



# NBFL

# Operations Manual



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**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.**

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## 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).

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## Warnings

### Health and Safety

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#### **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. These 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.

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.



### 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**

## Vehicle Identification Plate (V.I.N)

**WRIGHTBUS**

APPROVAL NO. **e111NKSK0E24**

VEHICLE ID. NO. **XSASDDRX0X131410451**

G.V.W. **18000** | **19000** **KG**

AXLE LOAD

AXLE	LEGALLY PERMITTED MASS (KG)	TECHNICALLY PERMITTED MASS (KG)
1	<b>7500</b>	<b>7500</b>
2	<b>11500</b>	<b>12000</b>
3		
4		

**1.3%**

BODY NUMBER **AH 281** | BODY TYPE **NEFL**

BODY LENGTH **11300mm** | CHASSIS REF.

BODY WIDTH **2550mm** | DATE **JUN 13**

GALGORM, BALLYMENA  
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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.

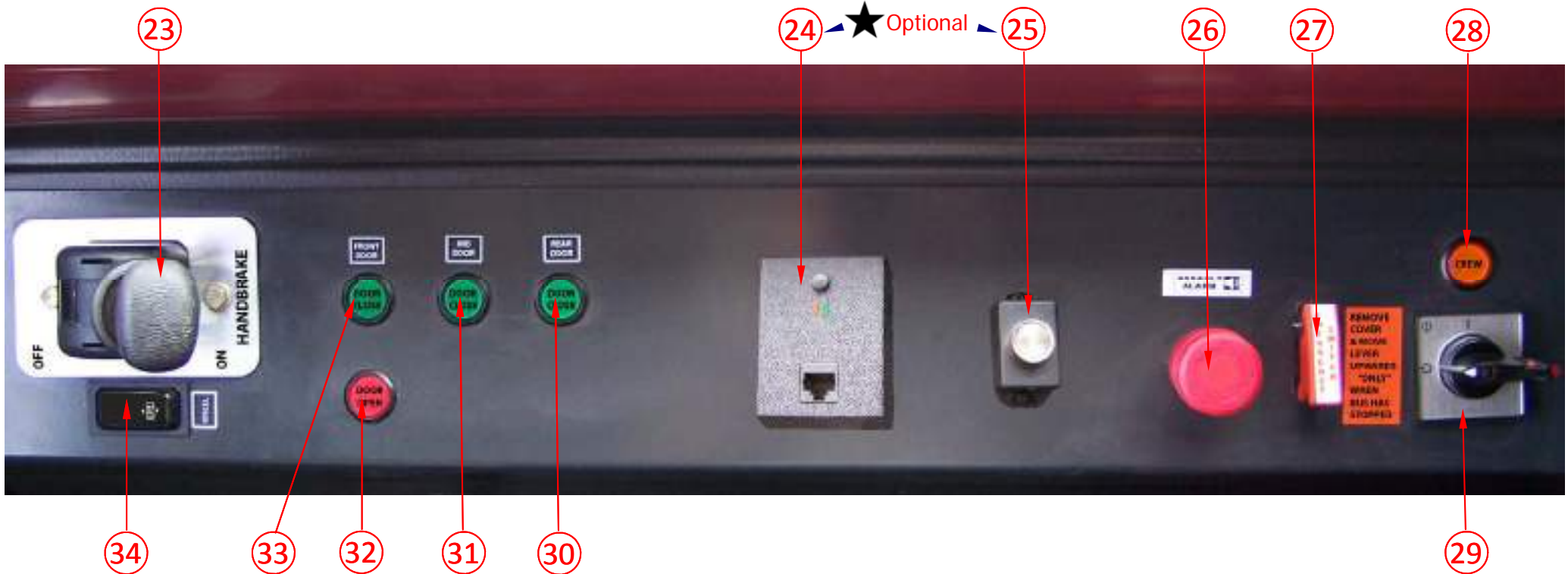
#### Position N

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

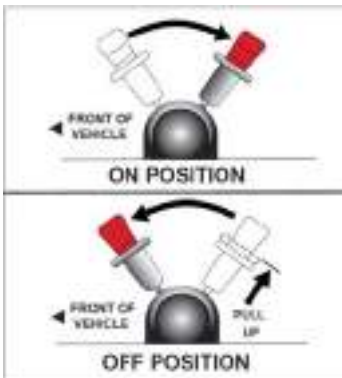
#### Position R

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

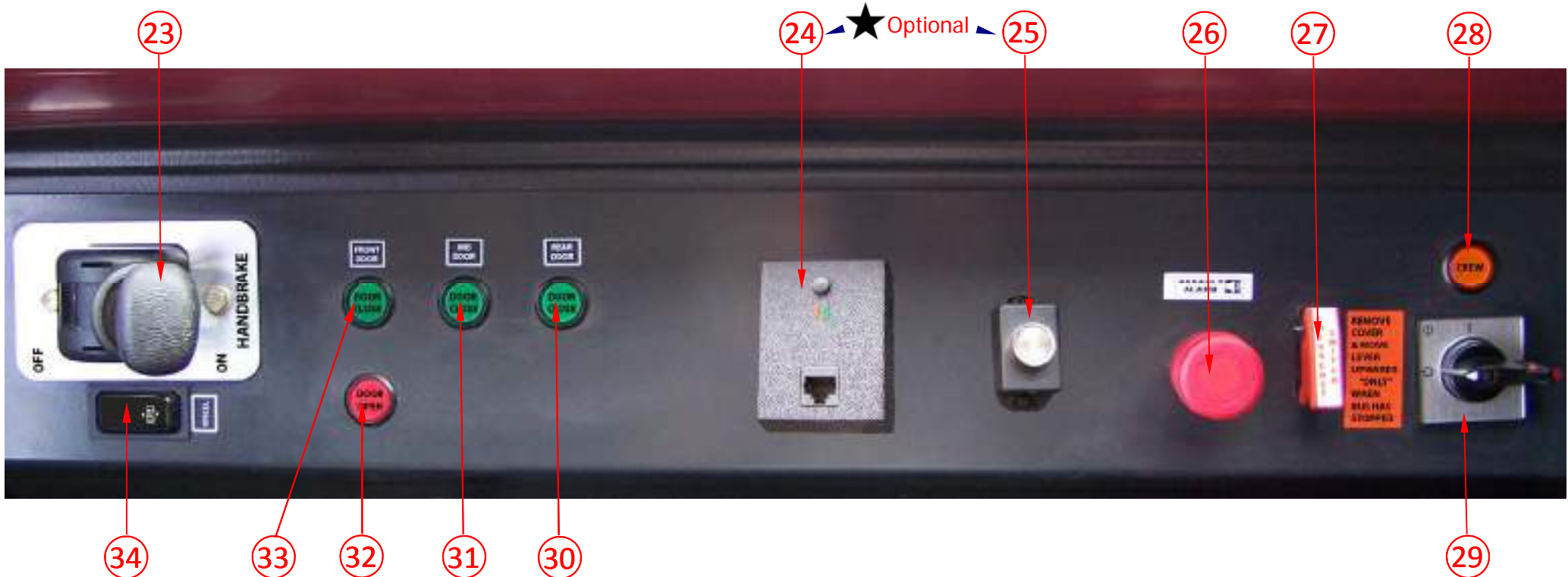
Provides a remote diagnostic functionality without the need to physically access the T1000 recorder unit. Two LEDs provide recording confirmation and camera fail alert.

- 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

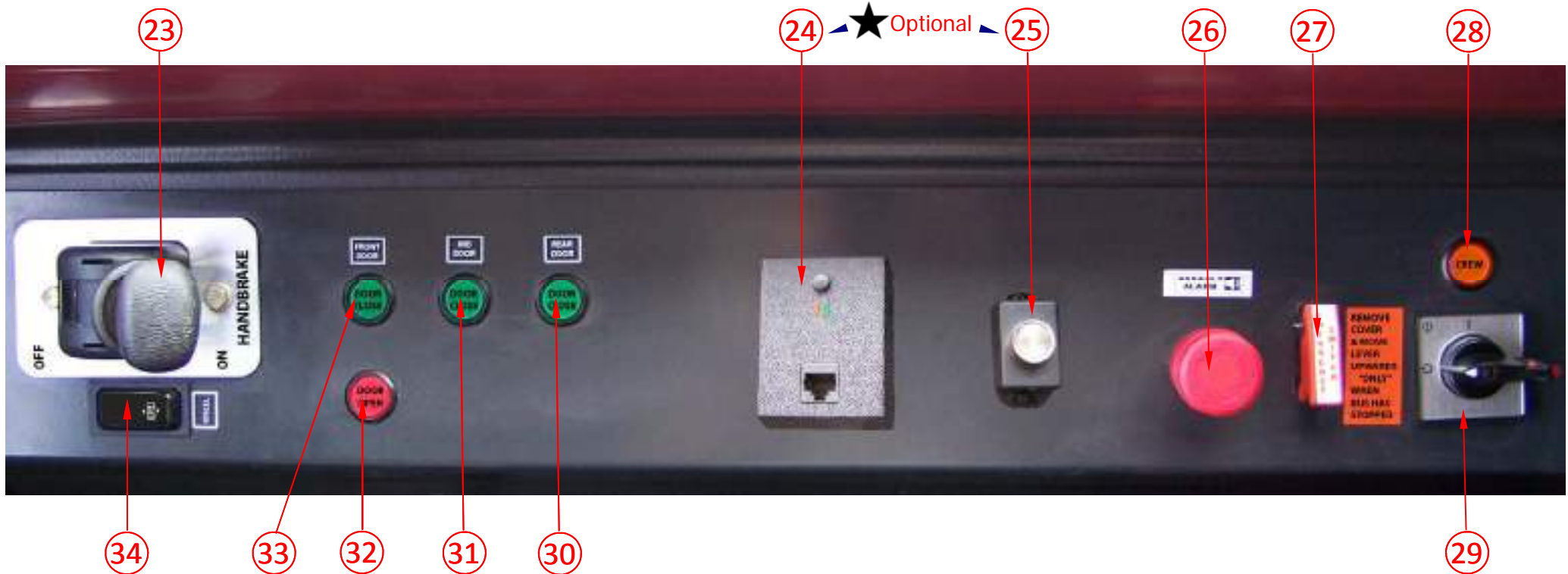
The vehicle is equipped with a panic alarm. Pressing this switch will activate the panic alarm. To de-activate the alarm twist anti-clockwise.



### 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.

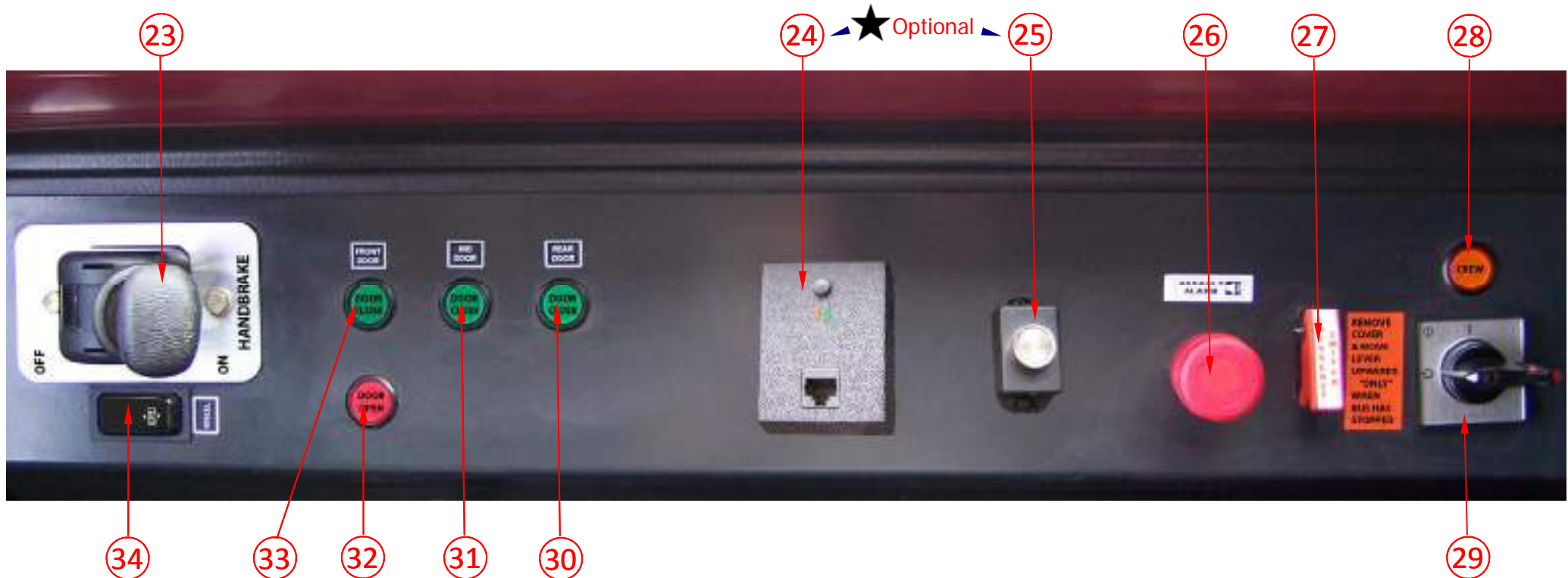


O - Off position Left in this position after total shut down .

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.

