CLS LITE

Operation & Maintenance Manual

C64.65201
Issue 3
June 2019

UNIPART DORMAN

INTELLIGENT ENGINEERING UNIQUE PEOPLE WORKING TOGETHER

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Document Control

It is the reader's responsibility to ensure they have the correct version of this document. If in doubt, please contact Unipart Dorman to verify the current issue status.

Issue Number	Dated	Reason
1	May 13	Initial Issue
2	Jan 19	Rewrite of Signal Alignment Section
3	Jun 19	Various Clarifications Based on Customer Feedback

Cautions and Warnings in This Document

To highlight items in this document that warrant extra vigilance the following two alert formats are used:

Activities identified as needing extra care are highlighted using the Caution Symbol

ACTIVITIES WHICH ARE OR HAVE THE POTENTIAL TO BE HAZARDOUS TO PERSONNEL AND/OR EQUIPMENT ARE HIGHLIGHTED WITH THE WARNING SYMBOL

Introduction

Following the introduction of the Unipart Dorman Integrated Lightweight Signal (iLS) which is a versatile yet simple signalling solution for installation in a wide variety of applications, a requirement for the enhanced optics and better maintenance characteristics of the iLS module but housed in a classic Unipart Dorman Colour Light

Signal frame was identified. The new signal is designed to retain the same interface with all standard modular, route relay, geographical and solid state interlocking systems and infrastructure used in the UK; and the use of modular based construction with plug coupled electrical components reduces test and commissioning time to a minimum.

The new lens/hood arrangement gives excellent protection against phantom aspects and is designed to be self-cleaning. This allows maintenance cost reductions to be made over the lifetime of the signal. The new module configuration also includes a Voltage Free Contact Proving capability where specified and the signals can be adapted to either single or double cut proving contacts.

Where Volt Free Contact Proving is used, a less power hungry signal drawing just 45mA is available giving a consumption of just 5 Watts. A low current 24Vdc signal head may also be specified, please contact Unipart Dorman for more information on these energy saving options.

The CLS LITE can be installed anywhere a Classic CLS or Filament Head is currently fitted or by using the Unipart Dorman Assisted Lift Trunnion range as standalone maintenance free signals, where all work is carried out from ground level.

Specifications

Nominal Voltage (AC)	110V
Operating Voltage	Max 121V, Min 88V
Nominal Voltage (DC)	120V
Operating Voltage	Max 145V, Min 88V
Operating Temperature Range	-25^{O}C to +40^{O}C
Flashing Aspects	Flashing controlled by the Interlocking

Current Proving Variant

Nominal Operating Current	300 mA @ 110Vac
Relay Based Interlocking	BR941A
Solid State Interlocking (SSI)	Current Path 1 or 4

110V Low Power Consumption (5 Watt CLS) Variant with Voltage Free Contacts

Nominal Operating Current	45 mA @ 110Vac
Relay Based Interlocking	BR941A
Solid State Interlocking (SSI)	Current Path 1 or 4

Storage

The standard CLS LITE signals are supplied complete two to a pallet and ALT variants one to a pallet with protective packaging which should not be removed prior to delivery to site. The signal heads can be stored outdoors if required.

The signal should be retained on the pallet until ready for installation and when removed should not be laid in such a way as the lenses are at risk of damage. The time it is laid down should be kept to a minimum

The two warning labels, protective strip and Lower Backboard Extension can be left in position until the head is mounted on the base but should be moved prior to aligning the signal as shown in the Backboard Arrangement sections of this manual.

Safety

Before commencing assembly, any local safety requirements affecting the continued safe working environment of the signalling installation and/or the working railway, either directly or indirectly should be carried out. It is the user's responsibility to ensure all necessary risk assessments, permissions to work and preparatory safety activities are correctly completed and adhered to throughout the installation and subsequent life of the signal.

The gross weight of the signal is clearly marked on the top of the signal as shown and installers should ensure that they have sufficient measures in place to ensure a safe lift.

All activity on the CLS LITE, both mechanical and electrical, must only be carried out by staff deemed competent in these fields by their employer. It is the user's sole responsibility to ensure that the CLS LITE is installed and/or maintained by certificated and competent staff.

Pre Installation Checks

It is assumed that the mounting/foundation for the particular signal has been installed and has been accepted by the person responsible for structures prior to commencement of the installation.

The signal should be checked for damage and any remaining transit packing materials should be removed and correctly disposed of.

The signal modules each weigh 5.5 Kg and can be removed to lighten the signal for lifting during installation. This is covered in the Module Replacement section of this document.

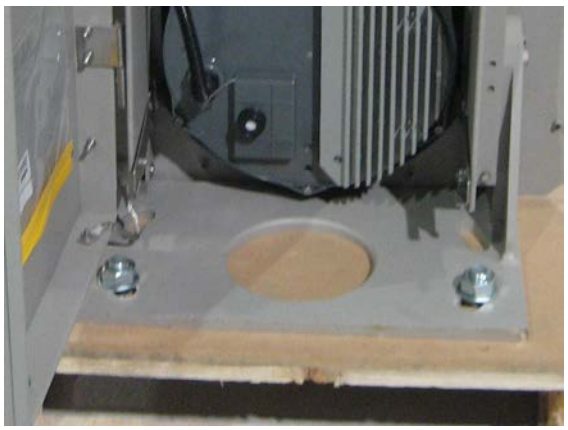
BEFORE THE COMMENCEMENT OF ANY ACTIVITY, ARRANGEMENTS SHALL BE APPLIED TO PROTECT THE WORKING RAILWAY.

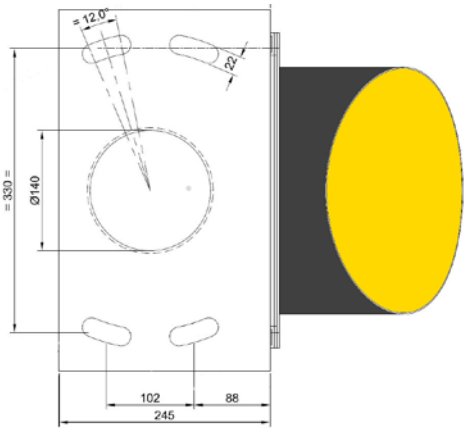
CLS LITE Variants

There are two types of CLS LITE head and they are defined by the way they are mounted. The installation instructions are different and it is important that you identify which variant you are installing.

CLS LITE was originally designed to be used on 'conventional' non-folding structures such as gantries and standard signal posts and also the Collis Folding Post.

It is supplied with the standard baseplate mandated in NR/SP/SIG10062.



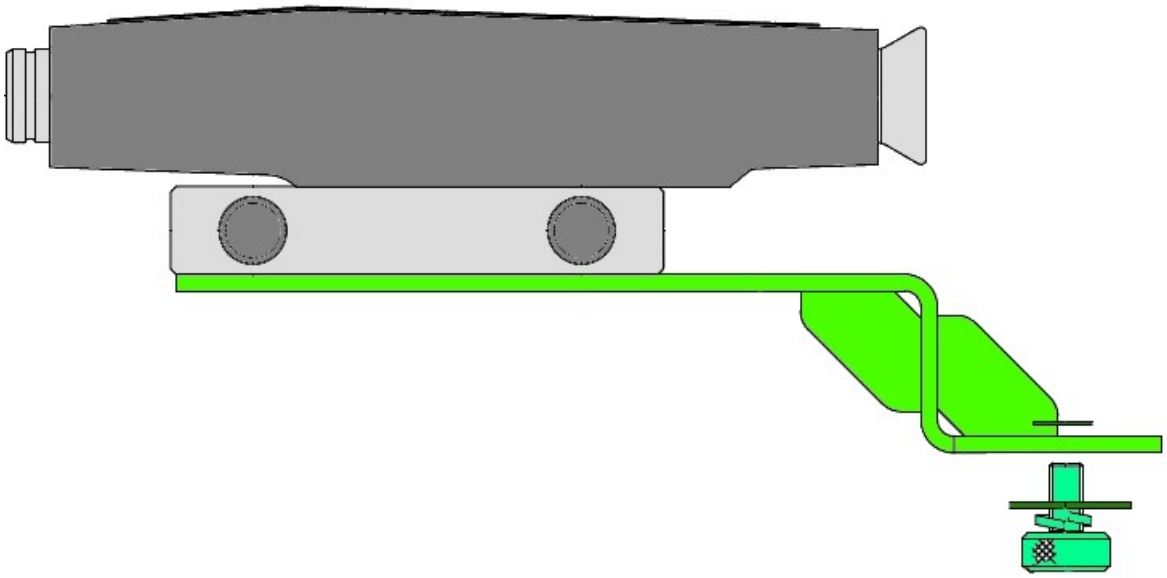


The other type can only be used with the Unipart Dorman GRP Post and Assisted Lift Trunnion and will be delivered with the Spigot Bracket attached. Where this method is employed, this document should be read in conjunction with the ALT Operations and Maintenance Manual C64.65976 which is available on the Unipart Dorman website.

