

Earth-Rite® II MGV Static Earthing System

MGV P1 - DC Version
For use on 12/24V DC Supplies

Installation & Operating Instructions



⊕ II 3 (1)G
II 2D



The safety of any system incorporating the equipment referred to in this manual is the responsibility of the installer of the system.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Any warranty is made void if the equipment is not installed, or used, in accordance with the manufacturers instructions.

Earth-Rite II MGVP1

Static Earth Monitoring System

Terminology used in this manual

Tri-Mode

The **Earth-Rite II MGVP1ED** system operates using “Tri-Mode” technology. This utilises the electrical capacitance of the road tanker to ensure the presence of an effective terrestrial Static Earth Point to which the road tanker is connected. It also monitors that the clamp is connected to an Earth Point rather than directly to the road tanker or isolated items of metal. Once permissive, the system continues to monitor the resistive loop circuit between the tanker and the Static Earth Point.

The **Earth-Rite II** has been supplied as a MGVP1ED system (capacitance and resistance monitoring), it is intended for use on board Road Tankers. It is set to show permissive only when the system detects:

- A - the presence of the Road Tanker on which the MGVP1ED system is mounted*,
- B - the presence of a connection to Earth, and
- C - that the connection to Earth is less than 1000 Ohms resistance.

Until these conditions have been met, the system will remain non-permissive.

* The circuit measures the capacitance of the Road Tanker with respect to Earth. The Road Tanker must be isolated from ground prior to fitting the Earthing clamp in order for the MGVP1ED system to measure the value of capacitance between the Road Tanker and Earth. If the value of capacitance is too low the system will not recognise the tanker.

The CDI Light is a diagnostic LED that pulses continuously when, the RTR system has detected a capacitance that is similar to a road tanker and a connection to true Ground, but detects a resistance greater than 10 Ohms in the Continuous Ground Loop Monitoring circuit. The CDI Light stays blue, (does not pulse), when the RTR has detected a combined positive test for the Road Tanker Recognition, Static Ground Verification and a Continuous Ground Loop Monitoring resistance of 10 Ohms or less.

Attaching the MGVP1ED Earthing Clamp to a good Earth Point, before connecting hoses etc., will ensure correct operation of the system.

Installation

The installation shall be carried out by suitably trained personnel in accordance with the relevant sections of IEC 60079 and EN 60079.

All cables entering the monitoring unit must be connected through approved cable glands in accordance with EN 60079-14 .

The glands should be fitted in such a way as to maintain the ingress protection rating of the enclosure.

The system should be connected as per the enclosed installation drawings.

The Earth-Rite II MGVP1ED system should be powered from a DC supply of 12 to 24 volts.

For correct operation the cable connecting the Junction Box to the Monitoring Unit should be no more than 3m in length.

The system should be protected using a 2A fast blow fuse, or Miniature Circuit Breaker, mounted in the distribution board / fuse box.

The ambient operating temperature (TAMB) for this system is -40°C to +55°C.

After installation of wiring, secure the cover to the body making sure it is fully tightened.

A device known as the MGVP1ED Tester is available to allow the Earth-Rite II MGVP1ED to switch to permissive for test purposes.

Maintenance: Periodically check exterior of enclosure for damage or deterioration.

Note: It is recommended that the transfer operation is interlocked with the contacts of the Earth-Rite II unit. This will ensure that the operation is stopped if the earth connection is inadvertently lost.

IF YOU HAVE ANY QUERIES REGARDING THE ABOVE POINTS THEN PLEASE CONTACT NEWSON GALE, OR THEIR APPROVED DISTRIBUTOR, WITHOUT DELAY.

CAUTION: For the Static Control Verification function to work correctly, the system must be turned **ON** prior to the earthing clamp being connected to a suitable earth point. Where an On/Off Switch is installed, a suitable warning label should be fitted adjacent to the switch.

Optional Intrinsically Safe Switching PCB

The optional Intrinsically Safe Switching PCB is provided in order to switch the I.S. circuit of an external Intrinsically Safe device. The parameters of the device shall meet the requirements of the ER11 Control Drawing. The switching operates in conjunction with the ER11 Normally-Open interlock contact.

Verification of the Earth Point

The Earth-Rite II MGVP1ED system is designed to verify the integrity of the earth point connection to the general mass of Earth. Ideally, known ground points, with low resistance to the general mass of Earth, should be used. However, other buried items of metal, such as steel posts, lightning conductors etc., may be used as the MGVP1ED system will verify that these items are less than 1000 ohms resistance, and therefore capable of dissipating electrostatic charges safely, to earth.

Customer Supplied Cable Specification

Recommended Specification

Cable from ERII Control Unit to ERII Junction Box

1.0mm² 2 core Cable (IS Circuit).

For correct operation the cable connecting the Junction Box to the Monitoring Unit should be no more than 3m in length and should not be screened. If conduit or screened cable is used it should be no more than 1m in length.

Cable from ERII Control Unit Intrinsically Safe Switching Contact to External Intrinsically Safe Device

1.0mm² 2 core Cable with blue sheath or identifier (IS Circuit).

Cable from Battery Supply to ERII Unit

1.5mm² 2 core cable + Protective Earth Cable.

Cable from ERII Unit to Tanker Chassis

4.0mm² single core cables with green sheath.

NOTE: Cables must be secured close to the enclosure in order to prevent them being accidentally pulled out.

The vehicle tank must be electrically bonded to the vehicle chassis.

The **Chassis Connection Cables** should be terminated on the chassis at a distance of about 200mm apart.

Cable Glands

Please refer to the latest edition of IEC 60079-14 or EN 60079-14 for more information on suitable cable glands and acceptable cable lengths.

IF YOU ARE IN ANY DOUBT REGARDING THE INSTALLATION PLEASE CONTACT NEWSON GALE, OR THEIR APPROVED DISTRIBUTOR, WITHOUT DELAY.

Operation

In the normal rest state, with clamp stowed on the Clamp Stowage Point, the Red *Negative Ground Connection* LED will show.

Attach the earthing clamp onto a designated terrestrial Earth point and ensure that both of the pointed contacts are positively located.

If the connection is healthy the Green *Positive Ground Connection* LEDs will flash and the interlock contacts will close.

The product transfer operation can now take place.

If the earth connection is broken during the transfer operation the Red *Negative Ground Connection LED* will show and the interlock contacts will open.

Once the process is complete and any interconnecting pipework has been removed, to avoid damage/injury, the clamp should be carefully removed and placed on the appropriate stowage point. The Red *Negative Ground Connection LED* will show.

As an alternative to stowing the clamp on the Clamp Stowage Point, the clamp and cable may be removed from the junction box and stowed in the road tanker cab or locker.

Important Note -

The earthing clamp should be connected to the earth point prior to fitting hoses, etc., as per the recommendations of ATEX 2014/34/EU, ATEX 137, EN 60079-14, IEC TS 60079-32-1 and CLC/TR: 60079-32-1. It is important that the clamp is fitted before hoses are connected to the road tanker and before articulated trailer legs are deployed.

Advanced Safety Feature

The Earth-Rite II MGV has a System Reboot facility in response to Power Outages. This safety feature is designed to maintain high site safety during interlocked transfer operations using hoses. Should the mains supply be lost during the transfer process, the system will become non-permissive and the transfer operation will stop.

The following procedure will ensure that the system can safely continue to monitor the clamp connection following a Power Outage situation:

1 Attach the clamp in the same position on the terrestrial Earth point as it was originally attached.

2 Turn OFF the supply to the ERII system.

3 Wait 10 seconds.

4 Turn ON the supply to the ERII system.

The system should become permissive as indicated by the green flashing LEDs.

