

# Medical Operating Room Troffers: ML-OR-LED

1x4, 2x2 and 2x4 High Lumen LED Recessed Luminaires with RF Filtering

- **For use in Operating and Exam Rooms**
- **IP65 Rating**
- **RF filtered circuits standard**
- **Green/white switching available**
- **Asymmetric distribution standard**
- **Antimicrobial finish standard**
- **Lutron controls available**
- **B.A.A. Compliant & Made in the USA by a Family Owned US Corporation**



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## ORDERING GUIDE

| Series       | Material                                   | Size                   | Row Qty.     | LED Type    | CCT/CRI          | Circuits         | Green LED         | Voltage     | Mounting   | Optics  | Options |   |  |               |             |            |   |  |
|--------------|--|------------------------|--------------|-------------|------------------|------------------|-------------------|-------------|------------|---|---------|---|--|---------------|-------------|------------|---|--|
| <b>ML-OR</b> |  |                        |              |             |                  |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
| Series       | Material                                   | Size                   | Light Source |             |                  | Circuits (white) | Green LED         | Voltage     | Mounting   | Optics  |         |   |  |               |             |            |   |  |
|              |  |                        | Row Qty.     | LED Type    | CCT/CRI          |                  |                   |             |            | Options   |         |   |  |               |             |            |   |  |
| <b>ML-OR</b> | 3 White 430 SS Hsg. & White AM 430 SS Door | 1x4 1' x 4' Housing    | 1            | <b>LEDH</b> | <b>83 CRI:</b>   | 1/CIR            | <b>(optional)</b> | <b>120V</b> | <b>IND</b> | <b>ASY</b> Diffusing Optics Assembly With Linear Prismatic Asymmetric Distribution<br><b>SYM</b> P12 Prismatic Lens With Embedded RF Grid<br><b>FROST</b> 0.125" Flat Diffusing Frost Acrylic (No RFI Grid)<br><b>LBW</b> 0.125" Flat Diffused Acrylic with Linear Batwing Distribution (No RFI Grid)<br><b>GH85</b> 0.125" Flat Diffused Acrylic with Glare Suppression Distribution (No RFI Grid)<br><b>AB20</b> 0.125" Flat Diffused 20 Degree Asymmetric Distribution (No RFI Grid) |         |   |  |               |             |            |   |  |
|              |  |                        | 2            |             | <b>3000K</b>     |                  |                   |             |            |   |         | 2/CIR   |  |               |             |            |   |  |
|              | 4 White Alum Hsg. & White AM 430 SS Door   | 2x2 2' x 2' Housing    | 1            |             | <b>835 3500K</b> |                  |                   |             |            |   |         | Specify Qty of RF Filtered Circuits for White Light | <b>Green LED's are provided with a dedicated RF Filtered circuit</b> | <b>1/GLED</b> | <b>277V</b> | <b>CRM</b> | Note*: ASY option is standard and will be provided when no other option is selected |  |
|              |  |                        | 2            |             | <b>840 4000K</b> |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
|              | 5 White Alum Hsg. & White AM Alum Door     | OR 2x4 2' x 4' Housing | 2            |             | <b>850 5000K</b> |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
|              |  |                        | 3            |             | <b>90+ CRI:</b>  |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
|              | 7 White Alum Hsg. & White AM CRS Door      |                        | 4            |             | <b>935 3500K</b> |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
|              |  |                        |              |             | <b>940 4000K</b> |                  |                   |             |            |   |         |   |  |               |             |            |   |  |
|              |  |                        |              |             | <b>950 5000K</b> |                  |                   |             |            |   |         |   |  |               |             |            |   |  |

