PTL Operations, OH&S and Maintenance Manual

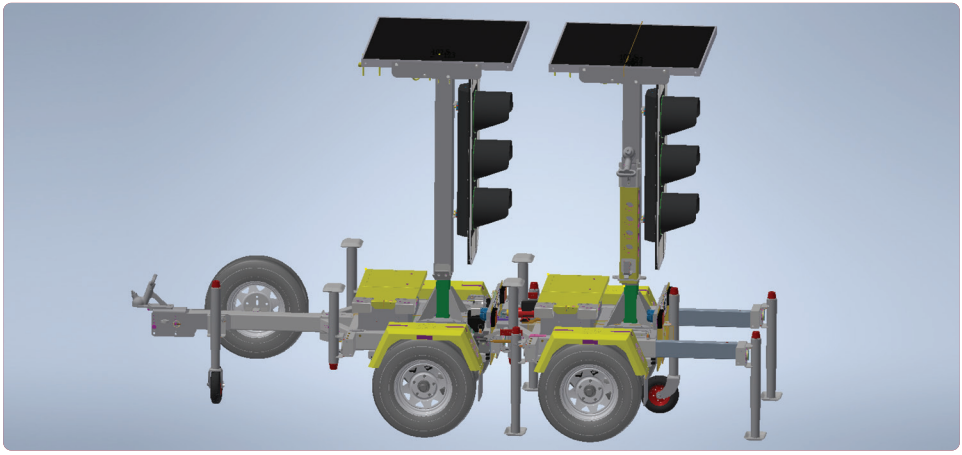
Your Portable Traffic Lights are a compact lightweight trailer set. As such correct operation for Set-up and Take-down procedure is essential. Please ensure this manual is read and understood before attempting to operate the Data Signs' Portable Traffic Lights (PTL).

Set-up, Take-down and Maintenance requirements of the PTL is covered by this Manual.

CAUTION:

The Data Sign Portable Traffic Lights should only be operated by qualified traffic managers.

If you have hired out this PTL, contact the Hire Company for assistance.



PTL dimensions

When towing the PTL's, bridges and other low obstacles may be encountered. Keep the following heights in mind when towing and setting up.

Towing height: 2150 mm
Raised height: 2850 mm

Trailers MUST NEVER be towed when lights are raised!

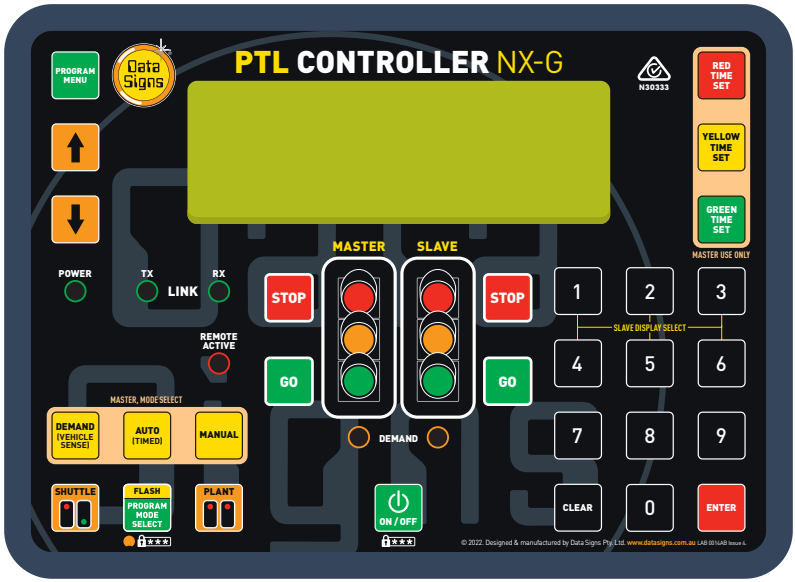
Contents

Set-up and Maintenance

PTL-300-Nx-G Controller QuickStart Guide

Operating as Type-2 *(Control possible via Main controller or Optional Remote)*

NxG



PTL Controller

This QuickStart Guide covers the PTL Controller Operation as per Australian Standards AS- 4191:2015 and Various State Authority requirements.

For Advanced Features, download the Portable Traffic Lights Advanced Features Manual from datasigns.com.au - this covers the additional sections as follows:

1. **Additional operational modes. Gating Mode, 3 way, 4 way ect.**
2. **Additional features, Radio Link explained, Internet control operation, Pedestrian crossing, Boom gates, troubleshooting guide, ect.**

Ensure the units are setup as described in the back section of this manual.
This User Manual applies to Controllers operating on firmware version 07 or later.

THE PORTABLE TRAFFIC LIGHTS SHOULD ONLY BE OPERATED BY QUALIFIED TRAFFIC MANAGERS.

Turning the Lights On

To turn the lights on, press and hold ON / OFF (and enter code if required).

Do this to the Slave, then the Master.

The Master and the Slave controllers will begin to establish a radio link as indicated by the **TX** and **RX** green lights on the controllers.

Both lights will show Flashing Yellow aspects and progress to showing RED aspects.

Also, the Controllers will complete a self-diagnosis and check any connected external equipment such as the *optional* vehicle detectors.

The Controllers will start up in the last mode that was set.

