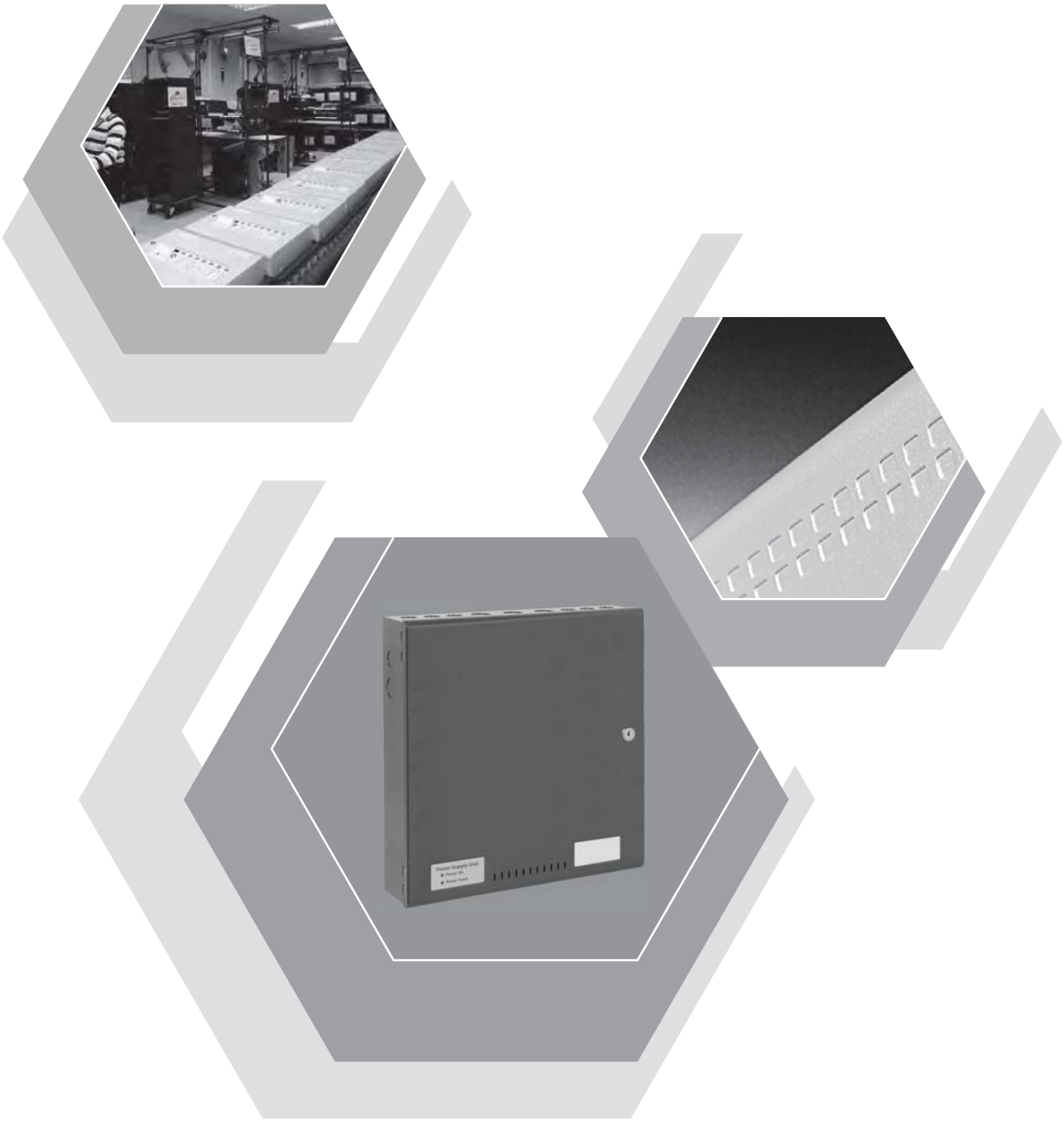
K8140 & K8141 Series

Fire Alarm Power Supplies

Installation, Commissioning and Operating Manual

Man-1223 (K8140 & K8141 Series) Issue 01.07 January 2015



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Fire Alarm Equipment

Kentec Electronics Ltd.

Kentec Electronics Ltd.
10.25 Amp Power Supply - Installation and Operation Manual
Man-1223 (K8139-00), Revision E01.07, Issue Date 1/9/2015

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Section 1

Introduction

This manual describes models of the Kentec 10.25 Amp Power Supply. Models of the power supply operate on 115 VAC or 230 VAC and include standard or deep cabinets based on standby-battery capacity.

Standard cabinet models of K8140 accept standby-batteries up to 18 AH. Deep cabinet models of K8141 accept standby-batteries up to 40 AH. All cabinet models of the 10.25 Amp Power Supply are provided in red or gray color.

Reference Appendix B, Equipment list of this manual for a complete description of features available for the 10.25 Amp Power Supply.

This section describes:

- Using This Manual
- Document Conventions
- If You Need Help

The figure below illustrates the 10.25 Amp Power Supply:

Figure 1-1
10.25 Amp Power Supply

Using This Manual

The following sections provide instructions for installing, testing and troubleshooting the 10.25 Amp Power Supply:

Section 1	Introduction provides document conventions, the technical help-line, repair and return information.
Section 2	Overview provides a summary of features for the 10.25 Amp Power Supply.
Section 3	Installation describes how to setup, install, test and troubleshoot the 10.25 Amp Power Supply.
Section 4	Maintenance and Repair describes how to maintain and repair the 10.25 Amp Power Supply.
Appendix A	Specifications provide operating characteristics of the 10.25 Amp Power Supply.
Appendix B	Equipment List provides model numbers of the Kentec 10.25 Amp Power Supply.
Appendix C	Door Label provides a summary of connections available on the 10.25 Amp Power Supply.
Appendix C	Calculations describes how to determine current loading and battery capacity on the 10.25 Amp Power Supply.
Appendix D	Door Label provides a summary of connections available on the 10.25 Amp Power Supply.
Appendix E	Operating Instructions provides a summary of operating procedures available on the 10.25 Amp Power Supply.

Document Conventions

This document contains conventions for part numbers and writing style.

Part Numbers

Part numbers are provided in Section 1, Appendix B and Appendix D of this manual. Refer to Appendix D, Door Label for a diagram summary of this manual. Refer to Appendix B, Equipment List for a complete list of part numbers required for completing this installation.

Writing Styles

Before you begin using the 10.25 Amp Power Supply, familiarize yourself with the stylistic conventions used in this manual:

Italic type	Denotes a displayed variable, a variable that you must type, or is used for emphasis.
Courier font	Indicates text displayed on a computer screen.

If You Need Help

If you need technical support contact Kentec at + 44 (0) 1322 222121 or e-mail the department, techsupport@kentec.co.uk. Kentec technical support is available Monday through Friday, 8:00 AM to 5:00 PM and Saturday 8:00 AM to 12:00 PM.

Limited Returns and Repairs Policy

In-Warranty Items

All equipment supplied by Kentec Electronics Ltd is provided with a warranty, as defined in Section 8 (Warranties & Liability) of the Terms and Conditions of Sale. These warranties are between Kentec Electronics Ltd (the Seller) and the company that placed the order upon the seller (the Buyer). The warranty period is valid for 36 months from the delivery date and is non-transferable.

Damaged Goods

In the event of damage to equipment during transit or any defect in the quality of goods, the Buyer shall notify Kentec Electronics Ltd within seven days of delivery as detailed in Section 8.5 of the Terms & Conditions of Sale. The goods may then be returned to the Customer Service Department of Kentec Electronics Ltd. for repair, or replacement parts may be supplied (by arrangement).

Component Failure

In the event of a defect of the supplied equipment during the warranty period, due to defective materials or workmanship, then replacement parts shall be supplied to the Buyer using the Service Replacement Item (SRI) scheme.

Service Replacement Items

The Buyer shall request the replacement part(s) required from the Customer Service Department. This request shall be made by fax to +44 (0)1322 291794 or e-mail to sales@kentec.co.uk and shall include the parts required, the panel Works Order (W/O) Number and the required delivery address.

If the Buyer is not aware of the required replacement part(s), additional advice may be obtained from the Technical Support Department of Kentec Electronics Ltd. Once the SRI has been approved, items are normally dispatched for next day delivery within the mainland UK, subject to stock availability.

SRI parts are supplied on the following terms and conditions:

- SRI parts are loan items and are not available for resale.
- At all times, Kentec Electronics Ltd. retains the title of SRI parts supplied, as detailed in Section 7.4 of the Terms and Conditions of Sale.
- All SRI parts must be returned to the Customer Service department of Kentec Electronics Ltd within 14 days of delivery.
- Any SRI parts that have not been returned within 28 days of delivery will be invoiced at the price given in the Kentec Price List, less discount.
- Any returned items that are found to have failed due to fair wear and tear, willful damage, negligence, abnormal working conditions, misuse or alteration or repair without the Suppliers approval or failure to follow the sellers instructions will be subjected to a repair fee of up to the price given in the Kentec Price List, less discount.
- Any returned items that are not part of the original equipment or are not in warranty will be invoiced at the price given in the Kentec Price List, less discount where applicable.
- All SRI parts shall be returned in the same packaging as the replacement parts were supplied in. Failure to ensure that adequate anti-static precautions are taken during the replacement of parts, or in the return of SRI parts may result in an invoice of up to the price given in the Kentec Price List, less discount.
- Any SRI parts returned without the completed SRI delivery report or any SRI reference documentation will be invoiced at the price given in the Kentec Price List, less discount.

The right to receive Service Replacement Items is regularly reviewed and may be withdrawn from persistent abusers of this facility. Kentec reserve the right not to supply SRI items without prior notice.

Out of Warranty Items

Kentec Electronics Ltd provides a test and repair facility for most standard and special build products. This facility can also recondition control panels, subject to availability of components.

Customer Repairs

Items for repair shall be returned to the Customer Service Department of Kentec Electronics Ltd. Any items returned for repair must be accompanied with the following:

- A request for repair work to be undertaken.
- A customer contact name.
- Details of the company requesting the repair.

Failure to supply the required information will result in the returned items being quarantined for a period not exceeding 60 days. If the items are not identified within 60 days of receipt, then Kentec Electronics Ltd reserves the right to dispose of these items or return them.

A written quotation will be provided for all items to be repaired that are not included in the repair prices section of the Kentec Price list. No repairs or refurbishment will be undertaken without prior authorisation from the customer and a written order for the repair work. Returned equipment will be held awaiting authorisation for a period not exceeding 60 days from the date of quotation. After this period, Kentec Electronics Ltd. reserves the right to dispose of these items or return them.

Repair Warranties

Repaired items are not covered by the normal Warranties and Liability conditions in the Terms and Conditions of Sale. Subsequent failures of repaired items will only be covered if the failure is due to a material or workmanship defect directly associated with the repair and for a period not exceeding three months from the date of the repair.

Kentec Electronics Ltd are under no liability if the repaired or replaced components are found to have failed due to fair wear and tear, willful damage, negligence, abnormal working conditions, misuse or alteration or repair without approval or failure to follow the sellers instructions.

Items Returned For Credit

Items shall only be accepted for credit by written approval with the Operations Manager or Directors of Kentec Electronics Ltd. Items will only be eligible for credit in the first 3 months from the supply date.

Before any items are returned for credit, an RMA reference number must be obtained from the Sales / Operations Department. This number must be used for any correspondence relating to the goods. All goods returned for credit must be approved before receipt.

Written approval will then be issued using a Goods Return Application Form (KENQA196.03.03). A copy of this form must be supplied with the returned goods. The RMA reference number must be clearly marked on the outer packaging when returning goods to the company.

Goods must be returned to Kentec Electronics Ltd within 30 days of the issue of the Goods Return Application Form. Only items listed on this from must be returned under the RMA reference. Items returned without prior request for an RMA reference may be returned to the customer.

Failure to supply the required information will result in the returned items being quarantined for a period not exceeding 60 days. If the items are not identified within 60 days of receipt, then Kentec Electronics Ltd reserves the right to dispose of these items.

Any items returned for credit will be tested and returned to a production release condition. Any material and labour costs associated with this process shall be deducted from the credit amount in accordance with the Returned Goods Policy in the Kentec price list and at the discretion of the Managing Director.

Kentec Electronics Ltd.

Units 25-27 Fawkes Avenue,
Questor, Dartford,
Kent. DA1 1JQ
United Kingdom
Registered in England:
No.1937570
Tel: +44 (0)1322 222121
Fax: +44 (0)1322 291794

Section 2

Overview

The Kentec 10.25 Amp Power Supply is a supervised, remote, power supply and charger for operating fire alarm control and indicating equipment. The power supply complies with UL 864 ninth edition and operates on 120V or 240V AC @ 50Hz or 60Hz. The 10.25 Amp Power Supply is listed under UL 864 and UL 1481.

The 10.25 Amp Power Supply provides two regulated 24 VDC outputs capable of maintaining a combined-output of 8 Amps. A reserve current of 2.25 Amps is used for charging the standby-batteries.

Cabinets of the 10.25 Amp Power Supply are offered in Standard and Deep sizes. Standard size cabinets accept standby-batteries up to 18 AH and Deep size cabinets accept standby-batteries up to 40 AH.

Cabinet-colors of the power supply are available in red or gray.

