



aetech

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AI-Powered Sorting Robot for Recyclable Waste

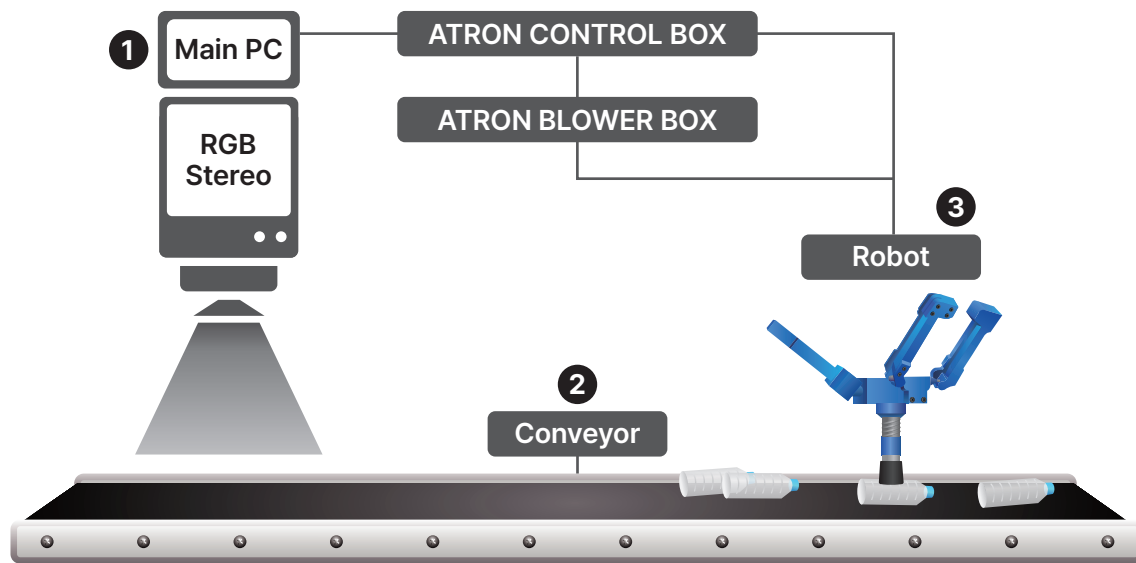


At Aetech, we drive innovation in resource circulation through cutting-edge waste sorting solutions. Since our founding in 2020, we have been committed to solving recycling challenges and developed Atron, an AI-powered waste sorting robot that achieved the first successful commercialization in Korea. Currently focused on municipal solid waste, we have achieved the highest number of installations nationwide. Our ultimate goal is to build a sustainable society by advancing smart solutions across the entire resource circulation value chain.



Aetech History

20	May	Established AETECH	20	January	Signed MOU with SK Eco-plant
20	July	Established corporate R&D center	24	April	Installed 2 Units in Songpa Public MRF (1st Dual Atron)
	August	Registered as a Venture Company			Certified as an Innovative Product by the Public Procurement Service
	December	Completed Development of Atron v1.0			Completed TIPS R&D Project
20	April	Completed Atron v2.0 & held Technology Demonstration		June	Installed 1 unit at Public MRF in Namwon
21	June	Secured 1st Seed Funding (\$86,000)		September	Completed Development of Atron v3.0
	November	Completed 6 Months Pilot Test at Songdo MRF		October	Installed 4 Units at Private MRF in Ulsan
					Collected more than 4 million Data in Atron
20	April	Installed 1 unit at Incheon Private MRF (1st Atron)		November	Installed 2 Units at Public MRF in Incheon (20 Units in total)
22	October	Secured Pre-A Funding (\$2,250,000)			Obtained Hi-Seoul Certification
20	August	Obtained MAIN-Biz Certification from the Ministry of Venture			
23	September	Completed Development of AI Data System	20	February	Completed development of 3D Vision technology
	November	Secured Series A Funding (\$6,200,000)	25	March	Completed development of Atron-E model
	December	12 units installed in Gyeonggi, Gyeongbuk, etc.			
		Obtained INNO-Biz Certification			
		Achieved annual revenue of \$1,650,000			



01

- ❑ Detection of object position and shape (width, height, and length)
- ❑ AI-based waste classification
- ❑ Obstacle detection for robot avoidance

