NORTH AMERICA TRAFFIC™

THE LEADER IN TRAFFIC CONTROL SYSTEMS

PTL 2.4LD

PORTABLE LANE CONTROL SIGNAL - USER FIELD GUIDE

ISO 9001:2015

REV 24 06.01.17 CAN

(i) Introduction

(Program Version 1-9, 1-10, 2-10)

The User Field Guide (UFG) is a quick reference for standard operations. It describes the basics for setup and safe operation of one or two units. This user field guide is your friend for whenever you have a problem, this guide will help you with simple, easy to follow, step by step instructions

The PTL 2.4 LD (Light Duty) model is a Portable Lane Control Signal (PLCS - dual head) that is designed for quick set up on a daily basis and eliminates the need for using Traffic Control Persons (TCPs) in a stationary flagging operation (i.e. Short Duration work).

Important Facts:

It is recommended that the units' batteries are charged for 24-48 consecutive hours (over a weekend) after operating for 50-60 hours (or one work week). The built-in battery charger has an external plug, located outside of the controller cabinet, which can be plugged into a 110 VAC power supply.

The PTL 2.4LD has the radio capabilities of communicating up to a 1.6 kms (1 mile) with a clear line of sight.

The operation of a PLCS shall be in strict conformance with the Manual of Uniform Traffic Control Devices (MUTCD) and/or the local road authority.

The person(s) responsible for setting up and programming PLCS shall be trained in accordance with this User Field Guide.

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(ii) Table of Contents

1. Glossary of Terms Used in this Guide

Controller Operating Modes – There are two commonly used operating modes for each controller;

Mode 1: **Master Unit 1A** – Phase 1A

Mode 2: **Secondary Unit 1B** – Phase 1B

Master Unit 1A – When two or more units are operating on one job, one unit must be set up to operate in Mode 1 - Master Unit 1A. All information entered into the controller such as Distances, Red, Green and Amber times must be entered at the Master Unit 1A. See “Mode 1” displayed ont he LCD screen.

Secondary Unit 1B – When two or more units are operating on one job, one unit must be set up to operate in Mode 2 - Secondary Unit 1B. The Secondary Unit 1B changes the Green, Amber and Red lights to the appropriate color from instructions received from the Master Unit 1A. All Secondary units should be turned “ON” prior to the Master Unit 1A. See “Mode 2” displayed on the LCD screen.

Hand Held Radio Remote Control (HHR) - Is a wireless radio remote control that allows for manual override of signal operation. Can be used when the units are operated Manually or during Automatic Cycle Time Control.

Comm Link Address - Is a unique Communication Link Address Number that is assigned to a Hand Held Radio Remote and/or to a Controller(s). It is used to prevent radio interference from other units operating within the communication range, typically 2 kms (1.24 miles) or less

Horizontal Mast Arm – Is the square aluminum arm that positions the traffic signal housing 5.2m (17ft) above the roadway, and 2.7m (9ft) out hortizontally from the nearest fender.

Main Light Post – Is the round, vertical aluminum post that holds the horizontal mast arm and the secondary signal housing at 2.7m (9ft) feet above the shoulder of the road.

Housings High-Low - Is when one traffic signal housing is positioned 5.2m (17ft) above the roadway, the other traffic signal housing is 2.7m (9ft) above the shoulder of the road.

Phase - Is an independent traffic movement with Green, Amber and Red Clear times assigned to it.

