CODE INFORM ROOF MOUNT SOLAR PERMIT PACKAGE THE INSTALLATION OF SOLAR ARRAYS AND PHO POWER SYSTEMS SHALL COMPLY WITH THE FOI XXXXXXXXXXXX 2018 INTERNATIONAL BUILDING CODE 2018 INTERNATIONAL FUEL GAS CODE 2.800KW DC GRID TIED PHOTOVOLTAIC SYSTEM 2018 INTERNATIONAL PLUMBING CODE 2018 INTERNATIONAL ENERGY CODE 2018 EXISTING BUILDING CODE 2018 INTERNATIONAL RESIDENTIAL CODE 5844 OAK ST, ARVADA, CO 80004 2018 INTERNATIONAL MECHANICAL CODE 2009 INTERNATIONAL PROPERTY MAINTENANCE CODE 2018 INTERNATIONAL FIRE CODE 2020 NATIONAL ELECTRIC CODE **BUILDING INFORMATION 1 STORY HOUSE** SINGLE FAMILY RESIDENCE AHJ: CITY OF ARVADA CONSTRUCTION TYPE: V-B OCCUPANCY: R3/U **ROOF: COMP SHINGLE** APN: 3909408010 WIND SPEED : 145 **PV SYSTEM SUMMARY:** SNOW LOAD : 30 SYSTEM SIZE (DC) : STC: 350 x 8 = 2.800kW DC EXPOSURE CATEGORY : C : PTC: 326.8 x 8 = 2.6144kW DC SYSTEM SIZE (AC) : 3.000kW AC @ 240V : (8) LONGI SOLAR: LR4-60HPB-350M MODULES BATTERY : (1) TESLA POWERWALL 2 **OPTIMIZERS** : (8) SOLAR EDGE: S440 **AERIAL VIEW** : SOLAR EDGE: SE3000H-USRGM[SI1] INVERTER TILT : 18° AZIMUTH : 225° : COMP SHINGLE ROOF : 2" X 4" TRUSS @ 24" O.C. RAFTER/TRUSS SIZE ATTACHMENT TYPE : ECOFASTEN ROCKIT SLIDE RAILLESS EXISTING 150 AMPS MSP WITH 150 AMPS MAIN MAIN SERVICE PANEL BREAKER ON TOP FED INTERCONNECTION PV BREAKER OCPD RATING : 20 AMPS UTILITY : XCEL ENERGY a K S C. **GENERAL NOTES:** LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF ANY SOLAR PHOTOVOLTAIC INSTALLATION THIS PROJECT SHALL COMPLY WITH LOCAL ORDINANCES PROPER ACCESS AND WORKING CLEARANCE WILL BE PROVIDED SHEET INDEX ALL ELECTRICAL WORK SHOWN ON THESE PLANS WILL BE COMPLETED BY THE UNDERSIGNED ALL APPLICABLE PV EQUIPMENT LISTED AND COMPLIANT WITH UL2703, UL1741 AND UL1703 ALL ROOF PENETRATIONS TO BE SEALED WITH A HIGH PERFORMANCE ROOF SEALANT SUCH AS GeoCel 2300 CLEAR SEALANT COVER PAGE PV-1.0 THE SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND THE UTILITY IS OBTAINED PV-2.0 THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS SITE PLAN IF THE EXISTING MAIN PANEL DOES NOT HAVE VERIFIABLE GROUNDING ELECTRODE. IT IS THE NECESSARY TO INSTALL A SUPPLEMENTAL PV-3.0 **ROOF PLAN** GROUNDING ELECTRODE 10. EACH MODULE WILL BE GROUNDED UL 2703 OR UL 1703 APPROVED USING THE SUPPLIED CONNECTION POINTS IDENTIFIED ON THE PV-4.0 STRUCTURAL MODULE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS" A LADDER SHALL BE IN PLACE FOR THE INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS PV-5.0 **ELECTRICAL 3LD** 12. MAX HEIGHT OF MODULES OFF OF ROOF FACE : <6" PV-6.0 ELECTRICAL SLD 13. PHOTOVOLTAIC SYSTEM WILL COMPLY WITH 2020 NEC. 14. PHOTOVOLTAIC SYSTEM INVERTER IS UNGROUNDED. NO CONDUCTORS ARE SOLIDLY GROUNDED IN THE INVERTER, AND SYSTEM PV-7.0 BOM COMPLIES WITH 690.35. MODULES CONFORM TO AND ARE LISTED UNDER UL 1703. PV-8.0 **ELECTRICAL PHOTOS** 16. INVERTER CONFORMS TO AND IS LISTED UNDER UL 1741. PV-9.0 17. ELECTRICAL EQUIPMENT AND MATERIAL TO BE LISTED, LABELED, AND INSTALLED PER THE NEC, THE INSTALLATION SIGNAGE STANDARDS/MANUFACTURER'S RECOMMENDATIONS AND IF REQUIRED A RECOGNIZED ELECTRICAL TESTING LABORATORY. PV-10.0 **OPTIMIZER CHART** CONDUITS EXPOSED TO SUNLIGHT ON ROOF SHALL BE LOCATED NOT LESS THAN 7/8" ABOVE ROOF SURFACE. IN EXPOSED LOCATIONS, WIRING AND CABLING SHALL BE IN CONDUIT OR CABLE SHALL BE RATED FOR EXPOSURE: TYPE NM CABLE PV-11.0 SAFETY PLAN ALLOWED IN PROTECTED LOCATIONS. WITHIN ATTIC SPACES, ALLOWED TO RUN TYPE NM (ROMEX) 10/3 OR 12/3 CONDUCTORS THROUGH PV-12.0 SAFETY PLAN OPEN SPACE OR TYPE THHN IN MINIMUM 3/4" ALUMINUM CONDUIT 20. MATERIALS, EQUIPMENT AND INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS, STANDARDS, RULES AND REGULATIONS OF THE PV-13.0 + SPEC. SHEETS FOLLOWING AND BE MOST SUITABLE TO THE PURPOSE INTENDED

