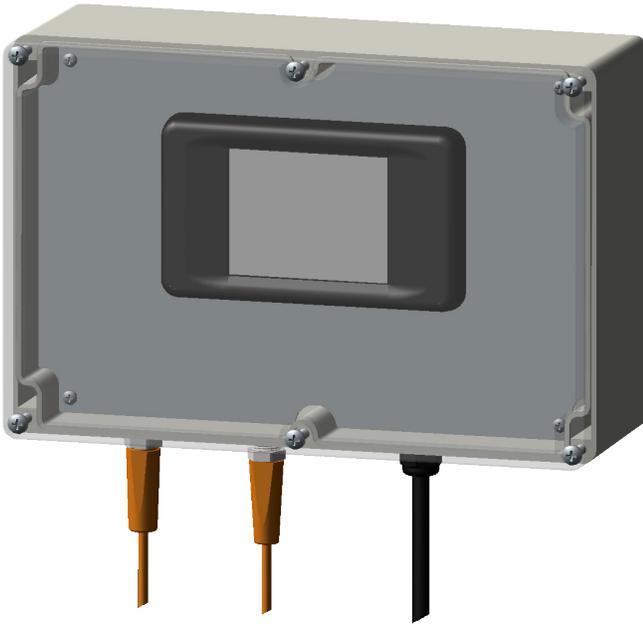


Sonny's Speed Display Controller



- Conveyor Speed Displayed in Cars Per Hour (CPH) or Feet Per Minute (FPM)
- 3.2" Backlit LCD Touchscreen Display
- 110V Powered Standard 10' Cord
- IP65 Rated Sealed Polycarbonate Enclosure
- Accepts Direct "Plug and Play" Input From Heco Speed Sensor
- Easy to Program Pulse Output for Any Wash Controller
- Inches Per Pulse (IPP) or Pulses Per Revolution (PPR) Output
- Presets Included for LOG, X458, and SC78 Conveyor Chains
- Automatically Starts/Stops with Power Cycle

GENERAL DESCRIPTION

The Sonny's Speed Display Controller provides users with the ultimate flexibility for integration of a Heco gearbox speed sensor into any new or existing carwash. Once programmed it immediately begins displaying accurate conveyor speed in Cars Per Hour (CPH) or Feet Per Minute (FPM) and outputting in the selected Inches Per Pulse (IPP) or Pulses Per Revolution (PPR) to the wash controller.

Programming is accomplished through simple touchscreen menus and the selected configuration is saved in the device's memory. There are preset configurations stored for the commonly used conveyor chain's such as LOG, X458, and SC78. Once programmed the display will stop and restart automatically when it's main power is cycled and requires no further input from the user.

SAFETY PRECAUTIONS

This manual will cover the topics of installation and wiring. In all cases these tasks should be performed by qualified personnel observing proper safety procedures. All safety related regulations, local codes and instructions that appear in this literature must be observed to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Ensure that any necessary safe guards in place in the event of a failure of this equipment.

