PM 1150 CB CANBUS In-cab Display

User & Calibration Guide
CAN Software Version 01.08.

PM Onboard Ltd

Design, manufacture and service of on-vehicle weighing systems.

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IMPORTANT INFORMATION

PM Onboard Ltd design and manufacture on-vehicle weighing equipment. PM Onboard Ltd accepts no responsibility or liability for consequences arising from any misapplication or misinterpretation of the information contained herein. PM Onboard Ltd also reserve the right to alter system specifications at any time without notice.

PM Onboard Ltd do not accept responsibility for the structural integrity of the vehicle concerned or any part thereof. Failure, due to poor workmanship or incorrectly installed elements, remains solely the responsibility of the installer. Strict observance of these guidelines however, should help to ensure accurate weight measurement. The company also reserves the right to make any amendments and alterations to this document deemed necessary.

Because of variations available in software installed in displays and intelligent junction boxes, not all features described may be available unless the items are upgraded to the latest specification.

Vehicle Loading Stability
An indication is given as to vehicle loading error stability. This is only intended as a guide and the customer is recommended to set a suitable value, this can be changed with experience over time.

The customer is responsible for the safe operation and legality of the vehicle during use.

Contents

Introduction   Section 1

This manual is aimed at the person or organisation that has the PM1150CB (CANBUS) display fitted to their vehicle(s).

This display is intended to be used with PM CAN loadcells, intelligent junction boxes and associated wiring and components fitted to the same vehicle(s).

IMPORTANT NOTE:
This manual is applicable to the PM1150CB display with software to **version 01. 08** , and **junction boxes to 01. 02+**.
To determine the versions installed contact PM Onboard.

This information shows the normal day to day user screens and also the screens for the setting up and changing of parameters and for diagnostic purposes.

This manual assumes that the display and all other associated equipment has been fitted to the vehicle and calibrated.

The PM 1150CB CAN Multifunction in-cab display is the latest addition to the range of PM weighing indicators.

This is a CANBUS compliant device. CANBUS is a modern data transmission system widely used in the automotive industry and can quickly diagnose damage to any of the connected devices.

Selectable data for vehicle stability indication, load distribution data and axle weight indication for 2,3, or 4 wheeled vehicles are optional.

The PM1150CB Display has a printer output facility as standard.

Alarm indication is given on-screen as well as audibly.

Important Note
1.   Only zero when the vehicle is empty.
2.   Tippers - Before zeroing or weighing lift the body
           about 2 feet (600mm) to ensure that the
           loadcells are carrying the weight of the body.

Other related information available is:

1.   **Loadcell Installation Guidelines**
           This covers the modifications to the vehicle and the fitting of the loadcells, junction box and wiring.

2.   **PM1150CB Driverguide**
           This covers the day to day functions available for use by the vehicle driver. This is a laminated A5 guide and is normally supplied as standard.
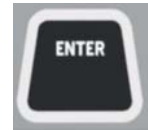
FRONT PANEL CONTROLS   Section 2

POWER ON/OFF BUTTON
The **ON/OFF** button is used to turn the indicator on or off.

ENTER BUTTON
The **ENTER** button is used to complete an editing operation.
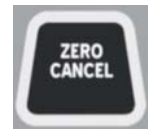The use of the editing procedure is described below.

ZERO/CANCEL BUTTON
This button is dual purpose.

1.) This is used to Zero the currently displayed weight. To avoid accidental zeroing of the display, the **ZERO** button must be held until the bleep is heard; otherwise the zeroing function will not be activated.

2.) This button is also used to cancel an activated alarm.

EDIT/PRINT BUTTON
This button is multipurpose.
1.) This is used to print the currently displayed weight.
NOTE
Prior to printing ensure that the printer is turned on and the printer is online. If the printing is not correct check that the Baud Rate in the setup menu is set to the correct baud rate for the printer in use.

2.) This button is used to commence an editing operation. It is also used to step the cursor along the line during editing.

DOWN BUTTON
The **DOWN** button is used to display the different items within a specific area, e.g. Cell x, Calibration, Options, etc.

UP BUTTON
The **UP** button is used to step the display through all of the available modes in turn. Modes that have been turned off during setup will not be displayed, which simplifies operation of the indicator.

# Starting & using the display   Section 3

Powering up

This information assumes that the display is connected to the rest of the equipment and that the equipment is installed correctly.

A diagram showing the layout and relationships of the various screens is shown at the back of this manual.

When the display is first accessed after powering up a series of USER screens can be accessed, these give access to the day to day information required to operate the equipment correctly.

To power up the display press the **Power On** button (see page 6), this will open the initial screen with the company name:

PM ONBOARD
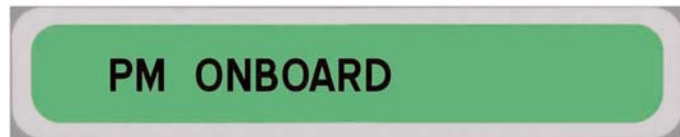
Followed by another screen with the software version, in this case 01.06:

VERSION   01.08
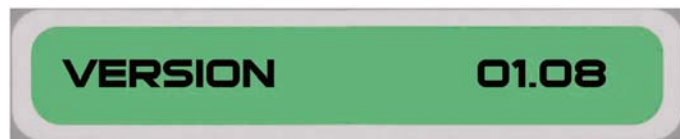
First USER screen

After a short delay this will go to the first USER screen:

NET   XXXXkg

This screen shows the payload weight.

Pressing the UP arrow button will open the Channel screens:

CHANNEL 1   XXXkg

See the next page for further details.

