



NV14 Energy Storage System User Manual

(with optional NV24 additional battery capability)

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1 Safety Information

1.1 Symbols Used in Manual



WARNING: This indicates a fact or feature very important for the safety of the user to prevent injury or death and/or which can cause serious hardware damage if not applied appropriately.



CAUTION: Presents information to prevent damage to this product

1.2 General Safety Warnings



WARNING: Do not attempt to self-install the NV14 Energy Storage System. A qualified solar installation professional or electrician must install and commission NeoVolta energy equipment. Contact NeoVolta for a list of Authorized installers in your region.



SHOCK RISK: HIGH VOLTAGE ELECTRICITY



WARNING: Before installing the NV14 Energy Storage System, read all instructions and caution markings in this guide and installation manual.



WARNING: Electrical installation in the United States shall be done in accordance with all local electrical codes and/or the National Electrical Code (NEC), ANSI/NFPA 70.



WARNING: Connecting the NV14 Energy Storage System to the electric utility grid must only be done after receiving prior approval from the utility company and installation completed only by qualified personnel/licensed electrician(s).



WARNING: This equipment is NOT intended for use with life support equipment or other medical equipment or devices.



WARNING: For continued protection against risk of fire, replace any fuses only with same type and rating.

1.3 Safety Instructions

This chapter contains important safety and operating instructions. Read and keep this manual for future reference.



CAUTION: Before using the NV14 Energy Storage System, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.



WARNING: Do not disassemble the NV14 Energy Storage System. If you need maintenance or repair, contact an authorized NeoVolta service dealer. Improper reassembly may result in electric shock or fire.



WARNING: To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning.



CAUTION: Strictly follow installation procedure when you want to disconnect AC or DC terminals. Refer to Installation section of this manual for the details



WARNING: The NV14 Energy Storage System must be connected to a permanent grounded wiring system.



CAUTION: Disconnect all smart batteries and set them to 'sleep mode' before servicing the inverter or touching electrical terminals. Refer to smart battery documentation for complete safety instructions.



CAUTION: Be very careful when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts. Additionally, risk of battery explosion is possible.



or

WARNING: PV modules pass direct current (DC) when the module is under load. Direct current will arc across gaps and may cause injury or death if improper connection or disconnection is made. Do not connect disconnect wires to the NV14 Energy Storage System

when current from the modules or an external source is present.

2 Product Description

2.1 Product Overview

This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. The NV14 is a fully sealed storage system and has no serviceable for the homeowner.

2.2 System Architecture

The following shows the basic architecture of the NV14 Energy Storage System with the various devices that are acceptable interfaces to the system (Figure 1). It is the responsibility of the authorized installer to determine the specific devices and interface requirements at each location.

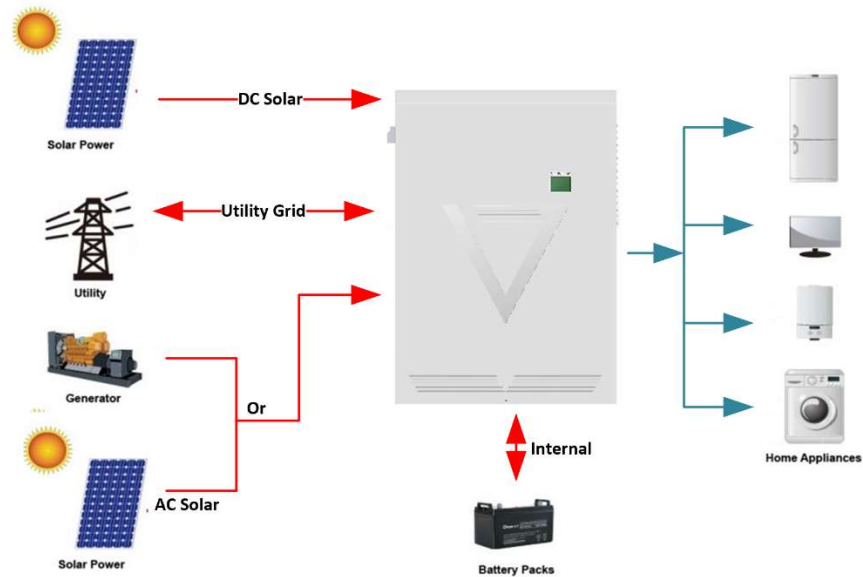


Figure 1

3 Installation Requirements

3.1 Site Location and Prep

The NV14 Energy Storage System can be installed indoors, such as a garage, or outdoors mounted using a concrete or pre-formed pad. The cabinet is a NEMA 3R rated cabinet suitable for outdoor use.

