QUADNET
FIRE DETECTION SYSTEM

Fire Detection & Alarm System Power Supply Unit V3

Power Supply Unit Installation Manual

(TO BE RETAINED BY THE COMMISSIONING ENGINEER)

26-0853 Issue 5

Fike's policy is one of continual improvement and the right to change a specification at any time without notice is reserved. Whilst every care has been taken to ensure that the contents of this document are correct at time of publication, Fike shall be under no liability whatsoever in respect of such contents.

Due to the complexity and inherent importance of a life risk type system, training on this equipment is essential, and commissioning should only be carried out by competent persons.

Fike cannot guarantee the operation of any equipment unless all documented instructions are complied with, without variation.

E&OE.

Fike equipment is protected by one or more of the following patent numbers: GB2426367, GB2370670, EP1158472, PT1035528T, GB2346758, EP0917121, GB2329056, EP0980056, GB2325018, GB2305284, EP1174835, EP0856828, GB2327752, GB2313690

Contents

Introduction

This Manual is intended as a guide to the engineering and commissioning principles of the Quadnet Addressable Intelligent Fire Alarm and Detection system, and covers the Power Supply Unit only.

Due to the complexity and inherent importance of a system covering a 'Life Protection Risk', training on this equipment is essential, and commissioning should only be carried out by competent and approved persons. For further details of the availability of commissioning services contact your supplier.

System Design

This document does not cover Fire Alarm system design, and a basic understanding is assumed.

A knowledge of BS5839: Pt 1: 2002 +A2: 2008 : Fire Detection and Alarm Systems for Buildings is essential.

It is strongly recommended that a suitably qualified and competent person is consulted in connection with the Fire Alarm System design and that the entire system is commissioned in accordance with the current national standards and specifications.

Equipment Guarantee

The equipment carries no warranty unless the system is installed, commissioned and serviced in accordance with this manual and the relevant standards by a suitably qualified and competent person or organisation

Anti Static Handling Guidelines

Immediately prior to handling any PCBs or other static sensitive devices, it is essential to ensure that a personal **connection to earth is made with an anti-static wrist-strap** or similar apparatus.

Always handle PCBs by their sides and avoid touching any components. PCBs should also be stored in a clean dry place, which is free from vibration, dust and excessive heat, and protected from mechanical damage.

Warning

Do not attempt to install this equipment until you have fully read and understood this manual.

Failure to do so may result in damage to the equipment and could invalidate the warranty.

Technical support will not be available if the instruction manual has not been read and understood. Please have this instruction manual available whenever you call for technical support.

For further technical support please contact your distributor. Do not call the Fike Safety Technology support department unless your distributor has first given their advice and attempted to rectify the issue.

EMC

This equipment when installed is subject to the EMC directive 2004/108/EC. It is also subject to UK Statutory Instrument 2006 No. 3418.

To maintain EMC compliance this system must be installed as defined within this manual. Any deviation from this renders the installer liable for any EMC problems that may occur either to the equipment or to any other equipment affected by the installation.

The Quadnet System

The Quadnet system is an addressable intelligent detector system, with many advantages over traditional addressable analogue detector systems. In order to understand the benefits let us look more closely at the terms **Fire Detector** and **Fire Sensor**. These terms are often used interchangeably but actually have quite different meanings. A fire detector is the device (component as defined in EN54) which automatically detects a fire. In the majority of addressable fire detection systems, the fire devices are in fact fire sensors which only transfer data relating to smoke and heat levels to the control panel, and the fire decision is made by the panel.

Nearly all current addressable systems are **Addressable Analogue Detector Systems** where the control panel continually scans the fire sensors, processes the returned data, and makes decisions about fires and faults.

The Quadnet system is defined as an **Addressable Intelligent Detector System**, or an **Addressable Fire Detection and Alarm System with Independent Distributed Intelligence.** Distributed intelligence signifies that the signal processing is spread throughout the system, in order that the decisions about fires and faults are taken within the detector itself. The detector is capable of being remotely programmed for different modes of detection.

Thus the Quadnet system is indeed an analogue addressable system, but with the processing power distributed across the entire system. This dramatically reduces the complexity of the control panel and the data traffic, and improves the efficiency of the system.

The system addressing is carried automatically upon initialisation from the control panel, and does not need to be programmed manually at each device.

