

**Hanwha DECAN S2**

## Background

- The following document is made with purpose of presenting and better understanding of Hanhwa DECAN S2 machine
- This document is a draft and for discussion and presentasion purpose only

# Content

- Introduction
- High speed dual gantry system
- Improved head design
- Powerful vision system
- DECAN Series Component Spectrum
- New vacuum system
- Smart recognition algorithm
- High speed dual lane conveyor system
- Backup table
- DECAN/SM series feeders
- DECAN/SM series nozzles
- Advanced and flexible user interface
- Technical specifications
- Vision specifications
- Available optional items

# Introduction

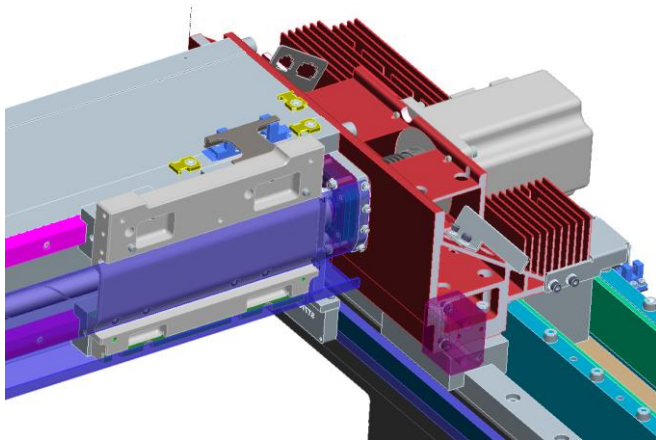
- The DECAN S2 next-generation precise high-speed chip mounter, with its flying vision 10-spindle x 2 gantry system, modular conveyors and linear motor, provides the highest productivity and mounting precision in its class, offering speeds up to 92.000 CPH (optimum) and a placement accuracy of  $\pm 28 \mu\text{m}$ .



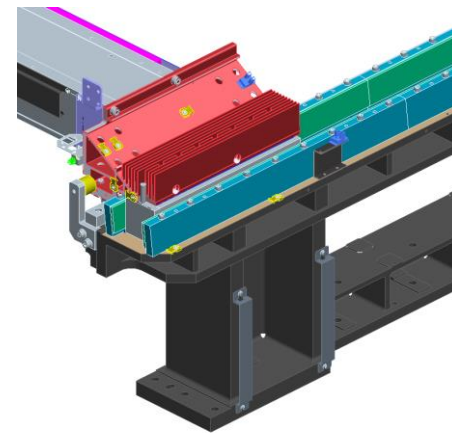
# High speed dual gantry system

## X-Y driving mechanism

- Dual gantry mechanism with dual head system provides highest component placement in the class
- X-axis servo motor and Y-axis linear motor allow high speed placement by strong accelerating force
- Equipped with self motion controller and reinforced rigidity of driving system, the machine achieves excellent repetition accuracy
- Change of X-Ball screw: 30 mm pitch → 20 mm pitch (03015 possibility!)



**X-axis servo motor**

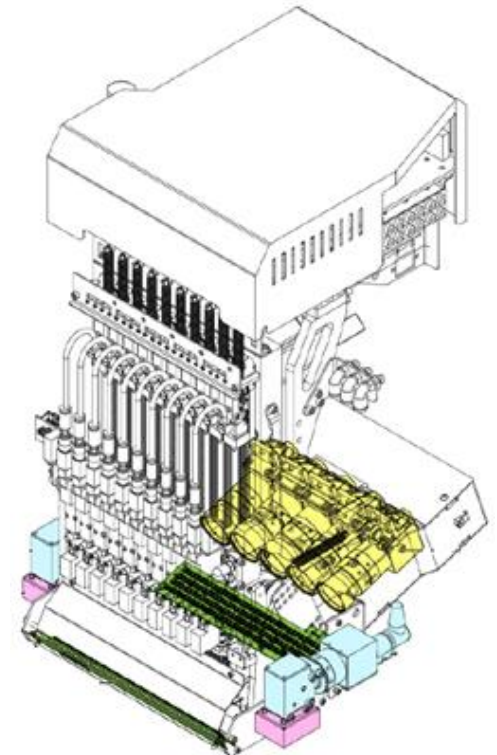
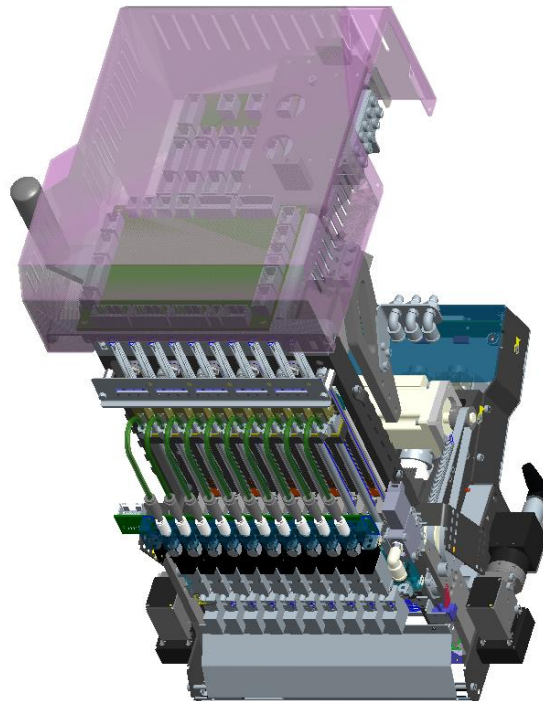


