EN54 Power Supplies

Product Data Sheet

Features:

- High efficiency switched mode power supplies
- Compact 1 Amp and 4 Amp versions
- Fully compliant to EN54-4

Models, Sales Order Parts:

Mxp-022: A boxed power supply unit with 4A output, charger facilities for charging up to 24Ah* capacity sealed lead acid batteries and housed in a metal enclosure with LED indication for “Power” and “Fault”. (*/D Deeper enclosure required for 24Ah. Standard enclosure houses up to 17Ah capacity batteries).

Mxs-022: An unboxed caged 4A power supply with charger facilities for charging up to 24Ah capacity sealed lead acid batteries. This unit is supplied as a spare part or for incorporating within a customers / OEM enclosure.

Mxp-023: A boxed power supply unit with 1A output, charger facilities for charging up to 7Ah capacity sealed lead acid batteries and housed in a metal enclosure with LED indication for “Power” and “Fault”.

Mxs-023: An unboxed caged 1A power supply with charger facilities for charging up to 7Ah capacity sealed lead acid batteries. This unit is supplied as a spare part or for incorporating within a customers / OEM enclosure.

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Revision: 03

Applications / Limitations:
For any fire alarm system which specifies EN54-4 power supplies (e.g. BS5839 code of practice).
Compatibility:
These power supply units can be used in any fire alarm installation requiring a 24Volt supply for operation.

Item	Specification Details	
Approvals	Both PSU's are designed to comply with the requirements of BS EN54-4 1998, EN55022 class B emissions limits & EN60950: 2000 safety standards.	
Input Supply	220-240 Volts AC (+10%, -15% tolerance) 50/60Hz Fuse rating: (Mxp-022) 3.15A. (Mxp–023) 1.6A (both Ceramic Anti-surge)	
Output Voltage (All models)	To Load: 18.5V minimum (at minimum battery voltage of 19V with mains disconnected & 28V maximum (at minimum load and -5°C) To Battery: 27.4 V nominal at 20°C temperature compensated over the range -5°C to +45°C	
Output Current	Mxp-022: 4A continuous rating.	Mxp-023: 1A continuous rating
Dimensions (H x W x D)	Mxp-022: 475 x 450 x 125mm. Both sealed to IP30	Mxp-023: 320 x 345 x 88mm.
Weight (without batteries)	Mxp-022: 5Kg	Mxp–023: 3Kg
Operating temperature	-5ºC to +45ºC @ full load output	
Relative Humidity	95% non-condensing (maximum)	
Standby Battery	2 x 12V Sealed Lead-Acid Type (Yuasa or Powersonic recommended) Mxp–022: 1.2Ahr minimum to 17Ahr maximum (Standard Enclosure) 24Ahr maximum (Deep Enclosure) Mxp-023: 1.2Ahr minimum to 7AHr maximum	
Fault output	Volt free change-over contacts rated 1A @ 30V dc (all models)	
External Indication	Green: Power indicator, Amber: Fault indicator	
On board indication	Mains Fail, Charger Fail, Battery open circuit, Battery Low & Heartbeat	
Deep discharge	Both models incorporate battery deep discharge protection (19volts)	

As our policy is one of constant product improvement the right is therefore reserved to modify product specifications without prior notice

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ISO9001 ISO9001

EN54 Power Supplies

EN54 Functions

EN 54	**This Fire Alarm Power Supply is designed to be compliant with the requirements of BS EN54 part 4 (1998).**

	P.S.E Functions	EN54-4 Clause
EN 54 4	**Operation from a main power supply**	**5.1**
	Operation from a standby battery	**5.2**
	Monitor and Charge the Standby Battery	**5.3**
	Recognise and Notify Supply Faults	**5.4**

Installation:

These instructions cover the installation, commissioning and maintenance of the Mxp-022 and Mxp-023 model Power Supplies.

For use of the Mxs-022 & Mxs-023 in an OEM / customer supplied enclosure, these power supplies should be mounted in an appropriate sized enclosure suitable for the intended batteries to be used, the minimum protection rating of the enclosure must be to IP30 and the power supply must be earthed. Take note of the important safety information in the remainder of this document.

NB: The batteries must not be mounted in an enclosure separate from the power supply since this could affect the temperature compensating charging characteristics, resulting in incorrectly charged batteries.

The power supplies are also incorporated into other boxed peripheral units. The information in this document is applicable to these power supplies. Refer to the additional data sheet supplied with each boxed unit for details on the installation, configuration and use of the peripheral function.