The 10.25 Amp Power Supply provides the following features:

Deep-Discharge Prevention	The 10.25 Amp Power Supply prevents deep-discharge of the standby-batteries by disconnecting the load when the standby-battery-voltage drops below 19V DC. A deep-discharge can cause permanent damage to standby-batteries. Preventing this condition allows standby-batteries to recharge for continued operation after extended power-outages.
Battery-backup	Provides battery power to the load when the AC input of the 10.25 Amp Power Supply falls below the rated level. The voltage at the load remains within the specified range during these switching-transitions.
Battery-boost	Boosts standby-battery voltage to maintain a constant 22 VDC when the battery voltage drops below the 22 VDC level.
Short-circuit protection	Provides overload protection on the load side of the 10.25 Amp Power Supply.
Automatic-retry	Restores output to the load when operating conditions return to nominal levels. This feature restores voltage levels at the load following conditions such as over-load and battery depletion.
Battery Impedance	Provides a fault warning when the battery impedance reaches a level that affects operation of the system.
Battery Supervision	Battery presence and low battery voltage supervision
Ground Fault detection	Ground Fault Detection
General trouble Relay	All troubles are reported over the common trouble contacts

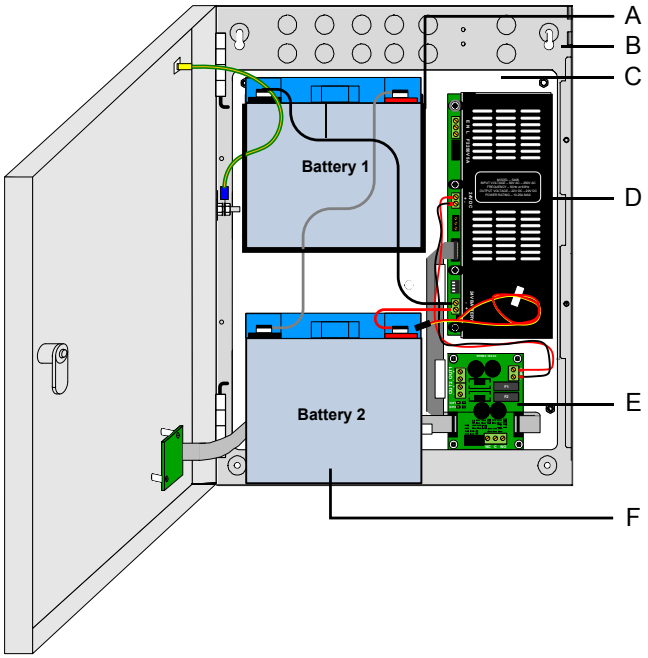
The 10.25 Amp Power Supply provides status LED indicators for:

AC Normal	The AC Normal LED lights green when the AC power is connected.
Heartbeat	The Heartbeat LED flashes yellow when the power supply is functioning.
DC Out On	The DC OUT ON LED lights green when the 24V DC output is functioning.
General Fault	The General Fault LED lights yellow when the charger is not functioning.
Earth Fault	The Earth Fault lights when less than 30K Ohm exists between 24V and ground.
Battery Low	The Battery Low LED lights when the standby-battery voltage is at or below 24V DC and the power supply is operating on AC power. The Battery Low LED lights when the standby-battery voltage is at or below 20.4V DC and the power supply is operating on standby-batteries during an AC power failure.
Battery Disconnected	The Battery Disconnected LED lights yellow when connections to the standby-batteries are open.

Hardware Features

The figure below illustrates hardware features of the 10.25 Amp Power Supply:

Figure 2- 1
Hardware Features



Key	Description
A	**Battery Shelf**
B	**Cabinet back-box**
C	**Back-plate**
D	**Power supply module**
E	**RPSM2 board**
F	**Standby-battery, two per cabinet**

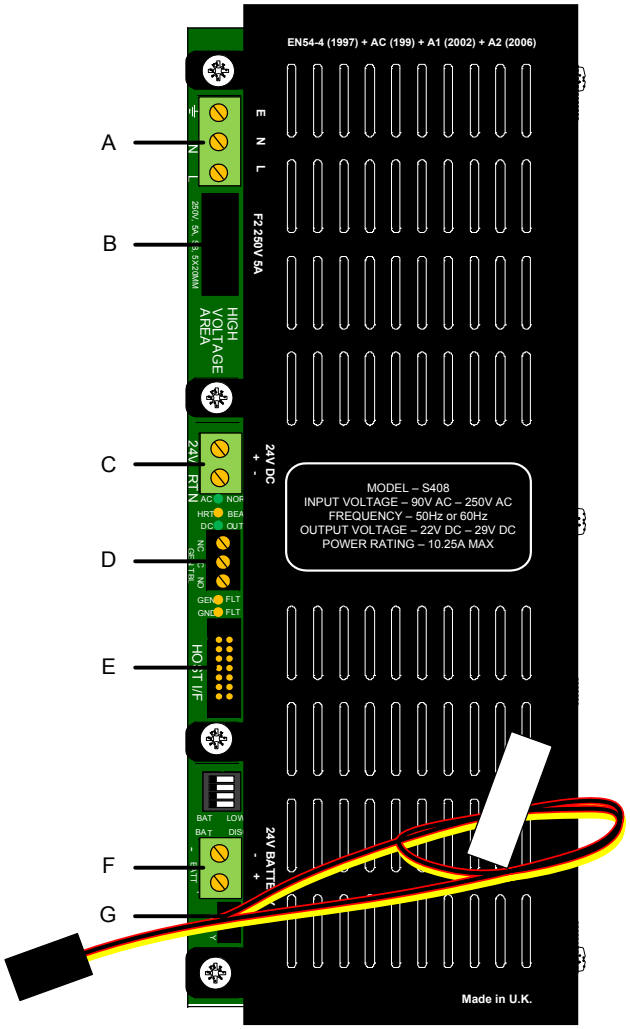
The 10.25 Amp Power Supply is offered in standard and deep size cabinet styles. Standard-Size cabinets accept standby-batteries up to 18 Ah and Deep-Size cabinets accept standby-batteries up to 40 Ah.

Reference Section 3, Installation for mounting dimensions of Standard-Size and Deep-Size cabinets.

Inputs and Outputs

The figure below illustrates inputs and outputs of the 10.25 Amp Power Supply Module:

Figure 2- 2
Inputs and Outputs

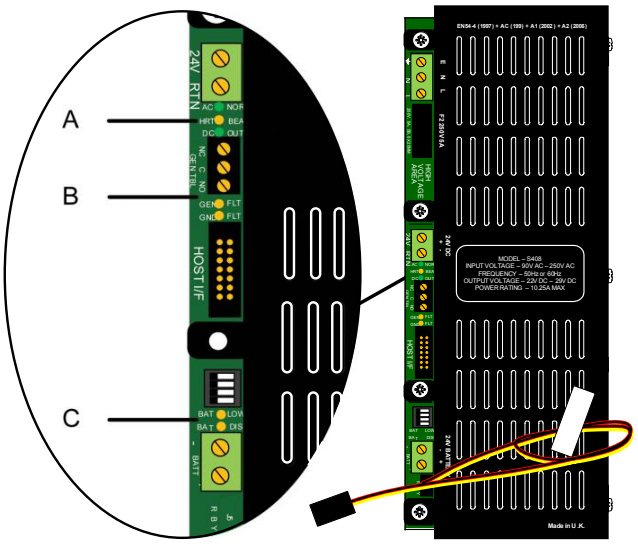


Key	Description
A	AC line input, Ground, Neutral, Line
B	5 Amp, Slow-blow, AC-line fuse
C	24V DC output, 24V, RTN
D	General trouble relay, NC, C, NO
E	Host I/F, ribbon cable connection
F	Standby-battery input, (-), (+)
G	Flying-lead temperature-sensor

LED Indicators

The figure below illustrates LED indicators of the 10.25 Amp Power Supply Module:

Figure 2- 3
LED Indicators



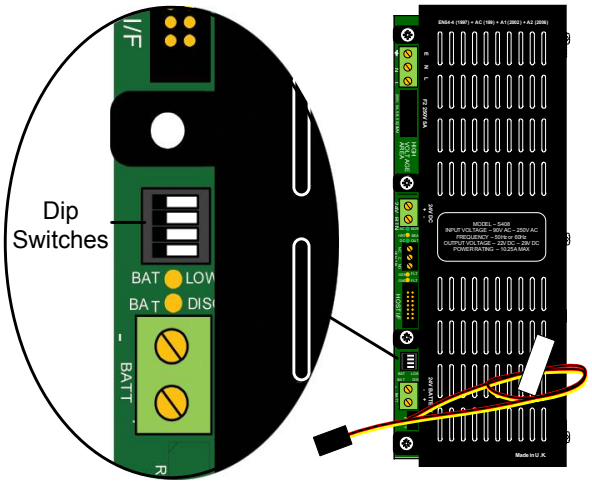
Key	Description
A	AC Normal
	Heartbeat
	DC Out On
B	General Fault
	Ground Fault
C	Battery Low
	Battery Disconnected

Dip Switches

Dip Switches are provided on the 10.25 Amp Power Supply for setting the manufacturer type and size of standby-batteries. Settings of the Dip Switches can also provide modes for factory testing and specific disablements.

The figure below illustrates Dip Switches of the 10.25 Amp Power Supply Module:

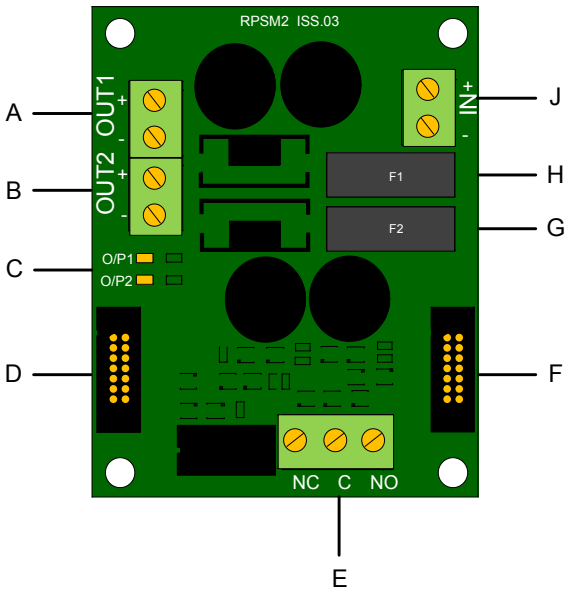
Figure 2- 4
Dip Switches



RPSM2 Board

The figure below illustrates the RPSM2 Board of the 10.25 Amp Power Supply Module:

Figure 2- 5
RPSM2 Board



Key	Description
A	OUT1 to fire alarm equipment
B	OUT2 to fire alarm equipment
C	Fuse failure LED indicators
D	Connector for Ribbon Cable Assembly containing Remote LED Board
E	Common Trouble Relay
F	Connector for Host I/F Ribbon Cable from 10.25 Amp Power Supply Module.
G	Fuse F2 for OUT 2
H	Fuse F1 for OUT 1
J	Input terminals from 24V and RTN of the 10.25 Amp Power Supply.

Section 3
Installation

Notice to Users, Installers, Authorities Having Jurisdiction, and other involved parties.

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864 9th Edition, certain programming features or options must be limited to specific values or not used at all as indicated below.

Program Feature or Option	Permitted in UL 864 ? (Y / N)	Possible Settings		Settings Permitted In UL 864
Battery Impedance Test	Y	SW1	Off – Enabled On - Disabled	Off or On*
Ground Fault detection Method	Y	SW2	Off – Dynamic On - Static	Off
Battery Size	Y	SW3	Off > 18 AH On ≤ 18 AH	Off* or On
Battery Manufacturer	Y	SW4	Off – Yuasa On - Power	Off or On

** SW3 must be Off when SW1 is On for UL approval.*

Reference Dip Switch Settings of this section for further information regarding the program features listed above.

This section provides instructions for connecting cables, mounting and testing the 10.25 Amp Power Supply for installation.

Install this product in accordance with NFPA 72, the National Electrical Code and all local codes.

General Installation Checklist

To complete the installation:

1 Create a plan for the fire alarm system and provide a checklist for installing the power supply.

2 Check the contents of the shipping package containing the 10.25 Amp Power Supply.

3 Identify the operating constraints of the fire alarm system and then determine the battery capacity of the fire control panel.

4 Mark the location for anchoring the cabinet-box to the premises-wall.

5 Remove the cabinet-door of the 10.25 Amp Power Supply.

6 Mount the cabinet-box of the fire control panel to the premises-wall.

7 Replace the standby-batteries in the base of the cabinet-box.

8 Replace the cabinet-door on the cabinet-box.

9 Connect the Trouble Relay.

10 Feed, secure and connect cabling.

11 Configure operation with Dip Switches of the 10.25 Amp Power Supply.

12 Install standby-batteries to the 10.25 Amp Power Supply.

13 Mount the Temperature Sensor and connect the RPSM2 Board.

14 Apply AC power from the main AC power source.

15 Connect the standby-batteries.

16 Test the installation of the 10.25 Amp Power Supply.

Before You Begin

Before you begin the installation, take a few minutes to review the installation information, gather the required items, and complete the tasks listed below to make the installation as quick and easy as possible.

1 Create a plan and checklist before beginning the installation process. Planning can reduce the number of problems that can occur during installation.

2 Select a mounting site that is a suitable operating environment for the 10.25 Amp Power Supply. The mounting site chosen should be clean, dry and not subject to shock, vibration or extreme temperatures.

3 Remove the 10.25 Amp Power Supply from the shipping package and check the contents to determine if the order has been satisfied.

Contact Kentec technical support if material is missing from the shipping package.

CAUTION!

Electronic components within the 10.25 Amp Power Supply are vulnerable to damage caused by electrostatic discharge. Ground straps must be worn by installers before handling electronic components to prevent this damage.

4 Acquire the following items that are not included with the 10.25 Amp Power Supply, but may be required for the installation:

Item	Quantity	Description
Mounting Hardware	1	The mounting hardware that secures the 10.25 Amp Power Supply to the premises-wall is not provided in the packaging.
Ground Strap	1	A ground strap is required for handling electronic components of the 10.25 Amp Power Supply. The ground strap is not provided in packaging of the 10.25 Amp Power Supply.
Standby-Batteries	2	Standard size cabinets accept 12V DC, 18 AH standby-batteries and deep size cabinets accept 12V DC, 40 AH standby-batteries. Reference Appendix B, Equipment List for compatible batteries from Powersonic or Yuasa.

CAUTION!

Disconnect power before removing the RPSM2 Board from the 10.25 Amp Power Supply. Never insert or remove the RPSM2 Board while powering the 10.25 Amp Power Supply. Electronic components can be permanently damaged when the RPSM2 Board is removed while the 10.25 Amp Power Supply is receiving power.

Determining System Current Draw

Determine the current draw of the fire alarm system for alarm and standby conditions. Use these maximum current values to determine the battery capacity.

Standby-Battery Capacity

Perform the installation only after calculations have been completed for a suitable battery size.
Battery standby-hours are dependent on battery capacity and load of the system.

Reference your equipment installation manual for further information regarding standby-battery capacity of the system.

