

Palletizing Solution

Universal Case Handling™ – Flexible Palletizing

Basic Description

FANUC Robotics developed Universal Case Handling, an innovative patented* process, for robotic 3-Servo Mixed-or-Fixed Size Product Handling EOAT (End of Arm Tooling) assembly. Using proven methods of material handling, integrated with a FANUC Robotics' robot, uniquely combining three servo-actuated motions to provide flexibility in handling mixed or fixed sizes and shapes of products (i.e., cases, bundles, etc...).

Technical Description

The servo-driven motions allow the EOAT to securely handle multiple product sizes, enabling mixed load palletizing and accommodating product changes under program control with no manual set-up required beyond initial product definition. Typically, but not always, the product is on a set of conveyor rollers or lifted up on a set of rails to allow underneath access by the EOAT rails. The EOAT handles the product by using a set of rails that support the product underneath and a servo-driven pusher that forms a rear support and extendable pusher function. The EOAT incorporates servo-driven top segmented-paddles, or fingers, that lower onto the product; thereby, applying the force necessary to secure the product between the top fingers and the bottom rails. This combined motion/force allows for secure handling of the product during pick-up, in-process handling, and final placement

FANUC Robotics' Universal Case Handling, the Solution for -

Mixed-or-Fixed case sizes:

- Min size 50 x 50 x 150 mm.
- Max size 660 x 660 x 660 mm.
- Weight to 30 kg.

Any product supported underneath (i.e. Cases, Bundles, etc...)



Overall Tool Size: 710 x 1020 x 950 mm / Dry Weight: 130 kg
Shown in blue with largest to smallest product size

Features

- The EOAT can be automatically pre-sized in three dimensions to accommodate a wide range of product. This allows the EOAT to re-configure itself prior to product pick up by pre-sizing the EOAT handling components to be "just open over the size of the product" for product pickup. Likewise, the EOAT can reverse itself by automatically releasing the product by "just opening over the size of the product" during a product placement. This allows for quick securing and releasing of the product to minimize cycle-time.
- The flexibility of the tooling to "size itself" to within the confines of the product, allow for product against product placement to build layers of product. This feature is extremely valuable in mixed case pallet building.
- The coordinated motion of the servo-driven pusher arms, working simultaneously to the motion of the robot to withdraw the forks/rails from underneath the product and the releasing of the product by the top segmented-paddles, provide quick and smooth product placement.
- The servo-driven top segmented-paddle can be configured to apply varying force (through motor and drivetrain feedback) to limit the securing force on the product.
- The servo-driven motions are part of the robot. They are auxiliary axes of the robot and are integrally controlled by the robot. The servo-driven units are compact, sized for continuous operation, have smooth operation, and powerful braking actions. The controllability of the units makes use of FANUC Robotics' advanced servo software. The units have high-resolution pulse coders to enable precise position.
- Sensing is incorporated to monitor product presence and is used in conjunction with robot error recovery routines to quickly assist in establishing handling status allowing for efficient recovery from stopped conditions

Robot Models

Universal Case Handling tools can be mounted on many FANUC robots including:

- FANUC M-410iB Series
- FANUC R-2000iA Series
- FANUC M-900iA Series

Currently featured on the FANUC M-410iB/160 robot.

