

RH800 Four Channel MDVR Intrinsically and None Intrinsically Safe Generic Install Document



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Preface

The purpose of this document is to provide technical advice and processes for fitting an RH800 into a vehicle. It will include information pertaining to an Intrinsically safe installation process as well as a none intrinsically safe process.

Intrinsically Safe

Vehicles incorporating a Tank design to allow the transportation of dangerous goods by road and as such come under the strict guidelines of the ADR/ATEX regulations. **Not all vehicles are of a tank design, please check before starting any installation work as this will have an impact on how the telematics unit is powered.**

This is usually but not limited to the Oil and Gas Industry whereby goods and substances carried, present a risk of an explosion when exposed to the outside world during service delivery procedures. It is therefore important that any Telematics/Radio Device fitted to these types of vehicles does not compromise the ADR/ATEX regulations.

The UK code of practice document FCS1364:2019 has been produced by the FCS (Federation of Communication Services) Installer Group in conjunction with the Energy Institute and the Safe Loading Pass Scheme (SLPS) to assist in the installation of such equipment. ALL automotive installers fitting trakm8 telematics equipment should be familiar with the procedures laid down in this document and should be trained and approved for the delivery of these procedures. They should also maintain a watching eye on the revision of this standard to ensure they are aware of the most up to date guidelines currently in circulation.

A key requirement of these guidelines is as follows:

If the equipment to be installed into the vehicle Cab is NOT ATEX zone approved, then it MUST be powered from the isolated side of the vehicle ADR switch to ensure that the telematics equipment is de-powered during service delivery operations involving an ADR switch.

ONLY ATEX ZONE 2 approved equipment is allowed to remain powered within the vehicle cab at all times during service delivery operations. The Trakm8 Telematics Equipment described in this document DOES NOT comply with this ATEX standard and as such CANNOT be permanently powered during ADR switch activation. This mandatory requirement implies that the telematics equipment CANNOT be powered from the same power source used by the vehicle Tachograph.

None Intrinsically Safe

None Intrinsically safe Vehicles can be permanently powered at all times, and it is the responsibility of the fitter to ensure that they are aware of the vehicle type they will be working on and select the appropriate procedure for connecting power to the telematics equipment as well as any specific cable protection and routing around the vehicle.

Tools

The following Tools and Consumables are required to carry out this installation:

- PVC material tape
- Insulation Tape
- Self-amalgamating tape
- TESA adhesive cloth fabric tape
- Cable Ties
- Radio keys (to remove tachograph)
- Dashboard trim removal tool
- Latex or anti-static gloves
- **Solder/ Soldering equipment***

PLEASE NOTE*

ATEX zoning and intrinsic safety requirements change across all sites, therefore it will be presumed that any hot works (heat gun), drilling and other processes which could present an explosive risk should be discussed with the site first to understand where the installation work can take place.

Where possible the installer/booking party should enquire as to workshop availability and where this is not possible the site contact should be asked to ensure a safe area is available to carry out the installation.

A risk assessment and onsite training may be required and should be checked with the site contact prior to attending the installation.

Overview

The following procedures describe the fitting of a Trakm8 RH800 telematics unit with four Camera Lens to provide a telematics solution that will monitor, collate and stream data in accordance with the regulations described previously:

- Video Recording – using the RH800 on board video system.
- GPS tracking – using the RH800 external GPS receiver/antenna.
- CAN data – using the RH800 connected to the vehicle FMS gateway.
- Tacho Driver ID – using the RH800 interfaced to the vehicle Tachograph.
- Tacho Vehicle and Driver download interfaced to the vehicle Tachograph.
- Panic Alert – using the RH800 accessory event button.
- Power Take Off (PTO) – using the RH800 Input.

This document has been produced to provide exact instructions on how this equipment is to be installed and under no circumstances should the installation methods deviate from this document without written permission. Before commencing any work, a pre-installation vehicle check should be carried out to check for vehicle faults and any issues found should be reported to the site contact before commencing any work.

These include but are not limited to:

- Dashboard Faults
- Windscreen damage
- Internal Panel damage
- Lights and indicators operation

The installer should also record the following:

- Vehicle registration (if available) and VIN Number.
- Vehicle make and model.
- Tachograph serial number
- IMEI, SIM SSN (If available), BLE Serial Number (GUID) numbers for the telematics accessory equipment.
- Complete the Pre-installation checklist and report any vehicle faults to the site contact.

NOTE

In some cases the solution may not call for all the hardware in this document. The works order will detail exactly what is required.

If you are NOT insured for the vehicle in question, then you should not drive or move the vehicle during the installation process.

Ensure the ignition remains switched OFF at all times during the installation process to avoid making electrical connections whilst the vehicle interfaces are active to avoid introducing faults into the vehicle ECU.

