



OGDEN WELDING SYSTEMS, INC.

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"YOUR SOLUTION PROVIDER"

EQUIPMENT MANUAL

BOOK 1 OF 2

PANEL TRANSPORTATION SYSTEM

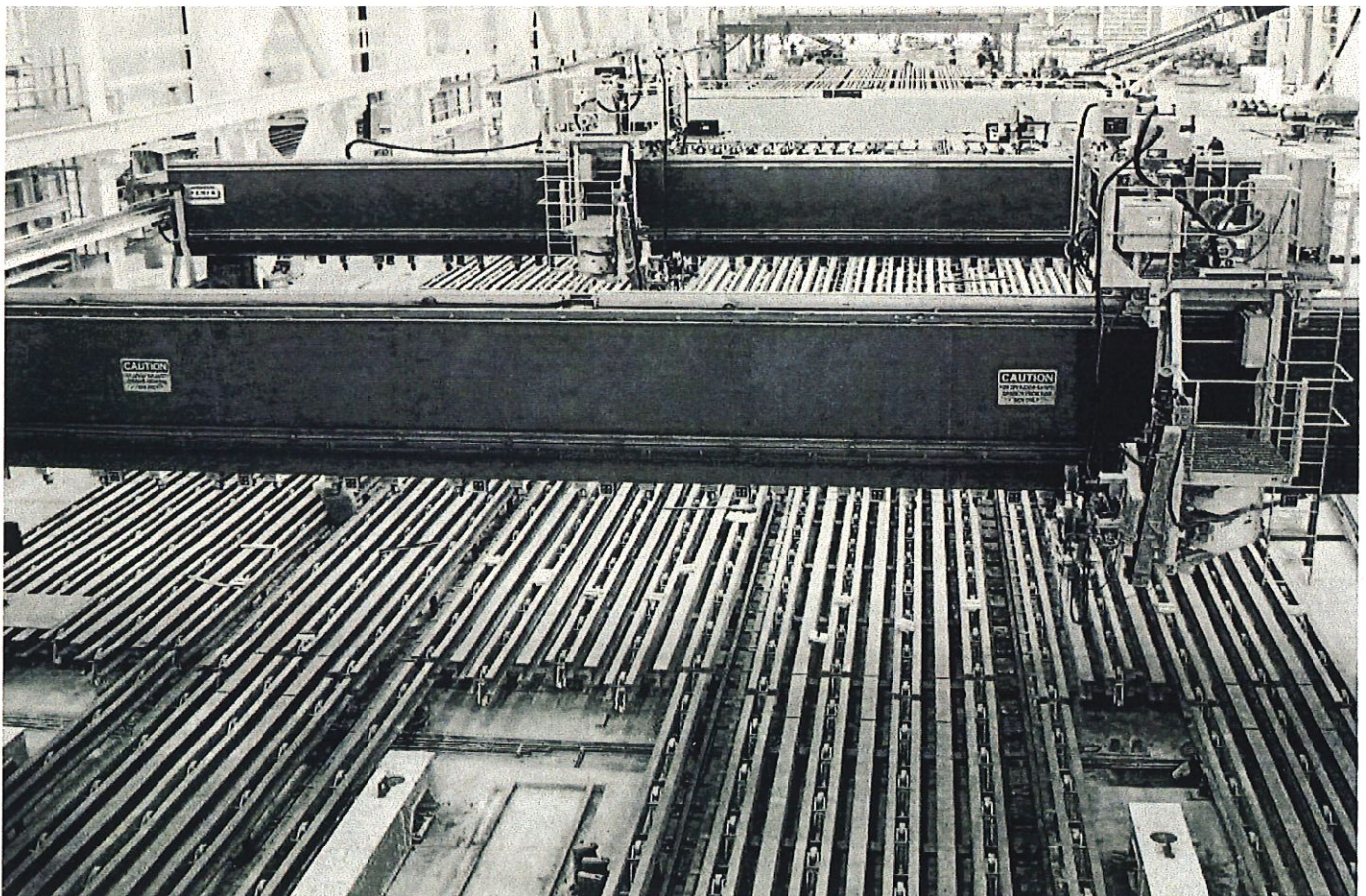
Model No. PT56X735-NGSSI-7010-01

Buyers PO Number: 440359-0000002

Northrop Grumman Ship Systems

Avondale, LA

Serial Number 1980



1.0 Description and Operation

The Panel Transportation System is designed to move panels from station to station making necessary stops at each selected station. Within station groups operator touch screen controls are capable of controlling its Station and the immediately adjacent stations. All station controls are capable of interfacing with machines located within their stations to facilitate product throughput. As the plates are carried from station to station, minimal manual intervention is required to correct position or align material into or through any Station.

The incoming plate support is accomplished via a carrier chain driver and a ball transfer bed with a steel table set at pass line height. Incoming plate positioning is accomplished via magnetic movers in both the longitudinal and transverse directions. For plate panel support, there are swivel roller support beams and intermediate bump beams both spaced at 30" on center. Plate movement is acquired by bi-directional plate drive units that are sectioned accordingly. The plate drive unit is capable of moving panels at two different speeds; normal and creep. The Transportation System is equipped with four Retractable Puller units. Depending on plate widths, only two units work at one time. The Retractable Puller Units pull material from Station to Station. These Puller Units are capable of pulling a panel weighing up to 200 tons on the conveyor system. The operator can see the Retractable Puller Units. There is a Lifting Roller Support Beam that serves as a work table. The rollers in each row of the Lifting Roller Support Beams raise the panel from the work table to a conveying height. The intermediate Support Beams support the panels during intermediate non-transitional movements.

The puller units lift and move material from Station 4 to Station 11. Transport trains move the material beyond Station 11. The puller units have the capability of carrying 200 tons of weight on the conveyor. The puller units can be operated by wireless radio control. The control system graphically displays the position of each train and allows the operator to reposition as required.

Station Descriptions

The capacity of the Panel Transportation Line is to handle plates as wide as 56 feet, as long as 56 feet and as thick as 1.50 inches. The normal working height of the Panel Line is 24.50 inches off the floor with a pass height of 26.50 inches.

Plates are sized and trimmed prior to entering Station 3. This Station is able to accept plates as delivered from the plate edge mill.

STATION 3 – (S/N 1981) Insert Fit & Pre-Tack

Nominal Length: 66'-0"

Plate support shall be accomplished by support beams. The carry chain conveyor assemblies are hydraulically controlled to lift the plates from the working height to the pass height. Upon entry of Station 3, the plates are loaded onto the top of the conveyors where they can accommodate cutting, tacking, and fitting in preparation of being seam welded in Station 4.

STATION 4 – (S/N 1999) One Sided Weld Station

Nominal Length: 105'-0"

The one sided welding Station is able to fit and align plates by incoming and outgoing zones. The incoming zone has plate positioners that are capable of magnetically moving the plate in both the longitudinal (electrical) and transverse directions (hydraulic). Plate drivers are independently controlled for aligning the plate. Both incoming and outgoing plate supports help move the plate over the seamer's backup support. The outgoing zone has plate movement by plate drive units, positioned for longitudinal and transverse movement. Plate drivers are logically divided for effective panel movement. The plate drivers are capable of moving panels at two different speeds - normal and creep. The plate drivers are capable of lifting to pass height and disappearing below table height.

