



Product specification

PickMaster™ 5

Industrial Software Products
Version 5.00



ABB

Product specification

PickMaster 5
Industrial Software Products
Version 5.00
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Revision -

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Overview

About this Product specification

It describes the performance of the PickMaster 5 in terms of:

- Application environment setting
- Basic concepts
- Ease of use of the software application configuration
- Interactions with peripheral equipment
- Robot operation and controls
- Software options and licenses.

Users

It is intended for:

- Product managers and Product personnel
- Sales and Marketing personnel
- Order and Customer Service personnel

Contents

Please see Table of Contents on page 3.

Revisions

Revision	Description
Revision -	New Product specification

Complementary Product specifications

Product specification	Description
PickMaster user documentation	Application Manual - PickMaster 5

Overview

1 Welcome to PickMaster 5

1.1 General

Overview

Thank you for your interest in PickMaster. This document will give you an overview of the product characteristics and how it can be used. PickMaster is a PC-based application software from ABB aimed at designing and running IRC5 robots in packaging and material handling applications. It will save both engineering and commissioning time in putting the palletizing process into work as well as it will save costs by reducing the amount of peripheral equipment as well as complex PLC code.

PickMaster 5 is the latest member of the PickMaster software concept. It is used for offline or online configuration of palletizing applications and runtime control of PC-independent processes on the robot controller. Multiple controllers and robots can be designed in the configurator and simultaneously downloaded to connected controllers.

A palletizing cell is characterized by a robot with single or multi-head grippers, work areas used as feeding areas for pallets, products, slip sheets, etc.

PickMaster benefits

- Comprehensive application oriented software
 - Configuration of palletizing lines for one or more robots
 - Integrated pallet pattern generator
 - Integrated expandable data base for products and patterns, grippers
 - Easy change or addition of new products in an existing line
 - Fast transfer of the application to the robots over Ethernet
 - Integrated search functions for stack heights
- Application Process efficiency
 - Integrated fully automated station logics and cell operation (LFC) provides unrivalled high flexibility of simultaneous production of many stacks and many feeder stations, which saves costs peripheral equipment
 - I/O interfaces for stations and multi-gripper control
 - Optimized robot operations on each station including pickup and place of one or more boxes at a time
 - Highest robot performance through pre-fetch of next operation simultaneously with the robot motion
 - PickMaster Operation Panel on the FlexPendant

- Minimal cost of ownership
 - Standard Software offering risk reduction through product-based repeat solution, configurable for a multitude of operational cases
 - Globally support by ABB
 - Highest enhancement flexibility through open RAPID code
 - Full offline capability including full application simulation in RobotStudio
 - Introduction

A palletizing application aims at picking larger size objects from a fixed position and to stack them together tightly in a second fixed position. An important parameter for the palletizing process is the speed of the process, i.e. the throughput of products in time and the efficiency to stack the products in a stable configuration without taking too much space. After the palletizing process the stacks are loaded into containers or trucks and the less space the products require, the less transportation costs are involved.

2 Introduction

2.1 Palletizing application

A palletizing application aims at picking container objects like boxes and cases from one or more stations and to stack them together tightly in a second station for further shipment. An important parameter for the palletizing process is the speed of the process, i.e. the throughput of products in time and the efficiency to stack the products in a stable configuration without taking too much space.

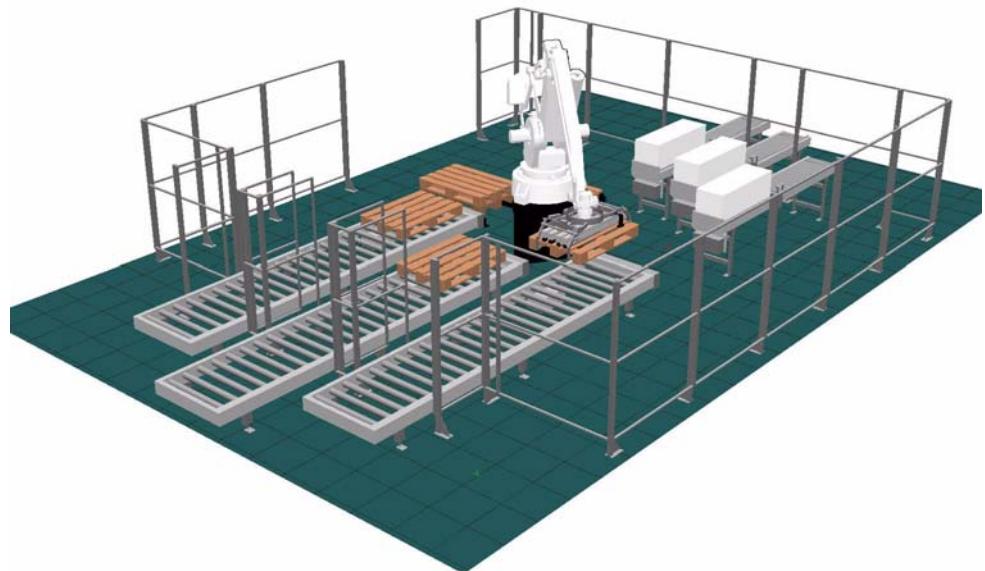


Figure 1 Typical palletizing cell with one robot and multiple in- and outfeeders.

A robot has the benefit of concentrating all palletizing to one cell where many different pallet loads may be produced simultaneously, for both high and low throughput demands, thus making the palletizing process flexibly adapted to many production situations. Therefore multiple infeeders and outfeeders are usually gathered around the robot, which enables parallel production of many different pallet loads.

