CURRENT LIMITING SOLUTIONS

JUNO®

Innovative current limiting solutions for optimal track lighting performance in an energy conscious world

JUNO LIGHTING GROUP
by Schneider Electric

JUNO® Current Limiting Solutions

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Frustrated by your local energy codes?

Are stringent energy codes impacting the way you highlight, promote and sell your merchandise? With energy codes throughout North America establishing power limits for commercial and retail lighting environments, the ability to apply track lighting effectively is becoming increasingly difficult. Expressed in watts-per-square-foot, these codes mandate total power consumption of installed lighting fixtures for a given space. Because of its inherent flexibility, line-voltage track lighting is typically assigned an arbitrary multiplier for purposes of energy calculations. Depending on the specific code, these multipliers can range from 30 to 70 watts per foot of track, regardless of the actual power consumed by the specified fixtures. Therefore, even though a track lighting installation may employ energy efficient fixtures, the watts-per-linear-foot power consumption formula still applies, effectively penalizing an otherwise energy-conscious design.

Fortunately, there is a simple solution to this dilemma. By specifying a Juno current limiting solution with your track lighting, energy codes permit the current limiter rating to be substituted for the linear footage formula. This means that track installations can be designed using ultra-efficient fixtures, and effortlessly achieve code compliance.

The Solutions

Juno Lighting Group can help you meet the challenge of energy code compliance with either a Current Limiting Subpanel or Current Limiting Track Feeds. The Subpanel design installs between the branch circuit breaker and the track lighting equipment and provides the lowest installed-cost solution. The Current Limiting Track Feeds are intended to be installed at every track feed location in place of a standard non-limiting feed, making it perfect for either new construction or upgrading existing circuits in a remodel application. By incorporating either current limiting solution into company-wide track lighting specifications, multi-facility organizations can be assured of lighting code compliance regardless of location. And no matter which system is best suited to a given application – Subpanel or Feed, – only Juno offers both solutions.

How the Devices Work

Both systems utilize supplementary current limiting circuit breakers, designed to limit available wattage based on the actual lighting design criteria, thereby avoiding the “watts-per-linear-foot penalty” imposed by energy codes. Track lighting density and performance can be optimized, and configuration flexibility can be retained, without exceeding code-mandated power utilization limits.

Optimize Your Energy Usage

To optimize your energy usage and to maximize operating cost savings, combining energy efficient, high-performance ceramic metal halide (CMH) and compact fluorescent track fixtures with either current limiting solution can reduce calculated energy use by as much as 75% or more versus standard halogen fixtures. This enables you to provide the lighting you need to effectively highlight merchandise and increase sales.

Code Compliance

Case Study

Background

A leading specialty retailer with more than 1,000 locations nationwide planned to renovate each location. Their targeted market focuses on everyday casual apparel accessories and footwear designs to meet the lifestyle needs of active teens and young adults. The rebranding efforts of the retail store locations included extensive track lighting, providing the retailer with the flexibility to move, replace and redesign merchandising displays to appeal to their market and maintain brand continuity within each location.

With their rebranding efforts, the retailer recognized that greater efficiencies could be realized, not only in energy, but in overall maintenance costs by using Juno's energy efficient, high performance ceramic metal halide (CMH) track fixtures. But this energy savings wasn't enough when the new energy codes were enforced.

Challenge

With new energy codes throughout North America placing a mandatory limit on lighting density, track lighting had an additional burden: an automatic VA (wattage) calculation per linear foot of track. ASHRAE 90.1, the basis for many municipal energy codes around the country, assigns 30-watts per linear foot of track. California's Title 24 code assigns 45-watts and other more stringent codes may assign up to 70-watts per linear foot.

Using California Title 24's 45-watts per linear foot calculation, the retailer's lighting layout had the calculated potential of using over 35,000 watts in a single store according to the energy code. This was an enormous exaggeration above the actual planned wattage of 7000 watts per store and 8.75-watts per linear foot of track. With stores projected to open in just a few weeks, redesigning the stores again and eliminating a large portion of track lighting was not an option.