NOTE:
To view Channel 2 from the Channel 1 screen press the DOWN button.
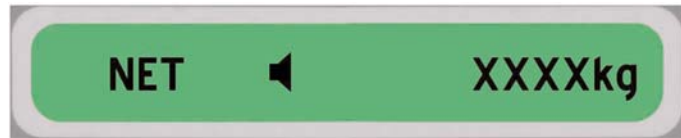
◀ 7 ▶

Net weight

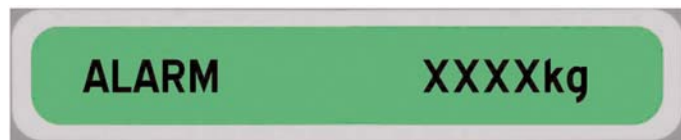This is the current vehicle payload.

If the alarm is enabled, a ◀ symbol is displayed.

Press the ZERO/CANCEL button to zero the payload:

Net weight alarm

Press the DOWN arrow button to display the alarm:

If the alarm is enabled, a ◀ symbol is displayed.

To turn the alarm on/off press the ENTER button, the ◀ the symbol will disappear.

Press the EDIT/PRINT button to start editing the alarm point.
While editing the DOWN arrow decrements and UP arrow increments the highlighted digit, EDIT/PRINT selects the next digit.

Accept new edited value with the ENTER button or cancel editing with the ZERO/CANCEL button.

Second USER screen

Channels

There are two channels available with this display.
Channel 1 and Channel 2.

These channels are best used when 4 loadcells are fitted to a vehicle, channel 1 is used to show the weight from the front pair of loadcells, channel 2 is used to show the weight from the rear pair of loadcells, together they show the total tare weight on the vehicle.
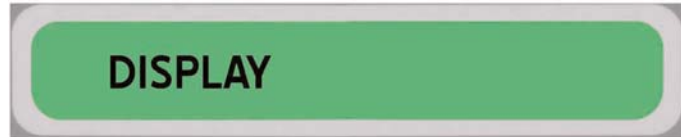
Pressing the UP arrow again will return you to the Display screen.
Pressing the Edit button in the Net Channel or Display screens will print out the Net Weight, Time and the date.

Third USER screen

Display Screen

Press the UP arrow button, until the display shows:

DISPLAY

Time

Press the DOWN arrow button, the display shows:

TIME   XX : XX : XX

Press the EDIT to start editing the time.
While editing DOWN arrow decrements and UP arrow increments the highlighted digit, EDIT/PRINT selects the next digit.

Accept new edited value with the ENTER button or cancel editing with the ZERO/CANCEL button.
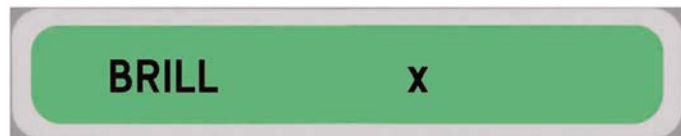
Date

Press the DOWN arrow button, the display shows:

DATE   XX - XX - XX

Edit as time above

Brilliance

Press the DOWN arrow button, indicator shows:
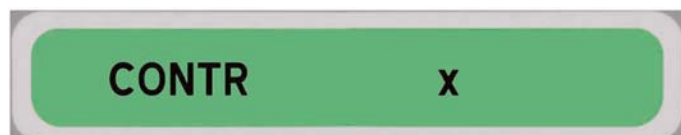
BRILL   X

Press EDIT/PRINT to start editing the brilliance.
While editing DOWN arrow decrements and UP arrow increments the value.

Accept new edited value with the ENTER button or cancel editing with the ZERO/CANCEL button.

Contrast

Press the DOWN arrow button the display shows:

CONTR   X

Edit as brilliance above.

Installation Setup   Section 4

Initial Setup

Press and hold the ON/OFF button until the display shows Goodbye THEN Setup screens.

Calibration Series of screens

The ON/OFF button can now be released. The display will then show the first screen in the series:

Installing the load cells

When a vehicle is fitted with new CAN bus load cells, these have to be set to their own unique CAN identity.

Connect all the load cells to the junction box ensuring that each cell is connected to the correct connection point on the junction box..

Go to the Inst cells screen (Setup - Calibration - Install cells) using the DOWN arrow button. The display will show:

INSTALL CELLS

once in that screen press the ENTER button to install the cells.

Cells Found

After all the cells are found the display will beep 3 times.

FOUND   4 OF 4

All cells are now connected to the system.

NOTE:
If 'FOUND 0 OF 0 is displayed, this means there is no communications with the junction box.

Number of Cells

Press the DOWN arrow button to open the Number of Cells screen.

NUMB OF CELLS   4

This shows the number of cells that the system has detected on startup.

Set the vehicle zero point

Press the DOWN arrow button, the display shows:

ZERO NET ?

To set the vehicle empty weight press ENTER. The display shows:
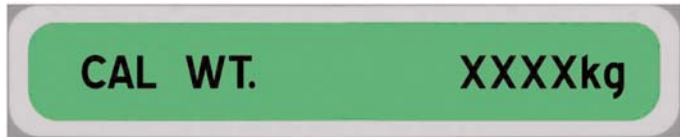
ZERO OK

NOTE:
If the display shows 'ERROR' and the vehicle is empty, press the ENTER button again.

Set the calibration weight.

NOTE:
The vehicle must have a KNOWN weight in the body.
Press the DOWN arrow button, the display shows:

CAL WT.   XXXXkg

Press the EDIT/PRINT button to start editing the calibration weight (Net/Payload at time of calibration).
While editing DOWN arrow decrements and UP arrow increments the highlighted digit, EDIT/PRINT selects the next digit.
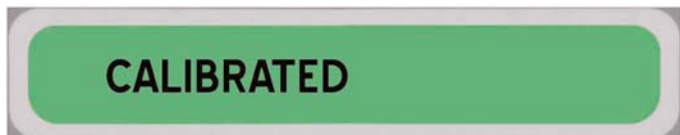Accept new edited value with the ENTER button or cancel editing with the ZERO/CANCEL button. This is just to edit known weight first. Go to the Calibrate menu to carry out the actual calibration.

