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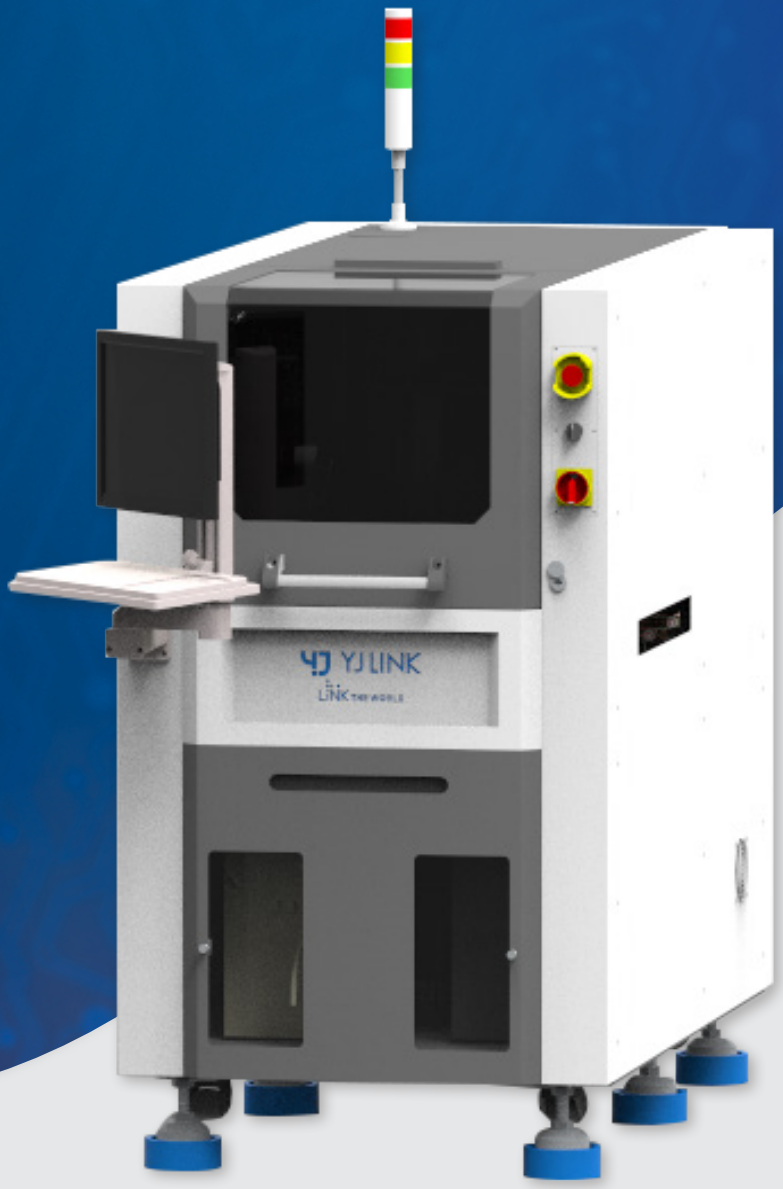
Laser Series

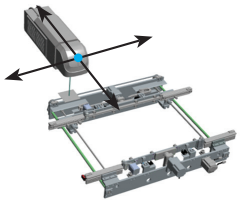
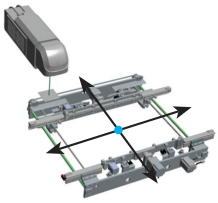
Laser marking machine

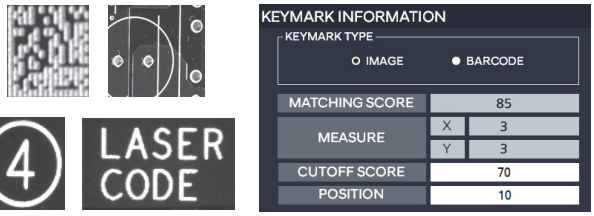


YJ LINK LINK THE WORLD

Laser Marking Machine

Laser Marking Machine engraves 1D/2D barcodes, logos, and characters on the surface of a PCB or an object without physical or chemical damage. The laser head performs it's marking by adjusting its own height in the Z axis according to the height of the object.

