



LED STRIP MOUNTING AND SAFETY INSTRUCTIONS

Before commencing the installation and operation of the product, read this manual thoroughly. This manual must be strictly retained for future reference to enable re-reading in the event of maintenance, expansion, or transfer of the installation to third parties.

I. INTENDED USE AND APPLICATION OF LIGHTING

- ✓ Specialized product intended for professional applications and installation by personnel with appropriate technical qualifications, knowledge, and skills.
- ✓ The product is used for decorative or general indoor and outdoor lighting, in strict and absolute accordance with the IP protection rating declared for a given model.
- ✓ Selected specialized models (e.g., HCL - Human Centric Lighting systems) are intended for the advanced reproduction of the natural circadian light cycle. Their functioning according to their intended use is possible **exclusively** through integration with a dedicated hardware controller specified on the product label.

II. EXPLANATION OF USED MARKINGS, PARAMETERS AND SYMBOLS

All technical parameters assigned to a given LED strip model are located on the rating label of the unit packaging and the product datasheet. The list below defines the meaning of individual pictograms and markings appearing on them:

- ✓ **VDC (Voltage):** Rated supply voltage. Low-voltage product, powered by direct current voltage (e.g., 12 VDC, 24 VDC, or 48 VDC). Requires the use of a dedicated, regulated power supply unit (PSU).
- ✓ **Watts/m (Max. power):** Power consumption expressed in watts per linear meter of the strip (W/mb).
- ✓ **Watts/m (Max. power / HCL mode):** Power consumption per linear meter. For specialized multi-channel strips HCL, the label specifies the averaged consumption in automatic mode "HCL mode", which serves as the basis for selecting a dedicated power supply unit, as well as the maximum value when all channels are fully driven simultaneously.
- ✓ **Lumens/W:** Luminous efficacy determining energy efficiency - the ratio of emitted luminous flux to consumed electrical power (lm/W).
- ✓ **Luminous flux (lm/m):** Luminous flux emitted per linear meter of the product. For specialized HCL LED strips, the label may indicate a range for the mode with the controller ("HCL mode").
- ✓ **Light color (K):** Color temperature of the light emitted by the LEDs, expressed in Kelvins (K) (e.g., 3000K - warm white) or designation of HCL, CCT, RGB, RGBW, RGB CCT type for multicolor models.

- ✓ **LEDs/m (LED quantity):** Placement density specifying the physical number of LED/COB diodes per linear meter of the strip and the model of LEDs used.
- ✓ **Protection rating (IP):** Degree of protection against ingress of solid objects and water:
 - **IP20:** No protection against water and moisture. Intended exclusively for dry interiors.
 - **IP54 (NANO) / IP65 / IP67:** Increased resistance to moisture and dust, allowing application in bathrooms, kitchens, or outdoors (according to model specifications).
- ✓ **✓ CRI (Ra):** Color rendering index. In advanced wide-spectrum models (e.g., RGBWW, CCT, HCL), this parameter may assume a range of values depending on which color range is currently activated.
- ✓ **Beam angle:** Beam spread angle.
- ✓ **Dimmable:** Product adapted for dimming and brightness adjustment using compatible dimmers operating on Pulse Width Modulation (PWM) technology.
- ✓ **Start time / Warm up time:** Ignition time of the light source to achieve full operating capacity and 95% of luminous flux.
- ✓ **On/Off:** Rated number of switching cycles (on/off) the product can withstand without failure.
- ✓ **Life span:** Rated minimum lifespan (in hours), after which flux degradation does not exceed normative limits.
- ✓ **Working temperature:** Permissible ambient temperature range within which the product can operate safely and reliably.
- ✓ **Cut line:** Graphical indicator on the strip laminate, precisely indicating locations where cutting and shortening the product is permitted (e.g., every 50 mm).
- ✓ **Rmin (Minimum bending radius):** Parameter defining the permissible bending radius of the flexible FPC substrate, the value of which must be read from the unit packaging or product datasheet of the given model. Exceeding this value risks fracturing copper power traces or detaching LEDs.
- ✓ **Indoor use:** Product intended exclusively for indoor mounting and application. Mounting in places directly exposed to weather conditions (precipitation, moisture, direct sunlight) is prohibited.
- ✓ **Outdoor / Indoor use:** Product with high ingress protection, adapted for mounting both indoors and in outdoor spaces directly exposed to moisture and variable weather conditions.
- ✓ **DCM (MacAdam Ellipses) / Perfect White (Duv):** Advanced photometric parameters certifying the strict color consistency of LEDs and perfect matching of the white point, guaranteeing no color distortion.

