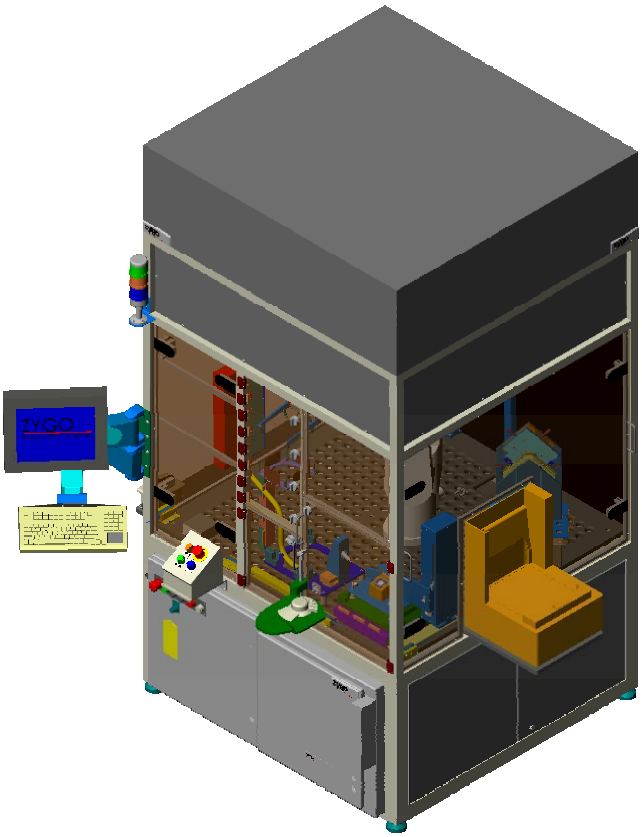
Automated Reticle Sorter/Inspection System
and
Automated Pellicle Mounting System
for IBM

Operator Manual

600-0133, Revision A
February 2001



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Automated Reticle Sorter/Inspection System
Automated Pellicle Mounting System
Operator Manual, Document Number 600-0133

This manual was written based on the following systems:

Zygo Project #	System Serial #	Top Level #	Install Location
500 (Ret Insp)	148-1100	100-0116	Essex Junction, VT
502 (Pel Mount)	149-1100	100-0117	Essex Junction, VT

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This document uses the following notation conventions:

Warning!	Indicates warnings critical to system operation. A **Warning!** means there is the possibility of personal injury to you or others or damage to the equipment or product. The operator or technician needs to take special notice of these **Warnings!** during operation, service, or repair of the equipment.
Note	Provides useful information about the topic under discussion.
Bolding, *italicizing*	Indicates notes, system and part identifications, word emphasis, and command names.

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Introduction to Manual

This manual provides the information needed to operate the ***Automated Reticle Sorter/Inspection and Pellicle Mounting System.*** It is written for the individuals responsible for the daily operation of the system.

Technical information for the Automated Reticle Macro Inspection System is found in the ***Automated Reticle Sorter/Inspection and Pellicle Mounting System Technical Reference Manual*** **(Document Number 600-0134, Rev A)**

The **Automated Reticle Sorter/Inspection and Pellicle Mounting System** is also known as and referred to in this manual as **ZARIS**.

This manual is divided into following chapters:

Chapter One: System Overview – this section provides an overview of the system, subsystems, and major components.

Chapter Two: Operator Interface – this chapter includes instructions for the operator to use the operator interface screens and system control buttons. Only the operator controls are included; the complete set of screens are included in the Technical Reference Manual.

Chapter Three: Operating Procedures – this section contains detailed operating information for the system. It includes procedures for system startup, operation, and shutdown.

Chapter Four: Troubleshooting – this section contains a list of the alarm conditions indicated by the system screens and display indicators. It also includes interpretations of each alarm condition and appropriate operator corrective action.

Chapter Five: Recovery Procedures – This chapter contains recovery procedures for all types of machine, alarm, and emergency stops.

Chapter Six: Preventative Maintenance – this section contains the preventative maintenance schedule. Only the operator maintenance schedule is included; the complete maintenance schedule is included in the Technical Reference Manual.

Safety

Safety Warnings and Labels

The following safety alert symbols are used to identify potential hazardous conditions on the equipment:

SAFETY ALERT SYMBOL	USAGE	DESCRIPTION
	General hazard	There is a danger of injury to the operator or technician if the procedures listed in this manual are not followed. Refer to this Safety chapter and other chapters or sections specific to the labeled hazard.
	Electrical hazard	There is a danger from high voltage electrical hazards. The workcell should be locked-out and tagged before proceeding beyond the label.
	Pinch point	There is a danger of pinching of hands, fingers or other body parts. Keep your hands clear when operating or servicing the workcell.
	Laser hazard	There is a class 2 laser in use. Do not remove any protective panels. For servicing, wear protective eyewear and do not stare into laser light.
	Burn hazard	There is a hot surface that can burn the hurt the operator or technician if caution is not used. Power off the workcell and allow the device to cool before servicing.

Note: These safety alert symbols comply with SEMI S2 requirements in the identification of potential safety hazards.

In this manual, the general alert **Warning!** indicates warnings critical to system operation. These **Warnings!** mean there is the possibility of personal injury to operator or technician or damage to the equipment or product. The operator or technician needs to take special notice of these **Warnings!** during operation, service, or repair of the

equipment. If applicable, the specific safety alert warning symbol is also provided to indicate the specific type of hazard associated with that procedure or component.

Warning!

Use extreme care around the electrical and moving parts of the Automated Reticle Inspection and Pellicle Mounting System because of the risk of personal injury.

The system includes safety mechanisms to protect the operator from inadvertently placing hands or equipment into the moving parts during operation. If the associated sensors are triggered, an emergency stop will result.

Safety Standards Compliance

The Automated Reticle Inspection and Pellicle Mounting System has been assessed to the following standards:

- SEMI Product Safety Guidelines, SEMI S2-93A
- SEMI Ergonomics Requirements, SEMI S8-95

Reports on SEMI compliance are on file at Zygo Automation Systems. Copies are available upon customer request.

The Automated Reticle Inspection and Pellicle Mounting System covered by this manual are custom manufactured for the customer. For ease of operator training, information on the operation of this machine is included in the Operator's Manual (Zygo Part Number 600-0133)

Zygo Automation is not responsible for verification of conformity to any standards or directives for customer supplied equipment. The customer is responsible for all continuing compliance.

General Safety Warnings

- Failure to use, maintain, or service Automated Reticle Inspection and Pellicle Mounting System in accordance with the Operator and Technical Reference Manuals and the associated vendor-supplied documentation may impair the safety protection provided by the system.
- A shock hazard exists within the high power control panel. There are some exposed 208VAC connections within the enclosure. A qualified electrician must

secure access to the Main Electrical Enclosure before attempting to operate, troubleshoot, or repair problems with the system.



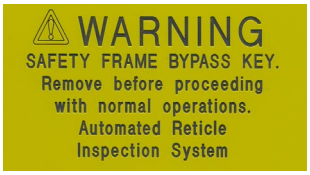


- Use one of the Emergency Machine Off (EMO) buttons in case of emergency when injury to personnel or damage to equipment or product is imminent.
- Do not disconnect or remove any of the safety devices installed on the machine. Under normal operating conditions, these devices protect the operator and technician from moving or electrical parts. The safety devices include the Emergency Machine Off button (EMO), the ROBOT STOP, MACHINE RESET pushbuttons, safety panels, and access doors.
- Observe all safety precautions at all times to reduce the chance of serious injury or equipment damage.
- Wear safety glasses at all times around operating equipment.
- Check pneumatic, electrical, and mechanical connections periodically for tightness and signs of wear. Replace or tighten, as required, to maintain the safety integrity of the system.
- Do not operate the ZARIS tool with the back panel removed. The back panel is not interlocked.





- Do not operate the ZARIS tool with the SAFETY FRAME BYPASS KEY on the ON position.

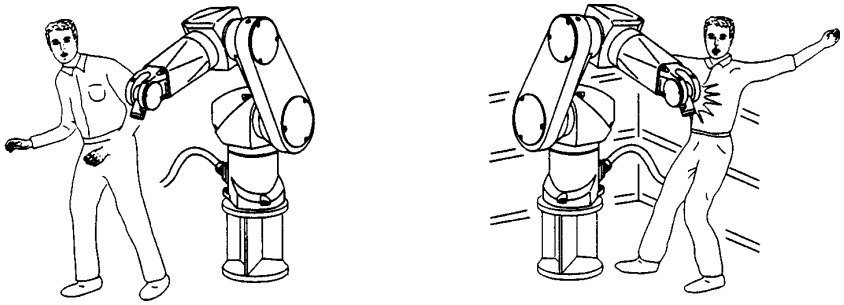


- Keep your hands clear of the Pellicle Mount Station and the SMIF Loader, there is a risk of getting your hands or fingers pinched in the mechanisms.



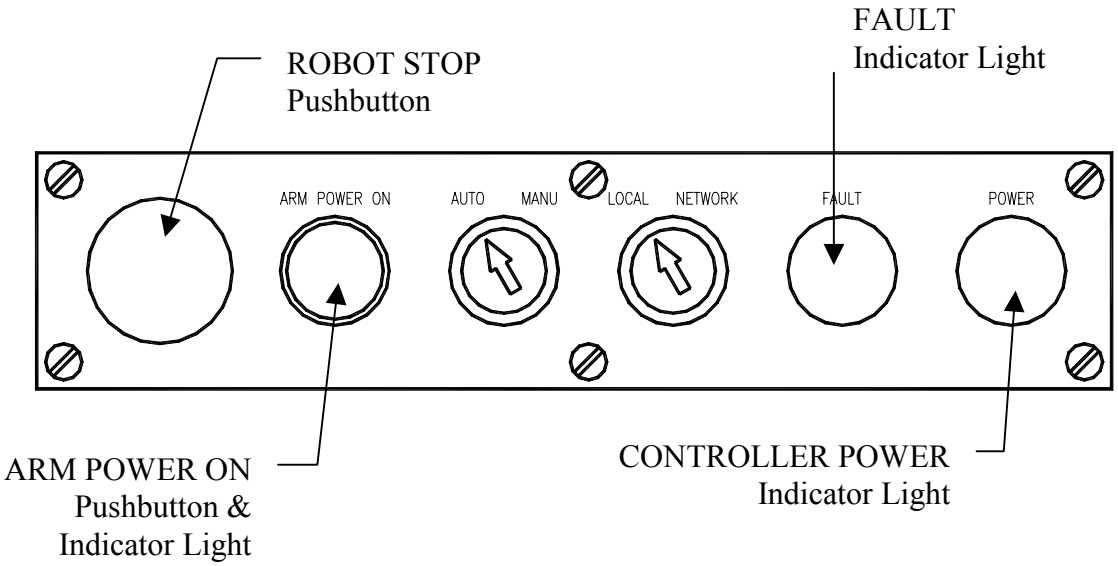
Robot Safety

Safety cannot be overemphasized when operating any robot system, including the Stäubli RX60 robot system. Before any operation begins, be sure to read and understand the following safety notices.



Note: Refer to the supplied Stäubli manuals for additional information related to the Robot, Robot Controller, Manual Control Pendant, and other associated equipment.

- Be familiar with the American National Standards Institute/Robotic Industries Association (ANSI/RIA) Safety Standard R15.06-1992.
- Ensure compliance with all local and national safety codes for the installation and operation of the robot.
- Observe the power and grounding instructions given in the robot manuals.
- The robot system should not be installed in an explosive atmosphere.
- Fire extinguishers should be located within easy access of the robot system.
- Do not enter the Robot area when the green ARM POWER ON or ARM POWER indicator lights or the orange PROG RUN indicator light on the Robot Controller (local or remote) are on. Refer to the figure below.



- The following design and construction techniques were used for this robot system:
    - Installation of a safety enclosure, and safety interlock switches on access doors and panels that drop power to the robot if they are opened or removed
    - Installation of Emergency Machine Off (EMO) circuits and ROBOT STOP buttons.
    - The EMO circuit cuts electrical power to all components in the system except the relay required to restart the machine.
    - The Robot Stop circuit cuts electrical power to the Robot Arm.

Robot Operation Safety Procedures

Safety precautions should always be observed when operating robot systems. As with any electromechanical machine or component, unpredictable failures could occur while the system is in operation.

Warning!

Whenever possible, electrical power and air pressure to the robot system should be turned off and disconnected before entering the robot work area. If it is not possible to disconnect power and air pressure due to the nature of the operation or maintenance task, extreme caution should be observed.

If you must penetrate the work area while electrical power is active, you must use the Safety Frame Bypass Keyswitch and carry the Manual Control Pendant into the work area to ensure that you remain in control of robot power.

Pressing the ROBOT STOP pushbutton or releasing the dead-man switch on the Manual Control Pendant activates the machine stop circuit, which removes robot arm power. You should ensure, however, that all potentially hazardous conditions are removed or otherwise secured before penetrating the work area.

- The robot arm moves with great force and speed. Therefore, serious injury could result from failure to observe caution when the work area is penetrated. As stated above, power and air pressure to the robot should be turned off and disconnected first, whenever possible.

- Before reconnecting power and air pressure, always check the robot work area for adequate clearance. Be certain no one is in the robot work area.

- All personnel working with the system must have, at a minimum, instruction and practice in the use of the safety devices on the system. Safety procedures should be thoroughly reviewed to ensure complete understanding.

- Utilize signs around the robot and at power disconnects to alert others to potential hazards.

Safety Inspections

Before servicing the robot system, verify that:

- Pressing the ROBOT STOP button causes Robot power to drop immediately.
- Another person familiar with power-off controls is in the immediate vicinity to turn the power off should it become necessary.

Start-up Safety Procedures

Warning!

Ensure all personnel have exited the restricted space prior to applying controller power.

Before applying power, verify that the following have been installed and are functioning as intended:

- Mechanical mounting and stability components
- Electrical connections
- Utility connections
- Communications connections
- Peripheral equipment and systems
- Safety barriers

After applying power, verify that

- Emergency stop devices are functional
- Each axis moves and is restricted as intended
- Program executes as intended
- Safety interlocks function
- Safeguards are functional

Lockouts and Tagouts

General Access Procedures

The ARHS System has been designed for easy access to components located under the table, inside the workcell, and in the Power and Control Enclosures.

The lift-off panels and hinged doors mounted to the frame that provide access to the robot work area are protected by safety interlock switches. The enclosures located under the worktable have mechanical locks that require a tool to unlock.

Warning!

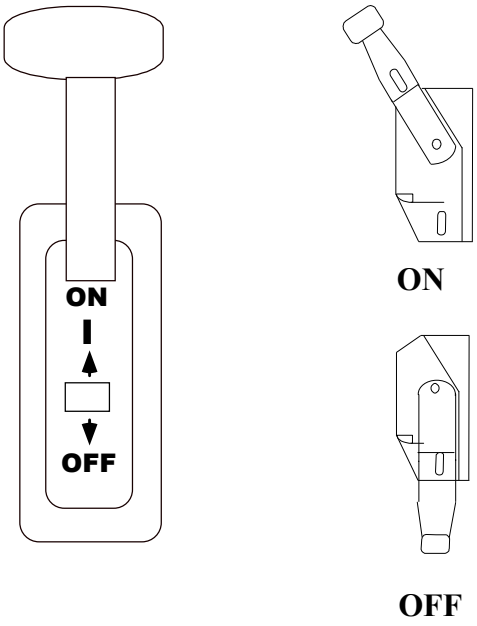
Only qualified personnel should attempt to access the interior of the workcell. Specific procedures must be followed to ensure that work area is secured and is safe to work in.

To gain access to the robot work area, the EMO or ROBOT STOP button must be pressed. This activates the EMO or Robot Stop circuits.

The EMO shuts off electrical power and pneumatic air to all components including the Robot Arm and Robot Controller. The Robot Stop removes electrical power from the Robot Arm.

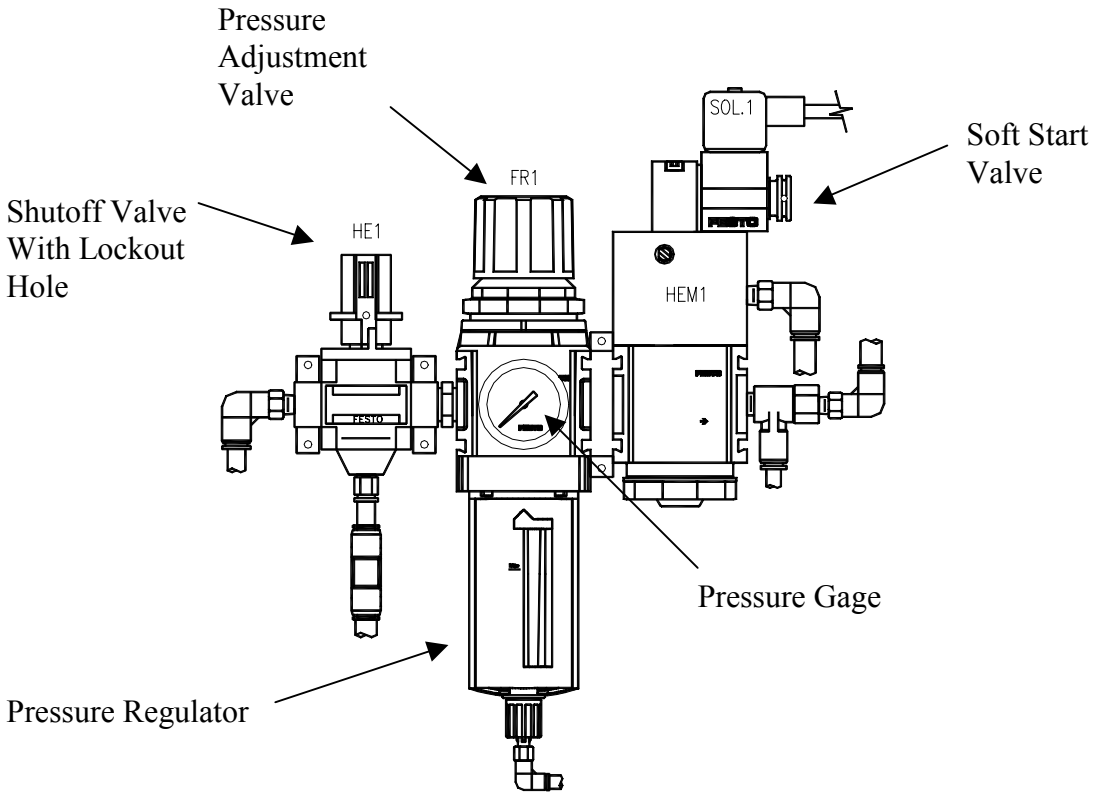
Installing Lockout Devices

The following general procedures should be followed if maintenance or servicing is required of high voltage components or circuits, pneumatically actuated equipment, or the Robot or Controller:



- Move the Main Electrical Disconnect Handle to the OFF position.
- Mechanically lock out electrical power using approved lockout devices. Refer to internal procedures for specific procedures to be used to lockout equipment during maintenance and service procedures.
- Tag the Main Electrical Disconnect Handle using authorized procedures and tags.
- Turn the red ring on the pneumatic Shutoff Valve 90 degrees clockwise to the OFF position. The Shutoff Valve is part of the combination valve located in the Pneumatics Enclosure.

- Place a lockout device and tag on the hole provided in the red ring.



Note: Refer to internal procedures for specific procedures to be used to lockout equipment during maintenance and service procedures.

Removing Lockout Devices

Warning!

Only authorized individuals should remove lockout devices and tags. Unauthorized removal of lockout devices and tags can result in injury to personnel and damage to equipment if unplanned electrical power is applied to the machine.



- Comply with internal procedures for the removal of lockout devices.

- Resolve condition that caused the system pneumatics or electrical system to be locked out.
- Remove lockout device from the Shutoff Valve in the Pneumatics Enclosure.
- Turn the red ring on the Shutoff Valve 90 degrees counterclockwise to the SUP position.
- Remove the lockout device from the Main Electrical Disconnect Handle.
- Move the Main Electrical Disconnect Handle to the ON position.

ASYST Reticle SMIF Pod Loader Safety

Please read the following before operating the system.



WARNING!

The ASYST model VersaPort 2200 Reticle SMIF Pod Loader is a Class 2 laser device and appropriate cautions must be taken by operators and maintenance personnel.

CAUTION!

Laser radiation when open. Do not stare into beam.

The SMIF LPX-2200 Reticle SMIF Pod Loader contains a Class II laser diode (670nm wavelength). The indexer is designed to prevent the operator from being exposed to the laser beam. During normal operation, or in AUTO mode, the laser is enabled only while the port door is lowering with a Pod locked to the port plate. The Loader protects the operator from exposure to the laser beam.

The laser beam is not harmful to the skin. There is no danger to arms or hands to the beam. The only possible health hazard is in exposing the eyes to the laser beam. Damage to the eyes can occur if the operator stares directly into the beam.

The following laser classifications apply to the barcode readers:

FDA	Class II
IEC 825-1 11.1993	Class 2

Proper safety procedures must be followed when adjusting or maintaining the laser or mirrors.

Laser Safety Procedure

Any combination of following indications shows possible laser emission.

- Reticle indexer is moving
- Red visible light can be seen emitting from the reticle indexer.
- The system software is indicating that the reticle indexer is moving.



CAUTION!