If FLASH PROGRAM MODE SELECT is activated, the Controller will wait for further input and all connected traffic lights will display Flashing Yellow when End OPERATION is selected.

The message: SYSTEM OPERATING will be displayed.

You can select to End OPERATION by selecting the ↓ & ENTER buttons, or press ENTER to keep the Lights operating in the background while you make changes on the fly such as Light timing, Auto return type, change Manual to Auto or Demand Modes, or most other menu items.

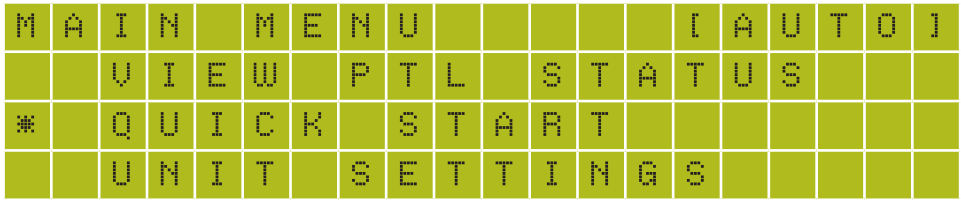
Press the PROGRAM MENU button to exit the selected MENU and return to the main screen.

After PROGRAM MODE selections are made, press either SHUTTLE or PLANT buttons to resume normal operation.

To turn the lights off, press and hold the ON / OFF button.

Note the controller will remain on as indicated by a slow pulse on the POWER indicator. (And continue to communicate with DS-Live if a DataSign SIM Card is fitted).

QUICK START



The Quick Start Menu item is used to get your PTL Lights set up in a few simple steps:

1. After selecting the Quick Start Menu, select 0 for Master or 1 for Slave operation and press ENTER
2. Select the RF Channel or press ENTER to keep current channel.
3. Press ENTER for OPERATION *(TEST is only used when units are joined)*.
4. Enter the work site length, followed by site speed and finally the time which to set the lights on GREEN.
   (for SLAVE you only need to set the site length.)
5. Select DEMAND, AUTO or MANUAL 

6. Finally, select Shuttle 

or 

Plant Crossing operation.

The current MODE setting is shown on the top display line in between square brackets, i.e. [AUTO] as per above display screen.

- **AUTO (TIMED)** AUTO MODE of operation. *For this Manual, AUTO will always mean (Automatic Timed Mode).*
- **DEMAND** is Vehicle-actuated MODE of operation. Vehicle detectors MUST be fitted. *For this Manual, DEMAND will always mean Vehicle-actuated.*
- **MANUAL** is Manual MODE of operation.

- **YELLOW FLASH** is active while Program Mode and End OPERATION is selected.

For more detailed programming of any of these items see the Advance Functions Document.

Controller Display Screens for Master and Slave

Master ID=0 The following values will be shown on the display panel during normal operation

1	2	.	1	V		G	S	M	:	N	/	A			1	2	.	4	V
		A	U	T	O	-	T	I	M	E	D								
S	H	U	T	T	L	E	:	2							G	R	E	E	N
C	H	A	N	N	E	L	:	1			S	1		0	5	6	S	e	c

First line: Master Battery Voltage, GSM status. Right side, alternates between Slave Battery Voltage and Signal Strength.
Second line: Current MODE in use or Warnings, i.e. LID OPEN.
Third line: Alternates between Control Type (i.e. *SHUTTLE:2*) and AUTO Return Type (*AR:RED*, *AR:GRN*, *AR:OFF*). Right side, Current light sequence.
Fourth line: Alternates between Current Time (if GSM module fitted), Current RF Channel, or other communication mode.
Right side, Current state remaining time of light phase.

Slave ID=1 (up to slave 5) The following values will be shown during normal operation:

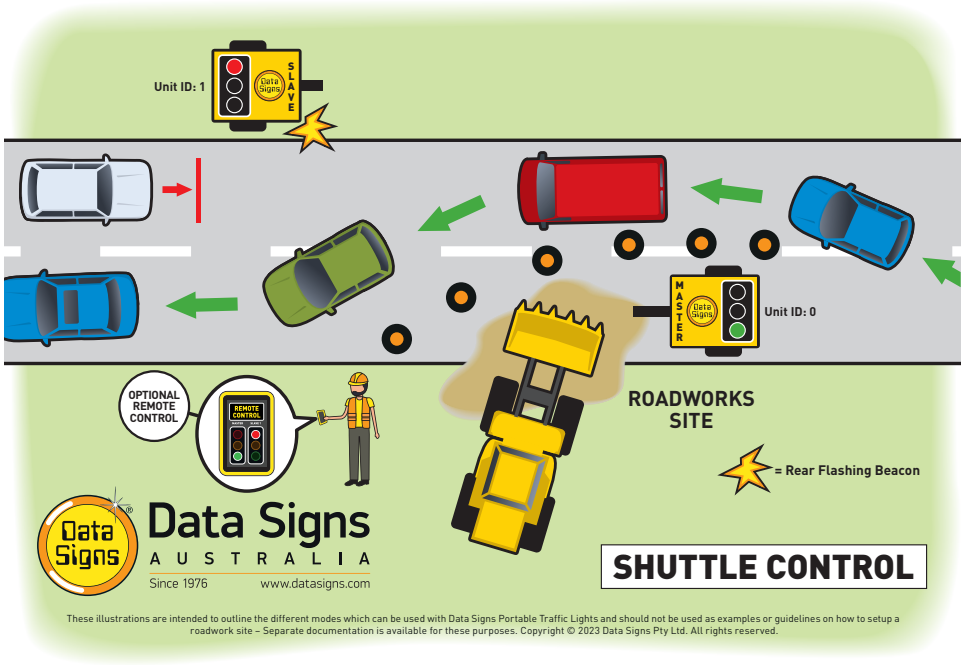
U	N	I	T		I	D	:	S	L	A	V	E	1		1	2	.	4	V
C	H	A	N	N	E	L	:	1											
C	O	N	N	E	C	T	E	D		T	O	:		1	2	A	4	5	
T	I	M	E	O	U	T		I	N	:		0	5		S	e	c		