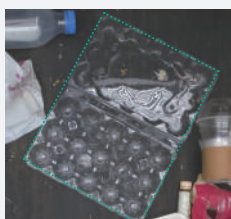
02

- ❑ Real-time object tracking for sorting targets
- ❑ Conveyor speed monitoring in real time
- ❑ Customized conveyors for waste sorting (contaminant removal and reinforced structure)

03

- ❑ Intelligent robot control based on AI analysis conveyor speed, and robot movement
- ❑ Robot behavior optimized for physical properties of each recycling facility

Advanced AI analysis enables precise sorting of materials that are difficult to distinguish visually, such as:



Flat PET



PP



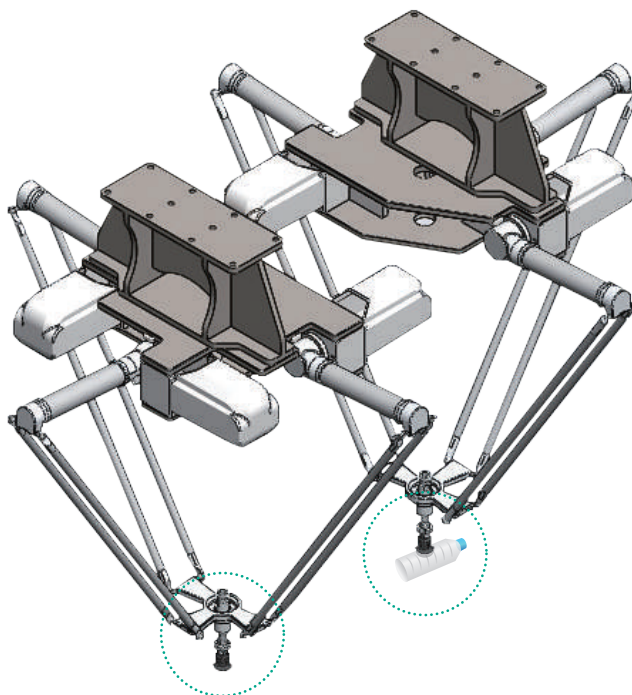
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PE

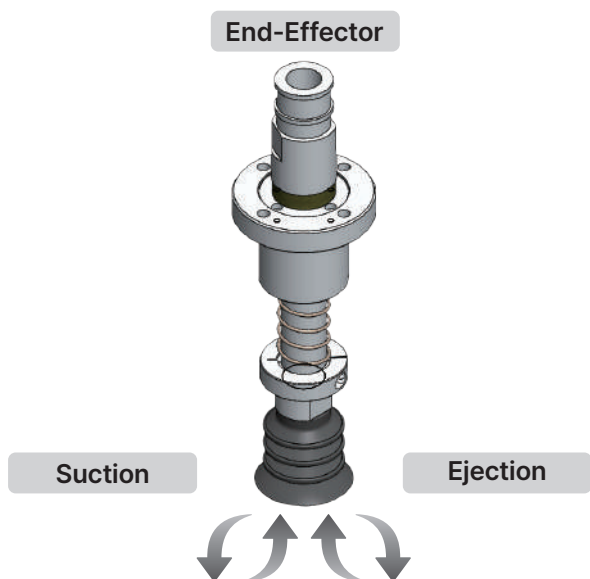


Colored PET



Delta Robot • End-Effector • High-Speed Vacuum Suction&Ejection System

Artificial Intelligence • Vision System • Data Training



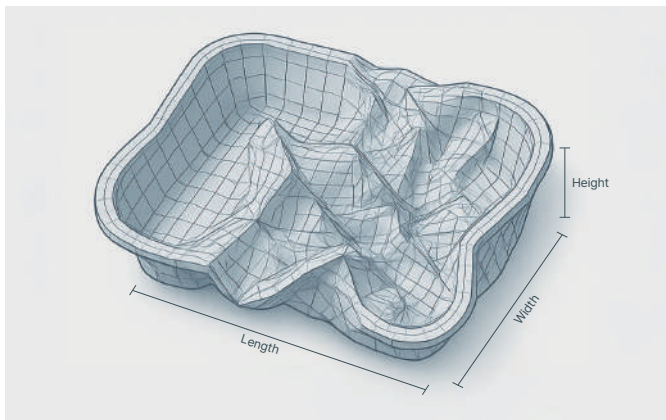
- ❑ Developed a customized end-effector optimized for on-site conditions that involve repetitive sorting of irregularly shaped waste, enabling precise picking.
- ❑ Equipped with a specialized device capable of suction and ejection in 0.2-second intervals, allowing for fast and efficient picking and placing of waste.