**Y-axis linear motor**

# Improved head design

## One piece structure

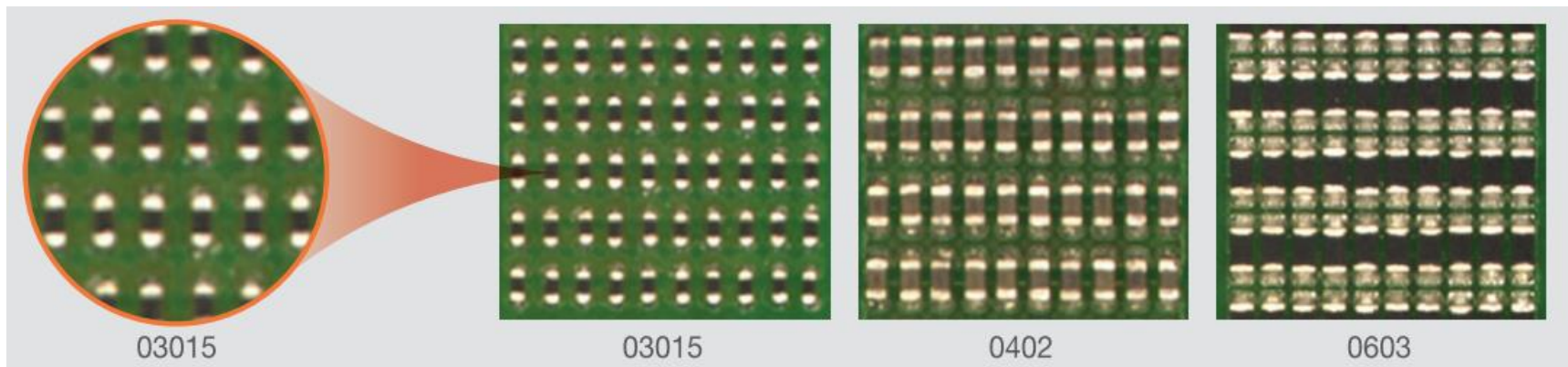
- 2 gantries, each with 10 nozzles (15 mm pitch)
- Reducing the weight of the head by using a single casting, stable high speed motion is realized
- Linear motors ensure high-speed operation



# Powerful vision system (1/2)

## Mega Pixel flying cameras

- Recognizes and calculates offset for components such as chip, TR, BGA and QFP as they are picked up and transferred to the placement point without stopping
- 5 Mega Pixel Cameras per head (1 camera for 2 nozzles), FOV 20,5 mm
- Applicable to parts from from 03015 to 12 mm (H=10 mm) square
- Wider Range of X illumination: inner, outer, coaxial
- Vision deviation is resolved by LED reinforcement of head location → improved vision differences between heads

