

# AS/RS Automated Storage & Retrieval System



## Wide variations provided for various load figures

# Muratec's AS/RS system

#### Muratec's AS/RS was born in 1967.

Since then, it has grown with the progress of high economic growth, the three-dimensional structure of the hazardous materials warehouse was succeeded in 1971. Muratec offers many variations of our systems to meet our costumers needs. Muratec has delivered more than 6,000 AS/RS systems to Japan and abroad.

Storage requirements such as storage of various kinds of products in small lots and establishment of traceability for safety and security have been sophisticated more and more. Picking systems which use AS/RS have been provided to ensure speedy processes from warehousing to storage and sorting retrieval, and expectations for timely supply have been accelerated. Muratec provides the AS/RS system as a tool not only to achieve the most suitable inventory management and goods receipt/ shipping measures for industry types, scales and goods characteristics but also to take an important role in SCM (supply chain management) and support business strategy. The most suitable AS/RS system for customer's needs is provided by the total engineering such as material handling equipment, information system and architectural structure.



# Selection of AS/RS





Retrieval System З

# Differences between unit-type rack and building-type rack

The installation height of the pallet ASRS is from 4m to 31m (from 13 ft. to 101 ft.) and it is suitable for various industries. The system is designed depending on the costumer's product characteristics such as storage of frozen goods, refrigerated goods and hazardous goods. Muratec has two types of racks available. The unit-type rack can be installed in an existing or new building while the building-type rack is integrated into the structure of the building.

#### Unit-type rack (treated as structure)

This is a self-standing AS/RS and treated as a self-supporting structure. It can be installed in short time at a relatively low cost, and the layout is designed depending on the available space and load figure. Chemical anchors or mechanical anchors are used for fixing.







#### Building-type rack integrated with building (treated as building)

Rack columns of AS/RS are used as building columns, a roof and walls are installed and the rack is integrated into the building. The separate columns to support building are not needed inside and the space can be efficiently used. The base channel type with high earthquake resistance is adopted.







# Pursuit of high functionality and performance

Muratec's AS/RS system has advantages of basic performance such as space efficiency, laborsaving, throughput, ease of use and energy saving and has the advanced technology which pursues safety from various points of view such as high earthquake resistance by seismic isolation structure.

#### **Greatly reduced cycle time**

S-curve acceleration and deceleration control is used to minimize shocks generated by reaction at the time of start and stop. Vibration is restricted by acceleration and stop. Therefore, the motor is controlled by the most suitable drive torque for wheel pressure, travel, load pickup and load drop-off are smoothly conducted. Load-friendly transport is achieved and cycle time is greatly reduced.



Time

#### Increase operability (Smart remote controller)

The smart remote controller incorporates an emergency shutdown unit (certified by the international safety standard) into a tablet terminal, enabling machine operations and monitoring from a single device.





# Improved operability (stationary operation panel \* Option)

On the operation panel, the LCD screen and LED indicators next to the switches guide operation and this design is easy for beginners to use.



**Ketrieval** System

# **Pursuit of safety**

The most important goal of the AS/RS system is to ensure worker's safety. Error sensors are installed in many places. When one of these sensors detects an error, the crane automatically stops and the top priority is given to worker's recovery work by manual operation.

#### Load figure (displacement) sensor

This checks the width and height of load when the load is picked by the slide fork. The crane stops when the size is too large.

#### Fork devices

- Prevention from coming off A mechanical stopper prevents the slide fork from coming off.
- Operation interlock
   Travel and hoisting are enabled only while the slide fork is in the center.
- Torque limiter This protects the slide fork from overload.

#### Smart remote controller

Can operate the machine on a smart remote controller that incorporates an emergency shutdown unit (certified by the international safety standard) from a tablet terminal.

Manual operation is possible from the outside of the safety fence to ensure worker safety.



#### **Operation switch**

Key switches are provided with the stationary operation box and on-board operation unit. Operation is disabled when the key is not set.





Stationary operation box

On-board operation unit



This detects looseness of the chain (wire) which hangs the hoisting carriage. When looseness is detected, the stacker crane immediately stops to prevent irregular winding which may cause breakage.

