Alignment controller for R&D
EW50/EW60

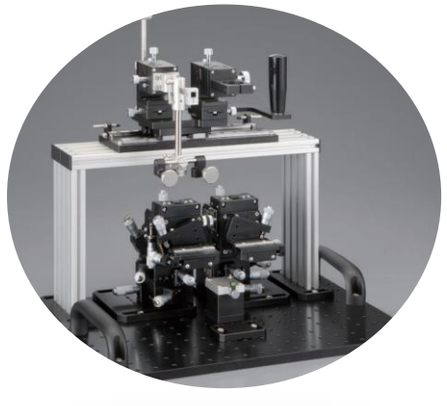
SURUGA SEIKI

OST SI Business Development
04/28/2023
SurugaSeiki_EW50＆EW60 Ver02
ENG_20230428

Development Engineer's Concerns

Troubles in the early stages of device development

Can't install equipment that can be used for production, right?



Manual alignment set is good?
I don't think so.

Engineer's Concerns

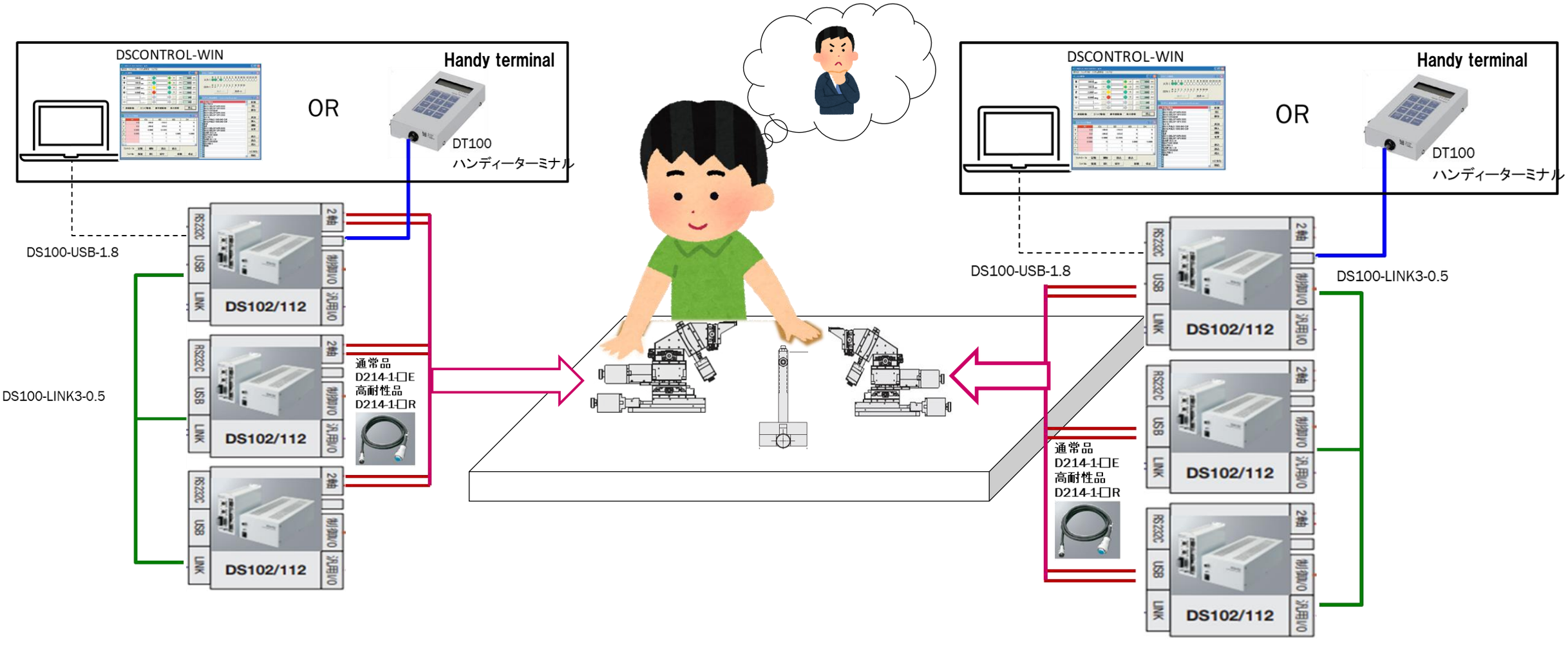
/Alignment machine is required for development.
/Design of device has not been decided yet.
/To avoid large investments at the initial stage.
/But equipment is necessary.

Doesn't the manual lose the engineer's thinking time for alignment work?
Should be avoided.

Solution to solve the concern

You can avoid the manual and align using a PC or handy terminal with a combination of motorized stage and controller, but...

Free layout to suit your device.
More peripheral facilities。But just move the stage with a motor.
Investment is necessary, but it does not save the time of engineers !!

