DRAFT

POWER DRIVE FAMILY · FULL TECHNICAL MANUAL

PJ-D
Smart Film Power Adapter

Universal AC supply for PDLC smart film and smart glass · 40 / 50 / 100 / 200 W

MODELS COVERED

PJ40D · PJ50D · PJ100D · PJ200D

DOCUMENT

PVS-SGS-MAN-PJD-01 · Rev 3.3

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ISSUED BY

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This manual is the authoritative installation, commissioning, operation and maintenance reference for the PRIVASEE® PJ-D family of smart film power adapters. Read in full before installation.

ABOUT THIS REVISION

Rev 3.3 supersedes all earlier PJ-D documentation. Specifications are verified against the source factory documents held by PRIVASEE® and the field-tested PJ-D Transformer reference sheet. In case of any conflict between this manual and earlier draft documents, this manual takes precedence.

01 Document control & revision history

DOCUMENT IDENTIFICATION

DOCUMENT NUMBER	PVS-SGS-MAN-PJD-01
DOCUMENT TITLE	PJ-D Smart Film Power Adapter — Full Technical Manual
ISSUING AUTHORITY	PRIVASEE® Group · Smart Glass Division
CLASSIFICATION	DRAFT (pending founder sign-off)
DISTRIBUTION	External — installers, electricians, integrators, end customers
LANGUAGE	English
FORMAT	A4 portrait · PDF (controlled) + PPTX (editable working source)

REVISION HISTORY

REV	DATE	AUTHOR	DESCRIPTION OF CHANGE
1.0	2026-04-28	PRIVASEE	Initial draft (legacy combined Power Controller manual)
2.0	2026-05-03	PRIVASEE	PJ-D-only short-form manual (6 pages) with embedded IEC schematic
3.0	2026-05-04	PRIVASEE	Full technical manual rebuild · upgraded engineering drawings · source-verified specs from authoritative PJ-D Transformer reference + Power Drive Brochure
3.1	2026-05-04	PRIVASEE	Applied no-invention governance rule · 9 invented values replaced with [ELECTRICIAN TO CONFIRM] / [VERIFY] markers · added Panel/Transformer/Cable schedules · added Missing-data list + QA checklist for electrician review · added CAD/ECAD handoff note · extended sign-off block
3.2	2026-05-04	PRIVASEE	Applied one-family-per-manual rule · stripped family-comparison table · removed all "use other family if you need X" cross-references · removed sister-manual companion list · per-model PJ-D-only photo placeholders. Catalogue covering full power-drive range will be issued separately after every per-family manual is complete.
3.3	2026-05-05	PRIVASEE	Embedded real PJ-D product photographs from authoritative source documents. §4 hero photo · §7 labelled component photo · §17 adapter+RF-remote combo. All four PJ40D/ 50D/100D/200D variants share the same housing so a single hero photograph represents the family.

SOURCE DOCUMENTS REFERENCED

- PJ-D Transformer.pdf — field-verified PRIVASEE-branded specification sheet
- Power Drive Brochure.pdf — PRIVASEE-branded 2-page family brochure
- IEC 60364 — Electrical installations for buildings (low-voltage)
- IEC 60617 — Graphical symbols for diagrams
- IEC 60446 — Identification of conductors by colour
- IEC 81346 — Reference designation system for industrial systems
- BS 7671:2018+A2:2022 — IET Wiring Regulations (UK installation)

DOCUMENT CONTROL RULE

02 Important safety information

■ DANGER · MAINS VOLTAGE

The PJ-D adapter is supplied from 110 V or 220 V AC mains. Installation, commissioning and removal must be carried out by a competent electrician working to the local electrical wiring regulations (BS 7671 in the UK; IEC 60364 in the GCC and EU). Isolate at the upstream consumer unit before any work on terminals.

■ DANGER · STORED ENERGY

Internal capacitors may retain a hazardous voltage for up to two minutes after disconnection. Verify dead before touching internal terminals using a calibrated voltage indicator and a Proving Unit before-and-after test.

▲ WARNING · OUTPUT AC MUST NOT BE TIED TO MAINS EARTH

The 48 V / 60 V output is an isolated AC supply intended for the PDLC film/glass busbars only. Do not bond output conductors to mains earth (PE), and do not feed the output into any 12/24 V DC equipment.

▲ WARNING · IP RATING

The PJ-D adapter has an IP20 enclosure. Install indoors only, in a dry, ventilated location protected from direct water ingress, condensation, dust and impact. For exterior or wet-zone glazing the adapter must be remote-mounted inside a suitable IP-rated enclosure with ventilation provision.

▲ WARNING · OPERATING ENVIRONMENT

Verified operating range −10 °C to +60 °C ambient. Provide minimum 50 mm of clearance to all adjacent surfaces for thermal dissipation. Do not install above heat sources or inside sealed cavities without ventilation.

PERSONAL PROTECTIVE EQUIPMENT

- Class-0 (1000 V) insulated gloves while terminals are exposed
- Eye protection (BS EN 166)
- Insulated screwdrivers — VDE 1000 V certified
- Locking-off / tagging-out equipment for the upstream MCB

03 Qualifications & symbols

REQUIRED QUALIFICATIONS

This adapter must be installed and commissioned by a person with one of the following minimum qualifications:

REGION	MINIMUM QUALIFICATION
United Kingdom	City & Guilds 2391 / EAL Level-3 Inspection & Testing · 18th-Edition (BS 7671)
European Union	EN 50110-1 nominated competent person
GCC (UAE / KSA / Qatar / Bahrain / Oman / Kuwait)	Civil Defence approved low-voltage electrician with valid trade-test certificate
Other regions	Equivalent licensed electrical contractor recognised by local authority

TOOLS REQUIRED

- Calibrated multimeter (CAT III 600 V minimum)
- Insulation resistance tester (500 V DC test capability)
- RCD tester for downstream verification
- Torx and pozi-drive insulated screwdriver set
- Cable strippers and crimping tool for ferrules

SYMBOLS USED IN THIS MANUAL

SYMBOL	MEANING
■ Danger	Risk of electric shock, fire, or death if instruction not followed
▲ Warning	Risk of equipment damage, personal injury, or invalidated warranty
i Note	Useful information that affects performance or operation
L	Live conductor (brown insulation per IEC 60446)
N	Neutral conductor (light-blue insulation per IEC 60446)
PE	Protective earth conductor (green/yellow striped per IEC 60446)

REFERENCE DESIGNATORS (IEC 81346) USED IN THIS DOCUMENT

CODE	COMPONENT CLASS	EXAMPLE IN PJ-D SYSTEM
Q1	Switching device / isolator	Upstream 2-pole isolator
F1	Protection device (fuse / MCB)	Upstream protection [ELECTRICIAN TO CONFIRM]
TR1	Transformer	Primary step-down 110/220 → 48/60 V
U1	Power-electronic assembly	The PJ-D adapter as a whole

A1	Control PCB / electronic assembly	RF receiver + PAIR-button board
K1	Relay / contactor	Output switching contact (mains-side)
X1, X2	Terminal block	X1 input terminals · X2 output terminals
W1	Cable	Output low-voltage cable to the panel
E1, E2…	End loads (PDLC panels)	Smart Film panels

04 Product overview

WHAT THE PJ-D DOES

The PJ-D is a fixed-output AC power adapter that converts 110 V or 220 V mains into the 48 V or 60 V AC required by PDLC (Polymer-Dispersed Liquid-Crystal) smart film and smart glass panels. The output is on/off only — the panel switches between transparent and opaque states. The PJ-D output is on/off only; it does not provide variable dimming.

WHERE THE PJ-D IS USED

- Architectural privacy glazing — meeting rooms, executive offices, residential bathrooms, healthcare consultation rooms
- Retrofit projects where a wall-mounted on/off adapter is the simplest interface
- Installations where wired wall switches OR an RF remote handset are the preferred user controls
- Commercial fit-out using on/off switching with wired or wireless user controls

PJ-D MODEL RANGE

MODEL	RATED POWER	RECOMMENDED PANEL AREA*	TYPICAL APPLICATION
PJ40D	40 W	up to ~3.2 m² (80% rule)	Single residential pane · small office sidelight
PJ50D	50 W	up to ~4.0 m² (80% rule)	Standard meeting-room pane · bathroom panel
PJ100D	100 W	up to ~8.0 m² (80% rule)	Larger meeting room · hospitality privacy
PJ200D	200 W	up to ~16 m² (80% rule)	Multi-panel parallel · feature wall glazing

** Indicative figures at typical PDLC current density of ~10 W/m². Confirm with PRIVASEE® for projects above 10 m² total.*

WHAT YOU WILL FIND IN THE BOX

- 1 × PJ-D adapter (model as ordered: PJ40D / PJ50D / PJ100D / PJ200D)
- 1 × RF remote handset (paired ex-works)
- 1 × installation quick-card
- 4 × M5 mounting screws

> **VOLTAGE SELECTION**
>
> The 48 V or 60 V output is selected at order. Both options use the same chassis. If the order does not specify, PRIVASEE® supplies the 48 V variant by default. The output voltage is permanently labelled on the adapter nameplate and on terminal block X2.