ATION DTOVOLTAIC LOWING CODES:	
VICINITY MAP 5844 Oak St, Arvada, CO 80004, USA	<u>CONTRACTOR INFO</u>
	Solar Individual Permit Package customer name 2.800KW Grid Tied
	Photovoltaic System 5844 OAK ST , ARVADA, CO 80004 Rev Description Date
	A INITIAL DESIGN 10/28/2022 OPPORTUNITY XXXXXX PROJECT # N/A DATE DRAWN 10/28/2022 DRAWN BY E.R SHEET # PV-1.0 TITLE COVER PAGE







ROOF NO	ROOF ROOF ROOFING NO TILT TYPE		ATTACHMENT TYPE	NO. OF STORIES TYPE		FRAMING SIZE	OC SPACING	PENETRATION PATTERN	PEN
ROOF 1	18	COMP SHINGLE	ECOFASTEN ROCKIT SLIDE RAILLESS	1	TRUSS	2" X 4"	24"	FULLY STAGGERED	





MAX DC CURRENT: Imax	= 1.25 X (OPTIMIZER OUTPUT CURRENT) = 1.25 X 15 = 18.75A
MAX AC CURRENT: Imax	= 1.25 X (SUM OF MAX CONTINUOUS OUTPUT CURRENT FROM INVERTERS)
	= 1.25 X (12.5) = 15.63A

					W	IRE SCHEDULE					
RACEWAY #		EQUIPMENT WIRE LOCATION CONDUCTOR QTY.		AWG WIRE SIZE AMPACITY @ 90°(310.15(B)(16)		STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUS FACTO MORE CONDU 310.15(
1	DC	MODULE	то	OPTIMIZER	ROOF/FREE-AIR	2	10	40	11.16	0.96	
2	2 DC OPTIMIZER		то	JUNCTION BOX	ROOF/FREE-AIR	2	10	40	15	0.96	1
3	DC	DC JUNCTION BOX		INVERTER	EXTERIOR WALL	2	10	40	15	0.96	1
4	4 AC INVERTER T		ТО	TESLA GATEWAY	EXTERIOR WALL	3	10	40	12.5	0.96	1
5	5 AC TESLA GATEWAY T		ТО	MSP	EXTERIOR WALL	3	4	95	72	0.96	1
6	AC	TESLA POWERWALL	то	TESLA GATEWAY	EXTERIOR WALL	3	8	55	32	0.96	1
7	AC	BACKUP PANEL	то	TESLA GATEWAY	EXTERIOR WALL	3	4	95	72	0.96	1



MAX DC CURRENT: Imax	= 1.25 X (OPTIMIZER OUTPUT CURRENT) = 1.25 X 15 = 18.75A
MAX AC CURRENT: Imax	= 1.25 X (SUM OF MAX CONTINUOUS OUTPUT CURRENT FROM INVERTERS)
	= 1.25 X (12.5) = 15.63A

