

Tunnel Master® wbc

User Manual

Version 15



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Introduction

Congratulations, and thank you for purchasing the Tunnel Master® *wbc*! Now, your wash the highly acclaimed, choice of tunnel controllers in the marketplace. The Tunnel Master® *wbc* , also known as the WBC, is a powerful tool that will help make your car wash more efficient, your customers happier, and your bottom line healthier. The first step is to review the manual so you and your staff can understand and leverage all of the features.

Version Considerations

This document is Version 15 released January 14, 2022.

There are two versions of the ICS firmware with the difference being the VS (Variable Speed) designation which is required when going to a new Tunnel Master® *wbc* unit:

- Controller firmware version 1.6 B1 (Requires StackController V1.7.5.8 or higher, Touch V5.2.33.40 or higher)
- Controller firmware version 1.5 B15 (Requires StackController V1.7.5.8 or lower, Touch V5.2.33.39 or lower)
- Controller firmware version 1.3 B12 (only available if hardware is compatible)

This document is intended for end-user audiences. No prior experience with the Tunnel Master® *wbc* is required. Some familiarity with the Auto Sentry® payment terminal operations is assumed.

Related Documents

The following document is available for further reference:

- Tunnel Master® *wbc* Installation Guide

ICS developed this manual in order to:

- Provide a comprehensive, easy-to-use system reference guide.
- Enable operators and their employees to obtain the maximum value from the system.
- Furnish operators with a tool for training their employees on the Tunnel Master®*wbc* car wash controller.

After reading this manual, you should be able to:

- Configure your wash settings and features
- Process vehicles through your wash
- View car counts and historical information
- Track sales and print reports

Many of the features you will find in the ICS controller system were integrated at the request of car wash operators. We welcome your feedback and want to assure you that ICS is committed to being the leader in the industry of car wash controller and management systems.

Controller Features

- Add up to 96 internally fused single-pole relays as needed. Each of the 96 relays can be profiled in nine different ways for nearly unlimited customization for all your current and future tunnel needs.
- Connect up to four additional ICS relay boxes (24 relays per box) to maximize 192 total relays (See Tunnel Master®WBC Installation Guide).

- 24 programmable, fused outputs, upgradeable to 48, each with two independent circuits for 24 VAC and 120 VAC.
- Programmable flashing relay.
- Exclusive, patented built-in anti-theft feature prevents unauthorized processing of car washes.
- 6 designated and 9 unassigned system inputs for Pulse, Gate, Tire, Roller Locator, Entrance Management, and Panic circuits.
- Built-in conveyor interlock circuit provides smart control of conveyor for emergency stops, panic stops, and conveyor auto start.
- Programmable staggered re-start after panic condition to reduce energy consumption.
- Auto pulse feature allows pulse simulation in the event of pulse switch failure.
- Auto Gate feature allows gate switch simulation in the event of gate switch failure.
- Roller Interlock disables the roller-up and gate switch until a valid service is programmed.
- Exterior indicators for easy troubleshooting.
- 16 programmable service buttons on the entry keypad, upgradeable to 32.
- Automated wet down feature for easy startup.
- Optional real-time reporting on receipt printers.
- Mobile Internet access via iPad, iPhone, and Android phones. Connect locally to the WBC via a Wi-Fi wireless network for reports and change settings while away from the wash location or while in the tunnel.

ETL Intertek

- The Tunnel Master®*wbc* is listed in Intertek's Directory of Listed Products. UL-61010-1

Getting Started

This chapter includes preliminary steps to take for a first-time Tunnel Master® *wbc* startup.

Reset Default Configuration Settings

When you receive your Tunnel Master® *wbc*, it arrives with preloaded settings. You can erase these settings before configuring your own settings. The following procedure shows how to erase the current settings.

To erase all configuration settings, follow these steps:

1. On the main CPU board, set DIP switch 4 to the ON position.
2. Locate the breaker inside the WBC on the power supply, and power cycle:
 - Press the breaker button and wait approximately 30 seconds. All lights goes out on the CPU board.
 - Press the breaker button again. Wait for the display to come back up. All settings are erased.
3. On the main CPU board, set DIP switch 4 to the OFF position again.
4. If you are currently logged in to the web interface, log out and then sign back in.

NOTE: You can also use DIP switches 1 and 2 in to initiate a partial erase. This clears only the configuration (switch 1) and shift data (switch 2). But ICS recommends doing a first-time complete erase using DIP switch 4, as described above.

Power On

Before you can log in, the following steps must be completed:

1. The Tunnel Master® *wbc* must be completely installed. See the Tunnel Master® *wbc* Installation Guide for instructions.
2. The Tunnel Master® *wbc* must be connected to the network.
3. Connect the power to the ICS power distribution box by turning on the Tunnel Master® *wbc* breaker inside the ICS® power distribution box.

4. On the Power Supply located inside the Tunnel Master® *wbc* in the lower-right corner, press the 6.0 A breaker button until it click in. (See Figure 1-2).

The Tunnel Master® *wbc* is fully powered on. Next, you can “Login”.

The 6.0 Amp breaker does not come installed. It is typically shipped in a baggie with the delivery of the the Tunnel Master®*wbc* and must be plugged in to the breaker socket

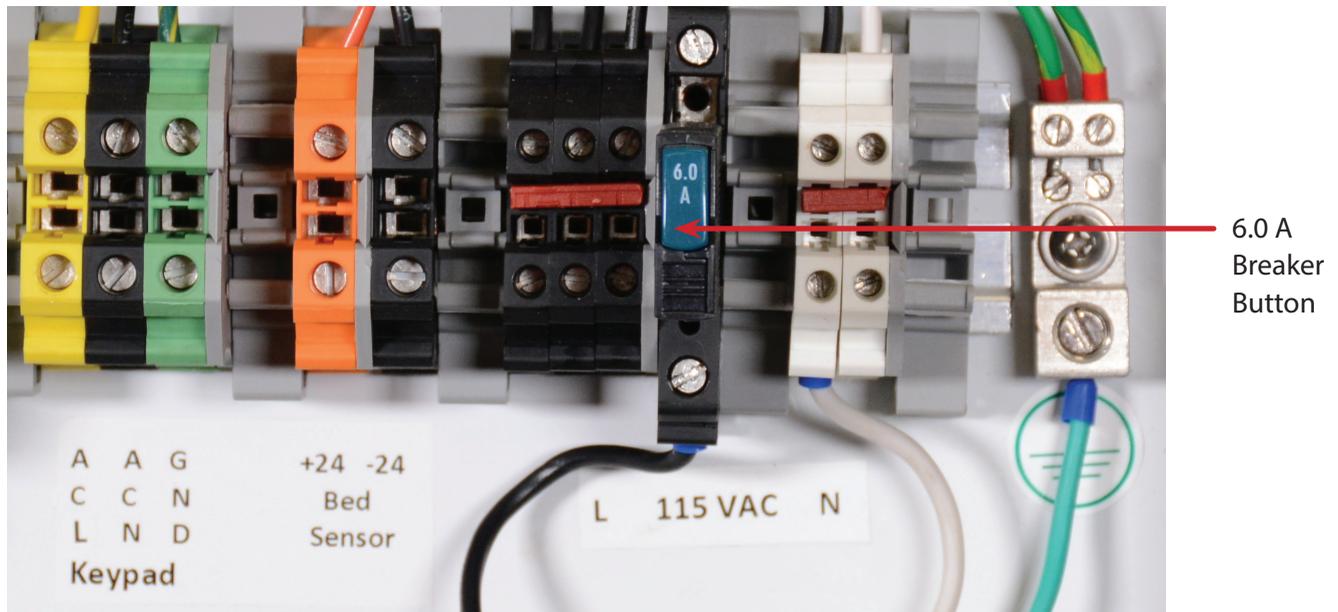


Figure 1. Power Breaker Button

Power Cycle

If you need to restart the Tunnel Master® *wbc*, follow these step to power cycle:

1. Locate the power breaker on the power supply located inside the Tunnel Master® *wbc* on the lower-right side. (See Figure 2)
2. Press the power breaker button and wait approximately 30 seconds.
All lights go out on the CPU board.
3. Press the breaker button again.
Wait for the display to come back up. You are now powered on.

Login

After powering on the unit, you can log in by following one of the login sections: Network Setup Log In, Non-network Setup Log In, or Wireless Network Setup Log In.

NOTE: You will also need the IP address of the Tunnel Master® *wbc*. This is found on the Tunnel Master® *wbc* built-in monitor or via the IPSetup.exe utility on the Tunnel Master® *wbc* installation CD.

Network Setup Log In

To log in to the Tunnel Master® *wbc* interface, follow these steps:

1. On a networked computer at the site, start a browser (Only Firefox, Chrome, or Edge can be used. Do not use Internet Explorer®).
 - Javascript or Active Scripting must be enabled on the browser.
 - The browser window should be maximized.
 - A minimum monitor resolution setting of 1024 X 768 is required.
2. Type the IP address of the Tunnel Master® *wbc* into the browser's address bar (for example, default IP address of the Tunnel Master® *wbc* is 10.0.0.200).
3. Type the default user name and password:

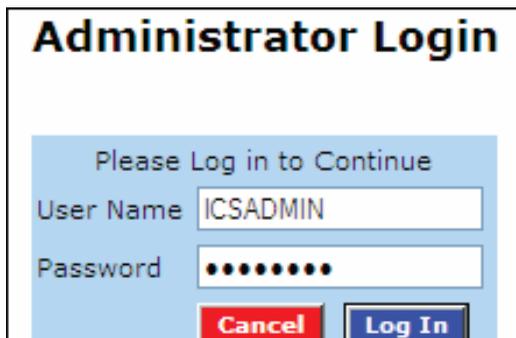


Figure 2. Administrator Login Screen

- In the User Name box, type **ICSADMIN**.
 - In the Password box, type **ICSADMIN**.
4. Click the **Log In** button.

The Welcome to the ICS Tunnel Controller screen appears.
For more information , see "Set the Date and Time" on page 12.

Non-Networked Setup Log In

If the Tunnel Master® *wbc* at your site is a non-networked unit, then you can access the web interface via an Ethernet crossover cable.

1. Connect one end of the Ethernet crossover cable to your laptop or PC.
2. Connect the other end of the cable to the RJ-45 terminal on the Tunnel Master® *wbc* main CPU board.

Wireless Network Setup Log In



Figure 3. RJ-45 Terminal on Main CPU Board

Wireless router is required for a Wi-Fi connection.

RJ-45 Connection

MAC
Address
Sticker
attached



Figure 4. Tunnel Master wbc MAC Address sticker attached to the CPU Module

If you have a Wi-Fi network and a mobile device, you can have access to the Tunnel Master® wbc interface functions and reporting via a Wi-Fi connection.

Mobile Devices: iPad®, smart phone, Android™, laptop, etc. If the Tunnel Master® wbc at your site is a wireless networked unit, then you can access the web interface via a Wi-Fi connection. Wi-Fi connections are available within so many feet of the wireless router. See router for more information.

NOTE:

- Wireless router box is required.
 - Smart Phone must support HTML 5.
 - Javascript and cookies must be enabled on the browser.
1. On a wireless mobile device at the site, start the Tunnel Controller Interface.
 2. Type the default user name and password:
 - In the User Name box, type ICSADMIN
 - In the Password box, type ICSADMIN
 3. Click Log In.

The message “Welcome to the ICS Tunnel Controller screen” appears.

From your tunnel with your iPhone® with Wi-Fi Connection, you can fine tune your output relay settings instantly with access to Relay Configuration. You have more functions and reporting available on all other mobile devices than with the iPhone®.

For more information, see “Wi-Fi Connection” on page 43.

Lost or Forgotten Passwords

If you cannot log in or if you have lost your password, contact ICS support for an override password. An override password utility is available through the ICS support department. Before you call, have the following information ready:

- The date as it appears on the Tunnel Master® *wbc* display.
- The last 4 digits of the Tunnel Master® *wbc* MAC address, which can be found on a sticker attached to the CPU module. The CPU module is on the main CPU board inside the Tunnel Master® *wbc* box. If you cannot find the CPU module, look for a network cable. A network cable is connected to the CPU module.

The ICS technician will take this information from you, and then use an in-house password override utility to generate a password. This password can be used with a user name of ICSADMIN to login to the Tunnel Master® *wbc* web interface. The password is good for one day only. Both the Password and Username should be immediately changed after you login.

Set the Date and Time

The date and time are reset during shipping. You must configure the date and time manually.

NOTE: For timed outputs to function correctly, it is important that your date and time settings are properly configured on the Tunnel Master® *wbc* web interface.

To set the date and time, follow these steps:

1. After Tunnel Master® *wbc* interface log in, select the Configuration menu, and then select Administrative Settings.

NOTE: The current firmware version of the controller is located at the top of the Administrative Settings screen (the figure below shows Version 1.5 B13VS).

Administrative Settings

02/23/2022 - 10:44:07 AM
R: 1.5B13VS

Display Cars	ON <input checked="" type="radio"/>	OFF <input type="radio"/>	
Display IP Address	ON <input checked="" type="radio"/>	OFF <input type="radio"/>	
Allow Priced Extra Service from Keypad	ON <input type="radio"/>	OFF <input checked="" type="radio"/>	Valid for ICS-POS Wash Input Device
Push Button Password	<input type="text"/>		Get Password from ICS for Code: "15D4"
VFD Output Start Range	<input type="text" value="97"/>		1 or 97 (1 ~ 96 or 97 ~ 192)
Pickup Bed Sensor Pulse Rate	<input type="text" value="12"/>		12 ~ 15 Only
VFD Debug Logging	<input type="text"/>		1 to 3 Hrs
Ultrasonic Sensor Reading Logging	<input type="text"/>		1 to 3 Hrs
Date	<input type="text" value="02/23/2022"/>		MM/DD/YYYY
Time	<input type="text" value="10:44:07"/>	AM <input type="button" value="v"/>	HH:MM:SS
Username	<input type="text" value="Sparkle"/>		5 to 9 Characters
Password	<input type="text"/>		6 to 9 Characters
Verify Password	<input type="text"/>		

Figure 1. Administrative Settings Create User Name and Password

Set the Date and Time

The date and time are reset during shipping. You must configure the date and time manually.

NOTE: For timed outputs to function correctly, it is important that your date and time settings are properly configured on the Tunnel Master® *wbc* web interface.

To set the date and time, follow these steps:

1. After Tunnel Master® *wbc* interface log in, select the Configuration menu, and then select Administrative Settings.

NOTE: The current firmware version of the controller is located at the top of the Administrative Settings screen (the figure below shows Version 1.5 B13VS).

2. In the **Date** box, type the current date.
3. In the **Time** box, type the current time.

NOTE: The date and time information is saved immediately as you type.

Create User Name and Password

After setting the correct date and time, then create a user name and password.

NOTE: For enhanced security, ICS recommends you create a user name and password to replace the default settings.

To create a user name and password, follow these steps:

1. On the **Configuration** menu, select **Administrative Settings**.

The Administrative Settings screen appears.

2. Use the arrow keys to scroll to the Username box
3. In the **Username** box, type a user name.
 - Minimum length = 5 characters
 - Maximum length = 9 characters
4. In the **Password** box, type a password.
 - Case Sensitive Password
 - Minimum length = 6 characters
 - Maximum length = 9 characters
5. In the Verify Password box, retype the password.
6. Press the Enter key to accept. The user name and password is saved and the user is automatically logged in. The previous user name and password are erased. Only one user name and password can be saved at a time.

-or-

Press the Esc key to exit without saving user name and password.

(Not available for Web Config pages.)

NOTE: The Tunnel Master® *wbc* does not support multiple user names and passwords. For more information on the Administrative Settings, see xxx.

Setting	Parameters	Description
Display Cars	ON or OFF	
Display IP Address	ON or OFF	
Allow Priced Extra Service from Keypad	ON or OFF	
Push Button Password		Get password from ICS.
VFD Output Start Range	1 or 97	
Pickup Bed Sensor Pulse Rate	12 ~ 15 only	
VFD Debug Logging	1 ~ 3 hours	Select ON to send the debug log via network connection to a networked computer. Log is written to root drive (e.g., D:/ -or- C:/). Enable the debug logging for VFD outputs to be able to quickly gather additional data about the VFDs.
Ultrasonic Sensor Reading Logging	1 ~ 3 hours	
Date	MM/DD/YYYY	
Time	HH:MM:SS	
Username	5 to 9 Characters	
Password	6 to 9 Characters	
Verify Password	Same as Password	Type in the exact same password used for Password above.

Table 1-1. Administrative Settings

Tunnel Settings

This chapter includes descriptions for all the **Tunnel Settings** from the Configuration menu broken down by sub menu. The descriptions for every setting are located in the respective description tables. There is no Save button. Any changes made to the settings, will automatically be saved.

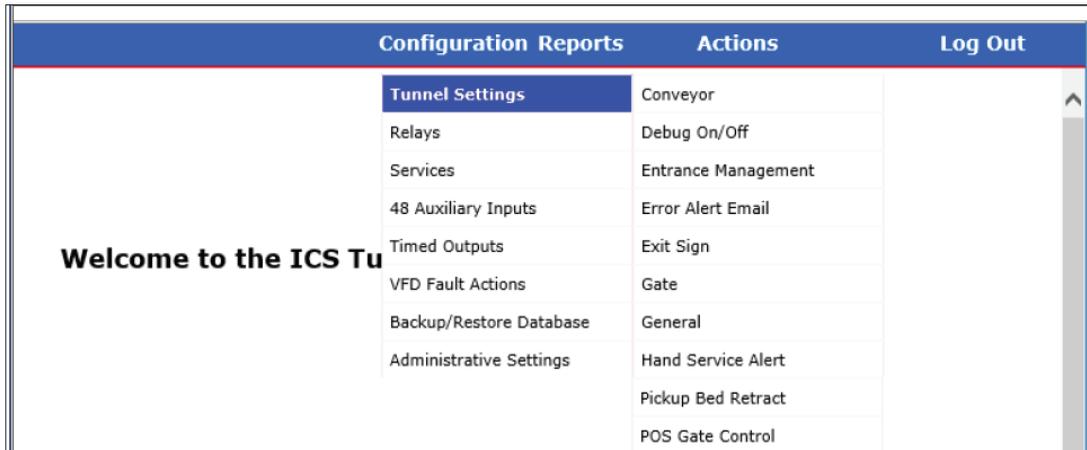


Figure 1. Tunnel Settings Menu

About Settings for Conveyor and Roller

The following four different scenarios may help you determine the best way to set up your wash based on the desired outcome. Based on your desired outcome, you can view from Use Settings column the proper setting for these scenarios.

NOTE: Keep in mind the safety of your employees.

