ECOSENSE

TROV Flex L09

101 Handbook

Complete Guide to TROV Flex including an extensive list of Frequently Asked Questions

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DESIGN

1. WHAT'S THE IDEA BEHIND THE TROV FLEX L09 DESIGN?

A. The design philosophy for TROV Flex L09 was to create a small, cost effective, exterior linear projector that maintains the quality of light our customers have come to expect.

2. HOW IS TROV FLEX L09 DIFFERENT THAN TROV L50?

A. L09 and L50 are both linear projectors that can be used in interior or exterior applications. L50 has an integral driver which makes it five times larger than L09, but gives it the ability to have run lengths up to 25 times longer than L09. L09 has a higher IP ratings and corrosion protection.

3. WHAT MATERIALS ARE USED TO MAKE TROV FLEX L09 WATERPROOF?

A. The L09 housing and optics are made from silicone unlike most flexible luminaires which are made from PVC.

4. WHY IS SILICONE BETTER THAN PVC?

A. Silicone does not fade, yellow, or crack like PVC, giving it a longer life. Silicone is also impervious to most chemicals, so it can be used in harsh conditions like marine and natatorium environments. Silicone is made from silica which comes primarily from sand, which makes it environmentally friendly. PVC is made from Petroleum based materials that contain chemicals like BPA and are bad for the environment.

6. WHAT IS THE INGRESS PROTECTION (IP) RATING OF L09?

A. L09 is rated to IP67 which means it is completely protected from dust and can be submerged in a few inches of water for short periods of time.

IP	First Digit Ingress of Solid Objects	Second Digit Ingress of Liquids
0	No Protection	No Protection
1	Protected against solid objects over 50mm	Protected against vertically falling drops of water or condensation
2	Protected against solid objects over 12.5mm	Protected against falling drops of water, if the case is disposed up to 15° from vertical
3	Protected against solid objects over 2.5mm	Protected against sprays of water from any direction, even if the case is disposed up to 60° from vertical
4	Protected against solid objects over 1.0	Protected against splash water from any direction
5	Limited protection against dust ingress (no harmful deposit)	Protected against low pressure water jets from any direction. Limited ingress permitted
6	Totally protected against dust ingress	Protected against low pressure water jets from any direction. Limited ingress permitted
7	N/A	Protected against short periods of immersion in water
8	N/A	Protected against long, durable periods of immersion in water
9K	N/A	Protected against closerange high pressure, high temperature spray downs

7. CAN TROV FLEX L09 BE CUT IN THE FIELD?

A. Yes, L09 can be cut in the field every 6 inches using the specially designed cutting tool, L09-A-CUTTOOL. The cutting tool was designed to cut the silicone housing without damaging the optics, LED boards, or connector.

8. HOW IS TROV FLEX L09 PROTECTED FROM WATER INGRESS AFTER IT IS CUT?

A. The terminator cap, L09-A-CAP, must be used to seal the end of L09 that was cut. The cap has non-hardening silicone inside which prevents water ingress. The terminator cap is not required in interior applications.

9. IS THE CUTTING TOOL REQUIRED TO CUT TROV FLEX L09?

A. No, a utility knife can be used to cut the silicone housing, but damage to the optic, LED board, and connector might occur. The cutting tool is highly recommended.

10. ONCE A SECTION OF TROV FLEX L09 HAS BEEN CUTOFF, CAN IT BE REATTACHED?

A. Yes, but L09 will no longer be waterproof.

11. CAN TROV FLEX L09 BE CUT AND RECONNECTED USING JUMPER CABLE AND LEADER CABLES IN EXTERIOR APPLICATIONS?

A. No, L09 jumper and leader cables are not outdoor wet location rated. Jumper and leader cables are for interior use only.

12. HOW FLEXIBLE IS TROV FLEX L09?

A. L09 can flex in the vertical direction to a minimum diameter of 6-inches(150mm). L09 cannot flex in the horizontal direction.