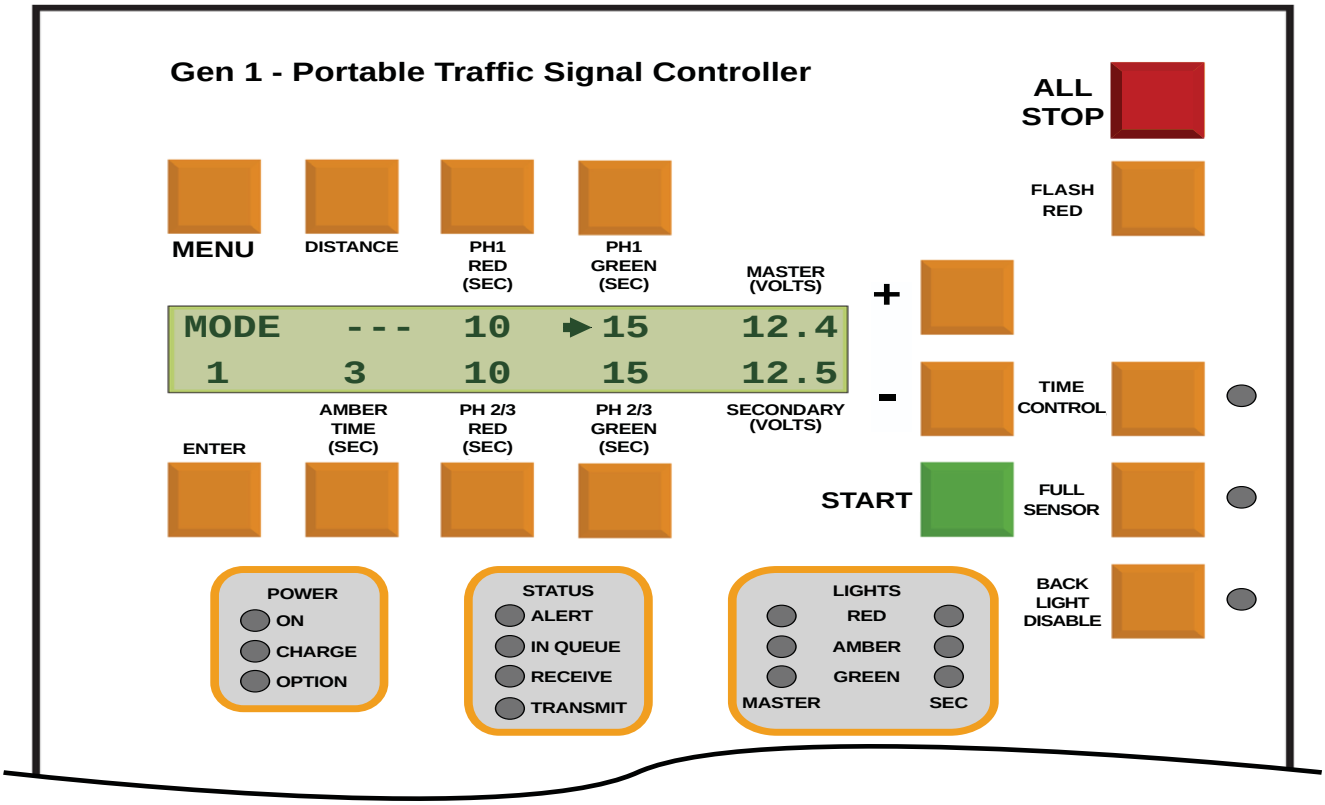
Cycle Time - Is the cycle time (in seconds) when adding up the GREEN, AMBER and RED times displayed at Master Unit 1A plus the Secondary Unit 1B. It is the total time it takes for vehicles to travel through the work-zone in both directions.

Automatic Cycle Time Control – when both the Master Unit 1A and Secondary Unit 1B are controlling traffic flow in both directions automatically, based on the cycle times inputted in the timing section. (Two-way traffic flow through a single lane).

Manual Operation - Manual operation of signal timing by Hand Held Radio Remote.

2. Gen 1 Contoller

2.1 Controller Label



2.2 Controller Button Definitions

MENU
The MENU Button is used to cycle through all the MENU settings. The MENU button is enabled for five seconds after turning the power "ON"; after which it is automatically disabled. In order to access this button after the initial 5 seconds, the power must be turned off using the external power switch, then turned back "ON".

ENTER
The ENTER Button is used to lock into memory any changes to the MENU settings.

DISTANCE
If a number is displayed it will represent the Distance in Meters/Feet used to select a pre-programmed cycle time. If "---" is displayed then distance is not applicable for this operation.

PH 1 RED – (PHASE 1 RED TIMES displayed in seconds)
This is the time the MASTER PHASE 1A unit will display a minimum red indication for vehicles to clear the work-zone.

