Junction Block & Wiring Device Product Training

Zacke Naughton   *October 2019*
Global Product Manager

PROTECT
CONTROL
SENSE

Agenda

- Introduction
- Littelfuse Company Overview
- Product Line Introduction
- Product Families
    - Design & Function
    - Applications & Markets
   - Composition
- Frequently Asked Questions
- Questions

From Small Beginnings to Global Expert through *Decades* of Innovation

Yesterday

- Founded in 1927 to address current regulation and electrical failure in diagnostic equipment
- Introduced many innovative, industry-first technologies

Today

- >10,000 employees in more than 40 locations worldwide
- Exceeded $1B USD in 2016 net sales
- Publicly held: LFUS (NASDAQ)
- Growth through innovation, customer & market expansion, and acquisition
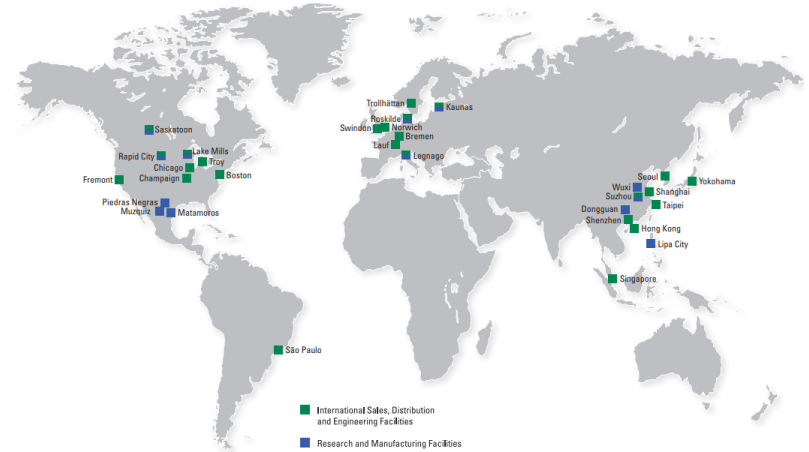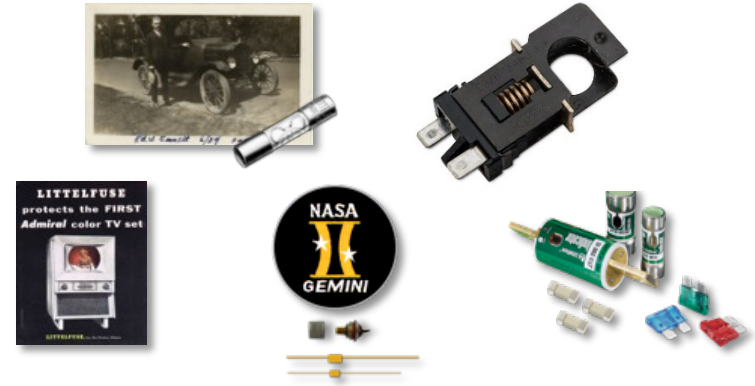
The #1 Brand in Circuit Protection
Expanding Player in Power Control and Sensing

Electronics

- Passive Products
- Semiconductor Products
- Sensor products

Automotive

- Passenger Car Products
- Automotive Sensor Products
- Commercial Vehicle Products

Industrial

- Fuse Products
- Protection Relays
- Custom Products

Littelfuse serves more than 100,000 customers across three major market segments

Product Line Introduction

What is it?

- A Product Line primarily comprised of smaller Product Families for power control / distribution and state indicators:
    - Circuit Breakers
    - Junction Blocks
    - Terminal Blocks
   - State Indicators

What do they do?

- Passively route or allow current through a series of wires or circuits
- Usually no direct interaction from end-users, but can be state indicators
- Separated from *Power Distribution* in that these products are single input/output, and are stand-alone mechanical components of a system

Product Line Introduction

- Annual revenue between $4M & $5M

- Primarily servicing Aftermarket

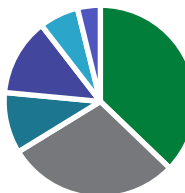- Grow the Distribution & Aftermarket Channels, retain OEM

2018 Global Sales, by Channel ($M)
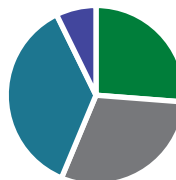
- Aftermarket (CVP)
- Aftermarket (PCP)
- OEM & Disti
- Other

2018 Global Sales, by Product Family ($M)

- Circuit Breakers
- Junction Blocks
- Terminal Blocks
- Alarms & Pilot Lights
- Connectors and Sockets
- Other

