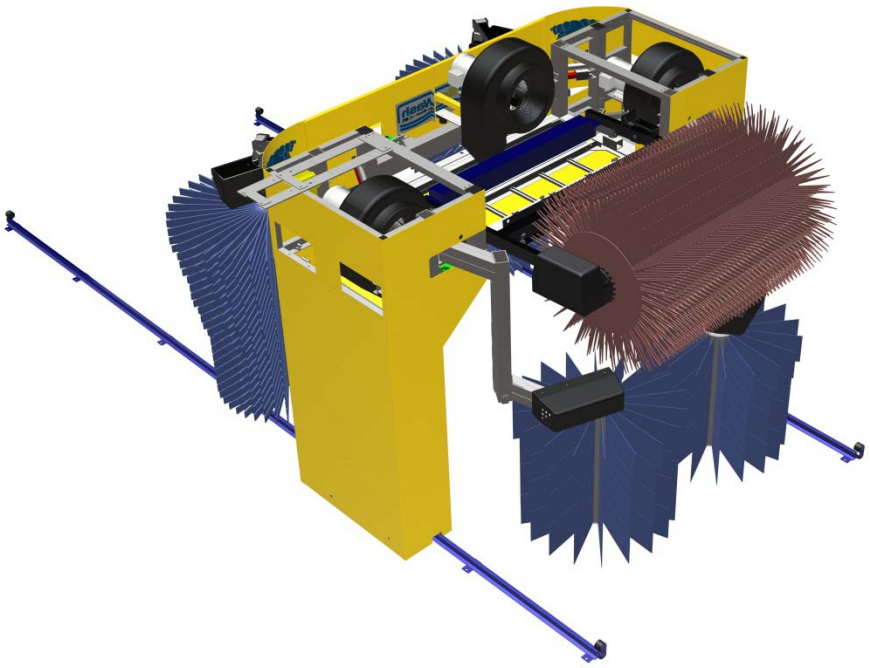
IMPORTANT! This manual is currently undergoing complete revision. The following information may not be completely accurate for your application. If you have any questions, please call an Oasis Service Technician at 800-892-3537. Thank you!

i5 In-Bay Automatic



Operation Manual

Oasis Car Wash Systems, Inc.
1909 E 12th Street
Galena, KS 66739

i5.2M16.00

TABLE OF CONTENTS

INTRODUCTION

This Owner's Manual contains information that is vital to the successful installation, operation, and maintenance of your BayWash i5 vehicle washing equipment.

Please read the full content of this manual prior to any installation and/or operation of the equipment. Keep this manual in a location where it may be used for ongoing reference.

Should you have any questions on the operation or servicing of this equipment please contact us directly at:

TECHNICAL SERVICES DEPARTMENT

OASIS CAR WASH SYSTEMS

1909 E 12th STREET

GALENA, KS 66739

TOLL FREE (US) PHONE: 800.892.3537 ext: 26 FAX: 620.783.5735

partsdept@oasiscarwashsystems.com

SAFETY REQUIREMENTS

1. *Only those employees specifically instructed by the location manager will be permitted to enter the wash bay to perform inspections or maintenance.*
2. *Do not enter the wash bay when the equipment is operating.*
3. *Always exercise caution when walking through the wash area, may be slippery conditions.*
4. *Be cautious when walking through the bay to avoid running into or tripping over equipment.*
5. *Do not ever run through the wash area.*
6. *Do not perform any work on equipment unless you performed Lock-Out Safety Precautions.*
7. *When maintenance requires that a piece of equipment be in operation, one qualified maintenance person must stay at the power disconnect switch while that equipment is operating.*
8. *All electrically powered equipment must have manually operated disconnects capable of being locked in the "OFF" position. Equipment that has been "locked out" for any reason can only be restarted by the person who performed the "lock out" operation.*
9. *Do not attempt to repair or adjust any pressurized liquid or pneumatic part, hose, pipe or fitting while that equipment is in operation.*
10. *Any "Stop" switch activated must be reset only by the person who initiated the operation.*
11. *Electrical connections and repairs are to be performed only by a Licensed Electrician Only.*
12. *Store all cleaning and washing solutions and oils in a well ventilated area.*
13. *Clean up fluid spills immediately to prevent hazardous safety conditions.*
14. *Be certain to follow all safety procedures on MSDS Sheets for each chemical product used.*
15. *All new employees must be thoroughly trained in safe operating and maintenance practices.*
16. *All employees must attend periodically scheduled safety procedure sessions.*
17. *Do not operate any piece of equipment that requires safety covers with those covers removed or improperly installed.*
18. *Do not allow any part of your body or other object to come in contact with moving machinery.*
19. *Do not wear loose fitting clothing around moving machinery.*
20. *At least two qualified maintenance people must be present when performing equipment repairs or preventative maintenance.*
21. *When working on any equipment that is higher than a person's shoulders, always use a fiberglass ladder that is in good condition.*

CHAPTER 1: BASIC CONCEPTS

Introduction

The BayWash i5 is a 5-brush carwash friction system. The main components of the system are:

(2) Rear brushes

(2) Front brushes

(1) Counter-weighted top brush

(2) Spinner wheel cleaners

Rear Brushes

The rear-brush design features a restricted universal joint and dampening shock system that delivers safe navigation around mirrors, antennas, and rear wiper blades.
The brush spins with the direction of travel of the vehicle so the brush will rotate off the front of the vehicle and not try to climb the hood.

Front Brushes

They are used to clean the side surfaces of a vehicle from the rocker panels to the body moldings on the tallest SUV's as well the front end of vehicles.
The brush spins opposite the direction of travel of the vehicle to increase cleaning force and penetration.

Counter Weighted Top Brush

Thoroughly cleans the top of the vehicles, especially the hood grooves, windshield, eyebrows, around roof racks and the top one foot of the back of SUV's (only at slower conveyor speeds).
The light touch is the result of perfect balance, which is achieved by the custom designed counter weight assembly. This allows the brush to float over the vehicle with the same penetration.
The brush spins opposite the direction of travel of the vehicle to increase cleaning force and penetration.

Spinner Wheel Cleaners

Pivoting spinners with 5 nozzles (4 zero degree nozzles, 1 turbo nozzle) for maximum impact and better cleaning.

Wash Passes

A wash pass is defined as one of the steps of the wash cycle. Based on the direction of travel, passes can be classified into two categories:

Odd Passes

The gantry travels from to home position towards the end of the vehicle.

Even Passes

The gantry travels from the end of the vehicle towards the home position.

Pass 0 – Positioning the Vehicle

The gantry is not moving during Pass 0. This pass involves the process of getting the vehicle positioned correctly to start the washing cycle.

The green lights located on the front arms as well as the off-board green signs will be lit until the vehicle front tire is over the treadle switch located inside the weldment attached to the floor.
Once the vehicle is positioned correctly, the green lights are turned off, the horn will be activated, and the red lights located on the front arms as well as the off-board red signs will be lit.
If by any chance, the customer drives over the treadle switch, and the front tire is over the backup switch, the red lights will turn off, and the yellow lights will be turned on.
On the other hand, if the customer backs up and comes off the treadle switch, the red lights will be turned off, and the green lights will be turned on.
After the vehicle has been positioned correctly over the treadle switch, the red lights are turned on, and the washing cycle will be started.

Wash Packages

The BayWash i5 offers a total of 4 wash packages. Each package can have up to 10 passes.

Wash Functions

As it was mentioned before, each pass offers up to 7 functions:

(3) Chemical functions

(1) Brush function

(2) Water functions

(1) Dry function

Chemical Functions

The system offers 8 chemical functions:

Presoak (PRESOAK)

It's applied thru (4) sets of side nozzles located on the side of the gantry.

Foam (FOAM)

It's applied thru (4) sets of foaming shower head assemblies located on the upper side of the gantry.

Triple Foam (TRIPLE FOAM)

It's applied using the same shower heads used for the standard foam.

Chemical Tire Applicator (CTA)

It's applied using (2) cone nozzles located on the lower portion of the gantry.

Total Body Protector (TBP)

It's applied using (2) sets of foaming shower head assemblies located on the upper side of the gantry (exit side only).

Clear Coat Protector (CCP)

It's applied directly on the water manifold.

Brush Functions

The system offers 3 brush functions:

Side Brushes (SIDE B)

The front brushes as well as the rear brushes are activated. This function can be selected in odd passes as well as even passes.

Top Brush (TOP B)

The top brush is activated. This function can only be selected in odd passes.

Side and Top Brushes (SIDE/TOP B)

The front brushes, rear brushes, as well as the top brush are activated. This function can be selected in odd passes as well as even passes. If this function is selected on Pass 1, the rear brushes will not be activated since the vehicle has not been lubricated.

Water Functions

The system offers 4 brush functions:

City Water Rinse (CITY W)

City water is applied thru a total of (3) top water manifolds and (2) sets of side water manifolds located on the gantry.

Spot Free Rinse (SF W)

Spot free water is applied thru a total of (1) top water manifold and (2) sets of side water manifolds located on the gantry.

High Pressure Water Rinse (HP RINSE)

City water is applied thru a total of (3) top water manifolds and (2) sets of side water manifolds located on the gantry at 120 psi.

Wheel Blasters (WB)

City water / reclaim water is applied thru the pivoting spinners located on the gantry at 800 psi.

Dry Functions

The system offers 1 dry function:

Dry (DRY)

The (3) blowers are activated (2 second delay between each blower for start-up).

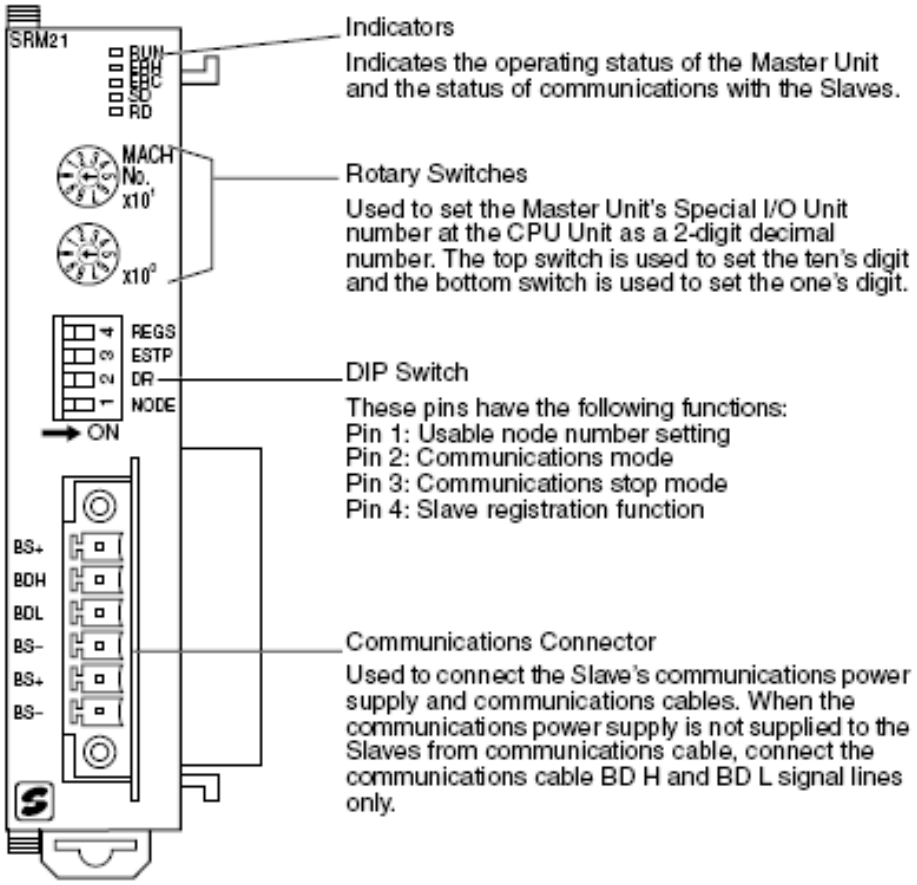
CHAPTER 2: CONTROL HARDWARE

Master Unit for CJ-series PCs

CJ1W-SRM21

A CJ1 Series basic configuration consists of a CPU, Power Supply Unit, Basic I/O Modules, Special I/O Modules, CPU Bus Modules, and an End Cover. This CJ-series PC can handle up to 40 masters, each master can handle up to 256 I/O points (128 inputs/128 outputs). The Rollover controls system provides two masters: the first master handles off-board I/O (off-board water panel); the second master handles the rest of the I/O within the machine (onboard panel).

Nomenclature



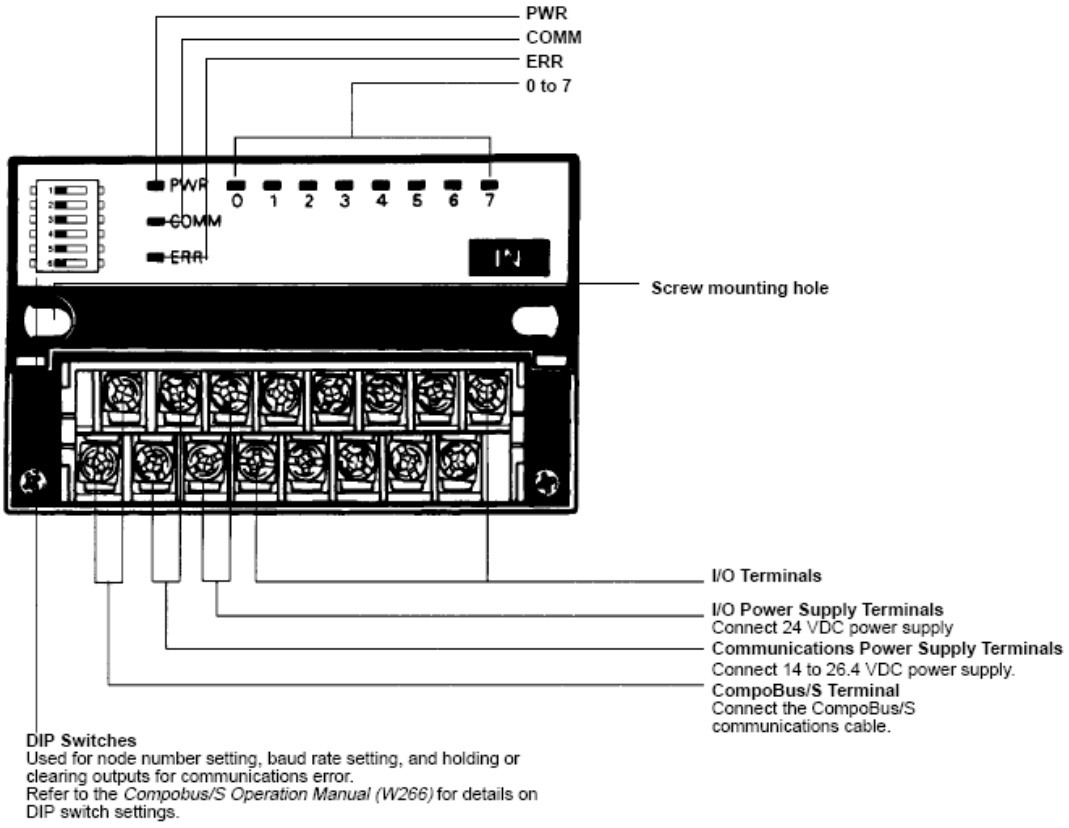
Indicator	Status	Meaning
RUN (green)	ON	The Unit is operating normally.
	OFF	Indicates one of the following conditions (the ERH and ERC indicators light when errors other than the following errors occur): Power is not turned ON, watchdog timer error, etc.
ERH (red)	ON	Indicates one of the following conditions: Errors occurring at the CPU Unit, such as Special I/O Unit number setting error.
	OFF	The Unit is exchanging data with the CPU Unit normally.
ERC (red)	ON	Indicates one of the following conditions: Master Unit internal error, communications error, or verification error
	OFF	The Slaves are communicating normally.
SD (yellow)	ON	Data is being transmitted.
	OFF	Data is not being transmitted.
RD (yellow)	ON	Data is being received.
	OFF	Data is not being received.

Transistor Remote Terminal Blocks

SRT2 modules support both high-speed communications and long distance communications. Two independent power supplies can be used because the I/O terminals are isolated from the internal circuits.

SRT2-ID16-1

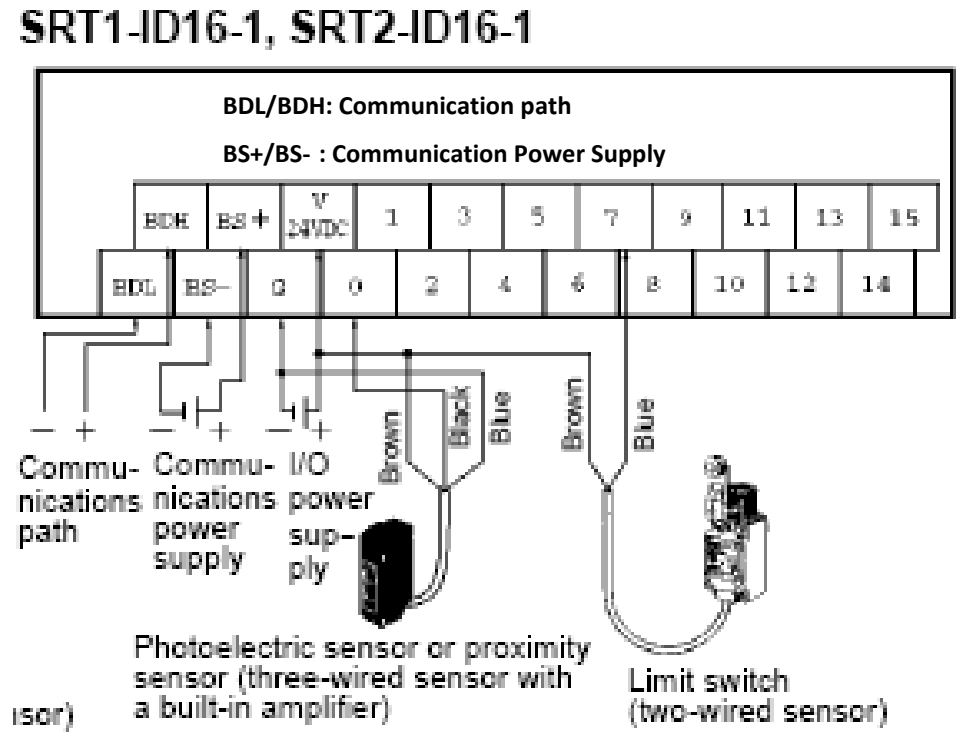
This Transistor Input Remote Terminal Block has an internal PNP input circuit common; and its rated voltage is 24 VDC. It can handle up to 16 inputs.



Nomenclature

Indicator	Display	Color	Meaning
PWR	Lit	Green	The communications power supply is ON.
	Not lit		The communications power supply is OFF.
COMM	Lit	Yellow	Normal communications
	Not lit		A communications error has occurred or the Unit is in standby status.
ERR	Lit	Red	A communications error has occurred.
	Not lit		Normal communications or the Unit is in standby status.
0 to 7	Lit	Yellow	The corresponding I/O signal is ON.
	Not lit		The corresponding I/O signal is OFF.

Terminal arrangement

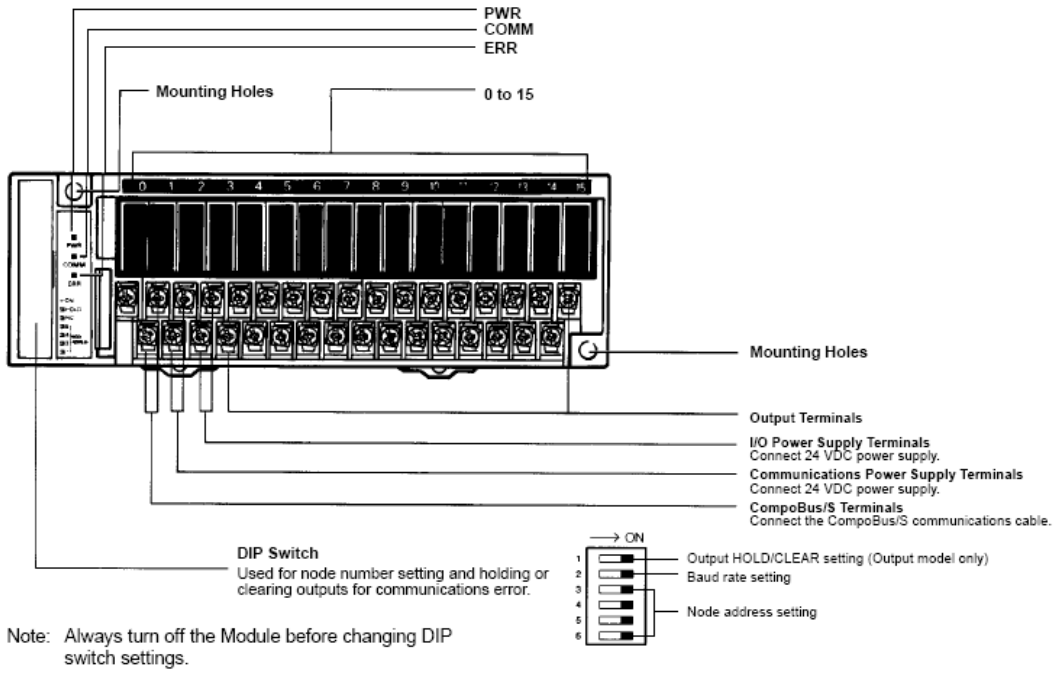


Relay Remote Output Blocks

SRT2 modules support both high-speed communications and long distance communications.

SRT2- ROC16

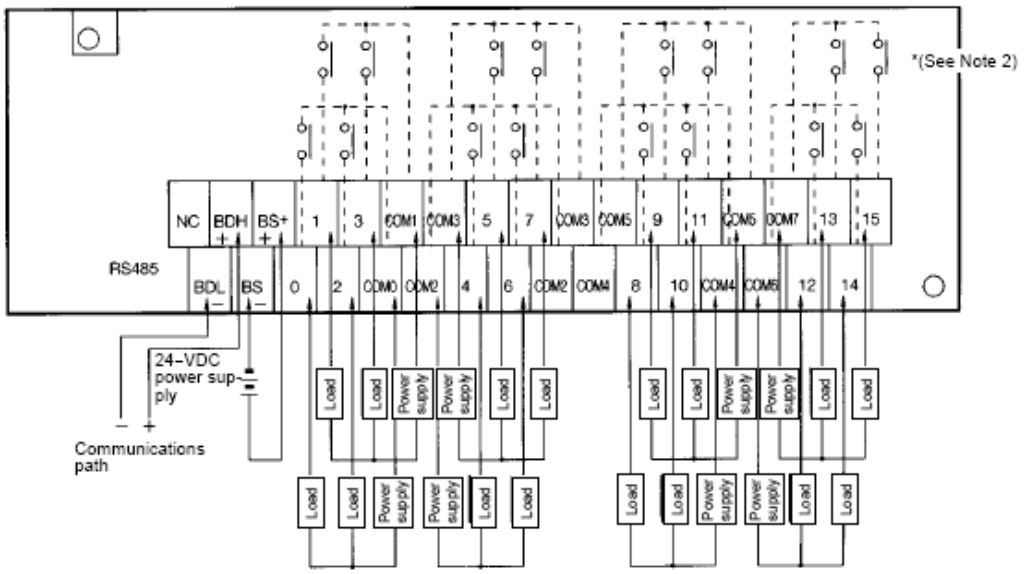
It can handle up to 16 outputs



Nomenclature

Indicator	Display	Color	Meaning
PWR	Lit	Green	The communications power supply is ON.
	Not lit		The communications power supply is OFF.
COMM	Lit	Yellow	Normal communications
	Not lit		A communications error has occurred or the Unit is in standby status.
ERR	Lit	Red	A communications error has occurred.
	Not lit		Normal communications or the Unit is in standby status.
0 to 15	Lit	Yellow	The corresponding I/O signal is ON.
	Not lit		The corresponding I/O signal is OFF.

Terminal Arrangement

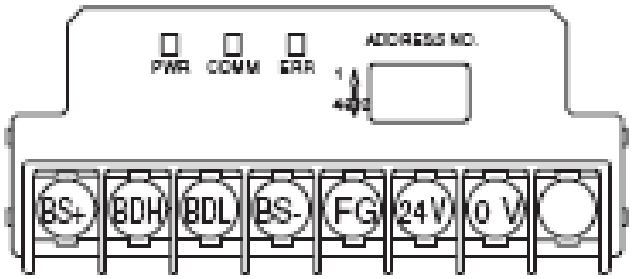


Note: 1. Dotted lines indicate internal connections.
SRT□-ROC08 and SRT□-ROF08 have the 0 to 7 and COM0 to COM3 terminals only.
2. The above is a connection example of the SRT□-ROC16 with G6D Relays mounted.
G3DZ Power MOSFET Relays are mounted to the SRT□-ROF08 and SRT□-ROF16.

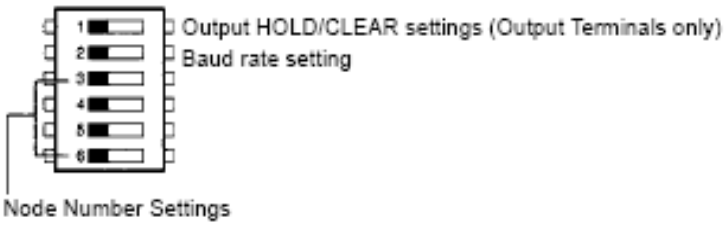
SMC Valve Bank

Model EX120 serial control up to 8 solenoid valves and receive up to 8 inputs. It offers diagnostics and troubleshooting capabilities which greatly reduce downtime.

Terminal Arrangement & Nomenclature

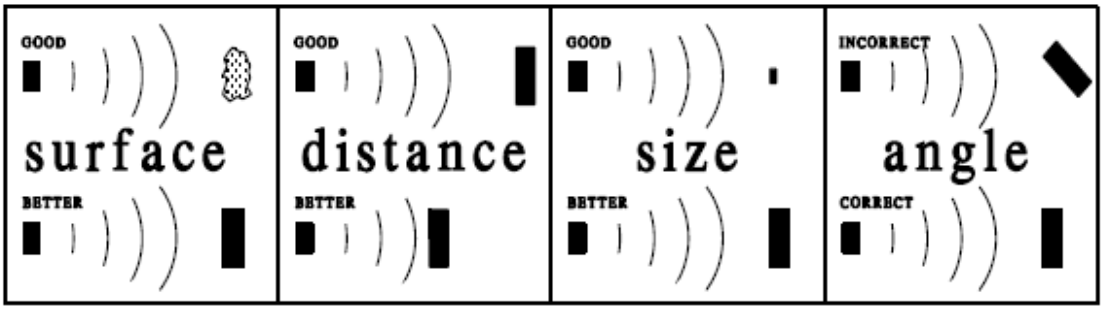


LED	Description
PWR	ON when communication power is supplied, OFF when power is OFF
COMM	ON for normal communication, OFF for abnormal communication or waiting
ERR	ON for abnormal communication, OFF for normal communication or waiting



Ultrasonic Sensor

Ultrasonic sensing is affected by several factors including the target surface, distance, size, and angle. It has an operating range of 1 to 25 ft.



Wiring

The ultrasonic sensor is equipped with a six conductor cable. The sensor is powered from 24 VDC. A quality regulated linear power supply is recommended.

6 -Conductor Cable

RED	+24 VDC
BLACK	Ground
GREEN	Clock Sync.
ORANGE	4-20 mA Output
BLUE	NPN Output 1
WHITE	NPN Output 2

General Mounting

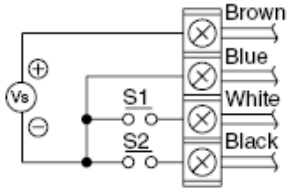
Mounting is a critical factor for successful operation of an ultrasonic sensor. Direct sunlight can affect the accuracy of the sensor when the temperature compensation is activated. If the target is more than 3-5 degrees off perpendicular, it may not be detected.

Electro-Pneumatic Regulator

The ITV regulators offer step free control of air pressure based in a 2-bit signal generated by the PLC. Internal circuitry pulses supply and release valves to maintain the desired output air pressure.

Terminal Arrangement

Preset input type



Vs: Power supply 24 VDC
12 to 15 VDC

One of the preset pressures P1 through P4 is selected by the ON/OFF combination of S1 and S2.

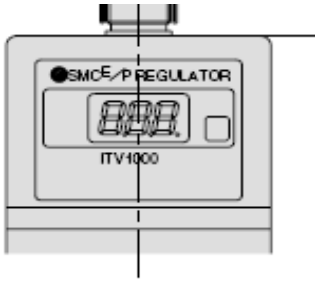
S1	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON
Preset pressure	P1	P2	P3	P4

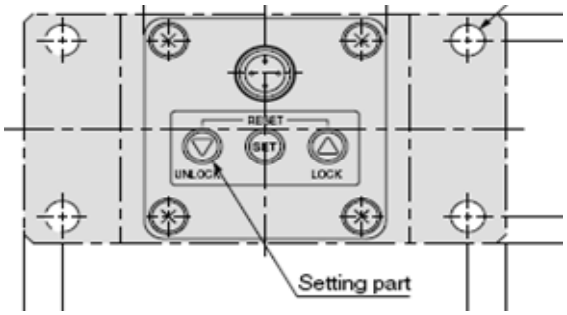
∗ For safety reasons, it is recommended that one of the preset pressures be set to 0 MPa.

Settings

You can specify the maximum pressure allowed through the electro-pneumatic regulator:

1. *Press **UNLOCK** button for 5 seconds*
2. ***Loc** start flashing on the LED display*
3. *Press **SET** button*
4. ***unL** appears for a fraction of time, meaning that the ITV has been unlocked*
5. ***P1** corresponding pressure number appears solid on the LED display*
6. *Press **SET** button to select pressure setting **(P1, P2, P3 or P4)***
7. *Once in the desired pressure, the value can be changed by using up/down arrows*
8. *Once the pressure setting has been changed*
9. *Press **SET (**To lock the ITV) until **P1** pressure is not flashing (solid)*
10. *Press **LOCK** button for 5 seconds*
11. ***unL** starts flashing on the LED display*
12. *Press **SET** button*
13. ***Loc** appears for a fraction of time, meaning that the ITV has been locked*





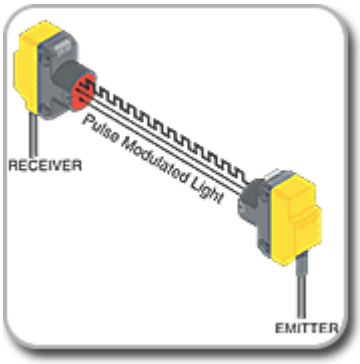
ITV DEFAULT SETTINGS

	ITV NUMBER	*P1*	*P2*	*P3*	*P4*
FRONT BRUSH DRIVERS SIDE	*1*	*30*	*25*	*30*	*0*
FRONT BRUSH PASSENGER SIDE	*2*	*30*	*25*	*30*	*0*
REAR BRUSH DRIVERS SIDE	*3*	*45*	*10*	*20*	*35*
REAR BRUSH PASSENGER SIDE	*4*	*45*	*10*	*20*	*35*

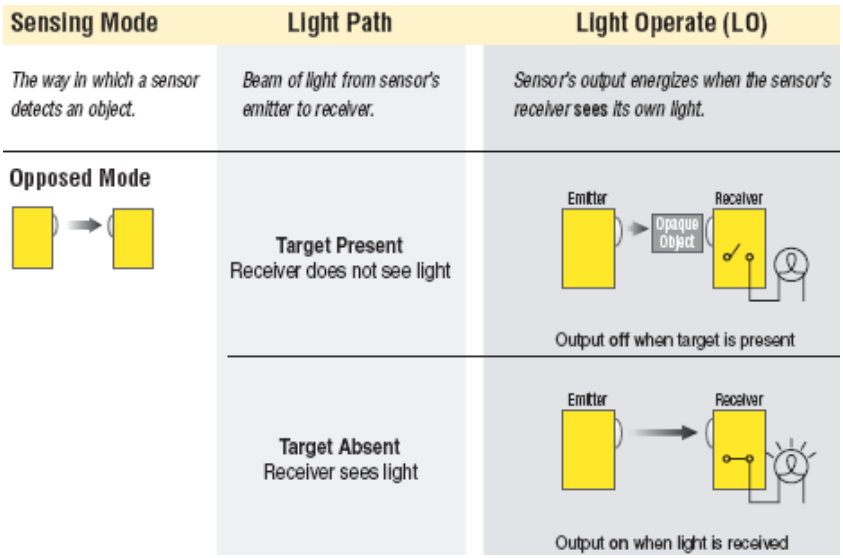
Photoelectric Sensors

A photoelectric sensor is an optical control that detects a visible or invisible beam of light, and responds to a change in the received light intensity.