ID	Desired Outcome	Use Settings
1	Turn Conveyor only on upon wash purchase.	Auto Start set to On Auto Roller set to Off Automatic Roller set to Off
2	Turn conveyor on and fire roller immediately upon wash purchase. Depending on site, this could result in car not being in the correct position for the tunnel when roller is fired.	Two ways to set up without an employee starting the Conveyor: Auto Start set to On and Auto Roller set to On -or- Auto Start set to Off and Auto Roller set to On
3	Turn on Roller upon wash purchase. Depending on the site, this could result in car not being in the correct position for the tunnel when roller is fired.	Auto Roller set to On. This will result in the Conveyor also starting automatically. NOTE: There is no way to fire a Roller without having the Conveyor start.
4	Start Conveyor when car is at the proper position and fire the roller.	Automatic Roller set to On. This setting uses the Entrance Management Treadle Switch to fire the roller after two inputs are received. This will also start the conveyor automatically. Auto Start can be set to either On or Off.

Table 1-2. Conveyor and Roller Settings

Conveyor

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Conveyor**.
2. Make any necessary changes to the settings.

The settings are saved immediately.

Conveyor		
	ON	OFF
Panic Stop	<input checked="" type="radio"/>	<input type="radio"/>
Conveyor Idle Timeout	<input type="text" value="5"/>	Seconds
Auto Start	<input checked="" type="radio"/>	<input type="radio"/>
External Conveyor Idle Input	<input type="radio"/>	<input checked="" type="radio"/> On Input1
Auto-Stop Period	<input type="text" value="60"/>	Seconds
Conveyor Relay	<input type="text" value="108"/>	1-192
Average Car Length	<input type="text" value="200"/>	Inches (For Conveyor Speed)
Distance Between Cars	<input type="text" value="84"/>	Inches (For Conveyor Speed)
System Calculated Average Car Length	200	Inches (Use as Reference)
Conveyor Speed	124	Cars/Hour
Conveyor Travel	586	Inches/Minute

Figure 2. Conveyor Settings

Setting	Parameters	Description
Panic Stop	ON or OFF	The panic stop feature manages equipment shut down with cars in the tunnel. Select ON to engage the panic stop circuit. Select OFF if a Panic Stop is not installed. This is a safety feature and is strongly recommended.
Conveyor Idle Timeout	Seconds	<p>This feature allows the operator to briefly stop the conveyor in idle mode but not stop the equipment and entering a panic state, directly from the Entrance Sign or from Stack Management. Until this time passes, the WBC stops the conveyor but does not go into a panic state up until this time is reached. This setting will keep the conveyor stopped for up to the maximum value of the time defined. When the Idle Conveyor button on the touch screen is selected, an idle conveyor message will be received from the Stack Controller. The button will change names to Restart Conveyor. The WBC stops the conveyor and will keep it stopped for up to the maximum value of the defined Conveyor Idle Timeout entry. If the operator taps the Restart Conveyor button BEFORE the maximum Conveyor Idle Timeout period is reached, the conveyor simply restarts and the wash continues. If the operator does not tap the Restart Conveyor button within the time period defined in Conveyor Idle Timeout, the wash enters a Panic Mode and all of the defined equipment shuts off.</p> <p>NOTE: This feature is only available in the releases after DB V1.4.7.1 and requires a minimum Stack Controller version of 1.4.6.0.</p>
Auto Start	ON or OFF	<p>Conveyor Auto Start is a standard feature so that when a wash is programmed, the conveyor will automatically start if it is not already running. However, this operation could be viewed as a safety issue. So the Auto Start option is available to allow you to turn off the standard Auto Start conveyor feature.</p> <p>NOTE: To entirely disable the Auto Start feature, the Auto Roller function must also be set to OFF.</p> <p>If you set Auto Start to OFF, but leave Auto Roller ON, when the roller is automatically fired it will still automatically turn on the conveyor.</p>
External Conveyor Idle Input	ON or OFF	<p>Controls a panic circuit. For example, it monitors voltage on an input. If set to ON, then the system will monitor the Input 1 (on the main CPU board).</p> <p>When the system is not in a panic state, the system expects a voltage high, for example, 1 or closed, all the time. When the input drops low, for example, 0 or open, the system goes into a panic state.</p> <p>When the input returns to closed, then system will do a panic restart.</p> <p>See Conveyor Idle Timeout.</p> <p>TMJ type external panic is deprecated.</p>
Auto-Stop Period	Numeric Seconds	Enter the number of seconds to wait after the last car has exited the tunnel before having the system automatically turn off the conveyor.

Setting	Parameters	Description
Conveyor Relay	Numeric 1-192	Relay number used to energize a separately configured conveyor relay. The web interface allows you to assign a relay (1-192) to be the conveyor relay. The conveyor relay will not turn on during a staggered restart until all staggered relays have been completed. The conveyor relay will turn on during the wetdown process. For more information, see "About the Conveyor Relay" on page 61.
Average Car Length	Numeric Inches	This value is needed for accurate conveyor speed calculation. Average length of the car that the tunnel gets on a day (sum of car lengths/number of cars). This value depends on the location of the car wash and what type of cars are being washed. Example: 200 inches is a well estimated average car length.
Distance Between Cars	Numeric Inches	This value is needed for accurate conveyor speed calculation. It is the average distance between cars in the tunnel. Example: 72 inches is a recommended distance between the front car and car being loaded.
System Calculated Average Car Length	Numeric	This value is automatically calculated by WBC for every 10,000 cars. Operators can use this as reference while configuring Average Car Length field.
Conveyor Speed	Numeric	System calculated conveyor speed is displayed in cars per hour for this field. This field can be automatically set or can be manually set in the VFD Advanced Settings by selecting Set Point Type, Cars per Hour.
Conveyor Travel	Numeric Inches	This field shows conveyor travel in inches per minute.

Table 1-1. Conveyor and Roller Settings

NOTE: If the Horn Duration or Conveyor Start Delay settings do not affect the operation of your tunnel after the horn stops blowing, then you may have an older version of the WBC (Web-based Controller) firmware. Older versions of the on-board CPLD firmware can be updated via a flash memory upgrade to both the main CPU board and the Input Board. Horn duration and conveyor start delay can be set with DIP switches on the Input Board. The Input Board can only be reflashed at the ICS facility. Contact ICS for support for more information.

Debug

From the Debug menu, you can enable or disable the Serial Debug Log, the Network Debug Log, and the VFD Debug Log.

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Debug**.
2. Make any necessary changes to the settings.

The settings are saved immediately.

Figure 3. Debug Setting

Setting	Parameters	Description
Serial Debug Log	ON or OFF	Select ON to send the debug log via serial connection directly to a computer for debugging. We are logging to the Central Log Server application that is used for logging our other applications. The logs are written to the Logs folder in the root drive. (e.g., D:\Logs -or- C:\Logs) NOTE: This is connection would not be sent across the network to the Central Log Server.
Network Debug Log	ON or OFF	Select ON to send the debug log via network connection to a networked computer. Log is written to root drive (e.g., D:/ -or- C:/).
IP Address	Numeric	IP address of networked computer. Used only if Network Debug Log is ON.
Port	Numeric Default = 32710	Port address of networked computer. Used only if Network Debug Log is ON.

Table 1-2. Debug Descriptions

Viewing Real-Time Debug Log

To view the debug log in real-time (as the wash is open and wash services are offered), you can use the Central Log Server application. There are two active versions of Central Log Server:

Version 1.2.0.3 is for the DB V1.4.X.X releases.

Version 1.3.0.1 is for the DB V1.5.X.X and V1.6.X.X releases.

The application filename is CentralLogServer.exe. Within the WBC software, you must setup the Debug info to enable logging to the Central Log Server.

You must turn on Network Debug Log, load the IP address of the machine running the Central Log Server application, and load the Port number (default is 32710).

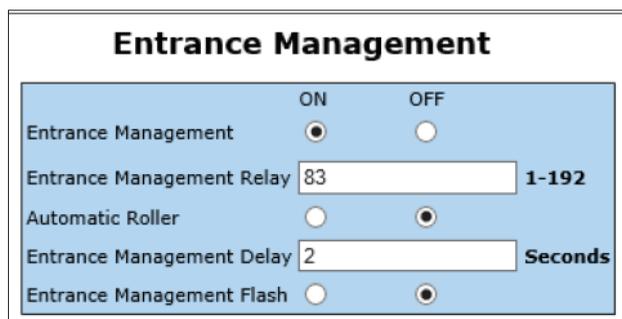
ICS recommends creating a shortcut on the Desktop to the CentralLogServer.exe file, and then using that shortcut to launch the application. The debug logging over network application allows you to view tunnel processes as they happen. This information temporarily appears on the controller screen. The actual log file contains a complete list.

When in the Central Log Server application, right-click to view the menu, and then click Clear Logs to clear the screen on the Debugging window. This does not clear anything in the actual log file.

Entrance Management

The Entrance Management System keeps your employees focused, your customers informed and engaged throughout the wash process. Better manage your throughput with loading flexibility, stack management control, and customer wash selection monitoring.

1. On the **Configuration** menu, select the **Tunnel Settings** menu, and then select **Entrance Management**.
2. Make any necessary changes to the settings.
The settings are saved immediately.



	ON	OFF
Entrance Management	<input checked="" type="radio"/>	<input type="radio"/>
Entrance Management Relay	<input type="text" value="83"/>	1-192
Automatic Roller	<input type="radio"/>	<input checked="" type="radio"/>
Entrance Management Delay	<input type="text" value="2"/>	Seconds
Entrance Management Flash	<input type="radio"/>	<input checked="" type="radio"/>

Figure 4. Entrance Management

Setting	Parameters	Description
Entrance Management	ON or OFF	Select ON to enable entrance management. NOTE: This setting needs to be ON for Front Wheel Pull 2nd Tire Auto Roller feature.
Entrance Management Relay	Numeric 1-192	The EM Relay allows the customer to control a separate piece of equipment when EM is activated i.e., a light or possibly a sign but not the ICS EM Sign.
Automatic Roller	ON or OFF	Select ON to enable Automatic Roller. Fires a roller automatically when EM is activated
Entrance Management Delay	Numeric Seconds	Number of seconds delay time between (1) when the entrance management treadle receives its signal to fire the entrance management sign; and, (2) when the roller activates to begin moving the vehicle into the tunnel. This is typically the time given to the customer to put the vehicle into neutral.
Entrance Management Flash	ON or OFF	Provides the ability to set the entrance management relay to flash (For example, make a sign or light flash).

Table 1-3. Entrance Descriptions

Error Alert Email

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Error Alert Email**.
2. Make any necessary changes to the settings.
The settings are saved immediately.

Error Alert Email

Server Name	<input type="text" value="smtp.yourISP.com"/>	40 Chars Max
User ID	<input type="text" value="yourISPlogin"/>	20 Chars Max
Password	<input type="password" value="••••••••"/>	20 Chars Max
From Address	<input type="text" value="typeaddress@yourISP.com"/>	40 Chars Max
To Address	<input type="text" value="youremail@yourISP.com"/>	1 Allowed w/ 40 Chars Max

Figure 5. Error Alert Email Settings

Setting	Parameters	Description
Server Name	Alphanumeric	Your email providers email server name or IP address.
User ID	Alphanumeric	Your user ID or login name. This is the user name you use to log in to your ISP or email account. Do not include the @xxx.xxx reference.
Password	Alphanumeric	Your password. This is the password you use to log in to your ISP or email account.
From Address	Alphanumeric	The sending email address. The From name can be any informative, non-existent name such as WBC@xxx.xxx. This is informational only. It is provided to show you where the message came from when you receive it. You cannot reply to the message. The email address does not need to be an active address that can receive email. The WBC does not receive email.
To Address	Alphanumeric	To Address is the mail address that will receive the email. This is your email address.

Table 1-4. Error Alert Email

NOTE: You cannot configure email alerts for accounts that require SSL/TLS authentication. Most free Online email services such as @gmail, @msn and @yahoo do require this authentication. Therefore you cannot configure email alerts for @gmail, @msn, and @yahoo accounts. ICS recommends you use an ISP to configure email. Most do not require SSL/TLS authentication. Contact your ISP for more information.

The WBC includes a standard email alert message for a low power indication condition. If the supplied battery on the WBC board begins to fail, a message is automatically sent to the email provided in the **To Address** field. No other configuration is required to receive this low power message. All other email alert messages must be configured in the **Tunnel Controller Input Configuration** screen.

Example Error Alert Email Message

Subject: !!! WBC Email Alert !!!

** Float Switch - Input: 1 - FAILED **

Exit Sign

The Exit Management LCD reduces anti-collision shutdowns. It provides an automated countdown for full drying, and safe exit from the wash. Leave a visual image, thank your customers for using your wash, and instruct them with arrows where to go next: the exit, hand finished services, or vacuums.

The Exit Management System has the ability to automatically calculate the start time of the Exit video with the release of V1.2B33 on March 17, 2016.

After configuring the Exit Sign Output setting, the Tunnel Master® *wbc* automatically calculates when to begin the Exit Count Down video so that the cars are properly instructed when to exit the tunnel. The Tunnel Master® *wbc* automatically calculates this value based on its conveyor speed and will adjust itself as the conveyor speed changes. After completing the Configuration below, the next step is to go to the Relay Configuration Page and complete the setup Exit Sign settings.

1. On the **Configuration** menu, click the **Tunnel Settings**, and then click **Exit Sign**.
2. In the **Go Output** box, assign a relay to the Exit Sign.

The settings are saved immediately.



Figure 6. Exit Sign Output

Setting	Parameters	Description
Go Output	Numeric 1-192	Number of the relay that controls the Exit Sign.

Table 1-5. Exit Sign Descriptions

Gate

From the Gate menu, you can turn on/off the Auto-Gate, Invert the Gate, and set an Auto-Gate Delay.

1. On the **Configuration** menu, select the **Tunnel Settings** menu, and then select **Gate**.
2. Make any necessary changes to the settings.

The settings are saved immediately.

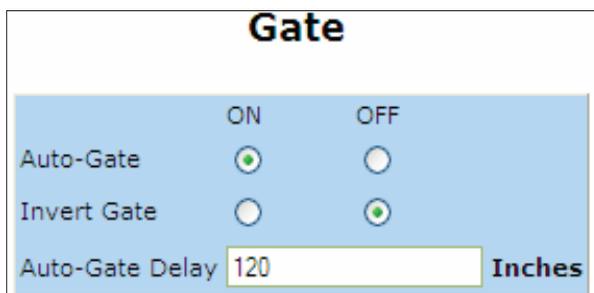


Figure 7. Gate Settings

Setting	Parameters	Description
Auto-Gate	ON or OFF	This feature is used as a backup for the Gate input. If the Gate input goes down, you can turn this feature on. This will simulate the measuring of the car. It will set every car length to the value set for Max Car Length.
Invert Gate	ON or OFF	Allows operator to decide if logo switch is wired normally open (low) or normally closed (high). (Will vehicle break continuous circuit or complete a circuit?)
Auto-Gate Delay	Numeric Inches	Enter the length in inches or pulses of estimated chain travel, after a roller button is activated, before a vehicle would normally activate the gate switch. This value must be greater than 0.

Table 1-6. Gate Descriptions

General

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **General**.
2. Make any necessary changes to the settings.

The settings are saved immediately.

General

	ON	OFF	
Stacking	<input type="radio"/>	<input checked="" type="radio"/>	
Minimum Car Length	<input type="text" value="36"/>		Inches
Maximum Car Length	<input type="text" value="450"/>		Inches
Wet Down Period	<input type="text" value="180"/>		Seconds
Wash Input Device	<input type="text" value="Stack and Control"/>		
My Listen Port	<input type="text" value="32502"/>		
Anti-Bounce	<input type="text" value="7"/>		Inches
Anti-Collision	<input type="text" value="900"/>		Inches

Figure 8. General Settings

Setting	Parameters	Description
Stacking	ON or OFF	Select ON to start stacking, OFF to stop stacking. This must be set to ON for the stand-alone Auto Sentry to Tunnel Master® wbc interface systems.
Minimum Car Length	Numeric Inches	Typically 24 - 36. The minimum length of a vehicle that is required to recognize it as a valid vehicle. Minimum car length value must be greater than the Pulse length and Anti-Bounce values. Minimum Car Length is part of the anti-theft feature. For example: An employee might stand in front of the eye sensor for a few seconds. The system might read that as 6 inches of activity. But it should not be registered as a vehicle.
Maximum Car Length	Numeric Inches	The length in inches of the longest vehicle that will enter the car wash before a violation is recorded. This is part of the anti-theft feature. If a vehicle longer than the Maximum Car Length value enters the wash, the maximum length will be the only portion of the vehicle to be washed.
Wet Down Period	Numeric Seconds	Enter the number of seconds you would like to have the wash equipment turned on for the wet down process. A wet down will fire all of the relay outputs that have the Wet Down option turned ON within the Relay Configuration page.

Setting	Parameters	Description
Wash Input Device	List	<p>Settings include Keypad, Stack N Control, Computer, and ICS-POS.</p> <p>NOTE: Retracts are only available in Stack N Control mode. For Retracts not in Stack N Control mode, set up Retracts as \$0 extra service.</p> <p>Select Keypad if you have a stand-alone WBC with a keypad.</p> <p>Select Stack N Control if you have WashConnect® and are configuring the WBC to be directly interfaced with one or more Touch POS units. In this mode, any services configured as retracts will work on the keypad. Retracts are \$0 services.</p> <p>Select Computer if you have Tunnel Master® software with the Control.exe application.</p> <p>NOTE: Any retract or wash input has to come from the Tunnel Controller software.</p> <p>Select ICS-POS if you are configuring the WBC to be directly interfaced with one or more stand-alone Auto Sentry units.</p> <p>Push Button: You must purchase this feature, if you have a stand-alone WBC with a push button control to wash cars. This setup does not allow for stacking. Support MUST enable the Push Button device with an override code.</p> <p>For information on setting up a Push Button password, 1See “On the Configuration menu, click Administrative Settings.” on page 103.</p> <p>Again, Push Button must be enabled by support with an override code. Select Keypad and Push Button if you have a WBC with both a keypad control and a push button control. With this setup, if Stacking is ON, then you can stack vehicles with the keypad.</p>
My Listen Port	Numeric	<p>Default value = 32502. Communication port number for Internet socket. Must match Tunnel Master® settings in Config > Machine Setup, Port field for the Tunnel Master® wbc device.</p>
Anti-Bounce	Numeric Inches	<p>The length in inches for which sensor activity (i.e., electric eye or loop sensor) can “bounce” (i.e., drop and then come on again) without being recognized as a vehicle.</p> <p>For example: The larger wheel wells of a truck might provide enough empty space for the eye sensor beam to make contact as the truck passes through the eye. The Anti-Bounce setting is used to ignore these momentary unbroken sensor events.</p> <p>Because Anti-Bounce and Minimum Car Length work together, the Anti-Bounce value must be less than the Minimum Car Length value.</p> <p>The following scenarios are true if these parameters are set: Minimum Car Length = 36. Anti Bounce = 6.</p> <p>Example 1: Eye sensor is broken for 3 inches. Results: No car. No error. Event ignored. Invalid Car Length.</p> <p>Example 2: Eye sensor is broken for 12 inches. Results: Minimum Car Length violation. Invalid Car Length and the Car is ignored.</p> <p>Example 3: Eye sensor is broken for 48 inches. Results: Car found. No error.</p>
Anti-collision	Numeric Inches	<p>If a car is sitting on the anticollision sensor and a second car is in the tunnel, the Anticollision setting is the distance in inches from the photo eye at the beginning of the tunnel that when the second car reaches that distance, we activate Anticollision and shut down the tunnel.</p>

Table 1-7. General Settings

Hand Services Alert

This Tunnel Master® *wbc* feature turns on a relay (output) from within the WBC whenever a car has purchased a hand service so the hand finished services team will be aware that it will be arriving soon. If wired to a light/siren/bell/whistle (etc.) this indicator will alert the hand finished team that a car will be arriving soon.