The welded panels travel through the outgoing conveyors of Station 4 where they are inspected and repaired (if required).

STATIONS 5, 6, and 7 – (S/N 1982 and 1983) Insert Weld Stations

Nominal Length: 231'-6"

Stations 5, 6, and 7 consist of multiple rows of lifting roller beam assemblies containing steel rollers for plate conveyance. The rollers are mounted on arms which are hydraulically controlled to lift the panels from the working height to the pass line height. When the plates are in the down position, they rest on solid steel channels for support. Four retractable plate puller units start in Station 4 and are used all the way through Station 11. When a panel is to be moved, a combination of two puller units will be actuated to move the panel. Each plate puller unit will have a clamp dog. The clamp dog grasps the panel and allows to pull the panel from one Station to the next. The plate pullers and conveyors can be remotely operated by the belly box, but only the conveyor can be controlled from the operating panel.

STATION 8 – Panel Grind/Cut/Mark Station

Nominal Length: 90'-0"

Station 8 is used to provide plasma and/or gas bevel plate cutting, marking and grinding of plates and the location of the cutting downdraft table. The plate pullers can be remotely operated by the belly box. There are no controlled conveyors in this station.

STATION 9 – (S/N 2000) Stiffener Fitting Station

Nominal Length: 103'-0"

Station 9 is used to fit and tack weld cross stiffeners on to the plate. Station 9 has multiple rows of lifting roller beam assemblies containing steel rollers for plate conveyance. The rollers are mounted on arms which are hydraulically controlled to lift the panels from the working height to the pass line height. When the panels are in the down position, they rest on solid steel channels for support. Both the plate pullers and conveyors can be remotely operated by the belly box, but only the conveyors can be controlled from the operating panel.

STATION 10 – (S/N 2001) Stiffener Welding Station

Nominal Length: 80'-0"

Station 10 is used to weld transverse stiffeners on to the panel. Station 10 has multiple rows of lifting roller beam assemblies containing steel rollers for plate conveyance. The rollers are mounted on arms which are hydraulically controlled to lift the panels from the working height to the pass line height. When the panels are in the down position, they rest on solid steel channels for support. The plate pullers and conveyors can be remotely operated by the belly box, but only the conveyor can be controlled from the operating panel.

STATION 11 – (S/N 2002) Stiffener Welding Station with Load Out

Nominal Length: 80'-0"

Station 11 is used to weld cross stiffeners to the plate and then transfer to the finished panel out of Station 11. Two transfer train assemblies are strategically placed in Station 11. After the panel is finished, the transfer train raises the panel and carries the stiffened panel onto Station 12 through Station 17.

STATIONS 12 – 17 – (S/N 194, 1985 and 1986 Web Welding

These Stations are used to weld web frames and miscellaneous components onto the stiffened panels using the welding service gantries provided. Material conveyance throughout these Stations is via the two transfer train assemblies. During welding operations, all panels are resting on floor beam tables. The trains are controlled by a hand held radio controlled belly box.

Startup and Shutdown Procedures

The Panel Transportation System start-up and shut down procedure for the conveyor stations are controlled by means of main control panels. Each station has a touch screen operating panel. Each panel touch screen is capable of controlling its station and the two adjacent stations. All stations are interfaced with machines located within their stations to provide a continuous line capable of transporting plates and panels from Station 3 through Station 11.

The monitor start-up is activated by supplying power to the system. This will energize the Human Machine Interface (HMI) control screen and preset all home parameters.

The HMI Sequence of Operations:

The Power Up screen displays Ogden contact information.

Located in the lower right hand corner is an EXIT button. Select the EXIT button.

The display screen is the HMI operating screen. Controls from this screen operate each station and the immediate adjacent stations.

Note: There is a power saver screen on the HMI monitor. Touch the screen to bring the control screens back into view.

Hydraulic Power Unit Pushbuttons

EMERGENCY STOP – An emergency stop pushbutton is located at each hydraulic unit. These are red mushroom head buttons. Pressing any of the emergency stop buttons will turn the corresponding conveyor station off.

STATION 3 HYDRAULIC UNIT POWER ON – This is a green illuminated pushbutton located on the Station 3 operator console. Pressing this button will turn the hydraulic pump on for Station 3. This button will be illuminated once pressed.

STATIONS 5, 6 & 7 HYDRAULIC UNIT POWER ON – This is a green illuminated pushbutton, which indicates that the power to the hydraulic unit has been energized. One hydraulic unit is shared by all three stations. If the E-Stop is engaged, all three stations will lose power to their respective machines.

STATIONS 9, 10 & 11 HYDRAULIC UNIT POWER ON – This is a green illuminated pushbutton, which indicates that the power to the hydraulic unit has been energized. One hydraulic unit is shared by all three Stations. If the E-Stop is engaged, all three stations will lose power to their respective machines.

Conveyor Operator Station Pushbuttons

EMERGENCY STOP – An emergency stop pushbutton is located at each conveyor operator station. These are red mushroom head buttons. Pressing any of the emergency stop buttons will turn the corresponding conveyor station off.

STATION 3 POWER ON – This is a green illuminated pushbutton, located on the Station 3 operator console. Pressing this button will engage the chain conveyor controls for Station 3. This button will be illuminated once pressed.

STATION 5 POWER ON – This is a green illuminated pushbutton, located on the Station 5 operator console. Pressing this button will energize the lifting rollers for Station 5. This button will be illuminated once pressed.

STATION 6 POWER ON – This is a green illuminated pushbutton, located on the Station 6 operator console. Pressing this button will energize the lifting rollers for Station 6. This button will be illuminated once pressed.

STATION 7 POWER ON – This is a green illuminated pushbutton, located on the Station 7 operator console. Pressing this button will energize the lifting rollers for Station 7. This button will be illuminated once pressed.

STATION 9 POWER ON – This is a green illuminated pushbutton, located on the Station 9 operator console. Pressing this button will energize the lifting rollers for Station 9. This button will be illuminated once pressed.

STATION 10 POWER ON – This is a green illuminated pushbutton, located on the Station 10 operator console. Pressing this button will energize the lifting rollers for Station 10. This button will be illuminated once pressed.

STATION 11 POWER ON – This is a green illuminated pushbutton, located on the Station 11 operator console. Pressing this button will energize the lifting rollers for Station 11. This button will be illuminated once pressed.

