

Appendix A: Appendix A: Luminaire, Lamp, and Equipment Specifications

LUMINAIRE SPECIFICATION



PROJECT : _____ DATE : _____

LOCATION : _____

QUANTITY : _____ NOTE : _____



91123-SFMB-70

Mustang surface high bay luminaire

IP54 /EN 60598/CLASS I / /IK07

Product Type

Ceiling luminaires.

Product Information

Small sizes rectangular shape surface high bay area light and cut-off light distribution also medium and large square sizes bi-symmetrical light distribution for metal halide lamps or sodium vapour discharge lamps and mercury vapour discharge 70-400w. A high quality reflector design creates broad spread light distribution. Main application for lighting of sports, warehouse, factories, under canopies and petrol stations.

Material Characteristics

Aluminium housing with high corrosion resistance. Single cable entry PG 13.5. Stainless steel screws. Durable silicone rubber gasket and clear toughened glass with hinge aluminium frame for in-position lamp replacement. Anodized high purity aluminium reflector. Main housing is powder paint with high corrosion resistance with chemical chromatised protection.

Physical Data

Length: 450 mm.

Height: 150 mm.

Weight: 7.9 Kg.

Colour

- | | |
|---|---|
| <input type="checkbox"/> Black - RAL 9011 | <input type="checkbox"/> Dark Grey - RAL 7043 |
| <input type="checkbox"/> White - RAL 9003 | <input type="checkbox"/> Metallic Silver - RAL 9006 |
| <input type="checkbox"/> Matt Silver - RAL 9006 | <input type="checkbox"/> Custom - RAL _____ |

Reflector

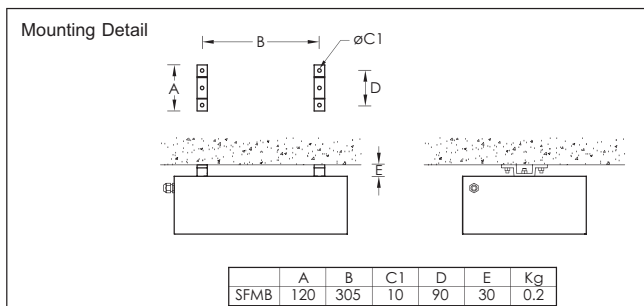
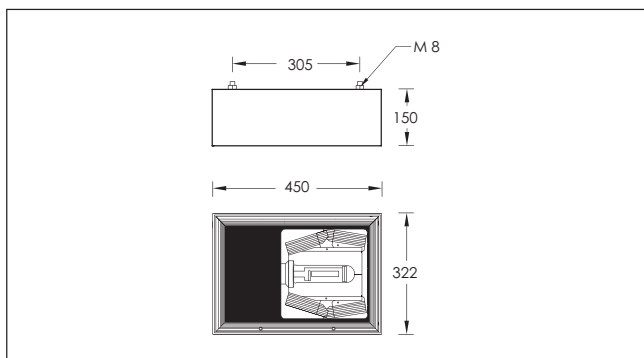
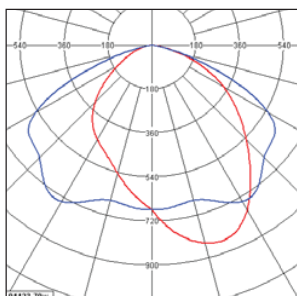
Small Cut-off reflector.

Lamp

HIE 70w. E27 4900 lm.

Note

- Integral control gear.



Branch : Business contact address / Showroom
 2912 Ladprao Rd., Klongjun, Bangkok,
 Bangkok 10240 Thailand
Email : info@ligmanlighting.com

Tel : +66 (0) 2 7339140 (9 lines)
Fax : +66 (0) 2 7339153 (Administration)
 +66 (0) 2 7339154 (Overseas Sales)
 +66 (0) 2 7339150 (Domestic Sales)

Head office : Chachoengsao factory office
 17/2 Moo 4, Monthong, Bangnampreaw,
 Chachoengsao 24150 Thailand

Tel : +66 (0) 38 581676-81
Fax : +66 (0) 38 581415
Email : factory@ligmanlighting.com
Website : www.ligmanlighting.com

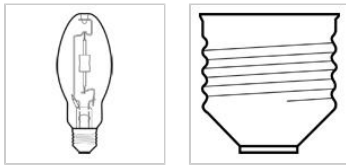
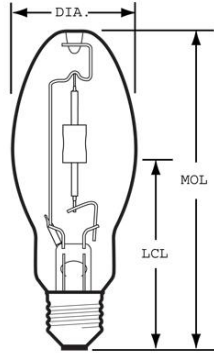


GE
Lighting

22124 - CMH70/C/U/830MED

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide BD17

a product of
ecomagination



CAUTIONS & WARNINGS

R- WARNING: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if outer envelope of the lamp is broken or punctured, and the arc tube continues to operate. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain types of lamps that will automatically extinguish when the outer envelope is broken or punctured are commercially available. Visit the FDA website for more information: <http://www.fda.gov/cdrh/radhealth/products/urburns.html>

Caution

- Lamp may shatter and cause injury if broken
 - Dispose of lamp in a closed container.
 - Do not use excessive force when installing lamp.
 - Do not use lamp if outer glass is scratched or broken.

Warning

- Risk of Fire
 - Keep combustible materials away from lamp.
 - Use in fixture rated for this product.
- Unexpected lamp rupture may cause injury, fire, or property damage
 - Do not exceed rated voltage.
 - Do not turn on lamp until fully installed.
 - Do not use beyond rated life.
 - Do not use lamp if outer glass is scratched or broken.
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Use in enclosed fixture rated for this product.
 - Use only properly rated ballast.
- Risk of Burn
 - Allow lamp to cool before handling.
 - Do not turn on lamp until fully installed.
- Risk of Electric Shock
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Turn power off before inspection, installation or removal.
- A damaged lamp emits UV radiation which may cause eye/skin injury
 - Turn power off if glass bulb is broken. Remove and dispose of lamp.

NOTES

- Rated life based on 11 hours per start

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide BD17
Bulb	Medium Screw (E26)
Base	Coated
Bulb Finish	15000 hrs
Rated Life	Hard glass
Bulb Material	Enclosed fixtures only
Lamp Enclosure Type (LET)	97 picograms Hg per mean lumen hour
LEED-EB MR Credit	

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	6000
Mean Lumens	4000
Nominal Initial Lumens per Watt	85
Color Temperature	3000 K
Color Rendering Index (CRI)	80
Effective Arc Length	0.28125 cm

ELECTRICAL CHARACTERISTICS

Wattage	70
Burn Position	Universal burning position
Open Circuit Voltage (peak lead ballast)	332 V
Open Circuit Voltage (RMS lag ballast)	225 V
Warm Up Time to 90% (MIN)	2 min
Warm Up Time to 90% (MAX)	5 min
Hot Restart Time to 90%	15 min
Hot Restart Time to 90% (MAX)	15 min

DIMENSIONS

Maximum Overall Length (MOL)	5.43 cm
Nominal Length	5.43 cm
Bulb Diameter (DIA)	2.125 cm
Bulb Diameter (DIA) (MAX)	2.125 cm
Light Center Length (LCL)	3.37 cm

PRODUCT INFORMATION

Product Code	22124
Description	CMH70/C/U/830MED
ANSI Code	C98/M139/M98
Standard Package	Case
Standard Package GTIN	10043168221242
Standard Package Quantity	6
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	6
UPC	043168221245

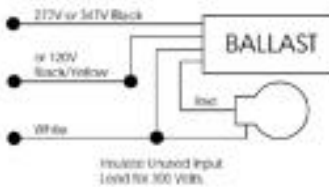
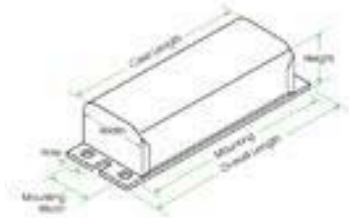


GE
Lighting

86578 - 11210506CTC000C

GE HID Magnetic F-Can Ballast

- For applications requiring quieter or cooler operation than provided by standard coil & coil ballasts.
- Excellent sound-deadening and heat transfer qualities.



GENERAL CHARACTERISTICS

Application	1- 70w M98 120/277 Enclosed & Potted
Category	High Intensity Discharge
Ballast Type	Magnetic - F-Can
Type	Standard
Line Voltage Regulation (+/-)	5 %
Ballast Factor	Normal
Circuit Type	HX-HPF
Sound Rating	B (25-30 decibels)
Insulation Class	90C
Distance to Lamp	20 ft
Additional Info	Thermally protected

PRODUCT INFORMATION

Product Code	86578
Description	11210506CTC000C
Standard Package	Master
Standard Package GTIN	30043168865785
Standard Package Quantity	4
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	4
UPC	043168865784

DIMENSIONS

Case dimensions			
Length (L)	11.8 in(298.45 mm)		
Width (W)	3.2 in(80.96 mm)		
Height (H)	2.6 in(66.68 mm)		
Mounting dimensions			
Mount Length (M)	11.1 in(282.97 mm)		
Mount Width (X or F)	2.0 in(50.80 mm)		
Mount Slots (MS)	0.2 in(5.95 mm)		
Weight	11 lb		
Exit Type	Side		
Remote Mounting Distance	20 ft		
Remote Mounting Wire Gauge	18 AWG		
Lead lengths	Qty	Exit	Length (± 1 in.)
Black	1		12 in (NaNmm)
Black/Yellow	1		12 in (NaNmm)
Red	1		12 in (NaNmm)
White	1		12 in (NaNmm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	60 Hz
--------------------------	-------

SAFETY & PERFORMANCE

- cUL Listed
- UL Listed

SPECIFICATIONS BY LAMP & LINE VOLTAGE

Lamp # of Lamps	Specifications by Line Voltage	System Wattage	Nominal Current	Ballast Factor	Ballast Efficiency	Max.Input Current	Starting Current	Open Circuit Voltage	Drop Out Voltage	Power factor	Min.starting temperature	Fuse rating	UL bench top rise
M98	1 120	90.0	0.78A	1	0.778	2A	0.6A	250V	66V	0.9	-22.0°F	6	
M98	1 277	90.0	0.35A	1	0.778	0.9A	0.27A	250V	152V	0.9	-22.0°F	3	

CAUTIONS & WARNINGS

Warning

- Risk of Electric Shock
 - Properly ground ballast and fixture.
 - Turn power off before servicing--see instructions.

NOTES

- Anchor bracket / Tab provided for splice box (SB-4 Not included)

WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

LUMUX

Date :

Project :

Type:

Agency :

Distributor :



Description : This Wall Mounted with fully shielded light source for up or down lighting for indoor or outdoor application is constructed from low copper aluminum die cast and tempered clear glass. This unit Fully gasketed with molded silicon rubber. Suitable for wet locations. ETL listed.

SPECIFICATION:

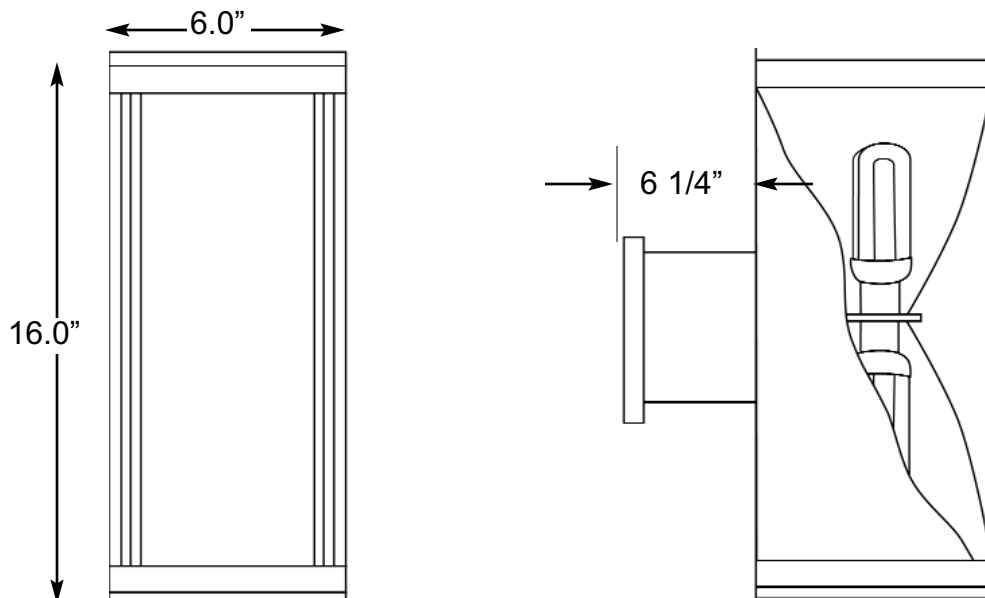
Housing : Low copper aluminum die cast.
Vandal resistance stainless steel screws.
Silicon gasketed for weather tight operation.

Diffuser : Clear glass.

Electrical : Voltage : 120 / 277
Lamp: (2) Compact Fluorescent
Socket : G23-2, G24Q
Ballast : Class P, Electronic Ballast

Installation: Unit's back plate is 5.0"x 7 1/2" (Width x Length) will cover any standard J-Box.

DIMENSIONS:



Lumux - UD410

Lumux reserves the right to modify the above details to reflect changes in the cost of materials and/or design without prior notice.

Lumux Lighting Inc

877-895-5552

Rev : B

Drawing Number
UD410

LUMUX

Date :

Project :

Type:

Agency :

Distributor :

ORDERING GUIDE:

UD410 / XXX / XXX / xxx / xxx

PL9, PL2x9	120	White	<u>Option</u>
PL13, PL2x13	277	Black	Up only
PL18, PL2x18		Silver	Down only
PL26 ,PL2x26		Bronze	
PL32,PL2x32		RAL	
PL42,PL2x42		(optional)	

Unit could be specified for UP only or Down only. If not specified would be up and down.

Lumux - UD410

PROJECT NOTES:

Comments

Approval

Lumux reserves the right to modify the above details to reflect changes in the cost of materials and/or design without prior notice.

Lumux Lighting Inc	877-895-5552	Rev :B	Drawing Number UD410
---------------------------	---------------------	---------------	--------------------------------



GE
Lighting

97634 - F42TBX/830/A/ECO

GE Ecolux® Biax® T4 - Facilities; Retail Display; Hospitality; Office; Restaurant; Warehouse

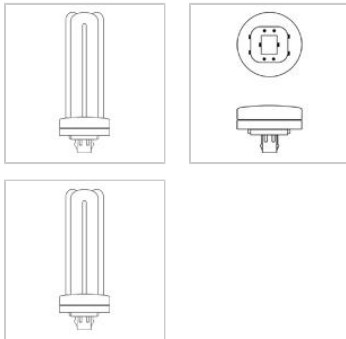


High Color Rendering

Photo
Not Available

Savings

Energy



CAUTIONS & WARNINGS

Caution

- Lamp may shatter and cause injury if broken
- Remove and install by grasping only plastic portion of the lamp.

NOTES

- 4-Pin lamp minimum starting temperature is a function of the ballast. Most ballasts are rated with a minimum starting temperature of 50 degrees F (10 C). Ballasts are also available that provide reliable starting to 0 degrees F (-18C) and -20 F (-29C).
- Amalgam product experience stable brightness over a wider temperature range and in various operating positions.
- Based on 60Hz reference circuit.
- Fluorescent lamp lumens decline during life

GENERAL CHARACTERISTICS

Lamp Type	Compact Fluorescent - Plug-In
Bulb	T4
Base	GX24-q4
Rated Life	17000 hrs
Starting Temperature	-18 °C (-0 °F)
Cathode Resistance	2.7 Ohm
LEED-EB MR Credit	66 picograms Hg per mean lumen hour
Rated Life (rapid start) @ Time	17000.0 @ 3.0/20000.0 @ 12.0 h
Additional Info	Dimmable with appropriate dimming ballast./End of Life Protection (EOL)/TCLP compliant
Primary Application	Facilities;Retail Display;Hospitality;Office;Restaurant;W:

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	3200
Mean Lumens	2690
Nominal Initial Lumens per Watt	76
Color Temperature	3000 K
Color Rendering Index (CRI)	82

ELECTRICAL CHARACTERISTICS

Wattage	42
Voltage	120
Current (max)	5.25 A
Open Circuit Voltage (after preheating)	265 V
Open Circuit Voltage	515 V
Lamp Current	0.32 A
Preheat Voltage	4.25 V
Current Crest Factor	1.7
Supply Current Frequency	20000 Hz

DIMENSIONS

Maximum Overall Length (MOL)	6.4000 in(162.6 mm)
Nominal Length	6.400 in(162.6 mm)
Base Face to Top of Lamp	5.770 in(146.6 mm)

PRODUCT INFORMATION

Product Code	97634
Description	F42TBX/830/A/ECO
ANSI Code	60901-IEC-7442-2
Standard Package	Case
Standard Package GTIN	10043168976340
Standard Package Quantity	10
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168976343



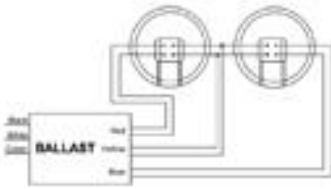
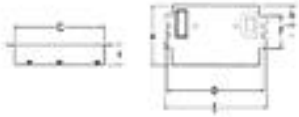
GE
Lighting

47506 - C242UNVBES-IP

GE CFL Electronic Program / Rapid Start Ballast

- Electronic compact fluorescent ballasts for all general fluorescent applications
- Low profile case

This product is no longer manufactured. Remaining stock will be sold.



GENERAL CHARACTERISTICS

Application	2- 42 / 36 / 32 / 26 / 24 watt CFL UNV Bottom Exit w Studs
Category	Compact Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Series
Line Voltage Regulation (+/-)	10 %
Ambient Temperature (MAX)	122 °F(50 °C)
Case Temperature	75 °C(167 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Additional Info	Auto-restart/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	47506
Description	C242UNVBES-IP
Standard Package	Master
Standard Package GTIN	30043168475069
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168475068

DIMENSIONS

Case dimensions	
Length (L)	4.2 in(107.95 mm)
Width (W)	3.0 in(75.69 mm)
Height (H)	1.0 in(25.40 mm)
Mounting dimensions	
Bracket Length (BL)	4.9 in(125.48 mm)
Mount Length (M)	4.6 in(117.09 mm)
Mount Width (X or F)	1.6 in(39.37 mm)
Weight	0.9 lb
Exit Type	Bottom
Remote Mounting Distance	12 ft
Remote Mounting Wire Gauge	18 AWG

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor(>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)	
FT55W/4P	1	120	46	0.38 A	0.83	1.80	99	1.7	10	0.0 / -18
FT55W/4P	1	277	46	0.17 A	0.83	1.80	95	1.7	10	0.0 / -18
FT36W/4P	2	120	64	0.43 A	0.83	NaN	99	1.7	10	0.0 / -18
FT36W/4P	2	277	64	0.19 A	0.83	NaN	97	1.7	10	0.0 / -18
FT24W/4P	2	120	51	0.43 A	1.02	2.00	95	1.7	10	0.0 / -18
FT24W/4P	2	277	50	0.19 A	1.02	2.04	95	1.7	10	0.0 / -18
FC9T5-22W/4P	1	120	66	0.54 A	0.98	1.48	97	1.7	10	0.0 / -18
FC9T5-22W/4P	1	277	64	0.24 A	0.98	NaN	97	1.7	10	0.0 / -18
FC9T5-22W/4P	2	120	50	0.42 A	1.05	2.10	95	1.7	10	0.0 / -18
FC9T5-22W/4P	2	277	50	0.19 A	1.05	2.10	95	1.7	10	0.0 / -18
FC12T5-55W/4P	1	120	44	0.36 A	0.83	1.89	99	1.7	10	0.0 / -18
FC12T5-55W/4P	1	277	43	0.17 A	0.83	1.93	93	1.7	10	0.0 / -18
FC12T5-40W/4P	1	120	66	0.54 A	0.98	1.48	97	1.7	10	0.0 / -18
FC12T5-40W/4P	1	277	64	0.24 A	0.98	NaN	97	1.7	10	0.0 / -18
FC12T5-40W/4P	2	120	80	0.65 A	0.98	1.22	98	1.6	10	0.0 / -18
FC12T5-40W/4P	2	277	79	0.29 A	0.98	1.24	98	1.6	10	0.0 / -18
CFTR70W/4P	1	120	73	0.61 A	1.00	1.37	98	1.6	10	0.0 / -18
CFTR70W/4P	1	277	72	0.27 A	1.00	1.39	95	1.6	10	0.0 / -18
CFTR57W/4P	1	120	58	0.52 A	1.00	1.72	98	1.6	10	0.0 / -18

CFTR57W/4P	1	277	57	0.20 A	1.00	1.75	98	1.6	10	0.0 / -18
CFTR42W/4P	1	120	45	0.4 A	1.00	2.22	93	1.6	10	0.0 / -18
CFTR42W/4P	1	277	45	0.18 A	1.00	2.22	93	1.6	10	0.0 / -18
CFTR42W/4P	2	120	91	0.76 A	0.98	1.08	98	1.6	10	0.0 / -18
CFTR42W/4P	2	277	90	0.32 A	0.98	1.09	98	1.6	10	0.0 / -18
CFTR32W/4P	2	120	69	0.58 A	1.00	1.45	98	1.6	10	0.0 / -18
CFTR32W/4P	2	277	67	0.26 A	1.00	1.49	98	1.6	10	0.0 / -18
CFTR26W/4P	2	120	56	0.46 A	1.02	1.82	95	1.6	10	0.0 / -18
CFTR26W/4P	2	277	55	0.2 A	1.02	1.85	95	1.6	10	0.0 / -18
CFS28W/4P	2	120	64	0.54 A	1.00	NaN	97	1.6	10	0.0 / -18
CFS28W/4P	2	277	63	0.24 A	1.00	1.59	97	1.6	10	0.0 / -18
CFM36W/4P	1	120	33	0.28 A	0.98	2.97	99	1.7	15	0.0 / -18
CFM36W/4P	1	277	33	0.14 A	0.98	2.97	90	1.7	15	0.0 / -18
CFM36W/4P	2	120	68	0.57 A	0.90	1.32	95	1.7	10	0.0 / -18
CFM36W/4P	2	277	67	0.24 A	0.90	1.34	95	1.7	10	0.0 / -18

CAUTIONS & WARNINGS

Warning

- Risk of Electric Shock
 - Properly ground ballast and fixture.
 - Turn power off before servicing--see instructions.

NOTES

- 42W applications also operate on 125VDC input, (+)L (-)N

WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

LUMINAIRE SPECIFICATION



PROJECT : _____ DATE : _____

LOCATION : _____

QUANTITY : _____ NOTE : _____

80036-M-35

Robust 1 recessed exterior downlight round dia 240 mm.

IP65 /EN 60598/CLASS I /CE/IK10

Product Type

Ceiling luminaires.

Product Information

AA robust 1 round design front frame recessed exterior downlight use compact fluorescent lamp, halogen main voltage lamp and discharge lamp. Easy to installation and relamping. The luminaires are designed for all area of interior and exterior lighting. Robust 1 aluminium powder painted front frame. Robust 1 are ballproof and suitable for sports facilities.

Material Characteristics

Die-cast aluminium housing with high corrosion resistance. Stainless steel screws. Two cable entry. Durable silicone rubber gasket and clear toughened glass. Powder painted with high corrosion resistance with chemical chromatised protection.

Physical Data

Dia: 240 mm.

Height: 256 mm.

Weight: 4.5 Kg.

Colour

- | | |
|---|---|
| <input type="checkbox"/> Black - RAL 9011 | <input type="checkbox"/> Dark Grey - RAL 7043 |
| <input type="checkbox"/> White - RAL 9003 | <input type="checkbox"/> Metallic Silver - RAL 9006 |
| <input type="checkbox"/> Matt Silver - RAL 9006 | <input type="checkbox"/> Custom - RAL _____ |

Reflector

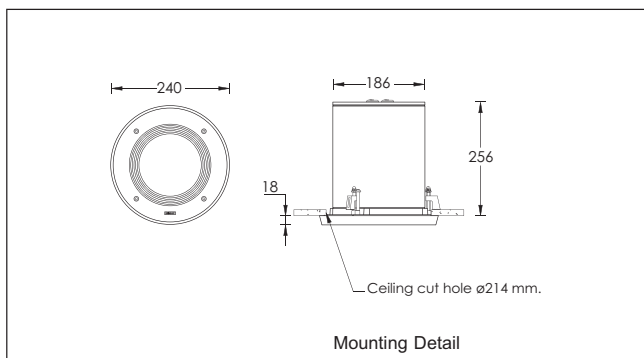
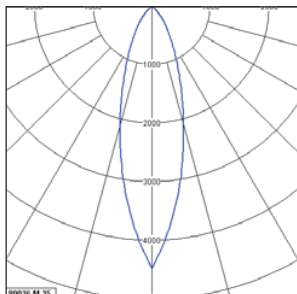
Medium beam 26°

Lamp

HIT-CE 35w. G12 3300 lm.

Note

- Remoted control gear box is included for the luminaires use lamp source from 100w. to 150w.



Branch : Business contact address / Showroom
 2912 Ladprao Rd., Klongjun, Bangkapi,
 Bangkok 10240 Thailand
Email : info@ligmanlighting.com

Tel : +66 (0) 2 7339140 (9 lines)
Fax : +66 (0) 2 7339153 (Administration)
 +66 (0) 2 7339154 (Overseas Sales)
 +66 (0) 2 7339150 (Domestic Sales)

Head office : Chachoengsao factory office
 17/2 Moo 4, Monthong, Bangnampreaw,
 Chachoengsao 24150 Thailand

Tel : +66 (0) 38 581676-81
Fax : +66 (0) 38 581415
Email : factory@ligmanlighting.com
Website : www.ligmanlighting.com

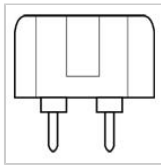
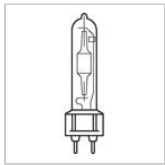


GE
Lighting

20153 - CMH39TUVCU830G12

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide T4.5

a product of
ecomagination™



CAUTIONS & WARNINGS

R- WARNING: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if outer envelope of the lamp is broken or punctured, and the arc tube continues to operate. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain types of lamps that will automatically extinguish when the outer envelope is broken or punctured are commercially available. Visit the FDA website for more information: <http://www.fda.gov/cdrh/radhealth/products/urburns.html>

Caution

- Lamp may shatter and cause injury if broken
 - Do not use excessive force when installing lamp.
 - Do not use lamp if outer glass is scratched or broken.

Warning

- A damaged lamp emits UV radiation which may cause eye/skin injury
 - Turn power off if glass bulb is broken. Remove and dispose of lamp.
- Risk of Electric Shock
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Turn power off before inspection, installation or removal.
- Risk of Fire
 - Keep combustible materials away from lamp.
 - Use fused or thermally protected ballast - see instructions.
 - Use in fixture rated for this product.
- Unexpected lamp rupture may cause injury, fire, or property damage
 - Do not exceed rated voltage.
 - Do not turn on lamp until fully installed.
 - Do not use beyond rated life.
 - Do not use lamp if outer glass is scratched or broken.
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Operate lamp only in specified position.
 - Use in enclosed fixture rated for this product.
 - Use only properly rated ballast.
- Risk of Burn
 - Allow lamp to cool before handling.
 - Do not turn on lamp until fully installed.

NOTES

- Rated life is 15,000 hours on magnetic ballasts.

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide T4.5
Bulb	T4.5
Base	Bi-Pin (G12)
Rated Life	16500 hrs
Bulb Material	Quartz
Lamp Enclosure Type (LET)	Enclosed fixtures only
LEED-EB MR Credit	127 picograms Hg per mean lumen hour
Additional Info	UV control

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	3400
Mean Lumens	2300
Nominal Initial Lumens per Watt	87
Color Temperature	3000 K
Color Rendering Index (CRI)	84

ELECTRICAL CHARACTERISTICS

Wattage	39
Burn Position	Universal burning position
Warm Up Time to 90%	2 min
Warm Up Time to 90% (MAX)	2 min
Hot Restart Time to 90% (MIN)	10 min
Hot Restart Time to 90% (MAX)	15 min

DIMENSIONS

Maximum Overall Length (MOL)	3.56 cm
Light Center Length (LCL)	2.18 cm

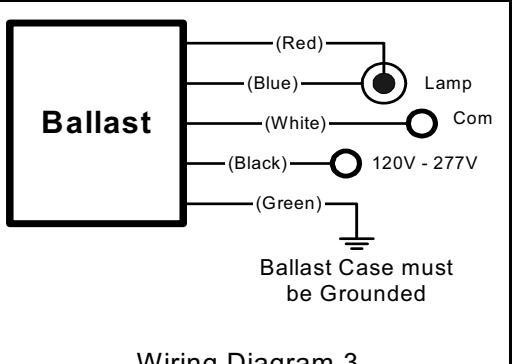
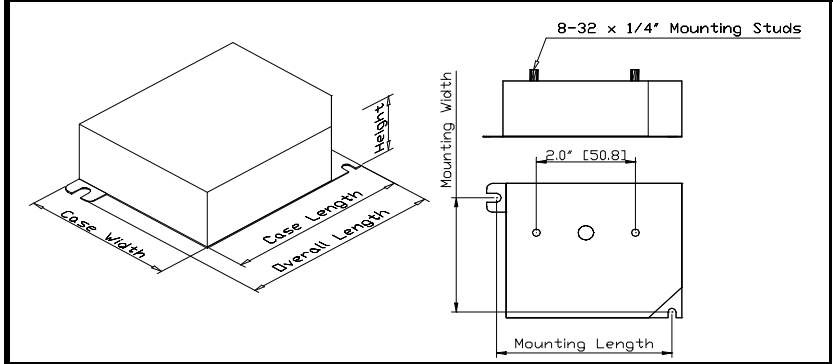
PRODUCT INFORMATION

Product Code	20153
Description	CMH39TUVCU830G12
ANSI Code	C130/M130
Standard Package	Case
Standard Package GTIN	10043168201534
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168201537

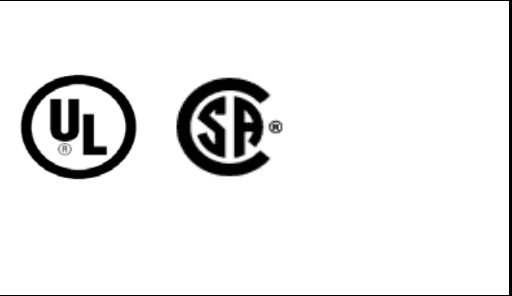
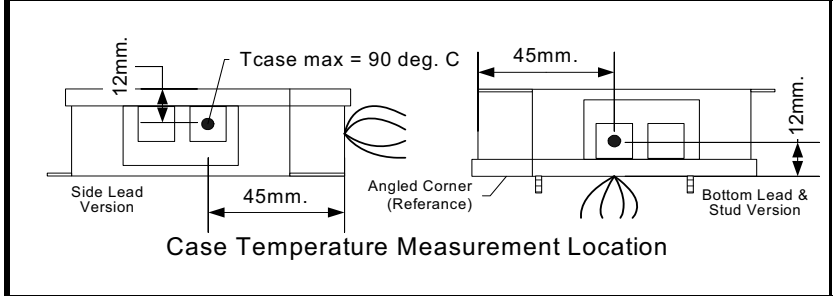
	e-Vision® Electronic Ballast for Metal Halide Lamps	Catalog Number: IMH-39-G For 39W Metal Halide Lamps ANSI M130 120-277 50/60Hz Electronic Status: RELEASED
---	--	---

DIMENSIONS AND DATA

Lamp		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (Watts)	Min Power Factor	Wiring Diag	Fig.	Weight (lb)	Max. Distance to Lamp (ft)
Number	Watts									
39W Watt Lamp, ANSI Code M130 Minimum Starting Temp -30°C/-20°F										
1	39	120 277	IMH-39-G-XXX	0.39 0.18	46 45	0.9	3	G	0.9	5



Case Figure	Overall Length	Case Length	Case Width	Height	Mounting Length	Mounting Width
G	97mm [3.8"]	90mm [3.5"]	77mm [3.0"]	30mm [1.2"]	87mm [3.4"]	67mm [2.6"]



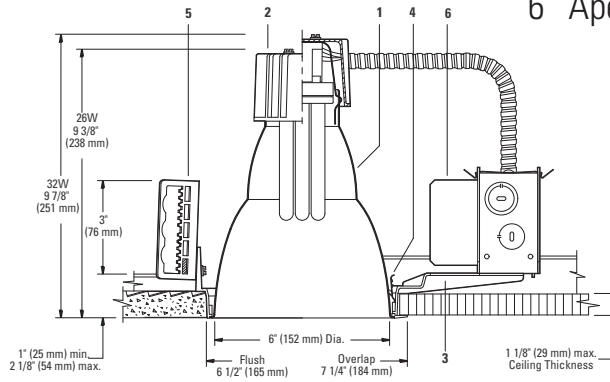
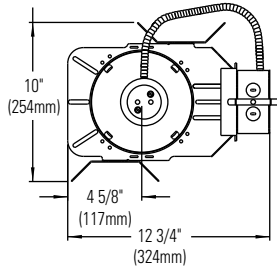
- INSTALLATION & APPLICATION NOTES:**
- Maximum allowable case temperature is 90°C. See figure above for measurement location
 - Ignition pulse is 4 kV max
 - All leads are 9 inches long
 - Ballast output will shutdown after 20 minutes if lamp fails to ignite
 - Power must be cycled off – then on, after replacing lamp
 - Connect the red lead to the center terminals of the lamp when using screw base lamps

*Ordering Information	
Order Suffix	Description
-LF	Ballast with side exit leads and mounting feet
-BLS	Ballast with bottom exit leads and mounting studs

Data is based on tests performed by Philips Advance in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

Philips Lighting Electronics N.A.

10275 West Higgins Road • Rosemont, IL 60018 • www.philips.com/advance
 Tel: 800-322-2086 • Fax: 800-423-1882 • Customer Support: 800-372-3331 • OEM Support: 866-915-5886



Ceiling Cutout: 6 9/16" (167 mm) Dia.

Reflector Trim

- 8021 CCLW** Comfort Clear™, White Flange
- 8021 CCLP** Comfort Clear™, Polished Flange
- 8021 CCL** Comfort Clear™, Molded Trim Ring
- 8021** Add suffix. See options for other finishes.

Frame-In Kit

- S6132BU** 6" aperture, 1 lamp 26/32W Triple Tube CFL (120/277V) 4-Pin (Amalgam)
- Standard Dimming Options:
- S6132B**
- CU3** Lightolier PowerSpec 3% Dimming (120/277V)
- J1LD3** Lutron 5% Dimming (120V)
- J2LD3** Lutron 5% Dimming (277V)
- JUM7** Mark 7 Dimming (120/277V)
- J1MX** Mark 10 Dimming (120V)
- J2MX** Mark 10 Dimming (277V)
- Other dimming product available, please consult factory

Remodeler Frame-In Kits

- 6126BURM** 6" aperture, 1 lamp 26W Triple Tube CFL (120/277V) 4-Pin (Amalgam)
- 6132BURM** 6" aperture, 1 lamp 26/32W Triple Tube CFL (120/277V) 4-Pin (Amalgam)

Features

- 1. Reflector:** 16 ga. Alzak® aluminum, 50° visual cutoff to lamp and lamp image, medium distribution. Comfort Clear™ low iridescence finish. Self-flanged or flangeless with molded white trim ring (field paintable).
- 2. Socket Cup:** Effectively dissipates heat and positions lamp holder. Snaps onto reflector neck to assure consistently correct optical alignment without tools.
- 3. Mounting Frame:** Galvanized steel for dry or plaster ceilings. Accepts other 6" Triple Tube reflectors (see S6132BU Spec Sheet).
- 4. Retaining Springs:** Precision-tooled steel friction springs secure reflector to mounting frame for quick, tool-less installation.
- 5. Mounting Brackets:** 16 ga. steel. Adjust from inside of fixture. Use 3/4" or 1 1/2" lathing channel, 1/2" EMT, or optional mounting bars.
- 6. Ballast/J-Box:** Electronic 120V-277V. UL listed for through branch circuit wiring with max of (8) No. 12 AWG, 90°C supply conductors. Outboard mounted to reduce heat transfer and maintain lamp efficacy and life. Service from below without tools.

