

Secret Sign Installation Handbook

667/HB/52570/100

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1 HEALTH AND SAFETY

HIGH-BRIGHTNESS LEDS - USE EYE PROTECTION

DO NOT CONNECT ELV SECRET SIGN TO 230VAC

HIGH VOLTAGES PRESENT AT SECRET SIGN ACTIVE LENS

SHOCK RISK WHEN POWERED

There is a shock hazard at the lens as the driving voltage is greater than 110Vac. There is also dazzle hazard when the sign door is opened (internal LED illumination).

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3 REVISION HISTORY

Revision Number	Date	Change Note	Description
A	30/09/2016	-----	First draft
B	01/10/2016	-----	Add new variants.
1	05/10/2016	-----	Released
2	20/10/2016	M300 Release	Final review.

4 GLOSSARY

Abbreviation	Meaning
INVERTER	Secret Sign Lens Inverter
SS	Secret Sign
ITS	Siemens Mobility, Intelligent Traffic Solutions

5 RELATED DOCUMENTS

Siemens Part No.	Description
667/HB/30000/000	Helios General Handbook
667/GA/52570/ETC	Helios Secret Sign General Assembly

5.1 PRODUCT IDENTIFICATION

Siemens Part No.	Description
667/1/52570/ETC	Helios Secret Sign Door
667/1/52581/ETC	Helios Secret Sign Box
667/1/52579/ETC	Helios Secret Sign Power Supply

6 PRODUCT OVERVIEW

The “Secret Sign” or “Secret Regulatory Sign” is a switched sign with the additional benefit of being obscured when extinguished. It is used to implement timed restrictions on vehicle

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movements; provide indication of weekly temporary road closures, one-way systems, right hand turn restrictions, etc. .

7 GENERAL DESCRIPTION

The “Secret Sign” consists of a High Brightness Helios LED Regulatory Sign with an additional lens fitted to the door. An inverter module is required for this additional lens which is mounted outside of the box sign, placed within a convenient adjacent aspect box.

The Secret Lens is an electronically controlled material which may be switched from almost clear to white. In the white (off) state it obscures the regulatory sign.

Figure 1 - Product Appearance



Secret Sign - Powered



Secret Sign – Frosted

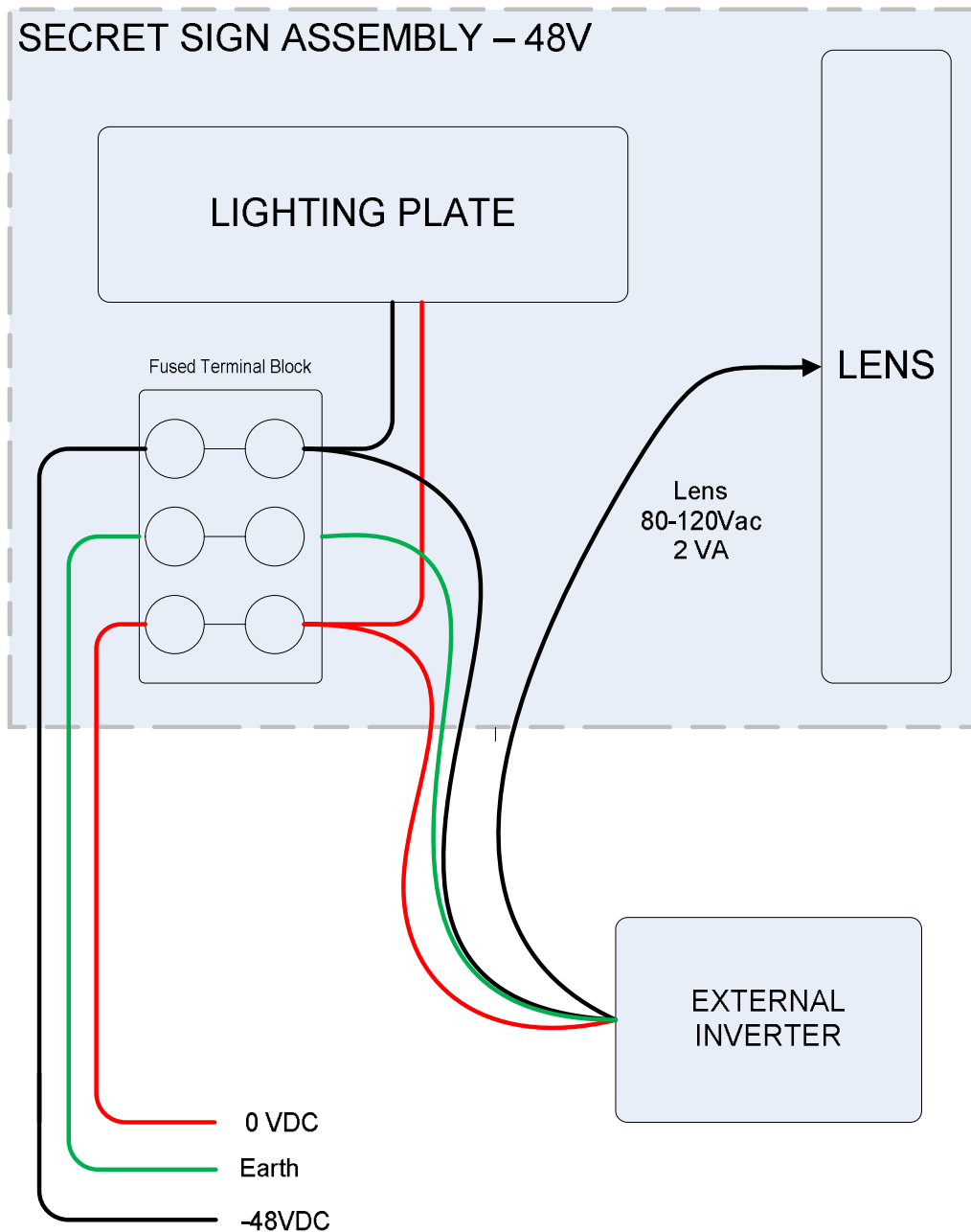
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8 INSTALLATION – COMPLETE UNIT

