C&T SOLUTION INC.

USER'S MANUAL

ECO-1000

EDGEBoost EnergyPack

Industrial Supercapacitor
Backup System

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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2023/09/01

Disclaimer

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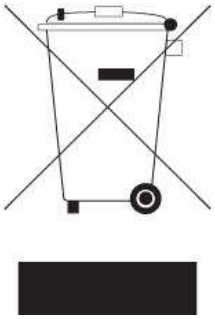
Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Please turn off the system power and disconnect the power cord from its source before making any installation.
- Be sure both the system and the external devices are turned OFF. A sudden surge of power could ruin sensitive components.
- Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid dusty, humid, and extreme temperatures.
- Do not place heavy objects on the equipment.
- If the equipment is not used for a long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -30°C and below 85°C.
- The computer is provided with supercapacitor batteries. There is a risk of unforeseen error if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- Do not let any conductive materials, including hands, touch the battery's conductive ports when they are fully charged to avoid high-voltage shock and short circuits.
- If one of the following situations arises, get the equipment checked to be service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work properly, or it cannot work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Technical Support and Assistance

1. Visit the C&T Inc website at https://www.candtsolution.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
   - Model name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Conventions Used in this Manual

WARNING This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.

CAUTION This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.

NOTE This indication provides additional information to complete a task easily.

Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	ECO-1000 Industrial energy pack system	1
2	Wall Mount Kit	1
3	Accessory Kit	1

Ordering Information

Model No.	Product Description
ECO-1000-8S	EDGEBoost EnergyPack Industrial Supercapacitor Power Backup System, with 8x 370F
ECO-1000-16S	EDGEBoost EnergyPack Industrial Supercapacitor Power Backup System, with 16x 370F
ECO-1000-8S-LCM	EDGEBoost EnergyPack Industrial Supercapacitor Power Backup System, with 8x 370F, 1x LCM
ECO-1000-16S-LCM	EDGEBoost EnergyPack Industrial Supercapacitor Power Backup System, with 16x 370F, 1x LCM

Chapter 1

Product Introductions

1.1 Overview

1.1.1 Introduction

The ECO-1000 Series is a self-sustaining, industrial supercapacitors that provides power backup solution for your edge computers and other IIoT devices. The ECO-1000 Series allow energy redundancy against unexpected power outages when computers are deployed at a remote and mobile environment in the rugged edge.

The ECO-1000 Series is an intelligent ruggedized supercapacitors that is programmable to match a specific power backup requirement based on the application's specification. When there is a sudden power shutdown from the main power source, user can program the ECO-1000 right on the hardware itself using its display module to set the ECO-1000 to backup power to the computer for an extended period of time. This provides the computer enough time to safely stop running applications and execute a proper shutdown to avoid data corruption.

With up to 16x High-Density Supercapacitors, the ECO-1000 is the leading industrial supercapacitor in capacity, with ultra-density energy that powers box PCs or other embedded systems for an extensive period of time. Moreover, the ECO-1000 has an outstanding max output of 200 Watt, allowing it to power various systems from fanless mini-PC, high-performance rugged PC, display panels, and panel PC. Moreover, the ECO-1000 rich functions such as Power Ignition Management, Remote Power On/Off, Delay Time Switch, Power Output Switch 12V/24V, and PC/CAR Mode Switch make the ECO-1000 configurable for numerous applications.

To ensure reliability and durability amid deployments at the rugged edge, the ECO-1000 Series is validated and certified with various standards including EN50155, EN50121-3-2, CE, and FCC Class A, UL. The ECO-1000 is capable withstands wide temperature environments ranging from -25°C to 55°C along with 20G of Shock and 5 Grms of Vibration resistance, ensuring safe operations amid extreme industrial deployments.

1.1.2 Key Features

- World-class Certification: UL-Certified, FCC, CE, and EN 50155
- Instantaneous Power Backup with supercapacitor technology
- 3 Smart Modes for Safe Shutdown
- Remote GUI and LCM Display Module
- Delivers Stable Power Supply
- Rapid Charge and Discharge
- Wide Temperature Tolerance
- 10 Years Operating Longevity

1.2 Hardware Specification

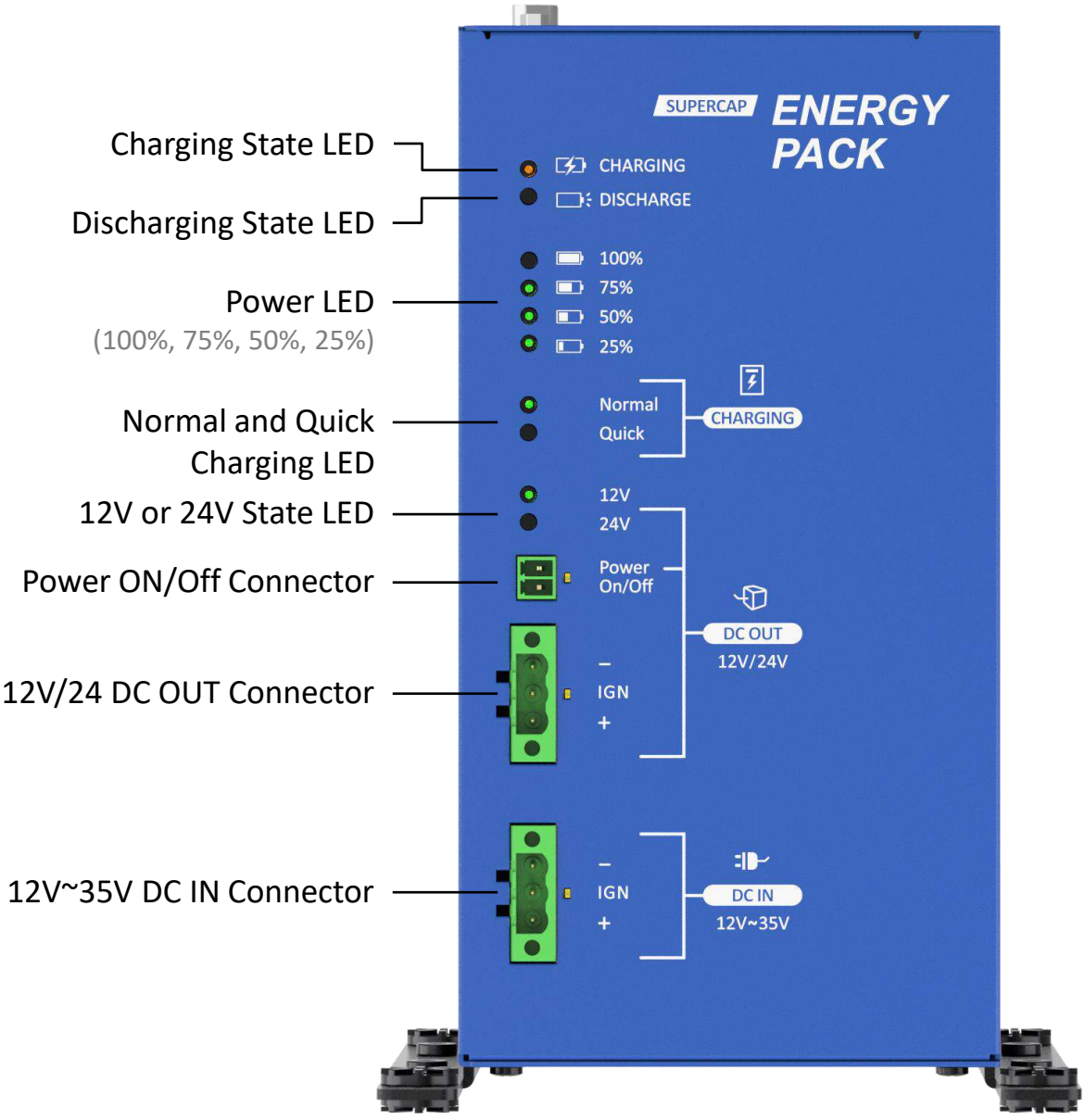
Model	ECO-1000-8S	ECO-1000-16S
Capacity	8x Supercapacitors (370 Farads/SuperCAP)	16x Supercapacitors (370 Farads/SuperCAP)
Power Specification		
Input Voltage	12 ~ 35 VDC	
Input Connector	3-pin Terminal Block (V+, GND, IGN IN)	
Output Voltage	Charge mode: DC IN Voltage bypass (DC OUT = DC IN) Discharge mode: 12 or 24V	
Output Power	Maximum 100W output	Maximum 200W output
Output Connector	3-pin Terminal Block (V+, GND, IGN Out)	
I/O		
COM	1x RS-232	
USB	1x USB	
DIO	2x DI + 2x DO with isolation	
Others	1x Remote Power On/Off 1x switch for 12V/24V, 1x PC/CAR Mode Switch, 1x Delay Time Switch	
Power Management		
Power Ignition Sensing	Power Ignition Management	
Power		
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) Reverse protection	
Environment		
Operating Temp.	-25˚C to 55˚C	
Storage Temp.	-30˚C to 85˚C	
Relative Humidity	10% to 95% (non-condensing)	
Vibration	5 Grms, 5 - 500 Hz, 0.5 hr/axis	
Shock	20G, half sine, 11ms	
Standards / Certification	CE, FCC Class A, UL 62368-1 Ed.3 EMC Conformity with EN50155, EN50121-3-2	
Physical		
Construction	Heavy Duty Metal	
Dimension	100 (W) x 192 (D) x 192 (H) mm	
Weight	1.8 kg	2.8 kg
Mounting	Wall Mounting, DIN Rail Mounting (Optional)	

* All specifications and photos are subject to change without notice.

1.3 System I/O

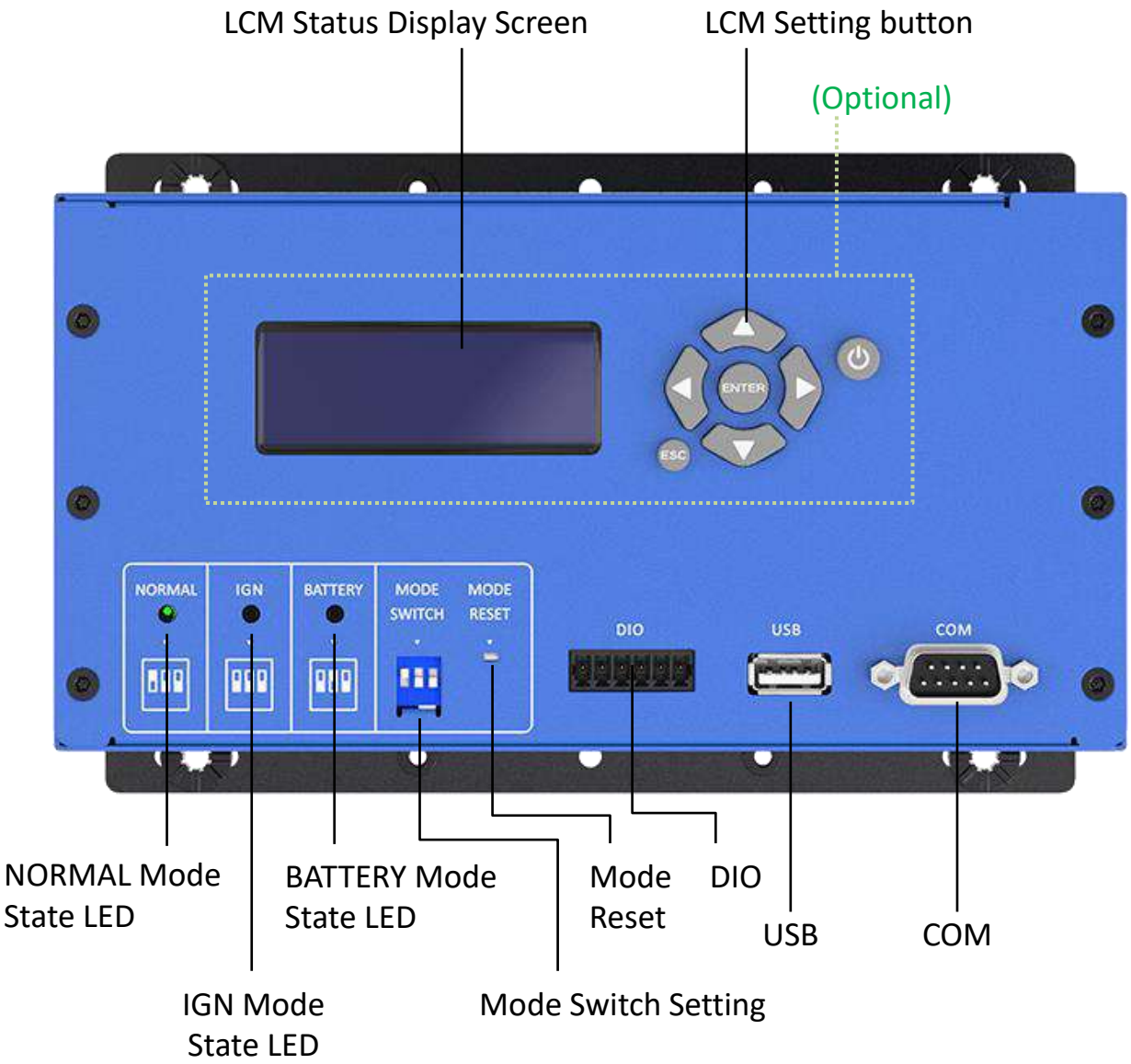
1.3.1 (Front) External I/O Mechanical Layout