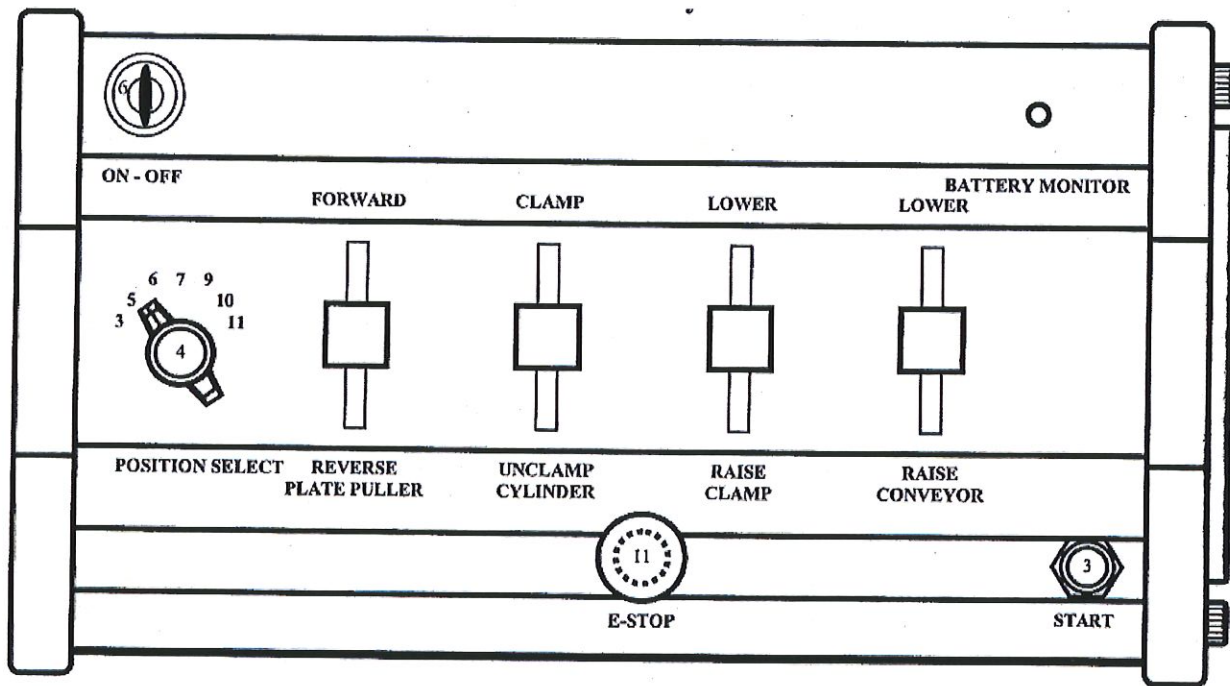
Main Control Enclosure Power (MCE-01)

Station 11

EMERGENCY STOP – An emergency stop pushbutton is located at the main control enclosure for the four puller carts. This is a red mushroom head button. Pressing the emergency stop button will disable the four puller carts.

POWER ON – This is a green pilot light. When the wireless radio system belly boxes are illuminated, this light will be illuminated indicating that the four puller carts are enabled. Control for the four puller carts comes from the belly box.

Radio Transmitter Controls



Radio Transmitter Box

POWER ON

- The disconnect switches on the main control enclosure (MCE-01) and the hydraulic power unit enclosures should be in the ON position. Make sure all the emergency stop pushbuttons are pulled out.
- Turn the power on for the puller carts by selecting the ON position of the keyed selector switch on each of the remote transmitter boxes (belly boxes), the green POWER ON light will illuminate.
- Turn the individual hydraulic power units on by pressing the respective HYDRAULIC PUMP ON buttons. Once pressed, the buttons will be illuminated.

POWER OFF

- To turn the control power off for the puller cart, select the OFF position of the keyed selector switch on each of the belly boxes.

EMERGENCY STOP - There is an emergency stop button located on the gantry radio controlled transmitter box. This is a red mushroom head button. Pressing this emergency stop button will stop the gantry movement.

ON-OFF - This is a two position keyed selector switch. It is used to turn the radio controlled transmitter and receiver ON and OFF.

START - This is a momentary pushbutton. It is used to activate the belly box for operation.

POSITION SELECT - This is a seven position selector switch. It is used to select which conveyor station the belly box will control.

BATTERY MONITOR— This is a red illuminated light. When the transmitter is ON, the light will flash at a slow rate. When the transmitter is transmitting data, the light will flash at a rapid rate.

PLATE PULLER FORWARD/REVERSE — This lever is used to control the plate pullers forward and reverse movement. Push the lever forward to make the puller cart(s) move in the forward direction. Pull the lever back to enable the puller cart(s) reverse direction. The moment the lever is released, it will return to the center position and puller cart movement will stop.

CYLINDER CLAMP/UNCLAMP — This lever is used to control the clamping cylinder. Push the lever forward to clamp the cylinder on a panel. Pull the lever back to unclamp the cylinder.

CLAMP LOWER/RAISE — This lever is used to lower and raise the clamp assembly. Push the lever forward to lower the clamp assembly. Pull the lever back to raise the clamp assembly.

CONVEYOR LOWER/RAISE — This lever is used to lower and raise the conveyor in individual stations. Push the lever forward to lower the conveyor. Pull the lever back to raise the conveyor.

Machine Operation

OGDEN LOGO – OPENING SCREEN

The Ogden Logo screen is displayed at the beginning of machine startup.

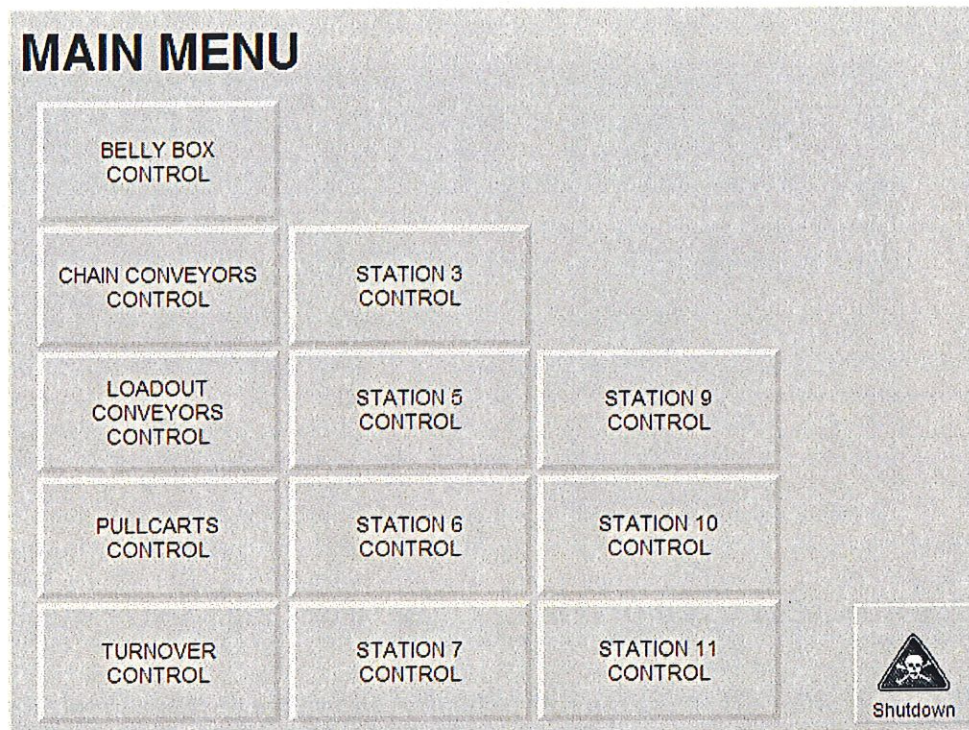


EXIT – Allows the operator to exit from the screen to the main menu.

