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DCES

DC Electronic Switch
with Source Control and Monitoring



Installation and Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at www.lamarchemfg.com

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 unit's 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.

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 system, 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 DC 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.
- Always assume that an electrical connection is live and check the connection relative to ground.
- Be sure that neither liquids nor any wet material comes 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 6 inches of free air on all vented surfaces 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 and take pictures. Unpack the product and inspect the exterior and interior of product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the unit sent back for evaluation and repair.



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 are no visibly damaged components.
- All internal components are secure.
- Printed circuit boards are firmly seated.
- 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 with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

Table of Contents

Important Safety Instructions	i
Electrical Safety	i
Mechanical Safety	i
Battery Safety	i
Unit Location	ii
Check for Damages	ii
Returns for Service	ii
Inspection Checklist	ii
Handling	ii
Table of Contents	iii
Table of Figures	iv
Model Scope/General Description	1
Understanding the Model Number	1
1.0 Installing the DCES	2
1.1 Mounting the DCES	2
1.1.1 Wall-Mounting the DCES	2
1.1.2 Floor-Mounting the DCES	3
1.1.3 Rack-Mounting the DCES	4
1.2 DC Input/Output Connections	4
1.3 Alarm Connections	8
1.3.1 Alarm/Status Description	9
1.3.2 Alarm/Status Connection Procedure	9
2.0 Operation	10
2.1 Factory Settings	10
2.2 LCD Display and LED Indicators	10
2.3 Modes of Operation	11
Mode of Operation Settings Flowchart	12
2.4 Calibration Menu	12
Customer Calibration Flowchart	13
3.0 Display Calibration	14
Appendix A: Manufacturer's Warranty	16
Appendix B: Manufacturer's Extended Parts Warranty	17
Document Control and Revision History	18

Table of Figures

Figure 1 – DCES Block Diagram	1
Figure 2 – 3 Enclosure Bolt Pattern	2
Figure 3 – 4 Enclosure Bolt Pattern	2
Figure 4 – DCES Enclosure Footprint	3
<i>(Top Left: 3 Enclosure, Top Right: 4 Enclosure, Center: 8A Enclosure)</i>	3
Figure 5 – Rack-Mounting Configurations	4
Figure 6 – 3 Enclosure Wiring Terminals.....	6
Figure 7 – 3 Enclosure Wiring Terminals (DCES with DC Inrush Current per NFPA110).....	7
Figure 8 – 4 Enclosure Wiring Terminals.....	8
Figure 9 – User Connections to Contacts on Terminals (TS3 on left, TS4 on right)	8
Figure 10 – LCD Display Showing DC Source Voltages and Status	10
Figure 11 – Source & Output Status LED Indicators (On Front Panel).....	10
Figure 12 – Display Calibration Potentiometers	14
Table 1 – Available Mounting Methods	2
Table 2 – DC & Ground Wire Size Minimum Requirements.....	4
Table 3 – Wire Size/Area Table.....	5
Table 4 – Status/Alarm Relay Logic & Ratings.....	9
Table 5 – Factory Default Settings	10

Model Scope/General Description

This DC Electronic switch allows control of power source usage in DC systems with redundant sources (batteries). DCES Digital Controller offers the flexibility of selecting the active source of DC power in a system or periodically switching between sources.

Modes of Operation:

- DC Source 1 Only
- DC Source 2 Only
- Both Sources ON
- Cycling Mode (switches the load between DC source 1 and 2, based on the customer select able time interval of 24Hr, 7-day, 14-day, 21-day and 30-day)

The LCD display provides voltage reading for each of the sources. The unit is also equipped with Source 1 On and Source 2 On LED indicators. La Marche has developed two versions of DC Electronic Switch product line; DCES has been developed for utility and other constant type loads (PLC's, switchgear, monitoring equipment, etc.), and DCESE for engine starting applications with higher inrush current.

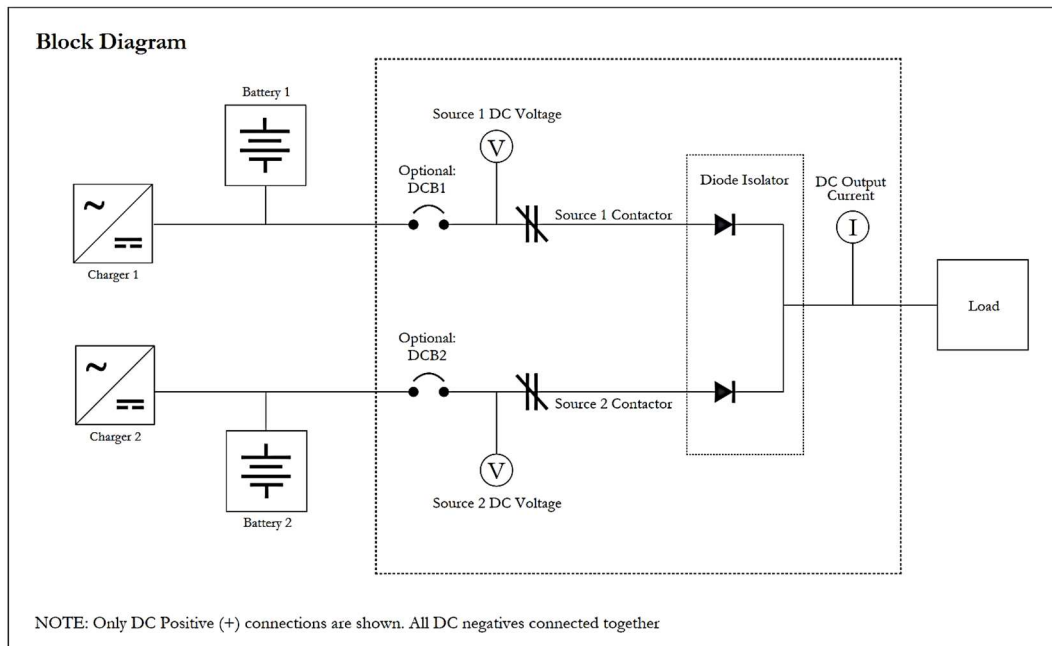
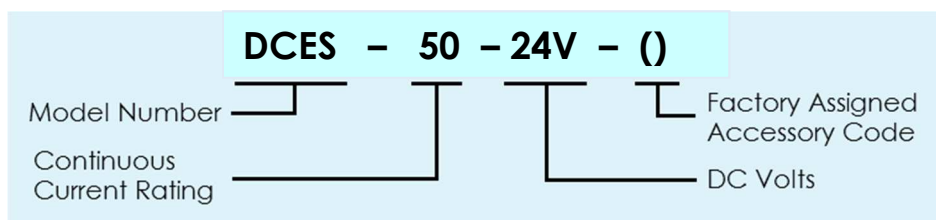


Figure 1 – DCES Block Diagram

Understanding the Model Number

The DCES model number is coded to describe the options that are included. Find the model number on the nomenclature nameplate of the DCES. Follow the chart to determine the configuration of your DC electronic switch.