#### **Overload sensor**

A thermal relay is equipped with each drive motor circuit in order to prevent burning by overload.

#### Load protrusion sensor (load location sensor)

This detects load protrusion from the hoisting carriage. When load protrusion is detected, the stacker crane immediately stops.

#### Double-storage prevention sensor

Before the slide fork is extended, this checks load presence in the station or rack in order to prevention double storage.

#### Mechanical stopper (travel/ hoisting end stopper)

This prevents the stacker crane from overrunning.



# Preventive measures for natural disasters or unexpected catastrophes

In the case of a natural disaster or catastrophe, such as an earthquake, Muratec takes preventive measures in designing our equipment to ensure worker safety, and to minimize damages that might occur to equipment or stored goods, and prevent loss of data. These measures will help to facilitate faster recovery time for your AS/RS.

#### **Vibration control devices**

"Vibration control dampers" help absorb the force of the earthquake and mitigate shaking in the rack structure. "Vibration control stoppers" are positioned on the rack supports to help prevent load displacement. Together, "Vibration control dampers" and "Stoppers" offer an effective countermeasure for preventing the rack structure from collapsing and keeping stored items in place within the rack itself.

#### Seismic isolation devices

"Seismic isolation devices" help to absorb the shock of an earthquake and reduce acceleration of an earthquake. "Ball isolators" and "Oil dampers" can be installed into the floor. By implementing high-rise seismic isolation devices, such as "Linear motion guide supports" and "High-damping rubber supports", it is possible to utilize 30-meter class racks for your automated storage & retrieval systems.



Vibration control dampers



Ball isolators



sliding unit support



Vibration control stoppers



Oil dampers



Repositioning rubber unit support



## Automatic stop system for power failure

Muratec's AS/RS warehouse management and controls system is equipped with UPS (Uninterruptible Power Supply). If an unexpected power failure or voltage drop occurs, UPS will provide a stable power source with enough time for you to perform a "normal" shut down of your system. A normal shutdown will allow for a "normal" startup following recovery of power and prevent any data loss.

**Ketrieval System** 

# Improved maintainability

Regular maintenance is essential for a more comfortable, safe and stable operation. In order to make parts replacement, inspection and other maintenance work as easy as possible, design is made in consideration of individual locations of parts and other details.

#### All-position startup method

When the crane stops due to an error, it can start up anywhere. Startup after return to the home position is not needed and trouble recovery time is reduced.

#### **Operation record tracking function**

Crane operation record data is accumulated and errors can be quickly determined. The number of errors with each error code is recorded. Therefore, error tendency can be grasped and maintenance measures and regular maintenance can be planned.

#### Replacement parts at bottom of equipment

Parts which need regular replacement are located at the bottom of equipment to make maintenance work easy. Workers can easily access them and maintainability is improved.

#### Approach to high place

A maintenance cage \* by which a worker can step on and move to a high place easily can be installed. \* Optional A maintenance ladder is a standard component.



# **Environmentally-friendly design**

Products which use less power and are easier to recycle and products which produce less environmental burdens and use less raw materials are developed and provided to promote reduction in environmental burdens such as carbon dioxide emission, resource saving and resource recycling.

When the travel

#### 30% reduction in weight of stacker crane

The weight of the crane is reduced by up to 30%. Therefore, the drive motor capacity and power consumption is reduced. The crane energy-saving and environmentally-friendly.

#### Power regenerating converter is a standard component

By the power regenerating converter, the energy generated during crane operation (travel brake, downward move of carriage) is converted to power and the power is supplied to other equipment. Compared with the case where the power regenerating converter is not used, power consumption is reduced up to 30% and energy-saving effects are given.

#### Lead-free design

Lead-free design is used for the CPU board in order to reduce environmental burden materials. Lead-free paint is standard on all cranes.



# Storage/ retrieval loading station

Various loading stations can be selected depending on the storage/ retrieval method, opening location and load shape.

### Hand lift station

The crane weight is reduced. The crane is energy-saving and environmentally-friendly.





