



Vehicle Installation
User Manual

Vehicle Installation



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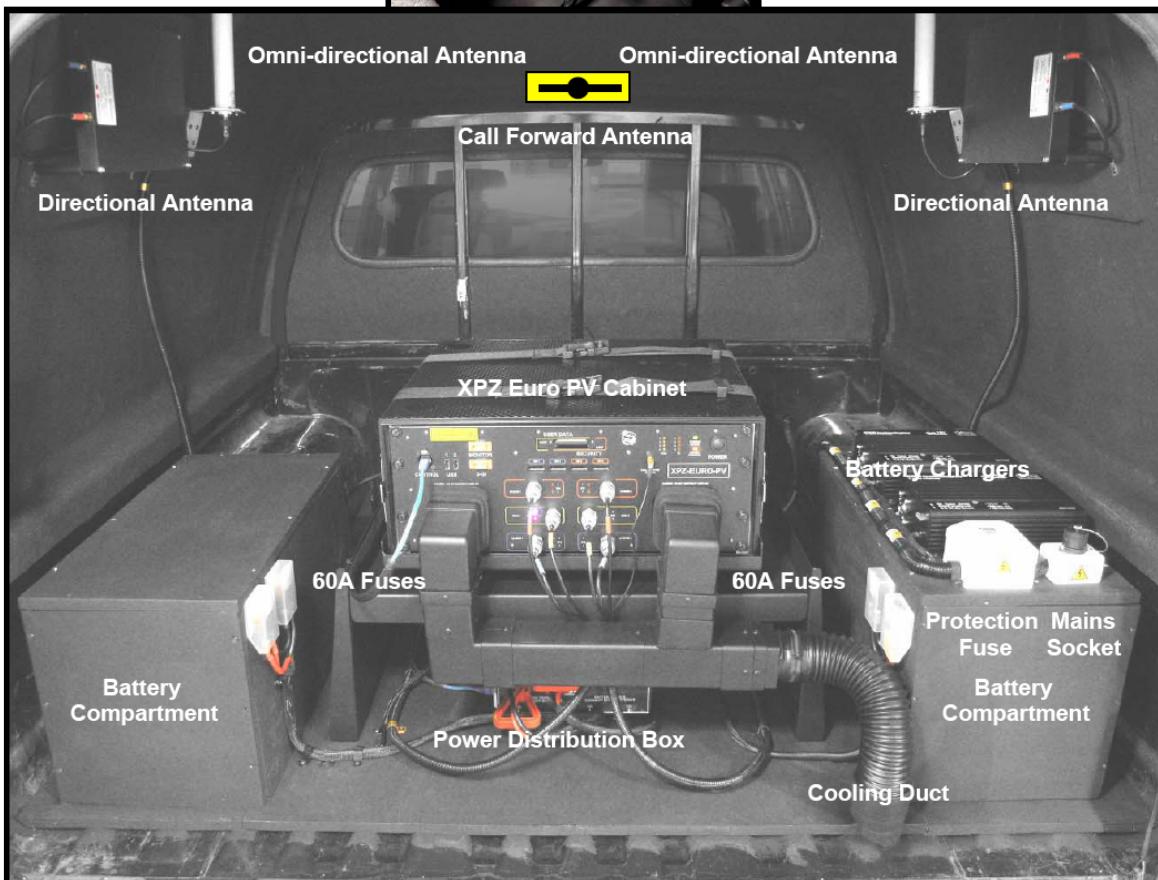
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SYSTEM OVERVIEW

1. Designed as a tactical tool for law enforcement, Government agencies and the Military, the GSM-XP family of GSM active interception solutions have proven to be a global hit with proven success in the field.
2. Based on commercial base-station technology this offers a quantum leap in mobile acquisition rate, higher transmit power, operational ranges and for the first time simultaneous operation on multiple networks and simultaneous servicing of multiple targets.



This symbol represents the dipole antenna location for the mobile network (Call Forward).



System Installation Overview

3. Key features include:

- Up to 50 Watts output power on 2 simultaneous channels
- Up to 4 simultaneous channels, allowing emulation of:
 - 4 broadcast channels on one network
 - 4 broadcast channels on four different networks
- Dual band solutions covering 900/1800 or 850/1900 MHz and for the first time a world box providing 850/900/1800/1900MHz capability.
- Real time monitoring and intercept of up to 4 simultaneous calls.
- Integrated antenna switch on the vehicle models.
- Capability to service multiple targets – up to 7 targets per carrier.
- Ruggedised carry-case.
- Multiple form factors to cover different operational scenarios.

4. The vehicle model is designed for customers with an 'in-country' requirement, i.e. operation within their own borders.

5. The nature of the installation allows the system to transmit up to 50 Watts which when added to the improved receive sensitivity and channel equalisation dramatically extends the range.

6. In addition the system will support multiple channels simultaneously to a maximum of 4 channels within the unit.

7. The PV system is supplied with a bench top power supply to allow normal use when not installed in a vehicle.

Primary Equipment

8. The vehicle is fitted with the following primary equipment which is described individually in the appropriate sections of this manual.

Equipment Description	Qty
Battery Charger	2
Control Terminal	1
Radio Antenna-Directional	2
Radio Antenna-Omni-directional	2
Radio Antenna-Call Forward	1
Toughbook Laptop	2
XPZ Euro PV System	1

9. The following table lists the types of equipment installed in this vehicle which can be classified as secondary equipment.

