Table Of Contents

NBFL

Operations Manual

Customcare is the Customer Service Division of Wright Group, Galgorm, Fenaghy Road, Ballymena BT42 1PY, N. Ireland.

Telephone: 028 25 663005 Fax: 028 25 630518

Revision 1.0 - 12/08/2013

Table Of Contents

Wrightbus reserve the right to change the procedures, materials, specification, dimensions or design of the vehicle shown, described or referred to herein at any time and without prior notice in accordance with the Company's policy of Continuous product improvement.

Introduction

It is recommended that this handbook is kept with the vehicle.

This handbook is based on the vehicle and original equipment fitted at the factory. Whilst every effort is made to ensure the information given in the manual is correct at the time of going to print, the Wrightbus policy is one of continuous improvement and the right to change specifications and equipment without notice is reserved.

For this reason, you may find some illustrations and/or certain parts of the text in this handbook which do not correspond exactly to the particular situation on your own vehicle.

The purpose of this operation guide is to provide drivers with information to help them to operate their vehicles safely and efficiently. It is recommended that it is kept with the vehicle.

Care and attention given at the right time will ensure efficient and optimum performance. Periodic attention is necessary, and should help to avoid breakdowns. Never run the vehicle in a doubtful condition, always report back to the garage for inspection and attention.

Vehicles manufactured by Wrightbus, when delivered, comply with all current department of transport regulations and codes of practise appertaining.

In all communications please quote the relevant V.I.N and engine number. This will ensure prompt attention.

Gross vehicle weight and axle loadings are based upon the maximum seating capacity of the vehicle, as delivered, (including the driver).

Wrightbus
Galgorm Industrial Estate
Fenaghy Road
Ballymena
BT42 1PY
N. Ireland

Telephone: +44 (0) 2825 641212
Fax: +44 (0) 2825 649703

Wright Group Customcare
Galgorm Industrial Estate
Fenaghy Road
Ballymena
BT42 1PY
N. Ireland

Telephone: +44 (0) 2825 663005
Fax: +44 (0) 2825 630518

Table of Contents

Table of Contents

Warnings

Health and Safety

Moving the vehicle

Before driving the vehicle, operators must familiarise themselves with the vehicle's operation guide.

Working on the vehicle

Before commencing work on the vehicle, take note of all the instructions relating to safety and hazardous items. The following potential hazards should be considered.

Stored Energy

Certain components and systems on the vehicle contain stored energy which must not be released in a non-approved manner.

Tyre air pressure.

Braking system spring compression, pressure in the air lines, Hybrid electrical system

Cooling system pressure and temperature. Coolant in the system will remain hot and under pressure for some time after use. Allow to cool before attempting to remove the header tank cap.

Chassis lifting - adequate support required during jacking or lifting. Eye protection should be worn when working under the vehicle

Diesel injection pumps supply fuel to the engine at a very high pressure, care must be taken when working on the injectors or injection pipes, as fuel under high pressure can penetrate the skin.

Brake discs will remain at an extremely high temperature for a considerable amount of time after use, caution must be exercised when handling such items to avoid burns.

Hazardous materials

Certain components on the vehicle contain, or can produce, material which must be handled with caution. Theses materials are as follows:

Those which must not be taken internally or contact the eyes, skin or mouth.

Battery Acid

Diluted sulphuric acid can cause skin burns, eye damage and internal damage if ingested. Vapour from the solution can also irritate the respiratory system and the eyes. Take care carrying the battery. Hydrogen gas given off by the battery is highly explosive.

Mineral Oil

This type of oil contains small quantities of polycyclic aromatic hydrocarbons, which can cause irritation, dermatitis and oil acne if allowed persistent contact with the skin. Toxicity through ingestion is of a low order, however this should be avoided. If swallowed or gets into eyes, seek medical advice.

Warnings

Health and Safety

Hydraulic fluids

These can cause mild irritation of the skin and eyes. The toxicity through ingestion is generally regarded to be low order. If swallowed or gets into the eyes, seek medical advice.

Friction Material Dust

The OEM friction materials are asbestos free. Handling and fitting lined brake pads or clutch plates is not regarded as a health risk. The dust produced by worn linings is degraded by the brake or clutch and is not believed to be hazardous. However it is prudent to avoid generating airborne dust concentration, therefore dust removal should be by the use of an approved vacuum cleaner or by the use of a damp cloth (for occasional exposure).

Insulation Material

Man made fibres which include glass, rock, slag and metal oxides. Inhalation of dust from the fibres should be kept below 1 fibre/ml.

Fuel

Contact with the skin can cause irritation and dermatitis. Inhalation and ingestion are serious risks and can cause chemical pneumonitis. If swallowed or if it gets into the eyes, seek medical advice.

Exhaust Emissions

Can be highly toxic if inhaled in sufficient quantity. Emissions in enclosed spaces should be minimised unless adequate extraction facilities are available.

Points to Remember

Remove rings and watches before working on the vehicle, particularly necessary when working on the electrical system.

Wear eye protection when underneath the vehicle.

Use barrier cream or wear gloves as necessary to protect the hands.

Keep loose clothing and long hair away from moving parts.

Environmental Warnings

For further information, see the safety section in the Parts or Service manual.

Warning

Used engine oil, hydraulic fluids, transmission fluid, antifreeze, (and their containers) batteries and tyres can be a hazard to health and the environment.

Fluids and other substances (e.g. used oil) and surplus parts must be disposed of in a safe environmentally sound manner.

On no account must any of these items be placed in household refuse bins, or the fluids poured down drains.

Observe local regulations and laws on environmental protection and disposal of hazardous materials.

These should be disposed of using authorised waste disposal facilities.

Consult local authority for safe disposal facilities.

General

Keys to Symbols

Please take note of the following symbols used throughout this manual, which identify any health hazards or instructions to prevent any personal injuries or damage to the vehicle.

Warning

Text with this heading and a shaded background is a reminder of an operation which, if not carried out with due care, could involve the risk of personal injury.

Caution

Text with this heading and a shaded background is a reminder of an operation which, if not carried out with due care, could involve the risk of damage to material.

Note

Text with this heading and a shaded background refers to special methods, features or procedures.

Options

Items marked with this sign ★ are fitted as options.

Buyer's Obligations

Caution

It is imperative that all maintenance procedures are complied with, records of all work are kept and available to view.

Operational

- The maximum permitted laden weight is identified on the VIN plate.
- The maximum passenger carrying capacity is identified in the cab area.
- When a defect is identified, it could cause serious problems or deterioration. This must be rectified prior to the vehicle going into service.

Note

Failure to comply with these requirements could cause mechanical and/or structural failure and will invalidate the warranty.

General

The Wrightbus NBFL has an efficient 4-cylinder turbo-charged diesel engine that is used to charge the hybrid batteries. The engine emission control system utilises a reagent (Adblue/Urea) to meet the requirements of euro 5 engine emission legislation.

The hybrid batteries power a direct drive electric motor into axle.

The air operated braking system is powered by means of an electrically driven compressor supplying air to reservoirs through an air dryer. The air dryer also regulates pressure. Service One and Service Two reservoirs each supply a separate system for the front and rear brakes. The park reservoir supplies the spring actuated, air released rear brakes. The auxiliary reservoirs supply the air suspension and body services such as the doors.

An electrically driven power steering pump is located under the driver, accessible through an exterior side access panel.

The front suspension is an independent wishbone system, supported by air springs and controlled by hydraulic dampers.

The rear suspension system consists of a drop centre axle located by radius rods and supported by air springs and controlled by hydraulic dampers.

Caution

It may be an offence to use a vehicle that does not consume reagent (Urea) if it is required for the reduction of pollutant emissions.

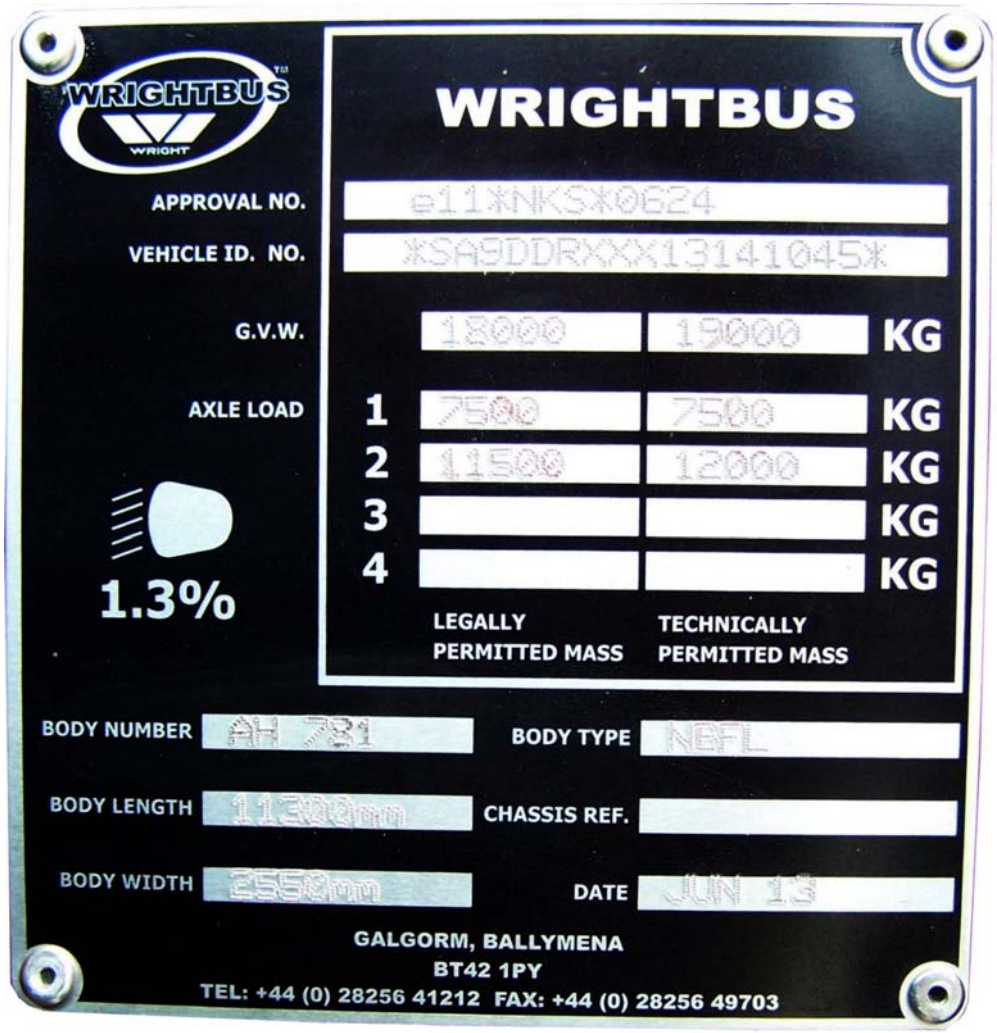
The use of a reagent (Urea) is mandatory for this vehicle in order to comply with the certificate of conformity.

Emissions - Diesel Engines 2005/55/EC/6.5.2.5/6

The 24 volt multiplex electrical system uses a 600 volt DC / DC converter to charge the 24 volt battery from the 600 volt battery.

An electronically controlled air suspension system is installed which allows a kneeling system to operate.

Vehicle Identification Plate (V.I.N)



Vehicle details can be identified from the V.I.N. plate; a typical example is shown above.

Please quote the V.I.N. number with any enquiries concerning the vehicle.

Vehicle Identification Sheet

Chassis

V.I.N. No. _____

Model _____

Registration No. _____

Date into service _____

Engine Type _____

Engine Number _____

Wheel Tyre Size _____

Bodywork

Body Builder _____

Body Type _____

Body Number _____

Operator

Company _____

Address _____

Telephone No. _____

Out of Hours Telephone No. _____

Fax No. _____

Drivers Seat Adjustment

There are 2 levers on the left hand side of the seat base. These are for adjusting the height of the front and rear of the seat. The wire loop at the front of the seat is pulled up to adjust the fore and aft position of the seat. There are also 3 knurled knobs at the base of the seat back, 1 on the left side and 2 on the right side. The lower one on each side is for adjusting the rake of the seat back. The upper one on the right side is for adjusting the lumbar support.

Controls Layout

1. Switch Panel
2. Drive Selector
3. Park Brake Control
4. Accelerator Pedal
5. Brake Pedal
6. Hidden Switches
7. Multifunction Switch
8. Drivers Information Screen
9. Warning Lights

★ Optional

Dash Layout - Upper Console

1. Rear Fog Lights Switch.

This function will only operate when the driving lights are on.

2. Reverse Bleeper Override Switch.

Pressing this switch overrides the reversing bleeper.

3. Interior Lights Master Switch.

This switch controls the operation of the interior saloon lights. When in the on position the switch will allow the saloon lights to be controlled using switches 4 and 5.

4. N/S Interior Saloon Lights.

This switch turns on the N/S interior lights, note that the interior light master switch needs to be on also.

* Note:- The entrance lights and first light on the N/S of the vehicle are illuminated in conjunction with the opening of the entrance door.

5. O/S Interior Saloon Lights.

This switch turns on the O/S interior lights, note that the interior light master switch needs to be on also.

6. Cab Light Switch.

This switch controls the operation of the drivers cab lights.

* Note:- When in the off position the cab lights will be illuminated when the entrance doors are opened and the vehicle sidelights are switched on.

7. Battery Protection System Reset Switch.

The vehicle is equipped with a battery guard. This switch resets the battery protection system.

Dash Layout - Right Hand

8. Camera Toggle Switch.

These switches toggles the cameras that are viewed on the drivers monitor.

9. Hazard Light Switch

Pressing this switch will activate the Hazard lights. The switch will flash to warn the driver the hazard lights are activated.

Note:- Only use in an emergency.

10. Ramp Switch.

The vehicle is fitted with an electronic ramp which is operated with this switch.

The vehicle must first be stopped at the bus stop with the mid door open. Press the lower part of the switch to extend the ramp, a buzzer will sound when the ramp is in motion. Press the upper part of the switch to retract the ramp.

When the ramp is out, an interlock will prevent the vehicle from driving away.

In the event of an electrical failure, the ramp can be manually retracted using the ramp tool located behind the fire extinguisher glass in the roof.

11. Drive Start Switch.

When the button is pressed, the drive is started. The main switch and the ignition switch must be turned on and the control button of the drive selector must be in position N.

12. Drive Ignition Start Switch

This switch is used to turn on the ignition once the main switch has been operated. If the ignition switch is turned off whilst the drive is active, the drive will stop. The ignition must not be switched off when in motion

13. Ferry Lift Switch.

Pressing this switch raises the vehicle body and thereby increases the ground clearance by a further 70mm.

14. Exterior Lighting Switch.

The light switch has three positions:

Pressed at the bottom: Dipped beam / main beam, width indicator lights and side-marker lights are turned on.

Switch in central position: Daylight running lights, width and marker lights turned on.

Pressed at the top: Daylight running lights only.

Dash Layout - Right Hand and L/H Steering Wheel Stalk

15. Blower Speed Switch.

Controls the speed of the blower unit. Turn clock-wise to increase the blower speed and anti-clock-wise to reduce blower speed.

16. Temperature Selector.

Controls the temperature for the cab area. Turn clock-wise for warmer air and anti-clockwise for cooler air.

17. Air Flow Selector (Cab Area).

Selects where the blower will direct the air flow.

18. Saloon Temperature Adjust Switch.

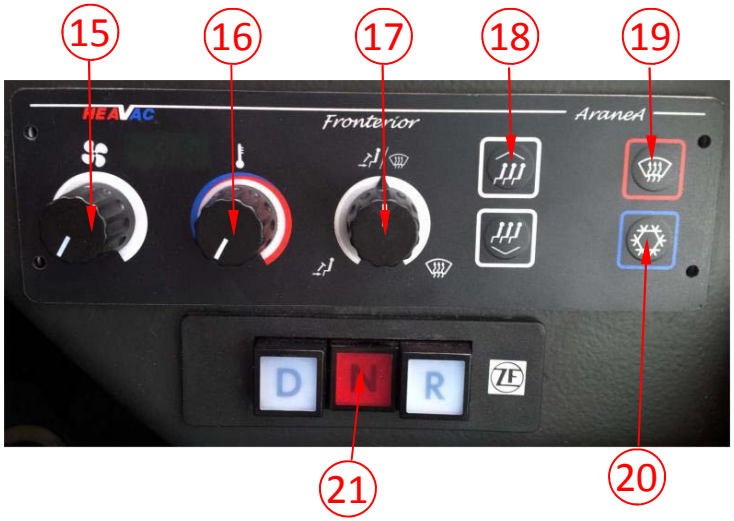
These switches adjust the desired temperature in the saloon area. The digital display shows the temperature setting.

19. Windscreen Air Flow Override Switch.

Pressing this switch directs the air flow to the windscreen, overriding the air flow selector knob. When enabled the green LED illuminates.

20. Air Con Switch.

This switch enables the drivers air conditioning unit.



22. L/H Steering Wheel Stalk

This switch controls the wipers, horn, headlights and indicators.

21. Drive Selector Switches

This control unit has 3 positions.

Position D

Select position 'D' to drive the vehicle forward.

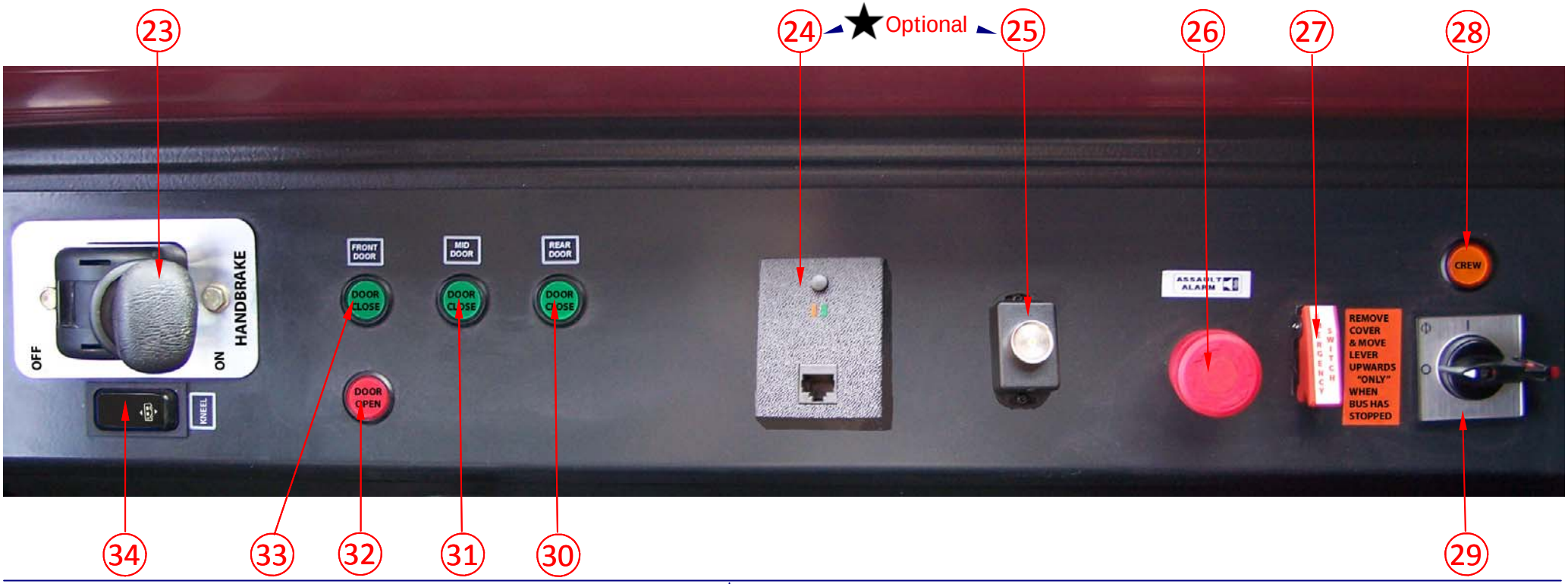
Position N

Only select neutral at a speed under 5 km/hr. and when the vehicle is stationary.

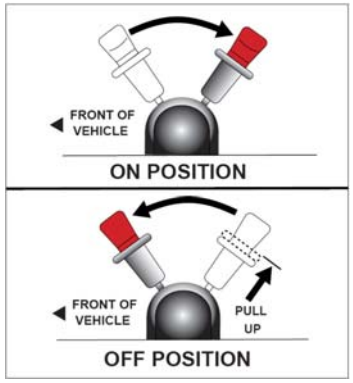
Position R

The reverse drive may only be selected with the vehicle stationary. The brake pedal must be operated before changing to position R (Reverse) from position D. Never put the drive in reverse when driving forward. In position R, the rear lights will come on and the reverse buzzer will sound if the ignition is turned on.

Dash Layout - Right Hand Side Console



23. Parking Brake



The parking brake is applied by pulling back the lever until it locks into position. To release the parking brake, the sleeve on the lever must first be lifted, then push the lever forward.

Warning

It is essential to apply the parking brake when leaving the vehicle.

24. Cab Checker Unit

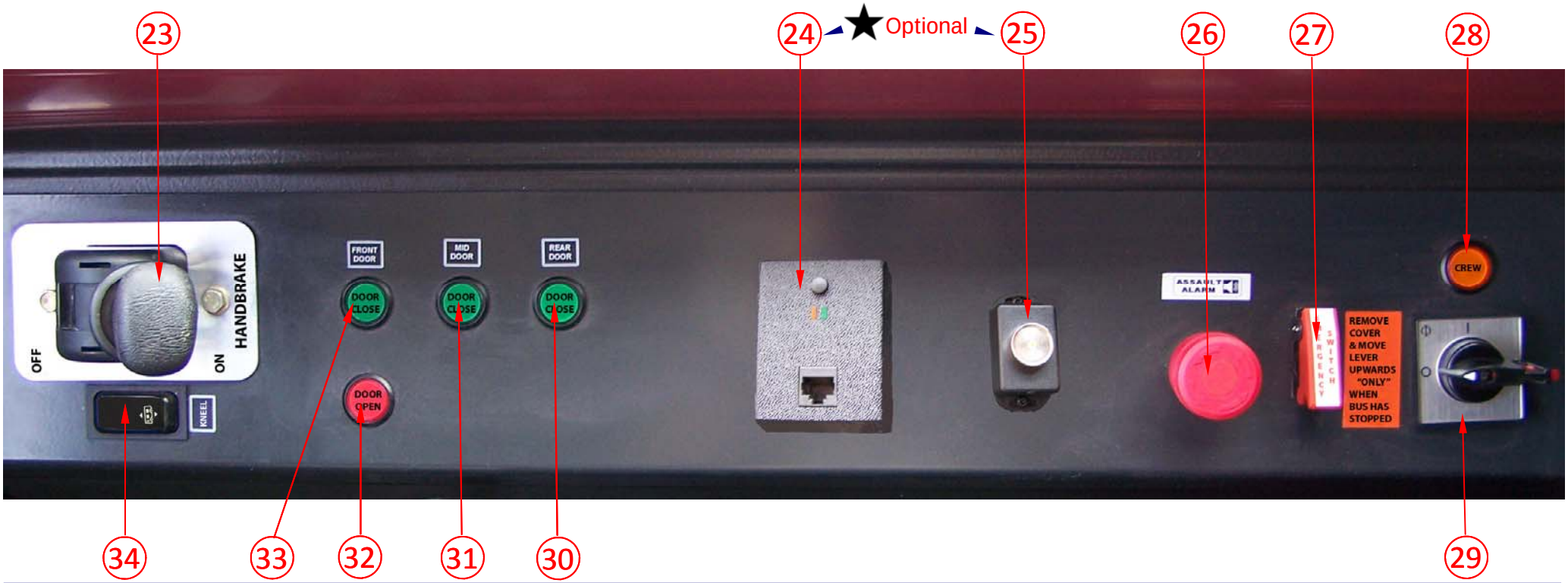
Provides a remote diagnostic functionality without the need to physically access the T1000 recorder unit. Two LEDs provide recording confirmation and camera fail alert.

Green only- Recording ok and all cameras ok
Red only- System is booting up
Green and red- Recording ok, one or more cameras fail
Neither- Recording error, all cameras ok

An integrated push switch commands the T1000 to utilise the driver monitor to display the health and then cycle through all the cameras to allow a camera function check, including alignment, focus, etc.

An Ethernet pass-thru connector allows direct PC connection to the T1000 from the cab checker location.

Dash Layout - Right Hand Side Console



25. Genius (Journey Data Management System)

Records the driver ID

Start inhibit – prevents the vehicle from starting without a valid driver's key.

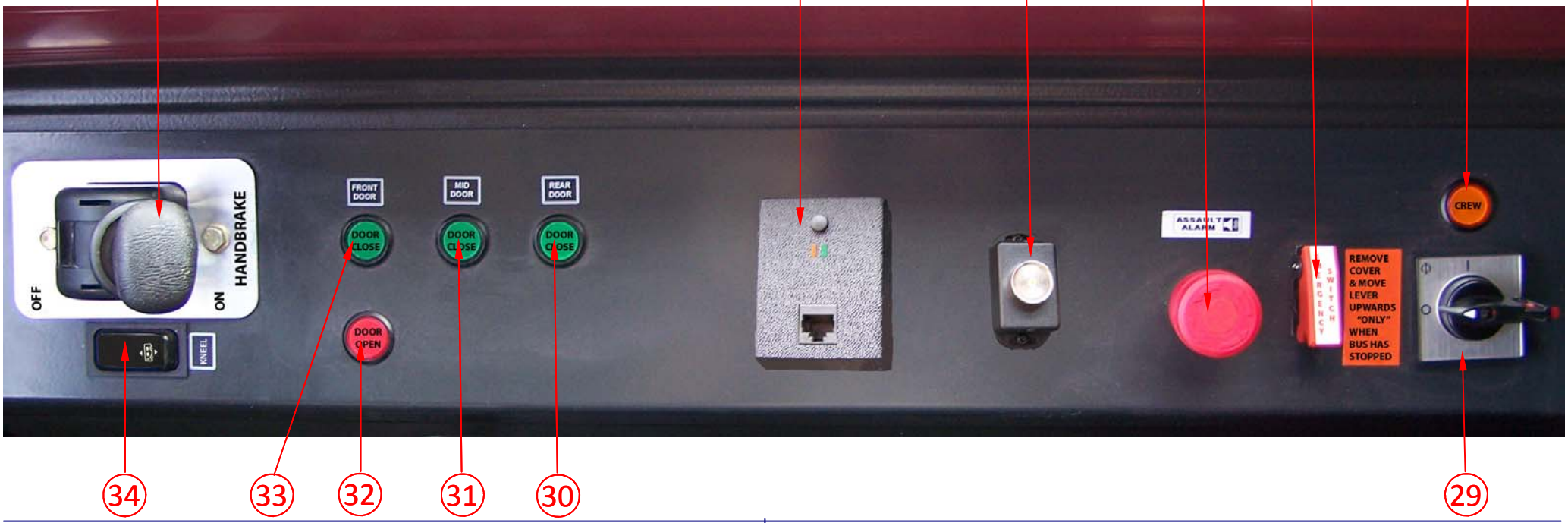
26. Panic Alarm Switch

The vehicle is equipped with a panic alarm. Pressing this switch will activate the panic alarm. To de-activate the alarm twist anti-clockwise.