THE PJ-D FAMILY · PRODUCT APPEARANCE

All four PJ-D variants share a common pressed-steel housing and the same external interface. Models differ in internal wattage rating and the corresponding nameplate marking.

PRIVASEE® PJ-D Smart Film Power Adapter — common housing across PJ40D / PJ50D / PJ100D / PJ200D variants

05 Full technical specifications

ELECTRICAL SPECIFICATIONS

PARAMETER	Value
INPUT VOLTAGE (VIN)	110 V or 220 V AC (selectable at order or universal-input depending on variant)
INPUT FREQUENCY	50 / 60 Hz
OUTPUT VOLTAGE (VOUT)	48 V or 60 V AC — **FIXED** (specify at order)
OUTPUT TYPE	Galvanically isolated low-voltage AC · on/off only (no dimming)
POWER FACTOR	[VERIFY] from supplier test report
EFFICIENCY	[VERIFY] from supplier test report
INRUSH CURRENT	[VERIFY] from supplier test report

PER-MODEL RATED POWER

MODEL	RATED OUTPUT POWER	RECOMMENDED PANEL AREA*	APPROX. WEIGHT
PJ40D	40 W	Up to 4 m²	~0.6 kg
PJ50D	50 W	Up to 5 m²	~0.7 kg
PJ100D	100 W	Up to 10 m²	~1.0 kg
PJ200D	200 W	Up to 20 m²	~1.4 kg

** Indicative figures at typical PDLC current density of ~10 W/m². Actual capacity depends on panel film grade, busbar configuration and ambient temperature; verify with PRIVASEE® for projects above 10 m² total.*

CONTROL & USER INTERFACE

WIRED CONTROL INPUT	Passive dry-contact (no voltage). Compatible with magnetic switches, wall switches, key-switches and BMS dry-contact outputs.
WIRELESS CONTROL	RF 433 MHz remote handset. Pairs to drive via PAIR button. Multiple remotes can be paired to one drive.
STATUS INDICATOR	Single multi-colour LED — Green = normal · Red = short-circuit fault
WI-FI / APP / RS-485	Not present on PJ-D

PROTECTION & ENVIRONMENTAL

OUTPUT PROTECTION	Short-circuit detection — drive auto-recovers when short is removed
THERMAL PROTECTION	Thermal cut-out (factory-set) on transformer winding
OPERATING TEMPERATURE	−10 °C to +60 °C ambient

STORAGE TEMPERATURE	−20 °C to +70 °C
OPERATING HUMIDITY	10–90 % RH non-condensing
IP RATING	IP20 (indoor / dry-zone only)
COOLING	Convection — natural air, no forced cooling

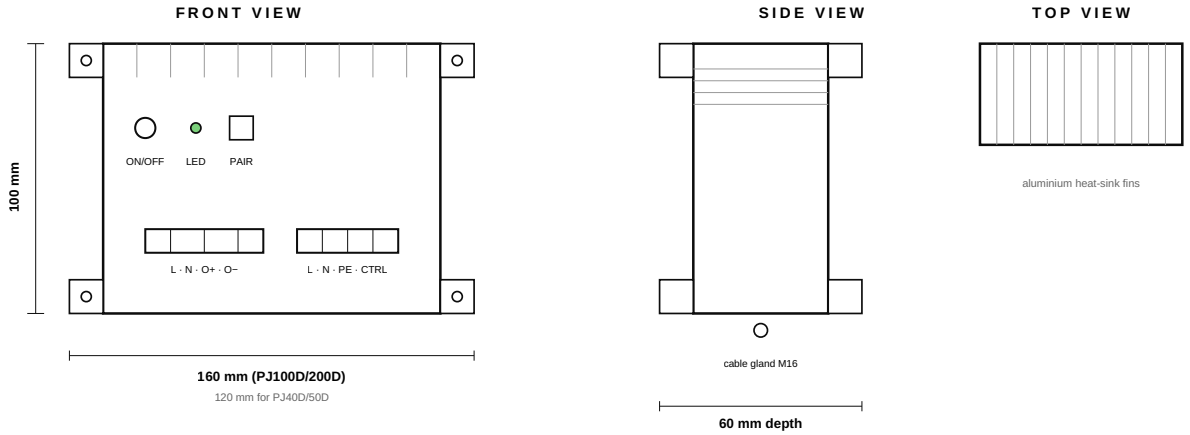
MECHANICAL & CONNECTIVITY

ENCLOSURE	Pressed-steel chassis with vented top, polymer end caps
TERMINAL TYPE	Screw cage clamp · accepts 1.0 – 4.0 mm² stranded copper with ferrule
MOUNTING	4 × M5 through-hole tabs · vertical orientation, cable gland down
NUMBER OF OUTPUT CHANNELS	1 channel · supports multiple panels in parallel up to rated wattage
COUNTRY OF ISSUE	UK / GCC

06 Mechanical drawings & dimensions

The PJ-D family shares a common mounting footprint within each wattage tier. Front, side and top views are shown below with per-model dimensional data. All dimensions in millimetres.

MECHANICAL DRAWING · PJ-D POWER ADAPTER



DIMENSIONS PER MODEL

PJ40D	120 × 80 × 50 mm · ~0.5 kg · M5 mounting
PJ50D	120 × 80 × 50 mm · ~0.6 kg · M5 mounting
PJ100D	160 × 100 × 60 mm · ~1.0 kg · M5 mounting
PJ200D	160 × 100 × 60 mm · ~1.4 kg · M5 mounting

Dimensions tolerance ±2 mm · subject to update on supplier confirmation.
Mounting: 4 × M5 holes through tabs · install vertical with cable gland down.
Ventilation: keep 50 mm clearance around housing for thermal dissipation.

DRAWING PJD-MEC-01 · SCALE NOT SHOWN · SUBJECT TO ±2 MM MANUFACTURING TOLERANCE

MOUNTING REQUIREMENTS

- Mount adapter vertically against a flat, non-combustible surface
- Use 4 × M5 fixings through the integral mounting tabs (one at each corner)
- Maintain minimum 50 mm clearance on all four sides for ventilation
- Cable entries face downward; do not invert the adapter
- Where the adapter is mounted within a recessed cavity (false ceiling, raised floor), provide a ventilated cover and ambient temperature monitoring

07 Component layout & port descriptions

The PJ-D adapter has six functional interfaces, each described below with the IEC 81346 reference designator used in the wiring schematics that follow.