Electrical

Note: For ballast electrical data and latest lamp/ballast compatibility refer to "Ballast" specification sheet for complete electrical data.
UL Listed for through branch circuit wiring with max of (8) No 12 AWG, 90 degree C supply conductors.

Options and Accessories

Comfort Clear™ Finishes ¹		Other Finishes	
Diffuse	CCD	White	WH
Champagne Bronze	CCZ	Specular Clear	CL
Multigroove	MG		

¹Specify desired flange. **W** White, **P** Polished, Blank - Molded Ring

Options and Accessories (continued)

- Emergency Ltg. Kit **FA EM3E***
- FA EM4***
- Fuse (Slow Blow) Add suffix **F**
- Existing/Thk. Ceiling **FA EC6***
- Emergency Add suffix **EM***
- Chicago Plenum Use S6132BULC
- *See Spec. Sheets: FAEM, FAEC

Mounting Bars & Accessories; see Specification Sheet MBA.
Sloped Ceiling Adapters; see Specification Sheet SCA.

IC Frame available; see **C6CFL32** Specification Sheet.

Labels

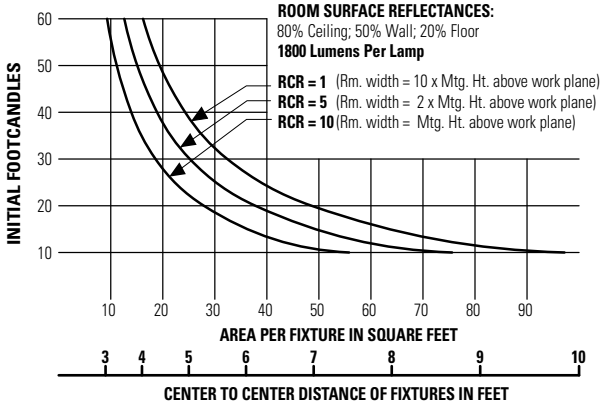
UL Listed for damp locations.

Alzak® is a registered trademark of ALCOA.

US Patent Pending.

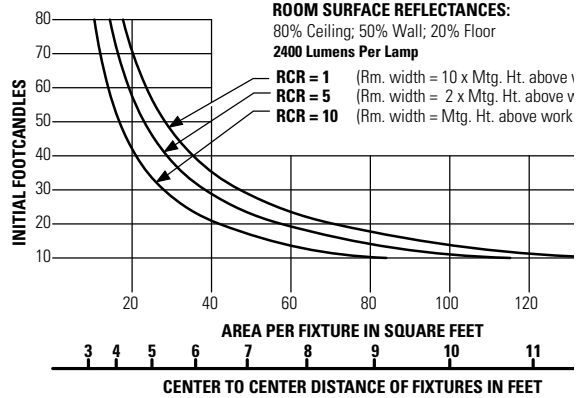
Job Information	Type:
Job Name:	
Cat. No.:	
Lamp(s):	
Notes:	

**26W
Quick Calculator**



This quick calculator chart determines the number and spacing of 1 ft.-26W TTT units with Comfort Clear™ reflector, for any level of illumination.

**32W
Quick Calculator**



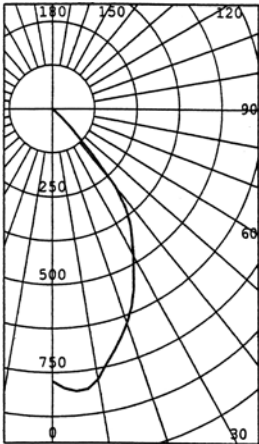
This quick calculator chart determines the number and spacing of 1 ft.-32W TTT unit with Comfort Clear™ reflector, for any level of illumination

Spacing Ratio = 1.0

REPORT NO: LSI 14025
LIGHTOLIER RECESSED FLUORESCENT LUMINAIRE,
WITH COMFORT CLEAR™ REFLECTOR
ONE 26 WATT CPFL GE LAMP,
CAT# F26TBX/SPX35-835.
LUMEN RATING = 1800 LMS.

ZONAL SUMMARY ANGLE CP LUMENS		
0	775	
5	806	77
10	780	
15	708	199
20	646	
25	566	258
30	478	
35	402	245
40	285	
45	78	81
50	13	
55	4	4
60	2	
65	1	2
70	1	
75	1	1
80	0	
85	0	0

ZONAL LUMENS AND PERCENTAGES ZONE LUMENS % LAMP % LUMINAIRE			
0-30	533	29.66	61.66
0-40	778	43.25	89.92
0-60	863	47.98	99.75
0-90	865	48.10	100.00
40-90	87	4.85	10.08
60-90	2	.12	.25
90-180	0	.00	.00
0-180	865	48.10	100.00

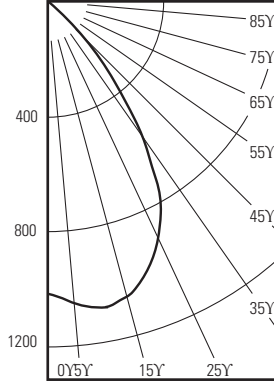


EFFICIENCY=48.1%
DATE: 4-23-99
CIE TYPE DIRECT
LUMINOUS DIAMETER: 6.000
THIS REPORT BASED ON LM-1 AND OTHER PERTINENT IES PROCEDURES.

Spacing Ratio = 1.1

REPORT PREPARED FOR: LIGHTOLIER 04-27-1999
REPORT NO: LRL 499-9G
LAMPS: 1 PLT-32 LUMENS: 2400
DESCRIP: 6" DIA X 10" HT RECESSED DOWNLIGHT
WITH COMFORT CLEAR™ REFLECTOR. VERTICAL LAMP.

ZONAL SUMMARY ZONE AVG* ZONAL DEG. C.P. LUMENS		
180	0	
175	0	0
165	0	0
155	0	0
145	0	0
135	0	0
125	0	0
115	0	0
105	0	0
95	0	0
90	0	0
85	1	1
75	1	1
65	3	3
55	9	8
45	99	77
35	563	354
25	904	418
15	1063	301
5	1066	102
0	1035	



EFFICIENCY=52.7%
DATE: 4-27-99
CIE TYPE DIRECT
LUMINOUS DIAMETER: 6.000
THIS REPORT BASED ON LM-1 AND OTHER PERTINENT IES PROCEDURES.

ZONAL LUMENS AND PERCENTAGES ZONE LUMENS % LAMP % LUMINAIRE			
0-30	821	34.2	64.9
0-40	1175	49.0	92.9
0-60	1260	52.5	99.6
0-90	1265	52.7	100.0
40-90	90	3.8	7.1
60-90	5	0.2	0.4
90-120	0	0.0	0.0
90-150	0	0.0	0.0
90-180	0	0.0	0.0
0-180	1265	52.7	100.0

Coefficients of Utilization

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

ROOM CAVITY RATIO	EFFECTIVE FLOOR CAVITY REFLECTANCE = .20																								
	80					70					50					30					10				
	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0			
1	.54	.53	.52	.53	.52	.51	.51	.50	.49	.49	.48	.48	.47	.47	.46	.46						.46			
2	.50	.49	.47	.50	.48	.47	.48	.47	.46	.47	.46	.45	.45	.44	.43	.43						.43			
3	.47	.45	.44	.47	.45	.43	.46	.44	.43	.44	.43	.42	.43	.42	.41	.41						.41			
4	.45	.42	.40	.44	.42	.40	.43	.41	.40	.42	.41	.39	.41	.40	.39	.38						.38			
5	.42	.39	.37	.42	.39	.37	.41	.39	.37	.40	.38	.37	.39	.38	.36	.36						.36			
6	.40	.37	.35	.39	.37	.35	.39	.36	.35	.38	.36	.34	.37	.36	.34	.34						.34			
7	.37	.34	.33	.37	.34	.32	.36	.34	.32	.36	.34	.32	.35	.33	.32	.31						.31			
8	.35	.32	.30	.34	.32	.30	.34	.32	.30	.34	.31	.30	.33	.31	.30	.29						.29			
9	.33	.30	.28	.32	.30	.28	.32	.30	.28	.32	.29	.28	.31	.29	.28	.27						.27			
10	.31	.28	.26	.30	.28	.26	.30	.27	.26	.29	.27	.26	.29	.27	.26	.25						.25			

Coefficients of Utilization

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

ROOM CAVITY RATIO	EFFECTIVE FLOOR CAVITY REFLECTANCE = .20																								
	80					70					50					30					10				
	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0			
1	.59	.58	.57	.58	.57	.56	.56	.55	.54	.54	.53	.53	.52	.52	.51	.50						.50			
2	.56	.54	.53	.55	.54	.52	.54	.52	.51	.52	.51	.50	.51	.50	.49	.48						.48			
3	.53	.51	.50	.53	.51	.49	.51	.50	.49	.50	.49	.48	.49	.48	.47	.46						.46			
4	.51	.48	.47	.50	.48	.46	.49	.47	.46	.48	.46	.45	.47	.46	.45	.44						.44			
5	.48	.46	.44	.48	.45	.44	.47	.45	.43	.46	.44	.43	.45	.44	.43	.42						.42			
6	.46	.43	.42	.46	.43	.41	.45	.43	.41	.44	.42	.41	.44	.42	.41	.40						.40			
7	.44	.41	.39	.43	.41	.39	.43	.41	.39	.42	.40	.39	.42	.40	.39	.38						.38			
8	.41	.39	.37	.41	.39	.37	.41	.38	.37	.40	.38	.37	.40	.38	.36	.36						.36			
9	.39	.36	.35	.39	.36	.35	.38	.36	.35	.38	.36	.34	.38	.36	.34	.34						.34			
10	.35	.32	.31	.35	.32	.31	.35	.32	.30	.34	.32	.30	.34	.32	.30	.30						.30			

Job Information	Type:
------------------------	--------------





GE
Lighting

97617 - F26TBX/841/A/ECO

GE Ecolux® Biax® T4 - Facilities; Retail Display; Hospitality; Office; Restaurant; Warehouse

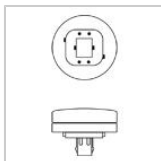


High Color Rendering

Photo
Not Available

Savings

Energy



GENERAL CHARACTERISTICS

Lamp Type	Compact Fluorescent - Plug-In
Bulb	T4
Base	GX24q-3
Rated Life	17000 hrs
Starting Temperature	0 K (32 °F)
Cathode Resistance	2.7 Ohm
LEED-EB MR Credit	115 picograms Hg per mean lumen hour
Rated Life (rapid start) @ Time	17000.0 @ 3.0/20000.0 @ 12.0 h
Additional Info	Dimmable with appropriate dimming ballast./End of Life Protection (EOL)/TCLP compliant
Primary Application	Facilities;Retail Display;Hospitality;Office;Restaurant;W:

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1800
Mean Lumens	1530
Nominal Initial Lumens per Watt	69
Color Temperature	4100 K
Color Rendering Index (CRI)	82

ELECTRICAL CHARACTERISTICS

Wattage	26
Voltage	120
Current (max)	5.25 A
Open Circuit Voltage (after preheating)	265 V
Open Circuit Voltage Across Starter	198 V
Lamp Current	0.42 A
Preheat Voltage	4.25 V
Supply Current Frequency	20000 Hz

DIMENSIONS

Maximum Overall Length (MOL)	5.2 cm
Nominal Length	5.2 cm
Bulb Diameter (DIA)	0.406 cm
Bulb Diameter (DIA) (MAX)	

PRODUCT INFORMATION

Product Code	97617
Description	F26TBX/841/A/ECO
ANSI Code	60501-IEC-3426-1
Standard Package	Case
Standard Package GTIN	10043168976173
Standard Package Quantity	10
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168976176



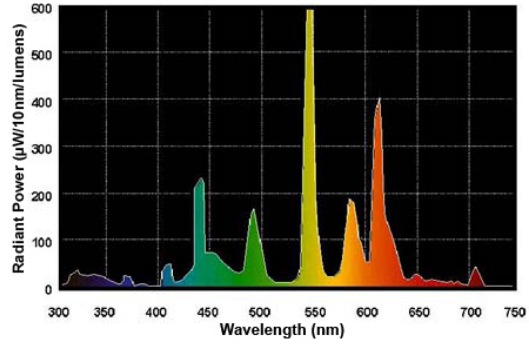
CAUTIONS & WARNINGS

Caution

- Lamp may shatter and cause injury if broken
- Remove and install by grasping only plastic portion of the lamp.

GRAPHS & CHARTS

Spectral Power Distribution



NOTES

- 4-Pin lamp minimum starting temperature is a function of the ballast. Most ballasts are rated with a minimum starting temperature of 50 degrees F (10 C). Ballasts are also available that provide reliable starting to 0 degrees F (-18C) and -20 F (-29C).
- Amalgam product experience stable brightness over a wider temperature range and in various operating positions.
- Based on 60Hz reference circuit.
- Fluorescent lamp lumens decline during life

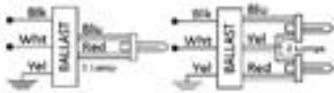
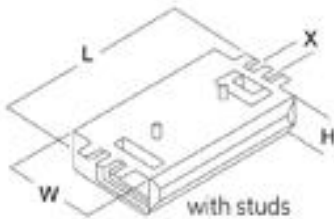


GE
Lighting

71434 - GEC218-MVPS-3W

GE CFL Multi-Volt ProLine™ Electronic Program / Rapid Start Ballast

- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Programmed starting for extended lamp life
- End-of-Lamp-Life Protection
- Color Coded Poke-In Connectors simplifies wiring
- 3-Way Ballast Kit (-3W) includes mounting plate, lead wires, extraction tool and mounting hardware for side exit, bottom exit or bottom exit with studs mounting



GENERAL CHARACTERISTICS

Application	2 or 1- CFQ18W/G24q 120-277V Proline PS 3 Way Kit
Category	Compact Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Series
Line Voltage Regulation (+/-)	10 %
Case Temperature	70 °C(158 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	71434
Description	GEC218-MVPS-3W
Standard Package	Master
Standard Package GTIN	10043168714348
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard	10
Package	
UPC	043168714341

DIMENSIONS

Case dimensions	
Length (L)	5.0 in(127.00 mm)
Width (W)	2.4 in(60.96 mm)
Height (H)	1.0 in(25.40 mm)
Mounting dimensions	
Mount Length (M)	4.6 in(117.60 mm)
Weight	1.1 lb
Exit Type	Poke-in
Remote Mounting Distance	20 ft
Remote Mounting Wire Gauge	18 AWG

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL
- FCC Part 18 Class B at 120 volts

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor	THD% (<=)	Min. Starting Temp (°F/°C)
CFTR26W/4P	1	120	28	0.24 A	1.00	3.57	99	1.6	12	-20.0 / -29
CFTR26W/4P	1	277	28	0.1 A	1.00	3.57	96	1.6	12	-20.0 / -29
CFTR18W/4P	1	120	20	0.17 A	1.05	NaN	97	1 1/2	10	-20.0 / -29
CFTR18W/4P	1	277	20	0.08 A	1.05	NaN	97	1 1/2	10	-20.0 / -29
CFTR18W/4P	2	120	39	0.33 A	1.05	2.69	97	1 1/2	10	-20.0 / -29
CFTR18W/4P	2	277	39	0.14 A	1.05	2.69	97	1 1/2	10	-20.0 / -29
CFS28W/4P	1	120	31	0.26 A	1.00	3.23	99	1 1/2	10	-20.0 / -29
CFS28W/4P	1	277	31	0.11 A	1.00	3.23	97	1 1/2	10	-20.0 / -29
CFS21W/4P	1	120	20	0.16 A	0.90	NaN	97	1 1/2	15	-20.0 / -29
CFS21W/4P	1	277	20	0.07 A	0.90	NaN	97	1 1/2	15	-20.0 / -29
CFS21W/4P	2	120	40	0.33 A	0.91	2.28	99	1 1/2	10	-20.0 / -29
CFS21W/4P	2	277	40	0.14 A	0.91	2.28	99	1 1/2	10	-20.0 / -29
CFS16W/4P	2	120	37	0.31 A	1.00	2.70	99	1 1/2	10	-20.0 / -29
CFS16W/4P	2	277	37	0.13 A	1.00	2.70	99	1 1/2	10	-20.0 / -29
CFQ26W/4P	1	120	28	0.24 A	1.00	3.57	99	1.6	12	-20.0 / -29
CFQ26W/4P	1	277	28	0.1 A	1.00	3.57	96	1.6	12	-20.0 / -29
CFQ18W/4P	1	120	19	0.07 A	0.95	5.00	99	1 1/2	10	-20.0 / -29
CFQ18W/4P	1	277	19	0.31 A	0.95	5.00	99	1 1/2	10	-20.0 / -29
CFQ18W/4P	2	120	35	0.3 A	1.00	2.86	97	1 1/2	10	-20.0 / -29
CFQ18W/4P	2	277	35	0.13 A	1.00	2.86	97	1 1/2	10	-20.0 / -29

DUPLUX® 126/8 226/8

COMPACT
FLUORESCENT
1-344

recessed compact fluorescent downlight/wallwashers

FEATURES

Duplux 126/8 and Duplux 226/8 are highly efficient 8" aperture low brightness downlights, for use with one or two 26-watt compact fluorescent lamps. Duplux 226/8 provides shielding angles of 35° parallel to and 40° perpendicular to the lamps. Recess depth is only 6 9/16".

One housing allows interchangeable use of downlight and wallwash reflectors, permitting housings to be installed first and reflectors to be installed or changed at any time.

Duplux 226/8 uses two 26-watt, 4-pin lamps providing 3600 lumens (nearly as many as a 200-watt incandescent), a 10,000-hour life, a color rendering index (CRI) of 85, and color temperatures as warm as 2700°K (nearly duplicating the color qualities of incandescent).

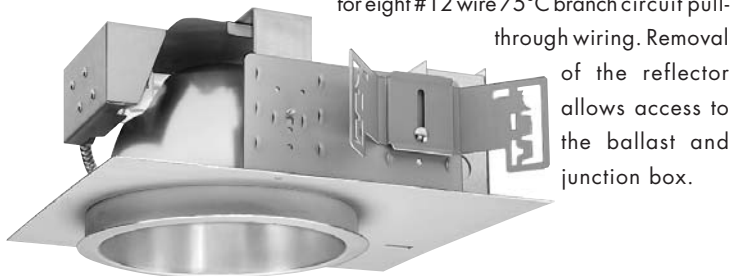
Reflectors are available in clear, natural aluminum in three finishes: **EvenTone**, our standard clear finish, partially diffuse, anti-iridescent and gently luminous in appearance; **OptiTone**, semi-specular and anti-iridescent, with minimum brightness and maximum efficiency; and **EasyTone**, diffuse and luminous. Additionally, reflectors are available in champagne gold, wheat, pewter, and bronze. Wallwash (120°) and double wallwash (2x120°) reflectors are also available.

Duplux 126/8 and Duplux 226/8 include pairs of mounting bars (3/4" x 27" C channel). Specialty bars for wood joist and T-bar installations are available as accessories.

APPLICATIONS

Fixtures are recommended for downlighting or wallwashing in offices, stores, banks, schools, hospitals and airports, as well as lobbies and public areas. The shallow recess depth allows mounting in constricted plenum situations.

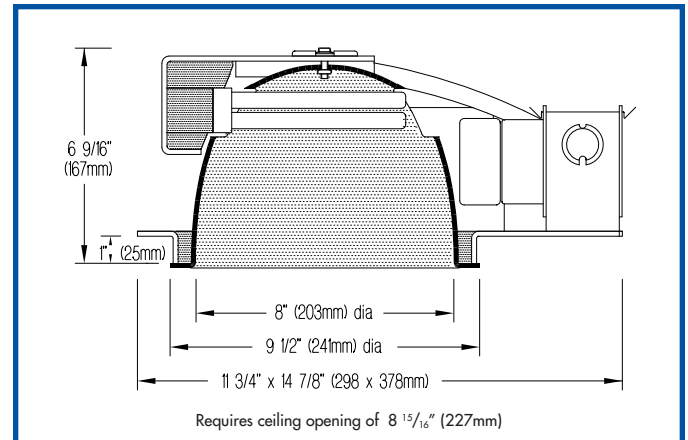
Fixtures are eULus listed for Damp Location (may not be suitable for some outdoor environments). Fixtures are prewired with high power factor Class P electronic ballast, suitable for use in a fire rated ceiling, and approved for eight #12 wire 75°C branch circuit pull-through wiring.



MODIFICATIONS AVAILABLE

Contact factory with quantity for pricing; orders may require shop drawing approval.

- CHP-**: fixture suitable for **Chicago Plenum**; add CHP- as prefix to Product Code.
- CONC-**: fixture suitable for poured-in-place **concrete**; add CONC- as prefix to Product Code.
- EXP-**: 'European-style' **install-from-below** fixture; add EXP- as prefix to Product Code.
- +2"CLG**: fixture suitable for installation in **2" thick ceiling** material; add +2"CLG to Product Code.



PRODUCT CODE

For complete product code, list basic unit and select one item from each following box.

Basic Unit	DPLX 126/8 or DPLX 226/8	
Reflector Type		
Downlight	no suffix	
Wallwash	WW	
Double Wallwash	DWW	
Voltage		
120 volt service	120	277 volt service
		277
Reflector and Flange Color	Overlap	
EvenTone Clear	VOL	
OptiTone Clear	COL	
EasyTone Clear	ECOL	
Champagne Gold	GOL	
Wheat	WHOL	
Pewter	POL	
Bronze	ZOL	
Other reflector finishes are available on special order.		
Standard reflector flange continues reflector finish. White painted flanges and custom painted flanges are available on special order. Add WF (white flange) or CCF (custom color flange).		

OPTIONS

Specify by adding to the basic unit.

- Dimmable** 3-wire ballast - DM
- Emergency battery pack** operates one lamp in event of power outage. Fixture footprint increases to 11 3/4 x 17 5/8" (298 x 448mm). Additional 1 1/4" (32mm) is required to remove EM pack through aperture. Not for outdoor application - EM
- 1/8" (3mm) thick **clear acrylic shield**, spring-mounted within reflector - PS

- ▶ For combinations of the Options above, contact factory or Edison Price Lighting representative.
- ▶ A modified fixture suitable for 347-volt service is available on special order. Contact factory.
- ▶ Decorative reflector rings are available on special order. Contact factory.



PHOTOMETRIC REPORT

Report No. 37444. Original Independent Testing Laboratories, Inc. (ITL) test report furnished upon request.

Luminairerecessed compact fluorescent downlight with spun aluminum reflector
 Lamps.....two 26-watt double-tube, 4-pin, G24q-3 base, 1800 lumens each
 Efficiency70.2%
 Spacing Criterion.....1.6

Photometric Report for Duplux I26/8 available on request.

BALLAST INFORMATION

Voltage	120	277
Input Watts	54	59
Line Current (A)	.45	.22
Power Factor (%)	>99	>99
Min. Starting Temp* (°F)	0	0

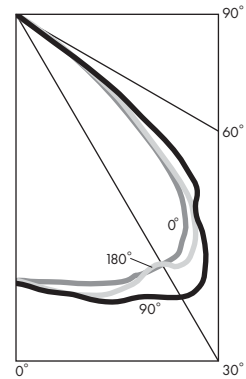
*Consult lamp manufacturers for specific temperatures.

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixture
0 - 30°	951	26.4	37.6
0 - 40°	1662	46.2	65.8
0 - 60°	2524	70.1	99.9
0 - 90°	2526	70.2	100.0
90 -180°	0	0.0	0.0
0 -180°	2526	70.2	100.0

CANDLEPOWER DISTRIBUTION (Candela)

Vertical Angle	Horizontal Angle				
	0.0	45.0	90.0	135.0	180.0
0	1012	1012	1012	1012	1012
5	1012	1015	1032	1041	1044
15	1054	1080	1114	1119	1098
25	1088	1173	1177	1172	1100
35	1076	1100	1221	1117	1134
45	773	878	962	925	831
55	177	181	170	184	147
65	2	2	2	2	0
75	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0



LUMINANCE DATA (Candela/m²)

Vertical Angle	Average 0° Longitude	Average 90° Longitude
45	32676	40675
55	9239	8876
65	140	140
75	0	0
85	0	0

To convert cd/m² to footlamberts, multiply by 0.2919.

COLOR MULTIPLIERS

OptiTone (C)	1.00	Wheat (WH)	.79
EvenTone (V)	.95	Pewter (P)	.81
EasyTone (EC)	.88	Bronze (Z)	.58
Champagne Gold (G)	.97		

COEFFICIENTS OF UTILIZATION – ZONAL CAVITY METHOD

Effective Floor Cavity Reflectance 20%

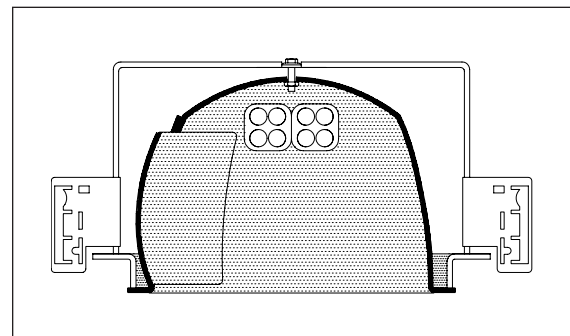
Ceiling Reflectance (%)	80				70				50				30				10				0								
	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10			
Room Cavity Ratio																													
0	84	84	84	84	82	82	82	82	78	78	78	75	75	75	72	72	72	70	70	70	70	70	70	70	70	70	70	70	70
1	79	77	75	73	77	75	74	72	73	71	70	70	69	68	67	67	66	64	64	64	64	64	64	64	64	64	64	64	64
2	75	71	68	65	73	70	67	64	67	65	63	65	63	62	63	62	60	59	59	59	59	59	59	59	59	59	59	59	59
3	70	65	61	58	69	64	60	58	62	59	57	60	58	56	59	57	55	54	54	54	54	54	54	54	54	54	54	54	54
4	66	60	55	52	64	59	55	52	57	54	51	56	53	50	55	52	50	49	49	49	49	49	49	49	49	49	49	49	49
5	61	55	50	46	60	54	50	46	53	59	46	51	48	45	50	47	45	44	44	44	44	44	44	44	44	44	44	44	44
6	57	50	45	41	56	49	45	41	48	44	41	47	43	41	46	43	40	39	39	39	39	39	39	39	39	39	39	39	39
7	53	45	40	37	52	45	40	36	44	39	36	43	39	36	42	38	36	35	35	35	35	35	35	35	35	35	35	35	35
8	49	41	36	32	48	40	36	32	40	35	32	39	35	32	38	34	32	31	31	31	31	31	31	31	31	31	31	31	31
9	45	37	32	28	44	36	32	28	36	31	28	35	31	28	34	31	28	27	27	27	27	27	27	27	27	27	27	27	27
10	42	33	28	25	41	33	28	25	32	28	25	32	27	25	31	27	24	23	23	23	23	23	23	23	23	23	23	23	23

DUPLUX 226/8 WW

WALLWASH INFORMATION

Distance From Ceiling (Feet)	3' From Wall; 3' O.C.		4' From Wall; 4' O.C.	
	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures
1	26	24	12	11
2	32	29	17	16
3	39	37	19	17
4	41	40	22	21
5	36	36	23	23
6	29	29	22	22
7	22	22	19	19
8	17	17	16	16
9	13	13	13	13
10	10	10	11	11

All vertical footcandles are initial values with no contribution from ceiling or floor reflectances. Computation performed with a total of five wallwashers.





GE
Lighting

97613 - F26DBX/841/ECO4P

GE Ecolux® Biax® T4 - Facilities; Retail Display; Hospitality; Office; Restaurant; Warehouse

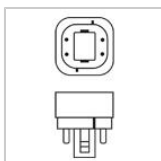
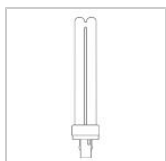


High Color Rendering

Photo
Not Available

Savings

Energy



GENERAL CHARACTERISTICS

Lamp Type	Compact Fluorescent - Plug-In
Bulb	T4
Base	G24q-3
Rated Life	17000 hrs
Starting Temperature	0 °C (32 °F)
Cathode Resistance	2.7 Ohm
LEED-EB MR Credit	115 picograms Hg per mean lumen hour
Rated Life (rapid start) @ Time Additional Info	20000.0 @ 12.0 h Dimmable with appropriate dimming ballast./End of Life Protection (EOL)/TCLP compliant
Primary Application	Facilities;Retail Display;Hospitality;Office;Restaurant;W

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1800
Mean Lumens	1530
Nominal Initial Lumens per Watt	69
Color Temperature	4100 K
Color Rendering Index (CRI)	82

ELECTRICAL CHARACTERISTICS

Wattage	26
Voltage	120
Current (max)	5.25 A
Open Circuit Voltage (after preheating)	240 V
Open Circuit Voltage Across Starter	198 V
Lamp Current	0.325 A
Preheat Voltage	4.25 V
Current Crest Factor	1.7
Supply Current Frequency	60 Hz

DIMENSIONS

Maximum Overall Length (MOL)	6.4000 in(162.6 mm)
Nominal Length	6.400 in(162.6 mm)
Base Face to Top of Lamp	5.800 in(147.3 mm)

PRODUCT INFORMATION

Product Code	97613
Description	F26DBX/841/ECO4P
ANSI Code	60901-IEC-2562-2
Standard Package	BUNDLE
Standard Package GTIN	
Standard Package Quantity	50
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	50
UPC	043168976138

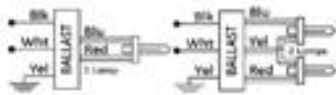
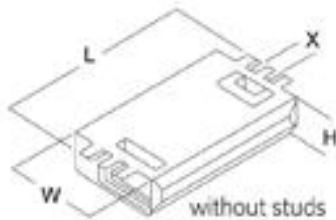


GE
Lighting

71440 - GEC242-MVPS-SE

GE CFL Multi-Volt ProLine™ Electronic Program / Rapid Start Ballast

- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Programmed starting for extended lamp life
- End-of-Lamp-Life Protection
- Color Coded Poke-In Connectors simplifies wiring
- Dual-Entry Connectors accessible from bottom or side



GENERAL CHARACTERISTICS

Application	2- 42 / 36 / 32 / 28/ 26 / 24 watt Side Exit 120-277V Proline PS
Category	Compact Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Series
Line Voltage Regulation (+/-)	10 %
Case Temperature	90 °C(194 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	71440
Description	GEC242-MVPS-SE
Standard Package	Master
Standard Package GTIN	10043168714409
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168714402

DIMENSIONS

Case dimensions	
Length (L)	5.0 in(127.00 mm)
Width (W)	3.0 in(76.20 mm)
Height (H)	1.4 in(35.05 mm)
Mounting dimensions	
Mount Length (M)	4.6 in(117.60 mm)
Weight	0.57 lb
Exit Type	Poke-in
Remote Mounting Distance	12 ft
Remote Mounting Wire Gauge	18 AWG

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type HL
- FCC Part 18 Class B at 120 volts
- Meets ANSI/IEEE C62.41 Cat. A

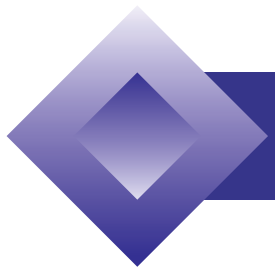
SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)	
FT55W/4P	1	120	43	0.36 A	0.71	1.65	99	1.7	10	-20.0 / -29
FT55W/4P	1	277	44	0.16 A	0.72	1.64	96	1.7	12	-20.0 / -29
FT40W/4P	1	120	45	0.37 A	1.00	2.22	99	1.7	10	-20.0 / -29
FT40W/4P	1	277	45	0.17 A	1.00	2.22	96	1.7	12	-20.0 / -29
FT40W/4P	2	120	82	0.69 A	0.95	1.16	99	1.7	10	-20.0 / -29
FT40W/4P	2	277	82	0.3 A	0.95	1.16	98	1.7	10	-20.0 / -29
FT39W/4P	1	120	45	0.37 A	1.00	2.22	99	1.7	10	-20.0 / -29
FT39W/4P	2	120	82	0.69 A	0.95	1.16	99	1.7	10	-20.0 / -29
FT39W/4P	1	277	45	0.17 A	1.00	2.22	96	1.7	12	-20.0 / -29
FT39W/4P	2	277	82	0.3 A	0.95	1.16	98	1.7	10	-20.0 / -29
FT36W/4P	1	120	33	0.27 A	0.80	2.42	99	1.7	10	-20.0 / -29
FT36W/4P	1	277	33	0.13 A	0.80	2.42	94	1.7	15	-20.0 / -29
FT36W/4P	2	120	63	0.52 A	0.78	1.24	99	1.7	10	-20.0 / -29
FT36W/4P	2	277	62	0.23 A	0.79	1.27	98	1.7	10	-20.0 / -29
FT24W/4P	1	120	26	0.22 A	0.92	3.54	99	1.7	10	-20.0 / -29
FT24W/4P	1	277	27	0.1 A	0.92	3.41	92	1.7	15	-20.0 / -29
FT24W/4P	2	120	54	0.45 A	1.00	1.85	99	1.7	10	-20.0 / -29
FT24W/4P	2	277	54	0.2 A	1.00	1.85	97	1.7	12	-20.0 / -29
FC9T5-22W/4P	1	120	28	0.23 A	1.10	3.93	99	1.7	10	-20.0 / -29
FC9T5-22W/4P	2	120	52	0.44 A	1.10	2.12	99	1.7	10	-20.0 / -29
FC9T5-22W/4P	1	277	28	0.11 A	1.11	3.96	93	1.7	12	-20.0 / -29
FC9T5-22W/4P	2	277	52	0.19 A	1.10	2.12	97	1.7	12	-20.0 / -29