(Refer also to the Helios General Handbook 667/HB/30000/000)

These instructions apply to a complete Secret Sign Assembly and Inverter

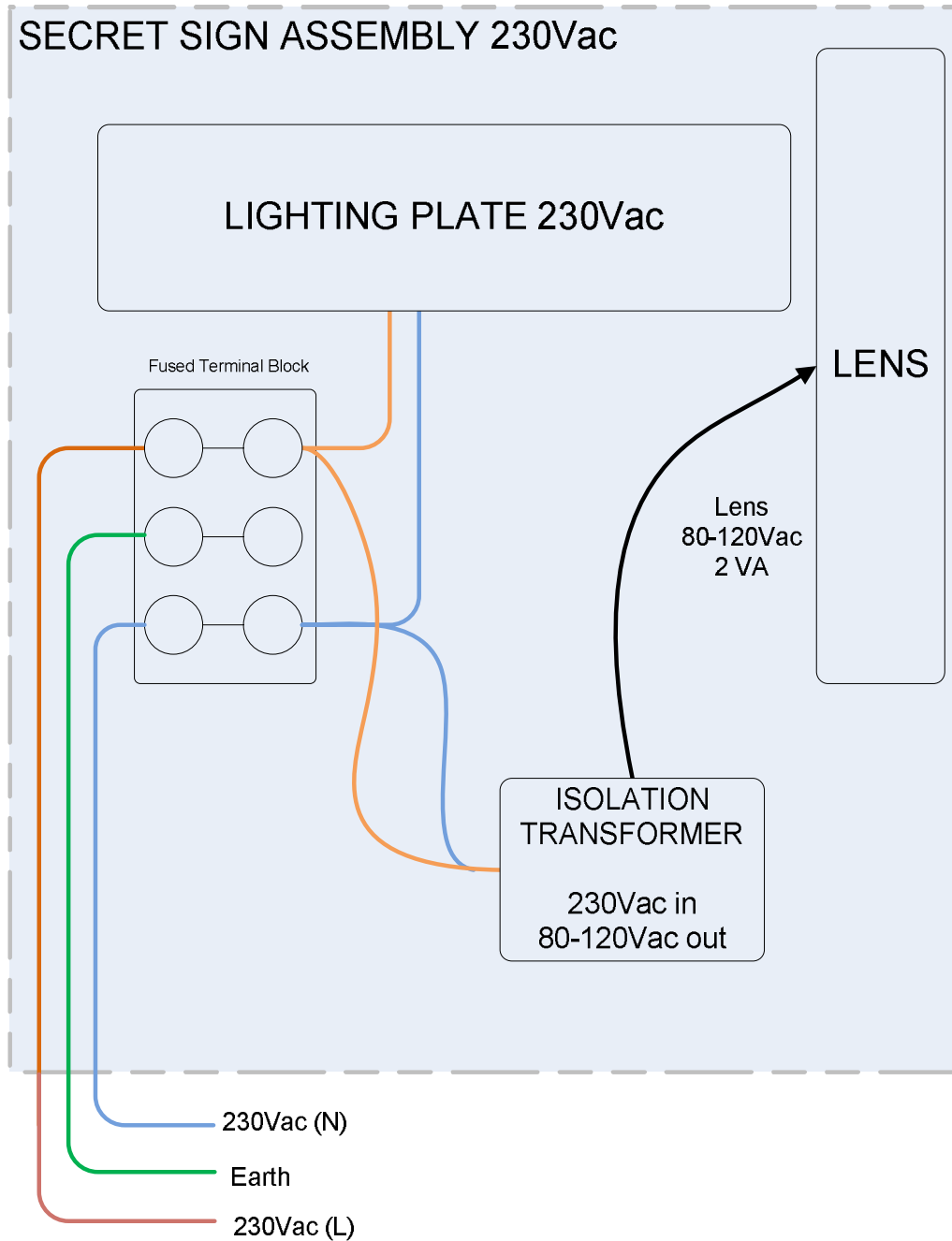
Figure 2 - Block diagram (wiring) – ELV Secret Sign