The benefits of the System Reboot facility also apply to the situation where the clamp is accidentally removed during the transfer process and the system goes non-permissive. If this happens, the above procedure should be used to allow the transfer operation to continue safely.

As an alternative, the system could be temporarily switched to Single Mode using the optional Mode Selector Key Switch.

Troubleshooting at the time of Installation – Earth-Rite II - MGV Tri-Mode System

Before contacting Newson Gale please check the following points:-

Symptom: Red and/or Green LEDs are NOT showing

Check that the system is installed in accordance with the supplied manual.

Check that there is power to the monitoring unit, and that it is the correct voltage.

Caution - Ensure all Health & Safety precautions are taken during the above procedures.

Symptom: System does NOT switch to the permissive state even when clamp is fitted to a verified ground point with less than 20 ohms resistance to the general mass of Earth (RED LED continues to show).

Note: This procedure must be carried out with the road tanker standing on a concrete or tarmac road surface.

Check that the system is installed in accordance with the supplied manual.

Check that a hose is not connected, between the road tanker and site inlet / outlet valve, and that there is no accidental contact between the road tanker and Earth with items such as loading arms, ladders, railings, gates etc. Ensure that the trailer (where applicable) does not have support legs deployed.

Check correct operation using the MGV Tester clamped onto the road tanker.

Check that the Earthing clamp is in good condition: that the contacts are level with each other, sharp and not loose.

Caution - Ensure all Health & Safety precautions are taken during the above procedures.

If the system still does not switch to permissive state when clamp is fitted to a good earth point please contact Newson Gale and confirm the following:-

Serial number -----

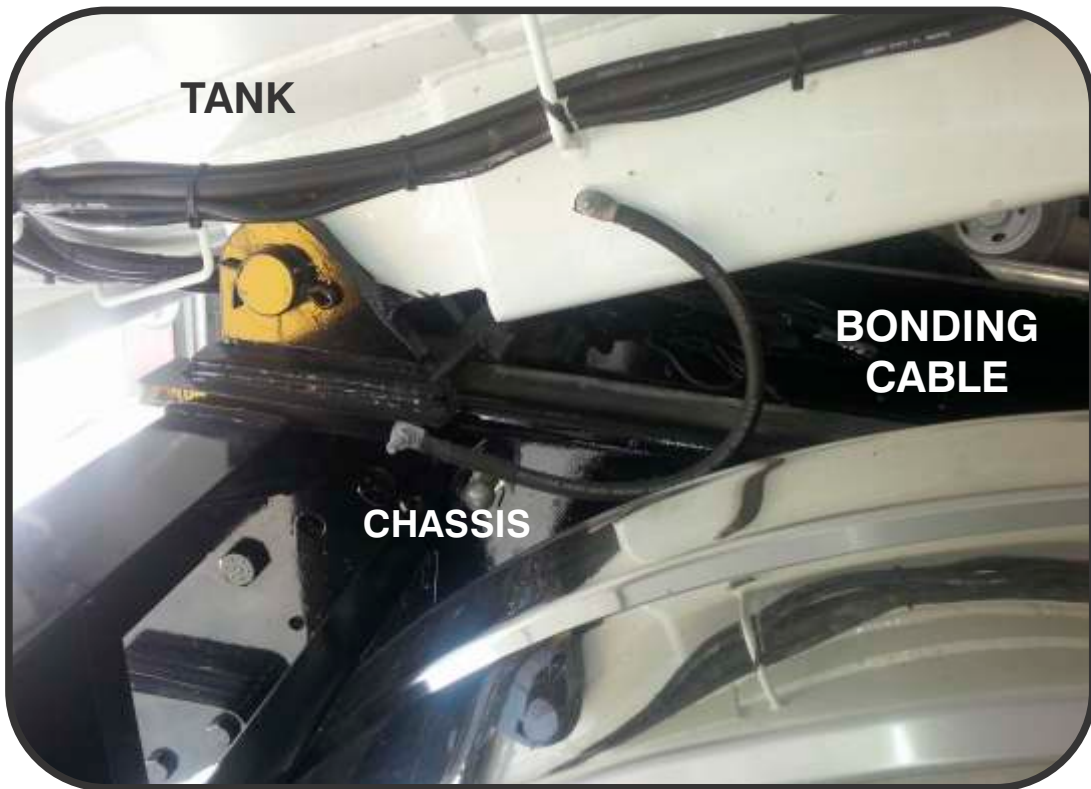
Company which ordered the system

Date of order -----

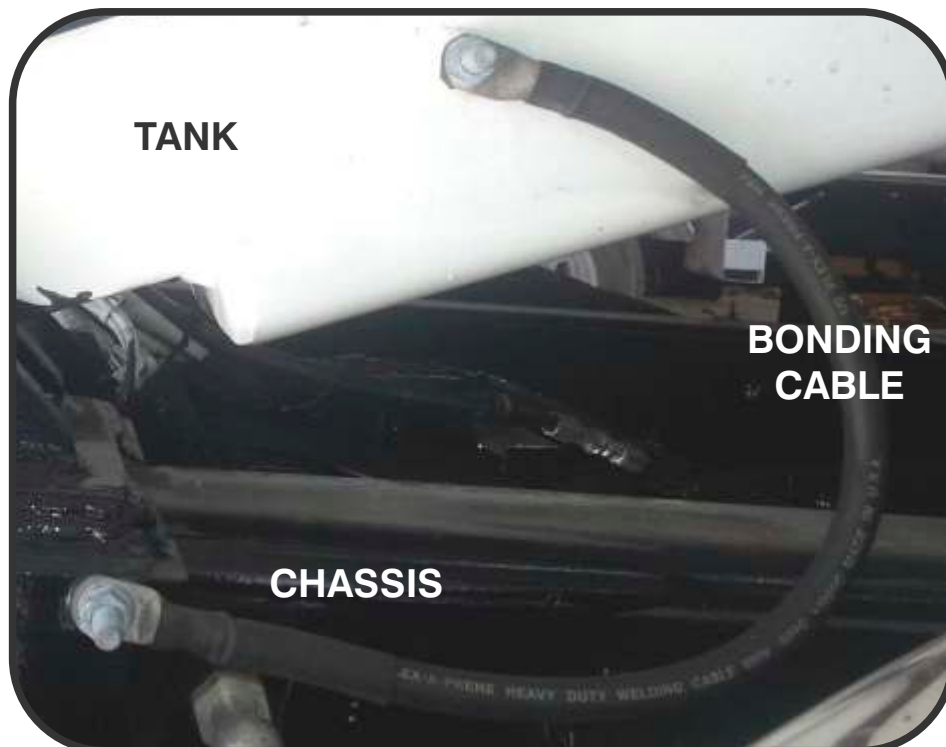
Any other information

Please contact Newson Gale Ltd if you require a translation of this manual.

Earth-Rite II MGV Road Tanker Tank to Chassis Bonding



It is important that the road tanker is fitted out with a bonding cable which electrically connects the product tank to the vehicle chassis.



EARTH-RITE II SYSTEM

Component Identification

MONITORING PCB



OPTIONAL I.S. SWITCHING PCB



VAC - FORM INSULATING COVER



DC POWER SUPPLY



Internal Component Assembly

Avoiding Electrostatic Discharge (ESD) damage to the ERII monitoring PCB /Card

Always take precautions to ensure that you are not electrostatically charged whilst handling the monitoring PCB / Card.

Always handle the PCB / Card by the edges, or terminal block, and avoid touching the components.