Front View

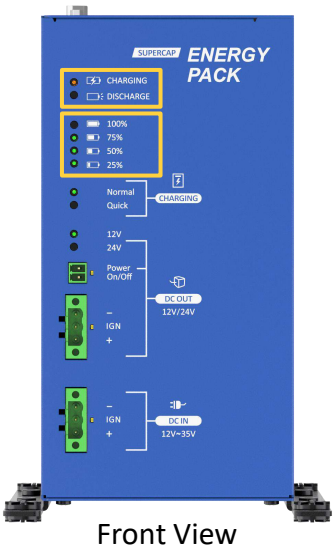


1.3.2 (Top) External I/O Mechanical Layout

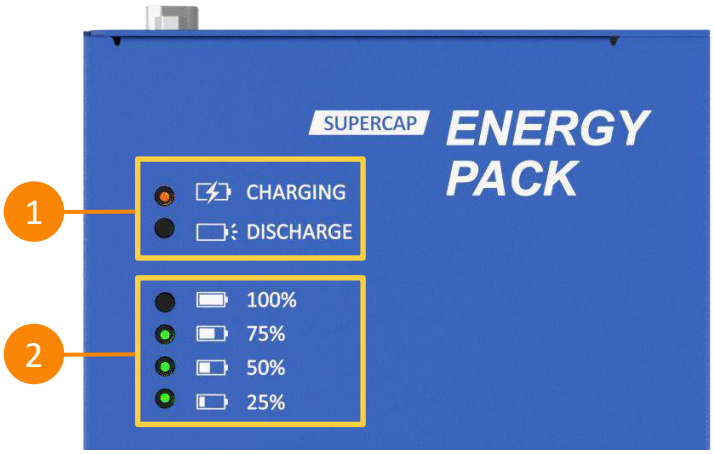
Top View



1.3.3 Charging/Discharging and Energy Level LED Status



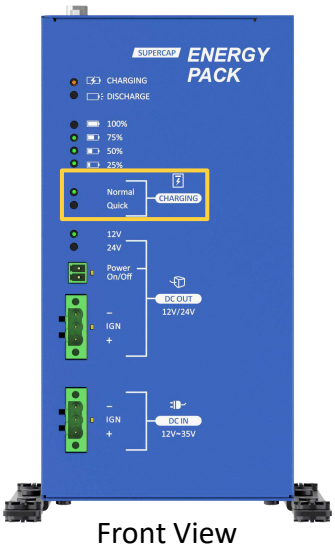
Front View



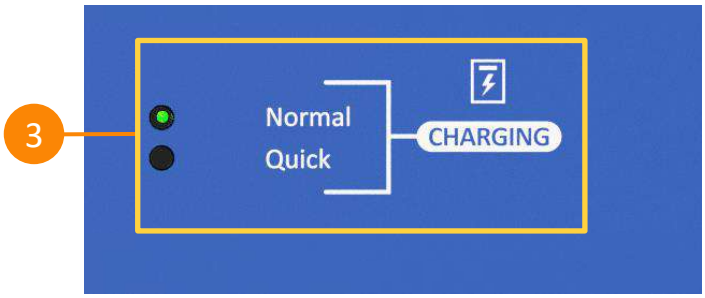
No.	ECO-1000 Status	LED Color	LED Behavior	Status Description
1	Charging	Orange	Solid	DC In Charging
			Flash	DC In Charging + DC OUT discharging
		Green	Solid	Full
			Flash	Full + DC OUT discharging
	Discharge	Blue	Solid	Not charging
			Flash	Not charging + DC Out discharging

No.	Supercapacitor Energy Level	LED Color	Supercapacitor Energy Level
2	100%	Green	Energy level is at 100%
	75%	Green	Energy level is between 75%~99%
	50%	Green	Energy level is between 50%~74%
	25%	Green	Energy level is between 25%~49%
	<25%	Off	Energy level is between 0%~24%

1.3.4 Charging Mode



Front View

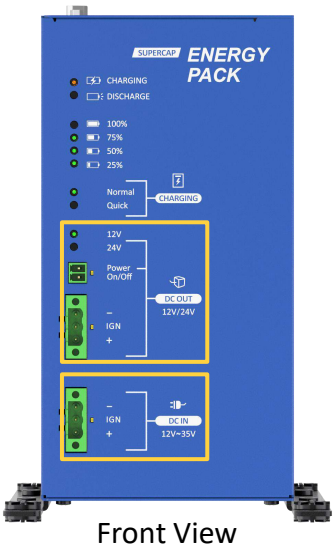


No.	Charging Mode	LED Color	Status Description
3	Normal	● Green	Normal Charge
	Quick	● Green	Quick Charge

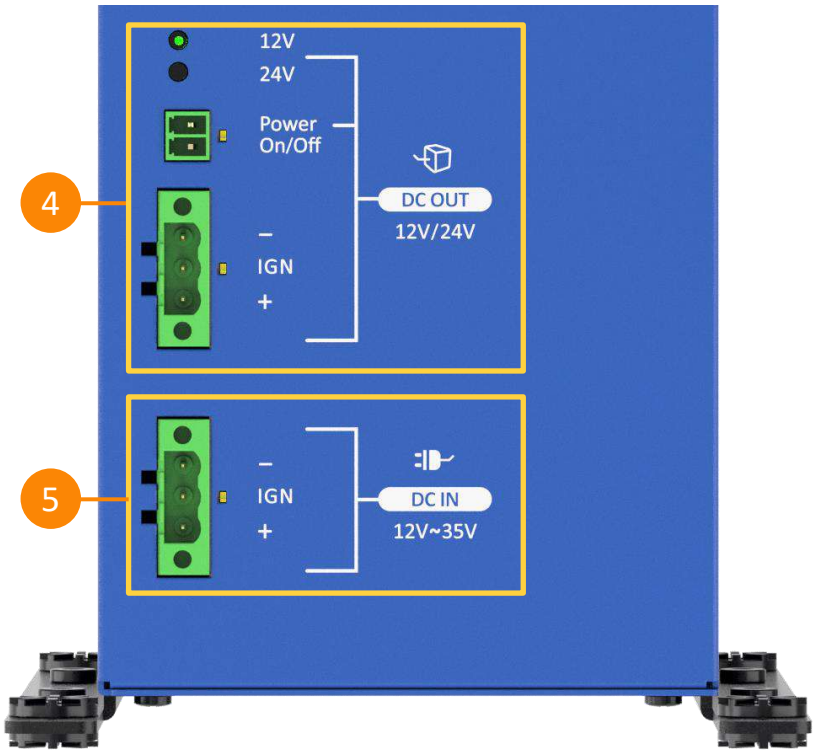
Here are the recommended power adapters based on each charging mode and wattage

	Adapter			
Charging Mode	Watt	Voltage	Current	P/N
Normal	60W	12V	5A	1-E09A06001
	120W	24V	5A	1-E09A12002
	220W	24V	9.2A	1-E09A22102
	280W	24V	11.67A	1-E09A22801
Quick	220W	24V	9.2A	1-E09A22102
	280W	24V	11.67A	1-E09A22801

1.3.5 DC Output and Input



Front View



No.	DC OUT	LED Color	LED Behavior	Status Description
4	12V	● Green	-	12V Output
	24V	● Green	-	24V Output
	Power ON/Off	● Yellow	Blink Once	Send a power on/off signal
	12V/24 DC OUT	● Yellow	-	12V/24V output

No.	DC IN	LED Color	Status Description
5	12V~35V DC IN	● Yellow	12V~35V input

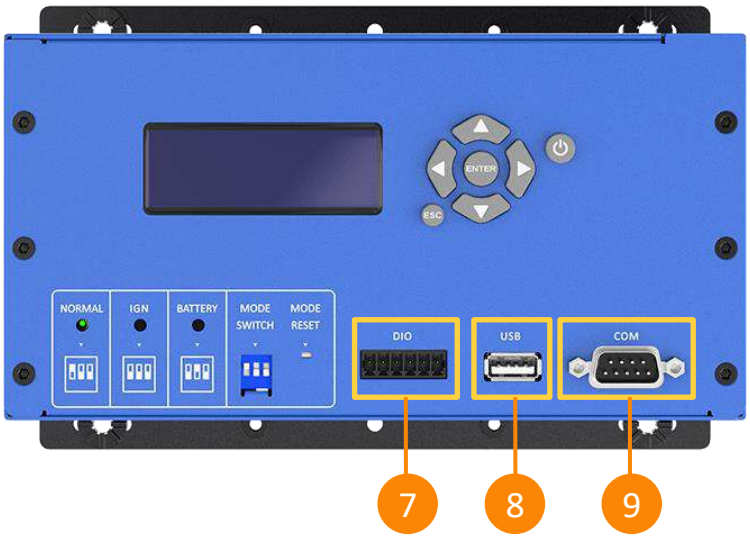
1.3.6 Mode Selection

Top View

No.	Mode Selection	LED Color / Other	Status Description
6	NORMAL	● Green	Normal Mode On
	IGN	● Green	IGN Mode On
	BATTERY	● Green	Battery Mode On
	MODE SWITCH		Mode Switch Setting
	MODE RESET		**MODE SWITCH is can only be physically changed on the ECO-1000**, please set the **MODE SWITCH** combination first then press the **MODE RESET** button to complete the switch, and the ECO-100 will restart with the new setup. Note: • DC OUT power will cut off power when the MODE RESET button is pressed. • Make sure the computer is safely turned OFF before doing the **MODE SWITCH**.

1.3.7 Connector Description

Top View

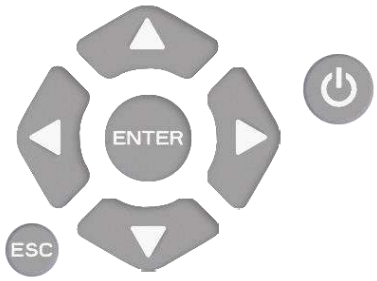


No.	I/O	Status Description
7	DIO (2 in/2 Out)	The DIO In and Out send and receive Low/High signals to connected systems. The MCU has an embedded logic to allow the DIO to provide information to the connected system for additional monitoring. **DIO Guide** GPIO CON： Digital Input / Output Connector Type: Terminal Block 6-pin, 3.5mm pitch
8, 9	USB/COM	Enable ECO-1000 remote management and monitoring via its USB or COM ports which can be connected to an external computer to access its GUI tool. *The ECO-1000 only can enable one port either USB or COM port to connect to the external computer. **The external computer can connect to multiple ECO-1000 Series for remote monitoring or management through the GUI tool.

Pin	Definition
1	DC power input (9V ~ 24V)
2	DIN1
3	DIN2
4	DOUT1
5	DOUT2
6	GND

1.3.8 LCM Description (Optional)

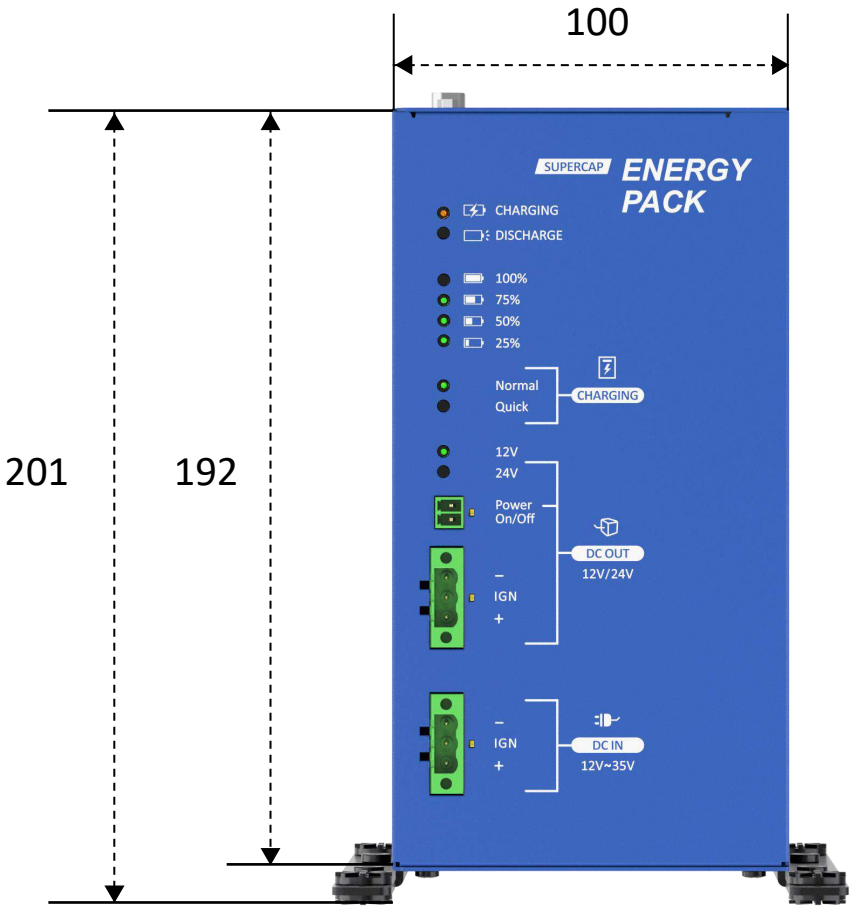
Top View

No.	item	Description
10	LCM	LCM Display Screen
	LCM Buttons 	ENTER button (Enter the L1: Menu or Enter Selected Page)
		ESC button (Go to Previous Page)
		↑ Up button
		→ Right button
		↓ Down button
		← Left button
		LCM Display ON/OFF Button