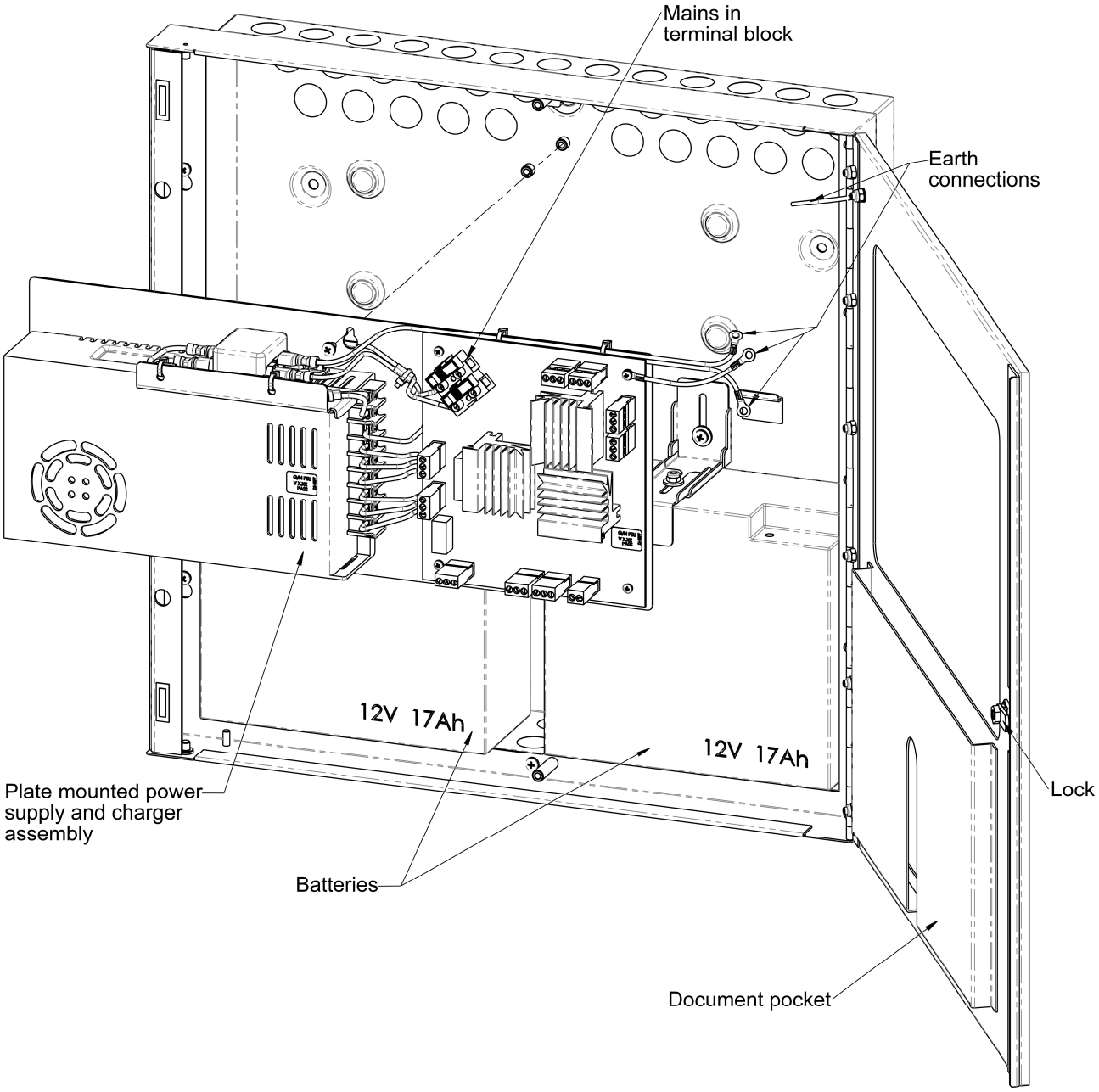
Advantages of Addressable Systems

The nature of a microprocessor control system with individually identified devices means that the precise location of fires and faults may be indicated, more complex actions may be implemented, system flexibility is improved and installation and cabling costs are reduced.

In the Quadnet system, very efficient communications mean that very low quiescent power consumption maximises the standby capacity, high power transfer capabilities allow more sounders to be connected to the loop, and a very fast response to events is achieved as the control panel does not have to poll every device for status data.

Power Supply Unit

The General Assembly



NOTE: The diagram above shows a V3 PSU. Earlier models differ slightly.

The power supply is normally supplied disassembled to make first fix easier. If the panel is already assembled it must be disassembled in order to fix the backbox to the wall.

If the power supply needs to be disassembled in order to fix the box to the wall see “Power Supply Disassembly”.

Power Supply Disassembly

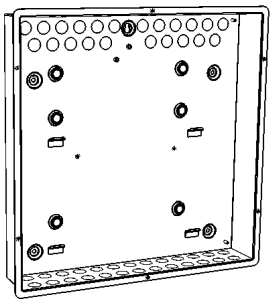
Remove the collar / flange assembly complete with door as follows. Loosen the 4 screws in the keyhole slots (2 per side). Remove the retaining screws (2) one at the top and one at the bottom. Lift off the collar / flange assembly complete with door and set aside.

The PSU Assembly is mounted on a chassis which is fixed into the box by 1 screw through a keyhole slot at the top of the chassis. There are two metal retainers at the bottom.

The screw must be loosened then the chassis plate can be lifted up and out of the box.

Cabinet Installation

This back box is compatible with the Quadnet range of Fire Alarm Control Equipment and is common to the range of control panels, repeater panels and power supply units.