When not fitted inside the ERII enclosure, always keep the PCB / Card in the static dissipative bag provided.

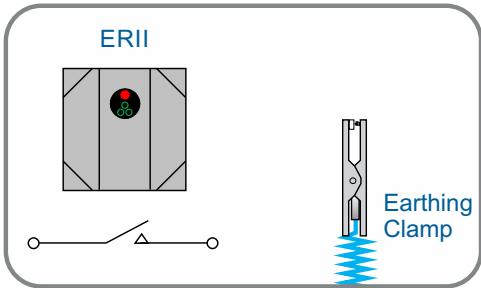
Always observe precautions against damage to the PCB's from electrostatic discharge.

1. Remove the lid of the enclosure.
2. Disconnect the three wires of the ribbon cable from the pi1 terminal block. Remove the monitoring PCB by unscrewing the three hexagonal metal pillars. Place the PCB in the anti-static bag provided and keep it safe.
3. Unscrew the pillar holding the Intrinsically Safe Switching PCB.
4. Swing the Intrinsically Safe Switching PCB to the left of the vacuum formed cover.
5. Remove the vac-form insulating cover.
6. Install the various cables into the enclosure using suitable glands and/or conduit. Make the connections to the Power Supply PCB.
7. Replace the vac-form insulating cover.
8. Replace the Intrinsically Safe Switching PCB onto the pillar and in front of the vacuum formed cover.
9. Replace and secure the pillar to hold the Intrinsically Safe Switching PCB.
10. Make the external I.S. wiring connections to the Intrinsically Safe Switching PCB terminals, taking care to support the PCB whilst tightening the terminal screws.
11. Replace the monitoring PCB and secure using the three hexagonal metal pillars. Reconnect the ribbon cable TO PI1 terminal block and make the external I.S. wiring connections into the PI3 and PI4 Terminal block.
12. Replace the lid of the enclosure securely.

Operation

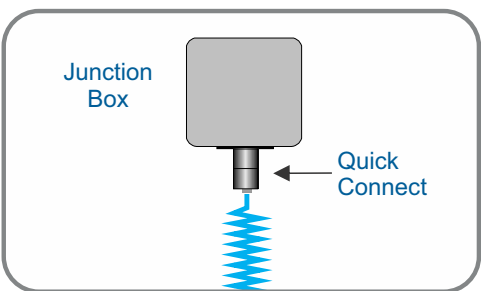
Important Note: The Clamp/s should be fitted prior to fitting hoses, or any other operation as per the recommendations of ATEX 2014/34/EU, ATEX 137, EN 60079-14, IEC TS 60079-32-1 and CLC/TR: 60079-32-1.

CAUTION: For the Static Control Verification function to work correctly, the system must be turned **ON** prior to the earthing clamp being connected to a suitable earth point.

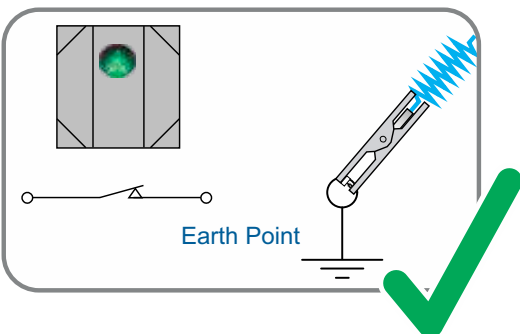


When not in use, the Clamp Cable should be disconnected from the Junction Box and stowed inside the vehicle cab or suitable locker.

A. In the normal "rest" state, with the Earthing Clamp not deployed, the **Red Negative Earth Condition** LED will be showing.



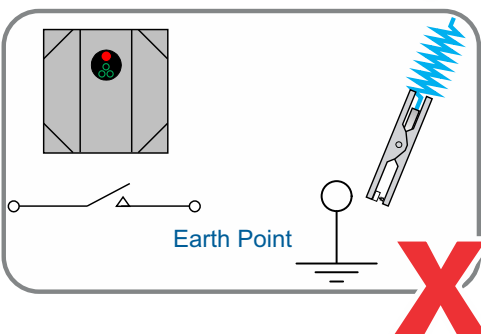
B. If necessary connect the Clamp and Cable assembly to the junction box via the quick connect.



C. Connect the Clamp Cable to the Junction Box Quick Connector. Attach the Earthing Clamp onto an Earth point and ensure that the pointed contacts are positively located.

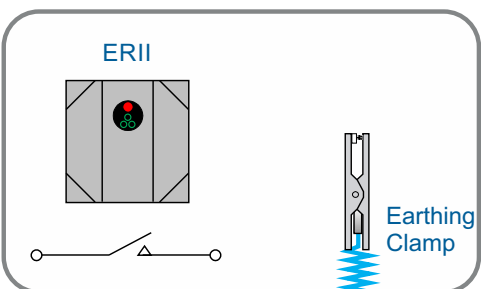
If the connection to the Road Tanker and Earth is good, the **Green Positive Earth Condition** LEDs will flash and the interlock contacts will close.

The product transfer operation can now take place.



D. If the connection between the Road Tanker and Earth is broken during the transfer operation, the

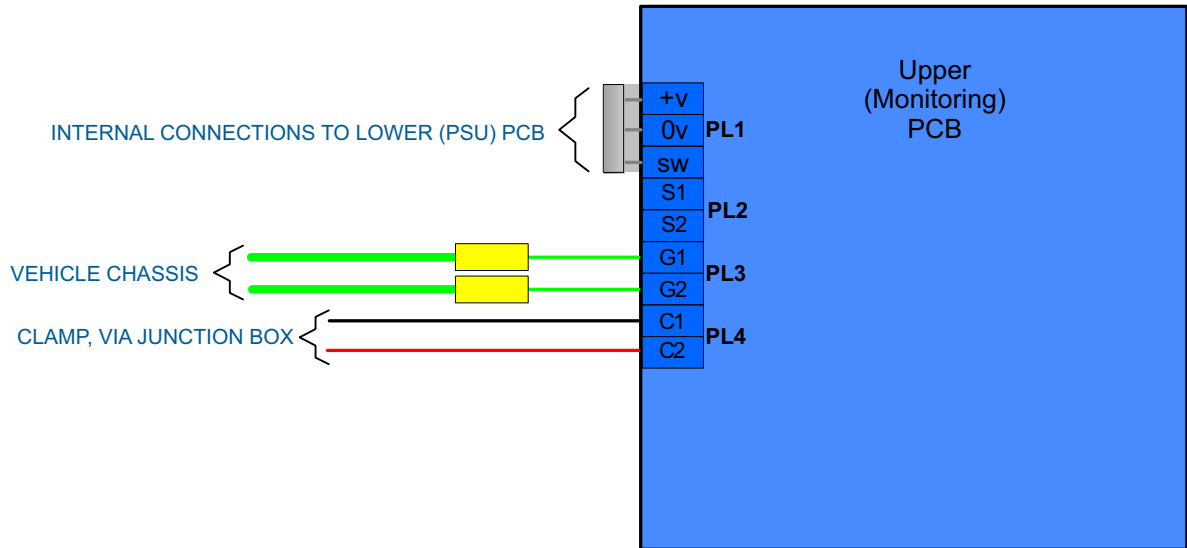
Red Negative Earth Condition LED will show and the interlock contacts will open.



