ARROWES™

ROADING SAFETY

eSTOP™

Operation & Service Manual

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eSTOP™ System Components Diagram

eSTOP™ Lantern Unit

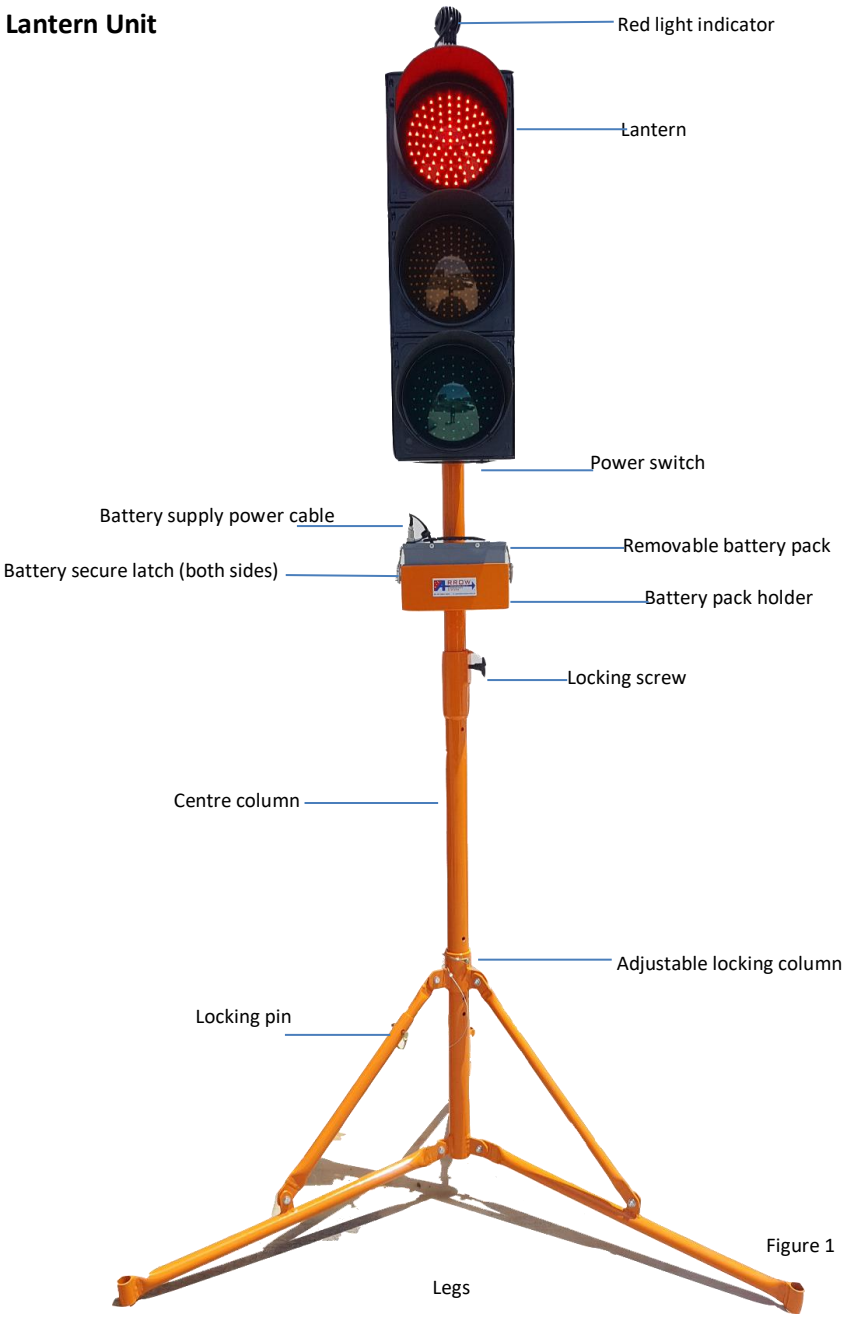
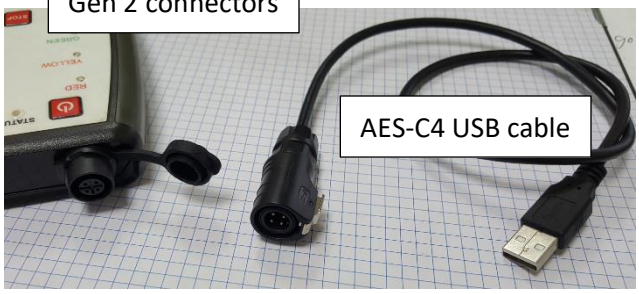


Figure 1

Lantern battery pack and charger

eSTOP™ Handheld Remote Controller (HRC)



Dual Port Wall Charger

USB cable

IP65 Carry Case

Note: Gen 2 connectors are only applicable to product released from 1st July 2019

HRC

Equipment Contents

1. 2 eSTOP™ lantern units
2. 2 tripod legs + battery holder
3. 2 lantern battery packs
4. 2 hand remote control
5. 2 USB charging cable
6. 1 double USB charge socket
7. 2 battery charger and power socket
8. Carry case
9. User and Service & Operation Manuals
10. 2 target boards (Applicable model only)

Safety Considerations

The eSTOP™ has been developed as a response to a need for safer working conditions for traffic controllers on job sites. It is designed to remove traffic controllers from the hazard zones, but still allow the traffic controllers to manage traffic movement within the worksite from a safe distance. In order to reduce the risk to road workers, traffic controllers and road users, the unit must at all times be operated effectively and consistently by authorized and trained operators.

The eSTOP™ must be operated in accordance with all safety, operation and service instructions contained in the manufacturer's operation and service manual. It is recommended that all operators read and understand the manual before operating the eSTOP™. Operators must understand and comply with the manufacturer's instructions as printed in the manual accompanying each eSTOP™ in conjunction with the respective Company's Safe Work Method Statement.

The eSTOP™ should only be operated by a designated, competent operator within the scope of on-site operation parameters (such as the Company's Safe Work Method Statement).