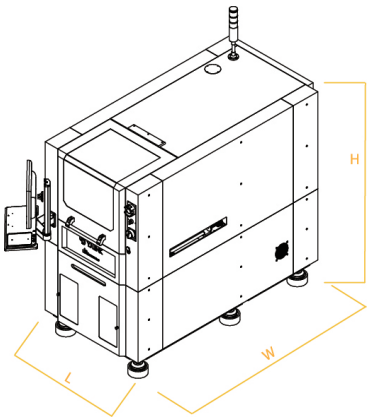
Model	YLM-00	YLM-10
System Movement	X, Y-axes Head moving	X, Y-axes Stage moving
		
Laser Type	CO2 10W	FAYb 12W
	Gas Laser	Solid Laser
Feature	Compact size Faster cycle time Suitable for FR4 grade	Able to mark on metal Better color formation for resin Head movimg type is inapplicable
Laser Wavelength	10.6㎛	1.06㎛
Spot	182㎚	60㎚
Marking	Resin(Plastic), Ceramic, Paper, Glass	Metal, Resin(Plastic), Ceramic
*Depending on the material of the PCB or the marking material, the laser head may be changed. Pre-test is recommended.		
1D code	Code39, Code128, ITF, NW-7, JAN/UPC, RSS-14, RSS	
2D code	QR, Micro QR, Data Matrix, GS1 Data Matrix	
Logo	BMP, DXF, HPGL, JPEG, AI, EPS	
Laser Grade	Grade 4 (It is extremely dangerous to expose the laser light to skin or eyes even if it is temporary. And the diffuse reflected light is also dangerous to skin or eyes. Lastly, it can cause fire as well if not used properly)	

Common Standard Specification	
Items	Contents
System Movement	· Double sided marking
Fiducial Recognition	· Position compensation up to ±0.1mm by recognizing Fiducial before marking · Camera brand : HIKVISION
Key Mark Function (Prevent wrong PCBs from coming in) 	· An operator registers the unique pattern(Barcode/Image) only on the PCB. When a new PCB comes in, the machine compares the pattern of the new PCB with the registered pattern to decide whether it is a correct board to engrave.  **Fiducial Point** | The machine starts marking even if a newly scanned pattern doesn't match 100% with the registered one as Key Mark but matches over 50%.  **Tolerance** | Error range can be set in 'mm' * When using key mark, if any of 'Fiducial Point' and 'Tolerance' can not be matched, an error occurs. · Teaching Marking Position » Marking position preview(Indicator) · Camera brand : HIKVISION
Scanner 	· Barcode Reading » COGNEX DM60X
BOFA Fume Collector 	· External Type - Structure: Primary Pre-Filter / Secondary HEPA Filter - ON/OFF control by the host(ALMC) - Check error status via Laser Marking Machine » Filter exchange / Operating Error
Marking time	· 0.5 sec / per PCB
Scanning time	· 0.5 sec / per PCB
Inverting time	· 2.0 sec / per PCB
· Saving data in a log file	
· Adopted internal motion controller (Industrial LAN Interface)	

* For more details on cycle time, please enquire with sales team

Optional Specification	
Items	Contents
Marking Grade	· Measuring the barcode grade marked on PCB » Able to provide the results to a PDF
Marking Power Detector	· Checking whether the set laser value is output after the set number of marking » When a certain set value 'n' (For example, n=1,000 : Every time after producing 1,000 PCBs) is input, the laser automatically moves to the laser power detector and measures the laser power so that the user can know the current state of the laser. » Since the detector and the Laser PC are connected by a USB cable, it can be directly controlled on the Laser Machine program. » If the marking power is different from the set value, it is necessary to re-adjust the set value in the program.
UPS	· The standard is a battery capacity that can last about 10 minutes
3 Color LED	· Red, Blue, White · It is necessary to set the LED color on machine program according to the PCB color. · LED color can be decided according to the customer's PCB color. (Ex. 2 color LED(Red, White)
Ionizer	· Minimize PCB damage by keeping ion balance below ±10V · Bar type · Brand : KEYENCE or PANASONIC 
MES SYSTEM	 Laser marking machine Barcode Information Marking, Scan Results  Customer's SERVER · Manufacturing Execution System · Communication Method : LAN(TCP or UDP) / RS-232 » LAN communication is a method using the Ethernet cable that we often use to connect to the Internet. Technically, you can use sockets and others for LAN communication. Also, it is fast. » RS-232 is one of the serial communication methods, and it was used mostly in the past industry. Also, it is mainly used when the amount of communication data is small and the communication speed is much slower than LAN. * MES protocols and flow charts sould be provided from customer.

