



# **La MARCHÉ**

La Marche Manufacturing Company | [www.lamarchemfg.com](http://www.lamarchemfg.com)

## **ESCR II**

### Engine Starting Battery Charger



## Installation and Operation Manual

## Important Safety Instructions

Before using this equipment read all manuals and other documents related to this unit and other equipment connected to this unit. Always have a copy of a units manual on file nearby, in a safe place; if a replacement copy of a manual is needed it can be found at [www.lamarchemfg.com](http://www.lamarchemfg.com).

### Electrical Safety



**WARNING:** Hazardous Voltages are present at the input of power systems. The output from rectifiers and from batteries may be low in voltage, but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power systems, someone should always be close enough to come to your aid.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



**WARNING:** Lethal Voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the AC input power. Check with a meter before proceeding. Do not touch any uninsulated parts.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

### Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.

### Battery Safety



**WARNING:** Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce risk of arc, connect and disconnect the battery only when the unit is off.
- If it is necessary to remove battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber lined vest/apron when working near a battery.
- Have plenty of fresh water and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop metal on a battery. A spark or short-circuit could occur and could cause an explosion.

## Unit Location

- Allow at least 3 inches of free air on all vented surfaces (and external heatsinks) for proper cooling.
- Allow sufficient clearance to open the front panel for servicing.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance free or valve regulated lead acid (VRLA) battery may be placed below this equipment.

## Check for Damages

Prior to unpacking the product, note any damage to the shipping container. Unpack the product and inspect the exterior of product for damage. If any damage is observed, contact the carrier immediately. Continue the inspection for any internal damage. In the unlikely event of internal damage, please inform the carrier and contact La Marche for advice on the risk due to any damage before installing the product. Verify that you have all the necessary parts per your order for proper assembly.



**CAUTION:** Failure to properly file a claim for shipping damages, or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

## Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

## Inspection Checklist

- Enclosure exterior and interior is not marred or dented.
- There is no visible damage components.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on packing list have been included.

## Handling

Equipment can be very heavy and/or top heavy. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent the equipment from being accidentally tipped over.

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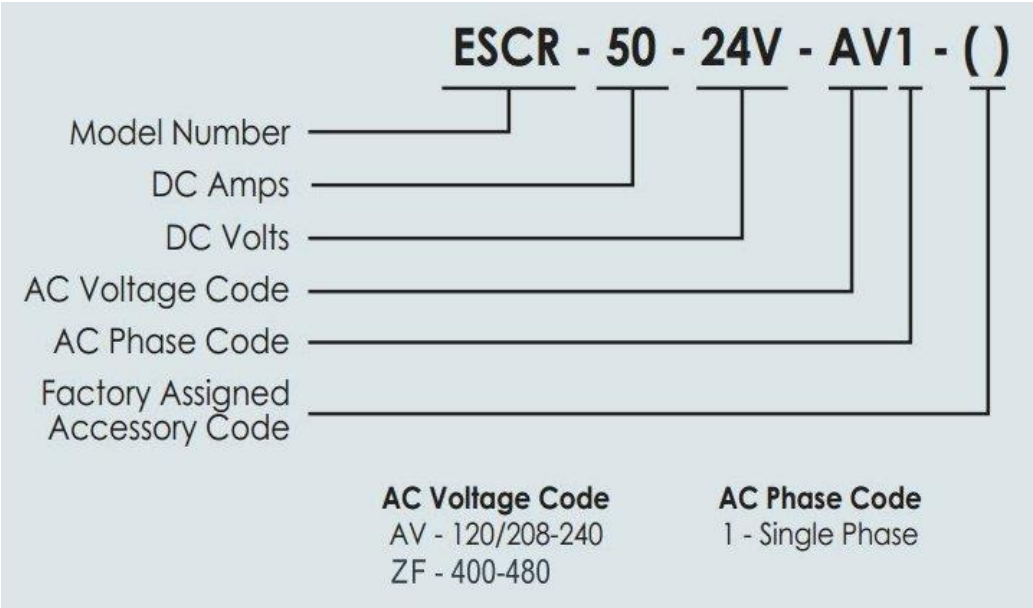
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**Model Scope/General Description**

The La Marche model ESCR II engine starting battery charger product line utilizes microprocessor controlled SCR Charging Technology. The PWM control provides the highest reliability that is required for maintaining and recharging engine start batteries for generator sets. The ESCR II features adjustable Float and Equalize voltages, soft start, equalize timer and is configurable for Flooded Lead Acid, NiCad or VRLA batteries. The ESCR II offers both AC and DC breakers as standard equipment. The ESCR II can run at both 50 and 60Hz.

**Understanding the Model Number**

The ESCR model number is coded to describe the charger and the options that are included. Find the model number on the nomenclature nameplate of the charger. Then follow the chart to determine the configuration of your battery charger.



**Optional Accessories Included in the Unit**

This unit may have been outfitted with a number of optional accessories or option packages. To find out what options this unit has (if any) refer to the very first page of the manual package.

# 1 Installation

## 1.1 Mounting the ESCR II

For customer convenience the ESCR II can either be wall or floor mounted. Be sure that the Wall or Floor planned for installation can support the weight of the ESCR II.