Detachable Alignment Scope

The Unipart Dorman Detachable Alignment Scope is an optical device that allows accurate signal alignment and is common to both variants of the CLS LITE. It is stored in a bespoke carrying box and should be returned to Unipart Dorman annually for an alignment verification check.

There is an adaptor bracket available that enable a suitable camera to be fitted to the scope. The camera and mount are subject to their own separate instruction sheets available on the Unipart Dorman website.



If the Scope lenses require any cleaning to be carried out, the only mediums approved are water and proprietary detergents.

Do not use any solvent based or abrasive cleaning material, as this may irreparably damage the lenses.

Ensure there is no grit etc on the lens and then using a lint free cloth moistened with the water detergent solution, carefully wipe the lens clean before using a dry second cloth to remove any water spotting etc and give a final buffing.

When the scope is moved from a cold to hot environment or vice versa there may occasionally be some temporary fogging of the internal lenses which will clear when the temperatures inside and outside the scope equalise.

Do not attempt to disassemble the scope to gain access to the internal lenses as this will disturb the optical alignment and the scope will need to be returned to Unipart Dorman for adjustment on the special to type jig

INSTALLATION AND ALIGNMENT OF CLS LITE HEADS ON ALL STRUCTURES EXCEPT THE UNIPART DORMAN ASSISTED LIFT TRUNNION

Preparing and Mounting the Signal Head

The signal will arrive from the factory on a standard pallet where it should remain until ready to commence the installation onto the prepared base.

Remove all packaging materials and dispose of in accordance with current procedures and retain any paperwork etc as required.

The mounting nuts and bolts which attached the head to the pallet are transit fixings only and shall not be used to mount the signal onto the base

Having taken into account the gross weight marked on the signal head and where necessary removed the module(s) to reduce this weight, an onsite risk assessment should be undertaken and a method of lifting the head into place shall be determined. Two removable lifting rings are fitted to assist in mechanical lifting.

Once in the required position, the CLS LITE is secured to the base platform using suitable mounting hardware. Ensure the Lower Backboard extension is fitted in its operational position as detailed below.

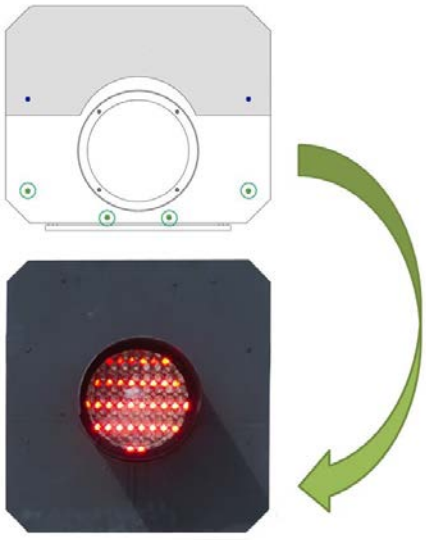
Backboard Arrangement

The signals are required to display a uniform backboard of at least 300mm from the centre of the lit aspect and the following procedure is applicable to both mounting arrangements. To prevent damage to the lower portion of backboard during transit a removable section is fitted in a stowed position to enable the signal head to be bolted securely to its pallet. As part of the installation, this extension piece must be moved into its operational position below the aperture once it has been removed from the pallet.

The backboard must be moved to its in-service position before aligning the signal as in the transit position; it obscures the holes in the backboard the scope looks through and the signal will not meet the 300mm backboard criterion

Remove the Lower Backboard Extension from its stowage position above the aperture by removing the two 3mm Allen screws shown in blue below. Refit the two screws and dispose of the 2 white plastic labels and the black plastic edge protector properly.

Using the existing Allen screws shown in green below, mount the plate at the bottom of the backboard.



Correctly fitted backboard on a 3 aspect short housing signal head shown – 3 aspect tall and 4 aspect signals have the same arrangement).

Signal Alignment

General Notes

GREAT CARE SHOULD BE TAKEN TO ALIGN THE SIGNAL IN STRICT ADHERENCE TO THE SIGNAL SIGHTING FORM REQUIREMENTS

The Signal Sighting Form (SSF) will provide the definitive, signal specific alignment details and should always be consulted prior to commencement of work.

Where the centre of the most restrictive aspect is greater than 2750mm above the LH running rail, the signal is generally aligned to a target board (PADS Number 086/011540) at a point detailed in the Signal Sighting Form.

These instructions refer to standard climbable structures such as posts/gantries and the Collis Fold Down Post system only. The Collis Post is easily identified by the use of a single, separate spring pot on the unit.

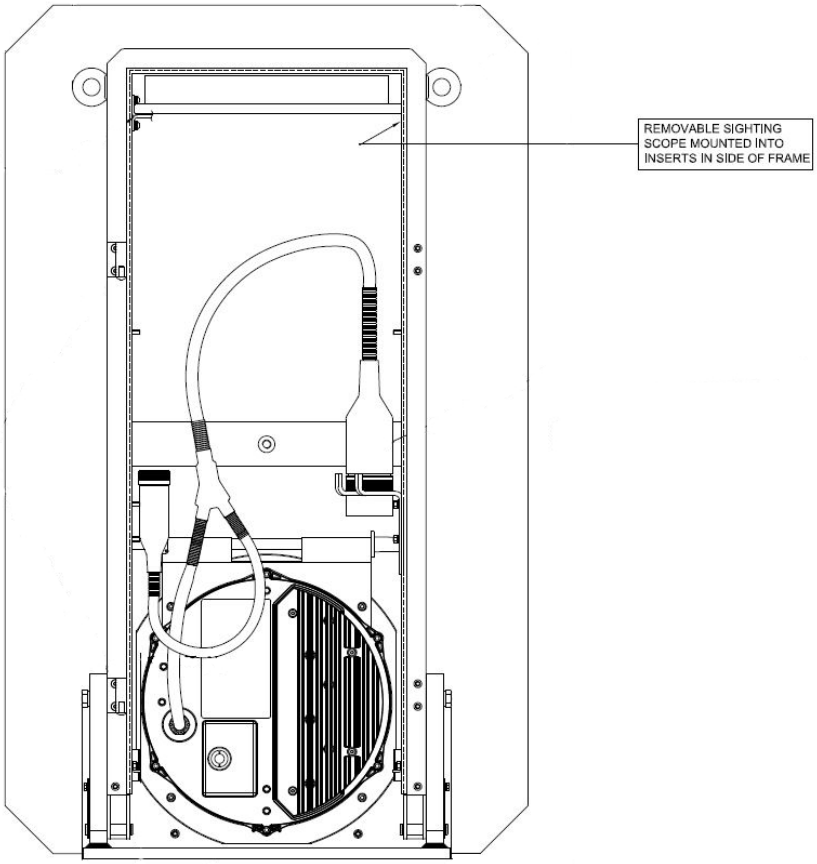
This Method is not to be used for signal heads mounted on the Unipart Dorman Spigot Mount fitted into the GRP Post and installed in the ALT.

Instructions for this mounting method are contained in their own section of this document

The removable Alignment scope should be fitted securely to the two mounting points by screwing the two knurled screws into the threaded holes in the positions shown for each signal configuration as shown:

4 Aspect and 3 Aspect tall Housings

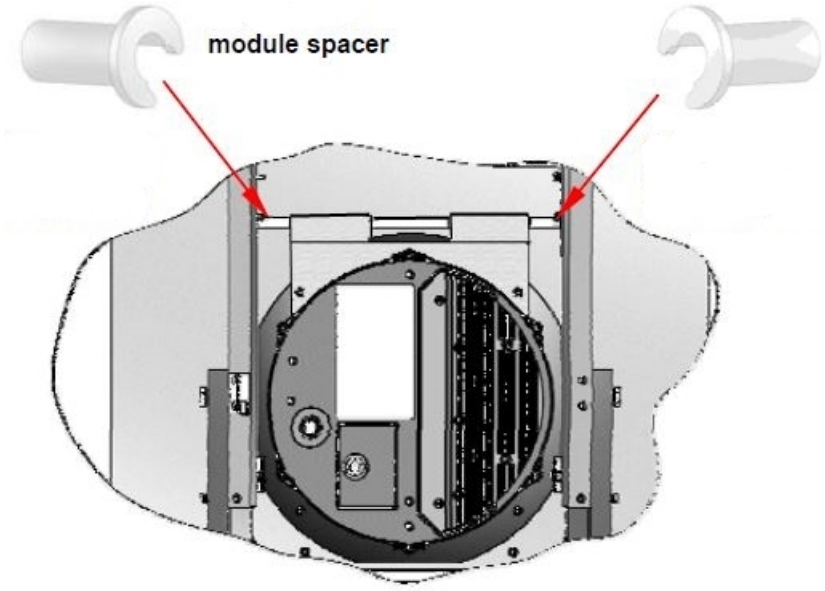
Use the threaded inserts in the inside of the frame in the positions shown below which correspond with the door stay mounting on the opposite side of the frame.



