

# LED Module Tester

An instrument, which measures the forward voltage ( $V_f$ ) under constant current forcing at room and high temperature for LED array module after SMT operation, also visually inspect the LED lighting.



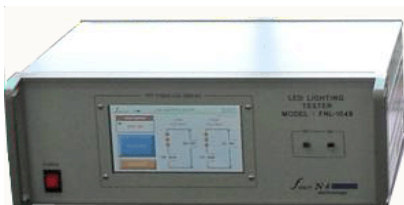
for TV, Monitor



for Mura test

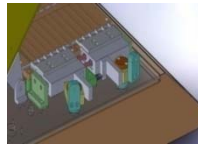


for Notebook



Controller & PPS

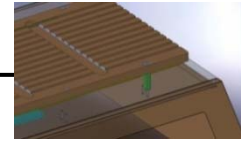
## Contact Jig



Contact Pin Block



Contact and Heating Area



Support Thermal Expansion

| Item             | Description                     | Remark                      |
|------------------|---------------------------------|-----------------------------|
| Size             | 600~800(L) X 500(W) X 270(H)    | Changeable                  |
| Operation        | Manual                          | Semi-auto option            |
| Contact Method   | Pin Block / PCB / FPC           |                             |
| Top Cover        | 8t Color Acryl                  |                             |
| Heater           | 1.5kw / Ceramic , Max. 200°C±10 | Separated from Contact Part |
| Current Accuracy | Within Current : ±0.3%          |                             |
| Voltage Accuracy | Within Vf : ±0.2V               |                             |

## Controller

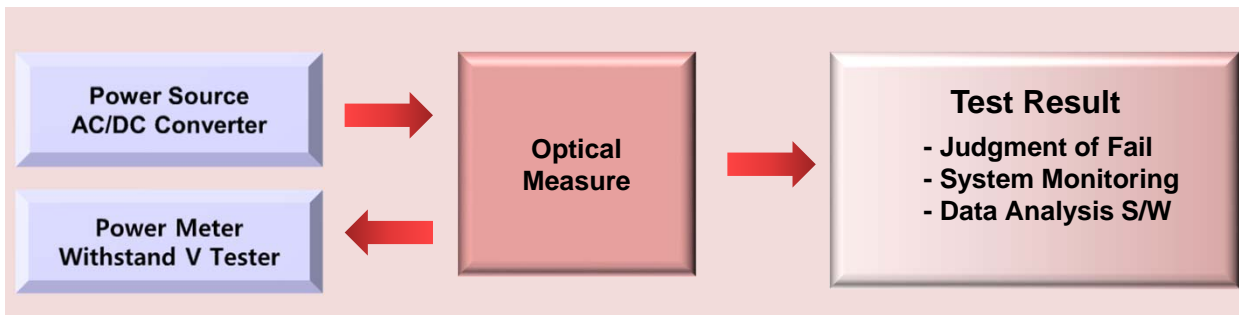



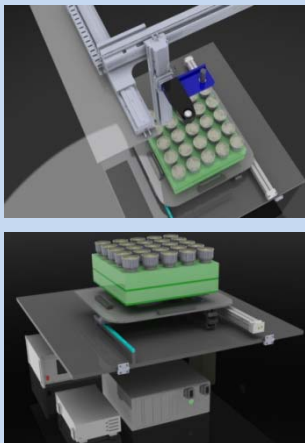

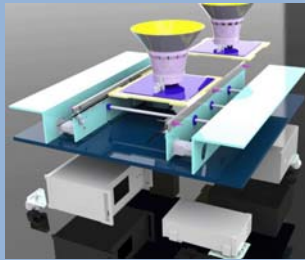
Model : FLT-2048 (48 Channel)

|   | Description              | Specification                          |                                       |
|---|--------------------------|--|---------------------------------------|
| 1 | Channels                 | 48 CH Setting (Option: Max. 96CH)      |                                       |
| 2 | Max. set current         | Max.1000mA/Ch                          |                                       |
| 3 | Max. set voltage         | Max.200Vdc                             |                                       |
| 4 | Lighting type            | Individual and simultaneously lighting |                                       |
| 5 | Vf, If measurement type  | Simultaneous measurement               |                                       |
| 6 | Setting constant-current | Range                                  | 0~1000mA                              |
|   |                          | Setting precision                      | 0.5% @ FSR                            |
|   |                          | Setting unit                           | 5uA/step(low current),1mA/step(Rated) |
| 7 | Safety function          | OVP & OCP protection circuit mounted   |                                       |
| 8 | Power Source             | Exterior PPS                           |                                       |

