

## ***Calculating AC Line Voltage Rise for IQ Series Microinverters with IQ Cable***

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# 1 Overview

This document provides voltage rise guidelines for dedicated PV branch circuits and methods for calculating the AC line voltage rise (VRise) when using the Enphase IQ Microinverters and the Enphase IQ Cable.

Applying proper voltage rise calculations in your system design helps prevent nuisance voltage out-of-range trip issues due to high line voltage conditions. Less resistance in conductors also results in less power loss, less heat at the terminals, and improved PV system performance.

These calculations are commonly called voltage drop (VDrop) when designing circuits for electrical loads. Since PV systems with inverters generate electricity instead of consuming it, the voltage rises at the AC terminals of each inverter. Therefore, this brief refers to these calculations as voltage rise (VRise).

## 1.1 Recommendations

To minimize voltage rise (VRise), Enphase recommends that you apply these guidelines when planning your system:

- The total VRise in the AC wiring should stay below 2% in all wire sections from the point of common coupling (PCC) to the last microinverter on each branch or sub-branch circuit (as described in “[Voltage Rise by Wire Section](#)”). Maintaining less than 1% VRise in the IQ Cable is a good practice.
- Center-feed the branch circuit to minimize voltage rise in a fully populated branch. Since the VRise is non-linear, reducing the number of microinverters on an IQ Cable from the junction box to the last inverter by center feeding and creating sub-branch circuits reduces the voltage measured at the last microinverter in each sub-branch. To center-feed a branch, divide the circuit into two sub-branch circuits protected by a single overcurrent protection device (OCPD). See “[Advantages of Center-Feeding the AC Branch Circuits](#)” for more information.
- Use the correct wire size in each wire section. Using undersized conductors can result in nuisance tripping the microinverter anti-islanding function when an AC voltage out-of-range condition occurs. See “[What Contributes to Voltage Rise?](#)” for more information.
- Use the calculation methods in “[Calculating Total Voltage Rise](#)” to determine voltage rise values for your project.

## 1.2 Background

The IEEE 1547 standard requires that grid-tied or utility-interactive inverters cease power production if voltage measured at the inverter terminal exceeds +10% or -12% of nominal. Enphase microinverters, like all utility-interactive inverters, sense voltage and frequency from the AC grid and cease exporting power when voltage or frequency from the grid is too high or too low.

If the voltage measured is outside the limit, the Enphase microinverter enters an AC Voltage Out-Of-Range (ACVOOR) condition and ceases to export power until this condition clears. Besides voltage variations from the AC grid, voltage changes within the system wiring can also contribute to VRise and cause microinverters to sense an over-voltage condition and cease operation.

The Enphase microinverter reference point for voltage measurement is at the microinverter AC output. Since the microinverter is located at the array, and the point of common coupling (PCC) is generally at the site load center, the distance from the microinverter AC output to the PCC could be substantial.

All components within system wiring contribute to resistance and must be considered when calculating the total VRise. The main factors that determine voltage rise in an Enphase microinverter system are:

- Distance from the microinverters to the PCC
- Conductor size.

“[What Contributes to Voltage Rise?](#)” provides more information on voltage rise.

Typically, you can quantify the voltage rise of three distinct wire sections and several wire terminations, as described in “[Voltage Rise by Wire Section](#)”. There is also some resistance associated with each OCPD, typically a circuit breaker, but this is generally not considered.

### 1.3 What contributes to voltage rise?

Enphase microinverter systems are installed as dedicated branch circuits, with each branch circuit protected by a 20 A OCPD. The following points must be considered for each branch circuit when calculating VRise.

- **Wire size:** Improper wire size can result in nuisance tripping the microinverter's utility-protective functions. Undersized conductors can cause the voltage measured at the microinverter to fall outside of the IEEE limits, triggering an ACVOOR condition. This results in a loss of energy harvest. Although the National Electric Code recommends that branch circuit conductors be sized for a maximum of 3% VRise (Article 210.19, FPN 4.), this value, in practice, is generally not low enough for a utility-interactive inverter.

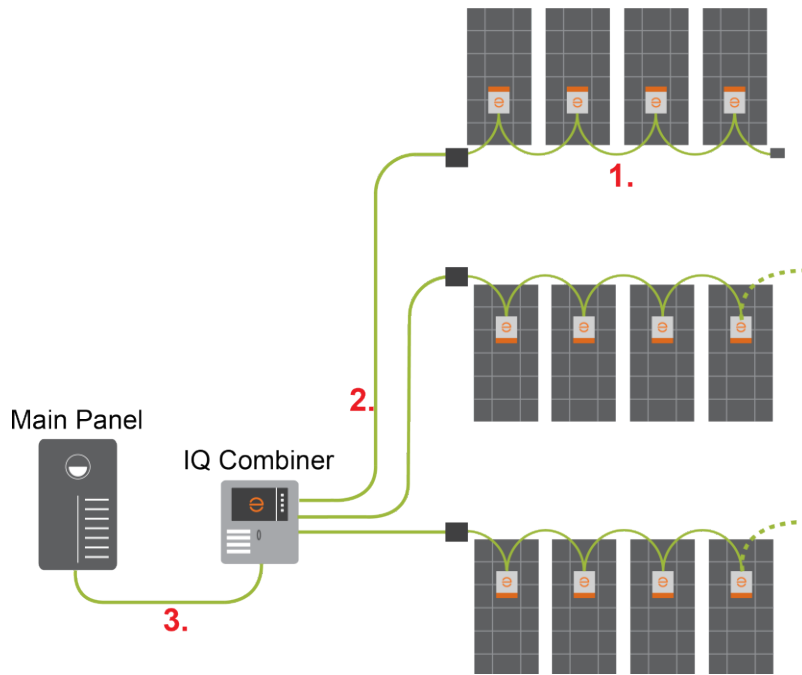
There is a trade-off made between increased wire size and increased cost. You can often increase wire size by one AWG trade size with minimal cost impact. At some point, increasing the wire size necessitates increases in the conduit and/or terminal size, thus further increasing costs. However, the increased wiring and conduit costs can be offset by the increase in energy production over the lifetime of the system. These are important to invest in, especially for long wire runs.

- **Circuit current:** Circuit current varies depending on which “wire section” is being considered in the installation. “[Voltage Rise by Wire Section](#)” describes a typical installation containing three wire sections where current is considered. With IQ Cable: current increases with each inverter added to the circuit.
- **Circuit length:** There is often little control over circuit length, but center-feeding the dedicated branch circuit significantly reduces voltage rise within the branch, as described in “[Advantages of Center-Feeding the AC Branch Circuits](#)”.
- **Voltage margin:** If service voltage is chronically high, the utility will sometimes perform a tap change on the distribution transformer. This can provide a percent or two of additional voltage margin.
- **Utility voltage:** The utility should maintain voltage at the PCC within  $\pm 5\%$  of nominal and, in some states, within  $\pm 3\%$  of nominal. The protective functions of the microinverters are set to  $+10\%$  /  $-12\%$  by default. The high voltage end of the tolerance is of most concern because the inverters are a source and not a load. If the utility is consistently 5% high, that leaves less than 5% for all wiring and interconnection losses, as well as inverter measurement accuracy. If you are concerned about the utility voltage, you may request that your utility place a data logger at the PCC and make a record of the voltages available to you at the site.

### 1.4 Voltage rise by wire section

This section discusses typical system configuration: IQ Microinverter system using an Enphase IQ Combiner (or IQ Combiner+) or PV subpanel.

### 1.4.1 IQ Microinverter system using an Enphase IQ Combiner or PV subpanel



IQ Microinverter system using an Enphase IQ Combiner or PV subpanel	
Section	Description
1	Internal voltage rise within the IQ Cables to the rooftop junction box. See internal VRise values for IQ Microinverters in <a href="#">Table 2-1 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)</a> through <a href="#">Table 2-33</a> . Only the IQ Cable with microinverter connectors is addressed in this section.
2	Voltage rise from the array-mounted AC junction box, along the AC branch circuits, to the load center containing the dedicated microinverter OCPDs (circuit breakers). The tables in “ <a href="#">Conductor Lengths by Wire Section</a> ” list maximum distances that maintain a 1% voltage rise for this wire section.
3	Enphase IQ Combiner or PV subpanel to the PCC. Voltage rise from the load center to the PCC. The tables in “ <a href="#">Conductor Lengths by Wire Section</a> ” list maximum distances that maintain a 1% voltage rise for this wire section.

Calculate each component individually and verify that the total voltage rise is less than 2%. “[Calculating Total Voltage Rise](#)” lists formulas to determine voltage rise. Additional losses exist at the terminals, connectors, and circuit breakers; however, if you design for a 2% total voltage rise, these other factors may be ignored.

### 1.4.2 IQ Cable and internal voltage rise

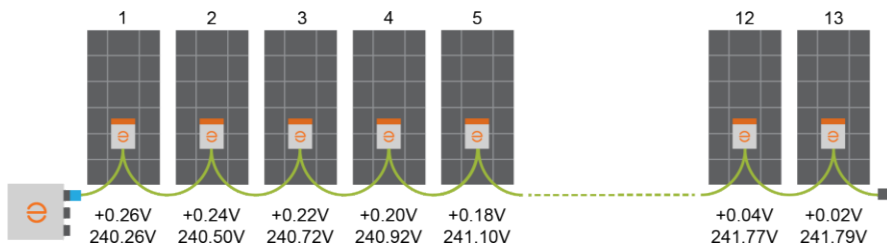
The IQ Cable is a continuous length of 12 AWG stranded copper, outdoor-rated cable, with integrated connectors for IQ Series Microinverters. The following table lists the IQ Cable types for single-phase projects.

Voltage type and conductor count	Model	Connector spacing	PV module orientation
240 VAC, two conductors	Q-12-10-240	1.3 m (4.2 ft)	Portrait
240 VAC, two conductors	Q-12-17-240	2.0 m (6.5 ft)	60-cell landscape
240 VAC, two conductors	Q-12-20-200	2.3 m (7.5 ft)	72-cell landscape

Regardless of the application, Enphase recommends that the total percentage of voltage rise in the AC wiring be less than 2%, with (an inclusive) less than 1% voltage rise in the IQ Cable. Although the IQ Cable is optimized for minimal VRise, it is still important to calculate the total VRise for the entire system for the array from the last microinverter on each branch of the sub-branch to the PCC.

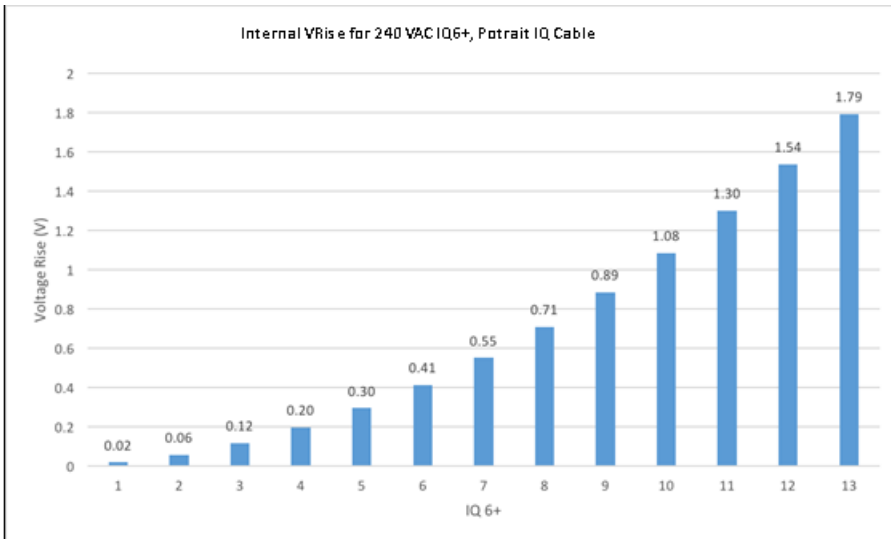
### 1.4.3 Determining VRise within a microinverter branch circuit

It is not difficult to determine VRise within the microinverter branch circuit. [Table 1-1 Internal IQ Cable VRise \(IQ6 – 240 V/Portrait Cable: Q-12-10-240\)](#) through [Table 2-36 Internal IQ Cable VRise \(Landscape 72-cell, cable: Q-12-20-200\)](#) provide VRise values for the available IQ Microinverters and IQ Cable types. Use these values to help calculate the total VRise for your project. The following diagram represents a 240 VAC system with a fully populated end-fed branch circuit of IQ6+ Microinverters. It illustrates how voltage measured at an individual microinverter increases by position in the branch circuit. As the number of microinverters in a branch circuit increases, the voltage at each microinverter rises in a non-linear manner.