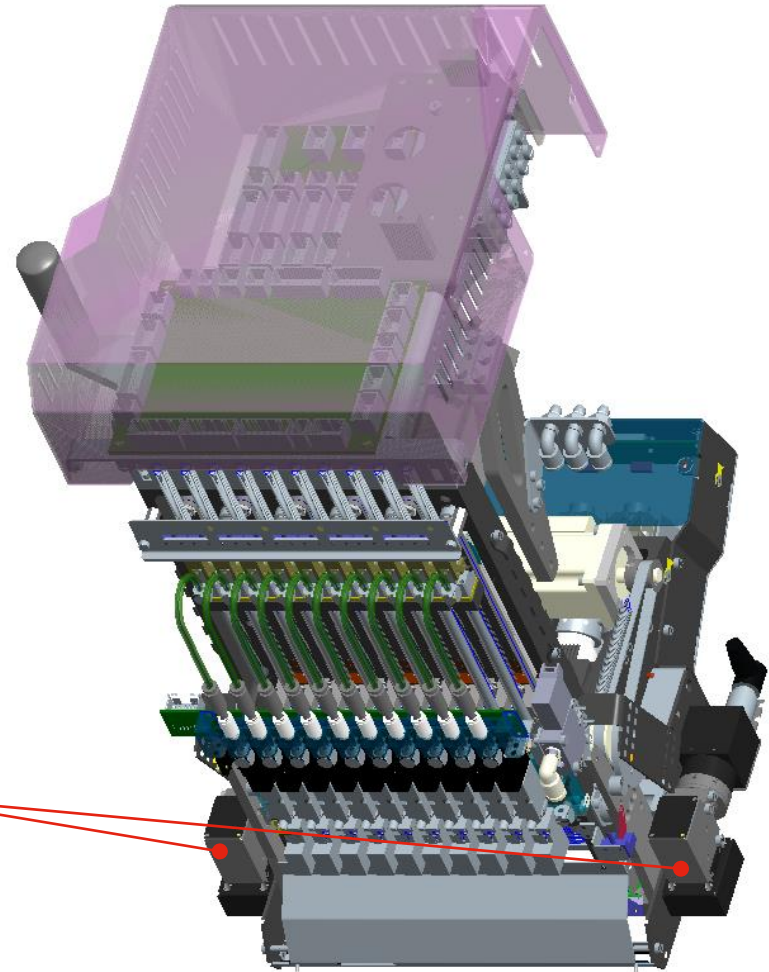


## Powerful vision systems (2/2)

**Fiducial cameras are placed on the side of the head and are used for:**

- Fiducial mark recognition
- Position teaching through X and Y axis
- Camera on both sides
- Feeder pocket recognition
- 2D barcode reading

Fiducial cameras





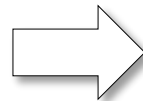
# New vacuum system

## Integrated vacuum pump

- Achieves stabilized part pickup and minimized air consumption by using a vacuum pump
- Standard built-in vacuum generator
- Free optional vacuum pump significantly reduces air consumption to 50 NI/min
- Average noise reduced from 82 dB to 75.5 dB



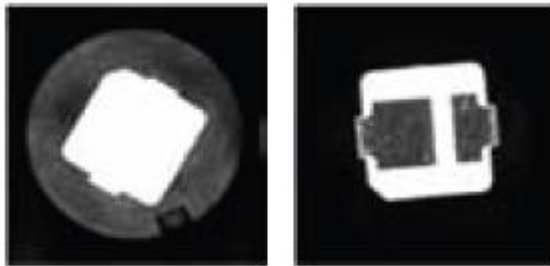
**KHA400A-301-G1 (ORION)  
SM471 Old pump**



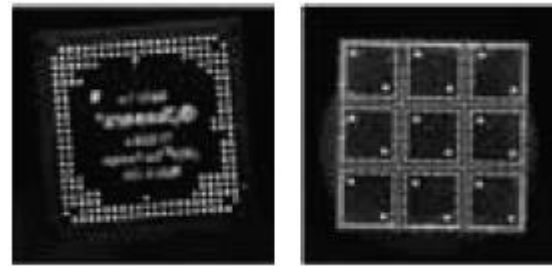
**KHF14-V-01 (ORION)  
DECAN S2 pump**

## Smart recognition algorithm

- Recognition accuracy increased by removing component image noise function and implementing an automatic teaching function
- The polygon recognition function, which extracts the part shape and recognizes the shape of the part entirely, provides optimal solution to the placement of irregular shaped SMD parts
- The part recognition speed, applicability to part and reliability was improved by reducing the image recognition time and by improving the part recognition algorithm.
- Up to 30° recognition tolerance of rotated components

