Green Mountain Energy®
myaccount.greenmountain.com

Date of Invoice: May 26, 2023

Date Due	Amount Due	After Due Date
6/12/2023	$26.79	$28.13

Account Information

Account #:	**75297228-1**
Invoice #:	223000314029
Customer Name:	ANTON CORTES
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
ESI ID:	10089010069015246101l9

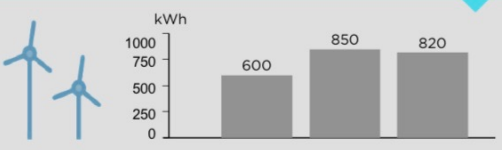
Billing Summary

Product	**Renewable Rewards® Essential**
Previous Amount Due	$66.22
Payments	-66.22
Current Electricity Charges	26.79
Amount Due	**$26.79**

Your Environmental Impact

kWh Electricity Used	600
CO_2 Emissions Avoided (pounds)[1]	782
Which is like the annual CO_2 absorbed by this many young trees	82

Electricity Usage Summary



Billing Period	Current	Previous	Last Year
Billing Days	29	30	29
Average High Temperature	84 ° F	77 ° F	89 ° F
Average Daily Usage (kWh)	21	28	28

Log in to My Account to see detailed usage history.

GM01

Cut your HVAC energy costs with increased efficiency.

Protect your entire HVAC system from unexpected issues and ensure it's running at peak efficiency with 20% off a year of professional maintenance and protection. Visit greenmountainenergy.com/airtron to sign up.

Thank you for choosing to be part of the Green Mountain community. For more information about residential electric service please visit www.powertochoose.com.

Questions

Lights Out? Report power outages by calling CenterPoint at 1-800-332-7143

We're Here to Help Contact us at: **1-866-785-4668** Daily 7 am - 10 pm CST

Account #: 75297228-1

How To Pay Your Bill

Online: Pay by credit card or bank account
myaccount.greenmountain.com
Check: Make check payable to **Green Mountain Energy Company.**

Please return this portion with payment

Date Due	6/12/2023
Amount Due	$26.79
After Due Date	$28.13

Bill Payment Assistance Program Donation Amount: $1, $5, $10 $.

Amount Enclosed $.

GREEN MOUNTAIN ENERGY COMPANY
P.O. BOX 660305
DALLAS TX 75266 - 0305

ANTON CORTES
32115 ASPEN GROVE CT
SPRING TX 77386-4879

223000314029l 027100007529722810000000026790000000281370

Account #: 75297228-1
Invoice #: 223000314029

Important Information

Green Mountain Energy Company (PUCT License 10009) is the nation's longest serving renewable energy retailer. Although we cannot promise that renewable energy will go directly to your home, the voluntary renewable portion of the electricity you purchase is added to the grid on your behalf and displaces power that's typically generated from more polluting resources.

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Notice to Customers -- If you believe this bill includes unauthorized charges, you should contact Green Mountain Energy to dispute those charges. If not satisfied with our review, you may file a complaint with the Public Utility Commission of Texas, P.O. Box 13326, Austin, Texas 78711-3326, 512-936-7120 or toll-free in Texas at 1-888-782-8477. Hearing and speech-impaired individuals with text telephones (TTY) may contact the commission at 512-936-7136 or toll-free at 1-800-735-2988.

Future Pricing Information: To obtain information about the price that will apply on your next bill, please contact one of our Customer Care representatives at 1-866-785-4668.

CENTERPOINT ENERGY UPDATE - The last time CenterPoint Energy changed its rates affecting the Delivery Charges line item on this account was 04/15/2023.

Detail Of Charges And Credits

Electric Service Identifier:	**10089010069015246101l9**
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
Billing Period From 04/26/2023 To 05/25/2023	
Product:	Renewable Rewards® Essential
Meter Number:	192354801
Current Meter Read 5/25/2023	41042
Previous Meter Read 4/26/2023	40442
kWh Usage	600
Days in Cycle:	29
Energy Charge 600 kWh @ $0.155137 /kWh	$93.08
GME Renewable Rewards Credit 600 kWh @ $-0.155137 /kWh	- 93.08
CenterPoint Energy Delivery Charges	26.79
The average price you paid for electric service this month (per kWh): $0.200	
Current Charges	$26.79
Previous Amount Due	$66.22
Payment 05/05/2023	-66.22
Balance Forward	0.00
Balance Forward: Non-Electricity	0.00
Amount Due	**$26.79**

Green Mountain Energy®
myaccount.greenmountain.com

Date of Invoice: April 28, 2023

Date Due	Amount Due	After Due Date
5/15/2023	$66.22	$69.53

Account Information

Account #:	**75297228-1**
Invoice #:	234000162760
Customer Name:	ANTON CORTES
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
ESI ID:	10089010069015246101 19

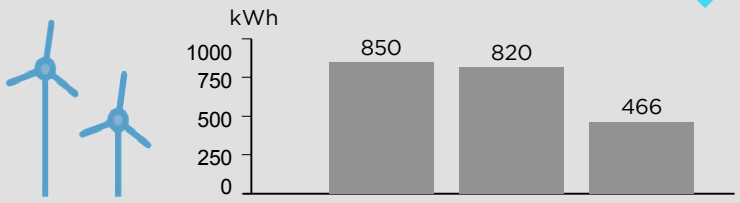
Billing Summary

Product	**Renewable Rewards® Essential**
Previous Amount Due	$15.22
Payments	-15.22
Current Electricity Charges	66.22
Amount Due	**$66.22**

Your Environmental Impact

kWh Electricity Used	850
CO_2 Emissions Avoided (pounds)[1]	1,108
Which is like the annual CO_2 absorbed by this many young trees	117

Electricity Usage Summary



Billing Period	Current	Previous	Last Year
Billing Days	30	31	31
Average High Temperature	77 ° F	78 ° F	83 ° F
Average Daily Usage (kWh)	28	26	15

Log in to My Account to see detailed usage history.

GM01

YOU ARE MAKING A DIFFERENCE!

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Thank you for choosing to be part of the Green Mountain community. For more information about residential electric service please visit www.powertochoose.com.

Questions

Lights Out? Report power outages by calling CenterPoint at 1-800-332-7143

We're Here to Help Contact us at: **1-866-785-4668** Daily 7 am - 10 pm CST

Account #: 75297228-1

How To Pay Your Bill

Online: Pay by credit card or bank account
myaccount.greenmountain.com
Check: Make check payable to **Green Mountain Energy Company.**

Please return this portion with payment

Date Due	5/15/2023
Amount Due	$66.22
After Due Date	$69.53

Bill Payment Assistance Program Donation Amount: $1, $5, $10 $ ____.__

Amount Enclosed $ ____,____.__

GREEN MOUNTAIN ENERGY COMPANY
P.O. BOX 660305
DALLAS TX 75266 - 0305

ANTON CORTES
32115 ASPEN GROVE CT
SPRING TX 77386-4879

234000162760 1 0271000075297228190000000662200000000695370

Important Information

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PUCT Required Notice: Involuntary Load Shedding. If there's a situation where there's not enough electricity supply to meet customer demand (load), the Electric Reliability Council of Texas (ERCOT) may instruct your transmission and distribution utility (TDU) company to implement temporary service interruptions. This is done to help protect the electric grid and is known as **involuntary load shedding**, and it will be conducted based on the TDU's procedures. For more information and to learn how you can help conserve energy, visit **greenmountain.com/loadshed.**

Detail Of Charges And Credits

Electric Service Identifier:	**10089010069015246101 19**
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
Billing Period From 03/27/2023 To 04/26/2023	
Product:	Renewable Rewards® Essential
Meter Number:	I92354801
Current Meter Read 4/26/2023	40442
Previous Meter Read 3/27/2023	39592
kWh Usage	850
Days in Cycle:	30
Energy Charge 850 kWh @ $0.155137 /kWh	$131.87
GME Renewable Rewards Credit 656 kWh @ $-0.155137 /kWh	- 101.77
CenterPoint Energy Delivery Charges	36.12
The average price you paid for electric service this month (per kWh): $0.198	
Current Charges	$66.22
Previous Amount Due	$15.22
Payment 04/05/2023	-15.22
Balance Forward	0.00
Balance Forward: Non-Electricity	0.00
Amount Due	**$66.22**

Bill Payment Assistance Program - This program provides assistance to customers who, as a result of hardship, need help paying their energy bills. It is funded by customer contributions. If you wish to contribute, enter the amount of your donation in the space provided. You may add the donation to your total payment or submit it separately.