Secondary Equipment

Equipment Description	Qty
Mains Charger Protection Unit	1
Mains Charger Socket	1
Mains Charger Cable & RCD	1
Power Distribution Box	1
Protection Fuse 60Amp	4
Two Tone Charging Alarm	1

10. The Secondary Equipment items are explained in more detail in the appropriate sections of this manual.

SYSTEM LAYOUT

Access

11. Access to the main equipment compartment is gained via the split tailgate.
12. Refer to the section titled **Powering Up The System** for information regarding powering up the system from the front cab mounted Control Terminal.
13. Refer to the section titled **System Fuses & Protection** which provides details of the protection fuses used in this installation.

Driver's Cab

Control Terminal

14. The Control Terminal provides operator access to the MASTER ON/OFF switch and remote power ON/OFF switch.

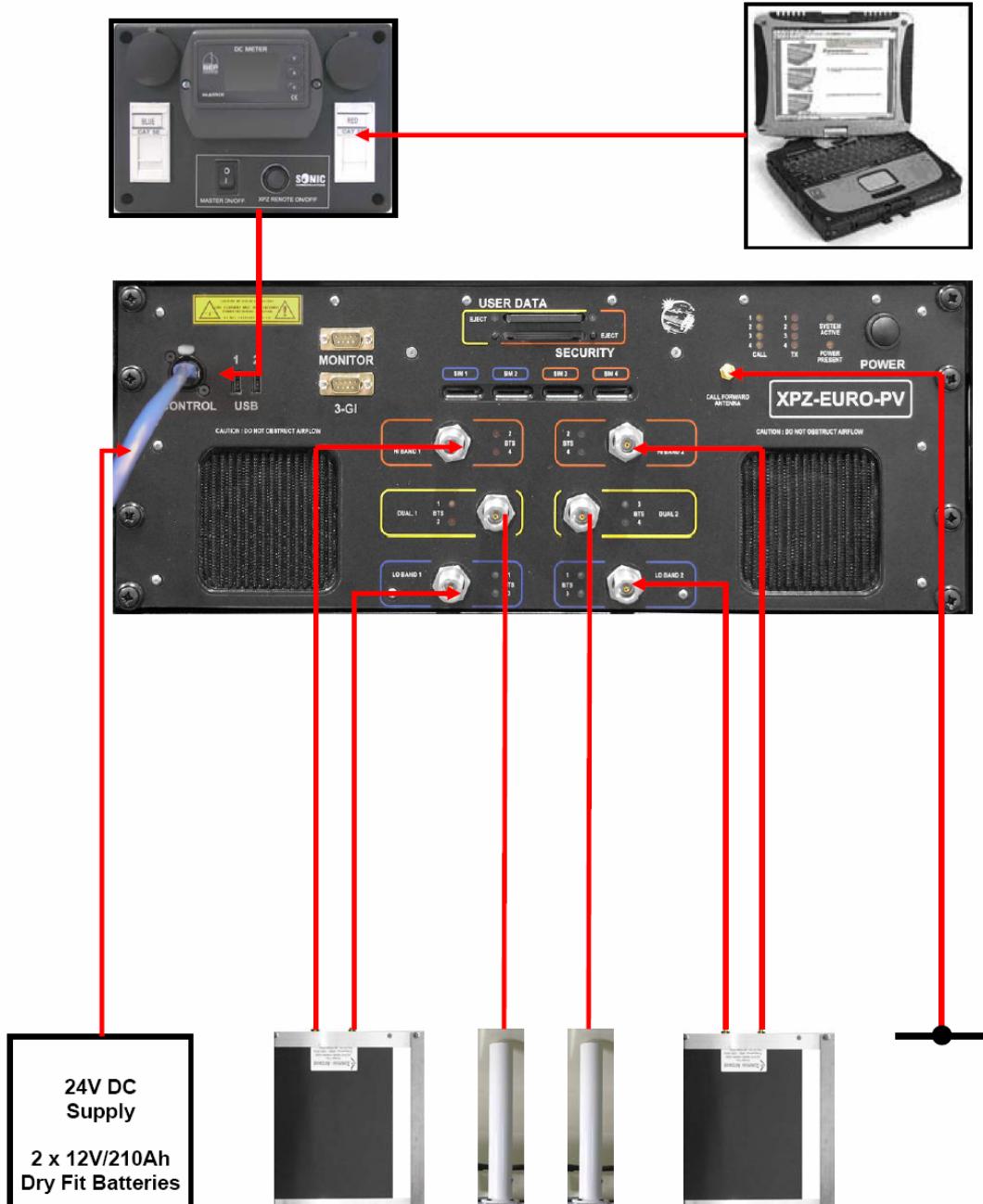


15. Further facilities to be described later include battery management, power outlets for charging laptop batteries, and interface sockets linking a laptop or laptops to the XPZ Euro PV system.

16. The battery compartments for the XPZ Euro PV system are mounted to the rear nearside and offside of the vehicle and accessible via the rear split tailgate.

XPZ Euro PV SYSTEM

17. The GSM-XPZ is controlled from a ruggedised Toughbook laptop connected to the unit via standard TCP/IP networking.



Schematic System Diagram

Antenna Configuration

18. Three types of antenna are used in conjunction with the GSM-XPZ:

- Directional antenna supplied with the unit is a flat panel antenna. It features strong signal gain in the direction of transmission which makes it ideal for use in situations where bearing to target is known.

19. Two of these antennas are used, one for each side of the vehicle and located on the side panelling of the rear compartment.

- Omnidirectional antenna transmits over 360° on the horizontal plane. This antenna is suited to scenarios where bearing to target is unknown.

20. Two of these antennas are used, one for each side of the vehicle and located on the side panelling of the rear compartment.

21. The GSM-XPZ features an integral antenna switch that is controlled from the software on the control laptop. This means that the operator can quickly and easily change between different antenna configurations using the switch control in the software.

