High Speed Smart Modular Mounter

RS-1R

Superior Productivity & Versatility

with the best throughput in an all-in-one mounter

- **Class leading tact time of 47,000 CPH[1]**
- **“Takumi Design Head” self optimizes height for maximum speed and flexibility**
- **Achieves optimum line balancing and maximum throughput**
- **Wide component range from 0201 (metric) to large odd-form parts**
- **Ideal for LED placement**

[1] Optimal

Improvements compared to RS-1

1. Optimal speed increased from 42,000 CPH to 47,000 CPH
2. 3 mm setting added to variable height of the “TAKUMI Design Head“.
   - Improves speed for small parts up to 3 mm in height
3. New RFID tagged nozzles
   - Provides traceability for individual nozzles
4. Larger nozzles capability to further improve flexibility

Class Leading Speed 47,000 CPH

RS-1R

KE-3010A
23,500CPH

→

RS-1
42,000CPH

→

RS-1R
47,000CPH

Single Head Mounter

RS-1R

- Self optimizing centering height based on part height.
- Speed is improved by shortening the Z-axis movement distance.
- Flexible for board type and production type
- Settings for 1 mm, 3 mm, 6 mm, 12 mm, 20 mm, and 25 mm all on one head. (6 heights)

RS-1R's new multi-laser head × 1 unit
● No height specification (up to 25mm height)

KE-3010A
Multi-laser head × 1 unit
- Fixed height of 6/12 mm

KE-3020VA
Multi-laser head × 1 unit
- Fixed height 6/12 mm

One high-resolution vision head
- Fixed height 12 mm/20 mm

KE-3020VRA
Multi-laser head × 1 unit
- Fixed height 6/12 mm

IC head with FMLA sensor × 1 IC head
- Fixed height 12 mm/20 mm

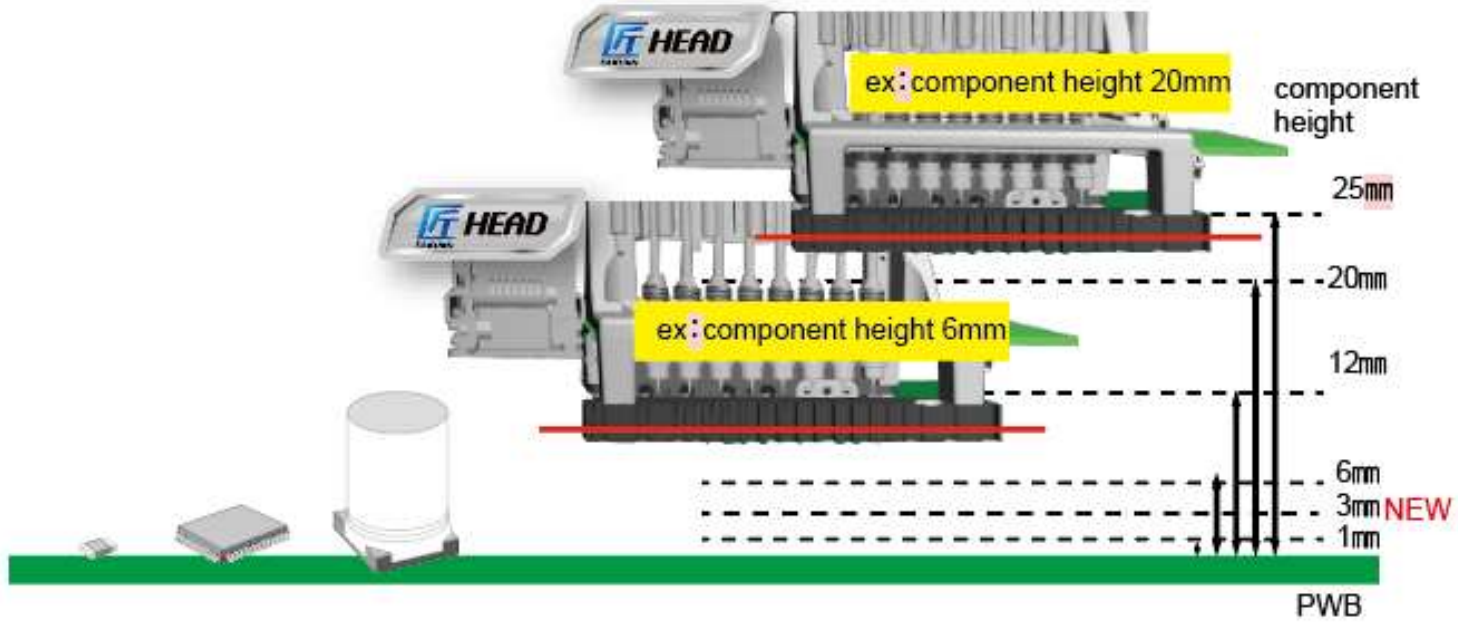
Expanded Speed & Versatility consolidated into one model

Features of “Takumi Head”

RS-1R

New Dynamic Height 8 nozzle placement head automatically adjusts height to optimize placement speed. This head adjusts automatically based on the components to be placed from 1mm to 25mm in 6 different positions (1・3・6・12・20・25mm).

Variable height of the laser sensor according to component height



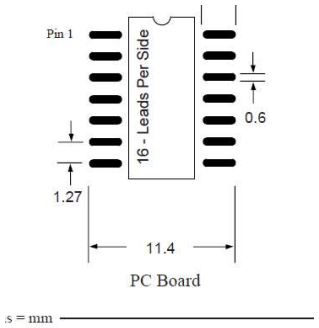
SMD Part Heights 0-1mm & 1-3mm

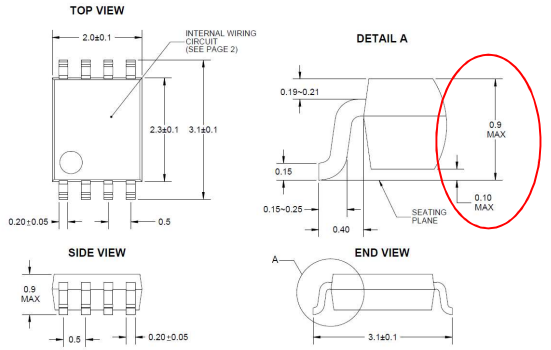
RS-1R

Most popular:

- **SOT-23 (Small Outline Transistor)** - (3 leads for diodes or transistors, but some ICs can come in this form factor too, and have more pins. 3 x 1.75 x 1.3mm.
- **SOT-223 (Small Outline Transistor)** - (for high powered devices, 6.7 x 3.7 x 1.8Mmm. Usually 3 leads plus a large one that acts as a heat-sink/transfer pad)

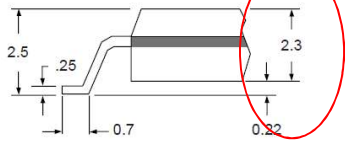
	Package Dimensions		
Rectangular End Cap	**Length**	**Width**	**Height**
Inch 01005, Metric 0402	0.40 mm	0.20 mm	0.25 mm
Inch 0201, Metric 0603	0.60 mm	0.30 mm	0.30 mm
Inch 0402, Metric 1005	1.00 mm	0.50 mm	0.40 mm
Inch 0603, Metric 1608	1.60 mm	0.80 mm	0.50 mm
Inch 0805, Metric 2012	2.00 mm	1.25 mm	0.60 mm
Inch 1008, Metric 2520	2.50 mm	2.00 mm	0.65 mm
Inch 1206, Metric 3216	3.20 mm	1.60 mm	0.70 mm
Inch 1210, Metric 3225	3.20 mm	2.50 mm	0.70 mm
Inch 1806, Metric 4516	4.50 mm	1.60 mm	0.75 mm
Inch 1812, Metric 4532	4.50 mm	3.20 mm	0.80 mm
Inch 2010 , Metric 5025	5.00 mm	2.50 mm	0.80 mm
Inch 2512, Metric 6332	6.40 mm	3.20 mm	0.80 mm
Inch 2920, Metric 7451	7.40 mm	5.10 mm	0.80 mm

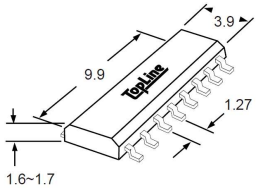


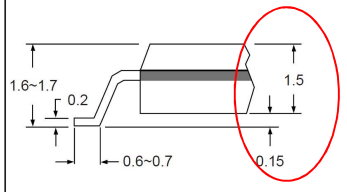


SO8 = 0.9mm

SOL32 = 2.3mm



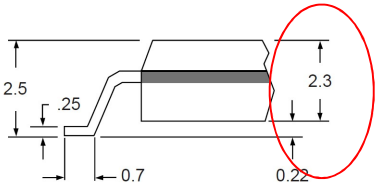




SO16 = 1.5mm

Tantalum Capacitors (SMD)

Package Size	Imperial Dimensions (EIA Standard)	Metric Dimensions (mm)
Size A	EIA 3216-18	3.2 x 1.6 x 1.6
Size B	EIA 3528-21	3.5 x 2.8 x 1.9
Size C	EIA 6032-28	6.0 x 3.2 x 2.2
Size D	EIA 7343-31	7.3 x 4.3 x 2.4
Size E	EIA 7343-43	7.3 x 4.3 x 4.1



