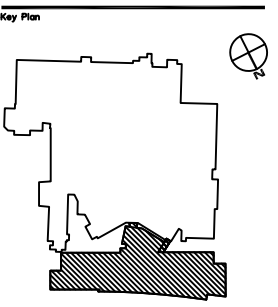


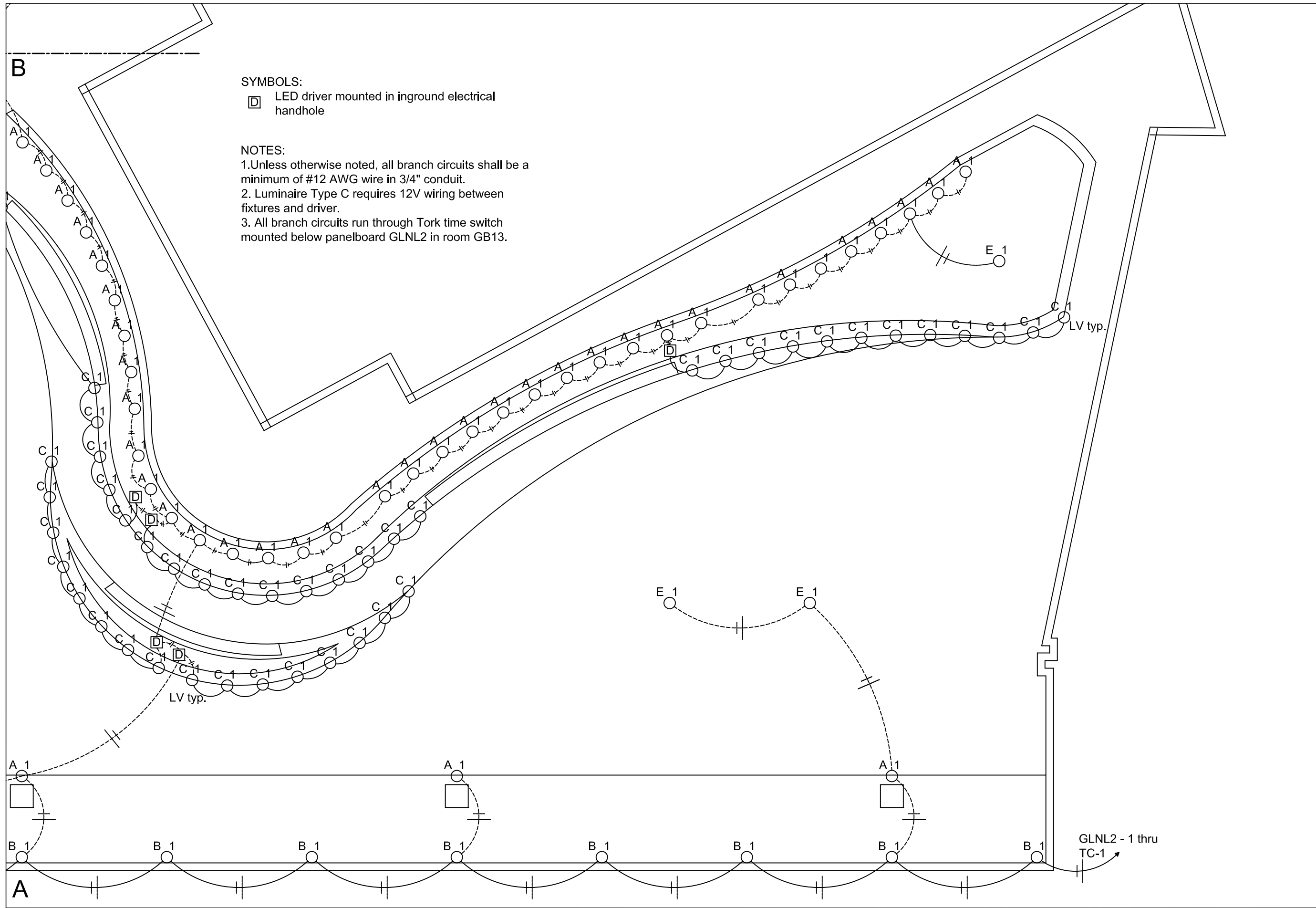
Appendix A | Lighting and Electrical Plans

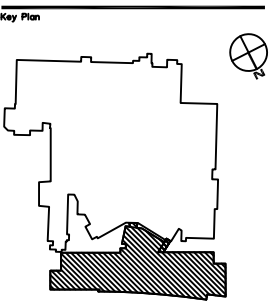


Scale:
1/8" = 1'

Courtyard
Electrical
Plan 1

E201

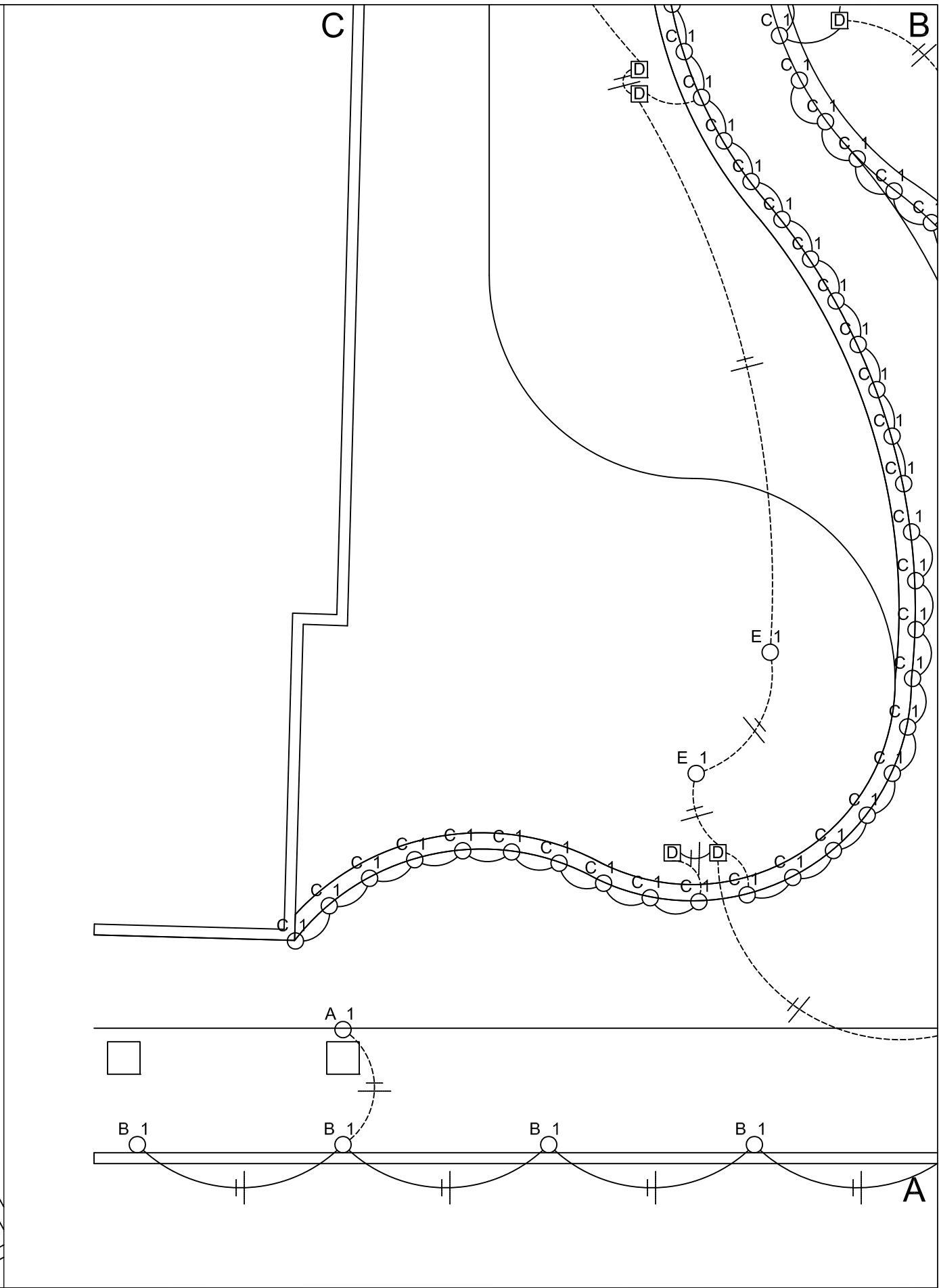
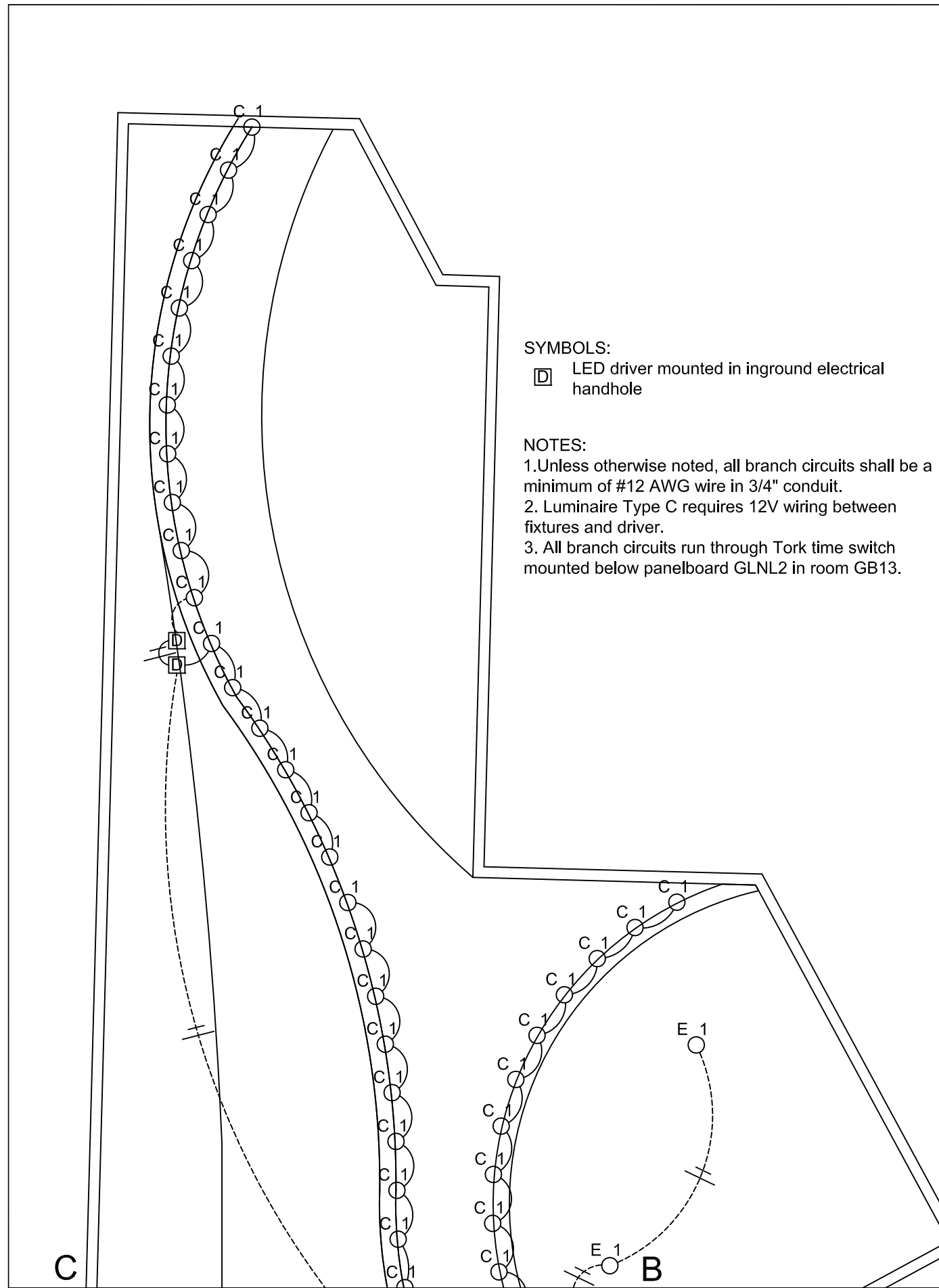


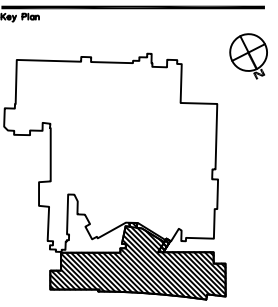


Scale:
1/8" = 1'

Courtyard
Electrical
Plan 2

E202

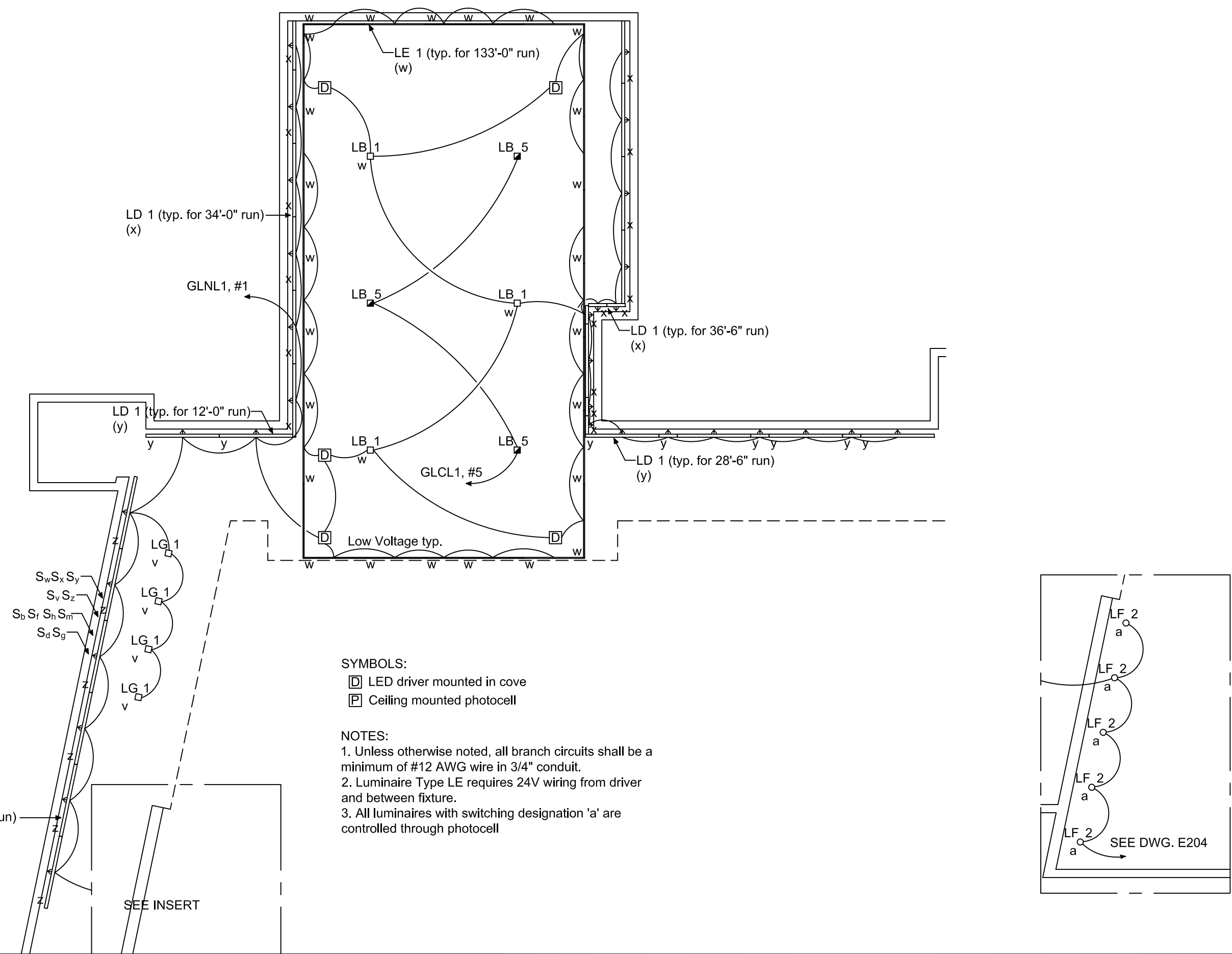


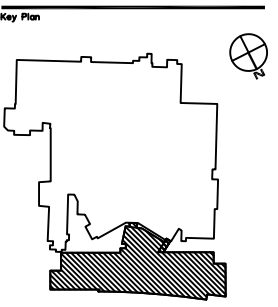


Scale:
1/8" = 1'

Lobby Ground
Electrical Plan

E203

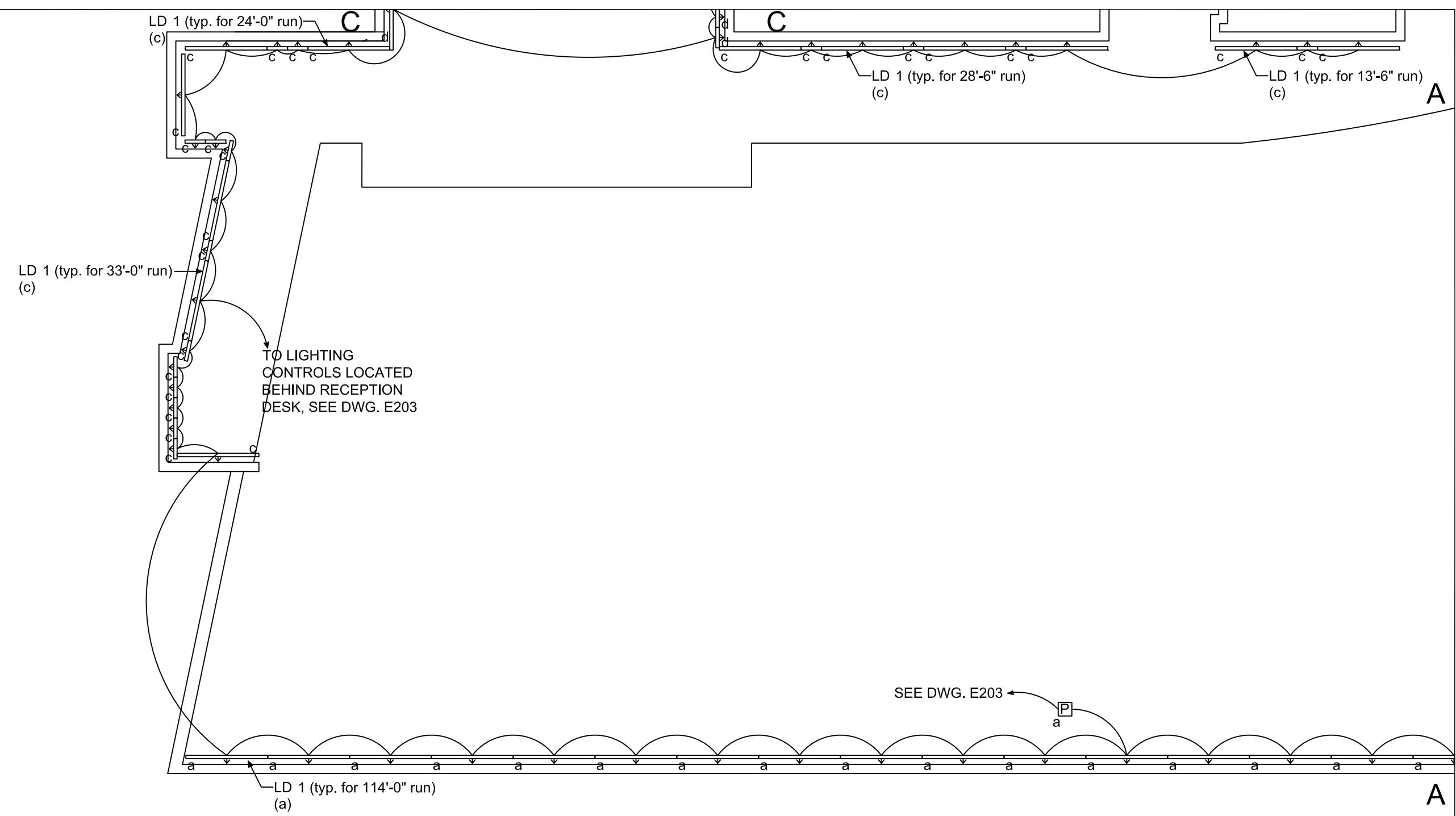






Scale:
1/8" = 1'

Lobby Electrical
Plan -
Slot Lighting 1

E204

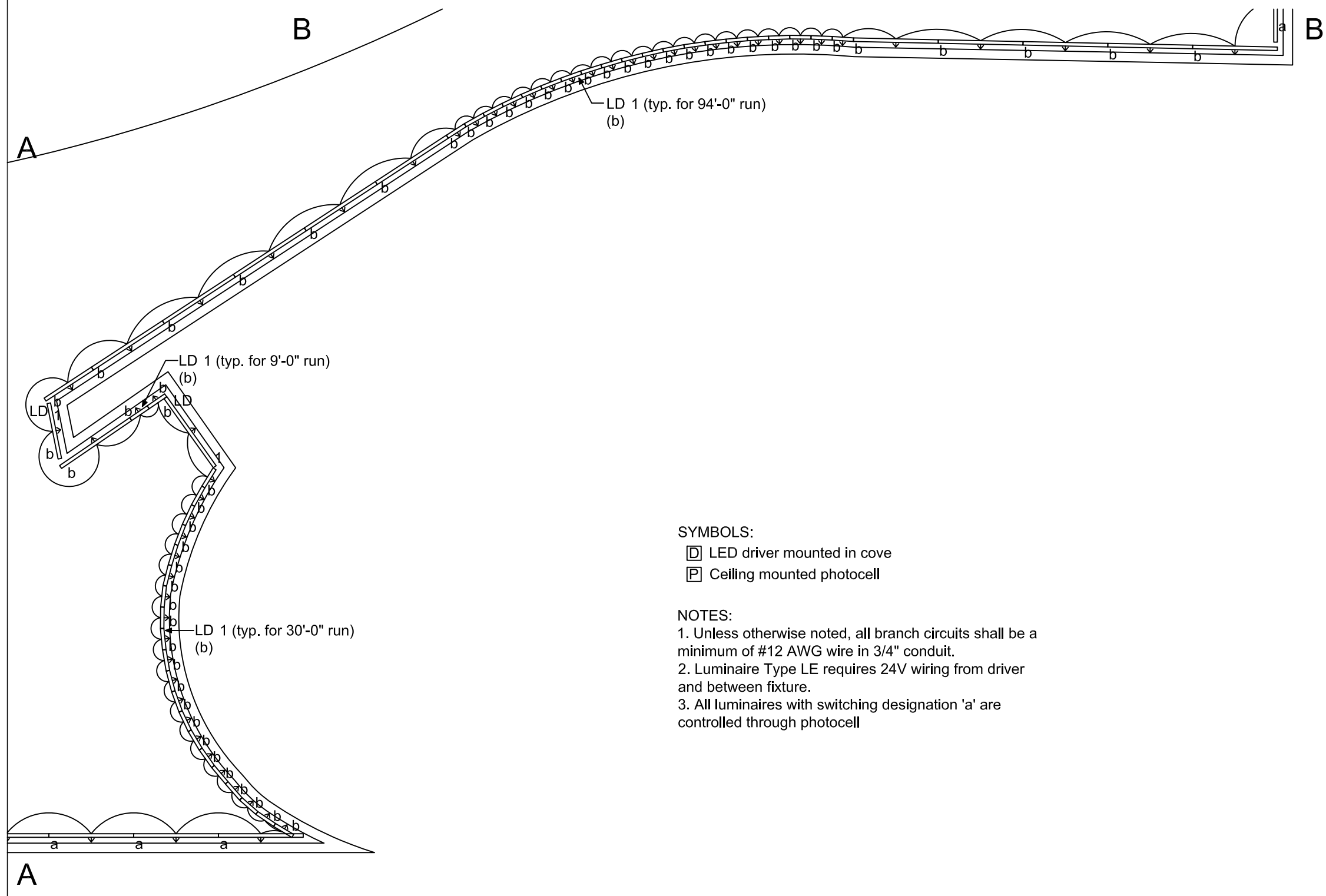




SYMBOLS:

-  LED driver mounted in cove
-  Ceiling mounted photocell

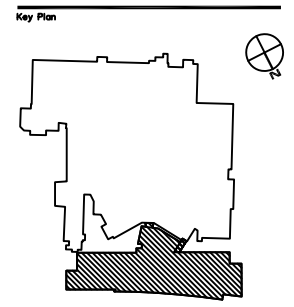
NOTES:

1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type LE requires 24V wiring from driver and between fixture.
3. All luminaires with switching designation 'a' are controlled through photocell



SYMBOLS:
 LED driver mounted in cove
 Ceiling mounted photocell

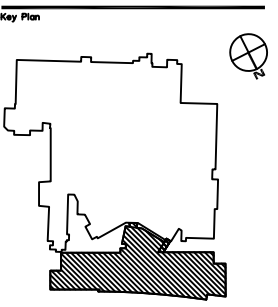
NOTES:
 1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
 2. Luminaire Type LE requires 24V wiring from driver and between fixture.
 3. All luminaires with switching designation 'a' are controlled through photocell



Scale:
 1/8" = 1'

Lobby Electrical
Plan -
Slot Lighting 2

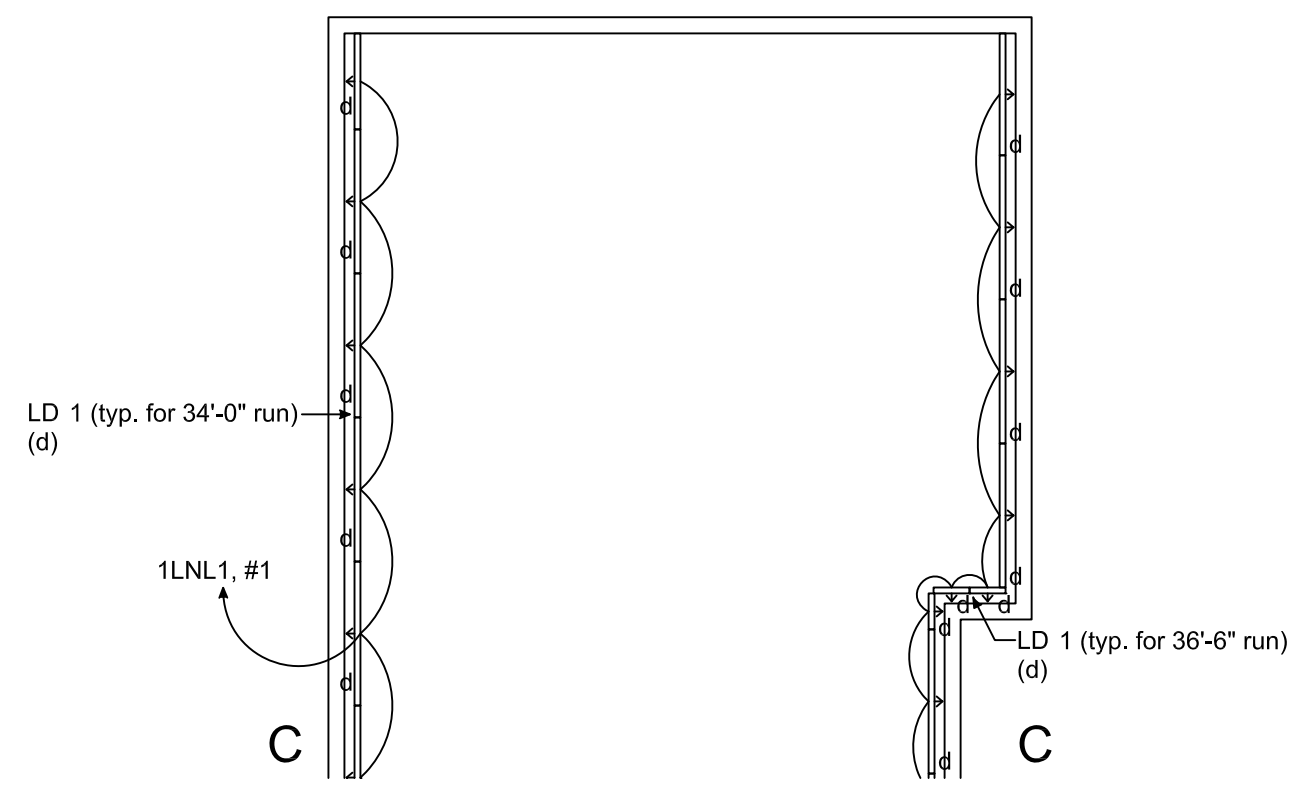
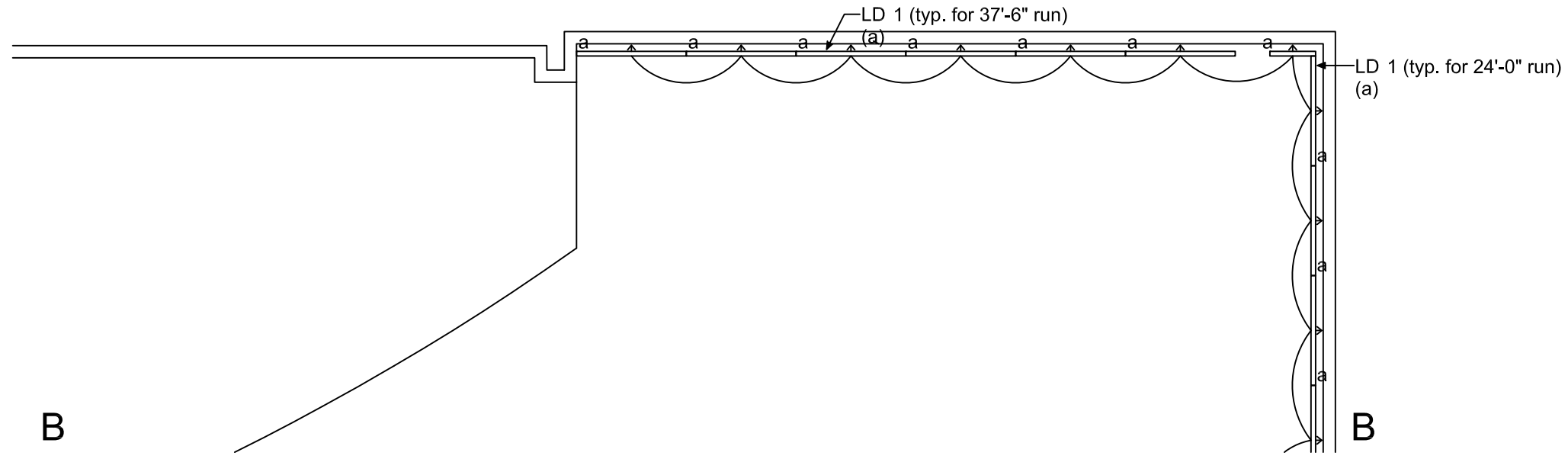
E205





Scale:
1/8" = 1'

Lobby Electrical
Plan -
Slot Lighting 3

E206

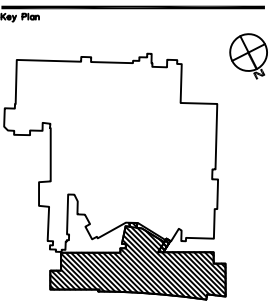


SYMBOLS:

-  LED driver mounted in cove
-  Ceiling mounted photocell

NOTES:

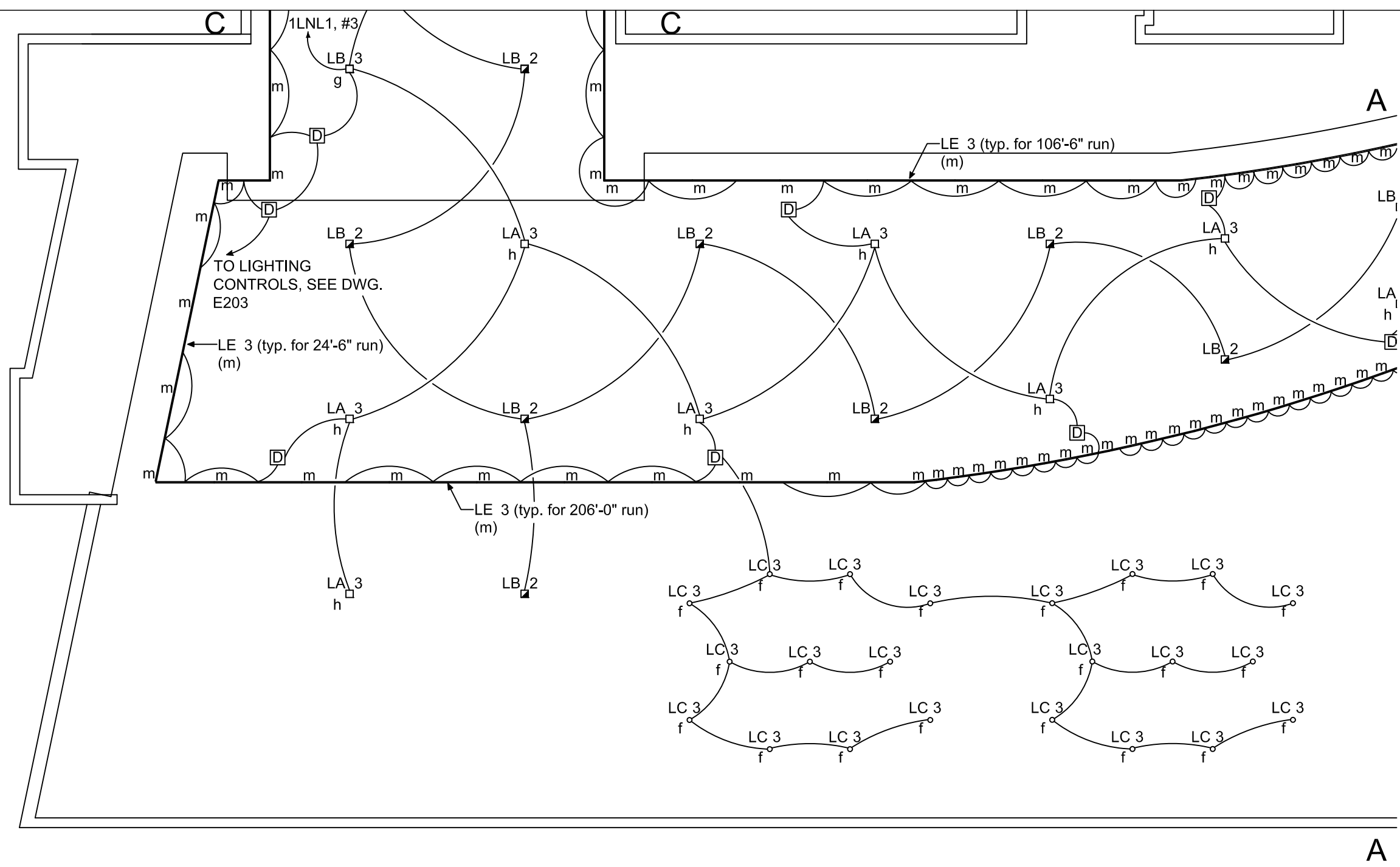
1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type LE requires 24V wiring from driver and between fixture.
3. All luminaires with switching designation 'a' are controlled through photocell



Scale:
1/8" = 1'

Lobby Electrical
Plan -
Cove Lighting 1

E207

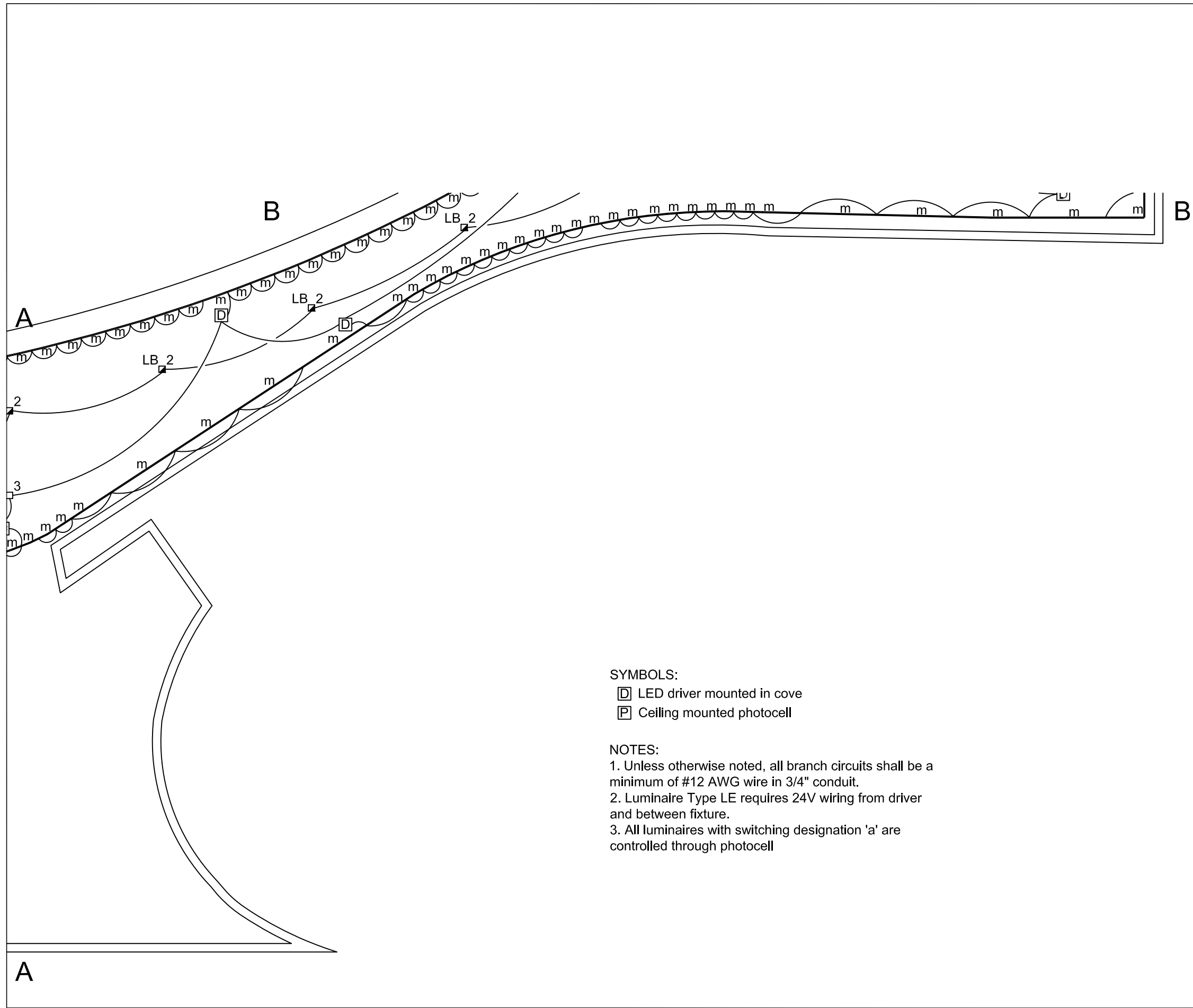




SYMBOLS:

- LED driver mounted in cove
- Ceiling mounted photocell

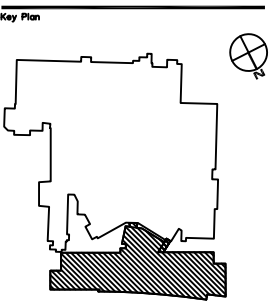
NOTES:

1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type LE requires 24V wiring from driver and between fixture.
3. All luminaires with switching designation 'a' are controlled through photocell



SYMBOLS:
 LED driver mounted in cove
 Ceiling mounted photocell

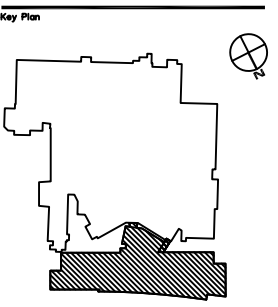
NOTES:
 1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
 2. Luminaire Type LE requires 24V wiring from driver and between fixture.
 3. All luminaires with switching designation 'a' are controlled through photocell



Scale:
 1/8" = 1'

Lobby Electrical
Plan -
Cove Lighting 2

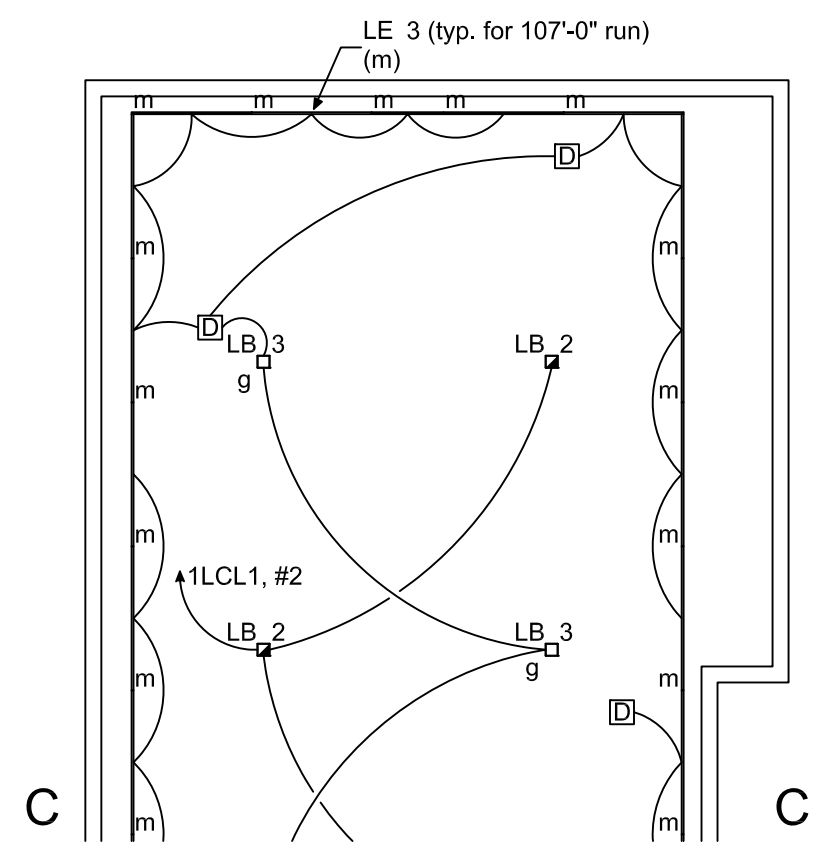
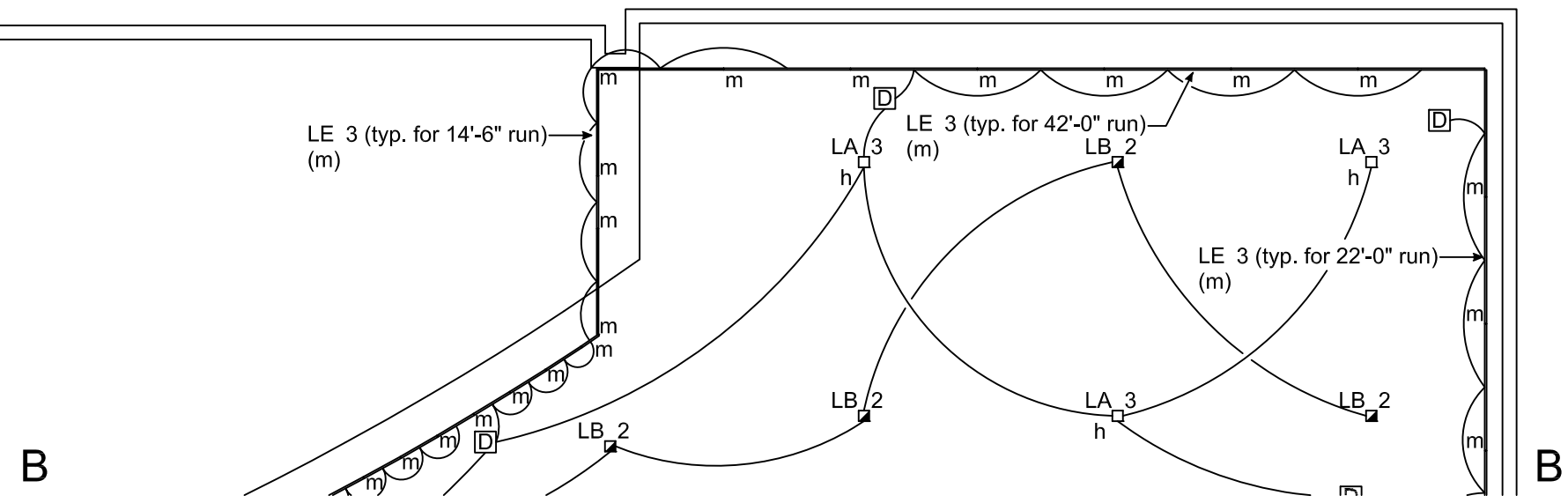
E208





Scale:
1/8" = 1'

Lobby Electrical Plan -
Cove Lighting 3

E209



SYMBOLS:

-  LED driver mounted in cove
-  Ceiling mounted photocell

NOTES:

1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type LE requires 24V wiring from driver and between fixture.
3. All luminaires with switching designation 'a' are controlled through photocell



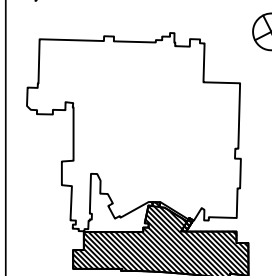
**SOUTH NASSAU
COMMUNITIES HOSPITAL**
OCEANIDE, NEW YORK

NORTH ADDITION
PROJECT

Senior Thesis
Final Report

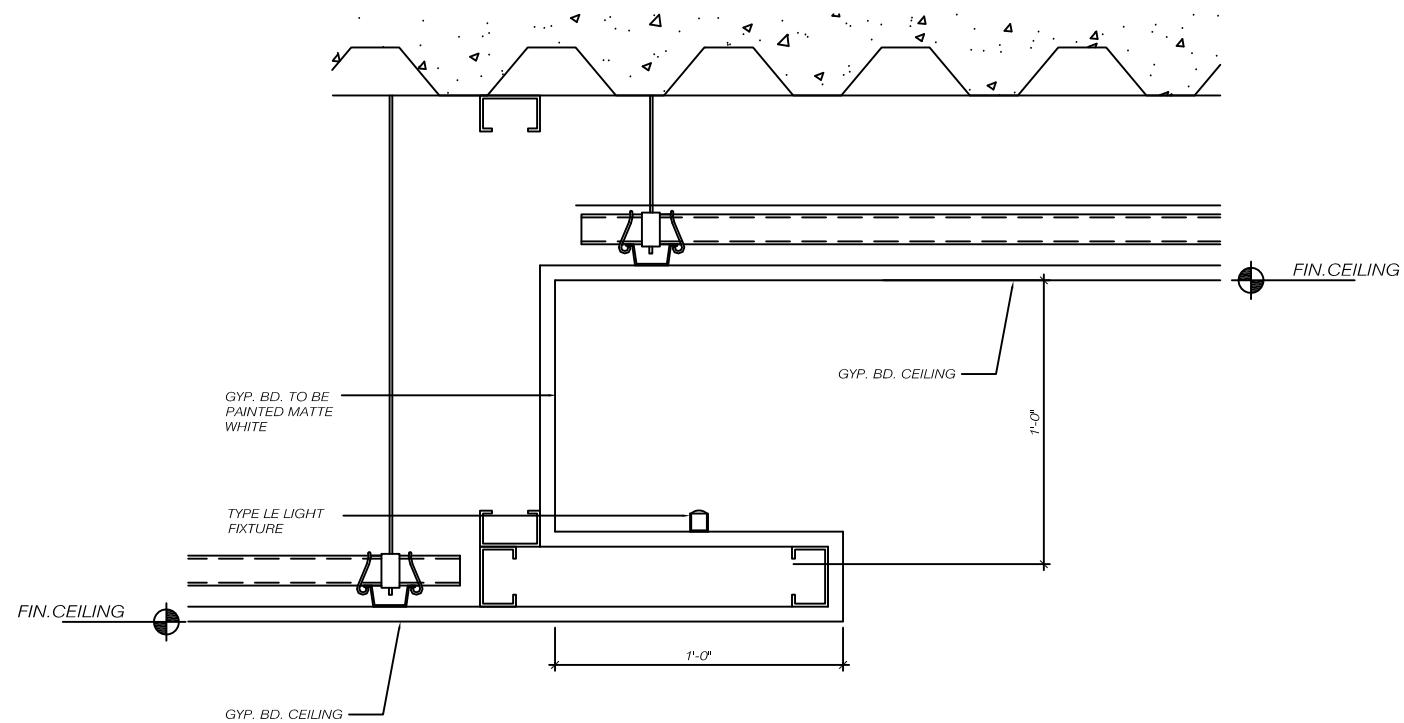
Carl Speroff

Key Plan



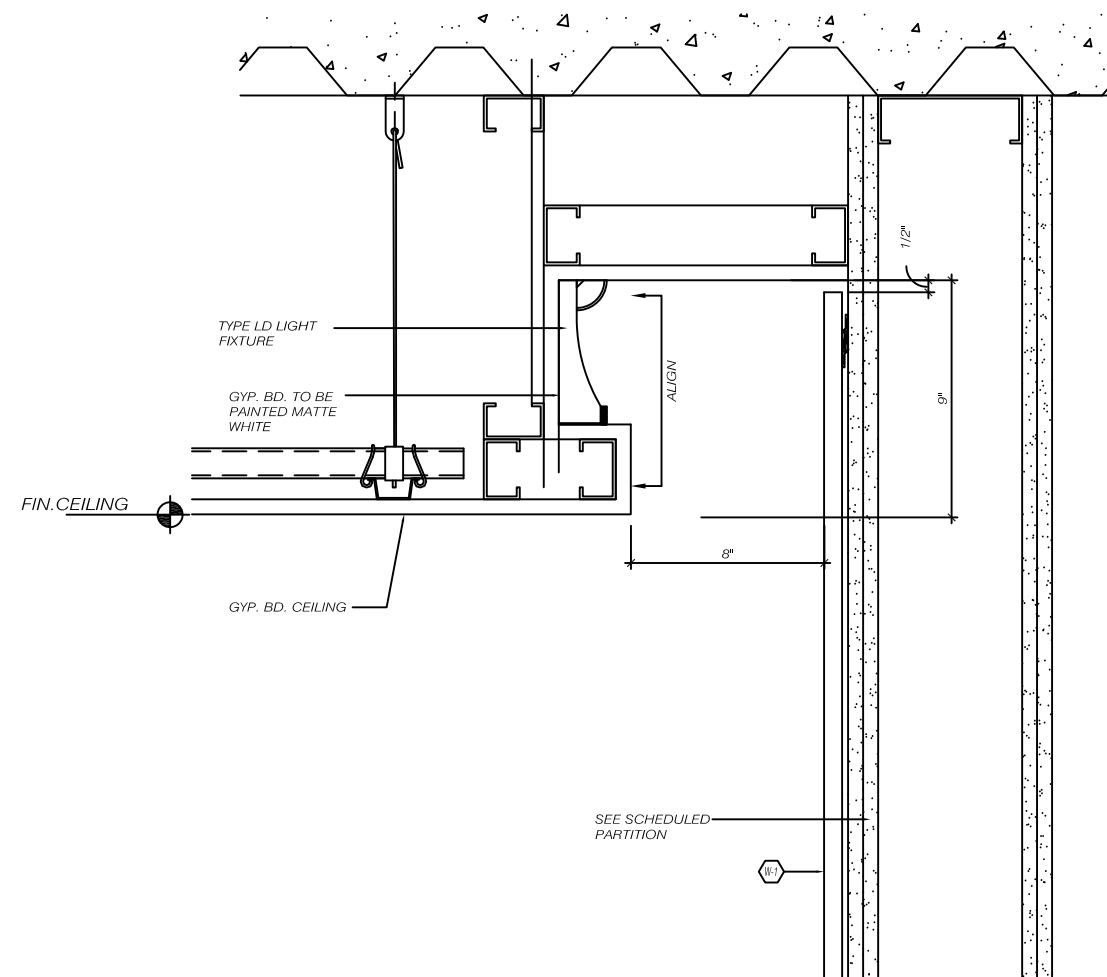
Scale: As Noted

TYPICAL LOBBY
MOUNTING
DETAILS



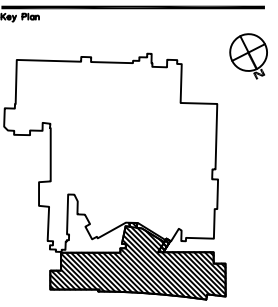
TYPICAL MOUNTING DETAIL FOR LOBBY COVE

SCALE: 1-1/2" = 1'



TYPICAL MOUNTING DETAIL FOR LOBBY SLOT

SCALE: 1-1/2" = 1'



Scale:
1/8" = 1'

**Auditorium
Electrical Plan**

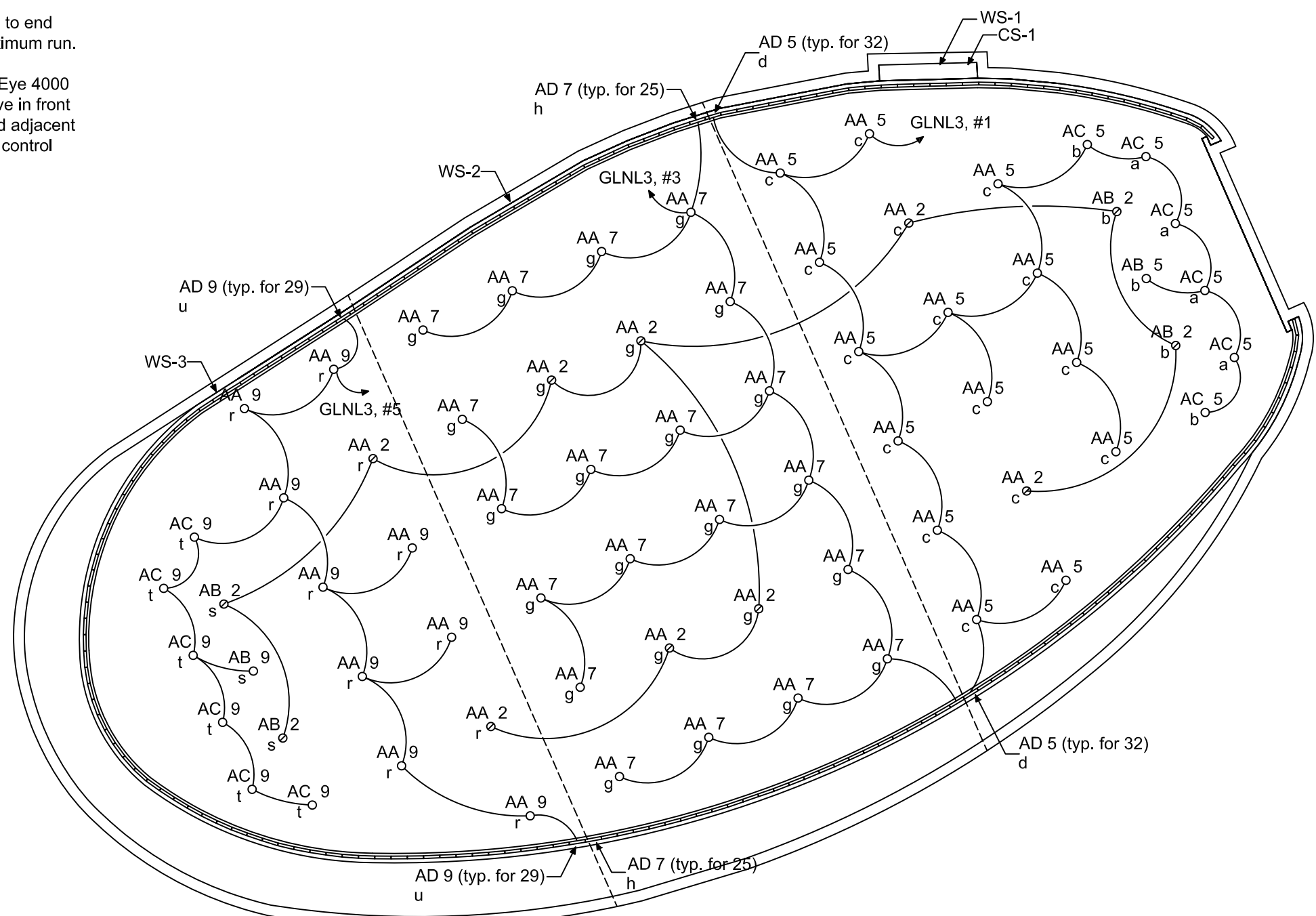
E210

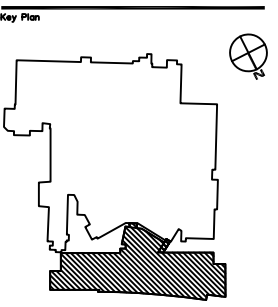
SYMBOLS:

- LED driver mounted in cove
- ▣ Ceiling mounted photocell

NOTES:

1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type AD shall be connected end to end with integral connectors. See drawing for maximum run.
3. All luminaires controlled with Lutron Grafik Eye 4000 Series. Grafik Eye panel to be located in alcove in front of auditorium. Individual keypads to be located adjacent to entrance to auditorium. See Dwg. E211 for control wiring detail.

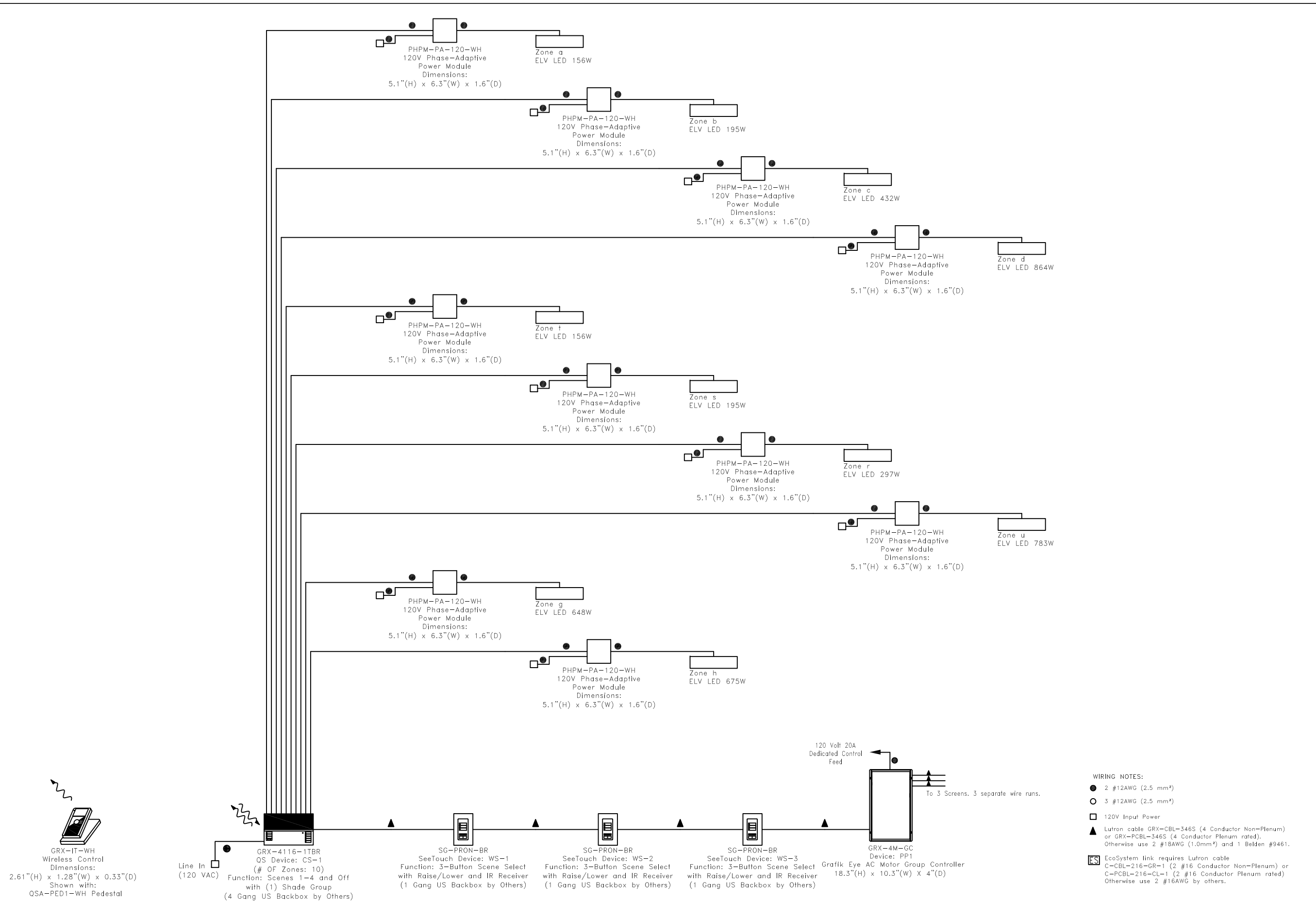




Scale: NTS

**Auditorium
Lighting Control
Wiring Diagram**

E211



- WIRING NOTES:**
- 2 #12AWG (2.5 mm²)
 - 3 #12AWG (2.5 mm²)
 - 120V Input Power
 - ▲ Lutron cable GRX-CBL-346S (4 Conductor Non-Plenum) or GRX-PCBL-346S (4 Conductor Plenum rated). Otherwise use 2 #18AWG (1.0mm²) and 1 Belden #9461.
 - ES EcoSystem link requires Lutron cable C-CBL-216-GR-1 (2 #16 Conductor Non-Plenum) or C-PCBL-216-CL-1 (2 #16 Conductor Plenum rated). Otherwise use 2 #16AWG by others.

GRX-IT-WH
Wireless Control
Dimensions:
2.61"(H) x 1.28"(W) x 0.33"(D)
Shown with:
QSA-PED1-WH Pedestal

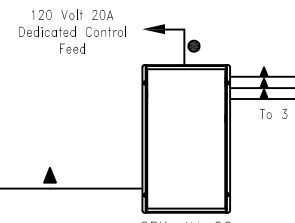
Line In
(120 VAC)
GRX-4116-1TBR
QS Device: CS-1
(# OF Zones: 10)
Function: Scenes 1-4 and Off
with (1) Shade Group
(4 Gang US Backbox by Others)

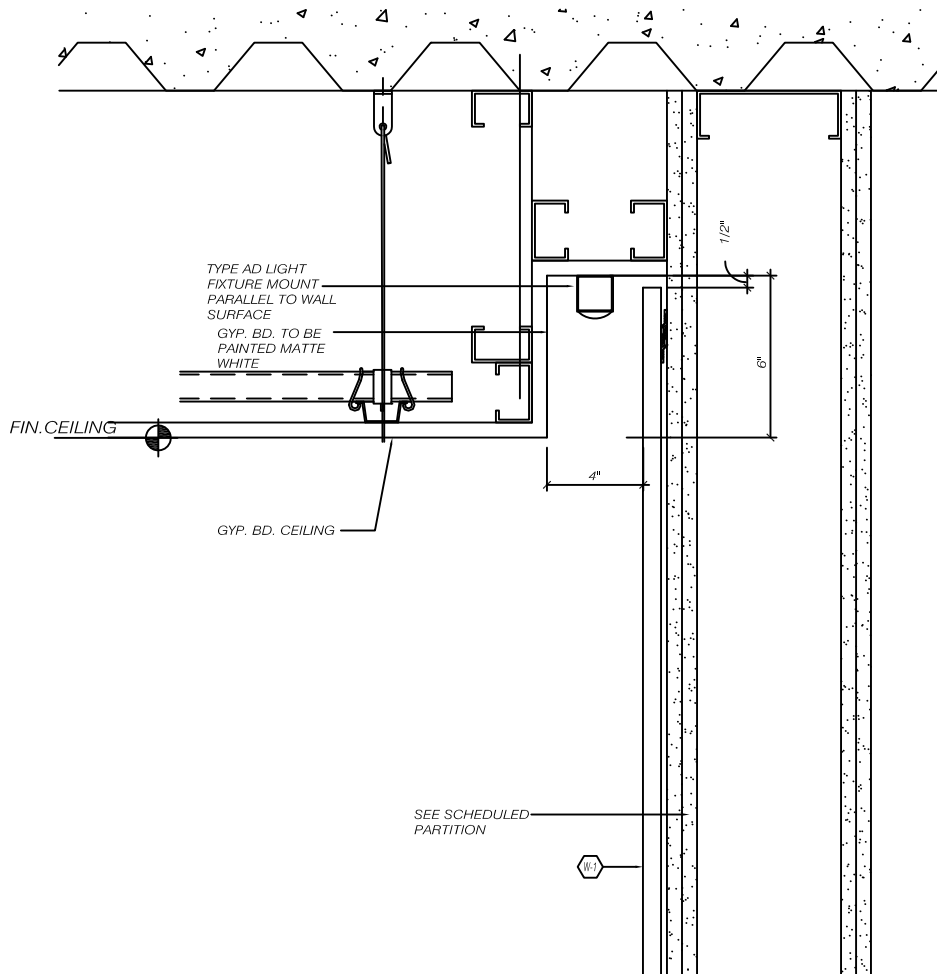
SG-PRON-BR
SeeTouch Device: WS-1
Function: 3-Button Scene Select
with Raise/Lower and IR Receiver
(1 Gang US Backbox by Others)

SG-PRON-BR
SeeTouch Device: WS-2
Function: 3-Button Scene Select
with Raise/Lower and IR Receiver
(1 Gang US Backbox by Others)

SG-PRON-BR
SeeTouch Device: WS-3
Function: 3-Button Scene Select
with Raise/Lower and IR Receiver
(1 Gang US Backbox by Others)

GRX-4M-GC
Device: PP1
Grafik Eye AC Motor Group Controller
18.3"(H) x 10.3"(W) x 4"(D)
To 3 Screens. 3 separate wire runs.

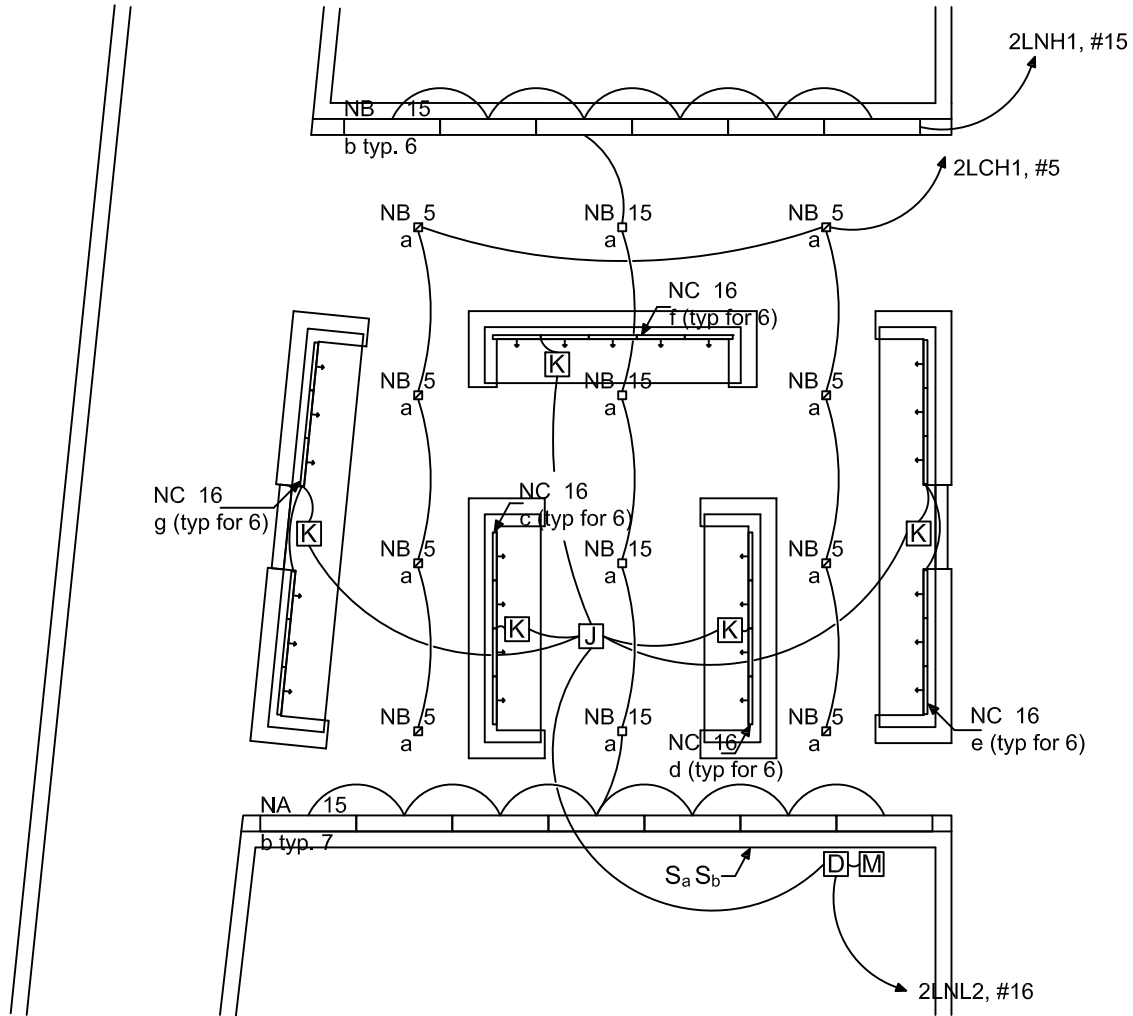




TYPICAL MOUNTING DETAIL FOR AUDITORIUM SLOT

SCALE: 1-1/2" = 1'





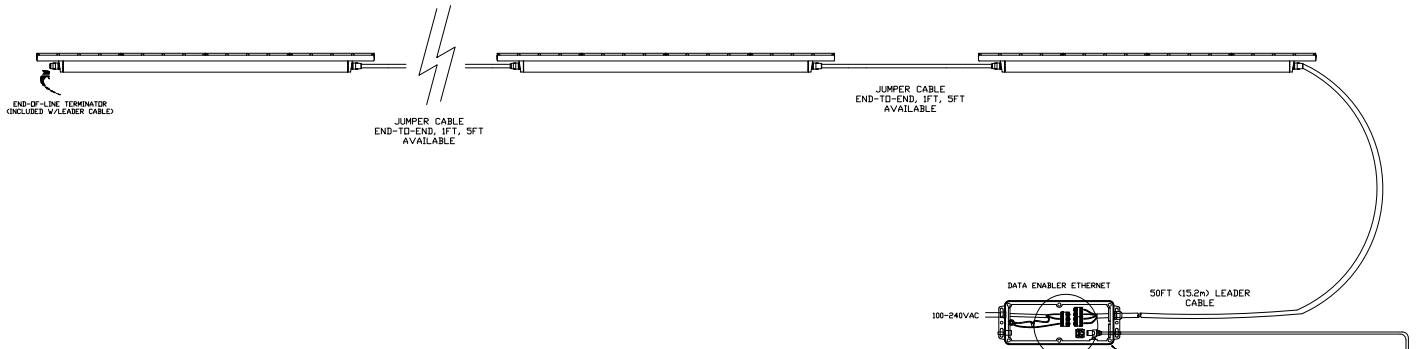
NOTES:

1. Unless otherwise noted, all branch circuits shall be a minimum of #12 AWG wire in 3/4" conduit.
2. Luminaire Type NC, Data Enabler Pro, Touch Pad, and Junction Box shall be connected via CAT 5e Cable. Line voltage connects directly to Data Enabler Pro. See Note 4.
3. Controls for luminaire Type NA and NB located in adjacent break room.
4. Luminaire type NC controlled with Color Kinetic Lighting System Manager. Individual touchpads located at workstations control task lighting. Lighting System Manager located in adjacent break room controls circadian lighting. See Dwg. E213 for control wiring detail.

