# VariCube R™ Flexible Assembly Machine

A STANDARD FLEXIBLE ASSEMBLY SOLUTION

RNA's VariCube R™ presents a flexible assembly solution that utilises intelligent vibration platforms, coupled with industrial machine vision recognition and a 6-axis robot to feed and assemble component parts of **various shapes and sizes**. The VariCube R™ offers flexibility, quick delivery time, reusability and speed.

The VariCube R™ is best used in applications where conventional bulk feeding systems find limitations such as fragile or complex parts, multiple variants requiring fast changeover, and evolving component design. Guiding robot with machine vision provides **high speed** and **high precision** handling and assembly solutions.
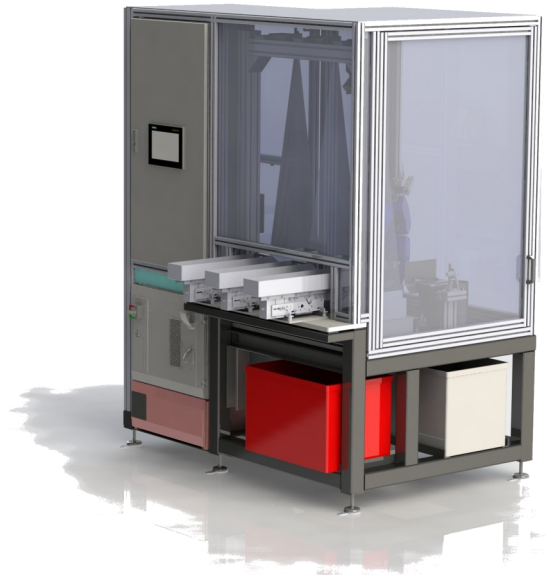
YOUR BENEFITS

Flexible feeding

- Alternative for vibratory bowl feeders
- Experience seamless, software-based part changeovers in minutes
- Easily process a wide range of part sizes and shapes
- Handle multiple variants of a component part or parts with complex geometry

Flexibility for part changeover

- Interchangeable FlexCube™ platform for pre-orientation of the parts
- Teachable vision system
- Auto calibration of the vibration parameters

Easy handling of variants

- Variants are stored by the controller
- Only 2 minutes to bring a new variant into production

Short delivery time

- Fully standard
- Pre-designed

High reusability

- More than 95% reusable (less investment)
- Specific tooling reduced to the minimum

Fast implementation

- Standard platform
- Standalone Package with Integrated Controls

Easy configuration and installation

- Quick setup and reprogram to perform a different application
- Fast and easy configuration adjusting to changes and demands

FLEXIBLE, RELIABLE AND STANDARD SOLUTION FOR THE AUTOMATED ASSEMLBY IN 6 STEPS

STEP 1: Various parts to be assembled are loaded in bulk into hoppers. Parts drop by vibration from hoppers onto FlexCube™ backlit vibratory platforms on demand.

STEP 2: The FlexCube™ complete pre-programmed vibratory cycles to orientate and separate component parts, presenting them to an integrated EYE+ vision system for robot pick.

STEP 3: The EYE+ vision system inspects the component parts on the FlexCube™ platforms and identifies which are laying in a position suitable for being picked. The coordinates are sent to the robot.

STEP 4: A 6-Axis Robot, with suitable end of arm tolling picks all identified component parts and places them in the proper orientation into the assembly nest.

STEP 5: The customisable nest is located by dowels for interchangeability and incorporate part present sensing. An overhead mounted vision system confirms positioning of the component parts before final assembly.

STEP 6: The robot unloads assembled component parts to a storage box via an unload chute.
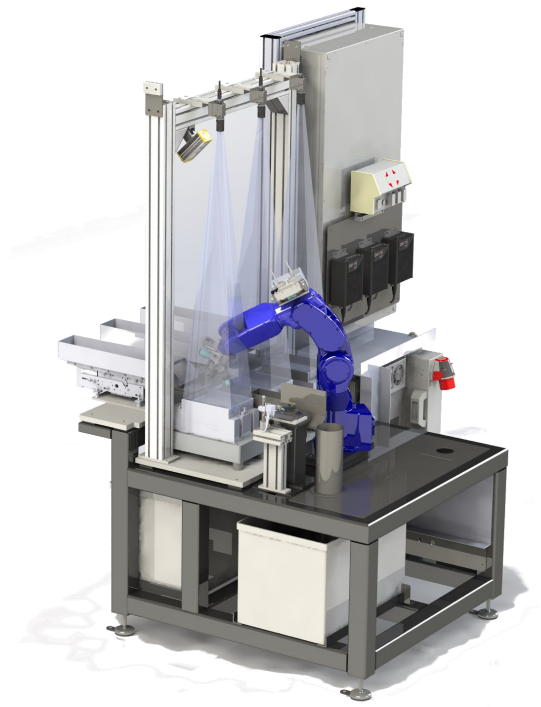
Included in VariCube R™