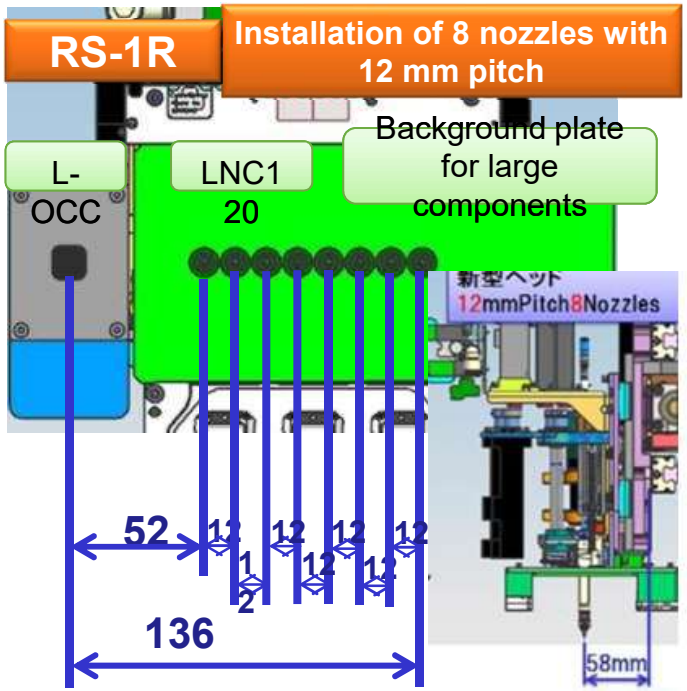
SOL20 = 2.3mm

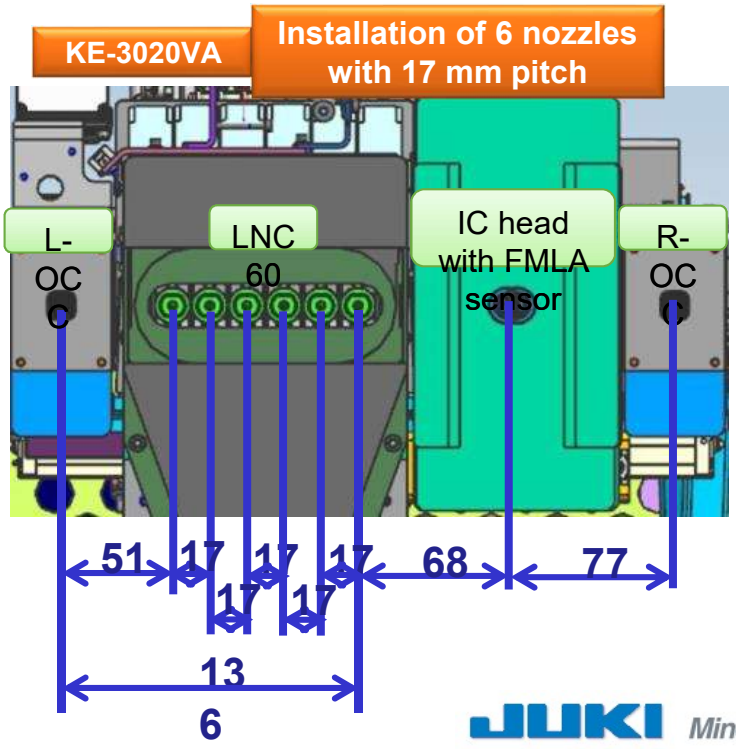
Features of "Takumi Head"

RS-1R

	RS-1R	KE-3020VA
Nozzle pitch	12mm	17mm,
Number of nozzles	8 Nozzle	6 nozzles + IC Head with FMLA
Laser sensor	LNC120-8	LNC60

- Reduces head mass
- Easier picking with RF feeders
- More parts picked per cycle (6 vs 8)





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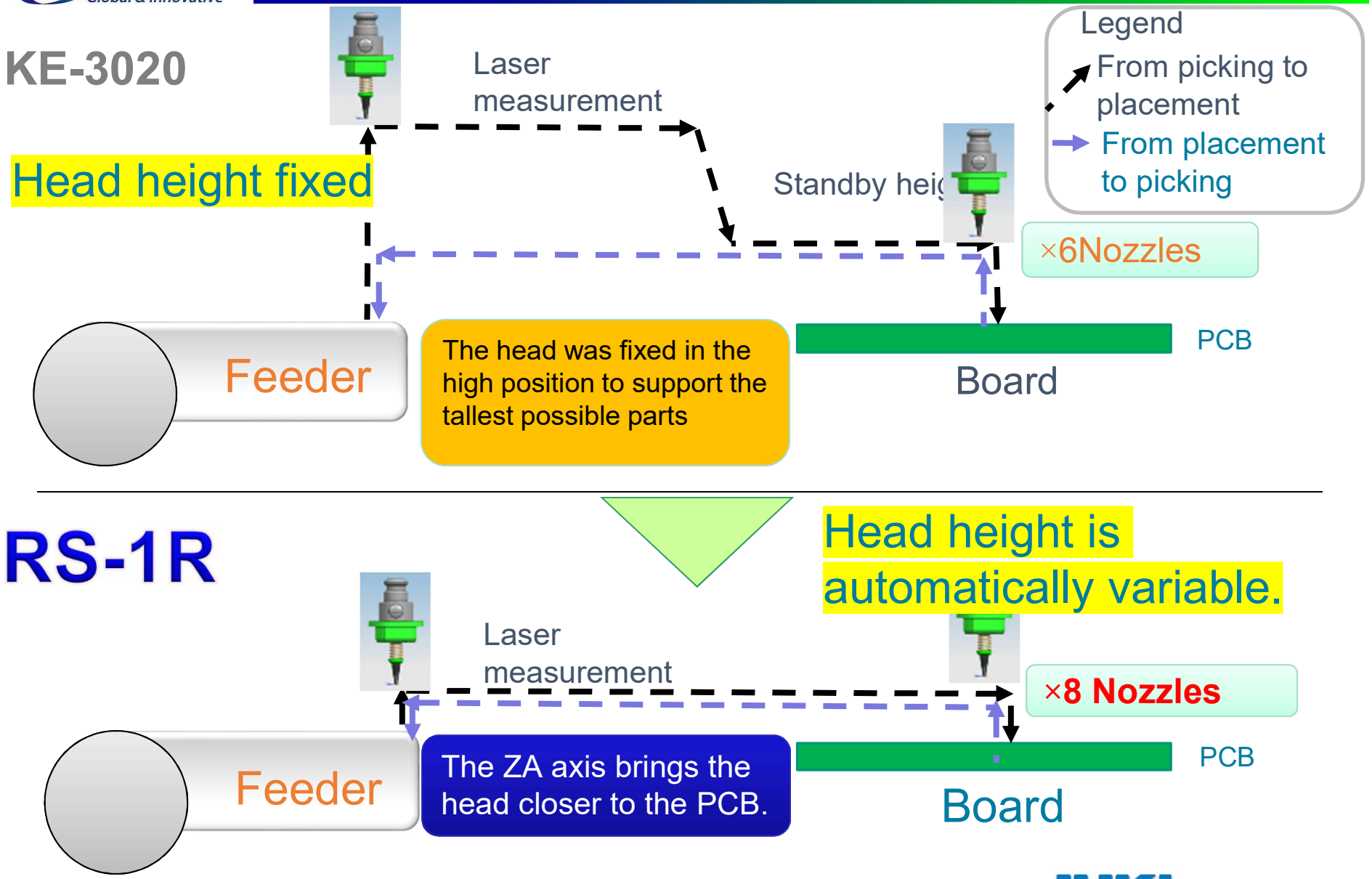
Features of the Takumi Head