FC9T5+FC12T5	1	120	67	0.55 A	0.90	1.34	99	1.7	10	-20.0 / -29
FC9T5+FC12T5	1	277	67	0.25 A	0.90	1.34	98	1.7	10	-20.0 / -29
FC12T5-40W/4P	1	120	37	0.31 A	0.84	2.27	99	1.7	10	-20.0 / -29
FC12T5-40W/4P	2	120	70	0.59 A	0.80	1.14	99	1.7	10	-20.0 / -29
FC12T5-40W/4P	2	277	70	0.26 A	0.81	1.16	98	1.7	10	-20.0 / -29
FC12T5-40W/4P	1	277	37	0.14 A	0.84	2.27	95	1.7	15	-20.0 / -29
CFTR70W/4P	1	120	73	0.61 A	1.00	1.37	99	1.7	10	-20.0 / -29
CFTR70W/4P	1	277	73	0.27 A	1.00	1.37	97	1.7	12	-20.0 / -29
CFTR57W/4P	1	120	58	0.49 A	1.00	1.72	99	1.7	10	-20.0 / -29
CFTR57W/4P	1	277	58	0.22 A	1.00	1.72	97	1.7	12	-20.0 / -29
CFTR42W/4P	1	120	47	0.4 A	1.00	2.13	99	1.7	10	-20.0 / -29
CFTR42W/4P	1	277	47	0.18 A	1.00	2.13	96	1.7	10	-20.0 / -29
CFTR42W/4P	2	277	93	0.38 A	1.00	1.08	98	1.7	10	-20.0 / -29
CFTR42W/4P	2	120	94	0.77 A	1.00	1.06	99	1.7	10	-20.0 / -29
CFTR32W/4P	1	120	42	0.35 A	0.96	2.29	99	1.7	10	-20.0 / -29
CFTR32W/4P	1	277	42	0.13 A	0.96	2.29	96	1.7	12	-20.0 / -29
CFTR32W/4P	2	277	63	0.23 A	0.95	1.51	98	1.7	12	-20.0 / -29
CFTR32W/4P	2	120	63	0.53 A	0.95	1.51	99	1.7	10	-20.0 / -29
CFTR26W/4P	1	120	32	0.27 A	1.00	NaN	99	1.7	10	-20.0 / -29
CFTR26W/4P	1	277	32	0.13 A	1.00	NaN	95	1.7	12	-20.0 / -29
CFTR26W/4P	2	120	54	0.45 A	0.90	1.67	99	1.7	10	-20.0 / -29
CFTR26W/4P	2	277	54	0.21 A	0.90	1.67	97	1.7	12	-20.0 / -29
CFS55W/4P	1	120	33	0.28 A	0.49	1.48	99	1.7	10	-20.0 / -29
CFS55W/4P	1	277	32	0.13 A	0.49	NaN	94	1.7	10	-20.0 / -29
CFS28W/4P	1	120	34	0.29 A	1.00	2.94	99	1.7	10	-20.0 / -29
CFS28W/4P	1	277	34	0.14 A	1.00	2.94	93	1.7	15	-20.0 / -29
CFS28W/4P	2	120	60	0.5 A	0.95	1.58	99	1.7	10	-20.0 / -29
CFS28W/4P	2	277	60	0.22 A	0.97	1.62	98	1.7	10	-20.0 / -29
CFQ26W/4P	1	120	32	0.27 A	1.00	NaN	99	1.7	10	-20.0 / -29
CFQ26W/4P	1	277	32	0.13 A	1.00	NaN	95	1.7	12	-20.0 / -29
CFQ26W/4P	2	120	54	0.45 A	0.90	1.67	99	1.7	10	-20.0 / -29
CFQ26W/4P	2	277	54	0.21 A	0.90	1.67	97	1.7	12	-20.0 / -29
CFM36W/4P	1	120	33	0.27 A	0.80	2.42	99	1.7	10	-20.0 / -29
CFM36W/4P	1	277	33	0.13 A	0.80	2.42	94	1.7	15	-20.0 / -29
CFM36W/4P	2	120	63	0.52 A	0.78	1.24	99	1.7	10	-20.0 / -29
CFM36W/4P	2	277	62	0.23 A	0.79	1.27	98	1.7	10	-20.0 / -29

WARRANTY INFORMATION

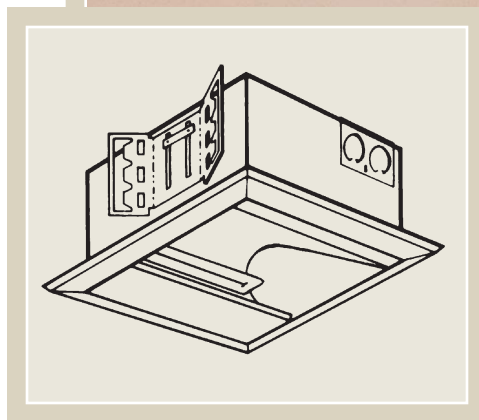
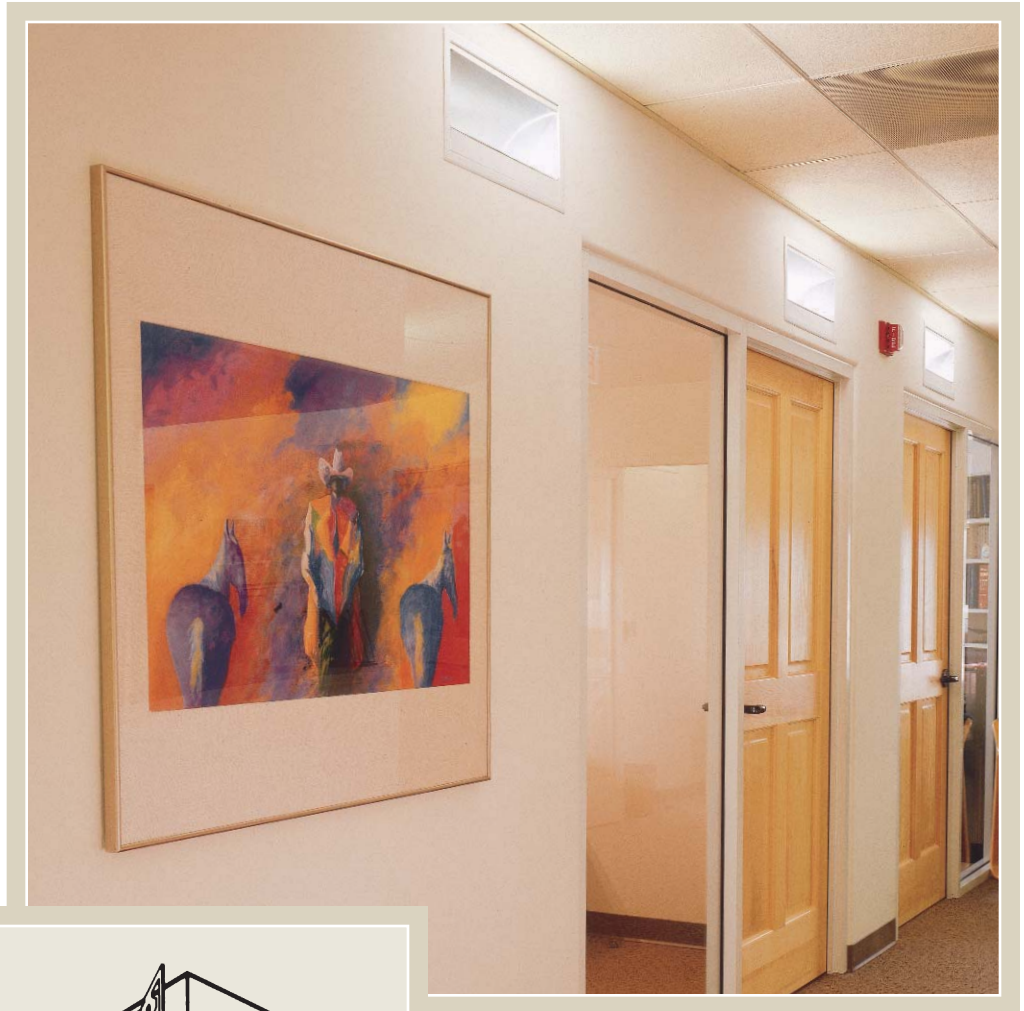
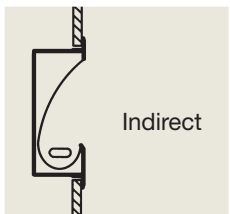
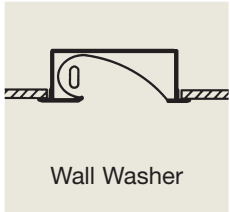
GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.



ELP

ENGINEERED LIGHTING
PRODUCTS

RECESSED Wall Washer For Plaster or Drywall



Project

Wilbur Medical Plaza
Tarzana, California

Interior Designer

McCabe Design
Long Beach, California

Specifier

McCabe Design
Long Beach, California

Photographer

Michael Sean
South Pasadena, California

Lighting

139 BXWW-AK, 39 watts

Ideal placement is 24" to 36" from the front edge of fixture to the surface you are lighting, for 8' to 12' ceilings.

System

High-performance wall wash fixtures with exceptional lamp shielding from the normal viewing angle. The shallow 3-1/2" design also allows wall installation in a standard 4" wall to wash the ceiling or floor with light. Formed, high purity aluminum reflectors provide even, unscalloped illumination.



RECESSED Wall Washer for Plaster or Drywall

TYPE:

CATALOG #:

JOB:

Specifications

Recessed wall washer for use with PL, Quad, Triple Tube, Biax, T-5 and T-8 fluorescent lamps and the T-10 incandescent lamp. All fixtures are 3-1/2" deep with the exception of the double lamp T-8 fixtures, which are 5". Both have integral ballast.

The shallow 3-1/2" fixture may be recessed into a standard 4" wall to wash the ceiling or floor with light. By lining the "wall recess" with gypsum, the wall installation may also be modified to maintain a one hour fire rating (SEE INSTRUCTIONS).

The one-piece, formed reflector is high-purity aluminum (99.9%) with 95% reflectance. It is easily removable without tools for access to the ballast and wiring. Reflector design provides even, unscaloped illumination with complete lamp shielding even when viewed directly beneath the fixture (Triple Tube lamps not entirely shielded).

TGIC polyester powder coated housing is made of 22 gauge CRS with cover and knock-outs that provide quick wire access to side or back of fixture for through wiring. All fluorescent fixtures are supplied standard with Luminaire Disconnect. Trim is extruded aluminum.

Continuous Mount – If fixtures are being mounted in a continuous row add "CC" (if in ceiling) or "CW" (if in wall) to the catalog number and provide row configuration, so proper trims may be provided, i.e.: (18) 240BXWW-AK-CC for (6) 12' rows.

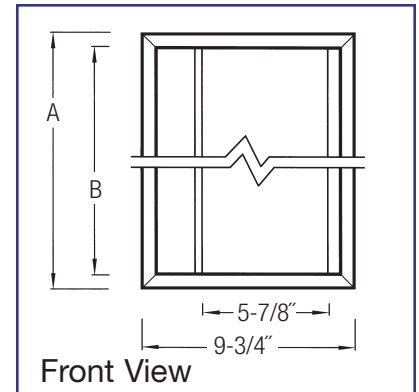
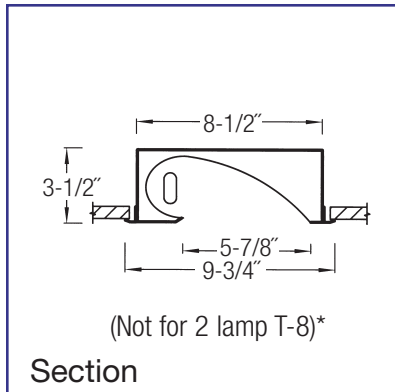
Rough-In Dimensions = (Entire length of row, add all "B" lengths + 1/2") x 9-1/8". Dimensions do *not* apply to Trimless installations.

UL/CUL Damp Location listed.

U.S. Patent #5,142,459

Options

- Ballast 120 or 277 HPF Electronic (Standard)
Dimming (Some models) -DM
Emergency (Some models) -EPP
- Finish White (Standard)
Anti-Microbial White -MB
Custom -Custom
- Reflectors Diffuse Silver (Standard)
Specular Silver -SP
Stepped Diffuse Silver -ST
Painted White -W
(To eliminate a clear lamp image in Up light installations that may occur at certain viewing angles, we suggest you use a White or Stepped reflector, OR standard reflector with Frosted Mini Lens)
- Lens Clear Lexan Mini Lens -ML
(Fluorescent only) Frosted Lexan Mini Lens -MLF
Clear Lexan Full Lens -FL**
Frosted Lexan Full Lens -FLF**
- Louver Diffuse Silver Parallel Blade -LV
- Trimless Gypsum/Drywall Installation -TLD
Plaster Installation -TLP
(See TRIMLESS sheet for dimensions)
- Hospital Hospital Grade Features -HG
(Full Lens; Gasket; Anti-Microbial Paint)



Model No.	A	B	Rough-in Dimensions	Lamp
160 INWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	60 watt T-10 Inc.
113 PLWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	13 watt PL
213 PLWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 13 watt PL
126 QDWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	26 watt Quad
226 QDWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 26 watt Quad
118 TTWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	18 watt Triple Tube
218 TTWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 18 watt Triple Tube
126 TTWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	26 watt Triple Tube
226 TTWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 26 watt Triple Tube
132 TTWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	32 watt Triple Tube
232 TTWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 32 watt Triple Tube
142 TTWW-AK	9-3/4"	8-1/2"	9-1/8" x 9"	42 watt Triple Tube
157 TTWW-AK	13-1/4"	12"	9-1/8" x 12-1/2"	57 watt Triple Tube
242 TTWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	(2) 42 watt Triple Tube
118 BXWW-AK	13-1/4"	12"	9-1/8" x 12-1/2"	18 watt Biax
127 BXWW-AK	15-1/4"	14"	9-1/8" x 14-1/2"	27 watt Biax
139 BXWW-AK	19-1/4"	18"	9-1/8" x 18-1/2"	39 watt Biax
140 BXWW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	40 watt Biax
150 BXWW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	50 watt Biax
155 BXWW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	55 watt Biax
239 BXWW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	(2) 39 watt Biax
240 BXWW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	(2) 40 watt Biax
250 BXWW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	(2) 50 watt Biax
255 BXWW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	(2) 55 watt Biax
114 T-5WW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	14 watt T-5
214 T-5WW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	(2) 14 watt T-5
124 T-5WW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	24 watt T-5 HO
224 T-5WW-AK	24-3/16"	22-15/16"	9-1/8" x 23-1/2"	(2) 24 watt T-5 HO
121 T-5WW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	21 watt T-5
221 T-5WW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	(2) 21 watt T-5
139 T-5WW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	39 watt T-5 HO
239 T-5WW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	(2) 39 watt T-5 HO
128 T-5WW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	28 watt T-5
228 T-5WW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	(2) 28 watt T-5
154 T-5WW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	54 watt T-5 HO
254 T-5WW-AK	48-3/16"	46-15/16"	9-1/8" x 47-1/2"	(2) 54 watt T-5 HO
117 T-8WW-AK	25-1/4"	24"	9-1/8" x 24-1/2"	17 watt T-8
125 T-8WW-AK	37-1/4"	36"	9-1/8" x 36-1/2"	25 watt T-8
132 T-8WW-AK	49-1/4"	48"	9-1/8" x 48-1/2"	32 watt T-8
217 T-8WW-AK*	25-1/4"	24"	10-5/8" x 24-1/2"	(2) 17 watt T-8
225 T-8WW-AK*	37-1/4"	36"	10-5/8" x 36-1/2"	(2) 25 watt T-8
232 T-8WW-AK*	49-1/4"	48"	10-5/8" x 48-1/2"	(2) 32 watt T-8

* T-8 Double lamp housing is 10"W x 5"Ht. ** Full Lens Option is not available for Continuous mount units (end to end rows).



GE
Lighting

46673 - F14W/T5/841/ECO

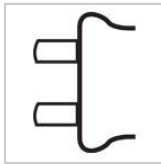
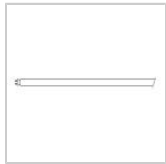
GE Ecolux® Starcoat® T5

- Passes TCLP, which can lower disposal costs.

a product of
ecomagination



High Color Rendering



CAUTIONS & WARNINGS

Caution

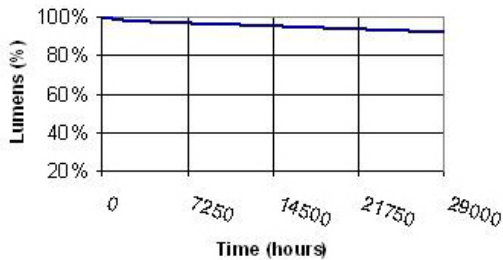
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

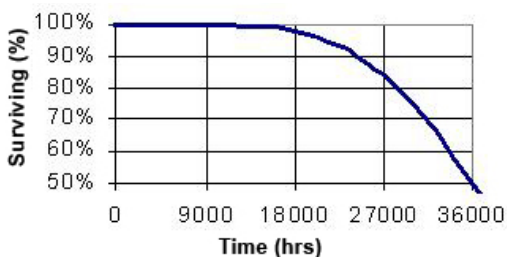
- Risk of Electric Shock
 - Turn power off before inspection, installation or removal.

GRAPHS & CHARTS

Lumen Maintenance



Lamp Mortality



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight Linear
Bulb	T5
Base	Miniature Bi-Pin (G5)
Rated Life	30000 hrs
Rated Life (rapid start) @ Time	30000.0 @ 3.0/36000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	-20 °C (-4 °F)
LEED-EB MR Credit	67 picograms Hg per mean lumen hour
Additional Info	TCLP compliant

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1350
Mean Lumens	1240
Nominal Initial Lumens per Watt	96
Color Temperature	4100 K
Color Rendering Index (CRI)	85
S/P Ratio (Scotopic/Photopic Ratio)	1.7

ELECTRICAL CHARACTERISTICS

Wattage	14
Voltage	82
Open Circuit Voltage (rapid start) Min @ Temperature	230 V @ 10 °C
Cathode Resistance Ratio - Rh/Rc (MIN)	4.25
Cathode Resistance Ratio - Rh/Rc (MAX)	6.5
Current Crest Factor	1.7

DIMENSIONS

Maximum Overall Length (MOL)	22.1700 in(563.1 mm)
Nominal Length	21.600 in(548.6 mm)
Bulb Diameter (DIA)	0.625 in(15.9 mm)
Bulb Diameter (DIA) (MAX)	0.670 in(17.0 mm)
Max Base Face to Base Face (A)	21.610 in(548.9 mm)
Face to End of Opposing Pin (B) (MIN)	21.790 in(553.5 mm)
Face to End of Opposing Pin (B) (MAX)	21.890 in(556.0 mm)

PRODUCT INFORMATION

Product Code	46673
Description	F14W/T5/841/ECO
Standard Package	Case
Standard Package GTIN	10043168466735
Standard Package Quantity	40
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	40
UPC	043168466738

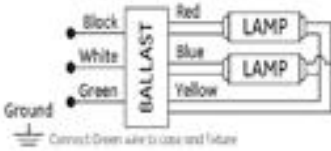
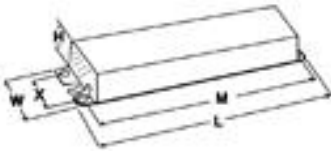


GE
Lighting

99655 - GE228MVPS-A

GE LFL UltraStart® Electronic Program / Rapid Start Ballast

- High Efficiency T5 ballast with Continuous Cathode Cutout Technology
- Lower Maintenance Costs with Parallel Lamp Operation
- Fast Starting Time <700ms
- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Auto-Restart withstands temporary losses in power without the need to cycle power
- UltraCool™ Operation 90C case rating
- Anti-Striation Control for better light quality, with no striations.



GENERAL CHARACTERISTICS

Application	2 or 1 - F14-F35HE 120 to 277 UltraStart PRS Normal Light .95 BF A Can
Category	Linear Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Parallel
Line Voltage Regulation (+/-)	10 %
Case Temperature	90 °C(194 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/End of Life Protection (EOL)/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	99655
Description	GE228MVPS-A
Standard Package	Case
Standard Package GTIN	10043168996553
Standard Package Quantity	10
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168996556

DIMENSIONS

Case dimensions			
Length (L)	9.5 in(241.30 mm)		
Width (W)	1.7 in(43.18 mm)		
Height (H)	1.2 in(30.48 mm)		
Mounting dimensions			
Mount Length (M)	8.9 in(226.06 mm)		
Mount Slots (MS)	0.2 in(6.35 mm)		
Weight	1.49 lb		
Exit Type	Side		
Remote Mounting Distance	8 ft		
Remote Mounting Wire Gauge	18 AWG		
Lead lengths	Qty	Exit	Length (± 1 in.)
Black	1	Left/Right	25.0 (635mm)
Blue	2	Left/Right	34.0 (864mm)
Green	1	Left/Right	3.5 (89mm)
Red	2	Left/Right	34.0 (864mm)
White	1	Left/Right	25.0 (635mm)
Yellow	2	Left/Right	45 (1143mm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL
- RoHS Compliant
- Meets ANSI Standard C82.11-Cons 2002
- Meets ANSI Standard C62.41-1991
- High Temperature Rated: Suitable for high temperature applications
- 70C max case temp 5 yr warranty or 90C max case temp 3 yr warranty

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor	THD% (<=)	Min. Starting Temp (°F/°C)
F35T5/WM	1	120	44	0.36 A	1.08	2.45	99	1 1/2	9	5.0 / -15
F35T5/WM	1	277	43	0.17 A	1.08	2.51	92	1 1/2	8	5.0 / -15
F35T5/WM	2	120	70	0.59 A	0.94	1.34	99	1.6	8	5.0 / -15
F35T5/WM	2	277	69	0.26 A	0.94	1.36	96	1.6	9	5.0 / -15
F35T5/HE	1	120	46	0.39 A	1.11	2.41	99	1.6	8	5.0 / -15
F35T5/HE	1	277	46	0.18 A	1.11	2.41	93	1.6	8	5.0 / -15
F35T5/HE	2	120	74	0.62 A	0.95	1.28	99	1.7	9	5.0 / -15

F35T5/HE	2	277	73	0.27 A	0.95	1.30	97	1.7	8 1/2	5.0 / -15
F28T5/WM	1	120	36	0.3 A	1.08	3.00	99	1 1/2	10	5.0 / -15
F28T5/WM	2	120	57	0.48 A	0.95	1.67	99	1.6	9	5.0 / -15
F28T5/WM	1	277	36	0.15 A	1.08	3.00	90	1 1/2	10	5.0 / -15
F28T5/WM	2	277	56	0.21 A	0.95	1.70	95	1.6	9	5.0 / -15
F28T5/HL	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HL	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F28T5/HL	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HL	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HE	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HE	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F21T5/WM	2	120	45	0.38 A	1.01	2.24	99	1 1/2	9	5.0 / -15
F21T5/WM	1	120	29	0.24 A	1.15	3.97	99	1 1/2	10	5.0 / -15
F21T5/WM	1	277	29	0.12 A	1.15	3.97	85	1 1/2	9	5.0 / -15
F21T5/WM	2	277	45	0.18 A	1.01	2.24	93	1 1/2	8	5.0 / -15
F21T5/HE	1	120	31	0.26 A	1.16	3.74	99	1 1/2	9	5.0 / -15
F21T5/HE	2	120	48	0.4 A	1.01	2.10	99	1 1/2	9	5.0 / -15
F21T5/HE	2	277	48	0.18 A	1.01	2.10	94	1 1/2	9	5.0 / -15
F21T5/HE	1	277	31	0.13 A	1.16	3.74	86	1 1/2	10	5.0 / -15
F14T5/WM	1	120	22	0.18 A	1.15	5.23	99	1 1/2	9	5.0 / -15
F14T5/WM	2	120	32	0.27 A	0.99	NaN	99	1 1/2	9	5.0 / -15
F14T5/WM	1	277	22	0.1 A	1.15	5.23	NaN	1 1/2	9	5.0 / -15
F14T5/WM	2	277	32	0.13 A	0.99	NaN	87	1 1/2	9	5.0 / -15
F14T5/HE	1	120	23	0.19 A	1.20	5.22	99	1 1/2	9	5.0 / -15
F14T5/HE	1	277	23	0.11 A	1.20	5.22	78	1 1/2	10	5.0 / -15
F14T5/HE	2	120	34	0.29 A	1.03	3.03	99	1 1/2	9	5.0 / -15
F14T5/HE	2	277	34	0.14 A	1.03	3.03	89	1 1/2	10	5.0 / -15

WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

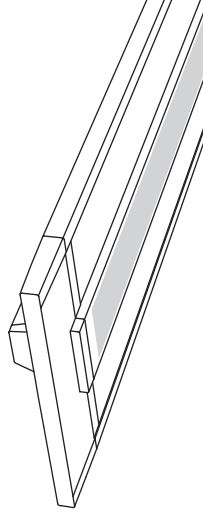
Voice™



Suspended

Direct/Indirect

1 T5



Project Name

Spec Type

Notes

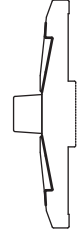
Order Guide

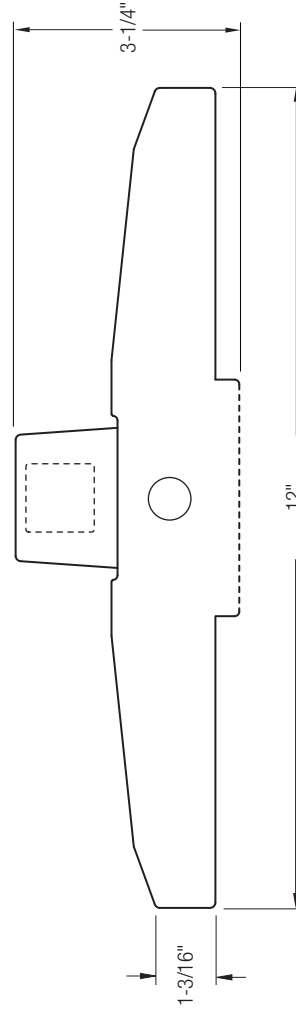
Some combinations of product options may not be available. Consult factory for assistance with your specification.

7306	F01												
Product Series & Type Voice Suspended Direct/ Indirect	Lamping 1 T5	Lower Optics I Slot Perf	Upper Optics N 60% Up / 40% Down G 20% Up / 80% Down J 100% Down	Run Length Enter the total run length in feet (4ft increments)	Wiring 1 1 cct 3 1 cct w/ Emergency cct 5 1 cct w/ Battery Pack 7 1 cct Dimming	Voltage 1 120V 2 277V 3 347V	Ballast E Standard Ballast Consult website for ballast manufacturer information	Color & Finish W Standard White					
Mounting Hardware													
Mount Type Consult separate mounting spec sheet for mount type options													
Suspension Length Enter distance from ceiling to top of fixture in inches													

Upgrades & Accessories

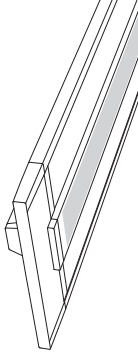
Please indicate with check mark.

<input type="checkbox"/> Lamps Included	<input type="checkbox"/> Lamps Included and Installed
<input type="checkbox"/> Flat Endcap See details on reverse	<input type="checkbox"/> Dust Cover Available with upper optics option N (options G & J include integral dust cover)
<input type="checkbox"/> Response Daylight (Integrated Controls) For details visit www.ledalite.com/response	



Voice™

Suspended
Direct/Indirect
1 T5



Photometry

Optics IN 60% Up / 40% Down

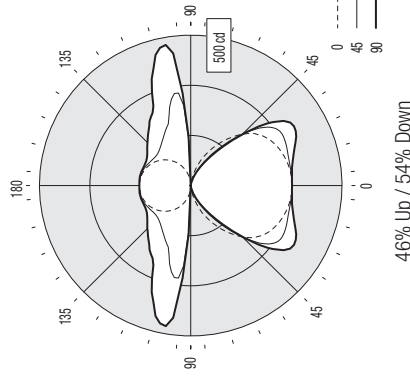
Report Summary

Efficiency 72.2% **Report #** 9900872
Peak Candela Value* 475 @ 100° **Filename** 7306F01N.ies
Peak to Zenith Ratio* 2.8 : 1
* Between 90-180° vertical angle

Meets RP-1-04 recommendations for VDT-intensive spaces

Candela Distribution

Vertical Angle	Horizontal Angle				Zonal Lumens
	0	22.5	45	67.5	
0	335	335	335	335	335
5	334	334	334	335	336
15	327	329	336	345	350
25	313	321	345	372	385
35	289	302	334	367	375
45	242	242	242	249	239
55	177	160	137	129	121
65	110	90	63	63	59
75	49	30	17	19	18
85	6	0	0	0	0
90	0	0	0	0	0
95	19	135	267	280	309
105	44	127	270	407	450
115	73	109	199	269	292
125	98	112	169	223	239
135	121	127	153	190	202
145	140	143	153	168	176
155	154	156	160	164	167
165	164	166	167	169	170
175	169	169	169	170	170
180	170	170	170	170	170



Coefficients of Utilization (%)

Ceiling:	80				70				50				0				
	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	0
0 RCR	77	77	77	77	70	70	70	70	58	58	58	58	31	0	0	0	0
1	70	68	65	63	64	62	60	51	50	48	27	27	27	27	27	27	27
2	64	59	55	52	59	54	51	45	43	41	23	23	23	23	23	23	23
3	59	52	47	43	54	48	44	40	37	34	20	20	20	20	20	20	20
4	54	46	41	37	49	43	38	36	32	29	17	17	17	17	17	17	17
5	49	41	36	31	45	38	33	32	28	25	15	15	15	15	15	15	15
6	46	37	31	27	42	34	29	29	25	22	13	13	13	13	13	13	13
7	42	33	28	24	38	31	26	26	22	19	12	12	12	12	12	12	12
8	39	30	25	21	36	28	23	24	20	17	10	10	10	10	10	10	10
9	36	27	22	19	33	25	21	22	18	15	9	9	9	9	9	9	9
10	34	25	20	17	31	23	19	20	16	14	8	8	8	8	8	8	8

Based on a floor reflectance of 0.2

Avg. Luminance (cd/m²)

Vertical Angle	Horizontal Angle		
	0	45	90
55	933	722	638
65	787	451	422
75	572	199	210
85	208	0	0

IES files for this and other photometric options can be downloaded online at www.ledalite.com

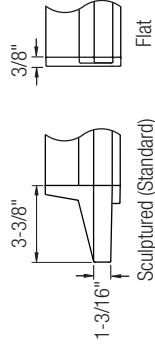
Additional Information

Modules

Module length excludes endcaps.
Nominal mount spacing for individually mounted modules.

Module 4ft 8ft
Mount Spacing 4' 0" 8' 0"

Endcap



Specifications

Due to continuing product improvements, Ledalite reserves the right to change specifications without notice.

Housing

18 gauge die-formed cold-rolled steel, precision formed and welded.

Weight

Maximum 5.5 lb/ft.

Optical System

Optical frame is constructed from 20 gauge die-formed cold-rolled steel. The optical lens assembly consists of flat acrylic panels with a layer of MesoOptics® film that provides high-angle glare control and high efficiency. The panels are secured to a perforated center basket using an acrylic lens. Optical door frame is secured to housing with safety straps. Frame can be removed from housing using a lift-and-shift mechanism. No hardware is visible. Standard distribution is 60% up / 40% down. Also available in 20% up / 80% down and 100% down distributions.

Endcaps

Available with sculptured die-cast endcaps (standard) or flat die-cast endcaps (optional).

Joints

Self-aligning joining system with hands-free pre-joining wire access.

Mounting

Aircraft cable gripper is tamper-resistant and provides infinite vertical adjustment capability. Aircraft cable, crimp and cable gripper independently tested to meet stringent safety requirements. Continuous run mounting on T-bar grid is limited to 32ft runs, but is unlimited in other ceiling types.

Electrical

Factory pre-wired to section ends with quick-wire connectors.

Ballast

Electronic.

Approvals

Certified to UL and CSA standards.

Finish

High-quality powder coat. Available in Ledalite Standard White only (textured matte finish).



GE
Lighting

46705 - F28W/T5/835/ECO

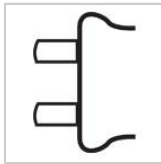
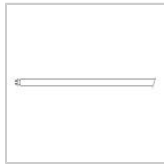
GE Ecolux® Starcoat® T5

- Passes TCLP, which can lower disposal costs.

a product of
ecomagination



High Color Rendering



CAUTIONS & WARNINGS

Caution

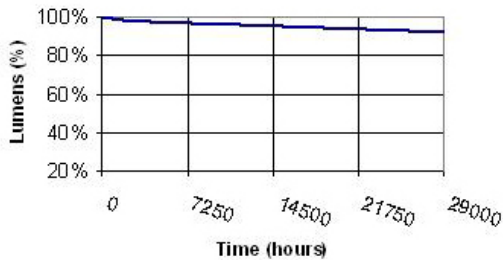
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

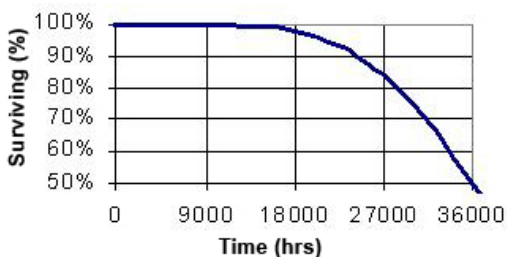
- Risk of Electric Shock
 - Turn power off before inspection, installation or removal.

GRAPHS & CHARTS

Lumen Maintenance



Lamp Mortality



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight
	Linear
Bulb	T5
Base	Miniature Bi-Pin (G5)
Wattage	28
Voltage	167
Rated Life	30000 hrs
Rated Life (rapid start) @ Time	30000.0 @ 3.0/36000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	-20 °C (-4 °F)
LEED-EB MR Credit	31 picograms Hg per mean lumen hour
Additional Info	TCLP compliant

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	2900
Mean Lumens	2660
Nominal Initial Lumens per Watt	103
Color Temperature	3500 K
Color Rendering Index (CRI)	85
S/P Ratio (Scotopic/Photopic Ratio)	1.5

ELECTRICAL CHARACTERISTICS

Open Circuit Voltage (rapid start) Min @ Temperature	425 V @ 10 °C
Cathode Resistance Ratio - Rh/Rc (MIN)	4.25
Cathode Resistance Ratio - Rh/Rc (MAX)	6.5
Current Crest Factor	1.7

DIMENSIONS

Maximum Overall Length (MOL)	45.8000 in(1163.3 mm)
Nominal Length	45.200 in(1148.1 mm)
Bulb Diameter (DIA)	0.625 in(15.9 mm)
Bulb Diameter (DIA) (MAX)	0.625 in(15.9 mm)
Max Base Face to Base Face (A)	45.240 in(1149.1 mm)
Face to End of Opposing Pin (B) (MIN)	45.420 in(1153.7 mm)
Face to End of Opposing Pin (B) (MAX)	45.520 in(1156.2 mm)

PRODUCT INFORMATION

Product Code	46705
Description	F28W/T5/835/ECO
Standard Package	Case
Standard Package GTIN	10043168467053
Standard Package Quantity	40
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	40
UPC	043168467056



GE
Lighting

46705 - F28W/T5/835/ECO

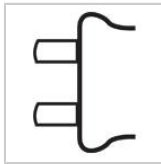
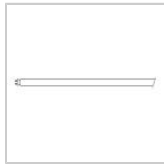
GE Ecolux® Starcoat® T5

- Passes TCLP, which can lower disposal costs.

a product of
ecomagination



High Color Rendering



CAUTIONS & WARNINGS

Caution

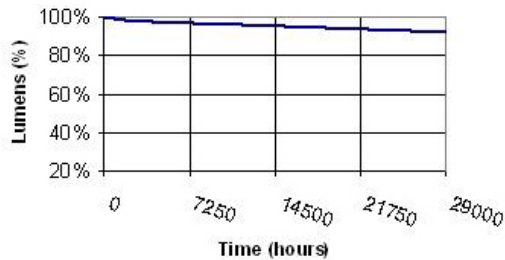
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

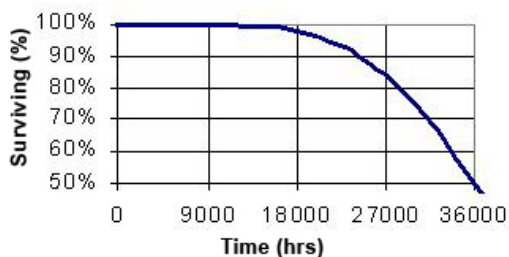
- Risk of Electric Shock
 - Turn power off before inspection, installation or removal.