PH 1 GREEN – (PHASE 1 GREEN TIMES displayed in seconds)
This is the time the MASTER PHASE 1A unit will display a green indication.

PH 2/3 RED – (PHASE 2 and 3 RED TIMES displayed in seconds)
This is the time the SECONDARY PHASE 1B unit will display a minimum red indication for vehicles to clear the work-zone (when operating in a 'ONE WAY AT A TIME' layout – for detailed information pertaining to layouts and corresponding phases, refer to the manual).

PH 2/3 GREEN – (PHASE 2 and 3 GREEN TIMES displayed in seconds)
This is the time the SECONDARY PHASE 1B unit will display a green indication (when operating in a 'ONE WAY AT A TIME' layout – for detailed information pertaining to layouts and corresponding phases, refer to the manual).

AMBER TIME (displayed in seconds)
This is the time that both the MASTER PHASE 1A and SECONDARY PHASE 1B units will display an amber indication.

START
Pressing the START button initiates the programming.

ALL STOP
Pressing this button on the MASTER PHASE 1A controller will cause all units in use to go into Solid Red or an 'All Stop' mode. This button is only enabled on the MASTER PHASE 1A controller.

FLASH RED
Pressing this button on the Master PHASE 1A controller will cause all units in operation to go into a 'Flash Red' mode. This button is only enabled on the MASTER PHASE 1A controller.

TIME CONTROL
When the corresponding LED indicator light is on, all units will automatically cycle through the green, amber and red timing as entered by the user.

FULL SENSOR
When the corresponding LED indicator light is on, all units are operated by traffic sensors.

BACK LIGHT DISABLE
Indicates whether the LED lights at the back of the upper traffic light functioning on or off:
- Unlit: back light is enabled or 'ON'
- Lit: back light is disabled or 'OFF'

"MASTER" VOLTS and "SECONDARY" VOLTS
A battery voltage reading at both the MASTER and SECONDARY is taken every few seconds and is displayed on the LCD screen of both units. A false reading will show when the sun is on the solar panels, the best time to read an accurate voltage is early in the morning before sunrise.

+ / - Buttons
These two buttons are used to scroll through MENU settings or used to increase or decrease timing selections (i.e. Red, Amber, Green times and DISTANCE).

3. Towing, Physical Setup and Takedown

3.1 Towing Safety

⚠ DANGER

Always make sure the main light post is in the down position. Never tow units with the main light post raised.

1. Hook unit(s) to truck using the 2" ball hitch, lift the tongue slightly to ensure coupler is secure to the ball hitch, ensure cotter pin in ball hitch is inserted
2. Ensure that the safety chains are crossed under the tongue and latched securely to the truck
3. Plug in trailer lights and check to ensure that all lights are working
4. Ensure that the controller cabinet door is securely closed and locked
5. Ensure that the battery box lid is securely closed and locked
6. Ensure that all swivel jacks are fully retracted and locked into the horizontal position
7. Ensure that all outriggers are fully retracted and securely locked into position
8. Drive the vehicle, with the unit(s) connected, forward about 3 m (10ft)
9. Turn on 4-way hazard flashers
10. Now conduct a final "walk around inspection" and visually inspect the following;
    A) Check that the ball hitch is locked down and safety chains are latched securely and not dragging on the ground
    B) Check all trailer lights are working
    C) Check anything sitting on the trailer is removed (i.e. coffee cups, radio remote control, miscellaneous tools, etc.)
    D) Check that wheel lugs are tight
    E) Check tires for air pressure, and give them a kick with your foot
11. Again, check controller cabinet door
12. Again, check battery box lid
13. Again, ensure swivel jacks are fully retracted and locked into the horizontal position
14. Again, ensure that outriggers are retracted and securely locked into position

⚠ DANGER

Never tow units with the swivel jacks or outriggers down
Failure to do so WILL result in an accident causing injury or death

3.2 Positioning, Leveling and Securing the Trailer

1. Move the PTL 2.4LD unit into position. Proper positioning of the unit(s) will be as described by the local road authority.
2. Level and stabilize the unit with the three, one located on the tongue and two located on the rear bumper of the unit.
3. Now deploy the outriggers to establish the wind rating.