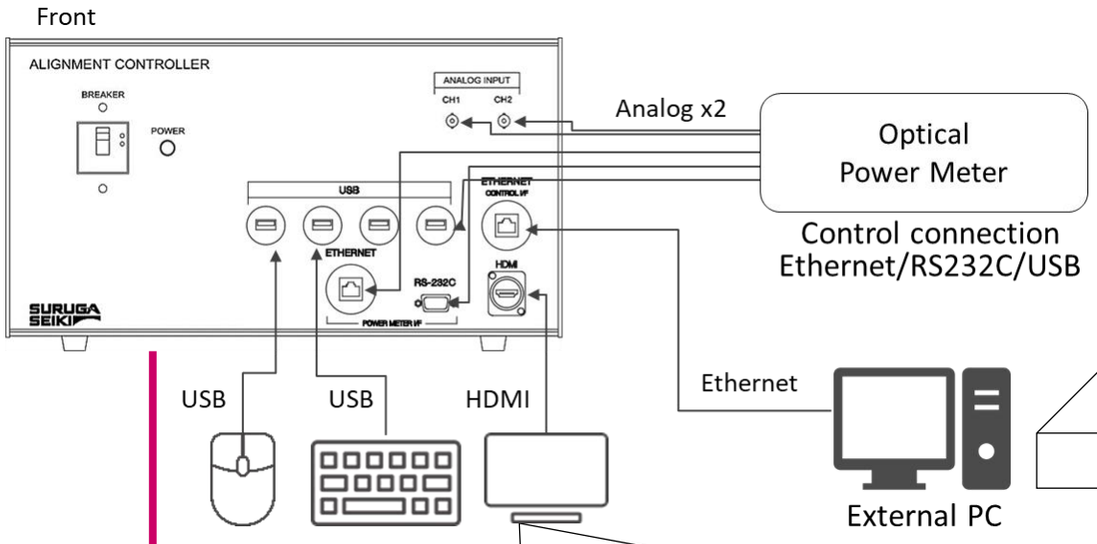


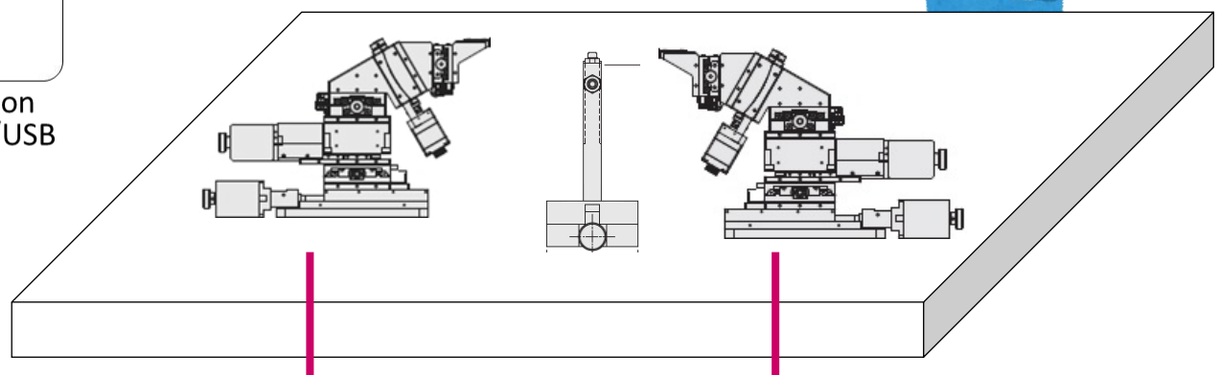
Suruga's Solution

Motorized stage and JOG, auto-alignment software installed controller.
Set the left and right stage positions based on to the size of the device and use the JOG to move the device more closer, and then use auto-alingmen.

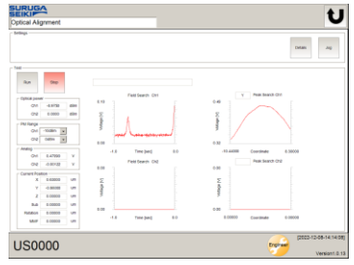
It's not fully automated, but investment can be reduced
To the reduce a engineers' work time by our solutions.
Many standard option available

12-axis controller



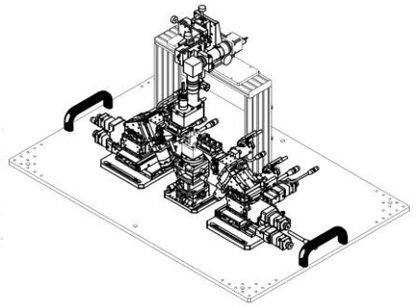


Built-in software operation screen



The equipment is compact and less wiring. Simple structure.