GRAPHS & CHARTS

Lumen Maintenance



Lamp Mortality



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight
	Linear
Bulb	T5
Base	Miniature Bi-Pin (G5)
Wattage	28
Voltage	167
Rated Life	30000 hrs
Rated Life (rapid start) @ Time	30000.0 @ 3.0/36000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	-20 °C (-4 °F)
LEED-EB MR Credit	31 picograms Hg per mean lumen hour
Additional Info	TCLP compliant

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	2900
Mean Lumens	2660
Nominal Initial Lumens per Watt	103
Color Temperature	3500 K
Color Rendering Index (CRI)	85
S/P Ratio (Scotopic/Photopic Ratio)	1.5

ELECTRICAL CHARACTERISTICS

Open Circuit Voltage (rapid start) Min @ Temperature	425 V @ 10 °C
Cathode Resistance Ratio - Rh/Rc (MIN)	4.25
Cathode Resistance Ratio - Rh/Rc (MAX)	6.5
Current Crest Factor	1.7

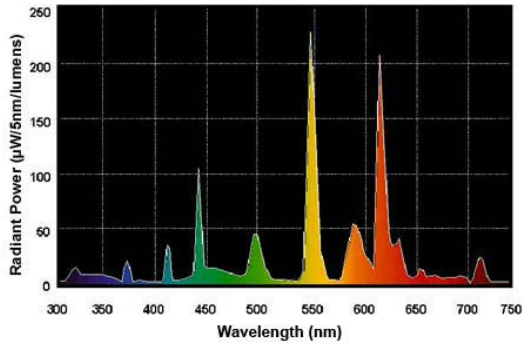
DIMENSIONS

Maximum Overall Length (MOL)	45.8000 in(1163.3 mm)
Nominal Length	45.200 in(1148.1 mm)
Bulb Diameter (DIA)	0.625 in(15.9 mm)
Bulb Diameter (DIA) (MAX)	0.625 in(15.9 mm)
Max Base Face to Base Face (A)	45.240 in(1149.1 mm)
Face to End of Opposing Pin (B) (MIN)	45.420 in(1153.7 mm)
Face to End of Opposing Pin (B) (MAX)	45.520 in(1156.2 mm)

PRODUCT INFORMATION

Product Code	46705
Description	F28W/T5/835/ECO
Standard Package	Case
Standard Package GTIN	10043168467053
Standard Package Quantity	40
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	40
UPC	043168467056

Spectral Power Distribution



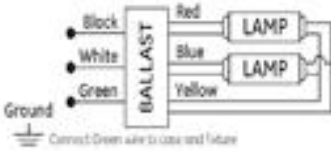


GE
Lighting

99655 - GE228MVPS-A

GE LFL UltraStart® Electronic Program / Rapid Start Ballast

- High Efficiency T5 ballast with Continuous Cathode Cutout Technology
- Lower Maintenance Costs with Parallel Lamp Operation
- Fast Starting Time <700ms
- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Auto-Restart withstands temporary losses in power without the need to cycle power
- UltraCool™ Operation 90C case rating
- Anti-Striation Control for better light quality, with no striations.



GENERAL CHARACTERISTICS

Application	2 or 1 - F14-F35HE 120 to 277 UltraStart PRS Normal Light .95 BF A Can
Category	Linear Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Parallel
Line Voltage Regulation (+/-)	10 %
Case Temperature	90 °C(194 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/End of Life Protection (EOL)/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	99655
Description	GE228MVPS-A
Standard Package	Case
Standard Package GTIN	10043168996553
Standard Package Quantity	10
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168996556

DIMENSIONS

Case dimensions			
Length (L)			9.5 in(241.30 mm)
Width (W)			1.7 in(43.18 mm)
Height (H)			1.2 in(30.48 mm)
Mounting dimensions			
Mount Length (M)			8.9 in(226.06 mm)
Mount Slots (MS)			0.2 in(6.35 mm)
Weight			1.49 lb
Exit Type			Side
Remote Mounting Distance to Lamp			8 ft
Remote Mounting Wire Gauge			18 AWG
Lead lengths	Qty	Exit	Length (± 1 in.)
Black	1	Left/Right	25.0 (635mm)
Blue	2	Left/Right	34.0 (864mm)
Green	1	Left/Right	3.5 (89mm)
Red	2	Left/Right	34.0 (864mm)
White	1	Left/Right	25.0 (635mm)
Yellow	2	Left/Right	45 (1143mm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL
- RoHS Compliant
- Meets ANSI Standard C82.11-Cons 2002
- Meets ANSI Standard C62.41-1991
- High Temperature Rated: Suitable for high temperature applications
- 70C max case temp 5 yr warranty or 90C max case temp 3 yr warranty

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)	
F35T5/WM	1	120	44	0.36 A	1.08	2.45	99	1 1/2	9	5.0 / -15
F35T5/WM	1	277	43	0.17 A	1.08	2.51	92	1 1/2	8	5.0 / -15
F35T5/WM	2	120	70	0.59 A	0.94	1.34	99	1.6	8	5.0 / -15
F35T5/WM	2	277	69	0.26 A	0.94	1.36	96	1.6	9	5.0 / -15
F35T5/HE	1	120	46	0.39 A	1.11	2.41	99	1.6	8	5.0 / -15
F35T5/HE	1	277	46	0.18 A	1.11	2.41	93	1.6	8	5.0 / -15

F35T5/HE	2	120	74	0.62 A	0.95	1.28	99	1.7	9	5.0 / -15
F35T5/HE	2	277	73	0.27 A	0.95	1.30	97	1.7	8 1/2	5.0 / -15
F28T5/WM	1	120	36	0.3 A	1.08	3.00	99	1 1/2	10	5.0 / -15
F28T5/WM	2	120	57	0.48 A	0.95	1.67	99	1.6	9	5.0 / -15
F28T5/WM	1	277	36	0.15 A	1.08	3.00	90	1 1/2	10	5.0 / -15
F28T5/WM	2	277	56	0.21 A	0.95	1.70	95	1.6	9	5.0 / -15
F28T5/HL	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HL	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F28T5/HL	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HL	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HE	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HE	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F21T5/WM	2	120	45	0.38 A	1.01	2.24	99	1 1/2	9	5.0 / -15
F21T5/WM	1	120	29	0.24 A	1.15	3.97	99	1 1/2	10	5.0 / -15
F21T5/WM	1	277	29	0.12 A	1.15	3.97	85	1 1/2	9	5.0 / -15
F21T5/WM	2	277	45	0.18 A	1.01	2.24	93	1 1/2	8	5.0 / -15
F21T5/HE	1	120	31	0.26 A	1.16	3.74	99	1 1/2	9	5.0 / -15
F21T5/HE	2	120	48	0.4 A	1.01	2.10	99	1 1/2	9	5.0 / -15
F21T5/HE	2	277	48	0.18 A	1.01	2.10	94	1 1/2	9	5.0 / -15
F21T5/HE	1	277	31	0.13 A	1.16	3.74	86	1 1/2	10	5.0 / -15
F14T5/WM	1	120	22	0.18 A	1.15	5.23	99	1 1/2	9	5.0 / -15
F14T5/WM	2	120	32	0.27 A	0.99	NaN	99	1 1/2	9	5.0 / -15
F14T5/WM	1	277	22	0.1 A	1.15	5.23	NaN	1 1/2	9	5.0 / -15
F14T5/WM	2	277	32	0.13 A	0.99	NaN	87	1 1/2	9	5.0 / -15
F14T5/HE	1	120	23	0.19 A	1.20	5.22	99	1 1/2	9	5.0 / -15
F14T5/HE	1	277	23	0.11 A	1.20	5.22	78	1 1/2	10	5.0 / -15
F14T5/HE	2	120	34	0.29 A	1.03	3.03	99	1 1/2	9	5.0 / -15
F14T5/HE	2	277	34	0.14 A	1.03	3.03	89	1 1/2	10	5.0 / -15

WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

ITH637

HID Metal Halide

PAR38MH 70W Stage III Theatrical Fixture Track Head

Catalog #:	Type:
Notes:	

Product Specifications

Lamp:

PAR38MH 70W

Socket:

E26 Medium Base

Features:

- Light weight, strong construction
- Clean style
- Adjustable for precision aiming
- One or two circuit track capability
- Compatible with Intense Lighting's Professional Series track
- Electronic ballast

Track Compatibility:

Single/two circuit positive contact is present to "down" position at factory, but may be raised to the higher position to install onto the second circuit.

Electronic Ballast:

High Power Factor.
 Input:
 .27A @ 70W
 Open Circuit Voltage 300V max.
 Sound Rated A
 Max. case temp +80°C
 Ignition Voltage 4.0KV max.
 THD < 5%
 PF > 98%
 Outdoor Type 1

Professional Series Option:

Track fixture is compatible with Intense Two Circuit / Two Neutral Professional Track series. Track adapter is factory installed on fixture. Must specify -27 for 277V.

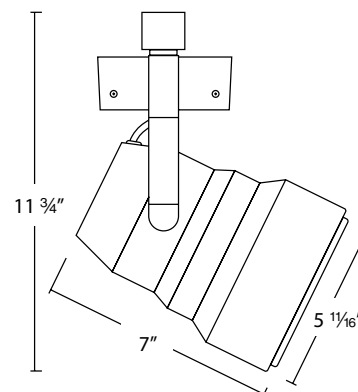
Two Circuit / Two Neutral 120V. The independent neutrals guarantee that the two circuits are completely isolated. Independent neutrals also offer twice the power handling capacity of ordinary common neutral track.

Two Circuit / Two Neutral 277V
 The Intense Professional Series 2-cct/2-neutral 277V track system is well suited for larger retail and institutional applications where a number of metal halide or fluorescent fixtures are used. The 277V system offers twice the capacity of ordinary 120V track allowing for substantially longer runs with more fixtures between feed points. This translates into enhanced aesthetics and reduced installation costs.

Listing:

NRTL listed for dry locations

Dimensions



Ordering Matrix

ITH637

Series	Finish	Options
	W white B black SN satin nickel	-PS 120V pro series -PS-27 277V pro series

*Note: Specifications and dimensions subject to change without notice.





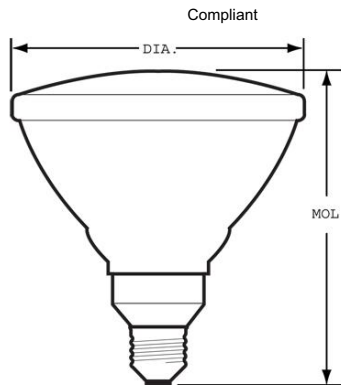
GE
Lighting

45677 - CMH70PAR38FL/ECO

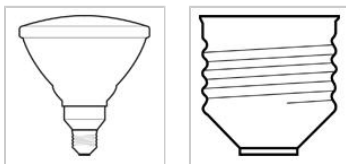
GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide PAR38

• Passes TCLP, which can lower disposal costs.

Photo
Not Available



RoHs



CAUTIONS & WARNINGS

R- WARNING: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if outer envelope of the lamp is broken or punctured, and the arc tube continues to operate. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain types of lamps that will automatically extinguish when the outer envelope is broken or punctured are commercially available. Visit the FDA website for more information: <http://www.fda.gov/cdrh/radhealth/products/urburns.html>

Caution

- Lamp may shatter and cause injury if broken
 - Do not use lamp if outer glass is scratched or broken.
- Risk of Burn
 - Allow lamp to cool before handling.
 - Do not turn on lamp until fully installed.

Warning

- Lamp emits UV radiation which may cause eye/skin irritation.
 - Turn power off if glass bulb is broken. Remove and dispose of lamp.
- Risk of Electric Shock
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Turn power off before inspection, installation or removal.

For additional information, visit www.gelighting.com

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide PAR38
Bulb Base	Medium Screw (E26)
Wattage	70
Rated Life	10000 hrs
Bulb Material	Hard glass
Lamp Enclosure Type (LET)	Open or enclosed fixtures
LEED-EB MR Credit	167 picograms Hg per mean lumen hour
Additional Info	TCLP compliant/UV control

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	4800
Nominal Initial Lumens per Watt	68
Beam Spread	25 °
Center Beam Candlepower (CBCP)	14000
Color Temperature	3000 K
Color Rendering Index (CRI)	82

ELECTRICAL CHARACTERISTICS

Burn Position	Universal burning position
Open Circuit Voltage (peak lead ballast)	280 V
Open Circuit Voltage (RMS lag ballast)	198 V
Warm Up Time to 90% (MAX)	2 min
Hot Restart Time to 90% (MIN)	10 min
Hot Restart Time to 90% (MAX)	15 min

DIMENSIONS

Maximum Overall Length (MOL)	5.31 cm
Nominal Length	5.31 cm
Bulb Diameter (DIA)	4.75 cm
Bulb Diameter (DIA) (MAX)	4.75 cm

PRODUCT INFORMATION

Product Code	45677
Description	CMH70PAR38FL/ECO
ANSI Code	M143/M98
Standard Package	Case
Standard Package GTIN	10043168456774
Standard Package Quantity	6
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	6
UPC	043168456777

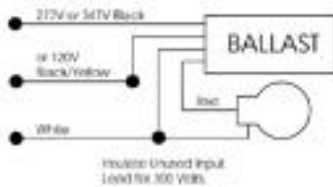
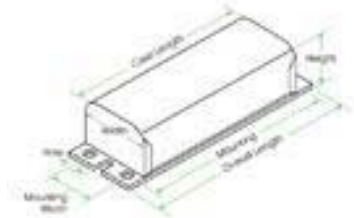


GE
Lighting

86578 - 11210506CTC000C

GE HID Magnetic F-Can Ballast

- For applications requiring quieter or cooler operation than provided by standard coil & coil ballasts.
- Excellent sound-deadening and heat transfer qualities.



GENERAL CHARACTERISTICS

Application	1- 70w M98 120/277 Enclosed & Potted
Category	High Intensity Discharge
Ballast Type	Magnetic - F-Can
Type	Standard
Line Voltage Regulation (+/-)	5 %
Ballast Factor	Normal
Circuit Type	HX-HPF
Sound Rating	B (25-30 decibels)
Insulation Class	90C
Distance to Lamp	20 ft
Additional Info	Thermally protected

PRODUCT INFORMATION

Product Code	86578
Description	11210506CTC000C
Standard Package	Master
Standard Package GTIN	30043168865785
Standard Package Quantity	4
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	4
UPC	043168865784

DIMENSIONS

Case dimensions			
Length (L)	11.8 in(298.45 mm)		
Width (W)	3.2 in(80.96 mm)		
Height (H)	2.6 in(66.68 mm)		
Mounting dimensions			
Mount Length (M)	11.1 in(282.97 mm)		
Mount Width (X or F)	2.0 in(50.80 mm)		
Mount Slots (MS)	0.2 in(5.95 mm)		
Weight	11 lb		
Exit Type	Side		
Remote Mounting Distance to Lamp	20 ft		
Remote Mounting Wire Gauge	18 AWG		
Lead lengths	Qty	Exit	Length (± 1 in.)
Black	1		12 in (NaNmm)
Black/Yellow	1		12 in (NaNmm)
Red	1		12 in (NaNmm)
White	1		12 in (NaNmm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	60 Hz
--------------------------	-------

SAFETY & PERFORMANCE

- cUL Listed
- UL Listed

SPECIFICATIONS BY LAMP & LINE VOLTAGE

Lamp # of Lamps	Specifications by Line Voltage	System Wattage	Nominal Current	Ballast Factor	Ballast Efficiency	Max.Input Current	Starting Current	Open Circuit Voltage	Drop Out Voltage	Power factor	Min.starting temperature	Fuse rating	UL bench top rise
M98	1	120	90.0	0.78A	1	0.778	2A	0.6A	250V	66V	0.9	-22.0°F	6
M98	1	277	90.0	0.35A	1	0.778	0.9A	0.27A	250V	152V	0.9	-22.0°F	3

CAUTIONS & WARNINGS

Warning

- Risk of Electric Shock
 - Properly ground ballast and fixture.
 - Turn power off before servicing--see instructions.

NOTES

- Anchor bracket / Tab provided for splice box (SB-4 Not included)

WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

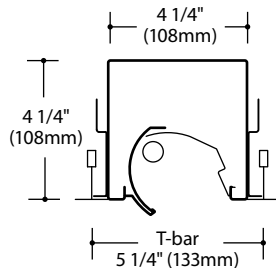
Mod² Recessed Wall/Wash

LG-WWD-4400

Exposed Grid Ceiling
Recessed Wall Wash Direct



R-WWD version shown here



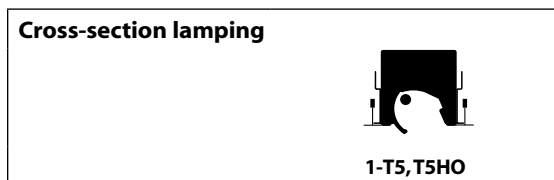
Product Description

The LG-WWD-4400 is a recessed fixture for grid ceilings with an optical system designed to provide uniform wall wash lighting. As part of the Mod² family from Litecontrol, the fixture has a low-profile housing (nominally 4" x 4") and uses T5 or T5HO lamping. The WWD-4400 can be row-configured for continuous run installations along a wall, and has an optional regressed lens that completely shields the lamp from view if desired.

Ordering Guide

Product, Lamping, & Length					Options						
LG -	WWD -	44	1	4	T5 -	--	CWM -	IND -	LP/ELB -	F -	120
Mounting	Distribution	Series	Lamp Count*	Nominal Length (ft)	Lamp Type	Diffuser	Finish	Position	Ballast	Other options	Volts
LG Recessed (exposed grid ceiling)	WWD Wall Wash Direct	44	1 → 2 → see notes	2, 3, 4 6, 8	T5 T5HO (not available in T8)	-- SGL	CWM (Matte White) is standard	IND INT EOR/LH EOR/RH	LP/ELB is std. DA/MK7 DL/ECO DO/HEL see Ballast Options	F CCEA see Other options notes: *Lamp Count = total number of lamps in the fixture For Ordering guide information in shaded areas, choose selection by reading ACROSS the shaded areas for correct specifications.	120 277

LG-WWD-4414T5-CWM-IND-LP/ELB-F-120 is a typical catalog number for a 1-lamp, 4-foot long T5 fixture, Matte White finish, individual fixture with an electronic ballast, optional fuse, 120 volts.

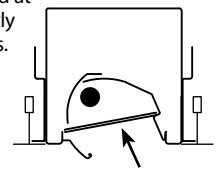


Diffuser

SGL Soft Glow Lens. Extruded, frosted acrylic lens regressed at an angle above the ceiling to soften view of lamp from directly below while minimizing visibility from normal viewing angles.

Position

IND Individual fixture.
INT Intermediate fixture in a row.
EOR/LH Left hand end-of-row fixture in a row.
EOR/RH Right hand end-of-row fixture in a row.



Soft Glow Lens

Ballast

Specify in place of **LP/ELB**, contact factory for availability/compatibility with lamping:

DA/MK7 Advance Mark VII dimming ballast.
DL/ECO Lutron ECO-10 dimming ballast.
DO/HEL Osram Sylvania dimming ballast.

Other Options

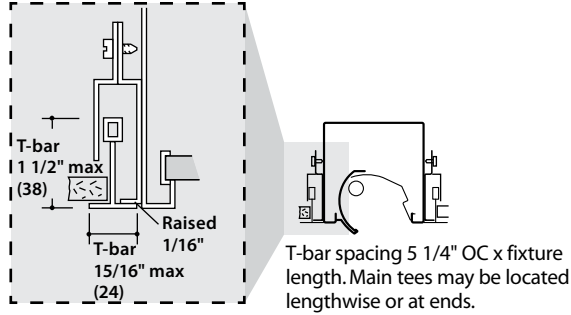
F Fuse. Slow or fast blow, determined by Litecontrol.
CCEA City of Chicago Environmental Air Modification.

Questions to Ask

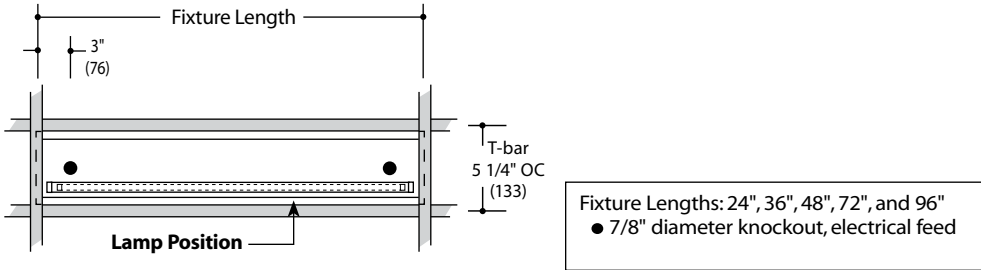
1. Row information, including desired fixture length?
2. Diffuser type? 3. Other options? 4. 1 120 or 277 volt?



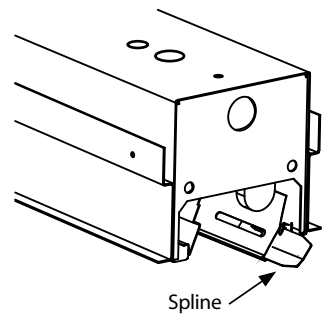
Planning for installation



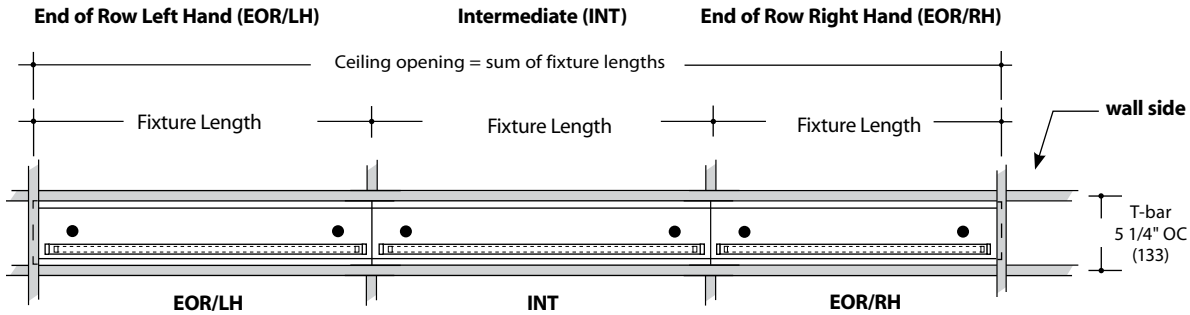
Individual Fixtures (IND)



Spline Detail



Row fixtures



Row is comprised of fixtures of standard lengths:

End of Row fixtures (EOR/LH & EOR/RH) are used at ends, Intermediate fixtures (INT) are used between other fixtures. Continuous opening in ceiling is framed by main tees parallel to row, spaced 5 1/4" OC and at end of row, spacing equal to the sum of the fixture lengths.

Cradle to Cradle Certified^{CM} is a certification mark of MBDC.

© 2009 LITECONTROL, Printed in U.S.A./TS10093-03

LITECONTROL

employee owned | customer driven

100 Hawks Avenue Hanson, MA 02341
781 294 0100 f: 781 293 2849 litecontrol.com



Specifications

HOUSING. Die-formed and welded steel, with 3/8" regression at housing bottom for rigidity and appearance. Continuous mounting rail along sides, with bottom flange regressed 1/16", is used as a lateral spacing aid between main T-bars, allows clearance for T-bar supporting wires, and accepts mounting of side clips. Furnished with 6" long, steel splines for insertion at each side of housing at junction of fixtures in rows for precise alignment. End headers have clearance holes for easy row installation.

REFLECTOR. Formed semi-specular high reflectance aluminum primary optic. Formed steel wall-side reflector painted gray. Painted, extruded aluminum room-side reflector shield extends below the ceiling and includes a pre-installed alignment spline that is slid between adjoining fixtures in the field.


END CAPS. Straddle T-bars and attach to ends of individual fixtures and ends of rows.

BALLAST. Low-profile Electronic Ballast (LP/ELB), high power factor, thermally protected Class P, Sound Rated A, less than 10% THD, manufactured by a UL-listed manufacturer, as available, determined by Litecontrol. Ballasts with a voltage range of 120 to 277 will be used when fixture configuration and ballast availability allow. The minimum number of ballasts will be used.

LAMPING. Available in one-lamp T5 or T5HO in cross-section.

BALLAST DISCONNECT. Fixture supplied with a ballast disconnect device to enable compliance with the NEC.

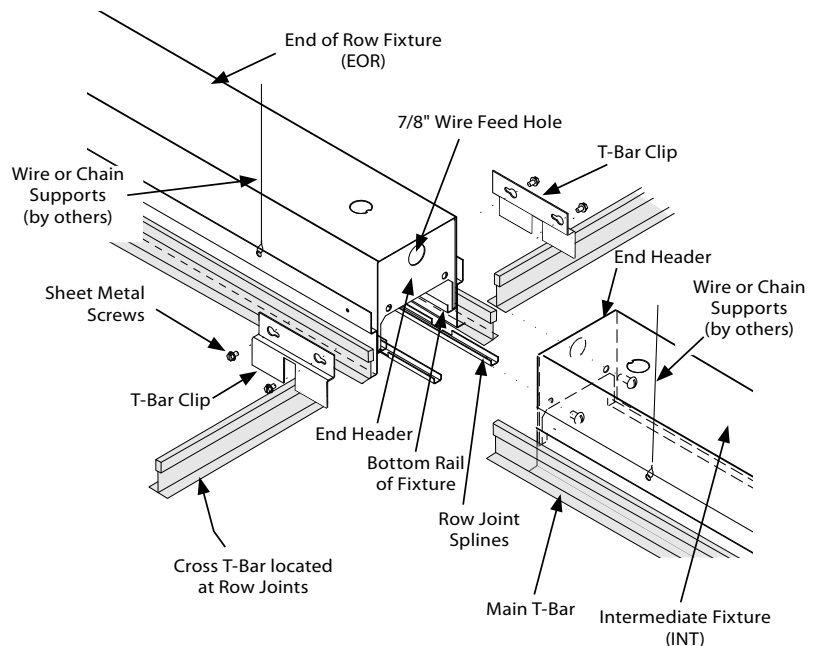
MOUNTING. For installation in exposed inverted T-bar grid ceilings (NEMA type G, 1 1/2" high T-bar) only. Side T-bar clips and T-bar end caps provided; field installed by contractor. Knockouts in housing top for wiring. Holes provided in mounting rail for S-hooks of chain supports or guy wires.

CERTIFICATION. Fixture and electrical components shall be UL and/or CUL Listed and shall bear the I.B.E.W., A.F. of L. label.  This fixture is Cradle to Cradle Certified^{CM} Silver by MBDC.

Note: Litecontrol reserves the right to change specifications without notice for product development and improvement.

General notes for specifiers and contractors

1. Fixtures may be mounted in exposed grid ceilings, either as individual units, or in rows, for continuous light.
2. Suffixes for individual fixtures (IND), and row fixtures (INT, EOR/LH, EOR/RH) should be shown on electrical and reflected ceiling plans, together with fixture type designations and lengths. Example: B-EOR/LH-2', B-INT-6', B-IND-4'. These will be shown on order processing and carton labeling, and will assist with on-the-job installation.
3. Electrical and ceiling contractors should understand that this system is not a standard troffer construction (due to continuous light feature), so coordination between the two trades is essential.
4. All main tees and cross tees must be rigidly attached to each other (i.e. with angles and pop rivets, by others), so main tees will not twist or pivot under fixture weight. Additional supporting means may be necessary and required by local codes, to provide adequate support of ceiling grid in fixture areas. Knockouts are located in housing top for wiring. Access openings and cover plates are not provided.
5. Electrical contractor must attach T-bar clips, supplied by Litecontrol, after the fixtures have been installed.



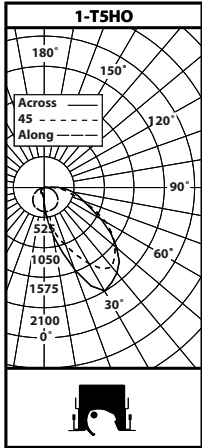
LITECONTROL

employee owned | customer driven

100 Hawks Avenue Hanson, MA 02341
781 294 0100 f: 781 293 2849 litecontrol.com



Photometric data



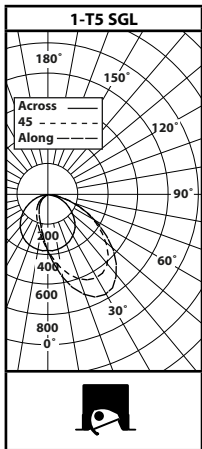
CANDLEPOWER SUMMARY					
ANGLE	0	45	90	135	180
90	3	3	6	138	223
85	2	2	25	271	379
80	6	9	61	377	503
75	32	23	103	489	607
70	36	47	147	722	718
65	52	64	182	970	890
60	60	86	219	1220	1132
55	84	111	249	1425	1388
50	95	130	278	1581	1619
45	104	121	306	1702	1812
40	119	120	332	1802	1932
35	120	115	353	1729	2011
30	109	120	374	1520	2068
25	113	128	386	1300	1883
20	122	142	394	1089	1537
15	128	150	407	916	1180
10	141	181	414	724	884
5	230	300	420	563	617
0	418	418	418	418	418

LG-WWD-4414T5HO 68.7% Efficiency																		
Litecontrol Certified Test Report #66016000																		
RCC	80				70				50				30				10	0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																		
0	82	82	82	82	80	80	80	80	76	76	76	73	73	73	70	70	69	
1	73	69	66	63	71	68	65	62	65	62	60	62	60	58	60	58	55	
2	66	59	54	49	64	58	53	49	55	51	48	53	50	46	51	48	44	
3	59	51	45	40	57	50	44	39	48	43	39	46	42	38	44	40	36	
4	54	44	38	33	52	44	37	32	42	36	32	40	35	31	38	34	29	
5	49	39	32	27	47	38	32	27	37	31	27	35	30	26	34	30	24	
6	45	35	28	23	43	34	28	23	33	27	23	31	26	23	30	26	21	
7	41	31	24	20	40	30	24	20	29	24	20	28	23	19	27	23	18	
8	38	28	22	17	37	27	21	17	27	21	17	26	21	17	25	20	15	
9	35	25	19	15	34	25	19	15	24	19	15	23	18	15	23	18	13	
10	33	23	17	13	32	23	17	13	22	17	13	21	17	13	21	16	12	

Floor Cavity Reflectance .20

ZONAL LUMEN SUMMARY			
ZONE	LUMENS	% LAMP	% LUMINAIRE
180-90°	0	0	0
90-0°	3093	69	100
180-0°	3093	69	100

LUMINANCE SUMMARY (cd/m ²)			
ANGLE	0°	45°	90°
45°	1464	1704	4309
55°	1458	1927	4323
65°	1225	1508	4288
75°	1231	885	3963
85°	228	228	2856



CANDLEPOWER SUMMARY					
ANGLE	0	45	90	135	180
90	1	1	1	30	41
85	1	1	16	49	59
80	1	1	45	95	86
75	0	3	74	158	147
70	5	11	104	226	222
65	9	17	135	295	304
60	17	37	166	372	391
55	29	55	197	444	482
50	45	74	228	513	572
45	63	91	257	572	649
40	78	109	285	615	711
35	95	127	306	637	757
30	113	147	326	641	767
25	134	169	342	625	752
20	158	196	354	593	704
15	187	225	364	546	637
10	232	266	370	491	552
5	292	312	374	428	456
0	369	369	369	369	369

LG-WWD-4414T5-SGL 49.3% Efficiency																		
Litecontrol Certified Test Report #68316600																		
RCC	80				70				50				30				10	0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																		
0	59	59	59	59	57	57	57	57	55	55	55	52	52	52	50	50	49	
1	53	51	49	47	52	50	48	46	48	46	45	46	45	43	44	43	41	
2	49	44	41	38	47	44	40	38	42	39	37	40	38	36	39	37	34	
3	44	39	35	32	43	38	34	31	37	33	31	35	33	30	34	32	29	
4	40	34	30	27	39	34	30	26	33	29	26	31	28	26	30	28	24	
5	37	31	26	23	36	30	26	23	29	25	22	28	25	22	27	24	21	
6	34	28	23	20	33	27	23	20	26	22	20	25	22	19	25	22	18	
7	32	25	21	17	31	24	20	17	24	20	17	23	20	17	22	19	16	
8	29	23	18	15	29	22	18	15	22	18	15	21	18	15	20	17	14	
9	27	21	17	14	27	20	16	14	20	16	14	19	16	14	19	16	13	
10	26	19	15	12	25	19	15	12	18	15	12	18	15	12	17	14	11	

Floor Cavity Reflectance .20

ZONAL LUMEN SUMMARY			
ZONE	LUMENS	% LAMP	% LUMINAIRE
180-90°	0	0	0
90-0°	1286	49	100
180-0°	1286	49	100

LUMINANCE SUMMARY (cd/m ²)			
ANGLE	0°	45°	90°
45°	1141	1648	4653
55°	647	1228	4397
65°	273	515	4089
75°	0	148	3660
85°	147	147	2350



GE
Lighting

46706 - F28W/T5/841/ECO

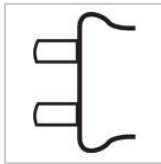
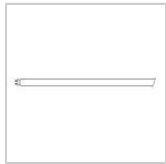
GE Ecolux® Starcoat® T5

- Passes TCLP, which can lower disposal costs.

a product of
ecomagination



High Color Rendering



CAUTIONS & WARNINGS

Caution

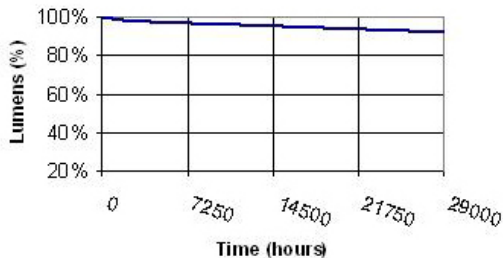
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

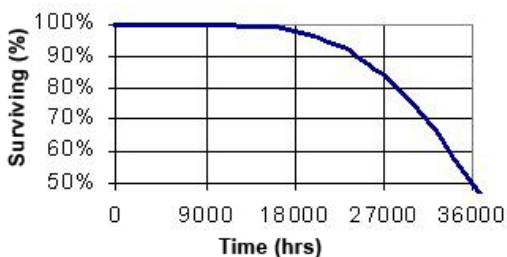
- Risk of Electric Shock
 - Turn power off before inspection, installation or removal.

GRAPHS & CHARTS

Lumen Maintenance



Lamp Mortality



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight Linear
Bulb	T5
Base	Miniature Bi-Pin (G5)
Wattage	28
Voltage	167
Rated Life	30000 hrs
Rated Life (rapid start) @ Time	30000.0 @ 3.0/36000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	-20 °C (-4 °F)
LEED-EB MR Credit	31 picograms Hg per mean lumen hour
Additional Info	TCLP compliant

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	2900
Mean Lumens	2660
Nominal Initial Lumens per Watt	103
Color Temperature	4100 K
Color Rendering Index (CRI)	85
S/P Ratio (Scotopic/Photopic Ratio)	1.3

ELECTRICAL CHARACTERISTICS

Open Circuit Voltage (rapid start) Min @ Temperature	425 V @ 10 °C
Cathode Resistance Ratio - Rh/Rc (MIN)	4.25
Cathode Resistance Ratio - Rh/Rc (MAX)	6.5
Current Crest Factor	1.7

DIMENSIONS

Maximum Overall Length (MOL)	45.8000 in(1163.3 mm)
Nominal Length	45.200 in(1148.1 mm)
Bulb Diameter (DIA)	0.625 in(15.9 mm)
Bulb Diameter (DIA) (MAX)	0.625 in(15.9 mm)
Max Base Face to Base Face (A)	45.240 in(1149.1 mm)
Face to End of Opposing Pin (B) (MIN)	45.420 in(1153.7 mm)
Face to End of Opposing Pin (B) (MAX)	45.520 in(1156.2 mm)

PRODUCT INFORMATION

Product Code	46706
Description	F28W/T5/841/ECO
Standard Package	Case
Standard Package GTIN	10043168467060
Standard Package Quantity	40
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	40
UPC	043168467063

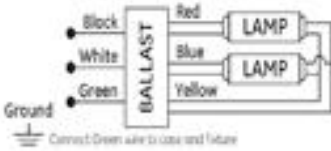


GE
Lighting

99655 - GE228MVPS-A

GE LFL UltraStart® Electronic Program / Rapid Start Ballast

- High Efficiency T5 ballast with Continuous Cathode Cutout Technology
- Lower Maintenance Costs with Parallel Lamp Operation
- Fast Starting Time <700ms
- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Auto-Restart withstands temporary losses in power without the need to cycle power
- UltraCool™ Operation 90C case rating
- Anti-Striation Control for better light quality, with no striations.



