



TAKE CHARGE

Universal Retrofit and New ESS Systems



POWERED BY

LithiumLife

TECHNOLOGY



H HUMLESS

HUMLESS UNIVERSAL

Residential & Commercial Energy Storage System

OFF-GRID AND ON-GRID READY

Humless Universal is one of the most advanced intelligent Energy Storage Systems (ESS) available on the market today. The Humless Universal Power System utilizes the same technology found in full commercial mini-grid systems to create a smart and highly versatile ESS. Some of our standard features are:

- Stackable & parallelable capacities
- Multiple storage options on same device
- Full generator management system
- Real-time weather algorithm to optimize your storage capacity
- Variable sell back capacity for PV and battery storage
- Load shifting & time of use control
- PV self-consumption
- Intelligent & dynamic load management on multiple outputs
- Integration capacity with other home and building management systems (*Additional module required*)

RETROFIT TO ANY HOME WITH SOLAR

Our intelligent system can run any grid-tied inverter system. This system will keep your solar panels fully operational even when there is no input from the grid! At Humless we take the complexity out of energy storage.





kWh	Essentials Load	Cycle Life	Size
5-200	10-430 hours	4,000+	66" x 30" x 9" (up to 30 kWh)

- Nano-Printed Lithium Storage
- High Efficiency 4 / 7 / 8.5 kVA (3.8 / 5.5 / 6.8 kW) Inverters Per Unit (Stackable)
- Battery Management System
- 60-150 Amp MPPT Charge Controller (Stackable)
- LCD Display & Remote Monitoring
- UPS
- AC and DC Inputs
- Dedicated Generator Input
- 120 – 240 VAC / 3 Inverter / 3 Phase AC



POWERED BY
LithiumLife
 TECHNOLOGY

ESSENTIALS LOAD
456 watts/hr

	4 LED Lights 10 x 4 = 40 w/hr		1 Refrigerator 100* w/hr		2 Smart phones 21 w/hr		Entertainment LED TV/Modem/Router/Console 295 w/hr
---	----------------------------------	---	-----------------------------	---	---------------------------	---	--

*Watts needed to maintain operating temperatures, averaged over a 24 hr period.

COMPARISON CHART

Compare the industry leaders



Humless Universal

Sonnen Eco 6

LG Chem

Tesla Powerwall 2

	Humless Universal	Sonnen Eco 6	LG Chem	Tesla Powerwall 2
Battery Bank	5-200 kWh	6 kWh	9.8 kWh	13 kWh
Battery Type	Lithium Polymer	Lithium Iron Phosphate	Lithium	Lithium Ion
Inverter Continuous	Up to 6.8 kW	4 kW	Inverter Not Included	5 kW
Inverter Peak	13.6 kW	n/a	Additional Purchase	7 kW
Charge Controller	60-150 Amp	n/a	Additional Purchase	Additional Purchase
AC Out	Yes	Yes	Additional Purchase	Yes
AC In	Yes	Yes	Additional Purchase	Additional Purchase
DC In	Yes	Yes	Additional Purchase	Additional Purchase
Dedicated Generator In	Yes	No	No	No
Integrated Generator Management System	Yes	No	No	No
On Grid	Yes	Yes	Yes	Yes
Off Grid	Yes	Yes	Yes	No
Universal Retrofit	Yes	No	No	No
Net Metering	Yes	No	No	Yes
Power Shaving	Yes	No	No	No
Load Shifting	Yes	No	No	No
Availability	Yes	Yes	4+ Months	Wait List (12+ months)
Battery Warranty	10 years	10 years	10 years	10 years
Additional Parts	\$0	\$0	\$2,000 - \$3,000	\$700

4 HOUR INSTALL*

Flexible and stackable parallel systems!

Prepare

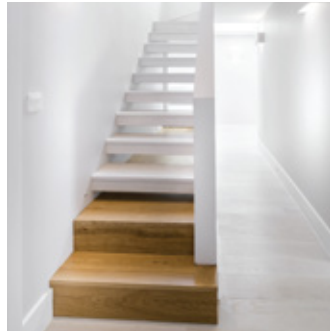


Pre-plan

Work with a certified electrician to pick an ideal location and determine what specific electrical needs you may have.

- Determine what will be powered
- Choose battery & inverter size
- Pick a location
 - Temperate & dry (32°-100°)
 - Close to electrical box
 - Easy access for install
- Install all panels, breakers, and necessary wiring
(Only use certified electricians)

Step 1



Clear a path

Clear a pathway from the truck to the installation spot. Make sure there is proper clearance through door ways, down stairs, and around corners.

