Description

Recessed LED module with interchangeable 2-inch round or square open pinhole apertures are available in various finishes to suit any décor. Use with 4-inch nominal recessed housings suitable for residential and shallow plenum commercial construction or can be used to retrofit existing installations. Field interchangeable primary optics provide various distribution patterns and spacing to mounting height ratios. Use for general and task lighting in low to medium height ceilings where energy savings, long life and optical control are required.

Catalog #		Type
Project		
Comments		Date
Prepared by		

Specification Features

Module
- Field interchangeable and upgradable LED module consists of LED array, primary optic and driver.
- Integral die cast aluminum heat sink provides passive thermal cooling achieving L70 at 50,000 hours in IC and non-IC applications.

Retention
- Heat treated compression springs hold module securely in the housing, can be removed thru the aperture for service or replacement

LED Array
- Proximity phosphors over chip on board LEDs provide a uniform source with high efficiency and no pixilation.
- Available in 90 CRI minimum, R9 greater than 50 and color accuracy within 3 SDCM provide color accuracy and uniformity.
- Compatible with Zhaga book 12 standards for interchangeability and can be replaced in the field

Gaskets
- Closed cell gaskets achieve restrictive airflow requirements without additional caulking

Primary Optic
- Precision molded TIR optic organizes source flux into useful beams without stray lumens in the field.
- Two-piece construction with matte black mounting ring and polarized turn and lock mounting aligns optic to source and minimizes backlight in the housing.
- Exceeds ENERGY STAR® color angular uniformity requirements, color deviation is typically less than 0.002 u' v'.
- Available in narrow flood, flood and wide flood distributions, ordered separately, ships with narrow flood installed.
- Also available in asymmetric distribution providing vertical illumination

Trims
- Die formed steel trims are available in 2-inch round or square pinhole apertures and can be interchanged in the field.
- Available in a broad range of painted or plated finishes, can be painted in the field to match any décor.
- Magnetic attachment holds trim tightly to ceiling and eliminates light leaks.

Driver
- Integral UNV 120 - 277V 50/60 Hz constant current driver provides noise free operation.
- Continuous, flicker-free dimming from 100% to 5% with select leading or trailing edge 120V phase cut dimmers.
- Inline electrical quick connect and E26 adapter (provided) provides mains connection.
- Driver can be replaced in the field.

Compliance
- cULus listed / certified for use with Halo housings, classified for use with other's housings, see instruction sheet for conditions of acceptability.
- Damp location listed, airtight per ASTM-E283.
- Suitable for use in clothes closets when installed in accordance with the NEC 410.16 spacing requirements
- EMI/RFI emissions per FCC 47CFR Part 15 B.
- Contains no mercury or lead and RoHS compliant.
- Photometric testing in accordance with IES LM-79-08.
- Lumen maintenance projections in accordance with IES LM-80-08 and TM-21-11.
- Can be used for State of California Title 24 high efficacy luminaire compliance, reference the California Energy Commission Title 20 Appliance Efficiency Database for current listings.
- ENERGY STAR® listed, reference qualified product listings.
- Meets State of California voluntary lamp standards.
- Zhaga book 12 compatible.

Warranty
Five year limited warranty, consult website for details.
www.eaton.com/lighting//Legal

ENERGY STAR

T24 Can be used to comply with California Title 24 High Efficacy requirements
T20 Certified to California Title 20 Appliance Database

Refer to ENERGY STAR® Certified Products List.
Can be used to comply with California Title 24 High Efficacy requirements.
Certified to California Title 20 Appliance Efficiency Database.

Zhaga

Eaton is a founding member of the Zhaga Consortium

ML4D
TL41R
TL42S

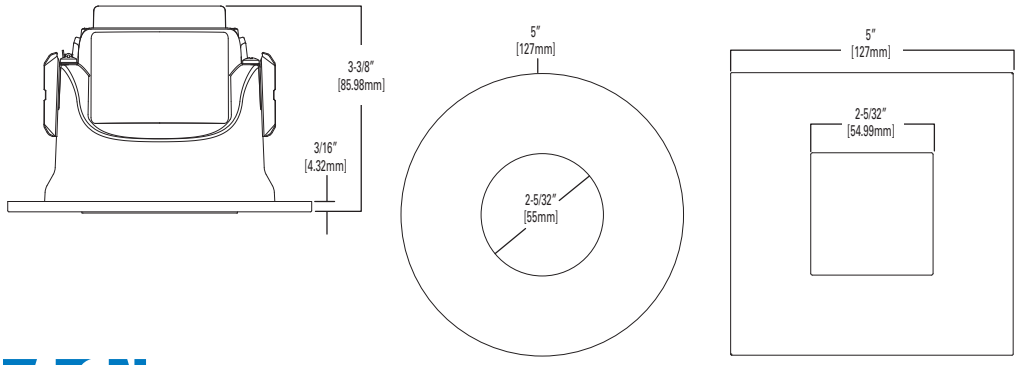
900 Lumen Series

LED

2-Inch Round and Square Pinhole Downlight

ENERGY DATA		
Lumens	900 Series	
Input Voltage	120V	277V
Input Current	101.6 (mA)	45.7 (mA)
Input Power	12.1 (W)	11.9 (W)
Efficiency	84.93 %	83.45 %
Inrush (A)	1.3	4.7
THD: ≤ 20%		
PF: ≥ 0.90		
T Ambient -40 - +40°C		
Sound Rating ≤ 20dba		