3.1.1 Cabinet Dimensions

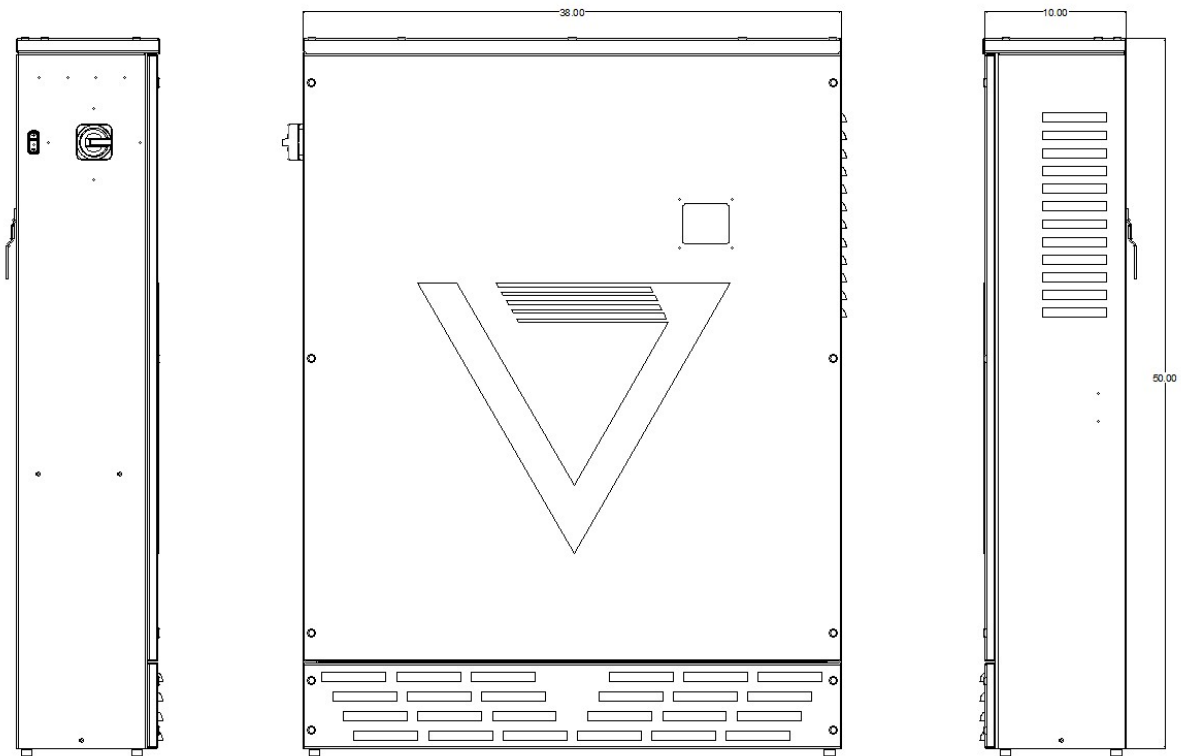


Figure 2

3.1.2 Clearance Requirements

The NV14 Energy Storage System requires clearance for cooling and service access. The cabinet must be installed with 2" clearance on right side, 6" on SW1 switch side and 36" clearance to the front. There is no vertical clearance requirement other than not to use the top as a shelf for storage (either temporary or permanent).