[1] Estimate based on the product's eligible new renewable content and applicable carbon dioxide (CO_2) emission rate from the U.S. Environmental Protection Agency's Emissions and Generation Resource Integrated Database (eGRID).

Important Information

Notice - Certain customers may be eligible to apply for the following designations based on their medical status or the nature of the business:

- Critical Care Residential Customer: A residential customer who has a person permanently residing in his or her home who has been diagnosed by a physician as being dependent upon an electric-powered medical device to sustain life.
- Chronic Condition Residential Customer: A residential customer who has a person permanently residing in his or her home who has been diagnosed by a physician as having a serious medical condition that requires an electric-powered medical device or electric heating or cooling to prevent the impairment of a major life function through a significant deterioration or exacerbation of the person's medical condition.
- Critical Load Public Safety Customer: A non-residential customer for whom electric service is considered crucial for the protection or maintenance of public safety, including but not limited to hospitals, police stations, fire stations, and critical water and wastewater facilities.
- Critical Load Industrial Customer: An industrial customer for whom an interruption or suspension of electric service would create a dangerous or life-threatening condition on the retail customer's premises.

You can apply for the applicable designation, which affords certain protections. Please contact Green Mountain Energy for more information. Critical Care Residential Customer and Chronic Condition Residential Customer designations require an application your physician completes and submits to your transmission and distribution utility (TDU) on your behalf. Critical Load Public Safety Customer and Critical Load Industrial Customer designations require you to complete an application with your TDU.

Future Pricing Information: To obtain information about the price that will apply on your next bill, please contact one of our Customer Care representatives at 1-866-785-4668.

CENTERPOINT ENERGY UPDATE - The last time CenterPoint Energy changed its rates affecting the Delivery Charges line item on this account was 04/15/2023.

Green Mountain Energy®
myaccount.greenmountain.com

Date of Invoice: March 28, 2023

Date Due	Amount Due	After Due Date
4/13/2023	$15.22	$15.98

Account Information

Account #:	**75297228-1**
Invoice #:	209000674206
Customer Name:	ANTON CORTES
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
ESI ID:	10089010069015246101 19

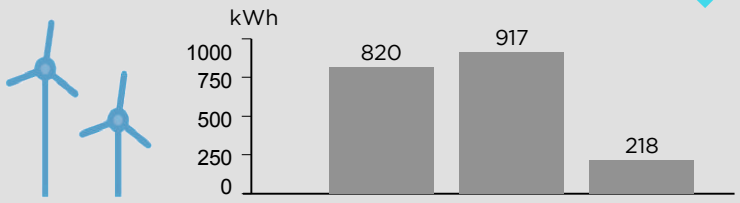
Billing Summary

Product	**Renewable Rewards® Perfect Match 12**
Previous Amount Due	$66.05
Payments	-66.05
Current Electricity Charges	15.22
Amount Due	**$15.22**

Your Environmental Impact

kWh Electricity Used	820
CO_2 Emissions Avoided (pounds)[1]	1,069
Which is like the annual CO_2 absorbed by this many young trees	113

Electricity Usage Summary



Billing Period	Current	Previous	Last Year
Billing Days	31	29	21
Average High Temperature	78 ° F	67 ° F	72 ° F
Average Daily Usage (kWh)	26	32	10

Log in to My Account to see detailed usage history.

GM01

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Questions

Lights Out? Report power outages by calling CenterPoint at 1-800-332-7143

We're Here to Help Contact us at: **1-866-785-4668** Daily 7 am - 10 pm CST

Account #: 75297228-1

Please return this portion with payment

How To Pay Your Bill

Online: Pay by credit card or bank account
myaccount.greenmountain.com
Check: Make check payable to **Green Mountain Energy Company.**

Date Due	4/13/2023
Amount Due	$15.22
After Due Date	$15.98

Bill Payment Assistance Program Donation Amount: $1, $5, $10 $.

Amount Enclosed $.

GREEN MOUNTAIN ENERGY COMPANY
P.O. BOX 660305
DALLAS TX 75266 - 0305

ANTON CORTES
32115 ASPEN GROVE CT
SPRING TX 77386-4879

209000674206

0271000075297228190000000152200000000159870

Account #: 75297228-1
Invoice #: 209000674206

Important Information

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The amount billed includes Transition Charges and System Restoration Charges that are the property of BondCo and not of Green Mountain Energy or CenterPoint Energy Houston Electric.

Detail Of Charges And Credits

Electric Service Identifier:	**10089010069015246101l9**
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
Billing Period From 02/24/2023 To 03/27/2023	
Product:	Renewable Rewards® Perfect Match 12

Thank you for supporting renewable energy. Your current plan term has expired, and you are currently being billed month-to-month under this plan. If you'd like to discuss plan options, let us know at 1-866-785-4668.

Meter Number:	I92354801
Current Meter Read 3/27/2023	39592
Previous Meter Read 2/24/2023	38772
kWh Usage	820
Days in Cycle:	31
Base Charge	$9.95
Energy Charge 820 kWh @ $0.164524 /kWh	134.91
GME Renewable Rewards Credit 788 kWh @ $-0.164524 /kWh	- 129.64
The average price you paid for electric service this month (per kWh): $0.177	
Current Charges	$15.22
Previous Amount Due	$66.05
Payment 03/06/2023	-66.05
Balance Forward	0.00
Balance Forward: Non-Electricity	0.00
Amount Due	**$15.22**

Bill Payment Assistance Program - This program provides assistance to customers who, as a result of hardship, need help paying their energy bills. It is funded by customer contributions. If you wish to contribute, enter the amount of your donation in the space provided. You may add the donation to your total payment or submit it separately.

[1] Estimate based on the product's eligible new renewable content and applicable carbon dioxide (CO_2) emission rate from the U.S. Environmental Protection Agency's Emissions and Generation Resource Integrated Database (eGRID).

Green Mountain Energy®
myaccount.greenmountain.com

Date of Invoice: February 27, 2023

Date Due	Amount Due	After Due Date
3/15/2023	$66.05	$69.35

Account Information

Account #:	75297228-1
Invoice #:	240000079260
Customer Name:	ANTON CORTES
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
ESI ID:	10089010069015246101 19

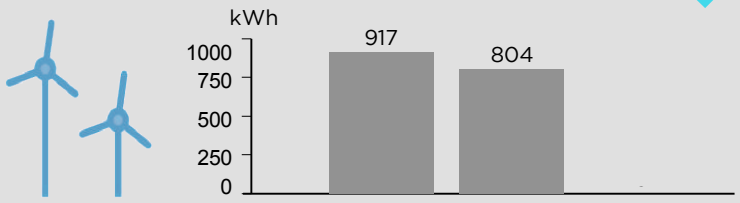
Billing Summary

Product	**Renewable Rewards® Perfect Match 12**
Previous Amount Due	$9.44
Payments	-9.44
Current Electricity Charges	66.05
Amount Due	**$66.05**

Your Environmental Impact

kWh Electricity Used	917
CO_2 Emissions Avoided (pounds)[1]	1,195
Which is like the annual CO_2 absorbed by this many young trees	126

Electricity Usage Summary



Billing Period	Current	Previous	
Billing Days	29	35	
Average High Temperature	66 ° F	67 ° F	
Average Daily Usage (kWh)	32	23	

Log in to My Account to see detailed usage history.

GM01

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Questions

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We're Here to Help Contact us at: **1-866-785-4668** Daily 7 am - 10 pm CST

Account #: 75297228-1

How To Pay Your Bill

Online: Pay by credit card or bank account
myaccount.greenmountain.com
Check: Make check payable to **Green Mountain Energy Company.**

Please return this portion with payment

Date Due	3/15/2023
Amount Due	$66.05
After Due Date	$69.35

Bill Payment Assistance Program Donation Amount: $1, $5, $10 $ ____.__

Amount Enclosed $ ____,___.__

GREEN MOUNTAIN ENERGY COMPANY
P.O. BOX 660305
DALLAS TX 75266 - 0305

ANTON CORTES
32115 ASPEN GROVE CT
SPRING TX 77386-4879

2400000792606 0271000075297228170000000660500000000693590

Account #: 75297228-1
Invoice #: 240000079260

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Detail Of Charges And Credits

Electric Service Identifier:	**10089010069015246101 19**
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
Billing Period From 01/26/2023 To 02/24/2023	
Product:	Renewable Rewards® Perfect Match 12

It's time to renew! **Your current clean electricity plan will expire with your meter reading on or after March 4, 2023**, but we've got options for you. If you haven't already locked in another competitive price,call us at 1-866-785-4668 to learn more.