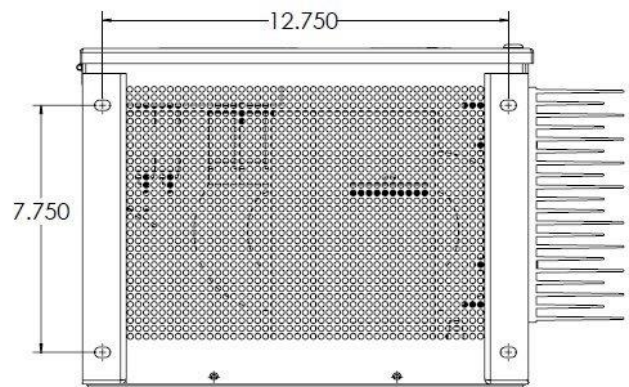
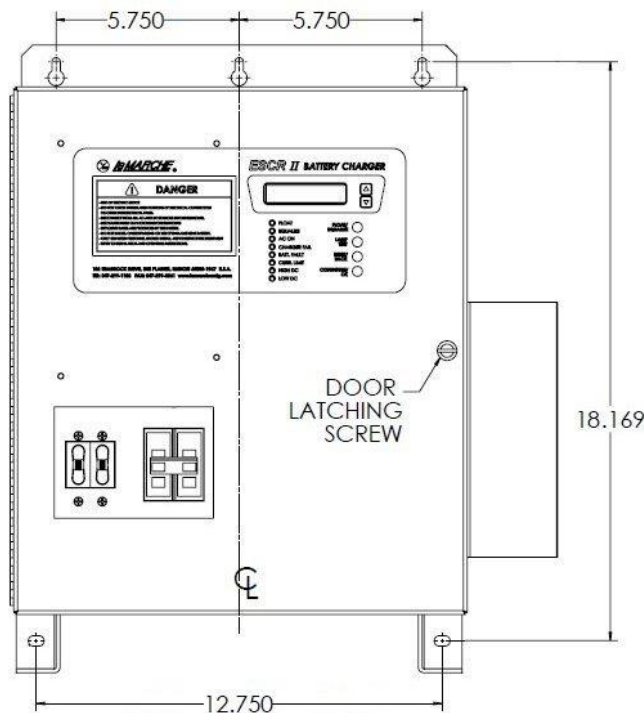
Model Number	AC Input		DC Output		Dimensions	Weight
	Amps	Volts	Amps	Volts		
ESCR-30-24V-AV1	18/8-9	120/208-240 50/60Hz	30	24	16.837" x 10.625" x 19.7" 427.7 x 269.9 x 500.4mm	100 lbs 45.36 kg
ESCR-40-24V-AV1	22/10-11	120/208-240 50/60Hz	40	24	16.837" x 10.625" x 19.7" 427.7 x 269.9 x 500.4mm	107 lbs 48.55 kg
ESCR-40-24V-ZF1	6-7	400-480 50/60Hz*	40	24	16.837" x 10.625" x 19.7" 427.7 x 269.9 x 500.4mm	130 lbs 58.97 kg
ESCR-50-24V-AV1	24/11.5-12	120/208-240 50/60Hz	50	24	16.837" x 10.625" x 19.7" 427.7 x 269.9 x 500.4mm	112 lbs 50.80 kg

\*The ZF1 unit can run at 60Hz over the full input range. At 50Hz it can only be run at 400VAC ( $\pm 10\%$ )

**Table 1 - ESCR II Weights and Dimensions**

### 1.1.1 Wall Mounting

To wall-mount the ESCR II, install three 0.25 in (6.4 mm) bolts on the wall rated to support the charger weight plus a safety factor of at least two times. Place the ESCR II on the bolts, add appropriate mounting hardware and tighten. Add two 0.25 in bolts to the bottom brackets for additional support. Refer to the figure below (left) for mounting dimensions and specifications.



**Figure 1 - ESCR II Mounting Dimensions**

### 1.1.2 Floor Mounting

To floor-mount the ESCR II, install four 0.25in (6.4mm) bolts into the floor. Place the ESCR II on the bolts, add appropriate mounting hardware, and tighten securely. The image above (right) shows the footprint of the ESCR II case.

## 1.2 Electrical Connections

### 1.2.1 Changing Transformer Taps

The ESCR II accepts standard input voltages of 120 VAC or 208 – 240 VAC by changing the connections to the input terminals. No other changes are required. The ZF1 unit (400-480VAC) has no taps.\*



**CAUTION:** Before wiring AC power to the ESCR II, check that the AC input taps are correct for the desired input voltage.

Before changing the AC input taps, be sure that AC supply and DC loads to the ESCR II are turned off and locked out. Verify that no voltage is present by using a voltmeter at all input and output terminals. Turning off the AC and DC circuit breakers on the ESCR II *does NOT* eliminate live voltages inside the enclosure. Also de-energize any external wiring to the alarm relay contacts.

Verify that all voltages within the enclosure are de-energized and locked out. Change the connections to the input terminals as shown in the table and figure below.

*\* An ESCR II battery charger rated for 400 – 480 VAC does not have transformer taps. The unit can be run at 400 – 480VAC ( $\pm 10\%$ ) at 60Hz. At 50Hz the unit can only be run at 400VAC ( $\pm 10\%$ ).*

### 1.2.2 AC Input Connections

Before beginning any work inside the charger enclosure ensure that all incoming AC supply and DC load wires are de-energized. Verify that no voltage is present inside the case by using a voltmeter at all input and output terminals.

