Siemens Traffic Controls,
Sopers Lane,
Poole,
Dorset,
BH17 7ER

SYSTEM/PROJECT/PRODUCT: Helios

HELIOS COMPATIBILITY

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Function: Technical Services

Issue	Change Ref	Date
1	-	25/03/2002
2	TS001076	18/07/2002
3	TS001142	11/02/2003
4	TS002501	04/05/2005

CONTENTS

1. INTRODUCTION

1.1 PURPOSE

The purpose of this document is :-

To define the compatibility between all issues of Helios Modular Signals, Enhanced optics, LED, LED (NLM), CLS with LMF and CLS (NLM) versions.

1.2 SCOPE

All issues of Helios software and hardware

1.3 RELATED DOCUMENTS

667/HB/30000/000 – Helios General Handbook
667/5/30200/ETC – Helios Signal Head BOM's

1.4 GLOSSARY

RAG	-	Red/Amber/Green three aspect signal head
AGD	-	Above Ground Detector
LED	-	Light Emitting Diode
NLM	-	Non Lamp Monitoring
CLS	-	Central Light Source
LMF	-	Lamp Monitoring Facility

2. HELIOS – HARDWARE DESCRIPTIONS

2.1 SUMMARY OF HARDWARE ISSUE STATES

2.1.1 667/1/30200/ETC – Helios Signal Head Assemblies

Issue 1 – First Issue

Issue 2 – ANL02721

Scope updated to indicate that this document will require updating for final LED optic assembly details.
/023 & /025 two Electric shock warning labels added to modular bodies. Fitted towards centre of body close to hinge blocks such that they are visible when door opened but not visible from the front when the door is shut.
/024 Green ident sleeves added for fitting to the ends of the transformer wires.
/026 /042 /043 /044 /045 /046 /050 /056 /101 /102 /500. All have details of Plas – Tech screws updated.
/047 /048 /049 Green and Red ident sleeves added for fitting to the ends of the transformer wires.
/047 details that top 2 aspect bracket to be fitted facing upwards outwards added.
/103 4 M8 nuts, M8 washers and large M8 plain washers, transferred to, bracket to signal kit /104. This allows bracket to pole 'M8 stud' kits to be supplied early with signal box still containing necessary parts to finally fit bracket to poles
/104 The M10 that were 20mm long now 30mm long, also 2 extra M10 nut caps added, such that all 4 M10 bolts can have caps fitted. M8 stainless steel spring washers added to ensure secure fixing of brackets to poles. Plastic bag added to contain above bracket fixing items.
/106 Signal to pole earth wire increased by 300mm

Issue 3 – ANL02179

All reg sign assy/doors – sealant noted as strip form – 920mm long (for clarification only)
/017 adhesive now supplied with lens.
/027, /028, /029, /030, /031, /032, /033, /034, /035, /037, /039 reference to items lists /107 or /108 or /109 or /120 or /121 added.
/102 item 2 deleted replaced by cut down reflector with a quantity of 1. Item 3 modified to discard screws, fixing bracket and door. Item 5 description changed fixings now M3.5 x 8 c/s taptites.
/105 and /106 changed to use an M5 tag for use on the earth lead.
/300 item 1 red lens changed to Clear lens with mask.
/301 and /302 deleted. All enhanced LED optics to become clear masked.
Update of Side Mount & AGD Brackets - /058.
All lens which have screened masks applied e.g. Ped Red Man changed from /2/ to /1/ (for clarification only)
Added /107, /108, /109, /120 and /121 LED arrays
Added /110 LED PSU Sub Assembly
Added /310 LED lens retaining ring
Added /401 and /409 Amber man Lamp and LED lens

Added /405, /406, /407, /408 LED lens for Red Man, Green Man, Amber Cycle and Green Cycle.
Removed item 18 from /104
Updated /024, /047, /048 and /049 – added notes to ident PSU/PCB leads for LED
Added /060 Equestrian Mask with Matt Black finish
Updated /034 and /035 item 4 and /039 item 2 arrow mask – matt black finish
/023 – added note to remove transformer if using as an LED aspect – item 4

Issue 4 – ANL02836
Updated to match MAPS.
PED Hood added /061
AGD only pole mounting kit added /130
Laser Label added to /107,/108,/109,/120, and /121

Issue 5 – ANL03041
LED PSU SUB Assembly (var 110) updated to increase length of protective strip to prevent chafing of mains wires.