Operating Constraints

Installation of the10.25 Amp Power Supply equipment must include the operating constraints of the system to maintain continuous signal monitoring and reporting of the equipment. Operating constraints are based on the current-driving capability of the power supply and the external loading caused by the equipment being powered.

External loads connected to the 10.25 Amp Power Supply outputs must be chosen within the driving limits of each output. The loading placed on these outputs can be caused by individual or multiple load combinations. Cabling is also an external loading property. Select cabling size and length based on the type of circuit connected to the output of the 10.25 Amp Power Supply.

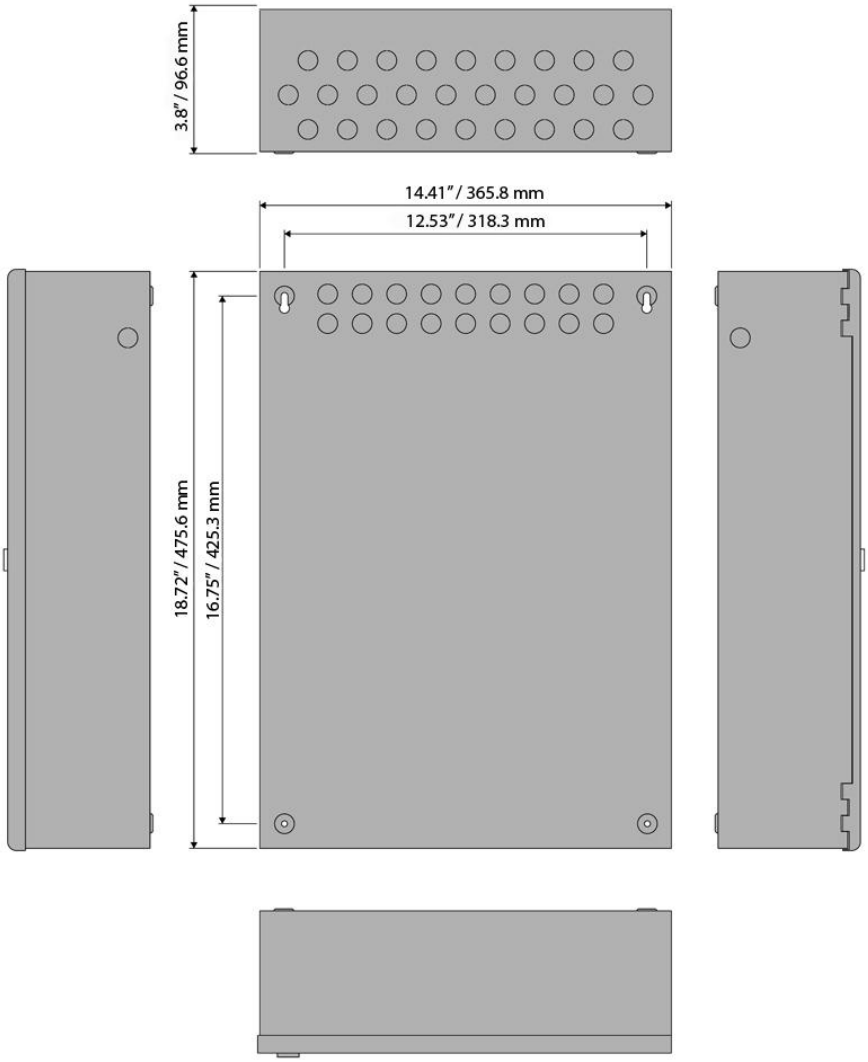
Reference your equipment installation manual for further information regarding standby-battery capacity of the system.

Marking the Location

Mark locations on the premises-wall for mounting the empty cabinet of the 10.25 Amp Power Supply. The 10.25 Amp Power Supply is offered in Standard-Size and Deep-Size cabinets.

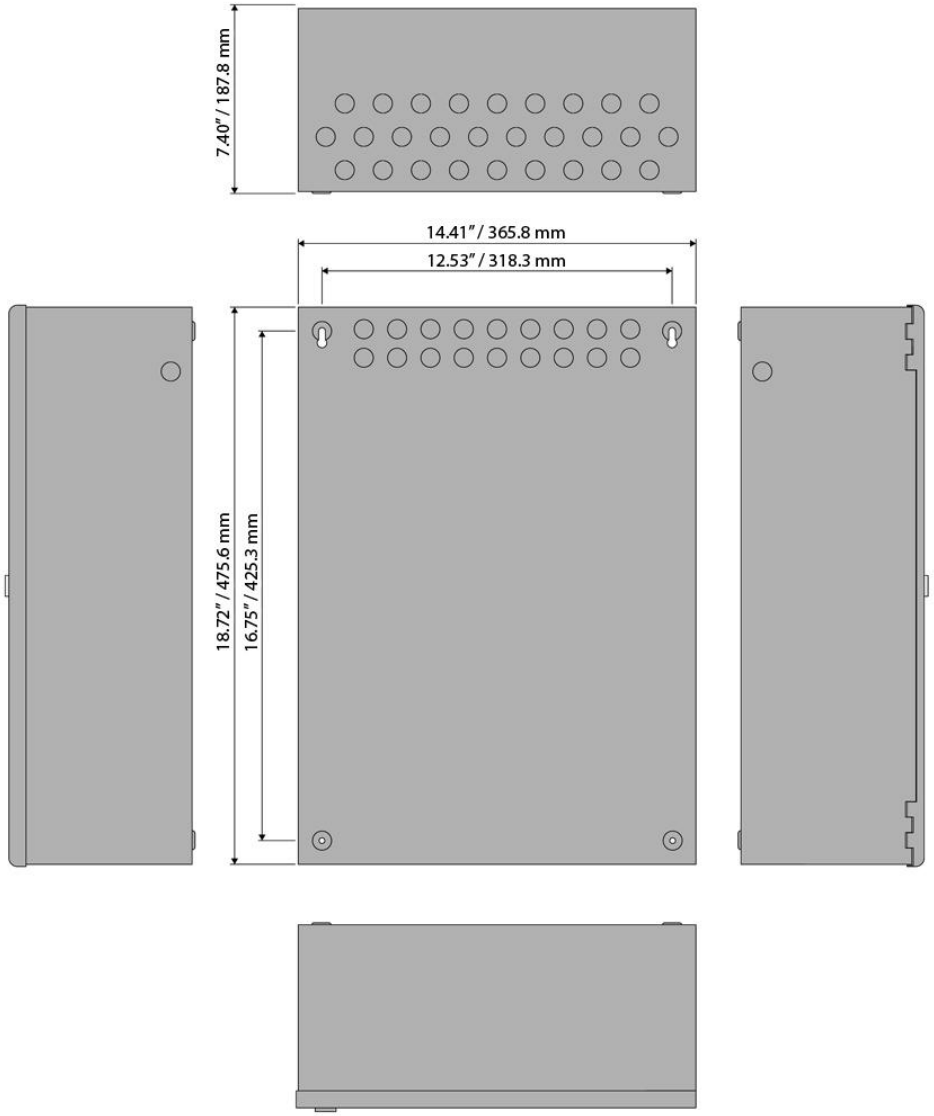
The figure below illustrates dimensions of the Standard-Size cabinet:

Figure 3-1
Standard-Size Cabinet Dimensions



The figure below illustrates dimensions of the Deep-Size cabinet:

Figure 3-2
Deep-Size Cabinet Dimensions



Removing Cabinet Components

Remove the cabinet door and standby-batteries before anchoring the 10.25 Amp Power Supply to the wall.

Removing the Cabinet-Door

Remove the cabinet-door to begin the wall-mounting process of the 10.25 Amp Power Supply.

To remove the cabinet-door of the 10.25 Amp Power Supply:

1 Place the 10.25 Amp Power Supply up-right on a flat surface such as a desk, bench or table-top. This will maintain alignment of the cabinet-door when it is removed from the cabinet-box of the 10.25 Amp Power Supply.

2 Turn the key to the right in the cabinet-door-lock to unlock and open the cabinet-door of the 10.25 Amp Power Supply.

3 Remove the ground-wire connection from the cabinet-door.

4 Remove the LED-ribbon-cable-connection from the RPSM2 Board.

5 Remove the LED-ribbon-cable from the two ribbon-cable retaining-clips.

6 Use needle-nose pliers to pull the head of the upper-pin away from the upper-hinge of the cabinet-door.

7 Brace the top-corner of the cabinet-door to maintain alignment with the lower-hinge.

8 Use needle-nose pliers to pull the head of the lower-hinge-pin away from the hinge-assembly of the cabinet-door.

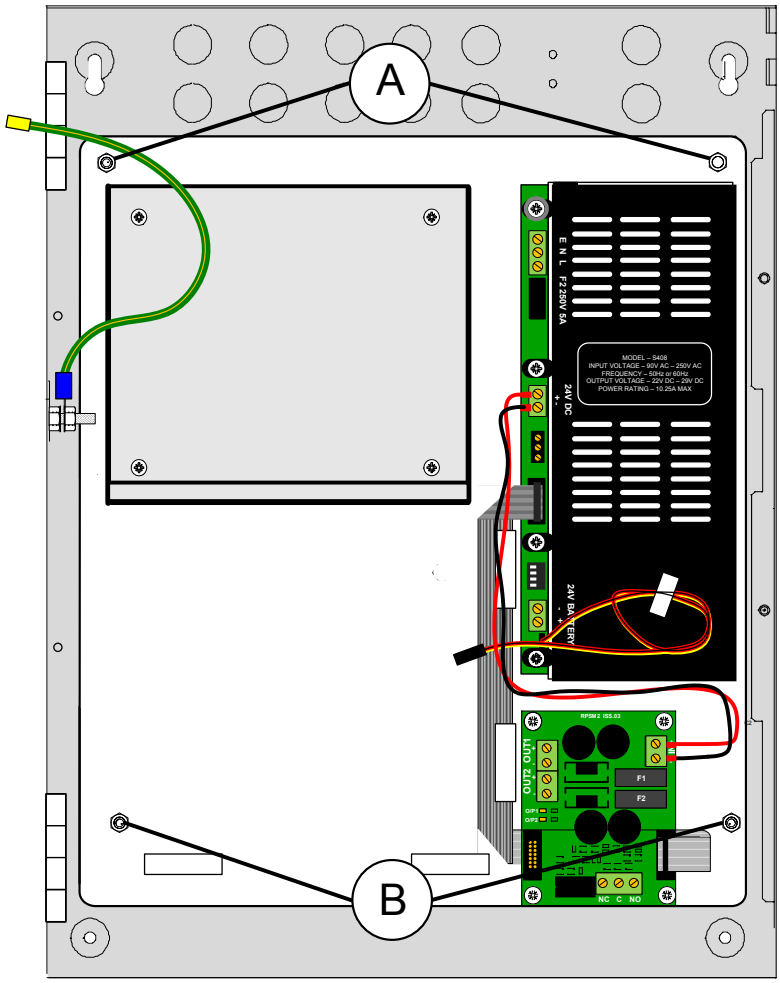
9 Remove the cabinet-door from the cabinet-box of 10.25 Amp Power Supply.
Return the hinge-pins to the hinges of the cabinet-box of 10.25 Amp Power Supply for safekeeping.

Removing the Back-Plate

Remove the back-plate from the cabinet-box of the 10.25 Amp Power Supply.
Remove 4-Phillips-head-screws from locations A and B on the back-plate of the cabinet-box.

The figure below illustrates locations A and B of the back-plate that secure the back-plate to the cabinet-box of the 10.25 Amp Power supply:

Figure 3-3
Removing the Back-Plate



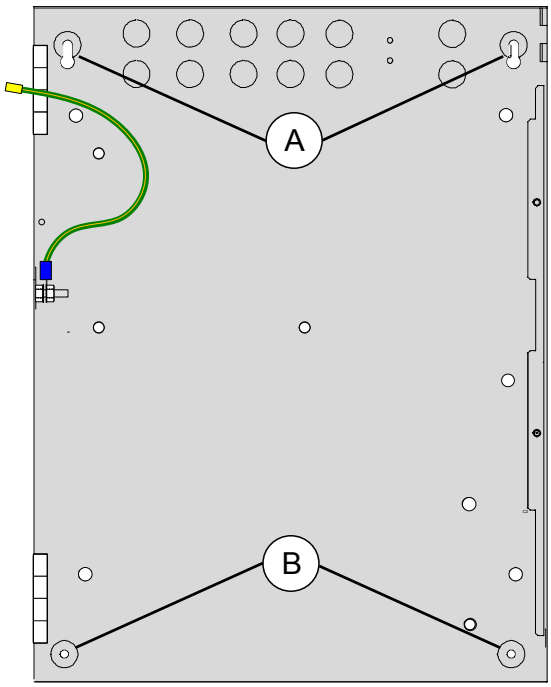
Mounting

Suitable fixings should be used at all fixing points so that the empty-cabinet is securely mounted and is not capable of moving once fixed. Cables should be connected using suitable cable glands fitted to the knockouts provided. All swarf and debris caused by the drilling of additional cable entries must be cleared before power is applied to the power supply.

Mount the cabinet-box on a flat and dry surface. Level the cabinet-box and secure it using screws or bolts with a minimum length of 40mm and a minimum diameter of 5mm. Mount the cabinet-box in 4 locations A and B on the cabinet-box.

The figure below illustrates mounting-hole-locations A and B of the cabinet-box:

Figure 3-4
Mounting the Cabinet-Box



Replacing Cabinet Components

Replace cabinet components after mounting the cabinet-box of the 10.25 Amp Power Supply.

To replace cabinet components after mounting the cabinet-box:

1. Install the Back-Plate
2. Replace the Cabinet-Door
3. Connect the Ground Wire to the Cabinet-Door.
4. Connect the LED Host I/F Ribbon-Cable to the RPSM2 Board.

Setting Dip-Switches

Set Dip Switches on the 10.25 Amp Power Supply Module before completing the installation. The power supply settings must be performed to establish the optimal charge current for the standby-batteries.