- Unauthorized or untrained personnel should not attempt any adjustments to the reticle indexer or the beam reflecting mirrors. Improper adjustment of these items could increase the risk of eye damage.
- Read and follow the *ASYST SMIF LPX-2200 Reticle Indexer Operating and Instruction Manual* before attempting any adjustments or servicing of the reticle indexer.
- When making adjustments to the reticle indexer, wear appropriate laser eye protection.
- When operating the reticle indexer laser in a manual mode, do not turn the laser on for any period longer than is required for testing or maintenance.
- Do not use the reticle indexer laser for other purpose than that which it is configured.
- Do not stare directly into the laser light.

SENA Superbeam High Intensity Light

WARNING

Do not attempt to touch or perform maintenance on the SENA High Intensity Light immediately after the power is shut off.

The housing and the lamps are very hot while light is on and immediately after the power is switched off. The maintenance activities must be carried out when the temperature of the units is low enough for handling.



The following safety warnings exist for the SENA High Intensity Light:

- Do not look at the light source or reflected light directly.
- Do not touch the housing or the lamp while lamp is turned on or immediately after the power is switched off.
- Do not touch the electrified part.
- No cleaning or replacement of the lamp is allowed unless the power is switched off.
- Do not modify the equipment without permission.
- Do not operate the equipment when the cover is opened.
- Do not attempt to perform any maintenance on the unit. Call appropriate maintenance personnel.

For maintenance and servicing personnel:

- Do not use the lamp house combined with an unspecified power supply unit.
- Do not use the power supply unit combined with an unspecified lamp house.
- Do not apply any unspecified power source.
- Do not use an unspecified lamp and/or lamp socket.

System Overview

Chapter 1

In This Chapter

- General Overview
- Description of Subsystems, Components, and Circuits

General Overview

The purpose of the Automated Reticle Inspection and Pellicle Mounting System (ZARIS) is to allow an operator to do a macro inspection of a reticle and/or mount a pellicle to the reticle without the need for the operator to handle the reticle or pellicle.

The ZARIS is a self-contained workcell. All reticle manipulations and transfers are performed by the robot located in the middle of the workcell.

The operator places a cassette containing a reticle and a cassette containing a pellicle into the appropriate cassette load/unload port. The operator then uses a touchscreen to instruct the robot to perform the following tasks:

- Remove a reticle from an ICS shipper cassette or SMIF Pod using the robot's end effector.
- Allow the operator to determine the orientation of the reticle.
- Remove a pellicle from a pellicle shipping container.
- Mount the pellicle to the reticle.
- Present the reticle to the bright light Macro Inspection Station. Manipulate the reticle under the bright light as instructed by the operator via the Space Mouse.
- Manipulate the reticle using a stored inspection program.
- Clean the reticle using the Cleaning Gun.
- Place the reticle into a selected output cassette.

These tasks may be performed in any order, as necessary, as determined by the operator.

Description of Subsystems, Components, and Circuits

Refer to the assembly drawings and electrical schematics in the Appendix of the Technical Reference manual for more information. In addition to the information contained in this document, vendor manuals for many of the major subsystems are provided.

Stäubli Robot Subsystem

The Stäubli Robot Subsystem is comprised of three major components – the RX60 Robot, CS7 MB Controller, and the Manual Control Pendent (MCP).

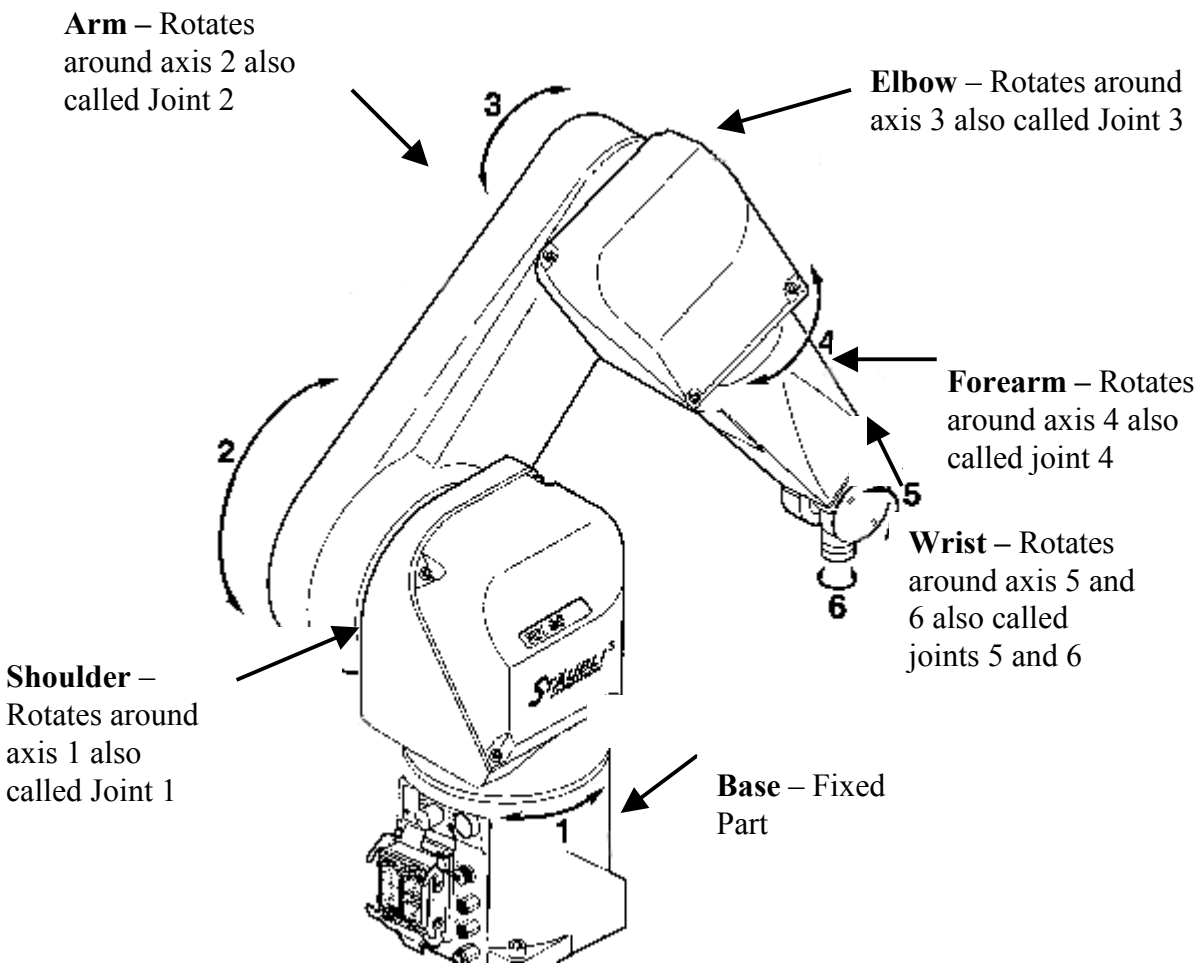
> **Note:** Refer to the Stäubli Robot RX60 manuals for detailed information related to the Robot and Robot Controller and their operation, installation, maintenance, and control.

Stäubli RX60 Robot – The RX60 Robot is used to move and manipulate the reticle. The revolute-type robot with six degrees of freedom consists of a mechanical arm assembly and a controller, connected via an interconnect cable located under the right side of the worktable.

The arm consists of segments or members interconnected by joints. Each joint comprises an axis around which two members pivot. The various elements of the robot arm are often referred to as: the base, the shoulder, the arm, the elbow, the forearm, and the wrist.

See Figure 1-1 Stäubli Robot for a location of these parts. The robot arm assembly contains the motorization, brakes, motion transmission mechanisms, cable bundle, pneumatic and electrical circuits for the user. An umbilical cable (E10 cable) mounted between the robot's forearm and End of Arm Tooling (EOAT) contains the electrical and pneumatic wiring and tubing required to control the crash detector and end effector. Brushless motors that are coupled to resolvers generate the robot's joint movements. The robot's assembly, associated with an innovative counting system, allows the absolute position of the robot to be known at all times.

Figure 1-1 Stäubli Robot

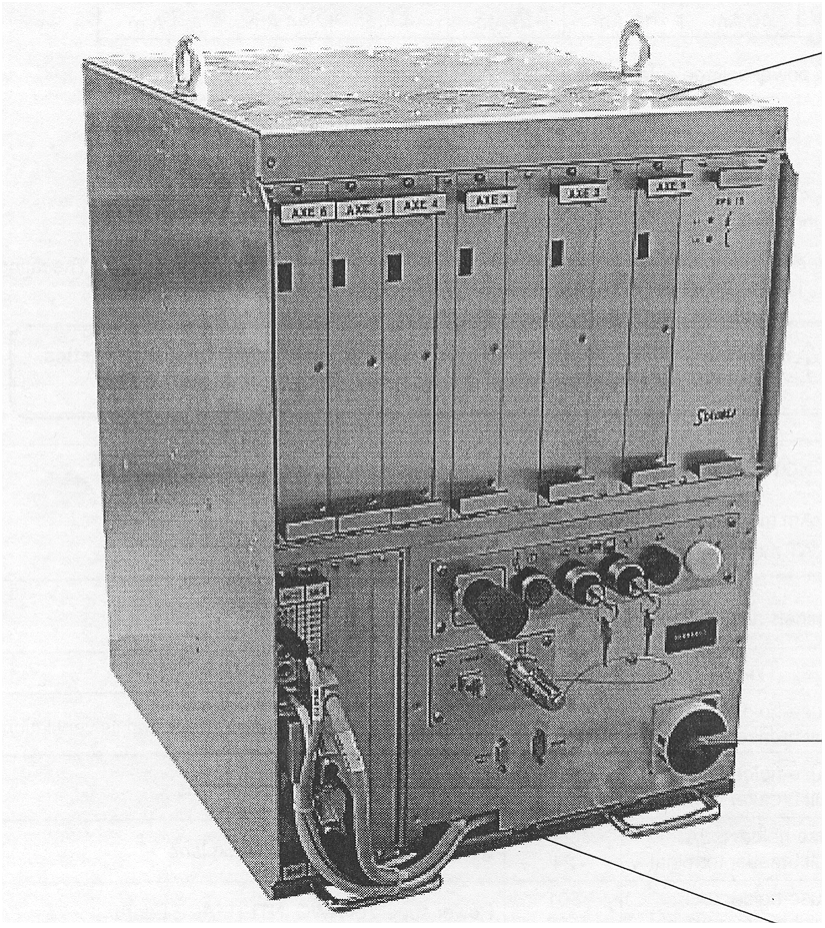


Stäubli CS7 MB Controller – The Robot Controller sits under the workcell table and is located behind the Controller Access Panel located under the left side of the workcell. The Robot Controller is on a cart to allow for easier service removal.

> **Note:** Do not turn off the controller battery switch or disconnect the power from the controller for extended periods. This may result in loss of the Robot's reference points and a requirement to re-teach robot points.

The Controller cabinet consists of a controller, power amplifiers, battery, and associated equipment. The controller is the intelligent part of the installation that controls the robot through the power amplifiers dedicated to each arm joint. A power block converts the three-phase voltage supply obtained from the electrical network into the voltages required for operating the controller and its sub-components. See Figure 1-2 Stäubli Controller below.

Figure 1-2 Stäubli Controller

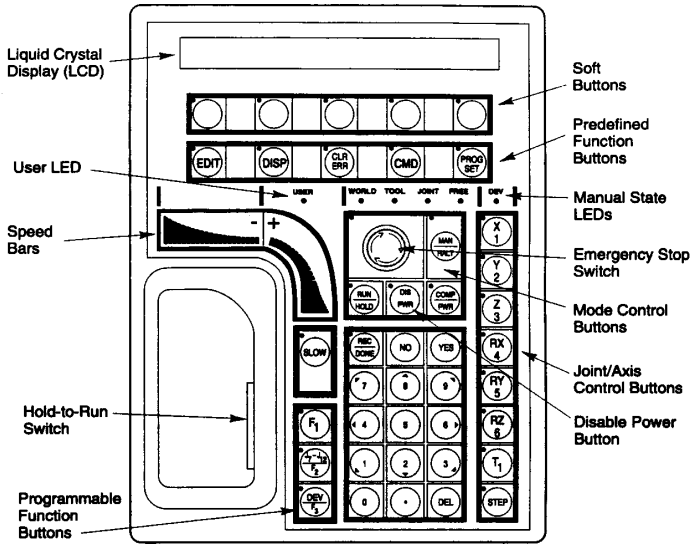


Manual Control Pendant (MCP) – The Pendant is used to train the Robot's points. It is attached to the Remote Panel. A complete description of the Stäubli MCP and its operation is contained in Stäubli Robot manuals.

It also contains a hold-to-run switch (dead man switch) to authorize power to the Robot Arm by closing the Machine Stop circuit. When the hold-to-run switch is released, power is removed from the arm.

The Manual Control Pendant also has a lockable emergency stop button which is connected the Machine Stop circuit.

Figure 1-2 Manual Control Pendant (MCP)



Caution!

Do not operate the machine with Pendant attached to the ZARIS System either standalone or mounted in the mounting plate. Disconnect the Pendant from the Controller Panel (either Remote or Main) when not in use and store.

User Interface Subsystem

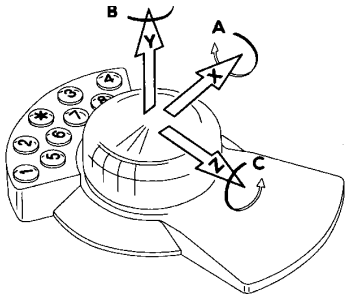
The user interface subsystem is comprised of a touchscreen, keyboard, and the Magellan Space Mouse. The ZARIS user interface software is run on the Adept Controller.

Touchscreen Flat Panel Display and Keyboard – The primary operator interface is through the Icon IP-1500 Touchscreen. This monitor has a 15-inch LCD display with a resistive touchscreen. The touchscreen display is mounted on an adjustable, cantilevered support mounted to the left front of the machine. The touchscreen provides a graphical display of the ZARIS system's status. The touchscreen is also used, along with the keyboard, as a means for the operator to input instructions to the system.

The command buttons displayed on the screen activate the various functions and obtain information related to ZARIS System operation and status. Chapter 3 contains a complete description of all the ZARIS System screens and their functions. The ZARIS

Operator's Manual contains information related to the operation of the system using the operator-accessible screens. Chapter 5 and 6 of this manual contain instructions for the technician screens and the use of the screens in the troubleshooting and maintenance of the system.

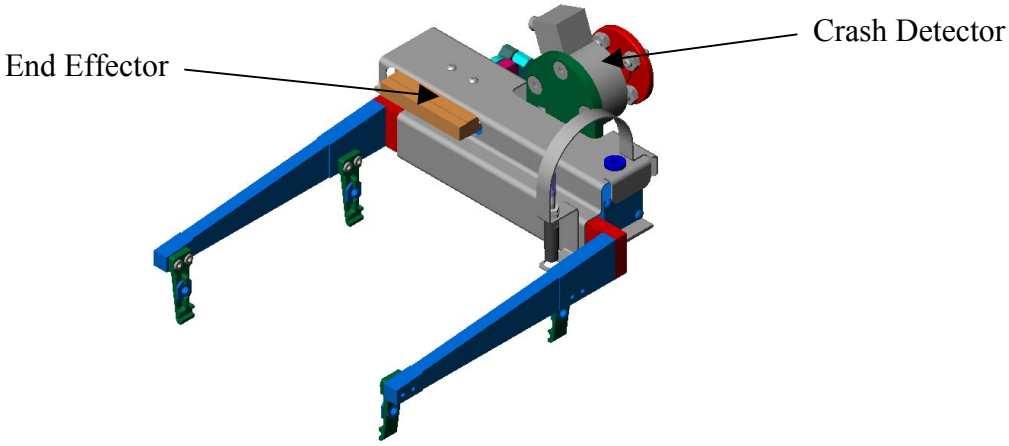
Magellan/Space Mouse – The Magellan Space Mouse is an input device that allows the user to simultaneously control the robot end effector in six degrees of freedom. Translational movement shifts the robot end effector in space without changing its orientation. This kind of motion is simultaneously possible along the x-, y-, and z-axes or planes. A rotational movement changes the object's orientation in space. This motion may be generated by rotations around the x-, y-, and z-axes simultaneously.



Refer to the ZARIS Operator's Manual, Chapter 2, for instructions on the use of the Space Mouse and its buttons.

Robot End Effector and Crash Detector

Crash Detection Device



The crash detection device has two purposes. First and most importantly, the crash detector will stop the robot immediately should the end effector strike a person or object. This device greatly reduces the risks of injury to the technician when they must be working close to the robot during maintenance or point teaching.

The second purpose of the crash detector is to minimize damage to the robot and end effector tooling during a robot crash. The end effector tooling is the most likely item to be damaged.

The ZARIS system utilizes the ATI SR45 Special crash detector. A sensor within the crash detector senses when the device is in its locked (operating) position. If axial or lateral forces are applied with sufficient force, the crash detector complies. When this happens, the sensor goes off. Since the sensor is wired into the machine stop circuit, the

robot arm power will immediately by dropped.

Robot arm power and machine start cannot be completed until the crash detector is physically reset.

End Effector

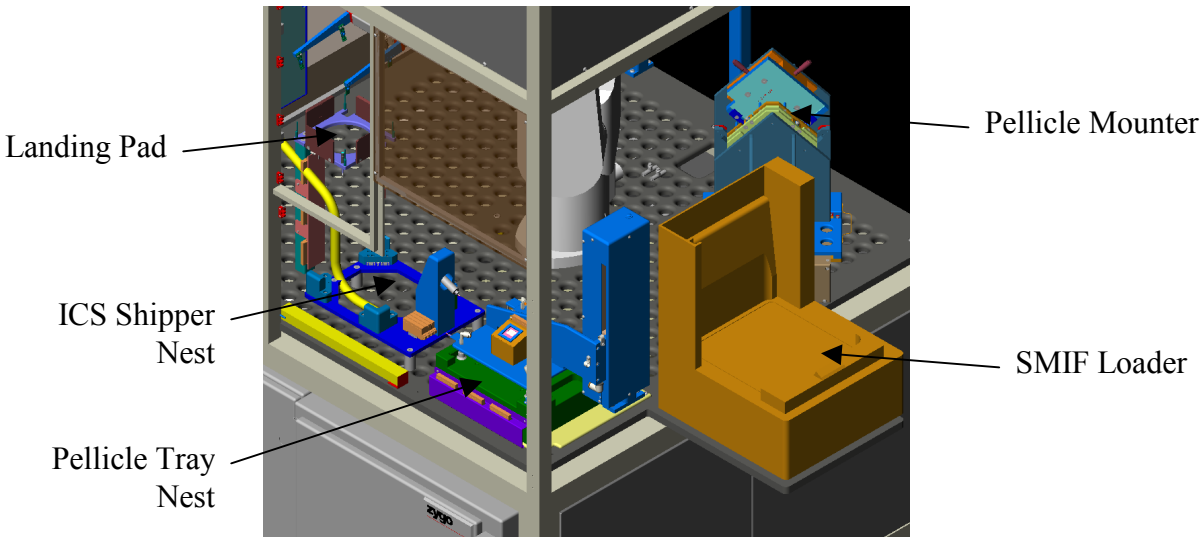
The ZARIS end effector has the ability to grip reticles, pellicle trays, and reticles with pellicle. The end effector is designed to handle the reticles and pellicle trays in and out of the cassettes as well as loading them to the pellicle mount station.

The end effector has a pneumatic actuator that opens and closes the gripper arms around the reticle or pellicle tray so that it they held securely. Elastomeric pads protect reticles from damage by the end effector. Two sensors on the gripper provide feedback to the controller for gripper open, gripper closed, and gripper closed with reticle. In addition, a retro-reflective sensor detects the presence of a reticle in the gripper.

Reticle Input/Output Ports

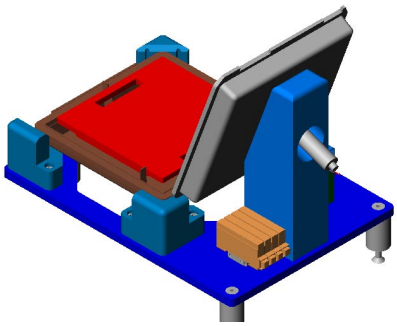
There are two input/output ports designed to allow the operator to present and remove reticle cassettes from the workcell: the ICS Shipper Port and the SMIF Pod Port.

Figure 1-3 Reticle and Pellicle Load/Unload Ports



The operator loads shipper cassettes and SMIF Pods on to the appropriate port. The robot retrieves the reticle from the cassette or pod for inspection and returns it to a cassette or pod depending upon the operators selection. The operator is only permitted to load or unload the ICS Shipper Port when the robot is at the Park Switch. If the front access door is opened before the robot is on the park switch, then a Machine Stop condition occurs.

ICS Shipper Port – The ICS Shipper Port is located behind the Left Door directly below Macro Inspection Station. The operator must physically open the top cover of a ICS Shipper cassette when it is loaded into the port. A sensor on the lid support detects the lid in the open position. Three corner sensors verify that the cassette is fully seated in the nest. A retro-reflective sensor detects the reticle presence in the cassette.

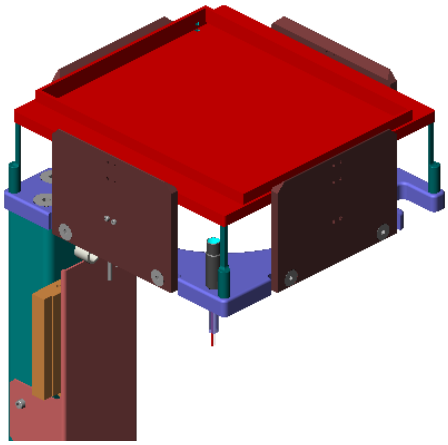


SMIF Pod Loader – Reticles can be introduced or removed from the tool with a single-reticle 200mm SMIF Pod. The SMIF Pod is placed on the SMIF Loader. The Loader accommodates only single-reticle SMIF Pods. When the operator places a pod on the loader, it will open the pod and present the reticle to the robot. After the robot places a reticle to the SMIF Loader, the robot parks and the loader will close the pod allowing the operator to remove the pod.