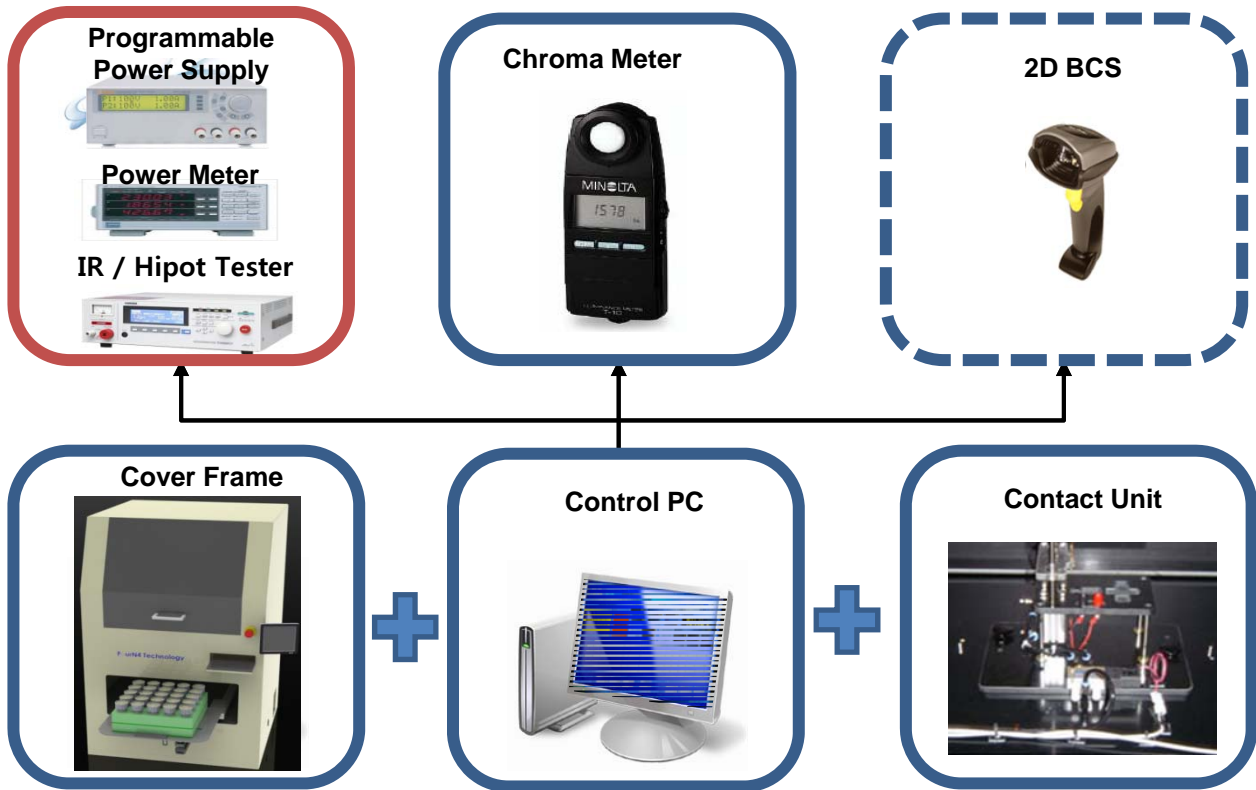
# LED LIGHTING INSPECTION SYSTEM

## Basic Concept



|                              | Model   | Loading Stage  | Remark  |
|------------------------------|---|--|---|
| Lighting Tester (Small Lamp) |   |   | Multiple Lamp Loading Carrier for Small Lamp                |
| Lighting Tester (Big Lamp)   |  |  | Single Lamp Loading Carrier with Conveyer for Big Size Lamp |

## Configuration

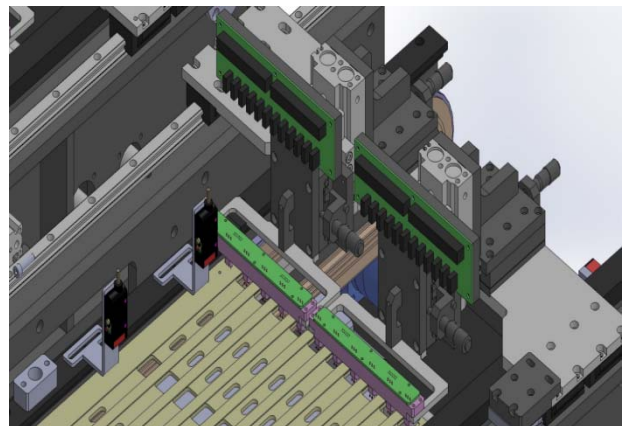
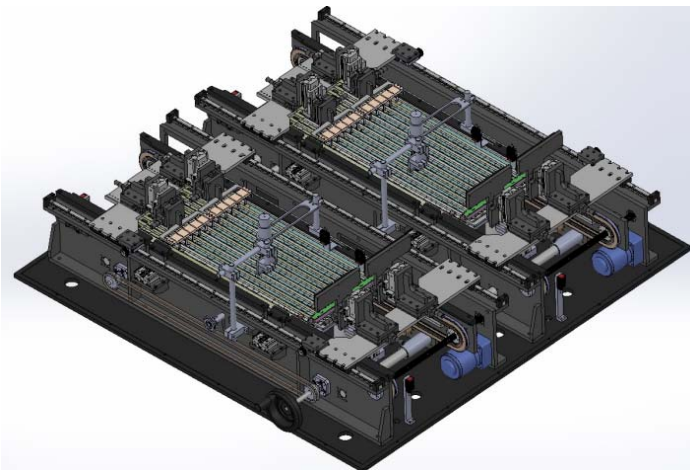


