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REPORT

On

Low-voltage Lighting Systems, Power Units, Luminaires and Fittings

LEDINGEDGE LIGHTING INC
Goodyear, Arizona

PRODUCT COVERED:

*USL, CNL – Low Voltage LED Luminaires, Models MIN21, MIN63, MIN48, MIN72, MIN36, MIN42, MIN32, MIC32, MIN16, and MIC16, MIN18, MIN28 MIN12, MIN06, RM03, RM04, RM06, RM08, O1R18, O1R28, O1R32, O2R18, O2R28, O2R32, O1R12, O2R12, O1R06, and O2R06, MM1R18, MM1R28, MM1R32, MM2R18, MM2R28, MM2R32, MM1R12, MM2R12, MM1R06, MM2R06, O1R36, O2R36, MIC1665-T follow by OFTD-F or OFTS-F, MIC3250-T follow by OFTD-F or OFTS-F, MIC-OFTD-F or MIC-OFTS-F, MICPRM, MINPRM. May additionally be provided with suffixes.

GENERAL CONSTRUCTION:

These Low Voltage Class 2 Luminaires shall comply with Section General and with the following description.

Unless otherwise indicated, all components of products bearing the C-UL mark shall be Listed or Recognized for Canada or CSA Certified, in addition to being UL Listed or Recognized.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

USL - Products designated USL have been investigated using US requirements as noted in the Test Record.

CNL – Products designated CNL have been investigated using Canadian requirements as noted in the Test Record.

Models Described in this Report (Table 1):

Model Series	Input Voltage, Vdc	Max. Nominal Length, inches	Max # of LED's	Maximum Wattage, W	Note: LED typical forward current
MIN21	12 V	97	168	13.60	20mA
MIN63	12 V or 24 V	97	168	40.32	60mA
MIN72	12 V or 24 V	97	312	24.96w	20mA
MIN48	12 V or 24 V	89	384	28.8	20mA
MIN36	12 V or 24 V	97	156	45W	65mA
			156	55W	80mA
			156	70W	100mA
MIN42	12 V or 24 V	97	182	40W	50mA
		97	182	45W	65mA
		97	182	55W	80mA
		97	182	70W	100mA
MIN18	12 V or 24 V	97	78	22.5W	65mA
			78	27.5W	80mA
			78	35W	100mA
MIN28	12 V or 24 V	94.5	119	20.4W	50mA
		94.5	119	22.5W	65mA
		94.5	119	27.5W	80mA
		94.5	119	35W	100mA
*MIN32, MIC32, MICPRM, MINPRM	12 V or 24 V	94.5	136	21.2W	50mA
		94.5	136	29.7W	65mA
		94.5	136	32.6W	80mA
		94.5	136	40.8W	100mA
MIN12	12 V or 24 V	110	51	15W	65mA
			51	18W	80mA
			51	23W	100mA
MIN06	12 V or 24 V	110	24	7W	65mA
			24	8.6W	80mA
			24	10.8W	100mA
MIN16, MIC16	12 V or 24 V	94.5	72	10.6W	50mA
		94.5	72	14.9W	65mA
		94.5	72	16.3W	80mA
		94.5	72	20.4W	100mA

Note - 12 Vdc models limited to 60 W.

Models Described in this Report (Table 1):