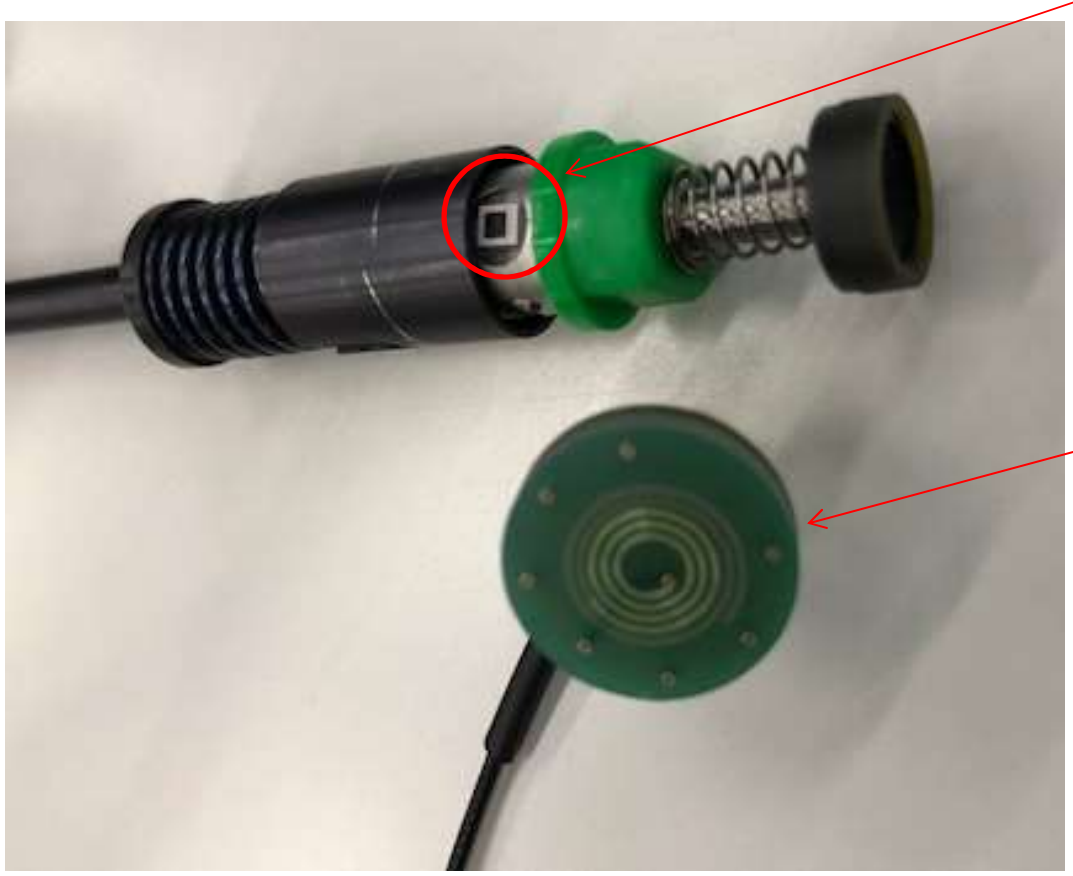
RS-1R



Nozzle RFID Tags

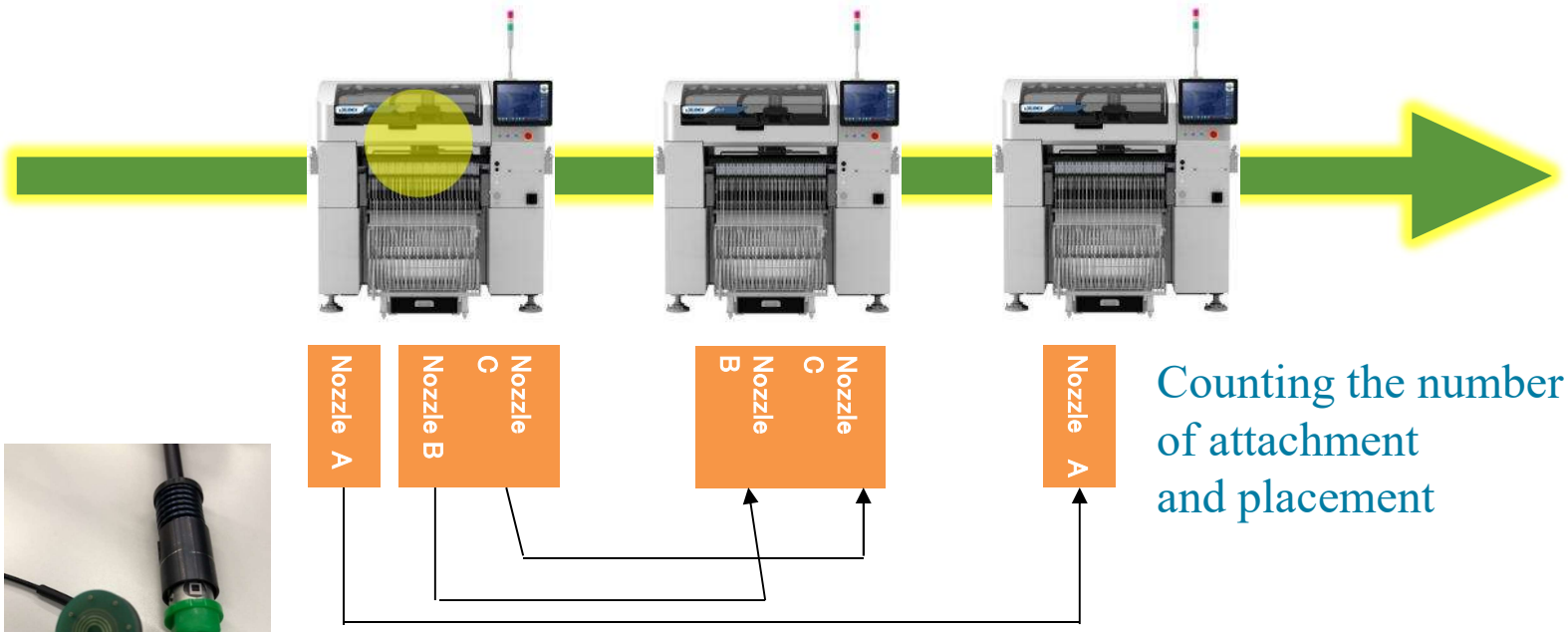
RS-1R

Every nozzle has an RFID tag that can be used to track exactly when it is used for traceability and maintenance control



Nozzle RFID Tags

RS-1R

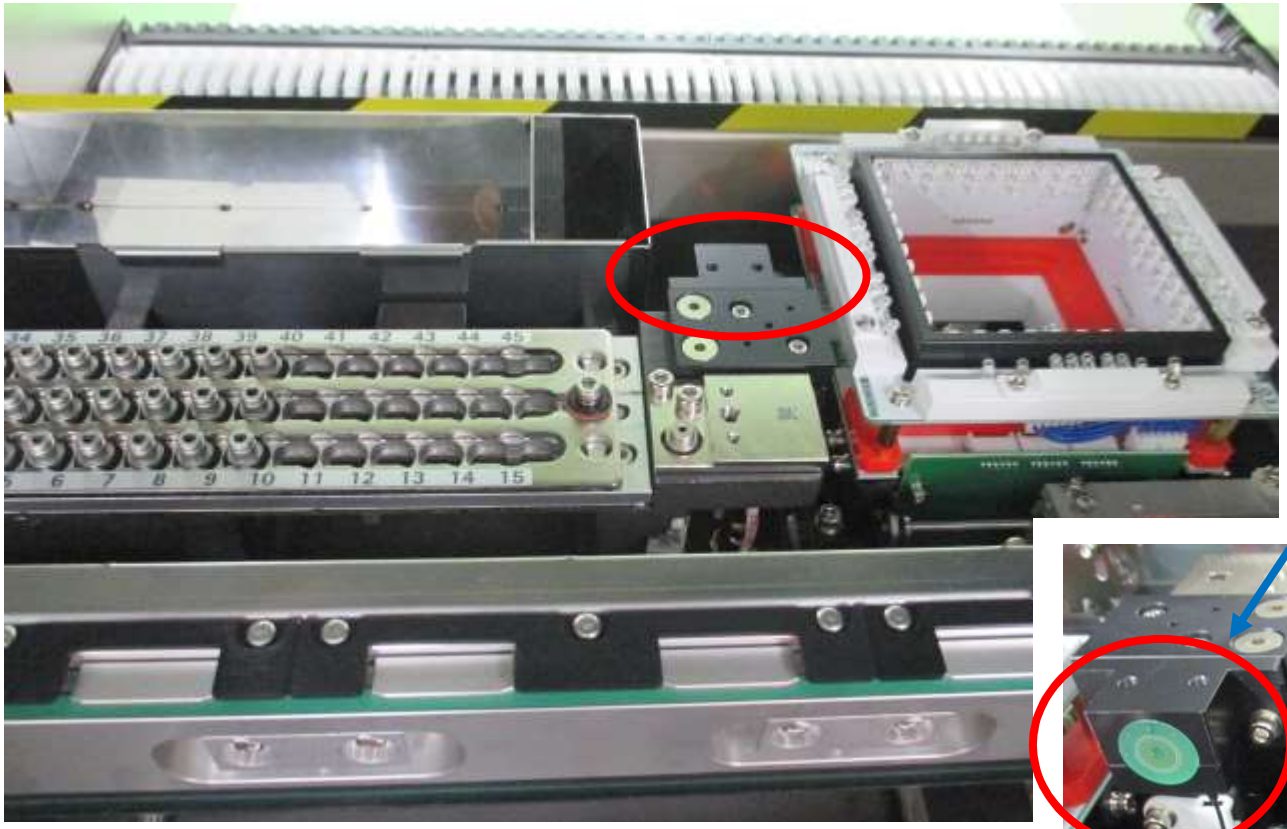


Counting the number of attachment and placement

By reading the RFID tag attached to the nozzle and associating the nozzle with the ID, it is possible to count operation information for each nozzle even if the nozzle is replaced in the ATC or between machines.