SYMBOLS:

- M Light System Manager
- J Junction Box
- D Data Enabler Pro
- K Touch Pad for Task Lighting

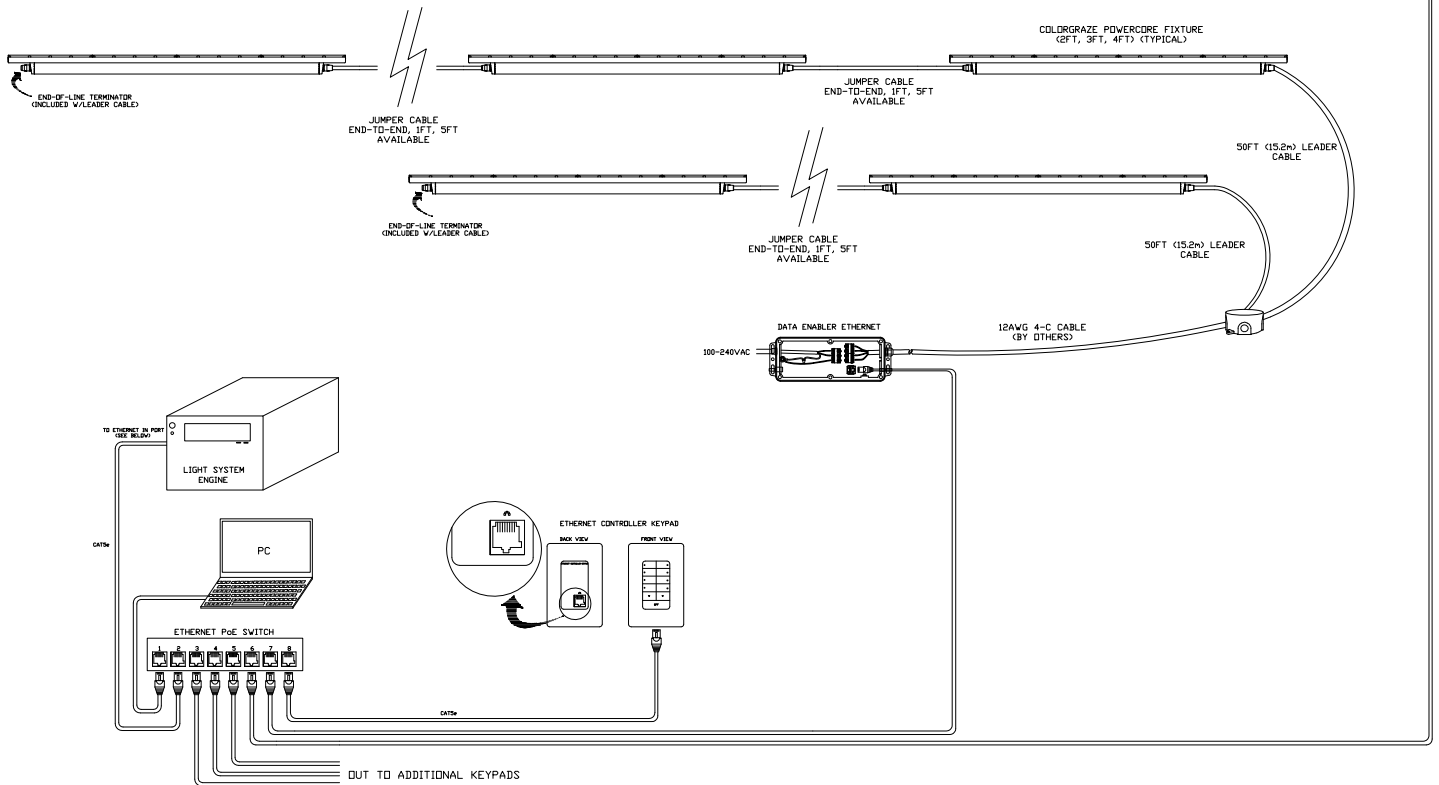
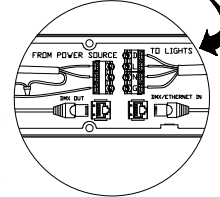
MAXIMUM TOTAL FIXTURE LENGTH: 65FT (19.8m) @ 100VAC, 90FT (27.4m) @ 120VAC, 160FT (48.7m) @ 240VAC .
 175FT(53.3m) MAXIMUM SINGLE RUN - 400FT (122m) MAXIMUM TOTAL CABLE RUN PER DATA ENabler



- NOTE:**
- MAXIMUM CAT5 RUN BETWEEN DEVICES IS 330 FEET (100m). CONTACT COLOR KINETICS TECHNICAL SUPPORT FOR INSTALLATIONS REQUIRING CUSTOM NETWORK CONFIGURATIONS.
 - COLORGRAZE POWERCORE IS ADDRESSABLE IN 1FT INCREMENTS. USE LIGHT SYSTEM COMPOSER SOFTWARE TO ADDRESS FIXTURES.
 - CONTACT TECHNICAL SUPPORT FOR RECOMMENDED NETWORK SWITCHES.
 - LIGHT SYSTEM ENGINE SUPPORTS UP TO 16 INDIVIDUAL KEYPADS CONNECTED TO THE LIGHTING NETWORK.
 - ETHERNET CONTROLLER KEYPAD REQUIRES COMPLIANT PoE SWITCH PORT OR COMPLIANT PoE INJECTOR (ITEM# 109-000029-00/01).

US:
 DATA - RED
 LINE - BLACK
 NEUTRAL - WHITE
 GROUND - GREEN/YELLOW

EUROPE:
 DATA - RED
 LINE - BROWN
 NEUTRAL - BLUE
 GROUND - GREEN/YELLOW



PHILIPS

COPYRIGHT © 2008 PHILIPS SOLID-STATE LIGHTING SOLUTIONS. ALL RIGHTS RESERVED. SPECIAL THANKS TO THE COLOR KINETICS TEAM FOR THEIR SUPPORT AND CONTRIBUTION TO THE SUCCESS OF THIS PROJECT. PHILIPS SOLID-STATE LIGHTING SOLUTIONS IS A REGISTERED TRADEMARK OF PHILIPS SOLID-STATE LIGHTING SOLUTIONS. ALL OTHER TRADEMARKS AND SERVICE MARKS ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS. PHILIPS SOLID-STATE LIGHTING SOLUTIONS IS NOT RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY CAUSED BY THE USE OF THIS PRODUCT. PHILIPS SOLID-STATE LIGHTING SOLUTIONS IS NOT RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY CAUSED BY THE USE OF THIS PRODUCT.

DATA TERMINATOR NOT REQUIRED WITH ETHERNET SYSTEMS

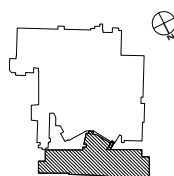
DATA CABLES (UTP)
 ACCEPTABLE CABLE TYPES:
 CAT-5/CAT-5e/CAT-6 STRAIGHT-THROUGH (T568B)

TITLE:
 SYSTEM WIRING DIAGRAM - TYPICAL

PRODUCTS:
 COLORGRAZE POWERCORE/DATA ENabler/ LIGHT SYSTEM MANAGER/ETHERNET CONTROLLER KEYPAD

DATE: 12-1-2008
 DWG. BY: BHG
 SCALE: NTS
 REV: _____
 PAGE: 1 OF 1

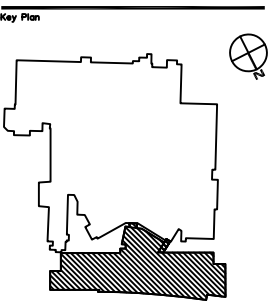
PHILIPS COLOR KINETICS 3 BURLINGTON WOODS DRIVE BURLINGTON, MA 01803 TEL 1.888.FULL.RGB (1.888.385.5742) FAX 1.617.482.8610 WWW.COLORKINETICS.COM



E213 NURSES STATION CONTROL DIAGRAM

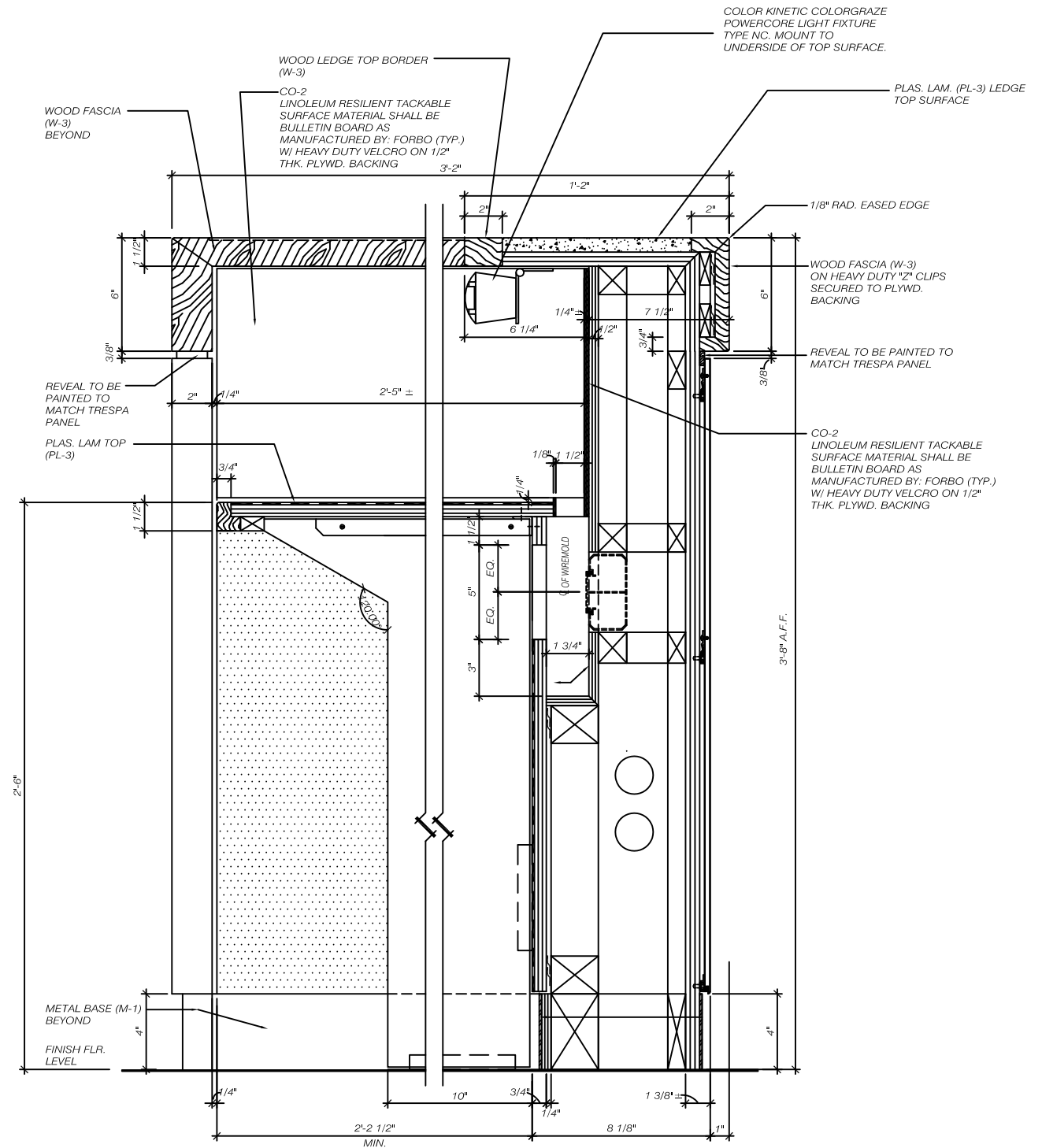
Scale: NTS

AE Senior Thesis Final Report
 Carl Speroff

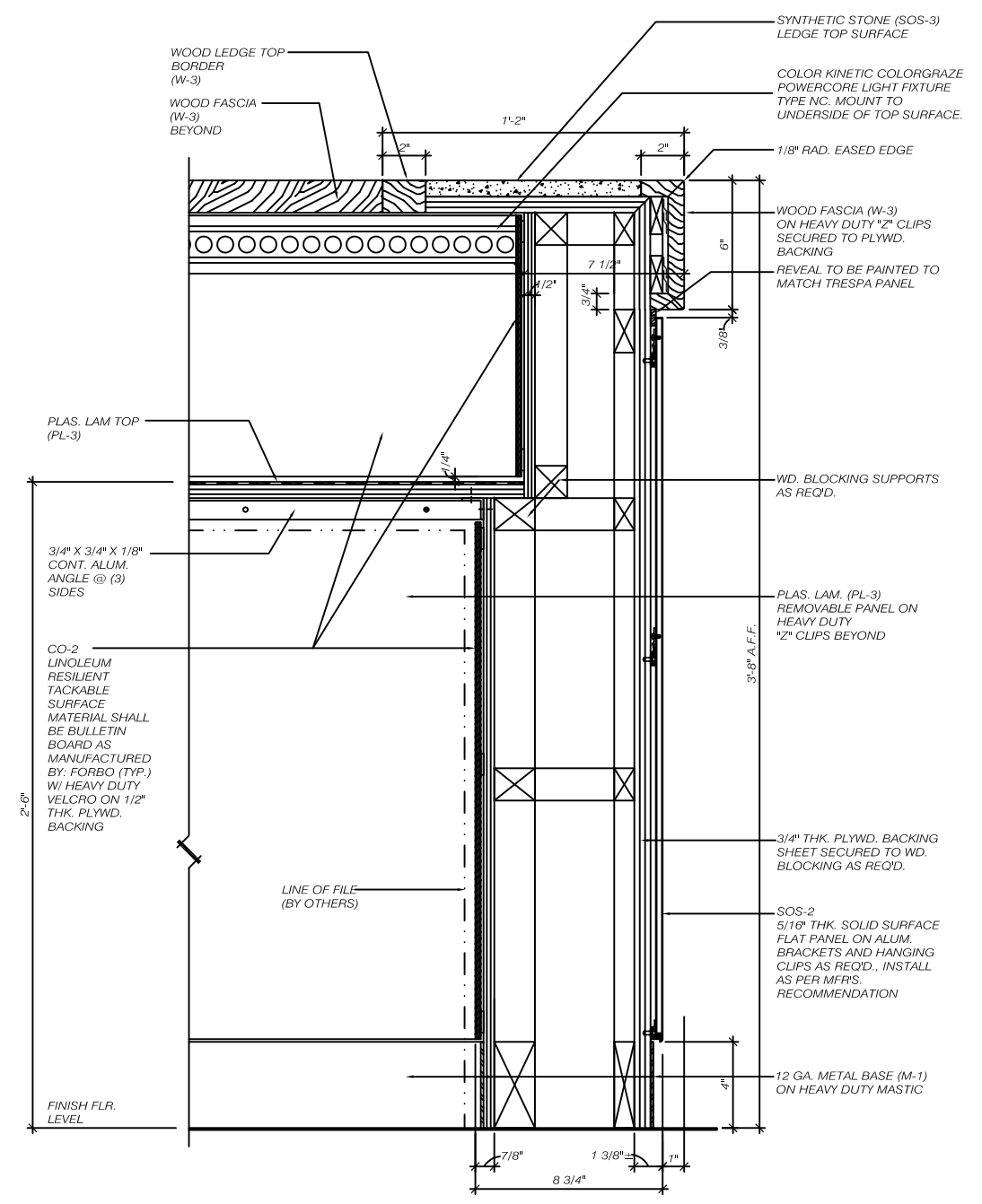


Scale: As Noted

TYPICAL
NURSES
STATION
MOUNTING
DETAIL









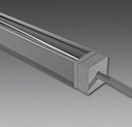






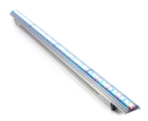




TYPICAL MOUNTING DETAIL FOR LUMINAIRE NC
SCALE: 1-1/2" = 1'



TYPICAL MOUNTING DETAIL FOR LUMINAIRE NC
SCALE: 1-1/2" = 1'

Appendix B | Luminaire Schedule and Luminaire Specifications

LUMINAIRE SCHEDULE								
TAG	IMAGE	MANUFACTURE R/CATALOG #	DECRPTION	LAMP	VOLT	BALLAST / POWER SUPPLY	WATT	LOCATION
A		Lumiere / Boca 696-12WLEDN-120/12-BK	6-1/4" diameter adjustable inground LED fixture. LED module with 17° beam spread.	LED Module 3000K	12	Integral 12V transformer for connection to line voltage. Integral driver	12	Exterior, 9" offset from stone landscaping wall, column base
B		MP Lighting / L17-1W-W30S-12-1-W30S-1-S	Wallmount direct indirect LED fixture. LED module with standard CRI. 120° beam spread uplight, 12° beam spread downlight.	(2) 1 W LED 3000K	16	350mA integral driver for connection to 120V	2	Exterior between office windows on new addition. Mounted 5-1/2' A.F.F.
C		MP Lighting / L151-3-W30S-60-MA	Surface mount LED fixture. LED module with 60° beam spread with (3) LEDs with standard CRI. Remote 120V driver for connection to line voltage.	(3) 1 W LED 3000K	12	Advance 120V LED Driver LED-120A-0012V-50-F. Input 75W.	3	Exterior surface mount under landscaping wall lip Mounted 2'-4" A.F.F.
D		Allscape / SL33-20MH-T4-120-MFLD-F-GS	8.75" diameter inground metal halide. 20W warm white (3000K) T4 ceramic metal halide lamp.	(1) CDM-TC-20W/830-T4	120	Advance electronic ballast. RMH-G20-K. Input 24W, BF 0.9	24	Exterior, ingrade under trees
LA		Kurt Versen / H8642-FM06-LL-UV-WT	6" square flush mount downlight. 42W CFL.	(1) Philips CDM 39W T-6 Elite. 3000K, 90 CRI	277	GE electronic ballast. GEC242-MVPS-3W. Input 47W, BF 1.0	47	21'-4" A.F.F. Located in cove above main lobby.
LB		Kurt Versen / H8632-FM06-LL-UV-WT	6" square flush mount downlight. 26W CFL.	(1) GE F26TBX. 3000K, 82 CRI	277	GE electronic ballast. GEC242-MVPS-3W. Input 32W, BF 1.0	32	9'-6" A.F.F. Located in cove above elevator lobby on ground and first floor.
LC		Visa / Sequence CP5201-Custom	4" diameter, 4' hieght stem mounted pendant. (1) 25W dimming T8 with 20W CMH MR16 downlight. Ballasts mounted in canopy.	(1) 25W F32T8 3000K, 85 CRI; (1) CMH20MR16 3000K, 85 CRI, 40D	277	Advance 277V IDA-132-SC, Input 27W, 0.99 BF; GEMH20-MC-120, Input 23W, BF 0.9	50	Mounted above seating area in main lobby, bottom luminaire 8' - 10' A.F.F.
LD		io / raye 0-08-3K-C33-1-18/72-277	Linear LED wall washer. High output (372 lms/ft), continous row mounting. 18" & 72" length as needed.	(1) LED Array 3000K, 86 CRI	277	Intergral LED driver. Input 7.4W per linear ft, BF 1.0	11.84/44.44	8" wall slot 1' from wall.
LE		io / line 0-03-l-3K-65-1-12/96-277	Linear LED wall washer. High output (68 lms/ft), continous row mounting. 18" & 72" length as needed.	(1) LED Array 3000K, 86 CRI	277	Remote io DR96MGD LED driver. Input 2.9W per linear ft, BF 1.0	4.35/17.4	Cove mounted above main lobby

LUMINAIRE SCHEDULE								
TAG	IMAGE	MANUFACTURE R/CATALOG #	DECIPTION	LAMP	VOLT	BALLAST / POWER SUPPLY	WATT	LOCATION
LF		Allscape / SL-23-20MH-T4-MFLD-F-NA-DS	Recessed 7" diameter wall washer mounted flush with lobby floor. Medium flood optics, clear lens, directional shield.	(1) Philips CDM 20W T-6 Elite. 3000K, 84 CRI	277	Advance electronic ballast. IMH-G20-G. Input 35W, BF 1.0	24	Recessed in lobby floor, near stone wall at entrance
LG		Kurt Versen / H8606-FM06-LL-UV-WT	6" square flush mount downlight. LED module. 35W ceramic metal halide lamping.	(1) Philips CDM 39W T-6 Elite. 3000K, 90 CRI	277	Advance electronic ballast. IMH-P39-G. Input 35W, BF 1.0	45	8'-6" A.F.F. Located above reception desk.
NA		Focal Point / focus3-1T8-1C-277-S-RC	High performance slot mounted open wall washing luminaire. 81% luminaire efficiency. Aluminum reflector with steel housing.	(1) 25W F32T8 4100K, 85 CRI; (1)	277	GE132-MVPS-N electronic program/rapid start ballast.	24	Recessed mounting in slot 8'-0" A.F.F.
NB		Lightolier / Calculite-C4X4L05-40K-W-CCL-FT	4.5" square recessed LED fixture. LED module with royal blue LEDs with remote phosphor. Wide beam. Dimmable. Tested in accordance with LM79	LED Module 4000K, CRI 78	277	Integral driver	10	Recessed mounting in ceiling 9'-6" A.F.F. See dwgs for additional details.
NC		Color Kinetics/ ColorGraze Powercore - Custom	Surface mount LED fixture. Channel 1 & 3 4000K White LEDs w/ 90° x 60° assymetric lens. Channel 2 royal blue LEDs w/ 30° x 60° lens.	(8) 4000K LEDs, (4) Royal Blue LEDs per 1' length	120	Advance 120V LED Driver LED-120A-0012V-50-F. Input 75W.	35	Mounted under desk in nurses station, 3'-6" A.F.F. See dwgs for additional details.
AA		Lightolier / Calculite-C6L15DL-30K-W-CCL-FT	6" diameter recessed LED fixture. LED module with royal blue LEDs with remote phosphor. Wide beam. Dimmable. Tested in accordance with LM79	LED Module 3000K, CRI 78	120	Integral driver	27	Recessed mounting in ceiling 15'-6" A.F.F. See dwgs for additional details.
AB		Lightolier / Calculite-C6L20DL-30K-W-CCL-FT	6" diameter recessed LED fixture. LED module with royal blue LEDs with remote phosphor. Wide beam. Dimmable. Tested in accordance with LM79	LED Module 3000K, CRI 78	120	Integral driver	39	Recessed mounting in ceiling 15'-6" A.F.F. See dwgs for additional details.
AC		Lightolier / Calculite-C6L20DL-30K-M-CCL-FT	6" diameter recessed LED fixture. LED module with royal blue LEDs with remote phosphor. Medium beam. Dimmable. Tested in accordance with LM79	LED Module 3000K, CRI 78	120	Integral driver	39	Recessed mounting in ceiling 15'-6" A.F.F. See dwgs for additional details.
AD		Color Kinetics/ eWFuse Powercore - 523-000065-05	1' length linear LED grazing fixture. LED module with warm white LEDs. 10° x 30° beam angle. Tested in accordance with LM79	LED Module 3000K, CRI 83	120	Integral driver	13.5	Recessed mounting in slot 16'-0" A.F.F. Mount parallel to wall surface.

LUMIÈRE®

DESCRIPTION

The Boca 696 is a compact 6-1/4" diameter inground LED fixture. It comes standard with either an integral 12V step down transformer or as a low voltage fixture, in which case a remote low voltage transformer is required. The integral transformer allows the fixture to be connected directly to 120V, 208V, 230V, 240V, 277V or 347V line voltage (specify). The adjustable lamp assembly provides +/- 22.5° vertical tilt and 360° horizontal rotation for precision uplighting, wall washing or general illumination in constricted areas. Designed for recessed mounting in concrete, brick, stone or dirt, it is suitable for drive-over applications. Fixture is also suitable for recessed mounting in indoor or outdoor wood flooring.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

A ... Material

Recessed housing is constructed from corrosion-resistant stainless steel. Trim ring and trim collar are die cast from corrosion resistant solid brass. The trim ring and trim collar are also available in machined stainless steel, machined bronze or machined copper.

B ... Finish

Solid brass, bronze, copper or stainless steel trim ring and trim collar are unpainted to reveal the natural beauty of the material. Brass, bronze and copper will patina naturally over time. The brass trim ring and trim collar can also be painted a variety of standard colors or custom colors as requested.

C ... Gasket

Recessed housing and trim ring are sealed with a high temperature silicone o-ring gasket to prevent water intrusion.

D ... Lens

Minimum 1/4" thick tempered glass lens, factory sealed with high temperature adhesive to prevent water intrusion and breakage due to thermal shock. Suitable for drive-over applications.

E ... Hardware

Stainless steel hardware is standard to provide maximum corrosion-resistance.

F ... Socket

Ceramic socket with 250° C Teflon® coated lead wires and GU5.3 bi-pin base.

G ... Electrical

When ordered as a line voltage fixture, an integral 12V transformer is included for connection to 120V, 208V, 230V, 240V, 277V, or 347V line voltage (specify). Bottom of line voltage fixtures include two 1/2-14 NPSM brass female conduit fittings for through wiring. When ordered as a low voltage fixture, a remote 12V transformer is required (not included). Sides of the low voltage fixture include two 1/2-14 NPSM brass female conduit fittings 180° apart for through wiring. Transformers used in conjunction with LED's must be magnetic only, not electronic. Available from Lumière as an accessory - see the Accessories & Technical Data section of the catalog for details. NOTE: initial power draw on LED equipped fixtures is 20 watts. When sizing remote transformers use 20 watts per LED fixture. Nominal power draw after start up is 12 watts.

H ... LED

LED modules are included and are available in three color temperatures (warm, neutral and cool) and three distributions (spot, narrow and flood). Both color temperature and distribution must be specified when ordering - see reverse side for details and catalog logic. Due to the onboard thermal feedback control circuitry, LED modules are non-dimmable.

I ... Labels & Approvals

UL and cUL listed, standard wet label. Fixtures equipped with option T (thermal cutoff protection) are UL/cUL listed, damp label. Manufactured to ISO 9001-2000 Quality Systems Standard. IBEW union made.

J ... Warranty

Lumière warrants its fixtures against defects in materials & workmanship for three (3) years. Auxiliary equipment such as transformers, ballasts and lamps carry the original manufacturer's warranty.

K ... Recessed Housing

Recessed housing is available to ship in advance of complete fixture for rough-in purposes. Specify option -LBB and order separately the accompanying recessed housing from below. Finish must be specified on recessed housing as trim collar is permanently attached and sealed to the housing at the factory.

Line Voltage
696-NBR-xxx/12-BB
Brass line voltage recessed housing
xxx specifies voltage:
120,208,230,240, 277 or 347

696-NBZ-xxx/12-BB
Bronze line voltage recessed housing
xxx specifies voltage:
120,208,230,240, 277 or 347

696-NCP-xxx/12-BB
Copper line voltage recessed housing
xxx specifies voltage:
120,208,230,240, 277 or 347

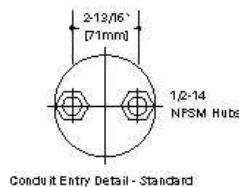
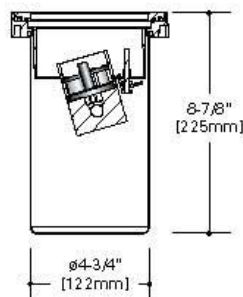
696-NSS-xxx/12-BB
Stainless steel line voltage recessed housing
xxx specifies voltage:
120,208,230,240, 277 or 347

696-yy-xxx/12-BB
Painted brass line voltage recessed housing
yy specifies painted finish: BK, BZ, CS, VE, WT
xxx specifies voltage:
120,208,230,240, 277 or 347



**BOCA
696**

12W LED
Line Voltage
w/ Integral 12V transformer
Low Voltage
Inground



Specifications and Dimensions subject to change without notice.
Consult your representative for additional options and finishes.



09.02.2010

LAMP INFORMATION

Lamp	ANSI Code	Watts	Beam Spread	CBCP	°K	Life (hrs.)	Base	Volts
12WLEDS		12	7°	11399	3000	50000	GU5.3 bi-pin	12
12NLEDS		12	7°	13725	4300	50000	GU5.3 bi-pin	12
12CLEDS		12	7°	14657	6300	50000	GU5.3 bi-pin	12
12WLEDN		12	19°	1160	3000	50000	GU5.3 bi-pin	12
12NLEDN		12	19°	1495	4300	50000	GU5.3 bi-pin	12
12CLEDN		12	19°	1794	6300	50000	GU5.3 bi-pin	12
12WLEDW		12	25°	1066	3000	50000	GU5.3 bi-pin	12
12NLEDW		12	25°	1414	4300	50000	GU5.3 bi-pin	12
12CLEDW		12	25°	1461	6300	50000	GU5.3 bi-pin	12

ORDERING INFORMATION

<p>Series 696 = 6-1/4" Dia, Adjustable 22° Vertical Tilt 360° Horizontal Rotation Boca Inground LED</p> <p>Source LED 12WLEDS = 12W Warm LED Spot Optic, GU5.3 Base 12NLEDS = 12W Neutral LED Spot Optic, GU5.3 Base 12CLEDS = 12W Cool LED Spot Optic, GU5.3 Base 12WLEDN = 12W Warm LED Narrow Optic, GU5.3 Base 12CLEDN = 12W Cool LED Narrow Optic, GU5.3 Base 12WLEDW = 12W Warm LED Wide Optic, GU5.3 Base 12NLEDW = 12W Neutral LED Wide Optic, GU5.3 Base 12CLEDSW = 12W Cool LED Wide Optic, GU5.3 Base 12NLEDN = 12W Neutral LED Narrow Optic, GU5.3 Base</p>	<p>Voltage 12 = 12 Volts 120/12 = 120V to 12V Integral Transformer 208/12 = 208V to 12V Integral Transformer 230/12 = 230V to 12V Integral Transformer 240/12 = 240V to 12V Integral Transformer 277/12 = 277V to 12V Integral Transformer 347/12 = 347V to 12V Integral Transformer</p>	<p>Finish Painted BK = Black BZ = Bronze CS = City Silver VE = Verde WT = White Metal NBR = Brass NBZ = Bronze NCP = Copper NSS = Stainless Steel</p> <p>Recessed Housing (order separately) Select Housing from recessed housing section on previous page.</p>	<p>Accessories ¹ Filters F71 = Peach Dichroic Filter, 2.00" Dia F72 = Amber Dichroic Filter, 2.00" Dia F73 = Green Dichroic Filter, 2.00" Dia F74 = Medium Blue Dichroic Filter, 2.00" Dia F75 = Yellow Dichroic Filter, 2.00" Dia F76 = Red Dichroic Filter, 2.00" Dia F77 = Dark Blue Dichroic Filter, 2.00" Dia F78 = Light Blue Dichroic Filter, 2.00" Dia F79 = Neutral Density Dichroic Filter, 2.00" Dia F80 = Magenta Dichroic Filter, 2.00" Dia F22 = Red Color Filter, 2.00" Dia F33 = Blue Color Filter, 2.00" Dia F44 = Green Color Filter, 2.00" Dia F55 = Yellow Color Filter, 2.00" Dia F66 = Mercury Vapor Color Filter, 2.00" Dia</p> <p>Filter Holder LH16 = MR16 Size Filter Holder with Hex Cell Louver</p>
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- Notes:** ¹ Filters require filter holder accessory
- See ACCESSORIES AND TECHNICAL DATA section of the Lumiere catalog for Low Voltage Cable & Transformers
 - Consult your Cooper Lighting representative for additional options and finishes



2 x 1W / 2.5W Walkway LED

L17

SPEC SHEET

Application: Wall stairs and walkway illumination.

Electrical: 2 x 1W LED powered by 120V primary, 350mA non-dimmable integral driver or 2 x 2.5W LED powered by 120V primary, 700mA non-dimmable integral driver.

Input Current: 350mA (2W) / 700mA (5W)

Input Voltage: 8V DC

Power Consumption: 2W / 5W

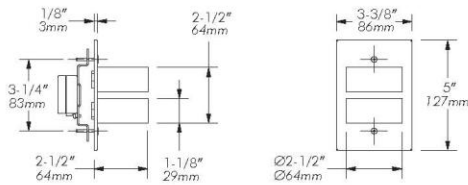
Dimming: Dimmable with remote driver (not included). Consult factory.

Weight: 3.06lbs (1.39kg).

Material: Stainless steel 316.

Mounting: Vertically positioned face plate mounts to a single gang box with flush mounted tamper proof screws.

Approval: Wet and dry locations. Approved to UL standards by CSA/US.



Type:

Project:

Modified:

Quantity:

Notes:

CODE	WATTAGE UP	COLOR UP	BEAM UP	WATTAGE DOWN	COLOR DOWN	BEAM DOWN	MATERIAL
L17							S
	1 = 1W 2 = 2.5W*	W27S = 2700K, std CRI W30S = 3000K, std CRI W35S = 3500K, std CRI W41S = 4100K, std CRI W30H = 3000K, high CRI	1 = 12° 3 = 30° 12 = 120°	1 = 1W 2 = 2.45W*	W27S = 2700K, std CRI W30S = 3000K, std CRI W35S = 3500K, std CRI W41S = 4100K, std CRI W30H = 3000K, high CRI	1 = 12° 3 = 30° 12 = 120°	S = stainless steel 316

*Only available in W30S (3000K, std CRI).

Note: A high CRI of 92 has about 25% less lumen output while a standard CRI of 75~82 has optimal lumen output.

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04-2010

2 x 1W / 2.5W Walkway LED

L17

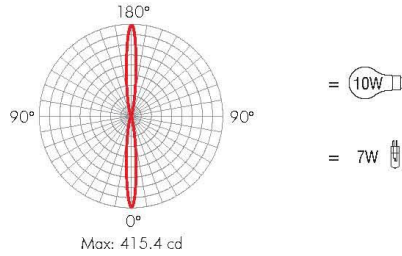
SPEC SHEET

Photometric Data

L17/12°
3000K, 99 lm

Distance		FC	Lux	Beam Diameter	
1.5'	0.46m	246.1	2830	0.3'	0.09m
3.0'	0.91m	61.53	707.4	0.7'	0.21m
4.5'	1.37m	27.35	314.4	1.0'	0.30m
6.0'	1.83m	15.38	176.9	1.4'	0.43m
7.5'	2.29m	9.85	113	1.7'	0.52m
9.0'	2.74m	6.84	78.6	2.1'	0.64m

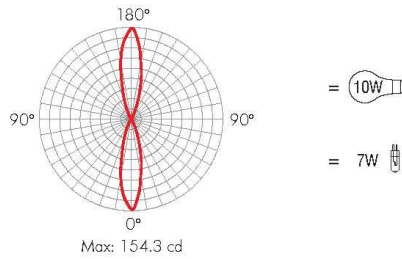
I max /2 → 13.2° (2 x 6.6)



L17/30°
3000K, 99 lm

Distance		FC	Lux	Beam Diameter	
1.5'	0.46m	91.20	2830	0.7'	0.21m
3.0'	0.91m	22.80	707.4	1.4'	0.43m
4.5'	1.37m	10.13	314.4	2.2'	0.67m
6.0'	1.83m	5.70	176.9	2.9'	0.88m
7.5'	2.29m	3.65	113	3.6'	1.10m
9.0'	2.74m	2.53	78.6	4.3'	1.31m

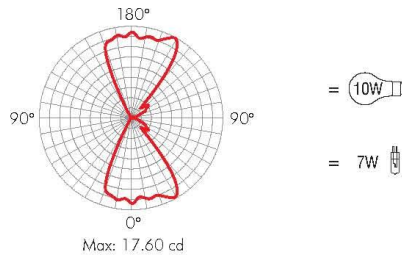
I max /2 → 27° (2 x 13.5)



L17/120°
3000K, 99 lm

Distance		FC	Lux	Beam Diameter	
0.5'	0.15m	88.05	947.8	0.6'	0.18m
1.0'	0.30m	22.01	236.9	1.3'	0.40m
1.5'	0.46m	9.78	105.3	1.9'	0.58m
2.0'	0.61m	5.50	59.20	2.5'	0.76m
2.5'	0.76m	3.52	37.89	3.1'	0.94m
3.0'	0.91m	2.45	26.37	3.8'	1.16m

I max /2 → 55.6° (2 x 27.8)



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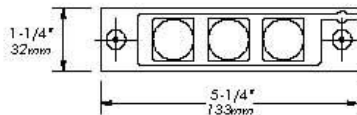
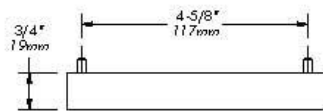
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3 x 1W Ceiling LED

L151

SPEC SHEET



Application: Discreet lighting for indoor and outdoor commercial and residential applications.

Electrical: 3 x 1W LEDs powered by constant current remote 350mA driver, 120V input, or 12V constant voltage driver, 120V input (not included).

Input Current: 350mA
 Input Voltage: 12V DC
 Power Consumption: 3W
 Dimming: Dimmable with remote driver (not included).
 Consult factory for details.

Note: 12V driver requires 2 fixtures minimum.

Weight: 0.30lbs (0.135kg)

Material: Anodized aluminum.

Mounting: Surface mount with 8" (152mm) wire lead.

Approval: Wet and dry locations. Approved to UL standards by CSA/US.



Type:

Project:

Modified:

Quantity:

Notes:

CODE	WATTAGE	COLOR	BEAM	FINISH
L151	3 3 = 1 x 1W	W27S = 2700K, std CRI W30S = 3000K, std CRI W35S = 3500K, std CRI W41S = 4100K, std CRI W30H = 3000K, high CRI	12 = 12° beam 30 = 30° beam 60 = 60° beam	MA MA = matte clear anodized



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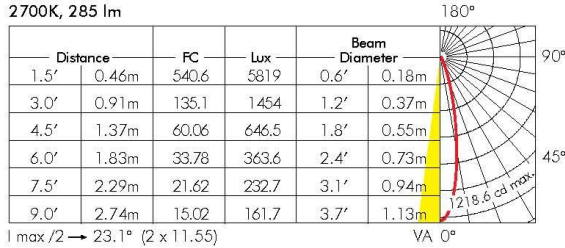
3 x 1W Ceiling LED

L151

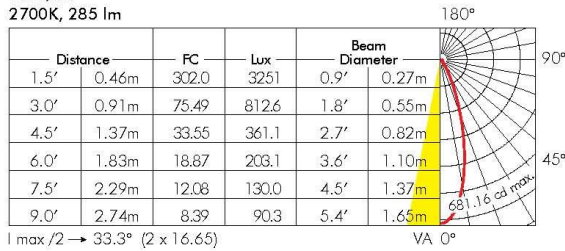
SPEC SHEET

Photometric Data

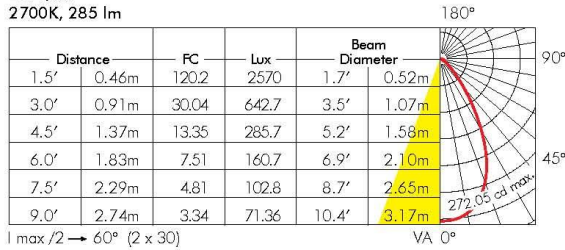
L151/12°
2700K, 285 lm



L151/30°
2700K, 285 lm



L151/60°
2700K, 285 lm



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Electrical Specifications

LED-I20A-00I2V-50-F	
Brand Name	XITANIUM
Driver Type	Electronic
Input Voltage	I20
Input Frequency	50/60Hz
RoHS	No
Status	Active

Output Power (W)	Output Voltage (V)	Output Current (A)	Operating Temp. Range (°F/°C)	Input Current at 120V (A)	Max. Input Power (W)	Inrush Current (A _{pk} /μs)	Max. THD (%)	Min. Power Factor	Surge Protection (KV)	Weight (Lbs)	IP Rating
10 ~ 60	12	0.8 ~ 5.0	-40°~140°F (-40~60°C)	0.63	75	-	20	0.9	2.5	1.4/635	IP66

Wiring Diagram

Input and output use lead-wires.
Lead-wires are 18AWG 105C/600V solid copper

Standard Lead Length

	in.	cm.
Black	9	22
White	9	22
Blue	26	66
Red	26	66
Gray		
Violet		

Maximum Wiring Distance (at full load)

Wire Size (AWG)	Distance (feet)
26	2
24	4
22	6
20	10
18	15
16	24
14	38
12	59
10	100

Enclosure

	in. (mm)
Case Length	8.34 (211.8)
Case Width	1.76 (42.5)
Case Height	1.1 (27.9)
Mounting Length	8.99 (228.4)
Mounting Width	1.22 (30.9)
Overall Length	9.45 (240)
Material, Color	Steel, White



UL Class 2
E220165



7310_S-000
3426-32

Revised 06/15/2009

PHILIPS LIGHTING ELECTRONICS N.A.
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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886



LED-I20A-00 I2V-50-F	
Brand Name	XITANIUM
Driver Type	Electronic
Input Voltage	I20
Input Frequency	50/60Hz
RoHS	No
Status	Active

Installation & Application Notes:

Section I – Physical Characteristics

- 1.1 LED Driver shall be installed inside an electrical enclosure
- 1.2 Wiring inside electrical enclosure shall comply with 600V/105°C rating or higher.

Section II – Performance

- 2.1 LED Driver is UL Class 2 power unit as per UL1310. It is also listed in the UL Sign Accessory Manual (UL SAM).
- 2.2 LED Driver is certified by UL for use in a dry or damp location (Outdoor Type I).
- 2.3 LED Driver has Class A sound rating.
- 2.4 LED Driver tolerates sustained open circuit and short circuit output conditions without damage.
- 2.5 LED Driver maximum allowable case temperature is 90°C – see product label for measurement location.
- 2.6 LED Driver shuts off output power to LEDs if its case temperature exceeds 90°C –thermal protection.
- 2.7 LED Driver complies with FCC rules and regulations, as per Title 47 CFR Part 15 Non-Consumer (Class A) for EMI/RFI (conducted and radiated) at full load.

Section III – UL Conditions of Acceptability (File E220165)

When installed in the end product, consideration shall be given to the following:

- 3.1 This component has been judged on the basis of the required spacings in the Standard for Class 2 Power Units, UL 1310, Fourth Edition, which would cover the component itself if submitted for Listing.
- 3.2 The supply terminals and connectors are suitable for factory wiring only of solid or tinned stranded No. 18 AWG conductors.
- 3.3 The equipment was submitted and tested for a maximum manufacturer’s recommended ambient (Tmra) of 40°C.
- 3.4 Leakage current measurements shall be performed when more than four LED drivers are used in the equipment or when the LED driver is used in combination with other equipment in the end-use product.
- 3.5 The drivers are intended for installation inside an electrical enclosure.
- 3.6 The ground connection is not suitable as the equipment ground for a sign. Separate provision for sign grounding must be provided.
- 3.7 LED Driver is suitable for damp location use.

Revised 06/15/2009

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ALLSCAPE®


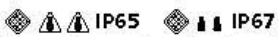

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sales@allscope.net
http://www.alllighting.com

SL-33

- Landscape Areas
- Wall Wash
- Flagpole Lighting
- Building Accent
- Pedestrian Areas
- Driveway Marker
- Sign Lighting



Specifications

Certifications	   <p>ETL and CETL listed for wet location, direct burial, and concrete pour. Certified to IP65 and IP67 to ensure protection against the harshest environments. IEC compliant versions available, consult factory.</p>
Lamp/Ballast Housing	Compression molded Rhinolite™ composite material, structurally reinforced with glass fibers. Superior resistance to ultraviolet degradation and corrosion resistant in harsh environments. Trim Rng (TR) and Debris Cover (DC) supplied standard.
Splice Compartment	Supplied with two 3/4" NPT conduit entrances. Connection to ballast compartment by way of anti-wicking chamber. Sealed with gasketed aluminum cover plate. Suitable for through wiring.
Lens	Standard 7/16" clear tempered flat borosilicate glass (F). All flat lenses will withstand loads up to 200 PSI. Sealed to housing with high temperature injection molded silicone gasket. Optional flat ADA anti slip and walkover lens (ADA), flat wall wash lens (VWW) and 1/4" clear tempered convex borosilicate glass lens (C).
Lens Frame	Heavy duty die cast bronze lens frame is supplied as standard. Fastened to housing with six captive 10-24 stainless steel Allen cap screws.
Reflectors	Spun aluminum highly specular Alzak™ finish for either NEMA type 2 spot (SPT) or NEMA type 3 flood (FLD) distributions. Field adjustable up to 15° tilt and 360° horizontal rotation. NOTE: Tilt adjustment varies by lamp type. Optional field adjustable reflector from flood-to-spot (FSR). A segmented fluorescent reflector is available for up to 42W lamps.
Lamp Holder	Porcelain 4kv pulse rated medium base for HID and Incandescent lamp sources.
Options	Cast aluminum Convex Rock Guard (CR), Directional Shield (DS), Glare Shield (GS), Directional Louver (DL), and Driveway Marker (DM). Internal Glare Shield (IGS), Internal Hex Cell Louver (HL), Glass Color Filter (GF), Grout Mask (GM), Debris Cover (DC).
Finish	Housing Black (BK). Options can be painted in standard or custom colors. Powder Coat Standard.
Safety	Caution: Care should be taken when specifying fixtures for use in pedestrian walkways to avoid problems that may be caused by high lens temperatures. Consult factory for more information.
Warning	Caution: Care should be taken not to install in-ground fixtures in areas where water can stand for prolonged periods of time. Sufficient drainage must be provided to avoid problems. Consult factory for more information.

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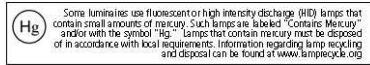
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PHILIPS

PROJECT
FIXTURE TYPE
CATALOG#

2930 South Fairview Street
Santa Ana, CA 92704
Phone: 714 668 3660
Fax: 714 668 1107
sales@allscape.net
http://www.allighting.com

SL-33



Product Order Guide

Series	Max Watts	Lamp Type	Voltage ⁴	Optics	Lens	Finish ⁵	Options
SL-33	Fluorescent						
	13CF	CF	120	SPT Spot	F ⁶	Clear Flat	BK Black DM Driveway Marker ³
	26CFQ	CFQ	208	FLD Flood	ADA ¹⁰	Walkover	BZ Bronze CR Convex Rockguard ⁸
	42CFT	CFT	240	FL Fluorescent	LS	Linear Spread	WH White DS Directional Shield ³
			277	WW ⁹ Wall Wash	C ⁷	Convex	GR Green GS Glare Shield ⁸
	High Pressure Sodium						
	70HPS	E17					NA Nat Alum DL Directional Louver ^{3,7}
	Metal Halide						
	70MH	E17					GY Gray HL Hex Cell Lower
	70MH	Par30 ⁵					CC Cust Color IGS Internal Glare Shield T6 only
	70MH	R111					GF Glass Color Filter ⁸
	70MH	T6 or T4					GM Grout Mask
	39MH	Par20 ⁵					LFSS Stainless Steel Lens Frame
	20MH	BT5	120				STA Square Top Adaptor ⁸
	20MH	T4	120/277				FSR Field Adjustable Flood to Spot Reflector ⁶
	Incandescent/Halogen/Low Voltage						
	75INC	Par38 ⁵	120				
	75INC	Par30 ⁵	120				
	100INC	T4mini	120				
	50INC	Par20 ⁵	120				
	75INC	MR16 ⁵	120/277/12				
	50INC	AR111 ⁵	120				
	LED						
	Titan25WW	CUS3 ¹¹	120-277	10,25,35,45		Warm White (3050K)	
	Titan25TC	CUS3 ¹¹	120-277	10,25,35,45		TruColor (3050K) 1290 Raw Lumens	
	Titan25CW	CUS3 ¹¹	120-277	10,25,35,45		Cool (Daylight) White (4700K)	
	Titan25FX	CUS3 ¹¹	120-277	25,35,45		Fixed Color Red, Green, Blue, Amber	

CF=single biax, CFQ = double biax, CFT = triple biax
Note: E17 Lamps 150W and below are medium base

- ¹ 42CFT works with convex lens only
- ² The DM Driveway Marker can be used with any lamp option up to 39W.
- ³ These options are supplied in heavy wall cast aluminum
- ⁴ Consult factory for other voltages and finishes.
- ⁵ Does not require internal optics.
- ⁶ Works with E17,T6,T4 and BT5 lamps only
- ⁷ DL works with flat lens only
- ⁸ GF Not available with 42CFT lamping.
- ⁹ WW optic includes a LS lens.
- ¹⁰ 39W max with ADA lens.
- ¹¹ The CUS3 uses a 25W Titan from Lamina.



DM

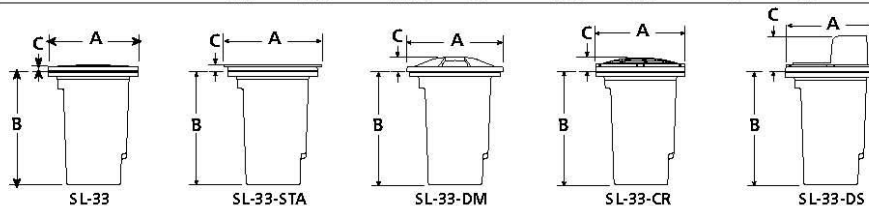


STA

Example: SL-33-70MH-E17-277-SPT-F-BK

Luminaire Dimensions

Luminaire	A		B		C		Weight	
	Inch	mm	Inch	mm	Inch	mm	lbs.	kg
SL-33	8.75	222	11.32	287	1.43	37	15	6.8
SL-33-STA	10.00	254	11.32	287	1.64	42	15	6.8
SL-33-DM	10.00	254	11.32	287	2.95	75	17	7.7
SL-33-CR	8.75	222	11.32	287	2.55	65	15	6.8
SL-33-DS	8.75	222	11.32	287	5.30	135	16	7.3



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Due to a program of continuous improvement, ALLSCAPE reserves the right to make any variation in design or construction to the equipment described.

Revised: 3/4/2009

PHILIPS ADVANCE		e-Vision® Electronic Ballast for Metal Halide Lamps				Catalog Number: RMH-G20-K For 20W Metal Halide Lamps ANSI M156 120V 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									
20W Watt Lamp, ANSI Code M156 Minimum Starting Temp -30°C/-20°F										
1	20	120	RMH-G20-K-XXX	0.21	24	0.9	4	K	0.4	6
						<p>Ballast Case must be Grounded</p> <p style="text-align: center;">Wiring Diagram 4</p>				
Case Figure	Overall Length	Case Length	Case Width	Height	Mounting Length	Mounting Width				
K	119mm [4.74"]	104mm [4.1"]	33mm [1.1"]	30mm [1.2"]	114mm [4.5"]	13.5mm [0.5"]				
<p style="text-align: center;">Case Temperature Measurement Location</p>										
INSTALLATION & APPLICATION NOTES: <ol style="list-style-type: none"> Maximum allowable case temperature is 90°C. See figure above for measurement location Ignition pulse is 2 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 terminal of lamp when using screw base lamps 							*Ordering Information			
			Order Suffix	Description						
			-LF	Ballast with side exit leads and mounting feet. Leads exit either end						
			-LFS	Ballast with side exit leads and mounting feet. Leads exit same end						
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



MasterColor® CDM-TC T4

MasterColor CDM-TC 20W/830 T4 1CT

The Elite family is at the very top of the MasterColor® CDM range, and gives a unique combination of unbeatable light quality and consistent performance over lifetime. While keeping running costs low. The Philips MasterColor® 3000KTubular Single-Ended T4 lamp is a compact, energy efficient, ceramic metal halide lamp that provides crisp, sparkling light.

Product data

• Product Data

Product number	404939
Full product name	MasterColor CDM-TC 20W/830 T4 1CT
Short product name	MASTERC CDM-Tc 20W/830 G8.5.CT/12
Pieces per Sku	1
eop_pck_cfg	12
Skus/Case	12
Bar code on pack	46677404932
Bar code on case	50046677404937
Logistics code(s)	928197305117
tpd_ilcos_cd	MT-20/30/1A-H-G8.5
eop_net_weight_pp	0.009 kg

• General Characteristics

Base	G8.5
Bulb	T4 [T 14 mm]
Bulb Material	FadeBlock Quartz
Bulb Finish	Clear
Operating Position	Universal [Any or Universal (U)]
Avg. Hrs. Life	12000 hr
Life to 5% failures EL	9000 hr
Life to 20% failures EL	11000 hr
Life to 10% failures EL	10000 hr

• Electrical Characteristics

System Power EL	24 W
Watts	20 W
Lamp Wattage EL	22 W
Lamp Voltage	100 V
Lamp Current EL	0.22 A
Ignition Time	30 s

Run-up time 90%	3 min
Re-ignition Time [min]	15 min
Dimmable	No

• Environmental Characteristics

Mercury (Hg) Content	2.3 mg
----------------------	--------

• Light Technical Characteristics

Color Code	830 [CCT of 3000K]
Color Rendering Index	82 (min), 85 (nom) Ra8
Color Designation	Warm White
Color Temperature	3000 K
Color Temperature technical	3000 K
Chromaticity Coordinate X	0.432 -
Chromaticity Coordinate Y	0.387 -
Initial Lumens	1650 Lm
Luminous Efficacy Lamp EL	75 Lm/W
Lumen Maintenance EL 2000h	79 %
Lumen Maintenance EL 5000h	70 %
Lumen Maintenance EL 10000h	59 %

• UV-related Characteristics

PHILIPS
sense and simplicity

MasterColor® CDM-TC T4

• **Product Dimensions**

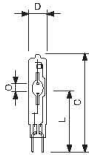
Overall Length C	85 mm
Diameter D	15 mm
Light Center Length L	51 (min), 52 (nom), 53 (max) mm
Arc Length O	3 mm
Light Center Length L	2 in

Max Overall Length (MOL) - C	3.34375 in
Diameter D	0.5 in

• **Luminaire Design Requirements**

Pinch Temperature	300 C
Bulb Temperature	320 C

Dimensional drawing



CDM-TC 20W

Product	C (Max)	D (Max)	L (Min)	L (Norm)	L (Max)	O (Min)	O (Norm)	O (Max)
CDM-TC 20W/830 G8.5	85	15	51	52	53	-	3	-

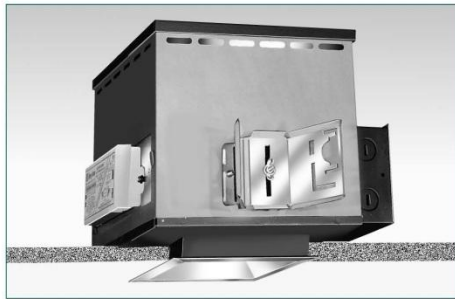
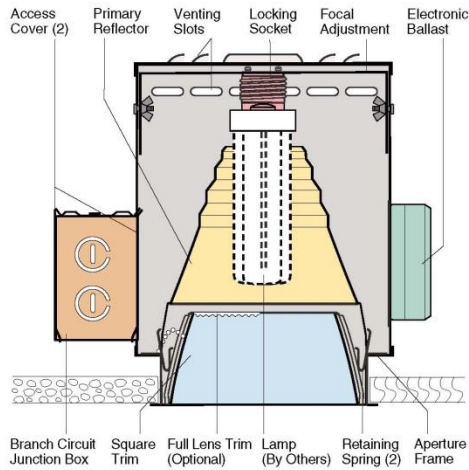


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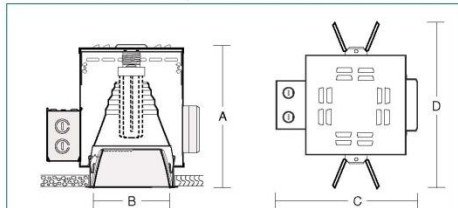
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www.philips.com/lighting

2010, December 19
 data subject to change



Dimensions and Lamps



Number	A Depth	B Aperture	C Width	D Length	Lamps
H8632	1 1/4" 286mm	6" sq. 153mm	12" 305mm	14" 356mm	26-32W Triple Tube compact fluorescent
H8642	1 1/4" 286mm	6" sq. 153mm	12" 305mm	14" 356mm	42W Triple Tube compact fluorescent

Brightness

Number	Lamps	85°	75°	65°	55°	45°
H8632	32W PL-T Philips	55	132	224	391	10904
	32W T/E Osram/Syl	32	84	148	247	9212
H8642	42W PL-T Philips	54	147	252	436	15069
	42W T/E Osram/Syl	37	116	231	2369	15908

Data in footcandle. Photometer readings, Maximum Brightness Method.

H8632 One 26 or 32W Triple Tube
H8642 One 42W Triple Tube

H22

Compact Fluorescent Downlights
6" Square Parabolic Trim

Optics and Applications

The primary reflector has a unique faceted shape designed for triple tube lamps. Distribution is for general use or task lighting. Suitable for damp locations.

Design Features

Steel housings protect and align reflectors and lamps. A safety locking socket prevents lamp fallout. Trims are stabilized to prevent racking and are retained by constant pressure springs. Maximum ceiling thickness 1 1/2". Top or bottom service.

Finish

Structural parts are painted matte black to suppress stray light leaks. Standard trims are anodized Softglow® clear. Special finishes, textures and colors are available.

Trim Textures

Select among different embossed patterns to match the ambiance of the space being illuminated. Refer to Squares brochure for descriptive photos.

Ballasts

Fully electronic, microprocessor controlled with programmed start to assure rated lamp life. Input voltage ranges from 120V through 277V. Power factor .98, starting temperature 0°F (-18°C), THD<10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

- R2 26" support rails.
- R5 52" support rails.
- SB Softglow black.
- SG Softglow gold.
- SH Softglow mocha.
- SP Softglow graphite.
- ST Softglow titanium.
- SW Softglow wheat.
- SY Softglow pewter.
- SZ Softglow bronze.
- BR Bright trim finish.
- FC Four cell cross baffle.
- F Fuse.
- EM Emergency power includes integral charger light and test switch visible through aperture. Battery operation for 90 minutes.
- FLT6 Full lens trim, specify lens type, e.g. H8632-FLT6LL.
- WRL Wattage restriction label, specify wattage.
- WT White trim flange.
- WHT White complete trim.
- BP Ball Peen texture.
- CG Corrugated texture.
- DS Distressed texture.
- WV Woven texture.
- LL Linear spread lens.
- LP Large prism lens.
- MP Microprism lens.
- DM Dimming ballast.
- V347 347 volt ballast.
- FR Frosting on lens, specify lens type.



H22 H8632 H8642

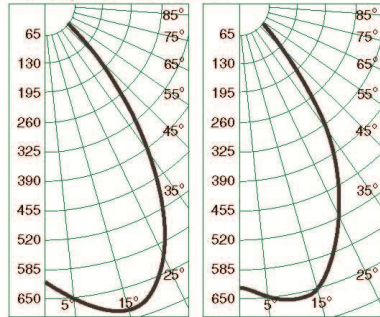
Performance Datachart

Single Unit, Initial Footcandles, 30° Work Plane					Ceiling to Floor	Multiple Units, Initial Footcandles, 30° Work Plane						
H8632 One 32W Philips Read Top Data					8'	Ceiling 80% Walls 50% Floor 20%						
H8632 One 32W Osram Read Bottom Data						Spacing is Maximum Over Work Plane						
Nadir	10°		20°			30°						
FC	FC	Diam	FC	Diam	FC	Diam	FC	Diam	Spacing	RCR 1	RCR 3	RCR 8
20	21	2'	18	4'	11	6'	8'	7'	24	20	14	16
21	21	2'	17	4'	9	6'	9'	6'	28	24	17	11
15	15	2'	13	5'	8	8'	10'	8'	17	14	10	11
15	15	2'	12	5'	7	8'	11'	7'	20	17	13	9
11	12	3'	10	5'	6	9'	12'	9'	13	11	8	9
11	11	3'	9	5'	5	9'	13'	8'	15	13	10	7
9	9	3'	8	6'	5	10'	14'	10'	10	8	6	7
9	9	3'	7	6'	4	10'	15'	11'	12	10	7	5
7	7	3'	6	7'	4	11'	16'	12'	8	7	5	5
7	7	3'	6	7'	3	11'	17'	13'	9	8	5	5

For 26 Watt x 88

Single Unit, Initial Footcandles, 30° Work Plane					Ceiling to Floor	Multiple Units, Initial Footcandles, 30° Work Plane						
H8642 One 42W Philips Read Top Data					8'	Ceiling 80% Walls 50% Floor 20%						
H8642 One 42W Osram Read Bottom Data						Spacing is Maximum Over Work Plane						
Nadir	10°		20°			30°						
FC	FC	Diam	FC	Diam	FC	Diam	FC	Diam	Spacing	RCR 1	RCR 3	RCR 8
25	27	2'	22	4'	13	6'	8'	6'	30	26	18	18
30	29	2'	22	4'	12	6'	9'	6'	38	32	23	23
18	19	2'	16	5'	9	8'	10'	7'	22	19	13	16
21	20	2'	16	5'	8	8'	11'	7'	27	23	16	16
14	14	3'	12	5'	7	9'	12'	9'	16	14	10	12
16	15	3'	12	5'	6	9'	13'	8'	21	17	12	12
11	11	3'	9	6'	5	10'	14'	10'	13	11	7	10
12	12	3'	9	6'	5	10'	15'	9'	16	13	10	10
9	9	3'	7	7'	4	11'	16'	11'	10	9	6	8
10	16	3'	7	7'	4	11'	17'	10'	13	11	6	8

Candlepower Distribution



H8632 32W Philips Eff. 39% S/M 1.19

H8632 32W Osram Eff. 36% S/M 1.07

Candelas

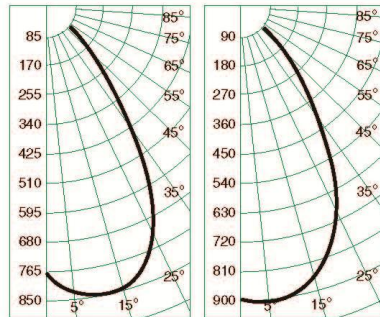
Vertical Angles	P 32W		O 32W	
	2400*	2400*	2400*	2400*
0	620	629	620	629
5	643	650	643	650
10	678	663	678	663
15	692	648	692	648
20	673	602	673	602
25	615	529	615	529
30	517	434	517	434
35	389	339	389	339
40	283	252	283	252
45	174	166	174	166
50	41	31	41	31
55	15	25	15	25
60	11	14	11	14
65	0	10	0	10
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

Vertical Angles
* Initial Lamp Lumens

Coefficients of Utilization

Ceiling	80%				70%				50%				30%				0			
	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10	70	50	30	10
1	.44	.43	.42	.41	.42	.40	.40	.39	.39	.38	.35	.36	.35	.36	.34	.31	.30	.29	.28	.28
2	.42	.40	.38	.36	.36	.36	.36	.35	.35	.36	.35	.36	.34	.31	.30	.30	.29	.28	.28	.28
3	.39	.36	.34	.33	.36	.32	.35	.32	.34	.31	.30	.30	.29	.28	.28	.28	.28	.28	.28	.28
4	.37	.34	.31	.30	.33	.29	.32	.29	.32	.29	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28
5	.35	.31	.29	.27	.31	.27	.30	.26	.29	.26	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
6	.33	.29	.26	.25	.29	.24	.28	.24	.27	.24	.23	.23	.23	.23	.23	.23	.23	.23	.23	.23
7	.31	.27	.24	.23	.27	.22	.26	.22	.26	.22	.22	.22	.22	.22	.22	.22	.22	.22	.22	.22
8	.29	.25	.22	.21	.25	.21	.24	.21	.24	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20
9	.28	.23	.21	.19	.23	.19	.23	.19	.22	.19	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18
10	.26	.22	.19	.18	.22	.18	.21	.18	.21	.18	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17

H8632 Osram 32W Triple Tube x .93
H8642 Philips and Osram 42W Triple Tube x .86



H8642 42W Philips Eff. 34% S/M 1.14

H8642 42W Osram Eff. 34% S/M 1.01

Vertical Angles	P 42W		O 42W	
	3200*	3200*	3200*	3200*
0	770	898	770	898
5	814	908	814	908
10	849	903	849	903
15	850	853	850	853
20	813	797	813	797
25	724	682	724	682
30	588	550	588	550
35	436	408	436	408
40	310	297	310	297
45	176	195	176	195
50	38	86	38	86
55	17	17	17	17
60	13	12	13	12
65	0	0	0	0
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

Vertical
* Initial Lamp Lumens

Notes

- For microprism spread lens multiply data x .88.
- All data with standard trim, Softglow® clear.
- Datachart degree headings measure one side from nadir. Diameter data includes both sides. Therefore the 20° column value describes a 40° pattern diameter at the work plane 30" above the floor. Footcandle values are at the diameter edge.
- Datachart spacing is rounded off to the nearest foot.
- Data by IES methods. Compact fluorescent data vary due to lamp lumen differences, power input, burning position, ambient temperature and ballast characteristics. A modification factor should be applied.
- Colored trim multipliers: Gold x .90, Wheat x .85, Mocha x .80, Pewter x .80, Graphite x .75, Titanium x .75, Bronze x .70, Black x .70.



GE
Lighting

97634 - F42TBX/830/A/ECO

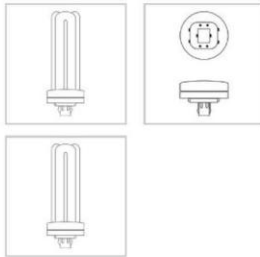
GE Ecolux® Biax® T4 - Facilities; Retail Display; Hospitality; Office; Restaurant; Warehouse



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

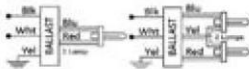
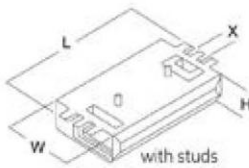
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ANSI Code	60901-EC-7442-2
Standard Package	Case
Standard Package GTIN	10043168976340
Standard Package Quantity	10
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168976343



71441 - GEC242-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- 42 / 36 / 32 / 28 / 26 / 24 watt 120-277V Proline PS 3 Way Mounting Kit
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	71441
Description	GEC242-MVPS-3W
Standard Package	Master
Standard Package GTIN	10043168714416
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168714419

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 HI
- FCC Part 18 Class B at 120 volts
- Meets ANSI/IEEE C62.41 Cat. A

SPECIFICATIONS BY LAMP & WATTAGE

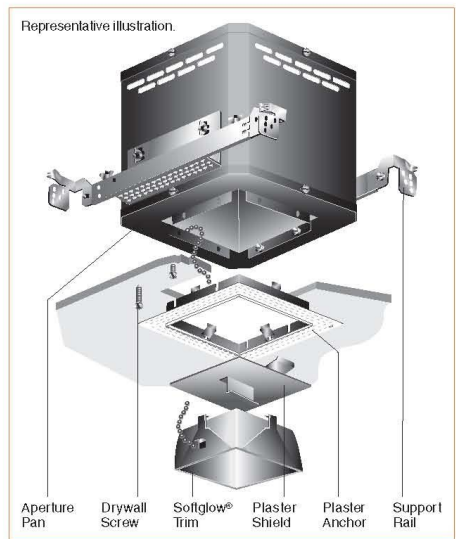
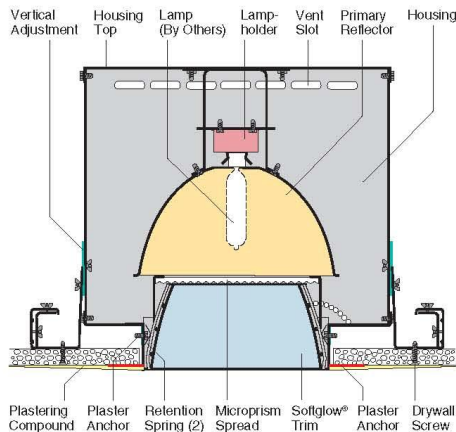
Lamp	# of Lamps	Line Volts	System Watts	Nom. Line Current	System Ballast Factor	Ballast Efficacy Factor	Power Factor% (>=)(<=)	Crest Factor	THD% (<=)	Min. Starting Temp (°F/°C)
FT55W/4P	1	120	43	0.36 A	0.71	1.65	99	1.7	10	-20.0 / -29
FT55W/4P	1	277	44	0.16 A	0.72	1.64	96	1.7	12	-20.0 / -29
FT40W/4P	1	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

For additional information, visit www.gelighting.com

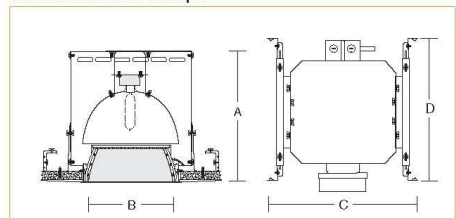
FC9T5-22W/4P	2	277	52	0.19 A	1.10	2.12	97	1.7	12	-20.0 / -29
FC9T5+FC12T5	1	120	67	0.55 A	0.90	1.34	99	1.7	10	-20.0 / -29
FC9T5+FC12T5	1	277	67	0.25 A	0.90	1.34	98	1.7	10	-20.0 / -29
FC12T5-40W/4P	1	120	37	0.31 A	0.84	2.27	99	1.7	10	-20.0 / -29
FC12T5-40W/4P	2	120	70	0.59 A	0.80	1.14	99	1.7	10	-20.0 / -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.



Dimensions and Lamps



Number	A Depth	B Aperture	C Width	D Length	Lamps
H8606FM*	10 1/2" 277mm	6" sq. 153mm	15" 381mm	14 1/4" 362mm	20-39W T-4 MH, 39-70W T-6 MH, G-12 base
H8606FM-150	10 1/8" 277mm	6" sq. 153mm	17 3/4" 451mm	17" 432mm	150W T-6 MH G-12 base

*To specify add watts and volts for proper ballast, e.g. H8606FM-39277.

H8606FM

Flush Mount Downlight
20-39W T-4 Metal Halide Lamp
39-70W T-6 Metal Halide Lamp
6" Square Parabolic Trim

**FMH
4-11**

Flush Mount

Kurt Versen's flush mount fixtures eliminate overlapping flanges and lock into the ceiling for a unique, finished appearance. A clean, uncluttered ceiling emphasizes the attention to detail, enhancing the impact of the interior environment. It is a factory installed option with a proven installation technique.

Optics and Applications

A microprism spread lens is supplied to satisfy code requirements and for brightness control. For general or task lighting in low to medium height ceilings.

Design Features

The trim is stabilized to prevent racking and is retained by constant pressure springs. Flush mount design resists cracking and chipping by mechanically fastening fixture to drywall. To simplify installation, three adjustment mechanisms adapt the fixture to ceiling conditions. Adjustable mounting rails fit different support systems and accommodate ceiling thicknesses from 3/8" to 7/8". Maximum extension is 26". Top or bottom service.

Finish

Housing and structural parts are painted matte black to suppress stray light leaks. The trim is anodized Softglow® clear. Special finishes and colors are available.

Ballast

Integral, encased, electronic ballast is standard. Features quiet operation, thermal protection and lamp shutdown at end of life. Input voltage is 120V or 277V, power factor is >.90.

General

Fixtures are pre-wired and thermally protected, UL and C-UL listed for damp location and eight wire 75°C branch circuit wiring. Union made IBEW.

Accessories

- SB Softglow black.
 - SG Softglow gold.
 - SH Softglow mocha.
 - SP Softglow graphite.
 - ST Softglow titanium.
 - SW Softglow wheat.
 - SY Softglow pewter.
 - SZ Softglow bronze.
 - F Ballast fuse.
 - WHT White complete trim.
 - EC Emergency circuit with mini-can socket and leads.*
 - TLI 60W emergency incandescent lamp.
 - AOE1 Electronic ballast Auto-On restrike system 120V.*
 - AOE2 Electronic ballast Auto-On restrike system 277V.*
- *Use open rated 60W max. auxiliary incandescent lamp.
- BR Bright trim finish.
 - LL Linear lens.
 - LP Large prism lens.
 - FR Frosted lens, specify lens type.
 - WR White trim return.
 - V347 347 volt ballast, contact the factory.
 - FMW Flush mount wood, contact factory.



H22 H8632 H8642

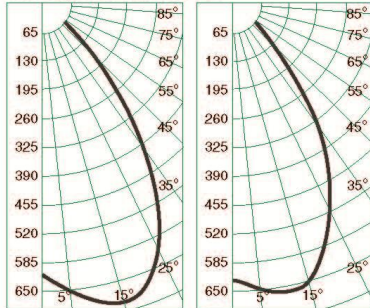
Performance Datachart

Single Unit, Initial Footcandles, 30° Work Plane				Ceiling to Floor				Multiple Units, Initial Footcandles, 30° Work Plane			
H8632 One 32W Philips Read Top Data								Ceiling 80% Walls 50% Floor 20%			
H8632 One 32W Osram Read Bottom Data								Spacing is Maximum Over Work Plane			
Nadir	10°	20°	30°					Spacing	RCR 1	RCR 3	RCR 8
FC	FC Diam	FC Diam	FC Diam					Spacing	RCR 1	RCR 3	RCR 8
20 21	21 21	2' 2'	18 17	4' 4'	11 9	6' 6'	8'	7' 6'	24 28	20 24	14 16
15 15	15 15	2' 2'	13 12	5' 5'	8 7	8' 8'	9'	8' 7'	17 20	14 17	10 11
11 11	12 11	3' 3'	10 9	5' 5'	6 5	9' 9'	10'	9' 8'	13 15	11 13	8 9
9 9	9 9	3' 3'	8 7	6' 6'	5 4	10' 10'	11'	10' 9'	10 12	8 10	6 7
7 7	7 7	3' 3'	6 6	7' 7'	4 3	11' 11'	12'	11' 10'	8 9	7 8	5 5

For 26 Watt x.88

Single Unit, Initial Footcandles, 30° Work Plane				Ceiling to Floor				Multiple Units, Initial Footcandles, 30° Work Plane			
H8642 One 42W Philips Read Top Data								Ceiling 80% Walls 50% Floor 20%			
H8642 One 42W Osram Read Bottom Data								Spacing is Maximum Over Work Plane			
Nadir	10°	20°	30°					Spacing	RCR 1	RCR 3	RCR 8
FC	FC Diam	FC Diam	FC Diam					Spacing	RCR 1	RCR 3	RCR 8
25 30	27 29	2' 2'	22 22	4' 4'	13 12	6' 6'	8'	6' 6'	30 38	26 32	18 23
18 21	19 20	2' 2'	16 16	5' 5'	9 8	8' 8'	9'	7' 7'	22 27	19 23	13 16
14 16	14 15	3' 3'	12 12	5' 5'	7 6	9' 9'	10'	9' 8'	16 21	14 17	10 12
11 12	11 12	3' 3'	9 9	6' 6'	5 5	10' 10'	11'	10' 9'	13 16	11 13	7 10
9 10	9 16	3' 3'	7 7	7' 7'	4 4	11' 11'	12'	11' 10'	10 13	9 11	6 8

Candlepower Distribution



H8632 32W Philips
Eff: 39% S/M 1.19

H8632 32W Osram
Eff: 36% S/M 1.07

Candelas

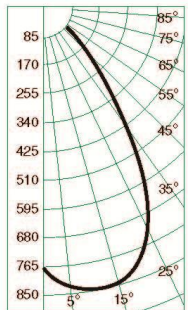
°	P 32W		O 32W	
	2400*	2400*	2400*	2400*
0	620	629	620	629
5	643	650	643	650
10	678	663	678	663
15	692	648	692	648
20	673	602	673	602
25	615	529	615	529
30	517	434	517	434
35	389	339	389	339
40	283	252	283	252
45	174	166	174	166
50	41	81	41	81
55	15	25	15	25
60	11	14	11	14
65	0	10	0	10
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

° Vertical Angles
* Initial Lamp Lumens

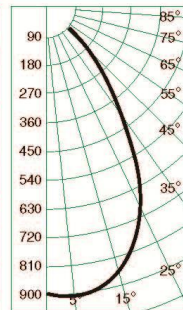
Coefficients of Utilization

Wall %	80%		70%		50%		30%		0		
	70	50	30	10	50	10	50	10	50	10	
RCR	Zonal Cavity Method - Floor Reflectance 20%										
1	.44	.43	.42	.41	.42	.40	.40	.39	.39	.38	.36
2	.42	.40	.38	.36	.39	.36	.38	.35	.36	.34	.33
3	.39	.36	.34	.33	.36	.32	.35	.32	.34	.31	.30
4	.37	.34	.31	.30	.33	.29	.32	.29	.32	.29	.28
5	.35	.31	.29	.27	.31	.27	.30	.26	.29	.26	.25
6	.33	.29	.26	.25	.29	.24	.28	.24	.27	.24	.23
7	.31	.27	.24	.23	.27	.22	.26	.22	.26	.22	.21
8	.29	.25	.22	.21	.25	.21	.24	.21	.24	.20	.20
9	.28	.23	.21	.19	.23	.19	.23	.19	.22	.19	.18
10	.26	.22	.19	.18	.22	.18	.21	.18	.21	.18	.17

H8632 Osram 32W Triple Tube x .93
H8642 Philips and Osram 42W Triple Tube x .86



H8642 42W Philips
Eff: 34% S/M 1.14



H8642 42W Osram
Eff: 34% S/M 1.01

°	P 42W		O 42W	
	3200*	3200*	3200*	3200*
0	770	898	770	898
5	814	908	814	908
10	849	903	849	903
15	850	853	850	853
20	813	797	813	797
25	724	682	724	682
30	588	550	588	550
35	436	408	436	408
40	310	297	310	297
45	176	195	176	195
50	38	86	38	86
55	17	17	17	17
60	13	12	13	12
65	0	0	0	0
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

° Vertical
* Initial Lamp Lumens

Notes

- 1 For microprism spread lens multiply data x.88.
- 2 All data with standard trim, Softglow® clear.
- 3 Datachart degree headings measure one side from nadir. Diameter data includes both sides. Therefore the 20° column value describes a 40° pattern diameter at the work plane 30" above the floor. Footcandle values are at the diameter edge.
- 4 Datachart spacing is rounded off to the nearest foot.
- 5 Data by IES methods. Compact fluorescent data vary due to lamp lumen differences, power input, burning position, ambient temperature and ballast characteristics. A modification factor should be applied.
- 6 Colored trim multipliers: Gold x .90, Wheat x .85, Mocha x .80, Pewter x .80, Graphite x .75, Titanium x .75, Bronze x .70, Black x .70.



