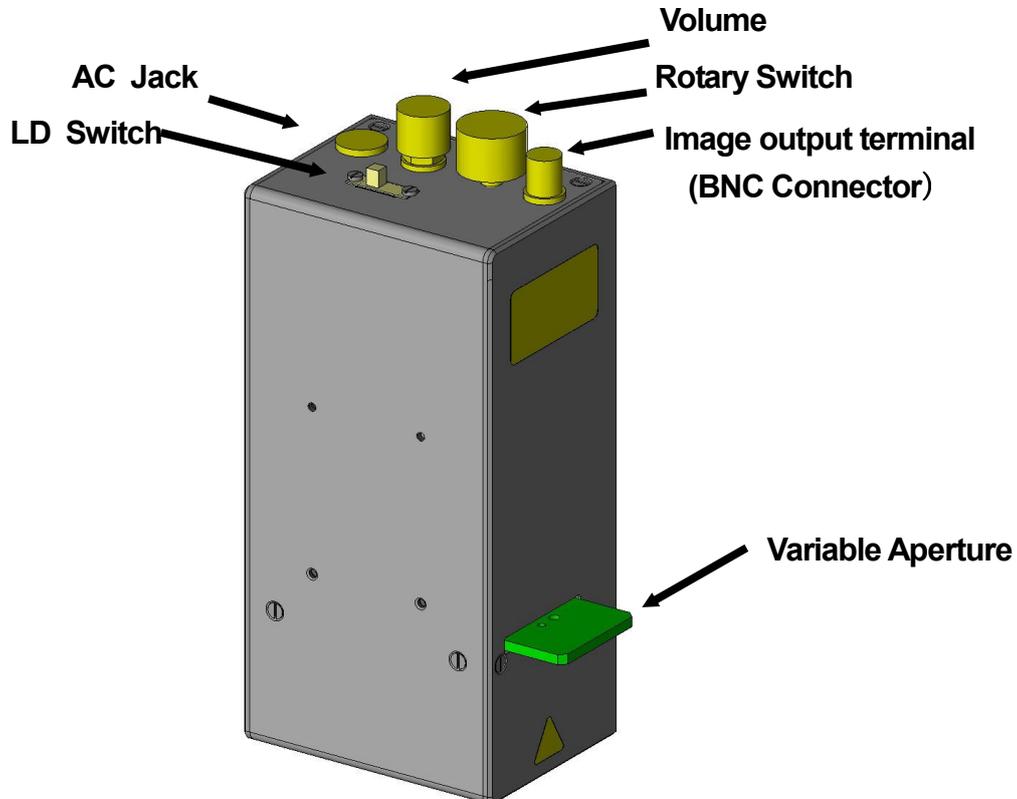


Fig.1-1 H400-C Main Body

2.2.2 H400-CS/H600-CS

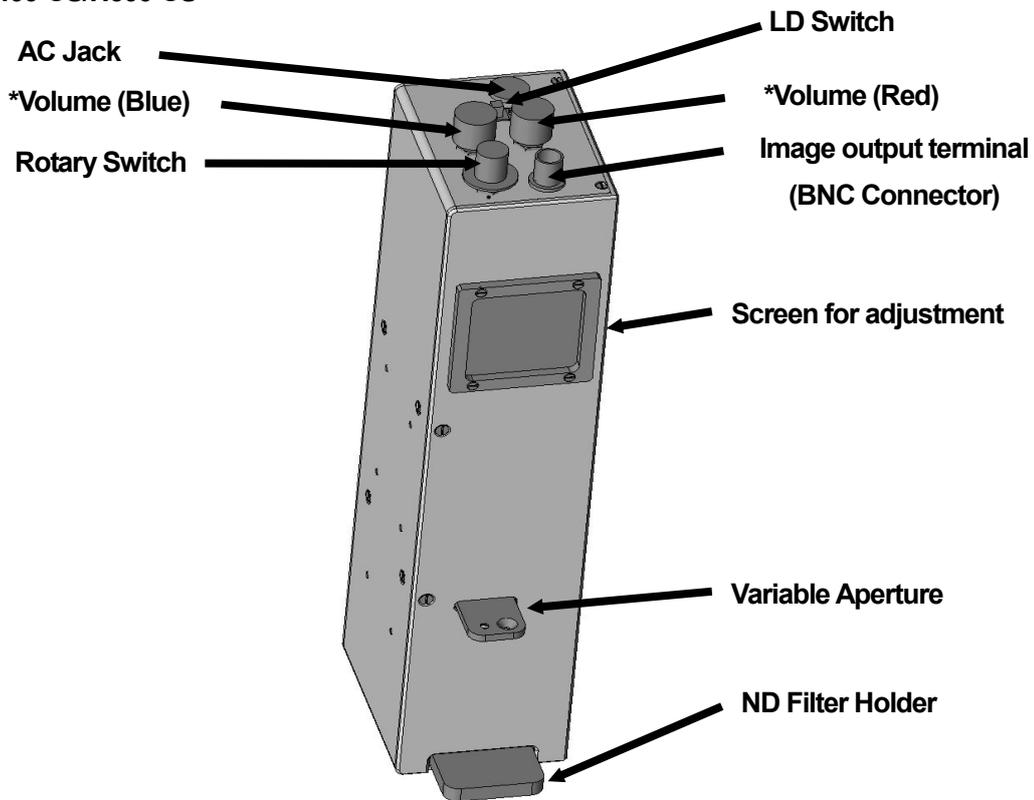


Fig1.2 H400-CS/H600-CS Main Body

*AC Jack

Connecting AC Adaptor (Input: AC100V Output 12V 300mA)

Supplying the electric power from the attached AC Adaptor or HIP-500.

*Rotary Switch

Switching CCD camera speed

(1/100、1/250、1/500、1/1000、1/2000、1/5000、1/10000、1/100000 sec)

Volume

Adjust the output light (Maximum output is less than 1mW)

*The only H600B-CS is loading Volume (Blue)

Image output terminal (BNC Connector)

Output the image of CCD or Monitor to image processing equipments

Variable aperture

Changing the output beam diameter (ϕ 1,2,3,4,6)

Switch

Switching LD output On/Off (Built-in CCD power don't shut down)