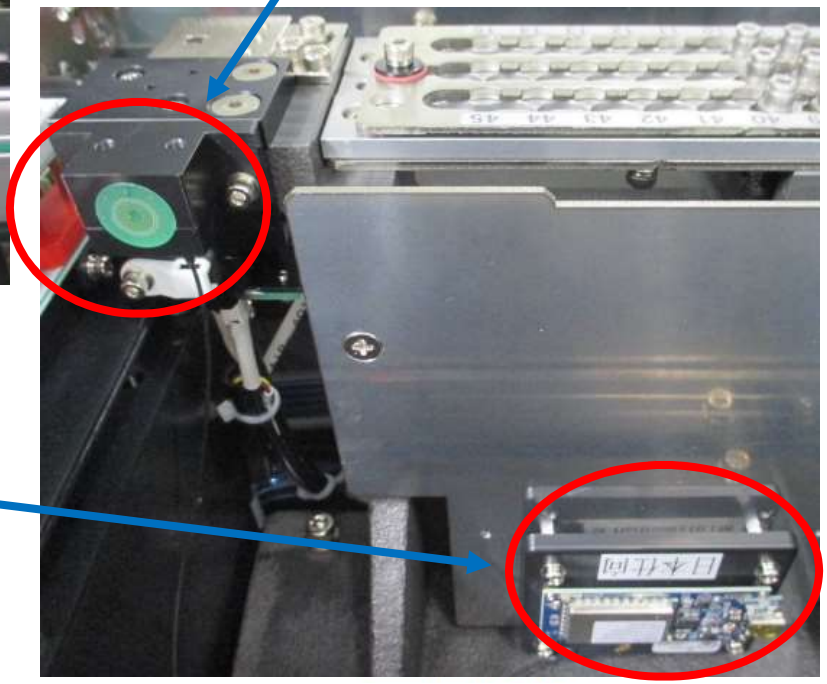
Nozzle individual control

RS-1R



NEW

Antenna



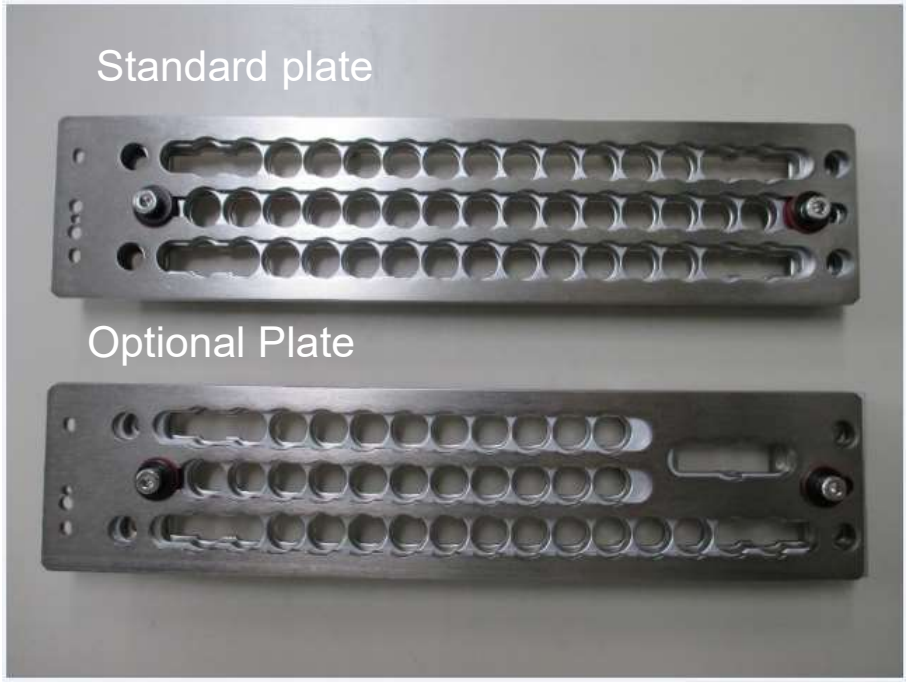
Reader/writer

Large Nozzle ATC

RS-1R

NEW

- ATC plate for large nozzles up to maximum of 7×28 mm.
- Also beneficial for larger odd shaped parts.



Compatible with ATC for large nozzles

RS-1R

NEW

Standard plate

	small nozzle hole(37pcs)	big nozzle hole(4pcs)	special big nozzle hole(1pc)	quantity of nozzle hole
only small nozzle	37	8	-	45
small and big nozzle	37	4	-	41

※Big nozzle hole can set 2pcs small nozzle.

Option plate

	small nozzle hole(31pcs)	big nozzle hole(3pcs)	special big nozzle hole(1pc)	quantity of nozzle hole
only small nozzle	31	6	1	38
small and big nozzle	31	3	1 (small or big nozzle)	35
small ,big and supecial big nozzle	31	3	1	35

※Big nozzle hole can set 2pcs small nozzle.
※Special big nozzle hole can set small or big nozzle 1pc.

Higher Throughput

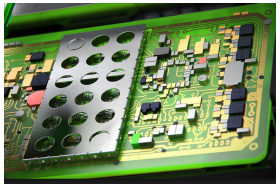
RS-1R

Benefits of adding a 3 mm height

Production with the optimum head height

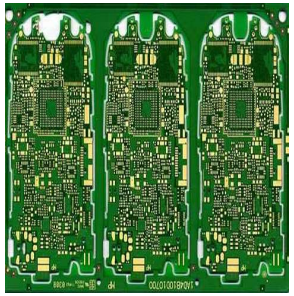
Production Type A

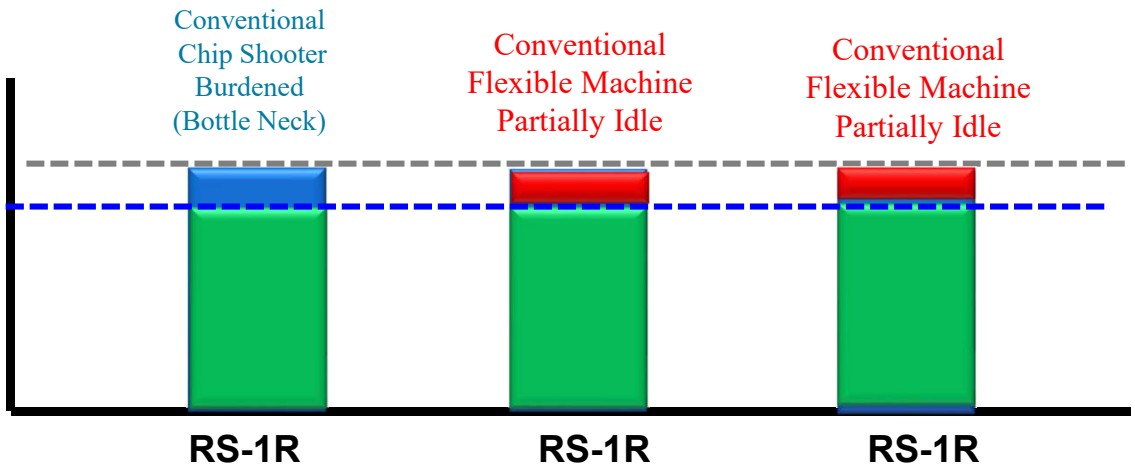
High Density Small Chips
Low Profile PCBAs



Higher output due to the greater flexibility = cph balancing

Conventional tact time
RS-1R balanced tact time



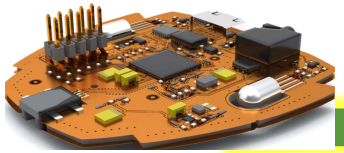


Achieve the highest throughput

RS-1R

Maximum throughput with optimum line balancing

Production Type B

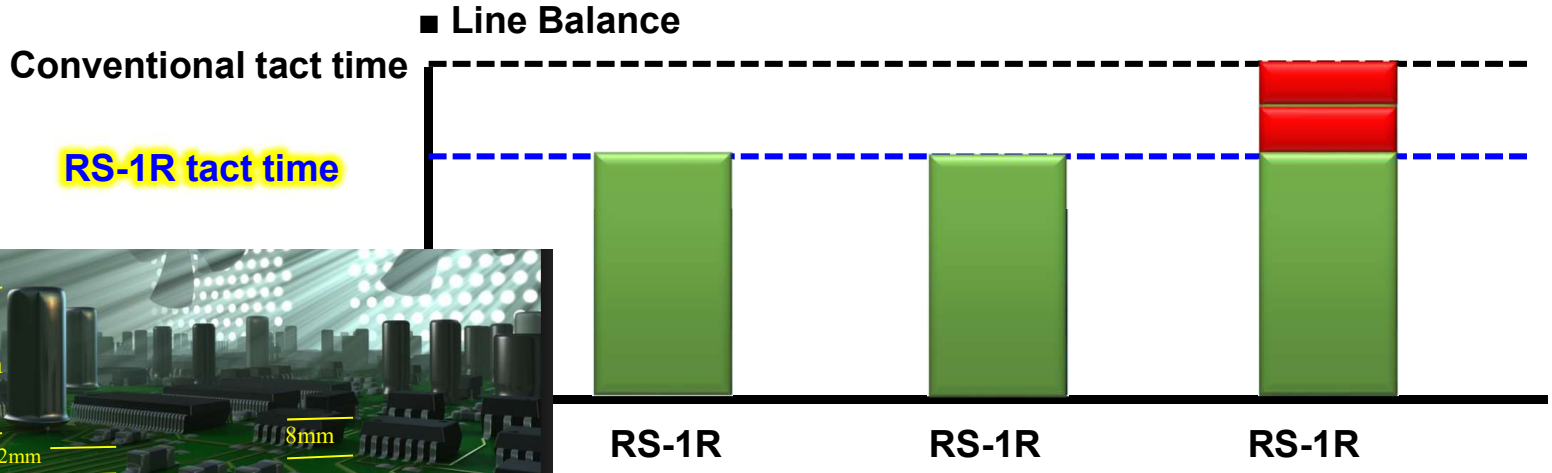


Tall Profile SMD Parts
Large Mix & Heights

Modular Production with the Optimum Head Heights for Each Part

Improve productivity even if the product item changes!