Please Note: With the exception of the Startup Logo screen and a few others, the screens may not match EXACTLY with what is listed here. Most of the screens used on the HMI stations are universal and the Touch BUTTON functions are the same. Please take time to familiarize yourself with the HMI (Human Machine Interface) station functions.

Main Menu

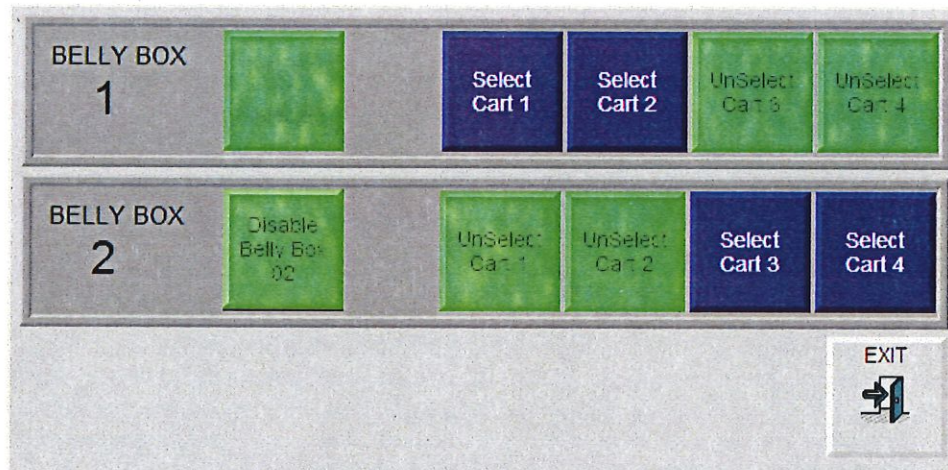
The Main Menu allows access to all of the main control screens.



- **BELLY BOX CONTROL** – This button will display the belly box control screen.
- **CHAIN CONVEYORS CONTROL** – This button will display the Station 3 chain conveyors control screen.
- **LOADOUT CONVEYORS CONTROL** – This button will display the Station 11 load out conveyors control screen.
- **PULLCARTS CONTROL** – This button will display the pull carts control screen.
- **TURNOVER CONTROL** – N/A
- **STATION 3 CONTROL** – This button will display the Station 3 control screen.
- **STATION 5 CONTROL** – This button will display the Station 5 control screen.
- **STATION 6 CONTROL** – This button will display the Station 6 control screen.
- **STATION 7 CONTROL** – This button will display the Station 7 control screen.
- **STATION 9 CONTROL** – This button will display the Station 9 control screen.
- **STATION 10 CONTROL** – This button will display the Station 10 control screen.
- **STATION 11 CONTROL** – This button will display the Station 11 control screens.
- **SHUTDOWN** – This button will shutdown the operator screen application and display the Panel View configuration screen.

Belly Box Control Screen

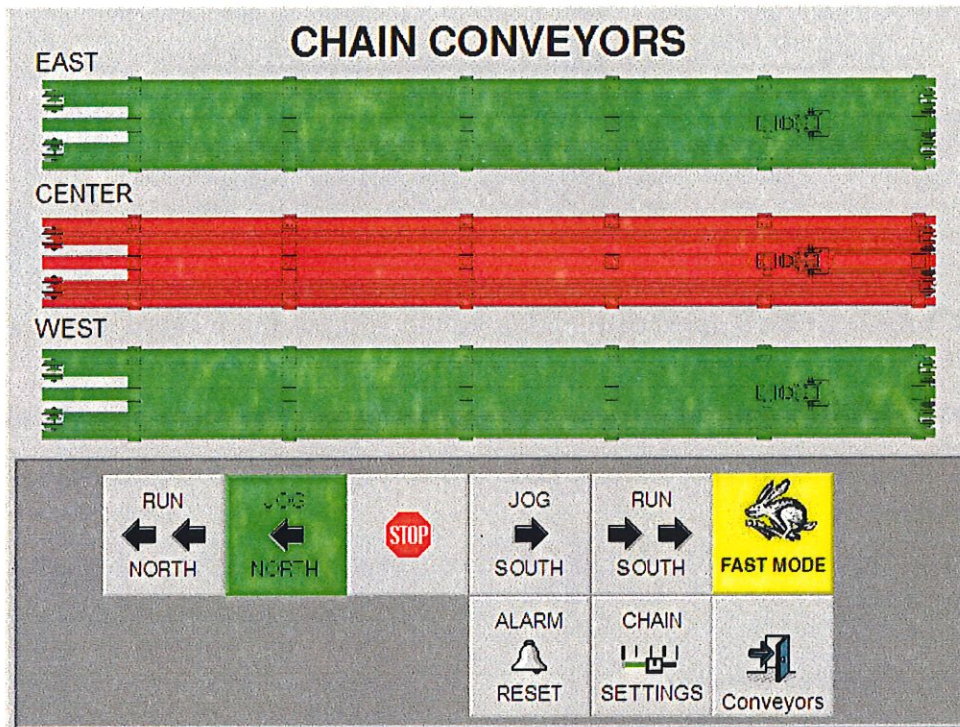
The operator can enable and disable control of the puller carts from the belly box. The puller carts can only be controlled by one belly box at a time.



- **BELLY BOX SELECTED/DISABLE** – These buttons will select or disable the respective belly box.
- **SELECT/UNSELECT** – The top row of buttons allows the operator to select which puller carts are controlled by the radio belly box 1. The bottom row of buttons allows the operator to select which puller carts are controlled by the radio belly box 2. The puller carts can only be controlled by one belly box at a time. When a cart is selected for control by belly box 1, the selection button for that cart on belly box 2 will not be shown. Only when the cart is unselected from belly box 1 will the selection button appear for belly box 2.
- **EXIT** – This button will close the belly box screen and return to the main menu.

Chain Conveyor Control Screen

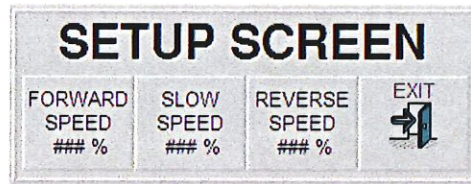
This screen enables and disables all chain conveyor controls.