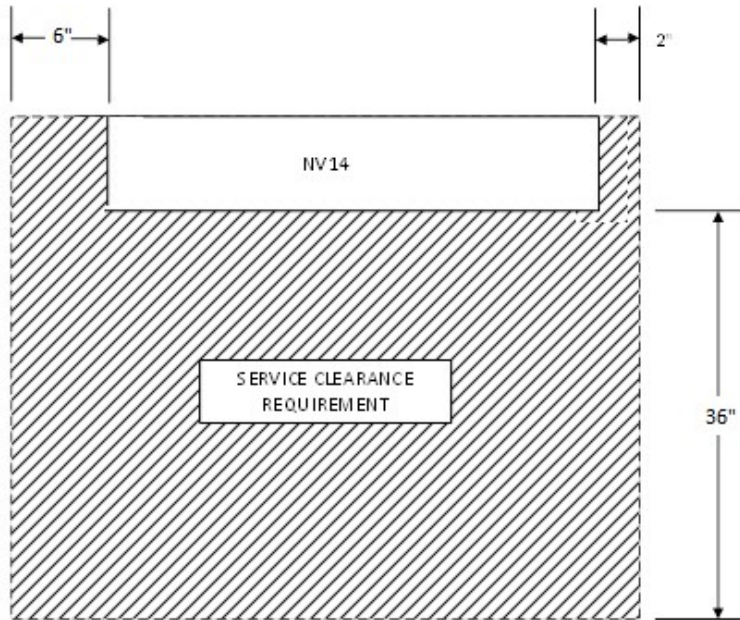


Figure 3

3.1.3 Critical Load Box

All installs must have a critical load box installed that consists of the basic loads needed in case of utility grid failure or power loss. The NV14 will provide power to the critical load box. All neutral wires for each critical load box breaker must be isolated from the main service panel and installed on the critical load box neutral bar. The critical load box neutral bar must be wired to the NV14 Output Load Neutral terminal block.



WARNING: Electrical installation in the United States shall be done in accordance with all local electrical codes and/or the National Electrical Code (NEC), ANSI/NFPA 70.



WARNING: Failure to install critical load box correctly could result in poor power quality (such as flickering lights) and possibly unsafe ground loops.

3.1.3.1 Critical Load Box Circuits

It is not possible to detail all possible loads that must be removed from the main service panel and installed on the critical load box. But some of the general guidelines to follow are:

- All lighting circuits
- All 120V receptacle circuits (this should include refrigerator outlet)
- Any Low Power or Low Use circuits needed under emergency conditions

Do not include non-essential circuits that could drain batteries quickly such as:

- Air Conditioner
- Electric Dryer
- Electric Water Heater
- Pool and/or Jacuzzi
- 240V Electric Vehicle Charger



WARNING: When moving breakers to critical load box, do not split multi-wire circuits that share the same neutral. Either move both breakers with a shared neutral to the critical load box or do not move either one. Never move one breaker of a multi-wire circuit and not the other. Unsafe ground loops could occur.

3.1.4 Indoor Location Preparation

The NV14 Energy Storage System must be installed on a rigid, flat level surface capable of supporting the full weight of the cabinet. If installed inside a garage, it may be necessary to raise the NV14 above the garage concrete sill to allow the NV14 to be placed flush against the garage wall. If a raised platform is used, it must be a level and sturdy enough to support the full weight of the NV14 (575lbs). The raised platform must extend beyond the NV14 cabinet by 3” on both sides and front (See figure 4).