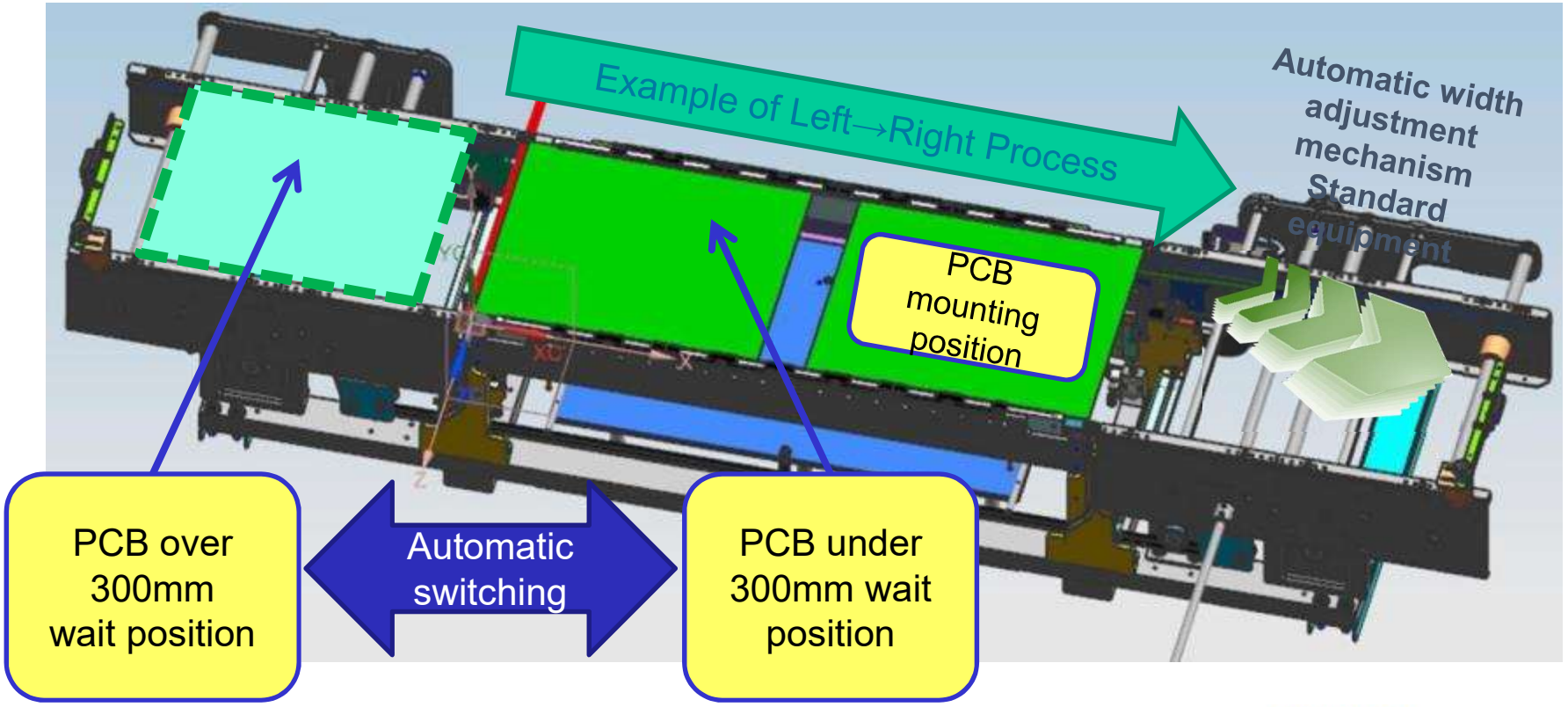
■ Line Balance



Optimization of PCB Transport

RS-1R

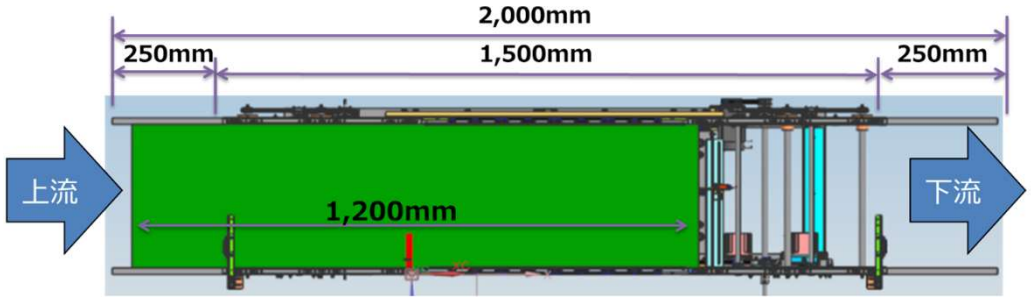
- Decreased PCB Loading Time
  - For PCBs under 300mm in the X direction, the PCB wait position is automatically switched to achieve a speed equivalent to a smaller PCB machine.
  - Total transport time is shortened.



Large Board Capability

RS-1R

	Conveyor cover option ※ Upstream and downstream	Transfer substrate condition unit: [mm]		
		Minimum Dimension	3 Buffer Maximum Dimension	Double Clamping Maximum Dimension
Standards specifications	Yes	50 × 50	360 × 370	950 × 370
With 150mm extensions	Yes	50 × 50	500 × 370	1100 × 370
With 250mm extensions	Yes	50 × 50	600 × 370	1200 × 370

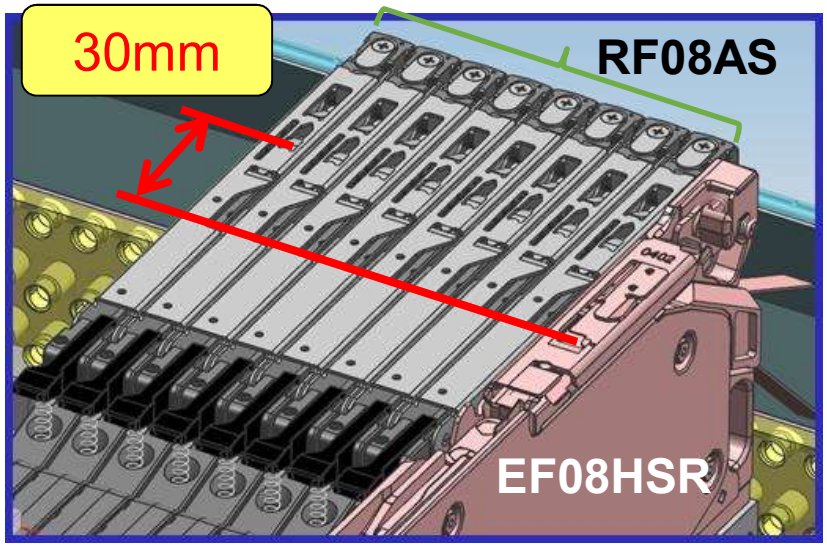


・ **If an extension of 250mm on both sides is installed, the X dimension of the board can be 1,200mm.**

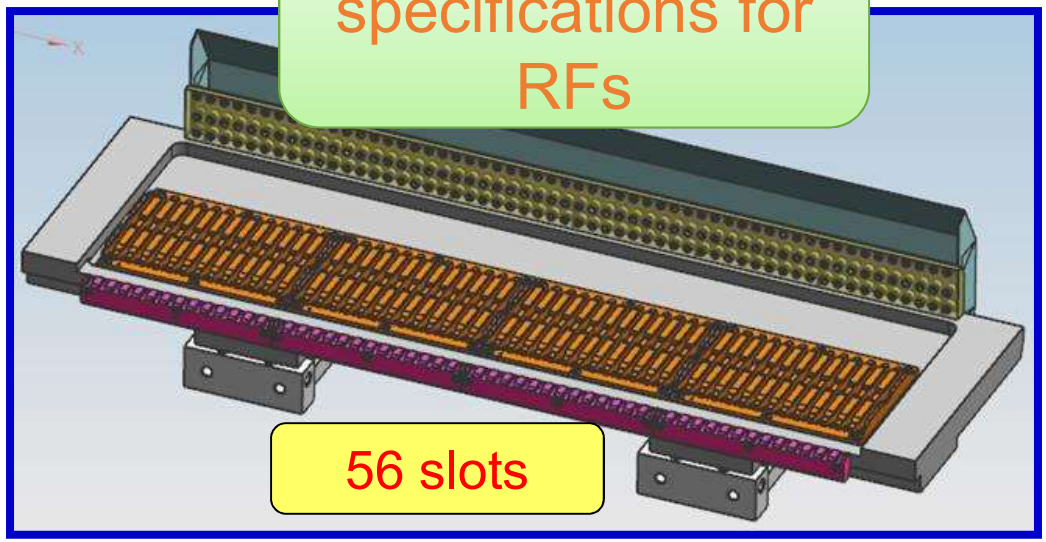
RF Feeders and Banks

RS-1R

- Pick position is closer to the PCB to minimize travel distance
  - Faster placement speed due to shorter travel
- RF feeder bank matches the head pitch of 12mm
  - Feeder capacity of 56 feeders per bank (112 total for front and rear)



RS-1R specifications for RFs



Not applicable to EF08HD and mechanical feeders.