Surface Mounting

At least four of the five mounting holes should be used to secure the cabinet to a solid wall using suitable screws of at least 50mm in length. A gap of at least 50mm should be left between this enclosure and the control panel enclosure (if mounted adjacent).

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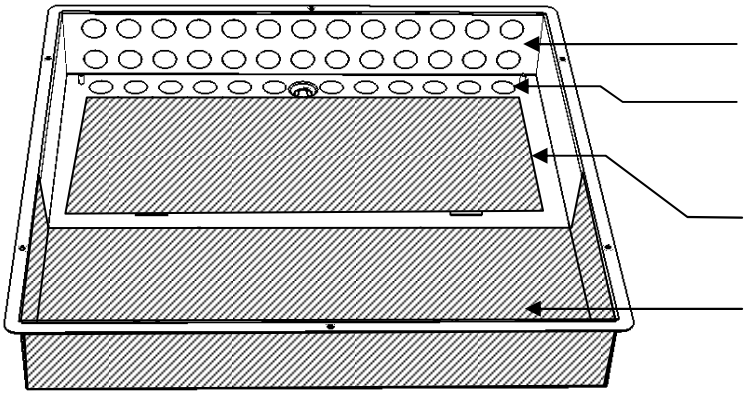
Cable Entry

The cable entry locations available will depend on the type of unit that is intended, and it is important to note which cable entry areas are suitable for each derivative.

Quadnet Power Supply Unit



The two rows of knockouts at the top are suitable.

The single row of knockouts in the rear at the top is suitable (not the second row).

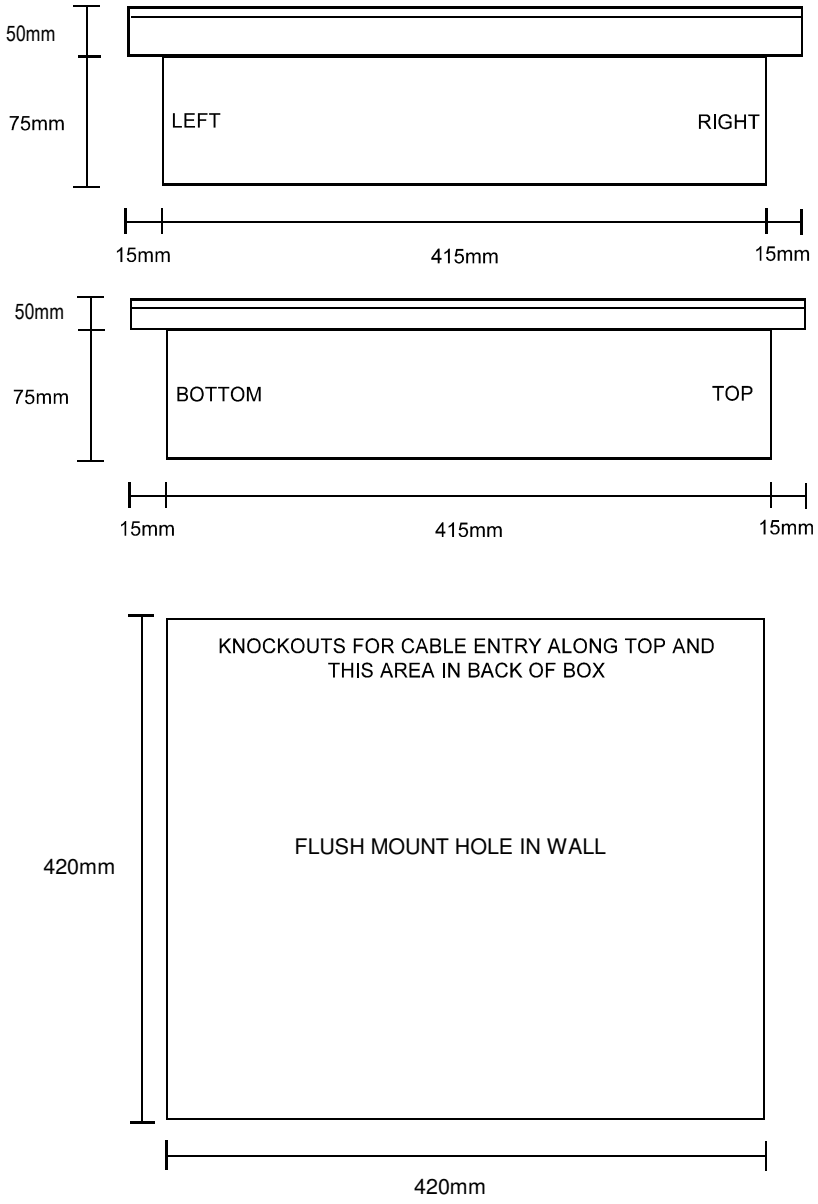
The main rear face in the top half must be kept clear for mounting the electronics.