3.3 Raising the Main Light Post and Extending the Horizontal Mast Arm

⚠ CAUTION

ALWAYS check for overhead power lines or utility lines in the immediate area to avoid contact with the main light post or horizontal mast arm. Move the unit to another location if necessary;

⚠ DANGER

ALWAYS raise the light post FIRST, before extending the horizontal mast arm out. Failure to do so may result in the traffic light coming in contact with vehicles driving through the work-zone which could cause an accident.

⚠ CAUTION

Trailer MUST be leveled and secured prior to raising the Main Light Post.

⚠ CAUTION

Use Traffic Control Persons to control traffic flow when extending the horizontal mast arm;

NOTE:
There are no lock pins to release before raising the main light post or for extending the horizontal mast arm. They automatically lock into place with the internal resistance of the electric actuator motor.

Steps to raise the main light post (ensure the following steps are completed in order)

1. Ensure the locking bracket (that locks the main light post in the vertical position) is in the open position.
2. Using the toggle switches, located inside the cabinet, raise the main light post.
   When the main light post reaches the vertical position the actuator will automatically stop.
   Release the toggle switch.
3. Close the locking bracket and lock the main light post into place with a lock.
4. Extend the horizontal mast arm out, using the toggle switch located inside the cabinet.
   The actuator will automatically stop when fully extended. Release the toggle switch.

3.4 Retracting the Horizontal Mast Arm and Lowering the Main Light Post

⚠ CAUTION

Press ALL STOP on the Master Unit 1A to set both units to a solid RED state to stop traffic in both directions;

⚠ CAUTION

Use Traffic Control Persons to control traffic flow when retracting the horizontal mast arm;

⚠ DANGER

ALWAYS retract the horizontal mast arm first, before lowering the main light post. Ensure the horizontal mast arm doesn't come into contact with vehicles passing by. Stop vehicles if necessary.

Steps to Retracting Horizontal Mast Arm and Lowering the Main Light Post

1. Set Master Unit 1A to solid RED mode (pressing the ALL STOP button) which will cause the Secondary Unit 1B to be solid RED also, or turn the units off.
2. Unlock the locking bracket (that locks the main light post in the vertical position).
3. Use the toggle switch, located inside the cabinet to retract the horizontal mast arm. When the horizontal mast arm comes in contact with the holding bracket, the actuator will automatically stop, then release the toggle switch.
4. Use the toggle switch, located inside the cabinet, to lower the main light post. When the main light post reaches the down position and comes in contact with the holding bracket, the actuator will automatically stop, then release the toggle switch.
5. Raise the four outriggers and two rear swivel screw jacks (leave the tongue front mount jack down until connected to the towing vehicle) to get ready for towing.
6. Once connected to the towing vehicle, raise the front mount jack on the tongue of the unit.
7. See towing instructions (Section 3.1)

NOTE: See Section 7.6 for instruction on manual lowering of the main light post and horizotnal mast arm.

4. Controller Operating Instructions

(Alternating traffic through a single lane)

⚠ CAUTION

It is important to measure the distance from the vehicle "stop" location at the Master Unit 1A to the vehicle "stop" location at the Secondary Unit 1B - every time you set up the units. **This will assist when using the DISTANCE setting to calculate the cycle times.**

4.1 To start Automatic Cycle Time Control

1. Turn "ON" the Secondary Unit 1B, then turn the power "ON" to the Master Unit 1A. Check the message on the LCD screen of the "Master Unit 1A". The message should read "Check Values, Then Press Start" (message cycles every 5 seconds).
2. Check the "Distance" on the LCD screen, change if necessary. (see section 4.2).
3. Press START (green button) on the "Master Unit 1A" controller and the message reads "Operating Fine".

The units are now operating in Automatic Cycle Time Control.

4.2 Changing the Distance to change RED and GREEN Cycle Times

NOTE:
Changing the "Distance" or any changes can only be done on the "Master Unit 1A". It will automatically change the GREEN and RED cycle times for both units to the values stored in the Master Unit 1A controller memory.