Issue 6 - ANL03059
Document Obsolete – replaced by 667/5/30200/ETC

2.1.2 667/5/30200/ETC – Helios Signal Head BOM's

Issue 1 – Draft issue used as a demonstration for John Williams Mouldings.
Issue 2 – ANL03059 - First Issue – makes document 667/1/30200/ETC obsolete.
Issue 3 – ANL03093 – First Issue to John Williams – no changes to issue 2
Issue 4 – ANL03383 - Update to include lens kits, green arrow doors and inclusion of shake proof washers on side-mounted aspects.
Issue 5 – TS001285 – Various minor changes
Issue 6 – ANL03704 – Added Equestrian Options
Issue 7 – TS001610 – Added Bus Lens and Reg Sign (Except Buses and Cycles)
Issue 8 – TS001741 – Added Reg Sign (Except Buses, Taxis and Cycles)
Issue 9 – TS002410 – Added Reg Sign (Except Service Vehicles)

2.1.3 667/1/30198/001 – Red LED PCB Assembly

Issue K – Issue for equipment experience at Portsmouth
Issue 1 – ANL02884 – First release
Issue 2 – ANL02205 – Development update
Issue 3 – ANL03006 - Resistor change and ensure link not fitted to board
Issue 4 – ANL02211 – /CH/ mod for RLM on T400 and T500 on issue 3 PCB
Issue 5 – ANL02213 – Update to PCB artwork for RLM on T400 and T500
Issue 6 – ANL03255 – Update parts list
Issue 7 – ANL03309 – Change Varister value
Issue 8 – ANL03327 – Part varnish PCB
Issue 9 – ANL03569 – Transistor Insulation Kit change (number of items used)

2.1.4 667/1/30198/002 – Amber LED PCB Assembly

Issue J – Issue for equipment experience at Portsmouth

Issue 1 – ANL02884 – First release
Issue 2 – ANL02205 - Development update
Issue 3 – ANL03006 – Resistor change and ensure link not fitted to board
Issue 4 - ANL02213 - Update to PCB artwork for RLM on T400 and T500
Issue 5 – ANL03255 – Update parts list
Issue 6 – ANL03309 – Change Varister value
Issue 7 – ANL03327 – Part varnish PCB
Issue 8 – ANL03569 – Transistor Insulation Kit change (number of items used)

2.1.5 667/1/30198/003 – Green LED PCB Assembly

Issue K – Issue for equipment experience at Portsmouth
Issue 1 – ANL02884 – First release
Issue 2 – ANL02205 - Development update
Issue 3 – ANL03006 - Resistor change and ensure link not fitted to board
Issue 4 - ANL02213 - Update to PCB artwork for RLM on T400 and T500
Issue 5 – ANL03255 – Update parts list
Issue 6 – ANL03309 – Change Varister value
Issue 7 – ANL03327 – Part varnish PCB
Issue 8 – ANL03569 – Transistor Insulation Kit change (number of items used)

2.1.6 667/1/30198/004 – Ahead Green Arrow LED PCB Assembly

Issue 1 – ANL02836 – First Release
Issue 2 – ANL02995 – Incorrect description on MAPS
Issue 3 – ANL03022 - Change LED colour
Issue 4 – ANL02213 - Update to PCB artwork for RLM on T400 and T500
Issue 5 – ANL03255 – Update parts list
Issue 6 – ANL03309 – Change Varister value
Issue 7 – ANL03327 – Part varnish PCB
Issue 8 – ANL03569 – Transistor Insulation Kit change (number of items used)

2.1.7 667/1/30198/005 – L/R Green Arrow LED PCB Assembly

Issue 1 – ANL02836 – First Release
Issue 2 – ANL02995 - Incorrect description on MAPS
Issue 3 – ANL03022 - Change LED colour
Issue 4 - ANL02213 - Update to PCB artwork for RLM on T400 and T500
Issue 5 – ANL03255 – Update parts list
Issue 6 – ANL03309 – Change Varister value
Issue 7 – ANL03327 – Part varnish PCB
Issue 8 – ANL03569 – Transistor Insulation Kit change (number of items used)

2.1.8 667/1/27871/001 – PSU/PCB Cableform for LED Aspects

Issue E - Issue for equipment experience at Portsmouth
Issue 1 – ANL02833 – First release
Issue 2 – ANL02961 – Change current monitor resistor to an inductor