22. The GSM-XPZ has six antenna outputs: two high band outputs, two low band outputs and two dual band outputs.

23. In addition to the output antennas, the GSM-XPZ has a network monitor antenna which provides signal for the GSM-XPZ's integrated phone modules. The phone modules are used to survey GSM networks present in the vicinity of the unit, and to sign on to local network cells for the purposes of neighbour list decoding and call forwarding.

Generic Features

- Ability to adjust BTS power to a maximum 50W.
- Ability to transmit 4 GSM broadcast channels simultaneously.
- Enhanced IMSI acquisition rate (theoretically up to 60 registrations per BTS per second).
- Intercept of 4 outgoing target calls simultaneously.
- Perform a Blind Call per GSM timeslot = 7 blind calls simultaneously per channel.
- Up to 28 Simultaneous Blind Calls whilst IMSI Grabbing.
- Advanced manipulation of BCH data to ensure better phone retention (once locked).
- Ability to survey spectrum using custom phone modules.
- Display of SERVER & 6 neighbouring cell information to enable simple cell emulation.
- Ability to adjust target mobile power once in a call to maximum 2W transmission.
- Visual indication of RX power level (mobile reporting BTS received signal strength).
- Advanced configuration of BTS for emulation of any network type.

- Off-line mode for mission file viewing.
- Powerful database search facility for quick target identification.
- Multiple antenna management using In-built antenna switching circuitry.
- Remote system operation via wireless link.

Control Options

24. The GSM-XPZ is controlled from a ruggedised Toughbook laptop connected to the unit via standard TCP/IP networking.

25. To provide users with maximum flexibility a range of control options is available. Direct Ethernet connection to the controlling laptop; wireless connection using a suitably enabled device e.g. PDA, Laptop etc. In this mode multiple users will be able to connect and view the following information over a secure connection:

- Target Identification – included as standard.
- Voice Intercept (only available on PV variant).
- SMS Intercept.
- Direction Finding Support.
- Service Denial.
- Bubble Mode.

26. The operator will be able to adapt the Graphical User Interface (GUI) to display the key information. The GUI will build on the familiarity of the existing GSM-XP to provide both novice and experienced users with the control to easily, and simultaneously, operate 4 base stations.

27. To enhance security, mission data is stored on an external memory device. This can be easily switched between multiple systems, or used to examine mission data offline on a separate PC or on the GSM-XPZ itself.

28. This also allows for protection of mission data, should the system have to be loaned to other organisations or returned to MMI.

29. All events as per current GSM-XP operation will be time stamped and logged in a mission file along with intercepted Voice/SMS data.

30. To maintain the integrity of the data the mission files cannot be edited or recorded voice replayed without using MMI software.

Operational Modes

Research & Release	Allows phones from up to 4 networks to simultaneously attach to the GSM-XPZ enabling their IMSI / IMEI to be logged. Once logged, they are released back to the real network - the most covert operational mode.
Research & Lock	Locks selected target phones to the GSM-XP BTS
Ping Mode	Clones the selected BTS exactly including LAC. A much quicker and more efficient way of capturing mobiles as it removes the overheads associated with a location update – the least covert operational mode.
Bubble Mode	Unless otherwise specified all phones registering to the system will be locked to the system thus creating a bubble of phones restricted from accessing the real networks.
Service Denial to all	Sends a service denial message to all phones, and
Hostiles	potential hostiles, that prevents them from rejoining a real network.
Exclusive Network	Allows friendly phones to use the XPZ as a means to covertly contact other operatives. Calls made in this way do not use the real network and are therefore secure.

Target Mobile Actions

Overt Call	Allows operator to call a target phone and optionally converse.
Blind Call	Covert (silent) call to a target phone. Used in conjunction with directional finding equipment.
Send SMS	Allows operator to send SMS to a target phone.
SIM Swap Indication	Shows indication of SIM swap.
Make Target	Allows operator to make a phone a target.
Invalidate Target	Allows operator to deny service to a selected target.
Make Reject	Allows operator to reject selected phones from the GSM-XP to prevent any interference by the system.
Show Target History	Shows all recorded activity by the target phone.

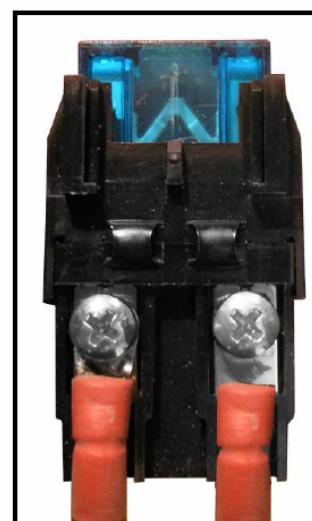
Setting up Procedure

80. Before the deployment of the system the operative must read and familiarise themselves with the manufacturer's Operating Instructions.

SYSTEM FUSES & PROTECTION

In-Line Fuse

31. Two in-line 60Amp fuses are connected between the batteries and the “flying lead” supply cable in each case.
32. These are designed to protect a battery from excessive current drain.
33. These are installed on the sides of the battery compartments and one of these fuses is shown here for reference purposes.
34. A second unit is employed in the negative lead of each battery supply cable.
35. They are encapsulated in a protective removable plastic cover which is shown in the image below.
36. The image shown opposite illustrates the unit with the cover removed for reference purposes.



