PERSIMMON

ON-BOARD

CONTROLLER

PRODUCT MANUAL

FOREWARD

Thank you for purchasing a Persimmon Technologies product. We focus on your success every day by providing the highest quality products with industry leading performance at the best possible value. We look forward to providing you innovative material handling solutions for many years to come.

-The Persimmon Technologies Team

INTELLECTUAL PROPERTY

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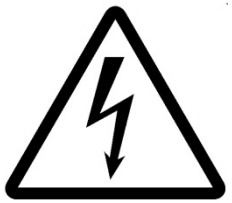
CONTENTS

SAFETY

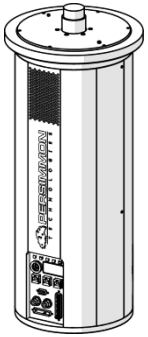
This section outlines the primary safety hazards associated with the Persimmon robot, but it is not a replacement for proper training. Only trained personnel should setup, operate, and service the Persimmon robot. This manual does not cover the safety hazards associated with the customer's integration into their respective material handling system. Please refer to the OEM system manual for complete safety hazard information.

ELECTRICAL HAZARDS



ELECTRICAL HAZARDS EXIST INSIDE ENCLOSURES

- REMOVE POWER BEFORE SERVICING ROBOT
- NEVER OPERATE ROBOT OR CONTROLLER WITH ENCLOSURE COVERS REMOVED
- TURN POWER OFF BEFORE CONNECTING OR DISCONNECTING ANY CABLES



ROBOT DRIVE UNIT

INPUT: 48 Volts DC 20 Amp

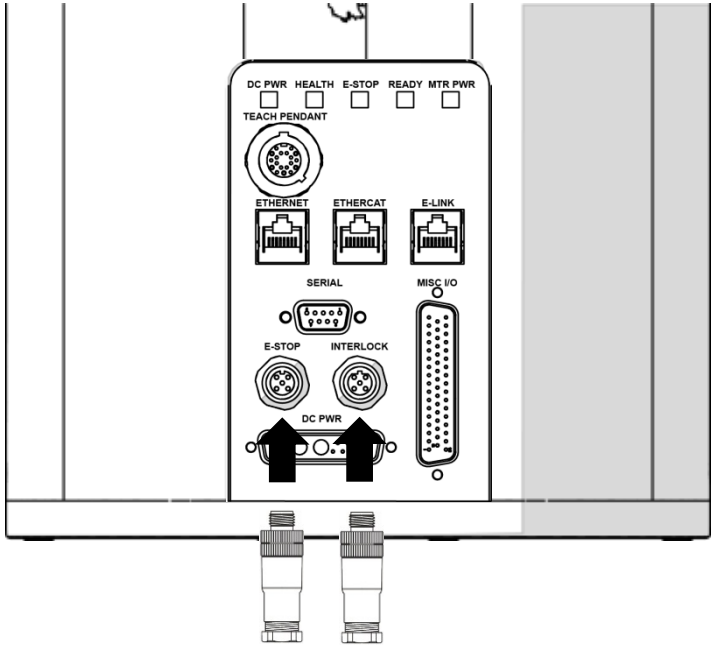
SETUP

This section outlines necessary steps to unpack, install, and power up the Persimmon robot.

COMPLETING THE SAFETY SYSTEM

In order to test the robot system as a stand-alone sub assembly the E-Stop and Interlock circuit terminators must be installed to complete the safety circuits. These terminators must be threaded in completely to establish a connection.

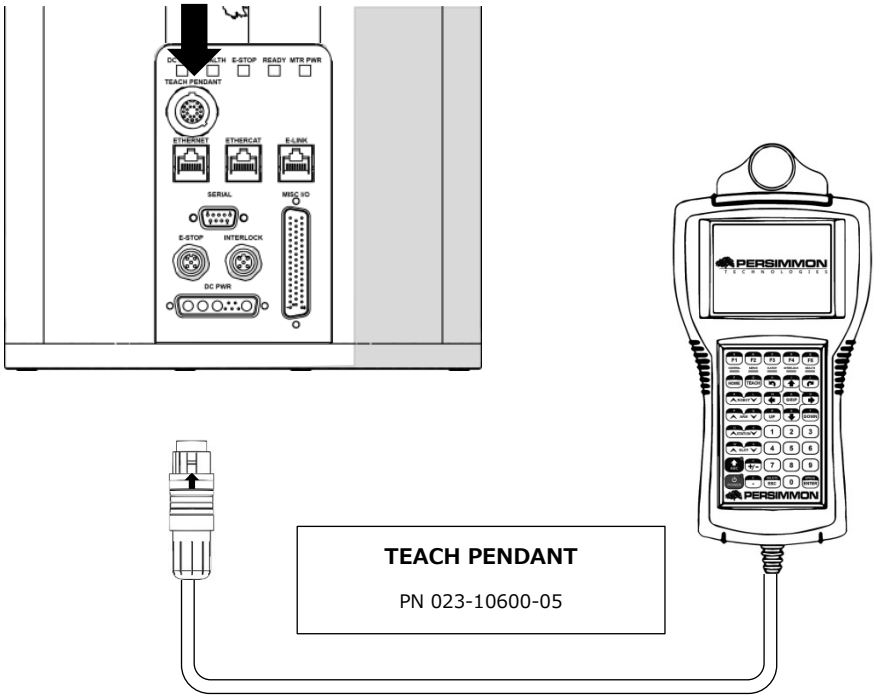
NOTE – The terminators will later be replaced by the host system e-stop and interlock circuits when system integration is completed.



E-STOP TERMINATOR	INTERLOCK TERMINATOR
PN 013-10691-04	PN 01310692-04

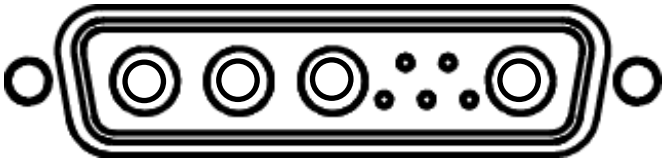
CONNECTING THE TEACH PENDANT

The teach pendant allows a user to control the robot system without a host computer present. Later, when the host computer is integrated, the teach pendant can be used to service and monitor the system. The teach pendant connector is a push to lock connector. To insert the connector, align the arrows and push the barrel of the connector towards the controller until it is fully seated. To unlock the connector the user must pull on the barrel of the connector to retract it and then remove the whole connector.



EXTERNAL DC POWER

DC PWR



The robot requires an external 24VDC 20 Amp power supply and prepared power cable with the specified mating connector. The DC Power connection provides all power to the Persimmon robot.

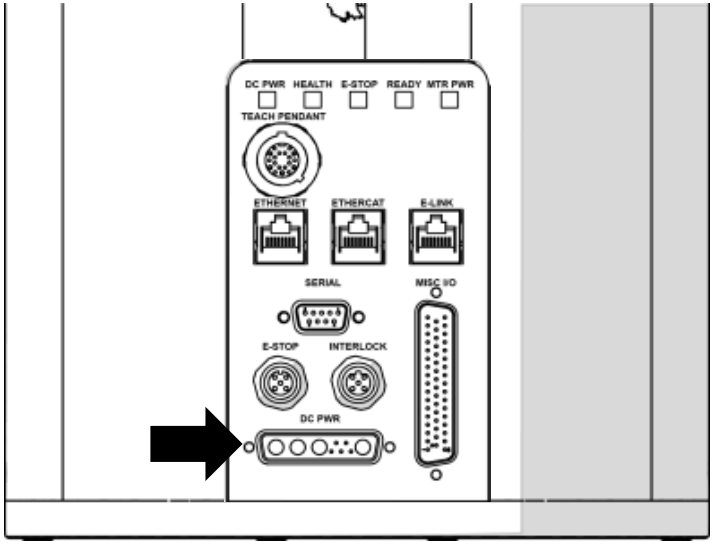
Pin	Signal
1	No Connection
2	Earth Ground
3	48V Return
4	48V DC 20 Amp

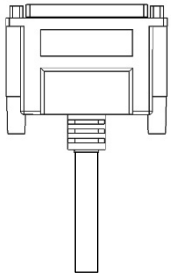
Robot Connector:	D-Subminiature Combo Male (DBM9W4PK87)
Mating Connector:	D-Subminiature Combo Female (DBM9W4SA197)

CONNECTING MAIN POWER

Connecting the main power source is the final step to make the robot system operational. Ensure the external power supply is off before connecting the DC power connector. Only enable the external power supply after the DC power connector is fully secured.

NOTE - Make sure all previous steps are complete before connecting main power.





INPUT POWER

48 V AC 20 Amps

STATUS INDICATORS

The robot has five LED status indicators across the top of the IO panel that help the user determine if the system is functioning properly. Their functions are described in the table to the right.

DC PWR	**Solid Green**	DC power is supplied from external supply to the robot
	Off	No power supplied to the robot
HEALTH	**Solid Green**	Normal Operation – Everything is OK
	Fast Blinking Green	Heath Risk – Check controller logs for warnings and cooling fan operation
	Solid Yellow	Safety Fault – Redundant safety circuits do not match, system power cycle required to clear
E-STOP	**Solid Green**	Normal Operation – Everything is OK
	Fast Blinking Green	E-Stop or Interlock Active, check all stop buttons, interlock switches, and connections (Including teach pendant)
	Slow Blinking Green	Teach Mode – Normal Operation, Interlocks Ignored
	Solid Yellow	Safety Fault – Redundant safety circuits do not match, system power cycle required to clear
READY	**Solid Green**	Controller is alive and ready to accept commands
	Off	Controller is not alive
MTR PWR	**Solid Green**	DC Motor Power Supply Enabled – Power available at motor amplifiers
	Off	DC Motor Power Supply Not Enabled – No power available at motor amplifiers

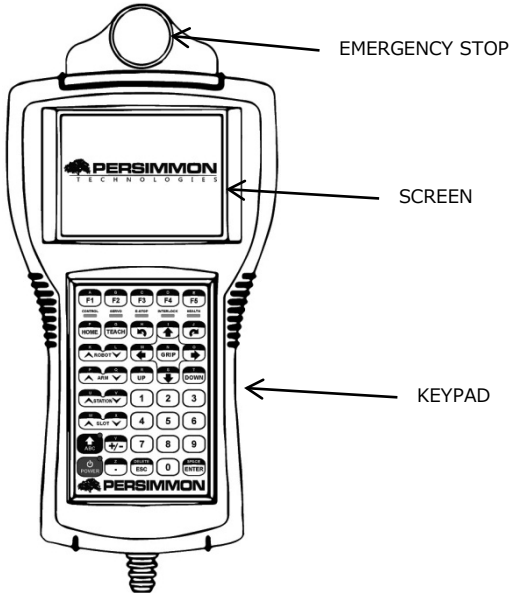
OPERATION

This section outlines how to operate the robot using the Teach Pendant.

TEACH PENDANT OVERVIEW

The Teach Pendant provides a portable interface for a user to configure and control the robot behavior. The main components of the Teach Pendant are shown on the right:

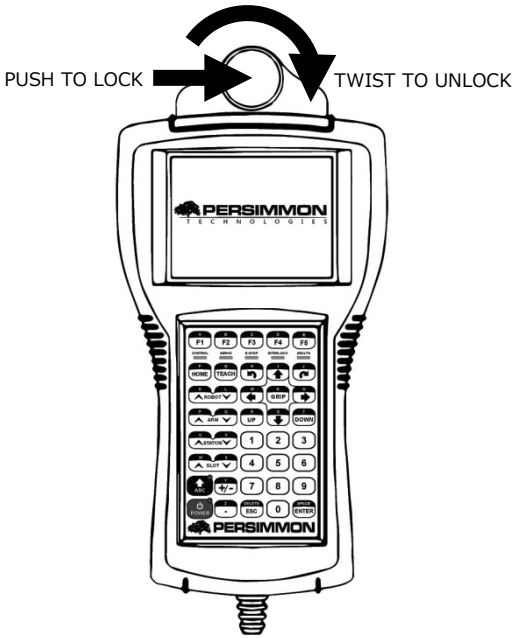
NOTE – All motions commanded from the teach pendant will execute at a reduced speed for operator safety.



EMERGENCY STOP

The Teach Pendant Emergency Stop button provides immediate control for a robot operator to initiate a category 1 safety stop (motion will stop then servo power will be disabled). The Emergency Stop Button will remain operational even if the Teach Pendant is turned off and still connected to the robot controller. The robot will not resume operation automatically, it must be initialized by the host or through the teach pendant after the button has been reset.

EMERGENCY STOP BUTTON OPERATION



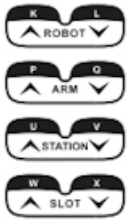
KEYPAD FUNCTIONS

HOME / TEACH

Provides direct access to the Home or Teach screens from any other screen.

QUICK SELECT CONTROLS

Allows the user to change the robot, arm, station, or slot without leaving the current screen.

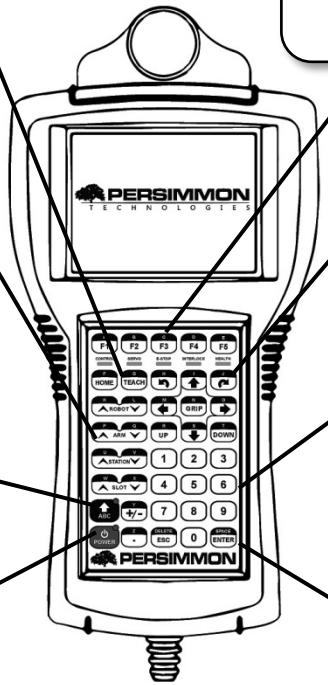


TEXT DATA ENTRY MODE

Allows the user to enter text data if needed. Text characters are listed on the eyebrow of keypad buttons.

POWER

Turns the Teach Pendant on and off.



SOFT FUNCTION KEYS

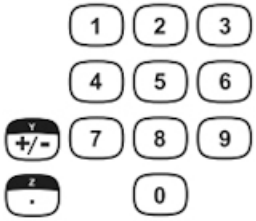
Provides access to primary robot functions: GOTO, HAND LOCATE, JOG, MOVE, and TRANSFER screens.

DIRECTIONAL CONTROLS

Supports GOTO, JOG, and TRANSFER motion control and on-screen navigation for data entry.

NUMERIC DATA ENTRY

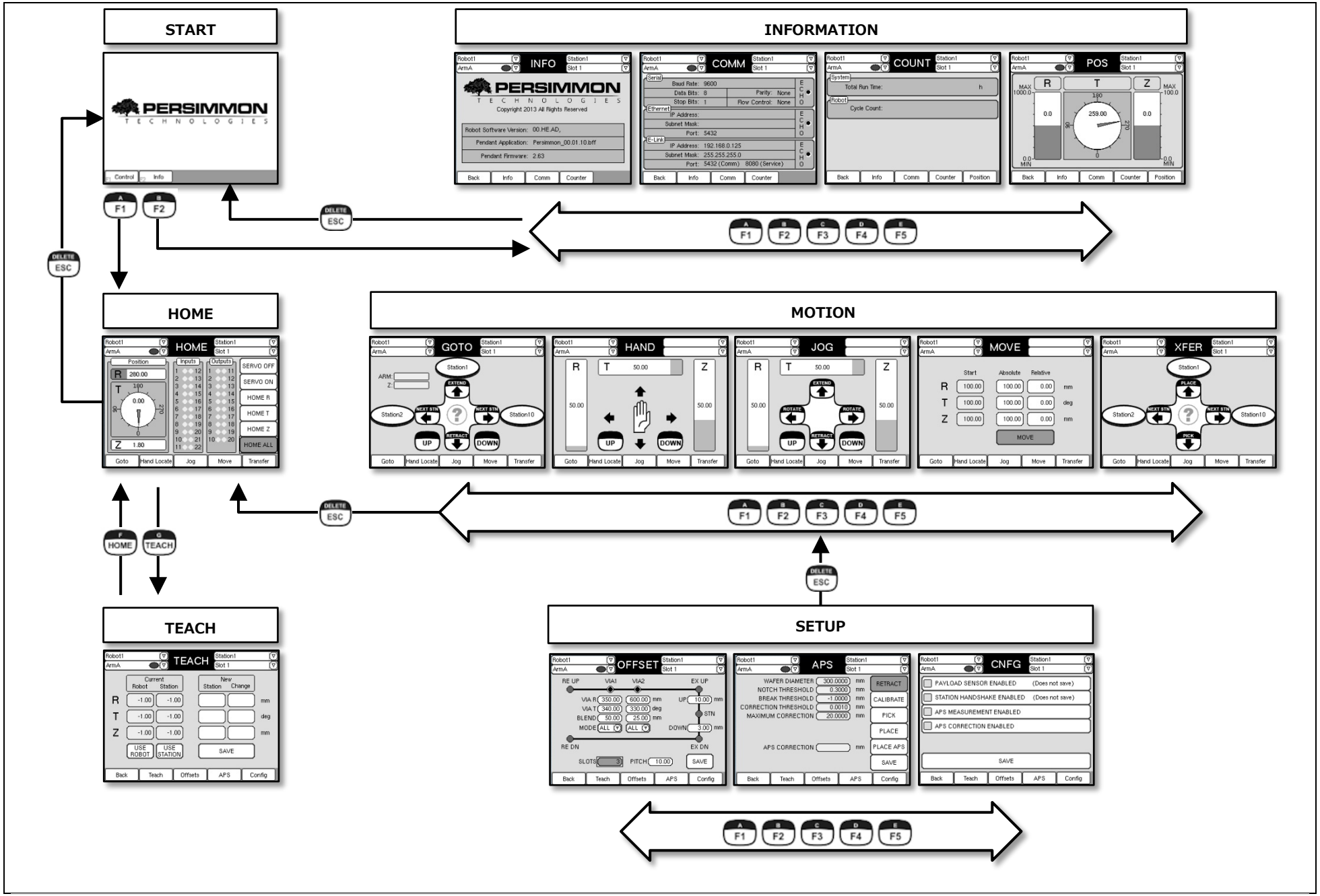
Supports data entry for move or station coordinates.



ENTER / ESCAPE

Execute action / complete data entry or cancel data entry.