# **Manual cart**

Load can be carried together with the cart. (The capacity is about 300 kg (660 lb.))





IN NY RUNNERSES.

NAN TATALAN INTE LITTE

III III III

## **Manual cart** (with rail)

The position is determined by the pedal and interlock is reliably provided.

1,000 kg (2,200 lb.) load can be manually carried.

# **Electric cart**

This is used for both storage and retrieval. It is convenient for picking and load handling by fork lift.







Chain conveyor

This is most suitable for storage/ retrieval from the side of the rack.





**Retrieval System** 

# Storage/ retrieval loading station

#### Chain conveyor (with lifter)

This is most suitable for storage/ retrieval, parallel with the rack.



#### Roller conveyor (with lifter) I

This is most suitable for load handling by fork lift, parallel with the rack.



#### Roller conveyor (with lifter) II

Only load can be retrieved from the dedicated pallet.



## Rail-guided high-speed sorting vehicle RTN-X (reciprocating type)

This is used for storage/ retrieval at AS/RS and load transfer with the conveyor.

# Speed Sorting Venicle RTN-X



Rail-guided high-speed sorting vehicle RTN-X (loop type)

This is used for storage/ retrieval at AS/RS and load transfer with the conveyor.

Several vehicles can be used together.





# Pallet AS/ RS PC series

The pallet AS/RS is used in a wide range of industries. For the rated load of up to 3.0t/PL (6,600 lb./PL), the installation height can be selected from 4m to 30m (13 ft. to 98 ft.) and AS/RS is available in various industries.

## Available for simple operation to online communication

The single operation by using an AS/RS control computer, and the comprehensively managed system operation with peripheral equipment, flat storage management and WMS are available.

#### **Construction of picking system**

A picking system can be easily constructed by using real time update of storage/ retrieval records, first-in first-out system in order of freshness and other inventory management functions provided by AS/RS. Picking areas are provided at the retrieval home position and rack back side and "no picking mistake" and work efficiency improvement are supported.

# Pallet AS/ RS PX series

The PX series which is the state-of-the-art high-spec machine and has the high storage capacity and high throughput achieves the greatest traveling, hoisting and fork speeds in the industry. Work efficiency is improved by using not only effective storage function but also storage/ retrieval capacity with high rotation and high precision.

#### **High-speed stacker crane**

The traveling, hoisting and fork speeds with the high throughput are the best in the industry.

- •Traveling speed: Max. 240 m/min (787 ft./min)
- •Hoisting speed: Max. 125 m/min (410 ft./min)
- •Fork speed: Max. 75 m/min (246 ft./min)

#### Significantly improved work efficiency

The high throughput with the cycle time significantly reduced is used and work efficiency in both distribution centers and fully automatic systems, which are directly connected with production lines in FA sites, are improved.

#### Design depending on equipment scale and space

Various designs such as the unit type installed in an existing building and the building-integrated type (building-type rack) by using the full space to the ceiling can be made depending on equipment plan and space.



# **Basic specifications**

#### **PC** series

Туре		PC	
Installation height		Up to 30 m	Up to 98 ft.
Rated load		Max. 1,000 / Max. 1,300 kg	Max. 2,200 / Max. 2,800 lb.
Load size	W	800 – 1,500 mm	31.5 – 59.1 in.
	D	800 – 1,500 mm	31.5 – 59.1 in.
	Н	100 – 2,000 mm	3.9 – 78.7 in.
Traveling speed		80 – 160 m/min	262 – 524 ft./min
Hoisting speed		15 – 80 m/min	49 – 262 ft./min
Hoisting drive method		Chain loop type / Wire rope winding type	
Fork speed		40 / 50 m/min	131 / 164 ft./min
Fork type		Single fork	
Reach		Single reach	
Maintenance cage		Option	
Power supply		3phases 200/220V 50/60Hz	

\* The speed values are the ones when there is no load on the hoisting carriage.

\* The maintenance cage cannot be mounted depending on the installation height.

\* Other than the above load size may be separately discussed.