Pallet pattern layout

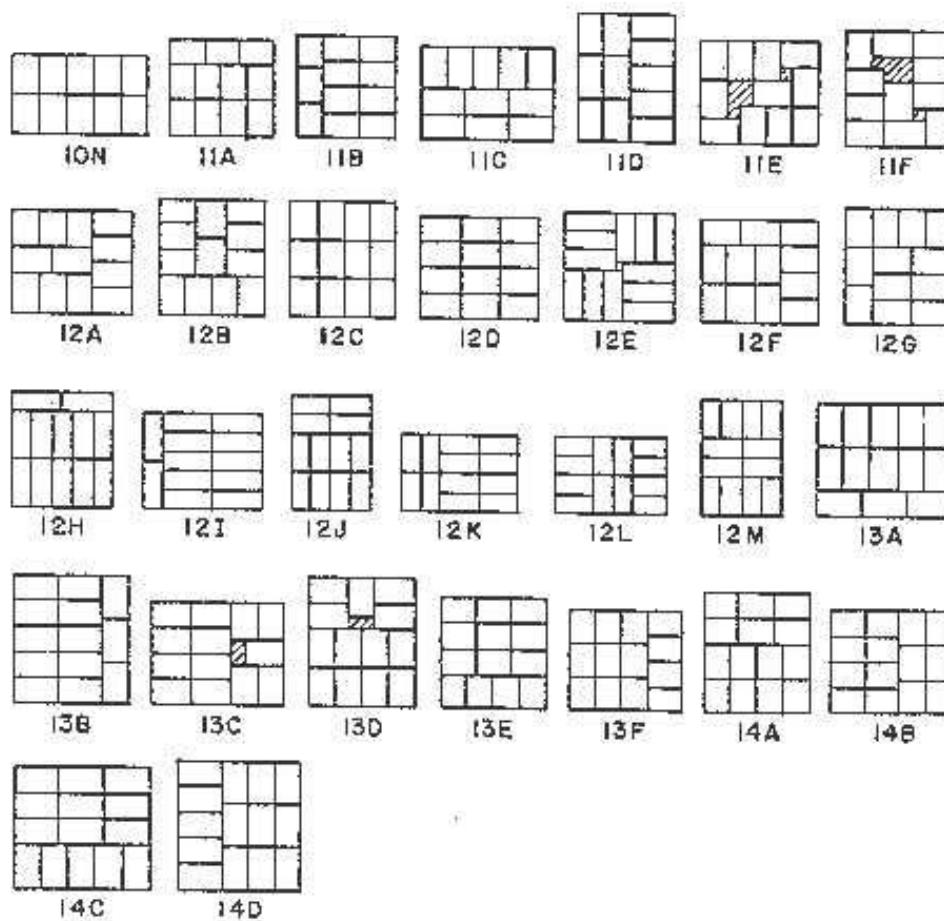


Figure 2 Typical pallet pattern layouts.

Software

PickMaster 5 is the software, which makes the creation of a palletizing process a comprehensive application oriented configuration task one gets both the benefit of the flexibility and minimal engineering costs for programming and trouble shooting.

Feeders

Additionally, if the production can be dynamically controlled, e.g. allowing pallet loads and products to swap between feeders based on instant production demands, the use of the feeders can be optimized. The number of feeders can be minimized and/or the productivity can be increased, which means lower costs per produced unit.

Logical Flow Control (LFC)

In order to achieve such a high efficiency, not having to rely on a predefined setup of dedicated products and pallet loads to given stations, PickMaster introduces an intelligent logical station control concept - the concept of "Logical Flow Control" LFC with built-in, automated intelligent order sequence control.

LFC sends order signals to the peripheral feeder control about what product to present on each product feeder and to the robot, where to get the next products from and where to place them. This standardized LFC-concept removes the need for advanced PLC programs to control the robot palletizing cell.

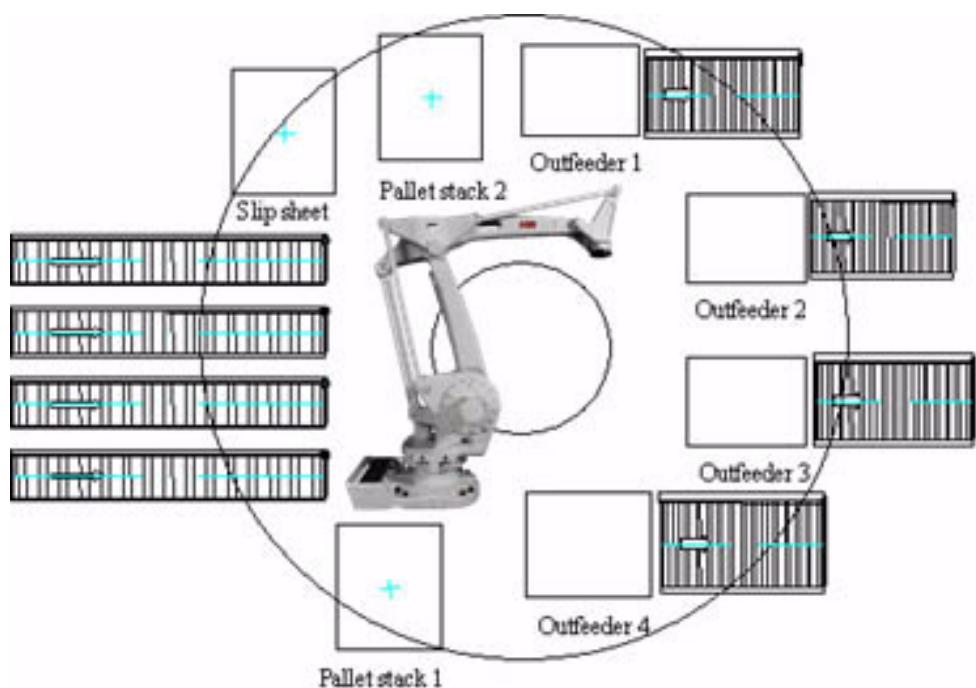


Figure 3 Robot cell with feeders and stack stations.

3 System overview

3.1 Introduction

Overview

PickMaster uses multiple hardware and software platforms in order to optimize the functions in each stage of the application life cycle.

3 System overview

3.2.1 Introduction

3.2 Product platforms

3.2.1 Introduction

PickMaster resides on three platforms

- Offline designer on a standard laptop PC
- Runtime execution on the IRC5 Robot Controller
- Operator's interface on IRC5 FlexPendant

Further, the software is well suited for simulation in RobotStudio.

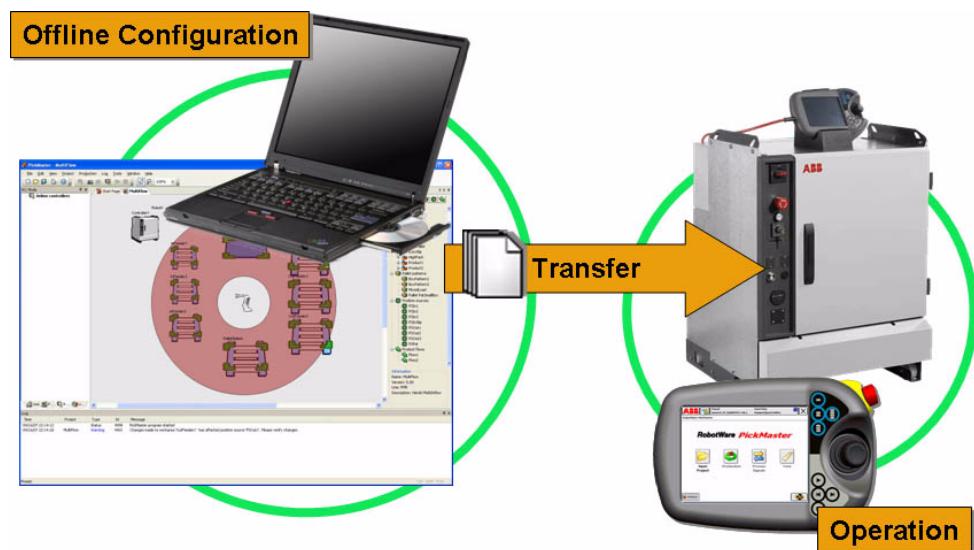


Figure 4 Overview of PickMaster platforms.

3.2.2 Application design

Configuration on standard PC

A PickMaster application is configured on a standard PC in a graphical design environment. All data including RAPID modules describing a PickMaster application is stored in Line and Project configuration files. The result is transferred as compiled setup-files carrying all necessary information to one or more IRC5 robot controllers over Ethernet.

Standard IRC5 backup function

PickMaster projects can easily be copied between different robots using the standard IRC5 backup functions. For this purpose, in order to support full PickMaster application recovery, the PickMaster Line and Project files are also transferred and stored in dedicated folders on the controller together with the setup files.

3.2.3 Operation

Runtime application

Once on the controller, the runtime application is self sufficiently able to start up and run on its own without the need for a PC online (Robot Controller mode, RC-mode).