SCREEN NAVIGATION



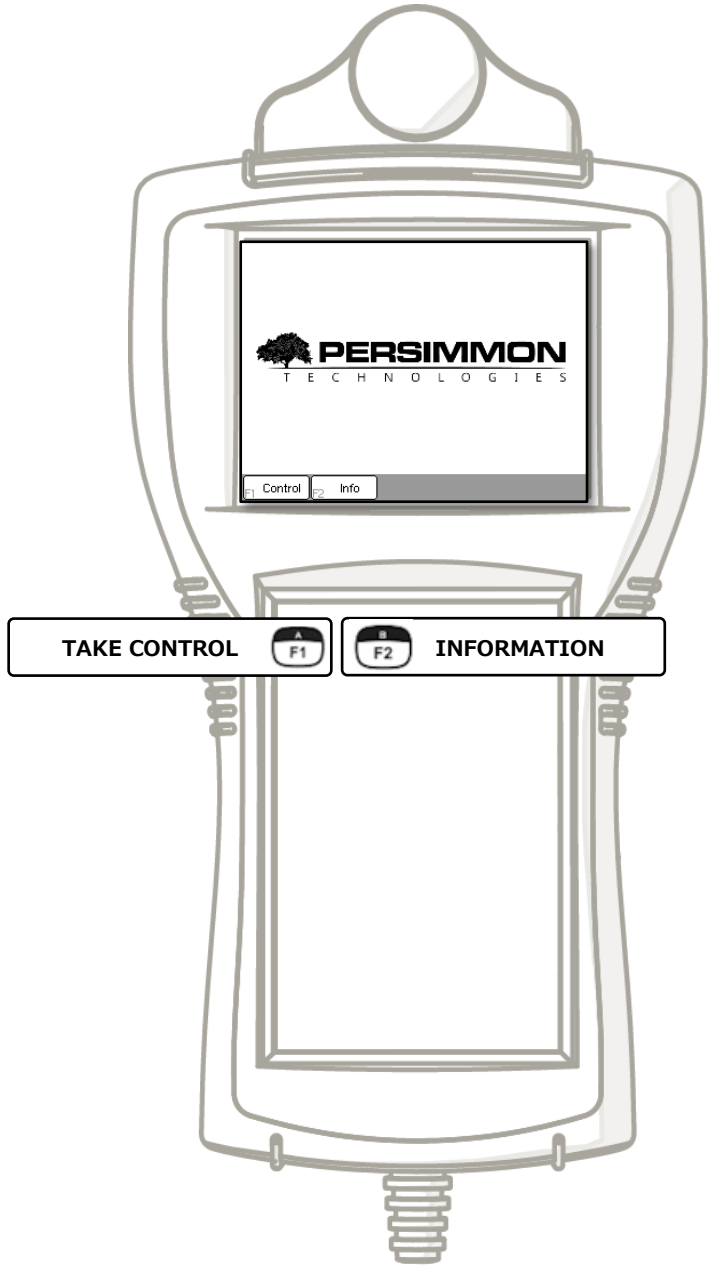
START SCREEN

The **START** screen is the first screen that appears when the Teach Pendant is turned on. The user has two options from this screen after the controller is ready for operation:

F1 – CONTROL – Take control and operate the system

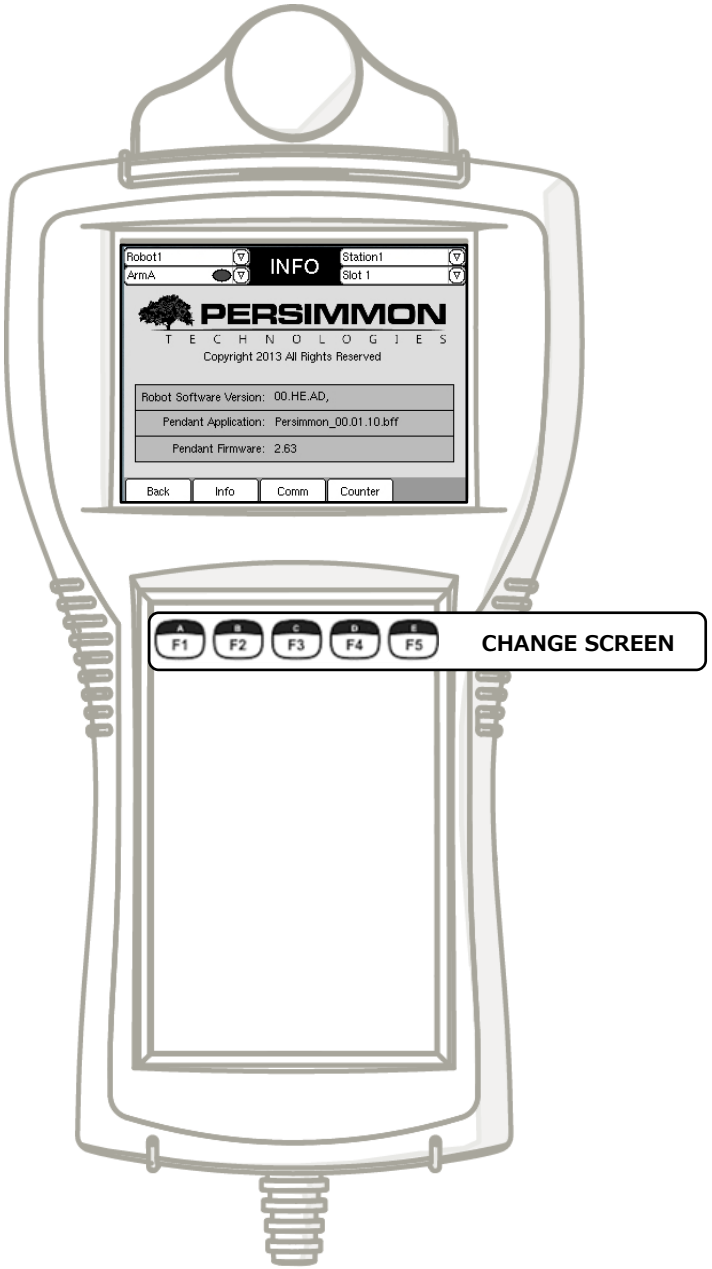
F2 – INFO – View information about the robot system

NOTE – Make sure the robot is not currently being operated by a remote host before taking control. Establishing control with the teach pendant will halt remote host operation. System information can be viewed without impacting remote host operation.



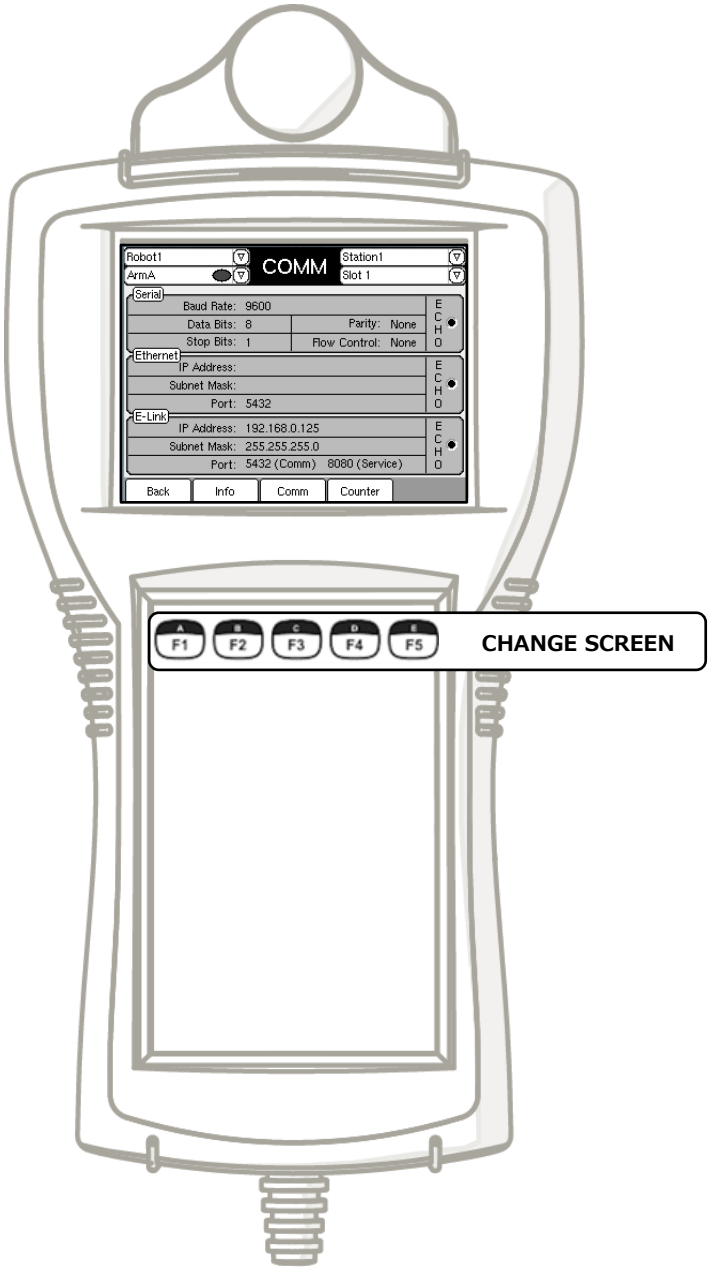
INFORMATION SCREEN

The **INFO** screen displays the current software versions for the robot control software and teach pendant.



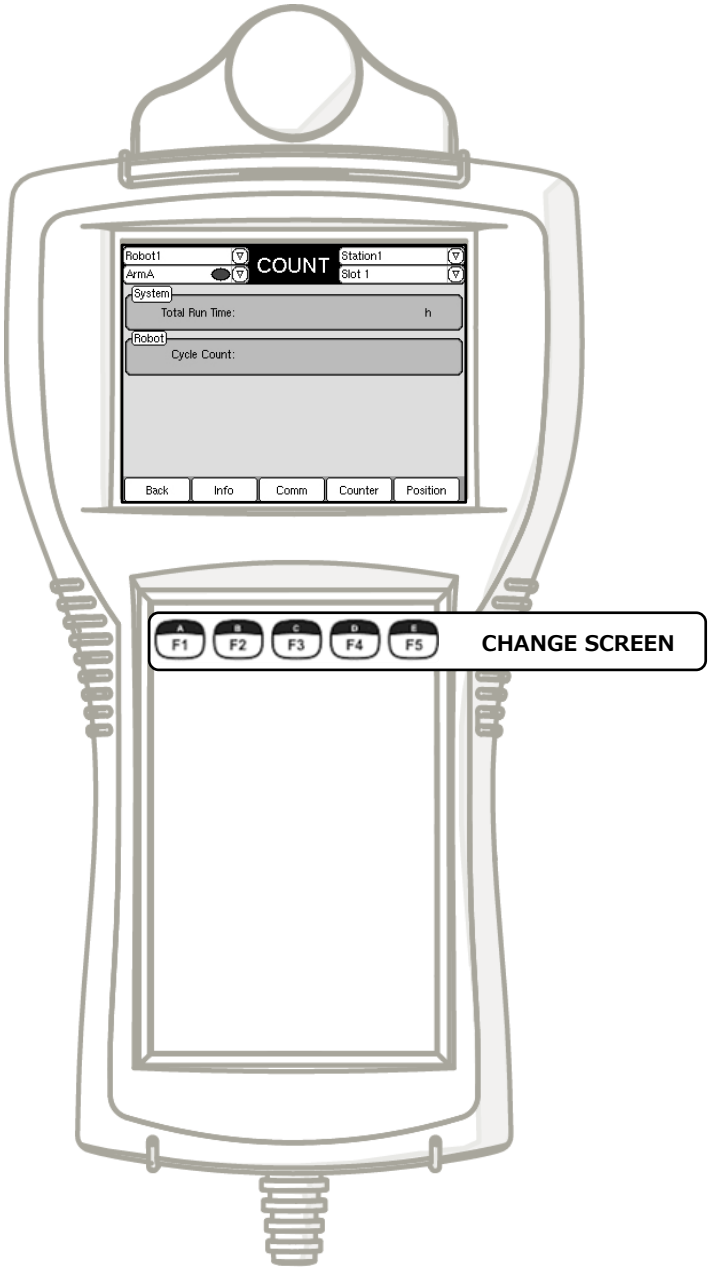
COMMUNICATION SCREEN

The **COMM** screen displays the current host serial, Ethernet, and E-Link communication port settings on the robot controller.



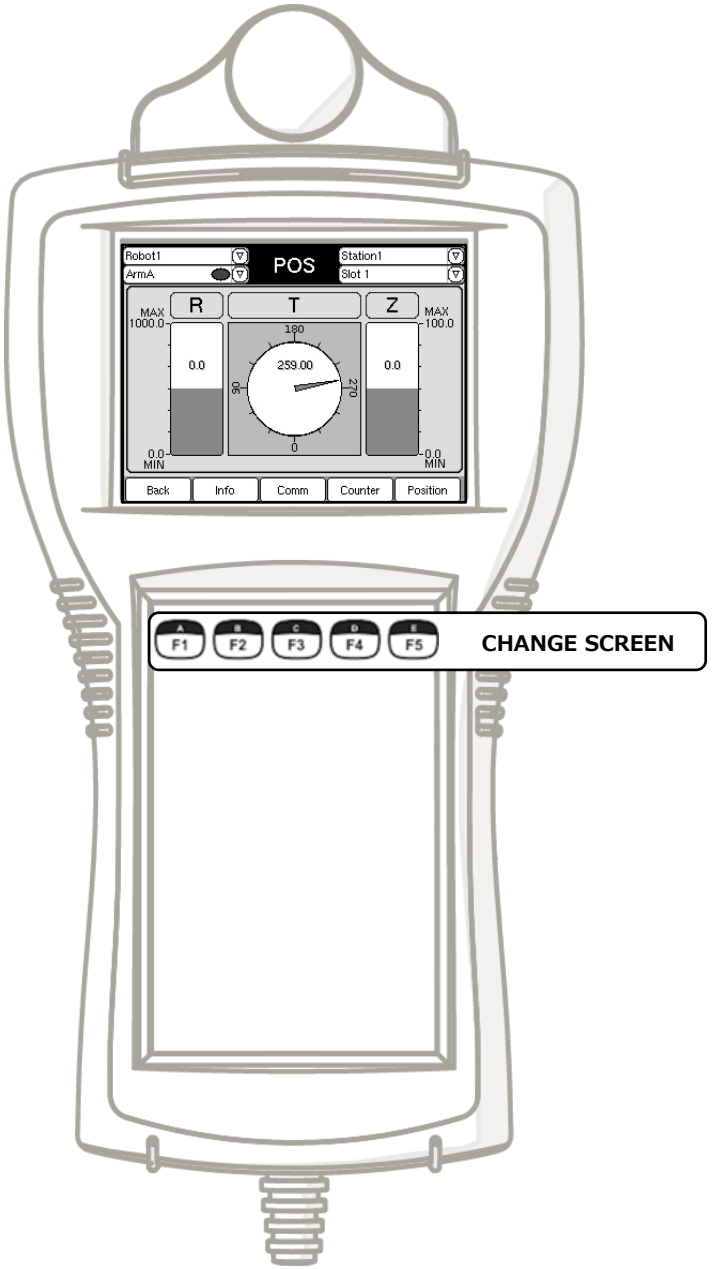
CYCLE COUNT SCREEN

The **COUNT** screen displays the current cycle count and total run time for the system.



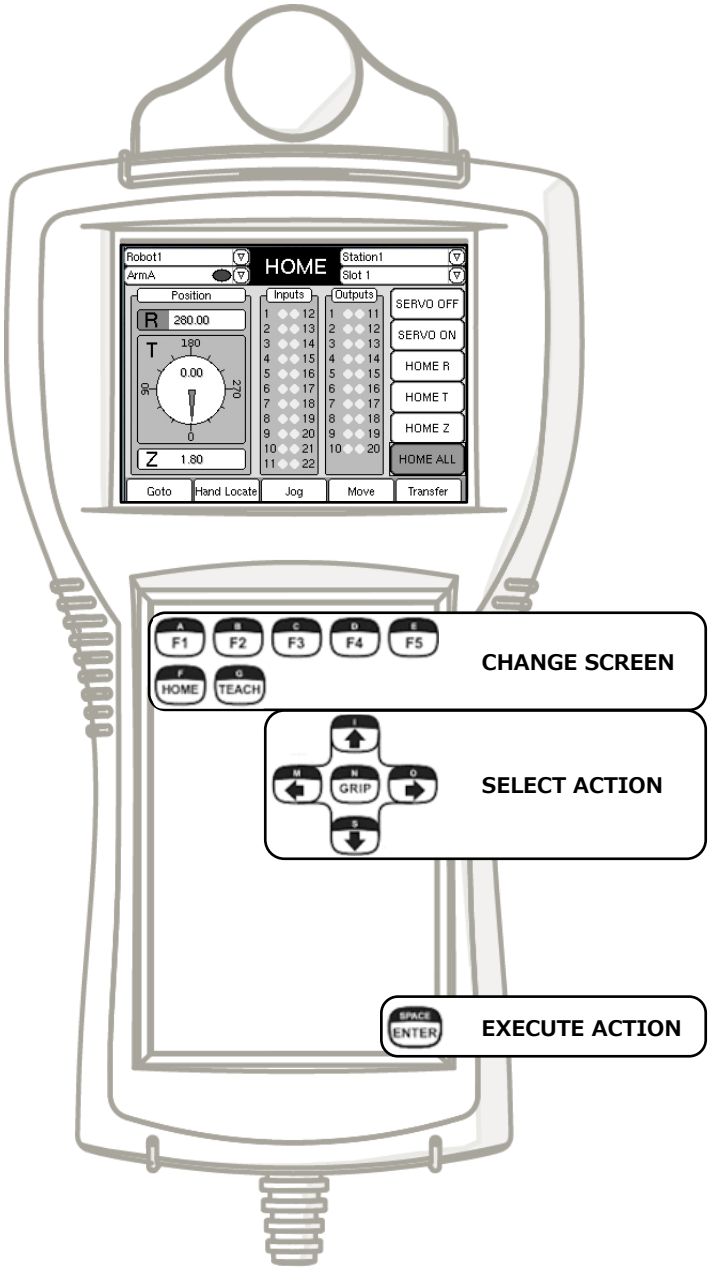
POSITION SCREEN

The **POS** screen displays the current position for the selected robot and arm.



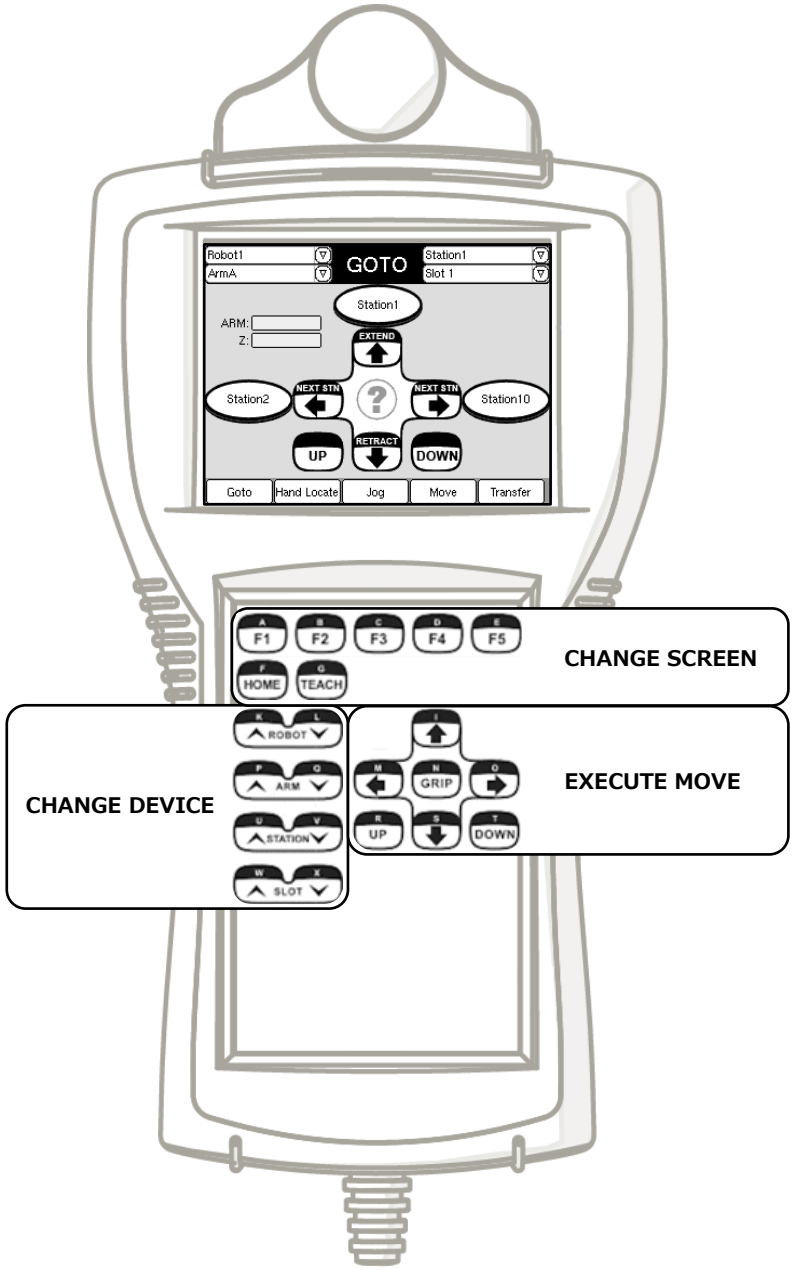
HOME SCREEN

The **HOME** screen is used to enable / disable motor servos or home the robot as part of system initialization after controller power up. The home screen also displays current robot position and miscellaneous IO state.