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Figure 3 - Block diagram (wiring) – LV Secret Sign

The LV variant contains everything within a single Helios enclosure.



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8.1 CABLING AND CONNECTIONS

The secret sign is supplied as three main components:-

- A secret sign Lens door assembly
- A high-brightness LED regulatory sign plate & box
- An inverter module for ELV installations
- A transformer for LV installations (160Vac dimming only)

The door assembly is supplied with an active lens with two black wires attached. The lens requires a nominal supply voltage of 80Vac 50Hz and so cannot be directly attached to either a 48VDC ELV system or an LV 230Vac system. It is supplied with power by an inverter (48V input) or a small step-down transformer (LV installations). The inverter or transformer is mounted in the base of an adjacent Helios enclosure (e.g. green aspect).

The door assembly lens cable is fitted with male bullet crimps of type 703/4/10211/003 ready for connection to the output of the inverter (ELV installations) or a small transformer (LV installations).

8.2 UPGRADE INSTRUCTIONS

Please refer to the upgrade instructions first if installing an upgrade kit to a standard Helios regulatory sign. A High Brightness LED Regulatory Sign Plate will need to be installed in the box. **Section 13 Upgrading a Regulatory Sign** describes how to upgrade an existing regulatory sign.

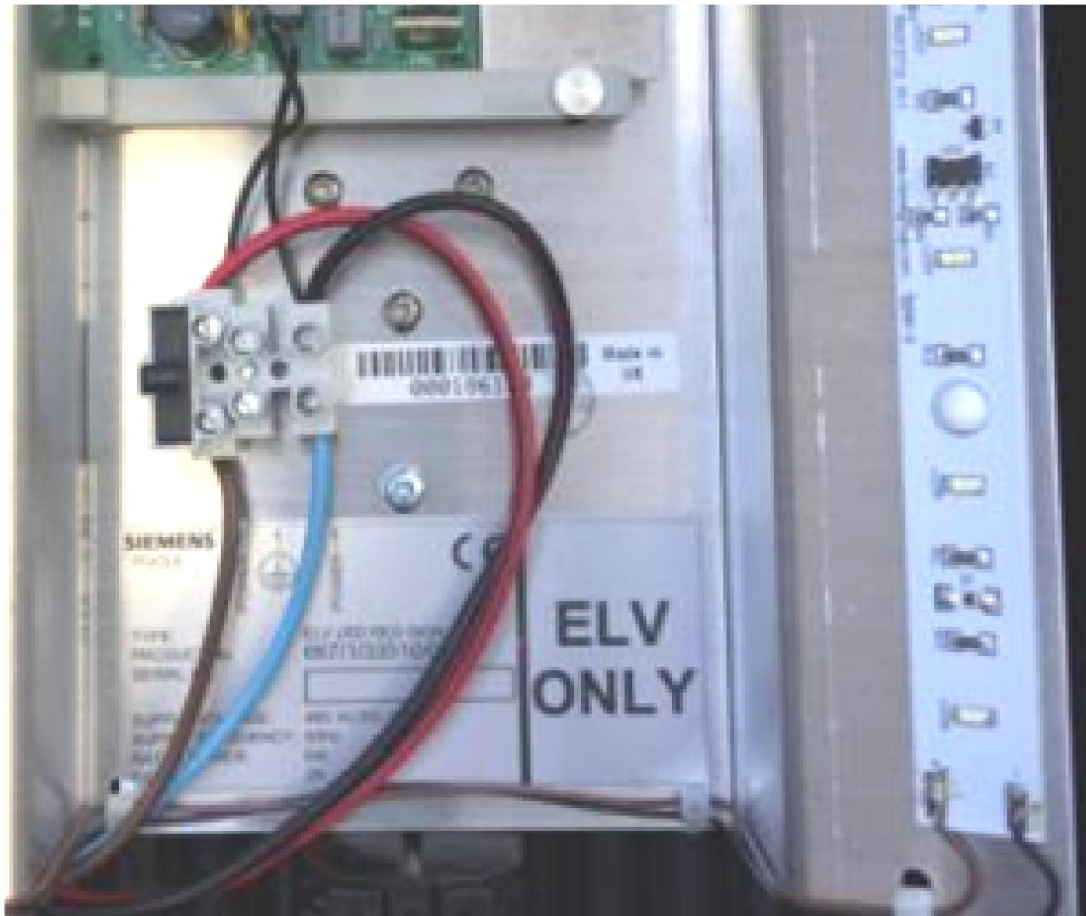
8.3 ELV INSTALLATION ONLY (48V)