LIABILITY DISCLAIMER

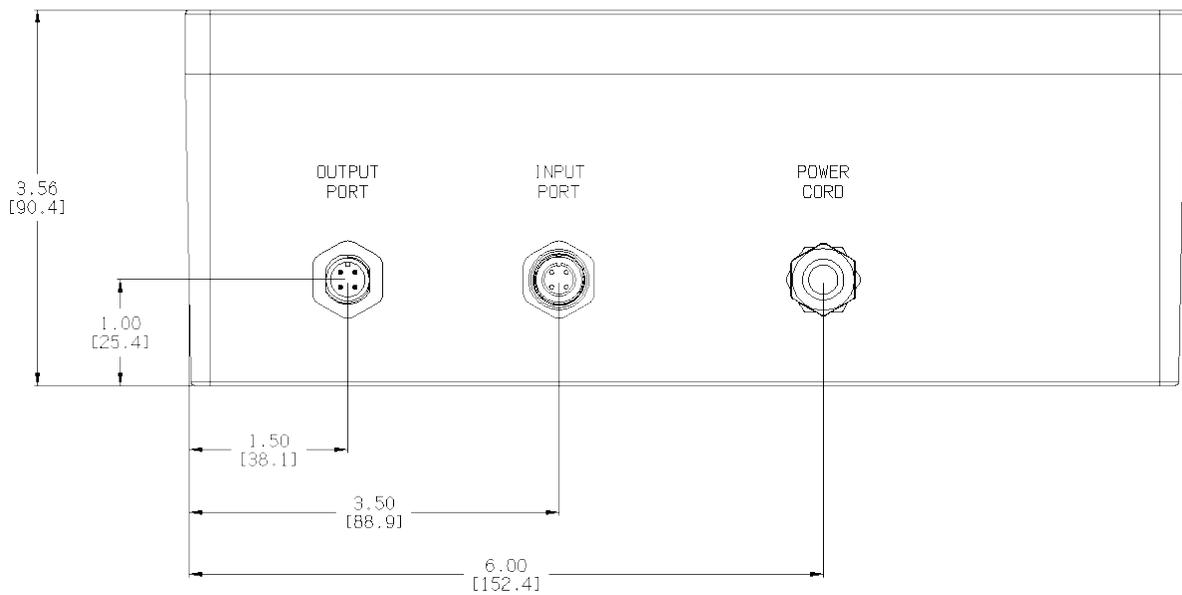
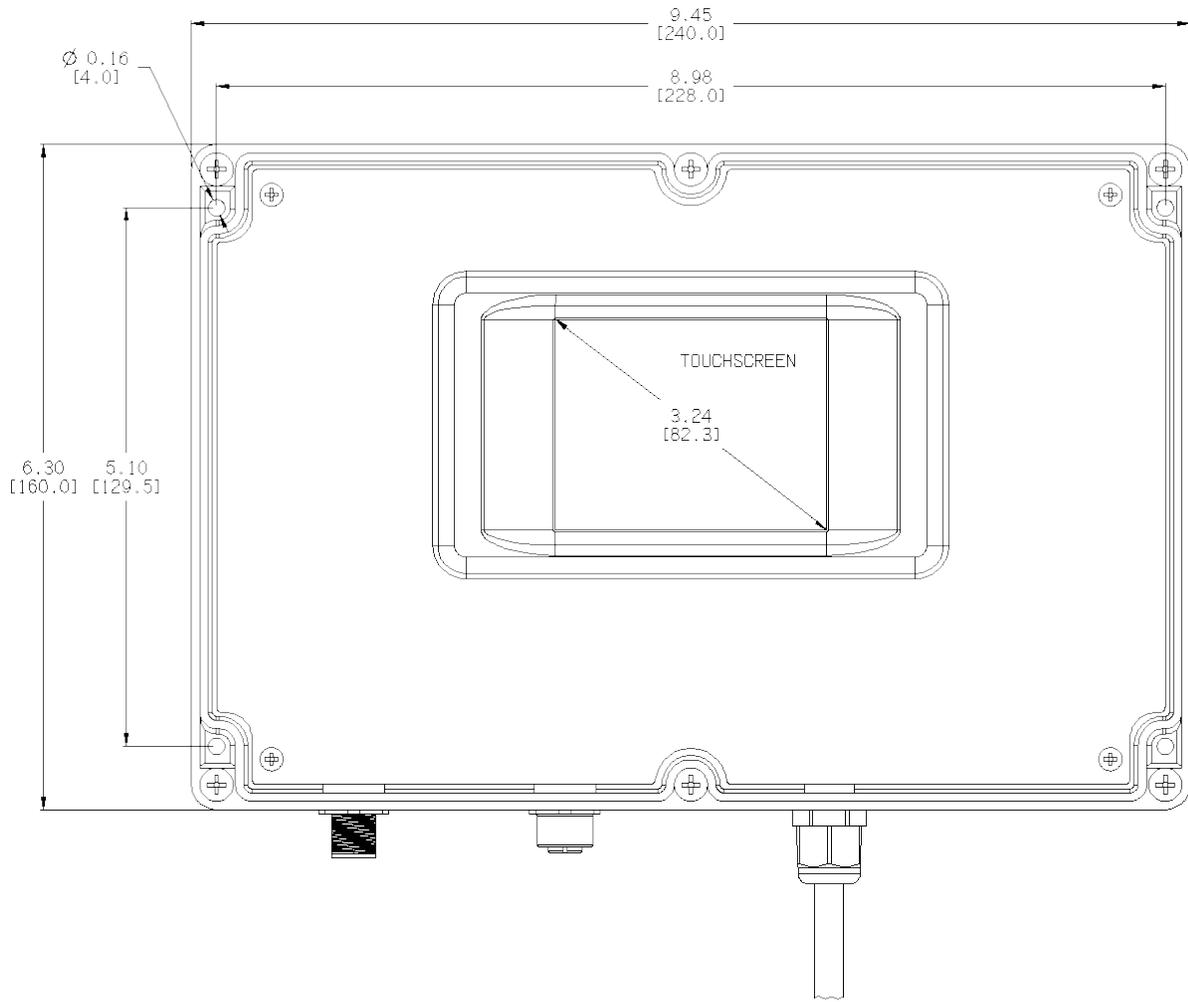
Pascal Systems recommends the user read and practice the techniques included in this manual. The information contained in this document is, to the best of our knowledge, accurate and is designed to augment the customers existing safety and operation procedures. It is the users responsibility to follow any local laws or codes that may apply. The information herein is limited to the equipment supplied by Pascal Systems and Pascal Systems assumes no liability for the use of the information contained in this document or the supplied equipment.