- ❑ The algorithm and data training are optimized based on on-site conditions, enabling analysis of waste type and contamination level. More than 52 categories can be identified and sorted according to use, material, and color.
- ❑ Even items that are difficult to distinguish with the naked eye—such as the rapidly increasing number of delivery containers—can be accurately recognized and classified.



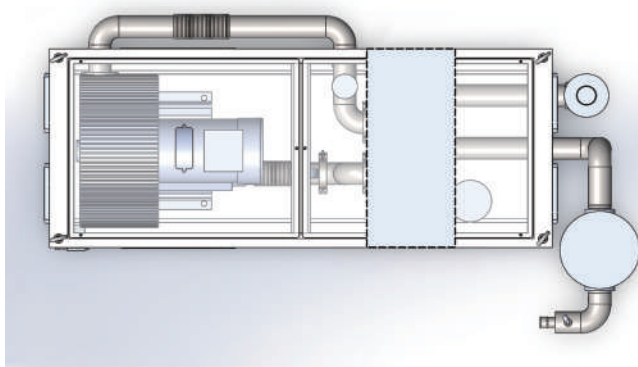
AI-Based Automatic Sorting Technology Replaces manual sorting through object detection, classification, and robotic picking

- Object recognition accuracy: **99.3%**
(via vision and AI training)
- Classification accuracy for target items: **99%**
- Picking success rate: **70%–80%**,
depending on site conditions
 - Up to 96 picks per minute in performance tests
 - 50–60 picks per minute under actual sorting facility conveyor input conditions



Speed, Position, and 3D Structure Analysis Technology, Optimized robot motion and maximized sorting performance

- Analyzes real-time conveyor speed and waste object positions to determine the shortest and **most efficient movement path for the robotic arm**
 - Avoids collision by detecting non-targets and obstacles
- Optimizes picking positions using 3D AI analysis**
 - Prevents picking failures caused by factors such as negative pressure



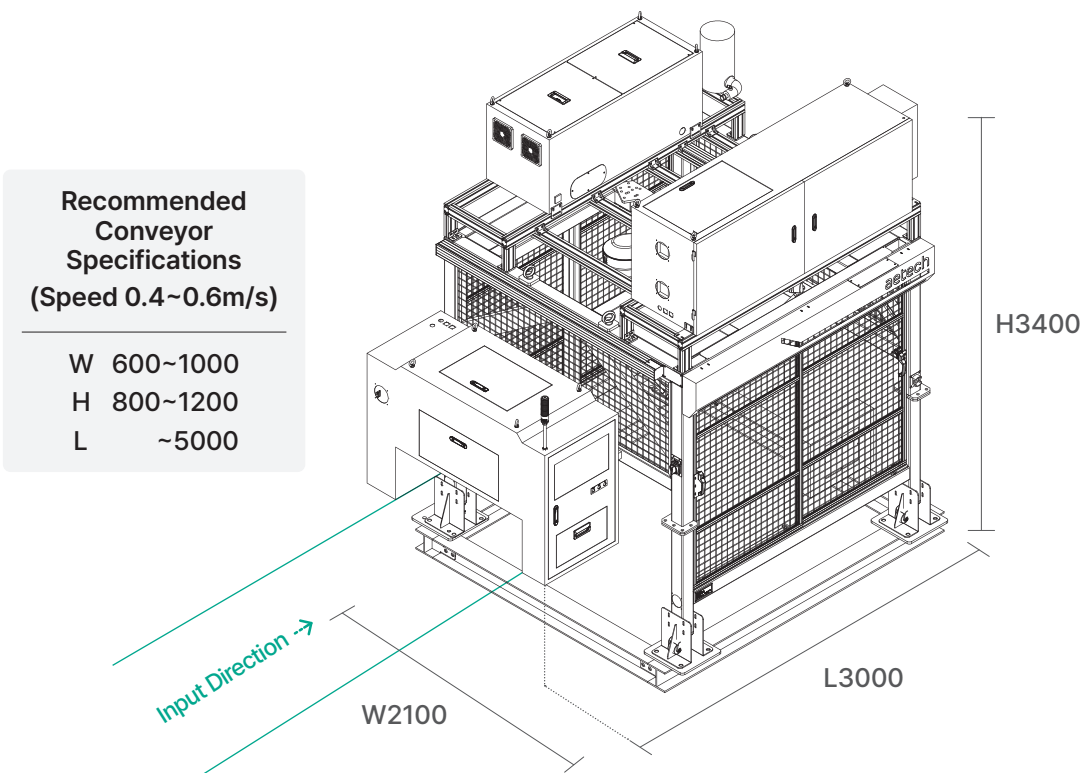
Simultaneous Suction and Blowing Using a Single Ring Blower, 41% Reduction in Rated Power Consumption-9kW Saved Compared to Conventional Systems

