Various motion in combination!

Posted a number of various use cases!

A reference for product selection!
Motorized Stages

The positioning motorized stages are operated mainly in stepping motors. Motorized linear stages are used mainly in ball screw, and motorized rotary stages are used mainly in worm wheel.

It has been used to decide positioning and attitude for Image processing by the installation of the part, and the inspection.

There is the series that standardized a motor option and in addition to high torque, high resolution, various stepping motors without lose step supports the drive with the AC servo motor.

The classification and motion type of motorized stages

- **X axis stage**
  - Move in one direction (in the X axis)
  - Motion guide has 3 type of linear ball guide, crossed roller guide and slide guide.

- **XY axis stage**
  - Move in two directions (in the X and Y axis).

- **Z axis stage**
  - Vertically moves in the Z axis.
  - Horizontal Z axis means table surface goes up and down.

- **1 axis goniometer stage**
  - Rotary motion type.
  - There are type of 360° rotation and tiny angle rotation type.

- **2 axis goniometer stage**
  - 360° around a stage surface space.
  - Perfect for angle control. We have worn gear and ball screw type.

- **Rotary stage**
  - Vertical combination.
  - It is possible to control angle variously with 2 axes.

A combination for achieving variety of motion

- **Z axis focusing**
- **XY axes positioning**
- **Angle adjustment in 2 axes Goniometer**

Examples of how motorized stage is used.

- **Inspection equipment for button switch pressure of notebook PC**
  - Z axis stage is used for the system that has inspection JGS, and judge acceptance or not.

- **Substrate inspection system**
  - Judge acceptable or rejectable after captured an image of substrate.

- **ACF Welding System**
  - Terminal Welding System by ACF.
  - X-axis stages used for moving heater, XY stages used for work alignment.

- **[Bio]DNA Sequencer (information reading equipment)**
  - It is used to DNA sequencer which read a fluorescence reaction in the observation unit with moving a sample on the compartment plate with XY axis stage.

- **Mapping Inspection Apparatus**
  - Example for wafer inspection equipment.
  - Alignment camera with X axis, wafer positioning with XY axis.

- **Substrate parallelism control by imaging focus**
  - 2 axes goniometer stage is used in substrate parallelism control by imaging focus.
Examples of how motorized stage is used.

1. **Delay line**
   - Outline: Enable an absolute position control by feedback control with the use of linear scale, and improve reliability of experiment.

2. **Glass substrate evaluation unit**
   - Outline: Work better for detector angle control to diffusion characteristics in combination with high rigidity motorized rotation stage using cross roller guide.

3. **Panel luminance evaluation unit**
   - Outline: The combination of tilt mechanism to motorized XY axis, it is adjustable an altitude of small panels and position with matching measurement items.

4. **Tabletop laser processing machine**
   - Outline: The panel-like sample accurately moved with motorized XY axis. Keeping the rigidity with support guide, then enable the high quality machining for the whole surface of the sample.

5. **Wafer exposure apparatus**
   - Outline: Enable the horizontal alignment by combine with three of motorized horizontal plane Z-axis stages.

6. **Stage for microscope**
   - Outline: It is an XY stage which assumed a combination with a microscope. Also available transmitted illumination.

7. **Crystallization X-ray diffractometer**
   - Outline: The combination of the motorized stage with a transmission hole. Allows analysis of the crystallization by rotating of the sample angle.

8. **Glass substrate evaluation unit**
   - Outline: Work better for detector angle control to diffusion characteristics in combination with high rigidity motorized rotation stage using cross roller guide.

9. **Lens alignment equipment**
   - Outline: To be integrated a set-up, removing, chuck and fine adjustment by combining with the various motorized stages.

10. **Laser line polarization rotation device**
    - Outline: Even a large wave plate should be controlled an angle in the polarized wave direction accuracy by large caliber motorized rotation stage.

11. **Film thickness distribution inspection equipment**
    - Outline: Adjust the sample position with four axis unit optionally. Motorized XY stage can be accurate and quick scanning.

12. **Aligner**
    - Outline: Can be organized from pick-up and reset process of sample to washing and drying doll process by using a long stroke motorized stage.
Manual Stages

The positioning manual stages are operated mainly in micrometer. Dovetail type, linear ball and cross roller are used for guide mechanism of the linear stage. There aregoniometer and rotary stage as well as motorized stage. Can be positioned at any place by stacking a stage working in each direction.