Different point of Package

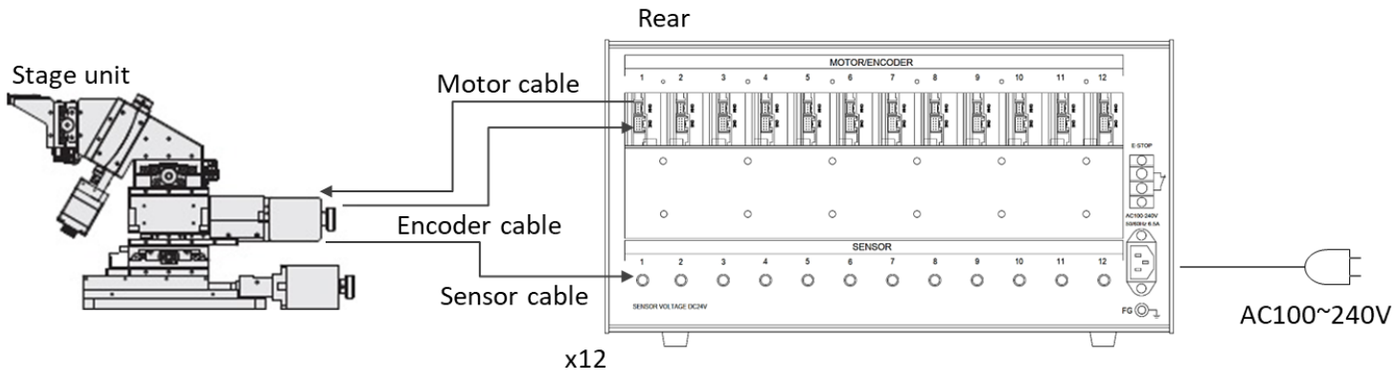


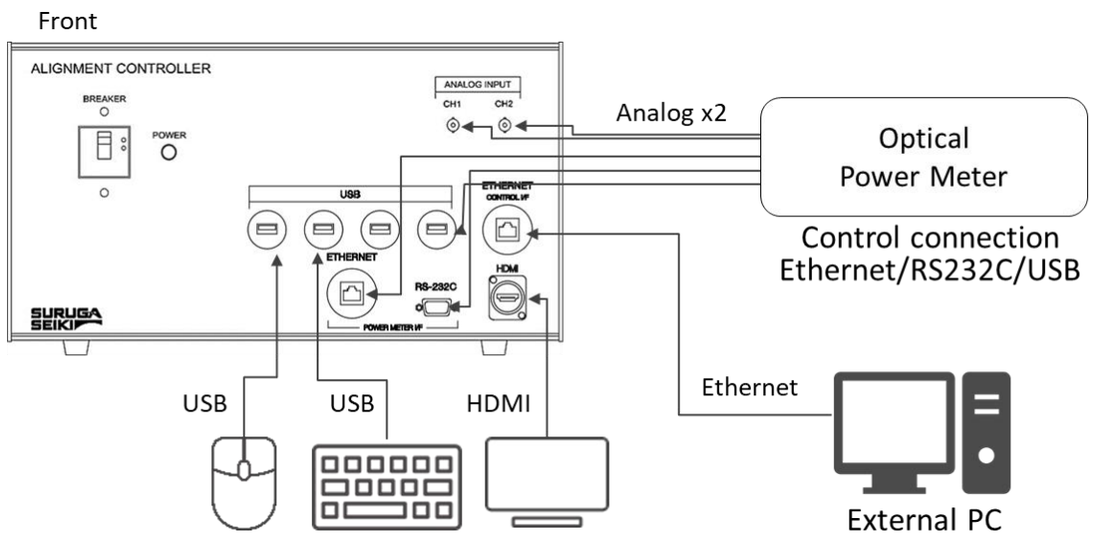
Unit	PSW-1000	EW60	EW50
Controller	○	○	○
6 Axis Stage (L/R)	○	○	○
Waveguide holder base	○	○	×
Vibration isolation table	○	×	×
Breadboard	×	○	×
Platform	○	○	×
Contact detection and surface matching function	○	×	×
Upper view camera	○	○	×
Rear view camera	○	Option	×
Edge surface camera(visible light)	Option*1	Option	×
Adhesive application function	○	×	×
UV curing function	○	×	×
Emergency stop switch	○	Option	×
Cover	○	×	×
Temperature control of device	Option	×	×

*1 This option for domestic market only. It can be used for waveguides that transmit He-Ne lasers.

Overview

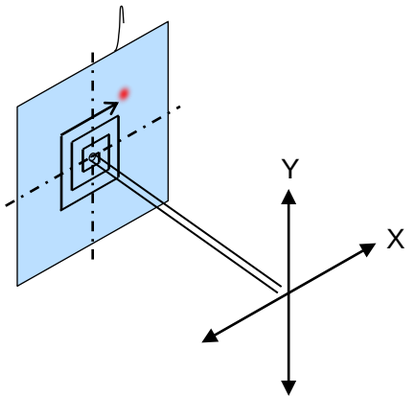
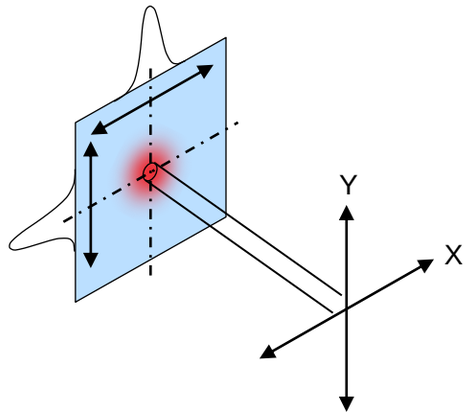
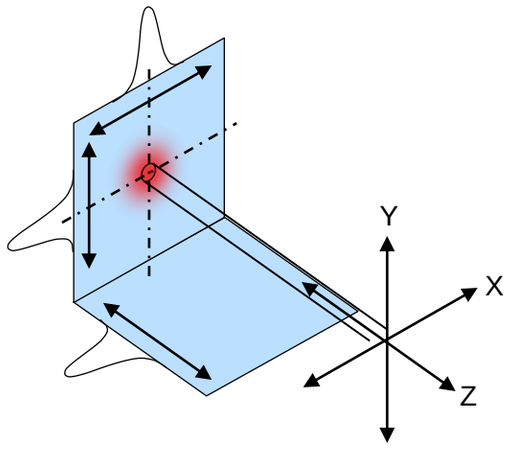
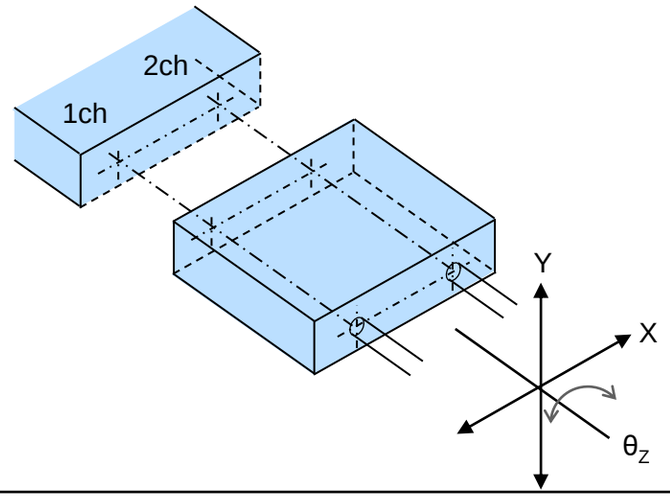
- This controller has 12 axis motorized stage driving and interface to external power meter.
- Available for various alignment functionality with external power meter
- Easy to use this inside of customer machine/system as equipped E-Stop terminal and ethernet control capability
- Available to control lots of functions remotely via Ethernet connection
- Available to use JOG control of motorized stages and alignment functionality without any external PC