III. SAFETY AND WARNINGS

- ✓ Before starting any mounting work (cutting, gluing to substrate, removing protective film of 3M double-sided tape), connect the LED strip to the power supply unit (PSU) and verify proper operation in terms of color and brightness uniformity along the entire length.
- ✓ It is strictly prohibited to energize and test the LED strip for longer than 10 seconds while it remains wound on the plastic transport reel. The absence of a heat sink and heat dissipation within a tight roll poses an immediate risk of overheating, permanent phosphor degradation, melting of the reel, and fire!
- ✓ Electrostatic charges accumulated on the human body and clothing account for nearly 33% (1/3) of all damage to LED semiconductor structures. Before touching the product, discharge body static electricity by touching a grounded metal component. Remove the product from ESD packaging immediately prior to mounting, and promptly return any unused sections.
- ✓ Power the LED strip exclusively from a certified switched-mode power supply unit (PSU) with constant output voltage (DC) of SELV class, featuring short-circuit and overload protection, certified according to the EN 61347-2-13 standard. Connecting to AC mains transformers, electronic halogen transformers, unregulated power supply units, or directly to 230V AC mains is strictly prohibited.
- ✓ Protect the product from direct exposure to aggressive UV radiation, prolonged sunlight, acidic chemical vapors, and the immediate proximity of intense heat sources.
- ✓ It is strictly prohibited to connect specialized HCL LED strips directly to a power supply unit bypassing the control, or to an incompatible dimmer. The absence of the dedicated management controller (indicated on the label) triggers full power on all strip channels simultaneously.

IV. INSTALLATION DESIGN AND MECHANICAL PARAMETERS

- ✓ All LED strips (especially those with dense LED configuration, high power rating (W), and sealed IP54/IP67 versions) require installation on a thermally conductive substrate (aluminum LED profile). Omission of a heat sink causes LED overheating, drastic loss of luminous flux, and shortened lifespan, which is not covered by warranty.
- ✓ To ensure correct operation of the installation, uniform brightness along the entire length, and thermal safety of laminate (PCB) traces, observe the following power supply rules:
 - **Standard LED strips:** Connecting standard LED strips in series in sections longer than 5 meters is strictly unacceptable. Due to copper trace resistance, exceeding this length results in a significant voltage drop, non-uniform illumination, and risk of laminate overheating. Sections of 5 meters in length must be powered in parallel (separate power leads to each section) - this applies particularly to high-power LED strips.
 - **LED strips with integrated current regulation (IC series):** These strips feature active regulation circuits that maintain a constant LED current even when voltage drops occur over long runs, enabling single-ended powering of sections up to 20 meters without loss of brightness.
***Note:** Despite maintaining constant brightness, long sections (up to 20m) physically strain the copper traces on the laminate. Therefore, verify the current-carrying capacity of the installation in each case to prevent laminate (PCB) overheating at connection points.*

- ✓ To eliminate design errors, voltage drops, and incorrect power supply unit loading, the installer can use the dedicated technical calculator at

<https://www.eled.pl/Kalkulator-doboru-przekroju-przewodow-i-zasilaczy-do-tasm-LED>

The tool automatically calculates:

- Precise wire cross-section (selects wiring to eliminate energy losses and conductor overheating)
 - Indicates where to physically connect power in long runs to uniformly load the laminate and prevent voltage drops
 - Indicates the minimum power supply unit (PSU) power rating incorporating a safety power margin
- ✓ The strip may only be bent along the permissible axis (in accordance with the specifications of the given product type). The minimum bending radius (R_{min}) is specific to the particular model and must be read from the unit packaging or product datasheet. Bending below the permissible radius, over sharp profile edges (90 degrees), or lateral twisting causes fracturing of copper power traces or detachment of LEDs.
- ✓ Fastening the strip using nails, staples, rivets, or cable ties in direct contact with the laminate is prohibited.
- ✓ Mounting and unrolling of IP67 versions must be performed at an ambient temperature above +10°C.
- ✓ Before commencing mounting, check the intended use pictogram on the packaging label. Mounting strips designated exclusively as Indoor use in outdoor conditions or high-humidity spaces causes permanent degradation of electronics and voiding of warranty.