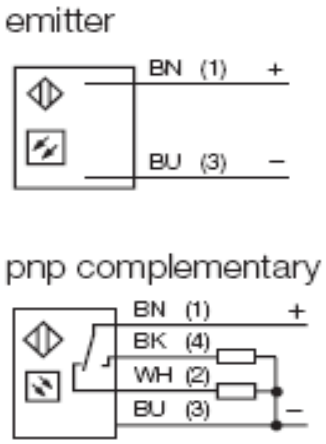
These are opposed mode photoelectric sensors (emitter and receiver required). Please reference the next figure for opposed mode photoelectric sensors set up.



These photoelectric sensors are light operated. Light-operated describes a condition in which a photoelectric sensor's output energizes its load when the sensor "sees" a sufficient amount of its own modulated light (also known as Normally Closed sensors NC). Please reference the next figure for light-operated mode.



Terminal Arrangement



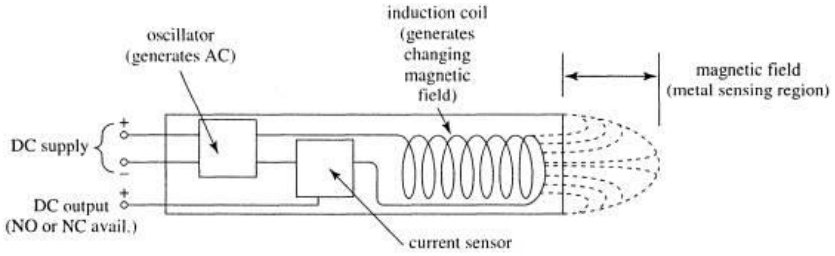
NOTE: *All the photoelectric sensors are to be wired normally closed (light operated)*

Proximity Sensors

Inductive proximity sensors operate under the electrical principle of inductance. Inductance is the phenomenon where a fluctuating current, which by definition has a magnetic component, induces an electromotive force (emf) in a target object. To amplify a device's inductance effect, a sensor manufacturer twists wire into a tight coil and runs a current through it.

An inductive proximity sensor has four components: the coil, oscillator, detection circuit and output circuit. The oscillator generates a fluctuating magnetic field the shape of a doughnut around the winding of the coil that locates in the device's sensing face.

When a metal object moves into the inductive proximity sensor's field of detection, Eddy circuits build up in the metallic object, magnetically push back, and finally reduce the Inductive sensor's own oscillation field. The sensor's detection circuit monitors the oscillator's strength and triggers an output from the output circuitry when the oscillator becomes reduced to a sufficient level.



There are 6 proximity sensors used within the BayWash i5:

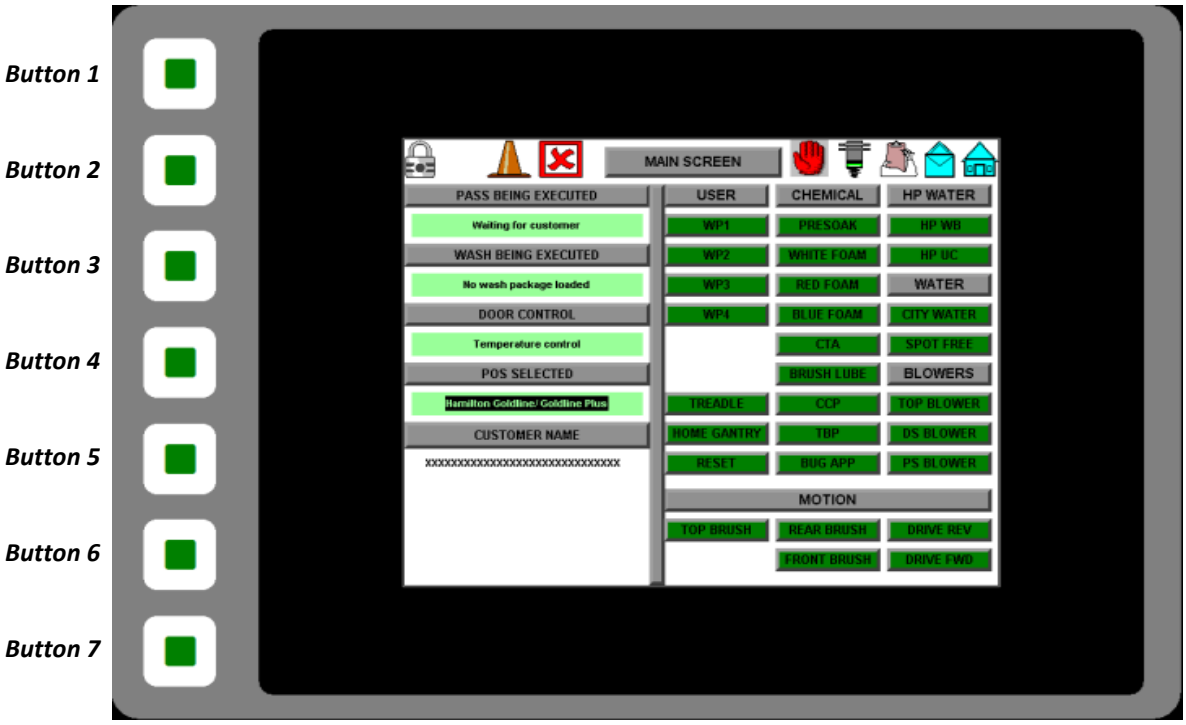
- *two gantry end of travel forward/reverse (30 mm)/ (NC)*
- *two on the top brush (30 mm)/ (NO)*
- *two on the rear brushes passenger/ driver side (30 mm)/ (NO)*

Gantry Encoder

A NEMA 4X hollow shaft encoder is used to position the gantry during traveling. Each count is equivalent to 1.25 inches.

CHAPTER 3: USER INTERFACE

HMI Side Buttons



Button 1 MAIN SCREEN

Button 2 MOTION SCREEN

Button 3 DATA SCREEN

Button 4 ALARM SCREEN

Button 5 COUNTER SCREEN

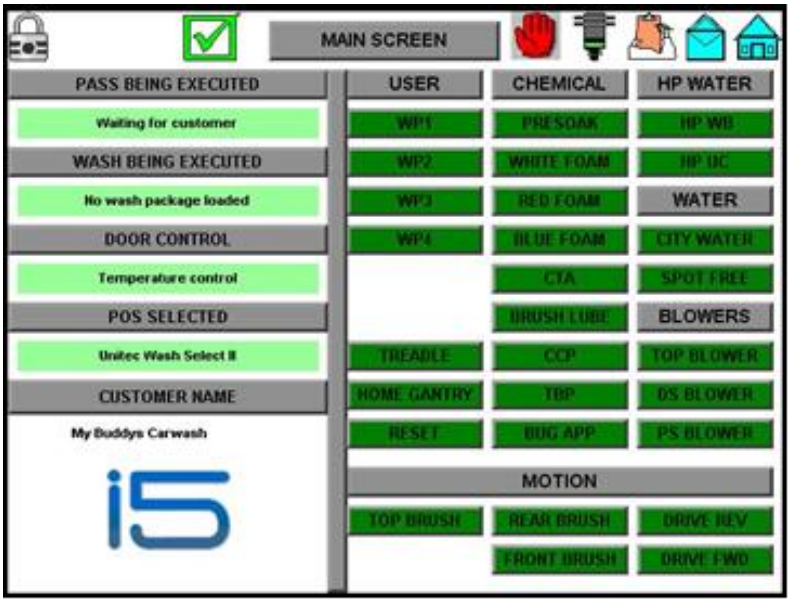
Button 6 SETTING MENU SCREEN

Button 7 TEST I/O SCREEN

Access Main Screen

Step	Action	Screen Display
1	To gain access to the main screen press the key icon 	
2	Press "**LOGON**" and enter the generic username and password User name: user Password: user Press **ENTER** when finished	

Main Screen Icons



Lock HMI

Auto Mode

Manual Mode

Alarm

Customer Information

Online Help Request

Machine Ready For Wash

Encoder Mode

Back up Encoder

Calibration Screen

Main Menu

This is the main screen for the touch-screen panel. From this screen the user can:

1.- Lock interface

2.- Select auto/manual mode

3.- Identify alarms

4.- Review customer information

5.- Request online help support

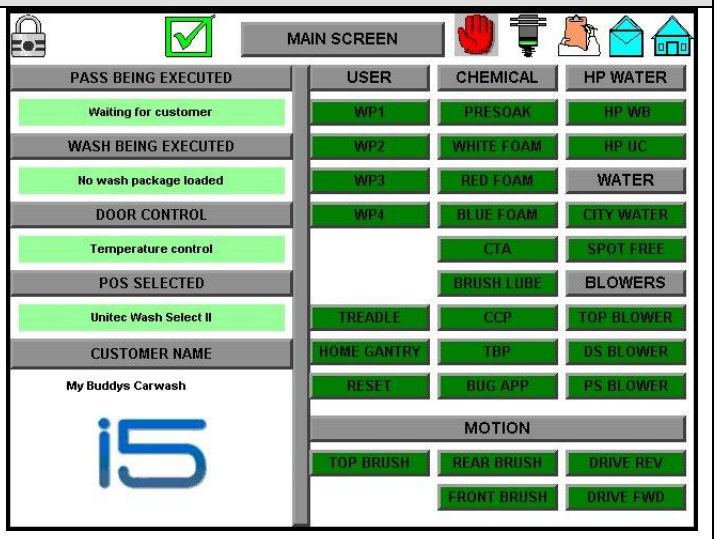
6.- Identify if the machine is ready for a wash

7.- Home the machine

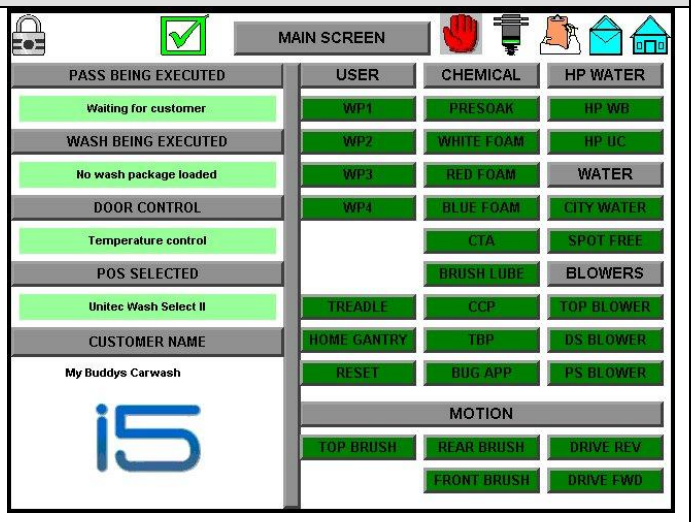
8.- Override outputs/inputs

9.- Switch to back up mode

Lock Interface

Step	Action	Screen Display
1	*Press lock icon on screen* 	

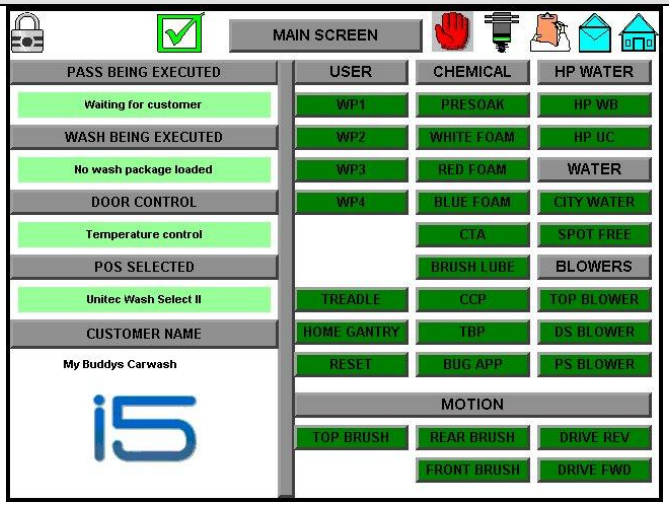
Select Auto/Manual Mode

Step	Action	Screen Display
1	Press check box icon on screen  **Auto mode**  **Manual mode**	

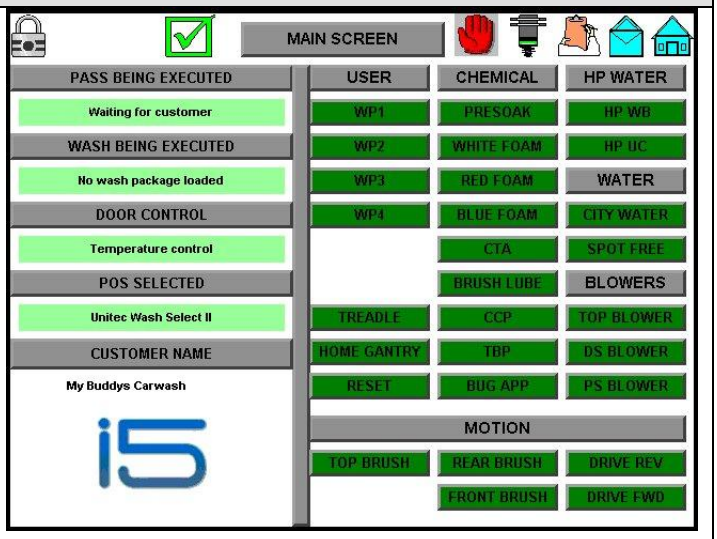
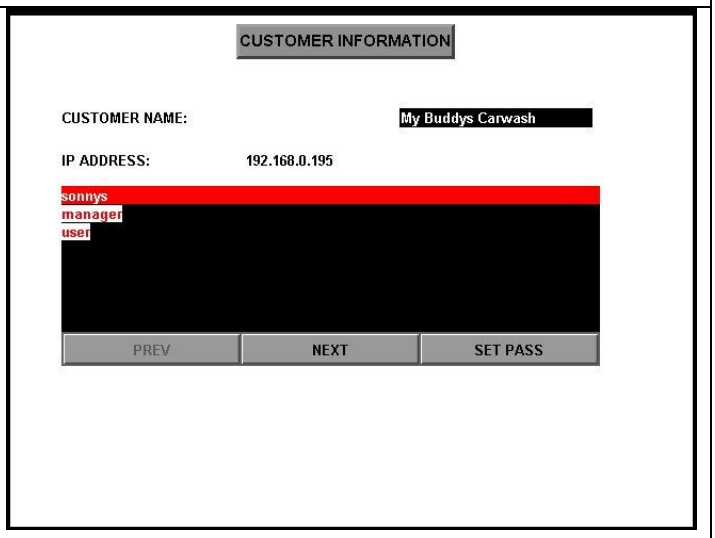
*In order to load a wash, the BayWash i5 has to be set to **Auto Mode**. In order to energize outputs from the touch-screen, the machine has to be set to **Manual Mode**. Once Manual mode is enabled, the user will be able to activate the green rectangular buttons shown on the screen to test the machine. These buttons are grouped on the following categories:*

USER	***Simulate POS inputs, machine sensors, etc.***
CHEMICAL	***Override chemical outputs.***
MOTION	***Override brush motion output, and drive motion outputs.***
HP WATER	***Override the HP water outputs.***
WATER	***Override water related outputs such as city water and spot free.***
BLOWERS	***Override blowers related outputs.***

Identify Alarms

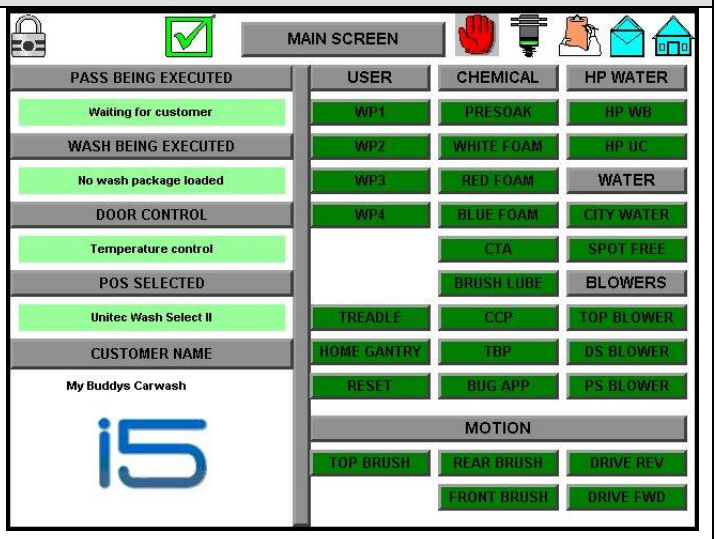
Step	Action	Screen Display
1	*If the red cone icon is present, that means that there are active alarms on the system.*  *In order to verify these alarms, press the keypad alarm button on the left side.*	

Review Customer Information

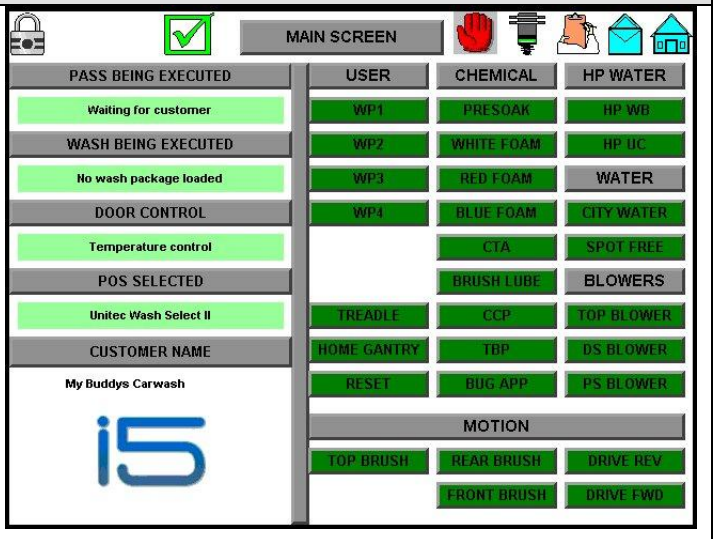
Step	Action	Screen Display
1	Press the pad icon to access the customer information 	
2		

Note: *For a list of users defined within the HMI please review the Security manager tab.*

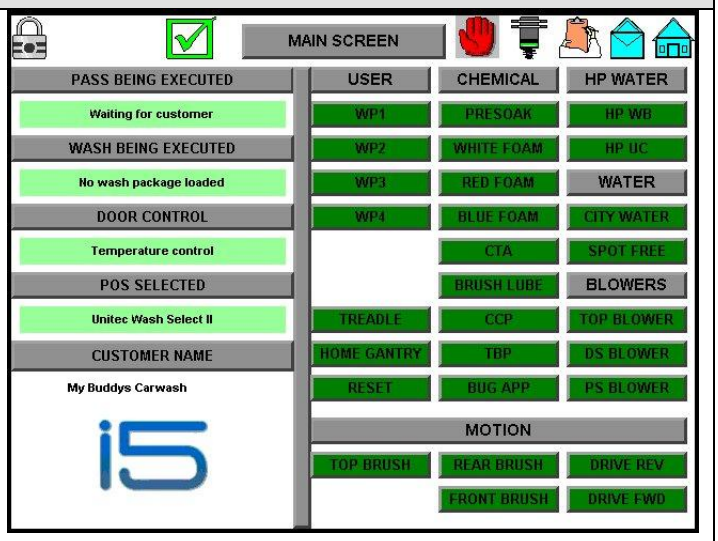
Request Online Help Support

Step	Action	Screen Display
1	*Press the mail icon to send an e-mail to Oasis' technical support online help center.* 	

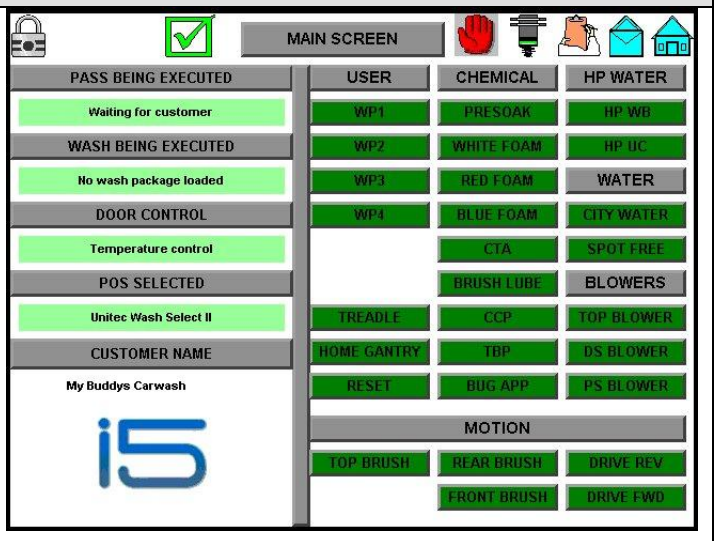
Identify if BayWash i5 is Ready for Wash

Step	Action	Screen Display
1	*If the home icon is present, that means that the machine is at home position ready to wash a car.* 	

Home the BayWash i5

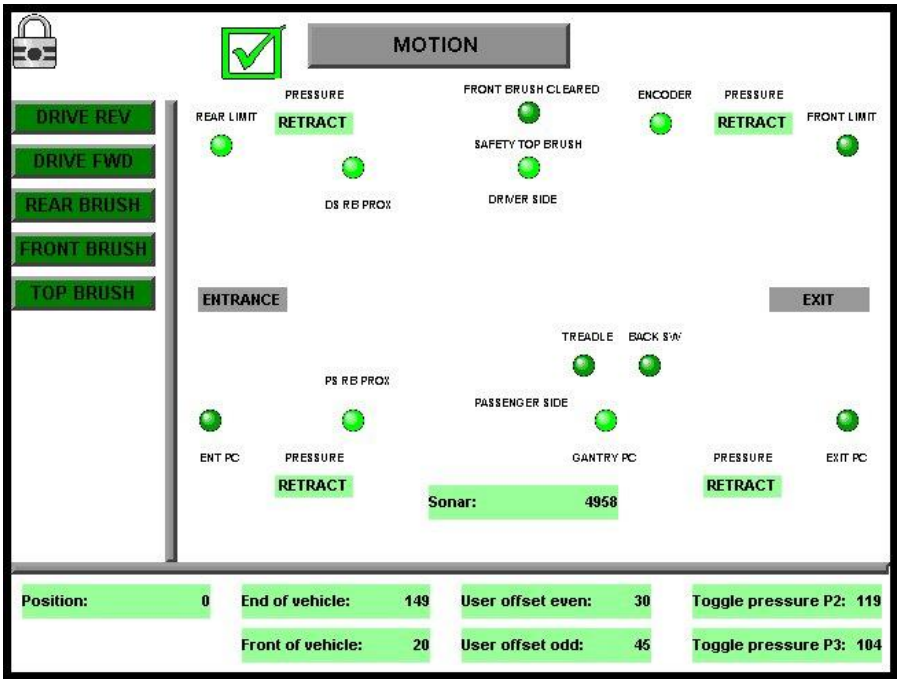
Step	Action	Screen Display
1	*Press the "**HOME GANTRY**" button (in order to home the BayWash i5, you have to make sure it is in **Auto Mode**).* 	

Override Outputs/Inputs

Step	Action	Screen Display
1	*Provided the machine is in **Manual Mode**, the user will be able to override outputs/inputs on the gantry by pressing the corresponding buttons.*	

Motion Screen

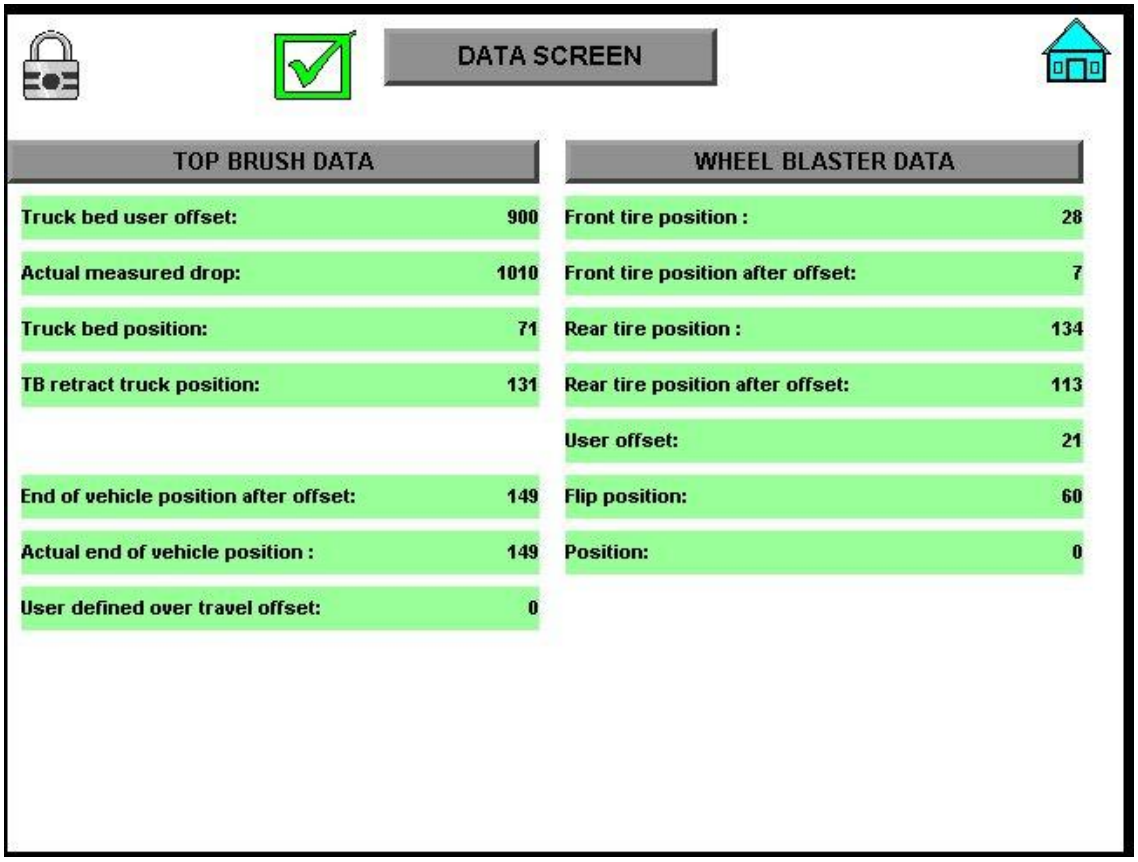
This screen allows the user to see real-time data related to the BayWash i5 motion logic while it is washing a vehicle. The motion related outputs can be overriden within this screen by pressing the buttons located at the left of the screen.



1. ***Motion output status***
   - *Gantry moving forward direction*
   - *Gantry moving reverse direction*
   - *Front brushes extended/retracted*
   - *Rear brushes extended/retracted*
   - *Top brush extended/retracted*
2. ***Motion input status***
   - *Front limit proximity sensor*
   - *Rear limit proximity sensor*
   - *Encoder*
   - *Top proximity sensors*
   - *Rear brush proximity sensors*
   - *Tire applicator photocell*
   - *Back up switch*
   - *Treadle photocell*
   - *Sonar sensor reading*
3. ***Motion data variables***
   - *Gantry position*
   - *Position to retract top brush*
   - *End of vehicle position*
   - *Front of vehicle position*
   - *Position to toggle P4 to P2 on Pass 2*
   - *Position to toggle P3 to P4 on Pass 3*

Data Screen

This screen allows the user to see real-time data related to wheel blaster feature as well as the top brush.

