ViTrox V510 Optimus 3D
Advanced Optical Inspection System

Site Preparation Manual

Thank you for using ViTrox Product……

"… innovating vision!"

Notices

Revision

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Warranty

Technology Licenses

Restricted Rights Legend

Safety Notices

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Revision History

Revision	Type Of Change	Date	Author
A	First Release	27th Jan 2014	Khoo Chun Yeng
B	Change pictures	17th Aug 2016	Lee Chia Wei

Table of Contents

Table of Figures

1

Legal Information

This chapter holds the following sections:

Legal Information

Warranty

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2

Safety and Regulatory Information

This chapter holds the following sections:

Safety Information

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. ViTrox Technologies, Inc. assumes no liability for the customer's failure to comply with these requirements.

Safety Notice

⚠CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

⚠WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

General

This product is provided with a protective earth terminal. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

⚠WARNING

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE. Do not operate the product in the presence of flammable gases or flames.

⚠WARNING

DO NOT REMOVE RACK PANELS OR INSTRUMENT COVERS. Operating personnel must not remove any rack panels or instrument covers. Only qualified service personnel will allow making component replacement and internal adjustments. Products that appear damaged or defective should be made inoperative and secured against unintended operation until qualified service personnel can repair them.

⚠WARNING

The protection provided by the ViTrox V510 system may be impaired if the system is used in a manner not specified by ViTrox.

⚠WARNING

Do not position the ViTrox V510 system so that it is difficult to operate the disconnecting device. ViTrox recommend the system to be placed minimum 3 feet away any obstructing object.

Environmental Conditions

The ViTrox V510 Advanced Optical Inspection System is designed for indoor use only. **Table 2-1** shows general environmental requirements.

Tab l e 2 -1 Environment Requirements

Environment Conditions	Requirements
Maximum Altitude	2000 meters
Temperature (Operation)	5 ° C to 40°C
Maximum Relative Humidity	The test system is designed to operate in the range from 5% to 80% relative humidity (non-condensing) with 80% for temperature up to 31°C, decreasing linearly to 50% relative humidity at 40°C

⚠CAUTION

This product is designed for use in Installation Category II and Pollution Degree 2, per IEC 61010-1 and 664 respectively. The operating voltage should be in the range of 100-120 VAC with 50/60 Hz (16 A) and 200-240 VAC with 50/60 Hz(8 A), with the Mains Supply Voltage fluctuations not to exceed ±10% of the nominal voltage.

Before Applying Power

Verify that the product is set to match the available line voltage and all safety precautions are taken. Note the external markings of the instruments described in **"Regulatory Markings".**

Ground The System

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Fuses

Use only fuses with the required rated current, voltage, and specified type (normal blow, time delay). Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

⚠WARNING

In order to avoid electrical hazards, only trained and qualified personnel will allow replace all system internal fuses.

Operator Safety Information

⚠WARNING

Module connectors and Test Signal cables connected to them cannot be operator accessible.

Cables and connectors are considered inaccessible if a tool (e.g. screwdriver, wrench, socket, etc.) or a key (equipment in a locked cabinet) is required to gain access to a conductive surface connected to any cable conductor (High, Low or Guard).

⚠WARNING

Assure the equipment under test has adequate insulation between the cable connections and any operator-accessible parts (doors, covers, panels shields, cases, cabinets, etc.)

Verify there are multiple and sufficient protective means (rated for the voltages you are applying) to assure the operator will NOT come into contact with any energized conductor even if one of the protective means fails to work as intended. For example, the inner side of a case, cabinet, and door cover or panel can be covered with an insulating material as well as routing the test cables to the front panel connectors of the module through non-conductive, flexible conduit such as that used in electrical power distribution.

Machine's Intended Use

In addition with the above environmental conditions, the machine is designed to be use solely in a Surface Mount Technologies (SMT) production line.

⚠CAUTION

This machine must only be used with conveyors on both sides either in-line or in off-line operation. This is to prevent users from accessing pinch points inside the machine.