The SMIF Loader is commanded by the robot controller through serial communication.

Landing Pad

The landing pad provides the robot a location to temporarily place a reticle. Reticles are placed on the Landing Pad for the following reasons:



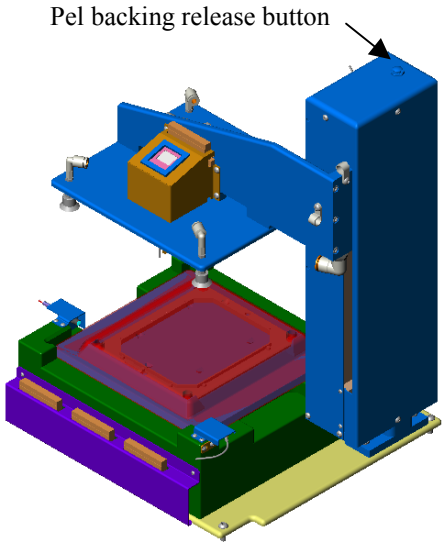
- resting location for a reticle while the robot waits for its next operator command
- to detect if the reticle is in a chrome-up orientation
- temporary location to place a reticle as the robot reorients the end effector either by flipping or rotating 90º

The Landing Pad has the following sensors:

- dual output sensor to detect reticle presence and chrome-up orientation.
- thru-beam sensor to detect pellicle-up orientation
- thru-beam sensor to detect pellicle-down orientation

Pellicle Tray Nest and Cover Lift

Unmounted pellicles are entered into the workcell by having the operator place a pellicle box onto the pellicle tray nest. The robot must be at its Park position before the operator opens the access door.



The Cover Lift device will lift the cover off of the pellicle box using four vacuum cups on the four corners of the cover. The vacuum is supplied by the customer through the pneumatics enclosure. A vacuum valve is mounted within the enclosure for turning vacuum on to the cups.

The robot will remove the pellicle (in pellicle tray) from the pellicle box. After the pellicle is mounted to a reticle, the robot will return the empty pellicle tray to the empty pellicle box. After the cover has been replaced, then the operator can remove the empty pellicle box and, if desired, place a new pellicle box onto the nest.

The Pellicle Tray Nest has the following sensors:

- thru-beam sensor shining diagonally across the nest to detect the pellicle present in the tray
- retroreflective sensor looking from below to detect the box present in the nest
- retroreflective sensor looking from the side to detect the tray present in the box

The Cover Lift has the following sensors:

- vacuum switch to detect that the vacuum cups have captured the cover
- retroreflective sensor to detect a cover present on the vacuum cups
- lift up and lift down sensors mounted to the pneumatic cylinder

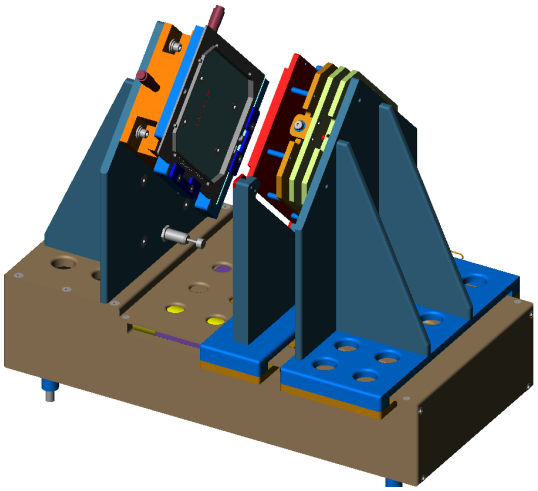
Pellicle Debacking Station

A small pneumatic cylinder is mounted to the top of the Cover Lift assembly. The robot positions the pellicle tray so that the pellicle backing tab is between the cylinders pin and the pin stop. The robot then commands the cylinder to extend which pinches the tab between the pin and the pin stop. At this point, the robot moves slowly away causing the backing to be removed from the pellicle frame.

A retroreflective sensor next to the pin detects when a backing is present or being held by the debacking station.

The unneeded backing is released when the operator opens the access door and presses the backing release button on top of the cover lift tower.

Pellicle Mount Station



The Pellicle Mount Station mounts a pellicle onto a reticle. The operator must command the robot to load the mounter with a reticle and a pellicle in a pellicle tray. After completing the mounting, the operator must command the robot to transfer the reticle out of the Pellicle Mounter and then command the robot to remove the empty pellicle tray from the mounter.

The Pellicle Mount Station has the following sensors:

- mounter compressed switch mounted on the air cylinder (cylinder retracted)
- mounter open switch mounted on the air cylinder (cylinder extended)
- pellicle tray present in pellicle fixture
- reticle present in reticle fixture

Camera Box and Vision Lighting

The robot will present a reticle to the camera for the purpose of locating the reticle date and time code or allowing the operator to inspect the reticle. The Camera Box shields the reticle from inconsistent outside light and provides a mounting surface for the camera. Below the camera box is a fluorescent ring light that illuminates the white opaque lower panel. When illuminated, the white panel acts as a back-lit surface for the camera mounted above. The camera box support weldment provides a mounting structure for the ring light and for the robot park switch.

Vision System

The vision system is comprised of a single camera and the Adept EVI vision card. The vision system is integral to the Adept/Stäubli controller. In this ZARIS tool, the vision system serves several purposes.

- provides the operator the ability to identify the corner of the reticle with the date and time code
- allows the operator to inspect other reticle markings and barcodes by viewing the reticle on the touchscreen monitor

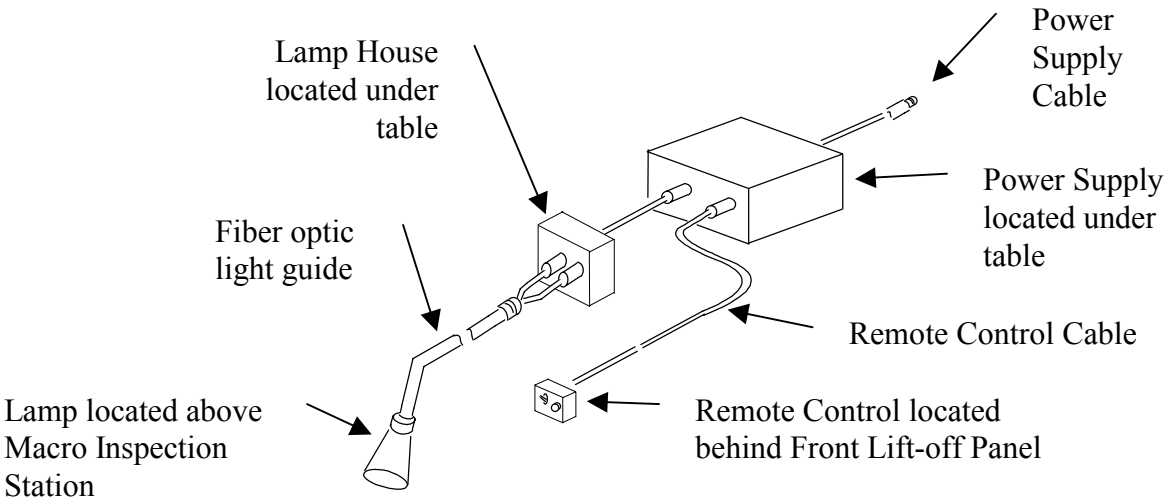
- allows the software to confirm that the pellicle type entered by the operator is consistent with the shape of the pellicle frame

The camera lens has adjustments for focus and aperture. The lens settings should not be adjusted by the operator or the technician. The vision system software also requires no adjustments by the operator or technician.

High Intensity Light

The SENA Superbeam High Intensity Light (HIL) is comprised of four major components as shown in Figure 1-3 SENA High Intensity Light System.

Figure 1-3 SENA High Intensity Light System



The spotlight is mounted to the Cleaning Gun housing directly above the Macro Inspection Station.

The SENA Power Supply unit and Lamp House are mounted under the table. They are accessible through the Right Side Maintenance Access Doors. The Remote Control is located behind Front Lift-off Panel.

Refer to the SENA Superbeam 500 TFI/R Fiber Optic Light Guide Ultra High-Intensity Halogen Spotlight Instruction Manual.

Cleaning Gun

The Cleaning Gun system is used to blow particles off the reticle and pellicle surfaces. Cleaning of a reticle or pellicle is usually performed as part of the reticle or pellicle bright light inspection. Both high and low pressure cleaning CDA is available – high pressure for cleaning reticles and low pressure for cleaning pellicles.

A pneumatic slide moves the Cleaning Gun needle up and down. The needle is in the up position except when cleaning with cleaning CDA. Cleaning CDA is supplied by the customer through a connection under the pneumatics enclosure. A filter is included to assure that the cleaning CDA has no particles that might cause contamination.

Emergency Machine Off (EMO) and Robot Stop Circuits

The EMO and Robot Stop circuits are designed to stop the workcell. The EMO circuit is designed for emergencies by cutting electrical power and pneumatic air to all components except the reset relay required to restart the system. The Robot Stop cuts electrical power to the Robot Arm. Refer to the electrical schematics for the wiring diagram of these circuits.

EMO Pushbuttons – The two red EMO pushbuttons are located on the front and left sides of the machine. These buttons activate the EMO circuit that shuts down electrical power and pneumatic air to all components except the EMO reset relay. After an EMO pushbutton is pressed, the pressed pushbutton will be illuminated to indicate that the button must be pulled out again before the EMO reset button can be pressed.

EMO Reset Pushbutton – This blue pushbutton is found only on the Four-Button enclosure located on the front of the workcell. This button is used to reset the circuit after the EMO button is pressed.

Robot Stop Pushbutton – The two amber Robot Stop pushbuttons are located on the front and left sides of the machine. These two buttons activate the robot stop circuit that cuts electrical power to the Stäubli Robot Arm. After a Robot Stop pushbutton is pressed, both the amber lamps will be illuminated. These lamps will also illuminate when the Machine Stop occurs, the crash detector was decoupled, a safety door interlock was opened, or the Stäubli E-Stop button was pressed.

Machine Reset Pushbutton – This green pushbutton is found on the Four-Button enclosure located on the front of the workcell. This button is used to reset the robot stop circuit after the Robot Stop button was pressed.

Crash Detector – The ATI collision detection device on the robot end of arm tooling (EOAT) detects a collision of the end effector with an object. The crash detector is part of the Robot Stop circuit and therefore power to the robot arm is removed whenever a collision is detected.

Door Safety Switches – Magnetically operated safety interlock switches are mounted on the following removable panels and access doors:

- Left Door
- Right Door

- Left Side Lift-off Panel
- Front Lift-off Panel
- Right Side Lift-off Panel

The magnetically-actuated non-contact safety interlock switches signal the Robot Stop circuit to disconnect electrical power to the Robot Arm when a door is opened or panel removed.

During normal operations, if the Robot is on the Park Switch, the Left Door and Right Door can be opened to load and unload reticle cassettes and pellicle boxes. If the Robot is not on the Park Switch, opening the right-side doors will result in a robot stop. The left-side door opening is protected by the light curtain. Leaving the left-side door open may result in an air pressure error since it allows a significant amount of air to escape the workcell interior.

Robot Park Switch – The Robot must activate the Robot Park Sensor Switch in order for the operator to open doors to load and unload reticles or pellicles. If the Robot is activating the Robot Park Switch, the safety interlock switches on the hinged access doors are bypassed. The safety interlock switches on the lift-off panels remain active even when the Robot is on the Park Switch. If the robot moves off the Park Switch while the right-side access door is opened, a robot stop will occur.

MicroSafe Light Curtain – This light curtain protects the vertical area between the View Port Doors and the left-front door. It is designed to protect the operator from inadvertently placing hands into the Robot's work area while the Robot is moving.

If the robot is not at the park switch, and the operator breaks the beams of the light curtain, then a robot stop condition occurs and the robot stops immediately. An appropriate message is displayed for the operator with resetting instructions.

The spaces between the Light Curtain beams can allow some parts of the robot's end effectors to extend through the light curtain, the robot is programmed to move at a safe speed and within a specific work envelope.

Complete information for the MicroSafe Light Curtain is contained in the MicroSafe Operating Instruction, Document MC4200E-DN.

Safety Frame Bypass Keyswitch – If the Safety Frame Bypass Keyswitch is in the ON (bypass) position, all access doors and lift-off panels can be removed without causing a machine stop. This switch should only be used to train robot points and to conduct those maintenance procedures that cannot be performed with the safety interlock switches active. It should never be used during normal operation of the system.

The V+ command prompt screen can only be activated when the Safety Frame Bypass Keyswitch is in the ON position.

Note: The robot will not move under automatic control with the Safety Frame Bypass Keyswitch in the ON (Bypass) position. The user must use the Manual Control Pendant to move the robot.

Stäubli Controller Safety Circuit – The Stäubli Robot and Adept Controller has its own safety features that include the Manual Control Pendant. The Manual Control Pendant and the Remote Panel have red Emergency Stop buttons that act like additional Robot Stop buttons to stop the workcell as well as the arm power to the Robot. In addition, the EMO safety circuit is tied into the Stäubli safety circuit.

View Port Doors – There are four small doors located on the front of the ZARIS workcell. These doors can be opened by the operator during the bright light inspection of a reticle or pellicle. The operator should open only two adjacent doors at a time. If more than two adjacent doors are opened, then the operator is alerted and told to open only two adjacent doors.

The view ports door sensors are not wired into either the EMO or Robot Stop circuit. Instead, the light curtain is used to protect the operator at these openings.

Operator Interface

Chapter 2

In this chapter

- Screen Structure
- System Security
- Operator Interface Screens
- Ergonomic Adjustments

Screen Structure

The operation of the ZARIS Reticle Sorter/Inspection and Pellicle Mount workcells is controlled by commands selected by the operator or technician on the touchscreen. To select a command, firmly touch the screen only once with your finger. Do not use a sharp object such as a tool, pointer, or pen to touch the screen. The touchscreen can only record one touch at a time. If it receives two touches, the results may be unpredictable.

Warning!

Do not use sharp objects such as tools, pointers, or pens to touch the screen. Damage will occur to the surface of screen.

The types of objects that appear on the screen are:

- **Message Fields –** display message and status information.
- **Command Buttons –** request execution of an operation.
- **Icons –** request execution of an operation.
- **Text Boxes –** allow entry of text.
- **List Boxes –** display a selection list attached to a message field.
- **Indicator Lights –** provide a status of a system operation.
- **Area Select** – allows the user to specify an area on the reticle

The background color of a screen is used to indicate what type of screen is being viewed:

Color	Screen Type
Light Blue	Normal
Red	System Faults
Yellow	Error
Dark Blue	Help

The relationship between the various screens is shown in Figure 2-1 Screen Hierarchy and Figure 2-2 Maintenance Screen Hierarchy.

Figure 2-1 Screen Hierarchy

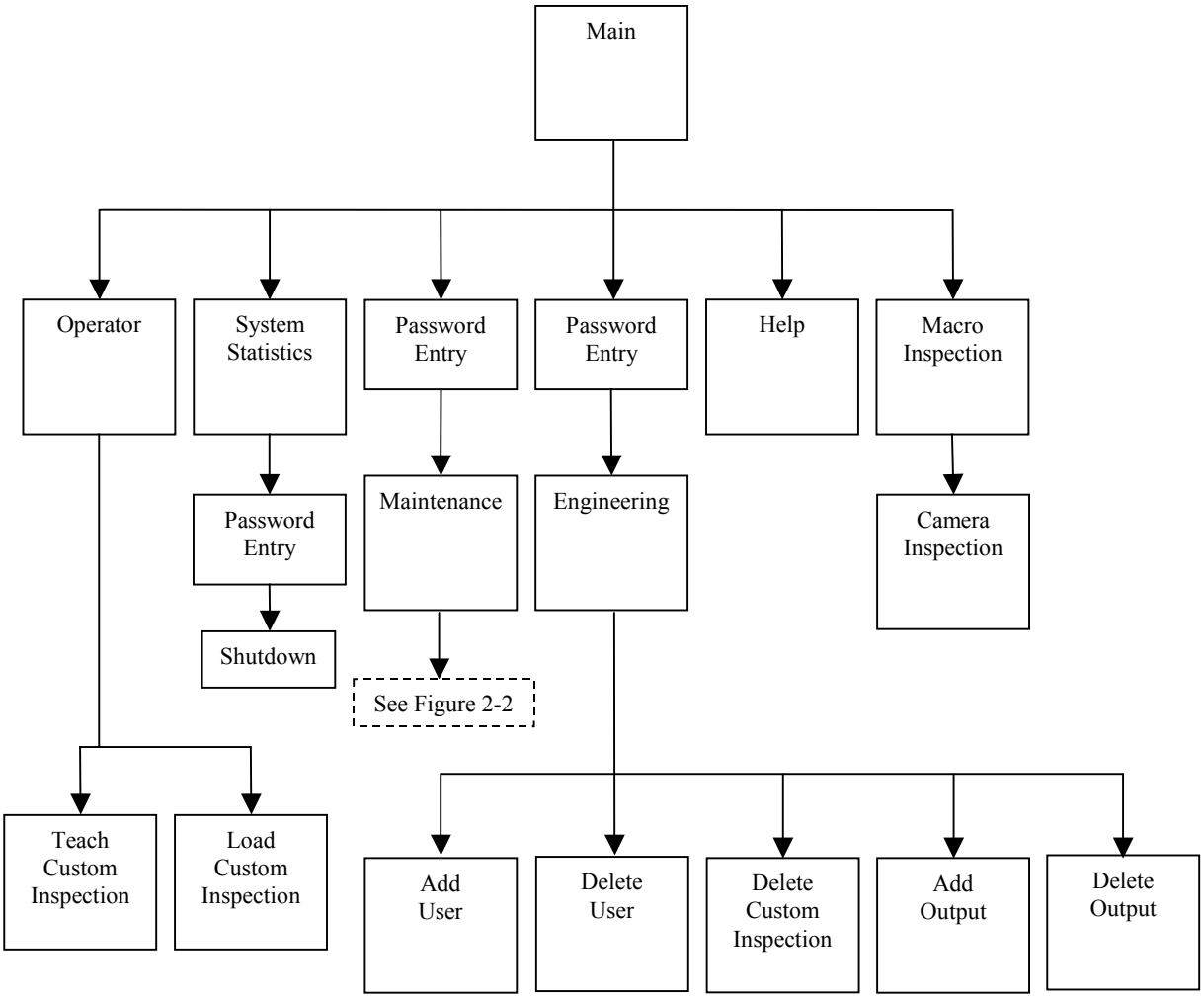
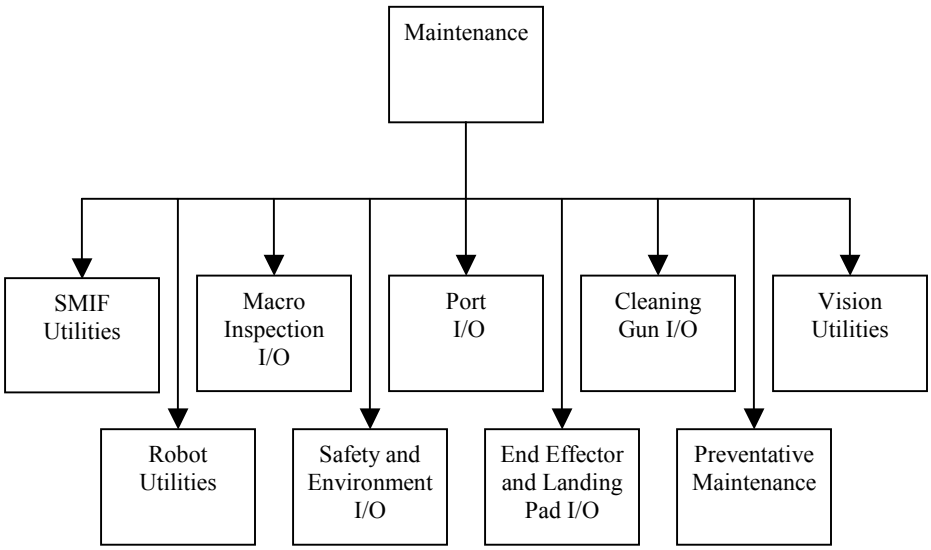


Figure 2-2 Maintenance Screen Hierarchy



Other screens that may appear include:

Date Code ID	The Date Code ID screen will appear when the robot needs to determine the location of the reticle's date code.
Macro Inspection Pass/Fail	When a reticle is taken to or from the Pellicle Mount Station, the reticle is presented to the operator for bright-light macro inspection. The operator must press a Pass or Fail button to proceed.
Password Entry	The Password Entry screen will appear whenever the user goes to a screen with a higher access level that the previous screen. Also, the screen will only appear if a password is required by the new screen's access level. The Engineering screen allows the Supervisor to set which levels require a password to access.
Error	Error screens can appear at anytime and while any other screen is showing. See Chapter 4 Troubleshooting for explainations of the error screens.