The relay will close for the specified Hold Time and then open when the time is met. This combination of selecting an available relay and specifying a hold time is simply to 'wake up' your hand finished services crew so they will be ready to begin servicing the car when it arrives in their area.

1. On the Configuration menu, select the Tunnel Settings menu, and then select Hand Services Alert.
2. Make any necessary changes to the settings, and the settings are saved immediately.

Setting	Parameters	Description
Relay	Numeric	Number of the relay that fires the Hand Finished Services Alert.
Hold Time	Numeric Seconds	Number of seconds that the relay will close and fire the wired alert such as a light/siren/bell/whistle.

Hand Finished Services Alert Output

Relay	<input type="text" value="0"/>	1-192
Hold Time	<input type="text" value="1"/>	In Seconds

Pickup Bed Retract

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Pickup Bed Retract**.
2. Make any necessary changes to the settings, and they are saved immediately.

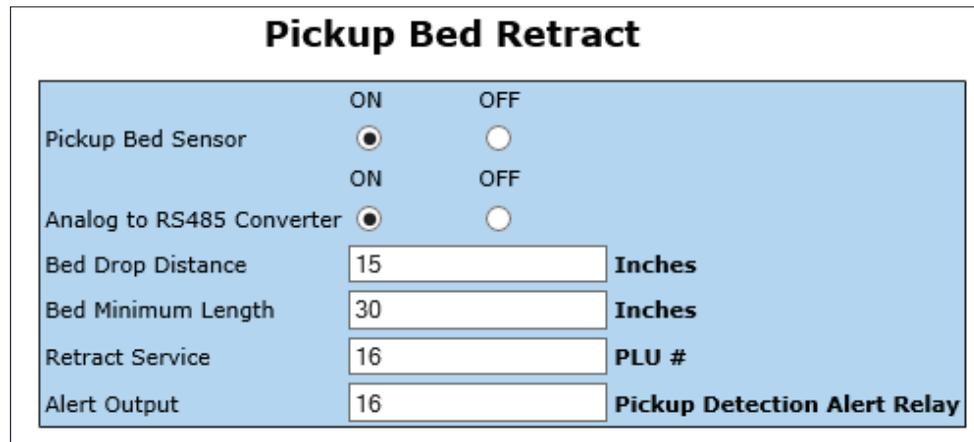
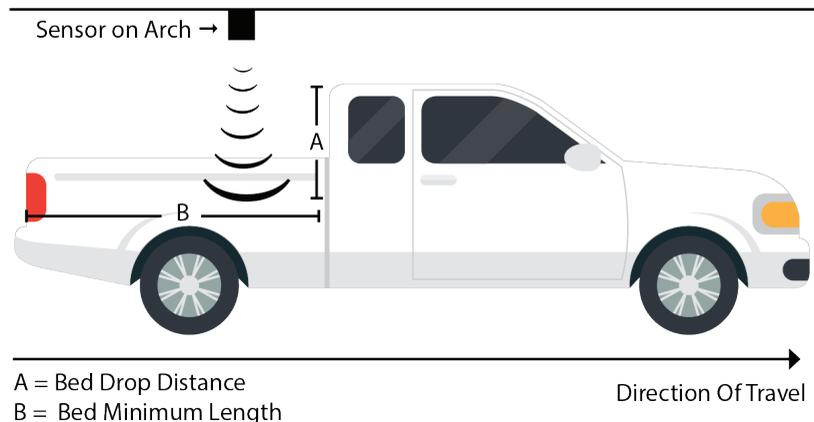


Figure 9. Pickup Bed Retract

Setting	Parameters	Description
Pickup Bed Sensor	ON or OFF	<p>You must have an IRU2004 or the Pepperl+Fuchs ultrasonic sensor wired in the tunnel for this feature.</p> <p>Select ON if you are using a pickup bed retract sensor. Otherwise select OFF.</p> <p>The pickup bed sensor is only on when the conveyor is running and can be turned off when the conveyor stops.</p> <p>See the Tunnel Master® <i>wbc</i> Installation Guide Communications Wiring chapter for more information.</p> <p>You should also test the sensor to verify it is correctly wired and operational before entering these settings. A Test Pickup Bed Sensor button is available on the Actions menu.</p> <p>The pickup bed sensor will stay on during testing and only will turn off during the next conveyor stop.</p> <p>See "Test Pickup Bed Ultrasonic Sensor" on page 111 for more information.</p>
Analog to RS485 Converter	ON or OFF	<p>This setting is for the Pepperl+Fuchs Ultrasonic Sensor only. If using the installed Pepperl+Fuchs sensor, set to ON.</p>
Bed Drop Distance	Numeric Inches	<p>The minimum distance (in inches); the sensor should detect this distance from the roof of the vehicle to the bed.</p> <p>Recommended setting of 16 based on initial tests.</p> <p>The first step is that this threshold is met or exceeded. The second requirement is that the bed length measurement must remain constant for a minimum threshold distance (see the next entry).</p>
Bed Minimum Length	Numeric Inches	<p>The minimum threshold distance that the bed length measurement must remain constant before a pickup truck bed is identified.</p> <p>Recommended setting of 18 based on initial tests.</p>

Retract Service	Numeric PLU#	<p>PLU number for the service that is programmed to provide retracting equipment for pickup trucks.</p> <p>When a pickup truck is recognized, the selective outputs found in this Retract Service PLU are added for the vehicle being sensed, while the deselected outputs are removed.</p> <p>This Retract Service PLU should be programmed with all required retracted outputs for the pickup bed. This PLU is configured in the Services page as one of the services.</p>
Alert Output	Numeric Relay #	<p>Pickup Detection Alert Relay. This configuration allows you to assign a designated relay output to turn on for one second whenever a pickup truck is detected.</p>

Table 1-8. Pickup Bed Retract Setting Descriptions



Settings for letters A and B shown in the figure above are described in the table below.

Letter	Setting	Recommended Setting*	Description
* Recommended settings based on initial ICS test results. Your settings may vary.			
A	Bed Drop Distance	16 Inches	Sensed first, from top of truck to inside floor of bed.
B	Bed Minimum Length	18 Inches	Sensed second, after bed drop distance is sensed. If both thresholds (A and B) are met, then system recognizes a pickup truck bed.

Table 1-9. Recommended Pick Up Bed Retract Setting Descriptions

Testing the Pickup Bed Sensor

If you suspect the Pickup Bed Ultrasonic Sensor is not working properly or an Ultrasonic Pickup Bed Sensor is installed, you will need to test the Pickup Bed Sensor.

To Test the Pickup Bed Sensor, follow these steps:

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Pickup Bed Retract**.
2. From the Pickup Bed Sensor, select **ON**.

3. In order to test the Ultrasonic Sensor: from the **Analog to RS485 Converter** setting, select **ON**.
 - 🔗**NOTE:** The Conveyor must be stopped in order to test the sensor.
4. From the **Actions** menu, click the **Test Pickup Bed Sensor** button.
5. Using the CentralLogServer app located on your desktop to monitor the WBC communication.
6. Scroll to the bottom of the screen to view the most recent logs, verify the sensor is reading the expected distance.
 - 🔗**NOTE:** If there is an open grate, you will need to cover with metal or the sensor will not work properly.
7. After the conveyor stops, test the sensor by having a person walk underneath it.
8. If the sensor is working properly, you will notice the log giving you correct distance reads.
9. If the sensor is not working properly, you will receive one of the following three logs:
 - You will receive a 0 distance read.
 - You will receive no logs.
 - You will receive a Communication Error log.
10. Contact ICS if you are not able to get a correct distance read to appear in the logs.

POS Gate Control

Gate Control allows for one or more ICS-POS or stand-alone Auto Sentry stacking cars to a single WBC. When gate control is turned on, each ICS-POS requests a gate-open token from the WBC. Upon receiving the gate-open token, the Auto Sentry raises the gate for the car to pull in front of the tunnel.

1. On the Configuration menu, select the Tunnel Settings menu, and then select POS Gate Control.
2. Make any necessary changes to the settings.

The settings are saved immediately.

Figure 10. POS Gate Control Settings

Setting	Parameter	Description
Gate Control	ON or OFF	Gate control turned on or off.
Queue Maximum	Numeric	Maximum number of cars that can be queued in front of the tunnel. Once this limit is met, the gates will not open and the screen will display the “stop sign” wash busy screen. For example, if you type 3, and three cars are lined up in front of the tunnel, then the gates will not open until the line is reduced to two or less. The maximum value is 10. Any value greater than 10 is reset to 10.
Timeout	Numeric Seconds	This timer indicates how long WBC has to wait once the gate-open token is granted to one ICS-POS. If there is a fifth loop, gate-close wired to the ICS-POS(s), then the close message is sent to the WBC which in turn resets this timer. If there is no close coming from the ICS-POS, then the WBC will wait until this timer expires before giving a gate-open token for the next ICS-POS.

Table 1-10. POS Gate Control

Pulse

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Pulse**.
2. Make any necessary changes to the settings.

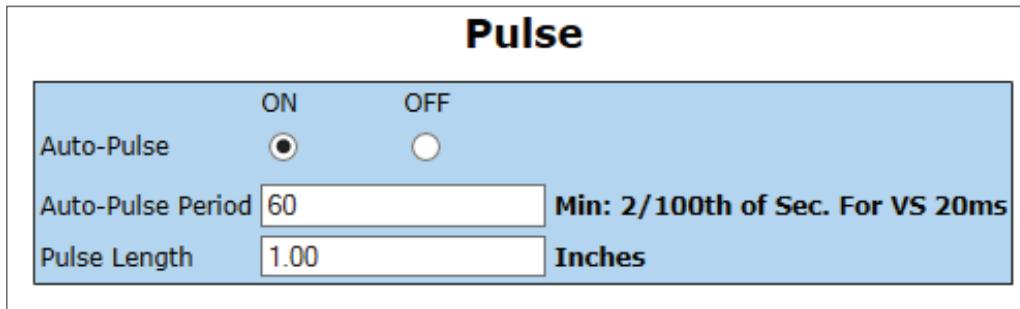


Figure 11. Pulse Settings

Setting	Parameter	Description
Auto-Pulse	ON or OFF	Select ON to simulate a pulse in the event of pulse switch failure. Select OFF whenever the pulses will be fed from an actual pulse switch. NOTE: This feature will activate as soon as ON is entered and the user exits the menu option.
Auto-Pulse Period	Numeric 1/100th Seconds	Auto-Pulse period is shown in 1/100th of a second for Non-VS version (Non-Variable Speed) and in direct milliseconds for VS version (Variable Speed). It is the time taken for the chain to travel one inch. For Non-VS - if the value is 1, then the chain travels one inch in 1/100th of a second (10 ms). For VS - if the value is 10, then the chain travels one inch in 10 ms. This is the rate in which you want the conveyor to run only when in Auto Pulse mode (i.e., when the pulser device is not functional). NOTE: You do not calibrate this by setting Pulse Length to zero. This method was only done on the Tunnel Master® Jr. controller. Instead, use the calibrate auto pulse feature, available when you log into the WBC with the attached keyboard. If you change conveyor speeds, you should recalibrate this field.
Pulse Length	Numeric Inches Round to two decimal places.	The Pulse Length is needed to maintain proper equipment timing in the tunnel. The number of inches of chain travel between two actual pulses. The Pulse length needs to be accurately determined. If the speed of the conveyor is ever changed and the pulse length is not accurate, the timing in the tunnel will be off. How to calculate a Pulse Length: 1. Lay down a tape measure next to the conveyor track, measuring 30 feet. 2. Fire a roller and count in seconds how long it takes the roller to travel the 30 feet. For example, it took 30 seconds. 3. On the Tunnel Master®WBC with the conveyor running, count how many times the pulse light on the display flashes in the amount of seconds it took the roller to travel 30 feet (30 seconds). For Example, 45 pulses were counted. 4. With this data, you can determine the pulse length. Take the number of inches 360 (30 feet) and divide that by the number of pulses you counted on the Tunnel Master®WBC (45 pulses). $360 / 45 = 8$ inch pulse length Pulse length must be set and will affect the input for Min and Max Car Length as well as Anti Bounce settings.

Table 1-11. Pulse Setting Descriptions

Receipt

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Receipt**.
2. Make any necessary changes to the settings.
The settings are saved immediately.

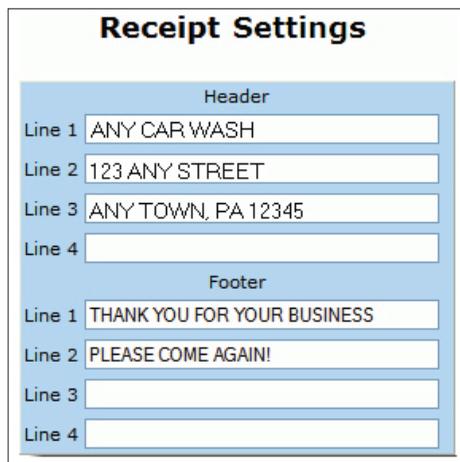


Figure 12. Receipt Settings

Setting	Parameter	Description
Header Line 1–4	Alphanumeric	Enter information desired to display on the four lines on the top of reports and receipts. This is usually company information.
Footer Line 1–4	Alphanumeric	Enter information desired to display on the four lines on the bottom of receipts. This is usually a message to the customer.

Table 1-12. Receipt Setting Descriptions

Relay Flash On/Off

NOTE: Only incandescent lights can be used with Flash.

1. On the **Configuration** menu, select the **Tunnel Settings** menu, and then select **Relay Flash On/Off**.
2. Make any necessary changes to the settings, and they are saved immediately.

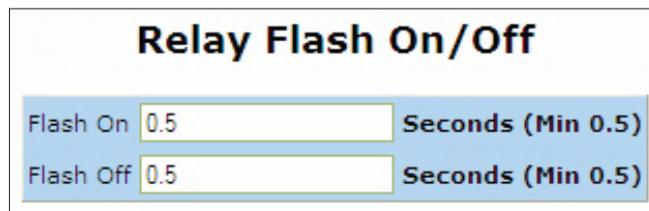


Figure 13. Relay Flash On/Off Settings

Setting	Parameter	Description
Flash On	Numeric Seconds Min. = 0.5	Time in seconds that an output will be turned on if the output is set to flash. This is what the system looks at when you set the Flash to ON in the Relay Configuration table.
Flash Off	Numeric Seconds Min. = 0.5	Time in seconds that an output will be turned off if the output is set to flash. This is what the system looks at when you set the Flash to ON in the Relay Configuration table.

Table 1-13. Flash On / Flash Off

Roller

1. On the **Configuration** menu, click **Tunnel Settings**, and then click **Roller**.
2. Make any necessary changes to the settings.
The settings are saved immediately

Roller

	ON	OFF	
Belt Conveyor	<input type="radio"/>	<input checked="" type="radio"/>	Roller Not Used
Roller Control	<input checked="" type="radio"/>	<input type="radio"/>	
Roller Interlock	<input type="radio"/>	<input checked="" type="radio"/>	
Roller Locator	<input type="radio"/>	<input checked="" type="radio"/>	
Auto Roller	<input type="radio"/>	<input checked="" type="radio"/>	
Front Wheel Pull 2nd Tire Auto Roller	<input checked="" type="radio"/>	<input type="radio"/>	
Roller Relay	<input style="width: 100px;" type="text" value="2"/>		1-192
	Inches	Count	
Roller Handling	<input checked="" type="radio"/>	<input type="radio"/>	
Roller Up	<input style="width: 100px;" type="text" value="90"/>		
Roller Down	<input style="width: 100px;" type="text" value="0"/>		
Roller Up	<input style="width: 100px;" type="text" value="0"/>		Valid for Up-Down-Up

Figure 14. Roller Settings

Setting	Parameter	Description
Belt Conveyor	ON or OFF	ON supports Belt Conveyor without Roller.
Roller Control	ON or OFF	ON if the roller is controlled by the WBC. OFF means the roller is controlled externally (e.g., by a button wired to an air solenoid). NOTE: When the Roller Control is set to ON and the Auto Start is set to OFF, after the roller button is pressed on the input terminal to fire a roller, the conveyor will start.
Roller Interlock	ON or OFF	When set to ON, the system will not allow a roller to be fired without a service selected for that vehicle. Roller Interlock disables the roller-up until a valid service is programmed for the vehicle. Since it will not recognize a car, no outputs would be turned on in the tunnel. When set to OFF, the system will allow a roller to be fired for a vehicle that is not assigned to a valid service. This will allow that vehicle to be sent into the tunnel and it will receive the Unloaded wash service. Roller Interlock disables the roller-up until a valid service is programmed for the vehicle: <ul style="list-style-type: none"> • Roller will not fire without paid service. • Gate eyes are ignored unless roller is fired and paid service is loaded.

Setting	Parameter	Description
Roller Locator	ON or OFF	Also known as roller anti-jam. Set to ON to enable the anti-jam feature. The software will use the Roller Locator input to fire the roller at the correct time.
Auto Roller	ON or OFF	Enter ON for yes, OFF for no. When this option is set to ON, as soon as you select a base service on a non-stacking system, a roller will fire. Set to OFF for stacking system. Ideally designed for a Tunnel Master®WBC only site. See Roller Handling.
Front Wheel Pull 2nd Tire Auto Roller	ON or OFF	When this option is set to ON, this feature allows entrance personnel to manually fire the first roller for the front wheel and the system automatically fires the second roller for the EM Tire input for the rear wheel that will be used to push the car out of the tunnel. The Entrance Management setting also needs to be ON.
Roller Relay	Numeric 1–192	Number of the relay that fires the roller.
Roller Handling	Inches or Count	<p>The WBC can handle roller up/down for the number of counts if there is a roller locator defined and installed.</p> <ul style="list-style-type: none"> ■ If Roller Locator = OFF, then select Inches (i.e., there is no roller locator). ■ If Roller Locator = ON, then select either Inches or Counts (i.e., there is a roller locator). <p>If you select Counts, then:</p> <ol style="list-style-type: none"> 1. The system fires a roller. 2. System counts the number of roller locator inputs equal to up-counts. 3. The system cancels the roller.
Roller Count	Numeric	When configured, this setting will be compared with the number of roller locator inputs.
Roller Up	Numeric Inches	How long the roller should fire in intervals of chain travel. If chain travel is handled in inches, then this represents length in inches. Otherwise, this is the number of roller locator inputs equal to Roller Count.
Roller Down	Numeric Inches	How long the roller should not fire. Can be zero. This feature is typically used only for a front-wheel pull configurations. When Roller handling is selected as Count, this setting is ignored.
Roller Up	Numeric Inches	Valid for Up-Down-Up. When Roller handling is selected as Count, this setting is ignored.