Electrical Safety

Electrical Enclosure

Live power and control circuits are situated in various parts of the machine.

- The **Main Control Panel** is accessed through the rear access panel, which is mechanically locked.

During the **Off** position, the machine only has main voltage on the primary side of the **Main Isolator**.

⚠WARNING

LETHAL VOLTAGE

DANGEROUS VOLTAGES (110/240 VAC) EXIST IN THIS EQUIPMENT. ENSURE THAT ALL ELECTRICAL ENCLOSURE COVERS ARE FITTED AND INTACT BEFORE OPERATING THE EQUIPMENT.

Emergency Stop Loop

The Emergency Stop (E-Stop) is designed according to the relevant safety standard. It is controlled using Honeywell SRS31 safety relay.

NOTE

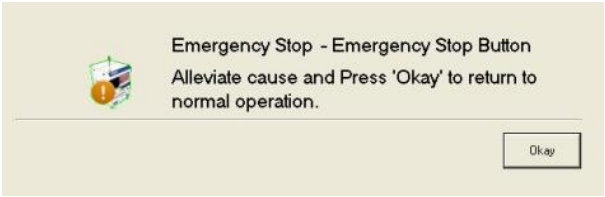
The V510 has three clearly visible and identifiable emergency stop buttons, one on the front of the machine and two on the back. To activate these buttons, push in once on the red pushbutton.

Refer to the hardware manual for E-stop locations on the V510. Opening the system's front access door also activates the E-stop system.

The Emergency stop circuit has the following attributes associated with it:

- During an E-Stop, power is removed from all motors including conveyors and XY Table. The only exception is that turning the maintenance key switch to the "on" position re-enables power to the clamping motors. This allows the clamping motors to be operated for engineering tests, troubleshooting or calibration.
- E-Stop overrides all modes of operation within the V510 machine.
- When power is removed from the system, the E-Stop is activated automatically and must be reset on powering the machine back up.

There are two ways to reset the E-stop. If the system software is running, click **Okay** to remove the E-stop condition. If the system software is not running, press the blue ES RESET button on the switch plate. In either case, you must first fix the condition that caused the E-stop by either closing the front door or pulling the E-stop button out.



Front Switch Panel – V510

- On startup, NO uncontrolled motion can occur.

The E-stop circuit has two channels, both of which go through all four E-stop switches and the front door switch. If either channel of the E-stop circuit is activated, an E-stop condition will result, and no motive power to the gantry or conveyor will be applied.

Resetting the E-stop circuit can only happen when both safety channels are closed.

In maintenance mode the user is permitted to operate the clamping mechanism, as described above.

Earth Bonding

All external metal surfaces are mechanically and electrically bonded to the machine earth point. The bonding wire used is identified by its green and yellow insulation.

⚠CAUTION

Never remove or cut these wires. If you find a cut or damaged connection, do not operate the machine and inform a suitable qualified person as soon as possible.

⚠WARNING

THIS MACHINE MUST ALWAYS BE EARTHED WHILE IN USE.

PC Safety

The PC's motherboard contains a lithium battery: CR2032 3V. See explanation of warning labels.

⚠CAUTION

Dangerous voltages may exist in the PC after the electrical supply has been disconnected.

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

Dispose of used batteries according to manufacturer instructions.

Physical Safety

Protective Guards

This machine is fitted with a set of protective guards that fully enclose any moving and electrical mechanisms that may harm you during normal use. Under no circumstances should these guards be removed.

DO NOT OPERATE THE MACHINE WHILE ANY OF THE SAFETY GUARDS ARE OPEN, LOOSE, DAMAGED OR MISSING. THIS INCLUDES ACCESS PANELS TO THE PC. THE PROTECTION PROVIDED MAY BE IMPAIRED IF IT IS NOT USED IN THE CORRECT MANNER.