Model Series	Input Voltage, Vdc	Max. Nominal Length, inches	Max # of LED's	Maximum Wattage, W	Note: LED typical forward current
O1R36	12 V or 24 V	68	108	30W	65mA
O2R36	12 V or 24 V	68	216	60W	65mA
O1R18	12 V or 24 V	68	54	15W	65mA
			54	19W	80mA
			54	24.5W	100mA
O1R28	12 V or 24 V	68	84	15W	50mA
			84	21W	65mA
			8	24W	80mA
			8	29W	100mA
O1R32	12 V or 24 V	68	96	15W	50mA
			96	21W	65mA
			96	24W	80mA
			96	29W	100mA
O2R18	12 V or 24 V	68	108	30W	65mA
			108	38W	80mA
O2R28	12 V or 24 V	68	168	30W	50mA
			168	42W	65mA
			168	48W	80mA
			168	58W	100mAmA
O2R32	12 V or 24 V	68	192	30W	65mA
			192	42W	65mA
			192	48W	80mA
			192	58W	100mA
O1R12	12 V or 24 V	68	36	10W	65mA
			36	12.5W	80mA
			36	16.5W	100mA
O2R12	12 V or 24 V	68	72	20W	65mA
			72	25W	80mA
			72	33W	100mA
O1R06	12 V or 24 V	68	18	5W	65mA
			18	6.5W	80mA
			18	8W	100mA
O2R06	12 V or 24 V	68	36	10W	65mA
			36	13W	80mA
			36	16W	100mA

Note - 12 Vdc models limited to 60 W.

Model Series	Input Voltage, Vdc	Max. Nominal Length, inches	Max # of LED's	Maximum Wattage, W	Note: LED typical forward current
MM1R18	12 V or 24 V	68	54	15W	65mA
			54	19W	80mA
			54	24.5W	100mA
MM1R28	12 V or 24 V	68	84	15W	50mA
				21W	65mA
			84	24W	80mA
			84	29W	100mA
MM1R32	12 V or 24 V	68	96	15W	50mA
				21W	65mA
			96	24W	80mA
			96	29W	100mA
MM2R18	12 V or 24 V	68	108	30W	65mA
			108	38W	80mA
MM2R28	12 V or 24 V	68	168	30W	50mA
			168	42W	65mA
			168	48W	80mA
			168	58W	100mA
MM2R32	12 V or 24 V	68	192	30W	50mA
			192	42W	65mA
			192	48W	80mA
			192	58	100mA
MM1R12	12 V or 24 V	68	36	10W	65mA
			36	12.5W	80mA
			36	16.5W	100mA
MM2R12	12 V or 24 V	68	72	20W	65mA
			72	25W	80mA
			72	33W	100mA
MM1R06	12 V or 24 V	68	18	5W	65mA
			18	6.5W	80mA
			18	8W	100mA
MM2R06	12 V or 24 V	68	36	10W	65mA
			36	13W	80mA
			36	16W	100mA

Note - 12 Vdc models limited to 60 W.

RM03	12 V	97	156	20W	30mA
			156	25W	40mA
			156	32W	50mA
			156	45W	65mA
			156	55W	80mA
			156	70W	100mA
RM06	24 V	97	156	20W	30mA
			156	25W	40mA
			156	32W	50mA
			156	45W	65mA
			156	55W	80mA
			156	70W	100mA
RM04	12 V	97	208	20W	30mA
			208	25W	40mA
			208	32W	50mA
			208	45W	65mA
			208	55W	80mA
			208	70W	100mA
RM08	24 V	97	208	20W	30mA
			208	25W	40mA
			208	32W	50mA
			208	45W	65mA
			208	55W	80mA
			208	70W	100mA

Note - 12 Vdc models limited to 60 W.

Series	Input Voltage, Vdc	Max. Nominal Length, inches	Max # of LED's	Maximum Wattage, W		Note: LED typical max. forward current
MIC1665-T follow by OFTD-F or OFTS-F	12 V or 24 V	94.5	72	Single unit	2.8 W	100 mA
				When Loaded	100 W	
MIC3250-T follow by OFTD-F or OFTS-F		94.5	136	Single unit	2.8 W	
				When Loaded	100 W	
MIC-OFTD-F and MIC-OFTS-F		3	N/A	Single unit	0.28 W	N/A
				When Loaded	100 W	

Note - 12 Vdc models limited to 60 W.

Model Series	Input Voltage, Vdc	Max. Wattage per ft
All Models	12 V or 24 V	5

Note - 12 Vdc models limited to 60 W.

Models MM1R12, MM2R12, MM1R06, **MM2R06, MM2R28, and MM2R32** are the same as O1R12, O2R12, O1R06, **O2R06, O2R28, and O2R32** except for marketing purposes.

