



INSTRUCTION MANUAL

BATTERY PACK/CHARGER

MODEL EM-2112

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BATTERY PACK/CHARGER

ELECTRO-METRICS

MODEL EM-2112

SERIAL NO: N/A

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WARRANTY

This Model EM-212 Battery Pack/Charger is warranted for a period of 12 months (USA only) from date of shipment against defective materials and workmanship. This warranty is limited to the repair of or replacement of defective parts and is void if unauthorized repair or modification is attempted. Repairs for damage due to misuse or abnormal operating conditions will be performed at the factory and will be billed at our commercial hourly rates. Our estimate will be provided before the work is started.

TABLE OF CONTENTS

SECTION	TITLE	PAGE
A	EM-2112 Accessories	A-1
1.0	Introduction	1
2.0	Specifications	1
2.1	Electrical	1
2.2	Mechanical	2
3.0	Description Front/Rear Panels	2
3.1	Front Panel	2
3.2	Rear Panel	3
4.0	Operating Instructions	3
4.1	Power Source Switch	3
4.2	Battery Operation	4
4.2.1	EM-2110/EM-2112 Connection	4
4.2.2	EM-2110/EM-2112 Operation	4
4.2.3	Recharging Operation EM-2112	5
4.2.4	Precautions	6
4.2.5	Battery Protection Circuits	6
4.2.5.1	Overcharging	6
4.2.5.2	Excessive Discharge	6

LIST OF ILLUSTRATIONS

FIGURE	TITLE	PAGE
1.0	EM-2112 Schematic Diagram	7

APPENDIX A EM-2112 ACCESSORIES

A-1.0 Standard Accessories

The following accessories are included as standard equipment with each EM-2112.

- a. Power/Control Cable NO: 2112.
- b. AC Power Cable NO: 8722.

NOTE:

The EM-2112 can only function with a modified EM-2110/EMC-11.

These modifications comprise:

1. The External DC Input Connector A4J2 is changed to:
PT06E-8-4P, 4 pin connector,
2. The connector is wired as follows:
Pin A: Plus (+) voltage line.
Pin B: Minus (-) voltage line.
Pin C: Power Switch Line 1.
Pin D: Power Switch Line 2.
3. The Power Switch Line 1 and Line 2 are connected to a set of contacts on the EM-2110 front panel power switch. This allows the EM-2112 Battery Pack/Charger Module to be activated whenever the front switch is activated.

DESCRIPTION AND USE ELECTRO-METRICS MODEL EM-2112 BATTERY PACK/CHARGER

1.0 Introduction

The Electro-Metrics Model EM-2112 Battery Pack/Charger Module enables the EM-2110 Interference Analyzer to operate independently of an AC power source for an longer period than possible on the internal battery pack alone. This permits the EM-2115 to be used for on-site (in-field) testing or to eliminate possible ground loop problems during laboratory testing.

The EM-2112 Module is a separate free-standing unit and is normally placed beneath the EM-2110 when used. A power-control cable connects the two units.

The battery pack is a 36 V (nominal) 8 ampere-hour battery made up of 18 sealed lead-acid cells. Since these cells are classified as "*dry*" by the U.S. DEPARTMENT OF TRANSPORTATION and the INTERNATIONAL AIR TRANSPORT ASSOCIATION, they are not subject to the Restricted Articles Regulations covering air shipments. The module can be stored in any position and the cells will not dry out, vent acid, or acid vapors. A self-sealing safety vent prevents cell rupture in the event of charger failure.

A fully charged battery will operate the EM-2110 for 16 hours (nominal). The actual operating time will vary and is dependent on the type of EMI testing the instrument will be performing. It will fully recharge after such usage in approximately 16 hours. A fully charged battery can be stored up to three years with no appreciable decrease in battery capacity.

The charger circuit incorporates monitor and protection circuitry to prevent overcharging or excessive discharging of the battery cells.

2.0 Specifications

2.1 Electrical

a. AC Power Sources

- 1) 105-130 VAC, 50-60 Hz.
- 2) 210-260 VAC, 50-60 Hz.

b. Fuse Specifications

- 1) 115 VAC operation: 1.5 AMP 3AG SLO-BLO.
- 2) 230 VAC operation: 0.75 AMP 3AG SLO-BLO.

c. Operating Time

Nominal 8 hours, typically 5-8 hours.