First line: The ID of this unit. Right side, current Battery Voltage.
Second line: RF Channel set on this unit.
Third line: The Serial Number of the Master Controller this unit (Slave) is connected to.
Fourth line: The current RF timeout value. If this starts to count down there are interruptions to the RF communications. *For more information regarding the radio link, see the Radio Link Explained in the PTL Advance Features Document.*

Shuttle Control – Single-Lane Usage

Shuttle Control is a form of traffic control used where a portion of the roadway is closed so that only a single lane can be used alternatively by traffic from opposite directions. Only one Portable Traffic Light unit can show the Green signal phase at any time; either the Master or the Slave. The diagram below illustrates the traffic control scenario where Shuttle control would typically be used.

Note: This diagram should not be used as a guideline for setting up a roadwork site, it is provided as an example only.



Each PTL unit will go to the Green signal phase in turn, with the All Red sequence in between each green phase. See Appendix 1 for more details.

SHUTTLE: MANUAL MODE.

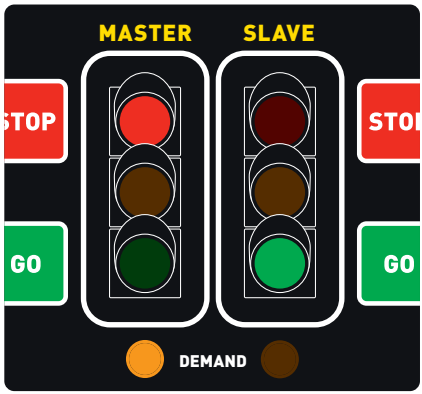
Buttons used:

MASTER: STOP 

or GO 

Manual mode is used when an operator wants to control the traffic. On start-up, both the Master and Slave will rest on All-Red phase until a demand for Green phase is entered.

To enter a demand for either Red or Green phase, press the **STOP** or **GO** buttons.



Master / Slave Controller

Shuttle Control, Manual mode example:

1. Slave unit is currently showing the Green signal phase.
2. Master: **GO** button is pressed.
3. If the Minimum Green time has expired, the Slave will cycle immediately to Yellow and then Red. If the Minimum Green time has not expired, the Master DEMAND LED will flash.
4. Once the Minimum Green time has expired, the Slave will cycle to Yellow and then Red. *The DEMAND LED will turn off once demand has been met.*
5. Both Master and Slave now show Red signal phase for the pre-set All-Red interval.
6. The Master then cycles to Green **and remains on Green** until a Slave **GO** or a Master **STOP** button is pressed, the sequence can then be repeated.
7. If Auto Return is set, the light will return back to Red or Green on the Master.

In Manual mode the signal phases can remain indefinitely on Green/Red, Red/Green or All-Red.

SHUTTLE: AUTO MODE

IT IS EXTREMELY IMPORTANT THAT THE ALL-RED INTERVAL IS SET CORRECTLY FOR EACH TRAFFIC CONTROL SITUATION.

Buttons available for HOLD-RED/RESUME feature:

MASTER: STOP 

or GO 

In AUTO mode, the Portable Traffic Lights will operate in cyclic order according to the pre-set times.

PAUSE – HOLD ALL-RED / RESUME

While in AUTO Mode, the operator can Pause and (hold) on All-Red.
Press the **STOP** button to hold All-Red for as long as required. The display will show 'PAUSING'. To resume the AUTO mode, press the **GO** button.

SHUTTLE: DEMAND MODE

(optional vehicle detectors must be fitted)
Buttons available to introduce artificial demands:

MASTER: STOP 

or GO 

For DEMAND mode to operate, the optional Vehicle Detector must be fitted to each Portable Traffic Light unit. A "NO VEHICLE DETECTOR" message will appear on the Master Controller display if no vehicle detector is attached and the DEMAND mode is selected.

The vehicle detector is preset to detect and create a DEMAND signal when vehicles approach the Portable Traffic Light at speeds between 10 km/h and 80 km/h. However, this can be changed, using the UNIT SETTINGS menu on both the Master and Slave units.