1.1.2 Floor-Mounting the DCES

The DCES is shipped from the factory with the necessary brackets installed for floor-mounting.

Floor-Mounting Procedure

To floor-mount the DCES, install four 0.25in (6.4mm) bolts into the floor. Place the DCES on the bolts, add appropriate mounting hardware, and tighten securely. The images below show the footprint of each DCES enclosure style.

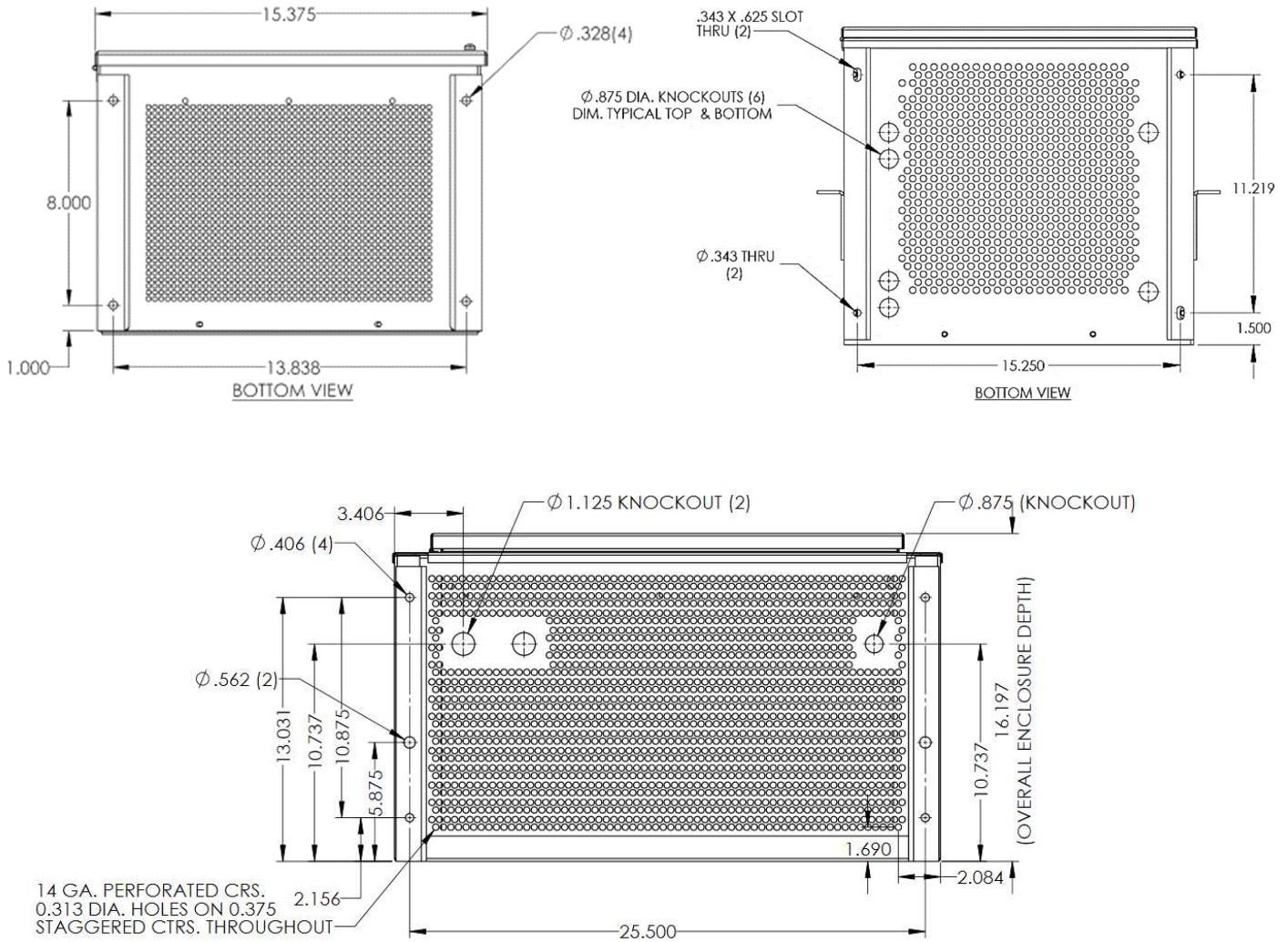


Figure 4 – DCES Enclosure Footprint
(Top Left: 3 Enclosure, Top Right: 4 Enclosure, Center: 8A Enclosure)

1.1.3 Rack-Mounting the DCES

The 4 enclosure can be installed in most relay racks with standard EIA hole spacing. If a relay rack is needed, they are available for purchase from La Marche. The 4 enclosure is shipped from the factory with the necessary brackets installed for mounting on a 19" relay rack (*The same bracket is used for wall mounting*). If center mounting is desired, the bracket can be removed and reinstalled to the center of the enclosure.

Before installing the DCES on the rack, locate the placement of the conduit entrances and assure the knockouts on the sides or bottom of the unit are accessible after the unit is rack-mounted.

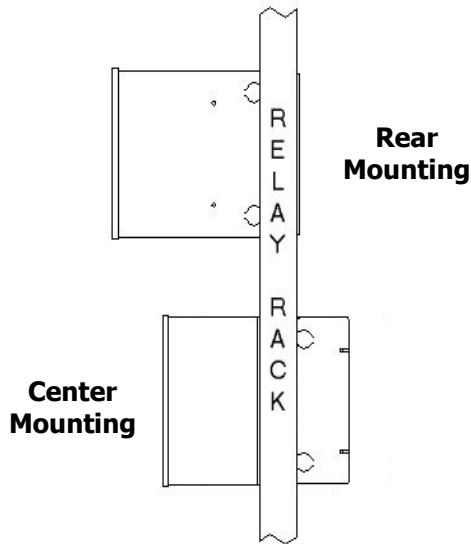


Figure 5 – Rack-Mounting Configurations

Rack Mounting Procedure

To rack mount the DCES, install the brackets onto the relay rack. Provide at minimum 6in (152mm) of air space above and below to allow for cooling.