The main rear face and the two sides in the bottom half, and the bottom edge, must be kept clear for mounting the batteries.

Technical Data

Dimensions:	Width x Height (excluding flange)	415mm x 415mm
	Width x Height (including flange)	445mm x 445mm
	Depth	75mm
Flush Mount Hole Size	Backbox only	420mm x 420mm

Physical Dimensions



Power Supply Assembly

This is the reverse of the disassembly process above.

Topology & Cabling

All system wiring should be installed to comply with BS 5839: Pt 1: 2002: Amendment 2: 2008 and BS 7671 (wiring regulations) and any other standards relevant to the area or type of installation. A cable complying with the BS 5839: Pt 1: 2002 Category 1 (cables required to operate for prolonged periods during fire conditions) is required. This must be a 2-core 1.5mm^2 screened fire resistant cable (ie. MICC, FP200, Firetuff, Firecell, Lifeline or equivalent). Ventcroft No-Burn multicore cable was utilised during the LPCB approval testing.

If connected to the Quadnet control panel, the Power Supply Unit requires both a data connection and dual power connections. Thus, one x 2 core 1.5 mm^2 screened fire resistant cable must be installed between the PSU and the control panel for data connection, and 2 x 1.5 mm^2 screened fire resistant cable must be installed between the PSU and the control panel for 24V DC power connections if each cable is no longer than 6.3m (use 2.5 mm^2 for 24V DC power cables up to a maximum of 9.5m).

In order to protect against possible data corruption it is important to ensure the following points are adhered to:

1. The data and power cables must have the **screen/earth connected at the control panel and at the Power Supply Unit** using the terminals provided.

2. **Do not use a 4-core cable** to save the installation of two 2-core cables. It is essential that individual 2-core cables are used.

When fitting the mains, power and signal cables to the Power Supply Unit equipment and before attaching the connectors, slide the ferrite sleeve over the cable so that it butts up against the Power Supply Unit case. Fit the tywrap around the cable under the ferrite sleeve to lock the ferrite into position on the cable.

Cable Specification

For DC Power and Communications between PSU and Control Panel:

Max Capacitance Core to Screen ..... 180pF / m

Max Capacitance Core to Core..... 100pF / m

Max Inductance..... 1.0mH / km

Max Resistance Two Core Screened 1.5mm² ..... 12.1Ω / km

Fire Proof ..... BS5839: Pt1: 2002 Category 1

Example ..... Datwyler 8700

Mains Supply & Batteries

The Fire Alarm Panel 230V AC supply requires fixed wiring between 0.75 mm^2 and 2.5 mm^2, a 3 amp fused un-switched spur with local isolation, to be terminated into the fused terminals provided in the power supply back box. The mains supply should be dedicated to the Fire Alarm Panel and should be clearly labelled 'FIRE ALARM: DO NOT SWITCH OFF' at all isolation points.

The standby will vary depending on the system loading. The PSU requires 2 x 12V 17Ah sealed lead acid batteries. These are to be sited in the power supply back box in the provided enclosure along the bottom edge. The batteries should be connected in series using the connection leads supplied. We recommend the use of type Yuasa NP17-12I (FR) or other equivalent approved type.

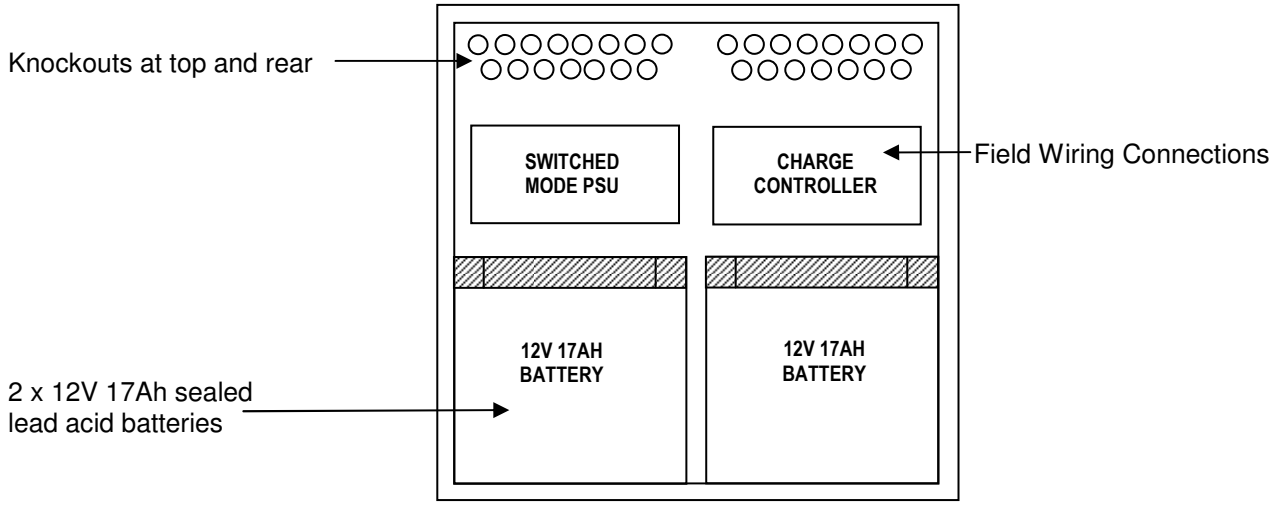
Do not use larger or smaller capacity batteries on this system, larger batteries will not fully charge in the time allowed and smaller ones will be overcharged and the service life will be reduced.