THESE INSTRUCTIONS APPLY TO THE ELV SECRET SIGN

Place the inverter in the bottom of an immediately adjacent aspect and run the wires of the inverter back into the Secret Sign Box. The output of the inverter is fitted with female crimps to allow connection to the secret lens cable (see table below for cable colour codes). The power input to the inverter should be connected to the fused output of the ELV Regulatory Sign – see Figure 4.

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Figure 4 - Photo of Inverter Power Connections at Regulatory Sign



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Figure 5- Photograph of inverter



Table 1 - Inverter Cable Colour Codes

Cable Colour	Purpose	Circuit
Red	0 VDC input	From inverter to positive connection of terminal block of LED regulatory sign plate.
Black	-48 VDC input	From inverter to negative connection of terminal block of LED regulatory sign plate.
Green/Yellow	Earth	Protective earth for the case of inverter.
Twin cable blue	80Vac output	From inverter output to lens (female bullet connector)
Twin cable brown	80Vac output	From inverter output to lens (female bullet connector)

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Figure 6 - Installation of Inverter Bracket

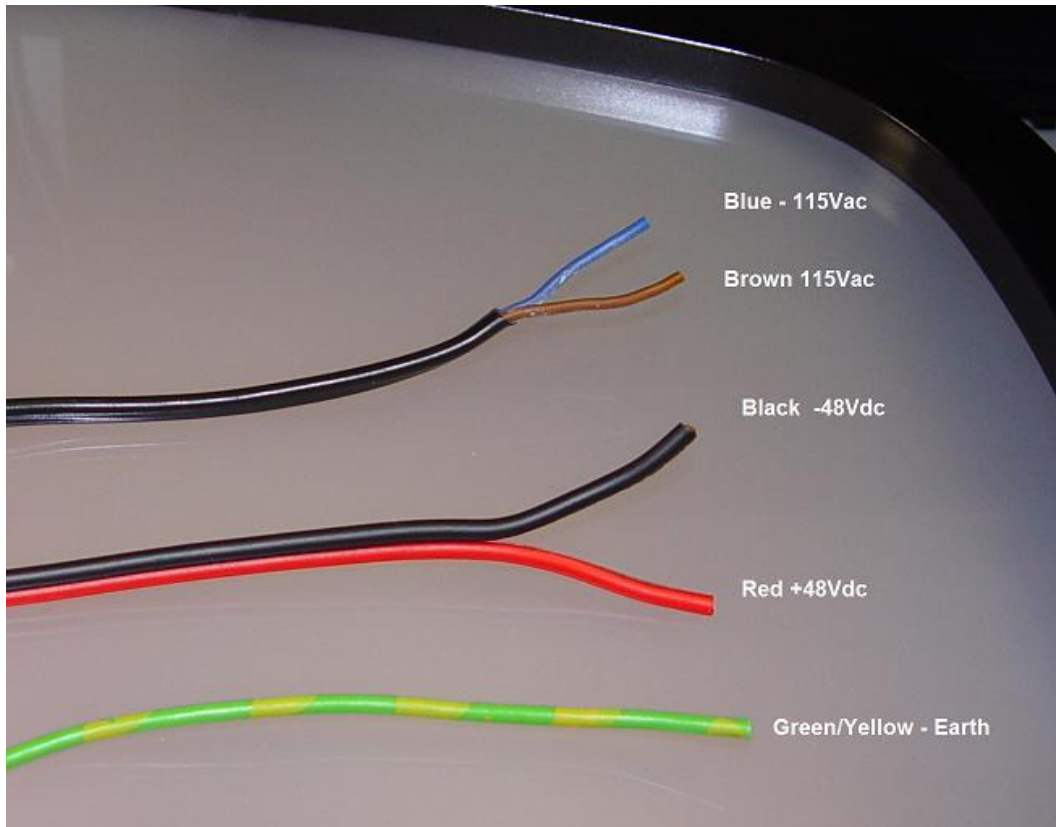


- The inverter is secured at the bottom of the enclosure with a "Z" shaped bracket , screws and washers (supplied) utilizing the fixing points at the rear of the Helios enclosure.
- When fitted correctly, there is sufficient clearance between the inverter and the door for a CLS aspect.
- The cables from the inverter should exit at the rear and be fed between the gap at the rear of the plate and the rear of the box.
- Cables should be fed into the adjacent Secret Sign / Regulatory Sign box (on the left in photo)
- Inverter and bracket part number can be found in section 19 - Ordering & Parts

The cables are supplied attached to the inverter. These are identified in the figure below. Attach crimps as detailed in this document.

