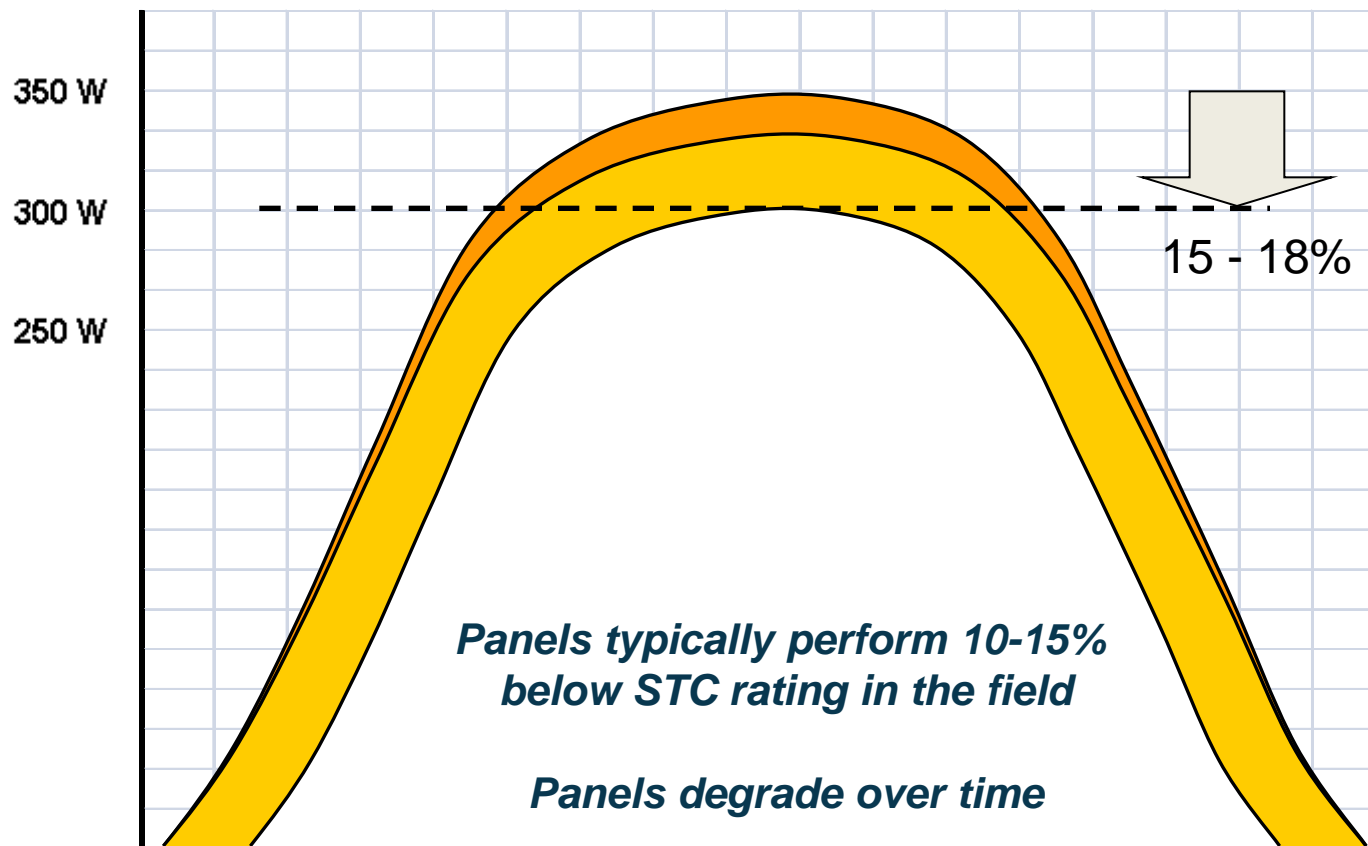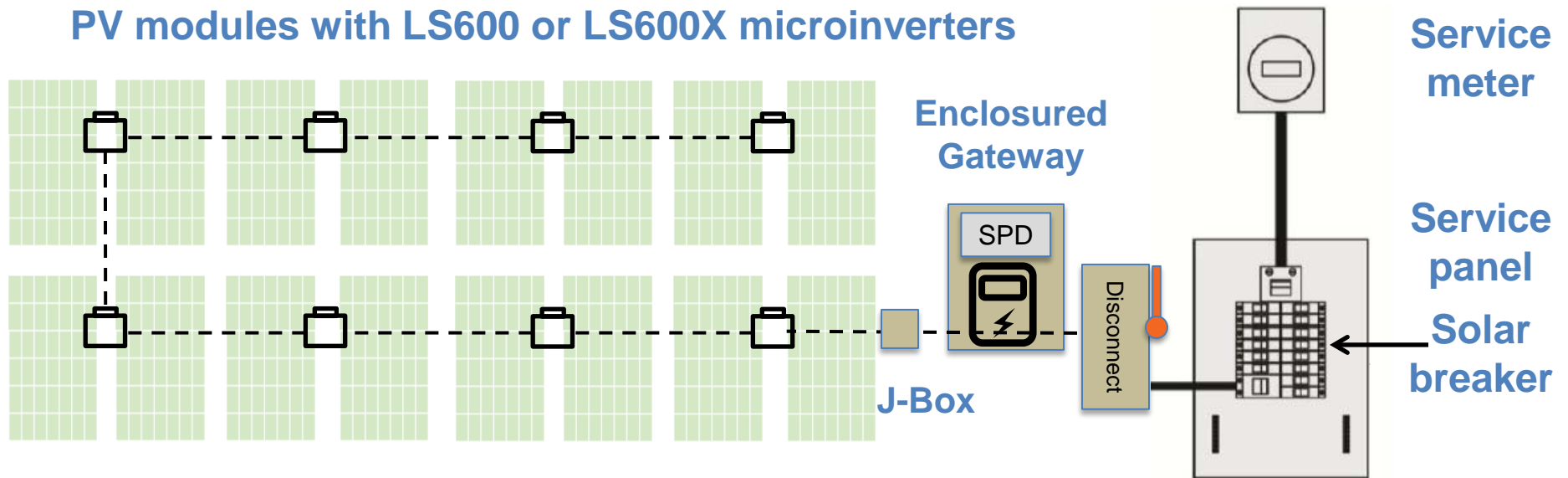# LeadSolar