Solution

To solve this problem, the retailer called on the expertise of their local Juno Lighting Group National Account Sales Manager. Working around the clock to meet a nearly impossible build schedule, and working closely with the California Energy Commission to get early acceptance to avoid delaying any store openings, the solution was a sub-branch current limiting panel. This panel would limit the amount of wattage used on each track, consequently eliminating the penalty for the calculated potential maximum load/unused wattage.

The Juno Current Limiting Subpanel reduced the retailer's calculated potential/unused wattage by over 75%. In fact, the retailer selected their current limiters to total 8000 watts, leaving them with additional flexibility for expansion while still easily complying with the local energy codes.

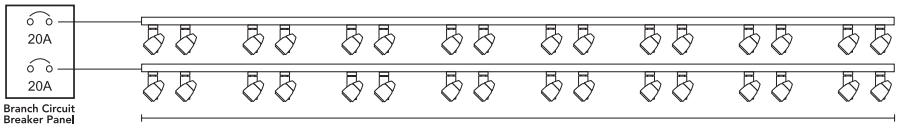
Energy Code Calculations

Illustrated below is an example of what current limiting means for track lighting relative to today's energy codes. The standard layout without a current limiting solution consists of 100' of single circuit trac (2 circuits x 50' each) with 32 CMH trac fixtures, each consuming 45W maximum, for a total connected load of 1440W. Per the Title 24 energy code, the wattage calculation would be a much greater 4500W.

The scenario with a Juno current limiting solution uses the original 100' of single circuit trac, with each 50' trac circuit monitored by a 7-Amp supplementary current limiter that is closely matched to the actual connected load of 720W per circuit plus a small buffer. This significantly reduces the calculated watts per the energy codes, solving the energy code calculation discrepancy, making the wattage calculation independent of trac length. In a real application, there would be many more track lighting circuits, resulting in an even greater calculated wattage reduction.

Calculations Example

Without Current Limiting



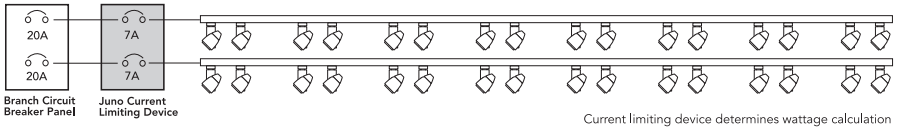
Trac length determines wattage calculation

Actual Design Wattage: 32 Fixtures @ 45W each 1440W total

100ft of trac (without current limiting) = 4500W*

*Based on 45W/ft multiplier of California Title 24

With Current Limiting



Current limiting device determines wattage calculation

Actual Design Wattage: 32 Fixtures @ 45W each 1440W total

Same 100ft of trac (with current limiting) = 7A @ 120V = 840W

7A @ 120V = 840W

1680W total

Current Limiting Subpanels

Compatible with any line-voltage track system

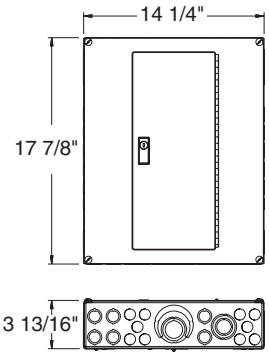
The Juno Current Limiting Subpanel permits you to take full advantage of any line-voltage track lighting without being penalized by watts-per-linear-foot code calculations. The subpanel is typically installed out-of-sight in an electrical control room, providing a centralized location for installation wiring and breaker resetting in the event of a circuit overload. The Current Limiting Subpanel installs between the branch circuit breaker and the track lighting equipment. This limits the amount of power that is available to operate the track circuit to only the wattage needed per the lighting plan. Installation labor is minimized since multiple track runs can be fed from a single current limiting circuit breaker.

The subpanel is offered in any configuration from 6 thru 42 circuits and is available in either surface or flush mount versions. Current limiting is provided by 1A to 13A supplementary current limiting breakers that are selected at the time of order based on the actual lighting loads specified. Units are factory pre-assembled and customized for your specific application…no programming is required. Complimentary factory assistance is provided to guide you through the simple specification process.