1. Press the "DISTANCE" button (located on the front of the controller of the Master Unit 1A).
2. Press the + or - button to increase or decrease the distance.
3. Once the new distance is displayed on the screen release the + or - button. The new GREEN and RED cycle times will automatically take effect on the next cycle.
4. Monitor traffic flow to ensure that there is a sufficient "CLEAR/RED" time for vehicles to clear work-zone prior to the next GREEN phase.

4.3 Changing GREEN Times on the fly

NOTE:
Changes can only be made on the Master Unit 1A controller.

1. Press the desired GREEN time button above (Master Unit 1A) or below (Secondary 1B) on the LCD screen.
2. Then press and hold the + button to increase the GREEN time for selected unit (- to decrease).
3. When you are have reached the desired GREEN time, release the button. The new GREEN time will automatically take effect on the next cycle.

4.4 Changing CLEAR/RED Times on the Fly (same time in both directions)

Note:
Using only the buttons on the Master Unit 1A controller;
The best way to change the all CLEAR/RED time is to use the DISTANCE button. Increasing the distance will increase the all CLEAR/RED time. Decreasing the distance will decrease the all CLEAR/RED time. The new distance will automatically change the all CLEAR/RED time for both directions of traffic.
See instructions on Changing the Distance to change Red and Green Cycle Times (Section 4.2)

⚠ CAUTION

Changing the distance will also alter your GREEN times to the default distance setting. Adjust if necessary.

4.5 Changing CLEAR/RED Times on the Fly (different for each direction)

NOTE:
Different "CLEAR/RED" times are typically used when the work zone has a steep hill. Trucks going up the hill in one direction will take longer to clear the zone than trucks going down the hill in the other direction;

Using only the buttons on the Master Unit 1A controller;
The button ***above*** the LCD screen (*PH 1 RED)* will change the RED time for cars approaching from the **Master Unit 1A.**
The buttons ***below*** the LCD screen (*PH 2/3 RED)* will change the RED times for cars approaching from the **Secondary Unit 1B.**
Press the desired button, then press the + or - button. The new value will take effect on the next cycle.

⚠ CAUTION

You must set the CLEAR/RED TIMES manually for both the Master Unit 1A and Secondary Unit 1B.

4.6 All Stop (manual over-ride on the controller)

1. On the Master Unit 1A controller, press the "ALL STOP" button located at the upper right hand corner of the controller.
2. Pressing this button will set both Master Unit 1A and Secondary Unit 1B units to solid RED.
3. Pressing the "START" button will resume back to Automatic Cycle Time Control.

4.7 All Stop (manual over-ride with the hand held remote control)

1. Press and hold the RED button for 3 seconds on the HHR.
2. The red LED indicator light on the HHR will turn "ON" to verify an "ALL STOP" command was received by the Master Unit 1A.
3. Pressing the GREEN button on the HHR will resume Automatic Cycle Time Control at Master Unit 1A.
4. Pressing the BLACK button on the HHR will resume Automatic Cycle Time Control at Secondary Unit 1B.

4.8 Controller Operating Modes

There are 6 possible Controller Operating Modes;

1. **Mode 1: Master Unit 1A** - No matter if you are using one unit or up to six units on one job site communicating with each other, you must always have one of the units operating in Master Unit 1A mode. Mode 1 is displayed on the left side of the LCD screen.
2. **Mode 2: Secondary Unit 1B** - This mode is always used for the second unit on a job site. Mode 2 is displayed on the left side of the LCD screen.

NOTE:
Master Unit 1A, Secondary Unit 1B and HHR must be on the same "comm" link

The following Controller Operating Modes are used when you have more than two units on one job site. For example, if you have a cross road in the middle of a job site, use Phase 2A and 2B for the additional units and locate them across from each other. Use Phase 3A and 3B for the next pair of units and locate them across from each other. For more detailed information regarding modes of operation, refer to the manual.

3. **Mode 3: Secondary Unit 2A**
4. **Mode 4: Secondary Unit 2B**
5. **Mode 5: Secondary Unit 3A**
6. **Mode 6: Secondary Unit 3B**

4.9 Changing the Controller Operating Mode Number

To change Controller Operating Mode number, use the buttons located on the front of the controller.