LS-600 & LS-600X Microinverter Residential System Design

System Sizing

- Evaluate the site's energy needs to obtain the total kWhs for offset.

- Determine the PV DC system size using programs such as PVWatts. *http://pvwatts.nrel.gov/pvwatts.php*

- Select the PV module.

    – LS600: Modules with STC 230-400W (60 or 72 cell).

    – LS600X: Modules with STC 330-400W (96 cell).

- Determine the number of modules needed:

    DC kW system size ÷ STC module rating

- Determine the number of inverters required: # Modules ÷ 2

- The LS600 comes with PLC or Zigbee communications.

- The LS600X comes with Zigbee only.

Inverter to Panel Sizing

350 W

300 W

250 W

15 - 18%

Panels typically perform 10-15% below STC rating in the field

Panels degrade over time

PV modules are typically oversized by 15-18% of inverter capacity with respect to their STC rating.

System Design

- LeadSolar microinverters connect to form AC branch circuits.

PV modules with LS600 or LS600X microinverters

- LeadSolar microinverters can be configured as follows:
  - LS600-P: One 20A branch circuit will support up to 16 PV Modules (8 micros*)
  - LS600-Z: One 30A branch circuit will support up to 24 PV Modules (12 micros*)
  - LS600X: One 30A branch circuit will support up to 20 PV Modules (10 micros*)
  - * With current limited outputs

- Installation of a Surge Protection Device (SPD) is recommended

Allowable Branch Circuits

- 100 A service panel ⇨ supports (1) 20 A branch circuit.

- 200 or 225 A service panel ⇨ typically supports 2 or 3 20/30 A branch circuits. (See LeadSolar Technical Bulletin on Branch Circuit sizing)

- Some utilities allow for a Generation Meter Adapter (GMA) which bypasses the main service panel.

- Dual branches to be combined in a subpanel with dedicated breaker in the main service panel.

- The PV system and electrical connections must be described by a Single Line Diagram (SLD).