Meter Number:	I92354801
Current Meter Read 2/24/2023	38772
Previous Meter Read 1/26/2023	37855
kWh Usage	917
Days in Cycle:	29
Base Charge	$9.95
Energy Charge 917 kWh @ $0.164524 /kWh	150.87
GME Renewable Rewards Credit 576 kWh @ $-0.164524 /kWh	- 94.77
The average price you paid for electric service this month (per kWh): $0.175	
Current Charges	$66.05
Previous Amount Due	$9.44
Payment 02/06/2023	-9.44
Balance Forward	0.00
Balance Forward: Non-Electricity	0.00
Amount Due	**$66.05**

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[1] Estimate based on the product's eligible new renewable content and applicable carbon dioxide (CO_2) emission rate from the U.S. Environmental Protection Agency's Emissions and Generation Resource Integrated Database (eGRID).

Green Mountain Energy®
myaccount.greenmountain.com

Date of Invoice: January 30, 2023

Date Due	Amount Due	After Due Date
2/15/2023	$9.44	$9.91

Account Information

Account #:	**75297228-1**
Invoice #:	302004367627
Customer Name:	ANTON CORTES
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
ESI ID:	10089010069015246101 19

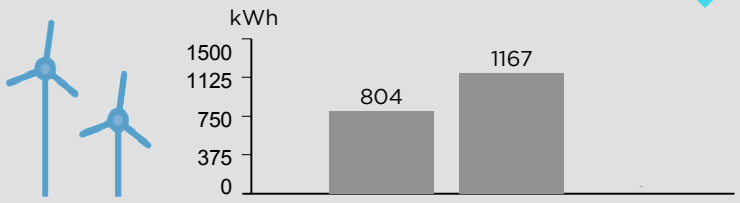
Billing Summary

Product	**Renewable Rewards® Perfect Match 12**
Previous Amount Due	$109.49
Payments	-110.00
Current Electricity Charges	9.95
Amount Due	**$9.44**

Your Environmental Impact

kWh Electricity Used	804
CO_2 Emissions Avoided (pounds)[1]	1,048
Which is like the annual CO_2 absorbed by this many young trees	110

Electricity Usage Summary



Billing Period	Current	Previous	
Billing Days	35	31	
Average High Temperature	67 ° F	70 ° F	
Average Daily Usage (kWh)	23	38	

Log in to My Account to see detailed usage history.

GM01

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Questions

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We're Here to Help Contact us at: **1-866-785-4668** Daily 7 am - 10 pm CST

Account #: 75297228-1

How To Pay Your Bill

Online: Pay by credit card or bank account
myaccount.greenmountain.com
Check: Make check payable to **Green Mountain Energy Company.**

Please return this portion with payment

Date Due	2/15/2023
Amount Due	$9.44
After Due Date	$9.91

Bill Payment Assistance Program Donation Amount: $1, $5, $10 $.

Amount Enclosed $.

GREEN MOUNTAIN ENERGY COMPANY
P.O. BOX 660305
DALLAS TX 75266 - 0305

ANTON CORTES
32115 ASPEN GROVE CT
SPRING TX 77386-4879

302004367627 0271000075297228190000000094400000000991 70

Account #: 75297228-1
Invoice #: 302004367627

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Detail Of Charges And Credits

Electric Service Identifier:	**10089010069015246101 19**
Service Address:	32115 ASPEN GROVE CT SPRING TX 77386-4879
Billing Period From 12/22/2022 To 01/26/2023	
Product:	Renewable Rewards® Perfect Match 12

Thanks for being part of our community. **Your current plan is effective through your meter read on or after March 4, 2023**. We'll be in touch about your plan options before then, and you can always call us at 1-866-785-4668.

Meter Number:	I92354801
Current Meter Read 1/26/2023	37855
Previous Meter Read 12/22/2022	37051
kWh Usage	804
Days in Cycle:	35
Base Charge	$9.95
Energy Charge 804 kWh @ $0.164524 /kWh	132.28
GME Renewable Rewards Credit 804 kWh @ $-0.164524 /kWh	- 132.28
The average price you paid for electric service this month (per kWh): $0.177	
Current Charges	$9.95
Previous Amount Due	$109.49
Payment 01/05/2023	-110.00
Balance Forward	-0.51
Balance Forward: Non-Electricity	0.00
Amount Due	**$9.44**

Bill Payment Assistance Program - This program provides assistance to customers who, as a result of hardship, need help paying their energy bills. It is funded by customer contributions. If you wish to contribute, enter the amount of your donation in the space provided. You may add the donation to your total payment or submit it separately.

[1] Estimate based on the product's eligible new renewable content and applicable carbon dioxide (CO_2) emission rate from the U.S. Environmental Protection Agency's Emissions and Generation Resource Integrated Database (eGRID).

SCOPE OF WORK

TO INSTALL A SOLAR PHOTOVOLTAIC (PV) SYSTEM AT THE
ANTON CORTES RESIDENCE,
LOCATED AT 32115 ASPEN GROVE COURT IN SPRING, 77386.
THE POWER GENERATED BY THE PV SYSTEM WILL BE INTERCONNECTED
WITH THE UTILITY GRID THROUGH THE EXISTING ELECTRICAL SERVICE EQUIPMENT.
THE PV SYSTEM DOES NOT INCLUDE STORAGE BATTERIES.