See also SUB-MENU: **OPERATING SETTINGS - DEMAND CYCLE**

REAR BEACON LAMP

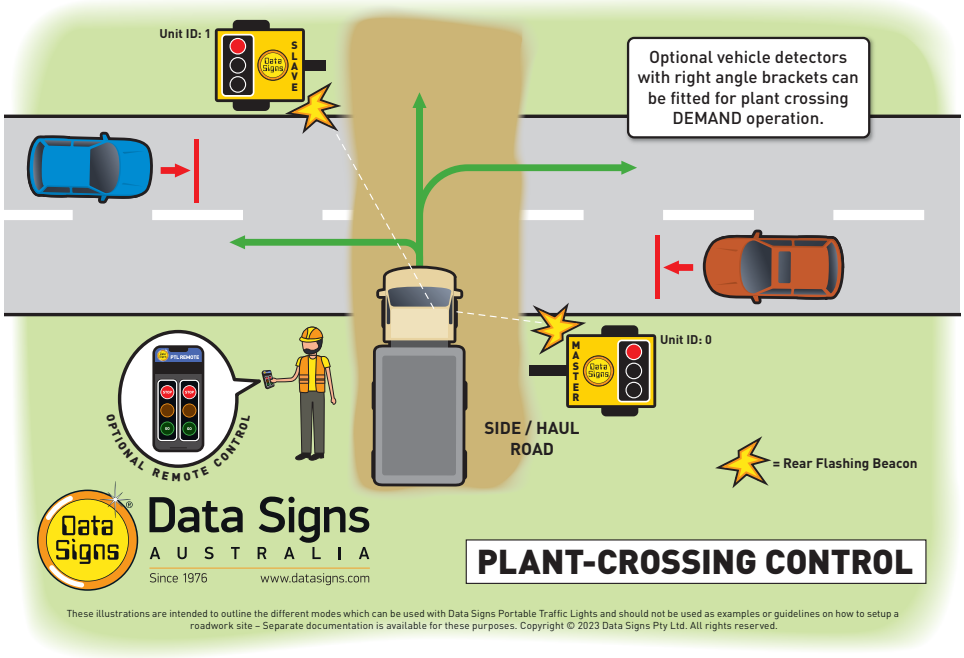
When enabled, the Beacon Lamps mounted behind the lights flash when the Red Light is ON.

This acts as a visual indicator to the Traffic controller that the Light is on Red, it also serves as a 'caution light' to oncoming traffic.

Plant-Crossing Control
2 way through traffic usage

Plant-Crossing control is used to enable both directions of traffic flow along a roadway to be simultaneously stopped, e.g. to allow road construction vehicles to cross. The diagram below illustrates Plant-Crossing control usage.

Note: This diagram should not be used as a guideline for setting up a roadwork site, it is only provided as an example.



Normally, the operator would use a Remote Control to change the Master and Slave units to the Red signal phase when a plant vehicle requires thoroughfare.

REAR BEACON LAMP

When enabled, the Beacon Lamps mounted behind the lights flash on each unit when the Red Lights are ON. This acts as a visual indicator to the Plant (vehicles) Crossing the road that it is safe to do so.

PLANT CROSSING: MANUAL MODE.

Buttons used:

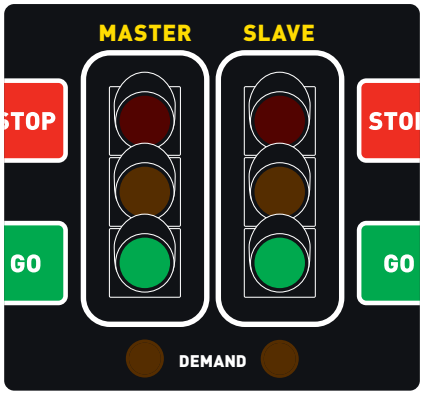
MASTER: STOP 

or GO 

On start-up, both the Master and Slave will rest on Green signal phase for Plant-Crossing Control until a demand for Red signal is entered by the operator.

The operator can enter a demand for All-Red signal using either the Master: **STOP** or Slave: **STOP** buttons. Both the Master and Slave units will then cycle to Yellow and the Red signal.

To change back to Green signal, either the Master: **GO** or Slave: **GO** button is pressed. When the All-Red time has expired, the lights will cycle back to the Green signal.



Master / Slave Controller

Plant-Crossing Control, Manual mode example:

1. Both the Master and Slave are on the Green signal phase.
2. Either the Master: **STOP** or Slave: **STOP** buttons are pressed.
3. If the Minimum-Green time has expired *both* the Master and Slave will cycle immediately to Yellow and then to Red. Otherwise - if the Green time has not expired - the DEMAND LED's will flash.
4. Once the Green time has expired, the Master and Slave will cycle to Yellow and then Red. The DEMAND LED will turn off once the demand has been met.
5. Both the Master and Slave now show Red for the preset All-Red interval.
6. **If the Auto-Return option is enabled and set to Green,** the Master and Slave will cycle back to Green signal phase automatically after the All-Red interval has expired.

PLANT CROSSING: AUTO MODE

IT IS EXTREMELY IMPORTANT THAT THE ALL-RED INTERVAL IS SET CORRECTLY FOR EACH TRAFFIC CONTROL SITUATION.

In AUTO mode, the Portable Traffic Lights will operate in cyclic order according to the pre-set times. AUTO mode allows plant vehicles to regularly cross over the road, or to turn onto the road. This would suit sites with heavy plant traffic.