Ordering Notes, If Applicable

| Options      |   |
|--------------|---|
| <b>SW</b>    | Wet Location Hub Supplied (not installed)                 |
| <b>PxL *</b> | Programmed to User Specified Lumen Value.                 |
| <b>PxW *</b> | Programmed to User Specified Wattage Value.               |
| <b>10KV</b>  | 10KV Parallel Surge Protection (One Supplied Per Circuit) |
| <b>GTD</b>   | Generator Transfer Device                                 |
| <b>WHIP</b>  | Must Specify Length and Wire Qty                          |
| <b>OCCMW</b> | Internal microwave OCC Sensor                             |
| <b>FC</b>    | Fuse & Holder (One Supplied Per Circuit)                  |
| <b>EM10</b>  | 10W Integral LED EM (Specify Input Voltage)               |
| <b>EM20</b>  | 20W Remote LED EM (Specify Input Voltage)                 |
| <b>LDE1</b>  | Lutron Hi-Lume 1% Ecosystem LED Driver SOFTB              |
| <b>SSP</b>   | Satin Polished Stainless Steel Doorframe                  |
| <b>GG</b>    | 1/8" Thick Grid Gasket (Provided Loose)                   |

Note\*: Specify Value in Ordering Notes Below

# Medical Operating Room Troffers: ML-OR-LED

1x4, 2x2 and 2x4 High Lumen LED Recessed Luminaires with RF Filtering

## SPECIFICATIONS

**HOUSING:** One piece, hole free, robotically seam welded housing has flattened knockouts for a superior seal. Recessed housings are available in .040" 3003 Aluminum or 20Ga 430 Stainless Steel. Optional row mounting available must specify in options

**DOOR FRAME:** One-Piece Inset door frame regresses into the housing to allow the gasket to seal to the housing. Door frame is hinged by aircraft cables and secures to housing with captive stainless steel pan head screws. Available in .040" 3003 Aluminum, 20Ga 430 Stainless Steel, or 20Ga 1008 CRS.

**GASKETS:** Closed microcellular Nitrile gasket with vulcanized corners making a one-piece oil and solvent resistant gasket system. GG option provides a loose 1/8" thick adhesive backed gasket intended to adhere to the top face of a suspended grid ceiling for grid profiles that do not already have gasket on them.

**OPTICS:** Standard ASY Lens is a 3 piece assembly consisting of a clear flat acrylic lens on the room side followed by a linear asymmetric lens and finished with a frost overlay on top. The clear flat room side lens is used to allow an easy to clean surface. The frosted diffusing top layer provides a more evenly illuminated surface. Center lens is an Asymmetric distribution pattern optimized for high visibility within the surgical field and is provided with a silkscreened RF grid to absorb radiated emissions. Symmetric lens with inverted pattern & RF filtering is also available in options.

**LEDS:** Commercially available in a wide variety of Color Temperature (CCT), FLUX, and CRI. Highly efficient and consistent color maintained to 3 SDMC for color critical applications. B50/L70 and compliant with Zhaga recognized hole patterns. See options for available 540nm Green LEDs. Consult factory for LED options or configurations not listed below.

**ELECTRICAL:** Standard Universal Voltage Class 2 drivers are 0-10v Dimmable to 1% for most LED configurations. They come with at least 2.5Kv surge protection, have less than 10% THD at max load, Ballast Factor Greater than .95 and are programmable to match specific lumen or wattage requirements. Multiple internal circuits are available for scene settings, each specified circuit is provided with an RFI filter that is tested to meet MIL-STD-461. Fixtures available with 10w 90min Emergency battery backup and surge protection. Consult factory for additional options not listed.

**REFLECTOR:** Die formed metal with high reflectance white polyester powder coat finish. Typical reflectivity 92%.

**INSTALLATION:** Suitable for recessed Non-IC installation into covered ceilings. Fixtures are supplied with .875" flattened knockouts for supply entry. Recessed housings have (4) swing out toggle arms that are used to draw the fixture in to the ceiling for hard lid installation without the need for a yoke hanger. The toggle arm adjuster bolts are accessible from the room side of the luminaire and the actual toggles can be used as means of establishing a seismic support for lay in ceiling installations.