Mounting Instructions:

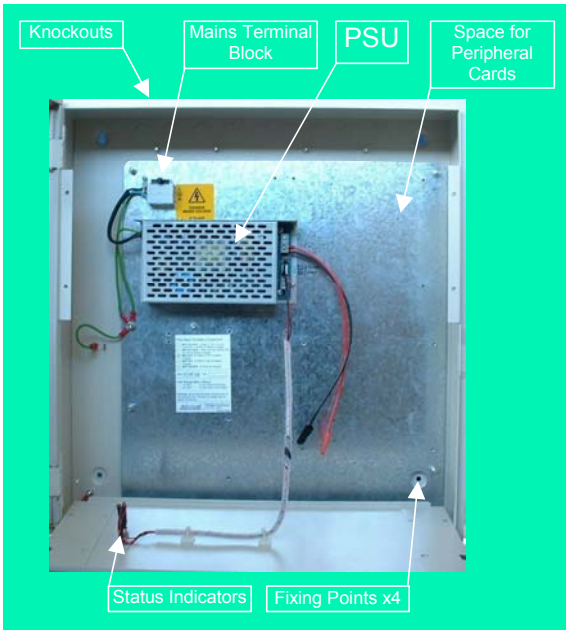
The Mxp-022 & Mxp-023 are power supplies mounted within an IP30 steel enclosure. These can accommodate 17A/Hr & 7A/Hr capacity batteries respectively.

When batteries are installed, the Mxp-022 can weigh in excess of 16Kg. Use appropriate fixing hardware to secure the panel to the wall.

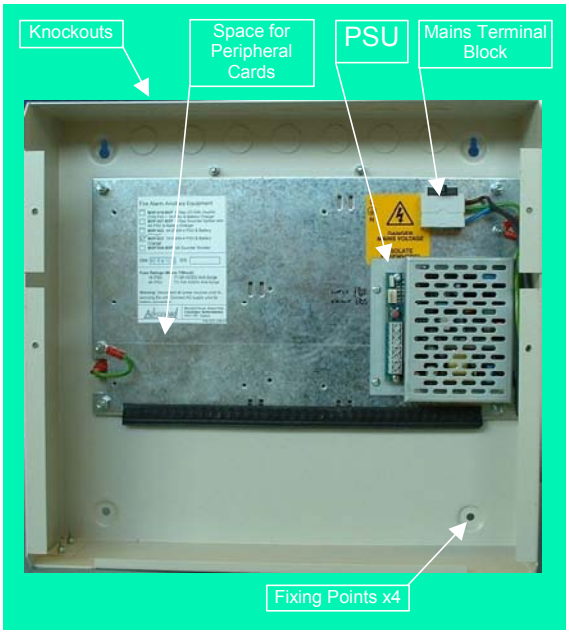
For example, drill the required holes in the supporting wall using a drill bit diameter 7.0 mm and plug with a suitable 40mm long expansion plug. Affix the panel to the wall with M5 screws (length 40mm) or No.10 screws (length 1½").

Ensure that there is sufficient space to allow the cover to be removed / opened when the panel is finally mounted.

An example of the Mxp-022 is shown opposite.



An example of the Mxp-023 is shown opposite.



Mounting Peripheral Cards or OEM equipment.

Each enclosure chassis has pre-installed M3 threaded insert positions for standoff pillars to mount a range of peripheral card options or other OEM equipment.

Use Nylon or Brass pillars depending on the application.

Refer to the data sheet supplied with each module for details on its installation, configuration and use.

Tie wrap fixing positions are also incorporated in the chassis to facilitate the securing of wiring connections.

Wiring Installation

AC Mains Wiring

The power supply is classified as Class1 equipment construction and must be earthed in accordance to EN60950 recommendations.

Route the high voltage mains AC wiring into the enclosure at the upper left corner only (Mxp-022) or upper right corner only (Mxp-023). Keep the AC wiring away from any circuit boards and all other wiring.

The panel must be connected to the supply earth through the power cable.

The mains input connector is shown in the diagrams opposite. Note the positions of the earth, neutral and live terminal connections. These are clearly marked on the label next to the connector. The connector block contains an integral fuse holder for a 20mm fuse.

Secure the mains input wiring using a tie wrap as close to the terminal block as possible.

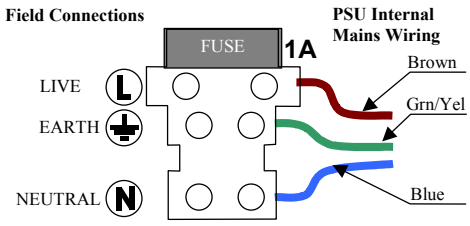
The fuses are rated as follows:

T 1.0A H 250V (for Mxp-023)

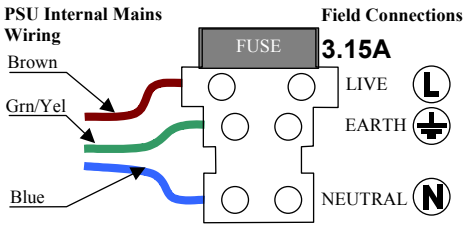
T 3.15A H 250V (for Mxp-022)

Replace with correct rating and specification only.

