

CIMflex



System Installation Guide

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intelitek▶▶

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CIMflex System Installation Manual
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1

Overview



Figure 1: CIM System

This manual provides instructions for installing the CIM System and is intended for an experienced qualified technician that has previous experience with the installation of automatic systems, such as robotic systems and CNC machines. In addition, the installation technician should be familiar with the operational procedures of the equipment.

Note: Issues such as the floor setup, electricity, network, pneumatic pressure, ventilation and so on are not described in this manual. Refer to the layout plans for your system and the documentation for each component.

This guide includes the general unpacking, assembly and installation procedures for the various hardware and software components in a CIM system.

These general descriptions together with the specific setup of your system will serve as a support for you to install your entire system.

This manual includes the following:

- 1 **Hardware Installation**, page 3, describes how to assemble and install the hardware components in your CIM system, such as the If there are any problems, fill out a report and send it to Intelitek.
 - Conveyor & Pallet Tracking System, Robots, Linear Slide Bases and Other Accessories.
 - **Stations**, page 32, describes the operational overview and installation of CIM stations.
 - **PC Network Connections**, page 49, describes how to set up the PC network in your CIM system.
 - **OpenCIM Software Installation**, page 51, describes how to install the OpenCIM software on the PC Manager as well as the workstation PC.
 - **Acceptance Testing Procedures**, page 53, describes the testing procedures required to verify that the CIM system is working properly,

Safety first:

Carefully read this manual and the user manual of each component, and ensure that you fully understand them before you start the unpacking or installation of the system. Read and observe all safety instructions for each component of the system.

If needed, contact Intelitek technical support.

This installation guide assumes familiarity with the installation, configuration and operation of each specific standalone product. This manual concentrates on the general procedure to integrate all components into a working CIM system.

Depending on the specific system configuration, relevant documentation is provided with each specific machinery or device in form of a technical note, user manual or curriculum. Additional documentation describes the specific system configuration.

Ensure that you fully understand these documents and if any changes are made to your system, be sure to update the relevant system specific documents accordingly. These documents should be available during installation and operation, and also for technical support requests from Intelitek.

The documents usually provided are as follows:

- **Layout Drawings:** Describes an option for the position of each machine and station.
- **Infrastructure Requirements:** Describes the requirements of the electric power line, LAN infrastructure, compressed air outlets and more.
- **PC and Table Requirements:** Describes the required computers and tables.
- **Test Application Description:** Describes the application to be performed for demonstration and acceptance test procedures.
- **Position Table:** Defines the positions used by the robotic program. Defined for each robot in each station.
- **I/O Table:** Describes the various input/output connections (digital I/O, RS-232) between different machines in a station (e.g., robot to CNC machine, etc).

If any of the documents listed here are missing, or if any further information is required, contact Intelitek's technical support.

2

Hardware Installation

This chapter describes the basic assembly and installation procedures of each of the hardware components in the CIM system. Your system may include all or some of the components described in this guide. For details on installation and configuration procedures, refer to the relevant user manual provided with each component.

Note: Make sure that all electrical wiring is properly grounded (verify that the electrical infrastructure does provide proper grounding). It is recommended that you use a voltage surge protector and line filter for your computer system.

- **General Unpacking and Installation Procedures**, page 4, describes the general unpacking and installation procedures for the CIM system.
- **If there are any problems**, fill out a report and send it to Intelitek.
- **Conveyor & Pallet Tracking System**, page 5, describes the operational overview and installation procedure for the conveyor and pallet tracking system.
- **Robots**, page 7, describes the operational overview and installation procedures for different robots.
- **Linear Slide Bases**, page 13, describes the operational overview and installation procedures for different slide base types.
- **Other Accessories**, page 30, describes the operational overview and installation procedures for various machines not included in the other sections.

General Unpacking and Installation Procedures

Since the equipment in each CIM system varies, refer to the specific packing lists for your shipment. This section describes the general unpacking and installation procedures.

Visual Inspection of Boxes

To perform a visual inspection:

- 2 Check that all the boxes have a label with the name and address of the correct customer.
- 3 Check with the shipment papers that all big boxes are present.
- 4 Check for any visible damage on the boxes. If there is any visible damage, document the damage
- 5 If there is any damage, fill out a report and send it to Intelitek.

Unpacking the Boxes

To unpack the boxes:

- 1 Open each box separately and carefully remove the contents. Arrange the contents of each box on tables in an organized manner.
- 2 Identify and mark every item in the packing list of each box. If you have problems identifying certain parts, contact Intelitek. Verify that all parts in the packing list have been received. After the check is complete, report any missing parts to Intelitek.
- 3 Check the parts for any visible damage. If any damage is found, inform Intelitek immediately.
- 4 If there is any damage, fill out a report and send it to Intelitek.

Organizing the Parts According to Products

- 1 Organize the parts according to the products (modules) that they belong to.
Note: For efficiency in packing and handling, sometimes parts belonging to different stations are packed together in the same shipping container.
- 2 Check against the part list for each product that all required parts can be identified. If you are in doubt, contact Intelitek.
- 3 If there is any damage, fill out a report and send it to Intelitek.

Installing Each Product

- 1 Install each hardware and software product. The installation order of the components is important. It is normally recommended that you first install the conveyor, then the storage system (ASRS) and then the various stations. However, in your installations, you may encounter limitations. For example, if a big machine is designed to be located in a specific location, it may be necessary to first place the machine and then build the conveyor before installing the other stations around the conveyor according to your system layout drawing.
- 2 Check the items and report any that are missing or damaged, and any problems that you may encounter during hardware and software installation.
- 3 If there is any damage or missing items, fill out a report and send it to Intelitek.

Function Test for Each Product

- 1** Check the basic functionality of each product. (Refer to the user manual provided with the product.)
- 2** Report any problems that you find in hardware or software at this point.
- 3** If there are any problems, fill out a report and send it to Intelitek.

Conveyor & Pallet Tracking System

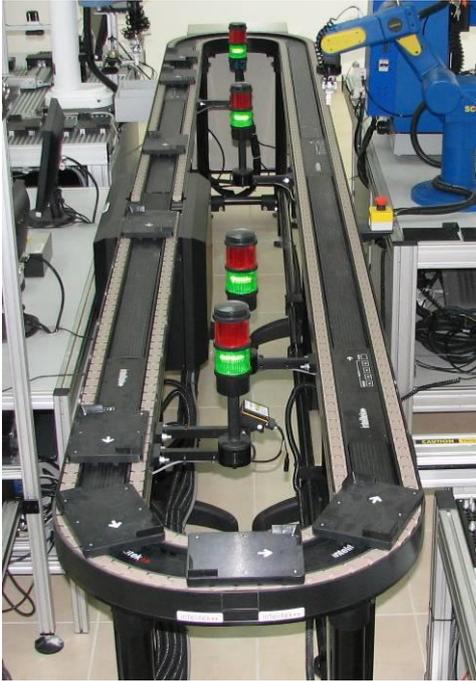


Figure 2: Conveyor



Figure 3: PLC

Operational Overview

The general operation of the pallet tracking and conveyor is as follows:

- Throughout a running production, the OpenCIM Manager regularly sends requests via the PLC Device driver to the PLC (GET FREE, DELIVER, FREE, RELEASE). These requests are stored in the PLC memory.
- Pallets travel on the conveyor continuously. Each pallet has an ID code that is identified by sensors in each station during every pass and the result is sent via the PLC Device driver to the OpenCIM Manager.
- At each station, the pallet is stopped by a piston. The PLC reads the pallet ID and transfers it via the PLC Device Driver to the OpenCIM Manager.
- The PLC program checks if there is a request for the pallet in this station. If the pallet is not required at this station, it is released immediately. If it is required, a message is sent from the PLC to the PLC device driver and then to the CIM Manager. The pallet is then only released when the OpenCIM Manager sends a specific instruction.

Installation

Install the Conveyor and Pallet Tracking system according to the following guidelines:

- Two people are required to assemble and install the conveyor.
- The following tools are required for the assembly and installation process:
 - 13mm wrench
 - 5mm Allen wrench
 - 6mm Allen wrench
 - Water scale (A level)

The location of the conveyor determines the location of all the other stations in the CIM setup. Before deciding on the final station position, ensure that all stations will fit around the conveyor according to the layout drawings of your CIM system provided.

To prepare the conveyor pallet tracking system for installation (review the manual *Conveyor and Pallet Tracking System Operational Manual* for more details):

- 1 Ensure that the floor is solid and level and that the electric power and compressed air outlets are ready at the installation site.
- 2 Unpack all conveyor parts, sort them and identify all major components using the layout and packing list.
- 3 Place all components in their approximate location on the floor. Verify that the feet of the conveyor are completely inside the shaft.
- 4 Begin assembling the conveyor and pallet tracking system as described in the *Conveyor and Pallet Tracking System Operational Manual* provided.

Robots

ASRS-36 and ASRS-36x2



Figure 4: ASRS-36



Figure 5: ASRS-36x2

Operational Overview

The function of the ASRS-36 or ASRS-36x2 in the CIM is to transfer templates between the fixed storage grid and other devices like stop stations and the barcode/RFID reader.

Note: The ASRS only handles templates and does not handle parts.

Installing the ASRS

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1** Place the ASRS close to the target location.
- 2** Install SCORBASE for ASRS-36 or ASRS-36x2 from the *Robotic Software for USB Controller* CD on the computer that will control the device.
- 3** Connect the cables of the robot to the robot controller.
- 4** Connect the Teach Pendant (optional).
- 5** Connect the robot controller via USB cable to the computer.
- 6** Connect the robot controller to a power supply.
- 7** When switching on the controller, the operating system will prompt for installation of the new device. Select automatic installation and the driver will be installed.
- 8** Run SCORBASE and activate online mode. Perform the homing. The robot is then ready for operation.

SCORBOT-ER 4u



Figure 6: SCORBOT-ER 4u

Operational Overview

The function of the SCORBOT ER 4u in the CIM is to transfer parts or templates between the various devices like the stop stations, buffers, machines, and so on.

Installing the SCORBOT ER 4u

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1 Place the robot on its work table or linear slide base.
 - 2 Install SCORBASE for SCORBOT ER 4u from the *Robotic Software for USB Controller* CD on the computer that will control the device.
 - 3 Connect the cables of the robot to the robot controller.
 - 4 Connect the Teach Pendant (optional).
 - 5 Connect the robot controller via USB cable to the computer.
 - 6 Connect the robot controller to a power supply.
 - 7 When switching on the controller, the operating system will prompt for installation of the new device. Select automatic installation and the driver will be installed.
 - 8 Run SCORBASE and activate online mode. Perform the homing. The robot is then ready for operation.