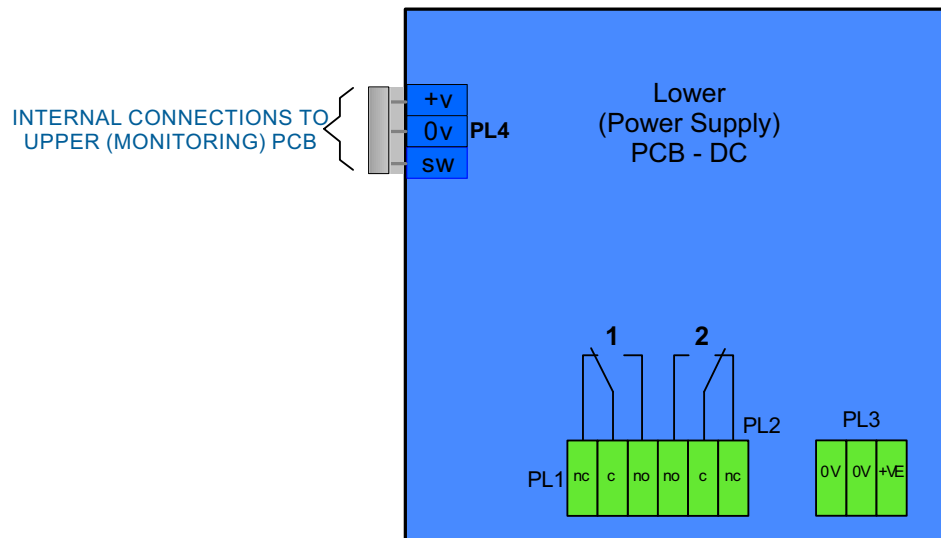
E. On completion the Earthing Clamp should be removed from the Earth point. The **Red Negative Earth Condition** LED will show. The Clamp Cable should be disconnected from the Junction Box and stowed inside the vehicle cab or suitable locker. Alternatively, the clamp may be stowed on the MGV Clamp Stowage Point.

Intrinsically Safe PCB Connections

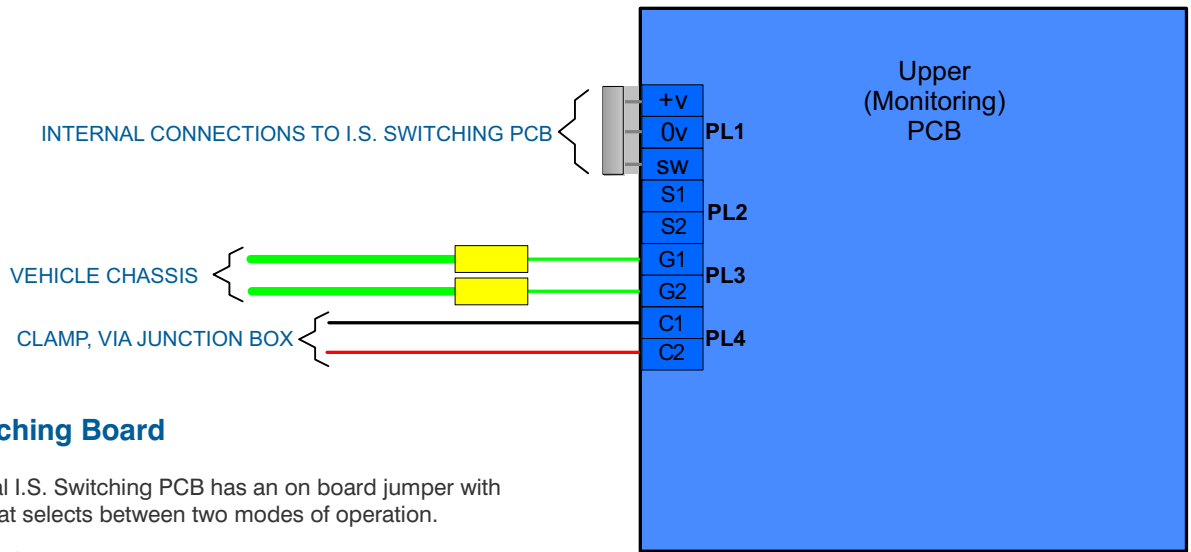
Monitoring PCB



Power Supply PCB

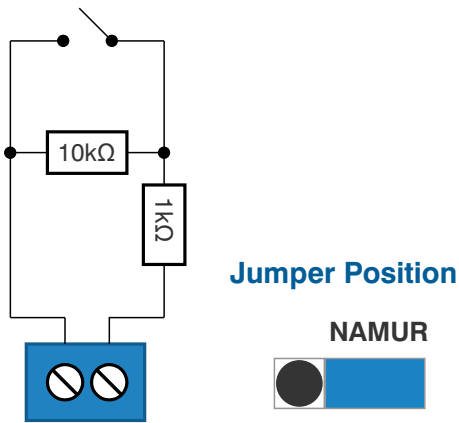


Optional Intrinsically Safe Switching PCB Connections

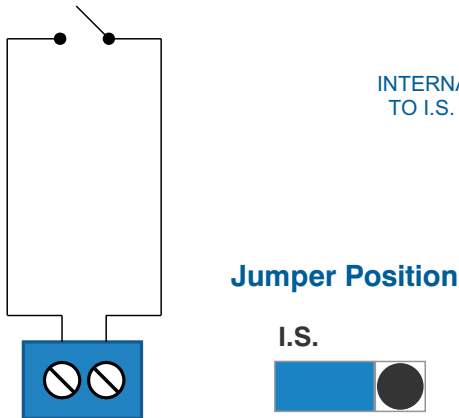


I.S. Switching Board

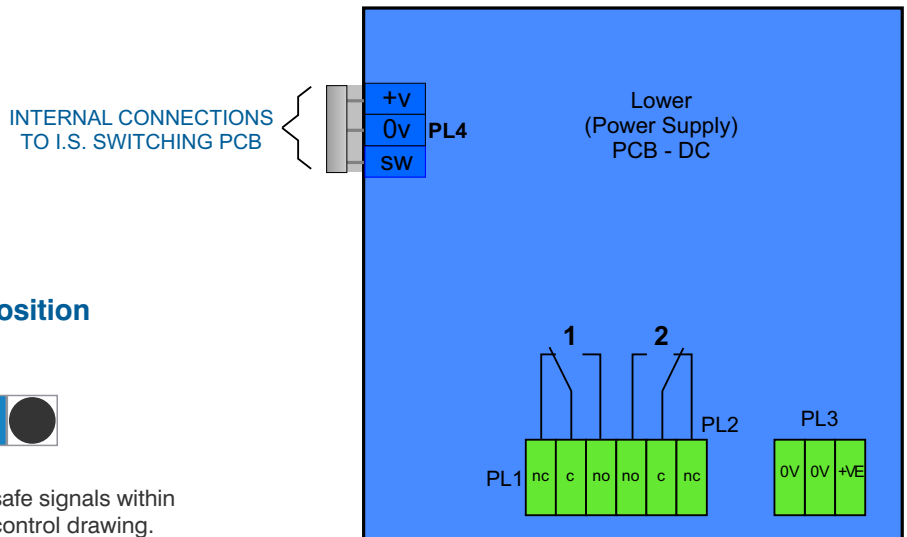
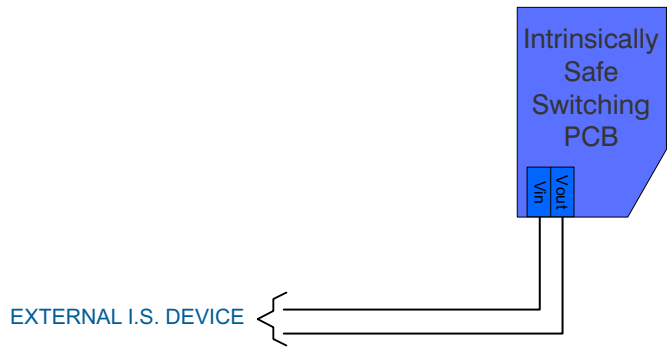
The optional I.S. Switching PCB has an on board jumper with a header that selects between two modes of operation.