## Test Item

| No. | Item              | Unit | Tool               |
|-----|-------------------|------|--------------------|
| 1   | Illuminance       | Lux  | Chroma Meter       |
| 2   | Color Temperature | K    | Chroma Meter       |
| 3   | THD               | %    | Power Analyzer     |
| 4   | Color Rendering   | -    | Chroma Meter       |
| 5   | Withstand Voltage | V    | Withstand V Tester |
| 6   | Power Efficiency  | %    | Power Analyzer     |
| 7   | Power Consumption | W    | Power Analyzer     |

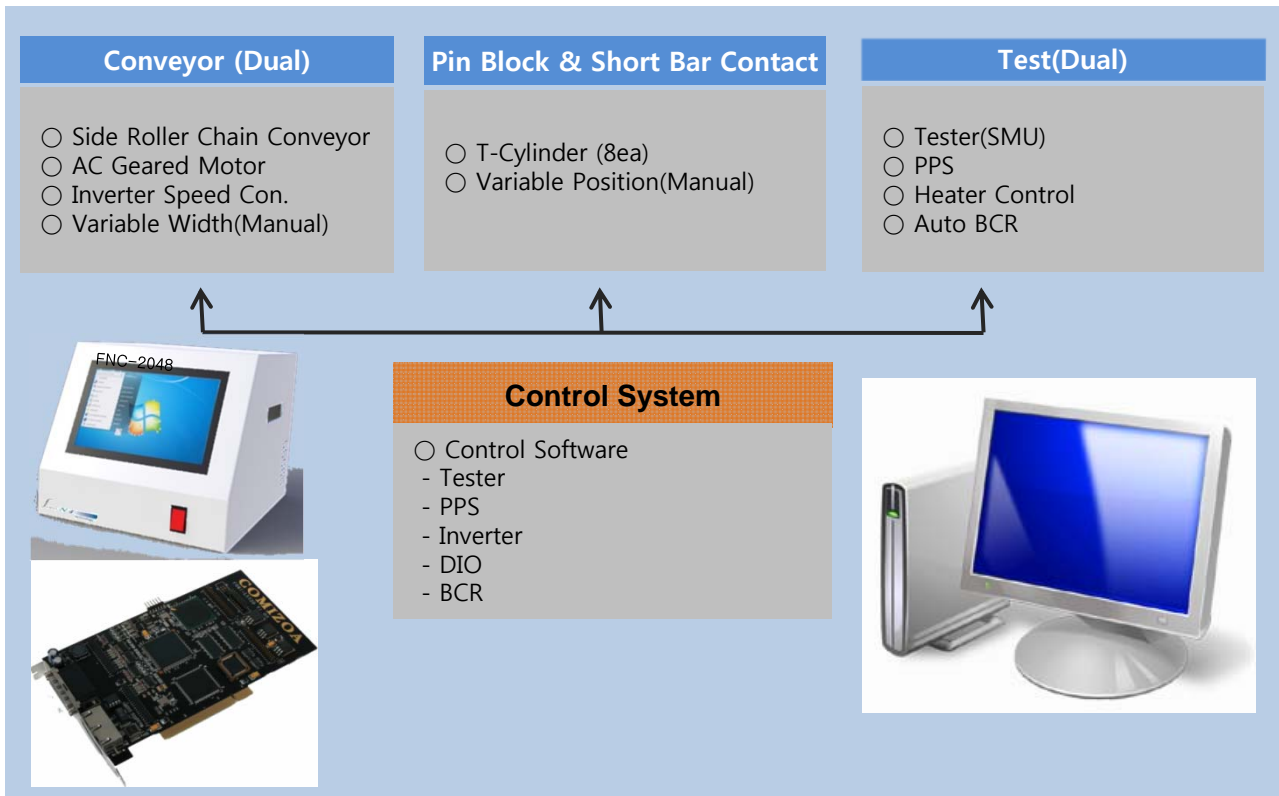
# LED MODULE INLINE HT INSPECTION SYSTEM

This product is equipment measuring then Forward Voltage with a fixed current value (low current, rated current) applied to LED Array Module for TV, Monitor BLU after SMT work at high temperature, automatically test the lighting of each LED chip and judge its acceptance or rejection.