- RNA Bulk Hopper
- FlexCube™
- EYE+ Vision System
- 6-Axis Robot
- Assembly Nest

PRE-ORIENTATION OF THE COMPONENTS

FlexCube™ | Intelligent 3-Axis Vibration System

RNA FlexCube™ flexible vibration feeders offer high performance part feeding, pre-orientation and optimal surface distribution of bulk parts and components.

- **Compatible with all parts geometries:** 99% of all parts can be separated by this feeding system, including parts featuring complex outer geometries, and highly fragile parts.

- **Minimum change-over times:** easy exchange of part-specific vibratory plates provides for flexible and future-proof production systems.

- **Extremely gentle part handling with patented 3-axis vibratory system:** Parts can be moved in all directions and flipping parameters can be stored for each specific part.

- **Free movement of parts** in all directions thanks to the use of magnetic coil actuators, for optimal acquisition by camera system with the objective of presenting the parts in the shortest possible time.

- **No transmission of vibrations** to the rest of the line thanks to decoupling of vibratory platform from the casing.

- **Systematic part orientation** using intelligent vibration cycles.

- **Easy configuration** with the feeding software.

	FlexCube™ 50	FlexCube™ 80	FlexCube™ 250	FlexCube™ 380	FlexCube™ 530
SPECIFICATION					
Typical part dimensions	<0.1 - 5 mm	3 - 15 mm	5 - 40 mm	15 - 60 mm	30 - 150 mm
A	14	15	39	252.8 ± 0.5 mm	369.8 ± 0.5 mm
B	60	82	219.5	323.8 ± 0.5 mm	426.8 ± 0.5 mm
C	8	9	26	10 mm	10 mm
D	34	52	150	1.5x45° (4x)	1.5x45° (4x)
E	45	65	195		
F	8	9	14.5		
G	46	65	171		
Supply Power	24V / 4A	24V / 6A	24V / 8A	24V / 20A	24V / 20A
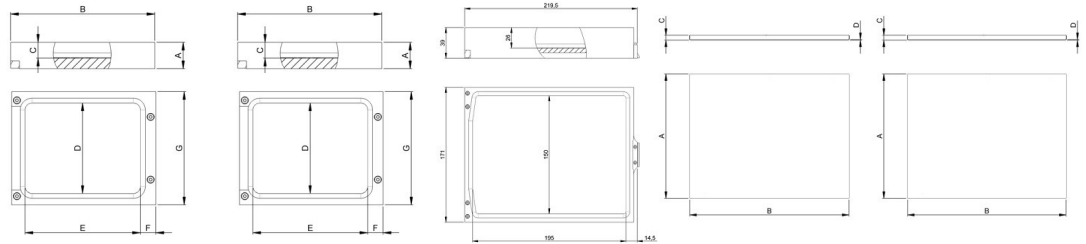
Platform	precision-manufactured platforms adapted to the parts geometry of parts and the task on hand
FlexCube™	available with and without backlighting available backlighting: Red / white / green / blue / infrared
Communication	Ethernet (TCP/IP), Modbus TCP, EtherNet/IP, EtherCAT, PROFIBUS, SERCOS
Software	easy configuration and integration via enclosed operating software
Miscellaneous	■ input for backlighting for synchronisation with vision system ■ 2 digital inputs/outputs, e.g. for synchronisation of 2 hoppers
Options	■ Easy installation on machine table ■ Platforms with part-specific surfaces ■ Calibration plates for robot / vision system ■ Quick emptying devices ■ Ejection system for quick emptying

HOPPER SYSTEMS

RNA hoppers are designed and manufactured in house to your requirements and almost all sizes and shapes of component can be catered for.

■ **Compatibility:** RNA BVL-P hopper systems have been developed to fit the various platform sizes and feeding tasks.