Set the calibration span point.

Press the DOWN arrow button, the display shows:

CALIBR. VEHICLE ?

Press ENTER to calibrate the loaded vehicle. The display shows:
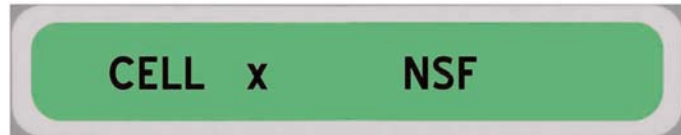
**CALIBRATED**

Cell (X) series of screens

This series of screens gives the user some general details about the cells and weight data etc.

From the Calibration screen press the UP arrow button to open the first screen in the series, this is the Cell x screen.

```
CELL  x        NSF
```

This shows each cell in turn (1 - 8) with the channel that each cell is on. Use the UP arrow button to access each cell in turn, or the DOWN arrow button to access the next screen in this series.

The next screen is the Serial number screen:

```
SER. NO.      XXXXX
```
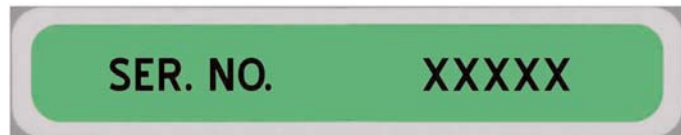
This shows the serial number of each cell, i.e. if cell 1 is selected in the first screen of the series then this screen will show the serial number for cell 1, if cell 2 is accessed in the first screen then this will show the serial number for cell 2, etc.

Use the DOWN arrow button to access the next screen, this is the Version screen:

```
VERSION       01.08
```
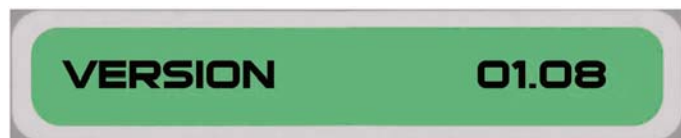
This screen shows the software version of the current loadcell.
Use the DOWN arrow button to access the next screen, this is the Channel screen:

```
CELL  x     CHANNEL 1
```

Use this screen to change the channel of the selected cell. EDIT/PRINT toggles between channel 1 and channel 2.
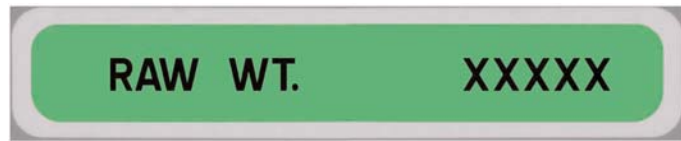
Use the DOWN arrow button to access the next screen, this is the Adjusted weight screen:

```
ADJ WT.      XXXXXX
```

This screen shows the NET weight on the selected cell after the system has been zeroed.

Use the DOWN arrow button to access the next screen, this is the Raw weight screen:

RAW WT.   XXXXX

This screen shows the overall weight and is the weight that the cell 'sees' on the individual loadcell, even after the system has been zeroed.
An excess figure here could indicate a faulty cell.

Use the DOWN arrow button to access the next screen, this is the Output screen:

OUTPUT   XXXXXmv
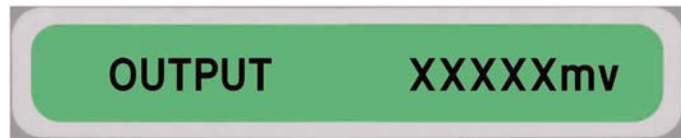
This screen shows their output in millivolts from the selected cell.

The last screen in the series is the P.I. value screen.
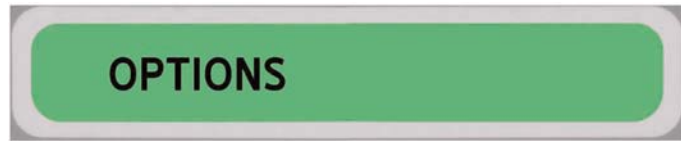
P.I. VALUE   016384
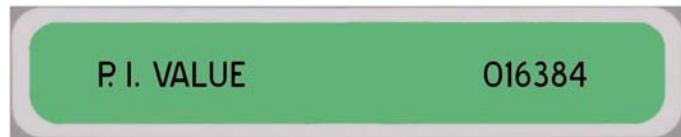
To go to the next series of screen press the UP arrow button, this will take you to the Options series of screens.

Options set of screens

In the Options series of screens, press the UP arrow button until the display shows:

> **OPTIONS**

Press the DOWN arrow button until the display shows:

> **CHANNEL MODE   OFF**

Channel mode allows load cells to be grouped together into 1 of 2 channels, I.E. the front pair or the rear pair when 4 cells are fitted, this is not used with 6 or 8 cells.
Use the EDIT/PRINT button to turn channel mode on or off.

Channels can be turned ON or OFF as required in Options - Channel Mode.
If the channels are turned OFF then the net weight will be equally taken from all the four load cells. The Channels screens will disappear from the user menu.

In the Calibration menu - Cell x - Channel, the number of the channel that a particular cell is on can be seen by selecting each cell in turn.

Set Printer options

Press the DOWN arrow button until the display shows:

> **COUNT BY   XXXXkg**
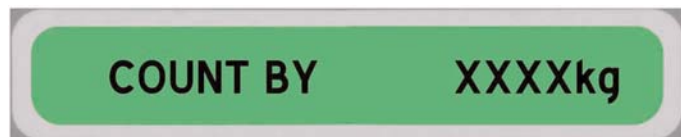
Use the EDIT/PRINT button to set the resolution of the display. (Options are 1, 10, 20, 50, 100 and 200kg).