27. Emergency Power Switch.

Only to be operated when vehicle has stopped. Flip up orange cover and operate switch. Switches off engine, operates fuel cut off, isolates the batteries, releases the doors and activates the one strip on internal lights to aid evacuation.

Dash Layout - Right Hand Side Console



28. Crew Switch.

This switch is used in conjunction with the rear crew member to lock and unlock the rear doors. For more information on this switch, see rear door control section of this book.

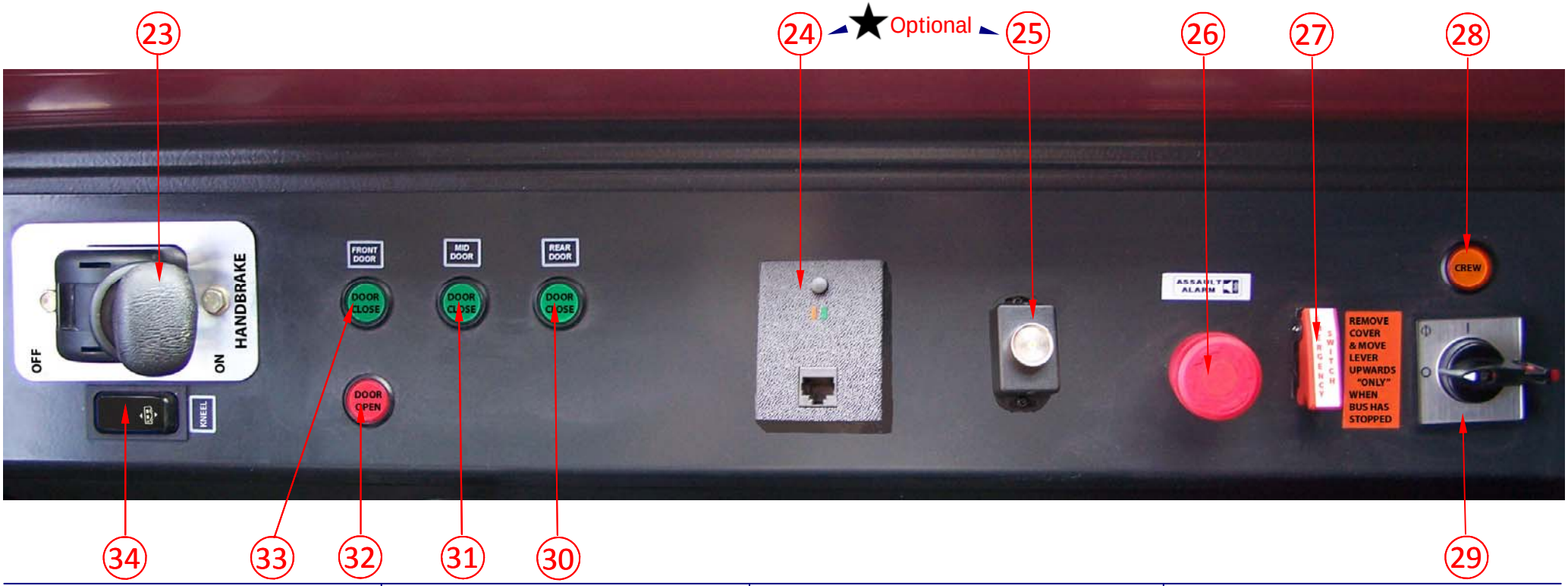
29. Battery Master Switch.

O - Off position Left in this position after total shut down .

I - On position Left in this position throughout use.

Note: Never turn off the main switch whilst engine is running.

Dash Layout - Right Hand Side Console



30. Rear Door Close Switch.

This switch closes the rear door.

31. Mid Door Close Switch.

This switch closes the mid door.

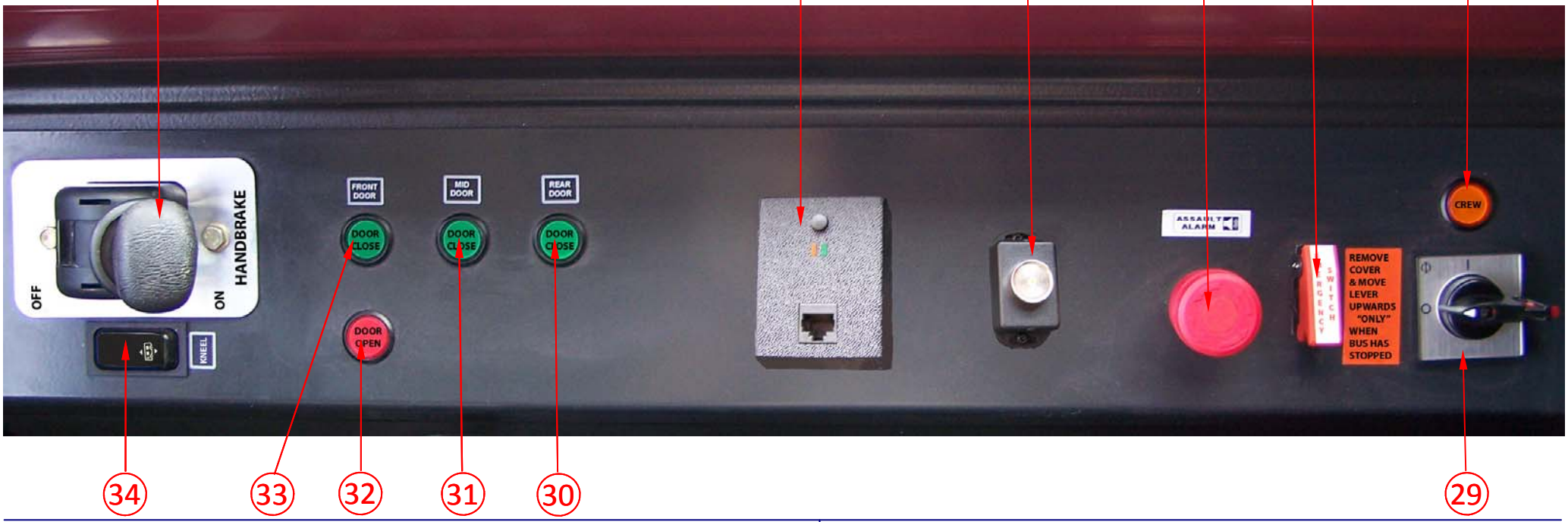
32. Door Open Switch.

This switch can open all the doors. The rear platform door has the option of being disabled.

33. Front Door Close Switch.

This switch closes the entrance. door.

Dash Layout - Right Hand Side Console



34. Kneeling Switch.

Keeping the lower part of the switch depressed lowers the vehicle to its lowest position (kneeling). Kneeling stops when the switch is released. Briefly depressing the upper part of the switch returns the vehicle to normal position.

Note:- To prevent injury please ensure that the area beneath the boarding step is clear before lowering the vehicle.

35. Battery Isolator Switch.

This switch disconnects the electrical system from the batteries. It must be switched on for the electrical equipment to operate.

36. Foot Switch Right.

This switch activates the microphone for the bus to base radio system, allowing the driver to keep in contact with base.

Dash Layout - Lower Left Hand Side Console

37. Assault Screen Unlock

This switch is used to unlock the electromagnet which holds the near side assault screen closed.

38. Hidden Start Switch

To start the engine, this switch must be pressed and held while pressing the engine start switch.

39. OnBoard Diagnostics

A laptop computer can connect to this diagnostics socket.

Front Door Buttons

Switches above entrance door - For emergency use only

These switches will open and close the entrance door when the vehicle is travelling below 5kph.

Exterior front door emergency door release switch. This switch can be used to open the door from the outside of the vehicle.

Mid Door Buttons

Switches above mid door - For emergency use only

These switches will open and close the mid door when the vehicle is travelling below 5kph.

Exterior mid door emergency door release switch.

This switch can be used to open the door from the outside of the vehicle.

Ramp Request Switch

This button is pressed to request the use of the ramp, when pressed a light will illuminate in the drivers cab to alert the driver.

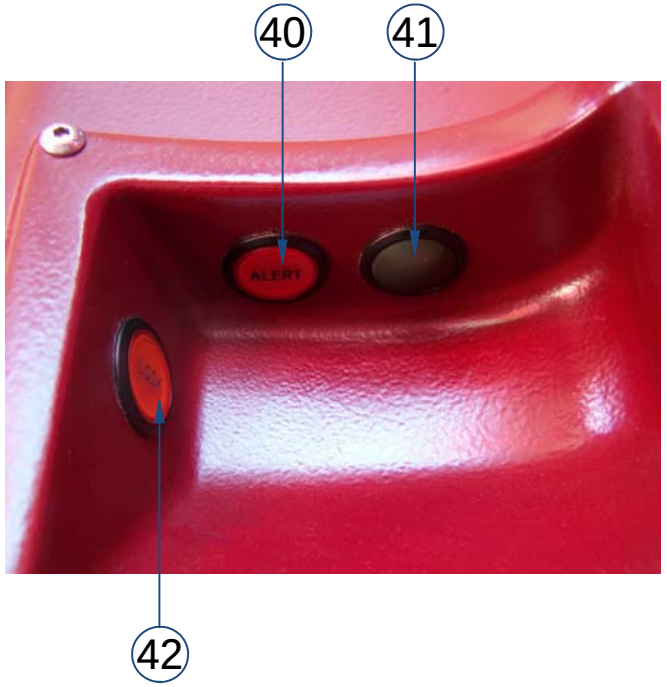
Rear Door Buttons

Switches above rear door - For emergency use only

These switches will open and close the rear door when the vehicle is travelling below 5kph.

Exterior rear door emergency door release switch.

This switch can be used to open the door from the outside of the vehicle.



40. Drivers alert button for crew member to attract the drivers attention.
41. This is used to release the door interlock brake.
42. This switch can be used to lock the rear door leaf.

Rear Crew Controls

Normal Operation

Open all doors press the door open button

Close the doors press the 3 door close buttons

both the front & mid doors have to be closed for driving, the rear doors can remain open while driving but the crew system needs to be in operation to allow this to happen

To open rear doors using Crew System

1. open all doors
2. press & hold crew button in cab area until dash symbol lights
3. go to rear within 5 secs hold unlock button for 5-6 secs until buzzer sounds - rear most door leaf is now unlocked
4. fold the rear most door leak round & press & hold lock button - the red man symbol will appear on the dash to confirm rear most door leaf is now locked
5. Close the doors
6. press the domed green button until buzzer switches off
7. drive vehicle with rear doors open

To close rear doors using crew system

1. press crew button in cab area
2. press & hold rear unlock button for 5-6 secs, this will unlock rear most door leaf
3. close rear most door leaf back into position, press & hold lock button for 5-6 secs - this will lock the rear most door leaf
4. close rear door from cab area
5. press & hold dome head clear button for 5-6 secs this will silence the warning buzzer
6. doors & bus are now back into normal operation mode

ICM Warning Indicators - Stop Warnings

1.0 PURPOSE

The following information details the various dash warnings displayed on the DMUX screen of the ICM. They are detailed to aid fault finding and correct testing/operation of the vehicle.

2.0 PROCEDURE - DMUX - WARNING ICONS

2.1 Stop Warnings

If any of the following symbols (as shown in Table 1) appear, you should proceed with caution and stop at a safe location, turning off the engine to prevent any further damage.

TABLE 1

Icon	Description
	Air pressure circuit 1 low (extinguished when air pressure is built up)
	Air pressure circuit 2 low (extinguished when air pressure is built up)
	Engine Oil pressure low warning
	Engine coolant level low warning
	Engine coolant temperature high warning
	Engine compartment temperature high warning

Icon	Description
	Engine ECU fault red stop warning
	EBS fault red stop warning
	Multiplex fault red stop warning
	Battery charge error warning
	Fuel level sensor warning
	Electrical compartment temperature high warning

ICM Warning Indicators - Stop Warnings

2.0 PROCEDURE - DMUX - WARNING ICONS

2.1 Stop Warnings

If any of the following symbols (as shown in Table 1) appear, you should proceed with caution and stop at a safe location, turning off the engine to prevent any further damage.

TABLE 1

Icon	Description
	Brake pedal error warning
	Compressor stop warning
	Power steering stop warning
	DICO stop warning
	Motor 1 inverter stop warning
	Generator invertor stop warning
	Drive system stop warning
	Generator charging error warning

Icon	Description
	Drive coolant temp high warning
	Fuel level critical warning
	LV battery warning
	Engine protection fault warning
	HV battery contactor fault
	Drive coolant low warning
	Vehicle approaching shutdown
	ECAS Red stop warning

ICM Warning Indicators - Caution Warnings

2.2 Caution Warnings

If any of the following symbols (as shown in Table 2) appear, you should proceed with caution and rectify the fault at the earliest opportunity.

TABLE 2

Icon	Description
	Transmission fault amber warning
	Power steering oil level low warning
	Fan oil level low warning
	Battery voltage low or BPS system activated warning
	Fuel level low warning
	Engine ECU fault amber warning
	Engine emission fault amber warning
	EBS fault amber warning

Icon	Description
	ECAS fault amber warning
	Brake lining wear sensor warning
	Water in fuel warning
	AdBlue tank level low warning
	Vehicle not at correct ride height warning
	Rear fog light active warning
	Engine rear start mode warning
	Engine hatch open warning

ICM Warning Indicators - Caution Warnings

2.2 Caution Warnings

If any of the following symbols (as shown in Table 2) appear, you should proceed with caution and rectify the fault at the earliest opportunity.

TABLE 2

Icon	Description
	Compressor fault warning
	Power steering fault warning
	Kneeling inhibit warning
	Crew mode warning
	Coolant level low warning
	Door override warning
	HV battery critically discharged
	HV battery low capacity

Icon	Description
	HV over-temp warning
	HV over-voltage warning
	HV battery off (DE mode) warning
	HV battery module lost warning
	HV battery BMU timeout warning
	Time approaching shutdown warning
	E-Stop warning
	HV battery contactor fault

ICM Warning Indicators - Caution Warnings

2.2 Caution Warnings

If any of the following symbols (as shown in Table 2) appear, you should proceed with caution and rectify the fault at the earliest opportunity.

TABLE 2

Icon	Description
	MUX warning
	Windscreen washer bottle level low warning
	Oil level warning
	Oil warning
	DICO warning

Icon	Description
	Motor1 warning
	Generator warning
	Drive System warning
	Drive Coolant warning

ICM Warning Indicators - Information Warnings

2.3 Information Warnings

The following symbols are for the driver's information (Table 3).

TABLE 3

Icon	Description
	Upper or lower saloon bus stopping request warning
	Wheelchair user bus stopping request warning
	Regen active warning
	Regenerative Braking active warning

ICM Warning Indicators

3.0 PROCEDURE - DMUX BUS DISPLAY INDICATIONS AND WARNINGS

3.1 The DMUX will have a visual representation of the vehicle on the display (Fig. 1), Visual warnings will appear on or around the image during various vehicle operations, as detailed in Table 4.

Fig. 1

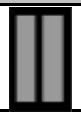
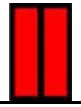
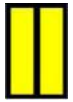
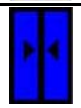
Icon	Description
	Door closed when symbol shown at door position
	Door open when symbol shown at door position
	Door low air pressure when symbol shown at door position
	Door sensitive edge active when image displayed at door position
	Vehicle ramp error warning when displayed below door 2 position

TABLE 4

ICM Warning Indicators

3.0 PROCEDURE - DMUX BUS DISPLAY INDICATIONS AND WARNINGS

3.1 The DMUX will have a visual representation of the vehicle on the display (Fig. 1), Visual warnings will appear on or around the image during various vehicle operations, as detailed in Table 4.

Fig. 1

Icon	Description
	Vehicle ramp not stowed or in an extended position warning
	Vehicle suspension knelt warning - separate symbol displayed below front and rear wheel
	Vehicle suspension in ferry lift position warning - separate symbol displayed below front and rear wheel
	Vehicle drive selected - a **'D'** (Drive) **'N'** (Neutral) or **'R'** (Reverse) will be displayed beside the icon shown to indicate the current drive selected
	Drive Ready

TABLE 4

ICM Warning Indicators

4.0 PROCEDURE - ICM LED WARNING INDICATIORS

4.1 Fig. 2 shows a representation of the ICM with all warning indicators active, Table 5 shows the function of each warning.

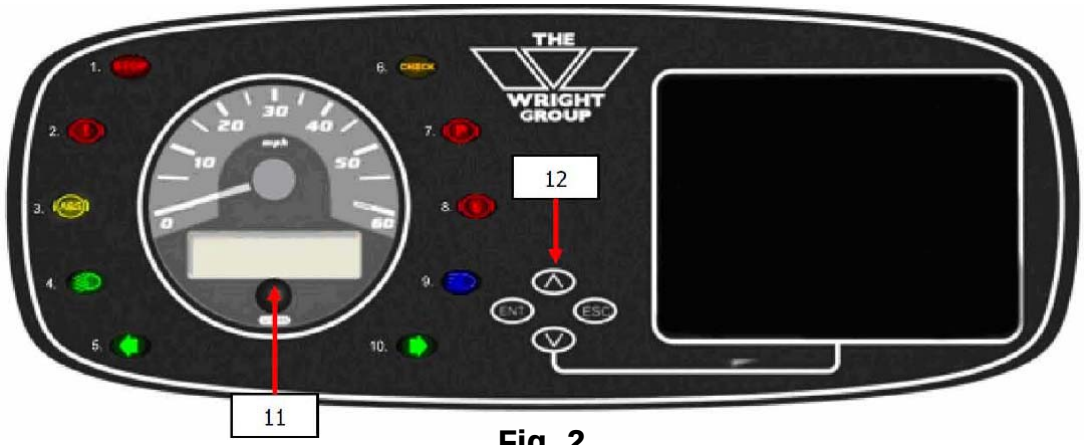


Fig. 2

 1. Stop. If this light comes on, stop immediately but safely.	 5. Left Indicator on.	 9. Headlights on - Full.
 2. Low air pressure.	 6. Check at the next stop.	 10. Right Indicator on.
 3. ABS Braking System.	 7. Parking brake is applied.	 11. Speedometer
 4. Headlights on - low.	 8. Door brake status.	 12. Keypad to navigate LCD Display area

Note :- Speedometer on NBFL has the dual functionality of displaying mileage and speed in kph in the LCD display. Switch between function by pressing the push button.

DMUX Screen - Instructions

1.0 PURPOSE

The following procedure describes the layout and contents of the DMUX screen on NBfL.

2.0 NBFL DRIVER'S DISPLAY SCREENS

On-board diagnostic menu only available on NBfL Models from 2011.

2.1 Intro Screen

Displays for 4 seconds, then the Running Screen is displayed (Fig. 1).

Fig. 1

2.2 Running Screen

Main display screen. Displays Engine rpm, door status, and warning icons (Fig. 2).

Fig. 2

3.0 MENU PUSHBUTTONS

Use the ICM1 integrated pushbuttons for menu navigation (Fig. 3).

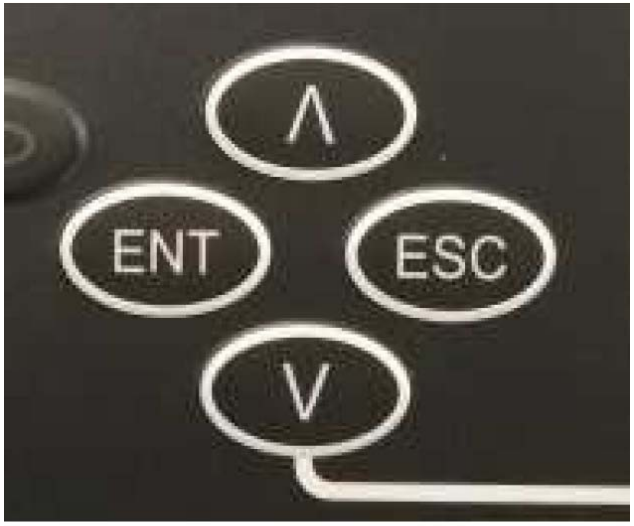


Fig. 3

4.0 BARGRAPH SCREENS

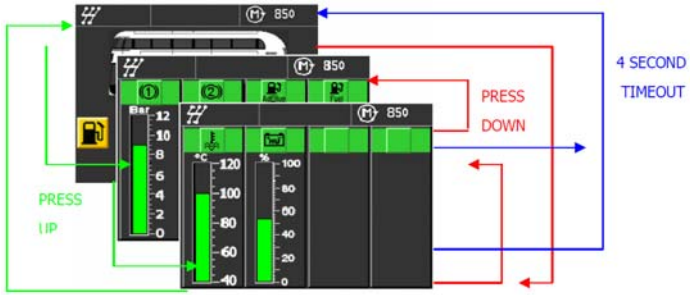


Fig. 4

4.1 Bargraph Screen 1

Shows Circuit 1 and 2 Air Pressure, AdBlue Level and Fuel Level (Fig. 5).

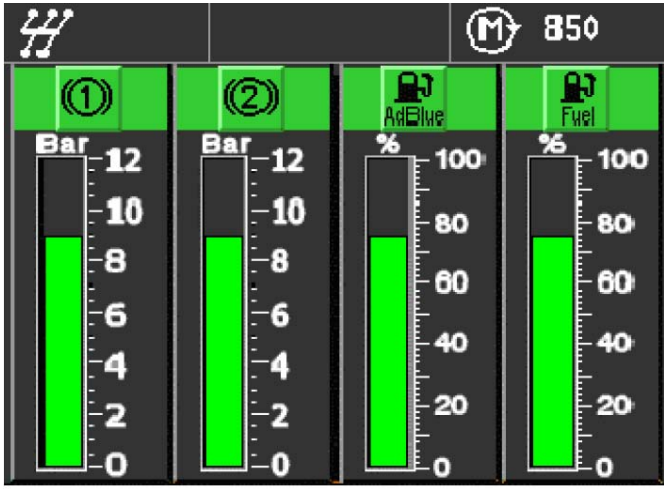


Fig. 5

DMUX Screen - Instructions

4.2 Bargraph Screen 2

Shows Engine Coolant Temperature and HV Battery State of Charge (Fig. 6).

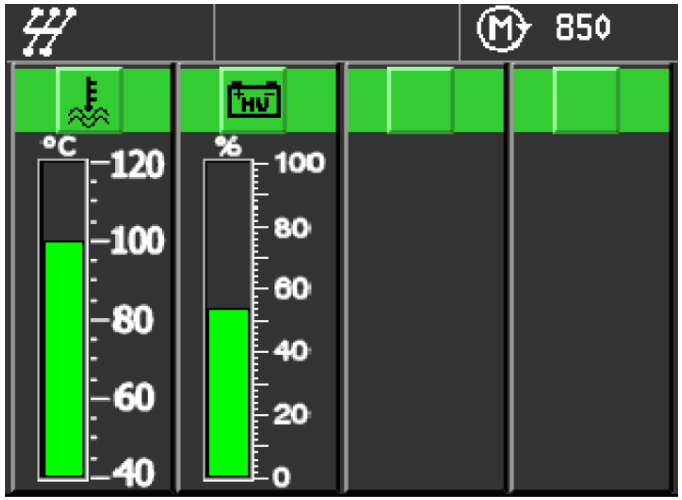


Fig. 6

5.0 DIAGNOSTIC MENU

The Diagnostic Menu is entered from the Driving Screen as shown in Fig. 7.

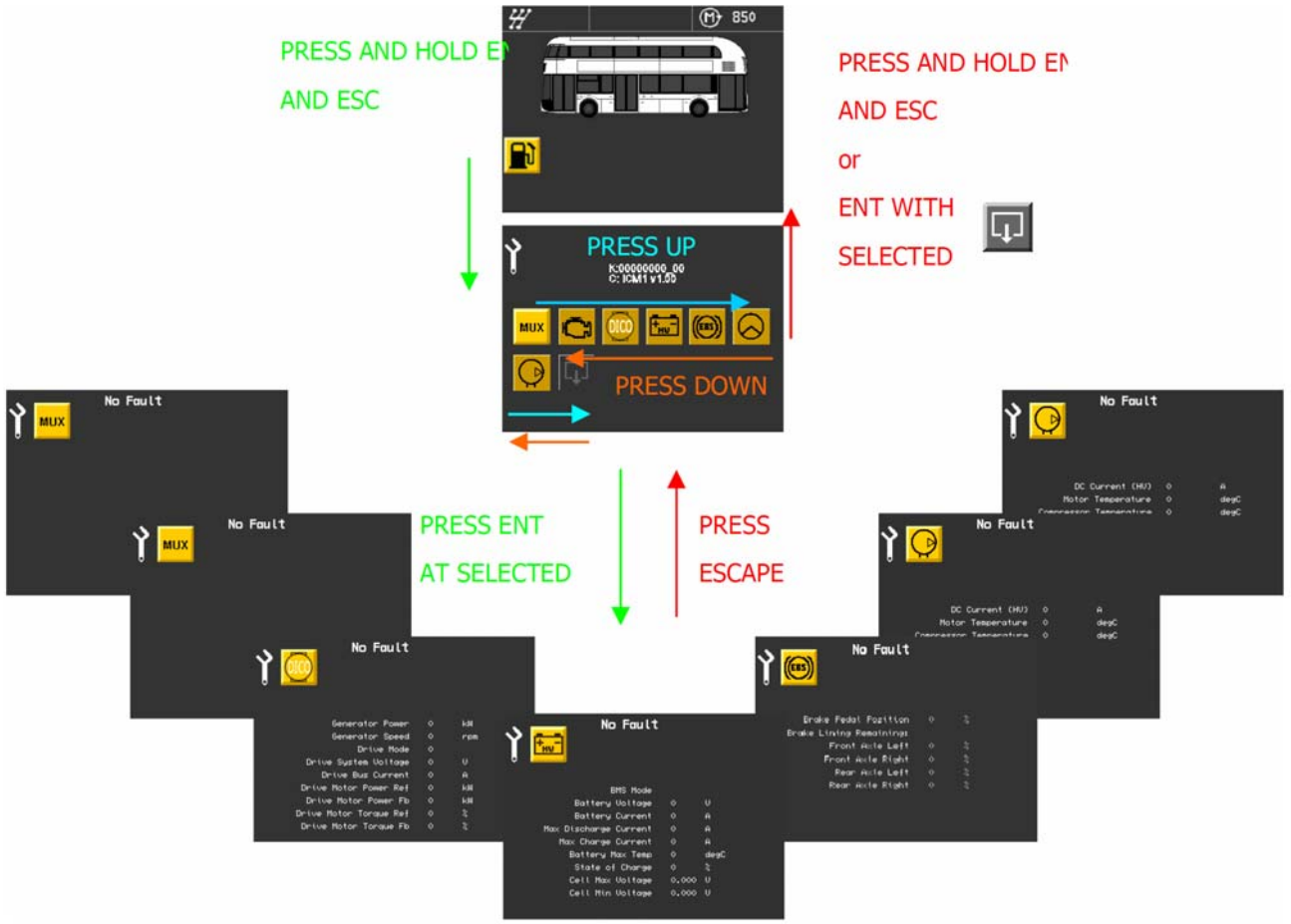


Fig. 7

5.1 Diagnostic Main Menu

Selection menu for ECU diagnostic screens.