NOMENCLATURE

MIN21	-	04	-	27K	-	C
I		II		III		IV

I: Indicates Model Series designation
II: Indicates luminaire nominal length in inches
III: Indicates LED Color Temperature
IV: Indicates lens color

Installation Instructions:

Provided and in accordance with Section General. Installation instructions shall be provided to instruct users to use a class 2 power unit with output not exceeding total output rating of 5 A or maximum wattage of the units when the units mounted in daisy chaining .

Model MIN21
Fig. 1

General – Fig. 1 illustrates the overall view and construction of the low-voltage LED luminaires. Model MIN21 represents Models MIN63 and MIN48, where differences are otherwise indicated. Measurements are nominal unless specified otherwise.

1. Housing Assembly – Three-piece construction:

Diffuser – R/C (QMFZ2) Rated min. 55°C, HB. Overall dimensions of 18 mm by 13 mm, length may vary.

End Caps – R/C (QMFZ2) Rated min. 55°C, HB. Two provided. Overall dimensions of 19 mm by 13 mm by 13 mm. Molded female quick connect with polarized groove, bi-pin type, soldered to PWB.

Base – Aluminum, min. 1.0 mm thick. Overall 15 mm by 6 mm, length may vary.

Alternate Base – Same as above except (QMFZ2)/CN, rated min. HB, 65°C, 1.3 mm thick.

Alternate Housing Assembly – Two-piece construction:

Diffuser – R/C (QMFZ2) Rated min. 65°C, HB. Overall dimensions of 18.8 mm by 12.7 mm, length may vary. Provided as a tube. Base not provided.

End Caps – R/C (QMFZ2) Rated min. 70°C, HB. Two provided. Overall dimensions of 19 mm by 13 mm by 13 mm. Molded female quick connect with polarized groove, bi-pin type, soldered to PWB.

2. PWB – R/C (ZPMV2) Rated min. HB, 90°C, min. 0.5 mm thick. 9.5 mm wide, length may vary.

Alternate - Not specified, located in a Class 2 circuit, rated min. 90°C as indicated by PWB manufacturer's specification, min. 0.5 mm thick. **5** mm wide, length may vary.

3. LED Array –

a. For Model MIN21 - Rated max. 3.5 V, 20 mA per LED. Spaced min. 14 mm apart, center-to-center. May be provided with SMD resistors.

b. For Model MIN63 – Same as MIN21, except rated max. 3.5 V, 60 mA per LED.

c. For Model MIN48 – Same as MIN21, except spaced min. 5 mm apart, center-to-center.

Alternate - Not specified, located in a class 2 circuit. Pwb is metal base or FR4 laminate type or flexible strip type, with LEDs and any associated circuitry of any rating or electrical configuration, provided the maximum total LED load shall not exceed 5W/ft (to be verified by measurement at the luminaire factory). The UL representative shall witness the manufacturer's measurement of the array load. The measurement shall be conducted with equipment that is calibrated in accordance with UL follow-up service requirements. The measurements and/or calculations shall not exceed the value indicated by greater than 10 percent. Measurements shall also not exceed output rating of driver.

4. Mounting Means – May be provided with one of the following mounting means.

a. Snap-in Brackets - Metal. Min. 0.6 mm thick, overall 2.0 by 1.8 by 1.3 cm. Secures to mounting surface by screws. Housing snaps into bracket by physical fit.

b. Double sided tape – May be provided on Housing Base to secure to mounting surface.

c. Magnetic tape - May be provided on Housing Base to secure to mounting surface.

d. Polymeric brackets – Polymeric. Shape and size as shown by Ill. 1.

5. Interconnecting Cord – Listed. Type SPT-1, 18 AWG/2C. Provided with molded male quick connector, R/C (QMFZ2), rated min. HB, with polarized groove.

6. Marking shall comply with the requirement in Section General. Each product shall provided with following markings:

- Manufacturer's name or trademark
- Model name or Cat. No.
- Date of manufacture
- Input Voltage and Amps or Wattage
- "USE ONLY WITH CLASS 2 POWER UNIT"
- "SUITABLE FOR DAMP LOCATIONS"
- May be marked "FOR CABINET USE ONLY" or "For under-cabinet mount" or for surface mounting.