Surface Mount

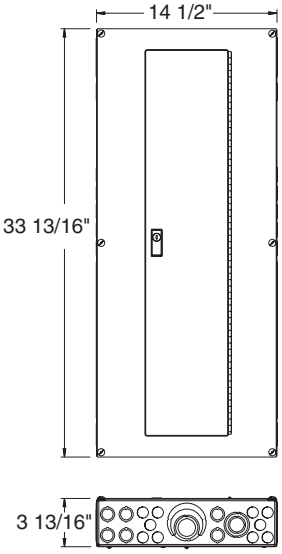
Catalog #	Description
CLS6	Surface Mount, 6 Circuit
CLS7	Surface Mount, 7 Circuit
CLS8	Surface Mount, 8 Circuit
CLS9	Surface Mount, 9 Circuit
CLS10	Surface Mount, 10 Circuit
CLS11	Surface Mount, 11 Circuit
CLS12	Surface Mount, 12 Circuit
CLS13	Surface Mount, 13 Circuit
CLS14	Surface Mount, 14 Circuit
CLS15	Surface Mount, 15 Circuit
CLS16	Surface Mount, 16 Circuit
CLS17	Surface Mount, 17 Circuit
CLS18	Surface Mount, 18 Circuit
CLS19	Surface Mount, 19 Circuit
CLS20	Surface Mount, 20 Circuit
CLS21	Surface Mount, 21 Circuit

6-21 Circuit Panel



Catalog #	Description
CLS22	Surface Mount, 22 Circuit
CLS23	Surface Mount, 23 Circuit
CLS24	Surface Mount, 24 Circuit
CLS25	Surface Mount, 25 Circuit
CLS26	Surface Mount, 26 Circuit
CLS27	Surface Mount, 27 Circuit
CLS28	Surface Mount, 28 Circuit
CLS29	Surface Mount, 29 Circuit
CLS30	Surface Mount, 30 Circuit
CLS31	Surface Mount, 31 Circuit
CLS32	Surface Mount, 32 Circuit
CLS33	Surface Mount, 33 Circuit
CLS34	Surface Mount, 34 Circuit
CLS35	Surface Mount, 35 Circuit
CLS36	Surface Mount, 36 Circuit
CLS37	Surface Mount, 37 Circuit
CLS38	Surface Mount, 38 Circuit
CLS39	Surface Mount, 39 Circuit
CLS40	Surface Mount, 40 Circuit
CLS41	Surface Mount, 41 Circuit
CLS42	Surface Mount, 42 Circuit

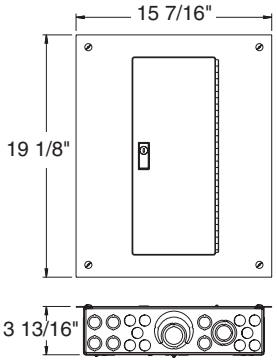
22-42 Circuit Panel



Flush Mount

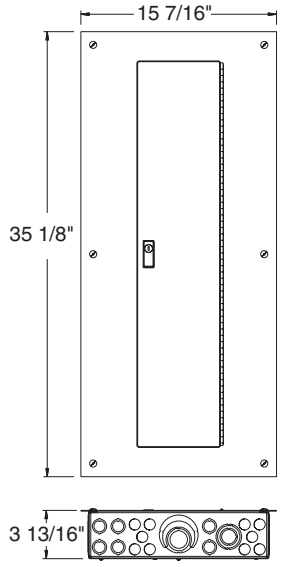
Catalog #	Description
CLS6F	Flush Mount, 6 Circuit
CLS7F	Flush Mount, 7 Circuit
CLS8F	Flush Mount, 8 Circuit
CLS9F	Flush Mount, 9 Circuit
CLS10F	Flush Mount, 10 Circuit
CLS11F	Flush Mount, 11 Circuit
CLS12F	Flush Mount, 12 Circuit
CLS13F	Flush Mount, 13 Circuit
CLS14F	Flush Mount, 14 Circuit
CLS15F	Flush Mount, 15 Circuit
CLS16F	Flush Mount, 16 Circuit
CLS17F	Flush Mount, 17 Circuit
CLS18F	Flush Mount, 18 Circuit
CLS19F	Flush Mount, 19 Circuit
CLS20F	Flush Mount, 20 Circuit
CLS21F	Flush Mount, 21 Circuit