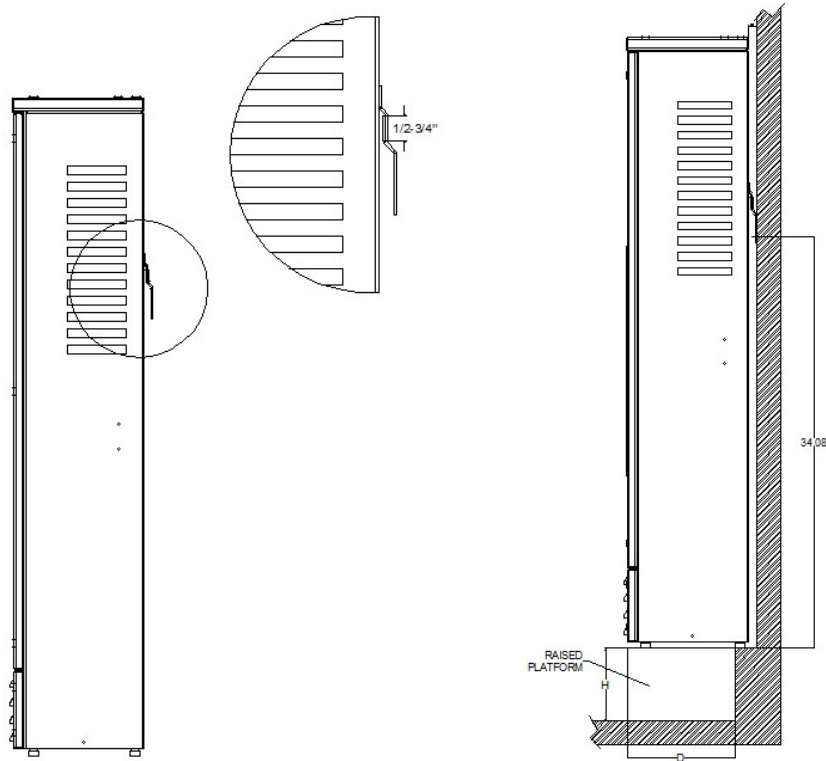


Figure 4

3.1.5 Outdoor Location Preparation

The NV14 Energy Storage System may be installed in an outdoor location against a wall – preferably under an eave. The NV14 Energy Storage System must not be installed on a south-facing wall if routinely over 120° F to prevent possible overheating and a shortened battery life. If installed outside on south facing wall and ambient temperatures are routinely over 120° F, then shade the NV14 Energy Storage System.

The NV14 Energy Storage System must be installed on a rigid, flat level surface capable of supporting the full weight of the cabinet. A concrete surface or pre-cast concrete pad is highly recommended. If using a pre-cast pad, the pad must be a minimum of 4” thick and overhang the cabinet by 3” on both sides and front.

Note: The NV14 Energy Storage System shall not be installed outside if above 2,500 ft in elevation or if more than two consecutive nights of below freezing temperatures, battery won’t charge until it warms up, which can take a while.

3.1.6 Securing the NV14

The NV14 Energy Storage System must be installed using the wall mounting brackets and hardware provided. The wall mounting brackets must be anchored to a minimum of two (2) vertical wall studs (See figure 5). 3/8" x 2 1/2" lag bolts with washers must be used to mount the wall mounting bracket to the vertical studs.

Position the Wall Mounting Bracket so that the top of the upper lip is approximately 1/2"-3/4" higher than the cabinet mounting bracket lower lip (See figure 6). The cabinet is equipped with leveling feet for minor height adjustments as needed. A leveling foot adjustment tool is provided.

When an adequate installation site has been prepared, position the NV14 Energy Storage System cabinet in place against the wall. Lift the cabinet up a few inches to clear the wall mounting bracket. Lower the cabinet so that the cabinet mounting bracket mates with the wall mounting bracket. Adjust the leveling feet as needed to ensure that all four (4) leveling feet are touching the floor or concrete slab.



CAUTION: All four leveling feet must be firmly on the surface. Do not 'hang' the cabinet solely from the wall mounting bracket.