NAMUR – A NAMUR compliant input that switches between two load resistances.



I.S. Switch – An interlock for intrinsically safe signals within the defined parameters as shown on the control drawing.

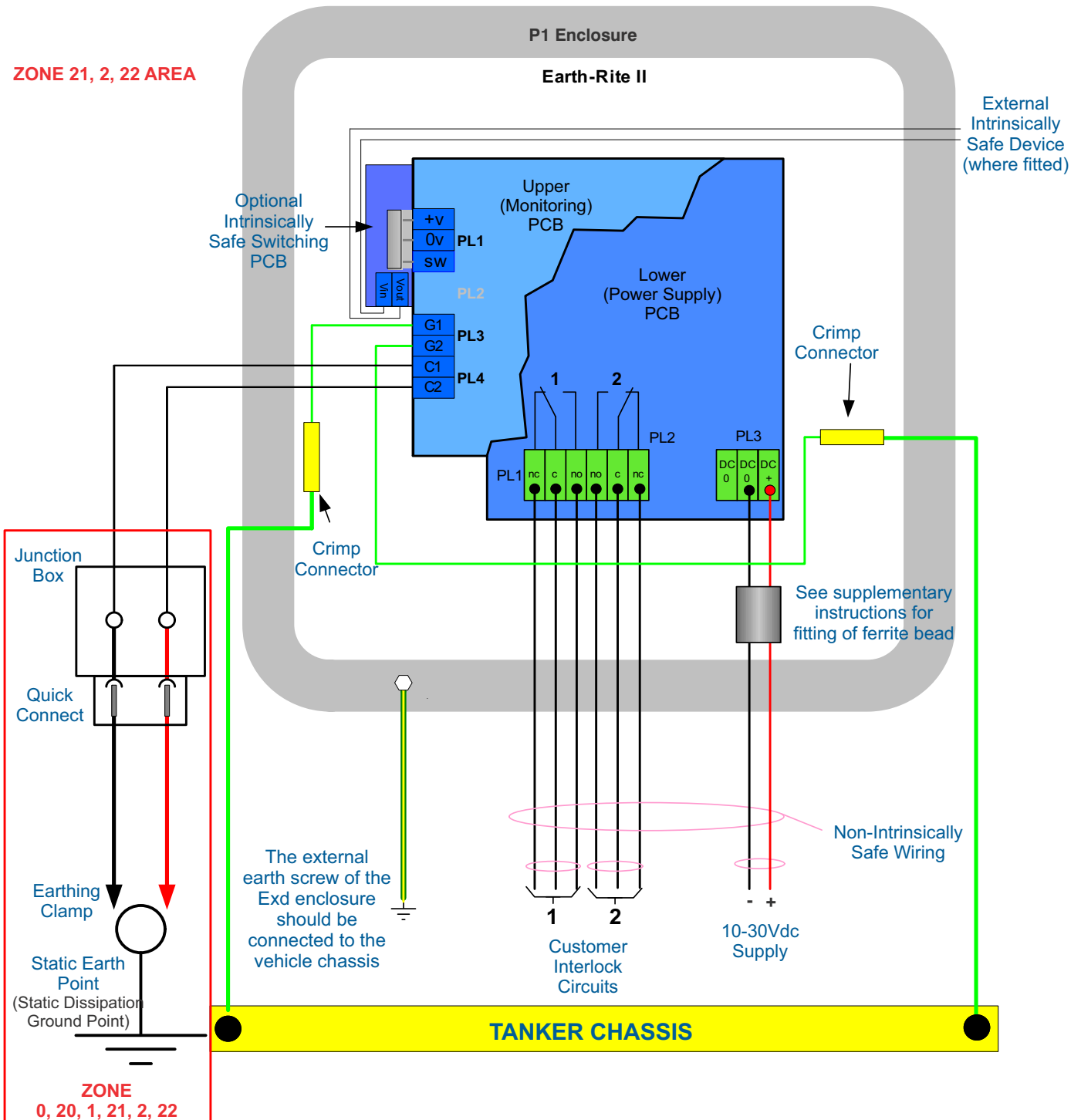


This I.S. Switching PCB is an optional extra.
Should this be required, order Part No.: **ER2/IS/KIT**

Earth-Rite II MGV

Cable Connections - DC Version

12-24V DC Supply



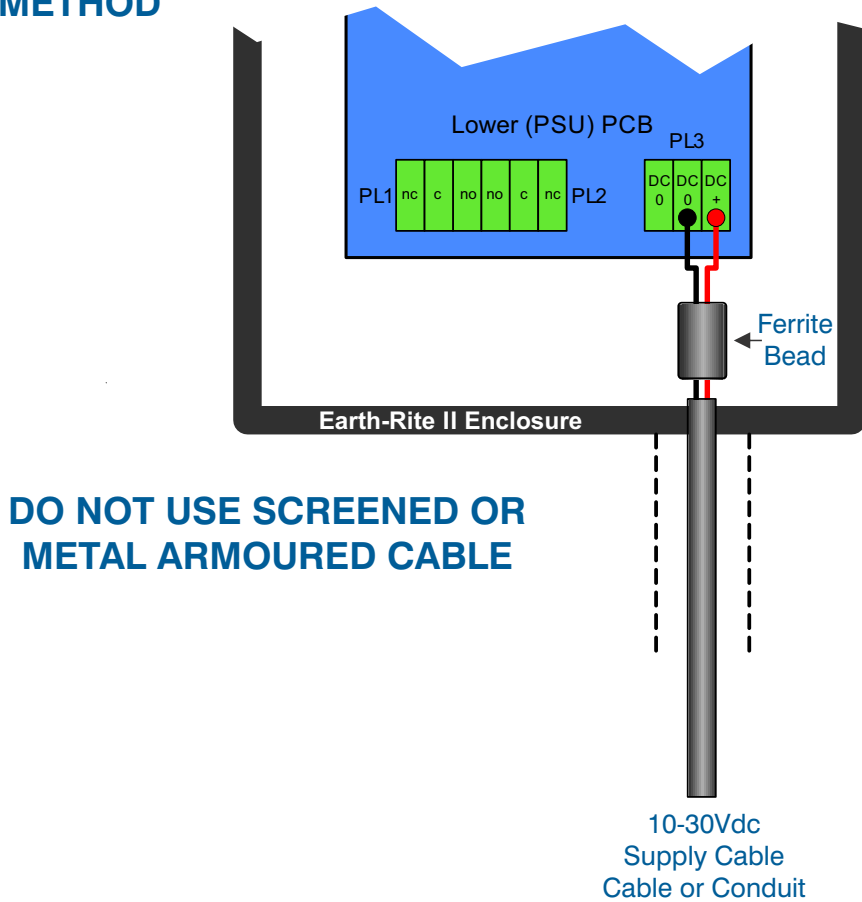
Verification of the Static Grounding Point

The Earth-Rite II MGV system is designed to verify the integrity of the ground point connection to the general mass of earth. Ideally, known ground points, with a low resistance to the general mass of Earth, should be used. However, other buried items of metal, such as steel posts, lightning conductors etc., may be used as the MGV system will verify that these items are less than 1000 ohms resistance, and therefore capable of dissipating electrostatic charges safely, to ground.