PickMaster Operator's interface

On the FlexPendant, the PickMaster 5 operator's interface displays a list of all downloaded projects to select from and to start.

Commissioning work in PC application

All commissioning work, e.g. editing, changing, adding products is always done in the PC application. This may be done while the robot is in full operation with the PC connected to the Ethernet port or completely off line. When the change is completed, simply stop the ongoing project and download the application again, select and restart.

3 System overview

3.3.1 Introduction

3.3 Interfaces to peripheral equipment

3.3.1 Introduction

General

PickMaster 5 connects in a generic way to peripheral equipment which together with robot controller and robot forms the palletizing cell. PickMaster 5 defines the interface names and the rules of communication with the equipment.

3.3.2 Interface description

Runtime signal areas

During commissioning, the application is defined and edited from the PC application and the setup files are transferred over Ethernet to the controller.

In runtime, a well defined set of signals defines the communication with the stations. The following runtime signal areas are supported

Runtime signal areas	Description
Gripper	open, close and idle Activators grouped in zones, which addresses one or more activators at the time. Additionally, there is a set of sensors and activator signals, which can be addressed in relation to the robot operation on a stack. This includes also search operation interfaces.
Stations	Trigger signals define the ordering and acknowledge events or products by or to PickMaster 5. Group signals define the identity of individual products or product groups and the pallet loads. Further group signals define the numbers of products as well as their orientation
Execution	Triggering project launch from event connections through I/O.

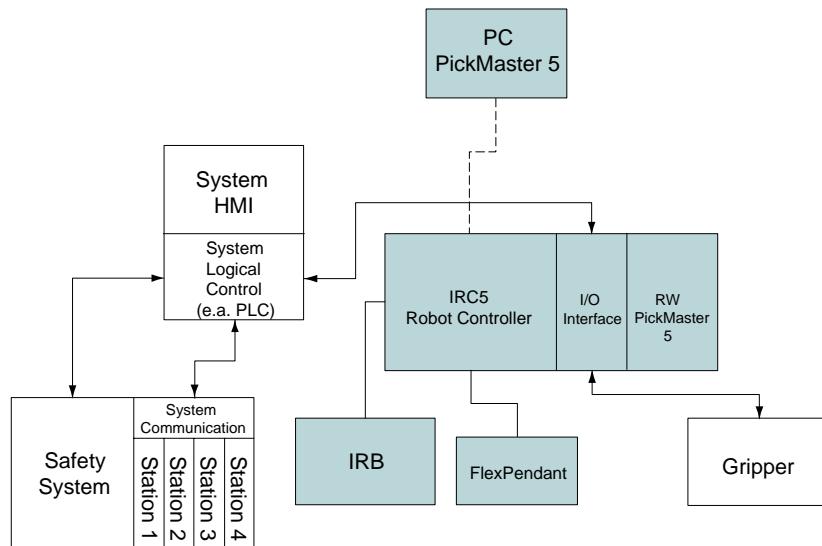


Figure 5 Hardware interfaces to PickMaster.

4 Application Scope and Coverage

4.1 Introduction

Application concepts

With PickMaster, a wide variety of application concepts for both palletizing and depalletizing in a multi-feeder cell layout can be configured.

A PickMaster 5 application is made for controlling palletizing applications, where a robot is picking up products and placing them in defined patterns. The products are presented on feeders and they are moved to other stations, which also may be feeders. This entire process also works in reverse and refers to depalletizing

Installation description

In an installation, there are many feeders, both in- and outfeeders, where the infeeders bring the products in, which shall be picked and the outfeeders are hosting the products where they are placed by the robot. A robot may be served by many infeeder and may be serving to many outfeeders.

Palletizing application

In a palletizing application, the robot is either gathering products to a specific order (palletizing) or distributing products from a specific order to product separation (depalletizing). One can say that palletizing is to create a new order of products and depalletizing to separate products from a given order.

For the robot to access the products, they need to be presented to the robot in areas, which can be reached by the robot tool. PickMaster is able to pick up one or more product from a feeder and to place them on a second feeder according to a configured pattern.

Working positions

PickMaster works with fixed predefined positions, which means, they have to be placed in given positions and orders. Most common use of infeeders is roll conveyors, which can push one or more products to a stop, but any other guides are possible solutions, like corner fixtures for slip sheet carriers.

Products may be presented either in one dimensional lines of multiple products side by side or piling up as stacks.

Product configuration - Format

A product configuration that can be gripped or placed in one move is called Format. A carrier may be able to present or receive different types of products, formats and patterns or stacks and it is possible to alternate between them in the same project, i.e. in the same production run.

4 Application Scope and Coverage

4.2.1 General

4.2 Production run cases

4.2.1 General

The following most important palletizing operations show the flexibility of the PickMaster process design capability. All the described combinations of pallet loads and processes may also shift dynamically between the available stations as long as the corresponding products and pallet loads are correctly allocated.

4.2.2 Type of pallet loads

General

It is possible to address monotype stacks of only one product type, mixed layout and even mixed product stacks. In mixed layout stacks, the same products are accumulated in different layouts per layer. In mixed product stacks, each layer needs to contain only one type of product.

The pallet loads may be designed to include the pallet itself or only the products and complete pallet loads including the pallets may also be stacked on top of each other.

Pallet load arrangements

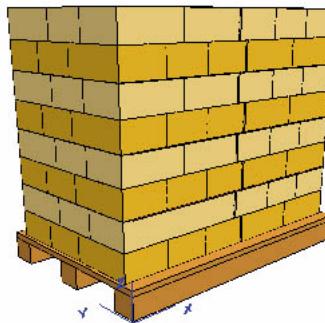


Figure 6 Mixed layout stack.

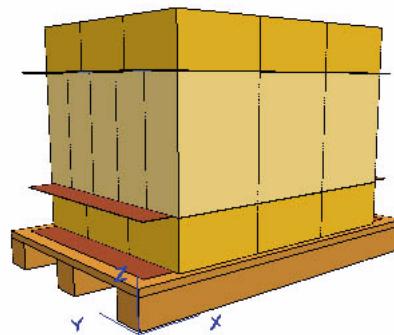


Figure 7 Slip sheets and mixed products.

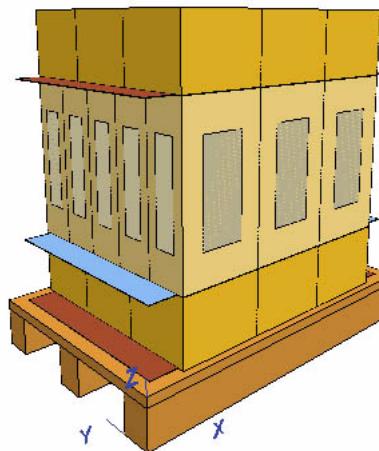


Figure 8 Preferred label orientation.

4.2.3 Product flows

General

The product accumulation or distribution is always accomplished by the combination of three-dimensional pallet loads and one dimensional product formats. The description is showing the big variation of product transfers or flows between feeders. The material flow directions are indicated by the arrows.

4 Application Scope and Coverage

4.2.3 Product flows

Mixed product infeed formats

One feeder may be enabled to carry one product or groups of products. The very same feeder may also carry different types of products and these different products and product formats are used to satisfy the defined order of the pallet load. This means that the formats may shift dynamically depending on the request from the pallet load.