The eSTOP™ should be installed in a suitable location clear of obstructions. An appropriate risk assessment must be conducted to ensure the safe and suitable use of the eSTOP™. Examples of factors to consider when assessing suitable location are a safe distance from the traffic path so that wide loads or turning vehicles will not impact the unit, length of worksite, volume of traffic and topography. The eSTOP™ should be installed on a stable surface.

The unit including the lanterns (red, amber and green), red light indicator and battery box must be kept clean. The equipment must be handled with care.

The eSTOP™ batteries (both for the hand remote control and the lanterns) should be fully charged before operating the unit.

The eSTOP™ has been designed in accordance with DTMR's (Department of Transport and Main Roads) specifications, MUTCD guidelines and the MRTS254, Arrowes ISO quality system and ACMA approved. The eSTOP™ has been approved for use by DTMR. The application of the eSTOP™ must be in accordance with these guidelines/standards as well as the respective company's worksite risk assessment and Safe Work Method Statements.

Any modifications made to the eSTOP™ (unless by or approved by Arrowes) could compromise the function of the eSTOP™ and therefore, the safe application of the units and voids the warranty of the eSTOP™.

eSTOP™ System Specifications

eSTOP™ Unit

Operating life of cluster:	100,000 hours
View angel of cluster:	12^{o}
Lantern IP rating:	IP45
LED Optics IP rating:	IP65
Voltage:	12v
Operating amperage:	1.2 A
Battery (rechargeable)	21 A/H Lithium Iron phosphate
Operating Hours (80% DoD)	~16 Hours
Charging time:	4-5 Hours
Operating Temperature Range:	-20 to 90^{o} Celsius
Lantern Compliancy	AS2144

Hand Remote Controller (HRC)

RF operating frequency:	2.4GHz
Configuration:	Single unit or dual unit control
IP rating:	IP65
Weight:	300g
Battery (rechargeable):	3 A/H Lithium Polymer
Operating Hours (50% DoD)	~15 Hours
Charging time:	4-6 Hours
Operating Current: (Transmitting)	120mA
Sleeping Current:	1mA
Operating Temperature Range:	-20 to 85^{o} Celsius

Overall Device

Total mass per device (incl. batt, Target Board):	24kg (allocated to 3 components)
Top lantern weight (max lifting weight):	14kg
Tripod leg footprint radius:	0.80m
Wind loading – no sandbag base:	~40km/h
Wind loading – 3 sandbag/leg ~50kg:	~100km/h

Dimensions

Maximum working height:	2900 cm
Minimum working height:	2600 cm
Dimensions when stored:	1710 mm x 480mm x 370mm
Base width, fully extended:	1600 mm diameter
Lantern height:	770 mm
Lantern width:	270 mm
Lantern depth:	170 mm

Battery Specifications

eSTOP™ *Unit*

Battery Type:	LiFePO4
Voltage:	12V
Full Capacity:	20 A/H
Max Traffic light power consumption:	1.02 A
Depth of Discharge:	80%
Operation time:	~16.5 hours at 80% DoD
Low battery warning:	~15.5 hours of operation
Life cycle:	>800 at 80% DoD
IP Rating:	IP54
Protection:	Over voltage, under voltage, over current and short circuit.

Note: Battery cuts off after ~16.5 hours at 80% DoD of full capacity.
Low battery warning begins 1 hour before battery cut-off time.

Charger

Input:	AC100-240V 50/60Hz Max. 1.6A
Output:	DC 14.4V Max. 5.0A
Charge rate:	~3A
Battery Charging Time:	4-5hours from low battery

Hand Remote Controller (HRC)

Battery Type:	LiPo
Voltage:	3.7V
Full Capacity:	3 A/H
HRC power consumption:	100mA
Depth of Discharge:	50%
Operation time:	~15 hours at 50% DoD
Low battery warning:	~14 hours of operation
Life cycle:	>800 at 50% DoD

Note: Battery cuts off after ~15 hours at 50% DoD of full capacity.
Low battery warning begins 1 hour before battery cut-off time.

Charger

Input:	AC110-240V 50/60Hz Max. 0.35A
Output:	DC 5V Max. 2.0A, with over current protection
Charge rate:	~0.6A
Battery Charging Time:	4-6 hours from low battery

Labels

Hand control identification number is located at the back base.

eSTOP™ identification number is located at the base of the lantern.

HRC charger C-tick labels

Lantern Battery charger C-tick

Key Features

The eSTOP™ is the first Electronic Single Traffic Operator Portable system of its kind. Designed to remove the traffic controllers from the hazard zone, the key features of the eSTOP™ system are:

- Traffic controllers operate from a safe distance (up to 400m with option to increase distance)
- Can be implemented anywhere a stop/slow baton would normally be used
- Can be operated with one controller (where there is clear line of sight) whilst the other takes a break or is on rotation as the HRC can control 2 eSTOP™ units
- Fail safe features - ensure no two green lights can be on at the same time, low battery, tilt and lantern fault warnings
- Environmentally robust, light weight, three-piece assembly, adjustable height
- Small Hand Remote Control (IP65)
- Hand Remote Control mimics traffic lantern states in real time
- Wind load up to 100km/hr when used as per manufacturer's guidance

Unit Assembly/On-site Setup

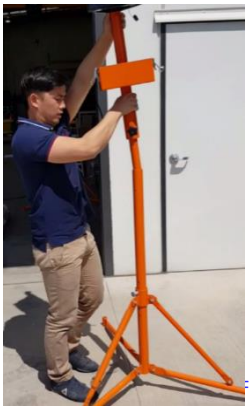
Pull spring pin to release leg

Extend legs out by pushing towards the ground

Place legs onto a flat surface and align adjustable locking column with pin holes to for uneven surface. (red circle)

Slide pole up and down to adjust height then release pin to lock in place

Use two hands to lift traffic lantern onto base



Slide lantern into the center locking column

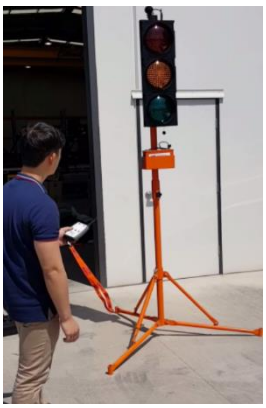
Secure with locking screw to stop lantern from rotating

Insert battery pack into battery holder

Lock latches to secure battery box

Connect power cable. Connector latches once pushed in place.