SCORBOT-ER 9Pro



Figure 7: SCORBOT-ER 9Pro

Operational Overview

The function of the SCORBOT ER9 Pro in the CIM is to transfer parts or templates between the various devices like the stop stations, buffers, machines, and so on.

Installing the SCORBOT ER9 Pro

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1 Place the robot on its work table or linear slide base.
 - 2 Install SCORBASE Pro for SCORBOT ER9 Pro from the *Robotic Software for USB Pro Controller* CD on the computer that will control the device.
 - 3 Connect the cables of the robot to the robot controller.
 - 4 Connect the Teach Pendant (optional).

- 5 Connect the robot controller via USB cable to the computer.
- 6 Connect the robot controller to a power supply.
- 7 When switching on the controller, the operating system will prompt for installation of the new device. Choose automatic installation and the driver will be installed.
- 8 Run SCORBASE Pro and activate online mode. Perform the homing. The robot is then ready for operation.

SCORBOT-ER14 Pro

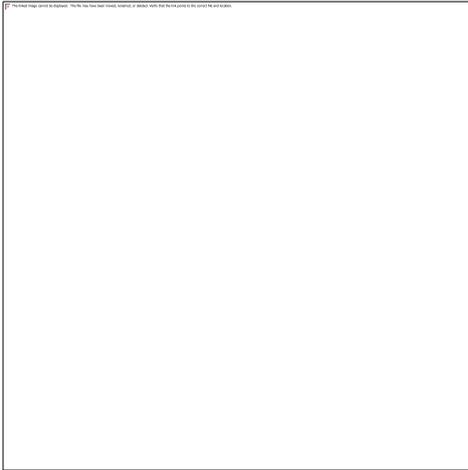


Figure 8: SCORBOT-ER 14Pro

Operational Overview

The function of the SCORBOT ER14 Pro in the CIM is to transfer parts or templates between the various devices like the stop stations, buffers, machines, and so on.

Installing the SCORBOT ER14 Pro

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1 Place the robot on its work table. **You must fix this robot securely to the work table before you can continue the installation.**
 - 2 Use the CD *Robotic Software for USB Pro Controller* and install SCORBASE Pro for SCORBOT ER14 Pro on the computer that will control the device.
 - 3 Connect the cables of the robot to the robot controller.
 - 4 Connect the Teach Pendant (optional).
 - 5 Connect the robot controller via USB cable to the computer.
 - 6 Connect the robot controller to a power supply.
 - 7 When switching on the controller, the operating system will prompt for installation of the new device. Choose automatic installation and the driver will be installed.
 - 8 Run SCORBASE Pro and activate online mode. Perform the homing. The robot is then ready for operation.

Industrial Robot Motoman-MH5F

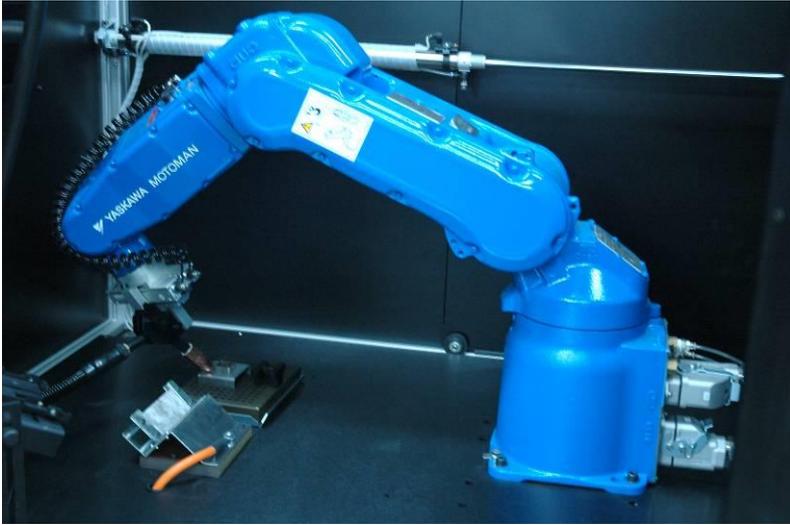


Figure 9: MH5F – Welding

Operational Overview

The Motoman MH5F is an industrial six-axis vertically articulated robot. It can be used for machine tending, assembly and other applications. It is important to carefully study all the relevant safety instructions for this robot and to become familiar with the robot before planning and integrating the specific application.

Installation

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1** Place the robot on a rigid stand or linear slide base. **You must fix this robot (including its stand or slide base) securely before you can continue the installation.** Follow your local safety regulations for work with industrial robots.
- 2** Use the CD *Robotic Software for USB Controller* and install SCORBASE for FS100 on the computer that will control the device. In addition you may need to install a sentinel driver or MotoCOM32 .dll files from the CD that came with the sentinel key. The USB sentinel key must be plugged in order for SCORBASE to communicate with the controller.
- 3** Connect the cables of the robot to the robot controller.
- 4** Connect the Teach Pendant.
- 5** Connect the robot controller via RS232 cable to the computer.
- 6** Connect the robot controller to a power supply.
- 7** After switching on the controller, run SCORBASE for FS100 and activate ONLINE mode. Once the click sound of the servo breaks is heard, the robot is ready for operation.

Third Party Industrial Robots

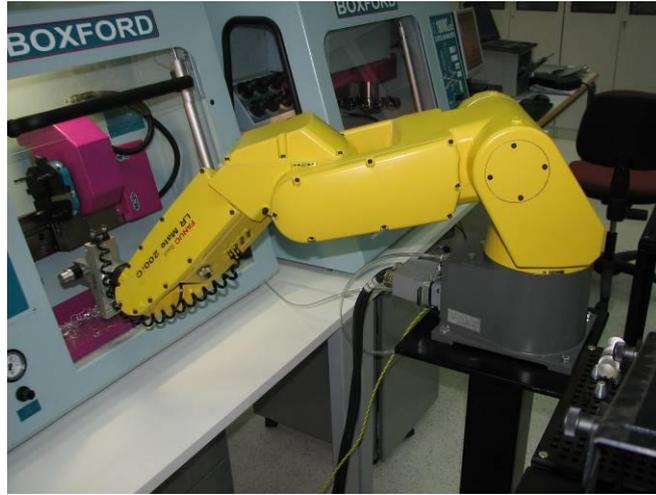
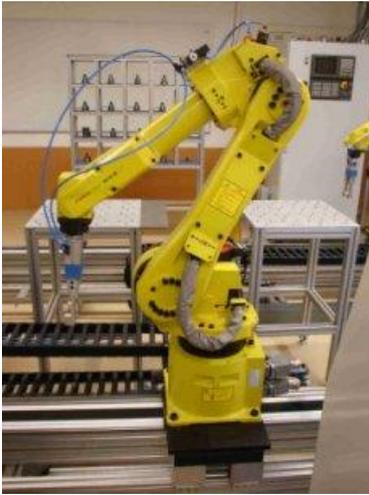


Figure 10: Third Party Robot 1 Figure 11: Third Party Robot 2

Operational Overview

Most third party robots can be integrated into Intelitek's CIM systems using either an I/O interface, an RS232 interface or a network. Within Intelitek's CIM systems they can be used for machine tending, assembly, welding and other applications.

Carefully study all relevant safety instructions for the relevant robot and become familiar with the operation of the robot before planning and integrating the specific application. The type of communication integration required should be determined before commencing installation. If possible, it is advisable to test the desired interface with Intelitek in advance.

Installation

- *Refer to the user manuals that came with the robot before starting the installation procedure.*
- 1 Place the robot on a rigid stand or linear slide base. **You must fix this robot (including its stand or slide base) securely before you can continue the installation.** Follow your local safety regulations for work with industrial robots.
- 2 Install SCORBASE from the *Robotic Software for USB Pro Controller* CD on the computer that will control the device.
- 3 Install the robot specific software (supplied by its manufacturer) and connect the cables of the robot to the robot controller.
- 4 Connect the Teach Pendant.
- 5 Connect the robot controller via suitable communication cable to the computer.
- 6 Connect the robot controller to a power supply.
- 7 After switching on the controller, run SCORBASE and activate online mode. Once the click sound of the servo breaks is heard, the robot is ready for operation.

Linear Slide Bases

Linear Slide Base for SCORBOT ER 4u



Figure 12: Floor-Mounted Linear Slidebase



Figure 13: Table-Mounted Linear Slidebase

Operational Overview

The function of the LSB for SCORBOT ER 4u in the CIM is to enlarge the workspace of the robots along a linear axis. Standard versions are available with a length of 1m or 1.8m. The default LSB is table mounted but can also be ordered with a set of legs for floor mounting.

Installing the LSB for SCORBOT ER 4u

- *Refer to the assembly instructions that came with the LSB before starting the installation procedure.*
- 1** Review and identify all parts.
 - 2** Assemble the LSB according to the instructions. Depending on your specific application use floor mounted or table top installation.
 - 3** After the LSB is stable, you can place the robot on top and determine the optimum orientation before fixing it to the LSB.
 - 4** All relevant wiring and tubing should be done through the flexible plastic chain of the linear slide base.
 - 5** Connect the LSB to the robot controller.
 - 6** Run SCORBASE, check the hardware configuration and activate online mode. Perform the homing. The robot and LSB are then ready for operation.

Linear Slide Base for SCORBOT ER9 Pro



Figure 14: Floor-Mounted Linear Slidebase



Figure 15: Table-Mounted Linear Slidebase

Operational Overview

The function of the LSB for SCORBOT ER9 PRO in the CIM is to enlarge the workspace of the robots along a linear axis. Standard versions are available with a length of 1m and 1.8m. The default LSB includes a set of legs for floor mounting. With the use of customized height adapters the LSB can also be table mounted.

Installing the LSB for SCORBOT ER9 Pro

- *Refer to the assembly instructions that came with the LSB before starting the installation procedure.*
- 1** Review and identify all parts.
 - 2** Assemble the LSB according to the instructions. Depending on your specific application use floor mounted or table top installation.
 - 3** After the LSB is stable you can place the robot on top and determine the optimum orientation before fixing it to the LSB.
 - 4** All relevant wiring and tubing should be done through the flexible plastic chain of the linear slide base.
 - 5** Connect the LSB to the robot controller.
 - 6** Run SCORBASE, check the hardware configuration and activate online mode. Perform the homing. The robot and LSB are then ready for operation.

Note: The above LSB types with belt drives can also be used with light industrial robots like the Motoman MH5F, FANUC200iC, and so on. (Robots with a robot arm weight of up to 50kg, and a reach not exceeding 1000mm).