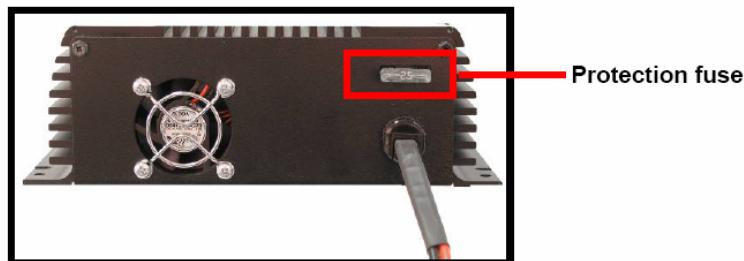
Charging Unit Fuse



The charging units may only be used when the vehicle is stationary with the engine turned OFF and with access to a domestic mains supply.

A built in unit protection fuse (25Amp) is located to the left hand side of the unit. Replacement of this fuse necessitates the removal of the mains supply from the vehicle for safety reasons.

37. This is shown here for reference purposes.



System Protection

38. A fused panel is employed to protect the on-board mains charger systems. This is co-located with the two battery chargers and the mains input socket which are mounted on top of the offside battery compartment cover.

39. Refer to the image shown here as a reference.



Instructions for TEST

With a mains supply connected to the vehicle via the mains input socket press the **ON** button and check that the red lamp is lit.

Press the **TEST** button and check that the red lamp extinguishes.

If it does not, disconnect the supply and replace the fuse.

The rated fuse for this device is 13Amps.

Replace by unscrewing the securing screw, lift the fuse cradle and remove the fuse. Replace with the same rated fuse.

Relocate the cradle and tighten retaining screw. Carry out test again.

BATTERY CHARGING

System Batteries

40. The vehicle XPZ Euro PV system is powered by a 2 x 12V/210VAH dryfit heavy duty batteries.
41. They obtain their charge through separate portable mains chargers which are hard wired into a mains socket distribution panel installed alongside the protection fuse described earlier.
42. An image of one of the chargers is shown here for reference purposes.



Battery Charging Procedures

Mains Supply Charging Socket



When mains charging is not taking place the protective cover **MUST** be used to prevent the possibility of damage to the unit's pins.

43. Connect the mains cable to a domestic AC mains supply ensuring the supply is **OFF**.
44. Connect the cable plug to the input socket shown above.

CAUTION: In the event that the vehicle ignition is turned on with the mains supply cable still connected, a two tone alarm will sound, warning the driver NOT to move off with the cable still attached to the vehicle.

Mains Cable RCD Safety Plug

45. **The unit must be tested before it is used and every time it is used!**

46. The RCD Plug continuously monitors the power supply to an electrical appliance and cuts off the power within 40 milliseconds if an earth current fault is detected.

47. **This will prevent a fatal electrical shock.**



Instructions for TEST

- Insert the RCD plug into a 13Amp mains socket and switch the supply on.
- Press the RESET button.
The ORANGE indicator should appear.
- Press the TEST button.
The ORANGE indicator will disappear from the CLEAR window.
DO NOT USE IF THE ORANGE INDICATOR REMAINS.
- a. Press the TEST button.
The RCD has now been set for safe use provided the ORANGE indicator shows in the CLEAR window.

48. There are no user serviceable parts within the unit other than a domestic fuse and failure of any item must entail the return of the said item to ***Sonic Communications (Int.) Ltd.*** for repair.

49. The 13Amp fuse shown in the image above which is a domestic product can be replaced if proven to have "blown".

50. **The cause of the fuse failure MUST be investigated and appropriate corrective action carried out before replacement of the fuse and subsequent use of the unit.**

51. The fuse is housed in the red box located between the socket pins on the base of the RCD.

52. To replace, use a small electrical screwdriver to remove the securing screws/cover and eject the fuse. A new fuse can be pushed home and the cover replaced.

XPZ Euro PV Battery Pack

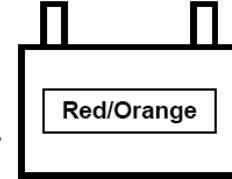
53. With the mains RCD plug connected to a domestic AC mains supply and the cable socket connected to the mains input socket on the vehicle and, with the mains switched ON, the chargers will start to charge the batteries as and when necessary.

54. Use the battery charging procedures provided to check the status of the batteries via the charger LED's.

Charger LED Description

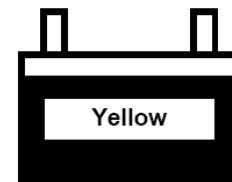
Boost

The charging current is maximum and at the same time
the battery voltage is lower than the switching level of the timer.
Orange LED indicates that it would be approved for medical use.



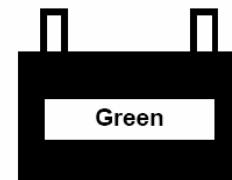
Timer

The charger is in time-controlled mode.
The charger current is lower than maximum.
The battery is normally between 80 and 95% charged when
the time-controlled mode starts (LED changes to yellow).
The battery voltage is the same as the switch level from
rapid charging, The charger remains in this mode until
the time interval is completed.



Float

The charger is in standby mode.
The battery is fully charged (LED changes to green).
The charge voltage is at standby level which means that
the charger can continue to be connected to the battery.
The charger can return to rapid charging if the battery is used.