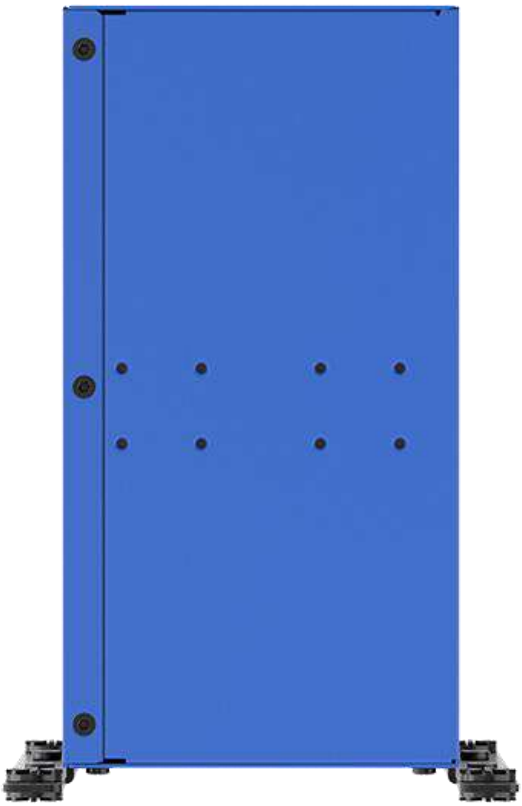
1.4 Mechanical Dimensions

1.4.1 Front & Back View

Unit: mm



Front View

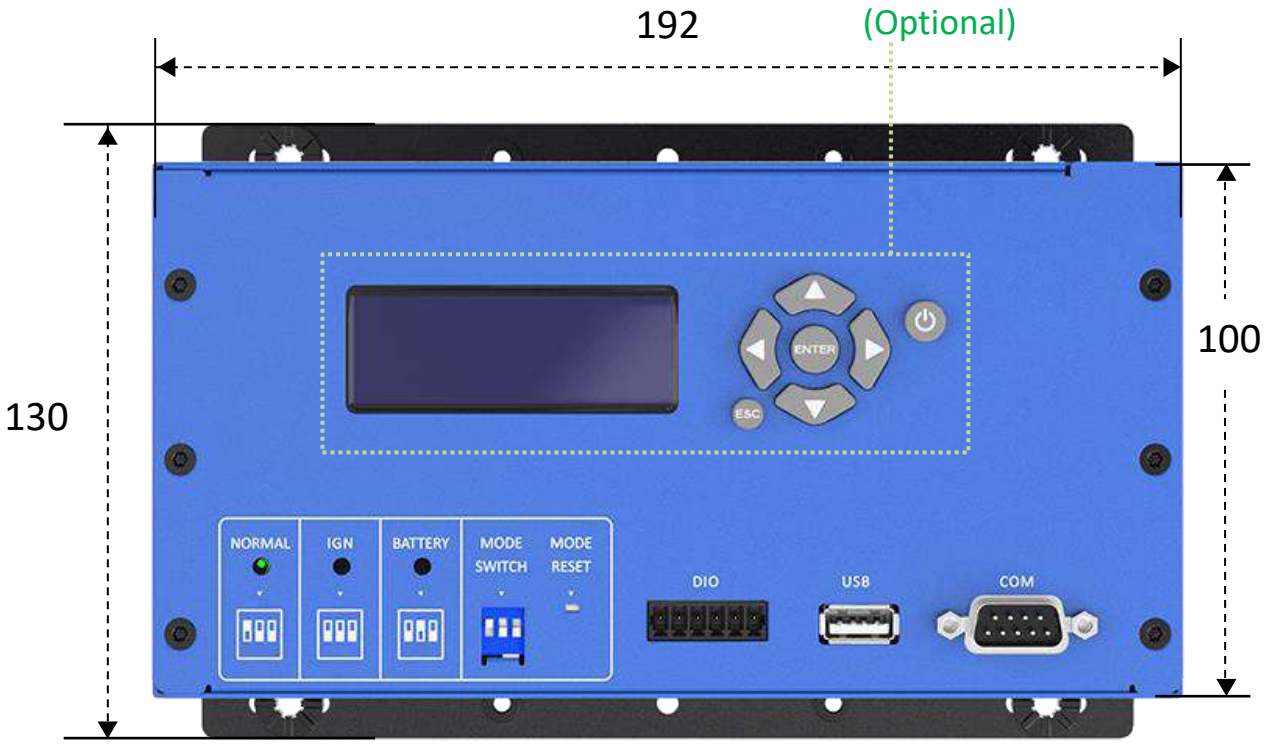


Back View

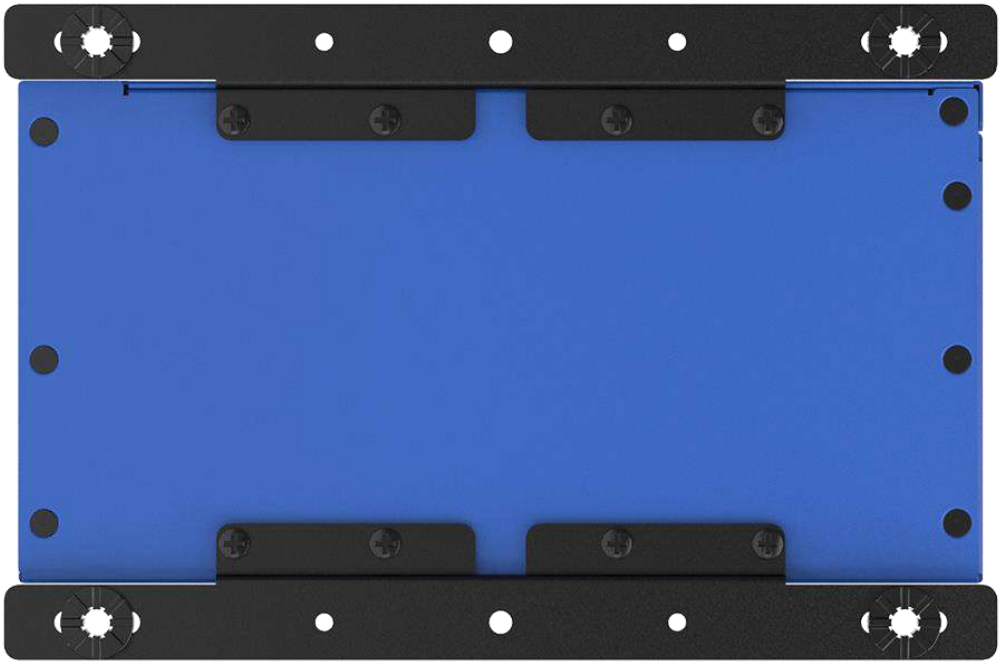
1.4.2 Top & Bottom View

Unit: mm

Top View



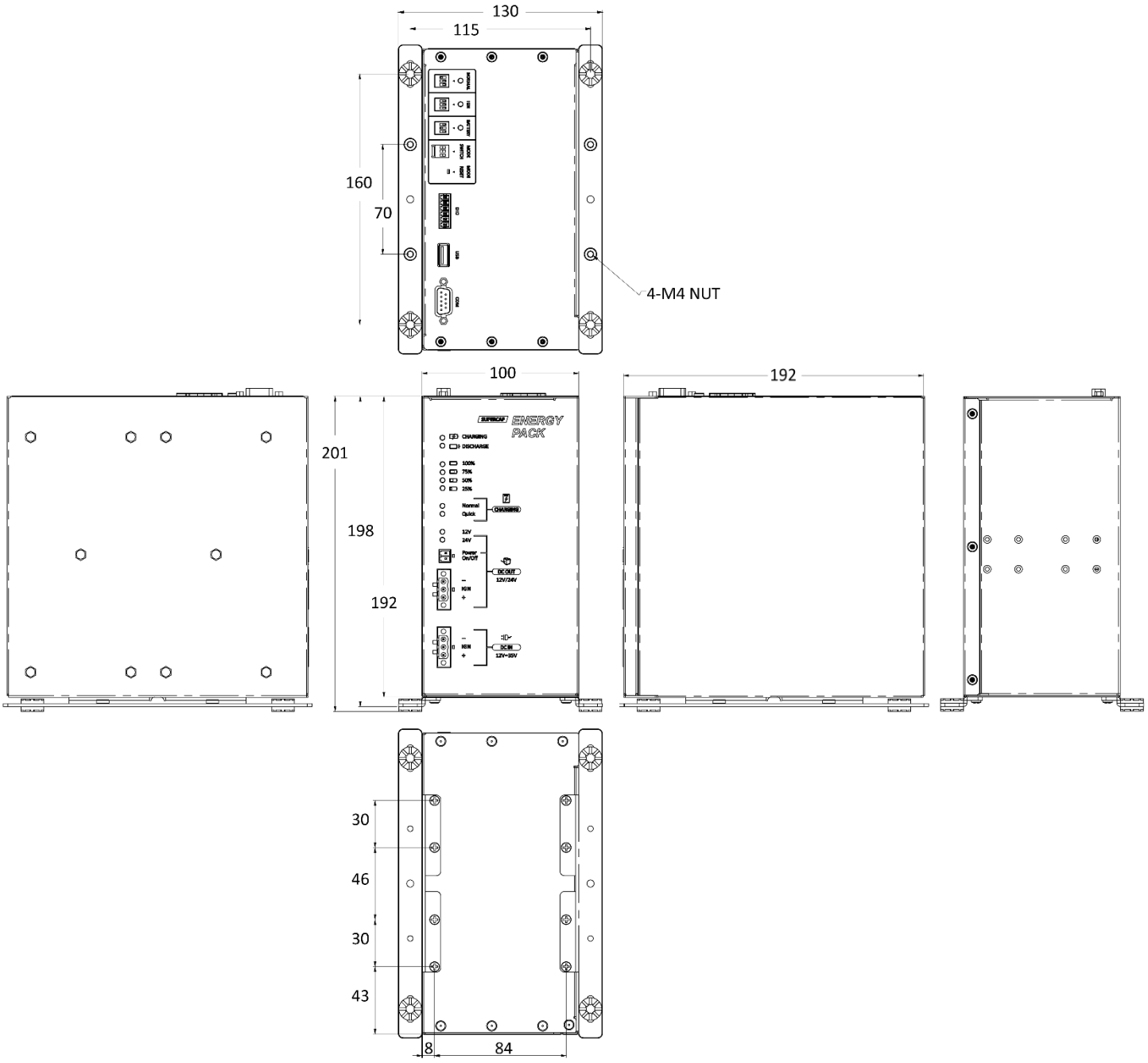
Bottom View



1.4.3 Mechanical Dimensions: All Sides

ECO-1000-8/16S

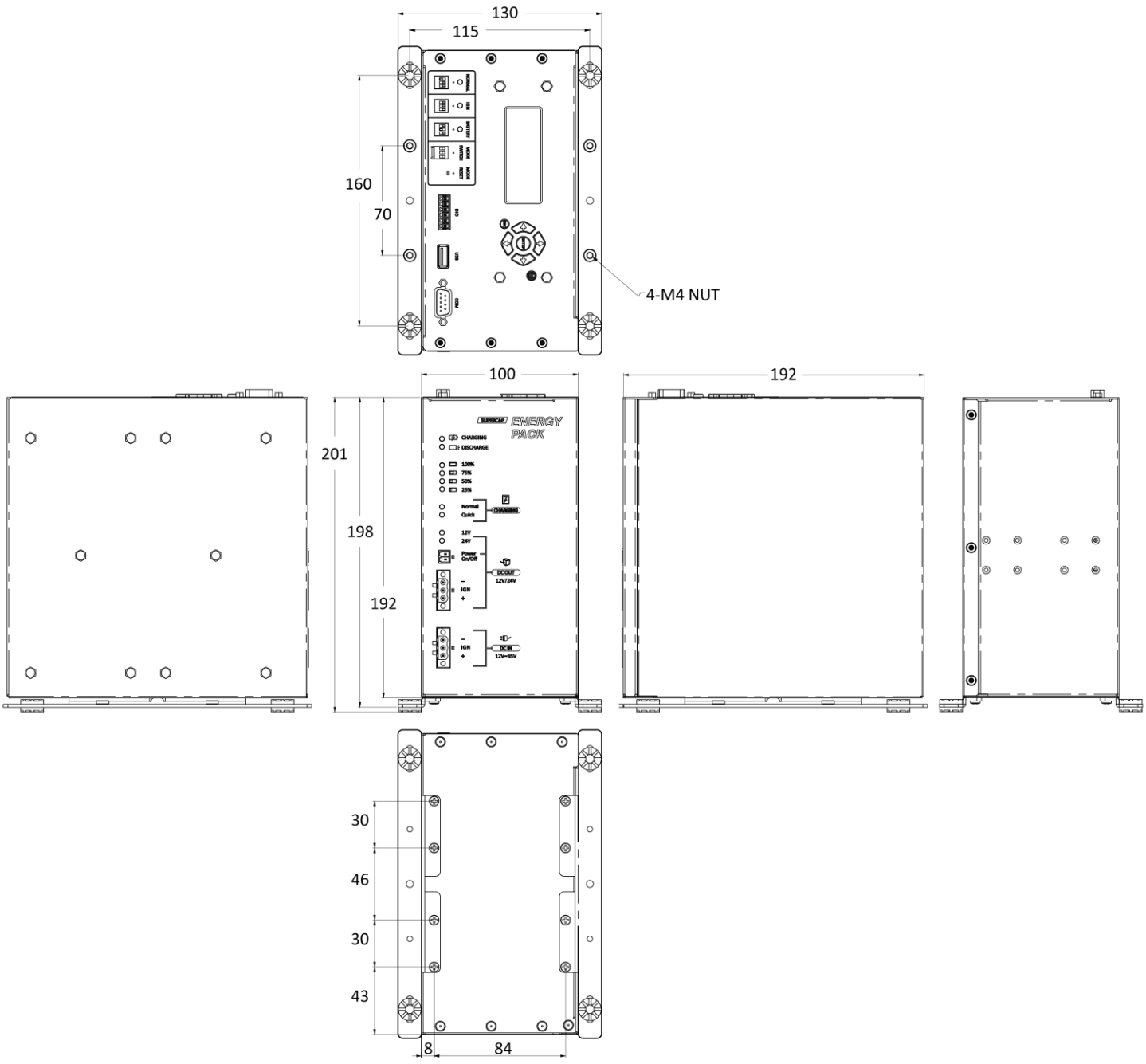
Unit: mm



1.4.3 Mechanical Dimensions: All Sides (LCM)

ECO-1000-8/16S-LCM (Optional)