6-21 Circuit Panel



Catalog #	Description
CLS22F	Flush Mount, 22 Circuit
CLS23F	Flush Mount, 23 Circuit
CLS24F	Flush Mount, 24 Circuit
CLS25F	Flush Mount, 25 Circuit
CLS26F	Flush Mount, 26 Circuit
CLS27F	Flush Mount, 27 Circuit
CLS28F	Flush Mount, 28 Circuit
CLS29F	Flush Mount, 29 Circuit
CLS30F	Flush Mount, 30 Circuit
CLS31F	Flush Mount, 31 Circuit
CLS32F	Flush Mount, 32 Circuit
CLS33F	Flush Mount, 33 Circuit
CLS34F	Flush Mount, 34 Circuit
CLS35F	Flush Mount, 35 Circuit
CLS36F	Flush Mount, 36 Circuit
CLS37F	Flush Mount, 37 Circuit
CLS38F	Flush Mount, 38 Circuit
CLS39F	Flush Mount, 39 Circuit
CLS40F	Flush Mount, 40 Circuit
CLS41F	Flush Mount, 41 Circuit
CLS42F	Flush Mount, 42 Circuit

22-42 Circuit Panel



Note:
Individual current limiting circuit breaker ratings are determined by the electrical layout drawings. A submittal package will be provided by Juno for customer approval following receipt of order. Current limiting circuit breaker ratings and panel position are not required to be specified as part of the catalog number.

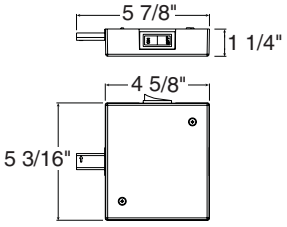
Current Limiting Feeds

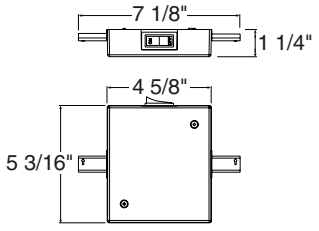
Juno Current Limiting Feeds are the perfect solution for new construction or for bringing existing Juno line-voltage track lighting applications into conformance with today's stringent energy codes. They enable you to take full advantage of energy efficient, high-performance CMH and CFL track fixtures without being penalized by watts-per-linear-foot code calculations, reducing calculated watts by as much as 75% or more.

Current Limiting Feeds are designed to take the place of standard non-limiting feeds and are installed at every track feed location. The feeds are compact and mount close to the ceiling for an unobtrusive appearance. Each feed connector is designed to accept up to two current limiting circuit breakers simultaneously. Feeds are supplied with tamper-resistant cover screws and screwdriver bits making installation convenient and future tampering impractical. Available in both end feed and in-line feed configurations, the Current Limiting Feeds can be specified for either Trac-Master 1-circuit, Trac-Master 2-circuit or Trac-Lites 1-circuit track systems.

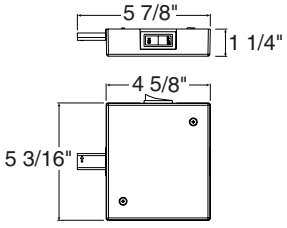
Current limiting circuit breakers (ordered separately) are available in increments from 1A to 14A enabling selection that closely matches the planned wattage use. Color-coded ON/OFF indication clearly identifies their status and they are easily resettable in the event of an overload situation.