The formats are either used to build the pallet load or they are placed by the robot when the pallet load is destacked.

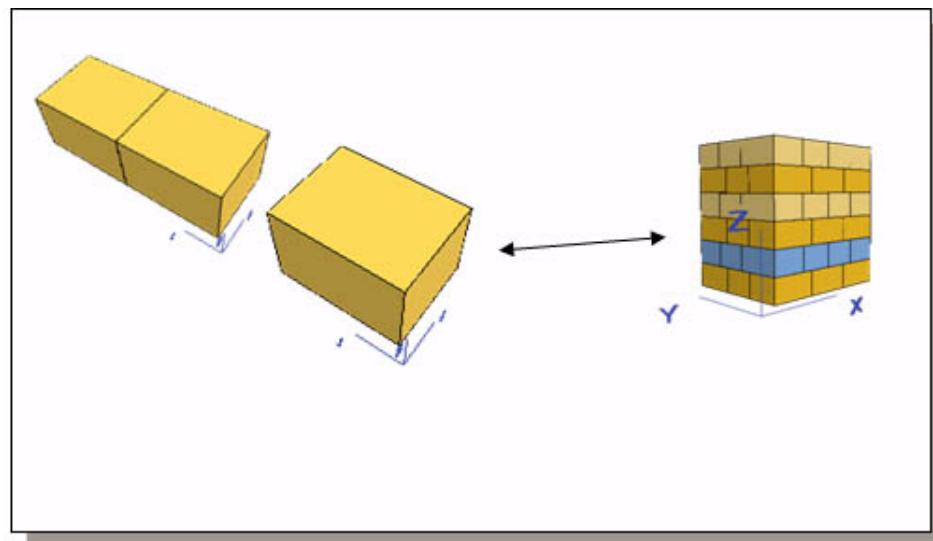


Figure 9 Mixed infeed formats.

One to one parallel production with separated in- and outfeeders

Parallel production of product feeders and pallet stations for simplifying the product flow and reducing complexity.

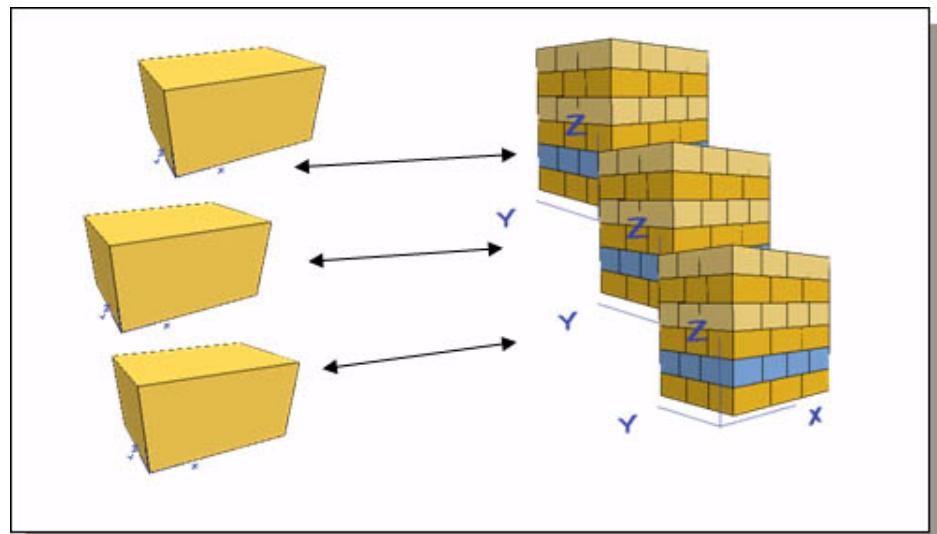


Figure 10 One to one parallel production.

Product distribution to multiple production stations

One feeder is used to serve multiple pallet stations. This is the case when a specific product is only presented on one feeder, but used by more than one stack. It is the same flow as when slip sheets or pallets are distributed from one stack to multiple pallet loads.

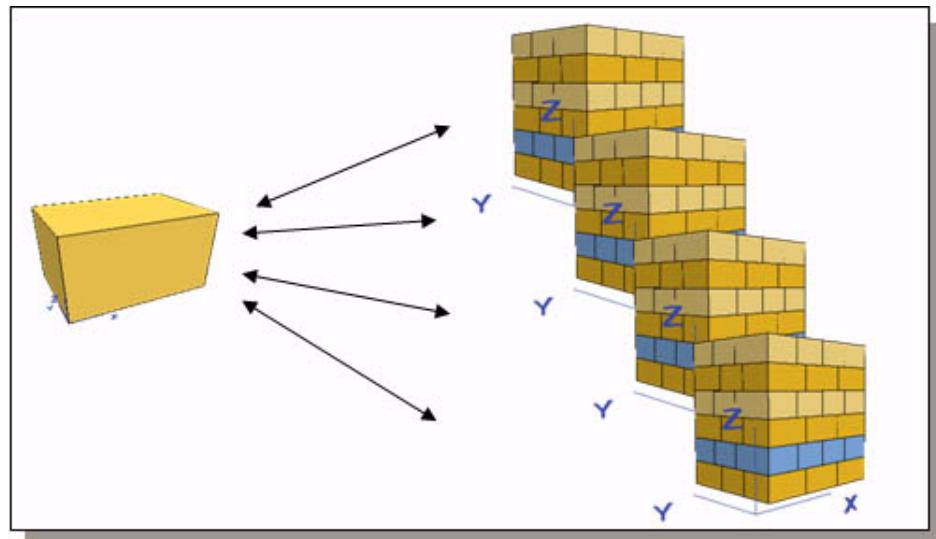


Figure 11 Product distribution to multiple pallet stations.

Mixing of multiple products to one stack

When different products are combined from multiple infeeders to one pallet load, this represents a mixing of products. It might sometimes also be the same product presented on different feeders in order to overcome long time delays for transporting the products to their presentation position. The first feeder that is ready will then be selected.

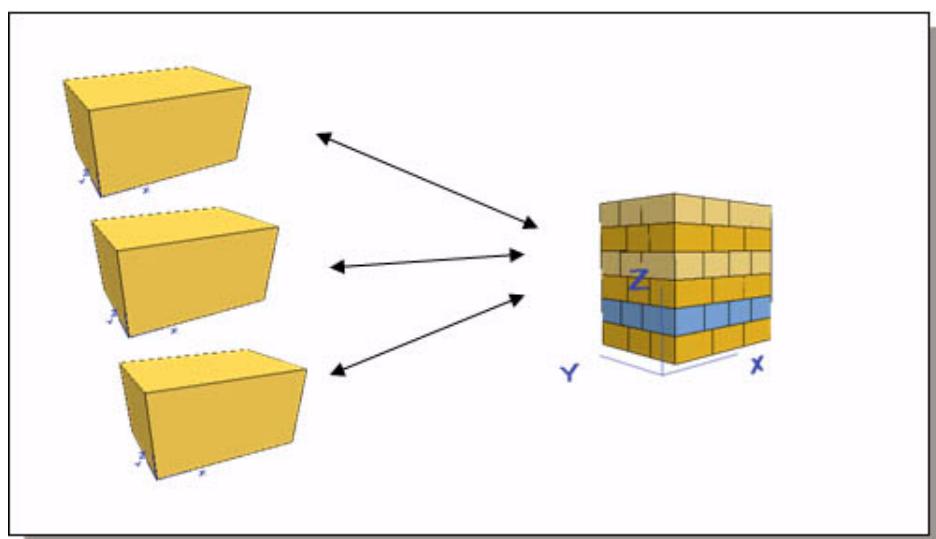


Figure 12 Mixing of multiple products to one stack.