TABLE OF CONTENTS

- 1.0 - Installing the Display
 - 1.1 - Dimensional Drawing
 - 1.2 - Selecting a Location
 - 1.3 - Mounting the Unit
- 2.0 - Wiring the Display
 - 2.1 - Connections
 - 2.2 - Schematic
- 3.0 - Programming the Display
 - 3.1 - Boot & Home Screens
 - 3.2 - Settings Menu
 - 3.3 - Calibration
- 4.0 - Troubleshooting

1.0 INSTALLING THE DISPLAY

1.1- DIMENSIONAL LAYOUT DRAWING



1.2 - SELECTING A LOCATION

In order to ensure a long service life for the display it is important to select a proper location to mount it. The unit is designed to withstand being placed in a washdown environment. It can be mounted in the car wash tunnel in view of the operator or wherever else is convenient. However, it should not be placed anywhere that it could be submerged with water. If water ingresses into the unit damage will result and warranty is void.

Another thing to consider when selecting a location is that the display is provided with 2 cables each 33 feet (10 meters) in length. The first cable must be routed from the Heco gearbox sensor in the conveyor drive pit to the input port of the display. The other cable will be routed from the output port of the display to the wash control panel. Also, the unit is equipped with a 10 foot (3 meter) power cord. Therefore the display must be mounted in a location close enough to each of these components that the cables can reach. Longer cables are available if necessary.

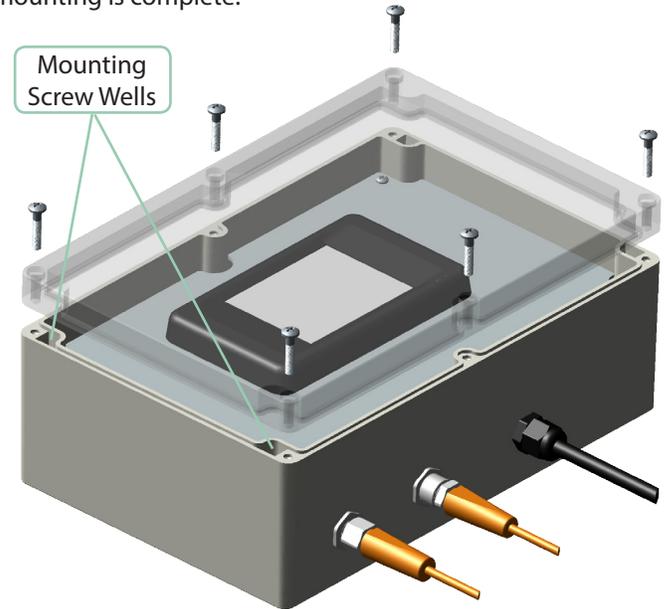
1.3 - MOUNTING THE UNIT

No hardware is provided for mounting the display. The reason for this is that it can be mounted to many different types of materials (steel, wood, masonry, etc.). After finding your mounting location, select the proper bolts/screws for the material in a #8 size.