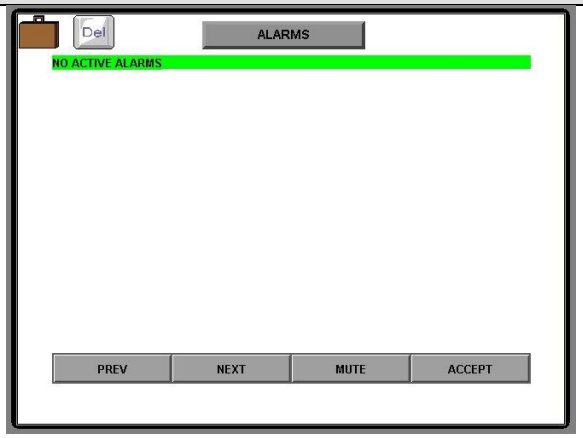
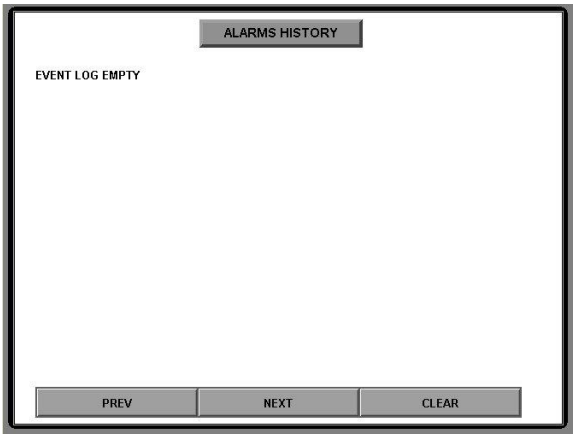


Alarm Screen

This screen allows the user to:

1. *Access the active alarms within the system*
2. *Check the alarm history*

Access active alarms within the system/alarm history

Step	Action	Screen Display
1	*Press the suitcase icon to access the alarm history log.* 	
2	*To clear the alarm history log press the "**CLEAR**" button.* 	

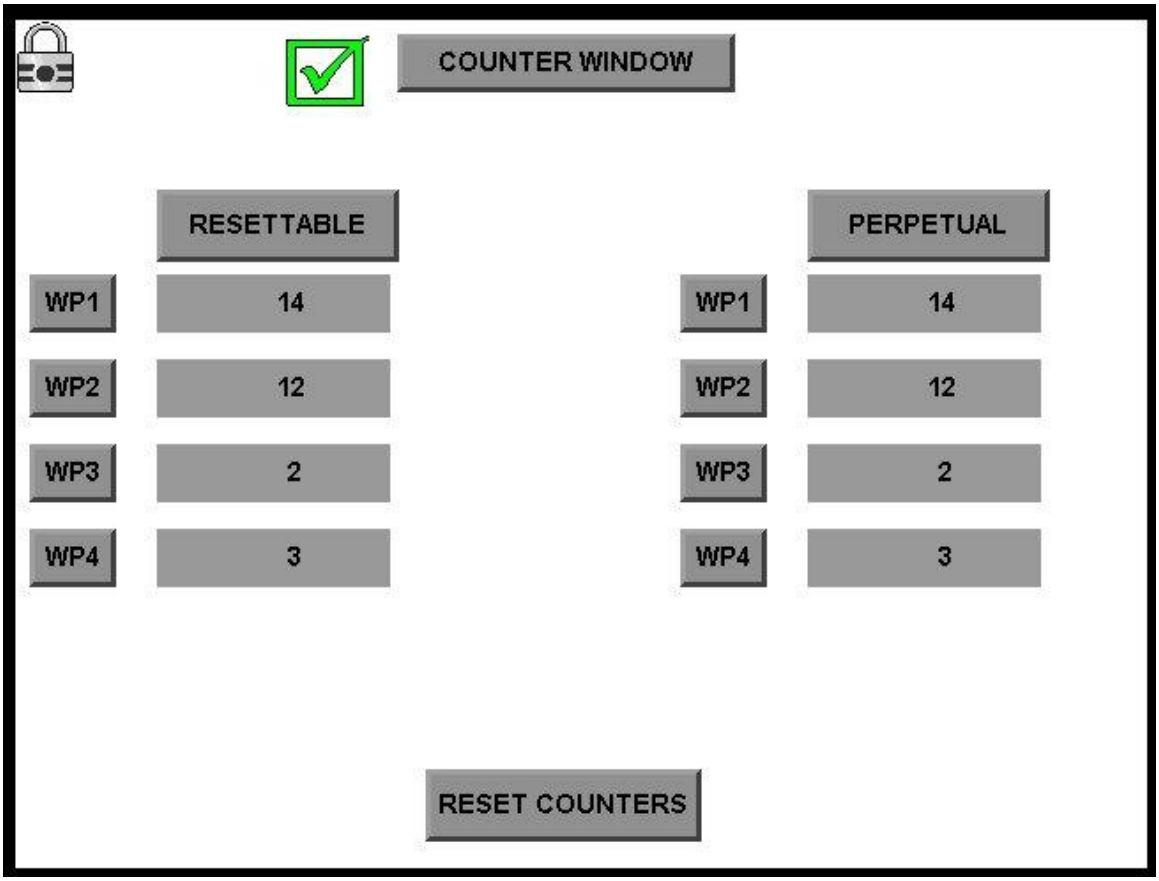
To clear an alarm:

*Press the "**ACCEPT**" button* 

*Press the "**DEL**" button* 

Counter Screen

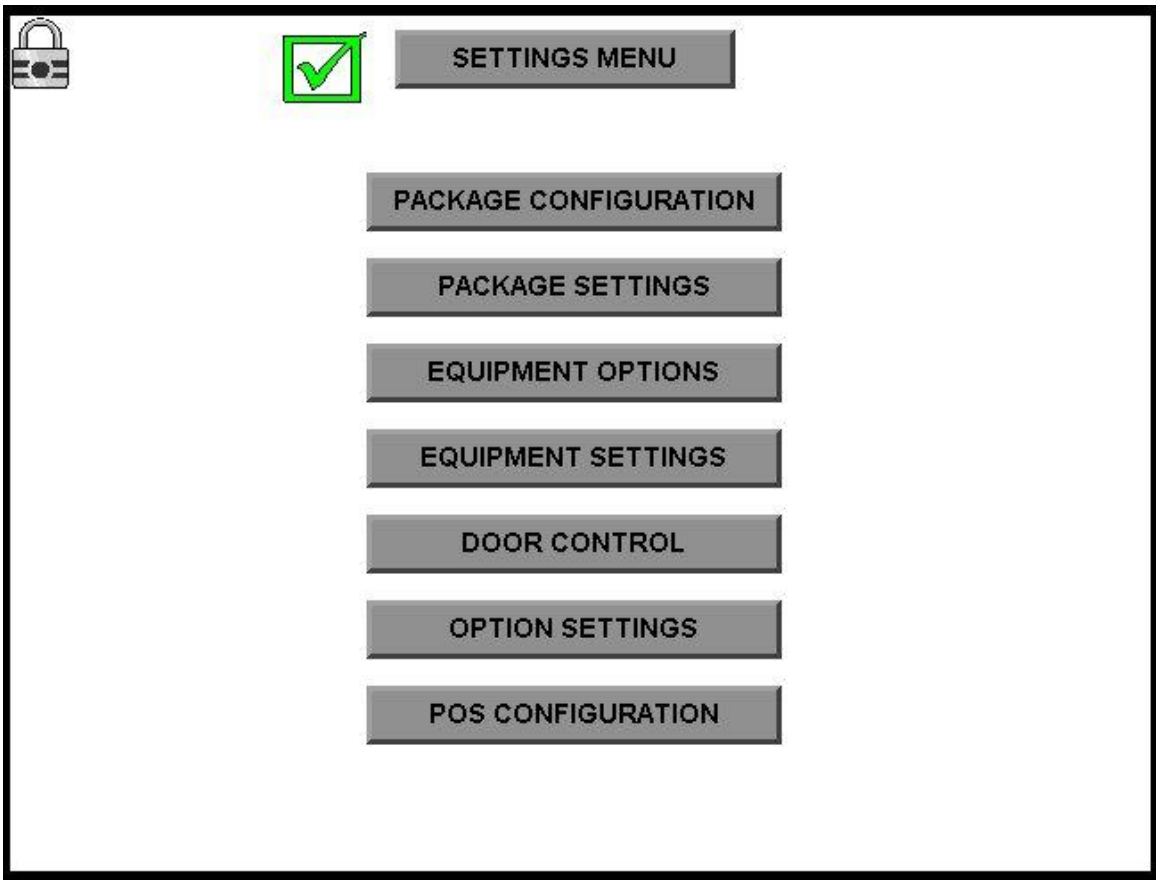
This screen allows the user to see perpetual counters as well as resettable counters per package.



In order to clear the resettable counters press RESET COUNTERS

Settings Screen

This screen allows the user to access the following menu:



Package Configuration

The BayWash i5 offers 4 wash packages fully customizable. Each wash package can be configured to have up to 10 passes. Each pass allows you to combine up to 7 different functions.

The functions are classified into different categories. The categories are:

Chemicals Category

PRESOAK: *Presoak chemical application thru side nozzles located on the exit and the entrance of the gantry frame*

FOAM: *Foam chemical application thru top mounted shower-heads located on the exit and the entrance of the gantry frame.*

TRIPLE FOAM: *Triple foam chemical application thru top mounted shower-heads located on the front and the back of the gantry frame.*

CTA1*: Low pH tire chemical applicator thru cone nozzle located on the lower exit side of the gantry frame.*

TBP: *Total body protectant application thru top mounted shower-heads located on the exit side the gantry frame.*

CTA2*: High pH tire chemical applicator thru cone nozzle located on the lower exit side of the gantry frame.*

CCP: *Clear coat protector chemical application injected directly on the water manifold.*

Brushes Category

SIDE B*: side brushes (which includes the front brushes as well as the rear brushes) for even or odd passes.*

TOP B: *top brush (only for odd passes).*

SIDE/TOP: *top brush as well as the side brushes (only for odd passes).*

Water Category

CITY W: *city water rinse thru the (4) sets of side nozzles located on the exit and the entrance of the gantry frame as well as the (4) sets of nozzles located on the top of the gantry.*

SF W: *spot free rinse thru the (2) sets of side nozzles located the entrance of the gantry frame as well as the (1) set of nozzles located on the top of the gantry.*

HP PASS: *high pressure water rinse thru the (4) sets of side nozzles located on the exit and the entrance of the gantry frame as well as the (4) sets of nozzles located on the top of the gantry (stainless steel nozzles).*

HP RINSE: *city water rinse thru the (4) sets of side nozzles located on the exit and the entrance of the gantry frame as well as the (4) sets of nozzles located on the top of the gantry. The HP rinse uses a pressure booster pump to increase water pressure to 120 psi.*

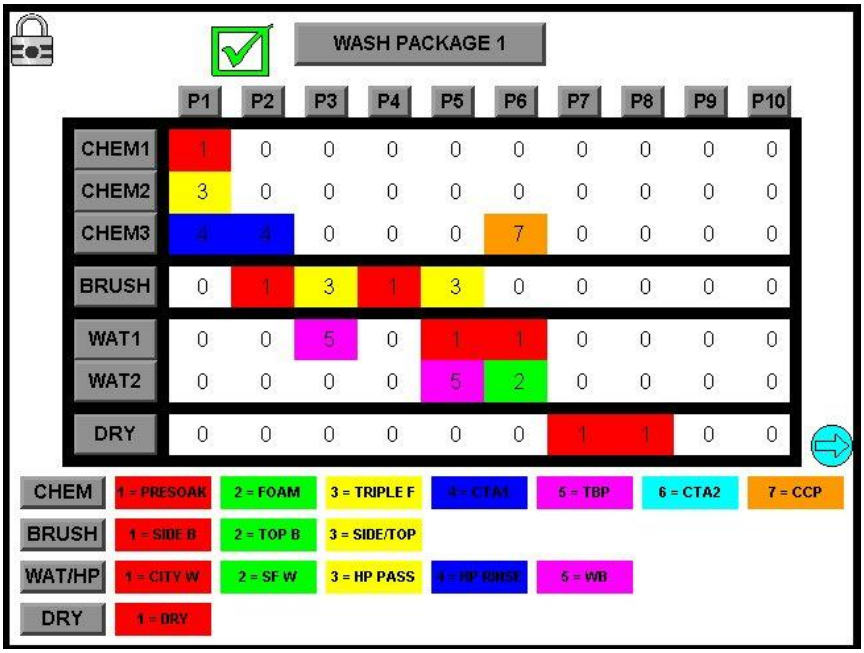
WB: *high pressure wheel cleaning.*

Dry Category

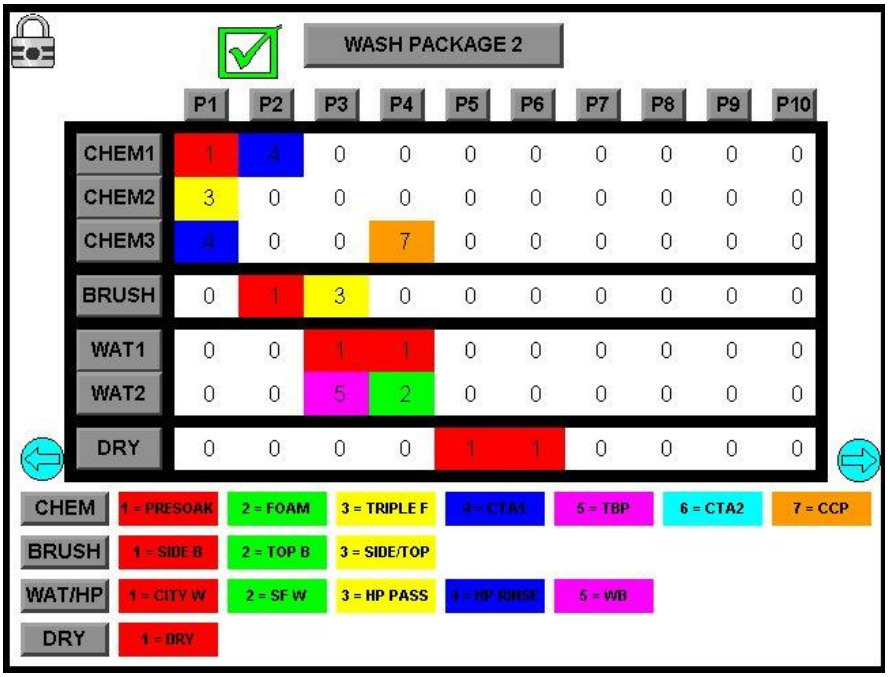
DRY: *blower pass which activates the PS, DS and top blowers.*

Factory Wash Package Configurations

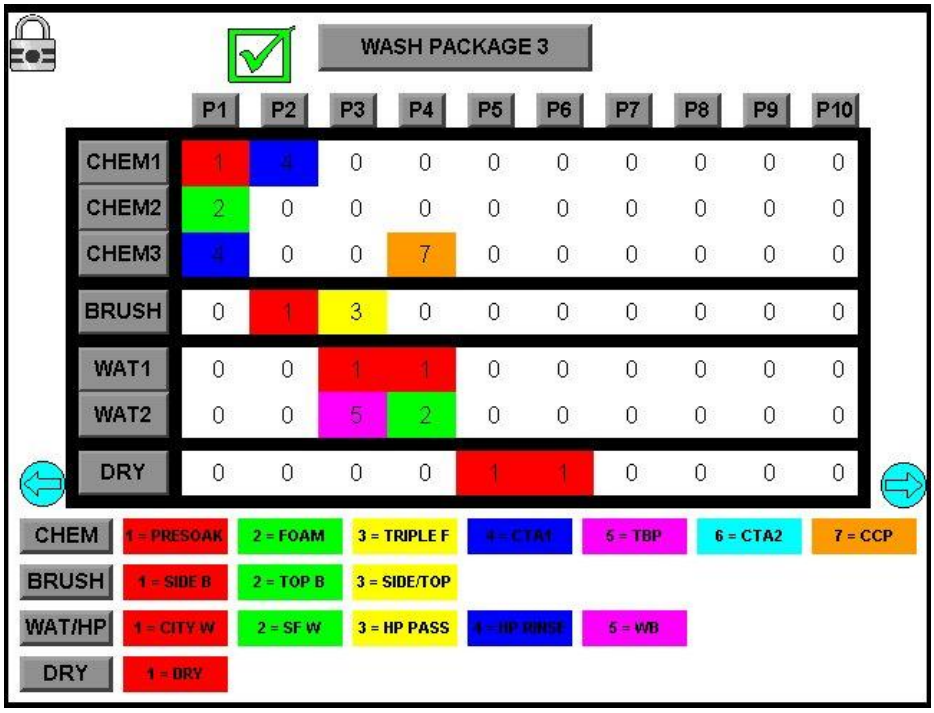
Wash Package 1



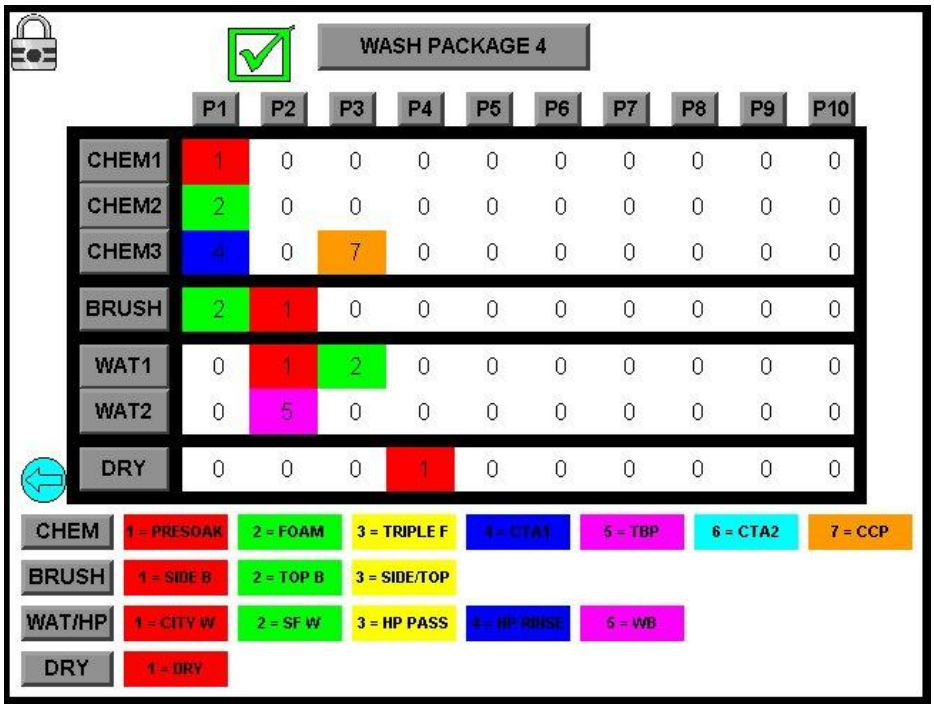
Wash Package 2



Wash Package 3



Wash Package 4



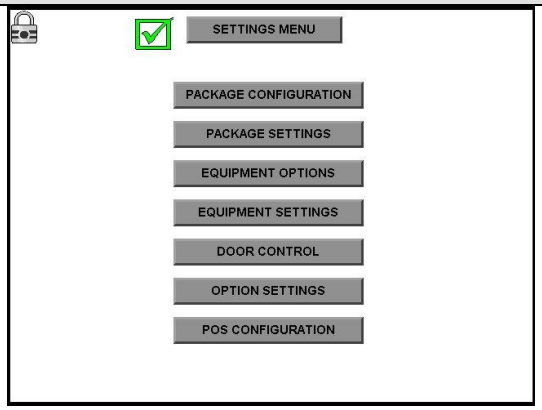
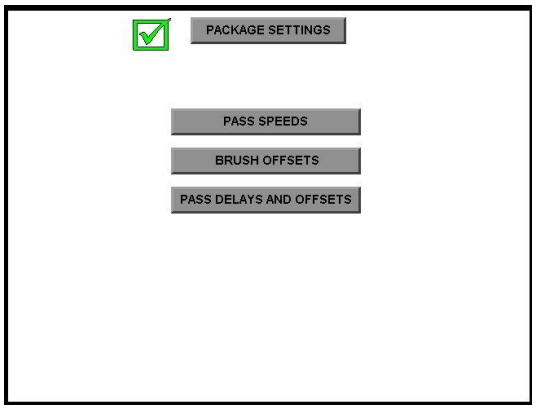
Package Settings

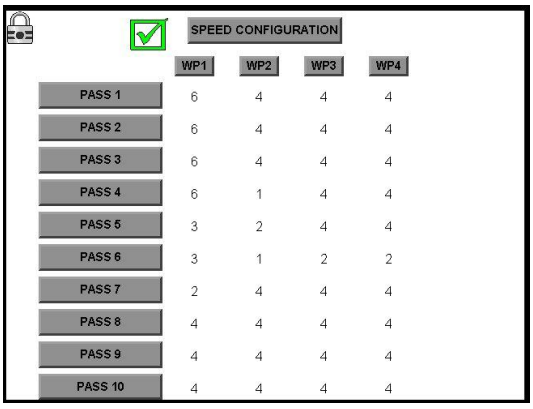
This screen allows the user to define different wash package specific related settings such as:

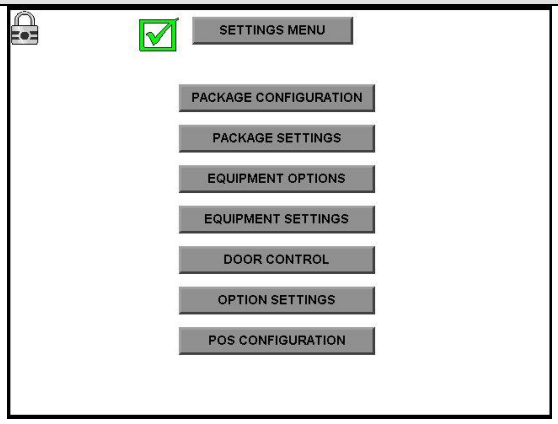
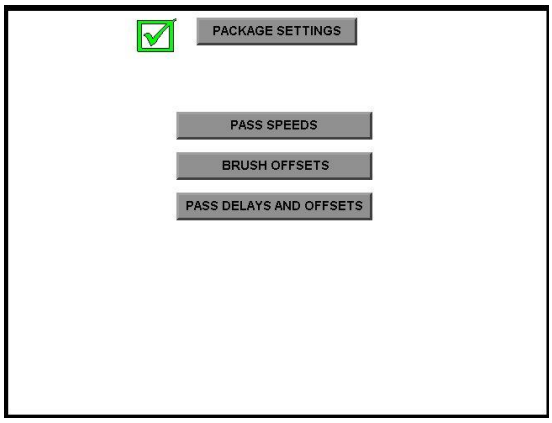
- Pass speeds

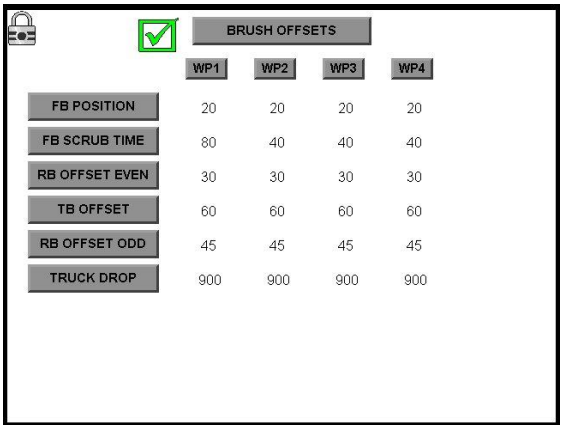
- Brush offsets

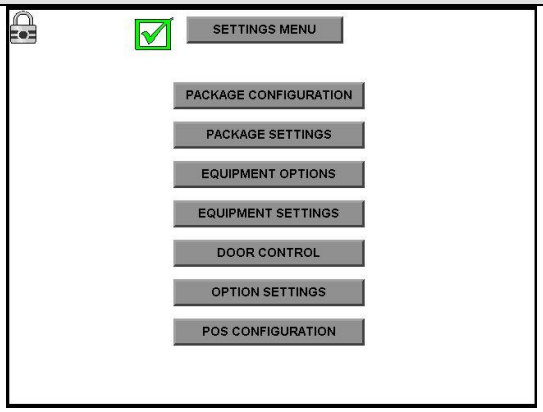
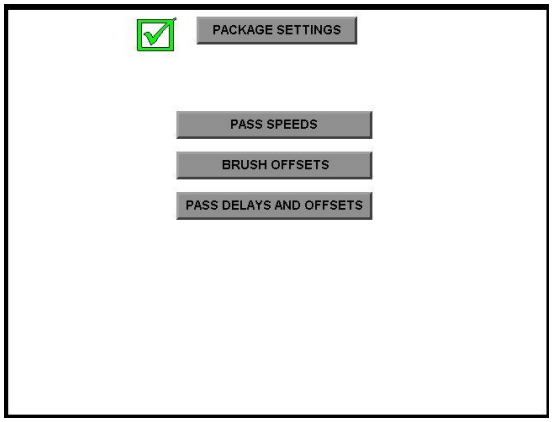
- Pass delays and offsets

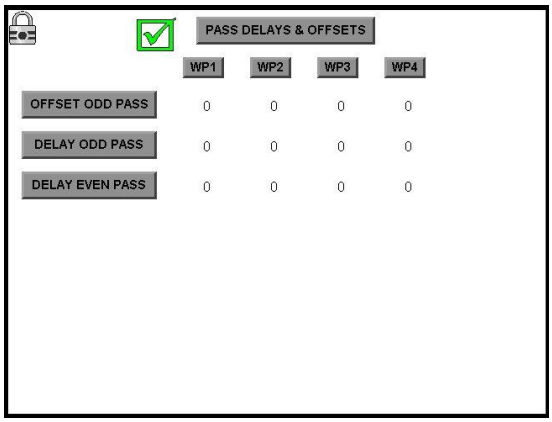
Package settings (Pass Speeds)		
Step	**Action**	**Screen Display**
1	*Press the "**PACKAGE SETTINGS**" button* PACKAGE SETTINGS	
2	*Press the "**PASS SPEEDS**" button* PASS SPEEDS	

3	*To modify a value, just tap twice on field you would like to modify.* ***1 = 10.5 Hz*** ***2 = 14 Hz*** ***3 = 17.5 Hz*** ***4 = 21 Hz*** ***5 = 28 Hz*** ***6 = 31.5 Hz***	

Package Settings (Brush Offsets)		
Step	***Action***	***Screen Display***
1	*Press the "**PACKAGE SETTINGS**" button* PACKAGE SETTINGS	
2	*Press the "**BRUSH OFFSETS**" button* BRUSH OFFSETS	

3	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

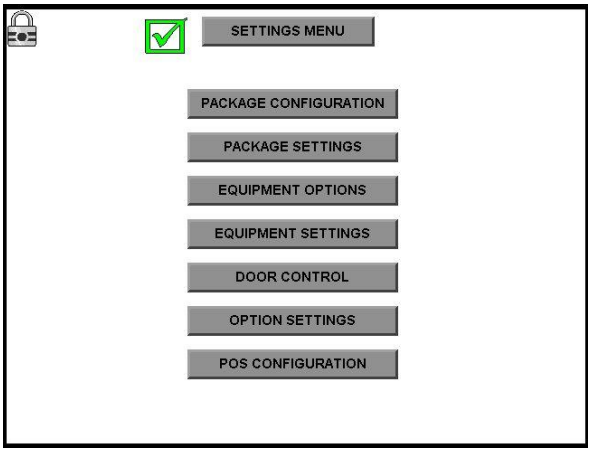
Package settings (pass delays and offsets)		
Step	***Action***	***Screen Display***
1	*Press the "**PACKAGE SETTINGS**" button* PACKAGE SETTINGS	
2	*Press the "**PASS DELAYS AND OFFSETS**" button* PASS DELAYS AND OFFSETS	

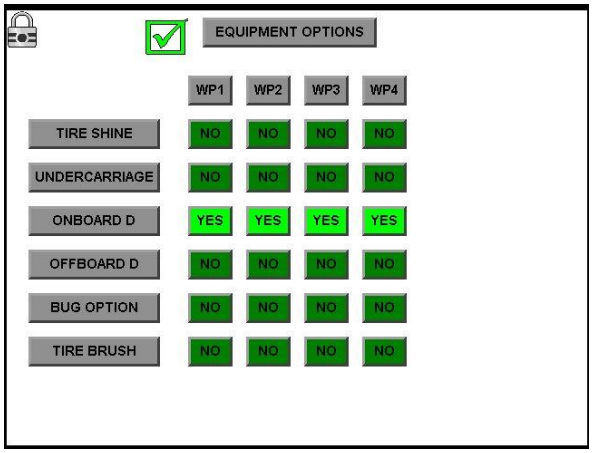
3	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

Equipment Options

This screen allows the user to define different off-board equipment options per wash package such as:

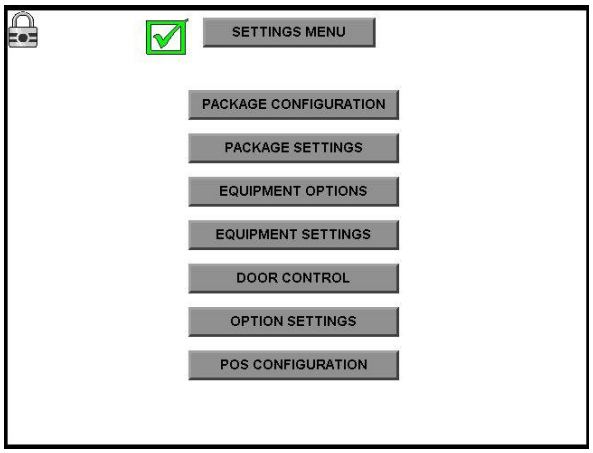
- *Tire shine*
- *Undercarriage*
- *Onboard dryers*
- *Off-board dryers*
- *Bug option*
- *Tire brush*

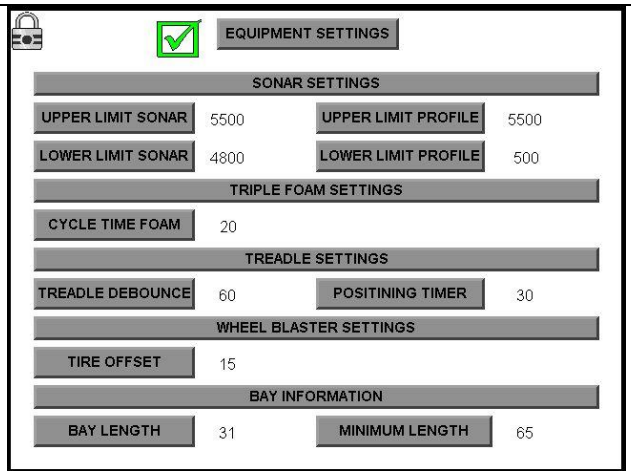
Equipment Options		
Step	***Action***	***Screen Display***
1	*Press the "**EQUIPMENT OPTIONS**" button* EQUIPMENT OPTIONS	

2	*To modify a value, just press the green buttons to enable features.* ***YES** = enabled.* ***NO** = disabled.*	

Equipment Settings

This screen allows the user to define the equipment settings: sonar settings, triple foam settings, treadle settings, wheel blaster settings, bay information.

Equipment options		
Step	***Action***	***Screen Display***
1	*Press the "**EQUIPMENT SETTINGS**" button* EQUIPMENT SETTINGS	

2	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

- ***CYCLE TIME FOAM [1/10 SEC]***

  Cycle time for triple foam configuration.

- ***TREADLE DEBOUNCE [1/10 SEC]***

  Amount of time the vehicle has to be off the treadle before the wash is terminated.

- ***POSITIONING TIMER [1/10 SEC]***

  Amount of time the vehicle has to be on the treadle before the wash starts.

- ***TIRE OFFSET [COUNTS]***

  Offset to adjust wheel blaster flip.

- ***BAY LENGTH [FEET]***

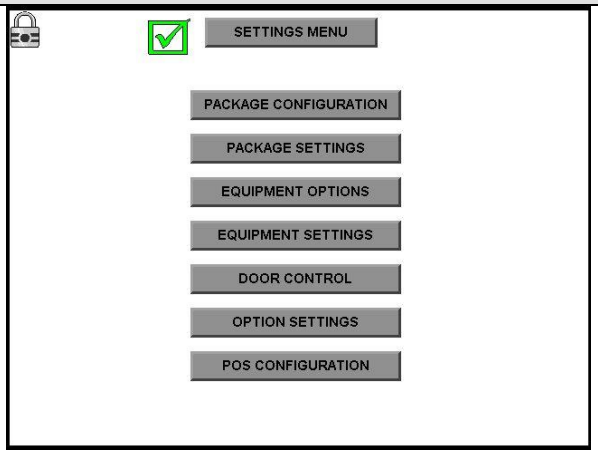
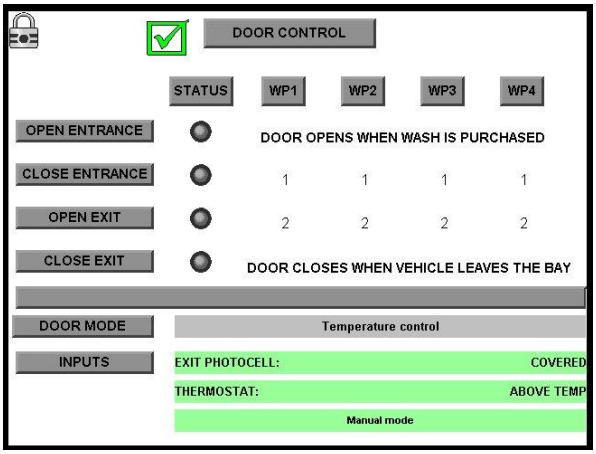
  Inside bay distance.

- ***MINIMUM LENGTH [COUNTS]***

  Minimum vehicle size that the BayWash I5 can wash.

Door Control

This screen allows the user to define in which passes the bay door would close or open. The configuration is wash package specific.