Issue 3 – ANL03059 – Reference to 667/1/30200/ETC replaced with reference to 667/5/30200/ETC
Issue 4 – ANL03155 – Allow manufacture at Poole and not at John Williams

2.1.9 605/4/08672/000 – LED PSU

Issue 1 – FOUR1269 - Initial release
Manufacturer initial release – RD
Manufacturer issue 2 – RD1
Manufacturer issue 3 – RD2
Issue 2 – TS002557 – Add conformal coating to PSU

2.1.10 667/1/30321/001 – Red LED (NLM) PCB Assembly

Issue 1 – ANL03343 – First Release
Issue 2 – ANL03544 – Resistor value changes
Issue 3 – ANL03569 – Transistor Insulation Kit change (number of items used)
Issue 4 – ANL03731 – Varnish of PCB

2.1.11 667/1/30321/002 – Amber LED (NLM) PCB Assembly

Issue 1 – ANL03343 – First Release
Issue 2 – ANL03544 – Resistor value changes
Issue 3 – ANL03569 – Transistor Insulation Kit change (number of items used)
Issue 4 – ANL03731 – Varnish of PCB

2.1.12 667/1/30321/003 – Green LED (NLM) PCB Assembly

Issue 1 – ANL03343 – First Release
Issue 2 – ANL03544 – Resistor value changes
Issue 3 – ANL03569 – Transistor Insulation Kit change (number of items used)
Issue 4 – ANL03731 – Varnish of PCB

2.1.13 667/1/30321/004 – Ahead Green Arrow LED (NLM) PCB Assembly

Issue 1 – ANL03343 – First Release
Issue 2 – ANL03544 – Resistor value changes
Issue 3 – ANL03569 – Transistor Insulation Kit change (number of items used)
Issue 4 – ANL03731 – Varnish of PCB

2.1.14 667/1/30321/005 – L/R Green Arrow LED (NLM) PCB Assembly

Issue 1 – ANL03343 – First Release
Issue 2 – ANL03544 – Resistor value changes
Issue 3 – ANL03569 – Transistor Insulation Kit change (number of items used)
Issue 4 – ANL03731 – Varnish of PCB

2.1.15 667/7/30632/000 – Helios LED (NLM) Transformer (Twin Output)

Issue 1 – ANL03127 – First Release.
Issue 2 – ANL03242 – Extend lead length from 2mtr to 4mtr.

2.1.16 667/7/28584/100 – CLS Unit Red

Issue 1 – TS002373 – First release

2.1.17 667/7/28584/101 – CLS Unit Amber

Issue 1 – TS002373 – First release

2.1.18 667/7/28584/102 – CLS Unit Green

Issue 1 – TS002373 – First release

2.1.19 667/1/31180/230R – LMF Assembly 230v Red

Issue 1 – TS002147 – Initial release
Issue 2 – TS002465 – Change of fixing screw type
Issue 3 – TS002516 – Change PCB fixing screw

2.1.20 667/1/31180/230AG – LMF Assembly 230v Amber/Green

Issue 1 – TS002147 – Initial release
Issue 2 – TS002465 – Change of fixing screw type
Issue 3 – TS002516 – Change PCB fixing screw

2.1.21 667/1/31180/230SP – LMF Spares Kit (Red LMF + Conversion Kit)

Issue 1 – TS002558 – Initial release

2.2 KNOWN PROBLEMS, RESTRICTIONS AND FUTURE ENHANCEMENTS

2.2.1 ENHANCED OPTICS

Early enhanced optic signal heads can create distortion at the centre of the lens with the resulting distortion of the light output at the centre of the lens. If this occurs, the lens and the enhanced optics reflector (667/2/30056/200) must be changed and replaced with the new reflector produced of a ‘black’ material.

Early enhanced optic lens can have the silk screen misaligned, with the result that ‘shadowing’ occurs around the edges or in quadrants of the lens. These lens have to be replaced. To overcome this problem a new lens silk screen has been produced.

The halogen lamps (517/4/92787/000) fitted to the enhanced optics aspects have to be fitted with their filament vertical to the lamp holder. A misalignment of greater than 3 mm from the vertical can cause ‘shadowing’ at the lens.