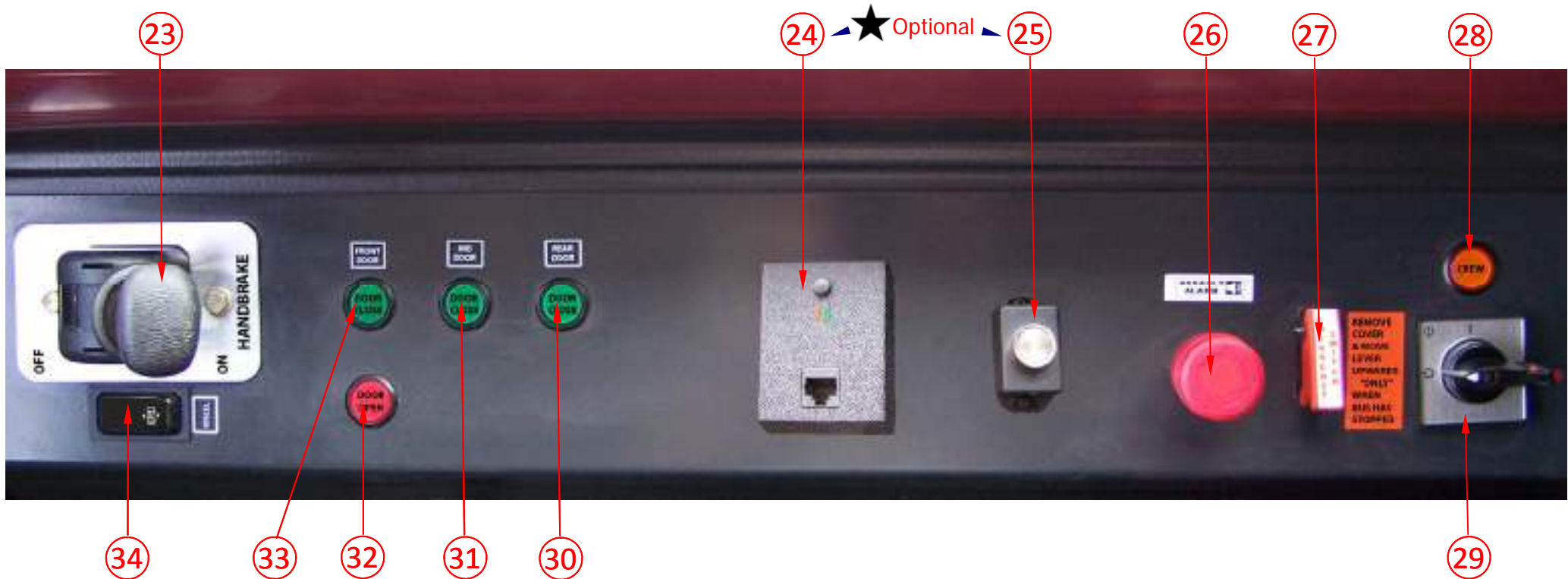


### 33. Front Door Close Switch.

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



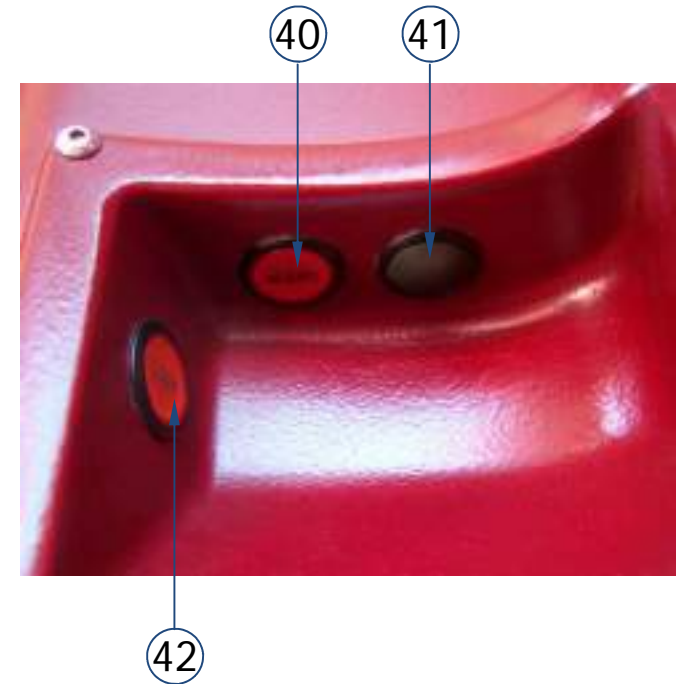
### Switches above rear door - For emergency use only

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 leaf 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 inverter 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

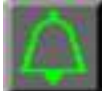





## ICM Warning Indicators - Information Warnings

### 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.

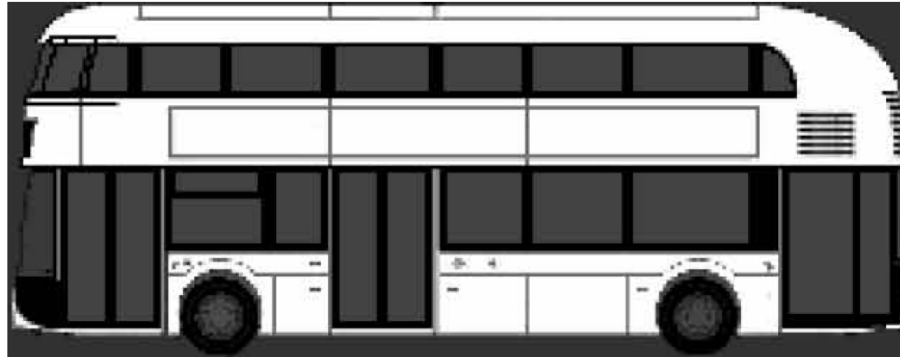


Fig. 1





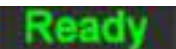
Icon	Description
	Vehicle ramp not stowed or in an extended position warning
	Vehicle suspension knelt warning - separate symbol displayed below front and rear wheel
	Vehicle suspension in ferry lift position warning - separate symbol displayed below front and rear wheel
	Vehicle drive selected - a 'D' (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 INDICATORS

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.



2. Low air pressure.



3. ABS Braking System.



4. Headlights on - low.



5. Left Indicator on.



6. Check at the next stop.



7. Parking brake is applied.



8. Door brake status.



9. Headlights on - Full.



10. Right Indicator on.



11. Speedometer



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).

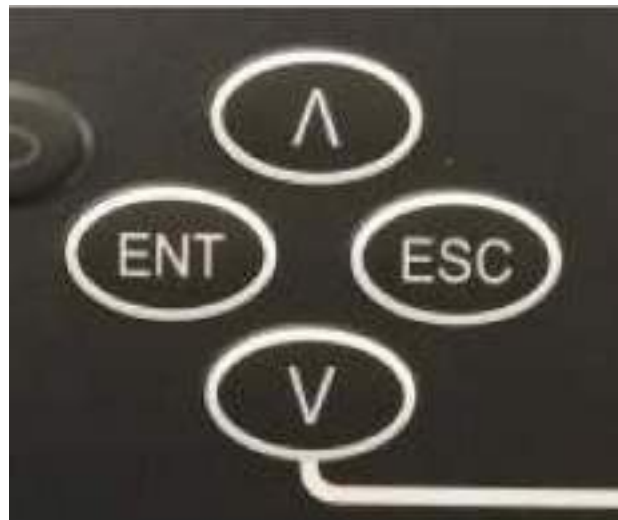


Fig. 3

## 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).

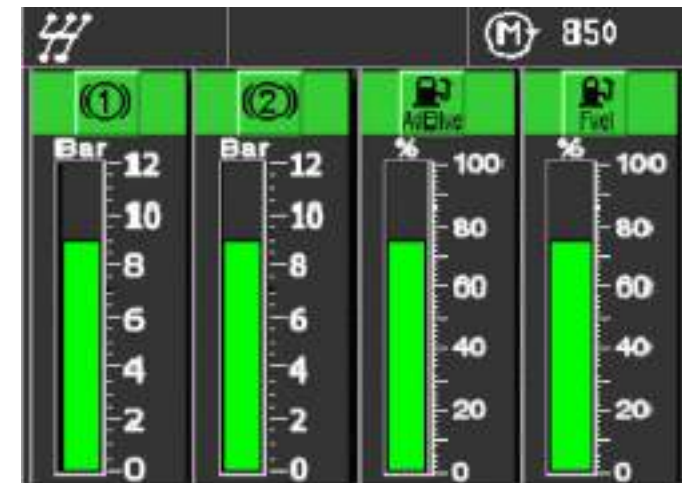


Fig. 5

## DMUX Screen - Instructions

### 4.2 Bargraph Screen 2

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

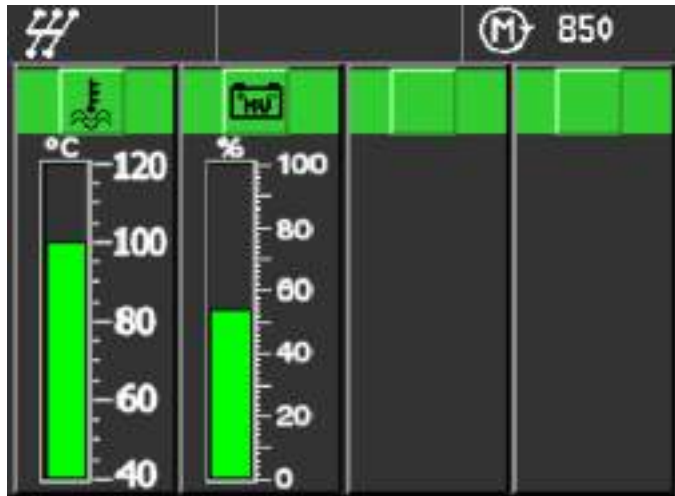


Fig. 6

### 5.0 DIAGNOSTIC MENU

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

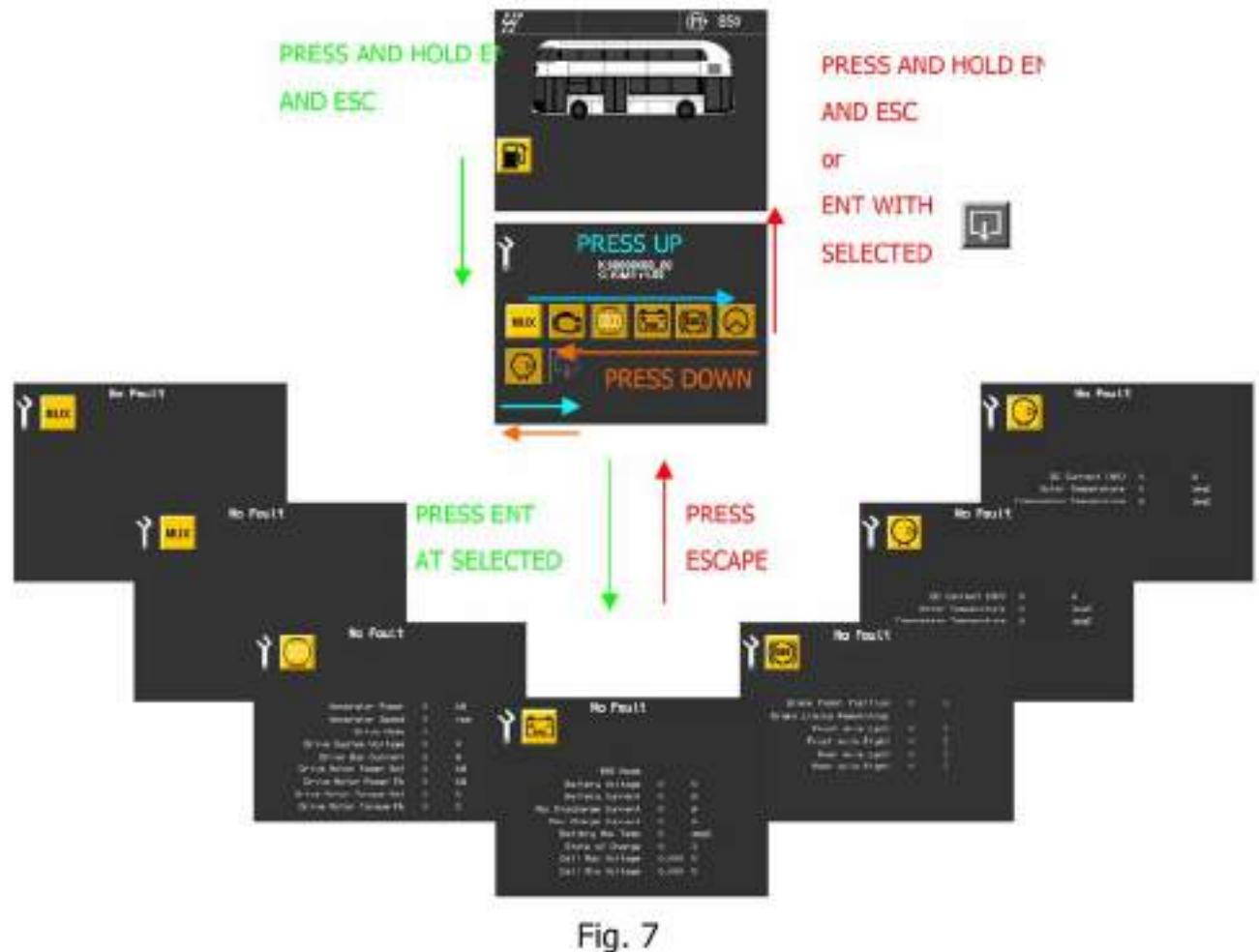


Fig. 7

### 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.

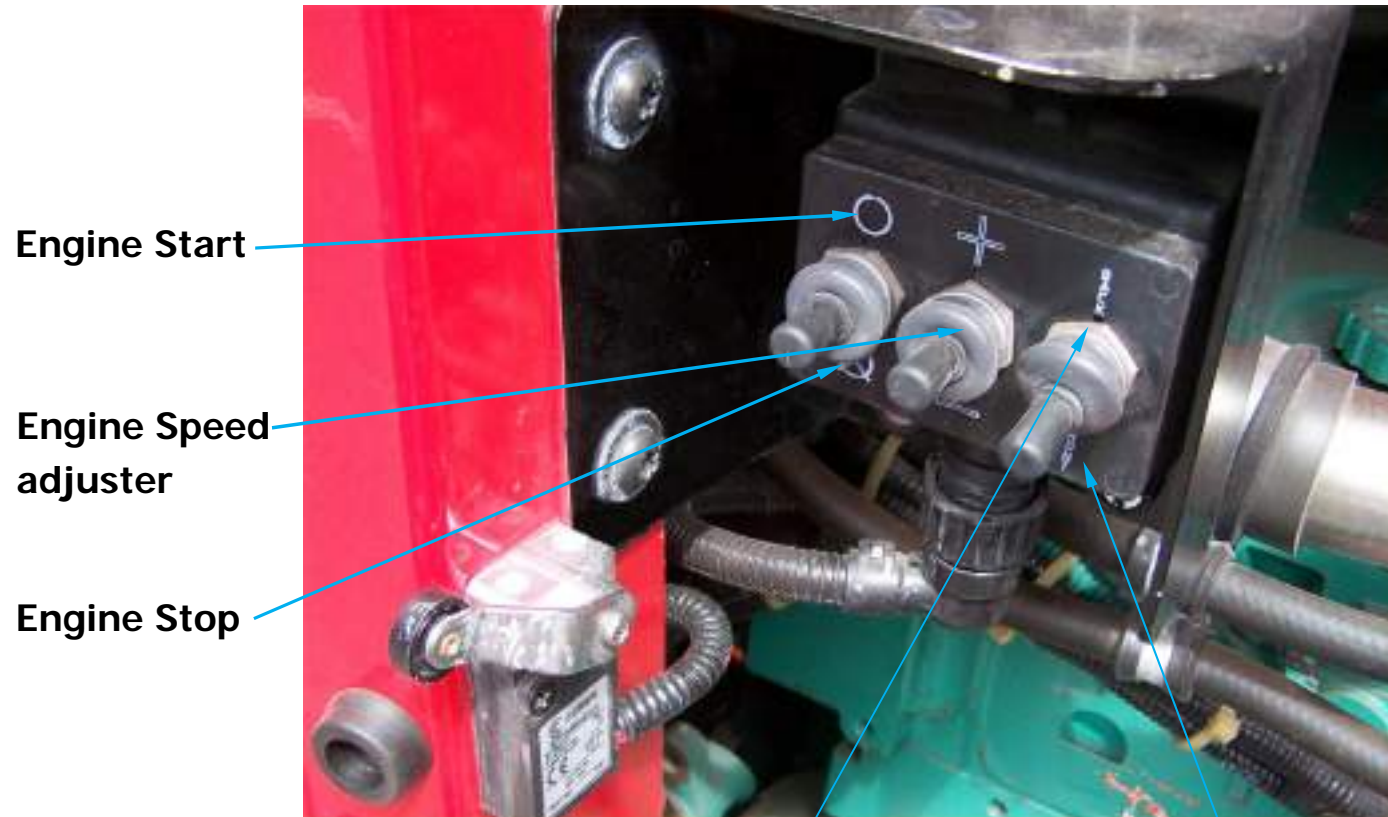
Where vehicles are consistently driven over traffic calming devices at speeds in excess of 10mph, the long term durability of the vehicle may be adversely affected.