GE
Lighting

97615 - F26TBX/830/A/ECO

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

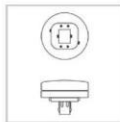


High Color Rendering

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; Warehouse

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1800
Mean Lumens	1530
Nominal Initial Lumens per Watt	69
Color Temperature	3000 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	0.325 A
Preheat Voltage	4.25 V
Current Crest Factor	1.7
Supply Current Frequency	20000 Hz

DIMENSIONS

Maximum Overall Length (MOL)	5.2 cm
Nominal Length	5.2 cm
Base Face to Top of Lamp	4.6 cm

PRODUCT INFORMATION

Product Code	97615
Description	F26TBX/830/A/ECO
ANSI Code	60901-IEC-3426-1
Standard Package	Case
Standard Package GTIN	10043168976159
Standard Package Quantity	10
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168976152

For additional information, visit www.gelighting.com

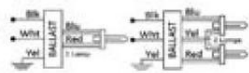
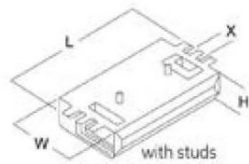
Page 1



71441 - GEC242-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- 42 / 36 / 32 / 28 / 26 / 24 watt 120-277V Proline PS 3 Way
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	71441
Description	GEC242-MVPS-3W
Standard Package	Master
Standard Package GTIN	10043168714416
Standard Package Quantity	10
Sales Unit	Individual Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168714419

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
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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

For additional information, visit www.gelighting.com

Page 1

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.

DECORATIVE AND
PERFORMANCE

INDOOR

SEQUENCE™

Typical Applications

- 2-story corridor
- Atrium
- Church
- Civic
- Airport
- Healthcare
- Education
- Large venue
- Hospitality

Features

- 5 year product warranty
- Matte white acrylic cylinder body
- Oven cured no VOC acrylic powder coat for painted finishes
- Consistent brightness uniformity gradient minimizes shadowing and lamp image
- T-5 fluorescent or high performance T-8 fluorescent lamping
- Low energy, long life LED lamping
- Osram Octron® XPS® Ecologic® T-8 lamp/ballast combination (.71 ballast factor) provides up to 42,000 hours of lamp life (rated at 12 hours/start)
- Optional recessed downlight with PAR lamps for beam spread selection
- Osram Powerball® R111 downlight lamping option
- Integral ballast standard for CP5205
- Powercord (white) is included with cable mount models



LED Features

- Static color LED bodylight or color changing LED RGB
- Modular design allowing replacement of the LED linear source and driver
- Constant current LED technology to protect LEDs from experiencing "over current" conditions that can cause overheating and premature failure
- Thermally managed within manufacturer specifications to promote long LED life
- No ultraviolet or infrared, alleviating potential damage to art, fabric and materials
- Mercury free LED source reduces impact to waste stream

Solid Color LED Features

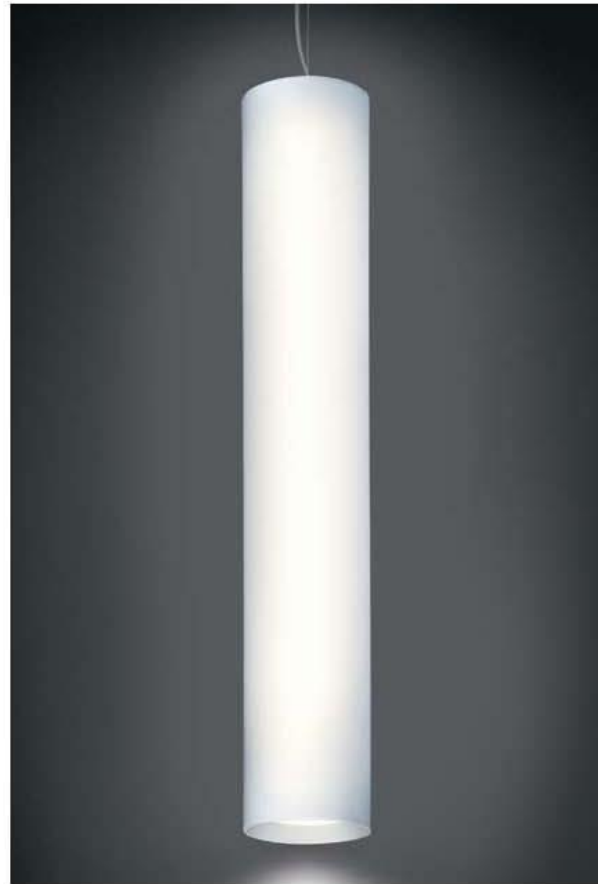
- Available in amber, blue, green, white and red
- Integral high power factor electronic driver (CP5205)
- Optional 0V-10V LED bodylight dimming
- Remote driver mountable up to 20' maximum (CP5201)

Color Changing LED (RGB) Features

- DMX controller is available, see www.visalighting.com for details
- DMX compliant driver is standard with LED RGB; integral for CP5205, remote for CP5201 (20' maximum distance)
- DMX driver is field addressable through use of onboard switches
- DMX control cable is separate from power cable to meet code requirements (CP5205)

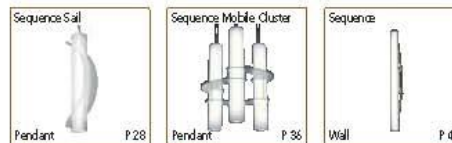
Suggested Variations

- Tether (cable mount only)
- Vary height of cylinders
- Alternative downlight bezel and end cap color
- Customized pre-programmed DMX controller effects
- See www.visalighting.com for additional variation suggestions



CP5205

Companions



VISA LIGHTING
An Osram Group Company
800-788-VISA www.visalighting.com

13

SAMPLE CATALOG NUMBER

CP5205-CBL - 2FHP32-1PH70PAR30(MVOLT) - B&SIL - HPT&L - OAH(192)
Model Number Lamping Option (Voltage) Canopy and Stem Finish Option Option

Model Number	Model	Lamping Options		Ballast Options	Finish	Options
		Bodylight Fluorescent or LED	Optional Downlight			
(Stem Mount only) CP5201	4 foot body - 4" diameter W 4" (102 mm) OAH 192" (4877 mm) X 51" (1295 mm)	1FS28 1FS54	LEDAMB LEDBLU LEDGRN LEDRED LEDWHT LEDRGB	1T35MR16 1LED12V16	CMB RMB MPB TMB	PTD DIM-L DIM10 FUSE OAH

For best "white color" LED light output use LEDWHT

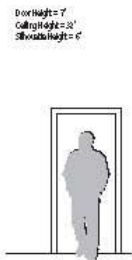
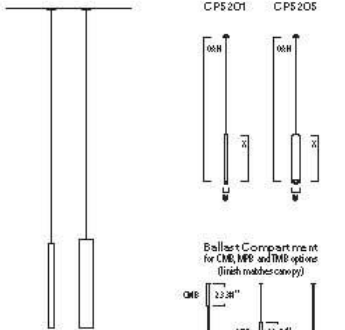
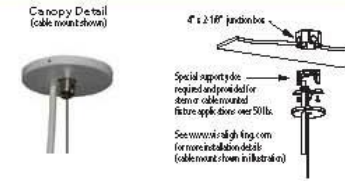
(Cable Mount) CP5205-CBL	4 foot body - 6" diameter W 8" (203 mm) OAH 192" (4877 mm) X 53" (1346 mm)	2FHP32 2FS28 2FS54	LEDAMB LEDBLU LEDGRN LEDRED LEDWHT LEDRGB	1PH35PB 1PH39PAR30 1PH70PB 1PH70PAR30 1T75PAR30	PTD	DIM-A DIM-L DIM10 FUSE HPT&L IEM OAH PBL
------------------------------------	---	--------------------------	--	---	-----	---

Feature bottom is solid if no downlight is specified

For best "white color" LED light output use LEDWHT

SEQUENCE™ indoor decorative and performance pendant

- Downlight bezel and end caps are painted white
- Cable is stainless steel (8" diameter models)



ABBREVIATION KEY

Dimensions	
W	Width
OAH	Overall Height
X	Body Height

Lamping Options (Voltage)		
FHP 32	32w High-Performance T8, med bi-pin base, FLR	(MVOLT)
FS28	28w T5, mini bi-pin base, FLR	(MVOLT)
FS54	54w T5/HO, mini bi-pin base, FLR	(MVOLT; 34.7V)
PH35PB	35w K111, GX8.5 base, MH	(MVOLT)
PH39PAR30	39w PAR30, medium base, MH	(MVOLT)
PH70PB	70w K111, GX8.5 base, MH	(MVOLT)
PH70PAR30	70w PAR30, medium base, MH	(MVOLT)
T35MR16	35w MR16, GU5.3 base, halogen	(120V; 2.77V)
T75PAR30	75w PAR30, medium base, halogen	(120V)
LED12V16	5w MRX, 2" diameter, GU5.3 base, LED (12V)	(MVOLT)
LEDAMB	Amber, LED	(MVOLT)
LEDBLU	Blue, LED	(MVOLT)
LEDGRN	Green, LED	(MVOLT)
LEDRED	Red, LED	(MVOLT)
LEDWHT	White, 4000K, LED	(MVOLT)
LEDRGB	Red, Green, Blue; DMX ready	(MVOLT)

Specify Voltage or MVOLT
MVOLT is a ballast that operates 120V through 277V

Ballast Options (must be specified for CP5201)	
CMB	Canopy mounted ballast for fluorescent lamping or single color LED. Not available with DIM-L option.
MPB	Mid-point ballast for fluorescent lamping or single color LED. Not available with DIM-L option.
RMB	Remote ballast for fluorescent lamping or single color LED. Required and included with LED RGB, not available with DIM-L option.
TMB	Top mounted ballast for fluorescent lamping or single color LED.

Finishes	
PTD	Painted - specify color code (ex. BRNZ for bronze)

Options	
DIM-A	Fluorescent dimming, Advance Mark 10, specify 120V or 277V. Not available with FS28 lamping.
DIM-L	Fluorescent dimming, Lutron Eco-10, specify 120V or 277V. Top mounted ballast is required and included for CP5201.
DIM10	Single color LED bodylight dimming, 0V-10V.
FUSE	Fusing, specify 120V or 277V.
HPT&L	Include 32w High-Performance Osram Octron® XPS® Ecologic® 3500 K T8 lamp providing up to 42,000 hour life (rated at 12 hours/start).
IEM	Integral emergency battery pack for fluorescent lamping, specify 120V or 277V.
OAH	Overall height variation from standard. Include desired height in inches. (ex. OAH(192) will produce an overall fixture height of 192")
PBL	Include Osram Powerball® R111 lamp.

PHOTOMETRICS and BIM

Complete BIM (Building Information Modeling) and photometric files for these models may be downloaded from www.visalighting.com

Nominal LED Wattage

	LEDAMB	LEDGRN	LEDRED	LEDWHT	LEDRGB
CP5201	38.4	26.8	38.4	38.4	40.8
CP5205	76.8	53.6	76.8	76.8	81.6



Energy Advantage™ T8

F32T8 25W ADV830 XEW ALTO

Philips Energy Advantage T8 lamps offer high energy savings in an environmentally responsible lamp.

Product data

• Product Data

Product number	137810
Full product name	F32T8 25W ADV830 XEW ALTO II 1LP
Short product name	F32T8 25W ADV830 XEW ALTO II 1LP
Pieces per Sku	1
Skus/Case	25
Bar code on pack	046677137816
Bar code on case	50046677137811
Logistics code(s)	927852383101

• General Characteristics

Base	Medium Bi-Pin [Medium Bi-Pin Fluorescent]
Base Information	Green Base
Bulb	T8
Energy Saving	Energy Saving
Rated Avg Life [12-Hr Prog St]	36000 hr
Rated Avg Life [12-Hr Inst St]	30000 hr
Rated Avg Life [3-Hr Prog St]	30000 hr
Rated Avg Life [3-Hr Inst St]	24000 hr

• Electrical Characteristics

Watts	25 W
-------	------

• Environmental Characteristics

Mercury (Hg) Content	1.7 mg
Picogram per Lumen Hour	29 p/LuHr

• Light Technical Characteristics

Color Code	Advantage 830 [CCT of 3000K]
Color Rendering Index	85 Ra8
Color Designation	Advantage 830
Color Temperature	3000 K
Initial lumen	2500 Lm
Design Mean Lumens	2425 Lm

• Product Dimensions

Nominal Length [inch]	48
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PHILIPS
 sense and simplicity

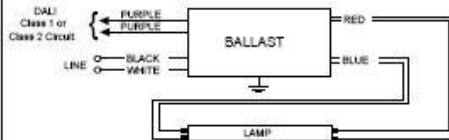


IDA-132-SC@120V	
Brand Name	ROVR
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (*F/C)	Input Current (Amps)	Input Power (Watts) (min/max)	Ballast Factor (min/max)	MAX THD %	Power Factor	Lamp Current Crest Factor	B.E.F.
F17T8	1	17	50/10	0.16	07/20	0.03/1.00	10	0.99	1.7	5.00
* F25T8	1	25	50/10	0.23	07/27	0.03/1.00	10	0.99	1.7	3.70
F32T8	1	32	50/10	0.30	08/27	0.03/1.00	10	0.99	1.7	3.70

Wiring Diagram

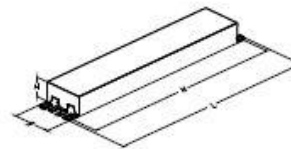


Diag. 55B

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 02/01/2008



Data is based upon tests performed by Philips Lighting Electronics N.A. 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.

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5888



IDA-132-SC@120V	
Brand Name	ROVR
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

- 1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.
- 1.2 Ballast shall be available in a plastic/metal can or all metal can construction to meet all plenum requirements.
- 1.3 Ballast shall be provided with poke-in wire trap connectors or integral leads color coded per ANSI C82.11.

Section II - Performance Requirements

- 2.1 Ballast shall be Programmed Start.
- 2.2 Ballast shall be provided with integral protection circuitry to withstand connection of low voltage control leads to mains power supply. In this event, ballast shall default to maximum light output.
- 2.3 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.
- 2.4 Ballast shall operate from 50/60 Hz input source of 120V or 277V with sustained variations of +/- 10% (voltage and frequency). IntelliVolt models shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency).
- 2.5 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.
- 2.6 Ballast shall have a Power Factor greater than 0.98 at full light output and greater than 0.90 throughout the dimming range for primary lamp.
- 2.7 Ballast shall have a minimum ballast factor of 1.00 at maximum light output and 0.03 at minimum light output for primary lamp application.
- 2.8 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less.
- 2.9 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% when operated at nominal line voltage with primary lamp.
- 2.10 Ballast shall have a Class A sound rating.
- 2.11 Ballast shall have a minimum starting temperature of 10C (50F) for primary lamp.
- 2.12 Ballast shall provide Lamp EOL Protection Circuit for all T5, T5/HO and CFL lamps.
- 2.13 Ballast shall control lamp light output from 100% - 3% relative light output for T8 and CFL lamps and 100% - 1% relative light output for T5/HO lamps.
- 2.14 Ballast shall ignite the lamps at any light output setting without first going to another output setting.
- 2.15 Ballast shall tolerate sustained open circuit and short circuit output conditions.

Section III - Regulatory Requirements

- 3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).
- 3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.
- 3.3 Ballast shall comply with ANSI C82.41 Category A for Transient protection.
- 3.4 Ballast shall comply with ANSI C82.11 where applicable.
- 3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).
- 3.6 Ballast shall comply with NEMA 410 for in-rush current limits.

Section IV - Other

- 4.1 Ballast shall be manufactured in a factory certified to ISO 9001 Quality System Standards.
- 4.2 Ballast shall carry a _____ warranty from date of manufacture against defects in material or workmanship for operation at a maximum case temperature of ____ (Go to our web site for up to date warranty information: www.philips.com/advancewarranty).
- 4.3 Manufacturer shall have a twenty-year history of producing electronic ballasts for the North American market.
- 4.4 Ballast shall be controlled by a compatible DALI protocol control.
- 4.5 Ballast shall be Philips Advance part # _____ or approved equal.

Revised 02/01/2008



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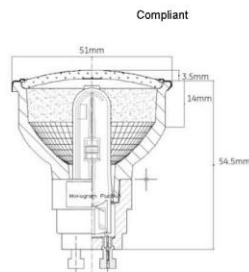


GE
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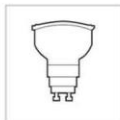
97638 - CMH20MR16/830WFL

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide MR16 - Wide Flood

Photo
Not Available



RoHS



CAUTIONS & WARNINGS

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.

Risk of Burn

- Allow lamp to cool before handling.
- Do not turn on lamp until fully installed.

Warning

- Unexpected lamp rupture may cause injury, fire, or property damage
 - Do not exceed rated voltage.
 - Do not store flammable materials near/below lamp.
 - 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 only properly rated ballast.

Risk of Electric Shock

For additional information, visit www.gelighting.com

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide
Bulb	MR16
Base	GX10
Rated Life	12000 hrs
Lamp Enclosure Type (LET)	Open or enclosed fixtures
LEED-EB MR Credit	183 picograms Hg per mean lumen hour
Additional Info	UV control
Primary Application	Wide Flood

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1000 /1000 /1000
Nominal Initial Lumens per Watt	50
Beam Spread	40 °
Center Beam Candlepower (CBCP)	1500
Color Temperature	3000 K
Color Rendering Index (CRI)	81

ELECTRICAL CHARACTERISTICS

Wattage	20
Burn Position	Universal burning position
Open Circuit Voltage (peak lead ballast)	95 V
Warm Up Time to 90%	3 min
Warm Up Time to 90% (MAX)	

DIMENSIONS

Maximum Overall Length (MOL)	2.28 cm
Bulb Diameter (DIA) (MAX)	1.99 cm

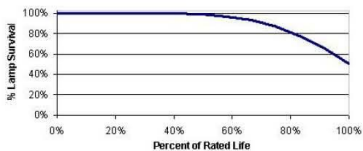
PRODUCT INFORMATION

Product Code	97638
Description	CMH20MR16/830WFL
ANSI Code	C156/M156
Standard Package	Case
Standard Package GTIN	10043168976388
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168976381

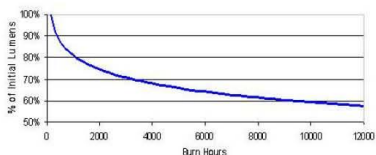
- Do not use where directly exposed to water or outdoors without an enclosed fixture.
- Turn power off before inspection, installation or removal.
- Risk of Fire
 - Keep combustible materials away from lamp.
 - Use fused or thermally protected ballast - see instructions.
 - Use in fixture rated for this product.

GRAPHS & CHARTS

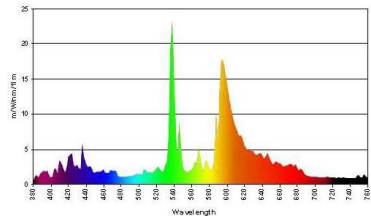
Lamp Mortality



Lumen Maintenance



Spectral Power Distribution



NOTES

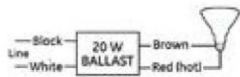
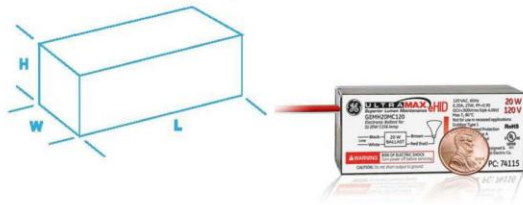
- Rated life based on 11 hours per start
- Use only with electronic ballast.



74115 - GEMH20-MC-120

GE HID UltraMax™ eHID Electronic Low Frequency Ballast

- Light-weight, Low Profile Housing
- Superior low frequency square wave frequency design maximizes performance and life of ceramic metal halide lamps.
- Ultra slim can size for fixture design flexibility



GENERAL CHARACTERISTICS

Application	1- 20W M156 120V Micro Electronic HID
Category	High Intensity Discharge
Ballast Type	Electronic - Low Frequency
Starting Method	n/a
Line Voltage Regulation (+/-)	10 %
Ambient Temperature (MAX)	55 °C(13 °C)
Case Temperature	80 °C(176 °F)
Ballast Factor	Normal-High (1.0)
Power Factor Correction	Active
Circuit Type	Electronic
Sound Rating	A (20-24 decibels)
Enclosure Type	Plastic
Distance to Lamp	8 ft
Additional Info	End of Life Protection (EOL)
Primary Application	Indoor Floodlight

PRODUCT INFORMATION

Product Code	74115
Description	GEMH20-MC-120
Standard Package	Case
Standard Package GTIN	10043168741153
Standard Package Quantity	10
Sales Unit	Case
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	10
UPC	043168741156

DIMENSIONS

Case dimensions			
Length (L)		3.0 in(75.95 mm)	
Width (W)		1.3 in(33.02 mm)	
Height (H)		1.1 in(27.94 mm)	
Mounting dimensions			
Weight		0.38 lb	
Exit Type		Side	
Remote Mounting Distance		8 ft	
Remote Mounting Wire Gauge		18 AWG	
Lead lengths	Qty	Exit	Length (± 1 in.)
Red	1	Left	6.0 (152mm)
White	1	Left	6.0 (152mm)
Brown	1	Left	6.0 (152mm)
Black	1	Left	6.0 (152mm)

ELECTRICAL CHARACTERISTICS

Lamp Operating Frequency	133 Hz
Supply Current Frequency	60 Hz/50 Hz/50 Hz

SAFETY & PERFORMANCE

- cUL Listed
- UL Listed
- RoHS Compliant
- UL 1029 Listed
- FCC Part 18 (Class A) for EMI and RFI Non-Consumer Limits
- ANSI - C82.14-2006
- UL94V0 Flame Retardant
- Short Circuit Protection
- Inherent Thermal Protection

SPECIFICATIONS BY LAMP & LINE VOLTAGE

Lamp # of Lamps by Line	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
M156	1	120	23.0	0.2A	1	0.87		4000V	96V	0.99	0.0°F	1 1/2	

CAUTIONS & WARNINGS

- Caution
- Do not connect Brown or Red wires to ground
 - Not designed for recessed applications.

NOTES

- Not designed for recessed applications.
 - 150C rated lead wires
 - Short Circuit Protection
 - Do not connect Brown or Red wires to ground
- For additional information, visit www.gelighting.com



2 x 6

raye

Application

io Lighting's **raye** is designed for cove and wall slot applications. Two cross sectional profiles are available: 3" h x 3.6" w and 2" h x 6" w. **raye** is ideal for applications where spatial conditions are limited but functional light is required. This low voltage LED-based luminaire offers three luminous intensities for a variety of architectural lighting requirements. **raye**'s optical assembly has been designed to uniformly illuminate the interior surfaces of the cove for a clean appearance, while offering a very precise asymmetric beam projection. **raye** is perfect for delivering light at low angles for shallow cove and wall slot conditions. Individual units may be placed end to end without socket shadows, offering a uniform distribution of light along an architectural reveal. io ensures that each LED is provided thermal and electrical management properties in accordance with the LED manufacturers recommendations. Projected average rated life is 50,000 hours at 70% of lamp lumen output. io utilizes LEDs that have been tested in accordance with IES LM-80 Standards. To ensure proper performance, architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120°F (48.9°C).

Light Output

raye is available with three lumen outputs for white light only. All values below are initial lumens per foot. IES LM-79 format files may be obtained from the factory or downloaded from www.iolighting.com. Consult factory for High CRI options and availability.

	Standard Output	High Output	Very High Output
2700K White:	253 lms/ft	372 lms/ft	557 lms/ft
3000K White:	253 lms/ft	372 lms/ft	557 lms/ft
5000K White:	317 lms/ft	464 lms/ft	697 lms/ft

Construction

Similar to a fluorescent strip light, **raye**'s wire way housing is die formed 20 gauge prime cold rolled steel. Wiring components, drivers and dimming module (optional) are mounted to one piece back housing, permitting removal of cover for maintenance. An anodized aluminum shroud mechanically fastens to the wire way housing allowing easy access. The aluminum shroud has been designed to house the LEDs and optical assembly as well as provide the required thermal management properties for the highest wattage solution available. All fixtures are shipped complete with integral drivers for ease of specification as well as installation.

Mounting Options

raye may be surface mounted within an architectural cove (indirect illumination) or in a perimeter wall slot (direct wall washing). Both conditions require that the architecture of the cove or wall slot be constructed of drywall, sheetrock or an equal material specified by an architect. **raye** is designed to be mechanically fastened either horizontally or vertically to drywall or sheetrock. For a uniform distribution (with no socket shadows) of light, for both coves and wall slots, fixtures should be mounted end-to-end. When installed in continuous rows, the housing forms a continuous wire way.

Electrical

All fixtures are pre-wired and pre-assembled for easy installation. Electronic drivers (power supplies) are integral within the sheet metal wire way housing for both the 18" and 72" units. For detailed information regarding power supplies and dimming options consult the io website, the io catalog (pages 98-100) or an io representative.

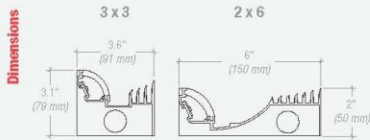
Power Consumption

Standard Output: 5.04 w/ft High Output: 7.40 w/ft Very High Output: 11.10 w/ft

Power consumption does not include power supply losses.

Finish

Anodized aluminum finish is standard.



io raye 3KWHG

lighting facts^{CM}

A Program of the U.S. DOE

Light Output (Lumens)	2041
Watts	71.1
Lumens per Watt (Efficacy)	28

Color Accuracy Color Rendering Index (CRI)	86
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Light Color Correlated Color Temperature (CCT)	3046 (Bright White)
--	----------------------------

Warm White

2700K

Bright White

3000K

Daylight

4500K

5000K

All results are according to IESNA LM-79-09/RE, Approved Method for the Electrical and Photometric Testing of Solid-State Lighting. The U.S. Department of Energy (DOE) verifies product test data and results. Products qualified under the DOE ENERGY STAR® program have the ENERGY STAR mark on this label.

Visit www.lightingfacts.com for the Label Reference Guide.

Registration Number: 6PRAE2M2XG
Model Number: 088 3KWHG G30 172
Type: Cove lighting - asymmetric distribution

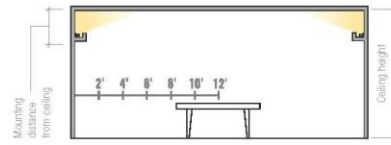
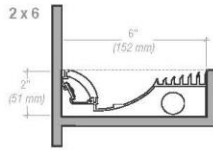
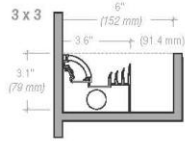
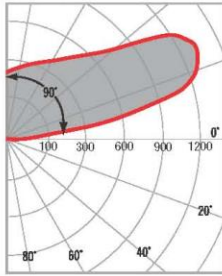
Label references 72" **raye** fixture in Very High Output 3000K. Lighting Facts for additional beam spreads and light output levels may be obtained from io Lighting.

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COVE LIGHTING

Candlepower Distribution Curve
3KVHO - 72"



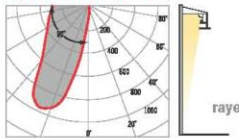
10" mounting distance

Ceiling Height	2'	4'	6'	8'	10'	12'
11'-6" (3.51)	17.5fc	17.9fc	15.7fc	13.9fc	12.4fc	11.9fc
10'-6" (3.20m)	19.1fc	18.4fc	16.1fc	13.5fc	11.8fc	11.2fc
9'-6" (2.90m)	21.4fc	20.1fc	16.6fc	13.2fc	11.1fc	10.5fc
8'-6" (2.59m)	23.7fc	21.3fc	16.3fc	12.2fc	10.0fc	9.3fc

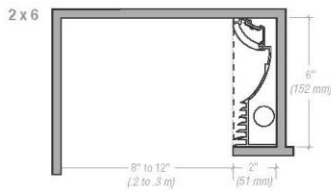
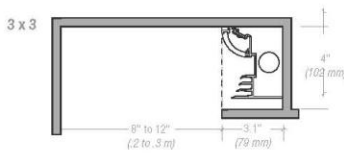
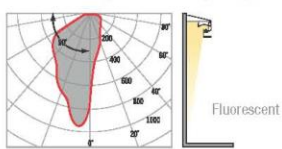
*Calculations based on 3KVHO LEDs.

WALL SLOT COMPARISON

Candlepower Distribution Curve
raye 3KVHO - 72" (11.1 w/ft)



Candlepower Distribution Curve
Fluorescent 1 Lamp T5HO Wall Slot (15 w/ft)



Application Notes

- For wall slot and cove applications, there should not be more than 6" of lampless (fixtureless) space at the end of all run lengths.
- For wall slot and cove applications, **raye** luminaires shall be butted end to end to eliminate any opportunity for socket shadows.
- For ease of maintenance, the Printed Circuit Board (PCB) Assembly may be removed from the all **raye** housings via a quick disconnect and a removable extruded aluminum sliding tray (which contains the PCB). This can be accomplished without removing the wireway which is connected to line voltage.

LIGHT OUTPUT CONVERSION TABLE

White Light Output	3000K S.O.	3000K H.O.	3000K V.H.O.	5000K S.O.	5000K H.O.	5000K V.H.O.
Light Output Multiplier	0.45 ⁽¹⁾	0.67 ⁽¹⁾	1.0 ⁽¹⁾	0.57 ⁽¹⁾	0.88 ⁽¹⁾	1.25 ⁽¹⁾

Note: 2700K and 3000K have same light output.

Color Light Output	RED	GREEN	BLUE	AMBER
Light Output Multiplier	0.53 ⁽²⁾	0.51 ⁽²⁾	0.30 ⁽²⁾	0.51 ⁽²⁾

Note: Baseline is 3KVHO.

IES format photometrics may be downloaded from www.ioighting.com

0
08
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io
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6

Order Code

1. **SERIES**
08 raye

2. **COLOR**
27K White 2700K⁽¹⁾
27KH0 White 2700K⁽¹⁾
27KVHO White 2700K⁽¹⁾
3K White 3000K⁽¹⁾
3KH0 White 3000K⁽¹⁾
3KVHO White 3000K⁽¹⁾
5K White 5000K⁽¹⁾
5KH0 White 5000K⁽¹⁾
5KVHO White 5000K⁽¹⁾
R Red⁽³⁾
G Green⁽²⁾
B Blue⁽²⁾
A Amber⁽³⁾

3. **MOUNTING**
C33 Cove 3" x 3"
C26 Cove 2" x 6"
W33 Wall slot 3" x 3"
W26 Wall slot 2" x 6"

4. **FINISH**
1 Anodized aluminum

5. **LENGTH**
UNITS (ACTUAL)
18 18" (17.02")
72 72" (68.02")

FOR CONTINUOUS ROW
Specify length (e.g., 51'-0")
Note: Overall length must be multiples of 72" and 18" lengths.

6. **VOLTAGE / DIMMING**
1 120v
2 277v
3 120v w/dim
4 277v w/dim
5 Other

SSL Chromaticity Standard: ANSI C78.337		
Color	Nominal CCT	Target CCT & Tolerance (K)
White	2700K	2725 ±145
White	3000K	3045 ±175
White	5000K	5028 ±283

For Metric Conversion		
1"	1"	1"
25.4mm	2.54cm	0.3m

¹ White light variance between LEDs within a single fixture will not exceed ANSI Blinking Standards.
² Green, Blue and Amber only available in 11.1 w/ft.
³ Red only available in 8.4 w/ft.

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line™ .75

SYMMETRIC

Application

io Lighting's **line series .75** is approximately .75" x .75" in cross section. UL listed for dry locations, its low profile housing enables functional luminous intensities from "tight" architectural details such as niches, coves and casework. Similar to halogen light sources, LEDs are point sources that offer superior definition to three-dimensional objects and sparkle to reflective surfaces.

series .75 is a low voltage linear accent luminaire that may be ordered in incremental nominal lengths that range from 6" to 96". Optional beam spreads along the perpendicular axis of the fixture include 10°, 45° and 65°. For details on the asymmetric beam spread, see dedicated specification sheet. io ensures that each LED is provided thermal and electrical management properties in accordance with the LED manufacturers recommendations. Projected average rated life is 50,000 hours at 70% of lamp lumen output. Contact factory for IES LM-80 compliance. To ensure proper performance, architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120°F (48.9°C).

Light Output

line series .75 is available with three lumen outputs for white light only. Red, green, blue and amber are available in high output only. All values below are initial lumens per foot. IES LM-79 format files may be obtained from the factory or downloaded from www.iolighting.com. Consult factory for High CRI options and availability.

	Standard Output	Mid Output	High Output
2700K White:	68 lms/ft	126 lms/ft	180 lms/ft
3000K White:	68 lms/ft	126 lms/ft	180 lms/ft
5000K White:	91 lms/ft	168 lms/ft	240 lms/ft

Construction

Extruded aluminum housing coupled with a patented optical assembly may not be disassembled for re-lamping. Customized acrylic optics offer very high transmissivity, UV stability and excellent longevity. Three mounting bracket options include: surface, side surface and field adjustable. Bracket material is composed of stainless steel for ease of installation and removal as required.

Electrical

Field adjustable 4'-0" 22 AWG, 300 volt rated power cords are supplied with strain reliefs. 24 volt 96 watt power supply will be provided as a standard if not specified otherwise. For detailed information regarding daisy chain limitations, remote distance limitations, power supply options, and dimming options consult the io website, the io catalog (pages 98-100) or an io representative.

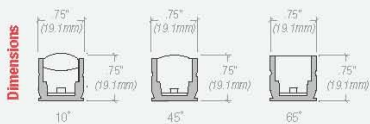
Power Consumption

Standard Output:	2.92 w/ft	Mid Output:	5.34 w/ft	High Output:	7.62 w/ft
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Power consumption does not include power supply losses.

Finish

Anodized aluminum finish is standard. Custom finishes may be available upon request.



io line .75 45°, 3KH0

lighting facts™

A Program of the U.S. DOE

Light Output (Lumens)	300
Watts	20.9
Lumens per Watt (Efficacy)	14
Color Accuracy Color Rendering Index (CRI)	72
Light Color Correlated Color Temperature (CCT)	3003 (Bright White)

All results are according to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid State Lighting. The U.S. Department of Energy (DOE) verifies product field data and results.

Visit www.lightingfacts.com for the Label Reference Guide.

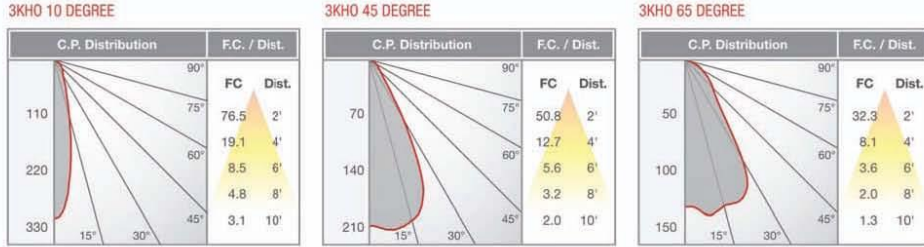
Registration Number: 6 PRA-JA/J15/J
Model Number: 033.1SKHO-45-1.052
Type: Shelf-mounted track light

Label references 30° line .75 symmetric fixture with a 45° beam spread in High Output 3000K. Lighting Facts for additional beam spreads and light output levels may be obtained from io Lighting.

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Light Output / Distributions / Electrical Feed Options



Charts reference 30° line. 75 symmetric fixture in High Output 3000K.

LIGHT OUTPUT CONVERSION TABLE

White Light Output	3000K S.O.	3000K M.O.	3000K H.O.	5000K S.O.	5000K M.O.	5000K H.O.
Light Output Multiplier	0.38 ⁽¹⁾	0.70 ⁽¹⁾	1.0 ⁽¹⁾	0.51 ⁽¹⁾	0.93 ⁽¹⁾	1.33 ⁽¹⁾

Note: 2700K and 3000K have same light output.

Color Light Output	RED	GREEN	BLUE	AMBER
Light Output Multiplier	0.53 ⁽²⁾	0.51 ⁽²⁾	0.30 ⁽²⁾	0.51 ⁽²⁾

IES format photometrics may be downloaded from www.ialighting.com.

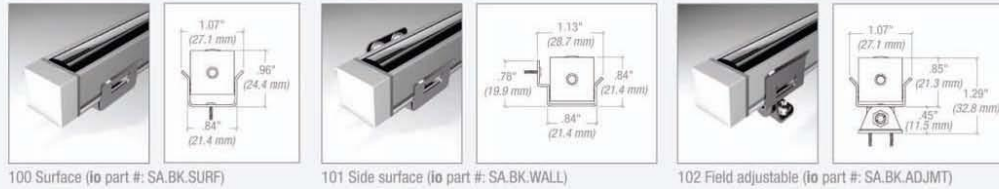
NEW FIELD CONFIGURABLE ELECTRICAL FEED



Note: Electrical contractor may adjust orientation of electrical feed in the field.



Mounting Options



Order Code

0	03	1	2	3	4	5	6	7	8	9	10																	
lo	1	2	3	4	5	6	7	8	9	10																		
1. LINE SERIES	03 .75 SO, MO or HO	4. DISTRIBUTION	10 10 Degree	45 45 Degree	65 65 Degree	7. LENGTH	UNITS (ACTUAL)	01 6" (6.53")	02 12" (12.22")	03 18" (17.97")	04 24" (23.53")	05 30" (29.22")	06 36" (34.97")	07 42" (40.53")	08 48" (46.22")	09 54" (51.97")	10 60" (57.53")	11 66" (63.22")	12 72" (68.97")	13 78" (80.22") ⁽³⁾	14 84" (85.97") ⁽³⁾	15 90" (91.53") ⁽³⁾	16 96" (97.22") ⁽³⁾	8. ELECTRICAL FEED	2 One end feed	22 Double end feed	10. SPECIFY DRIVER / DIMMING	Note: If not specified otherwise, lo will supply 96 watt drivers. Refer to pages 98-100 for Power Supply options or download Power Supply specification sheet from www.ialighting.com .
2. LOCATION	1 Interior	5. MOUNTING	100 Surface	101 Side surface	102 Field adjustable	6. FINISH	1 Anodized aluminum	2 Anodized custom color	9. VOLTAGE / DIMMING	1 120v	2 277v	3 120v w/dim	4 277v w/dim	5 Other														
3. COLOR	27K White 2700K (Standard) ⁽¹⁾	27KMO White 2700K (Mid Output) ⁽¹⁾	27KHO White 2700K (High Output) ⁽¹⁾	3K White 3000K (Standard) ⁽¹⁾	3KMO White 3000K (Mid Output) ⁽¹⁾	3KH0 White 3000K (High Output) ⁽¹⁾	5K White 5000K (Standard) ⁽¹⁾	5KMO White 5000K (Mid Output) ⁽¹⁾	5KH0 White 5000K (High Output) ⁽¹⁾	R Red ⁽²⁾	G Green ⁽²⁾	B Blue ⁽²⁾	A Amber ⁽²⁾															

Footnotes

- White light variance between LEDs within a single fixture will not exceed ANSI Binning Standards.
- Refer to conversion table for output. Only available in 7.6 watt.
- High Output only available in lengths up to 72".

SSL Chromaticity Standard: ANSI C78.337		
Color	Nominal CCT	Target CCT & Tolerance (K)
White	2700K	2725 ± 145
White	3000K	3045 ± 175
White	5000K	5028 ± 283

For Metric Conversion		
1"	1"	1"
25.4mm	2.54cm	0.3m



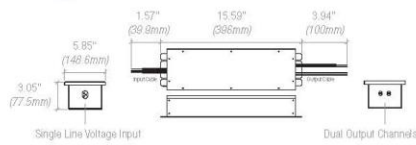
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power supplies

THE FOLLOWING POWER SUPPLIES HAVE BEEN UL LISTED FOR USE WITH **io** LUMINAIRES.

200-Watt Driver

IO PART#: DR200AM



Note: For higher IP enclosure alternatives contact **io** Lighting for availability.

REMOTE DISTANCE

7'-0" (2.1m)	w/22AWG
18'-0" (5.5m)	w/18AWG
46'-0" (14m)	w/14AWG
71'-0" (21.6m)	w/12AWG

Key Features

- Recommended for long continuous runs
- Suitable for dry, damp and wet locations
- Built in wiring compartments for easy installation
- Built in EMI Filter for low noise
- Class 2 w/dual 24v output

Specifications

Location: **Wet IP65**
Output Voltage: **24v DC**
Output Power: **200w (96 w/channel)**
Input Voltage: **90 to 264 VAC**
Frequency: **47 to 63 HZ**
Ambient Temp: **-20°C to +50°C**
Weight: **6.61 lbs**
Dimming: **Not Available**

200W	Max Run Length in Series	Max Run Lengths in Parallel
line .75 - SO	16'	64'
line .75 - MO	9'	36'
line .75 - HO and color	6'	24'
line 1.5 - SO	15'	60'
line 1.5 - MO	7.5'	36'
line 1.5 - HO	6'	24'
LEDge - SO	9'	36'
LEDge - HO	6'	24'
luxrail - SO	33'	132'
luxrail - HO and color	6'	24'
line 2.0 - SO	18'	36'
line 2.0 - HO	12'	24'
line 2.0 - VHO	7.5'	15'

277 NOT AVAILABLE

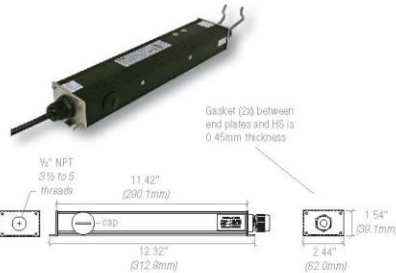
96-Watt Driver

WITH DIMMING OPTION

IO PART#: DR96MGD

WITHOUT DIMMING OPTION

IO PART#: DR96MGND



Note: For higher IP enclosure alternatives contact **io** Lighting for availability.

REMOTE DISTANCE

7'-0" (2.1m)	w/22AWG
18'-0" (5.5m)	w/18AWG
46'-0" (14m)	w/14AWG
71'-0" (21.6m)	w/12AWG

Key Features

- Integrated dimming available
- Suitable for dry, damp and wet locations
- Locations with an adequate end plate and connectors
- Built in wiring compartments for easy installation

Specifications

Location: **Wet IP66**
Output Voltage: **24v DC**
Output Power: **96w**
Input Voltage: **100 to 277 VAC**
Frequency: **47 to 63 HZ**
Ambient Temp: **-30°C to +70°C**
Dimming: **Integrated Available**

96W	Max Run Length in Series	Max Run Lengths in Parallel
line .75 - SO	16'	32'
line .75 - MO	9'	18'
line .75 - HO and color	6'	12'
line 1.5 - SO	15'	30'
line 1.5 - MO	7.5'	18'
line 1.5 - HO	6'	12'
LEDge - SO	9'	18'
LEDge - HO	6'	12'
luxrail - SO	33'	66'
luxrail - HO and color	6'	12'
line 2.0 - SO	18'	18'
line 2.0 - HO	12'	12'
line 2.0 - VHO	7.5'	7.5'

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allscope@philips.com
www.allscope.net

SL-23

SL

- Landscape Areas
- Wall Wash
- Flagpole Lighting
- Building Accent
- Driveway Marker
- Sign Lighting



Specifications



Certifications ETL and CETL listed for wet location, direct burial, and concrete pour. Certified to IP65 and IP67 to ensure protection against the harshest environments. IEC compliant versions available, consult factory.

Lamp/Ballast Housing Compression molded Rhinolite™ composite material, structurally reinforced with glass fibers. Superior resistance to ultraviolet degradation and corrosion resistant in harsh environments. Trim Rng (TR) and Debris Cover (DC) supplied standard.

Splice Compartment Supplied with two 3/4" NPT conduit entrances. Connection to ballast compartment by way of anti-wicking device. Sealed with gasketed die cast aluminum cover plate. Suitable for through wiring.

Lens Standard 3/8" clear tempered flat borosilicate glass (F) or ADA anti slip and walkover clear tempered flat borosilicate glass (ADA). Flat lenses will withstand loads up to 200 PSI. Sealed to housing with high temperature injection molded silicone gasket. Optional linear spread lens also available.

Lens Frame Heavy duty die cast bronze lens frame is supplied as standard. Fastened to housing with six captive 10-24 stainless steel Allen cap screws.

Reflectors Spun aluminum highly specular Alzak™ finish for either NEMA type 1 or 2 spot (SPT) or NEMA type 3 or 4 flood (FLD) distributions. Field adjustable up to 25° tilt and 360° horizontal rotation. NOTE: Tilt adjustment varies by lamp type. A segmented fluorescent reflector is available for up to 42W lamps.

Lamp Holder Porcelain 4kv pulse rated medium base for HID and Incandescent lamp sources.

Options Cast aluminum Convex Rock Guard (CR), Directional Shield (DS), and Driveway Marker (DM). Internal Glare Shield (IGS), Internal Hex Cell Louver (HL), Glass Color Filter (GF), Grout Mask (GM), Die cast bronze Port Hole (PH).


Finish Housing Black (BK). Options can be painted in standard or custom colors. Powder Coat Standard.

Safety Caution: Care should be taken when specifying fixtures for use in pedestrian walkways to avoid problems that may be caused by high lens temperatures. Consult factory for more information.

Warning Caution: Care should be taken not to install in-ground fixtures in areas where water can stand for prolonged periods of time. Sufficient drainage must be provided to avoid problems. Consult factory for more information.

SL-23

PROJECT
FIXTURE TYPE
CATALOG#

 Some luminaires use fluorescent or high intensity discharge (HID) lamps that contain small amounts of mercury. Such lamps are labeled "Contains Mercury" and/or with the symbol "Hg". Lamps that contain mercury must be disposed of in accordance with local requirements. Information regarding lamp recycling and disposal can be found at www.lamprecycle.org

Product Order Guide

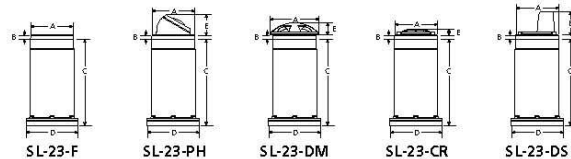
Series	Max Watts	Lamp Type	Voltage ⁶	Optics	Lens	Finish ⁶	Options	
SL-23	Fluorescent							
	13CF	CF ¹	120	SPT ¹	Spot	F ¹ Clear Flat	BK ⁶ Black	DM ¹ Driveway Marker ^{2,5,7}
	26CFQ	CFQ ¹	208			ADA ^{1,3} ADA Walkover	BZ ⁶ Bronze	CR ¹ Convex Rockguard ^{5,7}
	42CFT	CFT ¹	240	WW ¹ Wallwash	LS ¹ Linear Spread	WH ⁶ White	GR ⁶ Green	DS ¹ Directional Shield ^{5,7}
			277	FL ¹ Fluorescent		NA ⁶ Natural Alum	PH ⁴ Porthole	
	High Pressure Sodium							
	70HPS	E17 ¹		NFLD ¹ Narrow Flood		GY ⁶ Gray	HL	IGS ¹ Glare Shield
				MFLD ¹ Medium Flood		CC ⁶ Custom Color	GM	Hex Cell Louver
	Metal Halide							
	70MH	E17 ¹					GF	Glass Color Filter
	70MH	Par30 ^{1,8}					GM	Grout Mask
	39MH	Par20 ⁸					AHOT	AIM-HOT™
							LFSS ¹	Stainless Steel Lens Frame
							STA ¹	Square Top Adaptor ^{5,7}
	70MH	T6 or T4 ¹						
	70MH	R111 ^{1,8}						
	20MH	BT5 ¹	120					
	20MH	T4 ¹	120/277					
	Incandescent/Halogen/Low Voltage							
	75INC	Par30 ^{1,8}	120					
	100INC	T4mini ¹	120					
	50INC	Par20 ⁸	120					
	75INC	MR16 ⁸	120/277/12					
	50INC	AR111 ^{1,8}	120/277/12					
	LED							
	1X5 5WLED	CUS ^{1,9}	120-277	10,35,45	White (3050°K/ 4700°K)			
	Titan 25WW	CUS3 ^{1,9}	120-277	25,35,45	Warm White (3050°K)			
	Titan 25CW	CUS3 ^{1,9}	120-277	25,35,45	Cool (Daylight) White (4700°K)			
	Titan 25FIX	CUS3 ^{1,9}	120-277	25,35,45	Fixed Color Red, Green, Blue, Amber			

¹ Not available with the PH Porthole option, use Par20 or MR16 only. CF= single bias, CFQ = double bias, CFT = triple bias.
² The DM Driveway Marker can be used with any lamp option. Note: E17 Lamps 150W and below are medium base.
³ Use HPBB version if greater than 39W.
⁴ The PH Porthole option is supplied as standard in die cast bronze.
⁵ These options are supplied in heavy wall cast aluminum with baked enamel painted finish.
⁶ Consult factory for other voltages and finishes. Powder Coat Standard.
⁷ Consult factory for cast bronze options.
⁸ Does not require internal optics.
⁹ The CUS version uses a 5W Atlas from Lamina. The CUS3 uses a 25W Titan from Lamina with no tilt.

Example: SL-23-70MH-T6-277-SPT-F-BK-DS

Luminaire Dimensions

Luminaire	A		B		C		D		E		Weight	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	lbs.	kg
SL-23-F	6.95	177	0.75	19	14.10	358	8.50	216	n/a	n/a	19.0	8.6
SL-23-PH	6.95	177	0.75	19	14.10	358	8.50	216	3.35	85	21.0	9.5
SL-23-DM	8.00	203	0.75	19	14.10	358	8.50	216	2.00	51	21.0	9.5
SL-23-CR	6.95	177	0.75	19	14.10	358	8.50	216	1.00	25	19.5	8.8
SL-23-DS	6.95	177	0.75	19	14.10	358	8.50	216	3.85	98	20.0	9.1



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Due to a program of continuous improvement, ALLSCAPE reserves the right to make any variation in design or construction to the equipment described.



MasterColor® CDM-TC T4

MasterColor CDM-TC 20W/830 T4 1CT

The Elite family is at the very top of the MasterColor® CDM range, and gives a unique combination of unbeatable light quality and consistent performance over lifetime. While keeping running costs low. The Philips MasterColor® 3000KTubular Single-Ended T4 lamp is a compact, energy efficient, ceramic metal halide lamp that provides crisp, sparkling light.

Product data

• Product Data

Product number	404939
Full product name	MasterColor CDM-TC 20W/830 T4 1CT
Short product name	MASTERC CDM-Tc 20W/830 G8.5.CT/12
Pieces per Sku	1
eop_pck_cfg	12
Skus/Case	12
Bar code on pack	46677404932
Bar code on case	50046677404937
Logistics code(s)	928197305117
tpd_ilcos_cd	MT-20/30/1A-H-G8.5
eop_net_weight_pp	0.009 kg

• General Characteristics

Base	G8.5
Bulb	T4 [T 14 mm]
Bulb Material	FadeBlock Quartz
Bulb Finish	Clear
Operating Position	Universal [Any or Universal (U)]
Avg. Hrs. Life	12000 hr
Life to 5% failures EL	9000 hr
Life to 20% failures EL	11000 hr
Life to 10% failures EL	10000 hr

• Electrical Characteristics

System Power EL	24 W
Watts	20 W
Lamp Wattage EL	22 W
Lamp Voltage	100 V
Lamp Current EL	0.22 A
Ignition Time	30 s

Run-up time 90%	3 min
Re-ignition Time [min]	15 min
Dimmable	No

• Environmental Characteristics

Mercury (Hg) Content	2.3 mg
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• Light Technical Characteristics

Color Code	830 [CCT of 3000K]
Color Rendering Index	82 (min), 85 (nom) Ra8
Color Designation	Warm White
Color Temperature	3000 K
Color Temperature technical	3000 K
Chromaticity Coordinate X	0.432 -
Chromaticity Coordinate Y	0.387 -
Initial Lumens	1650 Lm
Luminous Efficacy Lamp EL	75 Lm/W
Lumen Maintenance EL 2000h	79 %
Lumen Maintenance EL 5000h	70 %
Lumen Maintenance EL 10000h	59 %

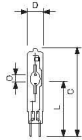
• UV-related Characteristics

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MasterColor® CDM-TC T4

- **Product Dimensions**
 - Overall Length C 85 mm
 - Diameter D 15 mm
 - Light Center Length L 51 (min), 52 (nom), 53 (max) mm
 - Arc Length O 3 mm
 - Light Center Length L 2 in
- **Luminaire Design Requirements**
 - Max Overall Length (MOL) - C 3.34375 in
 - Diameter D 0.5 in
 - Pinch Temperature 300 C
 - Bulb Temperature 320 C

Dimensional drawing



CDM-TC 20W

Product	C (°Max)	D (°Max)	L (°Min)	L (°Norm)	L (°Max)	O (°Min)	O (°Norm)	O (°Max)
CDM-TC 20W/830 GR5	85	15	51	52	53	-	3	-

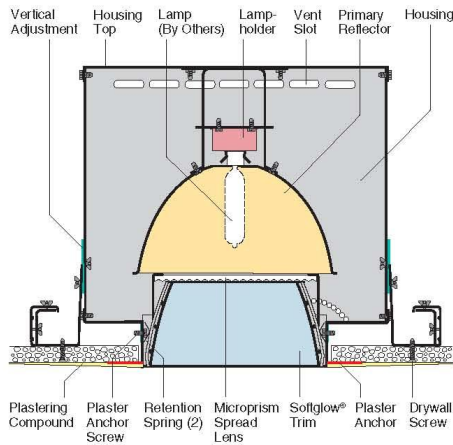


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www.philips.com/lighting

2010, December 19
 data subject to change



H8606FM

**FMH
4-11**

Flush Mount Downlight
20-39W T-4 Metal Halide Lamp
39-70W T-6 Metal Halide Lamp
6" Square Parabolic Trim

Flush Mount

Kurt Versen's flush mount fixtures eliminate overlapping flanges and lock into the ceiling for a unique, finished appearance. A clean, uncluttered ceiling emphasizes the attention to detail, enhancing the impact of the interior environment. It is a factory installed option with a proven installation technique.

Optics and Applications

A microprism spread lens is supplied to satisfy code requirements and for brightness control. For general or task lighting in low to medium height ceilings.

Design Features

The trim is stabilized to prevent racking and is retained by constant pressure springs. Flush mount design resists cracking and chipping by mechanically fastening fixture to drywall. To simplify installation, three adjustment mechanisms adapt the fixture to ceiling conditions. Adjustable mounting rails fit different support systems and accommodate ceiling thicknesses from 3/8" to 7/8". Maximum extension is 26". Top or bottom service.

Finish

Housing and structural parts are painted matte black to suppress stray light leaks. The trim is anodized Softglow® clear. Special finishes and colors are available.

Ballast

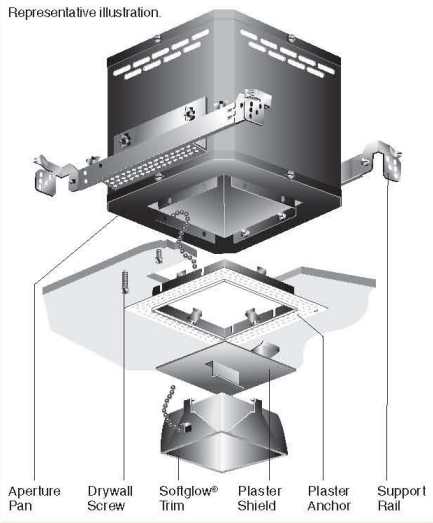
Integral, encased, electronic ballast is standard. Features quiet operation, thermal protection and lamp shutdown at end of life. Input voltage is 120V or 277V, power factor is >.90.

General

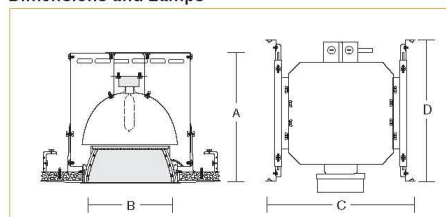
Fixtures are pre-wired and thermally protected, UL and C-UL listed for damp location and eight wire 75°C branch circuit wiring. Union made IBEW.

Accessories

- SB Softglow black. BR Bright trim finish.
 - SG Softglow gold. LL Linear lens.
 - SH Softglow mocha. LP Large prism lens.
 - SP Softglow graphite. FR Frosted lens, specify lens type.
 - ST Softglow titanium. WR White trim return.
 - SW Softglow wheat. V347 347 volt ballast.
 - SY Softglow pewter. SZ Softglow bronze. contact the factory.
 - F Ballast fuse. FMW Flush mount wood, contact factory.
 - WHT White complete trim.
 - EC Emergency circuit with mini-can socket and leads.*
 - TLI 60W emergency incandescent lamp.
 - AOE1 Electronic ballast Auto-On restrike system 120V.*
 - AOE2 Electronic ballast Auto-On restrike system 277V.*
- *Use open rated 60W max. auxiliary incandescent lamp.



Dimensions and Lamps



Number	A Depth	B Aperture	C Width	D Length	Lamps
H8606FM*	10 7/8" 277mm	6" sq. 153mm	15" 381mm	14 1/4" 362mm	20-39W T-4 MH, 39-70W T-6 MH, G-12 base
H8606FM-150	10 7/8" 277mm	6" sq. 153mm	17 3/4" 451mm	17" 432mm	150W T-6 MH G-12 base

*To specify add watts and volts for proper ballast, e.g. H8606FM-39277.



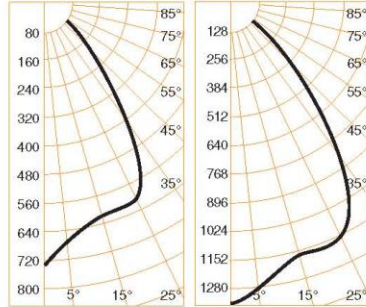
FMH H8606FM 4-11

Performance Datachart

Single Unit, Initial Footcandles, 30° Work Plane					Ceiling to Floor	Multiple Units, Initial Footcandles, 30° Work Plane				
H8606FM 20W T-6 MH Read Top Data					8'	Ceiling 80% Walls 50% Floor 20%				
H8606FM 39W T-6 MH Read Bottom Data						Spacing is Maximum Over Work Plane				
Nadir	15°		25°			35°				
FC	FC	Diam	FC	Diam	FC	Diam	Spacing	RCR 1	RCR 3	RCR 8
24	18	3'	15	5'	7	8'	6'	26	22	15
44	3'	3'	29	5'	13	8'	6'	50	42	29
13	10	4'	8	7'	4	11'	8'	14	12	8
24	19	4'	15	7'	7	11'	8'	27	23	16
8	6	5'	5	9'	2	13'	11'	9	8	5
15	12	5'	10	9'	4	13'	11'	17	14	10
5	4	6'	3	11'	2	16'	13'	6	5	3
10	8	6'	7	11'	3	16'	13'	11	10	7
4	3	7'	3	13'	1	19'	15'	4	4	3
7	6	7'	5	13'	2	19'	15'	8	7	5

Single Unit, Initial Footcandles, 30° Work Plane					Ceiling to Floor	Multiple Units, Initial Footcandles, 30° Work Plane				
H8606FM 70W T-6 MH Read Top Data					12'	Ceiling 80% Walls 50% Floor 20%				
H8606FM 150W T-6 MH Read Bottom Data						Spacing is Maximum Over Work Plane				
Nadir	15°		25°			35°				
FC	FC	Diam	FC	Diam	FC	Diam	Spacing	RCR 1	RCR 3	RCR 8
28	22	5'	19	9'	9	13'	11'	30	25	17
108	77	5'	44	9'	14	13'	8'	144	125	91
19	15	6'	13	11'	6	16'	14'	21	17	12
74	53	6'	30	11'	9	16'	9'	98	86	62
14	11	7'	9	13'	4	19'	16'	15	12	9
53	38	7'	22	13'	7	19'	11'	71	62	45
10	8	8'	7	14'	3	22'	18'	11	9	6
41	29	8'	16	14'	5	22'	13'	54	47	34
8	6	9'	5	16'	3	25'	21'	9	7	5
32	23	9'	13	16'	4	25'	14'	42	37	27

Candlepower Distribution



H8606FM 20W T-6 MH Clear Eff. 54% S/M 1.12
H8606FM 39W T-6 MH Clear Eff. 54% S/M 1.13

Candelas

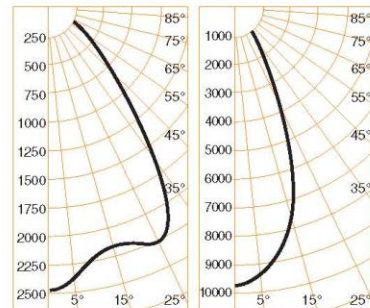
	20W	39W
0	1700*	3200*
5	718	1340
10	683	1290
15	635	1196
20	613	1164
25	613	1164
30	531	1012
35	384	733
40	257	487
45	150	290
50	82	155
55	31	70
60	6	25
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens

Coefficients of Utilization

Ceiling	80%		70%		50%		30%		0	
	70	50	30	10	50	10	50	10	50	10
Wall %	70	50	30	10	50	10	50	10	50	10
RCR	Zonal Cavity Method - Floor Reflectance 20%									
1	62	61	59	58	60	57	57	55	55	54
2	59	56	53	51	55	51	53	50	51	49
3	55	51	48	46	51	46	49	45	48	44
4	52	47	44	41	47	41	45	41	44	40
5	49	44	40	37	43	37	42	37	41	37
6	46	40	37	34	40	34	39	34	38	33
7	43	38	34	31	37	31	36	31	36	31
8	41	35	31	29	35	29	34	28	33	28
9	39	33	29	26	32	26	32	26	31	26
10	36	30	27	24	30	24	30	24	29	24

H8606FM 20W T-6 MH Clear x .97 H8606FM 70W T-6 MH Clear
H8606FM 39W T-6 MH Clear H8606FM 150W T-6 MH Clear x 1.07



H8606FM 70W T-6 MH Clear Eff. 55% S/M 1.18
H8606FM 150W T-6 MH Clear Eff. 57% S/M .81

	70W	150W
0	6200*	13500*
5	2497	9731
10	2387	9474
15	2225	8738
20	2200	7749
25	2247	6737
30	2258	5283
35	2010	3751
40	1489	2237
45	1002	1310
50	603	723
55	322	385
60	145	188
65	50	73
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens

Notes

- All data calculated using clear Softglow® trims.
- Datachart spacing is rounded off to the nearest foot.
- Datachart degree headings measure one side from nadir. Diameter data includes both sides. Therefore the 15° column value describes a 30° pattern diameter at the work plane 30" above the floor. Footcandle values are at the diameter edge.

 Kurt Versen Company, Westwood, New Jersey



MasterColor® CDM-TC T4

MasterColor CDM-TC 20W/830 T4 1CT

The Elite family is at the very top of the MasterColor® CDM range, and gives a unique combination of unbeatable light quality and consistent performance over lifetime. While keeping running costs low. The Philips MasterColor® 3000KTubular Single-Ended T4 lamp is a compact, energy efficient, ceramic metal halide lamp that provides crisp, sparkling light.

Product data

• Product Data

Product number	404939
Full product name	MasterColor CDM-TC 20W/830 T4 1CT
Short product name	MASTERC CDM-Tc 20W/830 G8.5.CT/12
Pieces per Sku	1
eop_pck_cfg	12
Skus/Case	12
Bar code on pack	46677404932
Bar code on case	50046677404937
Logistics code(s)	928197305117
tpd_ilcos_cd	MT-20/30/1A-H-G8.5
eop_net_weight_pp	0.009 kg

• General Characteristics

Base	G8.5
Bulb	T4 [T 14 mm]
Bulb Material	FadeBlock Quartz
Bulb Finish	Clear
Operating Position	Universal [Any or Universal (U)]
Avg. Hrs. Life	12000 hr
Life to 5% failures EL	9000 hr
Life to 20% failures EL	11000 hr
Life to 10% failures EL	10000 hr

• Electrical Characteristics

System Power EL	24 W
Watts	20 W
Lamp Wattage EL	22 W
Lamp Voltage	100 V
Lamp Current EL	0.22 A
Ignition Time	30 s

Run-up time 90%	3 min
Re-ignition Time [min]	15 min
Dimmable	No

• Environmental Characteristics

Mercury (Hg) Content	2.3 mg
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• Light Technical Characteristics

Color Code	830 [CCT of 3000K]
Color Rendering Index	82 (min), 85 (nom) Ra8
Color Designation	Warm White
Color Temperature	3000 K
Color Temperature technical	3000 K
Chromaticity Coordinate X	0.432 -
Chromaticity Coordinate Y	0.387 -
Initial Lumens	1650 Lm
Luminous Efficacy Lamp EL	75 Lm/W
Lumen Maintenance EL 2000h	79 %
Lumen Maintenance EL 5000h	70 %
Lumen Maintenance EL 10000h	59 %

• UV-related Characteristics

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MasterColor® CDM-TC T4

• Product Dimensions

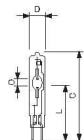
Overall Length C	85 mm
Diameter D	15 mm
Light Center Length L	51 (min), 52 (nom), 53 (max) mm
Arc Length O	3 mm
Light Center Length L	2 in

Max Overall Length (MOL) - C	3.34375 in
Diameter D	0.5 in

• Luminaire Design Requirements

Pinch Temperature	300 C
Bulb Temperature	320 C

Dimensional drawing



CDM-TC 20W

Product	C (Nom)	D (Nom)	L (Min)	L (Nom)	L (Max)	O (Min)	O (Nom)	O (Max)
CDM-TC 20W/830 GR5	85	15	51	52	53	-	3	-



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focus™ 3



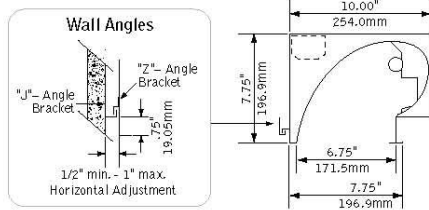
features

High performance perimeter open wall washing system.

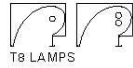
Luminaire alignment is maintained with continuous angle and splice brackets.

Focus™ 3 offers excellent vertical illumination without shielding.

dimensional data



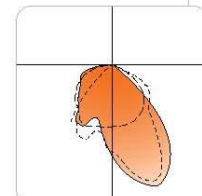
lamping options



august 2010 C

performance

1-Lamp T8
81% Efficiency
1437cd @ 15°

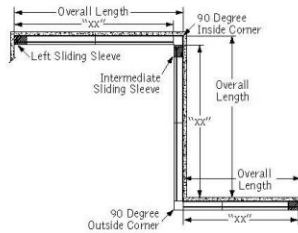


Visit focalpointlights.com for complete photometric data.

fixture:
project:

details

typical run layout



Luminaires must be installed prior to ceiling.
Start run from corner with any standard luminaire.
Corner to corner runs end with an intermediate sleeve.

sliding sleeves



Fractional Dimensions up to 12" are taken up by the use of a sliding sleeve.
"J" and "Z" angle brackets must be cut to length in field.

specifications

construction

- 20 Ga. steel housing.
- 20 Ga. steel T-rail mates with ceiling.
- 18 Ga. internal bulkheads join luminaires.
- 18 Ga. galvanized steel splice brackets are provided to ensure precise luminaire alignment.
- 20 Ga. steel continuous wall angles are provided to ensure horizontal alignment at wall.
- Luminaires are available up to 8' nominal lengths.

- 4' unit weight: 36 lbs
- 8' unit weight: 49 lbs

optic

CNC roll-formed semi-specular .024" aluminum front reflector with specular .024" aluminum back reflector.

electrical

Electronic ballasts are thermally protected and have a Class "P" rating.
Optional dimming ballasts available.
Consult factory for dimming specifications and availability.
UL and cUL listed.

finish

Polyester powder coat applied over a 5-stage pre-treatment.
Standard luminaire housing finished in Matte Satin White.

ordering

luminaire series FW3

Focus 3 FW3

shielding NS

No Shielding, Open Optic NS

lamping

- One Lamp T8 1T8
- Two Lamp T8 2T8
- One Lamp T5 1T5
- Two Lamp T5 2T5
- One Lamp T5HO 1T5HO
- Two Lamp T5HO 2T5HO

circuit

- Single Circuit 1C
- Dual Circuit (Two lamps only) 2C

voltage

- 120 Volt 120
- 277 Volt 277
- 347 Volt 347

ballast

- Electronic Instant Start <20% THD E
- Electronic Program Start <10% THD S
- Electronic Dimming Ballast* D

mounting RC

Recessed RC

factory options

- Air Return AR
- Emergency Circuit* EC
- Emergency Battery Pack* EM
- Flanged End (specify when run does not terminate at a wall) FL
- HLR/GLR Fuse FU
- Matte White Reflector WR
- Include 3000K Lamp* L830
- Include 3500K Lamp* L835
- Include 4100K Lamp* L841
- Sliding Sleeve SS

finish WH

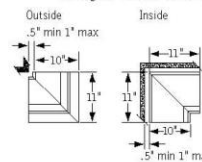
Matte Satin White WH

luminaire length

Designate length in feet (Nominal lengths: 2', 3', 4', 5', 6', 7', 8')
(All end caps are flat with no flange unless otherwise specified)

corner options

- 90-degree Inside Corner FW3-IC90
- 90-degree Outside Corner FW3-OC90



* for more information see Reference section.

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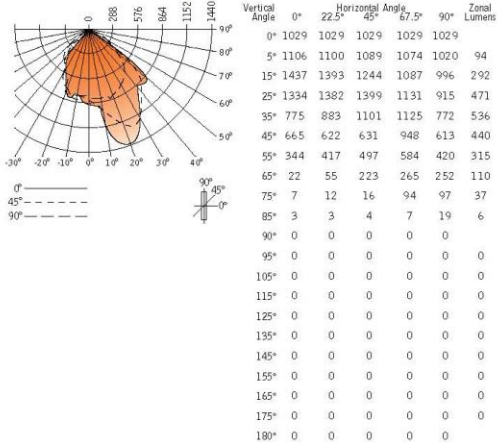
perimeter

focus™ 3



Filename: FW3NS1T8.IES
 Catalog #: FW3-1T8-1C-120-E-RC-HW
 Efficiency: 81%
 Test #: 8761.0

CANDLEPOWER DISTRIBUTION



LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt	
0°-30°	858	30.1	37.3	
0°-40°	1394	48.9	60.5	
0°-60°	2149	75.4	93.3	
0°-90°	2303	80.8	100.0	
Total Luminaire	0°-180°	2303	81	100.0

Go to www.focalpointlights.com for additional photometric data.

focus standard run length

Continuous Runs consist of standard fixture lengths. Left and Right End Trims and Sliding Sleeves are determinate, according to specific field conditions. Consult factory for details.