Selectable Bank Layout

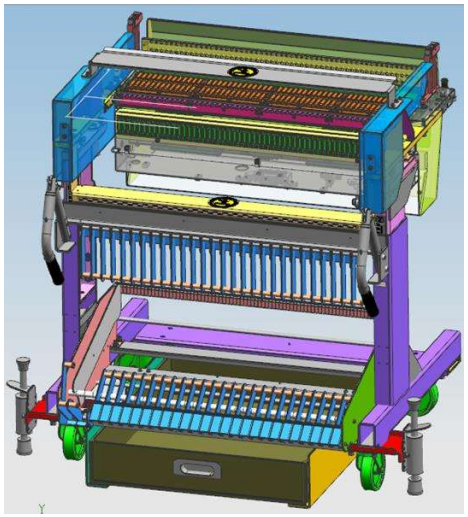
RS-1R

- RF banks work with all RF feeders and head height as low as 1mm
- RF/EF banks work with stick feeders, EF feeders using adapters, and head height down to 6mm

◎ Fixed banks

Front bank	Rear Bank
RF bank	RF/EF banks
RF bank	None

◎ Removable trolleys



Front bank	Rear Bank
RF bank or RF/EF banks*	RF bank or RF/EF banks*

※ Stick feeders and EF feeders (with adapters) require RF/EF Banks (Separate Attachment Required)
※ Min head height for RF/EF banks is 6mm

[productivity improvement function] RS-1R

- **Feeder Insertion/Removal Mode**

Effects: Parts can be replaced without stopping machine operation (Program with the same parts)

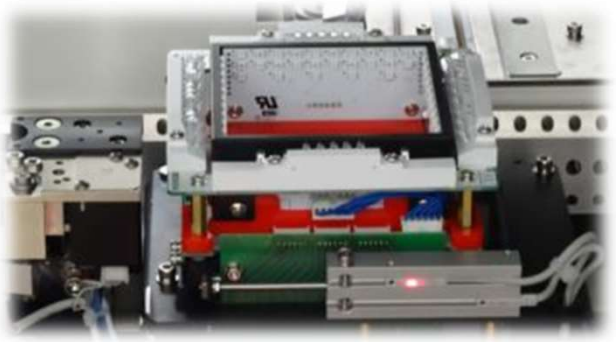
Normal mode Defaulted		**Feeder insertion/removal is not permitted during production. If the feeder is inserted or removed during production, the lock lever release is detected and all production is suspended.**
Mode shifting		**Mode transition is in progress.**
Insertion/Removal Mode		**Feeder insertion/removal is permitted during production. Operation is performed with the ZA axis height (head height) of 12mm or higher.**

[Insertion/Removal Mode Operating Conditions]
- RF-Feeder only
- The“normal mode” & “insertion/removal mode” can change during production.

Improved Vision Recognition System RS-1R

Image-recognition system		Specifications
VCS I	Wide viewing angle	☐54㎜
	Component size	Collective: ☐3 to ☐50 (Reflection)
		Split: ~50x150 (1x3 splitting/reflection) ~ ☐74 (2x2 divisional/reflection)
	Lead pitch	0.38㎜~2.54㎜
	Ball pitch	0.5㎜~3.0㎜
	Ball diameter	φ0.3mm~φ1.0mm
VCS II	Wide viewing angle	☐27㎜
	Component size	Collective: 1. 0x0. 5 to ☐24 (Reflections)
		Split: ~24x72 (1x3 splitting/reflection) ~ ☐48 (2x2 divisional/reflection)
	Lead pitch	0.2㎜~2.54㎜
	Ball pitch	0.25㎜~2.0㎜ (φ0.1~φ0.63)
VCS III	Wide viewing angle	☐10㎜
	Component size	Collective: 0.25 x 0.125 to ☐24 (reflection)
		Divisional: ~☐16 (2x2 division/reflection)
	Lead pitch	0.2㎜~0.5㎜
	Ball pitch	0.1㎜~0.5㎜ (φ0.04~0.2㎜)

Optional VCS combination	
1	VCS I
2	VCS I + VCS II
3	VCS I + VCS III
4	VCS II + VCS III



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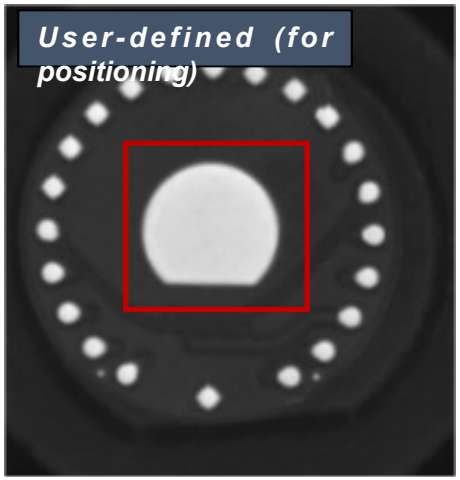
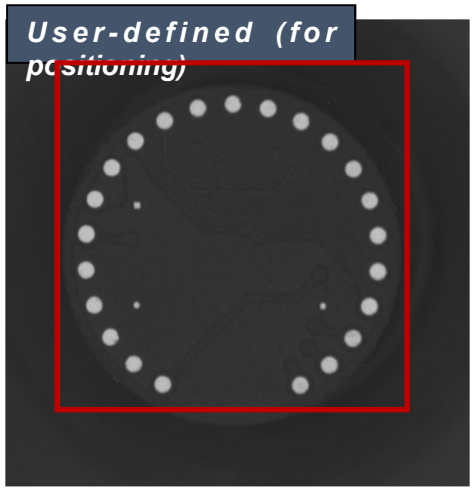
Improved Vision Recognition Functions

RS-1R

• VCS 360° Awareness

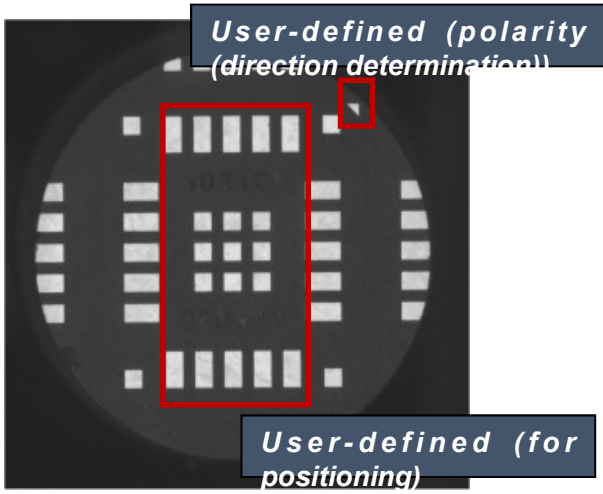
Component angle can be corrected, all the way up to 360 degrees, allowing for changing pick positions and large tolerance pockets





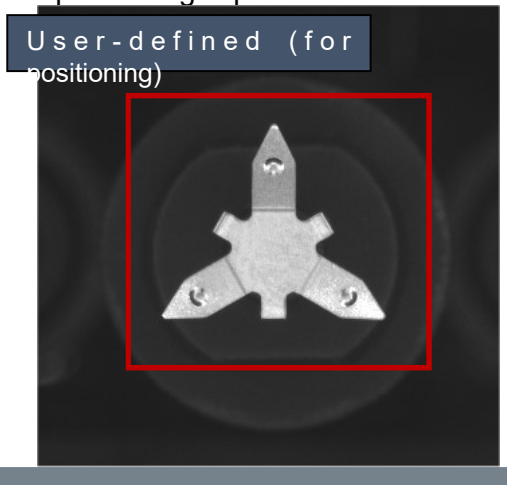
Conventional: Angle tolerance fixed

This time: Positioning angle allowable range is ±180°, and 360° positioning is possible.



New: Multiple user definitions can be set.

In addition, the direction can be determined by the polarity mark.



This time

Corresponds to positioning by element "user-defined" alone.

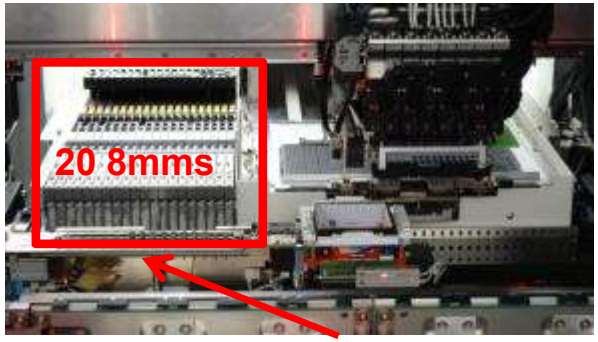
It is not necessary to create elements of "lead" and "connector" and only one "user-defined" element needs to be created.

Tray Feeding

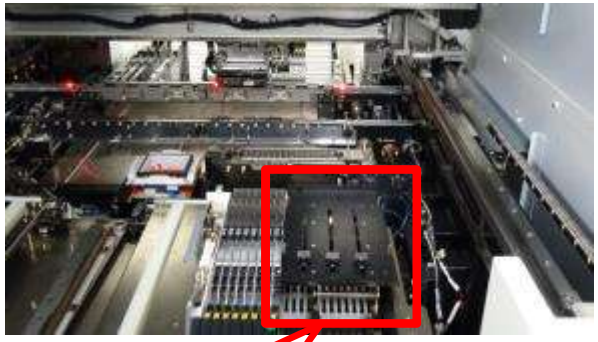
RS-1R

TR8SR (Direct Pick)

TR8SR (Rear Installation)