1. Turn power switch ON and then press the "MENU" button within 5 seconds
2. Press the +/- button repeatedly to scroll through the six possible controller operating modes
3. Once the desired controller operating mode is displayed on the LCD screen, press the "ENTER" button to initiate this operating mode.
4. Follow the instructions on the LCD screen. Then Press START

NOTE:
Whenever changing a Controller Operating Mode, it is good practice to review all of the values for each Menu Setting to ensure correct information is programmed.
Repeat steps 1 through 4 to change the Controller Operating Mode, if necessary, for the other unit(s).

4.10 Changing the Comm Link Address Number (Controller)

NOTE:
Comm Link 10 is used for hardwire applications

Refer to Section 5.1 under Menu Settings

5 Quick Setup Instructions for Typical Jobsite Applications

5.1 Two Units - Operating in Automatic Cycle Time Control

(Two-way traffic through a single lane)

One unit must be set to Master Unit 1A and the other is set to Secondary Unit 1B. Secondary Unit 1B should turned be "ON" first. Edit the menu settings below to select the following values; starting with the Secondary Unit 1B.

NOTE:
To enter the edit screen press the "MENU" button within 5 seconds of turning power "ON";
To change a menu setting on the controller, press the +/- button, then after the desired value is displayed press the "MENU" Button to scroll to the next menu option.
Once all the desired values are selected, press the "ENTER" button to lock in the new values. Then press the "START" button.

Secondary Unit 1B	Value	Menu Settings
Mode:	2	Secondary Phase 1 B
Unit:	See Options	Comm Link Address. **Options are 0-10 (10 is hardwire comm)**
Default Mode:	0	0=Flashing Red, 1=Solid Red
Time:	1	Minimum RED time. Options 1 to 10 (factory default 1 sec)
Time:	7	Minimum GREEN time. Options 7 to 25 (factory default 7 sec)

Master Unit 1A	Value	Menu Settings
Mode:	1	Master Phase 1 A
Unit:	See Options	Comm Link Address. **Options are 0-10 (10 is hardwire comm)**
Default Mode:	0	0=Flashing Red, 1=Solid Red
Time:	1	Minimum RED time. Options 1 to 10 (factory default 1 sec)
Time:	7	Minimum GREEN time. Options 7 to 25 (factory default 7 sec)
Distance in:	0	0=Feet, 1=Metres
Control Lights:	1	AUTOMATICALLY
Phase 1 traffic:	0	ONE WAY AT A TIME
Phase 2 Setup:	0	DISABLED
Rest In:	2	TIMED CONTROL

**NOTE:*
Above menu settings are recommended for a quick set up, user can also program units as required by engineer.

5.2 Two Units - Operated Manually by Hand Held Radio Remote Control

(Two-way traffic through a single lane)

One unit must be set to Master Unit 1A and the other set to Secondary Unit 1B. Edit the menu settings on the controller below to select the following values; starting with the Secondary Unit 1B

NOTE:
To enter the edit screen press the "MENU" button within 5 seconds of turning power "ON";
To change a menu setting on the controller, press the +/- button, then after the desired value is displayed press the "MENU" Button to scroll to the next menu option.
Once all the desired values are selected, press the "ENTER" button to lock in the new values. Then press the "START" button.

Secondary Unit 1B	Value	Menu Settings
Mode:	2	Secondary Phase 1 B
Unit:	See Options	Comm Link Address. **Options are 0 to 9**
Default Mode:	0	0=Flashing Red, 1=Solid Red
Time:	1	Minimum RED time. Options 1 to 10 (factory default 1 sec)
Time:	7	Minimum GREEN time. Options 7 to 25 (factory default 7 sec)

Master Unit 1A	Value	Menu Settings
Mode:	1	Master Phase 1 A
Unit:	See Options	Comm Link Address. **Options are 0 to 9**
Default Mode:	0	0=Flashing Red, 1=Solid Red
Time:	1	Minimum RED time. Options 1 to 10 (factory default 1 sec)
Time:	7	Minimum GREEN time. Options 7 to 25 (factory default 7 sec)
Distance in:	0	0=Feet, 1=Metres
Control Lights:	0	MANUALLY
Phase 1 traffic:	0	ONE WAY AT A TIME