Using different capacity or type of batteries could also invalidate any warranty.

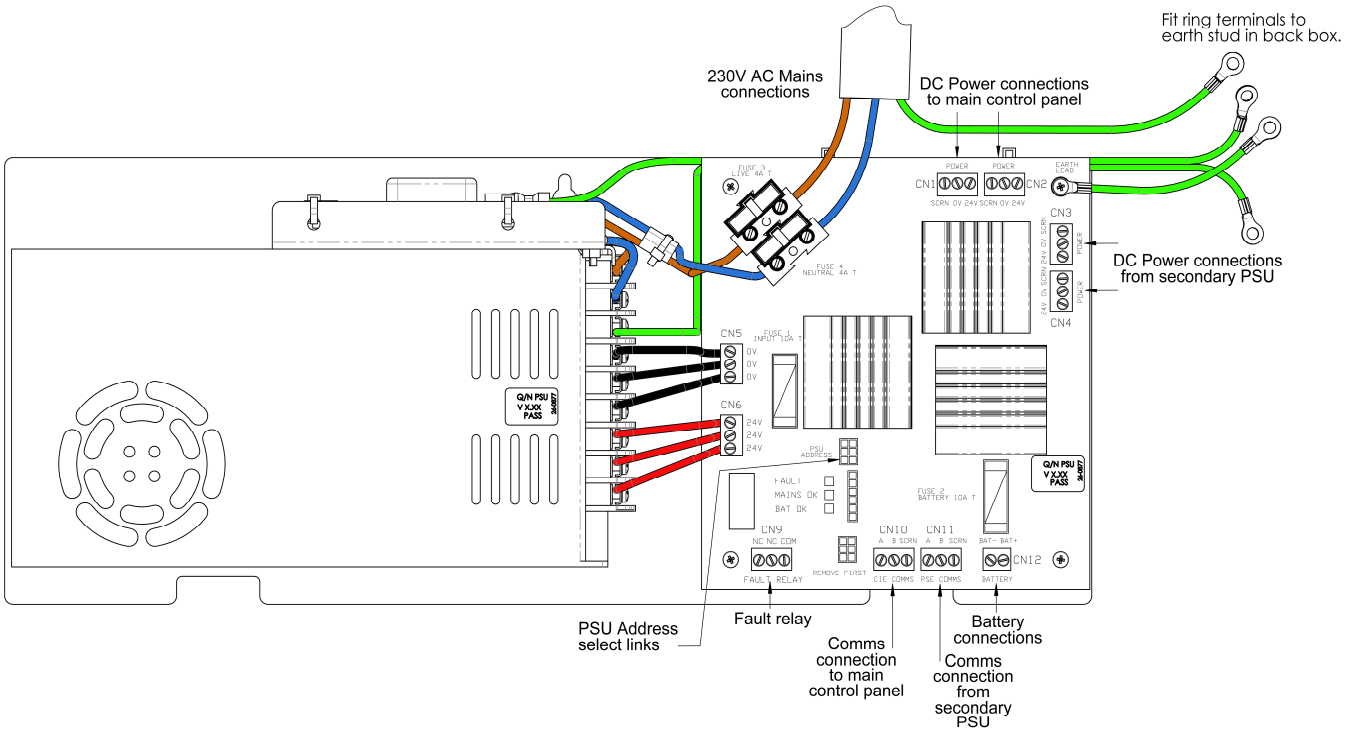
Note that batteries are electrically live at all times and great care should be taken to ensure that the terminals are never presented with a short circuit. Care should be taken at all times, especially during transit, installation and normal use.

Use caution as there is a risk of explosion if the batteries are replaced by an incorrect type.

Batteries no longer required should be disposed of in a safe and environmentally friendly manner by the battery manufacturer or a suitable recycling service. They should never be incinerated or placed in normal rubbish collection facilities. Dispose of used batteries according to the instructions.



PSU Termination Schematic



NOTE: The diagram above shows a V3 PSU. Earlier models differ slightly.

PSU Terminals

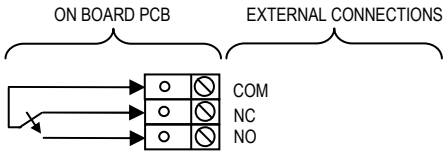
Mains Input: L, N, E

The 230V AC input is to be connected into the terminals provided on the Charge Controller Unit. This input is protected by the 4AT live and neutral fuses adjacent to the terminals. Please use caution as double pole live and neutral fusing is used.