PLANT CROSSING: DEMAND MODE

You can use Vehicle sensors fitted with swivel adaptors to detect traffic from the side roads to allow for DEMAND activated operation. When a demand is detected both lights will cycle to RED and then return back to GREEN after the RED Programmed time interval.

PAUSE – HOLD ALL-RED / RESUME

While in AUTO Mode, the operator can Pause and (hold) on All-Red.
Press the **STOP** button to hold All-Red for as long as required. The display will show 'PAUSING'. To resume the AUTO mode, press the **GO** button.

YELLOW FLASH mode

The Flashing Yellow mode operates in response to specific fault conditions or it is active when the PROGRAM MODE SELECT 

button is pressed and changes are being made.

If flashing yellow is required as the operation mode, press the 

button again and then the select 

button.

Note: As part of standards requirements, the Lights will go through the START-UP sequence which includes lights going to ALL-Red prior to the FLASH mode starting.

To exit the FLASH Mode, press the 

button, select End OPERATION, then you must select either 

before finally selecting either 

or 

Setting All-Red, Yellow & Green Times

Normally the RED and GREEN TIMES ARE automatically calculated DURING QUICK START

RED TIME SET

ALL-RED INTERVAL TIME

Default time: 20 seconds. Range: 1 to 300 seconds.

The All-Red interval is the period of time that the lights on both the Master and Slave units remain on the Red phase simultaneously. This allows for the clearance of traffic within the controlled area.

See Appendix 2 for detailed diagram.

YELLOW TIME SET

YELLOW TIME SET

Default: 5 seconds. Range: 4 to 9 seconds.

The Yellow time is the duration at which the light on the Master or Slave units is held on the Yellow signal when moving from Green to Red phase. Enter 4 to 9 seconds and then press the ENTER button. The Australian Standard allows for 4 to 5 seconds.

GREEN TIME SET

GREEN TIME SET

This button displays a MENU allowing either Minimum Green Time, Green Extension Time or Maximum Green Time to be set.

GREEN TIME - MINIMUM Green Time

Default: 10 seconds. Range: 1 to 99 seconds.

The Minimum Green time is the minimum time that the Green signal phase is on.
The Australian Standard allows for a range of 5 to 99 seconds for the minimum green time.

DEMAND Triggered Green Extension Time

Default: 5 seconds. Range: 1 to 99 seconds.

The Green Extension time is the interval of Green phase that will be extended (up to the MAXIMUM Green time) on each occurrence of vehicle detection while the Green phase is active.

For example: Units are running in Shuttle Control, DEMAND mode. The Slave is currently on the Red signal phase. A vehicle is detected on the Slave. The Slave will then change to the Green signal phase. The Green extension time applies if additional vehicles are detected on the Slave while it is on the Green signal phase.

Note: Once the MAXIMUM green time is reached but additional DEMANDS are received, the Lights will cycle to Red but a DEMAND will be registered as indicated by the Demand light. See Appendix 1 for illustration.
You can set the Green Extension time for ALL the units currently being used, or you can select to set the Green Extension time for a specific unit.

MAXIMUM Green Time

Default: 15 seconds. Range: 10 to 300 seconds.

The Maximum Green time is the maximum time-period at which an light on the Master or the Slave units can be held on the Green signal phase.

Auto-Return Functions

Auto-Return is a function that allows for the lights to **return-back** to a specified signal state after they have processed a demand. Auto-Return applies to DEMAND and MANUAL modes.

Options available for Auto-Return:

- **OFF:** Select this option to turn Auto-Return off. *Default setting.*
- **RED:** The Master PTL Auto-Returns to RED after the GREEN signal Phase. For PLANT CROSSING both the Master and Slave Auto-Return to RED.
- **GREEN:** The Master PTL returns to GREEN after the RED signal phase. For PLANT CROSSING both the Master and Slave Auto-Return to GREEN.

Auto return options can be selected by pressing the DEMAND and MANUAL buttons.

The Auto-Return function is shown on the LCD display as:

Select SUB-MENU: OPERATING SETTING and press ENTER to select the AUTO RETURN menu.

UNIT SETTINGS:
SUB-MENU: COMMUNICATION INTERNET

DS-Live™ INTERNET Mode:
(Good Mobile Internet service is required for this to work)

This allows control for your lights from the DS-Live platform.

Currently up to 8 units can be controlled with full programmable timing control.

It allows use of the PTL units when line of sight limitations or conditions that prevent normal operation of the lights. For example; in hilly area or distances greater than what the RF link will provide.

Note: All PTL controlled from DS-Live must be fitted with a Data Signs SIM card and be subscribed the the DS-Live platform.

For use and instruction manual for this mode of operation refer to the DS-Live Platform.

Other Menu Items for Basic PTL Operation

While the Controller is in PROGRAM SELECT, use the  or  buttons to navigate forward and back through the MENU's to select all other programming functions.

Press the 

button to exit the selected MENU and return to the main screen.

Note: for more comprehensive information see the PTL Advanced Features Manual.

MENU: **VIEW PTL STATUS**
When this menu item is selected, all the current settings and status of the PTL contoller are shown. This is very useful to diagnose and check the current setup.