# PC series: For heavy load

Туре			PC (For heavy load)	
Installation height		eight	Up to 30 m	Up to 98 ft.
Rated load			Max. 1,500 / Max. 3,000 kg	Max. 3,300 / Max. 6,600 lb.
		W	800 – 3,200 mm	31.5 – 126.0 in.
Load s	ize	D	800 – 2,200 mm	31.5 – 86.6 in.
		Н	100 – 2,000 mm	3.9 – 78.7 in.
Traveling speed		ed	80 – 200 m/min	262 – 656 ft./min
Hoisting speed		ed	15 – 90 m/min	49 – 295 ft./min
Hoisting drive method		e method	Chain loop type / Wire rope winding type	
Fork speed			30 / 40 / 50 m/min	98 / 131 / 164 ft./min
Fork type			Single fork / Twin fork	
Reach			Single reach / Double reach	
Maintenance cage		cage	Option	
Power	Installa	tion height≦21m	3phases 200/220V 50/60Hz	
supply	Installa	tion height>21m	3phases 400/440V, 380V 50/60Hz	

\* The speed values are the ones when there is no load on the hoisting carriage.

\* The maintenance cage cannot be mounted depending on the installation height.

\* Other than the above load size ,From 30m (98 ft.) may be separately discussed.

# PX series: High Speed type

Туре		PX	
Installation height		Up to 30 m	Up to 98 ft.
Rated load		Max. 1,500 kg	Max. 3,300 lb.
Load size	W	800 – 1,500 mm	31.5 – 59.1 in.
	D	800 – 1,500 mm	31.5 – 59.1 in.
	Н	100 – 2,000 mm	3.9 – 78.7 in.
Traveling speed		200 – 240 m/min	656 – 787 ft./min
Hoisting speed		80 – 125 m/min	262 – 410 ft./min
Hoisting drive method		Wire rope winding type	
Fork speed		75 m/min	246 ft./min
Fork type		Single fork	
Reach		Single reach / Double reach	
Maintenance cage		Option	
Power supply		3phases 400/440V, 380V 50/60Hz *Only 400V type available.	

\* The speed values are the ones when there is no load on the hoisting carriage.

\* Other than the above load size may be separately discussed.

# PC/ PX series delivery cases



AS/RS is used in a fastener wholesale warehouse. This contributes to inventory management of 100,000 kinds of products, establishment of an instant delivery system and rationalization of distribution.



AS/RS is used in a drug distribution center. The reciprocating-type RTN-X is adopted for storage/ retrieval in AS/RS and efficient sorting to several places is achieved.



# PC/ PX series delivery cases





Regardless of the industry, the type which uses the standard pallets that the distribution volume is the highest can be introduced in a short time at low cost.

Only the rack of the AS/RS system developed 40 years ago is used, the stacker crane is renewed, safety measures are taken for the storage/ retrieval station, and the inventory management system is coordinated with the product shipping management.



V.

# PC/ PX series delivery cases



Large-volume high-density storage is achieved by 18 double reach-type stacker cranes and high-rise 30 m (98 ft.) type in a distribution center directly connected to the largest beverage plant in Japan.



This series is used in a rice storage system which uses inside air-conditioning to prevent quality deterioration. Regardless of bags and flexible container bags, goods are stored with each pallet.



High-rise 38 m (124 ft.) large-volume high-density storage AS/RS available for load transfer of up to 3t (6,600 lb) by using twin fork and double reach

# Storage of class 2 and class 4 specific goods

# Hazardous material AS/RS

Fire-resistant coating is applied to the major structural members such as rack columns and explosion protection test-approved electrical equipment is used. The AS/RS system is compliant with the explosion protection standards (class d2, G4 and 2 hazardous places) of the Fire Service Act and has high safety and reliability. The storage and retrieval work in the warehouse is fully automated to ensure the worker's safety and the explosion-proof stacker crane which is the fastest in the industry is adopted to support efficient storage and retrieval work.

#### Storage/ retrieval of 60 PL per hour

The explosion-proof stacker crane which is the fastest in the industry and can store/ retrieve 60 PL per hour. The power regenerating inverter is equipped as a standard component and the power consumption is reduced by 30%. The stacker crane is easy to operate for storage/ retrieval.