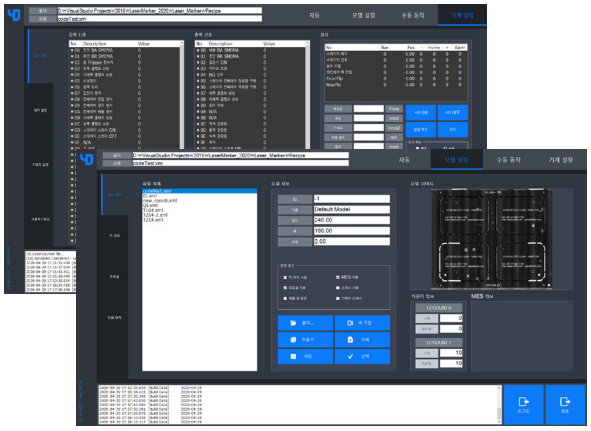
YLM-00 / YLM-10 General Specification				
No.	Items	M	XL	2XL
1	PCB Min.Size (L) x (W)mm	70 X 50		
2	PCB Max.Size (L) x (W)mm	330 X 250	460 X 460	610 X 460
3	PCB Thickness (mm)	0.6 ~ 4.0		
4	PCB Edge (mm)	3		
5	PCB Top/Bottom Clearance (mm)	30 / 25		
6	Loading Weight (kg)	3		
7	Conveyor Speed(mm/sec)	500		
8	Conveyor Belt	Antistatic $10^{8\sim10}$ Tem : 100˚		
9	Transport Height (mm)	950±20 / 900±20		
10	Flow Direction	Left to Right / Right to Left		
11	Fixed Rail	Front / Rear		
12	Air Supply (Mpa)	0.5(5bar)		
13	Air Usage (ℓ/min)	30		
14	Electricity Consumption (kw) – Laser	1.5		
15	Electricity Consumption (kw) – Extractor	1.1		
16	Power	220~230V/50~60Hz, 1Phase		
17	Color	SR RAL 7035		



Dimension (L)mm x (W)mm x (H)mm		
Model / Size	YLM-00	YLM-10
M	700 X 1550 X 1600	
XL	900 X 1827 X 1600	1050 X 1977 X 1600
2XL	1050 X 1827 X 1600	

* YLM-00 : X, Y-axes Head moving
* YLM-10 : X, Y-axes Stage moving

01 Self-developed Program

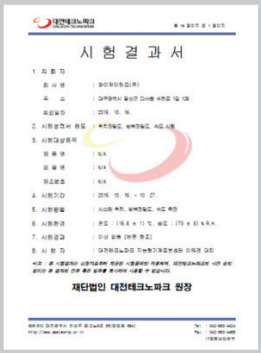


02 CPK

ITEM NUMBER	1	2
ITEM NAME	X	Y
AVERAGE	3.046	37.716
STANDARD DEVIATION	0.039	0.032
MAX. DATA	3.108	37.755
MIN. DATA	2.991	37.634
MAX. DEVIATION	0.117	0.121
CP	4.24	5.286
CPK	3.852	4.059

03 Certificate

Inverter Stage Repeat Precision Measurement

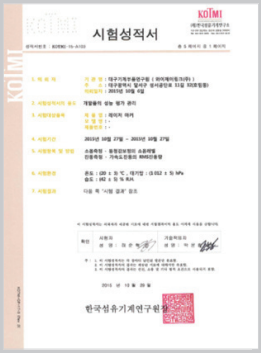


Stage Repeat Precision Measurement

Fiducial Repeat Precision Measurement

Built-In Inverter Performance Testing

- Inverting time
- Stage transfer response time



Noise and Vibration Measurements

- Noise level of 65db
- No misaligned marking position caused by vibration.