AC INPUT WIRING (AV1 INPUT)					
INPUT	AC1	AC2	A	B	C
120	1(L1)	4(N)	5	6	3
208–240	1(L1)	3(L2)	6	5	2

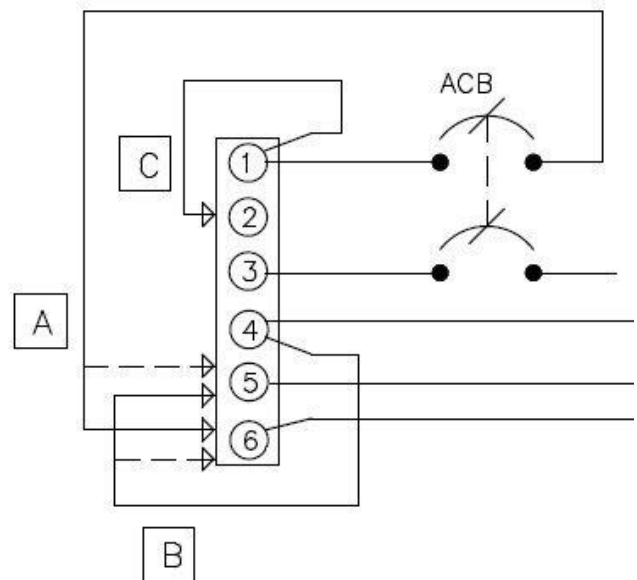
**Table 2 - AC Input Taps**

#### For 120 VAC Input Voltage:

1. Connect wire marked **A** to terminal **5**
2. Connect wire marked **B** to terminal **6**
3. Connect wire marked **C** to terminal **3**
4. **AC input 1** connects to terminal **1(L1)**
5. **AC input 2** connects to terminal **4(N)**

#### For 208 – 240 VAC Input Voltage:

1. Connect wire marked **A** to terminal **6**
2. Connect wire marked **B** to terminal **5**
3. Connect wire marked **C** to terminal **2**
4. **AC input 1** connects to terminal **1(L1)**
5. **AC input 2** connects to terminal **3(L2)**



**Figure 2 - AC Input Taps**



Before making any connections to the ESCR II ensure that the AC Power is off at the main breaker box and that both of the unit's breakers are off. Check that the source voltage and frequency matches the voltage and frequency listed on the charger nameplate. Select wire size, using Table 3 to the right.

Connect the AC input wires to the appropriate taps as described above. If the ESCR II has a 480V input there are not taps, simply connect the AC input wires to terminals 1 and 2.

*NOTE: These are recommended sizes. All National and Local Wiring Codes must be followed*

BREAKER SIZE (AMPS)	WIRE SIZE REQUIREMENT FOR CUSTOMER CONNECTION	EQUIPMENT GROUNDING CONDUCTOR MINIMUM
5	#14	#14
10	#14	#14
15	#12	#12
20	#12	#12
25	#10	#12
30	#10	#10
35	# 8	#10
40	# 8	#10
45	# 8	#10
50	# 8	#10
60	# 6	#10

**Table 3 - Wire Sizing Table**

### 1.2.3 Output Connections

Before connecting the Battery and/or DC loads, it is recommended to apply AC power and set the configuration for the correct output. See section 2.3 for the configuration instructions. Once the configuration is set, remove AC power from the main breaker to the charger.

Select proper size for the DC wiring from the wire size table above (Table 3). If the distance between the unit's DC output and the DC load exceeds 10 feet, use the Power Cable Guide below to minimize the voltage drop across the wire distance.

### Power Cabling Guide

Use the following formulas and table to determine proper wire size for minimal voltage drop.

#### Table of Conventions

CMA = Cross section of wire in circular MIL area  
A = Ultimate drain in amperes  
LF = Conductor loop feet  
MaxAmp = Maximum allowable amperes for given voltage drop  
AVD = Allowable voltage drop  
K = 11.1 for commercial (TW) copper wire (KS5482-01)  
= 7.4 for aluminum (KS20189)

SIZE (AWG)	AREA CIR.MILS	SIZE (AWG)	AREA CIR.MILS
18	1620	6	26240
16	2580	4	41740
14	4110	3	52620
12	6530	2	66360
10	10380	1	83690
8	16510	0	105600

**Table 4 - Wire Size/Area Table**

### Calculating Wire Size Requirements

$$CMA = \frac{A \times LF \times K}{AVD}$$

### Calculating Current Carrying Capacity of Wire

$$MaxAmp = \frac{CMA \times AVD}{LF \times K}$$



**CAUTION:** When connecting the DC cables to the battery, be certain the positive terminal of the charger is connected to the positive battery terminal and the negative terminal is connected to the negative battery terminal.

### 1.2.4 Standard Alarms

Four alarms are included as a standard feature of the ESCR II. The included alarms are a High DC Voltage, Low DC Voltage, Charger Failure and an AC Failure alarm. Each alarm includes a form C contact enabling the customer to connect remote annunciators. The Alarm contacts are rated for 10 Amps at 28 VDC.