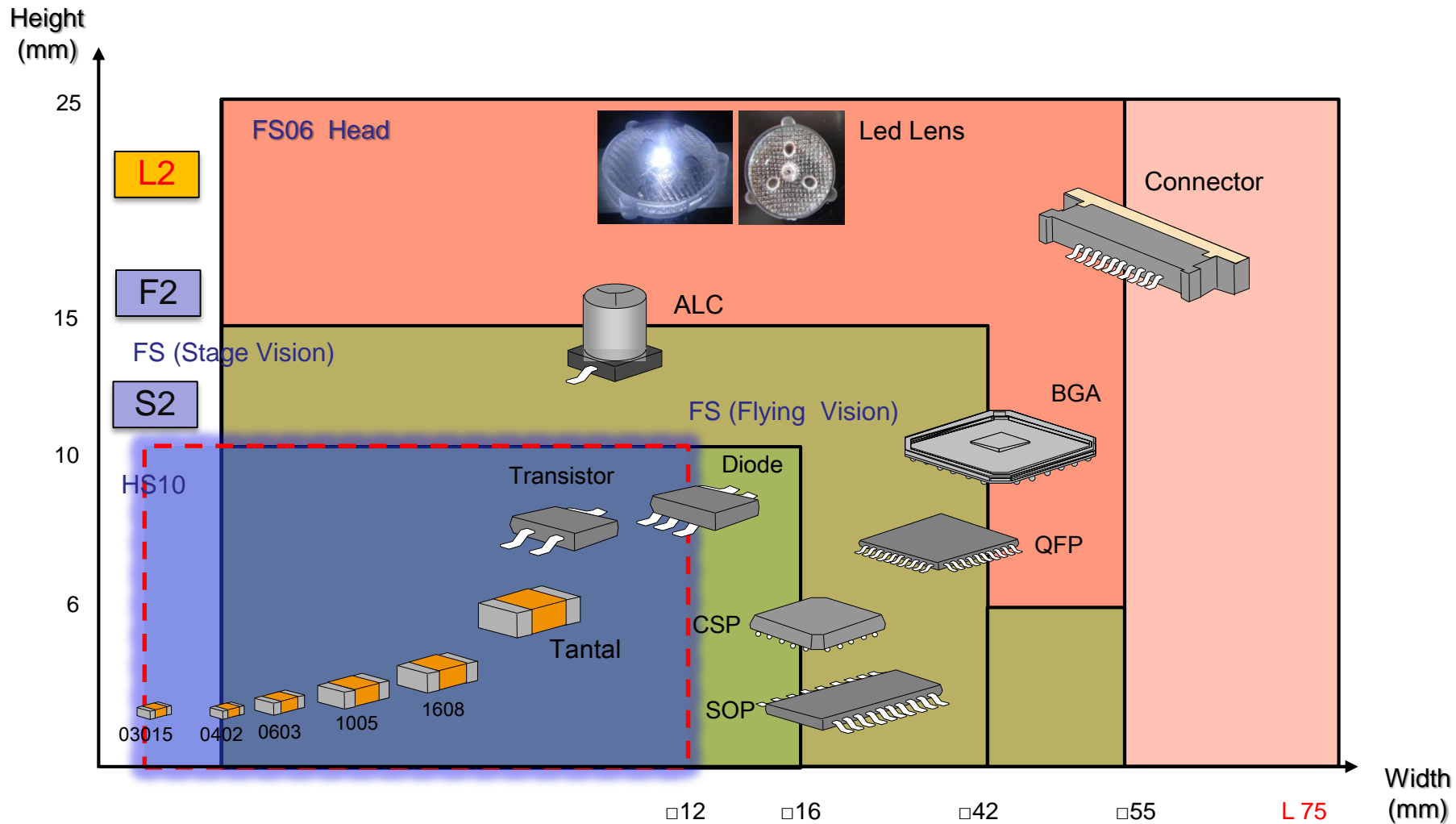


**Part polarity recognition**



**BGA and CSP recognition**

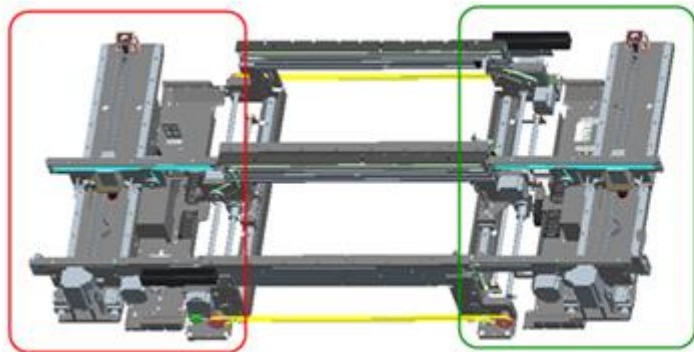
# DECAN Series Component Spectrum



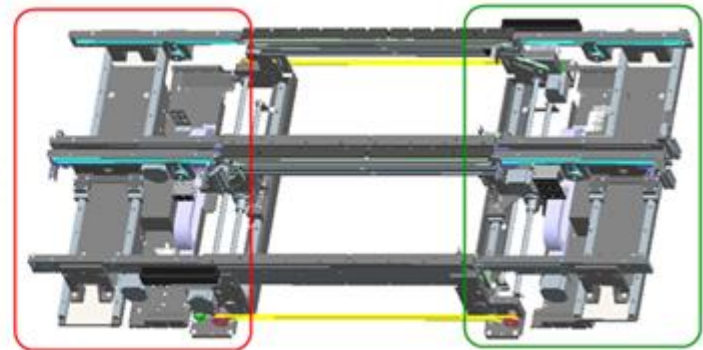
# High speed dual lane conveyor system (1/3)

## Conveyor

- Modular conveyor includes shuttle and dual lane conveyor, which are replaceable on site, providing maximum versatility and productivity speed
- Extra large PCB handling is also possible
- 1-2-1, 1-2-2, 2-2-2, 2-2-1, 1-1-1 options