## 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.



Engine Rear Start Mode

Engine Front Start Mode



### 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  $-23^{\circ}\text{C}$ , 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<sup>®</sup>
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.



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, affecting 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 effect.

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 of 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 or the detergent may be used at too high a concentration.





## 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  
Engine Coolant

Run in  
Run in

#### Fill

Washer bottle

Run in

#### Visual Checks

##### Exterior

Operation of all exterior lights  
Obvious fluid leaks  
Tyres, for damage and signs of pressure loss  
Wheel nut pointers, for signs of movement  
Security of all panels and access panels

Driver's walk round  
Driver's walk round / Run in  
Driver's walk round / Run in  
Driver's walk round / Run in  
Driver's walk round / Run in

##### Interior

Condition of break glass hammers  
Condition of legally required notices  
Security of escape hatch  
Operation of all interior lights  
Fitment of fire extinguisher

Driver's walk round  
Driver's walk round  
Driver's walk round  
Driver's walk round  
Driver's walk round

#### Physical Checks

Operation of doors  
Operation of ramp  
Operation of saloon bells, wheelchair buzzer and bus stopping sign  
Check operation of warning lights and buzzers in cab  
Check operation of cab all controls Inc. brakes, wash wipe system, horn and steering

Driver's walk round  
Driver's walk round  
Driver's walk round  
Driver's walk round  
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	1 Month	6 Months	6 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
<b>Air Cleaner</b>	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
	Change main air filter element	3					✓		✓	✓	✓
	Change safety filter	2							✓		✓
	Check evacuation valves (2 off) for correct operation	1		✓	✓	✓	✓	✓	✓	✓	✓
<b>Air Conditioning</b>	Check belt condition, tension, and pulley	2	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, sabin and cab chillers	10	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Front Axle</b>	Check hub bearing condition	4			✓		✓	✓	✓	✓	✓
	Strip and examine hub bearings, grease	30								✓	
	Check oil seals for leaks	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check axle fittings	2	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓
	Check wheel alignment and lock stop adjustment	30					✓		✓	✓	✓
	Check king pins for wear	4					✓		✓	✓	✓
	Lubricate king pins top and bottom, top and bottom wishbone bearings	4					✓		✓	✓	✓
<b>Front Suspension</b>	Check inward wishbone bushes and fittings	4	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓
	Check condition of bump stops	8					✓		✓	✓	✓
	Check damper bushes	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
<b>Rear Axle</b>	Check oil level. Top up as required	2			✓		✓	✓	✓	✓	✓
	Change oil and change breather. Check breather pipe.	30							✓	✓	
	Check hub bearing condition	4			✓		✓	✓	✓	✓	✓
	Strip and examine hub bearings, grease	30								✓	
	Check hub and pinion oil seal for leakage	4	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check security of half shafts and shafts	4			✓		✓	✓	✓	✓	✓
<b>Rear Suspension</b>	Check V stay and control rod bushes, fittings	2	Visual	Visual	Visual	Visual	✓	Visual	✓	✓	✓
	Check condition of bump stops	8					✓		✓	✓	✓
<b>Foundation Brakes</b>	Check pad wear	6	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Replace pads	18							✓	✓	✓
	Check disc wear and condition	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Replace discs	30							✓		
	Check condition of brake wear indicators, seals, pad retention components	2	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
Check presence, fit and condition of sealing caps	4	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: 30001-01

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
	Clean unit prior to maintenance	1			✓	✓	✓	✓	✓	✓	✓
	Change compressor oil and oil filter	5					✓		✓	✓	✓
	Change leaking elements	2					✓		✓	✓	✓
	Change compressor air filters, main and safety	2					✓		✓	✓	✓
	Replace crumpler, empty seat, internal separator filter	90								Hydraulic City	
	Check compressor condition, e.g. oil carry over and build up times, oil leaks, motor 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
	Check all pipe connections for leakage and fixings for security. Check rubber hoses etc for cracks and hardening	5	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 governor cut in and cut out pressures, build up times	5		✓	✓	✓	✓	✓	✓	✓	✓
	Change air dryer cartridges	5			✓	✓	✓	✓	✓	✓	✓
	Drain air reservoirs of condensate	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check for contamination discharge from silencers	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	
Brake Rotor test	15	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cooling System, Engine	Check coolant level	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check seal and pressurisation feature on caps	2				Visual	Visual	Visual	Visual	Visual	Visual
	Check engine anti-freeze solution strength	5		✓	✓	✓	✓	✓	✓	✓	✓
	Check low coolant sensor operation	15		✓	✓	✓	✓	✓	✓	✓	✓
	Drain system, flush and refill with coolant	25	First 3000 Miles						✓	✓	✓
	Check hoses for deterioration and all connections for leaks	5	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	2		Visual	Visual	Visual	✓	Visual	✓	✓	✓
Check operation of cooling fans	5			✓		✓	✓	✓	✓	✓	
Electrical	Check connections for cleanliness, security and insulation	15			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
	Check DC / DC converter, 24V charging voltage	5		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check correct operation of the instruments	2	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
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 2011

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	182000 Miles I	240000 Miles J
<b>Engine and Ancillaries</b>											
Check oil level. Top up as required.	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check Fire Suppression System	15	✓									
Change oil and filter	30	✓									
Change engine fuel filters	6				✓		✓	✓	✓	✓	✓
Check for oil, coolant and fuel leaks	5	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	Visual
Check power unit engine mounts, security to chassis	3	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 rollers	6										✓
Dosing with airside flushing	60		✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>SCR</b>											
Check AdBlue level. Top up as required.	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check / clean Ad Blue Filter neck, surroundings	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check clamp security, ensure no leakage	7	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check mountings for signs of damage or deterioration	1	To torque specs	Visual	Visual	Visual	Visual	To torque specs	Visual	To torque specs	To torque specs	To torque specs
Change diesel and / or air ab filter	4				✓		✓	✓	✓	✓	✓
Check exhaust system for damage	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check condition of wiring to temp. and NOx sensors	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
<b>Fuel System</b>											
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	To torque specs	Visual	Visual	Visual	To torque specs	Visual	To torque specs	To torque specs	To torque specs	To torque specs
Change remote fuel filter	6				✓		✓	✓	✓	✓	✓
Check fuel tank for external damage/corrosion	1		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
<b>Drive Shaft</b>											
Check tightness of fixings	1			Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check for wear & level damage to 90's	7			Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check for spline wear & damage to rib on coat	4			Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check bearing snap rings, balance weights, all seals	2			Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check joint bearings - manual rotation of yoke	40							Distorted		Distorted	
Check spline condition, backlash and axial backlash	30							Distorted		Distorted	
Regrease universal joints	1		✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Steering Gear</b>											
Check oil reservoir mounting integrity	1		Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Check hydraulic oil fluid level	1	✓									
Clean and prior to maintenance	1					✓		✓	✓	✓	✓
Change hydraulic filter	2					✓		✓	✓	✓	✓
Change hydraulic fluid	30					✓		✓	✓	✓	✓
Check steering and lower boxes for leakage, security	5		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 booster	4					✓		✓	✓	✓	✓
Check piping system for leaks	3	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
Lubricate steering rclays	3					✓		✓	✓	✓	✓
<b>Air Suspension</b>											
Check pump system for leaks	2	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 travel 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	✓	✓	✓	✓	✓	✓
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

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
<b>Wheels and Tyres</b>	Visually inspect all wheel nuts	2	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	8	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check all tyre pressures	5	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check tread depth to legal limit	8	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check valves are at 180° to each other on rear axle twin tyres	8	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
<b>Body</b>	Inspect body connections for security	8				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 main switches	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check heaters, Remove & clean refit heater / desister filters	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Lubricate all hinges, locks, door/seat mechanisms, fitted gear	5	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check emergency switches operate	4	Every 2 vits	✓	✓	✓	✓	✓	✓	✓	✓
Drain door regulator bowl	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Hybrid Systems</b>	Visually inspect traction motor, bolts, cooling, connections and damage	2	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	Check earths for damage, condition, security, continuity, all hybrid components	5					Visual		Visual	Visual	Visual
	Service traction motor and drain condensate	2					✓		✓	✓	✓
	Change traction motor bearing grease	80								✓	
	Change generator bearings	100									✓
	Check, investigate stored errors, Cammies, Siemens, ECAS, ERS, HV batteries	20	✓	✓	✓	✓	✓	✓	✓	✓	✓
	HV battery : Check coolant level	1	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
	HV Battery : Check seal and pressurisation features 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
	HV battery : Check radiator matrix and clean external debris	5	✓	✓	✓	✓	✓	✓	✓	✓	✓
	HV battery : Check radiator mountings	8							✓		✓
	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
	Hybrid Cooling : Check seal and pressurisation features 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							✓	✓	✓

# 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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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 clearance	2		Visual	Visual	Visual	✓	Visual	✓	✓	✓	✓
Hybrid Cooling : Check operation of cooling fans	5			✓		✓	✓	✓	✓	✓	✓
<b>Estimated Total Time</b>		3:00	5:00	5:00	6:00	14:00	11:00	6:00	3:15	7:00	1:45
<b>Hours Per Month (Based on 4,000 miles per month)</b>		0.25	0.75	0.11	0.12	0.20	0.11	0.40	0.09	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 of 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 Association des Constructeurs Europeens d'Automobiles American Petroleum Institute
ACEA E5	ACEA E7				
API CH4	API CH4				

## Maintenance Checks

### Body Checks

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#### 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.

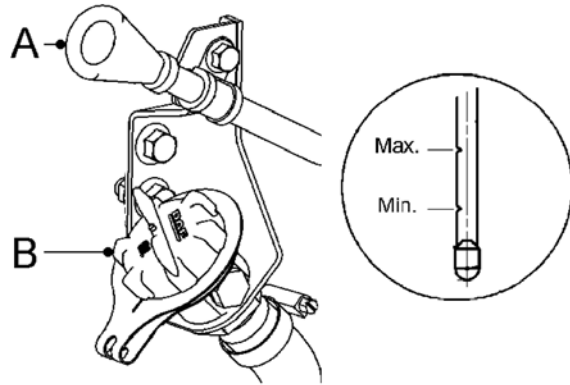
### Note

**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

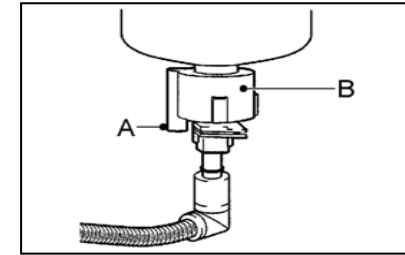
**Never operate the engine with the oil level below the Low mark or above the High mark. Wait at least 5 minutes after stopping the engine to check the oil level, this allows the oil to drain into the sump. If adding topping up, allow time for the oil to reach the sump.**

## 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

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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