**NOTE:*
Above menu settings are recommended for a quick set up, user can also program units as required by engineer.

5.3 Single Unit - Operated Manually by Hand Held Radio Remote Control

The unit must be set to Master Unit 1A. Edit the menu settings below to select to the following values

NOTE:
To enter the edit screen press the "MENU" button within 5 seconds of turning power "ON";
To change a menu setting on the controller, press the +/- button, then after the desired value is displayed press the "MENU" Button to scroll to the next menu option.
Once all the desired values are selected, press the "ENTER" button to lock in the new values. Then press the "START" button.

Master Unit 1A	Value	Menu Settings
Mode:	1	Master Phase 1 A
Unit:	See Options	Comm Link Address. **Options are 0 to 9**
Default Mode:	0	Flashing Red, 1=Solid Red
Time:	1	Minimum RED time. Options 1 to 10 (factory default 1 sec)
Time:	7	Minimum GREEN time. Options 7 to 25 (factory default 7 sec)
Distance in:	0	Feet, (1=Metres)
Control Lights:	0	MANUALLY
Phase 1 traffic:	2	SINGLE MACHINE

**NOTE:*
Above menu settings are recommended for a quick set up, user can also program units as required by engineer.

6. Hand Held Radio Remote Control

1. HHR does not have an on/off switch
2. Pressing and holding any button will turn the HHR ON automatically
3. HHR will automatically turn OFF after releasing a button

NOTE:
The radio frequency range is 910 MHz - 917 MHz (spread spectrum, frequency hopping). There is no FCC license required and the radio complies with all FCC regulations. The transmitter is an accepted FCC-type and does not exceed 1 watt output per FCC part 90.17. The radio complies with all specific limitations noted in FCC Part 90.17. FCC Commission 1-888-225-5322.

6.1 Hand Held Radio Remote Control Push Button Functions

There are three buttons located on the top of the HHR - a RED, GREEN and a BLACK.

- Pressing the RED button initiates an ALL STOP command. Both Master 1A and Secondary 1B units will turn to RED
- Pressing the GREEN button in Manual Mode resumes traffic flow, after an ALL STOP condition, at the Master Unit 1A. In Automatic Mode pressing the Green button will activate the next Green Phase in sequence.
- Pressing the BLACK button in Manual Mode resumes traffic flow, after an ALL STOP condition, at the Secondary Unit 1B. The BLACK button will not function in single unit operation

You must press and hold the button for a minimum of 3 seconds until the red LED turns “ON”.
The red LED indication light near the buttons on the HHR will light up confirming a valid command has been received by the Master Unit 1A.

NOTE:
An “ALL STOP” command (RED button) must be initiated before the GREEN or BLACK buttons will take effect. For safety purposes, the “CLEAR/RED” time must expire before the controller will accept a GREEN or BLACK button command. The red LED indication light will only light up after the “CLEAR/RED” time has expired.
Keep remote control in the nylon case at all times to protect the unit.
Keep remote control dry at all times to prevent water damage.

6.2 Hand Held Radio Remote Control Battery

The HHR is powered by four AA batteries which will last up to several months, depending on usage. Always keep a spare set in the HHR side pocket.

6.3 Hand Held Radio Remote Control Low Battery Indicator

A chirping sound indicates the batteries are low/dead when one of the buttons are pressed. Replace the batteries when this occurs.

6.4 Changing the Comm Link Address Number

NOTE:
The HHR, Master Unit 1A and Secondary Unit 1B must all be on the same comm link adress number. A communication error will result on the LCD screen if not on the same comm link address.
You will hear a "chirp" sound coming from the controller to verify when radio number has synced with the HHR.