Table 1-14. Roller Descriptions

RS-485 Devices

1. On the Configuration menu, click Tunnel Settings, and then click RS485.
2. Make any necessary changes to the settings.

The settings are saved immediately.

RS485

Baud Rate	<input type="text" value="9600"/>	Select 9600; if Pickup Bed Sensor Present
Keypad 1 Address	<input type="text" value="5"/>	5; Reboot if Baud Rate Changed
Keypad 2 Address	<input type="text" value="0"/>	6; Check Keypad DipSwitch
Smart Relay 1 Address	<input type="text" value="9"/>	Relays: 97 ~ 120
Smart Relay 2 Address	<input type="text" value="10"/>	Relays: 121 ~ 144
Smart Relay 3 Address	<input type="text" value="11"/>	Relays: 145 ~ 168
Smart Relay 4 Address	<input type="text" value="0"/>	Relays: 169 ~ 192
Report Address	<input type="text" value="0"/>	< Not Available >
Receipt Address	<input type="text" value="0"/>	< Not Available >

Figure 15. RS-485 Settings

Setting	Parameter	Description
Baud Rate	List	Either 9600 or 38400. This is the RS485 connection speed to keypads and smart relay boards. NOTE: If the Pickup Bed Sensor option is being used, then the maximum baud rate that can be supported is 9600. This is limited by the sonic sensor which can only support 9600 baud. Smart relay boards and keypads can work up to 38400 baud. Whichever baud rate is selected, the corresponding switch selections must be made on the smart relay boards and keypads.
Keypad 1 Address	Numeric	This is the address of the first keypad. If you are using a push button station, set this to "0". By default the keypad is set to "5". If you are using multiple keypads consult the DIP switch settings on the keypad for the proper address.
Keypad 2 Address	Numeric	This is the address of the second keypad. The address of the keypad is based on the DIP switch settings on the keypad.
Smart Relay 1 Address	Numeric	These settings allow the WBC to communicate with smart relay boards over RS485 lines.
Smart Relay 2 Address	Numeric	Type the address for each smart relay board in these fields. Confirm DIP switch settings on each smart relay board.
Smart Relay 3 Address	Numeric	The relays listed next to the Smart Relay Address selection boxes will be the designated relay numbers in that Smart Relay box. This means that if the WBC only has two relay boards internally (relays 1–48), the first Smart Relay box will still have the relays designated as 97–120.
Smart Relay 4 Address	Numeric	
Report Address	Numeric	NOT USED. This Address remains set to "0".
Receipt Address	Numeric	NOT USED. This Address remains set to "0".

Table 1-15. Shift Descriptions

Shift

1. From the **Configuration** menu, select the **Tunnel Settings** menu, and then select **Shift**.
2. Make any necessary changes to the settings.
The settings are saved immediately.

Shift	
Shift	0
Tax Rate 1	<input type="text" value="6.00"/> %
Tax Rate 2	<input type="text" value="0.00"/> %

Figure 16. Shift Settings

Setting	Parameter	Description
Shift	Numeric	
Tax Rate 1	Numeric Percentage	The percentage rate for the first tax rate charge.
Tax Rate 2	Numeric Percentage	The percentage rate for the second tax rate charge.

Vehicle Upper/Lower Output

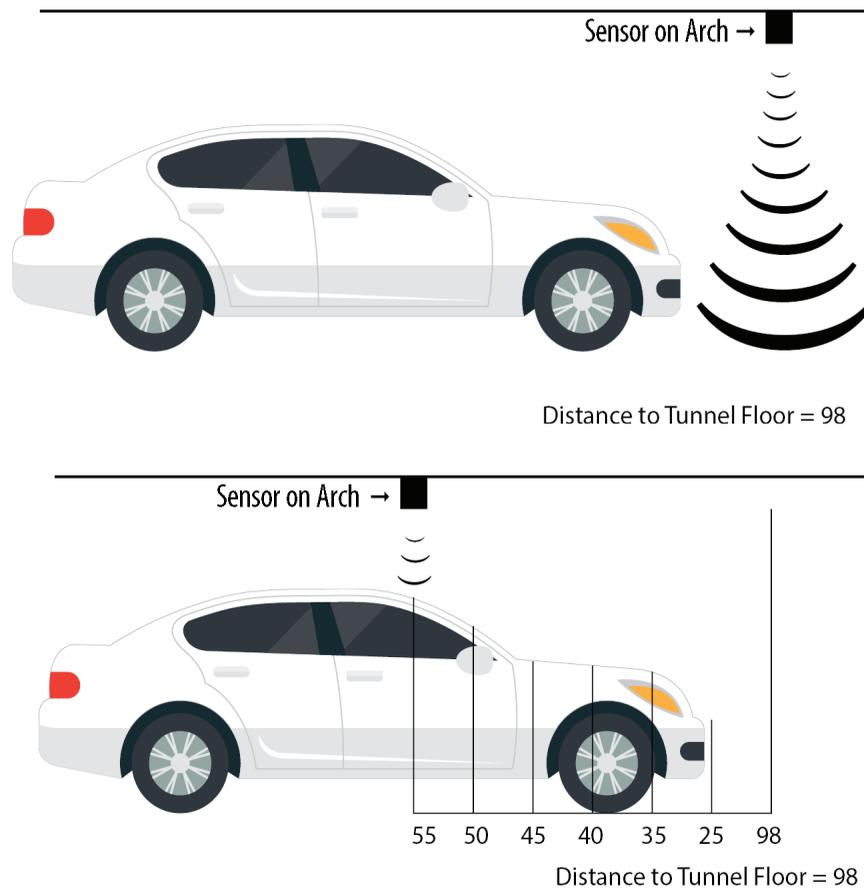
1. On the Configuration menu, click Tunnel Settings, and then click Vehicle Upper/Lower Output.
2. Make any necessary changes to the settings.
The settings are saved immediately. The sensor detects the distance to the tunnel floor.

Vehicle Upper/Lower Output	
Sensor Distance to Floor	100 Inches - From Tunnel Ceiling
Vehicle Upper Side Distance	<input type="text" value="48"/> Inches (18 ~ 48) - From Tunnel Floor; Enter '0' to Disable
Oversize Vehicle Hood Distance	<input type="text" value="35"/> Inches (30 ~ 55) - From Tunnel Floor; Enter '0' to Disable
Oversize Vehicle Top Distance	<input type="text" value="60"/> Inches (55 ~ 85) - From Tunnel Floor; Enter '0' to Disable

Figure 17. Vehicle Upper/Lower Output Settings

Setting	Parameter	Description
Sensor Distance to Floor	Read Only	Read only. Pickup bed sensor required. If 0, select Actions, and then click Get Distance to Tunnel Floor.
Vehicle Upper Side Distance	Numeric Inches	The average distance from tunnel floor to upper-half of vehicle. Range is 18 to 48 inches. Enter 0 to disable the Vehicle Upper/Lower Output feature. Typically set to the lower nozzle's maximum spray height for equipment that sprays the vehicle's upper and lower half. A pickup bed sensor is required before you can set a value other than 0. This value is used by relays with Part of Car set to Upper Side in the Relay Configuration screen.
Oversize Vehicle Hood Distance	Numeric Inches	This value is used to detect an oversize vehicle before the minimum car length is reached (i.e., pickup trucks, vans). Detecting vehicle starts from StartOfCar and up to 18 inches from floor for determining Start of Car. If vehicle is not found, then detection starts when vehicles Top is detected at configured VehicleTopDistance from tunnel floor. Pickup bed sensor is required for Vehicle Top Distance to work.
Oversize Vehicle Top Distance	Numeric Inches	This value is used to detect an oversize vehicle after minimum car length is reached. Detecting vehicle starts from StartOfCar and up to Top distance from floor. Pickup bed sensor is required.

Table 1-16. Roller Descriptions



The sensor also calculates the distance to the vehicle as it passes beneath the sensor. The measurements are used to build a profile of the vehicle height. Once the vehicle profile is known, the system can fire outputs for the upper half of the vehicle at the optimum time based on the position of the nozzle in relation to the height of the vehicle. This is useful for wax and polish.

Relay Configuration

This chapter includes descriptions for the Relay Configuration screen. An output relay can be set to automatically turn on and off equipment based on a defined distance in the tunnel from the eye sensor at the entrance of the tunnel.

Output relays can be set up to include a main output that is wired to a single relay which controls one piece of equipment. You can create a main output using whole number values (i.e., decimal place value must be zero). And then each main output can include up to nine alternate outputs for Selective or Deselective outputs using decimal place values (1–9).

Relay Configuration Settings

From the Configuration menu, you can configure Relays settings. Use the scroll bars to view more Relay Configuration settings.

VFD							
Output Relay.X	Name	Set Point			IP Address	Enabled	Delete
		Value	Type	Direction			
102.1	HY2 Wrap 1 Solenoid	80		Forward			Delete
103.0	HY3 Wrap 2	80	Washer RPM	None	10.0.2.3	<input checked="" type="checkbox"/>	Delete
103.1	HY3 Wrap 2 Solenoid	80		Forward			Delete
104.0	HY4 Spare	0	Washer RPM	None	10.0.2.4	<input type="checkbox"/>	Delete
104.1	HY4 Spare Solenoid	0		Forward			Delete
105.0	HP1 Side Blast	500	PSI	None	10.0.2.5	<input checked="" type="checkbox"/>	Delete
106.0	HP2 Wheel Blast D.S.	1000	PSI	None	10.0.2.6	<input checked="" type="checkbox"/>	Delete
107.0	HP3 Spare	500	PSI	None	10.0.2.7	<input type="checkbox"/>	Delete
108.0	HP4 Wheel Blast P.S.	1000	PSI	None	10.0.2.8	<input checked="" type="checkbox"/>	Delete
109.0	R1A Reclaim Solids	0	PSI	None	10.0.2.9	<input type="checkbox"/>	Delete
110.0	R1B Alternate	0	PSI	None	10.0.2.11	<input type="checkbox"/>	Delete
112.0	R2B Alternate	0	PSI	None	10.0.2.12	<input type="checkbox"/>	Delete
113.0	M1 Mitter 1	44	Washer RPM	None	10.0.2.13	<input checked="" type="checkbox"/>	Delete
114.0	M2 Mitter 2	44	Washer RPM	None	10.0.2.14	<input checked="" type="checkbox"/>	Delete
115.0	RO Spot Free	90	PSI	None	10.0.2.15	<input checked="" type="checkbox"/>	Delete
116.0	RO Reject	70	PSI	None	10.0.2.16	<input checked="" type="checkbox"/>	Delete
117.0	HY5 Rockers	70	Washer RPM	None	10.0.2.17	<input checked="" type="checkbox"/>	Delete
117.1	HY5 Rockers Solenoid	70		Forward			Delete
118.0	RO Blowers 1-4 Full						

Figure 1. Relay Configuration Settings

Field	Parameters	Description
Output Relay.X	Numeric	The output relay number represents a main output relay for a piece of equipment. In the Output Relay.X column, the decimal value for a main output must be zero. Each main output can include up to nine alternate outputs. These alternate outputs could be Selective or Deselective type, using the main output whole number plus the decimal place values (1—9) for the output numbers.
Name	Alphanumeric	The name for the service or product.
Start	Numeric Inches	In inches, this measurement represents the distance from the entrance eye to the equipment at the point where the equipment starts in the tunnel for the vehicle.
Extend	Numeric Inches	In the Extend column, this measurement represents how many inches the relay will be active longer than the part of car measurement.
Look Ahead	Numeric Inches	Look Ahead feature keeps a function or equipment energized if next vehicle is passed the Look Ahead distance. This feature helps reduce energy consumption. For instance, if a car is at the dryers and another car has entered the tunnel and they are past this exact Look Ahead distance, the dryers will stay energized. This prevents the spikes in the electric usage which in turn decreases the energy bill. If the second vehicle has not passed the Look Ahead distance, then the dryers will power down, and ramp up again when the second car passes the Dryers output Start distance.
Type	List	Mandatory, External, Selective, or Deselective are types of outputs. Each main output can include up to nine alternate outputs. These alternate outputs could be Selective or Deselective type, using decimal place values (1—9) for the output or profile numbers.
Part of Car	List	Select a Part of Car from the list. The Part of Car indicates which part of the car to use when this relay is active: Upper Side, Front Bumper, Pickup, Rear Half, All of Car. The Car or vehicle is measured as it passes the entrance eye sensor.
Flash	On or Off	If set to On, the output has to flash when the vehicle is passing this relay function in the Tunnel. NOTE: You can use other lighting throughout the wash such as LED or neon; however, lights for the Flash relay must be incandescent only.
Wet Down	On or Off	If set to On, then this equipment output or relay profile is included in the wetdown function.
Panic Stop	On, Off, or NC	If set to OFF, the relay turns off during a panic stop. If set to ON, the relay turns on during a panic stop. If set to NC (No change), there is no change to the state of the relay during the panic stop. For example, if it was on before the panic stop, then during a panic stop it remains on.

Field	Parameters	Description
Staggered Start	Numeric Seconds	A programmable staggered start can be set for each piece of equipment to start up again after a panic stop, one piece of equipment after the next. This is to offset the electricity peak demand. The Staggered Start time is measured in seconds and the value is how much time it takes the piece of equipment to get from the electricity peak demand to the amps used during normal operations. The Staggered Start times are cumulative and start up in consecutive relay output order. Example: Blowers.
Add / Delete	Buttons	Select the Add button to add the selected relay output. Select the Delete button to delete the selected relay output.

Table 1-17. VFD Relay Configuration Settings Descriptions

Main Output

A main output is wired to a single relay which controls one piece of equipment. You can create a main output using whole number values (i.e., decimal place value must be zero). Each main output can include up to nine alternate outputs for Selective or Deselective outputs using decimal place values (1–9).

Decimal place values (1–9) are used for alternate outputs. Each main output can include up to nine alternate outputs using the main output number with a decimal place between .1 and .9.

WARNING: If you add a main output that already exists in the list, then the existing output is replaced by the one. When you click Add (at the end of the following procedure), the output will be added immediately. You will not be prompted to verify this change with any type of message. So make certain you know that the output you will add is either unique or is meant to replace an existing output.

Add a Main Output

1. Select the **Configuration** menu, and then select **Relays**.
2. From the **Relay Configuration** screen, scroll to the last row where the Add button appears.
3. From the last row Output Relay.X box, type a main output relay number.
4. In the decimal Output Relay.X box, type the number 0.
 - NOTE:** The decimal value for a main Output Relay.X must be zero.
5. Type or select values in all the remaining boxes (e.g., Start, Extend, Look Ahead, etc.).
6. Click the **Add** button when you are finished.

The main output is added to the list or the output replaces an existing main output.

Add a Main Output for the Exit Sign

The Exit Sign always needs to be set to FH to detect when the car is starting to exit the tunnel.

1. Select the **Configuration** menu, and then select **Relays**.
2. From the **Relay Configuration** screen, scroll to the last row where the Add button appears.
3. From the last row Output Relay.X box, type a main output relay number.
4. In the decimal Output Relay.X box, type the number 0.
 - NOTE:** The decimal value for a main Output Relay.X must be zero.

- Type a value in the **Start** box.
- In the **Part of Car** box, select FH (Front Half).
 - NOTE:** AC (All Car) may appear in the list but is not a valid selection and therefore will be replaced by the software with FH.
- Click the **Add** button when you are finished.

The main output is added to the list or the output replaces an existing main output.

Output Relay.X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	Inrush Time in Seconds	Start Priority	
50.0	AIR COMPRESSOR	0	0	0	External	All of Car	Off	Off	Off	0	0	N/A	Delete
					Mandatory	All of Car	Off	Off	Off	0	0	N/A	Add

Leave Blank or Type 0 for a Relay*

Click add to Create the Relay or Replace an Existing Relay

Type Relay Number

*Alternate Output Decimal Values are 1-9

Deselecting a Selective Service

The reason for turning off a selective function on a wash, would be if a customer requests turning off a certain selective function. An example of this would be the customer requesting to disable the tire shine for their wash. Typically, the tire shine is a selective option.

To deselect the selective relay, we will need to turn off or cut power to the selective function. This is accomplished by adding another relay.

See the Installation Guide to wire a second relay in series with the original selective relay.

These instructions will help you program the relay to function correctly, and create a service to use the retract.

Programming a Second Relay

When setting up a second relay that turns off (or deselect) a selective relay, the programming will need to match the first relay that the customer wants turned off.

The reason to program the relays exactly the same is they are wired differently. With relay 2 wired to the normally closed terminal, it will pass power through the relay without needing to be turned on. When relay 2 is turned on, it will cut power to relay 1, causing relay 1 not to work for the duration relay 2 is turned on. For more wiring information, see the Tunnel Master® *wbc* Installation Guide.

See Below for example.

70.0	Relay 1		100	24	0	Selective	All of Car	Off	Off	Off			
71.0	Relay 2		100	24	0	Selective	All of Car	Off	Off	Off			

Figure 2. Deselecting a Selective Service Relay

Adding a Service to use as a Retract

The last step is setting up the retract service to turn on our second relay. One thing we cannot do is select a selective service a second time to turn it off. This is why we need the retract service added.

The service will be set up just like any other retract service. It will need to be set up as a \$0 retract service. For our example, we will need to put in just one relay. Depending on what is being turned off, there may be multiple relays needed.

The service will need to be added to WashConnect so it will be available for use as a retract.

Relay Configured for Conveyor Error

If you try to add a relay that is configured for a conveyor, an error message appears

<input type="checkbox"/>		10	Tire Shine	Extra	2.00	0	70.0
<input type="checkbox"/>		11	Tire Shine Retract	Retract	0.00	0	71.0

Figure 3. Tire Shine and Tire Shine Retract Example

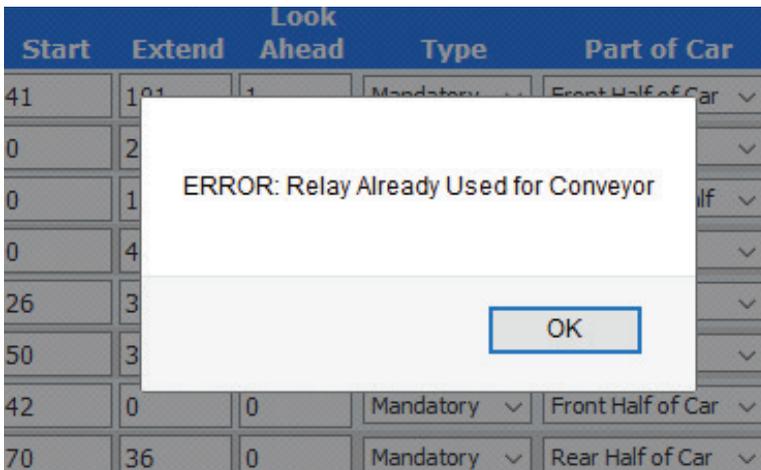


Figure 4. Relay Already Used for Conveyor Error

You can change the output number for the Roller or Entrance Management relays in the **Configuration > Tunnel Settings > Roller screen** -or- **Configuration > Tunnel Settings > Entrance Management**.