Important Note - The grounding clamp should be fitted prior to any other operation as per the recommendations of ATEX 2014/34/EU, ATEX 137, EN 60079-14, IEC TS 60079-32-1 and CLC/TR: 60079-32-1. It is important that the clamp is fitted before hoses are connected to the tank truck and before articulated trailer legs are deployed.

Ferrite Bead Fitting Instructions for **Earth-Rite II** P1 DC System

CABLE METHOD



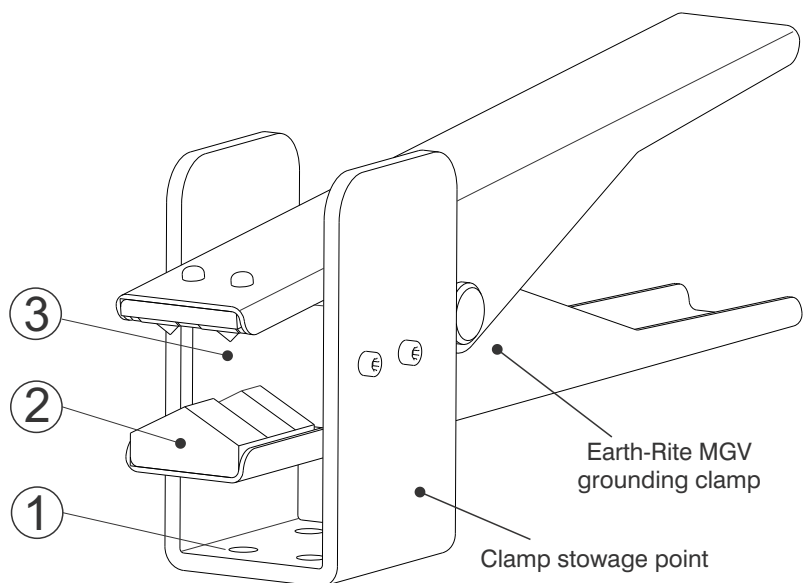
Clamp Stowage Point Fitting and User Instructions

Fitting Instructions

- Secure the Clamp Stowage point to a position on the truck that will enable the grounding cable to be stowed in the hose tray or some other location on the truck.
- The stowage point can be secured to the truck with 6 mm or 1/4" bolts at 4 bolt hole locations ①.

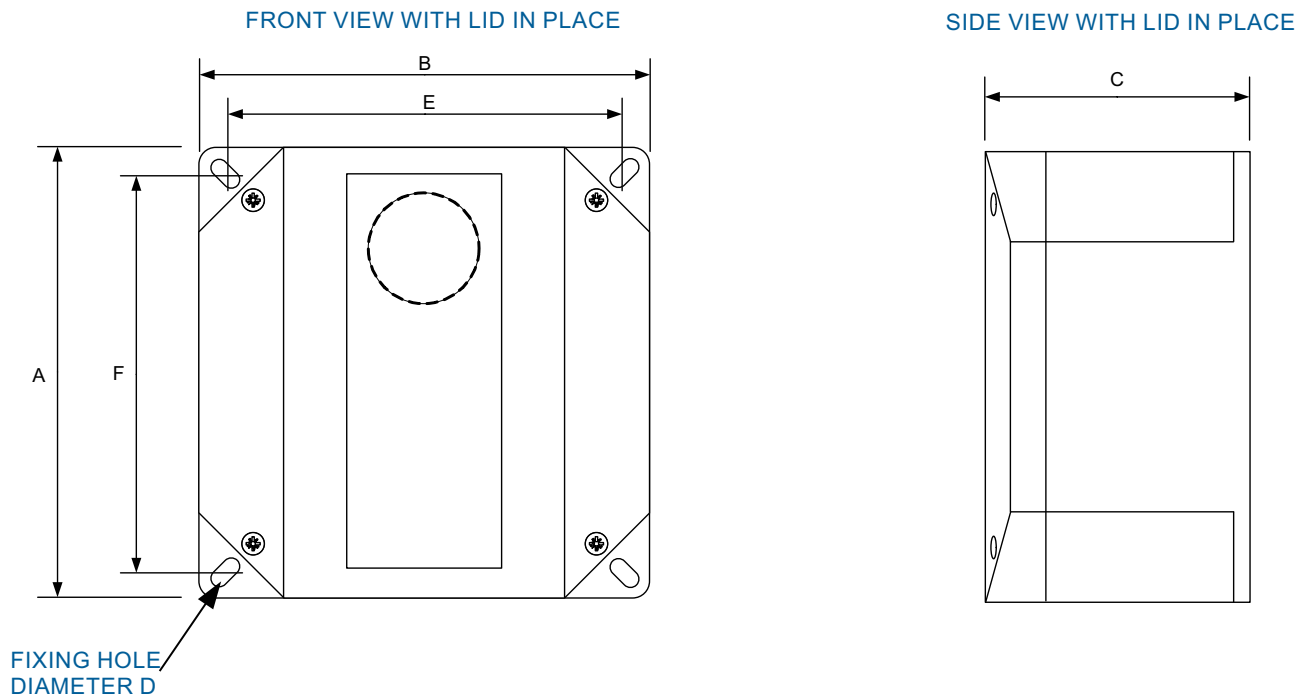
User Instructions

- To stow the grounding clamp correctly ensure the clamp's V-block ② is passed all the way across the stowage point block ③.
- Ensure the spiral cable is correctly stowed.

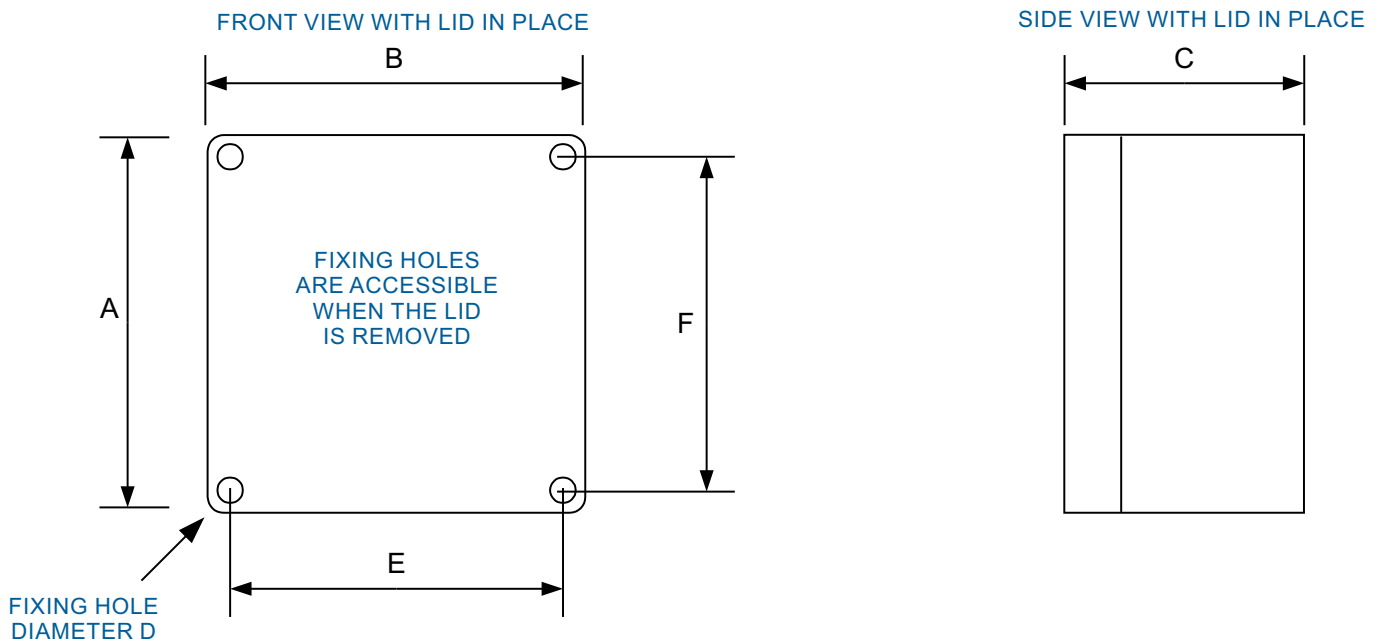


Earth-Rite ERII Dimensions

Monitoring Unit



Junction Box



PRODUCT DESCRIPTION	MAIN DIMENSIONS			FIXING DIMENSIONS		
	A mm	B mm	C mm	D mm	E mm	F mm
Earth-Rite II Monitoring Unit	160	160	94	12 X 7	140	140
Junction Box	75	80	57	4.5	68	45