**Shuttle conveyor**

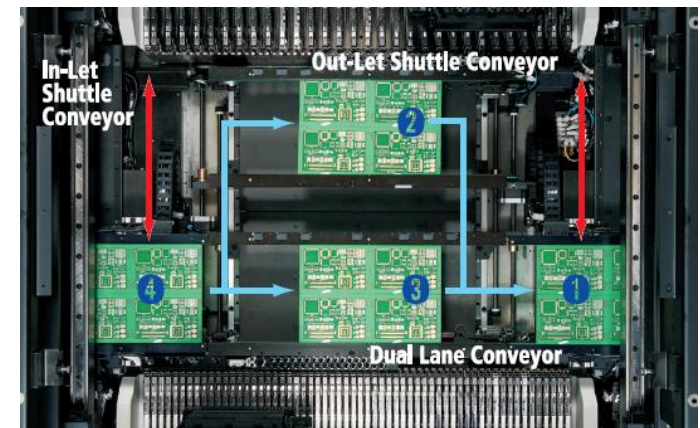
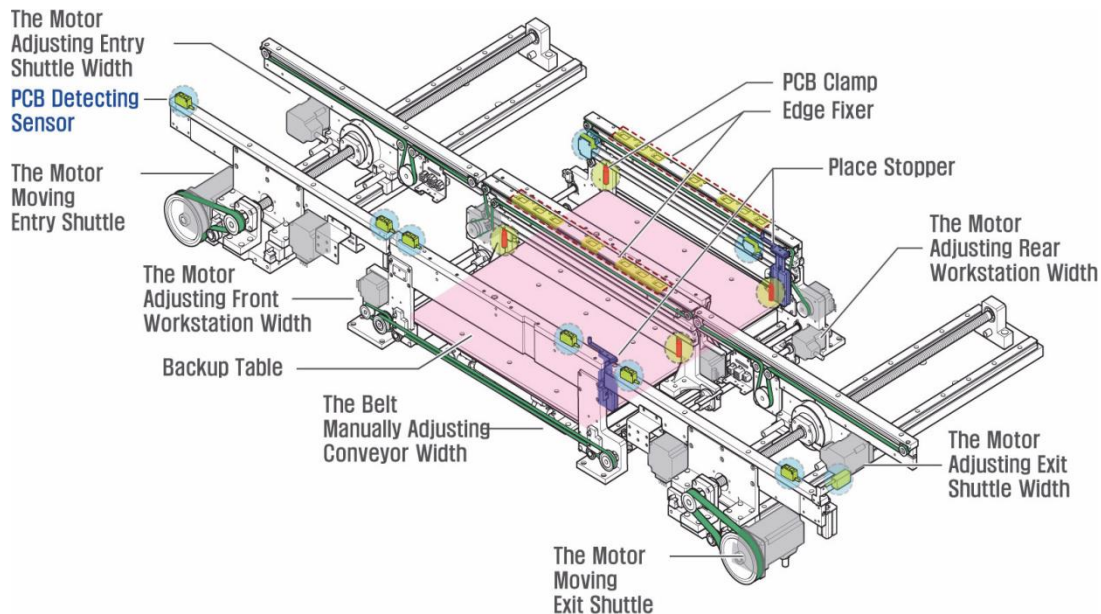