Connect the PSU to the mains supply via a readily accessible, disconnect device (Isolation Switch) and suitable earth fault protection incorporated in the building installation wiring.



AC Mains terminations – *Mxp-023*.



AC Mains terminations – *Mxp-022*

The Mains cable should be a minimum cable size of 0.5mm² for the Mxp-023 & 0.75mm² for the Mxp-022 PSU rated at 250V and fused via a 5A anti-surge fuse. Maximum cable size is limited to 4mm².

Keep all mains wiring separate from the Extra Low Voltage (ELV) battery cables and power supply output cables.

Cable Gland

The cable gland and any cord clamp bushings used in routing the Mains cable through the 20mm knockout must have a minimum flame-retardant rating of 94HB.

Suggested glands and bushings are: -

Type	Manufacturer
Gland IP65 – Brass M20, EExd / Eexe	Lappcable
Gland IP68 – Nylon 66 M20 Black, UL94V2	Multicomp
Bushing – Nylon 66 M20 Black, UL94V2	Multipcomp

Output Connections:

To Load:

Connect the 28V output connections to the load via terminals **VO+ & VO–** respectively via appropriately rated cable for the output rating:

For Mxp-022 a minimum 0.75 mm²

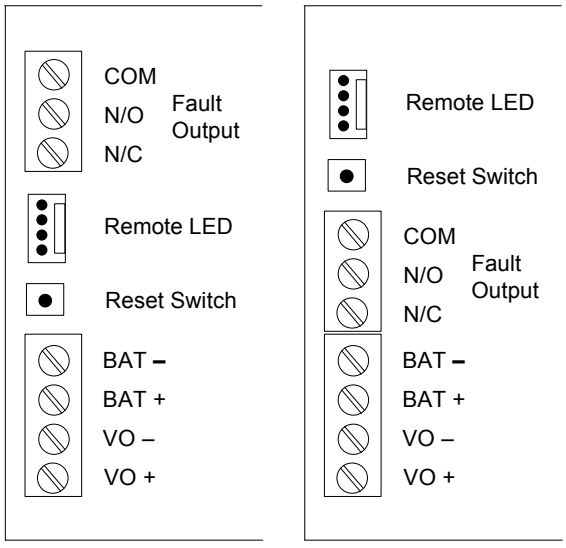
For Mxp-023 a minimum of 0.22mm²

NB Maximum cable size is limited to 2.5mm²

Refer to diagrams opposite for the positions of all output connections.

Observe that the load is connected with the correct polarity!

Route the wiring away from any mains connections.



4A PSU **1A PSU**

To Battery:

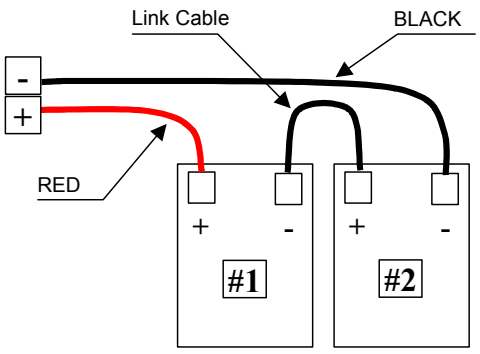
The system is designed to charge 24V batteries or two 12V batteries connected in series. Refer to diagram opposite.

Use the short black connection link to connect the batteries.

Use the Red & Black leads provided to connect the batteries to the **BAT+ & BAT–** terminals on the PSU.

Take care to observe the correct polarity and ensure the battery leads do not become shorted together!

Mount the batteries on the bottom of the enclosure.



Fault Output Connections:

Power supply/charger fault outputs are provided for in the form of volt free changeover contacts designated **COM, N/O & N/C**. These are available via three terminal blocks screws – refer to diagram above.

The “Fault” relay is held in a normally energised state and will fail to safety (de-energise) under any power supply/charger “Fault” conditions.

Remote LED indication:

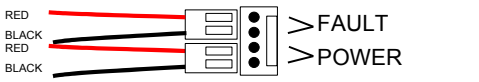
A latched 4 way single in line header, PL2, provides a means for remote/ external indication of “Power” and “Fault” indications.

The Mxp-022 and Mxp-023 are supplied fitted with Green and Amber LED Indicators. Refer to diagram opposite for how to connect these assemblies to the PSU.

