

Outdoor LED Lighting

TE Connectivity (TE)

EVERY CONNECTION COUNTS



\$2.1B

COMMUNICATIONS

Appliances, Data
& Devices

\$3.8B

INDUSTRIAL

Industrial, Aerospace,
Defense & Marine,
Medical, Energy



\$9.0B

TRANSPORTATION

Automotive, Industrial &
Commercial Transportation,
Sensors, Application Tooling

**CONNECT
LIKE THE WORLD
DEPENDS ON IT.
BECAUSE IT DOES.**

247B

PRODUCTS MANUFACTURED ANNUALLY



WITH GREAT POWER COMES GREAT SUSTAINABILITY



**GREENHOUSE
GAS INTENSITY**
FY20 VS FY10



**ENERGY
USE INTENSITY**
FY20 VS FY10



WATER USAGE
FY20 VS FY10



\$5.6M

GLOBAL
CHARITABLE
GIVING FY20

650K+

PEOPLE IMPACTED
IN NEXT-GENERATION
TECHNOLOGY
EDUCATION FY20

\$2.1B

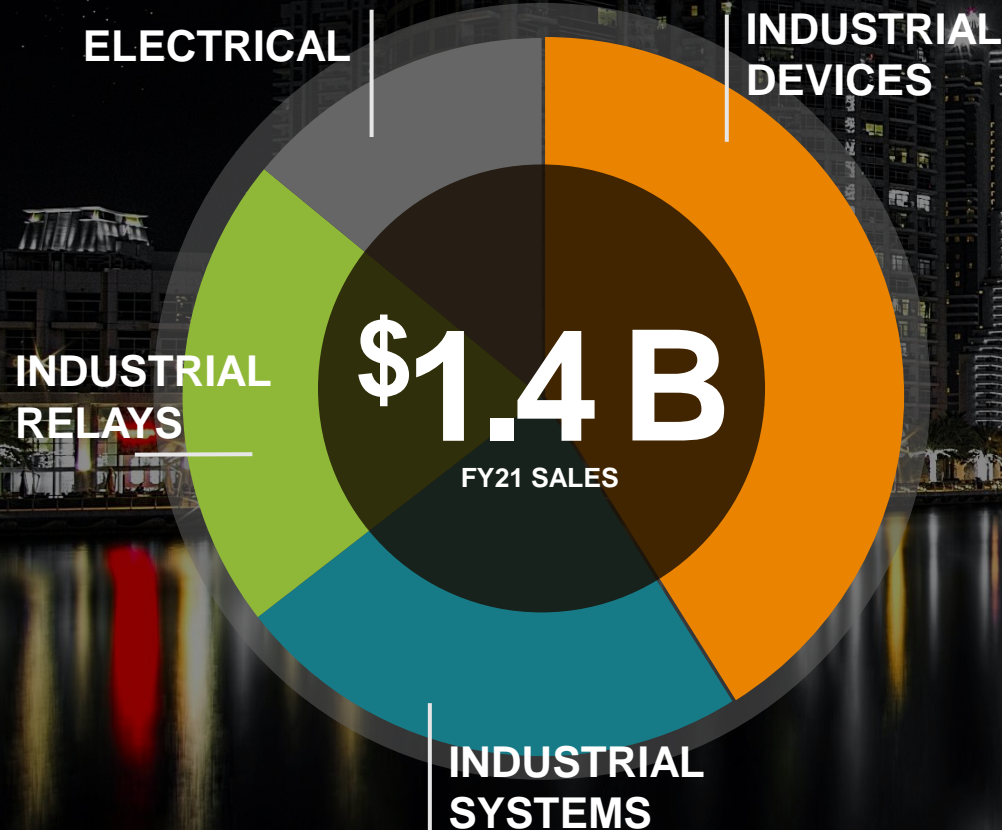
LOCAL ECONOMIC
IMPACT FROM
SUPPLY CHAIN FY20

INVESTOR'S BUSINESS DAILY
**2021 BEST
ESG
COMPANIES**
ENVIRONMENTAL, SOCIAL & GOVERNANCE

Member of
**Dow Jones
Sustainability Indices**
Powered by the S&P Global CSA

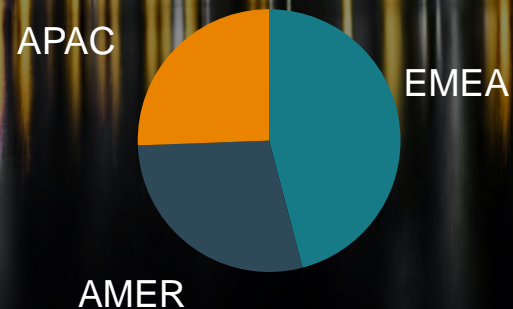
Sustainability Yearbook
Member 2021
S&P Global

TE INDUSTRIAL



IN A
12B
GLOBAL MARKET

SERVING OVER
100,000
CUSTOMERS



TE Industrial is committed to:

- Providing deep application, industry, and integration expertise
- Working with you to drive an extraordinary customer experience
- Offering a broad portfolio and presence across the globe
- Digitally enabled engineering solutions

TE Industrial Employees: ~6,700

GLOBAL APPLICATION FOCUS



Driven by co-creation | Creating something brilliant with you.

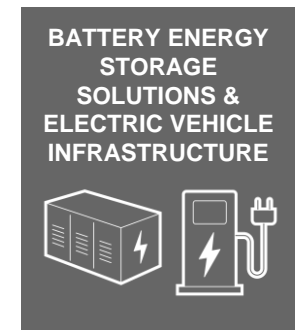
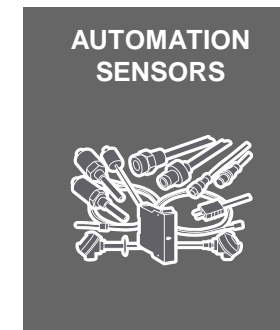
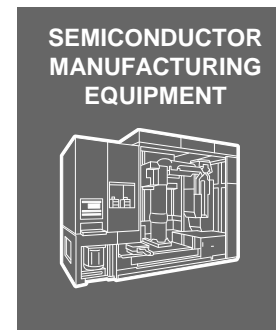
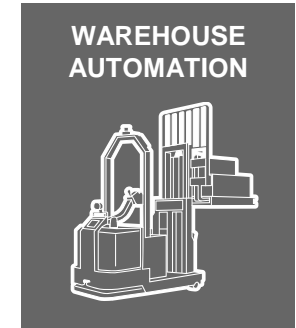
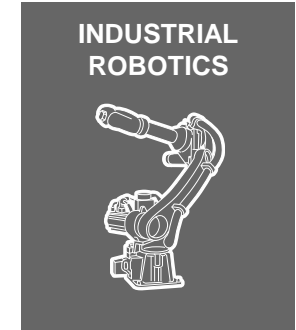
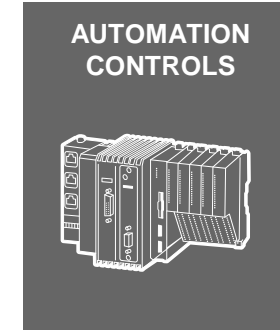
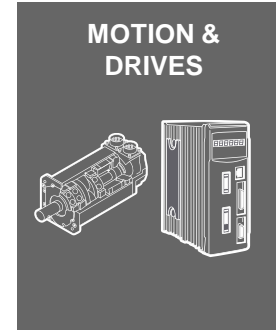
- Trained, skilled engineers that understand your needs
- Passionate and highly engaged team
- Expert consultancy

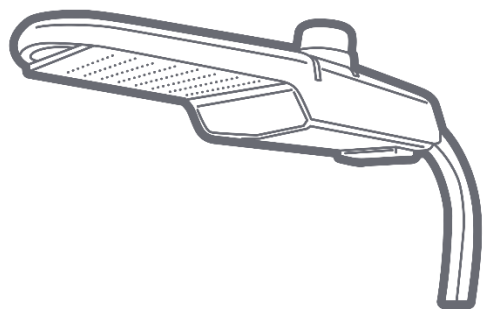
Customer support | Extraordinary customer experience.