Scope fitted in a 4 aspect head – 3 aspect tall housing scopes are fitted in the same position

These two variants require the removal and retention of the plastic module spacer fitted to the pivot bar to give enough clearance for the scope to be fitted. Alternatively, unlock the module and lift off the pivot bar then slide the spacers into the centre of the bar.

The alignment scope will not locate and fit properly unless the spacer is moved from its normal operating position

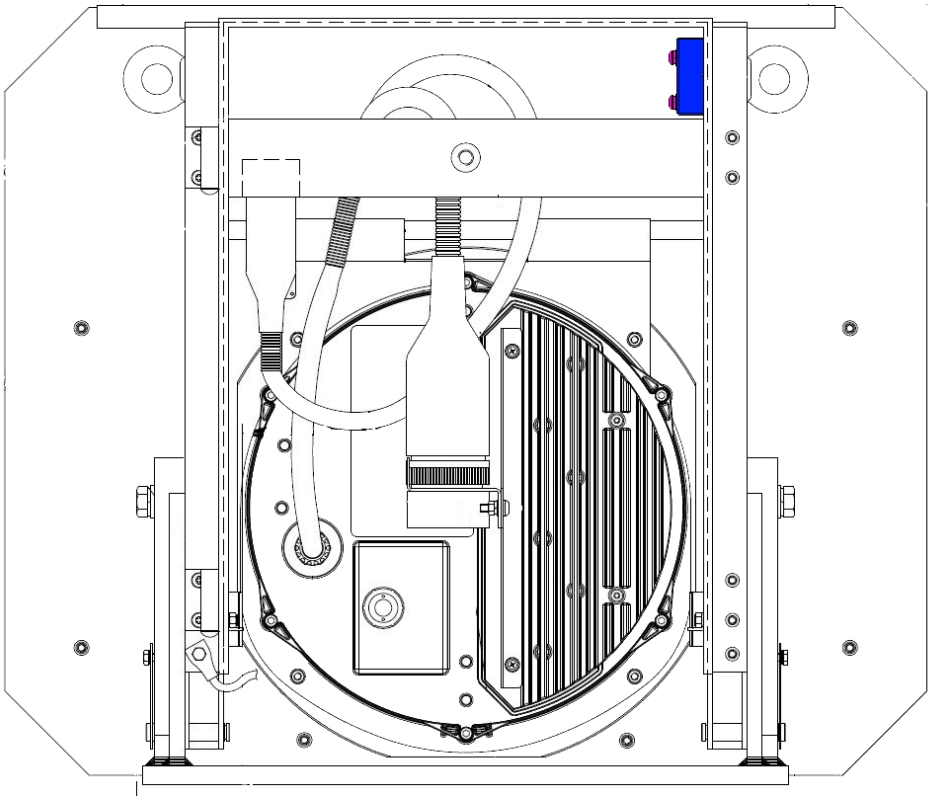


Once the alignment procedure is complete, refit the module spacer to the pivot bar with the flange end closest to the module. They are a 'snap fit' and will rotate freely on the bar when fitted correctly or where the spacers were moved to a different position on the bar return them to their original position.

The spacers centralise the module in its aperture and prevent the visor fretting on the backboard, so must be returned to their operational positions when the scope is removed

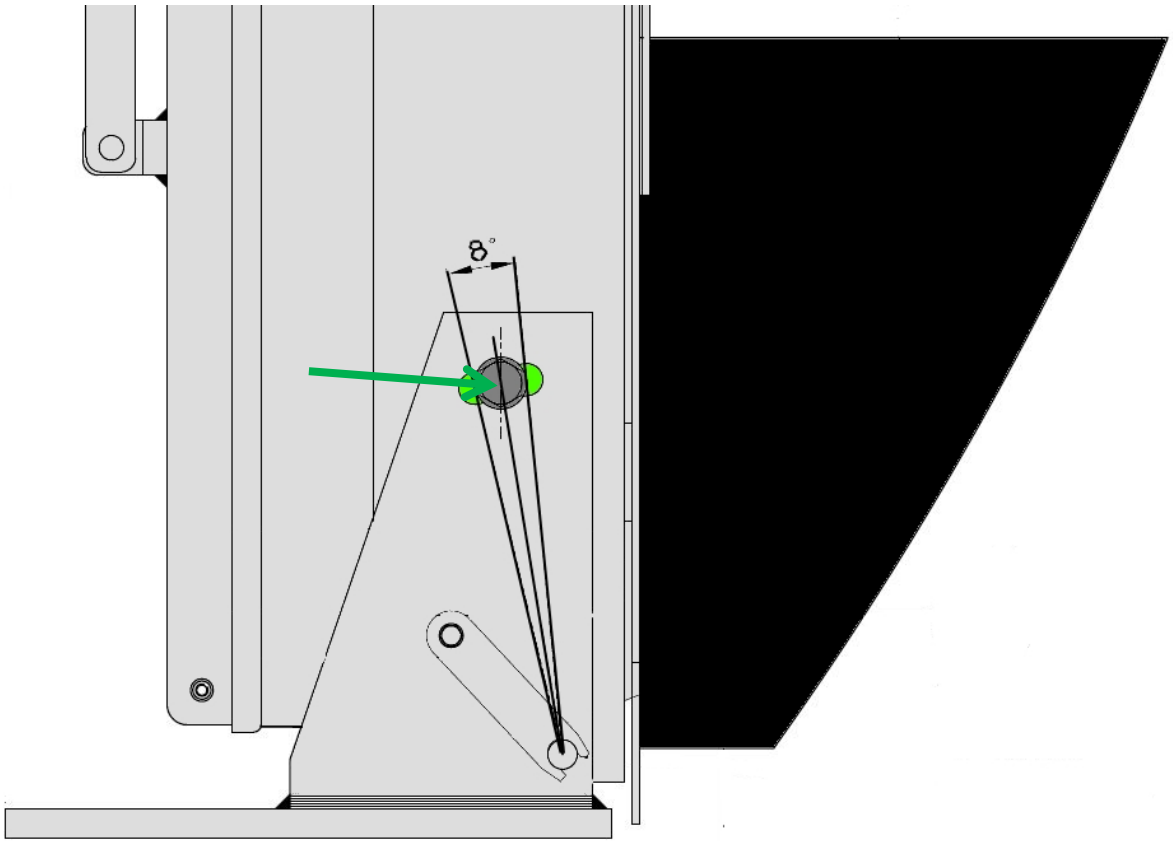
3 Aspect Short Housing

This signal uses an adaptor block to align the scope with the hole in the backboard as shown:

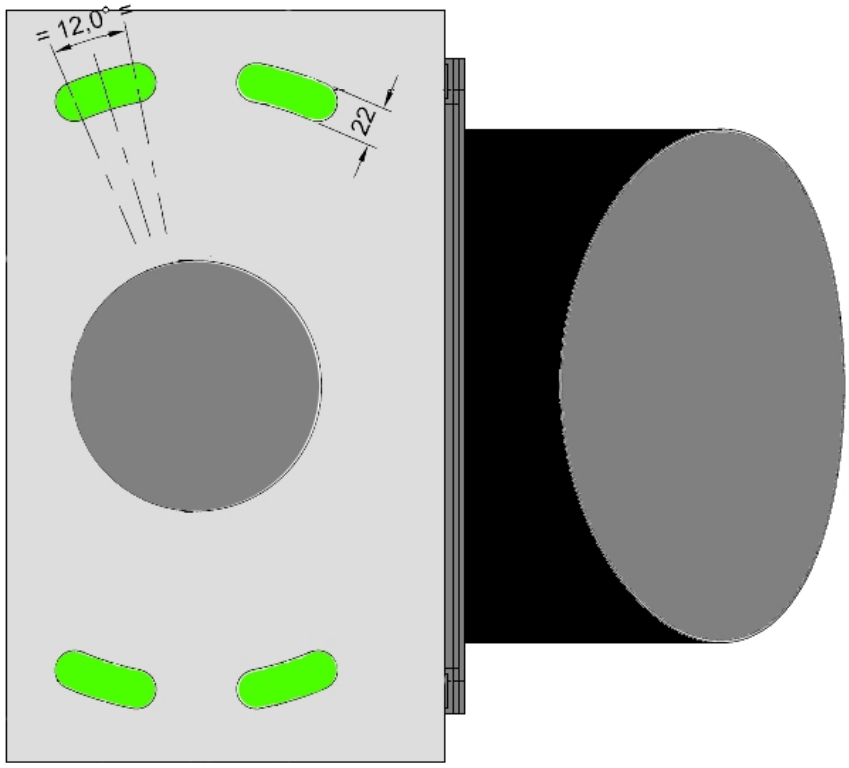


The block needs to be repositioned on the opposite side of the frame where the door opening side is changed. Detailed instructions on swapping the door are in a later section of this document.