PJ-D ADAPTER · FRONT FACE · INPUT · ON/OFF · PAIR LED · SWITCH · OUTPUT

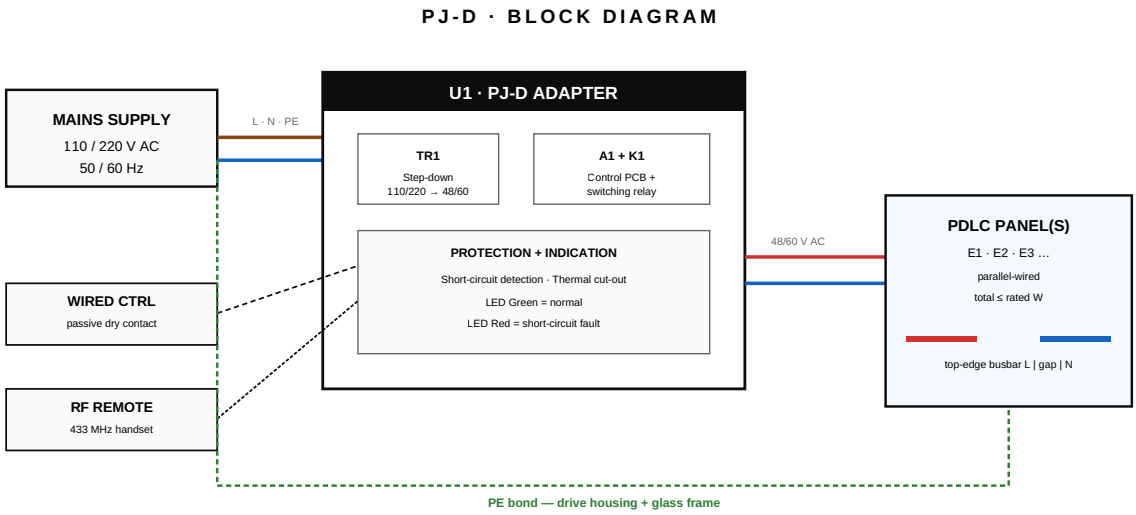
P1	**Power ON/OFF button** — primary on/off switch on the adapter housing. Holding for two seconds forces the output to the OFF state regardless of remote or wired switch state.
P2	**Status LED indicator** — single multi-colour LED. **Green** = mains present, output enabled, operating normally. **Red** = short-circuit detected on output. Returns to green automatically when the short is cleared.
P3	**PAIR / RESET / Initial-state button** — multi-function tact-switch on the control PCB (A1). Short press = enter RF pairing mode. Hold 10 s = factory reset. Hold during power-up = toggle initial-state of output (ON or OFF after power applied).
X1	**Mains supply input port** — terminal block with three poles: **L** (Live, brown), **N** (Neutral, blue), **PE** (Protective Earth, green/yellow). Accepts 1.5 mm² to 4 mm² stranded copper with ferrule.
X3	**Wired control switch port** — passive dry-contact terminal pair. Connect any voltage-free contact: magnetic reed switch, wall switch, key-switch, or BMS dry-contact relay output. Closing the contact toggles the output state.
X2	**Output port** — terminal pair delivering 48 V or 60 V AC at the rated wattage. Marked **+** and **−** for installer convenience but the output is true AC; either polarity may be connected to either side of the panel busbar with no operational difference.

TWO-PANEL PARALLEL OUTPUT

The X2 output is a single channel rated to the model wattage. Where two or more PDLC panels are wired in parallel, the total panel area must not exceed the rated capacity of the adapter (see Section 5). The factory-supplied wiring diagram shows two parallel output paths labelled "Smart film NO.1" and "Smart film NO.2" — these are physically two cables tapped from the same X2 terminal pair, not two independently-controlled channels.

08 System topology overview

The complete PJ-D system, end to end, comprises the upstream mains supply, the adapter itself, the user-control inputs (wired and / or wireless), and the downstream PDLC panel(s). The block diagram below shows the canonical single-channel topology.

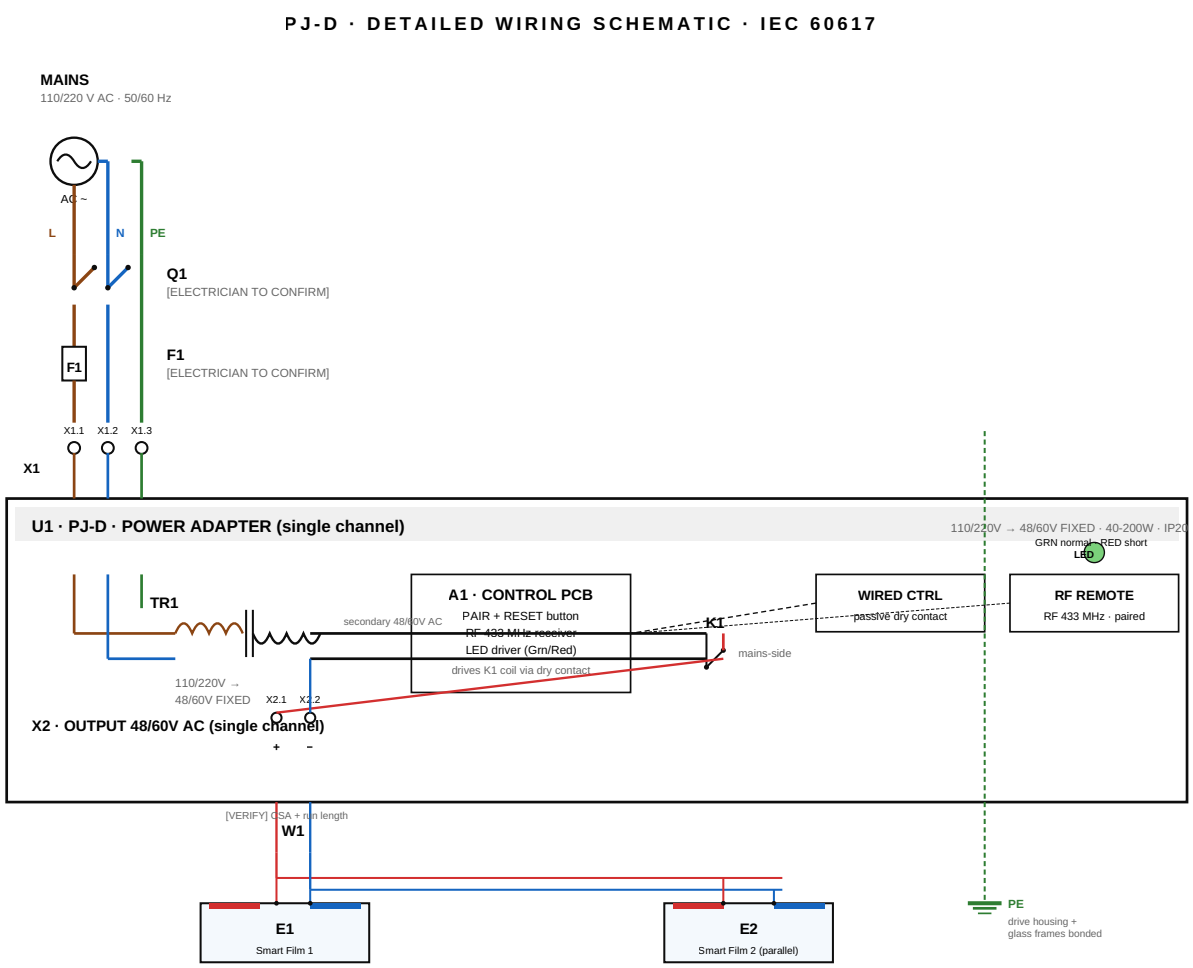


POWER FLOW SUMMARY

1. Mains energy enters at terminal block X1 via L / N / PE conductors
2. The internal step-down transformer TR1 isolates and steps the voltage to the selected 48 V or 60 V
3. The control PCB A1 receives the user command (wired-switch closure or RF remote signal) and energises the relay K1
4. Closed K1 routes the LV output through terminal block X2 to the cable W1
5. W1 arrives at the panel top-edge busbar; the PDLC layer aligns and the panel switches to transparent
6. Removing the command de-energises K1; the panel relaxes to its opaque state

09 Detailed wiring schematic (IEC 60617)

This drawing is the master single-line / multi-line wiring schematic for the PJ-D adapter. It shows the upstream isolation and protection, the internal transformer and control assembly, both user-control inputs, the LED indicator, the output terminals, and a typical two-panel parallel load. All graphical symbols follow IEC 60617; conductor identification follows IEC 60446 (brown = L, blue = N, green/yellow = PE).



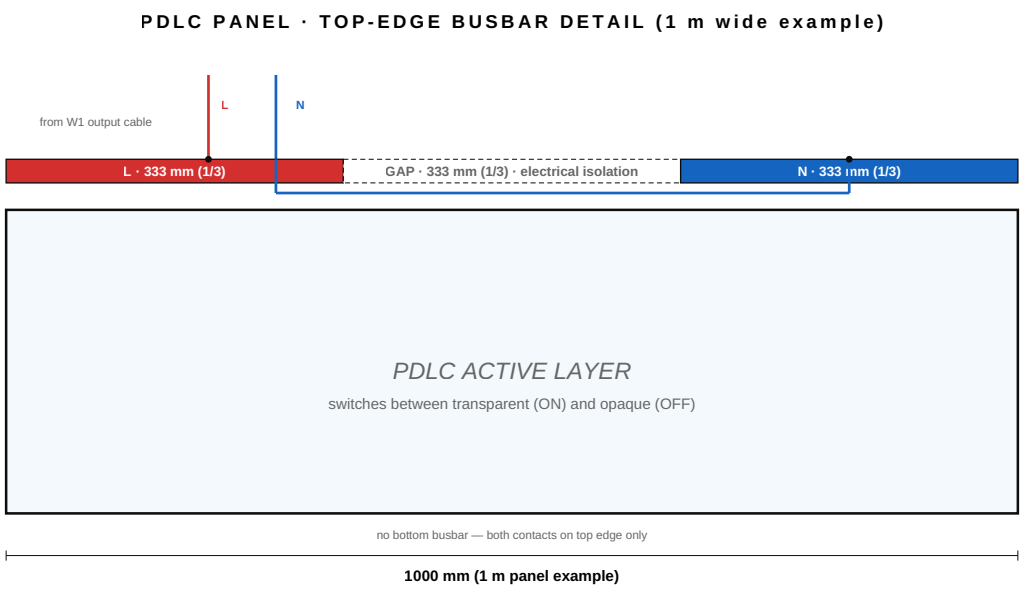
DRAWING PJD-WIR-01 · IEC 60617 SYMBOLS · IEC 60446 COLOURS · NTS · REV 3.3

NOTES

1. Q1 isolator and F1 protection are installer-supplied items in the upstream consumer unit / sub-board.
2. RCD type and rating [ELECTRICIAN TO CONFIRM] per local installation regulations (BS 7671 / IEC 60364). Where an RCD is fitted, verify trip operation on commissioning.
3. The dry-contact wired control input is shown linked to terminal X3 in the simplified diagram; in physical product these terminals are integrated on the same connector strip.
4. Output cable W1 size [VERIFY] per project load, run length, install method and ambient conditions; see the Cable Schedule (Section 14) for the columns the electrician must complete.
5. The PE bond (green / yellow dashed line) is mandatory: bond the adapter housing AND the glass framing system to the building protective earth.