Dimensions



Ordering Information

SAMPLE NUMBER: ML4D09NFL927E - TL41RMW
A complete luminaire consists of a housing, LED module and trim, order separately.

Models	Lumens	Distribution	CRI/CCT	Driver	Accessories
ML4D= 4" LED module	**09**=900 lumens (nominal)	**NFL**=25 degree narrow flood	**927**=90 CRI , 2700K **930**=90 CRI , 3000K **935**=90 CRI , 3500K **940**=90 CRI , 4000K	**E**=UNV 120 - 277V 50-60Hz, LE & TE phase cut 5% dimming at 120V only	**TIR50AWW25** =asymmetric wall wash **TIR50NFL25**=25° narrow flood **TIR50FL40**=40° flood **TIR50WFL55**=55° wide flood **LH501MB12PK**=Media holder for (1) 50mm lens, matte black, 12 pack

Trims	Flange Finish	Accessories
TL41R= 2" round pinhole **TL42S**= 2" square pinhole	**MW**=Matte white flange **MB**=Matte black flange **BN**=Brushed nickel flange **ORB**=Oil rubbed bronze flange **GB**=German bronze flange **BCu**=Brushed copper flange	**T24HWKIT**=Title 24 hard wire kit, converts incandescent, low voltage and compact fluorescent housings to LED

Housings

H245RICAT=4" IC, airtight ultra-shallow remodeler housing, LED, 120 - 277V
H99TAT=4" non-IC, airtight shallow new construction housing, E26, 120V
H99RTAT=4" non-IC, airtight shallow remodeler housing, E26, 120V
H99ICAT=4" IC, airtight shallow new construction housing, E26, 120V
H995ICAT=4" IC, airtight shallow new construction housing, LED, 120 - 277V
H995RICAT=4" IC, airtight shallow remodeler housing, LED, 120 - 277V
E4TATSB=4" non-IC, airtight shallow new construction housing, adjustable socket bracket, E26, 120V
E4RTATSB=4" non-IC, airtight shallow remodeler housing, adjustable socket bracket, E26, 120V
E4ICATSB=4" non-IC, airtight shallow new construction housing, adjustable socket bracket, E26, 120V
H4NCMF=4" new construction mounting frame
HS4R=Surface round, 120-277V
HS4S=Surface square, 120-277V

Powering Business Worldwide

Eaton
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.eaton.com/lighting

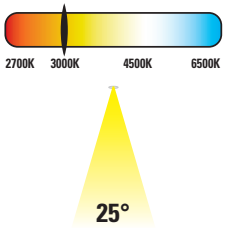
Photometry

ML4D09NFL930-TIR50NFL25-TL41RX _TL42SX

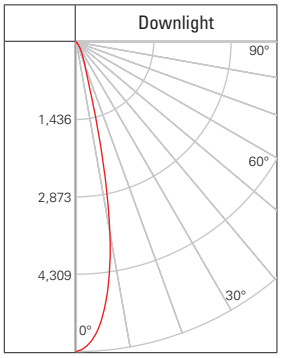
Description	Halo 2 Inch ML4 Round And Square Open Downlight-Narrow Flood Distribution
Test Number	P189393
Module	900 Series, 90CRI, Narrow Flood optic
Trim	2" Aperture, Open Round DL
Lumens	998 Lm
Efficacy	84.58
Spacing Criteria	0.39
CPCB	5584
Beam Angle (FWHM)	22.9

Color Metric Summary

TM-30-15	R_f = 91.3
	R_g = 97.7
CRI/ CIE	R_a = 92.7
	R_9 = 56.8



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	5584
5	5072
10	3493
20	460
30	143
40	34
50	6
60	2
70	1
80	0
90	0

Foot-candle Values at Nadir

0 deg Aiming Angle		
DD	FC	DIA
5.5'	184.6	2
7'	114	2.6
8'	87.2	3
9'	68.9	3.4
10'	55.8	3.8
12'	38.8	4.6

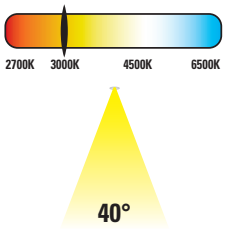
DD = distance down to illuminated work plane
FC = initial foot-candles at nadir
DIA = diameter