* - When marked for cabinet use shall be additionally marked: "CAUTION – To reduce the risk of fire, do not install in a compartment smaller than 12 inches by 12 inches by __ inches.", where the blank is filled in with the length of the unit but no longer than maximum length specified in the table 1.

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ALTERNATE CONSTRUCTION MODELS MIN72, MIN36, MIN18, MIN12, MIN06, MIN32, MIC32, MIC16 and MIN16

General - MIN72, MIN36, MIN42, MIN18, MIN28, MIN32, MIC32, MIC16 and MIN16 MIN12, MIN06 are identical to MIN48 and MIN63 except specified below:

1. **Housing Assembly – Same as models MIN48 and MIN63, Fig. 1, except may be provided with alternate end cap construction QMFZ2, HB, rated min. 70°C, with molded on female/male connector with polarized groove, bi-pin type, soldered to PWB as shown in Fig. 6.**

2. LED Array –

*a. For **model** MIN72 22" board - **same** as MIN48 except MIN72 has six (20 mA) LED spaced **7.8** mm each segment, total **twelve** segments.

*b. For **model** MIN36 22" board – MIN36 24V has six (65 mA or 80 mA or 100 mA) LEDS spaced 15.5 mm each segment, total **six** segments.

* Alternate – MIN36 12V has three (65 mA or 80 mA or 100 mA) LEDS spaced 15.5 mm each segment, total **twelve** segments.

*c. For **model** MIN18 22" board – **same** as MIN36 24V except MIN18 24V has six (65Ma or 80mA or 100mA) LEDS spaced 31 mm each segment, total **three** segments.

* Alternate – **same** as MIN36 12V except MIN18 12V has three (65 mA or 80 mA or 100 mA) LEDS spaced 31 mm each segment, total **six** segments.

*d. For **model** MIN12 22" board - **same** as MIN36 24V except MIN12 24V has six (65 mA or 80 mA or 100 mA) LEDS spaced 46.5 mm each segment, total **two** segments.

e. For **model** – MIN42 22" board – MIN42 24V has seven (50 mA, 65 mA or 80 mA or 100 mA) LEDS spaced 13.2mm each segment, total 6 segments.

*f. For **models** – MIN32 and MIC32 22" board – MIN32 and MIC32: 24V has eight (50 mA, 65 mA or 80 mA or 100 mA) LEDS spaced 14.5 mm each segment, total **four** segments. 12 V has 4 (50 mA, 65 mA, 80 mA, or 100 mA) LEDS spaced 14.5 mm in each segment, total **eight** segments. For **models** MIC16 and MIN16, same as MIN32 except half the # of LEDS provided.

*g. For **model** – MIN28 22" board – MIN28 24V has seven (50 mA, 65 mA or 80 mA or 100 mA) LEDS spaced **20** mm each segment, total **four** segments.

* Alternate – **same** as MIN36 12V except MIN12 12V has three (65 mA or 80 mA or 100 mA) LEDS spaced 46.6 mm each segment, total **four** segments.

h. For model MIN06 22” board – same as MIN36 24V except MIN06 24V has six (65 ma or 80 mA or 100 mA) LEDS spaced 93 mm each segment, total one segment.

Alternate - same as MIN36 12V except MIN06 12V has three (65 mA or 80 mA or 100 mA) LEDS spaced 93 mm each segment, total two segments.

Alternate - Not specified, located in a class 2 circuit. Pwb is metal base or FR4 laminate type or flexible strip type, with LEDs and any associated circuitry of any rating or electrical configuration, provided the maximum total LED load shall not exceed 5W/ft (to be verified by measurement at the luminaire factory). The UL representative shall witness the manufacturer's measurement of the array load. The measurement shall be conducted with equipment that is calibrated in accordance with UL follow-up service requirements. The measurements and/or calculations shall not exceed the value indicated by greater than 10 percent. Measurements shall also not exceed output rating of driver.