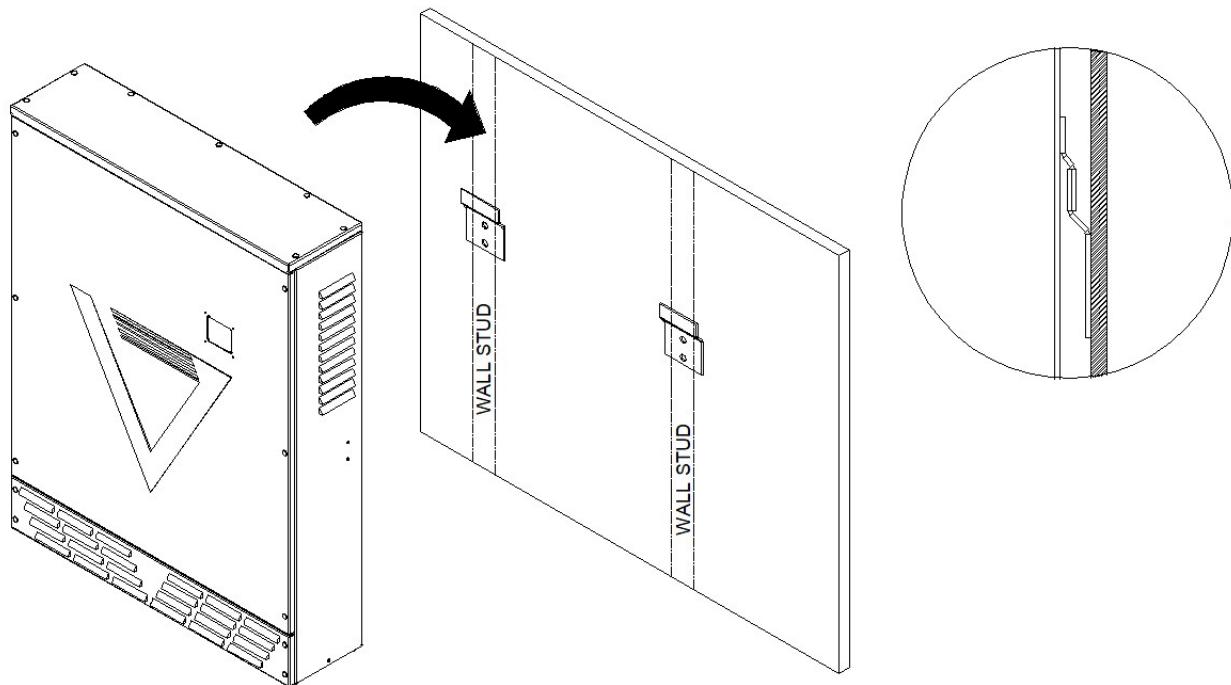


Figure 5

3.2 Optional Battery Cabinet Installation

3.2.1 Site Location and Prep

The NV24 Optional Battery Cabinet can be installed indoors, such as a garage, or outdoors mounted using a concrete or pre-formed pad. The cabinet is a NEMA 3R rated cabinet suitable for outdoor use.

3.2.2 Battery Cabinet Dimensions

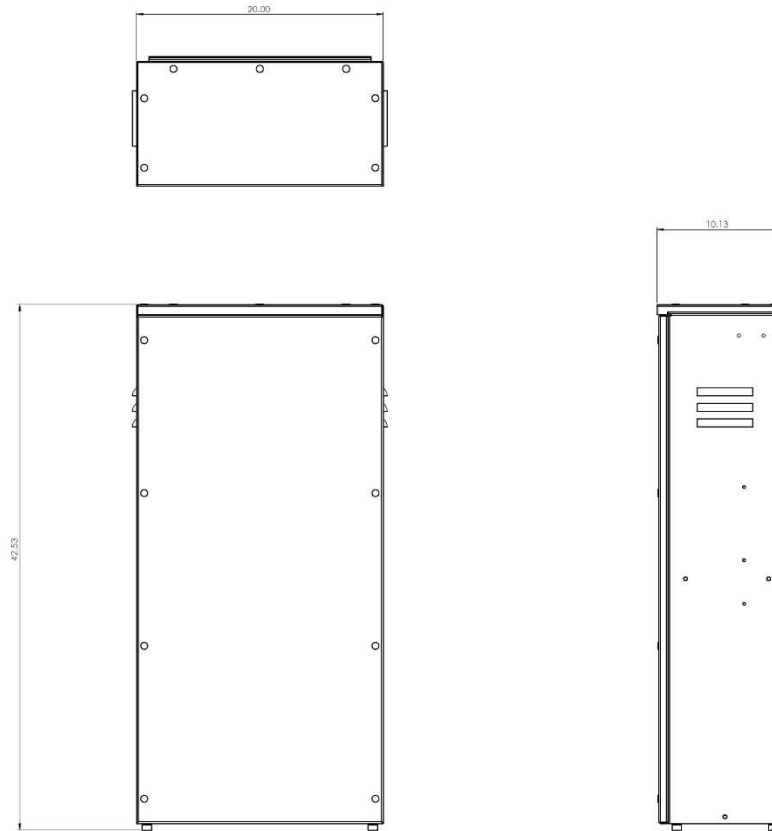


Figure 6

3.2.3 Location Preparation and Securing the Optional Battery Cabinet

The NV24 Optional Battery Cabinet must be installed in a similar fashion as the NV14. Refer to Sections 3 through 3.1.6.

The NV24 Optional Battery Cabinet must be installed using the wall mounting bracket and hardware provided. The wall mounting brackets must be anchored to a vertical wall studs similar to the installation of the NV14 (See figure 6). 3/8" x 2 1/2" lag bolts with washers must be used to mount the wall mounting bracket to the vertical studs.

The NV24 Optional Battery Cabinet has four (4) conduit landing locations identified by 1/4" diameter indentations in the top right side and top left side of the enclosure (refer to Figure 8). It is the responsibility of the installer to determine the best location to punch for conduit knockouts.

4 System Settings

All system settings are performed on the internal inverter at the LCD screen. The LCD screen is accessible by removing the front cover.



WARNING: Only a NeoVolta authorized installer is allowed to configure or adjust the system settings. Contact NeoVolta for a list of Authorized installers in your region.

All system settings are passcode protected. An authorized NeoVolta installer has the passcode and can adjust the system settings.