INSTALLATION

13. HOW IS TROV FLEX L09 MOUNTED?

A. L09 is mounted using stainless steel brackets, L09-A-MNT-BRKT. These brackets are screwed to the mounting surface every 6 inches and will hold onto the fixture with teeth that grab the silicone housing. These teeth will not compromise the integrity of the product.

14. HOW IS TROV FLEX L09 POWERED?

A. L09 is a Class 2 remote driver luminaire that operates at 24VDC. This means it cannot be powered by directly connecting it to building wire. It must be wired to a remote driver which will convert the building's power to 24VDC.

15. HOW IS TROV FLEX L09 WIRED?

A. Each L09 fixture comes with 12" leads pre-installed. These wires can be spliced to wire supplied by the installer that will run to the remote driver. Since the fixture is Class 2, conduit and junction boxes are not required by NEC, but some local municipalities might require them, so please contact your local building inspector.

16. SINCE TROV FLEX L09 COMES WITH A PRE-INSTALLED LEADER CABLE, ARE ADDITIONAL LEADER CABLES NEEDED?

A. No, leader cables are only needed if a cut off section will be used in another run.

17. CAN MULTIPLE RUNS BE WIRED TO A SINGLE DRIVER?

A. Yes, as long as the maximum wattage of the driver is not exceeded, multiple runs can be wired to one driver.

18. DOES THE OPERATING WATTAGE LISTED FOR EACH DRIVER NEED TO BE DE-RATED?

A. No, the specified operating wattage is the maximum wattage that can be used on that driver. A 96W driver will power 96W of load.

19. HOW FAR CAN THE DRIVER BE FROM THE FIXTURES?

A. The distance from the driver to the fixture will depend on the wattage and the wire gauge being used. Standard voltage drop calculation can be used to calculate the maximum distance. The chart below can be used as a guide.

WIRE GAUGE	10W .42 A	20W .83 A	30W 1.3 A	40W 1.7 A	50W 2.1 A	60W 2.5 A	70W 2.9 A	80W 3.3 A	90W 3.75 A	100W 4.2 A
20 AWG	85 ft.	43 ft.	27 ft.	21 ft.	17 ft.	14 ft.	12 ft.	11 ft.	9 ft.	8 ft.
18 AWG	134 ft.	68 ft.	45 ft.	33 ft.	27 ft.	22 ft.	19 ft.	17 ft.	15 ft.	14 ft.
16 AWG	215 ft.	109 ft.	72 ft.	54 ft.	43 ft.	36 ft.	31 ft.	27 ft.	24 ft.	22 ft.
14 AWG	345 ft.	174 ft.	115 ft.	86 ft.	69 ft.	57 ft.	49 ft.	43 ft.	39 ft.	36 ft.
12 AWG	539 ft.	272 ft.	181 ft.	135 ft.	108 ft.	90 ft.	77 ft.	68 ft.	61 ft.	56 ft.
10 AWG	784 ft.	397 ft.	263 ft.	197 ft.	158 ft.	131 ft.	112 ft.	98 ft.	97 ft.	82 ft.

20. WHAT IS THE MAXIMUM LENGTH TROV FLEX L09 CAN RUN OFF OF ONE POWER FEED?

A. L09 comes in two nominal power levels, 5W/ft and 9W/ft. The 5W/ft is limited to 20-foot runs and the 9W/ft is limited to 10-foot runs. However, the 5W/ft is limited to 10-foot runs in wet locations because the fixtures only come in 10-foot lengths and L09 currently does not have an accessory to seal the connection between two 10-foot sections. After these maximum run lengths addition power feeds will be needed at every maximum run length.

EX. There is a 45-foot interior run of L09 5W/ft. Since the maximum run length is 20-feet there will be a power feed at 0ft, 20ft, and 40ft for the last 5-feet of the run. If this run were exterior there would need to be a power feed every 10-feet.