Switch on lantern



Unit is ready to operate with Hand Remote Control

IMPORTANT: ensure eSTOP™ is stable and is weighted down with sandbags prior to operation. One sand bag per tripod leg is required.

Target Board Assembly

Target only applies to applicable systems with Target board brackets.

1. Place lantern and target board on a flat surface

2. Lift lantern and place in the gap of the target board.

3. Lift one side of the target board over and behind the lantern edge.

4. Lift the right side up then align the bolt hole.

5. Insert bolt then tighten wing nut.

6. Adjust camera bracket and align hole on the top side of the target board, then tighten wing nut.

Note: Ensure font facing camera (if applicable) is adjust to be above the target board.

Operational Procedures

When the units have been assembled.

eSTOP™ Lantern Unit

1. **Connect power cable** from eSTOP™ unit to battery box. To switch on the eSTOP™ unit, push the small power switch underneath the lantern unit. The green LED light will illuminate when powered on. The lantern unit will be controlled by its master, the Handheld Remote Controller (HRC) once it is paired.

   Modes - The unit runs in two modes: 'Test Mode' and 'Operation Mode'.

   Test Mode – When the unit first powers on, it is by default in test mode. In this mode, the HRC can be used to perform lantern test. See HRC procedures for LED test function, each lantern will flash for 0.5 seconds. The lantern test must be performed before switching to Operation Mode.

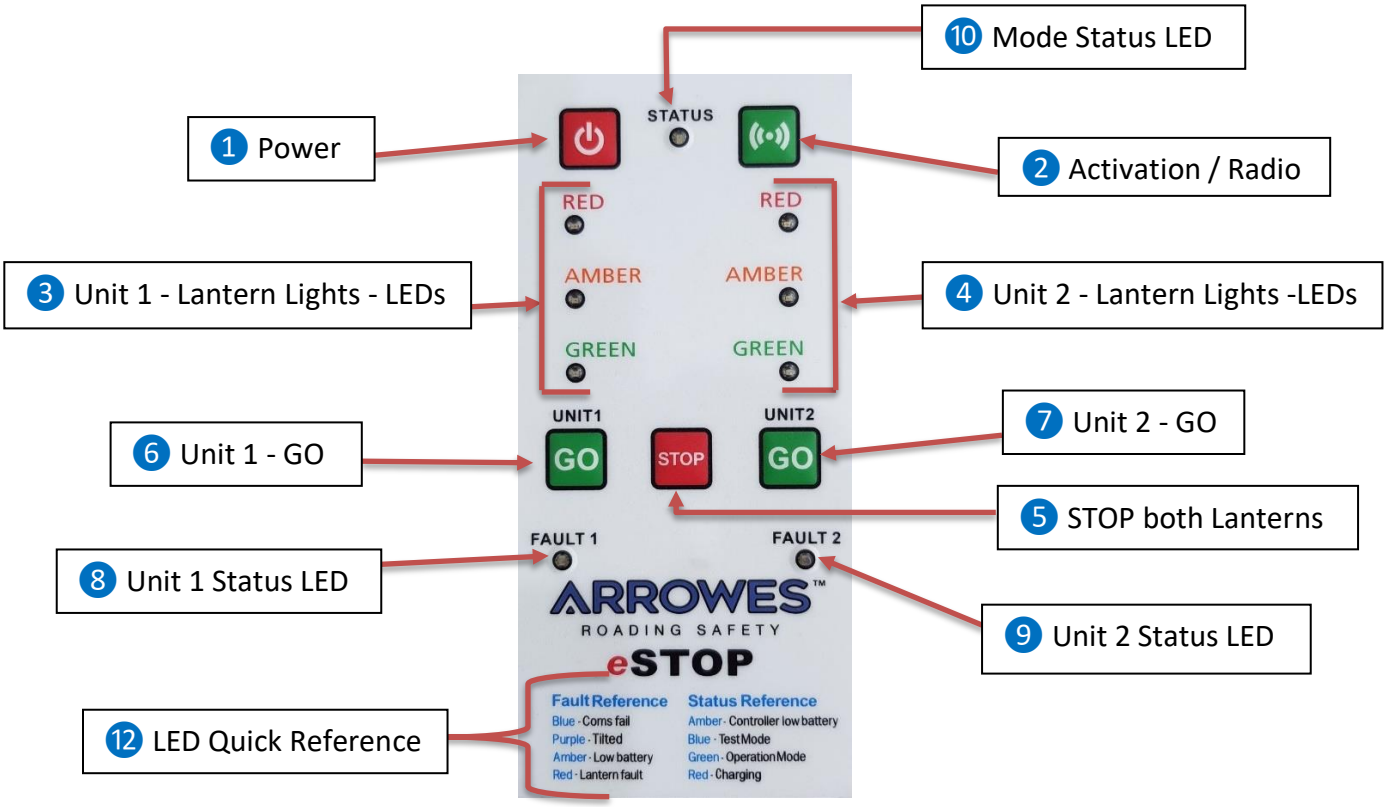
   Operation Mode – The unit can be activated (using HRC) to 'Operation Mode' after power-on/LED test. When the unit first activates it will flash amber for 5 seconds then default to red. The unit will **halt for 5 seconds before it can be operated.** See HRC procedures for operation functions.

2. When the lantern unit is on the RED state, a small amber LED, called the "red light indicator" will flash. This red light indicator faces the workers on the worksite. Its purpose is to indicate to the workers on the jobsite that the traffic lantern is red. The red light indicator must NOT face the motorists.

3. The eSTOP™ Lantern Unit is also fitted with a "Cut-Off Switch". This is the power switch, located at the base of the lantern. This switch will turn off the lantern instantaneously as required. It must also be switched off when not in use.

Note: When setting up the eSTOP™, the lanterns should face away from motorists during test mode. Once tested and ready for operation, face the lantern towards traffic. Ensure to start activating the lights after the lantern is facing the traffic, and not to turn the lantern face again.

Hand Remote Controller – HRC



LED indicators – There are 3 groups of LED indicators – Lantern, Status, and Fault.