10 PDLC panel busbar detail

Modern PRIVASEE® PDLC panels carry both electrical contacts on the **top edge only**. The top edge is divided into three equal-length segments along its width: a Live segment (left third), an isolation gap (centre third), and a Neutral segment (right third). On a 1 m wide panel, each segment is approximately 333 mm long. This single-edge configuration simplifies installation and reduces visible cable runs at the bottom of the glazing.



DRAWING PJD-BUS-01 · TOP-EDGE BUSBAR GEOMETRY · 1 M WIDE PANEL EXAMPLE

WHY A CENTRE GAP MATTERS

The gap is a deliberate dielectric break between the L and N conductors. It is the only thing that prevents a direct short-circuit between the two output legs of the adapter. Never bridge the gap with conductive material, and never apply silicone or sealant directly across the gap that contains metallic flake or conductive additives.

CONNECTION METHOD

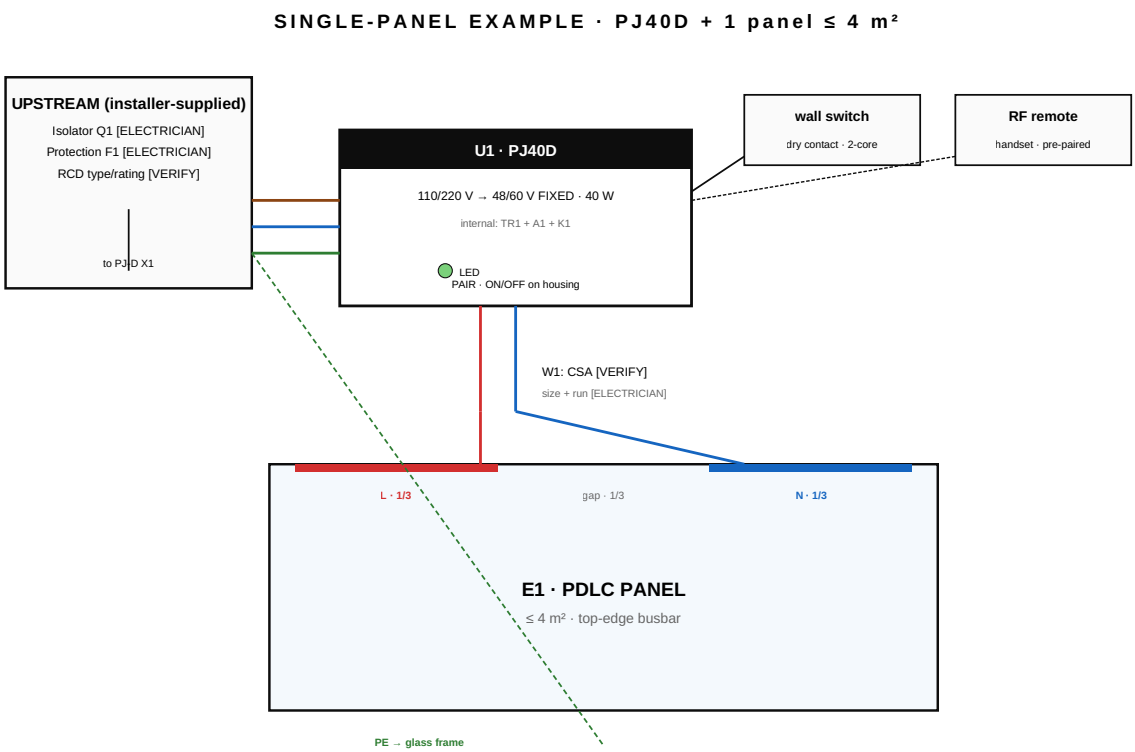
- Terminate the W1 cable into the L and N busbar segments using PRIVASEE-supplied conductive adhesive copper foil tabs
- Apply TOSSEAL 381 silicone over each terminated joint to provide moisture and mechanical protection (do not bridge the gap)
- Verify continuity end-to-end on each busbar before energising
- Verify isolation across the gap (insulation resistance > 10 MΩ at 500 V DC test) before energising

▲ WARNING · APPROVED SILICONE

Only TOSSEAL 381 is approved for use over PRIVASEE® PDLC busbar joints. Other silicones may contain corrosive cure-by-products that attack the busbar over time and will void the panel warranty.

11 Wiring example · single-panel install

The following worked example covers the most common installation scenario: one PJ-D adapter feeding one PDLC panel.



BILL OF MATERIALS

REF	DESCRIPTION	QTY
U1	PRIVASEE® PJ40D smart film power adapter, 48 V or 60 V output	1
Q1, F1	Upstream isolator + protection (installer-supplied) — rating [ELECTRICIAN TO CONFIRM]	1 ea
W1	2-core LV cable — CSA + maximum run [ELECTRICIAN TO CONFIRM] per project	per run
—	Magnetic / wall switch (optional, installer-selected)	0–1
—	PRIVASEE® RF remote handset (supplied with adapter)	1
E1	PRIVASEE® PDLC smart film panel ≤ 4 m²	1

CABLE SIZING — ELECTRICIAN'S JUDGEMENT

PRIVASEE® does not specify a cable CSA, run length, or voltage-drop budget for the W1 output cable. Cable size, method of installation, ambient temperature derating, grouping factor, and maximum permissible voltage drop are site-specific and must

be calculated by the project electrician using BS 7671 / IEC 60364 / local installation regulations. See the Cable Schedule (Section 14) for the columns the electrician must complete.

12 Panel schedule (project-fillable)

The panel schedule is the project-specific list of every PDLC panel that the PJ-D adapter(s) on this project will drive. The PRIVASEE® preparer fills the rows that are known at handover; the project electrician completes the remaining columns during commissioning.

TAG	LOCATION	PANEL SIZE (MM)	AREA (M²)	FILM GRADE	DRIVE REF	CHANNEL	NOTES
E1	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E2	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E3	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E4	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E5	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E6	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E7	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—
E8	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]	1	—

SCHEDULE PREPARATION NOTES

- **Tag** — unique reference designator (E1, E2, …) used in every drawing and BOM on the project
- **Location** — room or zone where the panel is installed
- **Panel size** — finished glass dimensions (W × H) in millimetres
- **Area — calculated panel area in m² (used for wattage budgeting)**
- **Film grade — PDLC SKU from the FM matrix (e.g. FM-T91-16-A, FM-T85SL-12-N) — see TEC-01a**
- **Drive ref — reference designator of the PJ-D adapter feeding this panel (U1, U2, …)**
- **Channel — output channel of the drive (PJ-D is single-channel · always 1)**
- **Notes — switching state expectations, special handling, integration notes**

> **WATTAGE BUDGET RULE**
>
> **Sum the Area column for all panels assigned to a single drive. The total must not exceed 80% of the drive's rated capacity (PJ40D = 3.2 m² · PJ50D = 4.0 m² · PJ100D = 8.0 m² · PJ200D = 16 m²). If exceeded, split panels across additional drives or upgrade the drive model.**

13 Transformer schedule

The transformer (power-drive) schedule lists every PJ-D adapter on the project, its rated capacity, the panels it serves, and its calculated load. This document is the design-authority record for matching drives to load.