Replacement parts are available. Green = Mxs-026-GRN and Amber = Mxs-026-YEL

The Green “Power” indicator will be ON continuously while ever the power supply is being supplied with mains power. This indicator will flash when the mains supply is off and the power supply is being powered from its battery source.

Remote LED Connector



The Amber “Fault” indicator will be ON continuously if any of the Fault conditions listed below are present:

1) Mains Supply failure
2) Battery disconnected or high impedance cell
3) Battery Charger output terminals low or short circuit
4) Battery charger output failure

The above “Fault” conditions are individually indicated by separate on–board LED Indicators.

Commissioning:

When all connections in the Installation section have been made and checked for correct wiring, switch on the mains power supply; the following conditions should occur:

1) The green “Power” LED should be ON, the “Fault” LED should be OFF.
2) The load should be supplied with power, check this with a voltmeter at the –VO & +VO terminals, the reading should be between 27 & 28 volts.
3) The batteries should be charging, check this by connecting a voltmeter across the –BAT & +BAT connections, depending on the state of discharge of the batteries, the voltage should be greater than 24 volts and for batteries approaching their full charge, the output voltage should be approximately 27.4 volts at an ambient temperature of 20°C
4) All on-board diagnostic LED indicators should be OFF, the “Heartbeat” indicator should be FLASHING.
5) The “Fault” relay should be energised. Check the fault output connections between common and the normally open (N/O). This connection should indicate a short circuit when checked with a test meter on the continuity setting.

Remove the mains supply and check the following occurs:

1) The green power LED changes state from being ON continuously to a FLASHING state and the “Fault” indicator should be ON.
2) The load is being supplied via the battery supply, check that +VO &-VO are approximately 0.5 volts below the battery supply voltage.
3) The on board diagnostic LED indicators should be: “Mains Fail”: FLASHING and on the Mx-022 PSU a “Battery On” indicator will be illuminated. The “Heartbeat” indicator should be FLASHING
4) The “Fault” relay should de-energise, check between COM & N/C. This connection should indicate a short circuit when checked with a test meter on the continuity setting.

Re-apply the mains supply and disconnect the battery, check the following occurs:

1) The green power LED is ON continuously and the “Fault” indicator ON
2) The load is supplied directly from the PSU between 27 & 28V
3) The on board diagnostic LED indicators should be: “Battery O/C”: ON.
   Heartbeat indicator: FLASHING all other indicators OFF.
4) The “Fault” relay should be de-energised, check as described above.

With the battery still disconnected check the output voltage from the charger circuit, @ +BAT & -BAT is within the voltage limits specified in table 1 below:

Table 1

Ambient Temperature ° C	Charger output voltage (minimum)	Charger output voltage (Nominal)	Charger output voltage (Maximum)
5	27.90	28.10	28.32
0	27.72	27.96	28.20
5	27.54	27.80	28.08
10	27.36	27.66	27.96
15	27.24	27.50	27.78
20	27.12	27.36	27.60
25	27.00	27.20	27.42
30	26.88	27.06	27.24
35	26.76	26.90	27.06
40	26.64	26.76	26.88
45	26.52	26.60	26.70

NB: The charger is designed to charge Yuasa & Powersonic sealed lead acid batteries only; other manufacturers batteries may have different temperature / charge characteristics.

Maintenance:

Maintenance of the power supply and charger should be minimal. The batteries, however, do have a limited life span and a maintenance program should be in place to determine battery replacement schedules.

It is recommended that the charger output should be checked on a yearly basis to ensure the charging characteristics have not drifted. Refer to Table 1 above for checking this parameter.

Standby Batteries

Expected Life - 3-5 years at an ambient temperature of 20°C

Replacement Schedule - As above. **However, note that the expected battery life is shortened by an increase in ambient temperature. The life reduces by 50% for every 10°C rise above ambient. This should be taken into account when assessing battery replacement schedules.** Refer to battery manufacturer manuals for further information.

Manufacturer / Part Numbers -

YUASA		POWERSONIC	
4AH	NP4-12	5AH	PS-1250-F1
7AH	NP7-12	7AH	PS-1270
12AH	NP12-12	12AH	PS-12100-F1
17AH	NP18-12	18AH	PS-12180-NB
24AH	NP24-12B	26AH	PS-12260-NB

For optimum performance and charge retention, Yuasa recommend that batteries are ‘top-charged’ prior to installation.

For batteries up to 6 months old from date of manufacture, charge at 2.4V per cell (i.e. 14.4V per battery) for 20 hours prior to installing the batteries.

It is not recommended to use batteries that are older than 6 months from the date of manufacture on a new installation.

It is quite normal for lead-acid batteries to vent hydrogen when being charged.

The enclosure is adequately ventilated to dissipate this hydrogen. DO NOT seal the enclosure or install in a sealed enclosure or cavity.