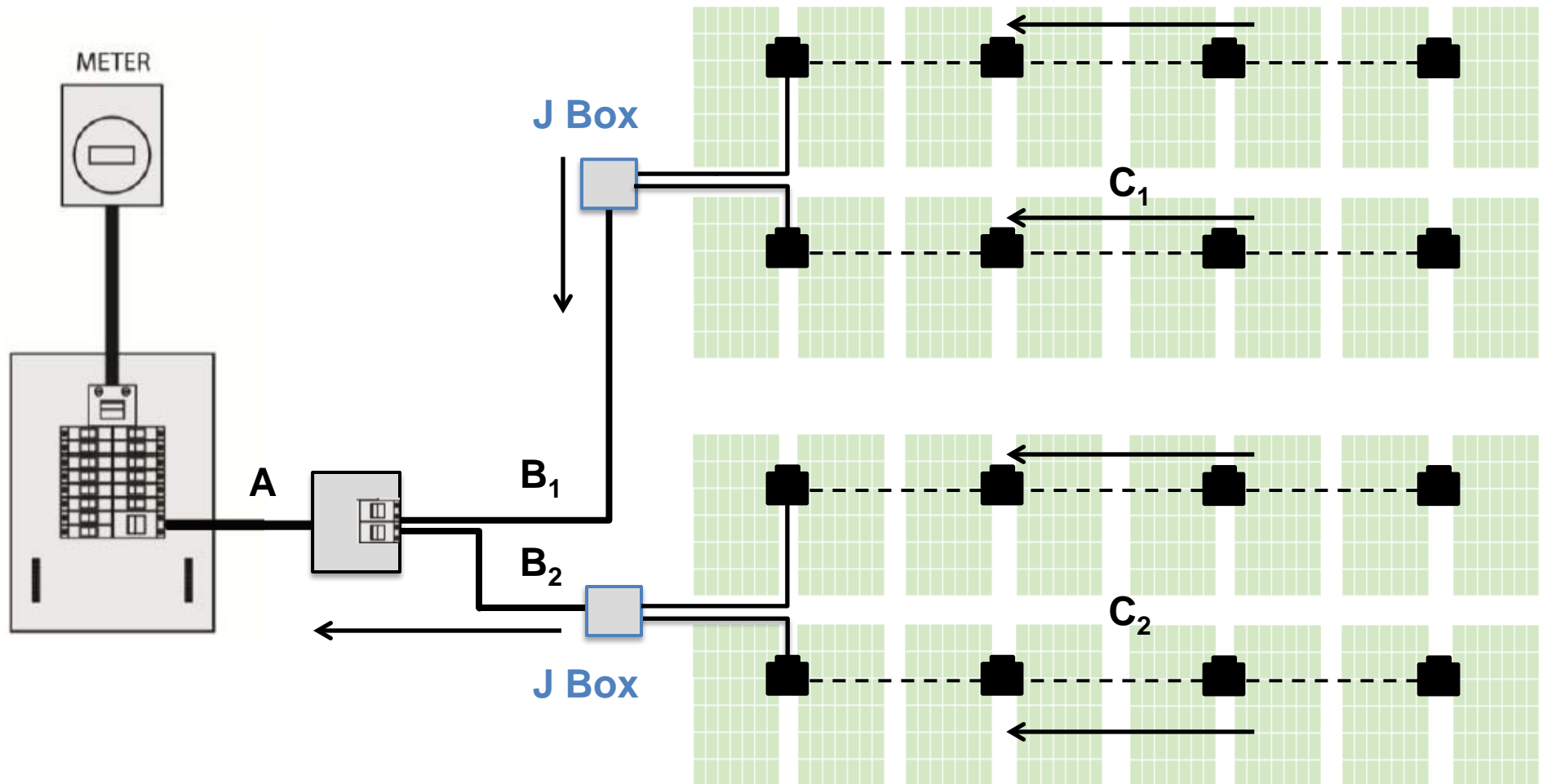*Rev2018-1* www.leadsolarenergy.com (888) 405-2860
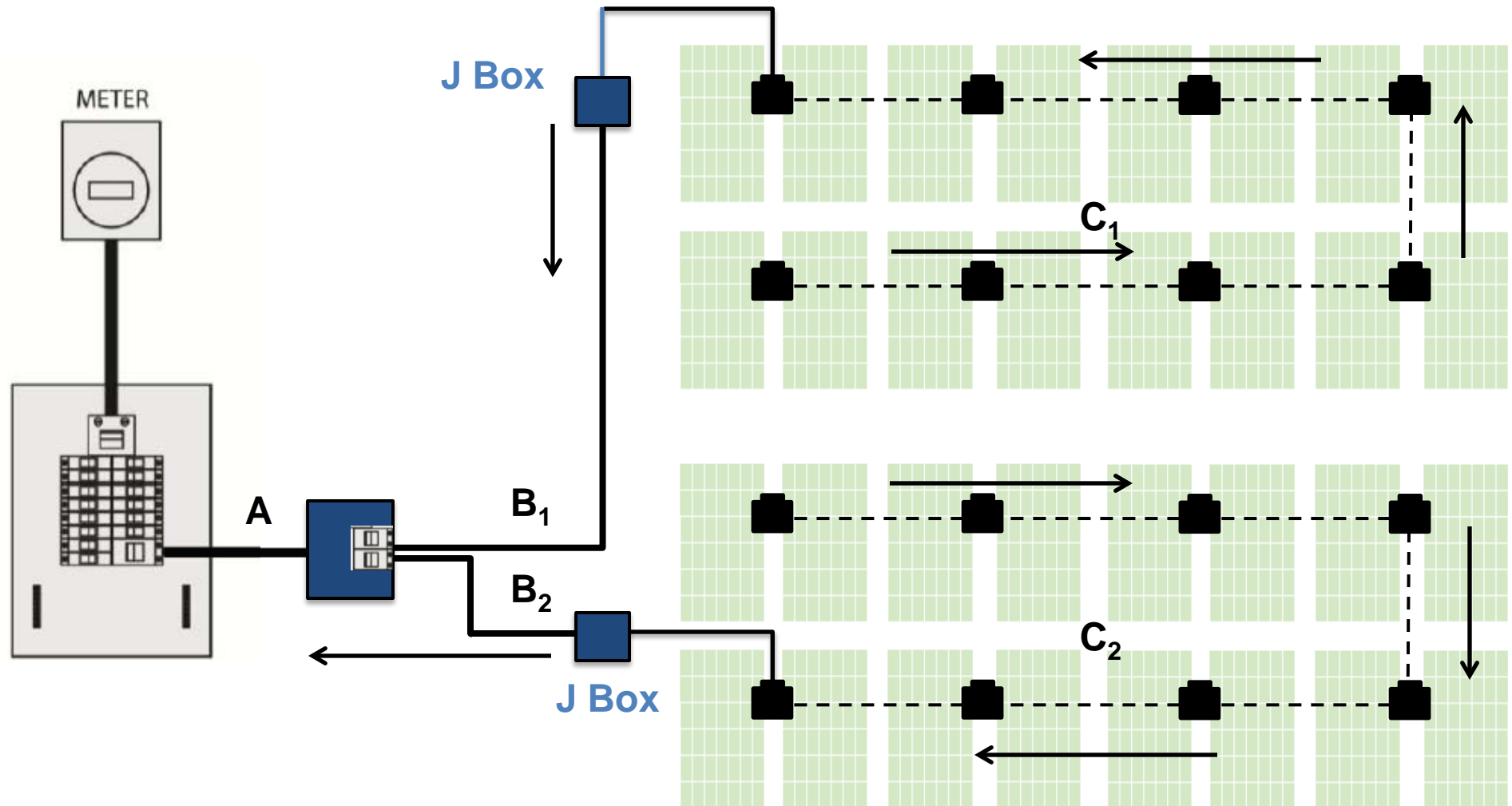
Voltage Rise