4 Application Scope and Coverage

4.2.3 Product flows

Combination of concepts

All above flow descriptions may be combined and changed dynamically without restarting a project.

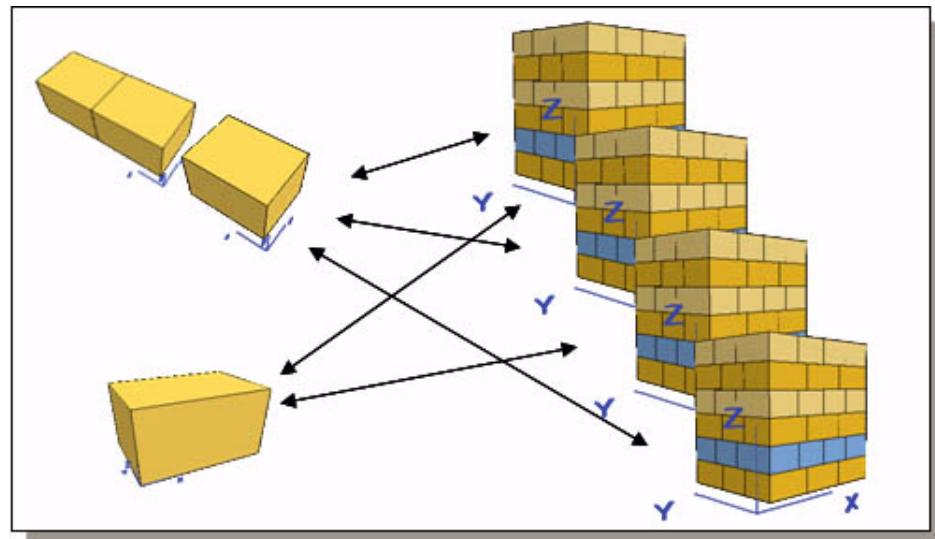


Figure 13 Combination of concepts.

5 Software concepts in PickMaster

5.1 Introduction

General

PickMaster is made for smart and effortless configuration of palletizing applications without the immediate need for functional and conceptual programming of the robot. The application oriented configuration concept solves a wide variety of application cases without the need for programming RAPID code.

This makes PickMaster the ideal tool for many material handling applications where material is moved between stations.

PickMaster supporting tools

PickMaster contains tools for supporting the entire process from design and description of equipment, as well as product and pallet loads, to the calculations of optimal robot operations and dynamic station logics. The PickMaster configuration is defined as user oriented application information, which is translated and understood as elements of a robotic movements and process interaction.

Source code template concept

The product covers a wide variety of typical cases and additionally secures full freedom of design and late adaptions in RAPID through a flexible open source code template concept.

5.2.1 Introduction

5.2 Description of software concepts

5.2.1 Introduction

General

On the PC the application is stored in PickMaster Line and Project files. These setup files follow the XML standard and may easily be transferred from one system to another.

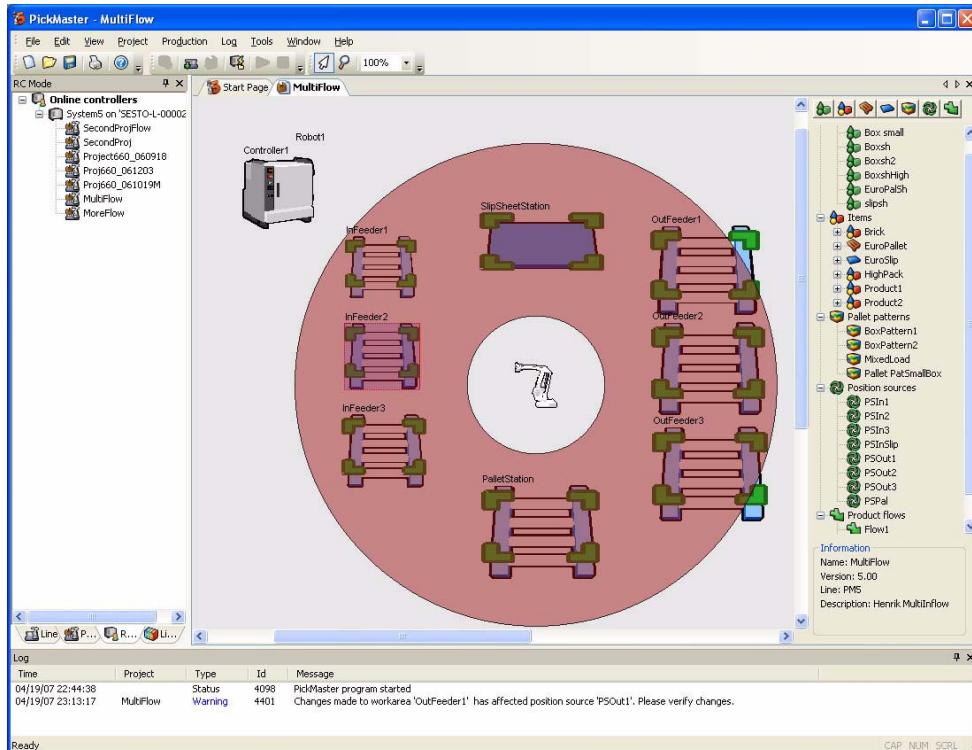


Figure 14 Project view.

Line concept

The line definitions carry all information which is related to the installation itself. It defines the robot controller identity, the stations, gripper and related application I/O control configurations.

Project concept

The project defines shapes, products, pallets, slipsheets, formats, tools, stations, I/O-mapping, layouts, patterns, operations and flow, i.e. everything related to the production and the actual use of the line. Many projects may be defined on the same line.

Controllers connected to PickMaster 5

A maximum of 32 IRC5 controllers may be connected simultaneously to PickMaster. PickMaster 5 supports all 4 and 6 axes ABB robots.

5.2.2 Task oriented definitions

With PickMaster the application is designed using the description of objects taking part in the process. The parameters describing the objects are used for influencing the process itself. Attributes like maximum allowable acceleration and speed are defined with each product and they limit the motion acceleration and speed of the robot when they are carried in the gripper.

5.2.3 Separation of geometry and process

The process components and result are described independently of the robot influence. In a second step they are combined with the robot placement, reach etc, which automates the sequences of picking up one or more products and placing them in one or more steps.

The independency of the geometry makes this part of the application description a generic one and therefore, other descriptions of products and pallet loads can easily be imported into the PickMaster form from other pallet load sources like 3rd party software or databases.

5.2.4 Flexible Gripper integration

Grippers are described in a generic way leaving it open to choose vacuum cup or mechanical arm grippers with sensors and to coordinate them with the robot motion and process.

5.2.5 Generic Station concept

All stations in PickMaster may be defined as in-, outfeeders or stack search stations. PickMaster defines a very generic interface concept with the stations leaving the details of how to accomplish certain formation completely open to the peripheral equipment control.

