

KISAE

**Home Solar 400 (HS 400)
Home Solar 800 (HS 800)
Home Backup 400 (HB 400)
Home Backup 800 (HB 800)**

Owner's Manual



For safe and optimum performance, the Home Solar or Home Backup unit must be used properly. Carefully read and follow all instructions and guidelines in this manual and give special attention to the **CAUTION** and **WARNING** statements.

PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE

Note: Because unit contains 2 large battery, upon purchasing, **immediately** charge unit for more than 48 hours through the utility, or through the DC Input Port (solar panel sold separately) for more than 72 hours depending on the availability of the sun light. To guarantee maximum device performance and life span, if the unit is not connected continuously to utility power or charge through the DC Input Port, it is recommended to charge the unit after *each* use and once every *90 days*.

Disclaimer

While every precaution has been taken to ensure the accuracy of the contents of this guide, **KISAE Technology** assumes no responsibility for errors or omissions. Note as well that specifications and product functionality may change without notice.

Important

Please be sure to read and save the entire manual before using your **KISAE Home Solar unit or Home Backup unit**. Misuse may result in damage to the unit and/or cause harm or serious injury. Read manual in its entirety before using the unit and save manual for future reference.

Product Number (KISAE Home Power System)

HS 400-00	KISAE Home Solar 400
HS 800-00	KISAE Home Solar 800
HB 400-00	KISAE Home Backup 400
HB 800-00	KISAE Home Backup 800
HB 400-03	KISAE Home Backup 400 LA
HB 800-03	KISAE Home Backup 800 LA

Document Part Number

MU HS400 rev 1.0

1. INTRODUCTION

Thank you for purchasing the **KISAE Home Solar unit** or **KISAE Home Backup unit**. With our state of the art, easy to use design, this product will offer you reliable service for providing a rechargeable power source for your home, cabin, or campsite. With its highly technical design and comprehensive features, the **KISAE Home Solar unit** or **KISAE Home Backup unit** will provide you with a simple yet effective system during power outage or use AC power everywhere when you need it.

For **KISAE Home Solar unit**, it can run many AC-powered appliances whenever you need power. The automatic transfer switch built inside means that it can switch seamlessly from household utility power to battery power or the solar power you generate from the sun.

NOTE: Upon purchasing, immediately charge unit through utility power for 48 hours or through the DC Input Port through solar panel (sold separately) for more than 72 hrs. To guarantee maximum device performance and life span, it is recommended to continuously connect the unit to utility power or solar panel to top up the internal battery or else to charge the unit after *each* use and once every *90 days*.

For **KISAE Home Backup unit**, it can run many AC-powered appliances whenever you need power. The automatic transfer switch built inside means that it can switch seamlessly from household utility power to battery power.

NOTE: Upon purchasing, immediately charge unit through utility power for 48. To guarantee maximum device performance and life span, it is recommended to continuously connect the unit to utility power to top up the internal battery or else to charge the unit after *each* use and once every *90 days*.

IMPORTANT SAFETY INFORMATION

This manual contains important safety information for unit. Each time, before using the unit, READ ALL instructions and cautionary markings on or provided with the system and all appropriate sections of this guide.

The unit contains no user-serviceable parts. See Warranty section for how to handle product issues.

FIRE AND/OR CHEMICAL BURN HAZARD

- Do not cover or obstruct any air vent openings and/or install in a zero-clearance compartment.
- Do not use the unit, if the unit is visibly leaking some type of liquid. It is possible that the internal battery has been damaged and battery acid may have spilled.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR SERIOUS INJURY

- When working with electrical equipment with lead acid batteries, have someone nearby in case of an emergency.
- Wear eye protection and gloves.
- Avoid touching your eyes while using this unit.
- Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, cleanse right away with soap and water for a minimum of 15 minutes and seek medical attention.
- Batteries produce explosive gases. **DO NOT** smoke or have an open spark or fire near the system.
- Keep unit away from moist or damp areas.
- Avoid dropping any metal tool or object on the battery. Doing so could create a spark or short circuit which goes through the battery or another electrical tool that may create an explosion.

WARNING: Shock Hazard. Keep away from children!