TAG	MODEL	VIN	VOUT	RATED	PANELS	TOTAL M²	% RATED
U1	[VERIFY]	[ELECTRICIAN]	48 V or 60 V	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]
U2	[VERIFY]	[ELECTRICIAN]	48 V or 60 V	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]
U3	[VERIFY]	[ELECTRICIAN]	48 V or 60 V	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]
U4	[VERIFY]	[ELECTRICIAN]	48 V or 60 V	[VERIFY]	[VERIFY]	[VERIFY]	[VERIFY]

DRIVE SELECTION RULES

- **Vin — site mains voltage [ELECTRICIAN TO CONFIRM] (typically 230 V AC in UK/EU; 220 V in GCC)**
- **Vout — 48 V or 60 V AC (PRIVASEE selects at order; verify panel busbar voltage rating before commissioning)**
- **Rated — 40 W (PJ40D) · 50 W (PJ50D) · 100 W (PJ100D) · 200 W (PJ200D)**
- **Total m² — sum of Area column from Panel Schedule for all panels assigned to this drive**
- **% rated — must not exceed 80% (target ≤ 80% to retain headroom for ageing and ambient variation)**

DRIVE LOCATIONS & ACCESS

- **Drive locations — [VERIFY] each drive on the project floor plan with the electrician before first-fix**
- **Mounting orientation — vertical, cable gland down, minimum 50 mm clearance all sides**
- **Access — drives must remain accessible for service and replacement; do not bury in plaster or sealed cavities**
- **Ambient — verify ambient temperature within −10 °C to +60 °C in the drive location at worst-case conditions**

14 Cable schedule (project-fillable)

The cable schedule lists every cable run on the project — both the upstream mains feed to each drive and the downstream low-voltage feed from each drive to its panel(s). The PRIVASEE® preparer specifies the from-to and the intended function of each run; the project electrician calculates and fills in the remaining columns per the applicable wiring regulations.

TAG	FROM	TO	CORES	CSA	LENGTH	INSUL.	PROTECTION
W0.1	Sub-board F1	U1 X1 (mains)	L · N · PE	[ELECT.]	[VERIFY]	[VERIFY]	[ELECT.]
W1.1	U1 X2	E1 busbar	2-core LV	[VERIFY]	[VERIFY]	[VERIFY]	—
W1.2	U1 X2	E2 busbar (parallel)	2-core LV	[VERIFY]	[VERIFY]	[VERIFY]	—
W1.3	U1 X3	Wall switch	2-core ctrl	[VERIFY]	[VERIFY]	[VERIFY]	—
W2.1	Sub-board F2	U2 X1 (mains)	L · N · PE	[ELECT.]	[VERIFY]	[VERIFY]	[ELECT.]
W2.2	U2 X2	E3 busbar	2-core LV	[VERIFY]	[VERIFY]	[VERIFY]	—
WPE	Building PE	U-housings + glass frames	1-core PE	[ELECT.]	[VERIFY]	G/Y	—

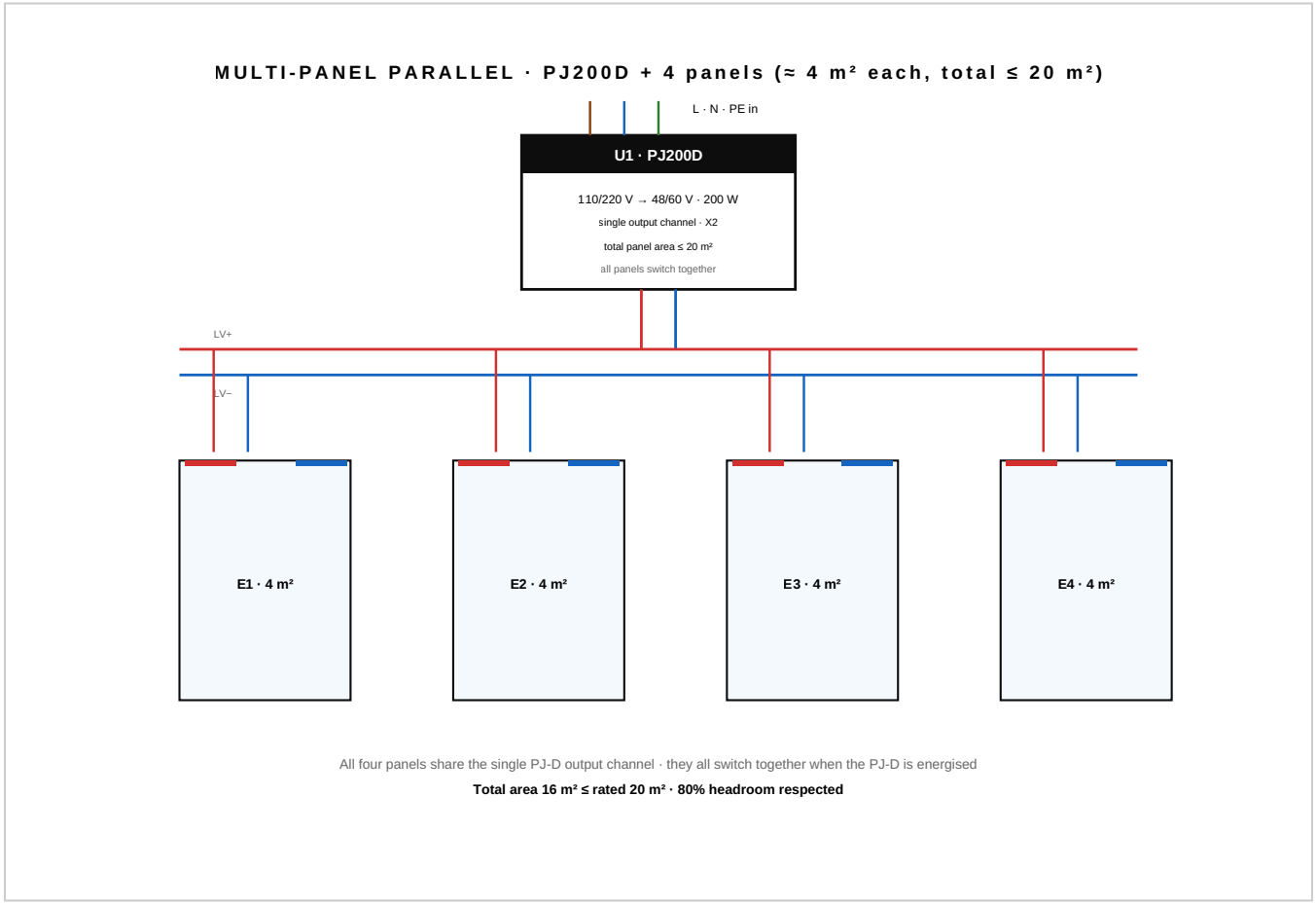
CALCULATION METHODOLOGY TO BE APPLIED BY ELECTRICIAN

1. **Establish the design current (load / Vout) for each output run**
2. **Apply BS 7671 / IEC 60364 cable-current-carrying-capacity tables for the chosen install method**
3. **Apply correction factors for ambient temperature, grouping, and thermal insulation**
4. **Calculate maximum permissible voltage drop (≤ 5% of nominal Vout for the LV runs is a common design target — confirm against project specification)**
5. **Select CSA that satisfies both current-carrying capacity and voltage-drop constraints, with a margin**
6. **Record the calculation in the project's electrical design report; reference the calculation in this schedule**

> ▲ **WARNING · DO NOT USE RULE-OF-THUMB CABLE SIZES**
>
> **Earlier draft documents (Rev 3.0) included rule-of-thumb cable sizes (e.g. "1.5 mm² up to 10 m"). These have been withdrawn. Cable size must be calculated for each run individually per the procedure above.**

15 Wiring example · multi-panel parallel

Where two or more PDLC panels share the same control state, they may be wired in parallel from a single PJ-D output channel, provided the combined panel area does not exceed the rated wattage capacity of the chosen model.



WATTAGE BUDGET RULE

Use no more than 80 % of the adapter's rated wattage as the design budget. Reserving 20 % headroom accommodates panel ageing, ambient temperature variation and small variations between panel batches.

ADAPTER	RATED	80 % DESIGN BUDGET	APPROX. MAX AREA*
PJ40D	40 W	32 W	≈ 3.2 m²
PJ50D	50 W	40 W	≈ 4.0 m²
PJ100D	100 W	80 W	≈ 8.0 m²
PJ200D	200 W	160 W	≈ 16 m²

** Based on ~10 W/m² PDLC current density. Verify with PRIVASEE® for projects above 10 m² total.*

PJ-D CHANNEL ARCHITECTURE

The PJ-D is a single-channel adapter — all parallel-connected panels driven by the same PJ-D switch together. Where every panel must switch in lockstep this is the simplest and most cost-effective topology.