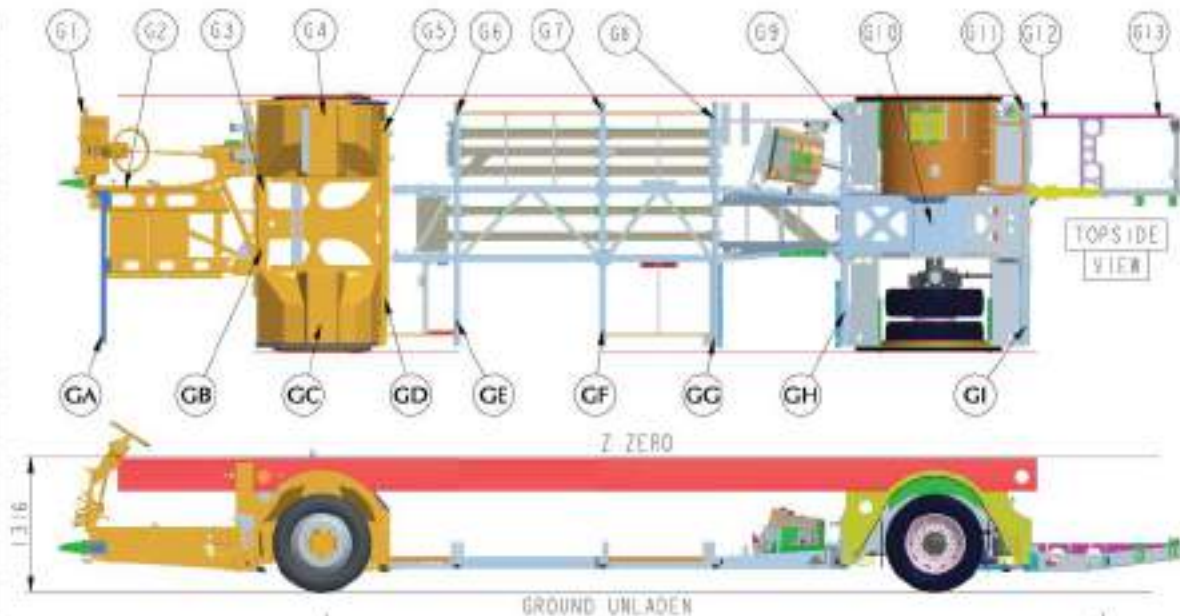
### NBFL PROP HEIGHTS

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	

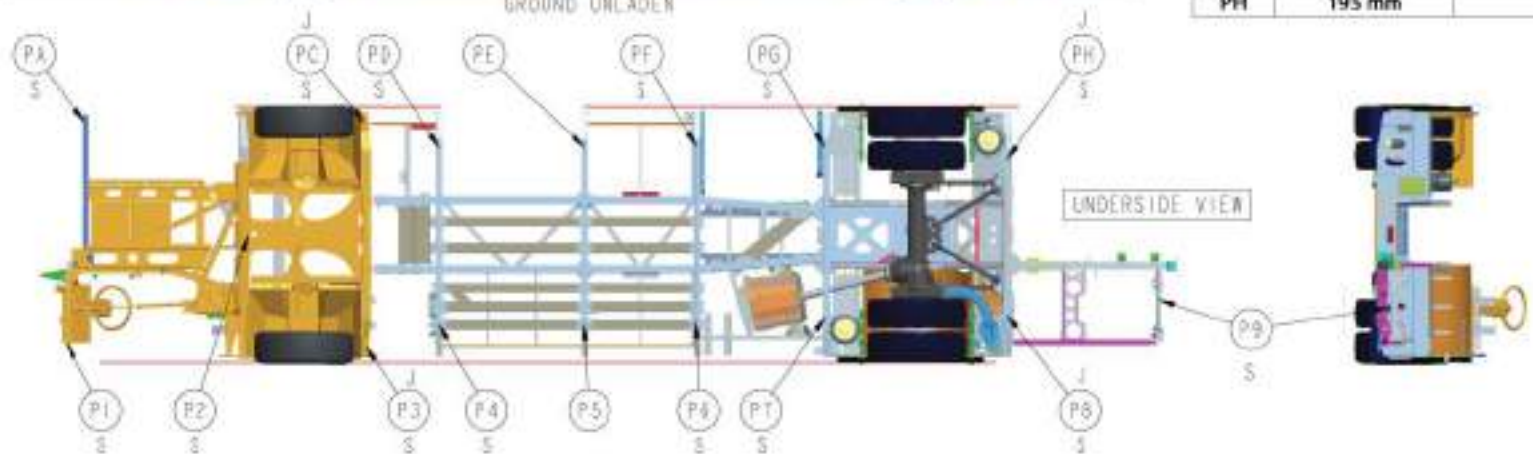


Driver's side		
Location	Jack / prop height up from ground	Comments
P1	344 mm	
P2	178 mm	
P3	185 mm	
P4	215 mm	
P5	215 mm	IF REQUIRED
P6	215 mm	
P7	215 mm	
P8	195 mm	
P9	350mm If 60x40 tube	MID POINT
P9	330mm If 80x40 tube	MID POINT

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	

J = JACKING POINT  
S = SUPPORT / PROP POINT



## Emergency Repairs

### Jacking Points - Prop Heights

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#### 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

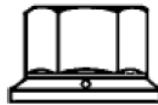
- 32mm Socket
- Air Impact Wrench
- Torque Wrench

### 3.0 PARTS REQUIRED

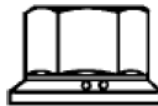
- R22 1/2" tyre and wheel assemblies
- Wheel Nuts M22x1.5 - 10 off per wheel

### 4.0 PROCEDURE

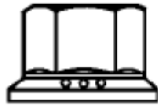
4.1 Check the wheel nuts are the correct type and show no signs of damage.



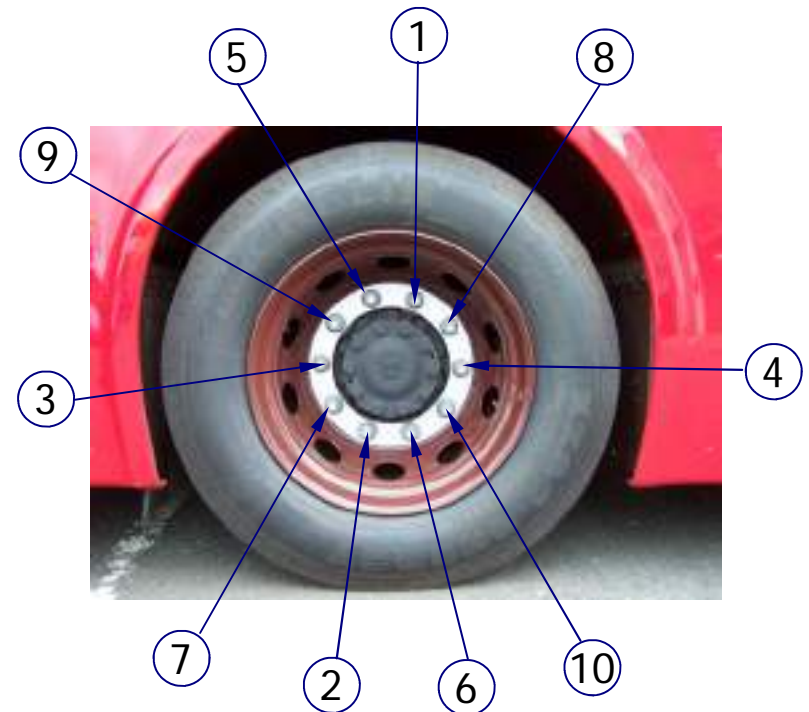
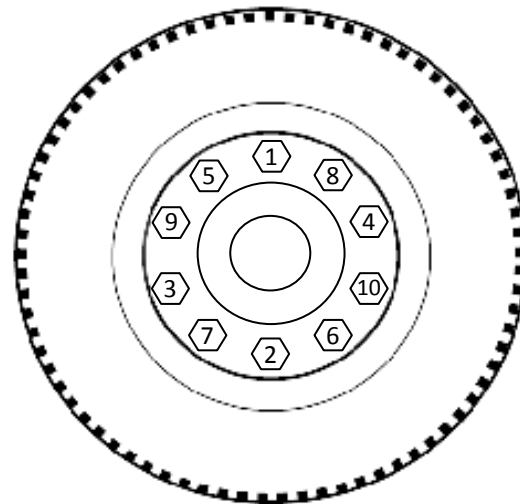
A spigot wheel nut with one 'mark' on the captive washer denotes that the captive washer has been hardened to a degree where it is suitable for **steel wheels only**.



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 all 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

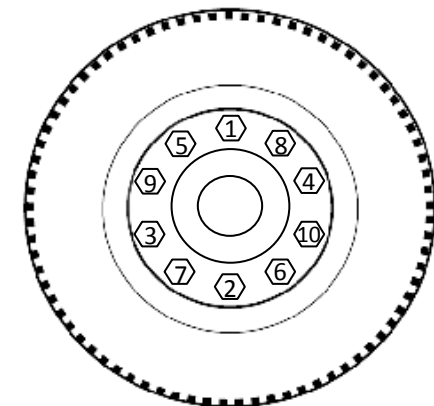
Fit and run up the wheel by hand initially. If using power tools, then only use for the initial phase of tightening. The last stages of tightening must be carried out with a torque wrench.

### 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.



# Emergency Repairs

## Wheels and Tyres

### 4.12

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

1<sup>st</sup> Stage - 300Nm  $\pm$ 7.5Nm

2<sup>nd</sup> Stage - 500Nm  $\pm$ 12.5Nm

3<sup>rd</sup> Stage - 600Nm  $\pm$ 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

### 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).



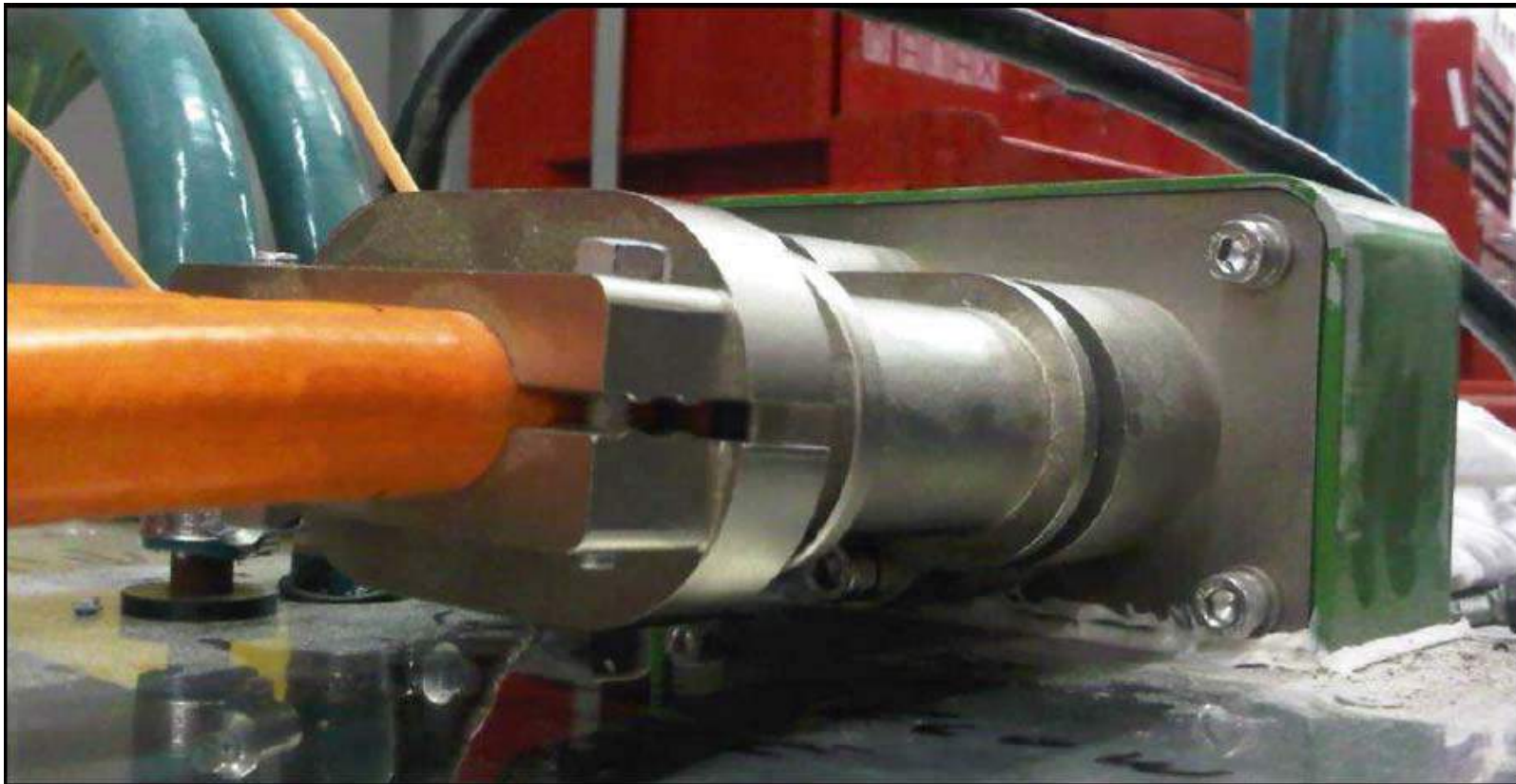
**Fig. 3**

## High Voltage Lock Off and Isolation procedure

### 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).



## High Voltage Lock Off and Isolation procedure

### 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 than 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.**



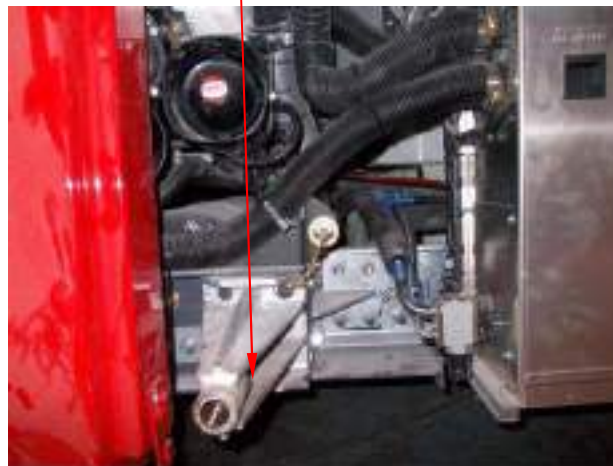
## Warning

**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.





I N T E R N A T I O N A L A B

Installation checklist  
 Regularly check up

Customer	Extinguisher s/n	Date and place of installation
Address	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:
<b>1</b>	<b>Extinguisher</b>		
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	
<b>2</b>	<b>Detector gas bottle</b>		
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
<b>3</b>	<b>Distribution and Nozzles</b>		
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	
<b>4</b>	<b>Detector tube</b>		
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	
<b>5</b>	<b>Alarm panel</b>		
5.1	Test light and sound alert	X	
5.2	Visible damages	X	
<b>7</b>	<b>Other remarks</b>		

## Electrical System Schedule Index

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



<b>SHEET</b>	<b>SHEET NAME</b>
00	INDEX
01	MODIFICATIONS
02	WIRE NUMBER REFERENCE LIST
03	MAIN POWER SUPPLIES
04	MODULAR FUSE BOARDS ELEC CENTRE MID
05	ON BOARD FUSE DIAGRAMS
06	MODULAR FUSE BOARDS ELEC CENTRE FRONT
07	ON BOARD FUSE DIAGRAMS
08	CPU WAKE UP BOARD
09	NODE 1.1 ELECTRICAL CENTRE MID
10	NODE 1.2 ELECTRICAL CENTRE MID
11	NODE 1.3 ELECTRICAL CENTRE MID
12	NODE 1.4 ELECTRICAL CENTRE FRONT
13	NODE 2.1 ELECTRICAL CENTRE REAR
14	NODE 2.2 ELECTRICAL CENTRE REAR
15	DMUX IPs
16	DMUX OPs

# NBfL AH765-789 & AH796-820



## 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 813
761		DHLX 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		VALANCE IGNITION
887		DICO SPEED SIGNAL OUT
909		DHLX WAKEUP
910-934		CHASSIS SPARES
935-964		DRIVELINE HARNESS SPARES

### SPARE WIRES USED

IDENT	DESCRIPTION
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### 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)