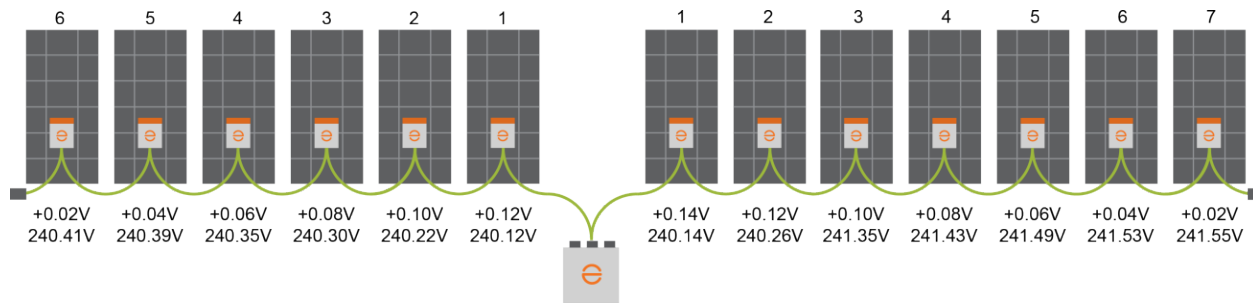
The top row of numbers is the incremental voltage rise from one microinverter to the next, and the bottom row is the cumulative line-to-line voltage overall.

The following graph illustrates how the number of microinverters connected to a portrait-oriented IQ Cable causes a non-linear voltage rise when operating at 240 VAC.



### 1.4.4 Advantages of center-feeding the AC branch circuits

As voltage rise is non-linear, reducing the number of microinverters in the branch circuit reduces the voltage measured at the last microinverter in the branch. One way to minimize this voltage rise is to center-feed the branch, dividing the circuit into two sub-branch circuits protected by a single OCPD. The following diagram illustrates the center-fed method.



A fully populated IQ6+ branch circuit has 13 microinverters. If center-fed, there will be seven microinverters on one sub-branch circuit and six on the other sub-branch circuit. All microinverters are parallel connected to a single circuit at a junction box and run back to the circuit breaker panel. As an example, a fully populated branch circuit with 13 IQ6+ Microinverters and 72-cell landscape cabling would measure a 1.32% voltage rise to the last inverter if the circuit was end-fed. If this same circuit was center fed, the voltage rise within the IQ Cable would be reduced to 0.52%. This analysis assumes that the circuit was equally center-fed, however, since the AC connections, in this case, will be parallelly connected, equal sub-circuits are not a requirement, and center-feeding can be used in a way that is more convenient at the site. When calculating the VRise of the total circuit, the larger sub-branches should be used when determining internal IQ Cable VRise.

### 1.4.5 IQ Raw Cable lengths

When using the IQ Raw Cable (P/N: Q-RAW-300), use [Table 2-37](#) through [Table 2-52](#) to determine the voltage rise for this section of cable. Reference the number of IQ Microinverters and the length of the cable to find the voltage rise for this section.

## 1.4.6 Conductor lengths for wire sections

Use the calculations in [Table 2-53](#) through [Table 2-65](#) to determine the proper conductor size for a given wire section. These tables list the maximum conductor lengths from the roof back to the main service panel for maintaining a 1% voltage rise. With the IQ system, each microinverter branch circuit can be kept separate if using a PV subpanel or Enphase IQ Combiner. Use these tables as a quick reference to determine the appropriate conductor size for a single circuit of IQ Microinverter or up to three circuits if installed with an IQ Combiner. Remember that a single wire section may only represent a single section of the overall system and that all sections should maintain a total voltage rise of 2%.

## 1.4.7 Calculating total voltage rise

### 1.4.7.1 Voltage rise formula

All resistances of the system components are in series and are cumulative. Since the same current flows through each resistance, the total VRise is the total current times the total resistance.

The VRise percentage for an Enphase microinverter system is:

$$\% \text{ of Total VRise} = \% \text{ VRise Section 1} + \% \text{ VRise Section 2} + \% \text{ VRise Section 3}$$

Where,

$\% \text{ VRise Section 1} = \% \text{ by number of microinverters in Internal VRise of IQ Cable with IQ Series Microinverters}$

$\% \text{ VRise Section 2} = \text{VRise Section 2} \div \text{System Voltage (either 240 or 208)}$

$\% \text{ VRise Section 3} = \text{VRise Section 3} \div \text{System Voltage (either 240 or 208)}$

### 1.4.7.2 VRise formula for a 240 VAC, single-phase installation

In a 240 VAC single-phase system, the total resistance is equal to two times the one-way resistance.

$\text{VRise of Section} = (\text{amps/inverter} \times \text{number of inverters}) \times (\Omega/\text{ft} \times 2\text{-way wire length of Section 2 (or 3)})$



## 1.5 Sample calculations for single-phase 240 VAC installations

As part of this analysis, we calculate VRise for a sample scenario of a fully populated PV subpanel with 48 IQ6 Microinverters. Each 20 A circuit has 16 IQ6 microinverters. Each branch circuit has been center-fed into two sub-branch circuits of eight microinverters each.

### 1.5.1 Section 1: IQ6 internal VRise for 240 VAC IQ Cable

Refer to the following table to find the IQ Cable VRise appropriate for your project.

Table 1-1 Internal IQ Cable VRise (IQ6 – 240 V/Portrait Cable: Q-12-10-240)

IQ6 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	0.96	1.92	2.88	3.83	4.79	5.75	6.71	7.67	8.63	9.58	10.54	11.50	12.46	13.42	14.38	15.33
<b>VRise (V)</b>	0.02	0.05	0.10	0.16	0.24	0.34	0.45	0.58	0.73	0.89	1.07	1.26	1.47	1.70	1.94	2.20
<b>VRise (%)</b>	0.01	0.02	0.04	0.07	0.10	0.14	0.19	0.24	0.30	0.37	0.45	0.53	0.61	0.71	0.81	0.92

For a sub-branch circuit of eight IQ6 Microinverters, the voltage rise on the 240 VAC IQ Cable is 0.24%.

### 1.5.2 Section 2: Voltage Rise from IQ Cable to PV subpanel or IQ Combiner

In some cases, connecting the IQ Cable directly to the PV subpanel or IQ Combiner may not be possible. For instance, when an array is located some distance from the PV subpanel, use the IQ Raw cable and male and female Field Wireable Connectors to make this configuration possible. Use [Table 2-37 IQ Raw Cable \(IQ6\)](#) through [Table 2-52 IQ Raw Cable \(IQ8HC 208 V\)](#) to determine the maximum length of the IQ Raw Cable to maintain a 1% voltage rise for this section. You may increase the conductor size to further reduce voltage rise and use the following calculation. Here, we calculate the voltage rise from an array of 16 IQ6 Microinverters back to the location of the PV subpanel.

This run uses 20 ft IQ Raw Cable.

$$\text{VRise} = (\text{amps/inverter} \times \text{number of inverters}) \times (\text{resistance in } \Omega/\text{ft}) \times (2\text{-way wire length in ft})$$

The following example is for a fully populated circuit of 16 IQ6 Microinverters.

- IQ6 full load AC current = 0.96 amp
- Wire gauge for IQ Raw Cable = #12 AWG THWN-2 CU
- #12 AWG THWN-2 CU resistance = 0.00198 /ft (from NEC 2017, Chapter 9, Table 8)
- Length of individual branch circuit = 20 feet, with two-way wire length = 40 feet

$$\begin{aligned} \text{VRise} &= (0.96 \text{ amp} \times 16) \times (0.00198 \text{ } \Omega/\text{ft}) \times (20 \text{ ft} \times 2) \\ &= 15.36 \text{ amps} \times 0.00198 \text{ } \Omega/\text{ft} \times 40 \text{ ft} \\ &= 1.22 \text{ volts} \end{aligned}$$

$$\% \text{VRise} = 1.22 \text{ volts} \div 240 \text{ volts} = 0.51\%$$

The voltage rise from the array to the PV Subpanel is 0.51%.

### 1.5.3 Section 3: Voltage rise from the PV subpanel to the main panel

Use [Table 2-53 Maximum distance \(in feet\) to maintain 1% VRise for 240 VAC \(IQ6\)](#) through [Table 2-65 Maximum distance \(in feet\) to maintain 1% VRise for 208 VAC \(IQ8H\)](#) as a quick reference to determine an

adequate wire size. To calculate the voltage rise in this portion of the circuit, multiply the combined current of the microinverters in the branch by the total resistance of the wire run.

$$VRise = (\text{amps/inverter} \times \text{number of inverters}) \times (\text{resistance in } \Omega/\text{ft}) \times (\text{2-way wire length in ft})$$

The following example is for a PV subpanel or IQ Combiner of 48 IQ6 Microinverters.

- IQ6 full load AC current = 0.96 amp
- Wire gauge for individual branch circuit = #10 AWG THWN-2 CU
- #6 AWG THWN-2 CU resistance = 0.000491 /ft (from NEC 2017, Chapter 9, Table 8)
- Length of individual branch circuit = 40 feet, with two-way wire length = 80 feet

$$\begin{aligned} VRise &= (0.96 \text{ amp} \times 48) \times (0.000491 \Omega/\text{ft}) \times (40 \text{ ft} \times 2) \\ &= 46 \text{ amps} \times 0.000491 \Omega/\text{ft} \times 80 \text{ ft} \\ &= 2.86 \text{ volts} \end{aligned}$$

$$\%VRise = 1.81 \text{ volts} \div 240 \text{ volts} = 0.75\%$$

The voltage rise from the PV subpanel to the main panel is 0.75%.

## 1.6 Summary of wire section calculations for single-phase 240 VAC applications

With the utility operating at the upper limit of their allowable tolerance (+5%) and the microinverters having a measurement accuracy of 2.5%, we are left with a voltage rise budget of 5.4 volts (2.25%) for all wiring to the PCC. The calculated VRise for all three portions of the system must be 5.4 volts or less. For systems with very long branch circuit runs and/or very long runs from the PV load center to the PCC, it is best to make the VRise in the IQ Cable as small as possible. As we have already determined, 5.4 volts is equal to 2.25% of the nominal voltage. After accounting for additional losses within connections, terminals, circuit breakers, and unexpected increases in wire length, we recommend the implementation of a total system voltage rise of less than 2%.

Section 1: Voltage rise in IQ Cable from the microinverters to the AC junction box	= 0.24%
Section 2: Voltage rise from the AC junction box to the microinverter subpanel	= 0.51%
Section 3: Voltage rise from the microinverter subpanel to the main service panel (PCC)	= 0.75%
Total system voltage rise for all three wire sections	= 1.5%

## 1.7 Conclusion

Center-feeding is an excellent way to decrease home run conductor costs, improve production, and increase system reliability. Follow the guidelines and calculations in this document to help minimize voltage rise issues with your installation and increase system production. Use the tables in the following Appendix to determine voltage rise and conductor size for your installations.

## 2 Appendix: VRise and conductor length tables

### 2.1 Internal VRise of IQ Cables with IQ Series Microinverters 240 V

Use the following tables to determine the voltage rise attributed to the IQ Cable when the IQ Microinverters are connected to 240 Volts. Reference the IQ Microinverter and IQ Cable type (model numbers provided) to find the appropriate table. For end-fed circuits, reference the number of microinverters in the circuit to find the voltage rise attributed to the IQ Cable. For center-fed circuits, reference the number of microinverters in the longer of the two sub-branches.