					WIRE SCHEDULE						
RACEWAY #	AY EQUIPMENT WIRE LOCATION CONDUCTOR AWG				AWG WIRE SIZE	STARTING ALLOWABLE AMPACITY @ 90°C 310.15(B)(16)	STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUS FACTO MORE 1 CONDU 310.15(I		
1	DC	MODULE	то	OPTIMIZER	ROOF/FREE-AIR	2	10	40	11.16	0.96	1
2	DC	OPTIMIZER	то	JUNCTION BOX	ROOF/FREE-AIR	2	10	40	15	0.96	1
3	DC	JUNCTION BOX	то	INVERTER	EXTERIOR WALL	2	10	40	15	0.96	1
4	AC INVERTER		ТО	TESLA GATEWAY	EXTERIOR WALL	3	10	40	12.5	0.96	1
5	AC	TESLA GATEWAY	ТО	MSP	EXTERIOR WALL	3	4	95	72	0.96	1
6	AC	TESLA POWERWALL	ТО	TESLA GATEWAY	EXTERIOR WALL	3	8	55	32	0.96	1
7	AC	BACKUP PANEL	то	TESLA GATEWAY	EXTERIOR WALL	3	4	95	72	0.96	1

MATERIAL LIST

ELECTRICAL EQUIPMENTS

QTY.	PART	PART #	DESCRIPTION
8	MODULE	LR4-60HPB-350M	LONGI SOLAR: LR4-60HPB-350M
8	OPTIMIZER	S440	SOLAREDGE S440 POWER OPTIMIZ
1	JUNCTION BOX	480-276	600VDC NEMA 3R UL LISTED JUNCTIO
1	INVERTER	SE3000H-USRGM[SI1]	SOLAREDGE SE3000H-USRGM[SI1]
1	TESLA POWERWALL	N/A	TESLA POWERWALL
1	TESLA GATEWAY	N/A	TESLA GATEWAY 2
1	SURGE PROTECTOR	N/A	SURGE PROTECTIVE DEVICE(SP

BREAKER AND FUSES

QTY.PARTDESCRIPT1BREAKER20A 2-POLE BREAKER(S)GENERAL 20A 2-POL	
1 BREAKER 20A 2-POLE BREAKER(S) GENERAL 20A 2-POL	NC
Image: Constraint of the second sec	BREAKER(S)
Image: Constraint of the second sec	
Image:	

		RACKIN	IG
9	PART	PART #	DESCRIPTION
19	COUPLING	2011021	RI COUPLING AL LBK
19	SLIDE	2011013	RI COM SLIDE AL BLK
19	MOUNT	2011020	RI MOUNT AL BLK
4	FLASHING	3012020	GF-1 FLASHING GLV BLK 8X10
1	GROUNDING LUG	2099012	ARRAY SKIRT 80 IN 35MM
			GROUNDING LUG

1 ERS N BOX 240V				
D)				
)				
		<u>CONT</u>	RACTOR IN	<u>FO</u>
		Sola Perm	r Individu nit Packaç	al je
		С	ustomer n	ame
	F	2.800k Photov	(W Grid T oltaic Sys	ied tem
		584 ARVA	4 OAK ST DA, CO 800	,)04
	Rev A	De INITI/	escription AL DESIGN	Date 10/28/2022
	OPPO PROJ DATE DRAV SHEE	DRTUNITY IECT # IDRAWN VN BY	JOHN BERT N/A 10/28/2022 E.R	
	TITLE	<u> </u>	BOM	

EXISTING SERVICE PANEL PHOTOS



CONTRACTOR INFO							
Solar Individu Permit Packag	Solar Individual Permit Package						
customer name							
2.800KW Grid Tied							
5844 OAK ST ,							
Rev Description	Date						
A INITIAL DESIGN	10/28/2022						
OPPORTUNITY JOHN BERT							
PROJECT # N/A							
DRAWN BY E.R							
SHEET # PV-8.0							
TITLE							

ELECTRICAL PHOTOS



NOTES:

1. NEC ARTICLES 690 AND 705 AND NEC SECTION R324 MARKINGS SHOWN HEREON.

2. ALL MARKING SHALL CONSIST OF THE FOLLOWING:

3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN

3. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

	1-10	11-20	21-30	31-40	41-50	51-60	SOLAREDGE OPTIMIZER CHART	
1								
2							SUB UM MSP G B INV	
3								
4								
5								CONTRACTOR INFO
6								
7								Solar Individual Permit Package
8								customer name 2.800KW Grid Tied Photovoltaic System 5844 OAK ST ,
9								ARVADA, CO 80004 Rev Description Date A INITIAL DESIGN 10/28/2022 OPPORTUNITY JOHN BERT
10								PROJECT # N/A DATE DRAWN 10/28/2022 DRAWN BY E.R SHEET # PV-10.0 TITLE OPTIMIZER CHART