V. MOUNTING PROCEDURE

1. Design work, selection of appropriate devices and protective gear, and verification of technical calculations must be assigned to a person holding appropriate qualifications, electrical certifications, and technical knowledge.

2. Before proceeding with physical mounting, every installation must be verified for electrical safety and component durability:

- ✓ **Power requirement calculation:** Sum the rated power of all LED strip sections in the planned circuit. For HCL LED strips, the calculation must strictly use the operating value for the mode with the controller (indicated on the label as power consumption in HCL mode). A mandatory 15% power reserve must be added to the calculated value for the power supply unit (PSU).
- ✓ **Wire cross-section selection:** Power wiring cross-section selection must be executed in a manner preventing voltage drops that cause non-uniform strip brightness. Using excessively thin conductors is unacceptable as it leads to fire hazards. Route cabling paths to avoid creating inductive loops.
- ✓ **Protection features verification:** Ensure that the power supply unit (PSU) features protection circuits: short-circuit protection (SCP), overload protection (OPP/OLP), and overvoltage protection (OVP). The installation must be designed so that the power supply unit is located in a space ensuring free air circulation (do not mount in sealed, impermeable cavities without ventilation).

3. The mounting surface (e.g., inside of the aluminum profile) must be clean, smooth, dry, and degreased. Mounting LED strips directly on non-heat-dissipating surfaces (e.g., plastics, wood, furniture boards) and flammable materials is strictly prohibited. To ensure fire safety and nominal LED strip lifespan, mount exclusively inside dedicated aluminum profiles serving as heat sinks and thermal barriers.

4. With power disconnected, shorten the strip using sharp scissors only, according to the following technological division:

- ✓ **STANDARD Series:** Cutting is permitted exclusively on the top layer, on designated transverse fields between circular copper pads.
- ✓ **FREECUT Series:** Cutting allowed at any arbitrarily selected location along the entire length.
- ✓ **SLIM and NEON Series:** Cut lines are printed and visible exclusively on the underside (bottom) of the LED laminate. Before cutting, gently peel back the protective backing of the 3M adhesive tape, locate the dedicated cut mark on the bottom, and cut the laminate at the designated point.

** Note: Cutting at non-designated locations results in permanent damage to LEDs along the entire length of the section, which is not a manufacturing defect but an interruption of the circuit in that section.*

5. If it becomes necessary to join LED strip sections together or solder power leads, observe the following guidelines strictly:

- ✓ Soldering is the most reliable, durable, and recommended electrical connection method, offering the lowest contact resistance. For joining, use only a soldering iron (heating element type) with a tip temperature of approx. 350°C. Tip contact time with the pad must not exceed a few seconds (prolonged heat application causes delamination of copper traces from the PCB substrate).
- ✓ Using soldering guns (transformer soldering irons) is strictly prohibited - their electromagnetic pulses destroy sensitive LED structures.
- ✓ Soldering any components with power connected is prohibited.
- ✓ In simple, non-complex installations, dedicated mechanical solderless connectors for LED strips are permissible, provided they are verified for full compatibility with PCB width, LED strip type, and current load capacity.
- ✓ For LED strips with IP67 protection rating, every connection or cut point must be restored to factory seal integrity. Dedicated end caps and feed connectors must be used for this purpose. Any point of breach in the silicone sheath requires mandatory sealing using specialized, transparent silicone dedicated for LED strips. Failure to seal results in loss of IP rating and warranty.
- ✓ Each soldered connection (IP20 versions) must be protected with heat-shrink tubing of appropriate diameter to protect against short circuits and mechanical damage.