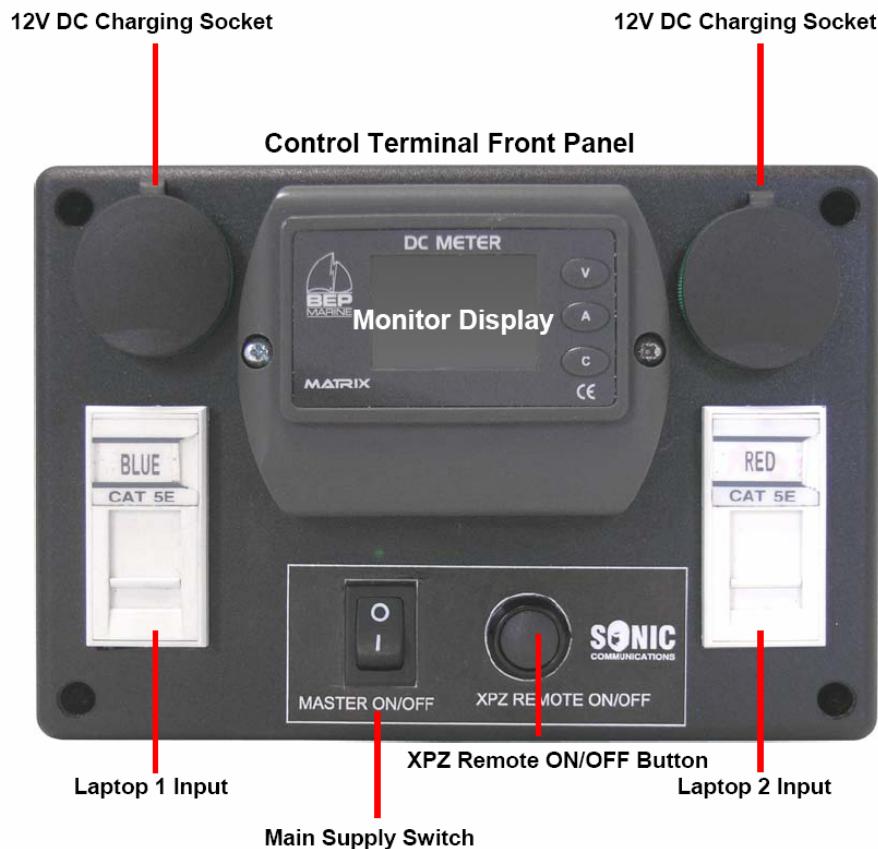
OPERATION

Powering Up the System

55. Operator's are strongly advised to read and familiarise themselves with the various manufacturer's instructions relating to the setting up and operation of the following facilities:

- i. XPZ Euro PV System.
- ii. Toughbook Laptop: Instructions for this facility are provided.
- iii. DCM Display Console: Instructions for this facility are included in this publication.
- iv. Portable 3 Step Battery Charger: Instructions for this facility are provided.

Ensure that the system batteries are fully charged before each deployment.



56. The console is located centrally in the front of the vehicle behind the front seats and connected to the main system via an umbilical cable.

57. This provides for laptop battery charging facilities, data connectivity between a laptop and the XPZ Euro PV system, and remote ON/OFF switching for the XPZ Euro PV system.

58. It also provides a visual display and menu driven facility for battery management.

59. The Main Supply Switch (**MASTER ON/OFF**) provides both 12V DC and 24V DC to the whole system as required.

60. The 600-DCM3.2 Battery Monitor offers the following features:

- 1/10th of an Amp resolution in the range of +/- 0-50A
- The Matrix Monitors use a dot Matrix LCD allowing for Full screen information on Function selected.
- Voltage monitoring for up to 3 battery banks.
- 12 custom selectable legends eg: Start Battery, House Battery etc.
- Hi/Low voltage alarm on all 3 banks.
- Amps charge and discharge on house bank only.
- Meter supplied with a 450-50mV shunt.
- Capacity remaining in amp hours and percentage.
- Low amp hour alarm.
- Suitable for use on battery banks 60-3000 Amp hours.

61. Two 12V DC sockets are provided to enable the operator's to charge both laptops at the same time should the need arise.

62. Two laptop input sockets are provided, CAT 5E-BLUE, and Cat 5E RED.

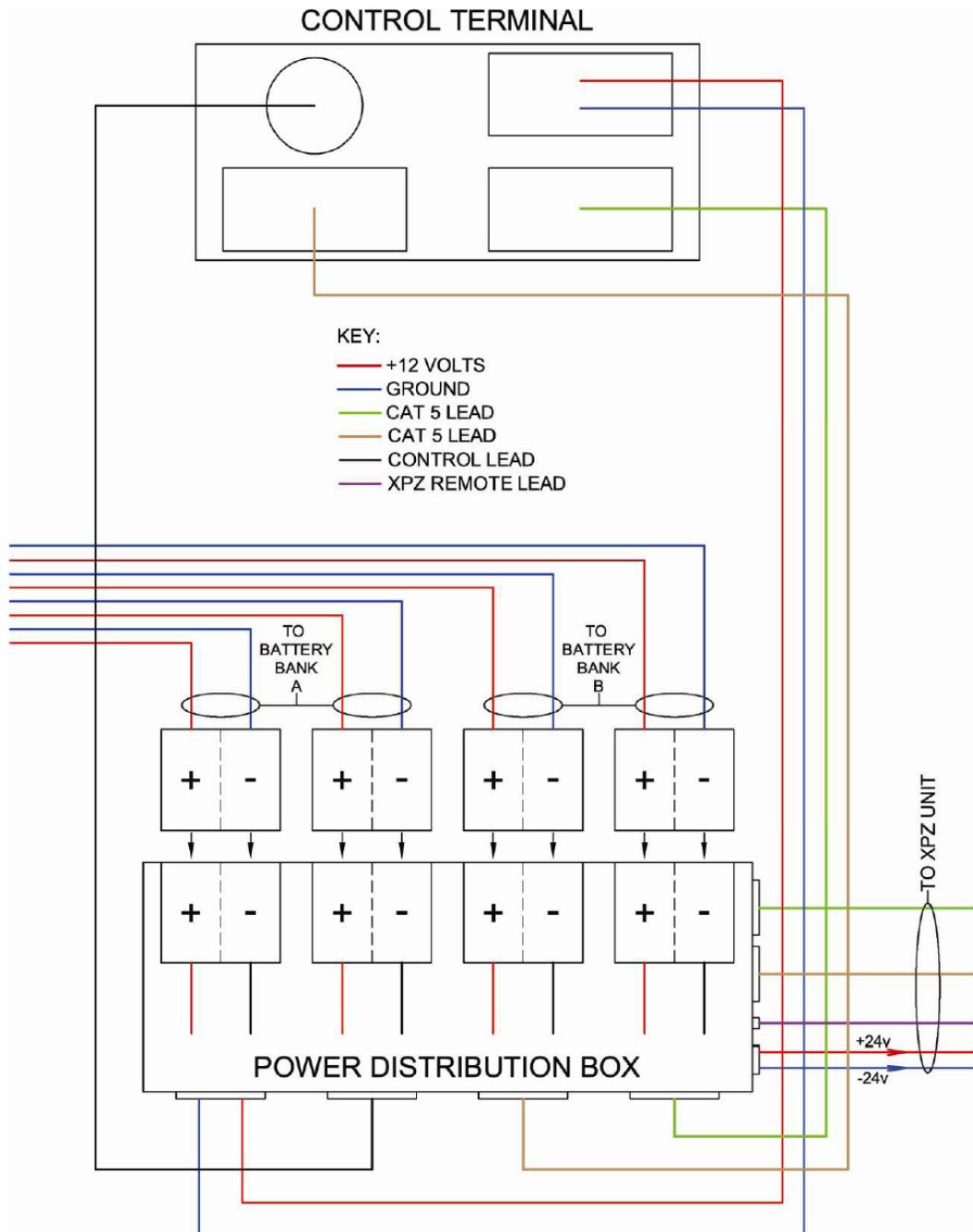
63. The outputs from the Control terminal are shown in the next image showing the base of the Terminal.