If a printer is used press the DOWN arrow button until the display shows:

> **PRINTER   IMPACT**
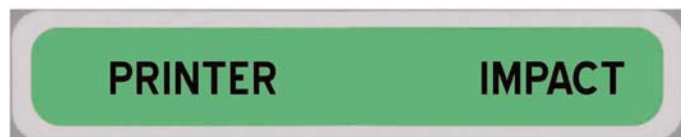
Use the EDIT/PRINT button to change between IMPACT (no RS232 handshaking required) and THERMAL (RS232 handshaking required).

Press the DOWN arrow button until the display shows:

ZERO LIM   XXXXkg

This set the maximum allowable net weight that can be zero'd/tare'd when in the normal user menu.
Press the EDIT/PRINT   button to start editing the net zero limit.

While editing DOWN arrow decrements andUP arrow increments the highlighted digit, EDIT/PRINT   selects the next digit.

Accept new edited value with the ENTER button or cancel editing with the ZERO/CANCEL key.

Baud
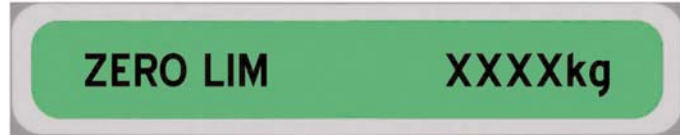
Press the DOWN arrow button until the display shows:

BAUD   XXXX

Use the EDIT/PRINT button to set the Baud rate for the printer. The options are 300, 1200, 2400, 9600 and 19200.

Buzzer

Press the DOWN arrow button until the display shows:

BUZZER   OFF
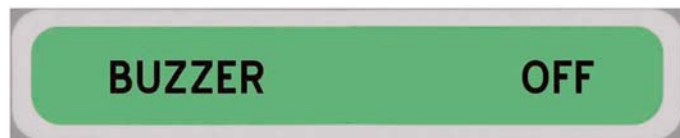
Use the EDIT/PRINT button to toggle between ON and OFF

PM 511 Handheld

Press the DOWN arrow button until the display shows:

PM 511   CHANNEL A
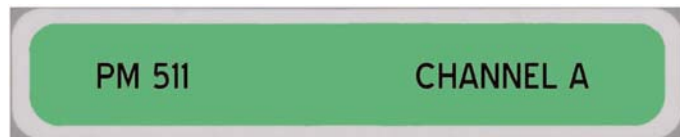
This screen changes the radio frequency channel used with the 511 handheld device.
This device only works in the NET screen.
See the separate 511 information for more details -
Binweigh/511driverguide/v1/190405

NOTE:
There is no facility to print the payload weight from Setup. On the CAN PM1150CB the vehicle parameters can be printed from the Troubleshoot menu in Setup.

Troubleshoot set of screens

The first screen in this series shows:

> **TROUBLESHOOT**

Supply

Press the DOWN arrow button until the display shows:

> **SUPPLY   23.8V**

This screen shows the supply voltage to the system, this should be between 17 and 30 volts.

Excite

Press the DOWN arrow button until the display shows:

> **EXCITE   ON   14.1V**

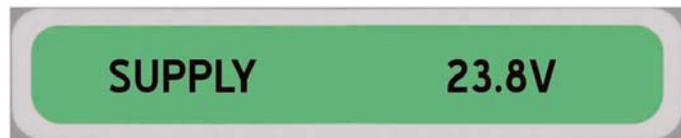This screen shows the exitation voltage of the system, this should be 10 to 15 volts. This feature can be turned on or off using the EDIT arrow button

Junction Box Version

Press the DOWN arrow button until the display shows:

> **J BOX VER   01.02**

This screen shows the software version of the junction box fitted to the system.

Print Setup

Press the DOWN arrow button until the display shows:

> **PRINT   SETUP ?**

This will output on paper the system settings.

Pressing the DOWN arrow again will return you to the Troubleshoot screen in the Setup menu.
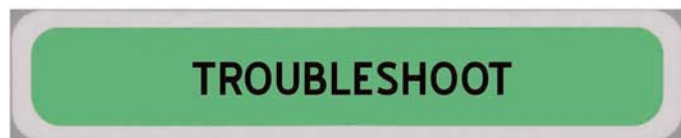
> **TROUBLESHOOT**

Exit Setup

Use the UP arrow button until the display shows:

> **DONE ?**

Press the ENTER button to return to the Net screen, in the normal user mode and save any changes, or press the DOWN arrow button to return to the Setup series of screens.

Troubleshooting   Section 5

Indicator shows NET   -------

> **NET   -------------**

(Display should also warn of no reply from specific cell and beep every 10 seconds)

Reason: Unable to get a weight from all cells.

Check: All cells are connected.

Check: Number of cells in SETUP matches number on vehicle.

Check: "Missing" cell has correct CAN identity (To search all IDs enter SETUP, temporarily set the number of cells to 8,
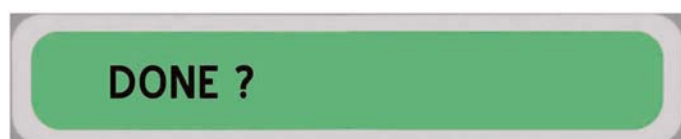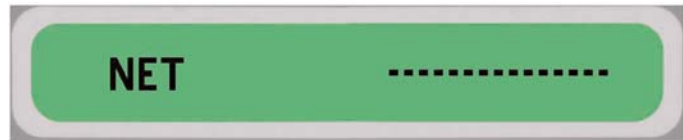
Data for each cell can be viewed while in SETUP. Use the DOWN arrow button to select cell to view, use the ENTER button to select data on this identity.