*The only H600B-CS has 3 switches, Red on/ Off/ Blue On

2.3 Connection of Components configuration and instrument

As requirement, it is possible to measure with connecting your stand, monitor etc...

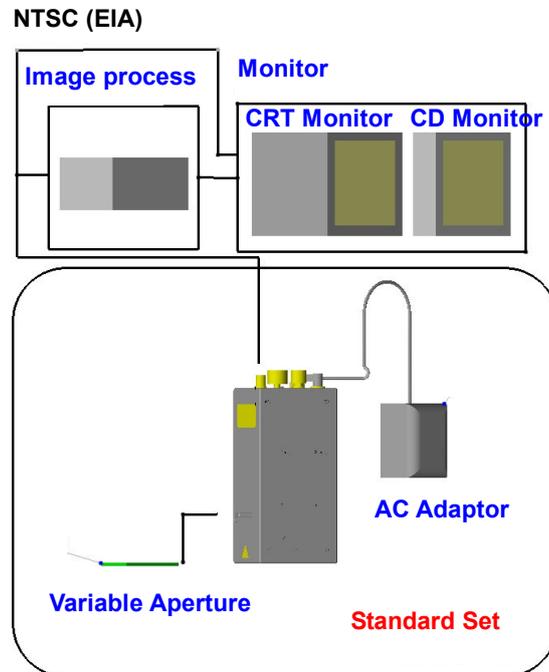


Fig2. Components configuration and connection example

Stand

HA10 Assembling the rod on the M8 tap hole of stand base.

HA11 Inserting 4 screws of pole flange and assembling on the base.

2Axis tilt stage

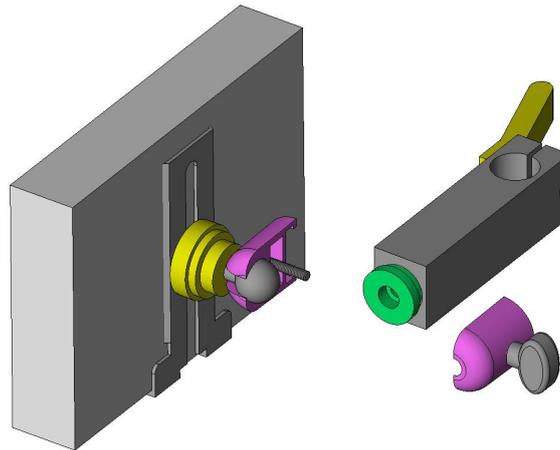
Fix the rod clamp attached with stand by attached screws to black knob side. Install the auto collimator on the stage of the other side of black knob. Please install the auto collimator by using attached screws and in this time the black knob should be located under the auto collimator, the opening side for measurement.