SYSTEM RATING

9.45	kW DC STC
8.86	kW DC PTC
7.97	kW CEC-AC

EQUIPMENT SUMMARY

27	LONGI SOLAR LR4-60HPB-350M PV MODULES
27	ENPHASE IQ7PLUS-72-2-US (240V) PV INVERTER(S)

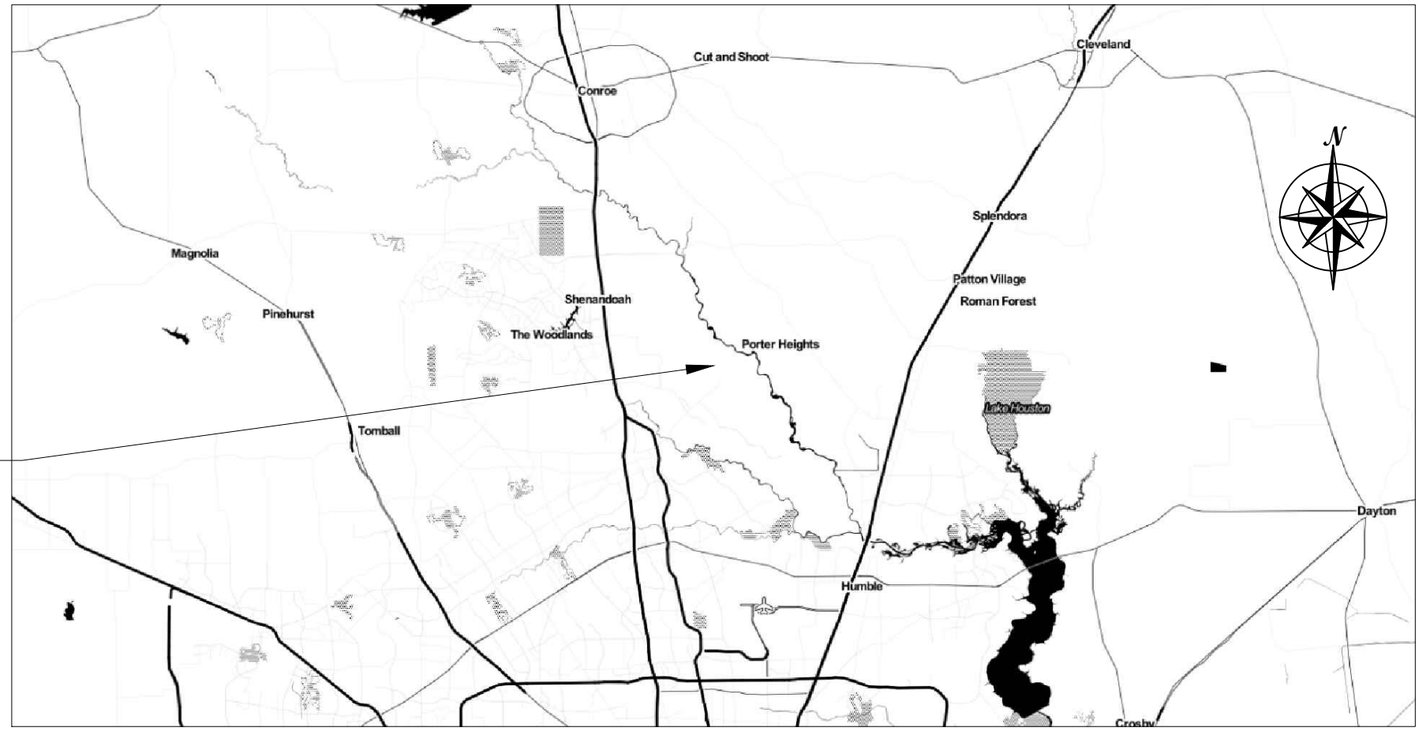
SHEET INDEX

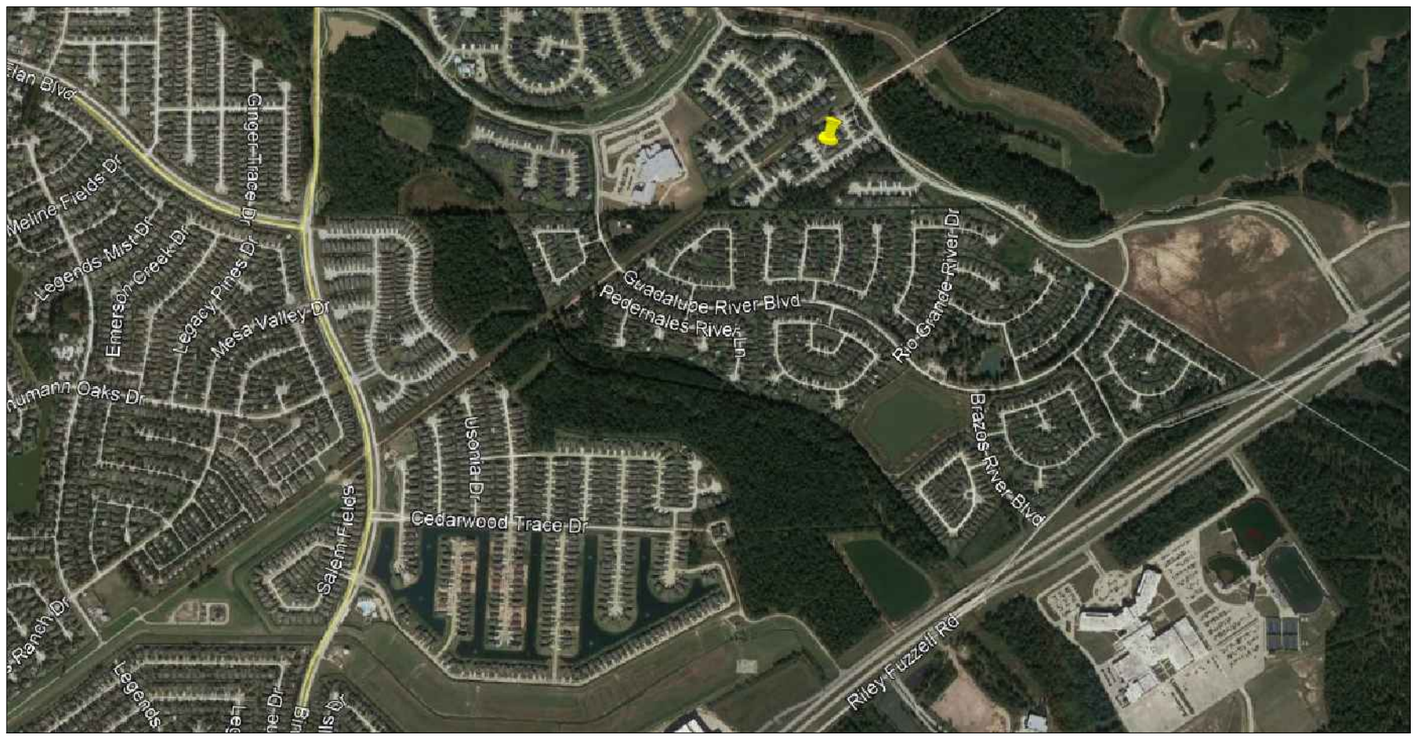
PV-1	COVER
PV-2	SITE MAP & PV LAYOUT
PV-2.1	ROOF 1 LAYOUT
PV-3.1	ELECTRICAL 1-LINE DIAGRAM
PV-3.2	ELECTRICAL WIRE CALCULATIONS
PV-5	SYSTEM LABELING DETAIL
PV-6	EQUIPMENT SPECIFICATION SHEETS
PV-6.1	EQUIPMENT SPECIFICATION SHEETS
PV-6.2	EQUIPMENT SPECIFICATION SHEETS
PV-6.3	EQUIPMENT SPECIFICATION SHEETS

GOVERNING CODES

2017 NATIONAL ELECTRICAL CODE
2018 INTERNATIONAL BUILDING CODE / INTERNATIONAL RESIDENTIAL CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269

PROJECT LOCATION
30.134505, -95.372541





DESIGN & DRAFTING BY:
JENNIFER GRUDOWSKI-FRIZZELL
--

REVISIONS

DESCRIPTION	DATE	REV
ORIGINAL	6/20/2021	A
SYSTEM CHANGE	7/2/2021	B

CONTRACTOR

TAC
WWW.TACSOLARANDAC.COM
1800 S. LOOP 288, STE 396 #105
DENTON, TX 76205
NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 1008901006901524610119

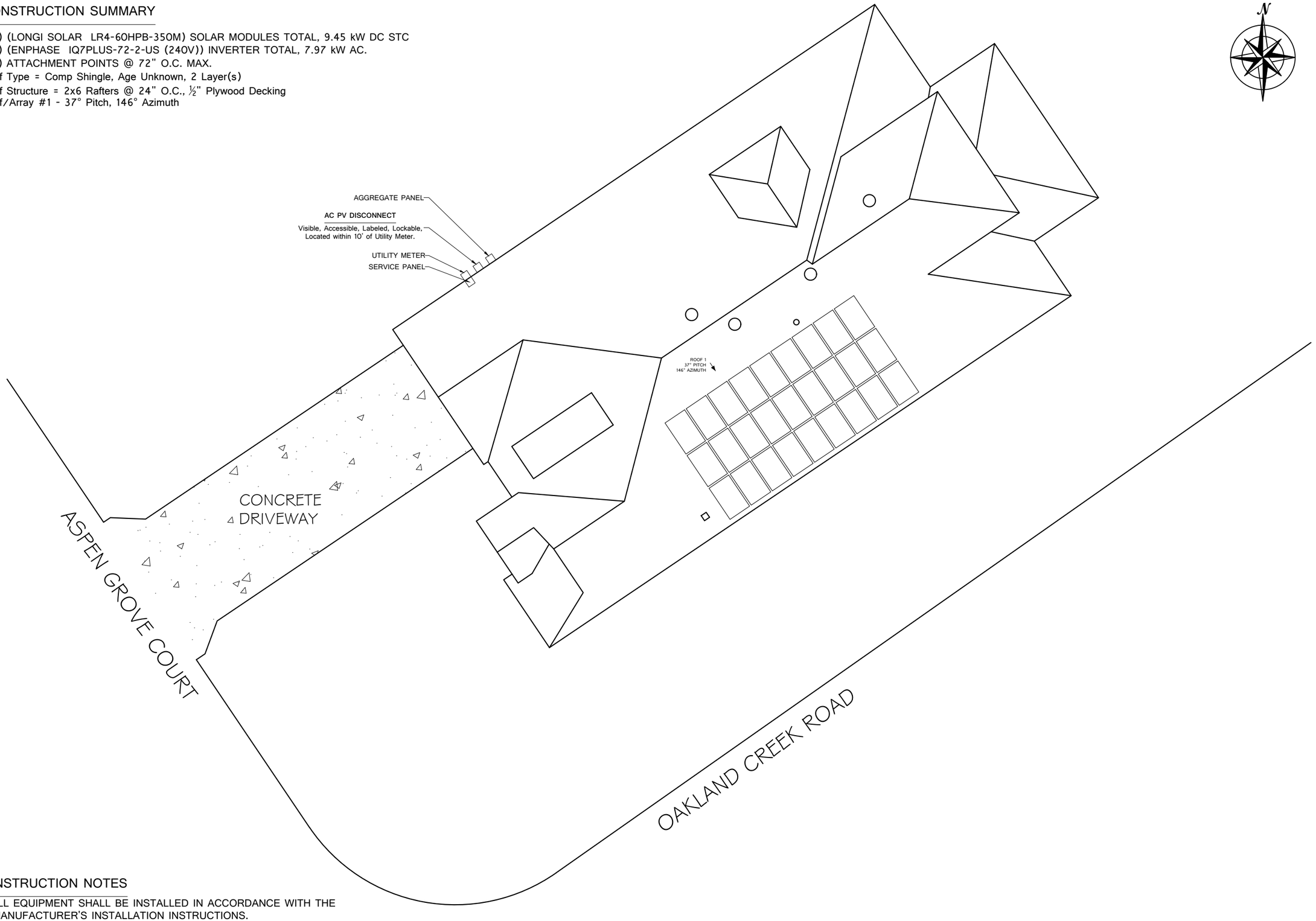
SHEET NAME
COVER PAGE

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-1

CONSTRUCTION SUMMARY

(27) (LONGI SOLAR LR4-60HPB-350M) SOLAR MODULES TOTAL, 9.45 kW DC STC
(27) (ENPHASE IQ7PLUS-72-2-US (240V)) INVERTER TOTAL, 7.97 kW AC.
(36) ATTACHMENT POINTS @ 72" O.C. MAX.
Roof Type = Comp Shingle, Age Unknown, 2 Layer(s)
Roof Structure = 2x6 Rafters @ 24" O.C., ½" Plywood Decking
Roof/Array #1 - 37° Pitch, 146° Azimuth



CONSTRUCTION NOTES

1.) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2.) ALL OUTDOOR EQUIPMENT SHALL BE RAINTIGHT WITH MINIMUM NEMA 3R RATING.
3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.