If you are center-mounting the unit, install the bracket on the front side of the relay rack.

If you are rear-mounting the unit, install the bracket to the back side of the relay rack, as pictured in the figure to the left.

1.2 DC Input/Output Connections

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

Breaker Size/ Fuse Size - Amps	AWG Minimum Wire Size for User Connection	AWG Minimum Wire Size for Equipment Grounding
70	#6	#8
80	#4	#8
90	#4	#8
100	#4	#8
125	#2	#6
150	#1	#6
175	#1/0	#6
200	#2/0	#6
250	#4/0	#4
300	250 MCM	#4
400	400 MCM	#2
500	600 MCM	#2

Table 2 – DC & Ground Wire Size Minimum Requirements
(All wires specified in the table are rated at 90°C or 194°F)

NOTE: These are recommended sizes per La Marche Standards. The National Electrical Code (NEC) and Local Wiring Codes must be followed.

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
 = 17.4 for aluminum

Calculating Wire Size Requirements

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

Calculating Current Carrying Capacity of Wire

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

SIZE (AWG)	AREA CIR.MILS	SIZE (MCM)	AREA CIR.MILS
18	1620	250	250000
16	2580	300	300000
14	4110	350	350000
12	6530	400	400000
10	10380	500	500000
8	16510	600	600000
6	26240	700	700000
4	41740	750	750000
3	52620	800	800000
2	66360	900	900000
1	83690	1000	1000000
0	105600	1250	1250000
00	133100	1500	1500000
000	167800	1750	1750000
0000	211600	2000	2000000

Table 3 – Wire Size/Area Table

DC Connection Procedure

The DCES is connected between the batteries and the DC Load. Connect the Positive and Negative of the first source to Positive and Negative DC Source 1 terminal. Connect the Positive and Negative of the second source to Positive and Negative DC Source 2 terminal. Connect the Positive and Negative load wiring to the DC Output terminals of the DCES. Refer to the following figures for connection locations per enclosure size.

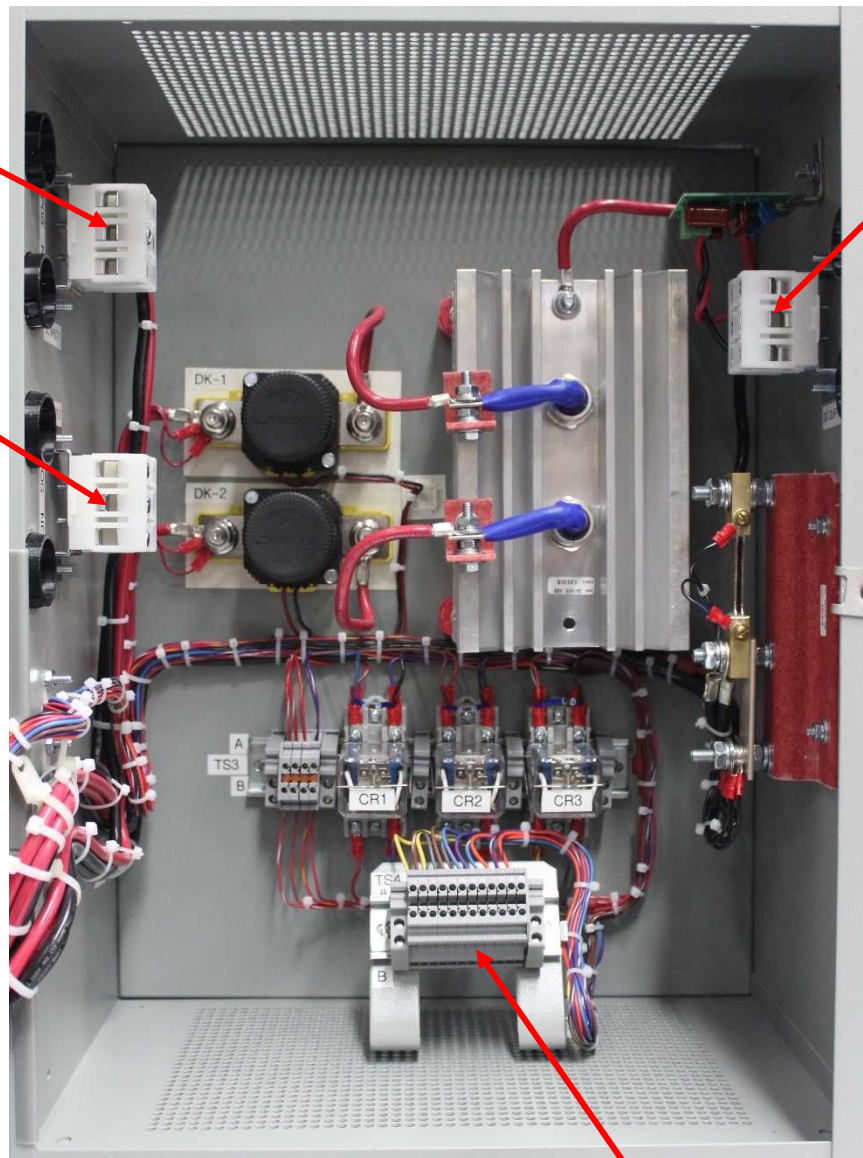


CAUTION: Observe proper polarity when making the DC connections. Connecting the batteries and/or the output in reverse polarity can cause damage to the DCES and/or the loads.