Total of all voltage rises from last inverter to main service panel for each branch must not exceed 2%: $A + B_1 + C_1 < 2\%$ and $A + B_2 + C_2 < 2\%$

For full branches "C" is approximately 1.5%

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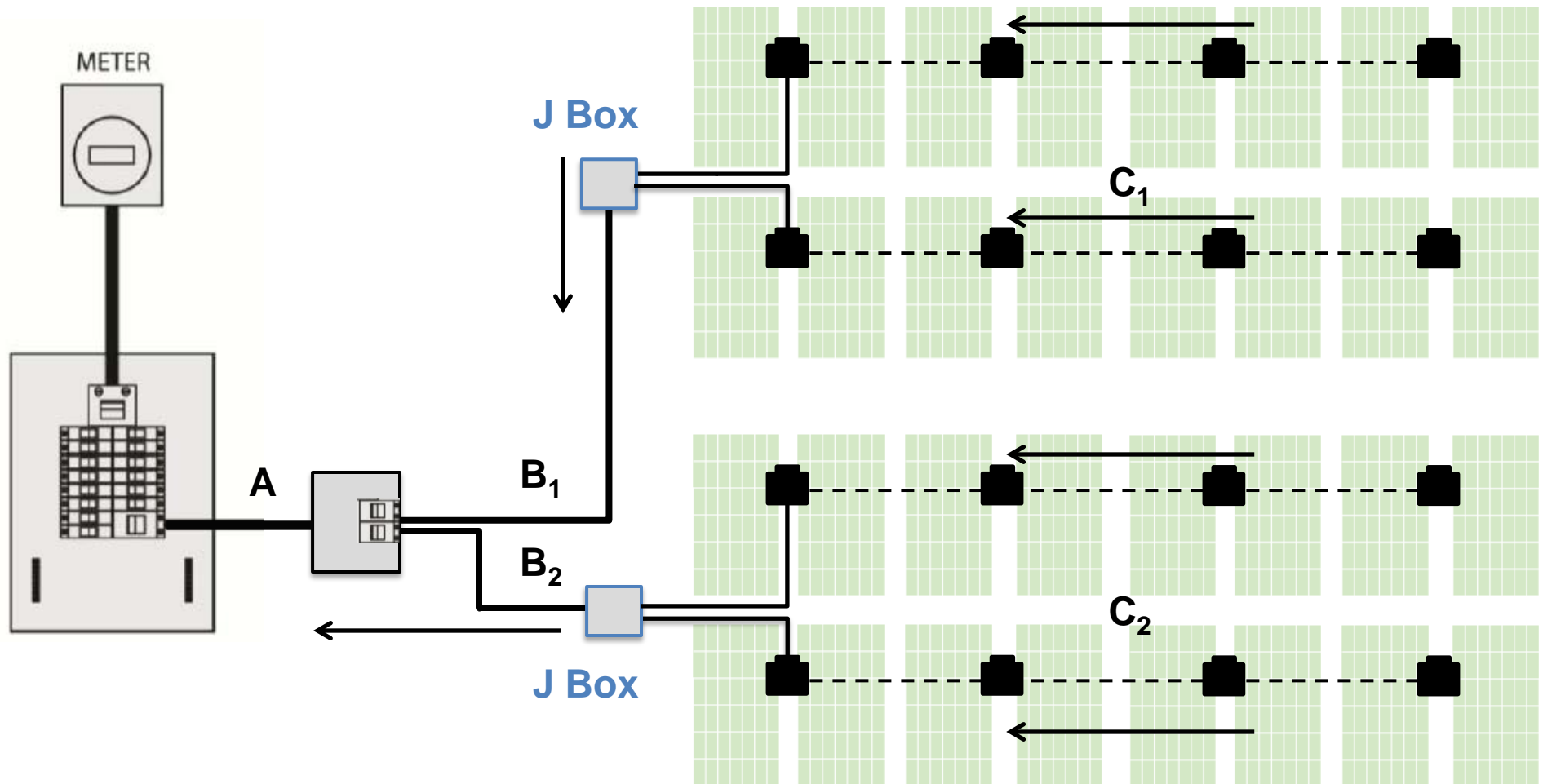
Voltage Rise – Center Tap

By center tapping, "C" now drops to 0.5%. Appropriate AWG wire sizing for "A"
and "B" can be determined via a voltage rise/drop calculator such as:

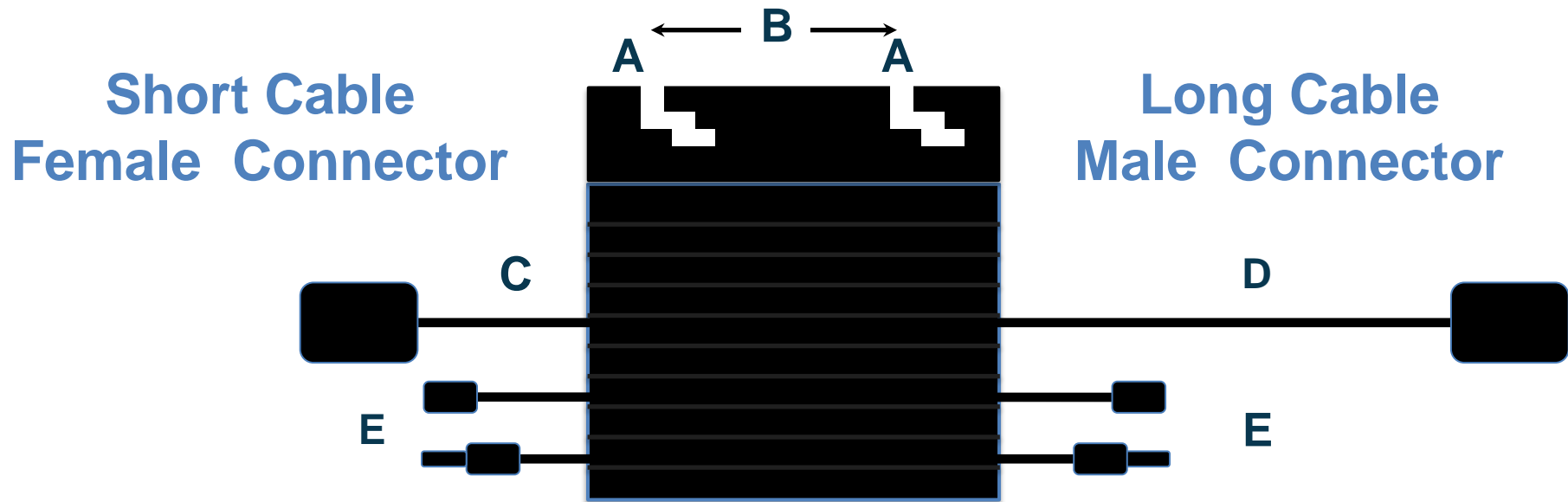http://www.southwire.com/support/voltage-drop-calculator.htm