Earth-Rite II MGV - P1 DC Technical Specification

Monitoring Unit

Power supply	12/24V dc (Supply voltage range: 10V to 30V dc)
Power rating	10 watt
Ambient temperature range	-40°C to +55°C
Ingress protection	IP66
Weight	1.25 kgs (nett)
Construction	Static Dissipative Glass-Reinforced Polyester
Certification	Ex ec nC [ia] IIC T4 Gc(Ga) Ex tb IIIC T70°C Db
Monitoring circuit	Intrinsically safe
Minimum tanker capacitance	1000 pF
Operational series ground resistance	</= 10 Ohm
Non I.S. Output relay contact rating	2 off voltage free change-over switch contacts, 250Vac, 5A, 500VA max resistive 30Vdc, 2A, 60W max resistive
I.S. switch rating	1 off contact Switching I.S. circuit only in accordance with the ER II control drawing
I.S. PCB terminal torque	0.5 Nm
Cable entries	7 x M20 (2 x plugged)

Junction box

Enclosure	GRP with carbon loading
Terminals	2 x 2.5mm ² conductor capacity
Cable entries	1 x 20mm
Clamp Cable Connection	Quick Connect

Earthing Clamp

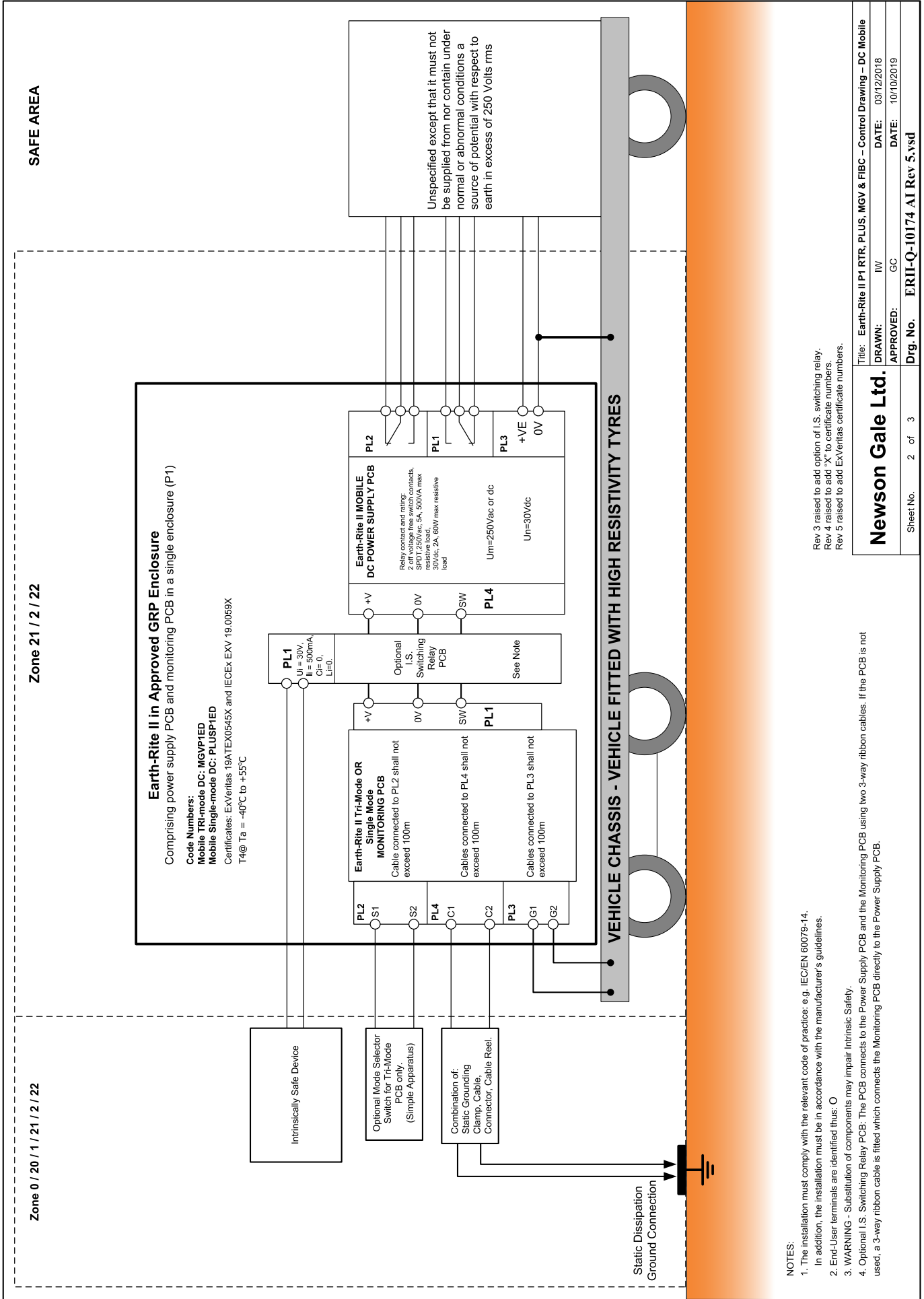
Clamp design	2 pole with tungsten carbide contacts
Body	Stainless steel

Spiral Cable

Cover	Blue Cen-Stat Hytrel sheath (Static dissipative, chemical & abrasion resistant)
Conductors	2 x 1.00mm ² copper
Length	15 metres extended, 1.5 metre unextended (other options available)

NB: In line with our policy of continual product development, we reserve the right to alter specifications at any time.

Ex scheduled drawing: DO NOT modify without approval from the notified body



- NOTES:**
- The installation must comply with the relevant code of practice: e.g. IEC/EN 60079-14. In addition, the installation must be in accordance with the manufacturer's guidelines.
 - End-User terminals are identified thus: O
 - WARNING** - Substitution of components may impair Intrinsic Safety.
 - Optional I.S. Switching Relay PCB: The PCB connects to the Power Supply PCB and the Monitoring PCB using two 3-way ribbon cables. If the PCB is not used, a 3-way ribbon cable is fitted which connects the Monitoring PCB directly to the Power Supply PCB.

Rev 3 raised to add option of I.S. switching relay.
 Rev 4 raised to add 'X' to certificate numbers.
 Rev 5 raised to add EXVentilas certificate numbers.

Title: Earth-Rite II PI RTR, PLUS, MGVP & FIBC - Control Drawing - DC Mobile	
DRAWN: IW	DATE: 03/12/2018
APPROVED: GC	DATE: 10/10/2019
Sheet No. 2 of 3	Drg. No. ER11-Q-10174 AI Rev 5.yxd

Ex scheduled drawing: DO NOT modify without approval from the notified body



Earth-Rite II

Important



The cables must enter the enclosure through the entries as shown to ensure certification is maintained.