Battery Connections: +24V, 0V

The battery terminals require 24V from 2 x 12V 17Ah sealed lead acid batteries, connected in series, in order to provide secondary backup power when the primary power fails. This input is protected by the 10AT fuse adjacent to the terminals.

Fault Relay: NO, NC, COM



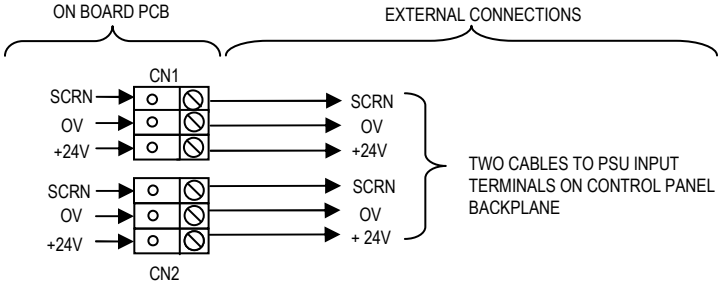
The Fault relay is a single-pole change-over 'volt-free' relay contact. The relay contacts are rated at 30V DC / 1A max. All inductive loads should be diode protected to prevent back EMF. However, if this is not done, the load should be limited to 200mA to reduce the likelihood of back EMF causing damage to the relay contacts.

The relay is de-energised in the fault condition.

Terminal	Description
COM	Common contact
NC	Normally closed contact
NO	Normally open contact

PSU OUTPUT TO CIE: SCRN, 0V, +24V, SCRN, 0V, +24V

The PSU OUTPUT connections connect the DC power from the PSU to the main control panel.



The PSU connections connect the Power Supply Unit to the control panel.

To comply with EN54-4, two 2-core 1.5mm^2 screened cables must be used for the +24V and 0V power connections, up to a maximum of 6.3m in length. These cables should be connected at each end using the SCRN terminals provided

If a greater distance is required between the main PSU and the main control panel, then two 2-core 2.5mm^2 screened cables should be used for the +24V and 0V power connections, up to a maximum of 9.5m in length. These cables should be connected at each end using the SCRN terminals provided.

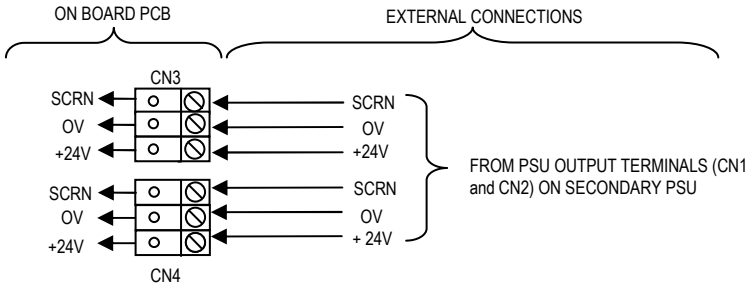
NOTE: that if using multiple external PSUs, the quoted maximum cable lengths are the total length from the CIE to the last PSU, not the length of each individual cable run.

Duonet control panels prior to V3 (backplane PCB Issue 3) do not have twin power connections for an external PSU or the facility for monitoring comms with an external PSU so it is recommended that no external PSU is used with those panels. For V3 Duonet control panels, wire as per Quadnet control panels above.

Terminal	Description
SCRN	Cable screen connection
+24V	Power Supply +24V connection
OV	Power Supply 0V connection

PSE INPUT: SCRN, 0V, +24V, SCRN, 0V, +24V

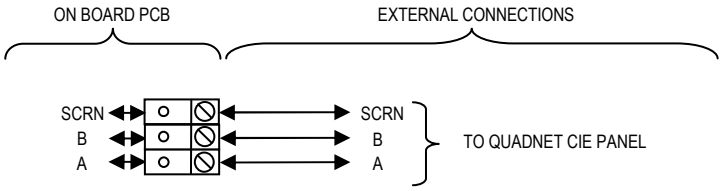
The PSE INPUT connections connect a Secondary PSU to the main Power Supply Unit.



The Secondary PSU must be installed adjacent to the main Power Supply unit. Two 2-core 1.5mm^2 or 2.5 mm^2 screened cables should be used for the +24V and 0V power connections. These cables should be connected to earth at each end at the SCRN terminals provided

Terminal	Description
SCRN	Cable screen connection
+24V	Power Supply +24V connection
OV	Power Supply 0V connection

CIE COMMS: A, B, SCRN,



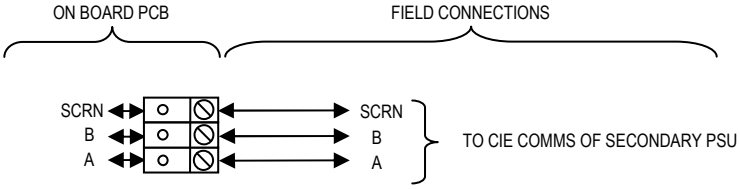
The CIE COMMS connections transmit the PSU status to the main CIE panel. These cables are fault monitored and are required for full fault monitoring of the PSU.

