Robotized palletizing and manipulation systems

Feel free to imagine.
We make it happen.
The Robby system is a comprehensive approach developed by SIPA to meet the increasing market demand for packaging flexibility and efficiency for a wide range of containers and packaging. In particular, it offers an extremely viable alternative to traditional palletizing and depalletizing systems.

By integrating an anthropomorphous robotic arm with the other components required, SIPA can create equipment and systems for palletizing/depalletizing and handling packages, crates, cartons, packs, bottles, cans, pallets and interlayer pads.

In addition to its experience in creating the right system configuration and managing installation electronics, SIPA’s breakthrough lies in the design and realization of a gripper head for each product type and all movement modes.

Its long-time experience in robotized manipulation has allowed SIPA to create a wide range of heads:
- halving platform
- pliers-type
- jaw-head and hook
- permanent magnet with release
- vacuum head
- inflatable pipes
- cap-type for lipped and lipless bottles
- suction cup

These are multifunction heads designed to handle not only the product but also other related elements such as empty pallets, plastic or cardboard interlayer pads, display trays etc.

Its broad range of traditional palletizing equipment allowed SIPA to realize the full potential of solutions for product feed and layer preparation in order to meet any positioning need in any operational setting.

Main characteristics and advantages

- **Flexibility.** One of the main features of this type of solution. It can handle any type of container under any conditions and serve multiple lines at the same time. The Multihead versions (equipped with head-change), can even handle completely different product lines (for example, packs and loose containers) using the same pallet island.
- **Footprint.** The Robby system allows for solutions with a very reduced footprint and, thanks to the compact, flexible robot body, it easily adapts to working areas of any size and layout, including pre-existing lines.
- **Modularity.** Robotized applications can be modular and integrable by combining a number of applications with different functions, custom configurations can be created to meet a wide range of needs.
- **Convertibility.** Robby can be relocated or converted easily in the event the installation needs to be modified in the future.
- **Reliability.** Movements are extremely precise and consistent.
- **Speed and Efficiency.** Thanks to the possibility of creating the best configuration and optimum control, cycle times are much shorter. As a result, the system can be applied to a wide range of production speeds, including high end.
- **Maintenance.** Reduced maintenance costs thanks to high product industrialization.
- **Size change.** The time required for size change is very short, both for product format and head change (possibility of automatic release system). Pallet layout can be modified by simply reprogramming from the control panel.
- **Environmental impact.** Using the robot arm significantly reduces the number of traditional mechanical components and, as a result, product noise levels.
An extremely complete solution to handle different types of containers and products. Thanks to its versatility and reliability, it is one of the most widely used on medium and high-speed bottling lines. This configuration can use the following head types:
- halving platform for packs and cartons
- jaws and hooks for plastic crates with and without windows
- magnet with release for tin containers or those with metal lids
- vacuum head for uniform, stable packs (e.g., packs of cans)

When required (for speed reasons, type of product etc.) the FastLayer robotic layer preparation with active pack orientation can be included.

Robby Pal layer handling applications are extremely flexible and can be designed to palletize a range of pallet sizes as well as half- and quarter-pallets.

Products that can be processed:
- Packs
- Cartons
- Crates
- Cans
- Tin containers

A) Multifunction gripper head.
B) Vacuum gripper head.
C) Magnetic gripper head.
D) Layer preparation area and robot with jaw head.
E) Robot with halving platform.
This type of pick-up is suitable for low- and medium-speed lines, but also to handle special shape or large containers. The size and shape of the grippers have been designed on the basis of the type of container or package to be handled.

On this type of equipment, accessory devices can be integrated into the product gripper head (for example, interlayer or empty pallet grippers) which greatly reduces the amount of required space. In traditional palletizing systems, this equipment is normally separate and occupies a significant amount of space.

Products that can be processed:
- Packs
- Cartons
- Crates
- Big size bottles

A) Close-up of pliers-type gripper.
B) Configuration for plastic crates with independent sector gripper.
C) Configuration for 5 l PET bottles.
D) Configuration for cartons.
Robby Pal
Multihead and loose product palletizer

This configuration is used to palletize both filled and empty loose containers in glass or PET.

Head types that may be used in this configuration are:
- cap-type for lipped and lipless bottles
- row pliers-type
- inflatable pipe
- vacuum head

If required by the application, self-adjusting heads can also be provided to handle special products or products in various sizes.

For this type of application, the row infed and preparation area is extremely important because often the equipment handles products that are especially unstable or delicate.

Palletization may be carried out directly on the pallet, or cardboard or plastic display tray.

Products that can be processed
- Loose PET bottles (filled or empty)
- Loose glass bottles (filled or empty)
- Jars

These applications can be integrated into MULTIHEAD solution a single palletization island that can handle a variety of products utilizing two different layer prep zones and two different head types, one for packs and the other for loose bottles. The robotic arm is positioned in the center and, thanks to a rapid head change system, can comfortably work with the current layer prep to palletize the type of selected product.

Thanks to their versatility, robotized applications are fully suitable for “special” operations, such as decanting system, bottle transfer, product pallet configuration, checking for empty pallets etc.

A) Palletizing filled loose PET bottles on displays.
B) Multihead configuration for packs and loose bottles.
C) Close-up of filled loose PET bottle gripper head.
D) Loose glass bottle decanting system.
E) Close-up of self-adjusting row gripper head.
This application is particularly suitable for handling 3 and 5 gallon bottles. SIPA first presented this configuration in 2000 and since then has acquired significant experience in handling a range of 5 gallon bottle types, including round, triangular and rectangular. Numerous types of racks have also been utilized in both metal and plastic, and palletization on pallets completes the configuration options for this type of application.

Its 6-axis robotic configuration is especially good for complex movements, making it extremely suitable for handling “special” containers and packages, including large-sized ones such as canisters, drums, kegs etc.

Again here the heart of the application is its head designed for optimum gripping during the entire handling process, without damaging the container in any way. Depending on the installation speed, multiple heads can also be mounted in order to handle a number of containers simultaneously (from 1 to 10 during racking of full 5 gallon bottles) with the choice of robot model based on the weight to be handled.

A modular gripping system has been designed to provide for interchangeability of the grippers as the installation evolves over time.

For these operations, movement precision, reliability and consistency are fundamental, but there are also safety measures against unforeseen problems, such as damaged or defective racks. In these situations, the internal safety program stops the machine before the installation is damaged.

Robby Rack may be used for either depalletizing or palletizing lines, as well as in combined cycles to simultaneously empty and fill the rack. If required by the application, self-adjusting grippers to handle special racks or ones of different size can also be supplied.

A) OP-crate palletization.  
B) Handling triangular 5 gallon bottles.  
C) Palletizing cycle with 10 filled 5 gallon bottles.  
D) Self-adjusting gripper head.