Product Families: Circuit Breakers

- Design & Function

  - Sub-Families are historically named based on best-use / mounting, but *all will change state when an overcurrent is realized (similar to fuses)*

  - A mechanical break ('trip') will occur due to chemical or mechanical state change (based on current)

  - Three *Types* across all families:

    - Type 1: Automatic Reset (bimetal which heats to break, closes once overcurrent removed)

    - Type 2: Modified Reset (circuit which maintains the break until after power removed)

    - Type 3: Manual Reset (the break will return to natural state after manual intervention)
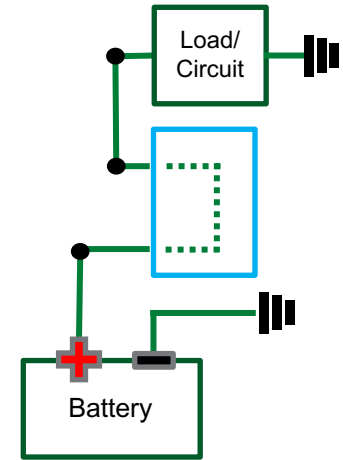
Always refer to online data for most recent, most correct, and most complete information:
https://www.littelfuse.com/products/other-products-and-accessories/circuit-breakers.aspx
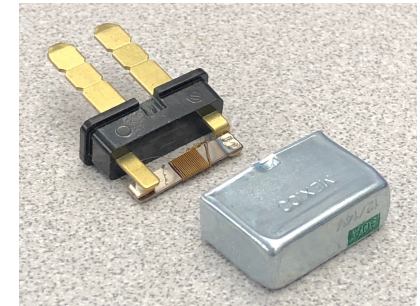
Product Families: Circuit Breakers

- Applications

  - Technically could function anywhere a fuse can function

  - Traditionally used when fuses are commonly exposed to overcurrent or cannot be packaged properly

  - Used as secondary or precautionary circuit protection

- Markets

  - Littelfuse is targeting Aftermarket with these products

    - Direct (Retailers, upfitters)

    - Distribution

  - OEM Business is legacy and growth will not be pursued
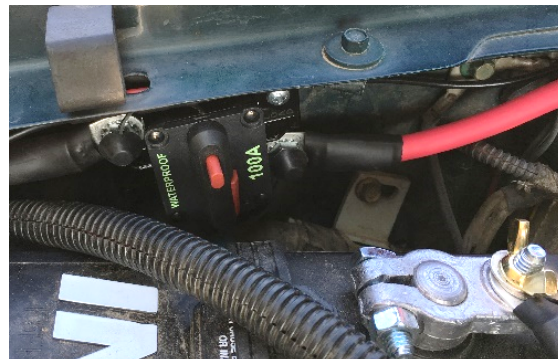
Product Families: Circuit Breakers

Sub-Families are historically named based on best-use / mounting, but *all change states in overcurrents*
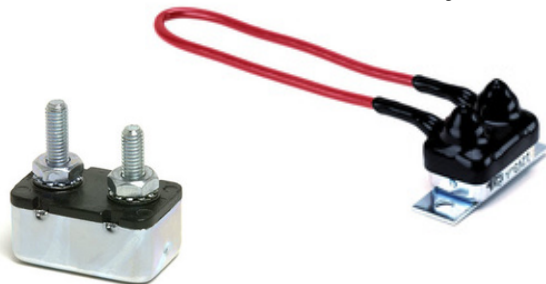
Box Style:

-Most popular circuit breaker

-Designed for exposed underhoood mounting

-#10 – 32 Steel Studs

-Available in 10A to 50A

Subfamily	Reset Type	Voltage	Bracket	Sealed	Packaging
08120XX	I - Automatic Reset	12	None	No	LF Retail
30056-xx	I - Automatic Reset	12	None	No	Bulk/Box
30137-xx	I - Automatic Reset	12	None	Sealed	Bulk/Box/Blister
08130XX	I - Automatic Reset	12	Cross	No	LF Retail
30128-xx	I - Automatic Reset	12	Cross	No	Bulk/Box
30055-xx	I - Automatic Reset	12	Straight	No	Bulk/Box/Blister
30138-xx	I - Automatic Reset	12	Straight	Sealed	Bulk/Box/Blister
30063-xx	I - Automatic Reset	12	None	Sealed Assy	Bulk/Box/Blister
30062-xx	I - Automatic Reset	12	Straight	Sealed Assy	Bulk/Box/Blister
30171-xx	I - Automatic Reset	24	None	No	Bulk/Box/Blister
30172-xx	I - Automatic Reset	24	Straight	No	Bulk/Box/Blister
30174-xx	I - Automatic Reset	24	Straight	Sealed	Bulk/Box/Blister
30525-xx	II - Modified Reset	12	Cross	No	Bulk/Box/Blister
30144-xx	II - Modified Reset	12	None	No	Bulk/Box/Blister
30181-xx	II - Modified Reset	24	Straight	No	Bulk/Box/Blister
30406-xx	III - Manual Reset	12	None	No	Bulk/Box/Blister