Linear Slide Base for Motoman MH5F or Equivalent Robot

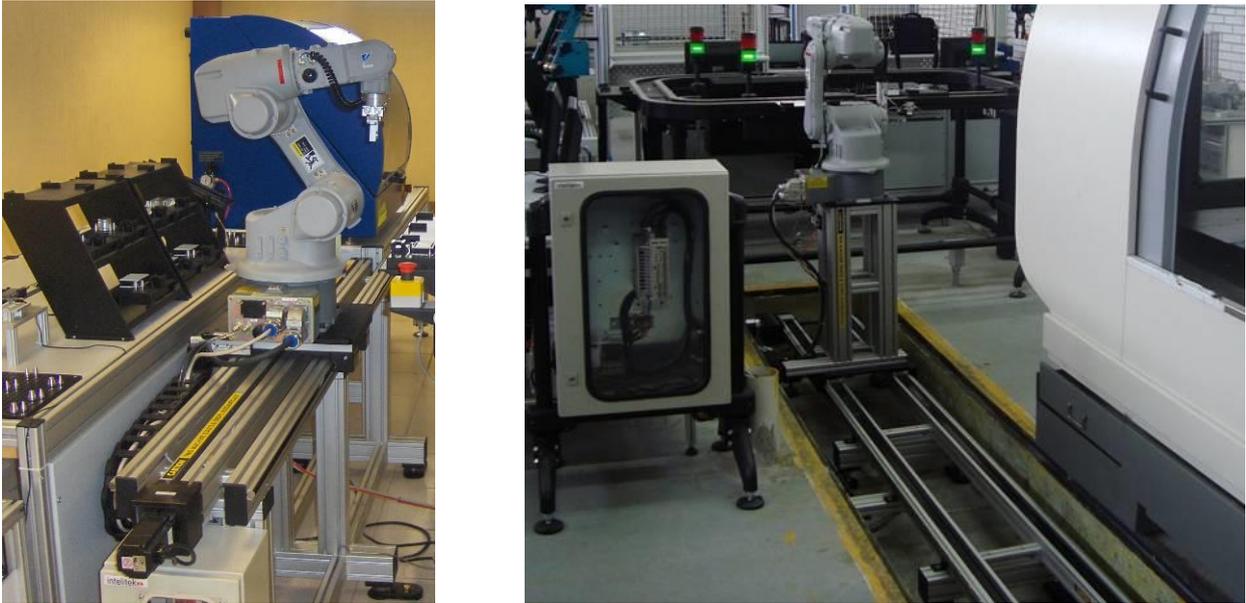


Figure 16 and 35 : XtraDrive Linear Slide Base – Ball Screw Type and Belt Type

Operational Overview

The function of the LSB for third party robots in the CIM is to enlarge the workspace of the robots along a linear axis. Standard versions with a ball screw drive are available with a length of 1m and 1.8m. The default LSB includes a set of legs for floor mounting. Longer linear slides are available with belt drive technology.

Installing the LSB for Small Industrial Robots

- *Refer to the assembly instructions that came with the LSB before starting the installation procedure.*
- 1** Review and identify all parts.
 - 2** Assemble the LSB according to the instructions. Depending on your specific application use floor mounted or table top installation.
 - 3** Once the LSB is stable you can place the robot on top and determine the optimum orientation before fixing it to the LSB.
 - 4** All relevant wiring and tubing should be done through the flexible plastic chain of the linear slide base.
 - 5** Connect the LSB to the robot controller.
 - 6** Run SCORBASE, check the hardware configuration and activate online mode. Perform the homing. The robot and LSB are then ready for operation.

Linear Slide Base for Motoman HP6 or Equivalent Robot



Figure 17: XtraDrive Linear Slide Base – Type 2

Operational Overview

The function of the LSB for third party robots in the CIM is to enlarge the workspace of the robots along a linear axis. Standard versions with a ball screw drive are available with belt drive technology.

Installing the LSB for Medium Industrial Robots

- *Refer to the assembly instructions that came with the LSB before starting the installation procedure.*
- 1** Review and identify all parts.
- 2** Assemble the LSB according to the instructions. Depending on your specific application use either the floor mounted or the table top installation.
- 3** Once the LSB is stable, place the robot on top of the LSB and determine its optimum orientation before fixing it to the LSB.
- 4** All relevant wiring and tubing should be done through the flexible plastic chain of the linear slide base.
- 5** Connect the LSB to the robot controller.
- 6** Run SCORBASE, check the hardware configuration and activate online mode. Perform the homing. The robot and LSB are then ready for operation.

Mobile Robot AGV ER-400



Figure 18: AGV (ER-400)

Operational Overview

The function of the R-400 automated guided vehicle (AGV) in the CIM is to provide a means of transporting light parts between different areas within an industrial installation. It can be fitted with an optional Internet camera system for guidance and/or surveillance operations.

Installation

- 1** Set up the specified docking stations and path as designated on the site layout plans included with your shipment. Note the following guidelines:
 - 0.5 meters should be left clear on each side of the AGV for the entire length of the path.
 - The path should be no more than 5 meters in length
 - The path should not include more than one turn
 - If the path includes a turn, it should be 90 degrees
- 2** Install the control software on the AGV and the workstation PC, as specified in the *AGV User Manual*.
- 3** Calibrate the AGV, docking station camera and robot to ensure smooth docking operations. Note the following guidelines:
 - Orient the robot's X axis toward the point where the AGV will dock.
 - Mount the camera rigidly and aim it so that the center of the docking area is at the center of the camera's field of view.
 - Mount the camera as low as possible without interfering with the operation of the robotic arm.
- 4** Test the operation of the AGV as specified in the *AGV User Manual*.

If the AGV includes the optional Internet Camera, follow the instructions in the *AGV User Manual*.

Spectralight 0200 Machining Center



Figure 19: SpectraLight 0200

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied material. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded/unloaded by a robot. Automatic program selection and activation can be done according predefined algorithms.

Installing the Spectralight 0200 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, Controller Box, the Interface Card, the Control Program software, the documentation, and the Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Install the CNC interface card, and after rebooting the PC, use the CNC software CD to install the operation software and the driver for the interface card.
- 3 Connect all cables between the CNC controller, the CNC machine and the interface card of the computer.
- 4 Connect the CNC controller to a power supply and switch the controller on. Use the setup tool to setup the key CNC data.
- 5 Run the CNC control program and initialize the machine.

Expertmill VMC0600 Machining Center



Figure 20: expertMILL VMC0600

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the Expertmill VMC0600 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, Controller Box, the Interface Card, the Control Program software, the documentation, and the Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Install the CNC interface card, and after rebooting the PC, use the CNC software CD to install the operation software and the driver for the interface card.
- 3 Connect all cables between the CNC controller, the CNC machine and the interface card of the computer.
- 4 Connect the CNC controller to a power supply and switch the controller on. Use the setup tool to setup the key CNC data.
- 5 Run the CNC control program and initialize the machine.

SuperProlight 1000 Machining Center



Figure 21: SuperProLIGHT 1000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the SuperProlight 1000 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, Controller Box, the Interface Card, the Control Program software, the documentation, and the Accessory Kit.

- 1 Place the CNC machine on a rigid table.

- 2 Install the CNC interface card and after rebooting the PC, use the CNC software CD to install the operation software and the driver for the interface card.
- 3 Connect all cables between the CNC controller, the CNC machine and the interface card of the computer.
- 4 Connect the CNC controller to a power supply and switch the controller on. Use the setup tool to setup the key CNC data.
- 5 Run the CNC control program and initialize the machine.

BenchMill 6000 Machining Center



Figure 22: BenchMill 6000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the BenchMill 6000 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, a blue network cable, the Control Program software, the documentation, and the Tool and Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Connect the network cable between the computer and the CNC machine and use the CNC software CD to install the operation software.
- 3 Connect the CNC machine to a power supply and switch the machine on.
- 4 Run the CNC control program and initialize the machine.

ProMill 8000 Machining Center



Figure 23: ProMill 8000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the ProMill 8000 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, a blue network cable, the Control Program software, the documentation, and the Tool and Accessory Kit.

- 1 Place the CNC machine on a solid and level floor.
- 2 Connect the network cable between the computer and the CNC machine and use the CNC software CD to install the operation software.
- 3 Connect the CNC machine to a power supply and switch the machine on.
- 4 Run the CNC control program and initialize the machine.

Spectralight 0400 Turning Center



Figure 24: SpectraLIGHT 0400

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the Spectralight 0400 Turning Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, Controller Box, the Interface Card, the Control Program software, the documentation, and the Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Install the CNC interface card, and after rebooting the PC, use the CNC software CD to install the operation software and the driver for the interface card.
- 3 Connect all cables between the CNC controller, the CNC machine and the interface card of the computer.
- 4 Connect the CNC controller to a power supply and switch the controller on. Use the setup tool to setup the key CNC data.
- 5 Run the CNC control program and initialize the machine.

Prolight 3000 Machining Center

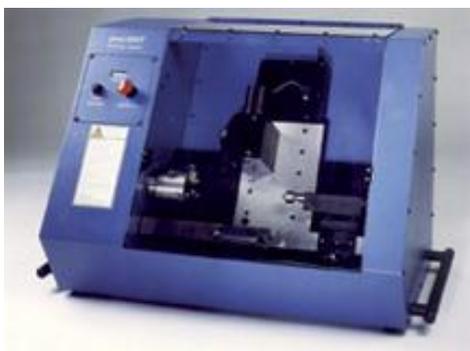


Figure 25: proLIGHT 3000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the Prolight 3000 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Machining Center you should receive a machining center, Controller Box, the Interface Card, the Control Program software, the documentation, and the Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Install the CNC interface card and after reboot use the CNC software CD to install the operation software and the driver for the interface card.
- 3 Connect all cables between the CNC controller, the CNC machine and the interface card of the computer.
- 4 Connect the CNC controller to a power supply and switch the controller on. Use the setup tool to setup the key CNC data.
- 5 Run the CNC control program and initialize the machine.

BenchTurn 7000 Turning Center



Figure 26: BenchTurn 7000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the BenchTurn 7000 Machining Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Turning Center you should receive a machining center, a blue network cable, the Control Program software, the documentation, and the Tool and Accessory Kit.

- 1 Place the CNC machine on a rigid table.
- 2 Connect the network cable between the computer and the CNC machine and use the CNC software CD to install the operation software.
- 3 Connect the CNC machine to a power supply and switch the machine on.
- 4 Run the CNC control program and initialize the machine.