SAFETY PLAN	MARK UP KEY	
INSTRUCTIONS: 1. USE SYMBOLS IN KEY TO MARK UP THIS SHEET. 2. SAFETY PLAN MUST BE MARKED BEFORE JOB STARTS AS PART OF THE PRE-PLAN 3. DOCUMENT ALL ADDITIONAL HAZARDS ON THIS PAGE & MAKE NOTES ON THE JHA SHEET IN CASE OF EMERGENCY NEAREST HOSPITAL OR OCCUPATIONAL/INDUSTRIAL CLINIC NAME:	INVERTERBTESLA POWER WALLGTESLA GATEWAYMSPMAIN SERVICE PANELSUBSUB PANELImage: Sub PanelUTILITY METERImage: PPERMANENT ANCHORJBJUNCTION BOXTTEMPORARY ANCHORILINSTALLER LADDERSSTUB-OUTSKYLIGHTNO LADDER ACCESS (STEEP GRADE OR GROUND LEVEL OBSTRUCTIONS)RESTRICTED ACCESSCONDUITGAS SHUT OFFImage: SVATER SHUT OFFImage: SImage: S <td>CONTRACTOR INFO Solar Individual Permit Package customer name 2.800KW Grid Tied Photovoltaic System 5844 OAK ST , ARVADA, CO 80004 Rev Description Date A INITIAL DESIGN 10/28/2022 OPPORTUNITY JOHN BERT</td>	CONTRACTOR INFO Solar Individual Permit Package customer name 2.800KW Grid Tied Photovoltaic System 5844 OAK ST , ARVADA, CO 80004 Rev Description Date A INITIAL DESIGN 10/28/2022 OPPORTUNITY JOHN BERT
		PROJECT # N/A DATE DRAWN 10/28/2022 DRAWN BY E.R SHEET # PV-11.0 TITLE SAFETY PLAN

JOB HAZARD ANALYSIS

Crew leader to fill out all sections below, hold a pre-job safety meeting with all personnel, and upload this completed document and the Safety Plan

Ladder Access

Ladders must be inspected before each use.

- Extension ladders must be set up on a firm and level surface at a 4-to-1 rise to run angle (or 75 degrees) and the top must be secured to the structure. Extension style ladders placed on uneven, loose or slipperv surfaces must additionally have the base firmly anchored or lashed so the base will not slip out.
- Extension ladders must be used with walk-through devices or the ladder must extend 36" above the stepping off point.
- A-frame ladders must only be climbed with the ladder spreader bars locked in the open position; A-frame ladders shall not be climbed while in the closed position (ex, closed and used while leaned against a structure).
- Additional notes:

Mobile Equipment

- Only Qualified operators will operate equipment; operators must maintain a certification on their person for the equipment being operated
- Type(s) of mobile equipment (Type/Make/Model):
- Qualified operator(s):

Material Handling and Storage

Materials will be staged/stored in a way that does not present a hazard to client, personnel or public. Materials stored on the roof will be physically protect from failing or sliding off.

Fall Protection

- A site-specific plan for fall prevention and protection is required prior to starting work and must remain onsite at all times until work is complete: a fall rescue plan must be outlined and discussed among the crew prior to work start.
- First-person-Up (FPU) must install their anchor and connect before any other task, including installing other anchors. The Last-Person-Down (LPD) must be the only person on a roof uninstalling fall protection.

FPCP (name and title):

· FPU and LPD (name and title):

Electrical Safety

- The Electrical Qualified Person (EQP) is required onsite to perform electrical work.
- All electrical work will be performed with equipment in an electrically safe condition (de-energized) unless approval has been granted prior to work.
- Service drops and overhead electrical hazards will be indentified and protected from contact, as neccessary.

· EQP (name and tile):

Public Protection

- The safety of the Client and the Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required
- Company, Client and Public property shall be protect from falling objects
- Pets (including dogs) shall be secured by their owners prior to work start.
- The client should not leave pets, family members, or others in the charge or care of Employees, Contractors, or Temporary Workers.

Crew leader responsible for communication with the client:

Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing

All employees onsite shall be made aware of the specific hazards of this project and review this HJA during a pre-job briefing, and their signature indicates awareness of site conditions and the plan to eliminate any hazards identified prior to and during the project.

Crew leader (name/title):

Crew member (name/title):

Airborne Contaminants:

- Asbestos-containing (Transite) piping (ACP) Do not disturb (move, drill, cut fracture, etc.)
- Asbestos-containing thermal insulation (ACI) and Asbestos-containing duct wrapping (ACW) - do not disturb, no attic or crawlspace access is allowed if work to be performed could cause exposure to personnel, client or public.