Pinch Hazards

The machine is fitted with safety side panels on the left and right hand sides of the platform. These panels protect the user from electrical and mechanical hazards within the work area. The user is to be aware of potential pinch hazards situated at the conveyor entry and exit openings.

To prevent pinch hazards, it is recommended to add additional guards or covers preventing access to the conveyor entry and exit openings. These guards could be preventive guards or conveyors.

Moving parts at the conveyor Entry and Exit openings situated at the sides of the machine. These can cause finger and hand damage. No attempt should be made to operate the machine while personnel are working in these areas. E-stop the machine before placing fingers or hands in these areas. It should be additionally noted that ViTrox recommends that boards should only enter or exit the V510 on a conveyor - not via hand loading.

Machine Stability

This machine weighs approximately 750 kg, and has a low center of gravity.

Do not attempt to lift or tip the machine at either end or side, as you could damage both the machine and injured yourself. Do not even attempt this with the help of others.

Falling Objects

Do not store boards, equipment, stencils, or other material on top of the machine.

System Warning / Caution Labels

The following are a list of warnings and their associated explanation.

Tab l e 2 -2 Safety Symbols

Safety symbols	Explanation
	Warning electrical danger. Label located on both left and right side panels also on right rear door to indicate High Voltage within.
	General warning label. Located inside PC at the lithium battery.
	This indicates you must read the manual before operating the machine. Label located on front right side of the hood.
	Moving parts at the conveyor Entry and Exit openings (for the Board) at the sides of the machine, which could cause finger and hand damage.
	Warning that maintenance switch is in ON position. Using the maintenance GUI, the stops and clamps can be operated; therefore, be caution as pinch points around clamps can cause injury.
	Do not operate with guard removed. Lockout/tagout before servicing.
	Warning that magnetic field can be harmful to pacemaker wearers.
	Caution interaction with metallic objects may produce Pinch Hazard. Can be harmful to pacemaker wearers.
	Warning to mind your head. Label located on the front left and right sides of hood.

Regulatory Markings

Markings on the system, in manuals and on instruments provide information about compliance with international regulations. **Table 2-3** defines the markings you may find in a manual or on an instrument.

Table 2 -3 Regulatory Markings

Regulatory markings	
	This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Electrostatic Discharge (ESD) Precautions

Static electricity is destructive to your production process and the ViTrox V510. Careless handling and poor site planning can cause system reliability problems and reduce your product yield. The system may not be as easily damaged as the modules you will be testing, but good anti-static planning will help ensure high reliability.

The ESD symbol below indicates areas where ESD caution must be exercised. This is to prevent damage to instruments and/or test disruption.

ESD Symbol

Caution: Static Sensitive.

Electrostatic discharge in this area may cause equipment damage or test disruption.

While not an exhaustive list of anti-static precautions, Table 2-4 shows suggestions to consider as you plan your system area:

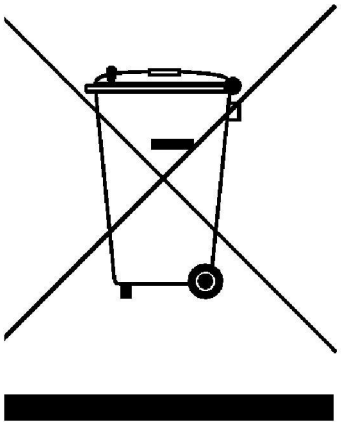
Tab l e 2 -4 Suggested Anti-Static Solutions for Site Planning

Precaution	Suggested Solution
Anti-static flooring	Plan to use an anti-static floor covering or mats.
Grounding straps	Plan for foot straps in conjunction with anti-static flooring and wrist straps for system operators.

The system test rack is secured to the pallet of the shipping crate and wrapped with a plastic wrap. Do not move the crate or the test rack and pallet to a static sensitive area until you have removed the plastic wrap from the test rack.

End of Life: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This product complies with the WEEE Directive (2002/96/EC) marking requirement. The affixed product label (see below) indicates that you must not discard this electrical/electronic product in domestic household waste.