To set the Dip Switches:

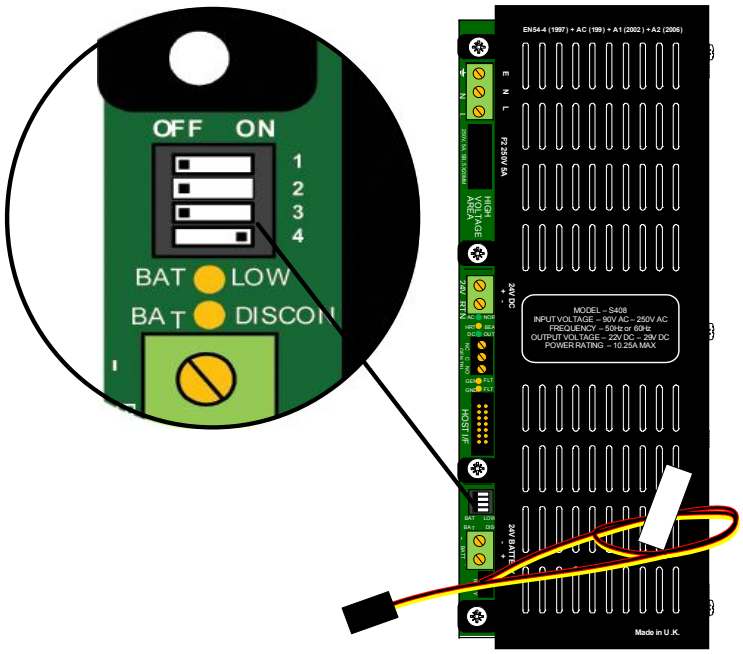
1 Set dip-switches 1 and 2 to the off position for standard operation of the 10.25 Amp Power Supply. Combination settings of switches 1 and 2 set factory testing, enable European compliance or disable battery monitoring.

2 Set switch 3 to define the Amp-hour size of the standby-batteries.

3 Set switch 4 to define the battery manufacturer Yuasa or Powersonic.

The figure below illustrates Dip Switch Settings of the 10.25 Amp Power Supply Module:

Figure 3-5
Dip Switch Settings



Setting Switches 1 and 2

The table below describes the combined settings of Dip Switches 1 and 2:

Switch 1	Switch 2	Description
Off	Off	Recommended for standard operation
Off	On	EN54-4 compliant
On	Off	Disable fault reporting of disconnected standby-batteries
On	On	Disable fault reporting of the standby-battery impedance test

Setting Switch 3

The table below describes the setting for Dip Switch 3:

Switch 3	Description
On	Sets standby-battery capacity ≤ 18 Ah.
Off	Sets standby-battery capacity > 18 Ah.

Setting Switch 4

The table below describes the setting for Dip Switch 4:

Switch 4	Description
On	Sets standby-batteries for the Powersonic manufacturer.
Off	Sets standby-batteries for the Yuasa manufacturer.

Disabling Battery Indication

Set Dip Switch 1 to the ON position, Dip Switch 3 to the ON position and Dip Switch 4 to the OFF position to disable the disconnected warning indication and to disable operation of the common fault relay.

Disabling the Impedance Test

Set Dip Switch 1 to the ON position and Dip Switch 3 to the OFF position to disable the battery impedance test and fault reporting.

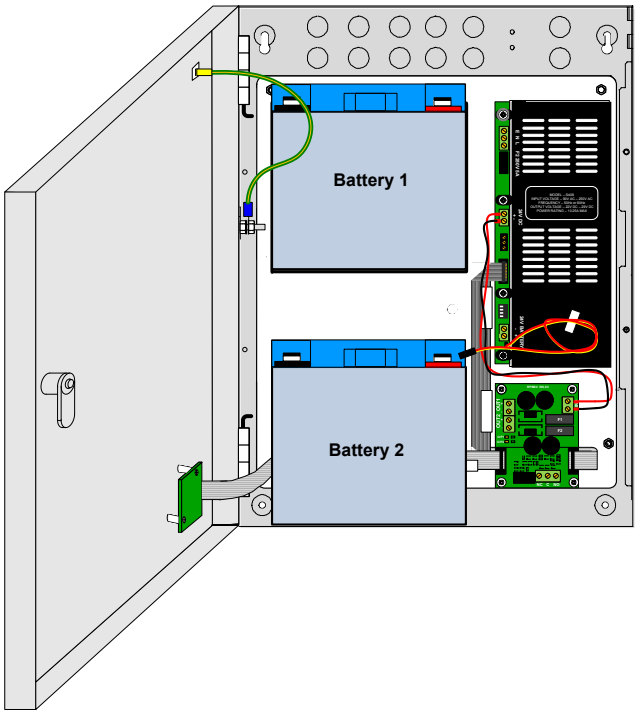
Installing and Connecting Standby-Batteries

Install and then connect the Standby-Batteries as illustrated in this procedure.

Installing Standby-Batteries

The figure below illustrates standby-battery installation:

Figure 3-6
Standby-Battery Installation



Connecting Standby-Batteries

Standby-Batteries are connected in series to provide 24V DC to the BATT terminals of the 10.25 Amp Power Supply Module. Do not connect the Standby-Batteries in parallel. The 12V DC provided from the parallel connection is insufficient for operating the 10.25 Amp Power Supply during brown out conditions.

CAUTION!

Standby-Batteries are capable of delivering high currents that can cause fire and injury.
Standby-Battery connections must be made using extreme caution.

To connect the Standby-Batteries:

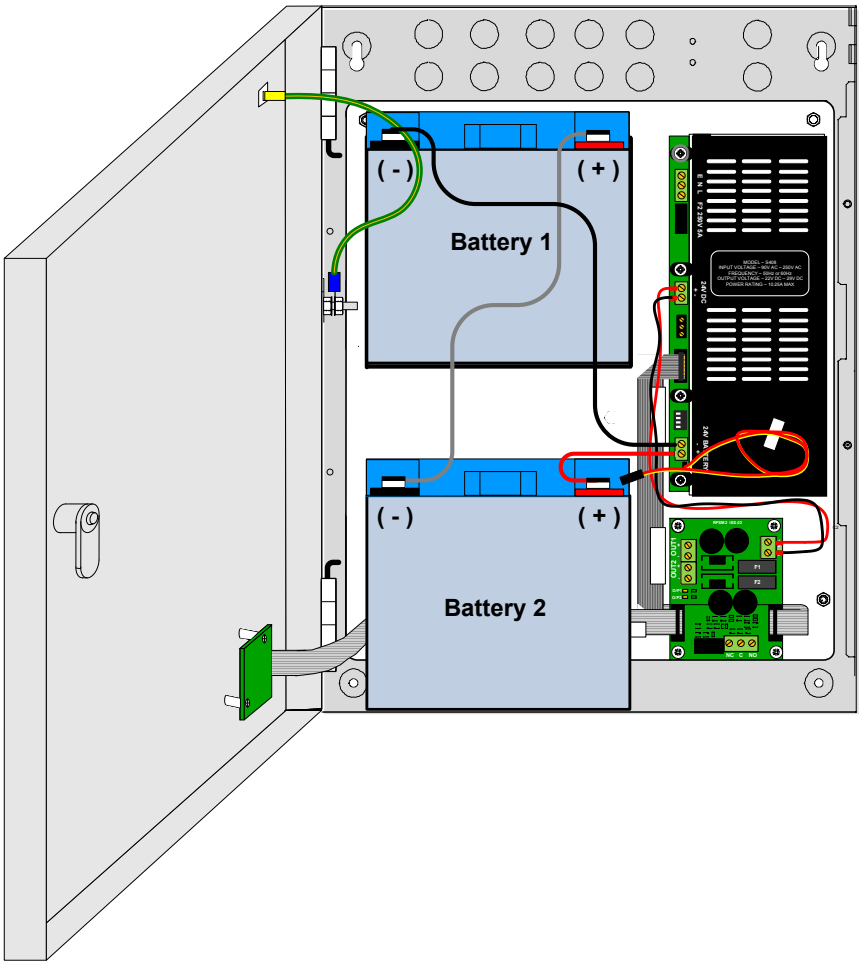
1 Connect the negative post (-) of Battery 1 to the (-) BATT terminal of the 10.25 Amp Power Supply Module using a black wire.

2 Connect the positive post of (+) Battery 2 to the (+) BATT terminal of the 10.25 Amp Power Supply Module using a red wire.

3 Connect the positive post (+) of Battery 1 to the negative post (-) of Battery 2 using a gray wire.

The figure below illustrates Standby-Battery connections of the 10.25 Amp Power Supply:

Figure 3-7
Standby-Battery Connections



Mounting the Flying-Lead Temperature-Sensor

The output of the standby-battery charger varies with temperature to maximize the service life of the standby-batteries. A flying-lead temperature-sensor is used in conjunction with the circuits of the 10.25 Amp Power Supply to monitor changes in temperature in the cabinet.

The flying-lead temperature-sensor and circuits of the 10.25 Amp Power Supply provide charging stability of the standby-batteries by compensating for changes in cabinet-temperature.

Correct placement of the flying-lead temperature-sensor is critical for proper charging of the standby-batteries. The flying-lead temperature-sensor must be attached to one of the standby-batteries as described in this manual to provide this essential charging function.

To attach the flying-lead temperature-sensor:

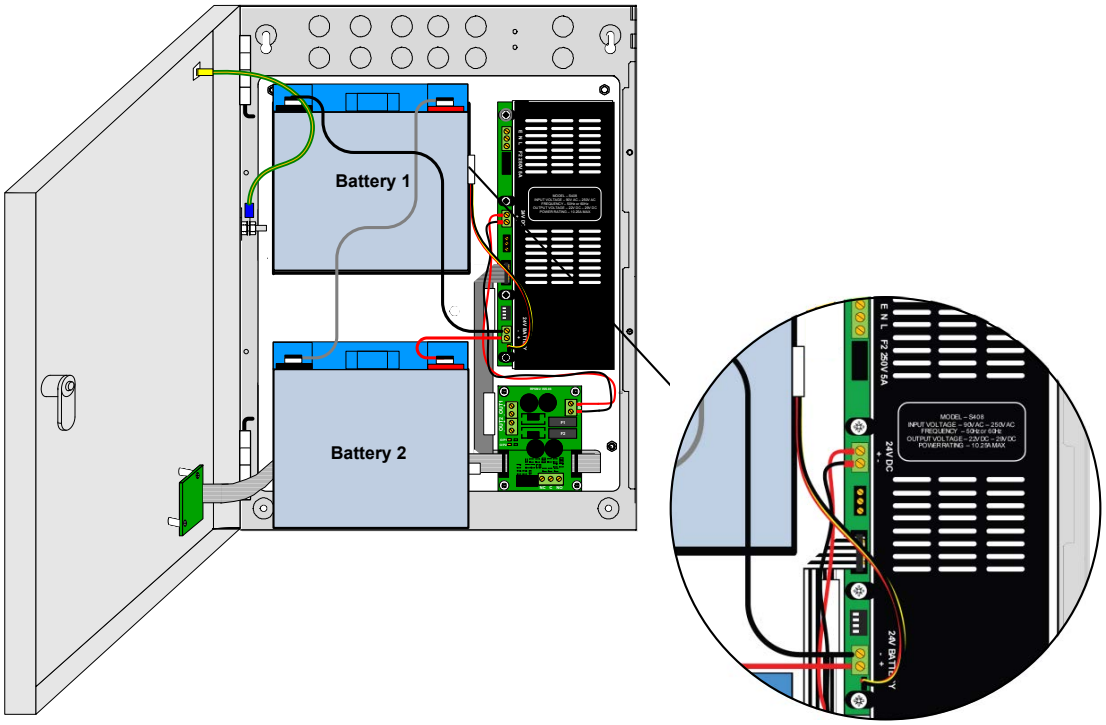
1 Remove white tape holding the flying-lead temperature-sensor on the top-cover of the 10.25 Amp Power Supply Module.

2 Place the flying-lead temperature-sensor on the side of Battery 1.

3 Secure the flying-lead temperature-sensor to the side of Battery 1 using the white tape.

The figure below illustrates mounting the flying-lead temperature-sensor:

Figure 3-8
Mounting the Flying-Lead Temperature-Sensor



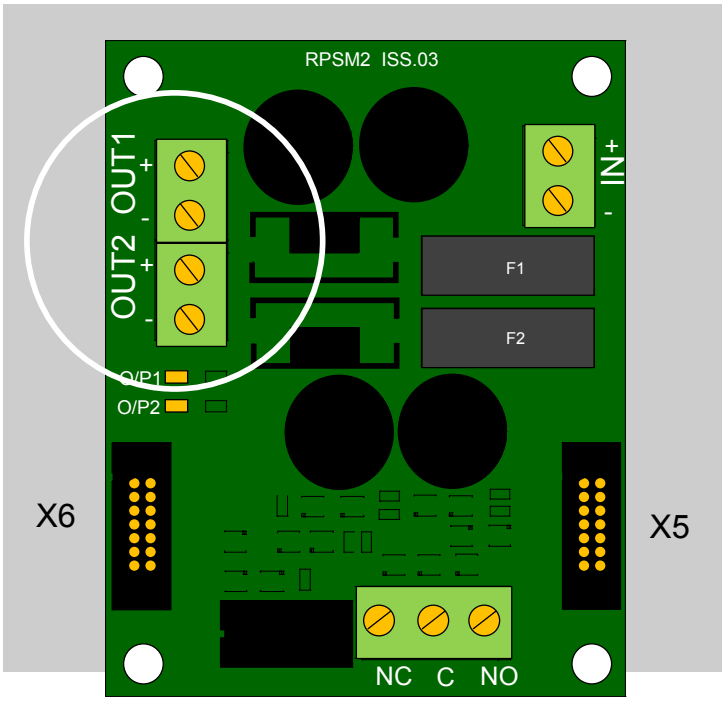
Connecting OUT1 and OUT2

The RPSM2 Board provides 24V DC outputs on OUT 1 and OUT 2. Loads connected to these outputs must contain wiring rated for a minimum of 8 Amps continuous. The range of cable sizes for these connections is 12 to 16 AWG.

Cable size and length must be considered in terms of circuit demands when connecting loads. Connecting the incorrect cable size and length can limit the voltage available to the load. Cables and connectors must be sized to ensure that the load receives the required voltage over maximum load conditions.

The figure below illustrates OUT 1 and OUT 2 terminals of the RPSM2 Board:

Figure 3-9
OUT 1 and OUT 2 Terminals



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Ancillary Connections

The RPSM2 Board is installed and connected in the 10.25 Amp Power Supply from the factory.