Note: Consult SAP for status by current by packaging type

Product Families: Circuit Breakers

Sub-Families are historically named based on best-use / mounting, but *all change states in overcurrents*

ATO Blade:

-Named for ability to mate with any ATO Fuse Block/Panel

-Available from 5A up to 30A

-Unsealed and without bracket

-Gray parts feature Snap-Off Terminals for flexibility in length/application installation (*Universal Circuit Breaker*)

Subfamily	Reset Type	Voltage	Packaging	Note
0ACBxxx	I - Automatic Reset	14.5	Retail Carded	Terminals in unique footprint, by OEM, and are at a determined length
0BCBxxx	I - Automatic Reset	12	Retail Carded	
0CCBxxx	I - Automatic Reset	12	Retail Carded	
0FCBxxx	II - Modified Reset	12	Retail Carded	
0UCBxxx	I - Automatic Reset	12	Retail Carded	Identical
BUCBxxx	I - Automatic Reset	12	Bulk	
30409-xx	I - Automatic Reset	12	Bulk/Box/Blister	Color Coded
30411-xx	II - Modified Reset	12	Bulk/Box/Blister	Color Coded
227xx-01	III - Manual Reset	28		Color Coded (Plastic)
227xx-02	III - Manual Reset	28		Color Coded (Plastic)

Littelfuse® | **Cole Hersee®** A Littelfuse® Brand

Product Families: Circuit Breakers

Sub-Families are historically named based on best-use / mounting, but *all change states in overcurrents*

Hi-Amp Surface Mount:

-Thermoset plastic meant to withstand high currents and weathering

-Available in 50A, 60A, 70A, 80A, 100A, 120A, 150A
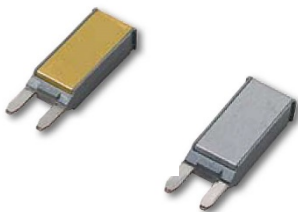
-Retail-packaged only

Due to high trip current, the 01850x0.X family is manual reset only (Type III), meaning that system shut-off and operator intervention required

Note: Consult SAP for status by current by packaging type

Product Families: Circuit Breakers

Sub-Families are historically named based on best-use / mounting, but *all change states in overcurrents*

MINI Blade:

-Named after ability to mate with
any MINI Fuse Block/Panel

-Available from 5A up to 30A

-Unsealed and without bracket

Subfamily	Footprint	Reset Type	Voltage	Packaging	Note
02110xx	MINI	I - Automatic Reset	14	Retail Carded	
30418-xx	MINI	I - Automatic Reset	12	Bulk/Box/Blister	
0MMB0xx	Wide	I - Automatic Reset	14	Retail Carded	Wide Body
0MIB0xx	MINI	II - Modified Reset	12	Retail Carded	
0MNB0xx	MINI	II - Modified Reset	14	Retail Carded	Wide Body
BMIB0xx	MINI	II - Modified Reset	12	Bulk/Box/Blister	Identical
30419-xx	MINI	II - Modified Reset	12	Bulk/Box/Blister	

Note: Consult SAP for status by current by packaging type

Product Families: Circuit Breakers

Sub-Families are historically named based on best-use / mounting, but *all change states in overcurrents*
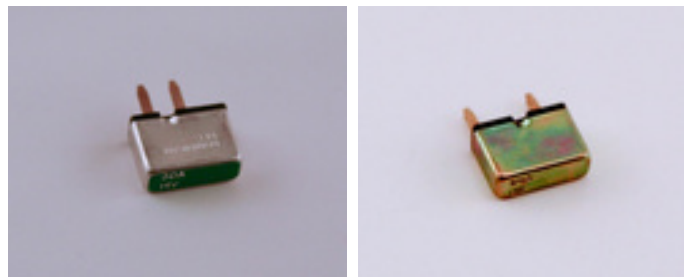
Glass Fuse:

-Available in 10A to 40A

-Replicates the footprint of a glass-fuse

-All Unsealed without bracket

MAXI Blade:

-Available in 10 to 40A

-All Unsealed without bracket

-0MCB0xx family is Type I, 0MXB0xx family is Type II

Accessories (Box Style):

-Brackets available in Nylon (87128) and Steel (30090)

-Busbars available in Brass (56099) and Copper (86126)

-Discontinued, so supply is as-is

*Note: Consult SAP for status by current by packaging type*

Product Families: Junction Blocks

- Design & Function

  - Passively route current through cables or circuits

  - Sub-Families are historically named based on application / mounting, but *all are connection points for distribution of power or ground*

  - Two Types:

    - Surface Mount (top): Current/wiring remains in same plane (no current *through* block)

    - Feed-Through (bottom): Current/wiring transfers to interior/other side of panel/firewall (current flows through product)
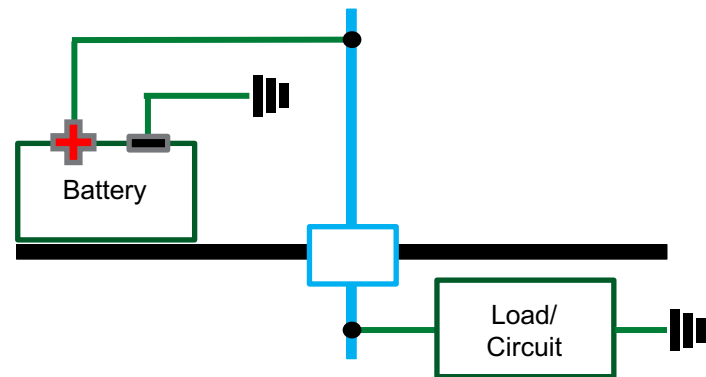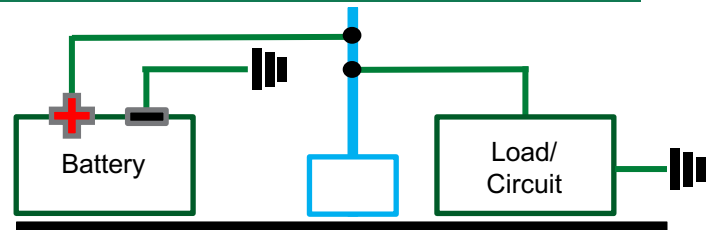
  Always refer to online data for most recent, most correct, and most complete information:
  https://www.littelfuse.com/products/other-products-and-accessories/power-distribution-accessories/junction-blocks.aspx

Battery

Load/ Circuit

Battery

Load/ Circuit

Note: Not to scale!

Product Families: Junction Blocks

- Applications

  - Common electrical connection/tap points for the distribution of power or ground

  - Ground for non-conductive chassis or as jump start posts

  - Simplify cable routing (no more than 4 routes)

- Markets

  - Littelfuse is targeting Aftermarket with these products

    - Direct (Retailers, upfitters)

    - Distribution

  - OEM Business is legacy and growth will not be pursued

Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*

Pass-Thru Studs:
-Body & Body Nut: Nylon 66 (+125* C)

-Large cross-sectional area for reduced resistance

-Plastic body locknut ensures quick and easy installation without need for additional hardware

-High stud installation torque (40 ftlbs) to allow larger cable sizes for high current applications

Part Number	Type	Bottom Stud	Body	Top Stud	Thread
JBPT0001Z	Double Nut with PVC Caps (Red)	0.75" (19.05mm)	0.75" (19.05mm)	0.75" (19.05mm)	3/8"-16
JBPT0001Z-NC	Hex Flange Nut (Red)	0.75" (19.05mm)	0.75" (19.05mm)	0.75" (19.05mm)	3/8"-16
JBPT0002Z-NC	Hex Flange Nut (Black)	0.75" (19.05mm)	0.75" (19.05mm)	0.75" (19.05mm)	3/8"-16
JBPT0003Z-NC	Hex Flange Nut (Red)	1.05" (26.67mm)	0.65" (16.51mm)	1.05" (26.67mm)	1/2"-13
JBPT0004Z-NC	Hex Flange Nut (Black)	1.05" (26.67mm)	0.65" (16.51mm)	1.05" (26.67mm)	1/2"-13
JBPT13802Z2B-NC	Hex Flange Nut (Red)	1.25" (31.75mm)	0.75" (19.05mm)	0.75" (19.05mm)	3/8"-16
JBPT13802Z2R-NC	Hex Flange Nut (Black)	1.25" (31.75mm)	0.75" (19.05mm)	0.75" (19.05mm)	3/8"-16

Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*
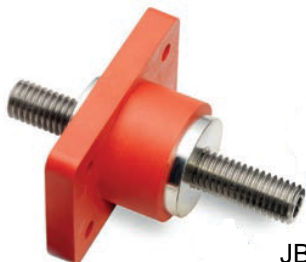
JBPT2

JBPT3

Junction Blocks:

-UL 94V Thermoplastic

-Temperature Range: -40° C → +125° C

-Suited for 12V – 48V

-Mounting hardware Required

-Insourcing in progress (white); PFR (gray)

Part Number	Type
JBPT2N02ZXB	Surface Mount
JBPT2P01ZXR	Feed-Through
JBPT3N03ZXB	Surface Mount
JBPT3N04ZXB	Surface Mount
JBPT3N04ZXR	Surface Mount
JBPT3P01ZXB	Feed-Through
JBPT3P02ZXB	Feed-Through
JBPT5N01ZXB	Surface Mount
880140	Feed-Through (Red)
880150	Feed-Through (Black)

Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*

PN	Color	Mounting Hardware	Mounting Post	Hardware
46210*	Black	Washer	0.57" (14.48mm), 3/8-16	Assembled
46210-01	Red	Washer	0.57" (14.48mm), 3/8-16	Assembled
46210-04	Black	Washer	0.57" (14.48mm), 3/8-16	Assembled
46210-02	Red	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	Bagged
46210-03	Black	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	Bagged
46210-09	Red	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	Assembled
46210-08	Black	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	Assembled
46210-05	Red	Washer/Lockwasher/Nut	1.07" (27.18mm), 3/8-16	Assembled
46210-10	Black	Washer/Lockwasher/Nut	1.07" (27.18mm), 3/8-16	Assembled

Battery Jumper Studs:

-Relocate battery terminals to a more accessible location inside or outside vehicle

-0.8" (20.32mm)⌀, 1.125" (28.83mm) length grooved solid Brass Stud meant for standard jumper cables

-3/8" – 16 Post

-Recommended Voltage: 6-48V DC

*All sold with cap except 46210 (Replacement caps: 97846-x)

Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*

Battery Feeder Studs:

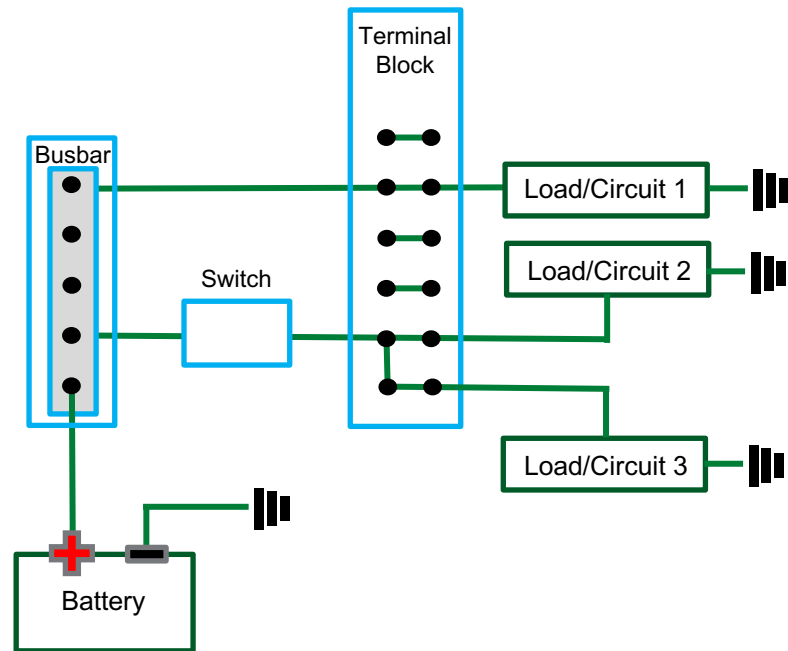-Serve to transmit power through bulkheads, firewalls, etc.