A 2-core 1.5mm^2 screened cable should be used for the Data connections (A and B), up to a maximum of 9.5m in length.

NOTE: If using multiple external PSUs, the quoted maximum cable length is the total length from the CIE to the last PSU, not the length of each individual cable run.

Terminal	Description
A	Serial Data connection A
B	Serial Data connection B
SCRN	Cable Screen connection

PSE COMMS: A, B, SCRN,



The Secondary PSU must be installed adjacent to the main Power Supply unit. The PSE COMMS connections transmit the status of any secondary PSUs to the main PSU. These cables are fault monitored and are required for full fault monitoring of any secondary PSU fitted.

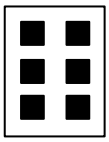
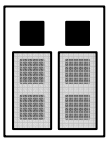
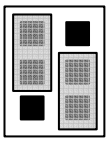
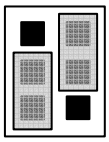
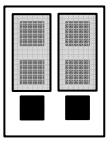
A 2-core 1.5mm^2 screened cable should be used for the Data connections (A and B).

Terminal	Description
A	Serial Data connection
B	Serial Clock connection
SCRN	Cable Screen connection

Address Select Links

Each PSU connected to the same control panel must be given a unique address.

Addresses are set using the address select links on the Quadnet PSU Charge Controller Unit, fitting link jumpers in the appropriate positions as follows:

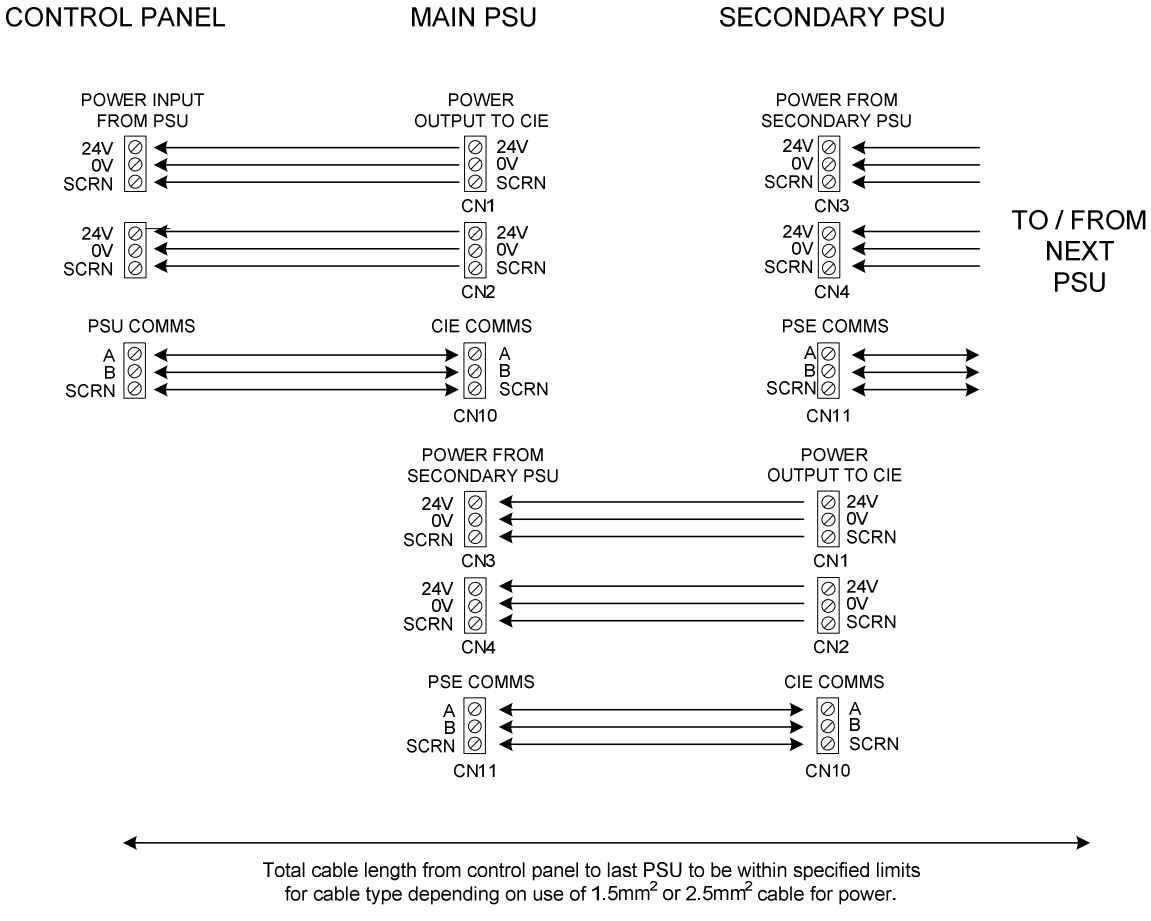
ADDRESS	0	1	2	3	4
LINK JUMPERS					

For normal Quadnet systems where only one PSU is used with the panel, the PSU's address must be set to 0 or 1.