Vertical adjustment of the head's tilt angle is carried out by loosening the bolt on either side of the baseplate highlighted and tilting it about the pivot shaft. Once the vertical alignment has been set and verified, tighten the bolts to 40Nm.



Horizontal adjustment is achieved by swivelling the head in the kidney slots on the fixed mounting as shown.



Once the horizontal adjustment is complete tighten the mounting bolts to the torque value specific to the size and material of the fasteners used.

The Collis Post System requires the use of a remote viewing device which attaches to the signal head by using the Unipart Dorman scope mount or another suitable method. The signal is raised, the alignment checked and then lowered for adjustment as required. It is then raised and the alignment is verified before the signal is lowered finally to retrieve the camera and Alignment scope.

Unipart Dorman does not recommend any particular camera or App. It is the user's responsibility that any camera and App is used in accordance with the manufacturer's terms and conditions of use and instructions.

Unipart Dorman cannot accept any responsibility for the performance of third party equipment, applications or software systems.

Users of these devices and their supporting operating systems should satisfy themselves that their usage will not compromise the device through the introduction of malicious software, bugs and viruses etc.

The end user is also solely responsible for ensuring any images captured and retained do not conflict with the Information Commissioner's Office Codes of Practice on privacy and the use of cameras, or the General Data Protection Regulations.

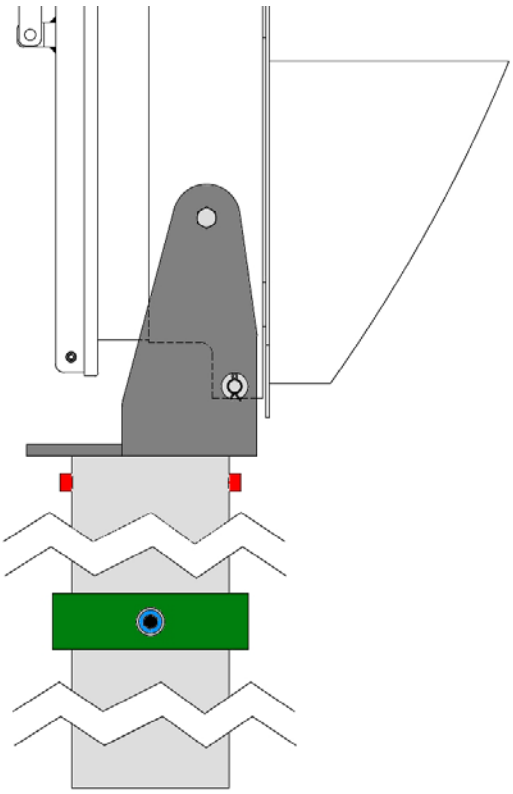
When the signal is aligned correctly to the point on the signal sighting form, ensure all the mounting nuts are correctly torque loaded and the alignment scope is removed and stored in its protective case.

INSTALLATION AND ALIGNMENT OF CLS LITE HEADS USING THE UNIPART DORMAN ASSISTED LIFT TRUNNION

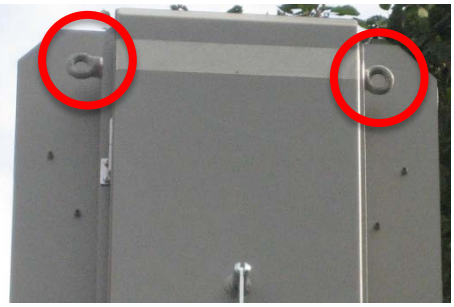
The following instructions are unique to the Unipart Dorman Assisted Lift Trunnion which is easily identified by the use of a single connection cover and a circular baseplate. Installation of the ALT is covered in its own O&M Document.

Preparing and Mounting the Signal Head

Where the signal is to be installed in a Unipart Dorman ALT the standard CLS LITE base plate is replaced by a Spigot Bracket which fits into the GRP Post and where all of the angles are set during manufacture to enable signal alignment from ground level.



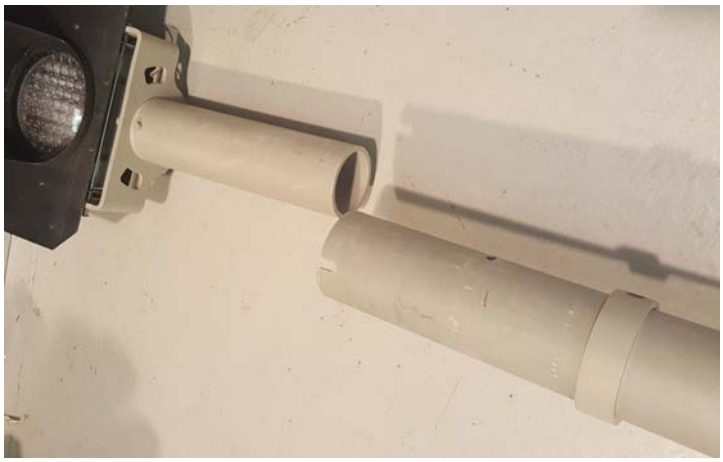
Where the head is to be fitted to the GRP Post and ALT, it will arrive upright on a pallet secured to a special to type mount. To remove it from the Pallet remove and retain the grub screws shown in blue above and slide the collar (in green) to the bottom of the mounting fixture. It is strongly recommended that the signal is removed from the transport fixture with mechanical lifting equipment using the lifting eyes provided.



A FOUR ASPECT HEAD WEIGHS UP TO 38 Kg AND SHOULD BE LIFTED OFF THE PALLET CAREFULLY

To install the spigot, first slide the collar onto the post.

Insert the post cable up through the bore of the spigot and connect the plug coupler.



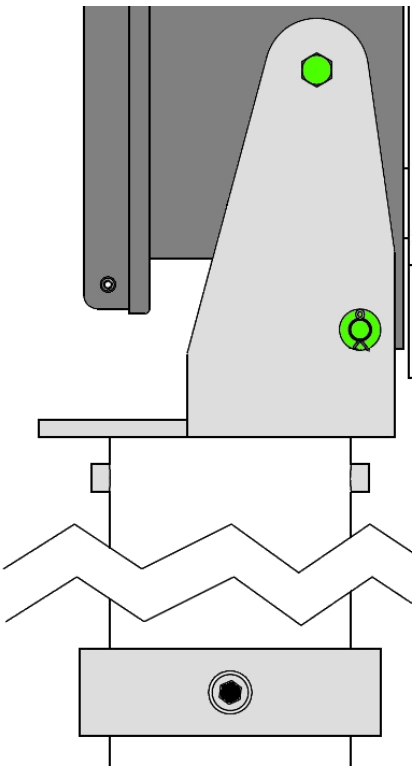
Fit the head into the post and ensure the two anti-rotation stops are aligned correctly within the slots set in the top of the GRP post.

Slide the collar into positon and secure it to the spigot through the GRP post using the grub screws tightened to 40 Nm.

Ensure the Lower Backboard Extension is fitted in its operational position. This is covered in the Backboard Arrangement section below.

The installation is now exactly the same as the procedure followed for a GRP Head and Post installed in an Assisted Lift Trunnion, as shown in the ALT Operations and Maintenance Manual C64.65976 which is available on the Unipart Dorman website.

Where the head is mounted on the Unipart Dorman GRP post installed in an ALT, the alignment and all adjustment is done from ground level as the head is fixed in the bracket with no adjustment facility.



The diagram above shows highlighted in green, that the vertical adjustment slot in the side bracket has been replaced with a simple through hole bolt securing the housing to the base plate and the E-Clip/Locking Plate on the pivot bar with a split pin arrangement.

Alignment is carried out by fitting the detachable scope to the ALT and then all vertical/horizontal adjustment is facilitated at the baseplate.