Figure 7 - Cable colour codes of Inverter

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Note the opal appearance of the Secret Sign lens in the obscured (off) state.

9 TRAFFIC CONTROLLER COMPATABILITY

The Secret Sign is controlled as a switched sign. It is compatible with dimming supply voltages so may be controlled directly from a switched sign output.

9.1 DIMMED OPERATION

The Secret Sign is suitable for operation in a system supporting lamp dimming and may be driven from a RAG output from the controller.

10 SAFETY CONSIDERATIONS

10.1 HIGH DRIVE VOLTAGE TO SECRET SIGN LENS

The voltage between the lens power supply and the front lens is typically 100Vac which exceeds the 50Vac limit for a pure ELV system. The Secret Sign aspect is therefore classed as an LV system component for this reason. Servicing of the lens assembly is only to be carried out with the sign unpowered.

SAFETY WARNING – ELECTRICAL SHOCK RISK AT LENS ASSEMBLY

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11 SAFETY CONSIDERATIONS – LED PLATE

The installation should include an earth connection to the input of the regulatory sign plate (centre connection of terminal block) to ensure compliance with EN60950-1:2006 when the sign door is open (being serviced).

The LED plate is of high brightness and presents an optical hazard. Ensure the sign is off and remove the LED plate fuse while servicing the sign.

12 SYSTEM CONSIDERATIONS – SAFETY

The Secret Sign is not to be used as part of a failsafe safety system.

12.1.1 Failure to Illuminate

The traffic installation should be designed so that a failure of the secret sign to illuminate does not result in a danger to traffic or pedestrians. A failure of power to the Secret Sign will leave it in the obscured state so drivers will be unaware of any driving restriction it should be indicating.

This may result in vehicles performing the turn or manoeuvre normally restricted by the sign.

Example:

if the sign is a no left hand turn, it is recommended that pedestrians are not presented with priority to cross (green man) based only on the turning restriction.

12.1.2 Failure to Extinguish

The traffic installation should be designed so that a failure of the secret sign to extinguish does not result in a danger to traffic or pedestrians. A failure to extinguish is very unlikely but can occur under short circuit cable fault conditions, or open circuit common return conditions.

Example:

If the secret sign is used to indicate a temporary road closure (no entry), and it is not extinguished at the end of the restriction period, then it may result in traffic confusion as drivers turn into a road which is then indicated as closed (no entry).

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13 UPGRADING A REGULATORY SIGN

There are three separate items required for upgrading an existing regulatory sign. The lighting plate will need to be replaced with a high brightness LED regulatory sign plate, the door will need to be replaced with the appropriate secret sign door, and a power source for the secret lens will need to be installed in an adjacent green aspect.

13.1 FLUORESCENT & BULB LAMP PLATES

The secret sign lens is not suitable for use with fluorescent or light bulb based signs and these should be replaced with the much more efficient and reliable ELV or LV LED version of the lighting plate.

13.2 ELV REGULATORY SIGN

THESE INSTRUCTIONS APPLY TO THE 48VAC SECRET SIGN

These instructions describe how to upgrade an existing Helios ELV Regulatory Sign.

The Secret Sign Lens requires an operating voltage above 80Vac which is provided by an inverter module. The inverter is normally installed into an adjacent Helios enclosure and is provided with appropriate cables.

The inverter should be installed into the bottom of an adjacent signal aspect box. It is secured in the bottom of the box with the supplied bracket .



The cable to the secret sign lens is supplied with bullet connectors, which allow simple interconnection of the lens and inverter output. The inverter output is fitted with female bullet