Hardware

The following hardware is required for a generic vehicle installation:

- RH800 – MDVR
- ACC540 - Tacho connection Cables
- R204XX – Cameras depending on install type



RH800 - Components

CAB943 - 3 Way Power harness



ANT140 External BLE Antenna



CAB942 - 16 Way Serial I/O harness



ANT141 External GPS Antenna



ACC540 - Components



CAB854

CAB853

CAB851

RH800 Connectors

RH800 Connectors

1. Power 4 Way Molex - CAB943
2. Serial Connector 16 Way Molex - CAB942
3. External GPS/GSM Antenna connectors – ANT141
4. Bluetooth Antenna – ANT142
5. External Cameras – Using 4 x CAB940
6. Monitor Cable – CAB941



RH800 Front showing LED status on the Cameras Lens and Unit Comms.



Vehicle Hardware Locations

The Locations of the hardware will be different from vehicle to vehicle. All on view hardware locations MUST be signed off by the customer

The Telematics hardware and associated interfaces are located within the driver cab of the vehicle as shown:

1. RH800 Telematics unit
2. R20401- In Cab forward facing
3. R20402 - Remote Camera Lens (driver monitoring)
4. ACC540 - Tacho connection.
5. Power and Direction Indicator Pickup points
6. GPS/GPRS Aerial
7. Monitor
8. Panic button

The Telematics hardware, located outside of the cab as shown:

9. Side camera, mounted on the bonnet with clear sight of the side of the HGV



Remote lens - R20402

Depending on the vehicle type a remote camera lens bracket (ACC921) would be required. Mount the bracket high up above the passenger door facing towards the driver seat.

Route the cable discretely and connect to an extension AVI cable.



Lens location



Electrical Connections – General

- Depending on the Vehicle type the Electrical installation process will essentially fall into one of two solutions:
 1. Intrinsically safe Installation.
 2. None Intrinsically Safe Installation.
- The main difference between the two are the rules governing the connection to the vehicle power source as well as the routing of wires and cables around the vehicle. It is the responsibility of the fitter to confirm what type of vehicle they will be working on and choose the appropriate guidelines and procedures described in this document.

Intrinsically Safe Installation

- All electrical connections between the equipment and the vehicle MUST be carried out in accordance with ADR/ATEX regulations referred to in the preface of this document.
- ALL power sources used for the telematics equipment and accessories MUST be sourced from the switched side of the ADR switch. Modern vehicle manufacturers can provide vehicles with more than one ADR switch fitted (Ext LHS, Ext Vehicle RHS and In cab variants) and it is the responsibility of the fitter to ensure that the power source is removed from the telematics equipment when ANY or ALL of these ADR switches are activated.
- It is common for this type of telematics equipment for ALL the Cables to remain within the vehicle cab (ATEX ZONE 2) and therefore do NOT fall under the strict regulations associated with the external cab ZONES 0 and 1 that require these to be contained and routed within none split conduit around the vehicle.

None Intrinsically Safe Installation

- All electrical connections should be carried out in accordance with MPT1362 which do NOT have any restrictions on the power source and/or the routing of any associated cables around the vehicle. Permanent Power sources such as those supplying the vehicle tachograph can be used to power the vehicle Telematics and accessories.

Electrical Connections Intrinsically Safe – RH800 CAB943

- The Cable assignment for the RH800 CAB943 Power Cable is as follows:

CAB943 - 4 Way Power connector	Wire Colour	Function
1	Red	12VDC/24VDC Positive Supply (12V and 24V vehicles)
2	Blue	Ignition Switched Live
3	Black	OEM Ground

- Red Wire – connect to an ADR switched vehicle supply.
 - **THIS MUST BE ISOLATED WHEN ANY ADR SWITCH IS ACTIVATED.**
 - **Ensure this is checked using a multi-meter.**
 - **This wire has an inline Fuse holder rated at 3A.**
- Black Wire – connect to vehicle ground. **Chassis bolt**
- Blue Wire – connect to vehicle ignition. This wire has an inline fuse holder rated at 1A

Electrical Connections Intrinsically Safe – RH800 CAB942

CAB942 - 16 Way Serial I/O connector	Wire Colour	Function
1	Green/White	CAN1_High - Twisted Pair 1 FMS/OBD
2	Purple/White	CAN2_High - Twisted Pair 2 Tacho
3	White/Black	Tacho D8 (Driver ID)
4	Purple	INPUT 0
5	White/Blue	INPUT 2 (Offside Camera) (Right hand vehicle indicator)
6	White/Red	RS232_TX1
7	Green	RS232_RX1
8	Black/Yellow	RS232 (Ground)
9	Blue/White	CAN1_Low - Twisted Pair 1 FMS/OBD
10	Red/White	CAN2_Low - Twisted Pair 2 Tacho
11	Yellow	Button/Input
12	Grey	INPUT 1
13	Black/Red	INPUT 3 (Nearside Camera) (Left hand vehicle indicator)
14	Orange	INPUT 4
15	White/Green	INPUT 5
16	Black	Button Input (Ground)

Electrical connections Tachograph – ACC540 wiring

The ADR/ATEX regulations do NOT allow connection to a Power and ground source via the rear of the tachograph using CAB854 cable.