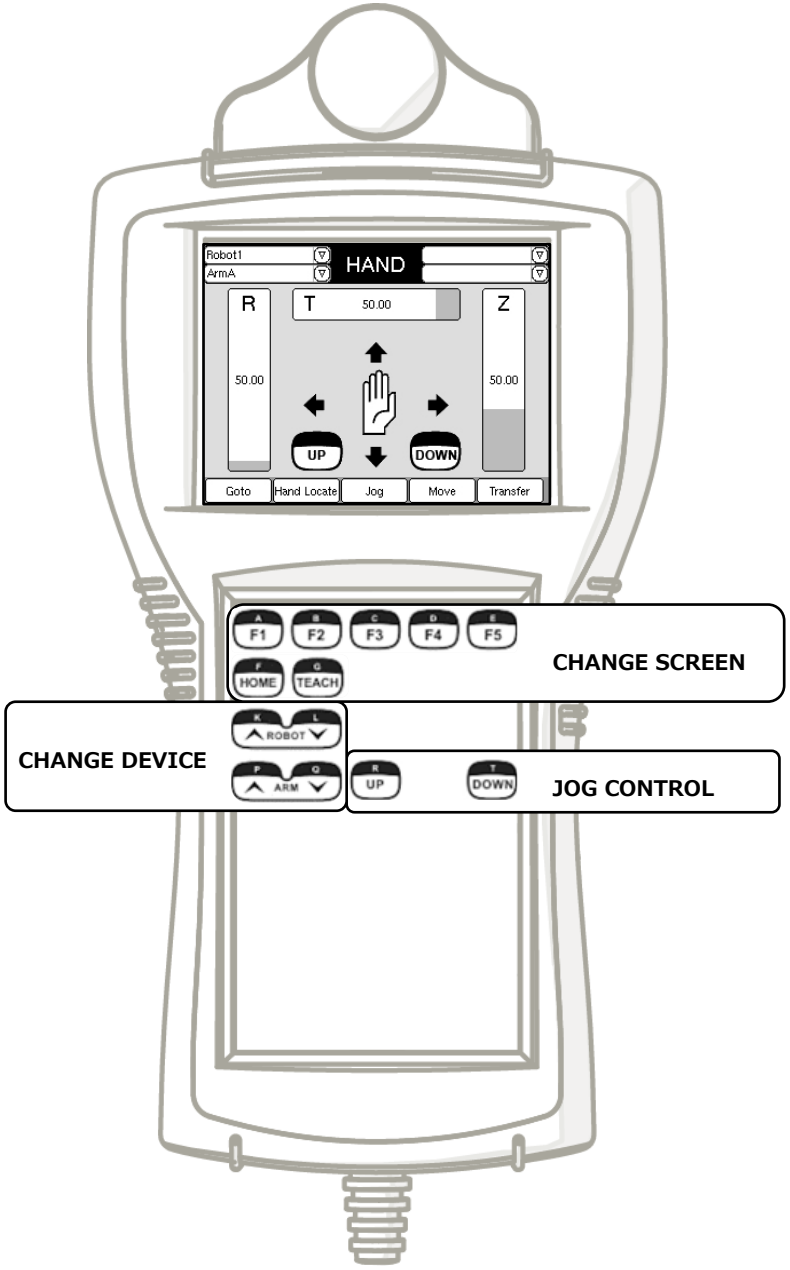
GOTO SCREEN

The **GOTO** screen is used to move the robot around a system either from station to station or move to extend / retract / up / down / teach positions within a station.



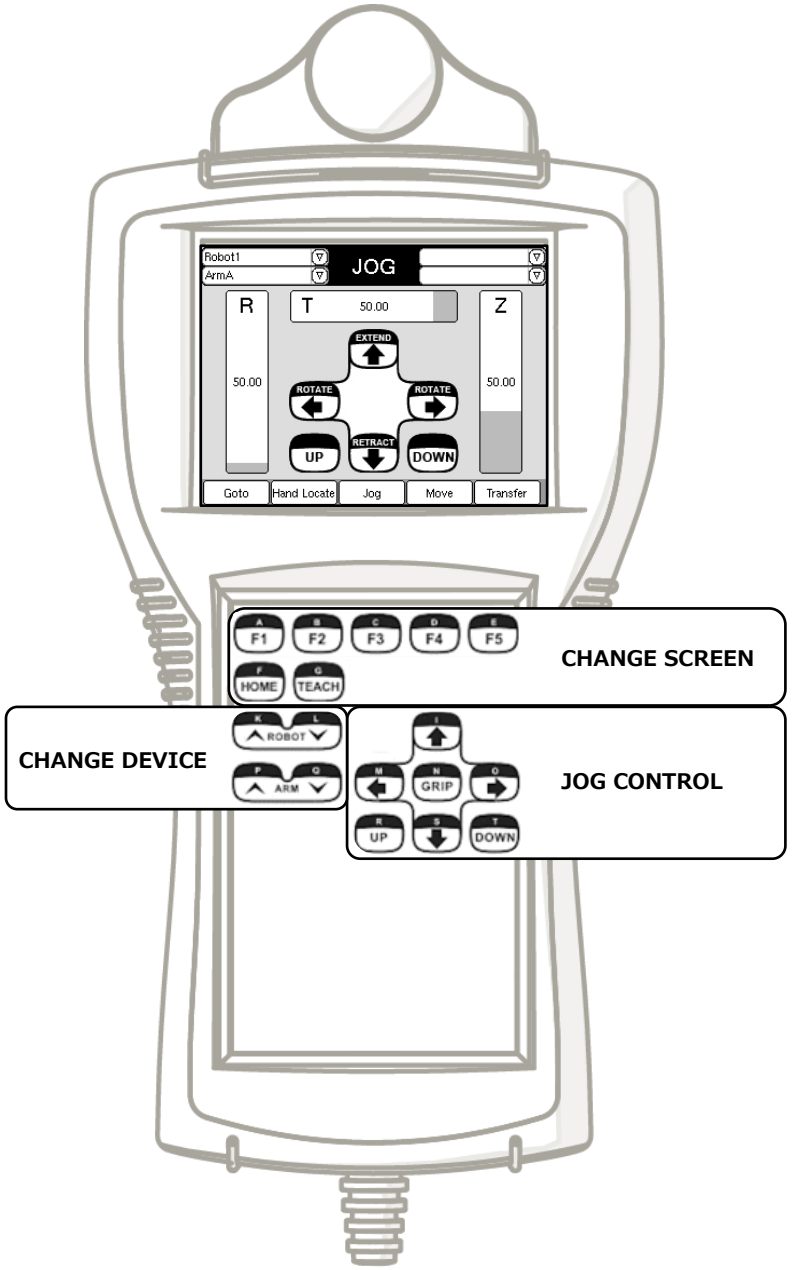
HAND LOCATE SCREEN

The **HAND LOCATE** screen is used to move the robot within a system by hand. Servo control for the radial and theta axes are disabled to allow the user to physically move the arm by hand in any direction without restrictions. The Z axis remains under servo control to allow the user to lift and lower the end effector by jogging. The current robot position is displayed in the radial, theta, and Z axes position bars.



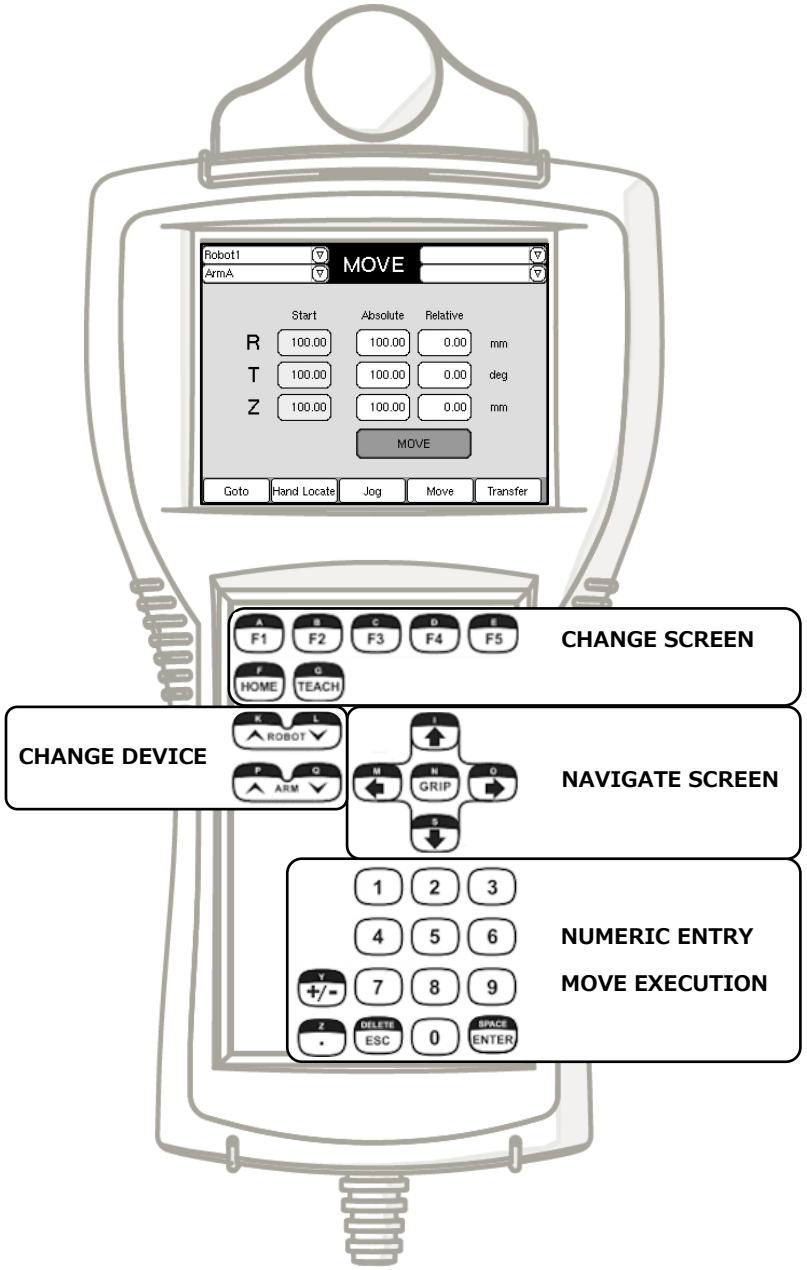
JOG SCREEN

The **JOG** screen is used to drive the robot in all directions using very slow controlled movement for fine position adjustment. The current robot position is displayed in the radial, theta, and Z axes position bars.



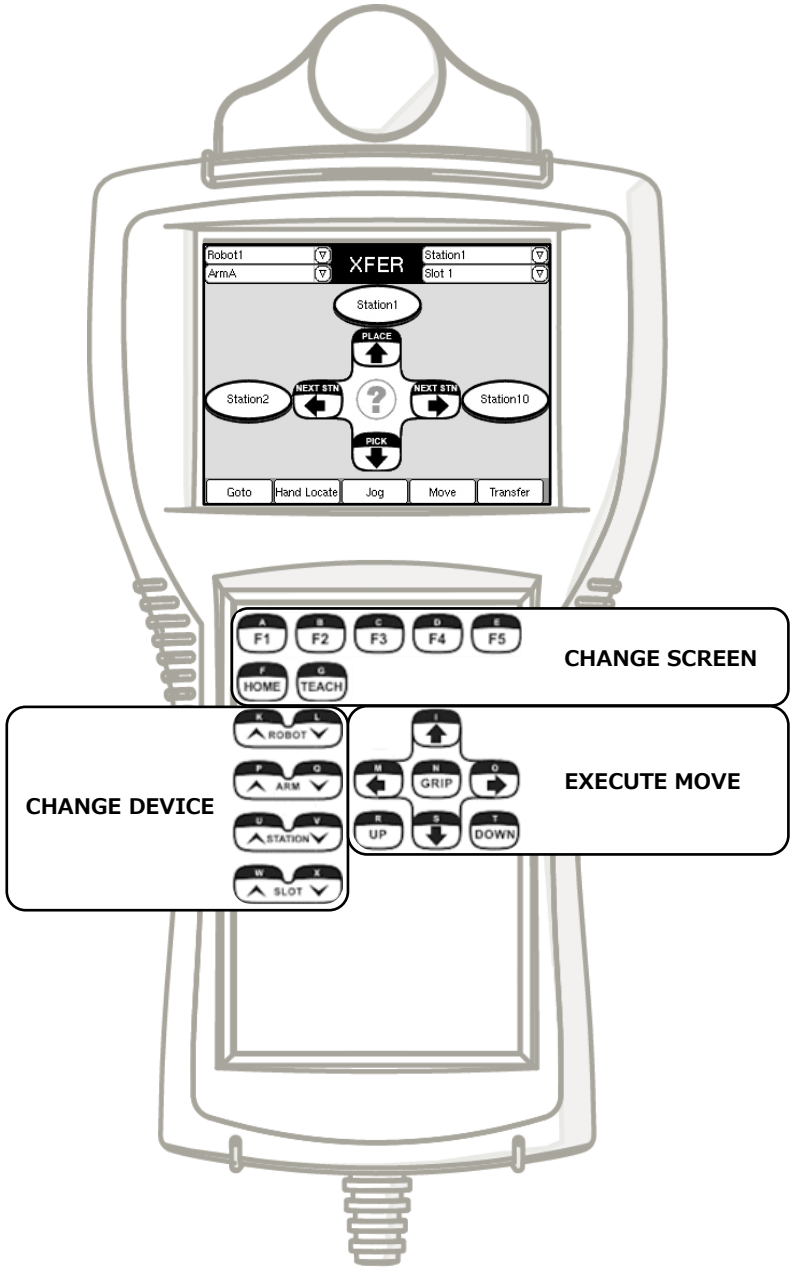
MOVE SCREEN

The **MOVE** screen is used to move each axis to an absolute coordinate position or move a relative distance from the current robot position. Enter the desired value in the ***Absolute*** or ***Relative*** columns, then select the ***MOVE*** button and press ***ENTER*** to execute the move.



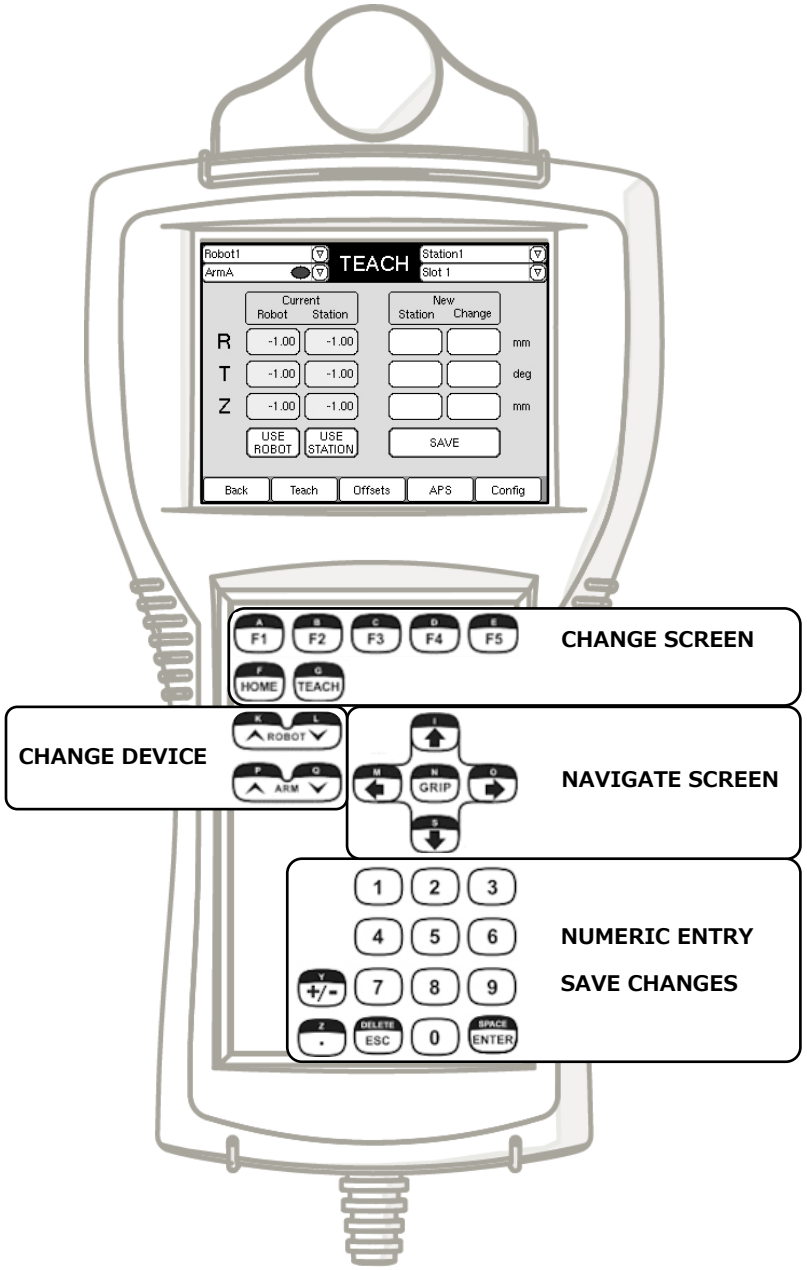
TRANSFER SCREEN

The **TRANSFER** screen is used to pick wafers from and place wafers to stations within the system. Motions are performed at teach pendant speed to support safe testing of newly taught stations.



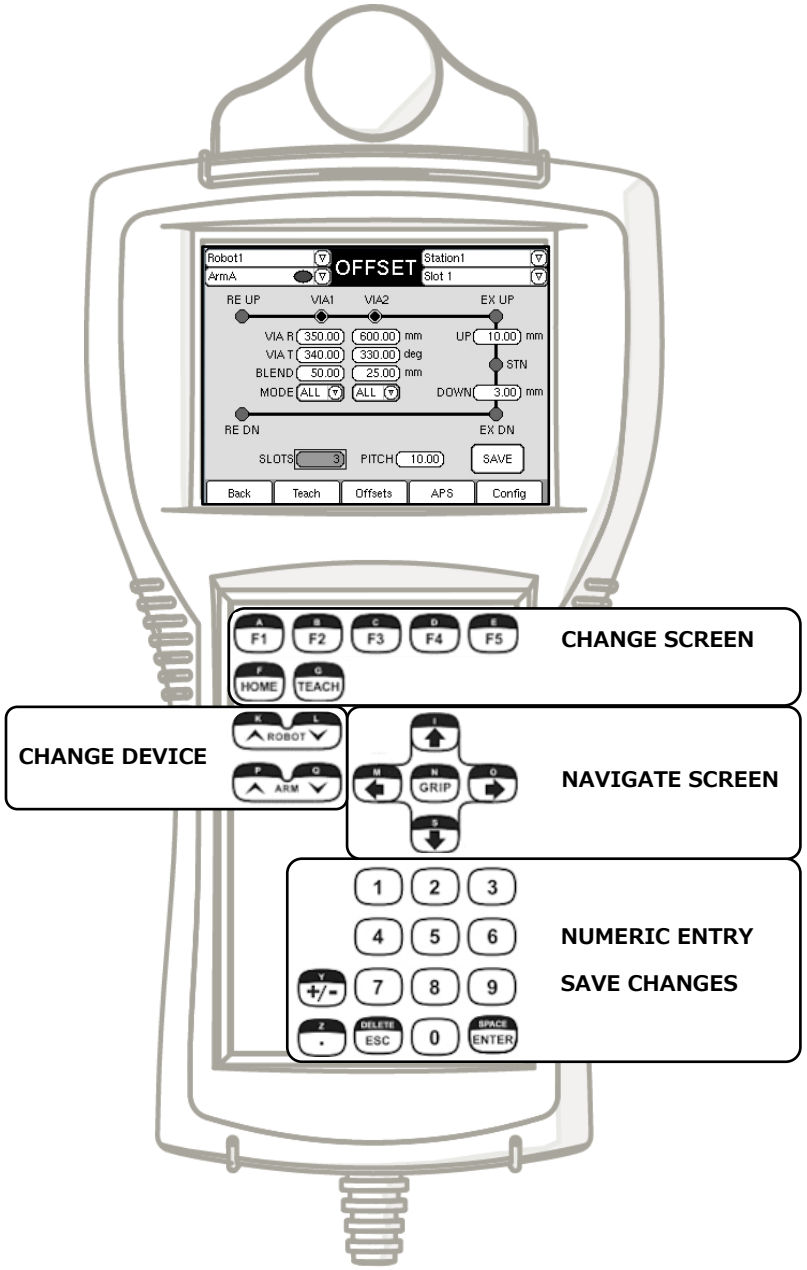
TEACH SCREEN

The **TEACH** screen is used to set the position coordinates for stations within the system. The user can select the robot's current position by pressing the ***USE ROBOT*** button or edit the existing station coordinates by pressing the ***USE STATION*** button and then editing the new absolute or relative value. Once the desired values have been set, the ***SAVE*** button is used to permanently store the new station position.