ProTurn 9000 Machining Center

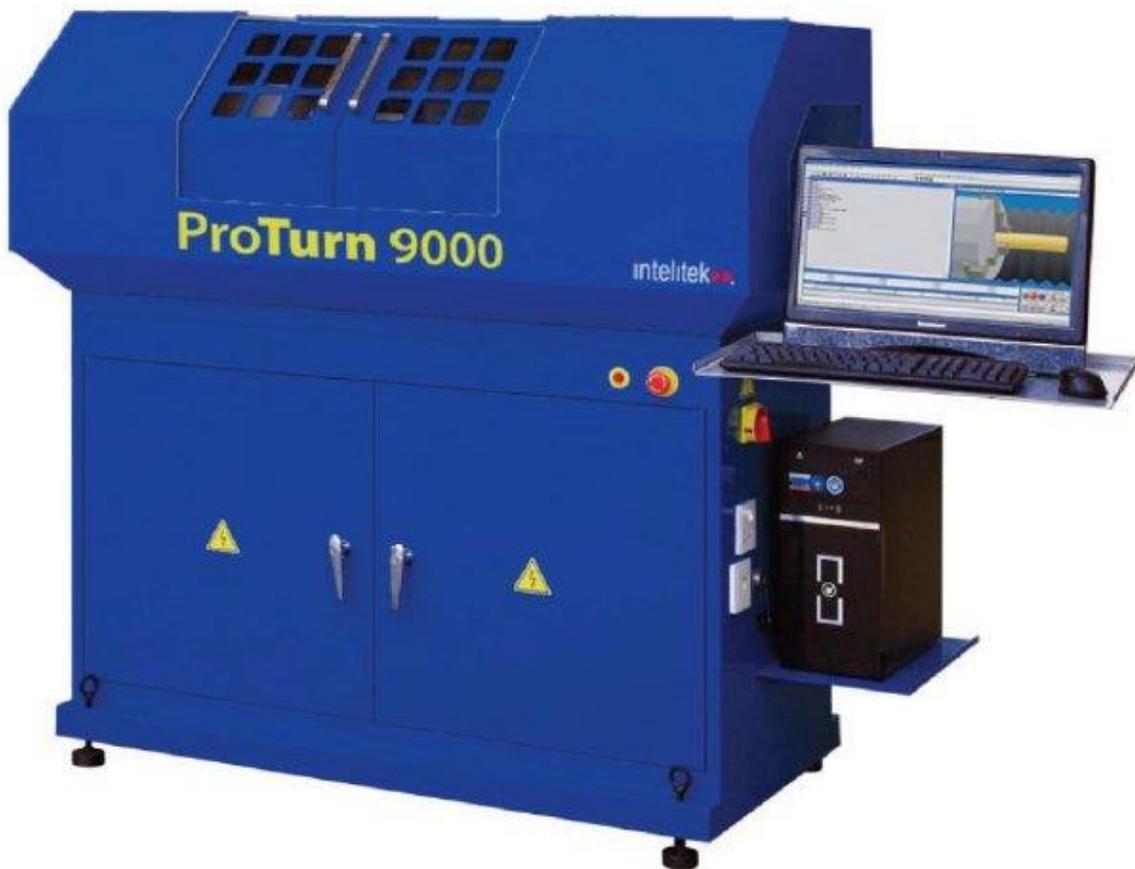


Figure 27: ProTurn 9000

Operational Overview

A CNC machine is used to flexibly machine different products from the same or different supplied materials. Predefined and tested programs can be activated automatically. In a CIM system the CNC machine is loaded and unloaded by a robot. Automatic program selection and activation can be performed according to predefined algorithms.

Installing the ProTurn 9000 Turning Center

Refer to the user manuals that came with the robot before starting the installation procedure. For each standard Turning Center you should receive a machining center, a blue network cable, the Control Program software, the documentation, and the Tool and Accessory Kit.

- 1 Place the CNC machine on a solid and level floor.
- 2 Connect the network cable between the computer and the CNC machine and use the CNC software CD to install the operation software.
- 3 Connect the CNC machine to a power supply and switch the machine on.
- 4 Run the CNC control program and initialize the machine.

Interfacing Third Party CNC Machines



Figure 28: Third Party CNC Machine

Operational Overview

Most third party CNC machines can be integrated into Intelitek's CIM systems using either an I/O interface, a RS232 interface or a network.

Carefully study all relevant machine specifications and determine whether the particular CNC machine can be integrated into CIM and be tended by a robot, before proceeding with installation.

Installation

Set up the specified application as designated on the site layout plans included with your shipment or according to your own design. Note the following guidelines:

- 1 The CNC machine should be mounted on a solid and level concrete base or other suitable base structure. (Follow the instructions provided by the machine's manufacturer).
- 2 The robot must be able to reach all relevant areas within the machine. Check that the reach of the robot extends to the machine's clamping device and that the gripper can assume the required orientation.

- 3 The layout should provide maximum human access to the CNC machine for standalone use but should also ensure a safe workspace during automatic mode (CIM/FMS).
- 4 Depending on local safety regulations, the customer may have to add additional fail-safe safety systems to prevent human access to the robot's workspace while it is tending the machines.
- 5 Install the relevant CNC software on the workstation PC.
- 6 Set up the robot for the CNC interface (check with the manufacturer of the specific controller regarding requirements, such as the use of I/O's, RS232, remote control, messaging). Standard functions that are required include open door, close door, open clamp, close clamp, cycle start, as well as their relevant status signals. Some machines also allow activation and status check of these functions via RS232 or TCP/IP.
- 7 Write the required G-code for the CNC machine in the relevant language.
- 8 Teach the relevant robot positions.
- 9 Write the relevant interface programs for the robot.
- 10 Test the CNC interface in standalone mode.

Interfacing other Third Party Machines



Figure 29: Third Party CMM Machine Figure 30: Third Party Laser Engraver

Operational Overview

Most third party machines can be integrated into Intelitek's CIM systems using either an I/O interface, a RS232 interface or a network.

Carefully study all relevant machine specifications and determine whether the particular machine can be integrated into CIM and be tended by a robot, before proceeding with installation.

Installation

- 1** Set up the specified application as designated on the site layout plans included with your shipment or according to your own design. Note the following guidelines:
- 2** The machine should be mounted on a solid and level concrete base or other suitable base structure. (Follow the instructions provided by the machine's manufacturer).
- 3** The robot must be able to reach all relevant areas within the machine. Check that the reach of the robot extends to the machine's clamping device and that the gripper can assume the required orientation.
- 4** The layout should provide maximum human access to the machine for standalone use but should also ensure a safe workspace during automatic mode (CIM/FMS).
- 5** Depending on local safety regulations, the customer may have to add additional fail-safe safety systems to prevent human access to the robot's workspace while it is tending the machines.
- 6** Install the relevant software on the workstation PC.
- 7** Set up the robot for the machine interface (check with the manufacturer of the specific controller regarding requirements, such as the use of I/O's, RS232, remote control, messaging). Standard functions that are required include open door, close door, open clamp, close clamp, cycle start, as well as their relevant status signals. Some machines also allow activation and status check of these functions via RS232 or TCP/IP.
- 8** Write the required programs for the machine in the relevant language.
- 9** Teach the relevant robot positions.
- 10** Write the relevant interface programs for the robot.
- 11** Test the machine interface in standalone mode.

Vision System



Figure 31: Vision System

Operational Overview

The vision system usually performs a part inspection in the manufacturing process. The following must be taken into account:

- **Part Handling:** A part is placed in the vision field view, the vision system takes a picture, analyses it and returns a pass or fail command.
- **Light Conditions:** Depending on the part, determine the appropriate stable light conditions.
- **Field View/Height:** Adjust the camera's field view to ensure the best view of the various parts that need to be inspected.

According to the system layout drawings determine the location of the vision system, as follows:

- The robot brings the part to the vision field view. In this case ensure that the robot reaches the surface under the camera without *bumping* into the camera or stand.
- A Linear Position Table or XY Positioning Table brings the part under the field view.
- The camera is located directly above the conveyor station and the part is inspected on the template on the conveyor.

Installation

Unpack the components according to the general unpacking procedures described in the *General General Unpacking and Installation Procedures* section, page 4, and then assemble and install the Vision System, as follows:

- 1 Assemble the camera stand.
- 2 Connect the software protection key.
- 3 Install the ViewFlex Software.
- 4 Install the Camera Software.
- 5 Connect the Camera to your Computer.

A description of each of these steps is described in the *Viewflex UserManual*.

RFID Reader System



Figure 32: RFID System

Operational Overview

The RFID system performs an identification of a template before the template is accepted into the production. The usual sequence is as follows:

- A template is placed in the RFID reading field by a robot.
- The RFID tag of the template is read automatically as soon as it is in reading range.
- The RFID device driver reads the tag number and uses a LUT (Look Up Table) file to identify the related Template ID.
- If the code is identical to the data in the storage database, the template is released into the production process.

If the code is different, the template is returned and the next suitable template (according to the storage database) is taken and checked.

According to the system layout drawings, determine the location of the RFID system, as follows:

- Place a template with RFID tag into the robots actuator (gripper). Manipulate the robot arm so that the template is placed in reading position. As soon as the tag is read a beep sound is heard. Align the robot in this area and teach a position. Test if the position is OK for reliable operation of the RFID using Pick&Place routines.

Installation

Unpack the components according to the general unpacking procedures described in the *General Unpacking and Installation Procedures* section, page 4, and then assemble and install the RFID System, as follows:

- 1 Assemble the RFID stand.
- 2 Connect the RFID to your Computer.

A description of each of these steps is described in the *RFID User Manual*.

Other Accessories

Operational Overview

A CIM system may include a large variety of additional accessories. All of these are used to provide a specific function within the system. These accessories include tables, machinery, storage devices, and so on.

Installation

For each of the accessories, follow this process:

- 1 Review any documentation that came with the specific accessory.
- 2 Perform the assembly if required.
- 3 Review the function of the accessory within the station and determine its optimum location and orientation.
- 4 Attach the accessory and test its function.