Lantern LED indicators 3 4 reflects the signal status of the paired eSTOP™ units with Green, Amber & Red lights.

Also, battery status of the HRC battery & Lantern batteries.

Status LED indicator 10 represents the states and faults of the overall system and indicates the following colours:

- **Red –**
  - when the HRC is off, Red indicates the HRC is charging.
  - When the HRC is on, Red indicates invalid press or fail pairing.
- **Blue** – once the HRC is powered on, the status indicator is Blue, which represents **Test** Mode.
- **Green –**
  - when the HRC is off, Green indicates the HRC is fully charged and stopped charging.
  - When the HRC is on, Green indicates valid press, or the system is in **Operation** Mode.
- **Yellow/Amber –** the Status will flash Yellow/Amber when the HRC battery is low.
- **Cyan –** flashing, in Wireless pairing mode to connect to eSERIES™ Unit by Bluetooth®.
- **Off –** the HRC is powered off, if pressing the buttons does not sound a beep, then the HRC is faulty, or battery is completely dead, please recharge battery.

Fault LED indicators 8 9 represents the states and faults of the respected paired lantern unit.

- **Blue –** HRC is paired to a lantern unit but has a communication failure (no connection, signal interruption, no power to lantern or paired to unknown lantern – lantern will need some attention).
- **Purple** – The paired lantern is tilted or knocked over.
- **Yellow/Amber –** The paired lantern battery is low.
- **Red –** The Paired lantern has a lantern light fault in one of the LEDs.
- **Green –** The paired lantern is communicating and operating normally.
- **Cyan –** 2 eSERIES™ Units are paired to that channel and operating normally.
- **Off –** HRC is on, no lantern is paired on Unit 1 or Unit 2.

Modes of Operations - **Test** Mode, and **Operation** Mode – Mode / Status LED 10

- **Off –** (Status LED is off) – HRC is off. By pressing **STOP** button 5 will show battery status of the HRC. With green and amber and red LED's showing the HRC battery is at full charge, and green only when the HRC battery is low on charge (both Unit 1 & 2 will light up).

- **Test Mode** (Status LED is blue) - When the HRC first powers up it is in Test Mode. During this mode, you can pair/un-pair any Lantern units (refer to pairing section). Once it's paired to a lantern unit (and Fault LED is green).
  - You can do a LED lantern test by pressing each **GO** button 6 or 7 and each LED colour will flash along with the Lantern lights.
  - Check the battery level of the Lanterns unit by pressing the **STOP** button 5 and will show the battery level of both lantern batteries, with green and amber and red LED's showing the lantern battery is at full charge, and green only when the lantern battery is low on charge.

- **Operation Mode** (Status LED green) - Once the HRC is paired and the Fault LED is green, the system can be activated into Operation Mode by holding **Activation** button 2 for 5 seconds until HRC beeps and Status LED flashes, will then take a moment to sync. Once this Mode is activated, both lanterns will go to Red, then operations of lantern signals can then be controlled, and then the desired direction can be set to GO or green light with buttons 6 or 7, to change direction of traffic flow, press STOP button 5 first, and then wait at least 5 seconds or when safe & clear to change to the other direction flow of traffic.

Turn ON the HRC

- Long Press of **Power** button 1 till beep & Status LED 10 flashes and then turns **Blue** for **Test** mode. The HRC will always start in **TEST** mode.
- To turn off, press and hold Power button 1, can be done from Test mode or Operation mode.

Changing Modes on HRC - 10 Status LED

Each lantern **MUST** have Quick Test done by pressing **Go** 6 & or 7 buttons while in **TEST** mode after pairing any eSERIES™ Unit, before changing Mode status to **Operation** mode.
Fault 1 & 2 LED's 8 & 9 must be Green or Cyan or off

To change the status from **Test** mode to **Operation** Mode by, long Press of Activate button 2 till beep the status LED 10 will turn to **Green**. Another long press of Activate button 2 to change back to **Test** mode, status LED 10 **Blue**.
Fault 1 & 2 LED's 8 & 9 must be Green or Cyan or off

HRC Operational Steps

1. **Power On** - Press and hold **Power** Button 1 for 5 seconds to power on Handheld Remote Control (HRC). Repeat above to turn the HRC off. This will not lose any paired units settings, and when HRC is turned back on, it will try to connect to these.

2. **Fault indicators** - When power is on, the Fault Indicator 8 9 will show different colours according to the fault hierarchy listed in Fault Reference 12. When more than one fault occurs, the fault with lower hierarchy will not be displayed until higher level fault(s) have been cleared.

3. **Test mode** - When first powered on, the HRC will start in Test Mode and the Status Indicator 10 will show blue. During Test Mode the HRC can be used to pair to a specific eSTOP™ unit (Refer to Pairing section). If the HRC is paired to an eSTOP™ unit, the Fault Indicator 8 9 will show Blue and change to Green when Synced to the paired eSTOP™ unit (allow up to 1 minute for the Fault light to turn green and get synced). Once synced the HRC can be used to control the eSTOP™ unit. Pressing Buttons 6 or 7 allows eSTOP™ lanterns to be tested (A quick flashing sequence of the 3 colours to ensure the lights are working). **Lanterns must be tested first before operation.**

4. **Activation** - When ready to operate the eSTOP™, hold down Activation Button 2 for 5 seconds to activate the synced eSTOP™ units into Operation Mode, the Status Indicator 10 will then show Green. The eSTOP™ will only operate when Fault Indicators are green.

5. **Start-up** - Upon switching from Test Mode to Operation Mode, the eSTOP™ lantern will flash amber for 5 seconds, then default to red. The HRC will lock for 5 seconds, and all buttons will not work during this time. After 5 seconds the eSTOP™ unit is in Operation Mode.

6. **Control Traffic Signals** - Use Buttons 5 6 or 7 to operate the eSTOP™ for traffic control. Use button 6 7 to switch a signal to green. (Note: in order to turn a signal green, both lanterns must be red first). Use button 5 to change all signals to red. (Note: the amber lantern will activate for 4 seconds during the transition from green to red. The LED indicators reflect the eSTOP™ lantern status and the HRC will lock for 5 seconds after changing lantern to red).