To mount the display you must remove the clear screen cover and use the 4 mounting holes in the cavities as

shown below. They are arranged in a 9" wide by 5" tall pattern and are outside of the sealed interior portion of the unit. **Do NOT attempt to mount the display by drilling through the back or side of the case.** Doing so can allow moisture into the case and will void the warranty.

If you are going to be programming the unit immediately after mounting and wiring you may leave the cover off until then. Otherwise reinstall the screen cover after mounting is complete.



2.0 WIRING THE DISPLAY

2.1 - CONNECTIONS

In order for the display to be reading speed there are only 2 connections that need to be made.

1. Power

The power cord must be plugged into a 110 Volt outlet. The display requires minimal power (less than 50 Watts) any available connection will work.

2. Patch Cable

The input port must be connected to the speed sensor on the Heco gear box with the supplied double ended patch cable. The patch cable has two connectors and is configured male/female. The female connector is screwed onto the sensor and the male connector is screwed into the input port on the speed display. **Make sure not to overtighten the connectors.** They should be snugged to prevent water intrusion and corrosion of the pins but if overtightened can be damaged.

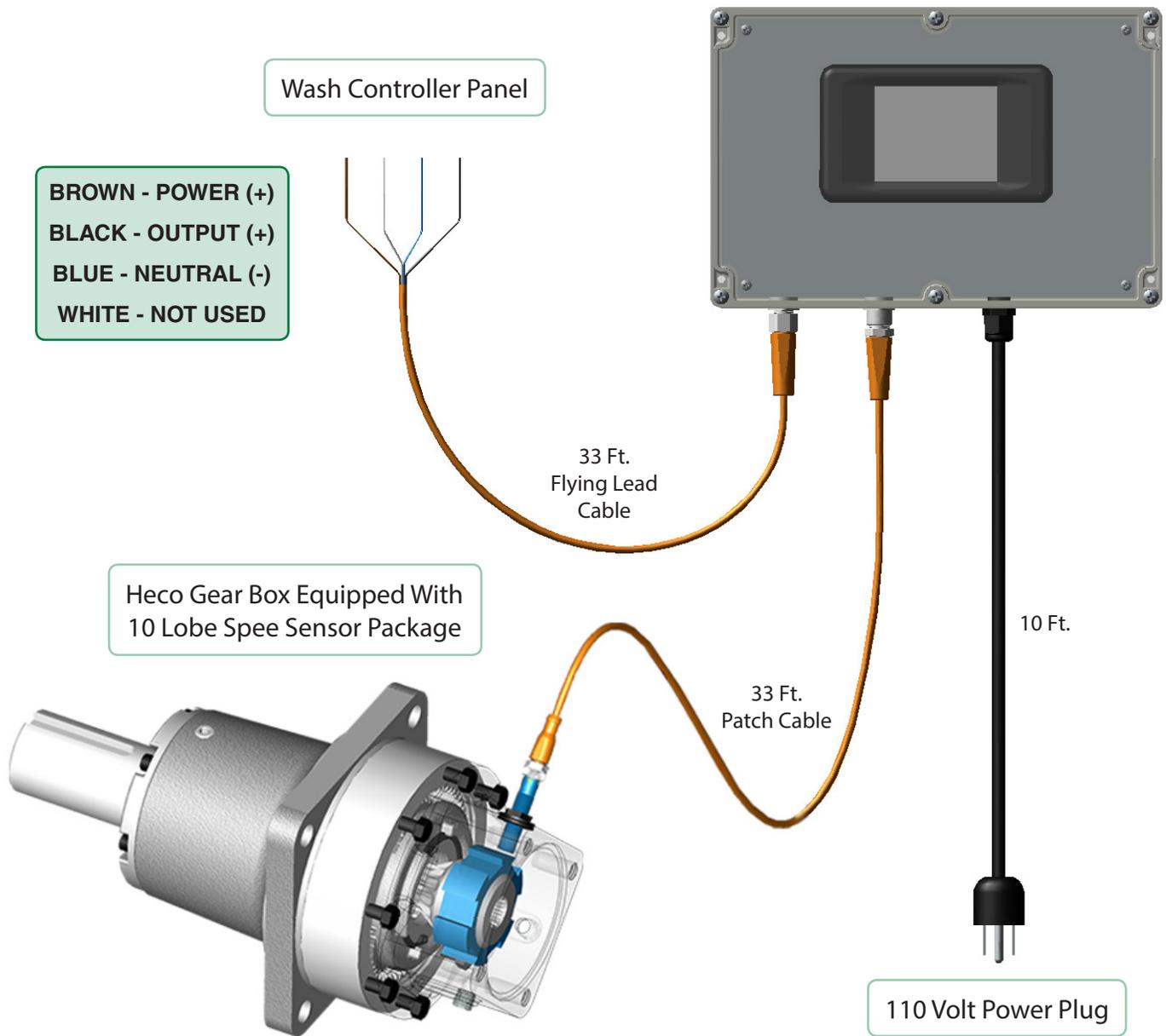
At this point the display will be powered up with the default configuration and is ready to be programmed and begin displaying speed. If you do not require an output from the display for your wash controller you may continue to the programming section. If an output is required, then one last connection needs to be made.