If no cell is connected on this identity, "- - - - " will be shown on the display.)

Indicator shows NET   ^^^^

> **NET   /\/\/\/\/**

(Display should also warn of specific cell in overload and beep every 10 seconds)

Reason: A load cell is in overload condition.

Indicator warns with message every 10 seconds.
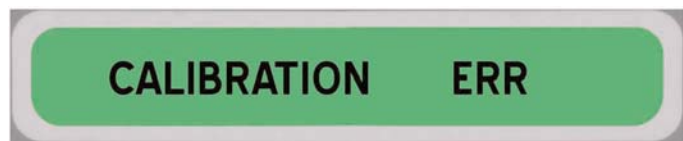
> **CALIBRATION   ERR**

Reason: Not all the cells have the same calibration factors. Re-calibrate vehicle.

When setting Zero or Calibrating display shows

> **ERROR**
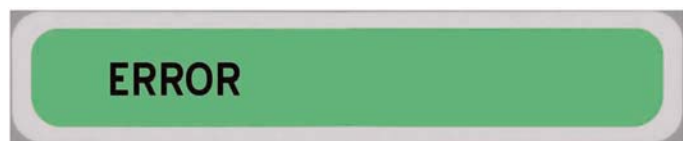
Reason: Did not get a response from all cells to command - see above.

Cell not being read

Reinstall cells -
Look at the mV reading, if there are several millivolts variation between the cells then this could be a faulty cell. Compare pairs of cells, i.e. 1 to 2, 3 to 4, etc. If in doubt ring PM Onboard for advice..
In Setup / Troubleshoot go to junction Box Version. If no firmware version is displayed this means that either the display signal cable or the junction box is faulty

Faulty Connection

Water in plug / socket
Remove connection and blow out with compressed air. Check plug for water entry round seals etc. Ensure that all removed items are properly sealed on re-assembly.
Use only a new cell to check with, the software detects if a cell has been used previously and will not allow access to these, this is to prevent unauthorised cells being used. Use cells can only be reset at the factory.
In Setup / Troubleshoot go to junction Box Version. If no firmware version is displayed this means that either the display signal cable or the junction box is faulty

Junction Box Faulty

Swap the junction box for a known good one to verify. Look on the initial setup screen for a message relating to the junction box, this could possibly indicate no communications to a cell. Ensure that the replacement is of the correct type, i.e. with an inclinometer fitted or not.

Cell / Junction Box

A cell can be plugged directly into any of the cell connectors on the junction box to check either functionality of the cell or of the intermediate cable.

Display Not Working

Check power supply and in-line fuse.

Cells not connected

If the cells are not connected and the display is used a screen "NOT CONNECTED   xxx" will appear and 3 beeps will be heard as each cell is checked.

Cables / junction box testing

Order of testing:

1. Cell plugs.

2. Junction box cell sockets.

Suspect CPU / junction box signal cable

Check the plug that goes into the end of the junction box.

Check the voltages with a meter set to: DC voltages up to 30 v.

PIN 4. - ground probe.

Check the other pins in turn:

Pin 1. - 2.5 volts approximately. CAN high.

Pin 2. - battery voltage approximately. Junction box power - 13V.

Pin 3. - 2.5 volts approximately. CAN low.

View on plug into junction box
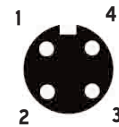
Suspect sockets on junction box, for cells.

Check the voltages with a meter, set to: DC voltages up to 30 v.

PIN 1. - ground probe.

Check the other pins in turn:

Pin 2. - 2.5 volts approximately. CAN low.

Pin 3. - cell exitation voltage, approximately 8 volts.

Pin 4. - 2.5 volts approximately. CAN high.

View on junction box cell socket

Junction box position

Ensure that the junction box is fitted in the correct position, as indicated by the arrows on the label to ensure correct calibration, and output in service.

Display Defaults   Section 6

Default Settings

The display has a set of factory default settings installed from new, these are:

Baud rate - 9600
Count By - 20
Brilliance - 5
Contrast - 6
Alarm - off
Printer - impact
Channel mode - off
Buzzer - on
Alarm set point - 50,000 Kg
Net zero limit - 500 Kg
Calibration weight - 25,000 Kg
Cells 1 & 2 - channel 1
Cells 3 & 4 - channel 2
Cells 5,6,7 & 8 - channel 1

Reloading Defaults

If the defaults need to be reloaded, there will be two main reasons.

1.   No defaults were loaded in the display originally, this is unlikely, but if a display was required in a hurry this could happen, in this case   hold down the ZERO / CANCEL button and press the POWER ON button, the screen will eventually show:
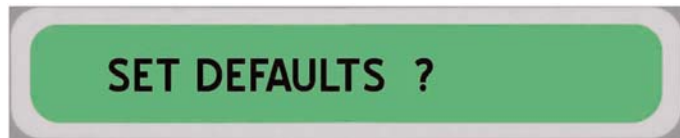
Press the ENTER button, the screen will show:
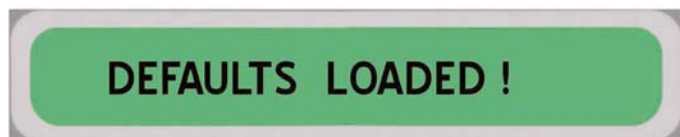
then will go to the Net screen.

2.   If the defaults need to be re-loaded for any reason, then upon startup the PMOnboard screen will appear, then the screen will go blank.
Follow the same procedure as shown in No.1.