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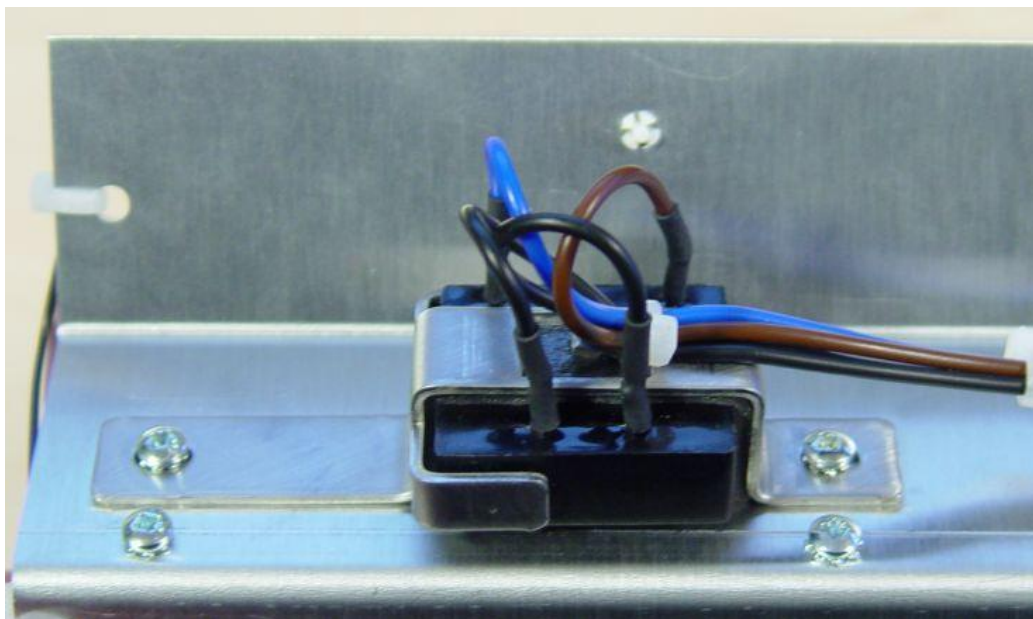
connectors, while the lens is fitted with male bullet connectors. The lens connections are not polarity sensitive – the lens is driven with an a.c. voltage.

13.3 LV LED REGULATORY SIGN

THESE INSTRUCTIONS APPLY TO THE 230VAC SECRET SIGN

The installation is similar to that for the ELV sign, however in this case the inverter is substituted with a small step down transformer which provides an output voltage between 80Vac and 120Vac. The transformer is mounted to the side of the LV LED plate, instead of being placed into an adjacent enclosure. The Secret Sign LV side and inline mounts are supplied with this transformer fitted to the LED plate.

Figure 8 - Lens Transformer



The colour coding for the small transformer cables is shown below:-

Wire Colour	Description
Blue	230V Neutral input.
Brown	230V Live input
Black	1150Vac output to female crimp (supplied with transformer)
Black	115Vac output to female crimp (supplied with transformer)

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The transformer is provided with wires terminated in the appropriate bullet crimps (for the lens), power input leads (live/neutral/earth) which can be connected to the terminal block of the LV LED lighting plate. The transformer is internally protected against short circuits.

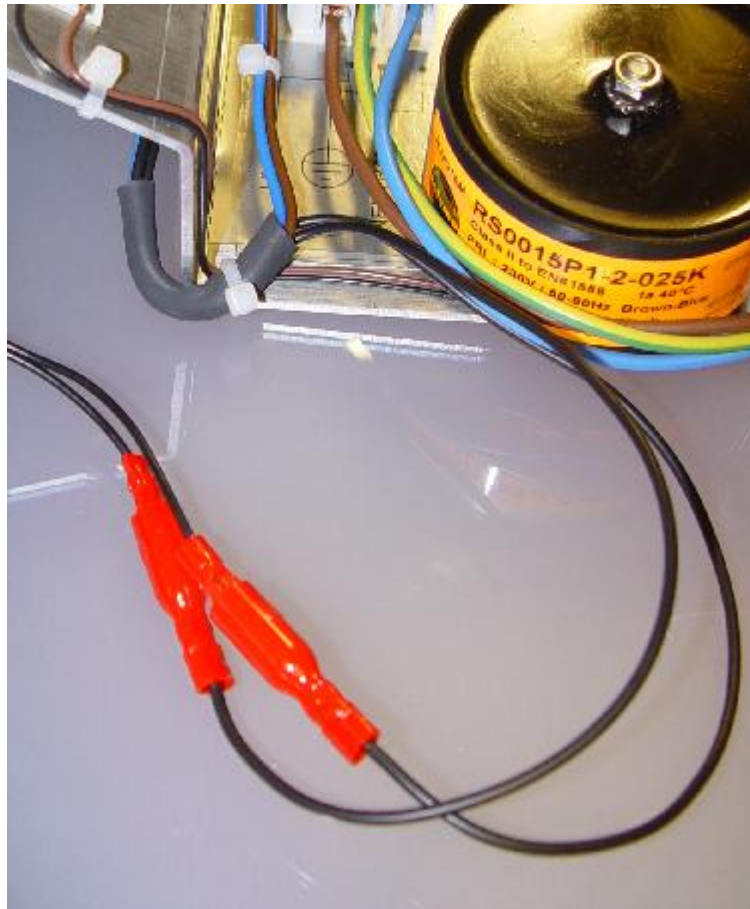


Figure 9 - Output Connections to Lens

13.4 ENHANCED BRIGHTNESS MODIFICATION – LED STRIPS

The Secret Sign Lens attenuates the light from the regulatory sign even in the transparent state.

The standard brightness LED regulatory Sign Plate must be replaced with the high brightness version when used with a secret sign lens.