Door control		
Step	**Action**	**Screen Display**
1	*Press the "**DOOR CONTROL**" button* DOOR CONTROL	
2	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

- ***DOOR MODE***

The system offers 3 different door operating modes:

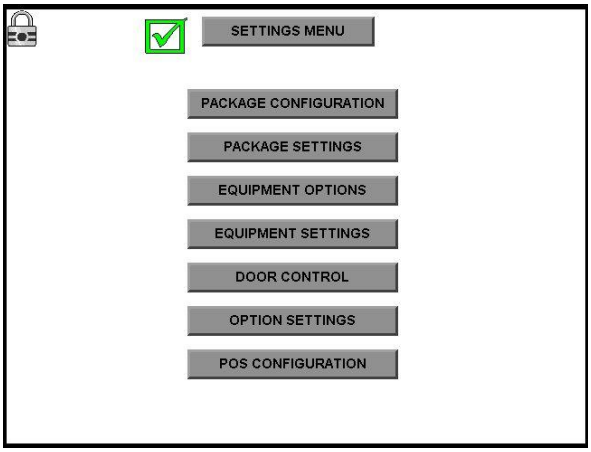
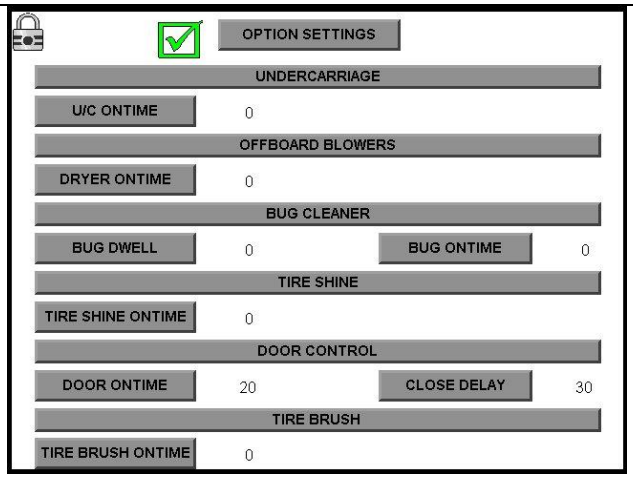
*- **Disabled:** doors are not activated.*

*- **Enabled:** doors will close and open based on the information provided by the interface, regardless of the thermostat feedback.*

*- **Temperature control:** doors will close and open based on the information provided by the interface based on the information provided by the thermostat.*

Option Settings

This screen allows the user to define the option settings: undercarriage ontime, dryer ontime, bug dwell, bug ontime, tire shine ontime, door ontime, close delay exit door, tire brush ontime.

Option settings		
Step	**Action**	**Screen Display**
1	*Press the "**OPTION SETTINGS**" button* OPTION SETTINGS	
2	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

- ***U/C ONTIME [1/10 SEC]***

  Amount of time for the undercarriage solenoid to be activated.

- ***DRYER ONTIME [1/10 SEC]***

  Off-board blower signal on-time.

- ***BUG DWELL [1/10 SEC]***

  Delay to start the wash after the bug chemical has been applied.

- ***BUG ONTIME [1/10 SEC]***

  Amount of time to for the bug chemical to be activated.

- ***TIRE SHINE ONTIME [1/10 SEC]***

  Amount of time for the tire shine signal to be activated.

- ***DOOR ONTIME [1/10 SEC]***

  Amount of time for the door signal to be activated.

- ***CLOSE DELAY [1/10 SEC]***

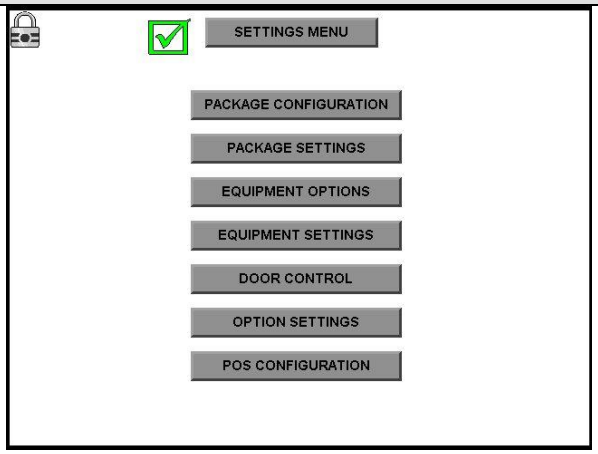
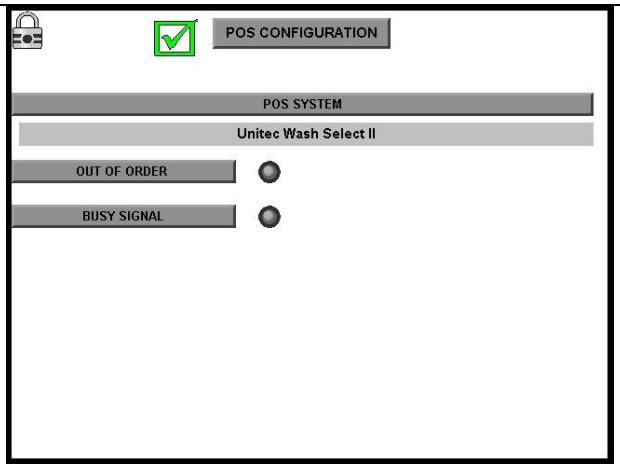
  Door close delay after the end of the vehicle has cleared the exit photocell

- ***TIRE SHINE ONTIME [1/10 SEC]***

  Amount of time for the tire brush signal to be activated

P.O.S. CONFIGURATION

This screen allows the user to define in which passes the bay door would close or open. The configuration is wash package specific.

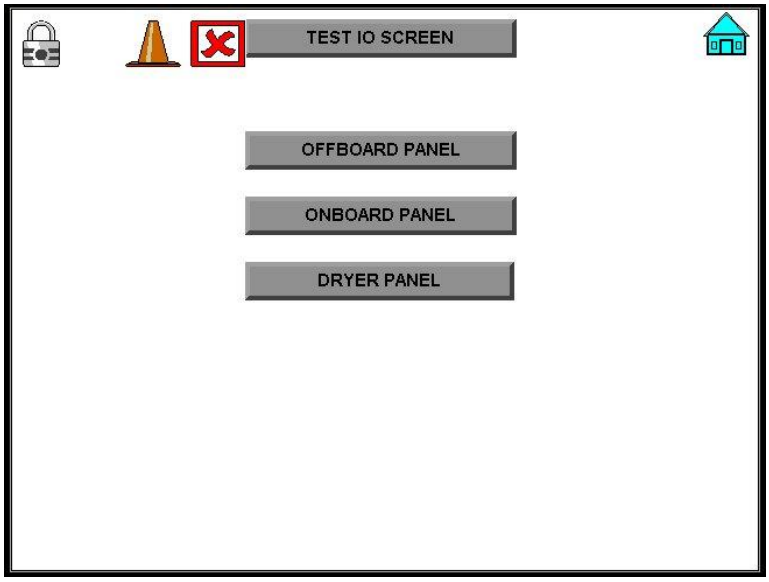
POS configuration		
Step	**Action**	**Screen Display**
1	*Press the "**P.O.S. CONFIGURATION**" button* POS CONFIGURATION	
2	*To modify a setting, press the value you would like to modify. Once the field is highlighted, press again for the pop up keypad shows up.* *Once you have entered the desired value, press **ENTER** on the keypad.*	

The interface supports the following point of sales models:

- *Hamilton ACW5*
- *Hamilton Goldline/Goldline Plus*
- *Hamilton HTK*
- *Unitec Wash Select II*
- *Unitec Portal*
- *Jim Coleman Water Wizard 2.0*

Test I/O Screen

This screen allows the user to override outputs and check input statuses by electrical panel.



1. ***Offboard Panel***

   All the outputs/inputs related to:

   - *Support equipment*
   - *Signs*
   - *Chemical solenoids*
   - *POS interface*

2. ***Onboard Panel***

   All the outputs/ inputs related to:

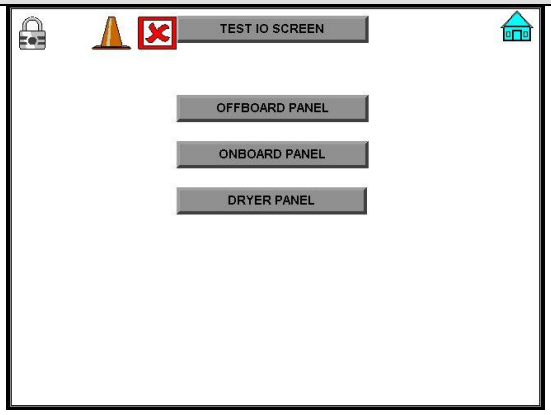
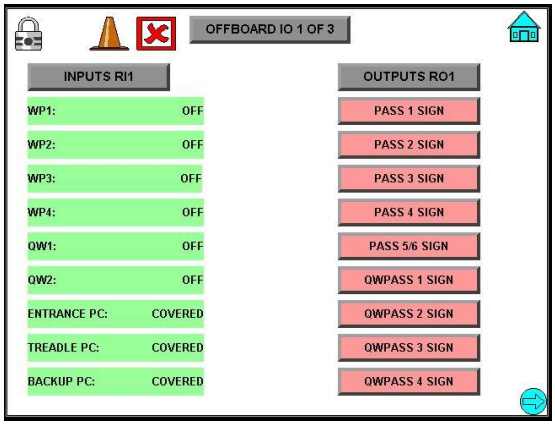
   - *Gantry drive*
   - *Side brushes/top brush*
   - *Photocell, sensors, sonar, and encoders mounted on the gantry*
   - *Pneumatic solenoids*

3. ***Dryer Panel***

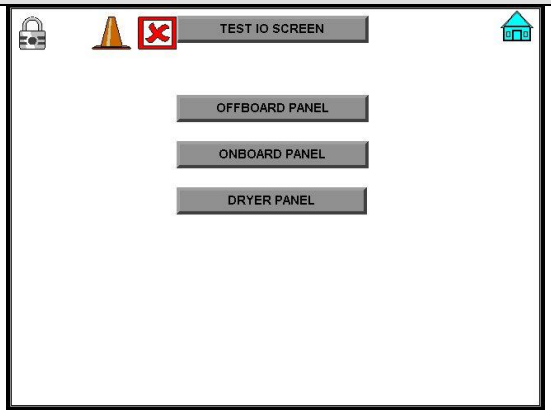
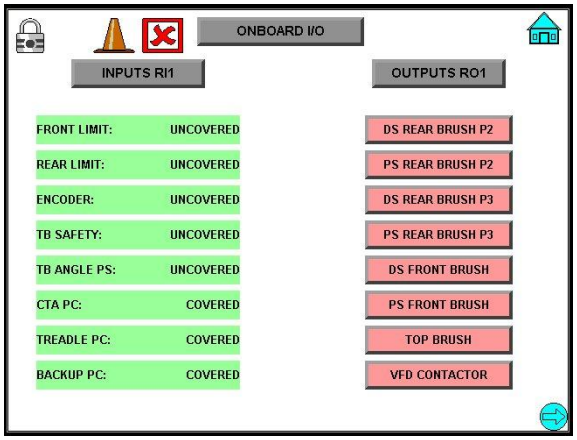
   All the outputs related to

   - *3 onboard blowers*

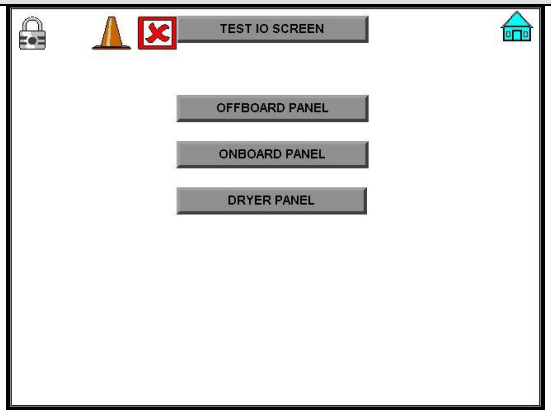
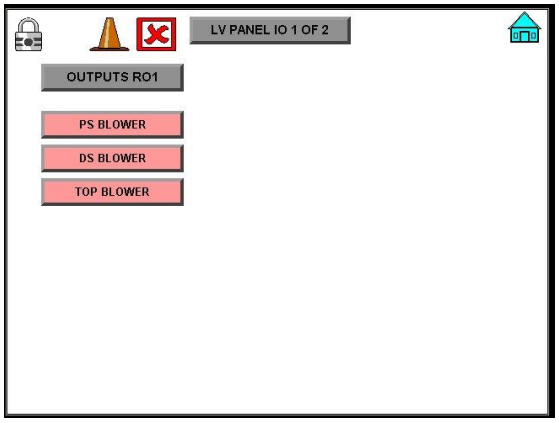
Offboard Panel

Offboard panel		
Step	**Action**	**Screen Display**
1	*Press the "**OFFBOARD PANEL**" button* OFFBOARD PANEL	
2	*To override an output, press the red buttons located under the outputs tabs. If the output is pressed, the button will display a dark red color.* *For example:* ***WATER SOLENOID OFF:*** WATER SOLENOID ***WATER SOLENOID ON:*** WATER SOLENOID	

Onboard Panel

Onboard panel		
Step	**Action**	**Screen Display**
1	*Press the "**ONBOARD PANEL**" button* ONBOARD PANEL	
2	*To override an output, press the red buttons located under the outputs tabs. If the output is pressed, the button will display a dark red color.* *For example:* ***WATER SOLENOID OFF:*** WATER SOLENOID ***WATER SOLENOID ON:*** WATER SOLENOID	

Dryer Panel

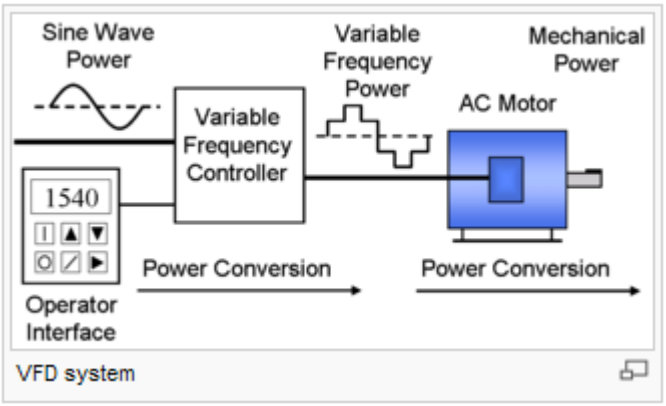
Dryer panel		
Step	**Action**	**Screen Display**
1	*Press the "**DRYER PANEL**" button* DRYER PANEL	
2	*To override an output, press the red buttons located under the outputs tabs. If the output is pressed, the button will display a dark red color.* *For example:* ***WATER SOLENOID OFF:*** WATER SOLENOID ***WATER SOLENOID ON:*** WATER SOLENOID	

CHAPTER 4: VFD INFORMATION

Variable Frequency Drive

*A **variable frequency drive (VFD)** is a system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor. A variable frequency drive is a specific type of adjustable speed drive. Variable frequency drives are also known as adjustable frequency drives (AFD), variable speed drives (VSD), AC drives, microdrives or inverter drives. Since the voltage is varied along with frequency, these are sometimes also called VVVF (variable voltage variable frequency) drives.*

A variable frequency drive system generally consists of an AC motor, a controller and an operator interface.



A variable motor drive controls the speed, torque, direction and resulting horsepower of a motor. The VFD is set up as a 2-wire control sequence. The start and stop signals, as well as the frequency reference come from a remote source (PLC).

2-wire control sequence utilizes a maintained switch or relay contact connected to the multifunction input terminals. S1 is the multifunction input terminal for forward run, S2 is the multifunction input terminal for reverse run.

The drive allows selection of different frequency references for the gantry speed control. The reference source selected to control the frequency is a 3-bit signal digital signal produced by the PLC (select up to 8 preset speeds).

VFD Display/Interface

The Digital Operator has a 5-digit LED display. Both numeric and alpha-numeric data can appear on the display. Indicators and keys on the Digital Operator are described in the following figure.

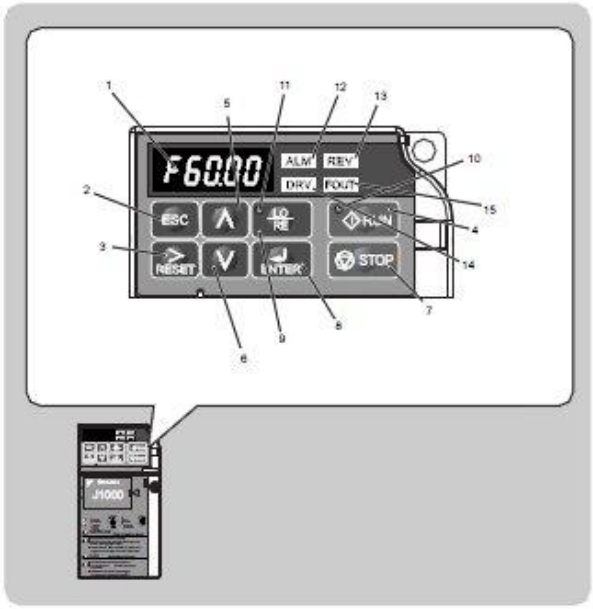


Table 4.1 Keys and Displays on the LED Operator

No.	Display	Name	Function
1	F60.00	Data Display Area	Displays the frequency reference, parameter number, etc.
2	ESC	ESC Key	Returns to the previous menu.
3	RESET	RESET Key	Moves the cursor to the right. Resets the drive to clear a fault situation.
4	RUN	RUN Key	Starts the drive.
5	∧	Up Arrow Key	Scrolls up to select parameter numbers, setting values, etc.
6	∨	Down Arrow Key	Scrolls down to select parameter numbers, setting values, etc.
7	STOP	STOP Key	Stops the drive. **Note:** Stop priority circuit. A fast-stop is available by pressing the STOP key when the drive detects a danger even if the drive is running by a signal from the multi-function contact input terminal (REMOTE is set). To avoid stoppage by using the STOP key, set o2-02 (STOP Key Function Selection) to 0 (Disabled).
8	ENTER	ENTER Key	Selects all modes, parameters, settings, etc. Selects a menu item to move from one display screen to the next.
9	LO/RE	LO/RE Selection Key	Switches drive control between the operator (LOCAL) and the control circuit terminals (REMOTE). **Note:** LOCAL/REMOTE key effective during stop in drive mode.
10	RUN	RUN Light	Lit while the drive is operating the motor.
11	LO/RE	LO/RE Light	Lit while the operator (LOCAL) is selected to run the drive.

No.	Display	Name	Function
12	ALM	ALM LED Light	*Refer to LED Screen Displays on page 57.*
13	REV	REV LED Light	
14	DRV	DRV LED Light	
15	FOUT	FOUT LED Light	

◆ Digital Text Display

Text appears on the LED Operator as shown below. This section explains the meaning of text as it appears on the display screen.

Lit	Flashing
	

Table 4.2 Digital Text Display

Text	LED	Text	LED	Text	LED	Text	LED
0	0	9	9	I	ı	R	r
1	1	A	A	J	J	S	S
2	2	B	b	K	t	T	t
3	3	C	C	L	L	U	U
4	4	D	d	M	<1>	V	v
5	5	E	E	N	n	W	<1>
6	6	F	F	O	o	X	none
7	7	G	G	P	P	Y	y
8	8	H	H	Q	q	Z	none

<1> Displayed in two digits.

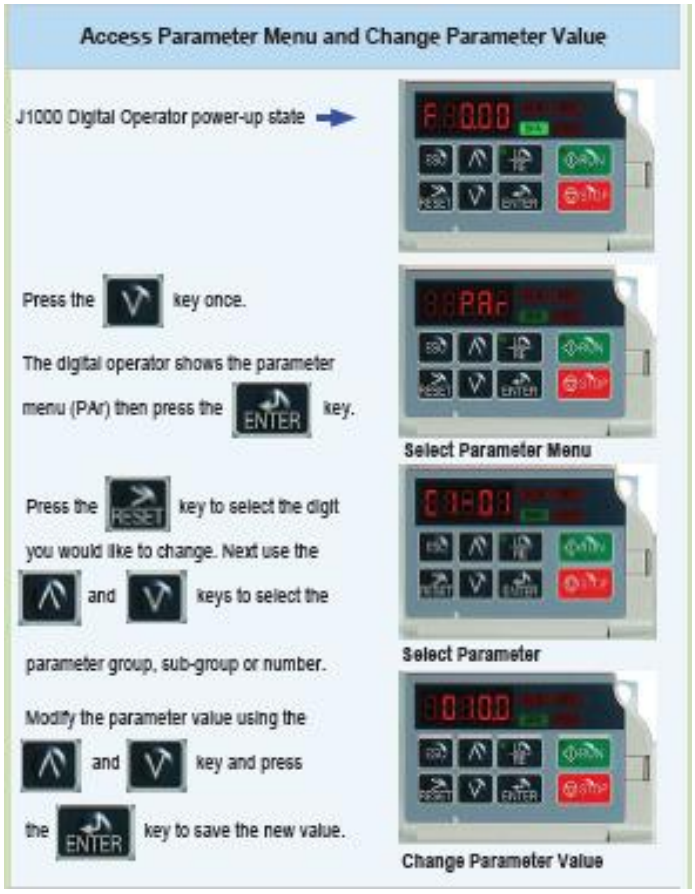
◆ LED Screen Displays

Display	Lit	Flashing	Off
ALM	When the drive detects an alarm or error	• When an alarm occurs • oPE detected	Normal state (no fault or alarm)
REV	Motor is rotating in reverse	—	Motor is rotating forward
DRV	Drive Mode	—	Programming Mode
FOUT	Displays output frequency (Hz)	—	—
As illustrated in this manual			

◆ LO/RE LED and RUN LED Indications

LED	Lit	Flashing	Flashing Quickly <1>	Off
	When run command is selected from LED operator (LOCAL)	—	—	Run command is selected from device other than LED operator (REMOTE)
	During run	• During deceleration to stop • When a run command is input and frequency reference is 0	• During deceleration at a fast-stop. • During stop by interlock operation.	During stop
As shown				

Changing VFD Parameters



Drive Motor VFD Settings

Parameter	Name	Value	Description
b1-01	Frequency reference selection	0	Switching between the multi-speed references in the d1-oo parameters.
b1-02	Run command selection	1	Control Circuit Terminal (Forward Run/Reverse Run Command for 2-Wire)
b1-03	Stopping method selection	0	Ramp to Stop
b2-02	DC Injection braking	75%	DC Injection braking current
b2-04	DC Injection braking at Stop	3	DC Injection braking at time stop
c1-01	Acceleration Time 1	0.5	C parameters are used to set the acceleration characteristics
c1-02	Deceleration Time 1	0.5	C parameters are used to set the deceleration characteristics
d1-01	Frequency Reference 1	10.5	Multi-Step Speed Selection frequency 1
d1-02	Frequency Reference 2	14	Multi-Step Speed Selection frequency 2
d1-03	Frequency Reference 3	17.5	Multi-Step Speed Selection frequency 3
d1-04	Frequency Reference 4	21	Multi-Step Speed Selection frequency 4
d1-05	Frequency Reference 5	28	Multi-Step Speed Selection frequency 5
d1-06	Frequency Reference 6	31.5	Multi-Step Speed Selection frequency 6
d1-07	Frequency Reference 7	35	Multi-Step Speed Selection frequency 7
d1-08	Frequency Reference 8	40	Multi-Step Speed Selection frequency 8
e2-01	Motor Rated Current	6.7	Set E2-01 to the full load amps (FLA) stamped on the motor nameplate.
h1-01	Digital Input S1 Function Selection	40	Forward Run Command (2-wire sequence)
h1-02	Digital Input S2 Function Selection	41	Reverse Run Command (2-wire sequence)
h1-03	Digital Input S3 Function Selection	3	Multi-Step Speed Reference 1
h1-04	Digital Input S4 Function Selection	4	Multi-Step Speed Reference 2
h1-05	Digital Input S5 Function Selection	5	Multi-Step Speed Reference 3

Fault Detection

When the Drive detects a fault, the fault information is displayed on the Digital Operator, the fault contact closes, and the motor coasts to stop. (However, a fault with selectable stopping method will operate according to the stopping method selected.)

If a fault occurs, take appropriate action according to the table by investigating the cause.

To restart, reset the fault with any of the following procedures:

- *Set "**14: Fault Reset**" to a multi-function digital input (**H1-01 to H1-06**). Then, close and open the input.*
- *Press the **RESET** key of the Digital Operator.*
- *Shut off the Drive input power, and then turn on again.*

Fault Diagnosis and Corrective Actions

Table 6.7 Detailed Fault Displays, Causes and Possible Solutions

LED Operator Display		Fault Name
CE	CE	MEMOBUS/Modbus Communication Error
		No data was received for longer than 2 seconds.
Cause		**Possible Solution**
Faulty communications wiring, or a short circuit exists.		• Check for faulty wiring. • Correct the wiring. • Check for loose wiring and short circuits. Repair as needed.
A communications data error occurred due to noise.		• Check the various options available to minimize the effects of noise. • Counteract noise in control circuit, main circuit, and ground wiring. • Use Yaskawa-recommended cables, or another type of shielded line. Ground the shield on the controller side or on the drive input power side. • Ensure that other equipment such as switches or relays do not cause noise and use surge suppressors if required. • Separate all wiring for communications devices from drive input power lines. Install a noise filter to the input side of the drive input power.
LED Operator Display		**Fault Name**
CoF	CoF	Current Offset Fault
		There is a problem with the current detection circuit.
Cause		**Possible Solution**
While the drive automatically adjusted the current offset, the calculated value exceeded the allowable setting range.		Replace the drive.
LED Operator Display		**Fault Name**
CPF00 or CPF01	CPF00 or CPF01	CPF11 – RAM Fault CPF12 – Problem with the ROM (FLASH memory) CPF14 – CPU error (CPU operates incorrectly due to noise, etc.) CPF17 – A timing error occurred during an internal process CPF18 – CPU error (CPU operates incorrectly due to noise, etc.)
Cause		**Possible Solution**
Hardware is damaged.		Replace the drive.
LED Operator Display		**Fault Name**
CPF02	CPF02	A/D Conversion Error
		An A/D conversion error occurred.
Cause		**Possible Solution**
Control circuit is damaged.		Cycle power to the drive. If the problem continues, replace the drive.
Control circuit terminals have shorted out (+V, AC).		• Check for wiring errors along the control circuit terminals. • Correct the wiring.
		Check the resistance of the speed potentiometer and related wiring.
Control terminal input current has exceeded allowable levels.		• Check the input current. • Reduce the current input to control circuit terminal (+V) to 20 mA.
LED Operator Display		**Fault Name**
CPF06	CPF06	EEPROM Data Error
		There is an error in the data saved to EEPROM.
Cause		**Possible Solution**
Control circuit is damaged.		Cycle power to the drive. If the problem continues, replace the drive.
The power supply was switched off when parameters were written (e.g., using an option unit).		Reinitialize the drive (A1-03).
LED Operator Display		**Fault Name**
CPF08	CPF08	EEPROM Communication Fault
		EEPROM communications are not functioning properly.
Cause		**Possible Solution**
Control circuit is damaged.		Cycle power to the drive. If the problem persists, replace the drive.
LED Operator Display		**Fault Name**
CPF20 or CPF21	CPF20 or CPF21	One of the following faults occurred: RAM fault, FLASH memory error, watchdog circuit exception, clock error
		• RAM fault. • FLASH memory error (ROM error). • Watchdog circuit exception (self-diagnostic error). • Clock error.

Cause		Possible Solution
Hardware is damaged.		Replace the drive.
LED Operator Display		**Fault Name**
CPF22	CPF22	A/D Conversion Fault
		A/D conversion error.
Cause		**Possible Solution**
Control circuit is damaged.		• Cycle power to the drive. *Refer to Diagnosing and Resetting Faults on page 139.* • If the problem continues, replace the drive.
LED Operator Display		**Fault Name**
CPF23	CPF23	PWM Feedback Fault
		PWM feedback error.
Cause		**Possible Solution**
Hardware is damaged.		Replace the drive.
LED Operator Display		**Fault Name**
CPF24	CPF24	Drive Capacity Signal Fault
		Entered a capacity that does not exist. (Checked when the drive is powered up.)
Cause		**Possible Solution**
Hardware is damaged.		Replace the drive.
LED Operator Display		**Fault Name**
EF0	EF0	MEMOBUS/Modbus Communication External Fault
		An external fault condition is present.
Cause		**Possible Solution**
An external fault was received from the PLC with other than H5-04 = 3 "alarm only" (the drive continued to run after external fault).		• Remove the cause of the external fault. • Remove the external fault input from the PLC.
Problem with the PLC program.		Check the PLC program and correct problems.
LED Operator Display		**Fault Name**
EF1	EF1	External Fault (input terminal S1)
		External fault at multi-function input terminal S1.
EF2	EF2	External Fault (input terminal S2)
		External fault at multi-function input terminal S2.
EF3	EF3	External Fault (input terminal S3)
		External fault at multi-function input terminal S3.
EF4	EF4	External Fault (input terminal S4)
		External fault at multi-function input terminal S4.
EF5	EF5	External Fault (input terminal S5)
		External fault at multi-function input terminal S5.
Cause		**Possible Solution**
An external device has tripped an alarm function.		Remove the cause of the external fault and reset the fault.
Wiring is incorrect.		• Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). • Reconnect the signal line.
Incorrect setting of multi-function contact inputs.		• Check if the unused terminals set for H1-□□ = 20 to 2F (External Fault). • Change the terminal settings.
LED Operator Display		**Fault Name**
Err	Err	EEPROM Write Error
		Data does not match the EEPROM being written to.
Cause		**Possible Solution**
-		• Press the  button. • Correct the parameter settings. • Cycle power to the drive. *Refer to Diagnosing and Resetting Faults on page 139.*
LED Operator Display		**Fault Name**
oC	oC	Overcurrent
		Drive sensors have detected an output current greater than the specified overcurrent level.
Cause		**Possible Solution**
The motor has been damaged due to overheating or the motor insulation is damaged.		• Check the insulation resistance. • Replace the motor.
One of the motor cables has shorted out or there is a grounding problem.		• Check the motor cables. • Remove the short circuit and power the drive back up.
		• Check the resistance between the motor cables and the ground terminal⏚. • Replace damaged cables.

The load is too heavy.	• Measure the current flowing into the motor. • Replace the drive with a larger capacity unit if the current value exceeds the rated current of the drive. • Determine if there is sudden fluctuation in the current level. • Reduce the load to avoid sudden changes in the current level or switch to a larger drive.
The acceleration or deceleration times are too short.	Calculate the torque needed during acceleration relative to the load inertia and the specified acceleration time. If the right amount of torque cannot be set, make the following changes: • Increase the acceleration time (C1-01, -03) • Increase the S-curve characteristics (C2-01 through C2-04) • Increase the capacity of the drive.
The drive is attempting to operate a specialized motor or a motor larger than the maximum size allowed.	• Check the motor capacity. • Ensure that the rated capacity of the drive is greater than or equal to the capacity rating found on the motor nameplate.
Magnetic contactor (MC) on the output side of the drive has turned on or off.	Set up the operation sequence so that the MC is not tripped while the drive is outputting current.
V/f setting is not operating as expected.	• Check the ratios between the voltage and frequency. • Set parameter E1-04 through E1-10 appropriately. • Lower the voltage if it is too high relative to the frequency.
Excessive torque compensation.	• Check the amount of torque compensation. • Reduce the torque compensation gain (C4-01) until there is no speed loss and less current.
Drive fails to operate properly due to noise interference.	• Review the possible solutions provided for handling noise interference. • Review the section on handling noise interference and check the control circuit lines, main circuit lines and ground wiring.
Overexcitation gain is set too high.	• Check if fault occurs simultaneously to overexcitation function operation. • Consider motor flux saturation and reduce the value of n3-13 (Overexcitation Deceleration Gain).
Run command applied while motor was coasting.	• Program the Speed Search command input through one of the multi-function contact input terminals (H1-□□ = "61" or "62").
The motor cable is too long	Use a larger drive.
LED Operator Display	**Fault Name**
oFA01 / oFA01	Option Unit Fault Replace the option unit.
Cause	**Possible Solution**
The option unit is not properly connected to the drive.	Turn the power off and reconnect the option unit.
LED Operator Display	**Fault Name**
oH1 / oH1	Overheat 1 (Heatsink Overheat) The temperature of the heatsink has exceeded the overheat detection level.
Cause	**Possible Solution**
Surrounding temperature is too high.	• Check the temperature surrounding the drive. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool the surrounding area. • Remove anything near the drive that might be producing excessive heat.
Load is too heavy.	• Measure the output current. • Lower the carrier frequency (C6-02). • Reduce the load.
Current flowing to control circuit terminal +V exceeded the tolerance level.	• Check the current level of the terminal. • Set the current to the control circuit terminal to be 20 mA or less.

