



SPECTRA
ENGINEERING PTY LTD

MXPS15 Series
Technical Manual



MXPS15 Series



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All performance figures quoted are typical and are subject to normal manufacturing and service tolerances.

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FCC Interference Warning

Note: The equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial or residential environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with this instruction manual, may cause harmful interference to radio communication.

SAFETY SUMMARY

The MXPSU power supply, contains dangerous mains voltages within.
For servicing, please return to your nearest distributor. No fuses or user-serviceable parts are within the power supply module.

The following general safety precautions as would normally apply, should be observed during all phases of operation, service and repair of this equipment.



CAUTION Risk of Electrical Shock.

AROUND THE EQUIPMENT

This product is a Safety Class 1 instrument. To minimise any possible shock hazard from power supply or lightning strike, the instrument chassis must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three conductor power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. For instruments designed to be hard-wired to the supply mains, the protective earth terminal must be connected to the safety electrical ground before another connection is made. Any interruption of the protective ground conductor, or disconnection of the protective earth terminal will cause a potential shock hazard that might cause personal injury.

Provide adequate ventilation around the rear of the equipment.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

DO NOT ATTEMPT INTERNAL SERVICEING

Operating personnel must not remove the instrument cover. No internal adjustment or component replacement is allowed by non-Spectra qualified personnel. Never replace components with power cable connected. To avoid injuries, always disconnect power, discharge circuits and remove external voltage source before touching components.

DO NOT SUBSTITUTE PARTS OR MODIFY THE EQUIPMENT

Because of the danger of introducing additional hazards, do not install substitute or lower voltage parts to the equipment. Return to your authorised distributor.

WARRANTY CONDITIONS & PRECAUTIONS

This MXPSU product is warranted against defects in materials and workmanship for a period of 1 years from date of shipment .During the warranty period, Spectra Engineering will, at it's option, either repair or replace products which prove to be defective.

The warranty shall not apply to defects resulting from improper or inadequate usage or maintenance by the buyer, buyer supplied products or interfacing. Furthermore, Spectra Engineering does not warrant any damage occurring as a result of the buyer's circuitry or the buyer's - supplied products.

The following conditions are not covered by the warranty. Please ensure that the MXPSU is not subject to;

1. Over voltage or Reverse Power Supply Voltage.

Do not use AC supply which exceeds the input voltage and frequency rating of this instrument. The input voltage and frequency rating of the power supply series is: 85VAC to 265VAC, 50/60Hz. For safety reasons, the mains supply voltage fluctuations should not exceed +/-10% of nominal voltage.

2. Operation in locations subject to abnormal environmental conditions such as extreme temperatures or ingress of moisture or excessively dusty environments.

Introduction

This user's manual contains the operating instructions, installation instructions and specifications of the MXPSU power supply series.

This versatile 15Amp switch mode power supplies come in a rugged sturdy compact construction metal case, made to withstand harsh industrial environments.

The MXPS15 comes with a battery charger option. A cheaper basic model is also available without charger facilities MXPS15B.

Both accept a wide mains voltage swings 85 to 265 VAC input voltage for worldwide use and provide output connectors for easy wiring. (Output Connectors included).

Features

- Protected against mains surges, spikes and brown outs.
- Tolerant of high temperatures and vibration.
- Protected against short circuit, "Current Limiting Circuit". If the peak current rating is exceeded due to a short circuit or excessive load across the output terminals, the output current will be limited to a safe level, preventing damage to the power supply
- Over temperature protection.
- Output over voltage shutdown. Induced output transient protected.
- Manufactured using only well specified and qualified high grade commercial parts.
- Infant mortality burn in period.
- DC output via polarised connector.
- AC input via covered IEC connector.
- Compliant with relevant international standards.
- 100% continuously rated at 9 Amps and 60° C. 15 Amps at 25° C.
- Thermostatically controlled cooling fan.
- Output short circuit protected, no minimum load current.
- 2RU rack mountable option.
- Optional provision for battery charging at a maximum of 2 amps typical. This allows a SLA type battery to be added for battery back up (future).

- Low radiated emissions due to double metal housing.

Turning the power supply ON/OFF

The power supply has an on/off switch located on the rear, marked "I" for ON and "O" for OFF.

Turn the power supply on, by pressing the "I" side of the switch.

Turning the power supply off, by press the "O" side of the power switch.