Displays Kibes and CAVTAN version numbers, denoted K: and C: (Fig. 8).

DMUX Screen - Instructions

5.1 Diagnostic Main Menu

Selection menu for ECU diagnostic screens.

Displays Kibes and CAVTAN version numbers, denoted K: and C: (Fig. 8).

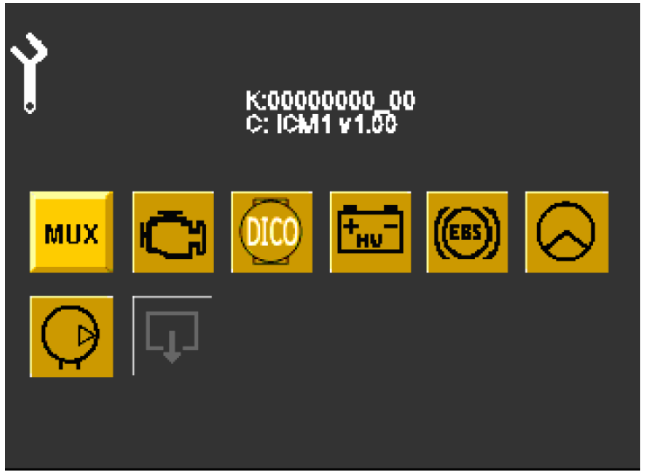


Fig. 8

5.2 MUX Diagnostic Screen

Displays MUX fault codes (Fig. 9).

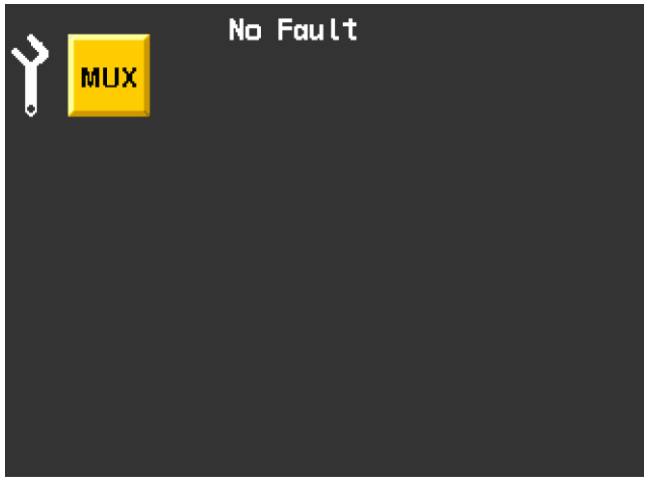


Fig. 9

5.3 DICO Diagnostic Screen

Displays DICO real-time data (Fig. 10).

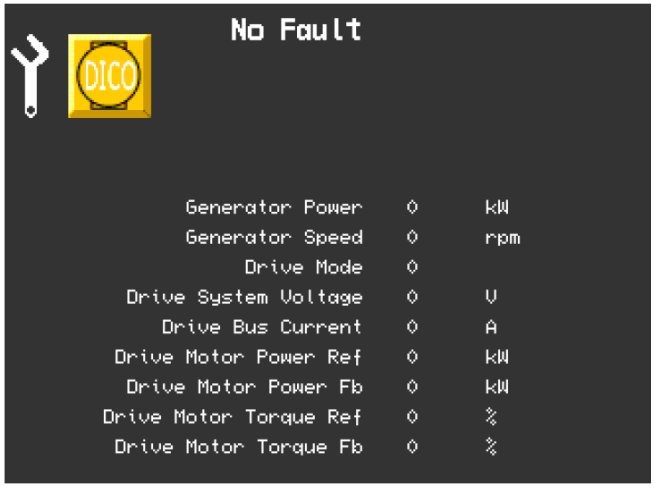


Fig. 10

DMUX Screen - Instructions

5.4 Engine Diagnostic Screen

Displays Engine fault codes and real-time data (Fig. 11).

Fig. 11

5.5 Battery Management System Screen

Displays Engine fault codes and real-time data (Fig. 12).

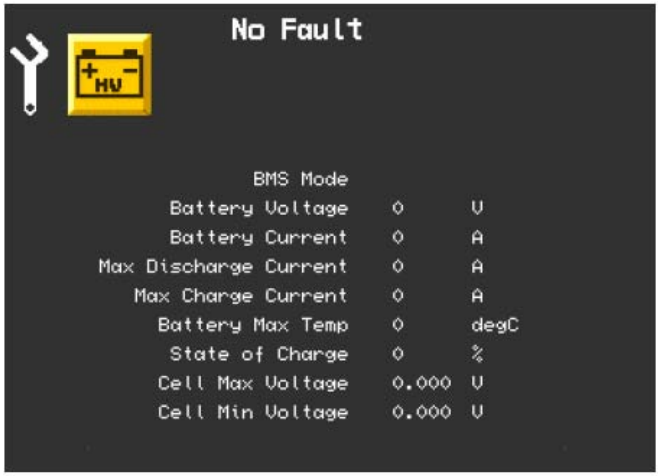


Fig. 12

5.6 EBS Diagnostic Screen

Displays EBS fault codes and real-time data (Fig. 13).

Fig. 13

DMUX Screen - Instructions

5.7 Compressor Diagnostic Screen

Displays Compressor fault codes and real-time data (Fig. 14).

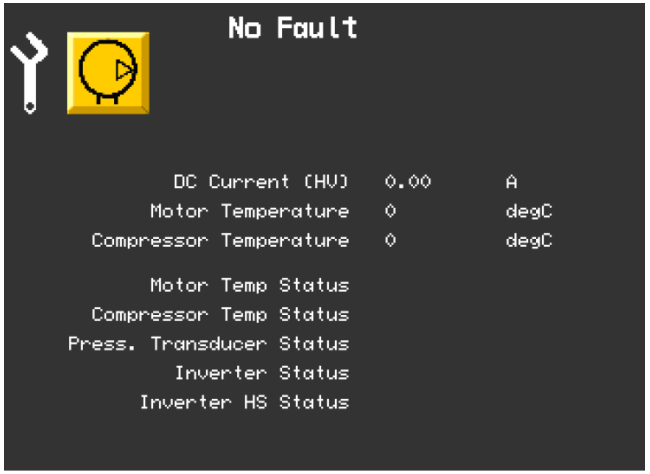


Fig. 14

5.8 Power Steering Diagnostic Screen

Displays Power Steering fault codes and real-time data (Fig. 15).

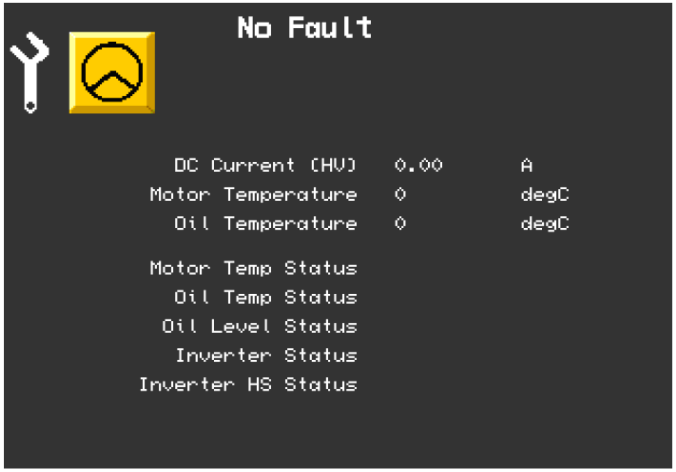


Fig. 15

Starting And Driving

Engine

Normal Starting Procedure

- Ensure the parking brake is in the on position.
- Select neutral (Drive selector position 'N').
- Turn master switch on.
- Turn ignition switch on, wait until engine warning lights go on.
- Press and hold the hidden start switch located under the left hand side dash (see page 25).
- Press the engine start switch. As soon as the engine has started, release the switch.
- Check the battery charge light goes out. Ensure air pressures are up before operating with a load.

Note

The engine will crank for a max of 10 seconds, then have a 2 second stop a total of three times. If after three attempts, the engine fails to start, the starter motor will be locked out for 5 minutes.

Caution

The engine must have adequate oil pressure within 15 seconds of starting. If the low oil pressure warning light has not gone out, shut off the engine immediately to avoid engine damage. Diagnose the low oil pressure problem.

Engine Rear Starting Procedure

- Ensure the parking brake is in the on position.
- Select neutral (Drive selector position 'N')
- Turn master switch**.**
- Turn ignition on, wait until engine warning lights go on.
- Select Engine rear start mode from engine bay.
- Press the engine rear start switch. As soon as the engine has started, release the switch.

Shutting Down

After full load operation, let the vehicle remain stationary for 3 to 5 minutes before shutting off, to allow the oil and coolant to remove the heat from many parts, especially the turbocharger.

To stop the engine, turn the ignition off.

Turn off the battery master switch. **This must not be done before the engine has stopped.**

Starting And Driving

Engine

Engine Operation

- Shut the engine off if the oil pressure warning light or coolant temperature warning light comes on.

Caution

Continuous operation with low coolant, temperature below 60°C or high coolant temperature above 100°C can damage the engine.

Most failures give an early warning.

Look and listen for changes in performance, sound, or engine appearance that can indicate service or engine repair is needed.

Some changes to look for are:

- Engine misfire.
- Excessive smoke.
- Vibration.
- Loss of power.
- Unusual engine noise.
- Fuel, oil or coolant leaks.
- An increase in fuel consumption.
- Sudden changes in engine operating temperature or oil pressure.

Check list before moving off

- Check that the air pressure reading on the display is 5.5 bar or higher.
- Check that the engine is idling satisfactorily.
- See that no warning lights are showing except the handbrake.

Speed Control Humps

Speed Control Humps

It is important to recognise that there should be a normal maximum speed of operation over speed control humps, consistent with ensuring the long term durability of the vehicle and passenger comfort. It is recommended that a maximum of 10mph is not exceeded over speed control humps.

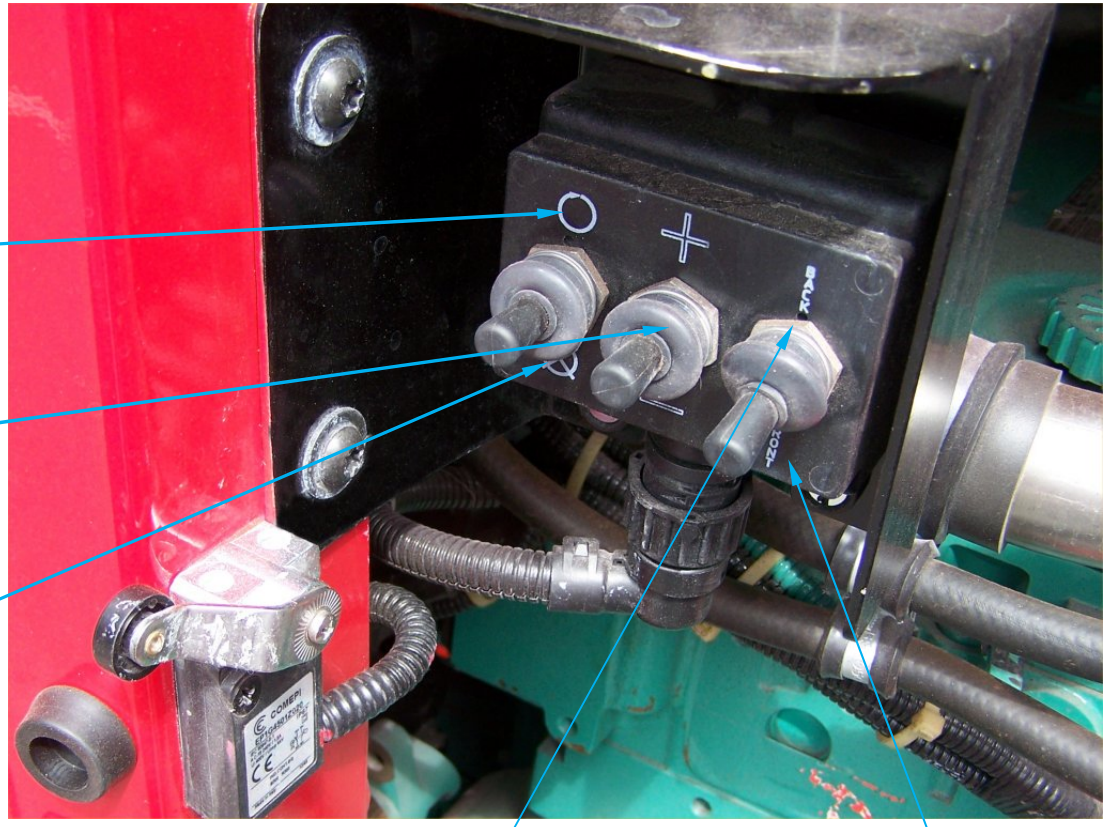
Where vehicles are consistently driven over traffic calming devices at speeds in excess of 10mph, the long term durability of the vehicle may be adversely affected.

Starting And Driving

Engine Stop

The engine stop control is located in the rear engine compartment to the left of the engine.

Press the stop button to stop the engine.



Emergency engine stop

The emergency engine stop switch is located behind a flap door on the offside rear corner as shown above, this button can be pressed to turn off the engine in case of an emergency.

Starting And Driving

General Driving

Warning

An accident may occur if the accelerator pedal is depressed instead of the footbrake whilst the drive selector is in position 'D'. Typically, such accidents can arise when moving off before properly locating the pedals. The driver wishing to check the vehicles initial movement unintentionally presses the accelerator instead of the footbrake.

Note

To assist drivers in correctly locating the pedals before engaging drive, the vehicle is fitted with a change speed interlock.

With the interlock fitted, drive can only be enabled when the footbrake is depressed.

Starting and driving away

With the vehicle standing still, the parking brake applied, apply the footbrake and select Drive (D), wait 1 to 2 seconds, then release the brakes and drive away by pressing the accelerator.

Caution

At temperatures below -23°C, start the engine and warm up the vehicle in neutral for approx. 10 to 15 minutes before selecting drive.

Neutral (N)

Use this position when the vehicle is stationary. Neutral should also be selected when experiencing longer than normal periods of idling.

Always apply the handbrake.

Drive (D)

This is the normal forward drive position. When the accelerator is depressed, the vehicle will move off.

Reverse (R)

The vehicle must be completely stationary before changing from forward to reverse, or reverse to forward.

Caution

Always apply the handbrake when the vehicle is stationary.

Starting And Driving

General Driving

Caution

Do not allow the vehicle to coast in neutral. No engine braking is available when coasting.

Hill Starting

To prevent rollback, press the D button and depress the accelerator to take up the drive before releasing the brake.

Driving Downhill

Use the regenerative braking to control the vehicle.

Braking

The vehicle has regenerative braking.

The regenerative braking operation is integrated with the service brakes and is controlled by the brake pedal.

The regenerative braking only acts on the rear wheels.

When braking on slippery surfaces, the ABS system may disengage the regenerative braking to prevent rear wheel locking.

Driving on Ice or Snow

Care should be taken when driving on snow or ice. When driving on ice or snow, any acceleration or deceleration should be made gradually.

Starting And Driving

General Driving

General Driving

Stopping in Traffic

During short stops at traffic lights etc., the drive selector need not be returned to neutral, but the hand brake must be applied to prevent the vehicle from creeping forwards.

During longer stops, neutral (N) should be selected and the handbrake applied.

Stopping the Engine

The engine can be stopped at any time regardless of the drive selector position.

Parking

Caution

It is essential to apply the parking brake when leaving the vehicle. In addition, it is good practise on slopes to chock the wheels, thus ensuring that the vehicle cannot roll away.

Warning

Do not leave the driver's seat when the vehicle is stationary on a slippery and/or snowy incline. Remain present in order to apply the foot brake if it appears that, as a result of the slippery surface, the grip of the wheels to which the parking brake is applied in order to keep the vehicle stationary less than the force of gravity

Vehicle Filler locations

1. Engine Oil
2. Engine Coolant
3. Hybrid Coolant
4. Adblue®
5. Diesel
6. Steering Fluid
7. Screen Wash
8. Battery Coolant

Vehicle Filler locations

Hydraulic Oil - Steering

The hydraulic steering reservoir is located behind a hinged panel on the O/S front of the vehicle. The hydraulic oil level is correct when the top of the internal reservoir filter is just submerged in oil.

Ensure that the filler cap is replaced securely.

See fluid and lubricants section of this manual for correct oil type.

Warning

See Environmental Warnings

Engine Oil and Dipstick

Engine Oil

The engine oil filler is located on the rear offside corner of the vehicle. Check the oil level using the dipstick. Fill with engine oil as required. Ensure that the filler cap is replaced securely.

Always use the correct grade of oil, and take care not to over fill allowing time for the engine oil to reach the engine and settle.

Engine Oil Specification - Euro 5

15W - 40 ACEA E5 API CI-4

Vehicle Filler locations

Adblue

The filling point for Adblue is located on the offside, towards the rear of the vehicle, behind a hinged cover.

It is recommended that the Adblue tank is filled each time the vehicle is refuelled with diesel.

Ensure that the filler cap is replaced securely.

Warning

See Environmental Warnings

It is recommended that ZVA type dispensing equipment is used when filling the Urea tank. This will ensure that filling cut off occurs at the correct level and prevent overfilling of the tank.

If equipment other than the correct dispensing nozzle is used, there is a possibility of overfilling the tank. This can result in activation of the Urea warning lamp.

Caution

It may be an offence to use a vehicle that does not consume reagent (Urea) if it is required for the reduction of pollutant emissions.

The use of a reagent (Urea) is mandatory for this vehicle in order to comply with the certificate of conformity.

Emissions-Diesel Engines 2005/55/EC/6.5.2.5/6

Diesel Fuel

The filling point for diesel fuel is located on the offside, towards the front of the vehicle, behind a hinged cover.

It is recommended that the Urea tank is filled each time the vehicle is refuelled with diesel.

Ensure that the filler cap is replaced securely.

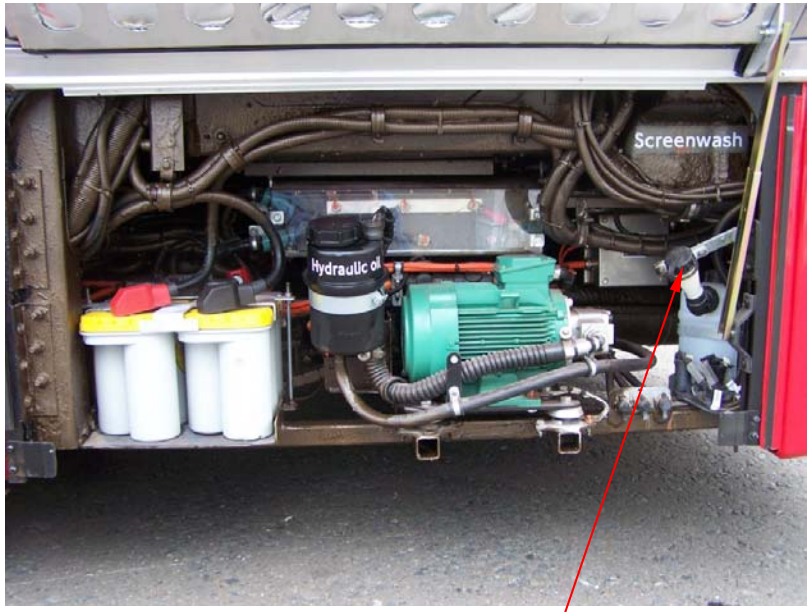
Vehicle Filler locations

Screen wash

The filling point for screen wash is located behind the offside front lower hinge panel.

Remove the filler cap and fill the reservoir with screen wash mixture.

Ensure that the filler cap is replaced securely.



Screen Wash Filler Cap

Note

Top up daily with screen wash, never use water on it's own. A reliable, screen wash is an essential safety requirement.

A reliable screen wash is an essential safety requirement. Autoglym all season quick clear screen wash provides a number of significant performance advantages.

Features and Benefits:

- Inhibits smearing of insect remains
- Clears contaminants rapidly
- 500ml makes 8 litres
- Antifreeze to -45°C

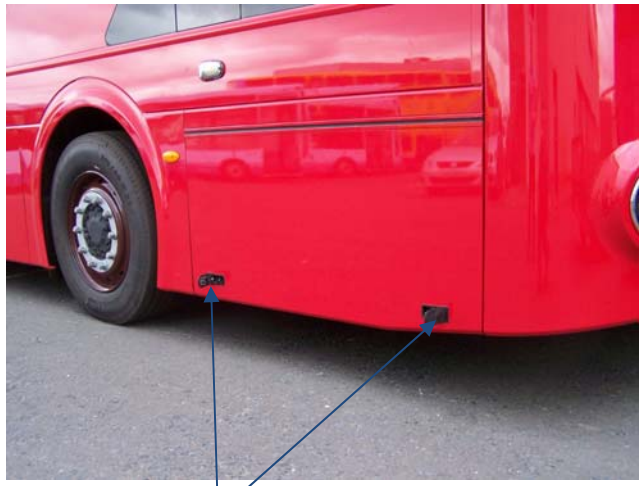
Use throughout the year at recommended dilution rates for safe, smear free driving.

Battery Door Panel

To open the above battery access panel, push the button on each catch, this will release the catch as shown below.

Lift the battery panel from both sides to its highest point then lower it to its lock position, see below.

To close the battery panel, lift to its highest point then lower to close position.



Push the catches into their lock position as shown below.

The strut should be lightly lubricated every 28 days to ensure smooth operation and long service life.

Batteries

Battery Jump Starting

Direct connection of either slave batteries or a donor vehicle battery to a flat battery may result in an explosion.

Warning

Hydrogen gas has a risk of explosion.

An amount of hydrogen gas is produced when the flat battery receives a charge from a donor battery, or more pronounced, from the higher voltage delivered by its own charging system when the engine starts.

When the recipient battery is being disconnected, a spark may occur and ignite the hydrogen gas.

Use the following procedure when jump starting batteries:

Use the boost socket only to connect the donor battery to the recipient battery.

Warning

Used batteries can be a hazard to health and the environment.

Do not dispose of used batteries with household waste.

Consult local authority for safe disposal facilities.

Cleaning

Body Exterior

Exterior Paintwork

Caution

All cleaning materials must be used strictly in accordance with the manufacturers instructions.

Use neutral soaps and cleaners only. When using automatic washers, ensure plenty of water is used and that brush pressure is not excessive.

Do not clean with dry cloths.

Do not use pressure washers.

Wash the paintwork regularly, either with lukewarm water and a soft brush, or by automatic washer.

Remove all contaminants etc., particularly from behind mouldings and at joints using a normal hose pipe only. Remove oil, diesel, tar and sap stains with non-abrasive liquid polish.

Repair surface fractures, deep scratches, stone chips, etc. promptly.

Caution

All cleaning materials must be used strictly in accordance with the manufacturers instructions.

Use neutral soaps and cleaners only. Do not use abrasive cleaners or polishes.

Do not use solvents: white spirit, petrol, thinners, etc.

ABS

Sponge clean regularly with soap and warm water.

The recommended composition of any soaps used should be as shown:

- Less than 20% Anionic Surfactant.
- Less than 15% Non-Ionic Surfactant.
- Non-Caustic Alkali 2-6% maximum.
- PH level of between 10 and 12
- No Solvents
- No Ammonia
- No Caustic Alkali

The detergent can be applied neatly to a wet cloth / scrub pad.

If extremely stubborn marks are found, Isopropyl Alcohol can be applied using a cloth. The surface must be rinsed with either hot or cold water immediately after use.

Caution

Do not use Acetone for cleaning ABS. This will affect the surface of the ABS upon exposure for just a short period and will lead to discolouration.

AUTOGLYM

See the Autoglym Cleaning manual for more details.

Cleaning

Body Interior

Moquette / Leather

Vacuum clean regularly. Remove heavy soiling with a stiff brush. Stains on Moquette should be removed using a proprietary cleaning fluid.

Use leather on leather.

Caution

Moquette should be cleaned thoroughly to prevent a build up of dust which could affect the fire retardancy of the seating.

Panelling

Sponge plastic laminate facings and panels regularly with a mild cleaning solution and dry off with a leather cloth.

Fittings

Wash chrome plated or aluminium fittings approximately every two weeks with soap and water only.

Flooring

Regular upkeep with suitable products is the best guarantee that the flooring stays clean. The floor's cleaning will be dictated by the intensity of traffic, climatic and environmental conditions.

Floor colour is an important factor, affection the level of cleaning required.

Dark Brown	Very easy care
Dark Grey	Easy care
Medium blue & grey	Moderate care
Beige, light grey	Heavy care needed

A mop can be used for daily maintenance and rinsing but always ensure the mop is rinsed in clean water to prevent redistribution of dirt.

Cleaning agents should be used in the prescribed dilution relative to the degree of soiling and most importantly in heavily soiled areas, the solution should be left on the floor for a few minutes to take affect.

Flooring must be rinsed to ensure thorough removal of the cleaning agents residue, thus avoiding a reduction in slip resistance and discolouration of the flooring.