MENU: **QUICK START**
This menu item is used to get your PTL set up in a few simple steps: AS PER PAGE 5.

MENU: **UNIT SETTINGS**
Use this menu to set the Communications, ID (Master or Slave) and Vehicle Detector settings.

MENU: **LID OPEN**
Used to enable the LID Open Alarm function.

MENU: **PING INTERVAL**
See PTL Advanced Features Manual for more information.

MENU: **OPERATING SETTINGS** **FOR CONTROLLER SET AS MASTER ONLY**

SUB-MENU: **OPERATING SETTINGS**

DEMAND CYCLE [Default: 3 minutes]
In DEMAND mode, if there are no vehicles detected, you can set period of time that an automatic demand cycle is introduced. If the DEMAND CYCLE value is set to 0, no automatic demand cycle will be introduced. Otherwise specify the minutes to wait where no vehicles are detected before introducing an automatic demand cycle.

CONTACT TIME OUT [Default: 5 Seconds]
Increase this time if RF link fails often (or change RF Channel)

For more menu items under the `Operating settings Menu', see the Advanced Features Manual. This document is not intended to cover all the possible Operating Settings.

Selecting the 

or 

button will EXIT the Program mode and resume SHUTTLE or PLANT modes.

The SD Card

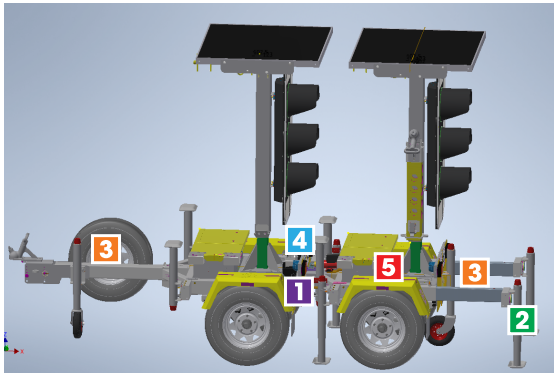
The PTL Controller is fitted with a SD card.
This is used for Software upgrades and to store Fault Logs.

Separating and Joining the Front and Rear Trailers

OH&S: Wear PPE when working with the PTL's.

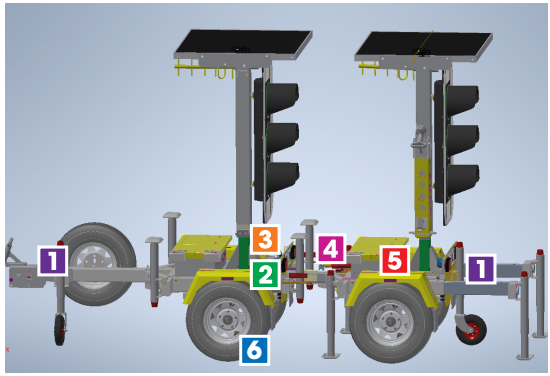
SCAN FOR VIDEO DEMONSTRATION

How to Correctly Separate Trailers.

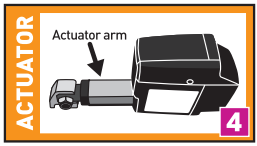


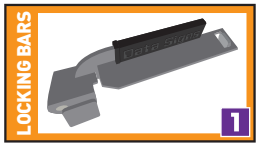
1. Undo safety chains that hold the trailers together. Lift up locking bars.
2. On Rear Trailer, pull out rear jack stands, rotate all jack stands and lower 25mm from ground.
3. Uncouple front trailer from towing vehicle, then lower and **use both jockey wheels to level trailers in a straight line with each other.** Rear trailer jockey wheel must face inwards.
4. Pull out locking pin.
5. Use Link switch to engage actuator to push apart.
6. See Quickstart (page 5) to switch on and set up Lights for correct operation

How to Correctly Join Trailers.



1. Use jockey wheels (rear wheel facing outwards) to level trailers.
2. Insert drawbar on rear trailer into coupling point on front trailer.
3. When rear drawbar is below locking pin, place pin back in.
4. Push down actuator arm and use.
5. Link switch to pull trailers together.
6. Ensure safety chains are looped through chassis on left and right, and secured. Adjust locking bars and lock down.





Portable Traffic Lights — Maintenance

This section details the PTL maintenance procedures. It is important that your PTL's are regularly maintained to make certain that your PTL is in continued working order. Note: The Warranty associated with your PTL may be voided if ad-hoc repairs outside the scope of this maintenance section are attempted.

Solar Panels

Keeping the Solar panels clean will ensure they are providing as much energy to charge the battery as possible. To clean the Solar panels, ensure the PTL mast is lowered and that the Jackstands are lowered and extenders fully out.

With a damp and soapy cloth, clean each of the panels, or hose them down (see General Cleaning notes). The solar panels should be cleaned periodically since they can quickly become dusty.

Battery & Circuit Breakers

12V, 135 AH AGM SEALED BATTERY

Battery Dimensions (approximate): 331 W x 213 H x 173 L mm

CAUTION:
LEAD ACID BATTERIES CAN PRODUCE FLAMMABLE GASES WHILE CHARGING. NO NAKED FLAME SHOULD BE ALLOWED NEAR THE PTL'S. TAKE CARE WHEN OPENING AND CLOSING THE BATTERY BOX LID. USE TWO HANDS.