Product Category:

With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control Instrumentation” product.

Do not dispose in domestic household waste

To return unwanted products, contact your local ViTrox office. For more information, see:

http://www.vitrox.com/

3

Introduction

This chapter holds the following sections:

Introduction

Purpose of This Document

Your ViTrox sales representative or customer engineer has given you this manual so you can be sure your site is prepared for installation of the ViTrox V510 system.

Please read it carefully and make sure you understand the requirements for installation of the V510 system. If you have any questions, contact your ViTrox sales representative or customer engineer.

Content of This Document

This manual describes what needs to be done prior to the V510 system delivery. A number of areas are addressed in this manual.

For example, included in this manual are a description of electrical power requirements and a requirements page for the electrician performing the electrical installation. Your site structural, electrical, environmental, and other required personnel should be consulted about “Moving the Unit" on page 19 and the connectivity requirements described on “General Machine Specifications" on page 21. These requirements must be met prior to the V510 - system installation.

Overview

The V510 - system consists of the following components:

- Main unit
- Accessories
- Electronics bay, which houses the computer and various electronics to run the system.

Depending on the configuration ordered, there may also be an Off Line Programming station (OLP) in another location.

The OLP is used for developing tests while the V510 system continues testing boards.

4

System Commission

This chapter holds the following sections:

This chapter describes how to start and shut down the V510.

System Commission

⚠CAUTION

When the machine has been kept in low temperature storage conditions (0°C to -40°C), it must be allowed to soak for at least 24 Hours in an 'Normal Operating' environment (10°C to 35°C) prior to installation. Make sure machine is completely dry prior to connecting it to the power.

System Delivery

The V510 system comes in a crate. The crate dimensions and weight are shown in table:

Tab l e 4 -1 Crate Dimensions and Weight

	Width	Depth	Height	Weight
Metric Measures	120 cm	148 cm	176 cm	1000Kg
Imperial Measures	48in	58in	69in	2245lb

Crate construction is a combination of nails and screws and cardboard. See General Machine Specifications for full dimensional details and a top view of the system after set up.

Moving the Unit

Procedure

1. Move the box using a forklift.
2. Once the top and bottom card surrounds are removed, remove the hold down straps at the feet.
3. Remove the vacuum bag off the machine.
4. Lift the main unit slowly off the pallet and move it to a safe location.

Moving Space

The V510 requires a vertical clearance of at least 150 centimeters (75 inches) and a horizontal clearance of at least 173 centimeters (56 inches) in all areas. This is the minimum space required for the V510 to through. The turning radius of the forklift or the moving equipment needs to be considered as well.

Forklift Requirements

A fork lift with tines of at least 153 centimeters (54 inches) and capable of lifting at least 1500 kilograms (5,000 pounds) at a load centre of 114 centimeters (45 inches) is needed to unload and move the system. Such a forklift is recommended for all V510 transportation.

Other transportation can be used as long as the full weight of the main unit is fully and properly supported.

⚠ WARNING

Failure to follow the requirements described above could result in V510 system damage and/or serious injury to personnel involved.

General Floor Plan

The floor plan incorporates areas needed around the machine to access panels and connection points for devices. Please carefully review the layout for connection point for power and product flow.