Alignment methods

- Supported following alignment methods

Field search	XY alignment (Flat)
	
Searching signal position roughly	Alignment by each single axis in flat plane
XYZ alignment (Focus)	**XY θ_Z alignment (Rotation)**
	
Alignment to search focusing position with Z axis adding to XY alignment	Alignment with θ_Z rotation based on 2ch signal peak position

JOG control screen

- Jog/Inching functionality is provided in the JOG control screen
- All functionality can be handled by mouse/keyboard or touch panel control

Jog control buttons
[+] Move forward
[-] Move backward
[Go] Move to target position
[ORG] Return to origin

Axis status: Red = active
[CW] CW sensor status
[CCW] CCW sensor status
[ORG] Origin sensor status
[ALM] Drive error indicator

Alignment control screen

- Alignment functionality is provided in the Alignment control screen
- All functionality can be handled by mouse/keyboard or touch panel control

Position to signal level graphs
For each axes

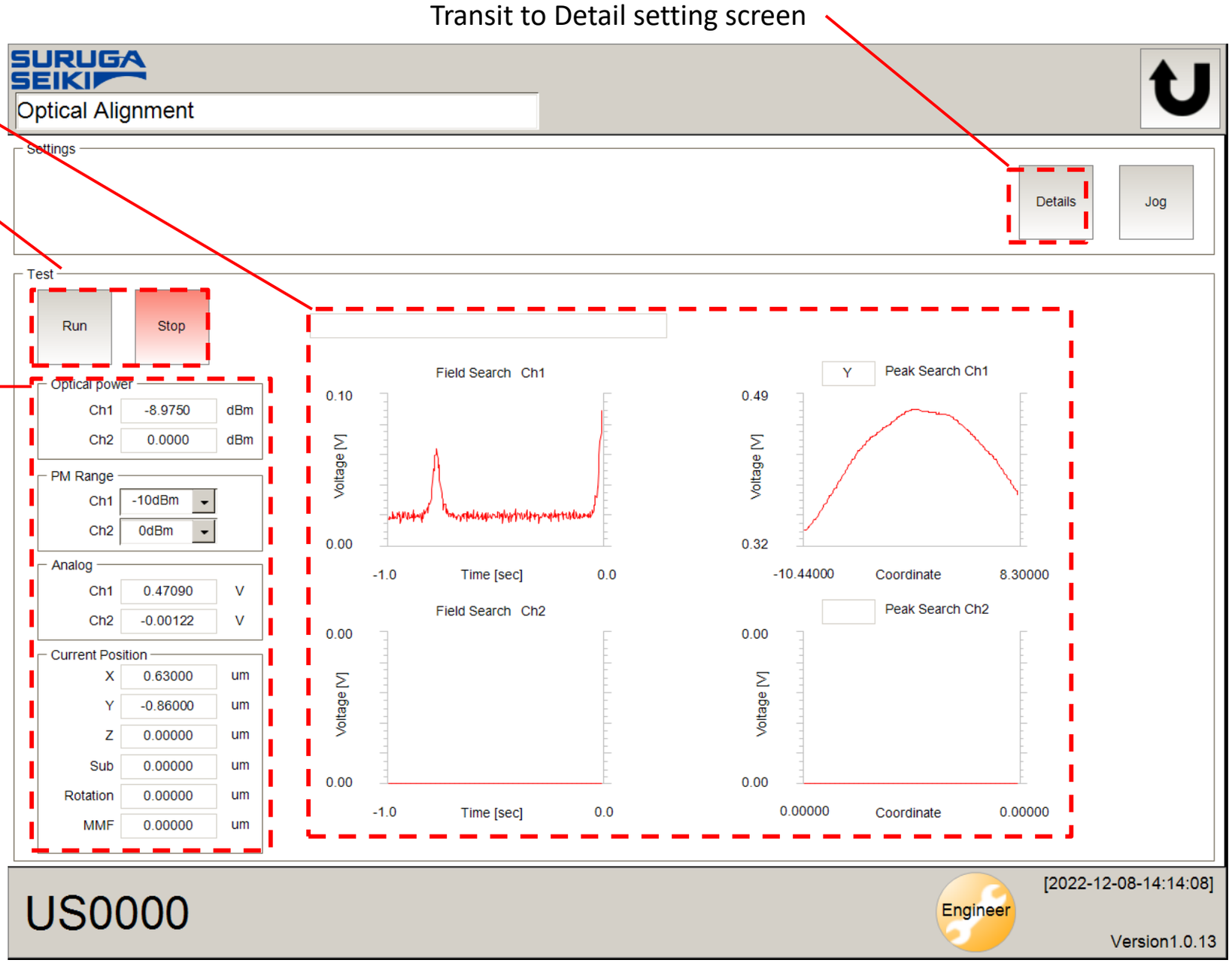
Alignment exec buttons
[Run] Execute alignment
[Stop] Stop alignment

