PalletSolver
Обзор

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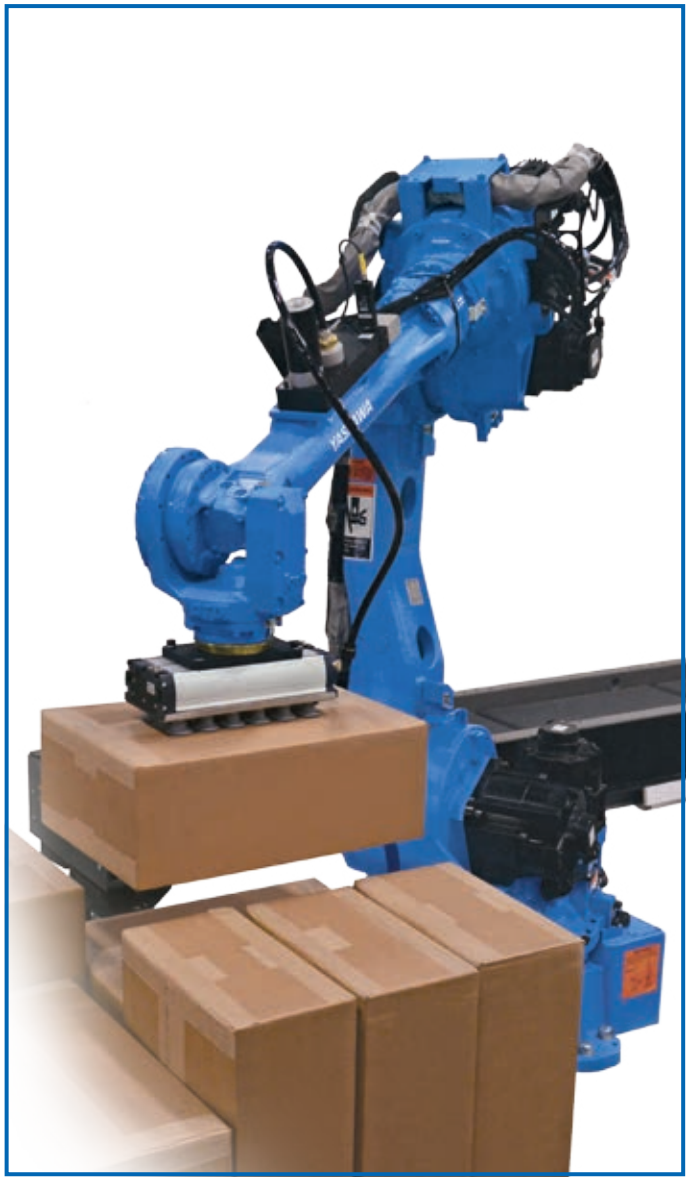
YASKAWA

PalletSolver

Palletising Software for MOTOMAN robots

PalletSolver is a revolutionary robotics palletizing software suite for MOTOMAN® robots. This feature-rich software is designed for homogeneous palletizing with two primary objectives:

- Enable fast development and integration of robotic palletizing system through user-friendly configuration, setup and customization.
- Facilitate system uptime without compromising production throughput through intuitive operator-friendly interface.



PALLETSOLVER SOFTWARE SUITE HAS TWO COMPONENTS

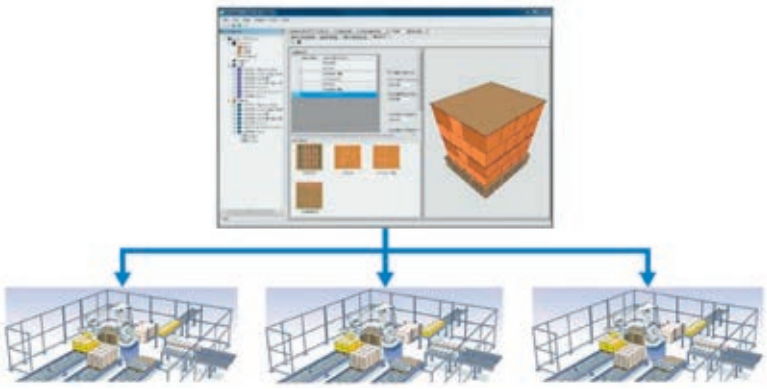
1. PalletSolver-PC – an offline pattern generation tool that resides on Windows®-powered PC.
2. PalletSolver-Engine – includes robot control programs, motion planning and I/O maps that reside on the robot controller DX200.