LED Operator Display	**Fault Name**
oL1 / oL1	Motor Overload The electrothermal sensor tripped overload protection.
Cause	**Possible Solution**
Load is too heavy.	Reduce the load.
Cycle times are too short during acceleration and deceleration.	Increase the acceleration and deceleration times (C1-01 through C1-04).
• Drive overloaded at low speeds. • Overload may occur at low speeds when using a general-purpose motor, even if operating within the rated current limitation.	• Reduce the load. • Increase the speed. • If the drive is supposed to operate at low speeds, either increase the motor capacity or use a motor specifically designed to operate with the drive.
Although a special type of motor is being used, the motor protection selection is set for a general-purpose motor (L1-01 = 1).	Set L1-01 = "2".
Voltage is too high for the V/f characteristics.	• Adjust the user set V/f patterns (E1-04 through E1-10). Parameters E1-08 and E1-10 may need to be reduced. • If E1-08 and E1-10 are set too high, there may be very little load tolerance at low speed.
The wrong motor-rated current is set to E2-01.	• Check the motor-rated current. • Enter the value written on the motor nameplate to parameter E2-01.
The maximum frequency for the drive input power is set too low.	• Check the rated frequency indicated on the motor nameplate. • Enter the rated frequency to E1-06 (Base Frequency).

Multiple motors are running off the same drive.	Disable the Motor Protection function (L1-01 = "0") and install a thermal relay to each motor.
The electrical thermal protection characteristics and motor overload characteristics do not match.	• Check the motor characteristics. • Correct the value set to L1-01 (Motor Protection Function). • Install an external thermal relay.
The electrical thermal relay is operating at the wrong level.	• Check the current rating listed on the motor nameplate. • Check the value set for the motor-rated current (E2-01).
Motor overheated by overexcitation operation.	• Overexcitation increases the motor losses and thereby the motor temperature. If applied too long, motor damage can occur. Prevent excessive overexcitation operation or apply proper cooling to the motor. • Reduce the excitation deceleration gain (n3-13). • Set L3-04 (Stall Prevention during Deceleration) to a value other than 4.
Output current fluctuation due to input phase loss	Check the power supply for phase loss.
LED Operator Display	**Fault Name**
oL2 / oL2	Drive Overload The thermal sensor of the drive triggered overload protection.
Cause	**Possible Solution**
Load is too heavy.	Reduce the load.
Cycle times are too short during acceleration and deceleration.	Increase the settings for the acceleration and deceleration times (C1-01 through C1-04).
Voltage is too high for the V/f characteristics.	• Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. • Be careful not to lower E1-08 and E1-10 excessively because this reduces load tolerance at low speeds.
Drive capacity is too small.	Replace the drive with a larger model.
Overload occurred when operating at low speeds.	• Reduce the load when operating at low speeds. • Replace the drive with a model that is one frame size larger. • Lower the carrier frequency (C6-02).
Excessive torque compensation.	Reduce the torque compensation gain (C4-01) until there is no speed loss but less current.
Output current fluctuation due to input phase loss	Check the power supply for phase loss.
LED Operator Display	**Fault Name**
oL3 / oL3	Overtorque Detection 1 The current has exceeded the value set for torque detection (L6-02) for longer than the allowable time (L6-03).
Cause	**Possible Solution**
Parameter settings are not appropriate for the type of load.	Check the settings of parameters L6-02 and L6-03.
There is a fault on the machine side (e.g., the machine is locked up).	Check the status of the load. Remove the cause of the fault.
LED Operator Display	**Fault Name**
oPr / oPr	External Digital Operator Connection Fault The external operator has been disconnected from the drive. **Note:** An oPr fault will occur when both of the following conditions are true: • Output is interrupted when the operator is disconnected (o2-06 = 1) • The run command is assigned to the operator (b1-02 = 0 and LOCAL has been selected)
Cause	**Possible Solution**
External operator is not properly connected to the drive.	• Check the connection between the operator and the drive • Replace the cable if damaged • Turn off the drive input power and disconnect the operator. Next reconnect the operator and turn the drive input power back on.
LED Operator Display	**Fault Name**
ov / ov	Overvoltage Voltage in the DC bus has exceeded the overvoltage detection level. • For 200 V class: approximately 410 V • For 400 V class: approximately 820 V (740 V when E1-01 is less than 400)
Cause	**Possible Solution**
Deceleration time is too short and regenerative energy flows from the motor into the drive.	• Increase the deceleration time (C1-02, -04). • Install a braking resistor or a dynamic braking resistor unit. • Enable stall prevention during deceleration (L3-04 = "1"). Stall prevention is enabled as the default setting.
Excessive braking load.	The braking torque was too high, causing regenerative energy to charge the DC bus. Reduce the braking torque, use a braking option, or lengthen decel time.
Surge voltage entering from the drive input power.	Install a DC reactor. **Note:** Voltage surge can result from thyristor convertor and phase advancing capacitor using same drive main input power supply.
Ground fault in the output circuit causing the DC bus capacitor to overcharge.	• Check the motor wiring for ground faults. • Correct grounding shorts and turn the power back on.
Excessive regeneration when overshoot occurs after acceleration.	• Lengthen the S-curve at acceleration end.

Drive input power voltage is too high.	• Check the voltage. • Lower drive input power voltage within the limits listed in the specifications.
The dynamic braking transistor is damaged.	Replace the drive.
The braking transistor is wired incorrectly.	• Check braking transistor wiring for errors. • Properly rewire the braking resistor device.
Drive fails to operate properly due to noise interference.	• Review the list of possible solutions provided for controlling noise. • Review the section on handling noise interference and check the control circuit lines, main circuit lines and ground wiring.
Motor hunting occurs.	• Adjust the parameters that control hunting. • Set the hunting prevention gain (n1-02).
LED Operator Display	**Fault Name**
PF	Input Phase Loss
	Drive input power has an open phase or has a large imbalance of voltage between phases. Detected when L8-05 = 1 (enabled).
Cause	**Possible Solution**
There is phase loss in the drive input power.	• Check for wiring errors in the main circuit drive input power. • Correct the wiring.
There is loose wiring in the drive input power terminals.	• Ensure the terminals are tightened properly. • Apply the tightening torque specified in this manual to fasten the terminals. *Refer to Wire Gauges and Tightening Torque on page 39*
There is excessive fluctuation in the drive input power voltage.	• Check the voltage from the drive input power. • Review the possible solutions for stabilizing the drive input power. • Disable Input Phase Loss Detection (L8-05 = "0"). PF is detected if DC bus ripple is too high. If it is disabled, there is no fault but the ripple is still too high, thereby the capacitors are stressed more and lose lifetime.
There is poor balance between voltage phases.	• Stabilize drive input power or disable phase loss detection.
The main circuit capacitors are worn.	• Check the maintenance time for the capacitors (U4-05). • Replace the drive if U4-05 is greater than 90%.
	• Check for anything wrong with the drive input power. • If nothing is wrong with the drive input power, try the following solutions if the alarm continues: • Disable Input Phase Loss Protection selection (L8-05 = "0"). PF is detected if DC bus ripple is too high. If it is disabled, there is no fault but the ripple is still too high, thereby the capacitors are stressed more and lose lifetime. • Replace the drive.
LED Operator Display	**Fault Name**
rH	Braking Resistor Overheat
	Braking resistor protection was triggered. Fault detection is enabled when L8-01 = 1 (disabled as a default). **Note:** The magnitude of the braking load trips the braking resistor overheat alarm, NOT the surface temperature. Using the braking resistor more frequently than its rating trips the alarm even when the braking resistor surface is not very hot.
Cause	**Possible Solution**
Deceleration time is too short and excessive regenerative energy is flowing back into the drive.	• Check the load, deceleration time and speed. • Reduce the load. • Increase the acceleration and deceleration times (C1-01 through C1-04). • Replace the braking option with a larger device that can handle the power that is discharged.
Excessive braking inertia.	Recalculate braking load and braking power. Then try reducing the braking load and checking the braking resistor settings and improve braking capacity.
The proper braking resistor has not been installed.	• Check the specifications and conditions for the braking resistor device. • Select the optimal braking resistor.
LED Operator Display	**Fault Name**
Uv1	DC Bus Undervoltage
	One of the following conditions occurred while the drive was stopped: • Voltage in the DC bus fell below the undervoltage detection level. • For 200 V class: approximately 190 V (160 V for single phase drives) • For 400 V class: approximately 380 V (350 V when E1-01 is less than 400) The fault is output only if L2-01 = 0 or the DC bus voltage is below the Uv detection level for a certain time while L2-01 = 1.
Cause	**Possible Solution**
Input power phase loss.	• The main circuit drive input power is wired incorrectly. • Correct the wiring.
One of the drive input power wiring terminals is loose.	• Ensure there are no loose terminals. • Apply the tightening torque specified in this manual to fasten the terminals. *Refer to Wire Gauges and Tightening Torque on page 39*
There is a problem with the voltage from the drive input power.	• Check the voltage. • Correct the voltage to within range listed in drive input power specifications.
The power has been interrupted.	Correct the drive input power.
Drive internal circuitry has become worn.	• Check the maintenance time for the capacitors (U4-05). • Replace the drive if U4-05 exceeds 90%.

The drive input power transformer is not large enough and voltage drops after switching on power.	Check the capacity of the drive input power transformer.
Air inside the drive is too hot.	Check the drive internal temperature.
Problem with the CHARGE indicator.	Replace the drive.
LED Operator Display	**Fault Name**
Uv3	Undervoltage 3 (Inrush Prevention Circuit Fault)
	The inrush prevention circuit has failed.
Cause	**Possible Solution**
The contactor on the inrush prevention circuit is damaged.	• Cycle power to the drive. Check if the fault reoccurs. • Replace the drive if the fault continues to occur. • Check monitor U4-06 for the performance life of the inrush prevention circuit. • Replace the drive if U4-06 exceeds 90%.

Alarm Diagnosis and Corrective Actions

Alarms are Drive protection functions that do not operate the fault contact. The Drive will automatically return to its original status once the cause of the alarm has been removed.

During an alarm condition, the Digital Operator display flashes and an alarm output is generated at the multi-function outputs (H2-01 to H2-03) if programmed.

When an alarm occurs, take appropriate corrective action according to the table below.

Alarm Displays and Corrective Actions

Table 6.8 Alarm Codes, Causes, and Possible Solutions

LED Operator Display		Minor Fault Name	
bb	bb	Baseblock	
		Drive output interrupted as indicated by an external baseblock signal.	
Cause		**Possible Solutions**	**Minor Fault (H2-01 = 10)**
External baseblock signal entered via multi-function input terminal (S1 to S5).		Check external sequence and baseblock signal input timing.	No output
LED Operator Display		**Minor Fault Name**	
CALL	CALL	Serial Communication Transmission Error	
		Communication has not yet been established.	
Cause		**Possible Solutions**	**Minor Fault (H2-01 = 10)**
Communications wiring is faulty, there is a short circuit, or something is not connected properly.		• Check for wiring errors. • Correct the wiring. • Remove and ground shorts and reconnect loose wires.	YES
Programming error on the master side.		Check communications at start-up and correct programming errors.	YES
Communications circuitry is damaged.		• Perform a self-diagnostics check. • Replace the drive if the fault continues to occurs.	YES
Terminal resistance setting is incorrect.		The terminal slave drive must have the internal terminal resistance switch set correctly. Place DIP switch S2 to the ON position.	YES
LED Operator Display		**Minor Fault Name**	
CE	CE	MEMOBUS/Modbus Communication Error	
		Control data was not received correctly for two seconds.	
Cause		**Possible Solutions**	**Minor Fault (H2-01 = 10)**
A data error occurred due to noise.		• Check options available to minimize the effects of noise. • Counteract noise in the control circuit wiring, main circuit lines and ground wiring. • Reduce noise on the controller side. • Use surge absorbers on magnetic contactors or other equipment causing the disturbance. • Use cables recommended by Yaskawa or another type of shielded line. The shield should be grounded on the controller side or on the drive input power side. • Separate all wiring for communications devices from drive input power lines. Install a noise filter to the input side of the drive input power.	YES
Communication protocol is incompatible.		• Check the H5 parameter settings as well as the protocol setting in the controller. • Ensure settings are compatible.	YES
The communication cycle is longer than 2 seconds.		• Check the PLC. • Change the software settings in the PLC.	YES
Incompatible PLC software settings or there is a hardware problem.		• Check the PLC. • Remove the cause of the error on the controller side.	YES
Communications cable is disconnected or damaged.		• Check the connector for a signal through the cable. • Replace the communications cable.	YES
LED Operator Display		**Minor Fault Name**	
CrST	CrST	Can Not Reset	
Cause		**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
Fault reset was being executed when a run command was entered.		• Ensure that a run command cannot be entered from the external terminals or option unit during fault reset. • Turn off the run command.	YES
LED Operator Display		**Minor Fault Name**	
EF	EF	Forward/Reverse Run Command Input Error	
		Both forward run and reverse run closed simultaneously for over 0.5 s.	

Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Sequence error		Check the forward and reverse command sequence and correct the problem. **Note:** When minor fault EF detected, motor ramps to stop.	YES
LED Operator Display		**Minor Fault Name**	
EF1	EF1	External fault (input terminal S1)	
		External fault at multi-function input terminal S1.	
EF2	EF2	External fault (input terminal S2)	
		External fault at multi-function input terminal S2.	
EF3	EF3	External fault (input terminal S3)	
		External fault at multi-function input terminal S3.	
EF4	EF4	External fault (input terminal S4)	
		External fault at multi-function input terminal S4.	
EF5	EF5	External fault (input terminal S5)	
		External fault at multi-function input terminal S5.	
Cause		**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
An external device has tripped an alarm function.		Remove the cause of the external fault and reset the multi-function input value.	YES
Wiring is incorrect.		• Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). • Reconnect the signal line.	YES
Multi-function contact inputs are set incorrectly.		• Check if the unused terminals have been set for H1-□□ = 20 to 2F (External Fault). • Change the terminal settings.	YES
LED Operator Display		**Minor Fault Name**	
oH	oH	Heatsink Overheat	
		The temperature exceeded 90-100 °C	
Cause		**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
Surrounding temperature is too high		• Check the surrounding temperature. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool surrounding area. • Remove anything near drive that may cause extra heat.	YES
Internal cooling fan has stopped.		• Replace the cooling fan. *Refer to Cooling Fan Replacement on page 151.* • After replacing the drive, reset the cooling fan maintenance parameter to (o4-03 = "0").	YES
Airflow around the drive is restricted.		• Provide proper installation space around the drive as indicated in the manual. *Refer to Correct Installation Orientation on page 27.* • Allow for the specified space and ensure that there is sufficient circulation around the control panel.	YES
		• Check for dust or foreign materials clogging cooling fan. • Clear debris caught in the fan that restricts air circulation.	YES
LED Operator Display		**Minor Fault Name**	
oL3	oL3	Overtorque 1	
		Drive output current was greater than L6-02 for longer than the time set in L6-03.	
Cause		**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
Inappropriate parameter settings.		Check parameters L6-02 and L6-03.	YES
There is a fault on the machine side (e.g., the machine is locked up).		• Check the status of the machine. • Remove the cause of the fault.	YES
LED Operator Display		**Minor Fault Name**	
ov	ov	DC Bus Overvoltage	
		The DC bus voltage exceeded the trip point. For 200 V class: approximately 410 V For 400 V class: approximately 820 V (740 V when E1-01 < 400)	
Cause		**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
Surge voltage present in the drive input power.		• Install a DC reactor or an AC reactor. • Voltage surge can result from a thyristor convertor and a phase advancing capacitor operating on the same drive input power system.	YES
• The motor is short-circuited. • Ground current has over-charged the main circuit capacitors via the drive input power.		• Check the motor power cable, relay terminals and motor terminal box for short circuits. • Correct grounding shorts and turn the power back on.	YES

Noise interference causes the drive to operate incorrectly.	• Review possible solutions for handling noise interference. • Review section on handling noise interference and check control circuit lines, main circuit lines and ground wiring. • If the magnetic contactor is identified as a source of noise, install a surge protector to the MC coil.	YES
	Set number of fault restarts (L5-01) to a value other than 0.	YES
LED Operator Display	**Minor Fault Name**	
PASS	MEMOBUS/Modbus Communication Test Mode Complete	
Cause	**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
MEMOBUS/Modbus test has finished normally.	This verifies that the test was successful.	No output
LED Operator Display	**Minor Fault Name**	
SE	MEMOBUS/Modbus Communication Test Mode Error	
Cause	**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
A digital input programmed to 67H (MEMOBUS/Modbus test) was closed while the drive was running.	Stop the drive and run the test again.	No output
LED Operator Display	**Minor Fault Name**	
Uv	Undervoltage One of the following conditions was true when the drive was stopped and a run command was entered: • DC bus voltage dropped below the under voltage detection level. • Contactor to suppress inrush current in the drive was open. • Low voltage in the control drive input power. This alarm outputs only if L2-01 is not 0 and DC bus voltage is below the detection level.	
Cause	**Possible Solutions**	**Minor Fault Output (H2-01 = 10)**
Phase loss in the drive input power.	Check for wiring errors in the main circuit drive input power. Correct the wiring.	YES
Loose wiring in the drive input power terminals.	• Ensure the terminals have been properly tightened. • Apply the tightening torque specified in this manual to fasten the terminals. *Refer to Wire Gauges and Tightening Torque on page 39*	YES
There is a problem with the drive input power voltage.	• Check the voltage. • Lower the voltage of the drive input power so that it is within the limits listed in the specifications.	YES
Drive internal circuitry is worn.	• Check the maintenance time for the capacitors (U4-05). • Replace the drive if U4-05 exceeds 90%.	YES
The drive input power transformer is not large enough and voltage drops when the power is switched on.	• Check for a tripped alarm when the magnetic contactor, line breaker and leakage breaker are turned on. • Check the capacity of the drive input power transformer.	YES
Air inside the drive is too hot.	• Check the temperature inside the drive.	YES
The CHARGE indicator light is broken or disconnected.	• Replace the drive.	YES

CHAPTER 5: NETWORK TROUBLESHOOTING

System Overview

The CompoBus/S System is a remote I/O communications system which provides higher-speed, longer-distance, and highly reliable communications.

Each CompoBus/S Master Unit can be connected to up to 32 Slaves of various types, including I/O Terminals and Sensor Terminals, and allows I/O communications for up to 256 points (128 inputs, 128 outputs).

Please make sure that all of the connections and settings have been made and all node configurations have been set (power supplied to the I/O remote modules, power supplied to the CompoBus/S System, and nodes have been set properly on the Masters and slave I/O modules). Node numbers are specified within the i5 wire schematics.

Communication Stop Mode

System malfunctions can be avoided by setting remote I/O communications to stop when a communications error occurs. You will not be able to run the system if a communication error is present (refer alarm section).

Power-up Checklist

After turning the power ON, use the following checklist to verify the Compo-Bus/S communications have started properly.

Unit	*Check*	*Answer*	
Master	*Are the RUN, SD, and RD indicators lit?*	*Yes*	*No*
	With CJ-series Master Units, are the ERH and ERC indicators OFF?	*Yes*	*No*
Slave	*Are the PWR and COMM indicators lit?*	*Yes*	*No*
	Is the ERR indicator OFF?	*Yes*	*No*
	Is the U.ERR indicator OFF? (For SRT2-AD04 and SRT2-DA02 Analog Terminals only)	*Yes*	*No*

If any questions are answered "No," please check the following tables to diagnose the root cause for the network to be down (Indicators of CJ- Series Master Units & Indicators of Slaves units).

Indicators of CJ-series Master Units

Situation	Indicator status					Probable cause	Possible remedy
	RUN	ERH	ERC	SD	RD		
Normal communications	ON	OFF	OFF	ON	ON	---	---
PC's power OFF	OFF	OFF	OFF	OFF	OFF	The PC's power is OFF.	Turn the PC's power supply ON.
						The correct voltage is not being supplied to the PC.	Supply the correct voltage to the PC.
						The Master Unit is faulty.	Replace the Master Unit.
						The PC is faulty.	Replace the PC (CPU Unit, Power Supply Unit).
Unit number setting error	OFF	ON	OFF	OFF	OFF	The same unit number is set on another Special I/O Unit, or the unit number is not within the specified range for Special I/O Units.	Set unit numbers that are unique and within the specified range.
						The Master Unit was restarted after changing the usable node number setting switch (DIP switch pin 1).	Restart the PC and set to automatically create I/O tables.
						The CPU Unit is faulty.	Restart the PC. If the same error occurs, replace the CPU Unit.
Master Unit error	OFF	OFF	ON	OFF	OFF	The Master Unit is faulty.	Replace the Master Unit.
CPU Unit error	---	ON	---	---	---	An error has occurred in the CPU Unit.	Remove the cause of the error, and restart the PC. If the same error occurs, replace the CPU Unit.
Communications error	ON	---	ON	---	---	A Slave disconnection has been detected.	Remove the cause of the error. In communications stop mode, turn ON the power or restart the Unit after removing the cause of the error. In normal communications mode, the Unit will restart automatically.
						The Master Unit is faulty.	Restart the Master Unit. If the same error occurs, replace the Master Unit.
Verification error	ON	---	ON	ON	---	When the Slave registration function is used indicates detection of a Slave that is missing in the network or an unregistered Slave that is in the network.	When a Slave is missing, the Unit will restart automatically when the missing Slave is connected to the network. When an unregistered Slave is detected, restart the Master Unit after removing the unregistered Slave.

Indicators of Slaves Units

The following table shows the meaning of the common indicators.

Indicator	Color	Status	Meaning
PWR (POWER OUT)	Green	ON	The communications power supply is ON.
		OFF	The communications power supply is OFF.
COMM	Yellow	ON	Normal communications
		OFF	A communications error has occurred or the Unit is in standby status.
ERR (BUS/S ERR)	Red	ON	A communications error has occurred.
		OFF	Normal communications or the Unit is in standby status.

The following table shows the status of the common indicators when an error occurs.

Situation	Indicator status			Probable cause	Possible remedy
	PWR	COMM	ERR		
Slave's power OFF	OFF	OFF	OFF	The Slave's power is OFF.	Turn the Slave's power supply ON.
Data area overlap	ON	OFF	ON	With a CQM1 Master that's "number of points/node number" setting is set to 4, the same area may be allocated to more than one Slave. Communications will be stopped.	Check the area allocated to the 8-point Slave where the error occurred, eliminate the area overlap, and then restart the PC.
Address over error	ON	ON	OFF	With a CQM1 Master that's "PC word allocation" setting is 2 or 4 words, an out-of-range node number from 0 to 7 may have been set.	Check the Master's indicators to determine the node number and set the node number within the specified range.
Node number out-of-range error	ON	OFF	OFF	With a CQM1 Master, an out-of-range node number from 8 to 15 may have been set. When a CS-series, C200HX/ C200HG/ C200HE-(Z)E, C200HS, or CJ-series Master is used and the range of usable node numbers is from 0 to 7, there are Slaves whose node numbers are set between 8 and 15.	Check the Master's indicators to determine the node number and set the node number within the specified range.
Communications mode conflict	ON	OFF	OFF	The communications mode setting of the Master Unit does not match that of the Slave.	Make the communications mode of the Master Unit and Slave agree, then power-up the Master Unit again.
Communications error	ON	OFF	ON	An error has occurred with a Slave during communications and it is withdrawn from the system.	Check the Master's indicators and clear the cause of the communications error.
Master's power OFF	ON	OFF	---	The Master's power is OFF.	Turn ON the Master's power supply.

Network Set-up

The system has two different networks: NET00 (network A) and NET 02 (network B).

- *NET 00 supports the off-board water panel. The first master (SRM1 Master A) is used to establish communication.*
- *NET 02 supports the onboard panel. The second master (SRM2 Master B) is used to establish communication.*

A 4-conductor cable is used to supply the high/low communications data signals. These wires are labeled as follows:

Make sure that all the remote I/O modules are set to the right node number within the network. Please reference wire diagrams for node number/dip switches positioning.

Make sure that the SRM's masters switches are set up as follows:

SRM1 Master A

Rotary switch MACH No. x 10° is set to zero (0)

Rotary switch x 10° is set to zero (0)

Dip switch 4 OFF position

Dip switch 3 OFF position

Dip switch 2 OFF position

Dip switch 1 ON position

SRM2 Master B

Rotary switch MACH No. x 10° is set to zero (0)

Rotary switch x 10° is set to two (2)

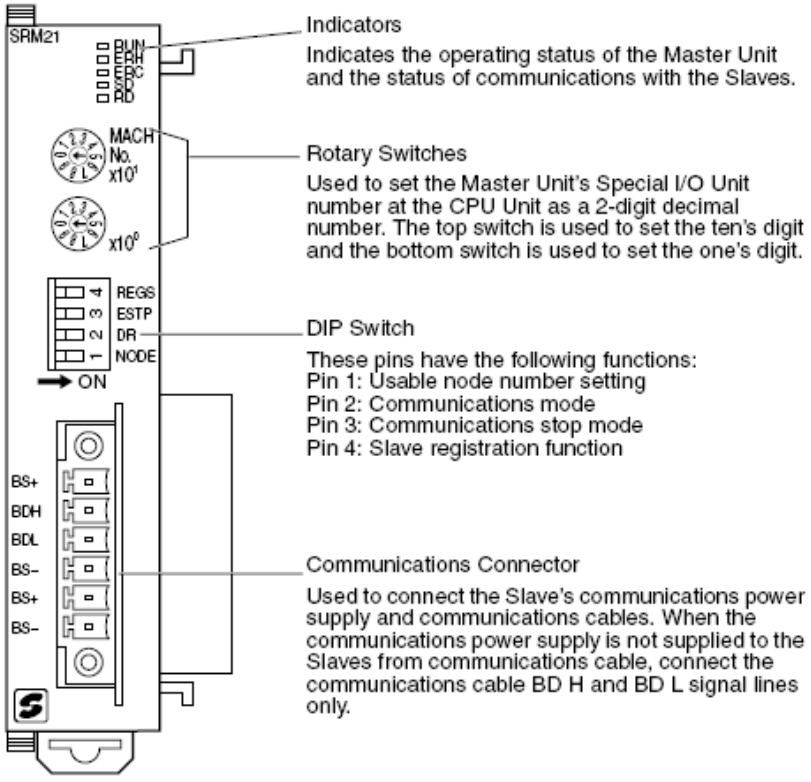
Dip switch 4 OFF position

Dip switch 3 OFF position

Dip switch 2 OFF position

Dip switch 1 ON position

For graphical references use the following figure.

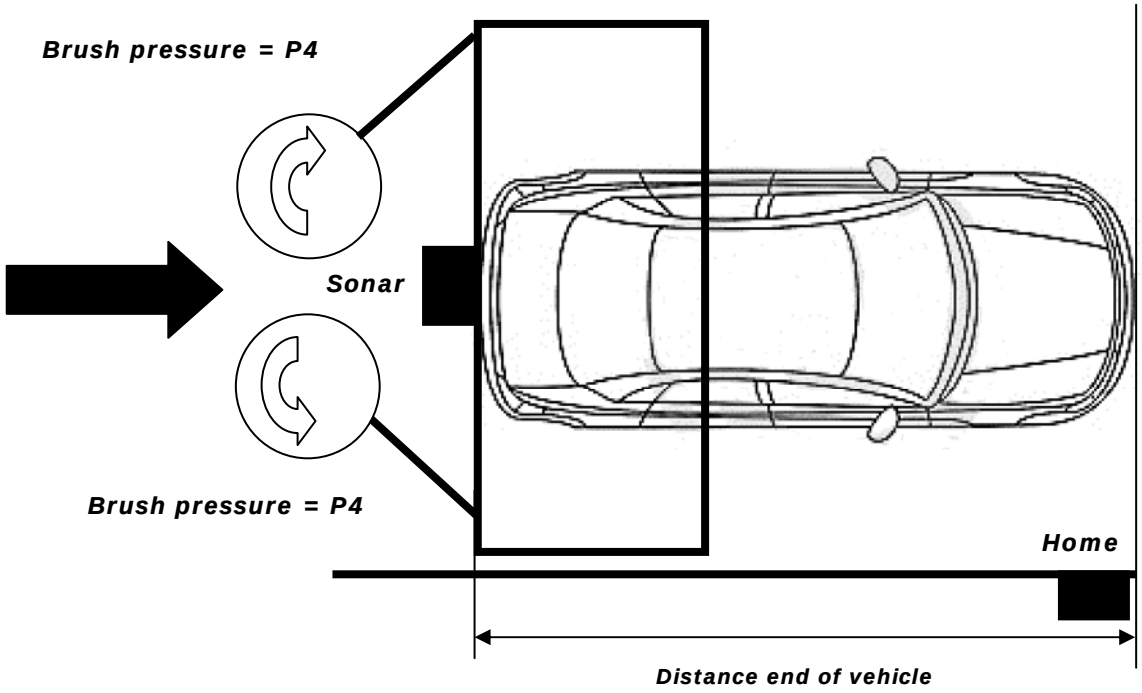


CHAPTER 6: BRUSH PRESSURE SET UP AND ADJUSTMENT

Rear Brush Set Up Even Passes

On even passes, the gantry travels from the back towards the front of the vehicle.

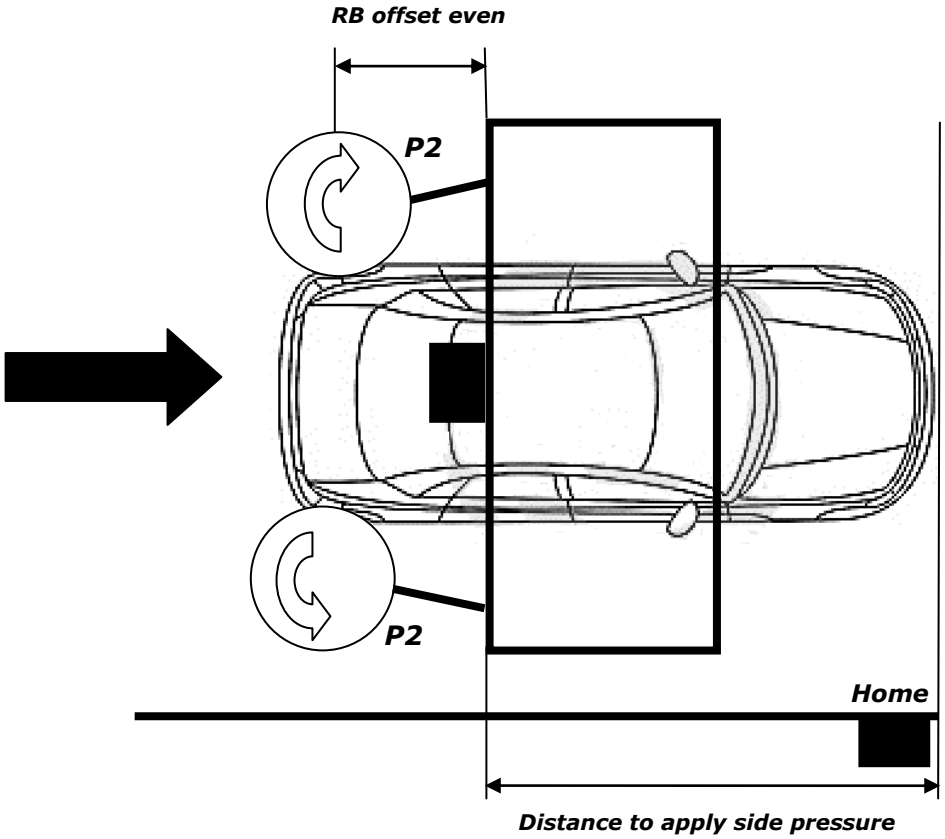
At the beginning of this pass, the pressure for the DS and PS rear brushes are set to P4 (back pressure).