TEACH OFFSETS SCREEN

The **TEACH OFFSETS** screen is used to configure the robot motion and behavior when transfering wafers to and from the specified station. The up offset, down offset, number of slots, and the slot pitch can be adjusted to match the requirements for the selected station.



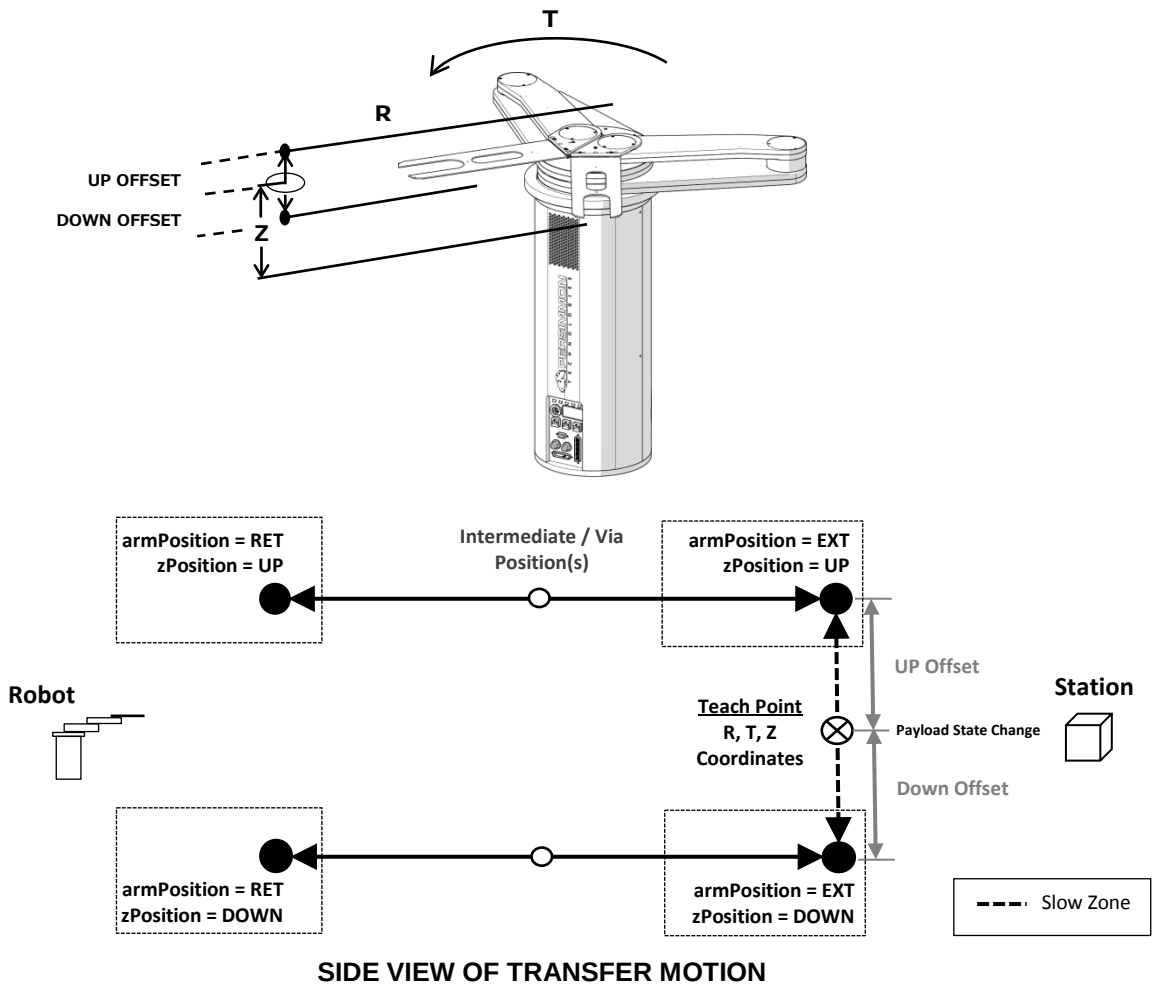
TEACHING

Teaching the robot is the process of assigning position coordinates for each transfer station. The teach pendant supports the steps required to configure, teach, and test each station with a portable interface so the user can be close to the physical station when needed. Each station has these configurable settings:

- Station Position (R, T, and Z coordinates)
- Up and Down Offsets
- Slot Count
- Pitch (distance between slots)

The following procedure outlines the steps necessary to calibrate and test these settings:

STATION COORDINATES



SIDE VIEW OF TRANSFER MOTION

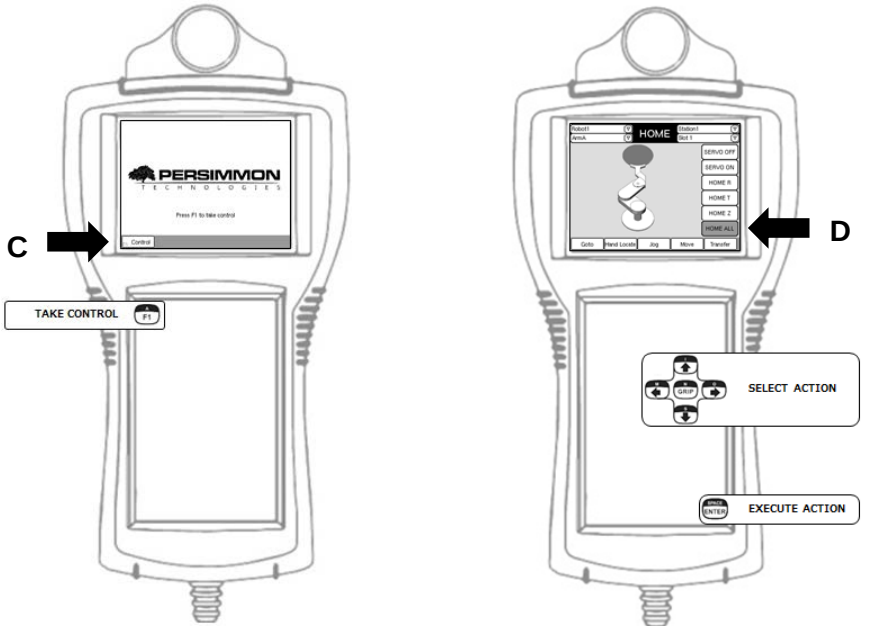
1. **Initialize the System**

a) Turn on the power supply.

b) Wait for the robot controller to boot up and the ready status light to turn on.

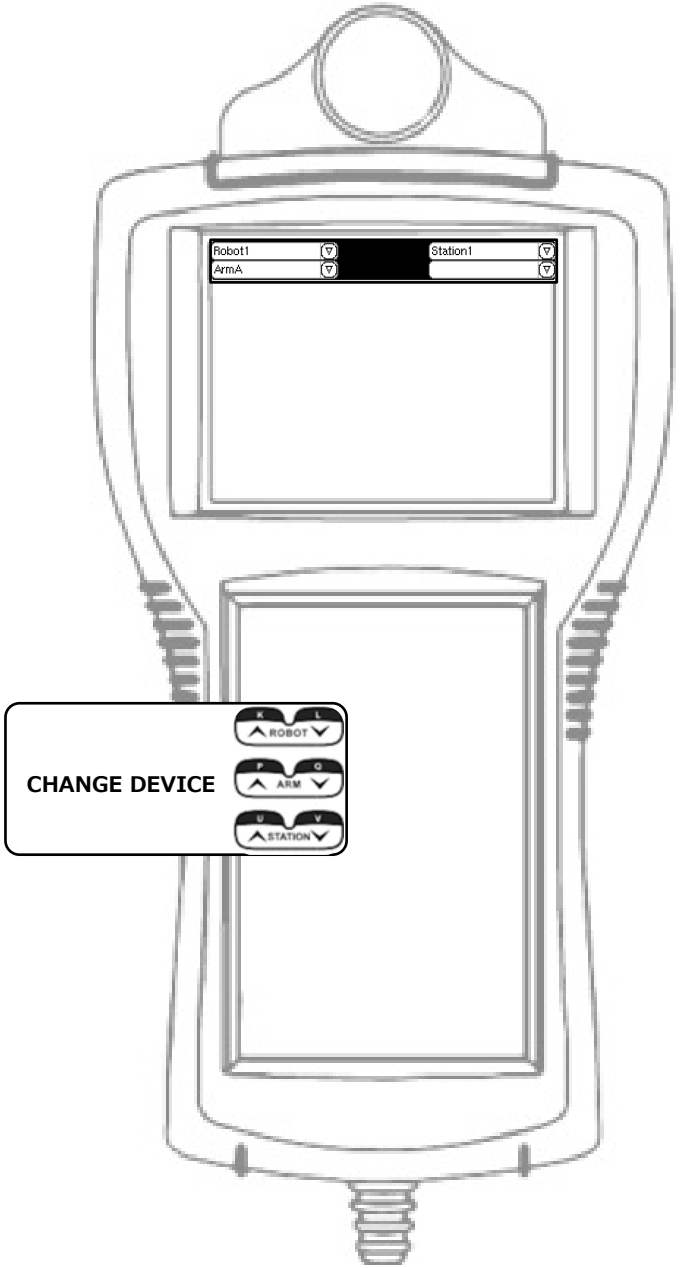
c) Obtain system control from the teach pendant by pressing ***F1***.

d) Initialize the robot by executing ***HOME ALL***.



2. Select the Robot, Arm, and Station to teach using the quick select controls.

NOTE – The first or bottom slot (Slot 1) is the default teach position, regardless of what is selected in the slot menu.

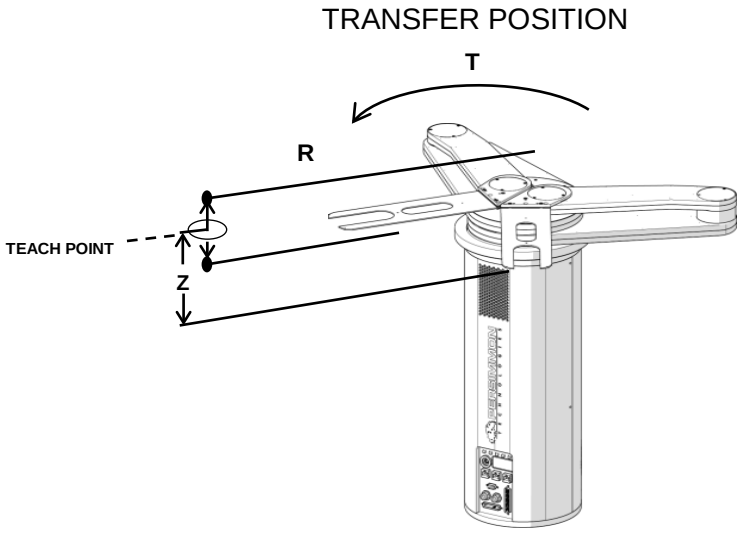


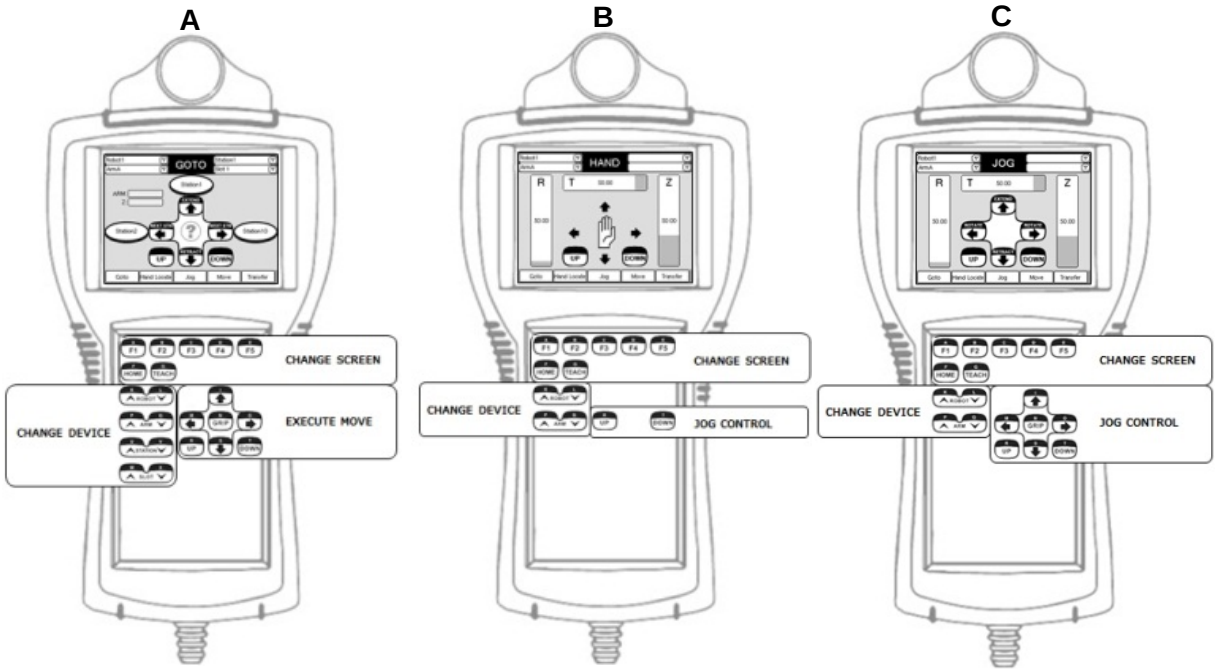
3. Move robot to desired transfer position (R,T,Z).

a) The **GOTO** screen can be used to quickly move the robot to the target station's retract or extend position if the target station has been previously taught or a default position has been defined.

b) The **HAND LOCATE** screen allows the user to quickly move the robot by hand to the station's teach position. This screen is the best option when using a mechanical teach fixture.

c) The **JOG** screen can be used for final position adjustments to align the end effector with the transfer station.

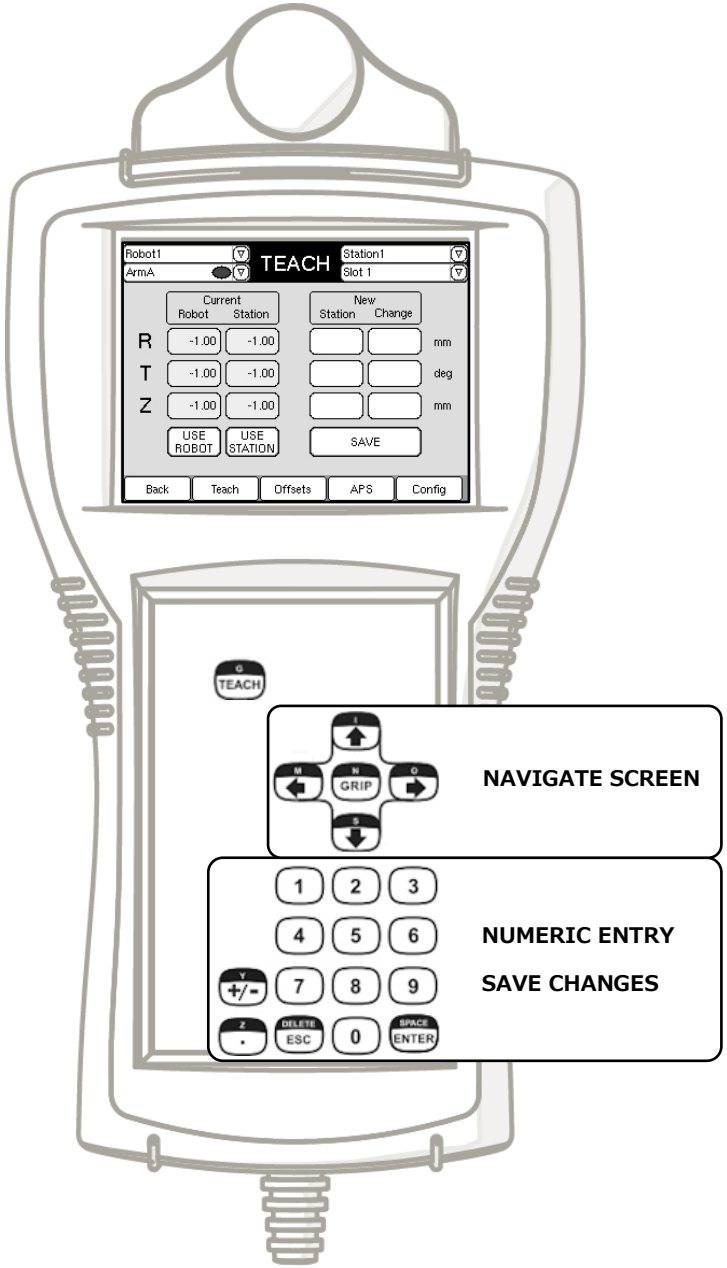




4. Teach the current robot position.

a) Press the **TEACH** button to open the **TEACH** screen.

b) The robot's current position is displayed in the "Current" "Robot" column and the station's current coordinates are displayed in the "Current" "Station" column. To set the robot's current position as the new station position, press the "USE ROBOT" screen button to copy the robot position to the "New" "Station" column. The difference between the new and original station position will be displayed in the "Change" column. Select the "SAVE" screen button and press **ENTER** to save the new coordinates for the station.