#### IQ6-60-\*-US (240 V)

Table 2-1 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	0.96	1.92	2.88	3.83	4.79	5.75	6.71	7.67	8.63	9.58	10.54	11.50	12.46	13.42	14.38	15.33
<b>VRise (V)</b>	0.02	0.05	0.10	0.16	0.24	0.34	0.45	0.58	0.79	0.89	1.07	1.26	1.47	1.70	1.94	2.20
<b>VRise (%)</b>	0.01	0.02	0.04	0.07	0.10	0.14	0.19	0.24	0.30	0.37	0.45	0.53	0.61	0.71	0.81	0.92

Table 2-2 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	0.96	1.92	2.88	3.83	4.79	5.75	6.71	7.67	8.63	9.58	10.54	11.50	12.46	13.42	14.38	15.33
<b>VRise (V)</b>	0.02	0.07	0.15	0.25	0.37	0.52	0.70	0.90	1.12	1.37	1.64	1.94	2.27	2.61	2.99	3.37
<b>VRise (%)</b>	0.01	0.03	0.06	0.10	0.16	0.22	0.29	0.37	0.47	0.57	0.68	0.81	0.94	1.09	1.25	1.41

Table 2-3 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ6 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	0.96	1.92	2.88	3.83	4.79	5.75	6.71	7.67	8.63	9.58	10.54	11.50	12.46	13.42	14.38	15.33
<b>VRise (V)</b>	0.03	0.09	0.17	0.29	0.43	0.60	0.80	1.03	1.29	1.58	1.89	2.23	2.61	3.10	3.44	3.89
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.18	0.25	0.33	0.43	0.54	0.66	0.79	0.93	1.09	1.25	1.43	1.62
*Note that IQ6 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.																

**IQ6PLUS-72-\*-US (240 V)**

Table 2-4 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6 Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.17	2.33	3.50	4.67	5.83	7.00	8.17	9.33	10.50	11.67	12.83	14.00	15.17
<b>VRise (V)</b>	0.02	0.06	0.12	0.20	0.30	0.41	0.55	0.71	0.89	1.08	1.30	1.54	1.79
<b>VRise (%)</b>	0.01	0.02	0.05	0.08	0.12	0.17	0.23	0.30	0.37	0.45	0.54	0.64	0.75

Table 2-5 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.17	2.33	3.50	4.67	5.83	7.00	8.17	9.33	10.50	11.67	12.83	14.00	15.17
<b>VRise (V)</b>	0.03	0.09	0.18	0.30	0.45	0.64	0.85	1.09	1.36	1.67	2.00	2.36	2.76
<b>VRise (%)</b>	0.01	0.04	0.08	0.13	0.19	0.27	0.35	0.45	0.57	0.69	0.83	0.99	1.15

Table 2-6 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ6+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.17	2.33	3.50	4.67	5.83	7.00	8.17	9.33	10.50	11.67	12.83	14.00	15.17
<b>VRise (V)</b>	0.03	0.10	0.21	0.35	0.52	0.73	0.98	1.26	1.57	1.92	2.30	2.72	3.17
<b>VRise (%)</b>	0.01	0.04	0.09	0.15	0.22	0.31	0.41	0.52	0.65	0.80	0.96	1.13	1.32

**IQ7-60-\*-US (240 V)**

Table 2-7 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.02	0.05	0.10	0.17	0.25	0.35	0.47	0.61	0.76	0.93	1.11	1.32	1.54	1.77	2.03	2.30
<b>VRise (%)</b>	0.01	0.02	0.04	0.07	0.11	0.15	0.20	0.25	0.32	0.39	0.46	0.55	0.64	0.74	0.84	0.96

Table 2-8 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.03	0.08	0.16	0.26	0.39	0.55	0.73	0.94	1.17	1.43	1.71	2.03	2.36	2.73	3.12	3.53
<b>VRise (%)</b>	0.01	0.03	0.06	0.11	0.16	0.23	0.30	0.39	0.49	0.60	0.71	0.84	0.99	1.14	1.30	1.47

Table 2-9 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ7 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.03	0.09	0.18	0.30	0.45	0.63	0.84	1.08	1.34	1.64	1.97	2.33	2.72	3.14	3.59	4.06
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.19	0.26	0.35	0.45	0.56	0.68	0.82	0.97	1.13	1.31	1.49	1.69
<b>*Note that IQ7 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.</b>																

**IQ7PLUS-72-\*-US (240 V)**

Table 2-10 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.02	0.06	0.12	0.20	0.31	0.43	0.57	0.73	0.92	1.12	1.35	1.59	1.86
<b>VRise (%)</b>	0.01	0.03	0.05	0.09	0.13	0.18	0.24	0.31	0.38	0.47	0.56	0.66	0.77

Table 2-11 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.03	0.09	0.19	0.31	0.47	0.66	0.88	1.13	1.41	1.73	2.07	2.45	2.86
<b>VRise (%)</b>	0.01	0.04	0.08	0.13	0.20	0.27	0.37	0.47	0.59	0.72	0.86	1.02	1.19

Table 2-12 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.04	0.11	0.22	0.36	0.54	0.76	1.01	1.30	1.62	1.99	2.38	2.82	3.29
<b>VRise (%)</b>	0.02	0.05	0.09	0.15	0.23	0.32	0.42	0.54	0.68	0.83	0.99	1.17	1.37

**IQ7X-96-2-US (240 V)**

Table 2-13 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7X Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.3	2.6	3.9	5.3	6.6	7.9	9.2	10.5	11.8	13.1	14.4	15.8
<b>VRise (V)</b>	0.02	0.07	0.13	0.22	0.33	0.47	0.62	0.80	1.00	1.22	1.46	1.73
<b>VRise (%)</b>	0.01	0.03	0.06	0.09	0.14	0.19	0.26	0.33	0.42	0.51	0.61	0.72

Table 2-14 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7X Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.3	2.6	3.9	5.3	6.6	7.9	9.2	10.5	11.8	13.1	14.4	15.8
<b>VRise (V)</b>	0.03	0.10	0.20	0.34	0.51	0.72	0.95	1.23	1.53	1.88	2.25	2.66
<b>VRise (%)</b>	0.01	0.04	0.09	0.14	0.21	0.30	0.40	0.51	0.64	0.78	0.94	1.11

Table 2-15 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7X Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.3	2.6	3.9	5.3	6.6	7.9	9.2	10.5	11.8	13.1	14.4	15.8
<b>VRise (V)</b>	0.04	0.12	0.24	0.39	0.59	0.82	1.10	1.41	1.76	2.16	2.59	3.06
<b>VRise (%)</b>	0.02	0.05	0.10	0.16	0.25	0.34	0.46	0.59	0.74	0.90	1.08	1.27

**IQ7A-72-\*-US (240 V)**

Table 2-16 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7A Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.5	2.9	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0
<b>VRise (V)</b>	0.02	0.07	0.15	0.25	0.37	0.52	0.69	0.88	1.11	1.35	1.62
<b>VRise (%)</b>	0.01	0.03	0.06	0.10	0.15	0.21	0.29	0.37	0.46	0.56	0.68

Table 2-17 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7A Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.5	2.9	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0
<b>VRise (V)</b>	0.04	0.11	0.23	0.38	0.57	0.79	1.06	1.36	1.70	2.08	2.49
<b>VRise (%)</b>	0.02	0.05	0.09	0.16	0.24	0.33	0.44	0.57	0.71	0.87	1.04

Table 2-18 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7A Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.5	2.9	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0
<b>VRise (V)</b>	0.04	0.13	0.26	0.43	0.65	0.91	1.22	1.56	1.96	2.39	2.87
<b>VRise (%)</b>	0.02	0.05	0.11	0.18	0.27	0.38	0.51	0.65	0.81	1.00	1.19



**IQ8-60-\*-US (240 V)**

Table 2-19 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.02	0.05	0.10	0.17	0.25	0.35	0.47	0.60	0.75	0.91	1.10	1.30	1.51	1.75	2.00	2.26
<b>VRise (%)</b>	0.01	0.02	0.04	0.07	0.10	0.15	0.19	0.25	0.31	0.38	0.46	0.54	0.63	0.73	0.83	0.94

Table 2-20 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.03	0.08	0.15	0.26	0.39	0.54	0.72	0.93	1.16	1.42	1.70	2.01	2.34	2.70	3.09	3.50
<b>VRise (%)</b>	0.01	0.03	0.06	0.11	0.16	0.23	0.30	0.39	0.48	0.59	0.71	0.84	0.98	1.13	1.29	1.46

Table 2-21 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8 Microinverters per branch																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Current (A)</b>	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
<b>VRise (V)</b>	0.03	0.09	0.18	0.30	0.45	0.62	0.83	1.07	1.34	1.63	1.96	2.32	2.70	3.12	3.56	4.04
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.19	0.26	0.35	0.45	0.56	0.68	0.82	0.97	1.13	1.30	1.49	1.68
<b>*Note that IQ8 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.</b>																

**IQ8PLUS-72-\*-US (240 V)**

Table 2-22 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.02	0.06	0.12	0.20	0.30	0.42	0.56	0.72	0.90	1.11	1.33	1.57	1.83
<b>VRise (%)</b>	0.01	0.03	0.05	0.08	0.13	0.18	0.23	0.30	0.38	0.46	0.55	0.65	0.76

Table 2-23 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.03	0.09	0.19	0.31	0.47	0.65	0.87	1.12	1.40	1.71	2.05	2.43	2.83
<b>VRise (%)</b>	0.01	0.04	0.08	0.13	0.19	0.27	0.36	0.47	0.58	0.71	0.86	1.01	1.18

Table 2-24 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.2	2.4	3.6	4.8	6.0	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7
<b>VRise (V)</b>	0.04	0.11	0.22	0.36	0.54	0.75	1.00	1.29	1.61	1.97	2.37	2.80	3.27
<b>VRise (%)</b>	0.01	0.04	0.09	0.15	0.22	0.31	0.42	0.54	0.67	0.82	0.99	1.17	1.36

**IQ8M-72-\*-US (240 V)**

Table 2-25 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8M Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9
<b>VRise (V)</b>	0.02	0.07	0.14	0.23	0.34	0.47	0.63	0.81	1.01	1.24	1.49
<b>VRise (%)</b>	0.01	0.03	0.06	0.09	0.14	0.20	0.26	0.34	0.42	0.52	0.62

Table 2-26 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8M Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9
<b>VRise (V)</b>	0.03	0.10	0.21	0.35	0.52	0.73	0.98	1.25	1.57	1.92	2.30
<b>VRise (%)</b>	0.01	0.04	0.09	0.15	0.22	0.30	0.41	0.52	0.65	0.80	0.96

Table 2-27 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8M Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9
<b>VRise (V)</b>	0.04	0.12	0.24	0.40	0.60	0.84	1.13	1.45	1.81	2.21	2.65
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.25	0.35	0.47	0.60	0.75	0.92	1.11

**IQ8MC-72-M-US (240 V)**

Table 2-28 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8MC Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.33	2.66	3.99	5.32	6.65	7.98	9.31	10.64	11.97	13.30	14.63	15.96
<b>VRise (V)</b>	0.02	0.07	0.13	0.22	0.33	0.46	0.62	0.80	1.00	1.22	1.46	1.73
<b>VRise (%)</b>	0.01%	0.03%	0.06%	0.09%	0.14%	0.19%	0.26%	0.33%	0.41%	0.51%	0.61%	0.72%

Table 2-29 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8MC Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.33	2.66	3.99	5.32	6.65	7.98	9.31	10.64	11.97	13.30	14.63	15.96
<b>VRise (V)</b>	0.03	0.10	0.21	0.34	0.51	0.72	0.96	1.23	1.54	1.88	2.26	2.67
<b>VRise (%)</b>	0.01%	0.04%	0.09%	0.14%	0.21%	0.30%	0.40%	0.51%	0.64%	0.78%	0.94%	1.11%

Table 2-30 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8MC Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.33	2.66	3.99	5.32	6.65	7.98	9.31	10.64	11.97	13.30	14.63	15.96
<b>VRise (V)</b>	0.04	0.12	0.24	0.40	0.59	0.83	1.11	1.42	1.78	2.17	2.61	3.08
<b>VRise (%)</b>	0.02%	0.05%	0.10%	0.16%	0.25%	0.35%	0.46%	0.59%	0.74%	0.91%	1.09%	1.28%

**IQ8A-72-\*-US and IQ8AC-72-M-US (240 V)**

Table 2-31 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8A, IQ8AC Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.5	2.9	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0
<b>VRise (V)</b>	0.02	0.07	0.15	0.24	0.36	0.51	0.68	0.87	1.09	1.33	1.60
<b>VRise (%)</b>	0.01	0.03	0.06	0.10	0.15	0.21	0.28	0.36	0.45	0.55	0.67

Table 2-32 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8A, IQ8AC Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9
<b>VRise (V)</b>	0.04	0.11	0.22	0.37	0.56	0.79	1.05	1.35	1.68	2.06	2.47
<b>VRise (%)</b>	0.02	0.05	0.09	0.16	0.23	0.33	0.44	0.56	0.70	0.86	1.03

Table 2-33 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8A, IQ8AC Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9
<b>VRise (V)</b>	0.04	0.13	0.26	0.43	0.65	0.91	1.21	1.55	1.94	2.38	2.85
<b>VRise (%)</b>	0.02	0.05	0.11	0.18	0.27	0.38	0.50	0.65	0.81	0.99	1.19

**IQ8H-240-72-\*-US, IQ8HC-72-M-US and IQ8X-80-M-US (240 V)**

Table 2-34 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8H, IQ8HC, and IQ8X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0
<b>VRise (V)</b>	0.03	0.08	0.16	0.27	0.40	0.56	0.75	0.96	1.20	1.46
<b>VRise (%)</b>	0.01	0.03	0.07	0.11	0.17	0.23	0.31	0.40	0.50	0.61

Table 2-35 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8H, IQ8HC, and IQ8X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0
<b>VRise (V)</b>	0.04	0.12	0.25	0.41	0.62	0.86	1.15	1.48	1.85	2.27
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.26	0.36	0.48	0.62	0.77	0.94

Table 2-36 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8H, IQ8HC, and IQ8X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0
<b>VRise (V)</b>	0.05	0.14	0.29	0.48	0.71	1.00	1.33	1.71	2.14	2.61
<b>VRise (%)</b>	0.02	0.06	0.12	0.20	0.30	0.42	0.55	0.71	0.89	1.09

## IQ Raw Cable lengths

When using the IQ Raw Cable (Model: Q-RAW-300), use the following tables to determine the voltage rise for this cable section. Reference the number of IQ Microinverters and the cable length to find the voltage rise for this section.