GENERAL CHARACTERISTICS

Application	2 or 1 - F14-F35HE 120 to 277 UltraStart PRS Normal Light .95 BF A Can
Category	Linear Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Parallel
Line Voltage Regulation (+/-)	10 %
Case Temperature	90 °C(194 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/End of Life Protection (EOL)/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	99655
Description	GE228MVPS-A
Standard Package	Case
Standard Package GTIN	10043168996553
Standard Package Quantity	10
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168996556

DIMENSIONS

Case dimensions			
Length (L)			9.5 in(241.30 mm)
Width (W)			1.7 in(43.18 mm)
Height (H)			1.2 in(30.48 mm)
Mounting dimensions			
Mount Length (M)			8.9 in(226.06 mm)
Mount Slots (MS)			0.2 in(6.35 mm)
Weight			1.49 lb
Exit Type			Side
Remote Mounting Distance to Lamp			8 ft
Remote Mounting Wire Gauge			18 AWG
Lead lengths	Qty	Exit	Length (± 1 in.)
Black	1	Left/Right	25.0 (635mm)
Blue	2	Left/Right	34.0 (864mm)
Green	1	Left/Right	3.5 (89mm)
Red	2	Left/Right	34.0 (864mm)
White	1	Left/Right	25.0 (635mm)
Yellow	2	Left/Right	45 (1143mm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL
- RoHS Compliant
- Meets ANSI Standard C82.11-Cons 2002
- Meets ANSI Standard C62.41-1991
- High Temperature Rated: Suitable for high temperature applications
- 70C max case temp 5 yr warranty or 90C max case temp 3 yr warranty

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)	
F35T5/WM	1	120	44	0.36 A	1.08	2.45	99	1 1/2	9	5.0 / -15
F35T5/WM	1	277	43	0.17 A	1.08	2.51	92	1 1/2	8	5.0 / -15
F35T5/WM	2	120	70	0.59 A	0.94	1.34	99	1.6	8	5.0 / -15
F35T5/WM	2	277	69	0.26 A	0.94	1.36	96	1.6	9	5.0 / -15
F35T5/HE	1	120	46	0.39 A	1.11	2.41	99	1.6	8	5.0 / -15
F35T5/HE	1	277	46	0.18 A	1.11	2.41	93	1.6	8	5.0 / -15

F35T5/HE	2	120	74	0.62 A	0.95	1.28	99	1.7	9	5.0 / -15
F35T5/HE	2	277	73	0.27 A	0.95	1.30	97	1.7	8 1/2	5.0 / -15
F28T5/WM	1	120	36	0.3 A	1.08	3.00	99	1 1/2	10	5.0 / -15
F28T5/WM	2	120	57	0.48 A	0.95	1.67	99	1.6	9	5.0 / -15
F28T5/WM	1	277	36	0.15 A	1.08	3.00	90	1 1/2	10	5.0 / -15
F28T5/WM	2	277	56	0.21 A	0.95	1.70	95	1.6	9	5.0 / -15
F28T5/HL	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HL	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F28T5/HL	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HL	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	1	120	37	0.31 A	1.09	2.95	99	1 1/2	10	5.0 / -15
F28T5/HE	1	277	37	0.15 A	1.09	2.95	91	1 1/2	10	5.0 / -15
F28T5/HE	2	277	59	0.23 A	0.96	1.63	96	1.6	9.3	5.0 / -15
F28T5/HE	2	120	60	0.5 A	0.96	1.60	99	1.6	8	5.0 / -15
F21T5/WM	2	120	45	0.38 A	1.01	2.24	99	1 1/2	9	5.0 / -15
F21T5/WM	1	120	29	0.24 A	1.15	3.97	99	1 1/2	10	5.0 / -15
F21T5/WM	1	277	29	0.12 A	1.15	3.97	85	1 1/2	9	5.0 / -15
F21T5/WM	2	277	45	0.18 A	1.01	2.24	93	1 1/2	8	5.0 / -15
F21T5/HE	1	120	31	0.26 A	1.16	3.74	99	1 1/2	9	5.0 / -15
F21T5/HE	2	120	48	0.4 A	1.01	2.10	99	1 1/2	9	5.0 / -15
F21T5/HE	2	277	48	0.18 A	1.01	2.10	94	1 1/2	9	5.0 / -15
F21T5/HE	1	277	31	0.13 A	1.16	3.74	86	1 1/2	10	5.0 / -15
F14T5/WM	1	120	22	0.18 A	1.15	5.23	99	1 1/2	9	5.0 / -15
F14T5/WM	2	120	32	0.27 A	0.99	NaN	99	1 1/2	9	5.0 / -15
F14T5/WM	1	277	22	0.1 A	1.15	5.23	NaN	1 1/2	9	5.0 / -15
F14T5/WM	2	277	32	0.13 A	0.99	NaN	87	1 1/2	9	5.0 / -15
F14T5/HE	1	120	23	0.19 A	1.20	5.22	99	1 1/2	9	5.0 / -15
F14T5/HE	1	277	23	0.11 A	1.20	5.22	78	1 1/2	10	5.0 / -15
F14T5/HE	2	120	34	0.29 A	1.03	3.03	99	1 1/2	9	5.0 / -15
F14T5/HE	2	277	34	0.14 A	1.03	3.03	89	1 1/2	10	5.0 / -15

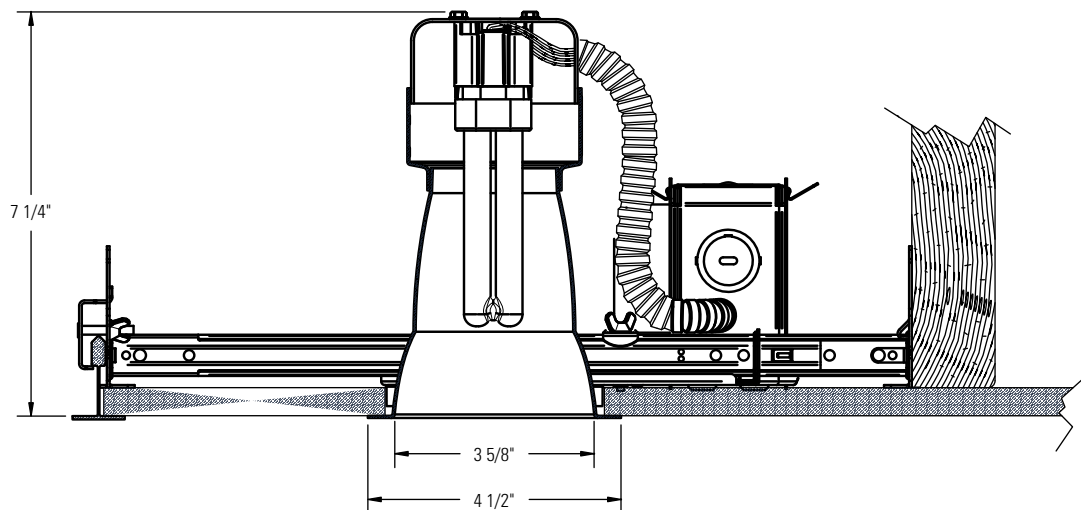
WARRANTY INFORMATION

GE Lighting warrants to the purchaser that each ballast will be free from defects in material or workmanship for period as defined in the attached documents from the date of manufacture when properly installed and under normal conditions of use.

Lytecaster® Performance Recessed CFL Downlighting **2001**

Page 1 of 2

3 3/4" Aperture Vertical Open, Compact Fluorescent, Performance Series, Reflector Trim



Complete Fixture consists of Frame-In Kit and Reflector Trim. Select each separately.

Uniframe™ Compact Fluorescent Performance Series Reflector Trims

Catalog No.	Description
2001CL	3 3/4" Vertical Open Downlight – Specular Clear
2001CD	3 3/4" Vertical Open Downlight – Clear Diffuse
2001WH	3 3/4" Vertical Open Downlight – Matte White

Compatible Frame-In Kits

(See Individual Frame-In Kit Specification Sheets)

Catalog No.	Installation Type	Lamping
2001F13U	Uniframe™ Non-IC 120v/277v	13w Quad/Triple
2001F18U	Uniframe™ Non-IC 120v/277v	18w Triple
2001F13ICU/N	Performance IC 120v/277v	13w Quad/Triple
2001F18ICU/N	Performance IC 120v/277v	18w Triple

Features

- Reflector:** Formed aluminum. Matte White flange.
- Finishes:** CL = Specular Clear (Iridescent Free coating)
CD = Clear Diffuse
WH = Matte White Paint
- Performance Data:** 65° Cutoff angle.
See attached photometric reports for distribution and efficiency data.
Go to www.lightolier.com for .IES files.

Labels

cULus Listed. Suitable for Damp Locations. I.B.E.W.

Job Information

Type:

Job Name:

Cat. No.:

Lamp(s):

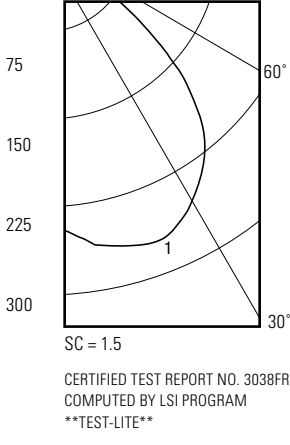
Notes:

Lightolier a Genlyte company www.lightolier.com
631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710
We reserve the right to change details of design, materials and finish.
© 2007 Genlyte Group LLC • C1007

LIGHTOLIER®



18W TRIPLE TUBE LAMP, LUMEN RATING = 1200 LMS, ELECTRONIC BALLAST, CL FINISH TRIM

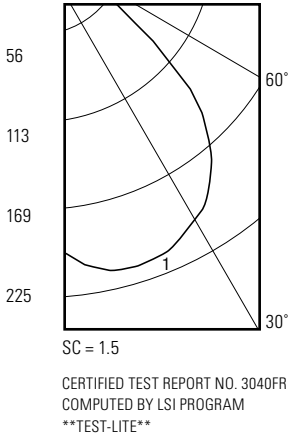


CANDLEPOWER SUMMARY		ZONAL LUMEN SUMMARY		ZONAL LUMENS AND PERCENTAGES			
Angle	0° CP	Zone	Lumens	Zone	Lumens	%Lamp	%Fixt
0	239	0-10	23.94	0-30	222.19	18.5	39
5	246	10-20	75.59	0-40	370.28	30.9	65.1
10	260	20-30	122.65	0-60	564.67	47.1	99.2
15	266	30-40	148.09	0-90	569.15	47.4	100
20	271	40-50	136.28	90-120	0	0	0
25	267	50-60	58.12	90-130	0	0	0
30	255	60-70	4.48	90-150	0	0	0
35	238	70-80	.0	90-180	0	0	0
40	215	80-90	0	0-180	569.15	47.4	100
45	180	90-100	0	** Efficiency = 47.4%**			
50	130	100-110	0				
55	59	110-120	0				
60	19	120-130	0				
65	1	130-140	0				
70	0	140-150	0				
75	0	150-160	0				
80	0	160-170	0				
85	0	170-180	0				
90	0						

COEFFICIENTS OF UTILIZATION												
Ceiling	80%				70%		50%		30%			
Wall	70	50	30	10	50	10	50	10	50	10	0	
RCR	Zonal Cavity Method - Effective Floor Reflectance = 20%											
Room Cavity Ratio	0	56	56	56	56	55	55	53	53	50	50	47
	1	53	52	50	49	50	48	49	47	47	45	43
	2	50	47	44	42	46	42	44	41	43	40	38
	3	46	42	39	37	42	37	40	36	39	35	34
	4	43	38	35	32	38	32	37	32	36	31	30
	5	40	35	31	29	34	28	33	28	32	28	27
	6	37	32	28	25	31	25	30	25	30	25	24
	7	35	29	25	23	29	23	28	23	27	22	21
	8	32	27	23	21	26	21	26	20	25	20	19
	9	30	24	21	19	24	19	24	18	23	18	18
	10	28	23	19	17	22	17	22	17	22	17	16

Determined In Accordance With Current IES Published Procedures
Luminaire Input Watts = 22.0

13W TRIPLE TUBE LAMP, LUMEN RATING = 900 LMS, ELECTRONIC BALLAST, CL FINISH TRIM

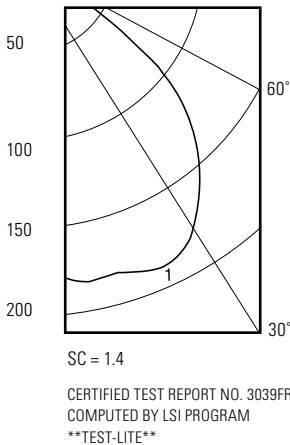


CANDLEPOWER SUMMARY		ZONAL LUMEN SUMMARY		ZONAL LUMENS AND PERCENTAGES			
Angle	0° CP	Zone	Lumens	Zone	Lumens	%Lamp	%Fixt
0	190	0-10	19.02	0-30	175.46	19.5	37.8
5	195	10-20	60.03	0-40	294.57	32.7	63.5
10	207	20-30	96.41	0-60	458.58	51.7	98.8
15	212	30-40	119.11	0-90	464.18	51.6	100
20	213	40-50	113.45	90-120	0	0	0
25	209	50-60	50.56	90-130	0	0	0
30	202	60-70	5.48	90-150	0	0	0
35	191	70-80	.13	90-180	0	0	0
40	175	80-90	0	0-180	464.18	51.6	100
45	151	90-100	0	** Efficiency = 51.6%**			
50	108	100-110	0				
55	53	110-120	0				
60	18	120-130	0				
65	3	130-140	0				
70	1	140-150	0				
75	0	150-160	0				
80	0	160-170	0				
85	0	170-180	0				
90	0						

COEFFICIENTS OF UTILIZATION												
Ceiling	80%				70%		50%		30%			
Wall	70	50	30	10	50	10	50	10	50	10	0	
RCR	Zonal Cavity Method - Effective Floor Reflectance = 20%											
Room Cavity Ratio	0	61	61	61	61	60	60	57	57	55	55	52
	1	58	56	54	53	55	52	53	50	51	49	47
	2	54	51	48	46	50	45	48	44	46	43	41
	3	50	46	42	40	45	39	44	39	42	38	37
	4	46	41	38	35	41	35	40	34	38	34	32
	5	43	38	34	31	37	31	36	30	35	30	29
	6	40	34	30	27	34	27	33	27	32	27	26
	7	37	31	27	24	31	24	30	24	29	24	23
	8	35	29	25	22	28	22	28	22	27	22	21
	9	33	26	22	20	26	20	25	20	25	20	19
	10	31	24	21	18	24	18	24	18	23	18	17

Determined In Accordance With Current IES Published Procedures
Luminaire Input Watts = 17.0

13W QUAD TUBE LAMP, LUMEN RATING = 900 LMS, ELECTRONIC BALLAST, CL FINISH TRIM



CANDLEPOWER SUMMARY		ZONAL LUMEN SUMMARY		ZONAL LUMENS AND PERCENTAGES			
Angle	0° CP	Zone	Lumens	Zone	Lumens	%Lamp	%Fixt
5	174	0-10	17.21	0-30	55.05	17.2	38.4
10	179	10-20	52.09	0-40	257.28	28.6	63.7
15	183	20-30	85.75	0-60	399.05	44.3	98.8
20	182	30-40	102.22	0-90	403.78	44.9	100
25	187	40-50	95.83	90-120	0	0	0
30	187	50-60	45.94	90-130	0	0	0
35	179	60-70	4.74	90-150	0	0	0
40	164	70-80	0	90-180	0	0	0
45	146	80-90	0	0-180	403.78	44.9	100
50	126	90-100	0	** Efficiency = 44.9%**			
55	97	100-110	0				
60	48	110-120	0				
65	17	120-130	0				
70	2	130-140	0				
75	0	140-150	0				
80	0	150-160	0				
85	0	160-170	0				
90	0	170-180	0				

COEFFICIENTS OF UTILIZATION												
Ceiling	80%				70%		50%		30%			
Wall	70	50	30	10	50	10	50	10	50	10	0	
RCR	Zonal Cavity Method - Effective Floor Reflectance = 20%											
Room Cavity Ratio	0	53	53	53	53	52	52	50	50	48	48	45
	1	50	49	47	46	48	45	46	44	44	43	41
	2	47	44	42	40	43	39	42	38	40	38	36
	3	44	40	37	35	39	34	38	34	37	33	32
	4	40	36	33	30	35	30	34	30	33	29	28
	5	37	33	29	27	32	27	31	26	30	26	25
	6	35	30	26	24	29	24	29	24	28	23	22
	7	32	27	24	21	27	21	26	21	26	21	20
	8	30	25	22	19	25	19	24	19	24	19	18
	9	28	23	20	17	23	17	22	17	22	17	16
	10	27	21	18	16	21	16	21	16	20	16	15

Determined In Accordance With Current IES Published Procedures
Luminaire Input Watts = 16.0

Job Information Type:

Lightolier a Genlyte company www.lightolier.com
 631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710
 We reserve the right to change details of design, materials and finish.
 © 2007 Genlyte Group LLC • C1007

LIGHTOLIER[®]



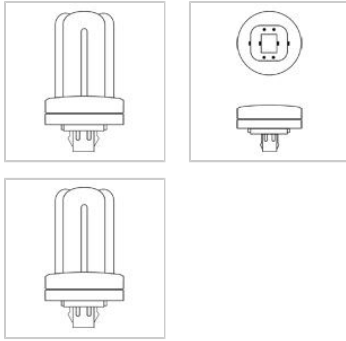
GE
Lighting

97622 - F13TBX/841/A/ECO

GE Ecolux® Biax® T4 - Facilities; Retail Display; Hospitality; Office; Restaurant; Warehouse



High Color Rendering
Energy Savings



CAUTIONS & WARNINGS

Caution

- Lamp may shatter and cause injury if broken
- Remove and install by grasping only plastic portion of the lamp.

NOTES

- 4-Pin lamp minimum starting temperature is a function of the ballast. Most ballasts are rated with a minimum starting temperature of 50 degrees F (10 C). Ballasts are also available that provide reliable starting to 0 degrees F (-18C) and -20 F (-29C).
- Amalgam product experience stable brightness over a wider temperature range and in various operating positions.
- Based on 60Hz reference circuit.
- Fluorescent lamp lumens decline during life

GENERAL CHARACTERISTICS

Lamp Type	Compact Fluorescent - Plug-In
Bulb	T4
Base	GX24q-1
Wattage	13
Voltage	120/91
Rated Life	17000 hrs
Cathode Resistance	10.5 Ohm
LEED-EB MR Credit	312 picograms Hg per mean lumen hour
Rated Life (rapid start) @ Time Additional Info	20000.0 @ 12.0 h Dimmable with appropriate dimming ballast./End of Life Protection (EOL)/TCLP compliant
Primary Application	Facilities;Retail Display;Hospitality;Office;Restaurant;W;

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	900
Mean Lumens	755
Nominal Initial Lumens per Watt	69
Color Temperature	4100 K
Color Rendering Index (CRI)	82

ELECTRICAL CHARACTERISTICS

Current (max)	5.25 A
Open Circuit Voltage (after preheating)	190 V
Open Circuit Voltage Across Starter	198 V
Lamp Current	0.175 A
Preheat Voltage	4.25 V
Current Crest Factor	1.7
Supply Current Frequency	60 Hz

DIMENSIONS

Maximum Overall Length (MOL)	4.3000 in(109.2 mm)
Nominal Length	4.200 in(106.7 mm)
Base Face to Top of Lamp	3.700 in(94.0 mm)

PRODUCT INFORMATION

Product Code	97622
Description	F13TBX/841/A/ECO
Standard Package	Case
Standard Package GTIN	10043168976227
Standard Package Quantity	10
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168976220

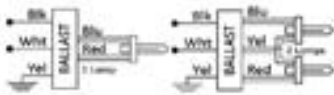
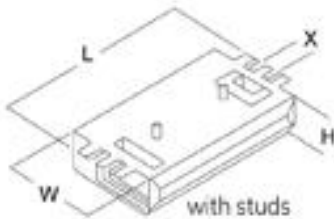


GE
Lighting

71430 - GEC213-MVPS-3W

GE CFL Multi-Volt ProLine™ Electronic Program / Rapid Start Ballast

- Multi-Voltage technology means a single ballast handles voltage from 108V to 305V
- Programmed starting for extended lamp life
- End-of-Lamp-Life Protection
- Color Coded Poke-In Connectors simplifies wiring
- 3-Way Ballast Kit (-3W) includes mounting plate, lead wires, extraction tool and mounting hardware for side exit, bottom exit or bottom exit with studs mounting



GENERAL CHARACTERISTICS

Application	2 or 1- CFQ13W/G24q 120-277V Proline PS 3-Way Kit
Category	Compact Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Series
Line Voltage Regulation (+/-)	10 %
Case Temperature	70 °C(158 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Enclosure Type	Metal
Additional Info	Auto-restart/Thermally protected/Universal voltage

PRODUCT INFORMATION

Product Code	71430
Description	GEC213-MVPS-3W
Standard Package	Master
Standard Package GTIN	10043168714300
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168714303

DIMENSIONS

Case dimensions	
Length (L)	5.0 in(127.00 mm)
Width (W)	2.4 in(60.96 mm)
Height (H)	1.0 in(25.40 mm)
Mounting dimensions	
Mount Length (M)	4.6 in(117.60 mm)
Weight	0.57 lb
Exit Type	Poke-in
Remote Mounting Distance to Lamp	20 ft
Remote Mounting Wire Gauge	18 AWG

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	50 Hz/60 Hz
--------------------------	-------------

SAFETY & PERFORMANCE

- CSA
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type CC
- UL Type HL
- FCC Part 18 Class B at 120 volts

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)
CFTR18W/4P	1	120	20	0.17 A	1.00	5.00	99	1 1/2 12	-20.0 / -29
CFTR18W/4P	1	277	20	0.07 A	1.00	5.00	97	1 1/2 12	-20.0 / -29
CFTR13W/4P	1	120	16	0.16 A	1.00	NaN	96	1 1/2 10	-20.0 / -29
CFTR13W/4P	1	277	16	0.06 A	1.00	NaN	96	1 1/2 10	-20.0 / -29
CFTR13W/4P	2	120	29	0.25 A	1.00	3.45	99	1 1/2 10	-20.0 / -29
CFTR13W/4P	2	277	29	0.11 A	1.00	3.45	99	1 1/2 10	-20.0 / -29
CFS16W/4P	1	120	17	0.14 A	1.00	5.88	96	1 1/2 12	-20.0 / -29
CFS16W/4P	1	277	17	0.06 A	1.00	5.88	96	1 1/2 12	-20.0 / -29
CFS10W/4P	1	120	13	0.11 A	1.05	8.08	96	1 1/2 14	-20.0 / -29
CFS10W/4P	1	277	13	0.05 A	1.05	8.08	96	1 1/2 14	-20.0 / -29
CFS10W/4P	2	120	23	0.19 A	0.95	4.13	97	1 1/2 11	-20.0 / -29
CFS10W/4P	2	277	23	0.09 A	0.95	4.13	97	1 1/2 11	-20.0 / -29
CFQ18W/4P	1	120	20	0.17 A	1.00	5.00	99	1 1/2 12	-20.0 / -29
CFQ18W/4P	1	277	20	0.07 A	1.00	5.00	97	1 1/2 12	-20.0 / -29
CFQ13W/4P	1	120	16	0.16 A	1.00	NaN	96	1 1/2 10	-20.0 / -29
CFQ13W/4P	1	277	16	0.06 A	1.00	NaN	96	1 1/2 10	-20.0 / -29
CFQ13W/4P	2	120	29	0.25 A	1.00	3.45	99	1 1/2 10	-20.0 / -29
CFQ13W/4P	2	277	29	0.11 A	1.00	3.45	99	1 1/2 10	-20.0 / -29

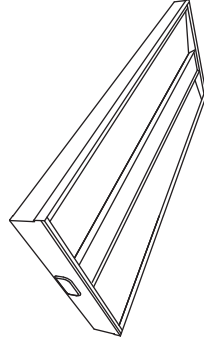
CAUTIONS & WARNINGS

For additional information, visit www.gelighting.com

Recessed

2'x4'

2 T8



Project Name

Spec Type

Notes

Order Guide

Some combinations of product options may not be available. Consult factory for assistance with your specification.

3324	T232	-	-	-	-	-	-	-	-
Product Series & Size Shine 2'x4'	Version D1 Standard T-Grid A1 Air Return on Standard T-Grid	Configuration ST Standalone CR Continuous Row SMS Standalone Master/Satellite CMS Continuous Row Master/Satellite	Lamping 2 T8 (32W)	Housing S Standard (22ga.) N New York (20ga.) C Chicago Plenum	Wiring 1 1 cct 2 2 cct 5 1 cct w/ Battery Pack 7 1 cct Dimming	Voltage 1 120V 2 277V 3 347V	Ballast E Standard Ballast	Consult website for complete list of standard wiring options Consult website for ballast manufacturer information	

See details on next page

Upgrades & Accessories

Please indicate with check mark.

Lamps Included

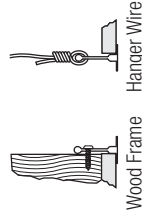
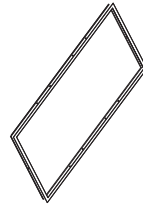
Lamps Included & Installed

Job Pack

Flex Whip

Drywall Kit

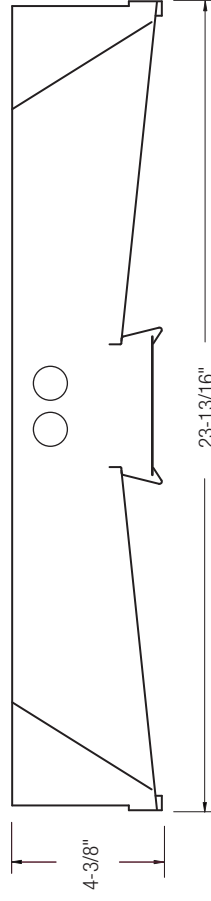
Can be mounted to wood frame or with hanger wire



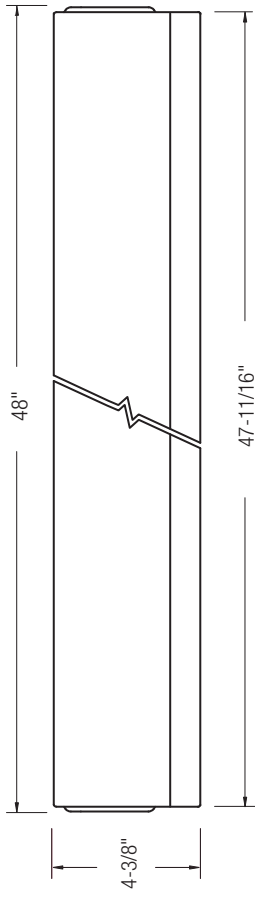
Response Daylight

For details visit www.ledalite.com/response

Cross Section

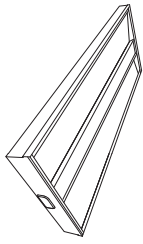


Side View



Shine™

Recessed
2' x 4'
2 T8



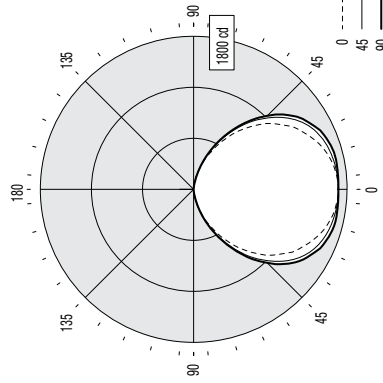
Photometry

Report Summary

Report # 9901682
Filename 3324D1T232.ies
Efficiency 81.5%
Spacing Criteria 1.24 @ 0° along
 1.35 @ 90° across

Candela Distribution

Vertical Angle	Horizontal Angle				Zonal Lumens
	0	22.5	45	67.5	
0	1700	1700	1700	1700	1700
5	1689	1695	1696	1702	1704
15	1624	1645	1666	1688	1704
25	1495	1547	1593	1637	1641
35	1312	1384	1432	1491	1489
45	1073	1151	1179	1257	1222
55	791	848	872	931	897
65	486	541	543	573	548
75	232	258	240	258	241
85	44	51	37	42	34
90	0	0	0	0	0



Coefficients of Utilization (%)

Ceiling:	80				70				50				0				
	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	0
0 RCR	97	97	97	97	94	94	94	94	90	90	90	90	81				
1	89	85	82	79	87	83	80	80	77	75	69	69	63				
2	81	74	69	65	79	73	68	70	66	62	58	58	53				
3	74	66	59	54	72	64	58	62	57	52	49	49	44				
4	68	58	51	46	66	57	50	55	49	45	42	42	37				
5	62	52	45	39	61	51	44	49	43	39	36	36	31				
6	57	47	39	34	56	46	39	44	38	34	32	32	27				
7	53	42	35	30	52	42	35	40	34	30	28	28	23				
8	49	39	32	27	48	38	31	37	31	27	25	25	20				
9	46	35	29	24	45	35	28	34	28	24	22	22	17				
10	43	33	26	22	42	32	26	31	26	22	20	20	15				

Based on a floor reflectance of 0.2

IES files for this and other photometric options can be downloaded online at www.ledalite.com

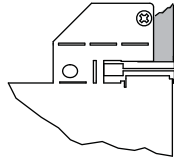
Avg. Luminance (cd/m²)

Vertical Angle	Horizontal Angle		
	0	45	90
55	1982	2185	2247
65	1649	1846	1863
75	1288	1333	1338
85	726	610	561

Additional Information

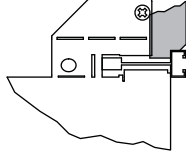
Mounting

Integrates with most common T-bar ceiling types.



Flat T-Grid

Option D1 works with 9/16" and 15/16" flat T-grid ceilings.

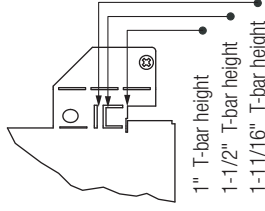


Slot T-Grid

D1 can also be used with slot T-grid ceilings, but it will not sit flush with the bottom of the T-bar.

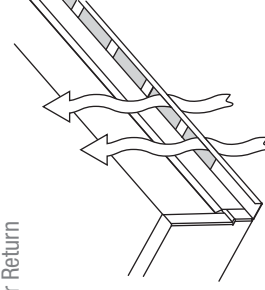
Ceiling Types

Integrated mounting tabs can be field-adjusted to various T-bar ceiling heights for fastening directly to the T-bar grid and/or tied-off to the building structure.



1" T-bar height
 1-1/2" T-bar height
 1-11/16" T-bar height

Air Return



The air return version features slotted vents along the sides of the fixture. As a result, the installation method of the air return version is different to the standard version, and the fixture cannot be installed in continuous rows.

Specifications

Housing

Die-formed, post-painted, 22 gauge cold-rolled steel (New York City version is 20 gauge). Wire entrances are positioned on the side of the housing to allow easy wiring access for the installer. Multiple wire entrances are available on top or side to allow continuous row mounting of fixtures. Maintenance can be performed from below the ceiling without tools. No hardware is visible.

Weight

Maximum 40 lbs.

Optical System

Optical system consists of highly reflective painted interior reflectors and three flat acrylic lenses with 95% transmittance.

Mounting

Fixture is compatible with most ceiling types. Option D1 works with 9/16" and 15/16" standard T-grid ceiling systems. D1 can be used with slot T-grid ceiling systems but fixture will be slightly regressed above the T-bar. Integrated tabs are provided for different T-grid heights. Optional drywall kit is available for non-accessible ceilings.

Ballast

Electronic. Supplied with pre-installed ballast disconnects as per national electric codes.

Wiring

Fixtures are factory pre-wired and tested for all circuits and emergency battery packs; all leads pulled to a side access with cover plate. Optional armored cable flex whips are supplied in 6' lengths for 1x4, 2x2 and 2x4 fixtures. Armored cable flex connectors are supplied in 9' lengths for optional master/satellite configurations.

Air Return

Air return option available in 2'x2' and 2'x4' sizes. Perforated air return side rails are finished in black.

Approvals

Certified to UL & CSA Standards. City of Chicago Approved CCEA (housing option C). Designed to comply with NYC code requirements (Housing Option N).

Finish

Housing and Frame: Post-painted, high quality powder coat. Available in white.



GE
Lighting

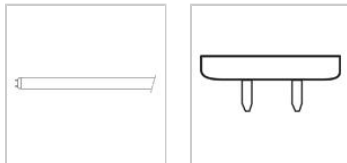
15904 - F32T8/SP41/ECO/C

GE Ecolux® Starcoat® T8

- Passes TCLP, which can lower disposal costs.



High Color Rendering
Meets Federal Minimum Efficiency Standards



CAUTIONS & WARNINGS

Caution

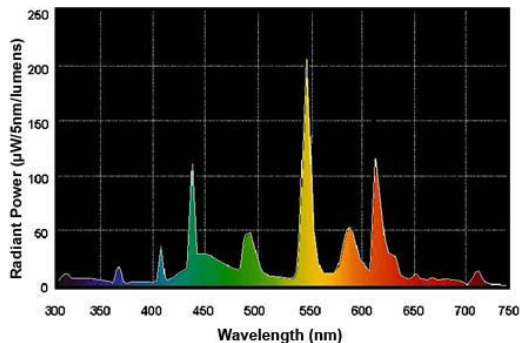
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

- Risk of Electric Shock
 - Turn power off before inspection, installation or removal.

GRAPHS & CHARTS

Spectral Power Distribution



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight
	Linear
Bulb	T8
Base	Medium Bi-Pin (G13)
Wattage	32
Voltage	137
Rated Life	20000 hrs
Rated Life (instant start) @ Time	24000 h @ 12 h
	20000 h @ 3 h
Rated Life (rapid start) @ Time	24000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	10 °C (50 °F)
LEED-EB MR Credit	74 picograms Hg per mean lumen hour
Additional Info	TCLP compliant
Primary Application	Standard

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	2800
Mean Lumens	2660
Nominal Initial Lumens per Watt	87
Color Temperature	4100 K
Color Rendering Index (CRI)	78

ELECTRICAL CHARACTERISTICS

Open Circuit Voltage (rapid start) Min @ Temperature	315 V @ 10 °C
Cathode Resistance Ratio - Rh/Rc (MIN)	4.25
Cathode Resistance Ratio - Rh/Rc (MAX)	6.5
Current Crest Factor	1.7

DIMENSIONS

Maximum Overall Length (MOL)	47.7800 in(1213.6 mm)
Minimum Overall Length	47.6700 in(1210.8 mm)
Nominal Length	48.000 in(1219.2 mm)
Bulb Diameter (DIA)	1.000 in(25.4 mm)
Bulb Diameter (DIA) (MIN)	0.940 in(23.9 mm)
Bulb Diameter (DIA) (MAX)	1.000 in(25.4 mm)
Max Base Face to Base Face (A)	47.220 in(1199.4 mm)
Face to End of Opposing Pin (B) (MIN)	47.400 in(1204.0 mm)
Face to End of Opposing Pin (B) (MAX)	47.500 in(1206.5 mm)
End of Base Pin to End of Opposite Pin End (C)	47.670 in(1210.8 mm)

PRODUCT INFORMATION

Product Code	15904
Description	F32T8/SP41/ECO/C
ANSI Code	1005-2
Standard Package	Case
Standard Package GTIN	10043168159040
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168159043

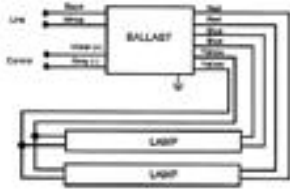
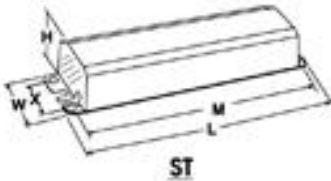


GE
Lighting

80355 - B232SR120V5

GE LFL Electronic Dimming Ballast

- T8 fluorescent dimming ballasts help you save as much as 30% on energy bills.
- Greater control of workspace lighting, ability to create a mood, energy savings
- Designed to ensure optimum lamp performance with lamp current crest factor below the 1.7 ANSI standard
- Start lamps according to ANSI recommendations throughout the entire dimming range.