Monitor

Connect the conversion connector to image output terminal and RCA plug, yellow from the monitor.

Monitor bracket

Install the bracket that attached with monitor to the monitor.
Sandwich the lowlet of the monitor bracket as like bellow figure.
Install the monitor bracket on the rod and clamp it.



AC Adaptor

Connect AC adaptor to auto collimator and LCD monitor.
Please use the attached AC adaptor, DC12V and 300mA.
Please use the attached AC adaptor, DC12V and 1.25A, to LCD monitor, red connector,

Others and accessories

Regarding to instruction of the image processing units, please refer to each instruction manual respectively

3.Operation method

3.1 Measurement method

Regarding to contents of instruction here, it is the method under using SURUGA optional 2axis tilt stage (HB11), optical parallel and wedge substrate. In case of purchasing only main body then refer to this method and set up the systems.

3.1.1 Installation of auto collimator

Install the autocollimator on 2axis tilt stage (HB11)

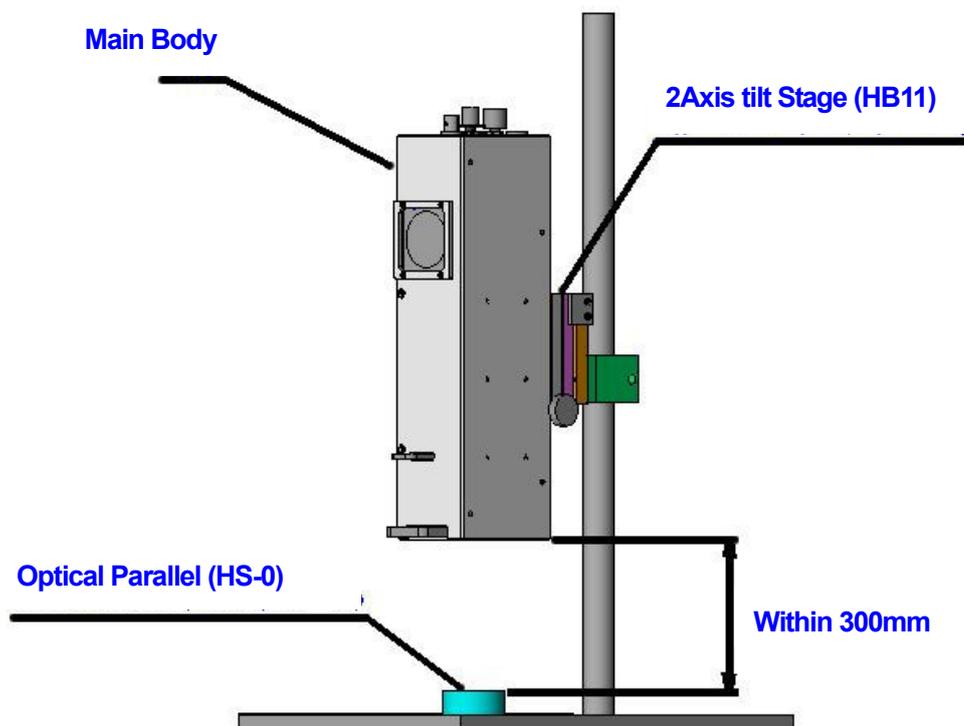


Fig3 Setup Example (H400-CS)

3.1.2 Auto Collimator setting position

The distance from laser output of main body to the optical parallel (HS-0) should be within measurement distance.

Adjusting 2 axis tilt stage (HB-10) as like the laser light reflected on the optical parallel superimpose with the center on the reference (center) from the monitor film or image processing equipment.