- **EAST CONVEYOR** – This button will enable or disable the east chain conveyor. When the conveyor is enabled the conveyor diagram will be green. When the conveyor is disabled the conveyor diagram will be red.
- **CENTER CONVEYOR** – N/A
- **WEST CONVEYOR** – This button will enable or disable the west chain conveyor. When the conveyor is enabled the conveyor diagram will be green. When the conveyor is disabled the conveyor diagram will be red.
- **RUN NORTH** – This button will move the chain conveyors in the north direction.
- **JOG NORTH** – This button will jog the chain conveyors in the north direction.
- **STOP** – This button will stop the chain conveyor movement.
- **JOG SOUTH** – This button will jog the chain conveyors in the south direction.
- **RUN SOUTH** – This button will move the chain conveyors in the south direction.
- **SLOW/FAST MODE** – This button will change the conveyor speed command from the forward/reverse speed setting to the slow speed setting.
- **ALARM RESET** – This button will reset any active alarms. When an alarm is active this button turns red.
- **CHAIN SETTINGS** – This button will display the chain conveyors setup screen.
- **CONVEYORS** – This button will close the chain conveyors control screen and return to the main menu.

Chain Settings Screen

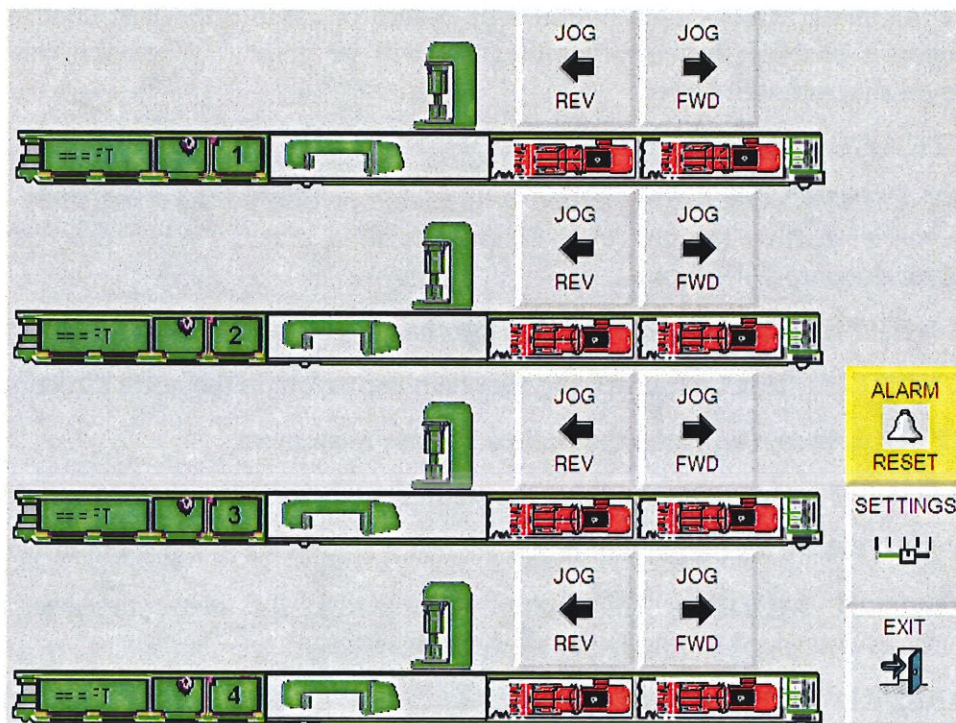
This screen sets the speed for the chain conveyor.



- **FORWARD SPEED (percent)** – This button will set the forward speed set-point for the chain conveyors.
- **SLOW SPEED (percent)** – This button will set the slow speed set-point for the chain conveyors.
- **REVERSE SPEED (percent)** – This button will set the reverse speed set-point for the chain conveyors.
- **EXIT** – This button will close the chain conveyor setup screen and return to the chain conveyor control screen.

Puller Carts Control Screen


This screen is used to control the puller carts.



- **JOG REV** – This button will jog the respective pull cart in the reverse direction.
- **JOG FWD** – This button will jog the respective pull cart in the forward direction.
- **ALARM RESET** – This button will reset any active alarms. When an alarm is active, this button turns red.
- **SETTINGS** – This button will display the pull carts setup screen.
- **EXIT** – This button will close the pull carts control screen and return to the main menu.

Puller Cart Setup Screen

This screen sets up the speed for the cart travel. The operator can set the home position for the puller cart. The operator can also ZERO the position of the encoder on each cart.

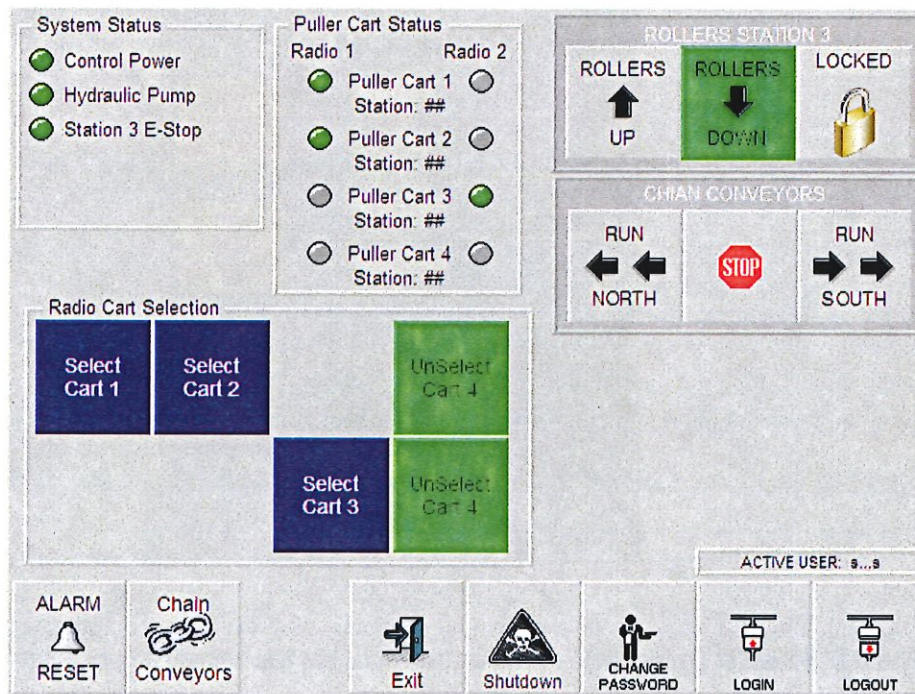
SETUP SCREEN			
FORWARD SPEED ### %	SLOW SPEED ### %	HOME POSITION #####'	SET HOME POSITION
REVERSE SPEED ### %	SLOW OFFSET ### "	END POSITION ##### "	SET END POSITION
CART 1 ZERO ENCODER	CART 2 ZERO ENCODER	CART 3 ZERO ENCODER	CART 4 ZERO ENCODER
			EXIT 

- **FORWARD SPEED (percent)** – This button will set the forward speed set-point for the pull carts.
- **SLOW SPEED (percent)** – This button will set the slow speed set-point for the pull carts.
- **HOME POSITION (inches)** – This button will allow the operator to enter the home position for the pull carts.
- **SET HOME POSITION** – This button will set the current position as the home position.
- **REVERSE SPEED (percent)** – This button will set the reverse speed set-point for the pull carts.
- **SLOW OFFSET (inches)** – This position is where the pull carts will switch from the fast speed set-point to the slow speed set-point.
- **END POSITION (inches)** – This button will allow the operator to enter the end position for the pull carts.
- **SET END POSITION** – This button will set the current position as the end position.
- **CART 1 ZERO ENCODER** – Pressing the CART 1 ZERO ENCODER button will set the encoder zero position for cart 1. *NOTE: This should only be done by properly trained personnel.*
- **CART 2 ZERO ENCODER** – Pressing the CART 2 ZERO ENCODER button will set the encoder zero position for cart 2. *NOTE: This should only be done by properly trained personnel.*

- **CART 3 ZERO ENCODER** – Pressing the CART 3 ZERO ENCODER button will set the encoder zero position for cart 3. *NOTE: This should only be done by properly trained personnel.*
- **CART 4 ZERO ENCODER** – Pressing the CART 4 ZERO ENCODER button will set the encoder zero position for cart 4. *NOTE: This should only be done by properly trained personnel.*
- **EXIT** – This button will close the pull cart setup screen and return to the load out conveyor control screen.

