



Installation Manual

Pixel Lighting System

90 PIXELS PER OUTPUT

24 V DC · 8 data zones · 450 W / 600 W controller · addressable



CHECK THE ARROWS

NEVER EXCEED 90

Two rules account for most field failures on this system.

Every pixel carries an arrow, and every fused output carries a hard limit of ninety lights. A run mounted against the arrows lights nothing past the first pixel — and it has to come back off the wall. An output carrying more than ninety pixels is power-sensed and blocks; it does not dim gracefully to warn you.

CHECK THE ARROWS

Data leaves the controller and follows the arrows away from it. **Confirm the direction on the first rail before mounting the rest.**

NEVER EXCEED 90

Ninety pixels — ten rails — is the maximum on any one fused output. Add a TAP rather than stretch a run.

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01 INTRODUCTION

The IllumiDEL Pixel Lighting System is a permanent architectural lighting system built around individually addressable 24 V pixels, clipped into aluminum rail and driven by an IllumiDEL 24 V controller.

This manual covers planning, installation, wiring, commissioning and service. It is written for IllumiDEL Certified Integrators. Warranty applies only to systems installed in accordance with this document.

TWO COUNTS GOVERN EVERY JOB

Ninety pixels — ten rails — per fused output, and one continuous run per data zone. Power and data are counted separately and they do not pair up. Section 05 is not optional reading.

How this manual is organised

- **Sections 02–04** — what the system is, how to work on it safely, and what to bring to site.
- **Section 05** — the load, TAP and cable planning that must be done before anything is mounted. Most field faults originate here.
- **Section 06** — the installation sequence, in order.
- **Sections 07–10** — commissioning, faults, service, and warranty.
- **Appendix A** — the four wiring diagrams referenced throughout.

02 SPECIFICATIONS

Pixel and rail

PARAMETER	VALUE	NOTE
Product	ILLUMIDEL Pixel Lighting System	Addressable pixels in aluminum rail
Nominal voltage	24 V DC	Supplied by the controller
Pixels per rail	9 · 6 ft per rail	Ten rails = 90 pixels = 60 ft = one fused output
Maximum per fused output	90 pixels · 10 rails	Hard limit — see 05.2
Mounting	Aluminum rail, screwed to soffit or fascia	Fixings every 3 pixels
Data direction	Arrow printed on every pixel	Arrows point away from the controller

Controller

PARAMETER	VALUE	NOTE
Controller	ILMC-24V-450W (4 outputs) ILMC-24V-600W (5 outputs)	Same enclosure and output board as the COB / Strip system
Input voltage	100-240 V AC	—
Output voltage	24 V DC	—
Power per output	100 W — electronically limited	Power sensing blocks the output at 100 W
Equivalent current	4.17 A at 24 V	Sensing trips before the 5 A fuse
Fuse rating	5 A	Device protection, not the working limit
Compliance	Class 2 / LPS	100 VA ceiling per output
Pixels per output	90 maximum	Ten rails — the field limit that keeps the output inside 100 W
Data outputs	8	Independent of the power outputs
Enclosure dimensions	292 × 206 × 105.5 mm	Outdoor-rated enclosure
Connectivity	Wi-Fi · RJ45 Ethernet	Ethernet preferred where available

Capacity per box

BOX	FUSED OUTPUTS	MAXIMUM PIXELS	RAILS
ILMC-24V-450W	4	360	40

BOX	FUSED OUTPUTS	MAXIMUM PIXELS	RAILS
ILMC-24V-600W	5	450	50

TWO SEPARATE COUNTS

The controller has **8 data zones** and **4 or 5 fused outputs**. These are counted independently. A single data zone normally spans several fused outputs. Do not assume they pair up.

Why the limit is 100 W

Each output is held to 100 VA so it remains a Class 2 circuit. Class 2 is what allows the low-voltage wiring methods used throughout this manual, and it is a safety limit, not a performance figure. The controller is the same enclosure and the same output board used on the IllumiDEL COB / Strip system.