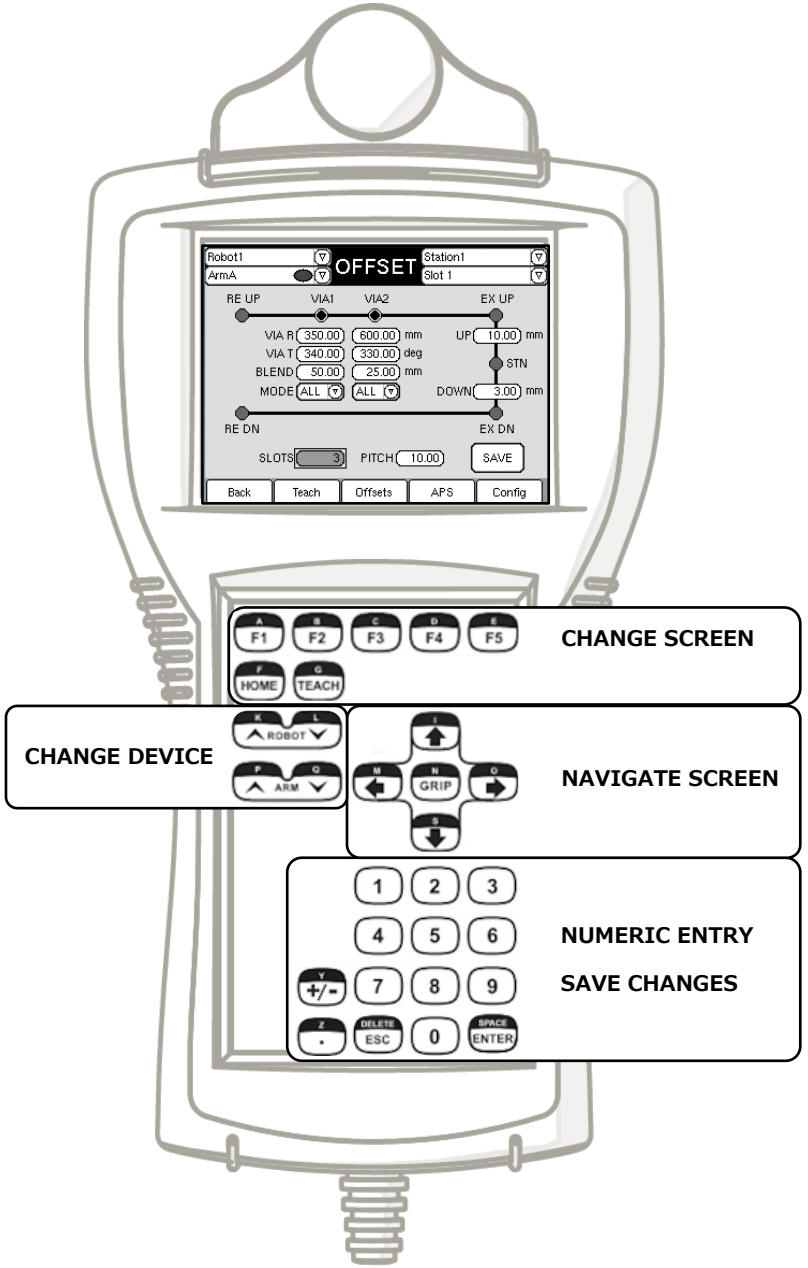
5. **Adjust the up/down offsets, pitch, and slot for desired clearance during transfers.**

a) From the **TEACH** screen, select the "Offsets" screen by pressing *F3*.

b) Select the field you would like to adjust (up/down offsets, pitch, and slot) and press **ENTER** to edit the value.

c) Use the numeric keypad to edit the value and press **ENTER** again to set the value.

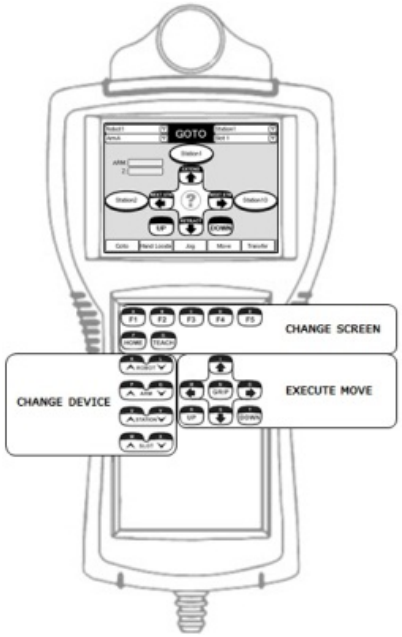
d) Select the "Save" screen button and press **ENTER** to save your changes.

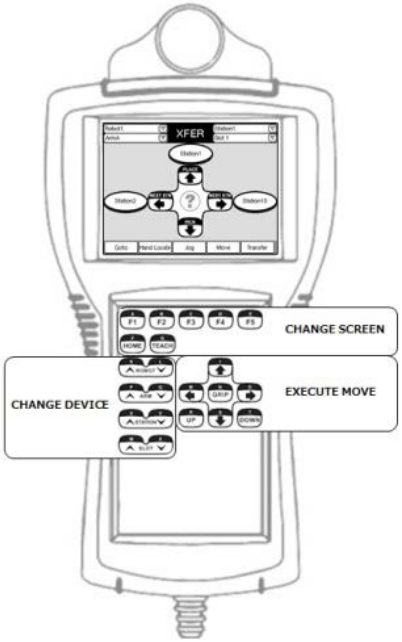


6. **Test the transfers to the new station coordinates.**

a) Use the **GOTO** screen to execute individual transfer move segments one at a time.

b) Use the **TRANSFER** screen to execute the complete pick or place transfer from start to finish.



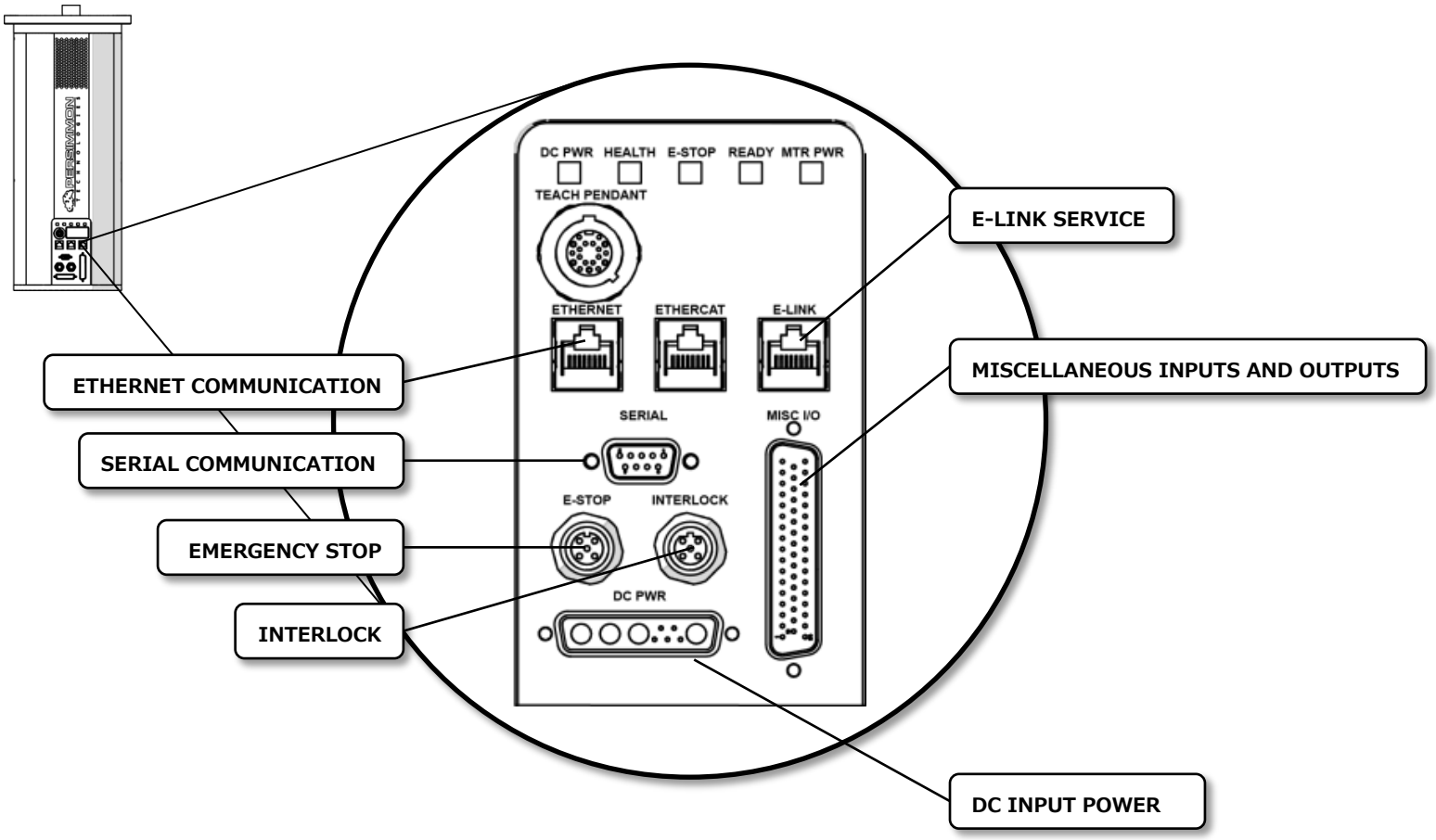


HOST INTEGRATION

This section outlines the electrical connections and software commands used to control the robot by a remote host computer.

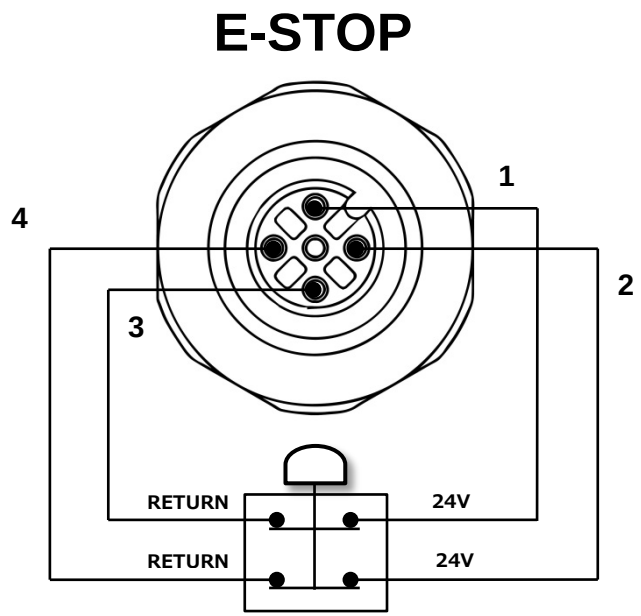
HOST CONNECTIONS

The Host Connections provide dedicated interefaces on the robot controller for host communication, system safety circuits, and system peripheral device control.



EMERGENCY STOP

The Emergency Stop connection allows the host to integrate external emergency stop buttons within the OEM system. This connection is a dual pole, normally closed circuit. Both poles of the circuit must be closed for the robot to operate. If both poles transition from closed to open, the robot will commence a category 1 safety stop (motion will stop then servo control will be disabled). If both poles transition from open to closed, the robot will be ready to initialize, but will not resume operation automatically. If the pole states do not match at any time, the controller will automatically enter the safety fault mode. A safety fault is displayed with a solid yellow E-Stop indicator LED on the front panel of the Stand Alone Controller. The user must power cycle the controller to clear the safety fault condition. The emergency stop terminator must remain connected to the robot controller if the host does not integrate an external emergency stop circuit.



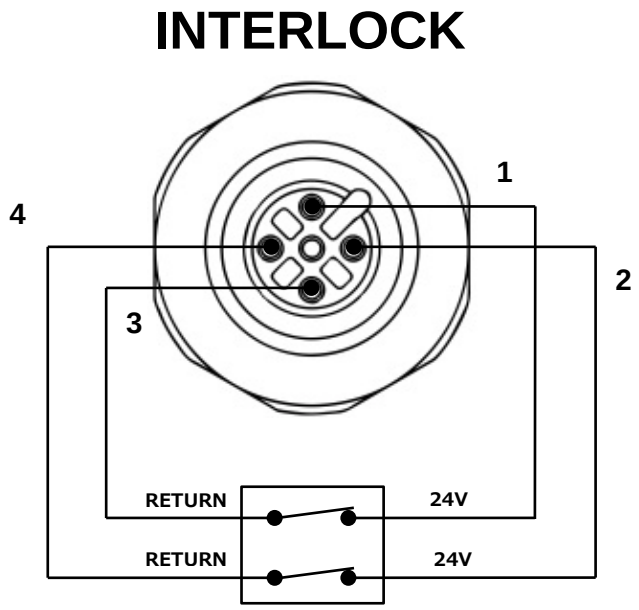
EMERGENCY STOP SWITCH

DUAL POLE NORMALLY CLOSED

Controller Connector:	Turck M12 eurofast FK4.5
Mating Connector:	Turck M12 eurofast BS 8151-0/PG9

INTERLOCK

The Interlock connection allows the host to integrate external safety interlock switches within the OEM system. A safety interlock switch is typically placed on any service door or port to prevent unintentional access to the robot workspace while the robot is in motion. The interlock connection is a dual pole, normally closed circuit. Both poles of the circuit must be closed for the robot to operate. If both poles transition from closed to open, the robot will commence a category 1 safety stop (motion will stop then servo control will be disabled). If both poles transition from open to closed, the robot will be ready to initialize, but will not resume operation automatically. If the pole states do not match at any time, the controller will automatically enter the safety fault mode. A safety fault is displayed with a solid yellow E-Stop indicator LED on the front panel of the Stand Alone Controller. The user must power cycle the controller to clear the safety fault condition. The interlock terminator must remain connected to the controller if the host does not integrate an external interlock circuit.



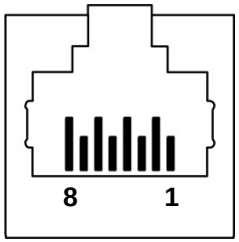
INTERLOCK SWITCH

DUAL POLE NORMALLY CLOSED

Controller Connector:	Turck M12 eurofast FK4.5W
Mating Connector:	Turck M12 eurofast BSWS 8151-0

The Ethernet Communication port supports Local Area Network connections from host computers to the Stand Alone Controller. This network connection is used primarily to control the robot and the E-Link connection is used to service the robot. A dedicated communications port allows the user to configure a host compatible IP address for communications while leaving the E-Link service port at a fixed IP address for easy service access to all Persimmon Technologies controllers.

ETHERNET



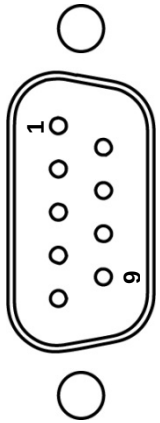
Pin	Signal
1	Transmit Data +
2	Transmit Data -
3	Receive Data +
4	No Connection
5	No Connection
6	Receive Data -
7	No Connection
8	No Connection

192.168.1.125

Controller Connector:	8P8C Female Jack
Mating Connector:	8P8C Male Plug (Cat 5e Network Patch Cable)

The Serial Communication port supports standard RS-232 communication in a DTE (Data Terminal Equipment) – DCE (Data Circuit-terminating Equipment) arrangement. The Stand-Alone Controller is configured as a DCE, similar to a data modem, with a female D-Subminiature 9 socket connector as shown on the right. This allows the use of a standard serial extension cable (straight female to male) to connect the host computer to the Stand-Alone Controller. The Serial Communications port can be configured to any standard RS-232 baud rate, data and stop bits, parity, and flow control.

SERIAL

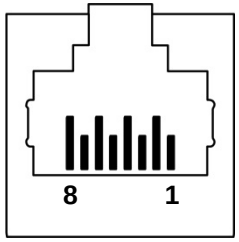


Pin	Signal
1	No Connection
2	Receive Data
3	Transmit Data
4	No Connection
5	Ground
6	No Connection
7	Request to Send
8	Clear to Send
9	No Connection

Controller Connector:	D-Subminiature 9 Female (DE9S)
Mating Connector:	D-Subminiature 9 Male (Serial Extension Cable)

The E-Link Service port supports Local Area Network connections from host computers to the Stand Alone Controller. This network connection is used primarily to service the Stand Alone Controller. Service activities include upgrading / downgrading software, collecting information, or performing diagnostics. This port will remain at a fixed IP address for easy service access to all Persimmon Technologies controllers regardless of host communication settings on the Ethernet communications port.

E-LINK



Pin	Signal
1	Transmit Data +
2	Transmit Data -
3	Receive Data +
4	No Connection
5	No Connection
6	Receive Data -
7	No Connection
8	No Connection

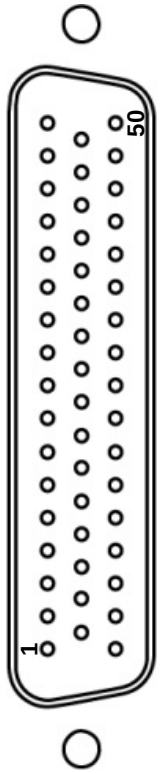
192.168.0.125

Controller Connector:	8P8C Female Jack
Mating Connector:	8P8C Male Plug (Cat 5e Network Patch Cable)

The Miscellaneous I/O connector provides 22 digital inputs and 20 digital outputs for general purpose use. This inputs and outputs are optically isolated and are powered through the isolated 24V inputs (pins 25 and 26) and isolated ground inputs (pins 27 and 28). The connector also has a 24 V 0.5A DC power source (pin 30) and a system ground (pin 29) for powering IO circuits if no external supply is available. A single channel legacy stop circuit is available to support robot retrofits in existing systems (pins 23 and 24).

NOTE – Digital inputs 1 – 17 can be used to capture the position of the robot at the time of the input state change (high speed transition) and inputs 18 – 22 are general purpose inputs that cannot be used for robot position capture.

MISC I/O

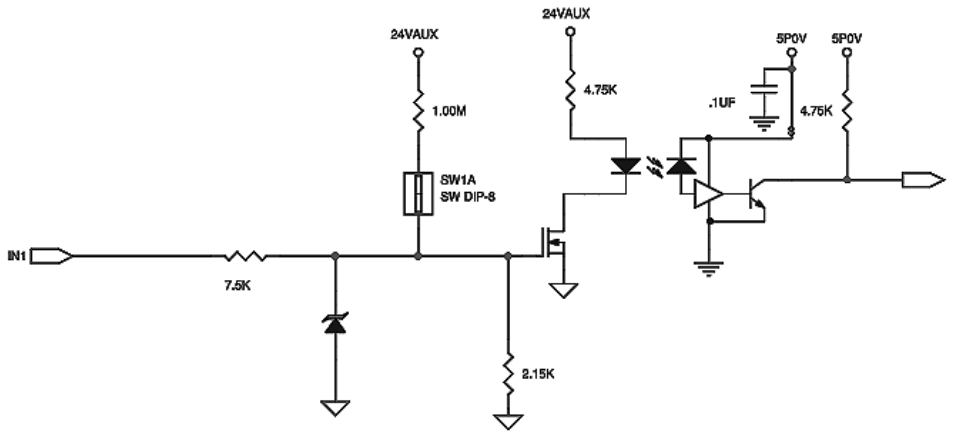


Pin	Signal	Pin	Signal
1	Input 1 (High Speed)	26	Isolated 24V Input
2	Input 2 (High Speed)	27	Isolated Ground
3	Input 3 (High Speed)	28	Isolated Ground
4	Input 4 (High Speed)	29	System Ground
5	Input 5 (High Speed)	30	24V System Supply (0.5A)
6	Input 6 (High Speed)	31	Output 1
7	Input 7 (High Speed)	32	Output 2
8	Input 8 (High Speed)	33	Output 3
9	Input 9 (High Speed)	34	Output 4
10	Input 10 (High Speed)	35	Output 5
11	Input 11 (High Speed)	36	Output 6
12	Input 12 (High Speed)	37	Output 7
13	Input 13 (High Speed)	38	Output 8
14	Input 14 (High Speed)	39	Output 9
15	Input 15 (High Speed)	40	Output 10
16	Input 16 (High Speed)	41	Output 11
17	Input 17 (High Speed)	42	Output 12
18	Input 18	43	Output 13
19	Input 19	44	Output 14
20	Input 20	45	Output 15
21	Input 21	46	Output 16
22	Input 22	47	Output 17
23	Legacy Stop +	48	Output 18
24	Legacy Stop -	49	Output 19
25	Isolated 24V Input	50	Output 20

Controller Connector:	D-Subminiature 50 Male (DD50P)
Mating Connector:	D-Subminature 50 Female (DD50S)

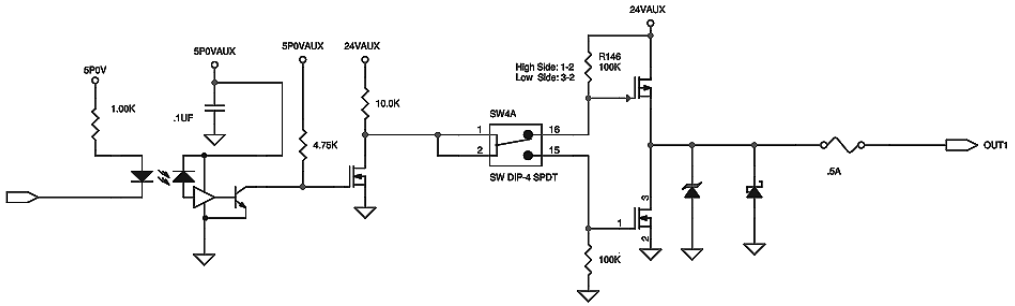
DIGITAL INPUTS

Each digital input can be configured as active high or active low depending on the host system requirements.