7. **De-activation -** In Operation Mode, holding Activation Button 2 for 5 seconds returns the eSTOP™ units to Test Mode. During transition from Operation Mode to Test Mode both eSTOP™ unit lanterns flash ambeer for 5 seconds.

8. **Power off** - In all modes, hold **Power** Button 1 for 5 seconds to commence power off. During Operation Mode the HRC will not power off if the paired units lost sync (comms fail) to an eSTOP™ unit (blue fault indicator).

9. Switch off eSTOP™ power and disconnect battery cable before packing up.

Note: While in "off" mode, pressing "STOP" on the HRC will indicate battery life remaining. In the event of forced power off is required on the HRC, pressing button "1" and "2" at the same time forces the HRC to soft reset then power off.

Flashing Amber Operations

Only for applicable HRC

1. When HRC is in **Activation Mode (Status 10 Green)** each and or both Unit 1 & Unit 2 can set to Flashing Amber.
2. Activating Flashing Amber**-** When Unit1 and/or Unit2 are Red **(LED Indicator 3 4 Red),** press and hold the Go button 6 or 7 for 5 seconds to activate the respective unit to flashing amber.
3. Deactivating Flashing Amber – when Unit 1 and/or Unit 2 is in Flashing Amber, quick press Stop Button 5 to deactivate Flashing Amber, and return the units to red. Units can now be operated as usual (e.g. changing to green or reactivating either unit to Flashing Amber).

Note: If a unit is green or has a critical fault, neither unit can be activated to flashing amber.
If one unit is flashing amber and one unit is red, the red unit can be activated to flashing amber.
If one unit is flashing amber and one unit is red, the red unit **cannot** be changed to green.
All flashing amber cannot be changed to green, must be changed to red before changing to green.
If a critical error occurs during flashing amber, the units will automatically change to red.

Pairing the Handheld Remote Controller (HRC) to eSTOP™ Lantern units.

The HRC can be paired to any eSTOP™ lantern unit. Once a lantern unit is paired to an HRC, it is stored in memory, and they will be automatically synced when powered up for operation. Re-pairing is not required unless the HRC is pairing to a different lantern unit, pairing 2 lantern units to 1 HRC, or lanterns has been mixed up and not knowing which lantern is paired.

It is recommended to begin pairing by un-pairing all lantern units from the HRC, this will reduce confusion about which lantern unit if already paired previously. Follow the steps below to begin the process. If not paired previously, the un-pairing steps are not required.

Power on the HRC and the Lantern units, HRC must be in Test mode for pairing (status Blue on LED 10).

Un-pairing eSTOP™ & eSERIES™ Units

Un-pairing is required if the HRC is already paired to an unknown lantern with Unit 1 or 2 Fault LED Indicator 8 or 9 is blue and unable to sync. To do this the HRC **must be in test mode** (status light is blue 10), the C4 USB cable **must be disconnected** from the HRC unit. Press and hold Unit 1 or Unit 2 "**Go**" button 6 or 7 for 5 seconds until a beep sounds. The HRC will flash a red light on the **Status Indicator,** then the **Fault LED** 6 & or 7 will be blank. This indicates no lantern unit is paired on HRC channel.

Repeat this un-pairing process on the other channel if required.

Pairing HRC Unit 1 (Left side of the HRC) to eSTOP™ & eSERIES™ Units

1. When in test mode attach the C4 USB cable from the Bottom of the HRC unit to the USB connector on the base of the eSTOP™ lantern unit, show on the image. Push on the plug, may have a locking latch to HRC.
2. Press and hold Unit 1 **GO button** 6 for at least 4 seconds until a beep sounds. This single beep indicates pairing has initiated and the button can be released.

   When the pairing process is complete, the HRC will sound either a fast double beep as well as a green flashing light on the **Status Indicator** or a long single beep with a red light on the **Status Indicator**.

   · A fast double beep and green light indicates successful pairing. **Fault 1** LED will go blue once it's paired and changed to green when synced to the paired unit.

   · A long, slow beep and red light on **Status Indicator** will indicate failed pairing.

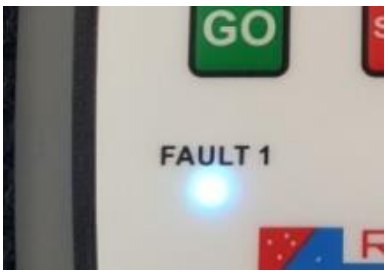
   The following issues may cause failed pairing:

   - C4 USB cable is not attached properly.
   - Faulty C4 USB cable, try another cable.
   - Unit is already paired on Unit 2 (right side of the remote).
   - The eSTOP™ unit has no power/is not turned on (push green button at base of eSTOP™).

Once paired and synced **Fault 1** LED is Green, (allow up to 60 seconds for this to turn Green), unplug the USB cable.

A lantern LED test **MUST BE DONE** with a short press unit 1 "GO" button, can be performed to test the paired lantern, follow HRC Operational Procedures to perform LED test and operate the lantern units.

For **HRC Multi** models only, a second eSTOP™ or eSERIES™ unit can be paired to Unit 1 (same side on the HRC). This is done by plugging the HRC to the second eSERIES™ unit and repeating the same process above, using the same side **GO** Button. When 2 eSERIES™ Units are paired to Unit 1 channel of the HRC, the eSERIES™ Units are controlled and behave simultaneously. The **Fault** LED will indicate **cyan** colour instead of green, indicating 2 eSERIES™ units are paired. The same process can be done with Unit 2 **GO** button.



Indicates in Cyan colour when 2 units are paired to one GO button.

Pairing HRC Unit 2 (right side of the HRC) to eSTOP™ & eSERIES™ Units.

1. Repeat the pairing process by pressing Unit 2 GO button 7 in **Test Mode**. Unit 1 on the HRC must be paired to an eSTOP™ before Unit 2 can be paired.

Note: This is pairing a second lantern to right side of the same HRC. This pairing setup allows 2 lanterns to be controlled such that **only 1 eSTOP™ lantern can be Green at a time**.