The limit is enforced by power sensing on the output board, not by the fuse. At 24 V, 100 W is 4.17 A, so the sensing acts before the 5 A fuse ever sees the fault. An overloaded output does not sag or gradually dim: it blocks.

COUNT PIXELS, THEN CHECK WATTS

Ninety pixels is the field limit — it is what an installer counts on the wall. **One hundred watts is the electrical limit** — it is what the output board enforces.

Confirm the per-pixel wattage of the SKU being installed against the reel or carton label, and check that ninety of them stay inside 100 W. Where they do not, the pixel count comes down, not the limit.

03 SAFETY GUIDELINES

WARNING

Installation must be performed by a qualified person in accordance with the Canadian Electrical Code (CSA C22.1, Part 1) and all applicable provincial or municipal regulations. Complete all low-voltage wiring before energizing the controller.

- ① **Wire before power.** Connect all conductors before plugging in the controller.
- ② **Wire preparation.** Strip conductors 10–12 mm for proper contact.
- ③ **Polarity.** Positive (+) to positive, negative (–) to negative. Reversed polarity damages the pixels and is not covered by warranty.
- ④ **Do not screw through conductors.** Keep fixings clear of all wiring.
- ⑤ **Insulate every connection.** Use WAGO connectors, then heat shrink or tape.
- ⑥ **Disconnect before service.** Always unplug the controller before maintenance.
- ⑦ **Do not overload.** Never connect more than 90 pixels — ten rails — to one fused output, and never exceed 100 W. The output is power-sensed and will block, keeping the circuit within Class 2.
- ⑧ **Data direction.** Follow the arrow printed on every pixel. Arrows point away from the controller.
- ⑨ **Environment.** Install within the rated temperature and humidity range, and seal all penetrations.

THE TAP POSITIVE IS BLACK WITH A WHITE STRIPE

On the TAP, **the black conductor with white lines is the positive (+24 V)**, not the negative. Everywhere else on this system black is 24 V negative. Landing it as a negative reverses polarity on everything downstream.

Identify the stripe before making any connection at a TAP, and label the conductor at the box end.

SEALING

Any hole drilled through a structure into a building interior must be sealed. This prevents water, air and insect infiltration and is part of a compliant installation.

04 TOOLS AND ACCESSORIES

Access equipment

- 4–5 ft stepladder for low work; telescopic stepladder for intermediate access
- 24 ft ladder for medium heights; 32 ft ladder for high or awkward areas

Hand tools

- Drill and 16 mm ($\frac{5}{8}$ ") screws · 30 mm metal drill bit for clean round holes · triangular bracket for tight angles
- Aluminum scissors or saw · file · square · measuring tape · pencil and black marker
- Wire strippers · crimp tool · pliers · tool belt

Consumables and accessories

- WAGO connectors for all joints; electrical tape, heat shrink or solderless connectors
- Loom tubing with $\frac{1}{2}$ " clips, and a wire insertion tool
- Extension cables — stranded copper, 14–18 AWG (see 05.4 for sizing)
- T-power injection connectors (TAPs)
- White, black and beige silicone and duck seal for sealing penetrations

ILLUMIDEL accessories

Rail, pixel extensions and bulk wire are ordered from the dealer portal at illumidelshop.com, under Pixel 24V.

- **Pixel extensions** — factory-terminated leads between rails
- **Rail profiles** — single 8 in, double 4 in, quadruple 2 in, and custom lengths
- **Bulk wire** — for home runs and TAP feeds

05 PLANNING THE INSTALLATION

Planning determines whether the system works. Complete Sections 05.1 through 05.4 on paper before mounting anything.