- We listen and act (customer pulse, net promoter score)
- Driving operational excellence through the TE Operating Advantage (TEOA) program
- Strong, global footprint serving customers anywhere in the world

Helping you grow | Connecting around the world.

- Global company serving you locally
- Testing capabilities
- Digital advantage: TE.com





OUTDOOR LED LIGHTING

An Overview



INDUSTRY DRIVERS

Increasing demand for LED lighting driven by:

- Global demand for energy-efficient lighting systems
- Modernization and development of smart cities infrastructure, leading to smart controls in lighting systems based on the Internet of Things (IoT)
- Reduced prices and maintenance for LED luminaries

TE supports with:

- Extensive portfolio of connectors, sensors, labels, and filters that allow LED fixtures to survive in harsh outdoor environments
- Single source partner for a multitude of LED lighting products to get your product to market faster
- Easy-to-install and maintain solutions
- Dependable support from a team of engineers who can assist with technical problems or design issues



Market Trends

- Sustainability
- Digitalization
- Standardization

TE's Role



Provide solutions to help you reduce energy consumption, CO2 emissions and contribute to a circular economy.



Be your preferred supplier in connectivity and sensors that leverage smart transportation, safety and social equality in smart cities.



Drive standardization and interoperability in the market to help create cost effective prices and simpler maintenance for LED luminaries.

Products & Solutions

ALR Photocells



Motion Sensors



Lighting Connectors



Lighting Base & Covers



Wire-to-Board & Board-to-Board Connectors



Terminals & Splices



Cable Assemblies



Board Connectors



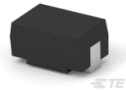
ENTRELEC Terminal Blocks



Identification & Labeling



Passives



Switches



Filters



Antennas



Relays



Fusebox

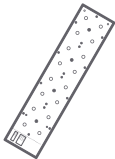


Subsystems

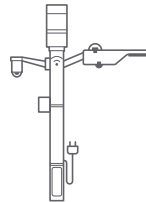
LED Driver



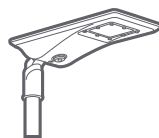
LED Module



Smart Poles

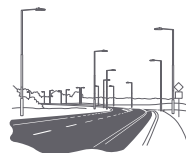


Connected Luminaire

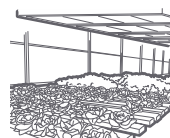


Sub-Applications

Street & Urban



Horticulture



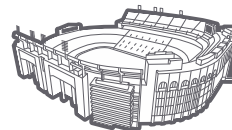
Tunnels



Bridges



Sports



Buildings & Facades



CUSTOMER SUCCESS STORY

McWong International, a leading lighting and controls solutions provider, and TE successfully teamed up to standardize the electrical and mechanical interface for the dominant 0-10V market (the most popular in the U.S).

McWong wanted to provide OEMs and installers the means to easily incorporate sensors and intelligent devices into their lighting projects, allowing both manufacturers and end-customers the ability to achieve greater energy savings through lighting controls.

Doing so helps meet the demands of smart cities applications by providing a method to reduce energy usage and demand and paves the way for more responsible resource management.





Street & Urban Lighting

An Overview

EVERY CONNECTION COUNTS





INDUSTRY DRIVERS

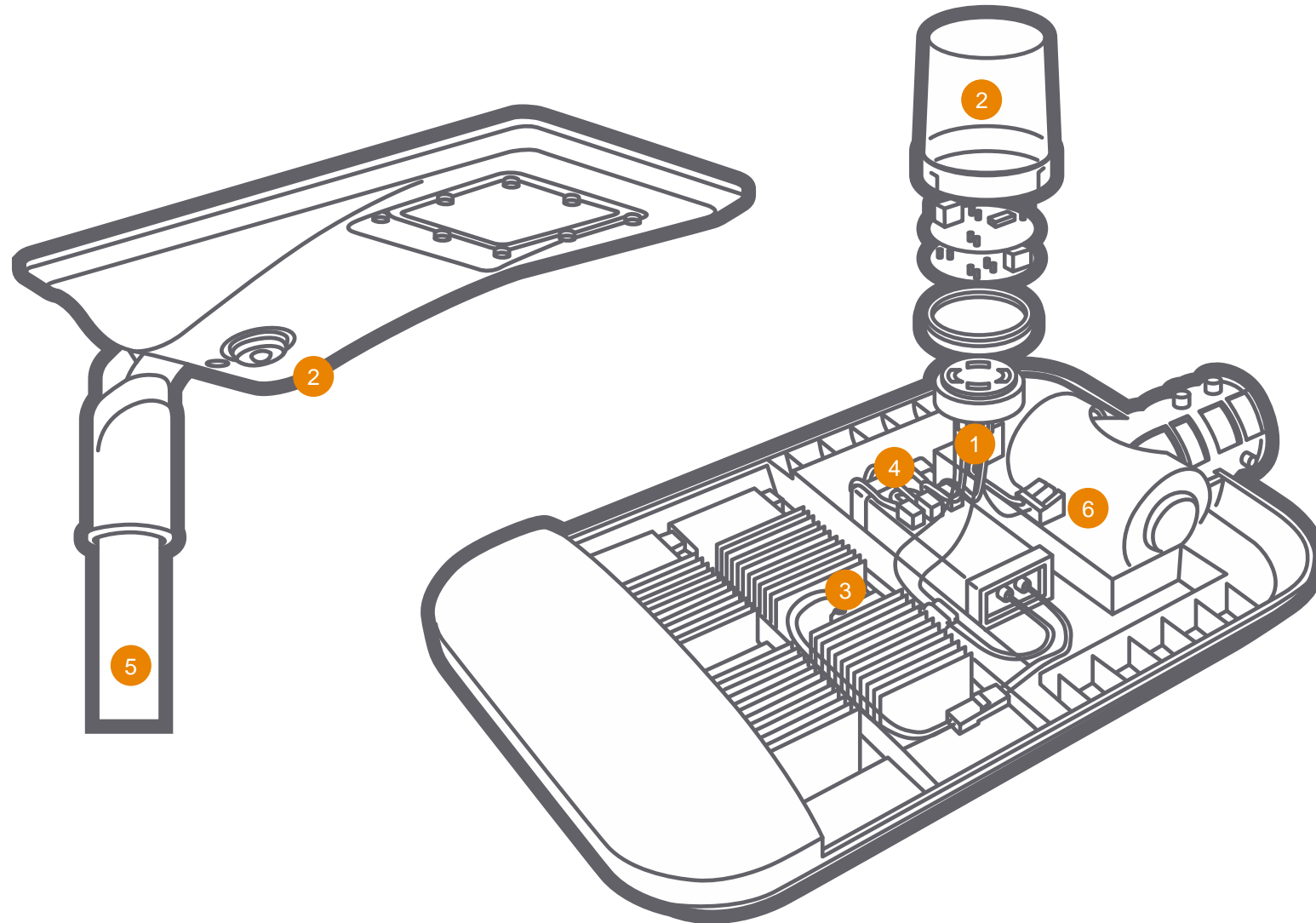
The street lighting market is driven by:

- The shift to smarter LED lighting in order to lower maintenance costs and cut energy usage
- Connected LED luminaires that improve safety and security for local communities
- The introduction of smart applications and data analysis capabilities

TE supports with:

- Streetlight control interfaces, sensors, power and data connectors, relays, powerline filters, and labels
- Customized interconnect solutions to help you create a sustainable, productive, and connected future
- A one-stop-shop for thousands of part numbers and an extensive portfolio of products designed for LED street lighting applications
- Global support network of engineers to offer service before and after the sale

Streetlight Inside Look



- [1 Fixture Connect Solutions](#)
- [2 Controls](#)
- [3 Light Engine Interconnects](#)
- [4 Driver Interconnects](#)
- [5 Pole-Mount Fuse Boxes](#)
- [6 Wire Management](#)

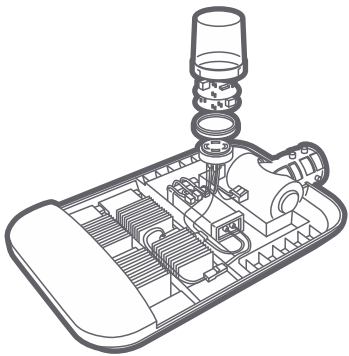
1 **FIXTURE CONNECT SOLUTIONS**

Engineered for improved manufacturability and faster time to market

Challenges

- Low-profile, easy-install receptacles, terminations, and power line filters to save time
- Ability to integrate into new or existing LED fixtures

Subsystem



Products



ANSI C136.41 Receptacles
[Street Lighting Receptacle with NEMA Socket](#)



Zhaga Book 18 Receptacles
[Zhaga Connectors](#)



Shorting Caps
[LUMAWISE, ALR and Endurance N Series Shorting and Open Caps](#)



TE Advantage

- Robust contacts twist lock for a reliable interconnect
- Available with two or four dimming contacts to support one or two channel dimming protocols
- Accepts ANSI standard shorting caps, photocells and other controls to provide a C136 compliant connection
- Compact size allows greater design flexibility
- Poke-in wire insertion provides easy termination
- S2 receptacle offers two wires per contact enabling daisy chain wiring
- Flexible mounting position: upward, downward, or sideways facing
- Current: 15A max
- Voltage: 0 – 480 VAC
- Operating temperature: -40°C to 120°C
- Optional surge protection from transient line voltages
- Distinct cap shape improves visual distinction between photo controls and shorting caps
- IP66 ingress protection reduces outdoor light fixture maintenance and extends operating life



BASE WITH VENT

Customer-Added Value



PROBLEM

Electronics on top of light poles are subject to large temperature swings; the resulting condensation reduces electronics' life.



SOLUTION

Vented base on the LUMAWISE Endurance N+ Gen 2 Connector System



RESULT

The vent allows condensation to escape, lengthening the life of the electronics, and resulting in 20% fewer failures.

For 100,000 light poles, the normal failure rate is 1,000 per year. With this solution, the failure rate would decrease by 200 per year.



VALUE

200 fewer failures
x \$1,000 per repair

SAVINGS: \$200,000 or \$2/pole/year

2

CONTROLS

Comprehensive line of products to meet a broad range of requirements

Challenges

- Meet a broad range of requirements for a variety of street and area lighting applications
- Economical and reliable way to control lighting systems from dusk to dawn
- Durable housing and weatherproof protection

Subsystem





TE Advantage



LUMAWISE Motion Sensor
In Development



ANSI Street Lighting Photocells
LUMAWISE, ALR Series Photocells



Shorting Caps
LUMAWISE, ALR and Endurance N Series Shorting and Open Caps

- Energy savings up to 80%
- Suitable for lighting schemes with low traffic
- Market leading detection zone +/- 15m
- Mask to adapt the detection zone to the application
- Simple plug and play installation
- Zhaga-D4i, Zhaga Book 18, Ed 1,2, 3, ANSI: C136.58 and C136.54 compliant
- Ready for harsh environments with IP68 and IK08

- Supports multiple input voltages
- ANSI C136.10 compliant
- Up to 20 years rated life
- MOV surge protection
- UL | CSA Listed

- Current: 15A max
- Voltage: 0 – 480 VAC
- Operating temperature: -40°C to 120°C
- Optional surge protection from transient line voltages
- Distinct cap shape improves visual distinction between photo controls and shorting caps
- IP66 ingress protection reduces outdoor light fixture maintenance and extends operating life

[> Overview of Equipment & Applications for TE Components](#)

16

© 2022 TE Connectivity. Confidential & Proprietary. Do not reproduce or distribute externally including non-authorized representatives and distributors. Create a sustainable future by limiting print copies, and recycling paper.

2

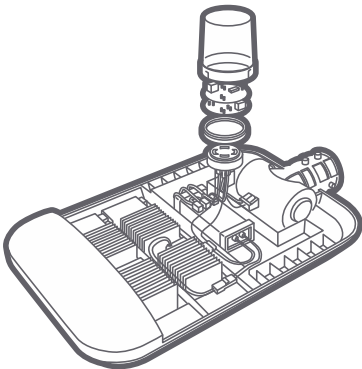
INSIDE CONTROLS

Leveraging cross-industry experience to enable rapid adoption of connected controls

Challenges

- Reduce time to market
- Reduce complexity
- Lower costs
- Compact designs
- Manufacturable
- Field-upgradeable solutions

Subsystem



Products



ANSI Street Lighting Accessories
[Covers for Street Lighting Photo Controls](#)



ANSI Street Lighting Base Assemblies
[NEMA/ANSI Street Lighting Base Assemblies](#)



Zhaga Book 18 Compliant Bases and Covers
[Zhaga Connectors](#)



Power PCB Relays
[SCHRACK Power PCB Relay](#)