The ONLY wiring to be taken from the rear of the tachograph are Tacho ID via CAB851 and Tacho download via CAB853

These are connected as follows:

- CAB851 is plugged into the D connector at the rear of the Tachograph and has the following connectivity.
 - White/Black wire – Tacho ID, connect to the White/Black wire on the CAB942 connected to the RH800.
- CAB853 is plugged into the C connector at the rear of the Tachograph and has the following connectivity.
 - Red/White wire – Tacho Download, connect to the Red/White wire on the CAB942 connected to the RH800.
 - Purple/White wire – Tacho Download, connect to the Purple/White wire on the CAB942 connected to the RH800.



CAB854
Not used (**Intrinsic**)
Tacho A Plug



CAB853
Tacho C Plug Download



CAB930
Not used (**Intrinsic**)
RH600 only



CAB851
Tacho D8 Driver ID

Rear of the tacho head- C and D Connector



Electrical Connections NONE Intrinsically Safe – RH800 CAB943

- The Cable assignment for the RH800 CAB943 Power Cable is as follows:

CAB943 - 4 Way Power connector	Wire Colour	Function
1	Red	12VDC/24VDC Positive Supply (12V and 24V vehicles)
2	Blue	Ignition Switched Live
3	Black	OEM Ground

- CAB943 Red Wire – Can be connected to the Red on the A Plug CAB854 Red wire see Page 15
- CAB943 Black Wire – Can be connected to the Black on the A Plug CAB854 Black wire see Page 15
- CAB943 Blue Wire – Can be connected to the Blue on the A Plug CAB854 Blue wire see Page 15

Electrical connections Tachograph – ACC540 wiring

These are connected as follows:

- CAB851 is plugged into the D connector at the rear of the Tachograph and has the following connectivity.
 - White/Black wire – Tacho ID, connect to the White/Black wire on the CAB942 connected to the RH800.
- CAB853 is plugged into the C connector at the rear of the Tachograph and has the following connectivity.
 - Red/White wire – Tacho Download, connect to the Red/White wire on the CAB942 connected to the RH800.
 - Purple/White wire – Tacho Download, connect to the Purple/White wire on the CAB942 connected to the RH800.
- CAB854 is plugged into the A connector in the rear of the Tachograph and the original removed Tacho A plug is inserted into the CAB854. Power connection for RH800 using CAB943
 - Red wire – Connect to the CAB943 Red wire.
 - Black wire -Connect to the CAB943 Black wire.
 - Blue wire – Connect to the CAB943 Blue wire.



CAB854
Tacho A Plug Power



CAB853
Tacho C Plug Download

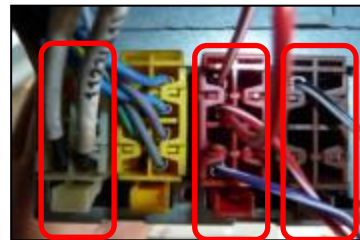


CAB930
Not used
RH600 only



CAB851
Tacho D8 Driver ID

Rear of the tacho head- A,C and D Connectors



Rear of the tacho head- with CAB854



Electrical connections PTO – (Power take off)

- The PTO function is sensed by the (RH800) using the Violet wire on the CAB942.
- The PTO may be labelled on the dashboard and subsequently initiated by the driver operating a switch and this switch may be labelled as shown.
- Connect the Violet wire to the PTO switch wire which changes state when being operated.
- The PTO wire will vary from vehicle to vehicle and should be cross referenced against vehicle type for its location.
- Record whether this switch is a positive or a negative going edge because this will determine the unit configuration options.



Note:

If the PTO wire is a Low (ground/negative) standing circuit transgressing to an open circuit, then the RH800 will not detect this as a PTO event. In this scenario a pull up circuitry via a resistor will need to be implemented. Please confirm/consult with TrakM8 engineering for an alternative wiring approach.

If the vehicle is intrinsically safe, then the PTO connection point may reside outside of the vehicle CAB. In this scenario the wiring will need to be routed within un-split conduit to maintain compliance with the ADR/ATEX regulations.