Example: 32' run = three 8' fixtures and one 7' fixture with a sliding sleeve expandable to 32'.

run length (in feet)	standard fixture lengths required	lamp sizes	sliding sleeve	run length (in feet)	standard fixture lengths required	lamp sizes	sliding sleeve
4 - 5	4	4	1	34 - 35	8 8 8 6 4	4 4 4 4 4 4 3 3	1
5 - 6	5	5	1	35 - 36	8 8 8 8 3	4 4 4 4 4 4 4 3	1
6 - 7	6	3 3	1	36 - 37	8 8 8 8 4	4 4 4 4 4 4 4 4	1
7 - 8	7	4 3	1	37 - 38	8 8 8 6 7	4 4 4 4 4 4 4 3 3 3	1
8 - 9	8	4 4	1	38 - 39	8 8 8 8 6	4 4 4 4 4 4 4 4 3 3	1
9 - 10	6 3	3 3 3	1	39 - 40	8 8 8 8 7	4 4 4 4 4 4 4 4 4 3	1
10 - 11	6 4	3 3 4	1	40 - 41	8 8 8 8 8	4 4 4 4 4 4 4 4 4 4	1
11 - 12	8 3	4 4 3	1	41 - 42	8 8 8 8 6 3	4 4 4 4 4 4 4 4 3 3 3	1
12 - 13	8 4	4 4 4	1	42 - 43	8 8 8 8 6 4	4 4 4 4 4 4 4 4 4 3 3	1
13 - 14	7 6	4 3 3 3	1	43 - 44	8 8 8 8 8 3	4 4 4 4 4 4 4 4 4 4 3	1
14 - 15	8 6	4 4 3 3	1	44 - 45	8 8 8 8 8 4	4 4 4 4 4 4 4 4 4 4 4 4	1
15 - 16	8 7	4 4 4 3	1	45 - 46	8 8 8 8 7 6	4 4 4 4 4 4 4 4 4 3 3 3	1
16 - 17	8 8	4 4 4 4	1	46 - 47	8 8 8 8 8 6	4 4 4 4 4 4 4 4 4 4 3 3	1
17 - 18	8 6 3	4 4 3 3 3	1	47 - 48	8 8 8 8 8 7	4 4 4 4 4 4 4 4 4 4 4 3	1
18 - 19	8 6 4	4 4 4 3 3	1	48 - 49	8 8 8 8 8 8	4 4 4 4 4 4 4 4 4 4 4 4	1
19 - 20	8 8 3	4 4 4 4 3	1	49 - 50	8 8 8 8 8 6 3	4 4 4 4 4 4 4 4 4 4 3 3 3	1
20 - 21	8 8 4	4 4 4 4 4	1	50 - 51	8 8 8 8 8 7 3	4 4 4 4 4 4 4 4 4 4 4 3 3	1
21 - 22	8 7 6	4 4 4 3 3 3	1	51 - 52	8 8 8 8 8 8 3	4 4 4 4 4 4 4 4 4 4 4 4 3	1
22 - 23	8 8 6	4 4 4 4 3 3	1				
23 - 24	8 8 7	4 4 4 4 4 3	1				
24 - 25	8 8 8	4 4 4 4 4 4	1				
25 - 26	8 8 6 3	4 4 4 4 3 3 3	1				
26 - 27	8 8 6 4	4 4 4 4 4 3 3	1				
27 - 28	8 8 8 3	4 4 4 4 4 4 3	1				
28 - 29	8 8 8 4	4 4 4 4 4 4 4	1				
29 - 30	8 8 7 6	4 4 4 4 4 3 3 3	1				
30 - 31	8 8 8 6	4 4 4 4 4 4 3 3	1				
31 - 32	8 8 8 7	4 4 4 4 4 4 4 3	1				
32 - 33	8 8 8 8	4 4 4 4 4 4 4 4	1				
33 - 34	8 8 8 6 3	4 4 4 4 4 4 3 3 3	1				

reference



GE
Lighting

72130 - F32T8/25WSPX41EC

GE Ecolux® Starcoat® T8

- Saves energy compared to standard wattage lamps
- Passes TCLP, which can lower disposal costs.



Photo
Not Available



Energy



GENERAL CHARACTERISTICS

Lamp Type	Linear Fluorescent - Straight
	Linear
Bulb	T8
Base	Medium Bi-Pin (G13)
Rated Life	50000 hrs
Rated Life (instant start) @ Time	36000 h @ 3 h
	40000 h @ 12 h
Rated Life (rapid start) @ Time	50000.0 @ 3.0/55000.0 @ 12.0 h
Bulb Material	Soda lime
Starting Temperature	15 °C (59 °F)
LEED-EB MR Credit	25 picograms Hg per mean lumen hour
Additional Info	TCLP compliant

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	2500
Mean Lumens	2350
Nominal Initial Lumens per Watt	100
Color Temperature	4100 K
Color Rendering Index (CRI)	85
S/P Ratio (Scotopic/Photopic Ratio)	1.8

ELECTRICAL CHARACTERISTICS

Wattage	25
Open Circuit Voltage (instant start) Min @ Temperature	550 V @ 15 °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)
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)	1.100 in(27.9 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	72130
Description	F32T8/25WSPX41EC
Standard Package	Case
Standard Package GTIN	10043168721308
Standard Package Quantity	36
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	36
UPC	043168721301



CAUTIONS & WARNINGS

Caution

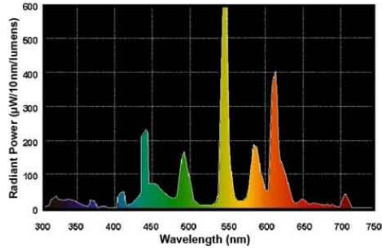
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.
- Lamp may shatter and cause injury if broken
 - Wear safety glasses and gloves when handling lamp.
 - Do not use excessive force when installing lamp.

Warning

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

GRAPHS & CHARTS

Spectral Power Distribution

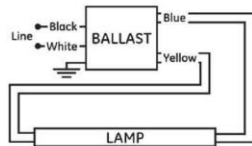




75953 - GE132-MVPS-N

GE LFL UltraStart® Electronic Program / Rapid Start Ballast

- < 10% THD, > 99% power factor
- A new generation of ultra-efficient Programmed Start ballasts (> 90% efficiency).
- Anti-striation circuitry reduces striations with energy saving lamps
- Extends lamp life in frequently switched applications (> 100,000 on/off cycles)
- Multi-Voltage Technology handles voltage from 120 to 277V
- Starting time visually the same as instant start



GENERAL CHARACTERISTICS

Application	1 F32T8 120V-277V Normal Light .88 BF<10% THD UltraStart
Category	Linear Fluorescent
Ballast Type	Electronic - Program / Rapid Start
Starting Method	Programmed start
Lamp Wiring	Parallel
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	Anti-striation control/Thermally protected/Universal voltage Standard
Primary Application	Standard

PRODUCT INFORMATION

Product Code	75953
Description	GE132-MVPS-N
Standard Package	Case
Standard Package GTIN	10043168759530
Standard Package Quantity	10
Sales Unit	Standard Pack
No Of Items Per Sales Unit	1
No Of Items Per Standard	10
Package	
UPC	043168759533

DIMENSIONS

Case dimensions			
Length (L)	9.5 in(241.30 mm)		
Width (W)	1.7 in(43.18 mm)		
Height (H)	1.2 in(29.97 mm)		
Mounting dimensions			
Mount Length (M)	8.9 in(225.81 mm)		
Mount Width (X or F)	1.1 in(28.70 mm)		
Mount Slots (MS)	0.3 in(7.92 mm)		
Weight	1.65 lb		
Exit Type	Side		
Remote Mounting Distance	18 ft		
Remote Mounting Wire Gauge	18 AWG		
Lead lengths	Qty	Exit	Length (± 1 in.)
Yellow	2	Right	48.0 (1219mm)
White	1	Left	25.0 (635mm)
Red	2	Right	33.0 (838mm)
Blue	2	Right	33.0 (838mm)
Black	1	Left	25.0 (635mm)

ELECTRICAL CHARACTERISTICS

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

SAFETY & PERFORMANCE

- ANSI - C62.41
- cUL Listed
- FCC - CLASS A Non-Consumer
- UL Class P
- UL Listed
- UL Type 1 Outdoor
- UL Type HL
- RoHS Compliant
- NEMA Premium®

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)
FE15T8	1	120	14	0.12 A	0.80	5.71	99	1.7	10	0.0 / -18
FE15T8	1	277	15	0.06 A	0.80	5.33	83	1.7	10	0.0 / -18
F40T8	1	120	35	0.31 A	0.88	2.51	99	1.7	10	0.0 / -18
F40T8	1	277	35	0.01 A	0.88	2.51	96	1.7	10	0.0 / -18
F32T8/AWM	1	120	28	0.24 A	0.87	3.11	99	1.7	10	50.0 / 10
F32T8/AWM	1	277	28	0.11 A	0.87	3.11	94	1.7	10	50.0 / 10
F32T8/25W	1	120	24	0.21 A	0.86	3.58	99	1.7	10	50.0 / 10
F32T8/25W	1	277	24	0.1 A	0.86	3.58	93	1.7	10	50.0 / 10
F32T8	1	120	30	0.26 A	0.89	2.97	99	1.7	10	0.0 / -18

For additional information, visit www.gelighting.com

F32T8	1	277	30	0.12 A	0.89	2.97	95	1.7	10	0.0 /-18
F28T8	1	120	26	0.22 A	0.87	3.35	99	1.7	10	50.0 /10
F28T8	1	277	26	0.1 A	0.87	3.35	93	1.7	10	50.0 /10
F25T8/AWM	1	120	20	0.18 A	0.88	4.40	99	1.7	10	50.0 /10
F25T8/AWM	1	277	21	0.08 A	0.88	4.19	90	1.7	10	50.0 /10
F25T8	1	120	24	0.2 A	0.89	3.71	99	1.7	10	0.0 /-18
F25T8	1	277	24	0.09 A	0.89	3.71	92	1.7	10	0.0 /-18
F25T12	1	120	25	0.21 A	0.89	3.56	99	1.7	10	0.0 /-18
F25T12	1	277	25	0.1 A	0.89	3.56	93	1.7	10	0.0 /-18
F17T8/AWM	1	120	15	0.13 A	0.90	6.00	99	1.7	10	50.0 /10
F17T8/AWM	1	277	15	0.07 A	0.90	6.00	85	1.7	10	50.0 /10
F17T8	1	120	17	0.15 A	0.91	5.35	99	1.7	10	0.0 /-18
F17T8	1	277	18	0.07 A	0.91	5.06	87	1.7	10	0.0 /-18

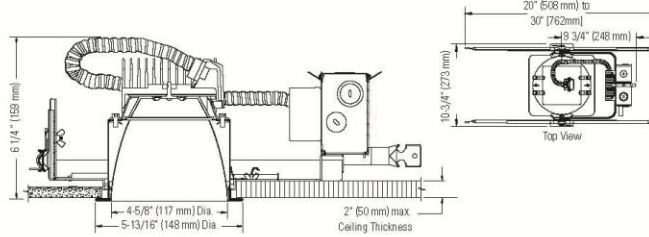
WARRANTY INFORMATION

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.

Calculite LED Square Downlight **C4X4L05DL**

Page 1 of 5

500 Lumen, 4 1/2" X 4 1/2" Aperture Remote Phosphor LED



Ordering Guide: Light Engines

Light Engine Series	Style	Color Temperature	Reflector Finish	Flange	Options
C4X4L05	DL (Downlight)	27K (2700K) 30K (3000K) 35K (3500K) 40K (4000K)	CL (Clear) CCL (Comfort Clear) CCD (Comfort Clear Diffuse) CCZ (Champagne Bronze) WH (Painted White)	W (Painted white) P (Aperture-matching/polished)	EM (Integral emergency test switch)

Example: C4L05DL35KCCLWEM

Ordering Guide: Frame-in Kits

Frame-in Kit Series	Installation Options	Input Voltage	Options
C4X4L05	N (New construction) R (Remodeler)	1 (120V) 2 (277V)	Blank (Electronic low voltage dimming) EM (Emergency) Z10V (0-10V dimming)
CUL05	J (J-box mount retrofit) S (Screw-in base retrofit (120V only))	1 (120V) 2 (277V)	Blank (Electronic low voltage dimming) Z10V (0-10V dimming)

Example: C4X4L05N1EM

Features

- Aperture:** 4 5/8" x 4 5/8" (117mm) I.D., 5 13/16" (148mm) O.D.
- Input Wattage:** 9W (+/- 5%)
- Reflector Cone:** Aluminum. Provides 50° cutoff to source & source image. Self-flanged.
- Depth (including Frame-in kit):** 5 3/4" (146mm)
- Power Connection:** Attaches to frame-in kit via push-in connector (on frame). Removable cover provides access.

Technology

- LED Board:** Array of high brightness royal blue LEDs.
- Remote Phosphor Technology:** Patented remote phosphor technology provides increased efficiency and color consistency. Phosphor lens assembly positioned in front of LED array converts blue light to white. Color shift will not exceed +/- 100K over life.
- Optical Mixing Chamber:** Lightolier-specific mixing chamber redirects back-reflected light through aperture resulting in 20% increase in efficiency.
- Thermal Management:** Proprietary heat sink and thermal design along with clean room assembly ensures specified performance.
- Rated Life:** Based on IESNA LM-80-2008
50,000 hours at 70% lumen maintenance.
- Photometric Performance:** Tested in accordance to IESNA LM-79-2008

Options

- Dimming Capability:** See LED-DIM specification sheet
- Emergency Capability (Integral):** Add "EM" suffix. See LED-EM spec sheet.
- Emergency Capability (Inverter):** See LED-LMI specification sheet

Labels

- UL (suitable for wet locations), CUL, I.B.E.W.
- 5 Year Warranty

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

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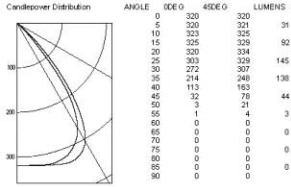
PHILIPS
LIGHTOLIER®

Calculite LED Square Downlight **C4X4L05DL**

Page 2 of 5

500 Lumen, 4 1/2" X 4 1/2" Aperture Remote Phosphor LED

10W LED, 2700K, CL FINISH TRIM



Title: C4X4L05DL27KCLV
Output lumens: 455 lm
Correlated Color Temp: 2700K
Input Watts: 8.7 w
Efficacy: 52.3 lm/w
CR: 80
Spacing Criteria: 1.2

CEILING Hgt.	80%	70%	50%	30%	0%
70	70	30	10	10	10
100	113	110	107	105	100
150	159	155	151	147	141
200	206	201	197	193	185
250	253	247	243	239	229
300	300	293	289	285	274
350	347	339	335	331	319
400	394	385	381	377	364
450	441	431	427	423	409
500	488	477	473	469	454
550	535	523	519	515	499
600	582	569	565	561	544
650	629	615	611	607	589
700	676	661	657	653	634
750	723	707	703	699	679
800	770	753	749	745	724
850	817	799	795	791	769
900	864	845	841	837	814

ZONAL LUMENS AND PERCENTAGES

Beam Diameter	LUMENS	%
0.30	268	59.1%
0.40	407	89.6%
0.60	454	99.8%
0.80	455	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	12	5"
6'	9	7"
7'	7	9"
8'	5	10"
9'	4	11"

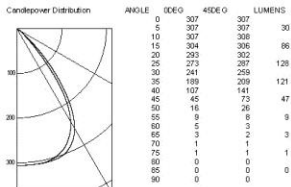
Multiple Unit Data - RCR 2

Spacing On Grid	Initial Footcandles	Beam Diameter	Value/ Footcandles Sq Ft
5'	13	5"	0.35
6'	10	7"	0.25
7'	8	9"	0.18
8'	6	10"	0.15
9'	5	11"	0.12

CERTIFIED TEST REPORT NO. F08943*

3828P10 Room, Workplane 2 1/2' above floor, 0.050/0.075 Reflectance

10W LED, 2700K, CCL FINISH TRIM



Title: C4X4L05DL27KCCV
Output lumens: 425 lm
Correlated Color Temp: 2700K
Input Watts: 8.7 w
Efficacy: 48.9 lm/w
CR: 80
Spacing Criteria: 1.2

CEILING Hgt.	80%	70%	50%	30%	0%
70	70	30	10	10	10
100	113	110	107	105	100
150	159	155	151	147	141
200	206	201	197	193	185
250	253	247	243	239	229
300	300	293	289	285	274
350	347	339	335	331	319
400	394	385	381	377	364
450	441	431	427	423	409
500	488	477	473	469	454
550	535	523	519	515	499
600	582	569	565	561	544
650	629	615	611	607	589
700	676	661	657	653	634
750	723	707	703	699	679
800	770	753	749	745	724
850	817	799	795	791	769
900	864	845	841	837	814

ZONAL LUMENS AND PERCENTAGES

Beam Diameter	LUMENS	%
0.30	244	57.6%
0.40	365	85.9%
0.60	421	99.3%
0.80	425	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	12	5"
6'	9	7"
7'	7	9"
8'	5	10"
9'	4	11"

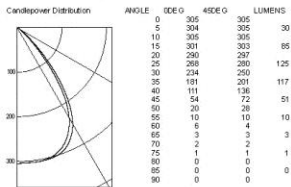
Multiple Unit Data - RCR 2

Spacing On Grid	Initial Footcandles	Beam Diameter	Value/ Footcandles Sq Ft
5'	13	5"	0.35
6'	10	7"	0.25
7'	8	9"	0.18
8'	6	10"	0.15
9'	5	11"	0.12

CERTIFIED TEST REPORT NO. F08944*

3828P10 Room, Workplane 2 1/2' above floor, 0.050/0.075 Reflectance

10W LED, 2700K, CCD FINISH TRIM



Title: C4X4L05DL27KCCV
Output lumens: 423 lm
Correlated Color Temp: 2700K
Input Watts: 8.7 w
Efficacy: 48.6 lm/w
CR: 80
Spacing Criteria: 1.1

CEILING Hgt.	80%	70%	50%	30%	0%
70	70	30	10	10	10
100	113	110	107	105	100
150	159	155	151	147	141
200	206	201	197	193	185
250	253	247	243	239	229
300	300	293	289	285	274
350	347	339	335	331	319
400	394	385	381	377	364
450	441	431	427	423	409
500	488	477	473	469	454
550	535	523	519	515	499
600	582	569	565	561	544
650	629	615	611	607	589
700	676	661	657	653	634
750	723	707	703	699	679
800	770	753	749	745	724
850	817	799	795	791	769
900	864	845	841	837	814

ZONAL LUMENS AND PERCENTAGES

Beam Diameter	LUMENS	%
0.30	240	56.7%
0.40	367	84.5%
0.60	418	98.8%
0.80	423	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	12	5"
6'	9	7"
7'	7	9"
8'	5	10"
9'	4	11"

Multiple Unit Data - RCR 2

Spacing On Grid	Initial Footcandles	Beam Diameter	Value/ Footcandles Sq Ft
5'	13	5"	0.35
6'	10	7"	0.25
7'	8	9"	0.18
8'	6	10"	0.15
9'	5	11"	0.12

CERTIFIED TEST REPORT NO. F08945*

3828P10 Room, Workplane 2 1/2' above floor, 0.050/0.075 Reflectance

*Correlated Color Temperature within specs as defined in ANSI/JEDEC/ANSI/C78.370-2008: Specifications for the Chromaticity of Solid State Lighting Products.
*Voltage controlled to within 0.5%.
*Rated to ultra absolute photometry as specified in LM79-1 IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
*Color Rendering Index within +/- 2%.

Job Information **Type:**

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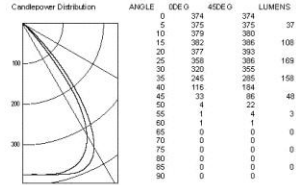
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Calculite LED Square Downlight **C4X4L05DL**

Page 4 of 5

500 Lumen, 4 1/2" X 4 1/2" Aperture Remote Phosphor LED

10W LED, 3500K, CL FINISH TRIM



ZONE	LUMENS	% LUMINAIRE
0.30	214	56.0%
0.40	473	90.1%
0.60	524	92.9%
0.90	525	100.0%

Title: C4X4L05DL3500CLW
Output lumens: 525 lm
Correlated Color Temp: 3500K
Input Watts: 8.7 w
Efficacy: 60.3 lm/w
CR1: 76
Spacing Criterion: 1.1

CEILING Hgt.	80%		70%		50%		30%		0%
	10'	20'	10'	20'	10'	20'	10'	20'	
1	113	110	107	105	100	104	104	100	97
2	107	102	98	94	100	93	97	91	84
3	101	94	89	85	93	84	90	83	81
4	95	87	81	77	88	76	84	76	72
5	90	81	75	70	80	70	78	69	66
6	85	75	69	64	75	64	73	64	63
7	80	70	64	59	69	59	68	59	56
8	76	65	59	55	65	54	64	54	52
9	72	61	55	51	61	50	60	50	49
10	68	57	51	47	57	47	56	47	45

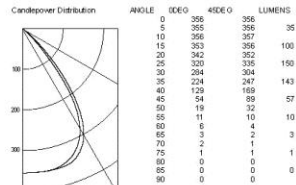
Height to Lighted Plane	Single Unit Data		Beam Diameter
	Initial Footcandles	Value/ Sq Ft	
5'	14	5.1	5'
6'	10	5.1	6'
7'	8	7.1	7'
8'	6	8.1	8'
9'	5	9.1	9'

Spacing	Multiple Unit Data - RCR 2	
	Initial Footcandles	Value/ Sq Ft
5'	15	0.25
7'	11	0.18
9'	9	0.15
9'	7	0.12

38.38x10 Room, Workplane 2.12' above floor, 0.050/0.0% Reflectance

CERTIFIED TEST REPORT NO. F09859*

10W LED, 3500K, CCL FINISH TRIM



ZONE	LUMENS	% LUMINAIRE
0.30	214	56.0%
0.40	427	85.5%
0.60	495	92.9%
0.90	499	100.0%

Title: C4X4L05DL3500CCLW
Output lumens: 499 lm
Correlated Color Temp: 3500K
Input Watts: 8.7 w
Efficacy: 57.4 lm/w
CR1: 76
Spacing Criterion: 1.1

CEILING Hgt.	80%		70%		50%		30%		0%
	10'	20'	10'	20'	10'	20'	10'	20'	
1	113	110	107	105	100	104	104	100	97
2	107	101	97	93	100	92	96	90	85
3	101	93	88	83	92	83	89	81	77
4	95	86	80	75	85	75	83	74	71
5	89	80	73	68	79	68	77	68	65
6	84	74	67	63	73	62	72	63	59
7	79	69	62	57	68	57	67	57	55
8	75	64	57	53	63	53	62	53	51
9	70	60	53	48	59	48	58	48	47
10	67	56	50	45	56	45	55	45	43

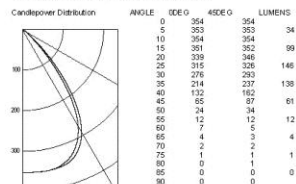
Height to Lighted Plane	Single Unit Data		Beam Diameter
	Initial Footcandles	Value/ Sq Ft	
5'	14	5.1	5'
6'	10	5.1	6'
7'	7	7.1	7'
8'	6	8.1	8'
9'	4	9.1	9'

Spacing	Multiple Unit Data - RCR 2	
	Initial Footcandles	Value/ Sq Ft
5'	15	0.25
7'	11	0.18
9'	9	0.15
9'	7	0.12

38.38x10 Room, Workplane 2.12' above floor, 0.050/0.0% Reflectance

CERTIFIED TEST REPORT NO. F09860*

10W LED, 3500K, CCD FINISH TRIM



ZONE	LUMENS	% LUMINAIRE
0.30	279	56.2%
0.40	419	84.2%
0.60	452	98.0%
0.90	497	100.0%

Title: C4X4L05DL3500CCW
Output lumens: 497 lm
Correlated Color Temp: 3500K
Input Watts: 8.7 w
Efficacy: 57.1 lm/w
CR1: 76
Spacing Criterion: 1.2

CEILING Hgt.	80%		70%		50%		30%		0%
	10'	20'	10'	20'	10'	20'	10'	20'	
1	113	110	107	105	100	104	104	100	97
2	106	101	97	93	99	92	96	90	84
3	100	93	88	83	92	83	89	81	77
4	94	86	80	75	85	75	83	74	70
5	89	79	73	68	78	68	77	67	64
6	84	74	67	63	73	62	71	62	59
7	79	69	62	57	68	57	66	57	54
8	74	64	57	53	63	52	62	52	50
9	70	59	53	48	59	48	58	48	46
10	66	56	49	45	55	45	54	45	43

Height to Lighted Plane	Single Unit Data		Beam Diameter
	Initial Footcandles	Value/ Sq Ft	
5'	14	5.1	5'
6'	10	7.1	6'
7'	7	9.1	7'
8'	6	10.1	8'
9'	4	11.1	9'

Spacing	Multiple Unit Data - RCR 2	
	Initial Footcandles	Value/ Sq Ft
5'	22	0.39
7'	15	0.25
9'	11	0.18
9'	7	0.12

38.38x10 Room, Workplane 2.12' above floor, 0.050/0.0% Reflectance

CERTIFIED TEST REPORT NO. F09861*

*Correlated Color Temperature within specs as defined in ANSI/IESNA-ANSI/C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products.
*Ambient controlled to within 0.5%.
*Illuminance using absolute photometry as specified in LM79. IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
*Color Rendering Index within +/- 2%.

Job Information **Type:**

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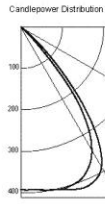
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Calculite LED Square Downlight **C4X4L05DL**

Page 5 of 5

500 Lumen, 4 1/2" X 4 1/2" Aperture Remote Phosphor LED

10W LED, 4000K, CL FINISH TRIM



ANGLE	0DEG	45DEG	387	LUMENS
0	387	387	387	37
5	388	388	388	37
10	391	391	391	37
15	395	395	395	113
20	391	408	408	178
25	373	404	404	171
30	334	376	376	171
35	262	303	303	171
40	132	195	195	171
45	38	92	92	53
50	4	24	24	3
55	1	4	4	3
60	1	1	1	0
65	1	0	0	0
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

Trim:
C4X4L05DCL40K/CLVY
Output lumens: 573 lm
Correlated Color Temp*: 4000K
Input Watts*: 9.7 w
Efficacy: 65.9 lm/w
CRI*: 76
Spacing Criterion: 1.2

CEILING	80%		70%		50%		30%		0%	
	WALL	70	50	30	10	50	10	50	10	0
FCR2	Zone	Center	Method	Effective	Foot	Center	Method	Effective	Foot	Center
0	119	119	119	119	119	119	111	111	106	106
1	113	110	108	105	100	104	104	100	100	97
2	107	102	97	94	100	93	97	91	94	89
3	101	94	89	84	83	84	90	82	88	81
4	95	87	81	76	86	79	84	75	82	74
5	90	81	74	70	80	69	78	69	76	68
6	85	75	68	64	74	63	72	63	71	63
7	80	70	63	58	69	58	68	58	66	58
8	75	65	58	54	64	54	63	53	62	52
9	71	61	54	50	60	50	59	49	58	49
10	67	57	50	46	56	46	55	46	55	44

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMENS
0-30	333	58.1%
0-40	510	89.0%
0-60	573	99.9%
0-90	573	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	15	6"
6'	11	7"
7'	8	9"
8'	6	10"
9'	5	11"

Multiple Unit Data - RCR 2

Spacing (On Ctr. Footcandles)	Initial	Watts/Sq Ft
5'	26	0.39
6'	17	0.25
7'	12	0.18
8'	10	0.15
9'	8	0.12

30"x30"x0" Room, Workplane 2 1/2' above floor, 80/50/20% Reflectances

CERTIFIED TEST REPORT NO. F0828*

*Correlated Color Temperature within specs as defined in ANSI_NEMA_ANSI C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products.
 **Wattage controlled to within 85%.
 *Tested using absolute chromometry, as specified in LM79: IESNA Approved Method for the Electrical and Photometric Measurements of Solid State Lighting Products.
 *Color Rendering Index within +/- 2%.

Job Information **Type:**

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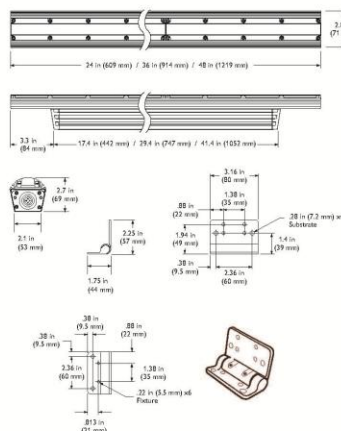
Date: _____ Type: _____
 Firm Name: _____
 Project: _____

ColorGraz Powercore

30° x 60° beam angle

Linear, color-changing LED surface light for wall washing and grazing

ColorGraz™ Powercore linear LED lights are optimized for surface grazing, wall-wash lighting, and efficient signage illumination. Superior light quality offers uniform beam saturation as close as 6 in (152 mm). A compact, low-profile design combined with flexible mounting options allows for discreet placement within a wide range of architectural features. Intelligent, controllable fixtures are available in standard full-color configurations. Build-to-order configurations with additional beam angles and custom channels of white or color LEDs are also available to support special applications.



- Tailor light output to specific applications — Available in three standard lengths, with standard 10° x 60° and 30° x 60° beam angles. Individually addressable 1 ft (305 mm) segments accommodate fine control of color-changing effects and pre-programmed light shows.
- High-performance illumination and beam quality — Delivers up to 271 lumens of color-changing light per foot. Superior beam quality offers striation-free saturation as close as 6 in (152 mm) from fixture placement with no visible light scalloping between fixtures.
- Integrates patented Powercore® technology — Powercore technology rapidly, efficiently, and accurately controls power output to ColorGraz Powercore fixtures directly from line voltage. The Philips Data Enabler Pro merges line voltage and control data and delivers them to the fixture over a single standard cable, dramatically simplifying installation and lowering total system cost.
- Versatile installation options — Constant torque locking hinges offer simple and consistent position control from various angles. The low-profile aluminum housing accommodates placement within most architectural niches.
- Superior color consistency and accuracy — Optibin®, an advanced binning algorithm, exceeds industry standards for chromaticity to ensure superior color consistency and uniformity of LED sources.

- Industry-leading controls — ColorGraz Powercore works seamlessly with the complete line of Philips controllers, including Light System Manager™, iPlayer® 3, and ColorDial™ Pro, as well as third-party controllers.
- Custom configurations for special applications — Standard configurations use three channels of LEDs (Red, Green, and Blue) to produce a full range of RGB colors. You can create custom configurations to support special applications by exchanging the LEDs in any channel. Available LEDs include eight color temperatures ranging from a warm 2700 K to a cool 6500 K, Royal Blue, Blue, Green, Amber; and Red. Additional beam angles (including 9° x 9°, 10° x 30°, and 90° x 60°) are also available. See the ColorGraz Powercore Ordering Information specification sheet for complete details.

For detailed product information, please refer to ColorGraz Powercore Product Guide at www.colorkinetics.com/ls/rgb/colorgraze/

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Specifications

Due to continuous improvements and innovations, specifications may change without notice.

Item	Specification	2 ft (610 mm)	3 ft (914 mm)	4 ft (1219 mm)
Output	Beam Angle	30° × 60°		
	Lumens*	506	759	1012
	LED Channels	Red / Green / Blue		
	Mixing Distance	6 in (152 mm) to uniform beam saturation		
Electrical	Lumen Maintenance†	100,000 hours L50 @ 25° C 90,000 hours L50 @ 50° C		
	Input Voltage	100 – 240 VAC, auto-switching, 50 / 60 Hz		
Control	Power Consumption at full output, steady state	35 W maximum	52.5 W maximum	70 W maximum
	Interface	Data Enabler Pro (DMX / Ethernet)		
Physical	Control System	Philips full range of controllers, including Light System Manager, iPlayer 3, and ColorDial Pro, or third-party controllers		
	Dimensions (Height x Width x Depth)	2.7 × 24 × 2.8 in (69 × 610 × 71 mm)	2.7 × 36 × 2.8 in (69 × 914 × 71 mm)	2.7 × 48 × 2.8 in (69 × 1219 × 71 mm)
	Weight	4.9 lb (2.2 kg)	8.1 lb (3.6 kg)	10.8 lb (4.9 kg)
	Housing	Extruded anodized aluminum		
	Lens	Clear polycarbonate		
	Fixture Connectors	Integral male / female waterproof connectors		
	Temperature	-40° – 122° F (-40° – 50° C) Operating -4° – 122° F (-20° – 50° C) Startup -40° – 176° F (-40° – 80° C) Storage		
	Humidity	0 – 95%, non-condensing		
	Maximum Fixture Run Lengths‡	37 @ 100 VAC 43 @ 120 VAC 56 @ 220 VAC 56 @ 240 VAC	Configuration: 2 ft (610 mm) fixtures installed end-to-end, 20 A circuit, standard 50 ft (15.2 m) Leader Cable	
	Certification and Safety	Certification	UL / cUL, FCC Class A, CE, PSE, CCC	
Environment	Dry / Damp / Wet Location, IP66			

* Lumen measurement complies with IES LM-79-08 testing procedures.
† L50 = 50% maintenance of lumen output (when light output drops below 50% of initial output). Ambient temperatures specified. Based on measurements that comply with IES LM-80-08 testing procedures. Refer to www.colorkinetics.com/support/appnotes/lm-80-08.pdf for more information.
‡ These figures, provided as a guideline, are accurate for this configuration only. Changing the configuration can affect the fixture run lengths.



Accessories

Item	Type	Size	Item Number	Philips 12NC
Leader Cable	UL / cUL	50 ft (15.2 m)	108-000042-00	910503700322
	CE / PSE	50 ft (15.2 m)	108-000042-01	910503700323
Jumper Cable	End-to-End	1 ft (305 mm)	108-000039-00	910503700314
		1 ft (305 mm)	108-000039-01	910503700315
	UL / cUL	5 ft (1.5 m)	108-000039-02	910503700316
		5 ft (1.5 m)	108-000040-00	910503700317
	CE / PSE	1 ft (305 mm)	108-000040-01	910503700318
		5 ft (1.5 m)	108-000040-02	910503700319
Glare Shield	1 ft (305 mm)	120-000081-00	910503700745	
	2 ft (610 mm)	120-000081-01	910503700746	
	3 ft (914 mm)	120-000081-02	910503700747	
	4 ft (1.2 m)	120-000081-03	910503700748	
Additional Terminators	Quantity 10	120-000074-00	910503700580	
Additional Hinge	Quantity 1	120-000098-00	910503700772	

Use Item Number when ordering in North America.

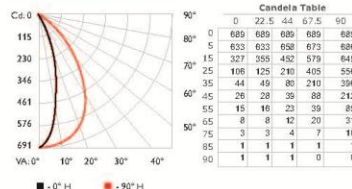


Philips Color Kinetics
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Burlington, Massachusetts 01803 USA
Tel 888.385.5742
Tel 617.423.9999
Fax 617.423.9998
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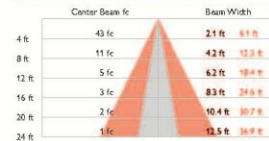
Photometrics

ColorGraze Powercore 2ft, 30° × 60° beam angle

Polar Candela Distribution



Illuminance at Distance



26.2 ft (8 m) Vert. Spread: 29.1°
1 ft maximum distance Horiz. Spread: 75.1°

LED	Lumens	Efficacy
RGB	506	14.5

For lux multiply ft by 10.7

Fixtures and Data Enabler Pro

Item	Type	Size	Item Number	Philips 12NC
ColorGraze Powercore	10° × 60° beam angle	2 ft (610 mm)	123-000030-00	910503700308
		3 ft (914 mm)	123-000030-01	910503700309
		4 ft (1219 mm)	123-000030-02	910503700310
		2 ft (610 mm)	123-000030-03	910503700311
Data Enabler Pro	30° × 60° beam angle	3 ft (914 mm)	123-000030-04	910503700312
		4 ft (1219 mm)	123-000030-05	910503700313
		3/4 in / 1/2 in NPT (US trade size conduit)	106-000004-00	910503701210
	PG21 / PG13 (metric size conduit)	106-000004-01	910503701211	

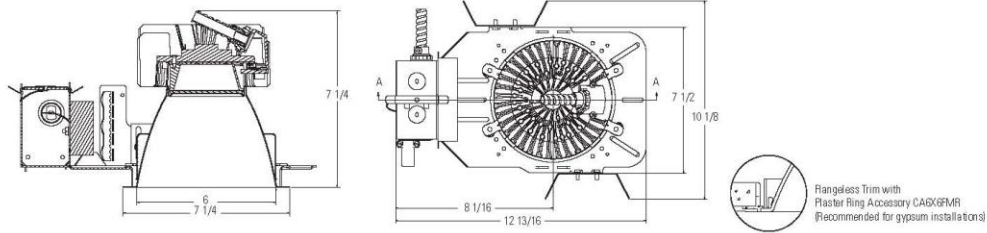
Use Item Number when ordering in North America.

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Calculite LED Downlight **C6L1520DL (W)**

Page 1 of 2

1500/2000 Lumen Wide Beam, 6" Aperture Remote Phosphor LED



Ordering Guide: Light Engines

Light Engine Series	Style	Color Temperature	Beam Spread	Reflector Finish	Flange	Options
C6L1520	DL (Downlight)	27K (2700K)	W (Wide beam, 1.2 s.c.)	CL (Clear)	W (Painted white) P (Aperture-matching/polished) FT (Flush-mount/flangeless)*	EM (Integral emergency test switch)
		30K (3000K)		CCL (Comfort Clear)		
		35K (3500K)		CCD (Comfort Clear Diffuse)		
		40K (4000K)		CCZ (Champagne Bronze) WH (Painted White)		

Example: C6L1520DL35KWCCLEWEM *Accessory CAG6FMR recommended for gypsum applications. Reflector flange is 1/8".

Ordering Guide: Frame-in Kits

Frame-in Kit Series	Installation Options	Input Voltage	Options
C6L15 (1500 Lumen)	N (New construction)	1 (120V)	Blank (0-10 volt dimming)
C6L20 (2000 Lumen)	R (Remodeler)	2 (277V)	EM (Emergency)
CUL15 (1500 Lumen)	J (J-box mount retrofit)	1 (120V)	Blank (0-10 volt dimming)
CUL20 (2000 Lumen)	S (Screw-in base retrofit (120V only))	2 (277V)	

Example: C6L15N1EM

Features

- Aperture:** 6" (152 mm) I.D., 7 1/4" (184mm) O.D.
- Input Wattage:** 27W (1500 Lumens), 39W (2000 Lumens).
- Reflector Cone:** Aluminum. Provides 50° cutoff to source & source image. Self-flanged.
- Depth (including Frame-in kit):** 7 1/4" (184mm)
- Power Connection:** Attaches to frame-in kit via push-in connector (on frame). Removable cover provides access.

Technology

- LED Board:** Array of high brightness royal blue LEDs.
- Remote Phosphor Technology:** Patented remote phosphor technology provides increased efficiency and color consistency. Phosphor lens assembly positioned in front of LED array converts blue light to white. Color shift will not exceed +/- 100K over life.
- Optical Mixing Chamber:** Lightolier-specific mixing chamber redirects back-reflected light through aperture resulting in 20% increase in efficiency.
- Thermal Management:** Proprietary heat sink and thermal design along with clean room assembly ensures specified performance.
- Rated Life:** Based on IESNA LM-80-2008
1500 Lumen – 60,000 hours at 70% lumen maintenance
2000 Lumen – 57,000 hours at 70% lumen maintenance.
- Photometric Performance:** Tested in accordance to IESNA LM-79-2008

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Options

- Dimming Capability:** 0-10V. See LED-DIM specification sheet
- Emergency Capability (Integral):** Add "EM" suffix. See LED-EM spec sheet.
- Emergency Capability (Inverter):** See LED-LMI specification sheet

Labels

- UL (suitable for wet locations), cUL, I.B.E.W.
- 5 Year Warranty

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

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Calculite LED Downlight **C6L1520DL (W)**

Page 2 of 2

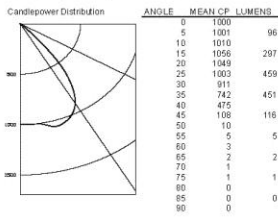
1500/2000 Lumen Wide Beam, 6" Aperture Remote Phosphor LED

Correlated Color Temperature (CCT) Multipliers
2700K (x 0.92), **3000K** (x 1.00), **3500K** (x 1.07), **4000K** (x 1.14)

Reflector Finish Multipliers

CL (x 1.00), **CCL** (x 0.92), **CCD** (x 0.90), **CCZ** (x 0.73), **WH** (x 0.80) — **CL** & **CCD** finishes are tested. **CCL**, **CCZ** & **WH** are calculated.

1500 LM, 3000K, CL FINISH TRIM



Trim Frame:
C6L1520DL30KWCLW/CBL15N1
Output lumens: 1426 lm
Correlated Color Temp: 3000K
Input Watts: 26.9 w
Efficacy: 53.0 lm/w
CRF: 78
Spacing Criterion: 1.2

CEILING	80%			70%			50%			30%			0%
WALL	70	50	30	10	50	10	50	10	50	10	50	10	0
R-CR	Zonal Cavity Method - Effective Floor Cavity Reflectance = 20%												
0	119	119	119	119	116	111	111	111	106	100	100	100	100
1	113	110	108	105	108	104	104	100	100	97	93	93	93
2	107	102	98	94	100	93	97	91	94	89	86	86	86
3	101	94	89	85	93	84	90	83	88	82	79	79	79
4	96	87	82	77	86	77	84	76	82	75	72	72	72
5	90	81	75	70	80	70	78	69	77	69	67	67	67
6	85	75	69	64	75	64	73	64	72	63	61	61	61
7	80	70	64	59	70	59	68	59	67	58	57	57	57
8	76	66	59	55	65	55	64	54	63	54	52	52	52
9	72	61	55	51	61	51	60	50	59	50	49	49	49
10	68	57	51	47	57	47	56	47	55	47	45	45	45

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	651	59.7%
0-40	1303	91.4%
0-60	1424	99.9%
0-90	1426	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	43	8"
6'	29	10"
7'	20	12"
8'	16	13"
9'	12	15"

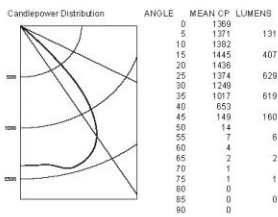
Multiple Unit Data - RCR 2

Spacing On-Ctr	Initial Footcandles	Watts/Sq. Ft.
5'	64.4	1.19
6'	42.2	0.78
7'	30.2	0.56
8'	25.1	0.47
9'	20.1	0.37

36"x36"x10" Room, Workplane 2 1/2' above floor, 80/50/20% Reflectances

CERTIFIED TEST REPORT NO. 18209⁴

2000 LM, 3000K, CL FINISH TRIM



Trim Frame:
C6L1520DL30KWCLW/CBL20N1
Output lumens: 1954 lm
Correlated Color Temp: 3000K
Input Watts: 39.8 w
Efficacy: 49.1 lm/w
CRF: 78
Spacing Criterion: 1.2

CEILING	80%			70%			50%			30%			0%
WALL	70	50	30	10	50	10	50	10	50	10	50	10	0
R-CR	Zonal Cavity Method - Effective Floor Cavity Reflectance = 20%												
0	119	119	119	119	116	111	111	111	106	100	100	100	100
1	113	110	108	105	108	104	104	100	100	97	93	93	93
2	107	102	98	94	100	93	97	91	94	89	86	86	86
3	101	94	89	85	93	84	90	83	88	82	79	79	79
4	96	87	82	77	86	77	84	76	82	75	72	72	72
5	90	81	75	70	80	70	78	69	77	69	67	67	67
6	85	75	69	64	75	64	73	64	72	63	61	61	61
7	80	70	64	59	70	59	68	59	67	58	57	57	57
8	76	66	59	55	65	55	64	54	63	54	52	52	52
9	72	61	55	51	61	51	60	50	59	50	48	48	48
10	68	57	51	47	57	47	56	47	55	47	45	45	45

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1166	59.7%
0-40	1785	91.3%
0-60	1951	99.8%
0-90	1954	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandles	Beam Diameter
5'	55	8"
6'	36	10"
7'	26	12"
8'	21	13"
9'	17	15"

Multiple Unit Data - RCR 2

Spacing On-Ctr	Initial Footcandles	Watts/Sq. Ft.
5'	88.2	1.76
6'	57.9	1.16
7'	41.3	0.83
8'	34.5	0.69
9'	27.8	0.55

36"x36"x10" Room, Workplane 2 1/2' above floor, 80/50/20% Reflectances

CERTIFIED TEST REPORT NO. 18208⁴

¹ Correlated Color Temperature within specs as defined in ANSI/NEMA ANSLG C78.377-2008: Specifications for the Chromaticity of Solid-State Lighting Products.
² Wattage controlled to within 5%.
³ Tested using absolute photometry as specified in LM79: IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
⁴ Color Rendering Index within +/- 2%.

Job Information **Type:**

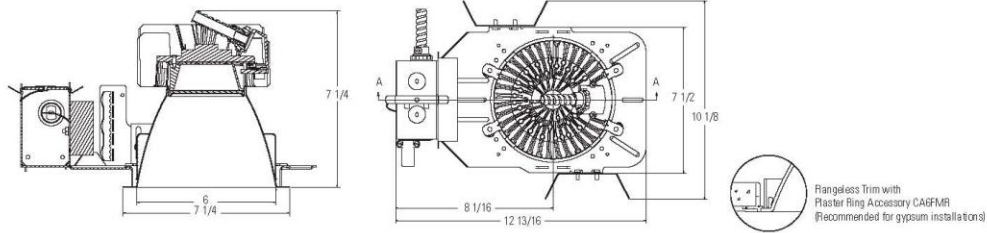
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Calculite LED Downlight **C6L1520DL (M)**

Page 1 of 2

1500/2000 Lumen Medium Beam, 6" Aperture Remote Phosphor LED



Ordering Guide: Light Engines

Light Engine Series	Style	Color Temperature	Beam Spread	Reflector Finish	Flange	Options
C6L1520	DL (Downlight)	27K (2700K)	M (Medium beam, 0.9 s.c.)	CL (Clear)	W (Painted white) P (Aperture-matching/polished) FT (Flush-mount/flangeless)*	EM (Integral emergency test switch)
		30K (3000K)		CCL (Comfort Clear)		
		35K (3500K)		CCD (Comfort Clear Diffuse)		
		40K (4000K)		CCZ (Champagne Bronze) WH (Painted White)		

Example: C6L1520DL35KMCCCLWEM *Accessory CAGFMR recommended for gypsum applications. Reflector flange is 1/8".

Ordering Guide: Frame-in Kits

Frame-in Kit Series	Installation Options	Input Voltage	Options
C6L15 (1500 Lumen)	N (New construction)	1 (120V)	Blank (0-10 volt dimming)
C6L20 (2000 Lumen)	R (Remodeler)	2 (277V)	EM (Emergency)
CUL15 (1500 Lumen)	J (J-box mount retrofit)	1 (120V)	Blank (0-10 volt dimming)
CUL20 (2000 Lumen)	S (Screw-in base retrofit (120V only))	2 (277V)	

Example: C6L15N1EM

Features

- Aperture:** 6" (152 mm) I.D., 7 1/4" (184mm) O.D.
- Input Wattage:** 27W (1500 Lumens), 39W (2000 Lumens).
- Reflector Cone:** Aluminum. Provides 50° cutoff to source & source image. Self-flanged.
- Depth (including Frame-in kit):** 7 1/4" (184mm)
- Power Connection:** Attaches to frame-in kit via push-in connector (on frame). Removable cover provides access.

Technology

- LED Board:** Array of high brightness royal blue LEDs.
- Remote Phosphor Technology:** Patented remote phosphor technology provides increased efficiency and color consistency. Phosphor lens assembly positioned in front of LED array converts blue light to white. Color shift will not exceed +/- 100K over life.
- Optical Mixing Chamber:** Lightolier-specific mixing chamber redirects back-reflected light through aperture resulting in 20% increase in efficiency.
- Thermal Management:** Proprietary heat sink and thermal design along with clean room assembly ensures specified performance.
- Rated Life:** Based on IESNA LM-80-2008
1500 Lumen – 60,000 hours at 70% lumen maintenance.
2000 Lumen – 57,000 hours at 70% lumen maintenance.
- Photometric Performance:** Tested in accordance to IESNA LM-79-2008

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Options

- Dimming Capability:** 0-10V. See LED-DIM specification sheet
- Emergency Capability (Integral):** Add "EM" suffix. See LED-EM spec sheet.
- Emergency Capability (Inverter):** See LED-LMI specification sheet

Labels

- UL (suitable for wet locations), cUL, I.B.E.W.
- 5 Year Warranty

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

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Calculate LED Downlight **C6L1520DL (M)**

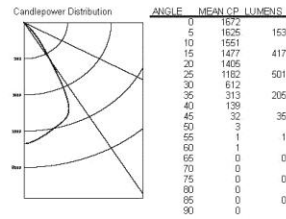
Page 2 of 2

1500/2000 Lumen Medium Beam, 6" Aperture Remote Phosphor LED

Correlated Color Temperature (CCT) Multipliers
2700K (x 0.92), 3000K (x 1.00), 3500K (x 1.07), 4000K (x 1.14)

Reflector Finish Multipliers
CL (x 1.00), CCL (x 0.80), CCD (x 0.78), CCZ (x 0.63), WH (x 0.68) — CL & CCD finishes are tested. CCL, CCZ & WH are calculated.

1500 LM, 3000K, CL FINISH TRIM



TrimFrame: C6L1520DL30KMCCLW/C6L15N1
Output lumens: 1312 lm
Correlated Color Temp¹: 3000K
Input Watts²: 26.6 w
Efficacy³: 49.3 lm/w
CRP⁴: 78
Spacing Criterion: 0.8

CEILING WALL	80%			70%			50%			30%			0%
	70	50	30	70	50	30	70	50	30	70	50	30	0
0	119	119	119	119	119	119	111	111	111	106	106	106	100
1	114	111	109	107	109	105	105	102	101	99	94	94	89
2	109	104	100	97	102	96	99	94	96	92	89	89	83
3	104	98	93	89	96	89	94	87	91	85	83	83	78
4	99	92	87	83	91	82	89	81	87	80	78	78	73
5	94	87	81	77	86	77	84	76	82	76	73	73	68
6	90	82	75	72	81	72	80	71	79	71	68	68	63
7	86	77	72	68	77	68	75	67	74	67	65	65	60
8	82	73	68	64	73	64	72	63	71	63	62	62	57
9	78	69	64	60	69	60	68	60	67	60	58	58	53
10	75	66	60	57	66	57	65	57	64	56	55	55	50

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1071	81.6%
0-40	1275	97.2%
0-60	1312	100.0%
0-90	1312	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandle	Beam Diameter
5'	67	5"
6'	46	6"
7'	34	7"
8'	26	8"
9'	21	10"

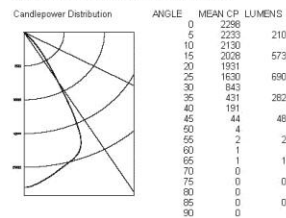
Multiple Unit Data - RCR 2

Spacing	Initial Watts/Ft	Watts/Ft
5'	60.5	1.18
6'	39.7	0.77
7'	28.4	0.55
8'	23.6	0.46
9'	18.9	0.37

CERTIFIED TEST REPORT NO. F10019³

36"x36"x10' Room, Workplane 2 1/2' above floor, 80/60/20% Reflectances

2000 LM, 3000K, CL FINISH TRIM



TrimFrame: C6L1520DL30KMCCLW/C6L20N1
Output lumens: 1805 lm
Correlated Color Temp¹: 3000K
Input Watts²: 39.5 w
Efficacy³: 45.7 lm/w
CRP⁴: 78
Spacing Criterion: 0.8

CEILING WALL	80%			70%			50%			30%			0%
	70	50	30	70	50	30	70	50	30	70	50	30	0
0	119	119	119	119	119	119	111	111	111	106	106	106	100
1	114	111	109	107	109	105	105	102	101	99	94	94	89
2	109	104	100	97	103	96	99	94	96	92	89	89	83
3	104	98	93	89	96	89	94	87	91	85	83	83	78
4	99	92	87	83	91	82	89	81	87	80	78	78	73
5	94	87	81	77	86	77	84	76	82	76	73	73	68
6	90	82	75	72	81	72	80	71	79	71	68	68	63
7	86	77	72	68	77	68	75	67	74	67	65	65	60
8	82	73	68	64	73	64	72	63	71	63	62	62	57
9	78	69	64	60	69	60	68	60	67	60	58	58	53
10	75	66	60	57	66	57	65	57	64	56	55	55	50

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1472	81.5%
0-40	1764	97.2%
0-60	1805	100.0%
0-90	1805	100.0%

Single Unit Data

Height to Lighted Plane	Initial Footcandle	Beam Diameter
5'	92	5"
6'	64	6"
7'	47	7"
8'	36	8"
9'	29	10"

Multiple Unit Data - RCR 2

Spacing	Initial Watts/Ft	Watts/Ft
5'	83.2	1.75
6'	54.6	1.15
7'	39.0	0.82
8'	32.5	0.68
9'	26.0	0.55

CERTIFIED TEST REPORT NO. F10019³

36"x36"x10' Room, Workplane 2 1/2' above floor, 80/60/20% Reflectances

¹ Correlated Color Temperature within specs as defined in ANSL_NEMA_ANSI C78.377-2008: Specifications for the Chromaticity of Solid-State Lighting Products.
² Wattage controlled to within 5%.
³ Tested using absolute photometry as specified in LM79: IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
⁴ Color Rendering Index within +/- 2%.

Job Information **Type:**

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Date: _____ Type: _____

Firm Name: _____

Project: _____

eW Fuse Powercore

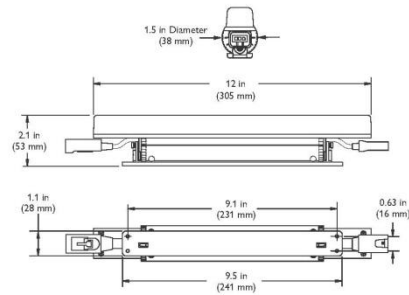
3000 K, 10° × 60° Beam Angle

Ultra-compact, high-performance LED grazing fixture

With narrow and medium beams of intense white or solid blue light, eW[®] Fuse Powercore is an excellent choice for a full range of surface grazing and wall-washing applications. Its ultra-compact form factor permits installation in tight spaces too small to accommodate conventional grazing fixtures with similar light output. Meets or exceeds the performance of comparable linear fluorescent grazing fixtures while lowering installation, energy, and maintenance costs. Offers environmentally-conscious buyers a green, energy-efficient grazing fixture with industry-leading quality and quantity of light.

- Cost-effective alternative — Long useful source life and low-maintenance operation represent a cost-effective alternative to traditional grazing fixtures.
- High-performance beam quality — Available narrow 10° × 60° or medium 30° × 60° beam angle. Superior beam quality delivers striation-free light as close as 6 in (152 mm) from fixture placement. Interlocking connectors for end-to-end installation with no light scalloping between fixtures.
- Multiple color temperatures for design and application flexibility — Available in 2700 K, 3000 K, 3500 K, and 4000 K for applications calling for warm, neutral, or cool white light. Solid blue also available.
- Optibin[®] advanced binning algorithm — Exceeds the recognized standards for color quality to guarantee uniformity and consistency of hue and color temperature across LED sources, fixtures, and manufacturing runs.
- Integrates patented Powercore[®] technology — Powercore rapidly, efficiently, and accurately controls power directly from line voltage, eliminating the need for an external power supply, dramatically simplifying installation, and lowering total system cost.

- Support for multiple voltages — Accepts power input of 100, 120, 208, 220 – 240, and 277 VAC for consistent installation and operation from line voltage in most locations.
- Dimming capability — Patented DIMand[®] technology offers smooth dimming capability with many electronic low voltage (ELV) dimmers for all input voltages.
- Simple installation — Contractor-friendly installation with product runs ranging from 50 fixtures at 100 VAC to 139 fixtures at 277 VAC. Easy-to-install 4 ft (1.2 m) mounting tracks for quick setup in linear applications.



- Easy mounting and positioning — With end-to-end locking power connectors that can make 180° turns, eW Fuse Powercore fixtures are easy to position in even the most challenging mounting circumstances. Fixtures rotate in 10° increments through 180° for precise aiming and color mixing. Optional mounting tracks support vertical and overhead positioning. 1 ft (305 mm) and 5 ft (1.5 m) jumper cables can add extra space between fixtures.

For detailed product information, please refer to the eW Fuse Powercore Product Guide at www.colorkinetics.com/essentialwhite/ewfusepc

PHILIPS

Specifications

Due to continuous improvements and innovations, specifications may change without notice.

Item	Specification	3000 K*, 10° x 60° beam angle	
Output	Lumens†	602	
	Efficacy (lm / W)	50.6	
	CRI	83	
Lumen Maintenance‡	50,000 hours L70 @ 25° C	37,000 hours L70 @ 50° C	
	90,000 hours L50 @ 25° C	80,000 hours L50 @ 50° C	
Electrical	Input Voltage	100 / 120 / 208 / 220 – 240 / 277 VAC, auto-switching, 50 / 60 Hz	
	Power Consumption	13.5 W maximum at full output, steady state	
	Power Factor	.99 @ 120 V	
Control	Dimming	Compatible with many commercially available ELV, trailing edge, or reverse-phase control dimmers§	
	Dimensions (Height x Width x Depth)	1.1 x 1.2 x 2.1 in (28 x 305 x 53 mm)	
Physical	Weight	0.98 lbs (.45 kg)	
	Housing	Die-cast aluminium, white powder-coated finish	
	Lens	Polycarbonate	
	Fixture Connections	Integral male / female connectors	
	Temperature Ranges	-40° – 122° F (-40° – 50° C) Operating	
		-4° – 122° F (-20° – 50° C) Startup	
	Humidity	-40° – 176° F (-40° – 80° C) Storage	
		0 – 95%, non-condensing	
	Maximum Fixture Run Length	50 @ 100VAC	Configuration: Fixtures installed end-to-end, 20 A circuit, standard 10 ft (3 m) Leader Cable
		60 @ 120VAC	
104 @ 208VAC			
115 @ 220 – 240VAC			
139 @ 277VAC			
Certification and Safety	Certification	UL / cUL, FCC, CE, C-Tick	
	Environment	Dry / Damp Location, IP20	

* Color temperatures conform to nominal CCTs as defined in ANSI Chromaticity Standard C78.377A.

† Lumen measurement complies with IES LM-79-08 testing procedures.

‡ L70 = 70% maintenance of lumen output (when light output drops below 70% of initial output). L50 = 50% maintenance of lumen output (when light output drops below 50% of initial output). Ambient temperatures specified. Based on measurements that comply with IES LM-80-08 testing procedures. Refer to www.colorkinetics.com/support/appnotes/lm-80-08.pdf for more information.

§ Refer to www.colorkinetics.com/support/appnotes/ for specific details.

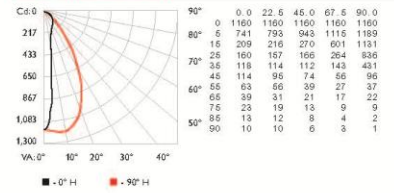
|| These figures are accurate for this configuration only. Changing the configuration can affect fixture run lengths.



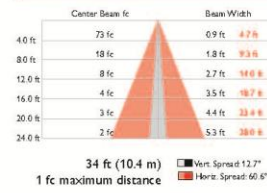
Photometrics

3000 K, 10° x 60° beam angle

Polar Candela Distribution



Illuminance at Distance



Lumens	602
Efficacy	50.6 lm / W

For lux multiply fc by 10.7



Accessories

Item	Type	Length	Item Number	Philips 12NC
Leader Cable with terminator and strain relief	UL / cUL	10 ft (3 m)	108-000047-00	910503700972
	CE / CCC	10 ft (3 m)	108-000047-01	910503700973
Wiring Compartment with terminator	UL / cUL		120-000077-01	910503700994
	UL / cUL	1 ft (305 mm)	108-000048-00	910503700974
Jumper Cable	UL / cUL	5 ft (1.5 m)	108-000048-01	910503700975
	CE / CCC	1 ft (305 mm)	108-000048-02	910503700976
	CE / CCC	5 ft (1.5 m)	108-000048-03	910503700977
	CE / CCC	5 ft (1.5 m)	108-000048-03	910503700977
Terminators	10 / box		120-000099-00	910503701120
Mounting Track, White	Quantity 1	4 ft (1219 mm)	120-000124-00	910503701787



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Burlington, Massachusetts 01803 USA
Tel 888.385.5742
Tel 617.423.9999
Fax 617.423.9998
www.philipscolorkinetics.com

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Use Item Number when ordering in North America.

Fixtures

Color Temp.	Beam Angle	Item Number	Philips 12NC
2700 K	10° x 60°	523-000065-00	910503701653
	30° x 60°	523-000065-04	910503701657
3000 K	10° x 60°	523-000065-01	910503701654
	30° x 60°	523-000065-05	910503701658
3500 K	10° x 60°	523-000065-02	910503701655
	30° x 60°	523-000065-06	910503701659
4000 K	10° x 60°	523-000065-03	910503701656
	30° x 60°	523-000065-07	910503701660
Blue	10° x 60°	223-000065-02	910503701676
	30° x 60°	223-000065-06	910503701680

Appendix C | Control Schedule and Control Specification

CONTROLS SCHEDULE					
TAG	DEVICE NAME	MODEL	DESCRIPTION	FUNCTION	LOCATION
TC-1	Time Clock	Tork DG120	Tork single channel, 7 day time clock. LCD display. Capable of different daily, weekly, and holiday schedules.	Timed ON/OFF	Elec. Closet GB13
CS-1	Control Station	Lutron GRX-4116-T-BR	16 Zone Grafik Eye 4000 control unit with integral astronomic time clock, lighting presets, and translucent top cover.	Scenes 1-16, off	Auditorium front
WS-1	Control Station	Lutron SG-PRON	Lutron seeTouch series control unit with 4 scene control, raise/lower, and IR receiver programming.	Scenes 1-4, Raise/lower	Auditorium wall
WD-1	Wireless Device	Lutron GRX-IT-WH	Lutron wireless remote control unit with 4 scene control, on/off, raise/lower, and IR transmitter.	Scenes 1-4, Raise/lower, on/off	Auditorium
M	Light System Manager	Color Kinetics Light System Manager	Color Kinetics integrated hardware and software. Ethernet based control. Automatic playback control.	Simultaneous light output data for up to 15,000 LED nodes.	Nurses' Station
D	Data Enabler	Color Kinetics Data Enabler Pro	Integrated data and power. Ethernet based control. Universal power input range, passes mains voltage to all connected fixtures	Simultaneous light output data for up to 15,000 LED nodes.	Nurses' Station
K	Keypad	Color Kinetics Ethernet Controller Keypad	Compact, convenient user control for Light System Manager. Ethernet based control, uses single CAT 5e cable for data and power.	Scenes 1-8, on/off	Nurses' Station Desks

MULTIPURPOSE CONTROLS

DG SERIES MULTIPURPOSE CONTROLS 1 CHANNEL

APPLICATIONS

DG180

ONE CHANNEL, 24 HOUR

Ideal for single circuit HVAC unit.

Use to control:

- Compressors
- Pumps
- Billboard Signs
- Ventilating Fans
- Security Systems
- SAME SCHEDULE EVERYDAY; CAN OMIT OPERATION ON SELECTED DAYS

DG100/120

ONE CHANNEL, 7 DAY

Indoor/Outdoor lighting and HVAC equipment:

- School warning and other traffic lights
- Water Heaters in offices, churches and factories
- CAPABLE OF DIFFERENT SCHEDULES EACH DAY OF THE WEEK; HOLIDAY SCHEDULE CAN BE EXECUTED AT ANY TIME FOR ANY NUMBER OF DAYS.

APPLICATIONS

DGM100

MOMENTARY CONTACTS

ONE CHANNEL, 7 DAY

2 SPDT MOMENTARY CONTACT (2 SECOND)

OUTPUTS: 1 FOR ON, 1 FOR OFF.

Ideal for use with:

- Low voltage latching relays
- Mechanically held contactors
- Magnetically held contactors

FEATURES

DISPLAY: LCD

DAYLIGHT SAVING: Automatic adjustment (can be omitted).

LEAP YEAR: Automatic Compensation

MANUAL OVERRIDE: Until the next regularly scheduled ON or OFF. Automatic operation then resumes.

LOCK FORMAT: AM/PM (can be set to 24 hour if required)

POWER OUTAGE BACKUP: Battery back-up retains schedules: standard 9V conveniently accessible from the front. Lithium averages 450 hours. Alkaline averages 175 hours (Battery not supplied).

- Building sweep OFF of low voltage systems
- Direct wire to motor starters, eliminating the need for any other momentary interface device.
- CAPABLE OF DIFFERENT SCHEDULES EACH DAY OF THE WEEK; HOLIDAY SCHEDULE CAN BE EXECUTED AT ANY TIME FOR ANY NUMBER OF DAYS.

DG180/100/120 DGM100



MEETS CALIFORNIA ENERGY COMMISSION'S TITLE 24 REQUIREMENTS 

SPECIFICATIONS

TIMING ACCURACY: Line Frequency

OPERATING TEMPERATURE:

-4 to +122°F (-20° to +50°C.)

STORAGE TEMPERATURE:

-22° to +167°F (-30° to +75°C.)

RELATIVE HUMIDITY: 0 to 90% RH (non-condensing)

POWER CONSUMPTION: 4VA max.

ENCLOSURE: Noryl® Indoor/Outdoor NEMA 3R is standard.

OTHER MOUNTINGS:

Metal Indoor: add suffix Y

Metal Indoor/Outdoor – NEMA 3R: add suffix O

Flush with lock and key: add suffix FLG

Bracket mounting – specify mechanism only with bracket

DG 100, DG 180						CONTACT RATINGS					
LOAD TYPE	UL			General Purpose	CSA			General Purpose	CSA		
	120/240VAC†	NO	NC		125VAC	NO	NC		125VAC	NO	NC
Resistive or Inductive	277VAC††	20A	10A	240VAC	15A	10A	277VAC	10A	10A	6A	3A
Resistive Pilot Duty	28VDC	20A	10A	Resistive Pilot Duty	28VDC	20A	10A	Resistive Pilot Duty	28VDC	10A	10A
	120/240VAC††	470VA	275VA		120/240VAC	470VA	275VA		120/240VAC	470VA	275VA
	277VAC	690VA			277VAC	690VA			277VAC	690VA	
Motor Load	120VAC	1HP	½HP	Motor Load	120VAC	½HP	¼HP	Motor Load	120VAC	½HP	¼HP
	240VAC	2HP	¾HP		240VAC	1HP	¾HP		240VAC	1HP	¾HP
Ballast	277VAC††	6A	3A								

DG 120, DGM100						CONTACT RATINGS					
LOAD TYPE	UL			General Purpose	CSA			General Purpose	CSA		
	120/240VAC	NO	NC		125VAC	NO	NC		125VAC	NO	NC
Resistive or Inductive	120/240VAC	15A	10A	General Purpose	125VAC	10A	10A	General Purpose	125VAC	10A	10A
Resistive Pilot Duty	28VDC	15A	10A	Resistive Pilot Duty	28VDC	10A	10A	Resistive Pilot Duty	28VDC	10A	10A
	120/240VAC	470VA	275VA		120/240VAC	470VA	275VA		120/240VAC	470VA	275VA
	277VAC	690VA			277VAC	690VA			277VAC	690VA	
Motor Load	120VAC	1HP	½HP	Motor Load	120VAC	½HP	¼HP	Motor Load	120VAC	½HP	¼HP
	240VAC	2HP	¾HP		240VAC	1HP	¾HP		240VAC	1HP	¾HP

† Model DG120 is 15A
†† Does not apply to Model DG120



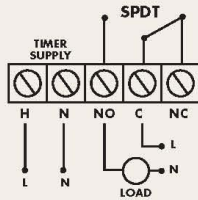
CATALOG NO	UPC CODE	TYPE	ON & OFF SET POINTS		CLOCK INPUT 50/60Hz	DRY CONTACTS (UNPOWERED)
			TOTAL PER WEEK	MIN. SETTING		
DG180*	82105	24 HOUR	288	5 minutes	120VAC	SPDT
DG100*	82101	7 DAY	32	1 minute	120VAC	SPDT
DG120**	82201	7 DAY	32	1 minute	120VAC	DPDT
DG120-2	82202	7 DAY	32	1 minute	240VAC	DPDT
DGM100	82103	MOMENTARY	32	1 minute	120VAC	2 SPDT

*Models DG100 and DG180 are available in:
240VAC: add suffix 2
277VAC: add suffix 3
24 VAC: add suffix 24
12 VDC: add suffix 12

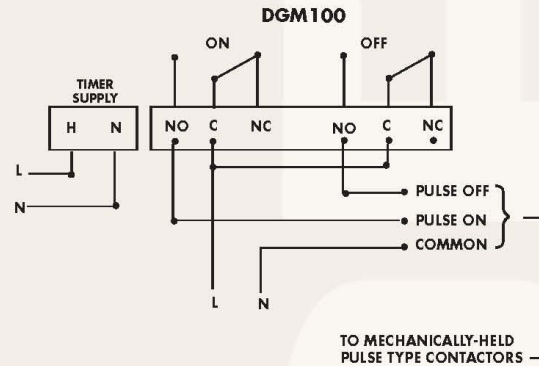
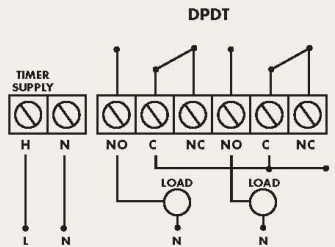
**Model DG120 is available in 24VAC; consult factory.
Model DG120 is not available in 277VAC

WIRING DIAGRAMS

DG100, DG180



DG120



SPECIFICATION WRITER'S GUIDES

DG180

1. Furnish and install TORK Model DG180, 24 hour with skip-a-day digital time switch.
2. Controller shall be capable of 288 set points.
3. Controller shall program in 5 minute resolution.
4. Controller shall repeat the same schedule each day or be capable of omitting any selected days.
5. Controller shall program in AM/PM or 24 Hour format.
6. Display shall be LCD.
7. Controller shall have daylight saving or standard time.
8. Controller shall have automatic leap year compensation.
9. Controller shall have battery backup capability of 450 hours with Lithium or 175 hours with Alkaline battery.
10. Controller shall be capable of manual override ON or OFF to the next scheduled event.
11. Unit shall have an indoor/outdoor Noryl enclosure as standard.

DG100/DG120

1. Furnish and install TORK Model DG100/DG120, 7-day digital time switch.
2. Controller shall be capable of 32 set points.
3. Controller shall program in 1 minute resolution.
4. Controller shall be capable of a different schedule each day of the week.
5. Controller shall program in AM/PM or 24 Hour format.
6. Display shall be LCD.
7. Controller shall have daylight saving or standard time.
8. Controller shall have automatic leap year compensation.
9. Controller shall have battery backup capability of 450 hours with Lithium or 175 hours with Alkaline battery.
10. Controller shall be capable of manual override ON or OFF to the next scheduled event.
11. Unit shall have an indoor/outdoor Noryl enclosure as standard.

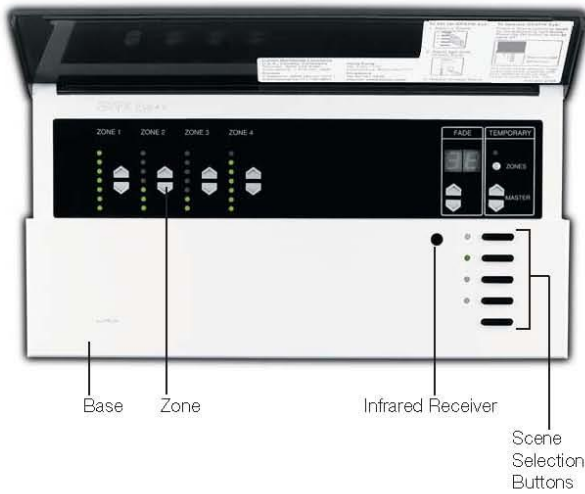
DGM100:

1. Furnish and install TORK Model DGM100, 7-day digital time switch with momentary contact capabilities.
2. Controller shall be capable of 32 set points.
3. Controller shall program in 1 minute resolution.
4. Controller shall be capable of a different schedule each day of the week.
5. Controller shall program in AM/PM or 24 Hour format.
6. Display shall be LCD.
7. Controller shall have daylight saving or standard time.
8. Controller shall have automatic leap year compensation.
9. Controller shall have battery backup capability of 450 hours with Lithium or 175 hours with Alkaline battery.
10. Controller shall be capable of manual override ON or OFF to the next scheduled event.
11. Unit shall have an indoor/outdoor Noryl enclosure as standard.



GRAFIK Eye 4000 Series Control Unit

Cover (shown open)



Description

- Provides pushbutton recall of four preset lighting scenes, plus Off.
- Allows setup of lighting scenes using buttons on the Control Unit.
- Controls virtually any light source via dimming and switching panels.
- Provides lockout options to prevent accidental changes.
- Includes built-in infrared receiver for operation with an optional remote control.