System Security

There are three authorization levels for the system: **Operator**, **Maintenance**, and **Supervisor**. When some commands are selected, a Password Entry screen is automatically displayed. The user must then use the on-screen keyboard to type a valid user name and password followed by the ENTER key. If the password has the necessary authorization level, the selected command will be executed. The screens that are accessible by each of the three authorization levels are listed in Table 2-1 Screen Access for Authorization Levels.

Table 2-1 Screen Access for Authorization Levels

Screen	Operator Access	Maintenance Access	Supervisor Access
Main	●	●	●
System Statistics	●	●	●
Operator	●	●	●
Maintenance*		●	●
Engineering			●
Help	●	●	●
Macro/Camera Inspection	●	●	●
Teach Custom Inspection	●	●	●
Load Custom Inspection	●	●	●
Delete Custom Inspection			●
Add / Delete User			●
Add / Delete Output			●
Start-up ZARIS System			●
Shutdown ZARIS System			●

*All Input / Output (I/O), Preventative Maintenance, Robot, SMIF and Vision Utility screens are accessed through the Maintenance screen and, therefore, require Maintenance or Supervisor access to use.

Operator Interface Screens

The following screens are accessible by individuals who have an Operator, Maintenance, or Supervisor security authorization.

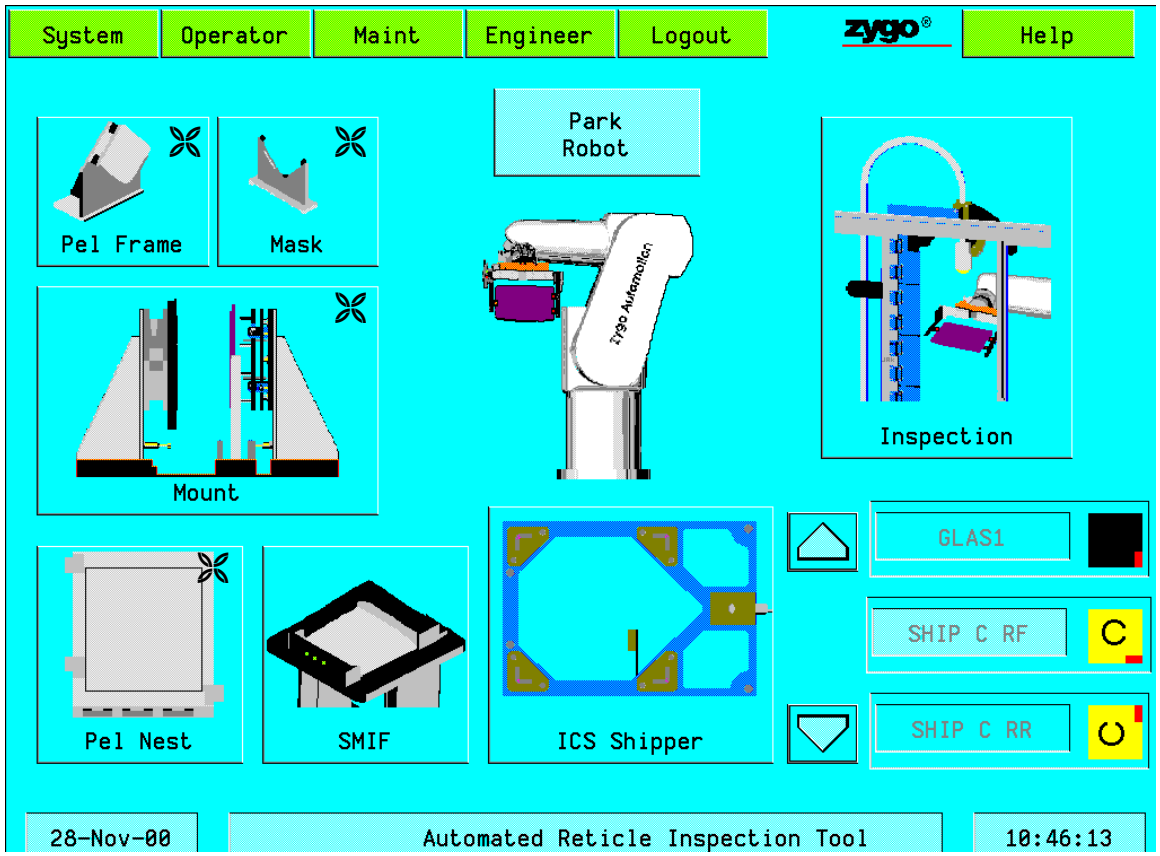
Note: ✂ - This symbol is used to identify items that are only found on the Pellicle Mounting Workcell.

Note: Only screens available to a system user with Operator access are described in this chapter. See the Technical Reference Manual for a description of all user interface screens.

Main Screen

The operator uses the command buttons on the Main screen to move the reticle between the various stations of the ZARIS system. The Main screen is shown in Figure 2-3 Main Screen. This screen contains three message fields, six command buttons, five icons and one display object.

Figure 2-3 Main Screen



	Touchscreen Object	Type of Object		Description And Resulting Action
	System	Command button		Accesses System Statistics screen. The **Shutdown ZARIS System** command button is accessed from this screen.
	Operator	Command button		Accesses Operator screen. (see page 2-10)
	Maintenance	Command button		Accesses Maintenance screen. (see page **Error! Bookmark not defined.**)
	Engineering	Command button		Accesses Engineering screen. (see page **Error! Bookmark not defined.**)
	Logout	Command button		Allows the operator to logout. The password screen is then displayed. This function is only valid if the operator password is enabled.
	Help	Command button		Provides explanatory information on a selected topic. Touch the **Help** command button, followed by any other command button or icon, to display a Help screen for that topic.
	Park Robot	Command button		Moves the Robot to the Park position.
⌘	**Pel Frame**	Icon	*	Tells the robot to pick a pellicle from or place a pellicle to the Pellicle Mounter.
⌘	**Mask**	Icon	*	Tells the robot to pick a reticle from or place a reticle to the Pellicle Mounter.
⌘	**Mount**	Icon	*	Commands the Pellicle Mounter to close and mount the pellicle to the reticle. The mounter will open automatically.
⌘	**Pel Nest**	Icon	*	Tells the robot to pick a pellicle from or place a pellicle to the Pellicle Nest.
	SMIF	Icon	*	Tells the robot to pick a reticle from or place a reticle to the SMIF Loader.
	ICS Shipper	Icon	*	Tells the robot to pick a reticle from or place a reticle to the ICS Shipper cassette.
	Inspection	Icon		Moves the reticle to the Macro Inspection Station and displays the Macro Inspection screen. (see page 2-13)

Touchscreen Object	Type of Object		Description And Resulting Action
Up/Down Arrows	Arrow		Scrolls the list to the right of the up/down arrows. The selected item is the item in the middle of the list. The list includes all entered output options. Each option includes a set of output port, chrome up/down, and date code orientation.
Date	Message field		Displays current date.
System Status	Message field		Displays the status of the robot as it transfers reticles or pellicles. If there is no status message to display, then this field will display "Zygo Automation Systems".
Time	Message field		Displays current time.
Robot	Display	*	Not an active icon, for display only.

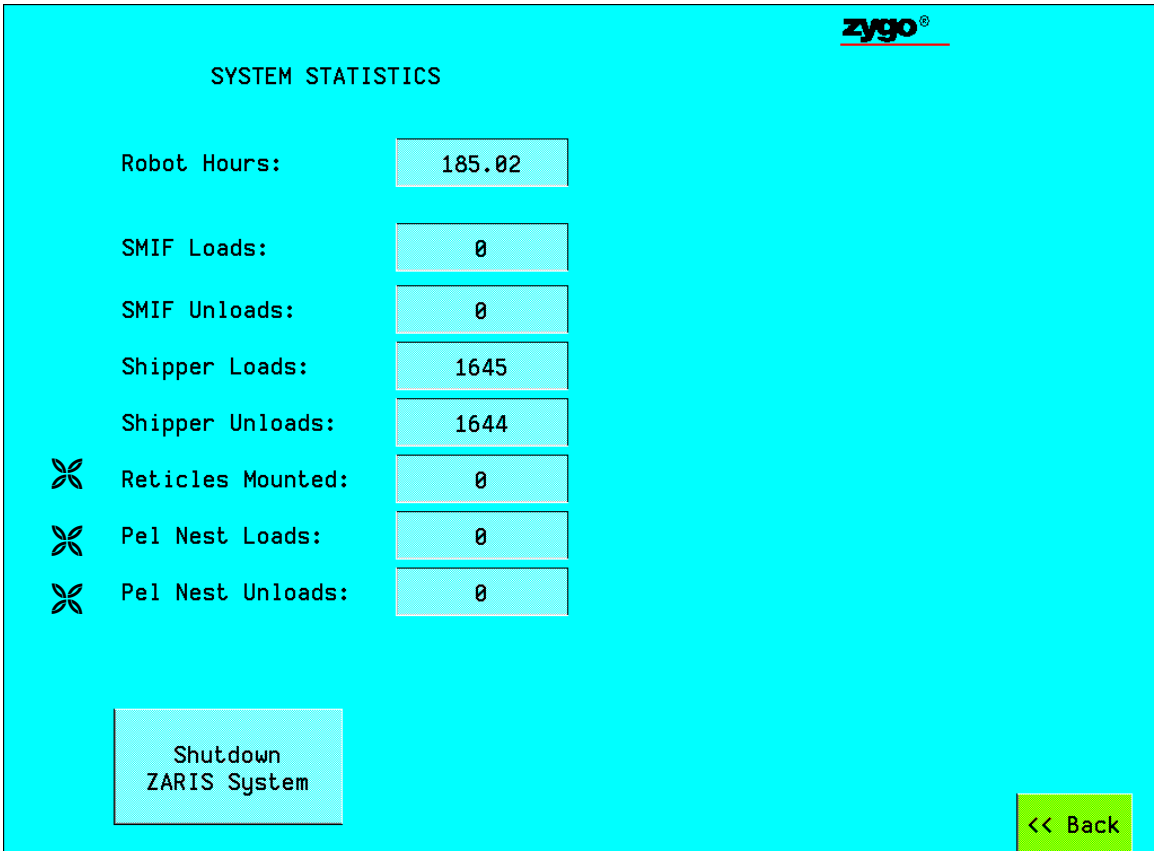
* These touchscreen objects, indicated with a * in the above table, will display a reticle icon when a reticle is present at their respective stations:

System Statistics Screen

The System Statistics screen provides a summary of system operations performed. This screen is shown in Figure 2-4 System Statistics Screen. The System Statistics screen contains message fields that display system statistics and two command buttons:

Note: ⌘ - This symbol is used to identify items that are only found on the Pellicle Mounting Workcell.

Figure 2-4 System Statistics Screen



The statistical information available on this screen includes:

Message Field	Description
Robot Hours	Number of hours since installation that the ZARIS system has been powered up.
SMIF Loads/Unloads	Total Load/Unload cycles to the SMIF Loader
Shipper Loads/Unloads	Total Load/Unload cycles to the ICS Shipper Cassette

	Message Field	Description
✂	**Reticles Mounted**	Total number of times that the Pellicle Mount Station has been cycled for mounting of a pellicle to a reticle.
✂	**Pel Nest Loads/Unloads**	Total number of Load/Unload cycles to the Pellicle Nest.
	Shutdown ZARIS System	Stops the program (software) that controls the system. When this command button is touched, the Password Entry screen is displayed. The user must then type a user name and password, followed by the **ENTER** key. If the user has Supervisor authorization level, the program will be stopped.
	Back	Returns user to the Main screen.

The timer and counter values on this screen cannot be reset from the user interface, but can be reset from the V+ command line.

1. Press **<Alt><Esc>** to get to the V+ dot prompt.
2. Type **abort 0** to abort task 0.
3. Type **do <variable>=0** to set the variable to 0. Replace <variable> with one of the variables listed in the table below.
4. After resetting the variables, type **ret 0** to proceed task 0.

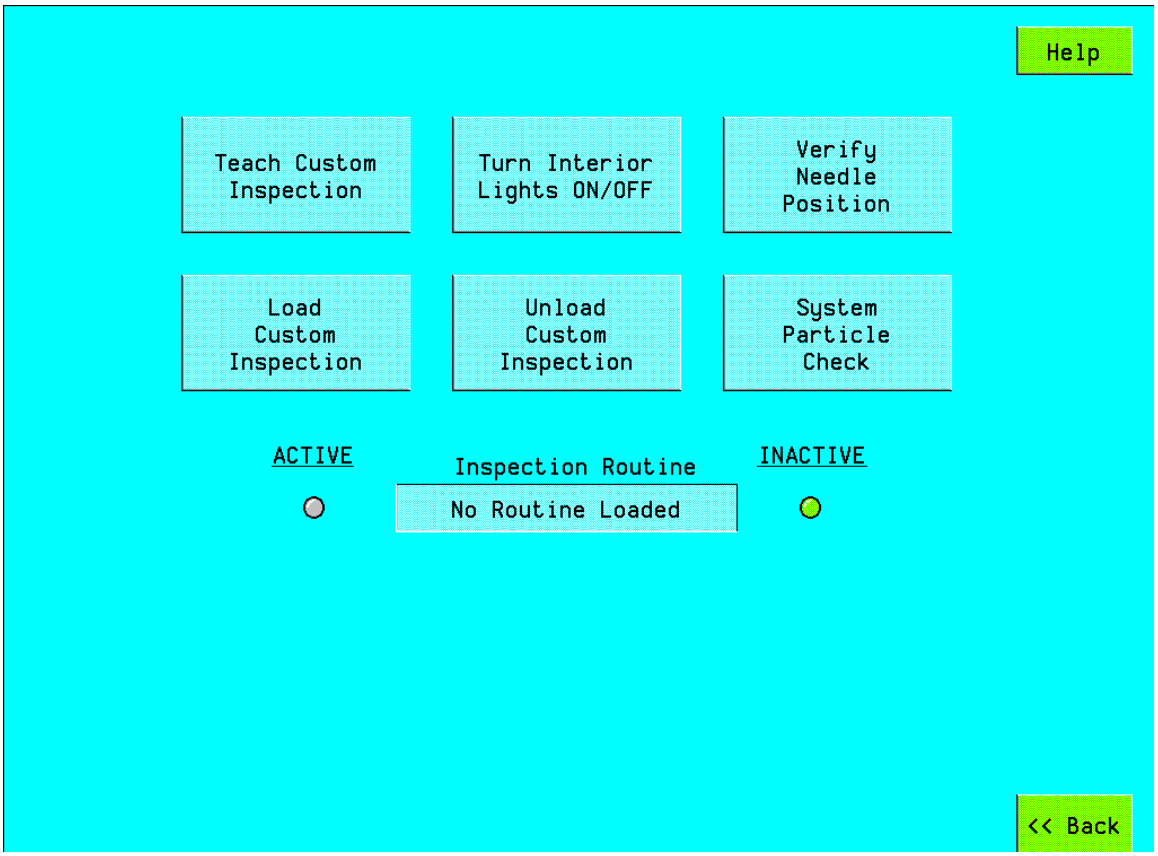
Table 2-2 Counter / Timer Variables

Counter / Timer	Screen	Variable
Robot Hours	Statistics	robot.hours
SMIF Loads	Statistics	smif.load
SMIF Unloads	Statistics	smif.unload
Shipper Loads	Statistics	ship.load
Shipper Unloads	Statistics	ship.unload
Reticles Mounted	Statistics	pms.mount
Pel Nest Loads	Statistics	pel.nest.load
Pel Nest Unloads	Statistics	pel.nest.unload

Operator Screen

The Operator screen provides access to the use of custom inspection routines and other system functions. This screen is shown in Figure 2-5 Operator Screen.

Figure 2-5 Operator Screen



The command buttons available on the Operator screen are:

Command Button	Description And Resulting Action
Teach Custom Inspection	Requests that the machine be taught a new custom inspection routine. See Teaching Custom Inspection for a description of this procedure.
Turn Interior Lights ON/OFF	Toggles the interior lights on and off.
Verify Needle Position	Allows operator to check the alignment of the Cleaning Needle. If the Needle is not correctly aligned, the Needle must be re-aligned by a technician. See Maintenance Procedure MP0134-03 in the maintenance chapter of the Technical Reference Manual.

Command Button	Description And Resulting Action
Load Custom Inspection	Requests loading of a stored custom inspection routine. The Load Custom Inspection screen will appear to allow a stored routine to be selected. See Running Custom Inspection for more details.
Unload Custom Inspection	Unloads the custom inspection routine currently installed.
System Particle Check	Exercises system by performing repeated reticle transfers. Reticle is checked for particles before and after the exercise.
Inspection Routine	Name of the custom inspection routine currently loaded. Custom inspection routines are taught using the Teach Custom Inspection screen. A stored routine is then loaded using the Load Custom Inspection screen. The two lights indicate if custom inspection routines are enabled or disabled.
Help	Provides explanatory information on a selected topic. Touch the Help command button, followed by any other command button, to display a Help screen for that topic.
Back	Returns user to the Main screen.

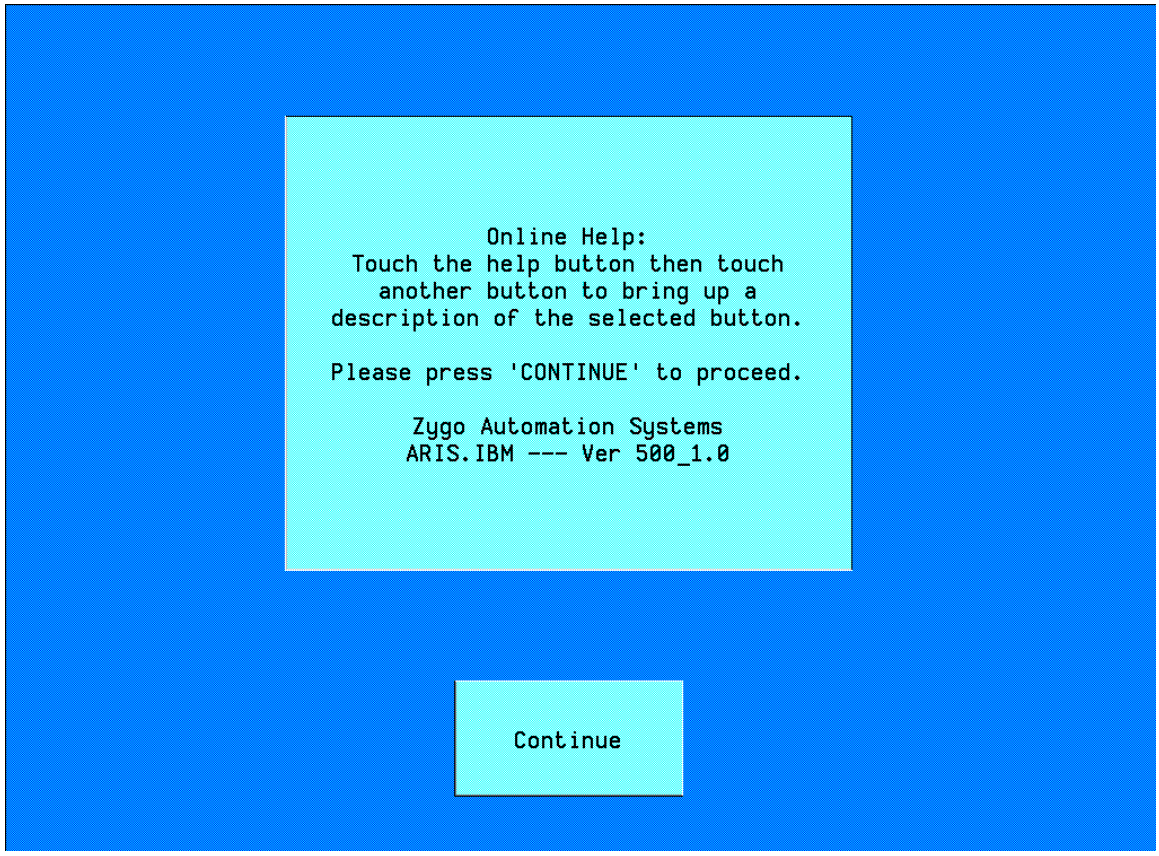
Help Screen

Help screens are provided within the ZARIS system to provide brief descriptions of system functions. The built-in help feature can be used from any screen where the **Help** command button appears. Touch the **Help** command button followed by any other icon or command button to select the topic about which information is desired.

A sample Help screen is shown in Figure 2-6 Sample Help Screen. One can see this screen by pressing **Help** on the **Help** button.

The last line of text on this help screen shows the current workcell software version number.

Figure 2-6 Sample Help Screen



Macro Inspection Screens

There are two similar Macro Inspection screens. The main Macro Inspection screen is accessed by pressing the Macro Inspection button on the main screen. This screen is shown in Figure 2-7 Macro Inspection Screen.

The second Macro Inspection screen is displayed whenever a reticle is transferred to or from the Pellicle Mount Station.

Both screens are used to control the system when the reticle is at the Macro Inspection Station.