2.2 Mechanical

Length:	491 mm (19.3").
Width:	426 mm (16.8").
Height:	65 mm (2.6").
Weight:	Approx. 15.5 kg (34 lbs).

3.0 Description Front/Rear Panel

3.1 Front Panel

a. Charge Indicator

Type: LED.

Color: Red.

Function: When activated, indicates that the EM-2112 Module is connected to an AC power source either directly or via the EM-2110.

b. Battery Test Switch

Type: Momentary Pushbutton.

Function: Use to activate the front panel Battery Status Meter.

c. Battery Status Meter

Type: 2-inch analog meter.

Function: To indicate the approximate status of the battery charge/dis-charge cycle.

The meter has three status markings:

1) CHG (CHARGE)

The battery is charging properly. Depending upon the depth of the previous discharge, the meter may indicate less than the actual charge value for the first few hours after the unit is connected to the AC power source.

2) HIGH

The battery is fully charged, unloaded condition. This indication is most accurate if the battery has not been charged or discharged for the past 24 hours.

3) LOW

The battery has insufficient capacity to run the EM-2110. The module should shut itself off before the indicator drops below the "LOW" status line.

3.2 Rear Panel

a. Input Connector (J1)

Type: 9-pin connector (MS-3102A-20-16P).

Function: Supply DC voltages to the EM-2110.

b. 115/230 Power Source Switch (S2)

Type: Two position slide switch.

Function: Set EM-2112 for operation with either 115 VAC or 230 VAC power source.

c. AC Power Line Fuse Holder (F1)

Type: Panel mount, knurl knob.

Function: Self-explanatory.

4.0 Operating Instructions

4.1 Power Source Switch

The AC Power Source Switch is located on the rear panel between the Input Connector and the fuse holder. To change the switch setting, move the switch slider to the side with the appropriate markings for the AC power source being used.

CAUTION

1. Verify that the Power Source Switch setting corresponds to the AC power source being used. Operation on "220" VAC with the switch set for "110" VAC can cause extensive circuit damage.
2. The switch setting "MUST" match the Power Source Selector setting of the EM-2110.

4.2 Battery Operation

EM-2110 operation is identical whether using the external EM-2112 Battery Pack/Charger or an AC power source except that the battery has a limited or finite time of operation.

4.2.1 EM-2110/EM-2112 Connection

- a. Connect the Power/Control Cable (2112) from Connector J1 on the rear panel of the EM-2112 to Connector A4J2 on the rear panel of the EM-2110.
- b. The EM-2110 is now ready for operation using the EM-2112. When connected to the EM-2110, the EM-2112 is controlled by the receiver.

4.2.2 EM-2110/EM-2112 Operation

Whenever the EM-2110 is connected to an AC power source, the receiver will operate from the AC line. The EM-2110 does **not supply any AC voltage** to the EM-2112.

If the EM-2110 is disconnected from the AC power source, the EM-2112 will supply the "raw" DC voltages to operate the power supplies within the EM-2110. The front panel Power Switch of the EM-2110 controls the input power to the DC supplies of the receiver in either mode of operation.

The battery charge status should be checked as soon as the EM-2110 Power Switch is activated using the front panel EM-2112 Battery Test Switch. When pressed, the front panel analog meter will indicate the approximate state of the battery charge. For operation using the battery as a sole power source, the meter should read between the LOW and HIGH markings of the battery test scale.

If the meter reads at or below the LOW marking, the EM-2110 will turn on momentarily and then be automatically turned-off by the Excessive-Discharge Circuitry. In this case, battery recharging is required.

- NOTE:**
- 1. To operate the receiver for the nominal five hours using the battery pack as the sole power source, the meter should read at or near the HIGH meter scale marking.**
 - 2. During periods of extended or heavy usage, it is advisable to check the battery condition periodically.**

A fully charged battery will operate the EM-2110 for five to eight hours (nominal). The actual operating time will vary and is dependent on the type of EMI testing the instrument will be performing. Some examples of usage that will reduce the operating time cycle of the battery pack:

- a. Use of accessories that draw their power from the EM-2115.

It will fully recharge after such usage in approximately 16 hours.