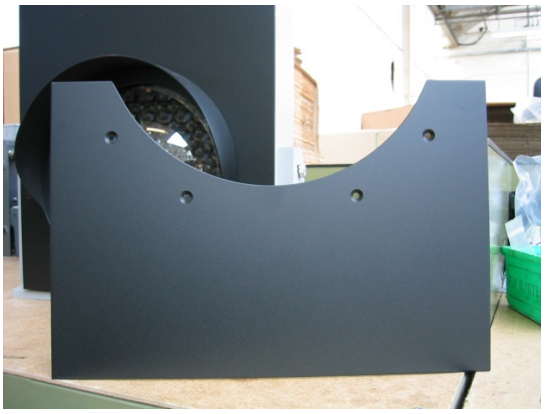
This method means the ALT can be aligned without the head and post being present, which offers greater flexibility to the customer in terms of installation planning.

Backboard Arrangement

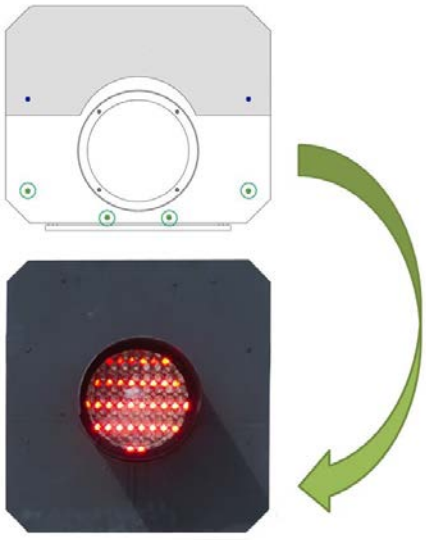
The signals are required to display a uniform backboard of at least 300mm from the centre of the lit aspect and the following procedure is applicable to both mounting arrangements. To prevent damage to the lower portion of backboard during transit a removable section is fitted in a stowed position to enable the signal head to be bolted securely to its pallet. As part of the installation, this extension piece must be moved into its operational position below the aperture once it has been removed from the pallet.

The backboard must be moved to its in-service position before aligning the signal as in the transit position; it obscures the holes in the backboard the scope looks through and the signal will not meet the 300mm backboard criterion

Remove the Lower Backboard Extension from its stowage position above the aperture by removing the two 3mm Allen screws shown in blue below. Refit the two screws and dispose of the 2 white plastic labels and the black plastic edge protector properly.



Using the existing Allen screws shown in green below, mount the plate at the bottom of the backboard.



Correctly fitted backboard on a 3 aspect short housing signal head shown – 3 aspect tall and 4 aspect signals have the same arrangement).

Alignment at the ALT

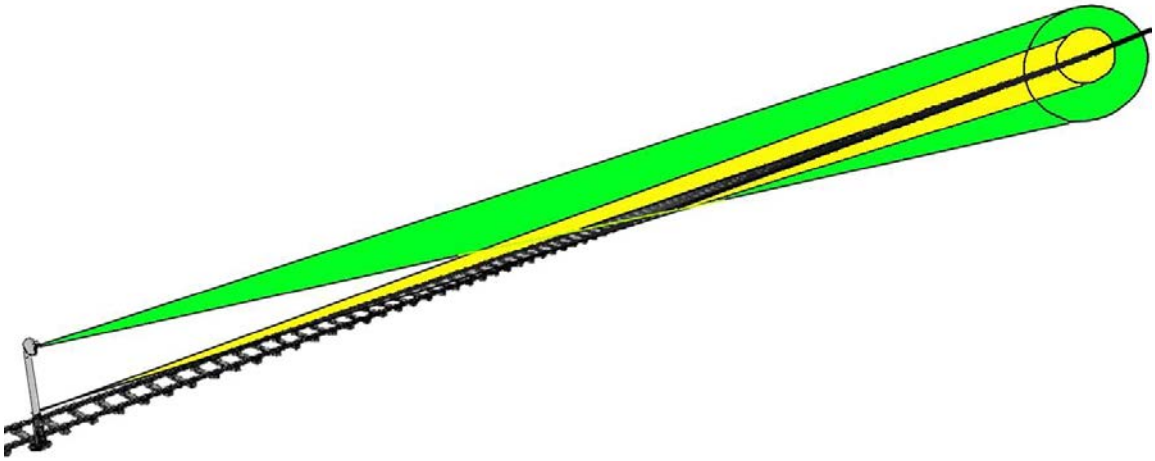
General Notes

GREAT CARE SHOULD BE TAKEN TO ALIGN THE SIGNAL IN STRICT ADHERENCE TO THE SIGNAL SIGHTING FORM REQUIREMENTS

The Signal Sighting Form (SSF) will provide the definitive, signal specific Alignment details and should always be consulted prior to commencement of work

The signal should not be aligned to a target board when using the Assisted Lift Trunnion. The beam profile allows the alignment activity to be done using the ALT mount as described below and to ensure accuracy, the signal shall be aligned to a point on the ground determined by the signal sighting form.

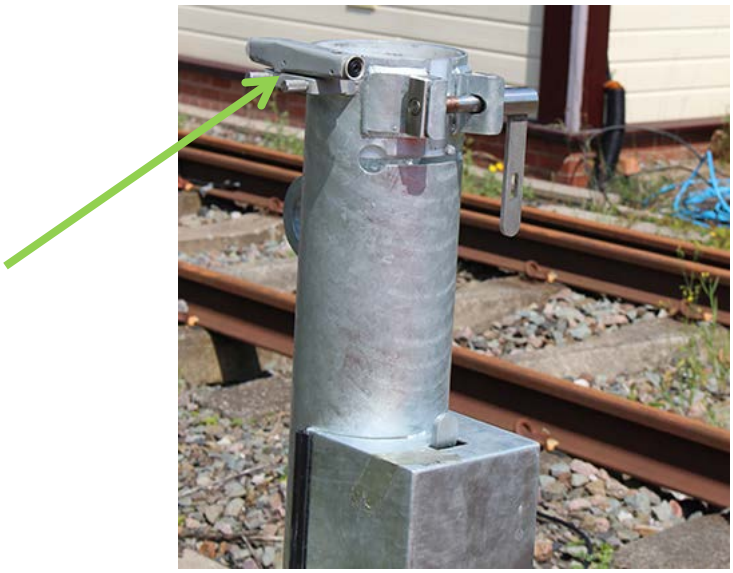
The illustration below shows a representation of the light beam shown in green and the Alignment scope field of view in yellow, converging at a point on the ground determined by the Signal Sighting Form



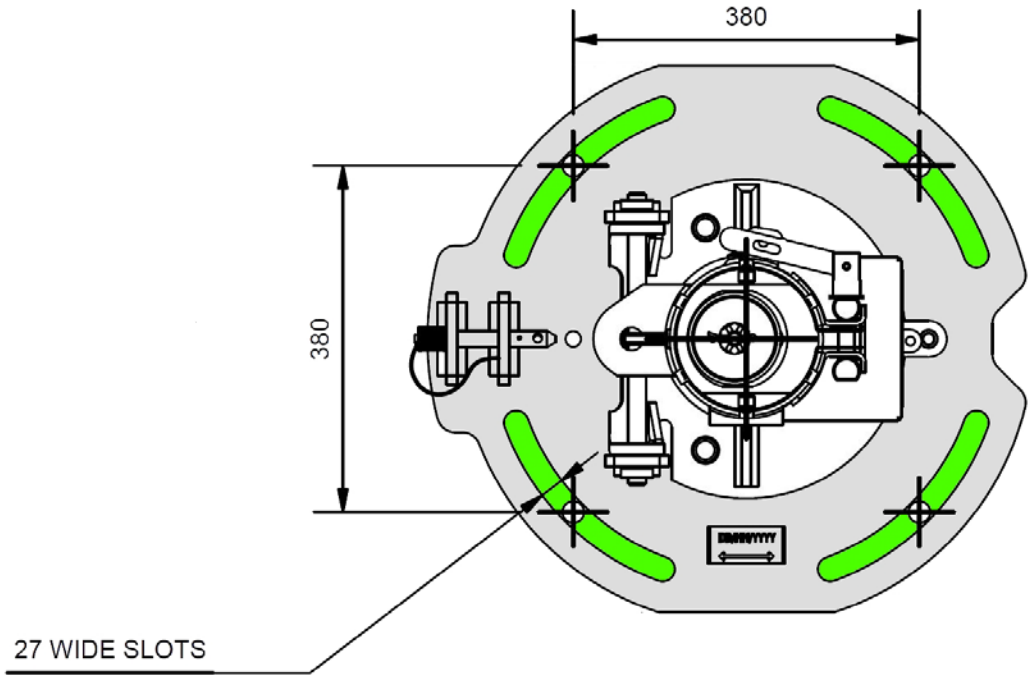
The signal shall be aligned to a point on the ground when sighted from the ALT