Figure 2-7 Macro Inspection Screen

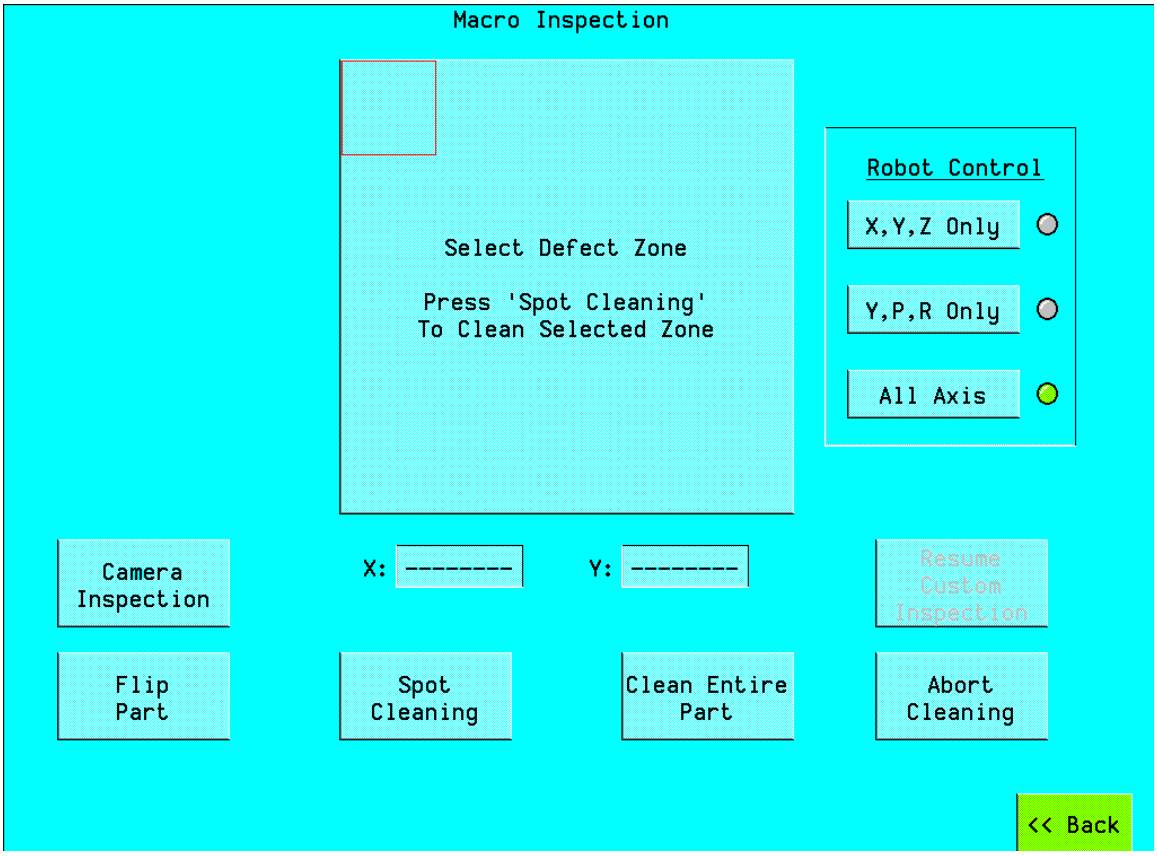
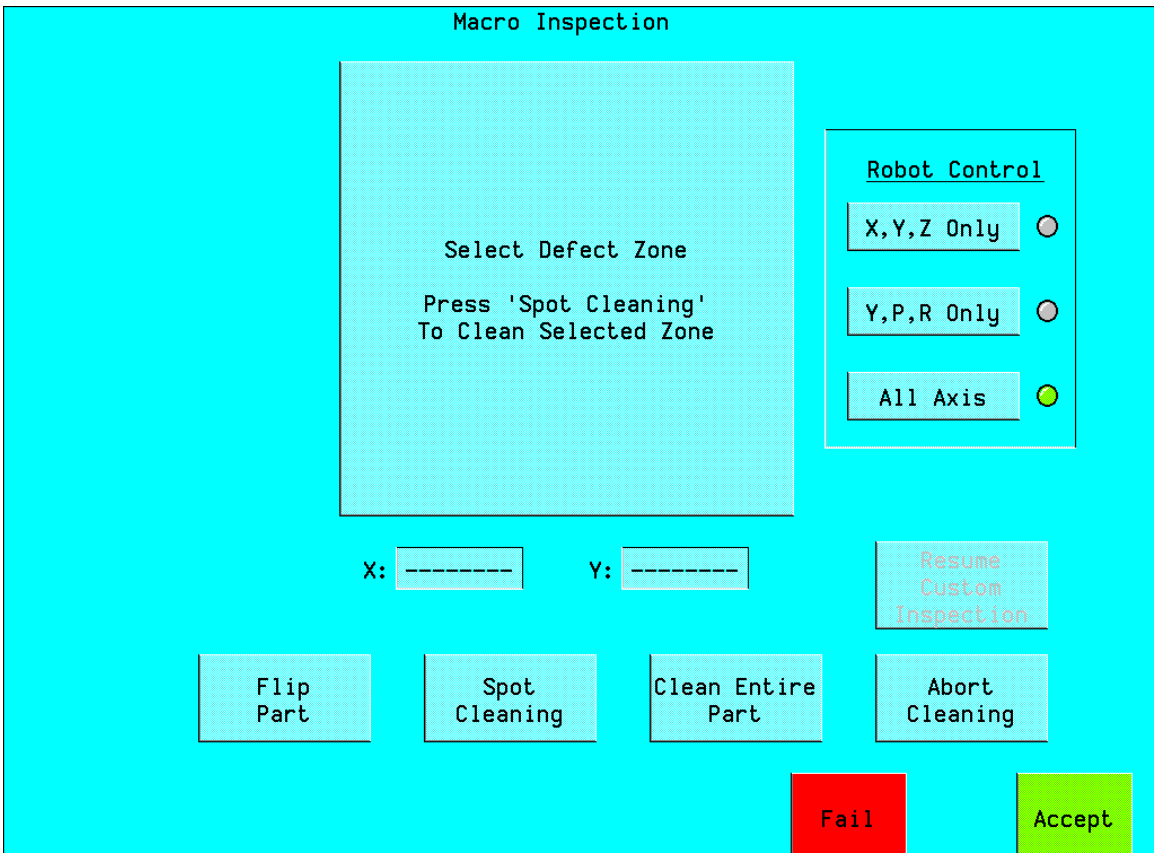


Figure 2-8 Macro Inspection Pass/Fail Screen



The Macro Inspection screens contain the following command buttons:

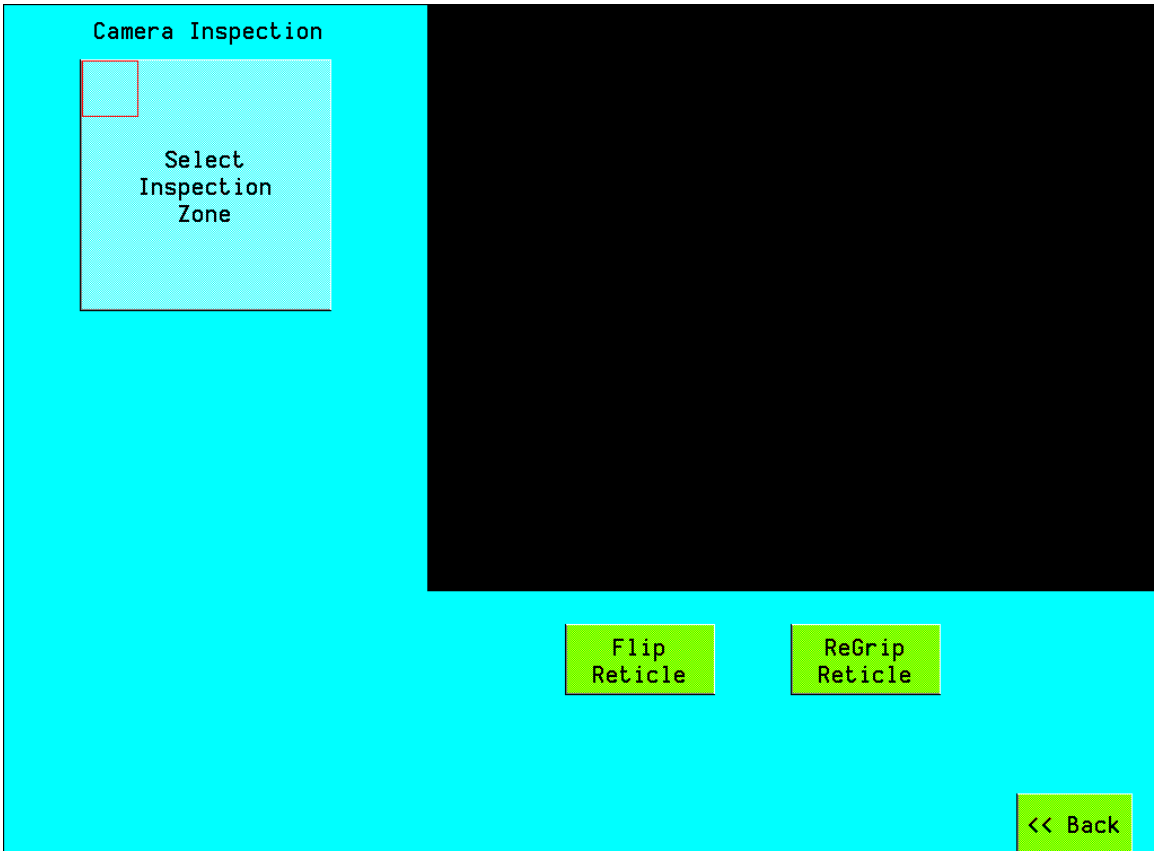
Touchscreen Object	Type of Object	Description And Resulting Action
Select Defect Zone	Area Select	Designates a sub-section of the reticle to be inspected or cleaned. Touch a representative region of the Select Defect Zone icon to select the zone. A square box will show the selected zone.
X,Y,Z Only	Command Button	Selects the X, Y, and Z axes for reticle manipulation using the Space Mouse. The associated Robot Control Indicator Light will be green when this mode is selected.
Y, P, R Only	Command Button	Selects the Yaw, Pitch and Roll axes for reticle manipulation using the Space Mouse. The associated Robot Control Indicator Light will be green when this mode is selected.

Touchscreen Object	Type of Object	Description And Resulting Action
All Axis	Command Button	Selects all six axes for reticle manipulation using the Space Mouse. The associated Robot Control Indicator Light will be green when this mode is selected.
X:	Message Field	The X value (in millimeters) of the center of the selected inspection.
Y:	Message Field	The Y value (in millimeters) of the center of the selected inspection.
Camera Inspection	Command Button	The robot will take the reticle to the Vision Box and present the reticle to the vision camera. See Camera Inspection Screen on page 2-16.
Resume Custom Inspection	Command Button	Restarts an interrupted custom inspection. This button is only available after a custom inspection routine has been stopped for cleaning.
Flip Part	Command Button	Flips the reticle so the other side may be inspected.
Spot Cleaning	Command Button	Requests cleaning of the selected region of the reticle.
Clean Entire Part	Command Button	Requests cleaning of the entire reticle.
Abort Cleaning	Command Button	Aborts cleaning of the reticle. The reticle is then returned to its previous location.
Back	Command Button	Returns user to the Main screen.
Fail	Command Button	The reticle is placed onto the landing pad.
Accept	Command Button	The reticle will continue to the location requested by the operator.

Camera Inspection Screen

This screen allows the user to view the reticle using the camera and backlighting.

Figure 2-9 Camera Inspection Screen



Touchscreen Object	Type of Object	Description And Resulting Action
Select Inspection Zone	Area Select	Designates a sub-section of the reticle to be inspected. Touch a representative region of the Select Inspection Zone icon to select the zone. A square box will show the selected zone.
Vision Screen	Vision Image	Displays a live image from the camera.
Flip Reticle	Command Button	The robot will place the reticle to the landing pad
Regrip Reticle	Command Button	
Back	Command Button	Return to the Macro Inspection Screen

Pellicle Selection Screen

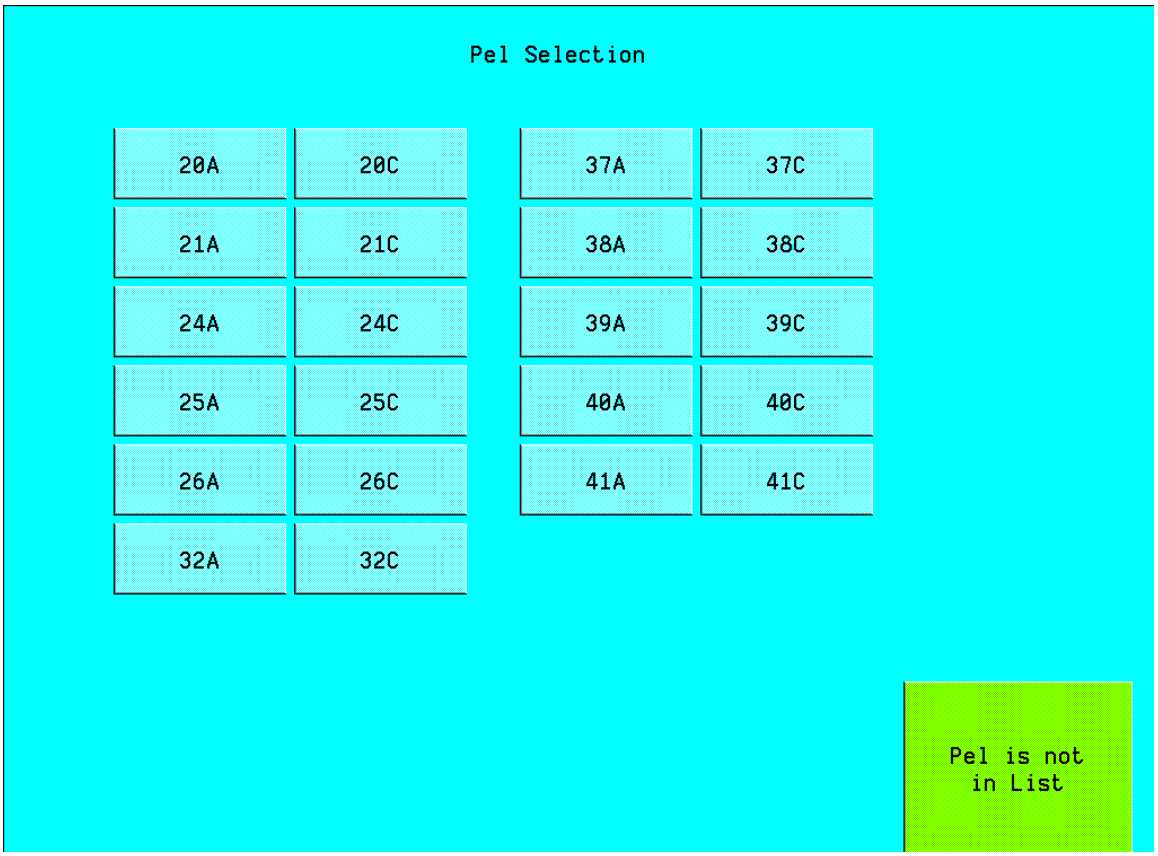
Note: This screen is only used on the pellicle mount workcell.

When the operator requests the robot to pick a pellicle tray from the Pellicle Box Nest, the operator is prompted with this Pellicle Selection screen. The list of pellicle numbers is based on a list supplied to Zygo by the customer.

The operator must press one of the buttons on the screen. If the "Pel is not in List" button, then an error screen will appear and the operator will need to return the pellicle tray back to the pellicle box.

To add items to the Pellicle Selection Screen, contact Zygo Automation Systems.

Figure 2-10 Pellicle Selection Screen

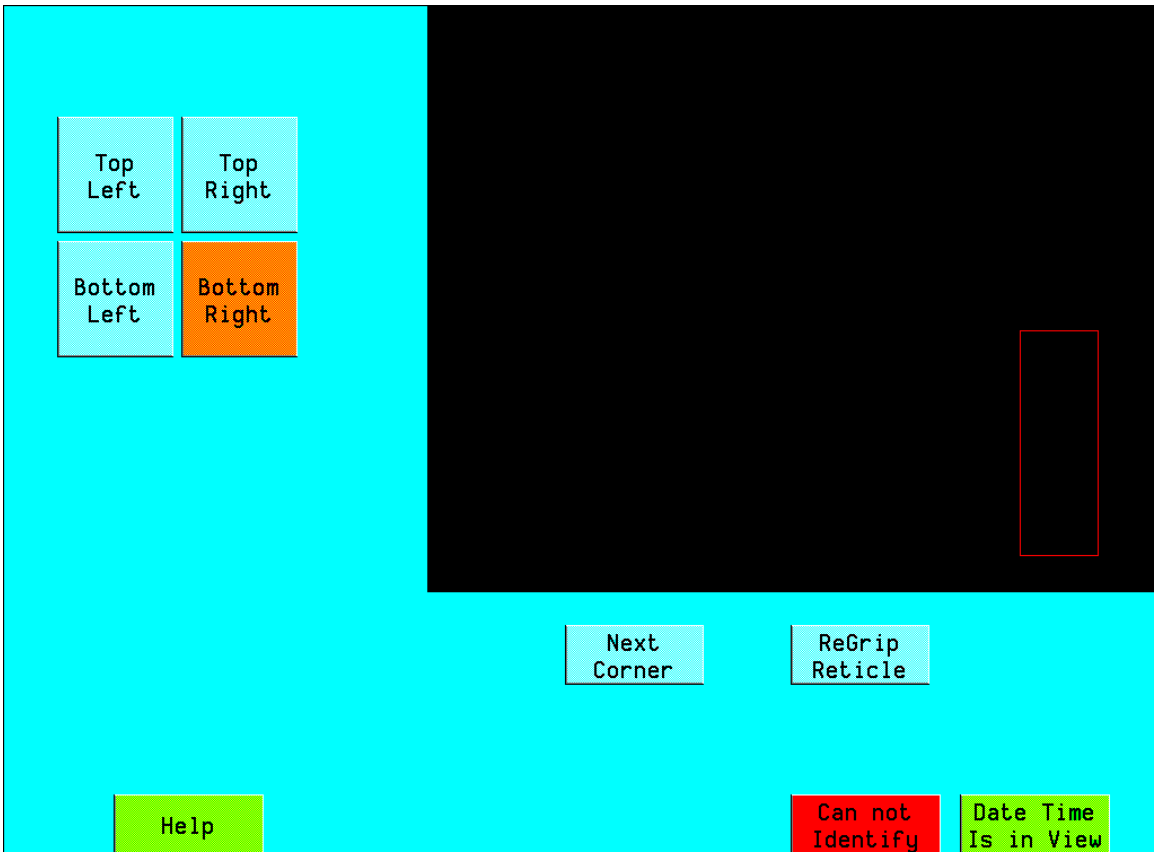


Date Code Finding Screen

When the operator requests that a reticle be placed to an output nest, then the robot needs to know the orientation of the reticle date code. To get the orientation information, the robot takes the reticle to the camera box and allows the user to view each of the reticle corners. The operator then tells the robot which corner has the date code. A red box aids the operator with finding the date code.

The locations of the red guide boxes can be modified by using the **Error! Reference source not found.** screen. See page **Error! Bookmark not defined.** for more information on this screen.

Figure 2-11 Date Code Finding Screen



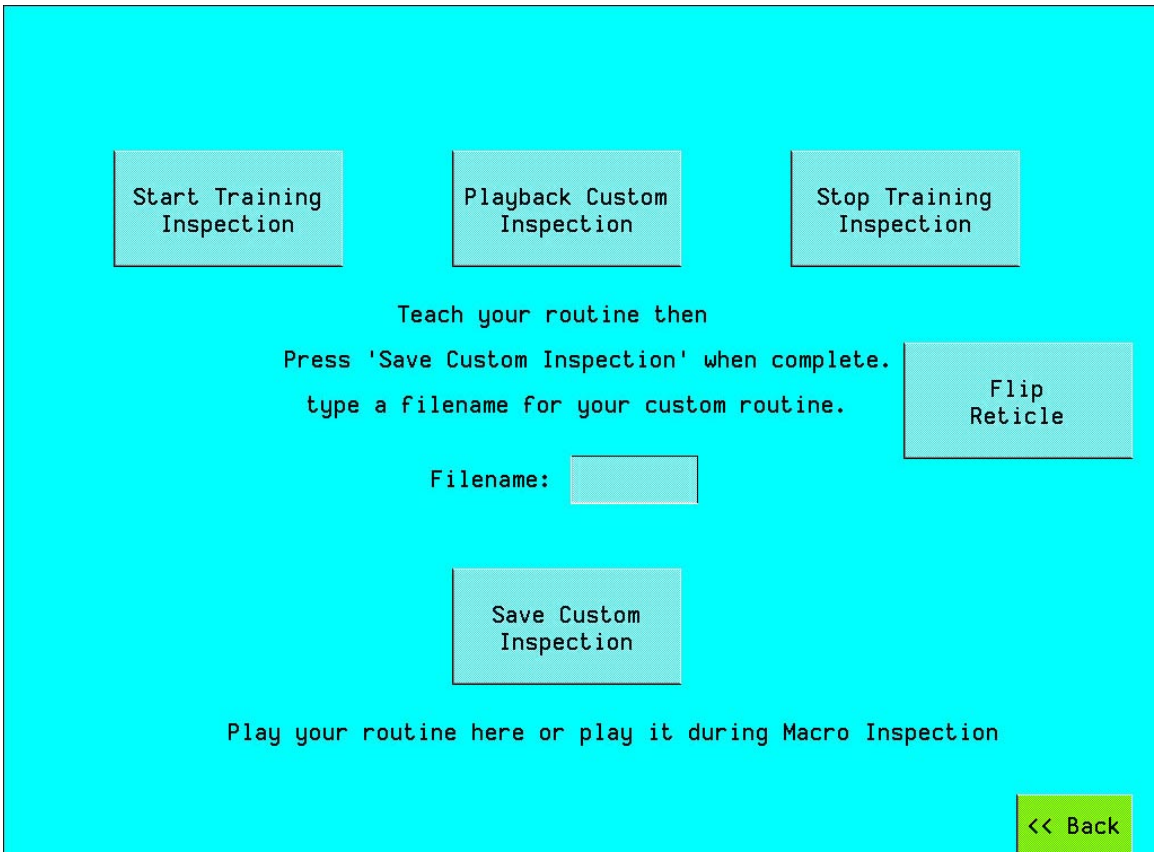
Touchscreen Object	Type of Object	Description And Resulting Action
Top / Bottom / Left / Right	Command Buttons	Moves the robot to the reticle corner. A red guide box is displayed to show the where to look for the date code.