Models **MICPRM**
Fig. 7

*General – Model **MICPRM** is identical to models MIN32 and MIC32 except as noted below. Model **MICPRM** also represents model, MINPRM.

1. Housing Assembly – Same as Housing Assembly in Fig. 1, models MIN32 and MIC32, except for minor shape of the end caps with molded on Interconnecting Cord as shown in Fig. 7.

MODELS O1R18, O1R12, O1R06, O1R28, O1R32

General – Models O1R18, O1R12, and O1R06 are identical to MIN18, MIN12, and MIN06, except for the following.

1. Housing Assembly – Two-piece construction:

* Diffuser – **QMFZ2**, min. 65°C, HB. Overall dimensions of **3.5 cm** by **1.9 cm**, length may vary. Provided as a tube. Base not provided.

* End Caps – **QMFZ2**, min. 70°C, **HB**, **two** provided. Overall dimensions of **3.8 cm** by **2.2 cm** by **2 cm**. Male quick connect with polarized groove, bi-pin type, soldered to PWB.

*3. Array –

a. For Model O1R18 24V 22” board – Same as MIN18 24V 22” board.

For **model** O1R18 12V 22” board – **same** as MIN18 12V 22” board.

b. For **model** O1R12 24V 22” board - **same** as MIN12 24V 22” board.

For **model** O1R12 12V 22” board – **same** as MIN12 12V 22” board.

c. For **model** O1R06 24V 22” board – **same** as MIN06 24V 22” board.

For **model** O1R06 12V 22” board - **same** as MIN06 12V 22” board.

d. For **model** O1R28 24v 22” board – **same** as MIN28 24V 22” board

For **model** O1R28 12V 22” board – **same** as MIN28 12V 22” board

e. For **model** O1R32 24V 22” board – **same** as MIN32 24V 22” board

For **model** O1R32 12V 22” board – **same** ae MIN32 12V 22” board

Alternate - Not specified, located in a class 2 circuit. Pwb is metal base or FR4 laminate type or flexible strip type, with LEDs and any associated circuitry of any rating or electrical configuration, provided the maximum total LED load shall not exceed 5W/ft (to be verified by measurement at the luminaire factory). The UL representative shall witness the manufacturer's measurement of the array load. The measurement shall be conducted with equipment that is calibrated in accordance with UL follow-up service requirements. The measurements and/or calculations shall not exceed the value indicated by greater than 10 percent. Measurements shall also not exceed output rating of driver.

MODELS O2R18, O2R12, O2R06, O2R28, and O2R32 – FIG. 2

*General – Models O2R18, O2R12, O2R06, O2R28, and O2R32 are identical to O1R18, O1R12, O1R06, O1R28, and O1R32 except provided with two arrays as shown.

Models O1R36, O2R36, and O2R32

General – Models O1R36, O2R32, and O2R36 are identical to O1R18 and O2R18 except as follows:

3. Array – For Models O1R36 and O2R36 – same as MIN36 12V/24V 22” board.

Alternate – O2R32

Alternate - Not specified, located in a class 2 circuit. Pwb is metal base or FR4 laminate type or flexible strip type, with LEDs and any associated circuitry of any rating or electrical configuration, provided the maximum total LED load shall not exceed 5W/ft (to be verified by measurement at the luminaire factory). The UL representative shall witness the manufacturer's measurement of the array load. The measurement shall be conducted with equipment that is calibrated in accordance with UL follow-up service requirements. The measurements and/or calculations shall not exceed the value indicated by greater than 10 percent. Measurements shall also not exceed output rating of driver.

MODELS MM1R18, MM2R18,MM1R28, and MM1R32

General – Models MM1R18,MM2R18,MM1R28, and MM1R32 are identical to O1R18,O1R12,O1R06,O1R28, and O1R32 except for the following.

1. Housing Assembly – As described except as follows. Two-piece construction:

   Diffuser – QMFZ2, min. 70°C, HB, overall dimensions of 1.9 cm by 1.3 cm, length may vary. Provided as a semi-cylindrical.