DC Source 1

DC Output

DC Source 2



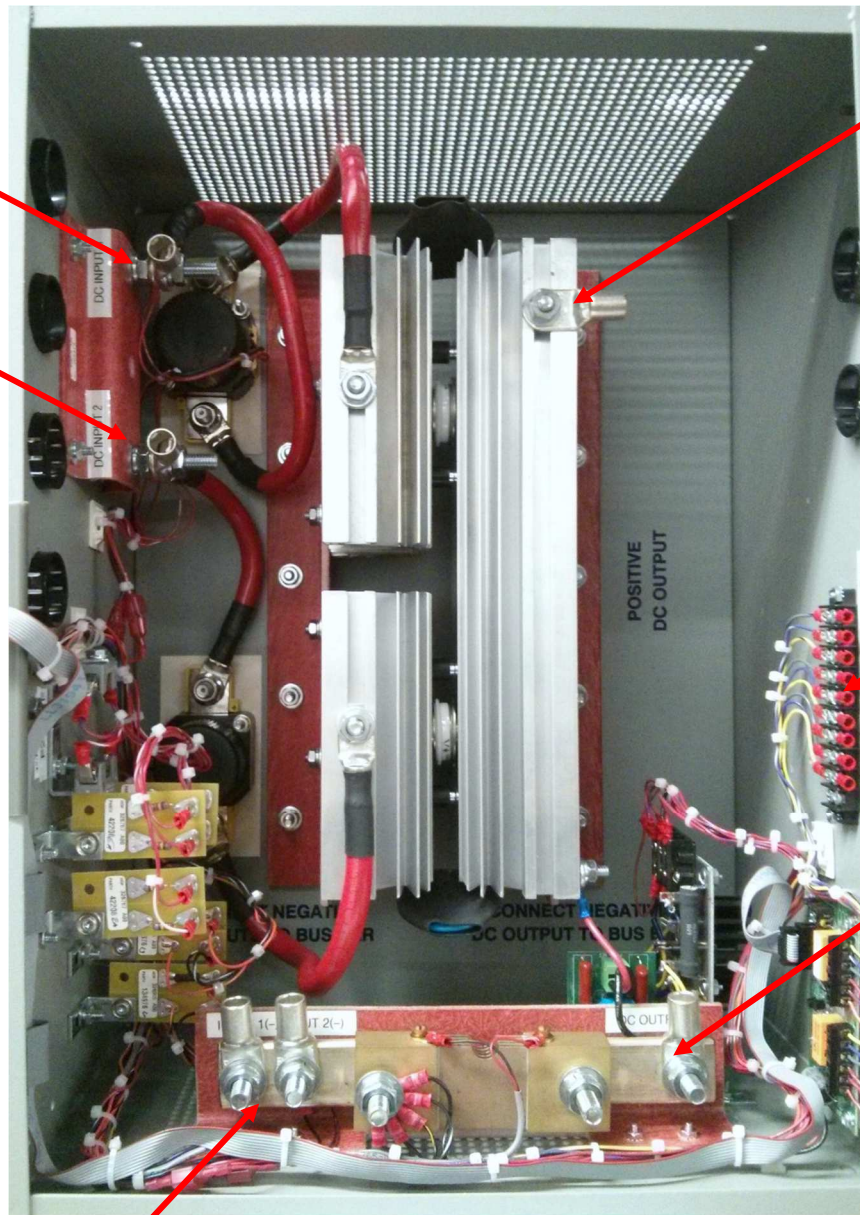
Status /
Alarm Relays
(TS4)

Figure 6 – 3 Enclosure Wiring Terminals

DC Source 1
Positive (+)

DC Source 2
Positive (+)

DC Output
Positive (+)



Status /
Alarm Relays
(TS3)

DC Output
Negative (-)

DC Source 1 and 2 Negative (-)

**Figure 7 – 3 Enclosure Wiring Terminals
(DCES with DC Inrush Current per NFPA110)**

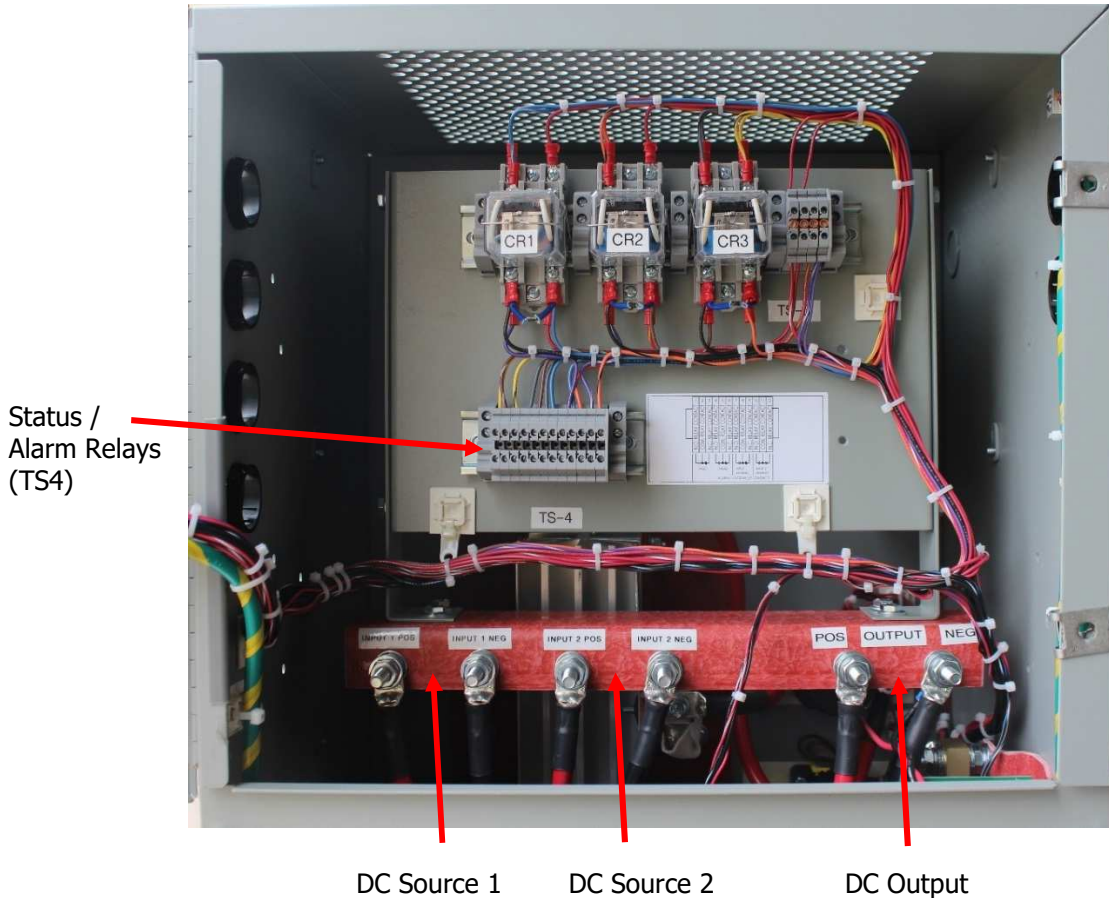


Figure 8 – 4 Enclosure Wiring Terminals

1.3 Alarm Connections

Two status/alarm relays (and 6 status/alarm LEDs) are included in the DCES. The included status/alarm relays are an Input 1 Enabled indicator, Input 2 Enabled indicator, and a Fault alarm. Each status indicator/alarm includes one set of form 'C' contacts (the Fault alarm has 2 sets for TS4 terminals), enabling the user to connect remote annunciators using the mounted terminal TS3/TS4 inside of the DCES. Refer to Table 4 for relay logic/ratings and Figure 8 for connections. Terminals are different depending on the type of DCES, refer to Figures 6-8 to distinguish.