With TRSR, (20) 8mm feeders still fit



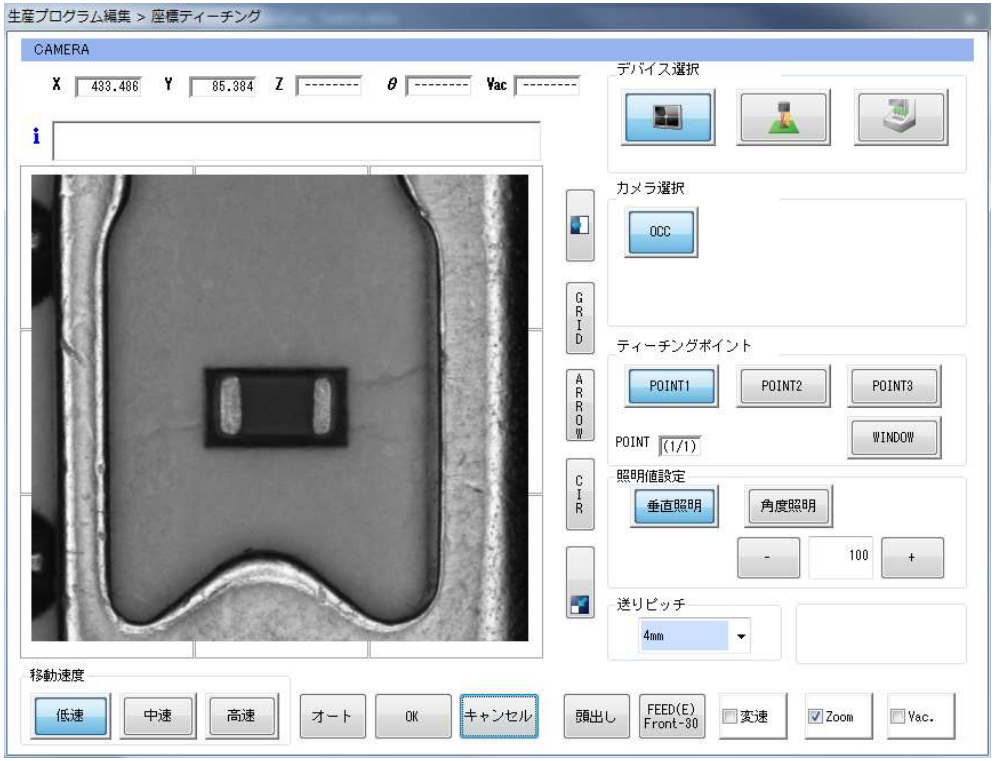
Tray holder

Tray feeder	Number of trays	Feeder positions used	Tape Feeder Spaces Remaining
Tray holder (full)	1	28	28
Dual tray server	2	34	22
TR8SR	30 (15×2)	36	20
TR5S/5D	40 (20×2)	56	0
TR6S TR6D	20 (20×1) 30 (15×2)	0	56

Part Auto-Feed Function

RS-1R

Feeder automatically advance to first full pocket
Saves time during setup and production startup



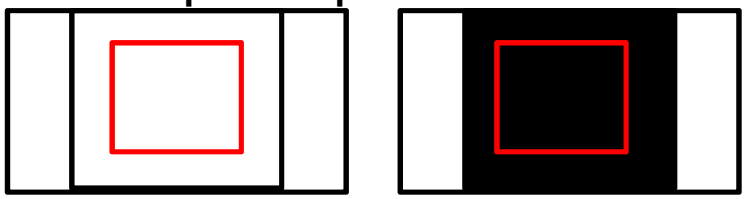
Specifications

Operation Method	OCC recognition
Feeder	RF feeder only
Corresponding part size	0402~3216 (metric)
Types of tapes	8 mm tape Paper or embossed (black)
Part type	Rectangular chip

Quality Improvement Function (1) RS-1R

◆ Right side up judgment function

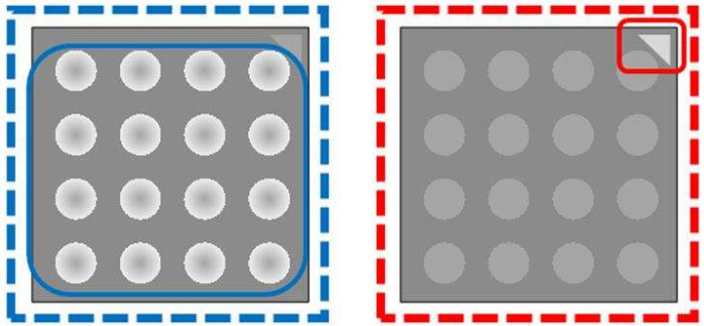
- **Components are checked for brightness to determine if they have been picked upside down**



OK　　Upside down error

Reight side up jufgement function	
Part type	Chips (03015~□50㎜)
Recognition method	Std VCS and S-VCS
Split recognition	Bulk recognition only
Remarks	Resistors only (Capacitors have no contrast between the front and back sides.)

◆ BGA Orientation Function



1. Recognize the ball with the current side light (blue)
2. Direction mark is recognized by reflection illumination.

BGA component orientation specification	
Part type	BGA、FBGA
Recognition method	VCS and Option VCS
Split recognition	Bulk recognition only
Remarks	Min. 10 pixel inspection area

Quality Improvement –
Coplanarity & Electrical Verification

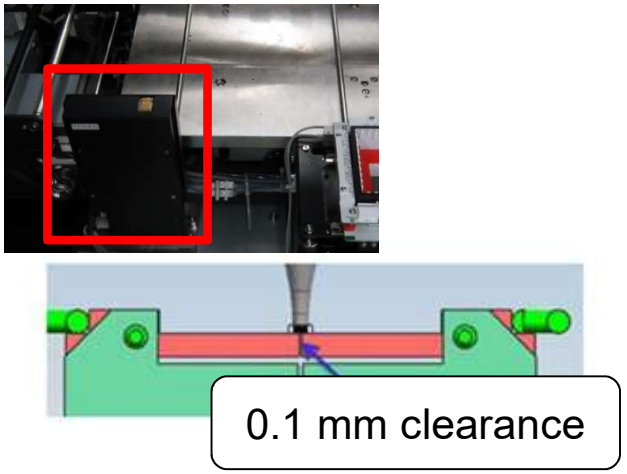
RS-1R

◆ Coplanarity Check

- **Applicable components: QFP, SOP, BGA, Connector**
- **Scan rate : 200㎜/s**

	Lead parts	Ball parts
Pitch	0.4 mm or more	0.8 mm or more
Width/diameter	0.18mm or more	0.4 or more
Lead	0.30 mm or more	-
Number of leads	5 or more	5 or more
Component size	48.0 × 150.0 mm or less	48.0 × 150.0 mm or less

◆ Part Verification



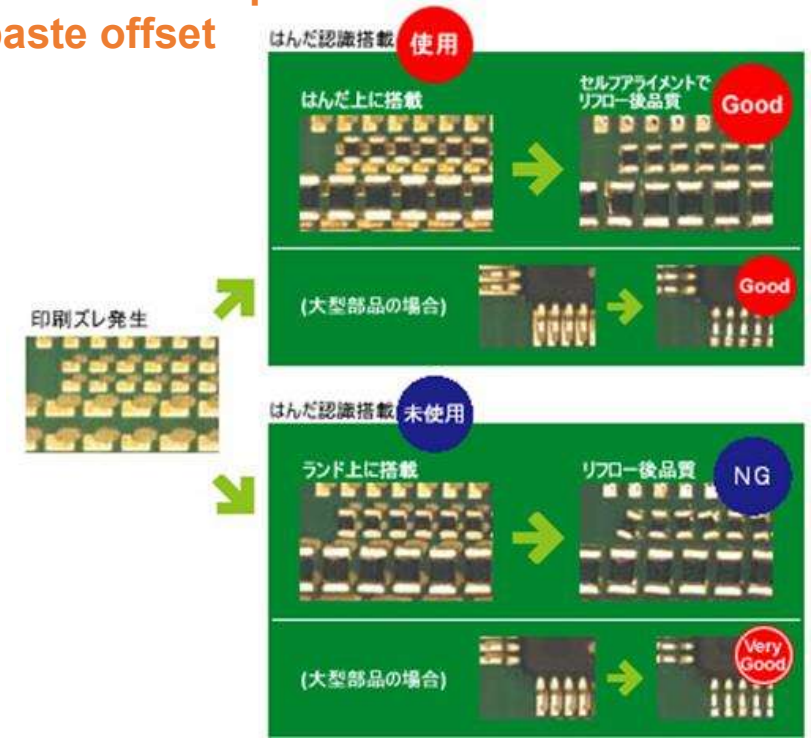
- **Part size: 0201 (metric) to □10.0 or less**
- **Electrode: 2 poles, opposite sides and bottoı**

Resistance	1Ω~1MΩ	±5%
Capacitance	100pF~100μF	±20 %
Diode polarity	~ 1. 8 V (forward voltage range)	±5%

Quality Improvement – OPASS and Load Control

RS-1R

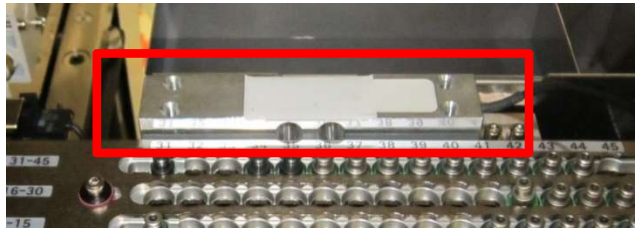
◆ Placement position based on solder paste offset

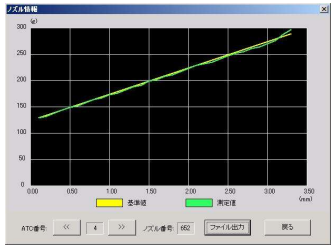


- Solder paste location used for placement offset correction
- Components are placed to be centered on the solder paste
- Final placement location after reflow is more accurate with less tombstoning

◆ Load control

- **For pressure sensitive components**
- **Force can be measured by load cell and applied during picking or placement**