GENERAL CHARACTERISTICS

Application	2 - F32T8 DIM 100 to 5% RS 120
Category	Linear Fluorescent
Ballast Type	Electronic - Dimming
Dimming Type	Continuous
Starting Method	Rapid start
Lamp Wiring	Series
Line Voltage Regulation (+/-)	10 %
Ambient Temperature (MAX)	105 °F(41 °C)
Case Temperature	70 °C(158 °F)
Ballast Factor	Normal
Power Factor Correction	Active
Sound Rating	A (20-24 decibels)
Additional Info	Auto-restart/Thermally protected

PRODUCT INFORMATION

Product Code	80355
Description	B232SR120V5
Standard Package	Case
Standard Package GTIN	
Standard Package Quantity	10
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard	10
Package	
UPC	043168803557

DIMENSIONS

Case dimensions			
Length (L)		9.5 in(241.30 mm)	
Width (W)		2.4 in(60.45 mm)	
Height (H)		1.6 in(39.37 mm)	
Mounting dimensions			
Mount Length (M)		8.9 in(225.81 mm)	
Mount Width (X or F)		1.7 in(42.93 mm)	
Mount Slots (MS)		0.3 in(7.92 mm)	
Weight		2.3 lb	
Exit Type		Side	
Remote Mounting Distance to Lamp		12 ft	
Remote Mounting Wire Gauge		18 AWG	
Lead lengths	Qty	Exit	Length (± 1 in.)
Blue	1	Right	33.0 (838mm)
Gray	1	Right	33.0 (838mm)
Violet	1	Right	33.0 (838mm)
White	1	Left	25.0 (635mm)
Yellow	1	Right	51.0 (1295mm)
Red	1	Right	33.0 (838mm)
Black	1	Left	25 in (NaNmm)

ELECTRICAL CHARACTERISTICS

Supply Current Frequency	60 Hz
--------------------------	-------

SAFETY & PERFORMANCE

- CSA
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type HL

SPECIFICATIONS BY LAMP & WATTAGE

Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor THD% (<=)	Min. Starting Temp (°F/°C)
F32T8	2	120	13	0.12 A	0.05	0.38	90	1.7 10	50.0 / 10
F32T8	2	120	62	0.52 A	0.88	1.42	99	1.6 10	50.0 / 10

CAUTIONS & WARNINGS

Warning

- Risk of Electric Shock
 - Properly ground ballast and fixture.
 - Turn power off before servicing--see instructions.

WARRANTY INFORMATION

LP8 Peanut Lighting Control Panels

Simple and effective interior and exterior lighting control

Controls up to eight single-pole lighting circuits

Easy user interface with on-screen help



Compatible with AS-100 Automatic Control Switches for local override control

System clock provides time scheduled or astronomic control

PROJECT
LOCATION/TYPE

Product Overview

Description

WattStopper's LP8 Peanut Lighting Control Panels provide simple, effective zone-based control of exterior and interior lighting in small applications. Panels control up to eight channels or zones of lighting. Zones respond to control signals from the system clock (or other signalling device) to turn lighting on and off. LP8 Panels ship pre-assembled in easy-to-install compact packages available for surface and flush mounting. They consist of relays, a system clock, panel intelligence, power supply, tub and cover. The standard enclosure is NEMA 1-rated.

Operation

For exterior applications, the system clock provides astronomic control (based on sunrise and sunset), or an optional EM Photocell can be added for light-level control. For interior applications, AS-100 Automatic Control Switches or low voltage switches can automate after-hours lighting shutoff while providing manual override control.

System Clock

The LP8 system clock provides automation and features a seven-day format with holiday scheduling. Set-up and programming is simple with an easy-to-navigate keypad, backlit LCD and user-friendly help menus. Preprogrammed control scenarios include: scheduled-on/off and manual-on/scheduled-off. Manual-on/sweep-off is available with an AS-100 switch. Astronomic or photocell on/off, and astronomic or photocell with schedule on/off available by adding an EM Photocell.

Applications

LP8 Panels save energy by turning lights off when not needed, while providing a secure illuminated space when occupants are present. They are ideal for areas with less than eight loads and a small amount of zones in both interior (i.e., small offices or retail facilities and elevator lobbies) and exterior (i.e., small parking lots, courtyards and driveways) applications. LP8 Panels integrate with a wide range of control devices, such as switches and occupancy sensors to create a flexible lighting shutoff strategy.

Features

- Preprogrammed control scenarios; seven-day format with holiday scheduling, astronomic control and automatic daylight savings
- Time retained during power outage; nonvolatile program memory
- Eight universal switch inputs for low voltage switches, occupancy sensors, photocells or other devices to directly control each relay
- Pushbuttons for manual override of each relay
- Uses individually replaceable HDR5P Mechanically Latching Relay with integral manual override
- Optional group of eight switch inputs for pushbutton grouping of relays (Smartwiring™)
- LED for visual indication of relay status
- Accepts most types of switch inputs
- Separate high voltage and low voltage sections for user protection

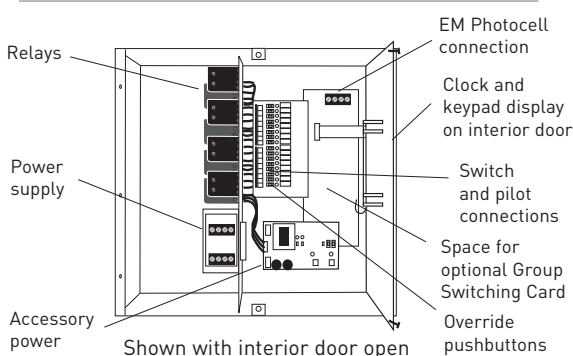


Specifications

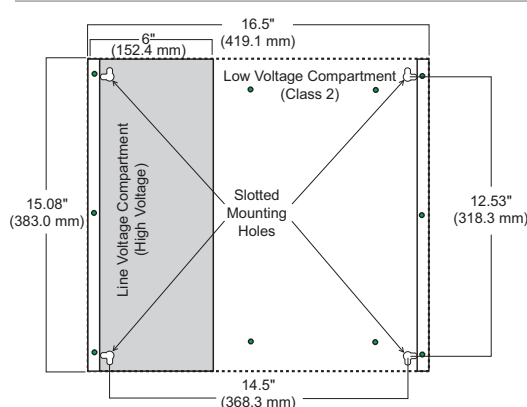
- Multiple power supplies available: 115/277 VAC, 220-240 VAC, 115/347 VAC; 50/60 Hz
- Relay: Mechanically latching
 - Integral manual override
 - Individually replaceable
 - Ratings: 20 Amp tungsten @ 120 VAC
 - 30 Amp ballast @ 277 VAC
 - 20 Amp ballast @ 347 VAC
 - 30 Amp resistive @ 347 VAC
 - 1.5 hp @ 120 VAC
- Accessory power 800 mA at 24 VDC/VAC/VACR
- Eight universal switch inputs; compatible with 3-wire momentary or maintained, 2-wire momentary or maintained, or 24 VDC input
- Eight universal group switch inputs that allow pushbutton grouping of relays (optional)
- Ambient temperature 32-139°F (0-60°C); 5-95% RH noncondensing
- Dimensions: 15.08" x 16.5" x 4.62" (383.0mm x 419.1mm x 117.3mm) L x W x D
- UL and CUL listed; one-year warranty

Wiring & Installation

LP8 Panel Layout



LP8 Dimensions



Ordering Information

Catalog No.	Description	Door Mounting	# Relays	Group Switching Card	Voltage
<input type="checkbox"/> LP8S-8-115	LP8 Peanut Lighting Control Panel	Surface	8 Relays	none	115/277 VAC
<input type="checkbox"/> LP8S-8-G-115	LP8 Peanut Lighting Control Panel	Surface	8 Relays	included	115/277 VAC
<input type="checkbox"/> LP8F-8-115	LP8 Peanut Lighting Control Panel	Flush	8 Relays	none	115/277 VAC
<input type="checkbox"/> LP8F-8-G-115	LP8 Peanut Lighting Control Panel	Flush	8 Relays	included	115/277 VAC
<input type="checkbox"/> LP8S-4-115	LP8 Peanut Lighting Control Panel	Surface	4 Relays	none	115/277 VAC
<input type="checkbox"/> LP8F-4-115	LP8 Peanut Lighting Control Panel	Flush	4 Relays	none	115/277 VAC
<input type="checkbox"/> LP8S-8-347	LP8 Peanut Lighting Control Panel	Surface	8 Relays	none	115/347 VAC
<input type="checkbox"/> LP8S-8-G-347	LP8 Peanut Lighting Control Panel	Surface	8 Relays	included	115/347 VAC
<input type="checkbox"/> LP8F-8-347	LP8 Peanut Lighting Control Panel	Flush	8 Relays	none	115/347 VAC
<input type="checkbox"/> LP8F-8-G-347	LP8 Peanut Lighting Control Panel	Flush	8 Relays	included	115/347 VAC
<input type="checkbox"/> LP8S-8-240	LP8 Peanut Lighting Control Panel	Surface	8 Relays	none	240 VAC
<input type="checkbox"/> LP8S-8-G-240	LP8 Peanut Lighting Control Panel	Surface	8 Relays	included	240 VAC
<input type="checkbox"/> LP8F-8-240	LP8 Peanut Lighting Control Panel	Flush	8 Relays	none	240 VAC
<input type="checkbox"/> LP8F-8-G-240	LP8 Peanut Lighting Control Panel	Flush	8 Relays	included	240 VAC
Optional system enhancements:					
<input type="checkbox"/> EM-24A2	Exterior Photocell, low voltage				24VAC
<input type="checkbox"/> AS-100-W	Automatic Control Switch, White				120/277 VAC, 50/60 Hz
<input type="checkbox"/> AS-100-A	Automatic Control Switch, Light Almond				120/277 VAC, 50/60 Hz
<input type="checkbox"/> AS-100-I	Automatic Control Switch, Ivory				120/277 VAC, 50/60 Hz

EM Exterior Photocell

Low voltage photocell automatically turns lighting on and off

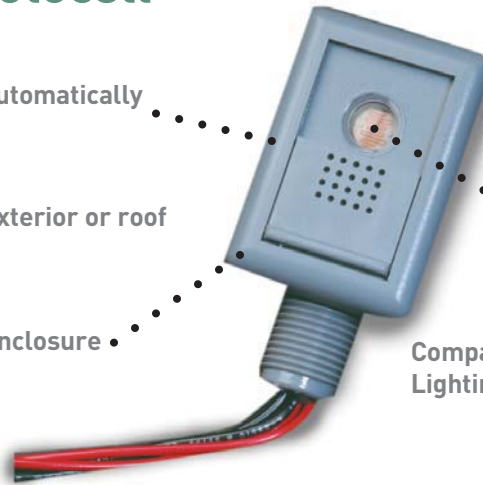
Mounts on building exterior or roof

Rain-tight gray plastic enclosure

Simple to install

Adjustable aperture window for varying on setpoint

Compatible with all Watt Stopper Lighting Control panels and power packs



PROJECT

LOCATION/TYPE

Product Overview

Description

The low voltage EM Exterior Photocell controls exterior lighting in conjunction with Watt Stopper/Legrand lighting control panels and power packs by signalling a change in light levels to the panel.

Operation

Typically mounted so the light level window faces the northern sky, the EM Exterior Photocell provides an on signal when the ambient light level drops below a preset 'dark' setpoint, and an off signal as the ambient light level rises above the preset 'light' setpoint. The setpoints can be changed for specific applications by opening and closing the EM Photocell's aperture window. Normally a lighting control panel or a power pack supplies power to the EM Photocell. The photocell's relay contact red wires are connected to the panel or to a low voltage controlled load.

Installation Flexibility

The EM Exterior Photocell is available in two models to provide multiple installation options. Model EM-24A2 is compatible with LP8 Peanut, LP24 Peanut Plus and Lighting Integrator Lighting Control Panels. Model EM-24D2 works with Watt Stopper/Legrand B347D-P, BZ-50 and BZ-150 power packs.

Applications

The EM Exterior Photocell provides dusk to dawn lighting control for most exterior lighting control applications such as parking lots, landscape lighting and signage.

Features

- One set of normally open, isolated relay contacts; closed when sensed light level is below dark setpoint, open when light level is above light setpoint
- Eight-second time delay and built-in setpoint deadband prevent cycling
- 1/2" threaded male conduit base for easy mounting on conduit fittings or junction boxes.

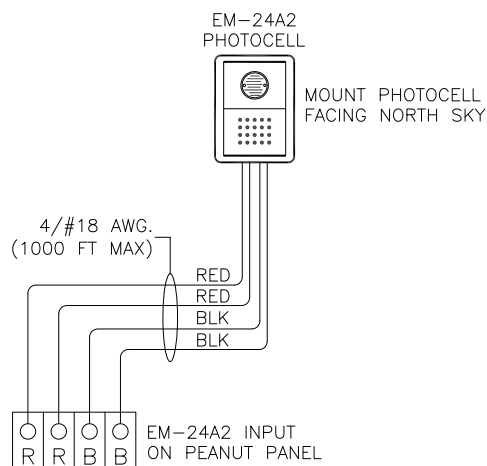


Specifications

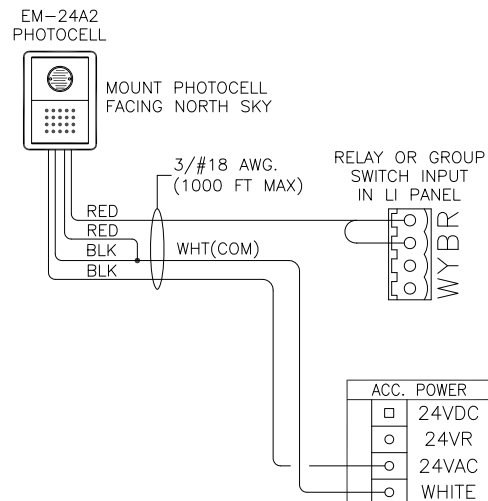
- 1-15 footcandle range (10.8 -161.5 lux)
- Isolated relay contacts 1 amp @ 30 VAC/VDC
- Power input: 24 VAC, 1 VA or 24 VDC, 1 VA
- Operating Temperature: -25 to 125°F (-31.67 to 51.67°C) ambient
- Dimensions: 2.65"x 1.88"x 1.5" (66.68mm x 47.63mm x 38.1mm) H x W x D
- One-year warranty

Wiring

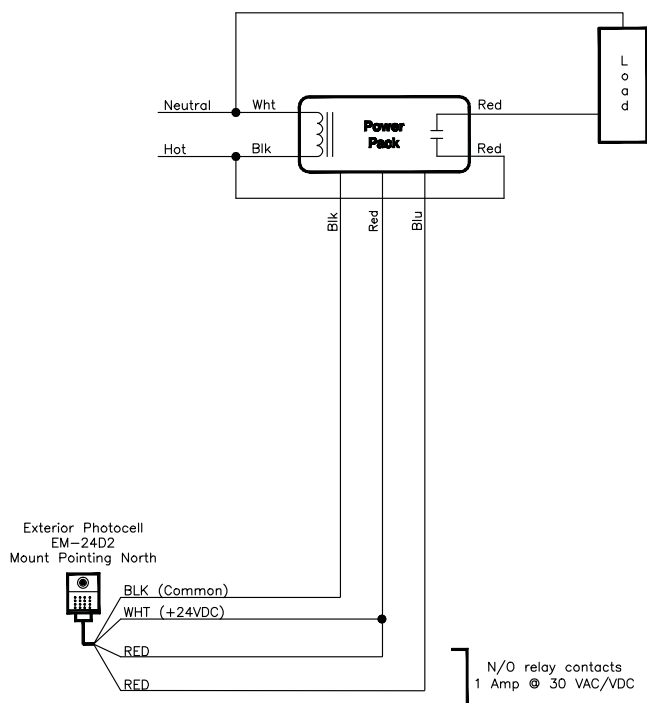
EM24A2 with LP Peanut Lighting Control Panel



EM24A2 with Lighting Integrator Control Panel



EM-24D2 with a Power Pack



Ordering Information

Catalog No.	Description	Voltage
<input type="checkbox"/> EM-24A2	EM Exterior Photocell for Use with Panels	24 VAC
<input type="checkbox"/> EM-24D2	EM Exterior Photocell for Use with Power Packs	24 VDC



DT-200 Series Dual Technology Ceiling/Wall Sensors

Combines passive infrared (PIR) and ultrasonic technologies

Auto set automatically selects optimal settings for each space

Walk-through mode increases savings potential



Built-in light level sensor

Accepts low-voltage switch input for manual-on operation

Automatic or manual-on operation when used with a BZ-150 Power Pack

PROJECT
LOCATION/TYPE

Product Overview

Description

WattStopper's DT-200 Series Dual Technology Ceiling Sensors combine PIR and ultrasonic technologies into one unit to achieve precise coverage in detecting occupancy.

Operation

Low voltage DT-200 Series Sensors utilize a WattStopper power pack to turn lights on when both PIR and ultrasonic technologies detect occupancy. They can also work with a low voltage switch for manual-on operation. PIR technology senses motion via a change in infrared energy within the controlled area, whereas ultrasonic uses 40 kHz high frequency ultrasound. Once on, detection by either technology holds lights on. When no occupancy is detected for the length of the time delay, lights turns off. DT-200 Series Sensors can also be set to trigger lights on when either technology or both detect occupancy, or to require both technologies to hold lighting on.

Auto set

The DT-200 requires no adjustment at installation. Auto set continuously monitors the controlled space to identify usage patterns. Based on these patterns, units automatically adjust time delay and sensitivity settings for optimal performance and energy efficiency. Sensors assign short delays (as low as five minutes) for times when the space is usually vacant, and longer delays (up to 30 minutes) for busier times.

Application

DT-200 Series Sensors have the flexibility to work in a variety of applications. Mounted at ten feet, the sensors can cover up to 2000 square feet of walking motion and 1000 square feet of desktop motion. The sensors are designed to control lighting in difficult applications where one technology alone could encounter false triggers. The DT-200 works well in classrooms, warehouses, large offices, open office spaces and computer rooms.

Features

- Advanced control logic based on RISC microcontroller provides:
 - Detection Signature Processing to eliminate false triggers and provides immunity to RFI and EMI
 - Walk-through Mode turns lights off three minutes after the area is initially occupied – ideal for brief visits, such as mail delivery
 - Available with built-in light level sensor featuring simple, one-step setup
- Sensors work with low-voltage momentary switches to provide manual control
- LEDs indicate occupancy detection
- Eight occupancy logic options provide the ability to customize control to meet application needs
- Available with isolated relay for integration with BAS or HVAC
- Swivel mounting bracket for convenient corner mounting to wall or ceiling
- Qualifies for ARRA-funded public works projects

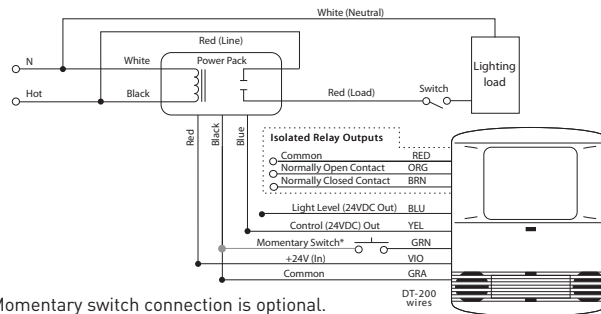


Specifications

- 24 VDC/VAC and halfwave rectified AC
- 40 kHz frequency ultrasonic transmission
- Time delays: Auto set, fixed (5, 10, 15, 20 or 30 minutes), Walk-through/Test Modes
- Sensitivity adjustment: Auto set; reduced sensitivity (PIR); variable with trim pot (ultrasonic)
- Built-in light level sensor: 2 to 200 footcandles (21 to 2,152 lux)
- Low voltage, momentary switch input for manual operation
- DT-200 contains an isolated relay with N/O and N/C outputs; rated for 1 Amp at 24 VDC/VAC
- 2000 ft² of walking motion mounted at 10 ft; 1000 ft² of desktop motion
- Max. DT-200s per power pack: B=2, BZ=3
Max. DT-205s per power pack: B=3, BZ=4
- Dimensions: 4.4" x 3.4" x 2" (110.3mm x 85.9mm x 49.6mm) L x W x D
- UL and cUL listed
- Five year warranty

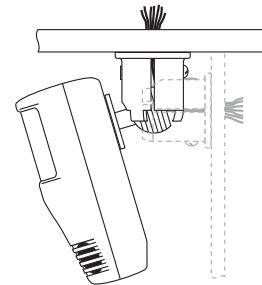
Wiring & Mounting

Wiring Diagram



*Momentary switch connection is optional.
Connect only when momentary switch is installed.

Mounting



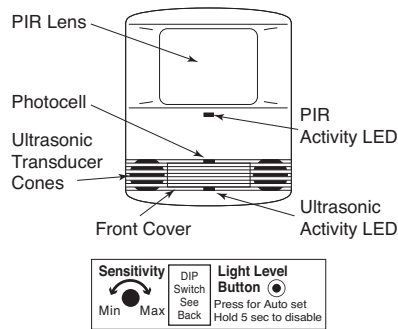
A swivel mounting bracket attached to the sensor allows the sensor to be angled for wall or ceiling mounting.

Grooves on the bracket help to achieve desired angle for coverage.

Mount to mud ring.

Controls & Settings

Product Controls



DIP Switch Settings

◀ = Factory Setting
● = ON
○ = OFF

Logic	Switch#		
	1	2	3
Standard	○	○	○
Option 1	●	○	○
Option 2	○	●	○
Option 3	○	○	●
Option 4	○	○	○
Option 5	○	○	○
Option 6	○	○	○
Option 7	○	○	○

Occupancy Logic	Trigger	Initial Occupancy	Maintain Occupancy	Re-trigger (seconds duration)
Option 1	Either	Either	Either(5)	
Option 2	PIR	Either	Either(5)	
Option 3	Both	Both	Both(5)	
Option 4	PIR	PIR	PIR(5)	
Option 5	Ultra	Ultra	Ultra(5)	
Option 6	Man.	Either	Either(30)	
Option 7	Man.	Both	Both(30)	

LEDs	7
Disabled	○
Enabled	●

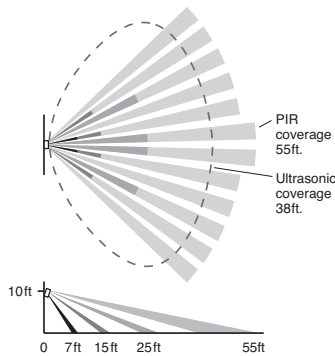
PIR Sensitivity	8
Minimum	○
Max./SmartSet	●

Time Delay	4	5	6
5 sec/SmartSet	○	○	○
5 minutes	○	○	○
10 min.	○	○	○
10 minutes	○	○	○
15 min.	○	○	○
15 minutes	○	○	○
20 minutes	○	○	○
30 min.	○	○	○

⏏ = walk-through mode

Coverage

Coverage Pattern



Coverages shown are maximum and represent half-step walking motion. Under ideal conditions with no barriers or obstacles, coverage for half-step walking motion can reach up to 2000 ft², while coverage for typical desktop activity can reach up to 1000 ft².

Ordering Information

Catalog No.	Voltage	Current	Coverage	Features
<input type="checkbox"/> DT-200	24 VDC	43 mA	2000 ft ² [185.8 m ²]	light level, isolated relay
<input type="checkbox"/> DT-205	24 VDC	35 mA	2000 ft ² [185.8 m ²]	

Sensors are white and use WattStopper power packs. Current consumption can be slightly higher when only one sensor per power pack is used.

LMSW-105 Digital 5-Button Scene Switch

Low voltage switch for control of four preset scenes and raise/lower control of scenes or loads

Component of Digital Lighting Management integrated control system

Plugs to other components using Cat 5e cables with RJ45 connectors eliminating wiring errors



Plug n' Go automatic configuration and Push n' Learn for personalization

Customizable buttons with LED status indicators

Active Dim feature enables temporary adjustment of any selected load

PROJECT

LOCATION/TYPE

Product Overview

Description

The LMSW-105 Digital Scene Switch is a low voltage device that sets and recalls preset lighting scenes and raises and lowers lighting levels. It is part of a Digital Lighting Management (DLM) system and controls loads connected to DLM room controllers by accessing four of the 16 scenes available in a DLM local network.

Operation

The LMSW-105 operates on Class 2 power supplied to a DLM local network by one or more room controllers. Plug n' Go automatic configuration assigns presets 1, 2, 3 and 4 to the scene buttons on the switch upon system startup. When multiple switches are installed, default operation is for multi-way control; each switch controls the same scenes. Scene buttons may be reconfigured to control different scenes or control loads instead of scenes. Users activate a scene by tapping one of the scene buttons. They may raise or lower light levels, and turn lights on or off, with the paddle. In Active Dim mode, users can temporarily adjust the level of any dimmable load or scene on the local network by selecting a load or scene button and then pressing and holding the paddle on the LMSW-105.

Features

- Hidden configuration button for easy access to Push n' Learn mode
- Used with DLM dimming room controller
- Master raise/lower paddle and all-on/all-off control
- Infrared (IR) transceiver for wireless configuration and control

Personalizing Scene Switches

Plug 'n Go assigns all loads to each LMSW-105 upon system startup. Load assignments may be changed using Push n' Learn. Preset scene levels are stored by the room controllers, and default levels are established by Plug n' Go. Scene 1 is 100%, scene 2 is 75%, scene 3 is 50% and scene 4 is 25%. Preset levels can be easily changed by adjusting lighting to the desired level, typically using LMDM-101 dimming switches assigned to control each load, or channel, and pressing and holding a scene button on the LMSW-105 to memorize the new levels. Each scene switch may be personalized in the field with custom-engraved buttons. The integral IR transceiver allows both wireless configuration and system operation.

Applications

The LMSW-105's sleek low profile appearance is ideally suited for use in conference and board rooms, classrooms, training centers, and other applications where preset scene-based dimming control is desired. The LMSW-105 Scene Switch works with LMDM-101 Digital Dimming Wall Switches to create a flexible and elegant small dimming system. Digital Lighting Management's Active Dim feature gives designers the option of reducing wall clutter by facilitating scene setting without the need for individual dimming switches for each load.

- Sleek single gang device fits decorator wall plates
- May be used for multi-way control applications
- LED status indicators
- Five color options and custom engraving options; standard buttons may be replaced in the field
- RoHS compliant
- Qualifies for ARRA-funded public works projects

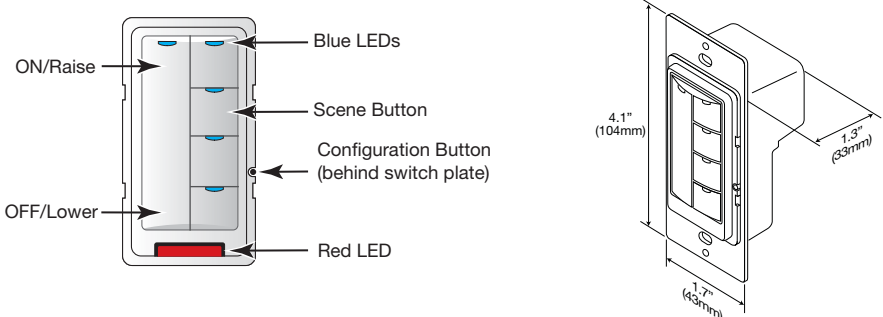


Specifications

- Input voltage: 24VDC from DLM local network
- Current consumption: 5mA
- DLM local network connection: 2 RJ45 ports
- Control button with LED status indicator
- Hidden configuration button for access to Push n'Learn mode
- Infrared (IR) transceiver
- Operating conditions: for indoor use only; 32-131°F (0-55°C); 5-95% RH, non-condensing
- UL and cUL listed
- FCC part 15 compliant
- Five year warranty

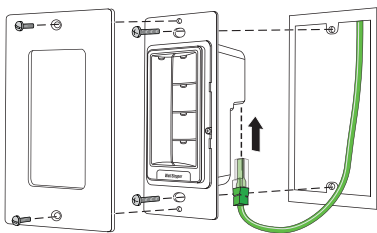
Controls & Dimensions

Switch Controls and Dimensions



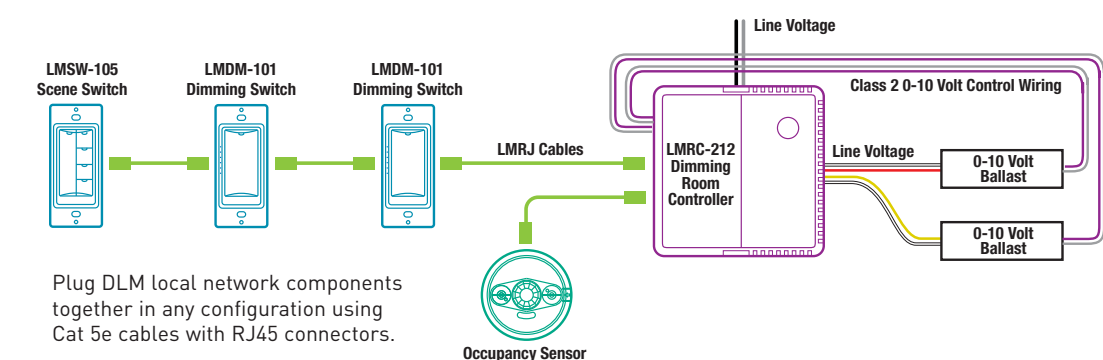
Mounting & Connecting

Mounting



LMSW-105 Scene Switches fit in standard single gang boxes.

Sample Connection Diagram with 0-10 Volt Dimming



Plug DLM local network components together in any configuration using Cat 5e cables with RJ45 connectors.

Ordering Information

Catalog No.	Color	Description
<input type="checkbox"/> LMSW-105-W	White	Digital 5-Button Scene Switch
<input type="checkbox"/> LMSW-105-W-U	White	Digital 5-Button Scene Switch, ARRA-compliant
<input type="checkbox"/> LMSW-105-LA	Light Almond	Digital 5-Button Scene Switch
<input type="checkbox"/> LMSW-105-I	Ivory	Digital 5-Button Scene Switch
<input type="checkbox"/> LMSW-105-I-U	Ivory	Digital 5-Button Scene Switch, ARRA-compliant
<input type="checkbox"/> LMSW-105-G	Grey	Digital 5-Button Scene Switch
<input type="checkbox"/> LMSW-105-B	Black	Digital 5-Button Scene Switch

Switches do not include face plates. Order decorator style plate separately.



DT-300 Series Dual Technology Ceiling Sensors

Architecturally appealing
low-profile appearance

Auto set automatically
selects optimal settings
for each space

Walk-through mode
increases savings potential

Ultrasonic diffusers give more
comprehensive coverage



Plug terminal wiring for
quick and easy installation

Accepts low-voltage
switch input for
manual-on operation

Automatic or manual-on operation
when used with a BZ-150 Power Pack

PROJECT
LOCATION/TYPE

Product Overview

Description

The DT-300 Series Dual Technology Ceiling Sensors combine the benefits of passive infrared (PIR) and ultrasonic technologies to detect occupancy. Sensors have a flat, unobtrusive appearance and provide 360 degrees of coverage.

Operation

Low voltage DT-300 Series sensors utilize a WattStopper power pack to turn lights on when both PIR and ultrasonic technologies detect occupancy. They can also work with a low voltage switch for manual-on operation. PIR technology senses motion via a change in infrared energy within the controlled area, whereas ultrasonic uses 40KHz high frequency ultrasound. Once lights are on, detection by either technology holds them on. When no occupancy is detected for the length of the time delay, lights turns off. DT-300 Series Sensors can also be set to trigger lights on when either technology or both detect occupancy, or to require both technologies to hold lighting on.

Auto Set

The DT-300 requires no adjustment at installation. Auto set continuously monitors the controlled space to identify usage patterns. Based on these patterns, the unit automatically adjusts time delay and sensitivity settings for optimal performance and energy efficiency. Sensors assigns short delays (as low as five minutes) for times when the space is usually vacant, and longer delays (up to 30 minutes) for busier times.

Application

DT-300 Series Dual Technology Sensors have the flexibility to work in a variety of applications, where one technology alone could cause false triggers. Ideal applications include classrooms, open office spaces, large offices and computer rooms. The DT-300 Series mounting system makes them easy to install in ceiling tiles or to junction boxes, providing the flexibility to be used in a wide range of spaces.

Features

- Advanced control logic based on RISC microcontroller provides:
 - Detection Signature Processing eliminates false triggers and provides immunity to RFI and EMI
 - Walk-through mode turns lights off three minutes after the area is initially occupied – ideal for brief visits such as mail delivery
 - Available with built-in light level sensor featuring simple, one-step setup
- Sensors work with low-voltage momentary switches to provide manual control
- Patented ultrasonic diffusion technology spreads coverage to a wider area
- LEDs indicate occupancy detection
- Uses plug terminal wiring system for quick and easy installation
- Eight occupancy logic options provide the ability to customize control to meet application needs
- Available with isolated relay for integration with BAS or HVAC
- Qualifies for ARRA-funded public works projects



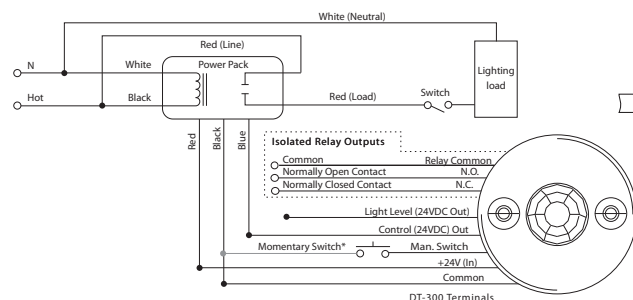
Specifications

- 24 VDC/VAC
- Ultrasonic frequency: 40kHz
- Time delays: Auto set, fixed (5, 10, 15, 20, or 30 minutes), Walk-through/Test Modes
- Sensitivity adjustment: Auto set; reduced sensitivity (PIR); variable with trim pot (ultrasonic)
- Built-in light level sensor: 10 to 300 footcandles (107.6 to 3,229.2 lux)
- Low-voltage, momentary switch input for manual on or off operation

- DT-300 contains an isolated relay with N/O and N/C outputs; rated for 1 Amp @ 30 VDC/VAC
- Multi-level Fresnel lens provides 360° coverage
- Mounting options: ceiling tile; 4" octagonal J-box, 1.5" deep
- Max DT-300s per power pack: B=2, BZ=3
Max DT-305s per power pack: B=3, BZ=4
- Dimensions: 4.50" diameter x 1.02" deep (114.3mm x 25.9mm)
- UL and cUL listed
- Five year warranty

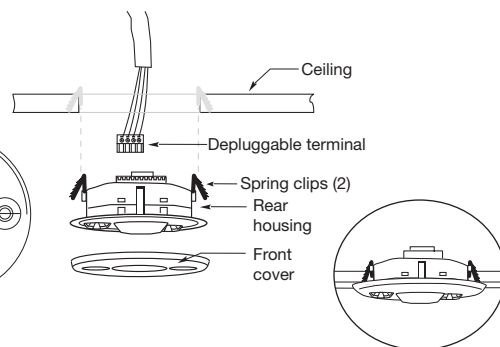
Wiring & Mounting

Wiring Diagram



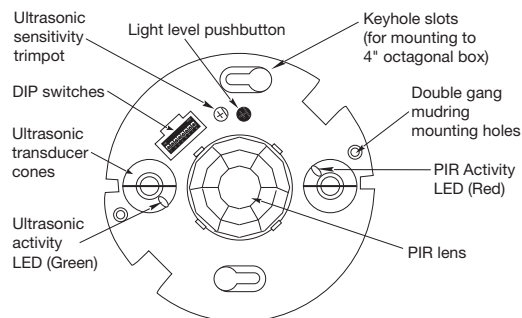
*Momentary switch connection is optional.
Connect only when momentary switch is installed.