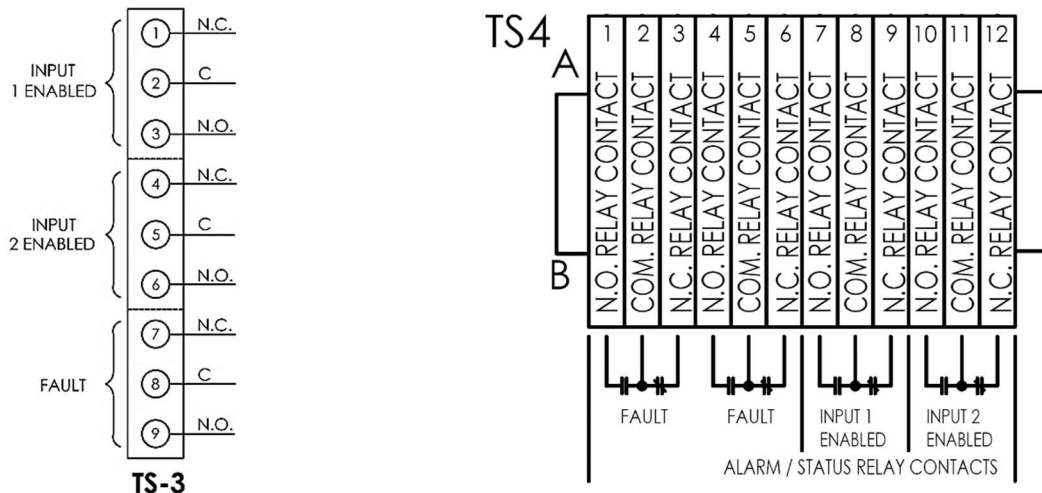


Figure 9 – User Connections to Contacts on Terminals (TS3 on left, TS4 on right)
NOTE: Contacts are shown in de-energized position.

TS3/TS4 Terminal Relay Information			
Status/ Alarm Relay	Logic	Rating	
		TS3	TS4
Input 1 Enabled	De-Energized when Input 1 Enabled	1 Amp @ 120VAC 2 Amps @ 32VDC	10 Amps @ 250VAC 10 Amps @ 28VDC
Input 2 Enabled	De-Energized when Input 2 Enabled		
Fault	De-Energized on Fault		

Table 4 – Status/Alarm Relay Logic & Ratings

LEDs are provided for the following status indicators/alarms: DC Source 1 Available, DC Source 2 Available, DC Source 1 ON, DC Source 2 ON , DC Output, and Alarm (Low Voltage). Refer to Figures 10 & 11 on Section 2.0 for LED locations.

1.3.1 Alarm/Status Description

DC1 LOW VOLTAGE ALARM will show as a message on the LCD display and the red “Alarm” LED will turn on if the DC Source 1 voltage falls below the specified voltage threshold of the alarm for longer than 0 seconds. This alarm has no dedicated contacts. The alarm will clear once the low DC voltage condition is no longer present.

DC2 LOW VOLTAGE ALARM will show as a message on the LCD display and the red “Alarm” LED will turn on if the DC Source 2 voltage falls below the specified voltage threshold of the alarm for longer than 0 seconds. This alarm has no dedicated contacts. The alarm will clear once the low DC voltage condition is no longer present.

FAULT ALARM is triggered when either the DC Source 1 Low Voltage or DC Source 2 Low Voltage alarm is activated. The alarm will clear once the alarm which triggered the Fault alarm has cleared. This alarm has a dedicated relay.

INPUT 1 ENABLED relay indicates whether DC Source 1 is enabled or disabled. This relay is dependent on the mode of operation and condition of the DCES. *EX: If the DCES is set to DC1 ONLY, the Input 1 Enabled relay will de-energize, indicating DC Source 1 is enabled.*

INPUT 2 ENABLED relay indicates whether DC Source 2 is enabled or disabled. This relay is dependent on the mode of operation and condition of the DCES. *EX: If the DCES is set to DC2 ONLY, the Input 2 Enabled relay will de-energize, indicating DC Source 1 is enabled.*

All alarms have adjustable time delays to energize; refer to Table 5 for the factory setting of each alarm.

1.3.2 Alarm/Status Connection Procedure

Before making any connections to the DCES, ensure that the unit is isolated from all power sources and that all of the system’s breakers are off, if applicable. Verify that no voltage is present by using a voltmeter at all input and output terminals.

For Input 1 Enabled and Input 2 Enabled Status Indicator:

If it is desired that the annunciator be active until the DC source is disabled or off, connect the annunciator leads to the **Normally Closed** and **Common** contacts of the desired alarm (located on the TS3/TS4 terminal strip). If it is desired that the annunciator be activated after the DC source is disabled or off , connect the annunciator leads to the **Normally Open** and **Common** contacts of the desired alarm.

For Fault Alarm:

If it is desired that the annunciator be active until the alarm triggers, connect the annunciator leads to the **Normally Open** and **Common** contacts of the desired alarm (located on the TS3/TS4 terminal strip). If it is desired that the annunciator be activated after the alarm triggers, connect the annunciator leads to the **Normally Closed** and **Common** contacts of the desired alarm.

2.0 Operation

2.1 Factory Settings

All DCES units are default set based on the nominal DC voltage of the unit. The defaults are as follows:

Parameter	Value		
	24VDC	48VDC	130VDC
DC Source 1 Low Voltage	23.8V	47.5V	118.8V
DC Source 1 Low Voltage Reset	5% of DC1 Low Voltage threshold		
DC Source 1 Low Voltage Delay	0 Seconds		
DC Source 2 Low Voltage	23.8V	47.5V	118.8V
DC Source 2 Low Voltage Reset	5% of DC2 Low Voltage threshold		
DC Source 2 Low Voltage Delay	0 Seconds		

Table 5 – Factory Default Settings

2.2 LCD Display and LED Indicators

The DCES includes a user-interface LCD display panel which has three LED indicators on the front. Five LEDs on the front are used as status indicators for DC Source 1, DC Source 2, and DC Output. One LED on the display membrane refers to the alarm present (if any). Refer to Figures below.