- Avoid moisture. Never expose unit to water.
- Unit provides 120 VAC from inverter or by pass utility power, treat the output sockets the same as regular wall AC sockets at home.

WARNING: Explosion hazard!

- DO NOT use the unit in the vicinity of flammable fumes or gases (such as propane tanks or large engines).
- AVOID covering the ventilation openings.
- Always operate unit in an open area.
- Prolonged contact to high heat or freezing temperatures will decrease the working life of the unit. Unit exposure to these elements may lead to cracking and decreased capacity of the internal battery.

FCC INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

LIMITATIONS ON USE

Do not use in connection with life support systems or other medical equipment or devices.

BATTERY RECYCLING

The unit is designed to provide years of service. However, the internal battery is not designed to be user replaceable.



Because the internal battery installed inside the battery box contains lead, which can be hazardous if exposed to the environment, the battery box should be recycled or safely disposed of at your local recycling depot. Do not dispose of the battery box with common household waste. Please ask your local authorities about recycling services that are available in your area.

2. PRODUCT DESCRIPTION

For **Home Solar 400 (HS400-00)** and **Home Solar 800 (HS800-00)**, package includes the items list below.

- Main unit (HS400-00 or HS 800-00)
- DC Input Cable
- AC Input Cable
- Owner's manual

For **Home Backup 400 or 400 LA (HB400-00 or -03)** and **Home Backup 800 or 800 LA (HB800-00 or -03)**, package includes the items list below.

- Main unit (HB 400-00 or 03 or HB 800-00 or -03)
- AC Input Cable
- Owner's manual



AC Input Cable



DC Input Cable
(not included on models
HB400-03 and HB800-03)



Solar panel sold separately for
used on Home Solar model

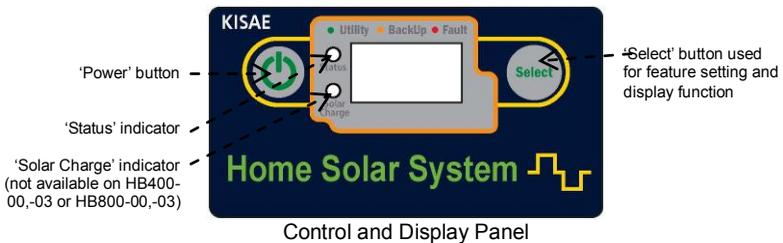
3. INSTALLATION

WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS CAN DAMAGE THE UNIT.

Before beginning your unit Installation, please consider the following:

- The unit should be used or stored in an indoor area away from direct sunlight, heat, moisture or conductive contaminants. The solar panel (sold separately for used on Home Solar unit) of course can be installed outdoors where the best access to sunlight occurs.
- When placing the unit, allow a minimum of three inches of space around the unit for optimal ventilation.
- Charge battery immediately upon purchasing this product.
- To ensure optimum battery run time and life expectancy, leave KISAE Home Solar continuously plugged into utility AC power and/or leave solar panel (sold separately for used on Home Solar unit) plugged into the unit to charge the internal battery.

Understanding the unit features



Main Unit Installation

IMPORTANT: The AC plug on the power supply cord is used as the disconnect device. The socket-outlet shall be installed near the equipment and shall be easily accessible for rapid disconnect.

To install the unit, connect the AC power cord (IEC end) to the back of the unit. Plug the other end of the AC input power cord directly into a wall outlet and unit is ready to use. Unit will automatically turn on.

- If the battery capacity is low, 'Status' indicator on display panel turns to flashing green and display shows battery capacity and the unit will automatically charge up the battery.
- If the battery is full, 'Status' indicator will turn to solid green and display show 'Full'
- Unplug the input power cord to simulate power failure and the indicator on display will turn amber indicating unit is running in backup power mode. AC output is now being provided from battery power.
- Reconnecting the AC power cord back to a wall outlet will switch unit back to standby mode and AC output is now being provided directly from utility power again.
- The unit is successfully installed and functioning properly.