A **Charger Failure Alarm** occurs if the charger is unable to regulate the output voltage. This alarm relay stays latched in, even after the alarm conditions clear; until the ESCR II unit is reset.

The **AC Failure Alarm** will trigger (after a preset delay) when the AC power to the unit is lost. The alarm will automatically reset when AC power is restored to the unit. When AC power is lost the front panel display and indicators will remain powered by the connected batteries.

The **High DC Voltage Alarm** will trigger when the DC output voltage of the ESCR II exceeds the preset high voltage alarm value, and will reset when the DC output voltage returns to normal. The high voltage value is adjustable and can be set in Configure Mode.

The **Low DC Voltage Alarm** will trigger when the DC output voltage of the ESCR II falls below the preset low voltage alarm value, and will reset when the DC output voltage returns to normal. The low voltage value is adjustable and can be set in Configure Mode.

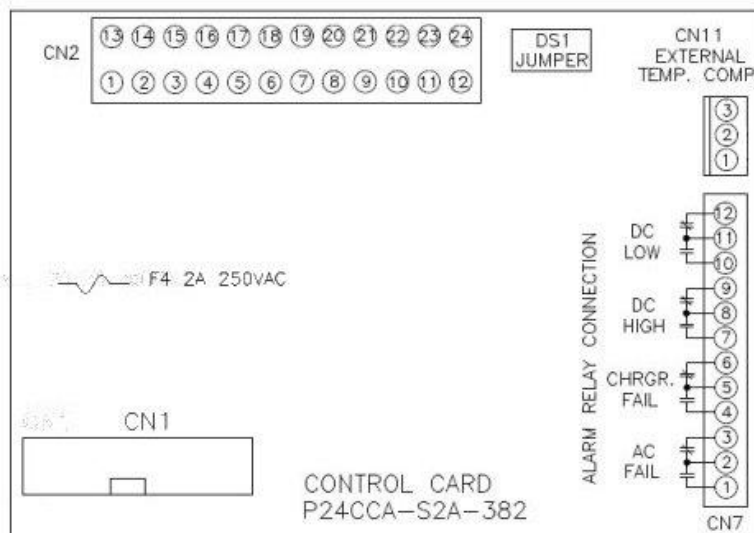


Figure 3 – Control/Alarm Card

### Alarm Logic

Alarm	Logic
AC Fail	De-Energize on Failure
Charger Fail	De-Energize on Failure
DC High	Energize on Failure
DC Low	De-Energize on Failure

Table 5-Alarm Logic

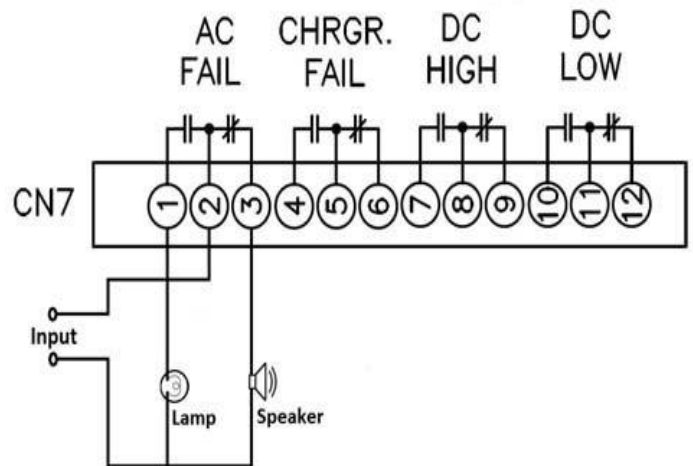
## Alarm Connections

Before making any connections to the ESCR II ensure that the AC Power is off at the main breaker box and that both of the unit's breakers are off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

For AC Fail, Charger Fail, Low DC Alarm: If it is desired that the annunciator be active until the alarm triggers connect the annunciator leads to the **NO** and **C** contacts of the desired alarm (located on the Control Card S24-382). If it is desired that the annunciator be activated when an alarm triggers connect the annunciator leads to the **NC** and **C** contacts of the desired alarm.

For High DC Alarm: If it is desired that the annunciator be active until the alarm triggers connect the annunciator leads to the **NC** and **C** contacts of the desired alarm (located on the Control Card S24-382). If it is desired that the annunciator be activated when an alarm triggers connect the annunciator leads to the **NO** and **C** contacts of the desired alarm.

*EXAMPLE:* A customer wants a Green Lamp to be illuminated while the AC Power is on, and a Speaker to sound when the AC is lost. Using customer provided equipment they could connect an external power supply, a speaker and a green lamp. The speaker would be connected to Pin 3 (NC contact) and the low side of the power supply. The Lamp would be connected to Pin 1 (NO contact) and the low side of the power supply. The high side of the power supply would be connected to Pin 2 (C contact). See Figure 4.



**Figure 4 - Example Connections  
(Customer Provided Equipment)**

### **1.2.5 External Temperature Compensation (Option 11W/11Y)**

The natural voltage of a battery changes as a function of temperature change. As the battery temperature rises, the effective voltage of the battery decreases. Without Temperature Compensation, the battery charger will always produce a set constant output voltage. As the battery temperature increases, this constant voltage will then induce a higher output current from the charger. This higher current can result in overcharging the battery, which in turn can result in damage to the batteries.