KEY BENEFITS

- Intuitive user interface with guided pattern file generation steps
- Virtually unlimited products
- Support for all common gripper types
- Dynamic gripper zone configuration changeable for each cycle
- Support for multiple cells
- Interference constraints per station to ensure quick changeover without halting production
- Import pallet patterns generated by TOPS or CAPE software
- Export / import cell and gripper database that can be shared between projects
- 2D layer and 3D build pictures generated to help with drop box recovery
- Pattern Generation Tools such as Label Positioning, Snap, Placement Spread, Auto Gaps, Pallet Overhang/Underhang, Centering, Calculated Weight and Height of Build

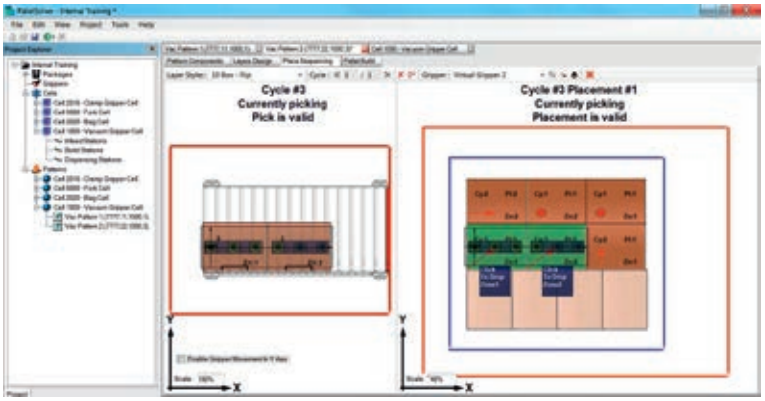
PalletSolver-PC

As shown in the diagram on the right, the build pattern recipes are generated offline using PalletSolver-PC and are stored in network storage that is accessible by the robot controller, or stored locally on the PC used to host the software. The pattern files can be downloaded via Ethernet using a parser, which will populate controller variables. The pattern files can also be copied to a CompactFlash card or USB storage media and be loaded with the robot teach pendant.
During production, when it is time to switch the pattern file for a particular line, an operator simply selects the file identified by the Product ID and Pattern ID, and downloads it to the robot controller. While the cell is executing, status is provided for all build stations, and errors are reported to the programming pendant or made available to the customized operator interface provided with the turnkey system.



PalletSolver-PC Screen

PalletSolver-PC software provides a key benefit of quick changeovers without halting production for validating pattern files. This is achieved by incorporating physical cell constraints of the work cell – such as distance between pallets or infeed stations, and interferences with neighboring objects or other build stations. Thus, the sequence for each pattern file is optimized based on constraints associated with that particular station ensuring the maximum production rate for each work cell.

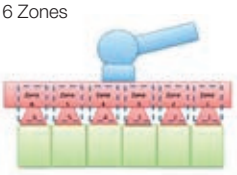


All Common Gripper Types Supported

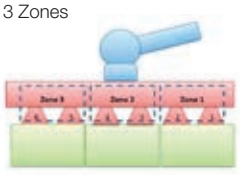
A gripper can be configured to have up to 32 grip areas. Each grip area is controlled by a set of I/O to grip, release and blowoff. These grip areas can be grouped into zones (maximum of eight). A key benefit is that the gripper can dynamically change its zone configurations for each infeed, depending on what size of box needs to be picked up. Refer to the following example:

Example of Gripper with Six Grip Areas

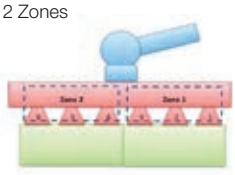
Infeed 1 Virtual Gripper
6 Zones



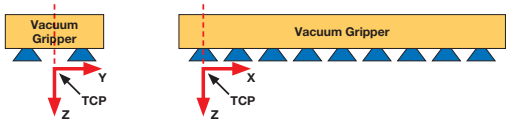
Infeed 2 Virtual Gripper
3 Zones



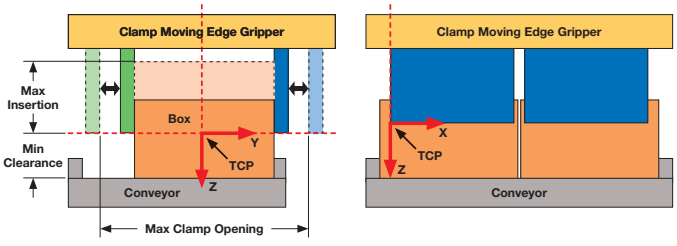
Infeed 2 Virtual Gripper
2 Zones



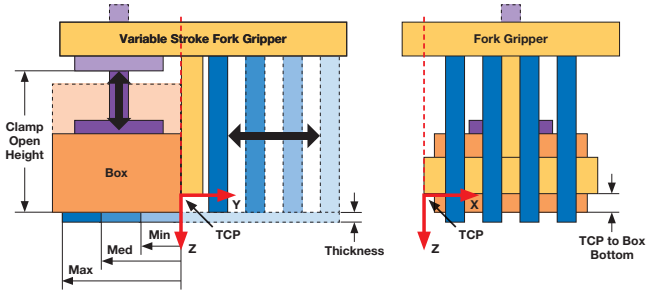
Vacuum Gripper



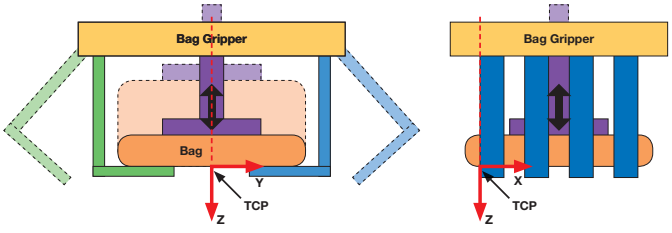
Clamp Gripper (Fixed Edge & 2 Movable Edges)