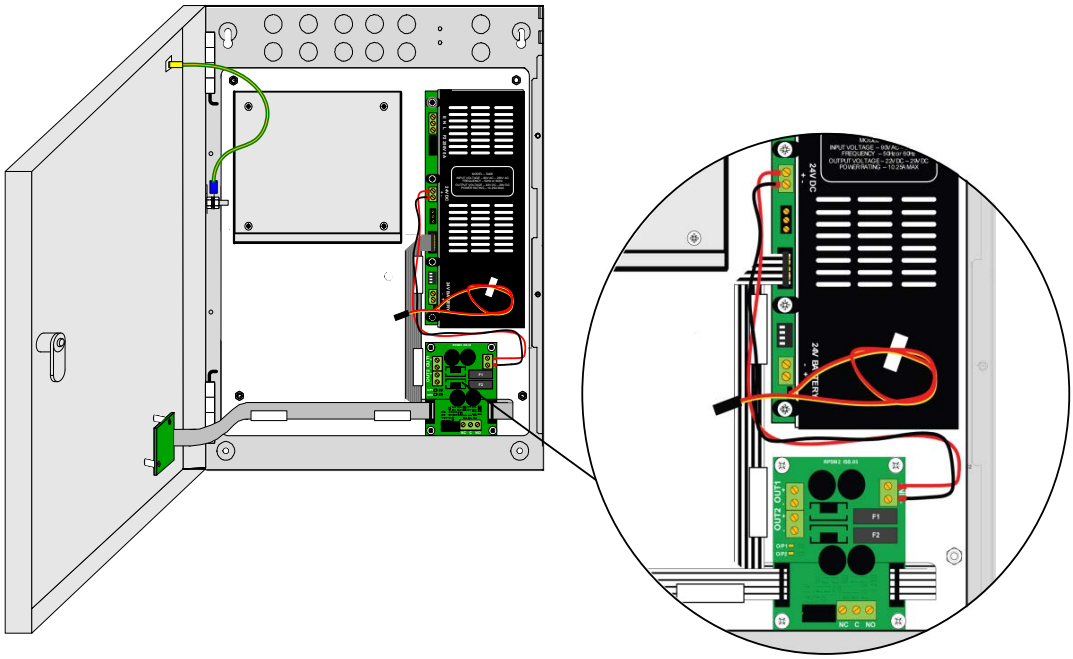
However, it may be necessary during the life of your product to remove the RPSM2 Board for testing or replacement. The following procedure describes the connection of RPSM2 Board in the cabinet of the 10.25 Amp Power Supply.

To connect the RPSM2 Board in the cabinet of the 10.25 Amp Power Supply:

1. Connect the Host I/F ribbon-cable of the 10.25 Amp Power Supply module to connector X5 on the RPSM2 Board.
2. Connect the Host I/F ribbon-cable of the cabinet-door LEDs to the X6 connector on the RPSM2 Board.
3. Connect output power from OUT 1 and OUT 2 to fire control circuits.
4. Connect circuits requiring trouble reporting to the trouble relay terminals.
5. Connect power to the + IN and - IN terminals of the RPSM2 Board from the 24V and RTN terminals of the 10.25 Amp Power Supply.

The figure below illustrates connections of the RPSM2 Board:

Figure 3-10
RPSM2 Board Connections

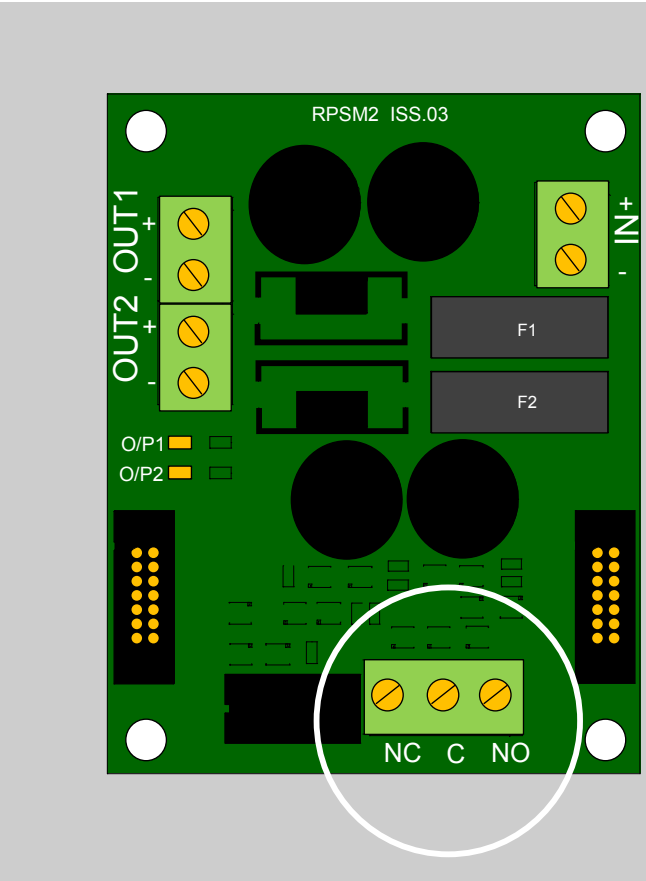


Trouble Relay of the RPSM2 Board

The trouble relay of the RPSM2 Board operates during the failure of the power supply and as well as during the failure of one of the RPSM2 Board fuses, F1 or F2.

The figure below illustrates trouble relay terminals of the RPSM2 Board:

Figure 3-11
RPSM2 Board - Trouble Relay Terminals



The trouble relay of the RPSM2 Board must be supervised on circuits monitored for integrity.

Perform this supervision when the 10.25 Amp Power Supply includes the RPSM2 Board.

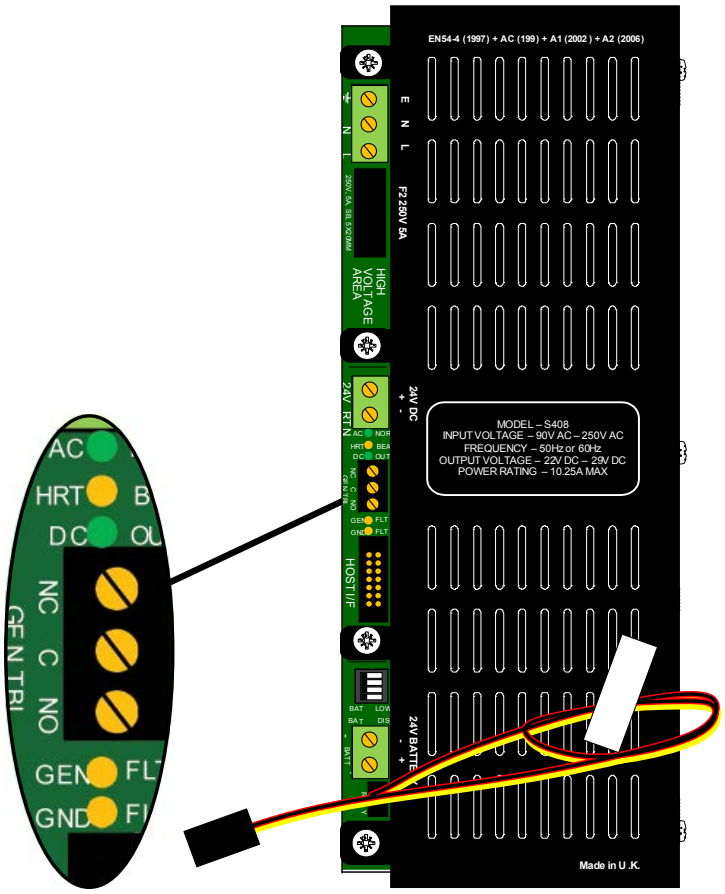
Do not perform this supervision on the trouble relay of the 10.25 Amp Power Supply Module when the 10.25 Amp Power Supply includes the RPSM2 Board.

Trouble Relay of the 10.25 Amp Power Supply Module

The trouble relay of the 10.25 Amp Power Supply Module operates during the failure of the power supply.

The figure below illustrates trouble relay terminals of the 10.25 Amp Power Supply Module:

Figure 3-12
10.25 Amp Power Supply Module - Trouble Relay Terminals



The trouble relay of the 10.25 Amp Power Supply Module must be supervised on circuits monitored for integrity.

Perform this supervision when the 10.25 Amp Power Supply does not include an RPSM2 Board.

Do not perform this supervision on the trouble relay of the 10.25 Amp Power Supply Module when the 10.25 Amp Power Supply includes the RPSM2 Board.

Connecting AC

Protect AC power to branch circuits with a 15 Amp anti-surge-fuse.

To connect AC power cabling to the 10.25 Amp Power Supply:

1 Shut the power off at the source.

2 Connect incoming cabling containing the green wire to the ground-stud of the cabinet-box.

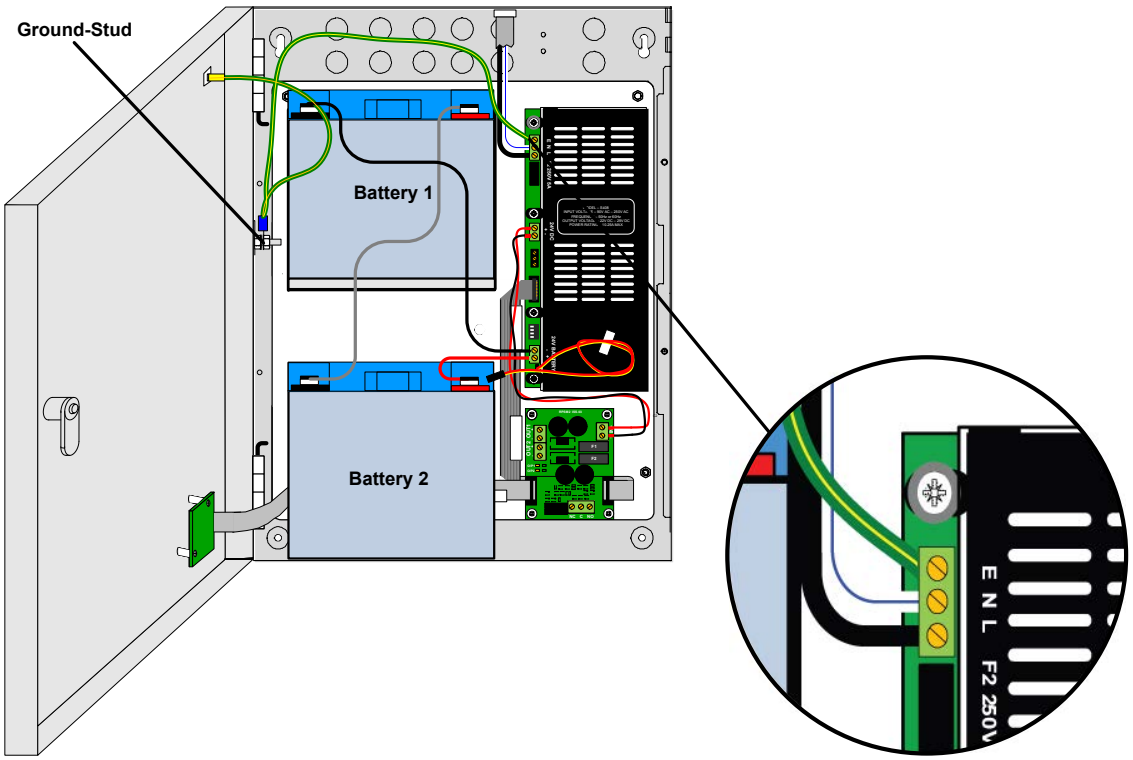
The factory has installed a ground-wire from the earth-ground terminal-block of the 10.25 Amp Power Supply to the ground-stud on the cabinet-box.

3 Connect incoming cabling containing the white wire to the Neutral terminal marked N on the AC terminal-block.

4 Connect incoming cabling containing the black wire to the Line terminal marked L on the AC terminal-block.

The figure below illustrates AC power connections of the 10.25 Amp Power Supply:

Figure 3-13
Connecting AC Power



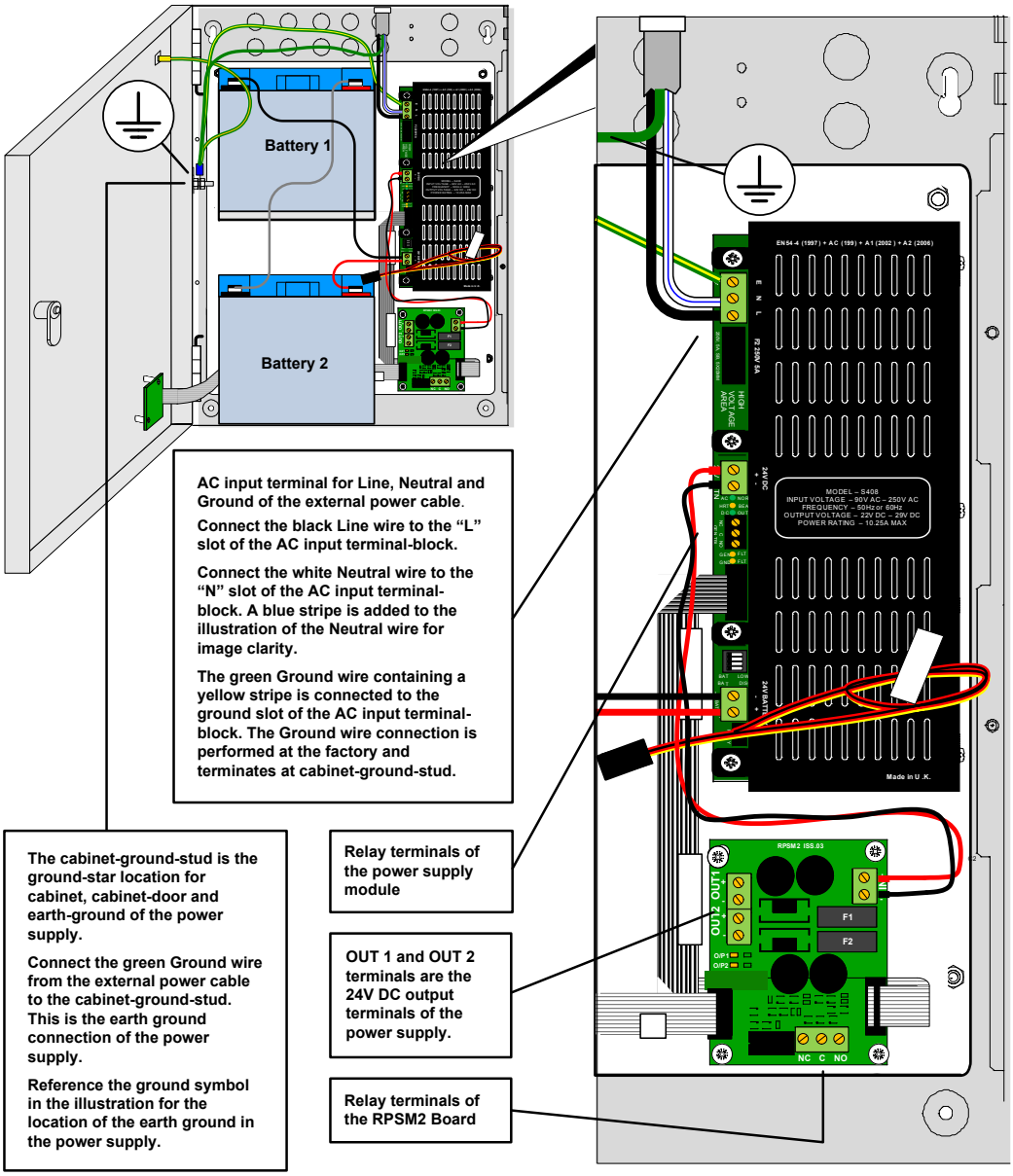
Dressing Cabling

Dress mains wiring without excess lengths or large loops and separate it from low voltage wiring. Ensure that all wiring is terminated without exposed lengths or strands to prevent electrical shock.