Print Setup Output   Section 7

When the PRINT SETUP ? button is pressed the printer (if fitted) will output various technical information, a typical printout is shown below.

```
PM OnBoard Ltd                          CELL 3  NSR     Chan 2
                                        Serial Number    178345
CAN 1150 Ver  01.06                     Version          0202
20:39:47  12/01/06                      Adjusted Net  -000000kg
Cells Installed        4                Non-Adj. Net  -000001kg
Net           000001kg                  Net Zero Pnt     FF77h
Alarm  Off    050000kg                  Current ADC     FFF6DFh
Count By          1kg                   Filter Samples     32
Zero Limit    000500kg                  Adjust Factor   00186Ah
Printer Thermal   9600                  Cal. Factor      2710h
Buzzer            On                    Zero Cal ADC     FF27h
                                        Span Cal ADC     9161h
                                        Cal Count        923Ah
CELL 1  NSF     Chan 1                  mV Output     000.01mV
Serial Number    000011                 Cal mV           0997h
Version          0204                   Min Net          FFFEh
Adjusted Net  -000001kg                 Max Net          000Ch
Non-Adj. Net  -000005kg
Net Zero Pnt     077h
Current ADC     0078E1h                 CELL 4  OSR     Chan 2
Filter Samples     32                   Serial Number    000003
Adjust Factor   00186Ah                 Version          0202
Cal. Factor      2710h                  Adjusted Net   000004kg
Zero Cal ADC     16FBh                  Non-Adj. Net   000012kg
Span Cal ADC     78BFh                  Net Zero Pnt     FDDEh
Cal Count        61C4h                  Current ADC     FFE191h
mV Output     000.24mV                  Filter Samples     32
Cal mV           098h                   Adjust Factor   00186Ah
Min Net          FEE8h                  Cal. Factor      2710h
Max Net          0000h                  Zero Cal ADC     FEBCh
                                        Span Cal ADC     9612h
                                        Cal Count        9755h
CELL 2  OSF     Chan 1                  mV Output     000.06mV
Serial Number    178376                 Cal mV           0993h
Version          0202                   Min Net          0000h
Adjusted Net   000000kg                 Max Net          0033h
Non-Adj. Net   000000kg
Net Zero Pnt     FF26h
Current ADC     FFEF6Eh
Filter Samples     32
Adjust Factor   00186Ah
Cal. Factor      2710h
Zero Cal ADC     FF3Ch
Span Cal ADC     91FDh
Cal Count        92Ch
mV Output     000.02mV
Cal mV           0993h
Min Net          FFFDh
Max Net          003h
```

When the EDIT button is pressed in the Net, Channel or Display USER screens the printer (if fitted) will output a transaction printout, a typical printout is shown below.