The standard Siemens LED regulatory sign plate may be modified by applying the modification detailed in 667/CH/33510/500 to the regulatory sign plate 667/1/33510. It is preferable to use the factory modified high brightness plate as described in the spares list, part numbers 667/6/33510/023 (LV 230V) or 667/6/33510/048 (ELV - 48V).

A secret sign supplied as a complete unit (box sign + front lens) will already contain the high brightness LED regulatory sign plate.

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14 LENS ASSEMBLY AND REMOVAL OVERVIEW

14.1 MECHANICAL ASSEMBLY OF THE LENS AND HOLDER

These instructions apply to the application of the lens and holder to a Helios regulatory sign door only. The secret sign lens and holder are supplied assembled to a door which contains the required regulatory sign plate. The assembly is sealed with mastic.

For maintenance purposes, it is possible to remove the front of the lens holder by releasing the clips around the lens retaining ring. The lens is sealed to the assembly with a rubber gasket which must be replaced on re-assembly.

14.2 LENS CABLE ATTACHMENT

The two black wires from the lens feed through two small holes at the edge of the regulatory sign plate and are terminated in male bullet connectors. These plug into the female bullet connectors on the inverter output lead.

15 TEST OF COMPLETED SIGN

Apply power to the regulatory sign aspect and check that the front lens becomes clear. The LED lighting plate should illuminate.

If the lens does not clear check that the inverter (ELV systems) or transformer (LV systems) is providing an output voltage between 80Vac and 120Vac (across female bullet connectors). There is a SHOCK HAZARD so due care and attention is required when taking this measurement.

16 LAMP MONITORING

The Secret Sign may be monitored as a Helios CLS for lamp failure.

The Secret Sign can also be monitored as an LV LED Regulatory Sign if the controller supports the monitoring of regulatory signs (LV installations only).

An ELV Regulatory Sign Extension Kit may be required, part number 667/1/33070/000 – which includes 48Vdc power supply and internal current monitoring transformer which is suitable for connection to an external toroid current monitor input (this solution is suitable for use with LV controllers).

17 ELEXON (UMS) CODE

The existing LED Regulatory Sign Elexon code may be used, as the lens adds negligible power demand and is switched off during certain periods of the day.

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18 MAINTENANCE

18.1 LENS CLEANING – ON - STREET

The outer regulatory sign lens surface and outer secret sign lens surfaces can be cleaned in the same manner as for any regulatory sign signal head.

18.2 LENS CLEANING – INSIDE SURFACES

The inner lens surfaces can only be cleaned after removal of the secret sign door.

Open the regulatory sign door and remove the LED plate fuse. Disconnect the lens cable from the inverter loom then fully remove the door for maintenance.

In a clean working area:-

Remove the Secret Lens outer fixing ring to gain access to the lens inner surfaces. This is secured with plastic tongues around the circumference of the lens retaining ring.

Replacement is the reverse of removal. The fixing ring and gasket may be damaged and need replacement so it is recommended that spares of these parts are obtained prior to removal (refer to section 19 for the part numbers of spares).

Replace the door on the box and re-connect the lens cable. Replace the fuse and check for correct operation of the sign.

18.3 INVERTER (ELV)

Check the fixing screws of the fixing bracket are correctly installed with washers and have been tightened correctly. Check inverter is held securely.

18.4 TRANSFORMER (LV)

Check the fixing screws of the fixing bracket are correctly installed with washers and have been tightened correctly. Check transformer is held securely.

18.5 LENS CABLE

Ensure the bullet crimp connectors are free of corrosion and securely fitted.

Bullet connectors showing signs of water damage should be replaced, as this may result in early failure of the cable loom.

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19 ORDERING & PARTS

The following part numbers are applicable to the Secret Sign

First decide if you are performing an LV installation or ELV installation and order the appropriate power supply solution for each sign:-

System Type	Part Number	Description (SECRET SIGN POWER SUPPLY)
ELV	667/1/52579/048	SECRET SIGN POWER SUPPLY ASSY-ELV
LV	not required	This is integral to 667/6/33510/023

