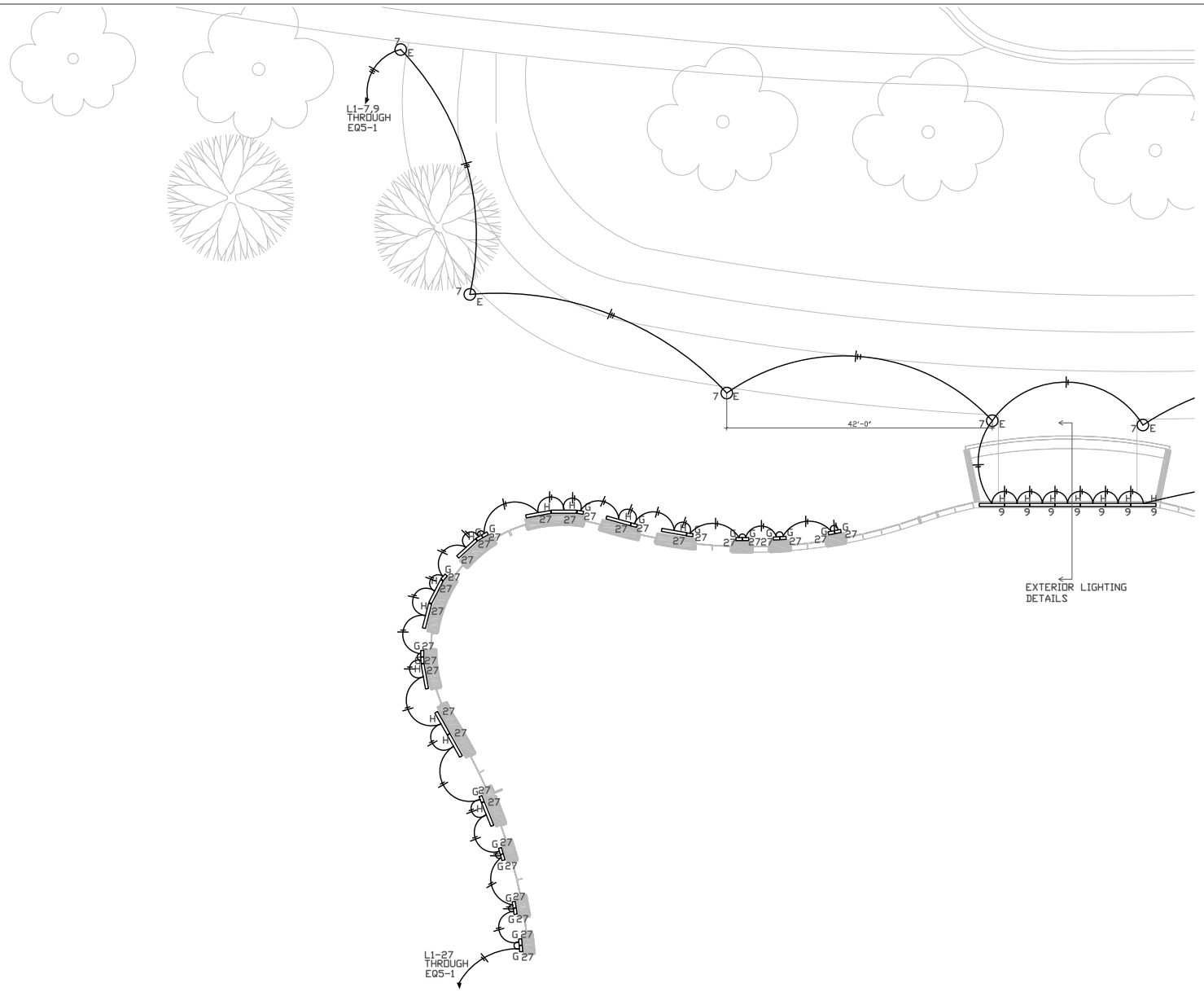
Appendix A: Lighting / Electrical Plans and Details



NATIONAL INTREPID CENTER OF EXCELLENCE
Bethesda, MD

NOTES:

Christine Clowes
AE Senior Thesis
Penn State University

SCALE: 1/16"=1'