Ceiling Mounting



Controls & Settings

Product Controls



DIP Switch Settings

◀ = Factory Setting
● = ON
- = OFF

Occupancy Logic	Switch#		
	1	2	3
Standard	-	-	-
Option 1	●	-	-
Option 2	-	●	-
Option 3	-	-	●
Option 4	-	●	●
Option 5	●	●	-
Option 6	●	●	●
Option 7	●	●	●

Occupancy Logic	Trigger		
	Initial Occupancy	Main Occupancy	Re-trigger (seconds duration)
Standard	Both	Either	Either(5)
Option 1	Either	Either	Either(5)
Option 2	PIR	Either	Either(5)
Option 3	Both	Both	Both(5)
Option 4	PIR	PIR	PIR(5)
Option 5	Ultra	Ultra	Ultra(5)
Option 6	Man.	Either	Either(30)
Option 7	Man.	Both	Both(30)

LEDs	7
Disabled	-
Enabled	●

PIR Sensitivity	8
Minimum	-
Max./SmartSet	●

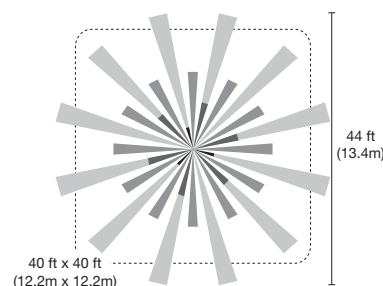
Time Delay	4	5	6
5 sec/SmartSet	-	-	-
5 minutes	-	-	●
10 min.	-	●	-
10 minutes	-	●	●
15 min.	●	●	-
15 minutes	●	●	●
20 minutes	●	●	●
30 min.	●	●	●

↑ = walk-through mode

The technology control (occupancy logic) options are adjustable by user. The standard setting recommended for most applications requires both technologies to trigger on, either to hold on.

Coverage

Coverage Pattern



Coverage shown is maximum and represents half-step walking motion. Under ideal conditions, coverage for half-step walking motion can reach up to 1000 ft².

Ordering Information

Catalog No.	Voltage	Current	Coverage	Features
<input type="checkbox"/> DT-300	24 VDC/VAC	43 mA	up to 1000 ft ² (92.9 m ²)	Isolated relay, light level
<input type="checkbox"/> DT-300-U				
<input type="checkbox"/> DT-305	24 VDC/VAC	35 mA	up to 1000 ft ² (92.9 m ²)	
<input type="checkbox"/> DT-305-U				

Sensors are white and use WattStopper power packs. Current consumption can be slightly higher when only one sensor per power pack is used.

Type PRL2a



10

Contents

<i>Description</i>	<i>Page</i>
Product Description	357
Application Description	358
Standards and Certifications	360
Technical Data and Specifications	361
Type PRL1a	376
Type PRL1aF	380
Type PRL1a-LX	384
Type PRL2a	
Product Selection	389
Box Sizing and Selection	390
Type PRL2aF	392
Type PRL2a-LX	396
Retrofit Panelboard	400
Type PRL3a	408
Type PRL3E	412
Type PRL4	416
Type PRL5P	426

Type PRL2a

Product Description

- 480Y/277 Vac maximum (125 Vdc)
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 400A maximum mains
- 100A maximum branch breakers
- Bolt-on branch breakers
- Each branch connector is capable of up to a total of 140A maximum by breaker ampere rating
- Factory assembled
- Refer to **Page 357** for additional information

Application Description

- Lighting branch panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages 357** through **373** for additional information

Standards and Certifications

- UL 67, UL 50
- Federal Specification W-P-115c
- Refer to **Page 357** for additional information



Product Selection

Type PRL2a



PRL2a

Ampere Rating	Interrupting Rating (kA Symmetrical)			Breaker Type
	240 Vac	480Y/277 Vac	125/250 Vdc	
Main Lug Only				
100	—	—	—	—
225	—	—	—	—
400	—	—	—	—
Main Breaker				
100	65	14	14	GHB
100	18	14	10	EHD
100	65	35	10	FD, FDE
100	100	65	22	HFD, HFDE
100	200	100	22	FDC
225	65	—	—	ED
225	65	35	10	FD, FDE
225	100	65	22	HFD, HFDE
225	200	100	22	FDC
250	65	35	10	JD
250	100	65	22	HJD
250	200	100	22	JDC
400	65	35	10	KD
400	100	65	22	HKD
400	100	65	—	LHH
400	200	100	22	KDC

PRL2a Branch Circuit Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical)			Breaker Type
	240 Vac ^①	480Y/277 Vac	125/250 Vdc	
15–20	65	14	—	GHQ ^②
15–20	65	14	14	GHB ^②
25–60	65	14	14	GHB ^②
70–100	65	14	14	GHB ^②
15–30	65	25	—	HGHB ^②
15–20	65	14	—	GHQRSP ^③
15–30	65	14	—	GHBS ^{②③}
15–60	—	14	—	GHBGFEP ^{②④}
15–20	—	14	—	GHBHID ^{②⑤}
Provision	—	—	—	—

Notes

- ① Interrupting ratings in this column are applicable to 120 Vac for single-pole breakers.
- ② Must be used on 480Y/277V grounded wye systems only.
- ③ Remote controllable breaker.
- ④ GFP for 30 mA equipment protection. Requires two-pole spaces. 277 Vac only.
- ⑤ HID (High Intensity Discharge) rated breaker.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards and Lighting Controls

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page 391**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
 2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single-poles, i.e., three-pole breaker, count as three poles.
3. Determine sub-feed breaker or through-feed lug requirements.
 3. Select the main ampere rating section from table on **Page 391**.
 4. Select panelboard type from first column, main breaker frame, if applicable, from second column, and sub-feed breaker frame, if applicable, from the third column.
 5. From Step #2, determine the number of branch circuits in Column 4.
 6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL2a Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ①			YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
				Height	Width	Depth				
100A										
Main breaker	BAB, QBHW (H)	—	15	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	27	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	39	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main lugs or main breaker	EHD, FD, HFD, FDE, HFDE (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
Main lugs or main breaker with 100A through-feed lugs or sub-feed breaker	EHD, FD, FDE, HFD, HFDE (V)	EHD, FD	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		HFD (V)	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
225A										
Main lugs or main breaker	EDB, EDS, ED, EDH, FD, HFD, FDE, HFDE (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
	JD, HJD, JDC (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	EHD, FD, HFD, EDB, EDS, ED, EDH, FDE, HFDE (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
	JD, HJD, JDC (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
400A										
Main lugs or main breaker	DK, KD, HKD, KDC, LHH (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main lugs or main breaker with 400A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	JD, HJD, JDC, DK, KD, HKD, KDC (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	YS2090	LT2090S or F	EZB2090R	EZT2090S or F
		—	42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	YS2090	LT2090S or F	EZB2090R	EZT2090S or F

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.



MULTIPLES OF RATED CURRENT

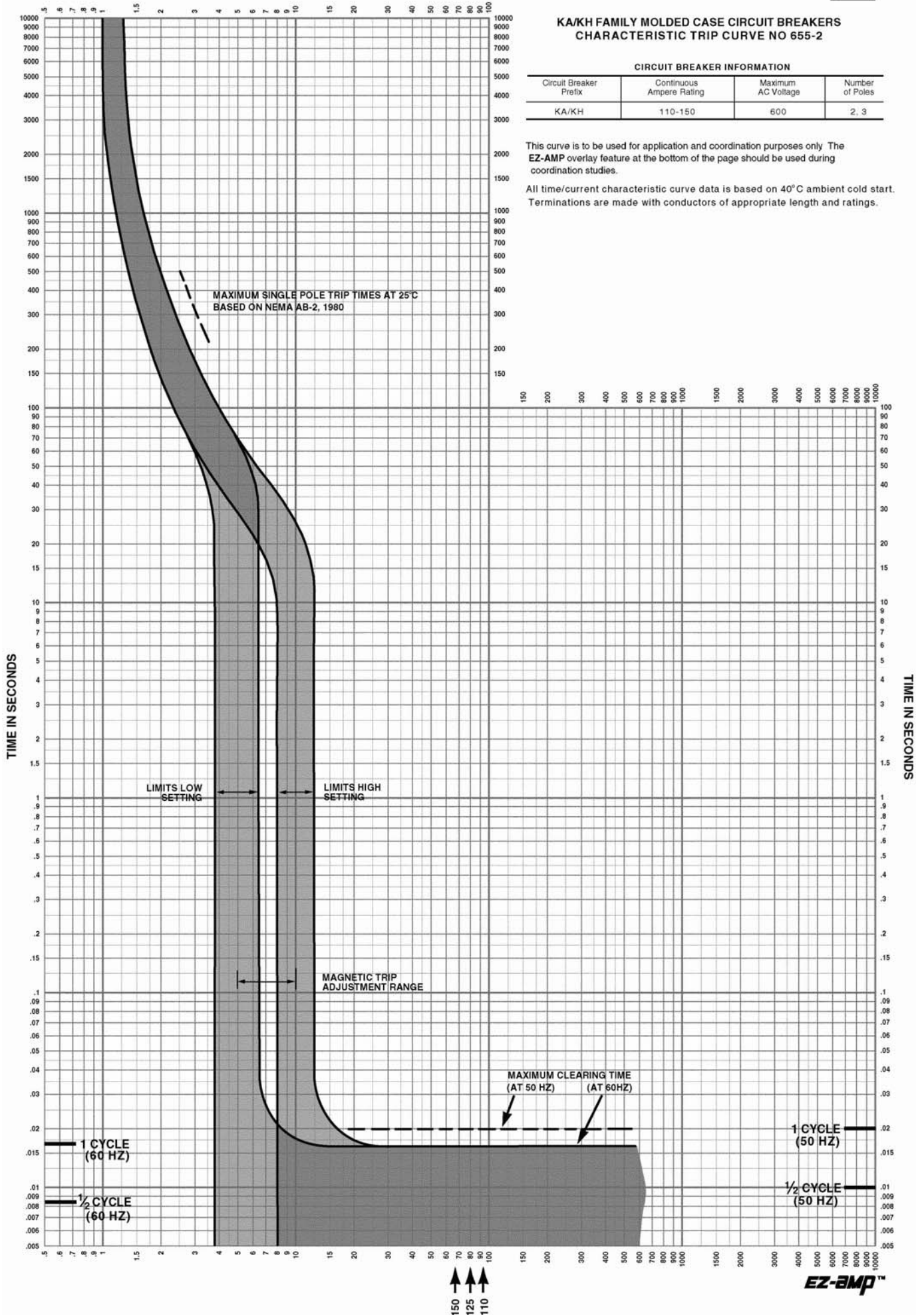
KA/KH FAMILY MOLDED CASE CIRCUIT BREAKERS
CHARACTERISTIC TRIP CURVE NO 655-2

CIRCUIT BREAKER INFORMATION

Circuit Breaker Prefix	Continuous Ampere Rating	Maximum AC Voltage	Number of Poles
KA/KH	110-150	600	2, 3

This curve is to be used for application and coordination purposes only. The EZ-AMP overlay feature at the bottom of the page should be used during coordination studies.

All time/current characteristic curve data is based on 40°C ambient cold start. Terminations are made with conductors of appropriate length and ratings.



↑ 150
↑ 125
↑ 110

EZ-AMP™



MULTIPLES OF RATED CURRENT

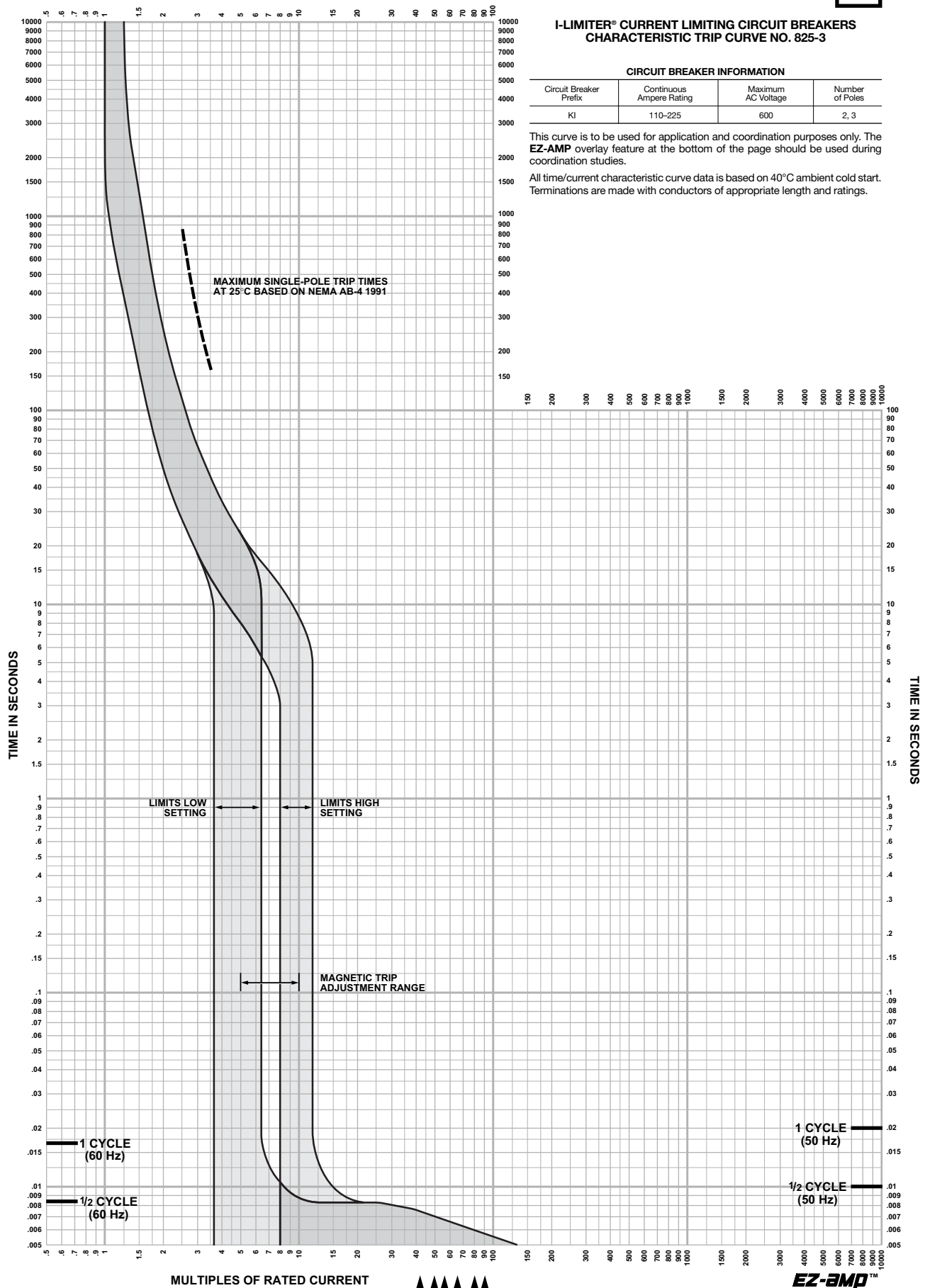
I-LIMITER® CURRENT LIMITING CIRCUIT BREAKERS
CHARACTERISTIC TRIP CURVE NO. 825-3

CIRCUIT BREAKER INFORMATION

Circuit Breaker Prefix	Continuous Ampere Rating	Maximum AC Voltage	Number of Poles
KI	110-225	600	2, 3

This curve is to be used for application and coordination purposes only. The EZ-AMP overlay feature at the bottom of the page should be used during coordination studies.

All time/current characteristic curve data is based on 40°C ambient cold start. Terminations are made with conductors of appropriate length and ratings.





MULTIPLES OF RATED CURRENT

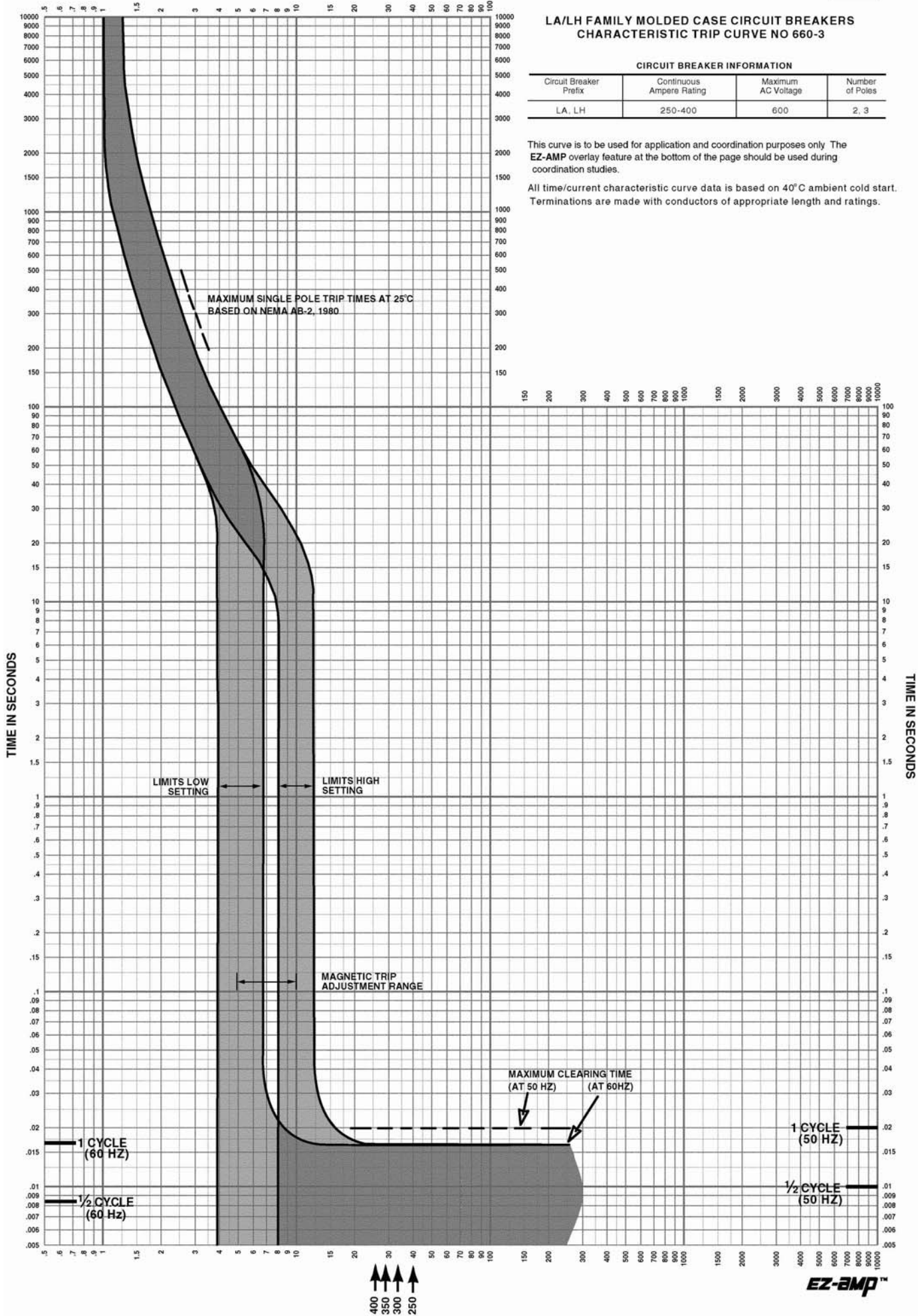
LA/LH FAMILY MOLDED CASE CIRCUIT BREAKERS
CHARACTERISTIC TRIP CURVE NO 660-3

CIRCUIT BREAKER INFORMATION

Circuit Breaker Prefix	Continuous Ampere Rating	Maximum AC Voltage	Number of Poles
LA, LH	250-400	600	2, 3

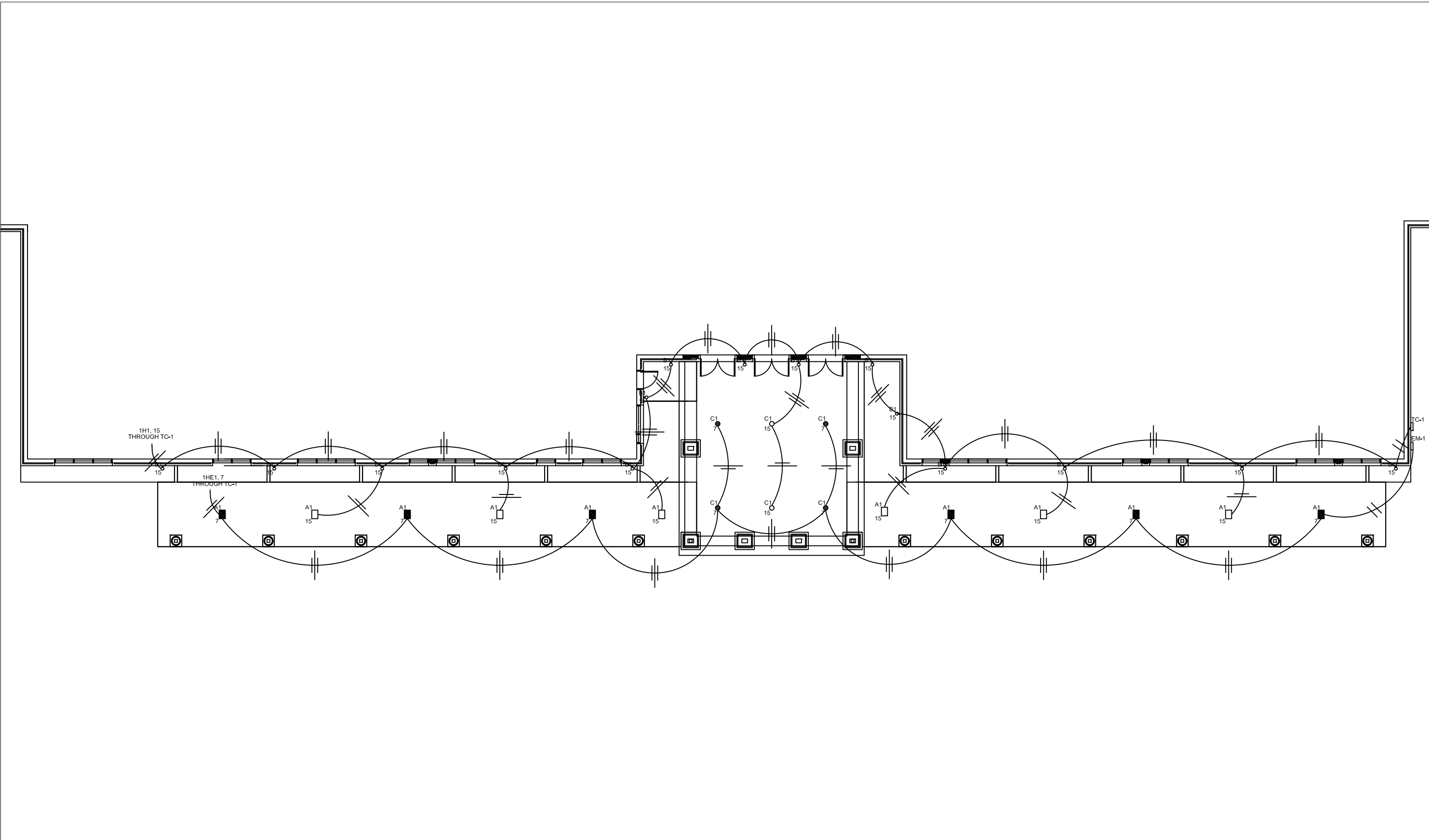
This curve is to be used for application and coordination purposes only. The EZ-AMP overlay feature at the bottom of the page should be used during coordination studies.

All time/current characteristic curve data is based on 40°C ambient cold start. Terminations are made with conductors of appropriate length and ratings.



EZ-AMP™

Appendix B: Lighting Layouts and Electrical Details



LEAH MATERN

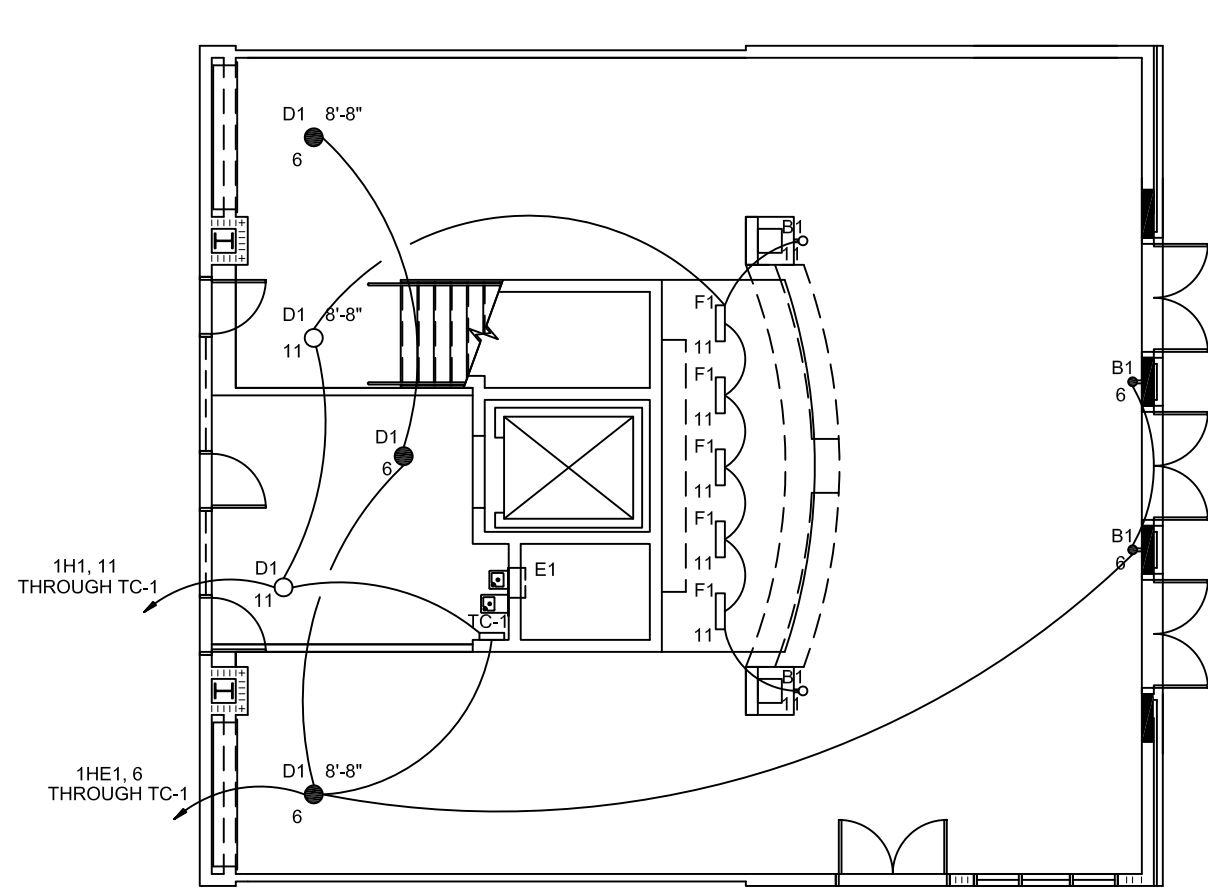
COVERED ENTRANCE LIGHTING PLAN

SCALE 1/16" = 1'

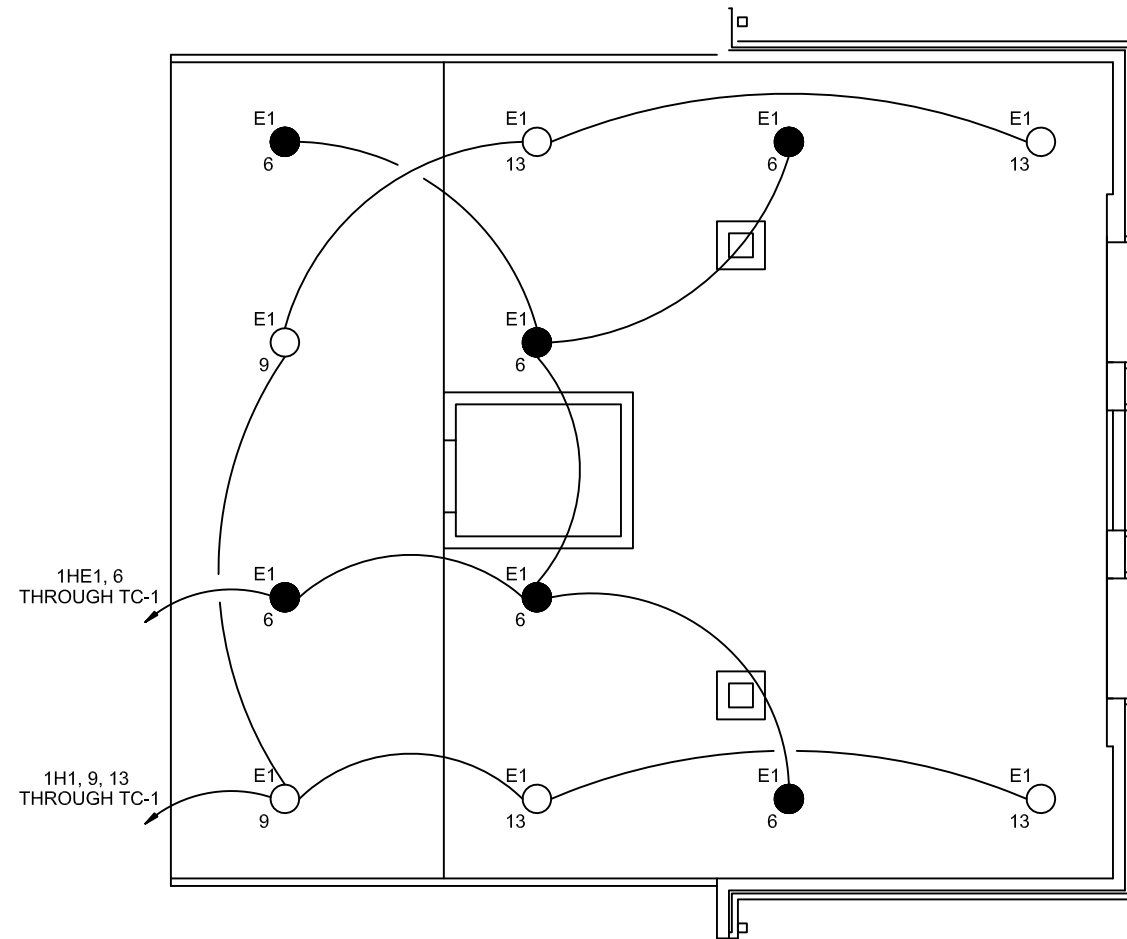
APRIL 7, 2011

CRYSTAL LAKE ELEMENTARY SCHOOL

AE 482
AE SENIOR THESIS



LOBBY FIRST FLOOR



LOBBY SECOND FLOOR

LEAH MATERN

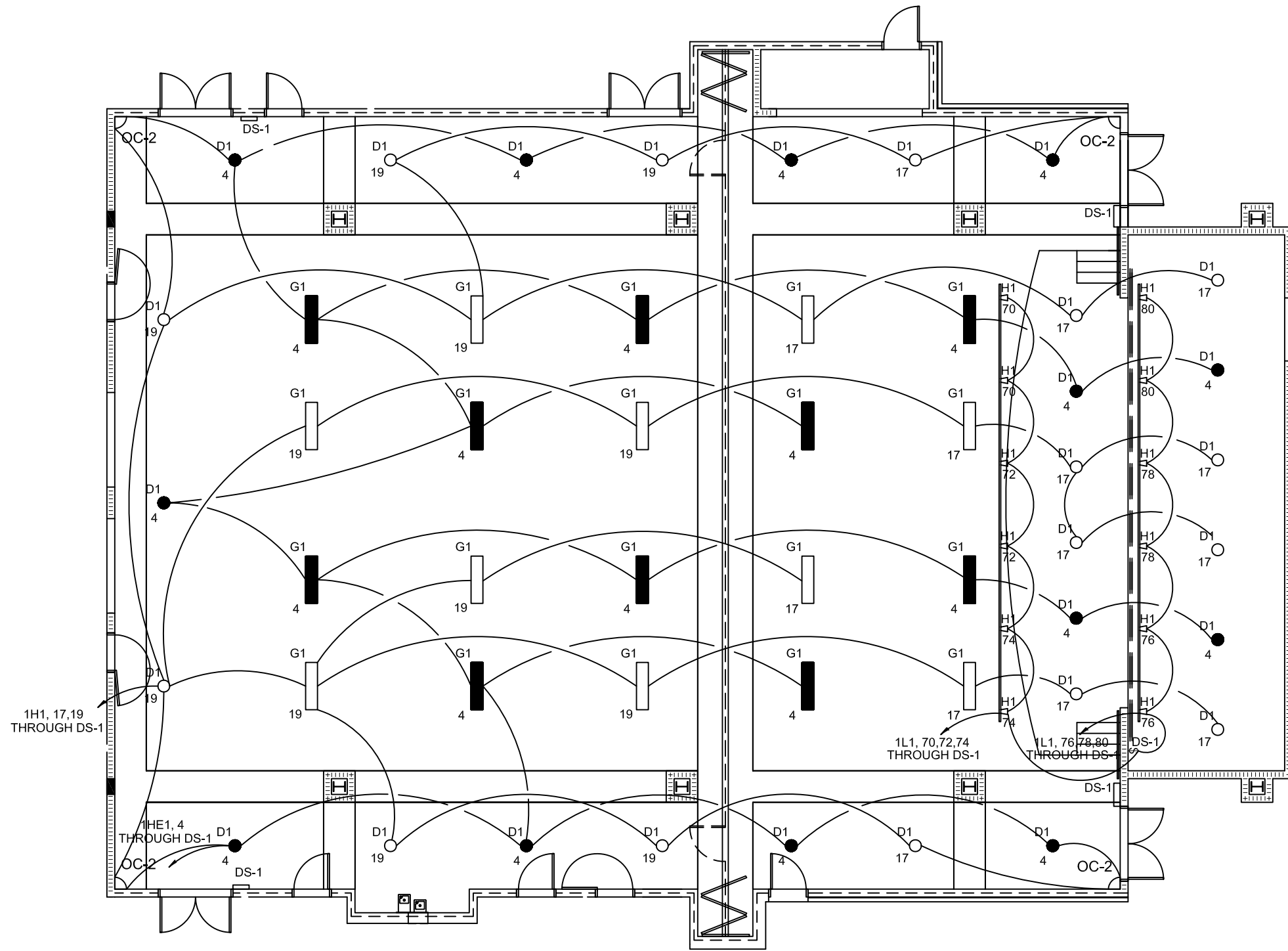
LOBBY LIGHTING PLAN

SCALE 3/32" = 1'