   End Caps – Overall dimensions of 2 cm by 1.4 cm.

MODELS RM03,RM04,RM06,RM08

General – Fig. 3 illustrates the overall view and construction of the low-voltage LED luminaires. Measurements are nominal unless specified otherwise.

1. Housing Assembly – Three-piece construction:

   Diffuser – QMFZ2, min. 55°C, HB, length may vary.

* End Caps – QMFZ2, min. 75°C, HB, two provided. Overall dimensions of 9 mm OD by 7.2 mm. Provided with UL/CN type SPT-1 cord, rated 300 V, min. 80°C, molded male/female quick connect with bi-pin type connector **or molded on connector as shown in Ill. 3.** Alternatively may employ other UL/CN cords or UL/CN wire, or AVLV2/CN wiring suitable for external use. **Alternatively may use other connectors not specified.**

   Base – Aluminum, min. 1.1 mm thick. Overall 9 mm OD, length may vary.

   Alternate Base – Same as above except QMFZ2, min. HB, 65°C, 9.2 mm OD.

2. PWB – Not specified, located in a class 2 circuit, min. HB, 75°C, min. 1 mm thick. 6 mm wide, length may vary.

3. Array – Ratings and number of LEDs provided as show in Table 1. Spaced min. 1.1 cm apart, center-to-center. May be provided with SMD resistors.

   Alternate - Not specified, located in a class 2 circuit. Pwb is metal base or FR4 laminate type or flexible strip type, with LEDs and any associated circuitry of any rating or electrical configuration, provided the maximum total LED load shall not exceed 5W/ft (to be verified by measurement at the luminaire factory). The UL representative shall witness the manufacturer's measurement of the array load. The measurement shall be conducted with equipment that is calibrated in accordance with UL follow-up service requirements. The measurements and/or calculations shall not exceed the value indicated by greater than 10 percent. Measurements shall also not exceed output rating of driver.

MODEL MIC3250-T
FIG. 4

General – Model MIC3250-T is identical to models RM03, RM04, RM06, RM08, MIN21, MIN72, MIN36, MIN42, MIN18, MIN28, MIN32, MIC32, MIC16 and MIN16 MIN12, MIN06, MIN48, MIN63, MM1R18, MM2R18, MM1R28, MM1R32, O1R18, O1R12, O1R06, O1R28, and O1R32 except for the following. Also represent models MIC1665-T follow by OFTD-F or OFTS-F.

1. Housing Assembly:

   Diffuser – Same as above except rated min. 90°C.

2. PWB – Same as above except rated min. 90°C.

7. Control Circuit – Integral to PWB, see Ill. 2 for components detail.

MODEL MIC-OFTD-F
FIG. 5

General – Fig. 5 illustrates the overall internal and external view of the product. Also represents model MIC-OFTS-F.

1. Housing Assembly –

   Diffuser – QMFZ2, rated min. 90°C, HB, overall dimensions min. 1.3 cm by 1 cm, length may vary. Provided as a tube.

   End Caps – QMFZ2, rated min. 55°C, HB, two provided. Molded female quick connected with polarized groove, bi-pin type, soldered to PWB.

2. PWB – ZPMV2, rated min. HB, 105°C, min. 1.5 mm thick, 10 mm wide, length may vary.

   Alternate - Not specified, located in a Class 2 circuit, rated min. 105°C as indicated by PWB manufacturer's specification, min. 1.5 mm thick. 10 mm wide, length may vary.

3. Components – Integral to PWB, see Ill. 2 for components detail.

4. Same as model MIN21, fig. 1, mounting means, except min. two provided.

   d. Polymeric brackets – Polymeric. Shape and size as shown, overall 1.3 cm by 3.1 cm by min. 1 mm thick.

5. Interconnecting Conductors – UL/CN flexible cord or UL/CN or AVLV2/CN suitable for external use, minimum 24 AWG/2C. Provided with molded male quick connector, not specified, located in a class 2 circuit.