- Electrical panels and wiring have been installed and are ready for set-up
- Install site is clear
- Entire path from truck to install site is free of obstacles & hazards

Step 2



Place Humless

This is the most labor intensive part of the install. Plan for strong helpers to do the heavy lifting. We suggest 2-4 people when lifting the Humless Universal.

- Locate studs
- Secure wall mounts
- Install & level the Humless System

Step 3



Wire it up!**

Now comes the easy part. Simply connect the input and output cables. Once that is complete test the system and ensure everything is working.

- Inputs are connected
- Outputs are connected
- System has been verified and tested

NOTE: Only use a certified electrician for installation** of Humless devices.

Consulting with the electrician

There are a few things that the electrician will need to know about the Humless before they get started. The Humless has built-in **AC and DC charge** controllers along with an **inverter** and **battery management system**.

*Average time for set-up. Does not include the time an electrician will spend consulting and preparing the home's electrical systems for installation.

**Warranty is null and void if installation is not performed by a certified electrician.



HUMLESS™

TAKE CHARGE

Enjoy power independence and security





H HUMLESS

WATTS GUIDE

References for common appliances

ESSENTIALS	Running Watts	Starting Watts
Light Bulbs - 40 W / 60 W / 75 W	40 / 60 / 75	-
LED Bulbs - 450 lm / 800 lm / 1100 lm	9 / 12 / 13	-
CPAP Machine	40-300	400-2000
Refrigerator/Freezer	100*	2200
Radio	200	-
Security System	500	-
LED TV / Modem / WiFi Router	150 / 35 / 10	-
Sump Pump - 1/3 HP	800	1300
Sump Pump - 1/2 HP	1050	2200

HEATING & COOLING	Running Watts	Starting Watts
Ceiling Fan	55-100	-
Humidifier - 13 gal	175	-
Box Fan	200	-
Space Heater	1,800	-
Heat Pump	4,700	4,500
Furnace Fan Blower - 1/2 HP	700	1,400
Furnace Fan Blower - 1/3 HP	800	2,350
Window AC - 10,000 BTU	1,200	1,800
Window AC - 12,000 BTU	3,250	3,950
Central AC - 10,000 BTU	1,500	3,000
Central AC - 24,000 BTU	3,800	4,950
Central AC - 40,000 BTU	6,000	6,700

LAUNDRY ROOM	Running Watts	Starting Watts
Clothes Dryer - Gas	700	1,800
Washing Machine	1,150	2,250
Clothes Iron	1,200	-
Clothes Dryer - Electric	5,400	1,350

PERSONAL	Running Watts	Starting Watts
Electric Shaver	20	-
Hair Clipper	25 - 100	-
Hair Dryer - 1250 W	1,250	-
Curling Iron	1,500	-

KITCHEN	Running Watts	Starting Watts
Slow Cooker - Low / High	70 / 250	-
Electric Can Opener	168	-
Rice Cooker	250	-
Food Processor	400	-
Toaster	850	-
Microwave Oven - 625 W / 1,000 W	625 / 1,000	-
Coffee Maker	1,000	-
Toaster Oven	1,200	-
Dishwasher - Hot Dry	1,500	1,500
Electric Stove - 8" Element	2,100	-

ELECTRONICS	Running Watts	Starting Watts
Streaming Devices	2 - 10	-
Smart Phone / Tablets	5 - 20	-
Blu-ray Player	10 - 20	-
Laptop	20 - 100	-
20" Computer Monitor - LED / LCD / CRT	24 / 26 / 90	-
Game Console	40 - 200	-
Inkjet Printer / Laser Printer	50 / 950	-
Desktop Computer	100 - 450	-
Stereo Receiver	450	-
1/2 HP Garage Door Opener	875	2350

POWER TOOLS	Running Watts	Starting Watts
Quartz Halogen Work Light, 300	300	-
Electric Drill - 3/8" (4 Amps)	440	600
Reciprocating Saw	960	-
Electric Drill - 1/2" (5.4 Amps)	600	900
Airless Sprayer - 1/3 HP	600	1,200
Air Compressor - 1/4 HP	975	1,600
Hammer Drill	1,000	4,000
Belt Sander	1,200	2,400
Circular Saw - 7 1/4"	1,400	2,300
Miter Saw - 10"	1,800	1,800
Planer/Joiner - 6"	1,800	1,800
Table Saw/Radial Arm Saw - 10"	2,000	2,000

This guide is for reference only. Product watts will vary depending on make & model. Check individual product specifications for accurate watts usage.

*Needed watts to maintain temperature once operating temperature has been reached (averaged over a 24 hour period).

WATTS WORKSHEET

Determine your needs

Step 1

Watt Needs

Select the items you wish to power. Fill in the running watts & additional starting watt requirements in the proper columns.