FIRST FLOOR
EXTERIOR
LIGHTING PLAN 1

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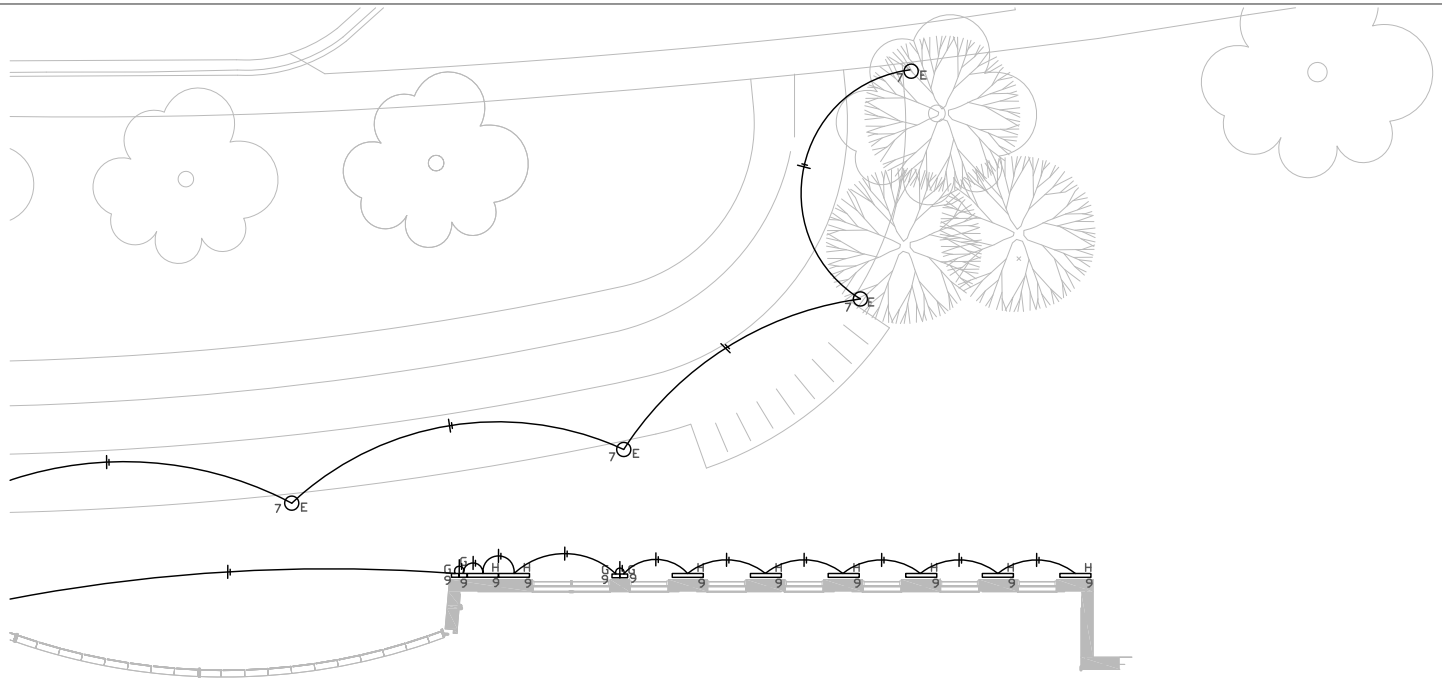
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



N

NATIONAL INTREPID CENTER OF EXCELLENCE
Bethesda, MD

NOTES:

Christine Clowes
AE Senior Thesis
Penn State University

SCALE: 1/16"=1'

FIRST FLOOR
EXTERIOR
LIGHTING PLAN 2

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NOTES:

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Penn State University

SCALE: 1/16"=1'