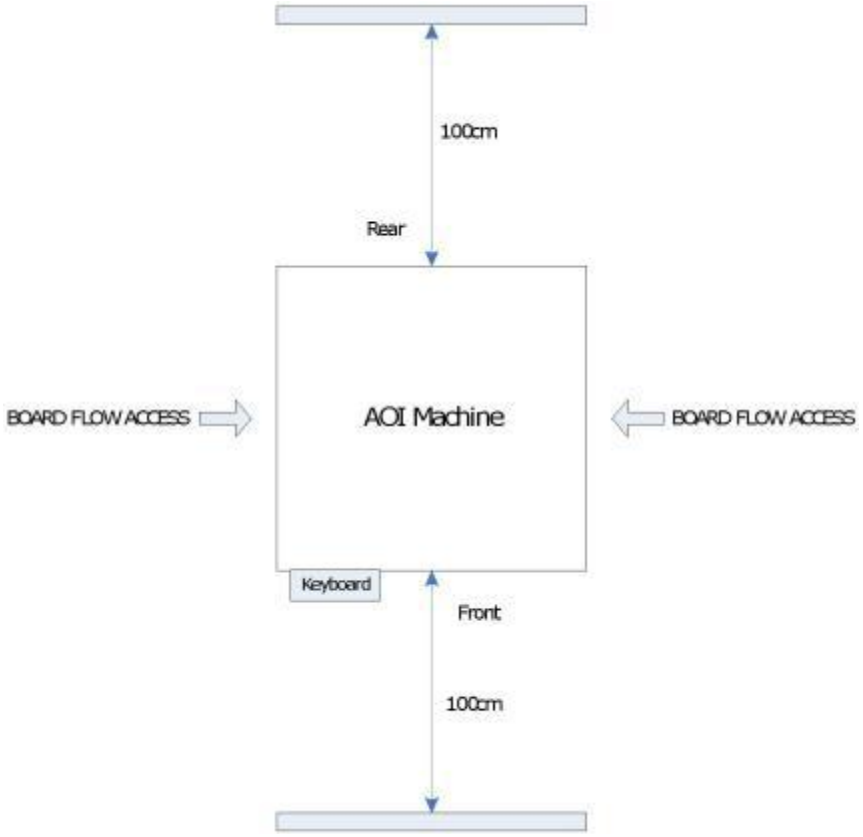


Figure 4- 1 General Floor Plan

Tab l e 4 -2 Board Flow Options

Board flow Options	Fixed Rail	Direction of flow
Left to Right	Front #	→
Right to Left	Front #	←
Left to Right	Back *	→
Right to Left	Back *	←

General Machine Specifications

The general machine specifications of V510 Optimus 3D are shown in Table 4-3:

Tab l e 4 -3 V510 Optimus 3D Dimensions

Dimension	Description	Values (mm)
A	Depth of system (with Ergotron Arm straight)	2452.3
B	Depth of system (without Ergotron Arm)	1352
C	Depth of Ergotron Arm (Arm fully extended)	1100
D	Height range of system (Including lighting tree)	1894 to 2038 (Nominal: 1996)
E	Height range of system (excluding light tree)	1432 to 1576 (Nominal: 1504)
F	Height range setting of feet (clearance under base)	60 to 150 (Nominal: 97)
G	Width of system	1060