Refer to 4.2 Basic specifications (Page21) about measurement distance

3.1.3 Angle correction

Put on the wedge substrate and illuminate the measurement light

(In case of non-coating wedge substrate, put the optical parallel on the wedge substrate)

Against the measurement center (3.1.1 – 3.1.2) that set by using optical parallel, measurement angle that the reflect light point indicates is the wedge substrate angle.

Please measure on this point as reference angel (correction value)

In case of purchasing the half set or main body/LCD monitor, the corrected LCD film is attached with monitor and refers to this film as visual inspection.

In case of purchasing the full set or high rigidity set, please refer image processing instruction manual.

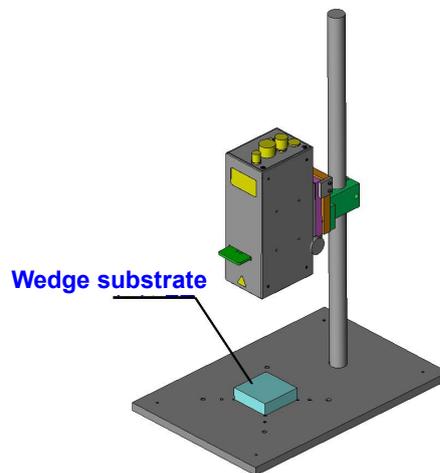


Fig4. Wedge substrate setup

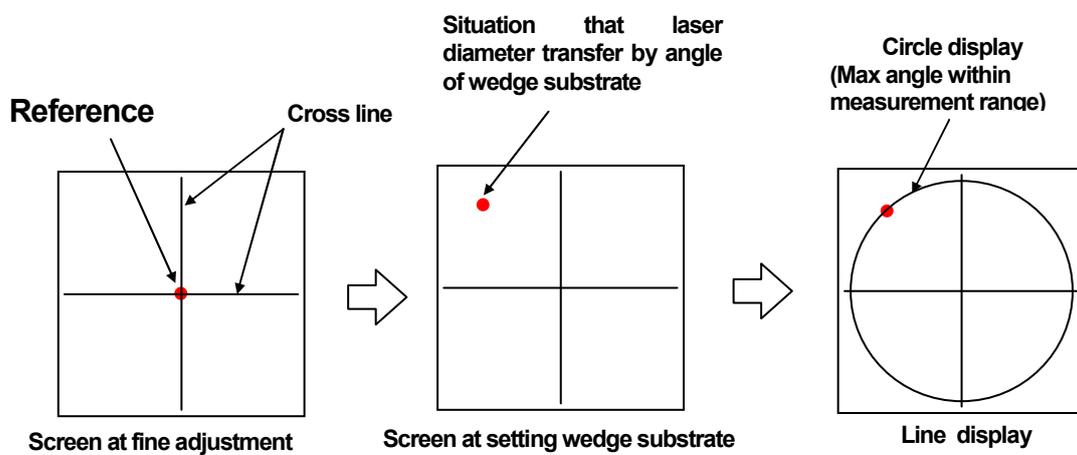
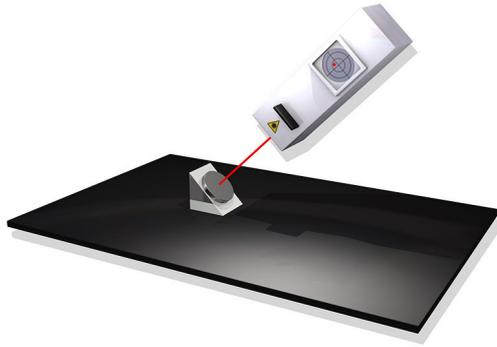


Fig5. Measurement by CCD

3.2 Measurement example

The following are some of applications on using this production. Please measure on referring them.

Mounting optical parts



For example in optical parts assembling process of optical pick up. Inclining inspection at assembly prism or mirror/lens is available to chassis. HIP-500/HIP-1000 also increases measurement effectiveness with its travel distance measuring function and pass-fall grading function.

Inclination adjustment of LD optical axis



Optical axis adjustment is available in LD mounting process. By direct insertion of the light from LD, measuring inserted light can be achieved. Power off the light from Auto collimator and Auto collimator needs to be placed as base line. During measuring internal light source needs to be off

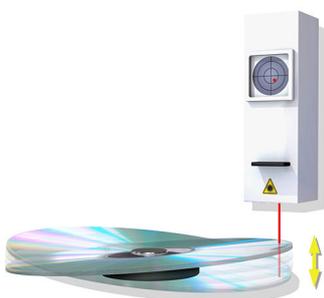
*When operation parallelism adjustment or intensity distribution check besides measuring inclination of LD optical axis, Please use "Proco" Profile and collimation checker.