DIGITAL OUTPUTS

Each digital output can be configured as active high or active low depending on the host system requirements.



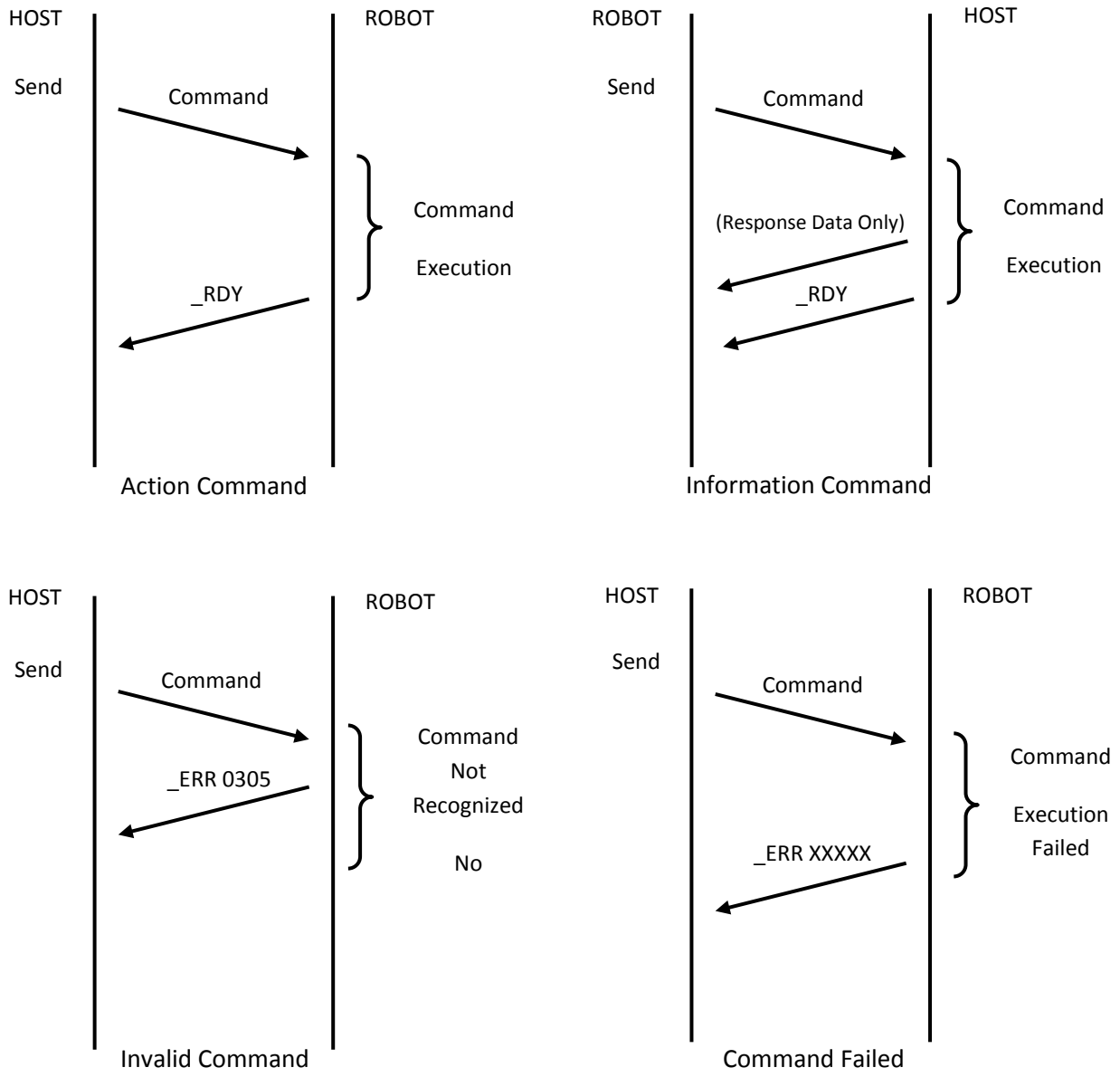
HOST COMMANDS

The following commands are available for a host computer to control the robot through the Ethernet or Serial ports.

HANDSHAKE

Unique command prompts are available to enhance communication transactions between the host computer and the robot controller by highlighting command acknowledged, command not acknowledged, information response, error occurred, and command complete. These prompts can be configured individually to match host requirements. The default values are listed in the table to the right and typical host communication transactions are illustrated in the diagram below.

Transaction	Default Prompt	Custom Prompt
Command Acknowledged	_ACK	None
Command Not Acknowledged	_NAK	_ERR 305
Information Response	_RSP	None
Command Failed	_ERR	_ERR
Command Complete	_RDY	_RDY
Asynchronous Event	_EVT	_EVENT
Command Prompt	>	None
Process Command	<Carriage Return><Line Feed>	<Carriage Return><Line Feed>


HOST
ROBOT
Send
Command
Command
Execution
_RDY
Action Command
ROBOT
HOST
Send
Command
(Response Data Only)
_RDY
Command
Execution
Information Command
HOST
ROBOT
Send
Command
_ERR 0305
Command
Not
Recognized
No
Invalid Command
HOST
ROBOT
Send
Command
_ERR XXXXX
Command
Execution
Failed
Command Failed

HELLO

The HELLO command will perform no actions other than responding with a “hello” response back to the host. It is used to test communication between the host and robot.

Command	Parameter	Send Command
Hello	[none]	<CR><LF>
Example		
Hello		
Response		
Hello		

HLLO

The HLLO command performs the same function as HELLO.

Command	Parameter	Send Command
Hllo	[none]	<CR><LF>
Example		
Hllo		
Response		
Hello		

RESET

The RESET command will perform a soft reset of the robot controller. It is similar to cycling the power on the controller, but can be issued remotely by command from the host.

Command	Parameter	Send Command
Reset	[none]	<CR><LF>
Example		
Reset		

RQ VERSION

The RQ VERSION command will respond to the host with the version of software currently running on the robot controller.

Command	Parameter	Send Command
RQ Version	[none]	<CR><LF>
Example	**Response**	
RQ Version	V 00.05.01 (major#.minor#.build#)	

SAVE

The SAVE command will permanently save all configuration changes made since the last save / store command or since power up.

Command	Parameter	Send Command
Save	[none]	<CR><LF>
Example		
Save		

STORE

The STORE command is used to store individual configuration changes made since the last save / store command or since power up.

The STORE command currently supports the following parameters

- COMM settings LF, ECHO, BAUD, and ALL
- STN settings R, T, Z, LOWER, PITCH, NSLOTS, and ALL

Command	Parameter	Send Command
STORE	[any]	<CR><LF>
Example		
STORE STN 1 ARM A ALL		

SET COMM

The SET COMM command is used to configure the host communication settings. There are settings for machine / human (verbose) responses (M/B PKT or MON), sequential command or multi command processing (FLOW SEQ or MULTI, echo on / off (ECHO ON or OFF), transfer position reporting (DREP AUTO or REQ), and command checksum (CHECKSUM ON or OFF). The only parameters that are currently active on the Persimmon controller are **FLOW**, **LF**, **ECHO**, and **BAUD**.

Command	Parameter 1 [mode] optional	Parameter 2 [flow] optional	Parameter 3 [line feed] optional	Parameter 4 [echo] optional	Parameter 5 [Checksum] optional	Parameter 6 [Position Reporting] optional	Parameter 7 [Baud Rate]	Send Command
SET COMM	M/B MON M/B PKT (no action)	FLOW SEQ FLOW MULTI (no action)	LF ON LF OFF (action)	ECHO ON ECHO OFF (action)	CHECKSUM ON CHECKSUM OFF (no action)	DREP REQ DREP AUT (no action)	BAUD 9600 (action)	<CR><LF>
Example								
SET COMM M/B PKT FLOW SEQ LF OFF ECHO OFF CHECKSUM OFF DREP REQ BAUD 9600								

RQ COMM

The RQ COMM command is used to request the host communication settings. Each individual setting can be queried independently by specifying the individual setting or all settings can be obtained at once by specifying “all”. The Persimmon controller will respond with the default configuration for communication settings that are not command line configurable and will respond with the appropriate response for the FLOW, LF, ECHO, and BAUD parameters as outlined below:

Command	Parameter 1 [mode] optional	Parameter 2 [flow] optional	Parameter 3 [line feed] optional	Parameter 4 [echo] optional	Parameter 5 [position reporting] optional	Parameter 6 [checksum] optional	Parameter 7 [Baud Rate]	Send Command
RQ COMM	M/B	FLOW	LF	ECHO	CHECKSUM	DREP	BAUD	<CR><LF>
Individual Responses	PKT	SEQ	ON|OFF	ON|OFF	OFF	REQ	1200 2400 4800 9600 14400 19200 38400 57600 115200	

Example	Response
RQ COMM M/B	COMM PKT
RQ COMM FLOW	COMM SEQ
RQ COMM ECHO	COMM ON
RQ COMM ALL	COMM PKT SEQ OFF OFF OFF REQ 9600

SET SERVOS OFF

The SET SERVOS OFF command will disable servo control for all motors. The Z brake will actuate automatically as part of this command.

Command	Robot (Optional for single robot systems)	Parameter	Send Command
Set Servos Off	robot1	[none]	<CR><LF>
Example			
Set Servos Off robot1 or Set Servos Off (in a single robot system)			

HALT

The HALT command will initiate a controlled stop motion and disable servo motor control when the motion is complete.

Command	Robot (Optional for single robot systems)	Parameter	Send Command
Halt	robot1	[none]	<CR><LF>
Example			
Halt robot1 or Halt (in a single robot system)			

HOME

The HOME command initializes and moves the robot's arm(s) to a predefined reference position. Each axis (R,Z,T) can be referenced in order individually or the entire home sequence can be executed by specifying "ALL". When retracting the arm (home R), the robot will attempt to retract through a known safe path to avoid obstructions. If a path is found within a close proximity of the robot's current location, the robot will move to the path and retract along the path through all associated via positions. If no path is found, the robot will retract on a direct radial path. All moves are executed using the "home" speed set.

Command	**Robot** (Optional for single robot systems)	**Parameter 1** [axis]	**Send Command**
HOME	robot1	R T Z ALL	<CR><LF>
Example			
Home robot1 ALL or Home ALL (in a single robot system)			

RQ POSITION ABS

The RQ POS ABS command is used to request the specified robot and arm's current position in absolute cylindrical coordinate reference frame.

- These parameters can be requested individually or in multiples in any order.
- All values can be requested by specifying "ALL".
- The parameters received by the robot controller can be in any order, but the response order shall follow the table order outlined below.
- If an individual parameter is omitted in the command, the corresponding response will not include the value for that parameter.
- If no arm parameter is sent, the value will default to A for execution, but no arm value ("A" or "B") will be included in the response string.

  If the arm is included in the command, the arm value ("A" or "B") will be included in the response string.

Command	Robot (Optional for single robot systems)	Parameter 2 [arm] (Optional, defaults to A if not sent)	Parameter 3 [Radial Coordinate] (Optional)	Parameter 4 [Theta Coordinate] (Optional)	Parameter 5 [Z Coordinate] (Optional)	Send Command
RQ POS ABS	robot1	A ARM A B ARM B	R	T	Z	<CR><LF>
Inidividual Responses	Null (if no robot is specified) robot1 robot2	Null (if no arm is specified) A B	0001234 (7 char)	360000 (6 char)	150000 (6 char)	

Example	Response
RQ POS ABS Robot1 1 ARM A R T Z	POS ABS robot1 A 0001234 360000 150000
RQ POS ABS Z T R (reversed order from above)	POS ABS 0001234 360000 150000 (same order as above)
RQ POS ABS B ALL	POS ABS B 0001234 360000 150000
RQ POS ABS ALL	POS ABS 0001234 360000 150000

RQ POSITION STN

The RQ POS STN command is used to determine if the robot is at a known station move position or home position.

- These parameters can be requested individually or in multiples in any order.
- All values can be requested by specifying “all”.
- The parameters received by the robot controller can be in any order, but the response order shall follow the table order outlined below.
- If an individual parameter is omitted in the command, the corresponding response will not include the value for that parameter.
- If no arm parameter is sent, the value will default to A for execution, but no arm value (“A” or “B”) will be included in the response string. If the arm is included in the command, the arm value (“A” or “B”) will be included in the response string.

Command Input Format

Command	Robot (Optional for single robot systems)	Parameter 2 [arm] (Optional, defaults to A if not sent)	Parameter 3 [Radial Coordinate] (Optional)	Parameter 4 [Theta Coordinate] (Optional)	Parameter 5 [Z Coordinate] (Optional)	Parameter 6 [Down Offset] (Optional) (No Action)	Parameter 7 [Slot Count] (Optional) (No Action)	Parameter 8 [Slot Pitch] (Optional) (No Action)	Parameter 8 [Slot Pitch] (Optional)	Send Command
RQ POS STN	robot1	A ARM A B ARM B	R	T	Z	W	WA	WB	SLOT	<CR><LF>

Response Format (different than command input format)

Response Header	Robot	Arm	Radial Position	Station	Slot	Z Position	Theta Position
POS STN	Null (if no robot is specified) Robot1 Robot2	Null (if no arm is specified) A B	RE EX HM -- (2 char)	00 (not at station) 01 02 03 -- (2 char)	0000 (not at station) 0001 (4 char slot number) Or -- (2 char unknown)	UP DN HM -- (2 char)	360000 (6 char theta position) Or HM (2 char)

Example	Response
RQ POS STN Robot1 ARM A ALL	POS STN robot1 A RE 01 0001 DN 360000
RQ POS STN ALL	POS STN RE 01 0001 DN 360000
RQ POS STN B ALL	POS STN B EX 12 0005 UP 360000
RQ POS STN ALL(robot at home position)	POS STN HM 00 0000 HM HM
RQ POS STN ARM A ALL (Position unknown)	POS STN A -- -- -- -- --
RQ POS STN ARM A R Z	POS STN A EX UP

RQ LOAD

The RQ LOAD command is used to check the logical payload state of an end effector. The response of this command will be determined by the Robot.Arm load state.

Command	**Robot** **(Optional for single robot systems)**	**Parameter 1** **[arm]** **(Optional, defaults to Arm A if not provided)**	**Send Command**
RQ LOAD	robot1	A ARM A B ARM B	<CR><LF>
Example		**Response**	
RQ LOAD robot1 ARM A or RQ LOAD (in a single robot system)		LOAD A Y <Default> LOAD A N <Default> LOAD A ON <Optional> LOAD A OFF <Optional>	

SET LOAD

The SET WAFER command allows the host to set the current payload tracking state from the robot controller. This is a recommended step for the host during system power up and system error recovery.

Command	Robot (Optional for single robot systems)	Parameter 1 [arm] (Optional, defaults to arm A if not provided)	Parameter 2 [Payload State]	Send Command
SET LOAD	robot1	A ARM A B ARM B	Y N ON OFF	<CR><LF>
Example				
SET LOAD robot1 ARM A Y or **SET LOAD Y** (in a single robot single arm system) **SET LOAD robot1 ARM A OFF** or **SET LOAD OFF** (in a single robot single arm system)				

CHECK LOAD

The CHECK LOAD command is used to check the actual payload state of an end effector using an external wafer presence sensor connected to the robot's digital inputs. The wafer presence sensors are typically located along the extension path to each station. To validate the payload on the end effector the robot must move to the retract position of the specified station, extend the arm to the specified radial position, and check the payload sensor state. The sensor state will be used to set the logical payload state in the object. The interlock option will temporarily enable or disable the specified interlock / handshake for the duration of the command execution. The interlock will resume normal operation when the command is complete.

Command	**Robot** **(Optional for single robot systems)**	**Parameter 1 [station]** **(Optional, searches for closest station with sensor if not sent)**	**Parameter 2 [arm]** **(Optional, defaults to A if not sent)**	**Parameter 3 [interlock option]** **(Optional, defaults to Enabled if not sent)**	**Send Command**
CHECK LOAD	robot1	1 2 3 4…	A ARM A B ARM B	INTLCK EX_ENABLE DIS INTLCK EX_ENABLE ENB	<CR><LF>
Example					
Check Load robot1 1 Arm A INTLCK EX_ENABLE DIS or **Check Load 1 Arm A** (in a single robot system)					

RQ STATION

The RQ STN command is used to request the current values for each station parameter in the list.

- These parameters can be requested individually or in multiples in any order.
- All values can be requested by specifying “all”.
- The parameters received by the robot controller can be in any order, but the response order shall follow the table order outlined below.
- If an individual parameter is omitted in the command, the corresponding response will not include the value for that parameter.
- If no arm parameter is sent, the value will default to A for execution, but no arm value (“A” or “B”) will be included in the response string. If the arm is included in the command, the arm value (“A” or “B”) will be included in the response string.

Command	Robot (Optional for single robot systems)	Parameter 1 [station]	Parameter 2 [arm] (Optional, defaults to A if not sent)	Parameter 3 [Radial Coordinate] (Optional)	Parameter 4 [Theta Coordinate] (Optional)	Parameter 5 [Z Coordinate] (Optional)	Parameter 6 [Down Offset] (Optional)	Parameter 7 [Slot Count] (Optional)	Parameter 8 [Slot Pitch] (Optional)	Send Command
RQ STN	robot1	1 2 3...	A ARM A B ARM B	R	T	Z	LOWER	NSLOTS	PITCH	<CR><LF>
Response Format										
STN		0001 0002 0003 (4 char)	Null (if no arm is specified) A B	0001234 (7 char)	360000 (6 char)	150000 (6 char)	003000 (6 char)	0002 (4 char)	10000 (6 char)	

Example	Response
RQ STN Robot1 1 ARM A R T Z	STN 0001 A 0001234 360000 150000
RQ STN 1 Z T R (reversed order from above)	STN 0001 0001234 360000 150000 (same order as above)
RQ STN 1 LOWER	STN 0001 003000
RQ STN 1 B NSLOTS	STN 0001 B 0002
RQ STN 1 PITCH	STN 0001 010000
RQ STN 1 A ALL	STN 0001 A 0001234 360000 150000 003000 0002 010000
RQ STN 1 R NSLOTS	STN 0001 0001234 0002

SET STATION

The SET STN command is used to configure the station parameters using the command line.

- These parameters can be sent individually or in multiples in any order.
- A STORE STN command must be sent by the host after the SET STN command to store changes to non-volatile memory.

Command	Robot (Optional for single robot systems)	Parameter 1 [station]	Parameter 2 [arm] (Optional, defaults to A if not sent)	Parameter 3 [Radial Coordinate] (Optional) [Integer microns]	Parameter 4 [Theta Coordinate] (Optional) [Integer millidegrees]	Parameter 5 [Z Coordinate] (Optional) [Integer microns]	Parameter 6 [Down Offset] (Optional) [Integer microns]	Parameter 7 [Slot Count] (Optional) [Integer]	Parameter 8 [Slot Pitch] (Optional) [Integer microns]	Send Command
SET STN	robot1	1 2 3 4…	A ARM A B ARM B	R 1234567	T 123456	Z 123456	LOWER 1234	NSLOTS 10	PITCH 1234	<CR><LF>

Example

SET STN Robot1 1 ARM A R 1234567 T 123456 Z 123456
Or
SET STN 1 R 1234567 T 123456 Z 123456 (in a single robot system)

SET STN 1 LOWER 1234

SET STN 1 NSLOTS 10

SET STN 1 PITCH 1234

MOVE

The MOVE command will move a single axis to a specified absolute or relative position. Robot motor servo control must be enabled to issue the move command. The software will check the joint limits to make sure the move coordinates are within the physical reach of the robot, but otherwise does not prevent the host from collisions with potential obstructions. The robot will execute the move at the appropriate speed for the given payload.