The classification type of motorized stages

<table>
<thead>
<tr>
<th>Guide system</th>
<th>Guide mechanism</th>
<th>Various motion in combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>リニアボール(格)</td>
<td>クロスローラ</td>
<td>For CCD camera alignment</td>
</tr>
<tr>
<td>アブリス</td>
<td></td>
<td>For laser sensor alignment</td>
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<td></td>
<td></td>
<td>For sample test analysis jig</td>
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</tbody>
</table>

Examples of how manual stage is used

- **Adjustment for displacement sensor**
  - Outline
  - X stage is the best for positioning irradiation of displacement sensor. We have great variation of size.

- **Bonding machine**
  - Outline
  - XY and rotary stages performs high accuracy coordinate plane alignment of works during the various implementation process.

- **Optical axis alignment for fiber optics**
  - Outline
  - We propose the optimum combination of stages for the adjustment of multiple axes, such as optical axis alignment.

- **Device bonding equipment**
  - Outline
  - It is equipment which paste a device together. Can be performed accuracy for positioning precise coordinate, correction lift and pasting in the multi-axis stage unit.

- **Adjustment for laser head**
  - Outline
  - The Goniometer is the best for controlling positioning irradiation. Can be suited for fine adjustments of optical axis in various scene.

- **In vehicle appearance test**
  - Outline
  - Adjust the camera by stage unit, and can be conducted validation in actual condition of in-vehicle meter and display equipment.
Examples of how manual stage is used

**Despense unit**
Outline
Positioning of the dispenser is easy with a combination of Dovetail stage and rod.

**Probe unit**
Outline
Can be contact accurately with high-performance XYZ stage for probe.

**Work height measurement unit**
Outline
Adjustable work positioning and attitude with XY stage stage can be scanned accurately by the measured stage.

**Substrate bonding unit**
Outline
Adjust the positioning and the work of the camera in the 6-axis unit. High-precision bonding is possible.

**Film observation jig**
Outline
Lab jack and dovetail XY-axis stage combination with a wide range of observation of efficiently realized.

**Collimated light adjustment unit**
Outline
A unit that is built-in holding, positioning, adjustment of optical axis saves working space.

**Polarization stage measurement unit**
Outline
To rotate the sample in order to observe the polarization state.

**Fiber evaluation unit**
Outline
Enable positioning of fiber fine-tuning for detector by using stage unit.

**Optical communication device characterization equipment**
Outline
According to a combination of optical rail and manual stage, can be a simple evaluation.

**Film material defect inspection apparatus**
Outline
Geometer stage has been used in a line sensor adjustment. It is possible easily view alignment.

**Resin stage for medical, biotechnology field**
Outline
In areas such as bio-medical and chemicals, you can use it with consuming water or an organic solvent environment.

**Reain stage**
Outline
There are no metal parts in resin stage. Strong magnetic fields, such as making it ideal for the non-magnetic is required applications.
Optical Fiber alignment

Guidance

Optical Fiber alignment system
Can be performed the optical axis adjustment of the photodevice such as optical fiber, waveguide, silicon photonics, LD, and PD efficiently and contribute it from a machine part to support a device evaluation and inspection, assembling (module/attachment) to a system device on low price and short delivery date.

Low price/Short delivery
- It has been prepared each unit that configure the system as standard.
- All stages manufactured by SURUGA SEIKI.

Versatility/Extensibility
- Can be controlled data communication and I/O especially motorized alignment as standard alignment software.
- It can arrange for various types.

Customized
- We can customize for your needs.

Lineup

Lineup of alignment method
Select from the device and the alignment method

Passive device alignment → Alignment of passive modules
Active device alignment → Alignment of active modules

Passive Alignment of passive modules
Can be performed the optical axis adjustment of the photodevice such as optical fiber, waveguide, silicon photonics, LD, and PD efficiently and contribute it from a machine part to support a device evaluation and inspection, assembling (module/attachment) to a system device on low price and short delivery date.