Connecting the power supply to the radio

Select a suitable gauge of the DC cable to ensure less than 0.5V volt drop at a maximum current draw of 15Amp. A 600mm pre-made cable is available as an option, PN # U06.

Unplug the power supply from the mains supply outlet.

Connect your cable to the included connector as indicated below. (+Ve) RED wire to the positive terminal pin and connect the negative (-Ve) Red with black or black wire to the negative terminal pin of connector mark as 1 in picture below. Please insure the correct polarity.

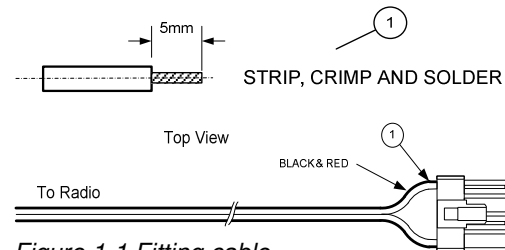


Figure 1-1 Fitting cable

Connect the appropriate plug to suit your radio on other end of cable.

Then plug the power cable into the power supply and into the back of the radio (CN2B).

Plug the power supply into the mains supply outlet and switch it on.

Turn power supply ON. Insure power led lights on radio. If no power led lights, turn OFF power supply and recheck cabling.

Cooling

The MXPS15 power supply provides cooling by convection and forced air cooling. This increases the normal airflow around the power supply in combination with a speed controlled fan to improve cooling at higher levels of use.

Caution: Place the power supply in a well ventilated and cool area. Do not block the ventilation openings on back or top of the unit.

Mounting

The MXPS15 design allows flexible mounting when used in conjunction with Spectra Engineering base stations / repeaters. The design allows it to be installed in a 2RU rack mount and it also can be installed at a distance from the base station / repeater if required, or to be retro fitted within the MX920.

Battery Charger Facilities

The battery charger facility is excellent for systems where a standby backup battery is required. It can deliver charge current up to 2 Amp (max) via rear connector CN3B.

To maintain a long battery life, it is desirable to use only a small part of the total battery(s) capacity before recharging. Each time the batteries are run down and charged up, the batteries undergo a charge/discharge cycle. If more than half the battery's stored energy is discharged before it is recharged, this is called 'deep cycling'.

The battery charger facility monitors the battery voltage and disconnects the load from the battery. This protects the battery from being deep cycled and therefore prolonging the life time of the battery. The factory default for battery disconnect is 10V, this is however user adjust to allow operation when using deep cycle batteries.

Battery Disconnect Setup

The easiest way to set the battery disconnect point is to use a variable DC power supply (test supply) and connect it to the battery in/output port.

Set the test supply to the required disconnect voltage. Then adjust RV1, while monitoring the voltage at TP1 (IC3 pin-1) until the voltage toggles from logic low (0) to logic high (5V).

To insure the correct adjustment of RV1, connect a DMM to the supply output (to load) connector and vary the test supply around the disconnect voltage (to see the voltage turn ON and OFF at the required levels.) Note. Approximately 1V hysteresis between ON and OFF.

Predefine disconnect points can be set by adjusting RV1 and monitoring TP2 (bottom side of R5) to have the table voltage listed below.

Note. There will be minor tolerances between power supplies using this method.

DISCONNECT VOLTAGE	TP2 VOLTAGE
8	1.8
10	2.3
11	2.5
11.5	2.7
12	3

Troubleshooting

Radio didn't power up when power supply was turned on.

Probable cause 1: No power in the AC outlet, or the main input fuse inside power supply mains (IEC) connector has blown.

Suggested solution: Check the mains power outlet, or replace the mains input fuse inside the unit (5 Amp fuse rating).

Probable cause 2: The unit is in current limiting condition or blown output fuse.

Suggested solution: Disconnect radio and check that the output terminals have not short-circuited and are have correct polarity.

Verify this fault condition with a multimeter.

Replace fuse 15Amp.

Fuse blows when power is turned on.

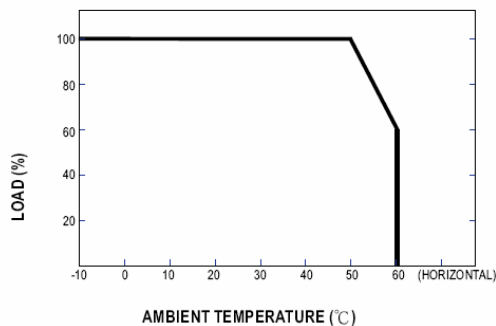
Probable cause: Unit is defective.