Table 2-37 IQ Raw Cable (IQ6)

Feet	IQ6 Microinverters per branch 240 V															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10	0.02%	0.03%	0.05%	0.06%	0.08%	0.09%	0.11%	0.13%	0.14%	0.16%	0.17%	0.19%	0.21%	0.22%	0.24%	0.25%
15	0.02%	0.05%	0.07%	0.09%	0.12%	0.14%	0.17%	0.19%	0.21%	0.24%	0.26%	0.28%	0.31%	0.33%	0.36%	0.38%
20	0.03%	0.06%	0.09%	0.13%	0.16%	0.19%	0.22%	0.25%	0.28%	0.32%	0.35%	0.38%	0.41%	0.44%	0.47%	0.51%
25	0.04%	0.08%	0.12%	0.16%	0.20%	0.24%	0.28%	0.32%	0.36%	0.40%	0.43%	0.47%	0.51%	0.55%	0.59%	0.63%
30	0.05%	0.09%	0.14%	0.19%	0.24%	0.28%	0.33%	0.38%	0.43%	0.47%	0.52%	0.57%	0.62%	0.66%	0.71%	0.76%
40	0.06%	0.13%	0.19%	0.25%	0.32%	0.38%	0.44%	0.51%	0.57%	0.63%	0.70%	0.76%	0.82%	0.89%	0.95%	1.01%
50	0.08%	0.16%	0.24%	0.32%	0.40%	0.47%	0.55%	0.63%	0.71%	0.79%	0.87%	0.95%	1.03%	1.11%	1.19%	1.27%
60	0.09%	0.19%	0.28%	0.38%	0.47%	0.57%	0.66%	0.76%	0.85%	0.95%	1.04%	1.14%	1.23%	1.33%	1.42%	1.52%
70	0.11%	0.22%	0.33%	0.44%	0.55%	0.66%	0.77%	0.89%	1.00%	1.11%	1.22%	1.33%	1.44%	1.55%	1.66%	1.77%
80	0.13%	0.25%	0.38%	0.51%	0.63%	0.76%	0.89%	1.01%	1.14%	1.27%	1.39%	1.52%	1.64%	1.77%	1.90%	2.02%
90	0.14%	0.28%	0.43%	0.57%	0.71%	0.85%	1.00%	1.14%	1.28%	1.42%	1.57%	1.71%	1.85%	1.99%	2.13%	2.28%
100	0.16%	0.32%	0.47%	0.63%	0.79%	0.95%	1.11%	1.27%	1.42%	1.58%	1.74%	1.90%	2.06%	2.21%	2.37%	2.53%

Table 2-38 IQ Raw Cable (IQ6+)

Feet	IQ6+ Microinverters per branch 240 V												
	1	2	3	4	5	6	7	8	9	10	11	12	13
10	0.02%	0.04%	0.06%	0.08%	0.10%	0.12%	0.13%	0.15%	0.17%	0.19%	0.21%	0.23%	0.25%
15	0.03%	0.06%	0.09%	0.12%	0.14%	0.17%	0.20%	0.23%	0.26%	0.29%	0.32%	0.35%	0.38%
20	0.04%	0.08%	0.12%	0.15%	0.19%	0.23%	0.27%	0.31%	0.35%	0.39%	0.44%	0.46%	0.50%
25	0.05%	0.10%	0.14%	0.19%	0.24%	0.29%	0.34%	0.39%	0.43%	0.48%	0.53%	0.58%	0.63%
30	0.06%	0.12%	0.17%	0.23%	0.29%	0.35%	0.40%	0.46%	0.52%	0.58%	0.64%	0.69%	0.75%
40	0.08%	0.15%	0.23%	0.31%	0.39%	0.46%	0.54%	0.62%	0.69%	0.77%	0.85%	0.92%	1.00%
50	0.10%	0.19%	0.29%	0.39%	0.48%	0.58%	0.67%	0.77%	0.87%	0.96%	1.06%	1.16%	1.25%
60	0.12%	0.23%	0.35%	0.46%	0.58%	0.69%	0.81%	0.92%	1.04%	1.16%	1.27%	1.39%	1.50%
70	0.13%	0.27%	0.40%	0.54%	0.67%	0.81%	0.94%	1.08%	1.21%	1.35%	1.48%	1.62%	1.75%
80	0.15%	0.31%	0.46%	0.62%	0.77%	0.92%	1.08%	1.23%	1.39%	1.54%	1.69%	1.85%	2.00%
90	0.17%	0.35%	0.52%	0.69%	0.87%	1.04%	1.21%	1.39%	1.56%	1.73%	1.91%	2.08%	2.25%
100	0.19%	0.39%	0.58%	0.77%	0.96%	1.16%	1.35%	1.54%	1.73%	1.93%	2.12%	2.31%	2.50%

Table 2-39 IQ Raw Cable (IQ7)

Feet	IQ7 Microinverters per branch 240 V															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10	0.02%	0.03%	0.05%	0.07%	0.08%	0.10%	0.12%	0.13%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.25%	0.26%
15	0.02%	0.05%	0.07%	0.10%	0.12%	0.15%	0.17%	0.20%	0.22%	0.25%	0.27%	0.30%	0.32%	0.35%	0.37%	0.40%
20	0.03%	0.07%	0.10%	0.13%	0.17%	0.20%	0.23%	0.26%	0.30%	0.33%	0.36%	0.40%	0.43%	0.46%	0.50%	0.53%
25	0.04%	0.08%	0.12%	0.17%	0.21%	0.25%	0.29%	0.33%	0.37%	0.41%	0.45%	0.50%	0.54%	0.58%	0.62%	0.66%
30	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.54%	0.59%	0.64%	0.69%	0.74%	0.79%
40	0.07%	0.13%	0.20%	0.26%	0.33%	0.40%	0.46%	0.53%	0.59%	0.66%	0.73%	0.79%	0.86%	0.92%	0.99%	1.06%
50	0.08%	0.17%	0.25%	0.33%	0.41%	0.50%	0.58%	0.66%	0.74%	0.83%	0.91%	0.99%	1.07%	1.16%	1.24%	1.32%
60	0.10%	0.20%	0.30%	0.40%	0.50%	0.59%	0.69%	0.79%	0.89%	0.99%	1.09%	1.19%	1.29%	1.39%	1.49%	1.58%
70	0.12%	0.23%	0.35%	0.46%	0.58%	0.69%	0.81%	0.92%	1.04%	1.16%	1.27%	1.39%	1.50%	1.62%	1.73%	1.85%
80	0.13%	0.26%	0.40%	0.53%	0.66%	0.79%	0.92%	1.06%	1.19%	1.32%	1.45%	1.58%	1.72%	1.85%	1.98%	2.11%
90	0.15%	0.30%	0.45%	0.59%	0.74%	0.89%	1.04%	1.19%	1.34%	1.49%	1.63%	1.78%	1.93%	2.08%	2.23%	2.38%
100	0.17%	0.33%	0.50%	0.66%	0.83%	0.99%	1.16%	1.32%	1.49%	1.65%	1.82%	1.98%	2.15%	2.31%	2.48%	2.64%

Table 2-40 IQ Raw Cable (IQ7+)

Feet	IQ7+ Microinverters per branch 240 V												
	1	2	3	4	5	6	7	8	9	10	11	12	13
10	0.02%	0.04%	0.06%	0.08%	0.10%	0.12%	0.14%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%
15	0.03%	0.06%	0.09%	0.12%	0.15%	0.18%	0.21%	0.24%	0.27%	0.30%	0.33%	0.36%	0.39%
20	0.04%	0.08%	0.12%	0.16%	0.20%	0.24%	0.28%	0.32%	0.36%	0.40%	0.44%	0.48%	0.52%
25	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
30	0.06%	0.12%	0.18%	0.24%	0.30%	0.36%	0.42%	0.48%	0.54%	0.60%	0.66%	0.72%	0.78%
40	0.08%	0.16%	0.24%	0.32%	0.40%	0.48%	0.56%	0.64%	0.72%	0.80%	0.88%	0.96%	1.04%
50	0.10%	0.20%	0.30%	0.40%	0.50%	0.60%	0.70%	0.80%	0.90%	1.00%	1.10%	1.20%	1.30%
60	0.12%	0.24%	0.36%	0.48%	0.60%	0.72%	0.84%	0.96%	1.08%	1.20%	1.32%	1.44%	1.56%
70	0.14%	0.28%	0.42%	0.56%	0.70%	0.84%	0.98%	1.12%	1.26%	1.40%	1.54%	1.67%	1.81%
80	0.16%	0.32%	0.48%	0.64%	0.80%	0.96%	1.12%	1.28%	1.44%	1.60%	1.75%	1.91%	2.07%
90	0.18%	0.36%	0.54%	0.72%	0.90%	1.08%	1.26%	1.44%	1.61%	1.79%	1.97%	2.15%	2.33%
100	0.20%	0.40%	0.60%	0.80%	1.00%	1.20%	1.40%	1.60%	1.79%	1.99%	2.19%	2.39%	2.59%



Table 2-41 IQ Raw Cable (IQ7X)

Feet	IQ7X Microinverters per branch 240 V											
	1	2	3	4	5	6	7	8	9	10	11	12
10	0.02%	0.04%	0.06%	0.09%	0.11%	0.13%	0.15%	0.17%	0.19%	0.22%	0.24%	0.26%
15	0.03%	0.06%	0.10%	0.13%	0.16%	0.19%	0.23%	0.26%	0.29%	0.32%	0.36%	0.39%
20	0.04%	0.09%	0.13%	0.17%	0.22%	0.26%	0.30%	0.35%	0.39%	0.43%	0.48%	0.52%
25	0.05%	0.11%	0.16%	0.22%	0.27%	0.32%	0.38%	0.43%	0.49%	0.54%	0.60%	0.65%
30	0.06%	0.13%	0.19%	0.26%	0.32%	0.39%	0.45%	0.52%	0.58%	0.65%	0.71%	0.78%
40	0.09%	0.17%	0.26%	0.35%	0.43%	0.52%	0.61%	0.69%	0.78%	0.87%	0.95%	1.04%
50	0.11%	0.22%	0.32%	0.43%	0.54%	0.65%	0.76%	0.87%	0.97%	1.08%	1.19%	1.30%
60	0.13%	0.26%	0.39%	0.52%	0.65%	0.78%	0.91%	1.04%	1.17%	1.30%	1.43%	1.56%
70	0.15%	0.30%	0.45%	0.61%	0.76%	0.91%	1.06%	1.21%	1.36%	1.52%	1.67%	1.82%
80	0.17%	0.35%	0.52%	0.69%	0.87%	1.04%	1.21%	1.39%	1.56%	1.73%	1.91%	2.08%
90	0.19%	0.39%	0.58%	0.78%	0.97%	1.17%	1.36%	1.56%	1.75%	1.95%	2.14%	2.34%
100	0.22%	0.43%	0.65%	0.87%	1.08%	1.30%	1.52%	1.73%	1.95%	2.17%	2.38%	2.60%