Fork Gripper (Retractable & Variable)



Bag Gripper



PALLETSOLVER

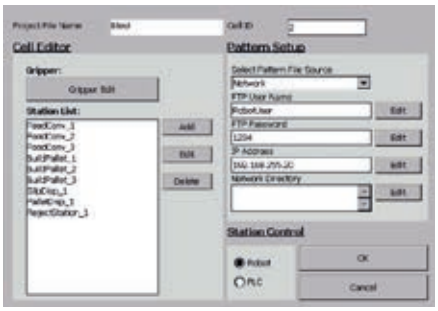
PalletSolver-Engine

The PalletSolver-Engine portion of the software has a modular design with detailed attention to customizability required to tailor each palletizing system. The PalletSolver software runs on the controller. This platforms is open for easy customization.

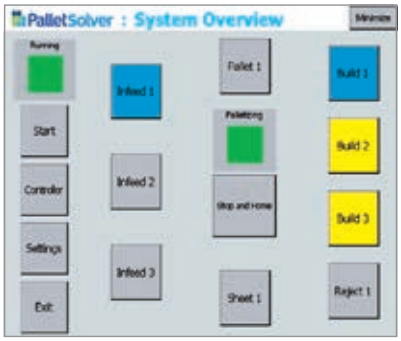
PalletSolver setup is accomplished with a series of simple steps. Screens are provided for each infeed, build and dispenser station to enter pertinent data. Only a user frame must be taught for each station. During execution, the palletizing software will automatically generate all motion points for each cycle of the build.

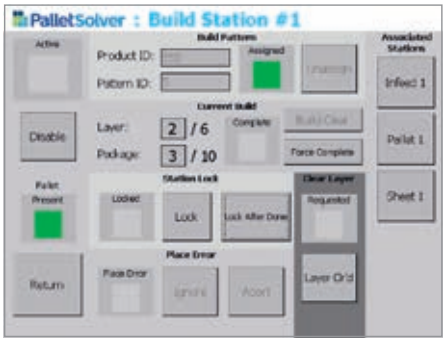
PalletSolver-DX200 Setup Screens

Operator interface screens are provided to control and monitor every aspect of the palletizing operation. Different options are available for sequencing the infeeds, which include round robin, priority, ratio balancing and override. There are also options on handling end of production to purge an infeed that doesn't have enough boxes for the next pick or for completing partial builds. The cycle rate is optimized by adjusting travel heights to cross over other builds as their heights increase. The speed for every segment of the motion profile can be uniquely set for each product being cycled. If a box is dropped during the cycle, a fault recovery screen can be accessed with different options on how to proceed.



PalletSolver-DX200 Control and Monitoring Screens





Features of PalletSolver-Engine

- System Configuration – Maximum
  - 8 In-feed
  - 8 Build stations
  - 2 Pallet dispensing stations
  - 2 Slip-sheet/abort dispensing stations
- Dynamic robot path adjustment to ensure optimum production rate
- Pre-Mapped I/O to communicate with PLC/supervisory control for status and monitoring
- PLC – Robot messaging interface for operations control
- Intuitive guided setup and configuration using robot pendant HMI
- PLC-less operation in case robot controller is the only controller
- Network-enabled for importing of pattern files
- Granular control over palletizing operations
- 4 sequencing options for infeed pick cycles: round robin, priority, ratio balancing, override
- Automatic reject of parts with no operator intervention
- End of production handling
- Adjusting pick-place depth as package changes due to environmental conditions
- Integrated customization library – customize applications for unique gripper handling, error handling or pick-place handling
- Support for vacuum, clamp, fork and bag grippers
- Gripper I/O capacity: 8 zones, 32 grip areas, 32 sensors
- 3 dropped box recoveries: re-pick, continue, abort
- Pick and place height adjustments for each station
- Reject drop station – automatic drop box recovery (with no operator intervention) by removing unwanted boxes still in gripper

Minimum Requirements Offline

- Microsoft Windows XP Service Pack 2.0 or Windows 7
- Microsoft .NET Framework 3.5
- 400 Mhz processor, Recommended 1 Ghz
- 128 MB of RAM, Recommended 1 GB
- 30 MB Hard Disk Space
- 1280 x 1024 Screen Resolution

Minimum Requirements (continued) DX-Series

- Controller software with MotoPlus™ support DX200
- Programming pendant
- Industrial-grade CompactFlash Card or USB Flash Drive with minimum of 256 MB available space

PalletSolver

Part Number	Description
175174	Software Pkg, PalletSolver, PC (Offline Pattern Generation Tool)
175175	Software Pkg, PalletSolver, DX200

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