SECOND FLOOR
EXTERIOR
LIGHTING PLAN 1

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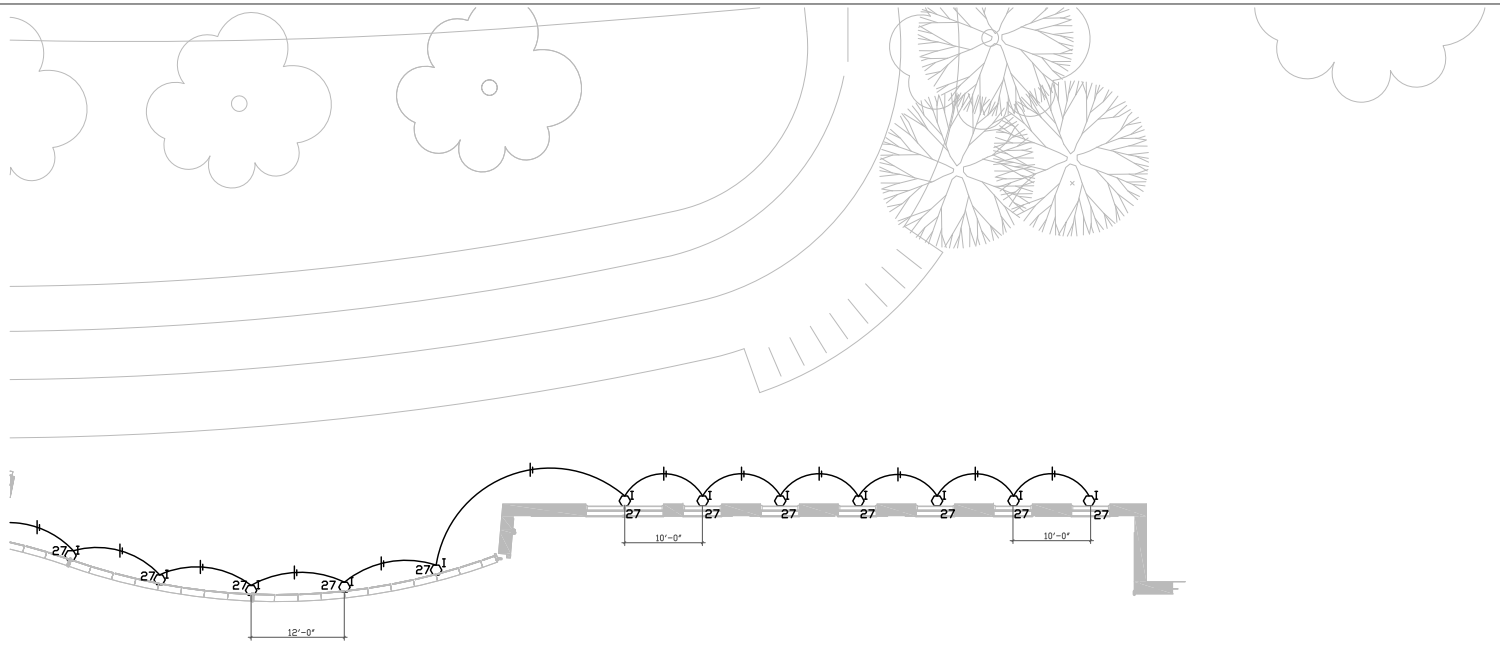
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



N

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NOTES:

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SCALE: 1/16"=1'

SECOND FLOOR EXTERIOR LIGHTING PLAN 2

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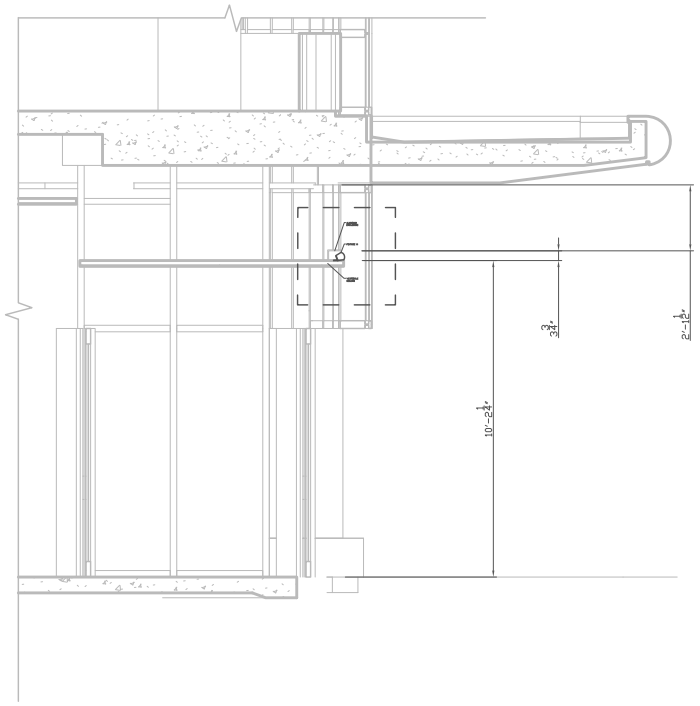
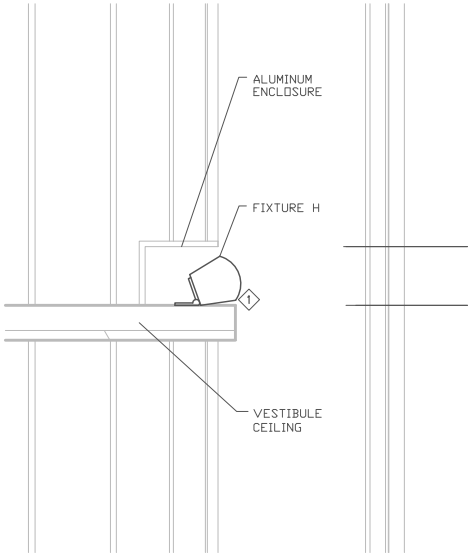
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Fixture H at Entrance
1/4" = 1'