3. Flying Lead Cable

The output port must be connected to the wash controller via the supplied single ended flying lead cable. This cable is configured with a female connector on one end and flying leads on the other. Attach the female connector to the output port (making sure again not to overtighten). Then run the flying leads end of the cable into the wash controller panel. There are 4 leads Brown, Black, Blue, and White. The Brown wire should be connected to the wash controller's control logic power source. The Black wire is the sourcing output and should be connected to the desired digital input on the wash controller. The Blue wire should be connected to ground. The White wire is not used and can be removed. Pinout table shown in the schematic in section 2.2.

Once these connections are made the unit is ready to begin outputting to the wash controller. It is important to note that the output from the display is a PNP square wave digital sourcing signal. When the unit outputs a pulse it will route the supplied control power from the Brown wire to the output on the Black wire.

2.2- WIRING SCHEMATIC



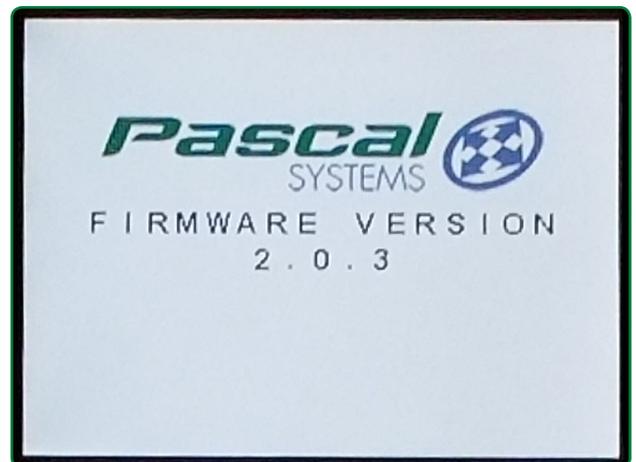
3.0 PROGRAMMING THE DISPLAY

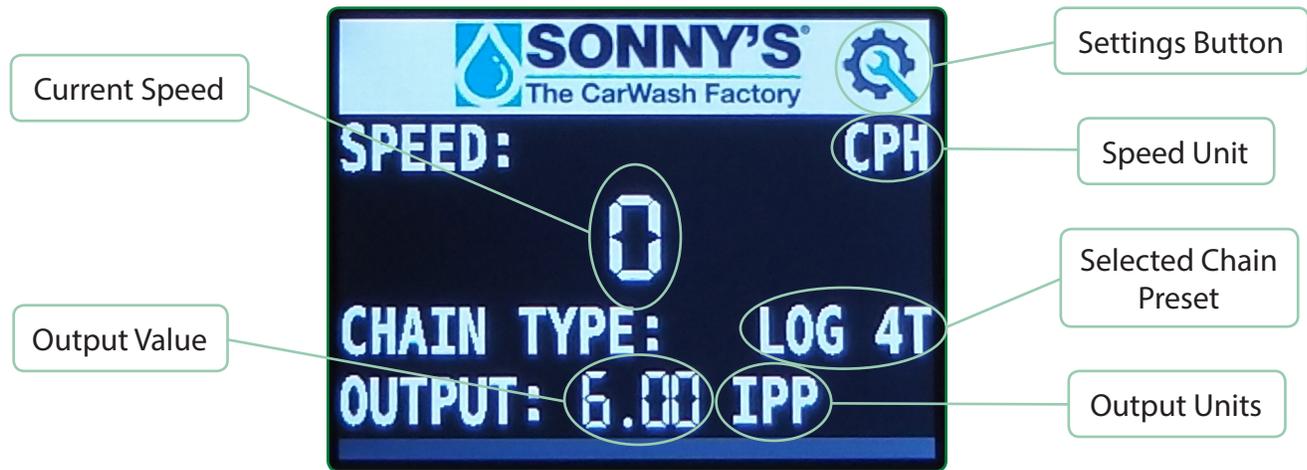
3.1 - BOOT & HOME SCREENS

At this point you should have completed the wiring as outlined in Section 2.0 and the unit will be resting on the Home screen. However, it is important to note each time you power down and restart the display it will go through a start up sequence that takes about 2-5 seconds.

BOOT SCREEN

During the start up sequence the display will show a Boot screen as seen in the pictorial to the right. The Boot screen shows the version of the firmware that the speed display is running on. This can be helpful during troubleshooting. The Boot screen will automatically change to the Home screen as soon as the system has loaded.





HOME SCREEN

The Home screen is the main screen for the function of the display. It shows most of the programmed settings and is the default screen any time that the unit is power cycled. The unit must be on this screen in order to show speed or output to the wash controller. The above pictorial shows the screen layout.