If yes, list specific tasks and protection in place:

- Weather and Environment
- The site supervisor shall forecast the weather conditions at the job site, prior to crew arrival, in order to mitigate any hazards associated with inclement weather (heat, cold, wind, rain, etc.)
- The site supervisor will utilized a portable wind meter (anemometer) to verify actual onsite wind conditions, by checking at the ground and on any elevated work surface (ex, rooftop) prior to work start, at midday and prior to solar panel staging on a roof.
- Elevated work involving the moving or maneuvering of solar panels shall cease at 25mph (sustained wind) until wind subsides.

Forecasted weather maximum temp (degrees F):

Heat Related Illness Prevention

- Employees shall have access to potable drinking water that is fresh, pure, and suitably cool. The water shall be located as close as practicable to the areas where employees are working. Water shall be supplied in sufficient quantity at the beginning of the work shift to provide at least one quart per employee per hour for drinking for the entire shift. Employees may begin the shift with smaller quantities of water if they identify the location and have effective means for replenishment during the shift to allow employees to drink on quart or more per hour. The frequent drinking of water shall be encouraged.
- Shade shall be present when temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work exceeds 80 degrees Fahrenheit, employees shall have and maintain one or more areas with shade at all times.
- · New employees must be acclimatized. New employees will be monitored by their Crew Leader (site supervisor) for the first two (2) weeks of employment or longer when necessary.
- · Employees will be allowed and encouraged to implement scheduled breaks during each shift. Employees must take cool-down breaks in the shade any time they feel the need to do so to protect them from overheating. Supervisors are REQUIRED to allow employees any break period they need during high heat conditions.
- Cool Vests are encouraged for all employees at all times during periods of high heat.
- Identify the location of the closet Occupational/Industrial Clinic or Hospital in case a crew member becomes ill.

What is the specific plan to provide and replenish sufficient water for all employees on site?

If offsite replenish is necessary, where will you go to replenish water (location/address):

Who will replenish the drinking water (name):

to Site	e Capture						
<u>R</u> ∙ ●	estroom facilities Employees shall have ac hand-washing stations. I discretion (location is an	ccess to restroom facilities with Jse of onsite restroom is at the client's notated below). If client does not give	S				
	permission, location of s hand-washing stations o supervisor will identify lo ensure all employees ha	uitable restroom facilities with ffsite will be provided. The onsite cation and make arrangements to ve access at any point.					
•	Restroom facilities will be If Offsite, add location na	e (circle one): Onsite - Offsite					
 In	cident Reporting Procedure						
•	Contact your Site Super	visor					
	Name:						
•	Contact your Manager						
	Name:						
	Phone:		:	<u>cc</u>	NTF		IFO
•	Contact your Site Super	visor					
	Name:						
	Phone:						
W of	/ith: Your full name, phone r what happen and when.	number, office location, brief description	on				
	NOTE ADDITIONAL HAZ (add as many as nece	ARDS NOT ADDRESSED ABOVE ssary by using additional sheets)					
[Define the Hazard:	Method/steps to prevent incident:					
				So Pe	olar erm	Individu it Packa	ial ge
	Define the Hazard:	Method/steps to prevent incident:	-		cu	stomer n	ame
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					5844	4 OAK ST	, ,
	Define the Hazard:	Method/steps to prevent incident:		Rev		scription	Date
				A	NITIA	L DESIGN	10/28/2022
l				OPPORTUN	ty I	JOHN BERT	
				PROJECT #		N/A	
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				TITLE			
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LR4-60HPB 345~370M

High Efficiency Low LID Mono PERC with Half-cut Technology



Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730

ISO 9001:2008: ISO Quality Management System

ISO 14001: 2004: ISO Environment Management System

TS62941: Guideline for module design qualification and type approval

OHSAS 18001: 2007 Occupational Health and Safety



* Specifications subject to technical changes and tests. LONGi Solar reserves the right of interpretation. Positive power tolerance (0 ~ +5W) guaranteed

High module conversion efficiency (up to 20.3%)

Slower power degradation enabled by Low LID Mono PERC technology: first year <2%, 0.55% year 2-25

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current



Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGi have the sole right to make such modification at anytime without further notice; Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

-M0 4 n

(Black)

NFW

R4-60HPB 345~370M **Mechanical Parameters**

Design (mm)





Cell Orientation: 120 (6×20)								
Junction Box: IP68, three diodes								
Output Cable: 4mm ² , 1200mm in length								
(for EU DG)								
Glass: Single glass								
3.2mm coated tempered glass								
Frame: Anodized aluminum alloy frame								
Weight: 19.5kg								
Dimension: 1755×1038×35mm								
Packaging: 30pcs per pallet								
180pcs per 20'GP								
780pcs per 40'HC								

Operating Parameters

Operational lemperature: -40 C ** +85 C
Power Output Tolerance: $0{}^{\sim}{+}5W$
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1000V (IEC/UL)
Maximum Series Fuse Rating: 20A
Nominal Operating Cell Temperature: 45 ± 2 C
Safety Class: Class II
Fire Rating: UL type 1 or 2