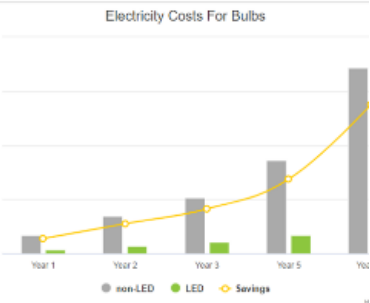


TE Advantage

- | | | | |
|---|---|---|--|
| <ul style="list-style-type: none">• Translucent covers allow transmission of daylight to a light sensing device• IP66 rated solution that helps protect against dust and heavy water jet spray• Meets the flammability rating with a UL 94 5-VA rated cover | <ul style="list-style-type: none">• ANSI C136 compliant• Available in 3, 5, and 7 positions• Power contact voltage: 600 volts AC/DC• Power contact current: 15A maximum per circuit at 25°C operating temp• Signal dimming contact voltage: 30 volts DC | <ul style="list-style-type: none">• Compact size allows greater design flexibility in luminaire• Poke-in wire insertion makes termination easy• S2 receptacle offers two wires per contact enabling daisy chain wiring for ZD4i applications• Flexible mounting position: upward, downward, sideways | <ul style="list-style-type: none">• RT series with global footprint lets you upgrade the application performance without changing the layout• Mono and bistable coil systems available to support low power consumption• Inrush current up to 800A for 200µs• Meets IEC standards |
|---|---|---|--|

MOTION SENSOR

Customer-Added
Value



PROBLEM

Outdoor luminaires are switched “on” all the time, even during dark hours when there is no traffic. This results in high levels of wasted power consumption.

SOLUTION

LUMAWISE Motion Sensor

RESULT

Outdoor luminaires can be dimmed to 20% brightness when no motion is detected in the area.

VALUE

Reduced outdoor lighting electricity billing up to 70%.

Reduced CO2 emissions — up to 7 tons per pole depending on the type of luminaire used.

IP66 ALR PHOTOCELL

Customer-Added
Value



PROBLEM

Photocells on outdoor luminaires are exposed to harsh environmental conditions that allows moisture or water ingress to damage PCBs.

SOLUTION

ALR Photocells with IP66 rated protection

RESULT

Fewer damaged photocells decreases the number of outdoor luminaires needing replacements.

VALUE

Reduced maintenance needs on installed luminaires — up to \$250 per control replacement (service truck and crew).

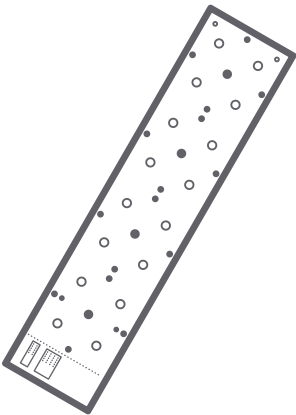
3 LIGHT ENGINE INTERCONNECTS

Flexible solutions that reliably transmit power for interconnect applications

Challenges

- Reliably transmit power
- Integrating components into modern LED streetlights
- Low-profile interconnects
- Faster and more efficient connections

Subsystem



Products



SMT Poke-In Connectors
[BUCHANAN WireMate Poke-In Connector](#)



Separable Wire-to-Board Connector
[3mm Low Profile Micro MATE-N-LOK Connectors](#)



Board-to-Board Connectors
[Hermaphroditic Blade and Receptacle Connectors](#)



Wire-to-Board Connector
[SlimSeal Connectors](#)



Soft Shell Connectors
[Soft Shell Connectors](#)



TE Advantage

- | | | | | |
|---|---|--|--|--|
| <ul style="list-style-type: none">• Modular technology enables flexibility in design• Easy and fast installation with poke-in contact feature• Color configurations enable easy identification• Compact size saves space | <ul style="list-style-type: none">• 2, 3, and 4 positions available• Black and neutral colors available• Less than 4.7mm in vertical height required• Polarized housings help prevent connector mis-mating• Positive latching helps prevent un-mating | <ul style="list-style-type: none">• Reduce design time using the same connector for power, data, or signal connections with 2, 4, or 6 positions• Reduce inventory requirements with a single connector that mates to itself• Simplify assembly and service with either vertical or horizontal connections | <ul style="list-style-type: none">• IP67 seal rating for outdoor applications• Save space with a compact design• Polarized connections reduce the possibility of mis-mating• Positive integral latching helps prevent inadvertent un-mating | <ul style="list-style-type: none">• Improved density, keying, and current carrying capacity• Power and signal connections can be made within the same housing• Secondary locking (on some product families) helps to ensure connections stay connected |
|---|---|--|--|--|

4 DRIVER INTERCONNECTS

User-friendly interconnects designed to reliably connect to a driver

Challenges

- Both board-to-board and wire-to-board options
- Deliver design flexibility
- Deliver ease of use
- Provide reliable connections

Subsystem



Products



Modular Terminal Blocks
[Modular Screwless Series](#)



Separable Board-to-Board Terminal Blocks
[Eurostyle Terminal Blocks](#)



Poke in Contacts
[Poke In Contacts](#)



TE Advantage

- | | | |
|--|---|---|
| <ul style="list-style-type: none">• Assembles quickly with essentially no need for special tooling• High density compact design saves space• Multiple pitch options provide design flexibility• Variety of color configurations makes identification easy | <ul style="list-style-type: none">• High temp and IR reflow compatible versions available• All blocks supplied with open screws to shorten the time for connection• Double captive screw system guards against lost screws• Halogen-free polyamide 6.6 per UL 94V-0 housing material | <ul style="list-style-type: none">• High temp and IR reflow compatible versions available• All blocks supplied with open screws to shorten connection time• Double captive screw system guards against lost screws• Halogen-free polyamide 6.6 per UL 94V-0 housing material |
|--|---|---|

4 DRIVER INTERCONNECTS, continued

User-friendly interconnects designed to reliably connect to a driver

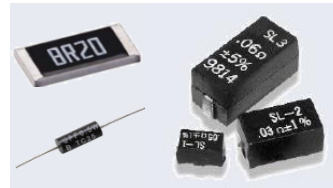
Challenges

- Both board-to-board and wire-to-board options
- Deliver design flexibility
- Deliver ease of use
- Provide reliable connections

Subsystem



Products



**Precision / Power /
Commodity Resistors**
[Resistors](#)



**Inverted Thru Board
ITB Interconnects**



TE Advantage

- Large product range offering on-board and off-board resistors
 - Precision resistors with tight tolerance down to +/- 0.01%
 - Power resistors for 1W to 2500W
 - Commodity resistors with package size down to R0005
 - Qualified AEC-Q200, surge with standing, pulse with standing, flame proof, and anti sulfur
- The inverted thru board (ITB) design approach reduces profile on the LED light-emitting surface for a good lighting effect
 - ITB headers enable power delivery from the underside of the PCB and LED arrays, eliminating top surface wire management issues
 - BUCHANAN WireMate ITB connectors offer a separable interface enabling rework or repair

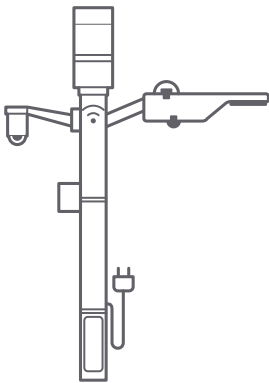
5 POLE-MOUNT FUSE BOXES

Designed for robust surge protection against overvoltage from lightning strikes

Challenges

- Single source for surge protection
- Quick and easy installation into street lighting grids
- Connect to large cross section supply cables