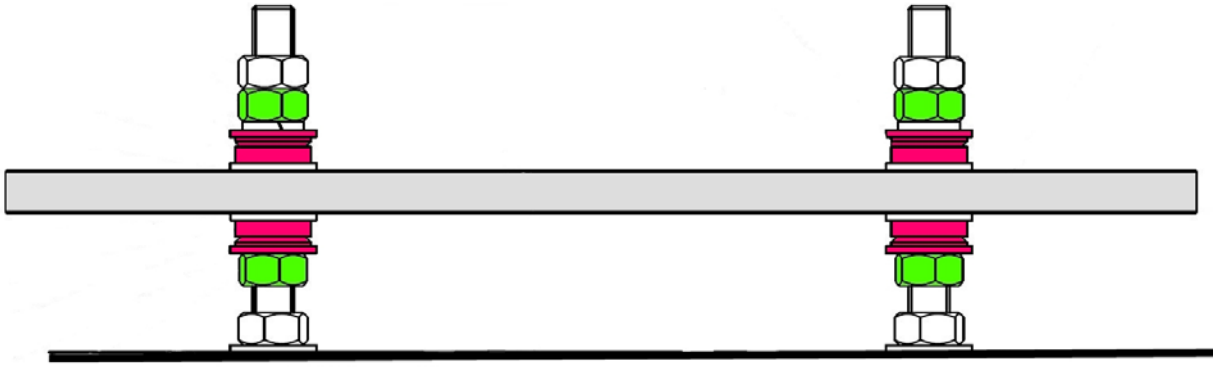
Fitting the Scope

The removable alignment scope unit should be fitted to the Trunnion by screwing the two knurled screws into the threaded holes as shown in the illustration below:



Using the alignment scope to provide visual cues, the signal is adjusted horizontally by rotating the base within the kidney slots and vertically by adjusting the angle of the ALT using the securing and adjustment nuts and the spherical washer sets shown in red.





The spherical washer sets are essential for the tilt adjustment and shall not be omitted

When the signal is aligned correctly to the point on the signal sighting form, ensure all the mounting nuts are correctly torque loaded in accordance with the ALT Manual and the alignment scope is removed and stored in its protective case.

If required the adaptor plate and camera described in the Detachable Signal Alignment Scope section above can be fitted.

INSTRUCTIONS COMMON TO BOTH VARIANTS

Electrical Connection

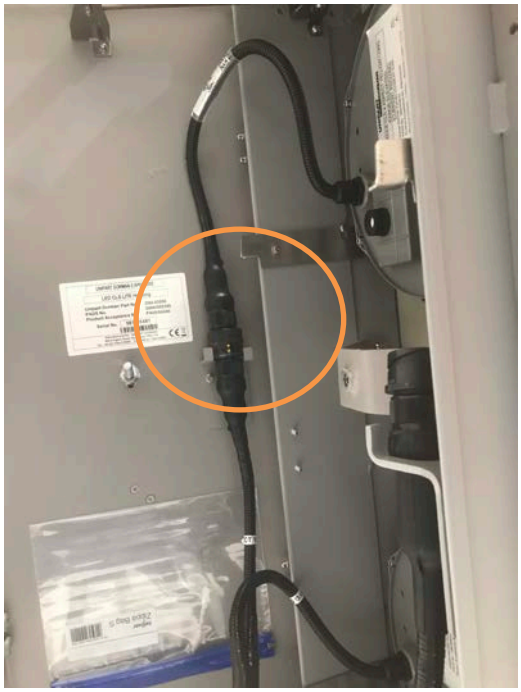
To reduce the amount of spares that need to be held, all CLS LITE Modules have the splitter cable for the second Yellow module attached. If the signal only uses a single Red Yellow Green module the splitter cable will have a blanking cap fitted and it will be secured to the main plug coupler using a cable tie or fitted in the bracket on the inside of the door.

The main connector is plug coupled and connected by aligning the keyway and lug inside the connector shells with a slight push to get the worm drive to engage and then turning the friction locking collar by hand until an audible ‘click’ is detected and the two indicator spots are aligned. (The spots may be of different colours; this is simply the preference of the manufacturer and does not affect the plug coupler’s physical attributes).

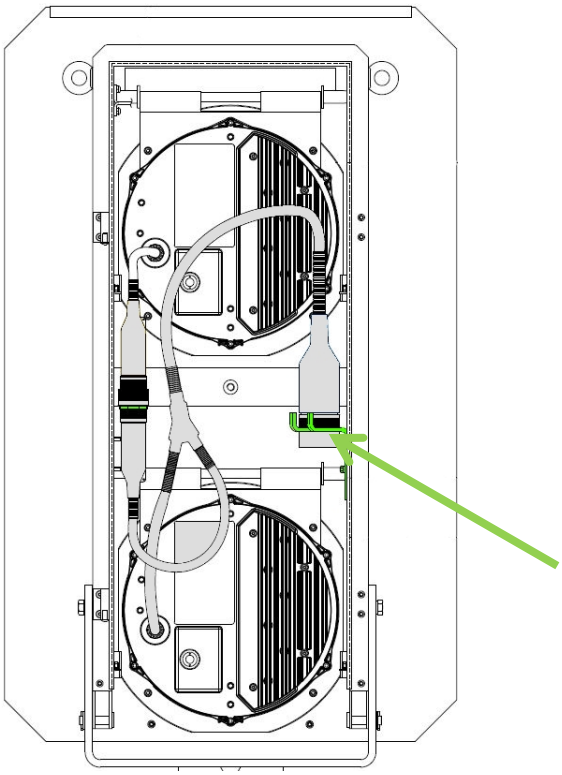
The Plug Couplers should connect easily and the use of handtools is discouraged. If the coupler cannot be operated by hand, there may be a fault or mismatch in connection detail. This should be investigated as any attempt to force the connection could result in bent or broken pins/sockets.

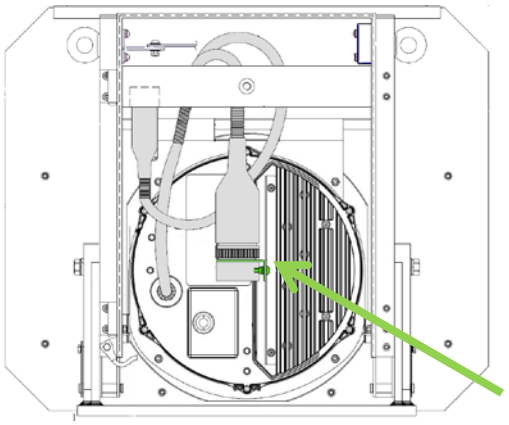
If the signal is a four aspect variant, connect the plug coupler which links the two modules together in exactly the same manner as the main feed coupler and stow it

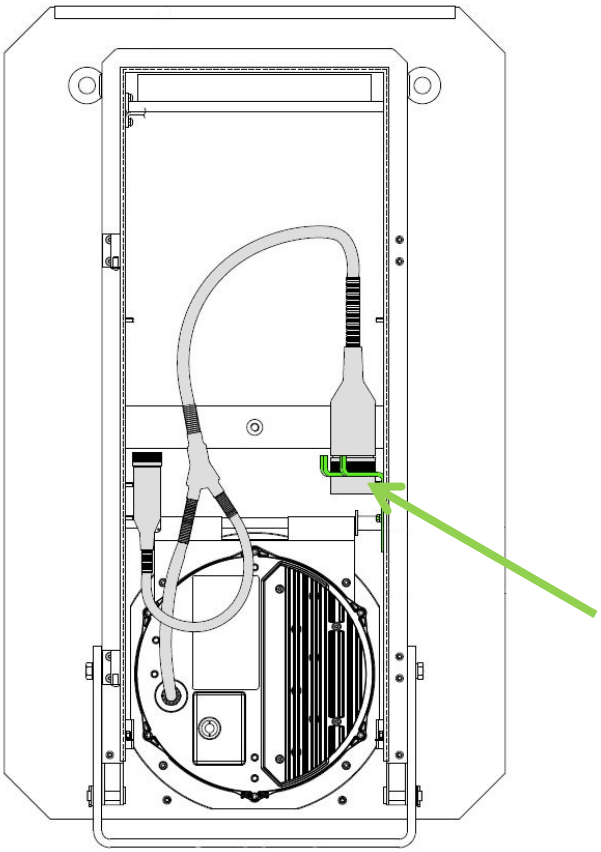
in the door bracket as shown. This stowage option can also be used where the feed cable is fitted with a blanking cap,



The RYG Plug Couplers are stowed in their brackets in the positions shown in green below.