6. Mechanical mounting - the mounting method depends on the selected LED strip type. Observe the following guidelines:

- ✓ **LED strips with 3M self-adhesive layer:** Carefully remove the paper protective backing from the 3M tape and adhere the strip inside the aluminum profile, pressing evenly along its entire length. To achieve optimal adhesion and mounting durability, using a dedicated pressure roller (pressing wheel) for LED strips is recommended. The roller applies uniform pressure across the PCB substrate surface without risk of damaging LEDs.
- ✓ **Neon type LED strips (IP67 series):** Due to their construction, Neon series LED strips do not feature factory 3M adhesive tape. Mounting must be performed using dedicated mounting clips purchased separately (matching the specified model). Fasten or bond clips to the substrate at equal intervals, then snap the Neon LED strip into place.

7. Electrical connection and commissioning. The LED strip wiring method depends directly on its technology. Before switching on power, ensure wires are arranged, correctly connected, and the installation forms no inductive loops.

Depending on the selected LED strip type, adhere to the following guidelines:

- ✓ **Standard LED strips (Mono, CCT, RGB, RGBW, RGB+CCT):** Connect output wires to the power supply unit (PSU) and/or dedicated PWM controller, adhering strictly to polarity matching (+ to +, - to -, or R/G/B/W color channel assignment).
- ✓ **Digital LED strips (addressable / SPI):** In addition to power, these require connection of the data signal line (Data). Digital strips are strictly directional - the signal must run in accordance with direction arrows printed on the laminate. Reversing the direction prevents data transmission and control. The data line (Data) must be connected at a single location only (at the start of the section). Splitting or tapping data lines from multiple points simultaneously is strictly prohibited as it causes wave reflections and transmission interference. If signal distribution across multiple runs is required, use dedicated professional SPI signal splitters and amplifiers exclusively.
- ✓ **HCL LED strips (Human Centric Lighting):** These systems replicate the natural daylight cycle and strictly require the use of a dedicated HCL controller, the model and requirements of which are specified each time on the warning label of the given product. This controller is hardware-calibrated to the strip's characteristics and manages its current load. Connecting the HCL strip to any other controller, a standard PWM dimmer, or directly to the power supply unit bypassing the control is strictly prohibited and results in the destruction of the installation.

After double-checking the electrical connections, polarity, and directionality, switch on the main power supply and conduct a test startup of the system across all operating modes.

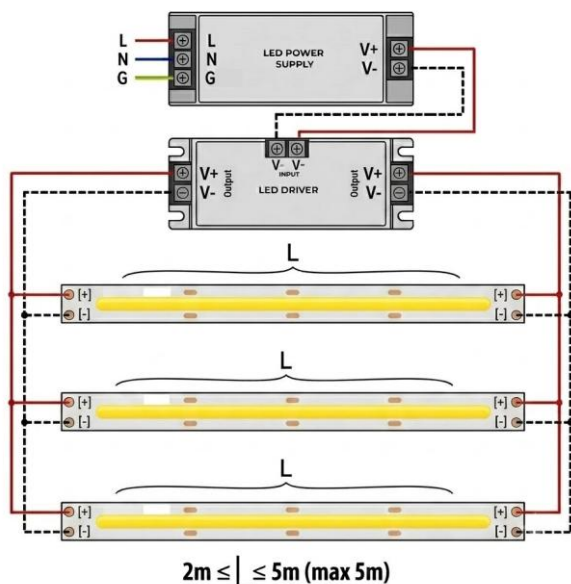
8. General mounting safety rules:

- ✓ Pressing the strip using screwdrivers, knives, wrenches, or other sharp-edged tools is strictly prohibited. Point pressure with a hard object causes crushing of the LED structure or tearing of the laminate, which constitutes mechanical damage not covered by warranty claim.
- ✓ If connection sealing is required during mounting, always use a dedicated sealing compound for LED strips.
- ✓ Store unused LED strips in original packaging (in ESD foil) in dry, ventilated rooms free from chemical fumes, at ambient temperatures between -20°C do +40°C.