Each controller may define maximum 15 work areas or stations.

5.2.6 Pattern generator, selector and editor

Patterns may be either selected from a database or calculated in a number of alternatives based on available palletizing areas and product shape.

5.2.7 Database

A database is included for hosting predefined and new shapes, pallet patterns and grippers. The database can easily be used by other lines and projects.

5.2.8 Online/offline definitions

The PickMaster application may be defined completely offline or online with one or more controllers connected. Definitions in the controller, e.g. user frames, I/O signals and TCP's are selected in PickMaster. New definitions are made with the standard tools like in Robot Studio Online or on the FlexPendant.

5.2.9 Bi-directional process execution

Process execution and operations are easily inverted, which enables easy switching between palletizing and depalletizing.

5.2.10 Parametrized Path

PickMaster automatically calculates the optimal path for each stack and format. The result is defined as a parameters feeding data for a generic motion sequence.

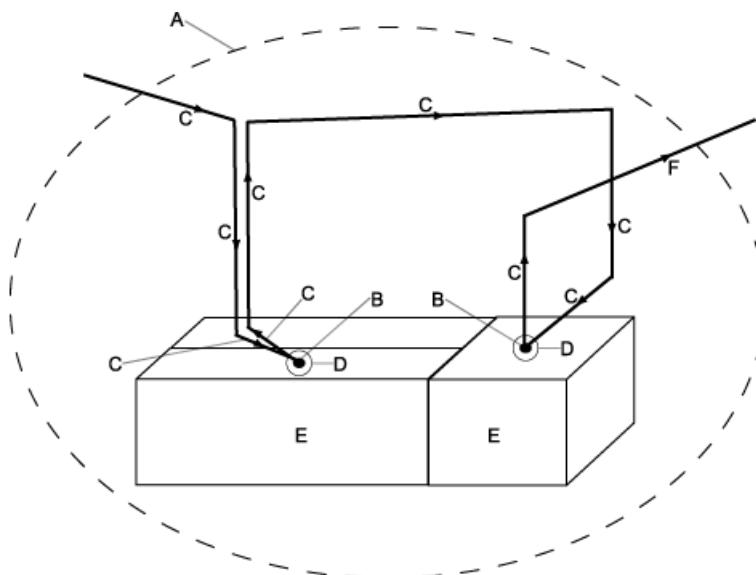


Figure 15 Parametrized robot operation.

Pos	Description
A	Operation
B	Targets
C	Actions
D	Event (in this case <i>Turn off the vacuum</i>)
E	Products
F	To next InterMid position

When applying automatic stack searching, a special search sequence will apply for finding the height of the stack, for feeding back the calculated number of layers, which may also be repeated periodically after a number of layers.

5.2.11 Logical Flow Control - LFC

PickMaster contains an integrated process sequence logics based on the concept named Logical Flow Control LFC, which enables a high flexibility for dynamically mixing products and pallet loads with a minimum of hardware cost and commissioning effort.

LFC is controlling the selection of pallet loads and product feeders at any time, thus preparing the process of providing products just in time for the robot to be ready to access before the prior operation was completed.

Running a PickMaster project means starting the flow concept and independently of that to launch the Robot Program.

A flow is described as containing one Master station and one or more slave stations. The master station dictates the product feeding on the slave stations. Flows may operate in parallel and a configurable priority concept controls the order of the master access.

With the Logical Flow Control concept, the user may instantly change a feeder for a product or a pallet load, thus making the installation very flexible and cost efficient. This means that LFC includes the ability to prepare products for showing up dynamically on different feeders.

5.2.12 RAPID Templates

RAPID modules are selected and saved with the PickMaster project. They may be downloaded with the project, but it is also possible to keep modules on the controller independently of the downloading of the projects. The RAPID code may be edited on the FlexPendant or on the PC and the result may be uploaded into the application again.

The RAPID needs only very little code for interacting with the PickMaster project where the complexity of the sequences and the target datas are hidden. The RAPID code does only need to execute simple generic loop code to ask the flow, operations, targets, etc for data to be used in generic move instructions.

The RAPID code is not generated or influenced directly by PickMaster. This means that a PickMaster palletizing process can easily interact with any RAPID code and other applications

5.2.13 Ordering a Production

5.2.13 Ordering a Production

PickMaster defines where pallet loads and products may be presented. In runtime, PickMaster only starts the project and the flows, which enables production on the appointed stations.

The decision to execute a specific pallet load is coming from the user's ordering system, setting the corresponding group signals on the appointed station.

PickMaster then directs the peripheral equipment to direct the correct products to the feeders to satisfy the pallet load's need

5.2.14 Simulation in RobotStudio

PickMaster may be simulated in runtime in RobotStudio . The PickMaster project is transferred to the Virtual Controller in the same way as to the real controller and the application is started from the Virtual FlexPendant.

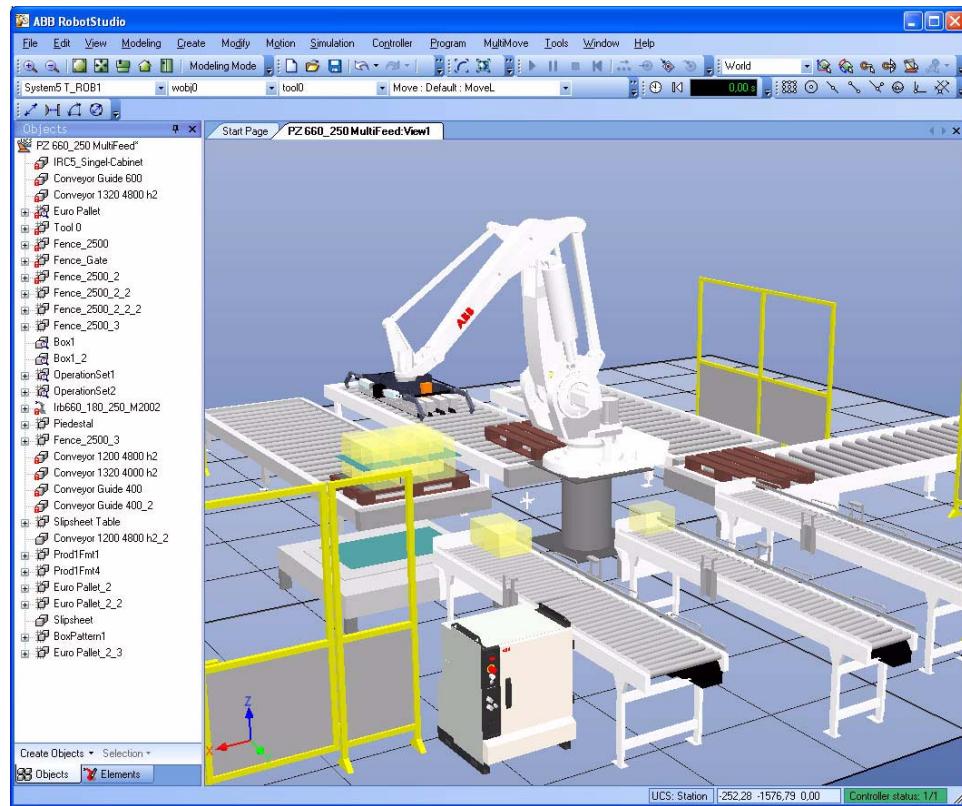


Figure 16 PickMaster 5 Simulation in RobotStudio.