Changing the Door Opening Side

There may be occasions when access to the back of the signal head may be limited by OLE cages etc and the rear door has been designed to be fitted so it hinges on the left or right to improve access to the signal Alignment scope.

The instructions below are illustrated using a 4 aspect head but the procedure is also the same for both 3 aspect configurations.

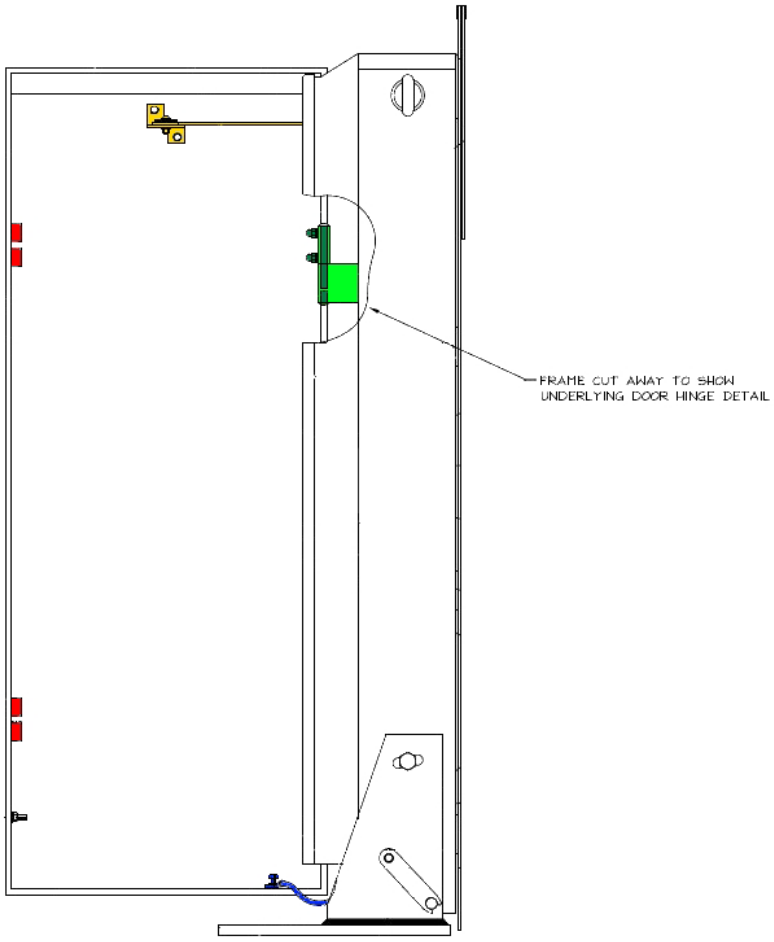
Unipart Dorman recommends that where the installation requires the door to be swapped, the signal alignment procedure is carried out using the camera attachment

or if there is insufficient space to fit the camera, the procedure is undertaken when the door is removed

Do not reposition the adaptor block on the scope as this will invalidate the scope alignment which can only be reset on the manufacturing jig

Door Preparation

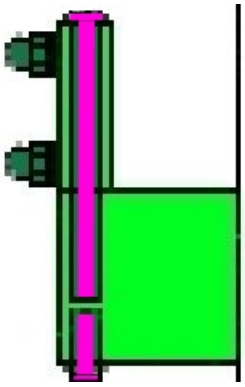
Note the assembly order of any fasteners removed in the instructions below, to ensure correct re-assembly sequence.



Undo the two dome nuts securing the door stay bracket (shown in yellow) to the door then undo the two button head screws securing the other end to the frame. Remove the door stay assembly as one complete unit.

Disconnect the braided bonded strap from the bottom of the door (shown in blue)

Lift the door off its hinges (shown in green) by driving out both of the two part hinge pins (shown in magenta below).

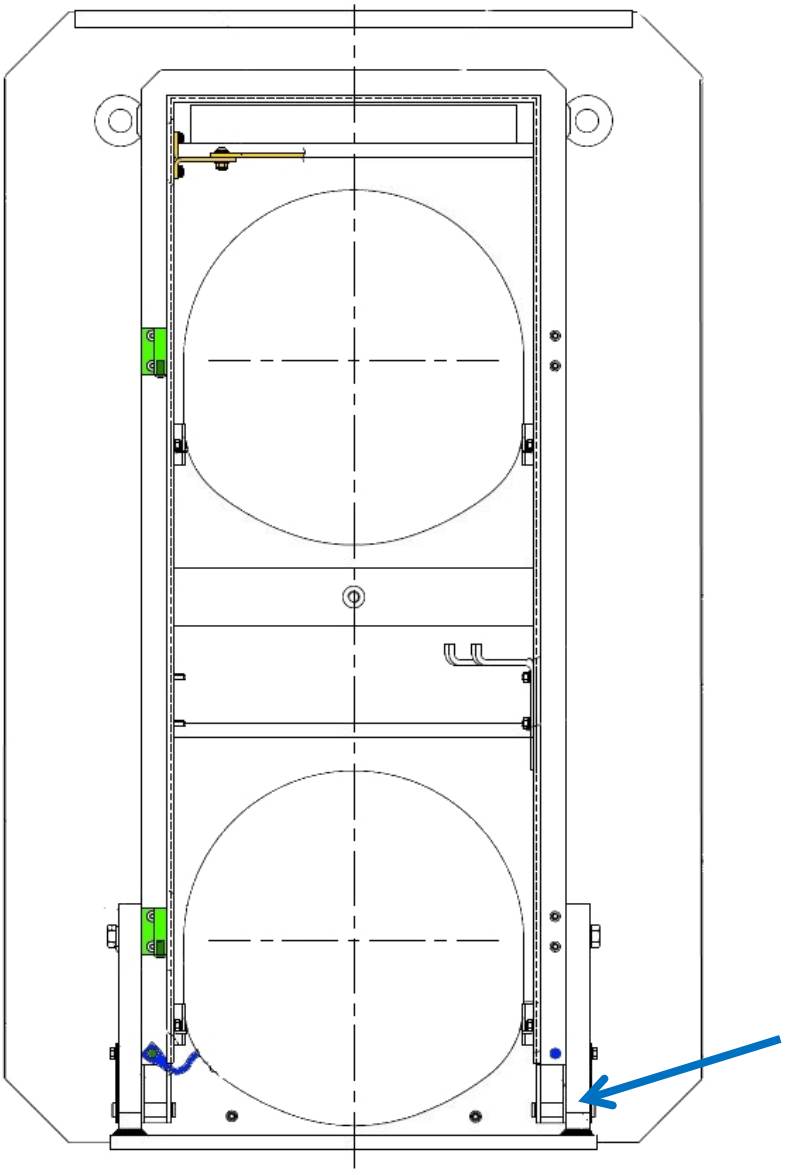


Once the door is off, using an 8mm socket, remove the 4 x rubber doorstops (shown in red) fitted inside the door flange and retain.

Remove the hinge plates and then using the same dome nuts and washers reposition the hinges to the opposite side of the door fitting them onto the studs previously used for the rubber door stops. (Do not fully tighten at this stage to allow later door / frame alignment).

Relocate the door stops to the studs previously used for the hinges.