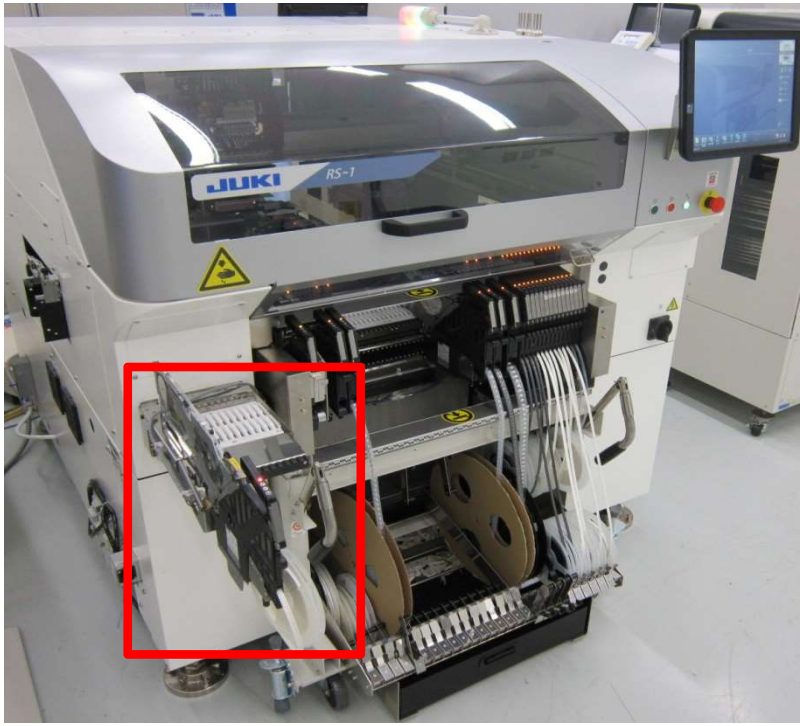


	7601 nozzle	7602 nozzle	7603 nozzle
MIN	75g	150g	250g
MAX	140g	275g	300g

Feeder Loading Stations

RS-1R

◆ Standard feeder loading station



◆ Optional mobile loading station

- Reels can be replaced quickly when parts run out.
- Foldable when not in use

※ Front-side Standard/Rear-side Optional

※ Mounting of reels on trolleys is possible with PW-02 only.

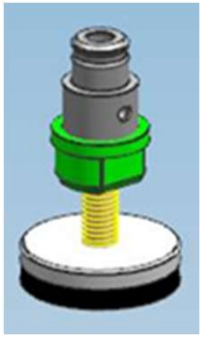
LED Lens Placement

RS-1R

- **Compatible with manually attached nozzles**
  - Large, custom-sized nozzles that do not fit the ATC can be attached by hand
- **Circuit BOC mark recognition optimization**
  - In a substrate on which a large series of elongated circuits are arranged,
  - Optimizes the recognition of fiducials to decrease cycle time
- **LED1 point recognition function and LED-recognition illumination**
  - Led Lens placement over LED achieved by recognizing the top edges of the mounted LED and aligning it with the center of the LED Lens placement.

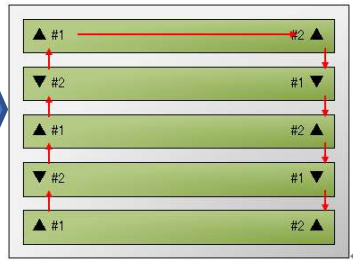
※ Please contact us for details.

Concave LED lens

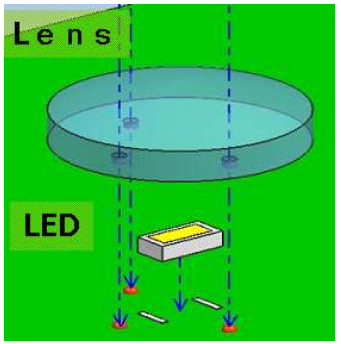


Nozzle for concave LED lens

Normal recognition sequence



Optimization recognition order



JUKI Mind&Technology

Specifications

RS-1R

		RS-1R
Conveyor		New Standard
PCB Dimensions	Standard	50 × 50 mm to 360 × 370mm (1 buffer), 650 × 370 mm (3 buffer), 950 × 370mm (2 x clamping)
	Conveyor Extension (Option)	150 mm extensions: 50 × 50mm to 500 × 370mm (3 buffers), 650 × 370mm (1 buffer)/1100 × 370 mm (2x clamping) 250 mm extension: 50 × 50mm to 600 × 370mm, 650 x 370mm (1buffer), 1200 x 370mm (2x clamping)
Mass		About 1,700 kg
Head Height Settings		1/3/6/12/20/25mm
Component Dimensions		0201-50 × 150 mm (1 × 3 split recognition) □ 74 mm (2 × 2 split recognition)
Placement Speed	Optimal	47,000 CPH
	IPC9850	31,000 CPH
Maximum Feeder Capacity		RF: Up to 112 varieties (equivalent to 8mm tape feeder)
Power		3 phase 200 ~415VAC (AC200V)
Current		2.2 kVA
Air pressure		0.5±0.05 Mpa
Air consumption (standard condition)		200 l/min (standard) when using a vacuum generator and 50 l/min (optional vacuum pump)
External dimensions (W ※3 × D × H ※2)		1,500 × 1,810 × 1,440 mm (conveyor height 900 or 950 mm)

Specifications

RS-1XL

		RS-1XL
Transport standard		Front rail fixed
PCB Dimensions		50 x 50 mm to 650 x 560 mm (1 clamp 3 buffers)
Mass		About 1,850 kg
Head Height Settings		1/3/6/12/20/25mm
Component Dimensions		0201~50 × 150 mm (1 × 3 split recognition), □74 mm (2 × 2 split recognition)
Placement speed	Optimal	42,000 CPH
	IPC9850	29,000 CPH
Maximum Feeder Capacity		RF: Up to 112 varieties (equivalent to 8mm tape feeder)
Power		3 phase 200 ~415VAC (AC200V)
Current		2.2 kVA
Air pressure		0.5±0.05 Mpa
Air consumption (standard condition)		Maximum 200 L/min (standard specification) Maximum 50 L/min (with optional vacuum pump)
External dimensions (W ※3 × D × H ※2)		2,109 × 2,000 × 1,440 mm (transport height 900 mm)

※ PCB transfer height specification 900 ± 20 mm (for Japan, China, and Asia), 950 ± 20 mm (for Europe and North America)

RF Feeder Details

RF

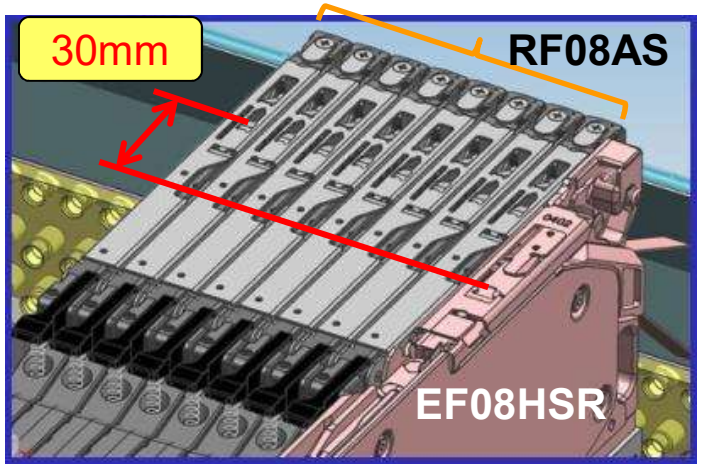
EF Series

RF Series

110mm

Weight	Length
2.5kg	635mm
-1.3kg ↓	-110mm ↓
1.2kg	525mm

For comparison: CTF=1.5 kg CTFR=1.2kg

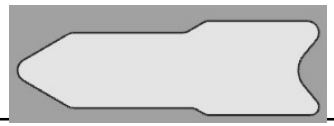


- Pick position is moved 30mm closer to the PCB vs the EF feeders
- Advancing time is 16% faster than EF feeders

RF Feeder Options

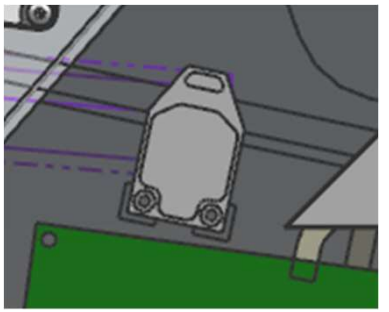
RF

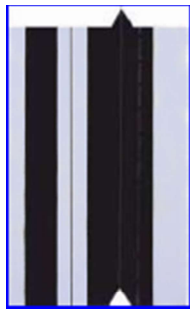
➢Upper cover

	Standard	Minimum pitch (option)	Large (option)
Part size	0402~3216 (metric)	0402~1005 (metric)	3216 and larger (metric)
Tape pitch	2mm / 4mm	1mm	4mm
Aperture shape			

➢Splicing sensor

Splices are automatically detected by checking for blocked sprocket holes in the carrier tape.
Recommended splice tape: FC**QE, Fuji Chemical Industry Co., Ltd.





➢EF Feeder adapter

Adapter allows EF feeders to be used on RF feeder banks

- RX-6/KE-3000 adapter (for ETF/ETFR)
- RX-7 adapter (for ETFR only)

Feeder and Speed Specs

RF

		RS-1R	RX-7R	RX-6B	KE-3000	FX-3R
Feeder Capacity (8mm)	EF	56	38	80	80	120
	RF	112	56	80	80	×
IPC9850 (CPH)	EF	-	49,000	26,000	17,100 (KE-3020VRA)	66,000
	RF	31,000	---	30,080	18,280 (KE-3020VRA)	×
RF Widths (# of feeder bank slots)	4mm	1	1	1	1	×
	8mm	1	1	1	1	×
	12mm	2	2	1	1	×
	16mm	2	2	2	2	×
	24mm	3	3	2	2	×
	32mm	4	4	3	3	×
	44mm	5	5	3	3	×
	56mm	6	6	4	4	×