Transaction printout

```
Time:         20:41:16
Date:         12/01/2006


Net           30 kg
```
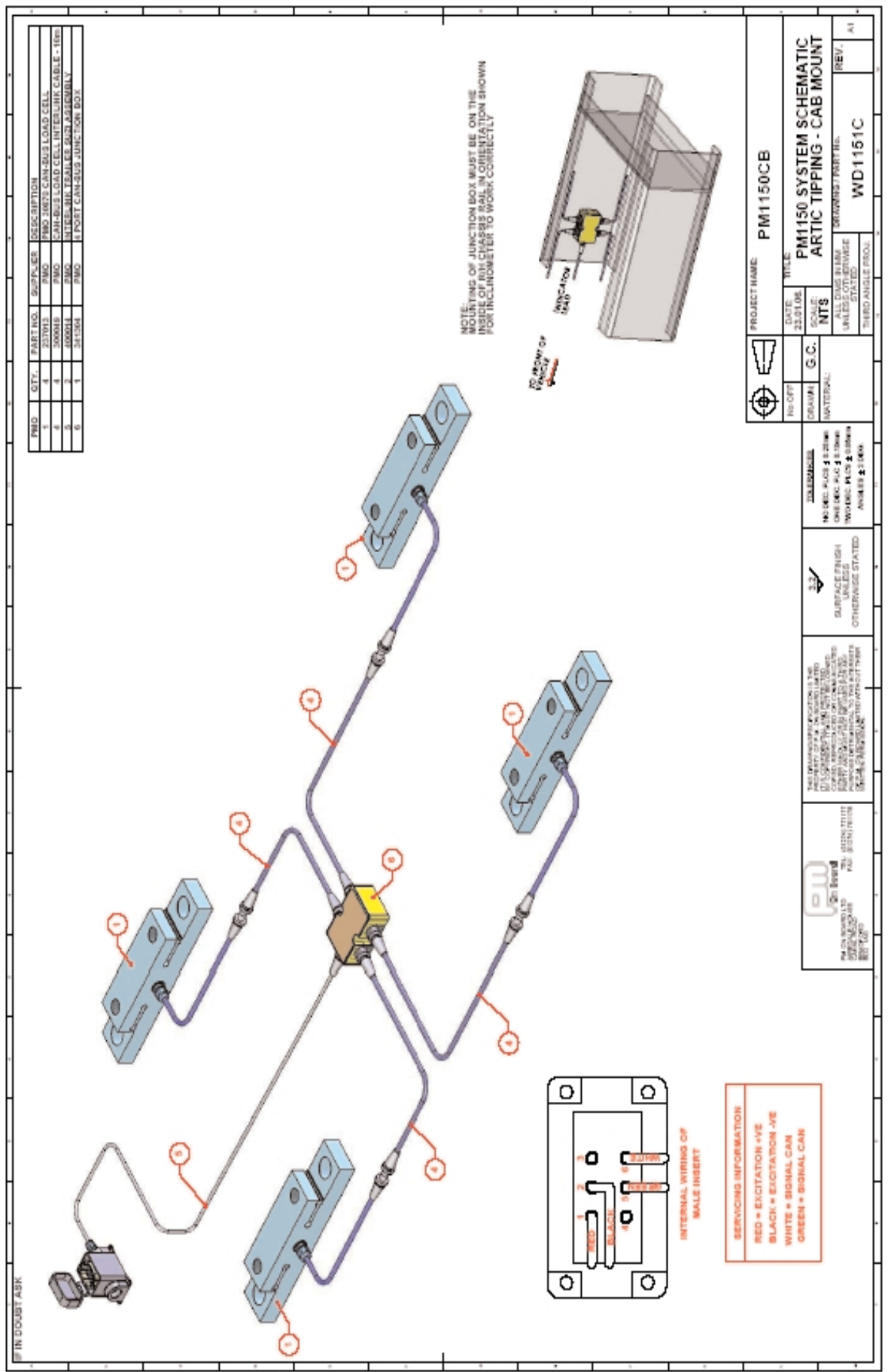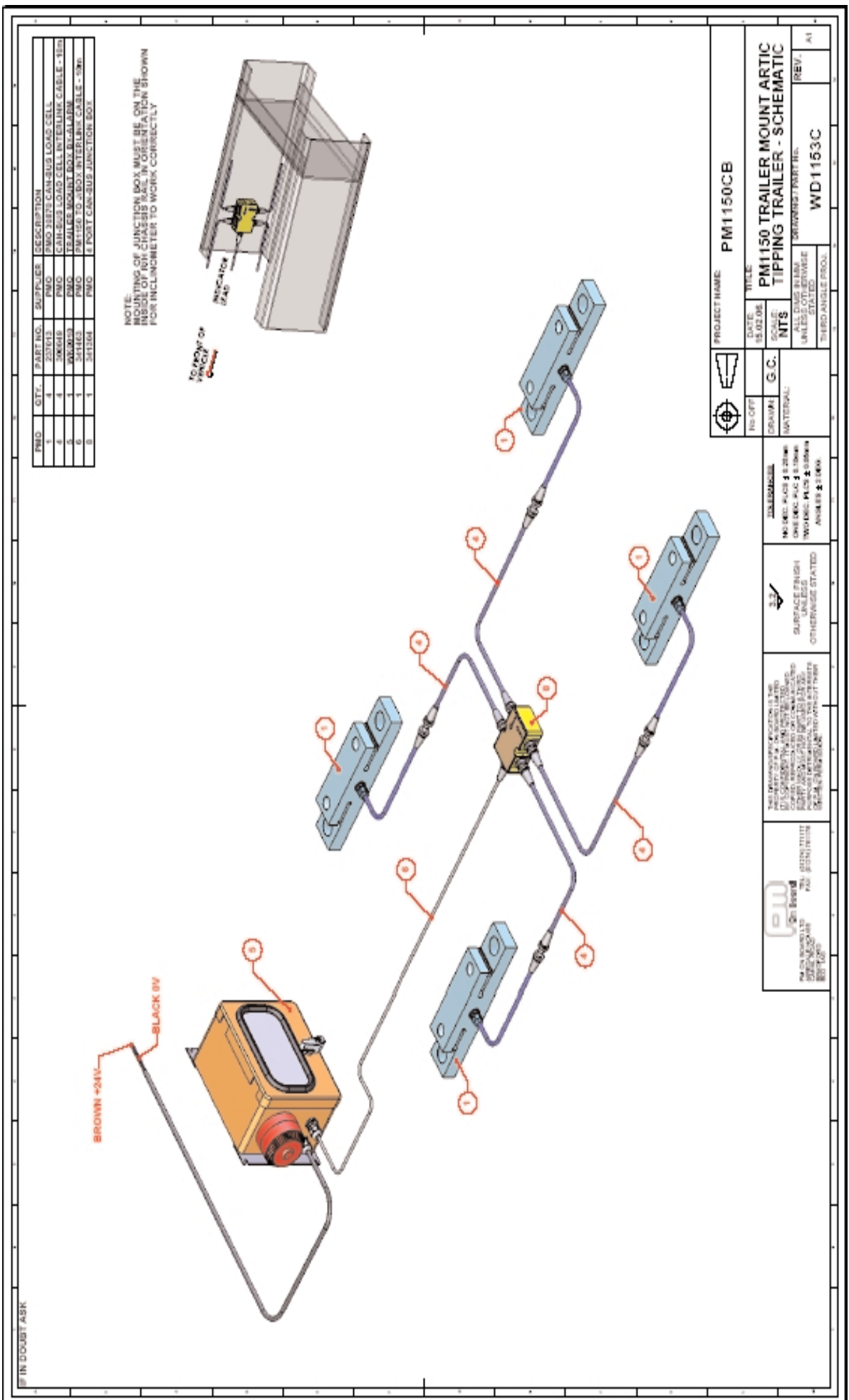
PROJECT NAME: **PM1150CB**

TITLE: **PM1150 TRAILER MOUNT ARTIC TIPPING TRAILER - SCHEMATIC**

NOTE:
MOUNTING OF RH JUNCTION BOX MUST BE ON THE
INSIDE OF RH CHASSIS RAIL IN ORIENTATION SHOWN
FOR INCLINOMETER TO WORK CORRECTLY.

FIND	QTY.	PART NO.	SUPPLIER	DESCRIPTION
1	4	20TX13	PMO	PMO 30870 CAN-BUS LOAD CELL
4	4	KK049	PMO	CAN-BUS LOAD CELL INTERLINK CABLE - 150
5	1	KK060	PMO	TRAILER MOUNT BOX W-ALARM
6	1	34103	PMO	PM1150 TO JBOX INTERLINK CABLE - 10m
8	1	34104	PMO	6 PORT CAN-BUS JUNCTION BOX

BROWN +24V

BLACK 0V

IF IN DOUBT ASK

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Layout of Screens   Section 9

User Menu

Start → PMOnboard → Version → Net → Chan 1 → Display

Net → Net
Net → Alarm
Net → Back to net

Chan 1 → Chan 2 → Back to net

Display → Time → Date → Brill → Contr → Back to display

Press & hold down the Power button to access the Calibration menu

Calibration Menu

Start → Net → Goodbye → Setup → Calibration → Cell X → Options → Troubleshoot → Done?