16 Wired control mode

The PJ-D wired control input X3 is a passive dry-contact pair. Closing the contact toggles the output state. The adapter supports the following types of switch:

SWITCH TYPE	BEHAVIOUR	TYPICAL USE
Magnetic reed (door switch)	Output follows door state — closes when door closed	Privacy follows door state in bathrooms / consultation rooms
Wall toggle / rocker	Each press toggles output state	Standard meeting-room privacy switch
Push-to-make momentary	Each press toggles output state	Door-frame integrated push button
Key-switch	Output follows key position	Restricted-access privacy override
BMS dry-contact relay	Output follows BMS state	Building management integration

■ **DANGER · X3 IS VOLTAGE-FREE**

The wired control input X3 is a passive dry-contact interface. NEVER apply mains voltage, low-voltage AC, or any DC supply to X3. Doing so will permanently damage the control PCB and invalidate the warranty. Only voltage-free contacts may be connected.

CABLE & WIRING

- **Use 2-core control cable; CSA [VERIFY] per project**
- **Maximum cable run [ELECTRICIAN TO CONFIRM] per project**
- **Run separately from mains cable bundles where possible to limit induced noise**
- **Where running parallel to mains is unavoidable, maintain > 100 mm separation or use shielded cable with the shield earthed at the adapter end only**

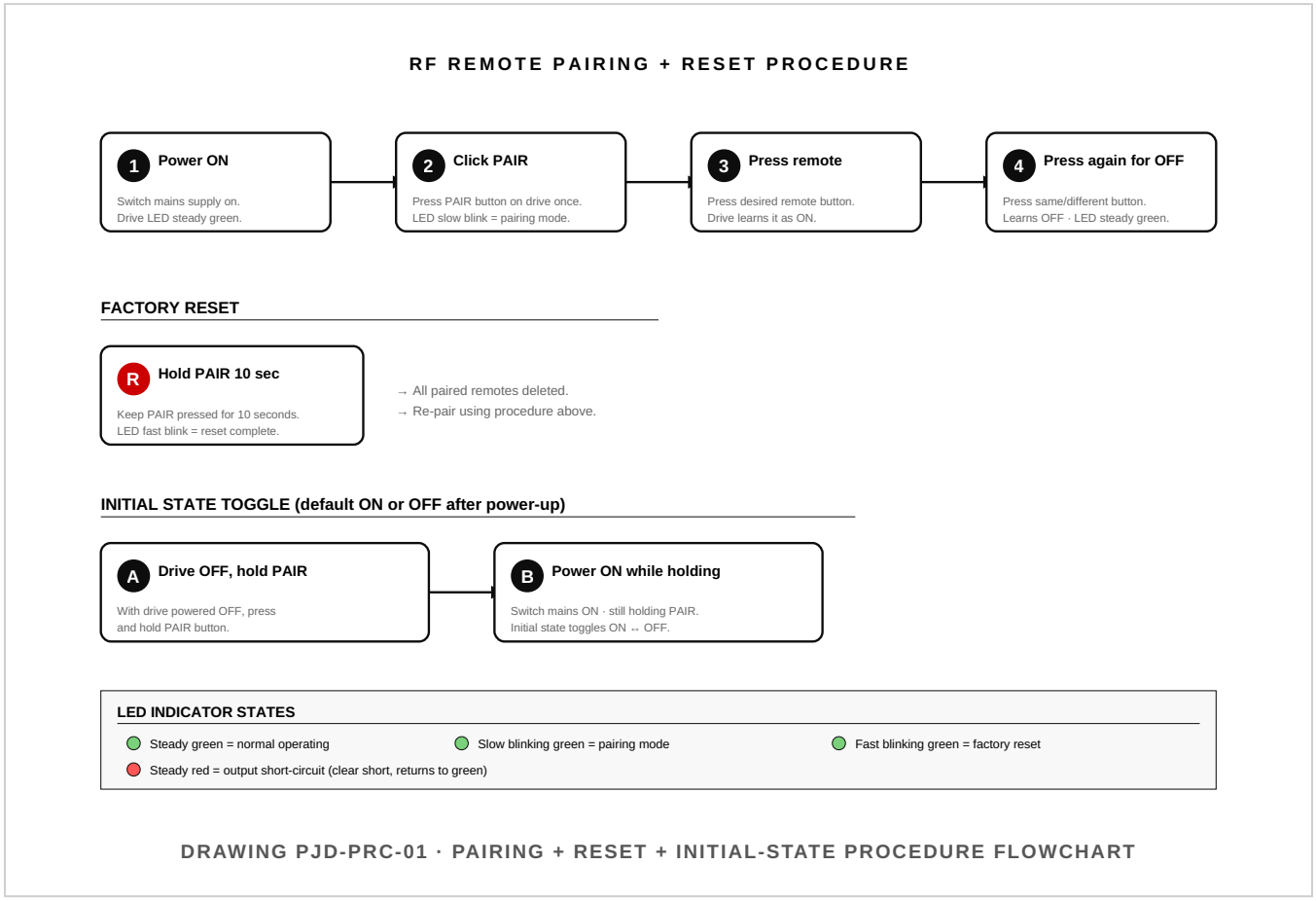
COMBINING WIRED AND WIRELESS CONTROL

The wired-switch and RF-remote inputs are logically combined inside the control PCB A1. Either input toggles the output state independently. This means a magnetic door-switch, a wall toggle, AND a paired RF remote can all coexist on the same adapter, and any of them can change the output state.

17 RF remote · pairing procedure

Each PJ-D adapter is supplied with one RF remote handset, paired ex-works. To re-pair after a factory reset, to add additional remotes, or to move a remote from one adapter to another, follow the procedure below.

PJ-D ADAPTER WITH PAIRED RF REMOTE HANDSET (433 MHz)



DRAWING PJD-PRC-01 · PAIRING + RESET + INITIAL-STATE PROCEDURE FLOWCHART

PAIRING PROCEDURE (VERBATIM FROM MANUFACTURER)

1. **Confirm the adapter is powered ON; the LED should be solid GREEN.**
2. **Press and release the PAIR button on the adapter housing. The LED begins to blink slowly (green pulse).**
3. **Within 10 seconds, press the desired button on the RF remote that you want to learn as the ON/OFF command.**
4. **The LED returns to solid GREEN. The button you pressed is now learned for the active state change.**
5. **To assign the OFF state to a different button, repeat from step 2 and press the alternative button when the LED is blinking.**
6. **The same button or two different buttons may be used for ON and OFF, depending on the desired user interface.**

> **MULTIPLE REMOTES**
>
> **Up to eight RF remotes may be paired to a single PJ-D adapter. Repeat the pairing procedure for each additional remote.**

18 Reset & initial-state procedures

FACTORY RESET

A factory reset clears all paired RF remotes from the adapter's memory and restores the default initial state (output OFF on power-up).

1. **With the adapter powered ON, press and hold the PAIR button.**
2. **After approximately 10 seconds, the LED begins to blink rapidly (green flicker).**
3. **Release the PAIR button. The reset is complete.**
4. **All previously paired remotes are now invalid and must be re-paired (see Section 17).**

> ▲ **WARNING · RESET CLEARS ALL REMOTES**
>
> **A factory reset clears every paired remote, not just selected ones. Plan to re-pair all remotes before issuing the reset.**

INITIAL-STATE TOGGLE

The initial-state setting determines whether the output is ON or OFF immediately after mains is applied. This is useful where the desired default state is "transparent" (output ON) instead of the factory default of "opaque" (output OFF).