05.1 — Controller location

- Place the box **within 30 ft of the first pixel**. This limits voltage loss and keeps output even across the run.
- Choose an accessible position near a 120 V outlet, with room to open the enclosure for service.
- Verify Wi-Fi signal strength at the box location with a phone before committing. If the signal is weak, move the box closer to the router, add a Wi-Fi extender, or run an RJ45 cable.
- On large installations, divide the job into zones and give each zone its own box.

05.2 — Load and TAP planning

THE ONE RULE THAT GOVERNS EVERYTHING

Ninety pixels — ten rails — per fused output, and never beyond 100 W. Every calculation in this section follows from it.

A run longer than ten rails is not fed further; it is fed again. After the tenth rail a TAP is inserted, and the next ten rails are supplied from their own fused output. A run of N rails therefore needs a new output every ten rails, rounded up.

RUN LENGTH	PIXELS	TAPS	FUSED OUTPUTS
10 rails	90	0	1
20 rails	180	1	2
40 rails	360	3	4 — fills a 450 W box
50 rails	450	4	5 — fills a 600 W box

TEN RAILS IS A CEILING, NOT A TARGET

Exceeding ninety pixels on one output overloads the fuse and produces the fault that is hardest to diagnose in the field: a run that works cold and dims, flickers or drops out once it warms up at full white.

Where a run sits close to the limit, TAP earlier rather than later. A TAP costs a connector; an overloaded output costs a return visit.

05.3 — Data planning

The controller is the source of the data signal. Data leaves a data terminal in the controller, enters the first pixel of the run, and travels from pixel to pixel in the direction of the printed arrows.

- The controller provides 8 independent data zones. Assign one continuous run to one zone.
- **Orient every rail so the arrows point away from the controller.** The first pixel of the run is the one nearest the box.
- Data enters at the first pixel only, and passes through every TAP uninterrupted.
- **Data is never injected mid-run.** Power is injected at every TAP; data is not.
- Confirm the pixel count for the run before commissioning — the same figure is entered in the app. See 07.

05.4 — Cable selection

Home-run cables carry power only, from a fused output to a TAP or to the first light. Use stranded copper, 14–18 AWG.

WHERE	CABLE	WHY
To the first light	18/3 or 16/4	Two power conductors plus the data conductor in one run
To a TAP	18/2, 16/2 or 14/2	Power only — the TAP carries no data
Two or three feeds in one cable	18/6, 16/4 or 14/4	Carries several power pairs back to the box, without data

DISTANCE COSTS VOLTS

Voltage drop is round-trip and rises with length. Where a home run approaches 30 ft, move the box closer or add a zone with its own box rather than increasing the length. The pixels are last in the circuit and absorb every millivolt lost upstream.

06 INSTALLATION STEPS

06.1 — Prepare the pixels and rail

- 1 Cut the rail with an aluminum blade and file the ends. Fit end caps before mounting. Make every cut and adjustment before anything goes on the wall.
- 2 Insert each pixel individually into the rail and press until it clicks. Work methodically along the rail.
- 3 Check that every pixel is seated and aligned. A pixel that is not fully clicked in will move under thermal cycling.
- 4 Drill pilot holes in the rail to simplify fixing.

06.2 — Position and fix the rail

- 1 Place the rail under the soffit or fascia. Keep it straight and aligned with the architectural lines around it.
- 2 Fix with 16 mm (5/8") screws roughly every three pixels, so the rail cannot deform between fixings.
- 3 Tighten firmly without overtightening. Match the screw colour to the fascia or soffit for a discreet finish.
- 4 Test stability with light hand pressure. The rail must stay immobile and aligned.
- 5 Keep the rail as far from the wall as the detail allows — it reads as a cleaner line by day.

06.3 — Set the data direction

The controller drives the data line, so the run is oriented with **its first pixel toward the box and the printed arrows pointing away from it**. That is the electrical direction and it never changes.

The mounting sequence is the opposite: **start at the far end of the run and work back toward the box**. Rails go up in that order so the last connection made is the short one at the controller, and so the run can be checked before the box is closed. Orientation and sequence are two different things — the arrows point away from the box no matter which end you started from.