Touchscreen Object	Type of Object	Description And Resulting Action
Next Corner	Command Button	Moves the robot to the next reticle corner.
Regrip Reticle	Command Button	The robot will place the reticle on the landing pad, repick the reticle rotated 90 degrees, and return to the vision box.
Cannot Identify	Command Button	If the date code cannot be found, press this button. The reticle will need to be returned to shipper cassette, determine corner with date code, then retry. This window will be closed.
Date Time is in View	Command Button	The operator can see the date code in the red guide box. This window will close and the robot will continue with its current sequence.
Help	Command Button	Press for help on buttons.

Teach Custom Inspection Screen

The Teach Custom Inspection screen allows the user to describe and store custom inspection routines. This screen is shown in Figure 2-12 Teach Custom Inspection Screen.

Figure 2-12 Teach Custom Inspection Screen



The Teach Custom Inspection screen contains the following objects:

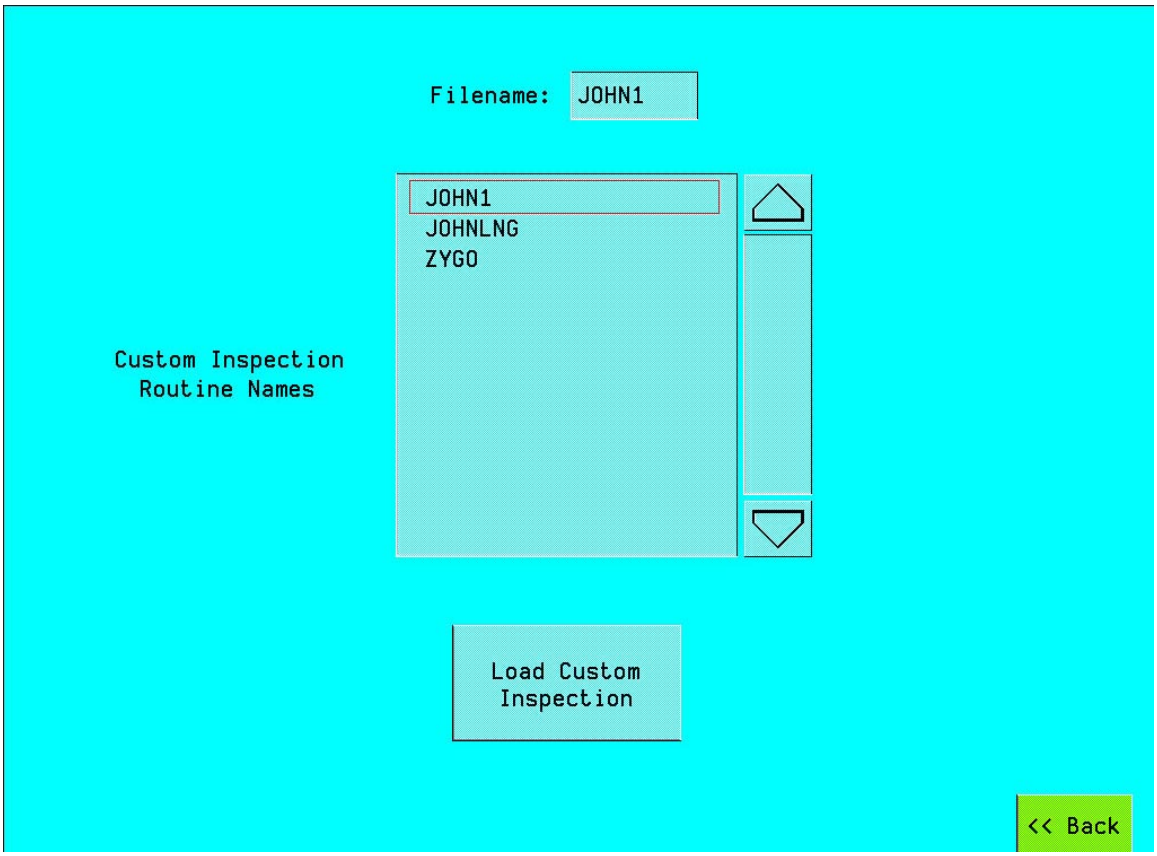
Touchscreen Object	Type of Object	Description And Resulting Action
Start Training Inspection	Command button	Starts recording of a custom inspection routine.
Playback Custom Inspection	Command button	Plays back the custom inspection routine just recorded.
Stop Training Inspection	Command button	Stops recording a custom inspection routine.
Flip Reticle	Command button	Flips reticle during custom inspection.

Touchscreen Object	Type of Object	Description And Resulting Action
Filename	Text box	Allows for entry of a filename for the custom inspection routine just recorded. You may use up to 7 alphanumeric characters. Do not include a file extension.
Save Custom Inspection	Command button	Stores the custom inspection routine just recorded.
Back	Command button	Returns user to the Operator screen.

Load Custom Inspection Screen

The Load Custom Inspection screen is used to load previously stored custom inspection routines for use at the Macro Inspection Station. This screen is shown in Figure 2-13 Load Custom Inspection Screen.

Figure 2-13 Load Custom Inspection Screen



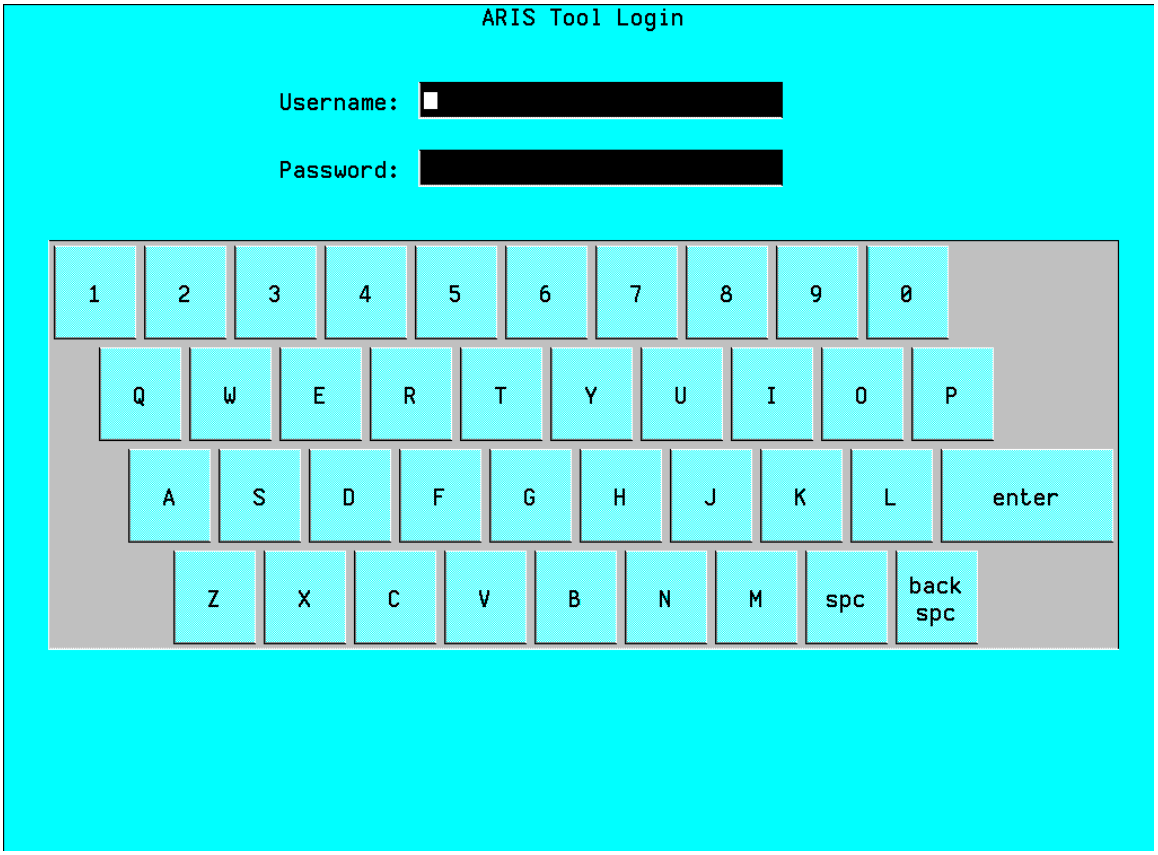
Touchscreen Object	Type of Object	Description And Resulting Action
Filename	Message Field	Displays the selected item from the list of stored custom inspection routines.
Custom Inspection Routine Names	List Box	Displays a list of the stored custom inspection routines.
▲ **(Up-arrow)**	Command Button	Moves selection (highlighting) to the item one line above the current location in the list.
▼ **(Down-arrow)**	Command Button	Moves selection (highlighting) to the item one line below the current location in the list.

Touchscreen Object	Type of Object	Description And Resulting Action
Load Custom Inspection	Command Button	Loads the selected custom inspection routine.
Back	Command Button	Returns user to the Operator screen.

Password Entry Screen

The Password Entry screen is used to limit access to certain system functions to users having designated authorization. This screen is automatically displayed when a command button is touched to request a system action that requires authorization. When this screen appears (as shown here), the user can use the workcell keyboard or on-screen keyboard to enter a user name and password and then press the **ENTER** key. If that password has the authorization to perform the requested action, it will be carried out. Otherwise, a yellow Error screen will appear to inform the user that the user does not have the required authorization for the requested action.

Figure 2-14 Password Entry Screen



Ergonomic Adjustments

The following components of the ZARIS system may be adjusted to best suit the individual user.

Touchscreen Monitor and Keyboard

The height of the arms for the touchscreen flat panel display and keyboard can be adjusted to meet individual needs.

Space Mouse Platform

The platform that the Space Mouse sits upon may be adjusted vertically to a position that is most comfortable for the operator.

To adjust the Space Mouse platform:

1. Hold the platform and the Space Mouse with right hand.
2. Use left hand to pull the red lever out.
3. Use left hand to slide the platform mount vertically until the desired position is reached.
4. Use left hand to push red lever back in until it snaps into place.

Operational Description

Chapter 3

Operating Sequence

The ZARIS Reticle Inspection and Pellicle Mount Workcells execute specific tasks as instructed by the operator. The sequence of operations is actually several somewhat independent sub-operations. The sequence of each subtasks is described in the sections below.

Based upon instructions from the operator, the Robot will move from the Safe position to perform an operation such as retrieving the reticle from the ICS Shipping cassette and then will return to the Safe position to await further instructions. The ZARIS's software uses the Safe position from which the Robot can move to any of the stations on the machine. This Safe position, or point, is called **#safe.front** and is located above the Landing Pad.

The system performs the following functions from the Safe position:

- Remove/place a reticle from/to either the ICS Shipper cassette or the SMIF Pod.
- Remove/place a pellicle tray from/to the Pellicle Box Nest.
- Present the reticle (with or without pellicle) to the Macro Inspection Station for operator inspection.
- Present the unmounted pellicle to the Macro Inspection Station or to the vision camera for operator inspection.
- Cleans the reticle or pellicle using the Cleaning Gun.
- Locate the date code on the reticle using the vision system.
- Remove backing sheet from the pellicle
- Verify the pellicle type using the vision system
- Place a reticle and pellicle tray into the Pellicle Mounter.
- Remove a mounted reticle from the Pellicle Mounter.
- Remove an empty pellicle tray from the Pellicle Mounter.

Remove a Reticle from the ICS Shipper Cassette

1. On the Main screen, the operator touches the **ICS Shipper** icon.

2. The Robot goes to the cassette, removes the reticle from the cassette, places the reticle onto the landing pad, and then returns to the Safe position.

Remove a Reticle from the SMIF Pod

1. On the Main screen, the operator touches the **SMIF** icon.

2. The Robot goes to the SMIF Loader, removes the reticle from the pod, places the reticle onto the landing pad, and then returns to the Safe position.

Remove Pellicle Tray from the Pellicle Box Nest

1. On the Main screen, the operator touches the **Pel Nest** icon to remove the pellicle tray from a Pellicle Box Nest.

2. The operator is prompted to select a pellicle type from a list on the touchscreen.

3. The pellicle box cover lift lowers, vacuum is turned on to the vacuum cups, and the cover is lifted.

4. The robot goes to the Pellicle Box Nest, removes the pellicle tray from the box.

5. The robot takes the pellicle tray to the camera box and the interior lights are turned off.

6. The vision system determines the shape of the pellicle frame and verifies that the shape is consistent with the pellicle type entered by the operator. If the shape does not match, an error screen is displayed.

7. The robot returns to the Safe position and the interior lights are turned on again.

Conduct Macro Inspection

The following steps occur when the operator requests that a macro inspection be performed by touching the Inspection icon on the Main screen. Macro inspections can either be performed using a custom inspection procedure previously loaded by the operator or by actual manipulation of the reticle using the Space Mouse.

1. The operator touches the Inspection icon and the Macro Inspection screen appears.

2. The Robot picks up the reticle from the landing pad and moves to the Macro Inspection Station.

3. The interior lights are turned off and the High Intensity Light is turned on.

4. If a custom inspection routine is loaded, the system automatically performs the custom routine by moving the reticle through the custom routine. See the Operator's Manual, Chapter 3, for instructions on how to teach and load custom inspection routines.

5. If no custom inspection routine is loaded, the Robot moves to the Macro Inspection Station and control of the Robot is turned over to the Space Mouse. The Space Mouse can then manipulate the reticle in six different axes: yaw, pitch, roll, x-axis, y-axis, and z-axis. See the Operator's Manual, Chapter 3 for a description of the use of the Space Mouse.

6. If a particle is detected, the operator can use the Cleaning Gun to clean either a specific defect zone or the entire reticle surface.

7. The Cleaning Gun cleans either the selected zone or the entire reticle and then returns the reticle to its previous location at the Macro Inspection Station.

8. Once the macro inspection is completed, the operator touches the Back command button to return to the Main screen.

9. When the reticle is moved from the Macro Inspection Station as a result of a subsequent operator request, the High Intensity Light is turned off and the interior lights are turned on.

Robot Axis Control

To select the axes for reticle manipulation touch one of the axis command buttons described below:

Command Button	Axes Selected for Manipulation
X,Y,Z Only	X, Y, and Z axes
Y,P,R Only	Yaw, Pitch and Roll axes
All Axis	All six axes

Once a set of axes is selected, the indicator light to the right of the command button will be illuminated green to indicate the set of axes being used.

The axes may also be selected by using the buttons on the Space Mouse, as explained below.

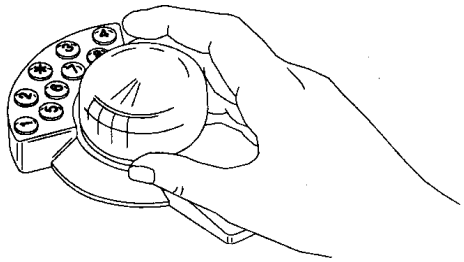
Reticle Flip

To flip the reticle, touch the **Flip Reticle** command button

Using the Space Mouse

The Space Mouse is a 3D input device that allows the control of objects in six degrees of freedom simultaneously. The Space Mouse is shown in Figure 3-1 Space Mouse.

Figure 3-1 Space Mouse



Either the right or left hand may be used to manipulate the Space Mouse. No wrist or shoulder movements are needed. The user should allow the hand to rest on the platform in a natural position as shown in the figure. Three or four fingertips spread around the cap are used to slightly shift and twist the cap.

The Space Mouse has been programmed so that when the cap is moved, the reticle will be moved similarly. The Space Mouse movements used to produce a desired reticle movement are summarized in Table 3-1 Space Mouse Movements.

Table 3-1 Space Mouse Movements

Desired Reticle Motion	Space Mouse Movement Required	Type
Operator's Right	Shift the cap to the right	X,Y,Z
Operator's Left	Shift the cap to the left	X,Y,Z
Up	Pull the cap upward	X,Y,Z
Down	Press the cap downward	X,Y,Z
Towards operator	Pull the cap towards the operator	X,Y,Z
Away from operator	Push the cap towards the buttons	X,Y,Z
Rotate back upward	Pull up on back of cap, push down on front of cap.	Y,P,R
Rotate front upward	Pull up on front of cap, push down on back of cap.	Y,P,R
Rotate left side upward	Pull up on left side of cap, push down on right side of cap.	Y,P,R
Rotate right side upward	Pull up on right side of cap, push down on left side of cap.	Y,P,R

Desired Reticle Motion	Space Mouse Movement Required	Type
Rotate left side away from operator	Twist cap clockwise.	Y,P,R
Rotate right side away from operator	Twist cap counterclockwise.	Y,P,R

The Type column in the above table identifies the type of motion associated with each reticle motion / Space Mouse movement.

Three of the buttons on the Space Mouse have been defined to facilitate the use of different groups of axes. The button definitions are:

Button	Definition
1, 4	Enables X, Y, and Z axes only for manipulation
2, 5	Enables Y, P, and R (Yaw, Pitch and Roll) axes only for manipulation
3, 6	Enables all six axes for manipulation (default)

When X-Y-Z axes manipulation is selected (button 1), the reticle will remain at its existing orientation with respect to yaw, pitch and roll. When Yaw-Pitch-Roll axes manipulation is selected (button 2), the center of the reticle will remain at its existing location.

Loading Custom Inspection Routines

To load a custom inspection routine, the operator first presses the **Macro Inspection** icon on the main screen, then presses the **Load Custom Inspection** button.

A new screen is opened that allows the operator to select a custom inspection routine from a list of routines stored in the robot controller.

> **Note:** When a custom inspection routine has been loaded, manual manipulation of the reticle at the Macro Inspection Station is disabled until the inspection routine has finished.

Running Custom Inspection Routines

If a custom inspection routine has been loaded and macro inspection is requested from the Main screen by touching the **Macro Inspection** command button, the custom inspection will be run automatically (after a short delay). Once the routine has been run, the reticle will remain at the Macro Inspection Station with the Macro Inspection screen displayed. Manual manipulation of the reticle using the Space Mouse may be performed at this time.

If it is desired to manually manipulate the reticle for inspection and a custom inspection routine is currently loaded, the custom inspection routine must first be unloaded or the

operator must wait until the routine has finished.

The **Select Defect Zone** icon may be touched at any time while a custom inspection routine is running. This will cause the custom inspection to stop immediately. The operator may then touch the **Cleaning** command button to request cleaning of the designated area of the reticle. The system will perform the cleaning and then return the reticle back to the Macro Inspection Station. The reticle may then be manually manipulated using the Space Mouse. If it is desired to re-run the loaded custom inspection routine, the user must return to the Main screen and then select macro inspection again.

Unloading Custom Inspection Routines

When the use of the loaded custom inspection routine is no longer desired, it must be unloaded so that manual manipulation may be used for macro inspection of a reticle (or so that another custom inspection routine may be loaded).

To unload a stored custom inspection routine:

1. From the Main screen, touch the **Operator** command button to display the Operator screen.

2. Touch the **Unload Custom Inspection** command button.

3. Touch the **Back** command button to return to the Main screen.

Teaching Custom Inspection Routines

Custom macro inspection routines may be stored and later used for automatic reticle manipulation for macro inspection.

To teach a custom inspection routine:

1. From the Main screen, touch the **Operator** command button to display the Operator screen.

2. Touch the **Teach Custom Inspection** command button to display the Teach Custom Inspection screen.

3. Touch the **Start Training Inspection** command button.

4. Use the Space Mouse to manipulate the reticle through the desired movements.

5. Touch the **Stop Training Inspection** command button to terminate the recording of reticle movements.

6. If desired, touch the **Playback Custom Inspection** command button to have the Robot play back the custom inspection routine for verification.

7. Use the keyboard to enter a filename for the custom inspection routine that has just been recorded. A filename may have up to 7 alphanumeric characters and is case-insensitive. Do not include any file extension.

8. Touch the **Save Custom Routine** command button to store the routine under the filename specified.

9. Touch the **Back** command button to return to the Operator screen.

10. Touch the **Back** command button on the Operator screen to return to the Main screen.

Clean Reticle or Pellicle Using Cleaning Gun

The following steps occur when the operator requests cleaning.

> **Note:** The Operator can initiate a cleaning from the Macro Inspection screens. If the operator selects to clean the entire reticle surface, the Cleaning Gun moves over the entire surface of the reticle. If the operator selects a defect zone to be cleaned, the Cleaning Gun is directed to that zone and a region slightly bigger than the zone is cleaned.

When either type of cleaning is selected, the cleaning process is the same:

1. The Robot moves the reticle under the Cleaning Gun mounted at the Macro Inspection Station.

> **Note:** On reticle surfaces, the cleaning gun blows with high pressure cleaning. On pellicle surfaces, the cleaning gun blows low pressure cleaning CDA.

2. The Cleaning Gun extends into position over the reticle or pellicle.

3. The Cleaning Gun sprays a flow of cleaning CDA from the needle over the reticle or pellicle surface. Either the entire surface or just a selected zones are cleaned, depending on which option the operator selected. For pellicles, if the backing has already been removed, then only the membrane side of the pellicle can be cleaned.