Accessories can include one or more of the following:

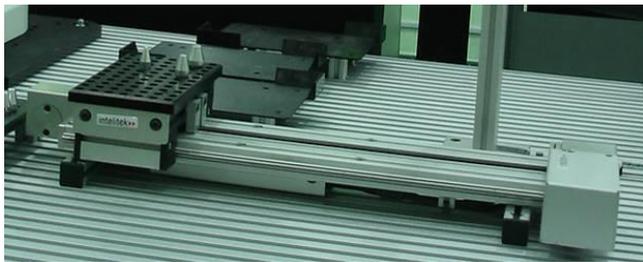


Figure 33: 300mm Linear axis (X-table)

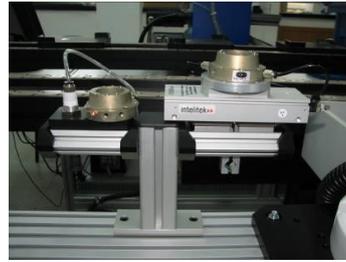


Figure 34: Automatic Tool Changer

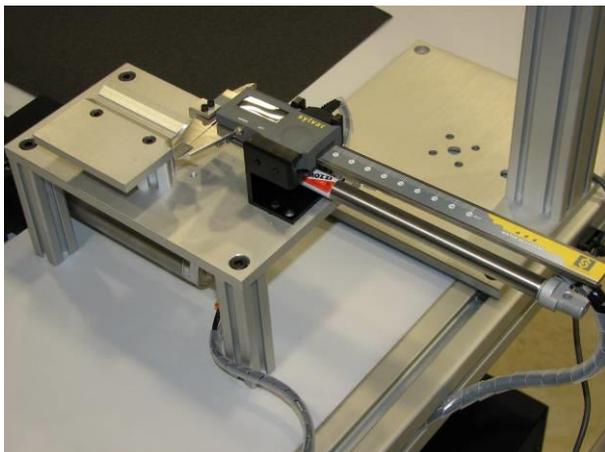


Figure 35: Electronic Caliper

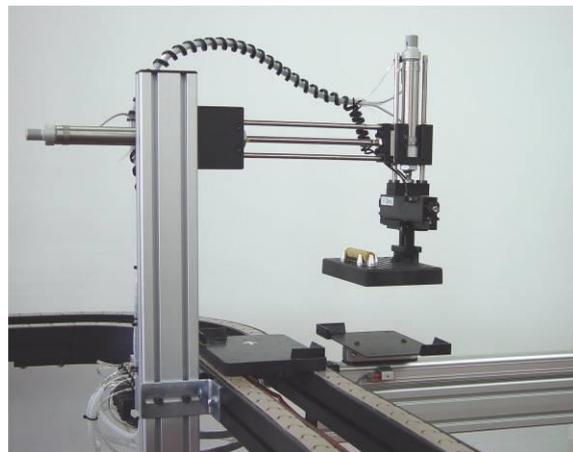


Figure 36: Pneumatic Lifter Shifter

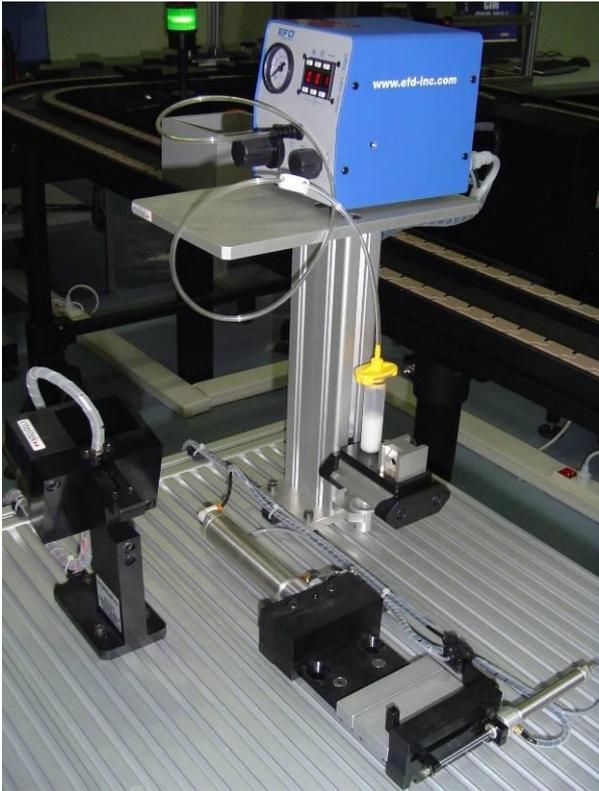


Figure 37: Ballfeeder, Vice and Glue



Figure 38: Screwdriver

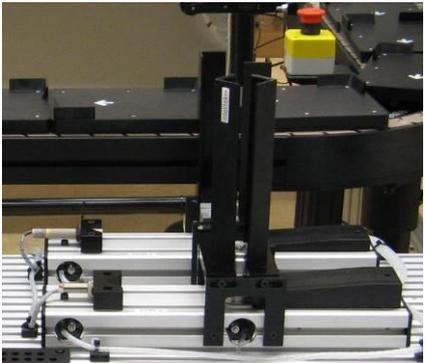


Figure 39: Feeder

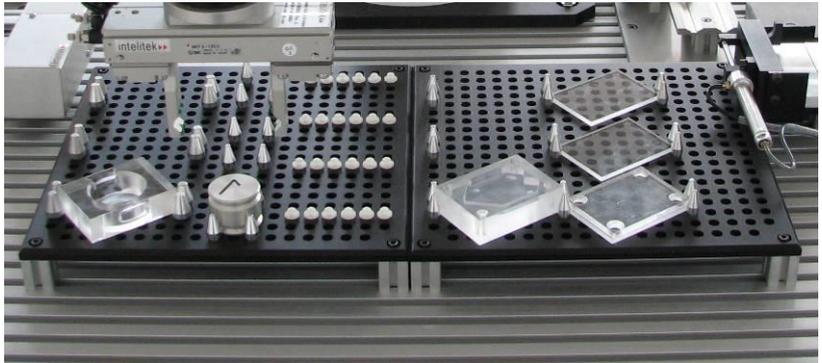


Figure 40: Palletizing Rack

3

Stations

ASRS (Storage Station)



Figure 41: ASRS-36u



Figure 42: ASRS²



Figure 43: ASRS-36ux2



Figure 44: Micro ASRS

The ASRS in your configuration may be one of the following systems:

- **ASRS-36u (with Controller USB)**
- **ASRS-36ux2 (with Controller USB)**
- **1-3 MicroASRS (requires a vertical articulated robot with a minimum of 5 axes)**

Operational Overview

The general operation of the ASRS is as follows:

- 1 The operator places the parts on the templates in the ASRS bays.
- 2 When an empty pallet arrives at the station, the ASRS takes the template with the part and places it on the empty pallet on the conveyor.
- 3 When a finished product arrives at the ASRS station, the ASRS removes the template containing the part from the conveyor and places it into an empty storage bay.
- 4 If an RFID or barcode reader exists, the ASRS may place the template next to the RFID or barcode reader to enable testing the template ID.

Note: Cartesian ASRS types (ASRS36, ASRS36x2) are very effective but can only handle templates while ASRS with vertical articulated robots can handle also parts.

Installation

According to the system layout drawings and the specific ASRS type that you have, determine the best possible location and orientation for the ASRS. Ensure that the gripper of the ASRS can reach, place and remove templates to and from the conveyor station without colliding with any obstacles at any time. If an RFID or Barcode reader is installed, the ASRS should also reach them.

RFID or Barcode Reader (Optional Device for ASRS Stations)

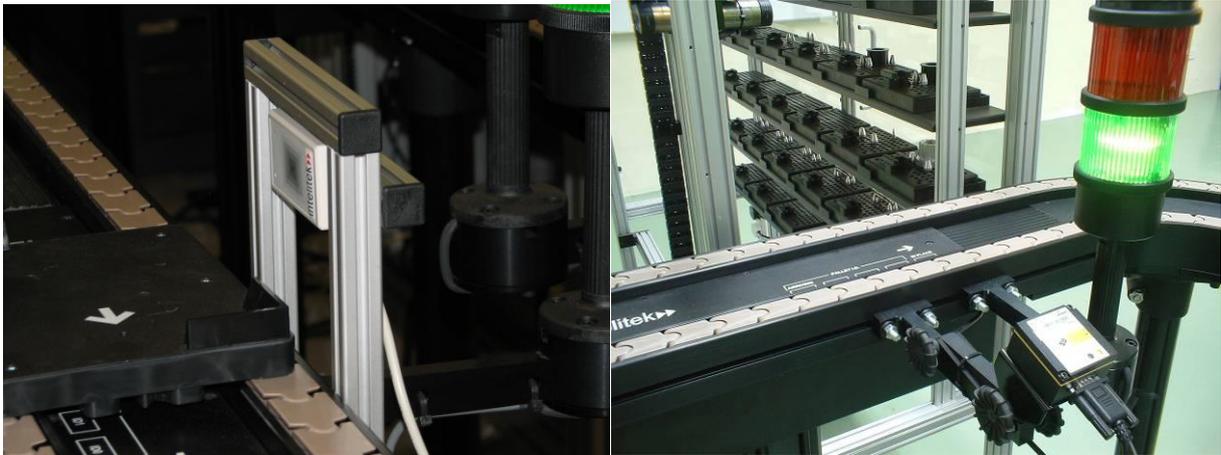


Figure 45: RFID Reader (left) and Barcode Reader (right)

Operational Overview

The CIM Manager instructs the ASRS robot to scan a template after removing it from the station and before placing it on the conveyor. The RFID or barcode reader is normally connected to the conveyor near the ASRS.

Installation

Assemble and install the RFID or barcode reader according to the process below. During the installation, ensure that the robot reaches the RFID or barcode reader and that the RFID or barcode does not block the robot from fetching the templates.

The installation process of the RFID or barcode reader includes the following:

- 1 Assembling the RFID or barcode reader stand.
- 2 Assembling the RFID or barcode reader on the mounting plate.
- 3 Attaching it to the conveyor profile.
- 4 Connecting the communication cables and power supply.

Assemble and install the RFID or barcode reader according to these steps as described in the *RFID or Barcode Reader Operational Manual* provided.

MTS (Machine Tending Station)

Operational Overview

The general operation of the MTS is as follows:

- A pallet containing a template and part arrives at the MTS station. The robot takes the template and places it on the buffer. The robot takes the part and places it in the machine's clamping device. The robot returns the machined part to the template on the buffer and then to an empty pallet on the conveyor.

Installation

The MTS usually includes a robot on a support or linear slide base and one or two machines. When determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers, local storage devices and each of the machines.
- Ensure that there is easy access to each of the machines for standalone operation to load and unload parts in the machine.
- While ensuring that the robot can comply with his tasks in the station try to reduce risks of collision to a minimum.

Make sure you have all the items on hand necessary to perform the installation. For desktop machines you must have a sturdy table to support the machine and your computer.

Before fixing any item into final positions you should double check that the robot can reach all relevant components without problems while avoiding unnecessary collision risks.

The interface differs depending on the robot type and machine. Refer to the user manuals of the robot and the machine to define a functional interface.

Note: Make sure that all electrical wiring and the outlets are properly grounded. It is recommended that you use a voltage surge protector and line filter for your computer system.