21. HOW MANY REMOTE DRIVERS ARE NEEDED TO POWER TROV FLEX L09?

A. L09 comes in two nominal power levels, 5W/ft and 9W/ft, with maximum operating wattage of 4.8W/ft and 8.7W/ft, respectively. TROV Flex Drivers come in 40W, 60W, and 96W options. Multiply the number of feet by the operating wattage to determine the total wattage. If the total wattage is less than 96W, 60W or 40W, use one driver that the total wattage does not exceed. If the total wattage exceeds 96W more than one driver will be needed.

EX 1. There is a 5-foot run of L09 9w/ft. 5ft x 8.7W/ft = 43.5W, so one 60W driver will be needed.

EX 2. There is a 45-foot run of L09 5W/ft. 45ft x 4.8W/ft = 216W. 216W ÷ 96W = 2.25, so 2 x 96W drivers will be needed. This leaves 24W, so 1 x 40W driver will also be needed. The 1st 96W driver will power the 1st 20ft, the 2nd 96W driver will power the 2nd 20ft, and the 40W driver will power the remaining 5ft. Driver count does not change for interior or exterior applications since multiple power feeds can be run to a single driver.

22. CAN TROV FLEX L09 BE USED IN CURVED APPLICATIONS?

A. Yes, for interior applications the fixtures can be cut to 6-inch sections that can be connected with jumper cables, which allow it to wrap around tight curves.

23. CAN TROV FLEX L09 BE PAINTED?

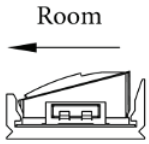
A. No, L09 is made from flexible silicone which cannot be painted.

24. WHAT MATERIALS ARE USED TO MAKE TROV FLEX L09 OPTICS?

A. The L09 optics are made from the same silicone material as the housing to ensure proper bonding between the two. Silicone has excellent optical performance and will not degrade the light or beam quality.

25. HOW IS THE ASYMMETRIC L09 INSTALLED INTO A COVE?

A. The L09 asymmetric fixture is installed in a cove with the optics aimed into the room.



26. ARE THE TROV FLEX L09 OPTICS FIELD REPLACEABLE?

A. No, L09 optics are sealed into the fixture and cannot be removed.

27. IS THERE A VERSION OF TROV FLEX L09 THAT DOESN'T HAVE AN OPTIC AND HAS A WIDE 110°-120° BEAM, SOMETIMES REFERRED TO AS OPEN BEAM?

A. No, currently L09 does not have an open beam option. A 120° option will be added in a future release.

28. WILL THERE BE ADDITION OPTICS ADD TO TROV FLEX L09?

A. Yes, we plan on developing addition optics for L09.

DRIVER / POWER SUPPLY

29. WHY DOES TROV FLEX L09 REQUIRE A REMOTE DRIVER THAT IS PURCHASED SEPARATELY?

A. TROV Flex L09 was designed to be as small as possible and to achieve this the driver needs to be remote.

30. DOES THE DRIVER NEED TO BE PUT INTO AN ENCLOSURE?

A. No, all our remote drivers come installed in IP66 enclosures, so conduit can be run directly to the driver without any additional parts.

31. WHAT IS THE DIFFERENCE BETWEEN MAGNETIC AND ELECTRONIC DRIVERS?

A. Magnetic drivers use a combination of an AC step-down transformer and an AC to DC driver. Magnetic drivers have fewer electronics and are made mostly of wire windings, which give them a much longer life and make them more reliable than electronic drivers. Electronic drivers use electronics to step down the AC power and convert it to DC. They are smaller, have more control functionality, and are usually cheaper than magnetic drivers. We offer both, so you can choose which is best for your application.

32. WHAT IS THE DIFFERENCE BETWEEN A REGULAR MAGNETIC DRIVER AND A "REGULATED" MAGNETIC DRIVER?

A. A regular magnetic driver uses limited electronics to convert AC power to DC, which can cause substantial flicker, especially when dimmed. Regulated magnetic drivers have more sophisticated electronics that eliminate flicker, even at very low-end dimming levels.