Four buttons are provided on the display for menu navigation – RESET , MODE , UP , and DOWN 



Figure 10 – LCD Display Showing DC Source Voltages and Status

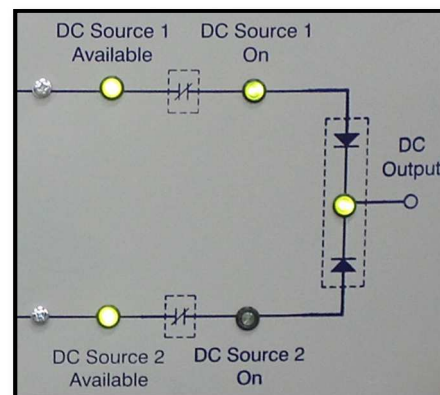


Figure 11 – Source & Output Status LED Indicators (On Front Panel)

NOTE: The Float and Equalize LEDs are not used. If option 18T is included, a sounder/strobe with a silence switch will be provided on the front panel. If option 068 is included, an audible alarm with a silence switch will be provided on the front panel.

After the DCES has completed the startup sequence, the digital meter display will show DC Source 1 & 2 Voltage and the DC Source 1 & 2 status. Pressing either the UP or the DOWN arrow on the membrane will change the parameter that is displayed.

The parameters viewable on the idle display are as follows:

DC1-125.9VDC-OFF DC2-130.0VDC-ON	DC Source Voltages & Source Status*	131.0V1 130.2V2 DC1 Low Voltage	DC Source Voltages & Active Alarms*
Next Cycle: OFF	Cycling Mode Status and Length	Load Current 24.6A	DC Output Current

**Only one of the displays will show, dependent on whether alarms are present.*

Status Indicator LEDs

DC Output	LED is ON when DC output is present.
DC Source 1 Available	LED is ON when DC Source 1 is available.
DC Source 2 Available	LED is ON when DC Source 2 is available.
DC Source 1 ON	LED is ON when DC Source 1 is connected.
DC Source 2 ON	LED is ON when DC Source 2 is connected.

2.3 Modes of Operation

The DCES is equipped with four modes of operation. The selected mode of operation can be viewed on the display by pressing the MODE button. To change the mode of operation, press the MODE button and use the UP and DOWN buttons to navigate to the desired mode. Press MODE button again to accept the new selection. Press MODE button again to confirm saving the new setting.

If no changes to the mode of operation is desired, select "No" in the "Save Settings" screen or simply do not make any selections – after 10 seconds, the controller will ignore changes and go back to previous settings.

The four modes of operation are as described below:

DC1 and DC2

In this mode, both sources supply the load continuously. The display will indicate DC1 to have the source enabled (source status ON). The Low Voltage alarm is triggered if the voltage at any source drops below the Low Voltage alarm set value.

Cycling Mode

In this mode, the load is alternated between each source at a fixed interval. The time interval can be set to 1, 7, 14, 21, and 30 days. During Cycling Mode, the voltage at both sources is monitored. If the voltage at any source drops below the set Low Voltage alarm threshold, the Low Voltage alarm for that source is activated. At the same time, the controller turns on both sources and suspends the cycling timer. Once the DC voltage on both sources rises above the Low Voltage alarm reset threshold, the unit resumes normal operation. During the load transition from DC1 to DC2 and vice versa, the load is momentarily powered by both sources.

DC1 Only Mode

In this mode, Load is supported only by DC Source 1 (DC1). If the DC1 voltage drops below the LV alarm threshold, the LV alarm is activated and both sources are enabled.

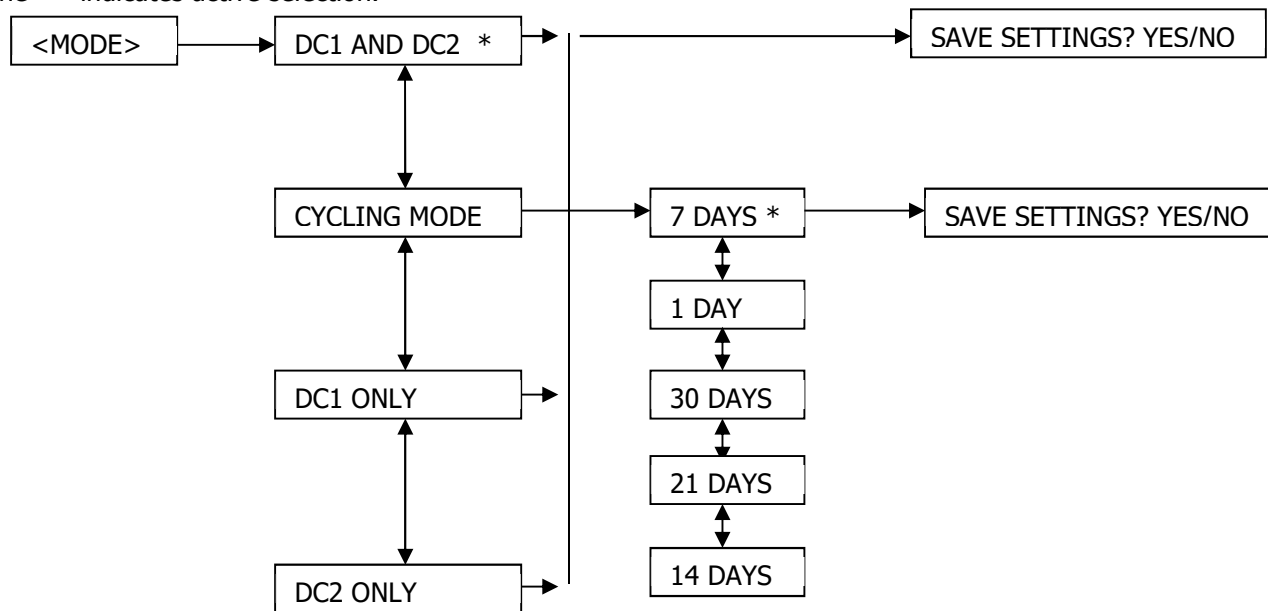
DC2 Only Mode

In this mode, Load is supported only by DC Source 2 (DC2). If the DC2 voltage drops below the LV alarm threshold, the LV alarm is activated and both sources are enabled.

NOTE: *If the primary source is suddenly unavailable by means of opening or tripping the input DC breaker, there is an approximate dead time of 150mS due to the mechanical transfer delay.*

Mode of Operation Settings Flowchart

The "*" indicates active selection.



2.4 Calibration Menu

In Customer Calibration Mode, the user can access and change various parameters. To access the Customer Calibration Mode, press both the UP and MODE buttons (press the UP button first - the LCD display should change. Hold it down and then press the MODE button) for about 5 seconds. After "Customer Calibration Mode" appears on the LCD display, release both buttons.