Voltage Rise – Example

Two fully populated branch circuits equals 16A @ 240V for "B" and 32 A for "A"
Center tapping allows "B" up to ~100' (10AWG) and "C" up to 10" (8 AWG)
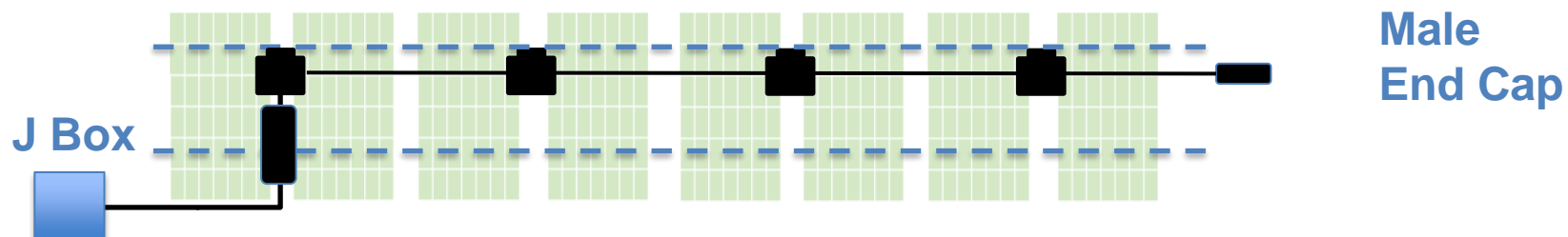
LS600 Microinverter Layout

Short Cable
Female Connector

Long Cable
Male Connector

- A 0.3" (7.62mm) gap
- B 4.7" (120mm) center-to-center
- C 7.5" (190.5mm) long
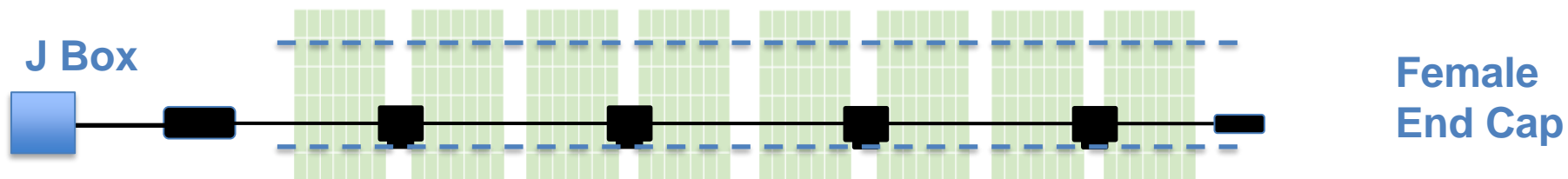- D 70.9" (1800mm) long
- E 7.4" (188mm) long

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Accessory Determination -PLC

3 m Jumper

Male and Female End Caps

Male End Cap

J Box

If the short cable (female) is to terminate into the J-box, you will need a male jumper and male end cap to complete the branch.