Station 3 Control Screen

This screen is the main control screen for Station 3. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Station 3 from this screen.



The touch buttons are described below:

ACTIVE USER - The ACTIVE USER indicator will identify the person who is currently logged in.

ALARM RESET – This button will reset any active alarms. When an alarm is active this button turns red.

CHAIN CONVEYORS – This button will display the chain conveyors control screen.

EXIT – This button will close the Station 3 control screen and return to the main menu.

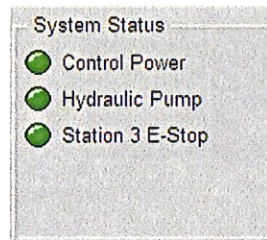
SHUTDOWN – This button will shutdown the operator screen application and display the Panel View configuration screen.

CHANGE PASSWORD – The touch button will only appear if a proper login has been identified. The authorized personnel can change the login password.

LOGIN – Authorized personnel need to enter a password before obtaining access to specific screens.

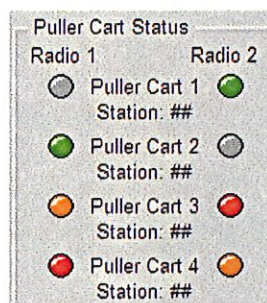
LOGOUT – This touch button logs out the authorized personnel.

System Status Display



- **Control Power** – This indicator shows the status of the Station control power. Green indicates the control power is turned on and gray indicates the control power is turned off.
- **Hydraulic Pump** – This indicator shows the status of the hydraulic pump. Green indicates the pump is running and red indicates the pump is off.
- **Station 3 E-Stop** – This indicator shows the status of the Station 3 E-Stop. Green indicates that the emergency stop circuit is normal and red indicates the emergency stop button has been pressed.

Puller Cart Status

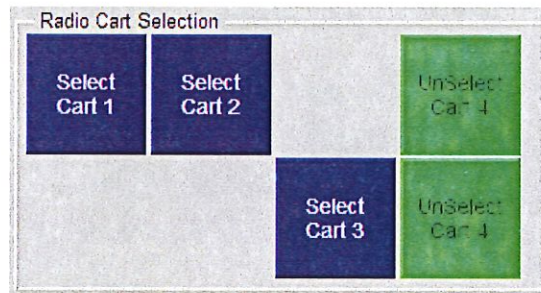


Puller Cart Station: ## - These display the current location, by station number, of the respective puller cart.

Radio 1 / Radio 2 - These indicators show the current status of the respective puller cart.

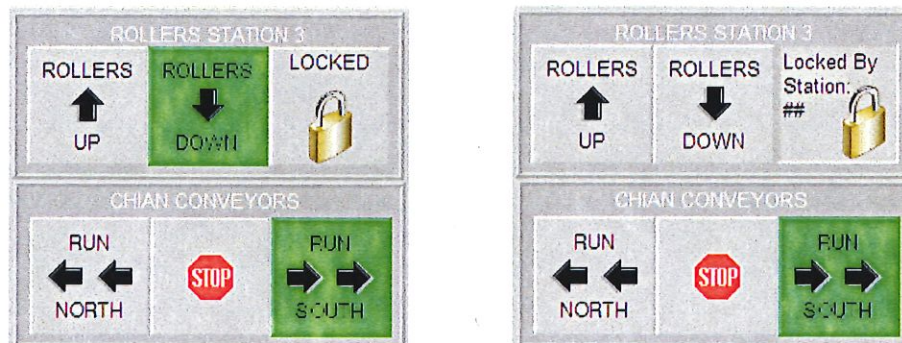
- Gray – indicates the puller cart is not selected for the respective radio belly box.
- Green – indicates the puller cart is being controlled by the respective radio belly box and there are no active alarms for the cart.
- Orange – indicates the puller cart is out of the position deviation limits.
- Red – indicates the puller cart has an active alarm condition.

Radio Cart Selection



The top row of buttons allows the operator to select which puller carts are controlled by the radio belly box 1. The bottom row of buttons allows the operator to select which puller carts are controlled by the radio belly box 2. The puller carts can only be controlled by one belly box at a time. When a cart is selected for control by belly box 1, the selection button for the cart on belly box 2 will not be shown. Only when the cart is unselected from belly box 1 will the selection button appear for belly box 2.

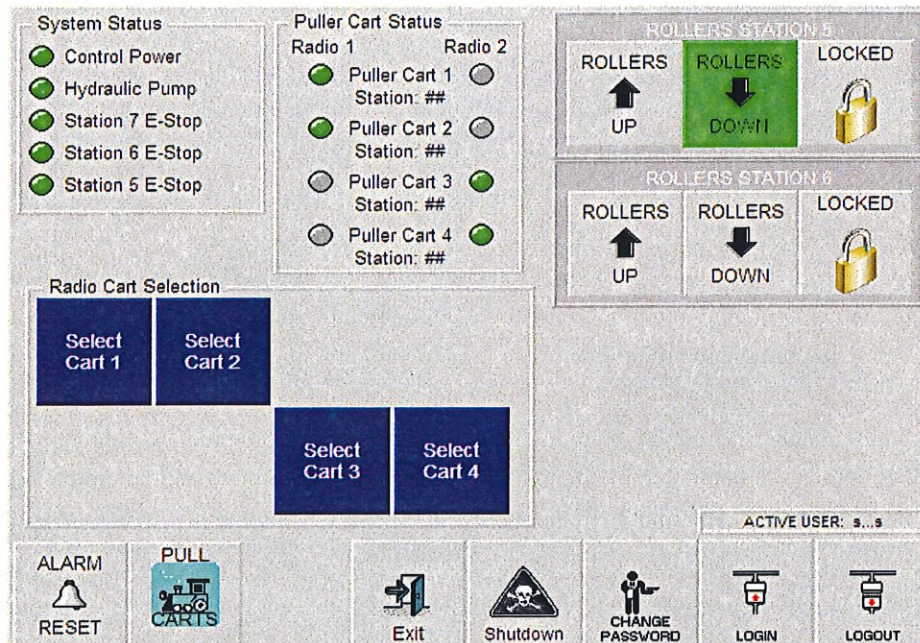
Station 3 Controls



- **ROLLERS UP** – This button will move the Station 3 rollers up.
- **ROLLERS DOWN** – This button will move the Station 3 rollers down.
- **LOCKED/UNLOCKED** – This button will lock or unlock the Station 3 rollers. If the Station 3 rollers have been locked out at any of the other Stations along the panel line, the locked/unlocked button will not be displayed. The Station number that has the rollers will be shown in the locked/unlocked button location.
- **RUN NORTH** – This button will move the Station 3 chain conveyors in the north direction.
- **STOP** – This button will stop the chain conveyor movement.
- **RUN SOUTH** – This button will move the Station 3 chain conveyors in the south direction.