Table 2-42 IQ Raw Cable (IQ7A)

Feet	IQ7A Microinverters per branch 240 V										
	1	2	3	4	5	6	7	8	9	10	11
10	0.02%	0.05%	0.07%	0.10%	0.12%	0.14%	0.17%	0.19%	0.22%	0.24%	0.26%
15	0.04%	0.07%	0.11%	0.14%	0.18%	0.22%	0.25%	0.29%	0.32%	0.36%	0.40%
20	0.05%	0.10%	0.14%	0.19%	0.24%	0.29%	0.34%	0.38%	0.43%	0.48%	0.53%
25	0.06%	0.12%	0.18%	0.24%	0.30%	0.36%	0.42%	0.48%	0.54%	0.60%	0.66%
30	0.07%	0.14%	0.22%	0.29%	0.36%	0.43%	0.50%	0.58%	0.65%	0.72%	0.79%
40	0.10%	0.19%	0.29%	0.38%	0.48%	0.58%	0.67%	0.77%	0.86%	0.96%	1.06%
50	0.12%	0.24%	0.36%	0.48%	0.60%	0.72%	0.84%	0.96%	1.08%	1.20%	1.32%
60	0.14%	0.29%	0.43%	0.58%	0.72%	0.86%	1.01%	1.15%	1.30%	1.44%	1.58%
70	0.17%	0.34%	0.50%	0.67%	0.84%	1.01%	1.18%	1.34%	1.51%	1.68%	1.85%
80	0.19%	0.38%	0.58%	0.77%	0.96%	1.15%	1.34%	1.54%	1.73%	1.92%	2.11%
90	0.22%	0.43%	0.65%	0.86%	1.08%	1.30%	1.51%	1.73%	1.94%	2.16%	2.38%
100	0.24%	0.48%	0.72%	0.96%	1.20%	1.44%	1.68%	1.92%	2.16%	2.40%	2.64%

Table 2-43 IQ Raw Cable (IQ8)

Feet	IQ8 Microinverters per branch 240 V															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10	0.02%	0.03%	0.05%	0.07%	0.08%	0.10%	0.12%	0.13%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.25%	0.26%
15	0.02%	0.05%	0.07%	0.10%	0.12%	0.15%	0.17%	0.20%	0.22%	0.25%	0.27%	0.30%	0.32%	0.35%	0.37%	0.40%
20	0.03%	0.07%	0.10%	0.13%	0.17%	0.20%	0.23%	0.26%	0.30%	0.33%	0.36%	0.40%	0.43%	0.46%	0.50%	0.53%
25	0.04%	0.08%	0.12%	0.17%	0.21%	0.25%	0.29%	0.33%	0.37%	0.41%	0.45%	0.50%	0.54%	0.58%	0.62%	0.66%
30	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.54%	0.59%	0.64%	0.69%	0.74%	0.79%
40	0.07%	0.13%	0.20%	0.26%	0.33%	0.40%	0.46%	0.53%	0.59%	0.66%	0.73%	0.79%	0.86%	0.92%	0.99%	1.06%
50	0.08%	0.17%	0.25%	0.33%	0.41%	0.50%	0.58%	0.66%	0.74%	0.83%	0.91%	0.99%	1.07%	1.16%	1.24%	1.32%
60	0.10%	0.20%	0.30%	0.40%	0.50%	0.59%	0.69%	0.79%	0.89%	0.99%	1.09%	1.19%	1.29%	1.39%	1.49%	1.58%
70	0.12%	0.23%	0.35%	0.46%	0.58%	0.69%	0.81%	0.92%	1.04%	1.16%	1.27%	1.39%	1.50%	1.62%	1.73%	1.85%
80	0.13%	0.26%	0.40%	0.53%	0.66%	0.79%	0.92%	1.06%	1.19%	1.32%	1.45%	1.58%	1.72%	1.85%	1.98%	2.11%
90	0.15%	0.30%	0.45%	0.59%	0.74%	0.89%	1.04%	1.19%	1.34%	1.49%	1.63%	1.78%	1.93%	2.08%	2.23%	2.38%
100	0.17%	0.33%	0.50%	0.66%	0.83%	0.99%	1.16%	1.32%	1.49%	1.65%	1.82%	1.98%	2.15%	2.31%	2.48%	2.64%

Table 2-44 IQ Raw Cable (IQ8PLUS)

Feet	IQ8PLUS Microinverters per branch 240 V												
	1	2	3	4	5	6	7	8	9	10	11	12	13
10	0.02%	0.04%	0.06%	0.08%	0.10%	0.12%	0.14%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%
15	0.03%	0.06%	0.09%	0.12%	0.15%	0.18%	0.21%	0.24%	0.27%	0.30%	0.33%	0.36%	0.39%
20	0.04%	0.08%	0.12%	0.16%	0.20%	0.24%	0.28%	0.32%	0.36%	0.40%	0.44%	0.48%	0.52%
25	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
30	0.06%	0.12%	0.18%	0.24%	0.30%	0.36%	0.42%	0.48%	0.54%	0.60%	0.66%	0.72%	0.78%
40	0.08%	0.16%	0.24%	0.32%	0.40%	0.48%	0.56%	0.64%	0.72%	0.80%	0.88%	0.96%	1.04%
50	0.10%	0.20%	0.30%	0.40%	0.50%	0.60%	0.70%	0.80%	0.90%	1.00%	1.10%	1.20%	1.30%
60	0.12%	0.24%	0.36%	0.48%	0.60%	0.72%	0.84%	0.96%	1.08%	1.20%	1.32%	1.44%	1.56%
70	0.14%	0.28%	0.42%	0.56%	0.70%	0.84%	0.98%	1.12%	1.26%	1.40%	1.54%	1.67%	1.81%
80	0.16%	0.32%	0.48%	0.64%	0.80%	0.96%	1.12%	1.28%	1.44%	1.60%	1.75%	1.91%	2.07%
90	0.18%	0.36%	0.54%	0.72%	0.90%	1.08%	1.26%	1.44%	1.61%	1.79%	1.97%	2.15%	2.33%
100	0.20%	0.40%	0.60%	0.80%	1.00%	1.20%	1.40%	1.60%	1.79%	1.99%	2.19%	2.39%	2.59%

Table 2-45 IQ Raw Cable (IQ8M)

Feet	IQ8M Microinverters per branch 240 V										
	1	2	3	4	5	6	7	8	9	10	11
10	0.02%	0.04%	0.07%	0.09%	0.11%	0.13%	0.16%	0.18%	0.20%	0.22%	0.25%
15	0.03%	0.07%	0.10%	0.13%	0.17%	0.20%	0.23%	0.27%	0.30%	0.34%	0.37%
20	0.04%	0.09%	0.13%	0.18%	0.22%	0.27%	0.31%	0.36%	0.40%	0.45%	0.49%
25	0.06%	0.11%	0.17%	0.22%	0.28%	0.34%	0.39%	0.45%	0.50%	0.56%	0.61%
30	0.07%	0.13%	0.20%	0.27%	0.34%	0.40%	0.47%	0.54%	0.60%	0.67%	0.74%
40	0.09%	0.18%	0.27%	0.36%	0.45%	0.54%	0.63%	0.72%	0.80%	0.89%	0.98%
50	0.11%	0.22%	0.34%	0.45%	0.56%	0.67%	0.78%	0.89%	1.01%	1.12%	1.23%
60	0.13%	0.27%	0.40%	0.54%	0.67%	0.80%	0.94%	1.07%	1.21%	1.34%	1.47%
70	0.16%	0.31%	0.47%	0.63%	0.78%	0.94%	1.09%	1.25%	1.41%	1.56%	1.72%
80	0.18%	0.36%	0.54%	0.72%	0.89%	1.07%	1.25%	1.43%	1.61%	1.79%	1.97%
90	0.20%	0.40%	0.60%	0.80%	1.01%	1.21%	1.41%	1.61%	1.81%	2.01%	2.21%
100	0.22%	0.45%	0.67%	0.89%	1.12%	1.34%	1.56%	1.79%	2.01%	2.23%	2.46%

Table 2-46 IQ Raw Cable (IQ8MC)

Feet	IQ8MC Microinverters per branch 240 V											
	1	2	3	4	5	6	7	8	9	10	11	12
10	0.02%	0.04%	0.07%	0.09%	0.11%	0.13%	0.15%	0.18%	0.20%	0.22%	0.24%	0.26%
15	0.03%	0.07%	0.10%	0.13%	0.16%	0.20%	0.23%	0.26%	0.30%	0.33%	0.36%	0.40%
20	0.04%	0.09%	0.13%	0.18%	0.22%	0.26%	0.31%	0.35%	0.40%	0.44%	0.48%	0.53%
25	0.05%	0.11%	0.16%	0.22%	0.27%	0.33%	0.38%	0.44%	0.49%	0.55%	0.60%	0.66%
30	0.07%	0.13%	0.20%	0.26%	0.33%	0.40%	0.46%	0.53%	0.59%	0.66%	0.72%	0.79%
40	0.09%	0.18%	0.26%	0.35%	0.44%	0.53%	0.61%	0.70%	0.79%	0.88%	0.97%	1.05%
50	0.11%	0.22%	0.33%	0.44%	0.55%	0.66%	0.77%	0.88%	0.99%	1.10%	1.21%	1.32%
60	0.13%	0.26%	0.40%	0.53%	0.66%	0.79%	0.92%	1.05%	1.19%	1.32%	1.45%	1.58%
70	0.15%	0.31%	0.46%	0.61%	0.77%	0.92%	1.08%	1.23%	1.38%	1.54%	1.69%	1.84%
80	0.18%	0.35%	0.53%	0.70%	0.88%	1.05%	1.23%	1.40%	1.58%	1.76%	1.93%	2.11%
90	0.20%	0.40%	0.59%	0.79%	0.99%	1.19%	1.38%	1.58%	1.78%	1.98%	2.17%	2.37%
100	0.22%	0.44%	0.66%	0.88%	1.10%	1.32%	1.54%	1.76%	1.98%	2.19%	2.41%	2.63%

Table 2-47 IQ Raw Cable (IQ8A, IQ8AC)

Feet	IQ8A, IQ8AC Microinverters per branch 240 V										
	1	2	3	4	5	6	7	8	9	10	11
10	0.02%	0.05%	0.07%	0.10%	0.12%	0.14%	0.17%	0.19%	0.22%	0.24%	0.26%
15	0.04%	0.07%	0.11%	0.14%	0.18%	0.22%	0.25%	0.29%	0.32%	0.36%	0.40%
20	0.05%	0.10%	0.14%	0.19%	0.24%	0.29%	0.34%	0.38%	0.43%	0.48%	0.53%
25	0.06%	0.12%	0.18%	0.24%	0.30%	0.36%	0.42%	0.48%	0.54%	0.60%	0.66%
30	0.07%	0.14%	0.22%	0.29%	0.36%	0.43%	0.50%	0.58%	0.65%	0.72%	0.79%
40	0.10%	0.19%	0.29%	0.38%	0.48%	0.58%	0.67%	0.77%	0.86%	0.96%	1.06%
50	0.12%	0.24%	0.36%	0.48%	0.60%	0.72%	0.84%	0.96%	1.08%	1.20%	1.32%
60	0.14%	0.29%	0.43%	0.58%	0.72%	0.86%	1.01%	1.15%	1.30%	1.44%	1.58%
70	0.17%	0.34%	0.50%	0.67%	0.84%	1.01%	1.18%	1.34%	1.51%	1.68%	1.85%
80	0.19%	0.38%	0.58%	0.77%	0.96%	1.15%	1.34%	1.54%	1.73%	1.92%	2.11%
90	0.22%	0.43%	0.65%	0.86%	1.08%	1.30%	1.51%	1.73%	1.94%	2.16%	2.38%
100	0.24%	0.48%	0.72%	0.96%	1.20%	1.44%	1.68%	1.92%	2.16%	2.40%	2.64%

Table 2-48 IQ Raw Cable (IQ8H, IQ8HC 240 V)