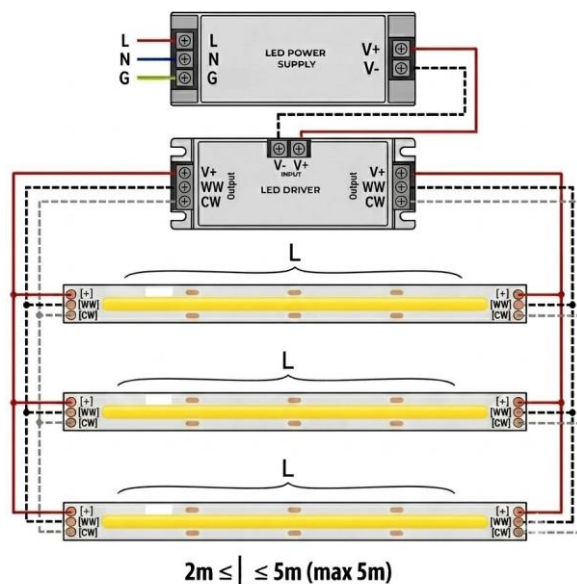
VI. SAMPLE WIRING DIAGRAMS

The diagrams below present sample reference topologies of electrical connections for selected LED strip types. Due to varying mounting conditions, run lengths, and current loads, the final installation design - including wire cross-section selection, placement of power injection points, and voltage drop prevention - must be based on individual technical calculations. Diagrams serve an illustrative purpose and show the parallel power supply rule.

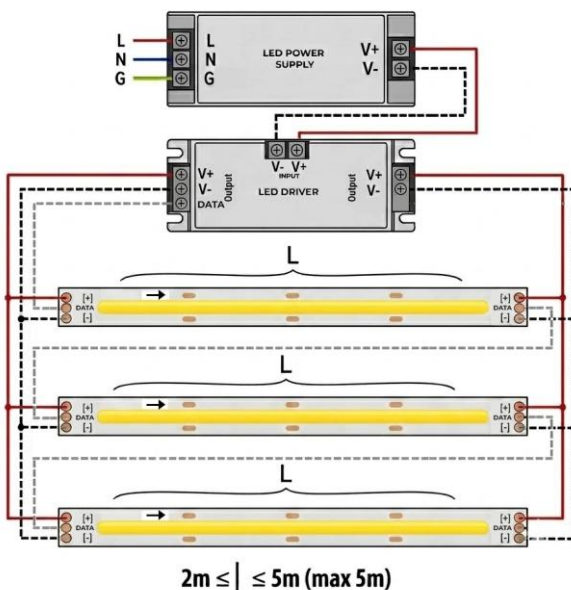
MONO



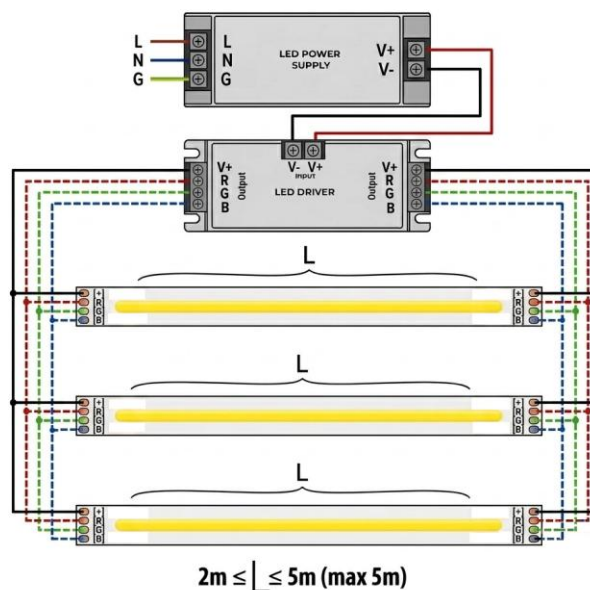
CCT



SPI



RGB



VII. MOST COMMON INSTALLATION ERRORS

Violation of the following guidelines may result in voiding the manufacturer's warranty and permanent product damage due to installer or user fault:

- ✓ **Series connection of sections:** Connecting LED strips in series in runs longer than 5 meters without additional power injection.
Effect: Severe voltage drop, non-uniform brightness (dimming at end of section), current overload of copper FPC traces, and thermal burn-out.
- ✓ **Incorrect wire cross-section selection and cabling topology:** Using undersized power conductors or forming inductive loops.
Effect: Energy losses in conductors, supply voltage drop across the LED strip, and risk of cable insulation overheating, posing a fire hazard..
- ✓ **Application of improper power supply unit:** Connecting low-voltage strips directly to 230V AC mains, toroidal transformers, electronic transformers, or unregulated power supply units.
Effect: Immediate burnout of LED semiconductor structures and regulation circuits.
- ✓ **Lack of adequate heat dissipation:** Mounting LED strips directly on insulating or non-heat-dissipating materials (wood, furniture boards, plastics, plasterboard without an aluminum profile).
Effect: Thermal energy accumulation, LED junction structure overheating, drastic luminous flux drop, phosphor degradation, and fire risk.
- ✓ **Unprofessional and defective soldering:** Using soldering guns (transformer soldering irons), applying excessive temperature, or prolonged tip contact time with the copper pad.
Effect: Damage to LED structures from electromagnetic pulses, delamination and tearing off of copper pads from the PCB substrate.
- ✓ **Incorrect strip cutting:** Cutting strips at non-permitted locations without checking cut marks.
Effect: Electrical circuit interruption and permanent damage (disabling) of the entire cut section.
- ✓ **Disregarding electrostatic discharge (ESD) protection rules:** Unpacking and mounting strips without prior static body discharge.
Effect: Latent damage to semiconductor structures invisible to the naked eye (ESD discharge accounts for approx. 1/3 of hidden electronic failures).

Mechanical, chemical, and structural damage:

- ✓ **Bending and exceeding bend radius:** Bending the strip at sharp angles (90°) or lateral twisting causing copper trace cracking.
- ✓ **Mechanical tension:** Excessive strip tensioning during adhesion.
- ✓ **Painting or varnishing:** Coating LED strips with paint, construction varnishes, or primers, blocking heat dissipation, causing color temperature shifts, and chemical degradation of silicone encapsulation.
- ✓ **Failure to seal IP67:** Omission of dedicated end caps and specialized sealant at cut/connection locations of sealed strips.

VIII. MAINTENANCE, CLEANING AND CARE

To ensure trouble-free operation and maintain nominal optical and aesthetic parameters throughout the product service life, adhere to the following maintenance rules::

- ✓ Any cleaning or maintenance work on the lighting fixture may only be performed after completely disconnecting the power supply.
- ✓ Clean lighting components (profiles, diffusers, and strip surfaces) using exclusively a dry, soft microfiber cloth. The use of liquids, wet, or damp cloths is strictly prohibited to entirely eliminate moisture penetration risk into electronic circuitry, LED damage, or compromise of silicone structure.
- ✓ During all maintenance, servicing, or direct touching of exposed LED strip sections, strictly adhere to electrostatic discharge (ESD) protection protocols. Before contacting the product, discharge body static electricity (e.g., by touching a grounded metal component) to prevent latent damage to semiconductor junctions.
- ✓ The use of harsh detergents, solvents (e.g., acetone, extraction petroleum), acids, abrasive agents, etc., is strictly prohibited. Aggressive chemicals cause permanent clouding of diffusers, breach of protective coatings, or chemical degradation of LEDs.

IX. WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

In accordance with the crossed-out wheeled bin symbol, waste electronic equipment must not be disposed of with household waste. Waste equipment must be delivered to a local e-waste collection point or returned to: ELED, ul. Rabsztyńska 16, 32-310 Klucze, Poland with the note "Waste equipment return".



TECH-SYSTEM Piotr Barczyk is registered in the national BDO register under number: 000200287. Recycling and reporting services for equipment and packaging recovery are certified and performed by TOM Organizacja Odzysku Sprzętu Elektrycznego i Elektronicznego S.A. and TOM-DOLEKO-EKOLA Organizacja Odzysku Opakowań S.A. in Szczecin.

X. RESPONSIBLE ENTITY

TECH-SYSTEM Piotr Barczyk

Cieślin, ul. Jurańska 37, 32-310 Klucze, Poland

VAT ID: PL 6372071933 | BDO: 000200287

Sales Office and Main Warehouse: ELED ul. Rabsztyńska 16, 32-310 Klucze, Poland

sklep@eled.pl | www.eled.pl | tel. (+48) 32 445 09 84

XI. AVAILABILITY OF FULL EU DECLARATION OF CONFORMITY

TECH-SYSTEM Piotr Barczyk (owner of the ELED brand) declares that this product complies with essential requirements and other relevant provisions of EU directives and regulations. The full text of the Declaration of Conformity for a specific product model is made available digitally.