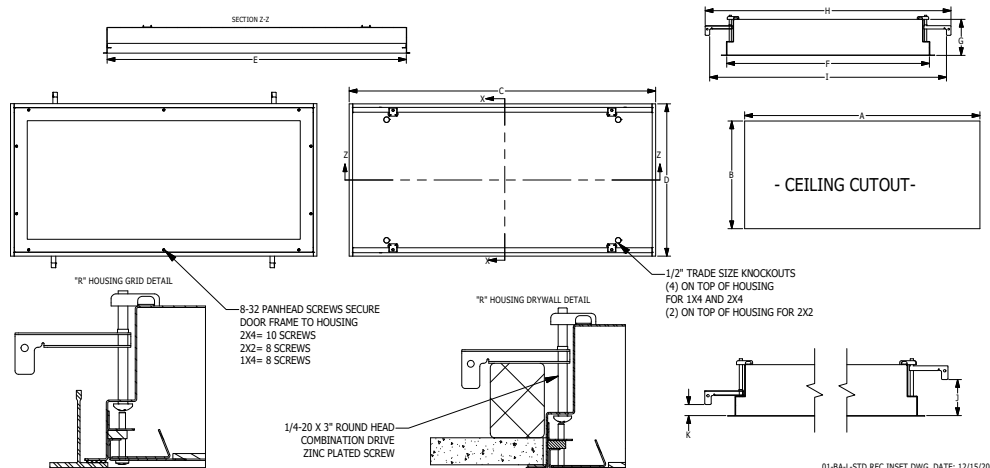
**CRM:** Continuous Row Mounting (CRM) option provides a means of securing luminaires to each other end to end in straight rows only. While all recessed luminaires are suitable for thru wiring, the CRM option is only available for Hard lid installation. CRM fixtures come with flanges on 2 of the 4 sides so that the luminaires can mount to each other without the appearance of a larger gap between the two fixtures. Endcaps are factory installed based upon customer provided row configuration information and the ceiling cutouts can be determined as shown on the CRM installation instructions that can be found on our website.

**DOOR FINISH:** White Dupont Alesta using Agion silver ion antimicrobial powder coat finish standard. See options for polished stainless steel.

**LISTINGS:** Military Standard 461F compliant for conducted and radiated emissions. IP65 rated for dust and water ingress. Suitable for 1700 PSI high pressure hosedowns. ETL listed per UL\_1598 for wet locations. Chicago Plenum Rated. Certified ISO-14644-1 for class 5 through class 9 cleanspaces. Certified Fed Std 209E for Class 100 through Class 100,000 cleanspaces. NSF2 listed for non-food & splash zones. Drivers and LEDs are covered by a 5 year warranty, the remaining fixture is covered by a 10 year warranty. This product is Buy American Act (B.A.A.) compliant.

## PRODUCT DRAWINGS

| "R" HOUSING REFERENCE DIMENSIONS |        |        |        |        |        |        |       |        |        |       |       |
|----------------------------------|--------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|
| SIZE                             | A      | B      | C      | D      | E      | F      | G     | H      | I      | J     | K     |
| 1X4                              | 47.00" | 11.00" | 47.63" | 11.69" | 46.50" | 10.50" | 4.00" | 15.27" | 14.27" | 2.81" | 0.86" |
| 2X2                              | 23.00" | 23.00" | 23.63" | 23.69" | 22.50" | 22.50" | 4.00" | 27.31" | 26.31" | 2.81" | 0.86" |
| 2X4                              | 47.00" | 23.00" | 47.63" | 23.69" | 46.50" | 22.50" | 4.00" | 27.31" | 26.31" | 2.81" | 0.86" |