ITV DEFAULT SETTINGS

	ITV NUMBER	P1	P2	P3	P4
REAR BRUSH DRIVERS SIDE	3	45	10	20	35
REAR BRUSH PASSENGER SIDE	4	45	10	20	35

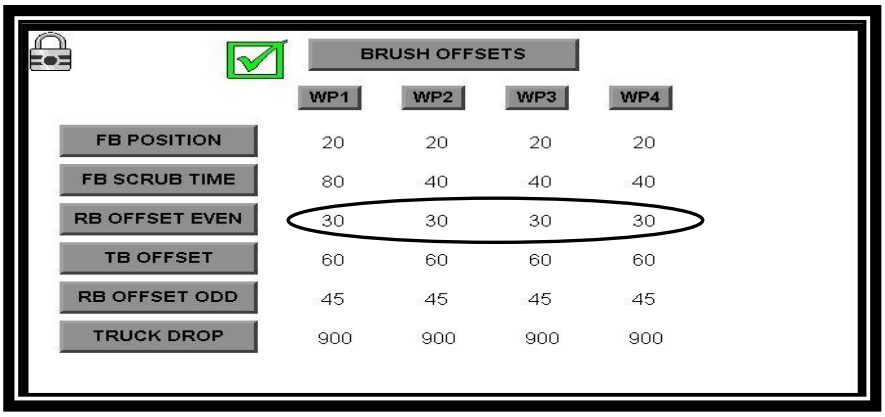
Once the rear brushes reach the side of the vehicle, the rear brush pressure will be set to P2 (side pressure for even passes).



The BayWash i5 allows you to adjust that toggle pressure point per wash package. The toggle pressure point for the rear brushes during the brush function on even passes is defined as follows:

Distance to apply side pressure = Distance end of vehicle – Rear brush offset even

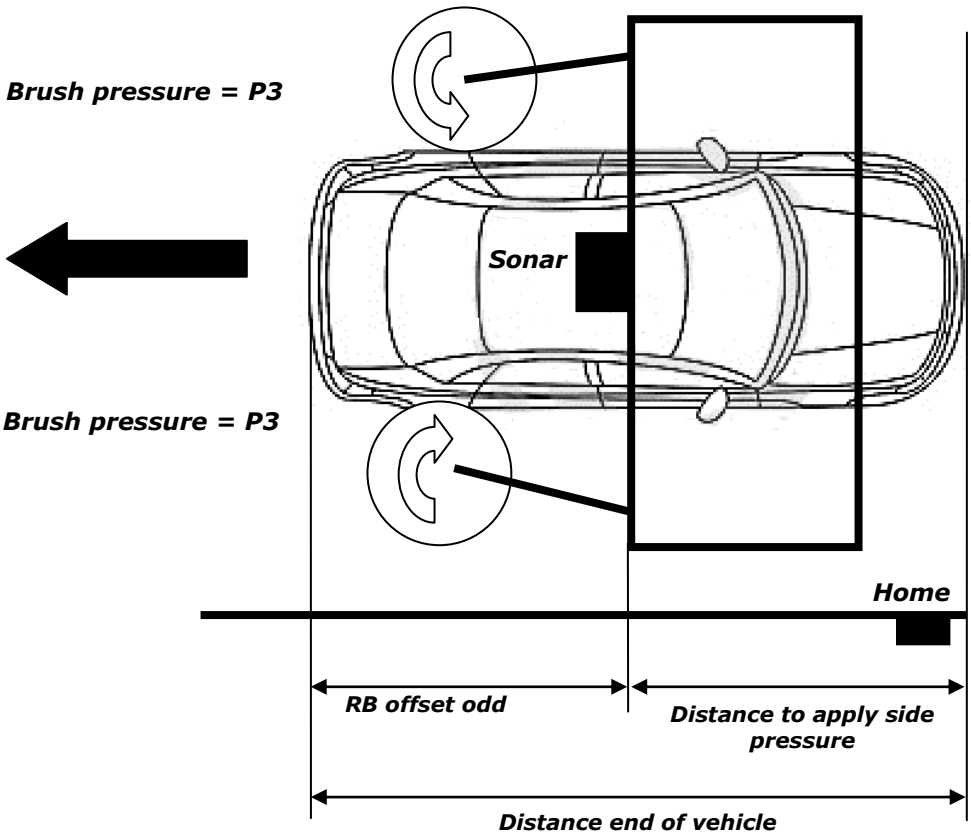
RB OFFSET EVEN IS GVEN IN COUNTS



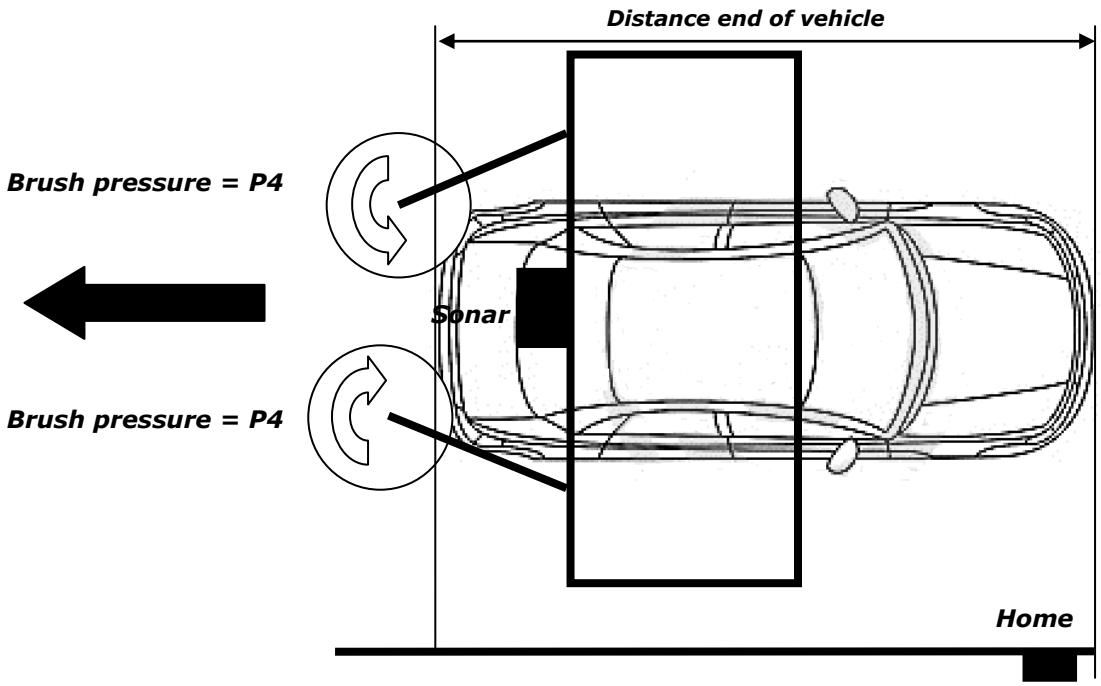
Note: *The smallest the RB OFFSET EVEN value, the fastest the rear brushes will transition from P4 to P2.*

Rear Brush Set Up Odd Passes

On odd passes, the gantry travels from the home position towards the back of the vehicle. At the beginning of this pass, the pressure for the DS and PS rear brushes are set to P3 (side pressure for odd passes).



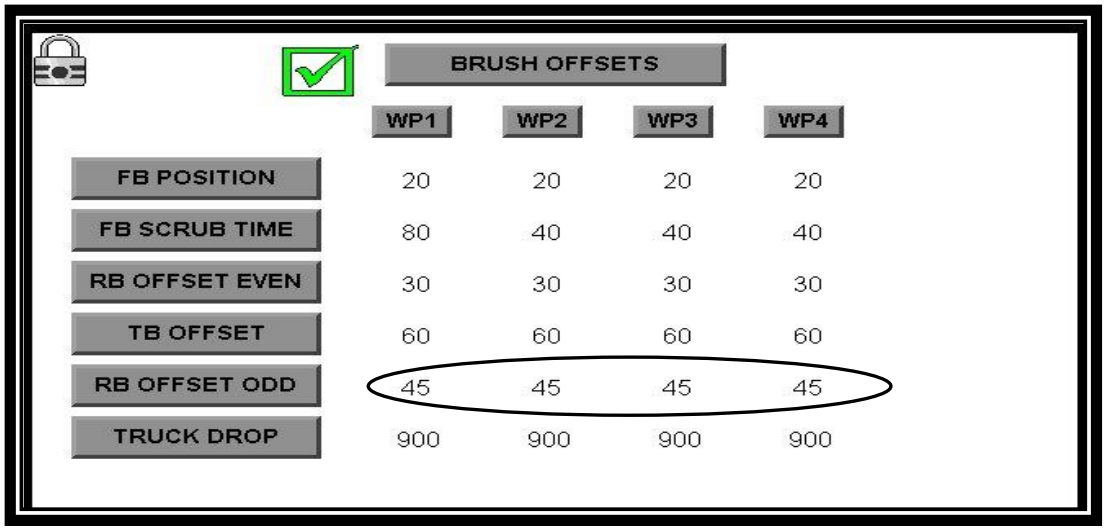
Once the rear brush reaches the end of the vehicle, the rear brush pressure will be set to P4 (back pressure).



The BayWash i5 allows you to adjust the toggle pressure point per wash package. The toggle pressure point for the rear brushes during the brush function on even passes is defined as follows.

Distance to apply side pressure = Distance end of vehicle – Rear brush offset odd

RB OFFSET ODD IS GIVEN IN COUNTS

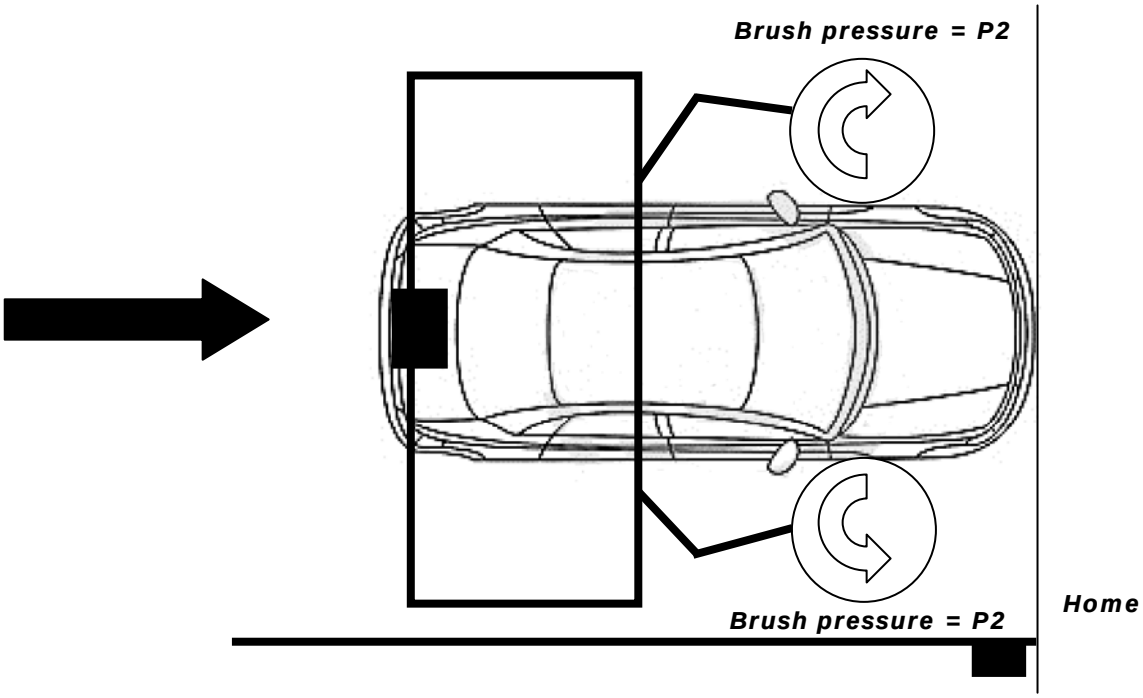


Note: *The smallest the RB OFFSET ODD value, the lowest the rear brushes will transition from P3 to P4 meaning that the transition will be made closer to the rear of the car.*

Front Brush Set Up Even Passes

On even passes, the gantry travels from the back towards the front of the vehicle.

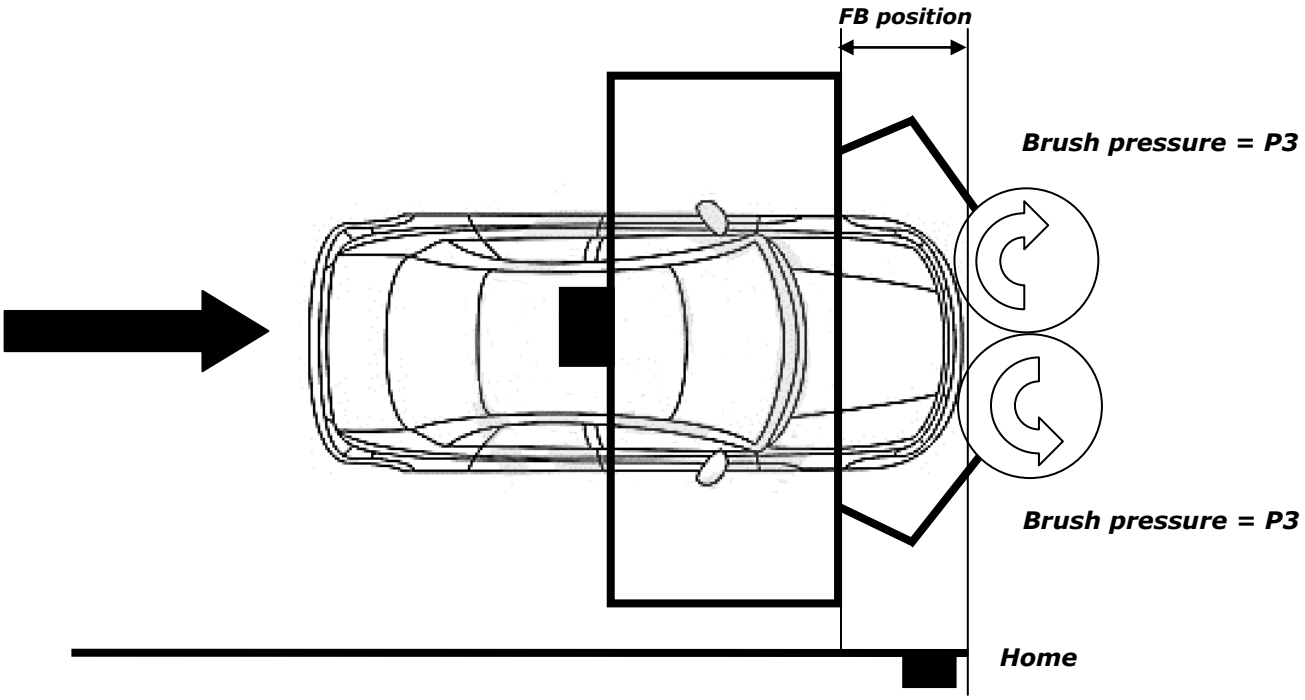
At the beginning of this pass, the pressures for the DS and PS front brushes are set to P2 (side pressure).



ITV DEFAULT SETTINGS

	ITV NUMBER	P1	P2	P3	P4
FRONT BRUSH DRIVERS SIDE	1	30	25	30	0
FRONT BRUSH PASSENGER SIDE	2	30	25	30	0

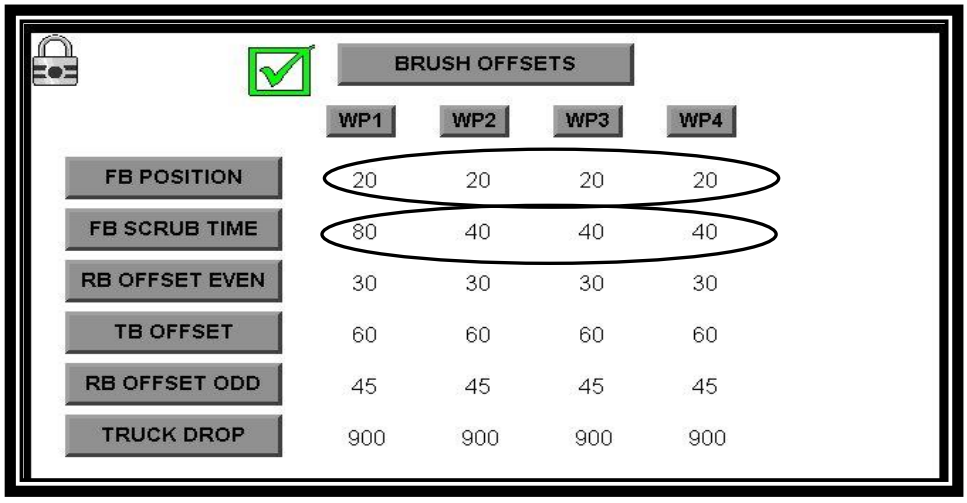
Once the gantry's position is equal than the front brush position defined by the user, it will stop for a user specified amount of time ***(FB SCRUB TIME).*** *At this point the pressure for DS and PS front brushes will be set to P3 (grill pressure).*



The BayWash i5 allows you to adjust the front brush stop position for even passes when the brush function has been selected. It also allows you to define how long the gantry will stop in front of the vehicle.

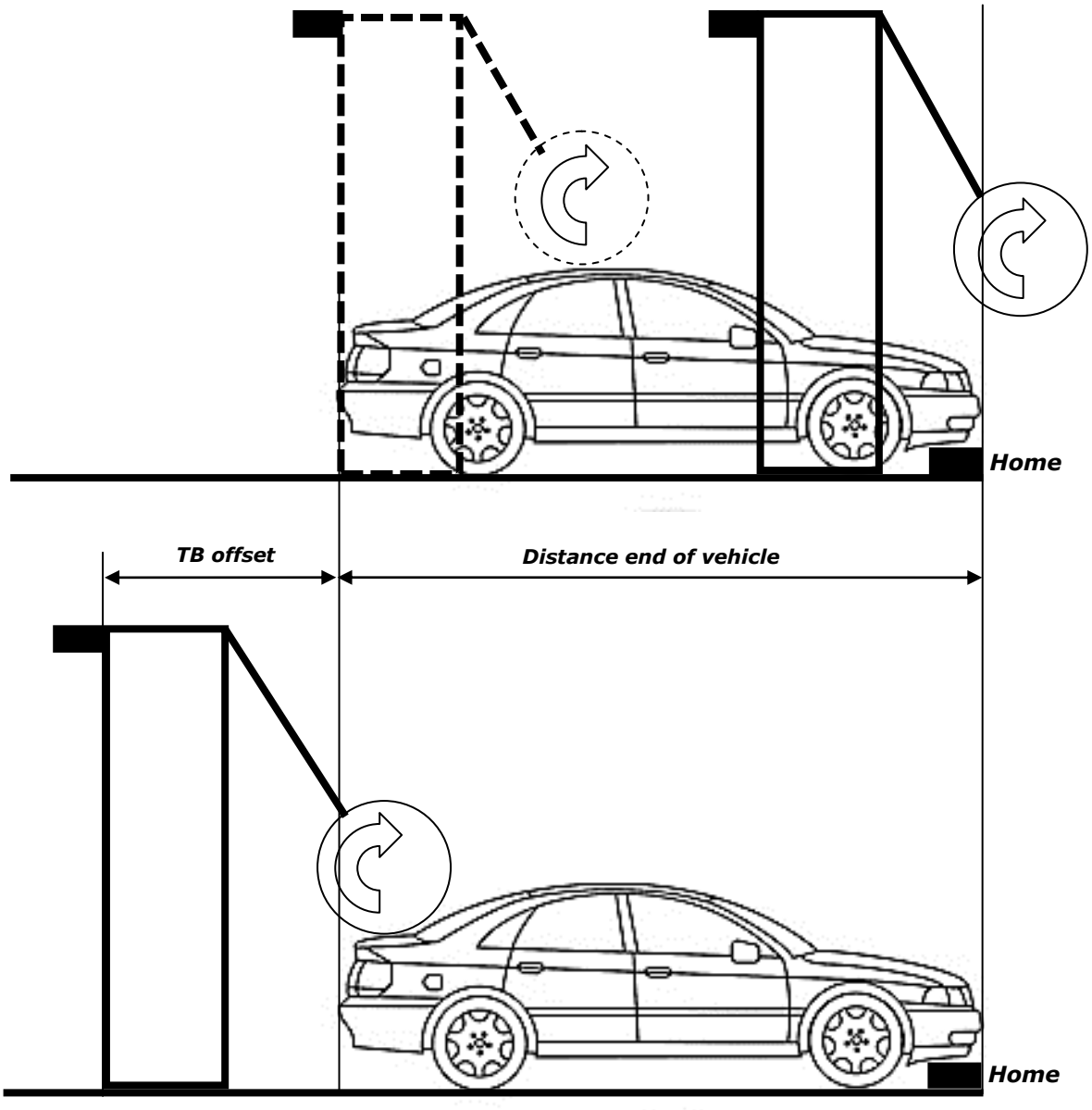
FB POSITION IS GIVEN IN COUNTS

FB SCRUB TIME IS GIVEN IN 1/10 SEC (10 = 1 SECOND)



Top Brush Set Up Odd Pass

On odd passes, the gantry travels from the home position towards the back of the vehicle. At the beginning of this pass, the top brush cylinder is activated (top brush comes down).

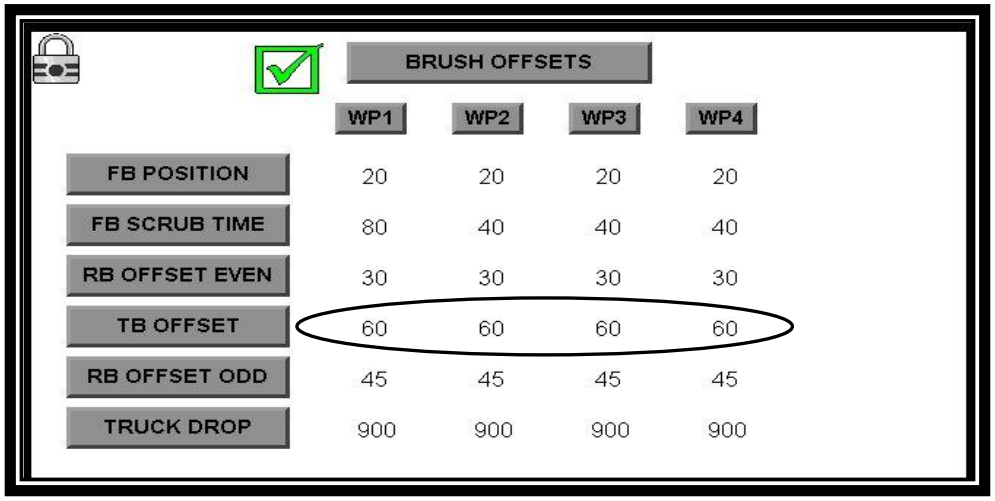


Once the top brush reaches the retract position, it will be retracted.

The BayWash i5 allows you to adjust the top brush retract position for odd passes when the brush function has been selected. The top brush retract position is defined as follows

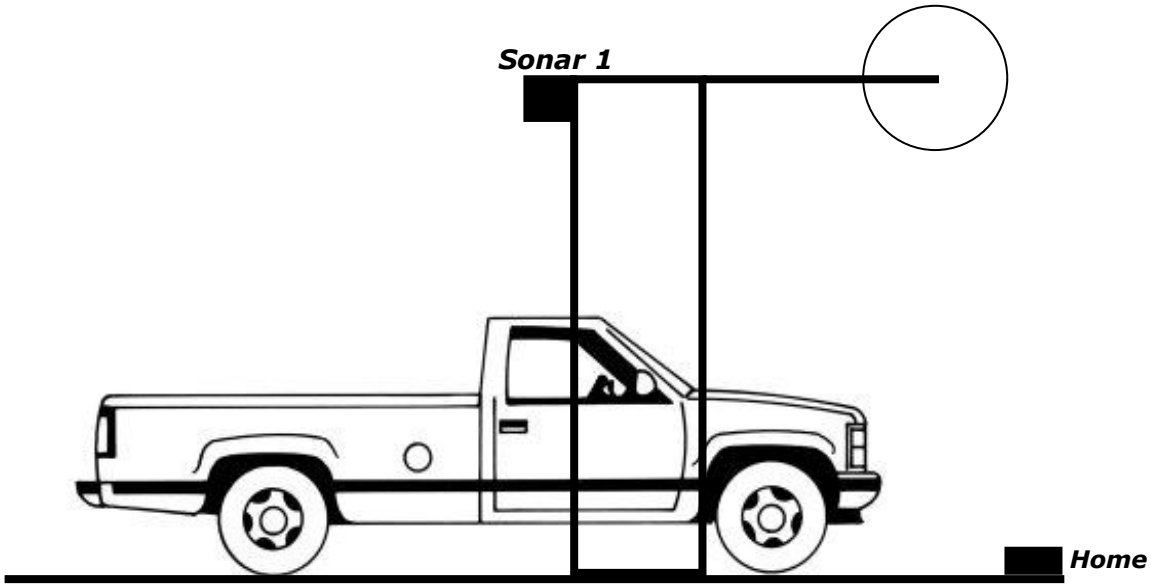
Top brush retract position = Distance end of vehicle + TB offset

TB OFFSET IS GIVEN IN COUNTS

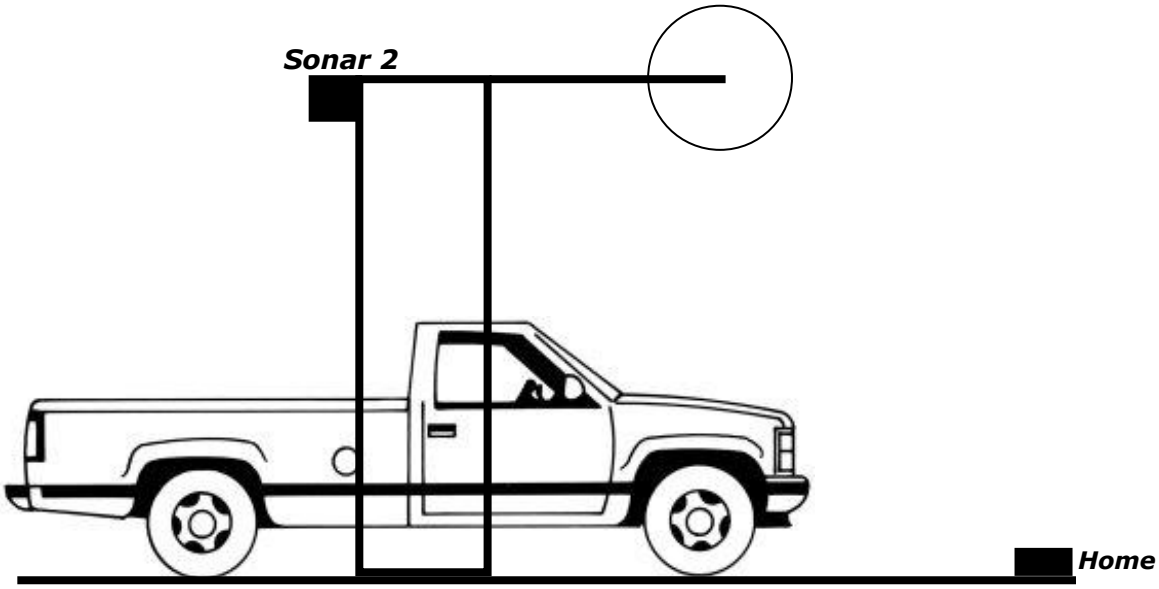


Set Sonar for Pickup Trucks

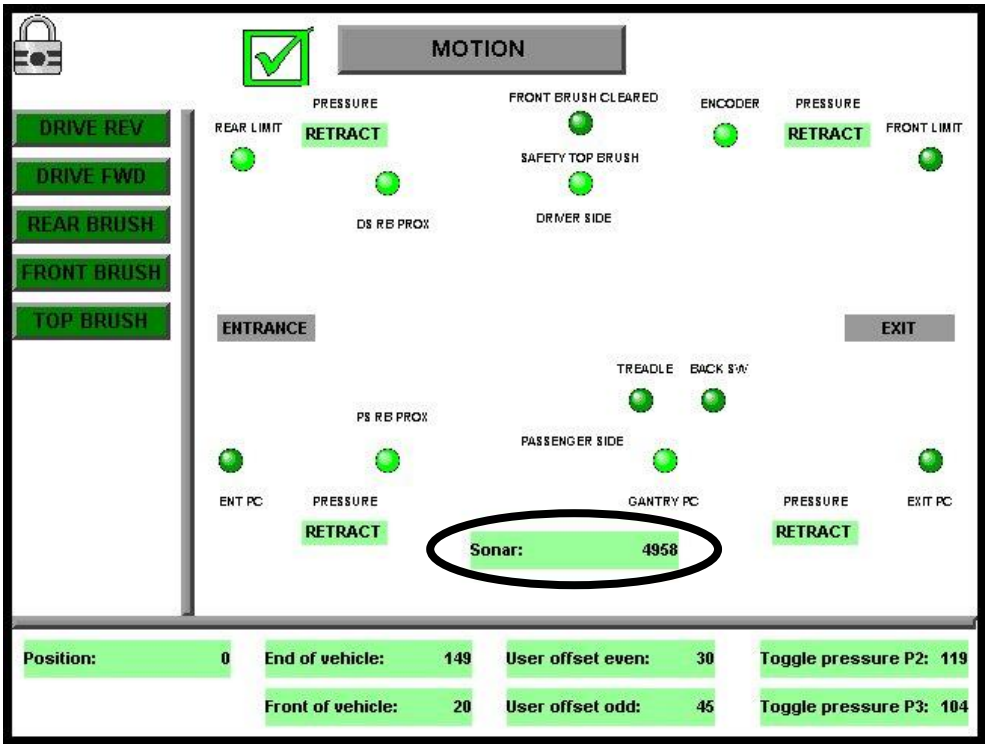
Move the gantry so the ultrasonic sensor is over the roof of the truck; record sonar sensor reading.



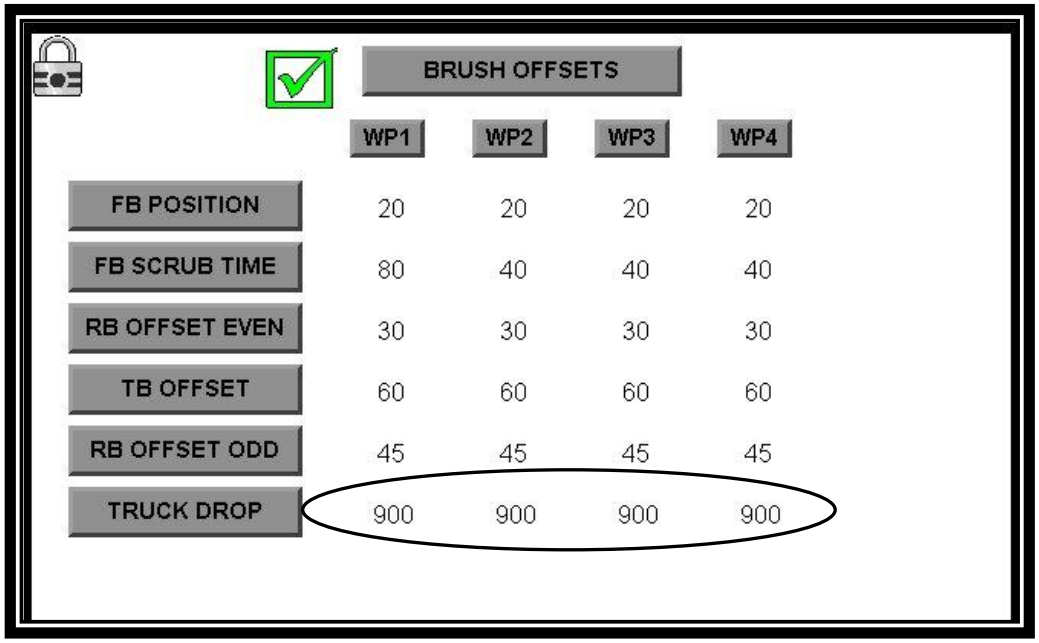
Move the gantry so the ultrasonic sensor is over the bed of the truck; record sonar sensor reading.