1. **Current Speed** - The real time measurement of the speed of the conveyor. The value will always be centered in the middle of the screen and update every 0.5 seconds. Value will be a whole number if the units are Cars Per Hour (CPH) and a two point decimal if Feet Per Minute (FPM).
2. **Speed Unit** - The units defining what the current speed value is displaying. This will be either in CPH or FPM depending on the setting selected.

3. **Selected Chain Preset** - This shows the chain preset being used by the program to calculate the speed. This should be the same chain type and sprocket count of your conveyor sprocket. The options further explained in Section 3.2
4. **Output Value** - The entered fixed value for the output pulse. This will be a whole number if units are Pulses Per Revolution (PPR) or a two point decimal if Inches Per Pulse (IPP).
5. **Output Units** - The units defining what the output value is displaying. This will either be in PPR or IPP depending on the setting selected.
6. **Settings Button** - This touch screen button is used to enter the settings menu to program the unit as explained in Section 3.2

3.2 - SETTINGS SCREENS

Now that you are familiar with the Home screen you will see that the unit is displaying in the default configuration of CPH, LOG 4T Chain, and 6.0 IPP output. In order to change the program settings for your conveyor you will need to enter the setup menu.

The unit has a touch screen so you must remove the clear enclosure cover to program it. **The clear enclosure cover must be reinstalled IMMEDIATELY after programming is complete.** If the cover is left off moisture will have direct access to the electronics which will void the warranty. To begin programming touch the Settings Button icon on the Home screen as shown above.

MAIN MENU SCREEN

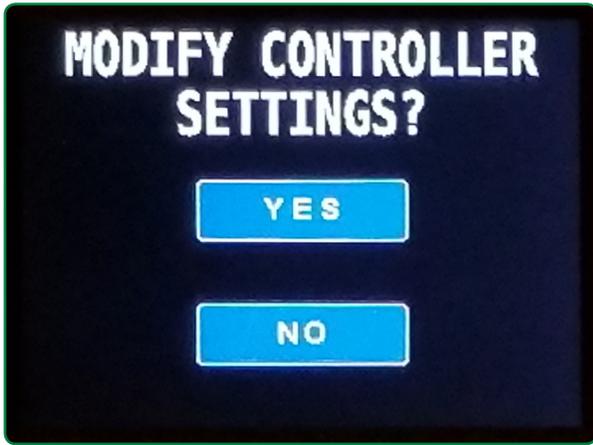
After selecting the Settings Button the Main Menu will appear. At this point you have entered the settings mode so the output from the display is disabled until you return to the Home screen. You can do that from the Main Menu simply by selecting Exit which is the last option. This will bring up the Home screen and the unit will automatically begin displaying speed and outputting again.