DESIGN & DRAFTING BY:
JENNIFER GRUDOWSKI-FRIZZELL
--

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NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246101 19

SHEET NAME
PV LAYOUT

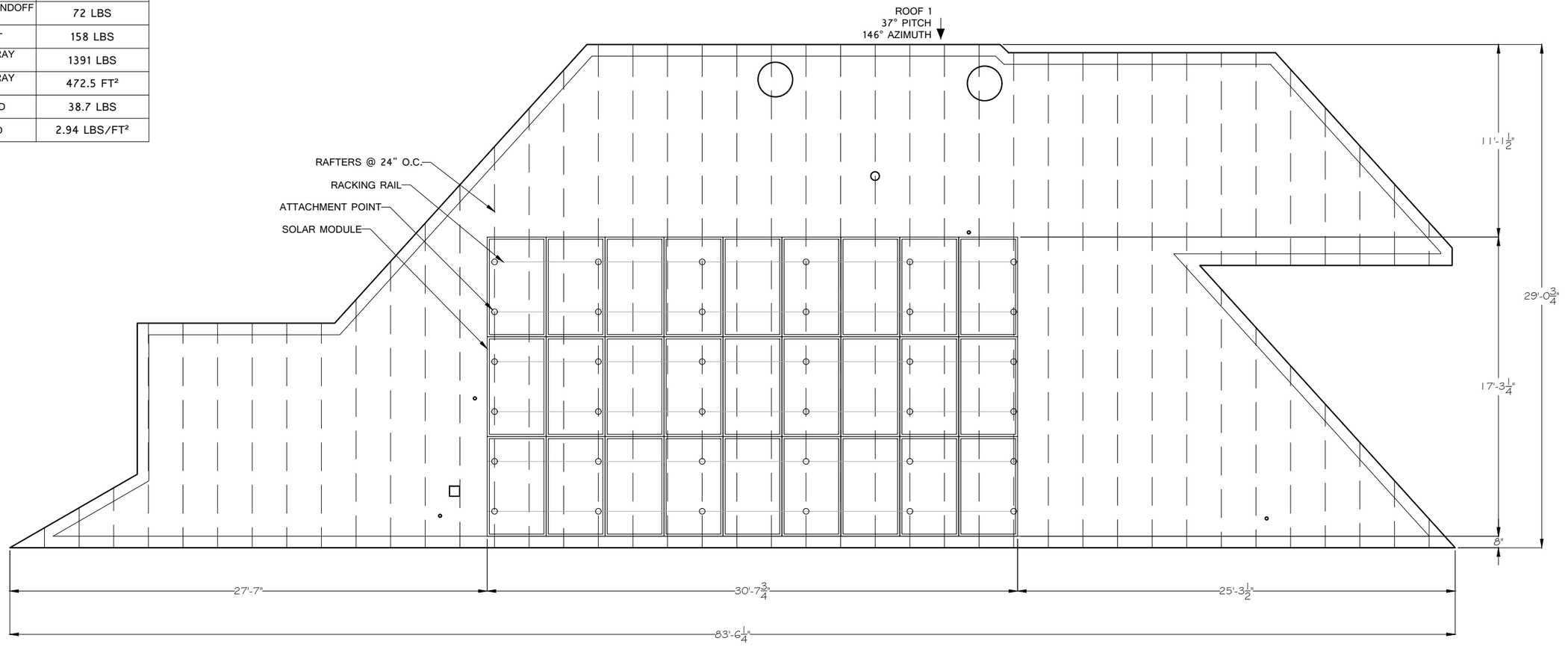
SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-2

CONSTRUCTION SUMMARY - ROOF 1

(27) SOLAR MODULES
(36) ATTACHMENT POINTS @ 72" O.C. MAX.
Roof Type = Comp Shingle, Age Unknown, 2 Layer(s)
Roof Structure = 2x6 Rafters @ 24" O.C., ½" Plywood Decking
Roof/Array #1 - 37° Pitch, 146° Azimuth

LOAD CALCULATIONS (ROOF - 1)	
TOTAL # OF MODULES	27
TOTAL # OF STANDOFFS	36
LINEAR FT OF RAIL	176 FT
MODULE WEIGHT	43 LBS
STANDOFF WEIGHT	2.0 LBS
RAIL WEIGHT LBS/FT	0.9 LBS
TOTAL MODULE WEIGHT	1161 LBS
TOTAL STANDOFF WEIGHT	72 LBS
TOTAL RAIL WEIGHT	158 LBS
TOTAL ARRAY WEIGHT	1391 LBS
TOTAL ARRAY AREA	472.5 FT²
POINT LOAD	38.7 LBS
DEAD LOAD	2.94 LBS/FT²



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1800 S. LOOP 288, STE 396 #105
DENTON, TX 76205
NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

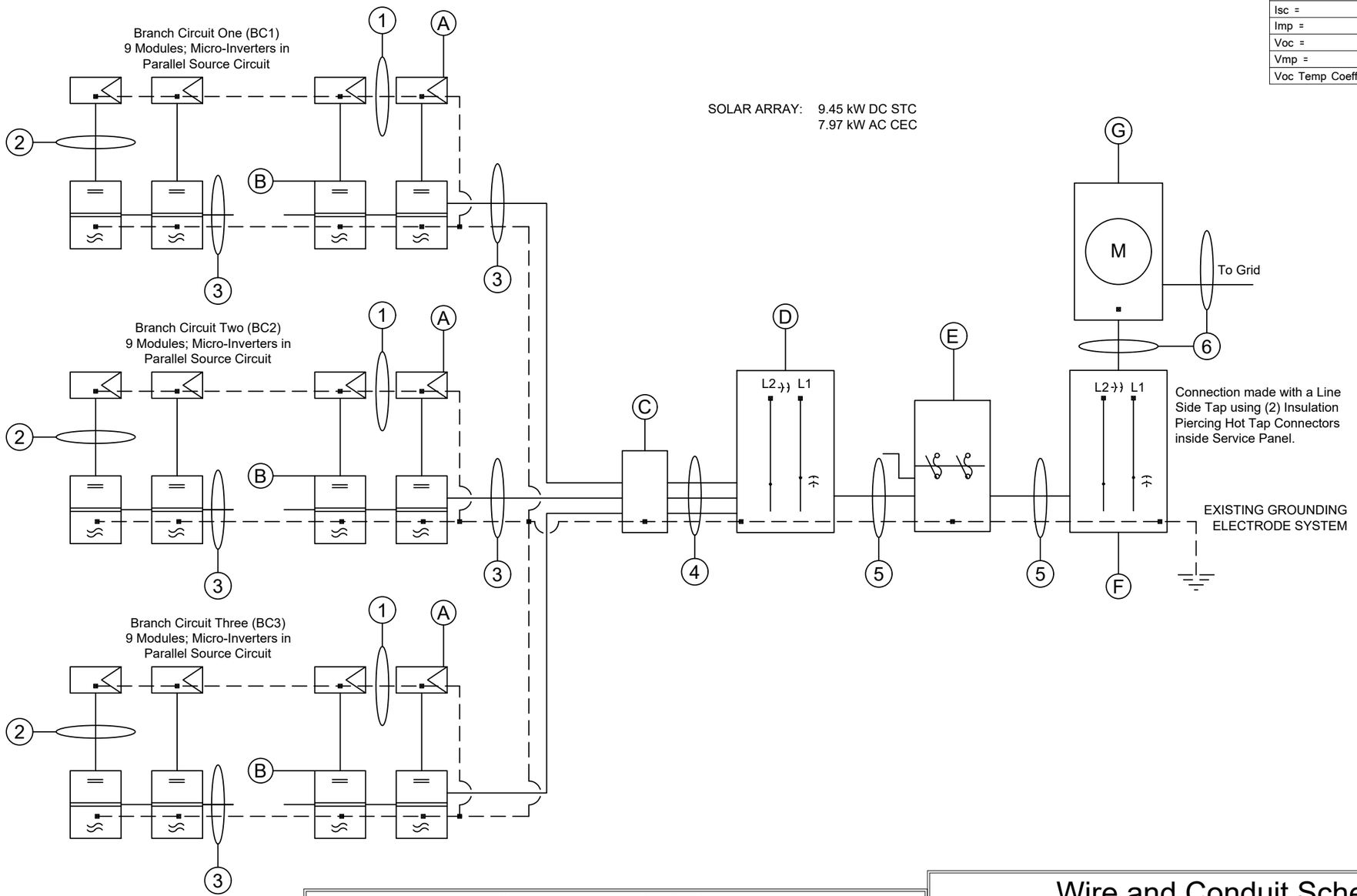
CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246 10119