Control Terminal Base

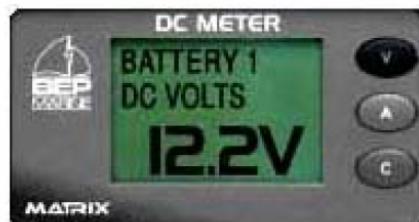
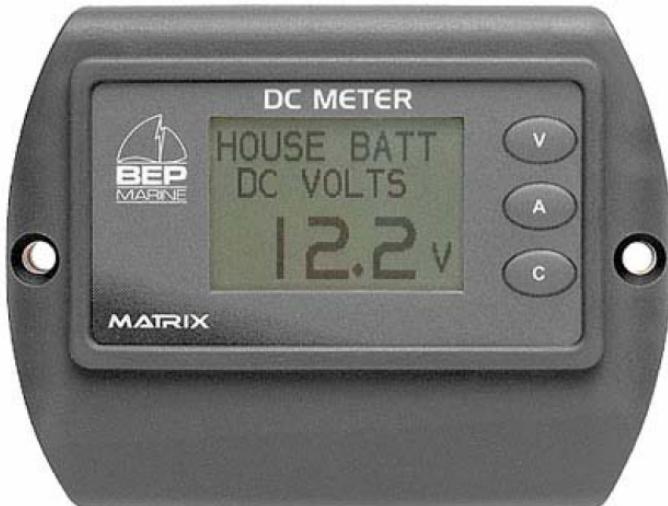


System Wiring Schedule

64. The diagram shows the interconnectivity between the Control Terminal, Power Distribution Box, and the XPZ Euro PV system.

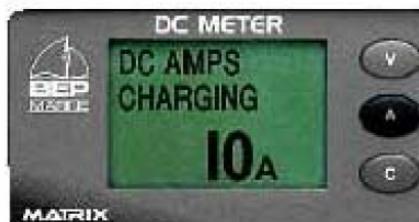


Monitor & Display Options



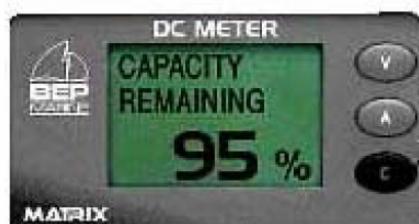
Voltage Monitor

- Voltage monitoring for up to 3 banks.
- 12 custom selectable legends.
- Hi/Low voltage alarms on all 3 banks.



Amps Charge & Discharge

- Monitored on house bank only.
- 450-50mv shunt supplied with meter.
- Resolution 0.1 amps up to 40 amps.



Amp Hour Monitoring

- Monitored on house bank only.
- Software utilises Peukerts exponent.
- Suitable for battery banks 60 to 3000Amp Hrs.
- Low amp hour alarm.

Note: The values shown here indicate what the display looks like for each of the parameters being monitored. The actual values depend on the installation requirements.

OPERATING INSTRUCTIONS

Apply Power

Power-up screen will show for 5 seconds

After 5 Seconds

First screen shows the Supply Battery Volts.

Press Button V

The second screen shows 2nd Battery volts.

Press Button V Again (3RD position as volt monitor)

The third screen shows the 3rd battery volts.

Press Button V Again (3RD position as bilge monitor)

The third screen shows the bilge monitoring information.

- In bilge monitor function press and hold "C" to reset the monitor back to zero.

To exit Bilge monitoring mode and resume battery monitoring press "V" to return to supply battery volts.

Press Button A

This screen shows either charging
OR discharging Amps.

Press Button C

This screen shows Capacity Remaining in Amp Hours. This will count down when Discharging. And count up when Charging.