(Note – ‘shadowing’ can occur in quadrants of the lens or around the edges of the whole lens.)

2.2.2 LED

PSU (667/1/30200/110) should be identified by a Red and Yellow Spot on its case. All other PSUs not identified with a Red and Yellow spot should be returned to Poole for upgrade.

PCBs 667/1/30198/001, /002, /003, /004 and /005 should have resistor R134 and R166 fitted as a 470ohm 5% 50 Watt (e.g. RTO 50 F 470 5% markings). If the resistor is of lower wattage the PCB should be returned to Poole for upgrade.

2.2.3 LED (NLM)

No known problems

2.2.4 CLS with LMF

No known problems

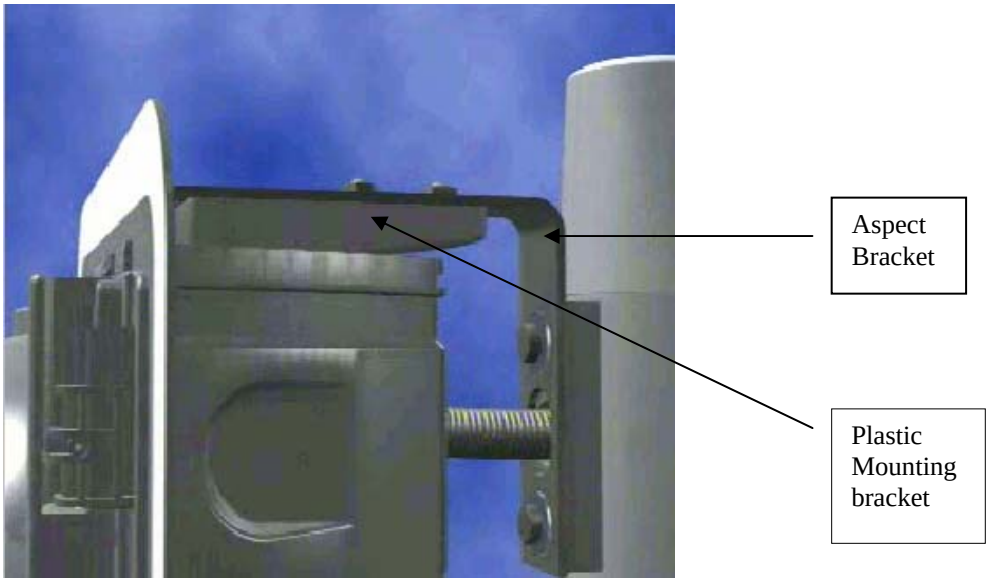
2.2.5 CLS (NLM)

No known problems

2.3 COMPATIBILITY

2.3.1 BOTH ENHANCED OPTICS AND LED

Early 1 aspect, 2 aspect and 3 aspect brackets were made of 5mm material and along with the 4 aspect mounting bracket had an 18mm slot for connecting to the plastic head mounting brackets (667/2/30052/003). Later 1 aspect, 2 aspect and 3 aspect brackets were made of 6mm material and the slot for connecting to the plastic head mounting brackets was reduced to 11mm for the 1, 2, 3 and 4 aspect brackets. Along with this change the plastic mounting brackets were changed. If an original bracket requires changing, then both the aspect bracket and the plastic mounting bracket need changing.



Top Aspect and Plastic Mounting Brackets

Early door clips (667/2/30054/000) were difficult to open and slide. Dry lubricant was sprayed on to the clip sliding area to overcome this problem. These clips have now been modified and the lubricant is no longer required.

2.3.2 ENHANCED OPTICS ONLY

The enhanced optics reflector (667/2/30056/200) is now made of a 'black' material. Earlier lenses were made of a 'light' coloured material and many were fitted with a black metal ring. This black metal ring was inserted to reduce the heat generated at the centre of the lens. If a 'light' coloured reflector has no black metal ring inserted, the reflector should be replaced if evidence of lens distortion is apparent.

2.3.3 LED ONLY

If using issue 2 software – use issue 1 of PSU/PCB cableform (667/1/27871/001)
If using issue 3 or higher software – use issue 3 of PSU/PCB cableform (667/1/27871/001)

2.3.4 LED (NLM)

LED (NLM) Signals Heads should NOT be used where lamp monitoring is required.
LED and LED (NLM) PCBs are NOT interchangeable.
LED (NLM) Signals Aspects should NOT be used for Pelican, Puffin, Toucan or at intersections with part-time or Pedestrian facilities where Red Lamp Monitoring is required for that Aspect.
LED (NLM) Signal aspects should NOT be used at sites having enforcement cameras fitted.
LED (NLM) Signal aspects should NOT be used in conjunction with Helios Enhanced Optics or Helios LED in the same Signal Head.