## Configuration



## Specification

| Item                | Detailed                       | Specification                            |
|---------------------|--------------------------------|--|
| Standard            | Dimension                      | 1300Lx1300W*1330H                        |
|                     | Communication                  | RS-232c / USB / IO terminal              |
| Utility             | Air supply pressure            | 5kg/f                                    |
|                     | Rating Voltage                 | Single phase 220V ±5%                    |
|                     | Rating frequency               | 50/60 Hz±0.2Hz                           |
| Probing type (Dual) | Type                           | Top Down type                            |
|                     | Driving                        | Table Cylinder                           |
|                     | Align                          | Guide block / Stopper                    |
| Tester(Dual)        | FLTL-2048                      | Max. 1000mA / ch.                        |
| Conveyor(Dual)      | AC Motor<br>Inverter Speed Con | Side Roller Chain Conveyor               |
| BCR(Dual)           | Auto Barcode Reader            | Cognex Dataman100s<br>5ea/sec processing |
| Heater(Dual)        | PE Film Type                   | 3Kw / Max. 200°C ± 5°C                   |
| Control             | PC control                     | Industrial PC & 17" Touch Monitor        |

# LED Module Inline Optical Inspection System

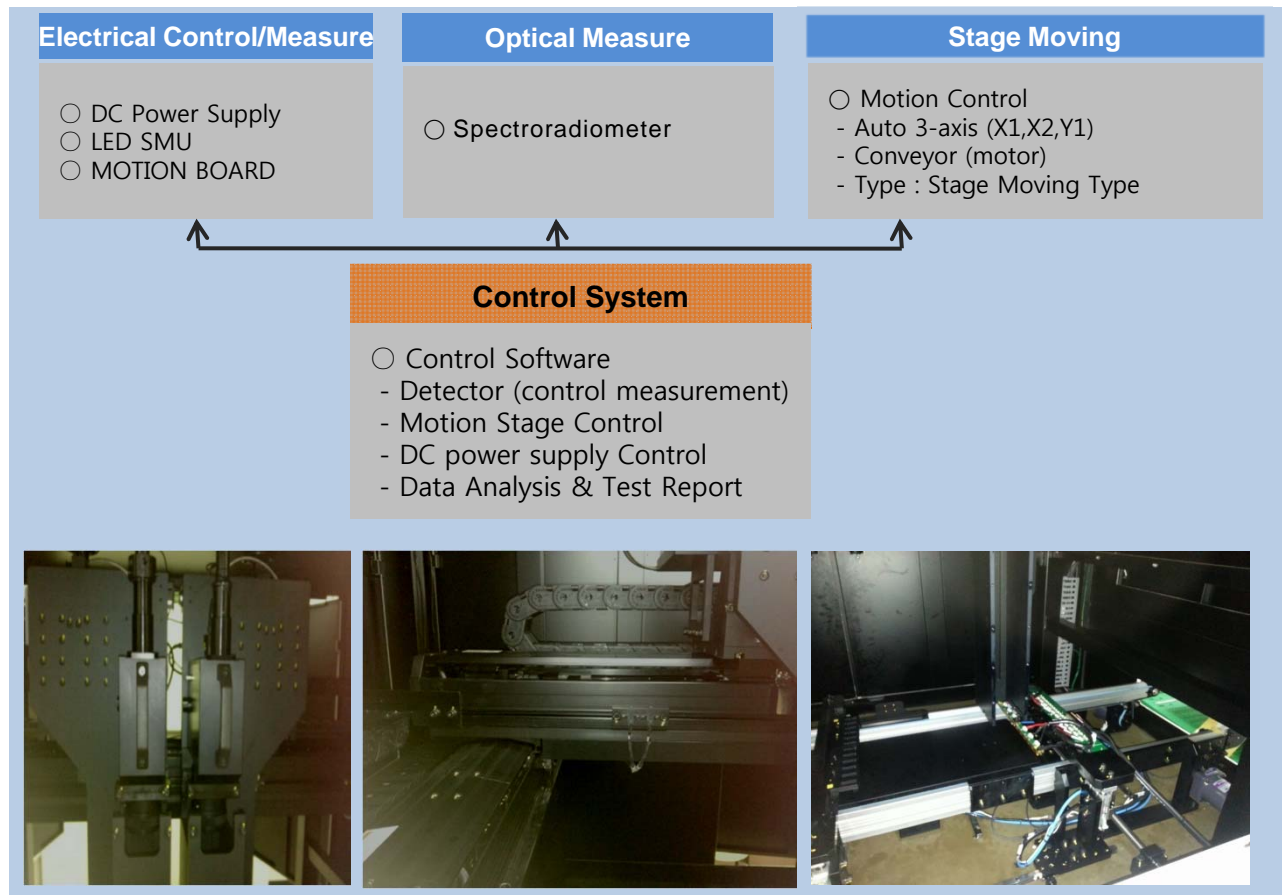


This is an automated system precisely processed and correctly controlled to reduce measurement error and position error in distance between measurement object and period, leveling extent, which can relieve work inefficiency by integrally operating measuring machine, Power equipment, motion stage etc.

## Test Item

| Item         | Content / Meaning  | Remark             |
|--------------|--|--------------------|
| Spectrum     | Visible ray band range 380 ~ 780nm   | Using Spectrometer |
| Luminance    | Measuring one model brightness (Unit cd/m <sup>2</sup> )                   | Using Spectrometer |
| Uniformity   | Measuring brightness uniformity of display pattern at measurement specimen | Using Spectrometer |
| Chromaticity | Indicating as CIE 1931 (x, y) & CIE 1976 (u', v') Data, color coordinate   | Using Spectrometer |