Optical power:
Measurement value by external power meter

PM range:
Power meter range setting

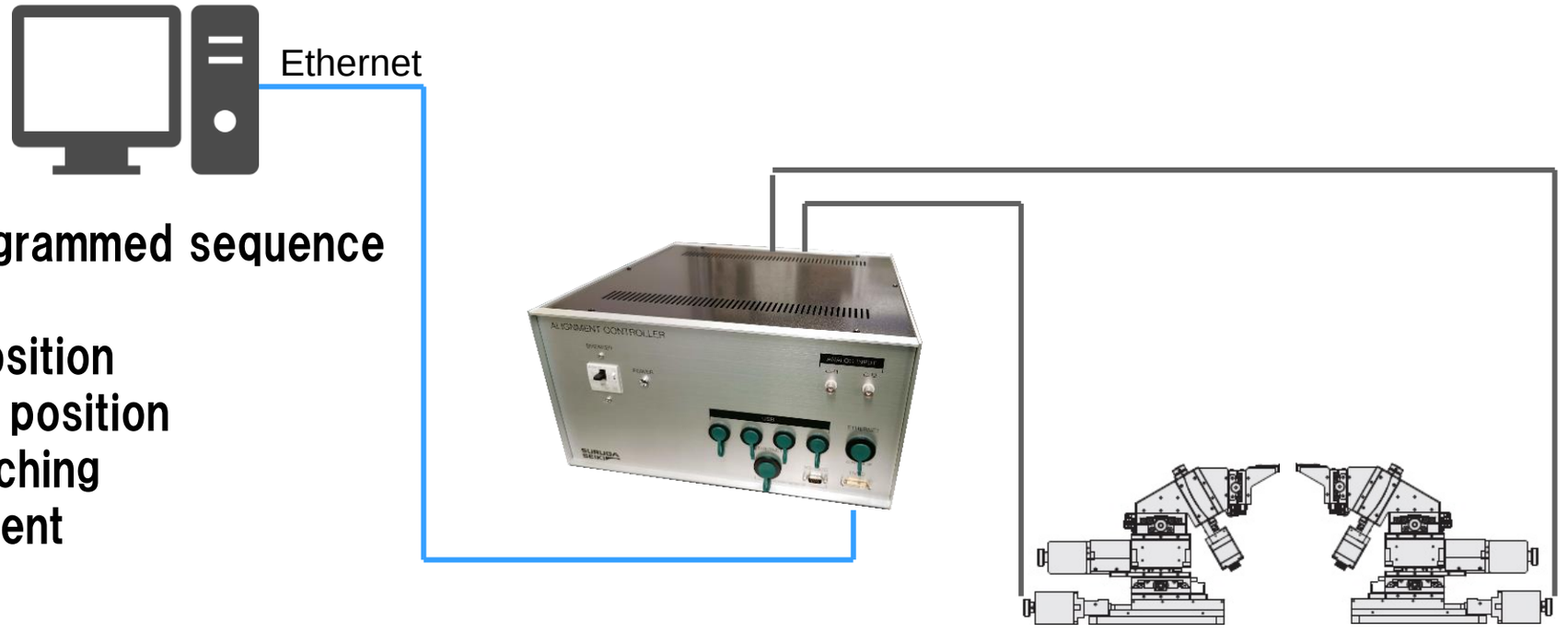
Analog:
Current analog signal level

Current position:
Current axis position assigned to each alignment control



Remote control functionality

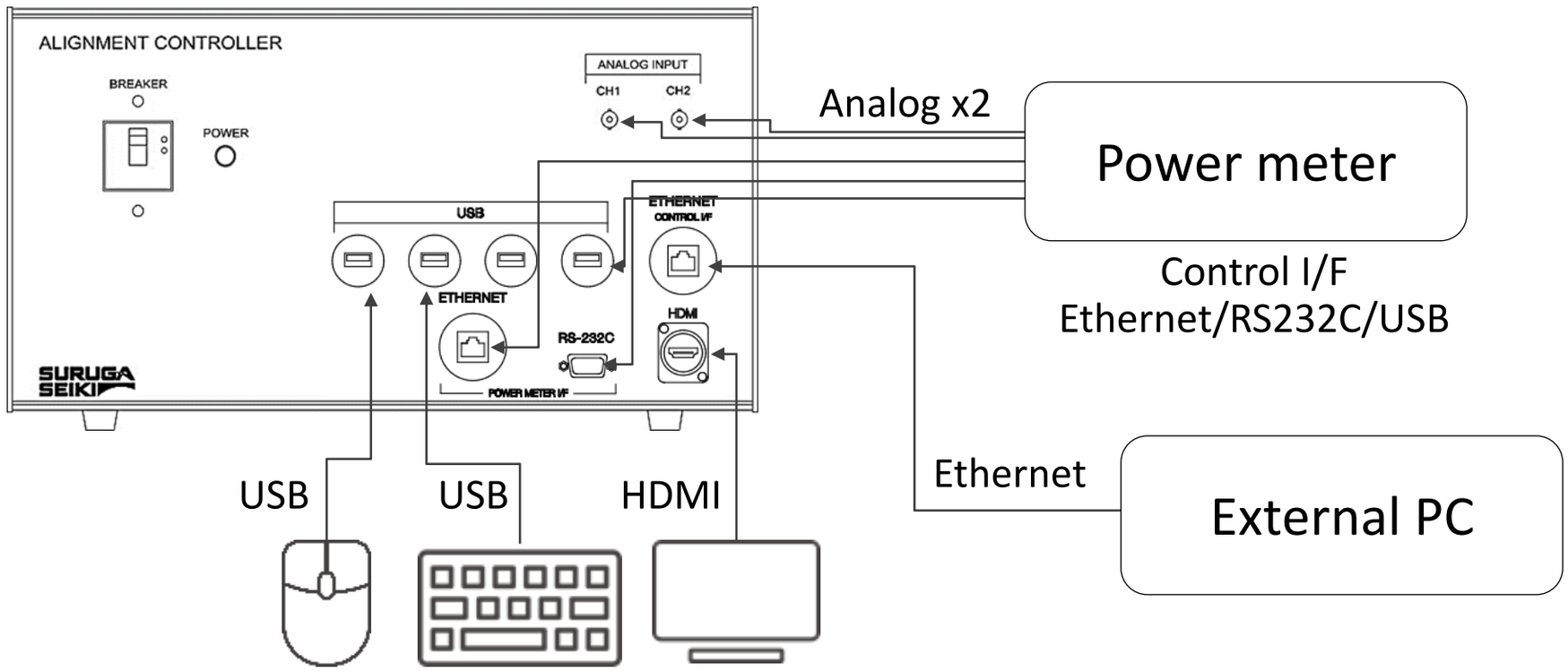
- External PC can control the controller via Ethernet connection
- DLL for following programing language provided
  - C# (.NET Framework) , C++, Python (Ready in 2023/2)