Confirm the orientation on the first rail before committing the rest. A run mounted with the arrows facing the wrong way lights nothing past the first pixel and has to come off the wall.

06.4 — Connect to the first light

- 1 Run an extension cable — 18/3, 16/4 or similar — from the controller to the first pixel.
- 2 Positive to the red conductor, negative to the black, data to the green.
- 3 Insulate every connection and dress it into loom tubing.

06.5 — Add a TAP after ten rails

- 1 Mount the first ten rails — ninety pixels — before any wiring is added mid-run.
- 2 Insert a TAP after the tenth rail and connect it to the next fused output with an 18/2, 16/2 or 14/2 cable.
- 3 **On the TAP, the black conductor with white lines is the positive.** Confirm the stripe before connecting — see 03.
- 4 Run the cable back to the box, tidy and supported. Label it at the box end and record which TAP it serves.
- 5 Repeat every ten rails. Distribute the TAPs so the load is balanced across the fused outputs.

06.6 — Loom tubing

- ① Bundle the conductors and feed them into the split loom with the insertion tool, or open the tube and lay them in.
- ② Secure the tube with ½" clips at regular intervals so it cannot move.
- ③ Seal both ends with electrical tape against dust and moisture.

06.7 — Install the controller

- ① Mount in an accessible spot near the run and a power source. Wood screws into timber; drill, plug and Tapcon into masonry.
- ② Level the box before final tightening.
- ③ Bring the loom through the enclosure gland. The tube must be secured and the conductors must not be in tension.
- ④ Seal every penetration through the structure with silicone or duck seal.

06.8 — Connect inside the box

See Fig. 1 to Fig. 4 for the four reference layouts.

- ① Land each pair on its own fused output. Never double up two pairs on one output.
- ② Land the data conductor on the assigned data zone, D1–D8.
- ③ **Never link the positives (V+) of two boxes.** That ties the two supplies together through the run.
- ④ **Always bond the negatives (V-) of two boxes** with a dedicated conductor. The data signal is measured against the controller's negative, and without a shared zero the pixels fed by the second box read a floating signal and flicker.
- ⑤ Confirm every terminal is tight, then close and seal the enclosure.

07 COMMISSIONING AND APP SETUP

Power on

- ① Plug the controller into a 120 V outlet.
- ② Turn the system on and confirm the whole run responds. On an unconfigured system the first 30 pixels are commonly off and the remainder show blue until the LED settings are set.
- ③ Set a colour other than blue before saving settings, so changes are easy to see.
- ④ Visually inspect all connections and rail alignment.

Connect to the app

- ① Open Wi-Fi settings on your phone near the box and connect to the **Illumidel** AP network. The IllumiDEL app launches automatically.
- ② Tap **Config**, open the **LED** section, and set the data zone and the pixel count for the installed run. Tap the green checkmark to save.
- ③ Open the **WiFi** section and tap **SCAN**. Choose the correct network, enter the password, and save.
- ④ Confirm an IP address appears under **IP**. If it does not, the box has not joined the network.

Handover checklist

- ☐ Polarity verified on every section, and every TAP stripe identified as positive
- ☐ No fused output carrying more than 90 pixels, and none above 100 W — counted, not estimated
- ☐ Each pair on its own output, each cable labelled
- ☐ Where two boxes are used: V+ separate, V- bonded
- ☐ Data zone and pixel count set in the app and saved
- ☐ Network joined and IP address confirmed
- ☐ Smooth dimming with no flicker across the whole run at full white
- ☐ All penetrations sealed; loom secured and capped
- ☐ Client trained; manual and warranty details handed over