- Equipped with technology that enables suction-blowing switching more than once per second**
 - A single ring blower controls both pneumatic pressure and airflow (Air for direction switching: 100NL/min @5Bar supplied separately)
- Reduces flow loss, resulting in a 41% reduction in rated power**
 - System rated power: 22kW → 13kW (9kW reduction)
 - Actual on-site power consumption per unit: approximately 10kW

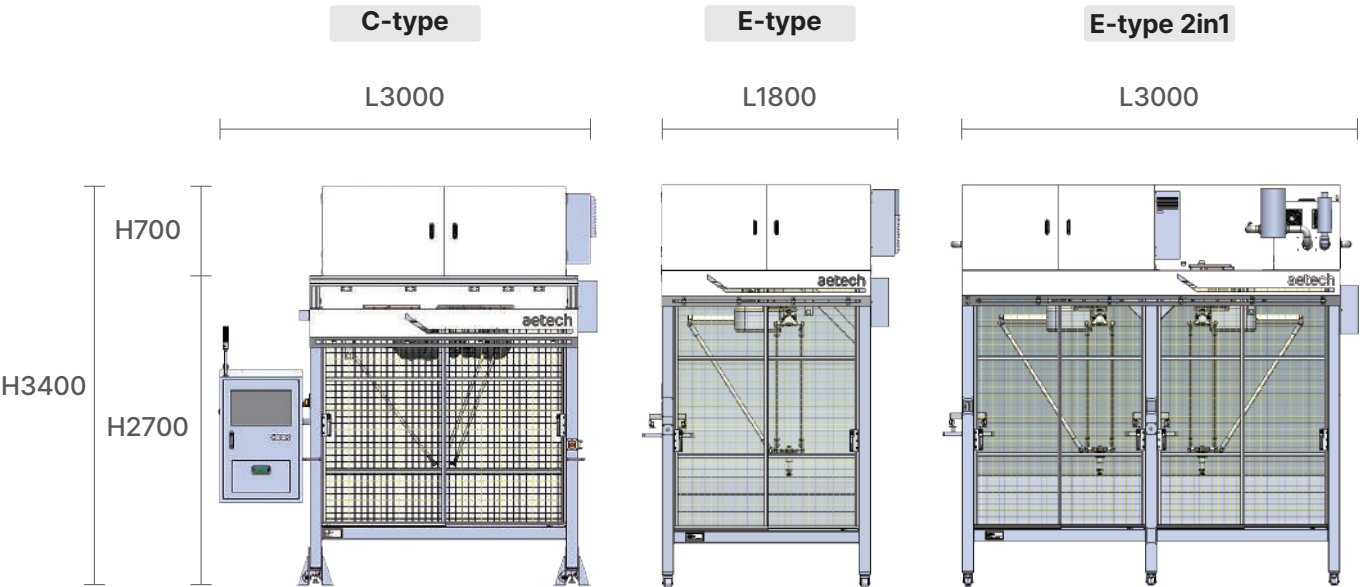


Data Analysis, Accumulation, Augmentation & Monitoring, Enhanced AI Algorithms, Optimized for On-Site Conditions

- Continuous development and updates of AI algorithms tailored to specific conditions by region and facility
 - Supports classification of over 52 types of materials and adaptive robotic control
- Application of optimal preprocessing and image augmentation techniques (e.g., brightness, angle adjustments)
 - Maximizes object recognition accuracy and generalization performance of AI models