⚠ DANGER

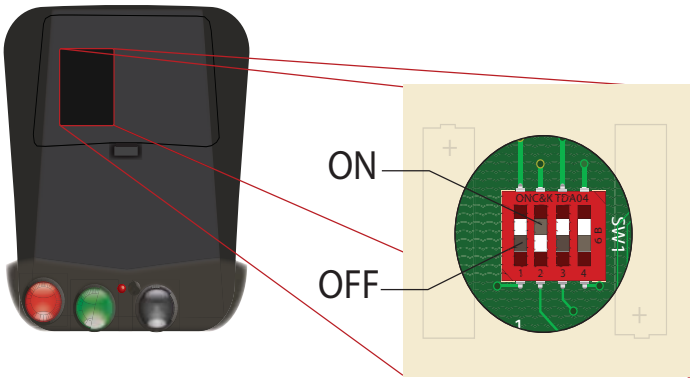
Always be aware of other crews operating North America Traffic signal trailers within 1.6 km (1 mile) of your work-zone;
Ensure that comm links address number are set to different numbers between work-zones to eliminate radio interference;
Failure to do so may result in a machine fault such as "conflicting lamps". The machines will stop their cycle timing and change to the default mode.

NOTE:
The Portable Traffic Lights must be turned "ON" and set to the same comm link prior to changing the comm link on the HHR.

Use the Dip Switch ON/OFF positions to change the comm link address number.
The Dip Switches are located inside the radio remote battery compartment, behind the batteries.

1. Remove back cover plate and four AA batteries, hold HHR upside down.
2. After changing the frequency on the radio HHR, replace the four AA batteries and replace cover plate.
3. Press and hold the RED button down for five seconds to reconfigure the radio. Two short chirp sounds will indicate when configuration is complete.

COMM LINK	1	2	3	4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON



(Example of Comm Link 2 above)

NOTE:
REV 1 HHR (REV # LOCATED ON HHR DECAL)
COMM LINK 0-9 AVAILABLE ON PTL2.4LD GEN 1 MODEL

7. Maintenance

7.1 Solar Panel

NOTE:
The solar panels do NOT provide sufficient charge to the batteries to allow for indefinite runtimes.

Clean the panel's surface whenever it gets dirty to maximize solar charging.

7.2 Battery Maintenance

For weekly battery maintenance instructions see decal on controller cabinet door.

7.3 Charging the Unit's Bank of Batteries

It is recommended that the batteries in each machine are charged EVERY weekend (after 50-60 hours of operation). Charge for a minimum of **24-48 consecutive hours.**

To charge the batteries, connect the on-board charger to a 110 VAC power source, using the power cord protruding from the bottom of the control cabinet.

Be sure that water levels in all cells in each battery are above the cell plates to maintain proper acid levels.

7.4 Battery Hazards

⚠ DANGER

Gas Explosion or Fire

Batteries release an explosive hydrogen gas while being charged. Keep cigarettes, sparks, flames and any other ignition sources away at all times.

Acid Burns

Battery acid can cause burns if it comes in contact with exposed skin and can cause blindness when it comes in contact with eyes. Always use eye protection, a face guard, and rubber gloves when working around batteries.

Electrical Burns

An electrical short between the positive and negative terminals of the battery can cause severe burns and death, even though the voltage is low.

7.5 Safety Precautions when working with batteries

- Always use eye protection, a face guard, and rubber gloves when working around batteries
- Have an eye wash kit available at all times
- Always have water and baking soda available to wash off and neutralize acid if it comes into direct contact with skin
- Avoid ingestion and inhalation of battery acid
- If any form of direct contact with battery acid occurs, seek medical aid immediately

7.6 Manual Lowering of the Main Light Post and Horizontal Mast Arm

The main light post and horizontal mast arm will need to be manually lowered in the event of:

- Dead batteries
- Actuator failure (inoperable)

⚠ CAUTION

Use traffic control persons to control traffic flow when lowering the main light post and retracting the horizontal mast arm.

Tools Required: 3/16” Allen wrench, 1/4” drive ratchet with an extension or, to save time, a drill with at least an 8” extension.

Remove silver access cap on the actuator motor housing using a 3/16” Allen wrench. Using the 1/4” drive extension at least 8” in length, lower the main light post until it reaches the holding bracket (to prevent stripping, use the drill set to “screw” mode or the highest clutch setting). If required, repeat the process for the horizontal mast arm.