Temperature Compensation combats this overcharging by adjusting the charger's output voltage based on the temperature read by the temperature probe. In order to increase the accuracy of the temperature compensation the external probe can be used to measure the temperature of the battery.

Option 11W includes the compensation circuit and a 24 foot long temperature probe. Option 11Y includes the compensation circuit and a 100 foot long temperature probe. With either option approximately two feet of the probe is taken inside the charger enclosure.

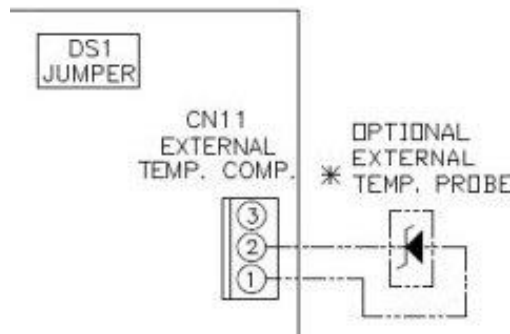
#### **External Probe Connection Procedure**

Before making any connections to the ESCR II ensure that the AC Power is off at the main breaker box and that both of the unit's breakers are off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

To connect the external probe the DS1 jumper must be removed from the control card. Removing this jumper will disable the charger's internal temperature compensation.

On the charger side, simply plug the probe's 3 pin connector in the CN11 connection on the Control/Alarm Board. Install the remaining lug of the probe to the battery. As battery setups vary between customers and battery manufacturers, it is recommended that the battery manufacturer be consulted for placement of the probe. The lug of the probe is completely isolated from the compensation circuitry, so the battery voltage will not affect the compensation.

With the probe connected, enter the configuration and make sure that Temperature Compensation has been enabled (For more details see section 2.3).



**Figure 5 - Temperature Probe Connection**

## 2 Operation

### 2.1 Starting the ESCR II



All equipment is shipped from the factory fully checked and adjusted based on the factory settings listed below. Before connecting the battery check with the battery manufacturer for the correct voltage settings and adjust the configuration accordingly (refer to section 2.3 for configuration). Failure to match the charger settings with the connected battery may damage or shorten the life of the battery.

#### **Factory Settings**

The factory settings of the ESCR II are based on the customer order, unless otherwise specified all units are set at the factory with the following settings.

<b>Battery Type:</b>	<i>12L (12 Cell Lead Acid)</i>
<b>Float Voltage:</b>	<i>2.25 Volts/Cell (V/C) for Lead Acid (LA) 1.40 V/C for Nickel Cadmium (NC)</i>
<b>Equalize Voltage:</b>	<i>2.33 V/C for LA (1.55 V/C for NC)</i>
<b>Current Limit:</b>	<i>105% or nominal output current</i>
<b>Equalize Hours:</b>	<i>Eight Hours</i>
<b>Equalize Mode:</b>	<i>Manual</i>
<b>Temp. Compensation:</b>	<i>Disabled</i>
<b>High DC Voltage:</b>	<i>2.45 V/C for LA (1.6 V/C for NC)</i>
<b>Low DC Voltage:</b>	<i>1.98 V/C for LA (1.2 V/C for NC)</i>
<b>Low DC Current:</b>	<i>0.5 Amps</i>
<b>Alarm Delay:</b>	<i>5 Seconds</i>

#### **2.1.1 Checking the Installation**

Before starting up the ESCR II check and verify that all connections are correct. Check that all terminations and contacts are tightened securely. Check that the transformer is set for the correct input voltage. Check that the input frequency matches the nameplate of the charger. Check that the battery voltage matches the DC output voltage on the nameplate of the charger.

#### **2.1.2 Starting/Stopping the ESCR II**

Once proper connections are established energize the charger by turning on the unit's AC breaker (the DC breaker should be off). This will charge the capacitors inside the unit and eliminate heavy arcing when the batteries are connected. After about 30 seconds, turn on the DC breaker. When shutting down the ESCR II switch off the DC breaker first and then switch off the AC breaker.

#### **2.1.3 Start-Up Sequence**

Upon powering up the ESCR II the LCD will display the model number. During the start up sequence, the low DC voltage alarm will be temporarily activated.

## 2.2 The Front Panel Display

After the ESCR II has completed start up, the "AC ON" indicator on the front panel and either the "Float" or "Equalize" indicator on the front panel will be lit. The LCD will display the system DC output voltage and DC output current on line one. Line two of the LCD displays the status of ESCR II.



Figure 6 - Front Panel Display (Unit in Float Mode)

### 2.2.1 Controls

**Up/Down Arrows** – The Up and Down arrows offer no function outside of Configure mode. When in configure mode the up and down arrows allow the customer to navigate menus and increase or decrease values.

**Float/Equalize Button** – The Float/Equalize button allows the user to manually switch between float mode and equalize mode. When the ESCR II is in equalize mode, line two of the display will switch between "EQUALIZE MODE" and the time remaining.

**Lamp Test Button** – The Lamp Test button allows the user to check the function of all of the Front Panel LEDs without affecting the operation of the rectifier. While the lamp test is running all of the LEDs flash and a sequence of numbers is written to the display.