02 Wire Numbers Reference List



## 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 <sup>2</sup>
HYBRID +	F102	100A	MODULAR FUSE BOARD FRONT - BATTERY POSITIVE +VE	P02	P+ 102	25mm <sup>2</sup>
+	F103	-	-	P03	-	-
BODY +30	F104	100A	MODULAR FUSE BOARD MID - BATTERY MASTER +30	P04	P+30 104	25mm <sup>2</sup>
HYBRID +30	F105	100A	MODULAR FUSE BOARD FRONT - BATTERY MASTER +30	P05	P+30 105	25mm <sup>2</sup>
HYBRID +30	F106	200A	DRIVELINE PANEL MAXI FUSES	P06	P+30 106	30mm <sup>2</sup>
HEAVAC +30	F107	100A	HEAVAC POWER SUPPLY	P07	P+30 107	25mm <sup>2</sup>
+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	FIN	IDENT	OU	FUSE	RATING	BODY +30 - MODULAR FUSE BOARD 2	CONN	FIN	IDENT	OU
F01	2A	CPU D3	NFB 00	20	F+ 01		F01	5A	INDUCTIV LOOP SYSTEM	NFB 00 +3	20	F+30 01	
F02	1A	VEHICLE DIAGNOSTIC SOCKETS (DSD & +PIN)	NFB 00	24	F+ 02		F02	15A	HEAVAC DEMISTER	NFB 00 +3	14	F+30 02	
F03	1A	SMUX FIN 3 OVERHEAD CONSOLE	NFB 00	21	F+ 03		F03	-	-	NFB 00 +3	21	F+30 03	
F04	2A	CPU WAKE UP BOARD FINS 20 & 22	NFB 00	30	F+ 04		F04	-	-	NFB 00 +3	18	F+30 04	
F05	1A	FILIX OVP RESET SWITCH	NFB 00	25	F+ 05		F05	-	DOOR 1 OPEN EXTERNAL RE ILLUM	NFB 00 +3	15	F+30 05	
F06	-	DOOR 1 OPEN RE EXTERNAL	NFB 00	32	F+ 06		F06	5A	DOOR 2 OPEN & RAMP REQUEST RE ILLUM	NFB 00 +3	13	F+30 06	
F07	7.5A	HEAVAC ARABER CONTROLER	NFB 00	9	F+ 07		F07	-	-	NFB 00 +3	9	F+30 07	
F08	15A	HEAVAC BACKBONE	NFB 00	6	F+ 08		F08	-	-	NFB 00 +3	8	F+30 08	
F09	-	VIDEO BOX SPARE SUPPLY	NFB 00	7	F+ 09		F09	2A	AMBIENT LIGHT SENSOR POWER	NFB 00 +3	3	F+30 09	
F10	20A	IBUS EQUIPMENT BATTERY LIVE (VIDEO BOX)	NFB 00	31	F+ 10		F10	-	-	NFB 00 +3	11	F+30 10	
F11	3A	DMUX2-C CTRL & INT BOARD EDS & FL2	NFB 00	3	F+ 11		F11	-	-	NFB 00 +3	5	F+30 11	
F12	-	ELECTRONIC TICKET MACHINE (ETM)	NFB 00	2	F+ 12		F12	-	-	NFB 00 +3	2	F+30 12	
F13	90A	MODE 2B-2.2 GRP 1 FIN A10	NFB 00	8	F+ 13		F13	5A	REVERSENG BLEEPER (VSA RELAY)	NFB 00 +3	8	F+30 13	
F14	15A	MODE 2B-2.2 GRP 2 FIN A8	NFB 00	1	F+ 14		F14	5A	DMUX2-C WAKE UP D3	NFB 00 +3	1	F+30 14	
F15	5A	MODE 2B-2.2 GRP 3 FIN B10	NFB 00	4	F+ 15		F15	3A	SPEEDO SUPPLY	NFB 00 +3	4	F+30 15	
F16	5A	MODE 2B-2.2 GRP 4 FIN B8	NFB 00	1	F+ 16		F16	-	-	NFB 00 +3	7	F+30 16	
F17	5A	MODE 2B-2.2 GRP 5 FIN B10	NFB 00	30	F+ 17		F17	3A	DRIVE FANS 1 & 2 PWH CONVERTER SUPPLY	NFB 00 +3	10	F+30 17	
F18	20A	MODE 2B-1.1 GRP 1 FIN A10	NFB 00	10	F+ 18		F18	-	-	NFB 00 +3	13	F+30 18	
F19	20A	MODE 2B-1.1 GRP 2 FIN A8	NFB 00	35	F+ 19		F19	-	-	NFB 00 +3	16	F+30 19	
F20	15A	MODE 2B-1.1 GRP 3 FIN B10	NFB 00	39	F+ 20		F20	-	-	NFB 00 +3	19	F+30 20	
F21	20A	MODE 2B-1.1 GRP 4 FIN B8	NFB 00	37	F+ 21		F21	-	-	NFB 00 +3	17	F+30 21	
F22	5A	MODE 2B-1.1 GRP 5 FIN B10	NFB 00	20	F+ 22		F22	-	CAB ROOF SPARE	NFB 00 +3	20	F+30 22	
F23	20A	MODE 2B-1.2 GRP 1 FIN A10	NFB 00	34	F+ 23		F23	10A	WIPER MOTOR MAIN SUPPLY	NFB 00 +3	14	F+30 23	
F24	15A	MODE 2B-1.2 GRP 2 FIN A8	NFB 00	21	F+ 24		F24	-	ENGINE BAY SPARE	NFB 00 +3	21	F+30 24	
F25	90A	MODE 2B-1.2 GRP 3 FIN B10	NFB 00	35	F+ 25		F25	-	REAR PANEL SPARE	NFB 00 +3	18	F+30 25	
F26	5A	MODE 2B-1.2 GRP 4 FIN B8	NFB 00	35	F+ 26		F26	-	VIDEO BOX SPARE SUPPLY	NFB 00 +3	12	F+30 26	
F27	3A	MODE 2B-1.2 GRP 5 FIN B10	NFB 00	32	F+ 27		F27	-	VIDEO BOX SPARE SUPPLY	NFB 00 +3	13	F+30 27	
F28	15A	MODE 2B-1.3 GRP 1 FIN A10	NFB 00	9	F+ 28		F28	-	TICKET EQUIPMENT MASTER FEED	NFB 00 +3	9	F+30 28	
F29	7.5A	MODE 2B-1.3 GRP 2 FIN A8	NFB 00	6	F+ 29		F29	-	-	NFB 00 +3	6	F+30 29	
F30	5A	MODE 2B-1.3 GRP 3 FIN B10	NFB 00	1	F+ 30		F30	-	-	NFB 00 +3	3	F+30 30	
F31	20A	MODE 2B-1.3 GRP 4 FIN B8	NFB 00	31	F+ 31		F31	-	-	NFB 00 +3	11	F+30 31	
F32	5A	MODE 2B-1.3 GRP 5 FIN B10	NFB 00	3	F+ 32		F32	-	-	NFB 00 +3	5	F+30 32	
F33	15A	MODE 2B-3.1 GRP 1 FIN A10	NFB 00	2	F+ 33		F33	15A	BATTERY COOLING FAN	NFB 00 +3	2	F+30 33	
F34	5A	MODE 2B-2.1 GRP 2 FIN A8	NFB 00	8	F+ 34		F34	20A	BATTERY COOLING PUMP	NFB 00 +3	3	F+30 34	
F35	15A	MODE 2B-2.1 GRP 3 FIN B10	NFB 00	1	F+ 35		F35	-	-	NFB 00 +3	1	F+30 35	
F36	20A	MODE 2B-2.1 GRP 4 FIN B8	NFB 00	4	F+ 36		F36	-	-	NFB 00 +3	4	F+30 36	
F37	3.0A	MODE 2B-3.1 GRP 5 FIN B10	NFB 00	1	F+ 37		F37	-	-	NFB 00 +3	7	F+30 37	
F38	-	RESTRICTION CONTROLLER REMOVT	NFB 00	16	F+ 38		F38	-	-	NFB 00 +3	10	F+30 38	
F39	10A	CCTV POWER SUPPLY (VIDEO BOX)	NFB 00	13	F+ 39		F39	-	-	NFB 00 +3	13	F+30 39	
F40	-	-	NFB 00	16	F+ 40		F40	-	-	NFB 00 +3	15	F+30 40	
F41	-	REAR PLATFORM ACTIVATION	NFB 00	19	F+ 41		F41	-	-	NFB 00 +3	19	F+30 41	
F42	-	-	NFB 00	17	F+ 42		F42	-	-	NFB 00 +3	17	F+30 42	

STANDARD SPECIFICATION	FUSE RATING SUPPLY "B"
CUSTOMER OPTION REQUIRED	INDICATES RESETTABLE CIRCUIT BREAKER USED
NOT REQUIRED	

# On Board Fuse Diagrams

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

BODY - MODULAR FUSE BOARD 1 (R01 & X02 LINKED)						BODY - MODULAR FUSE BOARD 2 (R01 & X02 LINKED)						PDB BATT +VE		
FUSE	BATT +VE	RATING	FUSE	BATT +VE	RATING	FUSE	BATT MASTER +B3	RATING	FUSE	BATT MASTER +B3	RATING	CIRCUIT	RATING	FUSE
F01	CPU 00	3A	F22	NODE 28-1.1 GRP 5 PIN E10	5A	F01	INDUCTION LOOP SYSTEM	5A	F22	CAB ROOF SPARE	-	MPS FROD +	100A	F101
F02	VEHICLE DIAGNOSTIC SOCKETS (OBD & 4-PIN)	1A	F23	NODE 28-1.1 GRP 1 PIN A10	10A	F02	HEAVAC DEFEATER	15A	F23	WIPER MOTOR MAIN SUPPLY	30A	MPS FRONT +	100A	F102
F03	SPRX PIN 3 OVERHEAD CONSOLE	1A	F24	NODE 28-1.2 GRP 2 PIN AB	15A	F03	-	-	F24	ENGINE BAY SPARE	-	-	-	F103
F04	CPU WAKE UP BOARD PINS 28 & 29	3A	F25	NODE 28-1.3 GRP 3 PIN B10	10A	F04	-	-	F25	REAR WHEEL SPARE	-	-	-	-
F05	PLX C/P RESET SWITCH	1A	F26	NODE 28-1.2 GRP 4 PIN BB	5A	F05	DOOR 1 OPEN EXTERNAL PW ILLUM	-	F26	VIDEO BOX SPARE SUPPLY	-	-	-	-
F06	DOOR 3 OPEN PW EXTERNAL	-	F27	NODE 28-1.3 GRP 5 PIN E10	3A	F06	DOOR 2 OPEN & RAMP REQUEST PW ILLUM	3A	F27	VIDEO BOX SPARE SUPPLY	-	-	-	-
F07	HEAVAC AIRWAYS CONTROL LINE	7.5A	F28	NODE 28-1.1 GRP 1 PIN A10	10A	F07	-	-	F28	TOILET EQUIPMENT (MACHINE FUEL)	-	-	-	-
F08	HEAVAC BATTERY	15A	F29	NODE 28-1.3 GRP 2 PIN AB	7.5A	F08	-	-	F29	-	-	-	-	-
F09	VIDEO BOX SPARE SUPPLY	-	F30	NODE 28-1.1 GRP 3 PIN B10	3A	F09	AMBIENT LIGHT SENSOR POWER	3A	F30	-	-	-	-	-
F10	IBUS EQUIPMENT BATTERY LINE (VIDEO BOX)	30A	F31	NODE 28-1.3 GRP 4 PIN BB	10A	F10	-	-	F31	-	-	-	-	-
F11	DMURS/C CTRL & INT BOARD F10 & F12	3A	F32	NODE 28-1.3 GRP 5 PIN E10	5A	F11	-	-	F32	-	-	-	-	-
F12	ELECTRONIC TICKET MACHINE (ETM)	-	F33	NODE 28-1.1 GRP 1 PIN A10	15A	F12	-	-	F33	BATTERY COOLING FAN	25A	-	-	-
F13	NODE 28-1.2 GRP 1 PIN AB	30A	F34	NODE 28-1.1 GRP 2 PIN AB	5A	F13	REMOVING SLEEPER (VIA RELAY)	3A	F34	BATTERY COOLING PUMP	20A	-	-	-
F14	NODE 28-2.2 GRP 2 PIN AB	15A	F35	NODE 28-2.1 GRP 3 PIN B10	15A	F14	DRAGGE C WAKE UP D2	3A	F35	-	-	-	-	-
F15	NODE 28-1.1 GRP 3 PIN B10	3A	F36	NODE 28-1.1 GRP 4 PIN BB	10A	F15	SPEEDO SUPPLY	3A	F36	-	-	-	-	-
F16	NODE 28-2.2 GRP 4 PIN BB	5A	F37	NODE 28-2.1 GRP 5 PIN E10	7.5A	F16	-	-	F37	-	-	-	-	-
F17	NODE 28-2.2 GRP 5 PIN E10	3A	F38	DISTRIBUTION COIL/ROLLER HIGHWAY	-	F17	DRIVE FANS 1 & 2 PWR CONVERTER SUPPLY	3A	F38	-	-	-	-	-
F18	NODE 28-1.1 GRP 1 PIN A10	10A	F39	CTTY POWER SUPPLY (VIDEO BOX)	10A	F18	-	-	F39	-	-	-	-	-
F19	NODE 28-1.1 GRP 2 PIN AB	15A	F40	-	-	F19	-	-	F40	-	-	-	-	-
F20	NODE 28-1.1 GRP 3 PIN B10	15A	F41	REAR PLATFORM ACTIVATION	3A	F20	-	-	F41	-	-	-	-	-
F21	NODE 28-1.1 GRP 4 PIN BB	15A	F42	-	-	F21	-	-	F42	-	-	-	-	-

PDB BATT +30		
CIRCUIT	RATING	IDENT
MPS FROD +30	100A	F104
MPS FRONT +30	100A	F105
DRIVE LINE INAXI 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	VPN 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 DETECTOR	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/+30HAZARD 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