Irregular cleaning can result in problems building up. For this reason, the importance of a regular programme, suited to the usage of the area cannot be overstated. A typical routine could involve daily sweeping and a damp mopping complemented by periodic scrub cleaning.

High pressure cleaners can be used successfully. However these are complicated to use and in view of this and the variations caused by incorrect use, serious deterioration may occur. For these reasons we advise against the use of this type of equipment unless strict operating instructions are in place.

Cleaning

Body Interior

Flooring (continued)

Examples of combined cleaning cycles:

- Aisles swept or vacuumed every day.
- Aisles wet cleaned every week.
- Major overall clean every three months including treatment of stains.

Detergent Composition

Detergent composition can vary widely. Alkaline detergents are best suited to the cleaning of buses and they will generally deal with the majority of soils.

The composition of a cleaning product suitable for cleaning the flooring would be as follows:

- Surfactant 2-7% w/w
- Non-Caustic alkali 2-6% w/w
- PH (conc) 5-8
- Solvent None
- Caustic Alkali None
- Phosphate None
- Ammonia None
- Perfume Optional

Care must be taken that the detergent is thoroughly removed in the rinsing operation, otherwise this may lead to the flooring performance being degraded.

Rinsing

Care must be taken to rinse the flooring thoroughly with hot or cold water. Vacuum or mop up excess water and allow to dry.

Dressing and Polishing

Treating the flooring with metallised emulsion is not recommended due to the intensity of passenger traffic, it will wear off quickly and unevenly thus creating unsightly patches on the floor.

Stain Removal

In many cases, a stronger concentration of the maintenance detergent will remove stubborn stains. Where the stain is pf a more permanent nature (i.e. graffiti or chewing gum) specialist products are available from most chemical suppliers, however it is always sensible to check that they are compatible with the flooring before using them.

Troubleshooting

New flooring becomes soiled after two or three months despite cleaning:

The choice of detergent is incorrect.

Grey streaks are left after cleaning:

Ascertain whether the streaks are due to soiling or detergent. If streaks are due to soiling, check that the detergent choice and detergent dilution is correct. If the streaks are due to detergent residues, the rinsing may be inadequate pr the detergent may be used at too high a concentration.

Treadmaster Flooring

Treadmaster Maintenance Programme

Treadmaster Cleaner Treadmaster Cleaner is a highly efficient solvent free cleaner specially formulated for cleaning light to medium soiling from all grades of Treadmaster Transport flooring.Dilution and use - For regular cleaning use 25 - 50 ml per 5 litres of water. Apply the cleaner using a brush, cloth, mop or scrubbing machine. Rinse thoroughly and allow to dry. For heavier soiling use 200 - 500 ml per 5 litres water. Apply the cleaner and allow to soften the dirt for a few minutes. Rinse thoroughly to remove all traces of the cleaner and allow to dry.When cleaning Treadmaster having a profiled surface it will be necessary to use a stiff brush to clean effectively into the profile.

Treadmaster Floor Polish Stripper Treadmaster Floor Polish Stripper is a powerful blend of alkalis, sequestrant, wetting agents and degreasing solvent designed to remove Treadmaster Sealer. It is also suitable for heavy duty cleaning of extremely dirty Treadmaster.Removal of Treadmaster Sealer -Dilute 1:10 in warm water. Apply liberally to a workable section of floor and leave to soak for approximately 10 minutes, ensuring the surface remains wet at all times.Machine scrub the floor using a rotary scrubbing machine fitted with green floor pads. Remove all slurry immediately using a suitable wet pick-up machine. When completed the surface should be rinsed twice with clean water to remove all residues.If re-application of Treadmaster sealer is required it is recommended that the surface is wet vacuumed again and allowed to dry thoroughly prior to re-applying the sealer.Heavy Duty Cleaning -Dilute 1:20 in warm water. Apply liberally to a workable section of floor and leave to soak for approximately 10 minutes, ensuring the surface remains wet at all times.Scrub the floor using a green floor maintenance pad or polypropylene scrubbing brush.Remove all slurry immediately using a wet pick-up machine, then rinse twice with clean water to remove all residues.

Treadmaster Sealer Treadmaster Sealer is a water based blend of acrylic polymers and polyethylene waxes, providing a durable finish and long lasting shine with a high degree of resistance to soiling and detergents.Treadmaster does not require sealing, but if sealing is desired then the following procedure should be adopted -Clean the floor thoroughly, removing existing sealer if necessary. Rinse with clean water and allow to dry. Apply an even coat of Treadmaster Sealer an applicator or clean mop. Do not rub the emulsion into the floor. When the first coat is dry, apply a second coat at right angles to the first and allow to dry. For the best results after sealing, the surface should be left for several hours or overnight for the film to harden before use.

Daily Checks

Paying particular attention to:

Check	When Done
Level Checks	
Engine Oil	Run in
Engine Coolant	Run in
Fill	
Washer bottle	Run in
Visual Checks	
Exterior	
Operation of all exterior lights	Driver's walk round
Obvious fluid leaks	Driver's walk round / Run in
Tyres, for damage and signs of pressure loss	Driver's walk round / Run in
Wheel nut pointers, for signs of movement	Driver's walk round / Run in
Security of all panels and access panels	Driver's walk round / Run in
Interior	
Condition of break glass hammers	Driver's walk round
Condition of legally required notices	Driver's walk round
Security of escape hatch	Driver's walk round
Operation of all interior lights	Driver's walk round
Fitment of fire extinguisher	Driver's walk round
Physical Checks	
Operation of doors	Driver's walk round
Operation of ramp	Driver's walk round
Operation of saloon bells, wheelchair buzzer and bus stopping sign	Driver's walk round
Check operation of warning lights and buzzers in cab	Driver's walk round
Check operation of cab all controls Inc. brakes, wash wipe system, horn and steering	Driver's walk round

Maintenance - Service Schedule - See Service Manual For Latest Version

NBFL Chassis & Body Inspection Service Matrix, 4 Week Rota Over 5 Years

Service intervals are defined by time in service, or distance which ever comes first. Service intervals are based on a 4 week / 4000 mile rota.

Base Document Issue : 01 Date : August 2013

	Inspection & Service Action	Average Service Times Minutes	1 Month	3 Months	6 Months	9 Months	12 Months	18 Months	24 Months	36 Months	48 Months	60 Months
			4000 Miles A	12000 Miles B	24000 Miles C	36000 Miles D	48000 Miles E	72000 Miles F	96000 Miles G	144000 Miles H	192000 Miles I	240000 Miles J
Air Cleaner	Check for leaks and mounting security	2		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check the restriction indicator	0.5	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Change main air filter element	3					✓		✓	✓	✓	✓
	Change safety filter	2								✓		
	Check evacuation valves (2 off) for correct operation	1		✓	✓	✓	✓	✓	✓	✓	✓	✓
Air Conditioning	Check belt condition, tension, and pulley.	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Replace drive belt	8					✓		✓	✓	✓	✓
	Check compressor security	1	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Service system	60					✓		✓	✓	✓	✓
	Carry out run up check, saloon and cab chillers	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Front Axle	Check hub bearing condition	4			✓		✓	✓	✓	✓	✓	✓
	Strip and examine hub bearings, regrease	90									✓	
	Check oil seals for leaks	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check axle fixings	2	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check wheel alignment and lock stop adjustment	10					✓		✓	✓	✓	✓
	Check king pins for wear	4					✓		✓	✓	✓	✓
	Lubricate king pins top and bottom, top and bottom wishbone bearings.	4					✓		✓	✓	✓	✓
Front Suspension	Check inboard wishbone bushes and fixings	4	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check condition of bump stops	0					✓		✓	✓	✓	✓
	Check damper bushes	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Rear Axle	Check oil level. Top up as required	2			✓		✓	✓	✓	✓	✓	✓
	Change oil and casing breather. Check breather pipe.	10							✓	✓	✓	
	Check hub bearing condition	4			✓		✓	✓	✓	✓	✓	✓
	Strip and examine hub bearings, regrease	90									✓	
	Check hub and pinion oil seal for leakage	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check security of half shafts and studs	4			✓		✓	✓	✓	✓	✓	✓
	Check axle fixings	2	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
Rear Suspension	Check V stay and control rod bushes, fixings	2	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check condition of bump stops	1					✓		✓	✓	✓	✓
Foundation Brakes	Check pad wear	6	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Replace pads	180							✓		✓	
	Check disc wear and condition	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Replace discs	300								✓		
	Check condition of brake wear indicators, seals, pad retention components	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check condition of hoses and wiring	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check presence, fit and condition of sealing caps	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual

Maintenance - Service Schedule - See Service Manual For Latest Version

NBFL Chassis & Body Inspection Service Matrix, 4 Week Rota Over 5 Years

Service intervals are defined by time in service, or distance which ever comes first. Service intervals are based on a 4 week / 4000 mile rota.

Base Document Issue : 01 Date : August 2013

	Inspection & Service Action	Average Service Times Minutes	1 Month	3 Months	6 Months	9 Months	12 Months	18 Months	24 Months	36 Months	48 Months	60 Months
			4000 Miles A	12000 Miles B	24000 Miles C	36000 Miles D	48000 Miles E	72000 Miles F	96000 Miles G	144000 Miles H	192000 Miles I	240000 Miles J
Pneumatic Braking System	Check compressor oil level	1	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
	Clean unit prior to maintenance	1			✓	✓	✓	✓	✓	✓	✓	✓
	Change compressor oil and oil filter	5					✓		✓	✓	✓	✓
	Change coalescing elements	2					✓		✓	✓	✓	✓
	Change compressor air filters, main and safety	2					✓		✓	✓	✓	✓
	Replace unloader, mpv seat, internal separator filter	90								Hydrovane Only		
	Check compressor condition, e.g. oil carry over and build up times, oil leaks, water leaks, air leaks	4			✓	✓	✓	✓	✓	✓	✓	✓
	Check all systems and warning buzzer function correctly. Confirm correct operating pressures are being achieved.	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check all pipe connections for leakage and fixings for security. Check rubber hoses etc for cracks and hardening	6	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check operation of the park brake	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check operation of service brakes	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check air dryer unit function and cleanliness. Check govenor cut in and cut out pressures, build up times	5		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Change air dryer cartridges	8			✓	✓	✓	✓	✓	✓	✓	✓
	Drain air reservoirs of condensate	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check for contamination discharge from silencers	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Brake Roller test	15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling System, Engine	Check coolant level	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check seal and pressurisation feature on caps	2				Visual		Visual		Visual		
	Check engine anti-freeze solution strength	5		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check low coolant sensor operation	10		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Drain system, flush and refill with coolant	25	First 3000 Miles						✓	✓	✓	
	Check hoses for deterioration and all connections for leaks	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check radiator matrix and clean external debris	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check radiator mountings	3							✓	✓	✓	
	Check fan and motor for mounting security and damage	3		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check operation of cooling fans	5			✓		✓	✓	✓	✓	✓	✓
Electrical	Check connections for cleanliness, security and insulation	10			Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check instrument warning lights, switches, direction indicators, fog lights, brake lights and horn for correct operation	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check DC / DC 24V converter, 24V charging voltage	5		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check correct operation of the instruments	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check terminal security and re-apply petroleum jelly	3		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check condition and security of all earth bonds	5		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓

Maintenance - Service Schedule - See Service Manual For Latest Version

NBFL Chassis & Body Inspection Service Matrix, 4 Week Rota Over 5 Years

Service intervals are defined by time in service, or distance which ever comes first. Service intervals are based on a 4 week / 4000 mile rota.

Base Document Issue : 01 Date : August 2013

	Inspection & Service Action	Average Service Times Minutes	1 Month 4000 Miles A	3 Months 12000 Miles B	6 Months 24000 Miles C	9 Months 36000 Miles D	12 Months 48000 Miles E	18 Months 72000 Miles F	24 Months 96000 Miles G	36 Months 144000 Miles H	48 Months 192000 Miles I	60 Months 240000 Miles J
Engine and Ancillaries	Check oil level. Top up as required.	2	Visual	Visual		Visual						
	Check Fire Suppression System	15	✓									
	Change oil and filter	10	✓									
	Change engine fuel filters	6				✓		✓	✓	✓	✓	
	Check for oil, coolant and fuel leaks	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check charge air piping for security, leaks, cracking	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check crankcase breather tube for blockages	1		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check power unit engine mounts, security to chassis	3	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check for excessive engine exhaust smoke	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check engine components/ancillaries for contamination. Clean / degrease as required	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Adjust valve clearances	45								✓		✓
	Change coupling drive rubbers	0										✓
	Dosing unit airside flushing	60		✓	✓	✓	✓	✓	✓	✓	✓	✓
SCR	Check AdBlue level. Top up as required.	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check/clean Ad Blue filler neck, surroundings	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check clamp security, ensure no leakage	2		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check mountings for sign of damage or deterioration	1	Re-torque straps	Visual	Visual	Visual	Re-torque straps	Visual	Re-torque straps	Re-torque straps	Re-torque straps	Re-torque straps
	Change doser unit in-line air filter	4				✓		✓		✓		
	Check exhaust system for damage	2		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check condition of wiring to temp. and NOx sensors	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Fuel System	Drain water from remote filter	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check fuel cap for leaks and secure fitting	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check security of fuel tank and mountings	5	Re-torque straps	Visual	Visual	Visual	Re-torque straps	Visual	Re-torque straps	Re-torque straps	Re-torque straps	Re-torque straps
	Change remote fuel filter	6				✓		✓		✓		
	Check fuel tank for external damage/corrosion	1		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Drive Shaft	Check tightness of fixings	1			Visual		Visual	Visual	Visual	Visual	Visual	Visual
	Check for wear & heat damage to UJ's	1			Visual		Visual	Visual	Visual	Visual	Visual	Visual
	Check for spline wear & damage to rilsan coat	4			Visual		Visual	Visual	Visual	Visual	Visual	Visual
	Check bearing snap rings, balance weights, all seals	2			Visual		Visual	Visual	Visual	Visual	Visual	Visual
	Check joint bearings - manual rotation of yoke	40							Dismount		Dismount	
	Check spline condition, backlash and axial backlash	10							Dismount		Dismount	
	Regrease universal joints	2		✓	✓	✓	✓	✓	✓	✓	✓	✓
Steering Gear	Check oil reservoir mounting integrity	1		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check hydraulic oil fluid level	1	✓									
	Clean unit prior to maintenance	1					✓		✓	✓	✓	✓
	Change hydraulic filter	2					✓		✓	✓	✓	✓
	Change hydraulic fluid	10					✓		✓	✓	✓	✓
	Check steering and bevel boxes for leakage, security	2		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check for steering column/wheel play	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check linkages and ball joints for wear and security	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check hydraulic steering limiter	4					✓		✓	✓	✓	✓
	Check piping system for leaks	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Lubricate steering relays	3					✓		✓	✓	✓	✓
Air Suspension	Check piping system for leaks	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check security of wiring, and sensors for damage	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check ferry lift and kneel function	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check spring mountings for security	4		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check shock dampers and their mountings	4		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Check vehicle ride height	3		✓	✓	✓	✓	✓	✓	✓	✓	✓

Maintenance - Service Schedule - See Service Manual For Latest Version

NBFL Chassis & Body Inspection Service Matrix, 4 Week Rota Over 5 Years

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Base Document Issue : 01 Date : August 2013

	Inspection & Service Action	Average Service Times Minutes	1 Month	3 Months	6 Months	9 Months	12 Months	18 Months	24 Months	36 Months	48 Months	60 Months
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Wheels and Tyres	Visually inspect all wheel nuts	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check and torque all wheel nuts. Note loose wheel nuts	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check tyres are free from damage, cuts, bulging, debris	6	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check all tyre pressures	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check tread depth to legal limit	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check valves are at 180° to each other on rear axle twin tyres	0	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Body	Inspect body connections for security	6					Visual		Visual	Visual	Visual	Visual
	Check wheelchair ramp, and warning lights	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Align headlamps	8					✓		✓	✓	✓	✓
	Clean out and lubricate wheelchair ramp	5		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check operation of engine bay micro switches	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check heaters, Remove & clean refit heater / demister filters	15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Lubricate all hinges, locks, door/seat mechanisms, blind gear	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check emergency switches operate	4	Every 2 wks	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Drain door regulator bowl	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hybrid Systems	Visually inspect traction motor, bolts, cooling, connections and damage	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check earths for damage, condition, security, continuity, all hybrid components	5					Visual		Visual	Visual	Visual	Visual
	Grease traction motor and drain condensate	5					✓		✓	✓	✓	✓
	Change traction motor bearing grease	60									✓	
	Change generator bearings	1400										✓
	Check, investigate stored errors, Cummins, Siemens, ECAS, EBS, HV batteries	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	HV battery : Check coolant level	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	HV Battery : Check seal and pressurisation feature on caps	2				Visual		Visual		Visual		
	HV battery : Check anti-freeze solution strength	5		✓	✓	✓	✓	✓	✓	✓	✓	✓
	HV battery : Drain system, flush and refill with coolant	40							✓		✓	
	HV battery : Check hoses for deterioration and all connections for leaks	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	HV battery : Check radiator matrix and clean external debris	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	HV battery : Check radiator mountings	6							✓		✓	
	HV battery : Check fan and motor for mounting security and damage	2		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	HV battery : Check operation of cooling fans	5			✓		✓	✓	✓	✓	✓	✓
	Hybrid Cooling : Check coolant level	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Hybrid Cooling : Check seal and pressurisation feature on caps	2				Visual		Visual		Visual		
	Hybrid Cooling : Check anti-freeze solution strength	5		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Hybrid Cooling : Check low coolant sensor operation	10		✓	✓	✓	✓	✓	✓	✓	✓	✓
	Hybrid Cooling : Drain system, flush and refill with coolant	45							✓		✓	

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NBFL Chassis & Body Inspection Service Matrix, 4 Week Rota Over 5 Years

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Hybrid Systems (contd)	Hybrid Cooling : Check hoses for deterioration and all connections for leaks	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Hybrid Cooling : Check radiator matrix and clean external debris	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Hybrid Cooling : Check radiator mountings	3							✓	✓	✓	
	Hybrid Cooling : Check fan and motor for mounting security and damage	2		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
	Hybrid Cooling : Check operation of cooling fans	5			✓		✓	✓	✓	✓	✓	✓
	Incremental Total Time		316	95	53	65	143	117	601	318	704	1,445
	Hrs Per Month (Based on 4,000 miles per month)		5.26	0.79	0.15	0.12	0.20	0.11	0.42	0.15	0.24	0.40

Euro 5 Engine Oil Drain & Oil Filter Change Interval
Cummins Recommendations For Approved Oil Specs.

	Average Vehicle Speed				
	6 MPH	6 - 9 MPH	9 - 12 MPH	12 - 16 MPH	16 - 19 MPH
Mileage	3500	4700	7000	9500	11700
Hours	7500	7500	7500	7500	7500
Months	3	3	3	3	3

Change oil & filter by mileage, hours in service, or calendar months depending on which occurs first
Use the lower oil change interval if the average vehicle speed is on a transition

Approved oil specs

CES 20071	CES 20072	CES 20076	CES 20077	CES 20078	Cummins Engineering Standards
ACEA E5	ACEA E7				Association des Constructeurs Europeens d'Automobiles
API CH4	API CI4				American Petroleum Institute

Maintenance Checks

Body Checks

Corrosion Inspection

When inspecting the underside of the vehicle or bodywork, view all the under structure which could hold dirt / road salts. Also check for damaged surfaces and / or signs of bare metal.

Structural Inspection

Check the underside of the bodywork for signs of loose mechanical fixing, cracks or weld fracture of joints. On the exterior and interior , check for bulges or cracks on all joints and body structure intersections. Seats should also be checked for cracks in pedestals and for security of mountings.

Part Attachments

Check the security of pipes, cables, mudflaps, flooring, stepwells, handrails, plus anything screwed. Bolted, riveted or glued to the bodywork.

Heating System

Check all pipe joints for signs of weeping coolant. Ensure gate valves are capable of being turned on and off and are not leaking.

Air filters should be cleaned regularly to insure good air circulation.

Electrical

Inspect wiring for signs of chafing, discolouration of joints or damage to protective covers.

Exterior Joints And Glazing

Check the glazing perimeter for signs of deterioration and possible water leaks or failure of joint adhesion.

Paint Finish

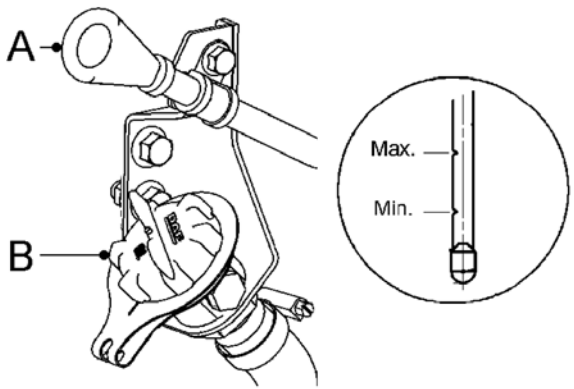
Inspect the exterior surface for signs of deterioration in the form of blisters, scratching or minor damage, which if not rectified will result in major problems.

Note

It is important to act quickly to rectify defects, as recommended in the service manual, since continued running in a defective condition could result in rapid deterioration.

Maintenance Checks

Engine Oil Level



The engine oil dipstick (A) and oil filler (B) are accessed from behind a hinged door on the rear offside of the vehicle. The correct oil level should register between the High and Low marks on the dipstick. There is 2.8 litres of oil between low and high.

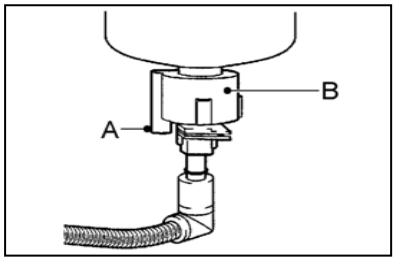
Note

Never operate the engine with the oil level below the Low mark or above the High mark. Wait at least 5 minutes after stopping the engine to check the oil level, this allows the oil to drain into the sump. If adding topping up, allow time for the oil to reach the sump.

Fuel System

Warning

When draining the water separator, an amount of fuel will escape. Collect the fuel and avoid the risk of fire.



Water in the fuel system may lead to significant damage to the fuel system.

- Place a container beneath the water separator.
- Remove the connector.
- Unscrew the ring-shaped drain cock (B) on the bottom of the water separator in anti-clockwise direction.
- Drain the filter until pure diesel fuel comes out of the drain cock (A).
- Turn the drain cock (B) if it abuts, another 1/8 - 1/4 turn.
- Check the drain cock (B) for leakage.
- To prevent pollution, pass the drained water and diesel fuel mixture to the relevant authorities for reprocessing.

Maintenance Checks

Electrical

Check the operation of all lights, switches, warning lights, direction indicators , stop lights and the horn.

Check that the batteries are charging correctly.

Check that instruments are working correctly.

Warning

See Environmental Warnings

Maintenance Checks

Cooling Systems

The expansion tank fillers are located on the O/S rear corner of the vehicle, behind a hinged access door.

The coolant level should be checked when the engine is cold. If the engine has been running, it must be allowed to stand for at least 15 minutes before checking the level.

ENSURE CORRECT COOLANT IS USED AND DO NOT MIX WITH OTHER TYPES.

Coolant level.

Engine coolant has sight glass on header tank. Hybrid circuit is a manual dip or visual check to the filler neck. Battery cooling circuit has an expansion tank under the stairs and has a moulded level line.

Warning

Allow the system to cool sufficiently before removing the coolant tank filler cap, to avoid personal injury from the hot coolant.

Always use the recommended coolant.

Warning

See Environmental Warnings

Battery coolant circuit has an expansion tank under the stairs and has a moulded level line.

Caution

Do not mix coolants between circuits, see fluids and lubricants for correct spec.