  - Sample program for LabVIEW (Ready in 2023/2)



Example of user programmed sequence
- -Return to origin
- -Move to setting position
- -Move to alignment position
- -Execute field searching
- -Execute XY alignment
- -Unload device

Supported equipment

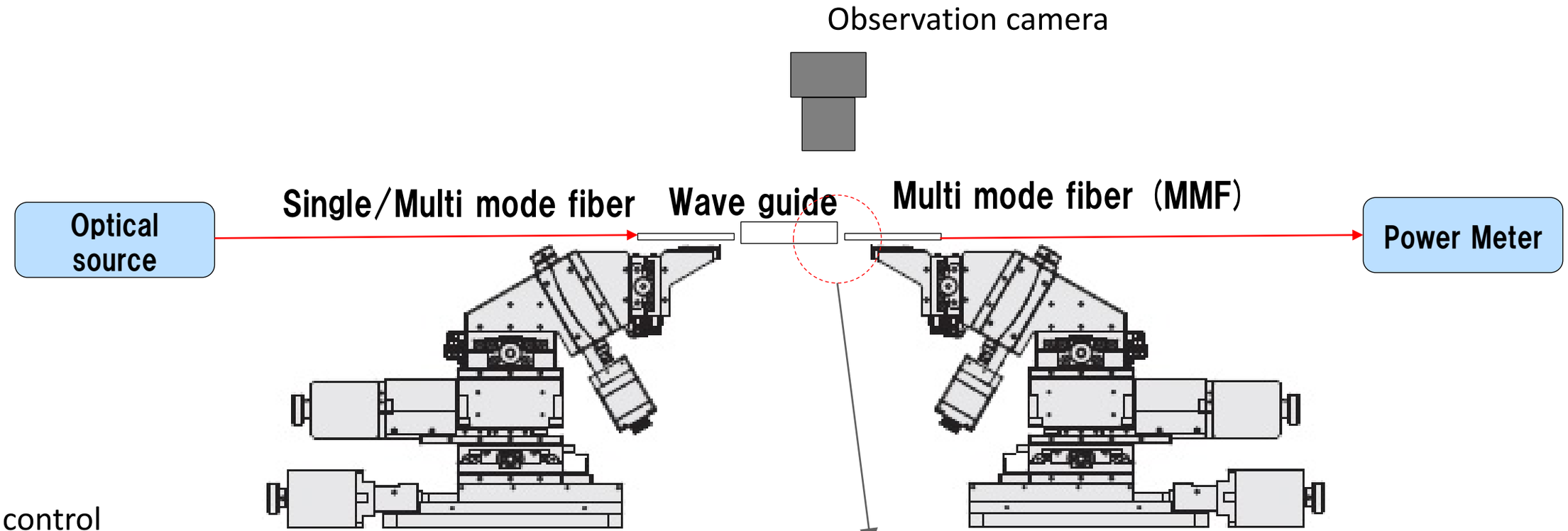
- Optical power meter
  - Thorlabs PM100D/PM400/PM320E/Keysight 8163/Yokogawa AQ2200/ (Anritsu MT9810A)
    Thorlabs PM5020 support will be ready soon
- Keyboard and mouse
  - USB HID device
- Display
- HDMI input