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
-	-	-	-

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

## 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 DETECTOR	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	OUTPUTS	No.	TYPE	PIN	IDENT
BATTERY MASTER	1	HS	1.4	WUI 600	<b>TO NODE INPUTS</b>				
EMERGENCY SWITCH	2	HS	1.3	WUI 601	BATTERY MASTER	1	LS	1.6	DIN 100
HAZARDS LIGHTS ACTIVE	3	HS	1.2	WUI 602	EMERGENCY SWITCH	2	LS	1.5	DIN 101
ENT DOOR OPEN PB EXTERNAL (FROM 2.5)	4	HS	1.1	WUT 611	HAZARDS LIGHTS ACTIVE	3	LS	1.8	DIN 105
ASSAULT ALARM ACTIVATE	5	LS	1.11	WUI 604	ENT DOOR OPEN PUSH BUTTON	4	LS	1.7	DIN 128
ENTRANCE DOOR OPENED SWITCH	6	LS	1.12	WUI 605	ASSAULT ALARM ACTIVATE	5	LS	1.14	DIN 146
CLEANERS LIGHT SWITCH	7	LS	1.9	WUI 606	ENTRANCE DOOR OPENED SWITCH	6	LS	1.13	DIN 127
EXIT DOOR OPENED SWITCH	8	LS	1.10	WUI 607	CLEANERS LIGHT SWITCH	7	LS	1.16	DIN 102
<b>PULSED WAKE UP INPUTS</b>					EXIT DOOR OPENED SWITCH	8	LS	1.15	DIN 129
ENT DOOR OPEN PUSH BUTTON EXTERNAL	A	HS	2.2	WUI 608	<b>TIME HELD OUTPUTS (4s)</b>				
	B	HS	2.4	WUI 609	ENT DOOR OPEN PB EXTERNAL (LINK TO 1.1)	A	HS	2.5	WUT 611
	C	LS	2.6	WUI 610		B	HS	2.3	WUT 612
NEGATIVE			1.19	BLK		C	LS	2.1	WUT 613
POSITIVE			1.20	P+ 04	<b>TO CPU WAKE UPS</b>				
NEGATIVE			1.21	BLK	ZR2-BD WAKE UP A2 (OPER. BY HS WUI 1-4)	1	HS	1.18	WUO 614
POSITIVE			1.22	P+ 04	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							OUTPUTS					
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
BATTERY MASTER (WAKE UP PIN 1.5)	1	E01 L5	80%	20%	D1	D24 100	<b>GROUP 1</b>					
EMERGENCY SWITCH (WAKE UP PIN 1.5)	2	E01 L5	80%	20%	D2	D24 101	SPOTLIGHT CAB ROOF	1	H5	A22	3A	DOT 300
CLEANERS LIGHT SW (WAKE UP PIN 1.1)	3	E01 L5	80%	20%	D3	D24 102	TACHO +L5 SUPPLY	2	H5	A20	3A	DOT 301
WASHER BOTTLE LEVEL SENSOR	4	E10 L5	80%	20%	D4	D24 103	EXTERIOR RAMP WARNING LAMPS	3	H5	A18	3A	DOT 302
WIPER MOTOR PARK SIGNAL	5	E01 L5	80%	20%	D5	D24 104	N/S SIDE MARKER LIGHTS	4	H5	A16	3A	DOT 303
HAZARD LIGHTS ACTIVE (WAKE UP PIN)	6	E01 L5	80%	20%	D6	D24 105	HORN	5	H5	A14	3A	DOT 304
	7		80%	20%	D7	D24 106	ASSAULT SCREEN MAGNETIC LOCK UPPER	6	H5	A12	3A	DOT 305
	8		80%	20%	D8	D24 107	<b>GROUP 2</b>					
	9		80%	20%	D9	D24 108	FRONT ROUTE SIGN LIGHT	7	H5	A6	3A	DOT 306
	10		80%	20%	D10	D24 109	DESTINATION POWER 1	8	H5	A4	3A	DOT 307
	11		80%	20%	D11	D24 110	DESTINATION POWER 2	9	H5	A2	10A	DOT 308
	12		80%	20%	D12	D24 111	<b>GROUP 3</b>					
	13		80%	20%	A21	D24 112	WINDOW WASHER PUMP SUPPLY	10	H5	B18	5A	DOT 309
	14		80%	20%	A19	D24 113	WIPER MOTOR RELAYS SUPPLY (RLY4 & RL)	11	H5	B16	5A	DOT 310
	15		80%	20%	A17	D24 114	FRONT CCTV MONITOR	12	H5	B14	5A	DOT 311
	16		80%	20%	A15	D24 115	REAR CCTV MONITOR	13	H5	B12	5A	DOT 312
	17		80%	20%	A13	D24 116	<b>GROUP 4</b>					
	18		80%	20%	A11	D24 117	ASSAULT SCREEN MAGNETIC LOCK LOWER	14	H5	B6	3A	DOT 313
	19		80%	20%	A5	D24 118	DOOR 1 PNEU EMG. PB INHIBIT SOLENOID	15	H5	B4	3A	DOT 314
	20		80%	20%	A3	D24 119	CCTV IGNITION SUPPLY	16	H5	B2	10A	DOT 315
	21		80%	20%	A1	D24 120	<b>GROUP 5</b>					
	22		80%	20%	B17	D24 121	EMERGENCY BUZZER (MT)	18	L5	E17	1A	DOT 316
DESTINATION SIGN SELECTOR SW	23	E01 L5	80%	20%	B15	D24 122	WHEELCHAIR BUS STOPPING ALARM (MT)	20	L5	E15	1A	DOT 317
PERISCOPE/DESTINATION SELECTOR SW	24	E01 L5	80%	20%	B13	D24 123	DRIVE FANS 1 & 2 PWM	22	PWM	E13	1A	PWM 318
	1	ANALOGUE			D13	AIN 280		24	L5	E11	1A	DOT 319
	2	ANALOGUE			D14	AIN 281	WIPER MOTOR PARK RELAY SIGNAL (RLY4)	26	L5	E7	1A	DOT 320
	3	ANALOGUE			B11	AIN 282	WIPER MOTOR FAST/SLOW RELAY SIG (RL)	28	L5	E5	1A	DOT 321
	4	ANALOGUE			B5	AIN 283		30	L5	E3	1A	DOT 322
	5	ANALOGUE			B3	AIN 284		32	L5	E1	1A	DOT 323
	6	ANALOGUE			B1	AIN 285	CCTV CAMERA SIGNAL 1 (N/S INDICATORS)	17	H5	E18	1A	DOT 324
<b>NODE GROUP POWER SUPPLIES</b>							CCTV CAMERA SIGNAL 2 (O/S INDICATORS)	19	H5	E16	1A	DOT 325
NEGATIVE	CHASSIS EARTH				A9	B	CCTV CAMERA SIGNAL 3 (BRAKE SIGNAL)	21	H5	E14	1A	DOT 326
POSITIVE GROUP 1	MFBL FUSE 18				A10	P+ 18	CCTV CAMERA SIGNAL 4 (DOOR3 OPEN)	23	H5	E12	1A	DOT 327
NEGATIVE	CHASSIS EARTH				A7	B	CCTV CAMERA SIGNAL 5 (DOOR2 OPEN)	25	H5	E0	1A	DOT 328
POSITIVE GROUP 2	MFBL FUSE 19				A8	P+ 19	CCTV O/S FLANK CAMERA SWITCH	27	H5	E6	1A	DOT 329
NEGATIVE	CHASSIS EARTH				B9	B	CCTV N/S FLANK CAMERA SWITCH	29	H5	E4	1A	DOT 330
POSITIVE GROUP 3	MFBL FUSE 20				B10	P+ 20	CCTV CAMERA SIGNAL 6 (REVERSE SIGNAL)	31	H5	E2	1A	DOT 331
NEGATIVE	CHASSIS EARTH				B7	B	<b>STANDARD SPECIFICATION</b>					
POSITIVE GROUP 4	MFBL FUSE 21				B8	P+ 21	<b>CUSTOMER OPTION REQUIRED</b>					
NEGATIVE	CHASSIS EARTH				E9	B	<b>NOT REQUIRED</b>					
POSITIVE GROUP 5	MFBL FUSE 22				E10	P+ 22	<b>CHANGE FROM STANDARD</b>					

## Node 1.2 Electrical Centre Mid

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

INPUTS							OUTPUTS					
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
ELECTRICAL CENTRE MID THERMAL SW	1	F10 LS	80%	20%	D1	DDN 124	<b>GROUP 1</b>					
	2		80%	20%	D2	DDN 125	FOGMAKER SPEAKER POWER	1	HS	A22	3A	DOT 332
	3		80%	20%	D3	DDN 126	ASSAULT ALARM POWER	2	HS	A20	3A	DOT 333
DOOR 1 OPENED SWITCH WAKE UP PIN 1	4	E01 LS	80%	20%	D4	DDN 127	DRIVERS FAN	3	HS	A18	3A	DOT 334
DOOR 1 OPEN FB EXTERNAL WAKE UP PIN 1	5	E01 LS	80%	20%	D5	DDN 128	SMARTCARD VALIDATOR - SV2	4	HS	A16	3A	DOT 335
DOOR 2 OPENED SWITCH WAKE UP PIN 1	6	E01 LS	80%	20%	D6	DDN 129	SMARTCARD VALIDATOR - SV3	5	HS	A14	3A	DOT 336
	7		80%	20%	D7	DDN 130	FRONT DESTINATION SIGN LIGHT	6	HS	A12	3A	DOT 337
	8		80%	20%	D8	DDN 131	<b>GROUP 2</b>					
	9		80%	20%	D9	DDN 132	OVS L/D LED SPOTLIGHTS	7	HS	A0	3A	DOT 338
	10		80%	20%	D10	DDN 133		8	HS	A4	3A	DOT 339
	11		80%	20%	D11	DDN 134	ELECTRONIC TICKET MACHINE (ETM)	9	HS	A2	10A	DOT 340
	12		80%	20%	D12	DDN 135	<b>GROUP 3</b>					
	13		80%	20%	A21	DDN 136	BUS IGNITION POWER SUPPLY	10	HS	B18	5A	DOT 341
	14		80%	20%	A19	DDN 137		11	HS	B16	5A	DOT 342
RAMP EXTENDED (COMPAK)	15	10E HS	80%	20%	A17	DDN 138	21ST CENTURY CCTV IGNITION POWER 1	12	HS	B14	5A	DOT 343
RAMP RETRACTED (COMPAK)	16	10E HS	80%	20%	A15	DDN 139	21ST CENTURY CCTV IGNITION POWER 2	13	HS	B12	5A	DOT 344
RAMP FAILURE SIGNAL	17	10E HS	80%	20%	A13	DDN 140	<b>GROUP 4</b>					
	18		80%	20%	A11	DDN 141	RAMP RETRACT (COMPAK)	14	HS	B6	3A	DOT 345
	19		80%	20%	A5	DDN 142	RAMP EXTEND (COMPAK)	15	HS	B4	3A	DOT 346
	20		80%	20%	A3	DDN 143		16	HS	B2	10A	DOT 347
	21		80%	20%	A1	DDN 144	<b>GROUP 5</b>					
DOOR 2 OVER RIDE SWITCH	22	E01 LS	80%	20%	B17	DDN 145		18	PWM	E17	1A	PWM 34
ASSAULT ALARM ACTIVATE WAKE UP PIN 1	23	B01 LS	80%	20%	B15	DDN 146	ASSAULT SPEECH UNIT TRIGGER L/S	20	LS	E15	1A	DOT 349
	24		80%	20%	B13	DDN 147	RAMP AUTHORIZATION SIGNAL (COMPAK)	22	LS	E13	1A	DOT 350
	1	ANALOGUE			D13	AIN 206		24	LS	E11	1A	DOT 351
	2	ANALOGUE			D14	AIN 207	FOGMAKER M1 - PRESSURE OK	25	LS	E7	1A	DOT 352
	3	ANALOGUE			B11	AIN 208	FOGMAKER M4 - PRESSURE LOW	26	LS	E5	1A	DOT 353
	4	ANALOGUE			B5	AIN 209	FOGMAKER M3 - SYSTEM DEPLOYED	30	LS	E3	1A	DOT 354
	5	ANALOGUE			B3	AIN 210	FOGMAKER M2 - SMOKE DETECTED	32	LS	E1	1A	DOT 355
	6	ANALOGUE			B1	AIN 211	BUS STOPPING BELL CAB	17	HS	E18	1A	DOT 356
								19	HS	E16	1A	DOT 357
							HEAVY AC AREA CONTROLLER WAKE UP	21	HS	E14	1A	DOT 358
							SW ILLUM DASH/SIDE/OVERHEAD CONSOLE	23	HS	E12	1A	DOT 359
							ASSAULT SPEECH UNIT TRIGGER H/S	25	HS	E9	1A	DOT 360
							DESTINATION CONTROLLER REVERSE SIGNAL	27	HS	E6	1A	DOT 361
							DESTINATION CONTROLLER IGNITION SIGNAL	29	HS	E4	1A	DOT 362
							MULTITONE BUZZER (W/C & BMS BUZZER)	31	HS	E2	1A	DOT 363
							<b>STANDARD SPECIFICATION</b>					
							<b>CUSTOMER OPTION REQUIRED</b>					
							<b>NOT REQUIRED</b>					
							<b>CHANGE FROM STANDARD</b>					