Subsystem



Products



Fuse Boxes
[Street Lighting Fuse Boxes](#)



Power Line Filters
[Corcom FB Series Single Phase Filters](#)



Circular Plastic Connectors (CPC)
[CPC](#)



NECTOR T
[NECTOR T Power System](#)



TE Advantage

- Connect and protect luminaires in light poles and outdoor lighting applications
- Equipped with sliding terminals for quick and easy installation
- Designed for easy assembly and performance reliability
- Fuse arrangement allows D01 size fuses to fit inside

- Multiple configuration options
- Specially designed for lighting devices, fluorescent lamp and related lighting ballasts
- Suitable for applications requiring 27 VDC or 277 VDC

- Rugged and cost-effective design
- Large breadth of power, signal and hybrid connectivity solutions
- Polarized interface for easy and reliable mating

- Designed specifically for the lighting industry
- Plug-and-play principle with upgraded modular wiring connectors
- Energy-efficient products that integrate into low- and high-voltage SSL luminaires
- Easy-to-install solution that fits in 8mm opening

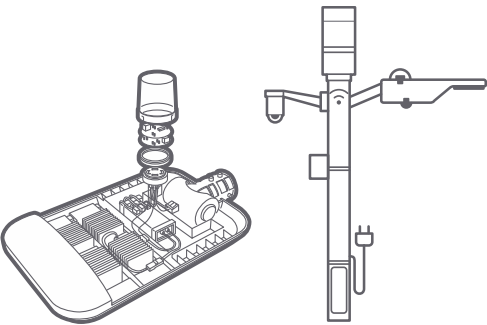
6 WIRE MANAGEMENT

Engineered for improved manufacturability and faster time to market

Challenges

- Low-profile, easy-install receptacles, terminations, and power line filters to save time
- Ability to integrate into new or existing LED fixtures

Subsystem



Products



Cable Glands
[Cable Glands](#)



Labels and Markers
[Identification Solutions](#)



DIN Rail Terminal Block
[ENTRELEC](#)



Terminals & Splices
[Terminals & Splices](#)

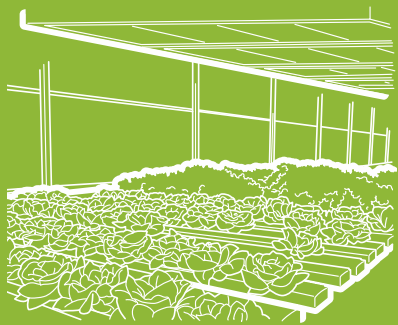


TE Advantage

- Relieves strain on cables
- IP68 and IP66 ratings offer high protection against dirt, dust, sand, water, and other liquids
- Plastic and brass options for indoor/outdoor applications
- Light gray, gray, and black colors available
- Heat-shrinkable cable marker sleeves available in a wide variety of configurations, colors and sizes
- Printable tag markers are flat, non-adhesive labels that can be used in either pre- or post-termination
- Standard labels are a cost-effective way to identify wires, wire bundles, and equipment
- Screw, push-in/spring, and pluggable connection technology
- Save installation time when using push-in/spring or pluggable technologies
- Large marking area for easier identification/labeling
- Common accessories help significantly reduce inventory needs
- Engineered for reliable connections
- Color coded insulation material for quick identification
- Robust tooling options
- Packaging options include loose piece or tape and reel
- UL, CSA, Mil Spec certifications

WHY TE?

- Our connectivity solutions reduce the complexity of LED streetlight architecture
- We are your partner throughout the process — offering streetlight control interfaces, power and data connectors, relays, powerline filters, labels and customized interconnect solutions



Horticulture

An Overview

EVERY CONNECTION COUNTS



INDUSTRY DRIVERS

The horticulture market is driven by the need to:

- Advance innovations in science to feed the growing population with finite land resources.
- Enable farmers to sustainably grow vegetables and fruit year-round with horticultural lights.
- Optimize cultivation using climate control and advanced plant sensors.

TE supports with:

- A range of connectors to handle the low-current/low-voltage DC power to the light engines, as well as the low-power control circuits and high-power AC connection to the drivers.
- Easy-to-use, durable interconnects that minimize installation time, and provide the reliability needed in harsh environments.
- Relays, filters, and interconnects to help controls provide the right amount and type of lighting to keep plants healthy.
- Sensors to help you measure the outputs that are most important to your business.





Indoor cultivators with flexible and precise LED grow light solutions can ensure crops receive the desired light spectrums needed to thrive year-round.

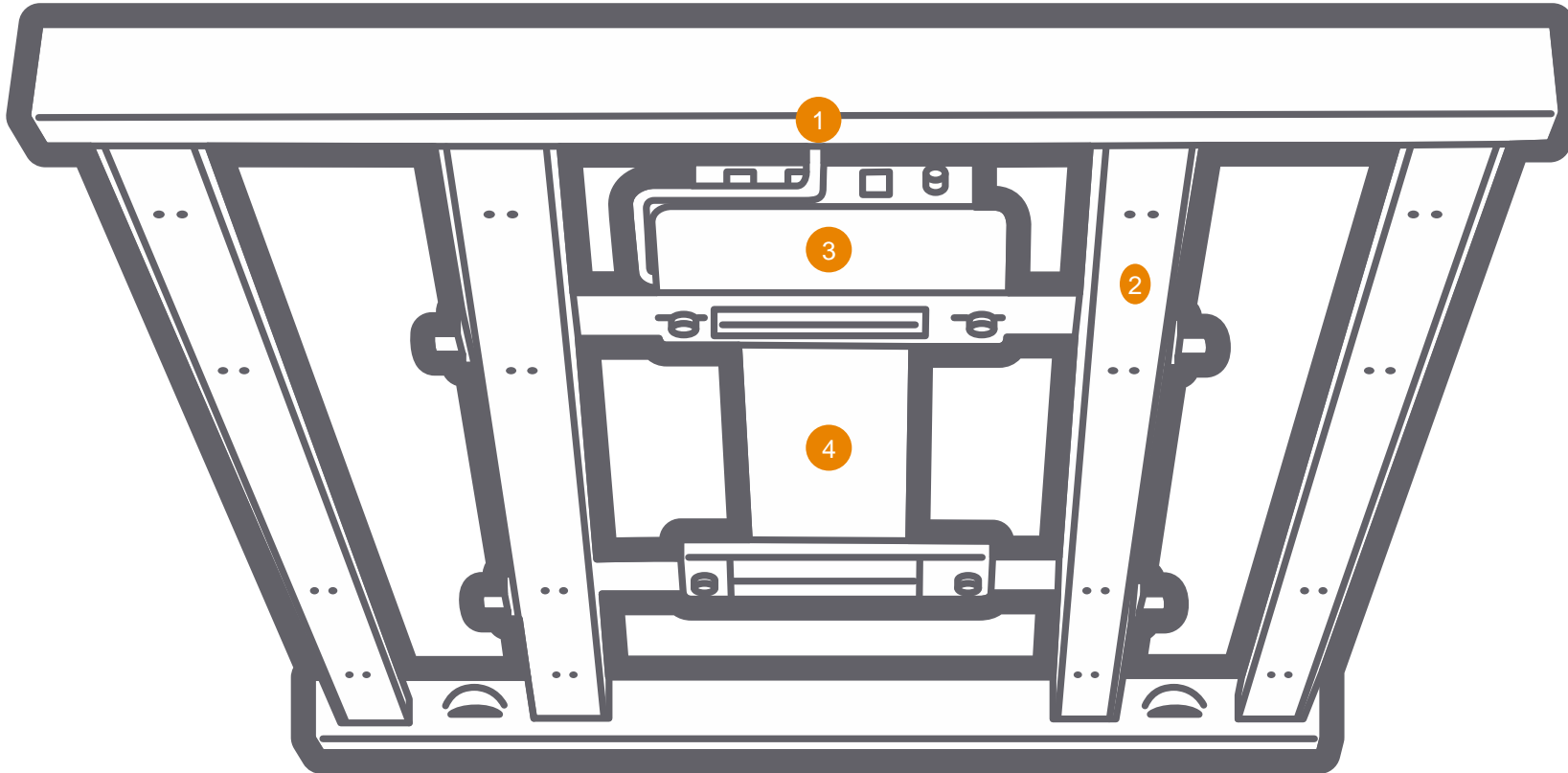
In **vertical farming**, LED grow lights allow you to control the cultivation through the plant canopy and control the macro and microclimate.