| Electrical   | Measuring voltage (Vf), If by applying constant current                    | FourN4's S/W       |
| MOTION       | Motion Data( Positioning data )  | FourN4's S/W       |
| Other        | Measurement item and result Report changeable                              | FourN4's S/W       |

## Configuration



## Specification

| Item                   | Detailed            | Specification   |
|------------------------|---------------------|---|
| <b>Utility</b>         | Air supply pressure | 5kgf/cm <sup>2</sup>                                    |
|                        | Rated voltage       | One-phase 220V ±5%                                      |
|                        | Rated frequency     | 50/60 Hz±0.2Hz  |
| <b>Motion</b>          | X1, X2- Axis        | ST : 700mm , Accuracy : ±20 [μm] Velocity : 1000 [mm/s] |
|                        | Y1,- Axis           | ST : 500mm , Accuracy : ±20 [μm] Velocity : 1000 [mm/s] |
| <b>SMU(Controller)</b> | Voltage             | 200V ± 0.1 [V]  |
|                        | Rated Current       | 100uA ~ 1000mA , [±1mA ]                                |
|                        | Low Current         | 5uA ~ 500uA (±10uA)                                     |
|                        | Channel             | 48CH  |
| <b>PPS(Power)</b>      | Power               | 200V/3A   |
|                        | Control             | RS-232c   |



# LENS TILT Inline Inspection System



This equipment measures the concentricity between lower LED Chip and upper Lens at LENS Type LED Module, which is used to test product quantity, pass and failure, and quickly detect abnormal process generated at SMT process, not to prevent unequal (brightness, chromaticity stain) at SMT process management and at client factory's Module assembling.

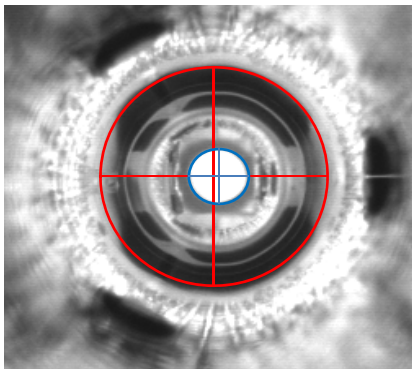
## Measuring concentricity methods

### A. Concentricity type

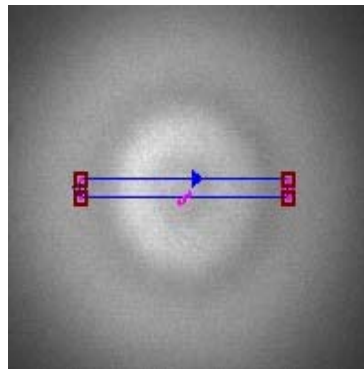
With power not impressed at product, and light not on, find the central point of LED package and that of upper LENS using UV lighting and UV camera, and measure concentricity between the central points using Vision technology.

### B. Peak type

Apply power to product, with light on, obtain Intensity Profile of Image projected at upper diffuser plate using Vision technology, and make relative comparison of maximum points of both ends of Profile curve and measure concentricity (Shift, Tilt).