FMS - PSM Electrical Connections

- HGV vehicles from 2006 onwards are fitted with a **Parameterizable Special Module** (PSM). The PSM control unit forms the interface between the vehicle and the electronic systems of the body manufacturer. The PSM control unit allows the body manufacturer's electronic systems to read vehicle information and control vehicle functions (e.g. the central locking (ZV)) via the Controller Area Network bus class B (interior) (CAN-B).

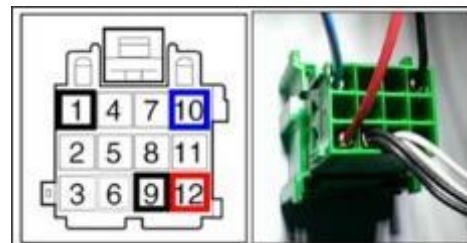
IMPORTANT NOTE

The CAN installation procedure for FMS (J1939) is not included as part of this manual as it is heavily vehicle/manufacture specific.

However, Trakm8 do hold specific documents pertaining to specific manufacturers of HGV vehicles. Please contact Trakm8 for further information.

Where an FMS gateway is not fitted, confirmation is required to make a 'direct' non gateway connection.

Example below is for a Daf LF (Gateway connection)

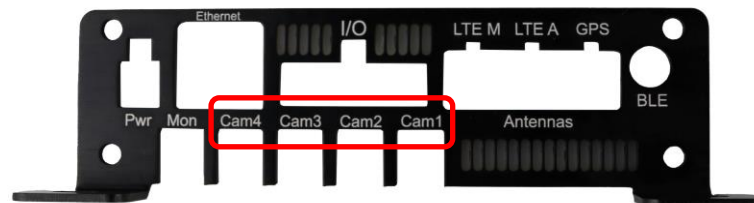


Body Builders Plug	RH800 Wire Colour	Function
1		OEM GND
6	Green/White	CAN_High - Twisted Pair FMS
9	Blue/White	CAN_Low - Twisted Pair FMS
10		Ignition Switched live
12		24VDC Positive Supply

Camera and trigger allocation

- Camera allocation
 - For the correct operation and view in insight the cameras MUST be allocated to the correct channel on the RH800. The camera channels are labelled. Please refer to the table
- Indicator triggers
 - RH800 has been designed to limit the amount of setup by the installer. Lefthand indicator will bring up the lefthand camera on the monitor and the righthand will bring up the righthand camera. Using the hazards will bring up the lefthand only. Please refer to the table

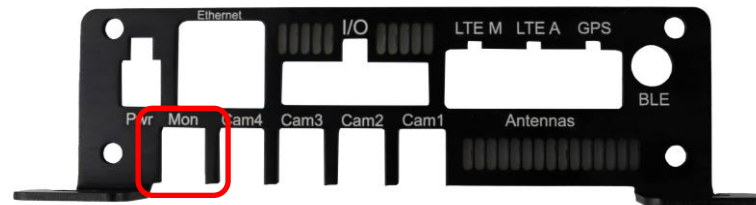
Channel	Camera
1	Front (MUST BE CONNECTED)
2	Driver
3	Offside or Rear
4	Nearside



CAB942 - 16 Way Serial I/O connector	Wire Colour	Function
5	White/Blue	Offside Camera
13	Black/Red	Nearside Camera

In Cab Monitor R20235

- Monitor
 - Please confirm with the customer the correct location for the monitor and if it been agreed that the mounting bracket can be screwed down
 - The monitor AVI connector marries up with the AVI connector on the RH800
 - The Red and Black wires on the monitor harness are not required. Make sure both wires are insulated.



Commissioning and Completion of Installation

- When the RH800 has powered up you can turn the ignition on for about 5mins you can perform a panic alert by holding down the panic button for 3 seconds this will send an alert to the server. Also perform some Tacho state changes on the Tachograph.
- Verify ADR switch(s) operation powers down the equipment (Power loss/restore).
- Please have the following information available before contacting the Trakm8 commissioning team on (03303334117). This will make the process quicker if these details are at hand:
 1. RH800 Unit IMEI (this is the 15 digit serial number across the Trakm8 unit).
 2. GUID number if any BLE accessories have been installed (this is the 12 digit serial number on the Trakm8 accessory).
 3. Vehicle registration.
 4. Vehicle Make and model.
 5. Tacho Serial number
 6. Mileage reading.
- The commissioning team will check the vehicle type and then send the correct configuration to the unit & check for an FMS reading & tacho state changes.
- When Trakm8 have finished commissioning the unit and it is reporting in as expected, you will then be issued with a unique commissioning number to confirm a successful install.
- The vehicle can now be rebuilt checking all panels are fitted correctly. Please ensure that the vehicle is left in a clean and tidy manner with all cable tie ends and cable snips removed from the vehicle.

A vehicle post installation check should now be completed to check vehicle functions.