Suggested solution: Call technical support.

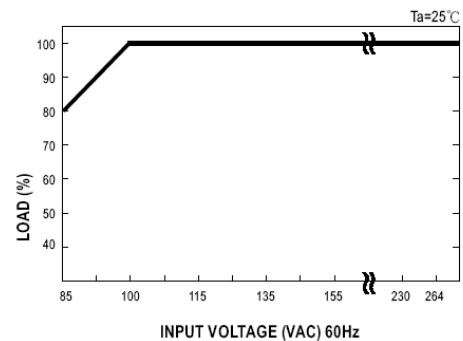
Specifications

Power Supply	MXPS15
AC Mains Input	85VAC to 265VAC
Nominal Output Voltage	13.8V \pm 0.2V (1 Amp)
Total Max Rated Output Current (TMROC)	15 Amps Continuous at 25°C.
Rated Output at Max Temp	9 Amps Continuous
Battery Charger Output	2 Amps (Max)
Regulation	\pm 100mV
Efficiency	80% typical
Ripple & Noise	< 6mV RMS
Operating Temperature	-30°C to 60°C
Design Field Lifetime (MTBF)	10 years @ 50°C
Power Factor	Auto Power Factor Correction
Weight	1.2 Kg
Approvals	C-Tick, CE, UL, TUV, CB, CUL, S-MARK

■ Derating Curve



■ Output Derating VS Input Voltage



MXPS15 CONFIGURATIONS

The MXPS has a number of flexible configurations. These include the following:

- Dual or single MXPS15 on a 2RU 90" rack mount panel.
- Duplexer tray option and MXPSU. Seen in Figure 4. MXPS15 Fitted on Rack mount with a duplexer
- Redundant power supply system/ or 30Amp load supply.

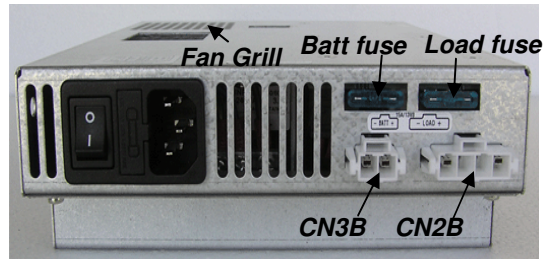


Figure 2. Rear View of MXPS15 (With Battery Charger)

Redundant Power Supply System

The redundant supply system requires two MXPS15 connected in parallel. The DC load ports are connect in parallel, thus providing a total of 30Amp TMROC and with the battery charger output also paralleled to provide a greater charge current of 4Amp max for bigger capacity battery systems.

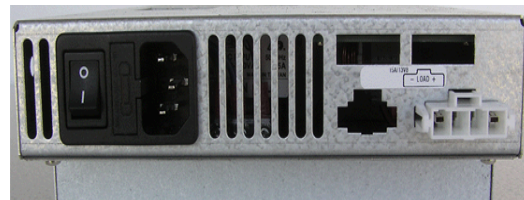


Figure 3. Rear View of MXPS15B (Basic)

How it works is if one of the MXPS15 should fail, the second unit we still provide power to the load @ 15Amp TMROC. The battery charge current of 4Amp max will be provided though both MXPS15 and 2Amp if one should have a charger output failure.

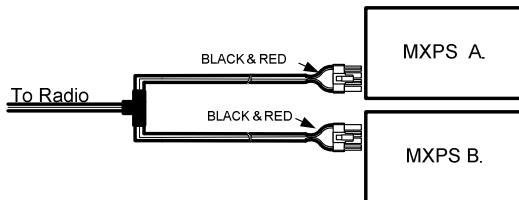


Figure 1. Example of Redundant Power System Wiring

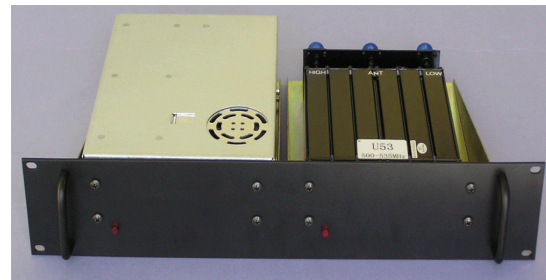


Figure 4. MXPS15 Fitted on Rack mount with a duplexer