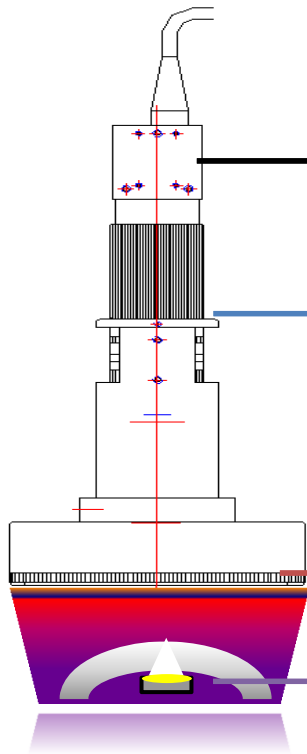


A. Concentricity type



B. Peak type

## Composition of vision system



### Vision Camera

- Resolution : 0.01 mm / pixel  
(Repeat precision = +/- 0.01mm )

### Optical Lens

- Select considering W/D(Working Distance) and F.O.V(25mm).

### Illumination(special lighting)

- Positioning and production that LED Package and Circle Image inside Lens can be visible well.

### DUT(measured object)

- LED Module mounted at Carrier.

## Specification

| Item            |                    | Description                |  |
|-----------------|--------------------|----------------------------|--|
| Motion (5-Axis) | X1/X2-Axis         | Stroke 800 mm              | Accuracy : $\pm 20 \mu\text{m}$<br>Velocity : Max. 1,000 mm/sec<br>Z-Servo Motor Home Position |
|                 | Y-Axis             | Stroke 500 mm              |  |
|                 | Z1/Z2-Axis         | Stroke 110 mm              |  |
| Conveyor        | Width 300~500mm    | Length 1900mm              | SPEED : 5~100m/sec   |
| Vision / Camera | Controller         | Cognex PCI Frame Grabber   |  |
|                 |                    | Cognex Geometric LIC Key   |  |
|                 | CCD Camera         | Sony XX – XX50 (UV Camera) | Resolution : 0.012mm/pixel   |
|                 | Light / Controller | 4Ch.                       | 2ch  |
| P/B & Tester    |                    | FLTIIILD-2048 Tester       | Vf Test(0.1V)  |
| Utility         | Power              | 220 VAC, 50~60Hz           |  |
|                 | Air Press          | 0.4~0.5 MPa                |  |
| Option          |                    | 2D BCR, Separate Jig       |  |

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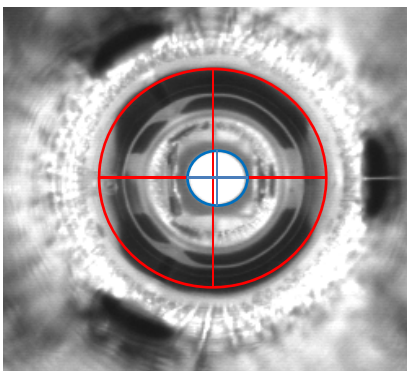
## Measuring concentricity methods

### A. Concentricity type

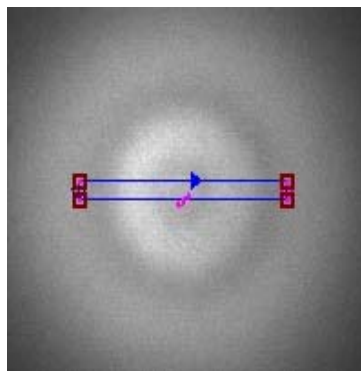
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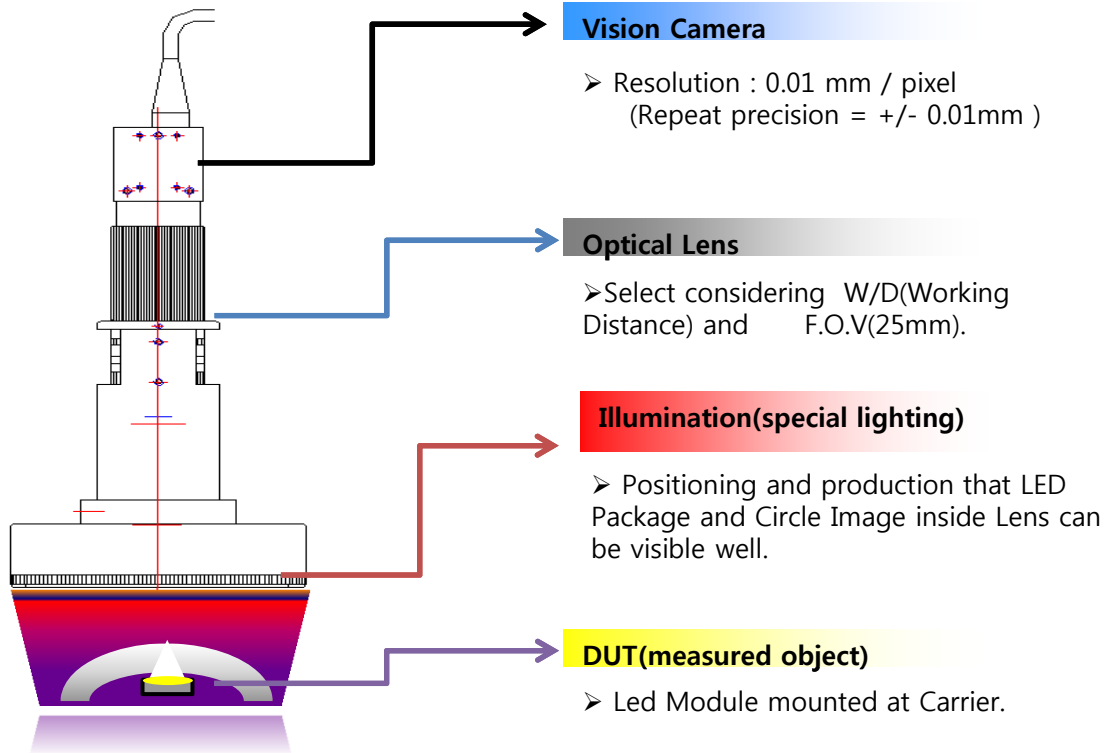