Press Button C Again While Viewing Capacity

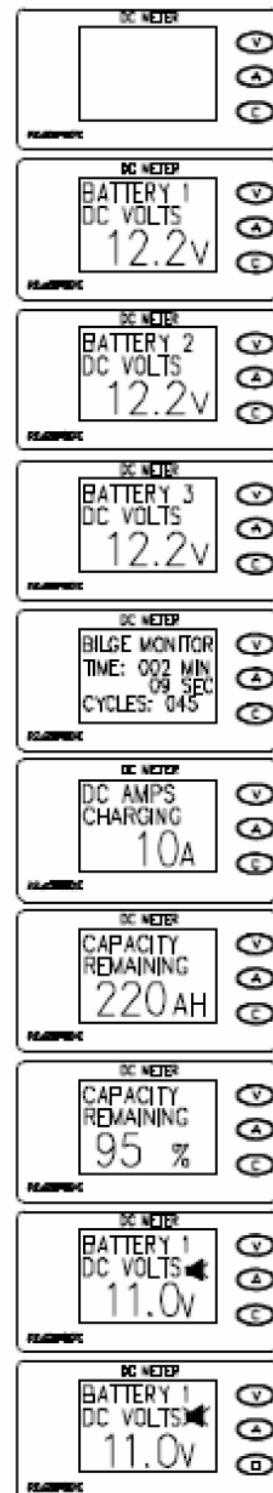
This screen will display the remaining Amp hours in percentage.

Alarm Enabled

When alarms are enabled in the monitor setup the alarm symbol will display as shown.

To Permanently Mute An Alarm

Press the A button for 2 seconds, the display will show the mute symbol as shown, repeat to reactivate the alarm.



SETUP & PROGRAMMING

To Enter Programming Mode

Hold buttons V & C down simultaneously for approx. 3 seconds the display will read:

EXIT
RESET
SETUP

Press 'V' to exit programming mode.

Press 'A' to enter amps zero and reset mode.

Press 'C' to enter Setup mode.

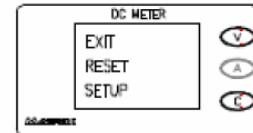


Figure 1

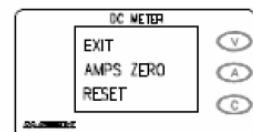


Figure 2

Amps Zero (figure 2)

While in programming mode screen (figure 1):

Press 'A' to enter amps zero and reset mode

Press 'V' to exit.

To Set Amps Zero Point

Press Button A.

"AMPS ZERO" will flash for approx 2-3 seconds, zero point has now been set. The screen will return to the programming mode screen (figure 1)

Factory Reset Mode (figure 2)

While in programming mode screen (figure 1)

Press 'A' to enter "amps zero" and "reset" mode screen (figure 2).

Press 'V' to exit.

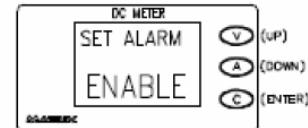
To reset the unit back to factory settings press and hold button C until "RESET" begins to flash, release button C, The display will continue to flash for approx 2-3 seconds. Unit is now reset to factory settings. The screen will return to the programming mode screen (figure 1)

SETUP MODE

Use Up (V) / Down (A) buttons to change value then press C to proceed to the next set up screen.

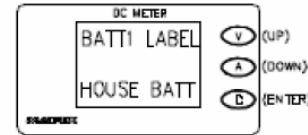
Set Alarm

Enable/Disable all alarms
Default: Enabled



Battery 1 Label

Label battery bank 1 options are
House Batt, House 1, House 2,
Start Batt, Stbd Start, Port Start,
Aux Batt, Radio, Genset

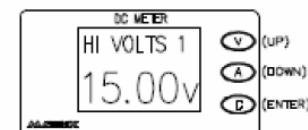


Battery 2 Label

As per Battery 1 label

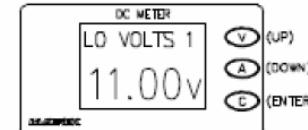
Battery 3 Label

As per Battery 1 label except includes
“Bilge monitor”
Refer to **Operations** section



High Voltage 1 Alarm

Default: 15.0 Volts
Up/Down to select value, 0.1V steps
Range: 10.0-32.0 Volts



Low Voltage 1 Alarm

Default: 11.0 Volts
Up/Down to select value, 0.1V steps
Range: 0.0-32.0 Volts

High Voltage 2 Alarm

As per High voltage 1

Low Voltage 2 Alarm

As per Low voltage 1

High Voltage 3 Alarm

As per High voltage 1

Low Voltage 3 Alarm

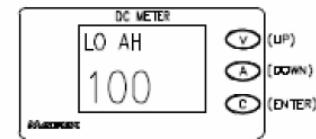
As per Low voltage 1

Low Amp Hours Alarm

Default: 100 Amp Hours

Up/Down to select value, 10AH steps

Range: 0-1000AH

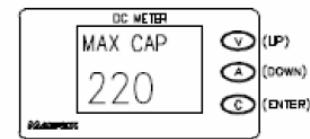


Maximum Capacity

Default: 220 Amp Hours

Up/Down to select value, 10AH steps

Range: 60-3000AH

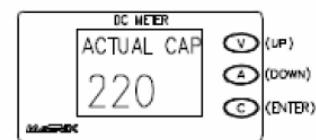


Actual Capacity

Up/Down to select value, 1AH steps

Range: 0-3000AH

Refer to **Operations** section



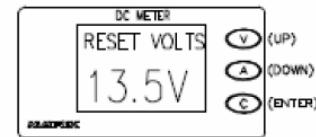
Amp Hour Capacity Reset Voltage

Default: 13.5V

Up/Down to select value, 0.1V steps

Range: 10.0-30.0V

Refer to **Operations** section



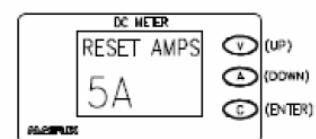
Amp Hour Capacity Reset Amps

Default: 5A

Up/Down to select value, 1A steps

Range: 0-50AH

Refer to **Operations** section



Charge Efficiency

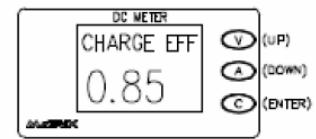
Default: 85% flooded lead acid

Use 90% for Valve regulated gel

Up/Down to select value, 0.01AH steps

Range: 0-1.0 (multiple by 100%)