•Traveling speed: Max. 125 m/min (410 ft./min)

•Hoisting speed: Max. 40 m/min (131 ft./min)

•Fork speed: Max. 50 m/min (164 ft./min)

#### 60% reduction in storage space

For class 2 and class 4 hazardous materials, AS/RS can be constructed with the area of 1,000m<sup>2</sup> or less and height of 20 m (65 ft.) or less. High-density storage of 3,000 PL (12,000 drums) \* is available. The retaining area is eased for only high-flash point hazardous materials (class 4 hazardous materials with flash points of 100 or more) and the storage efficiency is significantly increased.

\* It changes by Load size.

Class 2

#### Combustible solid

The solid is combustible and has properties such as emission of hazardous gas at the time of combustion.

Nitrified phosphorus/ red phosphorus/ sulfur/ iron powder/ metallic powder/ magnesium/ other substances specified by government ordinances
Substances which contain any of the above ones
Inflammable solids Class 4 Inflammable liquid

The liquid is strongly acidic and has properties such as ignition due to contact or mixing with combustible substances.

Inflammable substance/ alcohol/ first class petroleum/ second class petroleum/ third class petroleum/ fourth class petroleum/ animal or vegetable oil

## Standard specifications of hazardous material AS/RS

Explosion-proof specification		Flameproof enclosure, intrinsically safe type	
	W	800 – 1,500 mm	31.5 – 59.1 in.
Load size	D	800 – 1,500 mm	31.5 – 59.1 in.
	Н	800 – 1,300 mm	31.5 – 51.2 in.
Load capacity		Max. 1,000 kg	Max. 2,200 lb.
Control method		Remote control type, computer control type	
Storage/ retrieval equipment		Self-driven vehicle, conveyor	
Building structure		Self-standing type / Building-integrated type	
Control room		Centralized control (non-hazardous material area)	

# Hazardous material AS/RS delivery cases



Fire extinguishing equipment (CO<sub>2</sub> cylinders) is fully equipped.

Raw materials and products for chemical manufacturers are stored in the building-integrated-type AS/RS (1,800 PL). Temperature zones are divided by air-conditioning in order to maintain high quality at low cost.





Explosion-proof electric cart



Cleaners and reactive solvents made of petroleumderived raw materials are stored. Spent solvents, recycle solvents and solvent products are transported in Japan.

Complete control of temperature and humidity in warehouse

# **Freezing/ refrigeration storage AS/RS**

The low temperature or freezing-type AS/RS for food and drugs controls the internal temperature and humidity and thoroughly manages the quality and freshness of stored goods. Heat insulators are used for the exterior wall and ceiling, the heat-insulating auto door is controlled with interlock, the internal temperature is kept constant, and the workers outside the warehouse are freed from harsh cold-place work. The low-temperature total system is provided for various purposes.

## Available at -30 degrees or higher

Optimal design is made depending on goods types from class C3 (+10 degrees ~ -2 degrees) to class F2 (-30 degrees and lower). Precise freshness management, frequent small-volume shipping, just-in-time distribution and others are totally supported.

## Cold chain system

The total system is provided in coordination with the information system in order to manage temperature in all goods processes of warehousing, storage, picking, sorting, temporary placement and shipping.

## Design depending on equipment scale and space

Various designs such as the unit type which is installed in an existing building and used for management in each room and the building integrated type (building-type rack) which is equipped with rack columns as the structural columns of building and uses the full space to the ceiling can be made depending on equipment plan and space.

# **Coordination with peripheral equipment**

Various types of automated transport equipment such as automated guided vehicles, sorting vehicles and conveyor systems are coordinated to automate material handling and movement.



# Freezing/ refrigeration storage AS/RS delivery cases





A picking line is provided behind AS/RS and DPS is installed at the opening to construct the user-friendly picking system. Empty pallet handling and pallet replacement are also automated.