Models available to:

- Control 2 to 24 zones of lighting.

4000 Series Control Units work with:

- GRAFIK Eye Wallstations
- GP and LP Dimming Panels
- XP Softswitch™ Panels

GRX-4100 Control Units

Provide setup using buttons on the Control Unit.

GRX-4500 Control Units

Provide optional setup using a PC, including setting lighting levels in 1% increments.

Job Name:	Model Numbers:	
Job Number:		



Specifications

Power

- Low-voltage type Class 2 (PELV)
 Operating voltage: 24 V Direct Current.

Lighting Sources/Load Types

Controls lighting sources with a smooth, continuous Square Law dimming curve or on a full conduction non-dim basis via GP and LP Dimming Panels and XP Softswitch™ Panels.

Preset Control

- 4 preset lighting scenes and off are accessible from the Control Unit front panel.
- 12 additional scenes are stored in the Control Unit. These scenes are accessible via Wallstations and/or Control Interfaces.
- Light levels fade smoothly between scenes. Fade time can be set differently for each scene, between 0-59 sec. or 1-60 min. Fade time from Off is capped at 5 sec.

Key Design Features

- Meets IEC 801-2. Tested to withstand 15kV electrostatic discharge without damage or memory loss.
- Power failure memory automatically restores lighting to the scene selected prior to power interruption.
- Faceplate snaps on with no visible means of attachment.

System Communications and Capacities

- Low-voltage type Class 2 (PELV) wiring connects Control Units, Wallstations, and Control Interfaces.
- Up to 8 Control Units may be linked to control up to 64 zones.
- Up to 16 total Wallstations and Control Interfaces may be added for a total of 24 control points.

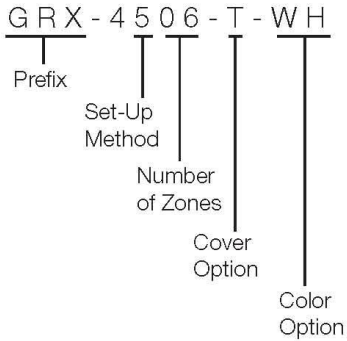
Environment

- 32-104°F (0-40°C). Relative humidity less than 90% non-condensing.

Job Name:	Model Numbers:	
<input type="text"/>	<input type="text"/>	<input type="text"/>
Job Number:	<input type="text"/>	<input type="text"/>



How to Build a Model Number



Prefix:
GRX for GRAFIK Eye 4000 Series Control Units

Set-Up Method:
1 for setup using front panel
5 for PC setup

Number of Zones:
 2, 3, 4, 6, 8, 16, or 24

Cover Option:
A for Opaque
T for Translucent Black

Color Option:
 See Color Options list

Model Numbers

Number of Zones	Standard Setup	PC Setup
2	GRX-4102-__	GRX-4502-__
3	GRX-4103-__	GRX-4503-__
4	GRX-4104-__	GRX-4504-__
6	GRX-4106-__	GRX-4506-__
8	GRX-4108-__	GRX-4508-__
16	GRX-4116-__	GRX-4516-__
24	GRX-4124-__	GRX-4524-__

Cover Options

Opaque **A**
 Cover and Base will match.
 Translucent Black **T**
 Black Cover and choice of
 Base color.

Also available:
 - Custom controls
 - Color matching
 - Engraving
 These options ship in 4 to 6 weeks.

Color Options

Architectural Matte Finishes

Standard – Ship in 48 hours
 Cover Option: A or T
 White **WH**
 Ivory **IV**
 Beige **BE**
 Gray **GR**
 Brown **BR**
 Black **BL**

Designer Gloss Finishes

Ship in 4 to 6 weeks
 Cover Option: A only
 White **GWH**
 Ivory **GIV**
 Light Almond **GLA**
 Almond **GAL**

Satin Color Matte Finishes

Cover Option: A or T
 Hot **HT**
 Ochre **OC**
 Terracotta **TC**
 Desert Stone **DS**
 Stone **ST**
 Limestone **LS**
 Blue Mist **BT**
 Midnight **MN**
 Taupe **TP**
 Biscuit **BI**
 Eggshell **ES**
 Snow **SW**

Architectural Metal Finishes

Cover Option: T only
 Bright Brass **BB**
 Bright Chrome **BC**
 Bright Nickel **BN**
 Satin Brass **SB**
 Satin Chrome **SC**
 Satin Nickel **SN**
 Antique Brass **QB**
 Antique Bronze **QZ**

Anodized Aluminum Finishes

Cover Option: T only
 Clear **CLA**
 Black **BLA**
 Brass **BRA**
 Bronze **BZA**

Job Name:	Model Numbers:	
<input type="text"/>	<input type="text"/>	<input type="text"/>
Job Number:	<input type="text"/>	<input type="text"/>



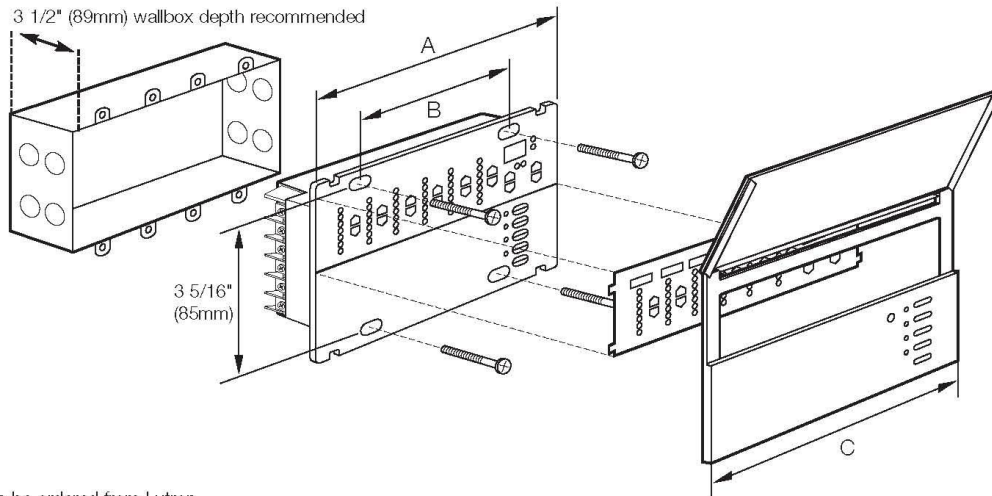
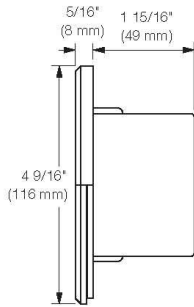
GRAFIK Eye 4000 Series

Preset Dimming Controls

4000-9.06.11.04

Dimensions and Mounting

Model	Side View	A	B	C	Wallbox ¹ U.S. Size	Depth
2-Zone: GRX-4102 GRX-4502		4 5/16" (123mm)	1 13/16" (46mm)	5.56" (141mm)	2 Gang	3.5" (89mm)
3-Zone: GRX-4103 GRX-4503		6 11/16" (168mm)	3 5/8" (92mm)	7.25" (184mm)	3 Gang	3.5" (89mm)
4-Zone: GRX-4104 GRX-4504		8 5/16" (208mm)	5 7/16" (138mm)	8.94" (227mm)	4 Gang	3.5" (89mm)
6-Zone: GRX-4106 GRX-4506		8 5/16" (208mm)	5 7/16" (138mm)	8.94" (227mm)	4 Gang	3.5" (89mm)
8-Zone: GRX-4108 GRX-4508		8 5/16" (208mm)	5 7/16" (138mm)	8.94" (227mm)	4 Gang	3.5" (89mm)
16-Zone: GRX-4116 GRX-4516		8 5/16" (208mm)	5 7/16" (138mm)	8.94" (227mm)	4 Gang	3.5" (89mm)
24-Zone: GRX-4124 GRX-4524		8 5/16" (208mm)	5 7/16" (138mm)	8.94" (227mm)	4 Gang	3.5" (89mm)



¹ Can be ordered from Lutron.

LUTRON SPECIFICATION SUBMITTAL

Page **4**

Job Name:	Model Numbers:	
Job Number:		



Low-Voltage Class 2 (PELV) Wiring (All Models)

- System communications use low-voltage Class 2 (PELV) wiring.
- Wiring must be daisy-chained.
- Wiring must run separately from line (mains) voltage.

Class 2 (PELV) wiring link requires:

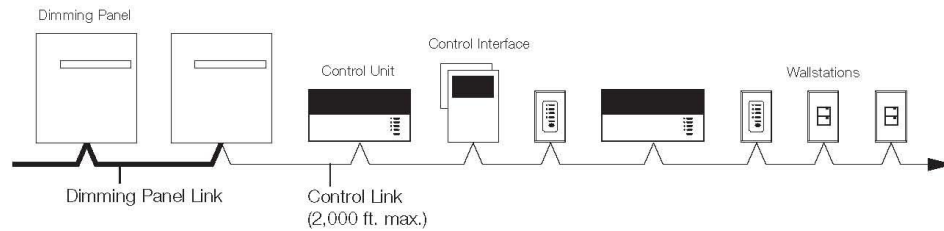
Two #12 AWG (2.5mm²) conductors for control power.

One twisted, shielded pair of #18 AWG (0.625mm²) for data link.

One #18 AWG (1.0mm²) conductor for Emergency (Essential) sense line between dimming panels.

Total length of Control Link may be up to 2,000 ft. (610m).

Approved low-voltage cable is available from Lutron¹, Belden, and Liberty. These are approved with #22 AWG data link wires.

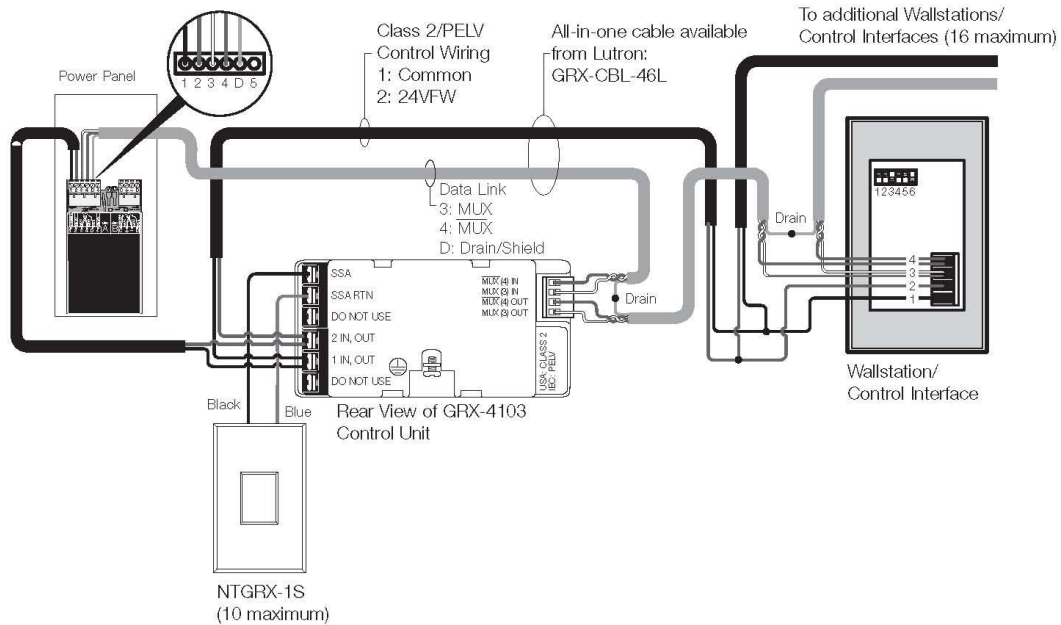


¹ GRX-CBL-46L Class 2 (PELV) wiring cable is available from Lutron and contains:
 Two #12 AWG (2.5mm²) conductors for control power.
 One twisted, shielded pair of #22 AWG (0.625mm²) for data link.
 One #18 AWG (1.0mm²) conductor for Emergency (Essential) sense line.

Job Name:	Model Numbers:	
<input type="text"/>	<input type="text"/>	<input type="text"/>
Job Number:	<input type="text"/>	<input type="text"/>

Class 2 (PELV) Terminal Connections

- Connect Drain/Shield as shown. Terminate only at Power Panel if Drain Terminal is provided. Connect the bare drain wires and cut off the outside shield.
- Make all connections in the Control Unit's wallbox. Remote connections (T-taps) must be in a switch box or junction box with a maximum wire length of 8 ft. (2.5m) from the link to the connected unit.



Job Name:	Model Numbers:	
Job Number:		

Phase-Adaptive Power Module



Description

- Provides capability for a zone on a *GRAFIK Eye* control unit (or other product) to dim a fully loaded circuit of lighting.
- May be used to control incandescent, electronic low-voltage, magnetic low-voltage, and neon/cold cathode lighting sources, as well as Lutron® Tu-Wire® fluorescent dimming ballasts.
- Automatically selects leading-edge or trailing-edge dimming for low-voltage transformers.
- Provides power and dimming for one zone.
- Up to 3 power modules may be wired on a single *GRAFIK Eye* zone.
- Models available for 120 V~ control power.
- Models available for 120 V~ or 120 - 277 V~ load power.
- Not for use with non-dim loads.

Works with 120 V~ versions of:

- *GRAFIK Eye* QS control units*
- *GRAFIK Eye* 3000 Series control units**
- LP, LCP, and GP dimming panels**
- HomeWorks® remote power panels**
- *Lutron* 3-wire fluorescent dimmers (consult Lutron for Verti®); see approved list in the dimmers & switches specification guide at www.lutron.com

*Set to power module load type

**Set to incandescent load type

Model and Capacities

Control Power	Load Power	Capacity	Model Number
120 V~	120 - 277 V~	16 A	PHPM-PA-DV-WH
120 V~	120 V~	16 A	PHPM-PA-120-WH

Job Name: <input type="text"/>	Model Numbers: <input type="text"/>	
Job Number: <input type="text"/>	<input type="text"/>	<input type="text"/>

Specifications

Power

- Control voltage: 120 V \sim
- Load voltage: 120 V \sim only for PHPM-PA-120-WH
 120 – 277 V \sim for PHPM-PA-DV-WH
- Capacity: Full 16 A
 120 V \sim 1920 W
 120 – 277 V \sim 1920 – 4432 W
- Frequency: 50 / 60 Hz, phase-to-neutral.
- Load (output) power: Phase independent of control device/control voltage.

Sources/Load Types

- Operates these sources with a smooth continuous Square Law dimming curve:
 - Incandescent (tungsten)
 - Halogen
 - Magnetic low-voltage transformer (iron core)
 - Electronic (solid-state) low-voltage transformer (must be manufacturer approved for reverse-phase control dimming).
 - Neon/Cold cathode
 - Lutron® Tu-Wire® fluorescent dimming ballasts
- Incandescent and electronic low-voltage sources may be controlled on the same circuit/control zone. Up to 30% of the unit's capacity may be used for incandescent lighting.
- Incandescent and magnetic low-voltage sources may be controlled on the same circuit/control zone. Up to 30% of the unit's capacity may be used for incandescent lighting.
- Electronic low-voltage and magnetic low-voltage sources may NOT be controlled on the same circuit/control zone.
- PHPM-PA not for use with non-dim loads. Use switching power module (PHPM-SW-DV-WH) for non-dim loads.
- Minimum load on power module is 10 W.
- Output must be directly connected to the load. Load side switching is not recommended.

Key Design Features

- Automatically selects between forward phase/leading edge (e.g., magnetic low-voltage) and reverse phase/trailing edge (e.g., electronic low-voltage) dimming/output based on connected load.
- Patented RTISS™ circuitry compensates in real time for incoming line voltage variations: Compensates for +/-2% change in RMS voltage/cycle and +/-2% Hz change in frequency/second.
- Provides air-gap off.
- Module protects itself during most temporary over-current and over-voltage conditions.
- Two LEDs on front of unit provide diagnostic information (visible when faceplate is removed).

Terminals

Each terminal accepts up to two 12 AWG (2.5 mm²) wires.

Environment

- 32 to 104 °F (0 to 40 °C). Relative humidity less than 90% non-condensing.
- Indoor use only.
- Maximum heat output of module: 135 BTU/hour.

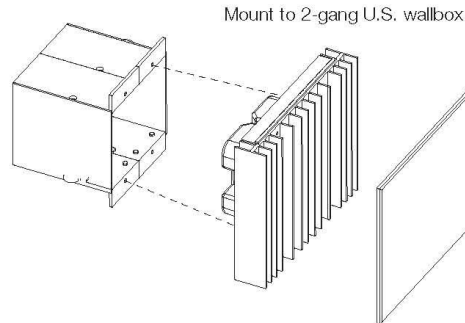
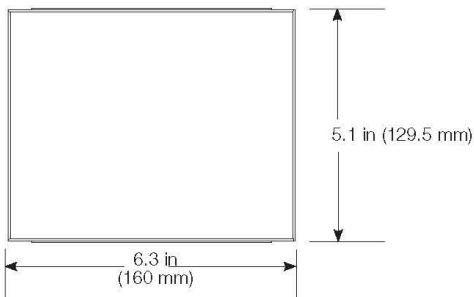
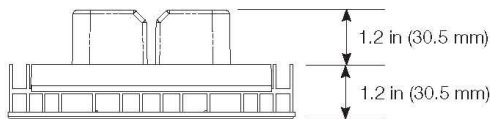
Mounting

- Surface or recess mount.
- Power module is UL tested and approved for use in spaces designed for environmental air handling.

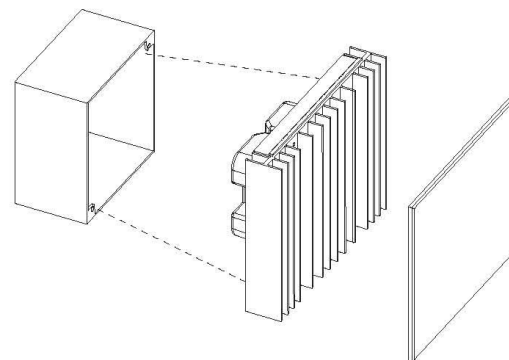
Job Name: <input type="text"/>	Model Numbers: <input type="text"/>
Job Number: <input type="text"/>	<input type="text"/>

Dimensions and Mounting

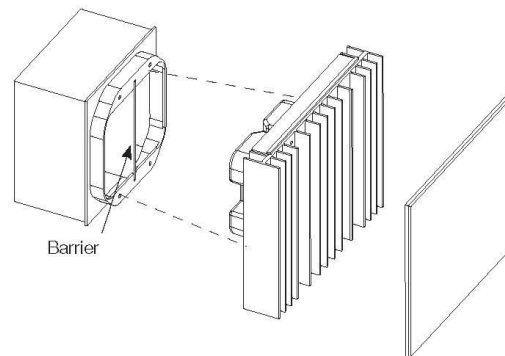
- Mount in 2-gang U.S. wallbox 3.5 in (89 mm) deep or 4 x 4 in (102 x 102 mm) junction box 2.1 in deep (53 mm).
- Indoors only.
- This device generates heat; mount only where ambient temperature is 32 to 104 °F (0 to 40 °C).
- Mount with arrows facing up to ensure adequate cooling.
- Allow 4.5 in (114 mm) above and below faceplates when mounting several modules in a vertical layout.
- Units may butt together when mounted in a horizontal layout.
- Mount so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and wiring.
- Mount within 7° of true vertical.



Mount to 4 x 4 in (102 x 102 mm), 2.1 in (53 mm) deep U.S. junction box



Mount to 4 x 4 in (102 x 102 mm), 2.1 in (53 mm) deep U.S. junction box with barrier (for 277 V~ loads if required by local electrical code)



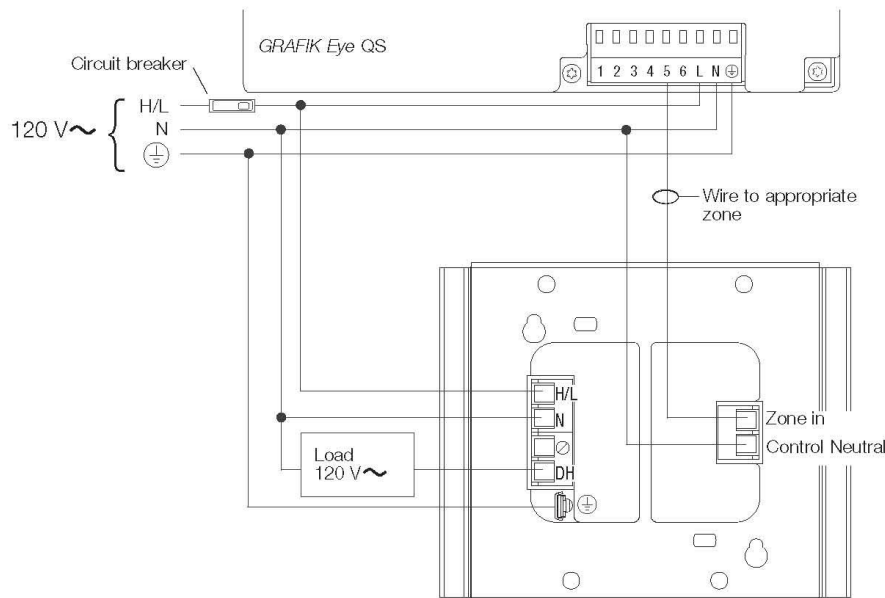
Job Name: <input type="text"/>	Model Numbers: <input type="text"/>
Job Number: <input type="text"/>	<input type="text"/>

Wiring

- Pull 12 AWG (2.5 mm²) copper (Cu) wires (75 °C/167 °F minimum) for input power and load circuit.
- Strip 1/2 in (12 mm) insulation from wires before connecting.
- Run separate neutral for load circuit - no common neutrals.
- May be used with GFI breaker protected loads. Load circuit wiring (from GFI breaker to power module to load) must be run in its own non-metallic conduit, or nuisance tripping may occur. Maximum 100 ft (30.5 m) between power module and load.
- May be used with AFI breaker protected loads. Maximum load on AFI circuit is 1000 W. Exceeding 1000 W may cause nuisance tripping of AFI breaker.

Single Power Feed

Note: The power module may be on the same circuit as the control unit only if the total load does not exceed the rating of the breaker.



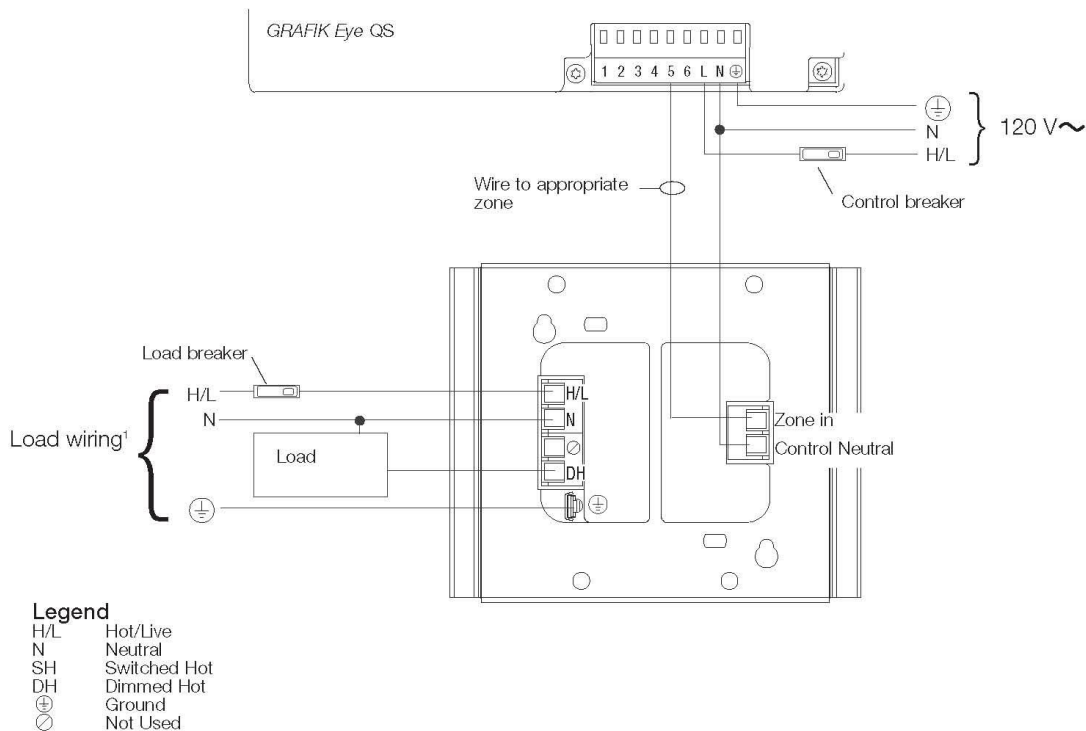
- Legend**
- H/L Hot/Live
 - N Neutral
 - SH Switched Hot
 - DH Dimmed Hot
 - ⊕ Ground
 - ⊘ Not Used

Job Name: <input type="text"/>	Model Numbers: <input type="text"/>
Job Number: <input type="text"/>	<input type="text"/>

Wiring

Multiple Power Feeds

The load breaker may be on a different phase than the control breaker.



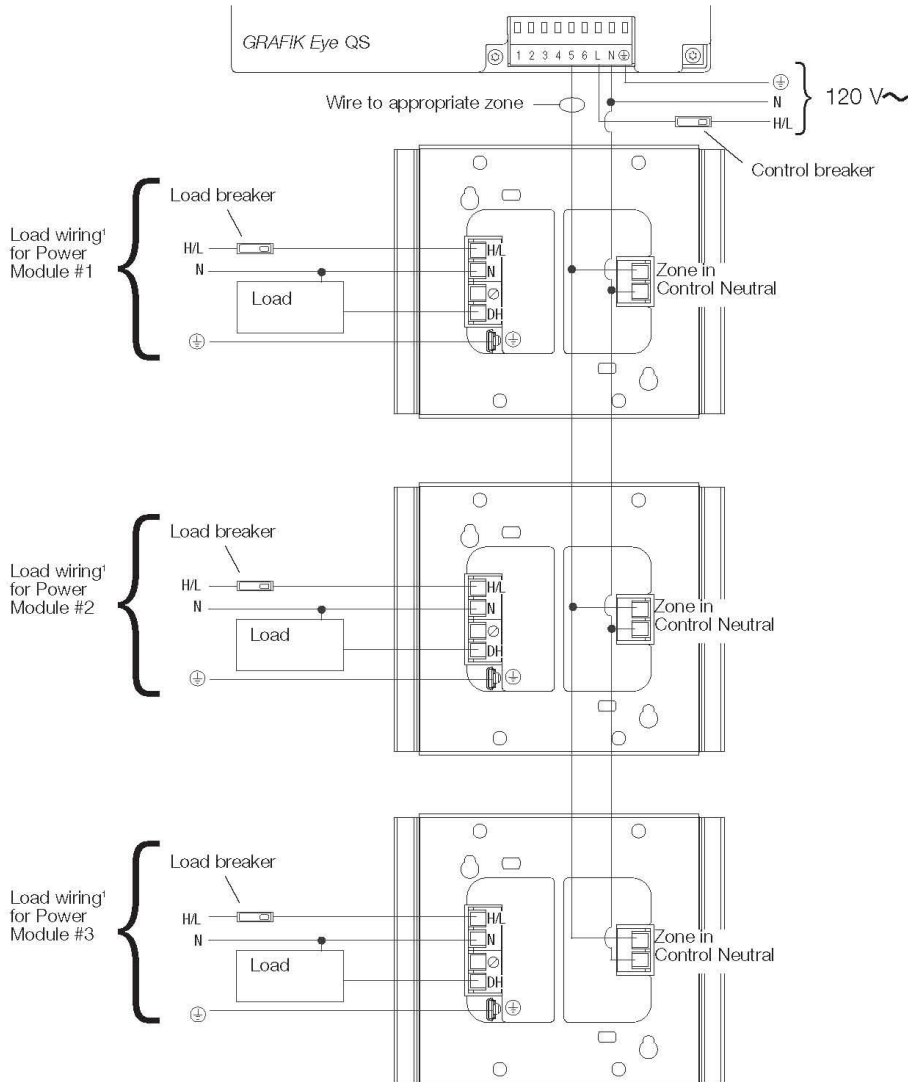
¹Load feed: 120 V~ for PHPM-PA-120-WH;
 120 – 277 V~ for PHPM-PA-DV-WH

Job Name:	Model Numbers:	
Job Number:		

369356 Rev. A 6 11.19.10

Wiring Multiple Power Modules to a Single GRAFIK Eye® Zone

Shown with separate feeds for control and loads. All breakers must be turned off prior to installing or servicing the modules. Up to 3 power modules may be wired to a single zone.

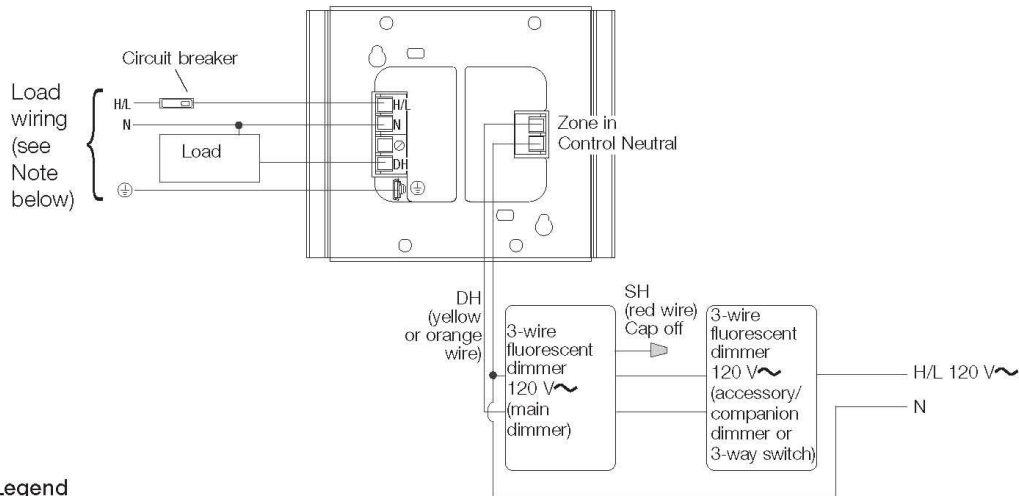


¹Load feed: 120 V~ for PHPM-PA-120-WH; 120 – 277 V~ for PHPM-PA-DV-WH

Job Name:	Model Numbers:	
Job Number:		

Multilocation Wiring

Note: The power module may be on the same circuit/control zone as the control device only if the total load does not exceed the rating of the breaker (120 V~ only).



Legend

- H/L Hot/Live
- N Neutral
- SH Switched Hot
- DH Dimmed Hot
- ⊕ Ground
- ∅ Not Used

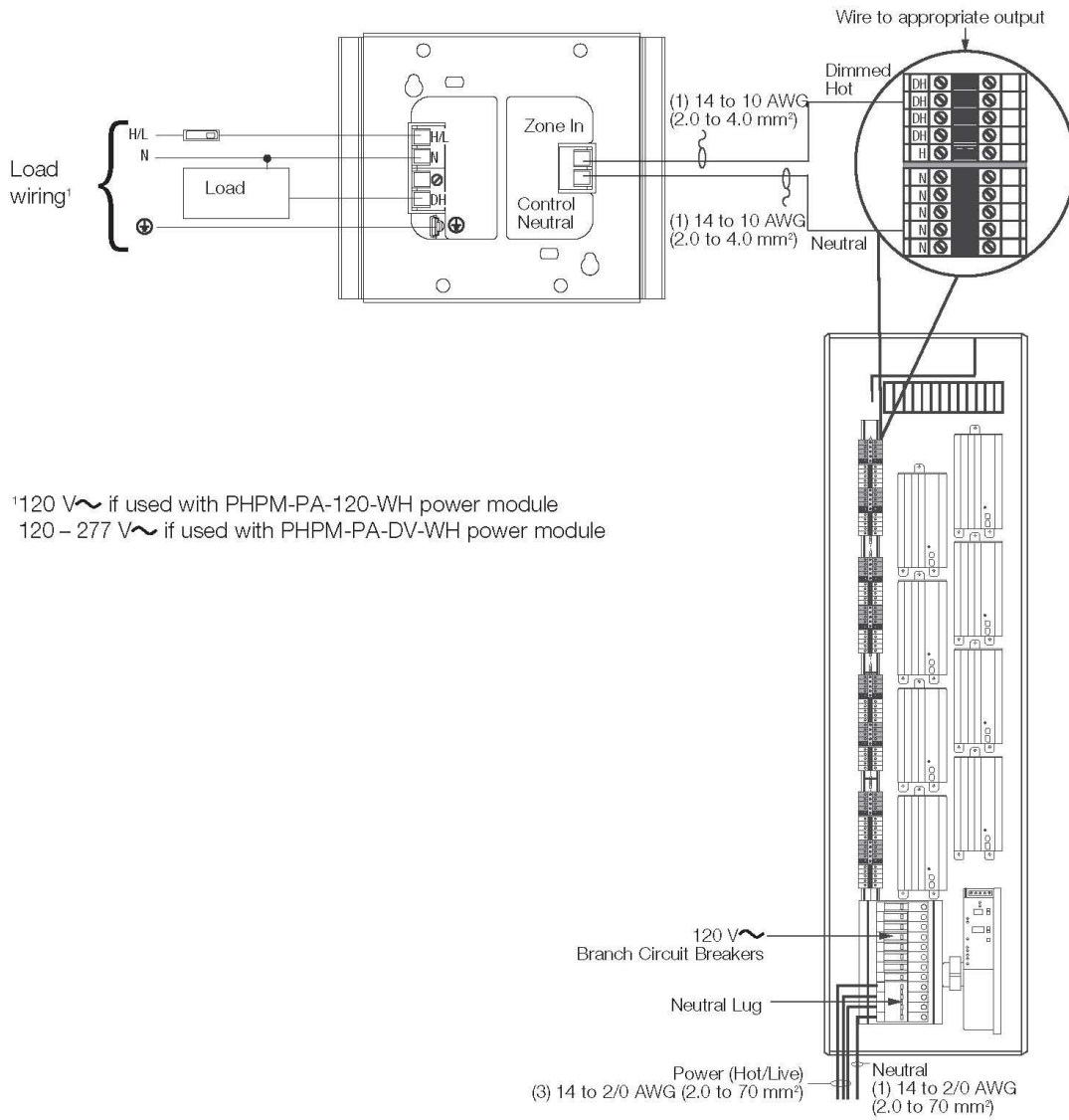
For specific wire colors, see the wallbox lighting controls catalog at www.lutron.com/wallbox catalog

Note: Load feed: 120 V~ for PHPM-PA-120-WH;
 120 – 277 V~ for PHPM-PA-DV-WH

Job Name: <input type="text"/>	Model Numbers: <input type="text"/>	
Job Number: <input type="text"/>	<input type="text"/>	<input type="text"/>

Wiring a Power Module to an LP, LCP, GP, or HomeWorks® Panel

Up to three phase-adaptive power modules may be wired to an output of a 120 V~ LP or LCP panel. The load type for the output must be set appropriately on the panel's circuit selector (for an LP or GP panel), controller (for an LCP panel), or HomeWorks software (for a HomeWorks panel).

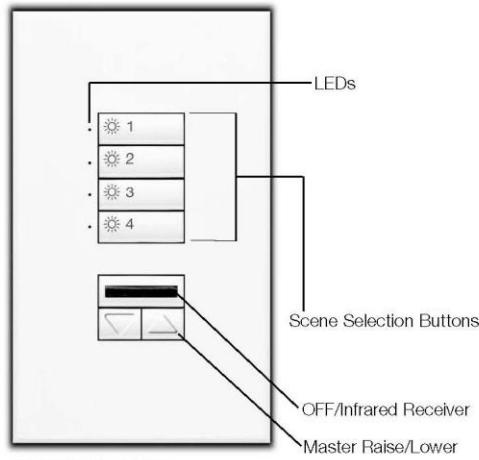


Job Name:	Model Numbers:	
Job Number:		

Color and Engraving Codes

SG-PRON-___ - ___
4-Scene with Off, Raise/Lower, and IR Receiver Programming

Program scene intensities using a PALM PDA.



SG-PRON-WH-EGN

Description

Allows user to perform the following functions in a system of GRX-3500 or GRX-4500 Control Units using a PDA at the wallstation:

- Select scenes 1-16 and off on any Control Unit in the system.
- Raise or lower any zone in the system.
- Save the new zone levels as the current scene.

For more information on the software required, contact Lutron or visit www.lutron.com.

When used without a PALM PDA, the wallstation offers the standard functionality and benefits of the SG-4SIRN wallstation:

- Large, rounded buttons are easy to use.
- Backlit buttons with optional engraving make it easy to find and operate the control in low light conditions.
- Optional button engraving is angled up to the eye for easy reading.
- Scene selection functionality can be selected in the field.
- Infrared receiver allows infrared transmitters to select scenes and raise/lower all lighting zones.
- Off button turns all lights off.
- Status LEDs indicate which scene is selected.
- Master raise/lower button brightens or dims all lighting in the selected scene.

Finish and Engraving Options

- Available with button engraving.
- Three engraving options are available: General Engraving, Standard Engraving, & Non-Standard Text Engraving. For more details, please refer to the seeTouch Ordering Guide (P/N 367-274) or visit the website at www.lutron.com/seeTouch.

Field Selected Functionality

DIP Switch Settings	Scene selection buttons and GRX-IT 4-Scene Wireless Remote Control activate:	GRX-8IT 8-Scene Wireless Remote Control activates:
5 6		
	Scenes 1 to 4	Scenes 1 to 8
	Scenes 5 to 8	Scenes 5 to 12
	Scenes 9 to 12	Scenes 9 to 16
	Scenes 13 to 16	Scenes 13 to 16/1 to 4

! DIP Switches 7-10 are set at the factory. Do not change switch 7, 8, or 9. Switch 10 controls the button backlight. Refer to product installation guide for more details.

Job Name: <input type="text"/>	Model Numbers: <input type="text"/>	<input type="text"/>
Job Number: <input type="text"/>	<input type="text"/>	<input type="text"/>

Specifications

Power

Low-voltage type Class 2 (PELV). Operating voltage: 12/24 V Direct Current.

Key Design Features

- Field-changeable button and faceplate assemblies allow easy customization.
- Front accessible DIP switches allow change of function without removing the unit from the wall.
- Meets IEC 801-2. Tested to withstand 15kV electro-static discharge without damage or memory loss.
- Faceplate snaps on with no visible means of attachment.
- Available as an "insert" style control for multi-gangging.
- Can be ganged to share a common faceplate with NovaT*® and Vareo® Dimmers. To order new Wallplates for multi-gangging, specify "R3" openings in a Lutron NovaT* multi-gang FB (fins broken) Series model number.
- Use Button Replacement Kits to change color, button configuration, or engraving.
- Button Replacement Kits may also be used to convert between non-insert and insert configurations.

System Communications and Capacity

- Low-voltage type Class 2 (PELV) wiring connects Wallstations to Control Units and other components.
- Up to 8 Control Units and 16 total Wallstations and/or Control Interfaces may be connected for a total of 24 control points.

Terminals

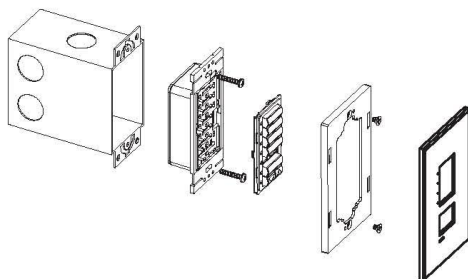
Accept up to two #18 AWG (1.0mm²) typical.

Environment

32-104°F (0-40°C). Relative humidity less than 90% non-condensing.

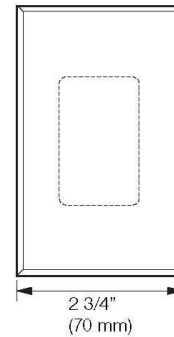
Mounting

Typical backbox dimensions: 95mm (3.74") high, 55mm (2.17") wide, 70mm (2.75") deep.

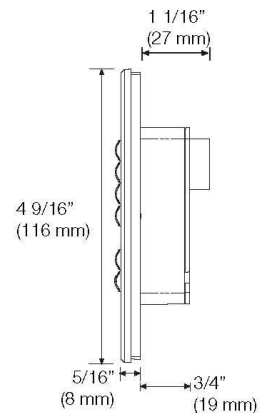


Dimensions

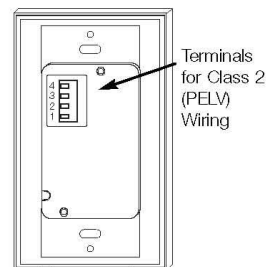
Front View



Side View



Back View



Job Name:	Model Numbers:	
<input type="text"/>	<input type="text"/>	<input type="text"/>
Job Number:	<input type="text"/>	<input type="text"/>

Color/Finish and Customizing Information

Color/Finish

Matte Finishes

White	WH
Ivory	IV*
Beige	BE
Gray	GR*
Brown	BR
Black	BL

* GR, IV not currently backlighted

Metal Finishes

With Black Plastic Buttons (Standard)

Bright Brass	BB
Bright Chrome	BC
Bright Nickel	BN
Satin Brass	SB
Satin Chrome	SC
Satin Nickel	SN
Antique Brass	QB
Antique Bronze	QZ

Gloss Finishes

Available with Insert (I) style controls only.
 Ship with Claro® faceplates.

White	GWH
Light Almond	GLA

Anodized Aluminum Finishes

Clear	CLA
Black	BLA
Brass	BRA

Backlighting Notes:

Illuminated text (translucent text on buttons) is available for these colors: BL and BR (including all metal finishes).

Illuminated buttons (with black text on buttons) are available for these colors: WH, BE, GR, WH*, GLA*.

* Insert (I) style controls only

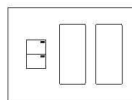
Multi-ganging

- Order Insert (I) style controls.
- To order new Wallplates for multi-ganging, specify "R3" openings in a Lutron NovaT® multi-gang FB (fins broken) Series model number.

Examples:



Wallplate for 2 seeTouch Wallstations,
 Model # NT-R3-R3-FB-(color)



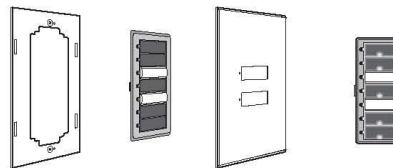
Wallplate for other Lutron controls and
 2 seeTouch Wallstations,
 Model # NT-T8-R3-R3-FB-(color)

Note: New button inserts are not included with multi-ganging Wallplates.

Button Replacement Kits

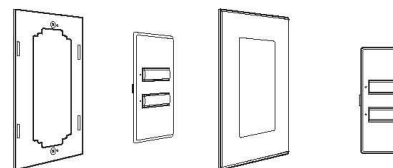
Use Button Replacement Kits to change: colors, button configuration, engraving, between insert and non-insert versions.

Non-Insert Kit



Each Kit includes an adapter, button assembly, and wallplate

Insert Kit



Job Name:	Model Numbers:	
<input type="text"/>	<input type="text"/>	<input type="text"/>
Job Number:	<input type="text"/>	<input type="text"/>

Wallstation Installation

DIP Switches

- Set DIP switches 1-4 to give the Wallstation a unique system address from 1 to 16.
- Set additional DIP switches (if any) to specify function as shown on the first page of the Wallstation's Specification Submittal.
- DIP switch 10 controls the button backlight.

Address	DIP Switch Settings			
	1	2	3	4
1	↑	↑	↑	↑
2	↑	↑	↓	↓
3	↑	↑	↑	↓
4	↑	↑	↓	↓
5	↑	↓	↑	↓
6	↑	↓	↓	↓
7	↑	↓	↑	↑
8	↑	↓	↓	↑
9	↓	↑	↑	↑
10	↓	↑	↓	↓
11	↓	↑	↑	↑
12	↓	↑	↓	↑
13	↓	↓	↑	↑
14	↓	↓	↓	↓
15	↓	↓	↑	↓
16	↓	↓	↓	↓

Reserved for GRX-PRG, if present on link.

Low-voltage Class 2 (PELV) Wiring

- Use low-voltage Class 2 (PELV) wiring to daisy-chain Wallstations to Control Units and other components.
- Make connections inside the wallbox or in a switch/junction box with a maximum wire length of 8 feet (2.5m) from the link to the Wallstation.

When used with GRAFIK Eye 3000 Control Units

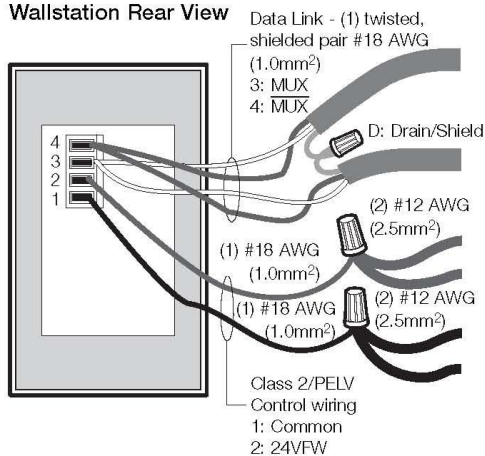
- Two #18 AWG (1.0mm²) conductors for common (terminal 1) and 12VDC (terminal 2). Ensure that the terminal 2 connection is wired correctly. Refer to GRAFIK Eye 3000 Series Specification Submittal.
- One shielded, twisted pair #18 AWG (1.0mm²) for data link (terminals 3 and 4).

When used with GRAFIK Eye 4000 Control Units

- Two #12 AWG (2.5mm²) conductors for common (terminal 1) and 24VFW (terminal 2). These won't fit in terminals. Connect as shown.
- One shielded, twisted pair #18 AWG (1.0mm²) for data link (terminals 3 and 4).
- Connect Drain/Shield as shown. Do not connect to Ground (Earth) or Wallstation. Connect the bare drain wires and cut off the outside shield.

Note: Use appropriate wire connecting devices as specified by local codes.

Wallstation Rear View



Job Name: <input type="text"/>	Model Numbers: <input type="text"/>	
Job Number: <input type="text"/>	<input type="text"/>	<input type="text"/>

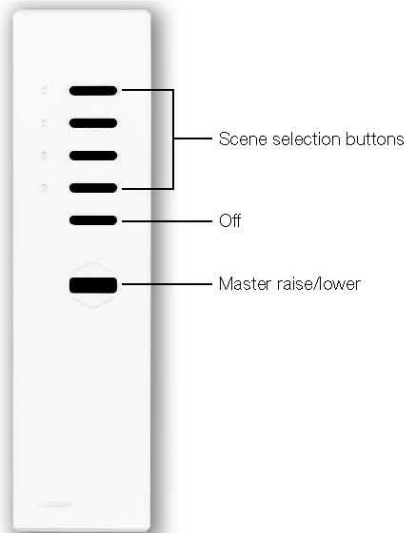


Infrared Transmitter

Wireless Remote Control

ntgrxwstns-1 12.12.03

GRX-IT-WH
4-Scene Wireless Remote Control
Infrared Transmitter



Description

- Uses wireless infrared communications to select and adjust scenes.
- Scene selection buttons select four scenes.
- Off button turns all lights off.
- Master raise/lower button brightens or dims all lighting zones.
- Works with GRAFIK Eye 3000 and 4000 Series Control Units or any Wallstation with an infrared receiver.

Specifications

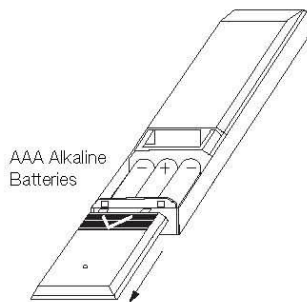
Power:
 Three AAA Alkaline batteries (included).

Infrared Frequency:
 40kHz.

Transmission Distance:
 Up to 50 feet (15m) line-of-sight range to receiver.

Design:
 Molded plastic, White only.

Environment:
 32-104°F (0-40°C).
 90% non-condensing relative humidity.



OLUTRON SPECIFICATION SUBMITTAL

Page

Job Name: <input type="text"/>	Model Numbers: <input type="text"/>	
Job Number: <input type="text"/>	<input type="text"/>	<input type="text"/>



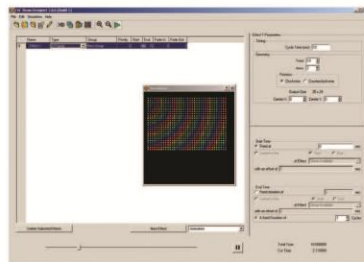
Date: _____ Type: _____
 Firm Name: _____
 Project: _____

Light System Manager

Versatile control and authoring for large-scale lighting installations

Optimized for medium and large-scale LED lighting installations, Light System Manager controller (LSM) is an integrated hardware and software solution comprising Light System Engine (LSE) controller hardware and Light System Composer (LSC) creative design software. With support for intricately designed installations containing thousands of LED nodes, Light System Manager offers the versatility to manage wide-ranging architectural, entertainment, and retail lighting environments.

- Easy to use — Featuring Ethernet-based control and automatic lighting system discovery, Light System Manager dramatically simplifies installation.
- Hardware support for medium and large environments — Light System Engine hardware processes simultaneous light output data for up to 15,000 individually controllable LED nodes, depending on configuration.
- Improved reliability — Solid-state drives reduce the number of moving parts to enhance the reliability of the LSE hardware.
- Slimmer profile — Slimmer form factor offers convenient surface mounting, as well as the ability to install in server racks and rackmount cases.
- Flexible mounting options — Integrated mounting tabs allow installation overhead, on vertical surfaces, or on moving architectural or entertainment features.
- Packaged with Light System Composer — Light System Composer software allows you to create and manage dynamic light shows with fully customizable effects, multi-layer editing, and unique color palettes. You can design shows with single or multiple color-changing effects, animated images, geometric patterns, and more.
- Versatile zone usage — Configure and control multiple playback zones, each with up to unique light show assignments. Light System Manager allows zone control of both indoor and outdoor fixtures within a single installation.
- Simplified control access — Designed for use with LSM, Ethernet Controller Keypad is a wall-mounted triggering device that controls light shows and fixture brightness at the touch of a button. LSM supports up to 10 keypads within a single lighting installation.
- Automatic playback control — Configure show scheduling based on a specific date, a day of the week, weekdays, weekends, or an astronomical event, such as sunrise or sunset.
- Support for IntelliWhite® lighting fixtures — Light System Manager offers visual effects with color temperature and intensity settings designed specifically for IntelliWhite white light fixtures.
- Supports the optional AuxBox expansion device — AuxBox automatically triggers up to eight light shows using any remote triggering device with a dry-contact closure. Via the AuxBox, you can trigger light shows by motion sensors, 3rd party control or sensor systems, and more.



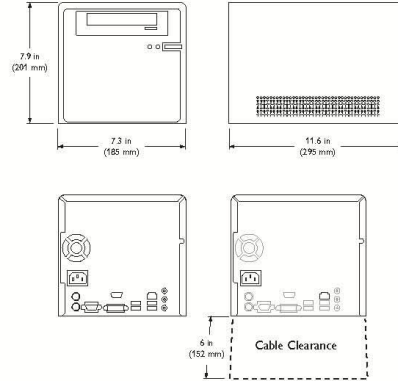
For detailed product information, please refer to the Light System Manager Product Guide at: www.colorkinetics.com/lsc/controllers/lsm/

PHILIPS

Specifications

Due to continuous improvements and innovations, specifications may change without notice

Item	Specification	Details
Electrical	Input Voltage	100 – 220 VAC, auto-switching
Capability	Supported LED Nodes	Up to 15,000 LED nodes
	Network Data	KiNET™ Ethernet protocol* via standard Ethernet switch†
	Playback Output	Light shows containing one or more visual effects
Physical	Dimensions (Height x Width x Depth)	7.9 x 7.3 x 11.6 in (201 x 185 x 295 mm)
	Weight	9.3 lb (4.2 kg)
	Operating Temperature	32 – 95° F (0° – 35° C)
	Operating Humidity	0 – 90%, relative humidity, non-condensing
Certification and Safety	Certification	UL / cUL, FCC, CE, CCC, C-Tick
	Environment	Indoor / Dry location



* KiNET™ is the Ethernet lighting protocol from Philips Color Kinetics.

† Use PoE (Power-over-Ethernet) switches, or PoE injectors, when installing a lighting system containing one or more Ethernet Controller Keypads.

Software Requirements

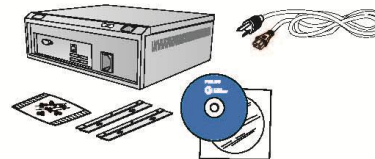
System Requirements	Specification	PC	Mac
Software	Operating System	Windows® XP / Vista	Mac OS X 10.4.9 or greater
	Optical Drive	CD-ROM or DVD drive	CD-ROM or DVD drive
Hardware	Memory	256 MB RAM	256 MB RAM
	Disk space	10 MB free disk space	10 MB free disk space

Light System Manager and Accessories

Item	Item Number	Philips 12NC
Light System Manager	103-000015-03	910503700626
Ethernet Controller Keypad	103-000023-00	910503700326
PoE Injector (North America Power Cord)	109-000029-00	910503700383
PoE Injector (Europe Power Cord)	109-000029-01	910503700384
AuxBox	103-000021-00	910503700224

Use Item Number when ordering in North America.

For detailed product information, please refer to the Light System Manager Product Guide at www.colorkinetics.com/lsm/controllers/lsm/



Included in the Box

Light System Manager
Power cable
(2) Mounting brackets and (6) Mounting screws
Software CD



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Tel 617.423.9999
Fax 617.423.9998
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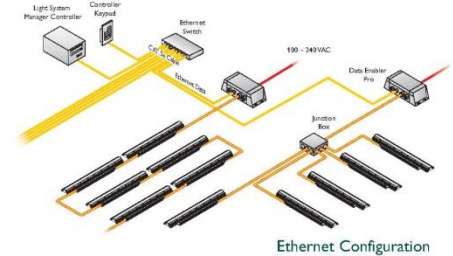
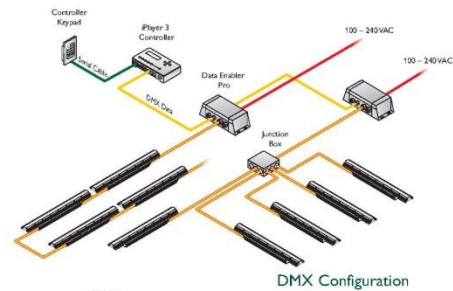
For information on installation planning, including electrical and data configuration guidelines, view or download the Data Enabler Pro Product Guide from www.colorkinetics.com/files/pdfs/dataenablerpro/

Date: _____ Type: _____
 Firm Name: _____
 Project: _____

Data Enabler Pro

Integrated data and power for intelligent LED lighting fixtures employing Powercore technology

Data Enabler Pro delivers integrated data and power to intelligent color and tunable white LED lighting fixtures employing Powercore® technology from Philips Color Kinetics. Data Enabler Pro integrates many of the features of the previous generation of Data Enablers, including Data Enabler DMX, Data Enabler Ethernet, and Data Enabler EO. Data Enabler Pro is the single solution for all intelligent Powercore-based installations, whether DMX or Ethernet, color or white, indoors or outdoors.



- Easy installation — Accessible, clearly labeled terminal block connectors for DMX, Ethernet, line voltage, and fixtures make installation easy. Tethered cover with captive screws ensures convenient removal and replacement.
- Supports fixtures employing Powercore technology — Powercore technology rapidly, efficiently, and accurately controls power output to LED lighting fixtures directly from line voltage. Philips Data Enabler Pro merges line voltage and control data and delivers them to Powercore fixtures over a single cable, dramatically simplifying installation and lowering total system cost.
- On-board diagnostics — On-board indicator LEDs provide visual feedback for normal operation, Ethernet connection detection, and Ethernet and DMX data transmission.
- Full support for DMX and Ethernet — Provides inputs and outputs for both DMX and Ethernet, allowing you to connect multiple Data Enabler Pro devices in series. Also provides an Ethernet output terminal for iColor Accent MX Powercore support.

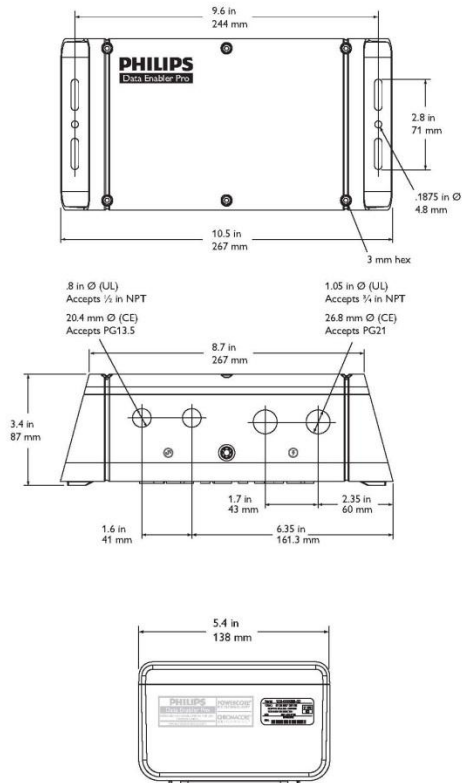
- Outdoor-rated for use in damp and wet environments — Data Enabler Pro offers superior leakage protection in a cast aluminum, IP66-rated enclosure.
- Multiple conduit entries — Data Enabler Pro offers superior leakage protection in a cast aluminum, IP66-rated enclosure.
- Multiple conduit entries — Data Enabler Pro offers superior leakage protection in a cast aluminum, IP66-rated enclosure.
- Universal power input range — Data Enabler Pro automatically senses mains voltages ranging from 100 VAC to 277 VAC, and passes mains voltages through to all connected lights.
- Designed for maximum energy efficiency — Data Enabler Pro consumes just 20 W maximum. Optional power-saving modes automatically cut power to attached lights when lights are off for a configurable number of minutes.



Specifications

Due to continuous improvements and innovations, specifications may change without notice.

Item	Specification	Details
Electrical	Input Voltage	100 – 277 VAC, auto-ranging, 50 / 60 Hz
	Maximum Input Current	16.5 A maximum
	Power Consumption	20 W maximum
	Load Current	16 A maximum
Connections	Power Input	3-wire PC terminal block connector*
	Power / Data Output	4-wire PC terminal block connector*
		4-wire IDC terminal block connector (iColor Accent Powercore only)†
	DMX Input / Output	Double-pair, double-entry IDC connectors‡
Ethernet Input / Output	Double-pair, double-entry IDC connectors‡	
Physical	Dimensions (Height x Width x Depth)	3.4 x 10.5 x 5.4 in (87 x 267 x 138 mm)
	Weight	5.4 lb (2.4 kg)
	Construction	Cast aluminum enclosure with slots for surface mounting
	Finish	Powder-coated gray matte
	Threaded Openings	3/4 in NPT for power / 1/2 in NPT for data (US trade) PG21 for power / PG13 for data (metric)
	Temperature Ranges	-40° – 122° F (-40° – 50° C) Operating
		-20° – 122° F (-20° – 50° C) Startup -40° – 176° F (-40° – 80° C) Storage
	Humidity	0 – 95%, non-condensing
	Cooling	Convection
	Heat Dissipation	20 W
Data Input Source	Philips full range of controllers, third-party DMX controllers, or KINET-compatible‡ third-party Ethernet controllers	
Certification and Safety	Certification	UL / cUL, FCC Class A, CE
	Environment	Dry / Damp / Wet Location, IP66



* PC terminal block connectors accept recommended wire sizes from 8 – 18 AWG (3.3 – 1.0 mm).

† IDC connectors accept wire sizes from 22 – 26 AWG (.6 – .5 mm).

‡ KINET™ is the Ethernet lighting protocol from Philips Color Kinetics.



Ordering Information

Item	Type	Item Number	Philips 12NC
Data Enabler Pro	3/4 in / 1/2 in NPT (US trade size conduit)	106-000004-00	910503701210
	PG21 / PG13 (metric size conduit)	106-000004-01	910503701211

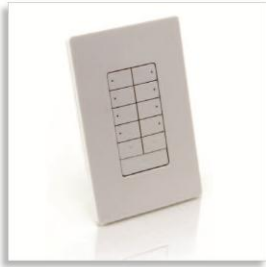
Use Item Number when ordering in North America.



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DAS-000052-01 R02 12-10



Date: _____ Type: _____

Firm Name: _____

Project: _____

Ethernet Controller Keypad

Compact, convenient user control for Light System Manager

Designed for use with the Philips Light System Manager controller, Ethernet Controller Keypad is a wall-mounted keypad that triggers up to eight light shows at the touch of a button. Together, Ethernet Controller Keypad and Light System Manager are the ideal solution for lighting installations that include multiple shows in multiple zones or locations. Ethernet Controller Keypad uses Power over Ethernet (PoE) technology to eliminate the need for a separate power source, affording greater freedom of placement, higher reliability, and easy installation.

- Power over Ethernet for increased flexibility — The IEEE 802.3af standard for Power over Ethernet (PoE) enables both electrical power and data to be transmitted over a single twisted-pair cable. Shared cabling reduces installation costs, decreases the space required for wires, and affords freedom of placement by eliminating wiring to a power source. Ethernet Controller Keypad works with any PoE-compliant switch or PoE injector.
- Simple installation with a single Ethernet connection — Mounts in a standard U.S. single-gang wall box. Uses a single CAT 5e cable for data and power with no additional wiring required.

- Multiple keypads in a single installation — With Light System Manager, you can install up to 16 Ethernet Controller Keypads to control as many as 128 light shows in a single installation spanning multiple zones or locations.
- Full set of lighting controls — Each keypad instantly and conveniently triggers up to eight Light System Manager light shows. Onboard indicator lamps identify the current show. Dimmer controls and a master OFF switch adjust the brightness of the light fixtures during playback.
- Compact design with sleek Decora® faceplate — Compact design uses wall space efficiently. Decora faceplate hides mounting hardware for a clean look that blends with a variety of architectural styles.

For detailed product information, refer to the Ethernet Controller Keypad Product Guide at: www.colorkinetics.com/lm/controllers/enetkeypad/

PHILIPS

Specifications

Due to continuous improvements and innovations, specifications may change without notice

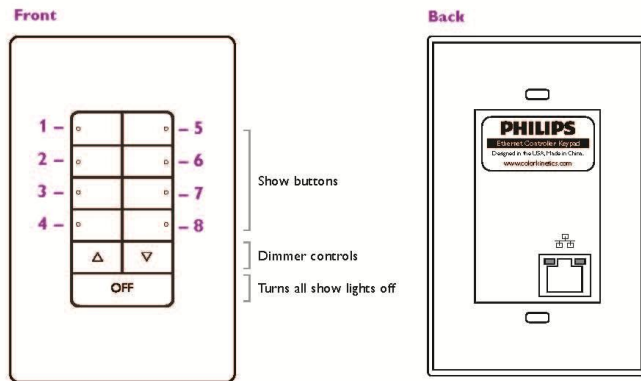
Item	Specification	Details
Control	Ethernet	10BASE-T from any PoE- or IEEE 802.3af-compliant Ethernet switch. PoE injector required for use with non-IEEE 802.3af-compliant switches
	Dimensions (Height x Width x Depth)	4.7 x 2.9 x 1.31 in (119 x 74 x 33 mm)
Physical	Weight	4.23 oz (120 g)
	Housing	Medium matte white plastic Decora® faceplate Mounts in single-gang wall box
	Connector / Cable	RJ45 Port, CAT 5e Data Cable (not included)
	Operating Temperature	14° – 104° F (-10° – 40° C)
	Humidity	0 – 95%, non-condensing
Certification and Safety	Certification	CSA, FCC Class B, CE, RoHS
	Environment	Indoor rated, IP40



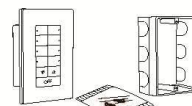
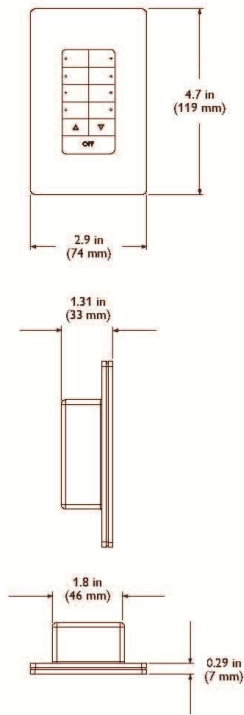
Ethernet Controller Keypad and Accessories

Item	Item Number	Philips 12NC
Ethernet Controller Keypad	103-000023-00	910503700326
Light System Manager	103-000015-02	910503700221
PoE Injector (North America Power Cord)	109-000029-00	910503700383
PoE Injector (Europe Power Cord)	109-000029-01	910503700384

Use Item Number when ordering in North America.



Dimensions



Included in the box

- Ethernet Controller Keypad
- Standard single-gang wall box for use outside of North America
- (2) self-threading flat head countersunk M2.5 screws

Ethernet Controller Keypad is part of a complete system that includes:

- Light System Manager for discovering and configuring the keypad and for assigning shows to each keypad trigger.
- A PoE-compliant switch to supply data and power to the keypad, or a non-PoE switch with one PoE-compliant power injector per keypad.
- CAT 5e data cable to connect the keypad to Ethernet switch or PoE injector.

For detailed product information, please refer to the Ethernet Controller Keypad Product Guide at www.colorkinetics.com/ls/controllers/enetkeypad/



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DAS-000017-01 R00 12-08

Appendix D | Motor Control Center Specifications

MOTOR CONTROL CENTERS



F2100 PRODUCT OVERVIEW



F2100 MOTOR CONTROL CENTERS

The World's Most Versatile Industrial Grade Motor Control Center.

No two motor control centers are alike. Every user has different control and power distribution requirements. With this in mind, Cutler-Hammer's F2100 motor control center is uniquely suited to meet your specific needs. The rugged, industrial grade F2100 motor control center is the most space-efficient and flexible design available and accommodates a wide range of state-of-the-art components. These components include NEMA motor starters, Cutler-Hammer's breakthrough Easy Start Advantage solid state starter, AF93 and AF95 adjustable frequency drives, programmable logic controllers and the IO family of power monitoring and metering devices. From fundamental applications to the most complex systems, F2100 users can integrate these newer components along with conventional products such as lighting contactors, transfer switches, panelboards, transformers and surge suppression systems. To meet your urgent delivery needs, Cutler-Hammer's regional service centers can supply F2100 motor control centers that contain these same state-of-the-art control components. Cutler-Hammer service centers can also provide replacement MCC units and spare parts with stock to five-day delivery. For long lasting service in every application, specify F2100 Motor Control Centers.



NEMA MOTOR STARTERS

Maximum Performance and Reliability.

COMPACT, EFFICIENT AN16 SERIES STARTERS.

Building on the Cutler-Hammer tradition as an innovator in motor control, AN16 Series NEMA motor starters have state-of-the-art features and materials that insure greater flexibility and increased performance in a size efficient package.

Low bounce power contacts provide longer life, and cooler operation.

And only 24 interchangeable heater packs are required for applications up to 400 HP at 480V. AN16 Series Starters' single-phase technology provides maximum motor protection without expensive phase loss relays.

The AN16 Series overload relay with +/-24% adjustable trip range can fill a wider range of motor applications than competing starters.

Feature-packed and compact, the AN16 Series represents the very best in NEMA starters.

INDUSTRY LEADING VACUUM STARTERS FOR SEVERE DUTY NEEDS.

Cutler-Hammer V200 Series contactors and motor starters are perfectly matched to F2100 motor control centers because of their small size, long service life and low maintenance requirements.



ADJUSTABLE FREQUENCY DRIVES

Plug-in Flexibility and Space Savings.



**ADVANCED TECHNOLOGY —
AF 90 SERIES DRIVES.**

Cutler-Hammer's AF90 Series adjustable frequency drives installed in standard 20 inch wide MCC structures provide the highest density packaging in the industry. For motors from one to 200 horsepower, the AF93 and AF95 family of adjustable frequency drives contain many features in a small package. Insulated Gate Bipolar Transistors (IGBTs) provide high-performance, silent and efficient motor operation, tight speed regulation and high starting torque.

THE EASY-TO-USE AF 95 KEYPAD.

Configuration and status monitoring are simplified on AF 90 Series drives using the logically arranged keys and a large easy-to-read display.



SOLID STATE STARTERS

Supporting a Wide Variety of Applications.

POWERFUL, FLEXIBLE, SOLID STATE STARTERS.

When motor starting applications require soft starting or reduced motor inrush, Cutler-Hammer offers three solid state reduced voltage starter models. These solid state starters provide longer motor life and reduced damage to driven equipment. Completely self-contained, they are all engineered for installation into standard F2100 Motor Control Centers.

THE COMPACT EA.

Available in current ranges from 45 to 750 amperes, the EA is the smallest solid state reduced voltage starter in the industry. This results in significantly reduced MCC unit size and makes NEMA 12 and 3R construction possible.

The EA uses SCRs to provide smooth, stepless, acceleration for NEMA three-phase induction motors.

Once the motor reaches full speed, a bypass contactor is automatically energized in parallel to the SCRs to handle the motor's continuous duty requirements. Since the SCRs are conducting current for only a short period of time, heat dissipation is minimized, making bulky heat sinks unnecessary and resulting in a compact design.

HIGH PERFORMANCE EJ AND ES SOLID STATE STARTERS.

For other applications that benefit from solid state starting from a continuous duty SCR controller, the EJ and ES models, ranging from 5 to 600 horsepower are also available in the F2100 MCC.



135 AMPERE EA SOLID STATE STARTER

ADVANCED CIRCUIT PROTECTION

The Most Advanced Circuit Protection

SPACE SAVING SERIES C MOTOR CIRCUIT PROTECTOR.

The Cutler-Hammer Series C HMCP Motor Circuit Protector is standard in all F2100 MCC combination starters and has a 65,000 amperes interrupting rating. Optional 100,000 amperes interrupting ratings are available without increasing unit size. This valuable space savings is achieved without the extra expense of integral fuses or add-on current limiters.



**SERIES C MOLDED CASE CIRCUIT BREAKERS.
MAXIMUM PERFORMANCE, MINIMUM SPACE.**

Series C circuit breakers applied as main or branch feeder units are available with thermal magnetic or electronic trip devices.

65,000 amperes interrupting capacity is standard, with 100,000 amperes interrupting available as an option. From the HFD 150 ampere frame to the RD 2500 ampere frame, Series C circuit breakers provide maximum cable entrance space while minimizing enclosure space.



**SPB INSULATED CASE POWER CIRCUIT BREAKERS —
ULTIMATE SYSTEM COORDINATION.**

Used as a main circuit breaker, the Cutler-Hammer SPB insulated case power circuit breaker has the

Devices in the Industry.

highest degree of system coordination and 100,000 amperes interrupting capacity.

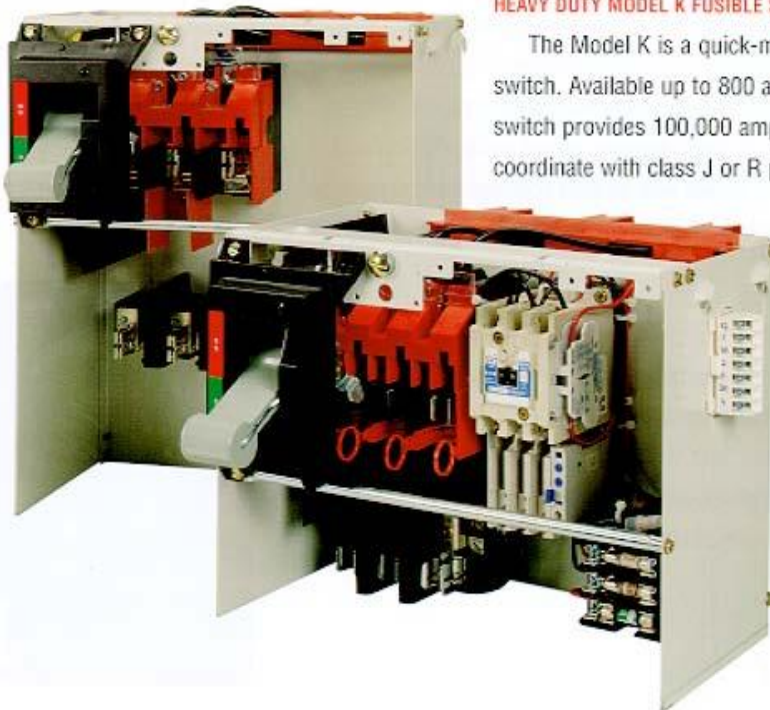
Supplied as standard with Cutler-Hammer's RMS 510 solid state trip units, SPB breakers provide the benefits of short circuit coordination and an optional electrical charging mechanism.

The SPB can be furnished in either fixed mounted or draw out designs from 800 to 2500 amperes.



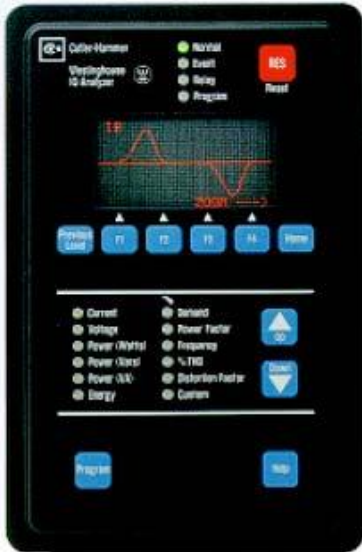
HEAVY DUTY MODEL K FUSIBLE SWITCH.