Test uncertainty for Pmax: ±3%

Electrical Characteristics

Model Number	LR4-60H	PB-345M	LR4-60H	PB-350M	LR4-60H	PB-355M	LR4-60H	PB-360M	LR4-60H	PB-365M	LR4-60H	PB-370M
Testing Condition	STC	NOCT										
Maximum Power (Pmax/W)	345	257.6	350	261.4	355	265.1	360	268.8	365	272.6	370	276.3
Open Circuit Voltage (Voc/V)	40.2	37.7	40.4	37.9	40.6	38.1	40.8	38.2	41.0	38.4	41.2	38.6
Short Circuit Current (lsc/A)	11.06	8.95	11.16	9.02	11.25	9.09	11.33	9.16	11.41	9.23	11.50	9.30
Voltage at Maximum Power (Vmp/V)	34.2	31.8	34.4	32.0	34.6	32.2	34.8	32.4	35.0	32.6	35.2	32.8
Current at Maximum Power (Imp/A)	10.09	8.09	10.18	8.16	10.27	8.23	10.35	8.30	10.43	8.36	10.52	8.43
Module Efficiency(%)	18	.9	19	.2	19	.5	19	.8	2	0.0	20).3

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25 °C , Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20 C , Spectra at AM1.5, Wind at 1m/S

Temperature Ratings (STC)		Mechanical Loading	
Temperature Coefficient of Isc	+0.048%/°C	Front Side Maximum Static Loading	5400Pa
Temperature Coefficient of Voc	-0.270%/ [°] C	Rear Side Maximum Static Loading	2400Pa
Temperature Coefficient of Pmax	-0.350%/ [°] C	Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

Current-Voltage Curve (LR4-60HPB-360M)



Power-Voltage Curve (LR4-60HPB-360M)



Current-Voltage Curve (LR4-60HPB-360M)



LONG

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

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POWERWALL

Tesla Powerwall is a fully-integrated AC battery system for residential or light commercial use. Its rechargeable lithium-ion battery pack provides energy storage for solar self-consumption, time-based control, and backup.

Powerwall's electrical interface provides a simple connection to any home or building. Its revolutionary compact design achieves market-leading energy density and is easy to install, enabling owners to quickly realize the benefits of reliable, clean power.



PERFORMANCE SPECIFICATIONS

AC Voltage (Nominal)	120/240 V
Feed-In Type	Split Phase
Grid Frequency	60 Hz
Total Energy	14 kWh
Usable Energy	13.5 kWh
Real Power, max continuous	5 kW (charge and discharge)
Real Power, peak (10 s, off-grid/backup)	7 kW (charge and discharge)
Apparent Power, max continuous	5.8 kVA (charge and discharge)
Apparent Power, peak (10 s, off-grid/backup)	7.2 kVA (charge and discharge)
Maximum Supply Fault Current	10 kA
Maximum Output Fault Current	32 A
Overcurrent Protection Device	30 A
Imbalance for Split-Phase Loads	100%
Power Factor Output Range	+/- 1.0 adjustable
Power Factor Range (full-rated power)	+/- 0.85
Internal Battery DC Voltage	50 V
Round Trip Efficiency ^{1,3}	90%
Warranty	10 years

MECHANICAL SPECIFICATIONS

Dimensions ¹	1150 mm x 755 mm x 147 mm				
	(45.3 in x 29.6 in x 5.75 in)				
Weight ¹	114 kg (251.3 lbs)				
Mounting options	Floor or wall mount				

¹Dimensions and weight differ slightly if manufactured before March 2019. Contact Tesla for additional information.



ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Recommended Temperature	0°C to 30°C (32°F to 86°F)
Operating Humidity (RH)	Up to 100%, condensing
Storage Conditions	-20°C to 30°C (-4°F to 86°F) Up to 95% RH, non-condensing State of Energy (SoE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R
Ingress Rating	IP67 (Battery & Power Electronics) IP56 (Wiring Compartment)
Wet Location Rating	Yes
Noise Level @ 1m	< 40 dBA at 30°C (86°F)

¹Values provided for 25°C (77°F), 3.3 kW charge/discharge power. ²In Backup mode, grid charge power is limited to 3.3 kW. ³AC to battery to AC, at beginning of life.