Greenhouses control the length of the day and the year session using LED lighting, creating the perfect atmosphere for plants to grow.



Horticulture Lighting



- 1 [Fixture Connect Solutions](#)
- 2 [Light Engine Interconnects](#)
- 3 [Driver Interconnects](#)
- 4 [Wire Management](#)

1

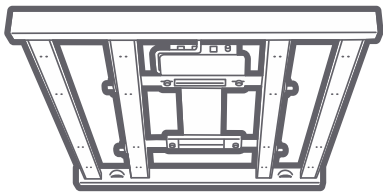
FIXTURE CONNECT SOLUTIONS

Engineered for improved manufacturability and faster installation

Challenges

- Meet the regulatory standards of various geographical regions
- Low-profile, easy-to-install connectors
- Able to integrate into new or existing LED fixtures
- Solve for troublesome conducted emissions that can be present in LED fixtures

Subsystem



Products



NECTOR T

[NECTOR T Power System](#)



NECTOR S

[NECTOR S Power System](#)



NECTOR M

[NECTOR M Circular Connectors](#)



Circular Plastic Connectors (CPC)

[CPC](#)



TE Advantage

- | | | | |
|--|---|---|--|
| <ul style="list-style-type: none">• Sealed pluggable connector system suitable for moist and wet environments (IP68)• Quick and flexible installation with both crimp and screw type terminals• High durability and pluggable design allows re-configuration and reduces waste | <ul style="list-style-type: none">• Designed for electrical installation and the lighting industry• Plug-and-play principle with upgraded modular wiring connectors• Energy-efficient products that integrate into low- and high-voltage SSL luminaires• Easy-to-install solution that fits in 8mm opening | <ul style="list-style-type: none">• Excellent for electrical construction and the lighting industry• Available in 3, 5, 6 and 7 positions for power, data and control requirements• Free-hanging and panel-mount, printed circuit board headers, splitters and cable assemblies• Plug-and-play design reduces labor cost on site | <ul style="list-style-type: none">• Rugged and cost-effective design• Large breadth of power, signal and hybrid connectivity solutions• Polarized interface for easy and reliable mating |
|--|---|---|--|

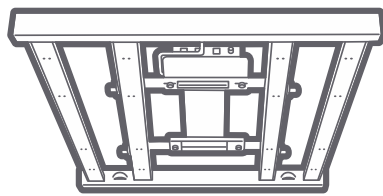
1 FIXTURE CONNECT SOLUTIONS, continued

Engineered for improved manufacturability and faster installation

Challenges

- Meet the regulatory standards of various geographical regions
- Low-profile, easy-to-install connectors
- Able to integrate into new or existing LED fixtures
- Solve for troublesome conducted emissions that can be present in LED fixtures

Subsystem



Products



CoolSplice Rated In-Line Splices
[CoolSplice Quick Connect Splice](#)



Power Line Filters
[Corcom FB Series Single Phase Filters](#)



TE Advantage

- Easy installation using independent push button termination for left and right side of connector
- Insulation displacement technology virtually eliminates the need to pre-strip wires, saving installation time
- Option to enable a water-resistant solution with an IPX8-rated splice
- Terminates 22 AWG to 12 AWG solid and stranded wire

- Specially designed for lighting devices, fluorescent lamp and related lighting ballasts
- Suitable for applications requiring 277 VAC or 277 VDC

2

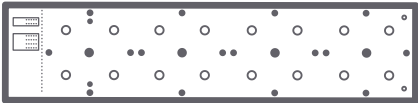
LIGHT ENGINE INTERCONNECTS

Flexible solutions reliably transmit power for interconnect applications

Challenges

- Integrate light engines into modern horticultural lighting systems
- Low-profile interconnects in surface mount and through-hole board mount configurations
- Faster and more efficient connections

Subsystem



Products



SMT Poke-In Connectors
[Buchanan WireMate Poke-In](#)



Separable Wire-to-Board Connector
[Low Profile Micro MATE-N-LOK Connectors](#)



Miniature Wire-to-Board Connectors
[SlimSeal Miniature Headers](#)



TE Advantage

- Modular technology enables design flexibility
- Easy and fast installation with poke-in contact feature
- Color configurations provide easy identification
- Compact size saves space

- 2, 3, and 4 positions available
- Black and neutral colors available
- Less than 4.7mm in vertical height required
- Polarized housings help prevent mis-mating
- Positive latching helps prevent un-mating

- IP67-rated connector for harsh environments
- Space-saving solutions available in 2- and 3-position configurations
- Press-to-release spring latch allows for more secure connector mating

3

DRIVER INTERCONNECTS

Deliver design flexibility and ease of use

Challenges

- User-friendly interconnects
- Reliably connect the inputs and outputs of a driver
- Design flexibility and ease of use

Subsystem



Products



Miniature Wire-to-Wire Connectors
[SlimSeal Miniature Connectors](#)



UL2459 Ballast Disconnects
[LIGHT-N-LOK Connectors](#)



Modular Terminal Blocks
[Modular Screwless Series](#)



TE Advantage

- Compact design saves PCB space
- IP67 rated connector works well for dust- and water-resistant applications
- Positive latching helps prevent inadvertent unmating
- Pre-assembled seals reduce assembly time

- Tool-less, easy and fast installation with poke-in contact feature
- Compact design saves space
- Support for hot plug abnormal overload test
- Color configurations enable easy identification
- Modular technology provides design flexibility