ML4D09NFL930-TIR50FL40-TL41RX _TL42SX

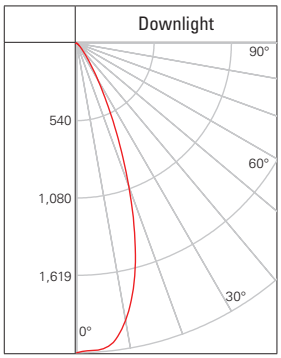
Description	Halo 2 Inch ML4 Round And Square Open Downlight- Flood Distribution
Test Number	P189399
Module	900 Series, 90CRI, Flood optic
Trim	2" Aperture, Open Round DL
Lumens	1013 Lm
Efficacy	86.59
Spacing Criteria	0.66
CPCB	2098.5
Beam Angle (FWHM)	39.7

Color Metric Summary

TM-30-15	R_f = 91.3
	R_g = 97.5
CRI/ CIE	R_a = 92.6
	R_9 = 56.7



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	2098
5	2080
10	1908
20	1034
30	289
40	63
50	18
60	6
70	3
80	0
90	0

Foot-candle Values at Nadir

0 deg Aiming Angle		
DD	FC	DIA
5.5'	69.4	3.6
7'	42.8	4.4
8'	32.8	5.2
9'	25.9	5.8
10'	21	6.4
12'	14.6	7.8

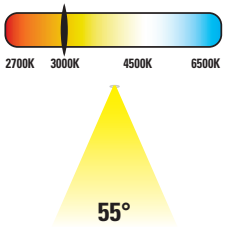
DD = distance down to illuminated work plane
FC = initial foot-candles at nadir
DIA = diameter

ML4D09NFL930-TIR50WFL55-TL41RX _TL42SX

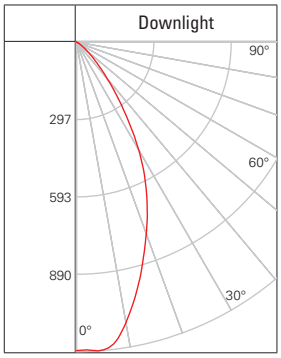
Description	Halo 2 Inch ML4 Round And Square Open Downlight-Wide Flood Distribution
Test Number	P189405
Module	900 Series, 90CRI, Wide Flood optic
Trim	2" Aperture, Open Round DL
Lumens	950 Lm
Efficacy	81.17
Spacing Criteria	0.79
CPCB	1152.2
Beam Angle (FWHM)	52.8

Color Metric Summary

TM-30-15	R_f = 91.3
	R_g = 97.6
CRI/ CIE	R_a = 92.6
	R_9 = 56.7



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	1149
5	1151
10	1061
20	760
30	464
40	181
50	54
60	14
70	3
80	0
90	0

Foot-candle Values at Nadir

0 deg Aiming Angle		
DD	FC	DIA
5.5'	38	4.2
7'	23.4	5.4
8'	18	6.2
9'	14.2	7
10'	11.5	7.8
12'	8	9.4

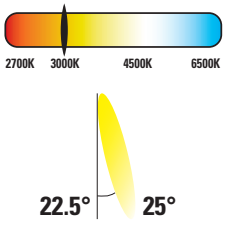
DD = distance down to illuminated work plane
FC = initial foot-candles at nadir
DIA = diameter

ML4D09NFL930-TIR50AWW25-TL41RX _TL42SX

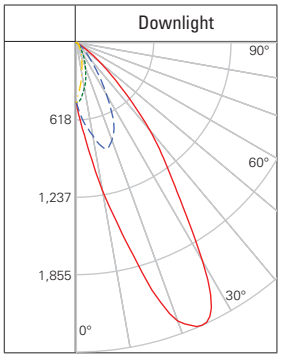
Description	Halo 2 Inch ML4 Round And Square Open Downlight-Asymmetric
Test Number	P189452
Module	900 Series, 90CRI, Asymmetric
Trim	2" Aperture, Open Round DL
Lumens	738 Lm
Efficacy	65.29
Spacing Criteria	1.63
Peak intensity	2410
Peak angle	23

Color Metric Summary

TM-30-15	R_f = 91.3
	R_g = 97.6
CRI/ CIE	R_a = 92.6
	R_9 = 56.9



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	464
5	719
10	1162
20	2300
30	1961
40	887
50	248
60	28
70	2
80	1
90	0

Single Unit Footcandles 2.5' from wall
(distance from fixture along wall)

DD	•
1'	0.2
2'	15.5
3'	37.9
4'	39.4
5'	33.4
6'	21.7
7'	13.9
8'	8.7
9'	5.5
10'	3.6

Multiplier Table

CCT Option	2700K	3000K	3500K	4000K
CCT Multiplier	0.946	1.000	1.020	1.042

Representative photometric test report for 3000K color temperature, 90CRI.
Multipliers may be used to determine relative lumen values with other color temperatures.

Powering Business Worldwide

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