Ensure that all terminal-block-screws are tightened during installation. Separate high and low voltage wiring in the cabinet-enclosure with a minimum gap of 0.25".

The figure below illustrates connections and cable dressing of the 10.25 Amp Power Supply:

Figure 3-14
Connections and Cable Dressing



Testing the Installation

This section tests the installation using LED indicators of the 10.25 Amp Power Supply.

Perform the following tests during the powering process of the 10.25 Amp Power Supply:

1	Confirm that connections are complete as described in the installation portion of this procedure.
2	Apply AC power to the input of the 10.25 Amp Power Supply.
3	Confirm that the following LED status conditions exist after the 10.25 Amp Power Supply receives power: ▪ AC NORM - Green ▪ HEART BEAT - Flashing Yellow ▪ DC OUTON – Green ▪ General Fault ▪ Earth Fault ▪ BAT LOW - This LED may turn on during the powering process to indicate a low battery voltage condition. This LED will turn off when the battery voltage is above the BAT LOW condition. ▪ All other LEDs are off
4	Place a voltmeter across the terminals of 24V, RTN and confirm that 24V DC +/- 1V is present at the load.
5	Remove power at the mains and confirm that standby-batteries continue to supply power to the load. *The AC Normal LED indicator switches-off 30 seconds after removing power from the mains.*
6	Disconnect the standby-batteries and then restore power to the mains. Confirm that the output at 24V, RTN continues to provide power to the load. Confirm that the battery disconnected LED (BATT DISCON) is illuminated.
7	Power supply testing is complete following successful completion of this procedure.

Troubleshooting the Installation

This section provides diagnostic information using LED indicators of the 10.25 Amp Power Supply. The 10.25 Amp Power Supply performs self-testing during the powering process.

10.25 Amp power Supply Module

Status LEDs	Normal	Fault	Recommended Action for Fault Condition
AC NORM	Green Mains power is connected	Off	Check fuse, source power and input wiring at the terminals of ground, line (L) and neutral (N).
HRT BEAT	Flashing Yellow The power-supply is functioning.	Not Flashing	Internal fault condition. Disconnect standby-batteries and cycle the power input feeding the 10.25 Amp Power Supply at the terminals of ground, line (L) and neutral (N).
DC OUTON	Green The 24V DC output is supplying power to the load.	Off	Check wiring at the DC output terminal of 24V.
GEN FLT	Off	Yellow	The battery charge voltage is too high. Check wiring integrity to the standby-batteries. Remove and replace the connection to the power supply at the BATT terminals. Replace standby-batteries. This LED condition can also be related to an internal fault of the 10.25 Amp Power Supply.
GND FLT	Off	Yellow	The 24V DC supply is connected to earth. Remove the wire connection at the 24V terminal. Check device wiring if trouble condition clears.
BAT LOW	Off	Yellow	Voltage of the standby-batteries is below 21 Volts. Check condition of the standby-batteries.
BAT DISCON	Off	Yellow	Standby-batteries are disconnected or the charging circuit has reached higher impedance than expected. Check wiring integrity and polarity to the standby-batteries.

RPSM2 Board

Status LEDs	Normal	Fault	Recommended Action for Fault Condition
O/P1	Off	On	OUT1 fuse failure. Diagnose and repair cause and then replace fuse.
O/P2	Off	On	OUT2 fuse failure. Diagnose and repair cause and then replace fuse.

Door Status LEDs

Status LEDs	Normal	Fault	Recommended Action for Fault Condition
Power On	On	Off	Reports that 24V DC exists on the 10.25 Amp Power Supply Module.
Power Fault	Off	On	Reports any and all fault conditions of the 10.25 Amp Power Supply.

Contact Kentec if fault conditions cannot be resolved using the recommended methods.

Section 4

Maintenance and Repair

This section provides procedures for maintaining and repairing the 10.25 Amp Power Supply.

Inspecting Batteries

Inspect the standby-batteries annually to determine the connection integrity to the 10.25 Amp Power Supply. The fire control panel contains valve-regulated, lead-acid batteries to provide standby power in the event of mains failure. The standby-batteries have a life expectancy of 3 to 5 years.

Test the standby-batteries annually in accordance with the battery manufacturer's recommendations to determine their suitability for continued standby operation.

Replacing Standby-Batteries

Replace standby-batteries when the service period reaches 3 to 5 years or when the low-battery indicator illuminates on the power supply. Specify replacement batteries that are valve-regulated, lead-acid.

Removing the Standby-Batteries

To remove the existing standby-batteries:

1 Disconnect the jumper-lead between the standby-batteries.

2 Disconnect the red-lead from the positive terminal of one standby-battery.

3 Disconnect the black-lead from the negative terminal of the opposite standby-battery.

4 Remove the standby-batteries from the bottom of the 10.25 Amp Power Supply cabinet.

5 Re-cycle the standby-batteries according to manufacturer instructions.

Sealed lead acid batteries have an expected life of 3 to 5 years when operated at an ambient temperature of 20°C. Batteries operating in temperatures higher than 20°C will have a reduced life of approximately 50% for every 10°C above 20°C. This must be considered when determining the battery maintenance schedule and batteries consistently operating in higher ambient temperatures should be replaced more frequently.

Batteries with a manufacturing date older than 6 months are not recommended for use with this equipment. Sealed lead acid batteries can liberate hydrogen during normal use.

Models of the 10.25 Amp Power Supply have adequate ventilation to allow this hydrogen to disperse safely therefore additional sealing or mounting inside a sealed enclosure is prohibited.

Batteries contain hazardous substances and must be returned to the supplier or manufacturer for disposal.

Refer to battery manufacturers recommendations for further information.

Installing the Standby-Batteries

Reference Section 3, Installation for installing the standby-batteries.

Replacing Fuses

The 10.25 Amp Power Supply contains a 5 Amp AC input fuse to protect it against circuit overloads.

During the life of the product it may be necessary to replace one or both of the fuses to restore operation.

Replace a fuse only after diagnosing and replacing components responsible for causing the fuse failure. Fuse failure is not a condition caused by the fuse. Diagnose and replace components in the circuit before replacing the fuse and then test the 10.25 Amp Power Supply for proper operation.

AC Input Fuse

The following procedures describe methods for removing and installing the 5 AC input fuse of the 10.25 Amp Power Supply.

Removing the AC Input Fuse

To remove the 5 Amp AC input fuse:

1 Turn off 115 VAC or 230 VAC at the power source.

2 Open the cabinet-door of the 10.25 Amp Power Supply.

3 Disconnect the red-lead from the positive terminal of the standby-battery.

4 Remove the AC input fuse from the fuse-block-housing.

Installing the AC Input Fuse

To install the 5 Amp AC Input Fuse:

1 Turn off 115 VAC or 230 VAC at the power source.

2 Open the cabinet-door of the 10.25 Amp Power Supply.

3 Disconnect the red-lead from the positive terminal of the standby-battery.

4 Install the replacement fuse in the fuse-block-housing.

5 Re-connect the red-lead to the positive terminal of the standby-battery.

6 Close the cabinet-door of the 10.25 Amp Power Supply.

7 Turn on 115 VAC or 230 VAC at the power source.

8 Test the power supply by operating it to determine that it functions.

RPSM2 Board Fuses

The following procedures describe methods for removing and installing fuses of the RPSM2 Board.

Removing RPSM2 Board Fuses

To remove RPSM2 Board fuses:

1 Turn off 115 VAC or 230 VAC at the power source.

2 Open the cabinet-door of the 10.25 Amp Power Supply.

3 Disconnect the red-lead from the positive terminal of the standby-battery.

4 Remove the fuse from the fuse-block-housing of the RPSM2 Board.

Installing RPSM2 Board Fuses

To install RPSM2 Board fuses:

1 Turn off 115 VAC or 230 VAC at the power source.

2 Open the cabinet-door of the 10.25 Amp Power Supply.

3 Disconnect the red-lead from the positive terminal of the standby-battery.

4 Install the replacement fuse in the fuse-block-housing of the RPSM2 Board.

5 Close the cabinet-door of the 10.25 Amp Power Supply.

6 Reconnect the red-lead to the positive terminal of the standby-battery.

7 Turn on 115 VAC or 230 VAC at the power source.

8 Test the power supply by operating it to determine that it functions.

Replacing Cabinet Components

Reference General Wiring Information when replacing components of the 10.25 Amp Power Supply.

Appendix A

Specifications

This appendix provides electrical and environmental specifications of the 10.25 Amp Power Supply.

Electrical

AC Line Connection

Terminals	Description	Voltage
L	AC Line	120 - 240V AC @ 50 / 60Hz, Supervised, 275VA Maximum
N	AC Neutral	
G	Earth-Ground	

Power Supply

Designation	Description
Input Voltage	120 - 240V AC 50/60Hz, supervised, non-power-limited
Transfer Voltage	90V AC
Output Voltage	24V DC regulated
Output Current	8 Amps maximum
Output Ripple Voltage	1.2 Vpk-pk
AC Input Fuse	5 Amp @ 250 VAC, Slow-Blow, 5 x 20mm
Load Fuse	Self-resetting Polyfuse rated @ 10 Amps. (Non-replaceable).
RPSM2 Fuses	Two 8 Amp fuses per board

Ground Trouble Indication

A ground trouble indication occurs when 30K Ohms or less exists between earth-ground and the 24V terminals of the 10.25 Amp Power Supply.

Rechargeable Battery Circuit

Parameter	Description
Standby-Battery Type	12 VDC, rechargeable, valve-regulated, lead-acid
Battery Current Draw	8 Amps maximum drawn from standby-batteries when mains is disconnected
Battery Quiescent Current	80 mA in mains failure mode
Standby-Battery Charging	Two standby batteries wired in series
Charge Current	2.25 A maximum
Battery Charging Voltage	26.4 V DC (at 104^{O} F, 40^{O} C) to 28.9 V DC (at 23^{O} F, -5^{O} C)
Battery Disconnect	Low battery shutoff voltage - 19 V (+/- 1 volt)

Relay Ratings

Terminals	Connection	Ratings
(NC), (C) and (NO)	GEN TBL General Trouble Relay	Power Factor: 1.0 Relay Function: Common, programmable, not monitored 30 VDC @ 1A maximum, volt free change over contact
(NC), (C) and (NO)	Common Fault Relay	Power Factor: 1.0 Relay Function: Common, programmable, not monitored 30 VDC @ 1A maximum, volt free change over contact

Field Wiring

Designation	Terminal	Wire Range	Description
Battery Connection	+, red lead and –, black lead		Connection for the standby-batteries. Non-supervised, non-power-limited
AC Power	L	12 – 14 AWG	Line connection
	N	12 – 14 AWG	Neutral connection
	E	12 – 14 AWG	Ground Connection
General Trouble Relay		14 – 18 AWG	
24V and RTN	24V, red lead and RTN, black lead	12 – 16 AWG	Non-supervised, non-power-limited

Battery leads are provided in the cabinet for recharging the standby-batteries.

The General Trouble Relay is a volt free contact rated at 30V DC and 1 Amp.

RPSM2 Board

Designation	Terminal	Wire Range	Description
IN	+, red lead - , black lead	12 – 16 AWG	Connection for the RPSM2 Board Non-supervised, non-power-limited
OUT 1	+, red lead - , black lead	12 – 16 AWG	Connection for the RPSM2 Board Non-supervised, non-power-limited
OUT 2	+, red lead - , black lead	12 – 16 AWG	Connection for the RPSM2 Board Non-supervised, non-power-limited
Common Trouble Relay	NC, C, NO	12 – 18 AWG	Normally closed contact, common contact, normally open contact.

The Common Trouble Relay is a volt free contact rated at 30V DC and 1 Amp.

Cabling

Grounding Conductor	Install ground conductors with 12 – 14 AWG cabling to support branch circuits of the 10.25 Amp Power Supply.
Branch Circuits	Provide 12 AWG wiring to branch circuits and protect with a 20 Amp fuse.
Material	All field wiring should be installed using fire rated cables according to the NFPA except AC.

Operating Environment

Low Temperature	32° F (0° C)
High Temperature	102° F (+ 49° C)
Relative Humidity	This device functions in an atmosphere of relative humidity up to 93 percent, non-condensing.