**Reset/Back Button** – Under normal system operation the Reset/Back Button operates as the reset button. Pressing reset allows the user to restart the rectifier. Upon restarting, the ESCR II will once again go through the start-up sequence describe in section 2.1.3. In the Configure mode the Reset/Back button operates as the back button. Pressing the back button allows the user to navigate to a previous screen or out of the configuration.

**Configure/OK Button** – The Configure/OK button brings the ESCR II into configuration mode. This allows the user to set charger parameters in Basic Settings as well as Float Voltage, Equalize Voltage, Equalize Timer, Current Limit, Temperature Compensation and Alarm settings. Once in configuration mode this button becomes the OK button which is used to make selections with in the menus.

### **2.2.2 LED Indicators/Alarms**

**LCD Display** – The LCD Display shows the output DC voltage and output DC amperage of the ESCR at all times. The second line of the Display shows the mode of the charger as well as displaying the different alarm conditions, should they occur.

**Float LED (Green)** – The Float LED will illuminate when the ESCR II is in float mode.

**Equalize LED (Amber)** – The Equalize LED will illuminate when the ESCR II is in equalize mode.

**AC On (Green)** – The AC On LED will illuminate whenever AC voltage is present at the ESCR II input terminals.

**Charger Fail LED (Red)** – The Charger Fail LED will illuminate when the charger is unable to regulate the output voltage. A set of Form C contacts is also provided to enable the customer to connect a remote annunciator.

**Battery Fault LED (Red)** – The Battery Failure LED illuminates to indicate a issue with the battery. Conditions that would cause this LED to illuminate are an open or high resistance battery, or a missing battery.

**Current Limit (Red)** – The Current Limit LED will illuminate when the rectifier is operating in a current limit condition.

**High DC (Red)** – The High DC LED will illuminate when the DC output voltage of the ESCR II exceeds the preset high voltage alarm value. The high voltage value is adjustable and can be set in Configure Mode. A set of Form C contacts is also provided.

**Low DC (Red)** – The Low DC LED will illuminate when the DC output voltage of the ESCR II falls below the preset low voltage alarm value. The low voltage value is adjustable and can be set in Configure Mode. A set of Form C contacts is also provided.

**AC Fail (contacts only)** – The AC Fail alarm does not have an LED indicator, however, an AC Fail message appears on the LCD display. A set of Form C contacts is provided for an AC Power Failure Alarm annunciation. These contacts change state when AC Fail threshold is reached.

## 2.3 Configure Mode

Pressing the Configure/OK button enters Configure mode. In configure mode the rectifier is turned off, and there will be no output.



**CAUTION:** There will be no output from the charger while in the configure mode. Caution must be taken when powering critical loads.

Each of the adjustable settings of the ESCR II is accessible using Configure mode. Once in Configure mode the user can navigate using the Up and Down arrows to the right of the display, the Reset/Back button and the Configure/OK button.

The following features are available to be configured:

**2.3.2 Basic Settings** – Allows selection of the output configuration (voltage/current) and the number of cells.

1. Select BASIC OUTPUT
  - Select O/P VOL. & CURR. (Output Voltage and Current)
    - Select the rectifier configuration needed
    - Return to previous menu by pressing BACK button
  - Select NUMBER OF CELLS
    - Select the number and type of battery cells to be charged
  - Return to configuration menu by pressing the Reset/Back button

**2.3.3 Float Voltage** – Allows the selection of voltage per cell for Float operation.

1. Select FLOAT VOLTAGE from configuration menu
  - Set to the voltage recommended by battery manufacturer

**2.3.4 Equalize Voltage** – Allows the selection of voltage per cell for Equalize operation.

1. Select EQUALIZE VOLTAGE from configuration menu
  - Set to the voltage recommended by battery manufacturer

**2.3.5 Equalize Timer** – Allows selection for the length of the Equalize cycle (in hours) as well as when an Equalize cycle is initiated (manual/automatic).

1. Select EQUALIZE TIMER from configuration menu
  - Select EQUALIZE HOURS
    - Set the hours that the rectifier will be in the EQUALIZE mode.
  - Select EQUALIZE MODE and set for MANUAL or one of the automatic modes:

<i>Manual:</i>	Equalize cycle is started manually
<i>7 Days:</i>	Equalize cycle is started automatically every 7 days
<i>14 Days:</i>	Equalize cycle is started automatically every 14 days
<i>30 Days:</i>	Equalize cycle is started automatically every 30 days
<i>Auto-AC Fail:</i>	Equalize cycle starts automatically when AC input power is restored after a power failure (AC power has to be off for 5 minutes for this mode to be activated)
<i>Auto-DC Low:</i>	Equalize cycle starts automatically if battery voltage falls below the Low Voltage Alarm set point

*In any equalize mode, the ESCR II will return to Float mode at the end of the equalize cycle.*



**2.3.6 Current Limit** – Allows adjustment of the current limit from 50% to 110% of rated output.

1. Select LIMIT CURRENT from configuration menu
  - Select current limit as a percentage of the rated output current of the rectifier.