In order to capture the sonar reading, access the following screen on the HMI:

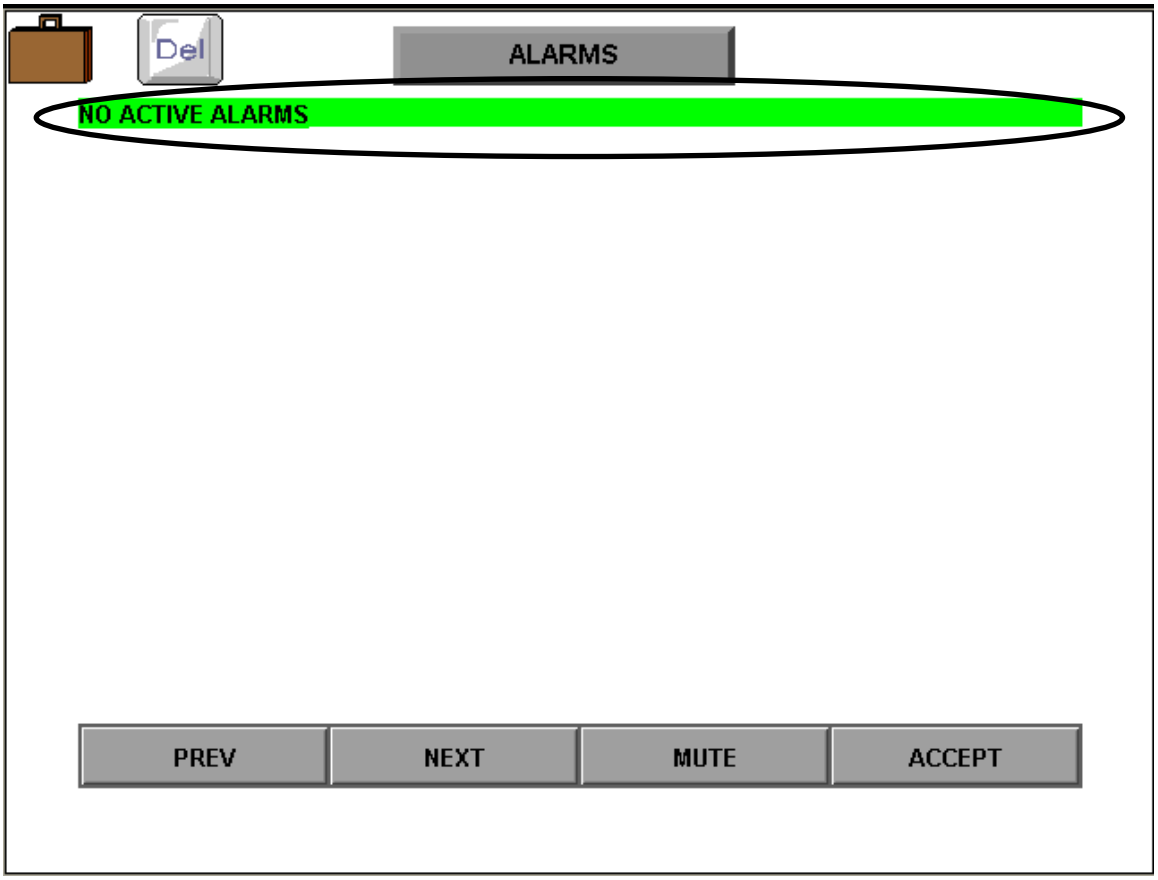


Truck drop = 1.10 X (Sonar 2 – Sonar 1)



CHAPTER 7: ALARMS TROUBLESHOOTING GUIDE

Alarm Screen



Press to retrieve alarm history

Press to clear alarm register on PLC

Press to clear alarm on touch-screen

Indicates that there are alarms present on the BayWash i5

Motor Overload Alarms

This is a list of the overload alarms that can be displayed on the alarm window:

- ***DS FRONT BRUSH OVERLOAD***
- ***PS FRONT BRUSH OVERLOAD***
- ***DS REAR BRUSH OVERLOAD***
- ***PS REAR BRUSH OVERLOAD***
- ***TOP BRUSH OVERLOAD***

Please follow the next table to troubleshoot any overload related issue present on the BayWash i5.

Situation	Possible cause	Action
Motor overload tripped	*Ambient temperature too high*	*Verify that the motor is getting enough air for proper cooling. Most motors are designed to run in an ambient temperature of less than 40°C.*
	Winding shorted or grounded	*Inspect stator for defects, or loose or cut wires that may cause it to go to ground.*
	Protector may be defective	*Replace the motor's protector with a new one of the same rating.*
	Phase Loss	*Make sure all the 3 phases are properly connected to the motor and they are properly balanced.*
	Overload setting is under-rated	*Adjust the overload setting based on the information provided by the manufacturer.*
	Motor rotation is being restricted, causing the motor to draw current beyond the overload point	*Make sure that the motor can rotate freely.*

Brush Arm Alarms

This is a list of the brush arm alarms that can be displayed on the alarm window

- ***DS REAR BRUSH SENSOR MALFUNCTION***
- ***PS REAR BRUSH SENSOR MALFUNCTION***
- ***TOP BRUSH SENSOR MALFUNCTION***

Situation	Possible cause	Action
Brush arms are not retracted	*PLC output not working properly*	*Replace the output relay within the module.*
		Make sure output module is online (verify that network is working properly). Reference network troubleshooting section within the manual.
	Voltage not being supplied to the output's COM	*Supply the correct voltage to the output.*
	Solenoid not working properly	*Replace solenoid.*
	Electro-pneumatic regulator not working/not adjusted properly	*Replace/ adjust electro-pneumatic regulator.*
	Retract pressure is not high enough	*Increase retract pressure on user interface.*
	Proximity switch needs to be adjusted	*Adjust proximity switch.*
	Proximity switch not working properly	*Replace proximity switch.*
	Arm movement is being restricted	*Make sure that the arm can pivot freely.*

Sensors Alarms

This is a list of the sensor alarms that can be displayed on the alarm window:

- ***ENCODER PROXIMITY SENSOR MALFUNCTION***
- ***SONAR MALFUNCTION***

Situation	Possible cause	Action
Encoder is malfunctioning	*No power being supplied to the sensor*	*Make sure 24VDC is being supplied to the sensor.*
	Encoder not working properly	*Replace encoder .*
	Encoder needs to be tightened to wheel weldment wheel	*Make sure that encoder split collar is adjusted properly.*
	VFD tripped	*Make sure VFD is not tripped*
Sonar is malfunctioning	*Sonar upper and lower limit needs to be adjusted due to temperature changes*	*Access the HMI to modify upper and lower limit values.*
	Sonar is not working properly.	*Replace sonar.*

Timeout Alarm

This alarm is triggered when a pass takes more than 90 seconds to complete/ 300 seconds for Pass 0 (positioning the vehicle).

E-stop Alarm

This alarm is triggered when a the E-stop is pressed on the off-board panel.

In order to clear the alarm, make sure the E-stop is un-pressed.

Resetting Alarms

In order to reset an alarm make sure the condition that is triggering the alarm has been cleared. Provided that condition is satisfied, proceed as follows:

1. ***Press "ACCEPT" button to clear the alarm from the HMI.***
2. ***Press "Del" button to clear the alarm from the PLC.***

CHAPTER 8: POS INTERCONNECTION

BayWash i5 POS Overview

Wash Package Inputs

The BayWash i5 offers 4 packages. Each wash package can have up to 10 passes.

The terminal blocks corresponding to the wash packages are located on the off-board panel, remote input card (RI1):

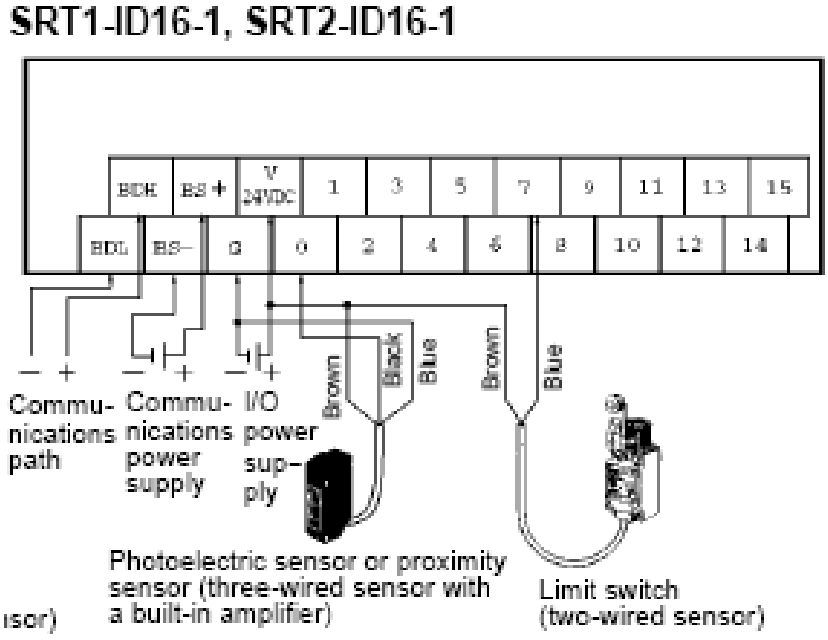
WP1 Input 2

WP2 Input 3

WP3 Input 4

WP4 Input 5

The inputs are rated for 24VDC (sinking). Please see the following figure for details on the remote input module.



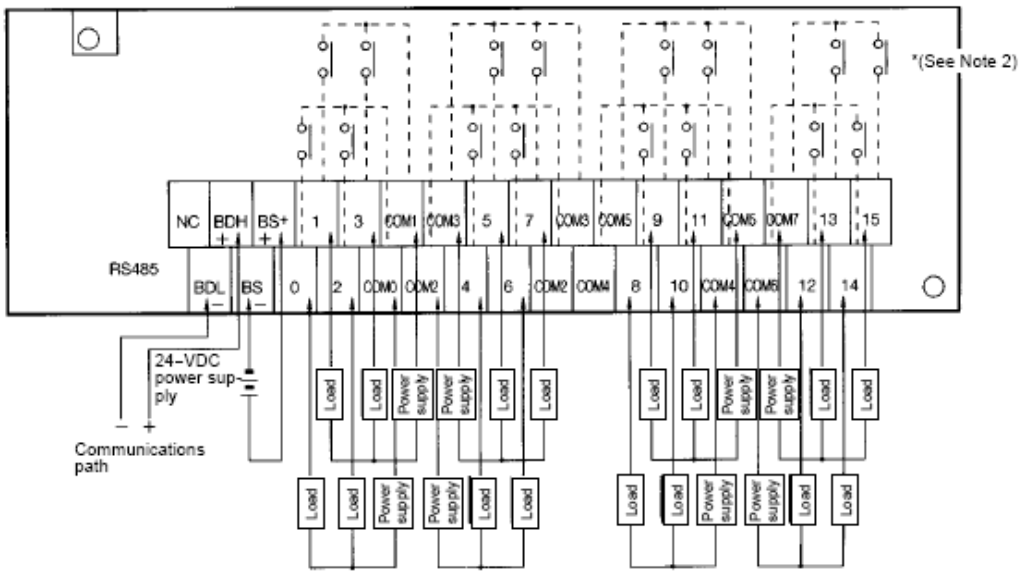
Busy Signal

Terminal block 11 corresponds to the cycle inhibit signal. The remote output module is located on the off-board panel (RO2). This is a dry relay contact (COM5).

Out of Order Signal

Terminal block 10 corresponds to the out of service signal. The remote output module is located on the off-board panel (RO2). This is a dry relay contact (COM5).

Please see the following figure for details on the remote output module.



Note: 1. Dotted lines indicate internal connections.
SRT□-ROC08 and SRT□-ROF08 have the 0 to 7 and COM0 to COM3 terminals only.
2. The above is a connection example of the SRT□-ROC16 with G6D Relays mounted.
G3DZ Power MOSFET Relays are mounted to the SRT□-ROF08 and SRT□-ROF16.

Interface Unitec Wash Select II

Wash Outputs

1. *Locate the small, thin-tipped screwdriver, and the Wash Select II main circuit board, which is located on the inner, right-hand wall of the Wash Select II unit. On the lower left-hand corner of the CPU, there is a green, 10-Pin phoenix connector, which is labeled "J-17 - Car wash Relays" (in white), directly above the connector.*
2. *Remove this connector from the socket and hold it so that the pin marked #1 is on the left side. Use the screwdriver to open and/or secure the manufacturer wash wires to each of the appropriate Unitec relay locations in accordance with the following table:*

Table 1. Wash Relays

Signal:	Wash Select II CPU board (lower left corner) Location:	Enterlink Equivalent	POS4000, E-system, Wash Select V1 Equivalent
Wash Relay Common	J-17, Pin 9	PC	Conn. A pin 8
Wash Output #1	J-17, Pin 1	P1	Conn. B pin 1
Wash Output #2	J-17, Pin 2	P2	Conn. B pin 2
Wash Output #3	J-17, Pin 3	P3	Conn. B pin 3
Wash Output #4	J-17, Pin 4	P4	Conn. B pin 4
Spare Option Relays	J-17, Pins 5-8	P5-8	Conn. B pin 5-8

Wash-In-Use

It is not uncommon for values of this voltage to be as much as 115-120 VAC, so it is extremely important to verify that there is no power applied to any of the wash components before proceeding. In previous models offered by Unitec, there was a need to set a jumper on the CPU, in order to program it for a 24VAC or a 120VAC circuit; however, this is not the case with the Wash Select II. This unit is fully capable of dealing with all ranges of wash-in-use voltage.

1. *Locate the Wash Select II CPU board and remove the green Phoenix connector from the socket labeled J-18. This will be located on the lower left-hand corner of the CPU. Use the screwdriver to open the terminals marked as pins 1& 2.*
2. *Identify the signals provided as a "Wash-In-Use Hot" and a "Wash-In-Use Neutral" coming from the wash PLC. Install the two signal wires in accordance with the following table:*

Table 2. Wash-In-Use Signal

Signal:	Wash Select II CPU board Location (lower left corner):	Enterlink Equivalent	POS4000, E-system, Wash Select V1 Equivalent
Wash-In-Use Hot	J-18, Pin #1	WUH	Conn. D pin 1
Wash-In-Use Neutral	J-18, Pin # 2	WUN	Conn. D pin 2

Wash-Fault

This signal could have a voltage as high as 115VAC, and the installer is advised to take the necessary precautions during installation.

1. *Locate the same connector to which the WIU signal is connected to in section 4.1.5 above, J-18 in the lower left corner of the CPU. The Wash-Fault Hot and Wash-Fault Neutral are connected to pins 3 and 4 respectively as shown in the table below.*

Table 3. Wash-fault SIGNAL

Signal:	Wash Select II CPU board Location (lower left corner):	Enterlink Equivalent	POS4000, E-system, Wash Select V1 Equivalent
Wash-Fault Hot	J-18, Pin #3	N/A	N/A
Wash-Fault Neutral	J-18, Pin # 4	N/A	N/A

Relay Latching

Relay Latching describes the type of relay output for the wash arming signals. Most car washes prefer the signals to be "No/Pulsed".

***Yes/Latched** – Relays are turned on when the arming signal is sent to the carwash. The relays stay on until either a customer upgrades the wash (if upgrading is enabled) or the wash becomes "In Use".*

***No/Pulsed** – Relays are turned on for a 2 second pulse when the arming signal is sent to the carwash. The relays will not activate again unless the customer upgrades the wash (if upgrading is enabled).*

Default Setting is: No/Pulsed

Relay Stacking

Relay Stacking is the ability for Wash Select II™ to hold back all wash arming signals while the wash is "In Use".

***Enabled** – No arming signals will be sent to the wash if the wash is "In Use" (See Wash Handshaking). If a customer comes up to the unit and purchases a wash while another customer is in the wash, the Wash Select II™ will wait till the wash is not "In Use", before sending the second customer's wash arming signal.*

***Disabled** – The Wash Select II™ will send any wash arming signal immediately to the Carwash regardless of the state of the carwash.*

Default Setting is: Yes/Enabled.

Interface Unitec Portal

Overview

In applications where the Portal will communicate with the Wash Controller, the wash control wires will need to be connected to the Wash I/O Board.

Most wash manufacturers use a five-wire system to provide the arming signals for the selected wash packages. One common line and four arming input wires are fed from the wash's PLC to the Wash I/O board. Each of the four arming input wires signal the equipment to give only the designated wash options. When a customer purchases a wash package, the Portal TI sends a signal down the appropriate arming input wire through the Wash I/O board.

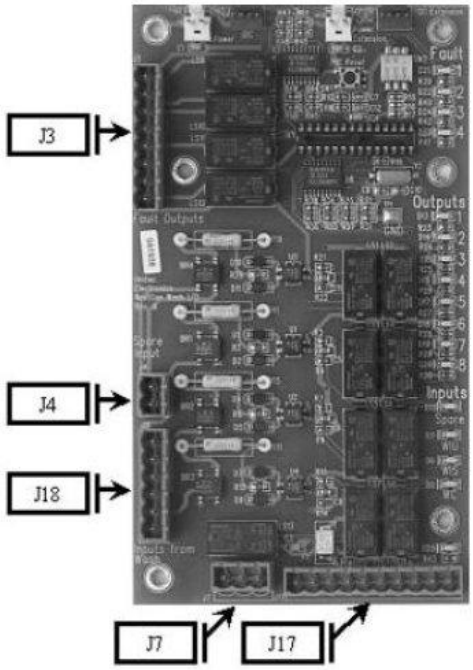
In addition to these five wires, a Wash-In-Use (WIU) Hot and WIU Neutral are required to reset the wash electronics. Typically, these are also provided by the PLC.

Wiring the Wash Relay Interface

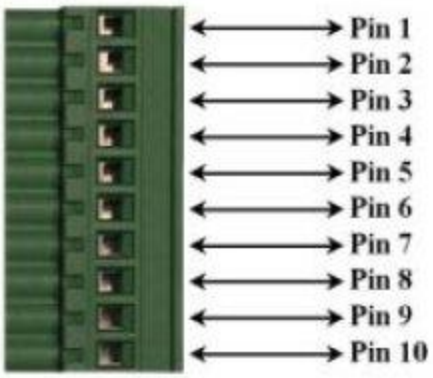
To wire the wash relays, connect the wires that come from the PLC to the appropriate pin numbers in the phoenix connector using the following procedures:

You will need a thin tipped, flat head screwdriver to open and tighten the relay connections of the Phoenix connector. (Phoenix connectors are shipped already inserted in the appropriate sockets on the Wash I/O board).

1. *Remove the Carrier Board/Wash I/O Board Cover Plate using a 5/16" socket wrench.*
2. *Locate the Wash I/O board on the inside lower right-hand wall of the Portal TI case.*
3. *On the Wash I/O Board, locate the 10-pin Phoenix connector labeled J17 on the lower right-hand corner of the Wash I/O board.*



4. *Remove the Phoenix connector from the socket.*
5. *Turn the connector so that the wire inputs are facing up as shown below.*



6. *Referring to the figure above, connect the wash relay arming wires, the wash relay common wire, and any spare option relay wires to the appropriate pins, as indicated in the following table. Use the screwdriver to open and/or secure the manufacturer wash wires to each of the Unitec relay locations.*

Wash Relays

Pin	Signal
Pin 1	Wash Output #1
Pin 2	Wash Output #2
Pin 3	Wash Output #3
Pin 4	Wash Output #4
Pins 5-8	Spare Option Relays (Outputs 5-8 respectively)
Pin 9	Wash Relay Common
Pin 10	N/A

7. *Plug the Phoenix connector into the Wash I/O board socket J17.*
8. *Continue to Wash-In-Use wiring procedures.*

Wiring the Wash-In-Use Interface

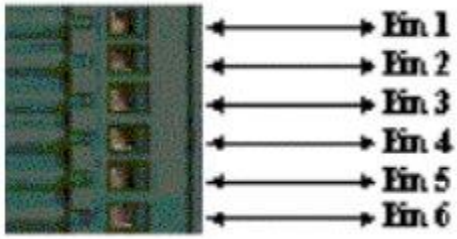
Wash equipment requires a reset circuit. This circuit is generally identified as the "Wash-In-Use" (WIU) signal. It is not uncommon for values of this voltage to be as much as 115-120 VAC, so it is extremely important to verify that there is no power applied to any of the wash components before proceeding.

You will need a thin tipped, flat head screwdriver to open and tighten the relay connections of the Phoenix connector.

Review the wash manufacturer's documentation to determine the color codes for the wiring of the wash pin-outs for your wash equipment before beginning this installation.

Phoenix connectors are shipped already inserted in the appropriate sockets on the Wash I/O board.

1. *On the Wash I/O Board, locate the 6-pin Phoenix connector labeled J18 on the lower left-hand corner of the Wash I/O board.*
2. *Remove the Phoenix connector from the socket.*
3. *Turn the connector so that the wire inputs are facing up as shown below.*



4. *Referring to the figure above, connect the following wires to the appropriate pins, as indicated in the following table. Use the screwdriver to open and/or secure the manufacturer wash wires to each of the Unitec relay locations.*
5. *Plug the Phoenix connector into the Wash I/O board socket J18.*
6. *Replace the protective metal plate that covers the Wash I/O board and the carrier board.*

Wash-In-Use Connections

Pin	Signal
Pin 1	Wash-In-Use Hot
Pin 2	Wash-In-Use Neutral
Pin 3	Wash-Fault-Hot
Pin 4	Wash-Fault-Neutral
Pin 5	Wash-Complete-Hot
Pin 6	Wash-Complete-Neutral

Interface Hamilton ACW-5

Wash Outputs

1.- The ITEM 1 wire pair (ITEM 1 SIGNAL and ITEM 1 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #1 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the ACW-5, connect one end of this pair to terminals 1 and 2 on the Relay Panel terminal block.

2.- The ITEM 2 wire pair (ITEM 2 SIGNAL and ITEM 2 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #2 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the ACW-5, connect one end of this pair to terminals 3 and 4 on the Rely Panel terminal block.

3.- The ITEM 3 wire pair (ITEM 3 SIGNAL and ITEM 3 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #3 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the ACW-5, connect one end of this pair to terminals 5 and 6 on the Rely Panel terminal block.

4.- The ITEM 4 wire pair (ITEM 4 SIGNAL and ITEM 4 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #4 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the ACW-5, connect one end of this pair to terminals 7 and 8 on the Rely Panel terminal block.

Cycle Inhibit Signal

The CYCLE/INHIBIT pair is used for the car wash controller to signal the ACW-5 when a car has completed its wash and has left the bay. The signal coming from the car wash controller must be able to energize the coil of a relay on the Relay Panel. This means that the car wash controller is supplying both voltage and current when it energizes the coil. Inside the ACW, the wiring connections depend on the signal provided by the car wash controller.

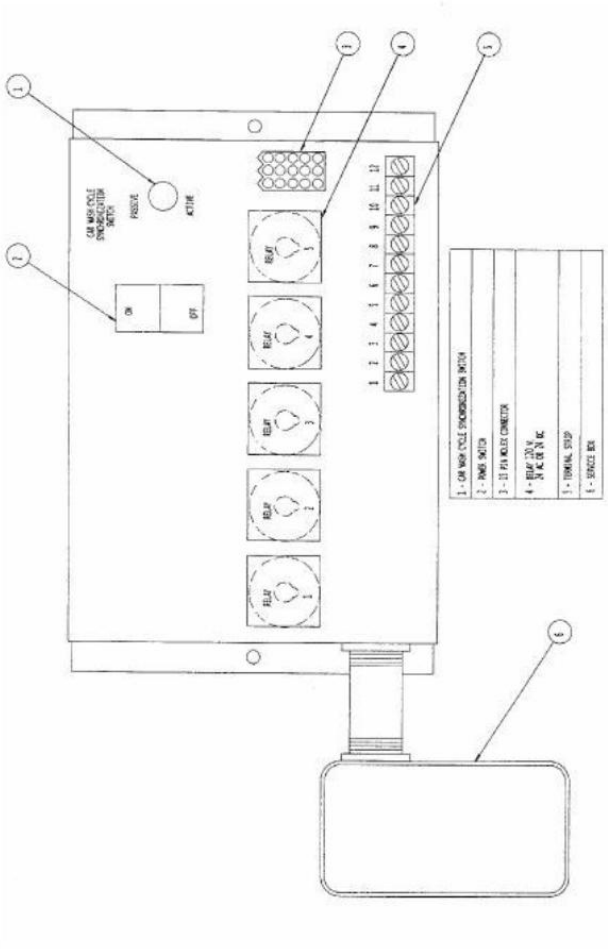
***If the externally supplied signal is a 120VAC signal**, the CYCLE/INHIBIT pair should be connected to the two RED wires coming from the service box connected to the Relay Panel. This connection is made by using wire-nuts to connect the CYCLE/INHIBIT SIGNAL to one of the RED wires (it doesn't matter which one), and connecting the CYCLE/INHIBIT RETURN wire to the other RED wire. If there are no RED wires coming from the service box, contact your equipment supplier or Hamilton Mfg. before proceeding.*

***If the externally supplied signal is 24VAC, 24VDC, 12VAC or 12VDC**, the CYCLE/INHIBIT pair should be connected directly to the terminal block of the Relay Panel. The proper connection will have one wire of this pair connected to terminal 9 of the Relay Panel (it doesn't matter which one) and the other wire of the pair connected to terminal 10. If there are no RED wires coming from the service box connected to the Relay Panel, contact your equipment supplier or Hamilton Mfg. before proceeding.*

Setting the Car Wash Cycle Synchronization Switch

The Car Wash Cycle Synchronization Switch is the silver toggle switch located on the Relay Panel (Refer to Figure 3). The proper setting of this switch depends on the equipment used in your car wash system. If the car wash equipment normally leaves the CYCLE/INHIBIT RELAY de-energized while in stand-by, and then energizes the relay briefly when the customer exits the bay, this switch should be set to PASSIVE. If the reverse occurs, where the car wash equipment normally energizes the CYCLE/INHIBIT RELAY while in stand-by, then de-energizes the relay briefly when the customer exits the bay, the switch should be set to ACTIVE.

NOTE: For the BayWash I5 make sure the switch is set to PASSIVE



RELAY PANEL

Car Wash Busy Signal

The normal signal at the Controllers cycle input is a TTL level logic low. When the car wash signals that a customer is leaving the bay, this line goes to a high logic level for the duration of the signal from the car wash. If this line should unexpectedly go high (no car should be in the wash) for more than 8 seconds, this error will occur indicating a malfunction in the car wash system. Returning the cycle line to its normal state will automatically clear this error.

Another cause for this error may be that the blue connector on the split harness has come loose or undone. Be sure to check this connection. If it is loose, reconnect it to clear the error.

Car Wash Closed

The normal signal at the Controllers cycle input is a TTL level logic low. When the car wash signals that a customer is leaving the bay, this line goes to a high logic level for the duration of the signal from the car wash. If this line should unexpectedly go high (no car should be in the wash) for more than 10 minutes, this error will occur indicating a malfunction in the car wash system. Returning the cycle line to its normal state will automatically clear this error.

Interface Hamilton GoldLine/ GoldLine Plus

Wash Outputs

1.- The ITEM 1 wire pair (ITEM 1 SIGNAL and ITEM 1 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #1 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the GLACW, connect one end of this pair to terminals A1 and A2 on the Relay Panel terminal block.

2.- The ITEM 2 wire pair (ITEM 2 SIGNAL and ITEM 2 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #2 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the GLACW, connect one end of this pair to terminals A3 and A4 on the Relay Panel terminal block.

3.- The ITEM 3 wire pair (ITEM 3 SIGNAL and ITEM 3 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #3 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the GLACW, connect one end of this pair to terminals A5 and A6 on the Relay Panel terminal block.

4.- The ITEM 4 wire pair (ITEM 4 SIGNAL and ITEM 4 RETURN) is used to signal the wash controller that a customer has completed a transaction and has selected the Wash #4 sequence. The signal presented to the car wash controller is a normally open, dry contact relay closure. In the GLACW, connect one end of this pair to terminals B1 and B2 on the Relay Panel terminal block.

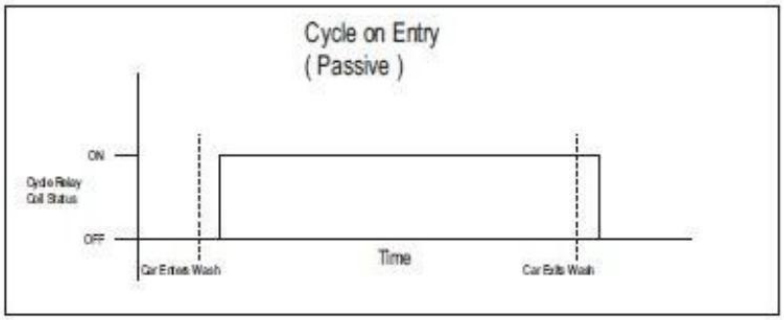
Cycle Inhibit Signal

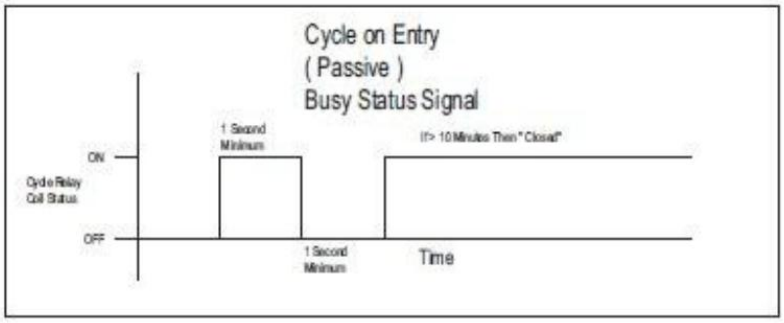
The CYCLE/INHIBIT pair is used for the car wash controller to signal the GL-ACW when a car has completed its wash and has left the bay. The signal coming from the car wash controller must be able to energize the coil of a relay on the Relay Panel. This means that the car wash controller is supplying both voltage and current when it energizes the coil. Inside the ACW, the wiring connections depend on the signal provided by the car wash controller. The CYCLE/INHIBIT pair should be connected directly to the terminal block of the Relay Panel. The proper connection will have one wire of this pair connected to terminal C5 of the Relay Panel (it doesn't matter which one) and the other wire of the pair connected to terminal C6.

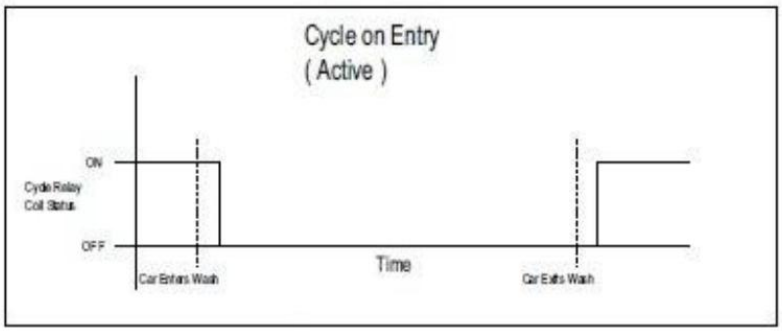
Setting Car Wash Cycle Synchronization Switch

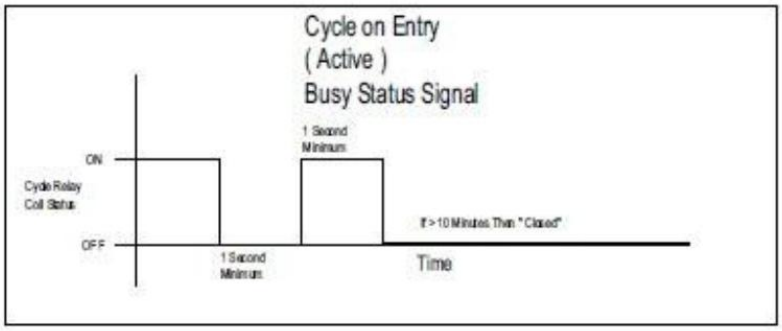
The Car Wash Cycle Synchronization Switch is the silver toggle switch located on the Relay Panel. The proper setting of this switch depends on the equipment used in your car wash system. If the car wash equipment normally leaves the CYCLE/INHIBIT RELAY de-energized while in standby, and then energizes the relay when the customer enters the bay, this switch should be set to PASSIVE (see Figure 2-2). If the reverse occurs, where the car wash equipment normally energizes the CYCLE/INHIBIT RELAY while in standby, then de-energizes the relay when the customer enters the bay, the switch should be set to ACTIVE (see Figure2-3).