*US PATENT PENDING

Functionality

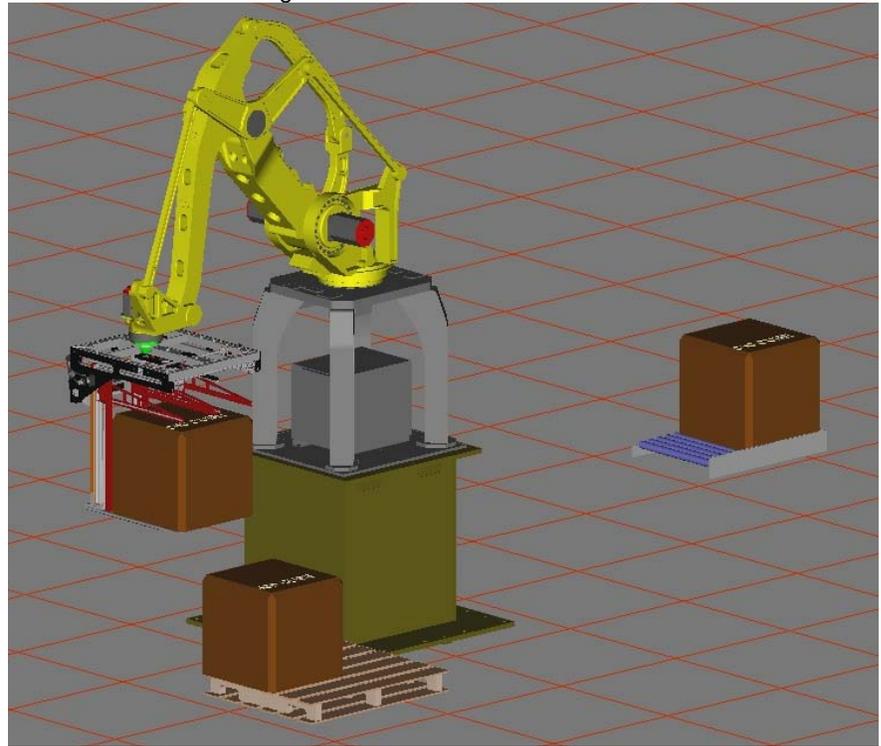
- Servo Motion 1 - The rails that support the product during transfer use a combination of fixed rails (or fingers) and outer moveable rails. The rail spacing is sized to accommodate the smallest product size; typically this means one or two fixed center rails and two moveable outer rails. The two outer rails are servo-driven sideways (from the center fixed rails) to allow for pre-sizing of the product; inward for the smallest of products and then outward to the largest product size. By doing this, the rails and outer rail supports never overhang outside of the product (front and two sides); thereby, making it compact to minimize clearances during pick-up or placement.
- Servo Motion 2 – There are pusher fingers (one per rail) to “push-off” the product, simultaneous to the robot motion to withdraw the bottom rails (allows for quicker overall cycle-time by not waiting for the rails to withdraw before moving the robot. The robot is in motion while the product is being removed from the rails). The pusher motion, in conjunction with the coordinated withdrawal of the underneath support forks/rails, provide for a smooth motion which allows the product to settle down into its place position. The pusher arms also allow automatic sizing to provide “just the right size opening” prior to product pick-up, which allows quicker cycle-times.
- Servo Motion 3 – The servo-driven top segmented-paddles move up and down to provide pre-sized opening for the product. When product is picked, the top paddles move to secure the product against the fixed rails under the product. When product is placed, the servo-driven top segmented-paddles raise “to just clear of the product” allowing the product to be released. These top segmented-paddles have the unique ability to move with the outer rails, while still providing clamping at the center fixed rails. This feature allows continuous capturing of the product across the entire width of a product at the center and at each end of the product (or anywhere in between) allowing for more secure handling. It is still one servo-driven motion. One distinct advantage of having the top segmented-paddles is that they move inward (or outward) in unison with the rails which prevents any overhang of the EOAT beyond the product (front and two sides); thereby making the EOAT compact enough to allow placement of cases against cases.

Included in Packaged Solution

- FANUC M-410iB/160 Robot
- Cabling Dress For robot arm only
- Tool with Servo motors and cables
- Assembly of all components
- Custom Universal Case Handling Gripper Control Software macros
- Custom Universal Case Handling Teach Pendant Screens
- Aux Axis Configuration
- Tested and Ready for System Integration
- ROBOGUIDE® Basic Cell; configured with 3D model. (provided after order placement for workcell development)
- Packaged part number **MO-6091-400-APS**.

Options Priced Separately

- Custom Software
- Customer Specific Processing
- Work Cell peripherals
- Mixed Case Palletizing (MCP) Plug-in Software
- ROBOGUIDE®-HandlingPRO™



Intelligent Robot Solutions

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