

Installation Guide

Surexi™ LED Series

Professional-Grade Horticulture LEDs

Illumitex has created a patented, breakthrough class of LEDs that is light years ahead of existing products. The **Surexi™ Horticulture LED** package design eliminates the need for secondary optics to control the beam angle while delivering maximum PPF to the targeted plants. All Surexi™ Horticulture LEDs are designed to work as self-sufficient light sources, addressing various photosynthetic and photomorphogenic aspects of plant growth. They may also be used to supplement daylight and other light sources. The arrays can be modified to deliver custom spectra to meet your application requirements. The patented package design substantially reduces the total volume of the light engine, thereby allowing luminaire and lamp engineers to create breakthrough lighting solutions with unrivaled optical performance. The **Surexi™ Horticulture LED** series also delivers breakthrough uniformity ratios within the specified beam angle, and produces the sharpest cut-offs available. By incorporating **Illumitex's** proprietary Digital Distribution™ beam control technology, **Surexi™ Horticulture LEDs** put more light on the targeted plants than any other LED package. **Surexi™ Horticulture LEDs** are also available with on-board IDC connectors, which eliminate the need for soldering connection wires. The optional IDC connector is a fast, plug-and-play solution for installing LEDs in horticulture applications.



PRECISION LIGHT. INFINITE POSSIBILITIES.

HANDLING

ESD considerations: The Surexi™ products are provided with ESD protection diodes (some models are inherently ESD safe). Best practice suggests that ESD grounding procedures be followed during all handling, mounting and connection of these devices.

Mechanical considerations: The Surexi™ products are mechanically robust packages but care must be taken to prevent damage to the optical surfaces (top of package). The package should be handled by the outer housing surface (white) or by the edges of the circuit board. The electrical contacts should be kept free of contaminants that may interfere with proper soldering of the joints. Use isopropyl alcohol to clean the units if needed.

MOUNTING

The package is designed to be secured to the heat sink by means of two screws (M2 or #2). The screw centers are offset and spaced on 10 mm lateral centers and 21 mm longitudinal centers. Use screws having a head diameter not greater than 4.0 mm.

Recommended fastener torque value is .23 – .34 Nm (2-3 in-lbs). It is the customer's responsibility to establish specific screw torque requirements for each application.

The Surexi™ product creates a square beam pattern. When using multiple packages, ensure that the beams are rotationally aligned.

The package must also make good thermal contact to a suitable heatsink as described in the thermal section below.

ELECTRICAL CONNECTION

The two pads of the package are the electrical connection points. The cathode (negative connection) pad is marked with a minus (-) sign; the anode (positive connection) is marked with a plus (+) sign.

There are two connection options for the Surexi Product: IDC connectors, or solder pads.

For the IDC connectors use 24 gauge stranded wire with insulation diameter between 1 and 1.5mm (.040-.060 inches). The cathode and anode connections are each provided with one IDC connector. The IDC connector will only accept a single wire. This connection method works very well for packages that are connected in series (daisy chained). For parallel connected packages, the parallel connections must be made in a cable harness, at the driver output, or at another location.

When installing the wire into the IDC slots the wire must be fully seated in both connector slots. A thin blade tool (.3 mm, .012") may be used to seat the wire.

An insulating cap is available to cover the connector once the connections are made.

Solder pad connection is made using a soldering iron or hot-bar tool. The units should NOT be soldered using a reflow oven. Soldering operations should be performed with the unit mounted on a thermally insulating material (wood or polymer) before they are mounted to the heatsink. Lead free solder should be used for RoHS compliance. Connection

wires should be pre-tinned and heat should be applied to the wire as it is placed on the pad with additional solder added as needed. The soldering iron should be kept in contact with the pad just long enough to flow the solder. Excessive dwell time may result in damage to the part.

The wire end should not protrude past the edge of the pad in the direction of the mounting screw. If flux is used, the joints should be cleaned with isopropyl alcohol to remove any residue after soldering.

Use a wire gauge sufficient to carry the maximum drive current, but do not substantially oversize the wire as this may overstress the connection.

Figure 1 shows a typical electrical diagram for the package. The Surexi package contains four sets connected in parallel, of four LEDs connected in series. The Zener protection diode pair is also connected in parallel.