**Full dual conveyor**

# High speed dual lane conveyor system (2/3)

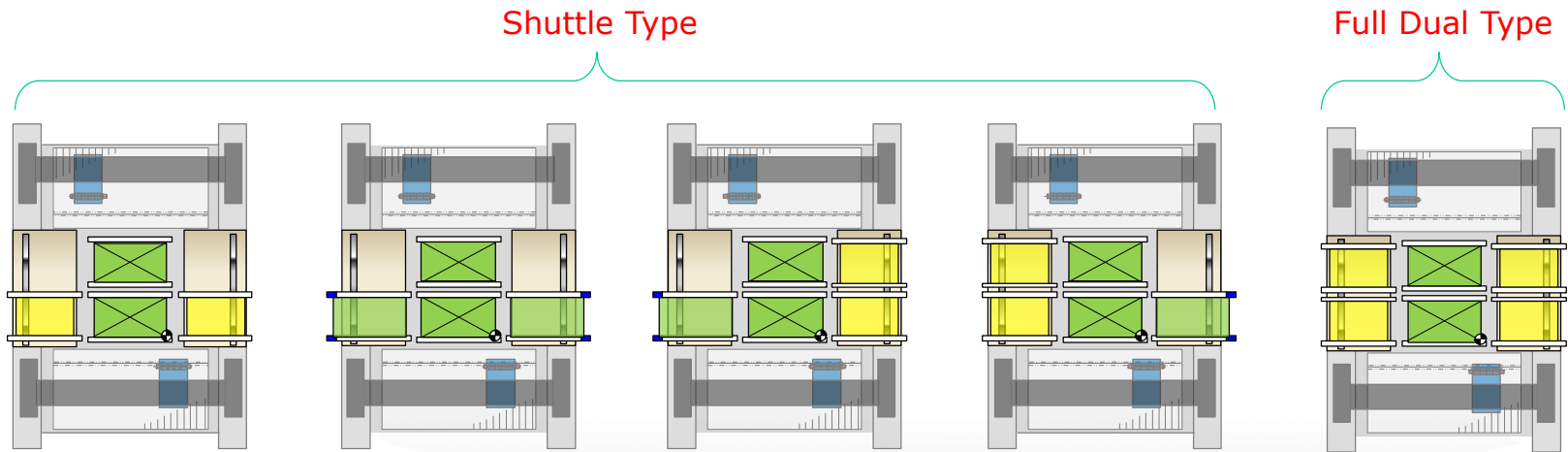
## Conveyor

- PCB Loading Time of "ZERO" maximizes productivity, by adopting a FIFO type shuttle inlet conveyor
- This system is divided into three stages, thus minimizing the PCB swap time
- The board transport system automatically adjusts to the precise board width in order to further facilitate quick changeover

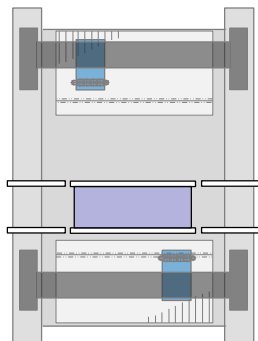


# High speed dual lane conveyor system (3/3)

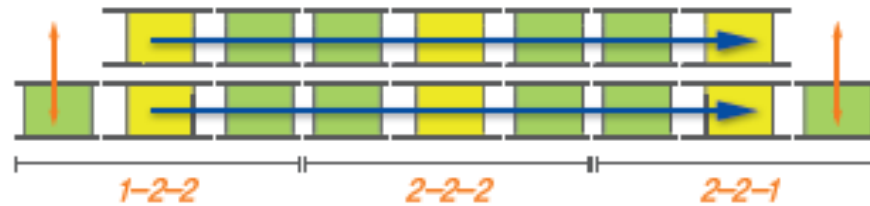
## Different Types of Conveyor module combination



Extra Large PCB



Full Dual Line up

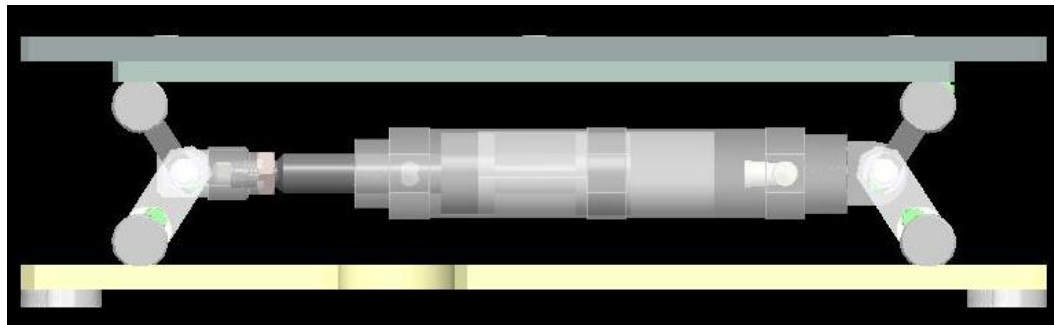
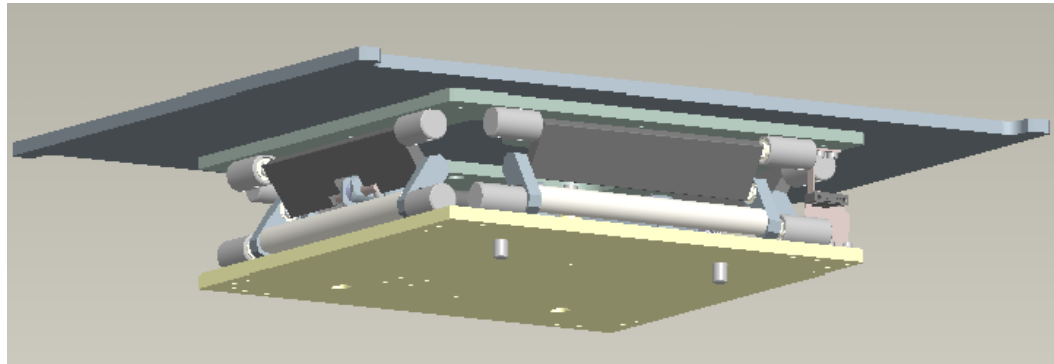