SHEET NAME
ROOF 1 LAYOUT

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-2.1

TOTAL SYSTEM SIZE 9.45 kW DC STC	
LONGI SOLAR LR4-60HPB-350M	
Isc =	11.16 A
Imp =	10.18 A
Voc =	40.4 VDC
Vmp =	34.4 VDC
Voc Temp Coefficient	-0.27%/°C



Component Notes

A	Solar Panel: LONGI SOLAR LR4-60HPB-350M. Typical of 27
B	ENPHASE IQ7PLUS-72-2-US (240V) Microinverter. Typical of 27
C	NEMA 3 Junction / Transition Box.
D	Aggregate Panel - 125 A MLO - (3) 15A Breakers for Inverter Interconnection
E	**AC PV DISCONNECT**: Lockable 60A 2-pole 240V. NEMA-3 w/45A Fuses. Accessible, Visible, Lockable, Labeled, within 10' of Utility Meter
F	Existing Load Center: 225A Bus, with 150A Main Breaker. Line Side Tap Interconnection.
G	Existing Utility Meter.

Wire and Conduit Schedule

Marker	Description	Required Conductor Ampacity
1	(1) 6AWG Bare Cu Ground.	
2	(2) 12AWG Cu PV Wire. Existing Manufacture Installed Wire	17.44
3	(2) 12AWG Enphase Wire. (1) 6AWG Bare Cu Ground.	13.61
4	3/4" EMT. (6) 10AWG Cu THWN-2. (1) 6AWG Cu THWN-2 Ground.	19.17
5	1" EMT. (3) 6AWG Cu THWN-2. (1) 6AWG Cu THWN-2 Ground.	40.84
6	Existing Infrastructure	

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NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246101190

SHEET NAME
ELECTRICAL 1-LINE DIAGRAM

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-3.1

ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.

2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90ºC WET ENVIRONMENT.

3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.

4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.

5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.

6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.

7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.

8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.

9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.

10.) THE DC SIDE OF THE PV SYSTEM IS UNGROUNDED AND SHALL COMPLY WITH NEC 690.35.

11.) INSTALLATION SHALL BE ACCORDING TO THE 2017 NATIONAL ELECTRIC CODE AND ALL STATE AND LOCAL STANDARDS AND CODES.

12.) LABELS SHALL BE INSTALLED ON ALL NECESSARY EQUIPMENT AS PER NEC, INCLUDING INVERTERS, SWITCHES, LOAD CENTERS AND ALL OTHER ENCLOSURES.

13.) ALL ELECTRICAL WORK WILL BE INSTALLED AND INSPECTED BY A MASTER ELECTRICIAN AND ALL LOCAL AUTHORITIES.

14.) CONTRACTOR IS RESPONSIBLE FOR ENSURING INSTALLATION IS FIELD VERIFIED, AND IS INSTALLED PER NEC REQUIREMENTS & MANUFACTURERS DESIGN SPECIFICATIONS.

15.) CONTINUOUS GROUND IS REQUIRED. IRREVERSIBLE COMPRESSION CLAMPS ARE REQUIRED FOR ALL GROUND SPLICES.

16.) IF APPLICABLE, CTs MOUNTED IN VERTICAL OR HORIZONTAL POSITION ON MOUNTING BAR PROVIDED IN CT ENCLOSURE. CTs MOUNTED EQUAL DISTANCE APART & CENTERED.

17.) ALL EQUIPMENT (TERMINALS,LUGS, & DEVICES) ARE LISTED & IDENTIFIED FOR 75°C CONDUCTORS MINIMUM.

18.) ALL EQUIPMENT SHALL BE LISTED & IDENTIFIED FOR APPLICATION. PV MODULES SHALL BE CERTIFIED TO UL 1703. INVERTERS, CONVERTERS, & COMBINERS SHALL BE CERTIFIED TO UL1741.

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS

#2 Existing Manufactured Installed AWG #12 Wire

#3 Microinverter Output Wire Ampacity Calculation - Branch 1, 2, 3
Branch Output Circuit OCP Calc. (Inverter Imp)*(# of Inverters)*(1.25) = 13.61 A
Using largest ampacity of separate branches for calculation
Branch Output Circuit Imax (Inverter Imp)*(# of Inverters) = 10.89 A
AWG #12, (Derated Amps=25)*(Temp Der.=0.91)*(CND Fill Der.=1) = 22.75 A
22.75 A > 10.89 A, therefore AC wire size is valid.

#4 Junction Box 1 Output Wire Ampacity Calculation
Using largest ampacity of separate branches for calculation = 10.89 A
AWG #10, (Derated Amps=35)*(Temp Der.=0.71)*(CND Fill Der.=0.8) = 19.88 A
19.88 A > 10.89 A, therefore AC wire size is valid.

#5 Aggregate Panel Output Wire Ampacity Calculation
Output Circuit OCP Calc.
(Inverter Imp)*(Total # of Inverters)*(1.25) = 40.84 A
Agg Panel Imax (Inverter Imp)*(Total # of Inverters) = 32.67 A
AWG #6, (Derated Amps=65)*(Temp Der.=0.91)*(CND Fill Der.=1) = 59.15 A
59.15 A > 32.67 A, therefore AC wire size is valid.

AC SYSTEM SPECIFICATIONS	
AC Output Current	32.7 A
Operating AC Voltage	240 V
CONFIGURATION	
Modules per String	1
Strings per Inverter	1
Number of Inverters	27
Record low temp	-10ºC
Voc Temp Coefficient	-0.27%/ºC

SYSTEM SIZE		
DC System Size	9.45	kW
AC System Size	7.97	kW

DC STRING CALCULATIONS	DC SYSTEM SPECIFICATIONS	
=(Inverter Imax DC Input)	Operating Current	n/a
=(Regulated Voltage from Power Optimizer)	Operating Voltage	n/a
=(Max Voltage from Inverter)	Max. System Voltage	n/a
=(Max Isc from Power Optimizer)*(# of Strings)	Short Circuit Current	n/a

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JENNIFER GRUDOWSKI-FRIZZELL
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NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246 10119

SHEET NAME
ELECTRICAL WIRE CALCULATIONS

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-3.2

SIGNAGE REQUIREMENTS

> RED BACKGROUND
> WHITE LETTERING
> MIN. 3/8" LETTER HEIGHT
> ALL CAPITAL LETTERS
> ARIAL OR SIMILAR FONT
> REFLECTIVE, WEATHER RESISTANT MATERIAL, UL 969

7 1/2" × 3 3/4"

WARNING
IF GROUND FAULT IS INDICATED, THE NORMALLY GROUNDED CONDUCTORS MAY BE ENERGIZED AND UNGROUNDED.