The Model K is a quick-make, quick-break visible blade switch. Available up to 800 ampere ratings, the Model K switch provides 100,000 amperes withstand rating and will coordinate with class J or R power fuses. All current carrying parts are tin-plated copper. All parts of the switch are fully accessible and easily replaceable. Changing fuses is made simple with an integral fuse puller.



POWER MONITORING

IQ Products Provide Superior Power Monitoring and Protection.



IQ ANALYZER. THE PREMIER POWER QUALITY METER.

It has been said that you can't manage what you can't measure. The IQ Analyzer provides the next step in power measuring devices. This economical yet powerful multi-function meter and power quality analyzer provides extensive information on a user-friendly display.

Power system harmonics caused by modern solid state power switching devices can be easily observed, displayed and analyzed. From this information, power systems can be managed to minimize equipment heating effects caused by power harmonics, reduce utility costs due to harmonic power contribution, and assist in effectively applying power switching products.

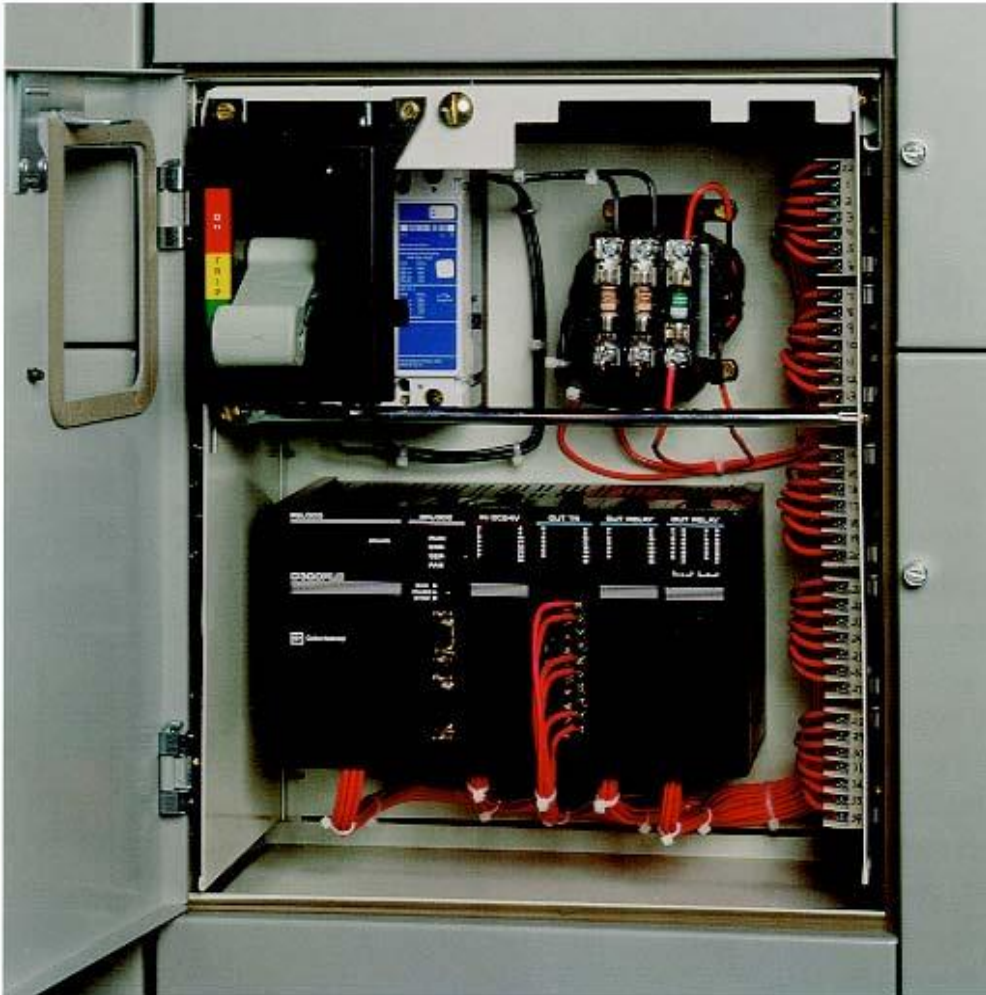
The compact IQ Analyzer comes with its own potential transformers and is installed in only 12 inches of MCC vertical space.

IQ DATA PLUS II. COMPLETE ELECTRICAL METERING.

This single, compact unit provides complete metering and voltage protection. No external PTs are required.

Installed in only a 12 inch high MCC compartment, the IQ monitors three phase amperes, three phase volts, frequency, watts, vars, power factor, watt hours, demand watt hours, and phase loss.





PROGRAMMABLE LOGIC CONTROL

Reduce Field Wiring Costs.

STATE-OF-THE-ART D300 PROGRAMMABLE LOGIC CONTROLLER.

Complete factory wiring of PLCs to motor starters saves time and labor costs in the field. The D300 programmable logic controller can be installed in an MCC plug-in unit only 18 inches high. Expandable to 544 I/O, the D300 offers RAM and PROM memory, ladder logic language, fast scan time and a large instruction set. Data transfer, data conversions and enhanced self-diagnostics are included as standard.

The D300's compact size affords a cost-effective alternative to discrete relaying and timing devices.

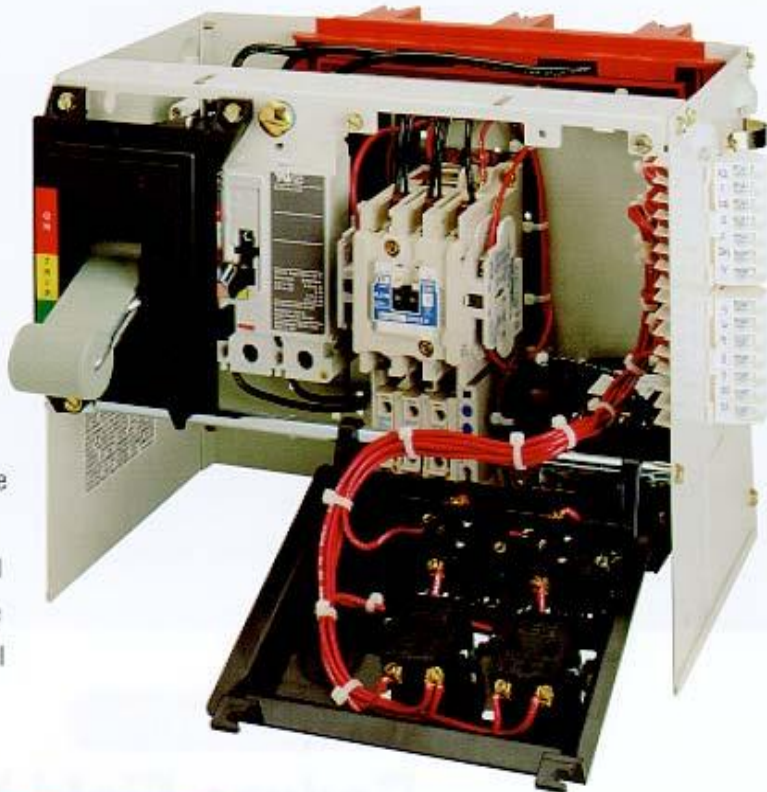
PLUG-IN UNITS

The Widest Variety of Plug-in Starter Units.

**F2100 UNITS CONFIGURE TO MEET
YOUR UNIQUE APPLICATIONS.**

To provide for all motor control application needs, the F2100 motor control center is available with the widest selection of combination starter types.

These include full voltage reversing or non-reversing, two speed one or two winding, auto-transformer, part winding or wye delta reduced voltage starter types. These starter units can be engineered with a variety of terminal blocks, wire types, wire lugs, wiremarkers, control and timing relays.



ALL THE POWER OF THE STANDARD 12" UNIT INTO A 6" PACKAGE.

This compact NEMA size 1 combination starter is designed for use where floor space is a premium—up to 12 of these starter units can be stacked in one MCC structure. Circuit breaker feeder units are also available in this compact design.

ADVANCED FEATURES



Durable and Reliable Features of the F2100.

HEAVY-DUTY T-LINE PILOT DEVICES AND DEVICE PANEL.

The F2100 uses rugged and reliable Cutler-Hammer 10250T pilot devices mounted on an insulated, heavy-duty panel. For ease of maintenance when the door of the unit is open, this panel can swing down allowing increased accessibility to the unit interior and pilot device terminals.

POSITIVE-LATCHING, SIDE-MOUNTED, PULL-APART TERMINAL BLOCKS.

The MCC unit terminal block assures easy unit removal and permanent circuit continuity. To aid installation and wiring, the terminal marking strips for both sides of the block are fully visible from the front of the unit. The 600V terminal block is rated 30 amperes and will accept up to #12 gauge stripped wire.



EASY-TO-READ DISCONNECT HANDLE.

The rugged handle mechanism features a highly visible position indicator that's easy to read, even from a distance. Bright color coded indicators for ON, OFF, TRIPPED and RESET positions clearly show the status of the disconnect device.

SECURE DOOR LATCHES.

Heavy-duty quarter turn latches provide positive door closure and latch position indication.



RELIABLE AND COMPACT CONTROL POWER TRANSFORMERS.

Integrally fused control power transformers allow easy access and reduced panel space.

The encapsulated design provides a higher degree of protection and reliability.



VERSATILE, FLEXIBLE FRAME DESIGN.

A versatile frame design permits unsurpassed flexibility in component and structure configuration. Just 20 inches wide and 90 inches high, each structure has 72 inches of unit mounting space in six-inch increments. Structures are 16 or 21 inches deep front-mount and only 21 inches deep for back-to-back mounted units.

65KA IS STANDARD.

The F2100 bus system has a standard short circuit withstand rating of 65,000 amperes. For larger distribution systems, this robust bus design can be optionally braced to withstand 100KA. The horizontal bus, located at the top, is mounted edge-to-edge and is available in ratings from 600 amperes up to 2500 amperes.

STRUCTURAL INTEGRITY

Rugged Structure Means Long Service.

The fully-rated vertical bus is available from 300 to 1200 amperes, providing clean designs for power cable entry. This feature translates directly into less floor space and reduced installation costs.

A strong, durable frame construction makes the F2100 the strongest motor control center enclosure available. This ruggedness establishes the F2100 as the design of choice for mission critical applications such as pulp and paper mills, petrochemical plants as well as nuclear power facilities. Its design integrity qualifies it for UBC seismic Zone 4 and CBC without modifications.

FIELD-PROVEN, TESTED-TOUGH.

A strong, durable frame construction

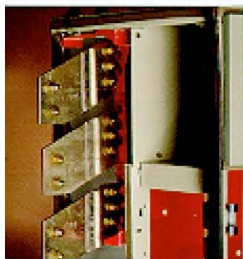


UNIQUE ANGULAR BUS CONFIGURATION.

The F2100's angular bus configuration provides independent mechanical strength to withstand fault stresses. Consequently, bus bracing at 65,000 RMS symmetrical amperes is standard. An insulated barrier isolates the vertical bus from the unit compartments.

LABYRINTH BUS BARRIER PREVENTS FAULT PROPAGATION.

An optional molded barrier forms a labyrinth around the vertical bus bars to prevent fault propagation and affords complete bus bar insulation and isolation. Unit shutters automatically cover vertical bus bar openings when a unit is removed, adding an extra measure of safety.



SPACE SAVING BUS SPLICE KITS.

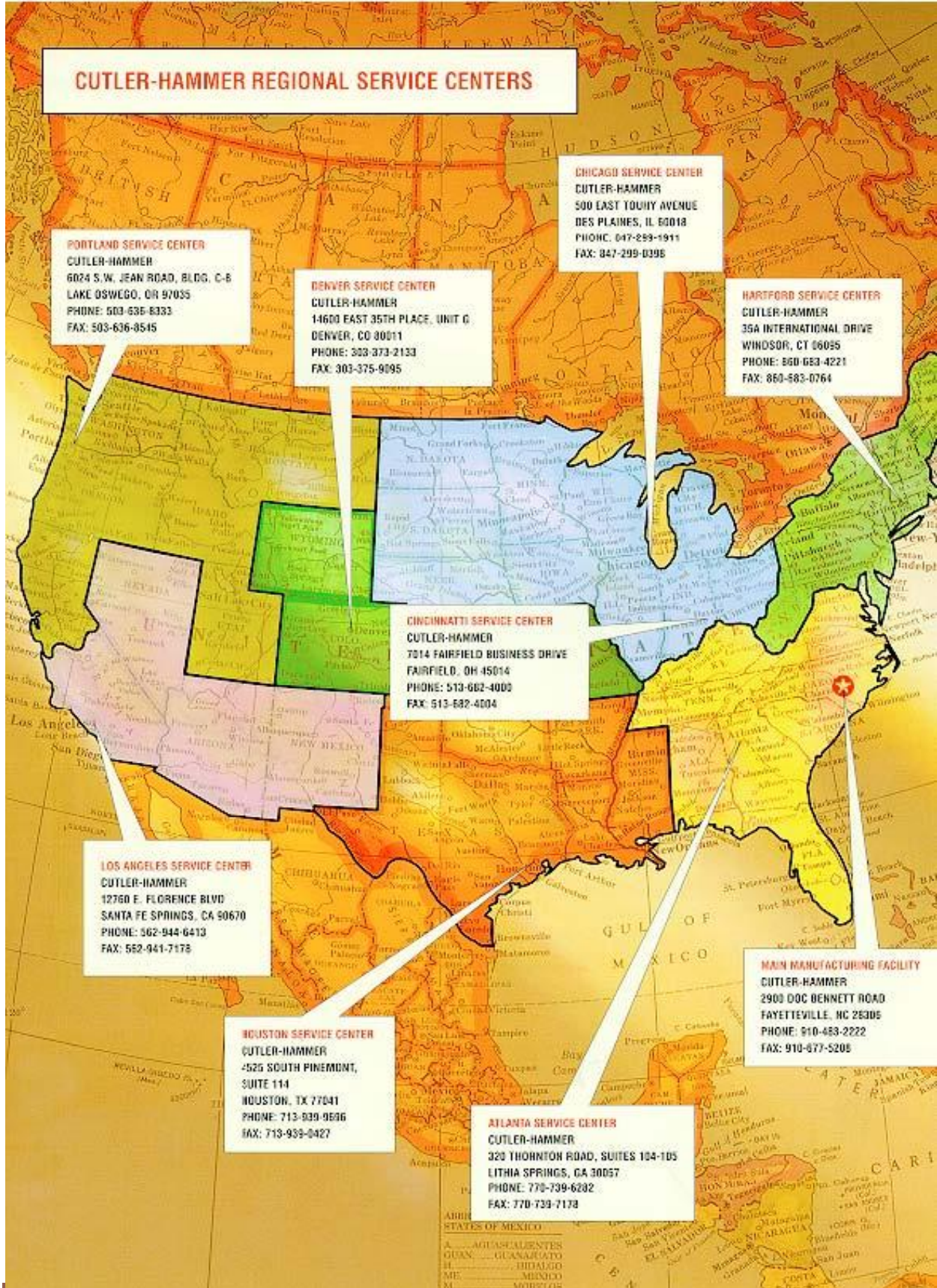
Bus bar splice kits are available to link F2100 MCCs to the following Westinghouse and Cutler-Hammer Motor Control Centers: Series 2100/Five Star, Advantage, Freedom Unitrol and F10 Unitrol. Since no bus transition sections are needed, floor space is saved.



OPTIONAL STRUCTURE BARRIERS.

Plug-in unit isolation and singularly strong frame design make isolation barriers unnecessary. Optional, full-length, steel structure barriers are available if specified.





SERVICE AND SUPPORT

Regional Service Centers.

Eight Service Centers strategically located throughout the country enable Cutler-Hammer to respond to urgent delivery needs. As opposed to typical factory quick ship programs, these uniquely resourced facilities are dedicated to delivering fully assembled MCCs and plug-in units as individual situations demand, without typical lead time constraints.

For delivery capability above and beyond the norm, contact your local Cutler-Hammer Service Center.

COMPLETE AFTERMARKET SUPPORT.

Motor Control Centers are major capital investments intended to provide years of service. As such, Cutler-Hammer supports what it sells, offering parts and replacement units for control center designs circa 1940 to present. Supported vintages include:

Advantage MCC	F2100	9800
Freedom Unitrol	Series 2100	F10 Unitrol
Type W	Five Star	11-300

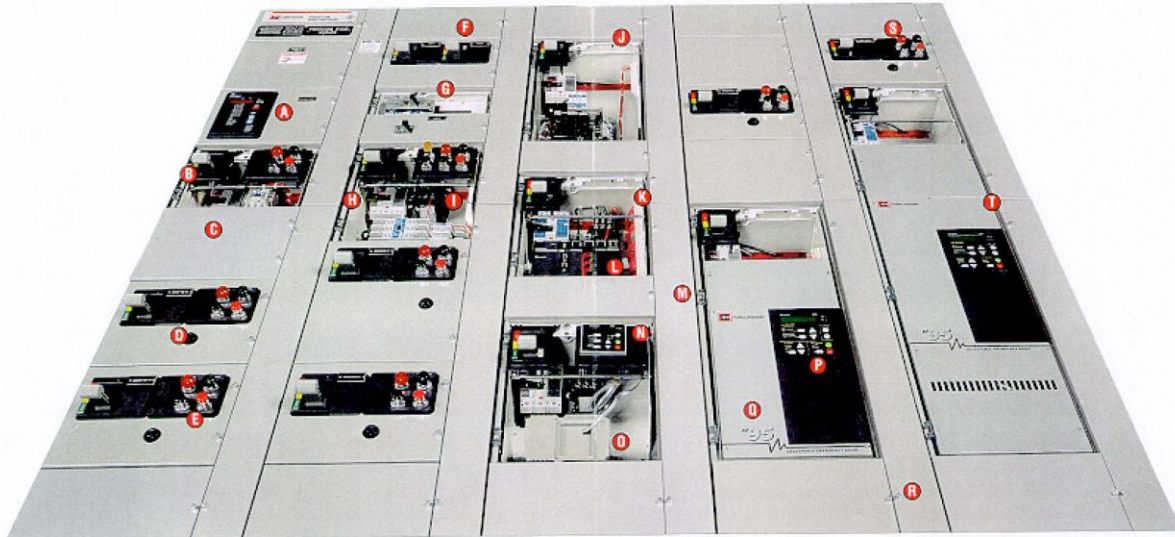
All replacement units are built to factory specifications and include branch circuit protection and handle mechanisms, a new starter, unit power stabs and fused control power transformer. All units are UL listed and labeled.

Regardless of the age of the parent equipment, Cutler-Hammer can provide a rapid replacement parts solution minimizing interruption to plant operations. Additional aftermarket services include: add on structures, transition bus sections and splice kits.

Technology retrofits including vacuum starters, IQ metering and protection devices and Series C breakers are also available. Cutler-Hammer will also retrofit plug-in units from other manufacturers where these technology upgrades are desired.

DESIGN FLEXIBILITY, ADVANCED COMPONENTS, TESTED TOUGH

Cutler-Hammer's F2100 is the Right Choice for Every Application.



- | | | | |
|---|--|---|---|
| <p>A IQ Data Plus II metering unit.</p> <p>B Combination HMCP Size 1 AN16 NEMA Starter.</p> <p>C Future space for later expansion.</p> <p>D Overload relay insulated reset pushbutton.</p> <p>E Flip down pilot device panel.</p> <p>F Dual mounted Series C circuit breaker feeder tap unit.</p> | <p>G Compact 6" plug-in HMCP Starter unit.</p> <p>H Combination HMCP Size 3 AN16 NEMA Starter.</p> <p>I Encapsulated and fused control power transformer.</p> <p>J EA SSRV plug-in unit with circuit breaker.</p> <p>K Latching pull apart terminal block.</p> <p>L D300 PLC with circuit breaker and CPT in plug-in unit.</p> | <p>M Opposite opening vertical wireway doors.</p> <p>N AP93 VFD keypad.</p> <p>O 5 HP AP93 VFD plug-in unit with circuit breaker.</p> <p>P AP95 VFD keypad.</p> <p>Q 30HP AP95 VFD plug-in unit with circuit breaker.</p> <p>R Indicating "L" door latch.</p> | <p>S 10250T pilot devices.</p> <p>T 75HP AP95 VFD slide-in unit with circuit breaker.</p> |
|---|--|---|---|



Cutler-Hammer, a part of Eaton Corporation, is a worldwide leader providing customer-driven solutions. From power distribution and electrical control products to industrial automation, Cutler-Hammer utilizes advanced product development, world-class manufacturing, and offers global engineering services and support.

For more information on Cutler-Hammer products and services, call 1-800-525-2000 or 1-732-417-5660, or visit our website at www.cutlerhammer.eaton.com

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EATON

Appendix E | Calculations for Cost Analysis of Increasing Feeder Size

COST ANALYSIS AT 30% DESIGN LOAD - EXISTING WIRE SIZE																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	250 KCMIL	-	4	2	11	124	0.3	37.2	18.6	0.012	0.02455	0.000457	0.42	0.83	855.00	752.40	-	
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	5	192	1255	0.3	376.5	75.3	0.00907	1.3113	0.098741	89.84	449.22	1225.00	47040.00	19.30	18528.00
3	Y4	G-SWBNDN01	CHILLER #3	500 KCMIL	4"	4	4	480	756	0.3	226.8	56.7	0.008	2.17728	0.123452	112.33	449.31	1475.00	113280.00	25.50	48960.00
4	U4	G-SWBNDN01	GNPH3	500 KCMIL	4"	4	2	440	336	0.3	100.8	50.4	0.008	1.77408	0.089414	81.36	162.71	1475.00	51920.00	25.50	22440.00
5	N4	G-SWBNDN01	G-ATSS01	250 KCMIL	2.5"	4	1	5	75	0.3	22.5	22.5	0.012	0.0135	0.000304	0.28	0.28	855.00	171.00	16.25	81.25
6	V4	G-SWBNDN01	G-ATSG01	300 KCMIL	2.5"	4	3	60	568	0.3	170.4	56.8	0.0106	0.36125	0.020519	18.67	56.01	980.00	7056.00	16.25	2925.00
7	V4	G-SWBNDN01	G-ATSG02	300 KCMIL	2.5"	4	3	55	538	0.3	161.4	53.8	0.0106	0.31365	0.016875	15.35	46.06	980.00	6468.00	16.25	2681.25
8	V4	G-SWBNDN01	G-ATSC01	300 KCMIL	2.5"	4	3	5	578	0.3	173.4	57.8	0.0106	0.03063	0.001771	1.61	4.83	980.00	588.00	16.25	243.75
9	R4	G-SWBNDN01	GNPH1	3/0 AWG	2"	4	2	235	215	0.3	64.5	32.25	0.0158	1.19744	0.038618	35.14	70.28	615.00	11562.00	8.80	4136.00
10	R4	G-SWBNDN01	GLNH1	3/0 AWG	2"	4	2	239	49	0.3	14.7	7.35	0.0158	0.27755	0.00204	1.86	3.71	615.00	11758.80	8.80	4206.40
11	T3	G-SWBNDN01	G-T02	350 KCMIL	3"	3	2	244	641	0.3	192.3	96.15	0.0096	2.25222	0.216551	197.04	394.08	1100.00	16104.00	19.30	9418.40
12	R4	G-SWBNDN01	3PNL1	3/0 AWG	2"	4	2	244	399	0.3	119.7	59.85	0.0158	2.30734	0.138094	125.65	251.30	615.00	12004.80	8.80	4294.40
13	P4	G-SWBNDN01	PPNH1	350 KCMIL	3"	4	1	400	157	0.3	47.1	47.1	0.0096	1.80864	0.085187	77.51	77.51	1100.00	17600.00	19.30	7720.00
14	M4	G-SWBNDN01	1PNH2	4/0 AWG	2.5"	4	1	45	54	0.3	16.2	16.2	0.0133	0.09696	0.001571	1.43	1.43	742.00	1335.60	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	2/0 AWG	-	4	1	527	124	0.3	37.2	37.2	0.019	3.72484	0.138564	126.08	126.08	506.00	10666.48	-	-
22	N4	G-ATSS01	GPSH1	250 KCMIL	2.5"	4	1	10	75	0.3	22.5	22.5	0.012	0.0207	0.000608	0.55	0.55	855.00	342.00	16.25	162.50
23	V4	G-ATSG01	GPGH1	300 KCMIL	2.5"	4	3	270	568	0.3	170.4	56.8	0.0106	1.62562	0.092335	84.01	252.04	980.00	31752.00	16.25	13162.50
24	V4	G-ATSG02	4PGH1	300 KCMIL	2.5"	4	3	330	538	0.3	161.4	53.8	0.0106	1.88192	0.101248	92.12	276.37	980.00	38808.00	16.25	16087.50
25	V4	G-ATSC01	GPC1	300 KCMIL	2.5"	4	3	10	578	0.3	173.4	57.8	0.0106	0.06127	0.003541	3.22	9.67	980.00	1176.00	16.25	487.50
26	R4	GNL1	1PNL1	3/0 AWG	2"	4	2	40	151	0.3	45.3	22.65	0.0158	0.14315	0.003242	2.95	5.90	615.00	1968.00	8.80	704.00
27	R4	GNL1	2PNL1	3/0 AWG	2"	4	2	53	304	0.3	91.2	45.6	0.0158	0.38185	0.017413	15.84	31.69	615.00	2607.60	8.80	932.80
28	J4	GNL1	1/0 AWG	1.5"	4	1	183	111	0.3	33.3	33.3	0.0229	1.3955	0.04647	42.28	42.28	420.00	3074.40	7.15	1308.45	
29	G4	GNL1	1/0 AWG	1.5"	4	1	85	28	0.3	8.4	8.4	0.0229	0.16351	0.001373	1.25	1.25	420.00	1428.00	7.15	607.75	
30	G4	GNL1	1/0 AWG	1.5"	4	1	185	82	0.3	24.6	24.6	0.0229	1.04218	0.025638	23.33	23.33	420.00	3108.00	7.15	1322.75	
31	M4	1PNL1	1LNL1	4/0 AWG	2.5"	4	1	138	141	0.3	42.3	42.3	0.0133	0.77637	0.032841	29.88	29.88	742.00	4095.84	16.25	2242.50
32	G4	1PNL1	1LNL2	4/0 AWG	2.5"	4	1	82	17	0.3	5.1	5.1	0.0229	0.09577	0.000488	0.44	0.44	420.00	1377.60	7.15	586.30
33	M4	2PNL1	2LNL1	4/0 AWG	2.5"	4	1	132	181	0.3	54.3	54.3	0.0133	0.95329	0.051764	47.10	47.10	742.00	3917.76	16.25	2145.00
34	M4	2PNL1	2LNL2	4/0 AWG	2.5"	4	1	130	137	0.3	41.1	41.1	0.0133	0.71062	0.029206	26.57	26.57	742.00	3858.40	16.25	2112.50
35	M4	3PNL1	4LNL1	4/0 AWG	2.5"	4	1	88	148	0.3	44.4	44.4	0.0133	0.51966	0.023073	20.99	20.99	742.00	2611.84	16.25	1430.00
36	M4	3PNL1	3LNL1	4/0 AWG	2.5"	4	1	113	147	0.3	44.1	44.1	0.0133	0.66278	0.029229	26.59	26.59	742.00	3353.84	16.25	1836.25
37	J4	3PNL1	3LNL2	1/0 AWG	1.5"	4	1	163	85	0.3	25.5	25.5	0.0229	0.95184	0.024272	22.08	22.08	420.00	2738.40	7.15	1165.45
38	C3	3PNL1	3LJL2	6 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0809	1.65424	0.015881	14.45	14.45	152.00	971.28	5.90	1256.70
39	C3	3PNL1	3LJL4	6 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0809	1.65424	0.015881	14.45	14.45	152.00	971.28	5.90	1256.70
40	R4	G-SWBNDN01	1LNH1	3/0 AWG	2"	4	2	255	64	0.3	19.2	9.6	0.0158	0.38678	0.003713	3.38	6.76	615.00	12546.00	8.80	4488.00
41	R4	G-SWBNDN01	2LNH1	3/0 AWG	2"	4	2	270	83	0.3	24.9	12.45	0.0158	0.53112	0.006612	6.02	12.03	615.00	13284.00	8.80	4752.00
42	R4	G-SWBNDN01	3LNH1	3/0 AWG	2"	4	2	285	46	0.3	13.8	6.9	0.0158	0.31071	0.002144	1.95	3.90	615.00	14022.00	8.80	5016.00
43	R4	G-SWBNDN01	4LNH1	3/0 AWG	2"	4	2	300	29	0.3	8.7	4.35	0.0158	0.20619	0.000897	0.82	1.63	615.00	14760.00	8.80	5280.00
44	J4	GNPH1	GNPH2	1/0 AWG	1.5"	4	1	185	39	0.3	11.7	11.7	0.0229	0.49567	0.005799	5.28	5.28	420.00	3108.00	7.15	1322.75
45	H4	GNPH1	EC-1	1/0 AWG	1.5"	4	1	82	65	0.3	19.5	19.5	0.0229	0.36617	0.00714	6.50	6.50	420.00	1377.60	7.15	586.30
46	H4	GNPH1	EC-2	1/0 AWG	1.5"	4	1	85	65	0.3	19.5	19.5	0.0229	0.37957	0.007402	6.73	6.73	420.00	1428.00	7.15	607.75
47	H4	GNPH1	EC-3	1/0 AWG	1.5"	4	1	88	65	0.3	19.5	19.5	0.0229	0.39296	0.007663	6.97	6.97	420.00	1478.40	7.15	629.20
48	H4	EC-1	ELEV-1	1/0 AWG	1.5"	4	1	80	65	0.3	19.5	19.5	0.0229	0.35724	0.006966	6.34	6.34	420.00	1344.00	7.15	572.00
49	H4	EC-2	ELEV-2	1/0 AWG	1.5"	4	1	80	65	0.3	19.5	19.5	0.0229	0.35724	0.006966	6.34	6.34	420.00	1344.00	7.15	572.00
50	H4	EC-3	ELEV-3	1/0 AWG	1.5"	4	1	80	65	0.3	19.5	19.5	0.0229	0.35724	0.006966	6.34	6.34	420.00	1344.00	7.15	572.00
51	B4	4PGH1	3-T03	8 AWG	3/4"	4	1	30	38	0.3	11.4	11.4	0.126	0.43092	0.004912	4.47	4.47	110.00	132.00	3.21	96.30
52	T4	4PGH1	PPGH1	350 KCMIL	3"	4	2	104	353	0.3	105.9	52.95	0.0096	0.52865	0.027992	25.47	50.94	1100.00	9152.00	19.30	4014.40
53	P4	4PGH1	PPGH2	350 KCMIL	3"	4	1	104	206	0.3	61.8	61.8	0.0096	0.61701	0.038131	34.70	34.70	1100.00	4576.00	19.30	2007.20
54	D4	3-T03	3LGL1	4 AWG	1.25"	4	1	5	38	0.3	11.4	11.4	0.0522	0.02975	0.000339	0.31	0.31	207.00	41.40	5.90	29.50
55	R3	GPC1	3-T02	3/0 AWG	2"	3	2	282	407	0.3	122.1	61.05	0.0158	2.72014	0.166065	151.10	302.20	615.00	10405.80	8.80	4963.20
56	P3	GPC1	2-T01	350 KCMIL	3"	3	1	269	335	0.3	100.5	100.5	0.0096	2.59531	0.260829	237.33	237.33	1100.00	8877.00	19.30	5191.70
57	J3	GPC1	4-T01	1/0 AWG	1.5"	3	1	295	145	0.3	43.5	43.5	0.0229	2.93864	0.127831	116.31	116.31	420.00	3717.00	7.15	2109.25
58	P3	GPC1	1-T01	350 KCMIL	3"	3	1	269	272	0.3	81.6	81.6	0.0096	2.10724	0.171951	156.46	156.46	1100.00	8877.00	19.30	5191.70
59	M4	GPC1	GLCH1	4/0 AWG	2.5"	4	1	261	9	0.3	2.7	2.7	0.0133	0.09373	0.000253	0.23	0.23	742.00	7746.48	16.25	4241.25
60	M4	GPC1	1LCH1	4/0 AWG	2.5"	4	1	284	10	0.3	3	3	0.0133	0.11332	0.00034	0.31	0.31	742.00	8429.12	16.25	4615.00
61	M4	GPC1	2LCH1	4/0 AWG	2.5"	4	1	307	13	0.3	3.9	3.9	0.0133	0.15924	0.000621	0.57	0.57	742.00	9111.76	16.25	4988.75
62	M4	GPC1	3LCH1	4/0 AWG	2.5"	4	1	330	34	0.3	10.2	10.2	0.0133	0.44768	0.004566	4.15	4.15	742.00	9794.40	16.25	5362.50
63	M4	GPC1	4LCH1	4/0 AWG	2.5"	4	1	353	20	0.3	6	6	0.0133	0.28169	0.00169	1.54	1.54	742.00	10477.04	16.25	5736.25
64	M4	3PCL1	3LCL1	4/0 AWG	2.5"	4	1	104	143	0.3	42.9	42.9	0.0133	0.59339	0.025457	23.16	23.16	742.00	3086.72	16.25	1690.00
65	M4	3PCL1																			

COST ANALYSIS AT 30% DESIGN LOAD - 1 WIRE SIZE LARGER																				
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																			
1	MI-V4	G-T01	G-LSIG1	300 KCMIL	-	4	2	11	124	0.3	37.2	18.6	0.0106	0.02169	0.000403	0.37	0.73	980.00	862.40	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	5	192	1255	0.3	376.5	75.3	0.008	1.15661	0.087093	79.24	396.22	1475.00	56640.00	25.50
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	5	480	756	0.3	226.8	45.36	0.00907	1.97479	0.089577	81.51	407.53	1225.00	117600.00	19.30
4	U4	G-SWBND01	GPNH3	300 KCMIL	2.5"	4	3	440	336	0.3	100.8	33.6	0.0106	1.5671	0.052655	47.91	143.73	980.00	51744.00	16.25
5	N4	G-SWBND01	G-ATSS01	300 KCMIL	2.5"	4	1	5	75	0.3	22.5	22.5	0.0106	0.01193	0.000268	0.24	0.24	980.00	196.00	16.25
6	V4	G-SWBND01	G-ATSG01	350 KCMIL	3"	4	3	60	568	0.3	170.4	56.8	0.0096	0.32717	0.018583	16.91	50.73	1100.00	7920.00	19.30
7	V4	G-SWBND01	G-ATSG02	350 KCMIL	3"	4	3	55	538	0.3	161.4	53.8	0.0096	0.28406	0.015283	13.91	41.72	1100.00	7260.00	19.30
8	V4	G-SWBND01	G-ATSC01	350 KCMIL	3"	4	3	5	578	0.3	173.4	57.8	0.0096	0.02774	0.001604	1.46	4.38	1100.00	660.00	19.30
9	R4	G-SWBND01	GPNH1	4/0 AWG	2.5"	4	2	235	215	0.3	64.5	32.25	0.0133	1.00797	0.032507	29.58	59.16	742.00	13949.60	16.25
10	R4	G-SWBND01	GLNH1	4/0 AWG	2.5"	4	2	239	49	0.3	14.7	7.35	0.0133	0.23363	0.001717	1.56	3.12	742.00	14187.04	16.25
11	T3	G-SWBND01	G-T02	400 KCMIL	3"	3	2	244	641	0.3	192.3	96.15	0.00907	2.12788	0.204595	186.16	372.32	1225.00	17934.00	19.30
12	R4	G-SWBND01	3PNL1	4/0 AWG	2.5"	4	2	244	399	0.3	119.7	59.85	0.0133	1.94225	0.116244	105.77	211.54	742.00	14483.84	16.25
13	P4	G-SWBND01	PPNH1	400 KCMIL	3"	4	1	400	157	0.3	47.1	47.1	0.00907	1.70879	0.080484	73.23	73.23	1225.00	19600.00	19.30
14	M4	G-SWBND01	1PNH2	250 KCMIL	2.5"	4	1	45	54	0.3	16.2	16.2	0.012	0.08748	0.001417	1.29	1.29	855.00	1539.00	16.25
15	MI-N4	G-LSIG1	G-ATSF01	3/0 AWG	-	4	1	527	124	0.3	37.2	37.2	0.0158	3.0975	0.115227	104.84	104.84	615.00	12964.20	-
22	N4	G-ATSS01	GPSH1	300 KCMIL	2.5"	4	1	10	75	0.3	22.5	22.5	0.0106	0.02385	0.000537	0.49	0.49	980.00	392.00	16.25
23	V4	G-ATSG01	GPGH1	350 KCMIL	3"	4	3	270	568	0.3	170.4	56.8	0.0096	1.47226	0.083624	76.09	228.27	1100.00	35640.00	19.30
24	V4	G-ATSG02	4PGH1	350 KCMIL	3"	4	3	330	538	0.3	161.4	53.8	0.0096	1.70438	0.091696	83.43	250.30	1100.00	43560.00	19.30
25	V4	G-ATSC01	GPC1	350 KCMIL	3"	4	3	10	578	0.3	173.4	57.8	0.0096	0.00549	0.003207	2.92	8.75	1100.00	1320.00	19.30
26	R4	GPNL1	1PNL1	4/0 AWG	2.5"	4	2	40	151	0.3	45.3	22.65	0.0133	0.1205	0.002729	2.48	4.97	742.00	2374.40	16.25
27	R4	GPNL1	2PNL1	4/0 AWG	2.5"	4	2	53	304	0.3	91.2	45.6	0.0133	0.32143	0.014657	13.34	26.67	742.00	3146.08	16.25
28	J4	GPNL1	GLN1	2/0 AWG	2"	4	1	183	111	0.3	33.3	33.3	0.019	1.15784	0.038556	35.08	35.08	506.00	3703.92	8.80
29	G4	GPNL1	GLN2	2/0 AWG	2"	4	1	85	28	0.3	8.4	8.4	0.019	0.13566	0.00114	1.04	1.04	506.00	1720.40	8.80
30	G4	GPNL1	GLN3	2/0 AWG	2"	4	1	185	82	0.3	24.6	24.6	0.019	0.86469	0.021271	19.35	19.35	506.00	3744.40	8.80
31	M4	1PNL1	1LNL1	250 KCMIL	2.5"	4	1	138	141	0.3	42.3	42.3	0.012	0.70049	0.029631	26.96	26.96	855.00	4719.60	16.25
32	G4	1PNL1	1LNL2	2/0 AWG	2"	4	1	82	17	0.3	5.1	5.1	0.019	0.07946	0.000405	0.37	0.37	506.00	1659.68	8.80
33	M4	2PNL1	2LNL1	250 KCMIL	2.5"	4	1	132	181	0.3	54.3	54.3	0.012	0.86011	0.046704	42.50	42.50	855.00	4514.40	16.25
34	M4	2PNL1	2LNL2	250 KCMIL	2.5"	4	1	130	137	0.3	41.1	41.1	0.012	0.64116	0.026352	23.98	23.98	855.00	4446.00	16.25
35	M4	3PNL1	4LNL1	250 KCMIL	2.5"	4	1	88	148	0.3	44.4	44.4	0.012	0.46886	0.020818	18.94	18.94	855.00	3009.60	16.25
36	M4	3PNL1	3LNL1	250 KCMIL	2.5"	4	1	113	147	0.3	44.1	44.1	0.012	0.598	0.026372	24.00	24.00	855.00	3864.60	16.25
37	J4	3PNL1	3LNL2	2/0 AWG	2"	4	1	163	85	0.3	25.5	25.5	0.019	0.78974	0.020138	18.32	18.32	506.00	3299.12	8.80
38	C3	3PNL1	3LJL2	4 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0522	1.06739	0.010247	9.32	9.32	207.00	1322.73	5.90
39	C3	3PNL1	3LJL4	4 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0522	1.06739	0.010247	9.32	9.32	207.00	1322.73	5.90
40	R4	G-SWBND01	1LNH1	4/0 AWG	2.5"	4	2	255	64	0.3	19.2	9.6	0.0133	0.32558	0.003126	2.84	5.69	742.00	15136.80	16.25
41	R4	G-SWBND01	2LNH1	4/0 AWG	2.5"	4	2	270	83	0.3	24.9	12.45	0.0133	0.44708	0.005566	5.06	10.13	742.00	16027.20	16.25
42	R4	G-SWBND01	3LNH1	4/0 AWG	2.5"	4	2	285	46	0.3	13.8	6.9	0.0133	0.26154	0.001805	1.64	3.28	742.00	16917.60	16.25
43	R4	G-SWBND01	4LNH1	4/0 AWG	2.5"	4	2	300	29	0.3	8.7	4.35	0.0133	0.17357	0.000755	0.69	1.37	742.00	17808.00	16.25
44	J4	GPNH1	GPNH2	2/0 AWG	2"	4	1	185	39	0.3	11.7	11.7	0.019	0.41126	0.004812	4.38	4.38	506.00	3744.40	8.80
45	H4	GPNH1	EC-1	2/0 AWG	2"	4	1	82	65	0.3	19.5	19.5	0.019	0.30381	0.005924	5.39	5.39	506.00	1659.68	8.80
46	H4	GPNH1	EC-2	2/0 AWG	2"	4	1	85	65	0.3	19.5	19.5	0.019	0.31493	0.006141	5.59	5.59	506.00	1720.40	8.80
47	H4	GPNH1	EC-3	2/0 AWG	2"	4	1	88	65	0.3	19.5	19.5	0.019	0.32604	0.006358	5.78	5.78	506.00	1781.12	8.80
48	H4	EC-1	ELEV-1	2/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.019	0.2964	0.00578	5.26	5.26	506.00	1619.20	8.80
49	H4	EC-2	ELEV-2	2/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.019	0.2964	0.00578	5.26	5.26	506.00	1619.20	8.80
50	H4	EC-3	ELEV-3	2/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.019	0.2964	0.00578	5.26	5.26	506.00	1619.20	8.80
51	B4	4PGH1	3-T03	6 AWG	1.25"	4	1	30	38	0.3	11.4	11.4	0.0809	0.27668	0.003154	2.87	2.87	152.00	182.40	5.90
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	2	104	353	0.3	105.9	52.95	0.00907	0.49947	0.026447	24.06	48.13	1225.00	10192.00	19.30
53	P4	4PGH1	PPGH2	400 KCMIL	3"	4	1	104	206	0.3	61.8	61.8	0.00907	0.58295	0.036026	32.78	32.78	1225.00	5096.00	19.30
54	D4	3-T03	3LGL1	3 AWG	1.25"	4	1	5	38	0.3	11.4	11.4	0.0432	0.02462	0.000281	0.26	0.26	239.00	47.80	5.90
55	R3	GPC1	3-T02	4/0 AWG	2.5"	3	2	282	407	0.3	122.1	61.05	0.0133	2.28974	0.139789	127.19	254.39	742.00	12554.64	16.25
56	P3	GPC1	2-T01	400 KCMIL	3"	3	1	269	335	0.3	100.5	100.5	0.00907	2.45203	0.246429	224.22	224.22	1225.00	9885.75	19.30
57	J3	GPC1	4-T01	2/0 AWG	2"	3	1	295	145	0.3	43.5	43.5	0.019	2.43818	0.106611	96.50	96.50	506.00	4478.10	8.80
58	P3	GPC1	1-T01	400 KCMIL	3"	3	1	269	272	0.3	81.6	81.6	0.00907	1.9909	0.162458	147.82	147.82	1225.00	9885.75	19.30
59	M4	GPC1	GLCH1	250 KCMIL	2.5"	4	1	261	9	0.3	2.7	2.7	0.012	0.08456	0.000228	0.21	0.21	855.00	8926.20	16.25
60	M4	GPC1	1LCH1	250 KCMIL	2.5"	4	1	284	10	0.3	3	3	0.012	0.10224	0.000307	0.28	0.28	855.00	9712.80	16.25
61	M4	GPC1	2LCH1	250 KCMIL	2.5"	4	1	307	13	0.3	3.9	3.9	0.012	0.14368	0.00056	0.51	0.51	855.00	10499.40	16.25
62	M4	GPC1	3LCH1	250 KCMIL	2.5"	4	1	330	34	0.3	10.2	10.2	0.012	0.40392	0.00412	3.75	3.75	855.00	11286.00	16.25
63	M4	GPC1	4LCH1	250 KCMIL	2.5"	4	1	353	20	0.3	6	6	0.012	0.25416	0.001525	1.39	1.39	855.00	12072.60	16.25
64	M4	3PCL1	3LCL1	250 KCMIL	2.5"	4	1	104	143	0.3	42.9	42.9	0.012	0.53539	0.02968	20.90	20.90	855.00	3556.80	16.25
65	M4	3PCL1	3LCL2	250 KCMIL	2.5"	4	1	152	128	0.3	38.4	38.4	0.012	0.70042	0.026896	24.47	24.47	855.00	5198.40	16.25
66	J4	3PCL1	3LCL3	2/0 AWG	2"	4	1	128	101	0.3	30.3	30.3	0.019	0.7369	0.022328	20.32	20.32	506.00	2590.72	8.80
67	C3	3PCL1	3LJL3	4 AWG	1.25"	3	1	208	32	0.3	9.6	9.6	0.0522	1.04233	0.010006	9.10	9.10	207.00	1291.68	5.90
68	C3	3PCL1	3LJL1	4 AWG	1.25"	3	1	208	32											

COST ANALYSIS AT 30% DESIGN LOAD - 2 WIRE SIZE LARGER

TAG		FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	350 KCMIL	-	4	2	11	124	0.3	37.2	18.6	0.0096	0.01964	0.000365	0.33	0.66	1100.00	968.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	6	192	1255	0.3	376.5	62.75	0.00907	1.09275	0.06857	62.39	374.35	1225.00	56448.00	19.30	22233.60
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	5	480	756	0.3	226.8	45.36	0.008	1.74182	0.079009	71.89	359.45	1475.00	141600.00	25.50	61200.00
4	U4	G-SWBND01	GNPH3	400 KCMIL	3"	4	3	440	336	0.3	100.8	33.6	0.00907	1.34091	0.045055	40.99	122.98	1225.00	64680.00	19.30	25476.00
5	N4	G-SWBND01	G-ATSS01	350 KCMIL	3"	4	1	5	75	0.3	22.5	22.5	0.0096	0.0108	0.000243	0.22	0.22	1100.00	220.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	400 KCMIL	3"	4	3	60	568	0.3	170.4	56.8	0.00907	0.30911	0.017557	15.98	47.93	1225.00	8820.00	19.30	3474.00
7	V4	G-SWBND01	G-ATSG02	400 KCMIL	3"	4	3	55	538	0.3	161.4	53.8	0.00907	0.26838	0.014439	13.14	39.41	1225.00	8085.00	19.30	3184.50
8	V4	G-SWBND01	G-ATSC01	400 KCMIL	3"	4	3	5	578	0.3	173.4	57.8	0.00907	0.02621	0.001515	1.38	4.14	1225.00	735.00	19.30	289.50
9	R4	G-SWBND01	GNPH1	250 KCMIL	2.5"	4	2	235	215	0.3	64.5	32.25	0.012	0.90945	0.02933	26.69	53.37	855.00	16074.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	250 KCMIL	2.5"	4	2	239	49	0.3	14.7	7.35	0.012	0.2108	0.001549	1.41	2.82	855.00	16347.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	500 KCMIL	4"	3	2	244	641	0.3	192.3	96.15	0.008	1.87685	0.180459	164.20	328.40	1475.00	21594.00	25.50	12444.00
12	R4	G-SWBND01	3PNL1	250 KCMIL	2.5"	4	2	244	399	0.3	119.7	59.85	0.012	1.75241	0.104882	95.43	190.86	855.00	16689.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	500 KCMIL	4"	4	1	400	157	0.3	47.1	47.1	0.008	1.5072	0.070989	64.59	64.59	1475.00	23600.00	25.50	10200.00
14	M4	G-SWBND01	1PNH2	300 KCMIL	2.5"	4	1	45	54	0.3	16.2	16.2	0.0106	0.07727	0.001252	1.14	1.14	980.00	1764.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	4/0 AWG	-	4	1	527	124	0.3	37.2	37.2	0.0133	2.60739	0.096995	88.25	88.25	742.00	15641.36	-	-
22	N4	G-ATSS01	GPSH1	350 KCMIL	3"	4	1	10	75	0.3	22.5	22.5	0.0096	0.0216	0.000486	0.44	0.44	1100.00	440.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	400 KCMIL	3"	4	3	270	568	0.3	170.4	56.8	0.00907	1.39098	0.079007	71.89	215.66	1225.00	39690.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	400 KCMIL	3"	4	3	330	538	0.3	161.4	53.8	0.00907	1.61029	0.086633	78.83	236.48	1225.00	48510.00	19.30	19107.00
25	V4	G-ATSC01	GPCH1	400 KCMIL	3"	4	3	10	578	0.3	173.4	57.8	0.00907	0.05242	0.00303	2.76	8.27	1225.00	1470.00	19.30	579.00
26	R4	GNP11	1PNL1	250 KCMIL	2.5"	4	2	40	151	0.3	45.3	22.65	0.012	0.10872	0.002463	2.24	4.48	855.00	2736.00	16.25	1300.00
27	R4	GNP11	2PNL1	250 KCMIL	2.5"	4	2	53	304	0.3	91.2	45.6	0.012	0.29002	0.013225	12.03	24.07	855.00	3625.20	16.25	1722.50
28	J4	GNP11	GLN11	3/0 AWG	2"	4	1	183	111	0.3	33.3	33.3	0.0158	0.96284	0.032062	29.17	29.17	615.00	4501.80	8.80	1610.40
29	G4	GNP11	GLN12	3/0 AWG	2"	4	1	85	28	0.3	8.4	8.4	0.0158	0.11281	0.000948	0.86	0.86	615.00	2091.00	8.80	748.00
30	G4	GNP11	GLN13	3/0 AWG	2"	4	1	185	82	0.3	24.6	24.6	0.0158	0.71906	0.017689	16.09	16.09	615.00	4551.00	8.80	1628.00
31	M4	1PNL1	1LNL1	300 KCMIL	2.5"	4	1	138	141	0.3	42.3	42.3	0.0106	0.61876	0.026174	23.82	23.82	980.00	5409.60	16.25	2242.50
32	G4	1PNL1	1LNL2	3/0 AWG	2"	4	1	82	17	0.3	5.1	5.1	0.0158	0.06608	0.000337	0.31	0.31	615.00	2017.20	8.80	721.60
33	M4	2PNL1	2LNL1	300 KCMIL	2.5"	4	1	132	181	0.3	54.3	54.3	0.0106	0.75977	0.041255	37.54	37.54	980.00	5174.40	16.25	2145.00
34	M4	2PNL1	2LNL2	300 KCMIL	2.5"	4	1	130	137	0.3	41.1	41.1	0.0106	0.56636	0.023277	21.18	21.18	980.00	5096.00	16.25	2112.50
35	M4	3PNL1	4LNL1	300 KCMIL	2.5"	4	1	88	148	0.3	44.4	44.4	0.0106	0.41416	0.018389	16.73	16.73	980.00	3449.60	16.25	1430.00
36	M4	3PNL1	3LNL1	300 KCMIL	2.5"	4	1	113	147	0.3	44.1	44.1	0.0106	0.52823	0.023295	21.20	21.20	980.00	4429.60	16.25	1836.25
37	J4	3PNL1	3LNL2	3/0 AWG	2"	4	1	163	85	0.3	25.5	25.5	0.0158	0.65673	0.016747	15.24	15.24	615.00	4009.80	8.80	1434.40
38	C3	3PNL1	3LJL2	3 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0432	0.88335	0.00848	7.72	7.72	239.00	1527.21	5.90	1256.70
39	C3	3PNL1	3LJL4	3 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0432	0.88335	0.00848	7.72	7.72	239.00	1527.21	5.90	1256.70
40	R4	G-SWBND01	1LNH1	250 KCMIL	2.5"	4	2	255	64	0.3	19.2	9.6	0.012	0.29376	0.00282	2.57	5.13	855.00	17442.00	16.25	8287.50
41	R4	G-SWBND01	2LNH1	250 KCMIL	2.5"	4	2	270	83	0.3	24.9	12.45	0.012	0.40338	0.005022	4.57	9.14	855.00	18468.00	16.25	8775.00
42	R4	G-SWBND01	3LNH1	250 KCMIL	2.5"	4	2	285	46	0.3	13.8	6.9	0.012	0.23598	0.001628	1.48	2.96	855.00	19494.00	16.25	9262.50
43	R4	G-SWBND01	4LNH1	250 KCMIL	2.5"	4	2	300	29	0.3	8.7	4.35	0.012	0.1566	0.00681	0.62	1.24	855.00	20520.00	16.25	9750.00
44	J4	GNPH1	GNPH2	3/0 AWG	2"	4	1	185	39	0.3	11.7	11.7	0.0158	0.34199	0.004001	3.64	3.64	615.00	4551.00	8.80	1628.00
45	H4	GNPH1	EC-1	3/0 AWG	2"	4	1	82	65	0.3	19.5	19.5	0.0158	0.25264	0.004927	4.48	4.48	615.00	2017.20	8.80	721.60
46	H4	GNPH1	EC-2	3/0 AWG	2"	4	1	85	65	0.3	19.5	19.5	0.0158	0.26189	0.005107	4.65	4.65	615.00	2091.00	8.80	748.00
47	H4	GNPH1	EC-3	3/0 AWG	2"	4	1	88	65	0.3	19.5	19.5	0.0158	0.27113	0.005287	4.81	4.81	615.00	2164.80	8.80	774.40
48	H4	EC-1	ELEV-1	3/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.0158	0.24648	0.004806	4.37	4.37	615.00	1968.00	8.80	704.00
49	H4	EC-2	ELEV-2	3/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.0158	0.24648	0.004806	4.37	4.37	615.00	1968.00	8.80	704.00
50	H4	EC-3	ELEV-3	3/0 AWG	2"	4	1	80	65	0.3	19.5	19.5	0.0158	0.24648	0.004806	4.37	4.37	615.00	1968.00	8.80	704.00
51	B4	4PGH1	3-T03	4 AWG	1.25"	4	1	30	38	0.3	11.4	11.4	0.0522	0.17852	0.002035	1.85	1.85	207.00	248.40	5.90	177.00
52	T4	4PGH1	PPGH1	500 KCMIL	4"	4	2	104	353	0.3	105.9	52.95	0.008	0.44054	0.023327	21.22	42.45	1475.00	12272.00	25.50	5304.00
53	P4	4PGH1	PPGH2	500 KCMIL	4"	4	1	104	206	0.3	61.8	61.8	0.008	0.51418	0.031776	28.91	28.91	1475.00	6136.00	25.50	2652.00
54	D4	3-T03	3LGL1	2 AWG	1.25"	4	1	5	38	0.3	11.4	11.4	0.0342	0.01949	0.000222	0.20	0.20	262.00	52.40	5.90	29.50
55	R3	GPCH1	3-T02	250 KCMIL	2.5"	3	2	282	407	0.3	122.1	61.05	0.012	0.26593	0.012615	114.76	229.52	855.00	14466.60	16.25	9165.00
56	P3	GPCH1	2-T01	500 KCMIL	4"	3	1	269	335	0.3	100.5	100.5	0.008	2.16276	0.217357	197.77	197.77	1475.00	11903.25	25.50	6859.50
57	J3	GPCH1	4-T01	3/0 AWG	2"	3	1	295	145	0.3	43.5	43.5	0.0158	2.02754	0.088198	80.25	80.25	615.00	5442.75	8.80	2596.00
58	P3	GPCH1	1-T01	500 KCMIL	4"	3	1	269	272	0.3	81.6	81.6	0.008	1.75603	0.143292	130.38	130.38	1475.00	11903.25	25.50	6859.50
59	M4	GPCH1	GLCH1	300 KCMIL	2.5"	4	1	261	9	0.3	2.7	2.7	0.0106	0.0747	0.000202	0.18	0.18	980.00	10231.20	16.25	4241.25
60	M4	GPCH1	1LCH1	300 KCMIL	2.5"	4	1	284	10	0.3	3	3	0.0106	0.09031	0.000271	0.25	0.25	980.00	11132.80	16.25	4615.00
61	M4	GPCH1	2LCH1	300 KCMIL	2.5"	4	1	307	13	0.3	3.9	3.9	0.0106	0.12691	0.000495	0.45	0.45	980.00	12034.40	16.25	4988.75
62	M4	GPCH1	3LCH1	300 KCMIL	2.5"	4	1	330	34	0.3	10.2	10.2	0.0106	0.3568	0.003639	3.31	3.31	980.00	12936.00	16.25	5362.50
63	M4	GPCH1	4LCH1	300 KCMIL	2.5"	4	1	353	20	0.3	6	6	0.0106	0.22451	0.001347	1.23	1.23	980.00	13837.60	16.25	5736.25
64	M4	3PCL1	3LCL1	300 KCMIL	2.5"	4	1	104	143	0.3	42.9	42.9	0.0106	0.47293</							

COST ANALYSIS AT 30% DESIGN LOAD - 3 WIRE SIZE LARGER																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	400 KCMIL	-	4	2	11	124	0.3	37.2	18.6	0.00907	0.01856	0.000345	0.31	0.63	1225.00	1078.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	6	192	1255	0.3	376.5	62.75	0.008	0.96384	0.060481	55.03	330.19	1475.00	67968.00	25.50	29376.00
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	6	480	756	0.3	226.8	37.8	0.00907	1.64566	0.062206	56.60	339.60	1225.00	141120.00	19.30	55584.00
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	3	440	336	0.3	100.8	33.6	0.008	1.18272	0.039739	36.16	108.48	1475.00	77880.00	25.50	33660.00
5	N4	G-SWBND01	G-ATSS01	400 KCMIL	3"	4	1	5	75	0.3	22.5	22.5	0.00907	0.0102	0.00023	0.21	0.21	1225.00	245.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	500 KCMIL	4"	4	3	60	568	0.3	170.4	56.8	0.008	0.27264	0.015486	14.09	42.27	1475.00	10620.00	25.50	4590.00
7	V4	G-SWBND01	G-ATSG02	500 KCMIL	4"	4	3	55	538	0.3	161.4	53.8	0.008	0.23672	0.012736	11.59	34.76	1475.00	9735.00	25.50	4207.50
8	V4	G-SWBND01	G-ATSC01	500 KCMIL	4"	4	3	5	578	0.3	173.4	57.8	0.008	0.02312	0.001336	1.22	3.65	1475.00	885.00	25.50	382.50
9	R4	G-SWBND01	GPNH1	300 KCMIL	2.5"	4	2	235	215	0.3	64.5	32.25	0.0106	0.80335	0.025908	23.57	47.15	980.00	18424.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	300 KCMIL	2.5"	4	2	239	49	0.3	14.7	7.35	0.0106	0.1862	0.001369	1.25	2.49	980.00	18737.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	250 KCMIL	2.5"	3	3	244	641	0.3	192.3	64.1	0.012	1.87685	0.120306	109.47	328.40	855.00	18775.80	16.25	11895.00
12	R4	G-SWBND01	3PNL1	300 KCMIL	2.5"	4	2	244	399	0.3	119.7	59.85	0.0106	1.54796	0.092645	84.30	168.59	980.00	19129.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	4/0 AWG	2.5"	4	2	400	157	0.3	47.1	23.55	0.0133	1.25286	0.029505	26.85	53.69	742.00	23744.00	16.25	13000.00
14	M4	G-SWBND01	1PNH2	400 KCMIL	3"	4	1	45	54	0.3	16.2	16.2	0.00907	0.06612	0.001071	0.97	0.97	1225.00	2205.00	19.30	868.50
15	MI-N4	G-LSIG1	G-ATSF01	250 KCMIL	-	4	1	527	124	0.3	37.2	37.2	0.012	2.35253	0.087514	79.63	79.63	855.00	18023.40	-	-
22	N4	G-ATSS01	GPSH1	400 KCMIL	3"	4	1	10	75	0.3	22.5	22.5	0.00907	0.02041	0.000459	0.42	0.42	1225.00	490.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	500 KCMIL	4"	4	3	270	568	0.3	170.4	56.8	0.008	1.22688	0.069687	63.41	190.22	1475.00	47790.00	25.50	20655.00
24	V4	G-ATSG02	4PGH1	500 KCMIL	4"	4	3	330	538	0.3	161.4	53.8	0.008	1.42032	0.076413	69.53	208.58	1475.00	58410.00	25.50	25245.00
25	V4	G-ATSC01	GPC1	500 KCMIL	4"	4	3	10	578	0.3	173.4	57.8	0.008	0.04624	0.002673	2.43	7.30	1475.00	1770.00	25.50	765.00
26	R4	GPNL1	1PNL1	300 KCMIL	2.5"	4	2	40	151	0.3	45.3	22.65	0.0106	0.09604	0.002175	1.98	3.96	980.00	3136.00	16.25	1300.00
27	R4	GPNL1	2PNL1	300 KCMIL	2.5"	4	2	53	304	0.3	91.2	45.6	0.0106	0.25618	0.011682	10.63	21.26	980.00	4155.20	16.25	1722.50
28	J4	GPNL1	GLNL1	4/0 AWG	2.5"	4	1	183	111	0.3	33.3	33.3	0.0133	0.81049	0.026989	24.56	24.56	742.00	5431.44	16.25	2973.75
29	G4	GPNL1	GLNL2	4/0 AWG	2.5"	4	1	85	28	0.3	8.4	8.4	0.0133	0.09496	0.000798	0.73	0.73	742.00	2522.80	16.25	1381.25
30	G4	GPNL1	GLNL3	4/0 AWG	2.5"	4	1	185	82	0.3	24.6	24.6	0.0133	0.60528	0.01489	13.55	13.55	742.00	5490.80	16.25	3006.25
31	M4	1PNL1	1LNL1	350 KCMIL	3"	4	1	138	141	0.3	42.3	42.3	0.0096	0.56039	0.023705	21.57	21.57	1100.00	6072.00	19.30	2663.40
32	G4	1PNL1	1LNL2	4/0 AWG	2.5"	4	1	82	17	0.3	5.1	5.1	0.0133	0.05562	0.000284	0.26	0.26	742.00	2433.76	16.25	1332.50
33	M4	2PNL1	2LNL1	350 KCMIL	3"	4	1	132	181	0.3	54.3	54.3	0.0096	0.68809	0.037363	34.00	34.00	1100.00	5808.00	19.30	2547.60
34	M4	2PNL1	2LNL2	350 KCMIL	3"	4	1	130	137	0.3	41.1	41.1	0.0096	0.51293	0.021081	19.18	19.18	1100.00	5720.00	19.30	2509.00
35	M4	3PNL1	4LNL1	350 KCMIL	3"	4	1	88	148	0.3	44.4	44.4	0.0096	0.37509	0.016654	15.15	15.15	1100.00	3872.00	19.30	1698.40
36	M4	3PNL1	3LNL1	350 KCMIL	3"	4	1	113	147	0.3	44.1	44.1	0.0096	0.4784	0.021097	19.20	19.20	1100.00	4972.00	19.30	2180.90
37	J4	3PNL1	3LNL2	4/0 AWG	2.5"	4	1	163	85	0.3	25.5	25.5	0.0133	0.55281	0.014097	12.83	12.83	742.00	4837.84	16.25	2648.75
38	C3	3PNL1	3LIL2	2 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0342	0.69932	0.006713	6.11	6.11	262.00	1674.18	5.90	1256.70
39	C3	3PNL1	3LIL4	2 AWG	1.25"	3	1	213	32	0.3	9.6	9.6	0.0342	0.69932	0.006713	6.11	6.11	262.00	1674.18	5.90	1256.70
40	R4	G-SWBND01	1LNH1	300 KCMIL	2.5"	4	2	255	64	0.3	19.2	9.6	0.0106	0.25949	0.002491	2.27	4.53	980.00	19992.00	16.25	8287.50
41	R4	G-SWBND01	2LNH1	300 KCMIL	2.5"	4	2	270	83	0.3	24.9	12.45	0.0106	0.35632	0.004436	4.04	8.07	980.00	21168.00	16.25	8775.00
42	R4	G-SWBND01	3LNH1	300 KCMIL	2.5"	4	2	285	46	0.3	13.8	6.9	0.0106	0.20845	0.001438	1.31	2.62	980.00	23444.00	16.25	9262.50
43	R4	G-SWBND01	4LNH1	300 KCMIL	2.5"	4	2	300	29	0.3	8.7	4.35	0.0106	0.13833	0.000602	0.55	1.10	980.00	23520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	4/0 AWG	2.5"	4	1	185	39	0.3	11.7	11.7	0.0133	0.28788	0.003368	3.06	3.06	742.00	5490.80	16.25	3006.25
45	H4	GPNH1	EC-1	4/0 AWG	2.5"	4	1	82	65	0.3	19.5	19.5	0.0133	0.21267	0.004147	3.77	3.77	742.00	2433.76	16.25	1332.50
46	H4	GPNH1	EC-2	4/0 AWG	2.5"	4	1	85	65	0.3	19.5	19.5	0.0133	0.22045	0.004299	3.91	3.91	742.00	2522.80	16.25	1381.25
47	H4	GPNH1	EC-3	4/0 AWG	2.5"	4	1	88	65	0.3	19.5	19.5	0.0133	0.22823	0.00445	4.05	4.05	742.00	2611.84	16.25	1430.00
48	H4	EC-1	ELEV-1	4/0 AWG	2.5"	4	1	80	65	0.3	19.5	19.5	0.0133	0.20748	0.004046	3.68	3.68	742.00	2374.40	16.25	1300.00
49	H4	EC-2	ELEV-2	4/0 AWG	2.5"	4	1	80	65	0.3	19.5	19.5	0.0133	0.20748	0.004046	3.68	3.68	742.00	2374.40	16.25	1300.00
50	H4	EC-3	ELEV-3	4/0 AWG	2.5"	4	1	80	65	0.3	19.5	19.5	0.0133	0.20748	0.004046	3.68	3.68	742.00	2374.40	16.25	1300.00
51	B4	4PGH1	3-T03	3 AWG	1.25"	4	1	30	38	0.3	11.4	11.4	0.0432	0.14774	0.001684	1.53	1.53	239.00	286.80	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	3	104	353	0.3	105.9	35.3	0.00907	0.33298	0.011754	10.69	32.08	1225.00	15288.00	19.30	6021.60
53	P4	4PGH1	PPGH2	4/0 AWG	2.5"	4	2	104	206	0.3	61.8	30.9	0.0133	0.42741	0.013207	12.02	24.03	742.00	6173.44	16.25	3380.00
54	D4	3-T03	3LGL1	1 AWG	1.25"	4	1	5	38	0.3	11.4	11.4	0.0279	0.0159	0.000181	0.16	0.16	340.00	68.00	5.90	29.50
55	R3	GPCH1	3-T02	300 KCMIL	2.5"	3	2	282	407	0.3	122.1	61.05	0.0106	1.82491	0.111411	101.37	202.74	980.00	16581.60	16.25	9165.00
56	P3	GPCH1	2-T01	4/0 AWG	2.5"	3	2	269	335	0.3	100.5	50.25	0.0133	1.79779	0.090339	82.20	164.40	742.00	11975.88	16.25	8742.50
57	J3	GPCH1	4-T01	4/0 AWG	2.5"	3	1	295	145	0.3	43.5	43.5	0.0133	1.70672	0.074242	67.55	67.55	742.00	6566.70	16.25	4793.75
58	P3	GPCH1	1-T01	4/0 AWG	2.5"	3	2	269	272	0.3	81.6	40.8	0.0133	1.4597	0.059556	54.19	108.38	742.00	11975.88	16.25	8742.50
59	M4	GPCH1	GLCH1	350 KCMIL	3"	4	1	261	9	0.3	2.7	2.7	0.0096	0.06765	0.000183	0.17	0.17	1100.00	11484.00	19.30	5037.30
60	M4	GPCH1	1LCH1	350 KCMIL	3"	4	1	284	10	0.3	3	3	0.0096	0.08179	0.000245	0.22	0.22	1100.00	12496.00	19.30	5481.20
61	M4	GPCH1	2LCH1	350 KCMIL	3"	4	1	307	13	0.3	3.9	3.9	0.0096	0.11494	0.000448	0.41	0.41	1100.00	13508.00	19.30	5925.10
62	M4	GPCH1	3LCH1	350 KCMIL	3"	4	1	330	34	0.3	10.2	10.2	0.0096	0.32314	0.003296	3.00	3.00	1100.00	14520.00	19.30	6369.00
63	M4	GPCH1	4LCH1	350 KCMIL	3"	4	1	353	20	0.3	6	6	0.0096	0.20333	0.00122	1.11	1.11	1100.00	15532.00	19.30	6812.90
64	M4	3PCL1	3LCL1	350 KCMIL	3"	4	1	104	143	0.3	42.9	42.9	0.0096	0.42831	0.018375	16.72					