Unit: mm



Chapter 2

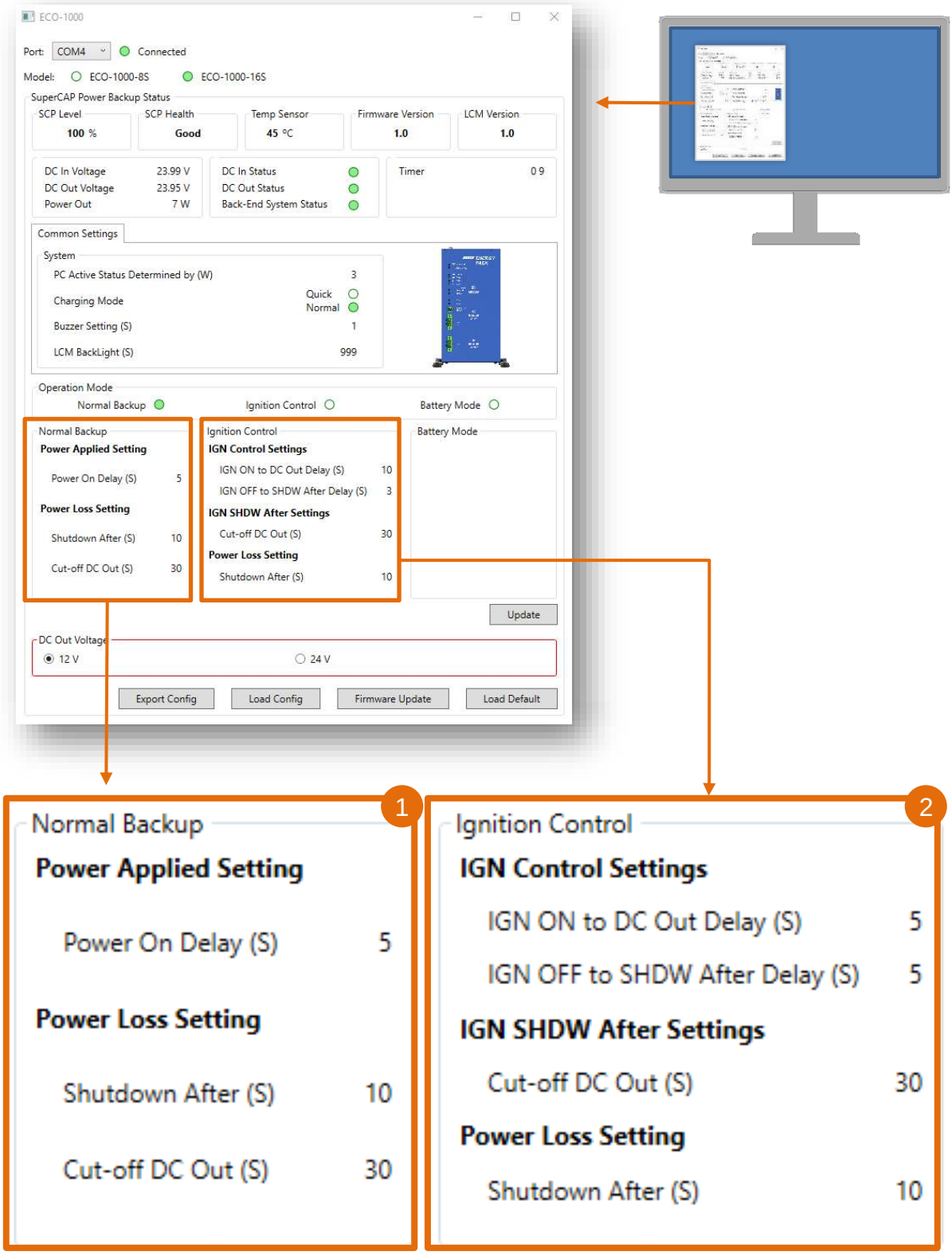
LCM / GUI Description

2.1 ECO-1000 Functions Guide

Category	Item	Standard		Optional	Note
		System	GUI	LCM	
Adjustable Set Up	MODE SWITCH	v			Normal Backup Mode/Ignition Control Mode/Battery Mode
	MODE RESET	v			Button to execute the MODE SWITCH
	Delay time Setting		v	v	Set delay time in seconds (s)
	Charging Mode Setting		v	v	Normal/Quick Charge Mode
	DC Out Voltage		v		DC Output 12V or 24V
	MB_On_Pw/PC Active Status Determined by (W)		v	v	The wattage (W) level where the ECO-1000 define the backend system is Power ON/OFF
	Vi_Off_Bz/Buzzer Setting		v	v	Buzzer sound time length (s)
	LCM Backlight		v	v	LCM Backlight Display On time length (s)
	All Set Default/Load Default		v	v	Set parameters to default configuration
	Port: COM#, COM…, …		v		Choose connected COM/USB port
Status Indicator	ECO-1000 Model Indicator		v		ECO-1000-8S/ECO-1000-16S
	ECO-1000 Status Indicator	v			Charging, Discharging
	CAP Energy Level Indicator	v	v	v	25%, 50%, 75%, 100%
	Charging Indicator	v	v	v	Normal/Quick Charge Mode
	MB: PW-ON/Back-End System Status		v	v	Backend system ON/OFF status
	12V/24V DC-Out Indicator	v	v	v	12V or 24V DC output
	DC OUT Voltage Indicator	v	v	v	Detected DC-out voltage status
	DC IN Voltage Indicator	v	v	v	Detected DC-in voltage status
	Supercapacitors' Health Indicator		v	v	Test, Good, Normal, Low
	PO/Power Out		v	v	Wattage (W) level deliver through DC-Out
	CE/SCP Level		v	v	SuperCAP storage capacity 0% to 100%
	CS/ SCP Health		v	v	Supercapacitor health status
Others	TMP SENSER/ Temp Sensor		v	v	Temperature measurement in ˚C
	Power ON/OFF	v			Remote Power ON/OFF Port
	Firmware Version		v		ECO-1000's Firmware Version
	LCM Version		v		ECO-1000's LCM Version

2.2 GUI/LCM Comparison table

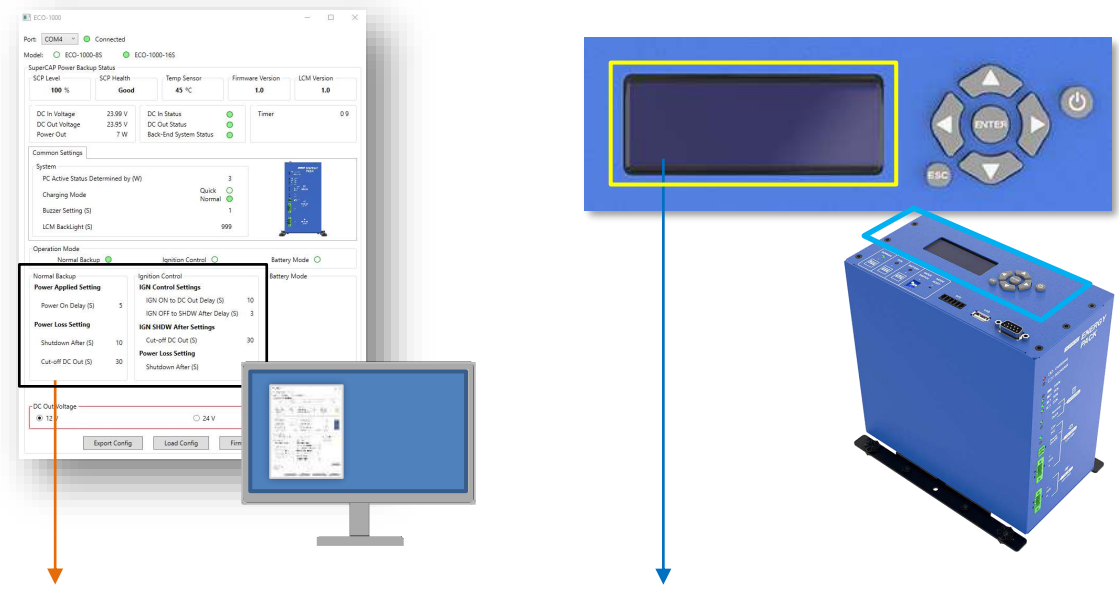
2.2.1 Computer GUI Settings



Note: ECO-1000's GUI Settings software is downloadable on C&T's product page. Visit the ECO-1000 product page at www.candtsolution.com and download the GUI driver to install on your computer.

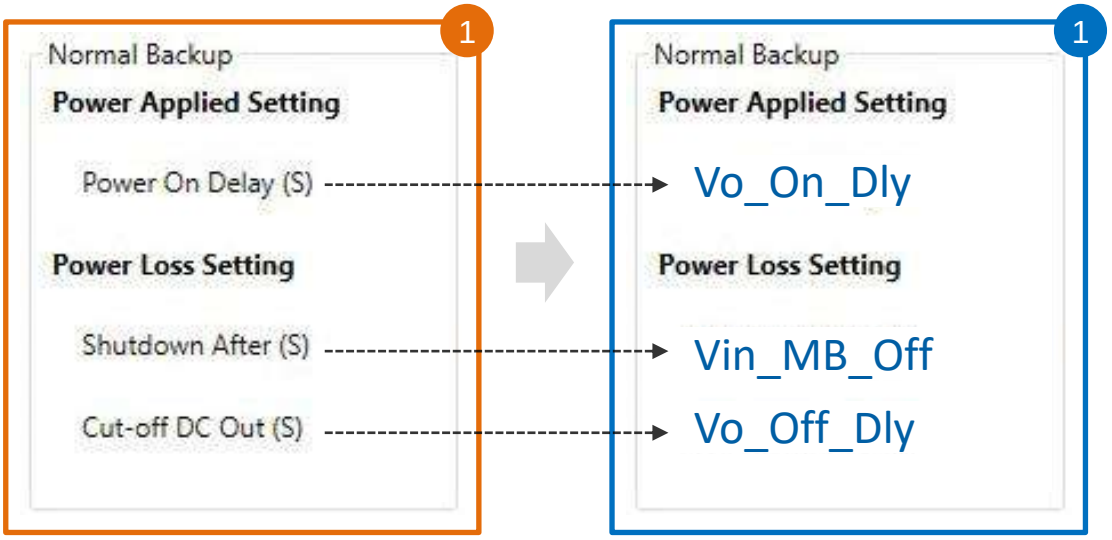
2.2.2 LCM Settings Name

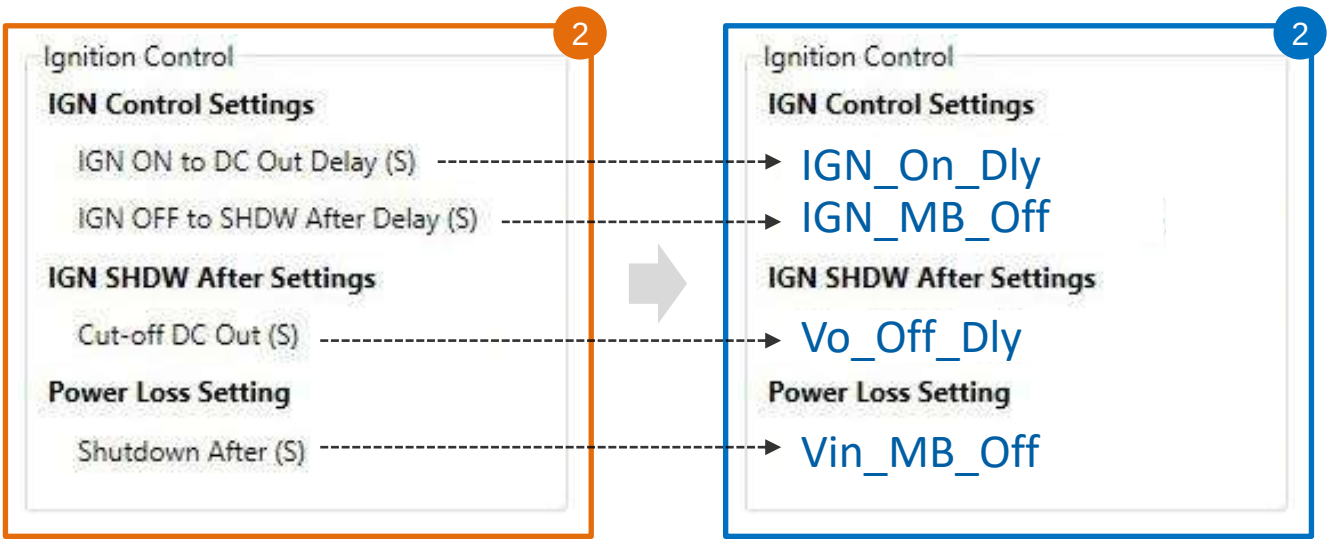
Attached below is how the Computer GUI settings are represented on the ECO-1000's LCM Display Setting.



Computer GUI Settings

LCM Display Settings

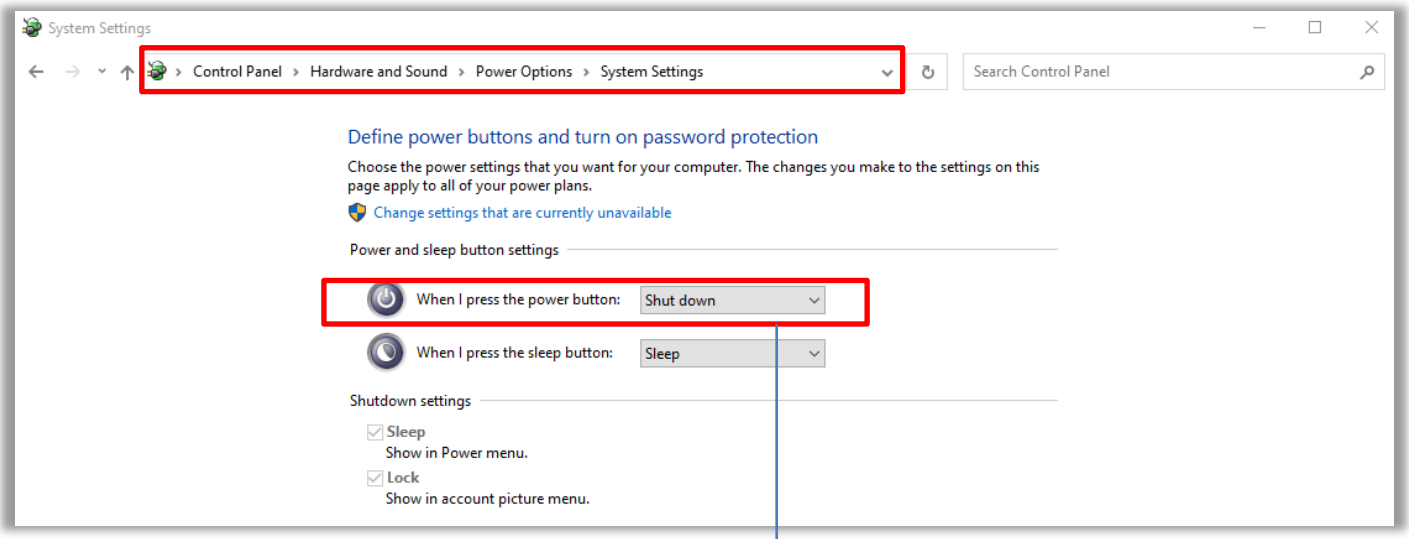




*** Related Models Must Have Following Functions/Settings:**

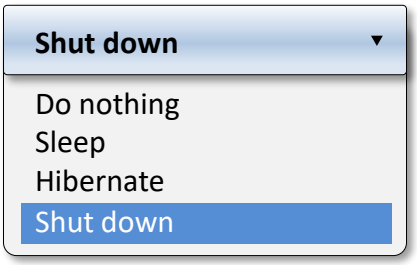
1. DC In 12V/24V Voltage Input
2. With Remote Power SW
3. With AT Mode
4. Windows Power Button Setting (Under Windows)

Visit Control Panel to Check the Power Button Setting
→ Control Panel\Hardware and Sound\Power Options\System Settings



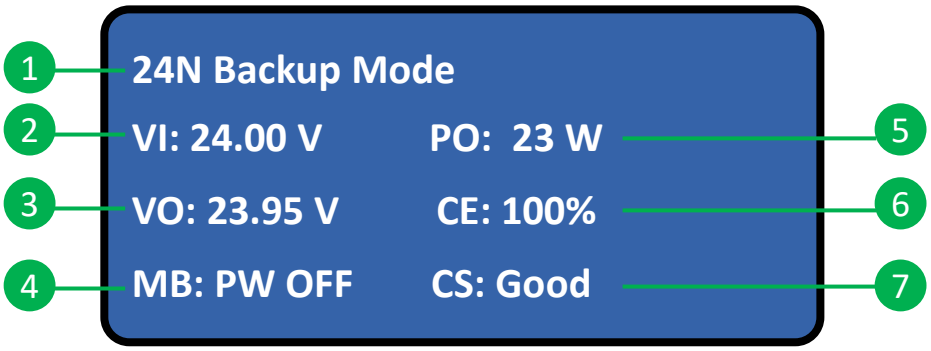
Select "Shut Down" on the power button settings:

When the power button is pressed:



2.3 LCM Display Description

2.3.1 LCM Home Page



The LCM Home Page will display the selected mode listed below.