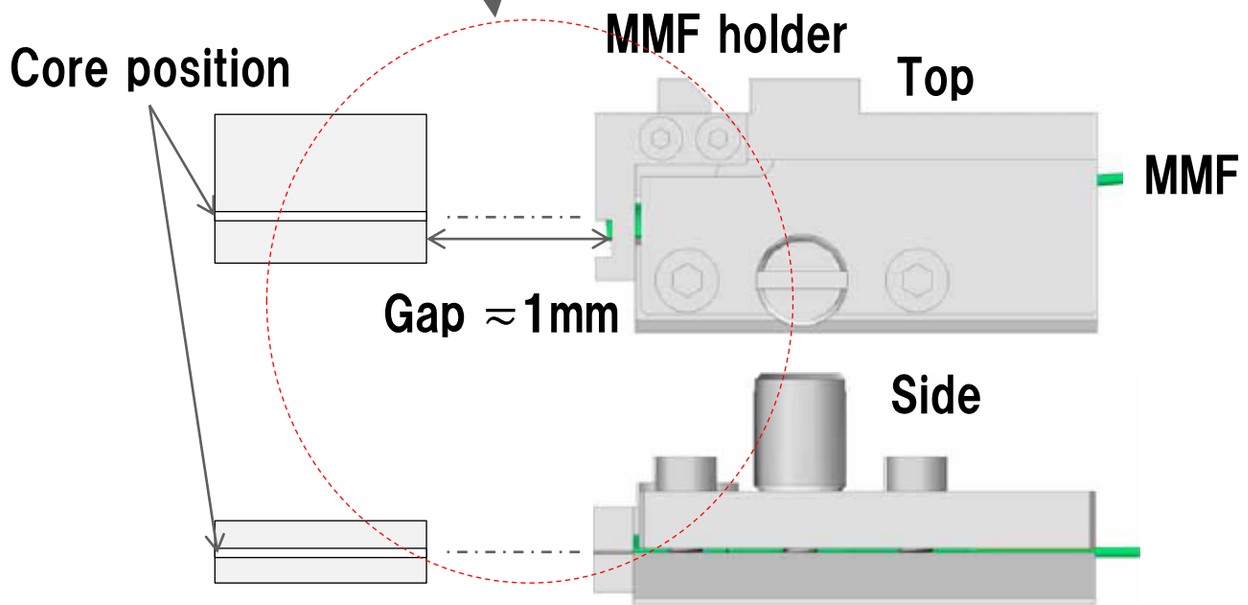
Example of alignment operation flow (1)

- **Operation flow of alignment process by controller without external PC**

[Settings]
Set wave guide and multi mode fiber as follows
Adjust multi mode fiber position as shown following figure