COST ANALYSIS AT 30% DESIGN LOAD - EXISTING WIRE SIZE

TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	250 KCMIL	-	4	2	11	124	0.5	62	31	0.012	0.04092	0.001269	1.15	2.31	855.00	752.40	-	-
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	5	192	1255	0.5	627.5	125.5	0.00907	2.18551	0.274281	249.57	1247.83	1225.00	47040.00	19.30	18528.00
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	4	480	756	0.5	378	94.5	0.008	3.6288	0.342922	312.02	1248.09	1475.00	113280.00	25.50	48960.00
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	2	440	336	0.5	168	84	0.008	2.9568	0.248371	225.99	451.98	1475.00	51920.00	25.50	22440.00
5	N4	G-SWBND01	G-ATSS01	250 KCMIL	2.5"	4	1	5	75	0.5	37.5	37.5	0.012	0.0225	0.000844	0.77	0.77	855.00	171.00	16.25	81.25
6	V4	G-SWBND01	G-ATSG01	300 KCMIL	2.5"	4	3	60	568	0.5	284	94.66667	0.0106	0.60208	0.056997	51.86	155.58	980.00	7056.00	16.25	2925.00
7	V4	G-SWBND01	G-ATSG02	300 KCMIL	2.5"	4	3	55	538	0.5	269	89.66667	0.0106	0.52276	0.046874	42.65	127.95	980.00	6468.00	16.25	2681.25
8	V4	G-SWBND01	G-ATSC01	300 KCMIL	2.5"	4	3	5	578	0.5	289	96.33333	0.0106	0.05106	0.004918	4.48	13.43	980.00	588.00	16.25	243.75
9	R4	G-SWBND01	GPNH1	3/0 AWG	2"	4	2	235	215	0.5	107.5	53.75	0.0158	1.99574	0.107271	97.60	195.21	615.00	11562.00	8.80	4136.00
10	R4	G-SWBND01	GLNH1	3/0 AWG	2"	4	2	239	49	0.5	24.5	12.25	0.0158	0.46258	0.005667	5.16	10.31	615.00	11758.80	8.80	4206.40
11	T3	G-SWBND01	G-T02	350 KCMIL	3"	3	2	244	641	0.5	320.5	160.25	0.0096	3.7537	0.60153	547.33	1094.65	1100.00	16104.00	19.30	9418.40
12	R4	G-SWBND01	3PNL1	3/0 AWG	2"	4	2	244	399	0.5	199.5	99.75	0.0158	3.84556	0.383595	349.03	698.06	615.00	12004.80	8.80	4294.40
13	P4	G-SWBND01	PPNH1	350 KCMIL	3"	4	1	400	157	0.5	78.5	78.5	0.0096	3.0144	0.23663	215.31	215.31	1100.00	17600.00	19.30	7720.00
14	M4	G-SWBND01	1PNH2	4/0 AWG	2.5"	4	1	45	54	0.5	27	27	0.0133	0.1616	0.004363	3.97	3.97	742.00	1335.60	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	2/0 AWG	-	4	1	527	124	0.5	62	62	0.019	6.20806	0.3849	350.22	350.22	506.00	10666.48	-	-
22	N4	G-ATSS01	GPSH1	250 KCMIL	2.5"	4	1	10	75	0.5	37.5	37.5	0.012	0.045	0.001688	1.54	1.54	855.00	342.00	16.25	162.50
23	V4	G-ATSG01	GPGH1	300 KCMIL	2.5"	4	3	270	568	0.5	284	94.66667	0.0106	2.70936	0.256486	233.37	700.12	980.00	31752.00	16.25	13162.50
24	V4	G-ATSG02	4PGH1	300 KCMIL	2.5"	4	3	330	538	0.5	269	89.66667	0.0106	3.13654	0.281243	255.90	767.70	980.00	38808.00	16.25	16087.50
25	V4	G-ATSC01	GPCH1	300 KCMIL	2.5"	4	3	10	578	0.5	289	96.33333	0.0106	0.10211	0.009837	8.95	26.85	980.00	1176.00	16.25	487.50
26	R4	GPNL1	1PNL1	3/0 AWG	2"	4	2	40	151	0.5	75.5	37.75	0.0158	0.23858	0.009006	8.19	16.39	615.00	1968.00	8.80	704.00
27	R4	GPNL1	2PNL1	3/0 AWG	2"	4	2	53	304	0.5	152	76	0.0158	0.63642	0.048368	44.01	88.02	615.00	2607.60	8.80	932.80
28	J4	GPNL1	GLNL1	1/0 AWG	1.5"	4	1	183	111	0.5	55.5	55.5	0.0229	2.32584	0.129084	117.45	117.45	420.00	3074.40	7.15	1308.45
29	G4	GPNL1	GLNL2	1/0 AWG	1.5"	4	1	85	28	0.5	14	14	0.0229	0.27251	0.003815	3.47	3.47	420.00	1428.00	7.15	607.75
30	G4	GPNL1	GLNL3	1/0 AWG	1.5"	4	1	185	82	0.5	41	41	0.0229	1.73697	0.071216	64.80	64.80	420.00	3108.00	7.15	1322.75
31	M4	1PNL1	1LNL1	4/0 AWG	2.5"	4	1	138	141	0.5	70.5	70.5	0.0133	1.29396	0.091224	83.00	83.00	742.00	4095.84	16.25	2242.50
32	G4	1PNL1	1LNL2	1/0 AWG	1.5"	4	1	82	17	0.5	8.5	8.5	0.0229	0.15961	0.001357	1.23	1.23	420.00	1377.60	7.15	586.30
33	M4	2PNL1	2LNL1	4/0 AWG	2.5"	4	1	132	181	0.5	90.5	90.5	0.0133	1.58882	0.143788	130.83	130.83	742.00	3917.76	16.25	2145.00
34	M4	2PNL1	2LNL2	4/0 AWG	2.5"	4	1	130	137	0.5	68.5	68.5	0.0133	1.18437	0.081129	73.82	73.82	742.00	3858.40	16.25	2112.50
35	M4	3PNL1	4LNL1	4/0 AWG	2.5"	4	1	88	148	0.5	74	74	0.0133	0.8661	0.064091	58.32	58.32	742.00	2611.84	16.25	1430.00
36	M4	3PNL1	3LNL1	4/0 AWG	2.5"	4	1	113	147	0.5	73.5	73.5	0.0133	1.10463	0.08119	73.87	73.87	742.00	3353.84	16.25	1836.25
37	J4	3PNL1	3LNL2	1/0 AWG	1.5"	4	1	163	85	0.5	42.5	42.5	0.0229	1.5864	0.067422	61.35	61.35	420.00	2738.40	7.15	1165.45
38	C3	3PNL1	3LIL2	6 AWG	1.25"	3	1	213	32	0.5	16	16	0.0809	2.75707	0.044113	40.14	40.14	152.00	971.28	5.90	1256.70
39	C3	3PNL1	3LIL4	6 AWG	1.25"	3	1	213	32	0.5	16	16	0.0809	2.75707	0.044113	40.14	40.14	152.00	971.28	5.90	1256.70
40	R4	G-SWBND01	1LNH1	3/0 AWG	2"	4	2	255	64	0.5	32	16	0.0158	0.64464	0.010314	9.38	18.77	615.00	12546.00	8.80	4488.00
41	R4	G-SWBND01	2LNH1	3/0 AWG	2"	4	2	270	83	0.5	41.5	20.75	0.0158	0.8852	0.018368	16.71	33.43	615.00	13284.00	8.80	4752.00
42	R4	G-SWBND01	3LNH1	3/0 AWG	2"	4	2	285	46	0.5	23	11.5	0.0158	0.51785	0.005955	5.42	10.84	615.00	14022.00	8.80	5016.00
43	R4	G-SWBND01	4LNH1	3/0 AWG	2"	4	2	300	29	0.5	14.5	7.25	0.0158	0.34365	0.002491	2.27	4.53	615.00	14760.00	8.80	5280.00
44	J4	GPNH1	GPNH2	1/0 AWG	1.5"	4	1	185	39	0.5	19.5	19.5	0.0229	0.82612	0.016109	14.66	14.66	420.00	3108.00	7.15	1322.75
45	H4	GPNH1	EC-1	1/0 AWG	1.5"	4	1	82	65	0.5	32.5	32.5	0.0229	0.61029	0.019834	18.05	18.05	420.00	1377.60	7.15	586.30
46	H4	GPNH1	EC-2	1/0 AWG	1.5"	4	1	85	65	0.5	32.5	32.5	0.0229	0.63261	0.02056	18.71	18.71	420.00	1428.00	7.15	607.75
47	H4	GPNH1	EC-3	1/0 AWG	1.5"	4	1	88	65	0.5	32.5	32.5	0.0229	0.65494	0.021286	19.37	19.37	420.00	1478.40	7.15	629.20
48	H4	EC-1	ELEV-1	1/0 AWG	1.5"	4	1	80	65	0.5	32.5	32.5	0.0229	0.5954	0.019351	17.61	17.61	420.00	1344.00	7.15	572.00
49	H4	EC-2	ELEV-2	1/0 AWG	1.5"	4	1	80	65	0.5	32.5	32.5	0.0229	0.5954	0.019351	17.61	17.61	420.00	1344.00	7.15	572.00
50	H4	EC-3	ELEV-3	1/0 AWG	1.5"	4	1	80	65	0.5	32.5	32.5	0.0229	0.5954	0.019351	17.61	17.61	420.00	1344.00	7.15	572.00
51	B4	4PGH1	3-T03	8 AWG	3/4"	4	1	30	38	0.5	19	19	0.126	0.7182	0.013646	12.42	12.42	110.00	132.00	3.21	96.30
52	T4	4PGH1	PPGH1	350 KCMIL	3"	4	2	104	353	0.5	176.5	88.25	0.0096	0.88109	0.077756	70.75	141.50	1100.00	9152.00	19.30	4014.40
53	P4	4PGH1	PPGH2	350 KCMIL	3"	4	1	104	206	0.5	103	103	0.0096	1.02835	0.10592	96.38	96.38	1100.00	4576.00	19.30	2007.20
54	D4	3-T03	3LGL1	4 AWG	1.25"	4	1	5	38	0.5	19	19	0.0522	0.04959	0.000942	0.86	0.86	207.00	41.40	5.90	29.50
55	R3	GPCH1	3-T02	3/0 AWG	2"	3	2	282	407	0.5	203.5	101.75	0.0158	4.53357	0.461291	419.73	839.45	615.00	10405.80	8.80	4963.20
56	P3	GPCH1	2-T01	350 KCMIL	3"	3	1	269	335	0.5	167.5	167.5	0.0096	4.32552	0.724525	659.24	659.24	1100.00	8877.00	19.30	5191.70
57	J3	GPCH1	4-T01	1/0 AWG	1.5"	3	1	295	145	0.5	72.5	72.5	0.0229	4.89774	0.355086	323.09	323.09	420.00	3717.00	7.15	2109.25
58	P3	GPCH1	1-T01	350 KCMIL	3"	3	1	269	272	0.5	136	136	0.0096	3.51206	0.477641	434.60	434.60	1100.00	8877.00	19.30	5191.70
59	M4	GPCH1	GLCH1	4/0 AWG	2.5"	4	1	261	9	0.5	4.5	4.5	0.0133	0.15621	0.000703	0.64	0.64	742.00	7746.48	16.25	4241.25
60	M4	GPCH1	1LCH1	4/0 AWG	2.5"	4	1	284	10	0.5	5	5	0.0133	0.18886	0.000944	0.86	0.86	742.00	8429.12	16.25	4615.00
61	M4	GPCH1	2LCH1	4/0 AWG	2.5"	4	1	307	13	0.5	6.5	6.5	0.0133	0.2654	0.001725	1.57	1.57	742.00	9111.76	16.25	4988.75
62	M4	GPCH1	3LCH1	4/0 AWG	2.5"	4	1	330	34	0.5	17	17	0.0133	0.74613	0.012684	11.54	11.54	742.00	9794.40	16.25	5362.50
63	M4	GPCH1	4LCH1	4/0 AWG	2.5"	4	1	353	20	0.5	10	10	0.0133	0.46949	0.004695	4.27	4.27	742.00	10477.04	16.25	5736.25
64	M4	3PCL1	3LCL1	4/0 AWG	2.5"	4	1	104	143	0.5	71.5	71.5	0.0133	0.98899	0.070713	64.34	64.34	742.00			

COST ANALYSIS AT 30% DESIGN LOAD - 1 WIRE SIZE LARGER																					
TAG		FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	300 KCMIL	-	4	2	11	124	0.5	62	31	0.0106	0.03615	0.001121	1.02	2.04	980.00	862.40	-	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	5	192	1255	0.5	627.5	125.5	0.008	1.92768	0.241924	220.12	1100.62	1475.00	56640.00	25.50	24480.00
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	5	480	756	0.5	378	75.6	0.00907	3.29132	0.248824	226.40	1132.01	1225.00	117600.00	19.30	46320.00
4	U4	G-SWBND01	GNPH3	300 KCMIL	2.5"	4	3	440	336	0.5	168	56	0.0106	2.61184	0.146263	133.08	399.25	980.00	51744.00	16.25	21450.00
5	N4	G-SWBND01	G-ATSS01	300 KCMIL	2.5"	4	1	5	75	0.5	37.5	37.5	0.0106	0.01988	0.000745	0.68	0.68	980.00	196.00	16.25	81.25
6	V4	G-SWBND01	G-ATSG01	350 KCMIL	3"	4	3	60	568	0.5	284	94.66667	0.0096	0.54528	0.05162	46.97	140.91	1100.00	7920.00	19.30	3474.00
7	V4	G-SWBND01	G-ATSG02	350 KCMIL	3"	4	3	55	538	0.5	269	89.66667	0.0096	0.47344	0.042452	38.63	115.88	1100.00	7260.00	19.30	3184.50
8	V4	G-SWBND01	G-ATSC01	350 KCMIL	3"	4	3	5	578	0.5	289	96.33333	0.0096	0.04624	0.004454	4.05	12.16	1100.00	660.00	19.30	289.50
9	R4	G-SWBND01	GNPH1	4/0 AWG	2.5"	4	2	235	215	0.5	107.5	53.75	0.0133	1.67996	0.090298	82.16	164.32	742.00	13949.60	16.25	7637.50
10	R4	G-SWBND01	GLNH1	4/0 AWG	2.5"	4	2	239	49	0.5	24.5	12.25	0.0133	0.38939	0.00477	4.34	8.68	742.00	14187.04	16.25	7767.50
11	T3	G-SWBND01	G-T02	400 KCMIL	3"	3	2	244	641	0.5	320.5	160.25	0.00907	3.54646	0.56832	517.11	1034.22	1225.00	17934.00	19.30	9418.40
12	R4	G-SWBND01	3PNL1	4/0 AWG	2.5"	4	2	244	399	0.5	199.5	99.75	0.0133	3.23709	0.322899	293.80	587.61	742.00	14483.84	16.25	7930.00
13	P4	G-SWBND01	PPNH1	400 KCMIL	3"	4	1	400	157	0.5	78.5	78.5	0.00907	2.84798	0.223566	203.42	203.42	1225.00	19600.00	19.30	7720.00
14	M4	G-SWBND01	1PNH2	250 KCMIL	2.5"	4	1	45	54	0.5	27	27	0.012	0.1458	0.003937	3.58	3.58	855.00	1539.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	3/0 AWG	-	4	1	527	124	0.5	62	62	0.0158	5.16249	0.320075	291.23	291.23	615.00	12964.20	-	-
22	N4	G-ATSS01	GPSH1	300 KCMIL	2.5"	4	1	10	75	0.5	37.5	37.5	0.0106	0.03975	0.001491	1.36	1.36	980.00	392.00	16.25	162.50
23	V4	G-ATSG01	GPCH1	350 KCMIL	3"	4	3	270	568	0.5	284	94.66667	0.0096	2.45376	0.232289	211.36	634.07	1100.00	35640.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	350 KCMIL	3"	4	3	330	538	0.5	269	89.66667	0.0096	2.84064	0.254711	231.76	695.28	1100.00	43560.00	19.30	19107.00
25	V4	G-ATSC01	GPCH1	350 KCMIL	3"	4	3	10	578	0.5	289	96.33333	0.0096	0.09248	0.008909	8.11	24.32	1100.00	1320.00	19.30	579.00
26	R4	GNL1	1PNL1	4/0 AWG	2.5"	4	2	40	151	0.5	75.5	37.75	0.0133	0.20083	0.007581	6.90	13.80	742.00	2374.40	16.25	1300.00
27	R4	GNL1	2PNL1	4/0 AWG	2.5"	4	2	53	304	0.5	152	76	0.0133	0.53572	0.040715	37.05	74.09	742.00	3146.08	16.25	1722.50
28	J4	GNL1	GLNL1	2/0 AWG	2"	4	1	183	111	0.5	55.5	55.5	0.019	1.92974	0.1071	97.45	97.45	506.00	3703.92	8.80	1610.40
29	G4	GNL1	GLNL2	2/0 AWG	2"	4	1	85	28	0.5	14	14	0.019	0.2261	0.003165	2.88	2.88	506.00	1720.40	8.80	748.00
30	G4	GNL1	GLNL3	2/0 AWG	2"	4	1	185	82	0.5	41	41	0.019	1.44115	0.059087	53.76	53.76	506.00	3744.40	8.80	1628.00
31	M4	1PNL1	1LNL1	250 KCMIL	2.5"	4	1	138	141	0.5	70.5	70.5	0.012	1.16748	0.082307	74.89	74.89	855.00	4719.60	16.25	2242.50
32	G4	1PNL1	1LNL2	2/0 AWG	2"	4	1	82	17	0.5	8.5	8.5	0.019	0.13243	0.001126	1.02	1.02	506.00	1659.68	8.80	721.60
33	M4	2PNL1	2LNL1	250 KCMIL	2.5"	4	1	132	181	0.5	90.5	90.5	0.012	1.43352	0.129734	118.04	118.04	855.00	4514.40	16.25	2145.00
34	M4	2PNL1	2LNL2	250 KCMIL	2.5"	4	1	130	137	0.5	68.5	68.5	0.012	1.0686	0.073199	66.60	66.60	855.00	4446.00	16.25	2112.50
35	M4	3PNL1	4LNL1	250 KCMIL	2.5"	4	1	88	148	0.5	74	74	0.012	0.78144	0.057827	52.62	52.62	855.00	3009.60	16.25	1430.00
36	M4	3PNL1	3LNL1	250 KCMIL	2.5"	4	1	113	147	0.5	73.5	73.5	0.012	0.99666	0.073255	66.65	66.65	855.00	3864.60	16.25	1836.25
37	J4	3PNL1	3LNL2	2/0 AWG	2"	4	1	163	85	0.5	42.5	42.5	0.019	1.31623	0.05594	50.90	50.90	506.00	3299.12	8.80	1434.40
38	C3	3PNL1	3LNL2	4 AWG	1.25"	3	1	213	32	0.5	16	16	0.0522	1.77898	0.028464	25.90	25.90	207.00	1322.73	5.90	1256.70
39	C3	3PNL1	3LNL4	4 AWG	1.25"	3	1	213	32	0.5	16	16	0.0522	1.77898	0.028464	25.90	25.90	207.00	1322.73	5.90	1256.70
40	R4	G-SWBND01	1LNH1	4/0 AWG	2.5"	4	2	255	64	0.5	32	16	0.0133	0.54264	0.008682	7.90	15.80	742.00	15136.80	16.25	8287.50
41	R4	G-SWBND01	2LNH1	4/0 AWG	2.5"	4	2	270	83	0.5	41.5	20.75	0.0133	0.74513	0.015461	14.07	28.14	742.00	16027.20	16.25	8775.00
42	R4	G-SWBND01	3LNH1	4/0 AWG	2.5"	4	2	285	46	0.5	23	11.5	0.0133	0.43591	0.005013	4.56	9.12	742.00	16917.60	16.25	9262.50
43	R4	G-SWBND01	4LNH1	4/0 AWG	2.5"	4	2	300	29	0.5	14.5	7.25	0.0133	0.28928	0.002097	1.91	3.82	742.00	17808.00	16.25	9750.00
44	J4	GNPH1	GNPH2	2/0 AWG	2"	4	1	185	39	0.5	19.5	19.5	0.019	0.68543	0.013366	12.16	12.16	506.00	3744.40	8.80	1628.00
45	H4	GNPH1	EC-1	2/0 AWG	2"	4	1	82	65	0.5	32.5	32.5	0.019	0.50635	0.016456	14.97	14.97	506.00	1659.68	8.80	721.60
46	H4	GNPH1	EC-2	2/0 AWG	2"	4	1	85	65	0.5	32.5	32.5	0.019	0.52488	0.017058	15.52	15.52	506.00	1720.40	8.80	748.00
47	H4	GNPH1	EC-3	2/0 AWG	2"	4	1	88	65	0.5	32.5	32.5	0.019	0.5434	0.017661	16.07	16.07	506.00	1781.12	8.80	774.40
48	H4	EC-1	ELEV-1	2/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.019	0.494	0.016055	14.61	14.61	506.00	1619.20	8.80	704.00
49	H4	EC-2	ELEV-2	2/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.019	0.494	0.016055	14.61	14.61	506.00	1619.20	8.80	704.00
50	H4	EC-3	ELEV-3	2/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.019	0.494	0.016055	14.61	14.61	506.00	1619.20	8.80	704.00
51	B4	4PGH1	3-T03	6 AWG	1.25"	4	1	30	38	0.5	19	19	0.0809	0.46113	0.008761	7.97	7.97	152.00	182.40	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	2	104	353	0.5	176.5	88.25	0.0133	0.83244	0.073463	66.84	133.69	1225.00	10192.00	19.30	4014.40
53	P4	4PGH1	PPGH2	400 KCMIL	3"	4	1	104	206	0.5	103	103	0.00907	0.97158	0.100073	91.06	91.06	1225.00	5096.00	19.30	2007.20
54	D4	3-T03	3LGL1	3 AWG	1.25"	4	1	5	38	0.5	19	19	0.0432	0.04104	0.00078	0.71	0.71	239.00	47.80	5.90	29.50
55	R3	GPCH1	3-T02	4/0 AWG	2.5"	3	2	282	407	0.5	203.5	101.75	0.0133	3.81624	0.388302	353.31	706.63	742.00	12554.64	16.25	9165.00
56	P3	GPCH1	2-T01	400 KCMIL	3"	3	1	269	335	0.5	167.5	167.5	0.00907	4.08672	0.684525	622.84	622.84	1225.00	9885.75	19.30	5191.70
57	J3	GPCH1	4-T01	2/0 AWG	2"	3	1	295	145	0.5	72.5	72.5	0.019	4.06363	0.294613	268.07	268.07	506.00	4478.10	8.80	2596.00
58	P3	GPCH1	1-T01	400 KCMIL	3"	3	1	269	272	0.5	136	136	0.00907	3.31817	0.451271	410.61	410.61	1225.00	9885.75	19.30	5191.70
59	M4	GPCH1	GLCH1	250 KCMIL	2.5"	4	1	261	9	0.5	4.5	4.5	0.012	0.14094	0.000634	0.58	0.58	855.00	8926.20	16.25	4241.25
60	M4	GPCH1	1LCH1	250 KCMIL	2.5"	4	1	284	10	0.5	5	5	0.012	0.1704	0.000852	0.78	0.78	855.00	9712.80	16.25	4615.00
61	M4	GPCH1	2LCH1	250 KCMIL	2.5"	4	1	307	13	0.5	6.5	6.5	0.012	0.23946	0.001556	1.42	1.42	855.00	10499.40	16.25	4988.75
62	M4	GPCH1	3LCH1	250 KCMIL	2.5"	4	1	330	34	0.5	17	17	0.012	0.6732	0.011444	10.41	10.41	855.00	11286.00	16.25	5362.50
63	M4	GPCH1	4LCH1	250 KCMIL	2.5"	4	1	353	20	0.5	10	10	0.012	0.4236	0.004236	3.85	3.85	855.00	12072.60	16.25	5736.25
64	M4	3PCL1	3LCL1	250 KCMIL	2.5"	4	1	104	143	0.5	71.5	71.5	0.012	0.89232	0.063801	58.05	58.05	855.00	3556.80	16.25	1690.00
65	M4	3PCL1	3LCL2	250 KCMIL	2.5"	4															

COST ANALYSIS AT 30% DESIGN LOAD - 2 WIRE SIZE LARGER																					
TAG		FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	350 KCMIL	-	4	2	11	124	0.5	62	31	0.0096	0.03274	0.001015	0.92	1.85	1100.00	968.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	6	192	1255	0.5	627.5	104.5833	0.00907	1.82126	0.190473	173.31	1039.86	1225.00	56448.00	19.30	22233.60
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	5	480	756	0.5	378	75.6	0.008	2.90304	0.21947	199.69	998.47	1475.00	141600.00	25.50	61200.00
4	U4	G-SWBND01	GPNH3	400 KCMIL	3"	4	3	440	336	0.5	168	56	0.00907	2.23485	0.125151	113.87	341.62	1225.00	64680.00	19.30	25476.00
5	N4	G-SWBND01	G-ATSS01	350 KCMIL	3"	4	1	5	75	0.5	37.5	37.5	0.0096	0.018	0.000675	0.61	0.61	1100.00	220.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	400 KCMIL	3"	4	3	60	568	0.5	284	94.66667	0.00907	0.51518	0.04877	44.38	133.13	1225.00	8820.00	19.30	3474.00
7	V4	G-SWBND01	G-ATSG02	400 KCMIL	3"	4	3	55	538	0.5	269	89.66667	0.00907	0.4473	0.040108	36.49	109.48	1225.00	8085.00	19.30	3184.50
8	V4	G-SWBND01	G-ATSC01	400 KCMIL	3"	4	3	5	578	0.5	289	96.33333	0.00907	0.04369	0.004209	3.83	11.49	1225.00	735.00	19.30	289.50
9	R4	G-SWBND01	GPNH1	250 KCMIL	2.5"	4	2	235	215	0.5	107.5	53.75	0.012	1.51575	0.081472	74.13	148.26	855.00	16074.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	250 KCMIL	2.5"	4	2	239	49	0.5	24.5	12.25	0.012	0.35133	0.004304	3.92	7.83	855.00	16347.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	500 KCMIL	4"	3	2	244	641	0.5	320.5	160.25	0.008	3.12808	0.501275	456.11	912.21	1475.00	21594.00	25.50	12444.00
12	R4	G-SWBND01	3PNL1	250 KCMIL	2.5"	4	2	244	399	0.5	199.5	99.75	0.012	2.92068	0.291338	265.09	530.17	855.00	16689.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	500 KCMIL	4"	4	1	400	157	0.5	78.5	78.5	0.008	2.512	0.197192	179.42	179.42	1475.00	23600.00	25.50	10200.00
14	M4	G-SWBND01	1PNH2	300 KCMIL	2.5"	4	1	45	54	0.5	27	27	0.0106	0.12879	0.003477	3.16	3.16	980.00	1764.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	4/0 AWG	-	4	1	527	124	0.5	62	62	0.0133	4.34564	0.26943	245.15	245.15	742.00	15641.36	-	-
22	N4	G-ATSS01	GPSH1	350 KCMIL	3"	4	1	10	75	0.5	37.5	37.5	0.0096	0.036	0.00135	1.23	1.23	1100.00	440.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	400 KCMIL	3"	4	3	270	568	0.5	284	94.66667	0.00907	2.31829	0.219465	199.69	599.07	1225.00	39690.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	400 KCMIL	3"	4	3	330	538	0.5	269	89.66667	0.00907	2.68381	0.240649	218.96	656.89	1225.00	48510.00	19.30	19107.00
25	V4	G-ATSC01	GPCCH1	400 KCMIL	3"	4	3	10	578	0.5	289	96.33333	0.00907	0.08737	0.008417	7.66	22.98	1225.00	1470.00	19.30	579.00
26	R4	GPNL1	1PNL1	250 KCMIL	2.5"	4	2	40	151	0.5	75.5	37.75	0.012	0.1812	0.00684	6.22	12.45	855.00	2736.00	16.25	1300.00
27	R4	GPNL1	2PNL1	250 KCMIL	2.5"	4	2	53	304	0.5	152	76	0.012	0.48336	0.036735	33.43	66.85	855.00	3625.20	16.25	1722.50
28	J4	GPNL1	GLNL1	3/0 AWG	2"	4	1	183	111	0.5	55.5	55.5	0.0158	1.60473	0.089062	81.04	81.04	615.00	4501.80	8.80	1610.40
29	G4	GPNL1	GLNL2	3/0 AWG	2"	4	1	85	28	0.5	14	14	0.0158	0.18802	0.002632	2.40	2.40	615.00	2091.00	8.80	748.00
30	G4	GPNL1	GLNL3	3/0 AWG	2"	4	1	185	82	0.5	41	41	0.0158	1.19843	0.049136	44.71	44.71	615.00	4551.00	8.80	1628.00
31	M4	1PNL1	1LNL1	300 KCMIL	2.5"	4	1	138	141	0.5	70.5	70.5	0.0106	1.03127	0.072705	66.15	66.15	980.00	5409.60	16.25	2242.50
32	G4	1PNL1	1LNL2	3/0 AWG	2"	4	1	82	17	0.5	8.5	8.5	0.0158	0.11013	0.000936	0.85	0.85	615.00	2017.20	8.80	721.60
33	M4	2PNL1	2LNL1	300 KCMIL	2.5"	4	1	132	181	0.5	90.5	90.5	0.0106	1.26628	0.114598	104.27	104.27	980.00	5174.40	16.25	2145.00
34	M4	2PNL1	2LNL2	300 KCMIL	2.5"	4	1	130	137	0.5	68.5	68.5	0.0106	0.94393	0.064659	58.83	58.83	980.00	5096.00	16.25	2112.50
35	M4	3PNL1	4LNL1	300 KCMIL	2.5"	4	1	88	148	0.5	74	74	0.0106	0.69027	0.05108	46.48	46.48	980.00	3449.60	16.25	1430.00
36	M4	3PNL1	3LNL1	300 KCMIL	2.5"	4	1	113	147	0.5	73.5	73.5	0.0106	0.88038	0.064708	58.88	58.88	980.00	4429.60	16.25	1836.25
37	J4	3PNL1	3LNL2	3/0 AWG	2"	4	1	163	85	0.5	42.5	42.5	0.0158	1.09455	0.046518	42.33	42.33	615.00	4009.80	8.80	1434.40
38	C3	3PNL1	3LJL2	3 AWG	1.25"	3	1	213	32	0.5	16	16	0.0432	1.47226	0.023556	21.43	21.43	239.00	1527.21	5.90	1256.70
39	C3	3PNL1	3LJL4	3 AWG	1.25"	3	1	213	32	0.5	16	16	0.0432	1.47226	0.023556	21.43	21.43	239.00	1527.21	5.90	1256.70
40	R4	G-SWBND01	1LNL1	250 KCMIL	2.5"	4	2	255	64	0.5	32	16	0.012	0.4896	0.007834	7.13	14.26	855.00	17442.00	16.25	8287.50
41	R4	G-SWBND01	2LNL1	250 KCMIL	2.5"	4	2	270	83	0.5	41.5	20.75	0.012	0.6723	0.01395	12.69	25.39	855.00	18468.00	16.25	8775.00
42	R4	G-SWBND01	3LNL1	250 KCMIL	2.5"	4	2	285	46	0.5	23	11.5	0.012	0.3933	0.004523	4.12	8.23	855.00	19494.00	16.25	9262.50
43	R4	G-SWBND01	4LNL1	250 KCMIL	2.5"	4	2	300	29	0.5	14.5	7.25	0.012	0.261	0.001892	1.72	3.44	855.00	20520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	3/0 AWG	2"	4	1	185	39	0.5	19.5	19.5	0.0158	0.56999	0.011115	10.11	10.11	615.00	4551.00	8.80	1628.00
45	H4	GPNH1	EC-1	3/0 AWG	2"	4	1	82	65	0.5	32.5	32.5	0.0158	0.42107	0.013685	12.45	12.45	615.00	2017.20	8.80	721.60
46	H4	GPNH1	EC-2	3/0 AWG	2"	4	1	85	65	0.5	32.5	32.5	0.0158	0.43648	0.014185	12.91	12.91	615.00	2091.00	8.80	748.00
47	H4	GPNH1	EC-3	3/0 AWG	2"	4	1	88	65	0.5	32.5	32.5	0.0158	0.45188	0.014686	13.36	13.36	615.00	2164.80	8.80	774.40
48	H4	EC-1	ELEV-1	3/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.0158	0.4108	0.013351	12.15	12.15	615.00	1968.00	8.80	704.00
49	H4	EC-2	ELEV-2	3/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.0158	0.4108	0.013351	12.15	12.15	615.00	1968.00	8.80	704.00
50	H4	EC-3	ELEV-3	3/0 AWG	2"	4	1	80	65	0.5	32.5	32.5	0.0158	0.4108	0.013351	12.15	12.15	615.00	1968.00	8.80	704.00
51	B4	4PGH1	3-T03	4 AWG	1.25"	4	1	30	38	0.5	19	19	0.0522	0.29754	0.005653	5.14	5.14	207.00	248.40	5.90	177.00
52	T4	4PGH1	PPGH1	500 KCMIL	4"	4	2	104	353	0.5	176.5	88.25	0.008	0.73424	0.064797	58.96	117.92	1475.00	12272.00	25.50	5304.00
53	P4	4PGH1	PPGH2	500 KCMIL	4"	4	1	104	206	0.5	103	103	0.008	0.85696	0.088267	80.31	80.31	1475.00	6136.00	25.50	2652.00
54	D4	3-T03	3LGL1	2 AWG	1.25"	4	1	5	38	0.5	19	19	0.0342	0.03249	0.000617	0.56	0.56	262.00	52.40	5.90	29.50
55	R3	GPCCH1	3-T02	250 KCMIL	2.5"	3	2	282	407	0.5	203.5	101.75	0.012	3.44322	0.350348	318.78	637.56	855.00	14466.60	16.25	9165.00
56	P3	GPCCH1	2-T01	500 KCMIL	4"	3	1	269	335	0.5	167.5	167.5	0.008	3.6046	0.603771	549.37	549.37	1475.00	11903.25	25.50	6859.50
57	J3	GPCCH1	4-T01	3/0 AWG	2"	3	1	295	145	0.5	72.5	72.5	0.0158	3.37923	0.244994	222.92	222.92	615.00	5442.75	8.80	2596.00
58	P3	GPCCH1	1-T01	500 KCMIL	4"	3	1	269	272	0.5	136	136	0.008	2.92672	0.398034	362.17	362.17	1475.00	11903.25	25.50	6859.50
59	M4	GPCCH1	GLCH1	300 KCMIL	2.5"	4	1	261	9	0.5	4.5	4.5	0.0106	0.1245	0.00056	0.51	0.51	980.00	10231.20	16.25	4241.25
60	M4	GPCCH1	1LCH1	300 KCMIL	2.5"	4	1	284	10	0.5	5	5	0.0106	0.15052	0.000753	0.68	0.68	980.00	11132.80	16.25	4615.00
61	M4	GPCCH1	3LCH1	300 KCMIL	2.5"	4	1	307	13	0.5	6.5	6.5	0.0106	0.21152	0.001375	1.25	1.25	980.00	12034.40	16.25	4988.75
62	M4	GPCCH1	3LCH2	300 KCMIL	2.5"	4	1	330	34	0.5	17	17	0.0106	0.59466	0.010109	9.20	9.20	980.00	12936.00	16.25	5362.50
63	M4	GPCCH1	4LCH1	300 KCMIL	2.5"	4	1	353	20	0.5	10	10	0.0106	0.37418	0.003742	3.40	3.40	980.00	13837.60	16.25	5736.25
64	M4	3PCL1	3LCL1	300 KCMIL	2.5"	4	1	104	143	0.5	71.5	71.5	0.0106	0.78822	0.056357	51.28	51.				

COST ANALYSIS AT 30% DESIGN LOAD - 3 WIRE SIZE LARGER																					
TAG		FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	400 KCMIL	-	4	2	11	124	0.5	62	31	0.00907	0.03093	0.000959	0.87	1.74	1225.00	1078.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	6	192	1255	0.5	627.5	104.5833	0.008	1.6064	0.168003	152.86	917.19	1475.00	67968.00	25.50	29376.00
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	6	480	756	0.5	378	63	0.00907	2.74277	0.172794	157.22	943.35	1225.00	141120.00	19.30	55584.00
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	3	440	336	0.5	168	56	0.008	1.9712	0.110387	100.44	301.32	1475.00	77880.00	25.50	33660.00
5	N4	G-SWBND01	G-ATSS01	400 KCMIL	3"	4	1	5	75	0.5	37.5	37.5	0.00907	0.01701	0.000638	0.58	0.58	1225.00	245.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	500 KCMIL	4"	4	3	60	568	0.5	284	94.66667	0.008	0.4544	0.043017	39.14	117.42	1475.00	10620.00	25.50	4590.00
7	V4	G-SWBND01	G-ATSG02	500 KCMIL	4"	4	3	55	538	0.5	269	89.66667	0.008	0.39453	0.035376	32.19	96.57	1475.00	9735.00	25.50	4207.50
8	V4	G-SWBND01	G-ATSC01	500 KCMIL	4"	4	3	5	578	0.5	289	96.33333	0.008	0.03853	0.003712	3.38	10.13	1475.00	885.00	25.50	382.50
9	R4	G-SWBND01	GPNH1	300 KCMIL	2.5"	4	2	235	215	0.5	107.5	53.75	0.0106	1.33891	0.071967	65.48	130.96	980.00	18424.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	300 KCMIL	2.5"	4	2	239	49	0.5	24.5	12.25	0.0106	0.31034	0.003802	3.46	6.92	980.00	18737.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	250 KCMIL	2.5"	3	3	244	641	0.5	320.5	106.8333	0.012	3.12808	0.334183	304.07	912.21	855.00	18775.80	16.25	11895.00
12	R4	G-SWBND01	3PNL1	300 KCMIL	2.5"	4	2	244	399	0.5	199.5	99.75	0.0106	2.57993	0.257348	234.16	468.32	980.00	19129.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	4/0 AWG	2.5"	4	2	400	157	0.5	78.5	39.25	0.0133	2.0881	0.081958	74.57	149.15	742.00	23744.00	16.25	13000.00
14	M4	G-SWBND01	1PNH2	400 KCMIL	3"	4	1	45	54	0.5	27	27	0.00907	0.1102	0.002975	2.71	2.71	1225.00	2205.00	19.30	868.50
15	MI-N4	G-LSIG1	G-ATSF01	250 KCMIL	-	4	1	527	124	0.5	62	62	0.012	3.92088	0.243095	221.19	221.19	855.00	18023.40	-	-
22	N4	G-ATSS01	GPSH1	400 KCMIL	3"	4	1	10	75	0.5	37.5	37.5	0.00907	0.03401	0.001275	1.16	1.16	1225.00	490.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	500 KCMIL	4"	4	3	270	568	0.5	284	94.66667	0.008	2.0448	0.193574	176.13	528.40	1475.00	47790.00	25.50	20655.00
24	V4	G-ATSG02	4PGH1	500 KCMIL	4"	4	3	330	538	0.5	269	89.66667	0.008	2.3672	0.212259	193.13	579.40	1475.00	58410.00	25.50	25245.00
25	V4	G-ATSC01	GPC1	500 KCMIL	4"	4	3	10	578	0.5	289	96.33333	0.008	0.07707	0.007424	6.76	20.27	1475.00	1770.00	25.50	765.00
26	R4	GPNL1	1PNL1	300 KCMIL	2.5"	4	2	40	151	0.5	75.5	37.75	0.0106	0.16006	0.006042	5.50	11.00	980.00	3136.00	16.25	1300.00
27	R4	GPNL1	2PNL1	300 KCMIL	2.5"	4	2	53	304	0.5	152	76	0.0106	0.42697	0.03245	29.53	59.05	980.00	4155.20	16.25	1722.50
28	J4	GPNL1	GLN1	4/0 AWG	2.5"	4	1	183	111	0.5	55.5	55.5	0.0133	1.35081	0.07497	68.21	68.21	742.00	5431.44	16.25	2973.75
29	G4	GPNL1	GLN2	4/0 AWG	2.5"	4	1	85	28	0.5	14	14	0.0133	0.15827	0.002216	2.02	2.02	742.00	2522.80	16.25	1381.25
30	G4	GPNL1	GLN3	4/0 AWG	2.5"	4	1	185	82	0.5	41	41	0.0133	1.00881	0.041361	37.63	37.63	742.00	5490.80	16.25	3006.25
31	M4	1PNL1	1LNL1	350 KCMIL	3"	4	1	138	141	0.5	70.5	70.5	0.0096	0.93398	0.065846	59.91	59.91	1100.00	6072.00	19.30	2663.40
32	G4	1PNL1	1LNL2	4/0 AWG	2.5"	4	1	82	17	0.5	8.5	8.5	0.0133	0.0927	0.000788	0.72	0.72	742.00	2433.76	16.25	1332.50
33	M4	2PNL1	2LNL1	350 KCMIL	3"	4	1	132	181	0.5	90.5	90.5	0.0096	1.14682	0.103787	94.43	94.43	1100.00	5808.00	19.30	2547.60
34	M4	2PNL1	2LNL2	350 KCMIL	3"	4	1	130	137	0.5	68.5	68.5	0.0096	0.85488	0.058559	53.28	53.28	1100.00	5720.00	19.30	2509.00
35	M4	3PNL1	4LNL1	350 KCMIL	3"	4	1	88	148	0.5	74	74	0.0096	0.62515	0.046261	42.09	42.09	1100.00	3872.00	19.30	1698.40
36	M4	3PNL1	3LNL1	350 KCMIL	3"	4	1	113	147	0.5	73.5	73.5	0.0096	0.79733	0.058604	53.32	53.32	1100.00	4972.00	19.30	2180.90
37	J4	3PNL1	3LNL2	4/0 AWG	2.5"	4	1	163	85	0.5	42.5	42.5	0.0133	0.92136	0.039158	35.63	35.63	742.00	4837.84	16.25	2648.75
38	C3	3PNL1	3LJL2	2 AWG	1.25"	3	1	213	32	0.5	16	16	0.0342	1.16554	0.018649	16.97	16.97	262.00	1674.18	5.90	1256.70
39	C3	3PNL1	3LJL4	2 AWG	1.25"	3	1	213	32	0.5	16	16	0.0342	1.16554	0.018649	16.97	16.97	262.00	1674.18	5.90	1256.70
40	R4	G-SWBND01	1LNH1	300 KCMIL	2.5"	4	2	255	64	0.5	32	16	0.0106	0.43248	0.00692	6.30	12.59	980.00	19992.00	16.25	8267.50
41	R4	G-SWBND01	2LNH1	300 KCMIL	2.5"	4	2	270	83	0.5	41.5	20.75	0.0106	0.59387	0.012323	11.21	22.42	980.00	21168.00	16.25	8775.00
42	R4	G-SWBND01	3LNH1	300 KCMIL	2.5"	4	2	285	46	0.5	23	11.5	0.0106	0.34742	0.003995	3.64	7.27	980.00	23444.00	16.25	9262.50
43	R4	G-SWBND01	4LNH1	300 KCMIL	2.5"	4	2	300	29	0.5	14.5	7.25	0.0106	0.23055	0.001671	1.52	3.04	980.00	23520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	4/0 AWG	2.5"	4	1	185	39	0.5	19.5	19.5	0.0133	0.4798	0.009356	8.51	8.51	742.00	5490.80	16.25	3006.25
45	H4	GPNH1	EC-1	4/0 AWG	2.5"	4	1	82	65	0.5	32.5	32.5	0.0133	0.35445	0.011519	10.48	10.48	742.00	2433.76	16.25	1332.50
46	H4	GPNH1	EC-2	4/0 AWG	2.5"	4	1	85	65	0.5	32.5	32.5	0.0133	0.36741	0.011941	10.86	10.86	742.00	2522.80	16.25	1381.25
47	H4	GPNH1	EC-3	4/0 AWG	2.5"	4	1	88	65	0.5	32.5	32.5	0.0133	0.38038	0.012362	11.25	11.25	742.00	2611.84	16.25	1430.00
48	H4	EC-1	ELEV-1	4/0 AWG	2.5"	4	1	80	65	0.5	32.5	32.5	0.0133	0.3458	0.011239	10.23	10.23	742.00	2374.40	16.25	1300.00
49	H4	EC-2	ELEV-2	4/0 AWG	2.5"	4	1	80	65	0.5	32.5	32.5	0.0133	0.3458	0.011239	10.23	10.23	742.00	2374.40	16.25	1300.00
50	H4	EC-3	ELEV-3	4/0 AWG	2.5"	4	1	80	65	0.5	32.5	32.5	0.0133	0.3458	0.011239	10.23	10.23	742.00	2374.40	16.25	1300.00
51	B4	4PGH1	3-T03	3 AWG	1.25"	4	1	30	38	0.5	19	19	0.0432	0.24624	0.004679	4.26	4.26	239.00	286.80	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	3	104	353	0.5	176.5	58.83333	0.00907	0.55496	0.03265	29.71	89.12	1225.00	15288.00	19.30	6021.60
53	P4	4PGH1	PPGH2	4/0 AWG	2.5"	4	2	104	206	0.5	103	51.5	0.0133	0.71235	0.036686	33.38	66.76	742.00	6173.44	16.25	3380.00
54	D4	3-T03	3LJL1	1 AWG	1.25"	4	1	5	38	0.5	19	19	0.0279	0.02651	0.000504	0.46	0.46	340.00	68.00	5.90	29.50
55	R3	GPC1	3-T02	300 KCMIL	2.5"	3	2	282	407	0.5	203.5	101.75	0.0106	3.04151	0.309474	281.59	563.18	980.00	16581.60	16.25	9165.00
56	P3	GPC1	2-T01	4/0 AWG	2.5"	3	2	269	335	0.5	167.5	83.75	0.0133	2.99632	0.250942	228.33	456.66	742.00	11975.88	16.25	8742.50
57	J3	GPC1	4-T01	4/0 AWG	2.5"	3	1	295	145	0.5	72.5	72.5	0.0133	2.84454	0.206229	187.65	187.65	742.00	6566.70	16.25	4793.75
58	P3	GPC1	1-T01	4/0 AWG	2.5"	3	2	269	272	0.5	136</										

COST ANALYSIS AT 30% DESIGN LOAD - EXISTING WIRE SIZE																						
TAG	SL	RD	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
1	MI-V4		G-T01	G-LSIG1	250 KCMIL	-	4	2	11	124	0.7	86.8	43.4	0.012	0.05729	0.002486	2.26	4.52	855.00	752.40	-	-
2	Z4		EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	5	192	1255	0.7	878.5	175.7	0.00907	3.05971	0.537591	489.15	2445.75	1225.00	47040.00	19.30	18528.00
3	Y4		G-SWBND01	CHILLER #3	500 KCMIL	4"	4	4	480	756	0.7	529.2	132.3	0.008	5.08032	0.672126	611.56	2446.25	1475.00	113280.00	25.50	48960.00
4	U4		G-SWBND01	GPNH3	500 KCMIL	4"	4	2	440	336	0.7	235.2	117.6	0.008	4.13952	0.486808	442.94	885.89	1475.00	51920.00	25.50	22440.00
5	N4		G-SWBND01	G-ATSS01	250 KCMIL	2.5"	4	1	5	75	0.7	52.5	52.5	0.012	0.0315	0.001654	1.50	1.50	855.00	171.00	16.25	81.25
6	V4		G-SWBND01	G-ATSG01	300 KCMIL	2.5"	4	3	60	568	0.7	397.6	132.5333	0.0106	0.84291	0.111714	101.65	304.94	980.00	7056.00	16.25	2925.00
7	V4		G-SWBND01	G-ATSG02	300 KCMIL	2.5"	4	3	55	538	0.7	376.6	125.5333	0.0106	0.73186	0.091873	83.59	250.78	980.00	6468.00	16.25	2681.25
8	V4		G-SWBND01	G-ATSC01	300 KCMIL	2.5"	4	3	5	578	0.7	404.6	134.8667	0.0106	0.07148	0.00964	8.77	26.31	980.00	588.00	16.25	243.75
9	R4		G-SWBND01	GPNH1	3/0 AWG	2"	4	2	235	215	0.7	150.5	75.25	0.0158	2.79403	0.210251	191.31	382.61	615.00	11562.00	8.80	4136.00
10	R4		G-SWBND01	GLNH1	3/0 AWG	2"	4	2	239	49	0.7	34.3	17.15	0.0158	0.64762	0.011107	10.11	20.21	615.00	11758.80	8.80	4206.40
11	T3		G-SWBND01	G-T02	350 KCMIL	3"	3	2	244	641	0.7	448.7	224.35	0.0096	5.25517	1.178998	1072.76	2145.52	1100.00	16104.00	19.30	9418.40
12	R4		G-SWBND01	3PNL1	3/0 AWG	2"	4	2	244	399	0.7	279.3	139.65	0.0158	5.38379	0.751846	684.10	1368.20	615.00	12004.80	8.80	4294.40
13	P4		G-SWBND01	PPNH1	350 KCMIL	3"	4	1	400	157	0.7	109.9	109.9	0.0096	4.22016	0.463796	422.00	422.00	1100.00	17600.00	19.30	7720.00
14	M4		G-SWBND01	1PNH2	4/0 AWG	2.5"	4	1	45	54	0.7	37.8	37.8	0.0133	0.22623	0.008552	7.78	7.78	742.00	1335.60	16.25	731.25
15	MI-N4		G-LSIG1	G-ATSF01	2/0 AWG	-	4	1	527	124	0.7	86.8	86.8	0.019	8.69128	0.754403	686.43	686.43	506.00	10666.48	-	-
22	N4		G-ATSS01	GPSH1	250 KCMIL	2.5"	4	1	10	75	0.7	52.5	52.5	0.012	0.063	0.003308	3.01	3.01	855.00	342.00	16.25	162.50
23	V4		G-ATSG01	GPGH1	300 KCMIL	2.5"	4	3	270	568	0.7	397.6	132.5333	0.0106	3.7931	0.502713	457.41	1372.24	980.00	31752.00	16.25	13162.50
24	V4		G-ATSG02	4PGH1	300 KCMIL	2.5"	4	3	330	538	0.7	376.6	125.5333	0.0106	4.39116	0.551236	501.57	1504.70	980.00	38808.00	16.25	16087.50
25	V4		G-ATSC01	GPC1	300 KCMIL	2.5"	4	3	10	578	0.7	404.6	134.8667	0.0106	0.14296	0.01928	17.54	52.63	980.00	1176.00	16.25	487.50
26	R4		GPNL1	1PNL1	3/0 AWG	2"	4	2	40	151	0.7	105.7	52.85	0.0158	0.33401	0.017653	16.06	32.12	615.00	1968.00	8.80	704.00
27	R4		GPNL1	2PNL1	3/0 AWG	2"	4	2	53	304	0.7	212.8	106.4	0.0158	0.89099	0.094802	86.26	172.52	615.00	2607.60	8.80	932.80
28	J4		GPNL1	GLN1	1/0 AWG	1.5"	4	1	183	111	0.7	77.7	77.7	0.0229	3.25617	0.253005	230.21	230.21	420.00	3074.40	7.15	1308.45
29	G4		GPNL1	GLN2	1/0 AWG	1.5"	4	1	85	28	0.7	19.6	19.6	0.0229	0.38151	0.007478	6.80	6.80	420.00	1428.00	7.15	607.75
30	G4		GPNL1	GLN3	1/0 AWG	1.5"	4	1	185	82	0.7	57.4	57.4	0.0229	2.43175	0.139583	127.01	127.01	420.00	3108.00	7.15	1322.75
31	M4		1PNL1	1LNL1	4/0 AWG	2.5"	4	1	138	141	0.7	98.7	98.7	0.0133	1.81154	0.178799	162.69	162.69	742.00	4095.84	16.25	2242.50
32	G4		1PNL1	1LNL2	1/0 AWG	1.5"	4	1	82	17	0.7	11.9	11.9	0.0229	0.22346	0.002659	2.42	2.42	420.00	1377.60	7.15	586.30
33	M4		2PNL1	2LNL1	4/0 AWG	2.5"	4	1	132	181	0.7	126.7	126.7	0.0133	2.22435	0.281825	256.43	256.43	742.00	3917.76	16.25	2145.00
34	M4		2PNL1	2LNL2	4/0 AWG	2.5"	4	1	130	137	0.7	95.9	95.9	0.0133	1.65811	0.159013	144.68	144.68	742.00	3858.40	16.25	2112.50
35	M4		3PNL1	4LNL1	4/0 AWG	2.5"	4	1	88	148	0.7	103.6	103.6	0.0133	1.21253	0.125619	114.30	114.30	742.00	2611.84	16.25	1430.00
36	M4		3PNL1	3LNL1	4/0 AWG	2.5"	4	1	113	147	0.7	102.9	102.9	0.0133	1.54648	0.159133	144.79	144.79	742.00	3353.84	16.25	1836.25
37	J4		3PNL1	3LNL2	1/0 AWG	1.5"	4	1	163	85	0.7	59.5	59.5	0.0229	2.22096	0.132147	120.24	120.24	420.00	2738.40	7.15	1165.45
38	C3		3PNL1	3LJL2	6 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0809	3.8599	0.086462	78.67	78.67	152.00	971.28	5.90	1256.70
39	C3		3PNL1	3LJL4	6 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0809	3.8599	0.086462	78.67	78.67	152.00	971.28	5.90	1256.70
40	R4		G-SWBND01	1LNH1	3/0 AWG	2"	4	2	255	64	0.7	44.8	22.4	0.0158	0.9025	0.020216	18.39	36.79	615.00	12546.00	8.80	4488.00
41	R4		G-SWBND01	2LNH1	3/0 AWG	2"	4	2	270	83	0.7	58.1	29.05	0.0158	1.23927	0.036001	32.76	65.51	615.00	13284.00	8.80	4752.00
42	R4		G-SWBND01	3LNH1	3/0 AWG	2"	4	2	285	46	0.7	32.2	16.1	0.0158	0.72498	0.011672	10.62	21.24	615.00	14022.00	8.80	5016.00
43	R4		G-SWBND01	4LNH1	3/0 AWG	2"	4	2	300	29	0.7	20.3	10.15	0.0158	0.48111	0.004883	4.44	8.89	615.00	14760.00	8.80	5280.00
44	J4		GPNH1	GPNH2	1/0 AWG	1.5"	4	1	185	39	0.7	27.3	27.3	0.0229	1.15656	0.031574	28.73	28.73	420.00	3108.00	7.15	1322.75
45	H4		GPNH1	EC-1	1/0 AWG	1.5"	4	1	82	65	0.7	45.5	45.5	0.0229	0.8544	0.038875	35.37	35.37	420.00	1377.60	7.15	586.30
46	H4		GPNH1	EC-2	1/0 AWG	1.5"	4	1	85	65	0.7	45.5	45.5	0.0229	0.88566	0.040297	36.67	36.67	420.00	1428.00	7.15	607.75
47	H4		GPNH1	EC-3	1/0 AWG	1.5"	4	1	88	65	0.7	45.5	45.5	0.0229	0.91692	0.04172	37.96	37.96	420.00	1478.40	7.15	629.20
48	H4		EC-1	ELEV-1	1/0 AWG	1.5"	4	1	80	65	0.7	45.5	45.5	0.0229	0.83356	0.037927	34.51	34.51	420.00	1344.00	7.15	572.00
49	H4		EC-2	ELEV-2	1/0 AWG	1.5"	4	1	80	65	0.7	45.5	45.5	0.0229	0.83356	0.037927	34.51	34.51	420.00	1344.00	7.15	572.00
50	H4		EC-3	ELEV-3	1/0 AWG	1.5"	4	1	80	65	0.7	45.5	45.5	0.0229	0.83356	0.037927	34.51	34.51	420.00	1344.00	7.15	572.00
51	B4		4PGH1	3-T03	8 AWG	3/4"	4	1	30	38	0.7	26.6	26.6	0.126	1.00548	0.026746	24.34	24.34	110.00	132.00	3.21	96.30
52	T4		4PGH1	PPGH1	350 KCMIL	3"	4	2	104	353	0.7	247.1	123.55	0.0096	1.23352	0.152402	138.67	277.34	1100.00	9152.00	19.30	4014.40
53	P4		4PGH1	PPGH2	350 KCMIL	3"	4	1	104	206	0.7	144.2	144.2	0.0096	1.43969	0.207604	188.90	188.90	1100.00	4576.00	19.30	2007.20
54	D4		3-T03	3LGL1	4 AWG	1.25"	4	1	5	38	0.7	26.6	26.6	0.0522	0.06943	0.001847	1.68	1.68	207.00	41.40	5.90	29.50
55	R3		GPCH1	3-T02	3/0 AWG	2"	3	2	282	407	0.7	284.9	142.45	0.0158	6.347	0.90413	822.66	1645.32	615.00	10405.80	8.80	4963.20
56	P3		GPCH1	2-T01	350 KCMIL	3"	3	1	269	335	0.7	234.5	234.5	0.0096	6.05573	1.420068	1292.11	1292.11	1100.00	8877.00	19.30	5191.70
57	J3		GPCH1	4-T01	1/0 AWG	1.5																

COST ANALYSIS AT 30% DESIGN LOAD - 1 WIRE SIZE LARGER																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	300 KCMIL	-	4	2	11	124	0.7	86.8	43.4	0.0106	0.0506	0.002196	2.00	4.00	980.00	862.40	-	
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	5	192	1255	0.7	878.5	175.7	0.008	2.69875	0.474171	431.44	2157.22	1475.00	56640.00	25.50	24480.00
3	Y4	G-SWBNDN01	CHILLER #3	400 KCMIL	3"	4	5	480	756	0.7	529.2	105.84	0.00907	4.60785	0.487695	443.75	2218.75	1225.00	117600.00	19.30	46320.00
4	U4	G-SWBNDN01	GPNH3	300 KCMIL	2.5"	4	3	440	336	0.7	235.2	78.4	0.0106	3.65658	0.286676	260.84	782.53	980.00	51744.00	16.25	21450.00
5	N4	G-SWBNDN01	G-ATSS01	300 KCMIL	2.5"	4	1	5	75	0.7	52.5	52.5	0.0106	0.02783	0.001461	1.33	1.33	980.00	196.00	16.25	81.25
6	V4	G-SWBNDN01	G-ATSG01	350 KCMIL	3"	4	3	60	568	0.7	397.6	132.5333	0.0096	0.76339	0.101175	92.06	276.17	1100.00	7920.00	19.30	3474.00
7	V4	G-SWBNDN01	G-ATSG02	350 KCMIL	3"	4	3	55	538	0.7	376.6	125.5333	0.0096	0.66282	0.083206	75.71	227.12	1100.00	7260.00	19.30	3184.50
8	V4	G-SWBNDN01	G-ATSC01	350 KCMIL	3"	4	3	5	578	0.7	404.6	134.8667	0.0096	0.06474	0.008731	7.94	23.83	1100.00	660.00	19.30	289.50
9	R4	G-SWBNDN01	GPNH1	4/0 AWG	2.5"	4	2	235	215	0.7	150.5	75.25	0.0133	2.35194	0.176983	161.04	322.07	742.00	13949.60	16.25	7637.50
10	R4	G-SWBNDN01	GLNH1	4/0 AWG	2.5"	4	2	239	49	0.7	34.3	17.15	0.0133	0.54515	0.009349	8.51	17.01	742.00	14187.04	16.25	7767.50
11	T3	G-SWBNDN01	G-T02	400 KCMIL	3"	3	2	244	641	0.7	448.7	224.35	0.00907	4.96504	1.113908	1013.54	2027.07	1225.00	17934.00	19.30	9418.40
12	R4	G-SWBNDN01	3PNL1	4/0 AWG	2.5"	4	2	244	399	0.7	279.3	139.65	0.0133	4.53192	0.632883	575.86	1151.71	742.00	14483.84	16.25	7930.00
13	P4	G-SWBNDN01	PPNH1	400 KCMIL	3"	4	1	400	157	0.7	109.9	109.9	0.00907	3.98717	0.43819	398.71	1225.00	19600.00	19.30	7720.00	
14	M4	G-SWBNDN01	1PNH2	250 KCMIL	2.5"	4	1	45	54	0.7	37.8	37.8	0.012	0.20412	0.007716	7.02	7.02	855.00	1539.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	3/0 AWG	-	4	1	527	124	0.7	86.8	86.8	0.0158	7.22749	0.627346	570.82	570.82	615.00	12964.20	-	-
22	N4	G-ATSS01	GPSH1	300 KCMIL	2.5"	4	1	10	75	0.7	52.5	52.5	0.0106	0.05565	0.002922	2.66	2.66	980.00	392.00	16.25	162.50
23	V4	G-ATSG01	GPGH1	350 KCMIL	3"	4	3	270	568	0.7	397.6	132.5333	0.0096	3.43526	0.455287	414.26	1242.79	1100.00	35640.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	350 KCMIL	3"	4	3	330	538	0.7	376.6	125.5333	0.0096	3.9769	0.499233	454.25	1362.75	1100.00	43560.00	19.30	19107.00
25	V4	G-ATSC01	GPCCH1	350 KCMIL	3"	4	3	10	578	0.7	404.6	134.8667	0.0096	0.12947	0.017461	15.89	47.66	1100.00	1320.00	19.30	579.00
26	R4	GPNL1	1PNL1	4/0 AWG	2.5"	4	2	40	151	0.7	105.7	52.85	0.0133	0.28116	0.014859	13.52	27.04	742.00	2374.40	16.25	1300.00
27	R4	GPNL1	2PNL1	4/0 AWG	2.5"	4	2	53	304	0.7	212.8	106.4	0.0133	0.75001	0.079801	72.61	145.22	742.00	3146.08	16.25	1722.50
28	J4	GPNL1	GLNL1	2/0 AWG	2"	4	1	183	111	0.7	77.7	77.7	0.019	2.70163	0.209917	191.00	191.00	506.00	3703.92	8.80	1610.40
29	G4	GPNL1	GLNL2	2/0 AWG	2"	4	1	85	28	0.7	19.6	19.6	0.019	0.31654	0.006204	5.65	5.65	506.00	1720.40	8.80	748.00
30	G4	GPNL1	GLNL3	2/0 AWG	2"	4	1	185	82	0.7	57.4	57.4	0.019	2.01761	0.115811	105.38	105.38	506.00	3744.40	8.80	1628.00
31	M4	1PNL1	1LNL1	250 KCMIL	2.5"	4	1	138	141	0.7	98.7	98.7	0.012	1.63447	0.161322	146.79	146.79	855.00	4719.60	16.25	2242.50
32	G4	1PNL1	1LNL2	2/0 AWG	2"	4	1	82	17	0.7	11.9	11.9	0.019	0.1854	0.002206	2.01	2.01	506.00	1659.68	8.80	721.60
33	M4	2PNL1	2LNL1	250 KCMIL	2.5"	4	1	132	181	0.7	126.7	126.7	0.012	2.00693	0.254278	231.37	231.37	855.00	4514.40	16.25	2145.00
34	M4	2PNL1	2LNL2	250 KCMIL	2.5"	4	1	130	137	0.7	95.9	95.9	0.012	1.49604	0.14347	130.54	130.54	855.00	4446.00	16.25	2112.50
35	M4	3PNL1	4LNL1	250 KCMIL	2.5"	4	1	88	148	0.7	103.6	103.6	0.012	1.09402	0.11334	103.13	103.13	855.00	3009.60	16.25	1430.00
36	M4	3PNL1	3LNL1	250 KCMIL	2.5"	4	1	113	147	0.7	102.9	102.9	0.012	1.39532	0.143579	130.64	130.64	855.00	3864.60	16.25	1836.25
37	J4	3PNL1	3LNL2	2/0 AWG	2"	4	1	163	85	0.7	59.5	59.5	0.019	1.84272	0.109642	99.76	99.76	506.00	3299.12	8.80	1434.40
38	C3	3PNL1	3LNL2	4 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0522	2.49057	0.055789	50.76	50.76	207.00	1322.73	5.90	1256.70
39	C3	3PNL1	3LNL2	4 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0522	2.49057	0.055789	50.76	50.76	207.00	1322.73	5.90	1256.70
40	R4	G-SWBNDN01	1LNH1	4/0 AWG	2.5"	4	2	255	64	0.7	44.8	22.4	0.0133	0.7597	0.017017	15.48	30.97	742.00	15136.80	16.25	8287.50
41	R4	G-SWBNDN01	2LNH1	4/0 AWG	2.5"	4	2	270	83	0.7	58.1	29.05	0.0133	1.04319	0.030305	27.57	55.15	742.00	16027.20	16.25	8775.00
42	R4	G-SWBNDN01	3LNH1	4/0 AWG	2.5"	4	2	285	46	0.7	32.2	16.1	0.0133	0.61027	0.009825	8.94	17.88	742.00	16917.60	16.25	9262.50
43	R4	G-SWBNDN01	4LNH1	4/0 AWG	2.5"	4	2	300	29	0.7	20.3	10.15	0.0133	0.40499	0.041111	3.74	7.48	742.00	17808.00	16.25	9750.00
44	J4	GPNH1	GPNH2	2/0 AWG	2"	4	1	185	39	0.7	27.3	27.3	0.019	0.9596	0.026197	23.84	23.84	506.00	3744.40	8.80	1628.00
45	H4	GPNH1	EC-1	2/0 AWG	2"	4	1	82	65	0.7	45.5	45.5	0.019	0.70889	0.032254	29.35	29.35	506.00	1659.68	8.80	721.60
46	H4	GPNH1	EC-2	2/0 AWG	2"	4	1	85	65	0.7	45.5	45.5	0.019	0.73483	0.033435	30.42	30.42	506.00	1720.40	8.80	748.00
47	H4	GPNH1	EC-3	2/0 AWG	2"	4	1	88	65	0.7	45.5	45.5	0.019	0.76076	0.034615	31.50	31.50	506.00	1781.12	8.80	774.40
48	H4	EC-1	ELEV-1	2/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.019	0.6916	0.031468	28.63	28.63	506.00	1619.20	8.80	704.00
49	H4	EC-2	ELEV-2	2/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.019	0.6916	0.031468	28.63	28.63	506.00	1619.20	8.80	704.00
50	H4	EC-3	ELEV-3	2/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.019	0.6916	0.031468	28.63	28.63	506.00	1619.20	8.80	704.00
51	B4	4PGH1	3-T03	6 AWG	1.25"	4	1	30	38	0.7	26.6	26.6	0.0809	0.64558	0.017172	15.63	15.63	152.00	182.40	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	2	104	353	0.7	247.1	123.55	0.00907	1.16542	0.143988	131.01	262.03	1225.00	10192.00	19.30	4014.40
53	P4	4PGH1	PPGH2	400 KCMIL	3"	4	1	104	206	0.7	144.2	144.2	0.00907	1.36021	0.196142	178.47	178.47	1225.00	5096.00	19.30	2007.20
54	D4	3-T03	3LGL1	3 AWG	1.25"	4	1	5	38	0.7	26.6	26.6	0.0432	0.05746	0.001528	1.39	1.39	239.00	47.80	5.90	29.50
55	R3	GPCCH1	3-T02	4/0 AWG	2.5"	3	2	282	407	0.7	284.9	142.45	0.0133	5.34273	0.761072	692.49	1384.99	742.00	12554.64	16.25	9165.00
56	P3	GPCCH1	2-T01	400 KCMIL	3"	3	1	269	335	0.7	234.5	234.5	0.00907	5.7214	1.341669	1220.77	1220.77	1225.00	9885.75	19.30	5191.70
57	J3	GPCCH1	4-T01	2/0 AWG	2"	3	1	295	145	0.7	101.5	101.5	0.019	5.68908	0.577441	525.41	525.41	506.00	4478.10	8.80	2596.00
58	P3	GPCCH1	1-T01	400 KCMIL	3"	3	1	269	272	0.7	190.4	190.4	0.00907	4.64544	0.884491	804.79	804.79	1225.00	9885.75	19.30	5191.70
59	M4	GPCCH1	GLCH1	250 KCMIL	2.5"	4	1	261	9	0.7	6.3	6.3	0.012	0.19732	0.001243	1.13	1.13	855.00	8926.20	16.25	4241.25
60	M4	GPCCH1	1LCH1	250 KCMIL	2.5"	4	1	284	10	0.7	7	7	0.012	0.23856	0.00167	1.52	1.52	855.00	9712.80	16.25	4615.00
61	M4	GPCCH1	2LCH1	250 KCMIL	2.5"	4	1	307	13	0.7	9.1	9.1	0.012	0.33524	0.003051	2.78	2.78	855.00	10499.40	16.25	4988.75
62	M4	GPCCH1	3LCH1	250 KCMIL	2.5"	4	1	330	34	0.7	23.8	23.8	0.012	0.94248	0.022431	20.41	20.41	855.00	11286.00	16.25	5362.50
63	M4	GPCCH1	4LCH1	250 KCMIL	2.5"	4	1	353	20	0.7	14	14	0.012	0.59304	0.008303	7.55	7.55	855.00	12072.60	16.25	5736.25
64	M4	3PCL1	3LCL1	250 KCMIL	2.5"	4	1	104</													

COST ANALYSIS AT 30% DESIGN LOAD - 2 WIRE SIZE LARGER																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	350 KCMIL	-	4	2	11	124	0.7	86.8	43.4	0.0096	0.04583	0.001989	1.81	3.62	1100.00	968.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	6	192	1255	0.7	878.5	146.4167	0.00907	2.54976	0.373327	339.69	2038.13	1225.00	56448.00	19.30	22233.60
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	5	480	756	0.7	529.2	105.84	0.008	4.06426	0.430161	391.40	1957.00	1475.00	141600.00	25.50	61200.00
4	U4	G-SWBND01	GPNH3	400 KCMIL	3"	4	3	440	336	0.7	235.2	78.4	0.00907	3.12879	0.245297	223.19	669.58	1225.00	64680.00	19.30	25476.00
5	N4	G-SWBND01	G-ATSS01	350 KCMIL	3"	4	1	5	75	0.7	52.5	52.5	0.0096	0.0252	0.001323	1.20	1.20	1100.00	220.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	400 KCMIL	3"	4	3	60	568	0.7	397.6	132.5333	0.00907	0.72125	0.095589	86.98	260.93	1225.00	8820.00	19.30	3474.00
7	V4	G-SWBND01	G-ATSG02	400 KCMIL	3"	4	3	55	538	0.7	376.6	125.5333	0.00907	0.62622	0.078612	71.53	214.59	1225.00	8085.00	19.30	3184.50
8	V4	G-SWBND01	G-ATSC01	400 KCMIL	3"	4	3	5	578	0.7	404.6	134.8667	0.00907	0.06116	0.008249	7.51	22.52	1225.00	735.00	19.30	289.50
9	R4	G-SWBND01	GPNH1	250 KCMIL	2.5"	4	2	235	215	0.7	150.5	75.25	0.012	2.12205	0.159684	145.30	290.59	855.00	16074.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	250 KCMIL	2.5"	4	2	239	49	0.7	34.3	17.15	0.012	0.49186	0.008435	7.68	15.35	855.00	16347.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	500 KCMIL	4"	3	2	244	641	0.7	448.7	224.35	0.008	4.37931	0.982499	893.97	1787.94	1475.00	21594.00	25.50	12444.00
12	R4	G-SWBND01	3PNL1	250 KCMIL	2.5"	4	2	244	399	0.7	279.3	139.65	0.012	4.08895	0.571022	519.57	1039.14	855.00	16689.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	500 KCMIL	4"	4	1	400	157	0.7	109.9	109.9	0.008	3.5168	0.386496	351.67	1475.00	23600.00	25.50	10200.00	
14	M4	G-SWBND01	1PNH2	300 KCMIL	2.5"	4	1	45	54	0.7	37.8	37.8	0.0106	0.18031	0.006816	6.20	6.20	980.00	1764.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	4/0 AWG	-	4	1	527	124	0.7	86.8	86.8	0.0133	6.0839	0.528082	480.50	480.50	742.00	15641.36	-	-
22	N4	G-ATSS01	GPSH1	350 KCMIL	3"	4	1	10	75	0.7	52.5	52.5	0.0096	0.0504	0.002646	2.41	2.41	1100.00	440.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	400 KCMIL	3"	4	3	270	568	0.7	397.6	132.5333	0.00907	3.24561	0.430151	391.39	1174.17	1225.00	39690.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	400 KCMIL	3"	4	3	330	538	0.7	376.6	125.5333	0.00907	3.75734	0.471671	429.17	1287.51	1225.00	48510.00	19.30	19107.00
25	V4	G-ATSC01	GPC1	400 KCMIL	3"	4	3	10	578	0.7	404.6	134.8667	0.00907	0.12232	0.016497	15.01	45.03	1225.00	1470.00	19.30	579.00
26	R4	GPNL1	1PNL1	250 KCMIL	2.5"	4	2	40	151	0.7	105.7	52.85	0.012	0.25368	0.013407	12.20	24.40	855.00	2736.00	16.25	1300.00
27	R4	GPNL1	2PNL1	250 KCMIL	2.5"	4	2	53	304	0.7	212.8	106.4	0.012	0.6767	0.072001	65.51	131.03	855.00	3625.20	16.25	1722.50
28	J4	GPNL1	GLN1	3/0 AWG	2"	4	1	183	111	0.7	77.7	77.7	0.0158	2.24662	0.174562	158.83	158.83	615.00	4501.80	8.80	1610.40
29	G4	GPNL1	GLN2	3/0 AWG	2"	4	1	85	28	0.7	19.6	19.6	0.0158	0.26323	0.005159	4.69	4.69	615.00	2091.00	8.80	748.00
30	G4	GPNL1	GLN3	3/0 AWG	2"	4	1	185	82	0.7	57.4	57.4	0.0158	1.6778	0.096306	87.63	87.63	615.00	4551.00	8.80	1628.00
31	M4	1PNL1	1LNL1	300 KCMIL	2.5"	4	1	138	141	0.7	98.7	98.7	0.0106	1.44378	0.142501	129.66	129.66	980.00	5409.60	16.25	2242.50
32	G4	1PNL1	1LNL2	3/0 AWG	2"	4	1	82	17	0.7	11.9	11.9	0.0158	0.15418	0.001835	1.67	1.67	615.00	2017.20	8.80	721.60
33	M4	2PNL1	2LNL1	300 KCMIL	2.5"	4	1	132	181	0.7	126.7	126.7	0.0106	1.77279	0.224612	204.37	204.37	980.00	5174.40	16.25	2145.00
34	M4	2PNL1	2LNL2	300 KCMIL	2.5"	4	1	130	137	0.7	95.9	95.9	0.0106	1.3215	0.126732	115.31	115.31	980.00	5096.00	16.25	2112.50
35	M4	3PNL1	4LNL1	300 KCMIL	2.5"	4	1	88	148	0.7	103.6	103.6	0.0106	0.96638	0.100117	91.10	91.10	980.00	3449.60	16.25	1430.00
36	M4	3PNL1	3LNL1	300 KCMIL	2.5"	4	1	113	147	0.7	102.9	102.9	0.0106	1.23254	0.126828	115.40	115.40	980.00	4429.60	16.25	1836.25
37	J4	3PNL1	3LNL2	3/0 AWG	2"	4	1	163	85	0.7	59.5	59.5	0.0158	1.53236	0.091176	82.96	82.96	615.00	4009.80	8.80	1434.40
38	C3	3PNL1	3LNL2	3 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0432	2.06116	0.04617	42.01	42.01	239.00	1527.21	5.90	1256.70
39	C3	3PNL1	3LNL1	3 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0432	2.06116	0.04617	42.01	42.01	239.00	1527.21	5.90	1256.70
40	R4	G-SWBND01	1LNH1	250 KCMIL	2.5"	4	2	255	64	0.7	44.8	22.4	0.012	0.68544	0.015354	13.97	27.94	855.00	17442.00	16.25	8287.50
41	R4	G-SWBND01	2LNH1	250 KCMIL	2.5"	4	2	270	83	0.7	58.1	29.05	0.012	0.94122	0.027342	24.88	49.76	855.00	18468.00	16.25	8775.00
42	R4	G-SWBND01	3LNH1	250 KCMIL	2.5"	4	2	285	46	0.7	32.2	16.1	0.012	0.55062	0.008865	8.07	16.13	855.00	19494.00	16.25	9262.50
43	R4	G-SWBND01	4LNH1	250 KCMIL	2.5"	4	2	300	29	0.7	20.3	10.15	0.012	0.3654	0.003709	3.37	6.75	855.00	20520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	3/0 AWG	2"	4	1	185	39	0.7	27.3	27.3	0.0158	0.79798	0.021785	19.82	19.82	615.00	4551.00	8.80	1628.00
45	H4	GPNH1	EC-1	3/0 AWG	2"	4	1	82	65	0.7	45.5	45.5	0.0158	0.5895	0.026822	24.41	24.41	615.00	2017.20	8.80	721.60
46	H4	GPNH1	EC-2	3/0 AWG	2"	4	1	85	65	0.7	45.5	45.5	0.0158	0.61107	0.027803	25.30	25.30	615.00	2091.00	8.80	748.00
47	H4	GPNH1	EC-3	3/0 AWG	2"	4	1	88	65	0.7	45.5	45.5	0.0158	0.63263	0.028785	26.19	26.19	615.00	2164.80	8.80	774.40
48	H4	EC-1	ELEV-1	3/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.0158	0.57512	0.026168	23.81	23.81	615.00	1968.00	8.80	704.00
49	H4	EC-2	ELEV-2	3/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.0158	0.57512	0.026168	23.81	23.81	615.00	1968.00	8.80	704.00
50	H4	EC-3	ELEV-3	3/0 AWG	2"	4	1	80	65	0.7	45.5	45.5	0.0158	0.57512	0.026168	23.81	23.81	615.00	1968.00	8.80	704.00
51	B4	4PGH1	3-T03	4 AWG	1.25"	4	1	30	38	0.7	26.6	26.6	0.0522	0.41656	0.01108	10.08	10.08	207.00	248.40	5.90	177.00
52	T4	4PGH1	PPGH1	500 KCMIL	4"	4	2	104	353	0.7	247.1	123.55	0.008	1.02794	0.127001	115.56	231.12	1475.00	12272.00	25.50	5304.00
53	P4	4PGH1	PPGH2	500 KCMIL	4"	4	1	104	206	0.7	144.2	144.2	0.008	1.19974	0.173003	157.41	157.41	1475.00	6136.00	25.50	2652.00
54	D4	3-T03	3LCL1	2 AWG	1.25"	4	1	5	38	0.7	26.6	26.6	0.0342	0.04549	0.00121	1.10	1.10	262.00	52.40	5.90	29.50
55	R3	GPNH1	3-T02	250 KCMIL	2.5"	3	2	282	407	0.7	284.9	142.45	0.012	4.82051	0.686681	624.81	1249.61	855.00	14466.60	16.25	9165.00
56	P3	GPNH1	2-T01	500 KCMIL	4"	3	1	269	335	0.7	234.5	234.5	0.008	5.04644	1.18339	1076.76	1076.76	1475.00	11903.25	25.50	6859.50
57	J3	GPNH1	4-T01	3/0 AWG	2"	3	1	295	145	0.7	101.5	101.5	0.0158	4.73092	0.480188	436.92	436.92	615.00	5442.75	8.80	2596.00
58	P3	GPNH1	1-T01	500 KCMIL	4"	3	1	269													