Specifications		* Some specifications may vary depending on on-site conditions.	
Specifications		Utility	
Size (mm)	W2100 x L3000 x H3400	Voltage	3-phase 380V
Robot Arm	3-axis Delta	Frequency	60Hz
Working Area	Circular	Power	Rated 13kW Average usage 10kW
Operating Radius	Max. 1000mm		
Weight	1.5 tons	Pneumatics	100NL/min, @5Bar
Configuration		Material	
Vision	3D Stereo Vision & Lighting	Contact Surface	AL 6061
Control / Electrical	PC,Cabinet, Controller, 3-axis Server Control, Electric Panel	Drive	S45C, SUS303
		Other	S45C, AL, SS400 SQ PIPE
Robot	Delta 1600	Finishing	Electroless Nickel Plating, Anodizing
Blower	Ring Blower, KRV		
Performance		Installation Environment	
Object Recognition Accuracy	99.3%	Temperature	0~40 °C (Indoor)
Picking Speed	Test Condition:93 picks/min Field Condition:50~60 picks/min	Humidity	Below 90% (No dew or frost)
Operating Time	8~20 hours/day	Vibration	Less than 0.5G
Payload Capacity	~3kg	Structure	2-story steel frame structure (Additional construction required if insufficient)
Target Objects	Waste items by height Max. 200mm		



Product Specification Table			
Product Name	Atron C-type	Atron E-type	Atron E-type 2in1
Configuration	Vision Box + Robot Frame	Integrated Vision + Robot Frame	Integrated Vision + Continuous Robot Frame
Robot Arm	3-axis Delta Robot (1 unit)	3-axis Delta Robot, T-type (1 unit)	3-axis Delta Robot, T-type (2 units)
Size (mm)	W2100 x L3000 x H3400	W2100 x L1800 x H3400	W2000 x L3000 x H3400
Weight (ton)	1.5	1.5	2
Working Area	Circular	Elliptical	Elliptical
Conveyor Specifications	W600~1000 (Max 0.6m/s)		
Power Consumption (kW)	Max. 13kW / avg. 10kW		Max. 25kW / avg. 15kW
Applicable Sites	• Public facilities eligible for Innovative Product Procurement • Local MRFs required to comply with optical sorter installation regulations • Sites with sufficient installation space (min. 3,000mm per unit)	• Private facilities not eligible for Innovative Product Procurement • Local MRFs required to comply with optical sorter installation regulations • Sites with space constraints requiring multiple units (min. 1,800mm per unit, 3,000mm for 2-in-1)	
Standard Lead Time	• 3 months from order to installation and commissioning • Standard installation takes 7 days (additional costs may apply if delayed due to site conditions)		
Remarks	• Maintenance cost: KRW 550,000/unit per month (incl. VAT), annual contract required • Some specifications may vary depending on customer requests or site conditions		



4 Units of Type C

Ulsan City – Private Sorting Facility

- ❑ Installed to enhance the quality of PET sorting for waste collected from multi-family housing complexes in major regional cities.
- ❑ Sorted Materials: PET (Clear·Colored·Flat-type), PP, PE



3 Units of Type C

Cheongdo-gun Environmental Management Center

- ❑ Installed in a rural area with low waste volume to improve sorting quality for specific items such as makgeolli bottles.
- ❑ Sorted Materials: PET (Clear·Colored)



2 Units of Type C

Incheon Songdo Public Sorting Facility

- ❑ Installed to enhance the sorting quality of PET and other materials after optical sorting, targeting waste from apartment complexes in the Seoul metropolitan area.
- ❑ Sorted Materials: PET (Clear·Colored)



3 Units of Type C

Namyangju Private Sorting Facility

- ❑ To improve the quality of sorting PET and other recyclables in the downstream process after optical sorting, targeting residential waste from eastern Seoul metropolitan area and nearby regions.
- ❑ Sorted items: PET (Clear·Colored), PP





Public

Type C (Dual Units)

Songpa-gu Resource Circulation Center

- ❑ To improve the sorting quality of mixed waste collected in Songpa-gu, a "Ballistic Separator + Atron" process was introduced.
- ❑ Sorted items: PET (Clear), PP



Public

2 Units of Type C

Seongnam-si Public Sorting Facility

- ❑ To enhance plastic recovery from residuals after initial manual sorting at a large-scale metropolitan facility, a "Ballistic Separator + Atron" process was introduced.
- ❑ Sorted items: PET (Clear · Colored · Flat-type), PP, PE



Public

1 Units of Type C

Namwon-si Sorting Facility

- ❑ Introduced to improve the quality of specific items after ballistic and optical sorting for mixed waste from regional areas.
- ❑ Sorted Materials: PET (Colored)



Private

3 Units of Type C

Incheon Private Sorting Facility

- ❑ Introduced at a large-scale metropolitan sorting center to improve sorting quality after trommel processing, targeting apartment and regional waste.
- ❑ Sorted Materials: PET (Clear · Colored)





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