- Assembles quickly without the need for special tooling
- High density compact design saves space
- Multiple pitch options provide design flexibility
- Variety of color configurations makes identification easy

4

WIRE MANAGEMENT

Engineered for improved manufacturability and faster time to market

Challenges

- Low-profile, easy-install receptacles, terminations, and power line filters to save time
- Ability to integrate into new or existing LED fixtures


Subsystem





TE Advantage

Products




Cable Glands

[Cable Glands](#)



Labels and Markers

[Identification Solutions](#)



DIN Rail Terminal Block

[ENTRELEC](#)



Terminals & Splices

[Terminals & Splices](#)

- Relieves strain on cables
- IP68 and IP66 offer high protection against dirt, dust, sand, water, and other liquids
- Plastic and brass options for indoor/outdoor applications
- Light gray, gray, and black colors available

- Heat-shrinkable cable marker sleeves available in a wide variety of configurations, colors and sizes
- Printable tag markers are flat, non-adhesive labels that can be used in either pre- or post-termination
- Standard labels are a cost-effective way to identify wires, wire bundles, and equipment

- Screw, push-in/spring, and pluggable connection technology
- Save installation time when using push-in/spring or pluggable technologies
- Large marking area for easier identification/labeling
- Common accessories significantly reduce inventory needs

- Engineered for reliable connections
- Color coded insulation material for quick identification
- Robust tooling options
- Packaging options include loose piece or tape and reel
- UL, CSA, Mil Spec certifications

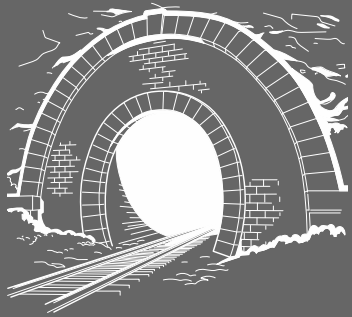
[> Overview of Equipment & Applications for TE Components](#)

34

© 2022 TE Connectivity. Confidential & Proprietary. Do not reproduce or distribute externally including non-authorized representatives and distributors. Create a sustainable future by limiting print copies, and recycling paper.

WHY TE?

- Robust fixture solutions for everything from small grow applications to commercial greenhouses
- Fixture connect solutions engineered to make manufacturing easy, improve time to market, and simplify installation
- Meets regulatory standards of multiple geographic regions
- Low-profile, easy-install connectors integrate into new or existing LED fixtures



Tunnels

An Overview

EVERY CONNECTION COUNTS





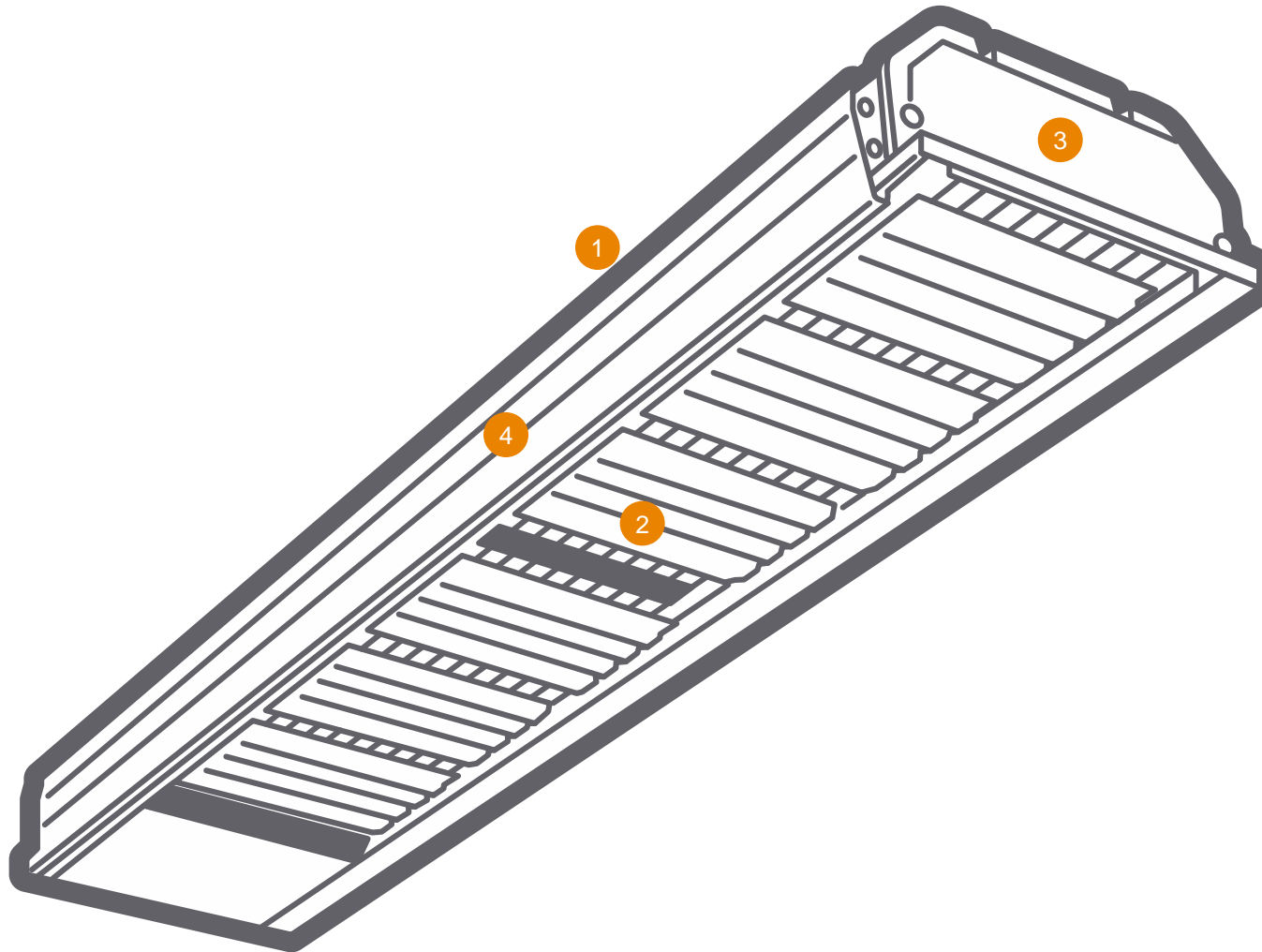
INDUSTRY DRIVERS

- Tunnels need light day and night to provide necessary visibility to users; light means safety.
- Since tunnel lights are 100% on for 24 hours, municipalities rely on LED technology to save energy and reduce CO2 emissions.
- Tunnel engineers seek methods to improve sustainability in their designs, looking for ways to reduce environmental pollution and optimize traffic efficiency.

TE supports with:

- Extensive product offering to help make installation faster and easier.
- Excellent quality and reliable solutions.
- Products to last in harsh outdoor environments with UV-resistant materials, effective dust-resistant sealing and venting.