2.3.5 CLS with LMF

CLS with LMF aspects are an instantaneous switch on/off and do not present the same visual display of the Helios Enhanced Optics or Helios LED signal aspects, hence CLS with LMF Signal aspects should NOT be used in conjunction with Helios Enhanced Optics or Helios LED in the same Signal Head.

2.3.6 CLS (NLM)

CLS (NLM) Signals Heads should NOT be used where lamp monitoring is required.
CLS (NLM) Signals Aspects should NOT be used for Pelican, Puffin, Toucan or at intersections with part-time or Pedestrian facilities where Red Lamp Monitoring is required for that Aspect.
CLS (NLM) Signal aspects should NOT be used at sites having enforcement cameras fitted.
CLS (NLM) aspects are an instantaneous switch on/off and do not present the same visual display of the Helios Enhanced Optics or Helios LED signal aspects, hence CLS (NLM) Signal aspects should NOT be used in conjunction with Helios Enhanced Optics or Helios LED in the same Signal Head.

3. HELIOS L.E.D. SOFTWARE DESCRIPTIONS

3.1 SUMMARY OF SOFTWARE ISSUES

3.1.1 ISSUE 1

Issue 1 firmware should not be used in any LED Signal.

3.1.2 ISSUE 2

FIRST DELIVERY TO PORTSMOUTH FOR ON STREET EXPERIENCE

Power Supply - The software requires a dummy load of a 100 ohm resistor.

3.1.3 ISSUE 3

Power Supply - The 100Ω dummy load resistor has been replaced by a torroid.

3.1.4 ISSUE 4

This allows the LED Signal to be used on T400 and T500 Pelicans.

3.1.5 ISSUE 5

Note that issue 5 was never released to production. However, the changes listed here are available in issue 6 onwards.

Further updates to enable LED Signals to be used on T400 and T500 Pelicans.

The firmware flashes the Heartbeat LED a number of times to identify the firmware issue. For example, issue 5.0 firmware flashes the heartbeat LED five times before pausing.

3.1.6 ISSUE 6

Note that issue 6 was never released to production.
This issue correct failures that when a green LED Signal is cold it draws less current, but soon returns to the correct level as the signal warms.

This issue increases the resilience of the LED Signal to external factors such as mains breaks, temperature and condensation.

3.1.7 ISSUE 7

Note that issue 7 was never released to production.
Further modifications were actioned to correct failures when green aspects are cold and to make the LED Signal more resilient to mains breaks.

3.1.8 ISSUE 8

Several ST800 controllers have reported a small number RLM faults on phase A when Helios LED Signals are fitted and the signals themselves have not failed.

4. HELIOS CLS LMF SOFTWARE DESCRIPTION

4.1 SUMMARY OF SOFTWARE ISSUES

4.1.1 ISSUE 1 – 8

Development issues

4.1.2 ISSUE 9

TS002459 – Initial release

5. SOFTWARE (L.E.D.) COMPATIBILITY PROBLEMS

As well as identifying compatibility concerns between different firmware and board issues, this section is also used to identify the compatibility concerns between the LED signal and traffic controller lamp monitoring equipment.

Tests have shown that the LED signal is compatible with the following equipment:

Equipment	Compatible?	Comments
ST800 Controller	Yes	System tests used on-board sensors.
ST700 Controller	Yes	System tests used on-board and 'black' external sensors.
T400 Intersection	Yes	Lamp monitored by freestanding OTU.
T400 Pelican	Yes	Use LED firmware Issue 4 onwards. On PB322 sites use Controller Firmware PB322 issue 10 or higher
T500 Pelican	Yes	Use LED firmware Issue 4 onwards
3U OMU	Yes	System tests used 'black' external sensors.
TC12 OTU	Yes	System tests used 'black' torroids.
T110 Pelican	Yes	See 'Restrictions'
T400 Integral LMU	Yes	Tested during changes for Issue 4.
TCSU/TfL IMU	Yes	Tested during changes for Issue 4.