If pairing as single unit operations, only pair to Unit 1 on each HRC with each eSTOP™. Unit 2 on HRC is not used.

HRC Lock-up?

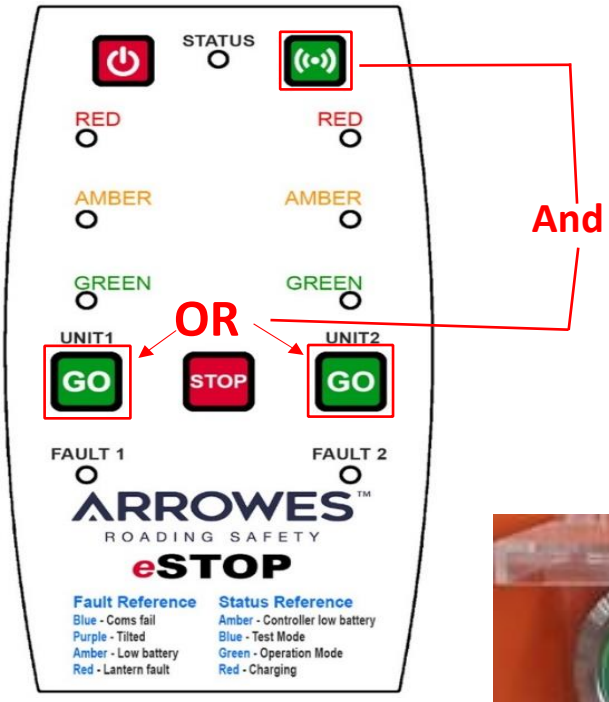
If unusual behavior or think a malfunction is experienced with the HRC unit, try performing a software restart first.

Pressing buttons Power 1 & Activate 2 at the same time to perform a software restart on the HRC, and the HRC will turn off. Turn HRC back on and continue.

** Note: a software restart will not un-pair any paired units.

Wireless Pairing

Only available on the latest firmware versions of HRC



With only Compatible HRC and eSERIES™ Units

Compatible eSERIES™ units can be identified by the **PAIR** button located on the unit. The location of the **PAIR** button is found on the eSTOP lantern on the rear lower side, the eBOOM™ next to the power switch and the eSAS™ on the rear panel.

Wireless Pairing process with Bluetooth (BT)

1. Set HRC to Test Mode. Push and release the PAIR button on the eSERIES™ Unit and this will start to flash.
2. Now, within 10 seconds
3. On the HRC unit, press and hold for 2 seconds the 2 Activation / Radio (BT) button **and** either Unit 1 **GO** 6 or Unit 2 **GO** 7 button. The Status LED 10 will change to Cyan. The button you press will pair to that channel.
4. The connection may take up to 60 seconds to connect.
5. Repeat above if fails to connect, may be from high BT activity about.
6. Once paired to the HRC, the Fault LED 8 or 9 will change to green once connection is established.
7. Repeat above for pairing to another unit.

Fault conditions

Lantern Tilted of knocked over – in the case of a lantern is knock over, the HRC will go into Fault LED will turn purple and Status LED will change to Red and sound alarm beeping. As this is a critical error all lanterns will

change to Red lights, until problem is fixed.

Communication lost – if a unit loses communication to the HRC or loses power, the Fault LED will change to Blue and the Status LED will change to Red and sound alarm beeping. As this is a critical error all lanterns will change to Red lights, until problem is fixed.

Lantern Light fail – if a lantern light colour fails, the HRC, the Fault LED will change to Red and the Status LED will change to Red and sound alarm beeping. Until the problem is fixed, but signal can still be activated, for Amber light fault will take a cycle of light changes before error is cleared.

Recharge HRC

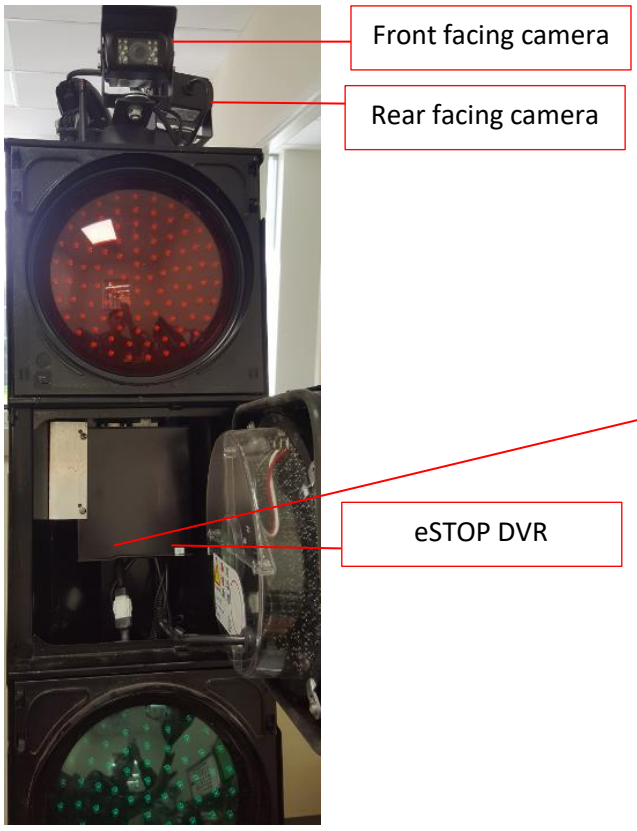
To Recharge the HRC battery is done by using the C4 USB cable connected to the wall USB charger (supplied). Also connected to an eSERIES™ Unit but not the HRC **CANNOT** be operated.

With the HRC turned off, a red Status LED will indicate charging, Green will indicate fully charged. When the HRC is on in any mode, will not indicate any charge state, except for Low battery charge of Amber Status LED.

User manual – eSTOP DVR camera system

Only for applicable eSTOP

eSTOP camera and DVR placement



DVR functions

Figure 1. eSTOP Camera and DVR

Recording

The eSTOP DVR is set up to record automatically when the eSTOP traffic light powers on. There is a 1-minute delay for the DVR to complete startup and start recording.

A Green light under SD status indicates the DVR is recording.