# Medical Operating Room Troffers: ML-OR-LED

1x4, 2x2 and 2x4 High Lumen LED Recessed Luminaires with RF Filtering

## ENERGY DATA

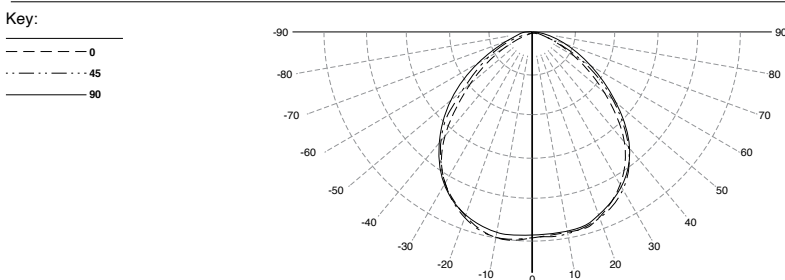
| MEDICAL ASY INSET-FGRS-LED TROFFER (APPROX <sup>1</sup> LUMENS DELIVERED) |               |                  |                               |               |                    |                           |                 |     |                               |               |                    |                           |                 |     |
|---|---------------|------------------|-------------------------------|---------------|--------------------|---------------------------|-----------------|-----|-------------------------------|---------------|--------------------|---------------------------|-----------------|-----|
| ENCLOSURE SIZE  | LIGHT PACKAGE | STANDARD DIMMING | LUMENS 83 CRI (3000K - 5000K) |               |                    | MAX AMB TEMP <sup>4</sup> | EFFICACY (LM/W) |     | LUMENS 90+ CRI (3500K, 4000K) |               |                    | MAX AMB TEMP <sup>4</sup> | EFFICACY (LM/W) |     |
|   |               |                  | ASY                           | SYM           | WATTS <sup>2</sup> |                           | ASY             | SYM | ASY                           | SYM           | WATTS <sup>2</sup> |                           | ASY             | SYM |
| 1X4   | 1LEDR         | 0-10V 1%         | 2,276                         | 3,034         | 29                 | 45°C (113°F)              | 78              | 105 | 2,193                         | 2,924         | 29                 | 45°C (113°F)              | 76              | 101 |
| 1X4   | 2LEDR         | 0-10V 1%         | 4,550                         | <b>6,067</b>  | 55                 | 45°C (113°F)              | 83              | 110 | 4,386                         | <b>5,848</b>  | 56                 | 45°C (113°F)              | 78              | 104 |
| 1X4   | 2LEDH         | 0-10V 1%         | 8,816                         | <b>11,754</b> | 109                | 35°C (95°F)               | 81              | 108 | 8,421                         | <b>11,228</b> | 109                | 35°C (95°F)               | 77              | 103 |
| 1X4   | 2LEDHF        | 0-10V 1%         | 13,010                        | <b>17,346</b> | 153                | 35°C (95°F)               | 85              | 113 | 10,841                        | 14,454        | 183                | 35°C (95°F)               | 59              | 79  |
| 1X4   | EM10          | NA               | 780-850                       | 1050-1130     | 4                  | 40°C (104°F)              | NA              | NA  | 590-780                       | 790-1040      | 4                  | 40°C (104°F)              | NA              | NA  |
| 2X2   | 2LEDR         | 0-10V 1%         | 2,508                         | 2,986         | 29                 | 45°C (113°F)              | 86              | 103 | 2,420                         | 2,881         | 29                 | 45°C (113°F)              | 83              | 99  |
| 2X2   | 3LEDR         | 0-10V 1%         | 3,762                         | <b>4,479</b>  | 42                 | 45°C (113°F)              | 90              | 107 | 3,630                         | <b>4,321</b>  | 42                 | 45°C (113°F)              | 86              | 103 |
| 2X2   | 2LEDH         | 0-10V 1%         | 4,935                         | 5,875         | 55                 | 40°C (104°F)              | 90              | 107 | 4,705                         | 5,601         | 55                 | 40°C (104°F)              | 86              | 102 |
| 2X2   | 4LEDR         | 0-10V 1%         | 5,016                         | 5,972         | 55                 | 45°C (113°F)              | 91              | 109 | 4,839                         | 5,761         | 56                 | 45°C (113°F)              | 86              | 103 |
| 2X2   | 3LEDH         | 0-10V 1%         | 7,403                         | <b>8,813</b>  | 80                 | 40°C (104°F)              | 93              | 110 | 7,058                         | <b>8,402</b>  | 81                 | 35°C (95°F)               | 87              | 104 |
| 2X2   | 4LEDH         | 0-10V 1%         | 9,870                         | 11,750        | 109                | 40°C (104°F)              | 91              | 108 | 9,410                         | 11,202        | 109                | 35°C (95°F)               | 86              | 103 |
| 2X2   | 4LEDHF        | 0-10V 1%         | 14,994                        | <b>17,850</b> | 153                | 35°C (95°F)               | 98              | 117 | 12,403                        | 14,766        | 184                | 35°C (95°F)               | 67              | 80  |
| 2X2   | EM10          | NA               | 860-980                       | 1030-1170     | 4                  | 40°C (104°F)              | NA              | NA  | 670-860                       | 80-1040       | 4                  | 40°C (104°F)              | NA              | NA  |
| 2X4   | 2LEDR         | 0-10V 1%         | 5,777                         | 6,718         | 55                 | 45°C (113°F)              | 105             | 122 | 5,528                         | 6,428         | 56                 | 45°C (113°F)              | 99              | 115 |
| 2X4   | 3LEDR         | 0-10V 1%         | 8,666                         | <b>10,077</b> | 83                 | 45°C (113°F)              | 104             | 121 | 8,292                         | <b>9,642</b>  | 83                 | 45°C (113°F)              | 100             | 116 |
| 2X4   | 2LEDH         | 0-10V 1%         | 11,404                        | 13,261        | 109                | 40°C (104°F)              | 105             | 122 | 10,837                        | 12,601        | 109                | 40°C (104°F)              | 99              | 116 |
| 2X4   | 4LEDR         | 0-10V 1%         | 11,555                        | 13,436        | 111                | 45°C (113°F)              | 104             | 121 | 11,056                        | 12,856        | 113                | 45°C (113°F)              | 98              | 114 |
| 2X4   | 3LEDH         | 0-10V 1%         | 17,107                        | <b>19,892</b> | 164                | 40°C (104°F)              | 104             | 121 | 16,256                        | <b>18,902</b> | 164                | 40°C (104°F)              | 99              | 115 |
| 2X4   | 4LEDH         | 0-10V 1%         | 22,809                        | 26,522        | 220                | 40°C (104°F)              | 104             | 121 | 21,674                        | 25,202        | 220                | 40°C (104°F)              | 99              | 115 |
| 2X4   | 4LEDHF        | 0-10V 1%         | 35,036                        | <b>40,740</b> | 305                | 35°C (95°F)               | 115             | 134 | 30,396                        | 35,344        | 373                | 35°C (95°F)               | 81              | 95  |
| 2X4   | EM10          | NA               | 1040-1150                     | 1210-1340     | 4                  | 40°C (104°F)              | NA              | NA  | 810-1000                      | 950-1160      | 4                  | 40°C (104°F)              | NA              | NA  |