Alternate Outputs

A main output is wired to a single relay which controls one piece of equipment. Establishing an alternate output for that main output, allows you to change the action of the equipment – using the same main output relay – based on the wash service selected.

For example, the main output 41.0 might control the Flex Wrap Retract with a Start of 520 inches and an Extend of 116 inches. It is a Selective output that fires for All of Car.

Output Relay.X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	Inrush Time in Seconds	Start Priority
41.0	FLEX WRAP RETRACT	520	116	0	Selective	All of Car	Off	On	Off	0	0	N/A

Figure 6. Main Output 41.0

As alternate outputs for output 41.0, you might create 41.1, Flex Wrap Retract Front Bumper (for the front-bumper retract), and 41.2, Flex Wrap Retract Rear Bumper (a rear bumper retract). For example, you might configure the front bumper retract for vehicles that include front-mounted license plates, which could be damaged by the mitter. In the same way the rear-bumper retract could be used for vehicles with rear-mounted hitches. If you change the Part of Car selection and the Extend Time selection for these two alternate outputs, they are established on the same relay as 41.0, instead of using two additional relays.

Alternate Output 41.1 and 41.2 are wired to the same relay as 41.0.

Output Relay.X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	
41.0	FLEX WRAP RETRACT	520	116	0	Selective	All of Car	Off	On	Off	0	Delete
41.1	FLEX WRAP RETRACT FRO	520	24	0	Selective	Front Bumper	Off				Delete
41.2	FLEX WRAP RETRACT REA	520	24	0	Selective	Rear Bumper	Off				Delete

The alternate outputs control the same piece of equipment in two alternate ways.

However, they use only one relay instead of two additional relays.

Relay Configuration: Wet Down, Panic Stop, and Staggered Start (Advanced Settings: Inrush Time and Start Priority are not available for the alternate outputs but are established by the main relay and do not change for each additional alternate output.)

NOTE: Keep in mind that if the alternate output is assigned to the same wash service as the main output then the alternate output cannot overlap the main profile start and extend times. For example, if the main profile is set to start at 50, and extend for 50, then the alternate output must start at 101 or higher. If not, it will be ignored.

Add an Alternate Output

NOTE: You can create or edit an alternate output for a main output. An alternate output is created using decimal-place values. Each main output can include up to nine alternate outputs (1-9).

You can create alternate output for Selective or Deselective outputs. Mandatory outputs should not include alternate outputs.

To add an Alternate Output, follow these steps:

1. From the **Configuration** menu, and select **Relays**.
The Relay Configuration screen appears.
2. Scroll to the last row where you will find an Add button.
3. In the last row's Output Relay.X box, type a main output number.
4. Type a nonzero value (1-9) in the decimal place box. The decimal value for an alternate output must be between 1 and 9.
5. Type or select values in the following boxes: Start, Extend, Look Ahead, Type, Part of Car, and Flash.
6. Leave the remaining fields blank. The values in Wet Down, Panic Stop, Staggered Start, Inrush Time (in Seconds), and Start Priority are determined automatically by the main output relay.
7. Click the **Add** button when you are finished.

The alternate output is added to the list and updated immediately, no need to click a Save button.

Output Relay.X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start		
74.0	TEST	1	1	1	Selective	All of Car	On	On	On	0	Delete	
74	1	TEST 74.1	0	0	0	Selective	All of Car	On	On	On	0	Add

Type 1 through 9 for an Alternate Output

Type Main Output Number

Click Add button to Create the Output

Figure 5. The last row of the list is where to Add an Alternate Output

Deleting a Relay or Output

To delete a relay or output:

1. Click to select the **Delete** button.
The message "Are you sure you wish to delete this relay?" appears.
2. Click **OK**.
The row is deleted from the list.

About Front Bumper Setting

If **Part of Car** is set to Front Bumper, then **Extend** represents how many inches the relay will activate before (not after) the front bumper has reached the equipment in the tunnel and will remain activated for the distance set in Extend.

Part Of Car is set to Front Bumper:

If the equipment needs to fire up before the front bumper reaches it, then that distance is set in the Extend field.

Start = Start - Extend.

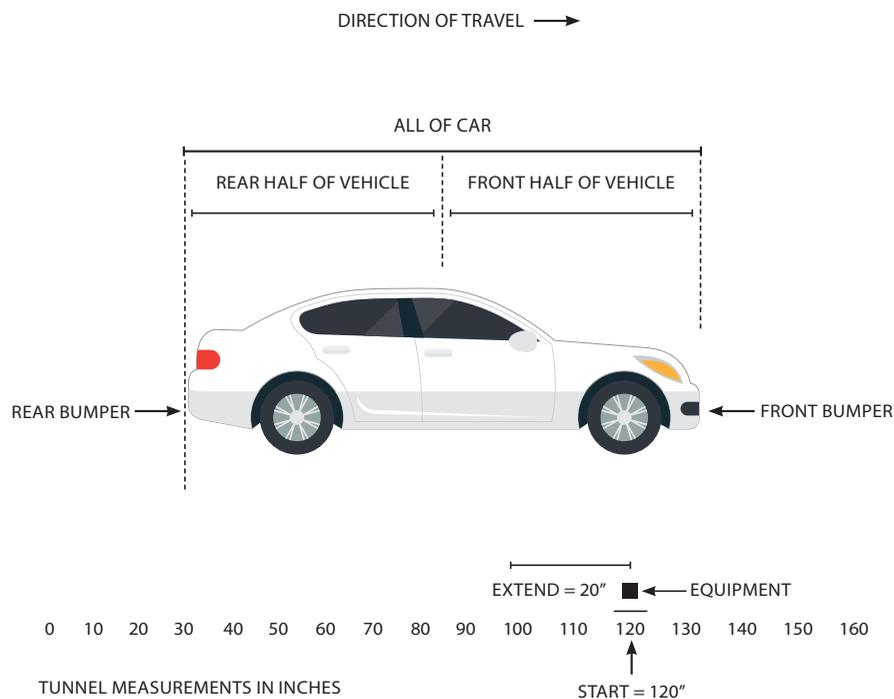


Figure 6. Part of Car Setting

In the previous figure, Part of Car is set to Front Bumper, and Extend is set to 20, and Start is set to 120. These settings allow the output to fire when the front bumper is at 100 inches into the tunnel (20 inches before the

front bumper reaches the output). It will continue to fire for those 20 inches, and then stop when the front bumper reaches 120 inches.

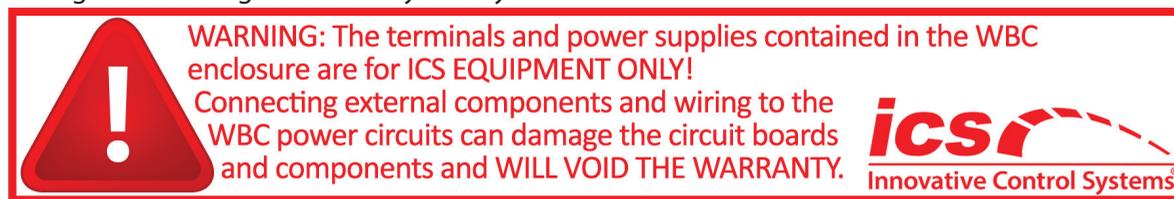
NOTE: This is only valid when Part of Car is set as Front Bumper. For example, if the Start setting is 100 and the Extend setting is 150, then Extend is calculated at zero inches, not negative 50 inches (which is not possible because the equipment would need to start firing before the car actually enters the tunnel). The output will fire at zero inches, and then turn off at 100 inches (the Start setting).

About Rear Half Settings

If Part of Car is set to Rear Half, this keeps equipment on for Rear half when the vehicle is detected. If Part of Car is set to Front Half, this keeps equipment on for Front half of vehicle.

About the Conveyor Relay

The conveyor is energized via a separately configured conveyor relay. The Input Board is used to feed voltage to the designated conveyor relay.



Details include the following:

- During a panic stop, the circuit is guaranteed to break power to the relays; therefore, not dependent on a computer to stop.
- During a staggered restart, the computer initiates a wash start, which energizes the relays. Then after the end of the wash start is the conveyor relay turned on.
- Wetdown process turns on the conveyor relay.

Conveyor Relay DIP Switch Settings

The conveyor horn and delay control is handled via the DIP switch settings.

The DIP switch on the Input Board follow the silk-screen reference on the board (0 and 1) to determine the desired switch positions.

NOTE: See the Tunnel Master®wbc Installation Guide for DIP switch settings.

Wi-Fi Connection

iPhone® and iPad® users with Wi-Fi connection can access the WBC Relay Configuration screen. This ability is an industry first and makes it possible for the manager to make changes to the timing of the relays using an iPhone, iPad with a Wi-Fi connection while inside the tunnel or away from the wash site.

For more information, see "Wireless Network Setup Log In" on page 10.

Tunnel Controller Interface

192.168.0.11/login.html? 

ics Relays Log Out

Relay Configuration

Output Relay.X	Name	Start	Extend	Look Ahead
1.0	DryingAgent-Top&Front	658	0	0
2.0	DryingAgent-UpperSide	664	20	0
3.0	DryingAgent-Top&Rear	684	40	0
4.0	DryingAgent- Oversize	664	40	0
5.0	Sealer Wax-Top&Front	664	20	0
6.0	Sealer Wax- UpperSide	664	20	0
7.0	Sealer Wax- Top&Rear	684	40	0
8.0	Sealer Wax- Oversize	664	40	0
9.0	Spot Free-Top&Front	736	8	0
10.0	Spot Free-UpperSide	748	20	0
11.0	Spot Free-Top&Rear	758	56	0
12.0	Spot Free-Oversize	748	40	0
13.0	Spot Free-UpperMirror	850	-50	0
14.0	Spot Free-LowerMirror	850	-50	0
15.0	PreSoak-Top&Front	0	-12	0
16.0	PreSoak-UpperSide	12	40	0
17.0	PreSoak-Top&Rear	12	40	0
18.0	PreSoak-Oversize	12	0	0
19.0	Foamer1	38	6	0
20.0	Foamer2Wrap#1	149	28	0







Figure 7. Relay Configuration screen from iPhone

Advanced Settings

Advanced Settings includes two sections: Power Management and VFD.

The ICS patent pending Power Management settings can improve tunnel efficiency by reducing the peak power usage on select equipment. These advanced settings are Inrush Time and Start Priority. Together the settings are collectively known as the Power Management system for the WBC.

You do not need to set power management requirements for every piece of tunnel equipment, but only for those that consume the most power or frequently overlap their motor start up times.

Equipment that is 208/480 VAC or 3-phase may be considered for power management.

This section also includes settings for a VFD control panel. The ICS VFD control panels are purchased separately and are used to improve performance and reduce costs at your wash by adjusting the settings for your pumps, hydraulics, vacuums and blowers.

Power Management

Inrush Time (in Seconds) - The amount of time the motor needs to start up and obtain full operational power.

Start Priority - a selection between 1 (fixed) and 4. Designates which relay to start up in order of priority to improve power efficiency by preventing overlapping of motors starting up.

- **Priority 1** (if relay Type is not External) relay keeps its assigned Start Time that is fixed and will not vary. Example: High Pressure Pumps.
- **Priority 2** (if relay Type is not External) fires on or before its assigned Start Time. Start time is calculated by the system and will vary. Example: Blowers
- **Priority 3 or Priority 4** (if relay Type is External) Start time will vary, but only if all Priority 1 and 2 relays have been scheduled. Examples: Vacuums, Air Compressor.

Setup Power Management Settings

Power Management can be setup from the WBC interface.

1. From the **Configuration** menu, and select **Relays**.

The Relay Configuration screen appears.

2. Click to mark the **Show Advanced Settings** box.

Show Advanced Settings											
Output Relay.X	Name	Power Mgmt		VFD							
		Inrush Time (s)	Start Priority	Value	Type	Direction	IP Address				
112.0	R2B Alternate	0	N/A	0	PSI	None	10	0	2	12	
113.0	M1 Mitter 1	0	N/A	44	Washer RPM	None	10	0	2	13	
114.0	M2 Mitter 2	0	N/A	44	Washer RPM	None	10	0	2	14	
115.0	RO Spot Free	0	N/A	90	PSI	None	10	0	2	15	
116.0	RO Reject	0	N/A	70	PSI	None	10	0	2	16	
117.0	HYS Rockers	0	N/A	70	Washer RPM	None	10	0	2	17	
117.1	HYS Rockers Solenoid			70		Forward					
118.0	B1 Blowers 1-4 Full	0	N/A	3400	Motor RPM	Forward	10	0	2	18	
118.1	B1 Blowers 1-4 Half			2900		None					
118.2	B1 Blowers 1-4 Idle			1750		None					
118.3	B1 Blowers 1-4 Conver			2800		None					
119.0	B2 Blowers 5-8 Full	0	N/A	3600	Motor RPM	Forward	10	0	2	19	
119.1	B2 Blowers 5-8 Half			2900		None					
119.2	B2 Blowers 5-8 Idle			1750		None					
119.3	B2 Blowers 5-8 Conver			2800		None					
120.0	B3 Blowers 9-12 Full	0	N/A	3600	Motor RPM	Forward	10	0	2	20	
120.1	B3 Blowers 9-12 Half			2900		None					
120.2	B3 Blowers 9-12 Idle			1750		None					

Figure 1. Battery on Main CPU Board

3. At the bottom of the list, the relay appears as a row with cleared boxes.
4. In the **Inrush Time** box, type the power up time in seconds. This is the amount of time (in seconds) the motor needs to start up and obtain full power. For example, a high pressure pump motor might require 1 second, a hydraulic motor might require 2 seconds and a blower motor might require 10 seconds.
5. In the **Start Priority** box, select an item:
 - Select **Priority 1** or **Priority 2**, if the relay **Type** is **not External**,
 - **Start Priority 1** means the relay will keep its assigned Start Time. It will become a power management relay, but its Start Time is fixed and will not vary.
 - **Start Priority 2** means the relay will fire on or before its assigned Start Time. Its Start Time will vary. The exact Start Time is calculated by the system.
 - Select **Priority 3** or **Priority 4**, if the relay **Type** is **External**.
 - **Start Priority 3** or **4** means the relay is an external relay. Its Start Time will vary, but only if all Priority 1 and 2 relays have been scheduled.

🔗 **NOTE:** Advanced Settings: Inrush Time and Start Priority are not available for the alternate outputs but are established by the main relay and do not change for each additional alternate output.

Setting	Parameter	Description
Inrush Times	Numeric Seconds	The amount of time in seconds that the motor needs to start up and obtain full operational power.
Start Priority	Numeric (1–4)	A selection between 1 (fixed) and 4. Designates which relay to start up in order of priority to improve power efficiency by preventing overlapping of motors starting up.
Set Point Value	Numeric	This number is the amount of PSI, RPM, inches of Lift or Cars per Hour. Type would define this is PSI or RPM. For example, 500 PSI.
Set Point Type	Motor RPM, Wash RPM, PSI Inches of Lift, or Cars per Hour	Type defines the value as Motor RPM, Wash RPM (Revolutions Per Minute), PSI (Pounds per Square Inch), Inches of Lift, or Cars per Hour.
Direction	Forward or Reverse	This sets the direction you would want your hydraulic motor to run: None, Forward, or Reverse.
IP Address	Numeric	IP Address of the VFD.

Table 2-1. Advanced Settings Descriptions

Power Management Settings Example

In Figure 5-2, the **Inrush Time** and **Start Priority** settings have been applied to five relays.

Editing Power Management Settings

To edit a relay to include power management settings:

1. On the **Configuration** menu, select **Relays**.

The Relay Configuration screen appears.

Output Relay.X	Name	↓	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	Inrush Time (s)	Start Priority
4.0	Vac #1	<input type="checkbox"/>	External	All of Car	Off	Off	N/A	0	10	Priority 3
6.0	Vac #2	<input type="checkbox"/>	External	All of Car	Off	Off	N/A	0	0	N/A
21.0	Macneil Dryer Start	<input type="checkbox"/>	Mandatory	All of Car	Off	Off	Off	5	10	Priority 2
23.0	Dryer Start	<input type="checkbox"/>	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
54.0	Wheel/Rocker Pump	<input type="checkbox"/>	Mandatory	All of Car	Off	Off	Off	0	2	Priority 1

Figure 2. Power Management Example

2. Locate the relay.
3. In the **Inrush Time** box, type the power up time in seconds. This is the amount of time (in seconds) the motor needs to start up and obtain full power. For example, a high pressure pump motor might require 1 second, a hydraulic motor might require 2 seconds and a blower motor might require 10 seconds.
4. In the **Start Priority** box, select an item:
 - Select **Priority 1** or **Priority 2**, if the relay **Type** is not **External**,
 - Start Priority 1 means the relay will keep its assigned Start Time. It will become a power management relay. But its Start Time is fixed and will not vary.
 - Start **Priority 2** means the relay will fire on or before its assigned Start Time. Its Start Time will vary. The exact Start Time is calculated by the system.
5. Select **Priority 3** or **Priority 4**, if the relay Type is External.

- Start **Priority 3** or **4** means the relay is an external relay. Its Start Time will vary, but only if all Priority 1 and 2 relays have been scheduled.

🔗**NOTE:** An error message appears if you select a **Start Priority** before you type an Inrush time. Type in Inrush time first, and then select a **Start Priority**.

For more information, See “About Inrush Time and Start Priority” on page 51.

Power Management Theory of Operations

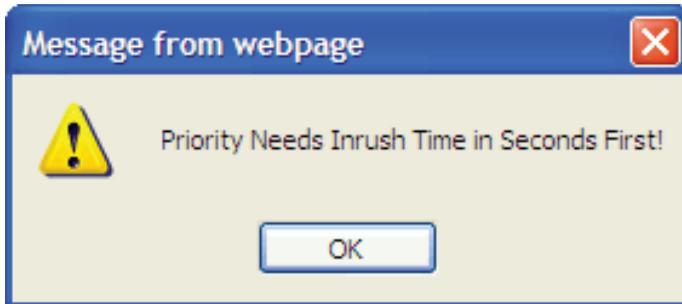


Figure 3. Priority Needs Inrush Time Error Message

Often times, tunnel equipment requires a certain power up time to come to full operational power. For safety reasons, the equipment must be fully operational by the time a vehicle arrives at the equipment location.

Start Time

Start Time is actually a measurement in inches to determine when the equipment should begin to power up. For example, the first criteria needed the measurement of the point in the tunnel where the equipment must be fully powered up and operational when the vehicle reaches it. Secondly, how much power up time is needed for the piece of equipment to be fully powered up. And finally, what is the chain speed of the tunnel.