■ **Plug and play:** our hopper systems come factory-tuned and are easily integrated in the complete concept thanks to the enclosed control system. The discharge height is adapted for part transfer to the downstream FlexCube™ system.

■ **Demand-based feeding:** BVL-P hopper systems are designed for optimized part transfer rates to the sorting platform, which are key to achieving short sorting cycle times.

■ **Enhanced autonomy:** the filling volume is easily adaptable to your needs through the addition of static or upstream hopper units. And of course, communication between these hopper systems can be handled by RNA controllers.

EYE+ | SMART CONTROL SYSTEM

EYE+ optimizes the performance of your FlexCube™ flexible feeder with an integrated vision based on Artificial Intelligence and a powerful controller. With EYE+ you have an innovative plug and play system that can be easily integrated into any automation machine.

- **Easy to use:** No previous experience of machine vision required to setup and use; EYE+ resulting in faster installation and lower setup costs.

- **Intuitive recipe creation and configuration:** User friendly interface, with step-by-step instructions and explanations, makes the software easy to follow.
  Have a complete new system with calibrated robot and vision setup within minutes. New recipes can be learnt in a fraction of the time compared to conventional models.

- **All included:** Simply accessible via a web browser, no software download or additional licensing required. No 3rd party software or hardware required for a complete system.

- **Plug and play:** Designed to easily integrate with any size of FlexCube™ and any industrial robot for hassle free set-up. Simple direct connection and pre-defined vision parameters with help tips and graphics mean installation, mounting and setup can be quickly performed without any prior experience.

- **Attractive:** Highly competitive system costs compared to traditional solutions.

- **Compatible with any PLC & industrial robot brand:** Command prompts are sent through TCP/IP so EYE+ is compatible with any robot brand giving pick point location for any part.
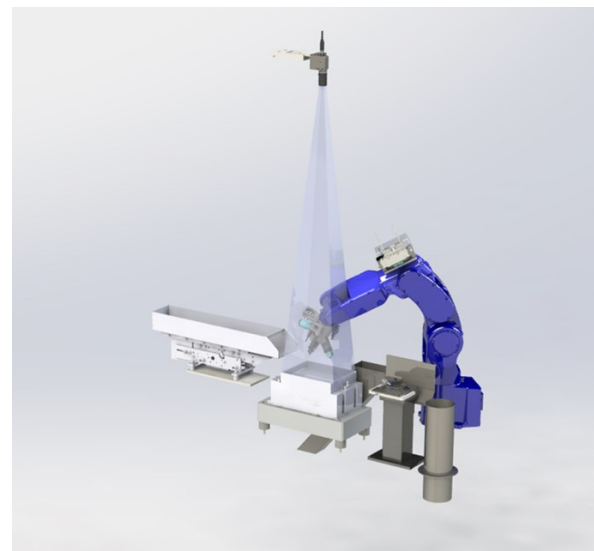
	EYE+
SPECIFICATION	
All in-one kit	Controller, camera, optics, calibration plate, power cable
EYE+ Controller	
Dimensions	141 x 187 x 71 mm
Weight	1.26 kg
Operating Temperature	+5°C to 40°C
Power	Voltage: +24VDC (+/- 5%) Current: 6.5 A max
EYE+ Camera	High resolution (6.3 MP)
Software	EYE+ Studio
Ethernet	4x Gigabit Ethernet (PoE for the camera)
Additional Cables	Ethernet cable to PLC or Robot, Ethernet cable for EYE+ Camera, Ethernet cable for Asycube Choice of length 2, 5, 10, 15 or 20 meters
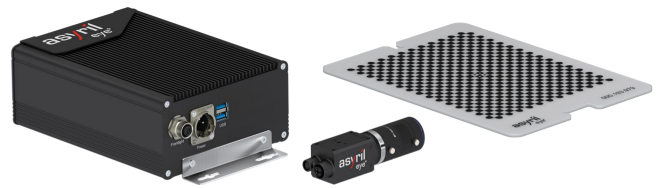
6-AXIS ROBOT & ASSEMBLY NEST

- **Fully integrated:** Compatible with customer preferred 6-axis robot, with custom gripper system to suit the application – quick change if required.

- **Quick change:** Reduce downtime with seamless changeover of both the robot gripper system and assembly fixture nest.

- **Customised:** Application specific gripper system and assembly fixture nest.

- **Double checked:** Fixture nest equipped with vision check to confirm efficient assembly, with good parts / bad part unload supplied as standard.