Laser Marking Depth Measurement

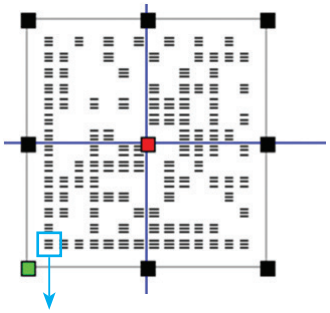
- No damage to the PCB caused by engraving. (The shallowest measurement depth: 15.6㎛)

* Marking depth depends on laser power, marking speed or PCB material.

04 Reference Symbol Size and Data Capacity-Data matrix

Symbol size	Numeric (Single-byte)	Alphanumeric (Single-byte)
10 x 10	6	3
12 x 12	10	6
14 x 14	16	10
16 x 16	24	16
18 x 18	36	25
20 x 20	44	31
22 x 22	60	43
24 x 24	72	52
26 x 26	88	64
32 x 32	124	91
40 x 40	172	127
44 x 44	228	169
48 x 48	288	214
52 x 52	-	259
64 x 64	-	-
72 x 72	-	-
80 x 80	-	-
88 x 88		-
8 x 18	10	6
8 x 32	20	13
12 x 26	32	22
12 x 36	44	31
16 x 36	64	46
16 x 48	98	72

» "Alphanumeric" includes blank characters, numerical characters and capitals.

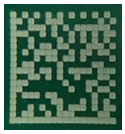


* The table represents the amount of data that can be included in barcodes, depending on the number of width- and lengthwise dots of the data matrix(symbol size).
* The recommended symbol size for manufacturing purposes is 0.2~0.25mm
* Amount of Markable data by barcode size

Barcode size	Numeric	Alphanumeric
2.8mmX2.8mm	16	10
3.2mmX3.2mm	24	16
3.6mmX3.6mm	36	25
4.0mmX4.0mm	44	31

» The above table is an example and may vary depending on laser type and PCB characteristics.
» Higher-resolution scanners should be used to read larger amounts of data in barcodes of the same size.
» The read rates of the scanner vary depending on the barcode size

05 Reference Marking Quality



BEST Example – barcode on Green PCB

It has a bright pattern with dark background, so it has good contrast ratio and good scan rate. The marking quality is excellent because the size of the marking DOT and the margin are the same(equidistant interval).

Bad Contrast Example – barcode on Red PCB

Most scanners use red LEDs for lighting. At this time, the red PCB strongly reflects the red LED, so the brightness difference between the barcode and the PCB color is reduced, resulting in a lower scan rate.

* If you are marking on a red PCB, the reading rate can be improved by using white illumination. However the reading rate may drop if other colors are going to be used under the same illumination. Therefore it is very important to check the colors of the boards that are going to be used at customer's site in advance.

06 Reference Laser Response by Materials

◎ Excellent / ○ Good / △ Pair / X Impossible

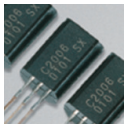
	Materials	FAYb Laser	CO2 Laser
Resin	PE (polyethylene)	○	○
	PC (polycarbonate)	○	○
	PP (polypropylene)	○	○
	POM (Polyacetal)	◎	○
	PBT (polybutylene terephthalate)	◎	○
	PET (polyethylene terephthalate)	X	○
	ABS (acrylonitrile butadiene styrene)	◎	○
	EP (epoxy)	◎	◎
	PF (phenol)	◎	◎
	UF (Urea)	◎	◎
	PVC (polyvinyl chloride)	◎	◎
	PA (polyamide)	◎	○
	SI (silicone)	○	X
Metal	Iron	◎	X
	Aluminium	◎	X
	Nickel	◎	X
	Stainless	◎	X
	Copper	○	X
	Gold	○	X
Others	Ceramic	○	○
	Lumber	△	◎
	Paper	△	◎
	Glass	X	◎
	Rubber	◎	◎

Marking Examples


Metal tray

Printed circuit boards

IC Package


Transistors


Product package

PET bottle

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