Assembling adjustment of Optical Pickup lens



During a mounting and curing process, it evaluates inclination of pickup lens against collimation-out from a chassis. Suruga's auto collimator can change a diameter of output beam between $\Phi 1$ to 4 (Non slit case, $\Phi 6$) and can properly illuminate with light volume adjustment function.

Inclination of Deflection test for Optical Disk or Spindle Motor



Checking the amount of linearity & deflection of optical disk or spindle motor. By using a featured HIP-1000's "Orbital measurement" function, the central point of rotation deflection can be observed with real time measuring of orbital tracking.

HDD Head Inclination Check



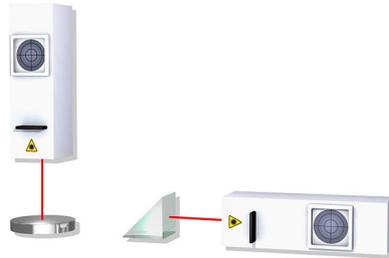
Enable to measure inclination of HDD disk, such as GMR head

Measuring Parallelism between CCD Device and Cover Glass



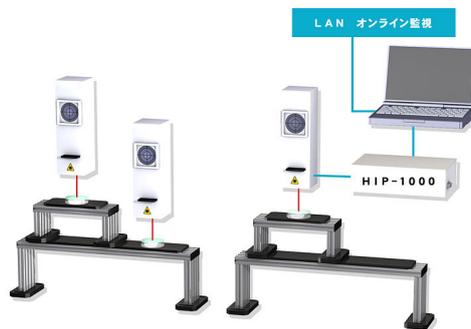
Measuring derivation between CCD reflected light and Cover Glass reflected light. The label measurement function of HIP-1000 enable numerical value display of angle derivation (Parallelism)

Inclination & parallelism measurement of various items



Available for parallelism checking of various items, such as Optical Device, Various metallic parts.
By using additional jig instrument, it can achieve measuring rectangular angle of rectangular mirror.
*Performance depends on surface coarseness of metal surface

Adjustment of Factory Instrument



Available to measure the inclination and parallelism of surface table, parts etc.
Auto collimator supports increase of production yield rate. It provides surveillance on the production line and adjustment in assembling process.

4.Others

4.Trouble shooting

4.1.1 Symptom and action

Symptom	Cause	Action	Refer page
No laser output	Unplug power code	Plug the power code properly	—
	Output power is weak	Adjust power volume	Page 9
	Laser's life is completed	Contact our sales person	Page 8 Page 25
No laser indication on the screen and monitor	The distance to measurement object is too far	Set the distance that to measurement object within measurement distance for each production	Page20
	Due to measuring the angle displacement over measuring range.	Measure the object within measurement range.	—
	Laser's life	Contact our sales person	Page 8 Page 25
Difficult to read laser light	Reflection rate of measurement object is low	Adjust by variable aperture or attach the mirror on the measurement object	—
Light volume on the monitor is strong	CCD Sensitivity is high	Adjust the shutter speed	Page 9
		In case using image processing, adjust the binarization level.	Refer to image processing instruction manual

4.2 Basic Specification

To improve this production, the specification or overviews are subject to change without prior notice.

4.2.1 Specification

Usage environment	: 0 - 40°C 20 - 80 %RH (non condense)
Storage environment	: 0 - 40°C 20 - 80 %RH (non condense)
Electric Power	: AC100 ± 10 % 50/60Hz / DC12V, 300mA
Light source	: Red semiconductor laser
Laser wavelength	: 650nm
Laser output	: Less than 1.0mW (Class2)
Aperture	: φ 1,2,3,4,6mm (Variable)
Measuring Wavelength	: 650±10nm