Physical Specifications

Cabinet Dimensions	
Standard Cabinet	H 18.72" / 475.6 mm x W 14.41" / 365.8 mm x D 3.8" / 96.6 mm Lid Depth = 17.8 mm
Deep Cabinet	H 18.72" / 475.6 mm x W 14.41" / 365.8 mm X D 7.40" / 187.8 mm Lid Depth = 17.8 mm
Mounting	Maximum screw diameter: 0.2" (5 mm) screws

This fire control panel is designed for indoor dry use only.
Install this product in accordance with NFPA 72, the National Electrical Code and all local codes.

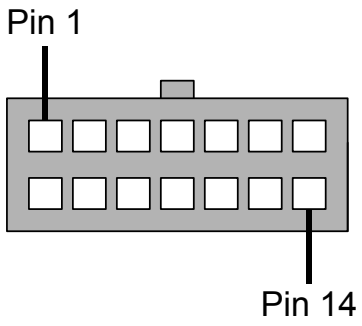
Host I/F Ribbon Cable

The Host I/F Ribbon Cable connects from the 10.25 Amp Power Supply to the RPSM2 Board. Pins 9 through 13 of the Host I/F Ribbon Cable support a maximum of 100 milliamps.

The Host I/F Ribbon Cable must always be connected in unison with the 24V and RTN terminals. The Host I/F Ribbon Cable must never be used without connection of the 24V and RTN terminals.

The figure below illustrates pin-assignments of the Host I/F Ribbon Cable:

Figure A-1
Pin-Assignments of the Host I/F Ribbon Cable



Pin	Description
1	VDC Negative (-)
2	VDC Negative (-)
3	VDC Negative (-)
4	VDC Negative (-)
5	VDC Positive 24V (+)
6	VDC Positive 24V (+)
7	VDC Positive 24V (+)
8	VDC Positive 24V (+)
9	Battery disconnected
10	Mains failed
11	Battery low / high impedance
12	Earth fault
13	Charger fault
14	No Connection

Appendix B

Equipment List

This appendix describes models of the 10.25 Amp Power Supply, supporting components and replacements.

Kentec 10.25 Amp Power Supply

The following models are provided for the Kentec 10.25 Amp Power Supply:

Models	Features
K8140-10	10.25 Amp Power Supply, 18 AH Batteries, Standard Cabinet, 115 VAC or 230 VAC, Red
K8140-40	10.25 Amp Power Supply, 18 AH Batteries, Standard Cabinet, 115 VAC or 230 VAC, Gray
K8141-10	10.25 Amp Power Supply, 40 AH Batteries, Deep Cabinet, 115 VAC or 230 VAC, Red
K8141-40	10.25 Amp Power Supply, 40 AH Batteries, Deep Cabinet, 115 VAC or 230 VAC, Gray

Supporting Components and Replacements

The following supporting components and replacements are available for the 10.25 Amp Power Supply:

Model	Description
K8128-00	10.25 Amp Power Supply
K8139-00	Installation and Operation Manual
K8138-00	Door Label
K8145-00	RPSM2 Power Supply Distribution Board
K8129-00	AC Input Fuse, 5 Amp @ 250 VAC, Slow-Blow, 5 x 20mm
K8143-00	RPSM2 Board Fuses, 8 Amp, 5 x 20 mm, (2)
K8153-00	Host I/F Ribbon Cable
K8154-00	Host I/F Ribbon Cable and LED Board Assembly
K8146-00	Wiring Kit for Power Supply, contains 18 AH and 40 AH power supply provisions

Model	Description
VF8147-10	*(1) Standard Cabinet Back-Box for 18 AH Power Supply, Red
VF8147-40	*(1) Standard Cabinet Back-Box for 18 AH Power Supply, Gray
VF8148-10	*(2) Deep Cabinet Back-Box for 40 AH Power Supply, Red
VF8148-40	*(2) Deep Cabinet Back-Box for 40 AH Power Supply, Gray
VF8149-10	Cabinet Door for Power Supply (Red)
VF8149-40	Cabinet Door for Power Supply (Gray)
VF8150-00	Battery Shelf, Standard Cabinet
VF8151-00	Battery Shelf, Deep Cabinet
VF8152-00	Back Plate for Standard and Deep Back-Box

*(1) Standard cabinet VF8140 models of the 10.25 Amp Power Supply accept battery dimensions at or below the following maximums:

Dimension	Size
Length	186 mm (7.23")
Width	80 mm (3.15")
Height	220 mm (8.66")

*(2) Deep cabinet VF8141 models of the 10.25 Amp Power Supply accept battery dimensions at or below the following maximums:

Dimension	Size
Length	200 mm (7.87")
Width	168 mm (6.61")
Height	220 mm (8.66")

Compatible Standby-Batteries

Standard and deep size cabinets of the 10.25 Amp Power Supply are compatible with the following battery models from Power-Sonic and Yuasa:

Cabinet Type	Battery Type	Power-Sonic	Yuasa
Standard	12V DC, 4 Ah	PS-1242	NP4-12
	12V DC, 7 Ah	PS-1270	NP7-12
	12V DC, 8 Ah	PS-1280	
	12V DC, 9 Ah	PS-1290	
	12V DC, 10.5 Ah	PS-12100H	
	12V DC, 12 Ah	PS-12120	NP12-12
	12V DC, 17 Ah	PS-12170	NP-17-12
	12V DC, 17.2 Ah		NP18-12B
	12V DC, 18 Ah	PS-12180	
	12V DC, 20 Ah	PS-12200	

Cabinet Type	Battery Type	Power-Sonic	Yuasa
Deep	12V DC, 12 Ah	PS-12100	
	12V DC, 12 Ah	PS-12120	
	12V DC, 14 Ah	PS-12140	
	12V DC, 24 Ah		NP-24-12
	12V DC, 26 Ah	PS-12260	
	12V DC, 27 Ah	PHR-12100*	
	12V DC, 28 Ah	PS-12280	
	12V DC, 33 Ah	PS-12330	
	12V DC, 35 Ah	PS-12350	
	12V DC, 35 Ah	PG-12V35 FR*	
	12V DC, 36 Ah	PHR-12150*	
	12V DC, 38 Ah		NP38-12I, screw-down terminals
	12V DC, 40 Ah	PS-12400	
	12V DC, 42 Ah	PG-12V42 FR*	
	12V DC, 45 Ah	PS-12450	

Appendix C

Calculations

This section describes current-loading, the standby-batteries rating and wiring length.

Current-Loading

Current-loading of the 10.25 Amp Power Supply is limited to the capacity of the power supply. Installers must determine the loading placed on the power supply by adding the sum of device-loads to the no-load-current of the 10.25 Amp Power Supply.

The result obtained from this calculation must be below the operating current of the power supply. The 10.25 Amp Power Supply operates loads with 8 Amps and reserves 2.25 Amps for charging the standby-batteries.

The total of device-currents must be below the limits provided in Appendix A, “Specifications” for circuit-connections of the power supply.

Reference current limits in Appendix A, Specifications for circuit-connections of the 10.25 Amp Power Supply.

The calculation of total-current-loading must include the sum of device-loads on the circuit outputs of the 10.25 Amp Power Supply.

Circuits OUT 1 and OUT 2 of the power supply must be included in the calculation for total-current-loading.

Example Load Condition

The 10.25 Amp Power Supply supports a combined load of 8 Amps on the 24V DC terminals of OUT 1 and OUT 2.

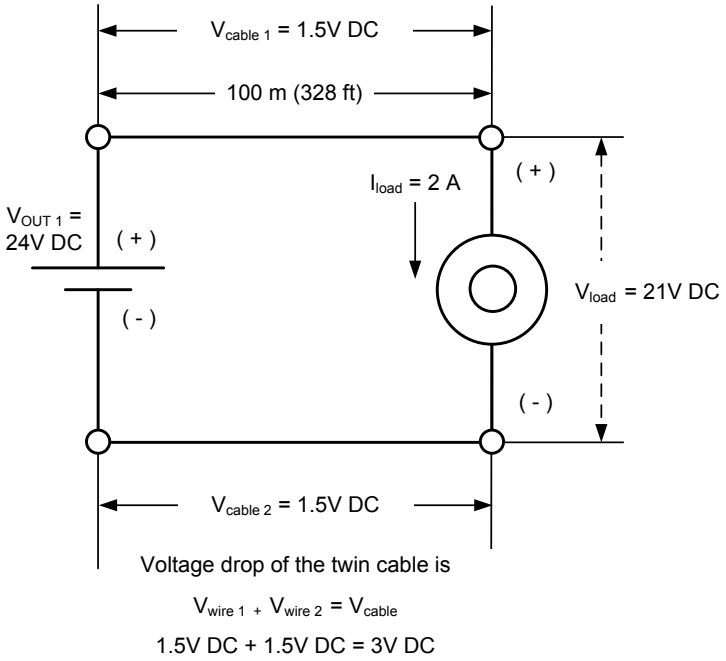
The following example demonstrates the impact of cable size and length on the output of OUT 1.

A twin-wire of 2.5 mm cabling is connected to OUT 1 of the 10.25 Amp Power Supply and terminated to a device-load of 2 A. The 2 A device-load is determined from manufacturer data sheets. The length of twin-wire between OUT 1 and the load is 100 m (328 ft).

OUT 2 of the 10.25 Amp Power Supply is unused in this example.

The figure below illustrates an example voltage-drop condition:

Figure 3-15
Example Voltage-Drop Condition



A voltage-drop of 3V DC is determined from the table of 2.5mm cable for a twin-cable-length of 100 m (328 ft) and a load of 2 A. The resistance of the 2.5 mm cable is 1.5 Ω at 100 m.

Voltage drop and resistance of the cable were approximated from the 2.5mm table using a load of 2 A and a cable-length of 100 m.

Voltage-drop of the twin-cable:

($V_{wire\ 1}$ + $V_{wire\ 2}$) = (1.5V DC + 1.5V DC) = 3V DC

The 3V DC value is determined from the 2.5 mm wire table where the cable length is 100 m and the current draw on the cable is 2 Amps.

Voltage-drop at the load:

$V_{load} = V_{OUT\ 1}$ - ($V_{cable\ 1}$ + $V_{cable\ 2}$) = 24V DC - (1.5V DC + 1.5V DC) = 21V DC

A voltage of 21V DC is available to operate the device-load at this circuit location.

Cable Loading

The 10.25 Amp Power Supply requires the use of the wire-gage and lengths specified in the loading-tables of this section. The maximum allowable voltage drop of 4.0 volts is permitted on circuit cabling to maintain a minimum device operating voltage of 18 volts.

The worst case voltage-drop occurs when the load is located at the farthest point from the terminals of the power supply. The worst case range of voltage at the source (Vsource) is 22 to 30.5 volts.

Loading-tables are provided for the following recommended wire gauges:

Wire Gauges	Resistance / Core
1.0 mm	16 Ohms / Core
1.5 mm	12 Ohms / Core
2.5 mm	7.4 Ohms / Core Ft.

Data provided in loading tables of this section represent resistance and voltage from twin wire-conductors.

Shading in the load tables highlight cable length and load combinations that are not permitted.

Table for 1.0 mm Cable
16 Ohms Per Core

Length m	Res. Ω	V Drop @ 0.25 A	V Drop @ 0.5 A	V Drop @ 0.75 A	V Drop @ 1.0 A	V Drop @ 1.25 A	V Drop @ 1.50 A	V Drop @ 1.75 A	V Drop @ 2.00 A	V Drop @ 2.25 A	V Drop @ 2.50 A
25	0.8	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
50	1.6	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4
100	3.2	0.8	1.6	2.4	3.2	4	4.8	5.6	6.4	7.2	8
150	4.8	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12
200	6.4	1.6	3.2	4.8	6.4	8	9.6	11.2	12.8	14.4	16
250	8	2	4	6	8	10	12	14	16	18	20
300	9.6	2.4	4.8	7.2	9.6	12	14.4	16.8	19.2	21.6	24
350	11.2	2.8	5.6	8.4	11.2	14	16.8	19.6	22.4	25.2	28
400	12.8	3.2	6.4	9.6	12.8	16	19.2	22.4	25.6	28.8	32
450	14.4	3.6	7.2	10.8	14.4	18	21.6	25.2	28.8	32.4	36
500	16	4	8	12	16	20	24	28	32	36	40

Table for 1.5 mm Cable
12 Ohms Per Core

Length m	Res. Ω	V Drop @ 0.25 A	V Drop @ 0.5 A	V Drop @ 0.75 A	V Drop @ 1.0 A	V Drop @ 1.25 A	V Drop @ 1.50 A	V Drop @ 1.75 A	V Drop @ 2.00 A	V Drop @ 2.25 A	V Drop @ 2.50 A
25	0.6	0.15	0.3	0.45	0.6	0.75	0.9	1.05	1.2	1.35	1.5
50	1.2	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3
100	2.4	0.6	1.2	1.8	2.4	3	3.6	4.2	4.8	5.4	6
150	3.6	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
200	4.8	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12
250	6	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
300	7.2	1.8	3.6	5.4	7.2	9	10.8	12.6	14.4	16.2	18
350	8.4	2.1	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21
400	9.6	2.4	4.8	7.2	9.6	12	14.4	16.8	19.2	21.6	24
450	10.8	2.7	5.4	8.1	10.8	13.5	16.2	18.9	21.6	24.3	27
500	12	3	6	9	12	15	18	21	24	27	30

Table for 2.5 mm Cable
7.4 Ohms Per Core

Length m	Res. Ω	V Drop @ 0.25 A	V Drop @ 0.5 A	V Drop @ 0.75 A	V Drop @ 1.0 A	V Drop @ 1.25 A	V Drop @ 1.50 A	V Drop @ 1.75 A	V Drop @ 2.00 A	V Drop @ 2.25 A	V Drop @ 2.50 A
25	0.375	0.09375	0.1875	0.28125	0.375	0.46875	0.5625	0.65625	0.75	0.84375	0.9375
50	0.75	0.1875	0.375	0.5625	0.75	0.9375	1.125	1.3125	1.5	1.6875	1.875
100	1.5	0.375	0.75	1.125	1.5	1.875	2.25	2.625	3	3.375	3.75
150	2.25	0.5625	1.125	1.6875	2.25	2.8125	3.375	3.9375	4.5	5.0625	5.625
200	3	0.75	1.5	2.25	3	3.75	4.5	5.25	6	6.75	7.5
250	3.75	0.9375	1.875	2.8125	3.75	4.6875	5.625	6.5625	7.5	8.4375	9.375
300	4.5	1.125	2.25	3.375	4.5	5.625	6.75	7.875	9	10.125	11.25
350	5.25	1.3125	2.625	3.9375	5.25	6.5625	7.875	9.1875	10.5	11.8125	13.125
400	6	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
450	6.75	1.6875	3.375	5.0625	6.75	8.4375	10.125	11.8125	13.5	15.1875	16.875
500	7.5	1.875	3.75	5.625	7.5	9.375	11.25	13.125	15	16.875	18.75

Determining the Standby-Battery-Rating

This section provides guidelines for determining the standby-battery-rating of the 10.25 Amp Power Supply.