COMPLIANCE INFORMATION

UL 1642, UL 1741, UL 1973, UL 9540, IEEE 1547, UN 38.3				
Worldwide Compatibility				
FCC Part 15 Class B, ICES 003				
RoHS Directive 2011/65/EU				
AC156, IEEE 693-2005 (high)				

TYPICAL SYSTEM LAYOUTS

WHOLE HOME BACKUP



PARTIAL HOME BACKUP



Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US



Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for / Optional: Revenue grade data, ANSI C12.20 NEC 2014 and 2017, per article 690.11 and 690.12
- / UL1741 SA certified, for CPUC Rule 21 grid compliance

- Extremely small
- I Built-in module-level monitoring
- Outdoor and indoor installation
- Class 0.5 (0.5% accuracy)



INVERTERS

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US			
OUTPUT										
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA		
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA		
AC Output Voltage MinNomMax. (211 - 240 - 264)	~	✓	~	✓	~	~	✓	Vac		
AC Output Voltage MinNomMax. (183 - 208 - 229)	-	~	-	✓	-	-	√	Vac		
AC Frequency (Nominal)		59.3 - 60 - 60.5(1)						Hz		
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A		
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A		
GFDI Threshold				1				A		
Utility Monitoring, Islanding Protection, Country Configurable Thresholds				Yes						
INPUT	^									
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W		
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W		
Transformer-less, Ungrounded				Yes			,			
Maximum Input Voltage				480				Vdc		
Nominal DC Input Voltage		3	80			400		Vdc		
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc		
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5		-	27	Adc		
Max. Input Short Circuit Current				45				Adc		
Reverse-Polarity Protection		Yes								
Ground-Fault Isolation Detection				600kΩ Sensitivity						
Maximum Inverter Efficiency	99			9	9.2			%		
CEC Weighted Efficiency			ç	99			99 @ 240V 98.5 @ 208V	%		
Nighttime Power Consumption		< 2.5								
ADDITIONAL FEATURES										
Supported Communication Interfaces			RS485, Etherne	t, ZigBee (optional), C	Cellular (optional)					
Revenue Grade Data, ANSI C12.20				Optional ⁽³⁾						
Rapid Shutdown - NEC 2014 and 2017 690.12			Automatic Rapi	id Shutdown upon AC	Grid Disconnect					
STANDARD COMPLIANCE										
Safety		UL1741	, UL1741 SA, UL1699B,	CSA C22.2, Canadiar	AFCI according to T.	I.L. M-07				
Grid Connection Standards			IEE	E1547, Rule 21, Rule 14	4 (HI)					
Emissions				FCC Part 15 Class B						
INSTALLATION SPECIFICATIO	ONS									
AC Output Conduit Size / AWG Range		1	" Maximum / 14-6 AW	/G		1" Maximur	n /14-4 AWG			
DC Input Conduit Size / # of Strings / AWG Range		1" Maxi	mum / 1-2 strings / 14	-6 AWG		1" Maximum / 1-3	strings / 14-6 AWG			
Dimensions with Safety Switch (HxWxD)		17.7 x	14.6 x 6.8 / 450 x 37	0 x 174		21.3 x 14.6 x 7.3	/ 540 x 370 x 185	in / mm		
Weight with Safety Switch	22	/ 10	25.1 / 11.4	26.2	/ 11.9	38.8	/ 17.6	lb / kg		
Noise		<	25			<50		dBA		
Cooling				Natural Convection						
Operating Temperature Range			-13 to +140 /	-25 to +60 ⁽⁴⁾ (-40°F /	-40°C option)(5)			°F/°C		
Protection Rating		NEMA 4X (Inverter with Safety Switch)								

⁽⁰ For other regional settings please contact SolarEdge support

⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated ⁽³⁾ Revenue grade inverter P/N: SExxxxH-US000NNC2

⁽⁹⁾ For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf ⁵⁾ -40 version P/N: SExxxxH-US000NNU4

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Power Optimizer For Residential Installations

S440, S500



POWER **OPTIMIZ** フ

Enabling PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)

* Functionality subject to inverter model and firmware version

- / Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- / Compatible with bifacial PV modules

/ Power Optimizer For Residential Installations S440, S500

	5440	S500	UNIT		
Rated Input DC Power®	440	500	W		
Absolute Maximum Input Voltage (Voc)	6	0	Vdc		
MPPT Operating Range	8 -	60	Vdc		
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc		
Maximum Efficiency	99	9.5	%		
Weighted Efficiency	98	3.6	%		
Overvoltage Category		1			
OUTPUT DURING OPERATION					
Maximum Output Current	1	5	Adc		
Maximum Output Voltage	6	0	Vdc		
OUTPUT DURING STANDBY (POWER OPTIMIZER DIS	SCONNECTED FROM INVERTER OR	INVERTER OFF)			
Safety Output Voltage per Power Optimizer		1	Vdc		
STANDARD COMPLIANCE					
EMC	FCC Part 15 Class B, IEC61000-6-2	2, IEC61000-6-3, CISPR11, EN-55011			
Safety	IEC62109-1 (class II safety), UL1741				
Material	UL94 V-0, UV Resistant				
RoHS	Y	es			
Fire Safety	VDE-AR-E 210	0-712:2013-05			
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	10	00	Vdc		
Dimensions (W x L x H)	129 x 1	55 x 30	mm		
Weight (including cables)	655	/ 1.5	gr / lb		
Input Connector	мс	4(2)			
Input Wire Length	0	.1	m		
Output Connector	M	C4			
Output Wire Length	(+) 2.3,	(-) 0.10	m		
Operating Temperature Range ⁽³⁾	-40 to +85				
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 -	100	%		
(1) Pated power of the module at STC will not exceed the Power Optimizer Pated Input D	C Devues Medules with up to 150/ percentelesance are all	aured			