- Normal Backup Mode

LCM Home Page			
No.	Item	Description	Display
1	12N/24N Backup Mode	ECO-1000 DC-Out Voltage: 12V or 24V	12N / 24N
2	VI	Voltage In	12~35V
3	VO	Voltage Out	12V/24V
4	MB	Backend Power Status ON or OFF	PW-OFF / PW-ON
5	PO	Backend System Power Consumption	0~200 W
6	CE	Remaining Energy Storage	0~100 %
7	CS	Supercapacitors' Health	Good, Normal, Low/Test

- IGN Mode

LCM Home Page			
No.	Item	Description	Display
1	12N/24N IGN Mode	ECO-1000 DC-Out Voltage: 12V or 24V	12N / 24N
2	IGN	Ignition status	IGN Mode IGN:OFF/ON
3	VI	Voltage In	12~35V
4	VO	Voltage Out	12V/24V
5	MB	Backend Power Status ON or OFF	PW-OFF / PW-ON
6	PO	Backend System Power Consumption	0~200 W
7	CE	Remaining Energy Storage	0~100 %
8	CS	Supercapacitors' Health	Good, Normal, Low/Test

- Battery Mode

1 **24N Battery Mode**

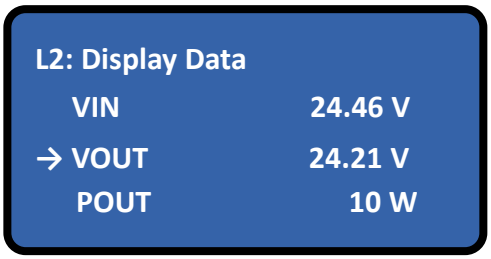
LCM Home Page			
No.	Item	Description	Display
1	12N/24N Backup Mode	ECO-1000 DC-Out Voltage: 12V or 24V	12N / 24N
2	VI	Voltage In	12~35V
3	VO	Voltage Out	12V/24V
4	MB	Backend Power Status ON or OFF	PW-OFF / PW-ON
5	PO	Backend System Power Consumption	0~200 W
6	CE	Remaining Energy Storage	0~100 %
7	CS	Supercapacitors' Health	Good, Normal, Low/Test

2.3.2 LCM L1: Menu

- LCM Page 1 - Menu

L1: Menu			
No.	Item	Description	Display
1	L1: Menu	Level 1: Page Name	Menu
2	Display Data	ECO-1000 and Backend Status	
3	Edit Parameter	Configure Setting	

2.3.3 LCM L2: Display Data



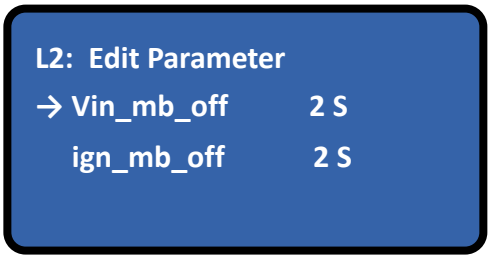
- LCM Page 2 - Display Data

L2: Display Data			
No.	Item	Description	Display
1	L2: Display Data	Level 2: Page Name	Display Data
2	VIN	Voltage In Measurement	V
3	VOUT	Voltage Out Measurement	V
4	POUT	Power Output consumed by the backend system	W
5	CAP ENERG	Energy Capacity of the Supercapacitors	0% to 100%
6	TMP SENSOR	Temperature Measurement	°C
7	CAP STATE	SuperCAP Health	test/Good/Normal/Low
8	VI STATE	Voltage In Status	Good/OFF
9	VO STATE	Voltage Out Status	ON/OFF
10	MB STATE	Back-End System Status	ON/OFF
11	IGN STATE	IGN Status	ON/OFF
12	MAIN MCU	Firmware Version	1.0
13	LCM MCU	Firmware Version	1.0

- LCM Page 1 - Menu

L1: Menu			
No.	Item	Description	Display
1	L1: Menu	Level 1: Page Name	Menu
2	Display Data	ECO-1000 and Backend Status	
3	Edit Parameter	Configure Setting	

2.3.4 LCM L2: Edit Parameter



The LCM Home Page will display the selected mode listed below

- **LCM Page 2 - Edit Parameter for Normal Backup Mode**

L2: Edit Parameter		
No.	Item	Description
1	Normal Mode L2: Edit Parameter	Level 2 Page Name
2	Vo_On_Dly (OED)	Upon receiving power from the DC-IN port, the ECO-1000 initiates a delay time countdown before sending V-out to power the backend system. *Set the backend system to AT mode for automatic activation upon receiving power from ECO-1000 V-out. **Set the value to 9,998(s) for max. delay time.
3	Vin_MB_Off (PBD)	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system. *Set the value to 9,998(s) for max. delay time.
4	Vo_Off_Dly (ODD)	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system. *Set the value to 9,999(s) to freeze the countdown time.
5	MB_On_Pw	Set the wattage (W) level to define the back-end system's minimum power ON consumption. (The ECO-1000 will define the back-end system as ON/OFF depending on the wattage (W) level is above/bellow the adjusted level.

L2: Edit Parameter		
No.	Item	Description
6	Vi_Off_Bz	Set the duration for the buzzer sound to beep. If the value is 0(s), the buzzer will not make a sound.
7	Backlight	Set the ON duration for the LCM backlight display. If the value is 999(s), the LCM backlight will always ON.
8	Chg_Mode	Current Charging Mode Status
9	All Set Default	Load default configuration

Note:
Set the delay time value to 9999(s) for the ECO-1000 to freeze (not execute) the delay countdown of the selected mode.

- **LCM Page 2 - Edit Parameter for IGN Mode**

L2: Edit Parameter		
No.	Item	Description
1	IGN Mode L2: Edit Parameter	Page
2	IGN_On_Dly	Upon receiving IGN-ON signal, the ECO-1000 initiates delay time countdown before sending V-out to power the backend system. *Set the value to 9,998(s) for max. delay time.
3	IGN_MB_Off	Upon receiving an IGN-Off signal, the ECO-1000 initiates a delay countdown before sending a power-off signal to the back-end system. *Set the value to 9,998(s) for max. delay time.
4	Vin_MB_Off (PBD)	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system. *Set the value to 9,998(s) for max. delay time.
5	Vo_Off_Dly (ODD)	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system. *Set the value to 9,999(s) to freeze the countdown time.
6	MB_On_Pw	Set the wattage (W) level to define the back-end system's minimum power ON consumption. (The ECO-1000 will define the back-end system as ON/OFF depending on the wattage (W) level is above/bellow the adjusted level.
7	Vi_Off_Bz	Set the duration for the buzzer sound to beep. If the value is 0(s), the buzzer will not make a sound.
8	Backlight	Set the ON duration for the LCM backlight display. If the value is 999(s), the LCM backlight will always ON.

L2: Edit Parameter		
No.	Item	Description
9	Chg_Mode	Current Charging Mode
10	All Set Default	Load default configuration

Note:
Set the delay time value to 9999(s) for the ECO-1000 to freeze (not execute) the delay countdown of the selected mode.

- **LCM Page 2 - Edit Parameter for BATTERY Mode**

L2: Edit Parameter		
No.	Item	Description
1	BATTERY Mode L2: Edit Parameter	Page
2	MB_On_Pw	Set the wattage (W) level to define the back-end system's minimum power ON consumption. (The ECO-1000 will define the back-end system as ON/OFF depending on the wattage (W) level is above/bellow the adjusted level.
3	Vi_Off_Bz	Set the duration for the buzzer sound to beep. If the value is 0(s), the buzzer will not make a sound.
4	Backlight	Set the ON duration for the LCM backlight display. If the value is 999(s), the LCM backlight will always ON.
5	Chg_Mode	Current Charging Mode
6	All Set Default	Load default configuration

Note:
Setting the delay to 9,999 (s) will equal to 0 (s) for these items:
- Vo_On_DLY
- Vin_MB_Off
- IGN_On_Dly
- IGN_MB_Off

Setting the delay to 9,999 (s) will freeze the countdown for these items:
- Vo_Off_Dly
- Backlight

2.4 GUI Installation

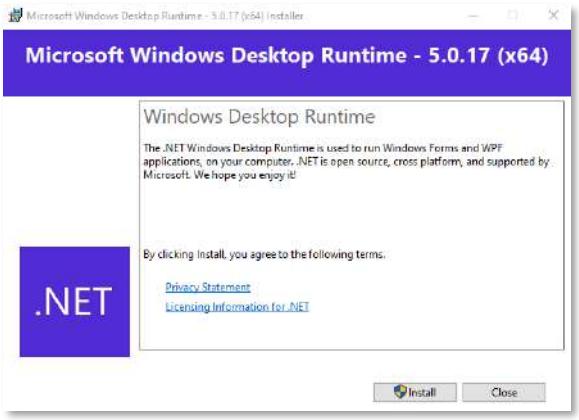
2.4.1 Installing the GUI on Windows

Download the driver from www.candtsolution.com

The zip folder contains three files:

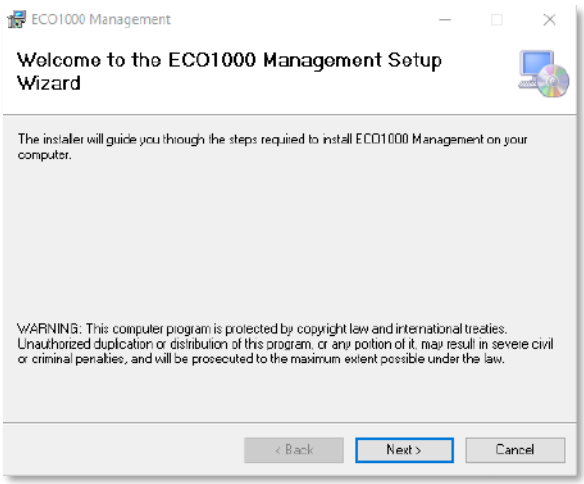
Step 1: Install .NET Windows Desktop Runtime

windowsdesktop-runtime-5.0.17-win-x64



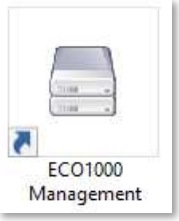
Step 2: Install ECO-1000 Management GUI

ECO1000ManagementSetup



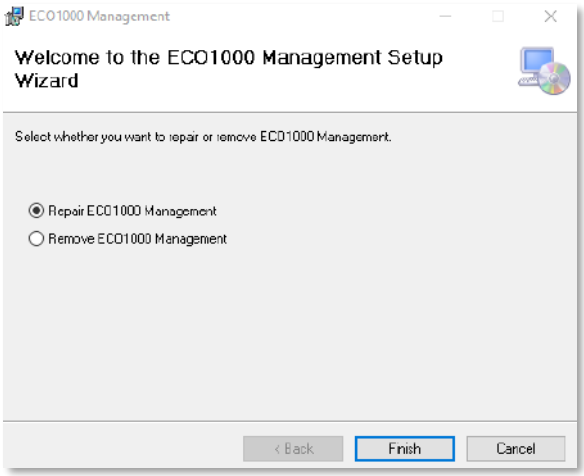
Step 2.1: The GUI shortcut will appear after installation is completed.

Click to open the GUI window >>



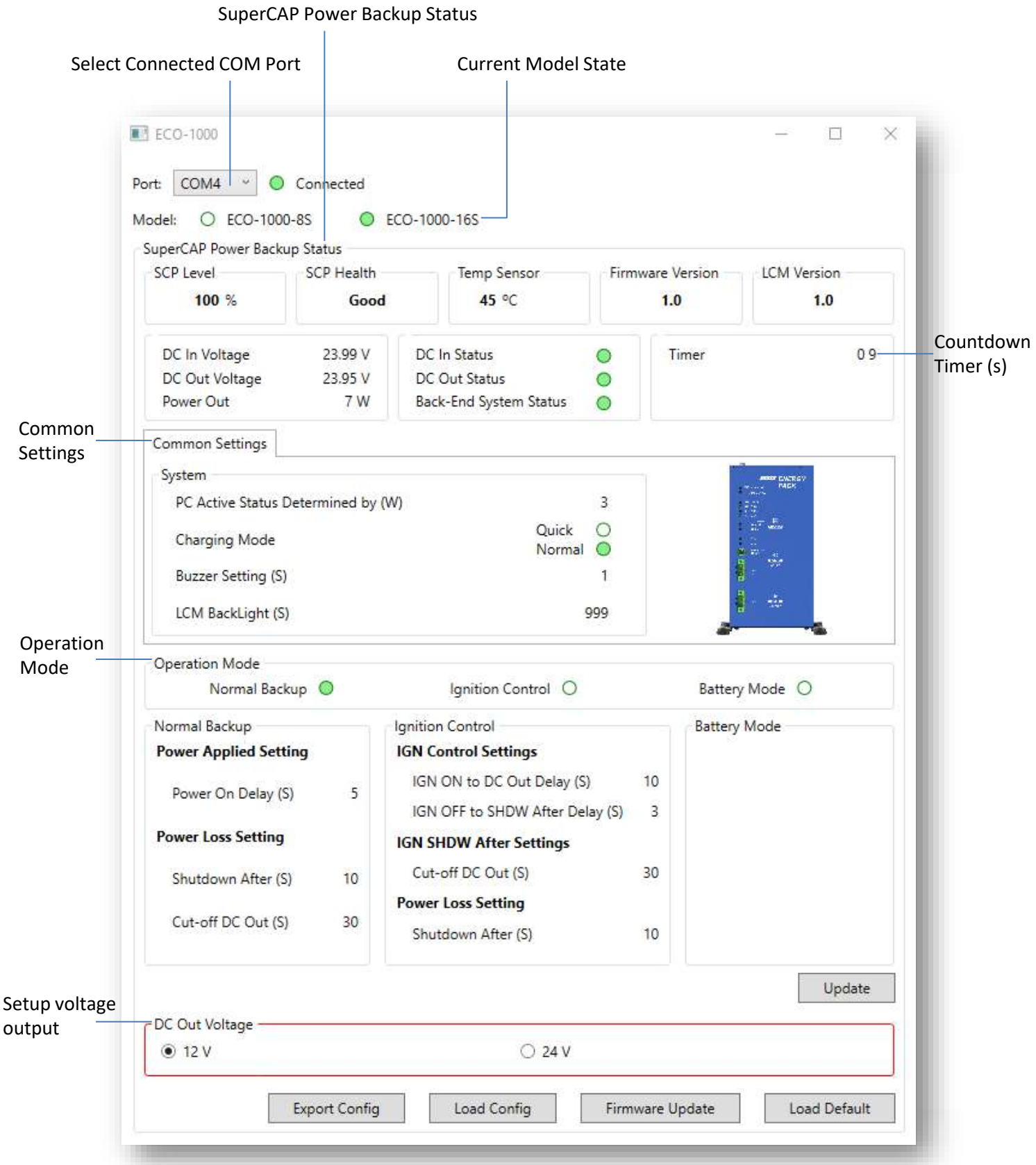
Uninstall or Debug the ECO-1000 Management Software with SETUP