4. Once cleaning is completed, the Cleaning Gun is retracted upward.

5. The operator has the option of aborting cleaning by touching the Abort Cleaning command button.

6. The Robot then returns reticles to the landing pad. Pellicles are kept in the robot end effector.

Place Pellicle Tray to the Pellicle Mounter

This command can only be done if the robot has a pellicle tray in the end effector.

1. On the Main screen, the operator touches the **Pel Frame** icon to indicate that the pellicle tray should be placed in the mounter.

2. If the pellicle backing has not yet been removed, the robot moves the pellicle tray to the backing removal station.

3. The robot positions the pellicle backing tab under the backing removal pin.

4. The pin extends pinching the backing tab.

5. The moves the pellicle tray away slowly, leaving the backing hanging from the backing removal pin.

6. The robot brings the pellicle back to the macro inspection station for operator inspection and cleaning. Press “Accept” or “Fail” when completed.

7. If accepted - the robot goes to the pellicle mounter, places the pellicle tray onto the pellicle tray capture nest, and then returns to the Safe position.
   If failed – the robot returns the pellicle tray to the pellicle nest and returns to the Safe position.

Place Reticle to the Pellicle Mounter

This command can only be done if a reticle is on the landing pad.

1. On the Main screen, the operator touches the **Mask** icon to pick the reticle from the landing pad.

2. If the robot does not know the orientation of the reticle date code, then the reticle is taken to the camera box and the interior lights are turned off.

3. Looking at the touchscreen display, the operator indicates which corner of the reticle has the date code.

4. If the robot needs to reorient the reticle, it places the reticle on the landing pad and then re-picks the reticle in the correct orientation.

5. The robot brings the reticle to the macro inspection station for operator inspection and cleaning. Press “Accept” or “Fail” when completed.

6. If accepted - the robot goes to the pellicle mounter, places the reticle onto the reticle capture nest, and then returns to the Safe position.

If failed – the robot places the reticle onto the landing pad and returns to the Safe position.

Mount the Pellicle to the Reticle

1. On the Main screen, the operator touches the **Mount** icon to command the Pellicle Mounter to mount the pellicle onto the reticle. The reticle and pellicle must already be loaded into the mounter before this operation is available.

2. The robot will return to the Safe position.

3. The mounter will close slowly adhering the pellicle to the reticle. The mounter stays closed for the number of seconds specified on the Engineering screen.

4. The mounter will open slowly making the mounted reticle available for removal.

Removing the Reticle and Pellicle Tray from the Pellicle Mounter

1. On the Main screen, the operator touches the **Mask** icon to command the robot to pick the reticle (mounted or not) from the Pellicle Mounter.

2. The robot moves to the pellicle mounter and picks the reticle.

3. The robot places the reticle onto the landing pad.

4. The robot moves back to the pellicle mounter and picks the pellicle frame.

5. The robot places the pellicle frame into the pellicle box.

6. The robot moves to the Safe location.

Return a Reticle to the ICS Shipper Cassette

1. On the Main screen, the operator touches the ICS Shipper icon.

2. The Robot goes to the landing pad, picks the reticle, moves to the ICS Shipper cassette, and places the reticle into the ICS Shipper cassette, and then returns to the Safe position.

Return a Reticle to the SMIF Pod

1. On the Main screen, the operator touches the ICS Shipper icon.

2. The Robot goes to the landing pad, picks the reticle, moves to the SMIF Pod, and places the reticle into the SMIF Pod, and then returns to the Safe position.

3. The SMIF Pod is then closed and available for the operator to remove the Pod.

Troubleshooting

Chapter 4

All alarm conditions for the system will cause an appropriate message to be displayed on either a yellow Error screen or a red System Fault screen on the Touchscreen monitor. This section contains a table that lists the messages displayed on these screens. The table is divided into the following columns:

1. **# (Error Code) –** Each message has an error code number associated with it. This number appears on the Error or System Fault screen and also in the error log file that may be accessed by maintenance personnel.

2. **Alarms Screen Message –** This column lists the message displayed on the screen when the alarm condition occurs. If the screen is a red System Fault screen, it will be noted in this column, otherwise it is assumed that the screen is a yellow Error screen.

   Note: Some screen messages include recovery hints along with the actual error messages. To keep the tables below as concise as possible, the text of these recovery hints is not included in the messages listed in column 2 of the tables.

3. **Most Likely Cause of Condition –** This column lists the most likely cause for the situation or problem that is causing the alarm condition.

4. **Operator's Recommended Recovery –** This column outlines the steps or procedures that can help resolve the indicated alarm condition. Many alarm conditions cannot be resolved by the operator and must be referred to the appropriate qualified maintenance personnel. The operator should, however, make a written note of the error code and message, and the status of the system, so that the technician may more easily diagnose the problem.

The messages that appear on the yellow Error screen and on the red System Fault screen are listed in Table 4-1 Error Screen Messages and Corrective Procedures.

Once an alarm condition has been resolved, touch the **CONTINUE** command button on the screen to clear the alarm message. It should then be verified that the alarm condition doesn't reappear immediately. If the same alarm condition reappears, notify the appropriate maintenance personnel.

Refer to the ZARIS Technical Reference Manual, Recovery chapter, for the recovery actions to be performed by a qualified maintenance technician.

Table 4-1 Error Screen Messages and Corrective Procedures

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
1	Robot cannot access the Shipping Cassette with a pel tray in its gripper.	Operator attempted invalid sequence.	Place Pel Tray back to the Pellicle Box before picking a reticle. If no pellicle is on the end effector, call a technician.
2	Shipper is not the selected output.	The operator has pressed on an output icon that does not match the output location defined in the selected output option.	Select an output option that matches the output location you want. If there is no output option available, call a technician.
3	Can't put a pellicized reticle in the SMIF or shipper chrome up.	Operator selected an invalid output orientation.	Find a different output selection that places the reticle in the Shipper Cassette with pellicle down. If no option exists, call a technician.
4	Output selection is not valid. Need to choose either chrome or glass.	The selected output option is invalid.	Use a different output option. Call a technician to have a new output option created.
5	Can't put a pellicized reticle into SMIF pod chrome up.	Operator selected an invalid output orientation.	Find a different output selection that places the reticle in the SMIF Loader with pellicle down. If no option exists, call a technician.
6	SMIF Pod is not the selected output.	The operator has pressed on an output icon that does not match the output location defined in the selected output option.	Select an output option that matches the output location you want. If there is no output option available, call a technician.
7	Park switch did not release.	The robot moved away from the park switch, but the controller did not see the switch open.	Call a technician.
8	The Robot must have a reticle in the end effector in order to go to the Cleaning station.	No reticle is seen in the gripper when one was expected.	Retry the operation. If a reticle IS present, call a technician.
9	Pel Frame not supported by system.	Operator pressed the "Pel not on list" button when selecting the pellicle type.	If pellicle is not on the list, call a technician. Return the pellicle back to the Pellicle Box.
10	The Robot must have a part in the end effector in order to go to the Macro Inspection station.	Operator attempted an invalid sequence.	Transfer a reticle to the landing pad before performing a cleaning cleaning.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
11	The Robot arm has lost power. Disconnect Pendant. Set manual release dial to '0'.	The robot power has been dropped due to external or internal robot stop signal.	Check "e-stop" button on remote panel, pendant bypass plug, Press Machine Reset and then press 'CONTINUE'. Then press the flashing Arm Power On button to reset the system. "Press ABORT to abort motion." If system cannot be reset, call Technician.
12	System Error: *XXXX* *Error Description*	An internal controller or robot error has occurred.	Please notify an Equipment Technician.
13	A reticle already exists at the landing pad.	The robot has a reticle both in the end effector and on the landing pad. This case was not true when the robot picked the reticle.	Please notify an Equipment Technician of this problem.
14	There is no reticle to retrieve from the landing pad.	The robot expected a reticle on the landing pad. The robot remembers placing one on the landing pad.	Please notify an Equipment Technician of this problem.
15	Cannot park with an inverted pel frame. Send pel frame to Pel Nest or to Pel Mounter.	The operator has pressed the Park Robot button while there is pel frame in the gripper	Transfer the pel frame to the Pellicle Nest or to Pellicle Mounter. If no Pel Tray is on the EOAT, call a Technician.
16	No Pel Tray to Load or Unload.	Operator attempted an invalid sequence.	Pick a pellicle tray from the Pel Nest or Pel Mounter first. If Pel Tray IS already in the end effector, call a Technician.
17	There is a pel tray in the EOAT and in the PMS.	Operator attempted an invalid sequence.	Place the Pel Tray back to the Pel Nest. If there are not Pel Trays in both the end effector and pel mounter, call a Technician.
18	Pel Tray must be loaded first.	Operator attempted an invalid sequence.	Pick a pellicle from the Pel Nest and place it to the Mounter. Then try mounting. If a Pel Tray IS in the Mounter, then call a Technician.
19	There is no reticle to retrieve from the shipping cassette.	Operator attempted an invalid sequence.	Place a Shipper cassette in the ICS Nest with a reticle. If a reticle IS present in the cassette, call a Technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
20	A reticle already exists in the Shipping cassette or EOAT.	Operator attempted an invalid sequence.	Try a different operation. If a reticle IS NOT present in the Shipping cassette or end effector, call a Technician.
21	You cannot logout.	Operator attempted to Logout, but operator passwords are not needed.	Do not use Logout. Contact super user if you wish to enable operator passwords.
22	The reticle is misoriented on the landing pad.	The landing pad sensors are conflicting.	See if reticle is resting on landing pad properly. If not, park robot, open viewport doors and reseat the reticle. If reticle is setting properly on landing pad, call a technician.
23	There is no reticle detected for that operation.	Operator attempted an invalid sequence.	Try a different operation. If a reticle IS present, call a technician.
24	Cannot take pel frame to camera inspection.	Operator attempted an invalid sequence. Only reticles can be taken to the camera for inspection.	Try a different operation.
25	Robot has failed to detect the orientation of the pellicle.	The robot could not see the pellicle well enough to detect the pellicle orientation.	Try a different pellicle.
26	PMS is not open for placing parts.	The Pel Mounter is busy. Pell Mounter is stuck closed.	Wait for Pel Mounter to complete its operation. If Pel Mounter appears to be open, call a Technician.
27	Robot cannot identify part in EOAT.	End effector sensors do not agree with expected state.	Call a technician.
28	Cannot search for date time stamp with pel tray in EOAT.	Robot expected a reticle in the end effector, but the sensors detect a pellicle frame.	Send the pel tray to the PMS or pel tray nest. If no pel tray is in the end effector, Call a technician.
29	Cannot perform operation on pel frame.	Operator attempted an invalid sequence. The robot detects a pellicle in the end effector, and the requested operation is only valid for a reticle.	Try a different operation. If there is no pel frame in the end effector, call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
30	You are not authorized for this function. Please contact a Super User or try re-entering the password.	You mistyped your user name or password. You are attempting to access a screen that requires a user name and password with a higher access permission than you have.	Retry user name and password. Contact a Super User to get a higher access permission.
31	One of the safety doors or the light curtain is currently defeated. The Robot won't move until all the doors are closed and the light curtain is clear.	One of the safety doors or access panels is open or the light curtain is currently blocked	Close all doors and access panels. Press Machine Reset and then press 'CONTINUE'. Then press the flashing Arm Power On button to reset the system. If system will not reset, call a Technician.
32	The Shipping Cassette is not open.	The ICS Shipping Cassette lid is not detected in open position.	Park the Robot and open the ICS Shipping Cassette. If lid IS open, call a Technician.
33	The light curtain was tripped.	The operator put their hand through an open Viewport door.	Verify light curtain is no longer blocked. Press Machine Reset and then press 'CONTINUE'. Then press the flashing Arm Power On button to reset the system. If error cannot be reset, call a Technician.
34	Robot has crashed. Fix the crash.	The robot crash detector has been detected as tripped.	Press Machine Reset and then press 'CONTINUE'. Then press the flashing Arm Power On button to reset the system.
35	No date time stamp was found. Reticle cannot be oriented.	The operator failed to locate the reticle corner with the date code.	Return the reticle to the shipper cassette, determine corner with date code, then retry. If you cannot see a date codes or reticle corners, call a Technician.
36	The System air pressure is outside the standard limits of operation.	The air pressure sensor has detected the air pressure outside of the set limits.	Retry operation. Notify a Technician if the error continues to occur.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
37	Keyswitch was moved to bypass position.	The user has switched the safety frame bypass switch from OFF to ON	CAUTION: The workcell should only by operated by a trained technician or engineer.
38	The gripper failed to open. Current operation will not be completed.	The robot commanded the gripper to open, but did not receive sensor feedback that the gripper opened.	Retry operation. Notify a Technician if the error continues to occur.
39	The gripper failed to close. Current operation will not be completed.	The robot commanded the gripper to close, but did not receive sensor feedback that the gripper closed.	Retry operation. Notify a Technician if the error continues to occur.
40	The park sensor failed to activate.	The robot commanded the robot to go to the park switch, but did not receive sensor feedback that the park switch is pressed.	Retry operation. Notify a Technician if the error continues to occur.
41	Cleaning gun failed to extend.	The system commanded the cleaning gun to lower, but did not receive sensor feedback that the cleaning gun is down.	Retry operation. Notify a Technician if the error continues to occur.
42	Cleaning gun failed to retract.	The system commanded the cleaning gun to raise, but did not receive sensor feedback that the cleaning gun is up.	Retry operation. Notify a Technician if the error continues to occur.
43	Two adjacent viewport doors must be opened for inspection.	If only one door, doors not next to each other, or more than two doors were opened, this error will occur.	Open any two adjacent viewport doors. If only two adjacent viewport doors ARE open, call a Technician
44	A SMIF Pod is not Present.	Operator attempted an invalid sequence.	Try a different operation. If a SMIF Pod IS present and loaded, call a Technician.
45	The Cleaning pressure is outside the standard limits of operation.	The high/low cleaning pressure sensors have detected the cleaning pressure outside of the set limits.	Retry operation. Notify a Technician if the error continues to occur.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
46	Initial startup. Make sure that the Robot is in the 'safe' position before proceeding.	This message occurs every time the ZARIS system is started.	Verify the robot is positioned above and right of the landing pad. The end effector should be pointing toward the viewport doors. The marks on the robot joints will be lined-up when the robot is at the 'safe' position. If the robot is not near the 'safe' position, call a Technician.
47	A Reticle is present on the landing pad and the robot is trying to place onto the pad.	The robot has a reticle both in the end effector and on the landing pad. This case was not true when the robot picked the reticle.	Please notify an Equipment Technician of this problem.
48	Robot motion was aborted. The robot needs to be in its 'safe' position before proceeding.	This message occurs when an ABORT button is pressed on an error screen.	Verify the robot is positioned above, right and back from the landing pad. The end effector should be pointing toward the viewport doors. If the robot is not near the 'safe' position, call a Technician.
49	A Shipping Cassette is not present or not open.	Operator attempted an invalid sequence.	Park the robot, then place an ICS Shipper cassette in the ICS Nest and open the lid. If cassette IS present and lid IS open, call a Technician.
50	The Shipping access door is open.	The ICS Shipping access door is detected as open.	Close the ICS Shipping access door. Retry operation. If all doors are closed, call a Technician.
51	There is not a pel tray in the gripper. Robot cannot remove backing.	Operator attempted an invalid sequence. Cannot remove the pel backing unless a pellicle is in the end effector.	Try a different operation. If a pel tray IS present in the end effector, call a technician.
52	There is still a backing present on the backing removal pin.	Operator attempted an invalid sequence. The previously removed backing must be removed from the tool before another backing can be removed.	Park the robot and remove the backing from the backing removal pin. Then retry operation. If no backing is present, call a technician.
53	The grips are completely closed Does the robot have a part in the end effector.	The robot was expecting a part in the gripper, but the gripper sensors say that no part exists.	Please press 'Yes' if the robot has a part. If a part is present, call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
54	The robot grips will open. Are you absolutely sure there is not a part in end effector.	This message is used as a verification prompt to reduce the possibility of dropping a reticle.	Please press 'no' if the robot has a part. Press 'yes' if you want the robot to immediately open the grippers.
55	There is a Reticle on the Landing Pad.	The robot has detected a reticle on the landing pad when it was expecting no reticle on the landing pad.	Call a Technician.
56 57 58 59	The Front Side Safety Panel is open. The Front Side Access Door is open. The Right Side Safety Panel is open. The Left Side Safety Panel is open.	The Safety Panel or Door is detected as open.	Close all access doors and panels. Retry operation. If all doors are closed and error reoccurs, call a Technician. Press Machine Reset and then press 'CONTINUE'. Then press the flashing Arm Power On button to reset the system. Press ABORT to abort motion.
60	Pel frame in PMS or EOAT is unknown.	The operator pressed the "Pel is not in list" button. The robot does not know the pel type of the pellicle in the PMS or on the end effector.	Place back in pel tray and load again.
61	Cannot perform this function without a reticle.	Operator attempted an invalid sequence. The requested command requires a reticle on the landing pad.	Transfer a reticle to the landing pad first. Then retry operation. If a reticle IS present on the landing pad, call a Technician.
62	There is already a reticle in the SMIF Pod.	Operator attempted an invalid sequence.	Park the robot and load an empty SMIF Pod.
63	SMIF Pod is invalid size.	The operator placed a multi-reticle pod on the SMIF Loader.	Call a technician.
64	Robot failed to acknowledge Macro inspection request.	Internal software error.	Call a technician.
65	Pellicle failed inspection.	The robot could not see the pellicle well enough to detect the pellicle orientation.	Remove pellicle. Try a different pellicle.
66	Pellicle failed backing removal inspection.	The robot attempted to remove the pellicle backing, but the system still sees a backing on the pellicle.	Call a Technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
67	Shipping Reticle Present Sensor has failed to detect a reticle.	No reticle is detected in the ICS Shipper cassette. The robot expected a reticle.	Call a Technician.
68	Shipping Reticle Present Sensor has failed to detect absence of a reticle.	A reticle is detected in the ICS Shipper cassette. The robot expected no reticle.	Call a Technician.
69	Vision was unable to identify pel frame type.	The robot could not see the pellicle well enough to detect the pellicle orientation.	Remove pellicle. Try a different pellicle.
70	Cannot place a pel tray into a reticle port.	Operator attempted an invalid sequence.	Return the pellicle tray to the pellicle box nest. If there is not a pellicle tray in the end effector, call a technician.
71	Pel frame type entered does not match vision system.	The operator selected a pel type, but the vision system cannot verify the pel type is correct.	Return the pellicle tray to the pellicle box nest. Verify pellicle type and retry.
72	Reticle failed inspection.	The operator pressed the Fail button on the Macro Inspection screen.	Transfer the reticle back to a cassette and remove it from the system.
73	Reticle already has a pel.	The operator attempted to send a pellicized reticle to the PMS. Only reticlces without pellicles can be placed in the PMS.	Try a different command.
74	GUI failed to acknowledge request.	An internal software error occurred. The graphical routines did not respond correctly.	Try command again, if error reoccurs, call a Technician.
77	The Robot must have a reticle to perform this teaching utility.	To teach robot locations, the robot must have a reticle in the end effector.	Call a Technician.
78 79 80	The left-front corner / right-front corner / right-rear corner of the Shipping Cassette is not properly seated.	The ICS Shipper cassette is not properly seated in its nest.	Park the robot. Open the door and make sure all four corners are seated in the nest. If cassette IS seated, but error reoccurs, call a Technician.
81	The Robot needs to be at the #safe.front position before any testing can begin.	The robot is not at the "safe" position.	Call a Technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
300	Robot placed pellicized reticle into shipper chrome down. Selection was chrome up.	The operator selected an output option with the chrome-side down. Reticles can only be placed in the ICS shipper chrome down. The robot placed the reticle in the cassette chrome down.	Informational message only. Next time select a chrome down output option for the ICS shipper cassette. Contact a technician to create a new output option.
1001	User interface did not respond.	There was a problem with the user interface.	Call a Technician.
1100	No Users in System.	You cannot login unless users have been defined.	Call a Technician.
1101	Can't delete last user.	You cannot delete a user when there is only one user.	Call a Technician.
1102	Can't delete last option.	You cannot delete an output when there is only one output option.	Call a Technician.
1103	Cannot shut down with robot on park switch. Unpark robot before shutdown.	The robot must not be at the Park switch when shutting down. The Safe location is the best place for the robot when shutting down.	Press the Unpark Robot button, and then shutdown. If the robot is not on the park switch, call a technician.
1200	No Pel Box in Pel Nest.	The sensor Pellicle Box Present sensor on the pellicle box nest does not sense a pellicle box.	Park the robot. Place a pellicle box in the pellicle box nest. Then retry the action. If a pellicle box IS present, call a Technician.
1201	No Pel tray in robot gripper or in Pel Nest.	Operator attempted an invalid sequence.	If pel tray is still in Pel Mounter tell robot to retrieve it. If pel tray is in gripper or pel nest, call a technician.
1202	There is a pel tray on the robot and in the pel nest.	The robot cannot place the pellicle tray it has in the gripper since there is already a pellicle in the pellicle nest.	Park the robot. Remove the pellicle tray from the pel nest. If there IS NOT a pellicle tray on the pel nest, call a Technician.
1203 1204	Pel Nest Slide did not rise. Pel Nest Slide did not lower.	The system commanded the pellicle box cover lift to raise or lower, but did not receive sensor feedback that the lift is in the up or down position.	Retry operation. If error reoccurs, call a technician.
1205	Pel Nest did not acquire lid.	The pellicle box cover lift attempted to lift the cover, but the sensor does not detect a cover on the lift.	Retry operation. If error reoccurs, call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
1206	Pel Nest did not release lid.	The pellicle box cover lift attempted to release the cover, but the sensor is still detecting a cover on the lift.	Retry operation. If error reoccurs, call a technician.
1207	There is not a reticle present in the PMS.	Operator attempted an invalid sequence.	Try a different operation. If a reticle IS in the Pellicle Mount Station, call a Technician.
1208	There is not a pel tray present in the PMS.	Operator attempted an invalid sequence.	Try a different operation. If a pellicle tray IS in the Pellicle Mount Station, call a Technician.
1209 1210	PMS did not open. PMS did not close.	The system commanded the pellicle mount press to open or close, but did not receive sensor feedback that the lift is in the open or closed position.	Call a technician.
1211	PMS still mounting a reticle.	Operator attempted an invalid sequence.	Wait for the pellicle mount station to complete its operation, then retry previous operation.
1212	PMS reticle sensor has failed to sense the reticle on/off.	The reticle present sensor in the pellicle mount station did not change state as expected.	Call a technician.
1213	PMS pel tray sensor has failed to sense the pel tray on/off.	The pel tray present sensor in the pellicle mount station did not change state as expected.	Call a technician.
1214	There is not a pel frame on the pel tray in the pel nest.	A pellicle tray is detected in the pellicle nest, but no pellicle frame is detected inside the pellicle box.	Replace the pellicle box with one that has a pellicle tray and frame. Then retry operation. If a pellicle frame IS present, call a technician.
1215	There is not a pel tray or frame in the pel nest.	A pellicle box is detected in the pellicle nest, but no pellicle tray is detected inside the pellicle box.	Replace the pellicle box with one that has a pellicle tray and frame. Then retry operation. If a pellicle tray IS present, call a technician.
1216	There is a pel tray in the pel nest and in the PMS.	A pellicle tray is detected in both the pellicle box nest and the pellicle mount station. Only one of these locations can have a pellicle frame at any one time.	Remove the Pel tray from the PMS. Retry operation. If a pellicle tray is NOT present in both locations, call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
1217	Reticle already has a pel frame. Can not load or mount on PMS.	Invalid operation. The reticle already has a pellicle.	Try a different operation. If reticle does not have a pel frame, call a technician.
1218	There is still a pel backing present on the debacking pin.	Operator forgot to remove the old pellicle backing before picking the new pellicle frame.	Park the robot and remove the pel backing. If no pel backing is present at the backing removal station, call a technician.
1219	Cannot teach custom routine with pel tray in gripper.	Operator is attempting to teach a custom inspection routine with a pel frame in the gripper.	Place the pel frame to the PMS or pel nest. Then pick a reticle, select Inspection and then teach a new inspection routine. If pel frame is not in gripper, call a technician.
1220	Pel nest vacuum and lid sensor do not agree.	Both the vacuum sensor and the lid sensor should be detecting the lid. One of the sensors is not detecting the lid.	Call a technician.
1221	Pel nest vacuum sensor is on, but there is no vacuum.	The vacuum valve is turned off, but the vacuum sensor is still detecting vacuum.	Call a technician.
1300	There is not a reticle to pick or place from the PMS.	Invalid operation. The Pellicle Mount Station already has a reticle.	Try a different operation. If the PMS does not have a reticle, call a technician.
1301	There is a reticle in the PMS and on the landing pad or in the grips.	Invalid state. There should not be two reticles in process at the same time. A reticle may have been placed manually into the tool.	Call a technician.
1400			
1401	The ULPA Flow is outside standard limits of operation.	The air pressure inside the ZARIS tool is below the acceptable setting on the digital pressure sensor on the front of the fan-filter unit.	Make sure that no more than two access doors are opened at a time. If error occurs with doors closed, call a technician.
1402	The high pressure cleaning flow is outside standard limits of operation.	The air pressure is either above or below the acceptable pressure range set on the digital pressure sensor.	Call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
1403	The low pressure cleaning flow is outside standard limits of operation.	The air pressure is either above or below the acceptable pressure range set on the digital pressure sensor.	Call a technician.
1404	The Front Shipping Access door is open. This affects air flow.	The Front Shipping Access door should only be opened when exchanging shipping cassettes.	Close the Front Shipping Access door. If door is closed, call a technician,
1405	More than two inspection doors are open. This affects air flow.	Only two adjacent inspection doors should be opened at one time.	Close unneeded inspection doors. If only to adjacent doors are open, call a technician.
1406	The lower shipping access door is open. This affects air flow.	The Front Shipping Access door should only be opened when exchanging shipping cassettes.	Close the Lower Shipping Access door. If door is closed, call a technician,
1407	The park switch is depressed and the robot is not at park.	The robot sees the park switch ON, but it does not believe that the robot is at the Park location.	Call a technician.
3000	Robot is in maintenance mode. Maintenance Personal must Clear error and unlock system.	An error has occurred and the robot cannot proceed without a technician reviewing the situation.	Call a technician.
3001	Robot is in maintenance mode. Landing pad has failed to turn on or off.	An error has occurred and the robot cannot proceed without a technician reviewing the situation.	Call a technician.
3002	Robot is in maintenance mode. Landing pad has failed to detect the chrome up or down.	An error has occurred and the robot cannot proceed without a technician reviewing the situation.	Call a technician.
3003	Robot is in maintenance mode. Robot cannot identify part in EOAT.	An error has occurred and the robot cannot proceed without a technician reviewing the situation.	Call a technician.
3004	Robot is in maintenance mode. Shipping Cassette has failed to transition on reticle presence.	An error has occurred and the robot cannot proceed without a technician reviewing the situation.	Call a technician.
3005	Robot is in maintenance mode. Grips have failed to open or close.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3006	Robot is in maintenance mode. Robot pel tray sensor did not detect pel tray.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
3007	Robot is in maintenance mode. Pel Top sensor failed to turn on or off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3008	Robot is in maintenance mode. Pel Tray sensor failed to turn on or off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3009	Robot is in maintenance mode. Pel Tray sensor failed to turn on or off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3010	Robot is in maintenance mode. Grip sensors have failed to identify part in robot tooling.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3011	Robot is in maintenance mode. The PMS is not open.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3012	Robot is in maintenance mode. EOAT reticle presence sensor has failed to turn on or off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3013	Park switch did not release Robot is in maintenance mode	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3014	EOAT and Landing Pad chrome sensor do not agree.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3015	Robot is in maintenance mode. One or both pel sensors on landing pad are ON and there is no reticle.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3016	Robot is in maintenance mode. Pel up sensor on Landing Pad has failed to turn on.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3017	EOAT and Landing Pad reticle sensor do not agree.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3018	Robot is in maintenance mode. Pel down sensor on Landing Pad has failed to turn off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
3019	Robot is in maintenance mode. Pel up sensor on Landing Pad has failed to turn off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
3020	Robot is in maintenance mode. Grip Open has failed to turn off.	A critical error has occurred. There is a risk of crashing the robot or damaging a reticle.	Call a technician.
7080 7083	Failed when communicating to SMIF.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7081	Line error when reading from SMIF.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7082	Timeout when reading from SMIF.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7084	SMIF is in Alarm state.	Error generated by SMIF Loader.	The reticle is likely skewed inside the SMIF Pod. Try a different SMIF Pod. Retry operation. If error reoccurs, call a Technician.
7085	SMIF is busy.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7086	SMIF rejected command.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7087	SMIF command has invalid parameter.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7088	SMIF has no pod.	Error generated by SMIF Loader.	Place a SMIF Pod on the Loader. Verify Pod is placed correctly on the Loader. If Pod placed correctly and error reoccurs, call a Technician.
7089 7090	SMIF is not ready.	Error generated by SMIF Loader.	Wait 30 seconds and retry operation. If error reoccurs, call a Technician.
7091	SMIF has just powered up.	Error generated by SMIF Loader.	Wait SMIF Loader to complete power-up sequence. Retry operation. If error reoccurs, call a Technician.
7092	SMIF aborted action.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7093	SMIF cannot recognize message.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.