COST ANALYSIS AT 30% DESIGN LOAD - 3 WIRE SIZE LARGER																					
TAG		FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	400 KCMIL	-	4	2	11	124	0.7	86.8	43.4	0.00907	0.0433	0.001879	1.71	3.42	1225.00	1078.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	6	192	1255	0.7	878.5	146.4167	0.008	2.24896	0.329285	299.61	1797.68	1475.00	67968.00	25.50	29376.00
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	6	480	756	0.7	529.2	88.2	0.00907	3.83988	0.338677	308.16	1848.96	1225.00	141120.00	19.30	55584.00
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	3	440	336	0.7	235.2	78.4	0.008	2.75968	0.216359	196.86	590.59	1475.00	77880.00	25.50	33660.00
5	N4	G-SWBND01	G-ATSS01	400 KCMIL	3"	4	1	5	75	0.7	52.5	52.5	0.00907	0.02381	0.00125	1.14	1.14	1225.00	245.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	500 KCMIL	4"	4	3	60	568	0.7	397.6	132.5333	0.008	0.63616	0.084312	76.72	230.15	1475.00	10620.00	25.50	4590.00
7	V4	G-SWBND01	G-ATSG02	500 KCMIL	4"	4	3	55	538	0.7	376.6	125.5333	0.008	0.55235	0.069338	63.09	189.27	1475.00	9735.00	25.50	4207.50
8	V4	G-SWBND01	G-ATSC01	500 KCMIL	4"	4	3	5	578	0.7	404.6	134.8667	0.008	0.05395	0.007276	6.62	19.86	1475.00	885.00	25.50	382.50
9	R4	G-SWBND01	GPNH1	300 KCMIL	2.5"	4	2	235	215	0.7	150.5	75.25	0.0106	1.87448	0.141054	128.34	256.69	980.00	18424.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	300 KCMIL	2.5"	4	2	239	49	0.7	34.3	17.15	0.0106	0.43448	0.007451	6.78	13.56	980.00	18737.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	250 KCMIL	2.5"	3	3	244	641	0.7	448.7	149.5667	0.012	4.37931	0.654999	595.98	1787.94	855.00	18775.80	16.25	11895.00
12	R4	G-SWBND01	3PNL1	300 KCMIL	2.5"	4	2	244	399	0.7	279.3	139.65	0.0106	3.61191	0.504403	458.95	917.90	980.00	19129.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	4/0 AWG	2.5"	4	2	400	157	0.7	109.9	54.95	0.0133	2.92334	0.160638	146.16	292.33	742.00	23744.00	16.25	13000.00
14	M4	G-SWBND01	1PNH2	400 KCMIL	3"	4	1	45	54	0.7	37.8	37.8	0.00907	0.15428	0.005832	5.31	5.31	1225.00	2205.00	19.30	868.50
15	MI-N4	G-LSIG1	G-ATSF01	250 KCMIL	-	4	1	527	124	0.7	86.8	86.8	0.012	5.48923	0.476465	433.53	433.53	855.00	18023.40	-	-
22	N4	G-ATSS01	GPSH1	400 KCMIL	3"	4	1	10	75	0.7	52.5	52.5	0.00907	0.04762	0.0025	2.27	2.27	1225.00	490.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	500 KCMIL	4"	4	3	270	568	0.7	397.6	132.5333	0.008	2.86272	0.379406	345.22	1035.66	1475.00	47790.00	25.50	20655.00
24	V4	G-ATSG02	4PGH1	500 KCMIL	4"	4	3	330	538	0.7	376.6	125.5333	0.008	3.31408	0.416028	378.54	1135.62	1475.00	58410.00	25.50	25245.00
25	V4	G-ATSC01	GPCH1	500 KCMIL	4"	4	3	10	578	0.7	404.6	134.8667	0.008	0.10789	0.014551	13.24	39.72	1475.00	1770.00	25.50	765.00
26	R4	GNL1	1PNL1	300 KCMIL	2.5"	4	2	40	151	0.7	105.7	52.85	0.0106	0.22408	0.011843	10.78	21.55	980.00	3136.00	16.25	1300.00
27	R4	GNL1	2PNL1	300 KCMIL	2.5"	4	2	53	304	0.7	212.8	106.4	0.0106	0.59776	0.063601	57.87	115.74	980.00	4155.20	16.25	1722.50
28	J4	GNL1	GLNL1	4/0 AWG	2.5"	4	1	183	111	0.7	77.7	77.7	0.0133	1.89114	0.146942	133.70	133.70	742.00	5431.44	16.25	2973.75
29	G4	GNL1	GLNL2	4/0 AWG	2.5"	4	1	85	28	0.7	19.6	19.6	0.0133	0.22158	0.004343	3.95	3.95	742.00	2522.80	16.25	1381.25
30	G4	GNL1	GLNL3	4/0 AWG	2.5"	4	1	185	82	0.7	57.4	57.4	0.0133	1.41233	0.081068	73.76	73.76	742.00	5490.80	16.25	3006.25
31	M4	1PNL1	1LNL1	350 KCMIL	3"	4	1	138	141	0.7	98.7	98.7	0.0096	1.30758	0.129058	117.43	117.43	1100.00	6072.00	19.30	2663.40
32	G4	1PNL1	1LNL2	4/0 AWG	2.5"	4	1	82	17	0.7	11.9	11.9	0.0133	0.12978	0.001544	1.41	1.41	742.00	2433.76	16.25	1332.50
33	M4	2PNL1	2LNL1	350 KCMIL	3"	4	1	132	181	0.7	126.7	126.7	0.0096	1.60554	0.203422	185.09	185.09	1100.00	5808.00	19.30	2547.60
34	M4	2PNL1	2LNL2	350 KCMIL	3"	4	1	130	137	0.7	95.9	95.9	0.0096	1.19683	0.114776	104.43	104.43	1100.00	5720.00	19.30	2509.00
35	M4	3PNL1	4LNL1	350 KCMIL	3"	4	1	88	148	0.7	103.6	103.6	0.0096	0.87521	0.090672	82.50	82.50	1100.00	3872.00	19.30	1698.40
36	M4	3PNL1	3LNL1	350 KCMIL	3"	4	1	113	147	0.7	102.9	102.9	0.0096	1.11626	0.114863	104.51	104.51	1100.00	4972.00	19.30	2180.90
37	J4	3PNL1	3LNL2	4/0 AWG	2.5"	4	1	163	85	0.7	59.5	59.5	0.0133	1.2899	0.076749	69.83	69.83	742.00	4837.84	16.25	2648.75
38	C3	3PNL1	3LJL2	2 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0342	1.63175	0.036551	33.26	33.26	262.00	1674.18	5.90	1256.70
39	C3	3PNL1	3LJL4	2 AWG	1.25"	3	1	213	32	0.7	22.4	22.4	0.0342	1.63175	0.036551	33.26	33.26	262.00	1674.18	5.90	1256.70
40	R4	G-SWBND01	1LNL1	300 KCMIL	2.5"	4	2	255	64	0.7	44.8	22.4	0.0106	0.60547	0.013563	12.34	24.68	980.00	19992.00	16.25	8287.50
41	R4	G-SWBND01	2LNL1	300 KCMIL	2.5"	4	2	270	83	0.7	58.1	29.05	0.0106	0.83141	0.024152	21.98	43.95	980.00	21168.00	16.25	8775.00
42	R4	G-SWBND01	3LNL1	300 KCMIL	2.5"	4	2	285	46	0.7	32.2	16.1	0.0106	0.48638	0.007831	7.13	14.25	980.00	23444.00	16.25	9262.50
43	R4	G-SWBND01	4LNL1	300 KCMIL	2.5"	4	2	300	29	0.7	20.3	10.15	0.0106	0.32277	0.003276	2.98	5.96	980.00	23520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	4/0 AWG	2.5"	4	1	185	39	0.7	27.3	27.3	0.0133	0.67172	0.018338	16.69	16.69	742.00	5490.80	16.25	3006.25
45	H4	GPNH1	EC-1	4/0 AWG	2.5"	4	1	82	65	0.7	45.5	45.5	0.0133	0.49622	0.022578	20.54	20.54	742.00	2433.76	16.25	1332.50
46	H4	GPNH1	EC-2	4/0 AWG	2.5"	4	1	85	65	0.7	45.5	45.5	0.0133	0.51438	0.023404	21.30	21.30	742.00	2522.80	16.25	1381.25
47	H4	GPNH1	EC-3	4/0 AWG	2.5"	4	1	88	65	0.7	45.5	45.5	0.0133	0.53253	0.02423	22.05	22.05	742.00	2611.84	16.25	1430.00
48	H4	EC-1	ELEV-1	4/0 AWG	2.5"	4	1	80	65	0.7	45.5	45.5	0.0133	0.48412	0.022027	20.04	20.04	742.00	2374.40	16.25	1300.00
49	H4	EC-2	ELEV-2	4/0 AWG	2.5"	4	1	80	65	0.7	45.5	45.5	0.0133	0.48412	0.022027	20.04	20.04	742.00	2374.40	16.25	1300.00
50	H4	EC-3	ELEV-3	4/0 AWG	2.5"	4	1	80	65	0.7	45.5	45.5	0.0133	0.48412	0.022027	20.04	20.04	742.00	2374.40	16.25	1300.00
51	B4	4PGH1	3-T03	3 AWG	1.25"	4	1	30	38	0.7	26.6	26.6	0.0432	0.34474	0.00917	8.34	8.34	239.00	286.80	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	3	104	353	0.7	247.1	82.36667	0.00907	0.77695	0.063995	58.23	174.68	1225.00	15288.00	19.30	6021.60
53	P4	4PGH1	PPGH2	4/0 AWG	2.5"	4	2	104	206	0.7	144.2	72.1	0.0133	0.99729	0.071904	65.43	130.85	742.00	6173.44	16.25	3380.00
54	D4	3-T03	3LGL1	1 AWG	1.25"	4	1	5	38	0.7	26.6	26.6	0.0279	0.03711	0.000987	0.90	0.90	340.00	68.00	5.90	29.50
55	R3	GPCH1	3-T02	300 KCMIL	2.5"	3	2	282	407	0.7	284.9	142.45	0.0106	4.25812	0.605569	551.91	1103.82	980.00	16581.60	16.25	9165.00
56	P3	GPCH1	2-T01	4/0 AWG	2.5"	3	2	269	335	0.7	234.5	117.25	0.0133	4.19485	0.491847	447.53	895.05	742.00	11975.88	16.25	8742.50
57	J3	GPCH1	4-T01	4/0 AWG	2.5"	3	1	295	145	0.7	101.5	101.5	0.0133	3.98235	0.404209	367.79	367.79	742.00	6566.70	16.25	4793.75
58	P3	GPCH1	1-T01	4/0 AWG	2.5"	3	2	269	272	0.7	190.4	95.2	0.0133	3.40597	0.324248	295.03	590.06	742.00	11975.88	16.25	8742.50
59	M4	GPCH1	GLCH1	350 KCMIL	3"	4	1	261	9	0.7	6.3	6.3	0.0096	0.15785	0.000994	0.90	0.90	1100.00	11484.00	19.30	5037.30
60	M4	GPCH1	1LCH1	350 KCMIL	3"	4	1	284	10	0.7	7	7	0.0096	0.19085	0.001336	1.22	1.22	1100.00	12496.00	19.30	5481.20
61	M4	GPCH1	2LCH1	350 KCMIL	3"	4	1	307	13	0.7	9.1	9.1	0.0096	0.2682	0.002441	2.22	2.22	1100.00	13508.00	19.30	5925.10
62	M4	GPCH1	3LCH1	350 KCMIL	3"	4	1	330	34	0.7	23.8	23.8	0.0096	0.75398	0.017945	16.33	16.33	1100.00	14520.00	19.30	6369.00
63	M4	GPCH1	4LCH1	350 KCMIL	3"	4	1	353	20	0.7	14	14	0.0096	0.47443	0.006642	6.04	6.04	1100.00	15532.00	19.30	6812.90
64	M4	3PCL1	3LCL1	350 KCMIL	3"	4															

COST ANALYSIS AT 30% DESIGN LOAD - EXISTING WIRE SIZE																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	250 KCMIL	-	4	2	11	124	0.9	111.6	55.8	0.012	0.07366	0.00411	3.74	7.48	855.00	752.40	-	
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	5	192	1255	0.9	1129.5	225.9	0.00907	3.93391	0.888671	808.59	4042.97	1225.00	47040.00	19.30	18528.00
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	4	480	756	0.9	680.4	170.1	0.008	6.53184	1.111066	1010.95	1475.00	113280.00	25.50	48960.00	
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	2	440	336	0.9	302.4	151.2	0.008	5.32224	0.804723	732.21	1464.42	1475.00	51920.00	25.50	22440.00
5	N4	G-SWBND01	G-ATSS01	250 KCMIL	2.5"	4	1	5	75	0.9	67.5	67.5	0.012	0.0405	0.002734	2.49	2.49	855.00	171.00	16.25	81.25
6	V4	G-SWBND01	G-ATSG01	300 KCMIL	2.5"	4	3	60	568	0.9	511.2	170.4	0.0106	1.08374	0.18467	168.03	504.09	980.00	7056.00	16.25	2925.00
7	V4	G-SWBND01	G-ATSG02	300 KCMIL	2.5"	4	3	55	538	0.9	484.2	161.4	0.0106	0.94096	0.151871	138.19	414.56	980.00	6468.00	16.25	2681.25
8	V4	G-SWBND01	G-ATSC01	300 KCMIL	2.5"	4	3	5	578	0.9	520.2	173.4	0.0106	0.0919	0.015936	14.50	43.50	980.00	588.00	16.25	243.75
9	R4	G-SWBND01	GPNH1	3/0 AWG	2"	4	2	235	215	0.9	193.5	96.75	0.0158	3.59233	0.347558	316.24	632.48	615.00	11562.00	8.80	4136.00
10	R4	G-SWBND01	GLNH1	3/0 AWG	2"	4	2	239	49	0.9	44.1	22.05	0.0158	0.83265	0.01836	16.71	33.41	615.00	11758.80	8.80	4206.40
11	T3	G-SWBND01	G-T02	350 KCMIL	3"	3	2	244	641	0.9	576.9	288.45	0.0096	6.75665	1.948957	1773.34	3546.68	1100.00	16104.00	19.30	9418.40
12	R4	G-SWBND01	3PNL1	3/0 AWG	2"	4	2	244	399	0.9	359.1	179.55	0.0158	6.92201	1.242847	1130.86	2261.71	615.00	12004.80	8.80	4294.40
13	P4	G-SWBND01	PPNH1	350 KCMIL	3"	4	1	400	157	0.9	141.3	141.3	0.0096	5.42592	0.766682	697.60	697.60	1100.00	17600.00	19.30	7720.00
14	M4	G-SWBND01	1PNH2	4/0 AWG	2.5"	4	1	45	54	0.9	48.6	48.6	0.0133	0.29087	0.014136	12.86	12.86	742.00	1335.60	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	2/0 AWG	-	4	1	527	124	0.9	111.6	111.6	0.019	11.1745	1.247075	1134.70	1134.70	506.00	10666.48	-	-
22	N4	G-ATSS01	GPSH1	250 KCMIL	2.5"	4	1	10	75	0.9	67.5	67.5	0.012	0.081	0.005468	4.97	4.97	855.00	342.00	16.25	162.50
23	V4	G-ATSG01	GPGH1	300 KCMIL	2.5"	4	3	270	568	0.9	511.2	170.4	0.0106	4.87685	0.831015	756.13	2268.40	980.00	31752.00	16.25	13162.50
24	V4	G-ATSG02	4PGH1	300 KCMIL	2.5"	4	3	330	538	0.9	484.2	161.4	0.0106	5.64577	0.911228	829.12	2487.36	980.00	38808.00	16.25	16087.50
25	V4	G-ATSC01	GPCI1	300 KCMIL	2.5"	4	3	10	578	0.9	520.2	173.4	0.0106	0.1838	0.031872	29.00	87.00	980.00	1176.00	16.25	487.50
26	R4	GPNL1	1PNL1	3/0 AWG	2"	4	2	40	151	0.9	135.9	67.95	0.0158	0.42944	0.029181	26.55	53.10	615.00	1968.00	8.80	704.00
27	R4	GPNL1	2PNL1	3/0 AWG	2"	4	2	53	304	0.9	273.6	136.8	0.0158	1.14556	0.156713	142.59	285.18	615.00	2607.60	8.80	932.80
28	J4	GPNL1	GLN1	1/0 AWG	1.5"	4	1	183	111	0.9	99.9	99.9	0.0229	4.18651	0.418232	380.55	380.55	420.00	3074.40	7.15	1308.45
29	G4	GPNL1	GLN2	1/0 AWG	1.5"	4	1	85	28	0.9	25.2	25.2	0.0229	0.49052	0.012361	11.25	11.25	420.00	1428.00	7.15	607.75
30	G4	GPNL1	GLN3	1/0 AWG	1.5"	4	1	185	82	0.9	73.8	73.8	0.0229	3.12654	0.230738	209.95	209.95	420.00	3108.00	7.15	1322.75
31	M4	1PNL1	1LNL1	4/0 AWG	2.5"	4	1	138	141	0.9	126.9	126.9	0.0133	2.32912	0.295566	268.93	268.93	742.00	4095.84	16.25	2242.50
32	G4	1PNL1	1LNL2	1/0 AWG	1.5"	4	1	82	17	0.9	15.3	15.3	0.0229	0.2873	0.004396	4.00	4.00	420.00	1377.60	7.15	586.30
33	M4	2PNL1	2LNL1	4/0 AWG	2.5"	4	1	132	181	0.9	162.9	162.9	0.0133	2.85987	0.465873	423.89	423.89	742.00	3917.76	16.25	2145.00
34	M4	2PNL1	2LNL2	4/0 AWG	2.5"	4	1	130	137	0.9	123.3	123.3	0.0133	2.13186	0.262858	239.17	239.17	742.00	3858.40	16.25	2112.50
35	M4	3PNL1	4LNL1	4/0 AWG	2.5"	4	1	88	148	0.9	133.2	133.2	0.0133	1.55897	0.207655	188.94	188.94	742.00	2611.84	16.25	1430.00
36	M4	3PNL1	3LNL1	4/0 AWG	2.5"	4	1	113	147	0.9	132.3	132.3	0.0133	1.98834	0.263057	239.35	239.35	742.00	3353.84	16.25	1836.25
37	J4	3PNL1	3LNL2	1/0 AWG	1.5"	4	1	163	85	0.9	76.5	76.5	0.0229	2.85552	0.218447	198.76	198.76	420.00	2738.40	7.15	1165.45
38	C3	3PNL1	3UL2	6 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0809	4.96273	0.142927	130.05	130.05	152.00	971.28	5.90	1256.70
39	C3	3PNL1	3UL4	6 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0809	4.96273	0.142927	130.05	130.05	152.00	971.28	5.90	1256.70
40	R4	G-SWBND01	1LNH1	3/0 AWG	2"	4	2	255	64	0.9	57.6	28.8	0.0158	1.16035	0.033418	30.41	60.81	615.00	12546.00	8.80	4488.00
41	R4	G-SWBND01	2LNH1	3/0 AWG	2"	4	2	270	83	0.9	74.7	37.35	0.0158	1.59335	0.059512	54.15	108.30	615.00	13284.00	8.80	4752.00
42	R4	G-SWBND01	3LNH1	3/0 AWG	2"	4	2	285	46	0.9	41.4	20.7	0.0158	0.93212	0.101925	17.56	35.11	615.00	14022.00	8.80	5016.00
43	R4	G-SWBND01	4LNH1	3/0 AWG	2"	4	2	300	29	0.9	26.1	13.05	0.0158	0.61857	0.008072	7.34	14.69	615.00	14760.00	8.80	5280.00
44	J4	GPNH1	GPNH2	1/0 AWG	1.5"	4	1	185	39	0.9	35.1	35.1	0.0229	1.48701	0.052194	47.49	47.49	420.00	3108.00	7.15	1322.75
45	H4	GPNH1	EC-1	1/0 AWG	1.5"	4	1	82	65	0.9	58.5	58.5	0.0229	1.09851	0.064263	58.47	58.47	420.00	1377.60	7.15	586.30
46	H4	GPNH1	EC-2	1/0 AWG	1.5"	4	1	85	65	0.9	58.5	58.5	0.0229	1.1387	0.06614	60.61	60.61	420.00	1428.00	7.15	607.75
47	H4	GPNH1	EC-3	1/0 AWG	1.5"	4	1	88	65	0.9	58.5	58.5	0.0229	1.17889	0.068965	62.75	62.75	420.00	1478.40	7.15	629.20
48	H4	EC-1	ELEV-1	1/0 AWG	1.5"	4	1	80	65	0.9	58.5	58.5	0.0229	1.07172	0.062696	57.05	57.05	420.00	1344.00	7.15	572.00
49	H4	EC-2	ELEV-2	1/0 AWG	1.5"	4	1	80	65	0.9	58.5	58.5	0.0229	1.07172	0.062696	57.05	57.05	420.00	1344.00	7.15	572.00
50	H4	EC-3	ELEV-3	1/0 AWG	1.5"	4	1	80	65	0.9	58.5	58.5	0.0229	1.07172	0.062696	57.05	57.05	420.00	1344.00	7.15	572.00
51	B4	4PGH1	3-T03	8 AWG	3/4"	4	1	30	38	0.9	34.2	34.2	0.126	1.29276	0.044212	40.23	40.23	110.00	132.00	3.21	96.30
52	T4	4PGH1	PPGH1	350 KCMIL	3"	4	2	104	353	0.9	317.7	158.85	0.0096	5.251929	0.251929	229.23	458.46	1100.00	9152.00	19.30	4014.40
53	P4	4PGH1	PPGH2	350 KCMIL	3"	4	1	104	206	0.9	185.4	185.4	0.0096	1.85103	0.343182	312.26	312.26	1100.00	4576.00	19.30	2007.20
54	D4	3-T03	3LGL1	4 AWG	1.25"	4	1	5	38	0.9	34.2	34.2	0.0522	0.08926	0.003053	2.78	2.78	207.00	41.40	5.90	29.50
55	R3	GPCI1	3-T02	3/0 AWG	2"	3	2	282	407	0.9	366.3	183.15	0.0158	8.16043	1.494583	1359.91	2719.82	615.00	10405.80	8.80	4963.20
56	P3	GPCI1	2-T01	350 KCMIL	3"	3	1	269	335	0.9	301.5	301.5	0.0096	7.78594	2.34746	2135.94	2135.94	1100.00	8877.00	19.30	5191.70
57	J3	GPCI1	4-T01	1/0 AWG	1.5"	3	1	295	145	0.9	130.5	130.5	0.0229	8.81593	1.150479	1046.81	1046.81	420.00	3717.00	7.15	2109.25
58	P3	GPCI1	1-T01	350 KCMIL	3"	3															

COST ANALYSIS AT 30% DESIGN LOAD - 1 WIRE SIZE LARGER

TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	300 KCMIL	-	4	2	11	124	0.9	111.6	55.8	0.0106	0.06506	0.003631	3.30	6.61	980.00	862.40	-	-
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	5	192	1255	0.9	1129.5	225.9	0.008	3.46982	0.783833	713.20	3566.02	1475.00	56640.00	25.50	24480.00
3	Y4	G-SWBNDN01	CHILLER #3	400 KCMIL	3"	4	5	480	756	0.9	680.4	136.08	0.00907	5.92438	0.806189	733.55	3667.73	1225.00	117600.00	19.30	46320.00
4	U4	G-SWBNDN01	GPNH3	300 KCMIL	2.5"	4	3	440	336	0.9	302.4	100.8	0.0106	4.70131	0.473892	431.19	1293.57	980.00	51744.00	16.25	21450.00
5	N4	G-SWBNDN01	G-ATSS01	300 KCMIL	2.5"	4	1	5	75	0.9	67.5	67.5	0.0106	0.03578	0.002415	2.20	2.20	980.00	196.00	16.25	81.25
6	V4	G-SWBNDN01	G-ATSG01	350 KCMIL	3"	4	3	60	568	0.9	511.2	170.4	0.0096	0.9815	0.167248	152.18	456.53	1100.00	7920.00	19.30	3474.00
7	V4	G-SWBNDN01	G-ATSG02	350 KCMIL	3"	4	3	55	538	0.9	484.2	161.4	0.0096	0.85219	0.137544	125.15	375.45	1100.00	7260.00	19.30	3184.50
8	V4	G-SWBNDN01	G-ATSC01	350 KCMIL	3"	4	3	5	578	0.9	520.2	173.4	0.0096	0.08323	0.014432	13.13	39.40	1100.00	660.00	19.30	289.50
9	R4	G-SWBNDN01	GPNH1	4/0 AWG	2.5"	4	2	235	215	0.9	193.5	96.75	0.0133	3.02392	0.292564	266.20	532.40	742.00	13949.60	16.25	7637.50
10	R4	G-SWBNDN01	GLNH1	4/0 AWG	2.5"	4	2	239	49	0.9	44.1	22.05	0.0133	0.7009	0.015455	14.06	28.12	742.00	14187.04	16.25	7767.50
11	T3	G-SWBNDN01	G-T02	400 KCMIL	3"	3	2	244	641	0.9	576.9	288.45	0.00907	6.38363	1.841358	1675.44	3350.88	1225.00	17934.00	19.30	9418.40
12	R4	G-SWBNDN01	3PNL1	4/0 AWG	2.5"	4	2	244	399	0.9	359.1	179.55	0.0133	5.82676	1.046194	951.92	1903.85	742.00	14483.84	16.25	7930.00
13	P4	G-SWBNDN01	PPNH1	400 KCMIL	3"	4	1	400	157	0.9	141.3	141.3	0.00907	5.12636	0.724355	659.09	659.09	1225.00	19600.00	19.30	7720.00
14	M4	G-SWBNDN01	1PNH2	250 KCMIL	2.5"	4	1	45	54	0.9	48.6	48.6	0.012	0.26244	0.012755	11.61	11.61	855.00	1539.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	3/0 AWG	-	4	1	527	124	0.9	111.6	111.6	0.0158	9.29249	1.037041	943.60	943.60	615.00	12964.20	-	-
22	N4	G-ATSS01	GPSH1	300 KCMIL	2.5"	4	1	10	75	0.9	67.5	67.5	0.0106	0.07155	0.00483	4.39	4.39	980.00	392.00	16.25	162.50
23	V4	G-ATSG01	GPGH1	350 KCMIL	3"	4	3	270	568	0.9	511.2	170.4	0.0096	4.41677	0.752617	684.80	2054.40	1100.00	35640.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	350 KCMIL	3"	4	3	330	538	0.9	484.2	161.4	0.0096	5.11315	0.825263	750.90	2252.70	1100.00	43560.00	19.30	19107.00
25	V4	G-ATSC01	GPNH1	350 KCMIL	3"	4	3	10	578	0.9	520.2	173.4	0.0096	0.16646	0.028865	26.26	78.79	1100.00	1320.00	19.30	579.00
26	R4	GNL1	1PNL1	4/0 AWG	2.5"	4	2	40	151	0.9	135.9	67.95	0.0133	0.36149	0.024564	22.35	44.70	742.00	2374.40	16.25	1300.00
27	R4	GNL1	2PNL1	4/0 AWG	2.5"	4	2	53	304	0.9	273.6	136.8	0.0133	0.9643	0.131917	120.03	240.06	742.00	3146.08	16.25	1722.50
28	J4	GNL1	GLNL1	2/0 AWG	2"	4	1	183	111	0.9	99.9	99.9	0.019	3.47352	0.347005	315.74	315.74	506.00	3703.92	8.80	1610.40
29	G4	GNL1	GLNL2	2/0 AWG	2"	4	1	85	28	0.9	25.2	25.2	0.019	0.40698	0.010256	9.33	9.33	506.00	1720.40	8.80	748.00
30	G4	GNL1	GLNL3	2/0 AWG	2"	4	1	185	82	0.9	73.8	73.8	0.019	2.59407	0.191442	174.19	174.19	506.00	3744.40	8.80	1628.00
31	M4	1PNL1	1LNL1	250 KCMIL	2.5"	4	1	138	141	0.9	126.9	126.9	0.012	2.10146	0.266676	242.65	242.65	855.00	4719.60	16.25	2242.50
32	G4	1PNL1	1LNL2	2/0 AWG	2"	4	1	82	17	0.9	15.3	15.3	0.019	0.23837	0.003647	3.32	3.32	506.00	1659.68	8.80	721.60
33	M4	2PNL1	2LNL1	250 KCMIL	2.5"	4	1	132	181	0.9	162.9	162.9	0.012	2.58034	0.420337	382.46	382.46	855.00	4514.40	16.25	2145.00
34	M4	2PNL1	2LNL2	250 KCMIL	2.5"	4	1	130	137	0.9	123.3	123.3	0.012	1.92348	0.237165	215.79	215.79	855.00	4446.00	16.25	2112.50
35	M4	3PNL1	4LNL1	250 KCMIL	2.5"	4	1	88	148	0.9	133.2	133.2	0.012	1.40659	0.187358	170.48	170.48	855.00	3009.60	16.25	1430.00
36	M4	3PNL1	3LNL1	250 KCMIL	2.5"	4	1	113	147	0.9	132.3	132.3	0.012	1.79399	0.237345	215.96	215.96	855.00	3864.60	16.25	1836.25
37	J4	3PNL1	3LNL2	2/0 AWG	2"	4	1	163	85	0.9	76.5	76.5	0.019	2.36921	0.181244	164.91	164.91	506.00	3299.12	8.80	1434.40
38	C3	3PNL1	3LNL2	4 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0522	3.20216	0.092222	83.91	83.91	207.00	1322.73	5.90	1256.70
39	C3	3PNL1	3LNL2	4 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0522	3.20216	0.092222	83.91	83.91	207.00	1322.73	5.90	1256.70
40	R4	G-SWBNDN01	1LNH1	4/0 AWG	2.5"	4	2	255	64	0.9	57.6	28.8	0.0133	0.97675	0.02813	25.60	51.19	742.00	15136.80	16.25	8287.50
41	R4	G-SWBNDN01	2LNH1	4/0 AWG	2.5"	4	2	270	83	0.9	74.7	37.35	0.0133	1.34124	0.050095	45.58	91.16	742.00	16027.20	16.25	8775.00
42	R4	G-SWBNDN01	3LNH1	4/0 AWG	2.5"	4	2	285	46	0.9	41.4	20.7	0.0133	0.78463	0.016242	14.78	29.56	742.00	16917.60	16.25	9262.50
43	R4	G-SWBNDN01	4LNH1	4/0 AWG	2.5"	4	2	300	29	0.9	26.1	13.05	0.0133	0.5207	0.006795	6.18	12.37	742.00	17808.00	16.25	9750.00
44	J4	GPNH1	GPNH2	2/0 AWG	2"	4	1	185	39	0.9	35.1	35.1	0.019	1.23377	0.043305	39.40	39.40	506.00	3744.40	8.80	1628.00
45	H4	GPNH1	EC-1	2/0 AWG	2"	4	1	82	65	0.9	58.5	58.5	0.019	0.91143	0.053319	48.51	48.51	506.00	1659.68	8.80	721.60
46	H4	GPNH1	EC-2	2/0 AWG	2"	4	1	85	65	0.9	58.5	58.5	0.019	0.94478	0.055269	50.29	50.29	506.00	1720.40	8.80	748.00
47	H4	GPNH1	EC-3	2/0 AWG	2"	4	1	88	65	0.9	58.5	58.5	0.019	0.97812	0.05722	52.06	52.06	506.00	1781.12	8.80	774.40
48	H4	EC-1	ELEV-1	2/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.019	0.8892	0.052018	47.33	47.33	506.00	1619.20	8.80	704.00
49	H4	EC-2	ELEV-2	2/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.019	0.8892	0.052018	47.33	47.33	506.00	1619.20	8.80	704.00
50	H4	EC-3	ELEV-3	2/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.019	0.8892	0.052018	47.33	47.33	506.00	1619.20	8.80	704.00
51	B4	4PGH1	3-T03	6 AWG	1.25"	4	1	30	38	0.9	34.2	34.2	0.0809	0.83003	0.028387	25.83	25.83	152.00	182.40	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	2	104	353	0.9	317.7	158.85	0.00907	1.4984	0.238021	216.57	433.15	1225.00	10192.00	19.30	4014.40
53	P4	4PGH1	PPGH2	400 KCMIL	3"	4	1	104	206	0.9	185.4	185.4	0.00907	1.74884	0.324235	295.02	295.02	1225.00	5096.00	19.30	2007.20
54	D4	3-T03	3LGL1	3 AWG	1.25"	4	1	5	38	0.9	34.2	34.2	0.0432	0.07387	0.002526	2.30	2.30	239.00	47.80	5.90	29.50
55	R3	GPNH1	3-T02	4/0 AWG	2.5"	3	2	282	407	0.9	366.3	183.15	0.0133	6.86922	1.258098	1144.73	2289.47	742.00	12554.64	16.25	9165.00
56	P3	GPNH1	2-T01	400 KCMIL	3"	3	1	269	335	0.9	301.5	301.5	0.00907	7.35609	2.21786	2018.01	2018.01	1225.00	9885.75	19.30	5191.70
57	J3	GPNH1	4-T01	2/0 AWG	2"	3	1	295	145	0.9	130.5	130.5	0.019	7.31453	0.954546	868.53	868.53	506.00	4478.10	8.80	2596.00
58	P3	GPNH1	1-T01	400 KCMIL	3"	3	1	269	272	0.9	244.8	244.8	0.00907	5.9727	1.462118	1330.37	1330.37	1225.00	9885.75	19.30	5191.70
59	M4	GPNH1	GLCH1	250 KCMIL	2.5"	4	1	261	9	0.9	8.1	8.1	0.012	0.25369	0.002055	1.87	1.87	855.00	8926.20	16.25	4241.25
60	M4	GPNH1	1LCH1	250 KCMIL	2.5"	4	1	284	10	0.9	9	9	0.012	0.30672	0.00276	2.51	2.51	855.00	9712.80	16.25	4615.00
61	M4	GPNH1	2LCH1	250 KCMIL	2.5"	4	1	307	13	0.9	11.7	11.7	0.012	0.43103	0.005043	4.59	4.59	855.00	10499.40	16.25	4988.75
62	M4	GPNH1	3LCH1	250 KCMIL	2.5"	4	1	330	34	0.9	30.6	30.6	0.012	1.21176	0.03708	33.74	33.74	855.00	11286.00	16.25	5362.50
63	M4	GPNH1	4LCH1	250 KCMIL	2.5"	4	1	353	20	0.9	18	18	0.012	0.76248	0.013725	12.49	12.49	855.00	12072.60	16.25	5736.25
64	M4																				

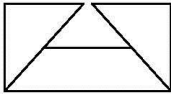
COST ANALYSIS AT 30% DESIGN LOAD - 2 WIRE SIZE LARGER																					
TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
																					SL
1	MI-V4	G-T01	G-LSIG1	350 KCMIL	-	4	2	11	124	0.9	111.6	55.8	0.0096	0.05892	0.003288	2.99	5.98	1100.00	968.00	-	-
2	Z4	EM. GEN.	G-SWBDE01	400 KCMIL	3"	4	6	192	1255	0.9	1129.5	188.25	0.00907	3.27826	0.617133	561.52	3369.15	1225.00	56448.00	19.30	22233.60
3	Y4	G-SWBND01	CHILLER #3	500 KCMIL	4"	4	5	480	756	0.9	680.4	136.08	0.008	5.22547	0.711082	647.01	3235.04	1475.00	141600.00	25.50	61200.00
4	U4	G-SWBND01	GNPH3	400 KCMIL	3"	4	3	440	336	0.9	302.4	100.8	0.00907	4.02273	0.405491	368.95	1106.86	1225.00	64680.00	19.30	25476.00
5	N4	G-SWBND01	G-ATSS01	350 KCMIL	3"	4	1	5	75	0.9	67.5	67.5	0.0096	0.0324	0.002187	1.99	1.99	1100.00	220.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	400 KCMIL	3"	4	3	60	568	0.9	511.2	170.4	0.00907	0.92732	0.158015	143.78	431.33	1225.00	8820.00	19.30	3474.00
7	V4	G-SWBND01	G-ATSG02	400 KCMIL	3"	4	3	55	538	0.9	484.2	161.4	0.00907	0.80514	0.12995	118.24	354.72	1225.00	8085.00	19.30	3184.50
8	V4	G-SWBND01	G-ATSC01	400 KCMIL	3"	4	3	5	578	0.9	520.2	173.4	0.00907	0.07864	0.013636	12.41	37.22	1225.00	735.00	19.30	289.50
9	R4	G-SWBND01	GNPH1	250 KCMIL	2.5"	4	2	235	215	0.9	193.5	96.75	0.012	2.72835	0.263968	240.18	480.36	855.00	16074.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	250 KCMIL	2.5"	4	2	239	49	0.9	44.1	22.05	0.012	0.63239	0.013944	12.69	25.38	855.00	16347.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	500 KCMIL	4"	3	2	244	641	0.9	576.9	288.45	0.008	5.63054	1.62413	1477.78	2955.57	1475.00	21594.00	25.50	12444.00
12	R4	G-SWBND01	3PNL1	250 KCMIL	2.5"	4	2	244	399	0.9	359.1	179.55	0.012	5.25722	0.943935	858.88	1717.76	855.00	16689.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	500 KCMIL	4"	4	1	400	157	0.9	141.3	141.3	0.008	4.5216	0.638902	581.33	1475.00	23600.00	25.50	10200.00	
14	M4	G-SWBND01	1PNH2	300 KCMIL	2.5"	4	1	45	54	0.9	48.6	48.6	0.0106	0.23182	0.011267	10.25	10.25	980.00	1764.00	16.25	731.25
15	MI-N4	G-LSIG1	G-ATSF01	4/0 AWG	-	4	1	527	124	0.9	111.6	111.6	0.0133	7.82216	0.872953	794.29	794.29	742.00	15641.36	-	-
22	N4	G-ATSS01	GPSH1	350 KCMIL	3"	4	1	10	75	0.9	67.5	67.5	0.0096	0.0648	0.004374	3.98	3.98	1100.00	440.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	400 KCMIL	3"	4	3	270	568	0.9	511.2	170.4	0.00907	4.17293	0.711067	646.99	1940.98	1225.00	39690.00	19.30	15633.00
24	V4	G-ATSG02	4PGH1	400 KCMIL	3"	4	3	330	538	0.9	484.2	161.4	0.00907	4.83086	0.779701	709.44	2128.33	1225.00	48510.00	19.30	19107.00
25	V4	G-ATSC01	GPCCH1	400 KCMIL	3"	4	3	10	578	0.9	520.2	173.4	0.00907	0.15727	0.027271	24.81	74.44	1225.00	1470.00	19.30	579.00
26	R4	GNL1	1PNL1	250 KCMIL	2.5"	4	2	40	151	0.9	135.9	67.95	0.012	0.32616	0.022163	20.17	40.33	855.00	2736.00	16.25	1300.00
27	R4	GNL1	2PNL1	250 KCMIL	2.5"	4	2	53	304	0.9	273.6	136.8	0.012	0.87005	0.119023	108.30	216.60	855.00	3625.20	16.25	1722.50
28	J4	GNL1	3/0 AWG	2"	4	1	183	111	0.9	99.9	99.9	0.0158	2.88851	0.288562	262.56	262.56	615.00	4501.80	8.80	1610.40	
29	G4	GNL1	GLNL2	3/0 AWG	2"	4	1	85	28	0.9	25.2	25.2	0.0158	0.33844	0.008529	7.76	7.76	615.00	2091.00	8.80	748.00
30	G4	GNL1	GLNL3	3/0 AWG	2"	4	1	185	82	0.9	73.8	73.8	0.0158	2.15717	0.159199	144.85	144.85	615.00	4551.00	8.80	1628.00
31	M4	1PNL1	1LNL1	300 KCMIL	2.5"	4	1	138	141	0.9	126.9	126.9	0.0106	1.85629	0.235564	214.34	214.34	980.00	5409.60	16.25	2242.50
32	G4	1PNL1	1LNL2	3/0 AWG	2"	4	1	82	17	0.9	15.3	15.3	0.0158	0.19823	0.003033	2.76	2.76	615.00	2017.20	8.80	721.60
33	M4	2PNL1	2LNL1	300 KCMIL	2.5"	4	1	132	181	0.9	162.9	162.9	0.0106	2.2793	0.371297	337.84	337.84	980.00	5174.40	16.25	2145.00
34	M4	2PNL1	2LNL2	300 KCMIL	2.5"	4	1	130	137	0.9	123.3	123.3	0.0106	1.69907	0.209496	190.62	190.62	980.00	5096.00	16.25	2112.50
35	M4	3PNL1	4LNL1	300 KCMIL	2.5"	4	1	88	148	0.9	133.2	133.2	0.0106	1.24249	0.1655	150.59	150.59	980.00	3449.60	16.25	1430.00
36	M4	3PNL1	3LNL1	300 KCMIL	2.5"	4	1	113	147	0.9	132.3	132.3	0.0106	1.58469	0.209654	190.76	190.76	980.00	4429.60	16.25	1836.25
37	J4	3PNL1	3LNL2	3/0 AWG	2"	4	1	163	85	0.9	76.5	76.5	0.0158	1.97018	0.150719	137.14	137.14	615.00	4009.80	8.80	1434.40
38	C3	3PNL1	3LNL2	3 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0432	2.65006	0.076322	69.44	69.44	239.00	1527.21	5.90	1256.70
39	C3	3PNL1	3LNL4	3 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0432	2.65006	0.076322	69.44	69.44	239.00	1527.21	5.90	1256.70
40	R4	G-SWBND01	1LNL1	250 KCMIL	2.5"	4	2	255	64	0.9	57.6	28.8	0.012	0.88128	0.025381	23.09	46.19	855.00	17442.00	16.25	8287.50
41	R4	G-SWBND01	2LNL1	250 KCMIL	2.5"	4	2	270	83	0.9	74.7	37.35	0.012	1.21014	0.045199	41.13	82.25	855.00	18468.00	16.25	8775.00
42	R4	G-SWBND01	3LNL1	250 KCMIL	2.5"	4	2	285	46	0.9	41.4	20.7	0.012	0.70794	0.014654	13.33	26.67	855.00	19494.00	16.25	9262.50
43	R4	G-SWBND01	4LNL1	250 KCMIL	2.5"	4	2	300	29	0.9	26.1	13.05	0.012	0.4698	0.006131	5.58	11.16	855.00	20520.00	16.25	9750.00
44	J4	GNPH1	GNPH2	3/0 AWG	2"	4	1	185	39	0.9	35.1	35.1	0.0158	1.02597	0.036012	32.77	32.77	615.00	4551.00	8.80	1628.00
45	H4	GNPH1	EC-1	3/0 AWG	2"	4	1	82	65	0.9	58.5	58.5	0.0158	0.75793	0.044339	40.34	40.34	615.00	2017.20	8.80	721.60
46	H4	GNPH1	EC-2	3/0 AWG	2"	4	1	85	65	0.9	58.5	58.5	0.0158	0.78566	0.045961	41.82	41.82	615.00	2091.00	8.80	748.00
47	H4	GNPH1	EC-3	3/0 AWG	2"	4	1	88	65	0.9	58.5	58.5	0.0158	0.81338	0.047583	43.30	43.30	615.00	2164.80	8.80	774.40
48	H4	EC-1	ELEV-1	3/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.0158	0.73944	0.043257	39.36	39.36	615.00	1968.00	8.80	704.00
49	H4	EC-2	ELEV-2	3/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.0158	0.73944	0.043257	39.36	39.36	615.00	1968.00	8.80	704.00
50	H4	EC-3	ELEV-3	3/0 AWG	2"	4	1	80	65	0.9	58.5	58.5	0.0158	0.73944	0.043257	39.36	39.36	615.00	1968.00	8.80	704.00
51	B4	4PGH1	3-T03	4 AWG	1.25"	4	1	30	38	0.9	34.2	34.2	0.0522	0.53557	0.018317	16.67	16.67	207.00	248.40	5.90	177.00
52	T4	4PGH1	PPGH1	500 KCMIL	4"	4	2	104	353	0.9	317.7	158.85	0.008	1.32163	0.209941	191.02	382.05	1475.00	12272.00	25.50	5304.00
53	P4	4PGH1	PPGH2	500 KCMIL	4"	4	1	104	206	0.9	185.4	185.4	0.008	1.54253	0.285985	260.22	260.22	1475.00	6136.00	25.50	2652.00
54	D4	3-T03	3LGL1	2 AWG	1.25"	4	1	5	38	0.9	34.2	34.2	0.0342	0.05848	0.002	1.82	1.82	262.00	52.40	5.90	29.50
55	R3	GPCH1	3-T02	250 KCMIL	2.5"	3	2	282	407	0.9	366.3	183.15	0.012	6.1978	1.135126	1032.84	2065.69	855.00	14466.60	16.25	9165.00
56	P3	GPCH1	2-T01	500 KCMIL	4"	3	1	269	335	0.9	301.5	301.5	0.008	6.48828	1.956216	1779.95	1779.95	1475.00	11903.25	25.50	6859.50
57	J3	GPCH1	4-T01	3/0 AWG	2"	3	1	295	145	0.9	130.5	130.5	0.0158	6.08261	0.79378	722.25	722.25	615.00	5442.75	8.80	2596.00
58	P3	GPCH1	1-T01	500 KCMIL	4"	3	1	269	272	0.9	244.8	244.8	0.008	5.2681	1.28963	1173.42	1173.42	1475.00	11903.25	25.50	6859.50
59	M4	GPCH1	GLCH1	300 KCMIL	2.5"	4	1	261	9	0.9	8.1	8.1	0.0106	0.22409	0.001815	1.65	1.65	980.00	10231.20	16.25	4241.25
60	M4	GPCH1	1LCH1	300 KCMIL	2.5"	4	1	284	10	0.9	9	9	0.0106	0.27094	0.002438	2.22	2.22	980.00	11132.80	16.25	4615.00
61	M4	GPCH1	2LCH1	300 KCMIL	2.5"	4	1	307	13	0.9	11.7	11.7	0.0106	0.38074	0.004455	4.05	4.05	980.00	12034.40	16.25	4988.75
62	M4	GPCH1	3LCH1	300 KCMIL	2.5"	4	1	330	34	0.9	30.6	30.6	0.0106	1.07039	0.032754	29.80	29.80	980.00	12936.00	16.25	5362.50
63	M4	GPCH1	4LCH1	300 KCMIL	2.5"	4	1	353	20	0.9	18	18	0.0106	0.67352	0.012123	11.03	11.03	980.00	13837.60	16.25	5736.25
64	M4	3PCL1	3LCL1	300 KCMIL	2.5"	4	1														

COST ANALYSIS AT 30% DESIGN LOAD - 3 WIRE SIZE LARGER

TAG	FROM	TO	WIRE SIZE	CONDUIT SIZE	NO. OF CONDUCT.	NO. OF SETS	LENGTH (FT)	LOAD (A)	% OF LOAD	AVG. LOAD (A)	AVG. LOAD PER SET (A)	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET (\$)	TOTAL COST OF ENERGY LOSS PER YEAR (\$)	2011 CONDUCTOR COSTS (\$/CLF)	INITIAL COST OF CONDUCTORS (\$)	2011 CONDUIT COSTS (\$/LF)	INITIAL COST OF CONDUIT (\$)	
SL	RD																				
1	MI-V4	G-T01	G-LSIG1	400 KCMIL	-	4	2	11	124	0.9	111.6	55.8	0.00907	0.05567	0.003106	2.83	5.65	1225.00	1078.00	-	
2	Z4	EM. GEN.	G-SWBDE01	500 KCMIL	4"	4	6	192	1255	0.9	1129.5	188.25	0.008	2.89152	0.544329	495.28	2971.68	1475.00	67968.00	25.50	29376.00
3	Y4	G-SWBND01	CHILLER #3	400 KCMIL	3"	4	6	480	756	0.9	680.4	113.4	0.00907	4.93698	0.559854	509.41	3056.44	1225.00	141120.00	19.30	55584.00
4	U4	G-SWBND01	GPNH3	500 KCMIL	4"	4	3	440	336	0.9	302.4	100.8	0.008	3.54816	0.357655	325.43	976.28	1475.00	77880.00	25.50	33660.00
5	N4	G-SWBND01	G-ATSS01	400 KCMIL	3"	4	1	5	75	0.9	67.5	67.5	0.00907	0.03061	0.002066	1.88	1.88	1225.00	245.00	19.30	96.50
6	V4	G-SWBND01	G-ATSG01	500 KCMIL	4"	4	3	60	568	0.9	511.2	170.4	0.008	0.81792	0.139374	126.81	380.44	1475.00	10620.00	25.50	4590.00
7	V4	G-SWBND01	G-ATSG02	500 KCMIL	4"	4	3	55	538	0.9	484.2	161.4	0.008	0.71016	0.11462	104.29	312.88	1475.00	9735.00	25.50	4207.50
8	V4	G-SWBND01	G-ATSC01	500 KCMIL	4"	4	3	5	578	0.9	520.2	173.4	0.008	0.06936	0.012027	10.94	32.83	1475.00	885.00	25.50	382.50
9	R4	G-SWBND01	GPNH1	300 KCMIL	2.5"	4	2	235	215	0.9	193.5	96.75	0.0106	2.41004	0.233172	212.16	424.32	980.00	18424.00	16.25	7637.50
10	R4	G-SWBND01	GLNH1	300 KCMIL	2.5"	4	2	239	49	0.9	44.1	22.05	0.0106	0.55861	0.012317	11.21	22.42	980.00	18737.60	16.25	7767.50
11	T3	G-SWBND01	G-T02	250 KCMIL	2.5"	3	3	244	641	0.9	576.9	192.3	0.012	5.63054	1.082754	985.19	2955.57	855.00	18775.80	16.25	11895.00
12	R4	G-SWBND01	3PNL1	300 KCMIL	2.5"	4	2	244	399	0.9	359.1	179.55	0.0106	4.64388	0.833809	758.68	1517.35	980.00	19129.60	16.25	7930.00
13	P4	G-SWBND01	PPNH1	4/0 AWG	2.5"	4	2	400	157	0.9	141.3	70.65	0.0133	3.75858	0.265544	241.62	483.23	742.00	23744.00	16.25	13000.00
14	M4	G-SWBND01	1PNH2	400 KCMIL	3"	4	1	45	54	0.9	48.6	48.6	0.00907	0.19836	0.00964	8.77	8.77	1225.00	2205.00	19.30	868.50
15	MI-N4	G-LSIG1	G-ATSF01	250 KCMIL	-	4	1	527	124	0.9	111.6	55.8	0.012	7.05758	0.787626	716.66	716.66	855.00	18023.40	-	-
22	N4	G-ATSS01	GPSH1	400 KCMIL	3"	4	1	10	75	0.9	67.5	67.5	0.00907	0.06122	0.004133	3.76	3.76	1225.00	490.00	19.30	193.00
23	V4	G-ATSG01	GPGH1	500 KCMIL	4"	4	3	270	568	0.9	511.2	170.4	0.008	3.68064	0.627181	570.67	1712.00	1475.00	47790.00	25.50	20655.00
24	V4	G-ATSG02	4PGH1	500 KCMIL	4"	4	3	330	538	0.9	484.2	161.4	0.008	4.26096	0.687719	625.75	1877.25	1475.00	58410.00	25.50	25245.00
25	V4	G-ATSC01	GPCI1	500 KCMIL	4"	4	3	10	578	0.9	520.2	173.4	0.008	0.13872	0.024054	21.89	65.66	1475.00	1770.00	25.50	765.00
26	R4	GPNL1	1PNL1	300 KCMIL	2.5"	4	2	40	151	0.9	135.9	67.95	0.0106	0.28811	0.019577	17.81	35.63	980.00	3136.00	16.25	1300.00
27	R4	GPNL1	2PNL1	300 KCMIL	2.5"	4	2	53	304	0.9	273.6	136.8	0.0106	0.76854	0.105137	95.66	191.33	980.00	4155.20	16.25	1722.50
28	J4	GPNL1	GLNL1	4/0 AWG	2.5"	4	1	183	111	0.9	99.9	99.9	0.0133	2.43147	0.242903	221.02	221.02	742.00	5431.44	16.25	2973.75
29	G4	GPNL1	GLNL2	4/0 AWG	2.5"	4	1	85	28	0.9	25.2	25.2	0.0133	0.28489	0.007179	6.53	6.53	742.00	2522.80	16.25	1381.25
30	G4	GPNL1	GLNL3	4/0 AWG	2.5"	4	1	185	82	0.9	73.8	73.8	0.0133	1.81585	0.13401	121.93	121.93	742.00	5490.80	16.25	3006.25
31	M4	1PNL1	1LNL1	350 KCMIL	3"	4	1	138	141	0.9	126.9	126.9	0.0096	1.68117	0.213341	194.12	194.12	1100.00	6072.00	19.30	2663.40
32	G4	1PNL1	1LNL2	4/0 AWG	2.5"	4	1	82	17	0.9	15.3	15.3	0.0133	0.16686	0.002553	2.32	2.32	742.00	2433.76	16.25	1332.50
33	M4	2PNL1	2LNL1	350 KCMIL	3"	4	1	132	181	0.9	162.9	162.9	0.0096	2.06427	0.336269	305.97	305.97	1100.00	5808.00	19.30	2547.60
34	M4	2PNL1	2LNL2	350 KCMIL	3"	4	1	130	137	0.9	123.3	123.3	0.0096	1.53878	0.189732	172.64	172.64	1100.00	5720.00	19.30	2509.00
35	M4	3PNL1	4LNL1	350 KCMIL	3"	4	1	88	148	0.9	133.2	133.2	0.0096	1.12527	0.149886	136.38	136.38	1100.00	3872.00	19.30	1698.40
36	M4	3PNL1	3LNL1	350 KCMIL	3"	4	1	113	147	0.9	132.3	132.3	0.0096	1.43519	0.189876	172.77	172.77	1100.00	4972.00	19.30	2180.90
37	J4	3PNL1	3LNL2	4/0 AWG	2.5"	4	1	163	85	0.9	76.5	76.5	0.0133	1.65844	0.216871	115.44	115.44	742.00	4837.84	16.25	2648.75
38	C3	3PNL1	3LJL2	2 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0342	2.09796	0.060421	54.98	54.98	262.00	1674.18	5.90	1256.70
39	C3	3PNL1	3LJL4	2 AWG	1.25"	3	1	213	32	0.9	28.8	28.8	0.0342	2.09796	0.060421	54.98	54.98	262.00	1674.18	5.90	1256.70
40	R4	G-SWBND01	1LNL1	300 KCMIL	2.5"	4	2	255	64	0.9	57.6	28.8	0.0106	0.77846	0.02242	20.40	40.80	980.00	19992.00	16.25	8267.50
41	R4	G-SWBND01	2LNL1	300 KCMIL	2.5"	4	2	270	83	0.9	74.7	37.35	0.0106	1.06896	0.039926	36.33	72.66	980.00	21168.00	16.25	8775.00
42	R4	G-SWBND01	3LNL1	300 KCMIL	2.5"	4	2	285	46	0.9	41.4	20.7	0.0106	0.62535	0.012945	11.78	23.56	980.00	23444.00	16.25	9262.50
43	R4	G-SWBND01	4LNL1	300 KCMIL	2.5"	4	2	300	29	0.9	26.1	13.05	0.0106	0.41499	0.050416	4.93	9.86	980.00	23520.00	16.25	9750.00
44	J4	GPNH1	GPNH2	4/0 AWG	2.5"	4	1	185	39	0.9	35.1	35.1	0.0133	0.86364	0.030314	27.58	27.58	742.00	5490.80	16.25	3006.25
45	H4	GPNH1	EC-1	4/0 AWG	2.5"	4	1	82	65	0.9	58.5	58.5	0.0133	0.638	0.037323	33.96	33.96	742.00	2433.76	16.25	1332.50
46	H4	GPNH1	EC-2	4/0 AWG	2.5"	4	1	85	65	0.9	58.5	58.5	0.0133	0.66134	0.038689	35.20	35.20	742.00	2522.80	16.25	1381.25
47	H4	GPNH1	EC-3	4/0 AWG	2.5"	4	1	88	65	0.9	58.5	58.5	0.0133	0.68468	0.040054	36.44	36.44	742.00	2611.84	16.25	1430.00
48	H4	EC-1	ELEV-1	4/0 AWG	2.5"	4	1	80	65	0.9	58.5	58.5	0.0133	0.62244	0.036413	33.13	33.13	742.00	2374.40	16.25	1300.00
49	H4	EC-2	ELEV-2	4/0 AWG	2.5"	4	1	80	65	0.9	58.5	58.5	0.0133	0.62244	0.036413	33.13	33.13	742.00	2374.40	16.25	1300.00
50	H4	EC-3	ELEV-3	4/0 AWG	2.5"	4	1	80	65	0.9	58.5	58.5	0.0133	0.62244	0.036413	33.13	33.13	742.00	2374.40	16.25	1300.00
51	B4	4PGH1	3-T03	3 AWG	1.25"	4	1	30	38	0.9	34.2	34.2	0.0432	0.44323	0.015159	13.79	13.79	239.00	286.80	5.90	177.00
52	T4	4PGH1	PPGH1	400 KCMIL	3"	4	3	104	353	0.9	317.7	105.9	0.00907	9.99893	0.105787	96.25	288.76	1225.00	15288.00	19.30	6021.60
53	P4	4PGH1	PPGH2	4/0 AWG	2.5"	4	2	104	206	0.9	185.4	92.7	0.0133	1.28223	0.118862	108.15	216.30	742.00	6173.44	16.25	3380.00
54	D4	3-T03	3LGL1	1 AWG	1.25"	4	1	5	38	0.9	34.2	34.2	0.0279	0.04771	0.001632	1.48	1.48	340.00	68.00	5.90	29.50
55	R3	GPCI1	3-T02	300 KCMIL	2.5"	3	2	282	407	0.9	366.3	183.15	0.0106	5.47472	1.002695	912.34	1824.69	980.00	16581.60	16.25	9165.00
56	P3	GPCI1	2-T01	4/0 AWG	2.5"	3	2	269	335	0.9	301.5	150.75	0.0133	5.39338	0.813052	739.79	1479.58	742.00	11975.88	16.25	8742.50
57	J3	GPCI1	4-T01	4/0 AWG	2.5"	3	1	295	145	0.9	130.5	130.5	0.0133	5.12017	0.668182	607.97	607.97	742.00	6566.70</		

Appendix F | Diffuser Specifications

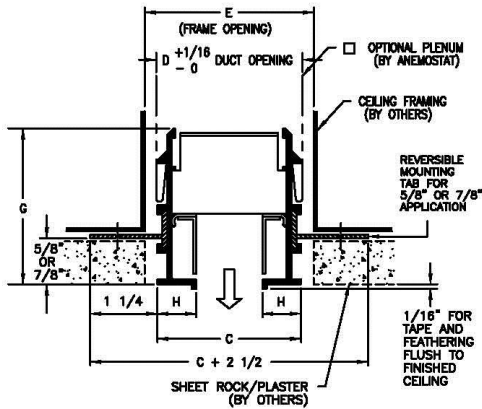
SUBMITTAL SHEET



from: **ANEMOSTAT**[®]
A MESTEK COMPANY
CARSON CA
310-835-7500

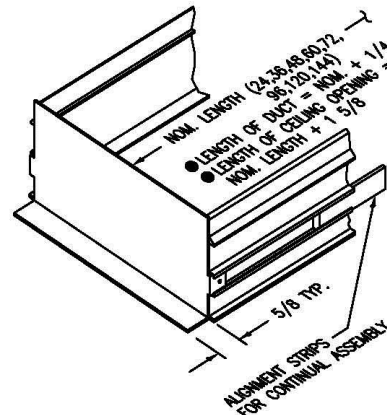
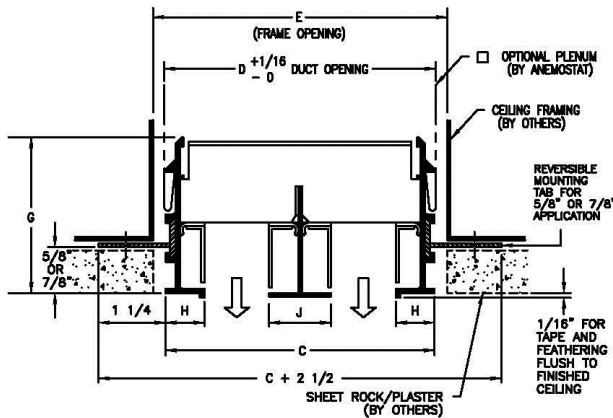
MODEL
PJCM-100
Pro Jet™
ARCHITECTURAL
LINEAR DIFFUSER
CONCEALED MOUNTING

SINGLE SLOT



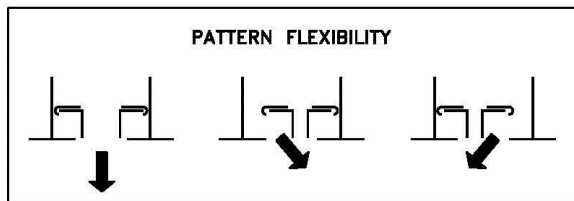
PJCM-100 (1" SLOT WIDTH)						
# OF SLOTS	C	D	E	G	H	J
1	2 9/32	2 5/16	2 5/8	2 3/16	5/8	-
2	4 9/32	4 5/16	4 5/8			1
3	6 9/32	6 5/16	6 5/8			
4	8 9/32	8 5/16	8 5/8			

MULTIPLE SLOT



END PLATE DETAIL

- MATERIAL: .062 ALUMINUM EXTRUSION
GALVANIZED HARDWARE
- FINISH: OUTER FRAME - BLACK
CENTER TEE - WHITE
INTERIOR COMPONENTS - BLACK
- ASSEMBLY: ALIGNMENT STRIPS AND MOUNTING
BRACKETS FURNISHED FOR FIELD
ASSEMBLY AND INSTALLATION



MFG. TOLERANCE ± 1/32

All Dimensions are in Inches

JOB NAME:	SUBMITTED BY:
LOCATION:	
ARCHITECT:	
ENGINEER:	DWG # LIN-0332
CONTRACTOR:	DATE 3-24-10 REV D

model Pro Jet™
Architectural Linear Slot Diffusers

performance data
supply

Architectural Diffusers

PJ-100 (1" SLOT)

CFM per Foot	1 SLOT						2 SLOT						CFM per Foot	1 SLOT				2 SLOT			
	Ps	NC	THROW			Ps	NC	THROW			Ps	NC		PROJ		Ps	NC	PROJ			
			20' F HOT	20' F COLD	20' F HOT			20' F COLD	20' F HOT	20' F COLD											
20	.01	-	1	4	8								.01	-	6	10					
25	.01	-	2	5	10								.01	-	8	12					
30	.01	-	3	6	11								.01	-	9	14					
40	.03	-	4	8	13	.01	-	3	7	14			.03	-	10	16	.01	-	11	17	
50	.04	-	6	9	14	.01	-	4	9	16			.04	-	11	18	.01	-	12	20	
60	.06	20	8	11	16	.01	-	5	10	17			.06	20	12	19	.01	-	13	21	
70	.08	22	9	12	17	.02	-	5	10	18			.08	22	13	21	.02	-	14	22	
80	.10	24	10	13	18	.03	-	6	11	19			.10	24	14	22	.03	-	15	23	
90	.13	27	11	14	19	.03	-	7	12	19			.13	27	15	24	.03	-	15	23	
100	.16	29	12	15	20	.04	-	8	13	21			.16	29	15	25	.04	-	16	26	
125						.06	21	8	14	23							.06	21	18	28	
150						.09	24	11	16	24							.09	24	18	30	
175						.12	27	13	18	26							.12	27	20	32	
200						.16	30	14	19	28							.16	30	22	34	

A

PJ-150 (1-1/2" SLOT)

CFM per Foot	1 SLOT						2 SLOT						CFM per Foot	1 SLOT				2 SLOT			
	Ps	NC	THROW			Ps	NC	THROW			Ps	NC		PROJ		Ps	NC	PROJ			
			20' F HOT	20' F COLD	20' F HOT			20' F COLD	20' F HOT	20' F COLD											
30	.01	-	3	7	12								.01	-	9	15					
40	.01	-	4	8	13								.01	-	10	16					
50	.02	-	5	9	14								.02	-	11	17					
60	.02	-	7	10	15	.01	-	4	9	18			.02	-	11	18	.01	-	14	22	
70	.03	-	9	12	16	.01	-	4	10	19			.03	-	13	20	.01	-	14	23	
80	.04	-	10	13	18	.01	-	5	10	19			.04	-	14	22	.01	-	15	23	
90	.05	-	11	14	19	.01	-	5	11	20			.05	-	15	23	.01	-	15	24	
100	.06	20	11	15	20	.03	-	6	11	20			.06	20	15	25	.02	-	15	25	
125	.09	23	13	17	23	.03	-	8	13	22			.09	23	17	28	.02	-	17	27	
150	.12	26	14	18	24	.04	-	10	15	24			.12	26	19	30	.03	-	18	30	
175	.16	29	15	19	26	.05	-	12	17	26			.16	29	20	32	.05	-	20	32	
200	.21	31	16	20	27	.06	21	12	18	28			.21	31	21	33	.06	21	22	34	
250						.09	23	14	20	30							.09	23	23	37	
300						.12	27	14	21	32							.12	27	25	39	
350						.16	30	16	23	34							.16	30	26	42	
400						.21	32	18	25	36							.21	32	28	44	

PJ-200 (2" SLOT)

CFM per Foot	1 SLOT						2 SLOT						CFM per Foot	1 SLOT				2 SLOT			
	Ps	NC	THROW			Ps	NC	THROW			Ps	NC		PROJ		Ps	NC	PROJ			
			20' F HOT	20' F COLD	20' F HOT			20' F COLD	20' F HOT	20' F COLD											
40	.01	-	2	6	11								.01	-	8	14					
50	.01	-	3	7	12								.01	-	9	15					
60	.01	-	4	8	13								.01	-	10	16					
70	.02	-	6	10	15								.02	-	11	18					
80	.02	-	8	11	15	.01	-	3	8	17			.02	-	12	19	.01	-	13	21	
90	.03	-	9	12	16	.01	-	3	9	18			.03	-	13	20	.01	-	14	22	
100	.03	-	10	13	17	.01	-	4	10	19			.03	-	13	22	.01	-	15	23	
125	.05	-	11	15	20	.01	-	5	11	20			.05	-	15	24	.01	-	16	24	
150	.07	22	12	16	21	.02	-	8	13	21			.07	22	16	26	.02	-	17	26	
175	.10	25	13	17	23	.03	-	10	15	22			.10	25	18	28	.03	-	18	27	
200	.13	27	14	18	25	.03	-	11	16	23			.13	27	19	31	.03	-	18	28	
250						.05	20	12	17	26							.05	20	20	32	
300						.07	23	13	19	28							.07	23	22	34	
350						.10	26	13	19	30							.10	26	23	37	
400						.13	28	15	21	32							.13	28	25	39	
450						.16	31	17	24	35							.16	31	27	43	

For performance data notes see page A-11.



PJ-250 (2-1/2" SLOT)

HORIZONTAL PATTERN	CFM per Foot	1 SLOT					2 SLOT					VERTICAL PROJECTION	CFM per Foot	1 SLOT					2 SLOT			
		Ps	NC	THROW			Ps	NC	THROW					Ps	NC	PROJ		Ps	NC	PROJ		
				20' F HOT	20' F COLD	20' F HOT			20' F COLD	20' F HOT	20' F COLD											
50	.01	-	3	6	11							50	.01	-	8	14						
60	.01	-	4	7	12							60	.01	-	9	14						
70	.01	-	5	8	12							70	.01	-	10	15						
80	.01	-	6	9	14							80	.01	-	11	16						
90	.02	-	8	11	14							90	.02	-	12	17						
100	.02	-	9	12	15	.01	-	4	10	19		100	.02	-	12	18	.01	-	15	23		
125	.03	-	11	14	17	.01	-	5	11	20		125	.03	-	13	21	.01	-	15	24		
150	.05	-	12	15	19	.01	-	7	12	21		150	.05	-	15	22	.01	-	16	26		
175	.07	21	13	16	20	.02	-	8	13	22		175	.06	21	16	24	.02	-	17	27		
200	.08	23	14	17	22	.02	-	10	15	24		200	.08	23	17	27	.02	-	18	30		
250	.13	27	15	19	26	.03	-	12	17	25		250	.13	27	20	32	.03	-	20	31		
300	.17	31	16	21	29	.05	20	13	18	26		300	.17	31	23	35	.05	20	21	32		
350						.07	22	14	19	28		350					.07	22	22	34		
400						.09	24	15	21	31		400					.08	24	23	37		
450						.11	26	16	22	33		450					.11	26	25	40		
500						.13	28	16	23	35		500					.13	28	27	43		

Architectural Diffusers

A

PJ-300 (3" SLOT)

HORIZONTAL PATTERN	CFM per Foot	1 SLOT					2 SLOT					VERTICAL PROJECTION	CFM per Foot	1 SLOT					2 SLOT			
		Ps	NC	THROW			Ps	NC	THROW					Ps	NC	PROJ		Ps	NC	PROJ		
				20' F HOT	20' F COLD	20' F HOT			20' F COLD	20' F HOT	20' F COLD											
60	.01	-	4	8	13							60	.01	-	10	16						
80	.01	-	5	9	14							80	.01	-	10	17						
100	.01	-	8	11	15							100	.01	-	11	18						
120	.02	-	9	12	16	.01	-	6	11	20		120	.02	-	13	20	.01	-	15	25		
140	.03	-	11	14	17	.01	-	6	12	21		140	.03	-	14	21	.01	-	16	26		
160	.04	-	11	14	19	.01	-	7	13	22		160	.04	-	15	24	.01	-	17	27		
180	.05	-	12	15	20	.01	-	8	13	22		180	.05	-	15	25	.01	-	17	27		
200	.06	20	12	16	21	.01	-	10	15	23		200	.06	20	16	26	.01	-	18	28		
225	.07	21	13	17	23	.02	-	11	16	24		225	.07	21	18	28	.02	-	18	29		
250	.09	23	14	18	24	.02	-	12	17	25		250	.09	23	18	29	.02	-	19	31		
300	.13	27	15	19	26	.03	-	13	18	26		300	.13	27	20	32	.03	-	20	32		
350	.17	30	16	21	29	.04	20	13	19	28		350	.17	30	22	36	.04	20	22	34		
400						.06	21	14	20	29		400					.06	21	22	36		
450						.07	22	15	21	31		450					.07	22	24	38		
500						.09	24	15	22	33		500					.09	24	25	41		
600						.13	28	17	24	36		600					.13	28	28	44		
700						.17	31	20	27	40		700					.17	31	31	49		

Test Standard

- ANSI / ASHRAE standard 70
- Isothermal Air

Sound Levels

- NC is noise criteria curve that will not be exceeded at the operating point. This is determined by assuming a 10dB (ref. 10⁻¹² watts) room attenuation that is subtracted from the power levels in each of the 2nd thru 7th octave bands
- NC shown is based on 4' diffuser length. For other active lengths, use the following adjustment factors:

If Diffuser Length is:	2'	4'	6'	8'	10+'
Adjust NC value by:	-3	0	+2	+3	+4

Throw (Horizontal Pattern)

- The numbers shown in table are throw distances, in feet, measured along the jet trajectory axis relating to terminal velocities of 150,100, & 50 fpm, for a free jet, for a 4' active length. For other active lengths, use the following throw adjustment factors:

If Diffuser Length is:	2'	4'	6'	8'	10+'
Multiply Throw Dist by:	.69	1.00	1.23	1.38	1.53

- For installation with an attached/bounded jet, multiply throw value by 1.40
- Terminal velocity is the air speed, in feet per minute, measured in the supply air stream

Vertical Projection

- The numbers shown in table are projection distances, in feet, measured along the jet trajectory axis relating to a terminal velocity of 50 fpm, for a 4' active length. H based on a heating differential of 20° F. C based on a cooling differential of 20° F. For other active lengths, use the following projection adjustment factors:

If Diffuser Length is:	2'	4'	6'	8'	10+'
Multiply Proj Dist by:	.70	1.00	1.20	1.40	1.50

- Terminal velocity is the air speed, in feet per minute, measured in the supply air stream.

Pressure

- P_s represents Static Pressure, inches of water



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