REQ'D BY: NEC 690.5(C) — 1

APPLY TO:
INVERTER

~~1/2" × 6 1/2"~~

~~SOLAR DC DISCONNECT~~

~~REQ' BY: NEC 690.14(C)(2)~~ — ~~2~~

~~APPLY TO:~~
~~DC DISCONNECTS~~

1/2" × 6 1/2"

SOLAR AC DISCONNECT

REQ' BY: NEC 690.14(C)(2) — 3

APPLY TO:
AC DISCONNECTS

7 1/2" × 4 1/2"

WARNING
ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

REQ'D BY: NEC 690.17 — 4

APPLY TO:
DISCONNECTS
SOLAR LOAD CENTERS
COMBINER BOXES

~~8 1/4" × 5"~~

~~GRID TIED PHOTOVOLTAIC POWER SOURCE~~
~~OPERATING CURRENT: xx A~~
~~OPERATING VOLTAGE: 400 V~~
~~MAX SYSTEM VOLTAGE: 480 V~~
~~SHORT CIRCUIT CURRENT: 30.0 A~~
~~MAX INVERTER OUTPUT:~~
~~5.0 kW, 21.0 A, 240 VAC~~

~~RED'Q BY: NEC 690.53~~ — ~~5~~

~~APPLY TO:~~
~~INVERTER~~

6 3/4" × 2 1/2"

PHOTOVOLTAIC SYSTEM DISCONNECT
AC CURRENT: 32.7 A
VOLTAGE: 240 VAC

REQ'D BY: NEC 690.54 — 6

APPLY TO:
PV SYSTEM BREAKER

7 1/4" × 2"

THIS ELECTRIC SERVICE IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

REQ'D BY: NEC 690.56(B) — 7

MAIN SERVICE PANEL

8" × 2"

CAUTION
DO NOT INSTALL ADDITIONAL LOADS IN THIS PANEL

REQ'D BY: NEC 690.64(B)(2) — 8

APPLY TO:
SOLAR LOAD CENTER

6 1/4" × 3 1/4"

WARNING
INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

REQ'D BY: NEC 690.64(B)(7) — 9

APPLY TO:
PV SYSTEM BREAKER

7 1/2" × 3 1/4"

CAUTION
SOLAR PV SYSTEM MAY REMAIN ENERGIZED AFTER DISCONNECT DURING DAYLIGHT HOURS.

REQ'D BY: AHJ — 10

APPLY TO:
MAIN SERVICE PANEL

1/2" × 6 3/4"

CAUTION: SOLAR CIRCUIT

REQ'D BY: AHJ — 11

APPLY TO:
SOLAR CONDUIT

7 1/2" × 3 3/4"

WARNING
ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THE PV SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

REQ'D BY: NEC 690.35(F) — 12

UNGROUNDED ARRAYS ONLY
JUNCTION BOXES
COMBINER BOXES
DC DISCONNECTS
INVERTERS

6 3/4" × 1 3/4"

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

REQ'D BY: NEC 690.56(C)(1)(b) — 13

LOCATED WITHIN 3 FT FROM PV SYSTEM DISCONNECT SWITCH

SCALE: 1" = 4"

DESIGN & DRAFTING BY:
JENNIFER GRUDOWSKI-FRIZZELL
--

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PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246101190

SHEET NAME
SYSTEM LABELING DETAIL

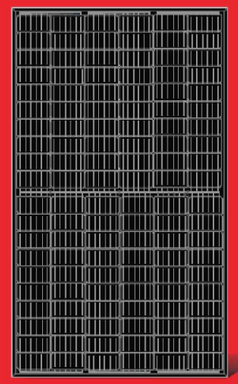
SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-5

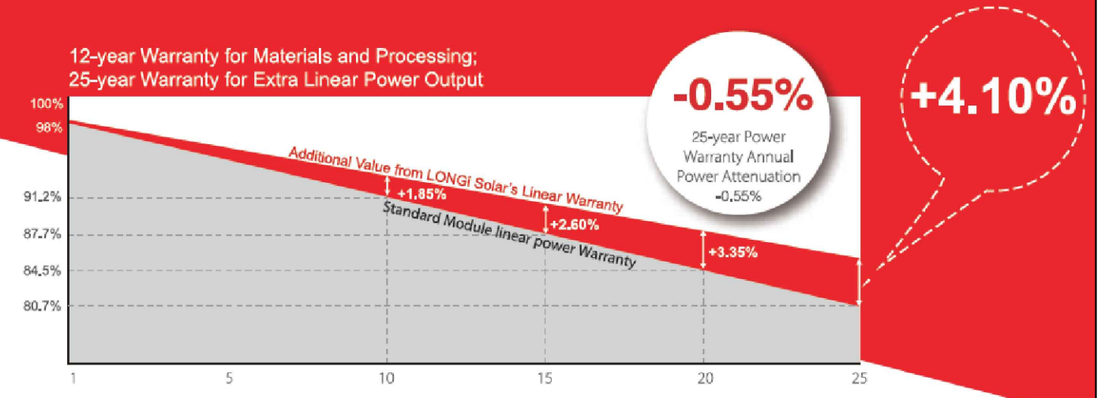
LR4-60HPB 345~370M

Hi-MO 4m (Black)

NEW



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

LONGi

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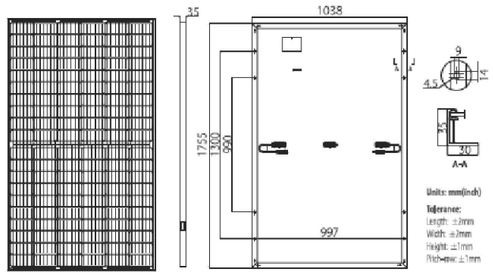
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

20200410V11 for US-D

LR4-60HPB 345~370M

Design (mm)



Mechanical Parameters

Cell Orientation: 120 (6×20)

Junction Box: IP68, three diodes

Output Cable: 4mm², 1200mm in length

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 Temperature: -40℃ ~+85℃

Power Output Tolerance: 0 ~ +5 W

Voc and Isc Tolerance: ±3%

Maximum System Voltage: DC1000V (IEC/UL)

Maximum Series Fuse Rating: 20A

Nominal Operating Cell Temperature: 45±2℃

Safety Class: Class II

Fire Rating: UL type 1 or 2

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-60HPB-345M		LR4-60HPB-350M		LR4-60HPB-355M		LR4-60HPB-360M		LR4-60HPB-365M		LR4-60HPB-370M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	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 (Isc/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		20.0		20.3	

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

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

Temperature Ratings (STC)

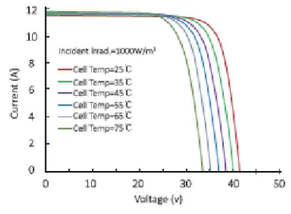
Temperature Coefficient of Isc	+0.048%/℃
Temperature Coefficient of Voc	-0.270%/℃
Temperature Coefficient of Pmax	-0.350%/℃

Mechanical Loading

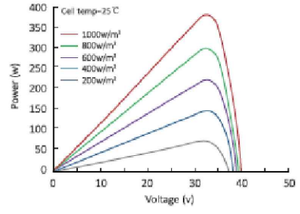
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

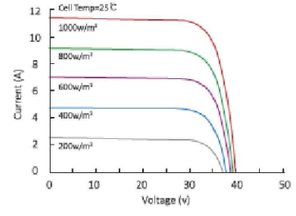
Current-Voltage Curve (LR4-60HPB-360M)



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



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



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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.

20200410V11 for US-D

DESIGN & DRAFTING BY:
JENNIFER GRUDOWSKI-FRIZZELL
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REVISIONS

DESCRIPTION	DATE	REV
ORIGINAL	6/20/2021	A
SYSTEM CHANGE	7/2/2021	B

CONTRACTOR

TAC
WWW.TACSOLARANDAC.COM
1800 S. LOOP 288, STE 396 #105
DENTON, TX 76205
NABCEP: PV-102216-015022
TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015211 9

SHEET NAME
EQUIPMENT SPECIFICATION SHEETS

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-6

Data Sheet
Enphase Microinverters
Region: AMERICAS

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready Enphase IQ 7 Micro™ and Enphase IQ 7+ Micro™ dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

*The IQ 7+ Micro is required to support 72-cell modules.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US	IQ7PLUS-72-2-US
Commonly used module pairings[1]	235 W - 350 W +	235 W - 440 W +
Module compatibility	60-cell PV modules only	60-cell and 72-cell PV modules
Maximum input DC voltage	48 V	60 V
Peak power tracking voltage	27 V - 37 V	27 V - 45 V
Operating range	16 V - 48 V	16 V - 60 V
Min/Max start voltage	22 V / 48 V	22 V / 60 V
Max DC short circuit current (module Isc)	15 A	15 A
Overvoltage class DC port	II	II
DC port backfeed current	0 A	0 A
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)	IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	

EFFICIENCY	@240 V	@208 V	@240 V	@208 V
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %

MECHANICAL DATA	
Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)
Weight	1.08 kg (2.38 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

FEATURES	
Communication	Power Line Communication (PLC)
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

2019-3-26

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CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246 10119

SHEET NAME
EQUIPMENT SPECIFICATION SHEETS

SHEET SIZE
ANSI B
11"x17"