Before attempting any maintenance work on your PTL batteries, make sure the PTL is not in the sun and that it is located in a well ventilated area.

- ***Remove the fuses.***
- ***Re instate fuses afterwards.***
- ***All fuses are normally 25Amp***

Corrosion inhibitor lacquer has been applied to the battery terminals, if replacing battery, use the same after installation to maintain this protection.

If replacing the battery, use the same rating and type of batteries.

Notes for Undercover storage: Storage outside is recommended so the battery can maintain charge via the solar array. If storing the trailer undercover for a long-term, unplug the SIGN SUPPLY fuse. Please be aware that the battery will drain over time; therefore fitting a battery charger is recommended.

Trailer Wheels and Wheel Bearings

Regularly check the tyre pressure. At the same time check tyre condition and that the wheel nuts are tight. After a few months of use have a qualified mechanic check. Grease the wheel bearings every 12 months under normal operating conditions. More frequently for adverse/ harsh road or operating conditions. Further, check after having travelled 1500 km.

Torque setting for wheel nuts:	**65ibs.ft or 90Nm**
Tyre Pressure for PTLs:	**50 psi**

Ensure wheel nuts are tightened according to manufacturer specifications for this trailers' tyre size. If unsure, contact your local mechanic. 13" wheel size, Ford stud pattern.

General Cleaning

The lights and trailer can be hosed. No abrasive solvents or thinners can be used anywhere on the PTL.

Take care when hosing down the Control Box that water ingress does not occur.

Charging the *optional* Remote Control

Remote illustration may be different than Photo

The Remote Control is charged from within the Control box normally on the front trailer only.

Plug the Remote charging cable into the remote.
The green LED on the remote will come on to indicate it is charging.

On the USB charger the led will light up orange and then go to green when the remote is charged

Battery Charger, *optional*

A separate Battery Charger User Manual is provided if a battery charger is fitted.

The slot on the control box allows the 240V cable to feed through.
The slot holds the cable in place when the shelf and lid is down.

To charge the battery, plug the power cable into 240V Mains power.
Ensure the charger is turned on.

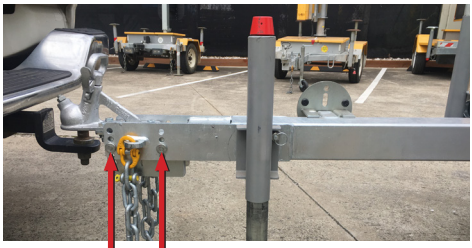
ENSURE THE CORRECT CHARGE MODE IS SELECTED!

It will normally charge the battery from a 25% charged condition to fully charged within 20 hours.

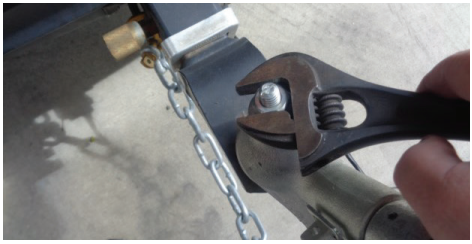
Tow Coupling Adjustment

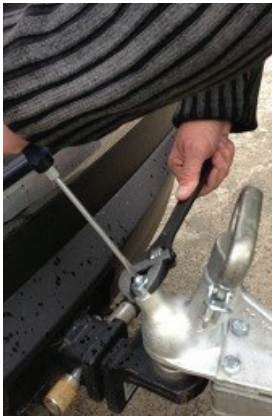
Adjust the tow coupling to fit snugly onto the tow ball of the towing vehicle to improve tow ride. This adjustment is not completed during manufacture as each vehicle tow ball may be a slightly different diameter due to wear or other factors. In Australia, the tow coupling is designed to fit a 50mm ball. Flathead screw driver and shifter required. This is a guide only, please view the disclaimer at the end of the document.

CAUTION: *ENSURE THE TOW BALL IS AT THE CORRECT HEIGHT TO THE TOWING VEHICLE, AS INCORRECT AND UNLEVEL TOWING WILL CAUSE DAMAGE TO THE REAR TRAILER COUPLING MECHANISM.*



CORRECT HEIGHT ADJUSTMENT IS MADE BY ADJUSTING THE TOW COUPLING HEIGHT ON THE DRAW BAR USING THE REMOVABLE PINS AS SHOWN ABOVE.