1. **Disconnect mains from the adapter and verify the LED is OFF.**
2. **Press and hold the PAIR button.**
3. **While still holding the PAIR button, restore mains. The adapter starts up; release the PAIR button immediately afterwards.**
4. **The initial state has now toggled. If it was OFF-on-power-up, it is now ON-on-power-up, and vice versa.**
5. **To revert, repeat the procedure.**

> ⓘ **INITIAL-STATE BEHAVIOUR AFTER MAINS INTERRUPTION**
>
> **The initial-state setting is non-volatile and is preserved through power loss. If the building loses power, the adapter restores its configured initial state when power returns. This matters for projects where the privacy state must be predictable after a power outage (e.g. healthcare or hospitality).**

19 Troubleshooting guide

SYMPTOM	LIKELY CAUSE	FIRST ACTION
LED off · panel not switching	No mains supply	Verify upstream MCB / RCD; check L/N at X1 with multimeter
LED off · mains present at X1	Internal fuse blown / hardware fault	Isolate, return adapter to PRIVASEE® for inspection — do not open
LED solid RED	Short-circuit detected on output	Disconnect W1; verify isolation across panel busbar L–N (> 10 MΩ at 500 V DC); inspect for water ingress
LED solid GREEN · panel does not respond to remote	RF remote not paired or out of battery	Replace remote battery; re-pair per Section 17
LED solid GREEN · panel does not respond to wall switch	Wired switch not closing or not connected to X3	Verify continuity across the switch terminals and the X3 dry-contact wiring
Panel partially switches (some areas remain milky)	Voltage drop on long output cable, or panel busbar damage	Measure voltage at panel busbar; ask electrician to re-evaluate cable size per Section 14 cable schedule. Inspect panel busbar for tears or sealant intrusion.
Panel switches but slowly / takes > 1 s	Cold ambient temperature or end-of-life film	Below +5 °C, switching slows naturally; allow time. If symptom persists at room temperature, contact PRIVASEE®.
Audible buzz from adapter	Loose mains-side fixing or sub-board harmonic	Check torque on X1 terminals; verify upstream supply is clean sine wave
Adapter unusually hot to touch	Overload or restricted ventilation	Verify total connected panel area ≤ adapter rating; ensure 50 mm clearance on all sides
Initial state unexpected after power loss	Initial-state setting toggled inadvertently	Reconfigure per Section 18

WHEN TO ESCALATE TO PRIVASEE®

- **LED solid RED that does not clear after isolating output cable**
- **Audible click or smell from the adapter housing**
- **Any visible damage to the adapter or panel busbar**
- **Repeated MCB or RCD trips on the upstream supply**
- **Any suspected water ingress to the adapter or panel**

Contact info@privasee.uk with the following information: model number (PJ40D / 50D / 100D / 200D), serial number from the adapter nameplate, project name, installation date, photographs of the symptom, and any multimeter readings already taken.

20 Maintenance

ROUTINE INSPECTION SCHEDULE

INTERVAL	ACTIVITY	PERFORMED BY
Monthly	Visual inspection of adapter housing for dust accumulation, mechanical damage, cable strain	Site facilities team
6-monthly	Function test — operate via wall switch and RF remote; confirm panel switches fully and LED is green	Site facilities team
Annually	Torque-check terminals X1 and X2; verify ventilation clearances; insulation resistance test on output (> 10 MΩ)	Qualified electrician
5-yearly	Full electrical inspection per BS 7671 / IEC 60364	Qualified electrician

ADAPTER CLEANING

- Isolate at the upstream MCB before any cleaning
- Wipe the housing with a clean, dry, lint-free microfibre cloth
- For stubborn marks, lightly dampen the cloth with isopropyl rubbing alcohol 70%; do not spray directly onto the housing
- Do not use ammonia (Windex), abrasive cleaners, or solvents
- Allow to dry fully before re-energising

PANEL CLEANING (INTERFACE WITH THE ADAPTER)

The PDLC panel itself is cleaned per the dedicated PRIVASEE® TEC-11 maintenance guide. The panel must be in the energised (transparent) state during cleaning so the cleaner can verify even tone before and after; the PJ-D adapter must therefore be left powered during scheduled cleaning windows.

▲ APPROVED CLEANER

The sole approved cleaner for PRIVASEE® smart film and smart glass panels is Isopropyl Rubbing Alcohol 70% Antiseptic-Disinfectant. Spray a small amount onto a lint-free microfibre cloth (never onto the surface) and clean without pressure. Other cleaners — ammonia, acidic, alkaline, solvent, or abrasive — will damage the panel and void warranty.

SPARE-PARTS POLICY

The PJ-D adapter is a sealed unit with no user-serviceable parts inside. In the event of failure, the unit is replaced. PRIVASEE® holds spares of all four wattages with typical lead time of 5 working days within the UK / GCC.

21 Warranty summary

WARRANTY TERM

PRIVASEE® warrants the PJ-D adapter to be free from defects in materials and workmanship for 24 months from the documented installation date, or 30 months from PRIVASEE® dispatch date — whichever is reached first.

WHAT IS COVERED

- **Manufacturing defects in the adapter housing, transformer, control PCB and switching relay**
- **Premature failure of the LED indicator**
- **Failure of supplied RF remote (excluding battery replacement)**

WHAT IS NOT COVERED

- **Damage from incorrect installation, including connection to the wrong supply voltage**
- **Damage from short-circuit, overload, or wiring outside the published specification**
- **Damage from water ingress where the adapter is installed outside the IP20 specification**
- **Cosmetic wear, scratches, or fading of label markings**
- **Damage from cleaning with non-approved chemicals (see Section 20)**
- **Damage from third-party silicone or sealant applied to terminals or busbars (only TOSSEAL 381 is approved)**
- **Consequential damage to building fabric, glass, furniture, or other equipment**

HOW TO CLAIM

1. **Contact info@privasee.uk with model and serial number, installation date and photographs of the symptom**
2. **PRIVASEE® will issue a Returns Material Authorisation (RMA) within 3 working days**
3. **Return the adapter, freight prepaid, to the PRIVASEE® address quoted on the RMA**
4. **PRIVASEE® will inspect, and within 10 working days either repair, replace, or issue a written explanation of why the warranty does not apply**

> **REFER TO FULL WARRANTY DOCUMENT**
>
> **This is a summary only. The full warranty terms and conditions are contained in document QUA-01a (UK) or QUA-01b (GCC), Rev 1.1 or later. In the event of any conflict between this summary and the full warranty document, the full document prevails.**

22 Compliance & standards

STANDARDS REFERENCED IN DESIGN

STANDARD	TITLE	APPLICATION
IEC 60364	Low-voltage electrical installations	Installation requirements
IEC 60617	Graphical symbols for diagrams	Wiring schematics in this manual
IEC 60446	Identification of conductors by colour	L=brown, N=blue, PE=green/yellow throughout
IEC 81346	Reference designation system	Q1, F1, TR1, U1, A1, K1, X1, X2, W1, E1 designators
BS 7671:2018+A2:2022	IET Wiring Regulations (UK)	UK installation compliance reference
EN 55015 / EN 61547	EMC for lighting / general lighting equipment (analogous)	EMC class for the adapter family
EN 61347-1	Lamp controlgear — general & safety	Safety basis for the adapter

MARKING

Each PJ-D adapter carries a permanent nameplate showing: model number, serial number, input voltage, output voltage, rated power, country of issue, manufacturer name (PRIVASEE® Group), and the recycling / WEEE pictogram.

DISPOSAL AT END OF LIFE

The PJ-D adapter is classified as Category 5 small equipment under the WEEE Directive (2012/19/EU). At end of life, return to PRIVASEE® for environmentally-responsible disposal at no cost to the customer. Do not dispose of in general or municipal waste.

APPROVALS & TEST REPORTS (WHERE APPLICABLE)

Test reports for the PJ-D family covering electrical safety, EMC, and environmental endurance are held by PRIVASEE® and are available to project specifiers under NDA on request. Reference the relevant compliance document numbers when requesting (CMP-01 to CMP-05).

i CE / UKCA MARKING

The PJ-D adapter is CE-marked for sale in the EU and UKCA-marked for sale in Great Britain. The Declaration of Conformity is available on request from info@privasee.uk.

23 Missing-data list

The following data items are not specified by PRIVASEE® and must be obtained from one of the listed sources before the installation drawing is final-approved. Until every row is closed, the drawing remains DRAFT.

#	ITEM	SOURCE	OWNER	STATUS
1	Site mains voltage at adapter input (110 / 220 / 230 / 240 V)	Site survey	Project electrician	OPEN
2	Earthing system type (TT, TN-S, TN-C-S, IT)	Site survey / consumer-unit inspection	Project electrician	OPEN
3	Upstream isolator Q1 rating (poles, current)	Project regs + selectivity study	Project electrician	OPEN
4	Upstream protection F1 rating + curve (MCB / RCBO / fuse)	Project regs + inrush analysis	Project electrician	OPEN
5	RCD requirement, type (AC / A / B / F) and rating (mA)	Local installation regulations	Project electrician	OPEN
6	Mains-side cable W0.x — CSA, length, insulation, install method	Cable calculation per BS 7671 / IEC 60364	Project electrician	OPEN
7	LV-side cable W1.x / W2.x — CSA, length, install method	Voltage-drop + current-carrying calculation	Project electrician	OPEN
8	Wired-control cable W1.3 / W2.3 — CSA, length	Project layout	Project electrician	OPEN
9	PE bond cable WPE — CSA, length	Project layout + earthing study	Project electrician	OPEN
10	Drive locations on the project floor plan	Architect drawings + electrician walk-through	Project electrician + architect	OPEN
11	Adapter power factor, efficiency, inrush — measured values	PRIVASEE supplier test report	PRIVASEE	OPEN
12	Panel schedule — final list of panel tags, sizes, locations, film grades	Architect schedule + commercial confirmation	PRIVASEE + architect	OPEN
13	Transformer schedule — final drive count and assignment	Engineering review against panel schedule	PRIVASEE	OPEN
14	Containment / conduit specification	Project specification	Project electrician	OPEN
15	Local-authority approvals required (if any)	Local authority	Project electrician	OPEN

HOW TO CLOSE A ROW

Each row is closed by writing the confirmed value into the relevant schedule (Panel §12, Transformer §13, Cable §14) AND replacing the corresponding [VERIFY] / [ELECTRICIAN TO CONFIRM] marker in the wiring

diagrams (§9, §11, §15) with the confirmed value. The Status column changes from OPEN to CLOSED with electrician initials and date.