-Impact-resistant insulator and bushing

-Recommended Voltage: 6-36V DC

PN	Color	Mounting Hardware	Mounting Post	Cable Post	Hardware
46211-01	Black	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	0.57" (14.48mm), 3/8-16	Bagged
46211-14	Black	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	0.57" (14.48mm), 3/8-16	Bulk
46211-06	Black	Washer	0.57" (14.48mm), 3/8-16	0.57" (14.48mm), 3/8-16	Assembled
46211-R	Red	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	0.57" (14.48mm), 3/8-16	Bagged
46211-04	Black	Washer/Lockwasher/Nut	0.57" (14.48mm), 3/8-16	1.312" (33.32mm), 3/8-16	Assembled
46211-11	Black	Washer/Nut	1.00" (25.4mm), 3/8-16	0.57" (14.48mm), 3/8-16	Assembled
46211-02	Black	Lockwasher/Nut	0.67" (17.02mm), 1/2-20	0.75" (19.06mm), 1/2-20	Assembled
46211-03	Black	Washers/Lockwasher/Nut	0.875" (22.23mm), 1/2-20	1.12" (28.45mm), 1/2-20	Assembled
46211-12	Black	Washer	0.786" (19.95mm), M10x1.5	0.63" (16.00mm), M10x1.5	Assembled
46211-13	Red	Washer	0.786" (19.95mm), M10x1.5	0.63" (16.00mm), M10x1.5	Assembled

Product Families: Terminal Blocks

- Design & Function

  – Redistribute power through multiple loads

  – Sub-Families differentiated by mounting/termination, and presence of common busbar, but *all serve to streamline distribution of power or ground*

Terminal Block

Busbar

Switch

Load/Circuit 1

Load/Circuit 2

Load/Circuit 3

Battery

Always refer to online data for most recent, most correct, and most complete information:
https://www.littelfuse.com/products/other-products-and-accessories/busbars-and-terminal-blocks.aspx

Product Families: Terminal Blocks

- Applications

  - Wire management

  - Reduction/simplification or duplication of ground or power sources

- Markets

  - Littelfuse is targeting Aftermarket with these products

    - Direct (Retailers, upfitters)

    - Distribution

  - OEM Business is legacy and growth will not be pursued
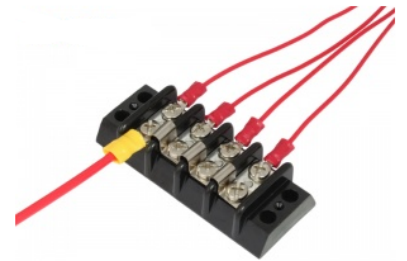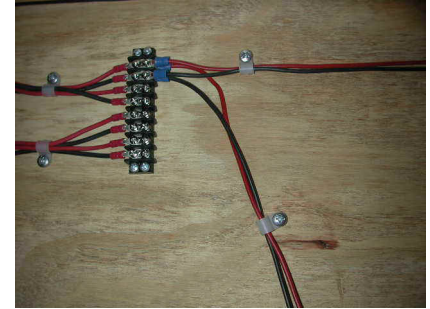
Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*

4721-Px

M-42x

475x

Terminal Blocks:
-Moisture Resistant (M-42x & 475x)

-Mounting hardware required

-M-42x & 475x include barrier strips between channels

-4721-Px available in 2, 3, 4, 5, 6, 7, 10, 12, 14

Part Number	Termination
4721-Px	#10-32 Stud (Varied)
4758	#10-24 Stud (4x)
4755	#10-24 Stud (5x)
M-426	#8-32 Screw (4x)
M-427	#8-32 Screw (6x)
M-428	#8-32 Screw (8x)
M-429	#8-32 Screw (10x)

Note: Consult SAP for status by current by packaging type

Product Families: Junction Blocks

Sub-Families are historically named based on application / mounting, but *all can distribute power or ground*


46206-04   M-448-02

Busbars:
-Independent or integrated onto Terminal Block, mounting hardware required

-M-44x are moisture resistant

-Brass busbars rated to 50A

-Gray parts in portfolio due to prior OE relationships; limited performance data available

Part Number	Type	Termination
880118	Busbar	N/A
887980300	Busbar	N/A
887980500	Busbar	N/A
887980600	Busbar	N/A
887980700	Busbar	N/A
888399901	Busbar	N/A
880100	Block with Common Busbar	3/8-16 Stud (4x)
880097	Block with Common Busbar	3/8-16 Stud (2x)
46206-04	Block with Common Busbar	#10-32 Stud (4x)
M-448	Block with Common Busbar	#8-32 Screw (20x)
M-448-02	Block with Common Busbar (Sn)	#8-32 Screw (20x)
M-449	Block with Common Busbar	#8-32 Screw (10x)

Note: Consult SAP for status by current by packaging type

Product Families: State Indicators

- Design & Function

  – Provide audio or visual signal to end user

  – Sub-Families differentiated by different design/form, but all *indicate condition/status change*

  – Three Smaller Product Lines:

    - Alarms

    - Pilot Lights

    - Connectors/Sockets
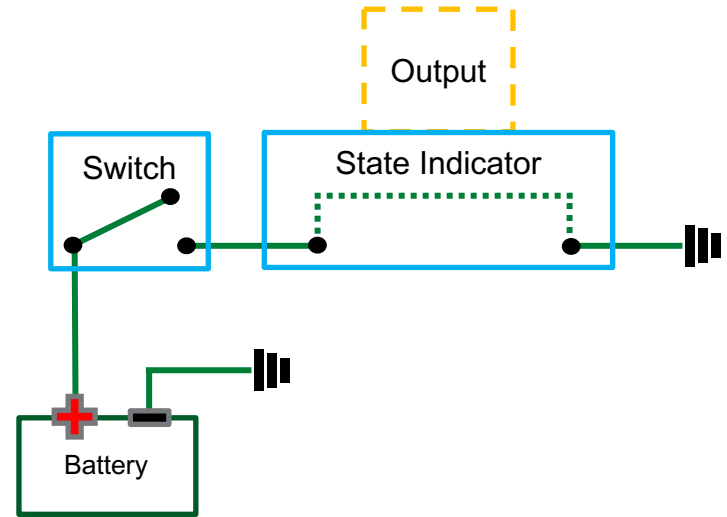
Output

Switch

State Indicator

Battery

Always refer to online data for most recent, most correct, and most complete information:
https://www.littelfuse.com/products/other-products-and-accessories/pilots-lamps-and-alarms.aspx

Product Families: State Indicators

- Applications

  - Manually, or automatic, provide an output alert for a critical condition

  - Traditionally connected to passive status switches to alarm for a

    'low' (air, pressure, oil, temperature, aperture ajar, etc.)

- Markets

  - Littelfuse is targeting Aftermarket with these products

    - Direct (Retailers, upfitters)

    - Distribution

  - OEM Business is legacy and growth will not be pursued

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

40212

4112-xC000

4099 / 40151

Alarms:

-Immediate, uninterrupted signal to end user

-Used for alerts, warnings, or other switch-tripped scenarios

Part Number	Type	Notes
4099	Universal Buzzer	12V DC, Buzzer
40151	Universal Buzzer	24V DC, Buzzer
4112-RC000	Dual Alarm	12V DC, Buzzer and LED Warning
4112-DC000	Dual Alarm	24V DC, Buzzer and LED Warning
40212	Dual Rate Alarm	12V DC, Buzzer (up to 90dB)

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

PL-522-xC

PL-521-xC

PL-6xx-x

PL-523-xC

PL-524-xC

PL-52x-xC

LED Pilot Lights:

-The 'x' can be replaced for 'R', 'A', or 'G' for Red, Amber, Green (availability by color by family)

-Polarity sensitive

-LED provides extended life

Part Number	Bezel	Notes
PL-521-xC	1"	12V DC
PL-522-xC	3/4"	12V DC
PL-612-x	5/8"	12V DC, also in blue
PL-624-x	5/8"	24V DC, also in blue
PL-523-xC	3/4"	12V DC, also in blue and clear
PL-524-xC	5/8"	12V DC
PL-525-xC	3/8"	12V DC
PL-526-xC	3/8"	12V DC, blinking (100 bpm)

Note: Consult SAP for availability by package type

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

PL-36-xC000

PL-2-xC000

PL-85-xC000

Incandescent Pilot Lights:

-Used for alerts, warnings, or other switch-tripped scenarios

The 'x' can be replaced for first letter of available color

-All 12V DC with 8" leads

Part Number	Bezel	Colors	Bulb	Notes
PL-2-xC000	1/2"	R/G/B	#53	Single Contact, Insulated
PL-36-xC000	3/4"	R/A	#53	Single Contact, Insulated with Honeycomb Lens (internal)
PL-85-xC000	1 1/4"	R/G/A	#67	Single Contact with Faceted Lens (external), gasket sealed

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

PL-86-xC000   PL-118-xC00x   M-320-RC000   M-326-RC000

Incandescent Pilot Lights, continued (all 12V DC with 8" leads)

Part Number	Bezel	Colors	Bulb	Notes
PL-86-xC000	1 1/4"	R/G/A	#68	Double Contact, Insulated with Faceted Lens (external), gasket sealed
PL-118-xC000	15/16"	R	#1893	Single Contact, Insulated; Silver Bezel
PL-118-xC001	15/16"	R/G/A	#1893	Single Contact, Insulated; Black Bezel
M-320-RC000	7/8"	R	#53	Single Contact
M-326-RC000	1 1/4"	R	#68	Double Contact, Insulated with Faceted Lens (external), gasket sealed