Maintenance - Fluids and Lubricant

1. Engine and Hybrid cooling system
2. Engine Oil
3. Rear Axle
4. Propshaft
5. Steering Reservoir
6. Battery Coolant (Battery cooling circuit is under the stairs)

Maintenance - Fluids and Lubricant

	Wright Bus	Quantity	Reference	
Engine oil (Euro 5)	CMM-00485	11L	15W-40 Grade	To Cummins CES20076, 77 or 78. ACEA E5 and API CI-4. See Cummins QuickServe On Line
Engine coolant	CMM-00442	55L		TEC PGXL (Propylene glycol) (TMC RP329 - grade). To CES 14603. See Cummins QuickServe On Line
Battery circuit coolant	CMM-00442	11L		As above
Hybrid circuit coolant	CMM-00438	40L		BASF G48 coolant (50/50 mixture with de-ionized water)
Steering fluid	CMM-00441	5L		TEXAMATIC 7045 E, GM Dexron III Equivalent spec.
Rear axle oil	CMM-00456	30L	80W - 90	Chevron Texaco Multigear SAE 80W - 90. (According to ZF List of Lubricants TE-ML 12)
Torque stripe paint	PTX-00975	As Required		
Front and rear axle hub grease, (compact bearings)	CMM-00496	Front 96g	ZF Specified supplier	3 greases specified, all Fuchs Renolit. (According to ZF List of Lubricants TE-ML 12)
Front axle pivot point grease	See right	A/R	ZF Specified	A lithium-saponified multi-purpose grease of NLGI class 2 which is mixable with mineral oil
Drive shaft UJ grease	See right	A/R	Dana Specified	Lithium based EP grease to NLGI Grade 2, temp range -23 to 163 deg C
Traction motor grease	See right	A/R	Siemens Specified	Shell Retinax LX2 rolling contact grease / Shell AG
Air compressor, lubricating oil	CMM-00427	1.3 Ltrs		Fluid Force 4000

Emergency Repairs

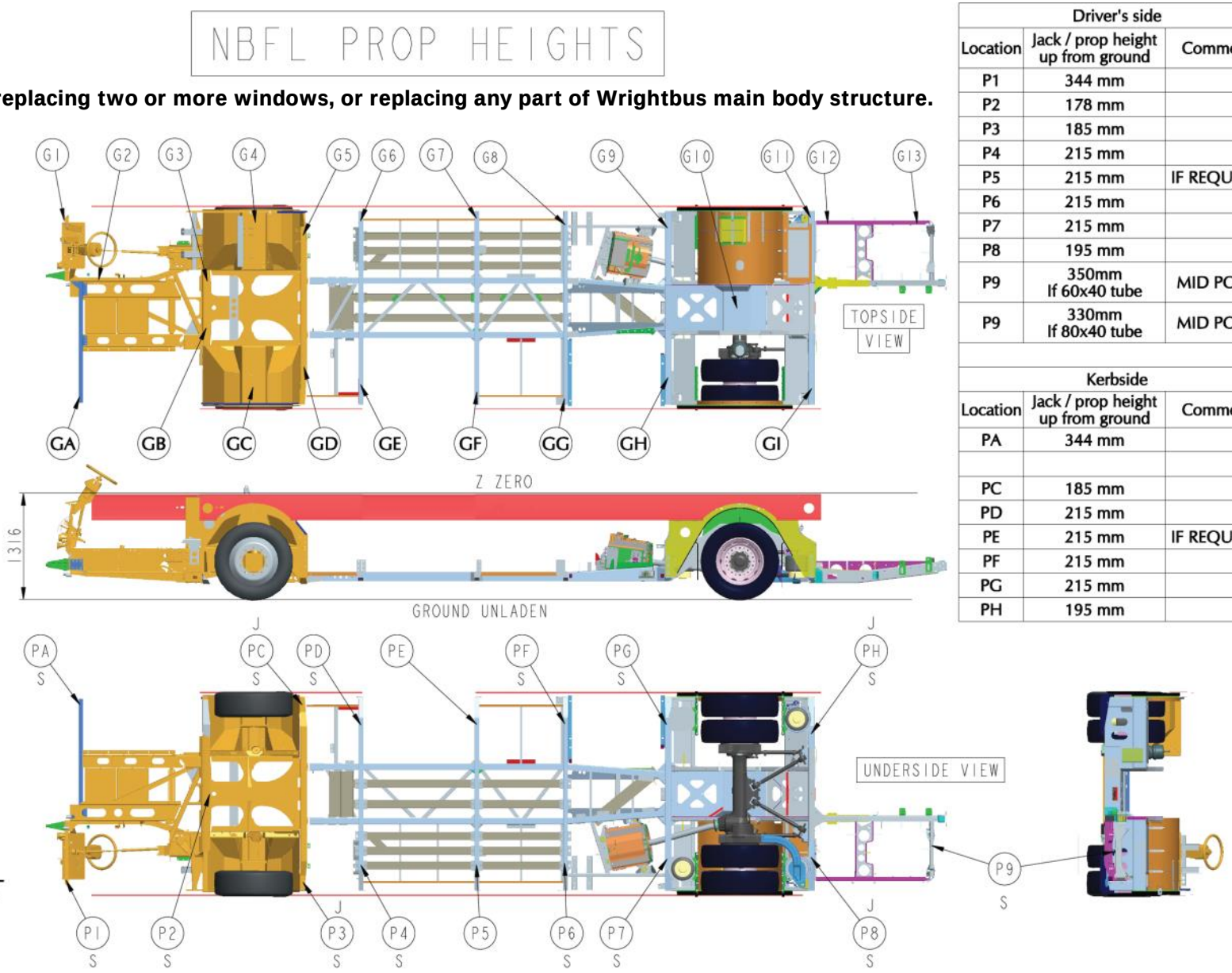
Jacking Points - Prop Heights

Chassis must be levelled when replacing two or more windows, or replacing any part of Wrightbus main body structure.

Driver's side		
Location	Gauge height down from Z zero	Comments
G1	812 mm	
G2	695 mm	IF REQUIRED
G3	981 mm	
G4	173 mm	IF REQUIRED
G5	981 mm	
G6	981 mm	
G7	981 mm	IF REQUIRED
G8	981 mm	
G9	608 mm	
G10	845 mm	IF REQUIRED
G11	608 mm	
G12	848 mm	IF REQUIRED
G13	848 mm	

Kerbside		
Location	Gauge height down from Z zero	Comments
GA	812 mm	
GB	981 mm	
GC	173 mm	IF REQUIRED
GD	981 mm	
GE	981 mm	
GF	981 mm	IF REQUIRED
GG	981 mm	
GH	608 mm	
GI	608 mm	

J = JACKING POINT
S = SUPPORT / PROP POINT



Driver's side		
Location	Jack / prop height up from ground	Comments
P1	344 mm	
P2	178 mm	
P3	185 mm	
P4	215 mm	
P5	215 mm	IF REQUIRED
P6	215 mm	
P7	215 mm	
P8	195 mm	
P9	350mm If 60x40 tube	MID POINT
P9	330mm If 80x40 tube	MID POINT

Kerbside		
Location	Jack / prop height up from ground	Comments
PA	344 mm	
PC	185 mm	
PD	215 mm	
PE	215 mm	IF REQUIRED
PF	215 mm	
PG	215 mm	
PH	195 mm	

Emergency Repairs

Jacking Points - Prop Heights

See Prop Height Diagram

Chassis must be levelled when replacing two or more windows, or replacing any part of Wrightbus main body structure.

Warning

The jack must be directly beneath the air spring base. Never place the jack under the unsupported span of the member that connects the two air spring bases.

Warning

It is not permissible to jack on any part of the frame. An external wheel jack or air lifting bag should be used to lift the vehicle for wheel change purposes.

Directly under the base of the air spring.

If a suitable jack is not available, an external wheel jack or air lifting bag should be used.

Under the chassis frame, where the crossmember in front of the rear axle crosses the frame longitudinal.

Emergency Repairs

Wheels and Tyres

1.0 PURPOSE

To ensure the correct fitment of front and rear wheels.

2.0 TOOLS REQUIRED

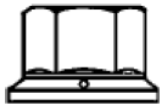
- 32mm Socket
- Air Impact Wrench
- Torque Wrench

3.0 PARTS REQUIRED

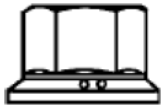
- R22 $^{1}/_{2}$" tyre and wheel assemblies
- Wheel Nuts M22x1.5 - 10 off per wheel

4.0 PROCEDURE

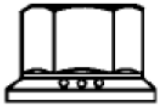
4.1 Check the wheel nuts are the correct type and show no signs of damage.



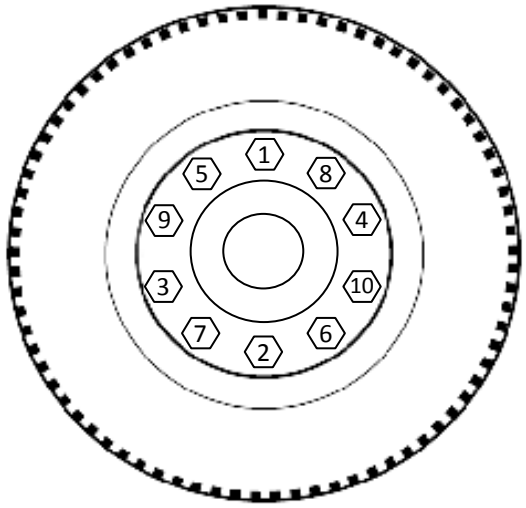
A spigot wheel nut with one 'mark' on the captive washer denotes that the captive washer has been hardened to a degree where it is suitable for **steel wheels only**.

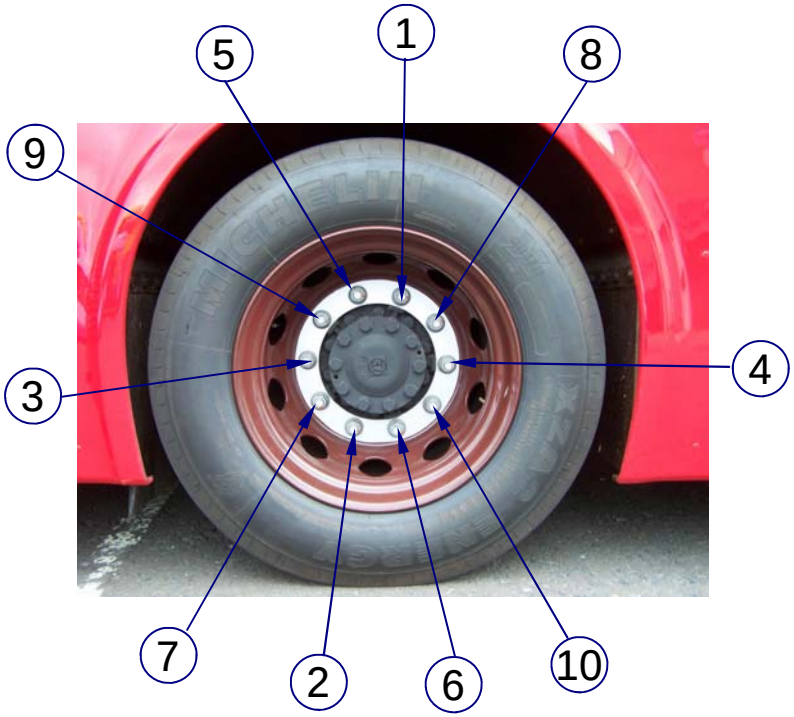


A spigot wheel nut with two 'marks' on the captive washer denotes that the captive washer has undergone a controlled process which allows it to be used with both steel and **aluminium wheels.**



A spigot wheel nut with three 'marks' on the captive washer denotes that the captive washer is suitable for use on **alloy wheel only**.





Emergency Repairs

Wheels and Tyres

4.2

It is recommended to use wheels that have been dynamically balanced. The maximum radial tyre run out should not exceed 2mm. New wheel & tyre assemblies are supplied balanced. When carrying out this operation in service, it is advisable to check the wheel & tyre assemblies.

4.3

Before the fitment of any wheel, they and al associated parts should be thoroughly inspected for distortion, damage, dents, cracks, corrosion, worn stud holes, stud security, hub and the condition of the spigot mounting area.

4.4

Inspect each wheel and hub mating surfaces, ensuring they are spotlessly clean and free from any paint additional to the wheel manufacturer's protective coating.

4.5

Never assume someone else has inspected all the components - it is the responsibility of the person fitting the wheels to carry out the inspection.

4.6

In order to minimise any friction of the wheel stud and nut threads, each should be cleaned down the entire length of the thread.

4.7

Friction-reducing thread lubricants are not permitted.

4.8

Carefully fit the wheels squarely over hub/ studs avoiding damage to stud threads. On twin wheel fitments, ensure the tyre valves are correctly aligned.

4.9

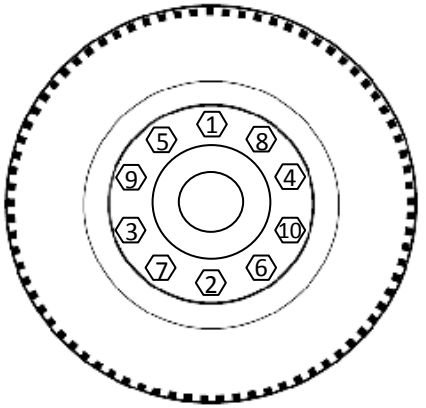
Fit and run up the wheel by hand initially. If using power tools, then only use for the initial phase of tightening. The last stages of tightening must be carried out with a torque wrench.

4.10

The final tightening of the wheel nuts should be done before fully lowering the wheel to the ground in order that the correct clamping force can be achieved.

4.11

Tighten the wheel nuts in the correct sequence as shown below using a calibrated torque wrench.



4.12

The torque when using steel wheels is 600Nm ±15Nm, carried out in three stages.

1st Stage - 300Nm ±7.5Nm

2nd Stage - 500Nm ±12.5Nm

3rd Stage - 600Nm ±15Nm

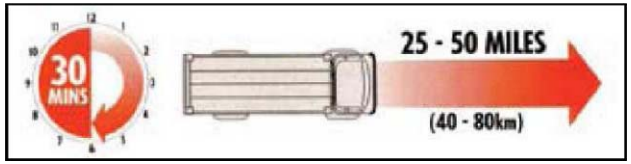
4.13

If the wheel nuts have been over tightened during the run up procedure (this will be indicated by no movement of the nut during the torqueing procedure) the wheel nuts must be slackened off, re-checked and re-tightened in the correct sequence.

5.0 WHEEL RE-TORQUE PROCEDURE

5.1

Due to relaxation of the joint, it is vital that all wheel nuts are rechecked for tightness after the vehicle has stood for a period of 30 minutes whether the vehicle has moved or not. Wheel nuts should be rechecked for tightness after 25-50 miles.



5.2

When carrying out the re-torque to the wheel nuts, under no circumstances should the wheel nuts be slackened and retightened. Instead, the wheel nuts should simply be checked to see if the correct torque is still applied.

5.3

The re-torque procedure should be carried out to complete the wheel fitment procedure in one operation in one operation before the vehicle is put into service.

Emergency Repairs

Wheels and Tyres

Tyre Pressures

The pressures quoted have been determined to ensure an acceptable compromise between ride comfort, handling and tyre life.

Recommended Tyres

The recommended tyres are

Front = Michelin 315/60 R22.5 X ENERGY XF TL 154/148L

Rear = Michelin 275/70R22.5 XZA 2 ENERGY TL 148/145 M

Recommended Tyre Pressure

Front

9.0 Bar Front

Rear

8.75 Bar Rear

Replacement Tyres

Replacement tyres must be of a similar specification as original fit. It is recommended that tyres from different manufacturers are not mixed on an axle.

Wheel Balancing

All wheels must be balanced when a new tyre is fitted. If a wheel is not balanced, it can cause abnormal vibrations at different road speeds.

Warning

See Environmental Warnings

Emergency Repairs

Battery Boost Socket

Battery Boost Socket

The battery boost socket is located below the drivers seat as you enter the drivers cab, behind a flap door, as shown in the photo below.

Warning

See Environmental Warnings

High Voltage Lock Off and Isolation procedure

SAFETY CRITICAL

1.0 PURPOSE

The purpose of this document is to instruct personnel how to lock off and isolate high voltage from the vehicle wiring and installed components.

High voltage will always remain inside the traction battery pack however isolating the battery pack will remove hazardous voltage from being present on the DC bus and components connected to the DC bus, i.e., Siemens components, Hydrovane components and DC-DC converter.

2.0 SAFETY INFORMATION

2.1 The vehicle must be de-energized during all work on the inverter.

2.2 Danger!! Even after the vehicle has been powered down, hazardous voltages can still be present for a period of time.

2.3 The vehicle must be isolated from hazardous voltage.

2.4 The vehicle must be secured from switching on again.

2.5 The operator must wait at least 5 minutes for hazardous voltage on the DC capacitors to internally discharge.

2.6 The operator must verify that the equipment is not live.

High Voltage Lock Off and Isolation procedure

SAFETY CRITICAL

3.0 PROCEDURE

3.1 Switch the vehicle ignition switch off (Fig. 1).

Fig. 1

3.2 Switch the battery master switch off and pad lock to prevent switching on (Fig. 2).

Fig. 2

You need a hasp for several people working on the vehicle so they can all lock the system.

SAFETY CRITICAL

3.3 Switch off the 24V dc battery isolator switch located in the drivers cab to the right of the driver's feet (Fig. 3).

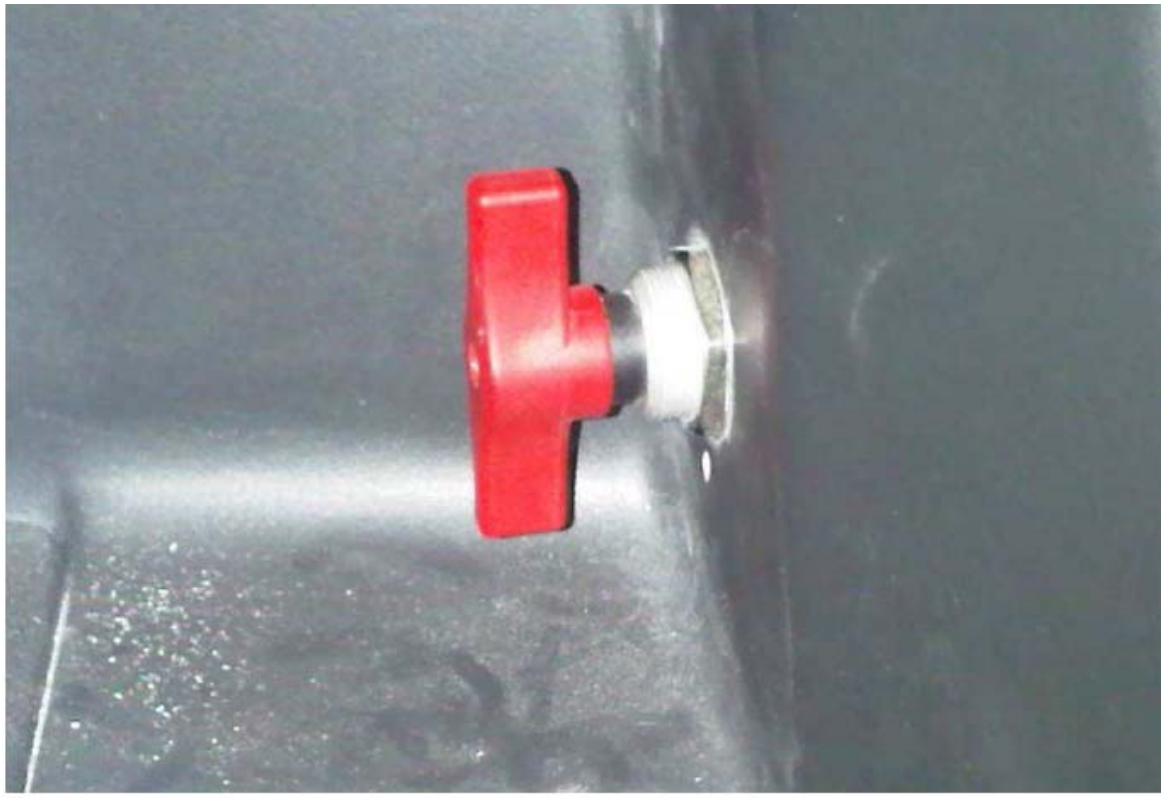


Fig. 3

SAFETY CRITICAL

3.4 Wait 5 minutes to ensure that the inverter internal capacitors have safely discharged.

3.5 Remove the exterior panel to expose the battery back. Disconnect the HV power connector by unscrewing the two fixing screws and pulling the connector out (Fig. 4).

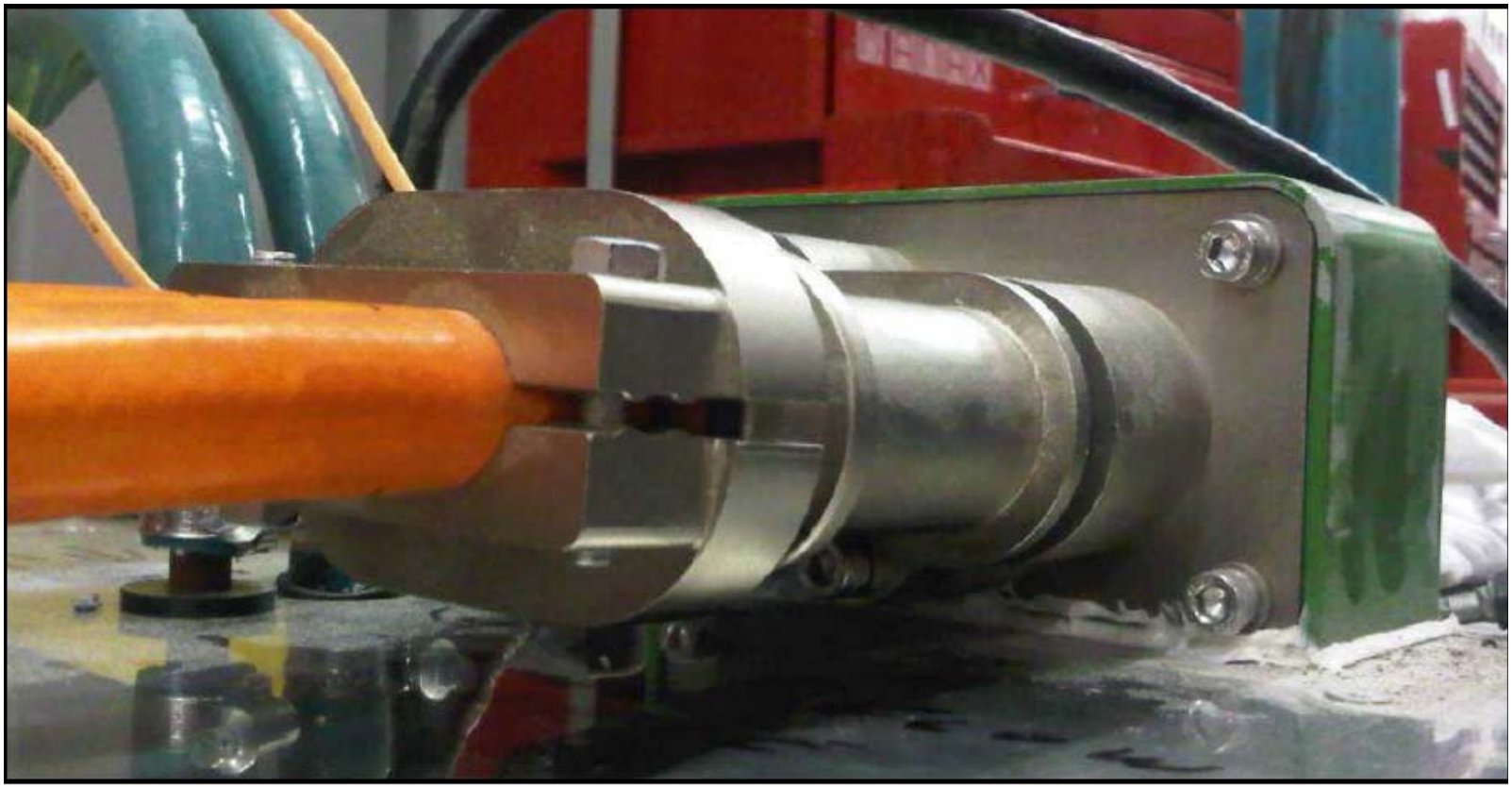


Fig. 4

3.6 Remove the access hatch in the fibreglass inside the bus to expose the HV distribution box (Fig. 5).

SAFETY CRITICAL

Fig. 5

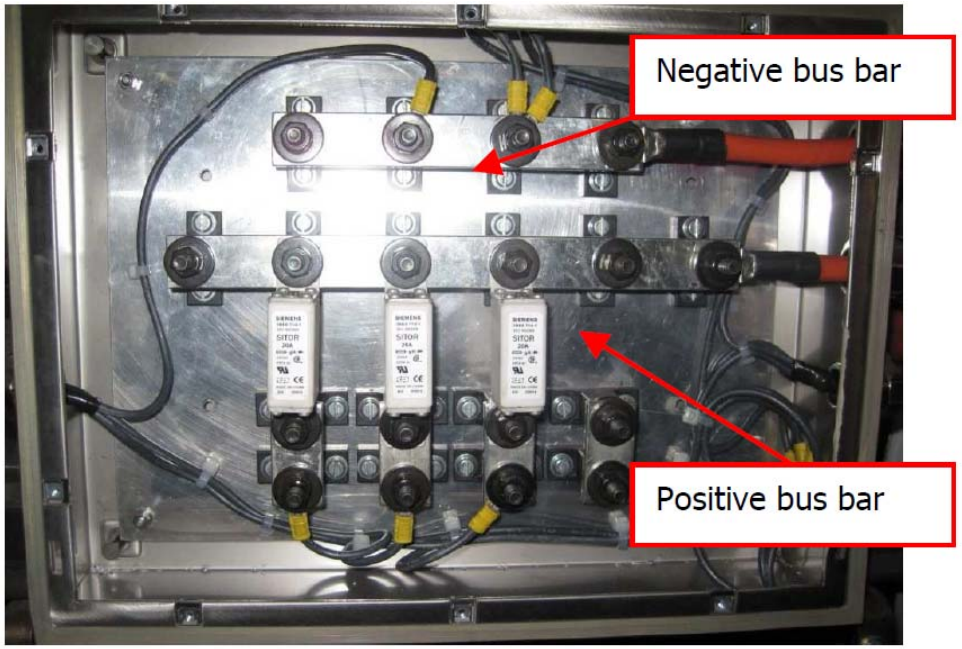


Fig. 6

3.7 Remove the cover on the HV distribution box and using a multi-meter (1000V dc CAT III type or greater), ensure that the following voltage measurements are less than 50V dc :-

- Voltage between the positive and negative bus bar
- Voltage between the positive bus bar and chassis
- Voltage between the negative bus bar and chassis

3.8 If the voltages measured are greater that 50V dc, STOP this isolation procedure, replace the cover on the HV distribution box and do not carry out any further work on the bus - seek Wrightbus Engineering Support.

Towing

The bus can only be towed from the front using the towing eye. Remove the front panel to access the towing socket. The towing eye should be screwed into the tapped socket in the front crossmember,

Caution.

It is essential to disconnect and support the propshaft at the rear axle before attempting to tow the vehicle,

1" BSF hook should be used.

An air coupling is located on the front of the vehicle to provide a means of supplying air to the braking system while the vehicle is being towed.

When there is no means of supplying air to the bus being towed or the parking brake cannot be released, the spring brakes must be manually released.

Caution

The bus must only be towed using a rigid tow bar.

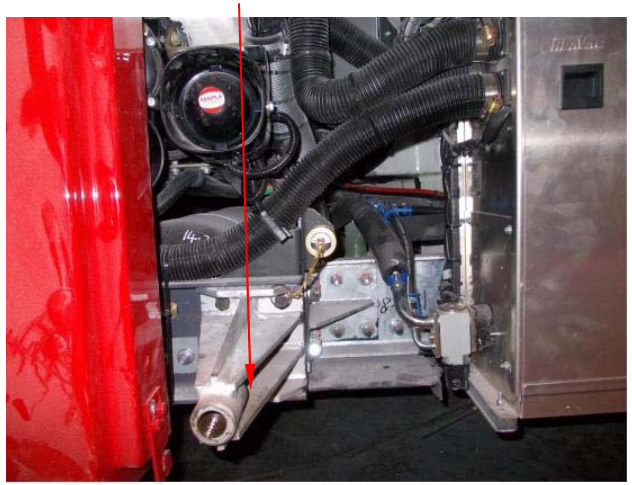
Warning

In this condition, the brakes are completely inoperative. Towing must be carried out using a rigid tow bar.