- Select **Repair** to Debug
- Select **Remove** to Uninstall



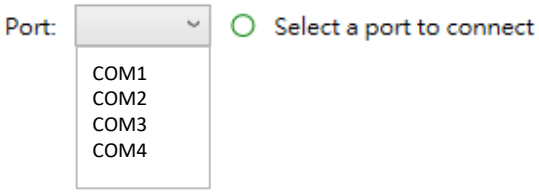
2.5 GUI Setup

2.5.1 GUI Window



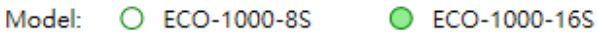
2.5.2 GUI: Status Setting

- **Select Connected COM Port**



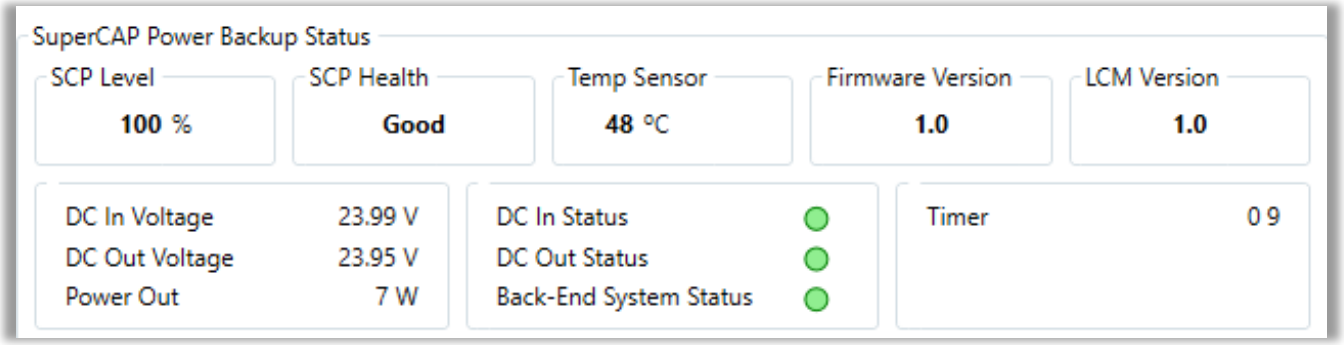
Port	Description
COM X (COM1, COM2, COM3, etc…)	Select Connected COM Port after connecting to ECO-1000's COM or USB port

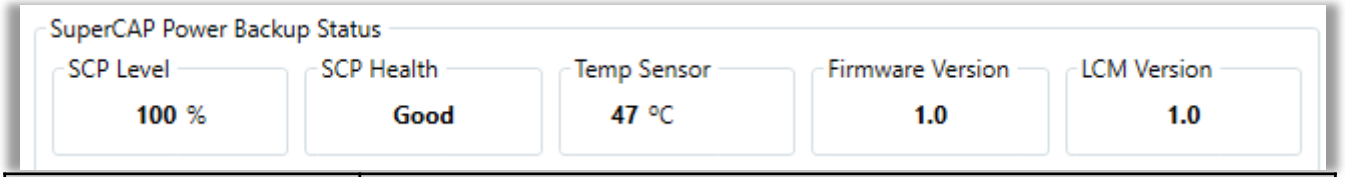
- **Current Model State**



Model ID	Indicator Color	Description
ECO-1000-8S	ECO-1000-8S ECO-1000-16S	Auto detect ECO-1000 with 8x / 16x supercapacitors
ECO-1000-16S	ECO-1000-8S ECO-1000-16S	

2.5.3 GUI: SuperCAP Power Backup Status

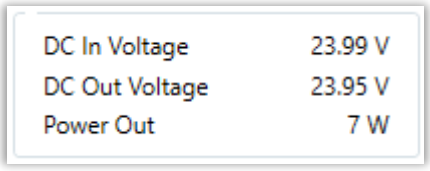




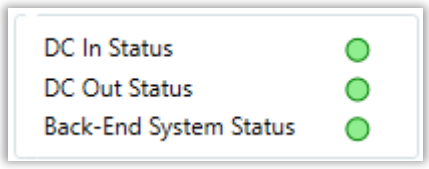
ECO-1000 Status	Description
SCP Level	Supercapacitor Energy Level
SCP Health	Supercapacitor Health Status
Temp Sensor	On-Board Temperature Sensor
Firmware Version	ECO-1000's MCU Version
LCM Version	LCM's MCU Version

SCP Health Note:

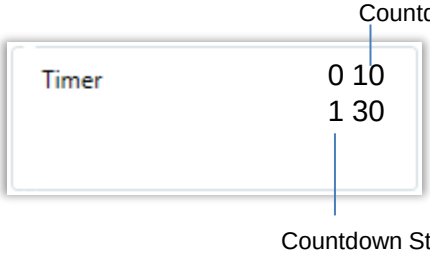
1. Every 24 hours, the ECO-1000's MCU updates the daily supercapacitor health.
2. Accurate supercapacitor health monitoring is supported within -25˚C to 40˚C temperature environments.
3. SCP Health Status provides an estimation guide for supercapacitors replacements.



ECO-1000 Status	Description
DC In Voltage	DC In Voltage Level
DC Out Voltage	DC Out Voltage Level
Power Out	Power Out Wattage Level

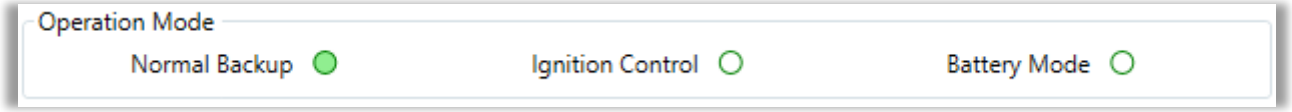


ECO-1000 Status	Indicator Color	Description
DC In Status	Green/Blank	Power In Detection Indicator
DC Out Status	Green/Blank	Power Out Detection Indicator
Back-End System Status	Green/Blank	Back-End System ON Detection Indicator



ECO-1000 Status	Description
Timer	Delay Time Countdown *The countdown stages will be executed in order from stage 0 to stage 2

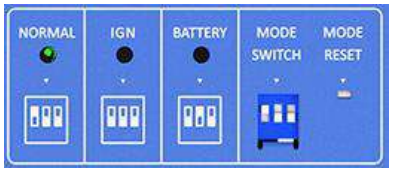
2.5.4 GUI: Operation Mode



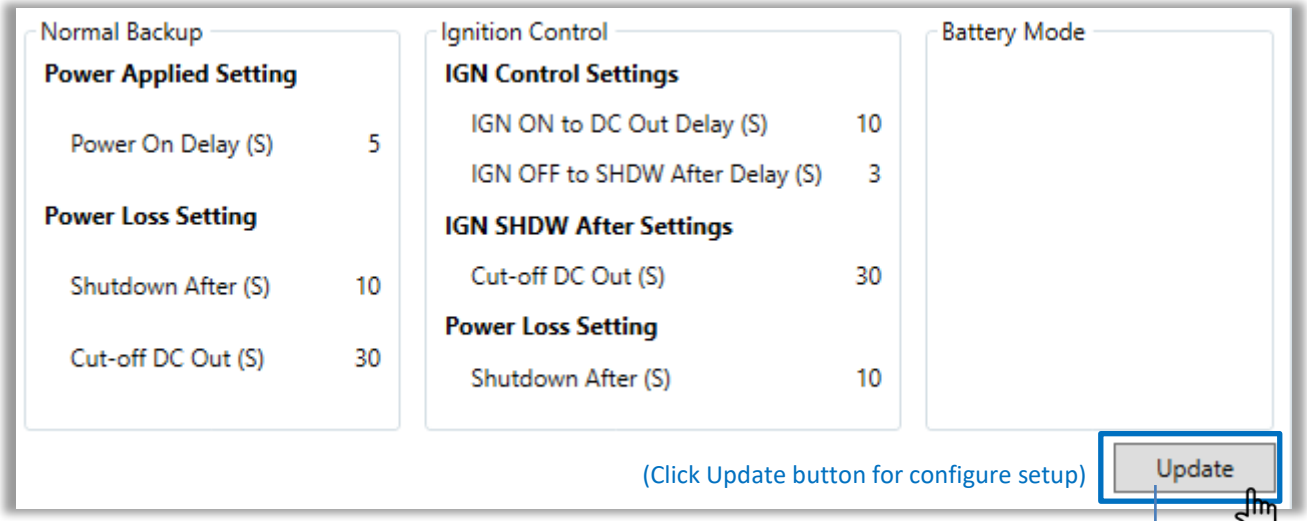
ECO-1000 Status	Indicator Color	Description
Normal Backup	Normal Backup ● Ignition Control ○ Battery Mode ○	Current Selected Mode
Ignition Control	Normal Backup ○ Ignition Control ● Battery Mode ○	
Battery Mode	Normal Backup ○ Ignition Control ○ Battery Mode ●	

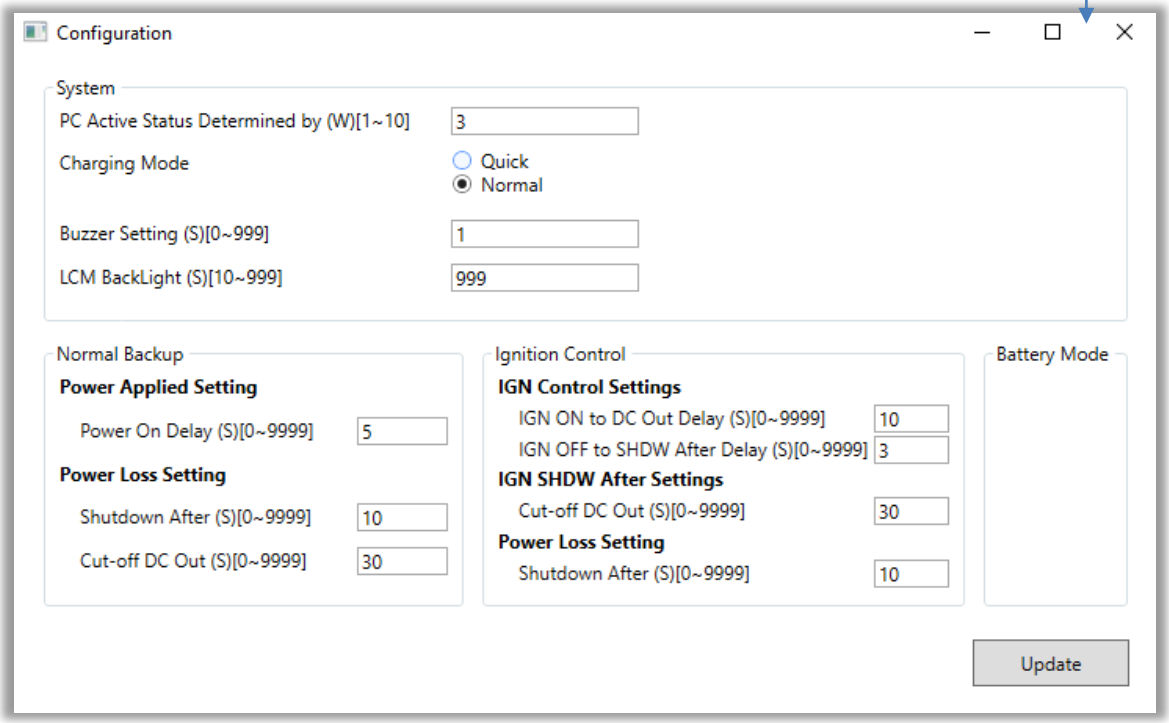
Note:

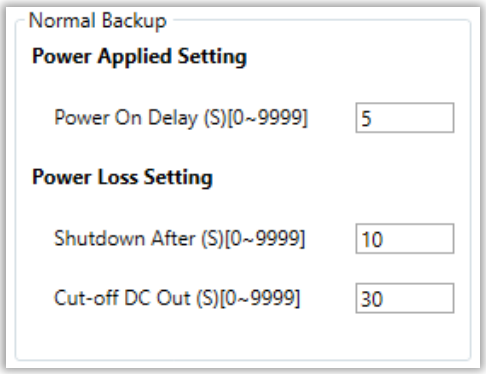
- MODE SWITCH can only be changed physically on the ECO-1000.
- When MODE RESET button is pressed, the DC-Out (Vout) will be cut.
- It's recommended to turn off the backend system beforehand.



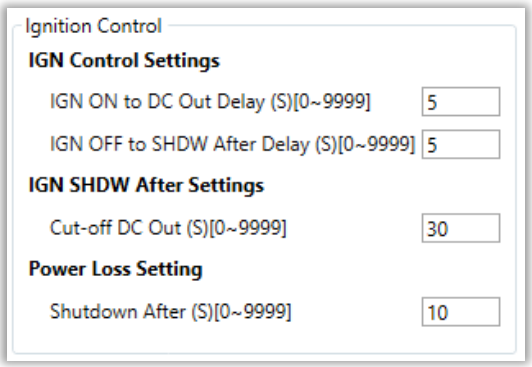
Setup from the GUI







Normal Backup Mode	Setting	Description
Power Applied Setting	Power ON Delay (Vo_On_Dly/OED)	Upon receiving power from the DC-IN port, the ECO-1000 initiates a delay time countdown before sending V-out to power the backend system.
Power Loss Setting	Shutdown After (Vin_MB_Off/PBD)	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system.
	Cut-off DC Out (Vo_Off_Dly/ODD)	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system.



Ignition Control	Setting	Description
IGN Control Setting	IGN-ON to DC-Out Delay (IGN_On_Dly)	Upon receiving DC-IN power or IGN-ON signal, the ECO-1000 initiates delay time countdown before sending V-out to power the backend system.
	IGN-OFF to SHDW After Delay (IGN_MB_Off)	Upon receiving an IGN-Off signal, the ECO-1000 initiates a delay countdown before sending a power-off signal to the back-end system.
IGN SHDW After Setting	Cut-off DC Out (Vo_Off_Dly/ODD)	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system.
Power Loss Setting	Shutdown After (Vin_MB_Off/PBD)	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system.