These three criteria are needed to adjust the Start Time and include the power up requirements. This is all done by the management system. For Example:

- Chain speed of 10 inches per second
- A tire brush located at 400 inches
- Tire brush power up time is six seconds
- Result: Start Time of 340 inches = 400 inches – (6 seconds × 10 inches per second)

Start Time Equation

$$\text{Equipment Tunnel Location Point} \text{ In Inches} - \left(\text{Equipment Power Up In Seconds} \times \text{Tunnel Chain Speed In Inches} \right)$$

If the conveyor speed changes, the Start Time must also be changed. This makes it difficult to increase the conveyor speed to handle high-volume days.

Peak Power Usage Dilemma: When multiple vehicles are running through the tunnel, two or more start times may overlap to consume a lot of power, driving up peak demand. For example, suppose the mitter starts at 100 inches, the tire brush starts at 400 inches, and the dryers start at 640 inches. If three vehicles simultaneously arrive at each position, all the equipment will start at once.

PEAK DEMAND INCREASED DUE TO STARTING OVERLAP

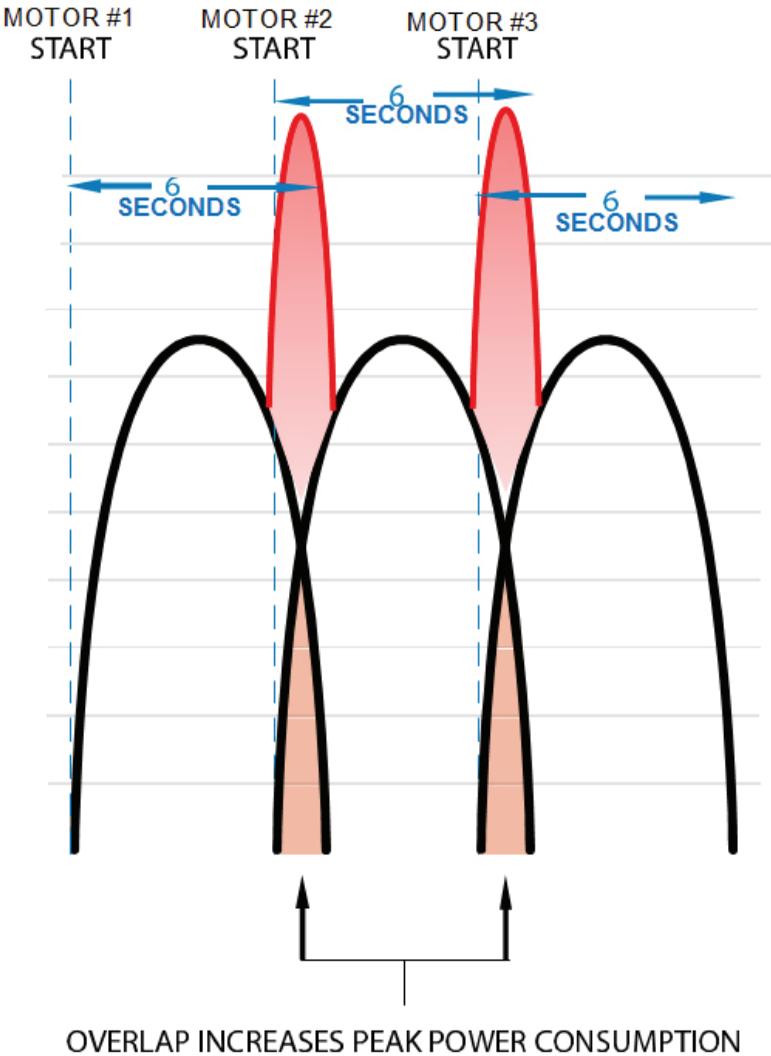


Figure 4. Peak Power Demand

Peek Power Usage Solution: The power management feature can help you fine-tune the motor start process in the car wash tunnel to avoid power up overlaps.

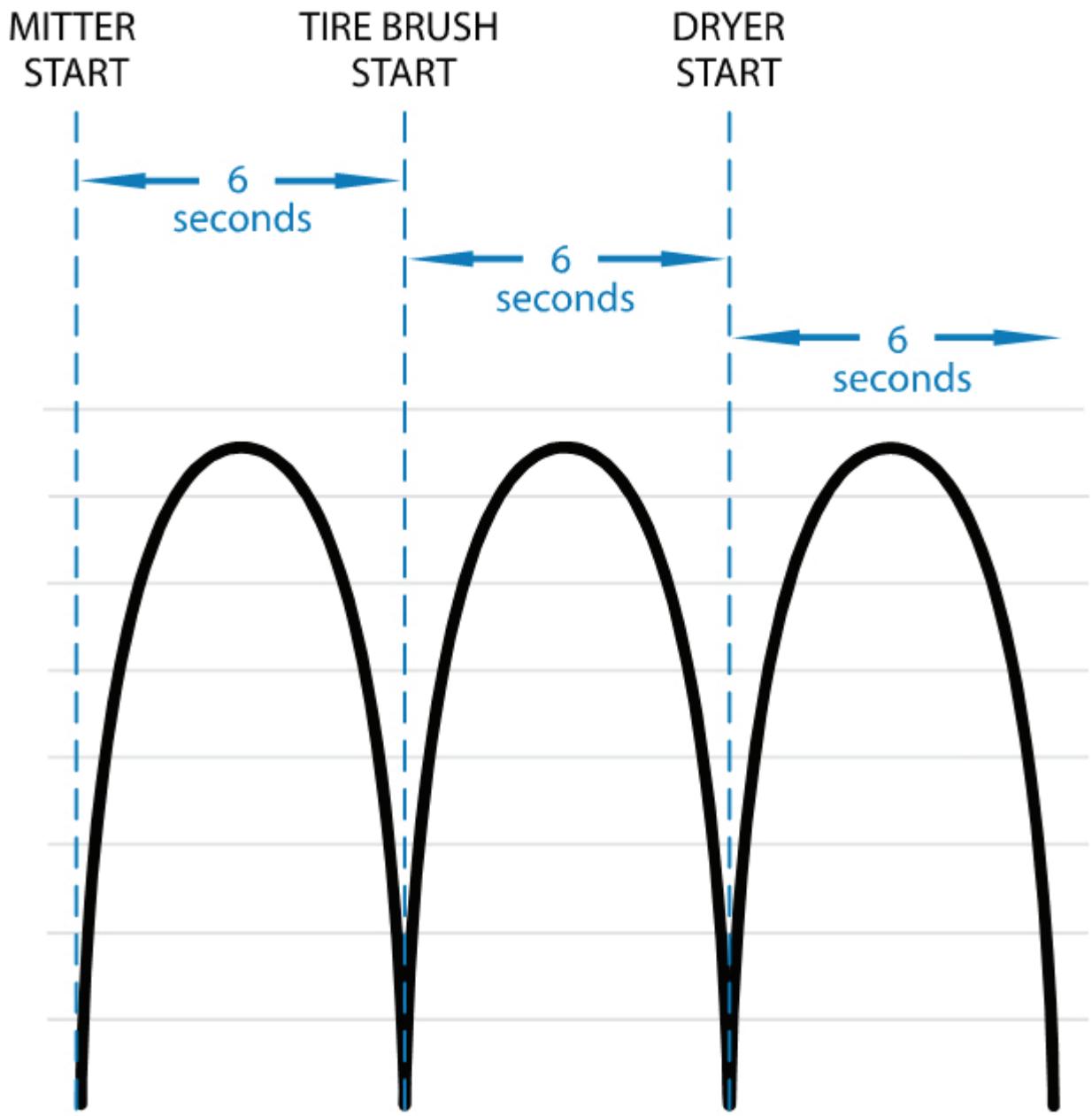


Figure 5. Optimized Power Demand

Instead of adjusting the Start Time, you can let the WBC Power Management system optimize the Start Time of each piece of equipment based on the Inrush and Start Priority settings. The system will ensure that the equipment is fully powered up and running by the time a vehicle arrives at the equipment.

About Inrush Time and Start Priority

This section includes technical details about the Inrush Time and Start Priority settings.

- The system evaluates Inrush Time and Start Priority relays separate from other relays that do not have Inrush Time and Start Priority settings. For example, suppose you have 50 relays configured for your tunnel, but only ten have Inrush Time and Start Priority settings. The system will consider those ten relays separately when calculating their optimized start times. The other 40 relays will start according to their assigned Start Time settings.
- When calculating optimized start times, the system will ensure that none of the power management relays will start after its assigned Start Time. Calculated start times will always be equal to or less than the assigned Start Time. For example, if a relay Start Time is 400 inches, the power management system will calculate a time equal to or less than 400 inches.
- Inrush Time is the same as the power up time. It represents the amount of time (in seconds) the motor needs to start up and obtain full power. Often times the motor itself contains a tag indicating the startup and run demands. Motors may also be wired for one of three different voltages. Typical voltages include 110 V and 240 V. A qualified electrician can help identify these important specifications for your equipment. You can measure the Inrush time for a piece of equipment with an amp probe directly on the motor lead for line-started motors.

NOTE: This method will not work for variable speed (e.g., electronic) drives, because they may provide derived AC waveforms. Therefore, an amp probe may not provide an accurate reading. Only use amp probes for line-started motors. All electrical voltage and current measurements should be made by a qualified electrician or trained service technician.

Start Priority

Start priority is a selection between 1 (fixed) and 4.

- Start Priority 1 is fixed. The relay will fire at its assigned Start Time.
- Start Priority 2 is variable. The relay will fire on or before its assigned Start Time.
- Start Priority 3 and 4 are also variable. But they are used only for external equipment.
- Relays assigned to Start Priority 2, 3, and 4 will fire at an optimized time. The times are calculated by the system. The system considers the conveyor speed, vehicle volume, other Start Priority and Inrush settings to determine each non-overlapped start time.
- Overlapping startups may be unavoidable for multiple Start Priority 1 relays. For example, if two or more pieces of equipment are assigned to Start Priority 1, and the system determines that they both need to start simultaneously, then the start times will overlap.
- Start Priority settings are not interdependent. For example, you do not need to create a Start Priority 1 relay before you create a Start Priority 2 relay, etc.
- You can create any combination of Start Priority relays. For example, you can create Start Priority 2 and 3 relays without a Start Priority 1 relay.
- Relays with Start Priority 3 and 4 are assigned an output type of External. The relay can be assigned to any of the 48 auxiliary inputs.
- If the system is in panic mode, then Start Priority 3 and 4 relays (external equipment) will be started without overlapping the Inrush Time of those relays that have already started.

- If the system is in restart mode (staggered restart), then Start Priority 3 and 4 relays will not be started until the system comes out of restart mode. During a staggered restart, the system will use the Inrush Time of the relay, if present, as the time count in seconds to do the restart process.

Understanding External Equipment and Auxiliary Inputs

The WBC can include up to 48 auxiliary inputs. When an input receives a signal, it can fire a relay. That relay can control external equipment, such as a vacuum or an air pump. If so, the relay Type is set to External in the Relay Configuration screen.

An External relay can be given power management settings. However, since it is an External relay, its Start Priority is either 3 or 4. These start priorities are reserved for External relays.

An error message appears if you try to assign Start Priority 3 or 4 to a relay that is not External.

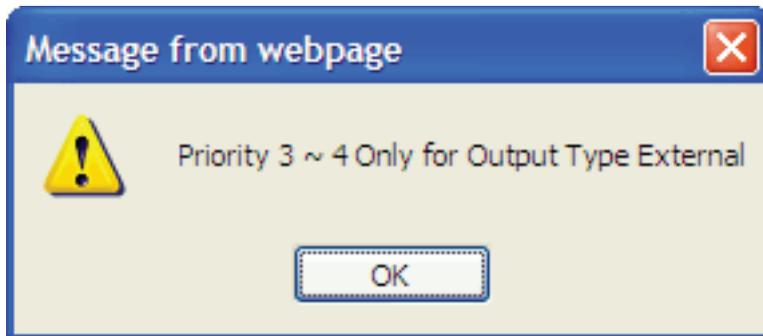


Figure 6. Priority 3 and 4 Error Message

About Start Priority 3 and 4 Equipment Scheduling

The power management system will evaluate the equipment queue for gaps between inrush times.

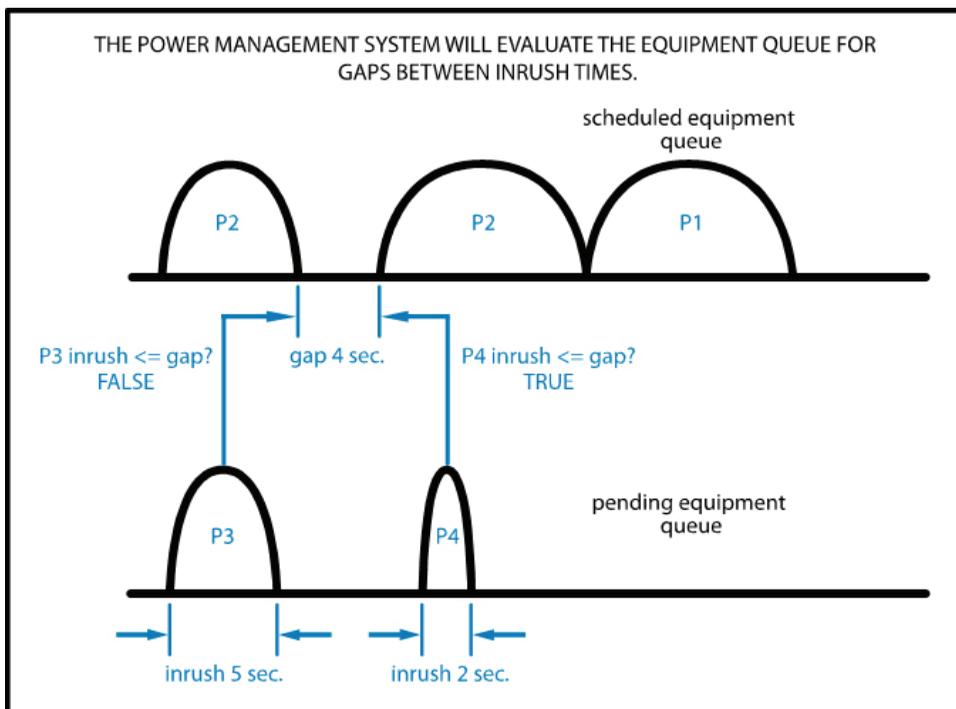


Figure 7. Automatic Power Management Equipment Scheduling Partially Complete

Each arc in the drawing represents an Inrush time for a piece of equipment. P1 means the equipment is a Start Priority 1, P2 means Start Priority 2, etc.

The P1 and both P2 equipment has been scheduled. The P3 and P4 equipment is pending. The system finds a four second gap between the Inrush times of the first P2 and the second P2 equipment. It then looks for any P3 equipment with an Inrush time less than or equal to that gap. The P3 equipment has an Inrush time of 5 seconds. Therefore, it is not scheduled to start within the gap.

Next, the system looks for any other P3 equipment. It finds none. So it looks for P4 equipment. It finds one with an Inrush time of two seconds. Since two that is seconds less than the gap between Inrush times, the P4 equipment is scheduled into that gap.

Finally, the remaining P3 equipment is scheduled to start before its start time in order to avoid overlapping startups. The equipment queue is complete, as shown in Figure 5-8.

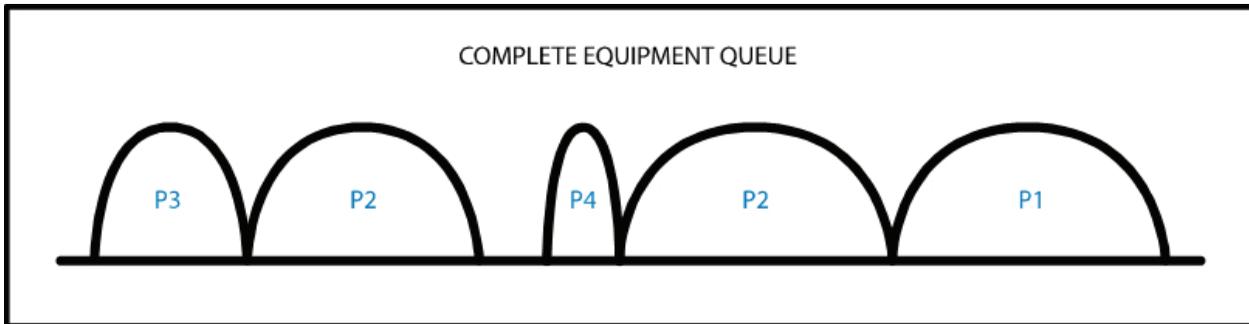


Figure 8. Automatic Power Management Scheduling of Equipment, Complete

Power Management Equipment Recommendations

You do not need to set power management requirements for every piece of tunnel equipment, but only for those that consume the most power or frequently overlap their start times.

NOTE: Equipment that is 208/480 VAC or 3-phase may be considered for power management. The following table provides guidelines for the type of equipment that might be controlled with power management, and offers Start Priority recommendations.

Equipment Type	Start Priority	Notes
High Pressure Pumps for Chemicals and Water	1	Since chemicals and liquids should not be wasted, they must be started at their exact start position.
Reclaim Pump	1	Reclaim pumps are typically configured with a Start Time of zero inches and an Extend setting equal to the length of the tunnel. If the Start Time is 0, then the reclaim pump must be Start Priority 1.
Hydraulic Motor Power Packs for Wraps and Mitters	2	Wraps and mitters that are controlled by hydraulic motor power packs can vary their start times to reduce the peak load.
Blowers	2	Blowers are good candidates for start priority 2. Blowers may draw a lot of power and require longer Inrush times.
External Air Compressors	3 or 4	External equipment is assigned start priority 3 or 4.
External Free Vacuums	3 or 4	External equipment is assigned start priority 3 or 4.

Table 2-2. Power Management Equipment Recommendations

Inrush Time and Start Priority Examples

Inrush Time and Start Priority Examples illustrate a before and after example of how you might set up power management relays with Inrush and Start Priority settings.

ICS VFD Control Panel

When you partner your Tunnel Master® *wbc* with an ICS VFD (Variable Frequency Drive) Control Panel, you will have the enhanced ability of connecting the two via an Ethernet connection over MODBUS. You will experience real-time control and monitoring of all your tunnel equipment, and improved performance and reduced costs.

 **NOTE:** The ability for the Tunnel Master® *wbc* to communicate with the ICS VFD Control Panel via Ethernet connection is proprietary to the ICS VFD. However, the WBC will be able to connect to third party VFD Panel (not an Auto Sentry) via hard-wired methods.