A. Concentricity type



B. Peak type

## Composition of vision system



### Vision Camera

- Resolution : 0.01 mm / pixel  
(Repeat precision = +/- 0.01mm )

### Optical Lens

- Select considering W/D(Working Distance) and F.O.V(25mm).

### Illumination(special lighting)

- Positioning and production that LED Package and Circle Image inside Lens can be visible well.

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- Led Module mounted at Carrier.

## Specification

| Item                    |              | Description                          |  |
|-------------------------|--------------|--------------------------------------|--|
| <b>Motion (5-Axis)</b>  | X1, X2-Axis  | Stroke 800 mm                        | Accuracy : ± 20 um<br>Velocity : 1,000 mm/sec<br>Z-Servo Motor Home Position |
|                         | Y-Axis       | Stroke 800 mm                        |  |
|                         | Z1, Z2-Zxis  | Stroke 110 mm                        |  |
| <b>Vision / Camera</b>  | Controller   | Cognex PCI Frame Grabber             |  |
|                         |              | Cognex Geometric LIC Key             |  |
|                         | CCD Camera   | Sony XX – XX50 (UV Camera)           | Resolution : 0.012mm/pixel   |
| <b>Work Base</b>        | Air Cylinder | Stroke 600 mm                        |  |
| <b>P/B &amp; Tester</b> |              | FLTI-2048 Tester                     | Vf Test(0.1V Management)   |
| <b>Utility</b>          | Power        | 220 VAC, 50~60Hz                     |  |
|                         | Air Press    | 0.5 Mpa                              |  |
|                         | Size         | L1550 X W1300 XH1870                 |  |
| <b>Option</b>           |              | 2D BCR, Jig designed by each product |  |

# LED Module Optical Inspection System

LED Module Optical Measuring system is an instrument which is able to get a various information about LED Module to confirm the optical and the electrical characteristics and the quality.