08 TROUBLESHOOTING

SYMPTOM	LIKELY CAUSE	REMEDY
Pixels do not light	Reversed polarity, or a connection not made	Check polarity and every connection before anything else. At a TAP, confirm the striped black is on the positive.
Flickering or random colour changes	A loose V- or data connection. This is the most common fault on this system.	Re-seat every ground and data joint. Confirm no conductor is crushed or damaged.
Flicker only on the pixels fed by the second box	The V- of the two boxes is not bonded, so the data line has no common reference	Run the bonding conductor between the two boxes — see 06.8
Run dims or drops out once warm	More than 90 pixels on one fused output	Count the pixels on that output. Add a TAP and move the excess to another output.
An output will not turn on, or shuts off under load	Power sensing has blocked the output at its 100 W Class 2 limit	Calculate the actual load. Move a section to another output or shorten it. Do not attempt to defeat the limit.
Pixels dark after a certain point	Failed connection between two pixels, or a section past a bad joint	Work outward from the last lit pixel and remake the connection
Pixels stay blue and ignore colour changes	Powered but receiving no data	Check the data conductor, the arrow direction on the pixels, and the data zone assigned under Config → LED
Nothing lights past the first pixel	Run mounted with the arrows pointing toward the box instead of away from it	The first pixel of the run must be the one nearest the controller. Re-lay the affected rail — see 06.3.
App loses connection	Weak Wi-Fi at the box	Add a Wi-Fi extender, or connect RJ45 for a stable link
Short circuit	Damaged conductor or connector	Disconnect power immediately and inspect all wiring and connectors

09 MAINTENANCE

- **Visual inspection.** Check the condition of the pixels, rail and cables periodically.
- **Cleaning.** Use a soft, dry cloth on all components.
- **Controller.** Keep the enclosure clean and confirm the fuses are sound.
- **Connections.** Test voltage and re-tighten terminals where needed.

10 SUPPORT AND WARRANTY

Warranty

- **Duration:** 12 year limited warranty
- **Coverage:** manufacturing defects and hardware failures
- **Exclusions:** incorrect installation, including reversed polarity, outputs carrying more than 90 pixels or loaded beyond 100 W, a TAP striped black landed as a negative, linked positives between boxes, and pixels installed outside an aluminum rail

Making a claim

- 1 Provide proof of purchase.
- 2 Describe the issue encountered.
- 3 Include photos or video where possible, plus the pixel count per output and the box model.

Technical support

EMAIL	PHONE	HOURS
support@illumidel.com	1-514-900-4018	Monday to Friday, 9 AM – 5 PM EST

Guides, FAQs and video are available on the IllumiDEL website. Rail, pixels and accessories are ordered from the dealer portal at illumidelshop.com.

A APPENDIX A — WIRING DIAGRAMS

The four diagrams that follow are the reference wiring for this system. They are printed landscape on the following pages.

FIGURE	TITLE	COVERS
Fig. 1	One controller — 60 ft	Ten rails, 90 pixels, one fused output, no TAP
Fig. 2	One controller — 168 ft	A TAP every ten rails, three outputs, one data zone
Fig. 3	Two controllers — 282 ft	Front and sides on A, rear on B; V+ separate, V- bonded
Fig. 4	Controller plus power box — 300 ft	Fifty rails on one data zone across two supplies; V+ separate, V- bonded

NOTE ON THE DIAGRAMS

All four diagrams are labelled in English. A French set is available on request.