Stop recording

Recording can be stopped by switching off the power or switching the recording off Enable SW as shown in figure one.

Adjusting Camera Angle

Figure 2. Camera rotations

Depending on where the eSTOP is placed, the camera can be rotated horizontally and vertically to suit the viewing angle of the traffic.

Using a LCD and DVR video output

Figure 3. DVR output and LCD

By plugging in the LCD to the DVR's video output connector shown in the figure 3 above, the videos of the cameras can be viewed live. This allows camera positions to be adjust effectively, video play back and indications of recording status.

DVR custom setting

While the LCD is plugged in, a USB mouse can also be plugged in to the USB port shown in figure 1. This allows custom settings of the DVR (a right-click to enter the settings menu).

Time stamp

The DVR has an internal battery to keep time in track when eSTOP power is off. The time should be adjusted to the local time by entering the settings menu.

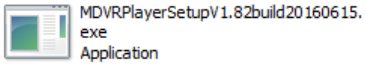
Play back video

Video playback can be done by accessing the DVR menu using the LCD and a mouse.

This can also be achieved by using a Windows computer and the PC software to read back the video storage on the SD card. The SD card is located on the bottom of the DVR as shown in figure 1.

Using the MDVR player to play back video

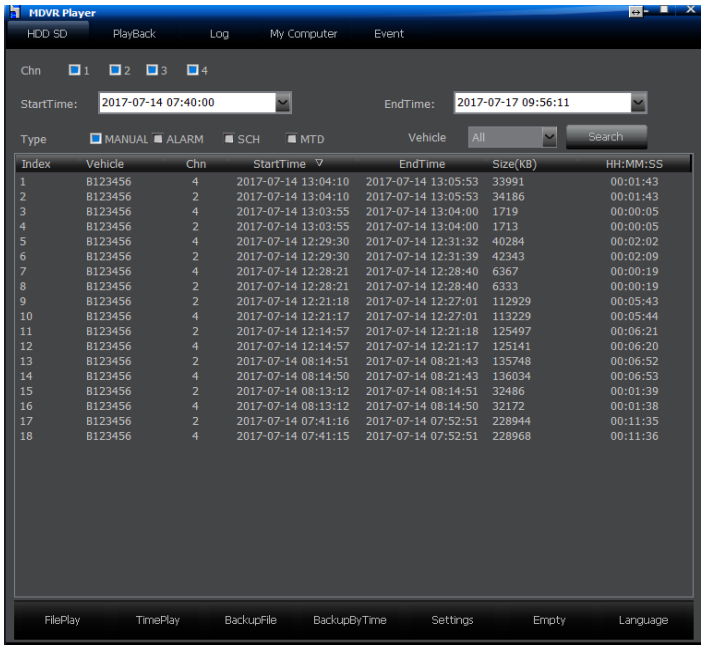
Installing the software



The MDVR player software can be found in the CD provide or contact supplier for a copy of the MDVR software. Or download from google drive below:
https://drive.google.com/drive/folders/1mdSDaauaRsrbOA3rruHFplIehOipbgky?usp=sharing

Open the installer file shown above and follow the setup wizards to complete installation.

Once the software is installed and shortcut icon shown above is create on the desktop. Open this software.



Search footage by time

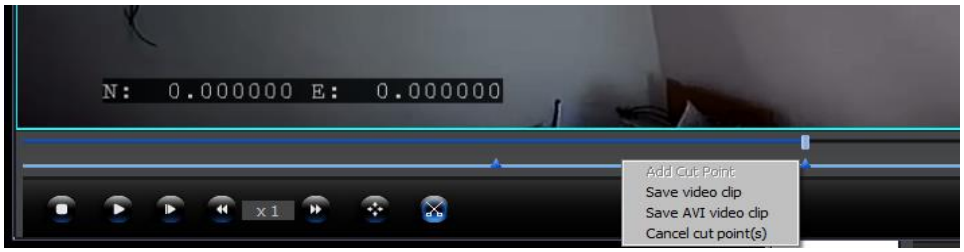
If the DVR SD card is plugged into the PC, the *StartTime and EndTime on the software shown above can be set to search the time period of the video required.*

Double click on any of the video files listed to play.

The files can be backed up using the BackupFile or BackupByTime buttons on the bottom menu bar.

Cut clips to backup

When the video is being played, clicking on the cut icon shown below allows the video to be cut with a starting and end point.



A timeline will appear on the bottom of the video when the cut icon is clicked.

Right click on the line to set starting and end point of the clip.

Then right click in between the 2 points to back up the clip as AVI format.

Batteries - Care, Safe Handling and Charging

When the power to the battery is low (3.6v or less) the ***status indicator*** will show amber. The HRC must be charged**.** Running the HRC at low voltage for prolonged periods may degrade the battery's integrity and reduce the HRC's transmitter power and will affect the reliability of the system.

DO only use the battery supplied. If replacement batteries are required, please contact Arrowes Roading Safety for the correct battery.

DO store batteries in their original packaging, in a dry place and at normal room temperature.

DO charge battery to 80+% if storing for long term.

DO keep all batteries in a safe place away from Children and pets.

A. Charging the Batteries

1. The HRC Battery

The HRC can be charged from any USB device including the one attached to the eSTOP™ unit base (the screw cap and USB connection are located at the base of the eSTOP™).

When the HRC is switched off and the USB is attached to a charging device, a red charge light indicates that the battery is being charged. When the light is green, the battery is fully charged. A flashing red light indicates that there is a battery fault, and the battery should be replaced.

(Note: the battery charge indicator is only active when the remote control is switched off)

While the HRC is powered off and not charging, pressing stop button will light up the Red, Amber, Green LEDs which indicates 3 battery levels. (refer to battery status for further detail)

2. The eSTOP™ Lantern Battery

The eSTOP™ is fitted with a light weight LifePo4 battery. To charge, remove the connector at the top box of the battery and connect to the battery charger that is supplied by Arrowes Roading Safety.

The battery is charged to 240AC outlet charger, an indication LED on the charger shows the status of charging.