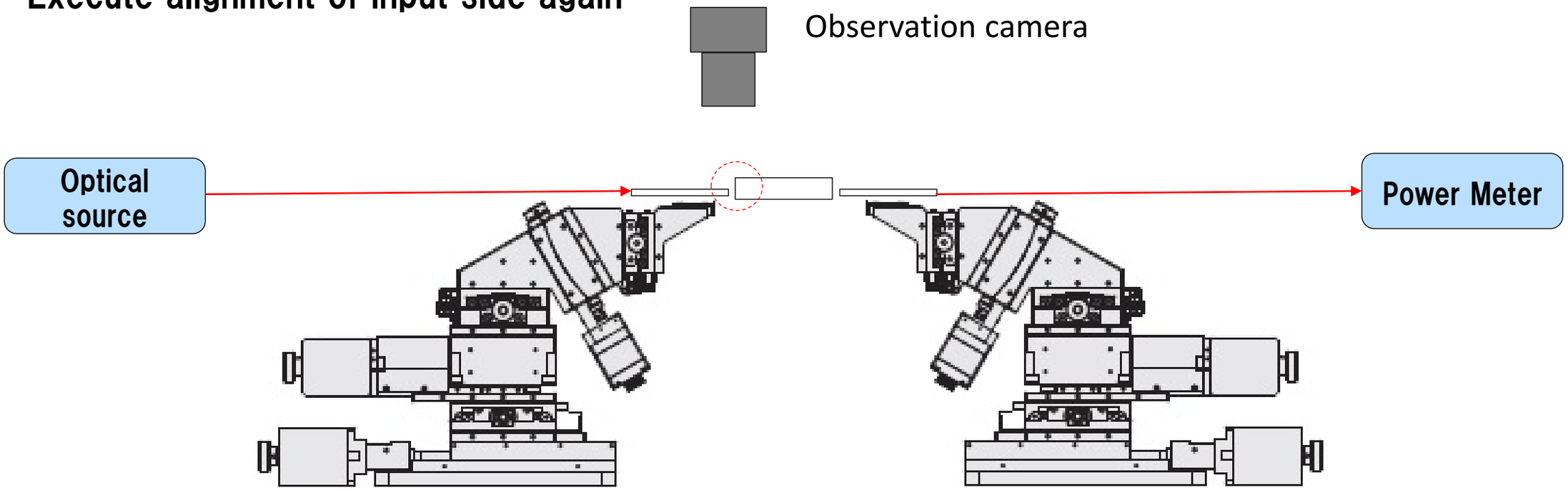
Jog control



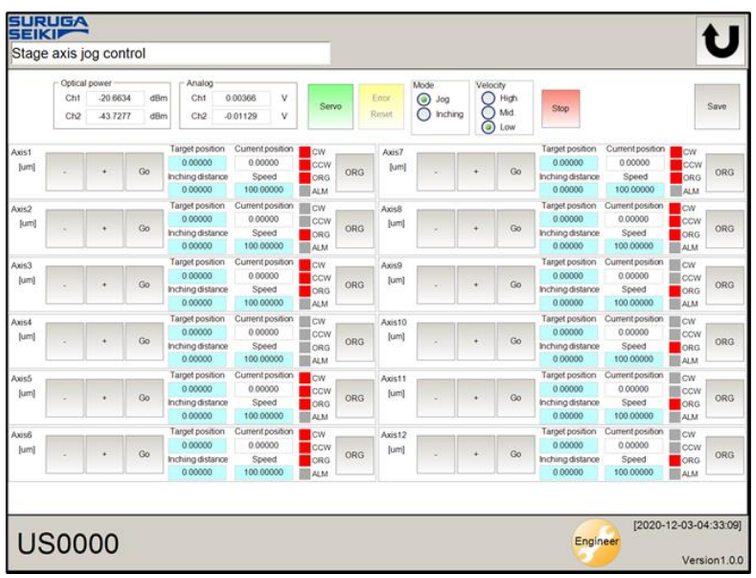
Example of alignment operation flow (2)

- **Operation flow of alignment process by controller without external PC**

[Aligning input side]
- Move input side fiber to alignment position by seeing observation camera
- Execute alignment of input side (left side)
- Execute alignment of output side (right side)
- Execute alignment of input side again



Jog control



Alignment control

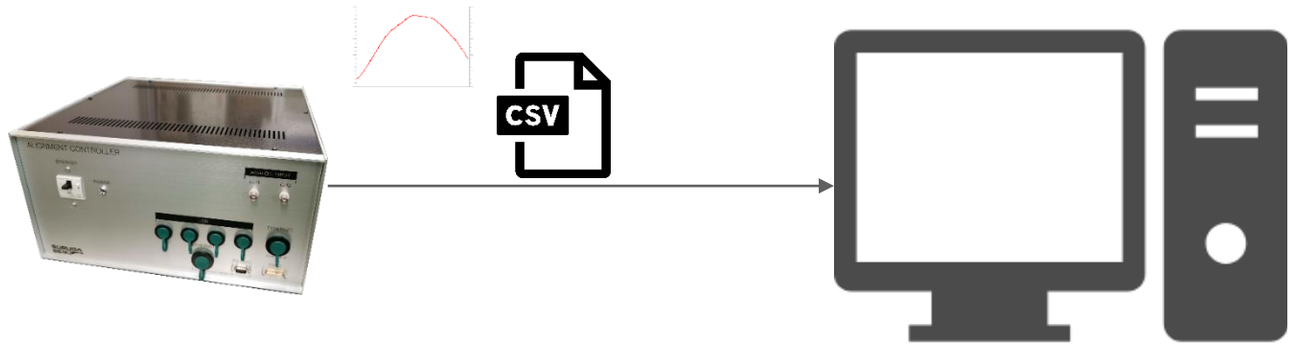
Example of alignment operation flow (3)

- Data evaluation

[Copying profile data]
- Copy profile data from the controller to movable storage media or ethernet
- Evaluate profile data

Evaluation of alignment result

Profile data



Necessary items

- Following items are necessary to use controller for wave guide alignment

[Suruga Seiki]

Name	Description	Necessary number
DA1000	Alignment controller	Main controller, x1
6 axis unit	6 axis unit	Motorized stages, x2 (12 axes)
	Cables for normal resolution motor Motor Cable: D214-3-3R2 Encoder Cable: D214-3-3RE2 Sensor Cable	x6 for two 6-axis units (6 gonio stages)
	Cables for high resolution motor Motor Cable: Encoder Cable: Sensor Cable	x6 for two 6-axis units (6 linear stages)
	Fiber holder	x2 for two 6-axis units (1 for input, 1 for output)
	WG holder	x1

[Other company]

Name	Description	Necessary number
Power meter	Power meter to measure optical power	x1 or x2
Optical source	Optical source for measurement	x1
Fiber cables		
Analog signal cable	Analog connection cable between power meter and the controller	x1 or x2

Specification

Item	Description
Control Axis	12 Axis
Motor Driver	Closed-loop control by 2-Phase Stepper Motor (2.0A_{0-P}/ph)
Alignment Patterns	Single, XY-FLAT, XYZ-FOCUS and XY θ_Z-ROTATE
Analog Inputs	DC0~10V, 2ch
Communication Interfaces	Ethernet for a host controller PC Ethernet/RS232C/USB for external power meter
User Interfaces	HDMI Port for Monitor Output USB Ports for keyboard/mouse/touch-screen I/F
Emergency Stop Input	Non-Voltage Contact with DC24V, 21mA
Power Source	AC100~240V+/-10% 50/60Hz, 650VA or less
External Dimensions	430 (W) 462.3 (D) 231.5 (H) mm (with protrusion)
Weight	17.5kg
Applicable Stage Unit	Suruga Seiki stages with STM28W100A/PEM28H236E25KZD-01 motor

Thank you

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