6 Features

6.1 Design

General

The application designer resides on a standard PC under Windows XP Professional. It is a visual graphical comprehensive configuration tool which requires a minimum in programming needs, but yet leaves the door open for many customer adaptations.

Design Studio environment

Features	Description
Graphical concept	With line and project configurator
Design Studio application	With workspace area, symbolic line/project view
Online context-sensitive help	Is used for fast navigation through the use of PickMaster
	Separation of fixed line components and production related information in separate Line and Project files stored. The file format used is XML-format defining (*.pmline) and (*.pmproject)-files. This makes the configurations compatible with new versions of PickMaster.
	Interface mapping with export to spread sheet format. All station interfaces and their values defined in PickMaster are presented in a list, which is easily exported to spreadsheet formats. This specification may be presented to the line controller program designers and thereby removing the needs for knowing how to run the PickMaster.
Size of an installation	One robot controller can operate with up to 15 stations. One PickMaster may connect up to 32 controllers.

Design elements

Features	Description
Gripper	PickMaster is designed in a generic way to work with many different types of multi-grip tools. Parameters like size, position and size of separate activators and zones, event and check signals and sensors, fully integrated tooldata, gives full control over grabbing and releasing products as requested by the operations accurately synchronized with the path.
Shapes and Products	Independent definition of shape and products makes it possible to reuse the same geometric shapes for many products. The shapes are rectangular. Other forms are possible, but described as rectangular boundary shapes.
Dynamic data	The products determine by their dynamic data the movement of the robot when the products are carried. Thus, the robot will adapt to speed and acceleration limitations defined in the product.
Formats	The format definition belongs to a specific product. It determines the number of products and their orientation as they are gripped by the robot tool. The format also determines which part of the gripper that shall be activated for each products.

6 Features

5.2.14 Simulation in RobotStudio

Features	Description
Product Format and Feeder alignment	One-dimensional accumulation of products with either facing combined with the proper location relative to the gripper. The products may be aligned to the right or left.
Layouts and Pallet Patterns	Defined by the shapes of the products. They are pure geometric representations of the accumulated products on the pallet load. A pallet load consists of layers. Each layer is defined by a specific layout. A layout consists of one or more shapes and it may represent a product layer, a slipsheet or a pallet. Both 2D and 3D displays provide comprehensive understanding of the pallet loads.

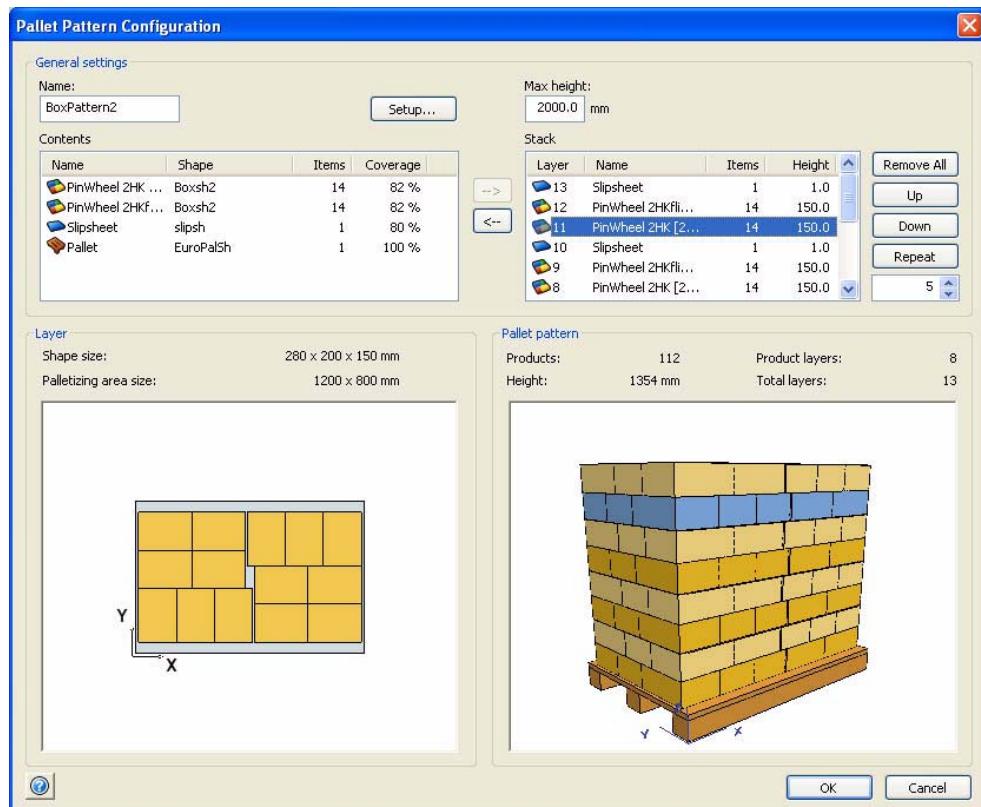


Figure 17 Pallet Pattern based on shapes.

A Layout may be defined by an automatic calculation or is based upon an existing layout in a database.

Layouts and pallet loads may be imported from the ABB/MultiScience Pallet-generator.

Features	Description
Pattern and stack operations	PickMaster automatically calculates the robot movements and gripper events for each situation in a pattern and a format.

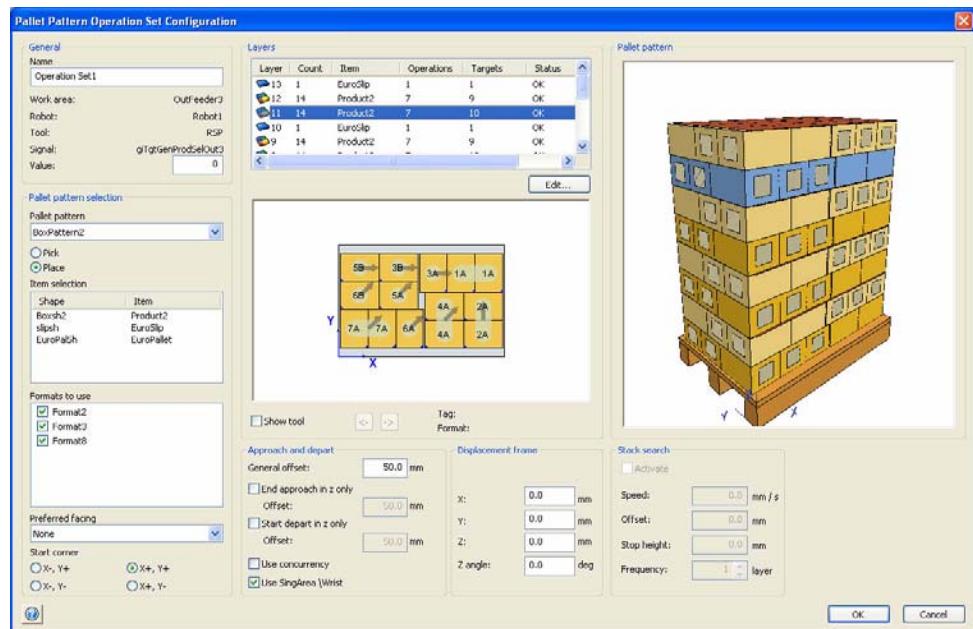


Figure 18 Operations.