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

DL-13

DL-21

M-451

M-458

Panel Lamps:

-Installed on dash/panels for rotatable, directed illumination

-Only PNs available from this product line

-Designed as single contact, self-grounding

-Operate within 12V DC systems (Lamp #67, not included)

Part Number	Color	Material	Lead
DL-13	Nickel-Plated	Brass	16AWG, 8"
DL-21	Black	Steel	16AWG, 8"
DL-21-11	Black	Steel	18AWG, 48", Insulated
M-451	Chrome-Plated	Brass	Two 0.147in (3.73mm) surface mounts
M-458	Chrome-Plated	Brass	16AWG, 8"

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

2611
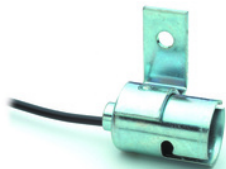
2609

26100

Wired Bayonet Base Sockets:

-Designed to recess LED or incandescent bulbs

-Smaller sizes (Minis) were all obsoleted due to vendor issues
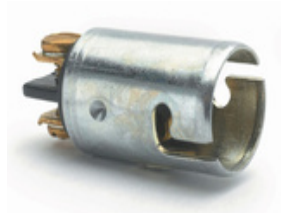
-All designed for 12V DC systems

Part Number	Lamps	Mounting	Contact	Leads
2609	BA15s	Side Bracket, 3/16in (4.8mm)	Single	16AWG (stranded Cu)
2611	BA15s	Through Hole, 3/4in (19mm)	Single	16AWG (stranded Cu)
26100	BA15d	Through Hole, 11/16in (17.463mm)	Double, Plastic Insulator	16AWG (stranded Cu)

Product Families: State Indicators

Sub-Families differentiated by different design/form, but *all indicate condition/status change.*

1465

2316

2106

M-432

Stand-Alone Bayonet Base Sockets:

-Designed to recess LED or incandescent bulbs

-Smaller sizes (Minis) were all obsoleted due to vendor issues

-All designed for 12V DC systems

Part Number	Lamps	Base Material	Contact
1465	BA15s	Steel	Single
2106	BA15d	Brass	Single
2316	BA15d	Steel, ZN-Plated	Double, Plastic Insulator
M-432	BA15d	Brass, Nickel-Plated	Double

Frequently Asked Questions

What part is this?
- Without pictures from all angles and a description of function, this is nearly impossible

Some years ago, I bought part X, but now it's obsolete, what do I do?
- First, seek to understand from customer *why* they need that *exact* product (fit, form, function, etc.?)
- Secondly, route any applicable info to PM so a replacement can be suggested

Some years ago, I bought part X, but now it's obsolete, why can't you make it again?
- Bringing a product "back to life" requires time and investment that are not justified by a single sale

Where can I learn about different part that LF has available?
- SAP Status is considered most up-to-date, Website is second best place for available parts

Does Littelfuse have a cross (cross-reference, X-Ref) to part X from competitor Y?
- Many parts in our portfolio are industry standard sizings and ratings
- Competitors we cross well with: Eaton, Bussman (Cooper-Bussman)
- Competitors we do not cross well with: ETA, Sensata

Frequently Asked Questions

What breaker / junction block / busbar should I use?

- What are we trying to connect and control?
- What circuitry is needed by the end user?
    - Are single or multiple applications being tethered to each other?
    - Are different states / outputs desired?
- What is the environment?
    - Is sealing needed?
    - Does the user have access to the body harness for installation? Can the user modify it?
    - Does the user have particular/limited/defined mounting configuration / real estate?

How do I hook up my Littelfuse part?

- Drawings can be provided by PM for end users
- Hardware is included (either installed or in bags) for installation….if not, this is a quality topic.

What is the limiting current / recommended voltage?

- Website is the first source for such data, but others are available (drawing, data sheet, PM, BDM)
- Most of these products were designed for US market, meaning 12V DC, with varying current

Summary

Littelfuse has been widely considered the Global Expert in Circuit *Protection* since 1927.

As we grew our market and portfolio from Protection to *Control*, we relied on the acquisition of several industry experts.
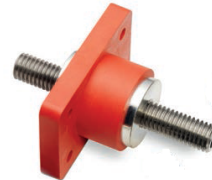
Combining decades of historical experience in design and manufacturing, we have leveraged the global brand and presence of Littelfuse to continue to grow these products across brands, applications, and markets.

2010   Cole Hersee Co.

2012   TERRA POWER SYSTEMS

2016   menber's CONNECTING POWER

Questions?