## Node 1.3 Electrical Centre Mid

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

INPUTS							OUTPUTS					
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
REAR PLATFORM ACTIVATION FUSE	1	10E HS	80%	20%	D1	P+ 41	<b>GROUP 1</b>					
	2		80%	20%	D2	DIN 149	N/S MAIN BEAM	1	HS	A27	3A	DOT 364
	3		80%	20%	D3	DIN 150	O/S MAIN BEAM	2	HS	A29	3A	DOT 365
CAB DOOR CLOSED SWITCH	4	ED1 LS	80%	20%	D4	DIN 151	N/S DAY TIME RUNNING LED	3	HS	A18	3A	DOT 366
WIRELESS BELL PRESS - UPPER DECK	5	ED1 LS	80%	20%	D5	DIN 152	O/S DAY TIME RUNNING LED	4	HS	A16	3A	DOT 367
WIRELESS BELL PRESS - LOWER DECK	6	ED1 LS	80%	20%	D6	DIN 153	O/S SIDE MARKER LIGHTS	5	HS	A14	3A	DOT 368
WIRELESS BELL PRESS - WHEELCHAIR	7	ED1 LS	80%	20%	D7	DIN 154	WIRELESS BELL PRESS	6	HS	A12	3A	DOT 369
WIRELESS BELL PRESS - SPARE	8	ED1 LS	80%	20%	D8	DIN 155	<b>GROUP 2</b>					
	9		80%	20%	D9	DIN 156	N/S DIP BEAM	7	HS	A6	3A	DOT 370
	10		80%	20%	D10	DIN 157	O/S DIP BEAM	8	HS	A4	3A	DOT 371
	11		80%	20%	D11	DIN 158	N/S & O/S FRONT FOG LIGHTS	9	HS	A2	10A	DOT 372
	12		80%	20%	D12	DIN 160	<b>GROUP 3</b>					
	13		80%	20%	A21	DIN 160	DOOR 1 OPEN SOLENOID	10	HS	B18	5A	DOT 373
	14		80%	20%	A19	DIN 161	DOOR 1 CLOSE SOLENOID	11	HS	B16	5A	DOT 374
	15		80%	20%	A17	DIN 162	DOOR 1 SHELF PLATE & EXT. LIGHTS	12	HS	B14	5A	DOT 375
	16		80%	20%	A15	DIN 163		13	HS	B12	5A	DOT 376
	17		80%	20%	A13	DIN 164	<b>GROUP 4</b>					
	18		80%	20%	A11	DIN 165	OCTV SWITCHING UNIT (IGN SUPPLY)	14	HS	B6	3A	DOT 377
	19		80%	20%	A5	DIN 166	DNR SWITCH - ILLUMINATION	15	HS	B4	3A	DOT 378
	20		80%	20%	A3	DIN 167	ODD DIAGNOSTIC +15 SUPPLY	16	HS	B2	10A	DOT 379
	21		80%	20%	A1	DIN 168	<b>GROUP 5</b>					
	22		80%	20%	B17	DIN 169	IBUS AVL BUS STOPPING SIGNAL	18	LS	E17	1A	DOT 380
	23		80%	20%	B15	DIN 170	IBUS AVL DOOR 1 OPEN SIGNAL	20	LS	E15	1A	DOT 381
	24		80%	20%	B13	DIN 171	IBUS AVL DOOR 2 OPEN SIGNAL	22	LS	E13	1A	DOT 382
BATTERY COOLING BOTTLE LEVEL	1	ANALOGUE			D13	AIN 212	ECCOBUS DOOR 1 OPEN SIGNAL	24	LS	E11	1A	DOT 383
	2	ANALOGUE			D14	AIN 213	ECCOBUS DOOR 2 OPEN SIGNAL	26	LS	E7	1A	DOT 384
	3	ANALOGUE			B11	AIN 214	IBUS AVL DOOR 3 OPEN SIGNAL	28	LS	E5	1A	DOT 385
	4	ANALOGUE			B5	AIN 215	IBUS AVL REVERSE SIGNAL	30	LS	E3	1A	DOT 386
	5	ANALOGUE			B3	AIN 216		32	LS	E1	1A	DOT 387
	6	ANALOGUE			B1	AIN 217	N/S FRONT SIDE LIGHT	17	HS	E18	1A	DOT 388
<b>NODE GROUP POWER SUPPLIES</b>							BUS STOPPING BELL (O/S SALOON)	19	HS	E16	1A	DOT 389
NEGATIVE		CHASSIS EARTH			A9	B		23	HS	E14	1A	DOT 390
POSITIVE GROUP 1		MFBI FUSE 28			A10	P+ 28	O/S FRONT SIDE LIGHT	23	HS	E12	1A	DOT 391
NEGATIVE		CHASSIS EARTH			A7	B	+30 SOLENOID (MDBH-S1)	25	HS	E8	1A	DOT 392
POSITIVE GROUP 2		MFBI FUSE 29			A8	P+ 29	+15 SOLENOID (MDBH-S1)	27	HS	E6	1A	DOT 393
NEGATIVE		CHASSIS EARTH			B9	B	N/S HIGH LEVEL MARKER (FRONT)	29	HS	E4	1A	DOT 394
POSITIVE GROUP 3		MFBI FUSE 30			B10	P+ 30	O/S HIGH LEVEL MARKER (FRONT)	31	HS	E2	1A	DOT 395
NEGATIVE		CHASSIS EARTH			B7	B	<b>STANDARD SPECIFICATION</b>					
POSITIVE GROUP 4		MFBI FUSE 31			B8	P+ 31	<b>CUSTOMER OPTION REQUIRED</b>					
NEGATIVE		CHASSIS EARTH			E9	B	<b>NOT REQUIRED</b>					
POSITIVE GROUP 5		MFBI FUSE 32			E10	P+ 32	<b>CHANGE FROM STANDARD</b>					

## Node 1.4 Electrical Centre Front

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

INPUTS							OUTPUTS					
DESCRIPTION	EIN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
E-STOP INPUT	1	LS	80%	20%	D1	DIN 220	<b>GROUP 1 +</b>					
STEERING ADJUST SWITCH	2	LS	80%	20%	D2	DIN 221		1	HS	A22	3A	DOT 480
24V BATTERY ISOLATOR AUX CONTACTS	3	LS	80%	40%	D3	DIN 222	AIR COMPRESSOR ENABLE	2	HS	A20	3A	DOT 461
ISOLATION DETECTION	4	LS	80%	20%	D4	DIN 223	POWER STEERING ENABLE	3	HS	A18	3A	DOT 462
VALENCE INTERLOCK (RESERVED)	5	LS	80%	20%	D5	DIN 224	ISOLATION DETECTION ENABLE	4	HS	A18	3A	DOT 463
PARK BRAKE TANK PRESSURE SWITCH	6	LS	80%	20%	D6	DIN 225	REMOTE DIAGNOSTIC IGNITION	5	HS	A14	3A	DOT 464
	7		80%	20%	D7	DIN 226		6	HS	A12	3A	DOT 465
EBS WARNING (RES)	8	LS	80%	20%	D8	DIN 227	<b>GROUP 2 +</b>					
VALENCE INTERLOCK (RESERVED)	9	LS	80%	20%	D9	DIN 228	STEERING ADJUST SOLENOID	7	HS	A6	3A	DOT 466
HANDBRAKE	10	LS	80%	20%	D10	DIN 229		8	HS	A4	3A	DOT 467
ENGINE BAY TEMPERATURE SWT	11	LS	80%	20%	D11	DIN 230		9	HS	A2	10A	DOT 468
ENGINE CRANK SWITCH	12	LS	80%	20%	D12	DIN 231	<b>GROUP 3 +</b>					
ENGINE STOP SWITCH	13	LS	80%	20%	A21	DIN 232	ENGINE CONTROL MODULE IGN RYL	10	HS	B18	5A	DOT 469
ENGINE REAR START SELECT	14	LS	80%	20%	A19	DIN 233	DRIVE COOLING PUMP IGNITION/RUN	11	HS	B16	5A	DOT 470
ENGINE FRONT START SELECT	15	LS	80%	20%	A17	DIN 234	DOSING PUMP IGNITION	12	HS	B14	5A	DOT 471
ENGINE RPM INCREASE (REAR SWT)	16	LS	80%	20%	A15	DIN 235	ENGINE CRANK SOLENOID	13	HS	B12	5A	DOT 472
ENGINE RPM DECREASE (REAR SWT)	17	LS	80%	20%	A13	DIN 236	<b>GROUP 4 +</b>					
BRAKE PEDAL SWITCH	18	LS	80%	20%	A11	DIN 237		14	HS	B6	3A	DOT 473
	19		80%	20%	A5	DIN 238	SIEMENS KEY ON	15	HS	B4	3A	DOT 474
PWR STR / DC-DC BAY THERMAL SW	20	LS	80%	20%	A3	DIN 239		16	HS	B2	10A	DOT 475
COMPRESSOR BAY THERMAL SW	21	LS	80%	20%	A1	DIN 240	<b>GROUP 5 +</b>					
OS INVERTER / PEM BAY THERMAL SW	22	LS	80%	20%	B17	DIN 241	DRIVE FANS 3 & 4 PWM	18	PWM	E17	1A	PWM 476
NS INVERTER / BATTERY BAY THERMAL SW	23	LS	80%	20%	B15	DIN 242	ENGINE CAC FANS 1 & 2 PWM	20	PWM	E15	1A	PWM 477
ELECTRICAL CENTRE FRONT THERMAL SW	24	LS	80%	20%	B13	DIN 243	ENGINE COOLANT FANS 3 & 4 PWM	22	PWM	E13	1A	PWM 478
AIR CIRCUIT 1	1	ANALOGUE			D13	AIN 229	SERVICE BRAKE POS SWITCH RELAY	24	LS	E11	1A	DOT 479
AIR CIRCUIT 2	2	ANALOGUE			D14	AIN 230	EMG SW LATCH RELAY	26	LS	E7	1A	DOT 480
FUEL SENDER	3	ANALOGUE			B11	AIN 231	BMU IGN RELAY COIL	28	LS	E5	1A	DOT 481
ENGINE COOLANT LEVEL	4	ANALOGUE			B5	AIN 232		30	LS	E3	1A	DOT 482
DRIVE COOLANT LEVEL	5	ANALOGUE			B3	AIN 233	HALTBRAKE SIGNAL EBS	32	LS	E1	1A	DOT 483
ECAS SUPPLY PRESSURE	6	ANALOGUE			B1	AIN 234	800-24V DC/DC ON	17	HS	E18	1A	DOT 484
<b>NODE GROUP POWER SUPPLIES</b>							BATTERY COOLING FAN	19	HS	E16	1A	DOT 485
NEGATIVE	CHASSIS EARTH				A9	B	FUEL SOLENOID SUPPLY RELAY	21	HS	E14	1A	DOT 486
POSITIVE GROUP 1	MFB FUSE 34				A10	P+	NOX IGNITION RELAY	23	HS	E12	1A	DOT 487
NEGATIVE	CHASSIS EARTH				A7	B	BATTERY COOLING PUMP	25	HS	E8	1A	DOT 488
POSITIVE GROUP 2	MFB FUSE 33				A8	P+	EBS/ECAS IGNITION RELAY	27	HS	E6	1A	DOT 489
NEGATIVE	CHASSIS EARTH				B9	B	FUEL SOLENOID RETURN RELAY	29	HS	E4	1A	DOT 490
POSITIVE GROUP 3	MFB FUSE 36				B10	P+		31	HS	E2	1A	DOT 491
NEGATIVE	CHASSIS EARTH				B7	B	<b>STANDARD SPECIFICATION</b>					
POSITIVE GROUP 4	MFB FUSE 35				B8	P+	<b>CUSTOMER OPTION REQUIRED</b>					
NEGATIVE	CHASSIS EARTH				E9	B	<b>NOT REQUIRED</b>					
POSITIVE GROUP 5	MFB FUSE 37				E10	P+	<b>CHANGE FROM STANDARD</b>					

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## Node 2.1 Electrical Centre Rear

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

INPUTS							OUTPUTS					
DESCRIPTION	EN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
BELL PASSES Q/S UPPER SALOON	1	E01 LS	80%	20%	D1	DIN 173	<b>GROUP 1</b>					
	2		80%	20%	D2	DIN 173	SMARTCARD VALIDATOR - SVS	1	HS	A22	3A	DOT 396
	3		80%	20%	D3	DIN 174	N/S UPPER DECK LIGHTS (CONE 2 & 4)	2	HS	A20	3A	DOT 397
	4		80%	20%	D4	DIN 175	BUS STOP BELL UPPER SALOON	3	HS	A18	3A	DOT 398
EMG. HAMMERS Q/S UPPER SALOON	5	E01 LS	80%	20%	D5	DIN 176	DOOR 3 OPEN SOLENOID	4	HS	A16	3A	DOT 399
CREW - DRIVER ALERT SWITCH	6	E01 LS	80%	20%	D6	DIN 177	FORMAN VLMS-6 POWER	5	HS	A14	3A	DOT 400
CREW - DRIVE ENABLE SWITCH	7	E01 LS	80%	20%	D7	DIN 178	REVERSING BLEEPER RELAY (RLY7)	6	HS	A12	3A	DOT 402
CREW - DOOR 4 LOCK RELEASE SWITCH	8	E01 LS	80%	20%	D8	DIN 179	<b>GROUP 2</b>					
DOOR 1 EMERGENCY CLOSE PB	9	E01 LS	80%	20%	D9	DIN 180	DOOR 3 CLOSE SOLENOID	7	HS	A6	3A	DOT 403
DOOR 2 EMERGENCY CLOSE PB	10	E01 LS	80%	20%	D10	DIN 181	SIDE DESTINATION LIGHT	8	HS	A4	3A	DOT 402
DOOR 3 EMERGENCY CLOSE PB	11	E01 LS	80%	20%	D11	DIN 183	SIDE DESTINATION SIGN POWER	9	HS	A2	10A	DOT 404
VLMS6 - FR N/S INDICATOR (LOAD 1) CN1	12	E01 LS	80%	20%	D12	DIN 183	<b>GROUP 3</b>					
VLMS6 - FR Q/S INDICATOR (LOAD2) CN1	13	E01 LS	80%	20%	A21	DIN 184	RAMP CONTROLLER POWER 1 (COMPWK)	10	HS	B18	5A	DOT 405
VLMS6 - RR N/S L/L IND (LOAD3) CN1ph1	14	E01 LS	80%	20%	A19	DIN 185	RAMP CONTROLLER POWER 2 (COMPWK)	11	HS	B16	5A	DOT 405
VLMS6 - RR Q/S L/L IND (LOAD4) CN1ph2	15	E01 LS	80%	20%	A17	DIN 186	LIGHTS N/S LOWER SALOON 1	12	HS	B14	5A	DOT 407
VLMS6 - N/S W/ARCH IND (LOAD5) CN2ph1	16	E01 LS	80%	20%	A15	DIN 187	LIGHTS N/S LOWER SALOON 2	13	HS	B12	5A	DOT 407
VLMS6 - Q/S W/ARCH IND (LOAD6) CN2ph2	17	E01 LS	80%	20%	A13	DIN 188	<b>GROUP 4</b>					
REAR ENGINE DOOR MS 1	18	E01 LS	80%	20%	A11	DIN 189	FIRE SUPPRESSION SMOKE DETECTOR	14	HS	B6	3A	DOT 409
SIDE ENGINE DOOR MS 2	19	E01 LS	80%	20%	A5	DIN 190	DOOR 3 SHELF PLATE LIGHTS	15	HS	B4	3A	DOT 410
FIRE SUPPRESSION SMOKE DETECTOR	20	E01 LS	80%	20%	A3	DIN 191	Q/S UPPER DECK LIGHTS (CONE 1, 3 & 5)	16	HS	B2	10A	DOT 411
	21		80%	20%	A1	DIN 192	<b>GROUP 5</b>					
PRESSURE SWITCH 1 - DETECTOR	22	E01 LS	80%	20%	B17	DIN 193		18	PWH	E17	1A	DOT 412
PRESSURE SWITCH 2 - EXTINGUISHER	23	E01 LS	80%	20%	B15	DIN 194		20	PWH	E15	1A	DOT 413
ELECTRICAL CENTRE REAR THERMAL SW	24	E10 LS	80%	20%	B13	DIN 195		22	LS	E13	1A	DOT 414
	1	ANALOGUE			D13	ADN 218		24	LS	E11	1A	DOT 415
	2	ANALOGUE			D14	ADN 219		26	LS	E7	1A	DOT 416
	3	ANALOGUE			B11	ADN 220		28	LS	E5	1A	DOT 417
	4	ANALOGUE			B5	ADN 221		30	LS	E3	1A	DOT 418
	5	ANALOGUE			B3	ADN 222		32	LS	E1	1A	DOT 419
	6	ANALOGUE			B1	ADN 223	N/S WHEELARCH INDICATOR - TO VLMS-6	17	HS	E18	1A	DOT 420
<b>NODE GROUP POWER SUPPLIES</b>							DOOR 4 LOCKED SOLENOID REAR LEAF	19	HS	E16	1A	DOT 421
NEGATIVE	CHASSIS EARTH				A9	B	N/S LOW LEVEL INDICATOR (LED) - TO V	21	HS	E14	1A	DOT 422
POSITIVE GROUP 1	MFBL FUSE 33				A10	P+ 33	DOOR 3 PNEU EMG. PB INHIBIT SOLENOID	23	HS	E12	1A	DOT 423
NEGATIVE	CHASSIS EARTH				A7	B	N/S LOW LEVEL BRAKE LIGHT (LED)	25	HS	E8	1A	DOT 424
POSITIVE GROUP 2	MFBL FUSE 34				A8	P+ 34	N/S REVERSE LIGHT (LED)	27	HS	E6	1A	DOT 425
NEGATIVE	CHASSIS EARTH				B9	B	N/S FRONT INDICATORS (LED) - TO VLMS-6	29	HS	E4	1A	DOT 426
POSITIVE GROUP 3	MFBL FUSE 35				B10	P+ 35	Q/S FRONT INDICATORS (LED) - TO VLMS-6	31	HS	E2	1A	DOT 427
NEGATIVE	CHASSIS EARTH				B7	B	<b>STANDARD SPECIFICATION</b>					
POSITIVE GROUP 4	MFBL FUSE 36				B8	P+ 36	<b>CUSTOMER OPTION REQUIRED</b>					
NEGATIVE	CHASSIS EARTH				E5	B	<b>NOT REQUIRED</b>					
POSITIVE GROUP 5	MFBL FUSE 37				E10	P+ 37	<b>CHANGE FROM STANDARD</b>					