Once in calibration mode, the user can raise and lower values with the UP and DOWN buttons and can advance to the next parameter with the MODE button. After the last setting is passed, all settings will automatically be saved. If a setting is accidentally passed over, the user must advance through the remaining features and restart calibration from the beginning. Alternatively, the user can press the RESET button and restart calibration from the beginning. The calibration settings are listed in order below with a brief description and default values.

The Customer Calibration menu is as follows:

DC Source 1 Low Voltage Alarm

This setting changes the voltage threshold that causes the DC1 Low Voltage alarm to activate. The default setting is 23.8V and 119.0V for 24VDC and 130VDC units respectively.

DC Source 1 Low Voltage Reset

This setting changes the voltage threshold that causes the DC1 Low Voltage alarm to clear after being activated. The default setting is 5 percent of the Battery 1 Low Voltage alarm threshold.

DC Source 1 Low Voltage Delay

This setting is used to set the amount of time the DC Source 1 voltage must be below the DC Source 1 Low Voltage threshold in order to activate the DC Source 1 Low Voltage alarm. The DC Source 1 Low Voltage Delay may be adjusted in 1-second increments, with 0 seconds being the default.

DC Source 2 Low Voltage Alarm

This setting changes the voltage threshold that causes the DC2 Low Voltage alarm to activate. The default setting is 23.8V, 47.5V, and 118.8V for 24VDC, 48VDC, and 130VDC units respectively.

DC Source 2 Low Voltage Reset

This setting changes the voltage threshold that causes the DC2 Low Voltage alarm to clear after being activated. The default setting is 5 percent of the DC Source 2 Low Voltage alarm threshold.

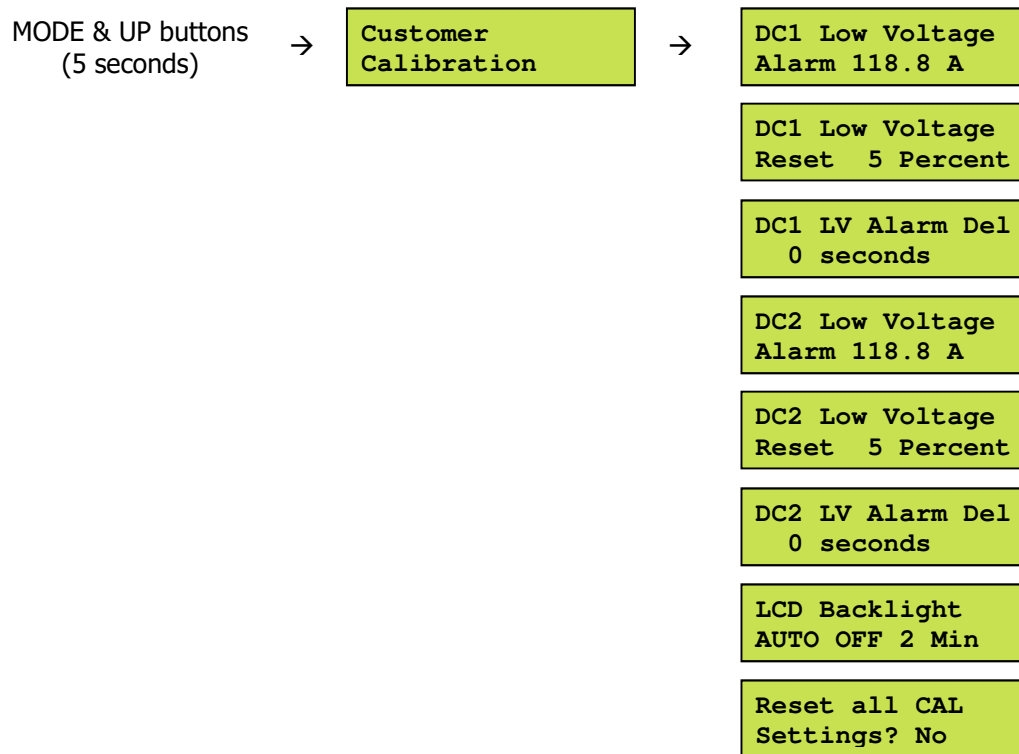
DC Source 2 Low Voltage Delay

This setting is used to set the amount of time the DC Source 2 voltage must be below the DC Source 2 Low Voltage threshold in order to activate the DC Source 2 Low Voltage alarm. The DC Source 2 Low Voltage Delay may be adjusted in 1-second increments, with 0 seconds being the default.

LCD Backlight

This setting changes the behavior of the LCD Backlight. By default, the backlight is set to turn off two minutes after the last key press on the display membrane. Alternatively, the backlight can be set to "Always ON."

Customer Calibration Flowchart



3.0 Display Calibration

In order to calibrate the display voltage to match the measured values, two small potentiometers are provided on the 225C display driver board. This circuit board is located behind the front door. P1 potentiometer is used to calibrate the DC1 display voltage and P4 is used to calibrate the DC2 display voltage. An LCD display contrast potentiometer (P3) is also provided for contrast adjustment. Please refer to Figure 11 below.