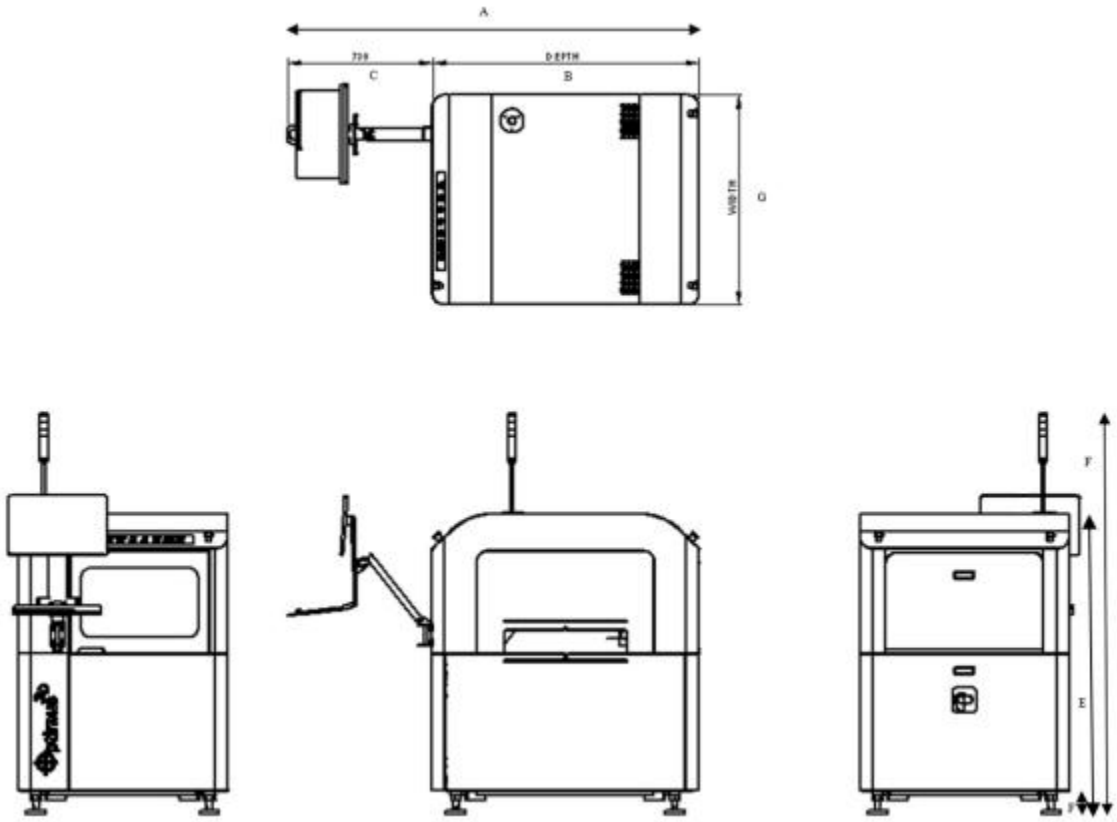


Figure 4- 2 V510 Optimus 3D Overall Dimensions

Additional Floor Plan Considerations

For user protection, ViTrox recommends that you consult an environmental health and safety professional concerning proper installation of a shield to both the exit and entry of your AOI systems to prevent user from physically reaching the pinch point hazard. ViTrox recommends the shield be constructed in conformance with Ref. EN294 Version 1992. As shown in Figure 4-3 on page 4-6, this shield should be 780mm in length extending from the each side of the system. The shield should have a top, a bottom and two sides to ensure access to the pinch point hazard is restricted. (Shield shown for the V510 Machine Configuration). If a closed top is not possible in your set-up then the sidewalls of the guard should extend up to the top of the inspection system. If a closed bottom is not possible in your set-up then the sidewalls of the guard should extend down to the floor.