Refer to **Operations** section



Peukerts Exponent

Default: 1.25

Up/Down to select value, 0.01 steps

Range: 1.00-1.50



Voltage 1 Calibration

Adjust this setting to actual battery voltage.

To Calibrate

Up/Down to select value, 0.01V steps

Range: 0-32V

Refer to **Operations** section



Voltage 2 Calibration

As per Voltage calibration 1

Voltage 3 Calibration

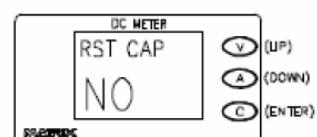
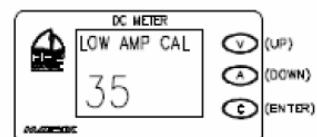
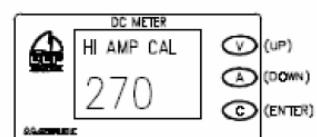
As per Voltage calibration 1

Low & High Amp Calibration

Note: The load must be applied before entering this screen.

Adjust this reading to correspond with the known load that is applied to the system.

For Low Amp Cal, the known load must be in the range +/- 0-50A. For High Amp Cal the known load must be within the range +/- 50-450A.



Note: You only need to do one range of calibration.

Up/Down to select value.

Range: +/-450A (Max)

Refer to **Operations** section

Reset Capacity

NO

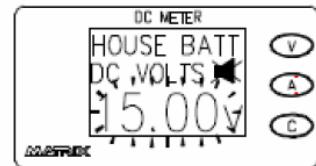
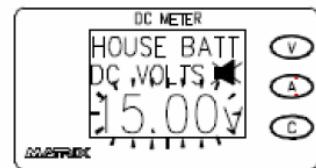
YES

Reset capacity provides the option to reset the capacity to the programmed value (YES) or to leave it at the current monitored level (NO).

ALARMS & ALARMS MUTE

When an alarm condition occurs, the alarm will sound and the corresponding display will flash.

To permanently mute any alarm, press the **A** button for 2 seconds. The display will show the alarm mute symbol. The alarm mute mode will remain set even when the power is removed.



MAINTENANCE

Battery Maintenance

Lead Acid Batteries

- Leaving a battery standing, even for quite short periods in a very discharged or even slightly discharged condition **WILL** damage your battery!

This may only be a few days, or a week or so. It's long enough! It causes the battery to become chemically damaged through sulphation.

This process is the **MAJOR** cause of ruined batteries. The batteries in this condition will hold less charge or go "flat" sooner than they did before.

In extreme cases they cannot even be re-charged at all, the situation gets worse the more often that the user allows the battery to get into this state.

- Avoid discharging any lead acid type battery too "**deeply**" as this destroys the active plate material. Deep cycle batteries can survive typically 300 / 80% discharges only.
- Remember - The secret to long battery life is to discharge them as little as possible (operational constraints can make this situation unavoidable) and to charge them back up as soon as it is possible to do so.
- If a battery fails it is extremely unlikely to be the fault of the battery, but very likely to be as a result of a lack of understanding of the chemistry involved and incorrect usage.

Safety & Handling

- Always wear proper eye, face and hand protection when working with battery.
- Never lean over battery while boosting, testing, or charging.
- Exercise caution when working with metallic tools or conductors to prevent short circuits and arcing.
- Keep terminals protected to prevent accidental shorting.
- Replace any battery that has signs of damage to the terminals, case, or cover.
- Install battery in a ventilated area for operation and during charging.

65. The following message chart illustrates the warnings that you may find on the casing of a battery.

66. DO NOT expect to see them all on every battery you come into contact with but take note of any warning that you see.

CERTIFICATION DOCUMENTS

67. The certificate(s) which are to be found to the rear of this manual are applicable to this installation and are identified below.
68. If a document is lost or is deemed illegible for whatever reason, a replacement copy can be provided.
69. Contact Sonic Communications (Int) Ltd in the first instance using the telephone number provided in the **NOTE** page of this publication.
70. This installation requires the following certificates:

Declaration of Conformity

71. This certificate provides information regarding equipment that conforms to EMC specification and compliance with the automotive EMC Directive 95/489-5/EC.



Declaration of Conformity

This is to certify that the following product (s):

VVSS, VSS, VSS2+2 & VSS-4 Video Surveillance
Equipment & Associated Items

- Conforms to the following EMC specification:- ETSI EN 301 489-5 FOR CE Approval.
- Electrical/electronic equipment installed in vehicle is 'e' marked for compliance with the automotive EMC Directive 95/54/EC.

Approval No: e11 *72/245*95/54*1696*00

Print Name: H.Takhar
Signature: 
Position: Technical Manager

Date: 29th Jan 2003
Date: 29th Jan 2003

Manufactured by :- Sonic Communications (International) Ltd.
Birmingham International Park
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Telephone: +44 (0) 121 781 4400 (Switchboard)



D00-100426-1



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