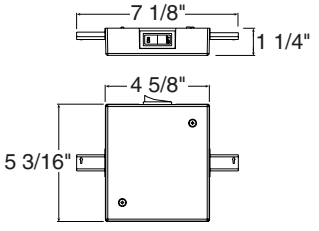
Trac-Master

End Feeds	Catalog #	Description	Trac Type	Finish	Dimensions
	TCLF11BL	End Feed	1-Circuit	Black	
	TCLF11WH	End Feed	1-Circuit	White	
	TUCLF11BL	End Feed	2-Circuit	Black	
	TUCLF11WH	End Feed	2-Circuit	White	

In-Line Feeds	Catalog #	Description	Trac Type	Finish	Dimensions
	TCLF21BL	In-Line Feed	1-Circuit	Black	
	TCLF21WH	In-Line Feed	1-Circuit	White	
	TUCLF21BL	In-Line Feed	2-Circuit	Black	
	TUCLF21WH	In-Line Feed	2-Circuit	White	

Trac-Lites

End Feeds	Catalog #	Description	Trac Type	Finish	Dimensions
	RCLF11BL	End Feed	1-Circuit	Black	
	RCLF11WH	End Feed	1-Circuit	White	

In-Line Feeds	Catalog #	Description	Trac Type	Finish	Dimensions
	RCLF21BL	In-Line Feed	1-Circuit	Black	
	RCLF21WH	In-Line Feed	1-Circuit	White	

Current Limiting Circuit Breakers - Order Separately

Catalog#	Description	Wattage	Finish
TCL1	1A Current Limiting Circuit Breaker	120W	WH, BL
TCL2	2A Current Limiting Circuit Breaker	240W	WH, BL
TCL3	3A Current Limiting Circuit Breaker	360W	WH, BL
TCL4	4A Current Limiting Circuit Breaker	480W	WH, BL
TCL5	5A Current Limiting Circuit Breaker	600W	WH, BL
TCL6	6A Current Limiting Circuit Breaker	720W	WH, BL
TCL7	7A Current Limiting Circuit Breaker	840W	WH, BL
TCL8	8A Current Limiting Circuit Breaker	960W	WH, BL
TCL9	9A Current Limiting Circuit Breaker	1080W	WH, BL
TCL10	10A Current Limiting Circuit Breaker	1200W	WH, BL
TCL12	12A Current Limiting Circuit Breaker	1440W	WH, BL
TCL14	14A Current Limiting Circuit Breaker	1680W	WH, BL

Ordering Example: TCLF11BL and TCL5BL

Energy Codes

Current energy codes impacting track lighting applications.

ASHRAE/IESNA Standard 90.1-2007

9.1.4 Luminaire Wattage. Luminaire wattage incorporated into the installed interior lighting power shall be determined in accordance with the following criteria:

c. For line-voltage lighting track and plug-in busway, designed to allow the addition and/or relocation of luminaires without altering the wiring of the system, the wattage shall be

1. the specified wattage of the luminaires included in the system with a minimum of 30 W/lin ft or
2. the wattage limit of the system's circuit breaker or
3. the wattage limit of other permanent current-limiting device(s) on the system.

d. The wattage of low-voltage lighting track, cable conductor, rail conductor, and other flexible lighting systems that allow the addition and/or relocation of luminaires without altering the wiring of the system shall be the specified wattage of the transformer supplying the system.

2008 Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Title 24)

SECTION 130 – LIGHTING CONTROLS AND EQUIPMENT – GENERAL

(d) Luminaire power. Luminaire wattage shall be determined as follows, or by a method approved by the Executive Director:

3. The wattage of line-voltage lighting track and plug-in busway which allows the addition or relocation of luminaires without altering the wiring of the system shall be determined by one of the following methods:

A. The wattage of line voltage busway and track rated for more than 20 amperes shall be the total volt-ampere rating of the branch circuit feeding the busway and track.

B. The wattage of line voltage busway and track rated for 20 amperes or less shall be determined by one of the following methods:

i. The volt-ampere rating of the branch circuit feeding the track or busway, or

ii. The higher of the rated wattage of all of the luminaires included in the system, where wattage is determined according to Section 130(d)(1, 2, 4, 5, or 6) as applicable, or 45 watts per linear foot, or

iii. When using an integral current limiter, the higher of the volt-ampere rating of an integral current limiter controlling the track or busway, or 12.5 watts per linear foot of track or busway, provided that the integral current limiter complies with Section 119(l), or

iv. When using a dedicated track lighting supplementary overcurrent protection panel, the sum of the ampere (A) rating of all of the overcurrent protection devices times the branch circuit voltages.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