4.2.2 H400 - C

Size	: 60x80x165mm (Only main body) refer to Page22
Weight:	: 0.85kg (Only main body)
Measurement distance	: C050 : 0 to 240mm / C100 : 0 to 200mm : C150 : 0 to 120mm / C200 : 0 to 80mm
Measurement range	: C050 : ±0.5 deg / C100 : ±1.0 deg : C150 : ±1.5 deg / C200 : ±2.0 deg

4.2.3 H400-CS

Size	: 60x80x260mm (Only main body) refer to Page23
Weight:	: 1.25kg (Only main body)
Measurement distance	: 0 to 300mm
Measurement range	: C016S:±0.16 deg / C020S:±0.2 deg / C030S:±0.3 deg : Screen for rough alignment: ±1.0 deg

4.2.4 H600-CS

Size	: 60x80x274mm (Only main body) refer to Page24
Weight:	: 1.26kg (Only main body)
Measurement distance	: 0 to 300mm
Measurement range	: C020S:±0.2 deg / C030S:±0.3 deg : Screen for rough alignment: ±0.8 deg

4.2.5 H600-CS

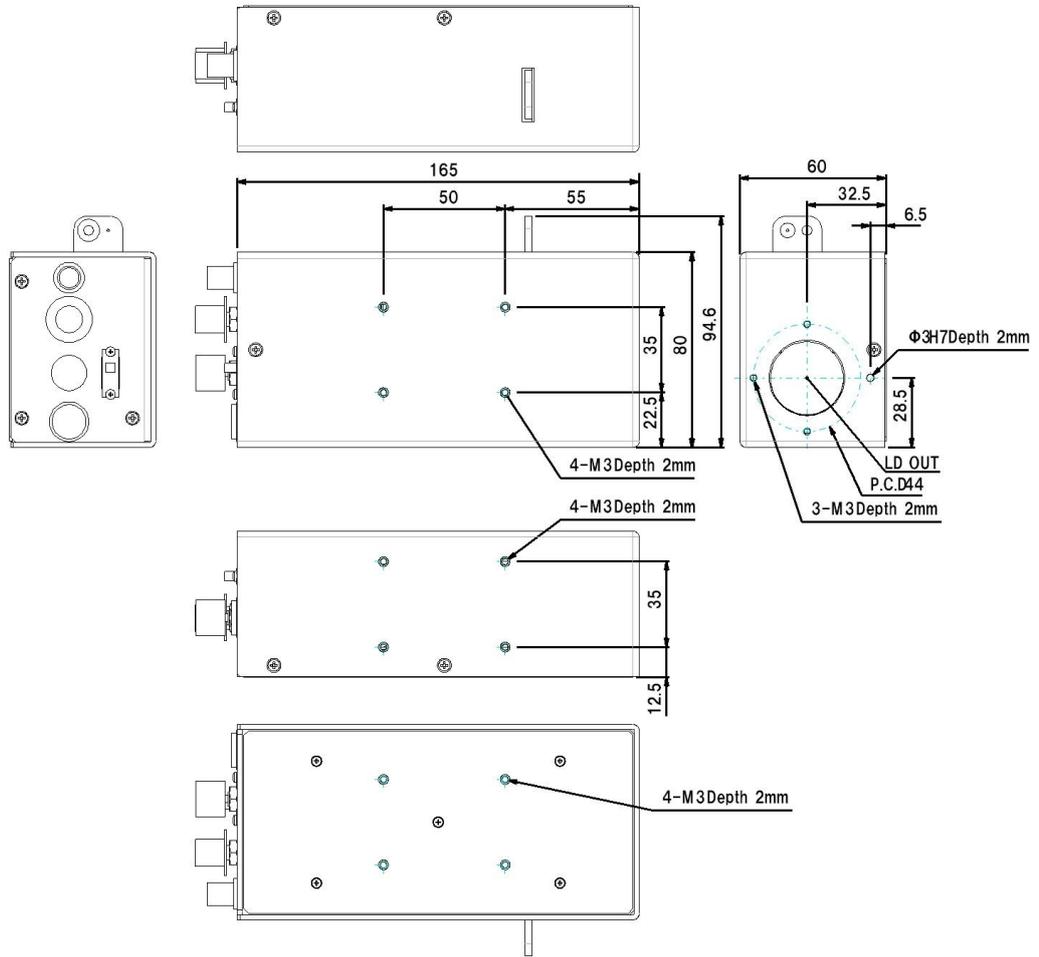
Size	: 60x80x274mm (Only main body) refer to Page24
Weight:	: 1.26kg (Only main body)
Measurement distance	: 0 to 300mm
Light source	: Red semiconductor laser / Blue violet semiconductor laser : 2 wave length loading
Laser wavelength	: 650nm / 408nm
Laser output	: Less than 1.0mW (Class2)
Aperture	: ϕ 1,2,3,4,6mm (Variable)
Measuring Wavelength	: $650 \pm 10\text{nm}$ / $405 \pm 10\text{nm}$
Measurement range	: C020 : ± 0.2 deg / C030 : ± 0.3 deg : Screen for rough alignment ± 0.8 deg