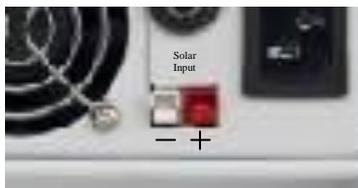
PV Solar Panel Installation: (Not available for Home Backup 400, 400LA (HB400-00,-03) & Home Backup 800, 800LA (HB800-00,-03))

For the system comes with a DC Input Port the internal solar charge controller rated at 140W (17.5V 8A) that provides an alternative method to charge the internal battery. It is designed to be used with the optional KISAE 40W and 80W solar panel. If a non-KISAE Home Solar panel is used, be sure the solar panel is designed for a 12V battery system with 8A maximum current, 17.5V rated voltage and open circuit voltage less than 26 VDC. Please refer to the specifications label on the solar panel before connecting. Do not connect to a PV source capable of delivering

more than 140W (17.5V 8A).

The solar charge controller is a fully automatic self-sustaining device that will initiate the charge cycle only when solar power is available. It runs independently from the built-in AC charger. When a solar panel is connected to the DC Input port, the 'Solar Charge' indicator located at the display panel indicates the charging status of the internal battery.

Note: If insufficient charge capacity is available from the solar source, it is recommended to use the built-in AC charger to complete the battery charging process through the utility once a month.



DC Input port

WARNING: Shock, fire and energy hazards. Make sure the solar panel is covered with an opaque sheet or facing the ground before connecting or disconnecting the cable wire to the DC Input Port located at the back of the unit. All wiring must be done in accordance with applicable local and national electrical wiring codes. Connect solar panel with higher voltage or current rating will permanently damage the unit and may cause fire and energy hazard.

Connect to optional KISAE Solar Panel:

- Cover the solar panel with an opaque sheet or facing the ground before connecting the cable wire.
- Plug in the DC cable connector to the DC input port located at the back of the unit. Please note the polarity of the connector before connected. Improper connections (reversing the wire connection on the solar panel connection box) will cause the unit to malfunction and may permanently damage the unit. Damage caused by a reverse polarity connection is not covered by your warranty.
- Remove the opaque sheet or flip the solar panel with solar cell surface facing upwards. Adjust the mounting fringe of the solar panel to have the solar cell surface facing directly to the sunlight to achieve the maximum power. When sunlight is available, the 'Solar Charge' indicator located at the display panel should automatically turn on and the indicator should either flash or remain solid depending on the battery status.

NOTE: It is recommended to always charge the internal battery to a 100% state-of-charge, as shown by a steady green on "Solar Charger" indicator.

Connect to non-KISAE Solar Panel:

The DC Input port located at the back of the unit comes with PP45 Anderson Powerpole connectors. To connect a non-KISAE Solar Panel to the Home Solar System, use the supplied cable and make your own wire connection to your solar panel through the two bare wire ends. Please double check on the polarity before connected. The red connector is used to connect to the positive terminal of the Home Solar System and the white connector is used to connect to the negative (ground) terminal of the Home Solar System.

CAUTION: Reverse polarity. Improper connections (reversing the wire connection on the solar panel connection box or the connector wiring) will cause the unit to malfunction and may permanently damage the unit. Damage caused by a reverse polarity connection is not covered by your warranty.

If you want to make your own connector on your solar panel cable, the following parts and the appropriate crimping tools are required

- PP45 Red Connector Housing & 45 amp Contact (1 pc): P/N 1345
- PP45 White Connector Housing & 45 amp Contact (1 pc): P/N 1345G7

The red connector is used to connect to the positive terminal of the Home Solar System and the white connector is used to connect to the negative (ground) terminal of the Home Solar System.



Disconnect Solar Panel from Unit:

- Cover the solar panel with an opaque sheet or flip the solar panel with the solar cell facing a flat ground to minimize the output voltage to zero volts.
- Verify the Solar charge indicator is off.
- Disconnect the solar cable connector from the DC Input Port of the unit.

4. CONFIGURATION

Please read the following table to fully understand unit settings and desire your own desirable settings. Unit default setting is “Full Automatic” (In1, AL1).

Understanding of Unit Setting

Inverter	Setting
In0	Inverter is disabled, unit will not provide backup function when utility power is not available
In1	Inverter is set to standby mode. Unit will provide backup function when utility power is not available

Alarm	Setting
AL0	Audio alarm sound is disabled. Alarm will not sound when warning and fault occur.
AL1	Audio alarm sound is enabled. Alarm sounds when warning or fault occurs.