The following sections describe the available NV14 Energy Storage System settings, the functional behavior, and the factory default settings.

Homeowner Responsibilities

4.1 Wireless Access

The homeowner is responsible to maintain a wireless access point (i.e. wireless router) that is capable of 2.5GHz settings. This is to allow for the installation and communication of the WiFi data logger through the Solarman App.

4.2 NV14 Use and Care

The homeowner is responsible to ensure that adequate clearance is provided for the NV14 at all times. Clearance requirements are listed in Section 3.1.2

It is important that the top of the NV14 is not used for a shelf (either temporary or permanently). It is acceptable to install shelving above the NV14 provided nothing rests on top of the NV14.

The homeowner is responsible to ensure that no external damage is done to the NV14 enclosure. If the enclosure is damaged (i.e. large dents, broken sight window, etc.), it is imperative that NeoVolta Service is called. The primary service contact is the installer for all service-related issues.

4.3 Service and Warranty

The NV14 has no serviceable parts for the homeowner. Removing any panels at anytime could result in serious injury or death. Removing any panel will void the warranty. A separate warranty is provided upon payment of system and should be kept in a safe place for future reference.

4.4 Operation and Display Panel

The Operation and Display Panel consists of four (4) indicators across the top, four (4) function keys at the bottom, and an LCD display that indicates the operating status and the input/output power information (Figure 7).

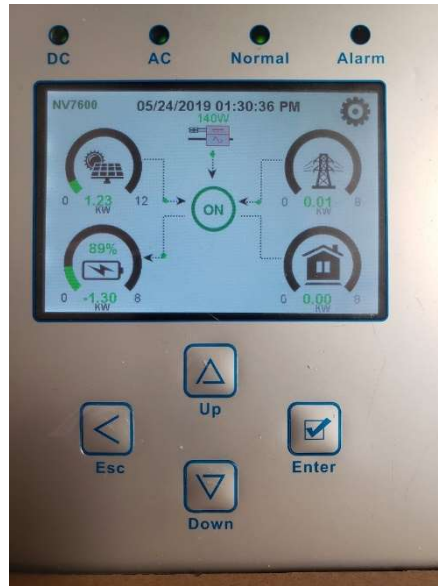


Figure 7

Table 1, shown below, lists the indicator LED status. Table 2, shown below, lists the function key action.

Table 1

LED Indicator		Status
DC	Green LED Solid Light	PV Connection Normal
AC	Green LED Solid Light	Grid Connection Normal
Normal	Green LED Solid Light	Inverter Operating Normal
Alarm	Red LED Solid Light	Malfunction or Warning

Table 2

Function Key	Action
Esc	Exit setting mode
Up	Go to previous selection or increase value of selected box
Down	Go to next selection or decrease value of selected box
Enter	Confirm selection or save screen values before exiting

4.5 LCD Display Icons

4.5.1 Main Screen

The LCD Main Screen is a touchscreen display. The image below, Figure 8, shows the overall information of the NV14 Energy Storage System.

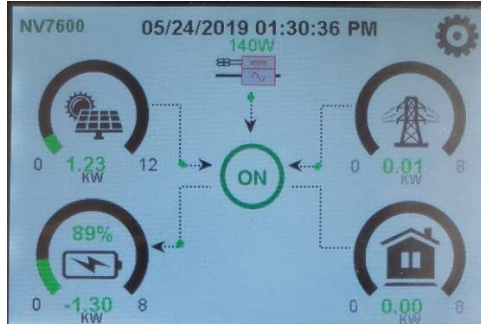






Figure 8


4.5.1.1 Features of the Main Screen


 06150001 Indicates system operating normally. If it displays a red “X” then the system has an error. An error code will display underneath the icon. Refer to Appendix for error codes. If the icon is an “up” green arrow, the firmware is being upgraded.

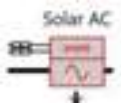
 System Setup Icon. Pressing this to enter into the system setup screen which includes Basic Setup, Battery Setup, Grid Setup, System Alarms and Li-Batt info. An alternate method to enter System Setup is to press the ‘Enter’ button.

 PV Power, DC. Value shown for illustrative purposes only. Arrows always shown flowing away from icon indicating DC PV Solar providing power to NV14 Energy Storage System. Power value shown is always positive.