J Box

Female End Cap
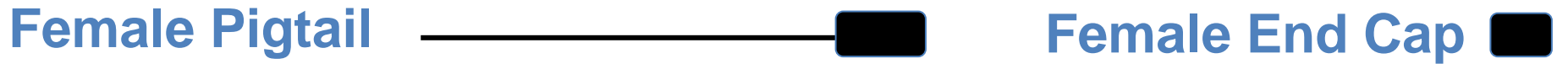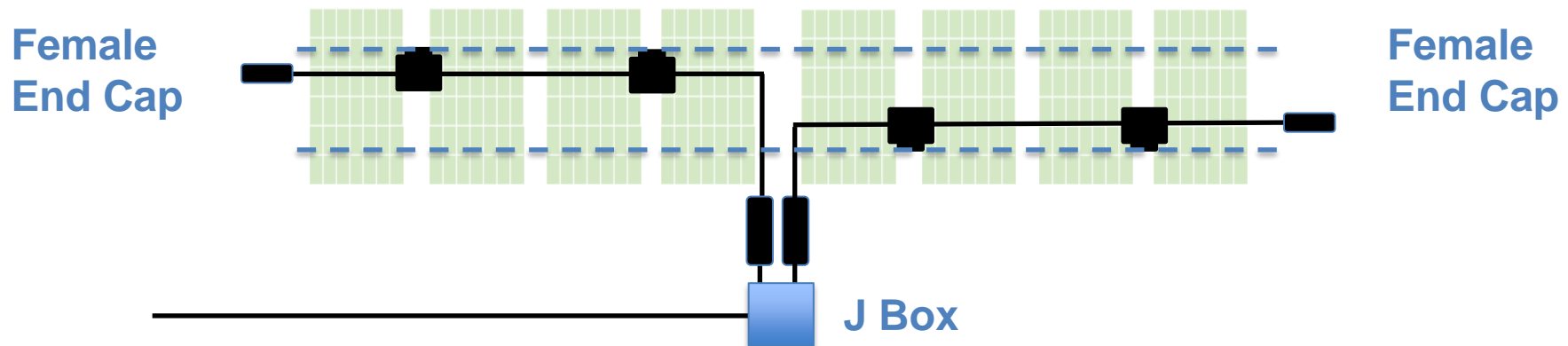
If the long cable (male) is to terminate into the J-box, you will need a female jumper and female end cap to complete the branch.

It addition to spanning gaps, the LSMFJ-3.0 jumper can be cut in half to form a male and female pigtail pair.
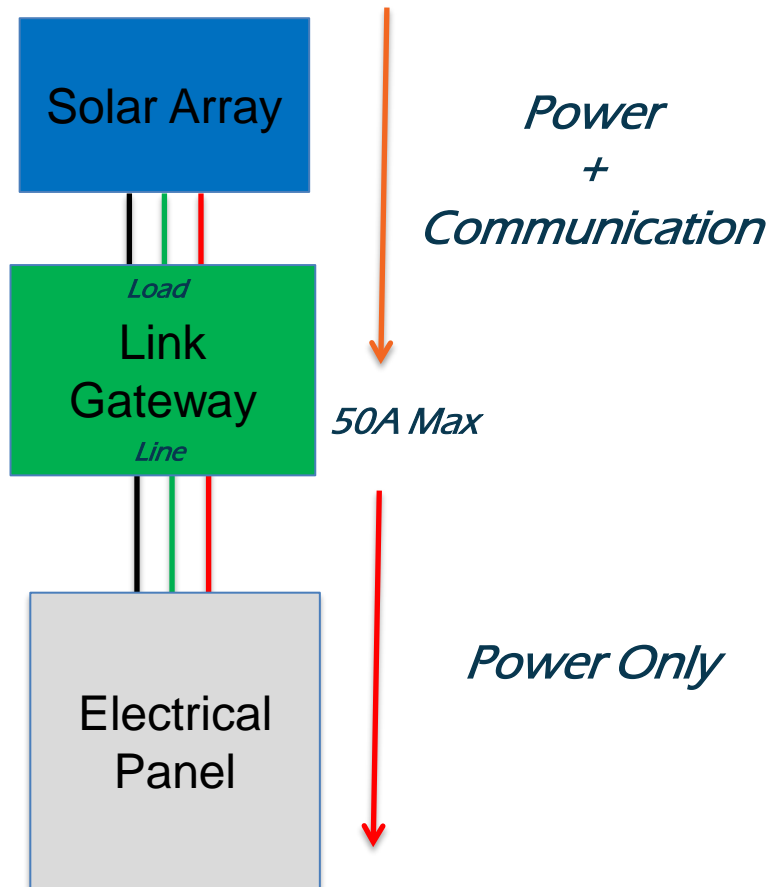
Accessory Determination -Zigbee

Female Pigtail ▬▬▬■

Female End Cap ■

3 m Jumper ■▬▬▬■
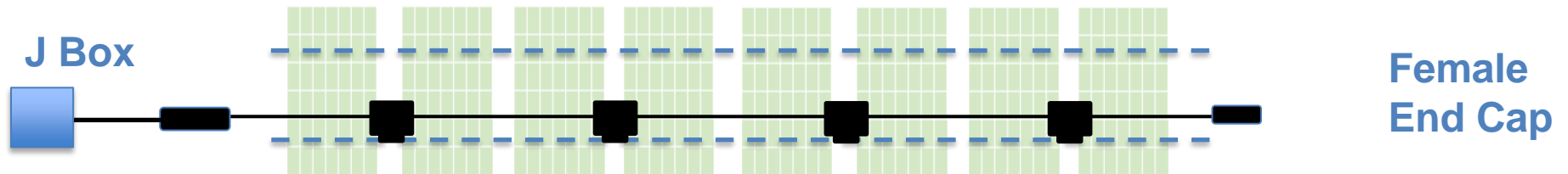
J Box

Female End Cap

Use a pigtail to connect the long cable (male) into the J-box.
Terminate the branch end with a female end cap.

