

LED Tape and Linear Power and Wiring

INSTALLATION NOTE

Our LED tape is constant voltage, 24V or 48V DC, and our linear fixtures are that same tape mounted in aluminum profiles. Each tape leaves the factory with a short lead, and the number of conductors identifies the build. Count the conductors, confirm the voltage, then terminate. Line voltage (120V) only ever lands on the driver input, never on the tape. Page 2 covers feeding tape and linear profiles and page 3 covers feed cable size.

Conductors by Build

BUILD	LEADS	CONDUCTOR FUNCTIONS	TYPICAL CONTROL
Static white	2	V+ (red), V- (black)	Triac, 0-10V, DALI-2 or Casambi, at the driver
Tunable white	3	V+ common, warm white -, cool white -	DALI-2 DT8 or Casambi, at the driver
RGB	4	V+ common, R -, G -, B -	DMX, DALI-2 DT8 or Casambi
RGBW	5	V+ common, R -, G -, B -, W -	DMX, DALI-2 DT8 or Casambi
RGBCW	6	V+ common, R, G, B, warm and cool -	DMX, DALI-2 DT8 or Casambi

Run Limits per Feed

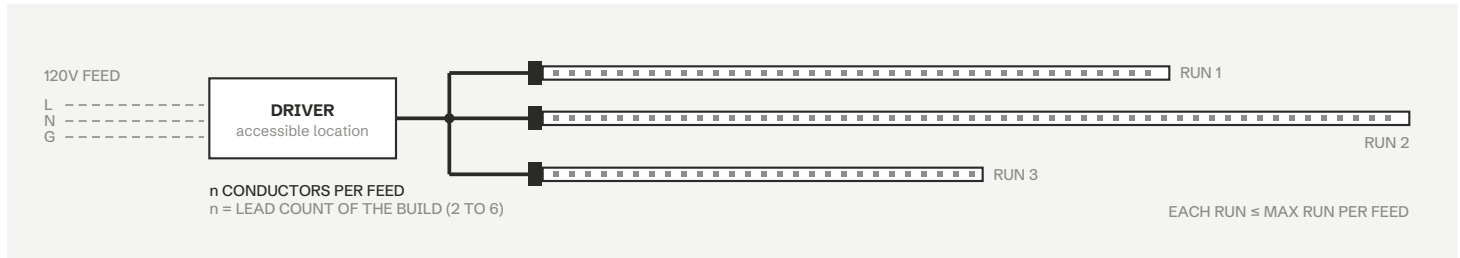
TAPE	CODE	VOLTAGE	POWER	MAX RUN PER FEED	CUT EVERY
8mm COB High Density	NST8C-HD	24V	5, 10 or 15 W/m	5 m (16 ft)	31.2mm
10mm COB Tunable White	NST10C-TW	24V	7.5 to 15 W/m	5 m (16 ft)	27.8mm
10mm COB Long Run	NST10C-48	48V	10 W/m	30 m (98 ft)	50mm

Every tape we supply lists its maximum run per feed on its spec sheet. That length is a property of the tape and is separate from the feed cable sizing on page 3.

Before You Install

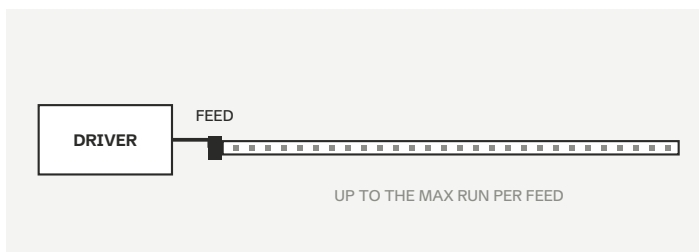
1. Never connect the tape lead to 120V. Line voltage lands on the driver input only.
2. Match tape voltage to driver voltage. 24V tape on a 24V driver, 48V tape on a 48V driver, never mixed.
3. Count the conductors and confirm the build matches the fixture schedule. Match multi-channel conductors by function.
4. Observe polarity. V+ to V+ at every connection; the tape will not light if reversed.
5. Keep every feed within the tape's maximum run per feed. Longer runs take more feeds, never a longer single feed.
6. Size the driver to at least 125 percent of the connected tape load, and keep each Class 2 driver to 80W of design load.
7. Cut only at the marked cut points. Mount the tape in an aluminum profile, which carries its heat away.
8. Keep Class 2 low voltage conductors separated from line voltage conductors.
9. If a lead, voltage or length does not match the schedule, stop and call us before terminating.

Feeding the Tape



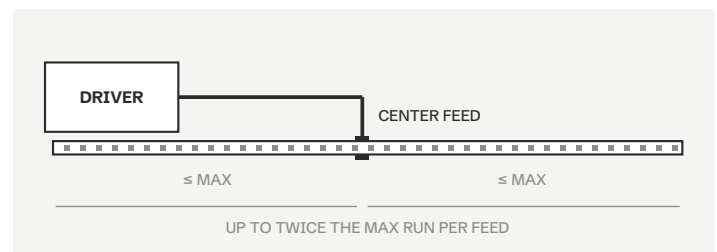
One driver can feed several runs. Run a separate feed cable from the driver output to each run and connect the runs in parallel, each conductor function to the same function. Size the driver on the total of every run it feeds. Every run on one driver output must be the same build and the same voltage.