NOTE – The firmware issue number is written onto the PCB (on both sides) in indelible ink

5.1.1 ISSUE 1

Issue 1 firmware must not be used in any L.E.D. Signal..

5.1.2 ISSUE 2

There are no compatibility problems with this issue of firmware. NB: issue 2 firmware functions with a 100Ω resistor in series with the power supply.

5.1.3 ISSUE 3

Issue 3 firmware is designed to work with a torroid in series with the power supply and thus aims for a much lower dummy load level.

5.1.4 ISSUE 4

Issue 4 firmware is designed to work on T400 and T500 Pedestrian Controllers. It has no known compatibility problems.

5.1.5 ISSUE 5

Has no known compatibility problems.

5.1.6 ISSUE 6

Has no known compatibility problems.

5.1.7 ISSUE 7

Has no known compatibility problems.

5.1.8 ISSUE 8

Has no known compatibility problems.

5.2 KNOWN PROBLEMS

This section lists all the known problems identified with the LED signal.

LED-09 - PSU Hold-up during Dim Flashing

When the traffic signal is flashing, normally the PSU holds-up the DC supplies during the ‘off’ period so that the software is ready to illuminate the LED’s as soon as the mains supply returns. However, if the supply is dimmed to around 160 volts, then the power supply does not quite hold up long enough and there is an obvious delay in the LED signal starting the ‘on’ period.

If a flashing sequence is lamp monitored (export sequence only) then lamp faults maybe reported.

5.3 RESTRICTIONS

Restrictions are defined with each firmware issue compatibility.

T400 Pedestrian Controllers – these controllers need to be fitted with PB322 issue 10 or higher along with RED LED PCB’s at issue 4 or higher. Invalid RLM faults could be experienced if the identified firmware is not fitted. (Note that T400 Pedestrian controllers fitted with firmware PB321 or PB 320 are not affected but still require issue 4 or higher RED LED PCBs in signal aspects)

T110 Pelican restriction – **do not** fit one green LED aspect only to either the vehicle green or pedestrian green drive or else the T110 may erroneously report a green conflict/correspondence fault. As long as two or more LED or normal lamp aspects are fitted (in any combination) the T110 Pelican should function correctly. (Note the Red Aspect must have issue 4 or later software fitted, Amber and Green Aspects must have issue 3 or later software.)

6. SOFTWARE (CLS – LMF) COMPATIBILITY PROBLEMS

As well as identifying compatibility concerns between different firmware and board issues, this section is also used to identify the compatibility concerns between the CLS with LMF signal and traffic controller lamp monitoring equipment.

Tests have shown that the CLS with LMF signal is compatible with the following equipment:

Equipment	Compatible ?	Comments
ST800 Controller	**Yes**	
ST700 Controller	**Yes**	
T400 Intersection	-	See “T400 Integral LMU” below
T400 Pelican	**Yes**	2 Phase Driver Card (667/1/20225/000) needs to be issue 11 or greater
T500 Pelican	**Yes**	
Gemini / 3U OMU	**Yes**	
5U OMU	**Yes**	
TC12 F/S OTU	**Yes**	
T400 Integral LMU	TBD	Based on TC12 OTU so should work
TCSU/TfL IMU	TBD	Based on TC12 OTU so should work

6.1.1 ISSUE 9

This is the first production release. All previous issues have been during development. No compatibility problems.

6.2 KNOWN PROBLEMS

This section lists all the known problems identified with the CLS with LMF signal.

Mantis 0000524 – CLS bright current new 25watt level at about 180v.

6.3 RESTRICTIONS

Restrictions are defined with each firmware issue compatibility.

T400 Pedestrian Controllers – these controllers need to be fitted with PB322 issue 11 . Invalid RLM faults could be experienced if the identified firmware is not fitted. (Note that T400 Pedestrian controllers fitted with firmware PB321 or PB 320 are not affected).

T400 Pedestrian Controllers – these controllers need to be fitted with Lamp Driver cards (667/1/20225/000) issue 11 or later.

T110 Pelican restriction – **do not** fit one green CLS with LMF aspect only to either the vehicle green or pedestrian green drive or else the T110 may erroneously report a green conflict/correspondence fault. As long as two or more CLS with LMF or normal lamp aspects are fitted (in any combination) the T110 Pelican should function correctly.