-Red indicates charging

-Green indicates charging complete

Note: using any other non LiFePo4 charger could damage the battery and degrade the life expectancy of the battery. If the battery/charger gives an odour, generates heat, becomes discoloured or deformed, or in any way appears abnormal during use, immediately stop using the battery and chargers, then contact your supplier.

B. Battery Status

1. The HRC

When the HRC is switched off, pressing button 5 will provide battery life status. Each of the LED indicator lights (3 4) red, amber and green represents 1/3 of the battery life (similar to a battery bar), such that red+amber+green indicates fully charged, amber+green indicates 2/3 and green 1/3 of battery life remaining.

(Note: the battery charge indicator is only active when the HRC is switched off)

2. The eSTOP™ Lantern

The status of the eSTOP™ unit battery can be determined when the system is in ***Test Mode*** and the eSTOP™ unit is sync to the HRC.

By pressing the stop button (5) during test mode, the connected units battery status will be indicated by each of the LED indicator lights ((3) (4)). Each light represents 1/3 of the battery life (similar to a battery bar), such that red+amber+green indicates fully charged, amber+green indicates 2/3 and green 1/3 of battery life remaining.

The LED indicators will indicate battery status according to its respective paired units.

C. Safe Manual Handling for Batteries

- Do not immerse the battery in water and keep the battery in a cool, dry surrounding.
- Do not use or leave the battery near a heat source such as fire or heater.
- Use only the battery charger specifically supplied when recharging.
- Do not reverse the position and negative terminals.
- Do not connect the battery directly to an electrical outlet.
- Do not discard the battery in fire or a heater.
- Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.
- Do not strike, trample, or throw the battery.
- Do not directly solder the battery and pierce the battery with a nail or other sharp objects.
- Do not use or leave the battery at high temperature. Otherwise, it can overheat, or its performance will degenerate, and its service life will be decreased.
- Do not use the battery in a location where static electricity and magnetic field is high, otherwise the safety devices may be damaged.
- If the battery has leaked, and the electrolyte gets into the eyes, do not rub the eyes, instead, rinse the eyes with clean water, and immediately seek medical attention. Otherwise, it may injure eyes.
- If the battery gives an odour, generates heat, becomes discoloured or deformed, or in any way appears abnormal during use, recharging, or storage, immediately remove it from the device or battery charger and stop using it.
- In case the battery terminals are dirty, clean the terminals with a dry cloth before use. Otherwise, suboptimal performance may occur due to the poor connection with the instrument.
- Be aware discarded batteries may cause fire or explode, tape the battery terminals to insulate them.
- These lithium batteries should be recycled. Look for companies who will buy them or your local battery recycling centre for disposal options.

Maintenance of the eSTOP™

1. When the power to the battery is low, the ***status indicator*** will be amber. ***The HRC must be charged.*** Running the HRC at low voltage for prolonged periods may degrade the battery's integrity and reduce the HRC's transmitter power and will affect the reliability of the system.

2. ***Turn all battery units off when not in use*** *(both the* eSTOP™ *unit and the HRC unit).*

3. The Lantern should be wiped with a damp cloth to remove dirt/dust which may form.

IMPORTANT – As a safety precaution, in case of communication failure/out of range, the lantern will default to RED

Troubleshooting

If troubleshooting does not solve the issues, contacting the manufacturer is advised.

Soft Reset

HRC – Assuming battery is not low. In the event of no response from the HRC, press down both buttons 1 and 2 at the same time to soft reset the HRC. A sequence of flashing all LED indicators on the HRC will take place and a beep will sound then powers off. The HRC should then operate as usual.

eSTOP™ Lantern – Assuming battery is not low. In the event of unknown error or faults, soft reset the eSTOP™ lantern by powering it off and on again. The power switch is located on the bottom of the eSTOP™ unit.

Battery check

HRC – in power off mode. Pressing the 'Stop' 5 button on the HRC will show the battery status of the HRC. Refer to "Charging the HRC battery" section A of "Care and Safe Handling of Batteries" for more detail.

eSTOP™ Lantern – when the lantern is sync to the HRC during ***test mode***, use the 'Stop' 5 button to check the battery status of the of the lantern. Refer to section B of "Care and Safe Handling of Batteries" for more detail.

Faults

Coms fail – check that the distance of the eSTOP™ from HRC does not exceed the maximum operating distance. Check that the correct unit is being paired or pair the units again. Perform a system soft reset.

Tilted – check the eSTOP™ unit is not on tilt over 20 degrees from vertical. Place eSTOP™ unit in its operating vertical position then perform a soft reset to recalibrate its orientation.

Low Battery – use the battery check procedures to check the battery status. Charge the batteries if they are low.

Lantern fault – Use LED test procedures to check the LED fault. If the eSTOP™ operates but an individual LED module remains faulty, contact manufacturer for replacements. An individual LED module can be removed by releasing the latches located on the top left or right corner, then disconnect the connector attached to the module cable.

Repairs & Servicing

All repairs and servicing of the eSTOP™ shall be performed by Arrowes Roading Safety or its authorised service center.

Any services/repairs/modification or use of parts not approved by Arrowes Roading Safety voids any warranty and may affect the safe performance of the eSTOP™.

Safe Transportation of the eSTOP™

The eSTOP™ shall be suitably packed to accommodate bumpy rides on roads and some instances rough terrain, ensuring the load is fully secure and stable. The units shall be suitably protected and prevented from being knocked against each other or other equipment during transportation.

The Hand Remote Control, battery chargers, USB socket & cables shall be stored in the carry case provided.

Arrowes Roading Safety has designed a secure cage system to transport the eSTOP™ unit with the existing traffic control equipment loads to avoid additional freight costs. Contact Arrowes Roading Safety for more information.

Material Life

Materials/parts used in the production of the eSTOP™ have been selected based on the manufacturer's claim or technical guidance on the material life to meet the requirement of MRTS254.

The lanterns used are type approved by QLD DTMR and meets with AS2144. The manufacturer of the lantern has claimed that it has a service life of at least 20 years.

The mechanical components and structure of the eSTOP™ use steel and aluminum. The type used has material life of at least 20 years.

Dulux X15 orange is used, this meets with the requirements of AS2700.

Warranty

The eSTOP™ is supplied with a limited ex-factory warranty for 12 months.