A Single Feed



1. Mount the driver (supplied with its enclosure) where the drawings show it, with permanent access. Land the 120V feed and any control wiring on the driver input.
2. Run the feed cable from the driver output to the start of the tape. Splice to the tape lead function to function, using connectors listed for the conductor size.
3. Keep the tape length within its maximum run per feed (page 1).

B Center or Double-End Feed



1. For a run longer than one feed allows, feed it at the center, or at both ends, from the same driver output. Each section from a feed point stays within the maximum run per feed.
2. Make a center feed at a cut point with a strip-to-wire connector or solder. Join every conductor function to the same function at each feed point.
3. Beyond twice the maximum run, split the tape into separate runs, each with its own feed.

Linear Profiles

1. Our linear fixtures are tape set in surface, recessed, mud-in, corner and cornice aluminum profiles. The profile is the tape's heat sink; mount the tape directly to it along its full length.
2. Plan the lead exit before mounting: out through the end cap, or through a hole drilled in the back of the profile with the edge deburred so it cannot cut the lead.
3. Leave a short service loop at the feed so the diffuser and end caps can be removed later. For mud-in and recessed profiles, pull the feed cable during framing and terminate after finishes.
4. Test the run at full output before fitting the diffuser and end caps.

Sizing the Feed Cable

Size the cable from the driver to each feed point on the current that feed carries: the watts of tape it supplies divided by the voltage. On tunable white, RGB, RGBW and RGBCW, use the total for all channels; the common conductor carries every channel at once. Measure along the cable route from the driver to the feed point, including drops and rises, and choose the smallest gauge whose length equals or exceeds the run. Use that gauge for every conductor in the cable.

VOLTAGE	LOAD ON FEED	CURRENT	18 AWG	16 AWG	14 AWG	12 AWG
24V	24W	1.0 A	55 ft (17 m)	85 ft (27 m)	140 ft (43 m)	225 ft (69 m)
24V	48W	2.0 A	25 ft (8 m)	40 ft (13 m)	70 ft (21 m)	110 ft (34 m)
24V	60W	2.5 A	20 ft (6 m)	35 ft (10 m)	55 ft (17 m)	90 ft (27 m)
24V	80W	3.3 A	15 ft (5 m)	25 ft (8 m)	40 ft (13 m)	65 ft (20 m)
48V	24W	0.5 A	225 ft (68 m)	355 ft (109 m)	565 ft (173 m)	905 ft (276 m)
48V	48W	1.0 A	110 ft (34 m)	175 ft (54 m)	280 ft (86 m)	450 ft (138 m)
48V	80W	1.7 A	65 ft (20 m)	105 ft (32 m)	170 ft (52 m)	270 ft (82 m)

Maximum run, driver to feed point. Basis: 3 percent drop (0.72V at 24V, 1.44V at 48V), copper at 68°F (20°C), rounded down to the nearest 5 ft. Loads stop at 80W, the Class 2 design load. In attics and other hot spaces, take about 20 percent off these lengths.

Drivers and Control

Sizing: watts per meter × meters of tape, then a driver of at least 125 percent of that load. A Class 2 driver tops out at 100W, so plan 80W of tape per Class 2 driver.

Static white: our 5-in-1 constant voltage driver dims by Triac, 0-10V, 1-10V or potentiometer.

Tunable white and color: DALI-2 DT8 multi-channel constant voltage drivers, Casambi drivers, or DMX decoders.

In-wall driver and dimmer: the 96W wireless in-wall unit is for indoor wall boxes only. Outdoor runs need a separate driver and dimmer.

DALI bus: 18 AWG to 500 ft (150 m), 16 AWG to 984 ft (300 m). **DMX:** shielded twisted pair, 120 Ω, terminated at the last device.

Cable Type and Rating

Every feed from a Class 2 driver is a Class 2 circuit. Use cable listed for the space it passes through: CL2 for walls and ceilings, CL2R for vertical runs between floors, and CL2P in plenum (air handling) spaces. CL3 types may substitute for the matching CL2 type. A driver above 100W is not Class 2; wire its output to the method local code requires.

Outdoors and in wet locations, use tape with the matching IP rating (IP65 or IP68) and cable rated for the location. Keep low voltage separated from line voltage, and use connectors listed for the conductor size.

Working It Out

$$\text{Maximum run (ft)} = \text{allowed drop (V)} \times 1000 \div (2 \times \text{current (A)} \times \text{conductor resistance } (\Omega \text{ per } 1000 \text{ ft}))$$

The 2 accounts for the conductor out and the conductor back. Copper resistance at 68°F (20°C):

18 AWG 6.39 Ω 16 AWG 4.02 Ω 14 AWG 2.53 Ω 12 AWG 1.59 Ω per 1000 ft

Example, 24V. A 4 m cove of 10 W/m tape loads 40W, so specify a 60W driver. The feed carries $40 \div 24 = 1.7$ A. On 16 AWG at 3 percent: $0.72 \times 1000 \div (2 \times 1.7 \times 4.02) = 52.7$ ft.

Example, 48V long run. A full 30 m run of 10 W/m tape loads 300W, more than one Class 2 driver can supply. Split it into four runs of about 7.5 m (75W each), each on its own feed and Class 2 driver, or use a single driver above 100W with its output wired to the method local code requires.