 Battery Power and Charge level. Values shown for illustrative purposes only. When arrows shown flowing away from icon, it indicates batteries are providing power to NV14 Energy Storage System and power value is positive. When arrows shown flowing into icon, it indicates batteries are being charged and power value is negative.

 Grid Power. Values shown for illustrative purposes only. When arrows shown flowing away from icon, it indicates utility is providing power to NV14 Energy Storage System and power value is positive. When arrows shown flowing into icon, it indicates the system is selling to the main service panel and/or grid. Power value is negative.

 Load Power. Value shown for illustrative purposes only. Arrows always shown flowing into icon indicating NV14 Energy Storage System is providing power to loads.

 Solar AC (String or Micro inverter). Value shown for illustrative purposes only. Arrows always shown flowing away from icon indicating AC PV Solar providing power to NV14 Energy Storage System. Power value shown is always positive. This icon may show small 5-20 watts of current flow even when the sun is not out as this value reflects the NV14 safe grid signal.

5 Specifications

SOURCE	SPECIFICATION	UNITS	VALUE
UTILITY	Voltage	VAC	120/240 Split phase
	Current	AAC	32A
	Frequency	Hz	57.0 – 62.0
	Circuit Protection	--	40A 2-pole circuit breaker
PV1, DC	Voltage	VDC	370 (range 100-500)
	Current	ADC	18A
	Power	W	7680
	Circuit Protection	--	15A Fuse (x2)
PV2, DC	Voltage	VDC	370 (range (100-00)
	Current	ADC	18A
	Power	W	7680
	Circuit Protection	--	15A Fuse (x2)
PV, AC (GENERATOR OPTIONAL)	Voltage	VAC	240
	Current	AAC	32A
	Frequency	Hz	57.0 – 62.0
	Circuit Protection	--	50A 2-pole circuit breaker
BATTERY PACK, CHARGING	Voltage	VDC	
	Current, nominal	ADC	60
	Current, max	ADC	100
	Capacity	Ah	300
	Type	--	Li-Fe-PO4
	Protection (+)	--	125A, 80VDC Fuse
BATTERY PACK, DISCHARGE	Voltage	VDC	42-58, 48 nominal
	Current, nominal	ADC	60
	Current, max	ADC	100
	Capacity	Ah	300
	Type	--	Li-Fe-PO4
	Protection (+)	--	125A, 80VDC Fuse
OUTPUT	Voltage	VAC	120/240 Split phase
	Current	AAC	32A
	Frequency	Hz	57.0 – 62.0
	Circuit Protection	--	50A 2-pole circuit breaker
ENVIRONMENT	Enclosure Rating	--	NEMA 3R
	Dimensions	in (mm)	50H x 38W x 10D (1270 x 965 x 25)
	Temperature, Min	C (°F)	-25 (-13)
	Temperature, Max	C (°F)	60 (140), derating >45C (113)
	Weight	lbs (kg)	575 (260)
COMPLIANCE	NV14		CAN/UL-9540:2016
	Inverter, NV7600		UL1741, IEEE1547, FCC 15 Class B, UL1699B
	Battery	Ah	UL1741, IEEE1547-2003, FCC 15 CLASS B, UL1699B

6 Technical Reference

	SPECIFICATION	UNITS	VALUE
TORQUE	Utility Input, CB1	In-lb	25
	Utility Input, TB1	In-lb	25
	PV, DC Input, F1-F4	In-lb	25
	PV, DC Input, TB4-TB5	In-lb	25
	PV, AC Input, CB2	In-lb	25
	PV, AC Input, TB2	In-lb	25
	Output, CB3	In-lb	25
	Output, TB3	In-lb	25
	Ground Bar, TB6	In-lb	25
WIRE SIZES	Utility Input	--	8 AWG Cu, 75C, 600V
	PV, DC Input	--	8 AWG Cu, 75C, 600V
	PV, AC Input	--	8 AWG Cu, 75C, 600V
	Output	--	8 AWG Cu, 75C, 600V
	Ground	--	8 AWG Cu, 75C, 600V
FUSES	PV, DC Input	--	15A, 600VDC, Littelfuse SPF or UL listed equivalent
	Battery	--	125A, 80VDC, Littelfuse CNN_E or UL listed equivalent

7 Contact Information

For all service installation questions, please contact NeoVolta Technical Support

Phone: (858) 226-4936

Hours: Mon-Fri, 8am-5pm Pacific