Features	Description
Database	PickMaster 5 works together with a predefined database, where shapes, layers and grippers may be stored for use through different lines and projects. The database is preloaded with some elements at delivery.

Built-in parametrized robot movements

Features	Description
Automated stacks search	PickMaster 5 stack may be defined as search stacks, which means that the operations are adapted to search and store actual heights. This function defines a search operation in vertical direction, which works together with sensors in the gripper. The search operation may be configured to repeat itself after a given number of layers. The search is performed in vertical direction
Robot Station Operations	The robot operations are calculated automatically based on given parameters. The operations are applied onto formats or pallet loads. The operations are consistent and completed per layer.
Checking stack height	A RAPID function provides the current height of a stack. It may be used to make sure the robot does not crash into stacks, which are located between the origin and destination stations.
Intermediate positions	A preinstalled RAPID code calculates an intermediate position when the robot moves between stations. The intermediate position calculation may be modified to calculate multiple intermediate positions to avoid collisions with line equipment, other stacks or the robot base itself.

6 Features

5.2.14 Simulation in RobotStudio

Features	Description
Safe Pos	In normal operation the stations are approached from a varying height depending on the current size of the stack, but it is also possible to pass through a well defined position when entering or leaving a station. This is usually the case where there are stabilizing guides. It may be necessary for 6-axes robots to use Safe Pos for each station in order to define a given arm configuration for the robot.
	Preprogrammed RAPID-code for optional download at project transfer
Limitation of Pallet load height and weight	The stacks are supervised in design time to avoid excess height and load.

Line Logics

Features	Description
Integrated Logics: LFC	
Station control	
Gripper control	
Master / slave concept	
I/O Interfaces to peripherals	
Generic I/O definitions	They describe signals for trigger and acknowledge as well as ID for ordering products and stacks on the stations.
Activator and zone concept	For controlling multi-zone grippers, additional signals and sensors for mechanical grippers.

Transferable software

Features	Description
Backup	The complete PickMaster configuration is stored on the controller at transfer. It is therefore part of the standard backup of the controller.
Compatibility	Configurations secured for future new versions.

Application cases

Features	Description
Palletizing/depalletizing	The PickMaster palletizing process works in both directions, i.e. palletizing/depalletizing.
Mixed layers	Pallet stacks may contain mixed layers with different layouts and/or different products in different layers.
Mixed product in-feed	One entire layer must be completed in one operation description. It is not possible to "save" a product in the gripper for the next layer.
Process interaction	The PickMaster process is open to extracting data for customizing the robot operations. In most palletizing applications, this is not needed.

6.2 Operation

6.2.1 Introduction

The PickMaster 5 run time process is entirely located on the IRC5 Robot Controller for self-contained launch and operation. All application data is stored in the setup files which were transferred from the PC configurator.

The application is launched from the PickMaster operator's interface on the FlexPendant.

Open RAPID code is interacting with the built-in application leaving many openings to enhanced proprietary variations to the preinstalled default templates.

The integrated application solution takes care of the preparation of all execution data and the timely control of the stations.

The PickMaster user code uses dedicated data, functions and instructions to extract relevant information and to execute the simplest instruction loop with the robot move instructions.

6.2.2 Application control

The application is selected and launched from the PickMaster 5 interface on the FlexPendant. The operation is started by starting the flows all together or one at the time individually.

It is also possible to launch an application by a RAPID instruction, which can be connected to an I/O signal for remote control from a line controlling system. In this case the flows shall be configured for automatic launch.

The RAPID execution may be stopped and restarted at any time without loosing application data. The application will also persist when the Program Pointer is reset to Main. The application will adapt to the status of the interrupted ongoing operation and resume from there.

6 Features

6.2.3 Operator's panel on FlexPendant

6.2.3 Operator's panel on FlexPendant

The Operation panel has the following windows:

- Project selection
- Project start/stop and Flow start/stop
- I/O Signals
- Application Status



Figure 19 Operator's Panel Production screen.

7 Technical Specifications

7.1 Product content

7.1.1 Software Package

The PC software is delivered on a CD as an option. It may also be downloaded from the ABB Product site.

7.1.2 Licenses

The PC software is licensed through a Product Certificate, which enables one license to be requested for one PC. The PickMaster 5 PC software works together with robot controllers, which have the option Prepared for PickMaster/PickMaster 5.

7.2 Requirements and Limitations

PickMaster 5.00 runs with the IRC5 robot controller and RobotWare 5.09 or higher. It is approved for running all IRB types in general with the exception that IRB2400 and IRB4400 with Prepared for PickMaster/PickMaster 5 are offered only on request.

The PC application is verified on Windows XP Professional.

PickMaster 5.00 is not approved for running in a MultiMove configuration.

A maximum of 15 stationary work areas are possible per robot controller.

8 Specification of Variants and Options

8.1 PickMaster options

8.1.1 General

PickMaster 5.0 consists of the PC software and the RobotWare options on the IRC5 controller. The PC software is licensed per PC, which makes it able to interface any IRC5 controller that is configured with the Prepared for PickMaster/PickMaster 5 option.

The delivery content of a PC software license is an electronic license certificate document.

8.1.2 Basic options

Software

Option	Description
833-1 PickMaster 5 CD	<p>This option contains the PickMaster 5 PC design software with the online documentation. In order to enable the use of the PickMaster 5 PC software, one of the below PickMaster RC Mode options has to be selected separately.</p> <p>Physical items delivered with this option:</p> <ul style="list-style-type: none">• PickMaster software box

RC Mode licenses

Option	Description
834-1 Single design license	<p>This option contains one PC design license. This license enables the PickMaster design software to run on one PC. Without the license, it is not possible to save projects and lines and it is not possible to download PickMaster to a robot controller.</p> <p>No physical items are delivered with this option. Maximum ordering volume of this option is 2.</p>
835-1 Package of design licenses	<p>This option contains a package of four PC design licenses. Each license enables the PickMaster design software to run on one PC. Without the license, it is not possible to save projects and lines and it is not possible to download PickMaster to a robot controller.</p> <p>No physical items are delivered with this option. Maximum ordering volume of this option is 2.</p>

8 Specification of Variants and Options

8.1.3 PickMaster related Controller Options

The following options need to be ordered for the IRC5 robot controller operating with PickMaster. See also the related robot controller product specification.

8.1.4 RobotWare Option

Option	Description
642-2 PickMaster 5	Each robot operating with PickMaster requires the option PickMaster 5 on the IRC5 robot controller. The option contains all necessary functions to interface PickMaster 5. This option does not work together with MultiMove (604-1 or 604-2) and Conveyor Tracking (606-1)

8.1.5 Hardware options

Option	Description
716-1 VDC or 717-1 AD Combi	At least one digital I/O board or similar is required for exchanging signals between PickMaster and the robot controller. See hardware description for the number of signals required.

9 Documentation

The following documentation is part of the PickMaster product:

Documentation	Description
3HAC 5842-9	Product Specification PickMaster 5.0 (this document)
User Documentation	The PickMaster 5 user documentation, Application Manual - PickMasterTM 5, is available as HTML online help and as pdf-file together with the PC application software.

9 Documentation

8.1.5 Hardware options

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