33. WHEN CALCULATING LOAD DOES THE DRIVERS NEED TO BE DE-RATED?

A. No, the drivers are designed to operate at their full rated power.

34. WHAT DOES MULTI-VOLT 120-277V MEAN?

A. Multi-volt drivers can accept any voltage from 120V to 277V. No special wiring is need and there is only one input hot wire. The electronics in the driver will detect which voltage is being used and adjust to that voltage.

35. WHAT DOES DUAL TAP 120/277 MEAN?

A. Magnetic drivers cannot use electronics to regulate input voltage. Many magnetic drivers will only operate at a single voltage, but dual tap drivers have two input wires, hence the name dual tap. If the input voltage is 120V, the 120V wire must be used. If the input voltage is 277V, the 277V input wire must be used. Damage can occur if 277V is wired to the 120V wire.

36. HOW FAR CAN THE DRIVER BE FROM THE FIXTURES?

A. The distance from the driver to the fixture will depend on the wattage and the wire gauge being used. Standard voltage drop calculation can be used to calculate the maximum distance. The chart below can be used as a guide.

WIRE GAUGE	10W .42 A	20W .83 A	30W 1.3 A	40W 1.7 A	50W 2.1 A	60W 2.5 A	70W 2.9 A	80W 3.3 A	90W 3.75 A	100W 4.2 A
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37. WHAT IS THE BINNING STRATEGY FOR TROV FLEX L09 AND HOW DOES IT COMPARE TO TROV?

A. TROV Flex L09 uses a 2-step SDCM bin from Samsung, while TROV uses a 2-step SDCM from Lumileds. Even though the LEDs are made from different manufactures, the bins are the same, which will ensure the closest possible color match.

38. WHAT LED DOES TROV FLEX L09 USE?

A. L09 uses Samsung LM101A, which is a Chip Scale Package (CSP). CSP LEDs are the smallest LED packages available. They are only slightly larger than the chip itself, which is where they get their name.

39. HOW MANY LEDS ARE THERE PER FOOT?

A. L09 uses 7 LEDs in every 6-inch section, so there are 14 LEDs per foot.

40. WHAT IS THE LED PITCH OF TROV FLEX L09?

A. L09 has an LED pitch of 0.857" (21.8mm).

41. WHAT HAPPENS WHEN ONE LED GOES OUT? DOES THE FIXTURE TURN OFF?

A. No, one LED failure will not prevent other LEDs from working.

42. CAN I REPLACE THE LED BOARD IF AN LED GOES OUT?

A. No, the LED board is not field replaceable, but the 6-inch section can be swapped out with a new one in interior applications.

43. HOW LONG WILL THE TROV FLEX L09 LEDS LAST?

A. L09 has an L70 of greater than 50,000 hours at 25C ambient conditions.

44. WHAT KIND OF DIMMERS ARE COMPATIBLE WITH TROV FLEX L09?

A. Dimming of TROV Flex L09 is dependent on the remote driver being used. TROV Flex Regulated Magnetic drivers will work with most TRIAC or Magnetic-Low-Voltage (MLV) dimmers. TROV Flex Electronic drivers will work with 0-10V, ELV, and TRIAC dimmers. See dimmer compatibility sheet for a list of approved dimmers and their performance.

45. WHAT HAPPENS IF I CONNECT TROV FLEX DRIVERS TO A NON-COMPATIBLE DIMMER?

A. TROV Flex drivers will likely still work, but flickering or other performance issues might be observed.

46. DOES TROV FLEX L09 HAVE TO BE USED WITH TROV FLEX DRIVERS?

A. No, but we cannot guarantee the performance of the product if L09 is used with another driver.

47. HOW LOW CAN TROV FLEX L09 BE DIMMED TO?

A. L09 can be dimmed to 0% when used with TROV Flex drivers.

48. WHAT IS ELV DIMMING?

A. ELV stands for Electronic Low Voltage. ELV is reverse-phase dimming, which means the voltage is turned off on the back of the sine wave, unlike forward phase which turns off voltage on the front of the sine wave. Reverse phase is quieter and more stable. ELV does not always mean the fixture is low voltage, but in this case it is.