For power supply applications that do not include fire alarm equipment, alarm current is the dynamic-current present during operation of the power supply. Standby-current is the static-current present when the power supply is not functioning.

Battery Rating Equation

The equation below describes the method for determining the Amp-Hour Rating of the standby-batteries:

Battery Rating = (Battery De-Rating Factor) x [(Standby Amp-Hours) + (Alarm Amp-Hours)]

Or

Battery Rating = (Battery De-Rating Factor) x [(24 hours x Standby-Current) + (5 Minutes x Alarm Current)]

where the battery de-rating factor = 1.2 and 5 minutes = 5 / 60 minutes = 1/12 = .0833 hours.

To determine the Amp-hour-rating of standby-batteries:

1	Record the Quiescent-Current, 0.08 A of the standby-batteries while operating in standby.
2	Record the maximum Standby-Current from cabling and external devices on OUT 1.
3	Record the maximum Standby-Current from cabling and external devices on OUT 2.
4	Record the Combined Standby-Currents of OUT1 and OUT 2.
5	Record the Total Standby-Current of Combined Standby-Current and the 0.08 A standby-battery Quiescent-Current.
6	Record the Quiescent-Current, 0.08 A of the standby-batteries while operating in alarm.
7	Record the maximum Alarm-Current from cabling and external devices on OUT 1.
8	Record the maximum Alarm-Current from cabling and external devices on OUT 2.
9	Record the Combined Alarm-Currents of OUT1 and OUT 2.
10	Record the Total Alarm-Current of Combined Alarm-Current and the 0.08 A standby-battery Quiescent-Current.
11	Multiply the total standby-current with the required standby-time of 24, 48 or 72 hours to provide the result in Amp-hours.
12	Multiply the total alarm-current with the required alarm-time 5 or 15 minutes to provide the result in Amp-hours.
13	Record the sum of Standby and Alarm currents.
14	Determine the Amp-hour capacity of the standby-battery by multiplying the combined Amp-hours with the 1.2 de-rating factor.
15	Select a battery with a rating equal to or greater than the minimum Amp-Hour-Rating determined in step 14.

Complete the worksheet on the following page to determine the Standby-Battery Capacity of the standby-batteries and then select a corresponding standby-battery based on these calculations.

Standby-Battery Capacity

Determine the standby-battery capacity in Amp-hours using the table below:

	Category	Instruction	Standy-Current	Alarm-Current
1	Standby-Current	*(1) Quiescent-Current of standby-batteries	0.08 A	
2	Standby-Current OUT 1	Record the maximum standby-current on OUT 1	Amps	
3	Standby-Current OUT 2	Record the maximum standby-current on OUT 2	Amps	
4	Combined Standby-Current	Record the sum of Standby-Current for OUT 1 and OUT 2.	Amps	
5	Total Standby-Current	Combined Standby-Current plus 0.08 A Quiescent-Current of standby-batteries	Amps	
6	Alarm-Current	*(2) Quiescent-Current of standby-batteries		0.08 A
7	Alarm-Current Out 1	Record the maximum alarm-current on OUT 1		Amps
8	Alarm-Current Out 2	Record the maximum alarm-current on OUT 2		Amps
9	Combined Alarm-Current	Record the sum of Alarm-Current for OUT 1 and OUT 2.		Amps
10	Total Alarm-Current	Combined Alarm-Current plus 0.08 A Quiescent-Current of standby-batteries.		
11	Standby Amp-hours	Multiply Total Standby-Current with 24, 48 or 72 hours to provide the result in Amp-hours.	Amp-hours	
12	Alarm Amp-hours	Multiply Total Alarm-Current with 5 or 15 minutes to provide the result in Amp-hours. 5 minutes = .0833 hours 15 minutes = .25 hours		Amp-hours
13	Standby Amp-hours and Alarm Amp-hours	Sum of Standby Amp-hours and Alarm Amp-hours.	Amp-hours	
14	Amp-hour Capacity	Multiply the Sum of Standby Amp-hours and Alarm Amp-hours with the de-rating factor of 1.2	Amp-hours	

*(1) *Quiescent current of standby-batteries with AC input failure.*

*(2) *Quiescent current measured at AC input with AC input operating.*

Standby-Currents

Standard and Deep Cabinet sizes of the 10.25 Amp Power Supply accept specific ranges of standby-batteries. Standby-battery dimensions are based on Amp-hour capacity. Standard cabinets accept standby-battery dimensions with capacities up to 18 Amp-hours. Deep cabinets accept standby-battery dimensions with capacities up to 40 Amp-hours.

Determine the amount of standby-current remaining in the standby-batteries after operating standby for 24 hours with 80 mA of quiescent-current and 5 minutes of alarm.

Combined Standby-Currents are provided in tables for standard and deep cabinets. Combined Standby-Currents are maximum levels from the sum of OUT 1 and OUT 2:

Standard Cabinet

12 VDC Standby-Battery	Combined Standby-Current
4 Ah	31 mA
7 Ah	135 mA
8 Ah	170 mA
9 Ah	204 mA
10.5 Ah	257 mA
12 Ah	309 mA
17 Ah	482 mA
17.2 Ah	489 mA
18 Ah	517 mA

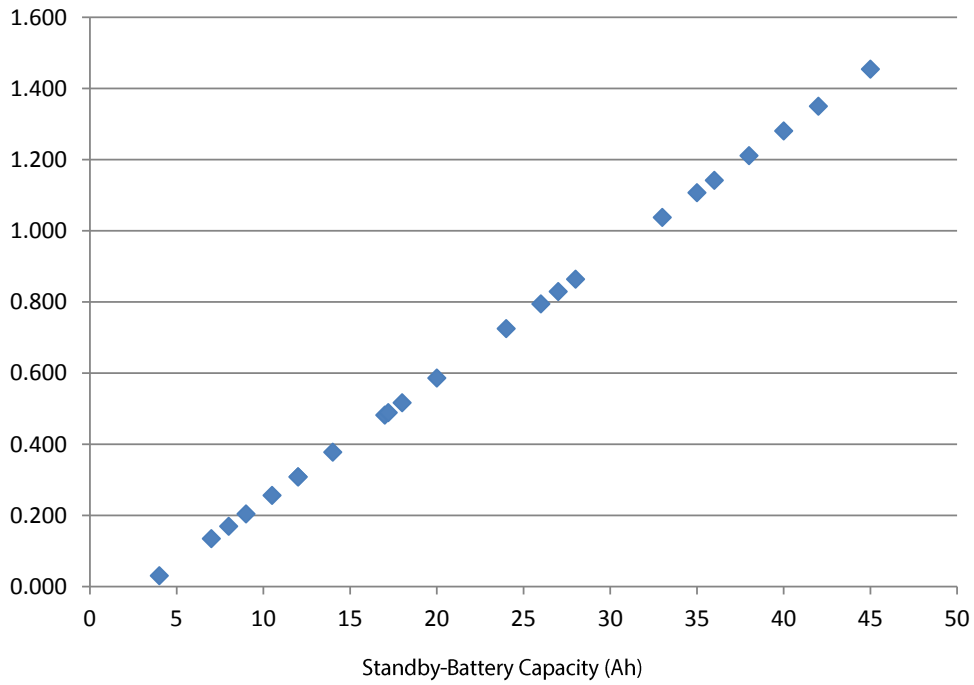
Deep Cabinet

12 VDC Standby-Battery	Combined Standby-Current
12 Ah	309 mA
14 Ah	378 mA
24 Ah	725 mA
26 Ah	795 mA

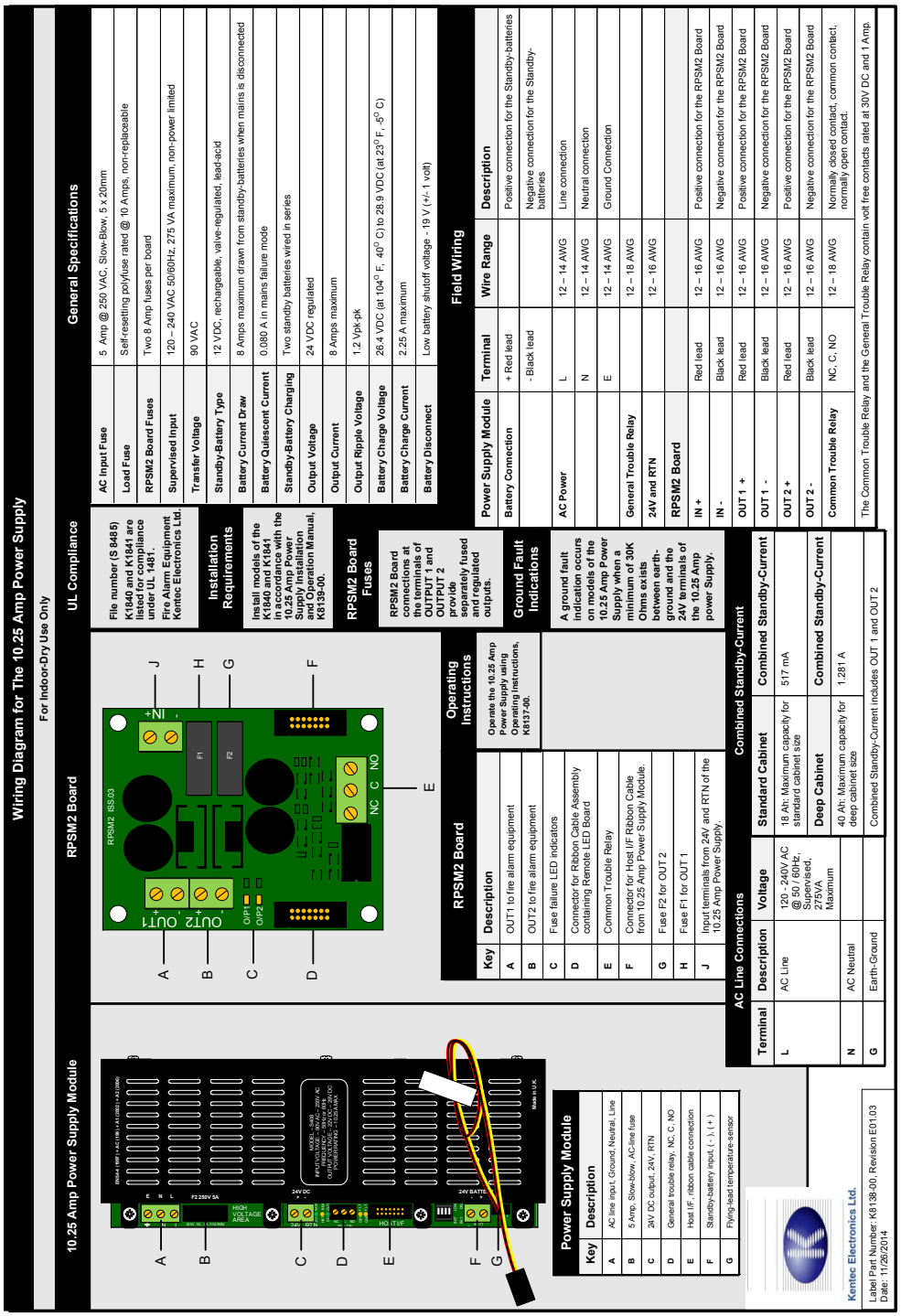
12 VDC Standby-Battery	Combined Standby-Current
27 Ah	829 mA
28 Ah	864 mA
33 Ah	1.038 A
35 Ah	1.107 A
36 Ah	1.142 A
38 Ah	1.211 A
40 Ah	1.281 A

The figure below illustrates Combined Standby-Current versus Standby-Battery (Ah) Capacity:

Figure 3-16
Combined Standby-Current versus Standby-Battery (Ah) Capacity



Appendix D
Door Label



Appendix E

Operating Instructions

Operating Instructions, K8137-00 describes functional details of the 10.25 Amp Power Supply including LED Status Indicators, Dip Switch Settings, Current Ratings, Input / Output Ratings and an area for Notifying the Emergency Contact.

Post these operating instructions on the front of the cabinet-enclosure or on a separate sheet that can be framed adjacent to the product. Models of the 10.25 Amp Power Supply operate on 120 VAC or 240 VAC and include standard or deep cabinets based on standby-battery capacity.

Standard cabinet models of K8140 accept standby-batteries up to 18 AH. Deep cabinet models of K8141 accept standby-batteries up to 40 AH. All cabinet models of the 10.25 Amp Power Supply are provided in red or gray color.

LED Status Indicators

The 10.25 Amp Power Supply provides LED status indicators for:

Power On	The AC Normal LED lights green when operating AC or DC from the standby-batteries.
Power Fault	The Trouble Fault LED lights yellow when an off-normal condition is detected.

Current Ratings

Designation	Description
Maximum Load	0 – 8 Amps
Standby-Battery Ah Capacity	The 10.25 Amp Power Supply is offered in standard and deep size cabinet styles. Standard-Size cabinets accept standby-batteries up to 18 Ah and Deep-Size cabinets accept standby-batteries up to 40 Ah. Standby-Batteries in this unit are _____ AH.
Standby-Battery Charge Current	2.25 A maximum

Input / Output Ratings

Designation	Description
AC Line	120 - 240V AC @ 50 / 60Hz, Supervised, 275VA Maximum
Output Voltage	24V DC regulated
Output Current	8 Amps maximum

Notifying the Emergency Contact

Contact the company or individual responsible for providing assistance in the event of an emergency:

Name	
Company	
Primary Telephone	
Secondary Telephone	
Cell Phone	
Address	

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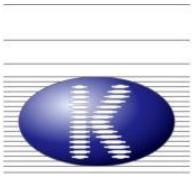

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