Frame Preparation

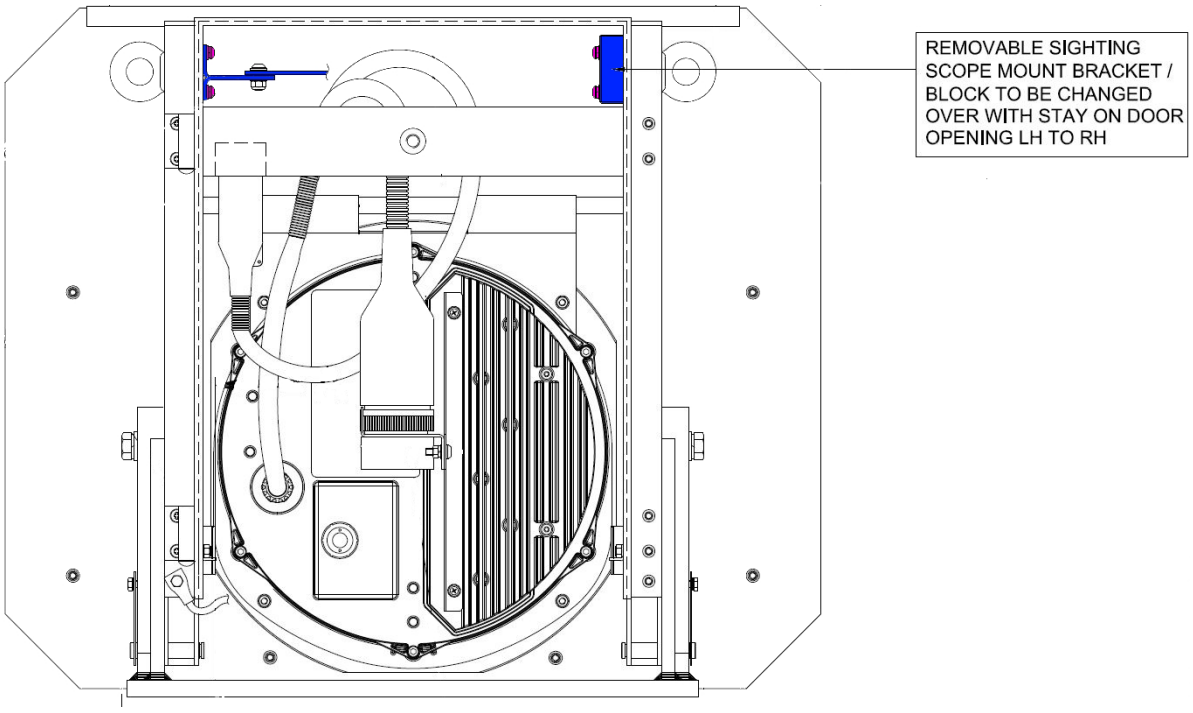


Remove the frame earth strap and fit it to the corresponding stud on the opposite side of the frame (shown in blue above).

Move the two hinges to the opposite side of the frame. Do not tighten at this stage to allow later door/frame alignment.

3 Aspect Short Housings Only

Remove the adaptor block shown in blue below by undoing the two bolts and fit it using the threaded inserts which were previously used for the door stay bracket



Refitting the Door

Rehang the door onto the frame using the two part hinge pins ensuring the short pins are fitted at the bottom of both hinges. Adjust the hinges on the mounting for satisfactory door operation and to give approximately 1mm clearance between the inner face of the door and the rolled edge on the frame. Tighten all hinge fasteners. Then recheck the clearances and readjust if required.

Turn the door stay bracket assembly over and refit to the opposite side and attach the bonding lead.

Ensure all of the fasteners disturbed are torque loaded to 1.5 Nm

The door is closed and secured using the locking bolt and bar and a standard padlock.

Maintenance Activity

The signal design is such that it is maintenance free where the lens is subject to free falling rain. However, Network Rail may mandate some maintenance activity and this will be promulgated through the normal channels.

The LED module(s) can be tilted up and back using the hanging bracket and pivot bar arrangement giving access from the rear of the signal ensuring the worker remains in a position of safety.

Signal Husbandry

If the signals require any cleaning to be carried out, the only mediums approved are water and proprietary detergents.

Do not use any solvent based or abrasive cleaning material as this may irreparably damage the signal.

Using a lint free cloth moistened with the water detergent solution, carefully wipe the lens clean and using a dry second cloth remove any water spotting etc.

Service and Repair

The LED modules have no user maintainable elements (apart from general husbandry requirements) and are intended to be replaced completely should they fail. A complete list of signal heads, spares and their catalogue numbers are shown on the Network Rail Approval Certificate.

Module Replacement

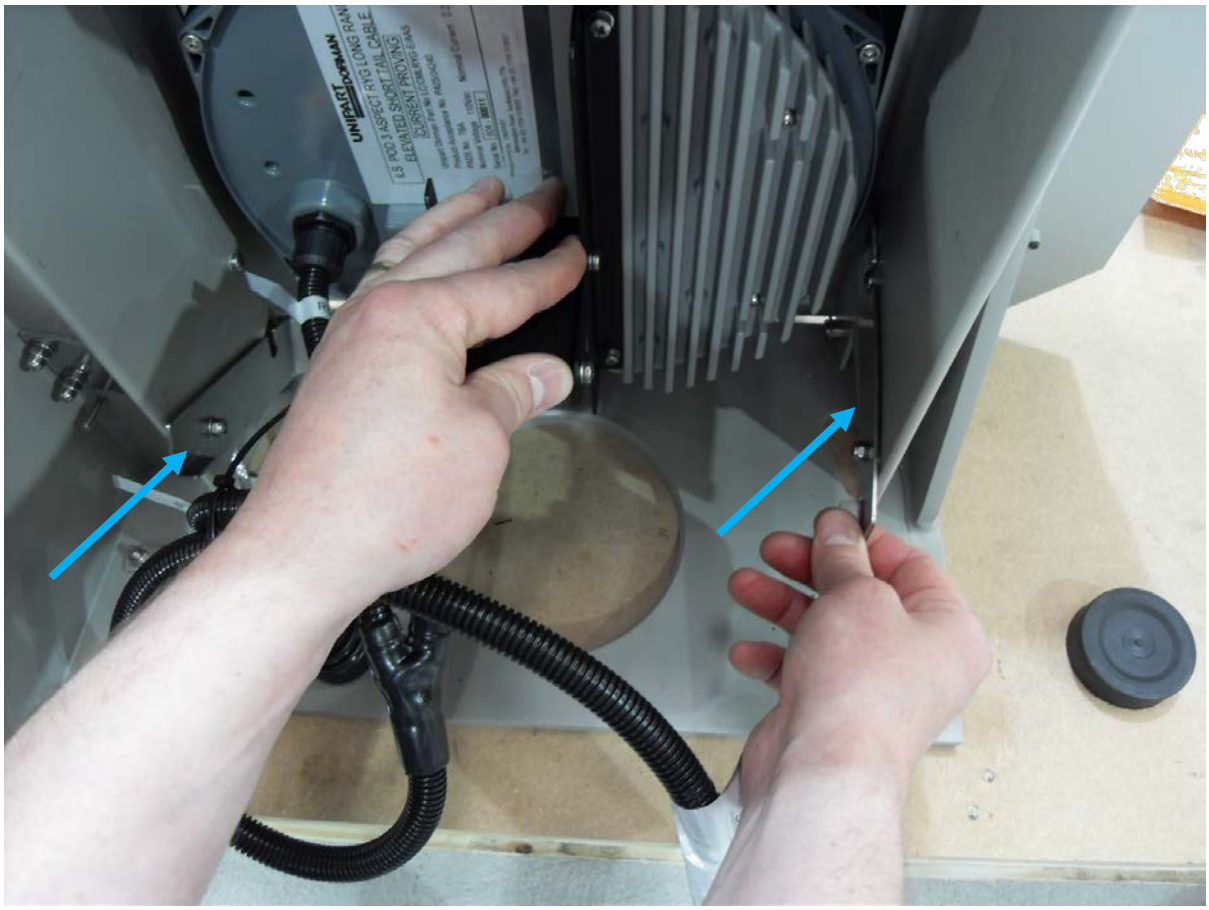
Before replacing the module remove any cable ties and disconnect the plug coupler.

With 4 Aspect heads note the position of each module before removal. Elevated signals will have the RYG module (fitted with the large plug coupler and the top yellow feeder cable with a small plug coupler) in the lower aperture and the second yellow only module (fitted with a small plug coupler only) in the upper.

Ground and most tunnel signals are configured as RYG in the top aperture and the second yellow in the bottom aperture.

Note the position of the plastic module spacers on the pivot bar where fitted.

Support the module to stop it swinging back and release the two locking levers as shown below



The module can then be swung out and if required is unhooked from the top bar for removal.

Refitting is achieved by hanging the correct module (RYG or YY) onto the mounting rail ensuring the plastic module spacers are in the position noted before removal and then pushing the locking levers down past the horizontal until the slot in the lever has fully engaged with the lock pin on the inside of the frame.

Lever position shown without module fitted for clarity

BOTH LOCKING LEVERS MUST BE FULLY ENGAGED.

CHECK THE MODULE IS LOCKED IN PLACE BY TRYING TO PULL THE BOTTOM OF THE MODULE AWAY FROM THE FRAME - IT SHOULD NOT MOVE

Ensure the plug couplers are stowed correctly in the support brackets and any cable ties are replaced.

If the module is simply to be tilted back to facilitate cleaning etc., sufficient cable is available to allow the module to be swung on the pivot bar without disconnecting the plug coupler.

End of Life Disposal

Wherever possible the component parts and complete assemblies of the Unipart Dorman CLS LITE are designed to be disposed of in accordance with the requirements of the Waste Electronic and Electrical Equipment Regulations 2006.

Please contact Unipart Dorman for full details of the procedure to be undertaken when a signal is permanently withdrawn from service for disposal.

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