## Advantage

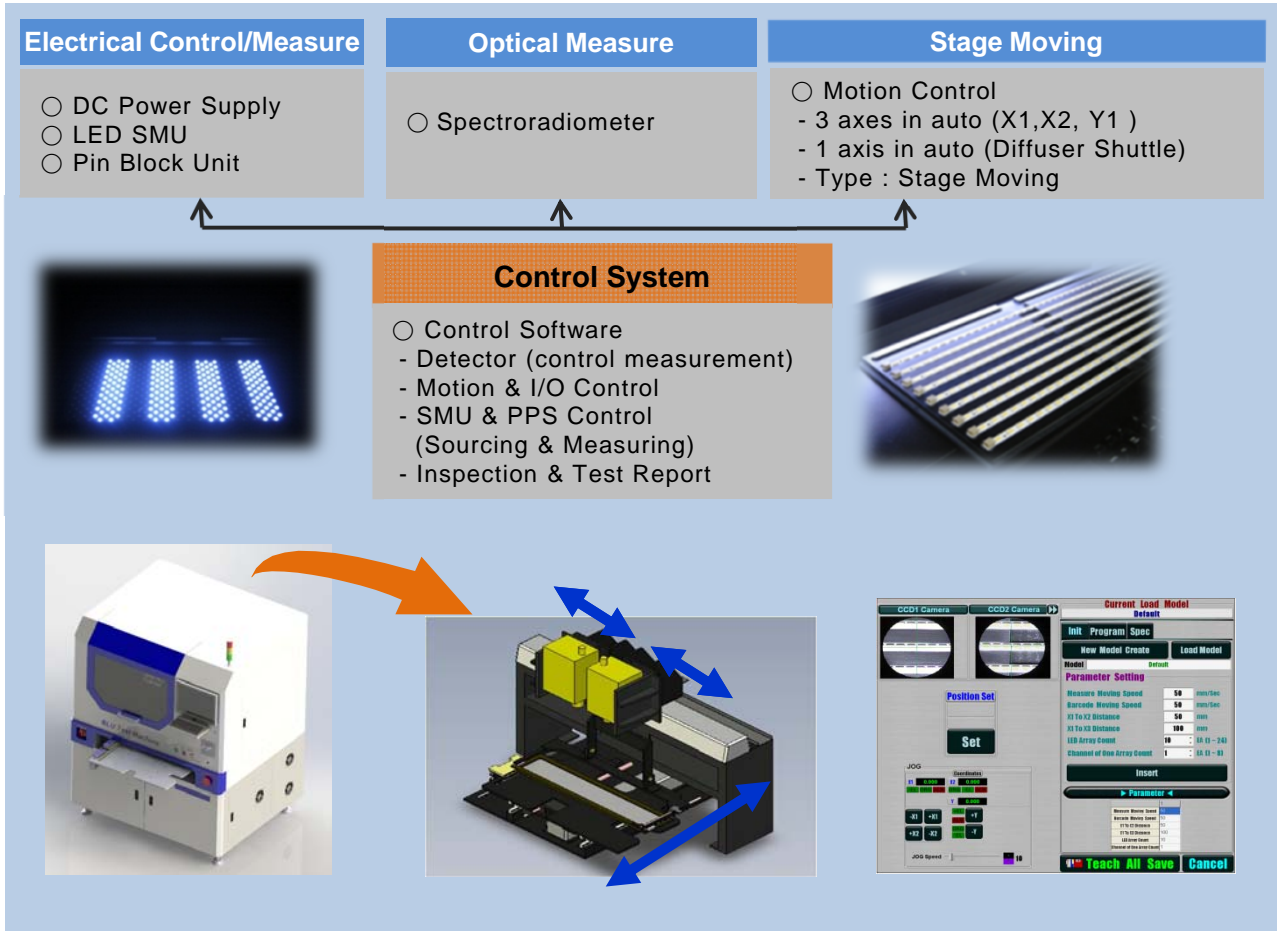
1. Easier Operation by GUI(Graphic User Interface)
2. Highly Precise Positioning by the Vision Function
3. Easy Instrument Management  
: Separated Admin. Mode & Operator Mode
4. Adopt Touch Screen LCD Interface
5. Convenient Application Change  
: Wide Mode of Program Selection

## Test Item

| Item        | Description   | Remark            |
|-------------|---|-------------------|
| Wp          | 380 ~ 780nm, (Peak Wavelength Measure)                              | Spectroradiometer |
| Luminance   | Unit : cd/m <sup>2</sup>  | Spectroradiometer |
| Uniformity  | Luminance Uniformity per LED Module Array                           | Spectroradiometer |
| Color Space | Coordinates [CIE 1931 (x, y) & CIE 1976 (u', v')] Data              | Spectroradiometer |
| Vf          | Forward Voltage of Each String under High Current forcing Condition | SMU               |
| Others      | Judgment of OK/NG by Tolerance of Model and save the measuring Data | Customized S/W    |



## Configuration



## Specification

| Items                |                         | Description   |
|----------------------|-------------------------|---|
| Samples              | Type                    | Edge type , Direct type   |
| Stage and Motion     | Black Box               | Air circulation fan for Black box                                 |
|                      | Motion X1、X2(Auto)      | Servo Motor / Stroke 700 mm                                       |
|                      | Motion Y1 (Auto)        | Servo Motor / Stroke 800 mm                                       |
|                      | Diffuser Shuttle (Auto) | Air cylinder type (400mm)   |
| Measuring Instrument | Light Detector          | Spectroradiometer (1nm, 2nm optional)                             |
|                      | LED SMU                 | Range 100uA ~ 1000mA , [±1mA ]                                    |
|                      | Control PC              | 17" Touch Screen LCD  |
|                      | Power Supply            | Determined by LED Test Specification                              |
| Software             | Measuring Control       | Motion Control, Test Item, Auto Positioning, Safety Mode Function |
|                      | Data Handling           | Store DUT Measure Data in Excel Form                              |