Sample MTS Stations



Figure 46: MTS with SuperProlight 1000, LSB 1.8m and ER 9Pro



Figure 47: MTS with Prolight 3000, LSB 1m and ER 9Pro



Figure 48: MTS with expertMill, LSB 1.8m and HP3

Assembly Station

Operational Overview

The general operation of the Assembly Station is described as follows:

The Assembly Station assembles parts that may arrive from one of the following locations:

- ASRS
- Other Stations in the CIM System
- Local Storage at the Assembly Station

All parts needed for a specific assembly are temporarily stored on a palletizing rack. After all parts are available at the station, the robot begins the assembly process by placing the part on the jig according to the Part Definition. The robot then returns the part to the local storage or the template on the buffer and then to the conveyor.

Installation

Unpack the components according to the general unpacking procedures, described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Assembly Station. In addition, unpack and assemble the Slotted table provided.

The Assembly Station can include one or more of the following:

- Robot (SCORA ER-14Pro, Scorbot ER-9Pro, Scorbot ER-4u or small industrial robot)
- X or XY-Table
- Part Feeder
- Palletizing Rack
- Automatic Gluing Machine
- Automatic Screwdriver
- Automatic Tool Changer
- Quality Control Devices
- Others

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Assembly Stations



Figure 49: Assembly Station with SCORA ER-14



Figure 50: Assembly Station with SCORBOT ER-9



Figure 51: Assembly Station with MH5F

Quality Control Station

Operational Overview

The general operation of the Quality Control Station is described as follows:

The Quality Control Station inspects parts that may arrive from one of the following locations:

- ASRS
- Other Stations in the CIM System
- Local Storage at the QC Station

Depending on the desired and available quality control the robot begins loads the part in the QC device. The QC device executes the QC process according to the Part Definition. The robot then returns the part to the local storage device or the template on the buffer and then to the conveyor.

Installation

Unpack the components according to the general unpacking procedures, described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Quality Control Station. In addition, unpack and assemble the Slotted or standard table provided.

The Quality Station can include one or more of the following:

- Robot (SCORA ER-14Pro, Scorbob ER-9Pro, Scorbob ER-4u or small industrial robot)
- X or XY-Table
- Part Feeder
- Palletizing Rack
- Vision System
- Caliper
- Others

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Quality Control Stations



Figure 52: QC Station with SCORA ER-14



Figure 53: QC Station with SCORBOT ER-9



Figure 54: QC Station with Motoman HP3

Welding Station

Operational Overview

The general operation of the Welding Station is described as follows:

The Welding Station permanently joins pre-assembled parts that may arrive from one of the following locations:

- ASRS (default)
- Other Stations in the CIM System (optional)
- Local Storage at the Welding Station (optional)

The robot loads the special welding template with the pre-assembled part on to the welding buffer. It then executes the required welding process. The robot then returns the welding template with the welded part to the conveyor.

Installation

Unpack the components according to the general unpacking procedures, described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Welding Station. In addition, unpack and assemble the PC table.

The Welding Station can include one or more of the following:

- Robot (small industrial robot (5 or 6 axes) or Scorbot ER-9Pro (5 axes)). With a five axis robot, the possible welding types and possible paths are restricted. A six axis robot provides more flexible access and reach.
- Part Feeder
- Welding Fixtures
- Welding Machine
- Welding Gun Stand

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Welding Stations



Figure 55: Welding Station with SCORBOT ER-9

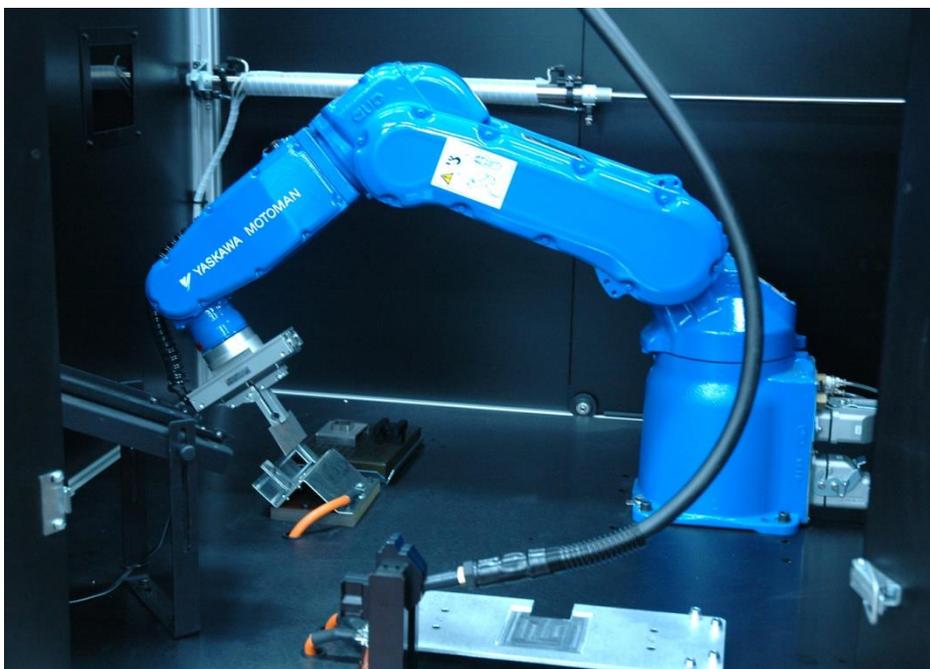


Figure 56: Welding Station with Motoman HP3

Part Feeding and Storage Station

Operational Overview

The general operation of the Part Feeding and Storage Station is described as follows:

- The Part Feeding and Storage Station feeds and stores parts that are processed in the system.
- Empty templates arrive and are loaded with parts from one of the local part feeders
- Loaded templates arrive and the parts are stored in the local storage racks

Depending on the operation, the robot takes an empty or loaded template from the conveyor into the station buffer. It loads the template with a part from one of the feeders or unloads the part onto one of the racks. The robot then returns the empty or loaded template from the buffer to the conveyor.

Installation

Unpack the components according to the general unpacking procedures described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Part Feeding and Storage Station. In addition, unpack and assemble the Slotted or standard table provided.

The Part Feeding and Storage Station can include one or more of the following:

- Robot (Scorbot ER-4u, Scorbot ER-9Pro or small industrial type robot)
- X or XY-Table
- Part Feeder
- Palletizing Rack
- Vision System
- Caliper

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Part Feeding and Storage Stations



Figure 57: QC Station with SCORBOT ER-4u

Hydraulic/Pneumatic Press Station

Operational Overview

The general operation of the Hydraulic/Pneumatic Press Station is described as follows:

The Hydraulic/Pneumatic Press Station joins pre-assembled parts by applying pressure force via a hydraulic or pneumatic driven cylinder. The parts that may arrive from one of the following locations:

- ASRS (default)
- Other Stations in the CIM System (optional)
- Local Storage at the Press Station (optional)

The robot loads the parts on a template. It then loads the template into the press and executes the required pressing process. The robot then returns the template with the assembly to the conveyor or to the optional local storage.

Installation

Unpack the components according to the general unpacking procedures, described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Hydraulic/Pneumatic Press Station. In addition, unpack and assemble the Slotted or standard table provided.

The Hydraulic/Pneumatic Press Station can include one or more of the following:

- Robot (Scorbot ER-4u, Scorbot ER-9Pro or small industrial type robot)
- Hydraulic or Pneumatic Press
- X or XY-Table
- Part Feeder
- Palletizing Rack
- Vision System
- Caliper
- Other devices

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Hydraulic/Pneumatic Press Stations



Figure 58: Hydraulic Press Station with SCORBOT ER-4u



Figure 59: Pneumatic Press Station with SCORBOT ER-9Pro

Project or User Defined Stations

Operational Overview

According to the required project or user definitions the station design and operation is developed and supplied with specific instructions for installation and operation.

Installation

Unpack the components according to the general unpacking procedures, described in the *General Unpacking and Installation Procedures* section, page 4, and then install the Project or User Defined Station. In addition, unpack and assemble the Slotted or standard table provided.

The Project or User Defined Station can include one or more of the following:

- Robot (Scorbot ER-4u, Scorbot ER-9Pro or small industrial type robot)
- Hydraulic or Pneumatic Press
- X or XY-Table
- Part Feeder
- Palletizing Rack
- Vision System
- Caliper
- Other devices

In determining the proper placement of these components, note the following considerations:

- The robot should easily access the conveyor, the buffers and each of the components.
- Ensure that there is easy access to each of the components for standalone operation.
- Try to reduce collision risks to a minimum.

Sample Project or User Defined Stations



Figure 60 and 20: Process Station and Mechatronic Station with SCORBOT ER-9



Figure 21 and 22: Industrial Hydraulic Press Station with SCORBOT ER-9Pro and Cartesian MTS Loader

4

PC Network Connections

This chapter describes how to set up the PC network. It includes the following sections:

- **Specifications**, below, contains the CIM system specifications which can be used as a guide.
- **Hardware Setup**, below, contains a general description for setting up the cable connections in the system.
- **Network Setup**, page 50, describes how to set up the PC network and define the names for the CIM Manager and Workstation PCs in the network.

Specifications

Refer to the specifications for each component in the CIM system. The following specifications can be used as a guide to operate the CIM system:

- **Computer:** PCs with standard CPU types available at the time of the installation.
- **Internal Memory:** As recommended for the selected Operating System
- **Ports:** USB, LAN, RS232 ports on request or via USB to RS232 adapter
- **Drives:** common size Hard Disk drive and CD/DVD ROM drive.
- **On request:** Additional LAN port or Internal PCI slots.
- **Operating System:** Windows 7 Professional 32Bit or 64Bit

Hardware Setup

To set up the hardware:

- 1 Plug the Hub/Switch/Router into to a power source.
- 2 Plug the LAN cables from the Hub/Switch/Router to each of the PCs in the system.

Network Setup

To set up the network:

- 1 Right click on **Network Neighborhood** icon on your desktop. A popup menu is displayed. Select **Properties** to display the properties dialog box and select the **Identification** tab. (This procedure may vary slightly depending on your operating system.)
- 2 Enter **CIM-MANAGER** as the manager's computer name.
- 3 Enter **CIM** as the workgroup.
- 4 Repeat steps 1 through 3 for each of the PC workstations, as follows:
 - Station 1 PC:
 - i. Enter **CIM-PC1** as the station 1 PC name.
 - ii. Enter **CIM** as the workgroup
 - Station 2 PC:
 - i. Enter **CIM-PC2** as the station 1 PC name.
 - ii. Enter **CIM** as the workgroup
 - Station 3 PC:
 - i. Enter **CIM-PC3** as the station 1 PC name.
 - ii. Enter **CIM** as the workgroup

Repeat the above for the remaining workstations in your CIM system.

Note: Make sure that when selecting the *Network Neighborhood* icon on your desktop, you can see the CIM workgroup in the browser tree, and that all the PC names can be seen from all computers.