(See the next page for a reference guide of common household appliance watts)

Step 2

Running Watts Needs

Add up all the Running Watts for the items you wish to power and write that in the Total Running Watts box.

Step 3

Highest Starting Watts

Find the item with the highest number of starting watts and write this number in the Highest Starting Watts box.

Step 4

Peak

Add the Total Running Watts and Highest Starting Watts together to find the Peak Output Power.

EXAMPLE

Appliances	Running Watts	Starting Watts
1. Humless Inverter*	15	0
2. Refrigerator/Freezer	100	2,200
3. 1/2 HP furnace fan	700	1,400
4. Laptop	30	0
5. LED Television	150	0
6. Lights (4 x 13 Watts)	52	0
7.	-	-
	1,047	2,200
	Total Running Watts	Highest Starting Watts

*When converting stored, AC electricity to usable DC electricity, an inverter must be used. The Humless inverter uses on average 15 watts per hour. It's important to take this into consideration when calculating your watt needs.

MY NEEDS

Appliances	Running Watts	Starting Watts
1. Humless Inverter*	15	0
2.		
3.		
4.		
5.		
6.		
7.		
	Total Running Watts	Highest Starting Watts

$$\begin{array}{c}
 \mathbf{1,047} \\
 \text{Total Running} \\
 \text{Watts/Hour}
 \end{array}
 +
 \begin{array}{c}
 \mathbf{2,200} \\
 \text{Highest Starting} \\
 \text{Watts}
 \end{array}
 =
 \begin{array}{c}
 \mathbf{3,247} \\
 \text{Peak Output} \\
 \text{Power (Watts)}
 \end{array}$$

$$\begin{array}{c}
 \text{Total Running} \\
 \text{Watts/Hour}
 \end{array}
 +
 \begin{array}{c}
 \text{Highest Starting} \\
 \text{Watts}
 \end{array}
 =
 \begin{array}{c}
 \text{Peak Output} \\
 \text{Power (Watts)}
 \end{array}$$

	Battery Size	Max Output	Max Peak Output
HUMLESS UNIVERSAL 4	5-120 kWh	4,000 Watts	8,000 Watts
HUMLESS UNIVERSAL 7	10-200 kWh	7,000 Watts	14,000 Watts
HUMLESS UNIVERSAL 8.5	10-200 kWh	8,500 Watts	17,000 Watts

FREQUENTLY ASKED QUESTIONS

How many watts does it take to power basic items in an average size house?

In a typical home, essential items will average between 700 - 5,000 Watts of power each hour.

Why is only one additional starting watt item used to calculate the peak output power requirement?

Unlike running watts, starting watts are only needed during the first few seconds of operation. In most cases, only one item will start or cycle at the same time; therefore this is the most accurate estimate.

What if I can't find the starting watt requirement for a tool or appliance?

Most motor-driven and devices with a power supply will have an additional starting watt requirement. Estimate starting watts at 2X the running watts.

What is the difference between running watts & starting watts?

Running watts are the continuous watts needed to keep items running. Starting watts are extra watts needed for two to three seconds to start motor-driven products like a refrigerator or circular saw, or devices that have a power supply.

WATTS TIPS

Get watt smart

HOW TO FIND WATTS?

Most devices have the Watts stated on the bottom of the device or printed in the user manual. In the event you can't find this information simply multiply the Amps by the Volts to calculate the Watts.

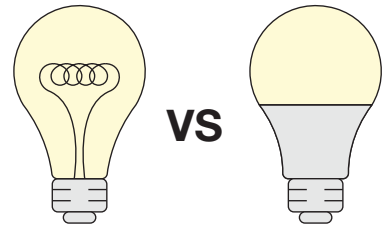
What happens if none of this information is provided on your device? You can purchase a device that monitors the electricity used by an appliance, for example the Kill-A-Watt Electricity Monitor.

These types of monitors are simple to use and inexpensive. All you need to do is plug the device you wish to test into the monitor, and the display will show what Watts are being used.



$$\begin{array}{c}
 \mathbf{A} \\
 \text{(Amps)}
 \end{array}
 \times
 \begin{array}{c}
 \mathbf{V} \\
 \text{(Volts)}
 \end{array}
 =
 \begin{array}{c}
 \mathbf{W} \\
 \text{(Watts)}
 \end{array}$$