Fixture H Detail at Entrance
1-1/2"=1'

N

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NOTES:
1 AIM IN FIELD

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Penn State University

SCALE: AS NOTED

EXTERIOR LIGHTING DETAILS

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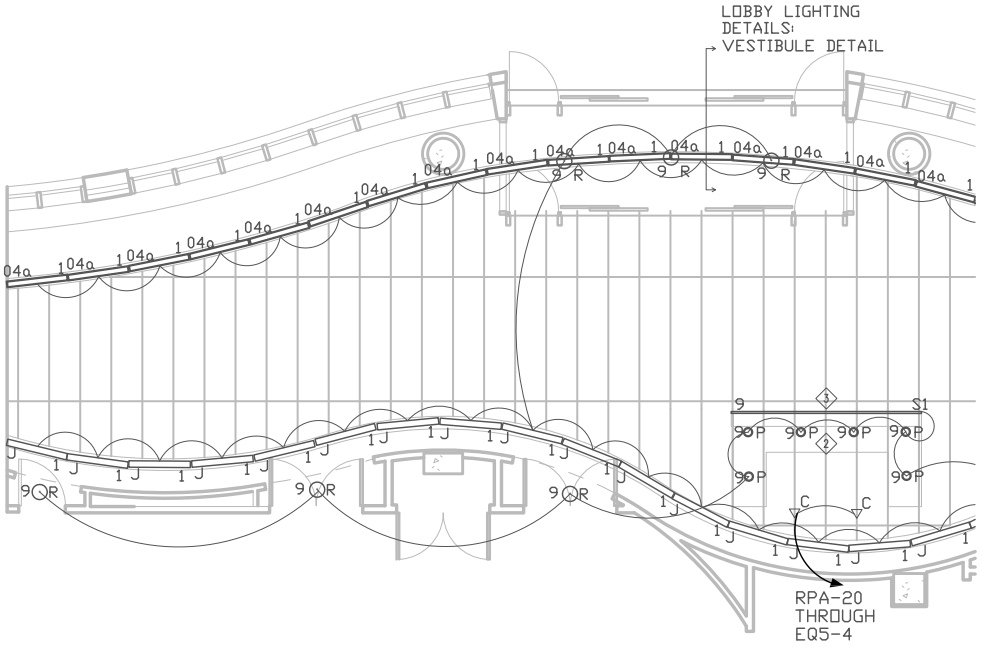
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



N

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NOTES:
1. MOUNT 6.5' O.C. AFF
2. MOUNT 7' AFF
3. FIXTURE INTEGRATED INTO FURNITURE

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SCALE: 1/8"=1'