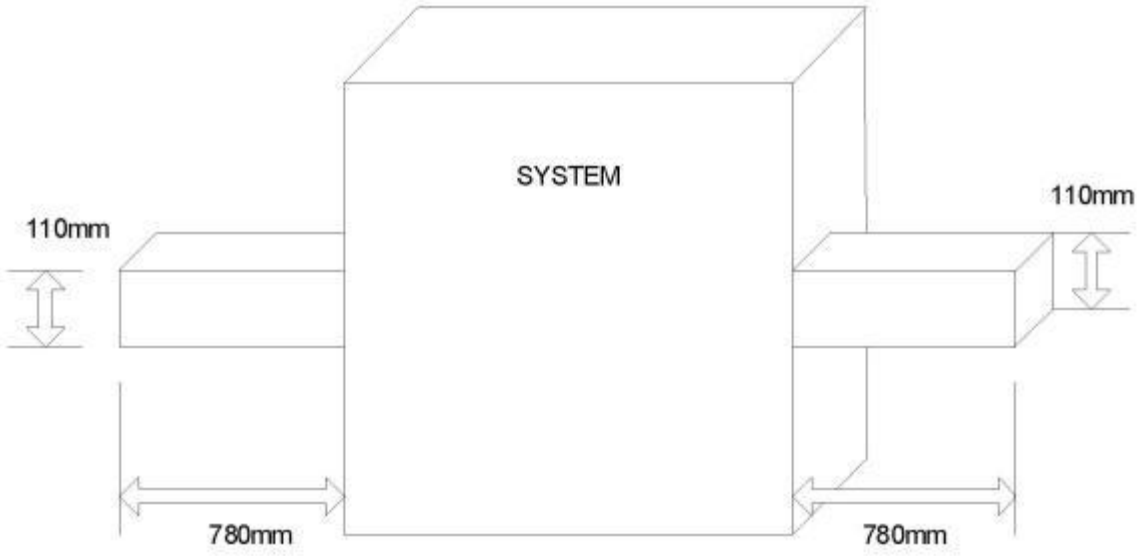


Figure 4- 3 Additional System Dimensions For Planning Purposes

5

Power Requirements and SMEMA Specifications

This chapter holds the following sections:

V510 Requirements

Electrical Requirements

Table 5-4 V510 Electrical Requirements

Voltage Ranges	Nominal Running Current	Installation Category	Mains Connection Type	System Mains Protection
100V-120V, 200V-240V, 50/60Hz	100V-120V, 200V-240V, 50/60Hz at 8A	Category II	Permanent Connection	16A ViTrox recommends the use of a branch type circuit breaker at the main distribution panel.

Important Electrical Information for Power Installation

The following are important information concerning the electrical power set up for the V510:

- Voltage, phase and configuration must match the power option (see Table 5-4 above).
- The circuit breaker requirement is indicated in the Systems Mains Protection in Table 5-4. Over current protection must exceed the maximum current according to local code.
- The power drop for the AOI must be a dedicated circuit from the facility panel board or bus way.
- The AOI has a switch that can be locked in the off position. However, a mains disconnect switch or circuit breaker may be located adjacent to the AOI if your needs or local code require it. It must be labeled "**MAINS DISCONNECT**" (or the local language equivalent) and the *on* and *off* positions must be marked **1** and **0** respectively. The switch is designed such that it can be locked in the *off* position but cannot be locked in the *on* position.
- If a circuit breaker is used for mains disconnect, it must be rated for a minimum of 10,000A interrupting capacity (AIC) for service voltages of up 240 VAC.
- Connections to the AOI by permanent wiring. All wiring must meet local electrical code.
- Plan to install a local power outlet box near the AOI for extra accessories such as a printer or ART terminal, rework station etc.. It is recommended that 4 additional outlets be installed near the machine. The AOI ships with outlets mounted internally for accessories that require 100V–120V AC, and 200V– 240V AC at 8A. Examples of such accessories could be internal computers, monitor and an optional bar code reader.
- Line conditioners and Automatic Voltage Regulators (AVRs) may be used for sites where there is poor power quality. A line conditioner or AVR must be rated at 5.0 KVA or greater.

SMEMA Specifications

Machine-to-Machine Communications

Machine to machine communications and physical machine dimensions for board travel height and direction for this equipment follow industry SMEMA standards.
Board flow and fixed rail position for the V510 is shown in Table 4-2 on page 20, General Floor Plan.

Conveyor Height

Each machine has a transport conveyor, height adjustment from 813mm(32”) to 965mm(38”) from the floor.
SMEMA Compatible upstream and downstream height is a minimum of 821mm and maximum of 965mm.

Edge Clearance Between Conveyor and Circuit Board

The conveyor requires an edge clearance of a minimum of 3.5mm to maximum 6mm.

Maximum Gap

The maximum gap between inline machine track ends is 9.5mm (0.375”).

Lead In

The minimum lead in on the track ends of the conveyor is 3.2mm (0.125”).

6

Additional Considerations

This chapter holds the following sections:

Description

ViTrox Technologies V510 series equipment can and usually comes with additional options.

The options for your systems are outlined on your purchase order. This document does not cover additional options. Please contact your local ViTrox support or sales person for details on any options ordered.

Support Tools

For support purposes, it is recommended that a phone (land) line and a network connection line be located with the system. A cordless phone with near system access is appropriate if a phone line is not feasible. These tools provide options for supportability.