24 QA checklist for electrician review

Before the installation drawing is approved as FINAL, the project electrician must work through this checklist and sign each row. PRIVASEE® holds a copy of the signed checklist as the design-authority record.

1 — SOURCE & SCOPE REVIEW

1. **Verified that the PRIVASEE PJ-D specifications quoted in §5 match the supplier-issued product datasheet · Pass / Fail**
2. **Confirmed that the PJ-D output (48 V or 60 V AC) matches the panel busbar voltage rating · Pass / Fail**
3. **Confirmed that the wattage budget (sum of panel areas vs drive rated wattage × 0.8) is satisfied for every drive · Pass / Fail**

2 — MAINS-SIDE REVIEW

1. **Verified site mains voltage and frequency at adapter input · Pass / Fail**
2. **Verified earthing system type and that PE bonding is correctly specified for the type · Pass / Fail**
3. **Selected upstream isolator Q1 — rating, poles, breaking capacity — per project regs and selectivity study · Pass / Fail**
4. **Selected upstream protection F1 — type, rating, curve — per project regs and inrush analysis · Pass / Fail**
5. **Specified RCD where required by local regs — type and mA rating per regs · Pass / Fail**
6. **Sized W0.x mains cable per BS 7671 / IEC 60364 with applicable correction factors · Pass / Fail**

3 — OUTPUT / LV-SIDE REVIEW

1. **Sized W1.x / W2.x output cables for current-carrying capacity AND voltage-drop simultaneously · Pass / Fail**
2. **Verified that the wattage budget margin (≥ 20%) is preserved at each drive · Pass / Fail**
3. **Verified that PDLC panels in parallel on the same drive are intended to switch together (else specify multi-channel drive) · Pass / Fail**
4. **Verified that the wired-control input X3 is connected only to voltage-free dry contacts (no mains, no DC) · Pass / Fail**

4 — EARTHING & PE BOND REVIEW

1. **Verified that the PE conductor reaches every adapter housing AND every glass frame · Pass / Fail**
2. **Specified PE bond CSA per project regs · Pass / Fail**
3. **Verified that the LV output (48/60 V AC) is NOT bonded to mains earth · Pass / Fail**

5 — DOCUMENTATION & SIGN-OFF

1. **Closed every row in the Missing-Data List (§23) — no OPEN items remain · Pass / Fail**
2. **Updated every [VERIFY] / [ELECTRICIAN TO CONFIRM] marker in §9 / §11 / §15 with the confirmed value · Pass / Fail**
3. **Produced the final drawing in EPLAN / AutoCAD Electrical / Revit MEP (or equivalent) — see §25 · Pass / Fail**
4. **Included calculation evidence (cable, voltage drop, protection selectivity) in the project electrical design report · Pass / Fail**
5. **Obtained all required signatures per §25 final-approval chain · Pass / Fail**

> ▲ **WARNING · ALL ROWS MUST PASS BEFORE ENERGISING**
>
> **If any row of this checklist returns Fail, the installation must NOT be energised. Resolve the failure (revise the drawing, repeat the calculation, or refer back to PRIVASEE® for clarification) and re-run the affected section of the checklist before commissioning.**

25 CAD/ECAD handoff & final-approval chain

The wiring schematics in §9, §11 and §15 of this manual are draft logic diagrams only. They show the intended power flow, control flow, and signal flow for an electrician to translate into the project's own CAD/ECAD environment. They are not the deliverable that goes to site.

REQUIRED FINAL-DRAWING SOFTWARE

The final drawing for site use must be produced or checked in one of the following:

SOFTWARE	BEST FOR	OUTPUT FORMAT
EPLAN Electric P8 / EPLAN Pro Panel	Cabinet-based industrial control	Schematic + cabinet-build dwg
AutoCAD Electrical	Single-line + multi-line diagrams · building services	DWG · PDF
Revit MEP	BIM-coordinated electrical models · whole-building projects	RVT · IFC · PDF
DDS-CAD / Stabicad	MEP design with BIM coordination	DWG · IFC · PDF

WHAT THE ELECTRICIAN RECEIVES FROM PRIVASEE®

- This manual (PVS-SGS-MAN-PJD-01 Rev 3.3+) — drives, panels, wiring logic, busbar geometry, IEC reference
- Product datasheets for the PJ-D family (PVS-SGS-DAT-PJD)
- Panel schedule (§12) seeded with PRIVASEE-known data; remainder for project completion
- Transformer schedule (§13) listing the drives PRIVASEE® will supply
- Cable schedule (§14) seeded with the from-to topology; CSA / length / protection columns for project completion

WHAT THE ELECTRICIAN PRODUCES

- Project-specific single-line and multi-line wiring diagrams in the chosen ECAD software
- Complete cable, panel, and transformer schedules with all OPEN rows closed
- Cable calculations + voltage-drop calculations + protection selectivity studies (separate calculation report)
- Test certificates per the applicable regulations (BS 7671 EICR / IEC 60364 / local equivalents)
- Commissioning record with the QA checklist (§24) signed

FINAL-APPROVAL CHAIN

STEP	ROLE	RESPONSIBILITY
1	PRIVASEE® preparer	Issues this manual + product datasheets + seeded schedules

2	Project electrical designer (M&E consultant)	Produces final drawings in ECAD + supporting calculations
3	Qualified electrician (UK 18th-Edition / EU EN 50110-1 / GCC Civil Defence approved)	Reviews drawings, runs the QA checklist, signs the commissioning record
4	Chartered / licensed engineer	Provides design-authority sign-off where the project size or class requires
5	Local authority / building control / Civil Defence	Final approval for energising where mains-side work requires it

■ DANGER · DO NOT ENERGISE WITHOUT ALL SIGNATURES

The installation must not be energised until every step of the final-approval chain that applies to the project has been completed and signed. PRIVASEE® disclaims liability for any installation energised without qualified-electrician approval.

26 Contact & document close

PRIVASEE® GROUP

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GCC SALES	S O R S Reflective LLC · United Arab Emirates
ENGINEERING	SORS GT UK LTD · Sandbach, England

COMPANION PRIVASEE® DOCUMENTS REFERENCED IN THIS MANUAL

DOC NUMBER	TITLE
PVS-SGS-DAT-PJD	PJ-D Power Adapter — Product Datasheet (this family)
PVS-SGS-TEC-01a/b	FM Smart Film Datasheet series
PVS-SGS-TEC-02	SG-01 / LG-01 / LG-02 Smart Glass Datasheet
PVS-SGS-TEC-11	Smart Film & Smart Glass Maintenance Guide
PVS-SGS-QUA-01	PRIVASEE® Smart Glass Warranty (UK / GCC variants)

Other PRIVASEE® power-drive families (PJ-C, DZD-NO, LD-A, DZ6L, CZ) are documented in their own dedicated manuals. A consolidated power-drive catalogue covering the full range will be issued separately.

DOCUMENT PREPARATION & PROJECT SIGN-OFF CHAIN

This document is the engineering preparation. The site installation requires additional sign-offs from the project electrician, consultant engineer, and local authority where applicable.

PRIVASEE® PREPARER	PRIVASEE® REVIEWER	PRIVASEE® APPROVER
PRIVASEE® Smart Glass Engineering		
Date: 2026-05-04 · DRAFT	[awaiting founder review]	[awaiting founder approval]

PROJECT ELECTRICIAN (QUALIFIED)	CONSULTANT ENGINEER	LOCAL AUTHORITY
[name · qualification · date]	[name · qualification · date]	[authority · permit · date]
UK 18th Ed / EU EN 50110-1 / GCC Civil Defence	where required by project size / class	where required by jurisdiction

END OF DOCUMENT

This document is issued in DRAFT classification pending founder review and approval. On approval, classification is upgraded to FINAL and the issue date is updated. Please return any review comments to info@privasee.uk referencing the document number PVS-SGS-MAN-PJD-01 Rev 3.3.