Caution

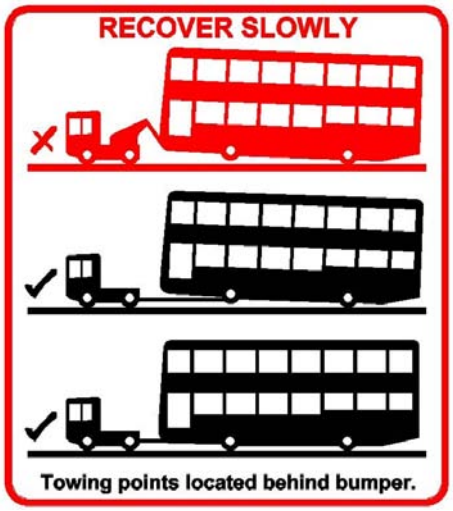
The actuators must only be wound Off with the handbrake in the On position or with the air pressure exhausted from the system.

Front Towing Eye.



Releasing Parking Brake

- **Place chocks behind and in front of the wheels.**
- **Remove the cap from the end of both drive and axle actuators.**
- **Unscrew the release bolts of both actuators until the brake pads release from the discs.**
- **When resetting, release the bolts, tighten to 46Nm (35ft lbs.) in a clockwise direction.**
- **Replace the spring brake actuator caps.**

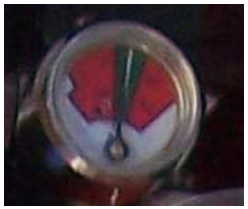


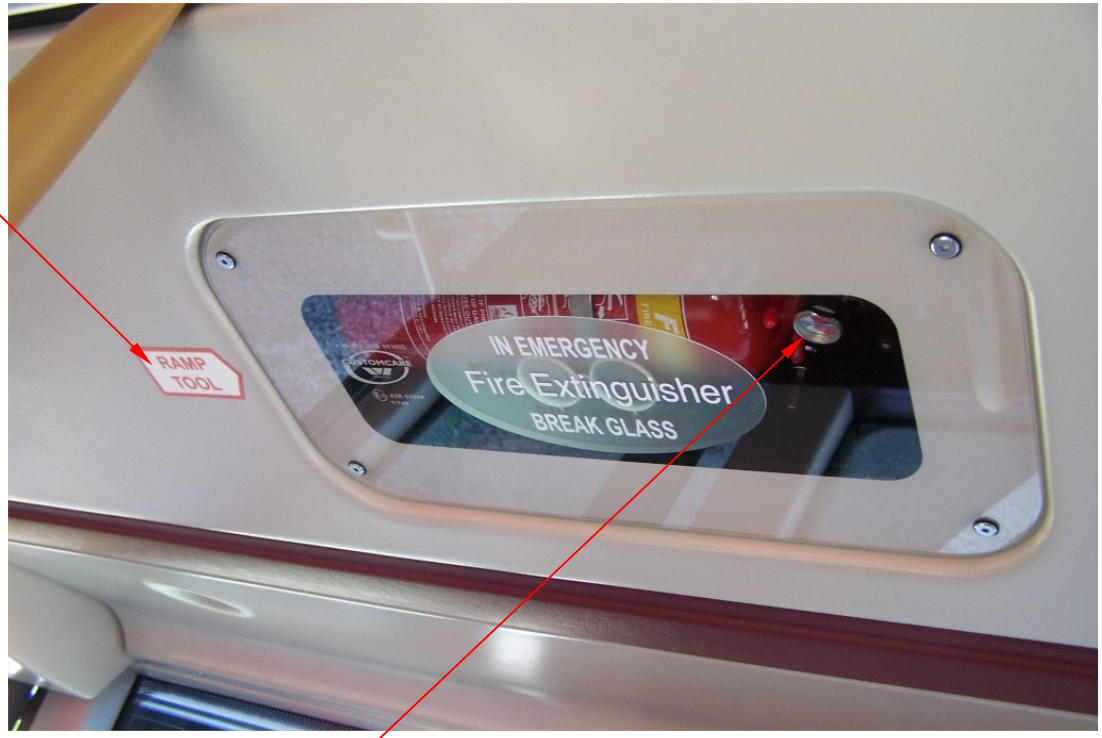
Emergency Equipment

The fire extinguisher is located on the near-side roof cove beside the mid-door behind glass, to gain access, the glass must be broken.

Ramp Tool

Used to manually wind in ramp.





Warning

The gauge should be inspected regularly to insure the fire extinguisher is charged.

In the event of a fire:

Certain plastic seals can, in the event of a fire, form gases which together with water form a corrosive acid. Therefore, do not touch any fire extinguisher fluid on the vehicle without protective gloves.

The bus is fitted with several emergency windows located throughout the vehicle. In an event of an emergency, the glass can be broken by removing the yellow safety tag from the break glass tool and then striking the red button with your fist.

Emergency Equipment

Emergency Exit

Located in the upper deck as shown in the photo above. In case of emergency, push in the white areas and pull to remove the panel. Behind this panel is an emergency glass which can be broken in case of emergency.

Revision 1.0 - 12/08/2013

FOGMAKER
INTERNATIONAL AB

[ ] Installation checklist
[ ] Regularly check up

Customer	Extinguisher s/n	Date and place of installation
Adress	Detector gas bottle s/n	Installed by
Post address		Checked by.
Bus no / reg no.		Phone.

Checklist: Fogmaker extinguisher for bus engine compartments

Pos	Remark	Installation & regularly	Checked	Note:
1	**Extinguisher**			
1.1	Bracket and clamps	X		
1.2	Visible damage	X		
1.3	Manometer-pressure	X		Pressure: bar
1.4	Visible leak	X		
1.5	Label: Next service	X		
1.51	Label: Antifreeze	X		
1.52	Label: Serial number	X		
1.53	Label: CE	X		
2	**Detector gas bottle**			
2.1	Visible damage, clamps.	X		
2.2	Manometer-pressure	X		Pressure: bar
2.3	Pressure switch, standard 12 bar N/O	X		Cable connections
3	**Distribution and Nozzles**			
3.1	Valve hose, visible damages	X		
3.2	Pipe and connections fitted	X		
3.3	Nozzles. (fitted with Loctite)	X		
3.4	Adjustment Nozzle direction	X		
4	**Detector tube**			
4.1	Visible damages	X		
4.2	Clamps or 10 mm cable ties	X		
4.3	Protection-hose, visible check	X		
4.3	Protection spring, no sharp edge	X		Bended or protected end
4.4	Minimum distance from turbo 300 mm	X		
5	**Alarm panel**			
5.1	Test light and sound alert	X		
5.2	Visible damages	X		
7	**Other remarks**			

Electrical System Schedule Index

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

NBfL AH765-789 & AH796-820

Modifications

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

REVISION	DATE	BY	SHEET	MODIFICATIONS
R1.00	12-Mar-13	SK		based on original schedules
R1.01	29-Apr-13	SK		Resettable fuses removed on NBfL contracts as standard

Wire Numbers Reference List

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

DIGITAL INPUT WIRE NUMBERS

FROM	TO	RESERVED
DIN 100	DIN 219	

ANALOGUE INPUT WIRE NUMBERS

FROM	TO	RESERVED
AIN 200	AIN 229	

DIGITAL OUTPUT (DOT) & PEAK WAVE MODULATION OUTPUT (PWM) WIRE NUMBERS

FROM	TO	RESERVED
DOT 300	DOT 459	

CPU WAKE UP BOARD WIRE NUMBERS

FROM	TO	RESERVED
WUI 600	WUI 610	WAKE UP INPUTS
WUT 611	WUT 613	WAKE UP TIMED
WUO 614	WUO 615	WAKE UP OUTPUTS

NON- MULTIPLEXED WIRE NUMBERS

FROM	TO	RESERVED
C3-01		SPEED SIGNAL IN
C3-02		SPEED SIGNAL OUT - VIDEO BOX IBUS SYSTEM
C3-03		SPEED SIGNAL OUT - VIDEO BOX CCTV SYSTEM
C3-04		SPEED SIGNAL OUT - HEV PANEL
C3-05		SPEED SIGNAL OUT - VIDEO BOX
C3-06		SPEED SIGNAL OUT - VIDEO BOX
701		MUX O/P RESET SWITCH ILLUMINATION
702		MUX O/P RESET SWITCH INPUT
711		DMUX32-C CONTROL BOARD WAKE UP
760		DIAGNOSTIC SOCKETS TO CPU B13
761		DMUX K-LINE
762		CAN COCKPIT K-LINE
766	767	DASH SPARES FROM ELEC CENTRE FRONT
806	808	FRONT END SPARES FROM ELEC CENTRE FRONT
809		FRONT DOOR SPARES FROM ELEC CENTRE FRONT
817	818	REAR DOOR SPARES FROM ELEC CENTRE REAR
822	823	ENGINE BAY SPARES FROM ELEC CENTRE REAR
827	828	MID DOOR SPARES FROM ELEC CENTRE REAR
838	840	VIDEO BOX SPARES FROM ELEC CENTRE FRONT
853		EBS K-LINE DIAGNOSTICS
854		SPEEDO FREQUENCY I/P 1 (0-40KHz)
855		SPEEDO FREQUENCY GND
865		SIEMENS SAFETY CUT-OFF
877		SIEMENS VPM PRECHARGE
880		EMERGENCY STOP SPARE 1
881		EMERGENCY STOP SPARE 2
882		EMP DRIVE FANS PWM RETURN
883		~~VALENCE IGNITION~~
887		DICO SPEED SIGNAL OUT
909		DMUX WAKEUP
910-934		CHASSIS SPARES
935-964		DRIVELINE HARNESS SPARES

SPARE WIRES USED

IDENT	DESCRIPTION

RELAY REFERENCE LIST

NAME	DESCRIPTION
RLY1	
RLY2	N/S HEATED SCREEN RELAY
RLY3	O/S HEATED SCREEN RELAY
RLY4	WIPER MOTOR PARK RELAY
RLY5	WIPER MOTOR FAST / SLOW RELAY
RLY6	
RLY7	BROADBAND REVERSE ALARM *(REAR ELECT)*

Main Power Supplies

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

TYPE	FUSE	RATING	MAIN BODY POWER SUPPLIES	CONNECTION	IDENT OUT	CABLE CSA
BODY +	F101	100A	MODULAR FUSE BOARD MID - BATTERY POSITIVE +VE	P01	P+ 101	25mm^2
HYBRID +	F102	100A	MODULAR FUSE BOARD FRONT - BATTERY POSITIVE +VE	P02	P+ 102	25mm^2
+	F103	-	-	P03	-	-
BODY +30	F104	100A	MODULAR FUSE BOARD MID - BATTERY MASTER +30	P04	P+30 104	25mm^2
HYBRID +30	F105	100A	MODULAR FUSE BOARD FRONT - BATTERY MASTER +30	P05	P+30 105	25mm^2
HYBRID +30	F106	200A	DRIVELINE PANEL MAXI FUSES	P06	P+30 106	30mm^2
HEAVAC +30	F107	100A	HEAVAC POWER SUPPLY	P07	P+30 107	25mm^2
+15	F108	-	-	P08	-	-
+15	F109	-	-	P09	-	-

	STANDARD SPECIFICATION
	CUSTOMER OPTION REQUIRED
	NOT REQUIRED

Modular Fuse Boards Elec Centre Mid

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

FUSE	RATING	BODY BATT +VE - MODULAR FUSE BOARD 1	CONN	PIN	IDENT OUT
F01	3A	CPU D3	MFB 01	20	P+ 01
F02	1A	VEHICLE DIAGNOSTIC SOCKETS (OBD & 4-PIN)	MFB 01	14	P+ 02
F03	1A	SMUX PIN 3 OVERHEAD CONSOLE	MFB 01	21	P+ 03
F04	3A	CPU WAKE UP BOARD PINS 20 & 22	MFB 01	18	P+ 04
F05	1A	MUX O/P RESET SWITCH	MFB 01	15	P+ 05
F06	-	DOOR 1 OPEN PB EXTERNAL	MFB 01	12	P+ 06
F07	7.5A	HEAVAC ARANEA CONTROLLER	MFB 01	9	P+ 07
F08	15A	HEAVAC BACKBONE	MFB 01	6	P+ 08
F09	-	VIDEO BOX SPARE SUPPLY	MFB 01	3	P+ 09
F10	10A	IBUS EQUIPMENT BATTERY LIVE (VIDEO BOX)	MFB 01	11	P+ 10
F11	3A	DMUX32-C CTRL & INT BOARD E35 & F12	MFB 01	5	P+ 11
F12	-	ELECTRONIC TICKET MACHINE (ETM)	MFB 01	2	P+ 12
F13	10A	NODE 2B-2.2 GRP 1 PIN A10	MFB 01	8	P+ 13
F14	15A	NODE 2B-2.2 GRP 2 PIN A8	MFB 01	1	P+ 14
F15	5A	NODE 2B-2.2 GRP 3 PIN B10	MFB 01	4	P+ 15
F16	5A	NODE 2B-2.2 GRP 4 PIN B8	MFB 01	7	P+ 16
F17	3A	NODE 2B-2.2 GRP 5 PIN E10	MFB 01	10	P+ 17
F18	10A	NODE 2B-1.1 GRP 1 PIN A10	MFB 01	13	P+ 18
F19	10A	NODE 2B-1.1 GRP 2 PIN A8	MFB 01	16	P+ 19
F20	15A	NODE 2B-1.1 GRP 3 PIN B10	MFB 01	19	P+ 20
F21	10A	NODE 2B-1.1 GRP 4 PIN B8	MFB 01	17	P+ 21

FUSE	RATING	BODY +30 - MODULAR FUSE BOARD 2	CONN	PIN	IDENT OUT
F01	5A	INDUCTION LOOP SYSTEM	MFB 01 +30	20	P+30 01
F02	15A	HEAVAC DEMISTER	MFB 01 +30	14	P+30 02
F03	-	-	MFB 01 +30	21	P+30 03
F04	-	-	MFB 01 +30	18	P+30 04
F05	-	DOOR 1 OPEN EXTERNAL PB ILLUM	MFB 01 +30	15	P+30 05
F06	3A	DOOR 2 OPEN & RAMP REQUEST PB ILLUM	MFB 01 +30	12	P+30 06
F07	-	-	MFB 01 +30	9	P+30 07
F08	-	-	MFB 01 +30	6	P+30 08
F09	3A	AMBIENT LIGHT SENSOR POWER	MFB 01 +30	3	P+30 09
F10	-	-	MFB 01 +30	11	P+30 10
F11	-	-	MFB 01 +30	5	P+30 11
F12	-	-	MFB 01 +30	2	P+30 12
F13	3A	REVERSING BLEEPER (VIA RELAY)	MFB 01 +30	8	P+30 13
F14	3A	DMUX32-C WAKE UP D2	MFB 01 +30	1	P+30 14
F15	3A	SPEEDO SUPPLY	MFB 01 +30	4	P+30 15
F16	-	-	MFB 01 +30	7	P+30 16
F17	3A	DRIVE FANS 1 & 2 PWM CONVERTER SUPPLY	MFB 01 +30	10	P+30 17
F18	-	-	MFB 01 +30	13	P+30 18
F19	-	-	MFB 01 +30	16	P+30 19
F20	-	-	MFB 01 +30	19	P+30 20
F21	-	-	MFB 01 +30	17	P+30 21

FUSE	RATING	BODY BATT +VE - MODULAR FUSE BOARD 1	CONN	PIN	IDENT OUT
F22	5A	NODE 2B-1.1 GRP 5 PIN E10	MFB 02	20	P+ 22
F23	10A	NODE 2B-1.2 GRP 1 PIN A10	MFB 02	14	P+ 23
F24	15A	NODE 2B-1.2 GRP 2 PIN A8	MFB 02	21	P+ 24
F25	10A	NODE 2B-1.2 GRP 3 PIN B10	MFB 02	18	P+ 25
F26	5A	NODE 2B-1.2 GRP 4 PIN B8	MFB 02	15	P+ 26
F27	3A	NODE 2B-1.2 GRP 5 PIN E10	MFB 02	12	P+ 27
F28	15A	NODE 2B-1.3 GRP 1 PIN A10	MFB 02	9	P+ 28
F29	7.5A	NODE 2B-1.3 GRP 2 PIN A8	MFB 02	6	P+ 29
F30	5A	NODE 2B-1.3 GRP 3 PIN B10	MFB 02	3	P+ 30
F31	10A	NODE 2B-1.3 GRP 4 PIN B8	MFB 02	11	P+ 31
F32	5A	NODE 2B-1.3 GRP 5 PIN E10	MFB 02	5	P+ 32
F33	15A	NODE 2B-2.1 GRP 1 PIN A10	MFB 02	2	P+ 33
F34	5A	NODE 2B-2.1 GRP 2 PIN A8	MFB 02	8	P+ 34
F35	15A	NODE 2B-2.1 GRP 3 PIN B10	MFB 02	1	P+ 35
F36	10A	NODE 2B-2.1 GRP 4 PIN B8	MFB 02	4	P+ 36
F37	7.5A	NODE 2B-2.1 GRP 5 PIN E10	MFB 02	7	P+ 37
F38	-	DESTINATION CONTROLLER MEMORY	MFB 02	10	P+ 38
F39	10A	CCTV POWER SUPPLY (VIDEO BOX)	MFB 02	13	P+ 39
F40	-	-	MFB 02	16	P+ 40
F41	-	REAR PLATFORM ACTIVATION	MFB 02	19	P+ 41
F42	-	-	MFB 02	17	P+ 42

FUSE	RATING	BODY +30 - MODULAR FUSE BOARD 2	CONN	PIN	IDENT OUT
F22	-	CAB ROOF SPARE	MFB 02 +30	20	P+30 22
F23	10A	WIPER MOTOR MAIN SUPPLY	MFB 02 +30	14	P+30 23
F24	-	ENGINE BAY SPARE	MFB 02 +30	21	P+30 24
F25	-	REAR PANEL SPARE	MFB 02 +30	18	P+30 25
F26	-	VIDEO BOX SPARE SUPPLY	MFB 02 +30	15	P+30 26
F27	-	VIDEO BOX SPARE SUPPLY	MFB 02 +30	12	P+30 27
F28	-	TICKET EQUIPMENT (MASTER FEED)	MFB 02 +30	9	P+30 28
F29	-	-	MFB 02 +30	6	P+30 29
F30	-	-	MFB 02 +30	3	P+30 30
F31	-	-	MFB 02 +30	11	P+30 31
F32	-	-	MFB 02 +30	5	P+30 32
F33	15A	BATTERY COOLING FAN	MFB 02 +30	2	P+30 33
F34	20A	BATTERY COOLING PUMP	MFB 02 +30	8	P+30 34
F35	-	-	MFB 02 +30	1	P+30 35
F36	-	-	MFB 02 +30	4	P+30 36
F37	-	-	MFB 02 +30	7	P+30 37
F38	-	-	MFB 02 +30	10	P+30 38
F39	-	-	MFB 02 +30	13	P+30 39
F40	-	-	MFB 02 +30	16	P+30 40
F41	-	-	MFB 02 +30	19	P+30 41
F42	-	-	MFB 02 +30	17	P+30 42

	STANDARD SPECIFICATION	FUSE RATING SUFFIX "R"
	CUSTOMER OPTION REQUIRED	INDICATES RESETTABLE CIRCU
	NOT REQUIRED	BREAKER USED

On Board Fuse Diagrams

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

BODY - MODULAR FUSE BOARD 1 (X01 & X02 LINKED)					
FUSE	BATT +VE	RATING	FUSE	BATT +VE	RATING
F01	CPU D3	3A	F22	NODE 2B-1.1 GRP 5 PIN E10	5A
F02	VEHICLE DIAGNOSTIC SOCKETS (OBD & 4-PIN)	1A	F23	NODE 2B-1.2 GRP 1 PIN A10	10A
F03	SMUX PIN 3 OVERHEAD CONSOLE	1A	F24	NODE 2B-1.2 GRP 2 PIN A8	15A
F04	CPU WAKE UP BOARD PINS 20 & 22	3A	F25	NODE 2B-1.2 GRP 3 PIN B10	10A
F05	MUX O/P RESET SWITCH	1A	F26	NODE 2B-1.2 GRP 4 PIN B8	5A
F06	DOOR 1 OPEN PB EXTERNAL	-	F27	NODE 2B-1.2 GRP 5 PIN E10	3A
F07	HEAVAC ARANEA CONTROLLER	7.5A	F28	NODE 2B-1.3 GRP 1 PIN A10	15A
F08	HEAVAC BACKBONE	15A	F29	NODE 2B-1.3 GRP 2 PIN A8	7.5A
F09	VIDEO BOX SPARE SUPPLY	-	F30	NODE 2B-1.3 GRP 3 PIN B10	5A
F10	IBUS EQUIPMENT BATTERY LIVE (VIDEO BOX)	10A	F31	NODE 2B-1.3 GRP 4 PIN B8	10A
F11	DMUX32-C CTRL & INT BOARD E35 & F12	3A	F32	NODE 2B-1.3 GRP 5 PIN E10	5A
F12	ELECTRONIC TICKET MACHINE (ETM)	-	F33	NODE 2B-2.1 GRP 1 PIN A10	15A
F13	NODE 2B-2.2 GRP 1 PIN A10	10A	F34	NODE 2B-2.1 GRP 2 PIN A8	5A
F14	NODE 2B-2.2 GRP 2 PIN A8	15A	F35	NODE 2B-2.1 GRP 3 PIN B10	15A
F15	NODE 2B-2.2 GRP 3 PIN B10	5A	F36	NODE 2B-2.1 GRP 4 PIN B8	10A
F16	NODE 2B-2.2 GRP 4 PIN B8	5A	F37	NODE 2B-2.1 GRP 5 PIN E10	7.5A
F17	NODE 2B-2.2 GRP 5 PIN E10	3A	F38	DESTINATION CONTROLLER MEMORY	-
F18	NODE 2B-1.1 GRP 1 PIN A10	10A	F39	CCTV POWER SUPPLY (VIDEO BOX)	10A
F19	NODE 2B-1.1 GRP 2 PIN A8	10A	F40	-	-
F20	NODE 2B-1.1 GRP 3 PIN B10	15A	F41	REAR PLATFORM ACTIVATION	1A
F21	NODE 2B-1.1 GRP 4 PIN B8	10A	F42	-	-

BODY - MODULAR FUSE BOARD 2 (X01 & X02 LINKED)					
FUSE	BATT MASTER +30	RATING	FUSE	BATT MASTER +30	RATING
F01	INDUCTION LOOP SYSTEM	5A	F22	CAB ROOF SPARE	-
F02	HEAVAC DEMISTER	15A	F23	WIPER MOTOR MAIN SUPPLY	10A
F03	-	-	F24	ENGINE BAY SPARE	-
F04	-	-	F25	REAR PANEL SPARE	-
F05	DOOR 1 OPEN EXTERNAL PB ILLUM	-	F26	VIDEO BOX SPARE SUPPLY	-
F06	DOOR 2 OPEN & RAMP REQUEST PB ILLUM	3A	F27	VIDEO BOX SPARE SUPPLY	-
F07	-	-	F28	TICKET EQUIPMENT (MASTER FEED)	-
F08	-	-	F29	-	-
F09	AMBIENT LIGHT SENSOR POWER	3A	F30	-	-
F10	-	-	F31	-	-
F11	-	-	F32	-	-
F12	-	-	F33	BATTERY COOLING FAN	15A
F13	REVERSING BLEEPER (VIA RELAY)	3A	F34	BATTERY COOLING PUMP	20A
F14	DMUX32-C WAKE UP D2	3A	F35	-	-
F15	SPEEDO SUPPLY	3A	F36	-	-
F16	-	-	F37	-	-
F17	DRIVE FANS 1 & 2 PWM CONVERTER SUPPLY	3A	F38	-	-
F18	-	-	F39	-	-
F19	-	-	F40	-	-
F20	-	-	F41	-	-
F21	-	-	F42	-	-

PDB BATT +VE		
CIRCUIT	RATING	FUSE
MFB MID +	100A	F101
MFB FRONT +	100A	F102
-	-	F103

PDB BATT +30		
CIRCUIT	RATING	IDENT
MFB MID +30	100A	F104
MFB FRONT +30	100A	F105
DRIVELINE MAXI FUSES	200A	F106
HEAVAC	100A	F107

PDB BATT +15		
CIRCUIT	RATING	FUSE
-	-	F108
-	-	F109

R = RE-SETTABLE CIRCUIT BREAKER

Modular Fuse Boards Elec Centre Front

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

FUSE	RATING	HYBRID BATT +30 - MODULAR FUSE BOARD 3	CONN	PIN	IDENT OUT
F01	15A	EBS SUPPLY 1	MFB 01 +30	20	HP+30 01
F02	15A	EBS SUPPLY 2	MFB 01 +30	14	HP+30 02
F03	5A	EBS IGNITION VIA RELAY & DIAGNOSTIC	MFB 01 +30	21	HP+30 03
F04	15A	ECAS SUPPLY	MFB 01 +30	18	HP+30 04
F05	5A	ECAS IGNITION VIA RELAY	MFB 01 +30	15	HP+30 05
F06	1A	AIR CIRCUIT 1 & 2	MFB 01 +30	12	HP+30 06
F07	10A	AIR DRIER	MFB 01 +30	9	HP+30 07
F08	10A	VALENCE BMS SUPPLY	MFB 01 +30	6	HP+30 08
F09	3A	VALENCE BMS IGNITION VIA RELAY	MFB 01 +30	3	HP+30 09
F10	20A	NOX IGNITION SUPPLY VIA RELAY	MFB 01 +30	11	HP+30 10
F11	5A	ENGINE EMC IGN SUPPLY VIA RELAY	MFB 01 +30	5	HP+30 11
F12	-	-	MFB 01 +30	2	HP+30 12
F13	15A	ENGINE CRANK SOLENOID	MFB 01 +30	8	HP+30 13
F14	5A	AIR COMPRESSOR DRIVE	MFB 01 +30	1	HP+30 14
F15	5A	POWER STEERING DRIVE	MFB 01 +30	4	HP+30 15
F16	15A		MFB 01 +30	7	HP+30 16
F17	3A	DRIVE 1 & 2 FANS & ENG FANS PWM CONVERTER	MFB 01 +30	10	HP+30 17
F18	3A	REMOTE DIAGNOSTICS	MFB 01 +30	13	HP+30 18
F19	-		MFB 01 +30	16	HP+30 19
F20	-		MFB 01 +30	19	HP+30 20
F21	-		MFB 01 +30	17	HP+30 21
FUSE	**RATING**	**HYBRID +VE - MODULAR FUSE BOARD 3**	**CONN**	**PIN**	**IDENT OUT**
F22	15A	DICO HIGH SIDE SUPPLIES	MFB 02 +	20	HP+ 22
F23	2A	DICO MICROCONTROLLER SUPPLY	MFB 02 +	14	HP+ 23
F24	5A	MONO INVERTER MOTOR 1	MFB 02 +	21	HP+ 24
F25	5A	MONO INVERTER GENERATOR	MFB 02 +	18	HP+ 25
F26	5A	VPM INVERTER	MFB 02 +	15	HP+ 26
F27	3A		MFB 02 +	12	HP+ 27
F28	5A		MFB 02 +	9	HP+ 28
F29	5A	RELAY BANK COIL SUPPLY	MFB 02 +	6	HP+ 29
F30	20A	DOSING PUMP SUPPLY	MFB 02 +	3	HP+ 30
F31	3A	ISOLATION DECTOR	MFB 02 +	11	HP+ 31
F32	-		MFB 02 +	5	HP+ 32
F33	15A	NODE 2B-1.4 GRP 2 PIN A8	MFB 02 +	2	HP+ 33
F34	15A	NODE 2B-1.4 GRP 1 PIN A10	MFB 02 +	8	HP+ 34
F35	15A	NODE 2B-1.4 GRP 4 PIN B8	MFB 02 +	1	HP+ 35
F36	15A	NODE 2B-1.4 GRP 3 PIN B10	MFB 02 +	4	HP+ 36
F37	15A	NODE 2B-1.4 GRP 5 PIN E10	MFB 02 +	7	HP+ 37
F38	-		MFB 02 +	10	HP+ 38
F39	10A	FUEL CONTROL SOLENOID	MFB 02 +	13	HP+ 39
F40	1A	EMG/+30/HAZARD SWITCH	MFB 02 +	16	HP+ 40
F41	-	TACHO +VE SUPPLY	MFB 02 +	19	HP+ 41
F42	10A	24V POWER SOCKET	MFB 02 +	17	HP+ 42