Tunnel Lighting



- ① [Fixture Connect Solutions](#)
- ② [Light Engine Interconnects](#)
- ③ [Driver Interconnects](#)
- ④ [Wire Management](#)

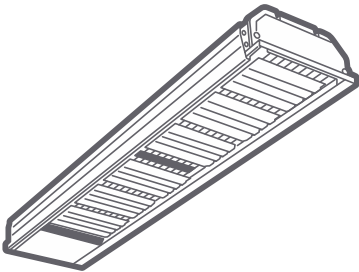
1 **FIXTURE CONNECT SOLUTIONS**

Engineered for improved manufacturability and faster installation

Challenges

- Low-profile, easy-to-install connectors
- Components with long lifetime to significantly reduce installation and maintenance issues
- Harsh, dusty environments

Subsystem



Products



Circular Plastic Connectors (CPC)
[CPC](#)



NECTOR M
[NECTOR M Circular Connectors](#)



CoolSplice Rated In-Line Splices
[CoolSplice Quick Connect Splice](#)



TE Advantage

- Rugged and cost-effective design
- Large breadth of power, signal and hybrid connectivity solutions
- Polarized interface for easy and reliable mating

- Suitable for electrical construction and the lighting industry
- Available in 3, 5, 6 and 7 positions for power, data and control requirements
- Free-hanging and panel-mount, printed circuit board headers, splitters and cable assemblies.
- Plug and play design helps reduce labor cost on site

- Easy installation using independent push button termination for left and right side of connector
- Insulation displacement technology virtually eliminates the need to pre-strip wires, saving installation time
- Option to enable a water-resistant solution with an IPX8-rated splice
- Terminates 22 AWG to 12 AWG solid and stranded wire

2

LIGHT ENGINE INTERCONNECTS

Flexible solutions that reliably transmit power for interconnect applications

Challenges

- Reliably transmit power
- Integrate components in modern LED streetlights
- Low-profile interconnects
- Faster and more efficient connections

Products



SMT Poke-In Connectors
[BUCHANAN WireMate Poke-In Connector](#)



Separable Wire-to-Board Connector
[3mm Low Profile Micro MATE-N-LOK Connectors](#)



Board-to-Board Connectors
[Hermaphroditic Blade and Receptacle Connectors](#)



Wire-to-Board Connector
[SlimSeal Connectors](#)



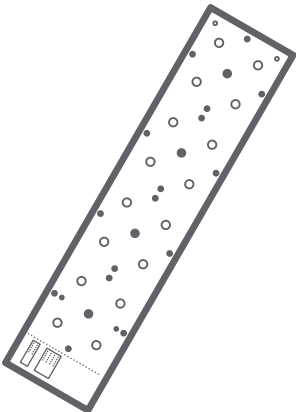
Soft Shell Connectors
[Soft Shell Connectors](#)



TE Advantage

- | | | | | |
|---|---|--|--|--|
| <ul style="list-style-type: none">• Modular technology enables flexibility in design• Easy and fast installation with poke-in contact feature• Color configurations enable easy identification• Compact size saves space | <ul style="list-style-type: none">• 2, 3, and 4 positions available• Black and neutral colors available• Less than 4.7mm in vertical height required• Polarized housings help prevent connector mis-mating• Positive latching helps prevent un-mating | <ul style="list-style-type: none">• Reduce design time using the same connector for power, data, or signal connections with 2, 4, or 6 positions• Reduce inventory requirements with a single connector that mates to itself• Simplify assembly and service with either vertical or horizontal connections | <ul style="list-style-type: none">• IP67 seal rating for outdoor applications• Save space with a compact design• Polarized connections reduce the possibility of mis-mating• Positive integral latching helps prevent inadvertent un-mating | <ul style="list-style-type: none">• Improved density, keying, and current carrying capacity• Power and signal connections can be made within the same housing• Secondary locking (on some product families) helps to ensure connections stay connected |
|---|---|--|--|--|

Subsystem



[> Overview of Equipment & Applications for TE Components](#)

3 DRIVER INTERCONNECTS

User-friendly interconnects designed to reliably connect to a driver

Challenges

- Both board-to-board and wire-to-board options
- Deliver design flexibility
- Deliver ease of use
- Provide reliable connections

Subsystem



Products



Modular Terminal Blocks
[Modular Screwless Series](#)



Separable Board-to-Board Terminal Blocks
[Eurostyle Terminal Blocks](#)



Poke in Contacts
[Poke In Contacts](#)



TE Advantage

- | | | |
|--|---|---|
| <ul style="list-style-type: none">• Assembles quickly without the need for special tooling• High density compact design saves space• Multiple pitch options provide design flexibility• Variety of color configurations makes identification easy | <ul style="list-style-type: none">• High temp and IR reflow compatible versions available• All blocks supplied with open screws to shorten the time for connection• Double captive screw system guards against lost screws• Halogen-free polyamide 6.6 per UL 94V-0 housing material | <ul style="list-style-type: none">• High temp and IR reflow compatible versions available• All blocks supplied with open screws to shorten connection time• Double captive screw system guards against lost screws• Halogen-free polyamide 6.6 per UL 94V-0 housing material |
|--|---|---|

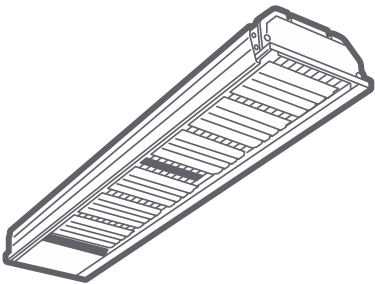
4 WIRE MANAGEMENT

Engineered for improved manufacturability and faster time to market

Challenges

- Low-profile, easy-install receptacles, terminations, and power line filters to save time
- Ability to integrate into new or existing LED fixtures

Subsystem



Products



Cable Glands
[Cable Glands](#)



Labels and Markers
[Identification Solutions](#)



DIN Rail Terminal Block
[ENTRELEC](#)



Terminals & Splices
[Terminals & Splices](#)



TE Advantage

- Relieves strain on cables
- IP68 and IP66 offer high protection against dirt, dust, sand, water, and other liquids
- Plastic and brass options for indoor/outdoor applications
- Light gray, gray, and black colors available
- Heat-shrinkable cable marker sleeves available in a wide variety of configurations, colors and sizes
- Printable tag markers are flat, non-adhesive labels that can be used in either pre- or post-termination
- Standard labels are a cost-effective way to identify wires, wire bundles, and equipment
- Screw, push-in/spring, and pluggable connection technology
- Save installation time when using push-in/spring or pluggable technologies
- Large marking area for easier identification/labeling
- Common accessories significantly reduce inventory needs
- Engineered for reliable connections
- Color coded insulation material for quick identification
- Robust tooling options
- Packaging options include loose piece or tape and reel
- UL, CSA, Mil Spec certifications

WHY TE?

- Low-profile, easy-install connectors integrate into new or existing LED fixtures
- Fixture connect solutions engineered to make manufacturing easy, improve time to market, and simplify installation
- Robust solutions to improve your application

**CONNECT
LIKE THE WORLD
DEPENDS ON IT.
BECAUSE IT DOES.**

EVERY CONNECTION COUNTS