- 5 In each of the computers in the system, select **Network Neighborhood** and then select the **Configuration** tab.
- 6 Select the **TCP/IP Driver** option and then select **Properties**. The TCP/IP Properties window is displayed. Ensure that the *Obtain IP Address Automatically* checkbox is selected.

In some cases it may be necessary to work with fixed IP addresses and the following systematic should be used:

CIM-MANAGER:	IP	192.168.0.1	Subnet Mask	255.255.255.0
CIM-PC1:	IP	192.168.0.11	Subnet Mask	255.255.255.0
CIM-PC2:	IP	192.168.0.12	Subnet Mask	255.255.255.0
CIM-PC3:	IP	192.168.0.13	Subnet Mask	255.255.255.0
CIM-PC4:	IP	192.168.0.14	Subnet Mask	255.255.255.0

etc.

5

OpenCIM Software Installation

For further details on instruction on the installation and configuration refer to the *OpenCIM User Manual* provided with the OpenCIM software.

Generic Software Installation Sequence

To install the OpenCIM Software and Device Drivers:

- 1 Install software that are required for the operation of specific station devices (robots, CNC, Vision etc.) on the relevant station PCs.
- 2 Install the OpenCIM software on the Manager PC (Setup menu option OpenCIM). Follow the detailed instructions for this step that are described in chapter 4 of the *OpenCIM User Manual*.
- 3 Import the specific project for your system via the Project Manager or create a customized project via the Virtual Setup module.
- 4 Enable relevant folder sharing as described in the user manual.
- 5 Install the OpenCIM software on the Station PCs (select the Workstation Environment option from the OpenCIM Installation setup menu). For each workstation, select the relevant workstation for the specific PC.

Testing the Device Drivers Communication

The various device drivers and their function and operation is described in chapter 9 of the OpenCIM user manual. Review that chapter in detail before proceeding.

After installing the OpenCIM Software and Device Drivers the next step is to test the communication between the Manager, device drivers and devices, described as follows:

- 1 From the **Manager PC**. Click on the  **Project Manager** icon on the manager computer. The CIM Project Manager window is displayed.
- 2 Double click on the specific project to activate the CIM Manager software. The CIM Manager window is displayed.
- 3 Click the  **CIM MODES** icon. The Modes window is displayed.
- 4 Select the **Real Mode** option and click **SAVE**.

5 Test the device drivers are working properly, as follows:

1. Click on the relevant device driver loader icon. For example:  Loader of WS1 . The **CIM DD Loader** window is displayed.
2. In the WSDDLoder window, ensure that the Load option is selected for the **SCORBASE DEVICE DRIVER** and click the green  **Run** button to test the device drivers. SCORBASE is loaded.
3. In the SCORBASE window a blue “Message send” message should appear indicating that the device driver can send messages to the manager .
4. Follow the standard procedure to home the robot. The device driver is then ready for operation
5. Follow the same procedure for all remaining SCORBASE Device Drivers.

Other device drivers similarly tested. Review chapter 9 of the *OpenCIM User Manual* for more details.

Acceptance Testing Procedures

After installing hardware, connecting the PC network and installing the software components the final step is to verify that the CIM system is working properly. This includes:

- Standalone Testing Procedures, below, describes how to prepare the parts and programs, as well as the machine and station testing procedures and more.
- Testing the CIM System in Real Mode, page 57, describes how to power up the system, initialize the system devices, activate the device drivers and run a test production in real mode.

Standalone Testing Procedures

This section describes standalone testing procedures required before running the CIM system in real mode.

The machine and station testing procedures contain the following:

- Preparing parts and programs required for the demo and tests.
- Testing each hardware component separately using the machine operational environment (in standalone mode).
- Testing each station using the OpenCIM device drivers.
- Testing the Production cycle in simulation mode.
- Testing the production in real mode, with the device drivers in simulation mode.
- Testing a full cycle using a single part of each type in dry run.
- Testing a full cycle using a single part of each type.
- Testing a full cycle using multiple parts of different types (described in the Testing the CIM System in Real Mode section.)

Each of these standalone procedures is described in full in the following section.

To perform the standalone testing procedures:

- 1 Prepare the parts and programs required for the demonstration run as well as the tests required for each machine and the PC manager station.
- 2 Test each hardware component (Robot, Machine, Vision, Conveyer, and so on) separately, using the machine operational environment (stand alone). Verify that the appropriate interface (hardware, communication and programs) exists between the stations.

Test the required hardware components, as follows:

- To test the ASRS:
 1. Run the SCORBASE software to operate the ASRS-36u.
 2. Home the robot.
 3. Manually send the ASRS to the positions used to access the conveyer and barcode and verify that all positions are taught correctly. See the *Position Table* provided with your CIM system for details.
- To test the conveyer:
 1. Operate the conveyer and PLC without pallets and verify smooth operation.
 2. Place pallets on the conveyer and verify that they are stopped and released at each station. Notice the PLC led indication of each palette ID.

Note: Ensure that the pallet arrows are pointing in the direction that the conveyer is moving.

- To test the robot:
 1. Run the SCORBASE software to operate the robot.
 2. Home the robot.
 3. Manually send the robot to all relevant positions, first without using parts, and then using parts, as follows:
 - i. Take a template from the conveyer and place it on the buffer. Then take the part off the buffer and place it in the machine.
 - ii. Take the part from machine and place it on the buffer. Then take the part off the buffer and place it on the conveyer.

Note: Be sure to test all positions by simulating a full production cycle.

4. Verify that the I/O connections exist between the machine and the robot (check the robot input is **ON/OFF** when the machine cycle starts and finishes.) See the provided *I/O Table* for details of your CIM system.
 5. Verify the RS-232 connection. (Start the CNC machine and use the **PLACE** or **CLEAR** programs in the ACL software to send RS-232 commands from the SCORBASE software to the CNC.)
- To test the CNC machine:
 1. Load the appropriate part and program into the CNC machine.
 2. Run a production cycle.
 3. Repeat for each part as described in the provided *Test Application Description*.

- To test the Vision Station:
 1. Place the part to be inspected under the vision system.
 2. Snap the picture and verify appropriate analysis by the vision system.

Repeat the previous steps for all parts as described in the *Test Application Description* provided with your CIM system.

Note: If light conditions (or any other conditions) could affect vision, test all relevant scenarios. For example, day, night, and open and closed shades.

Test each station (such as, FMS, Storage) using the appropriate OpenCIM Device drivers, as follows:

- To test the robot:

In the SCORBASE device driver select the Standalone Mode. Open the Pick and Place dialog box and send commands to the robot to move parts from one location to another (first running a cycle in dry run without using parts), as follows:

1. Take a template from the conveyer and place it on the buffer. Then take the part off the buffer and place it in the machine.
2. Take the part from machine and place it on the buffer. Then take the part off the buffer and place it on the conveyer.

Note: Be sure to test a full production cycle.

- To test the Barcode Reader:

- Using the Barcode reader device drivers, test the operation of the barcode reader (in standalone mode).

- To test the CNC machine:

- Operate the CNC machine for each device driver using available commands such as **Open Door, Close Door, Open Chuck Close Chuck, Start Cycle** and more.

- To test the Vision System:

Activate the vision system using the ViewFlex device driver as described in the *OpenCIM User Manual* and *ViewFlex User Manual* provided.

- 3 Test the production cycle using the CIM Manager application in simulation mode.
- 4 Test the production cycle using the CIM Manager application in simulation mode using device drivers.
- 5 Test a full production cycle using a single part of each type without using parts (dry run).
- 6 Test a full production cycle using a single part of each type.
- 7 Test a full production cycle using multiple parts of different types. (Described in detail in the Testing the CIM System in Real Mode section.)

Testing the CIM System in Real Mode

After performing the machine and station testing procedures, the next step is to power up the system and activate the devices and device drivers and run the production cycle in real mode.

This section includes:

- Powering Up the System, below
- Initializing System Devices, page 58
- Activating Device Drivers, page 59
- Preparing the System for Production, page 61
- Running the Manufacturing Process (Real Mode), page 62
- Documenting Test Procedures, page 62

Powering Up the System

To power up the system:

- 1 Turn on the Main Power Switch of the System.
- 2 Activate the air compressor.
- 3 Power on the computers in the following sequence:
 - **CIM-Manager Computer** (must be booted first since it shares folders with other PCs).
 - CIM-PC1
 - CIM-MILL
 - CIM-LATHE
 - CIM-PC2
 - CIM-PC3
 - CIM-PC4

If you start from the CIM Manager and proceed counter clockwise around the system you will automatically follow this sequence.

After the computers are booted you must login. Make sure the user displayed is identical to the PC-name listed above. The login must be in the same sequence as before.

Initializing System Devices

- 1 Most of the devices will be powered on automatically by the Main Switch, provided that the device power switch was in **ON** position and the system was shut-down by the Main Switch. Verify the correct status for each machine, each of which is described in the sections that follow:
 - Robots
 - CNC Machines
 - Vision System
 - Programmable Logic Controller (PLC) - Omron

Robots

Test the robots, as follows:

- Check that the robot controller is powered.
- Home the robot if necessary.
- Refer to the relevant user manuals for further details (robot, controller, software, Teach Pendant, and so on).

CNC Machines

- 1 Power on the CNC machine.
- 2 For PC operated machines, activate the control software.
- 3 Initialize the machine as required for the specific machine.
- 4 Activate the specific program or mode if required for the machine operation within the CIM system.

Vision System

To test the ViewFlex operation:

- 1 Activate Viewflex by double clicking the icon on the desktop.



The ViewFlex toolbar is displayed:



- 2 Select camera 1 and verify that a picture appears. If not, unplug the USB connector of the camera and plug it in again.
- 3 Exit the ViewFlex application.

Programmable Logic Controller (PLC) - Omron

To operate the PLC:

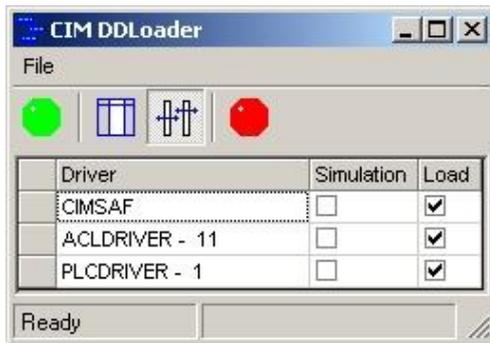
- Switch on the Power button on the lower left side of the PLC. The PLC unit will begin to operate.

Activating Device Drivers

Activate all Device Drivers (DDs) on Station PCs with the Loader Icon. The example below describes the procedure for Station 1 on CIM-PC1.