4.2.6 System outline drawing

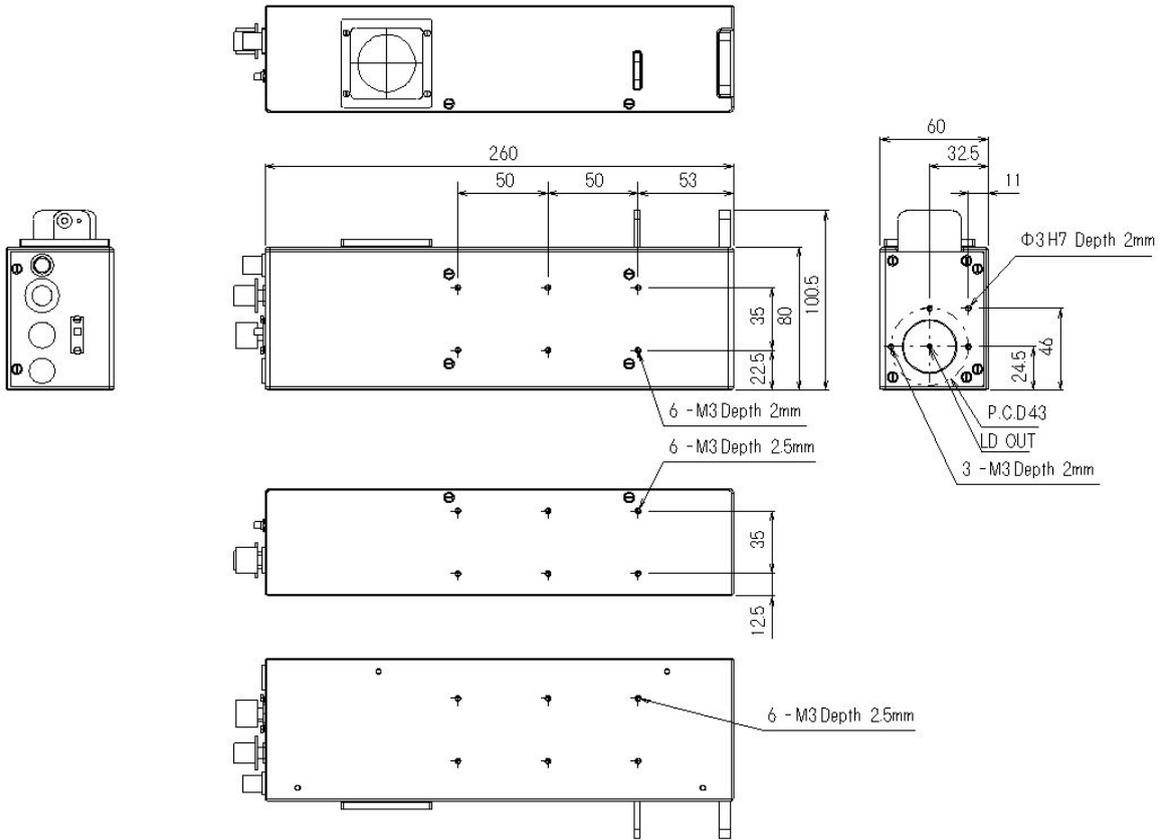
H400-C refer to Page22

H400-CS refer to Page23

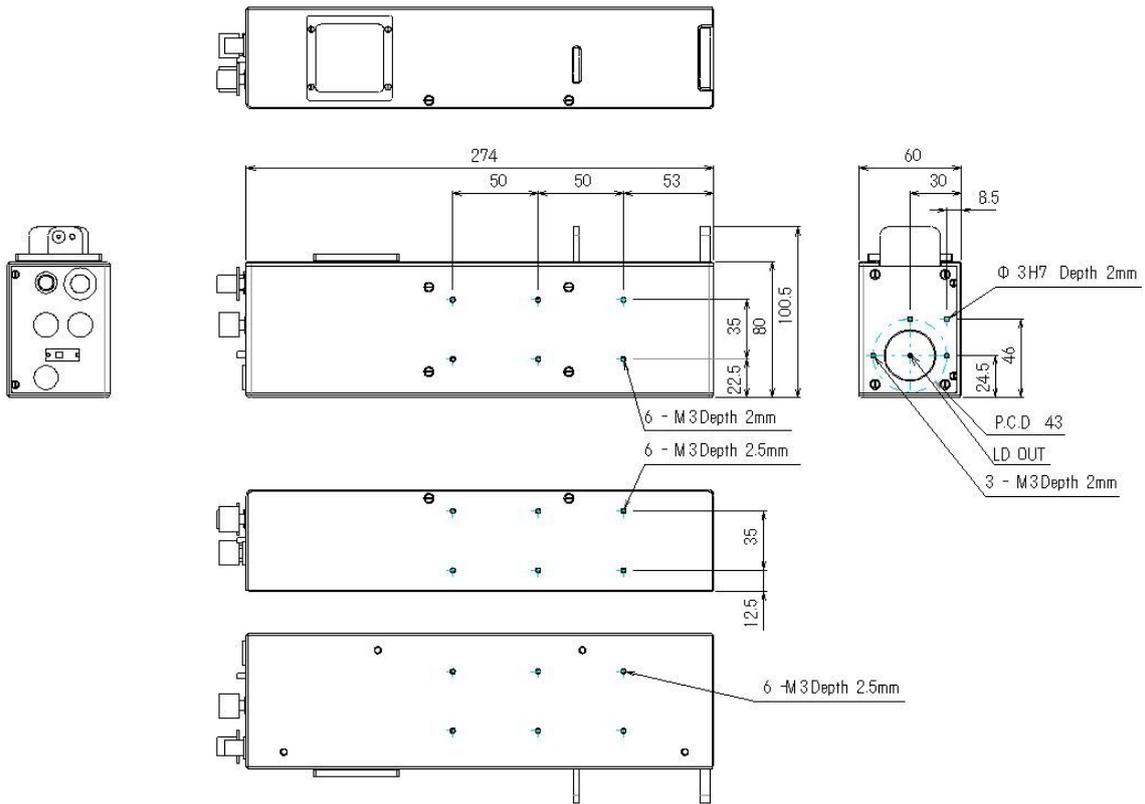
H600-CS refer to Page24



H400-C



H400-CS



H600-CS

4.3 Warranty and Service

Warranty

Please inform us the 8 digit serial number that marked on certification or rear side of production at inquiring/contacting us. We record the serial number and deliver date. The warranty period is one year after deliver date. However, in case of following, out of warranty and the repair is chargeable.

- Misusage, due to modification, repair by suruga's engineer, malfunction and damage
- Fall down the system during transportation or transferring. Or irregular operation cause malfunction or damage.
- Fire, Brine Damage, Gas Damage, Abnormal voltage and Act of providence such as earthquake, thunder, wind and flood damage and the others cause malfunction and damage.
- Negligence for instruction manual or caution cause malfunction and damage.

Service

Please check Page 20 before repair request. If you have questions and concern then please contact us, Sales Group of OST department

<During under warranty>

In case that malfunction happen under normal usage following instruction and caution, the repair is free. In case of above malfunction out of warranty, the repair is chargeable.

<Expired warranty period>

In case the performance is maintained by repair, we accept chargeable repair depending on customer's request.

<Repair possible period>

The minimum period of spare parts (the parts to maintain the function) of this product is one year after discontinuing this production. This period is "repair possible period" After this period some case that repair might be possible therefore please contact us.

Notification: About the malfunction on this production, we don't accept responsibility without warranty repair base on the certification.

For More Information Call to us:

SURUGA SEIKI CO., LTD.

Overseas Section, OST Division

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