Female End Cap

Female End Cap

J Box

To center tap, use two pigtails to connect the long cables (male) into the J-box.
Terminate each branch end with a female end cap.

Link™ Gateway Installation

- Used with PLC communication devices
- Link™ Gateway installed in series with array
- Supports up to 50A thru current (16-25 micros)
- Gateway should be placed ≤ 200 ft from micros

Solar Array

Load

Link
Gateway

Line

Electrical
Panel

Power
+
Communication

50A Max

Power Only

Digi™ Gateway installation

- Digi™ Gateway installed in parallel to array
- Supports up to 100+ micros
- Up to 100' (30 m) separation micro-micro
- Up to 250' (75 m) separation micro-gateway

Additional Support
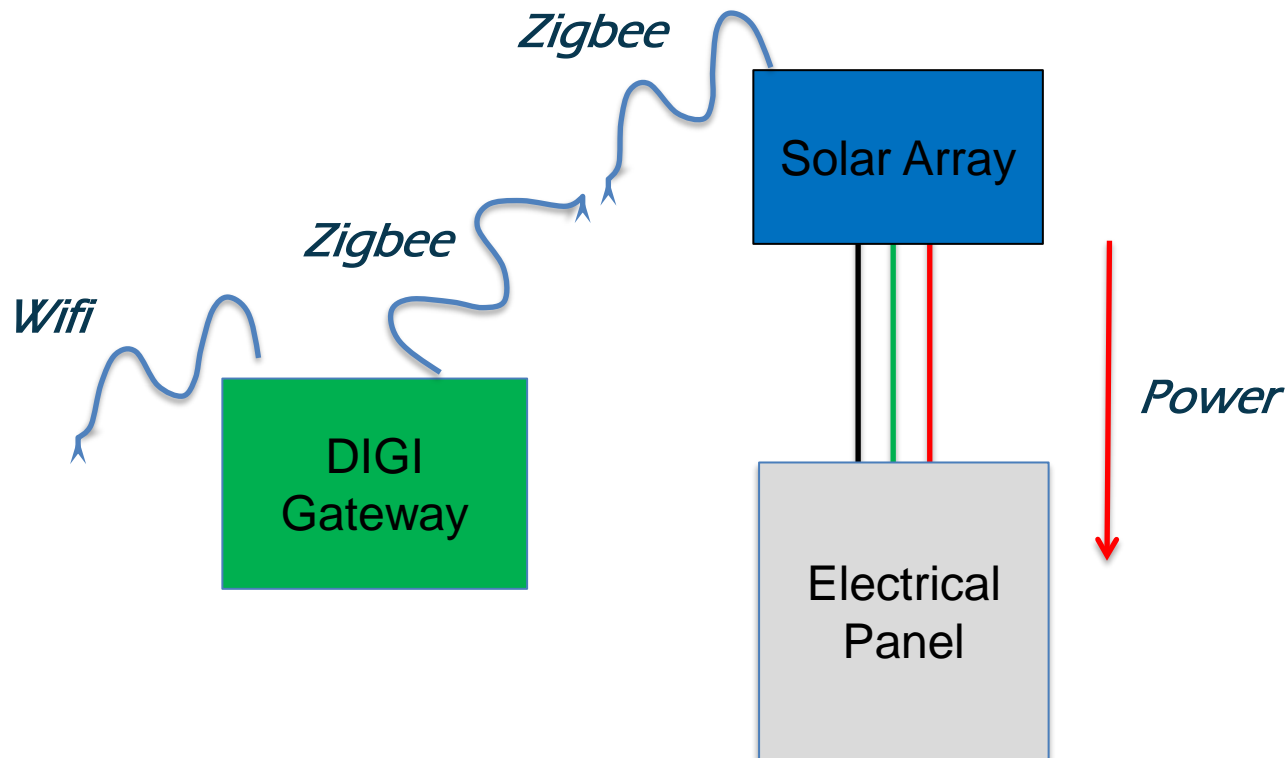
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