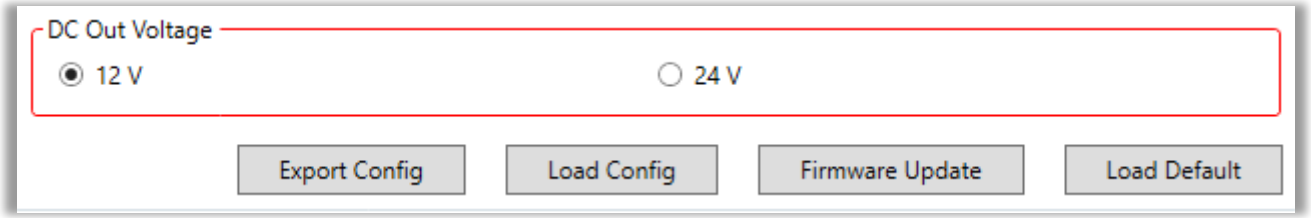
Note:
Set to 9,999s to freeze the delay countdown time on Cut-off DC Out (Vo_Off_Dly).
This will make the ECO-1000 to continuously send DC-Out (Vout) to the backend system.

2.5.5 GUI: Common Settings

Setting	Description
PC Active Status Determined by	Set the wattage (W) level to define the back-end system's minimum power ON consumption. The ECO-1000 will define the back-end system as ON/OFF depending on the wattage (W) level is above/bellow the adjusted level.
Charging Mode	Set the Normal/Quick charging mode based on the adapter's specifications. Please refer to the Adapter Configurations below.
Buzzer Setting (S)	Set the time length for the buzzer sound to beep when the main power source gets cut off. If the value is 0(s), the buzzer will not make a sound.
LCM Backlight (S)	Set a time length for the LCM display backlight to standby. If the value is 9999(s), the LCM backlight will continuously standby.

	Adapter			
Charging Mode	Watt	Voltage	Current	P/N
Normal	60W	12V	5A	1-E09A06001
	120W	24V	5A	1-E09A12002
	220W	24V	9.2A	1-E09A22102
	280W	24V	11.67A	1-E09A22801
Quick	220W	24V	9.2A	1-E09A22102
	280W	24V	11.67A	1-E09A22801

- **DC Out Voltage**

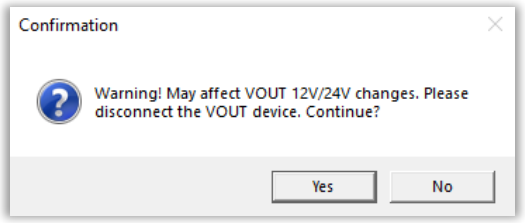


DC Out Voltage Setting	Description
12V	DC-OUT Voltage options for power delivery to the back-end system.
24V	

Note:

1. Please confirm that your back-end system supports the selected Voltage Level (12V or 24V).
2. Please unplug all cables to the connected system before switching the Voltage Level.
3. Failure to comply with any of these steps correctly might damage the supercapacitor and the back-end system.
4. The LCM L1: Menu Display Data will show 12N for 12V and 24N for 24V.

A window alert will appear when switching the DC-OUT voltage selection.



Setting	Description
Export Config	Export file with ECO-1000's pre-selected settings and parameters.
Load Config	Import file with ECO-1000's pre-selected settings and parameters.
Firmware Update	Update ECO-1000's MCU/LCM Firmware.
Load Default	Reset ECO-1000 to its default configuration.

Chapter 3

System Setup

3.1 Charge and Discharge

The ECO-1000 EnergyPack have more than 10 years of lifespan with 500,000 charging/discharging cycles.

3.1.1 Charge Time

The ECO-1000 support various power supply adapters for Normal and Quick Charge.
The ECO-1000 support 12V to 35V of power supply input.

ECO-1000 Normal Charge and Quick Charge Time from 0% to 100%

Power Supply Adapter	Normal	8x SuperCAP	16x SuperCAP	Quick	8x SuperCAP	16x SuperCAP
60W (12V | 5A)	✓	3m47s	7m30s			
120W (24V | 5A)	✓	3m17s	5m52s			
220W (24V | 9.2A)	✓	3m15s	5m52s	✓	2m23s	4m21s
280W (24V | 11.67A)	✓	3m15s	5m50s	✓	2m23s	4m23s

*Ambient Temperature 25°C
**MCU firmware: 1.0

3.1.2 Discharge Time

The ECO-1000 can be configured with 12V or 24V DC OUT to power external system.

Discharge time of the ECO-1000-8S and ECO-1000-16S with 12V and 24V systems.

	8x SuperCAP		16x Super CAP	
Load	12V	24V	12V	24V
200W	n/a	n/a	n/a	23s
180W	n/a	n/a	n/a	49s
160W	n/a	33s	n/a	1m 15s
140W	n/a	52s	n/a	1m 42s
120W	n/a	1m08s	n/a	2m 16s
100W	1m 10s	1m28s	2m 24s	2m 52s
80W	1m 32s	1m55s	3m 10s	3m 55s
60W	2m 11s	2m40s	4m 33s	5m 17s
40W	3m 23s	4m12s	6m 50s	8m 35s

*Ambient Temperature 25°C
**MCU firmware: 1.0
***This is tested with continuous and constant load of power wattage (W) output

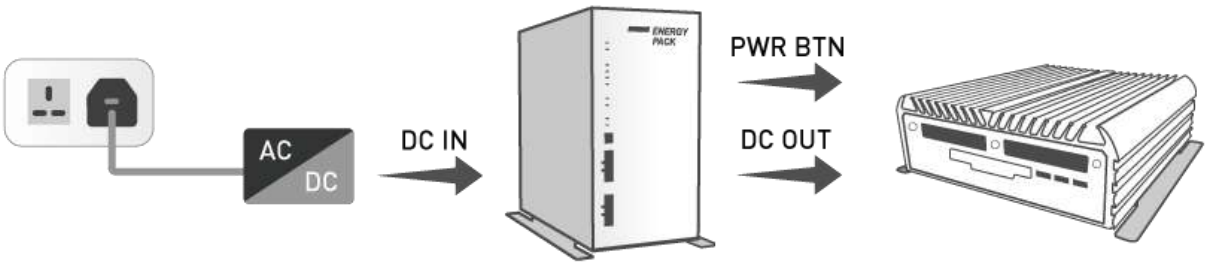
3.2 Mode Configuration

The ECO-1000 EDGEBoost EnergyPack has three operating modes:

- Normal Backup Mode
- Ignition Control Mode
- Battery Mode

When a power outage occurs, ECO-1000 can provide power redundancy with three power backup modes to allow the system to safely shutdown or extend the operating time. These three modes are mainly utilized for BOX PC, Panel PC, or other related industrial controllers and systems that can receive 12V/24V of power. The following sections show illustrations and descriptions for each connection mode.

3.2.1 Normal Backup Mode



Normal Backup Mode

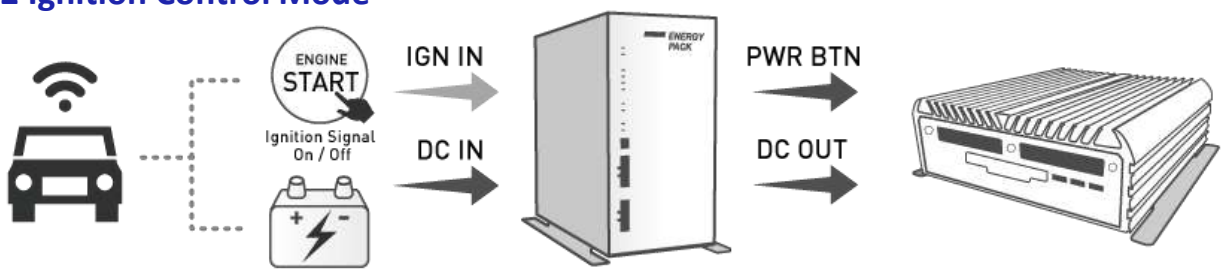
- ECO-1000's DC IN port receives power from a power adapter connected to an AC power plug.
- ECO-1000's DC OUT port sends power to the connected system.
- ECO-1000 sends power ON/OFF signal for safe shutdown.
- ECO-1000 automatically detects power outages and provides power backup.

ECO-1000 can set the delay time countdown for these parameters:

LCM	GUI	Description
Vo_On_Dly	Power On Delay	Upon receiving power from the DC-IN port, the ECO-1000 initiates a delay time countdown before sending V-out to power the backend system.
Vin_MB_Off	Shutdown After	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system.
Vo_Off_Dly	Cut-off DC Out	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system.

Click Here To See Cable Routing Guide >>

3.2.2 Ignition Control Mode



Ignition Control Mode

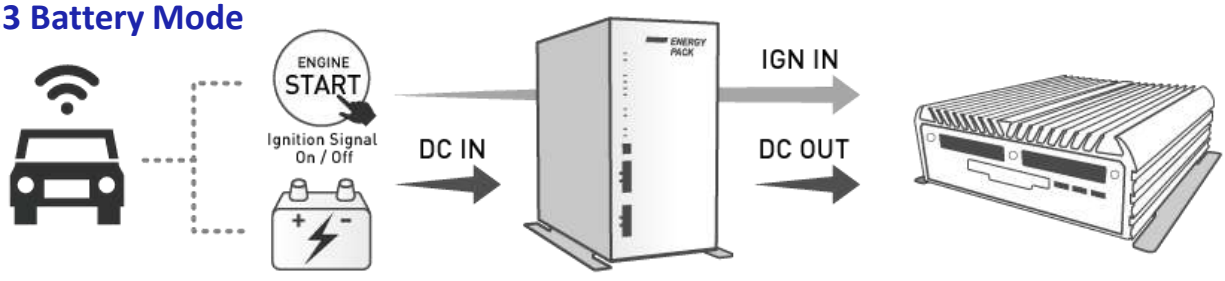
- ECO-1000's DC IN port receives power from an in-vehicle power supply.
- ECO-1000 IGN port receives ignition signal from the vehicle.
- ECO-1000's DC OUT port sends power to the connected system.
- ECO-1000 connects to PWR BTN (power button) to send power ON/OFF signal.
- ECO-1000 automatically detects power outages/ignition signal and provides power backup.

ECO-1000 can set the delay time countdown for these parameters:

LCM	GUI	Description
IGN_On_Dly	IGN ON to DC Out Delay	Upon receiving DC-IN power or IGN-ON signal, the ECO-1000 initiates delay time countdown before sending V-out to power the backend system.
IGN_MB_Off	IGN OFF to SHDW After Delay	Upon receiving an IGN-Off signal, the ECO-1000 initiates a delay countdown before sending a power-off signal to the back-end system.
Vin_MB_Off	Shutdown After	Upon a power loss from DC-IN port, the ECO-1000 initiates a delay time countdown before sending a Power-Off signal to the backend system.
Vo_Off_Dly	Cut-off DC Out	Right after the Vin_MB_Off (PBD) countdown ends, the ECO-1000 begins its delay time countdown to completely stop the DC-Out voltage to the backend system.

Click Here To See Cable Routing Guide >>

3.2.3 Battery Mode



Battery Mode

- ECO-1000's DC IN port receives power from an in-vehicle power supply.
- Ignition Signal (IGN IN) connects directly to the system for Power On/Off.
- ECO-1000's DC OUT port continuously delivers DC-Out (Vout) power to the connected system without delay time countdown.

Click Here To See Cable Routing Guide >>

3.3 Compatible List

ECO-1000 Support Model List

Model		Series				Note
RCO	Fanless Mini Rugged Computers	1000	1000-EHL			
	Compact High-Performance Fanless Computers	3400	3600	3000-CFL	3000-CML	
	AI Edge Inference Computers	6000	6100	6000-CML	6000-ADL	Only support 24V for ADL
BCO	Rich I/O Fanless Mini Computer	1000	1000-EHL	2000	2000-RYZ	BCO-2000 w/ Customized Power Switch Cable, w/ 12V Adapter Only
ACO	EN50155 In-Vehicle Fanless Computers	6000	6000-CML			
VCO	Machine Vision Industrial Computers	6000	6100	6000-ADL		Only support 24V for ADL
WCO	Waterproof Edge Computers	3400	3000-EHL			w/ Customized M12 Power Switch Cable
PC/VIO	IP65 Modular Industrial Panel PC	100	100-EHL	400		
PC/MX	IP65 Modular Industrial Panel Display	MX200				w/ 1x PC System,
SIO	IP67-IP69K Stainless Steel Industrial Panel PC	200				w/ Customized M12 Power Switch Cable