Add a Relay with ICS VFD Control Panel Settings

To add a relay so it includes ICS VFD settings, follow these steps:

1. On the **Configuration** menu, click Relays.
The Relay Configuration screen appears.
2. Click on the box that says Show Advanced Settings in order to see the VFD configuration settings for an output.
3. Scroll to the bottom, and Add a relay that requires ICS VFD Control Panel settings.
 **NOTE:** VFD settings need to be added when adding a Relay. If you need to edit a relay, then delete the relay and add the relay settings again along with the VFD settings. See “Add a Main Output” on page 38.
4. In the **Set Point Value** box, type a value for the type of setting. i.e., 800.
5. In the **Set Point Type** box, select a type for the value from the following:
 - Motor RPM
 - Wash RPM
 - PSI
 - Inches of Lift
6. In the **Direction** box, select one of the following:
 - None
 - Forward
 - Reverse
7. In the **IP Address** box, type in the IP address of the VFD.
8. Click the **Add** button, and the relay settings are saved immediately.

Show Advanced Settings

		VFD					
Output Relay_X	Name	Set Point			IP Address	Enabled	Delete
		Value	Type	Direction			
102.1	HY2 Wrap 1 Solenoid	80		Forward	10.0.2.3	<input checked="" type="checkbox"/>	Delete
103.0	HY3 Wrap 2	80	Washer RPM	None	10.0.2.3	<input checked="" type="checkbox"/>	Delete
103.1	HY3 Wrap 2 Solenoid	80		Forward	10.0.2.3	<input checked="" type="checkbox"/>	Delete
104.0	HY4 Spare	0	Washer RPM	None	10.0.2.4	<input type="checkbox"/>	Delete
104.1	HY4 Spare Solenoid	0		Forward	10.0.2.4	<input type="checkbox"/>	Delete
105.0	HP1 Side Blast	500	PSI	None	10.0.2.5	<input checked="" type="checkbox"/>	Delete
106.0	HP2 Wheel Blast D.S.	1000	PSI	None	10.0.2.6	<input checked="" type="checkbox"/>	Delete
107.0	HP3 Spare	500	PSI	None	10.0.2.7	<input type="checkbox"/>	Delete
108.0	HP4 Wheel Blast P.S.	1000	PSI	None	10.0.2.8	<input checked="" type="checkbox"/>	Delete
109.0	R1A Reclaim Solids	0	PSI	None	10.0.2.9	<input type="checkbox"/>	Delete
110.0	R1B Alternate	0	PSI	None	10.0.2.11	<input type="checkbox"/>	Delete
112.0	R2B Alternate	0	PSI	None	10.0.2.12	<input type="checkbox"/>	Delete
113.0	M1 Mitter 1	44	Washer RPM	None	10.0.2.13	<input checked="" type="checkbox"/>	Delete
114.0	M2 Mitter 2	44	Washer RPM	None	10.0.2.14	<input checked="" type="checkbox"/>	Delete
115.0	RO Spot Free	90	PSI	None	10.0.2.15	<input checked="" type="checkbox"/>	Delete
116.0	RO Reject	70	PSI	None	10.0.2.16	<input checked="" type="checkbox"/>	Delete
117.0	HYS Rockers	70	Washer RPM	None	10.0.2.17	<input checked="" type="checkbox"/>	Delete
117.1	HYS Rockers Solenoid	70		Forward	10.0.2.17	<input checked="" type="checkbox"/>	Delete

Figure 1. Advanced Settings

The following table describes the Advanced Settings fields.

Field	Parameter	Description
Inrush Time(s)	Numeric Seconds	The amount of time in seconds that the motor needs to start up and obtain full operational power.
Start Priority	Numeric (1-4)	A selection between 1 (fixed) and 4. Designates which relay to start up in order of priority to improve power efficiency by preventing overlapping of motors starting up.
Set Point Value	Numeric	This number is the amount of PSI, RPM or inches of Lift. Type would define this is PSI or RPM. e.g. 500 PSI.
Set Point Type	Motor RPM, Wash RPM, PSI or Inches of Lift	Type defines the value as Motor RPM, Wash RPM (Revolutions Per Minute), PSI (Pounds per Square Inch), or Inches of Lift.
Direction	Forward or Reverse	This sets the direction you would want your hydraulic motor to run: None, Forward or Reverse.
IP Address	Numeric	IP Address of the VFD.

Table 2-3. Advanced Settings

Output Relay.X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start
2.0	PRESOAK	10	-10	0	Deselective	All of Car	Off	Off	Off	0
2.2	PRESOAK	50	20	0	Mandatory	Tire All	Off			
5.0	WHEEL BLASTER/ROCKER	24	104	0	Mandatory	All of Car	Off	Off	Off	0
7.0	SOAP FOAMER	20	9	0	Mandatory	All of Car	Off	Off	Off	0
8.0	CTA	16	18	0	Mandatory	Tire All	Off	Off	Off	0
9.0	WRAP MOTOR	95	192	0	Mandatory	All of Car	Off	On	Off	0
10.0	BUG SPRAY	30	25	0	Selective	Front Bumper	Off	Off	Off	0
11.0	UNDERCARRIAGE	36	0	0	Selective	All of Car	Off	Off	Off	0
12.0	WRAP 1 DS	50	90	0	Deselective	All of Car	Off	On	Off	0
13.0	WRAP 1 PS	60	90	0	Deselective	All of Car	Off	On	Off	0
14.0	WRAP 1 H2O	50	100	0	Mandatory	All of Car	Off	On	Off	0
15.0	WRAP 1 FOAMER	50	100	0	Mandatory	All of Car	Off	Off	Off	0
16.0	MITTER 1	75	120	0	Mandatory	All of Car	Off	On	Off	0
17.0	MITTER 1 H2O	75	120	0	Mandatory	All of Car	Off	On	Off	0
18.0	TIRE BRUSH AIR	80	100	0	Deselective	All of Car	Off	Off	Off	0
19.0	TIRE BRUSH H2O	80	100	0	Mandatory	All of Car	Off	On	Off	0
20.0	SIDE BRUSH WH2O	100	36	0	Mandatory	Upper Side	Off	On	Off	0
21.0	TOP Brush	120	60	0	Deselective	All of Car	Off	Off	Off	0
21.1	TOP Brush Front half	120	60	0	Deselective	Front Half of Car	Off			
22.0	TOP BRUSH FOAM	120	60	0	Mandatory	All of Car	Off	Off	Off	0
23.0	OMNI H2O	190	115	0	Mandatory	All of Car	Off	Off	Off	0
24.0	OMNI HYD	193	115	0	Mandatory	All of Car	Off	Off	Off	0
25.0	WRAP 2 DS	200	90	0	Deselective	All of Car	Off	On	Off	0
26.0	WRAP 2 PS	210	90	0	Deselective	All of Car	Off	On	Off	0
27.0	WRAP 2 H2O	200	100	0	Mandatory	All of Car	Off	On	Off	0
28.0	WRAP 2 FOAMER	200	100	0	Mandatory	All of Car	Off	Off	Off	0
29.0	SIDE TO SIDE MITTERS	260	165	0	Mandatory	All of Car	Off	On	Off	0
30.0	MITTER 2 H2O	260	120	0	Mandatory	All of Car	Off	On	Off	0
31.0	TRI FOAM	275	0	0	Selective	All of Car	Off	Off	Off	0
32.0	RAIN X	300	0	0	Selective	All of Car	Off	Off	Off	0
33.0	FINAL RINSE	330	0	0	Mandatory	All of Car	Off	Off	Off	0
34.0	CLEAR COAT	338	0	0	Selective	All of Car	Off	Off	Off	0
35.0	DRYING AGENT	340	0	0	Mandatory	All of Car	Off	Off	Off	0
36.0	DRYER 1 DS	345	300	200	Deselective	All of Car	Off	Off	N/A	0
37.0	DRYER 2 PS	350	300	200	Deselective	All of Car	Off	Off	N/A	0
38.0	DRYER 3 DS	360	300	200	Deselective	All of Car	Off	Off	N/A	0
39.0	DRYER 4 TOP	365	300	200	Deselective	All of Car	Off	Off	N/A	0
40.0	DRYER 5 TOP	370	300	200	Deselective	All of Car	Off	Off	N/A	0
41.0	DRYER 6 PS	375	300	200	Deselective	All of Car	Off	Off	N/A	0
42.0	DRYER 7 DS	385	300	200	Deselective	All of Car	Off	Off	N/A	0
43.0	DRYER 8 PS	390	300	200	Deselective	All of Car	Off	Off	N/A	0
44.0	TIRE SHINE	364	100	200	Deselective	All of Car	Off	Off	Off	0
44.1	RETRACT	0	0	0	Deselective	All of Car	Off			
45.0	WAIT GO	30	25	0	Mandatory	Rear Bumper	Off	Off	Off	0
51.0	GROUP 1 HIGH	740	145	0	Deselective	All of Car	Off	Off	Off	0
52.0	GROUP 1 MED.	812	25	0	Deselective	All of Car	Off	Off	Off	0
53.0	GROUP 1 LOW	812	25	0	Selective	All of Car	Off	Off	Off	0
54.0	GROUP 2 HIGH	824	145	0	Deselective	All of Car	Off	Off	Off	0
78.0	BLOWER 1	800	110	180	Mandatory	All of Car	Off	Off	Off	0
79.0	BLOWER 2	876	110	180	Mandatory	All of Car	Off	Off	Off	0
80.0	BLOWER 3	894	110	180	Mandatory	All of Car	Off	Off	Off	0
81.0	BLOWER 4	912	110	180	Mandatory	All of Car	Off	Off	Off	0
83.0	BLOWER 5	930	110	180	Mandatory	All of Car	Off	Off	Off	0
84.0	BLOWER 6	945	110	180	Mandatory	All of Car	Off	Off	Off	0
92.0	RECLAIM	0	900	0	Mandatory	All of Car	Off	On	Off	0
96.0	VACUUM	0	0	0	External	All of Car	Off	Off	Off	0
98.0	AIR COMPRESSOR	0	0	0	External	All of Car	Off	Off	Off	0
124.0	LAVA	0	0	0	Deselective	All of Car	Off	Off	Off	0
124.1	LAVA PICKUP	0	0	0	Selective	Pickup Bed	Off			
					Mandatory	All of Car	Off	Off	Off	0

Figure 2. Relay Configuration Before Power Management

In Figure 5-2, the example shows the Relay Configuration screen for a tunnel approximately 75-feet long with 50 relays. None of the relays has been assigned an Inrush Time or Start Priority.

Output Relay.X	Name	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	Power Mgmt	
								Inrush Time (s)	Start Priority
2.0	PRESOAK	Deselective	All of Car	Off	Off	Off	0	0	N/A
2.2	PRESOAK	Mandatory	Tire All	Off					
5.0	WHEEL BLASTER/ROCKER	Mandatory	All of Car	Off	Off	Off	0	1	Priority 2
7.0	SOAP FOAMER	Mandatory	All of Car	Off	Off	Off	0	8	Priority 1
8.0	CTA	Mandatory	Tire All	Off	Off	Off	0	0	N/A
9.0	WRAP MOTOR	Mandatory	All of Car	Off	On	Off	0	3	Priority 2
10.0	BUG SPRAY	Selective	Front Bumper	Off	Off	Off	0	0	N/A
11.0	UNDERCARRIAGE	Selective	All of Car	Off	Off	Off	0	0	N/A
12.0	WRAP 1 DS	Deselective	All of Car	Off	On	Off	0	0	N/A
13.0	WRAP 1 PS	Deselective	All of Car	Off	On	Off	0	0	N/A
14.0	WRAP 1 H2O	Mandatory	All of Car	Off	On	Off	0	0	N/A
15.0	WRAP 1 FOAMER	Mandatory	All of Car	Off	Off	Off	0	0	N/A
16.0	MITTER 1	Mandatory	All of Car	Off	On	Off	0	0	N/A
17.0	MITTER 1 H2O	Mandatory	All of Car	Off	On	Off	0	0	N/A
18.0	TIRE BRUSH AIR	Deselective	All of Car	Off	Off	Off	0	0	N/A
19.0	TIRE BRUSH H2O	Mandatory	All of Car	Off	On	Off	0	0	N/A
20.0	SIDE BRUSH W/H2O	Mandatory	Upper Side	Off	On	Off	0	0	N/A
21.0	TOP Brush	Deselective	All of Car	Off	Off	Off	0	10	Priority 2
21.1	TOP Brush Front half	Deselective	Front Half of Car	Off					
22.0	TOP BRUSH FOAM	Mandatory	All of Car	Off	Off	Off	0	0	N/A
23.0	OMNI H2O	Mandatory	All of Car	Off	Off	Off	0	2	Priority 1
24.0	OMNI HYD	Mandatory	All of Car	Off	Off	Off	0	2	Priority 2
25.0	WRAP 2 DS	Deselective	All of Car	Off	On	Off	0	0	N/A
26.0	WRAP 2 PS	Deselective	All of Car	Off	On	Off	0	0	N/A
27.0	WRAP 2 H2O	Mandatory	All of Car	Off	On	Off	0	0	N/A
28.0	WRAP 2 FOAMER	Mandatory	All of Car	Off	Off	Off	0	0	N/A
29.0	SIDE TO SIDE MITTERS	Mandatory	All of Car	Off	On	Off	0	1	Priority 2
30.0	MITTER 2 H2O	Mandatory	All of Car	Off	On	Off	0	0	N/A
31.0	TRI FOAM	Selective	All of Car	Off	Off	Off	0	0	N/A
32.0	RAIN X	Selective	All of Car	Off	Off	Off	0	0	N/A
33.0	FINAL RINSE	Mandatory	All of Car	Off	Off	Off	0	0	N/A
34.0	CLEAR COAT	Selective	All of Car	Off	Off	Off	0	0	N/A
35.0	DRYING AGENT	Mandatory	All of Car	Off	Off	Off	0	0	N/A
36.0	DRYER 1 DS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
37.0	DRYER 2 PS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
38.0	DRYER 3 DS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
39.0	DRYER 4 TOP	Deselective	All of Car	Off	Off	N/A	0	0	N/A
40.0	DRYER 5 TOP	Deselective	All of Car	Off	Off	N/A	0	0	N/A
41.0	DRYER 6 PS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
42.0	DRYER 7 DS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
43.0	DRYER 8 PS	Deselective	All of Car	Off	Off	N/A	0	0	N/A
44.0	TIRE SHINE	Deselective	All of Car	Off	Off	Off	0	0	N/A
44.1	RETRACT	Deselective	All of Car	Off					
45.0	WAIT GO	Mandatory	Rear Bumper	Off	Off	Off	0	0	N/A
51.0	GROUP 1 HIGH	Deselective	All of Car	Off	Off	Off	0	0	N/A
52.0	GROUP 1 MED.	Deselective	All of Car	Off	Off	Off	0	0	N/A
53.0	GROUP 1 LOW	Selective	All of Car	Off	Off	Off	0	0	N/A
54.0	GROUP 2 HIGH	Deselective	All of Car	Off	Off	Off	0	2	Priority 1
78.0	BLOWER 1	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
79.0	BLOWER 2	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
80.0	BLOWER 3	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
81.0	BLOWER 4	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
83.0	BLOWER 5	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
84.0	BLOWER 6	Mandatory	All of Car	Off	Off	Off	0	10	Priority 2
92.0	RECLAIM	Mandatory	All of Car	Off	On	Off	0	5	Priority 1
96.0	VACUUM	External	All of Car	Off	Off	Off	0	5	Priority 3
98.0	AIR COMPRESSOR	External	All of Car	Off	Off	Off	0	5	Priority 4
124.0	LAVA	Deselective	All of Car	Off	Off	Off	0	0	N/A
124.1	LAVA PICKUP	Selective	Pickup Bed	Off					
		Mandatory	All of Car	Off	Off	Off	0	0	N/A

Figure 3. Relay Configuration Inrush Time and Priority Settings

In Figure 5-3, the example shows the same Relay Configuration screen with Inrush Time and Start Priority settings. Power management settings were applied to the following equipment:

- Wheel Blaster (relay 5)
- Wraps (relay 9)
- OMNI Arch (relays 23–24)
- Side to Side Mitters (relay 29)
- Blowers (relays 78–81, 83–84)
- Reclaim system (relay 92)
- Free vacuum (relay 96)
- Air compressor (relay 98)

The equipment chosen consumes the most power; therefore, it was selected for power management.

Equipment	Relays	Name	In	Parameter	Description
Wheel Blaster	5	ROCKERS	1	2	Relay 5 is wired to the high-pressure pump for the wheel blaster. Example specifications for such a pump are as follows: 5 HP, 1,500 RPM, 208 VAC, three phase.
Wraps	9	WRAP MOTOR	1	2	Relay 9 is wired to the hydraulic motor power pack for the wraps.
OMNI Arch	23	OMNI H2O	2	1	Relay 23 is wired to the high-pressure pump for the OMNI arch.
	24	OMNI HYD	2	2	Relay 24 is wired to the hydraulic motor power pack for the OMNI arch.
Side to Side Mitters	29	SIDE/SIDE	1	2	Relay 29 is wired to the hydraulic motor power pack for the mitter.
Blowers	78–81, 83–84	BLOWER 1–5	10	2	Relays 78–81, 83–84 and 1.2 B51 wired to the blower motors.
Reclaim System	92	RECLAIM	5	1	Relay 92 is wired to reclaim system.
Free Vacuum	96	VACUUM	5	3	Relay 96 is wired to the external free vacuum.
Air Compressor	98	AIR COMPRESSOR	5	4	Relay 98 is wired to the external air compressor for the tire pump.

Exit Sign Configuration

After the relay for the Exit Sign has been set up, see “Exit Sign” on page 34, you can complete the setup for the Exit Sign to automatically play the Exit Countdown Video.

1. On the **Configuration** menu, click **Relays**.
The Relay Configuration screen appears.
2. Click to select the **Show Advanced Settings** box at the top of the Relay Configuration screen.
3. The Relay Configuration page expands to the right to display the Power Mgmt and VFD settings.
4. Scroll down as necessary to locate to the assigned Exit Sign relay.

NOTE: If you do not see the Exit Sign relay in the list, see “Exit Sign” on page 34 to set up the relay.