Feet	IQ8H, IQ8HC, and IQ8X Microinverters per branch 240 V									
	1	2	3	4	5	6	7	8	9	10
10	0.03%	0.05%	0.08%	0.11%	0.13%	0.16%	0.18%	0.21%	0.24%	0.26%
15	0.04%	0.08%	0.12%	0.16%	0.20%	0.24%	0.28%	0.32%	0.36%	0.40%
20	0.05%	0.11%	0.16%	0.21%	0.26%	0.32%	0.37%	0.42%	0.48%	0.53%
25	0.07%	0.13%	0.20%	0.26%	0.33%	0.40%	0.46%	0.53%	0.59%	0.66%
30	0.08%	0.16%	0.24%	0.32%	0.40%	0.48%	0.55%	0.63%	0.71%	0.79%
40	0.11%	0.21%	0.32%	0.42%	0.53%	0.63%	0.74%	0.84%	0.95%	1.06%
50	0.13%	0.26%	0.40%	0.53%	0.66%	0.79%	0.92%	1.06%	1.19%	1.32%
60	0.16%	0.32%	0.48%	0.63%	0.79%	0.95%	1.11%	1.27%	1.43%	1.58%
70	0.18%	0.37%	0.55%	0.74%	0.92%	1.11%	1.29%	1.48%	1.66%	1.85%
80	0.21%	0.42%	0.63%	0.84%	1.06%	1.27%	1.48%	1.69%	1.90%	2.11%
90	0.24%	0.48%	0.71%	0.95%	1.19%	1.43%	1.66%	1.90%	2.14%	2.38%
100	0.26%	0.53%	0.79%	1.06%	1.32%	1.58%	1.85%	2.11%	2.38%	2.64%

Table 2-49 IQ Raw Cable (IQ8MC 208 V)

Feet	IQ8MC Microinverters per branch 208 V									
	1	2	3	4	5	6	7	8	9	10
10	0.03%	0.06%	0.09%	0.11%	0.14%	0.17%	0.20%	0.23%	0.26%	0.28%
15	0.04%	0.09%	0.13%	0.17%	0.21%	0.26%	0.30%	0.34%	0.38%	0.43%
20	0.06%	0.11%	0.17%	0.23%	0.28%	0.34%	0.40%	0.45%	0.51%	0.57%
25	0.07%	0.14%	0.21%	0.28%	0.35%	0.43%	0.50%	0.57%	0.64%	0.71%
30	0.09%	0.17%	0.26%	0.34%	0.43%	0.51%	0.60%	0.68%	0.77%	0.85%
40	0.11%	0.23%	0.34%	0.45%	0.57%	0.68%	0.79%	0.91%	1.02%	1.13%
50	0.14%	0.28%	0.43%	0.57%	0.71%	0.85%	0.99%	1.13%	1.28%	1.42%
60	0.17%	0.34%	0.51%	0.68%	0.85%	1.02%	1.19%	1.36%	1.53%	1.70%
70	0.20%	0.40%	0.60%	0.79%	0.99%	1.19%	1.39%	1.59%	1.79%	1.99%
80	0.23%	0.45%	0.68%	0.91%	1.13%	1.36%	1.59%	1.82%	2.04%	2.27%
90	0.26%	0.51%	0.77%	1.02%	1.28%	1.53%	1.79%	2.04%	2.30%	2.55%
100	0.28%	0.57%	0.85%	1.13%	1.42%	1.70%	1.99%	2.27%	2.55%	2.84%

Table 2-50 IQ Raw Cable (IQ8AC 208 V)

Feet	IQ8AC Microinverters per branch 208 V								
	1	2	3	4	5	6	7	8	9
10	0.03%	0.06%	0.09%	0.13%	0.16%	0.19%	0.22%	0.25%	0.28%
15	0.05%	0.09%	0.14%	0.19%	0.24%	0.28%	0.33%	0.38%	0.43%
20	0.06%	0.13%	0.19%	0.25%	0.32%	0.38%	0.44%	0.51%	0.57%
25	0.08%	0.16%	0.24%	0.32%	0.40%	0.47%	0.55%	0.63%	0.71%
30	0.09%	0.19%	0.28%	0.38%	0.47%	0.57%	0.66%	0.76%	0.85%
40	0.13%	0.25%	0.38%	0.51%	0.63%	0.76%	0.88%	1.01%	1.14%
50	0.16%	0.32%	0.47%	0.63%	0.79%	0.95%	1.11%	1.26%	1.42%
60	0.19%	0.38%	0.57%	0.76%	0.95%	1.14%	1.33%	1.52%	1.71%
70	0.22%	0.44%	0.66%	0.88%	1.11%	1.33%	1.55%	1.77%	1.99%
80	0.25%	0.51%	0.76%	1.01%	1.26%	1.52%	1.77%	2.02%	2.28%
90	0.28%	0.57%	0.85%	1.14%	1.42%	1.71%	1.99%	2.28%	2.56%
100	0.32%	0.63%	0.95%	1.26%	1.58%	1.90%	2.21%	2.53%	2.84%

Table 2-51 IQ Raw Cable (IQ8HC 208 V)

Feet	IQ8H, IQ8HC, and IQ8X Microinverters per branch 208 V								
	1	2	3	4	5	6	7	8	9
10	0.03%	0.07%	0.10%	0.13%	0.16%	0.20%	0.23%	0.26%	0.30%
15	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%	0.44%
20	0.07%	0.13%	0.20%	0.26%	0.33%	0.40%	0.46%	0.53%	0.59%
25	0.08%	0.16%	0.25%	0.33%	0.41%	0.49%	0.58%	0.66%	0.74%
30	0.10%	0.20%	0.30%	0.40%	0.49%	0.59%	0.69%	0.79%	0.89%
40	0.13%	0.26%	0.40%	0.53%	0.66%	0.79%	0.92%	1.05%	1.19%
50	0.16%	0.33%	0.49%	0.66%	0.82%	0.99%	1.15%	1.32%	1.48%
60	0.20%	0.40%	0.59%	0.79%	0.99%	1.19%	1.38%	1.58%	1.78%
70	0.23%	0.46%	0.69%	0.92%	1.15%	1.38%	1.61%	1.84%	2.08%
80	0.26%	0.53%	0.79%	1.05%	1.32%	1.58%	1.84%	2.11%	2.37%
90	0.30%	0.59%	0.89%	1.19%	1.48%	1.78%	2.08%	2.37%	2.67%
100	0.33%	0.66%	0.99%	1.32%	1.65%	1.98%	2.31%	2.63%	2.96%

### 2.1.1 Conductor lengths by wire section

Use the following tables to help determine the proper wire size based on the number of microinverters in the circuit and the length of the wire section. Use these tables for either individual microinverter branch circuits or combined branch circuits that use the PV subpanels. The tables list the maximum length a particular conductor can be run to maintain 1% voltage rise for this section of wire. Keep in mind that if multiple sections are combined, then the conductor size should be increased appropriately.

Table 2-52 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ6)

AWG	Number of IQ6 Microinverters																
	3	6	9	12	15	16	18	21	24	27	30	33	36	39	42	45	48
#12	211	105	70	53	42	40	35	30	26	23	21	19	18	16	15	14	13
#10	337	168	112	84	67	63	56	48	42	37	34	31	28	26	24	22	21
#8	536	268	179	134	107	101	89	77	67	60	54	49	45	41	38	36	34
#6	850	425	283	213	170	159	142	121	106	94	85	77	71	65	61	57	53
#4	1355	678	452	339	271	254	226	194	169	151	136	123	113	104	97	90	85
	Single branch circuit						Multiple branch circuits										

Table 2-53 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ6+)

AWG	Number of IQ6+ Microinverters														
	3	6	9	12	13	15	18	21	24	27	30	33	36	39	
#12	173	87	58	43	40	35	29	25	22	19	17	16	14	13	
#10	276	138	92	69	64	55	46	39	35	31	28	25	23	21	
#8	441	220	147	110	102	88	73	63	55	49	44	40	37	34	
#6	698	349	233	175	161	140	116	100	87	78	70	63	58	54	
#4	1113	557	371	278	257	223	186	159	139	124	111	101	93	86	
	Single branch circuit						Multiple branch circuits								

Table 2-54 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ7)

AWG	Number of IQ7 Microinverters																
	3	6	9	12	15	16	18	21	24	27	30	33	36	39	42	45	48
#12	202	101	67	51	40	38	34	29	25	22	20	18	17	16	14	13	13
#10	323	161	108	81	65	60	54	46	40	36	32	29	27	25	23	22	20
#8	514	257	171	129	103	96	86	73	64	57	51	47	43	40	37	34	32
#6	815	407	272	204	163	153	136	116	102	91	81	74	68	63	58	54	51
#4	1299	649	433	325	260	244	216	186	162	144	130	118	108	100	93	87	81
	Single branch circuit						Multiple branch circuits										

Table 2-55 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ7+)

AWG	Number of IQ7+ Microinverters														
	3	6	9	12	13	15	18	21	24	27	30	33	36	39	
#12	167	84	56	42	39	33	28	24	21	19	17	15	14	13	
#10	267	133	89	67	62	53	44	38	33	30	27	24	22	21	
#8	425	213	142	106	98	85	71	61	53	47	43	39	35	33	
#6	674	337	225	169	156	135	112	96	84	75	67	61	56	52	
#4	1075	537	358	269	248	215	179	154	134	119	107	98	90	83	
	Single branch circuit					Multiple branch circuits									

Table 2-56 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ7X)

AWG	Number of IQ7X Microinverters											
	3	6	9	12	15	18	21	24	27	30	33	36
#12	154	77	51	38	31	26	22	19	17	15	14	13
#10	246	123	82	61	49	41	35	31	27	25	22	20
#8	392	196	131	98	78	65	56	49	44	39	36	33
#6	621	310	207	155	124	103	89	78	69	62	56	52
#4	989	495	330	247	198	165	141	124	110	99	90	82
	Single branch circuit				Multiple branch circuits							

Table 2-57 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ7A)

AWG	Number of IQ7A Microinverters											
	3	6	9	11	14	17	20	22	25	28	31	33
#12	139	69	46	38	30	25	21	19	17	15	13	13
#10	222	111	74	60	48	39	33	30	27	24	21	20
#8	354	177	118	96	76	62	53	48	42	38	34	32
#6	560	280	187	153	120	99	84	76	67	60	54	51
#4	893	447	298	244	191	158	134	122	107	96	86	81
	Single branch circuit				Multiple branch circuits							

Table 2-58 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ7A)

AWG	Number of IQ8 Microinverters																
	3	6	9	12	15	16	18	21	24	27	30	33	36	39	42	45	48
#12	202	101	67	51	40	38	34	29	25	22	20	18	17	16	14	13	13
#10	322	161	107	81	64	60	54	46	40	36	32	29	27	25	23	21	20
#8	514	257	171	129	103	96	86	73	64	57	51	47	43	40	37	34	32
#6	815	407	272	204	163	153	136	116	102	91	81	74	68	63	58	54	51
#4	1,299	649	433	325	260	244	216	186	162	144	130	118	108	100	93	87	81
	Single branch circuit						Multiple branch circuits										

Table 2-59 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ8PLUS)

AWG	Number of IQ8PLUS Microinverters														
	3	6	9	12	13	15	18	21	24	27	30	33	36	39	
#12	167	84	56	42	39	33	28	24	21	19	17	15	14	13	
#10	267	133	89	67	62	53	44	38	33	30	27	24	22	21	
#8	425	213	142	106	98	85	71	61	53	47	43	39	35	33	
#6	674	337	225	169	156	135	112	96	84	75	67	61	56	52	
#4	1,075	537	358	269	248	215	179	154	134	119	107	98	90	83	
	Single branch circuit						Multiple branch circuits								

Table 2-60 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ8M)

AWG	Number of IQ8M Microinverters											
	3	6	9	11	14	17	20	22	25	28	31	33
#12	149	75	50	41	32	26	22	20	18	16	14	14
#10	238	119	79	65	51	42	36	32	29	26	23	22
#8	380	190	127	104	81	67	57	52	46	41	37	35
#6	602	301	201	164	129	106	90	82	72	64	58	55
#4	959	480	320	262	206	169	144	131	115	103	93	87
	Single branch circuit						Multiple branch circuits					

Table 2-61 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ8MC)

AWG	Number of IQ8MC Microinverters												
	3	6	9	12	14	17	20	22	25	28	31	33	36
#12	152	76	51	38	33	27	23	21	18	16	15	14	13
#10	242	121	81	61	52	43	36	33	29	26	23	22	20
#8	387	193	129	97	83	68	58	53	46	41	37	35	32
#6	613	306	204	153	131	108	92	84	74	66	59	56	51
#4	976	488	325	244	209	172	146	133	117	105	94	89	81
	Single branch circuit						Multiple branch circuits						