Work PCB

Stand by PCB

## Backup table

- Table mechanisms with smaller strokes and parallel elevation provides great stability
- The driving mechanism of the backup table was improved to increase the up and down movement speed of the backup table
- Improved degree of horizontality of the backup table by applying a linkage mechanism

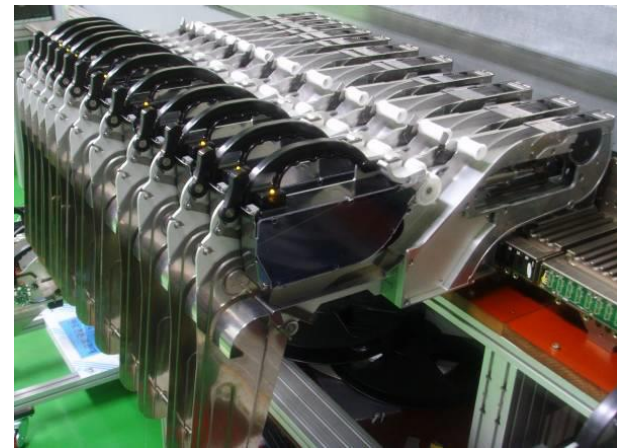
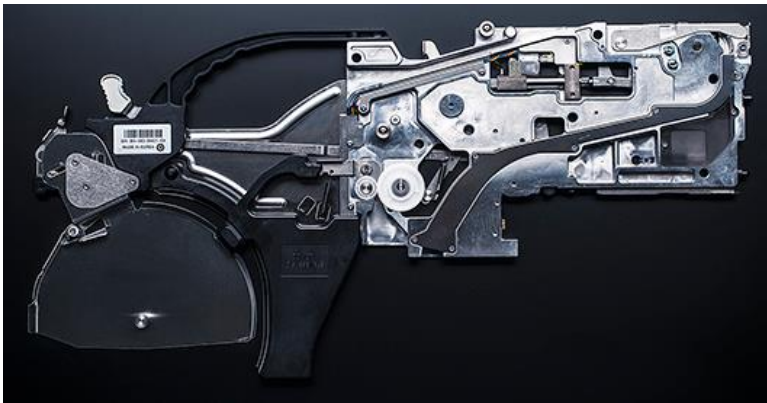




# DECAN/SM series feeders (1/4)

## Feeder bank

- Rigid feeder bank with 120 slots for 8 mm tape feeders
- Easy to use feeder clamping mechanism
- Feeder floating detector with photo sensor
- Automatic recognition of pickup positions with fiducial cameras on left and right side
- Full Electric IT Feeders support
- Swing type reel hanger for easier access
- Feeder handling (installation and removal) available during production