## Node 2.2 Electrical Centre Rear

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

INPUTS							OUTPUTS					
DESCRIPTION	EN	TYPE	U	L	PLUG	IDENT	DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
BELL PRESSES N/S UPPER SALOON	1	E01 LS	80%	20%	D1	DEN 190	<b>GROUP 1</b>					
BELL PRESSES N/S LOWER SALOON	2	E01 LS	80%	20%	D2	DEN 193	DOOR 2 OPEN SOLENOID	1	HS	A22	3A	DOT 428
BELL PRESS N/S LOWER SIDE WALL	3	E01 LS	80%	20%	D3	DEN 198	DOOR 2 CLOSE SOLENOID	2	HS	A20	3A	DOT 428
DOOR 4 CLOSED SWITCH (R.L.)	4	E01 LS	80%	20%	D4	DEN 199	DOOR 2 CUSHIONING SOLENOID	3	HS	A18	3A	DOT 430
DOOR 3 SENS EDGE ON CLOSE (F.L.)	5	E01 LS	80%	20%	D5	DEN 200	DOOR 2 CLOSE ALARM	4	HS	A16	3A	DOT 430
DOOR 4 LOW AIR PRESS SWITCH (R.L.)	6	E01 LS	80%	20%	D6	DEN 201	DOOR 2 PNEU EMG. PB INHIBIT SOLENOID	5	HS	A14	3A	DOT 430
DOOR 1 CLOSED SWITCH	7	E01 LS	80%	20%	D7	DEN 202	DOOR 2 SHELF PLATE LIGHTS	6	HS	A12	3A	DOT 430
DOOR 1 LOW AIR PRESSURE SWITCH	8	E01 LS	80%	20%	D8	DEN 203	<b>GROUP 2</b>					
DOOR 3 SENS EDGE ACTIVATED	9	E01 LS	80%	20%	D9	DEN 204	N/S REAR SIDELIGHT & H/LEVEL PARKER	7	HS	A6	3A	DOT 430
	10		80%	20%	D10	DEN 205	Q/S REAR SIDELIGHT & H/LEVEL MARKER	8	HS	A4	3A	DOT 430
DOOR 2 CLOSED SWITCH	11	E01 LS	80%	20%	D11	DEN 206	N/S UPPER DECK LIGHTS (COVE 1 & 3)	9	HS	A2	10A	DOT 430
DOOR 2 LOW AIR PRESSURE SWITCH	12	E01 LS	80%	20%	D12	DEN 207	<b>GROUP 3</b>					
DOOR 2 SENS EDGE ACTIVATED	13	E01 LS	80%	20%	A21	DEN 208	ADVERTISING BOARD LIGHT Q/S	10	HS	B18	5A	DOT 430
DOOR 2 CUSHIONING SWITCH	14	E01 LS	80%	20%	A19	DEN 209	ADVERTISING BOARD LIGHT N/S	11	HS	B18	5A	DOT 430
DOOR 2 OBSTRUCTION DETECT	15	E01 LS	80%	20%	A17	DEN 210		12	HS	B14	5A	DOT 430
	16		80%	20%	A15	DEN 211	Q/S UPPER DECK LIGHTS (COVE 2 & 4)	13	HS	B12	5A	DOT 440
N/S EMG. HAMMERS UPPER SALOON	17	E01 LS	80%	20%	A13	DEN 212	<b>GROUP 4</b>					
DOOR 3 OPENED SWITCH (F.L.)	18	E01 LS	80%	20%	A11	DEN 213	NUMBER PLATE LIGHTS	14	HS	B6	3A	DOT 440
DOOR 2 RAMP REQUEST PB	19	10E HS	80%	20%	A5	DEN 214	REAR DESTINATION LIGHT	15	HS	B4	3A	DOT 440
DOOR 2 PNEUMATIC OPEN PB EXTERNAL	20	E01 LS	80%	20%	A3	DEN 215	REAR DESTINATION POWER	16	MS	B2	10A	DOT 440
DOOR 3 CLOSED SWITCH (F.L.)	21	E01 LS	80%	20%	A1	DEN 216	<b>GROUP 5</b>					
DOOR 3 LOW AIR PRESS SWITCH (F.L.)	22	E01 LS	80%	20%	B17	DEN 217		18	PWH	E17	1A	DOT 440
DOOR 4 OPENED SWITCH (R.L.)	23	E01 LS	80%	20%	B15	DEN 218		20	PWH	E15	1A	DOT 440
DOOR 3 OBS DETECT ON CLOSE (F.L.)	24	E01 LS	80%	20%	B13	DEN 219		22	LS	E13	1A	DOT 440
	1	ANALOGUE			D13	A1N 224		24	LS	E11	1A	DOT 440
	2	ANALOGUE			D14	A1N 225		26	LS	E7	1A	DOT 440
	3	ANALOGUE			B11	A1N 226		28	LS	E5	1A	DOT 440
	4	ANALOGUE			B5	A1N 227		30	LS	E3	1A	DOT 450
	5	ANALOGUE			B3	A1N 228		32	LS	E1	1A	DOT 450
	6	ANALOGUE			B1	A1N 229	DOOR 3 CLOSE ALARM	17	HS	E18	1A	DOT 450
<b>NODE GROUP POWER SUPPLIES</b>							Q/S REVERSE LIGHT (LED)	19	MS	E16	1A	DOT 450
NEGATIVE		CHASSIS EARTH			A9	B	Q/S LOW LEVEL INDICATOR (LED)	21	MS	E14	1A	DOT 450
POSITIVE GROUP 1		MFBL FUSE 13			A10	P+13	HIGH LEVEL BRAKE LIGHT (LED)	23	MS	E12	1A	DOT 450
NEGATIVE		CHASSIS EARTH			A7	B	Q/S LOW LEVEL BRAKE LIGHT (LED)	25	MS	E8	1A	DOT 450
POSITIVE GROUP 2		MFBL FUSE 14			A8	P+14	Q/S WHEELARCH INDICATOR - TO VLMS-0	27	MS	E6	1A	DOT 450
NEGATIVE		CHASSIS EARTH			B9	B	Q/S FOG LIGHT (LED)	29	MS	E4	1A	DOT 450
POSITIVE GROUP 3		MFBL FUSE 15			B10	P+15	Q/S SIDE MARKER (LED)	31	MS	E2	1A	DOT 450
NEGATIVE		CHASSIS EARTH			B7	B	<b>STANDARD SPECIFICATION</b>					
POSITIVE GROUP 4		MFBL FUSE 16			B8	P+16	<b>CUSTOMER OPTION REQUIRED</b>					
NEGATIVE		CHASSIS EARTH			E9	B	<b>NOT REQUIRED</b>					
POSITIVE GROUP 5		MFBL FUSE 17			E10	P+17	<b>CHANGE FROM STANDARD</b>					

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## 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	DESCRIPTION	EIN	TYPE	U	L	PLUG IDENT
<b>INPUTS EIN 1-8 ARE WAKE UP CAPABLE AND WILL ACTIVATE AUS WAKE UP</b>											
DMUX3-C WAKE UP (BATTERY MASTER)	1	HS F00	80%	20%	D2 P+30 14	FAST WIPER SWITCH	41	LS F01	80%	20%	C35 DIN 041
	2				D09 DIN 002	PARTIAL BRAKE	42	LS F01	80%	20%	C32 DIN 042
	3				D11 DIN 003	SPARE SWITCH 2 (OFF/ON)	43	LS F01	80%	20%	C33 DIN 043
	4				D08 DIN 004		44		80%	20%	C22 DIN 044
	5				D30 DIN 005	FLANK CAMERA (ON/OFF/ON)	45	LS F01	80%	20%	C5 DIN 045
	6				D10 DIN 006	FLANK CAMERA (ON/OFF/ON)	46	LS F01	80%	20%	C8 DIN 046
	7				D19 DIN 007	RAMP EXTEND CAB SWITCH	47	LS F01	80%	20%	C25 DIN 047
	8				D1 DIN 008	RAMP RETRACT CAB SWITCH	48	LS F01	80%	20%	C14 DIN 048
<b>INPUTS EIN 9-68 ARE NON WAKEUP CAPABLE</b>											
MBU PAD UP	9	LS F01	80%	20%	D6 DIN 009	DOOR 3 PUSH BUTTON CAB	49	LS F01	80%	20%	C7 DIN 049
MBU PAD DOWN	10	LS F01	80%	20%	D12 DIN 010	DOOR 4 (DOOR 2 CLOSE)	50	LS F01	80%	20%	C17 DIN 050
MBU PAD ENTER	11	LS F01	80%	20%	D16 DIN 011		51		80%	20%	C6 DIN 051
MBU PAD ESCAPE	12	LS F01	80%	20%	D13 DIN 012	HIDDEN START	52	LS F01	80%	20%	C13 DIN 052
DRIVE START SWITCH	13	LS F10	80%	20%	D25 DIN 013	IMMOBILISER	53	LS F01	80%	20%	C24 DIN 053
IGNITION SWITCH	14	LS F01	80%	20%	D5 DIN 014		54		80%	20%	C4 DIN 054
DRIVE STOP SWITCH	15	LS F01	80%	20%	D17 DIN 015		55		80%	20%	C34 DIN 055
SIDELIGHTS	16	LS F01	80%	20%	D21 DIN 016	SMOKE ALARM OVERRIDE SWITCH	56	LS F01	80%	20%	C16 DIN 056
DIPPED BEAM	17	LS F01	80%	20%	D06 DIN 017		57		80%	20%	C15 DIN 057
ASSAULT SCREEN UNLOCK SWITCH	18	LS F01	80%	20%	D8 DIN 018		58		80%	20%	C23 DIN 058
DOOR 1 (ALL DOORS OPEN)	19	LS F01	80%	20%	D33 DIN 019	DOOR 5 PUSH BUTTON CAB	59	LS F01	80%	20%	E19 DIN 059
DOOR 2 (DOOR 1 CLOSE)	20	LS F01	80%	20%	D32 DIN 020	DOOR 6 (DOOR 3 CLOSE)	60	LS F01	80%	20%	E28 DIN 060
SCREEN WASH SWITCH	21	LS F01	80%	20%	D15 DIN 021	ONR SWITCH - DRIVE	61	LS F01	80%	20%	E20 DIN 061
SIDE CONSOLE SPARE	22	LS F01	80%	20%	D03 DIN 022	ONR SWITCH - REVERSE	62	LS F01	80%	20%	E29 DIN 062
REAR FOG SWITCH	23	LS F01	80%	20%	D4 DIN 023	ONR SWITCH - NEUTRAL	63	LS F01	80%	20%	E21 DIN 063
SPARE SWITCH 1 (OFF/ON)	24	LS F01	80%	20%	D30 DIN 024		64		80%	20%	E30 DIN 064
ASSAULT ALARM RESET	25	LS F01	80%	20%	D12 DIN 025		65		80%	20%	E22 DIN 065
RETARDER OFF SWITCH	26	LS F01	80%	20%	D31 DIN 026		66		80%	20%	E31 DIN 066
SQUAT SWITCH	27	LS F01	80%	20%	D14 DIN 027		67		80%	20%	E23 DIN 067
FERRY LIFT SWITCH	28	LS F01	80%	20%	D8 DIN 028		68		80%	20%	E32 DIN 068
KNEEL SWITCH	29	LS F01	80%	20%	D34 DIN 029		1	ANALOGUE			E24 AIN 624
RIDE HEIGHT SWITCH	30	LS F01	80%	20%	D34 DIN 030		2	ANALOGUE		20%	E25 AIN 625
TRACTION CONTROL OFF SWITCH	31	LS F01	80%	20%	D35 DIN 031	CTRL BOARD WAKE UP (FROM AUS E26)	1	WAKEUP	N/A	N/A	F10 711
CREW SELECT SWITCH	32	LS F01	80%	20%	C31 DIN 032		2	WAKEUP	N/A	N/A	F11
REVERSE BLEEPER OVR	33	LS F01	80%	20%	C11 DIN 033	<b>CONTROL BOARD WAKE UP 1 MUST BE CONNECTED EXTERNALLY TO AUS WAKE UP</b>					
MAIN BEAM SWITCH	34	LS F01	80%	20%	C2 DIN 034	INTERFACE BOARD POSITIVE SUPPLY 1					E35 P+ 11
MAIN BEAM FLASH	35	LS F01	80%	20%	C3 DIN 035	NEGATIVE					E33 B
INDICATORS N/S	36	LS F01	80%	20%	C30 DIN 036	INTERFACE BOARD POSITIVE SUPPLY2					E36 P+ 11
INDICATORS O/S	37	LS F01	80%	20%	C30 DIN 037	NEGATIVE					E34 B
HORN SWITCH	38	LS F01	80%	20%	C29 DIN 038	CONTROL BOARD POSITIVE SUPPLY					F12 P+ 11
INTERMITTANT WIPER SWITCH	39	LS F01	80%	20%	C21 DIN 039	NEGATIVE					F9 B
SLOW WIPER SWITCH	40	LS F01	80%	20%	C12 DIN 040	<b>STANDARD SPECIFICATION</b>					
						<b>CUSTOMER OPTION REQUIRED</b>					
						<b>NOT REQUIRED</b>					

## DMUX OPs

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

<b>OUTPUTS</b>					
DESCRIPTION	AUS	TYPE	PLUG	RATING	IDENT
<b>GROUP 1</b>					
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
<b>GROUP 2</b>					
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
<b>STANDARD SPECIFICATION</b>					
<b>CUSTOMER OPTION REQUIRED</b>					
<b>NOT REQUIRED</b>					

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