Table 2-62 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ8A, IQ8AC)

AWG	Number of IQ8A, IQ8AC Microinverters											
	3	6	9	11	14	17	20	22	25	28	31	33
#12	139	69	46	38	30	25	21	19	17	15	13	13
#10	222	111	74	60	48	39	33	30	27	24	21	20
#8	354	177	118	96	76	62	53	48	42	38	34	32
#6	560	280	187	153	120	99	84	76	67	60	54	51
#4	893	447	298	244	191	158	134	122	107	96	86	81
Single branch circuit					Multiple branch circuits							

Table 2-63 Maximum distance (in feet) to maintain 1% VRise for 240 VAC (IQ8H, IQ8HC, and IQ8X)

AWG	Number of IQ8H, IQ8HC, and IQ8X Microinverters											
	3	6	9	10	13	16	19	22	25	28	30	
#12	126	63	42	38	29	24	20	17	15	14	13	
#10	201	101	67	60	46	38	32	27	24	22	20	
#8	321	161	107	96	74	60	51	44	39	34	32	
#6	509	255	170	153	117	95	80	69	61	55	51	
#4	812	406	271	244	187	152	128	111	97	87	81	
Single branch circuit					Multiple branch circuits							

Table 2-64 Maximum distance (in feet) to maintain 1% VRise for 208 VAC (IQ8MC)

AWG	Number of IQ8MC Microinverters									
	3	6	10	12	15	18	21	24	27	30
#12	136	68	41	34	27	23	19	17	15	14
#10	216	108	65	54	43	36	31	27	24	22
#8	345	173	104	86	69	58	49	43	38	35
#6	547	273	164	137	109	91	78	68	61	55
#4	872	436	261	218	174	145	125	109	97	87
Single Branch Circuit				Multiple Branch Circuits						

Table 2-65 Maximum distance (in feet) to maintain 1% VRise for 208 VAC (IQ8A, IQ8AC)

AWG	Number of IQ8A, IQ8AC Microinverters								
	3	6	3	12	3	18	21	24	27
#12	122	#12	122	#12	122	#12	17	15	13
#10	194	#10	194	#10	194	#10	27	23	21
#8	310	#8	310	#8	310	#8	42	37	33
#6	491	#6	491	#6	491	#6	67	59	52
#4	782	#4	782	#4	782	#4	107	94	83
Single Branch Circuit				Multiple Branch Circuits					

Table 2-66 Maximum distance (in feet) to maintain 1% VRise for 208 VAC (IQ8H, IQ8HC, and IQ8X)

AWG	Number of IQ8H, IQ8HC, and IQ8X Microinverters								
	3	6	9	12	15	18	21	24	27
#12	117	58	39	29	23	19	17	15	13
#10	186	93	62	47	37	31	27	23	21
#8	297	149	99	74	59	50	42	37	33
#6	471	235	157	118	94	78	67	59	52
#4	750	375	250	188	150	125	107	94	83
	Single branch circuit			Multiple branch circuits					

## 2.2 Internal VRise of IQ Cables with IQ Series Microinverters 208 V

Use the following tables to determine the voltage rise attributed to the IQ Cable when the IQ Microinverters are connected to 208/120 V services. To find the appropriate table, reference the IQ Microinverter and IQ Cable type (model numbers provided). For end-fed circuits, reference the number of microinverters in the circuit to find the voltage rise attributed to the IQ Cable. For center-fed circuits, reference the number of microinverters in the longer of the two sub-branches.

### IQ6-60-\*--US (208 V)

Table 2-67 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.11	2.21	3.32	4.42	5.53	6.63	7.74	8.85	9.95	11.06	12.16	13.27	14.38	15.48
<b>VRise (V)</b>	0.02	0.06	0.11	0.19	0.28	0.39	0.52	0.67	0.84	1.03	1.23	1.46	1.70	1.96
<b>VRise (%)</b>	0.01	0.03	0.05	0.09	0.13	0.19	0.25	0.32	0.40	0.49	0.59	0.70	0.82	0.94

Table 2-68 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.11	2.21	3.32	4.42	5.53	6.63	7.74	8.85	9.95	11.06	12.16	13.27	14.38	15.48
<b>VRise (V)</b>	0.03	0.09	0.17	0.29	0.43	0.60	0.81	1.04	1.29	1.58	1.90	2.24	2.62	3.02
<b>VRise (%)</b>	0.01	0.04	0.08	0.14	0.21	0.29	0.39	0.50	0.62	0.76	0.91	1.08	1.26	1.45

Table 2-69 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ6 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.11	2.21	3.32	4.42	5.53	6.63	7.74	8.85	9.95	11.06	12.16	13.27	14.38	15.48
<b>VRise (V)</b>	0.03	0.10	0.20	0.33	0.50	0.69	0.93	1.19	1.49	1.82	2.18	2.58	3.01	3.47
<b>VRise (%)</b>	0.02	0.05	0.10	0.16	0.24	0.33	0.45	0.57	0.72	0.87	1.05	1.24	1.45	1.67

\*Note that IQ6 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.

### IQ6PLUS-72-\*-US (208 V)

Table 2-70 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.35	2.69	4.04	5.38	6.73	8.08	9.42	10.77	12.12	13.46	14.81
<b>VRise (V)</b>	0.02	0.07	0.14	0.23	0.34	0.48	0.64	0.82	1.02	1.25	1.50
<b>VRise (%)</b>	0.01	0.03	0.07	0.11	0.16	0.23	0.31	0.39	0.49	0.60	0.72

Table 2-71 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.35	2.69	4.04	5.38	6.73	8.08	9.42	10.77	12.12	13.46	14.81
<b>VRise (V)</b>	0.04	0.11	0.21	0.35	0.53	0.74	0.98	1.26	1.58	1.93	2.31
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.25	0.35	0.47	0.61	0.76	0.93	1.11

Table 2-72 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ6+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.35	2.69	4.04	5.38	6.73	8.08	9.42	10.77	12.12	13.46	14.81
<b>VRise (V)</b>	0.04	0.12	0.24	0.40	0.60	0.85	1.13	1.45	1.81	2.21	2.66
<b>VRise (%)</b>	0.02	0.06	0.12	0.19	0.29	0.41	0.54	0.70	0.87	1.06	1.28

**IQ7-60-\*-US (208 V)**

Table 2-73 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7 Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.15	2.31	3.46	4.62	5.77	6.92	8.08	9.23	10.38	11.54	12.69	13.85	15.00
<b>VRise (V)</b>	0.02	0.06	0.12	0.20	0.29	0.41	0.55	0.70	0.88	1.07	1.29	1.52	1.77
<b>VRise (%)</b>	0.01	0.03	0.06	0.09	0.14	0.20	0.26	0.34	0.42	0.52	0.62	0.73	0.85

Table 2-74 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7 Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.15	2.31	3.46	4.62	5.77	6.92	8.08	9.23	10.38	11.54	12.69	13.85	15.00
<b>VRise (V)</b>	0.03	0.09	0.18	0.30	0.45	0.63	0.84	1.08	1.35	1.65	1.98	2.34	2.73
<b>VRise (%)</b>	0.01	0.04	0.09	0.14	0.22	0.30	0.40	0.52	0.65	0.79	0.95	1.13	1.31

Table 2-75 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ7 Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Current (A)</b>	1.15	2.31	3.46	4.62	5.77	6.92	8.08	9.23	10.38	11.54	12.69	13.85	15.00
<b>VRise (V)</b>	0.03	0.10	0.21	0.35	0.52	0.72	0.97	1.24	1.55	1.90	2.28	2.69	3.14
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.25	0.35	0.46	0.60	0.75	0.91	1.09	1.29	1.51
*Note that IQ7 Microinverters are compatible with 60-cell PV modules only but can be used with Q- 12-20-200 cable.													

**IQ7PLUS-72-\*-US (208 V)**

Table 2-76 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.39	2.79	4.18	5.58	6.97	8.37	9.76	11.15	12.55	13.94	15.34
<b>VRise (V)</b>	0.02	0.07	0.14	0.24	0.35	0.49	0.66	0.85	1.06	1.30	1.56
<b>VRise (%)</b>	0.01	0.03	0.07	0.11	0.17	0.24	0.32	0.41	0.51	0.62	0.75

Table 2-77 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.39	2.79	4.18	5.58	6.97	8.37	9.76	11.15	12.55	13.94	15.34
<b>VRise (V)</b>	0.04	0.11	0.22	0.36	0.54	0.76	1.02	1.31	1.63	1.99	2.39
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.26	0.37	0.49	0.63	0.78	0.96	1.15

Table 2-78 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7+ Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.39	2.79	4.18	5.58	6.97	8.37	9.76	11.15	12.55	13.94	15.34
<b>VRise (V)</b>	0.04	0.13	0.25	0.42	0.63	0.88	1.17	1.50	1.88	2.29	2.75
<b>VRise (%)</b>	0.02	0.06	0.12	0.20	0.30	0.42	0.56	0.72	0.90	1.10	1.32

**IQ7X-96-2-US (208 V)**

Table 2-79 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.51	3.03	4.54	6.06	7.57	9.09	10.60	12.12	13.63	15.14
<b>VRise (V)</b>	0.03	0.08	0.15	0.26	0.38	0.54	0.72	0.92	1.15	1.41
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.18	0.26	0.34	0.44	0.55	0.68

Table 2-80 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.51	3.03	4.54	6.06	7.57	9.09	10.60	12.12	13.63	15.14
<b>VRise (V)</b>	0.04	0.12	0.24	0.39	0.59	0.83	1.10	1.42	1.77	2.17
<b>VRise (%)</b>	0.02	0.06	0.11	0.19	0.28	0.40	0.53	0.68	0.85	1.04

Table 2-81 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7X Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.51	3.03	4.54	6.06	7.57	9.09	10.60	12.12	13.63	15.14
<b>VRise (V)</b>	0.05	0.14	0.27	0.45	0.68	0.95	1.27	1.63	2.04	2.49
<b>VRise (%)</b>	0.02	0.07	0.13	0.22	0.33	0.46	0.61	0.78	0.98	1.20

## IQ7A-72-\*-US

The IQ7A Microinverter connected to 208 V L-L voltage has the same specifications as the IQ7+ Microinverter. Refer to [Table 2-98](#) - [Table 2-100](#) for VRise details for IQ7A in 208 V applications.

## IQ8MC-72-2-US (208 V)

Table 2-82 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8MC Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.49	2.98	4.47	5.96	7.45	8.94	10.43	11.92	13.41	14.90
<b>VRise (V)</b>	0.02	0.07	0.15	0.25	0.37	0.52	0.69	0.89	1.12	1.36
<b>VRise (%)</b>	0.01%	0.03%	0.06%	0.10%	0.15%	0.22%	0.29%	0.37%	0.46%	0.57%

Table 2-83 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8MC Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.49	2.98	4.47	5.96	7.45	8.94	10.43	11.92	13.41	14.90
<b>VRise (V)</b>	0.04	0.12	0.23	0.38	0.58	0.81	1.07	1.38	1.73	2.11
<b>VRise (%)</b>	0.02%	0.05%	0.10%	0.16%	0.24%	0.34%	0.45%	0.58%	0.72%	0.88%

Table 2-84 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8MC Microinverters per branch										
	1	2	3	4	5	6	7	8	9	10
<b>Current (A)</b>	1.49	2.98	4.47	5.96	7.45	8.94	10.43	11.92	13.41	14.90
<b>VRise (V)</b>	0.04	0.13	0.27	0.44	0.66	0.93	1.24	1.59	1.99	2.43
<b>VRise (%)</b>	0.02%	0.06%	0.11%	0.18%	0.28%	0.39%	0.52%	0.66%	0.83%	1.01%

**IQ8AC-72-2-US (208 V)**

Table 2-85 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8AC Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.66	3.32	4.98	6.64	8.30	9.96	11.62	13.28	14.94
<b>VRise (V)</b>	0.03	0.08	0.17	0.28	0.41	0.58	0.77	0.99	1.24
<b>VRise (%)</b>	0.01%	0.03%	0.07%	0.12%	0.17%	0.24%	0.32%	0.41%	0.52%