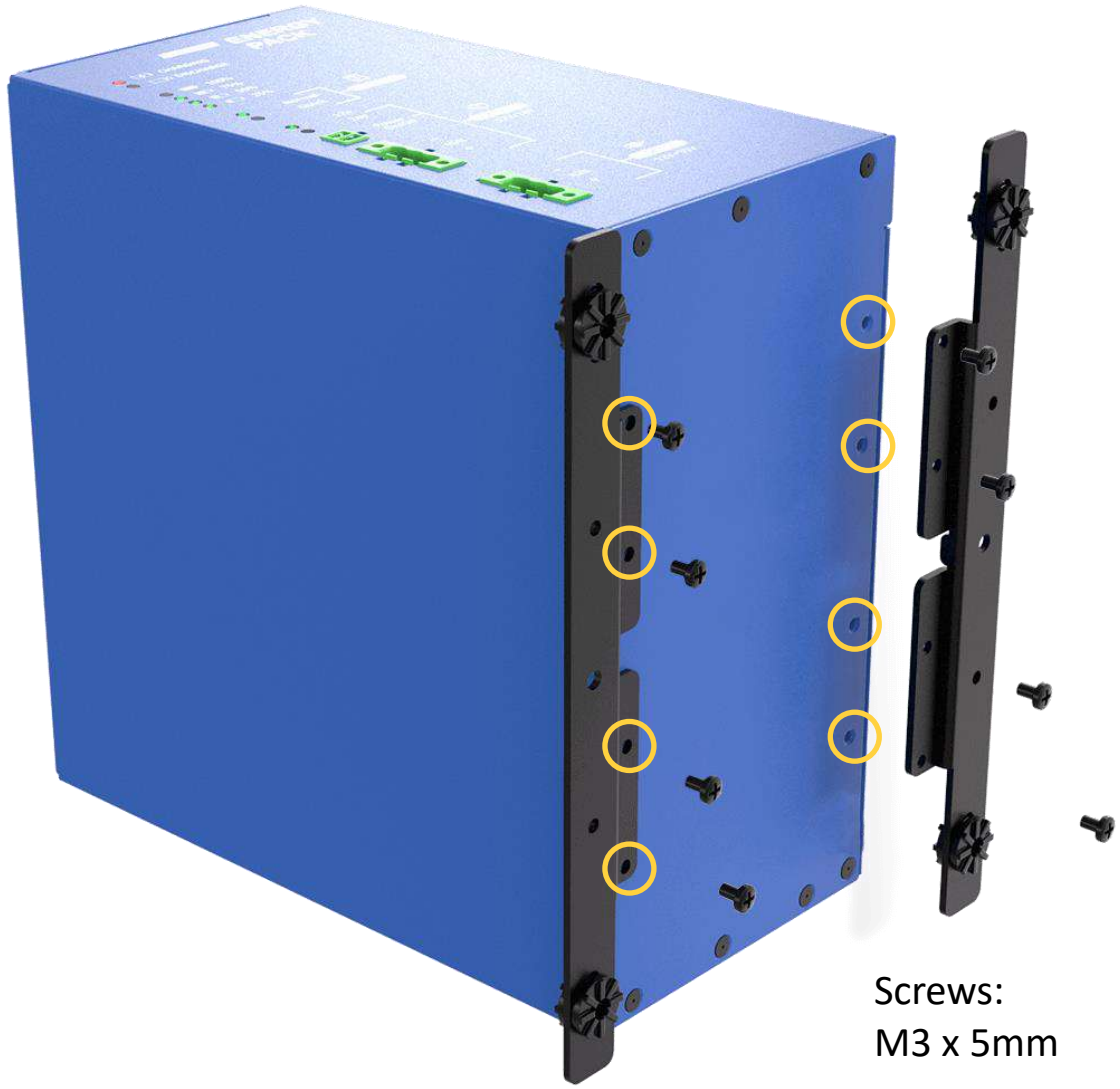
Model Series							
	RCO-1000		RCO-1000-EHL		RCO-3400		RCO-3600
	RCO-3000-CFL		RCO-3000-CML		RCO-6000		RCO-6100
	RCO-6000-CML		BCO-1000		BCO-2000 BCO-2000-RYZ		ACO-6000
	ACO-6000-CML		BCO-1000-EHL		VCO-6000		VCO-6100
	WCO-3400		WIO IP67 Rugged Industrial Panel PC		SIO IP67-IP69K Stainless Steel Industrial Panel PC		VIO IP65 Modular Industrial Panel PC or Touch Monitors

3.4 Installing Wall Mount Kit

3.4.1 Wall Mounting

(Bottom View)

Lock the wall kit with 8 screws



3.4.2 DIN Rail Mounting (Optional)

(Back View)

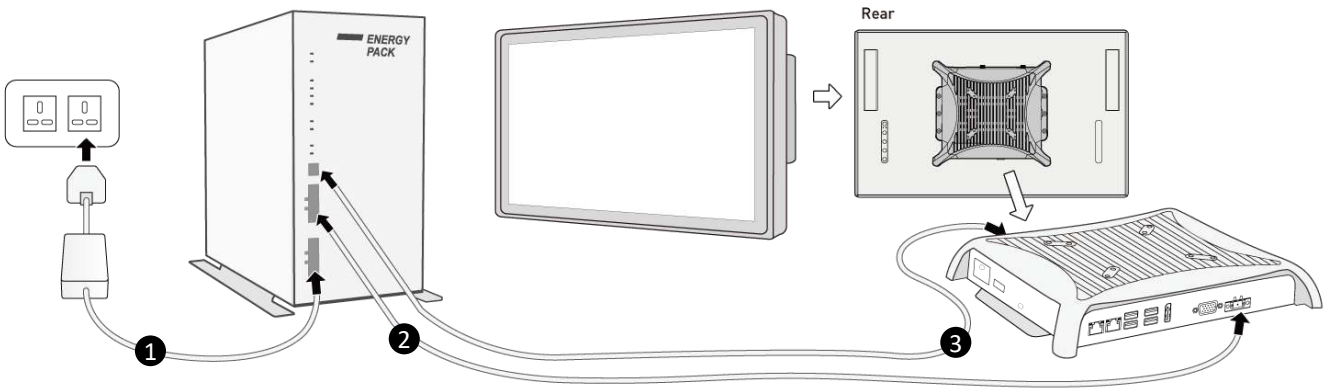
Lock the wall din rail mount kit with 8 screws

Chapter 4

Cable Routing Guide

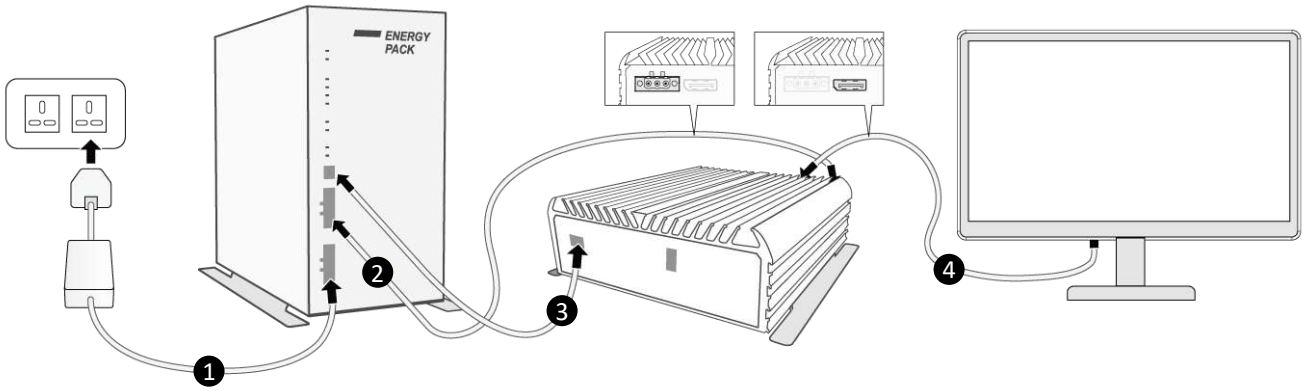
4.1 Normal Backup Mode

4.1.1 ECO-1000 → VIO-W224R/PC400



No.	item	No.	item
1	Power Adapter Cable	2	DC OUT Power Cable
3	Power Switch Cable		

4.1.2 ECO-1000 → RCO-1000-EHL → Display



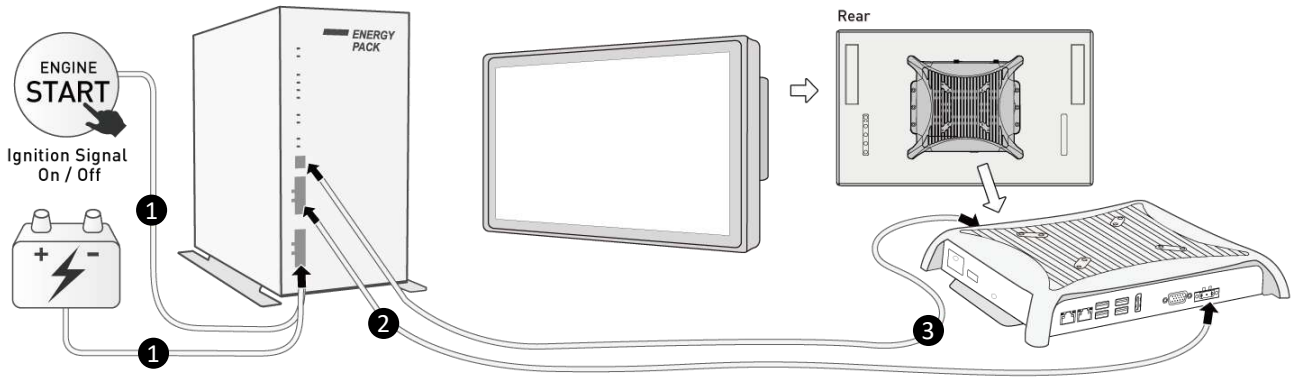
No.	item	No.	item
1	Power Adapter Cable	2	DC OUT Power Cable
3	Power Switch Cable	4	DP Cable

More references (Download)

- ECO-1000 → RCO-1000-EHL → VIO-W224R/MX200
- ECO-1000 → SIO-W224R
- ECO-1000 → RCO-3000-CFL → Display
- ECO-1000 → RCO-6000-CML → Display

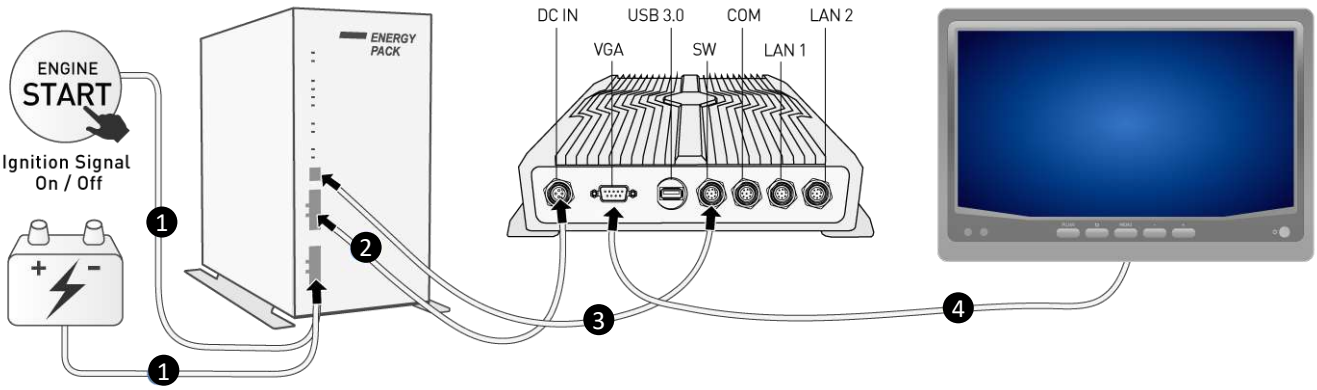
4.2 Ignition Control Mode

4.2.1 ECO-1000 → VIO-W215R/PC400



No.	item	No.	item
1	Power with IGN signal Y Cable	2	DC OUT Power Cable
3	Power Switch Cable		

4.2.2 ECO-1000 → WCO-3400 → Display



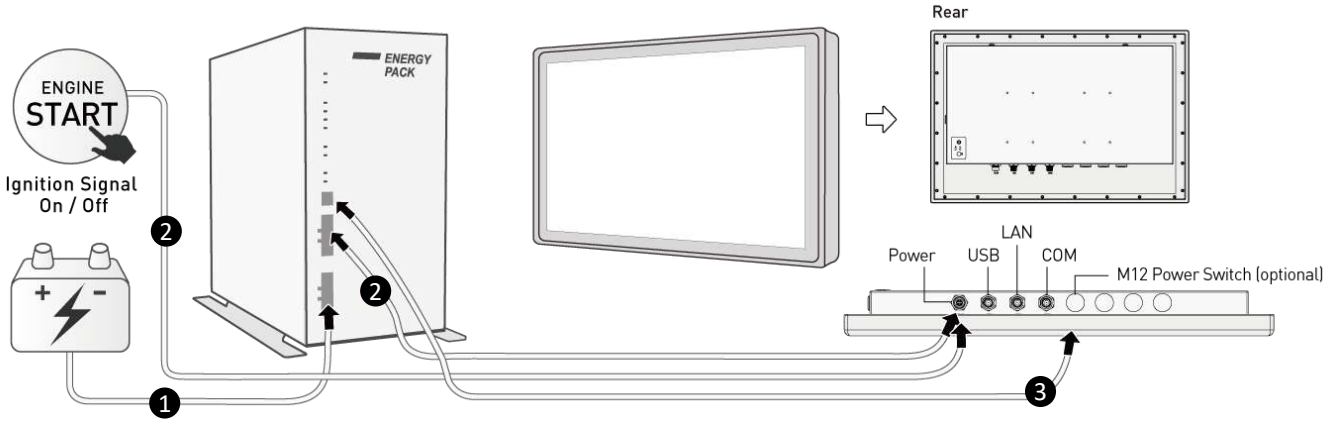
No.	item	No.	item
1	Power with IGN signal Y Cable	2	M12 Power Cable
3	M12 Power Switch Cable (Optional)	4	M12 VGA Cable

More references (Download)

- ECO-1000 → BCO-2000 → VIO-W215R/MX200
- ECO-1000 → SIO-W215R
- ECO-1000 → BCO-1000 → Display
- ECO-1000 → BCO-2000 → Display

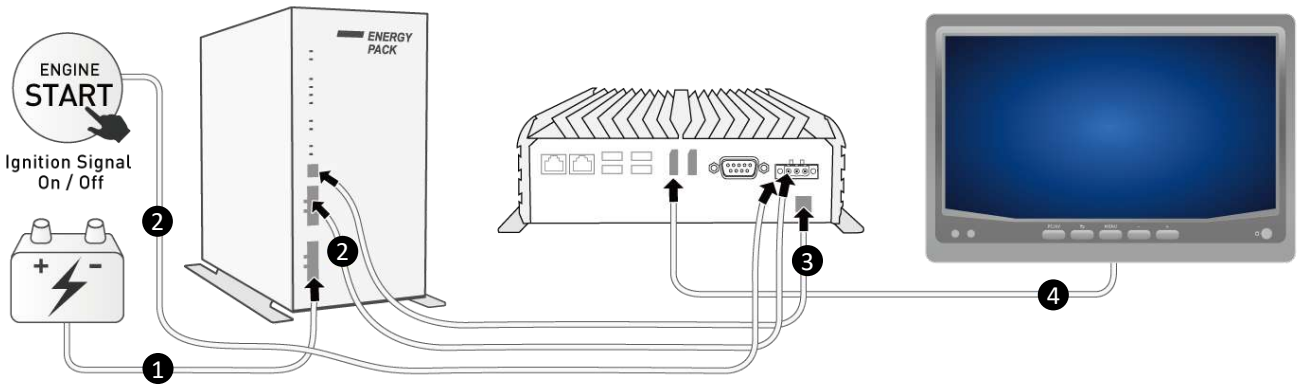
4.3 Battery Mode

4.3.1 ECO-1000 → SIO-W215R



No.	item	No.	item
1	Power Cable	2	M12 Power with IGN signal Y Cable
3	Power Switch Cable		

4.3.2 ECO-1000 → RCO-3400 → Display



No.	item	No.	item
1	Power Cable	2	DC OUT with IGN signal Y Cable
3	Power Switch Cable	4	DP Cable or VGA Cable

More references (Download)

- ECO-1000 → VIO-W215R/PC400
- ECO-1000 → WCO-3400 → Display
- ECO-1000 → RCO-1010G → Display
- ECO-1000 → ACO-6000-CML → Display

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