In order to proceed with modifying the configuration you must select the first option which is Change Settings. There is also a third option which is Calibrate Speed, use of which is covered in Section 3.3



CONFIRM SCREEN

Upon selecting the Change Settings button the next screen to come up is the Confirmation Screen. It will ask you if you want to modify the current controller settings and give options of Yes or No. If you select No you will be returned to the Home screen. In order to continue with programming select the Yes option. The confirmation is shown at the top left of the following page for reference.



DISPLAY UNITS SCREEN

After confirming that you would like to modify the current controller settings the next screen to come up will be the Display Units selection screen. It shows the two available options for the speed display units.

The first is Cars Per Hour (CPH) which is the default and Sonny's standard speed unit for car washes. It represents the number of inches that the chain travels over a period of 15 seconds. This is displayed as a whole number on the Home screen.

The second available setting is Feet Per Minute (FPM) which is a standard speed unit for industrial conveyors and could be useful in some applications. This unit will be displayed as a 2 point decimal on the Home screen.

Select one of these units to continue.



CHAIN TYPE SCREEN

Once you have selected a display unit the next screen will be the Chain Type selection screen. It shows the available preset chain type and drive sprocket tooth counts. There are 3 available options:

1. Log 3.5" Pitch Chain with 4 Tooth Sprocket
2. SC78 2.6" Pitch Chain with 12 Tooth Sprocket
3. X458 4.0" Pitch Chain with 4 Tooth Sprocket

These are the most common drive configurations for car wash conveyors. Select the option that matches your conveyor. If you utilize a different tooth count sprocket than the one listed for your chain simply select the option

that matches your chain and continue programming. After completing programming you will have to use the speed calibration as outlined in section 3.3 to correct for the difference in tooth count.

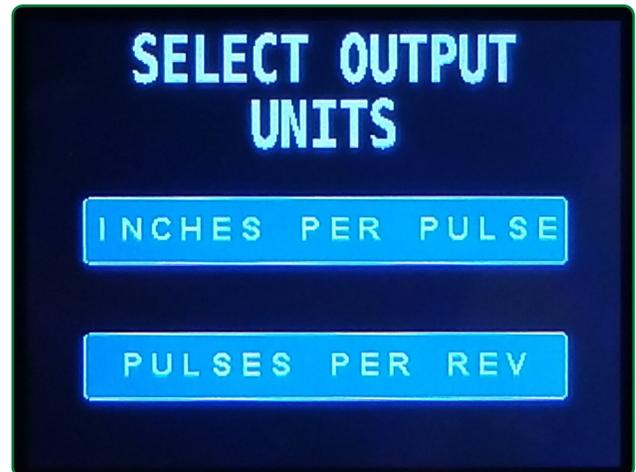


OUTPUT UNITS SCREEN

After you have selected the Chain Type the output units selection screen will be displayed. It shows the two available unit options for the pulse output to the wash controller.

The first is Inches Per Pulse (IPP) which is what is set in the default configuration. When selecting this unit and subsequently a value, the value represents a single square wave pulse (off/on) sent to the wash controller for the entered number of inches of chain travel.

The second option is Pulses Per Revolution (PPR). When selecting this unit and a corresponding value, the value will represent that number of square wave pulses (off/on) sent to the wash controller for each complete revolution of the drive chain sprocket. This can be useful for integration to a wash controller which was originally setup for an external pulse switch.

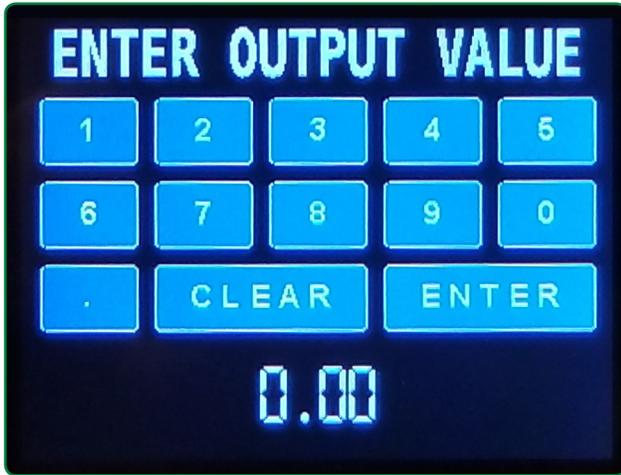


OUTPUT VALUE SCREEN

Once you have selected the output units the next screen will be the corresponding output value screen. It displays a keypad where you enter the desired value for IPP or PPR.