Table 2-86 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8AC Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.66	3.32	4.98	6.64	8.30	9.96	11.62	13.28	14.94
<b>VRise (V)</b>	0.04	0.13	0.26	0.43	0.64	0.90	1.20	1.54	1.92
<b>VRise (%)</b>	0.02%	0.05%	0.11%	0.18%	0.27%	0.37%	0.50%	0.64%	0.80%

Table 2-87 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ8AC Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.66	3.32	4.98	6.64	8.30	9.96	11.62	13.28	14.94
<b>VRise (V)</b>	0.05	0.15	0.30	0.49	0.74	1.04	1.38	1.77	2.22
<b>VRise (%)</b>	0.02%	0.06%	0.12%	0.21%	0.31%	0.43%	0.58%	0.74%	0.92%



**IQ8H-208-72-\*-US, IQ8HC-72-M-US, and IQ8X-80-M-US (208 V)**

Table 2-88 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8H, IQ8HC, and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.73	3.5	5.2	6.92	8.7	10.4	12.1	13.8	15.6
<b>VRise (V)</b>	0.03	0.09	0.17	0.29	0.43	0.60	0.81	1.04	1.30
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.18	0.25	0.34	0.43	0.54

Table 2-89 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8H, IQ8HC, and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.7	3.5	5.2	6.9	8.7	10.4	12.1	13.8	15.6
<b>VRise (V)</b>	0.04	0.13	0.27	0.45	0.67	0.94	1.25	1.60	2.00
<b>VRise (%)</b>	0.02	0.06	0.11	0.19	0.28	0.39	0.52	0.67	0.84

Table 2-90 Internal IQ Cable VRise (Landscape 72 cell, cable: Q-12-20-200)

IQ8H, IQ8HC, and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.73	3.46	5.19	6.92	8.65	10.38	12.11	13.84	15.57
<b>VRise (V)</b>	0.05	0.15	0.31	0.51	0.77	1.08	1.44	1.85	2.31
<b>VRise (%)</b>	0.02	0.06	0.13	0.21	0.32	0.45	0.60	0.77	0.96

### 3 Addendum to calculating AC line voltage rise for IQ Series Microinverters with IQ Cable

#### 3.1 Internal VRise of IQ Cables with IQ Series Microinverters 220 V

The 220-volt services exist in Latin America, such as Mexico and Brazil. They are less common and virtually non-existent in the United States.

Use the following tables to determine the voltage rise attributed to the IQ Cable when the IQ Microinverters are connected to 220 V services. Reference the IQ Microinverter and IQ Cable type (model numbers provided) to find the appropriate table. For end-fed circuits, reference the number of microinverters in the circuit to find the voltage rise attributed to the IQ Cable. For center-fed circuits, reference the number of microinverters in the longer of the two sub-branches.

##### IQ6-60-\*-US (220 V)

Table 2-1 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6 Microinverters per branch															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Current (A)</b>	1.05	2.09	3.14	4.18	5.23	6.27	7.32	8.36	9.41	10.45	11.50	12.55	13.59	14.64	15.68
<b>VRise (V)</b>	0.02	0.05	0.11	0.18	0.27	0.37	0.49	0.64	0.80	0.97	1.17	1.38	1.61	1.86	2.12
<b>VRise (%)</b>	0.01	0.02	0.05	0.08	0.12	0.17	0.22	0.29	0.36	0.44	0.53	0.63	0.73	0.84	0.96

Table 2-2 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6 Microinverters per branch															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Current (A)</b>	1.05	2.09	3.14	4.18	5.23	6.27	7.32	8.36	9.41	10.45	11.50	12.55	13.59	14.64	15.68
<b>VRise (V)</b>	0.03	0.08	0.16	0.27	0.41	0.57	0.76	0.98	1.22	1.50	1.79	2.12	2.47	2.85	3.26
<b>VRise (%)</b>	0.01	0.04	0.07	0.12	0.19	0.26	0.35	0.44	0.56	0.68	0.82	0.96	1.12	1.30	1.48

Table 2-3 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ6 Microinverters per branch															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Current (A)</b>	1.05	2.09	3.14	4.18	5.23	6.27	7.32	8.36	9.41	10.45	11.50	12.55	13.59	14.64	15.68
<b>VRise (V)</b>	0.03	0.09	0.19	0.31	0.47	0.66	0.88	1.13	1.41	1.72	2.06	2.44	2.84	3.28	3.75
<b>VRise (%)</b>	0.01	0.04	0.09	0.14	0.21	0.30	0.40	0.51	0.64	0.78	0.94	1.11	1.29	1.49	1.71

**\*Note that IQ6 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.**

## IQ6PLUS-72-\*-US (220 V)

Table 2-4 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ6+ Microinverters per branch													
	1	2	3	4	5	6	7	8	9	10	11	12	
<b>Current (A)</b>	1.27	2.55	3.82	5.09	6.36	7.64	8.91	10.18	11.45	12.73	14.00	15.27	
<b>VRise (V)</b>	0.02	0.06	0.13	0.22	0.32	0.45	0.60	0.77	0.97	1.18	1.42	1.68	
<b>VRise (%)</b>	0.01	0.03	0.06	0.10	0.15	0.21	0.27	0.35	0.44	0.54	0.65	0.76	

Table 2-5 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ6+ Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.27	2.55	3.82	5.09	6.36	7.64	8.91	10.18	11.45	12.73	14.00	15.27
<b>VRise (V)</b>	0.03	0.10	0.20	0.33	0.50	0.69	0.93	1.19	1.49	1.82	2.18	2.58
<b>VRise (%)</b>	0.02	0.05	0.09	0.15	0.23	0.32	0.42	0.54	0.68	0.83	0.99	1.17

Table 2-6 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ6+ Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.27	2.55	3.82	5.09	6.36	7.64	8.91	10.18	11.45	12.73	14.00	15.27
<b>VRise (V)</b>	0.04	0.11	0.23	0.38	0.57	0.80	1.07	1.37	1.71	2.09	2.51	2.97
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.26	0.36	0.48	0.62	0.78	0.95	1.14	1.35

**IQ7-60-\*-US (220 V)**

Table 2-7 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.09	2.18	3.27	4.36	5.45	6.55	7.64	8.73	9.82	10.91	12.00	13.09	14.18	15.27
<b>VRise (V)</b>	0.02	0.06	0.11	0.18	0.28	0.39	0.52	0.66	0.83	1.01	1.22	1.44	1.68	1.94
<b>VRise (%)</b>	0.01	0.03	0.05	0.08	0.13	0.18	0.23	0.30	0.38	0.46	0.55	0.65	0.76	0.88

Table 2-8 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.09	2.18	3.27	4.36	5.45	6.55	7.64	8.73	9.82	10.91	12.00	13.09	14.18	15.27
<b>VRise (V)</b>	0.03	0.09	0.17	0.28	0.43	0.60	0.79	1.02	1.28	1.56	1.87	2.21	2.58	2.98
<b>VRise (%)</b>	0.01	0.04	0.08	0.13	0.19	0.27	0.36	0.46	0.58	0.71	0.85	1.01	1.17	1.35

Table 2-9 Internal IQ Cable VRise (Landscape 72-cell cable\*, Q-12-20-200)

IQ7 Microinverters per branch														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Current (A)</b>	1.09	2.18	3.27	4.36	5.45	6.55	7.64	8.73	9.82	10.91	12.00	13.09	14.18	15.27
<b>VRise (V)</b>	0.03	0.10	0.20	0.33	0.49	0.68	0.91	1.17	1.47	1.79	2.15	2.54	2.97	3.42
<b>VRise (%)</b>	0.01	0.04	0.09	0.15	0.22	0.31	0.42	0.53	0.67	0.82	0.98	1.16	1.35	1.56
*Note that IQ7 Microinverters are compatible with 60-cell PV modules only but can be used with Q-12-20-200 cable.														

**IQ7PLUS-72-\*-US (220 V)**

Table 2-10 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7+ Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.32	2.64	3.95	5.27	6.59	7.91	9.23	10.55	11.86	13.18	14.50	15.82
<b>VRise (V)</b>	0.02	0.07	0.13	0.22	0.33	0.47	0.62	0.80	1.00	1.23	1.47	1.74
<b>VRise (%)</b>	0.01	0.03	0.06	0.10	0.15	0.21	0.28	0.36	0.46	0.56	0.67	0.79

Table 2-11 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7+ Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.32	2.64	3.95	5.27	6.59	7.91	9.23	10.55	11.86	13.18	14.50	15.82
<b>VRise (V)</b>	0.03	0.10	0.21	0.34	0.51	0.72	0.96	1.23	1.54	1.89	2.26	2.67
<b>VRise (%)</b>	0.02	0.05	0.09	0.16	0.23	0.33	0.44	0.56	0.70	0.86	1.03	1.22

Table 2-12 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7+ Microinverters per branch												
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Current (A)</b>	1.32	2.64	3.95	5.27	6.59	7.91	9.23	10.55	11.86	13.18	14.50	15.82
<b>VRise (V)</b>	0.04	0.12	0.24	0.39	0.59	0.83	1.10	1.42	1.77	2.17	2.60	3.07
<b>VRise (%)</b>	0.02	0.05	0.11	0.18	0.27	0.38	0.50	0.64	0.81	0.99	1.18	1.40

**IQ7X-96-2-US (220 V)**

Table 2-13 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ7X Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.43	2.86	4.30	5.73	7.16	8.59	10.02	11.45	12.89	14.32	15.75
<b>VRise (V)</b>	0.02	0.07	0.15	0.24	0.36	0.51	0.68	0.87	1.09	1.33	1.60
<b>VRise (%)</b>	0.01	0.03	0.07	0.11	0.16	0.23	0.31	0.40	0.49	0.60	0.73

Table 2-14 Internal IQ Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ7X Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.43	2.86	4.30	5.73	7.16	8.59	10.02	11.45	12.89	14.32	15.75
<b>VRise (V)</b>	0.04	0.11	0.22	0.37	0.56	0.78	1.04	1.34	1.68	2.05	2.46
<b>VRise (%)</b>	0.02	0.05	0.10	0.17	0.25	0.36	0.47	0.61	0.76	0.93	1.12

Table 2-15 Internal IQ Cable VRise (Landscape 72-cell, cable: Q-12-20-200)

IQ7X Microinverters per branch											
	1	2	3	4	5	6	7	8	9	10	11
<b>Current (A)</b>	1.43	2.86	4.30	5.73	7.16	8.59	10.02	11.45	12.89	14.32	15.75
<b>VRise (V)</b>	0.04	0.13	0.26	0.43	0.64	0.90	1.20	1.54	1.93	2.35	2.83
<b>VRise (%)</b>	0.02	0.06	0.12	0.19	0.29	0.41	0.54	0.70	0.88	1.07	1.28

## IQ7A-72-\*-US

The IQ7A Microinverter connected to 220 V L-L voltage has the same specifications as the IQ7+ microinverter. Refer to [Table 2-100](#) - [Table 2-102](#), for VRise details for IQ7A in 220 V applications.

## IQ8HC-72-M-US, and IQ8X-80-M-US (220 V)

Table 2-16 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8HC and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.73	3.46	5.19	6.92	8.65	10.38	12.11	13.84	15.57
<b>VRise (V)</b>	0.03	0.09	0.17	0.29	0.43	0.60	0.81	1.04	1.29
<b>VRise (%)</b>	0.01%	0.04%	0.07%	0.12%	0.18%	0.25%	0.34%	0.43%	0.54%

Table 2-17 Internal Q Cable VRise (Landscape 60-cell, cable: Q-12-17-240)

IQ8HC and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.75	3.49	5.24	6.98	8.73	10.47	12.22	13.96	15.71
<b>VRise (V)</b>	0.04	0.13	0.27	0.45	0.67	0.94	1.26	1.62	2.02
<b>VRise (%)</b>	0.02%	0.06%	0.11%	0.19%	0.28%	0.39%	0.52%	0.67%	0.84%

Table 2-18 Internal IQ Cable VRise (Portrait Cable: Q-12-10-240)

IQ8HC and IQ8X Microinverters per branch									
	1	2	3	4	5	6	7	8	9
<b>Current (A)</b>	1.75	3.49	5.24	6.98	8.73	10.47	12.22	13.96	15.71
<b>VRise (V)</b>	0.05	0.16	0.31	0.52	0.78	1.09	1.45	1.87	2.33
<b>VRise (%)</b>	0.02%	0.06%	0.13%	0.22%	0.32%	0.45%	0.60%	0.78%	0.97%

## Revision history

Revision	Date	Description
TEB-00111-1.0	November 2023	Added new internal Vrise of IQ Cable

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