WARRANTY TERMS AND CONDITIONS

1. General Provisions

- The Guarantor is TECH-SYSTEM Piotr Barczyk based in Cieślin, 32-310, Poland, owner of the ELED brand (service and office address: ELED ul. Rabsztyńska 16, 32-310 Klucze, Poland).
- The warranty for ELED brand LED strips is granted for a period of 36 or 60 months (in strict accordance with the precise indication on the unit packaging and in the product datasheet on www.eled.pl), counting from the delivery/purchase date confirmed by a VAT invoice.
- The territorial scope of warranty coverage encompasses the territory of the Republic of Poland.

2. Conditions for Proper Operation and Operating Environment

- The warranty applies exclusively provided that transportation, storage, mounting, and usage of LED strips are carried out strictly according to the manufacturer's recommendations and user manual.
- Unless otherwise specified in the product datasheet, LED strips are intended for operation under standard environmental conditions indicated on the product packaging or product datasheet.
- The total continuous operation time of the LED strip must not exceed 12 hours per day.
- LED strips must be mounted exclusively in dedicated aluminum profiles serving as heat sinks and effective heat dissipation components.
- Operation under non-standard conditions requires prior agreement in writing under pain of nullity with the Guarantor's Technical Department.

3. Warranty Exclusions

The warranty does not cover defects, damage, and malfunctions resulting from external causes or execution errors, specifically:

- Natural operational wear and tear of strip components, loss of luminous flux within normative technical tolerances (up to 10% tolerance for flux, power, and color), and natural module color shift over time.
- Mechanical, thermal, chemical, or surface damage (scratches, cracks, dents) caused by fault of the Buyer, installer, or third parties.
- Use of soldering guns (transformer soldering irons) for mounting or soldering, whose electromagnetic pulses destroy semiconductor structures, or errors in the soldering process.
- Powering the product from improper sources, including toroidal transformers, electronic transformers, linear power supply units, unregulated power supply units, or directly from 230V AC mains.
- Failure to ensure proper heat dissipation, including mounting LED strips directly on insulating materials (wood, furniture boards, plastics, plasterboard, etc.) without an aluminum profile.
- Performing cuts on the LED strip at non-permitted locations (outside designated markings).

- Disregarding electrostatic discharge (ESD) protection rules, exceeding permissible bending radius, sharp bending (90°) and lateral twisting.
- Painting, varnishing, or coating LED strips with construction primers and chemicals.
- Consequences of defective electrical installation, power grid surges, or improper selection of wire cross-sections and power supply units.

4. Warranty Claim Procedure

- The basis for claim processing is a valid proof of purchase (VAT invoice) and a claim submitted in writing via the dedicated complaint form on the website: www.eled.pl/reklamacje_i_gwarancje
- The claimed product must be delivered to the Guarantor's service center (ELED, ul. Rabsztyńska 16, 32-310 Klucze, Poland) at the claimant's expense, in original packaging or packaging protecting against damage in transit.
- The Guarantor undertakes to evaluate the claim and fulfill warranty obligations within 14 working days from the date of delivery of goods to the service center.
- In the event that a claim is deemed groundless (where the Guarantor's liability is excluded or no defect exists), all service, testing, and logistical costs shall be borne by the Buyer.
- Upon request of the Guarantor's service center, the Buyer shall provide all technical and operational documentation related to the application or operation of the product.

5. Method of Rights Execution and Limitation of Liability

- Upon claim approval, the Guarantor shall perform a free-of-charge repair of the defective product or - if repair is impossible or economically unjustified - replace it with a defect-free product (identical or equivalent in terms of parameters).
- The Guarantor is under no obligation to provide a temporary replacement unit for the duration of the service procedure.
- The Guarantor shall not be liable for consequential or indirect damages, lost profits, or additional costs associated with the disassembly and reassembly of defective goods at the site.
- Any disputes arising from this warranty between commercial entities shall be resolved by the court of general jurisdiction having jurisdiction over the Guarantor's registered seat.