Command	Robot (Optional for single robot systems)	Parameter 1 [axis]	Parameter 2 [mode]	Parameter 3 [value] (Integer, micron or millidegrees)	Parameter 4 [arm] (Optional, defaults to A if not sent)	Send Command
MOVE	robot1	R T Z	ABS REL	###### (1000 = 1mm and 180000 = 180 Deg.)	A ARM A B ARM B	<CR><LF>
Example						
Move robot1 R ABS 1000 A or Move R ABS 1000 (in a single robot system)						

GOTO

The GOTO command will move the specified robot arm to one of four possible positions at a station. The robot arm can be extended (EX) or retracted (RE) and the z height can be up (UP) at the wafer transfer height or down (DN) below the substrate handoff position for a specific substrate slot. These positions are determined by the station teach point coordinates and up/down offsets. All moves execute at the appropriate speeds determined by arm payload. Z position moves with the arm extended will execute using reduced speed values to minimize the speed during substrate transfer. Motion between retract and extend positions will pass through all intermediate via positions if configured. The GOTO command can also be used to move from one station's retract position to another station's retract position. The offset parameters (6 & 7) can be specified only if the final arm position is extended.

Command	Robot (Optional for single robot systems)	Param 1 [station] (Optional if robot is currently at a valid station position)	Param 2 [armPosition] (Optional)	Param 3 [zPosition] (Optional)	Param 4 [slot] (Optional)	Param 5 [arm] (Optional)	Param 6 [radialOffset] (Optional, offsets can only be applied to R EX position) [Integer microns]	Param 7 [thetaOffset] (Optional, offsets can only be applied to R EX position) [Integer millidegrees]	Send Command
GOTO	robot1	1 N 1 2 N 2 Etc…	R RE R EX	Z DN Z UP	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	A ARM A B ARM B	RO 1234	TO 1234	<CR><LF>
Example									
Goto robot1 N 1 R RE Z DN SLOT 1 ARM A or Goto N 1 (in a single robot system)									

PICK

The PICK command is used to pick up and remove a wafer from a station. The PICK command combined with a PLACE command will allow the host to move substrates from one station to another.

Command	Robot (Optional for single robot systems)	Param 1 [station] (Optional if robot is currently at a valid station position)	Param 2 [slot] (Optional, defaults to "slot 1" if not sent)	Param 3 [arm] (Optional, defaults to A if not sent)	Param 4 [radialOffset] (Optional, defaults to zero if not sent) [Float microns]	Param 5 [thetaOffset] (Optional, defaults to zero if not sent) [Float millidegrees]	Param 6 [Stop or Start Point] (Optional, Stops or starts transfer at teach point)	Send Command
Pick	robot1	1 2 3 Etc…	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	A ARM A B ARM B	RO 1234	TO 1234	ENRT NR (end at teach point) STRT NR (Start at teach point)	<CR><LF>
Example								
Pick robot1 1 SLOT 1 ARM A RO 1234 TO 1234 ENRT NR								

PLACE

The PLACE command is used to place a wafer into a station. The PLACE command combined with a PICK command will allow the host to move substrates from one station to another.

Command	Robot (Optional for single robot systems)	Parameter 1 [station] (Optional if robot is currently at a valid station position)	Parameter 2 [slot] (Optional, defaults to "slot 1" if not sent)	Parameter 3 [arm] (Optional, defaults to A if not sent)	Parameter 4 [radialOffset] (Optional, defaults to zero if not sent) [Float microns]	Parameter 5 [thetaOffset] (Optional, defaults to zero if not sent) [Float millidegrees]	Param 6 [Stop or Start Point] (Optional, Stops or starts transfer at teach point	Send Command
Place	robot1	1 2 3 Etc…	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	A ARM A B ARM B	RO 1234	TO 1234	ENRT NR (end at teach point) STRT NR (Start at teach point)	<CR><LF>
Example								
Place robot1 1 SLOT 1 ARM A RO 1234 TO 1234 STRT NR								

SWAP

The SWAP command is used to combine a pick and place transfer into one high level command to increase throughput by blending motion between the pick and place operations. The command will pick up and remove a wafer from a station / slot with the specified arm then place a wafer into the same station / slot with the other arm on a dual arm robot.

Command	Robot (Optional for single robot systems)	Param 1 [station] (Optional if robot is currently at a valid station position)	Param 2 [slot] (Optional, defaults to "slot 1" if not sent)	Param 3 [pick arm] (Optional, defaults to A if not sent)	Send Command
SWAP	robot1	1 2 3 Etc…	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	A ARM A B ARM B	<CR><LF>
Example					
SWAP robot1 1 SLOT 1 ARM A					

XFER

The XFER command is used to combine a pick and place transfer into one high level command to increase throughput by blending motion between the pick and place operations. The command will pick up and remove a wafer from the first specified station / slot and then place the same wafer into the second specified station / slot.

Command	Robot (Optional for single robot systems)	Param 3 [arm] (Optional, defaults to A if not sent)	Param 4 [endEffector] (Optional, Defaults to ALL EE's if not sent)	Param 1 [pickStation]	Param 2 [pickSlot] (Optional, defaults to "slot 1" if not sent)	Param 1 [placeStation]	Param 2 [placeSlot] (Optional, defaults to "slot 1" if not sent)	Send Command
XFER	robot1	A ARM A B ARM B	PAN L PAN R	1 2 3 Etc…	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	1 2 3 Etc…	SLOT 1 SLOT 2 SLOT 3 SLOT 4 Etc…	<CR><LF>
Example								
XFER robot1 ARM A 1 SLOT 1 2 SLOT 1 or XFER 1 2								

SET CPTR

The SET CPTR command is used to enable position capture for a specific digital input. This command is generally used with the RQ CPTR command to enable position capture, perform a robot operation, and then request the captured data after the robot operation is complete.

Command	Robot (Optional for single robot systems)	Parameter 1 [inputAddress]	Parameter 2 [state]	Send Command
SET CPTR	robot1	1 2 3 4…	ON OFF	<CR><LF>
Example				
Set CPTR Robot1 1 ON or Set CPTR 1 ON (in a single robot system)				

RQ CPTR

The RQ CPTR command is used to request the position capture data immediately following a robot operation. This command is generally used with the SET CPTR command to enable position capture, perform a robot operation and then request the captured data after the robot operation is complete.

Command	**Robot** **(Optional for single robot systems)**	**Parameter 1 [inputAddress]**	**Send Command**
RQ CPTR	robot1	1 2 3 4…	<CR><LF>
Example			
RQ CPTR Robot1 1 or **RQ CPTR 1** (in a single robot system)			
Response (with capture data)			
CPTR R 0036379 T 0090232 Z 1234 H CPTR R 0036458 T 0090325 Z 1256 L CPTR R 0036567 T 0090343 Z 1245 H Format: CPTR R [microns] T [millidegrees] Z [microns] [State (h/L)] (Note – Capture data is only provided for specified trigger)			
Response (no capture data)			
CPTR NOT TRIGGERED			

RQ WAF_CEN DATA

The RQ WAF_CEN DATA command is used to request the calculated leading and trailing wafer edge transitions for each sensor and the calculated correction offset immediately following a robot transfer with APS

Command	**Robot** (Optional for single robot systems)	**Send Command**
RQ WAF_CEN DATA	robot1	<CR><LF>

Example

RQ WAF_CEN DATA Robot1 or **RQ WAF_CEN DATA** (in a single robot system)

Response format

Header	Right Sensor Identifier	Right Sensor Leading Edge Radial Value **[microns] (6 char)**	Right Sensor Leading Edge Theta Value **[millidegrees] (6 char)**	Right Sensor Trailing Edge Radial Value **[microns] (6 char)**	Right Sensor Trailing Edge Theta Value **[millidegrees] (6 char)**	Left Sensor Identifier	Left Sensor Leading Edge Radial Value **[microns] (6 char)**	Left Sensor Leading Edge Theta Value **[millidegrees] (6 char)**	Left Sensor Trailing Edge Radial Value **[microns] (6 char)**	Left Sensor Trailing Edge Theta Value **[millidegrees] (6 char)**	Center Sensor Identifier	Center Sensor Leading Edge Radial Value **[microns] (6 char)**	Center Sensor Leading Edge Theta Value **[millidegrees] (6 char)**	Center Sensor Trailing Edge Radial Value **[microns] (6 char)**	Center Sensor Trailing Edge Theta Value **[millidegrees] (6 char)**	Correction Offset Radial Value **[microns] (6 char)**	Correction Offset Theta Value **[millidegrees] (6 char)**
WAF_CEN	RT	000000	000000	000000	000000	LFT	000000	000000	000000	000000	CEN	000000	000000	000000	000000	000000	000000

WAF_CEN RT 000000 000000 000000 000000 LFT 000000 000000 000000 000000 CEN 000000 000000 000000 000000 000000 000000

CUSTOM ERROR CODES

These error codes are supported to be compatible with customer specific host software:

305 – Invalid Parameter

451 – APS Correction Over Limit

715 – Payload Present

745 – Payload Missing

771 – APS Invalid Capture Data

772 – APS Broken Wafer Detected

775 – APS Disabled

777 – APS Offset Calculation Error

778 – APS Sensor Not Found, Calibration Error

NATIVE ERROR CODES

ERR_OK	ERR_NOTATSTATION
ERR_DONE	ERR_PAYLOADPRESENT
ERR_WAIT	ERR_PAYLOADMISSING
ERR_ALREADYDONE	ERR_COREOBJNOTEXISTS
ERR_UNKNOWN	ERR_COREOBJDIFFTYPE
ERR_NOTIMPLEMENTED	ERR_NULLCALLPARAM
ERR_NOMEMORY	ERR_RESOURCEBUSY
ERR_BUFFFULL	ERR_CTRLLOCKED
ERR_HWFAILURE	ERR_CommInternalError
ERR_HWCONFIGINVALID	ERR_CommMemoryLeak
ERR_HWOFFLINE	ERR_CommWrongParam
ERR_HWONLINE	ERR_CommNotConnected
ERR_HWTIMEOUT	ERR_CommSendProblem
ERR_SERVOOFF	ERR_CommTimeOut
ERR_SERVOON	ERR_CommComunicationStoped
ERR_MOVING	ERR_CommNoParseableMessage
ERR_TRACEACTIVE	ERR_CommToLongMessage
ERR_POSCPTRACTIVE	ERR_CommReturn4MemoryLeak
ERR_POSCPTRINACTIVE	ERR_CommReturn4WrongParam
ERR_NOTCONFIGURED	ERR_CommReturn4NoParseable
ERR_INVALIDPARAM	ERR_CommOutputNotDefined
ERR_ALREADYCONFIGURED	ERR_CommNoFreeOutputSlot
ERR_TRJGENERR	ERR_CommUndefinedError
ERR_TRJSINGULARITY	ERR_PAR_ID_MINUS1
ERR_TRJOUTOFRANGE	ERR_PAR_IMPL
ERR_SAFETYFAULT	ERR_PAR_IS_NOT_DEF
ERR_ESTOP	ERR_PAR_DIFFTYPE
ERR_INTLCK	ERR_PAR_IS_NOT_ARRAY
ERR_POWERFAULT	ERR_PARARR_NULL
ERR_MTRPWROFF	ERR_PARARR_DIFFSIZE
ERR_HARDTRACK	ERR_GETTRACEVARADDR
ERR_OVERCURRENT	WRN_TRACEDIFFCOUNT
ERR_UNDERVOLTAGE	ERR_APSNOTCONFIGURED
ERR_OVERTEMP	ERR_APSINVALIDEVENTS
ERR_ENCODER	ERR_APSCORROVERLIMIT
ERR_STNINVALID	ERR_APSWAFERBREAKAGE
ERR_NOACTIVEARM	ERR_APSUNKNOWNSENSOR
ERR_NOTRETRACTED	ERR_APSCORRITERSFAIL

SERVICE PROCEDURES

The following section outlines the procedures necessary to service the Persimmon robot.

SOFTWARE UPGRADE

OVERVIEW

This procedure outlines the steps needed to upgrade the Persimmon robot control software on the Stand Alone Controller.

REQUIRED TOOLS

The following tools are required:

1. Personal computer (Service PC) with Ethernet port
2. Web browser application
3. Ethernet cable (Cat 5 patch cord)

SOFTWARE FILES

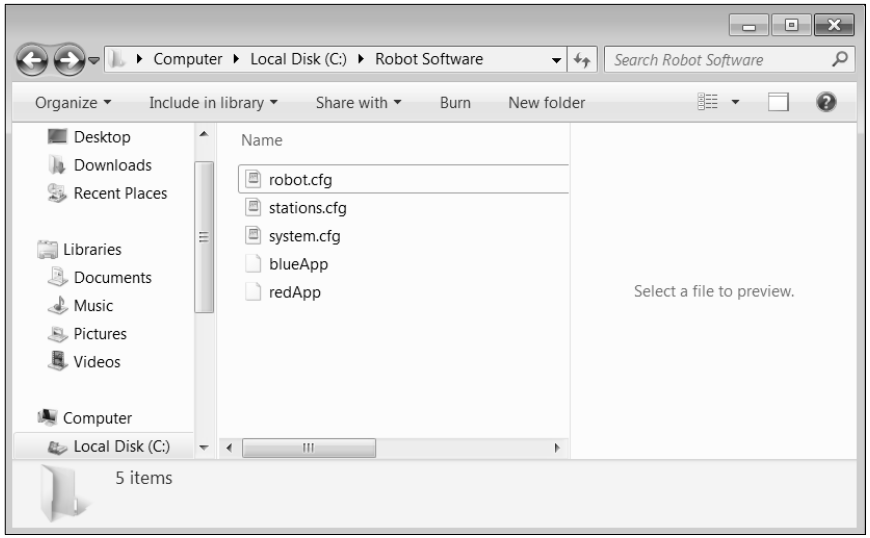
The following executable and configuration files can be upgraded or downgraded using this procedure:

NOTE - These files are typically loaded together as a complete software package in a .zip file, but files can be loaded independently if only a single file update is required.

- **Robot Control Software**
- **Robot Configuration Files**
- **Teach Pendant Application**

PROCEDURE

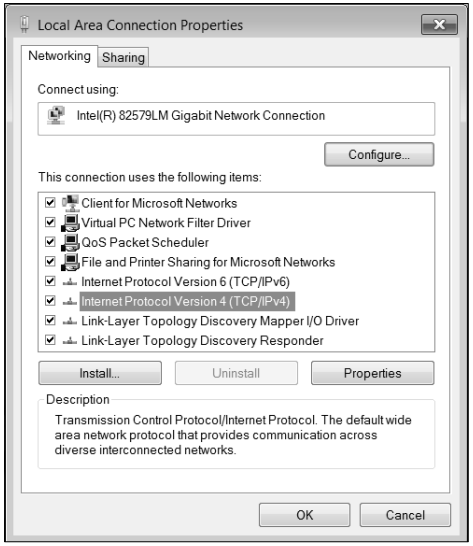
Copy the upgrade package to a known location (folder) on the Service PC .

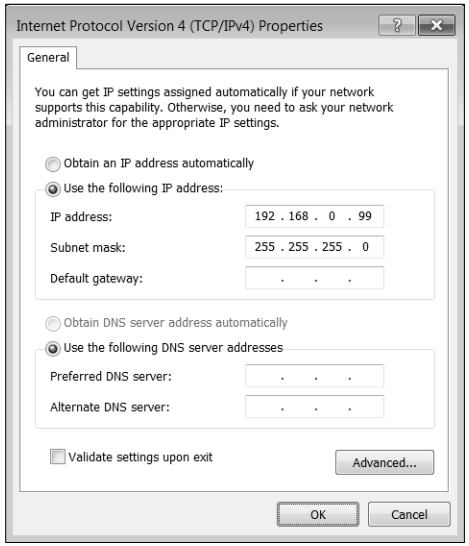


Configure the Service PC's Local Area Connection network adapter to a static IP address shown:

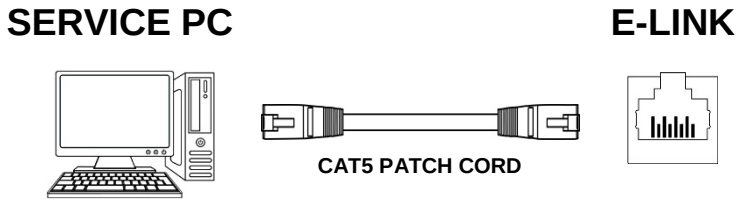
USING WINDOWS - CONTROL PANEL > NETWORK AND SHARING CENTER > CHANGE ADAPTER SETTINGS > LOCAL AREA CONNECTION > PROPERTIES

192.168.0.99



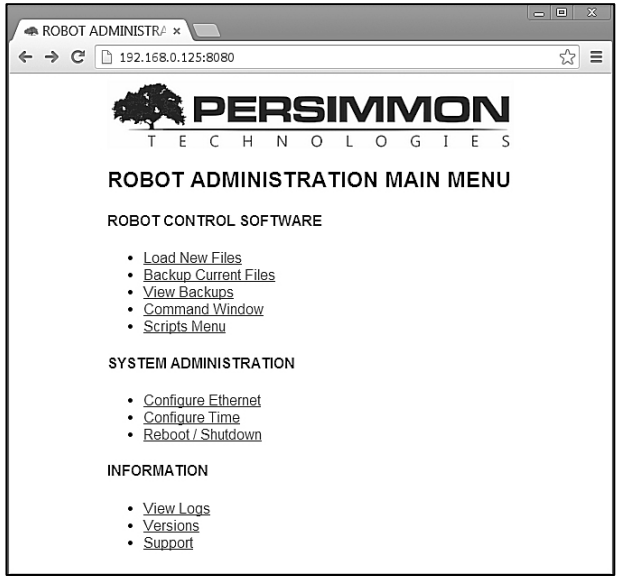


Connect the Service PC's LAN connection to the Robot Controller's E-Link port.