FIG. 1 — ONE CONTROLLER, ONE DATA ZONE / 60 FT

Ten rails · 90 pixels · one fused output · no TAP

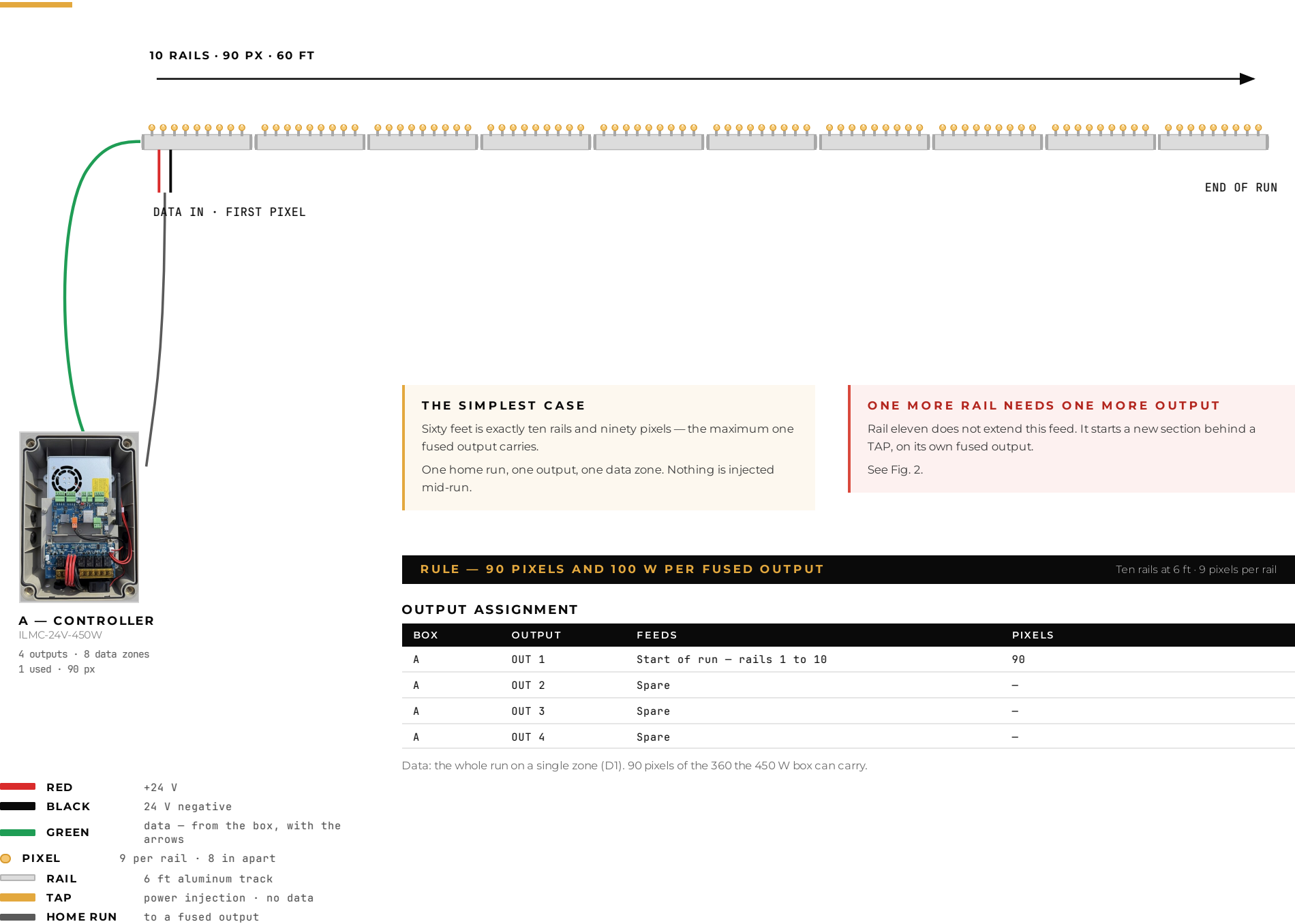


FIG. 2 — ONE CONTROLLER, ONE DATA ZONE / 168 FT

Twenty-eight rails · 252 pixels · a TAP every ten rails · three fused outputs · one data zone