**2.3.7 Temperature Compensation** – Allows enable or disable of the temperature compensation feature.

1. Select TEMP. COMP. from configuration menu
  - Select DISABLE or ENABLE

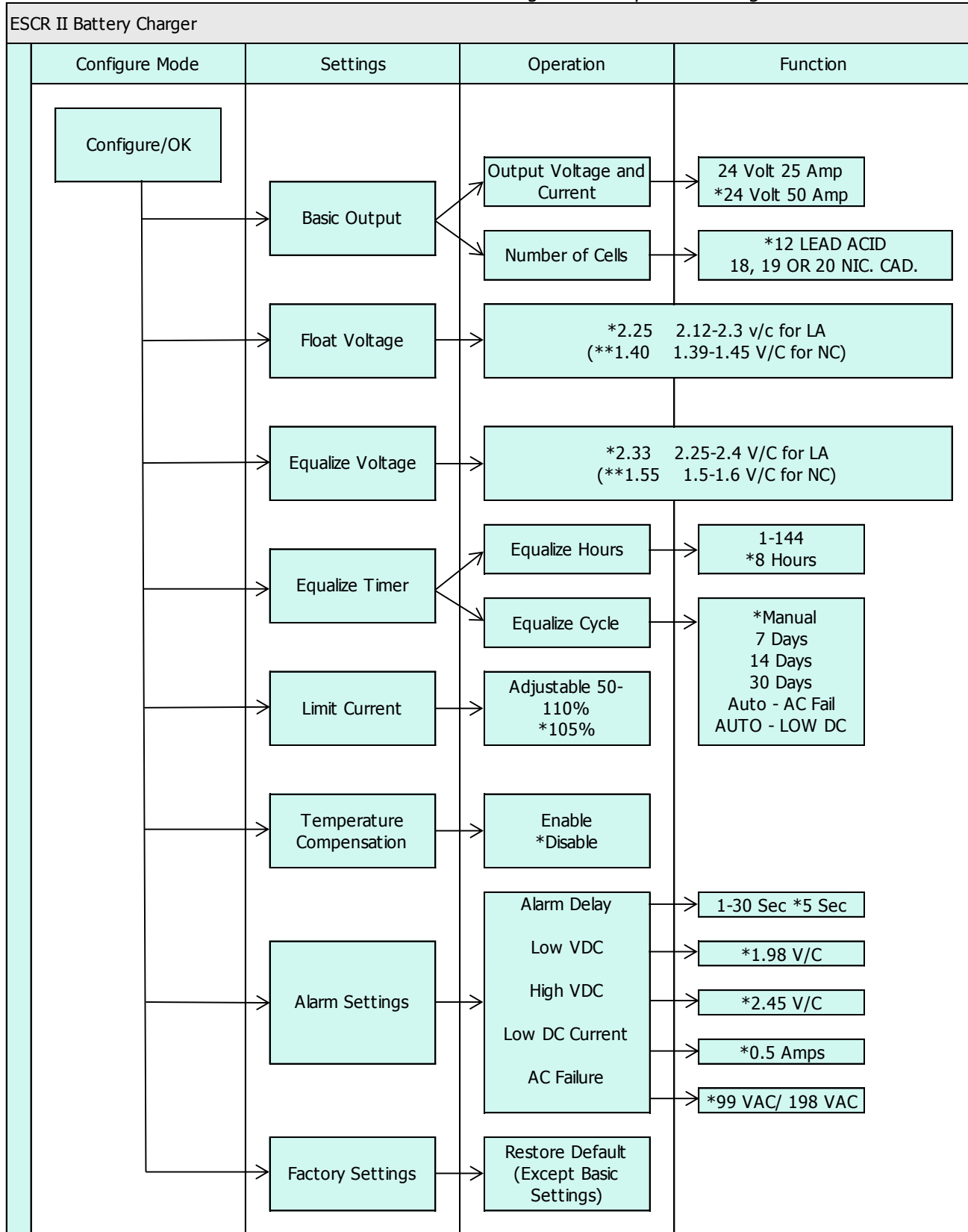
**NOTE:** *DS1 jumper must be removed when temperature compensations is enabled.*

**2.3.8 Alarm Settings** – Allows setting the alarm thresholds for the provided alarms and the alarm time delay

1. Select ALARM SETTING from the configuration menu.
  - In the ALARM SETTING menu select ALARM DELAY
    - Select the alarm delay in seconds. Delay can be set from 1 second to 30 seconds
2. In the ALARM SETTING menu select DC LOW VOLTAGE
  - Select the desired low voltage alarm point in V/C (volts per cell)
3. In the ALARM SETTING menu select DC HIGH VOLTAGE
  - Select the desired high voltage alarm point in V/C (volts per cell)
4. In the ALARM SETTING menu select DC LOW CURRENT
  - Select the desired low current alarm point
5. In the ALARM SETTING menu select AC FAIL VOLTAGE
  - Select the AC voltage operating range for the rectifier. Alarm will activate when the AC voltage is below the selected value.

**2.3.9 Factory Settings** – Allows the user to reset all settings to how they were programmed from the factory. To reset the ESCR II settings to the original factory settings, scroll to FACTORY SETTING in the configuration menu. Select FACTORY SETTING. This will not change the BASIC OUTPUT settings.

The flow chart below shows the available and default settings of each option in configure mode.



\*Indicates Default Value

\*\*Indicates Default Value for NiCad Battery Type

**Table 6 - Configure Mode Flow Chart**

### 3 Service

All work inside the ESCR II should be performed by a qualified electrician. La Marche is not responsible for any damages caused by an unqualified technician.