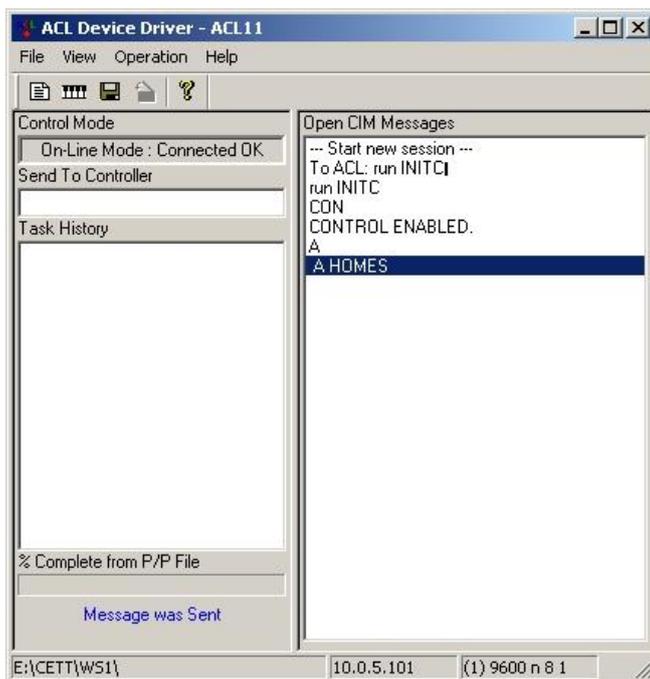
To activate the station 1 Device Drivers:

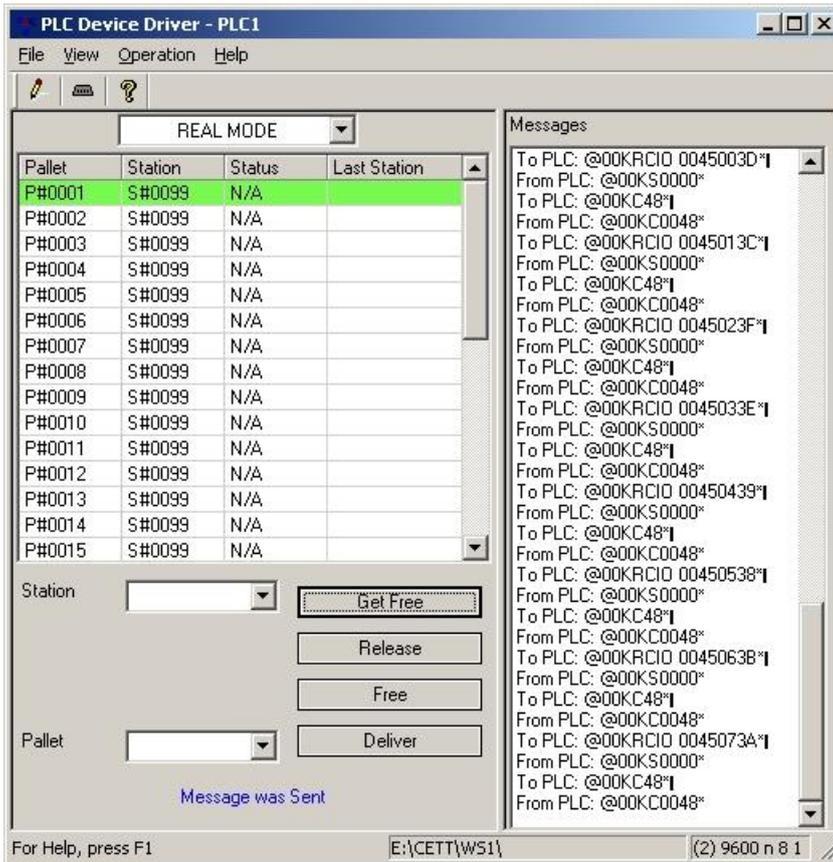
- 1 Double Click the  **Loader** Icon located in the lower right corner of the Desktop. The CIM DD Loader window is displayed.



- 2 Click on the green  **Start** button on the CIM DD Loader toolbar.

A CIM Safety message box and the Device Drivers will be displayed, as follows:



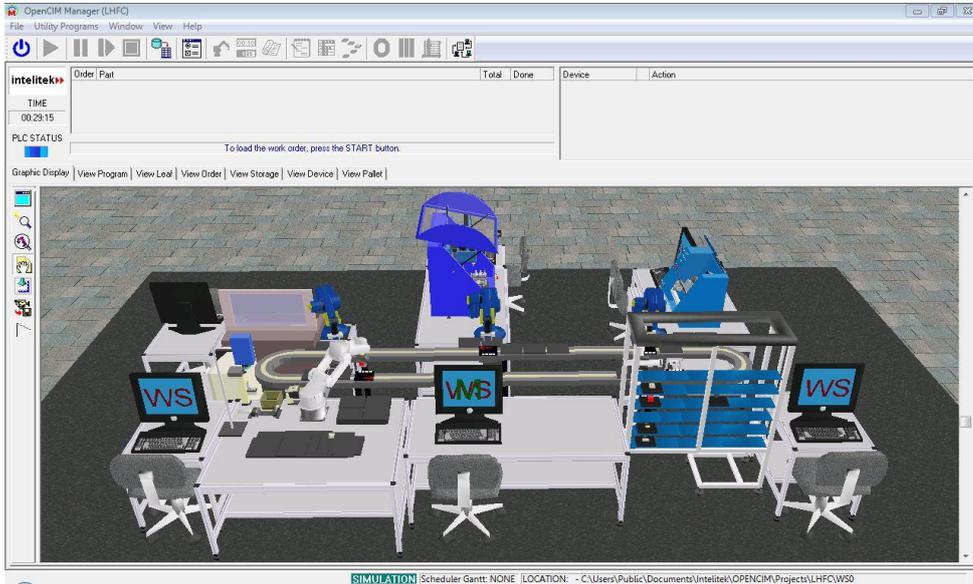


- 3 Repeat steps 1 through 2 for all stations.
- 4 Check the system for any visual for obstacles and return all parts/templates to their original location. Ensure that the templates are empty, parts are in their original storage location, and so on.

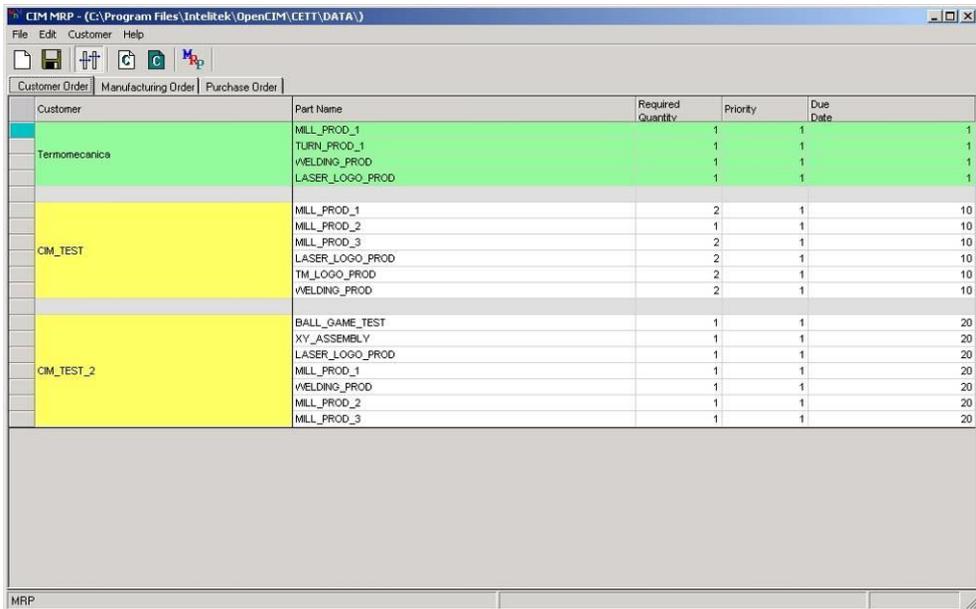
Preparing the System for Production

To prepare the system for production:

- 1 Activate the CIM Manager software on the PC Manager computer by double clicking on the **CIM Manager**  icon in the lower right corner of the desktop. The CIM Manager window is displayed.



- 2 From the *Utilities Programs* menu select the **MRP**. The CIM MRP window is displayed.



- 3 In the *Customer Order* tab of the CIM MRP window you can create a new order or modify an existing order. Click the **MRP**  icon to create the order.

- 4 In the *Manufacturing Order* tab, select an order date and click the **MO**  icon to submit the manufacturing order.

Order Date	Part Name	Total Quantity	Initial Quantity	Priority	Due Date
	8 MILL_PROD_1	1	1	1	1
	TURN_PROD_1	1	1	1	1
	WELDING_PROD	1	1	1	1
	LASER_LOGO_PROD	1	1	1	1
	9 MILL_PROD_1	2	1	1	10
	MILL_PROD_2	1	1	1	10
	MILL_PROD_3	2	1	1	10
	LASER_LOGO_PROD	2	1	1	10
	TM_LOGO_PROD	2	1	1	10
	WELDING_PROD	2	1	1	10
	18 BALL_GAME_TEST	1	1	1	20
	XY_ASSEMBLY	1	1	1	20
	LASER_LOGO_PROD	1	1	1	20
	MILL_PROD_1	1	1	1	20
	WELDING_PROD	1	1	1	20
	MILL_PROD_2	1	1	1	20
	MILL_PROD_3	1	1	1	20

Running the Manufacturing Process (Real Mode)

After submitting the order the next step is to run the Manufacturing Process with CIM Manager.

To run the manufacturing process:

- 1 From the CIM Manager window click the **Start**  button on the toolbar to initiate the communication. On all the device drivers you should see a message indicating a proper communication with the manager. In the device view of the manager you should see a green led for each active device. (Devices that are not required in the order display a yellow LED without disturbing the production process.)
- 2 Review the PLCDD, wait until the initialization script has finished processing and then start the conveyor.
- 3 Wait until at least one pallet has passed Station 1 completely. Then click the **Run**  button in the CIM Manager to start the production process.
- 4 Watch and study the manufacturing process. Take notes regarding the part flow and the manufacturing sequences.
- 5 The CIM Manager will send a message for each product group that has been completed. Once the entire order has been completed, the CIM Manager will display a message box.
- 6 Wait until all templates have returned to the ASRS and then press the **Stop**  button to stop the production process.

Documenting Test Procedures

Create the required testing documentation and define a test series that will check each of the available products and use each station at least once when running a manufacturing cycle.

Document your observations from each manufacturing cycle and report any irregular system performance to Intelitek Technical Support.