A 3PL warehouse is provided to transport frozen food. This provides both distribution function and storage function and warehousing, sorting and distribution processing are conducted at a managed temperature.







Frozen food is stored at -28 degrees. Heat-insulating auto doors are completely equipped to prevent quality deterioration due to a temperature difference with case shipping work station (5 degrees).

Solution of difficulties such as heavy weight, large size, long length and hard-to-carry condition

# AS/RS for heavy goods and long goods

AS/RS for heavy goods and long goods is useful in a variety of environments such as sheet-metal processing plants, wood processing plants, production sites, distribution centers for completed goods like carpets and printing material roll storage facilities. Uses of the system required for goods which cannot be stacked or hard to handle due to "heavy weight, large size, long length or hard-to-carry condition" are increasing for not only the storage function such as just-in-time supply and temporary placement of in-process goods but also transport and sorting.

#### Safe and secure handling

The standard weight is up to 5 tons (11,000 lb.), the standard length is up to 2.2 m (7 ft.), and strength, safety and flexibility are provided. The system can be expanded depending on the use and can handle special pallets safely and securely.

#### **FA** system

The factory production system is coordinated to enable timely replenishment and supply of materials and in-process goods.

#### **Coordination with peripheral equipment**

Various types of automated transport equipment such as automated guided vehicles, sorting vehicles and conveyor systems are coordinated to automate material handling and movement.

#### Standard specifications of AS/RS for heavy goods and long goods

Туре		SSH	
Installation height		Up to 30 m (Up to 98 ft.)	
Load size	W	800 – 2,200 mm (31.5 – 86.6 in.)*1	
	D	800 – 2,200 mm (31.5 – 86.6 in.)*1	
	Н	200 – 2,000 mm (7.9 – 78.7 in.)*1	
Load capacity		Max. 5,000 kg (Max. 11,000 lb.)*1	
Traveling speed		Max. 125 m/min (Max. 410 ft./min)	
Hoisting speed		Max. 30 m/min (Max. 98 ft./min)	
Fork speed		Max. 30 m/min (Max. 98 ft./min)	

<sup>1</sup> The maximum hoisting load is 20t (44,000 lb.).

The speed values are the ones when there is no load on the hoisting carriage.
 Other than the above load size may be separately discussed.

# Heavy goods and long goods AS/RS delivery cases

The 9-fork crane responds to the amount of materials and flexibly changes the destination shelves for 12 kinds of load figures such as completed goods before shipping and production members.







Architectural sheet-metal rolls are stored in a processing plant of a manufacturer for housing materials such as metallic roofs and wall materials.

# Case AS/RS UX series

The case AS/RS is available for various shapes and weights of buckets and carton cases. This is widely used for picking and shipping work precisely and speedily supplies desired amounts of goods at times.

#### Free size

The free size type is provided to handle various load figures for storage of regular-size buckets and storage of irregular-size carton cases.

## Significantly reduced cycle time

Cycle time is significantly reduced by high-speed operation and optimum speed control. The system serves as picking equipment by using the flexible warehousing patterns and the precise high-speed retrieval capacity according warehousing and storage requests.

## **Coordination with peripheral equipment**

Various systems such as backside picking systems connected to inclined shelves behind the rack, digital indicators and shipping sorters are coordinated to construct the optimum system.

## **UX** series

Туре		UX	
Installation height		3 – 15 m	9 – 49 ft.
Rated load		Max. 100 kg×1, Max. 50×2	Max. 220 lb.×1, Max. 110×2
Load size	W	250 – 600 mm	9.8 – 23.6 in.
	D	350 – 700 mm	13.8 – 27.6 in.
	Н	20 – 600 mm	0.8 – 23.6 in.
Traveling speed		80 – 300 m/min	262 – 984 ft./min
Hoisting speed		40 – 160 m/min	131 – 524 ft./min
Load transfer speed		40 – 125 m/min	131 – 410 ft./min
Hoisting drive method		Wire rope winding type	
Load transfer method		Fork / Side clamp	
Power supply		3phases 200/220V 50/60Hz	

\* The speed values are the ones when there is no load on the hoisting carriage

\* Other than the above load size may be separately discussed.