Calibration → Inst Cells → Numb Cells → Zero Net → Cal Wt → Calib Veh → Back to calibration

Cell X → Serial No. → Version → Channel → Adj Wt → Raw Wt → Output → PI Value → Back to cell X

Options → Ch Mode → Count By → Printer → Zero Limit → Baud → Buzzer → 511 → Back to options

Troubleshoot → Supply → Excite → J/box Ver → Print Setup → Back to trouble shoot

Done? → Enter → Back to Net
Done? → UP arrow → Back to Calibration

NOTES:
CELL X, the x denotes the cell number, on the display this will be a number from 4 to 8, depending on how many cells are installed.
Use the UP arrow to move between different areas, e.g. Calibrations, Cell x, Options etc.
Use the DOWN arrow to move between items within each area.
Use EDIT to toggle between settings. e.g. Baud rates, printer types and to alter settings. e.g. Time, Date.

PM 1150CB
Display
Version 01.06

Junction Boxes   Section 10
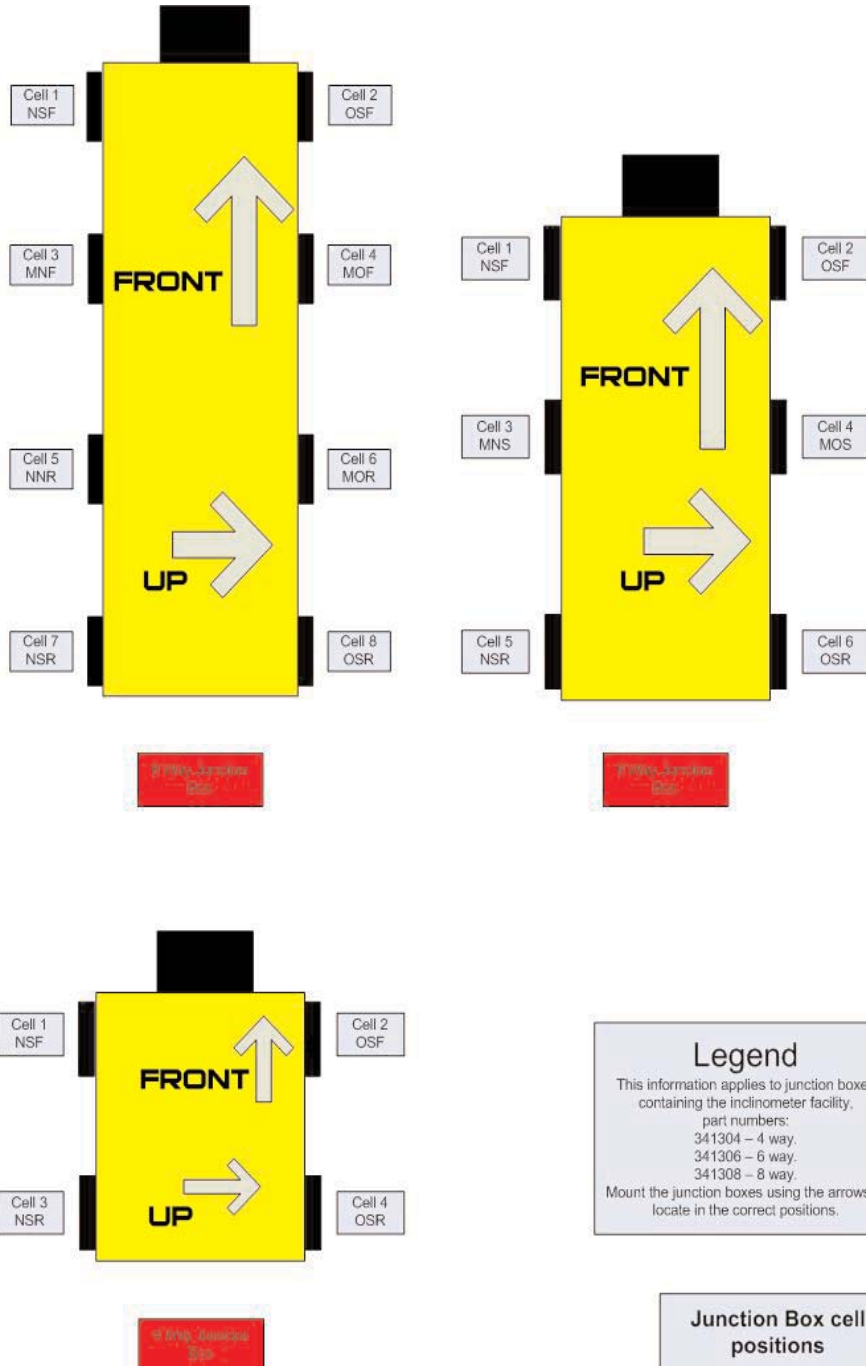
The diagram above shows the correct descriptions of the cell locations on the junction boxes and the arrows showing the correct location of the junction boxes when mounted on a vehicle.

Document Information

The reference number for this document is:

1150CB/cancalinst/v3/180406

This reference filename is divided into 4 areas, these are:

1150CB	This designation is for documents covering the series 1150CB (CANBUS) display equipment supplied by PMOnboard.
cancal	This designation refers to the type of equipment supplied, in this case **CAN Calibration**.
v3	This denotes that this documentation is version 3.
180406	This is the date on which the document was compiled. In this case the date was April 18th 2006.