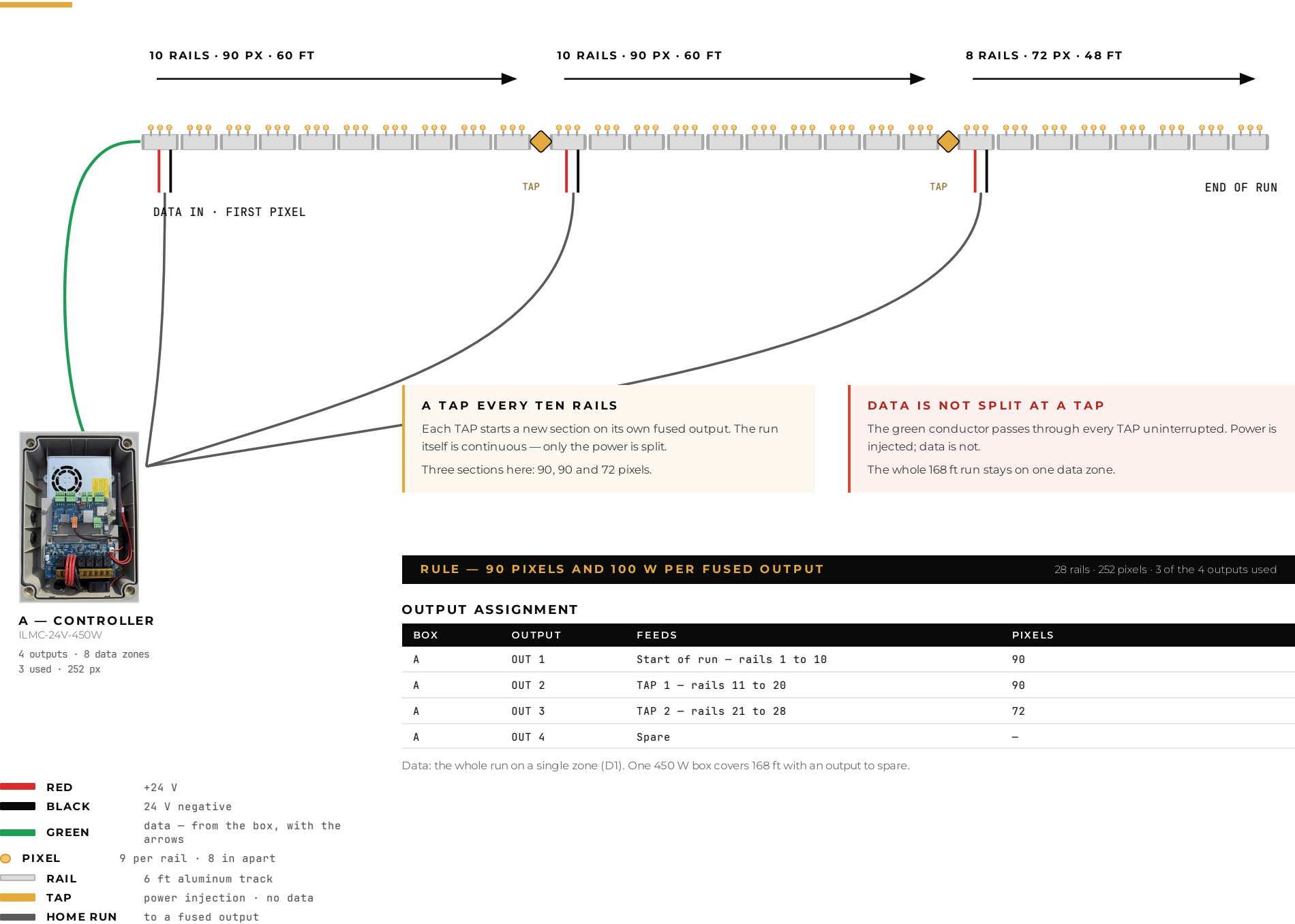


FIG. 3 — TWO CONTROLLERS / 282 FT

Front and sides on controller A, rear on controller B · separate data zones · V- bonded, V+ never linked