		STANDARD SPECIFICATION	FUSE RATING SUFFIX "R" INDICATES RESETTABLE CIRCUIT BREAKER USED
		CUSTOMER OPTION REQUIRED	
		NOT REQUIRED	

FUSE	RATING	MAXI BLADE FUSES	IDENT OUT
MF01	30A	ENGINE CAC FAN 1	HP+30 01
MF02	30A	ENGINE CAC FAN 2	HP+30 02
MF03	30A	ENGINE COOLANT FAN 3	HP+30 03
MF04	30A	ENGINE COOLANT FAN 4	HP+30 04
MF05	30A	HYBRID COOLING PUMP	HP+30 05
MF06	30A	ECM SUPPLY	HP+ 06
MF07	30A	DRIVE FAN 1	HP+30 07
MF08	30A	DRIVE FAN 2	HP+30 08
MF09	30A	DRIVE FAN 3	HP+30 09
MF10	30A	DRIVE FAN 4	HP+30 10
-	-	-	-

On Board Fuse Diagrams

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

BODY - MODULAR FUSE BOARD 1 (X01+30 & X02 +VE)					
FUSE	BATT +30	RATING	FUSE	BATT +VE	RATING
F01	EBS SUPPLY 1	15A	F22	DICO HIGH SIDE SUPPLIES	15A
F02	EBS SUPPLY 2	15A	F23	DICO MICROCONTROLLER SUPPLY	2A
F03	EBS IGNITION VIA RELAY & DIAGNOSTIC	5A	F24	MONO INVERTER MOTOR 1	5A
F04	ECAS SUPPLY	15A	F25	MONO INVERTER GENERATOR	5A
F05	ECAS IGNITION VIA RELAY	5A	F26	VPM INVERTER	5A
F06	AIR CIRCUIT 1 & 2	1A	F27	0	3A
F07	AIR DRIER	10A	F28	0	5A
F08	VALENCE BMS SUPPLY	10A	F29	RELAY BANK COIL SUPPLY	5A
F09	VALENCE BMS IGNITION VIA RELAY	3A	F30	DOSING PUMP SUPPLY	20A
F10	NOX IGNITION SUPPLY VIA RELAY	20A	F31	ISOLATION DECTOR	3A
F11	ENGINE EMC IGN SUPPLY VIA RELAY	5A	F32	0	-
F12	-	-	F33	NODE 2B-1.4 GRP 2 PIN A8	15A
F13	ENGINE CRANK SOLENOID	15A	F34	NODE 2B-1.4 GRP 1 PIN A10	15A
F14	AIR COMPRESSOR DRIVE	5A	F35	NODE 2B-1.4 GRP 4 PIN B8	15A
F15	POWER STEERING DRIVE	5A	F36	NODE 2B-1.4 GRP 3 PIN B10	15A
F16	0	15A	F37	NODE 2B-1.4 GRP 5 PIN E10	15A
F17	DRIVE 1 & 2 FANS & ENG FANS PWM CONVERTER	3A	F38	0	-
F18	REMOTE DIAGNOSTICS	3A	F39	FUEL CONTROL SOLENOID	10A
F19	0	-	F40	EMG/+30/HAZARD SWITCH	1A
F20	0	-	F41	0	-
F21	0	-	F42	24V POWER SOCKET	10A

FUSE	MAXI BLADE FUSES	RATING
MF01	ENGINE CAC FAN 1	30A
MF02	ENGINE CAC FAN 2	30A
MF03	ENGINE COOLANT FAN 3	30A
MF04	ENGINE COOLANT FAN 4	30A
MF05	HYBRID COOLING PUMP	30A
MF06	ECM SUPPLY	30A
MF07	DRIVE FAN 1	30A
MF08	DRIVE FAN 2	30A
MF09	DRIVE FAN 3	30A
MF10	DRIVE FAN 4	30A
MF11	-	-

CPU Wakeup Board

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

WAKE UP INPUTS	No.	TYPE	PIN	IDENT
BATTERY MASTER	1	HS	1.4	WUI 600
EMERGENCY SWITCH	2	HS	1.3	WUI 601
HAZARDS LIGHTS ACTIVE	3	HS	1.2	WUI 602
ENT DOOR OPEN PB EXTERNAL (FROM 2.5)	4	HS	1.1	WUT 611
ASSAULT ALARM ACTIVATE	5	LS	1.11	WUI 604
ENTRANCE DOOR OPENED SWITCH	6	LS	1.12	WUI 605
CLEANERS LIGHT SWITCH	7	LS	1.9	WUI 606
EXIT DOOR OPENED SWITCH	8	LS	1.10	WUI 607
PULSED WAKE UP INPUTS				
ENT DOOR OPEN PUSH BUTTON EXTERNAL	A	HS	2.2	WUI 608
	B	HS	2.4	WUI 609
	C	LS	2.6	WUI 610
NEGATIVE			1.19	BLK
POSITIVE			1.20	P+ 04
NEGATIVE			1.21	BLK
POSITIVE			1.22	P+ 04

OUTPUTS	No.	TYPE	PIN	IDENT
TO NODE INPUTS				
BATTERY MASTER	1	LS	1.6	DIN 100
EMERGENCY SWITCH	2	LS	1.5	DIN 101
HAZARDS LIGHTS ACTIVE	3	LS	1.8	DIN 105
ENT DOOR OPEN PUSH BUTTON	4	LS	1.7	DIN 128
ASSAULT ALARM ACTIVATE	5	LS	1.14	DIN 146
ENTRANCE DOOR OPENED SWITCH	6	LS	1.13	DIN 127
CLEANERS LIGHT SWITCH	7	LS	1.16	DIN 102
EXIT DOOR OPENED SWITCH	8	LS	1.15	DIN 129
TIME HELD OUTPUTS (4s)				
ENT DOOR OPEN PB EXTERNAL (LINK TO 1.1)	A	HS	2.5	WUT 611
	B	HS	2.3	WUT 612
	C	LS	2.1	WUT 613
TO CPU WAKE UPS				
ZR2-BD WAKE UP A2 (OPER. BY HS WUI 1-4)	1	HS	1.18	WUO 614
ZR2-BD WAKE UP A4 (OPER. BY LS WUI 5-8)	2	HS	1.17	WUO 615

STANDARD SPECIFICATION
CUSTOMER OPTION REQUIRED
NOT REQUIRED

CONNECTOR 1 - 22WAY JUNIOR POWER TIMER
CONNECTOR 2 - 6WAY JUNIOR POWER TIMER

Node 1.1 Electrical Centre Mid

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS						
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
BATTERY MASTER (WAKE UP PIN 1.6)	1	E01 LS	80%	20%	D1	DIN 100
EMERGENCY SWITCH (WAKE UP PIN 1.5)	2	E01 LS	80%	20%	D2	DIN 101
CLEANERS LIGHT SW (WAKE UP PIN 1.1	3	E01 LS	80%	20%	D3	DIN 102
WASHER BOTTLE LEVEL SENSOR	4	E10 LS	80%	20%	D4	DIN 103
WIPER MOTOR PARK SIGNAL	5	E01 LS	80%	20%	D5	DIN 104
HAZARD LIGHTS ACTIVE (WAKE UP PIN	6	E01 LS	80%	20%	D6	DIN 105
	7		80%	20%	D7	DIN 106
	8		80%	20%	D8	DIN 107
	9		80%	20%	D9	DIN 108
	10		80%	20%	D10	DIN 109
	11		80%	20%	D11	DIN 110
	12		80%	20%	D12	DIN 111
	13		80%	20%	A21	DIN 112
	14		80%	20%	A19	DIN 113
	15		80%	20%	A17	DIN 114
	16		80%	20%	A15	DIN 115
	17		80%	20%	A13	DIN 116
	18		80%	20%	A11	DIN 117
	19		80%	20%	A5	DIN 118
	20		80%	20%	A3	DIN 119
	21		80%	20%	A1	DIN 120
	22		80%	20%	B17	DIN 121
DESTINATION SIGN SELECTOR SW	23	E01 LS	80%	20%	B15	DIN 122
PERISCOPE/DESTINATION SELECTOR SW	24	E01 LS	80%	20%	B13	DIN 123
	1	ANALOGUE			D13	AIN 200
	2	ANALOGUE			D14	AIN 201
	3	ANALOGUE			B11	AIN 202
	4	ANALOGUE			B5	AIN 203
	5	ANALOGUE			B3	AIN 204
	6	ANALOGUE			B1	AIN 205

NODE GROUP POWER SUPPLIES			
NEGATIVE	CHASSIS EARTH	A9	B
POSITIVE GROUP 1	MFB1 FUSE 18	A10	P+ 18
NEGATIVE	CHASSIS EARTH	A7	B
POSITIVE GROUP 2	MFB1 FUSE 19	A8	P+ 19
NEGATIVE	CHASSIS EARTH	B9	B
POSITIVE GROUP 3	MFB1 FUSE 20	B10	P+ 20
NEGATIVE	CHASSIS EARTH	B7	B
POSITIVE GROUP 4	MFB1 FUSE 21	B8	P+ 21
NEGATIVE	CHASSIS EARTH	E9	B
POSITIVE GROUP 5	MFB1 FUSE 22	E10	P+ 22

OUTPUTS					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
SPOTLIGHT CAB ROOF	1	HS	A22	3A	DOT 300
TACHO +15 SUPPLY	2	HS	A20	3A	DOT 301
EXTERIOR RAMP WARNING LAMPS	3	HS	A18	3A	DOT 302
N/S SIDE MARKER LIGHTS	4	HS	A16	3A	DOT 303
HORN	5	HS	A14	3A	DOT 304
ASSAULT SCREEN MAGNETIC LOCK UPPER	6	HS	A12	3A	DOT 305
GROUP 2					
FRONT ROUTE SIGN LIGHT	7	HS	A6	3A	DOT 306
DESTINATION POWER 1	8	HS	A4	3A	DOT 307
DESTINATION POWER 2	9	HS	A2	10A	DOT 307
GROUP 3					
WINDOW WASHER PUMP SUPPLY	10	HS	B18	5A	DOT 309
WIPER MOTOR RELAYS SUPPLY (RLY4 & RL	11	HS	B16	5A	DOT 310
FRONT CCTV MONITOR	12	HS	B14	5A	DOT 311
REAR CCTV MONITOR	13	HS	B12	5A	DOT 312
GROUP 4					
ASSAULT SCREEN MAGNETIC LOCK LOWER	14	HS	B6	3A	DOT 313
DOOR 1 PNEU EMG. PB INHIBIT SOLENOID	15	HS	B4	3A	DOT 314
CCTV IGNITION SUPPLY	16	HS	B2	10A	DOT 315
GROUP 5					
EMERGENCY BUZZER (MT)	18	LS	E17	1A	DOT 316
WHEELCHAIR BUS STOPPING ALARM (MT)	20	LS	E15	1A	DOT 317
DRIVE FANS 1 & 2 PWM	22	PWM	E13	1A	PWM 31
	24	LS	E11	1A	DOT 319
WIPER MOTOR PARK RELAY SIGNAL (RLY4)	26	LS	E7	1A	DOT 320
WIPER MOTOR FAST/SLOW RELAY SIG (RL	28	LS	E5	1A	DOT 321
	30	LS	E3	1A	DOT 322
	32	LS	E1	1A	DOT 323
CCTV CAMERA SIGNAL 1 (N/S INDICATORS	17	HS	E18	1A	DOT 324
CCTV CAMERA SIGNAL 2 (O/S INDICATORS	19	HS	E16	1A	DOT 325
CCTV CAMERA SIGNAL 3 (BRAKE SIGNAL)	21	HS	E14	1A	DOT 326
CCTV CAMERA SIGNAL 4 (DOOR3 OPEN)	23	HS	E12	1A	DOT 327
CCTV CAMERA SIGNAL 5 (DOOR2 OPEN)	25	HS	E8	1A	DOT 328
CCTV O/S FLANK CAMERA SWITCH	27	HS	E6	1A	DOT 329
CCTV N/S FLANK CAMERA SWITCH	29	HS	E4	1A	DOT 330
CCTV CAMERA SIGNAL 6 (REVERSE SIGNAL	31	HS	E2	1A	DOT 331
STANDARD SPECIFICATION					
CUSTOMER OPTION REQUIRED					
NOT REQUIRED					
CHANGE FROM STANDARD					

09 Node 1.1 Electrical Centre Mid

Node 1.2 Electrical Centre Mid

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS						
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
ELECTRICAL CENTRE MID THERMAL SW	1	E10 LS	80%	20%	D1	DIN 124
	2		80%	20%	D2	DIN 125
	3		80%	20%	D3	DIN 126
DOOR 1 OPENED SWITCH WAKE UP PIN 1	4	E01 LS	80%	20%	D4	DIN 127
DOOR 1 OPEN PB EXTERNALWAKE UP PIN	5	E01 LS	80%	20%	D5	DIN 128
DOOR 2 OPENED SWITCH WAKE UP PIN 1	6	E01 LS	80%	20%	D6	DIN 129
	7		80%	20%	D7	DIN 130
	8		80%	20%	D8	DIN 131
	9		80%	20%	D9	DIN 132
	10		80%	20%	D10	DIN 133
	11		80%	20%	D11	DIN 134
	12		80%	20%	D12	DIN 135
	13		80%	20%	A21	DIN 136
	14		80%	20%	A19	DIN 137
RAMP EXTENDED (COMPAK)	15	10E HS	80%	20%	A17	DIN 138
RAMP RETRACTED (COMPAK)	16	10E HS	80%	20%	A15	DIN 139
RAMP FAILURE SIGNAL	17	10E HS	80%	20%	A13	DIN 140
	18		80%	20%	A11	DIN 141
	19		80%	20%	A5	DIN 142
	20		80%	20%	A3	DIN 143
	21		80%	20%	A1	DIN 144
DOOR 2 OVER RIDE SWITCH	22	E01 LS	80%	20%	B17	DIN 145
ASSAULT ALARM ACTIVATE WAKE UP PIN	23	E01 LS	80%	20%	B15	DIN 146
	24		80%	20%	B13	DIN 147
	1	ANALOGUE			D13	AIN 206
	2	ANALOGUE			D14	AIN 207
	3	ANALOGUE			B11	AIN 208
	4	ANALOGUE			B5	AIN 209
	5	ANALOGUE			B3	AIN 210
	6	ANALOGUE			B1	AIN 211

NODE GROUP POWER SUPPLIES			
NEGATIVE	CHASSIS EARTH	A9	B
POSITIVE GROUP 1	MFB1 FUSE 23	A10	P+ 23
NEGATIVE	CHASSIS EARTH	A7	B
POSITIVE GROUP 2	MFB1 FUSE 24	A8	P+ 24
NEGATIVE	CHASSIS EARTH	B9	B
POSITIVE GROUP 3	MFB1 FUSE 25	B10	P+ 25
NEGATIVE	CHASSIS EARTH	B7	B
POSITIVE GROUP 4	MFB1 FUSE 26	B8	P+26
NEGATIVE	CHASSIS EARTH	E9	B
POSITIVE GROUP 5	MFB1 FUSE 27	E10	P+27

OUTPUTS					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
FOGMAKER SPEAKER POWER	1	HS	A22	3A	DOT 332
ASSAULT ALARM POWER	2	HS	A20	3A	DOT 333
DRIVERS FAN	3	HS	A18	3A	DOT 334
SMARTCARD VALIDATOR - SV2	4	HS	A16	3A	DOT 335
SMARTCARD VALIDATOR - SV3	5	HS	A14	3A	DOT 336
FRONT DESTINATION SIGN LIGHT	6	HS	A12	3A	DOT 337
GROUP 2					
O/S L/D LED SPOTLIGHTS	7	HS	A6	3A	DOT 338
	8	HS	A4	3A	DOT 339
ELECTRONIC TICKET MACHINE (ETM)	9	HS	A2	10A	DOT 340
GROUP 3					
IBUS IGNITION POWER SUPPLY	10	HS	B18	5A	DOT 341
	11	HS	B16	5A	DOT 342
21ST CENTURY CCTV IGNITION POWER 1	12	HS	B14	5A	DOT 343
21ST CENTURY CCTV IGNITION POWER 2	13	HS	B12	5A	DOT 343
GROUP 4					
RAMP RETRACT (COMPAK)	14	HS	B6	3A	DOT 345
RAMP EXTEND (COMPAK)	15	HS	B4	3A	DOT 346
	16	HS	B2	10A	DOT 347
GROUP 5					
	18	PWM	E17	1A	PWM 348
ASSAULT SPEECH UNIT TRIGGER L/S	20	LS	E15	1A	DOT 349
RAMP AUTHORISATION SIGNAL (COMPAK	22	LS	E13	1A	DOT 350
	24	LS	E11	1A	DOT 351
FOGMAKER M1 - PRESSURE OK	26	LS	E7	1A	DOT 352
FOGMAKER M4 - PRESSURE LOW	28	LS	E5	1A	DOT 353
FOGMAKER M3 - SYSTEM DEPLOYED	30	LS	E3	1A	DOT 354
FOGMAKER M2 - SMOKE DETECTED	32	LS	E1	1A	DOT 355
BUS STOPPING BELL CAB	17	HS	E18	1A	DOT 356
	19	HS	E16	1A	DOT 357
HEAVAC ARANEA CONTROLLER WAKE UP	21	HS	E14	1A	DOT 358
SW ILLUM DASH/SIDE/OVERHEAD CONSO	23	HS	E12	1A	DOT 359
ASSAULT SPEECH UNIT TRIGGER H/S	25	HS	E8	1A	DOT 360
DESTINATION CONTROLLER REVERSE SIG	27	HS	E6	1A	DOT 361
DESTINATION CONTROLLER IGNITION SI	29	HS	E4	1A	DOT 362
MULTITONE BUZZER (W/C & EMG BUZZER	31	HS	E2	1A	DOT 363
STANDARD SPECIFICATION					
CUSTOMER OPTION REQUIRED					
NOT REQUIRED					
CHANGE FROM STANDARD					

10 Node 1.2 Electrical Centre Mid

Node 1.3 Electrical Centre Mid

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS

DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
REAR PLATFORM ACTIVATION FUSE	1	10E HS	80%	20%	D1	P+ 41
	2		80%	20%	D2	DIN 149
	3		80%	20%	D3	DIN 150
CAB DOOR CLOSED SWITCH	4	E01 LS	80%	20%	D4	DIN 151
WIRELESS BELL PRESS - UPPER DECK	5	E01 LS	80%	20%	D5	DIN 152
WIRELESS BELL PRESS - LOWER DECK	6	E01 LS	80%	20%	D6	DIN 153
WIRELESS BELL PRESS - WHEELCHAIR	7	E01 LS	80%	20%	D7	DIN 154
WIRELESS BELL PRESS - SPARE	8	E01 LS	80%	20%	D8	DIN 155
	9		80%	20%	D9	DIN 156
	10		80%	20%	D10	DIN 157
	11		80%	20%	D11	DIN 158
	12		80%	20%	D12	DIN 160
	13		80%	20%	A21	DIN 160
	14		80%	20%	A19	DIN 161
	15		80%	20%	A17	DIN 162
	16		80%	20%	A15	DIN 163
	17		80%	20%	A13	DIN 164
	18		80%	20%	A11	DIN 165
	19		80%	20%	A5	DIN 166
	20		80%	20%	A3	DIN 167
	21		80%	20%	A1	DIN 168
	22		80%	20%	B17	DIN 169
	23		80%	20%	B15	DIN 170
	24		80%	20%	B13	DIN 171
BATTERY COOLING BOTTLE LEVEL	1	ANALOGUE			D13	AIN 212
	2	ANALOGUE			D14	AIN 213
	3	ANALOGUE			B11	AIN 214
	4	ANALOGUE			B5	AIN 215
	5	ANALOGUE			B3	AIN 216
	6	ANALOGUE			B1	AIN 217

NODE GROUP POWER SUPPLIES

NEGATIVE	CHASSIS EARTH	A9	B
POSITIVE GROUP 1	MFB1 FUSE 28	A10	P+ 28
NEGATIVE	CHASSIS EARTH	A7	B
POSITIVE GROUP 2	MFB1 FUSE 29	A8	P+ 29
NEGATIVE	CHASSIS EARTH	B9	B
POSITIVE GROUP 3	MFB1 FUSE 30	B10	P+ 30
NEGATIVE	CHASSIS EARTH	B7	B
POSITIVE GROUP 4	MFB1 FUSE 31	B8	P+ 31
NEGATIVE	CHASSIS EARTH	E9	B
POSITIVE GROUP 5	MFB1 FUSE 32	E10	P+ 32

OUTPUTS

DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
N/S MAIN BEAM	1	HS	A22	3A	DOT 364
O/S MAIN BEAM	2	HS	A20	3A	DOT 365
N/S DAY TIME RUNNING LED	3	HS	A18	3A	DOT 366
O/S DAY TIME RUNNING LED	4	HS	A16	3A	DOT 367
O/S SIDE MARKER LIGHTS	5	HS	A14	3A	DOT 368
WIRELESS BELL PRESS	6	HS	A12	3A	DOT 369
GROUP 2					
N/S DIP BEAM	7	HS	A6	3A	DOT 370
O/S DIP BEAM	8	HS	A4	3A	DOT 371
N/S & O/S FRONT FOG LIGHTS	9	HS	A2	10A	DOT 372
GROUP 3					
DOOR 1 OPEN SOLENOID	10	HS	B18	5A	DOT 373
DOOR 1 CLOSE SOLENOID	11	HS	B16	5A	DOT 374
DOOR 1 SHELF PLATE & ENT. LIGHTS	12	HS	B14	5A	DOT 375
	13	HS	B12	5A	DOT 376
GROUP 4					
CCTV SWITCHING UNIT (IGN SUPPLY)	14	HS	B6	3A	DOT 377
DNR SWITCH - ILLUMINATION	15	HS	B4	3A	DOT 378
OBD DIAGNOSTIC +15 SUPPLY	16	HS	B2	10A	DOT 379
GROUP 5					
IBUS AVL BUS STOPPING SIGNAL	18	LS	E17	1A	DOT 380
IBUS AVL DOOR 1 OPEN SIGNAL	20	LS	E15	1A	DOT 381
IBUS AVL DOOR 2 OPEN SIGNAL	22	LS	E13	1A	DOT 382
ECOBUS DOOR 1 OPEN SIGNAL	24	LS	E11	1A	DOT 383
ECOBUS DOOR 2 OPEN SIGNAL	26	LS	E7	1A	DOT 384
IBUS AVL DOOR 3 OPEN SIGNAL	28	LS	E5	1A	DOT 385
IBUS AVL REVERSE SIGNAL	30	LS	E3	1A	DOT 386
	32	LS	E1	1A	DOT 387
N/S FRONT SIDE LIGHT	17	HS	E18	1A	DOT 388
BUS STOPPING BELL O/S SALOON	19	HS	E16	1A	DOT 389
	21	HS	E14	1A	DOT 390
O/S FRONT SIDE LIGHT	23	HS	E12	1A	DOT 391
+30 SOLENOID (PDBH-S1)	25	HS	E8	1A	DOT 392
+15 SOLENOID (PDBH-S1)	27	HS	E6	1A	DOT 393
N/S HIGH LEVEL MARKER (FRONT)	29	HS	E4	1A	DOT 394
O/S HIGH LEVEL MARKER (FRONT)	31	HS	E2	1A	DOT 395