FIG. 1 - SUREXI™

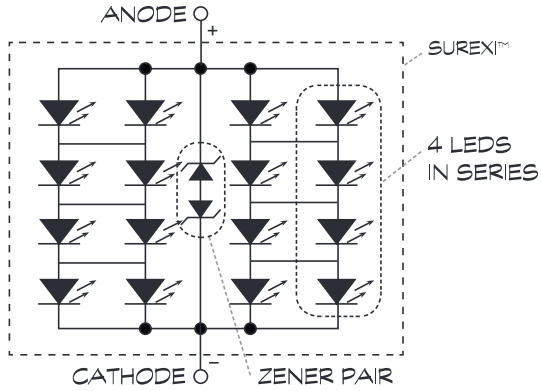
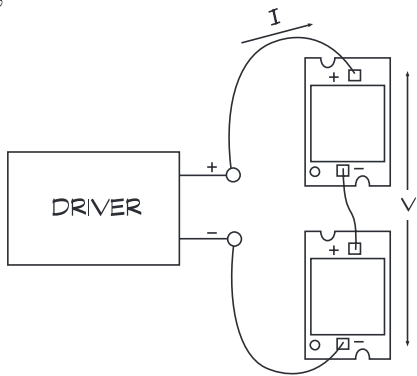


Figure 2 shows a typical series connected pair of Surexi™ units.

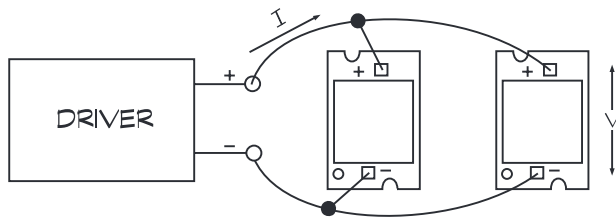
FIG. 2 - SERIES



I = Drive current for single Surexi™
 $V_{TOTAL} = n \times \text{Max voltage for single Surexi™}$
 where n = number of modules

Figure 3 shows a typical parallel connected pair of Surexi™ units.

FIG. 3 - PARALLEL



$$I = n \times \text{drive current for single Surexi}^{\text{TM}}$$
$$V = \text{Max voltage for single Surexi}^{\text{TM}}$$

where n = number of modules

For LED applications, the driver must be a constant current type. With this type of driver, the current to the LED is fixed at the set value (set value may be adjustable) and the voltage changes as needed to provide the set current value to the LED. The driver must supply a high enough voltage for the max rated voltage of each device. Typical drivers show a maximum output voltage rating (the voltage will automatically adjust up to the appropriate value).

Figures 2 & 3 show driver requirements for two Surexi F1 units. In the Series example, a 500 mA drive current is required at a max voltage of at least 22 volts. In the parallel arrangement, a 1000 mA drive is required at a max voltage of at least 11 volts. For other combinations of series and parallel connections, and other drive currents, the correct requirements must be calculated.

When connecting units in series, all units will be driven at the same current. The lowest rated current of any unit in the series string is the maximum allowable current.

When connecting units in parallel, all units must have the same forward voltage and allowable maximum drive current capability. Failure to follow this guidance may result in failure of the units.

The metal base of the package is electrically isolated from the LED circuit and may be grounded to the fixture if desired.

THERMAL CONNECTION

The metal base of the package must make good thermal contact with the heatsink or other thermal mass. The contact area of the base provides good heat spreading and heat transfer to the heat sink. A thermally conductive pad is recommended for use between the unit and the heatsink. Securing the unit with the two mounting screws will provide adequate clamp pressure to ensure good heat transfer through the pad.

Thermal grease is not recommended as it may migrate over time and significantly reduce thermal performance.

SPECIFICATIONS

Surexi™ Drive Conditions

Surexi™ Type	Part Number	IDC connector	Max Required Voltage (VDC)	Nominal Current (mA)	Maximum Continuous Current (mA)
F1 Spectrum	AD446S-500F1	No	11.0	500	600
	AD446S-503F1	Yes	11.0	500	600
F3 Spectrum	AD446S-500F3	No	11.0	500	600
	AD446S-503F3	Yes	11.0	500	600
F6 Spectrum	AD446S-500F6	No	12.0	500	600
	AD446S-503F6	Yes	12.0	500	600
F7 Spectrum	AD446S-500F7	No	13.0	500	600
	AD446S-503F7	Yes	13.0	500	600

REFERENCE

Thermal Mounting Materials

Bergquist Company, www.bergquistcompany.com

Electrically Isolating Materials - 1500ST, A1500, 1100ST, 900S

Electrically Conductive Materials - Q pad 3

Dow Corning, www.dowcorning.com

SE4486

CV Thermally Conductive Adhesive

IDC connector tools

AVX Corporation (www.avx.com)

Metal, high volume tool - 06-9176-7021-01-000

Polymer, low volume tool - 06-9176-7022-01-000

Handle for either tool - 06-7000-7730-01-000

Connector cap - 60-9176-001-415-000 (black),

60-9176-001-415-100 (white)



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