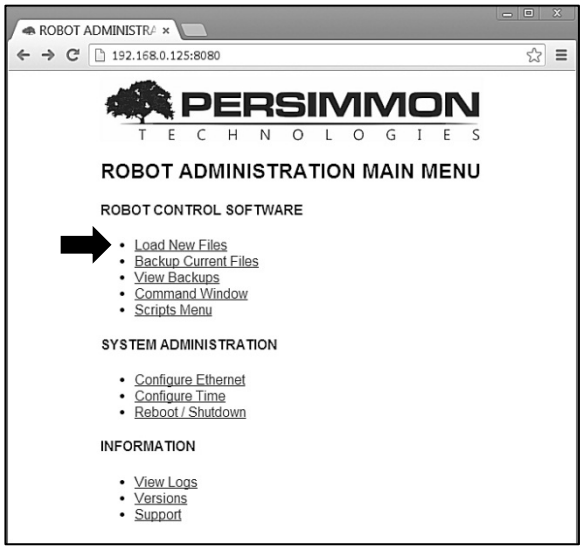


Open the service PC's web browser application and type the following address to access the Stand Alone Controller's Service Interface:

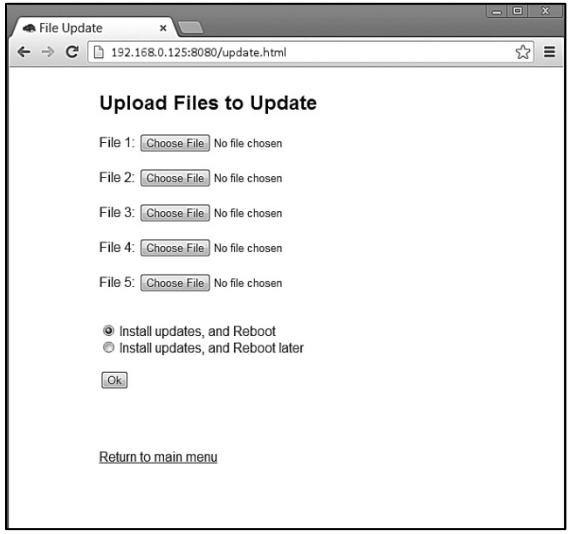
http://192.168.0.125:8080/



Select "**Load New Files**" from the menu:



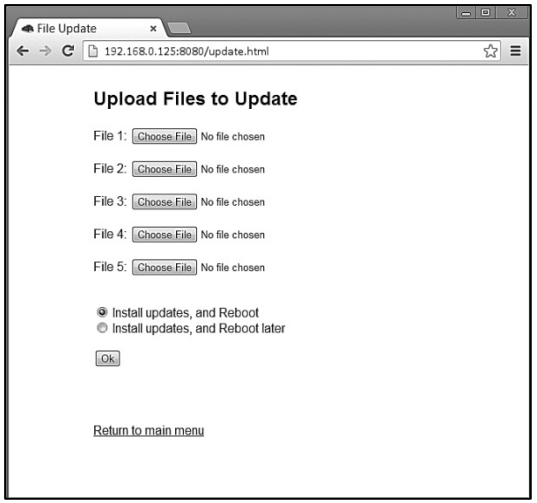
Select the "**Choose Files**" button and navigate to the Service PC folder containing the files for the upgrade. An updgrade package can be created by placing all the necessary upgrade files into a .zip folder and loading the .zip folder. Repeat this step for additional files if more than one file needs to be loaded.



After all the files have been selected, choose the install option:

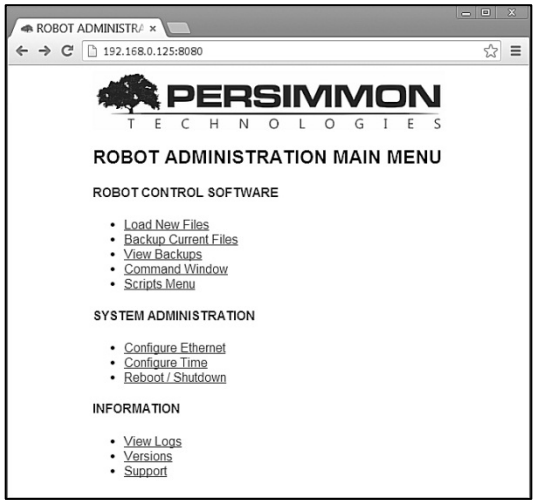
- Install and reboot now
- Install and reboot later

Press the "**Ok**" button and wait for the file transfer and reboot to complete. After the controller restart, the controller will run using the new files.



The reboot will take approximately 30 seconds to shut down and restart the robot controller. Once running the robot controller will be ready for operation with the new software. The "**Ready**" light on the controller will turn on when the software update is complete.

NOTE – The teach pendant will be updated automatically if the teach pendant application file is included with the software upgrade package. This process will add approximately 30 seconds to the overall upgrade time.



LOG FILE COLLECTION

OVERVIEW

This procedure outlines the steps needed to collect all log files from the Stand Alone Controller.

REQUIRED TOOLS

The following tools are required:

1. Personal computer (Service PC) with Ethernet port
2. Web browser application
3. Ethernet cable (Cat 5 patch cord)

SOFTWARE FILES

The following log files can be collected using this procedure:

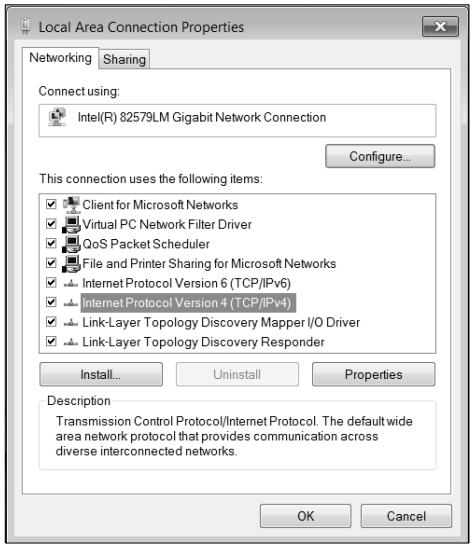
- Communication log files
- Robot control software log file
- Operating System log file

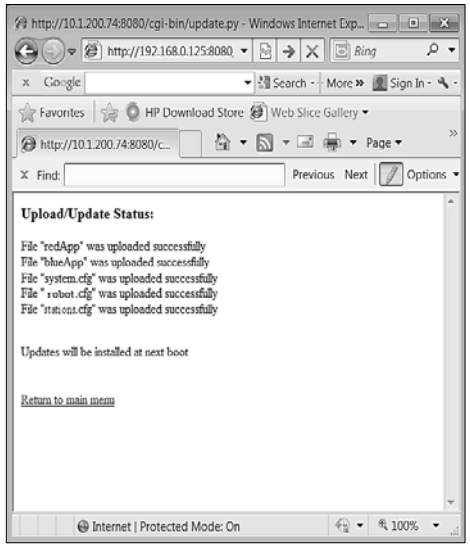
PROCEDURE

Configure the Service PC's Local Area Connection network adapter to a static IP address shown:

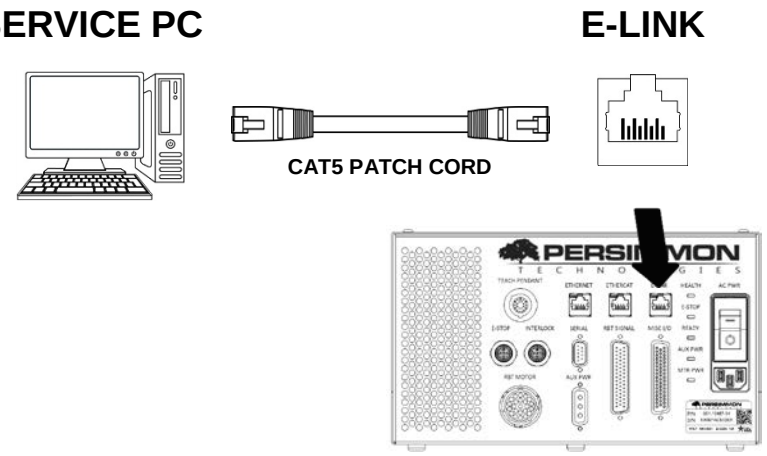
USING WINDOWS - CONTROL PANEL > NETWORK AND SHARING CENTER > CHANGE ADAPTER SETTINGS > LOCAL AREA CONNECTION > PROPERTIES

192.168.0.99



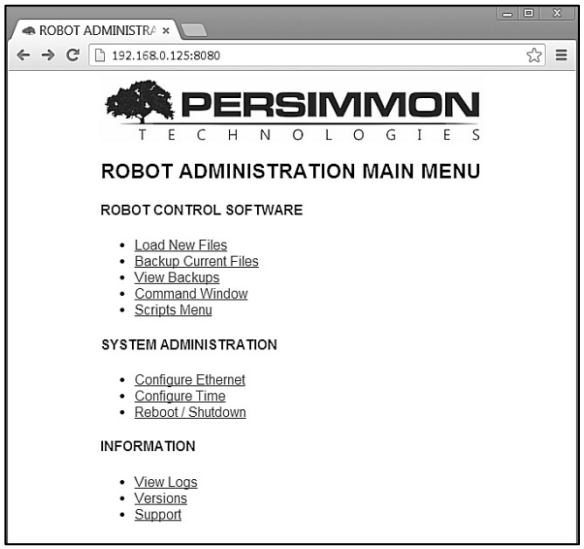


Connect the Service PC's LAN connection to the Stand Alone Controller's E-Link port.



Open the service PC's web browser application and type the following address to access the Stand Alone Controller's Service Interface:

http://192.168.0.125:8080/

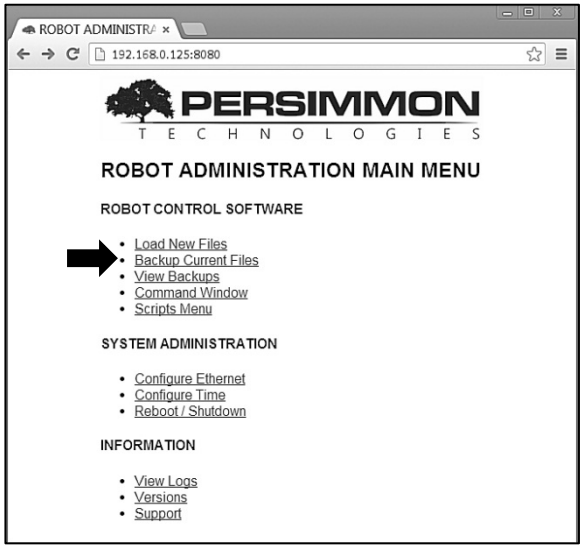


Select the "Backup Current Files"

Select "Backup Log Files"

Select directory on service PC to save log .zip file.

Save.



LEGACY STOP CONFIGURATION

OVERVIEW

This procedure outlines the steps needed to enable or disable the Legacy Stop circuit on the MISC I/O connector

REQUIRED TOOLS

The following tools are required to configure the Legacy Stop circuit on the Stand Alone Controller:

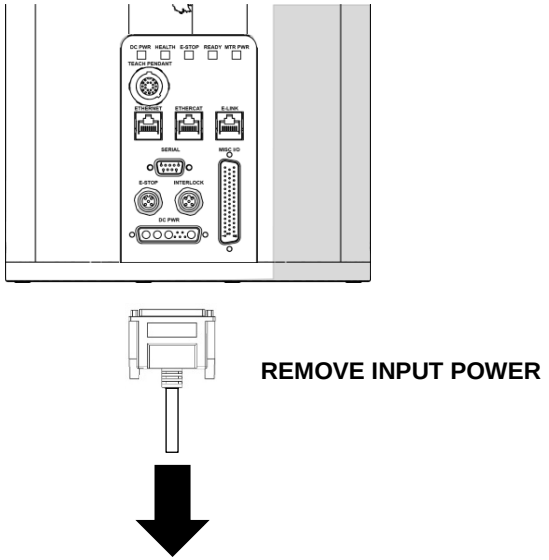
1. 2.5mm hex key

PROCEDURE

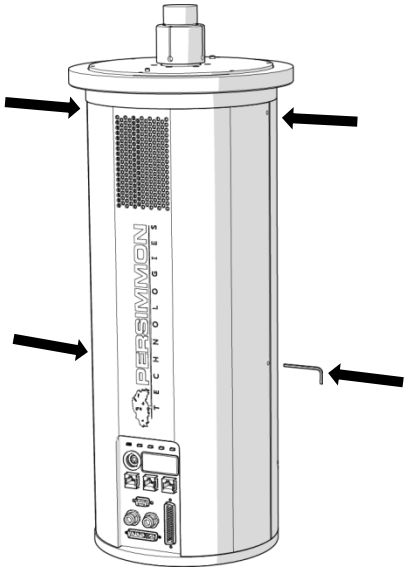
1. Turn main power supply to robot

   Remove input power from robot.

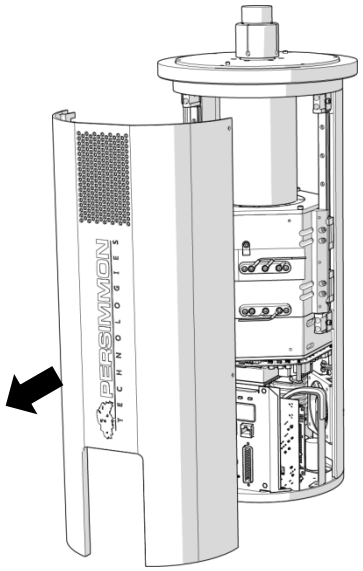
   NOTE – USE PROPER LOCKOUT TAGOUT PROCEDURES TO PREVENT POWER FROM BEING APPLIED TO THE ROBOT DURING SERVICE.



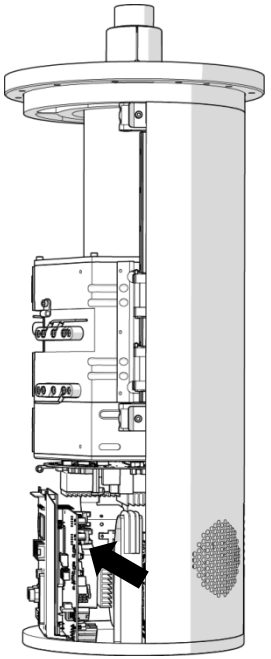
2. Use a 3mm hex wrench to loosen the 4 screws that secure the front robot cover.

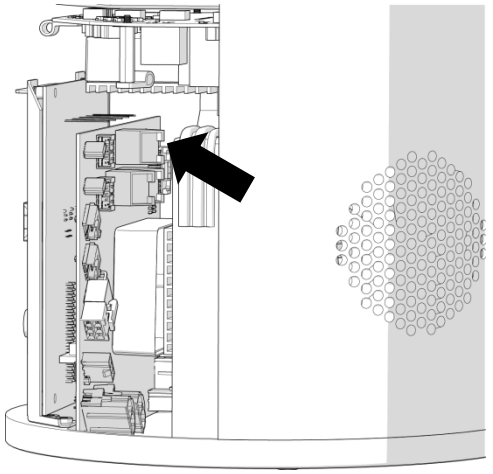


3. Remove robot front cover.



4. Rotate robot as shown so Legacy Stop Jumper connector (arrow) is visible and accessisble

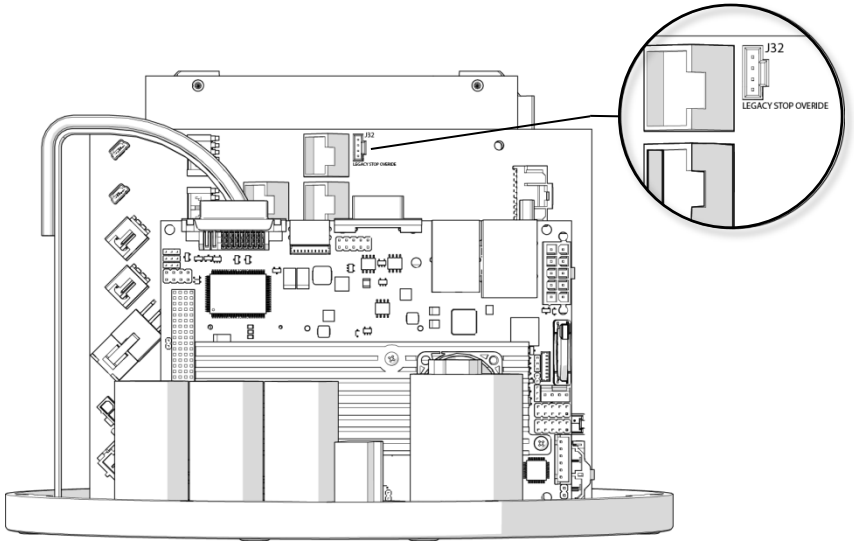




RIGHT SIDE OF ROBOT

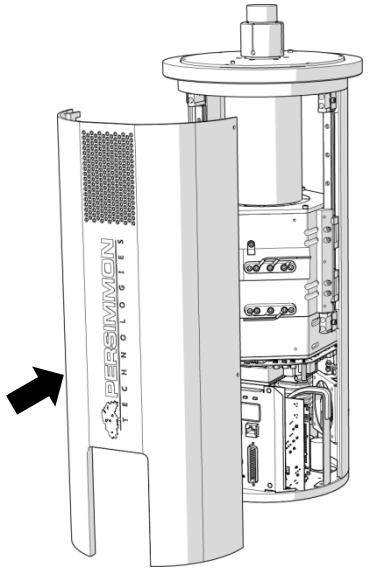
5. Install or remove jumper in connector J32 as needed.

Legacy Stop Overide Jumper Part Number: 013-10681-04	
Jumper installed in J32	Legacy stop disabled
Jumper removed from J32	Legacy stop enabled

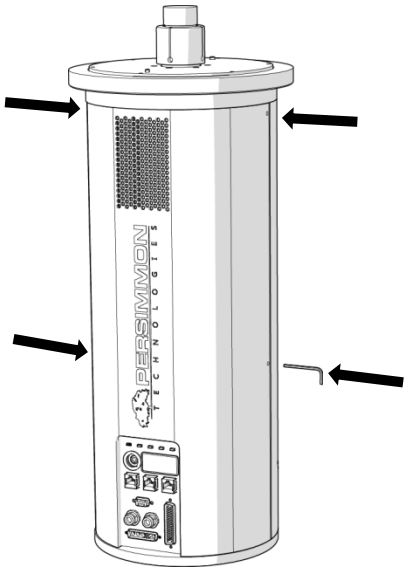


BACK OF PCB SHOWN FOR CONNECTOR LOCATION

6. Install Stand-Alone controller cover.



7. Secure the robot cover with the 4 screws removed in step 3.

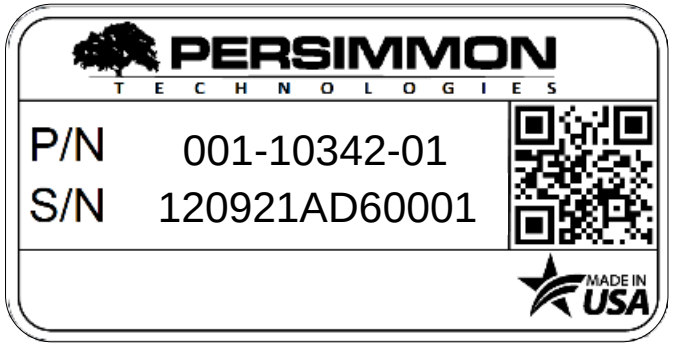


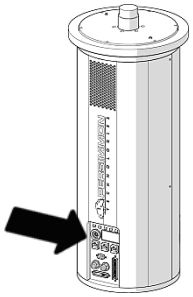
REFERENCE MATERIAL

The following section contains reference material related to the Persimmon 8 Stand-Alone Controller and Robot Drive Unit.

SERIAL NUMBERS

Part and serial number tags are located on the robot drive and robot arm set.





REGULATORY COMPLIANCE

This product is compliant to the following Standards, Industry Guidelines, and Regulatory requirements:

- **UL/CSA 61010-1**, 3rd Edition, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements
- **IEC/EN 61010-1**, 3rd Edition, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use –
- Part 1: General Requirements
- **IEC/EN 61326-1 : 2012**, Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements
- **IEC/EN 60204-1 : 2006 + A1 : 2008,** Safety of Machinery - Electrical Equipment of Machines – Part 1: General Requirements –
- **IEC/EN 60204-33 : 2011**, Safety of Machinery - Requirements for Semiconductor Fabrication Equipment
- **NFPA 79-2012** - Electrical Standard for Industrial Machinery
- **SEMI S2-0712a** - Safety Guideline, Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment
- **European Union Low Voltage Directive (2006/95/EC)**
- **European Union Machinery Directive (2006/42/EC)**
- **European Union EMC Directive (2004/108/EC)**
- **EN 61000-6-2, EN 61000-6-4**, Electromagnetic compatibility (EMC) - Part 6: Generic standards - Immunity for industrial environments

NOTE - Under the European Union Machinery Directive this product is considered “Partly Completed Machinery” and is not eligible to bear a CE Mark. A Declaration of Incorporation has been issued by Persimmon Technologies and a generic copy is available upon request.