# Case AS/RS delivery cases





This system is used in an Internet shopping company for children's clothing, toys and sundries. This is of the free size type available for various case sizes by using the horizontal comb tooth rack method.



The system is used on a picking line for shipping of small components of FA equipment. The high-performance high-speed stacker crane is used to support shipping work.





Drug cases are stored in a drug distribution center. The vertical comb tooth type is used.



The bucket AS/RS is equipped with the single mast and single fork. It is used for picking before pre-shipping arrangement in a fastener wholesale warehouse.

# Quick and precise support of air cargo transportation

# Air cargo system

An important role in the supply chain such as production, procurement and distribution is given to international air transportation, and handling of a wide variety of products in small quantities to meet market needs greatly changes distribution. Business globalization is needed to sensitively and quickly respond to changes in the world economy and geopolitical risks. The greatest merit of air transportation is speed. However, that merit becomes effective by smoothly operating the distribution system on the ground. Murata Machinery's cargo system provides the total logistics service from receipt of air transportation cargo to delivery of them.



#### **Ready for Carriage**

The most advanced distribution support functions are provided to enhance cargo transportation efficiency. Temporary storage, inventory management, sorting and delivery of cargo are totally supported. Transportation cost is significantly reduced and international distribution is facilitated.

#### Available for air cargo container size

Various types of equipment such as large AS/RS and transport/ sorting vehicles can be designed to store cargo containers as they are.

#### Available for special cargo

The system is also available for distribution of imported fruit, vegetables, flowers, fish, shellfish and other goods which should be fresh.



# Air cargo system delivery cases



RTN-X system to transport bulks



TV system to transport air cargo containers



ETV system to transport and store air cargo containers



AS/RS system to store bulks

# MURATA MACHINERY, LTD. Logistics & Automation Division http://www.muratec.co.jp

#### MURATA MACHINERY, LTD.

International Business Dept. Green-Bldg. 7F, 2-6-26, Kitahama, Chuo-ku, Osaka, 541-0041, JAPAN TEL. +81-(0)6-6202-1387 FAX. +81-(0)6-6202-1388

#### MURATA SYSTEMS, LTD.

3, Kisshoin Minami-Ochiai-cho, Minami-ku, Kyoto, 601-8326, JAPAN TEL. +81-(0)75-672-8320 FAX. 81-(0)75-671-5106

#### MURATA MACHINERY USA, INC.

#### Logistics & Automation Division

2120 Queen City Drive, P.O.Box 667609, Charlotte, N.C. 28208, U.S.A. TEL. +1-704-394-6900 FAX. +1-704-394-2001 http://www.muratec-usa.com/

#### SALT LAKE CITY OFFICE

120 North Redwood Road Suite 3 North Salt Lake, UT 84054, U.S.A. TEL. +1-801-683-3500 FAX. +1-801-683-3501

#### **CIMCORP USA, INC.**

1867-B McFarland Parkway Alpharetta, GA 30005, USA TEL. +1-888-797-3703

#### CIMCORP AUTOMATION LTD.

635 South Service Road, Grimsby, Ontario L3M 4E8, CANADA TEL. +1-905-643-9700 FAX. +1-905-643-9666

#### **MURATA MACHINERY EUROPE GMBH**

Hanns-Martin-Schleyer-Strasse 3, D-47877, Willich, GERMANY TEL. +49-(0)2154-914-0 FAX. +49-(0)2154-914-188

#### **CIMCORP OY**

Satakunnantie 5, FI-28400 Ulvila, FINLAND TEL, +358-10-2772-000 FAX, +358-10-2772-200

#### AGVE AB

Askims Industriväg 9, 436 34 Askim, SWEDEN TEL. +46-(0)31-7483900

#### MURATA MACHINERY INDIA PRIVATE LTD.

NEW DELHI OFFICE (Registered Office) 1010, Hemkunt Tower, 98, Nehru Place, New Delhi, 110019, INDIA TEL. +91-(0)11-2628-0046/47 FAX. +91-(0)11-2628-0048