Station 5 Control Screen

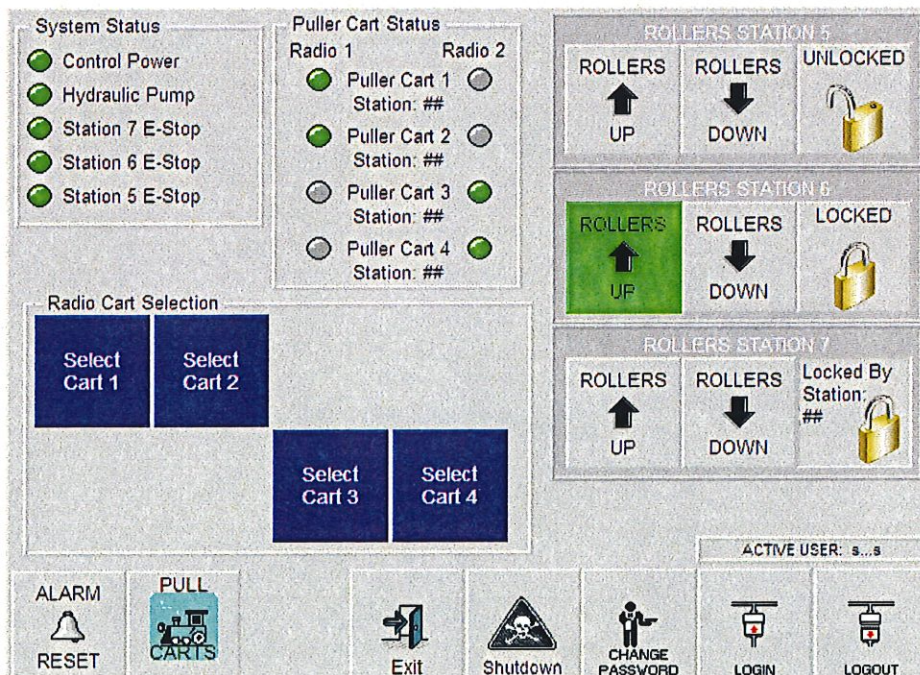
This screen is the main control screen for Station 5. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Stations 5 and 6 from this screen.



PULL CARTS – This button will display the pull carts control screen.

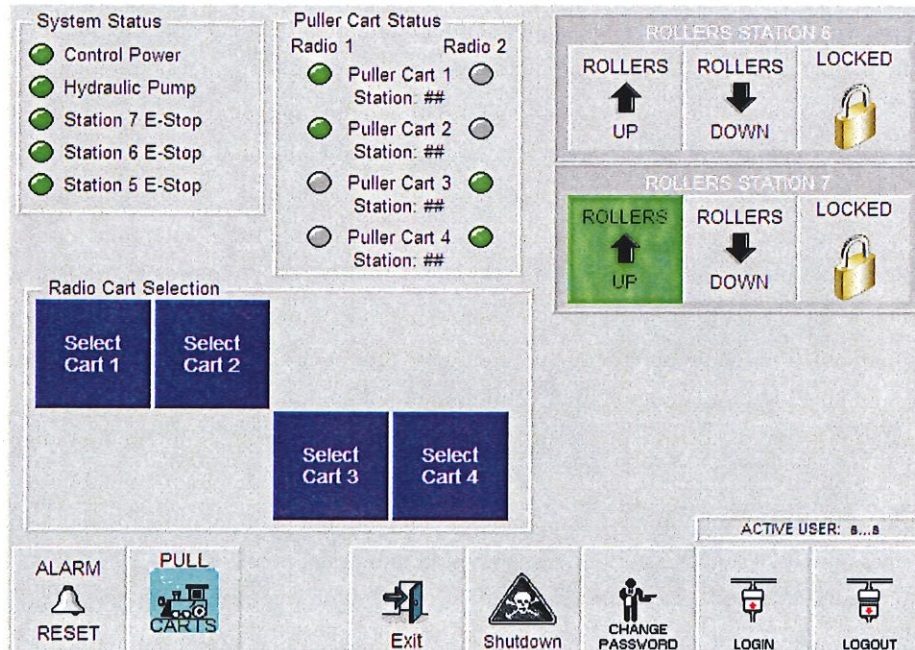
Station 6 Control Screen

This screen is the main control screen for Station 6. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Stations 5, 6, and 7 from this screen.



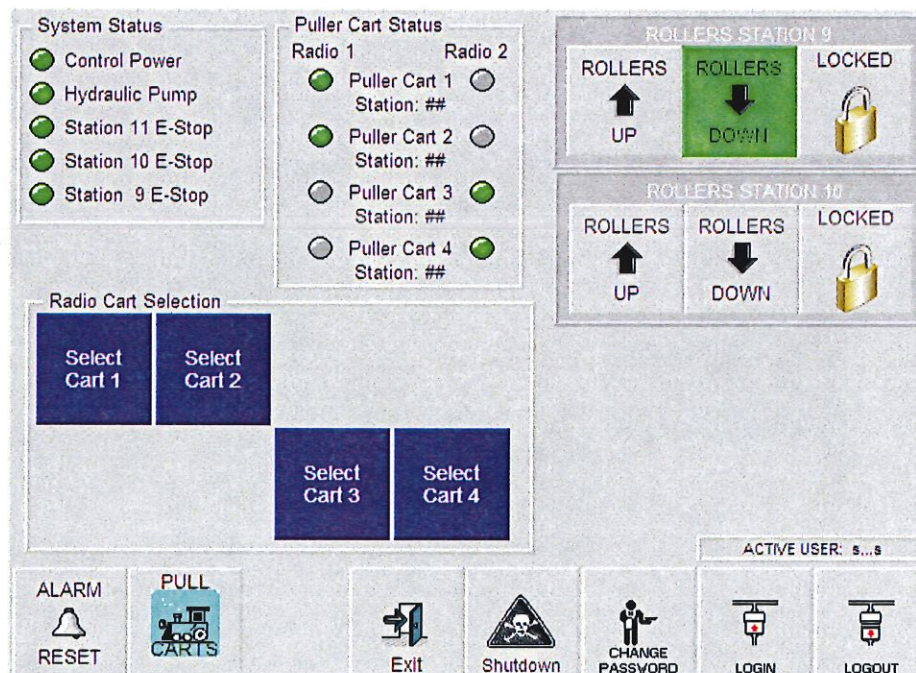
Station 7 Control Screen

This screen is the main control screen for Station 7. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Station 6 and 7 from this screen.