NOTE: For the BayWash I5 make sure the switch is set to PASSIVE.

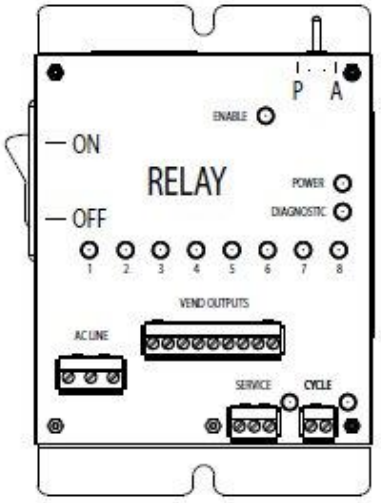

Cycle on Entry
(Passive)
ON
Cycle Relay
Coil Status
OFF
Car Enters Wash
Time
Car Exits Wash

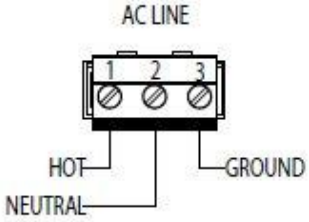

Cycle on Entry
(Passive)
Busy Status Signal
1 Second
Minimum
If > 10 Minutes Then " Closed"
ON
Cycle Relay
Coil Status
OFF
1 Second
Minimum
Time

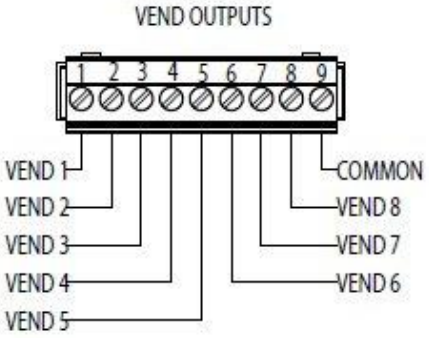

Cycle on Entry
(Active)
ON
Cycle Relay
Coil Status
OFF
Time
Car Enters Wash
Car Exits Wash

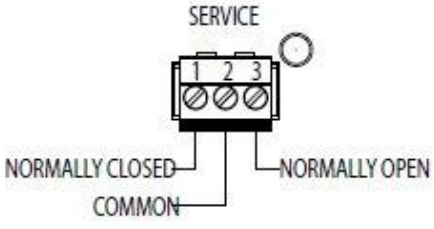

Cycle on Entry
(Active)
Busy Status Signal
1 Second
Minimum
ON
Cycle Relay
Coil Status
If > 10 Minutes Then " Closed"
OFF
1 Second
Minimum
Time

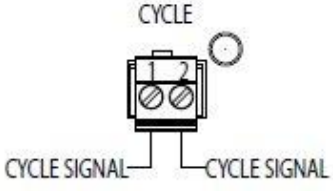
Universal Relay Panel











Interface Hamilton HTK

Wash Outputs

1.- The Vend 1 wire is used to signal the car wash controller that a customer has completed a transaction and has selected the Vend 1 sequence. The connection for Vend 1 is position 1 on the phoenix connector.

2.- The Vend 2 wire is used to signal the car wash controller that a customer has completed a transaction and has selected the Vend 2 sequence. The connection for Vend is position 2 on the phoenix connector.

3.- The Vend 3 wire is used to signal the car wash controller that a customer has completed a transaction and has selected the Vend 3 sequence. The connection for Vend 3 is position 3 on the phoenix connector.

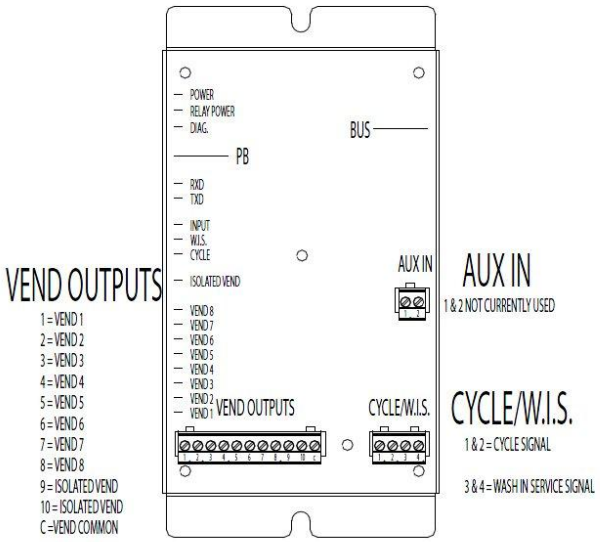
4.- The Vend 4 wire is used to signal the car wash controller that a customer has completed a transaction and has selected the Vend 4 sequence. The connection for Vend 4 is position 4 on the phoenix connector.

The Common wire pulled to the HTK from the car wash controller is connected in Position 11 (C) of the phoenix connector on the Wash Interface.

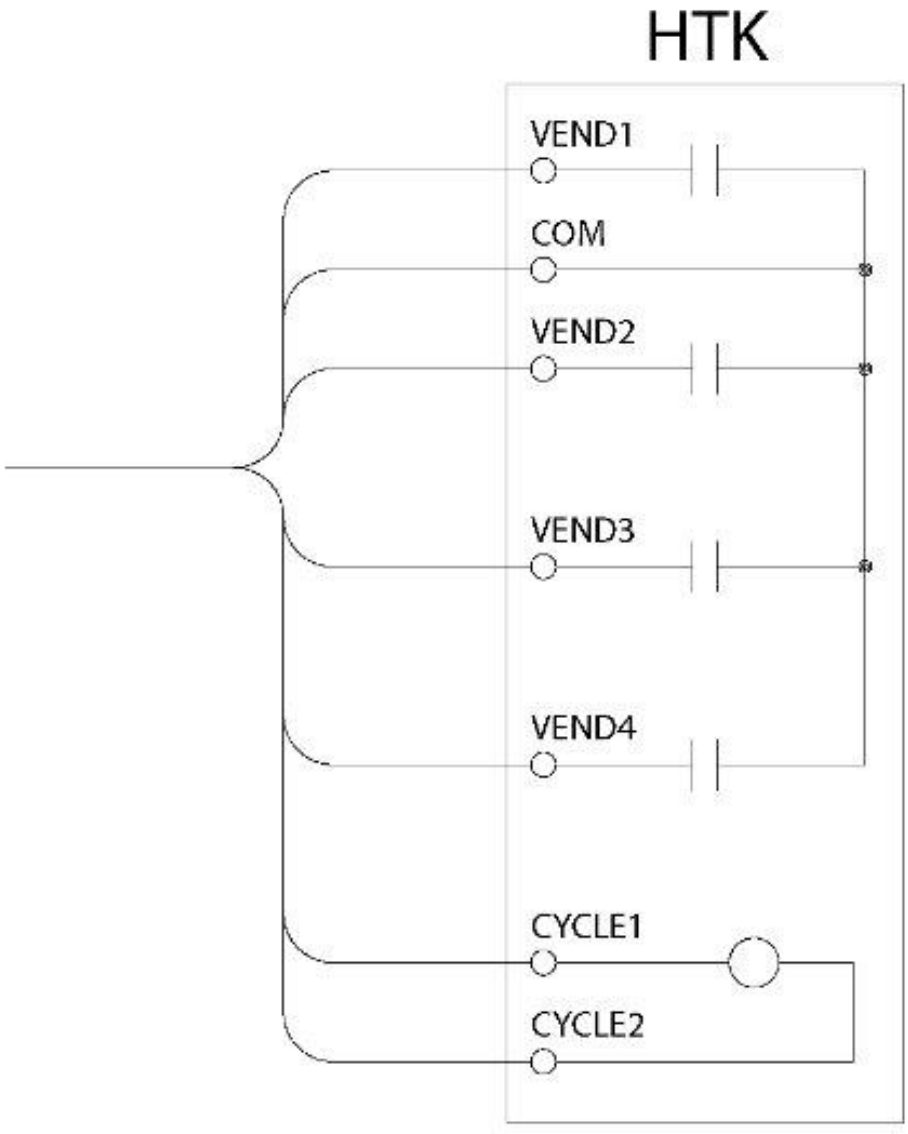
Cycle Inhibit Signal

The CYCLE/INHIBIT wires are used for the car wash controller to signal the HTK when a car has completed its wash and left the bay. The signal coming from the car wash controller must be able to energize the coil of a relay on the wash interface. This means that the car wash controller must be supplying both voltage and current when it energizes the coil. Inside the HTK, the wiring connection depends on the signal provided by the car wash controller. The CYCLE/INIBIT wires should be connected directly to the 4 position phoenix connector. Position 1 and 2 on the wash interface. Note: Refer to the "Wash Interface" for proper wiring connection

Wash Interface



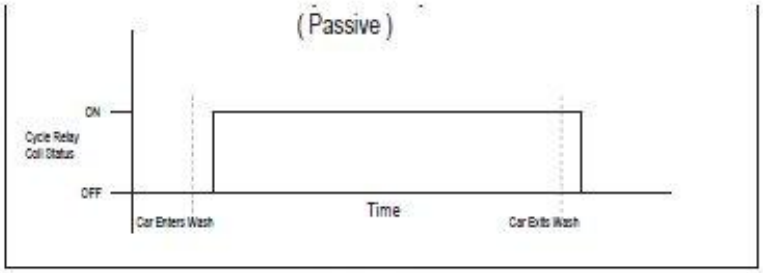
HTK "Automatic" Wiring

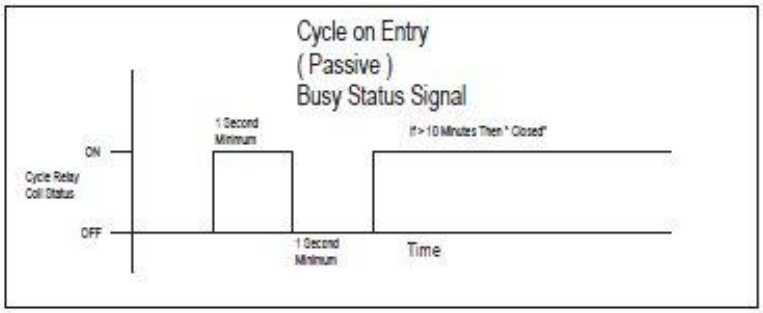


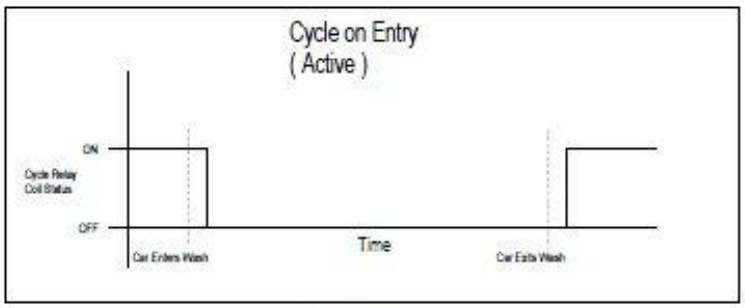
Setting Car Wash Cycle Synchronization

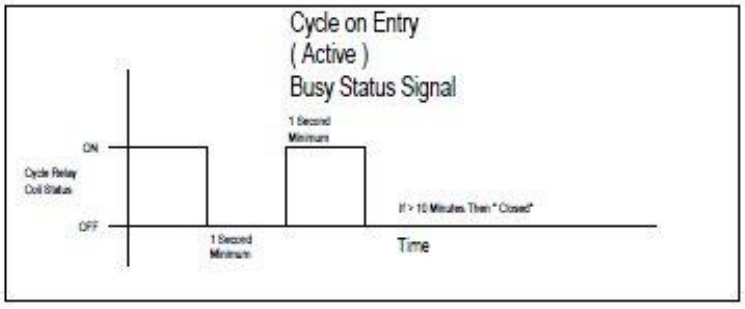
The Car Wash Cycle Synchronization is a programmable setting in the HTK controller. The proper setting of this category depends on the equipment used in your car wash system. If the car wash equipment normally leaves the CYCLE/INHIBIT RELAY de-energized while in standby, and then energizes the relay when the customer enters the bay, the programming category should be set to PASSIVE . If the reverse occurs, where the car wash equipment normally energizes the CYCLE/INHIBIT RELAY while in standby, then de-energizes the relay when the customer enters the bay, the programming category should be set to ACTIVE.

NOTE: For the BayWash I5 make sure the switch is set to PASSIVE.







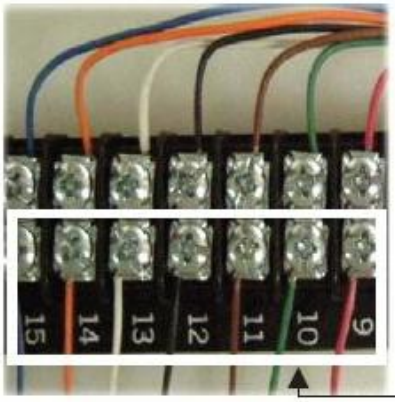


Interface Jim Coleman Water Wizard 2.0

Cycle Outputs/ Clear to Send Output

1. *Connect control cable to terminal strip located in the top of the electrical box.*

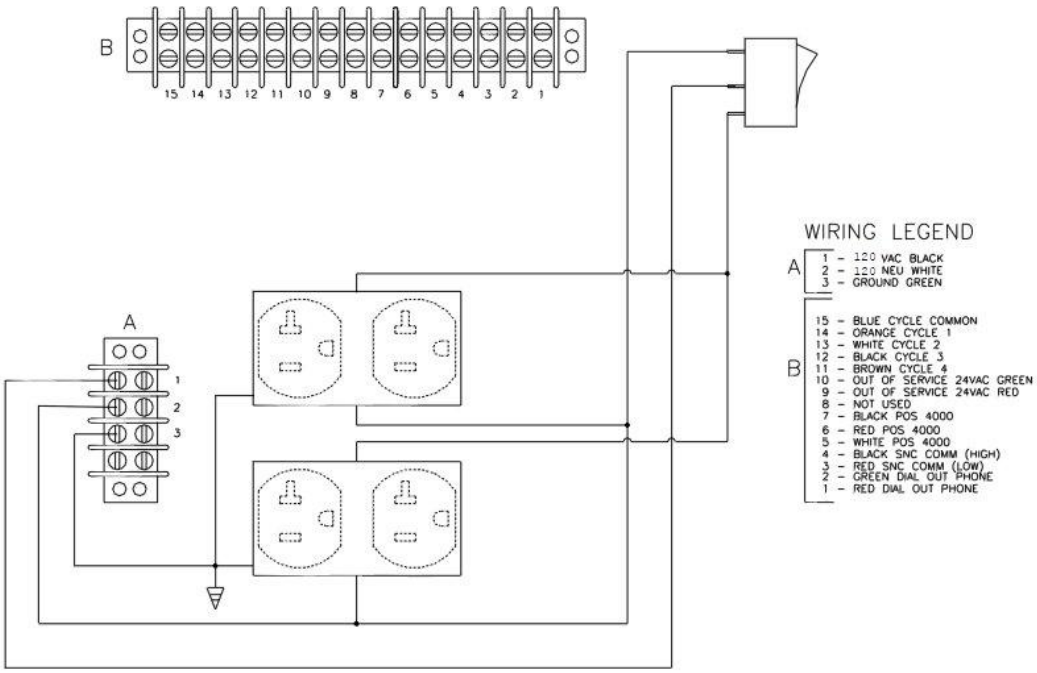
2. *Control cable wires connect to #'s 9-15 on the terminal.*



Color Code	
#9	Red
#10	Green
#11	Brown
#12	Black
#13	White
#14	Orange
#15	Blue

3. *One Return Signal from auto control (Water Wizard 24VDC)* ***(Terminal number 15).***
4. *Four Cycle control wires* ***(Terminals number 11 through 14).***
5. *Two Inhibit Clear to Send wash wires (Water Wizard 10VAC)* ***(Terminals number 9,10).***

Entry Wizard Electrical Wire Schematic



Normal Operation

The Entry Wizard normal operation is as follows:

- *Customer drives up to Entrance Controller and is greeted by music and active screen.*
- *Customer can touch screen and receive on-screen instructions or review the menu of car wash services available.*
- *Customer can deposit money in the form of dollar bills or coins until the correct amount is received or swipe a Credit Card for payment.*
- *Customer can touch the screen to select the desired wash.*
- *The Entry Wizard will send out a signal to the Automatic Car wash to turn on the desired wash.*
- *When the Automatic Car wash is finished washing a car, the Automatic needs to send out a Clear to Send signal to tell the Entry Wizard that the wash is complete and it is ready to accept a new wash signal.*
- *If a Customer drives up to the Entry Wizard before the Automatic Car wash sends the Clear to Send signal, the Entry Wizard will allow the customer to purchase a wash package but will not send the signal to the Automatic Car wash until it receives a Clear to Send signal from the Automatic Car Wash that the first wash is complete.*

Clear to Send Signal

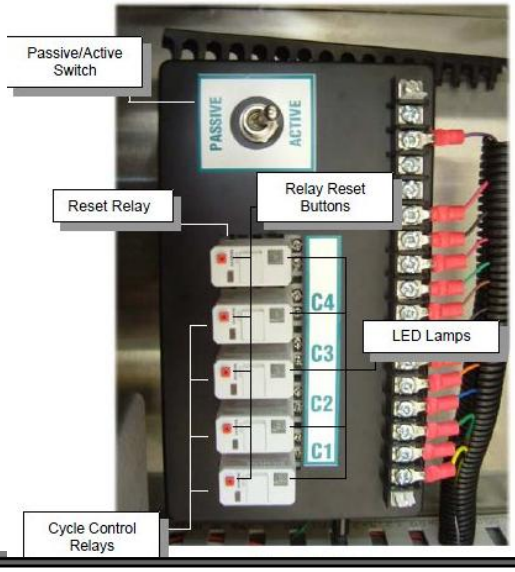
- *The Automatic Car wash is required to send out a Clear to Send Signal to tell the Entry Wizard that the Car Wash is ready to wash a car. The Entry Wizard comes standard with the capability to accept an 24 vdc signal. If the Clear to Send signal is a different voltage, the relay on the Cycle Control Board needs to be changed out to match the voltage of the signal.*
- *The Clear to Send signal should only be sent to the Entry Wizard if the automatic is ready to accept another wash signal. This signal should be longer than 2 seconds and shorter than 9 seconds. We recommend a 3 second Clear to Send signal. If the Clear to Send signal lasts longer than 10 seconds, the Entry Wizard will go Out of Service.*
- *The Water Wizard sends out a Clear to Send signal for 3 seconds after the unit is completely through washing the car and the car has exited the bay. When the Water Wizard sends out the Clear to Send signal it is ready to receive another wash package. The Water Wizard also will send a Clear to Send signal if the car fails to enter the bay within a predetermined time or leaves the bay before the wash is complete. You can press the Reset switch on the electrical panel on the Water Wizard and it will send out a Clear to Send signal for 3 seconds. The Water Wizard will tell the Entry Wizard to go Out of Service any time the Water Wizard detects a fault condition that prevents it from washing a car safely. This is accomplished by sending out a continuous signal longer than 10 seconds. Once the problem is corrected on the Water Wizard and the Clear to Send signal is removed, the Entry Wizard will go back into service.*

Clear to Send Switch

Located on the cycle control board is a switch that controls the way the Entry Wizard handles the Clear to Send signal. The switch can be put in two different positions depending on how the Automatic Car wash equipment sends a signal. If you are connecting to a Water Wizard set the switch to the Passive Mode. The Automatic car wash needs to send out a signal to tell the entrance controller that it is ready to wash a car. This signal should be longer than 2 seconds and shorter than 9 seconds. We recommend a 3 second Clear to Send signal.

- ***PASSIVE MODE:** Signal is usually off and only comes on when your automatic car wash equipment sends out a signal to tell the Entrance controller that the wash is complete.*
- ***ACTIVE MODE:** Signal is on at all times and only goes away when the Automatic is ready to receive a new wash package.*

NOTE: For the BayWash i5, make sure the switch is set to PASSIVE (reference following figure).



CHAPTER 9: MAINTENANCE AND CHECKS

Photocells

Adjustments

Signal Strength Adjustment

The signal strength can be adjusted by adjusting the angle of the transmitter beam and the angle of the receiver.

To adjust, loosen the mounting nuts on the transmitter and receiver and adjust to be aimed at each other. Snug the nuts up and check the signal strength again. Make small changes until satisfied.

Tighten nuts and recheck signal strength. Strength will vary with ambient light conditions.

If sunlight is a problem, a directing cone may need to be added to the receiver.

Preventive Maintenance Requirements

Daily

- *Operational Checks*
- *Perform a general examination of operation. Check the transmitter and receiver of the photo eye and wipe clean.*

Weekly

- *Check the signal strength of the system. This will vary with light conditions.*

Floor Switches/Treadle Switches

Preventive Maintenance Requirements

Daily

- *Perform general examination of operation. The switch is checked to ensure proper operation of the BayWash i5.*

Foaming Dual Applicators

Adjustments

Pump Station Adjustment

Adjustment is made at the air regulators on the pump station for the arch.

The air pressure to the pump is set around 40 psi and to the Foamers is set around 20 psi.

Foamer Adjustment

Fine adjustment to the consistency of the foam can be accomplished at the individual Foamers. Each has an air and solution adjustment.

Wet foam is desired so it will hit the vehicle and start to run, pulling the sand and dirt with it.

Preventive Maintenance Requirements

Daily

- *Operational Checks.*
- *Check for leaks around hoses and fittings. Repair any serious leaks immediately.*
- *Perform general examination of operation, listening for any unusual noises.*
- *Check spray pattern from nozzles. Clean any dirty nozzles.*

Weekly

- *Check all nozzles for wear and replace if necessary.*

Monthly

- *Check all hardware and fittings for tightness and clean thoroughly.*

Annually

- *Replace all nozzles to prevent excessive chemical usage and uneven application.*

Foamer/Cleaner Pump Stations

Adjustments

Tank Level

- Tank level can be adjusted by changing the length of chain on the Hydrominder float assembly.
- Level should be within 2" to 3" of the rim of tank.

Solution Mixture

- The ratio of chemical concentrate to water is adjusted by changing the metering tip size.
- The dilution rate does not normally require adjustment, unless the chemical being used is changed.

Preventive Maintenance Requirements

Daily

1. Opening Checks
   - Check chemical draw from drum and level in tank and drum.
   - Check for sufficient chemical supply for the day's use.
   - Inspect for liquid and air leaks and check chemical draw line to make sure chemical is not draining back to barrel.
2. Operational Checks
   - Check for leaks around hoses and fittings. Repair any serious leaks immediately.
   - Perform general examination of operation, listening for any unusual noises.
   - Check pressure gauges. They should come up to pressure and remain steady.

Monthly

- Check all hardware and fittings for tightness and clean thoroughly.
- Clean sediment and dirt from storage/solution tank.

Annually

- Replace all nozzles/tips (metering) to prevent excessive chemical usage and uneven application.

Top Brush

Adjustments

Solution Adjustment

- *Only lubrication soap is applied to the Washer material with a standard installation.*

Cleaning Pressure Adjustment

- *The amount of pressure applied by the brush to the vehicle can be adjusted by moving the counter-weight balance.*
- *Should apply a light pressure sufficient to remain in contact with vehicle and not bounce continuously, approximately 3-4 inches of penetration.*

Rotation Speed Adjustment

- *Should be wired properly to rotate against the travel of the vehicle on pass 3.*

Preventive Maintenance Requirements

Daily

- *During Opening Checks, check for air leaks around pneumatic lines and fittings. Repair any leaks immediately.*
- *Operational Checks.*
- *General examination of operation, listening for any unusual noises.*
- *During Closing Checks, check condition of cloth. If dirty, clean with prep gun.*

Weekly

- *Grease all rotational shaft bearings with 1-2 pumps per bearing.*
- *Check all nozzles for wear and replace if necessary.*
- *Perform a close inspection of operating mechanisms.*
- *Spray lubricant on cylinder rod ends and clevises.*

Monthly

- *Grease all pivotal bearings with 1-2 pumps per bearing.*
- *Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.*

Semi-Annually

- *Check cloth for wear or damage and replace as needed.*

Rear Side Brushes

Adjustments

Solution Adjustment

- *Only lubrication soap is applied to the Washer with a standard installation.*

Cleaning Pressure Adjustment

- *The amount of pressure applied by the brush to the vehicle can be adjusted by changing the electro-pneumatic regulator setting through the user interface.*
- *Should apply a light pressure sufficient to remain in contact with vehicle and not bounce continuously, approximately 3-4 inches of penetration.*

Rotation Speed Adjustment

- *Should be wired properly to rotate with the travel of the vehicle on pass 3.*

Preventive Maintenance Requirements

Daily

- *During Opening Checks, check for air leaks around pneumatic lines and fittings. Repair any leaks immediately.*
- *Operational Checks.*
- *Check and repair any serious water or air leaks immediately.*
- *General examination of operation, listening for any unusual noises.*
- *Observe retract operation. Should be smooth and retract completely.*
- *During Closing Checks, check condition of cloth. Iif dirty, clean with prep gun.*

Weekly

- *Grease all rotational shaft bearings with 1-2 pumps per bearing.*
- *Check all nozzles for wear and replace if necessary.*
- *Perform a close inspection of operating mechanisms and hoses for problems.*
- *Spray lubricant on cylinder rod ends and clevises.*

Monthly

- *Grease all pivotal bearings with 1-2 pumps per bearing.*
- *Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.*

Semi-Annually

- *Check cloth for wear or damage and replace as needed.*

Front Brushes

Adjustments

Solution Adjustment

- *Only lubrication soap is applied to the Washer with a standard installation.*

Cleaning Pressure Adjustment

- *The amount of pressure applied by the brush to the vehicle can be adjusted by changing the electro-pneumatic regulator setting through the user interface.*
- *Should apply a light pressure sufficient to remain in contact with vehicle and not bounce continuously, approximately 3-4 inches of penetration.*

Rotation Speed Adjustment

- *Should be wired properly to rotate with the travel of the vehicle on pass 2 and pass 3.*

Preventive Maintenance Requirements

Daily

- *During Opening Checks, check for air leaks around pneumatic lines and fittings. Repair any leaks immediately.*
- *Operational Checks.*
- *Check and repair any serious water or air leaks immediately.*
- *General examination of operation, listening for any unusual noises.*
- *During Closing Checks, check condition of cloth. If dirty, clean with prep gun.*

Weekly

- *Grease all rotational shaft bearings with 1-2 pumps per bearing.*
- *Check all nozzles for wear and replace if necessary.*
- *Perform a close inspection of operating mechanisms and hoses for problems.*
- *Spray lubricant on cylinder rod ends and clevises.*

Monthly

- *Grease all pivotal bearings with 1-2 pumps per bearing.*
- *Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.*

Semi-Annually

- *Check cloth for wear or damage and replace as needed.*

Wheel Blasters

Adjustments

Water Pressure to Nozzles

It is adjusted at the HP bypass valve on the Water Pump station to approximately 800 psi.

Rotating Speed Adjustment

The rotation speed of the manifold can be adjusted by changing the angle of the nozzles.

Speed is preset to 60-70 RPM by the fixed angle of the nozzles.

Tracking Speed Adjustment

Each manifold has a flow control valve on the reservoir to regulate how fast the manifold tracks the vehicle as it passes, and a flow control valve on the air cylinder to control how quickly it returns to the ready position, facing the tunnel entrance.

- *The manifolds should be aimed at the vehicle as Pass 3 starts.*
- *As the front wheel/tire area comes into target range, the tracking speed should be so that it stays aimed in the wheel/tire area as it passes.*
- *When the front wheel/tire area is out of target range, the manifold should return to the ready position with enough speed to make it there before the rear wheel/tire area enters target range.*
- *As the rear wheel/tire area comes into target range, the tracking speed should be so that it stays aimed in the wheel/tire area as it passes.*
- *As the wheel/tire area passes beyond target range, the manifold should return to the ready position for the next vehicle.*

Preventive Maintenance Requirements

Daily

- *Operational Checks.*
- *Check for air leaks around hoses and fittings. Repair any serious water or air leaks immediately.*
- *General examination of operation, listening for any unusual noises.*

Weekly

- *Check all nozzles for wear and replace if necessary.*
- *Perform a close inspection of operating mechanisms and hoses for problems.*
- *Spray lubricant on cylinder rod ends and clevises.*

Monthly

- *Inspect all UHMW bearings for wear. Replace if necessary.*
- *Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.*

High Pressure Water Pumps

Adjustments

Water Pressure

- *The water pressure supplied to the associated equipment can be adjusted with the valve and gauge on the pump head.*
- *To adjust, loosen the jam nut on the valve, adjust to desired pressure and tighten the jam nut to prevent drifting.*

Preventive Maintenance Requirements

Daily

- *Operational Checks.*
- *Check for leaks around hoses and fittings. Repair any serious water or air leaks immediately.*
- *General examination of operation, listening for any unusual noises.*
- *Check pressure gauge. Should come up to pressure and remain steady.*

Weekly

- *Clean all filters and strainers.*
- *Perform a close inspection of operating mechanisms and hoses for problems.*
- *Check lubricant level in pump crankcase and refill if necessary.*

Monthly

- *Inspect all hardware and fittings for tightness and clean the entire assembly thoroughly.*
- *Check drive belts for wear or damage. Replace if necessary.*
- *Clean sediment and dirt from storage/solution tanks.*

Annually

- *Drain and refill the pump crankcase with oil recommended by pump manufacturer.*
- *Have a licensed electrician measure and record the full load current readings from each of the three legs of motor. If the difference between legs exceeds 10% creating an imbalance, or if the total load current of any motor has increased by more than 10% since the previous quarterly measurement, order and replace the motor.*

Blowers

Adjustments

- *The only adjustments to be made to the Drying System would be the positioning of the dryer nozzles which can be accomplished by moving the dryer mount.*

Preventive Maintenance Requirements

Daily

- *During Operational Checks, perform general examination of operation, listening for any unusual noises.*
- *During Closing Checks, remove any debris from inlet screen.*

Weekly

- *Close inspection of operating mechanisms for problems. If equipped, check the oscillating and flip nozzles for proper operation.*
- *Spray lubricant on cylinder rod ends and clevises, if equipped with flip nozzles.*

Monthly

- *If equipment grease all bearings on the oscillating and flip nozzles.*
- *Check all hardware and fittings for tightness and clean thoroughly. Remove inlet screen and clean the impellers thoroughly.*

Annually

- *Have a licensed electrician measure and record the full load current readings from each of the three legs of motor on each producer. If the difference between legs exceeds 10% creating an imbalance, or if the total load current of any motor has increased by more than 10% since the previous quarterly measurement, order and replace the motor.*
- *Grease all electrical motors on the dryer assembly.*

CHAPTER 10: ELECTRICAL SCHEMATICS

CHAPTER 11: WATER SCHEMATICS

CHAPTER 12: PNEUMATIC SCHEMATICS

CHAPTER 13: CHEMICAL SCHEMATICS