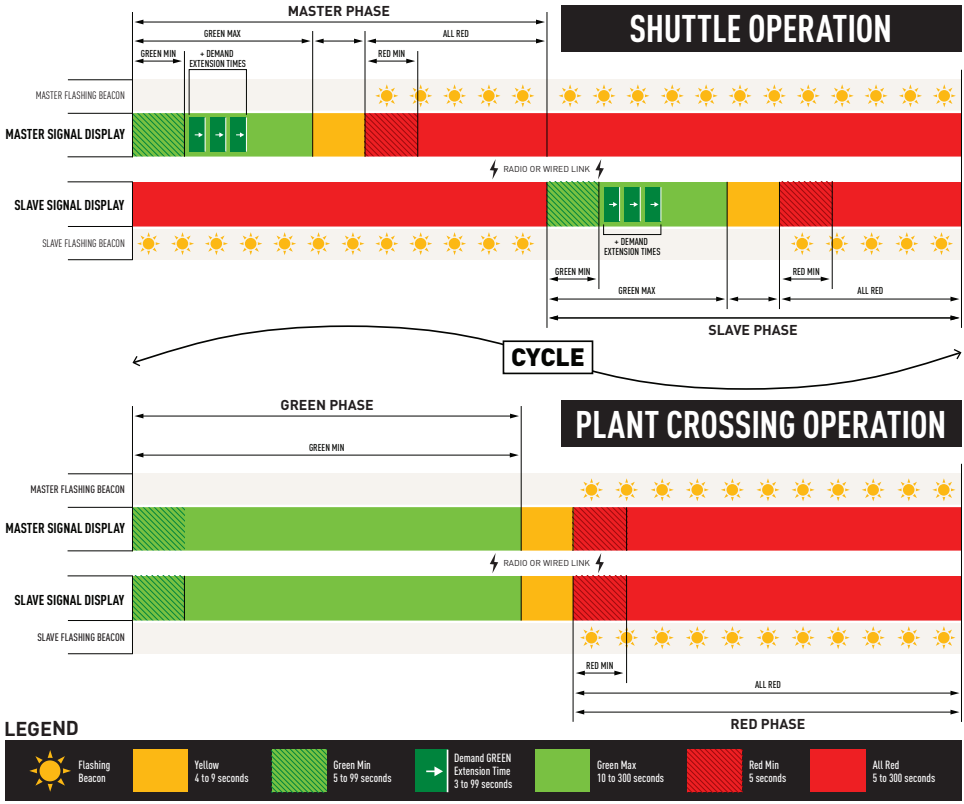




Adjusting the Tow Coupling

1. Fit the tow coupling to the vehicle and lock in place. Raise the jockey wheel.
2. Release the locking nut.
3. Undo the locking nut to give some leeway.
4. Using a flat-head screw driver on the slot on top of the pin-bolt, turn until tight, and then loosen very slightly. This will pull the coupling forward onto the tow ball and grip it.
5. Check that you can still unhook the coupling without too much effort, but maintaining a tight fit on the tow ball when attached. Use the jockey wheel to assist if required.
6. Hold the Pin-bolt with the screwdriver and then tighten the locking nut firmly with a shifter.

APPENDIX 1:
PTL CYCLE & PHASE INTERVALS FOR SHUTTLE AND PLANT CROSSING



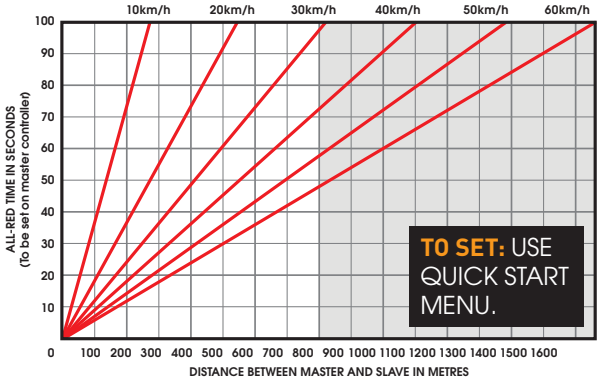
APPENDIX 2:
ALL-RED INTERVAL EXPLAINED

The All-Red interval is the period of time that the aspects on both the Master and Slave units remain on RED *(both the Master and Slave on Red light).*

This allows for the clearance of traffic from within the controlled area. A maximum All-Red time of 300 seconds (5 minutes) can be set, **although it is not recommended that this time be used.**

The Australian Standard currently only allows for a maximum of 100 seconds. This is due to safety reasons, where drivers may be less inclined to wait at a Red light for a long period of time; i.e. "run the Red".

RELATIONSHIP BETWEEN ALL-RED INTERVAL AND TRAVEL DISTANCE FOR A RANGE OF VEHICLE SPEEDS



ENSURE ALL-RED TIME IS CORRECTLY SET

The information in this diagram is provided to assist in a determination of the minimum all-red interval necessary for a vehicle to clear the controlled area.The vehicle speed lines indicate the minimum observed speed for a given direction.

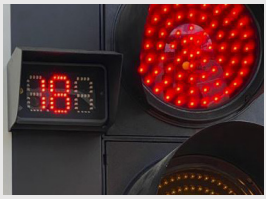
When using the diagram, it is important to note that the maximum length of the controlled area (distance between master and slave) must be separately determined having due regard to:

(a) total delays to queued traffic, and
(b) restrictions imposed by the quality of the communications link

Distances greater than 800m not recommended due to excessive all red time delays.

Use this chart to determine the minimum All-Red interval to set depending on the distance between the PTL units and the set speed zone.

For example, if the speed limit in the road-work zone is 40 km/h, and the distance between the Master and Slave units is 500 meters, working along the red line to 40km/h, check where that intersects the distance value, to read off the All-Red Time setting which would be 45 seconds.



The PTL Red Light Timer.

This is an optional three digit display that is added beside the Red Aspect which will show the time remaining as a count down sequence.

It is only used as a Master Slave using RF or Wired configuration, not suitable for other configurations, i.e. internet mode.