- 1 DELIVERED LUMEN DATA IS EXTRAPOLATED FROM MEASURED DATA @ 25C WITH NO EXTRA OPTIONS. VARIANCES WILL OCCUR WHEN OPTIONS ARE CHOSEN
- 2 WATTAGE IS MEASURED WITH 4000K SELECTION @ 120vAC AND Tambient = 25C. WATTAGES MAY VARY WITH ALTERNATE CONFIGURATIONS
- 3 EFFICACY CALCULATED USING 4000K CCT DATA.
- 4 MAX AMBIENT TEMP RATING, NON-IC INSTALLATION. TEMP RATING MAY VARY WITH SPECIFIED DRIVERS OR ANY NON STANDARD SELECTION
- 5 90 MINUTE 10W EMERGENCY DRIVER; LUMENS CALCULATED BASED ON FIXTURE EFFICACY.
- 6 EM10 DELIVERED LUMENS = (LUMINAIRE EFFICACY) x10
- 7 EM20 DELIVERED LUMENS = (LUMINAIRE EFFICACY) x20

| MEDICAL ASYMMETRIC INSET-FGRS-LED TROFFER (APPROX <sup>1</sup> LUMENS DELIVERED) |               |                  |                 |                    |                       |
|--|---------------|------------------|-----------------|--------------------|-----------------------|
| ENCLOSURE SIZE   | LIGHT PACKAGE | STANDARD DIMMING | 540nm GREEN LED |                    |                       |
|  |               |                  | LUMENS          | WATTS <sup>2</sup> | EFFICACY <sup>3</sup> |
| 1X4  | 1GLED         | 0-10V 1%         | 2,500           | 36                 | 69                    |
| 1X4  | 2GLED         | 0-10V 1%         | 5,000           | 72                 | 69                    |
| 2X2  | 1GLED         | 0-10V 1%         | 1,200           | 18                 | 67                    |
| 2X2  | 2GLED         | 0-10V 1%         | 2,400           | 36                 | 67                    |
| 2X4  | 1GLED         | 0-10V 1%         | 2,500           | 36                 | 69                    |
| 2X4  | 2GLED         | 0-10V 1%         | 5,000           | 72                 | 69                    |

## PHOTOMETRICS

### ASYMMETRIC



### SYMMETRIC