If connecting secondary PSUs to the Quadnet system the main PSU should be address 1 and up to 3 more PSUs may be connected (addressed in sequence).

Note that if the Quadnet PSU is used as an additional external PSU for a Duonet control panel, the internal PSU within Duonet already has address 1. Therefore the external PSU addresses should start at 2 and continue in sequence up to address 4.

Example Connection Diagram



Fuses

The following fuses are located on the Charge Controller Unit.

Fuse No	Label	Fuse	Type	Breaking Capacity	Max Rated Voltage
FUSE1	Input from SMPS	10A T	Glass	100A	250VAC
FUSE2	Battery	10A T	Glass	100A	250VAC
FUSE3	Mains Input: Live	4A T	Ceramic	1500A	250VAC
FUSE4	Mains Input: Neutral	4A T	Ceramic	1500A	250VAC

Commissioning

Installation 1st Stage

The Power Supply Unit back box should be mounted, with the mains supply tested, connected and isolated at the un-switched fused spur, ready for the commissioning engineer.

The installer needs to provide a set of **As-Wired** drawings and proof of **cable continuity and insulation test readings** etc., to enable commissioning to proceed. This information is essential for commissioning and programming to proceed, and may be entered onto the forms provided at the rear of the manual.

Power Up

It is generally advisable that this Power Supply Unit should be powered up by making the 230V AC mains connection before the batteries are connected.

Good Practice

The following suggestions are good practice if carried out during commissioning, and may help avoid common problems at a later date. The Fike Technical Support department may be unable to assist if the information is unavailable, and the guidelines not followed.

Battery Data

Make a clear note by labelling of the batteries of the installation date and the battery voltage. The battery voltage should be taken for each battery with the 230V AC mains supply removed, and the system in the quiescent state. The voltage should also be noted on the label of each battery as a part of the system servicing.

Cable Readings

Make a clear note in the Power Supply Unit of the cable continuity and insulation resistance readings, including those for the screen and mains earth.

Technical Data

Power Supply Unit

	Quadnet Power Supply Equipment	
Dimensions	W x H x D	445mm x 445mm x 110mm
Power Supply	Standby batteries	2 x 17Ah 12V sealed lead acid batteries
	Mains supply	230V AC nominal
	Vmax	31V
	Vmin	19V
	Ri max	0.5R (max internal resistance)
	I min	350mA (min output current)
	I max a	5.5A (max output current)
	Battery Charging	27.3V @ 21°C, temperature compensated
	Voltage/Current Details	-5°/+40°C, max charge current 1.7A
	Ripple and noise	<= 5% of Vmax
Outputs	Relay Outputs x 1	Volt free contact SPCO Fault Output 30V DC @ 1.0A max

Note: Refer to the relevant sections in the manual for full details of output ratings

Further Information

PSU Cable Continuity & Insulation Test Results

After installation of the cable, and termination into all the relevant back-boxes, take cable continuity and insulation readings. Make sure that all the cables are dressed smoothly and neatly into their back-boxes in order that they will not be disturbed after the readings are taken.

The commissioning engineer will require these readings, along with correctly marked 'as-wired' drawings and completed configuration sheets, before attending site to commission the system.

CORE	**CONTINUITY READING (OHMS)**			
	PSU Data	***Power 1***	***Power 2***	
+ve to -ve with temp short circuit applied				
-ve to Earth with temp short circuit applied				
+ve to Earth with temp short circuit applied				

A reading of approximately 1 ohm per 100 metres of 1.5 mm^2 cable is expected and any significant variation from this should be investigated. If the above readings are satisfactorily showing circuit continuity then you may also take the reading below.

CORE	**INSULATION READING (OHMS)**			
	PSU Data	***Power 1***	***Power 2***	
+ve to -ve				
+ve to Screen				
-ve to Screen				
Screen to Mains Earth				

A reading in excess of 1 M ohm is expected and any significant variation from this should be investigated. If the readings are satisfactory then the loop wiring is largely proven other than for faults such as complete polarity reversal.

Site Name & Address:	
Installation Company:	
Testing Engineer:	
Signature:	
Date:	

Your Notes

Your Notes

Your Notes

Important Points

- Use a **2-core 1.5mm^2 (or 2.5mm^2 for power connections up to 9.5m) with screen fire rated cable**.

- Make sure that the PSU screen cables are sleeved and connected to the appropriate terminals **at both ends.**

- For PSU connections to control panels install two power connection cables and one data connection cable.

- Leave a copy of the User Instructions by the control panel, and make sure that you have explained its operation carefully to the relevant persons (the user, not the contractors or their agents).

If you have any further queries, please contact your supplier for further information.