Before working inside the ESCR II ensure that the AC Power is off at the main breaker box and that both of the unit's breakers are off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

#### 3.1 Performing Routine Maintenance

In order for the ESCR II to continue to operate properly it must undergo routine maintenance. The recommended maintenance schedule is listed below

##### **Yearly**

1. Blow out rectifier/inverter with a low-pressure air hose.
2. Make sure all connections are tight. (make sure the unit is de-energized)
3. Perform a visual check on all internal components.
4. Check front panel meters and LEDs for accuracy.
5. Check capacitors for electrolyte leakage (and replace if necessary).

##### **Every 7 Years** (If the charger is consistently run in environments with extreme temperatures)

1. Filter capacitors should be replaced.

##### **Every 10 Years**

1. Check magnetics, components and wiring for signs of excessive heat.

### 3.2 Troubleshooting Procedure

Troubleshooting should be performed only by trained service personnel or experienced electricians. Before setting up any complicated testing, give the unit a general inspection.

Check the following:

1. Check DC output cables, connections, battery type, and number of cells against the unit's rating.
2. Check unit specifications against customer order.
3. Check input connections, input voltage and feeder breaker/fuse
4. Check any internal wiring, fuses, and breakers.
5. Check for shipping damage, loose connections, broken wires, etc.
6. Certain failures can be caused by defective batteries; make sure batteries are free from defects.

**NOTE:** *If the problem is found to be located in the printed circuit boards (excepting a blown fuse), the board should be replaced. No attempt should be made to repair circuit boards in the field.*

When calling in for a service inquiry or for troubleshooting assistance, be sure to have all of the following information on hand:

1. Equipment model number and serial number.
2. The actual AC input voltage.
3. The DC output voltage with and without the battery.
4. Result of the check of the AC and DC breakers.
5. The actual DC output current and voltage, measured with battery and load connected to charger.

**NOTE:** *When ordering replacement parts, drawings, or schematics, always give model number and serial number.*

### 3.3 Troubleshooting Chart

<b><i>Symptom</i></b>	<b><i>Possible Cause</i></b>
AC Breaker Trips (High Input Current)	Wrong AC Input Voltage Frequency out of Range Internal Wiring Failure Defective Component on Rectifier Assembly
DC Breaker Trips (High Output Current)	Internal Wiring Failure Incorrect Battery Connected Shorted Output Cables Battery Cable Polarity Reversed Defective Component on Rectifier Assembly
No Display and No LEDs	Internal Wiring Failure Defective Display Driver Card (S2A-348) Defective Control Card (S2A-382)
Failed LED Test	Defective LEDs Defective Display Driver Card (S2A-348)
Meter Reading Incorrect Voltage or Current	Internal Wiring Failure Defective Shunt Defective Control Card (S2A-382) POT Misadjustment
Unit Running Hot	Inadequate Ventilation Ambient is Too Hot
Battery Temperature Too High	Ambient is Too Hot Shorted Battery Cell(s) Float/Equalize Voltage Set Too High
Low Output Voltage or Current	Float/Equalize Voltage Incorrectly Set Charger is in Current Limit Tripped/Defective DC Breaker Defective Control Card (S2A-382) Defective Component on Heatsink Assembly
High Output Voltage or Current	Float/Equalize Voltage Incorrectly Set Defective Control Card (S2A-382) Defective Component on Heatsink Assembly

## Appendix A: ESCR II Specifications

<b>ELECTRICAL</b>	
<b>AC Input</b>	Voltage range $\pm 10\%$ Frequency Range 50/60Hz
<b>DC Output</b>	30, 40 or 50 ADC @ 24 VDC
<b>Output Filtering</b>	Less then 500mV RMS, with connected battery
<b>Regulation</b>	$\pm 0.5\%$ from no load to full load over the specified input voltage, frequency and ambient temperature range.
<b>Meters</b>	LCD Digital Display DC Ammeter & DC Voltmeter $\pm 1\%$ Accuracy
<b>PROTECTION</b>	
<b>Current Walk-In</b>	The output current will gradually increase after the charger is turned on, eliminating surges and overshoot
<b>Current Limit</b>	50 - 110% of the rated DC output current.
<b>AC Breaker</b>	AC breaker is standard.
<b>DC Breaker</b>	DC breaker is standard.
<b>ENVIROMENTAL</b>	
<b>Operating Temperature</b>	-20 to 50°C (-4 to 122°F), derated to 55°C
	-20 to 60°C (-4 to 140°F), derated to 67°C (for ZF1 units)
<b>Storage Temperature</b>	-40 to 85° C (-40 to 185° F)
<b>Relative Humidity</b>	0 to 95% (non-condensing)
<b>Cooling</b>	Convection cooled
<b>Shock</b>	The battery charger in its shipping container withstands shock developed when one edge of the container is dropped six inches while the opposite edge is resting on the ground, or it is dropped two inches without any physical damage or degradation of the electrical performance.
<b>Vibration</b>	The battery charger in its shipping contained, withstands vibration encountered in shipping without physical damage or degradation of the electrical performance.
<b>Altitude</b>	This battery charger is capable of operation at altitudes up to 10,000 feet at an ambient temperature of up to +40° C.