LIGHT BULB COMPARISON



Incandescent

LED

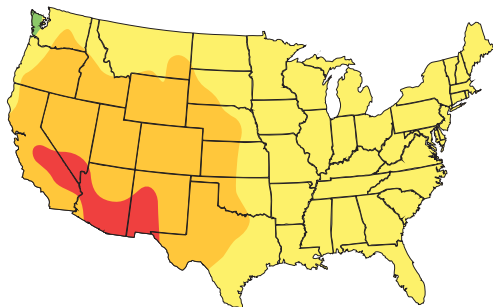
Lumens	Incandescent	LED
2,600 lm	150 W	25-28 W
1,600 lm	100 W	16-20 W
1,100 lm	75 W	9-13 W
800 lm	60 W	8-12 W
450 lm	40 W	6-9 W

KILOWATT HOURS PER DAY

Kilowatts Per Day ■ 0 - 2 ■ 2 - 3 ■ 3 - 4 ■ 4 - 5 ■ 5 - 6 ■ 6 - 7 ■ 7 - 8

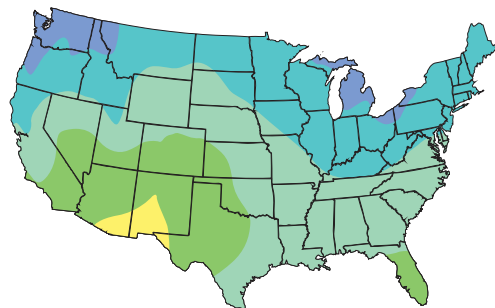
Average Daily Solar Radiation Per Month

JUNE



Average Daily Solar Radiation Per Month

DECEMBER



HUMLESS UNIVERSAL SPECS

5-200 kWh systems

SPECIFICATIONS

System Storage Capacity	5-200 kWh
System Work Model	On and Off-Grid Hybrid
UPS Function	Yes
Cycle life	4,000+ cycles (daily use ~10+ yrs)
Integrated systems	AC & DC controllers, inverter, and BMS
System efficiency	95.7% (>70% Load)

AC INPUT

Input Voltage	Yes	216-264 VAC
Input Frequency	59.3~60.5Hz (60Hz Default)	
Max Charge Power	140 Amps	
Max Efficiency	> 95.7%	
AC Voltage Range	216-264 VAC (60Hz Default)	

GENERATOR INPUT

Input Voltage	Yes	216-264 VAC
Input Frequency	59.3~60.5Hz (60Hz Default)	
Max Charge Power	10, 20 kWh	
Max Efficiency	> 93%	
AC Voltage Range	216-264 VAC (60Hz Default)	

AC OUTPUT

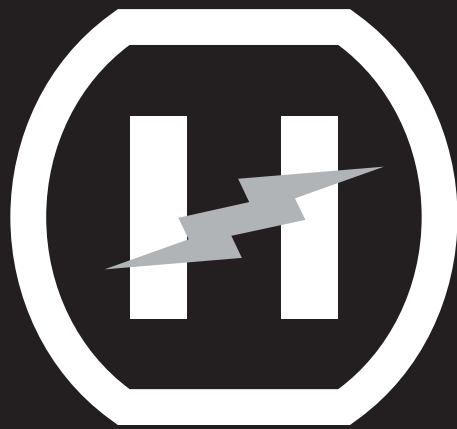
Nominal AC Output Power	4 kVA	7 kVA	8.5 kVA
Maximum AC Output Power	8 kVA	14 kVA	17 kVA
120V - Maximum Inverter Output Current (Nominal Inverter Voltage)	58 Amp	82 Amp	102 Amp
240V - Maximum Inverter Output Current (Nominal Inverter Voltage)	29 Amp	41 Amp	52 Amp
Able to grid cell	No	Yes	Yes
AC Voltage (Nominal Inverter Voltage)	120 Vac / 240 Vac		
Nominal Frequency	50Hz / 60Hz		
Overload (8.5 kVA)	102 A (120 V); 52 A (240 V)		
Energy Consumption	Intelligent Control		
Maximum Efficiency	95.7%		

SOLAR PV INPUT DC COUPLED PER MPPT

Maximum Input Power	AC coupled any / DC coupled 4 kW per MPPT
Start-up Voltage	45 V
MPPT Amount	1
MPPT Input Voltage	40~140V
MPPT Efficiency	94.7%
Maximum Input Voltage	150 VDC
Maximum Efficiency	> 95.7%
Solar Charging Model	MPPT

GENERAL

IP Protection	21
Connectivity	Cables Terminals
Communication	Monitoring
Using Conditions	Humidity: 5%-90%
Operating Temperatures	-13°F — 158°F
Warranty	5 Year Component / 10 Year Battery
Ventilation Location	Top and Side
Dimensions	36" x 30" x 9" (BMS) / 30" x 30" x 9" (Battery)
Gross Weight	Up to 170 lbs (78 Kg) / 300 lbs (136 Kg)
Safety	UL 1741; CSA 107.1; UL 1642; UN 38.3



HUMLESS™