Table 4-1 Error Screen Messages and Corrective Procedures (continued)

#	ERROR SCREEN MESSAGE	MOST LIKELY CAUSE OF CONDITION	OPERATOR'S RECOMMENDED RECOVERY
7094 7095	SMIF is in alarm condition.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7096	SMIF equipment constant data is out of range.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7097	SMIF constant data does not exist.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7098	SMIF equipment id is unknown.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
7099	SMIF has just powered up.	Error generated by SMIF Loader.	Wait SMIF Loader to complete power-up sequence. Retry operation. If error reoccurs, call a Technician.
7100	SMIF has timed out.	Error generated by SMIF Loader.	Retry operation. If error reoccurs, call a Technician.
9401	Too many users in system.	The maximum number of users has been reached.	Call a technician.
9402	User does not exist on system.	The user attempted to delete a user name that does not exist in the system.	Call a technician.
Other	Error Number: *XXXX* Undefined Error	An undefined error occurred.	Call a technician.

Operator Recovery Procedures

Chapter 5

In This Chapter

- Stopping and Recovery General Information
- Machine At Rest Procedures
- Error Stop Recovery Procedures
- System Fault Recovery Procedures
- Robot Stop Recovery Procedures
- Emergency Machine Off (EMO) Recovery Procedures

Stopping and Recovery General Information

The machine may stop under error, system fault, emergency, or system shutdown conditions. Emergency stops include Robot Stop and Emergency Machine Off. The recovery procedures depend upon the type of stop that has occurred. Stopping circumstances and recovery procedures for each of these conditions are described below.

Please note the following definitions:

EMO – Emergency Machine Off. When an EMO button is pressed, ALL power to the workcell is dropped with the exception of the EMO Reset circuitry. The EMO button should be used FOR EMERGENCY PURPOSES ONLY. Do not use the EMO button to stop the robot for maintenance or standard shutdown. An EMO condition can only be caused by pressing an EMO Button.

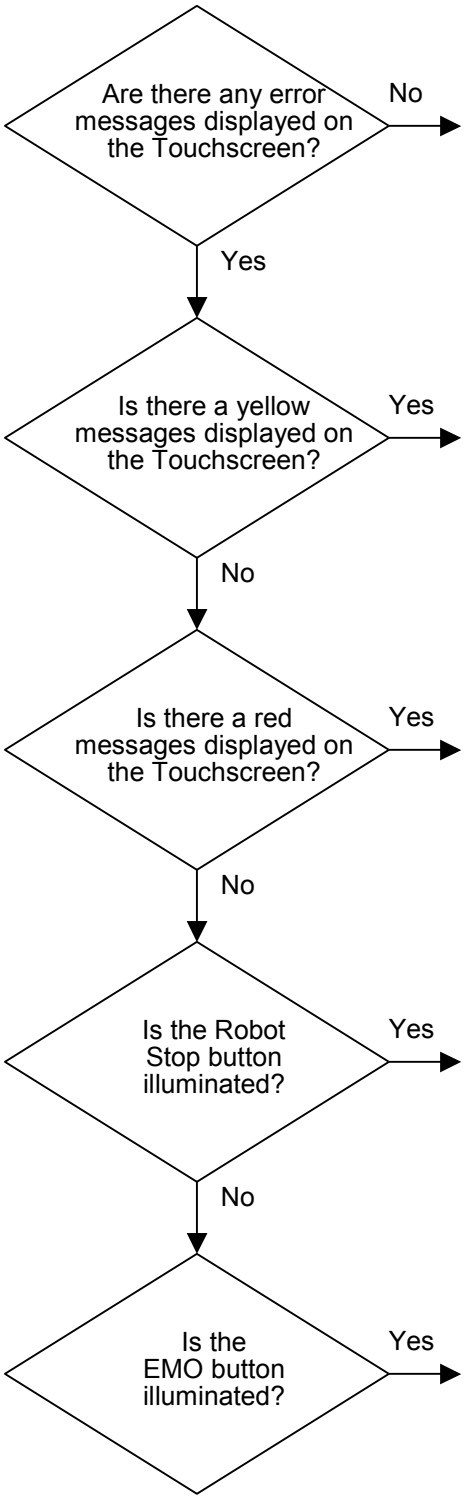
Robot Stop – When a Robot Stop button is pressed, power to the robot motors is stopped immediately. The Robot Stop button should only be pressed when the robot is at the Safe position or the Park position. The following items are all a part of the Robot Stop circuit.

- Robot Stop pushbuttons (2x)
- Stäubli Remote Panel 'E-stop' button
- Pendant 'E-stop' button
- Pendant dead-man switch
- Front, Right and Left lift-off panels
- Front-right Access Door
- Light Curtain
- Crash Detector
- Robot Park Switch

- Bypass Key Switch
- Joint Selection knob (back of robot)

Figure 5-1 Recovery Flow Chart for a flow diagram indicating what to do for the various types of Robot Stops.

Figure 5-1 Recovery Flow Chart



Machine At Rest

Refer to Machine At Rest on page 5-4.

Error Stop

Refer to Error Stops Recovery Procedures on page 5-4 and the Troubleshooting Matrix contained in Chapter 4.

System Fault Stop

Refer to System Fault Stops Recovery Procedures on page 5-4.

Robot Stop

Refer to Robot Stop Recovery Procedures on page 5-5.

Emergency Machine Off (EMO)

Refer to the Emergency Machine Off (EMO) Recovery Procedures on page 5-6

Machine At Rest

Unlike some systems that cycle continuously, the ZARIS only executes tasks as instructed by the operator. As a result, the machine may remain at rest indefinitely with the reticle at any station (or with no reticle present).

The Robot must be at the Park position for the operator to penetrate the workcell to insert or remove a cassette, otherwise a Robot Stop condition occurs.

Error Stops Recovery Procedures

When an error condition is detected, the Touchscreen will display a yellow Error screen. Refer to Chapter 5, Troubleshooting, for appropriate corrective action. Once the condition causing the error condition has been corrected, the ZARIS system should be ready to resume normal operations. The message on the Error screen will instruct the operator to press the **CONTINUE** command button on the Touchscreen. After this command button is touched, the system will display the Main screen.

If the same error condition continues to occur, notify the appropriate maintenance personnel.

System Fault Stops Recovery Procedures

When a system fault condition is detected, the Touchscreen will display a red System Fault screen. Some System Fault conditions may be corrected by the operator, and some will require assistance from a technician. Refer to Chapter 5 Troubleshooting for appropriate corrective action.

➢ To restart the ZARIS system from a system fault condition:

1. Verify that the condition causing the system fault condition has been corrected.
2. Press the Machine Reset pushbutton on the EMO / Robot Stop / Reset Box.
3. Verify that the light on the Machine Reset pushbutton is on and remains on.
4. Touch the **CONTINUE** command button on the Touchscreen.
5. Press the flashing ARM POWER ON pushbutton on the Stäubli Remote Control Panel. The green light in the center of the pushbutton should turn to a steady green. The ARM POWER Indicator Light should also be steady green.
6. Verify that the Touchscreen returns to the screen that was displayed prior to pressing the Robot Stop pushbutton.

If the same system fault condition continues to occur, notify the appropriate maintenance personnel.

Robot Stop Recovery Procedures

When one of the Robot Stop buttons is pressed, the Light Curtain is broken, a Safety Frame door is opened, or the crash detector decouples, a Robot Stop will occur. The Touchscreen will display a red System Fault screen with an appropriate message.

➢ To restart the ZARIS system from a robot stop condition:

1. Verify that all conditions that prompted the robot stop have been corrected.

   The following items must be set, reset or operating properly to clear the Robot Stop:
   - Robot Stop pushbuttons (2x)
   - Machine Reset pushbutton
   - Stäubli Remote Panel 'E-stop' button
   - Pendant 'E-stop' button
   - Pendant dead-man switch
   - Front, Right and Left lift-off panels
   - Front-right Access Door
   - Light Curtain
   - Crash Detector
   - Robot Park Switch
   - Bypass Key Switch
   - Joint Selection knob (back of robot)

2. Press the Machine Reset pushbutton on the EMO / Robot Stop / Reset Box.

3. Verify that the light on the Machine Reset pushbutton is on and remains on.

4. Touch the **CONTINUE** or **ABORT** command button on the Touchscreen. If ABORT is pressed, then the robot must be moved manually to the Safe position. Contact a technician for assistance with moving the robot to the Safe position.

5. Press the flashing ARM POWER ON pushbutton on the Stäubli Remote Control Panel. The green light in the center of the pushbutton should turn to a steady green. The ARM POWER Indicator Light should also be steady green.

6. Verify that the Touchscreen returns to the screen that was displayed prior to pressing the Robot Stop pushbutton.

Emergency Machine Off (EMO) Recovery Procedures

Warning!

Do not attempt to perform EMO recovery procedures until determining that the workcell and robot are in a safe operating conditions. Damage to the workcell or injury to personnel will result if EMO procedures are not followed correctly.

EMO recovery is a Technician function, not an operator function. Contact the Equipment Technician for EMO recovery.

See the Technical Reference Manual for EMO Recovery procedures.

Preventative Maintenance

Chapter 6

Table 6-1 Operator Preventative Maintenance Schedule

INTERVAL	TASK	RECOMMENDED ACTION
Daily	General Visual Inspection	Read Maintenance Procedure MP0143-01
	Align Cleaning Gun Needle	Read Maintenance Procedure MP0143-03
Weekly	End Effector Visual Inspection	Read Maintenance Procedure MP0143-02

The Maintenance Procedures listed above should be following this page in your manual.

If you do not have the Maintenance Procedures listed above, contact an Equipment Technician. They can provide copies of the procedures from the Technical Reference Manual.

Procedure:	**General Visual Inspection**	**MP#:**	MP0134-01
Issue Date:	December 2000	**Revision:**	A

Applies To: Automated Reticle Inspection and Pellicle Mounting System (ZARIS)

Zygo Project #	System Serial #	Top Level #
500	148-1100	100-0116
502	149-1100	100-0117

Reason for maintenance:	Visual inspection for any workcell components that appear abnormal.
Frequency:	Daily Before every start-up
Tools/Materials Needed:	None
Reference Documents:	None
Before Starting:	• Allow robot to complete any reticle and pel frame transfers. • Put all reticles and pel frames into an output nest.
Procedure:	1. Park the robot. 2. Press the Robot Stop pushbutton. 3. Take several steps back away from the ZARIS workcell. 4. Visually scan the entire workcell exterior looking for anything that appears different from normal. 5. Open the front access door. 6. Visually inspect the interior of the ZARIS workcell. Look for any of the following: a. reticles not in an output nest b. any loose items laying around c. dust or other small particles on table top d. glass particles on table top e. cable or tubing hanging down from robot or end effector 7. If any of the above items appear not to be normal, call a technician for assistance. 8. Close all doors. 9. Press Machine Reset pushbutton.
Before Leaving:	None
Follow-up:	None

Procedure:	**End Effector Visual Inspection**	**MP#:**	MP0134-02
Issue Date:	December 2000	**Revision:**	A

Applies To: Automated Reticle Inspection and Pellicle Mounting System (ZARIS)

Zygo Project #	System Serial #	Top Level #
500	148-1100	100-0116
502	149-1100	100-0117

Reason for maintenance:	Visual inspection of End Effector.
Frequency:	Daily Before every start-up
Tools/Materials Needed:	None
Reference Documents:	None
Before Starting:	• Allow robot to complete any reticle transfers. • Put all reticles into an output nest.
Procedure:	1. Make sure the robot is at its Safe position. 2. Open two viewport doors. 3. Visually inspect the robot end effector. Look for any of the following: a. no bent arms or bent fingers b. there should be a blue gripper pad in each finger c. end effector is straight and level d. no wires, tubing or connectors hanging, loose, or not tied-down 4. If any of the above items appear not to be normal, call a technician for assistance. 5. Close viewport doors.
Before Leaving:	None
Follow-up:	None

Procedure:	**Align Cleaning Gun Needle**	**MP#:**	MP0134-03
Issue Date:	December 2000	**Revision:**	A

Applies To: Automated Reticle Inspection and Pellicle Mounting System (ZARIS)

Zygo Project #	System Serial #	Top Level #
500	148-1100	100-0116
502	149-1100	100-0117

Reason for maintenance:	Verify the cleaning gun needle is properly aligned. Prevent damage to reticles and pellicles.
Frequency:	Daily – upon start-up
Tools/Materials Needed:	None
Reference Documents:	None
Before Starting:	• Make sure no reticle is located on the landing pad. Put all reticles and/or pellicles back to their storage cassette.
Procedure:	1. From the Main screen, touch the Operator command button to display the Operator screen. 2. Touch the Check Cleaning Needle command button to have the system position the end effector to the cleaning needle. The Needle Alignment screen will be displayed. 3. Verify that the Needle is positioned directly at the outer and upper left corner of the right-hand gripper tong (looking from operator perspective) of the Active End Effector as shown in the diagram below. The tip of the needle should be nearly touching the corner of the gripper tong. (see figure on page 2) 4. If the needle is correctly aligned, proceed to step 12 of this procedure. 5. Press the ROBOT STOP pushbutton. 6. Open the two of the View Port Doors so that you have access to the cleaning needle. 7. Using a gloved hand, carefully bend the needle so that it is correctly aligned. 8. Press the MACHINE RESET pushbutton. 9. Touch the Continue command button on the Touchscreen. 10. Press the flashing ARM POWER ON pushbutton on the Stäubli Remote Control Panel. 11. Verify that the Touchscreen returns to the Needle Alignment screen that was displayed prior to pressing the Robot Stop. 12. Touch the Continue command button to return to the Operator screen. 13. Touch the Back command button to return to the Main screen.
Before Leaving:	None

Follow-up:	None