STANDARD SPECIFICATION	
CUSTOMER OPTION REQUIRED	
NOT REQUIRED	
CHANGE FROM STANDARD	

11 Node 1.3 Electrical Centre Mid

Node 1.4 Electrical Centre Front

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS						
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
E-STOP INPUT	1	LS	80%	20%	D1	DIN 220
STEERING ADJUST SWITCH	2	LS	80%	20%	D2	DIN 221
24V BATTERY ISOLATOR AUX CONTACTS	3	LS	80%	40%	D3	DIN 222
ISOLATION DETECTION	4	LS	80%	20%	D4	DIN 223
VALENCE INTERLOCK (RESERVED)	5	LS	80%	20%	D5	DIN 224
PARK BRAKE TANK PRESSURE SWITCH	6	LS	80%	20%	D6	DIN 225
	7		80%	20%	D7	DIN 226
EBS WARNING (RES)	8	LS	80%	20%	D8	DIN 227
VALENCE INTERLOCK (RESERVED)	9	LS	80%	20%	D9	DIN 228
HANDBRAKE	10	LS	80%	20%	D10	DIN 229
ENGINE BAY TEMPERATURE SWT	11	LS	80%	20%	D11	DIN 230
ENGINE CRANK SWITCH	12	LS	80%	20%	D12	DIN 231
ENGINE STOP SWITCH	13	LS	80%	20%	A21	DIN 232
ENGINE REAR START SELECT	14	LS	80%	20%	A19	DIN 233
ENGINE FRONT START SELECT	15	LS	80%	20%	A17	DIN 234
ENGINE RPM INCREASE (REAR SWT)	16	LS	80%	20%	A15	DIN 235
ENGINE RPM DECREASE (REAR SWT)	17	LS	80%	20%	A13	DIN 236
BRAKE PEDAL SWITCH	18	LS	80%	20%	A11	DIN 237
	19		80%	20%	A5	DIN 238
PWR STR / DC-DC BAY THERMAL SW	20	LS	80%	20%	A3	DIN 239
COMPRESSOR BAY THERMAL SW	21	LS	80%	20%	A1	DIN 240
OS INVERTER / PEM BAY THERMAL SW	22	LS	80%	20%	B17	DIN 241
NS INVERTER / BATTERY BAY THERMAL SW	23	LS	80%	20%	B15	DIN 242
ELECTRICAL CENTRE FRONT THERMAL SW	24	LS	80%	20%	B13	DIN 243
AIR CIRCUIT 1	1	ANALOGUE			D13	AIN 229
AIR CIRCUIT 2	2	ANALOGUE			D14	AIN 230
FUEL SENDER	3	ANALOGUE			B11	AIN 231
ENGINE COOLANT LEVEL	4	ANALOGUE			B5	AIN 232
DRIVE COOLANT LEVEL	5	ANALOGUE			B3	AIN 233
ECAS SUPPLY PRESSURE	6	ANALOGUE			B1	AIN 234
NODE GROUP POWER SUPPLIES						
NEGATIVE	CHASSIS EARTH				A9	B
POSITIVE GROUP 1	MFB FUSE 34				A10	P+
NEGATIVE	CHASSIS EARTH				A7	B
POSITIVE GROUP 2	MFB FUSE 33				A8	P+
NEGATIVE	CHASSIS EARTH				B9	B
POSITIVE GROUP 3	MFB FUSE 36				B10	P+
NEGATIVE	CHASSIS EARTH				B7	B
POSITIVE GROUP 4	MFB FUSE 35				B8	P+
NEGATIVE	CHASSIS EARTH				E9	B
POSITIVE GROUP 5	MFB FUSE 37				E10	P+

OUTPUTS					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1 +					
	1	HS	A22	3A	DOT 460
AIR COMPRESSOR ENABLE	2	HS	A20	3A	DOT 461
POWER STEERING ENABLE	3	HS	A18	3A	DOT 462
ISOLATION DETECTION ENABLE	4	HS	A16	3A	DOT 463
REMOTE DIAGNOSTIC IGNITION	5	HS	A14	3A	DOT 464
	6	HS	A12	3A	DOT 465
GROUP 2 +					
STEERING ADJUST SOLENOID	7	HS	A6	3A	DOT 466
	8	HS	A4	3A	DOT 467
	9	HS	A2	10A	DOT 468
GROUP 3 +					
ENGINE CONTROL MODULE IGN RYL	10	HS	B18	5A	DOT 469
DRIVE COOLING PUMP IGNITION/RUN	11	HS	B16	5A	DOT 470
DOSING PUMP IGNITION	12	HS	B14	5A	DOT 471
ENGINE CRANK SOLENOID	13	HS	B12	5A	DOT 472
GROUP 4 +					
	14	HS	B6	3A	DOT 473
SIEMENS KEY ON	15	HS	B4	3A	DOT 474
	16	HS	B2	10A	DOT 475
GROUP 5 +					
DRIVE FANS 3 & 4 PWM	18	PWM	E17	1A	PWM 476
ENGINE CAC FANS 1 & 2 PWM	20	PWM	E15	1A	PWM 477
ENGINE COOLANT FANS 3 & 4 PWM	22	PWM	E13	1A	PWM 478
SERVICE BRAKE POS SWITCH RELAY	24	LS	E11	1A	DOT 479
EMG SW LATCH RELAY	26	LS	E7	1A	DOT 480
BMU IGN RELAY COIL	28	LS	E5	1A	DOT 481
	30	LS	E3	1A	DOT 482
HALTBRAKE SIGNAL EBS	32	LS	E1	1A	DOT 483
600-24V DC/DC ON	17	HS	E18	1A	DOT 484
BATTERY COOLING FAN	19	HS	E16	1A	DOT 485
FUEL SOLENOID SUPPLY RELAY	21	HS	E14	1A	DOT 486
NOX IGNITION RELAY	23	HS	E12	1A	DOT 487
BATTERY COOLING PUMP	25	HS	E8	1A	DOT 488
EBS/ECAS IGNITION RELAY	27	HS	E6	1A	DOT 489
FUEL SOLENOID RETURN RELAY	29	HS	E4	1A	DOT 490
	31	HS	E2	1A	DOT 491
STANDARD SPECIFICATION					
CUSTOMER OPTION REQUIRED					
NOT REQUIRED					
CHANGE FROM STANDARD					

Node 2.1 Electrical Centre Rear

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS

DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
BELL PRESSES O/S UPPER SALOON	1	E01 LS	80%	20%	D1	DIN 172
	2		80%	20%	D2	DIN 173
	3		80%	20%	D3	DIN 174
	4		80%	20%	D4	DIN 175
EMG. HAMMERS O/S UPPER SALOON	5	E01 LS	80%	20%	D5	DIN 176
CREW - DRIVER ALERT SWITCH	6	E01 LS	80%	20%	D6	DIN 177
CREW - DRIVE ENABLE SWITCH	7	E01 LS	80%	20%	D7	DIN 178
CREW - DOOR 4 LOCK RELEASE SWITCH	8	E01 LS	80%	20%	D8	DIN 179
DOOR 1 EMERGENCY CLOSE PB	9	E01 LS	80%	20%	D9	DIN 180
DOOR 2 EMERGENCY CLOSE PB	10	E01 LS	80%	20%	D10	DIN 181
DOOR 3 EMERGENCY CLOSE PB	11	E01 LS	80%	20%	D11	DIN 182
VLMS6 - FR N/S INDICATOR (LOAD 1) CN1	12	E01 LS	80%	20%	D12	DIN 183
VLMS6 - FR O/S INDICATOR (LOAD2) CN1	13	E01 LS	80%	20%	A21	DIN 184
VLMS6 - RR N/S L/L IND (LOAD3) CN1pin1	14	E01 LS	80%	20%	A19	DIN 185
VLMS6 - RR O/S L/L IND (LOAD4) CN1pin9	15	E01 LS	80%	20%	A17	DIN 186
VLMS6 - N/S W/ARCH IND (LOAD5) CN2pi	16	E01 LS	80%	20%	A15	DIN 187
VLMS6 - O/S W/ARCH IND (LOAD6) CN2pi	17	E01 LS	80%	20%	A13	DIN 188
REAR ENGINE DOOR MS 1	18	E01 LS	80%	20%	A11	DIN 189
SIDE ENGINE DOOR MS 2	19	E01 LS	80%	20%	A5	DIN 190
FIRE SUPPRESSION SMOKE DETECTOR	20	E01 LS	80%	20%	A3	DIN 191
	21		80%	20%	A1	DIN 192
PRESSURE SWITCH 1 - DETECTOR	22	E01 LS	80%	20%	B17	DIN 193
PRESSURE SWITCH 2 - EXTINGUISHER	23	E01 LS	80%	20%	B15	DIN 194
ELECTRICAL CENTRE REAR THERMAL SW	24	E10 LS	80%	20%	B13	DIN 195
	1	ANALOGUE			D13	AIN 218
	2	ANALOGUE			D14	AIN 219
	3	ANALOGUE			B11	AIN 220
	4	ANALOGUE			B5	AIN 221
	5	ANALOGUE			B3	AIN 222
	6	ANALOGUE			B1	AIN 223

NODE GROUP POWER SUPPLIES

NEGATIVE	CHASSIS EARTH	A9	B
POSITIVE GROUP 1	MFB1 FUSE 33	A10	P+ 33
NEGATIVE	CHASSIS EARTH	A7	B
POSITIVE GROUP 2	MFB1 FUSE 34	A8	P+ 34
NEGATIVE	CHASSIS EARTH	B9	B
POSITIVE GROUP 3	MFB1 FUSE 35	B10	P+ 35
NEGATIVE	CHASSIS EARTH	B7	B
POSITIVE GROUP 4	MFB1 FUSE 36	B8	P+36
NEGATIVE	CHASSIS EARTH	E9	B
POSITIVE GROUP 5	MFB1 FUSE 37	E10	P+37

OUTPUTS

DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
SMARTCARD VALIDATOR - SV5	1	HS	A22	3A	DOT 396
N/S UPPER DECK LIGHTS (COVE 2 & 4)	2	HS	A20	3A	DOT 397
BUS STOP BELL UPPER SALOON	3	HS	A18	3A	DOT 398
DOOR 3 OPEN SOLENOID	4	HS	A16	3A	DOT 399
FORMAN VLMS-6 POWER	5	HS	A14	3A	DOT 400
REVERSING BLEEPER RELAY (RLY7)	6	HS	A12	3A	DOT 401
GROUP 2					
DOOR 3 CLOSE SOLENOID	7	HS	A6	3A	DOT 402
SIDE DESTINATION LIGHT	8	HS	A4	3A	DOT 403
SIDE DESTINATION SIGN POWER	9	HS	A2	10A	DOT 404
GROUP 3					
RAMP CONTROLLER POWER 1 (COMPAK)	10	HS	B18	5A	DOT 405
RAMP CONTROLLER POWER 2 (COMPAK)	11	HS	B16	5A	DOT 405
LIGHTS N/S LOWER SALOON 1	12	HS	B14	5A	DOT 407
LIGHTS N/S LOWER SALOON 2	13	HS	B12	5A	DOT 407
GROUP 4					
FIRE SUPPRESSION SMOKE DETECTOR	14	HS	B6	3A	DOT 409
DOOR 3 SHELF PLATE LIGHTS	15	HS	B4	3A	DOT 410
O/S UPPER DECK LIGHTS (COVE 1, 3 & ST	16	HS	B2	10A	DOT 411
GROUP 5					
	18	PWM	E17	1A	DOT 412
	20	PWM	E15	1A	DOT 413
	22	LS	E13	1A	DOT 414
	24	LS	E11	1A	DOT 415
	26	LS	E7	1A	DOT 416
	28	LS	E5	1A	DOT 417
	30	LS	E3	1A	DOT 418
	32	LS	E1	1A	DOT 419
N/S WHEELARCH INDICATOR - TO VLMS-6	17	HS	E18	1A	DOT 420
DOOR 4 LOCKED SOLENOID REAR LEAF	19	HS	E16	1A	DOT 421
N/S LOW LEVEL INDICATOR (LED) - TO VI	21	HS	E14	1A	DOT 422
DOOR 3 PNEU EMG. PB INHIBIT SOLENOI	23	HS	E12	1A	DOT 423
N/S LOW LEVEL BRAKE LIGHT (LED)	25	HS	E8	1A	DOT 424
N/S REVERSE LIGHT (LED)	27	HS	E6	1A	DOT 425
N/S FRONT INDICATORS (LED) - TO VLMS	29	HS	E4	1A	DOT 426
O/S FRONT INDICATORS (LED) - TO VLMS	31	HS	E2	1A	DOT 427

STANDARD SPECIFICATION	
CUSTOMER OPTION REQUIRED	
NOT REQUIRED	
CHANGE FROM STANDARD	

13 Node 2.1 Electrical Centre Rear

Node 2.2 Electrical Centre Rear

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS						
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
BELL PRESSES N/S UPPER SALOON	1	E01 LS	80%	20%	D1	DIN 196
BELL PRESSES N/S LOWER SALOON	2	E01 LS	80%	20%	D2	DIN 197
BELL PRESS N/S LOWER SIDE WALL	3	E01 LS	80%	20%	D3	DIN 198
DOOR 4 CLOSED SWITCH (R.L.)	4	E01 LS	80%	20%	D4	DIN 199
DOOR 3 SENS EDGE ON CLOSE (F.L.)	5	E01 LS	80%	20%	D5	DIN 200
DOOR 4 LOW AIR PRESS SWITCH (R.L)	6	E01 LS	80%	20%	D6	DIN 201
DOOR 1 CLOSED SWITCH	7	E01 LS	80%	20%	D7	DIN 202
DOOR 1 LOW AIR PRESSURE SWITCH	8	E01 LS	80%	20%	D8	DIN 203
DOOR 1 SENS EDGE ACTIVATED	9	E01 LS	80%	20%	D9	DIN 204
	10		80%	20%	D10	DIN 205
DOOR 2 CLOSED SWITCH	11	E01 LS	80%	20%	D11	DIN 206
DOOR 2 LOW AIR PRESSURE SWITCH	12	E01 LS	80%	20%	D12	DIN 207
DOOR 2 SENS EDGE ACTIVATED	13	E01 LS	80%	20%	A21	DIN 208
DOOR 2 CUSHIONING SWITCH	14	E01 LS	80%	20%	A19	DIN 209
DOOR 2 OBSTRUCTION DETECT	15	E01 LS	80%	20%	A17	DIN 210
	16		80%	20%	A15	DIN 211
N/S EMG. HAMMERS UPPER SALOON	17	E01 LS	80%	20%	A13	DIN 212
DOOR 3 OPENED SWITCH (F.L.)	18	E01 LS	80%	20%	A11	DIN 213
DOOR 2 RAMP REQUEST PB	19	10E HS	80%	20%	A5	DIN 214
DOOR 2 PNEUMATIC OPEN PB EXTERNAL	20	E01 LS	80%	20%	A3	DIN 215
DOOR 3 CLOSED SWITCH (F.L.)	21	E01 LS	80%	20%	A1	DIN 216
DOOR 3 LOW AIR PRESS SWITCH (F.L)	22	E01 LS	80%	20%	B17	DIN 217
DOOR 4 OPENED SWITCH (R.L)	23	E01 LS	80%	20%	B15	DIN 218
DOOR 3 OBS DETECT ON CLOSE (F.L.)	24	E01 LS	80%	20%	B13	DIN 219
	1	ANALOGUE			D13	AIN 224
	2	ANALOGUE			D14	AIN 225
	3	ANALOGUE			B11	AIN 226
	4	ANALOGUE			B5	AIN 227
	5	ANALOGUE			B3	AIN 228
	6	ANALOGUE			B1	AIN 229

NODE GROUP POWER SUPPLIES			
NEGATIVE	CHASSIS EARTH	A9	B
POSITIVE GROUP 1	MFB1 FUSE 13	A10	P+13
NEGATIVE	CHASSIS EARTH	A7	B
POSITIVE GROUP 2	MFB1 FUSE 14	A8	P+14
NEGATIVE	CHASSIS EARTH	B9	B
POSITIVE GROUP 3	MFB1 FUSE 15	B10	P+15
NEGATIVE	CHASSIS EARTH	B7	B
POSITIVE GROUP 4	MFB1 FUSE 16	B8	P+16
NEGATIVE	CHASSIS EARTH	E9	B
POSITIVE GROUP 5	MFB1 FUSE 17	E10	P+17

OUTPUTS					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
DOOR 2 OPEN SOLENOID	1	HS	A22	3A	DOT 428
DOOR 2 CLOSE SOLENOID	2	HS	A20	3A	DOT 429
DOOR 2 CUSHIONING SOLENOID	3	HS	A18	3A	DOT 430
DOOR 2 CLOSE ALARM	4	HS	A16	3A	DOT 431
DOOR 2 PNEU EMG. PB INHIBIT SOLENOI	5	HS	A14	3A	DOT 432
DOOR 2 SHELF PLATE LIGHTS	6	HS	A12	3A	DOT 433
GROUP 2					
N/S REAR SIDELIGHT & H/LEVEL MARKER	7	HS	A6	3A	DOT 434
O/S REAR SIDELIGHT & H/LEVEL MARKER	8	HS	A4	3A	DOT 435
N/S UPPER DECK LIGHTS (COVE 1 & 3)	9	HS	A2	10A	DOT 436
GROUP 3					
ADVERTISING BOARD LIGHT O/S	10	HS	B18	5A	DOT 437
ADVERTISING BOARD LIGHT N/S	11	HS	B16	5A	DOT 438
	12	HS	B14	5A	DOT 439
O/S UPPER DECK LIGHTS (COVE 2 & 4)	13	HS	B12	5A	DOT 440
GROUP 4					
NUMBER PLATE LIGHTS	14	HS	B6	3A	DOT 441
REAR DESTINATION LIGHT	15	HS	B4	3A	DOT 442
REAR DESTINATION POWER	16	HS	B2	10A	DOT 443
GROUP 5					
	18	PWM	E17	1A	DOT 444
	20	PWM	E15	1A	DOT 445
	22	LS	E13	1A	DOT 446
	24	LS	E11	1A	DOT 447
	26	LS	E7	1A	DOT 448
	28	LS	E5	1A	DOT 449
	30	LS	E3	1A	DOT 450
	32	LS	E1	1A	DOT 451
DOOR 3 CLOSE ALARM	17	HS	E18	1A	DOT 452
O/S REVERSE LIGHT (LED)	19	HS	E16	1A	DOT 453
O/S LOW LEVEL INDICATOR (LED)	21	HS	E14	1A	DOT 454
HIGH LEVEL BRAKE LIGHT (LED)	23	HS	E12	1A	DOT 455
O/S LOW LEVEL BRAKE LIGHT (LED)	25	HS	E8	1A	DOT 456
O/S WHEELARCH INDICATOR - TO VLMS-6	27	HS	E6	1A	DOT 457
O/S FOG LIGHT (LED)	29	HS	E4	1A	DOT 458
O/S SIDE MARKER (LED)	31	HS	E2	1A	DOT 459
STANDARD SPECIFICATION					
CUSTOMER OPTION REQUIRED					
NOT REQUIRED					
CHANGE FROM STANDARD					

14 Node 2.2 Electrical Centre Rear

DMUX IPs

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

INPUTS			LIMITS			
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
INPUTS EIN 1-8 ARE WAKE UP CAPABLE AND WILL ACTIVATE AUS WAKE UP						
DMUX32-C WAKE UP (BATTERY MASTER)	1	HS 1F0	80%	20%	D2	P+30 14
	2				D29	DIN 002
	3				D11	DIN 003
	4				D28	DIN 004
	5				D20	DIN 005
	6				D10	DIN 006
	7				D19	DIN 007
	8				D1	DIN 008
INPUTS EIN 9-68 ARE NON WAKEUP CAPABLE						
MENU PAD UP	9	LS F01	80%	20%	D6	DIN 009
MENU PAD DOWN	10	LS F01	80%	20%	D12	DIN 010
MENU PAD ENTER	11	LS F01	80%	20%	D16	DIN 011
MENU PAD ESCAPE	12	LS F01	80%	20%	D13	DIN 012
DRIVE START SWITCH	13	LS F10	80%	20%	D25	DIN 013
IGNITION SWITCH	14	LS F01	80%	20%	D5	DIN 014
DRIVE STOP SWITCH	15	LS F01	80%	20%	D17	DIN 015
SIDELIGHTS	16	LS F01	80%	20%	D21	DIN 016
DIPPED BEAM	17	LS F01	80%	20%	D26	DIN 017
ASSAULT SCREEN UNLOCK SWITCH	18	LS F01	80%	20%	D3	DIN 018
DOOR 1 (ALL DOORS OPEN)	19	LS F01	80%	20%	D33	DIN 019
DOOR 2 (DOOR 1 CLOSE)	20	LS F01	80%	20%	D22	DIN 020
SCREEN WASH SWITCH	21	LS F01	80%	20%	D15	DIN 021
SIDE CONSOLE SPARE	22	LS F01	80%	20%	D23	DIN 022
REAR FOG SWITCH	23	LS F01	80%	20%	D4	DIN 023
SPARE SWITCH 1 (OFF/ON)	24	LS F01	80%	20%	D30	DIN 024
ASSAULT ALARM RESET	25	LS F01	80%	20%	D32	DIN 025
RETARDER OFF SWITCH	26	LS F01	80%	20%	D31	DIN 026
SQUAT SWITCH	27	LS F01	80%	20%	D14	DIN 027
FERRY LIFT SWITCH	28	LS F01	80%	20%	D8	DIN 028
KNEEL SWITCH	29	LS F01	80%	20%	D24	DIN 029
RIDE HEIGHT SWITCH	30	LS F01	80%	20%	D34	DIN 030
TRACTION CONTROL OFF SWITCH	31	LS F01	80%	20%	D35	DIN 031
CREW SELECT SWITCH	32	LS F01	80%	20%	C31	DIN 032
REVERSE BLEEPER O/R	33	LS F01	80%	20%	C11	DIN 033
MAIN BEAM SWITCH	34	LS F01	80%	20%	C2	DIN 034
MAIN BEAM FLASH	35	LS F01	80%	20%	C3	DIN 035
INDICATORS N/S	36	LS F01	80%	20%	C30	DIN 036
INDICATORS O/S	37	LS F01	80%	20%	C20	DIN 037
HORN SWITCH	38	LS F01	80%	20%	C29	DIN 038
INTERMITTANT WIPER SWITCH	39	LS F01	80%	20%	C21	DIN 039
SLOW WIPER SWITCH	40	LS F01	80%	20%	C12	DIN 040

INPUTS			LIMITS			
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT
FAST WIPER SWITCH	41	LS F01	80%	20%	C35	DIN 041
PARTIAL BRAKE	42	LS F01	80%	20%	C32	DIN 042
SPARE SWITCH 2 (OFF/ON)	43	LS F01	80%	20%	C33	DIN 043
	44		80%	20%	C22	DIN 044
FLANK CAMERA (ON/OFF/ON)	45	LS F01	80%	20%	C5	DIN 045
FLANK CAMERA (ON/OFF/ON)	46	LS F01	80%	20%	C8	DIN 046
RAMP EXTEND CAB SWITCH	47	LS F01	80%	20%	C25	DIN 047
RAMP RETRACT CAB SWITCH	48	LS F01	80%	20%	C14	DIN 048
DOOR 3 PUSH BUTTON CAB	49	LS F01	80%	20%	C7	DIN 049
DOOR 4 (DOOR 2 CLOSE)	50	LS F01	80%	20%	C17	DIN 050
	51		80%	20%	C6	DIN 051
HIDDEN START	52	LS F01	80%	20%	C13	DIN 052
IMMOBILISER	53	LS F01	80%	20%	C24	DIN 053
	54		80%	20%	C4	DIN 054
	55		80%	20%	C34	DIN 055
SMOKE ALARM OVERRIDE SWITCH	56	LS F01	80%	20%	C16	DIN 056
	57		80%	20%	C15	DIN 057
	58		80%	20%	C23	DIN 058
DOOR 5 PUSH BUTTON CAB	59	LS F01	80%	20%	E19	DIN 059
DOOR 6 (DOOR 3 CLOSE)	60	LS F01	80%	20%	E28	DIN 060
DNR SWITCH - DRIVE	61	LS F01	80%	20%	E20	DIN 061
DNR SWITCH - REVERSE	62	LS F01	80%	20%	E29	DIN 062
DNR SWITCH - NEUTRAL	63	LS F01	80%	20%	E21	DIN 063
	64		80%	20%	E30	DIN 064
	65		80%	20%	E22	DIN 065
	66		80%	20%	E31	DIN 066
	67		80%	20%	E23	DIN 067
	68		80%	20%	E32	DIN 068
	1	ANALOGUE			E24	AIN 624
	2	ANALOGUE		20%	E25	AIN 625
CTRL BOARD WAKE UP (FROM AUS E26)	1	WAKEUP	N/A	N/A	F10	711
	2	WAKEUP	N/A	N/A	F11	
CONTROL BOARD WAKE UP 1 MUST BE CONNECTED EXTERNALLY TO AUS WAKE UP						
INTERFACE BOARD POSITIVE SUPPLY 1					E35	P+ 11
NEGATIVE					E33	B
INTERFACE BOARD POSITIVE SUPPLY2					E36	P+ 11
NEGATIVE					E34	B
CONTROL BOARD POSITIVE SUPPLY					F12	P+ 11
NEGATIVE					F9	B
STANDARD SPECIFICATION						
CUSTOMER OPTION REQUIRED						
NOT REQUIRED						

DMUX OPs

Example layout shown below, see electric manual and electrical compartment for vehicle specific layout.

OUTPUTS					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
GROUP 1					
SCREENWASH LOW LED	1	HS	A1	60mA	DOT 492
COOLANT LOW LED	2	HS	A2	60mA	DOT 493
OIL LEVEL LED	3	HS	A3	60mA	DOT 494
KEYPAD ILLUMINATION (VBAT)	4	HS	A4	60mA	DOT 495
KEYPAD ILLUMINATION (VBAT)	5	HS	A5	60mA	DOT 495
ICM1 INDICATOR BUZZER	6	HS	A6	60mA	DOT 497
CAN COCKPIT SPEEDO IGNITION	7	HS	A7	60mA	DOT 498
AUDIBLE CLICKER	8	HS	A8	60mA	DOT 499
	9	HS	A9	60mA	DOT 500
	10	HS	A10	60mA	DOT 501
GROUP 2					
STOP TELLTALE	11	HS	D9	20mA	DOT 502
BRAKE TELLTALE	12	HS	D18	20mA	DOT 503
ABS TELLTALE	13	HS	D27	20mA	DOT 504
DIPPED BEAM TELLTALE	14	HS	D36	20mA	DOT 505
LEFT INDICATOR TELLTALE	15	LS	C1	20mA	DOT 506
CHECK TELLTALE	16	LS	C10	20mA	DOT 507
HANDBRAKE TELLTALE	17	LS	C19	20mA	DOT 508
DOORBRAKE TELLTALE	18	LS	C28	20mA	DOT 509
MAIN BEAM TELLTALE	19	HS	C9	20mA	DOT 510
RIGHT INDICATOR TELLTALE	20	HS	C18	20mA	DOT 511
HAZARD WARNING BLINKER	21	HS	C27	20mA	DOT 512
DOOR OPEN WARNING LAMP (PB)	22	HS	C36	20mA	DOT 513
MID DOOR OPEN WARNING LAMP (PB)	23	HS	E1	20mA	DOT 514
SPEEDO ILLUMINATION	24	HS	E2	20mA	DOT 515
REAR DOOR OPEN WARNING LAMP (PB)	25	HS	E3	20mA	DOT 516
	26	HS	E4	20mA	DOT 517
	27	HS	E5	20mA	DOT 518
	28	HS	E6	20mA	DOT 519
STANDARD SPECIFICATION					
CUSTOMER OPTION REQUIRED					
NOT REQUIRED					