#### MUMBAI OFFICE

Unit No.401, 4th Floor, Madhava Building, Bandra Kurla Complex, Bandra East, Mumbai, 400051, INDIA

TEL. +91-(0)22-2659-0275/76/77 FAX. +91-(0)22-2659-0280

#### COIMBATORE OFFICE

7-A1/A2, Avinashi Road, Thottiyapalayam Pirivu, Civil Aerodrome (P.O.,) Coimbatore, 641014, Tamilnadu, INDIA TEL. +91-(0)422-450-4184/85 FAX. +91-(0)422-450-4186

#### MURATA (THAILAND) CO., LTD.

3068 Mu 10, Sukhumvit 107 Road., Samrongnua, Muangsamutprakarn, Samutprakarn, 10270, THAILAND TEL. +66-(0)2294-7734 FAX. +66-(0)2294-7732

#### MURATA MACHINERY SINGAPORE PTE. LTD.

69 Ubi Crescent #06-01, SINGAPORE, 408561 TEL. +65-6545-1228 FAX. +65-6545-2221

#### MURATA MACHINERY (SHANGHAI) CO., LTD.

806 Room, No. 666 West Huaihai Road, Changning District, Shanghai, 200050, CHINA

TEL. +86-(0)21-6372-3322 FAX. +86-(0)21-3331-3570

#### [Registry Add] Room 1203A, Floor 12, Building 1, No.139, FuTeXiYi Road, China (Shanghai) Pilot Free Trade Zone, CHINA

**BEIJING BRANCH** Rm.309 Yu Lin Bldg., Xiang Jun Nan Li Er Xiang Jia No.5, Chaoyang-qu, Beijing, 100020, CHINA

TEL. +86-(0)10-6597-8829 FAX. +86-(0)10-6591-1768

#### **GUANGZHOU BRANCH**

Room 1018, No. 238 Chang Gang Zhong Rd., Haizhu District, Guangzhou, Guangdong, 510250, CHINA TEL. +86-(0)20-8434-2882 FAX. +86-(0)20-8434-3463

#### SHENZHEN OFFICE

Room 1503 A building, Yousongwuwu Dongfulong Garden, Longhua Street., Shenzhen, Guangdong, 518109, CHINA TEL/FAX. +86-(0)755-2956-2683

#### SHANGHAI MURATEC AUTOMATION SYSTEMS LTD.

11F A-B Room, No. 659 Fengyang Road, Jingan District, Shanghai, 200041, CHINA

TEL, +86-(0)21-6327-6445 FAX, +86-(0)21-6327-6449

#### TIANJIN BRANCH

1508, International Center, Water Park North Road Luneng, Nankai District, Tianjin, 300380, CHINA

TEL. +86-(0)22-8702-8991/+86-(0)22-8702-8992 FAX. +86-(0)22-8702-8993

#### MURATA MACHINERY (H.K.). LTD.

Unit 502, 5/F., Yen Sheng Centre, 64 Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong, CHINA TEL. +852-2332-0000 FAX. +852-2780-6340

#### MURATA MACHINERY TAIWAN, LTD.

18F., No.17, Sec.1, Chengde Rd., Taipei 10351, TAIWAN TEL. +886-(0)2-2558-5505 FAX. +886-(0)2-2558-6606

#### HSIN-CHU SERVICE CENTER

6F.-1, No.1, Sec.3, Gongdao 5th Rd., East Dist., Hsinchu City 300, TAIWAN TEL. +886-(0)3-561-0508 FAX. +886-(0)3-561-0515

#### TAICHUNG OFFICE

No.505, Sec. 1, Dunhua Rd., Beitun District, Taichung 40678, TAIWAN TEL. +886-(0)4-2292-2325 FAX. +886-(0)4-2292-3515

#### TAINAN OFFICE

No.6, Zhongxin Rd., Xinshi District., Tainan City 74148, TAIWAN TEL. +886-(0)6-589-1635 FAX. +886-(0)6-589-1634



\*All specifications are subject to change without advance notice. LAm01E 09 20-10-1(FR-TU)