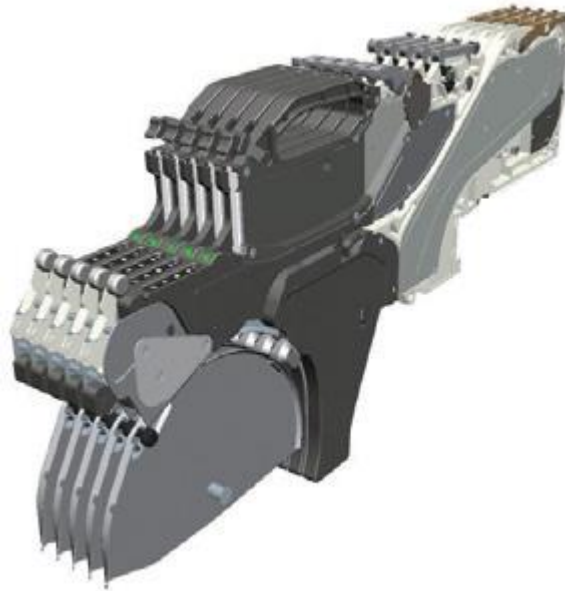




## DECAN/SM series feeders (2/4)

### Electrically driven SM feeders

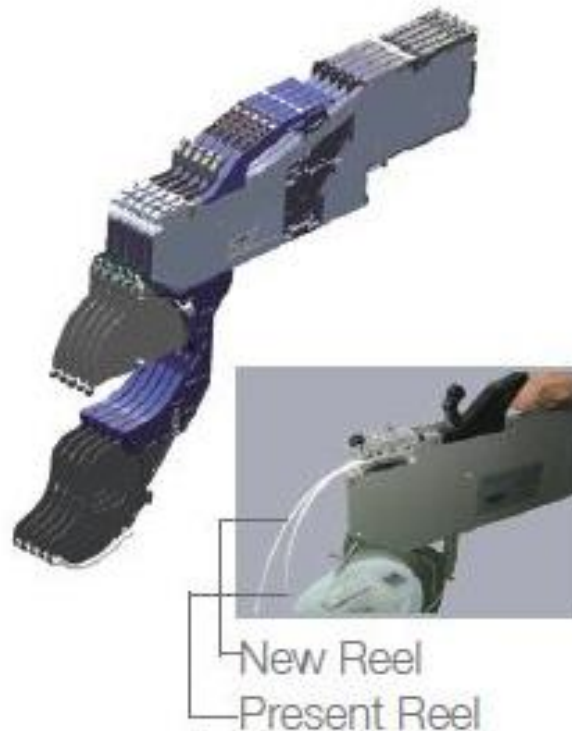
- High speed and high precision electrically driven feeders improve productivity and placement quality
- Allows integrated use of 0201/2P/4P tapes
- Automatically sets the pickup position between feeders, thus improving simultaneous pickup rate
- Automatic feeding pitch recognition function



# DECAN/SM series feeders (3/4)

## SM smart feeder

- The world's first feeder with Auto Splicing and Auto Loading functions
- Automatic splicing process for part reel replacement maximizes work convenience and productivity
- Applicable to reels with a small quantity of parts
- Compatible with DECAN/SM pneumatic feeders



# DECAN/SM series feeders (4/4)

## Docking cart capability









- Docking carts significantly reduce product changeover time
- The system allows for replacing a complete feeder configuration in just minutes
- Basic set Docking Cart configuration:
  - Docking Feeder Base
  - Docking Cart
- Please note that docking cart reduces available 8 mm feeder slots on the machine by 4



# DECAN/SM series nozzles

## Precise nozzles

- Nozzle set for placing wide range of component types included with the machine
- Optional nozzles for placing odd-shaped components
- High speed automatic nozzle changer (ANC)
- Calibration tool set included
- Dump box for disposing irregular components included

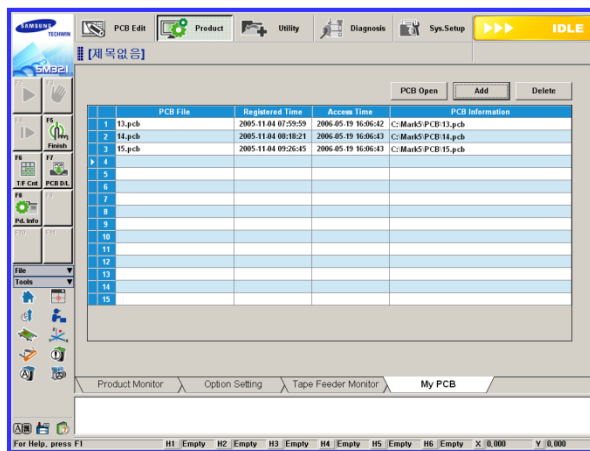
Nozzle name	CN015	CN020	CN030	CN040	CN065	CN140	CN220	CN400
Shape								
Outer diameter	Φ0,38	Φ0,50	Φ0,60	Φ0,75	Φ1,2	Φ2,2	Φ3,6	Φ6,0
Inner diameter	Φ0,13	Φ0,16	Φ0,28	Φ0,38	Φ0,65	Φ1,4	Φ2,2	Φ4,0

## General nozzles

# Flexible user interface

## Hardware and software

- High Speed PC with Windows 7 OS and SSD
- Drastically improved MMI software - focus on user-friendly and simple programming/operating
- Easy and improved data transfer between machines
- Full support for DECAN IT system and EasyOLP & T-Solution II software
- High performance built-in software placement optimizer
- 2x LCD monitors, keyboards and mice for front and rear machine access



# Technical specifications

<b>DECAN S2</b>	
Placement speed (Optimum)	90.000 CPH
Placement accuracy	±28 µm (03015 chip) ±25 µm (IC)
Repeatability	±0,01 mm
Minimum PCB size (L x W)	50 x 40 mm
Maximum PCB size (L x W)	510 x 460 mm (Standard) up to 740 x 460 mm (Option)
PCB thickness	From 0,38 mm up to 4,2 mm
8 mm feeder slots	120
Power supply requirements	3 phase, 200/208/220/240/380/415 V (50/60 Hz)
Maximum power consumption	5,0 kVA
Air supply requirements	50 NI/min using vacuum pump
Machine weight	1.800 kg
Machine dimensions (L x W x H)	1.430 x 1.740 x 1.485 mm

# Vision specifications

## Flying vision

Machine type	Field of view	Component size	IC, Connector	BGA, CSP
DECAN S2	20,5 x 20,5 mm (Mega Pixel)	From 03015 up to 12 x 12 mm	Lead pitch 0,3 mm	Ball pitch 0,3 mm