SHEET NUMBER
PV-6.1

Tech Brief

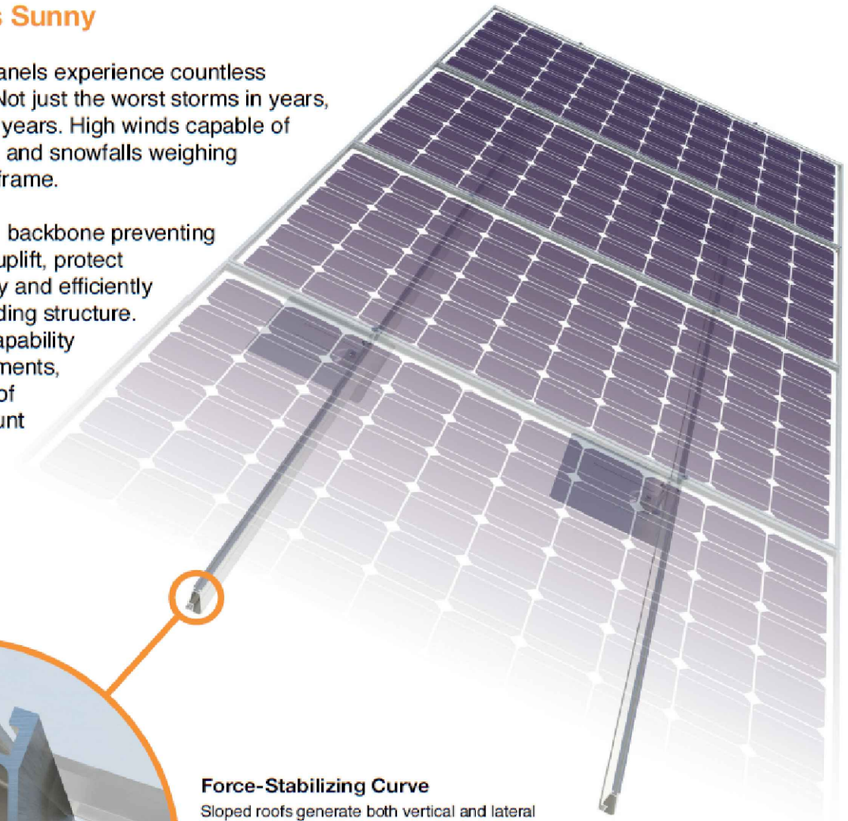
IRONRIDGE

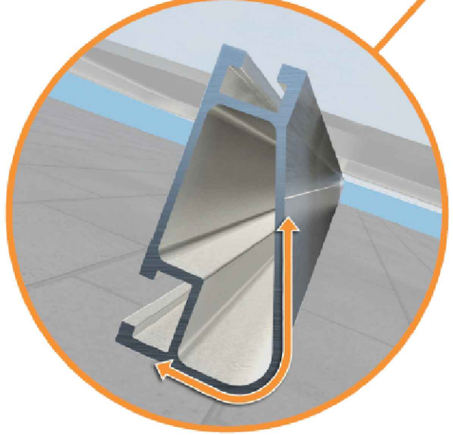
XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.





Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

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TECL# 31393

PROJECT NAME

CORTES - 32115 ASPEN GROVE CT
32115 ASPEN GROVE COURT
SPRING, TX, 77386
ESI ID#: 10089010069015246119

SHEET NAME
EQUIPMENT SPECIFICATION SHEETS

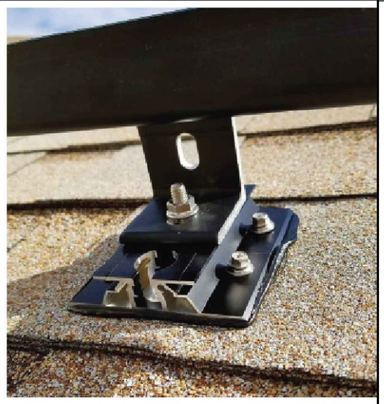
SHEET SIZE
ANSI B
11"x17"

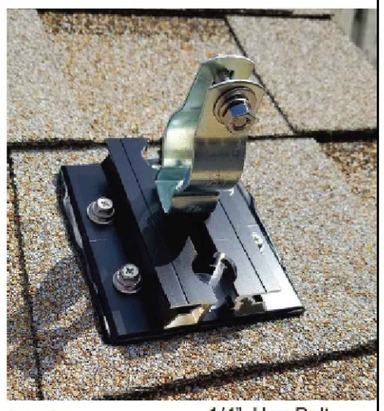
SHEET NUMBER
PV-6.2

RT-MINI

Self-flashing base for asphalt & metal roof-top PV mounting systems

RT-MINI is suitable for mounting any rail system with a conventional L-Foot.



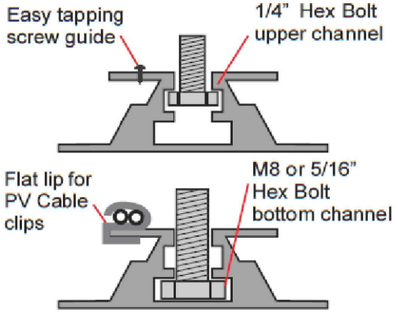


Dual bolt design: M8 or 5/16" for L-Foot & 1/4" for EMC

ICC ES

ICC ESR 3575

Call Now for more details
858-935-6064



Roof Tech

Smarter PV mounting solutions from top of roof to bottom line®

www.roof-tech.us info@roof-tech.us

RT-MINI

Flexible Flashing certified by the International Code Council (ICC)

Engineered to ASTM D 1761 (Standard Test Methods for Mechanical Fasteners in Wood)

Components

RT2-00-MINIBK

PAT : PENDING

MINI base : 20 ea.
Screw : 40 ea.
Extra RT-Butyl : 10 ea.

Optional item

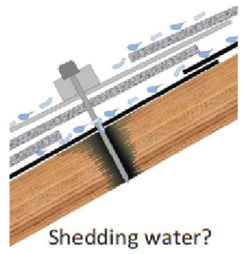
5 x 60mm Mounting screw (RT2-04-SD5-60) : 100 ea./Bag

5/16" Hex bolt, washer & nut set (RT-04-BN30SL-US) : 100 ea./Bag

RT-Butyl (RT2-04-BUTYLT) : 10 ea./Box

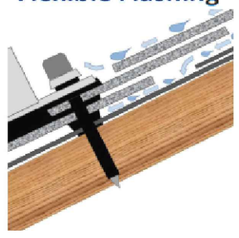
RT-Butyl is Roof Tech's flexible flashing used in 700,000 residential PV systems for the last 24 years. It is the first PV mounting system with Flexible Flashing certified by the ICC.

Metal Flashing Retrofit



Shedding water?

Flexible Flashing



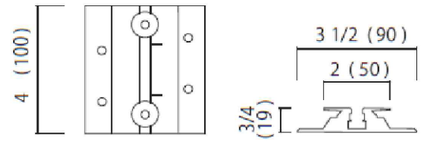
100% Waterproof

ICC ESR-3575

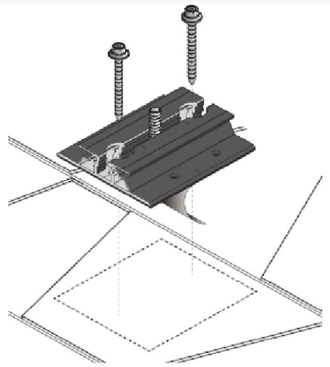
ASTM2140 testing

UV testing (7500 hrs.)

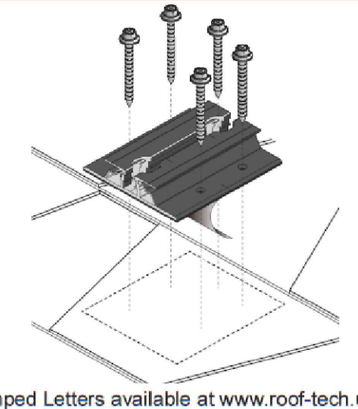
Dimensions in (mm)



Rafter installation



Deck installation



P.E. Stamped Letters available at www.roof-tech.us/support

Roof Tech Inc.
www.roof-tech.us info@roof-tech.us
10620 Treena Street, Suite 230, San Diego, CA 92131
858.935.6064

Rev. 03-2020

DESIGN & DRAFTING BY:
JENNIFER GRUDOWSKI-FRIZZELL
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ESI ID#: 10089010069015246101 19

SHEET NAME
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SHEET SIZE
ANSI B
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PV-6.3