Always use correctly specified and certified cable glands or conduit fittings.

Please refer to the main manual for conduit installations.

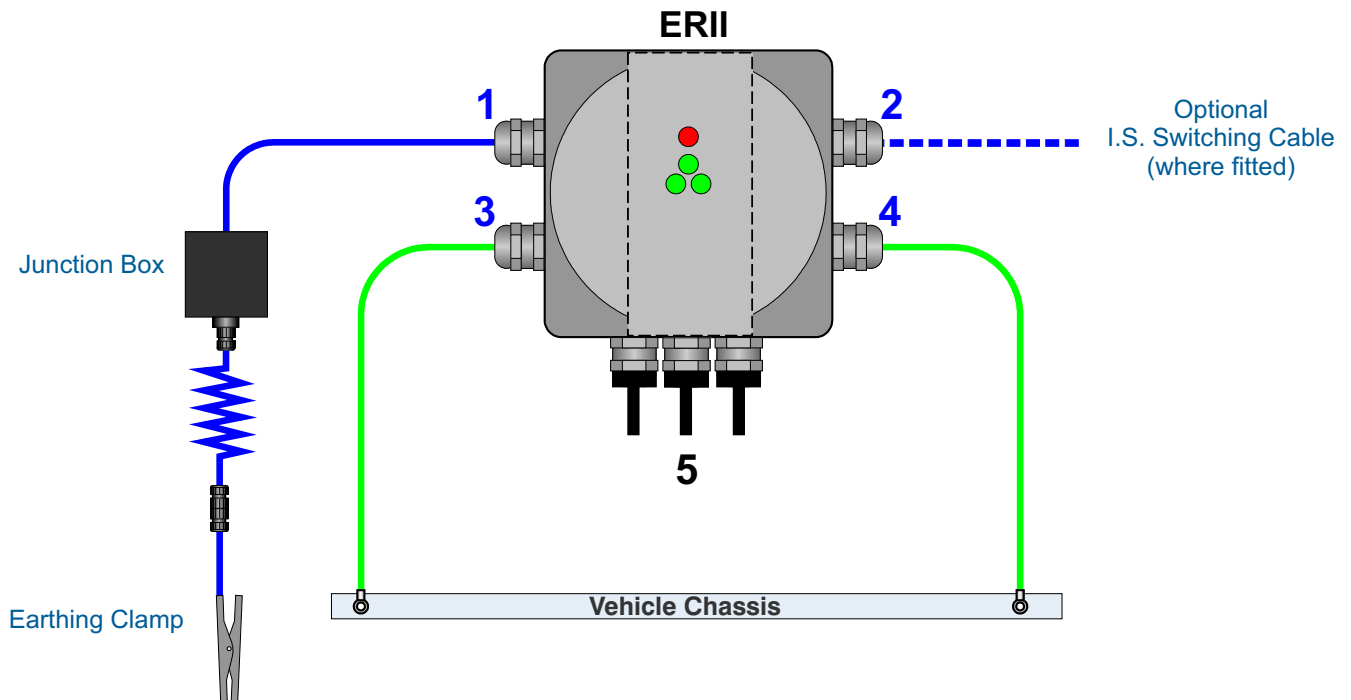
You will invalidate the certification if you do not install as per the instructions

1. CABLE ENTRY FOR CLAMP CIRCUIT CABLE (FROM MONITORING PCB TERMINALS C1 AND C2).
2. CABLE ENTRY FOR EXTERNAL I.S. DEVICE CABLE CONNECTION (FROM OPTIONAL I.S. SWITCHING PCB TERMINAL PL1).
3. CABLE ENTRY FOR GROUND CABLE (FROM MONITORING PCB TERMINAL G1).
4. CABLE ENTRY FOR GROUND CABLE (FROM MONITORING PCB TERMINAL G2).
5. CABLE ENTRIES FOR NON-INTRINSICALLY SAFE CABLES (FROM POWER SUPPLY PCB TERMINAL BLOCKS PL1, PL2, PL3 AND PROTECTIVE EARTH TERMINAL).

Earth-Rite II MGV Cable Considerations

The use of conduit, armoured, braided or screened cable between the monitoring unit and junction box will affect the factory set permissive threshold of the Earth Rite II MGV system and is not recommended.

Where regulations insist on its use, conduit, armoured or braided cable should have a maximum length of 1 metre (3' 3") between the monitoring unit and junction box.



Avoiding Electrostatic Discharge (ESD) damage to the ERII monitoring PCB / Card



- Always take precautions to ensure that you are not electrostatically charged whilst handling the monitoring PCB / Card.
- Always handle the PCB / Card by the edges, or terminal block, and avoid touching the components.
- When not fitted inside the ERII enclosure, always keep the PCB / Card in the static dissipative bag provided.

User instructions in compliance with IEC 60079-0 clause 30

The following instructions apply to the **Earth-Rite II Earth Monitoring Unit**, covered by certificate numbers **IECEX EXV 19.0059X** and **ExVeritas 19ATEX0545X**.

Instructions for **safe selection, installation, use, maintenance and repair**

The equipment may be used in zones 2, 21 and 22 with flammable gases and dusts.

The equipment may be used in the presence of flammable gases and vapours with apparatus groups IIC or IIB or IIA and with temperature classes T1 or T2 or T3 or T4.

The equipment may be used in the presence of flammable dusts, powders and flyings, conductive or non-conductive, the only limitation being the maximum external surface temperature of 70°C.

The equipment is certified for use in ambient temperatures in the range of -40°C to +55°C and should not be used outside this range.

The equipment is to be installed by suitably trained personnel in accordance with the applicable code of practice (typically IEC/EN 60079-14).

No user adjustment is required.

Regular periodic inspection of the equipment should be performed by suitably trained personnel in accordance with the applicable code of practice (typically IEC/EN 60079-17) to ensure it is maintained in a satisfactory condition.

The equipment is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice.

The equipment contains no user-replaceable parts.

Specific Conditions of Use (denoted by X after the certificate number)

In locations where high external humidity and internal temperature variations (e.g. frequent on-off cycles) may cause condensation inside the equipment, the interior shall be periodically inspected.

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Right to change

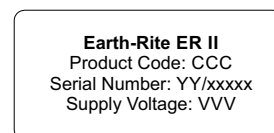
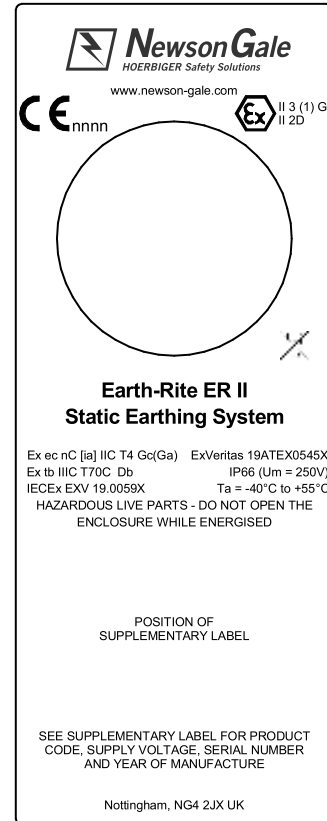
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Certification Label Detail



NOTE:

CCC = MGVP1ED
YY = Year of Manufacture
XXXXX = Specific Serial Number
VVV = 12-30Vdc



www.newson-gale.co.uk