Unit Function Setting

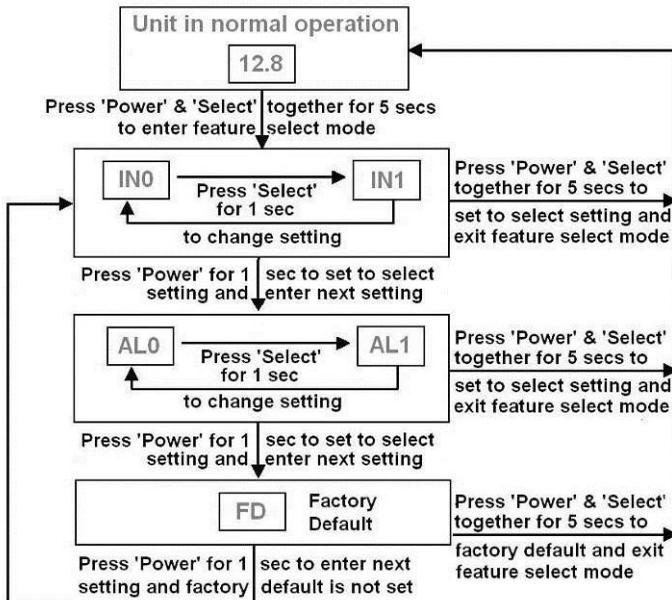
Setting	Mode of Operation	Unit Function
In1 AL1	Full Automatic (Factory default)	AC output is provided by AC utility when utility is available. Internal battery is automatically charged by the 2A charger. AC output will automatically switch to inverter mode power by the internal battery when utility is not available. Audio alarm is enabled and will sound when any warning or fault occurs.
In1 AL0	Full Automatic Silent	Same as “Full Automatic” mode but with alarm disabled. Audio alarm will not sound when any warning or fault occurs. The unit fault protection features remain active and will shut down without audio warning when fault occurs.

In0 AL1	Backup Disabled	AC output is provided by AC utility when utility is available. Internal battery is automatically charged by the 2A charger. Inverter is disabled and no backup power occurs when AC utility is not available. Audio alarm is enabled and will sound when any warning or fault occurs.
In0 AL0	Backup & Alarm Disabled	Same as "Backup Disabled" mode but with alarm disabled. Audio alarm will not sound when any warning or fault occurs. The unit fault protection features remain active and will shut down without audio warning when fault occurs.

To change unit function:

- To enter the feature setting mode, press and hold "Power" and "Select" button together for about 5 seconds until a beep is sounded. Display will show current inverter setting as "In0 or In1"
- Press and hold "Select" button for 1 second to toggle between the two settings.
- Once the desired setting is selected, press and hold "Power" button for 1 second to set the desired setting and carry on with setting the other features.
- Display will show current alarm setting as "AL0 or AL1".
- Press and hold "Select" button for 1 second to toggle between the two settings.
- Once the desired setting is selected, press and hold "Power" button for 1 second to set the desired setting and carry with setting the other features.
- Display will show "Fd" factory default setting. If you desire to use the factory setting, press and hold 'Power' and 'Select' button together for 5 seconds to exit the setting mode. If you wish to keep all the previous settings on inverter and alarm, just press 'Power' button for 1 second and press and hold 'Power' and 'select' button together for about 5 seconds to exit the feature setting mode.

Note: Press and hold 'Power' and 'Select' button together for 5 seconds at any time to exit the feature setting mode. See feature setting chart below.



5. UNIT OPERATION

WARNING: RISK OF EQUIPMENT DAMAGE

- Do not plug surge-protected power bars into the unit's 120 VAC outlets. The surge protected components on the surge-protected power bar may not like the modified sine wave output generated by the unit.
- Do not connect an AC power source such as utility power or a generator to the 120 VAC outlets.
- Do not connect the unit's AC power input cord to its 120 VAC outlets.

Quick Unit Operation Guide

Turn ON and OFF the 120 VAC and USB when Utility AC is not available.

- Press and hold the 'Power' button for 1 second until a beep is sounded. Display will show the measured battery capacity and output power alternatively. Status indicator will turn green. 5V is available at the USB port and 120 VAC is available at the AC socket.
- Press 'Power' button to turn unit off to save battery power.