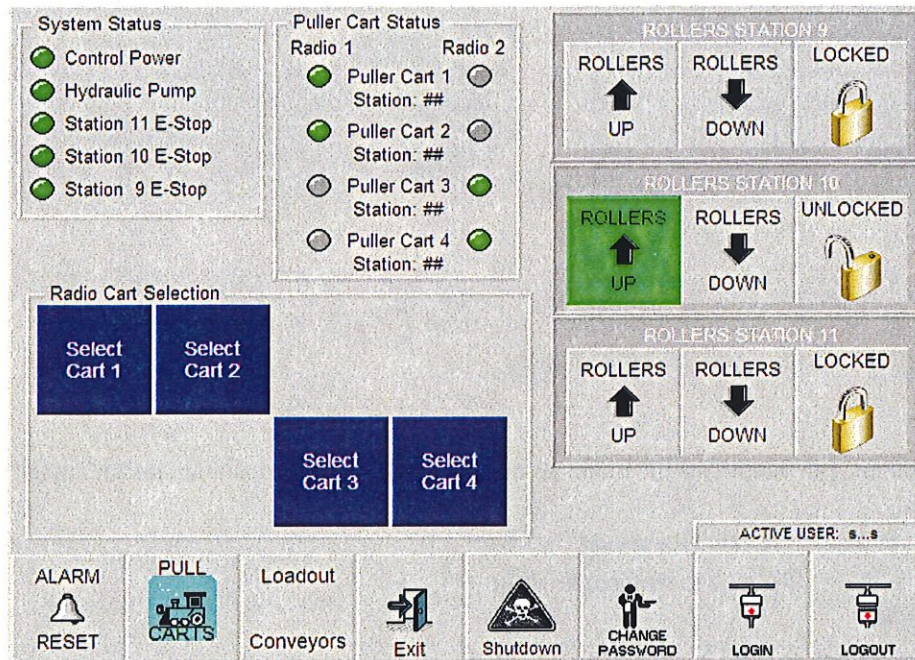
Station 9 Control Screen

This screen is the main control screen for Station 9. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Stations 9 and 10 from this screen.



Station 10 Control Screen

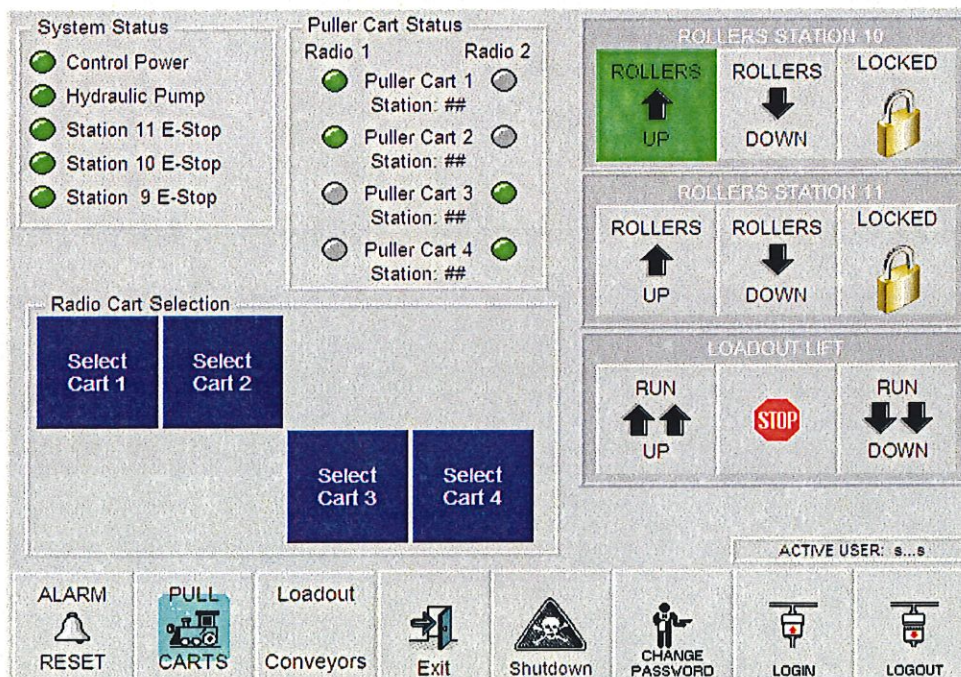
This screen is the main control screen for Station 10. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Stations 9, 10 and 11 from this screen.



LOADOUT CONVEYORS – This button will display the load out conveyors control screen.

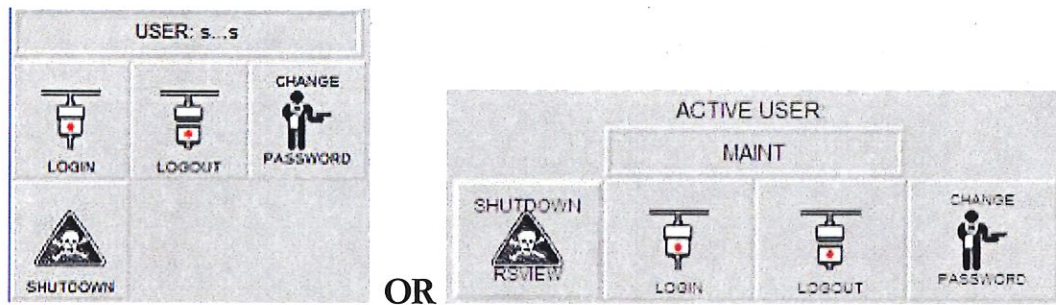
Station 11 Control Screen

This screen is the main control screen for Station 11. The puller carts can be enabled and disabled within this screen. The status for each cart is viewable here. The operator can run the chain conveyors or operate the rollers within Stations 10 and 11 from this screen.



Security – Engineering and Maintenance

SECURITY LOGIN AND LOGOUT CONTROL



There can be two login codes: one for Engineering and one for Maintenance. The touch button activates a login and logout screen. A security code is required for authorized personnel. The box above the login and logout touch buttons indicates the active user.

LOGIN:

Authorized personnel will have a code number in which to enter obtaining access to specific screens.

- **USER NAME (Keypad):**
Default user name – eng

ACTIVE USER:

The ACTIVE USER indicator will identify the person who has login to the recipe files.

LOGOUT:

This touch button logs out the authorized personnel.

CHANGE PASSWORD: Password Protected

The touch button will only appear if a proper login has been identified.

The authorized personnel can change the password to retrieve restricted screens.

- **PASSWORD (Keypad):**
(Default password – 1000)

Alarm Reset

The **ALARM RESET** will pop up on the screen alerting the operator of a possible fault.



ACKNOWLEDGE (ACK) ALARMS:

The ACK ALARM button will acknowledge the highlighted alarm to the system.

ALARM RESET

If an alarm is activated, and the problem has been corrected, the operator can press the ALARM RESET button to reset the alarm. Otherwise the button is identified with NO ALARM.

EXIT

The *EXIT* button will return the operator to the Main HMI operating screen.