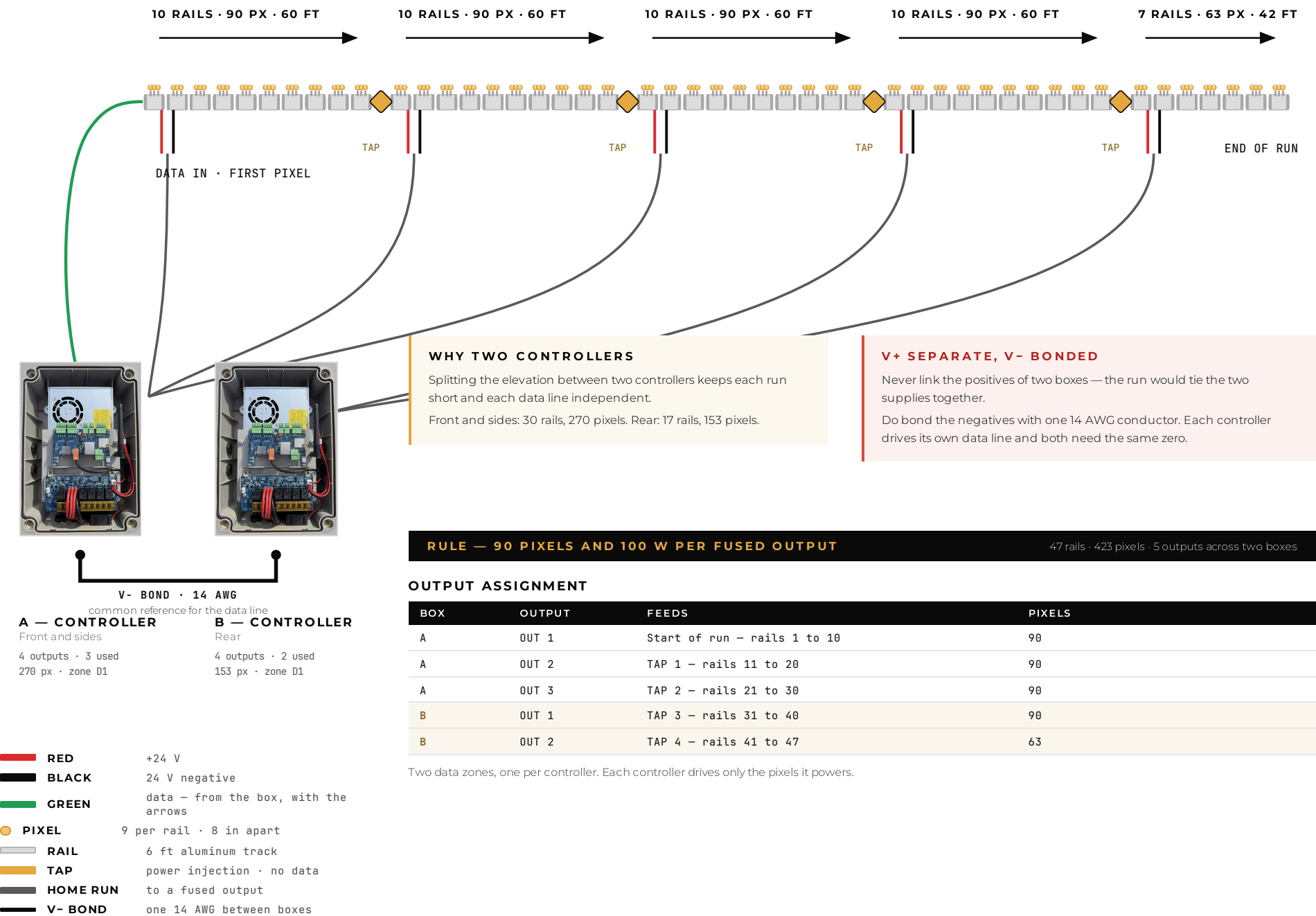


FIG. 4 — CONTROLLER PLUS POWER BOX / 300 FT

Fifty rails · 450 pixels · one data zone from the controller · power shared with a power box