Turn ON and OFF the 120 VAC and USB when Utility AC is available.

When utility is available, the unit will perform like a power bar and the AC output cannot be disconnected unless the AC plug on the unit is removed and the 'Power' button is held for a second to turn unit off.

Using the USB port

The USB port on the system provides standard 5V 750mA power to power up USB powered handheld device.

Using the 12V DC port

The 12V DC port on the system provides standard 12V 15A maximum DC current to power up 12V lighter plug type automotive handheld appliance.

AC Load connected to the unit

Although the unit can provide high surge power up to two times the rated output power, some appliances may still trigger the unit's protection system. A higher power system like Home Solar Kit 1800 (HS 1800-60-00) is required for those appliances.

Some appliances like speed controllers found in some fans and AC chargers for some power tools may not like the modified sine wave generated by the inverter. Those appliances may not work or may be damaged if they are connected to the inverter. If you are unsure about powering any device with the inverter, contact the manufacturer of the appliances.

Unit Mode Setting

Mode	Status indicator	Display	Condition
Full Automatic In1, A11 (factory default setting)	Solid green	"Ful"	AC output is supplied by utility power. Internal battery is fully charged.
	Flashing green	Battery capacity in %	AC output is supplied by utility power. Charging of internal battery by the 2A charger is in progress.
	Solid amber	Flash between Output Power in kW & battery capacity in %	AC output power is generated by the inverter using the internal battery and/or from the optional KISAE solar panel.
	Flashing amber	Same as above	Same as above and utility AC power is just detected and AC output will switch to utility power within seconds.

	Solid red	"E01-E10"	Error on unit is detected. AC output is disconnected. See Trouble shooting section.
Full Automatic Silent In1, AI0	Same as "Full Automatic" mode but with audio alarm mute if error occurs. The unit fault protection features remain active.		
Backup Disable In0, AI1	Solid green	"Fu"	AC output is supplied by utility power. Internal battery is fully charged.
	Flashing green	Battery capacity in %	AC output is supplied by utility power. Charging of internal battery by 2A charger is in progress.
Backup Disable with Alarm Disable In0, AI0	Same as "Backup Disabled" mode but with audio alarm mute. The unit fault protection features remain active.		

Understanding the Error Code

Error Code	Condition	Corrective Action
E01	System senses battery voltage is low and has shutdown.	Recharge battery immediately and restart unit.
E02	System senses battery voltage is high and has shutdown.	Check battery voltage or if any external high voltage DC source is connected to DC Input Port.
E03	System AC output is overloaded or short circuited and has shutdown.	Check load connected to AC output. Reduce load and restart the unit.
E04	System senses high internal temperature and has shutdown	Turn unit off. Wait for 15 minutes before restarting. Check if any object is blocking the ventilation of unit.
E05	System warns battery voltage is low and will shut down shortly	Recharge battery as soon as possible or system will shut down shortly.
E06	System warns AC load connected is close to overload shutdown limit.	Check load connected to AC output. Reduce load.
E07	System warns of high internal temperature and will shut down shortly.	Reduce load. Check if any object is blocking the ventilation of unit.
E08 - 09	Not used	
E10	Internal battery is overcharged	Check battery voltage or if any external high voltage is connected to DC Input Port.

Estimated Run time of AC Load

Following run times are estimates. Actual run times may vary.

Load	Estimate Consumption	Estimate Run time	
		Home Solar 400 Home Backup 400	Home Solar 800 Home Backup 800
Cordless Phone	5W	55 hrs	65 hrs
Home Alarm System	5W	55 hrs	65 hrs
Clock/Radio	8W	34 hrs	4/ hrs
Table Lamp	40W	7.2 hrs	8.5 hrs
Table Lamp	60W	4.6 hrs	5.5 hrs
Energy Saving Light (5x17W)	85W	3.5 hrs	4.2 hrs
20" LCD TV	40W	8 hrs	9.5 hrs
Flooded Light	300W	35 min	45 min
Sump Pump (1/4 hp)	300W	N/A (surge too high)	45 min
½" drill	700W	N/A (overload)	13 min

Tips: Maximize the runtime of your system

During times of power outage, here are some tips to maximize your run times for key back-up power applications:

- Do not leave appliances on when not in use because they will drain the internal battery
- For computer use, use laptop, or desktop computer with LCD monitor instead of with CRT monitor.
- Use small televisions instead of big screen TV's
- Use small desk lamps (25 to 40 W) instead of high-wattage lamps.
- Use energy saving light bulbs or fluorescent lamp instead of incandescent or halogen light.