If entering a value for IPP the keypad will have a decimal point and you can enter any 2 decimal point value from 1.00 inch to 300.00 inches. If entering a PPR value the keypad will not display a decimal point. You can enter any whole number from 1 to 50.

Once you have entered your desired value select the Enter button to complete programming. If you make a mistake in your entry you can use the Clear button to re-enter the Value.



COMPLETION

After you select enter in the output value screen all of your selections will be saved to the internal memory of the device. You will be automatically returned to the Home screen and the unit will begin displaying and outputting based on the new settings. The display can now be power cycled whenever necessary and will retain the new configuration.

3.3 - CALIBRATION

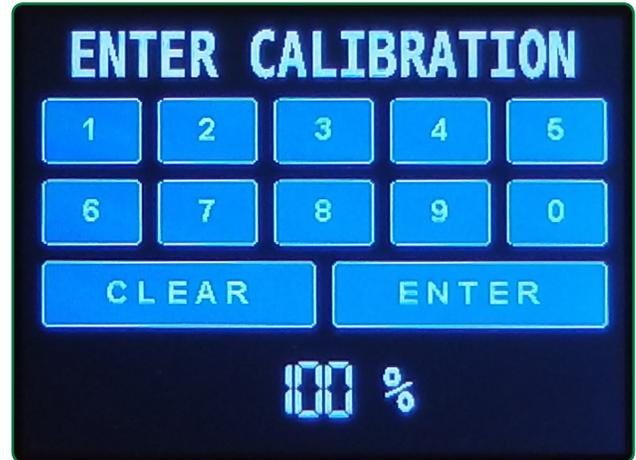
Using the calibration features of the display should not be necessary for most installations. The preset chain configurations are already calibrated for their respective sprockets. However, if you have completed programming and notice that the actual speed of the conveyor differs from the displayed speed or if you are using a sprocket/chain not available in the presets you will have to calibrate.

Enter calibration mode by selecting Calibrate Speed from the Main Menu screen as shown in section 3.2 above. The first thing that will display is a warning to only change the calibration if necessary. When changing the calibration it will affect the CPH and FPM readings for any of the presets. Select Continue to proceed.

Next the instructions for calibration will be displayed on the screen. The calibration is a multiplier that affects overall speed by a percentage. The default setting is 100 percent. If the multiplier is increased by 5 percent then the displayed speed will increase 5 percent and vice versa. So if the actual conveyor speed is faster than the displayed speed,

the multiplier should be increased above 100 percent. If the actual conveyor speed is slower than the displayed speed then the multiplier should be decreased below 100 percent. Select continue to proceed.

The screen will show a keypad and below it current value of the multiplier. Enter your new setting and select Enter. You will be returned to the Home screen and the display will begin to read speed. Check the new displayed speed against your actual speed. If the speeds still differ, repeat the calibration process adjusting the multiplier until the speeds match.



You may utilize the trial and error method if that is preferred but the multiplier is set as a percentage so that it can be calculated easily.

Example 1 - You are using an SC78 chain with an 8 tooth sprocket. According to the programming instructions select the closest preset which is the SC78 12 tooth sprocket. The display will be reading faster than the actual conveyor speed. Simply divide the two sprocket counts and multiply by 100 to get your calibration multiplier. $(8/12)*100 = 67\%$

Example 2 - You select your chain preset as explained in the programming instructions. You put a tape measure next to the conveyor and find that in 15 seconds one of the rollers has covered 88 inches equaling 88 CPH. The display is reading 80 CPH. Simply divide the two readings and multiply by 100 to get your calibration multiplier. $(88/80)*100 = 110\%$

3.4 - TROUBLESHOOTING

This display unit should be maintenance free. If you feel that you have followed all of the setup instructions as described in this manual and the unit is not working properly or your unit stops working at any time please contact us. We will be happy to assist you. Contact information is as follows:

PASCAL SYSTEMS
2350 Del Monte St.
West Sacramento, CA
95691

Phone: 916-372-5411 x293
Hours: M-F 7AM-4PM PST