49. WHAT IS TRIAC DIMMING?

A. TRIAC is short for Triode for Alternating Current. TRIAC dimming is forward-phase and it the most widely used dimming protocol in the world. TRIAC dimmers are mostly found in residential use because of the low cost, wide range of options, and availability at most hardware stores.

50. WHAT IS MLV DIMMING?

A. MLV stands for Magnetic Low Voltage. MLV is forward-phase and is only used with Magnetic drivers and transformers.

51. WHAT IS 0-10V DIMMING?

A. 0-10V is a dimming protocol that uses two extra wires that send a signal to the driver to control dimming levels. These wires are typically Violet and Grey. They carry an analog signal that ranges from 0VDC-10VDC. When the driver sees 0VDC it will dim to its lowest setting or turns off depending on the driver. When the driver sees 10VDC it goes to full brightness.

CERTIFICATIONS & COMPLIANCE

52. IS TROV FLEX L09 UL OR ETL LISTED?

A. TROV Flex L09 is ETL listed to UL standards for surface mount wet locations use.

53. WHAT OTHER CERTIFICATIONS DOES TROV FLEX L09 HAVE?

A. TROV Flex L09 90CRI meets the requirements for ETLus, ETLc, CE, RoHS, and California Title 24 JA-8 2019. L09 80CRI meets the requirements for ETLus, ETLc, and RoHS. See the spec sheet for a complete list.

54. CAN TROV FLEX L09 BE CUT AT THE FACTORY?

A. Yes, TROV Flex can be factory cut to order. Please contact your local sales representative for more details.

55. CAN SHOP DRAWINGS BE CREATED UPON REQUEST FOR TROV FLEX L09?

A. Yes, shop drawings can be generated that will show run lengths and wiring diagrams. Please contact your local sales representative for more details.

56. IS TROV FLEX L09, "MADE IN AMERICA"?

A. No, 50% of the fixture must be made in the USA to meet this requirement and L09 does not meet this requirement.

57. WILL TROV FLEX L09 MEET THE "BUY AMERICAN" AND "BUY AMERICA" ACTS?

A. No, the fixture must be "Made in America" to meet the requirements for these acts.

58. WILL THE FIXTURES AND BOXES BE LABELED "MADE IN CHINA"?

A. Yes, they both say, "Made in China."

59. WILL WE MEET USMCA STANDARDS?

A. No, L09 fixtures do not meet NAFTA requirements.

60. WHEN ARE THE TROV FLEX L09 MOUNTING BRACKETS USED?

A. L09 mounting brackets, L09-A-BRKT, are needed for every 6-inches of fixture length.

61. CAN TROV FLEX L09 LEADER AND JUMPER CABLES ACCESSORIES BE USED IN OUTDOOR WET LOCATIONS?

A. No, L09 accessory cables are for interior use only.

62. WHEN ARE LEADER CABLES NEEDED FOR TROV FLEX L09?

A. For interior applications when cut sections of L09 are intended to be reused to start a new run.

EX. The application is two 5-foot runs of 9W/ft. Order one 10-foot spool and one-leader cable. The 10-foot spool is cut in half then the additional leader cables is added to the cut off piece.

63. WHEN ARE JUMPER CABLES NEEDED FOR TROV FLEX L09?

A. For interior applications with curves or corners. Jumper cables can be added to the ends of two sections to go around curves or corners.

64. WHEN ARE THE TROV FLEX L09 STRAIN RELIEF NEEDED?

A. The L09 strain relief, L09-A-SR, can be used to secure leader and jumper accessories from accidentally becoming disconnected. They are not required, but if the fixture is easily accessible it is recommended.