(2) For other connector types please contact SolarEdge

g i al obioi controctor gipto produc contact polaritago	
8) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Techn B) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Techn B) For ambient temperature above +70°C / +158°F power de-rating is applied.	ilcal Note for more details

PV System Design Using a Inverter	a SolarEdge	Single Phase HD-Wave	Three Phase	Three Phase for 277/480V Grid	
Minimum String Length (Power Optimizers)	S440, S500	8	16	18	
Maximum String Length (Power Op	timizers)	25	5	0	
Maximum Nominal Power per String	g ⁽⁴⁾	5700	11250(5)	12750%	W
Parallel Strings of Different Lengths	or Orientations		Yes		

(4) If the investers rated AC powers a maximum nominal power per string, then the maximum power per string will be able to reach up to the investers maximum input DC power Refer to https://www.soiaredge.com/sites/defaul/files/se-power-optimizer-single-string-defaul-papilication-note.pdf (5) For the 2304/000 yrdir it is allowed to install up to 15:0000 yre string when the maximum power difference between each string is 2,000W (6) For the 2704/2007 yrdir. It is allowed to install up to 15:0000 yre string when the maximum power difference between each string is 2,000W (7) It is not allowed to install up to 15:0000 yre string when the maximum power difference between each string is 2,000W (7) It is not allowed to mix-selens and Powers Power Optimizers in new installations





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CE RoHS

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POWERWALL

Backup Gateway 2

The Backup Gateway 2 for Tesla Powerwall provides energy management and monitoring for solar self-consumption, time-based control, and backup.

The Backup Gateway 2 controls connection to the grid, automatically detecting outages and providing a seamless transition to backup power. When equipped with a main circuit breaker, the Backup Gateway 2 can be installed at the service entrance. When the optional internal panelboard is installed, the Backup Gateway 2 can also function as a load center.

The Backup Gateway 2 communicates directly with Powerwall, allowing you to monitor energy use and manage backup energy reserves from any mobile device with the Tesla app.



PERFORMANCE SPECIFICATIONS

AC Voltage (Nominal)	120/240V
Feed-In Type	Split Phase
Grid Frequency	60 Hz
Current Rating	200 A
Maximum Input Short Circuit Current	10 kA1
Overcurrent Protection Device	100-200A; Service Entrance Rated ¹
Overvoltage Category	Category IV
AC Meter	Revenue accurate (+/- 0.2 %)
Primary Connectivity	Ethernet, Wi-Fi
Secondary Connectivity	Cellular (3G, LTE/4G) ²
User Interface	Tesla App
Operating Modes	Support for solar self-consumption, time-based control, and backup
Backup Transition	Automatic disconnect for seamless backup
Modularity	Supports up to 10 AC-coupled Powerwalls
Optional Internal Panelboard	200A 6-space / 12 circuit Eaton BR Circuit Breakers
Warranty	10 years

¹When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.
² The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

COMPLIANCE INFORMATION

Certifications	UL 67, UL 869A, UL 916, UL 1741 PCS CSA 22.2 0.19, CSA 22.2 205
Emissions	FCC Part 15, ICES 003

MECHANICAL SPECIFICATIONS

Dimensions	660 mm x 411 mm x 149 mm (26 in x 16 in x 6 in)
Weight	20.4 kg (45 lb)
Mounting options	Wall mount, Semi-flush mount



ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R



ROCKIT

COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aestheticallypleasing finishing touch.



Composition Shingle, Tile, Metal Rail-Less



ECOFASTENSOLAR.COM



ROCKIT SLIDE

Available in three variations, the Rocklt Slide allows installation on composition shingle, tile, and metal roofs.



ROCKIT

COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a topdown leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- · North-South adjustability
- Single tool install

STREAMLINED INSTALLATION WITH **MINIMAL ROOF PENETRATIONS**



ROCKIT MOUNT

Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features topdown leveling.

FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.