Then select the appropriate sign assembly :-

System Type	Part Number	Description
LV or ELV	667/1/52570/001	SS + NO RIGHT TURN
LV or ELV	667/1/52570/002	SS + NO LEFT TURN
LV or ELV	667/1/52570/004	SS + MAND ARROW
LV or ELV	667/1/52570/005	SS + NO U-TURN
LV or ELV	667/1/52570/006	SS + NO ENTRY
LV or ELV	667/1/52570/007	SS + CYC ROUTE
LV or ELV	667/1/52570/014	SS + BUS,CYC ROUTE
LV or ELV	667/1/52570/015	SS + NO UTURN EXP ONLY
LV or ELV	667/1/52570/017	SS + BUS + CYCLE
LV or ELV	667/1/52570/018	SS + BUS, CYC, TAXI
LV or ELV	667/1/52570/019	SS + EXCPT SER VEH
LV or ELV	667/1/52570/020	SS + BUS ROUTE
LV or ELV	667/1/52570/021	SS + MOB SCOOTERS
LV or ELV	667/1/52570/023	SS + BUS + TAXI
LV or ELV	667/1/52570/024	SS + EXCPT BUS
LV or ELV	667/1/52570/025	SS + EXCPT CYCLE
LV or ELV	667/1/52570/026	SS + EXCPT LCL BUS
LV or ELV	667/1/52570/027	SS + LCL BUS + CYC
LV or ELV	667/1/52570/028	SS + LCL BUS + TAXI
LV or ELV	667/1/52570/029	SS + EXPT IN 2STAGES
LV or ELV	667/1/52570/030	SS + EXPT PERMTD VEH

add the appropriate mounting box:-

System Type ¹	Part Number	Description
ELV	667/6/52582/807	SIDE MOUNT SECRET SIGN ASSEM
ELV	667/6/52582/808	INLINE MOUNT SECRET SIGN ASSEM
LV	667/6/52583/807	SIDE MOUNT SECRET SIGN ASSEM - LV
LV	667/6/52583/808	INLINE MOUNT SECRET SIGN ASSEM - LV

¹ The mounting box assembly includes the appropriate lighting plate but not the inverter for the ELV version.

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Spares

Part Number	Description
667/1/52579/048	SECRET SIGN POWER SUPPLY ASSY-ELV
667/1/52580/000	SECRET SIGN BASIC KIT OF PARTS
667/2/52573/001	SECRET SIGN LENS SEAL
667/2/52575/000	SECRET SIGN SWITCHABLE LENS
667/2/52576/000	INVRTR FIX PLATE-SECRET SIGN
667/GA/52570/ETC	SECRET SIGN + LENS GENERAL ASSEMBLY
704/4/10211/007	MALE BULLET CONNECTOR (RED)
704/4/10211/007	FEMALE BULLET CONNECTOR (RED)
667/6/33510/048	HIGH BRIGHTNESS LED REGULATORY SIGN PLATE (ELV)
667/6/33510/023	HIGH BRIGHTNESS LED REGULATORY SIGN PLATE (LV)
667/DZ/52570/ETC	SECRET SIGN FAMILY TREE

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20 DEPOT TEST OF SECRET SIGN

These instructions provide a brief guide to the good/no good testing of a secret sign on the bench. These tests must only be carried out by suitably qualified personnel familiar with the repair, servicing and testing of mains powered equipment.

SAFETY – Ensure a mains rated RCD is used in the power line to the sign.
 Do not modify wiring with power applied.

The sign may be tested with a variable transformer (Variac) or attached to a suitable traffic controller for testing.

20.1 BASIC TEST - ELV

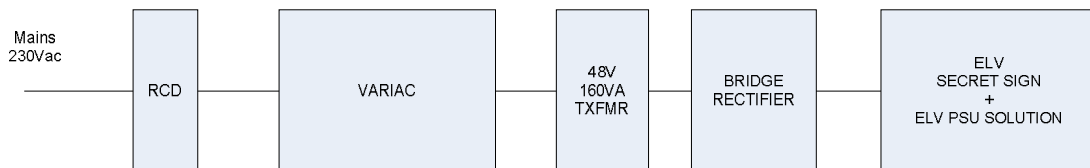
Connect the output of a 48V 160VA transformer to the terminal block of the high brightness LED plate and also to the input of the Handy Inverter. If an ELV controller is available then the sign can be connected to an aspect drive instead.

Connect the output of the Handy inverter (bullet connectors) to the bullet connectors of the secret sign lens.

Apply power to the input of the transformer (230Vac) and check the secret sign lens clears fully, the regulatory sign illuminates.

Apply power to the input of the transformer (140Vac) and check the secret sign lens clears fully, and that the regulatory sign illuminates at the dimmed level.

Switch off and disconnect.

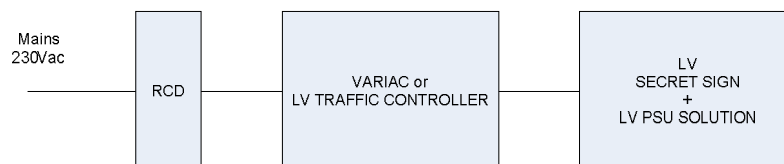


20.2 BASIC TEST – LV

Connect AC mains power from a Variac to the terminal block of the LV high brightness LED plate. Connect the AC mains power from the same Variac to the LV PSU for the Secret Sign Lens.

Power up at 230Vac and check the lens clears, regulatory sign illuminates brightly.
 Power up at 140Vac and check the lens clears, regulatory sign illuminates at dim levels.

Switch off and disconnect the cabling.



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