Relay Configuration														Power Mgmt		VFD					
Output Relay_X	Name	Start	Extend	Look Ahead	Type	Part of Car	Flash	Wet Down	Panic Stop	Staggered Start	Inrush Time (s)	Start Priority	Set Point Value	Type	Direction	IP Address	Enabled				
118.0	VFD - Modbus Test 20	775	65	36	Mandatory	All of Car	Off	Off	Off	1	0	N/A	1200	Motor RPM	Forward	10 0 0 28	Delete				
119.0	VFD - Modbus Test 21	775	65	36	Mandatory	All of Car	Off	Off	Off	1	0	N/A	1200	Motor RPM	Forward	10 0 0 26	Delete				
120.0	VFD - Modbus Test 22	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	10 0 0 25	Delete				
121.0	VFD - Modbus Test 23	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	10 0 0 10	Delete				
122.0	Vac 3	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	0 0 0 0	Delete				
123.0	Vac 4	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	0 0 0 0	Delete				
124.0	Vac 5	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	0	Motor RPM	Forward	0 0 0 0	Delete				
125.0	Vac 6	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	0 0 0 0	Delete				
126.0	Vac 7	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	0 0 0 0	Delete				
127.0	Vac 8	0	0	0	External	All of Car	Off	Off	No Change	0	0	N/A	1000	Motor RPM	Forward	0 0 0 0	Delete				
128.0	HP1 D35	805	30	12	Mandatory	All of Car	Off	Off	Off	1	0	N/A	800	Motor RPM	Forward	0 0 0 0	Delete				
130.0	Blower 2-Side1	1100	140	1100	Mandatory	All of Car	Off	On	No Change	1	0	N/A	3600	Motor RPM	Forward	0 0 0 0	Delete				
131.0	Blower 3-SP2	1185	140	1100	Mandatory	All of Car	Off	On	No Change	1	0	N/A	3600	Motor RPM	Forward	0 0 0 0	Delete				
132.0	Blower 4-Side2	1250	140	1100	Mandatory	All of Car	Off	On	No Change	1	0	N/A	3600	Motor RPM	Forward	0 0 0 0	Delete				
133.0	Blower 5-SP3	1295	140	1100	Mandatory	All of Car	Off	On	No Change	1	0	N/A	3600	Motor RPM	Forward	0 0 0 0	Delete				
135.0	Exit Sign	1400	0	0	Mandatory	All of Car	Off	Off	Off	0	10	N/A	0	Motor RPM	None	0 0 0 0	Delete				
					Mandatory	All of Car	Off	Off	Off	0	0	N/A	0	Motor RPM	None	0 0 0 0	Add				

Figure 4. Exit Sign Relay Configuration

5. In the Start box, type a value in inches. This value represents the distance in inches to where the rear tire will leave the conveyor. In figure, it is 1400 inches.
6. In the Part of Car box, select All of Car as a standard setting.
7. In the Inrush Time(s) box, type the total duration of the exit video. In Figure 50, the exit video example has a total duration of 10 seconds.

The WBC will automatically calculate the exact time to play the video based on the conveyor speed by using the following WBC formula:

Wait Sign Start Time = Exit Point in Inches – Video Duration in Seconds (the seconds get converted to Inches based on the conveyor speed)

In Table 5-4: Wait Sign Start Time = 1400 inches – 10 seconds

WARNING: This setup will provide an initial configuration for the Exit Sign video, but multiple vehicles should be run to determine if any of the settings should be adjusted to provide the best video triggering for each individual tunnel configuration. This chapter includes descriptions for the Services menu item.

Timed Outputs

This chapter includes descriptions for the Timed Outputs menu item.

A timed output is a relay that works as “timed,” meaning it can be automatically turned on and off based on a defined day-and-time profile.

NOTE: For timed outputs to function correctly, it is important that your date and time settings are properly configured on the WBC web interface. See “Reset Default Configuration Settings” on page <?>.

A popular use of timed outputs includes lighting controls for both inside and outside the tunnel. For example, you might set up a relay to automatically illuminate the tunnel entrance during evening business hours. Or you might use timed outputs to control lighting for added security during non-business hours.

Available timed output selections include the following: each day (**Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday**); **Monday through Friday**; **Saturday and Sunday**; and **All Days**. This creates a total of 10 different “Day” selections—seven weekdays plus three multi-day selections.

Each **Day** selection can have up to six unique timed output profiles. Therefore, the 10 different **Day** selections multiplied by the six unique timed output profiles will allow you to create up to 60 different timed output profiles.

NOTE: Do not confuse a WBC timed output profile with a profile in **Tunnel Master®** or **WashConnect®** software. A WBC timed output profile is used to control relays on the board. Tunnel Master® and WashConnect profiles control the wash choices displayed on an Auto Sentry. The two are completely separate and do not interact.

The image shows a screenshot of the 'Timed Outputs' screen. At the top, a dropdown menu titled 'Day' is open, showing 10 options: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Monday through Friday, Saturday and Sunday, and All Days. A red box highlights this dropdown, with a line pointing to the text '10 Day Selections'. Below the dropdown is a table with columns for Day, Start Time, End Time, and Outputs. Each row represents a timed output profile, and each row has 'Edit Outputs' and 'Delete Profile' buttons.

Day	Start Time	End Time	Outputs	
Sunday	07 :00 PM	09 :00 AM	9 189 191	Edit Outputs Delete Profile
Sunday	06 :00 AM	07 :00 AM	9 10	Edit Outputs Delete Profile
Sunday	10 :00 AM	12 :00 PM	189 190	Edit Outputs Delete Profile
Sunday	07 :00 PM	10 :00 PM	191 192	Edit Outputs Delete Profile
Monday	06 :00 AM	07 :00 AM	9	Edit Outputs Delete Profile
Monday	08 :00 AM	09 :00 AM	10	Edit Outputs Delete Profile
Monday	10 :00 AM	11 :00 AM	189	Edit Outputs Delete Profile
Monday	12 :00 PM	01 :00 PM	190	Edit Outputs Delete Profile
Tuesday	12 :45 PM	12 :50 PM	10 191	Edit Outputs Delete Profile
Tuesday	04 :00 AM	06 :00 AM	10 190	Edit Outputs Delete Profile
Tuesday	07 :00 AM	09 :00 AM	9 191	Edit Outputs Delete Profile
Tuesday	09 :00 AM	10 :30 AM	190 191	Edit Outputs Delete Profile

Figure 1. Timed Outputs Screen

Timed Outputs Screen Descriptions

The following table describes each field available on the **Timed Outputs** screen.

Setting	Parameter	Description
Day	Predefined list.	The Day selection is used to assign a specific day or day range for the timed output profile. Selections include the following: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday; Monday through Friday; Saturday and Sunday; and All Days
Start Time	Numeric	The Time that the profile will become active on the assigned Day selection.
End Time	Numeric	The Time that the profile will become inactive on the assigned Day selection.
Outputs	List	Lists the outputs (i.e., relays) assigned to the profile. These are the relays that will fire when the profile is active. They must be selected from the available relays that have not already been set up as standard (i.e., non-timed) relays in the Relay Configuration (Configuration > Relays) screen or Tunnel Settings (Configuration > Tunnel Settings) screen. You can assign up to 12 relays per profile.

Table 2-1. Timed Outputs Settings

Adding a Timed Output Profile

You can add a timed output profile to the WBC. When you add or change the timed output profiles through the web interface, they are immediately effective on the WBC relays and equipment.

To add a timed output profile

1. On the **Configuration** menu, and then select **Timed Outputs**.

The Timed Outputs screen appears.

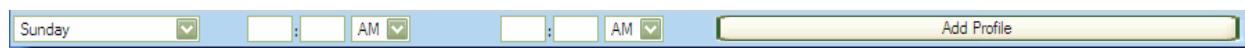


Figure 1. Add Profile

2. Scroll to the bottom of the screen until you see the last row where the Add Profile button is visible.
3. In the **Add Profile** row, do the following (see “Timed Outputs” on page 1 for an explanation of each selection):
 - In the **Day** column, select a day.
 - In the **Start Time** column, type a start time.
 - In the **End Time** column, type an end time.
4. Click the **Add Profile** button.

The timed output profile is added to the list. At this time, no relays have been assigned to the new Timed Outputs profile.

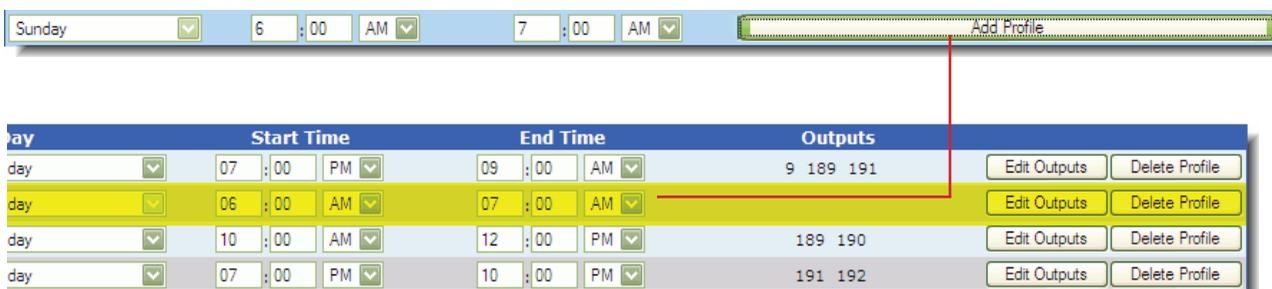


Figure 2. New Timed Output Profile

NOTE: If you exceeded six profiles per selection, the following error message appears.



Figure 1. No Free Profiles

Next, you can edit the timed output profile to select specific relays. See the next procedure, Edit Timed Output Profiles, for more information.

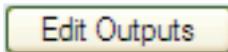
Edit Timed Output Profiles

You can edit a timed output profile to add and remove numbers that appear in its Outputs column. These numbers represent the relays that are assigned to the timed output profile.

NOTE: You can assign up to 12 outputs per profile.

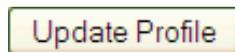
To edit a timed output profile, follow these steps:

1. Click the **Edit Outputs** button next to the timed output you want to change.



The relay selection screen appears.

2. Select or clear the check boxes the timed outputs for the available relays that you want to change.
3. Click the **Update Profile** button.



The Timed Outputs screen appears and the Outputs column is immediately updated for the profile.

Update Profile Cancel

Relays 1 - 24												Relays 25 - 48																																			
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input checked="" type="checkbox"/> 9	<input checked="" type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12	<input type="checkbox"/> 13	<input type="checkbox"/> 14	<input type="checkbox"/> 15	<input type="checkbox"/> 16	<input type="checkbox"/> 17	<input type="checkbox"/> 18	<input type="checkbox"/> 19	<input type="checkbox"/> 20	<input type="checkbox"/> 21	<input type="checkbox"/> 22	<input type="checkbox"/> 23	<input type="checkbox"/> 24	<input type="checkbox"/> 25	<input type="checkbox"/> 26	<input type="checkbox"/> 27	<input type="checkbox"/> 28	<input type="checkbox"/> 29	<input type="checkbox"/> 30	<input type="checkbox"/> 31	<input type="checkbox"/> 32	<input type="checkbox"/> 33	<input type="checkbox"/> 34	<input type="checkbox"/> 35	<input type="checkbox"/> 36	<input type="checkbox"/> 37	<input type="checkbox"/> 38	<input type="checkbox"/> 39	<input type="checkbox"/> 40	<input type="checkbox"/> 41	<input type="checkbox"/> 42	<input type="checkbox"/> 43	<input type="checkbox"/> 44	<input type="checkbox"/> 45	<input type="checkbox"/> 46	<input type="checkbox"/> 47	<input type="checkbox"/> 48

Day	Start Time	End Time	Outputs	Edit Outputs	Delete Profile
Sunday	07 : 00 PM	09 : 00 AM	9 10 189 191	Edit Outputs	Delete Profile
Sunday	06 : 00 AM	07 : 00 AM	9 10	Edit Outputs	Delete Profile
Sunday	10 : 00 AM	12 : 00 PM	189 190	Edit Outputs	Delete Profile
Sunday	07 : 00 PM	10 : 00 PM	191 192	Edit Outputs	Delete Profile

Figure 2. Relays (Outputs) Added to Time Output Profile

Relay Selection Screen for Timed Output Profiles

On the relay selection screen, relays are grouped together as if they were laid out on relay boards. You will see eight groups of 24 per group because the WBC can handle up to 192 relays on eight separate boards. If you do not have eight relay boards wired at your site, then remember to select outputs only for the boards and relays you know are available (e.g., groups 1-24, 25-48, 49-72, and 73-96 are available if you only have four separate boards).

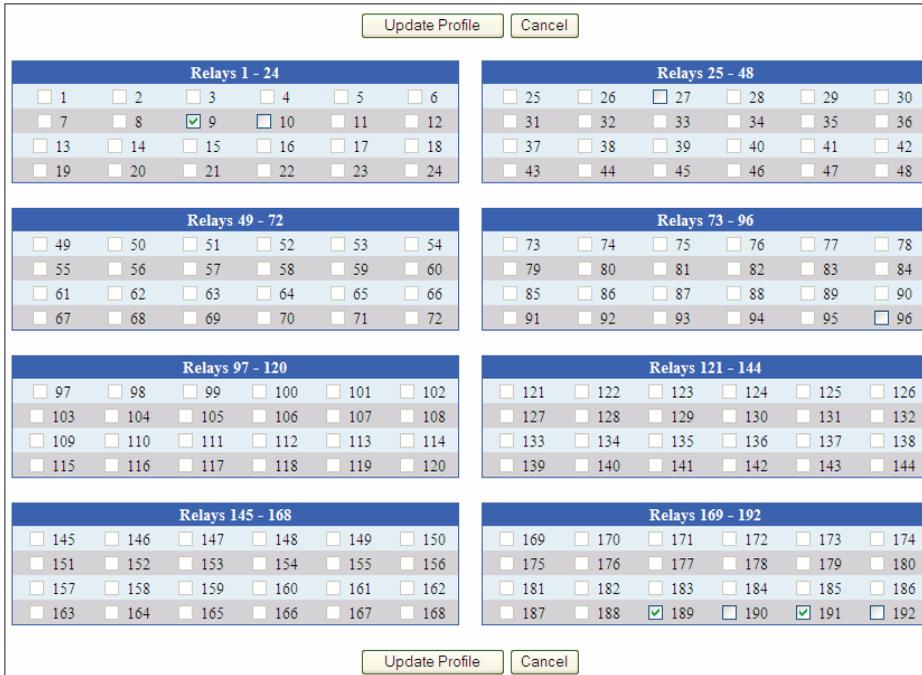
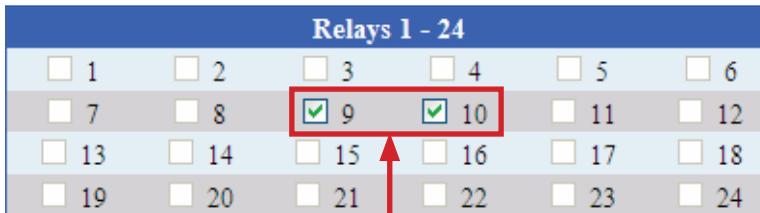


Figure 1. Edit Timed Outputs Screen

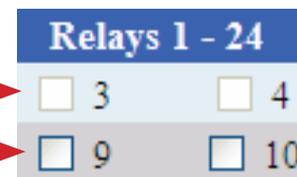
Any relays that are currently unassigned for your car wash are available for assignment to a timed output profile. You cannot select relays if they are currently assigned as standard relays. Standard relays are assigned on the **Relay Configuration** screen and in certain sections on the **Tunnel Settings** screen (e.g., **Entrance Management**, **Roller Settings**, etc.).



Select the check boxes for the relay numbers you want to configure as timed outputs.

Check boxes with lighter outlines are not available.

Check boxes with darker outlines are available.



Delete a Timed Output Profile

To delete a timed output profile, follow these steps:

1. Select the **Configuration** menu, and then select **Timed Outputs**.
The Timed Outputs screen appears.
2. Click **Delete Profile** button in the row that corresponds to the timed output profile.
A confirmation message appears.
3. Click **OK**.
The profile is deleted on the Timed Outputs page.

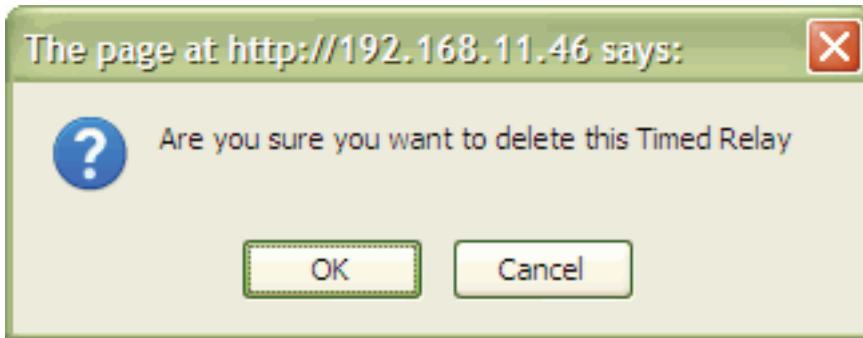


Figure 1. Delete Timed Relay Confirmation Message

Active Timed Output Profiles

The WBC processes all timed output profiles at once. Outputs from multiple profiles can be active depending on the time and day.

Day	Start Time	End Time	Outputs		
Sunday	07 :00 PM	09 :00 AM	9 10 189 191	Edit Outputs	Delete Profile
Sunday	06 :00 AM	07 :00 AM	9 10	Edit Outputs	Delete Profile
Sunday	10 :00 AM	12 :00 PM	189 190	Edit Outputs	Delete Profile
Sunday	07 :00 PM	10 :00 PM	191 192	Edit Outputs	Delete Profile

Day	Start Time	End Time	Outputs		
Sunday	07 :00 PM	09 :00 AM	9 10 189 191	Edit Outputs	Delete Profile
Sunday	10 :00 AM	12 :00 PM	189 190	Edit Outputs	Delete Profile
Sunday	07 :00 PM	10 :00 PM	191 192	Edit Outputs	Delete Profile

Figure 2. Timed Output Profile Deleted

For example, consider the following scenario, illustrated is in the following figure:

- Monday includes two profiles.
- All Days includes three profiles.

In Figure 6-3, two timed output profiles are defined for the Monday selection. Additionally, three timed output profiles are defined for the All Days selection.

Day	Start Time	End Time	Outputs	
Monday	8 :00 AM	10 :00 AM	4, 7	Edit Outputs Delete Profile
Monday	4 :00 PM	6 :00 PM	4, 7, 8	Edit Outputs Delete Profile
All Days	6 :00 AM	10 :00 AM	1, 2, 3	Edit Outputs Delete Profile
All Days	10 :00 AM	2 :00 PM	1, 2, 3, 4	Edit Outputs Delete Profile
All Days	2 :00 PM	7 :00 PM	1, 2, 3, 4, 5	Edit Outputs Delete Profile
Sunday				Add Profile

Figure 1. Multiple Timed Output Profiles for Monday and All Days

The following table shows a summary of when each output is on according to the example timed output profiles above.

In Table 6-1, you can see when each output is on (X) or off (—) according to the example timed output profiles. On a Monday at 4:00 PM, for example, a total of seven outputs are active. Notice how the Monday profile will not override the All Days profile at that time. The outputs are collectively evaluated, and then turned on for both profiles.

PROFILES													
	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM
	MONDAY 8—10						MONDAY 4—6						
	ALL DAYS, 6—10			ALL DAYS, 10—2				ALL DAYS, 2—7					
OUTPUTS													
1	X	X	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X	X	X	X
4	—	—	X	X	X	X	X	X	X	X	X	X	X
5	—	—	—	—	—	—	—	—	X	X	X	X	X
7	—	—	X	X	—	—	—	—	—	—	X	X	—
8	—	—	—	—	—	—	—	—	—	—	X	X	—

Table 2-1. Active Outputs for Multiple Profiles



If you have any questions or concerns, please contact ICS Technical Support: 800-246-3469.

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