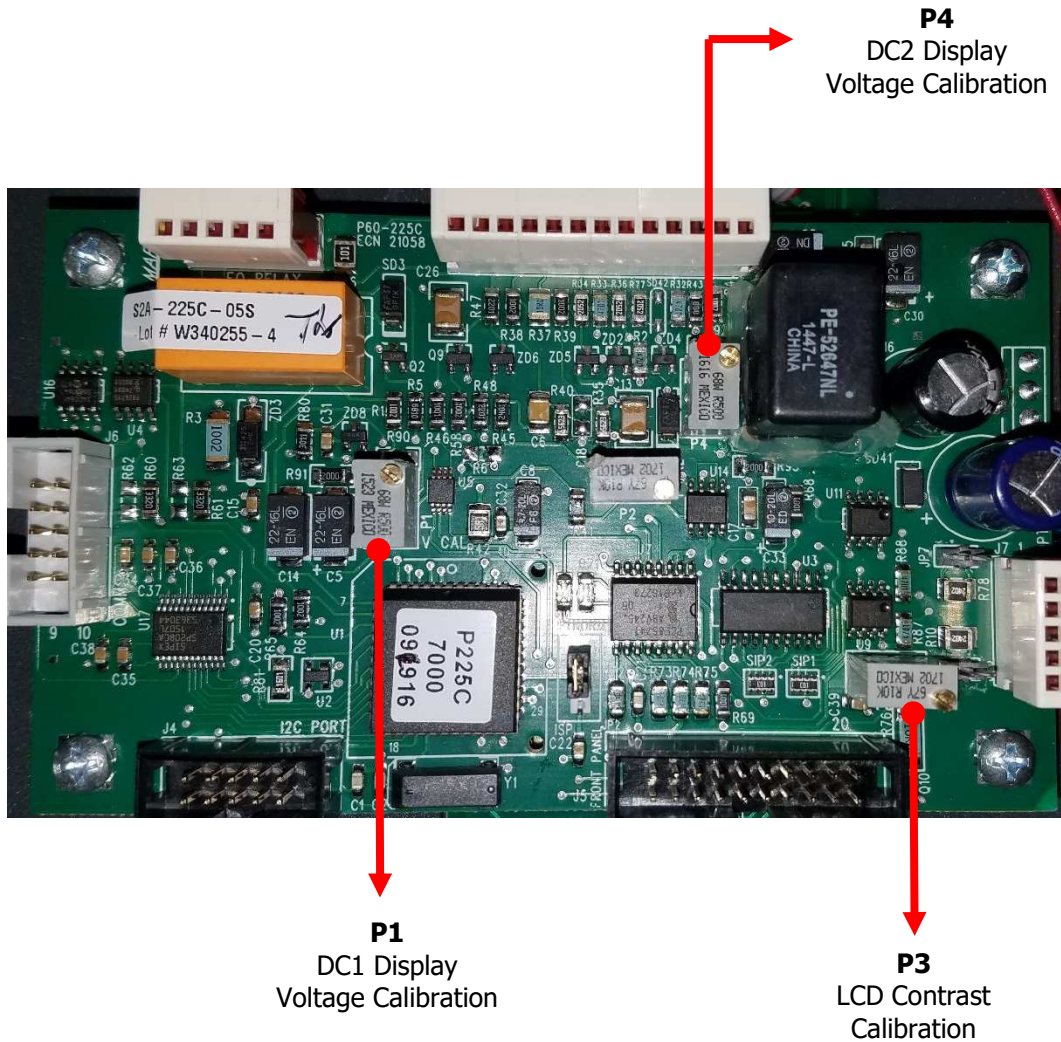


Figure 12 – Display Calibration Potentiometers

4 Service

All work inside the DCES should be performed by qualified personnel. La Marche is not responsible for any damages caused by an unqualified technician.



Before working inside the DCES, ensure the DC power is off at the main breaker box and the battery has been removed from the unit's DC output terminals, either by removing the battery cables or exercising the battery disconnect. Verify that no voltage is present by using a voltmeter at all input and output terminals.

4.1 Performing Routine Maintenance

Although minimal maintenance is required with La Marche units, routine checks and adjustments are recommended to ensure optimum system performance.

Yearly

1. Confirm air vents are open. Remove dust and debris from interior of unit.
2. Verify all connections are tight.
3. Perform a visual inspection on all internal components.
4. Check front panel meters for accuracy and LED operation.

4.2 Troubleshooting Procedure

Troubleshooting should be performed only by trained service personnel or experienced electricians. Before setting up any complicated testing or making any conclusions, inspect the unit using the guide below.

Check the following:

1. Check DC output cables, connections and battery type against the unit's rating.
2. Check unit specifications against model number.
3. Check input connections, input voltage and breaker size, if applicable.
4. Check for shipping damage, loose connections, broken wires, etc.
5. Certain failures can be caused by defective batteries and customer loads; make sure batteries and loads are free from defects.

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

La Marche Service Technicians are available to help with troubleshooting or with scheduling unit service. When calling 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 measured DC input voltages.
3. The measured DC output voltage, with and without the battery.
4. Result of the check of the DC breakers, if applicable.
5. The DC output current and voltage, measured with battery and load connected to the unit.

NOTE: *When ordering replacement parts, drawings, or schematics, provide the model number, serial number, and description of problem, if available.*

La Marche Phone Number: (847) 299-1188
24-hour **Emergency** Number: (847) 296-8939

Appendix A: Manufacturer's Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within one year from date of purchase. In addition to the standard one (1) year warranty, La Marche warrants its magnetics and power diodes on a parts replacement basis only for four (4) more years under normal use.

Any part or parts of the equipment (except fuses, DC connectors and other wear-related items) that prove defective within a one (1) year period shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Magnetics and power diodes are warranted for five (5) years after date of purchase. During the last four (4) years of this five (5) year warranty period, the warranty covers parts replacement only, and no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard La Marche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

Appendix B: Manufacturer's Extended Parts Warranty

(THIS IS YOUR WARRANTY IF YOU HAVE PURCHASED THE EXTENDED PARTS WARRANTY AS SHOWN ON OUR INVOICE TO YOU OR IF YOU PURCHASE THE EXTENDED PARTS WARRANTY ANYTIME DURING THE FIRST 12 MONTHS AFTER THE DATE OF OUR INVOICE)

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory. Any part or parts of the equipment (except protective devices, DC connectors and other wear-related items) that prove defective within a one (1) year period from the date of our invoice to you shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Labor and parts are covered during this one (1) year period.

For the next four (4) years after the expiration of the one-year warranty, on a parts replacement only basis, any part or parts of the equipment (except protective devices, DC connectors and other wear-related items) that prove defective within the additional four (4) year period shall be replaced providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. During this four (4) year period, the warranty covers parts replacement only, no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed. If you return the equipment to our factory (freight prepaid), we will repair and cover parts and labor.

Should a piece of equipment require major component replacement or repair during the extended warranty period, these can be handled in one of three ways:

1. If the Purchaser elects to take the responsibility of repairing the equipment and requests replacement part(s), Purchaser or Sales Representative must contact Factory for return authorization and a purchase order must be issued. Replacement part(s) will be promptly shipped and invoiced. After the defective part(s) are returned and inspected at the Factory, if the defect(s) were due to faulty material or workmanship, credit will be issued.
2. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer under the Extended Warranty. Transportation charges or duties shall be borne by Purchaser.
3. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard La Marche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

THE ABOVE WARRANTY IS EXCLUSIVE, SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS. NO PERSON, AGENT OR DEALER IS AUTHORIZED TO GIVE ANY WARRANTIES ON BEHALF OF THE MANUFACTURER, OR TO ASSUME FOR THE MANUFACTURER ANY OTHER LIABILITY IN CONNECTION WITH ANY OF ITS PRODUCTS UNLESS MADE IN WRITING AND SIGNED BY AN OFFICIAL OF THE MANUFACTURER.

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