Active Alignment of active modules
It has a combination, such as optical fiber, SC laser and lens. It consists an alignment stage that collect SC laser light, and incident optical fiber without attenuation, the lens for welding, positioning camera, etc.
### Type 1: Laser autocollimator is the best for angle, tilt, and runout measurement

- Superior workability.
- Good for various application such as optical equipment, AV equipment, machining etc.
- Can be digitalized, automatical judgment and automatic system by processing unit.

### Type 2: High speed, High resolution autocollimator HARAD

**Dynamic measurement for tilt**

- Contactless angle sensor by using laser.
- Compatible with high frequency sampling (500kHz/2μsec) and high resolution: 0.4arc.
- Improve detectible analysis by analog voltage output and a wide variety analysis application.

### Type 3: 6 axis position alignment O-PIAS

This 6 axis sensor can detect a position and attitude of works without contact:

- Can be measured 6 positions such as tilt, height, plane position and rotation.
- Measurement repeatability is:
  - Tilt: 0.05min, height/plane position: 0.5μm, rotation angle: 0.3min.
- Constructible an automatic positioning system with sequencer.

### Examples of how Optical Sensor is used.

#### Tilt adjustment of imaging elements

**Outline**

- 2 CCD or CMOS.
- Adjustment is implemented in the implementation of the imaging elements is very important. It will be accurately measured by the autocollimator.
- Shape is used for the system that has inspection JG, and judge acceptance or not.

#### Measuring parallelism of precision press devices

**Outline**

- Autocollimator used to verify the parallelism between the other surfaces respect to the reference plane of the precision press devices.

#### Runout measurement of the imaging elements

**Outline**

- Measure the deflection of the imaging element due to vibration from the outside.

#### Runout measurement of rotary motor

**Outline**

- Runout measurement of high resolution to high speed rotating motor.

#### Positioning of the image elements

**Outline**

- Optical Sensor used to confirmation of positioning, installing and adjusting the imaging device to the casing.

#### 6 axis position/posture adjustment

**Outline**

- Optical Sensor use the 6-axis position information of the imaging elements without mechanical switching mechanism.
Can be customized in a flexible layout for the vibration isolation function of the highest performance

**Performance of TMD (Tuned Mass Damping) structure**

The TMD structure adapted in JSD and JHD, by a combination of oil and spring, and auxiliary mass, it is passive vibration damper to control the resonance of the table top. Resonance point of the fundamental mode of torsion and bending will exist in the table top, and TMD is a damper to suppress pin point there. Its excellent effect is in a narrow band. The torsion and bending mode, because it depends on the shape and size of the table top, the design of the TMD which is optimally adjusted are individually made. Oil has been completely sealed, it does not leak.

**The features excellent steel honeycomb optical table top**

**Realization of high rigidity**

Rigidity is improved more than 60% compared to aluminium honeycomb at all from the top to the bottom skin, and using completely curable adhesive achieve high rigidity. This is totally different from the welded aluminium honeycomb product.

**A specially customized solution example**

**Docking version**

It is possible to join two or more tables to create ultra large vibration isolation system. It is possible to suit the conditions of the room and the design of the optical system, constitute a form of such L, or T-shaped. It is also effective when the entrance is narrow and difficult to carry in.

**Examples**

<table>
<thead>
<tr>
<th>Joint model</th>
<th>Low model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designate tables in various scene.</td>
<td>The big equipment can be suited stable position by low table</td>
</tr>
</tbody>
</table>

**What is optostation style?**

Designed 45mm(1.77in) optical axis. All of optical axis holder is 25mm(0.98in).

- Selection and installation is very easy!
  - Easy selection for rod and base.
  - Easy selection for combination. Need only M3 screws for mounting.

You can shorten the selection time!

**Do you need more spaces?**

**Problem solving 1**

It is compact holder. Can be keep more spaces.

**Problem solving 2**

A vertical bread board. A double bread board keep more spaces by 3D structure.

Is both space-saving and high rigidity, you can effectively use the space!

**Examples of optical**

- **A vertical type**
  - It is an optical system to be incident on with a laser for a sample from right above. There is the merit that can be built in limited space by doing it so that length establishes an optical system. Holders realize stability superior to a rod for the conclusion with the screw for a base.

- **Optical light switching type**
  - It is the optical system that assumed He-Ne laser reference light. After having built an optical system, it is evaluated the sample with He-Ne laser (red). In addition, it enables it in an optical system compactly more that polarize holders in DFE.