4.2.3 EM-2112 Recharging Procedure

Connect the external AC power cable (8722) to the Input Connector J1 and connect the EM-2112 to an AC power source.

NOTE: The Power Source Switch setting should correspond to the AC power source being used.

CAUTION

The EM-2112 should "NEVER" be stored with discharged battery cells. A fully charged battery pack can be stored up to three years with no appreciable decrease in battery capacity.

4.2.4 Precautions

If the EM-2112 will not recharge or operate the EM-2110 for five hours, contact **Electro-Metrics, Inc.** or your nearest **Electro-Metrics, Inc.** representative for any assistance required.

All rechargeable battery systems have a limited number of charge-discharge cycles. To obtain maximum battery life:

- a. Prevent deep discharges. Even though the EM-2112 has circuitry to prevent excessive discharge, battery cell life will be increased if the time spent near the lower charge limit is kept to a minimum.
- b. "**NEVER**" store a deeply discharged EM-2112, without recharging the module first.
- c. Avoid high temperatures. The higher the operating or storage temperature, the shorter the operating life-time of the battery.

4.2.5 Battery Protection Circuits

4.2.5.1 Overcharging

Whenever the charging current reaches a significant level, the charger circuit will automatically reduce the charging current to prevent overcharging the battery.

4.2.5.2 Excessive Discharge

Excessive discharge will not occur since the flow of battery current to all circuits is automatically interrupted as soon as battery voltage drops to a value indicating negligible remaining capacity.

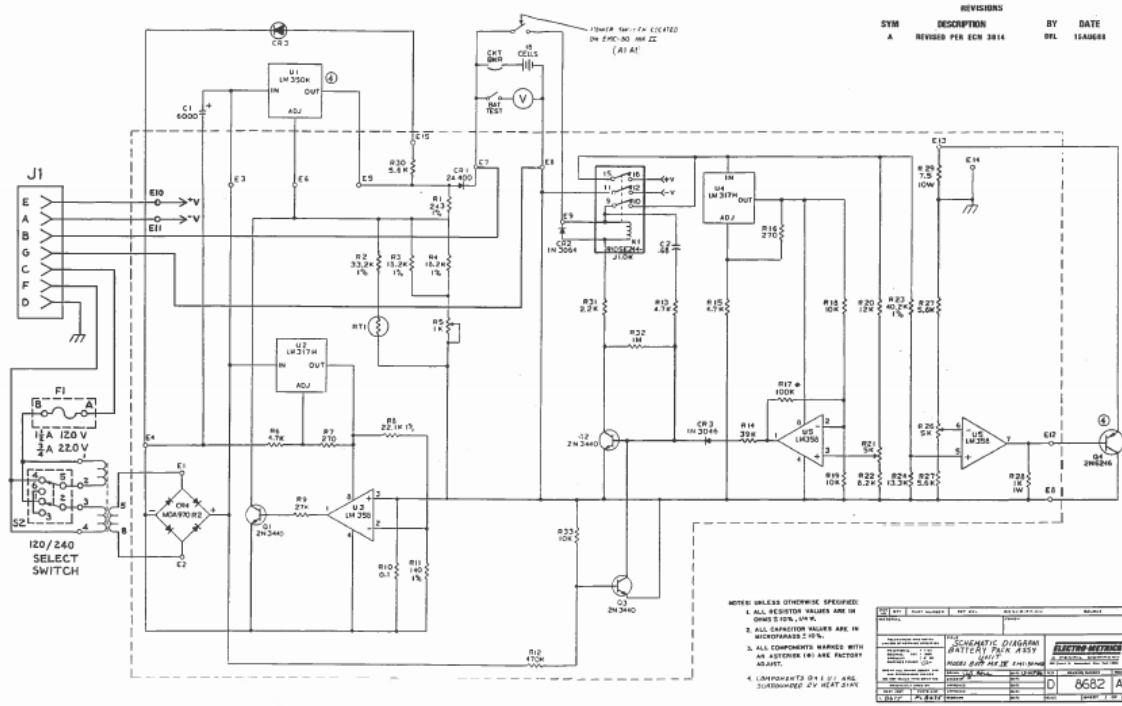


Figure 1.0
EM-2112 Schematic Diagram