6. TROUBLESHOOTING

To trouble shoot the unit, please note the error code displayed on the main unit and review the "Understanding the Error Codes" in section 5.

Problem/Question	Symptom	Solution
Appliance connected to unit malfunction or overheat	Products connected to unit do not accept modified sine-wave waveform	Products are not compatible with the modified sine wave output produced by the unit. See "AC load connected to the unit" on page 11.
Insufficient run-time	Battery is not fully charged	Charge battery by leaving the unit plugged to the utility for more than 48 hrs to fully charge the battery or leave the optional solar panel plugged into the battery box for more than 72 hrs
Solar Charger indicator is not ON when optional solar panel is connected <small>(not suitable for model HB400-00,-03 & HB800-00,-03)</small>	Solar panel cannot supply sufficient power to start the solar charger and charge the battery	Check location and direction of solar panel. Check the connection and polarity of the solar panel plug to the DC Input Port.
	Wrong wire connection on solar panel junction box	Verify solar panel junction box connection.
System has no output	Unit is off	Turn unit on.
	Unit has shutdown due to various potential conditions	Check utility, battery voltage, and unit settings. See Unit Operation section.
	Circuit Breaker is tripped	Check AC load connected and press the knob on the circuit breaker to reset.
When utility is available, 'Power' buttons cannot be used to shut down the unit.	This is normal. When system is plugged in to utility, it acts as a power bar.	To shut down the system completely, unplug the unit from utility. Press 'Power' button' to turn unit off.
How can I disable the auto backup feature?	Desire a manual start up instead of automatic back up.	See page 11 'Backup Disabled' setting under 'Unit Mode Setting'.

7. SPECIFICATIONS

Note: Specifications are subject to change without notices.

Specification	Home Solar 400 Home Backup 400	Home Solar 800 Home Backup 800
<i>Inverter</i>		
Output Power	400W	800W
Output Current	3.3A	6.6A
Surge Power	800W	1600W
Output Voltage	120 VAC / 60 Hz	
Output Frequency	60 Hz	
Output Waveform	Modified Sinewave	
Peak Efficiency	90%	
No Load battery draw (unit in standby):	< 3W	
<i>USB</i>		
	5V, 750 mA	
<i>Transfer Switch Protection</i> (Supplementary Breaker)	10A	15A
<i>Internal Charger</i>		
Charging Current	2 ADC	
Charging Voltage (Absorption/Float):	14.8/13.7 VDC	
Charger type	3 stages (bulk/absorption/float)	
<i>DC Input Port</i> (not applicable for model HB400-00 or 03, HB800-00 or -03)		
Charging Current	8A maximum	
Charging Voltage	14.8/13.7 VDC	
Input DC Voltage Range	9 - 26 VDC maximum	
Charger Type	PWM control	
<i>12V DC Port</i>		
Voltage	12V	
Current	15A DC Maximum	
Protection	15A (automatically reset)	
<i>Battery</i>		
Battery Capacity	12V, 34Ah	12V, 40Ah
Battery Type	Sealed Lead Acid	
<i>Safety and Environmental</i>		
Conformance	Conforms to UL 1778 Certified to CSA C22.2 no.107.1	
Agency Markings	cETLus	
Operating Temperature	0°C to 40°C (32°F to 104°F)	
Storage Temperature	-20°C to 40°C (-4°F to 104°F)	
Relative Humidity	5-90% noncondensing	
Operating Altitude	Up to 9,843ft (3000 meters) above sea level	
<i>Weights and Dimensions</i>		
Weights	HS400-00: 31.0 lbs (14.1 kg) HS800-00: 34.3 lbs (15.6 kg) HB400-00 or -03: 30.0 lbs (13.6 kg) HB800-00 or -03: 33.3 lbs (15.1 kg)	
Dimensions	10½" x 6¼" x 10¼" 27cm x 16 cm x 26cm	