APRIL 7, 2011

CRYSTAL LAKE ELEMENTARY SCHOOL

AE 482
AE SENIOR THESIS



LEAH MATERN

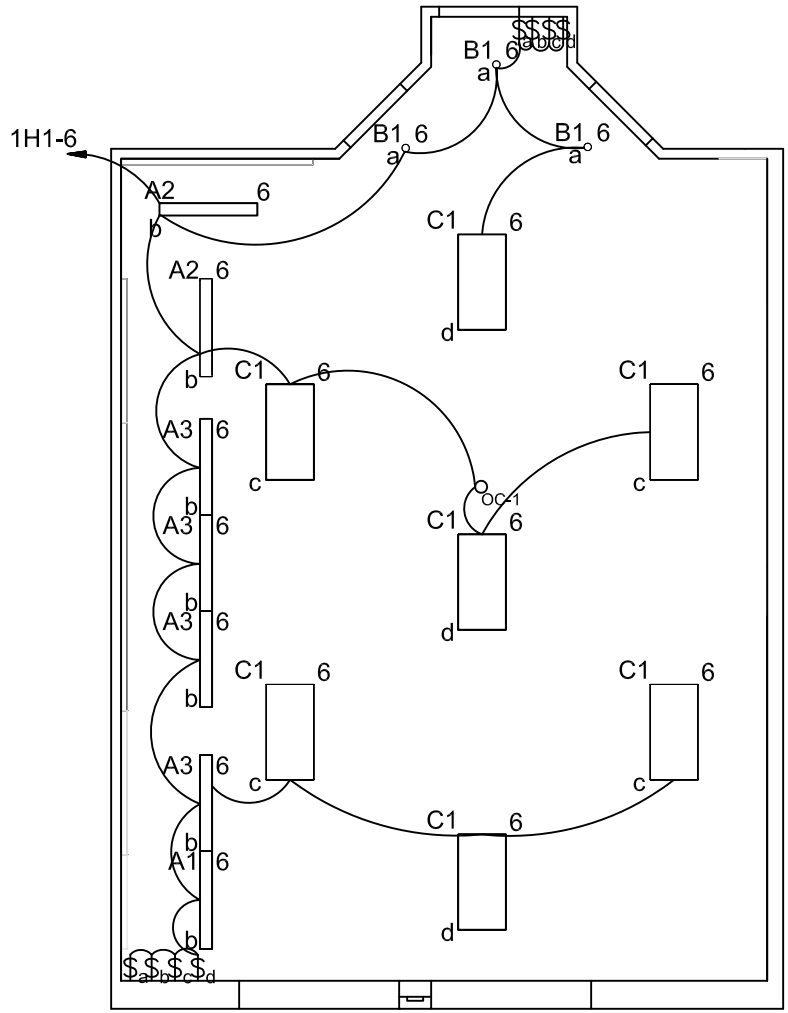
MULTIPURPOSE ROOM LIGHTING PLAN

SCALE 3/32" = 1'

APRIL 7, 2011

CRYSTAL LAKE ELEMENTARY SCHOOL

AE 482
AE SENIOR THESIS



LEAH MATERN

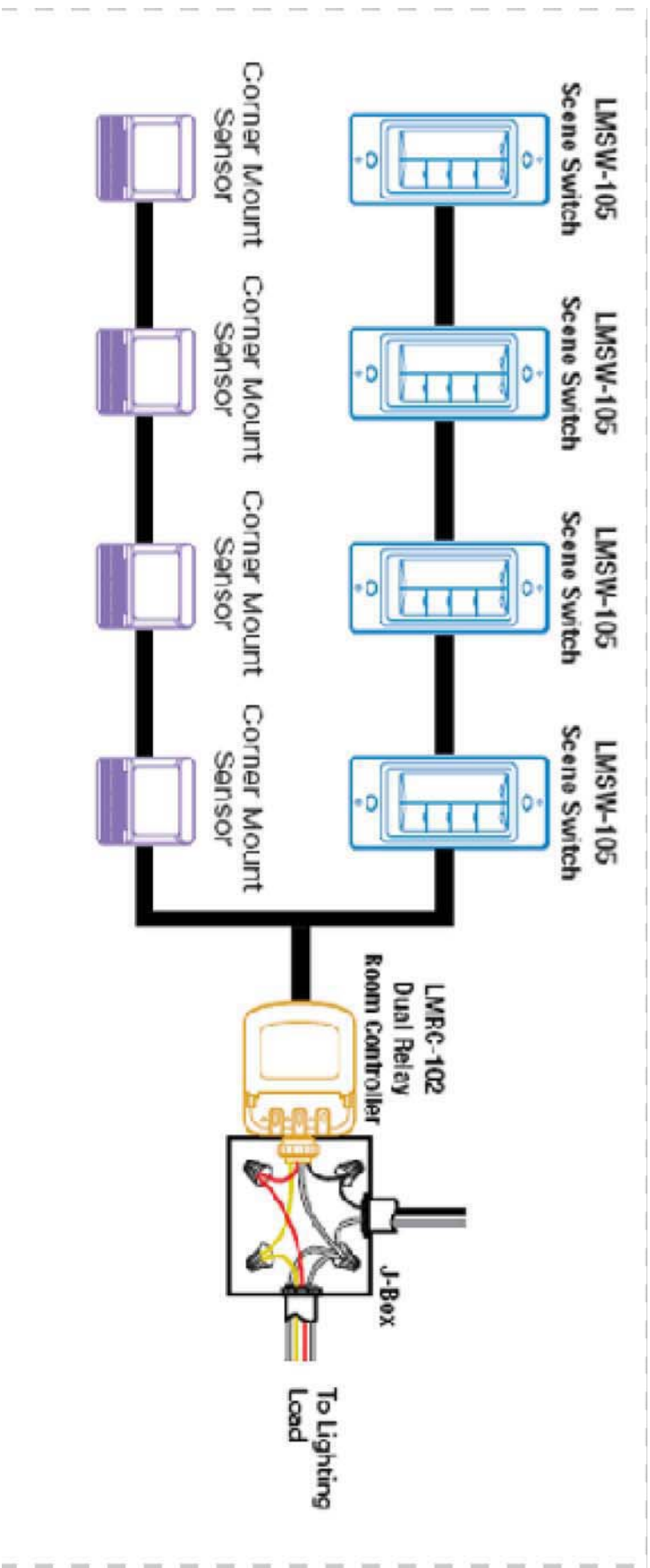
APRIL 7, 2011

PRIMARY CLASSROOM LIGHTING PLAN

CRYSTAL LAKE ELEMENTARY SCHOOL

SCALE 1/8" = 1'

AE 482
AE SENIOR THESIS

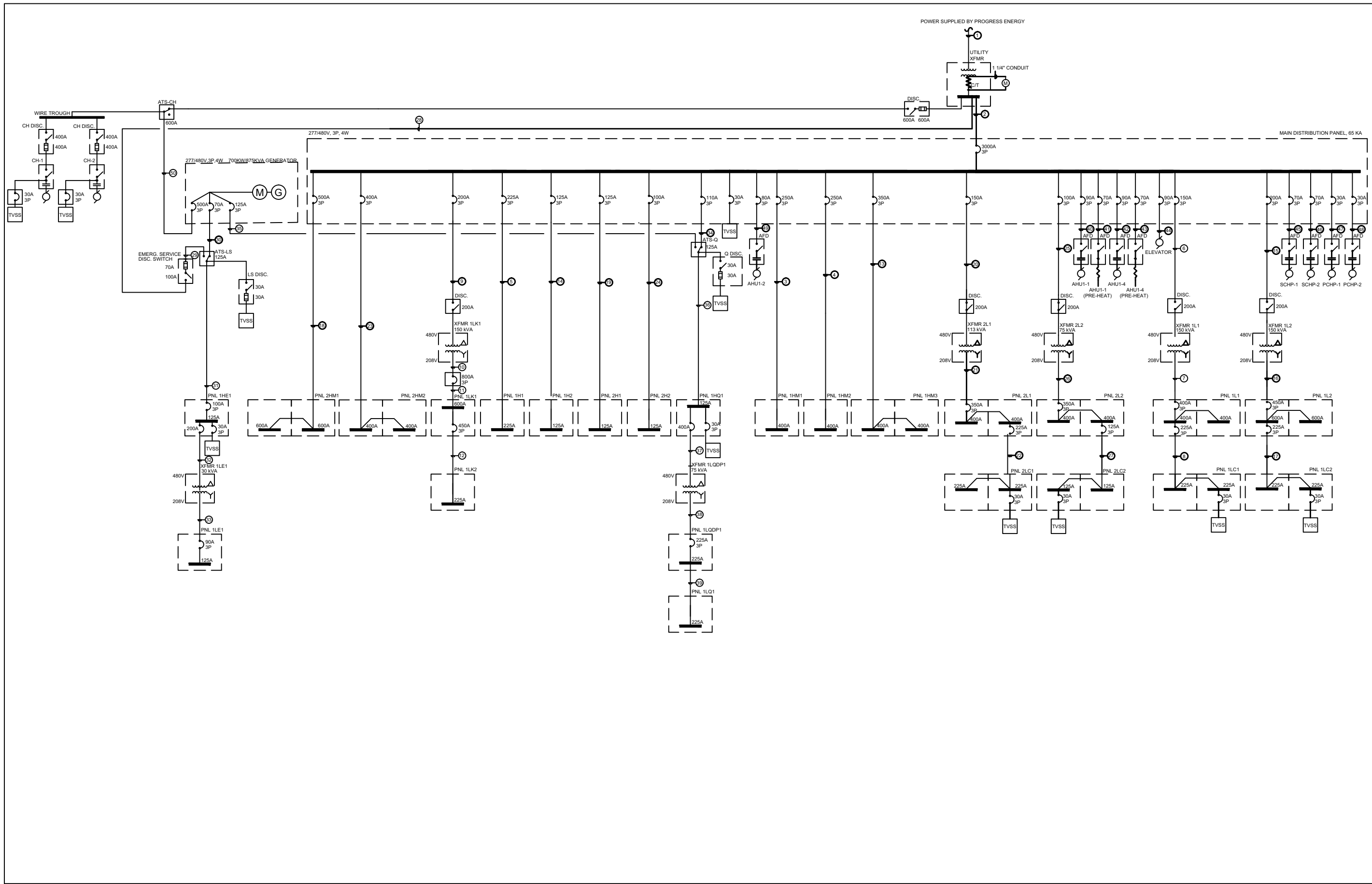


LEAH MATERN
APRIL 7, 2011

MULTIPURPOSE ROOM WIRING DIAGRAM
CRYSTAL LAKE ELEMENTARY SCHDDL

NTS
AE 482
AE SENIOR THESIS

Appendix C: Emergency System Redesign



**CRYSTAL LAKE
ELEMENTARY
SCHOOL**

SEMINOLE COUNTY
SCHOOL BOARD
LAKE MARY, FL

DATE: 04/07/2011

DRAWN BY:

LEAH MATERN

AE 482-SENIOR THESIS

Single Line
Diagram

E502

FEEDER SCHEDULE

TAG	FROM	TO	CONDUIT			CONDUCTORS (PER SET)									SIZE OF OVERCURRENT PROTECTION	FRAME OR SWITCH SIZE	REMARKS
			NO. OF SETS	SIZE	TYPE	PHASE CONDUCTORS			NEUTRAL CONDUCTORS			GROUND CONDUCTORS					
						No.	SIZE	TYPE	No.	SIZE	TYPE	No.	SIZE	TYPE			
1	UTILITY	POWER CO. XFMR	2	4"	PVC												BY UTILITY
2	POWER CO. XFMR	MDP	8	3.5"	PVC	3	#500MCM	CU THWN	1	#500MCM	CU THWN	1	#3/0	CU THWN	3000	3000A/3P	
3	MDP	1HM1	1	2.5"	RMC	3	#250MCM	CU THWN	1	#250MCM	CU THWN	1	#4	CU THWN	250	250A/3P	
4	MDP	1HM2	1	2.5"	RMC	3	#250MCM	CU THWN	1	#250MCM	CU THWN	1	#4	CU THWN	250	250A/3P	
5	MDP	1H1	1	2.0"	RMC	3	#3/0	CU THWN	1	#3/0	CU THWN	1	#4	CU THWN	225	225A/3P	
6	MDP	XFMR 1L1	1	2.5"	RMC	3	#3/0	CU THWN	0			1	#6	CU THWN	175	225A/3P	
7	XFMR 1L1	PNL1L1	2	3.00"	RMC	3	#3/0	CU THWN	1	#3/0	CU THWN	1	#4	CU THWN	400	400A/3P	
8	PNL 1L1	PNL1LC1	1	2.5"	RMC	3	#3/0	CU THWN	1	#4/0	CU THWN	1	#6	CU THWN	175	225A/3P	
9	MDP	XFMR 1LK1	1	2"	PVC	3	#3/0	CU THWN	0			1	#6	CU THWN	450	600A/3P	
10	XFMR 1LK1	ENCLOSED C.B.	2	2.5"	RMC	3	\$4/0	CU THWN	1	#4/0	CU THWN	1	#1/0	CU THWN	450	600A/3P	
11	ENCLOSED C.B.	PNL 1LK1	2	2.5"	RMC	3	\$4/0	CU THWN	1	#4/0	CU THWN	1	#1/0	CU THWN	450	600A/3P	
12	PNL 1LK1	PNL 1LK2	1	2"	RMC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	150	150A/3P	
13	MDP	PNL 1HM3	1	3.5"	PVC	3	#500MCM	CU THWN	1	#500MCM	CU THWN	1	#3	CU THWN	350	400A/3P	
14	MDP	PNL 1H2	1	2"	PVC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	125	125A/3P	
15	MDP	XFMR 1L2	1	2"	PVC	3	#3/0	CU THWN	0			1	#6	CU THWN	200	225A/3P	
16	XFMR 1L2	PNL 1L2	2	2.5"	RMC	3	#4/0	CU THWN	1	#4/0	CU THWN	1	#1/0	CU THWN	450	600A/3P	
17	PNL 1L2	PNL 1LC2	1	2.5"	RMC	3	#3/0	CU THWN	1	#4/0	CU THWN	1	#6	CU THWN	175	225A/3P	
18	MDP	2HM1	2	2.5"	RMC	3	#250MCM	CU THWN	1	#250MCM	CU THWN	1	#2	CU THWN	500	600A/3P	
19	MDP	2H1	1	2"	RMC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	125	125A/3P	
20	MDP	XFMR 2L1	1	1.5"	RMC	3	#1/0	CU THWN	0			1	#6	CU THWN	150	150A/3P	
21	XFMR 2L1	PNL 2L1	2	2"	RMC	3	#3/0	CU THWN	1	#3/0	CU THWN	1	#2	CU THWN	350	400A/3P	
22	PNL2L1	PNL 2LC1	1	2"	RMC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	125	125A/3P	
23	MDP	PNL 2HM2	2	2"	RMC	3	#3/0	CU THWN	1	#3/0	CU THWN	1	#3	CU THWN	400	400A/3P	
24	MDP	PNL 2H2	1	1.5"	RMC	3	#1	CU THWN	1	#1	CU THWN	1	#8	CU THWN	100	100A/3P	
25	MDP	XFMR 2L2	1	1.25"	RMC	3	#1	CU THWN	0			1	#8	CU THWN	100	100A/3P	
26	XFMR 2L2	PNL 2L2	1	3"	RMC	3	#250MCM	CU THWN	1	#250MCM	CU THWN	1	#2	CU THWN	225	225A/3P	
27	PNL 2L2	PNL 2LC2	1	2"	RMC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	125	150A/3P	
28	POWER CO. XFMR	EMERG. DISC.	1	1.25"	PVC	3	#4	CU THWN	1	#4	CU THWN	1	#10	CU THWN	60	100A/3P	
29	EMERG. DISC	ATS-LS	1	1.25"	PVC	3	#4	CU THWN	1	#4	CU THWN	1	#10	CU THWN	60	100A/3P	
30	GENERATOR	ATS-LS	1	1.25"	PVC	3	#4	CU THWN	1	#4	CU THWN	1	#10	CU THWN	60	100A/3P	
31	ATS-LS	PNL 1HE1	1	1.25"	RMC	3	#3	CU THWN	1	#3	CU THWN	1	#8	CU THWN	90	100A/3P	
32	PNL 1HE1	XFMR 1LE1	1	0.75"	RMC	3	#8	CU THWN	0			1	#10	CU THWN	40	100A/3P	
33	XFMR 1LE1	PNL 1LE1	1	1.25"	RMC	3	#2	CU THWN	1	#2	CU THWN	1	#8	CU THWN	90	100A/3P	
34	MDP	ATS-Q	1	1.5"	RMC	3	#2	CU THWN	1	#2	CU THWN	1	#6	CU THWN	110	125A/3P	
35	GENERATOR	ATS-Q	1	1.5"	PVC	3	#2	CU THWN	1	#2	CU THWN	1	#6	CU THWN	110	125A/3P	
36	ATS-Q	PNL 1HQ1	1	1.5"	RMC	3	#2	CU THWN	1	#2	CU THWN	1	#6	CU THWN	110	125A/3P	
37	PNL 1HQ1	XFMR 1LQDP1	1	1.25"	RMC	3	#1	CU THWN	0			1	#8	CU THWN	100	100A/3P	
38	XFMR 1LQDP1	PNL 1LQDP1	1	2.5"	RMC	3	#4/0	CU THWN	1	#4/0	CU THWN	1	#2	CU THWN	225	225A/3P	
39	PNL 1LQDP1	PNL 1LQ1	1	2.5"	RMC	3	#1/0	CU THWN	1	#1/0	CU THWN	1	#6	CU THWN	150	150A/3P	
40	MDP	AHU 1-1	1	0.75"	PVC	3	#6	CU THWN	0			1	#8	CU THWN	90	100A/3P	
41	MDP	AHU 1-1 (PRE-HEAT)	1	1"	PVC	3	#4	CU THWN	0			1	#8	CU THWN	70	100A/3P	
42	MDP	AHU 1-4	1	0.75"	PVC	3	#6	CU THWN	0			1	#8	CU THWN	90	100A/3P	
43	MDP	AHU 1-4 (PRE-HEAT)	1	1"	PVC	3	#4	CU THWN	0			1	#8	CU THWN	70	100A/3P	
44	MDP	ELEVATOR	1	1"	PVC	3	#4	CU THWN	0			1	#8	CU THWN	70	100A/3P	
45	MDP	SCHP-1	1	0.75"	PVC	3	#8	CU THWN	0			1	#8	CU THWN	70	100A/3P	
46	MDP	SCHP-2	1	0.75"	PVC	3	#8	CU THWN	0			1	#8	CU THWN	70	100A/3P	
47	MDP	PCHP-1	1	0.75"	PVC	3	#12	CU THWN	0			1	#12	CU THWN	30	100A/3P	
48	MDP	PCHP-2	1	0.75"	PVC	3	#12	CU THWN	0			1	#12	CU THWN	30	100A/3P	
49	MDP	AHU 1-2	1	0.75"	PVC	3	#12	CU THWN	0			1	#12	CU THWN	30	100A/3P	

NOTES:
 1. REFER TO RISER DIAGRAM FOR FEEDER TAGS
 2. ADD OTHER PROJECT NOTES HERE

AL=ALUMINUM
 CU=COPPER

Appendix D: Photovoltaic Design

BENEFITS

Highest Efficiency

SunPower™ Solar Panels are the most efficient photovoltaic panels on the market today.

More Power

Our panels produce more power in the same amount of space—up to 50% more than conventional designs and 100% more than thin film solar panels.

Reduced Installation Cost

More power per panel means fewer panels per install. This saves both time and money.

Reliable and Robust Design

Proven materials, tempered front glass, and a sturdy anodized frame allow panel to operate reliably in multiple mounting configurations.



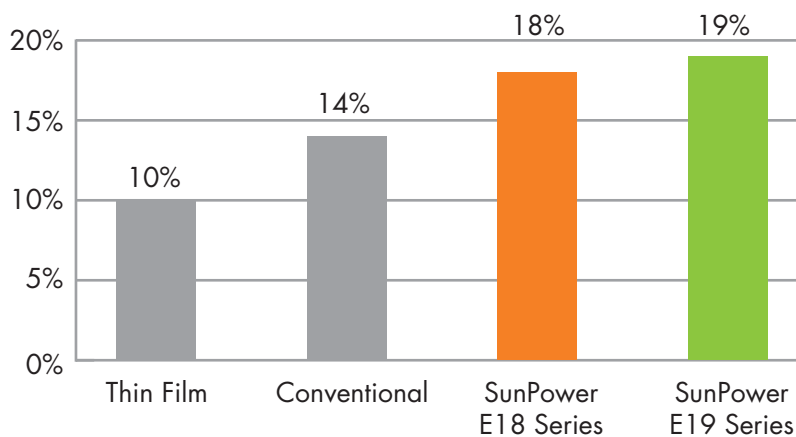
SPR-320E-WHT-D



The planet's most powerful solar panel.

The SunPower™ 320 Solar Panel provides today's highest efficiency and performance. Utilizing 96 back-contact solar cells, the SunPower 320 delivers a total panel conversion efficiency of 19.6%. The 320 panel's reduced voltage-temperature coefficient, anti-reflective glass and exceptional low-light performance attributes provide outstanding energy delivery per peak power watt.

SunPower's High Efficiency Advantage



Electrical Data

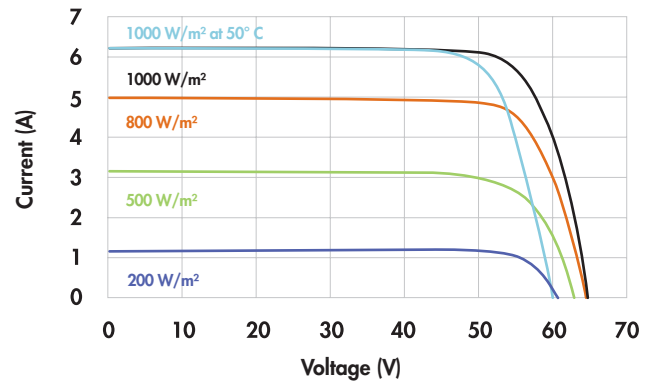
Measured at Standard Test Conditions (STC): irradiance of 1000W/m², AM 1.5, and cell temperature 25° C

Peak Power (+5/-3%)	P _{max}	320 W
Efficiency	η	19.6 %
Rated Voltage	V _{mpp}	54.7 V
Rated Current	I _{mp}	5.86 A
Open Circuit Voltage	V _{oc}	64.8 V
Short Circuit Current	I _{sc}	6.24 A
Maximum System Voltage	UL	600 V
Temperature Coefficients	Power (P)	-0.38% / K
	Voltage (V _{oc})	-176.6mV / K
	Current (I _{sc})	3.5mA / K
NOCT		45° C +/-2° C
Series Fuse Rating		15 A

Mechanical Data

Solar Cells	96 SunPower all-back contact monocrystalline	
Front Glass	High transmission tempered glass with anti-reflective (AR) coating	
Junction Box	IP-65 rated with 3 bypass diodes Dimensions: 32 x 155 x 128 (mm)	
Output Cables	1000mm length cables / MultiContact (MC4) connectors	
Frame	Anodized aluminum alloy type 6063 (silver); stacking pins	
Weight	41.0 lbs (18.6 kg)	

I-V Curve



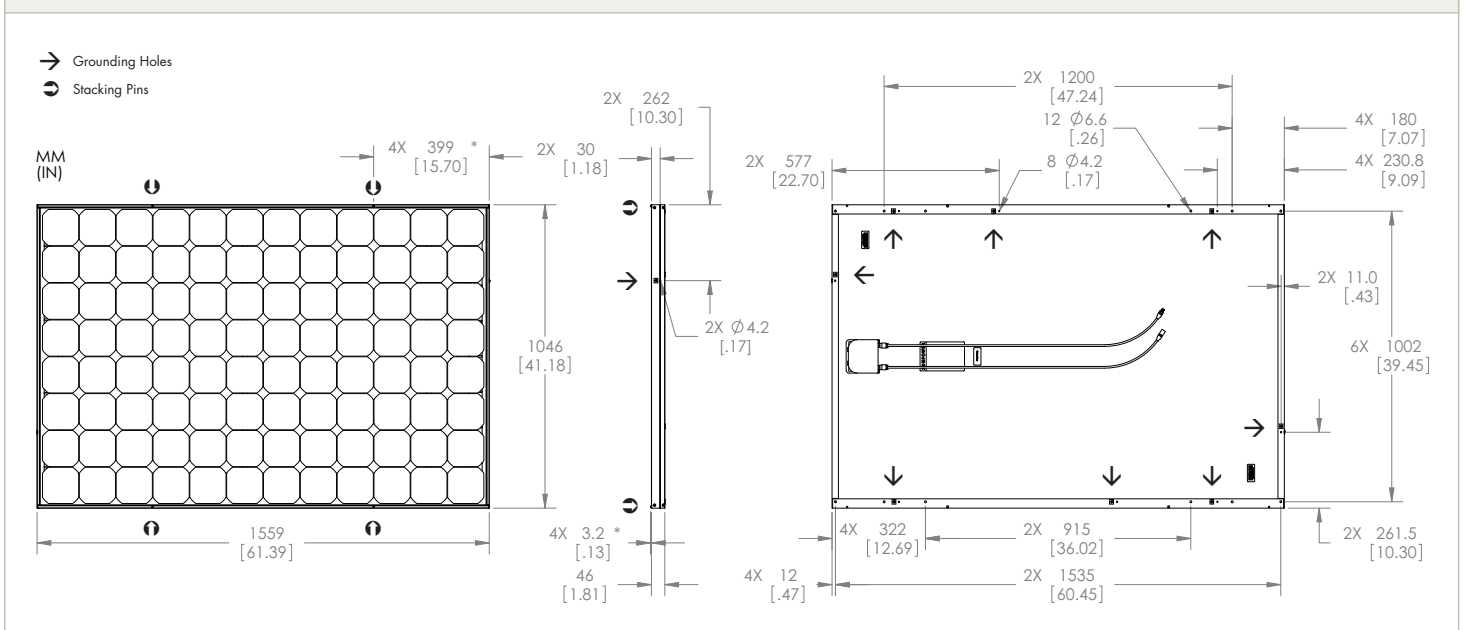
Tested Operating Conditions

Temperature	-40° F to +185° F (-40° C to + 85° C)
Max load	113psf 550 kg/m ² (5400 Pa), front (e.g. snow) w / specified mounting configurations 50 psf 245 kg/m ² (2400 Pa) front and back – e.g. wind
Impact Resistance	Hail 1 in (25 mm) at 51 mph (23 m/s)

Warranties and Certifications

Warranties	25 year limited power warranty 10 year limited product warranty
Certifications	Tested to UL 1703. Class C Fire Rating

Dimensions



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Visit sunpowercorp.com for details



Grid-Tied PV Inverters

PVI 60KW PVI 82KW PVI 95KW
a breakthrough in price and quality



Best-in-class PVI 60KW, PVI 82KW and PVI 95KW inverters:
exceptional quality and efficiency at an extraordinary price.



Product Information

PVI 60KW PVI 82KW PVI 95KW

Grid-Tied PV Inverters

OVERVIEW: INTEGRATED PV INVERTER
 The Solectria Renewables PVI 60KW, PVI 82KW and PVI 95KW are rugged, DSP-controlled, premium efficient PV inverters for grid-connected commercial, industrial and utility 3-phase PV systems. The core of the inverter, Solectria's proven DMGI 660 distributed generation inverter, uses state-of-the-art control techniques and devices including space vector PWM, a precision MPT algorithm, and low-loss IGBTs. With peak inverter power electronics efficiency over 98% (over 96.5% including the transformer and filters), fully integrated packaging, and heavy duty AC & DC disconnects, these inverters set a new industry standard for efficiency, ease of installation and use, reliability and installed cost. Made in USA.

- APPLICATIONS**
- 40-95kWAC, 60Hz, 208, 240, 480 or 600VAC, 3-phase, grid-tied commercial PV systems (50-120kWDC STC array).
 - Multiple inverters can be used together in any combination for 150, 200, 500kW, MW or larger PV systems.
 - Designed for mounting as desired, in full sun, driving rain and drifting snow: rooftop/ground or indoors.
 - Can be used for other renewable and distributed generation applications such as wind power, hydro, geothermal, biomass, battery and smart grid as new technologies develop.

- FEATURES & OPTIONS**
- Fully integrated design includes transformer, filters, and heavy duty, visible blade AC & DC disconnects (with optional DC sub-combiner fuses).
 - Smart user-navigable LCD display.
 - Near zero nighttime standby losses.
 - Industry-leading overall efficiency.
 - Simple set-up and connections (connect DC from PV combiners and 3-phase AC connections).
 - Precision DSP-controlled Maximum Power Tracking Algorithm.
 - High-reliability design, based on 20 years of power electronics development. Includes sealed power and signal electronics unit and high-efficiency magnetics.
 - Optional fused DC sub-combinder (2-48 fuses, 8-250A).
 - Optional positive grounded version.
 - Optional hwd. facing disconnect orientation (AC, DC or both).
 - Optional stainless steel enclosure & disconnects.
 - Custom grid-interactive settings for utilities: KVAR support, ramp rates, remote control.

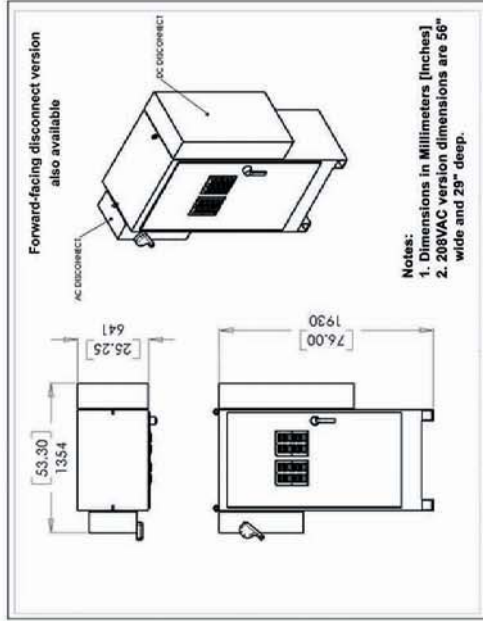
- CONNECTIVITY**
- RS232 and PC software for diagnostics and data capture.
 - RS485 port and MODBUS RTU for data monitoring.
 - Ethernet port for direct connection to the internet with optional Solenview web-based monitoring or various third party services.

- SAFETY FEATURES**
- Electronic temperature protection.
 - DC ground-fault detection and interrupt.
 - Current limit protections.
 - Standards-compliance: All inverters Listed to UL 1741, IEEE Std 1547, CSA 22.2 #107.1 and certified to IEEE 62.41 (NY SIR Surge Test Requirements) as well as FCC Part 15, class A. Units are also listed on CEC's eligible equipment list (208 & 480VAC).

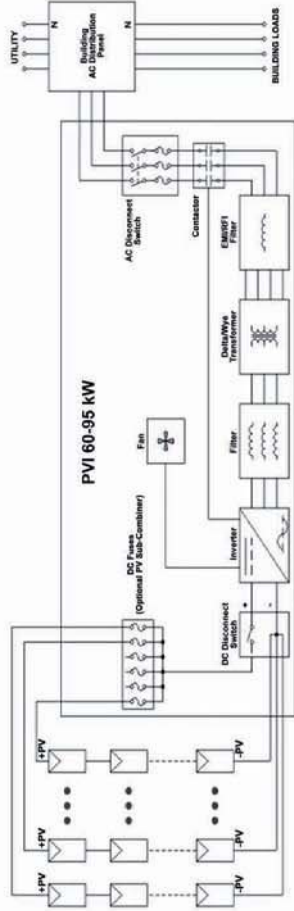
INTEGRATED INVERTER



DIMENSIONS



PVI 60-95KW 3-PHASE COMMERCIAL / INDUSTRIAL INVERTER BLOCK DIAGRAM



SPECIFICATIONS

	PVI 60KW	PVI 82KW	PVI 95KW
Continuous AC Power (CEC)	60 kW	83 kW	95 kW
Power Factor	> 0.98		
Voltage (L-L), ±10%	208 / 240 / 480 / 600 VAC, 3-Ph		
Rated Current	(CEC) 208VAC 106A 240VAC 147A (CEC) 480VAC 73A 600VAC 60A	229A 204A 100A 80A	261A 230A 115A 92A
Current Distortion	< 3% THD, Nom Power		
Frequency, ±1 %	60 Hz		
Inverter Electronics Peak Efficiency	> 98% (50%-100% load)		
Overall Peak Efficiency	> 96.5% (50%-100% load) @ 480 VAC		
CEC Efficiency	> 96.5% (50%-100% load) @ 480 VAC		
Audible Noise Level (1m), blower on	73dBA 74dBA 76dBA		
Certification: UL1741, IEEE1547, IEEE C92.41.2, CSA 22.2#107.1, FCC Part 15, Class A			
Input	Monopole, negative grounded (Positive ground option)		
Max. V _{oc} ¹	600 VDC		
Maximum DC Current	190A	248A	287A
CEC Eligible DC Current	177A	241A	279A
MPT Voltage Range ²	315-500 VDC (300 with low tap option) ³		
CEC Full Power Voltage Range	345-480 VDC		
Protection ⁴	Over/Under Voltage, Over Current		
AC Grid-connection (Standards Compliance: See "Safety Features")	Over/Under Freq., DC Ground Fault (GFD)		
AC Disconnect (Integral)	NEMA 3R, Integral		
DC Sub-Combiner w/fuses (Optional ⁵)	8A-250A, fuses available, 2-48 pole, NEMA 3R, TVSS		
DC Disconnect (Integral)	Break board rated, NEMA 3R		
Environmental	Ambient Temperature		
Cooling	Automatic Forced Convection		
Enclosure	Rain Proof (UL 1741)		
Electronics Enclosure	Sealed (IP66)		
Weight (lb) (kg)	1526 (694)	1615 (734)	1748 (794)
Dimensions: feet (mm) ⁶	208 240VAC 76" (1930) H x 56" (1422) W x 29" (744) D	240VAC 76" (1930) H x 54" (1372) W x 29" (744) D	480 600VAC 76" (1930) H x 54" (1372) W x 29" (744) D
Communications, Optional Data Acquisition	Ethernet, Optional Solenview web-based monitoring.		
Warranty	5 years standard (optional 10, 15, & 20 year warranties)		

Product Information

All information subject to change without notice



proven history, sustainable future

Solectria Renewables designs and manufactures power electronics for renewable power generation systems. Feature-packed and highly integrated, the products lead the industry in installation ease and total value. At the heart of Solectria's products are its reliable and efficient core inverters, which have been proven over the past 20 years in the extremely harsh environment of truck, bus and military transportation applications. Solectria Renewables is run by the renowned MIT engineers who founded the Solectria brand in 1989. With a customer-focused team, high quality suppliers and a best practices manufacturing process, Solectria is committed to your success.



Lawrence, Massachusetts
USA

Ph: 978.683.9700 (MA)

Ph: 562.608.8913 (CA)

Fax: 978.683.9702

inverters@solren.com

www.solren.com



Background: 118kW Spire Corporation installation at North Coast Seafoods includes a PVI 95KW inverter.

Left: 1.26MW Chico Electric/DC Power Systems installation at Sierra Nevada Brewery.

Right: 1.2MW Third Energy Development installation at Hyundai Heavy Industries in Hae Nam, South Korea.