FIRST FLOOR
LOBBY
LIGHTING PLAN

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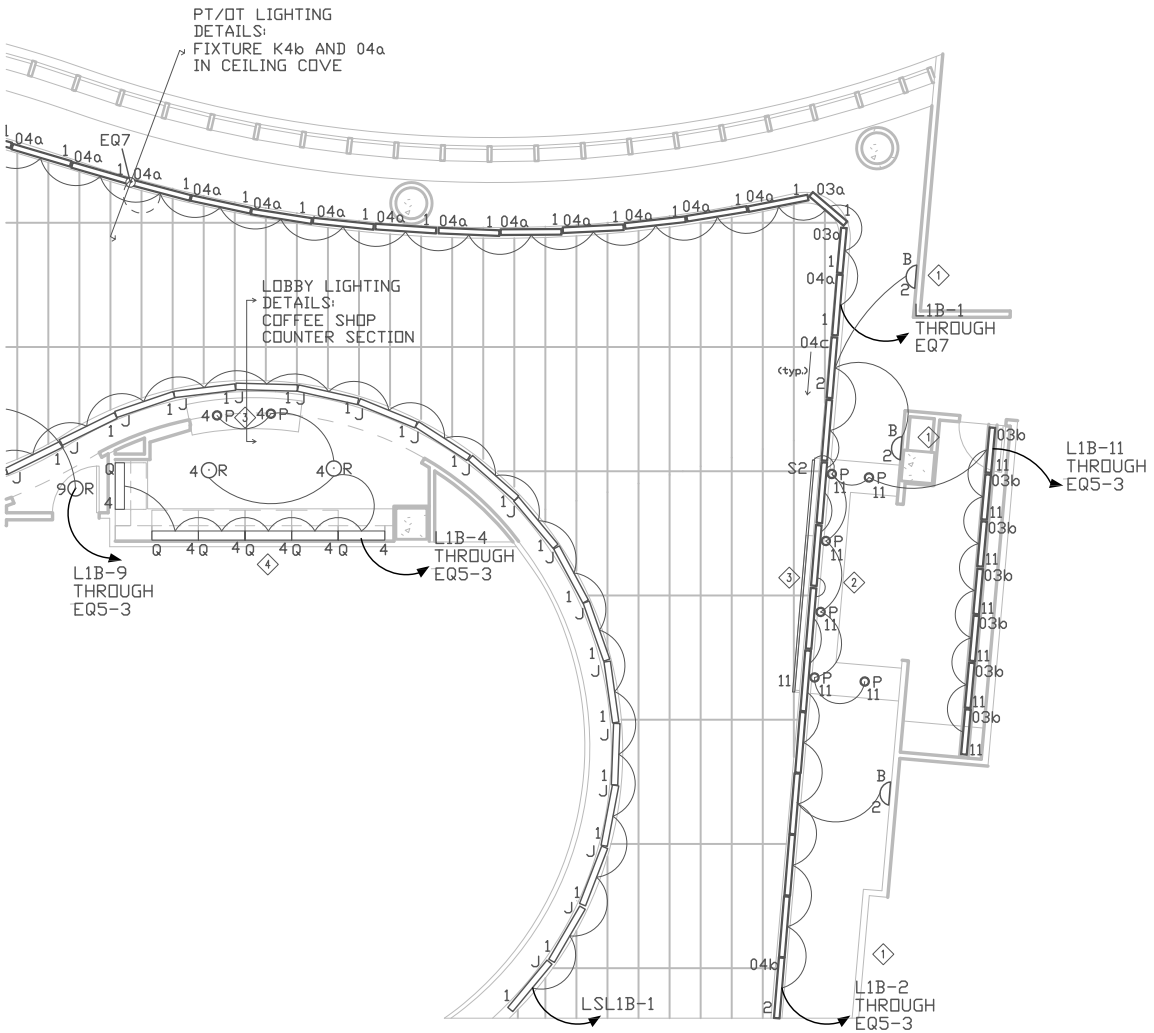
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



NATIONAL INTREPID CENTER OF EXCELLENCE
Bethesda, MD

NOTES:
1. MOUNT 6.5' O.C. AFF
2. MOUNT 7' AFF
3. FIXTURE INTEGRATED INTO FURNITURE
4. MOUNT UNDER CABINET

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Penn State University

SCALE: 1/8"=1'

FIRST FLOOR
LOBBY
LIGHTING PLAN

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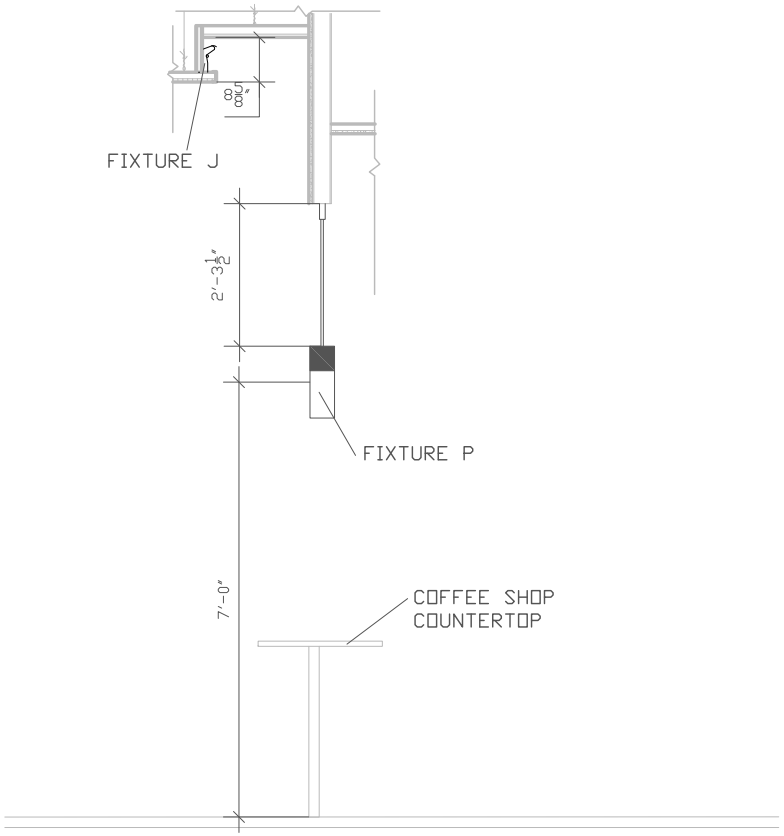
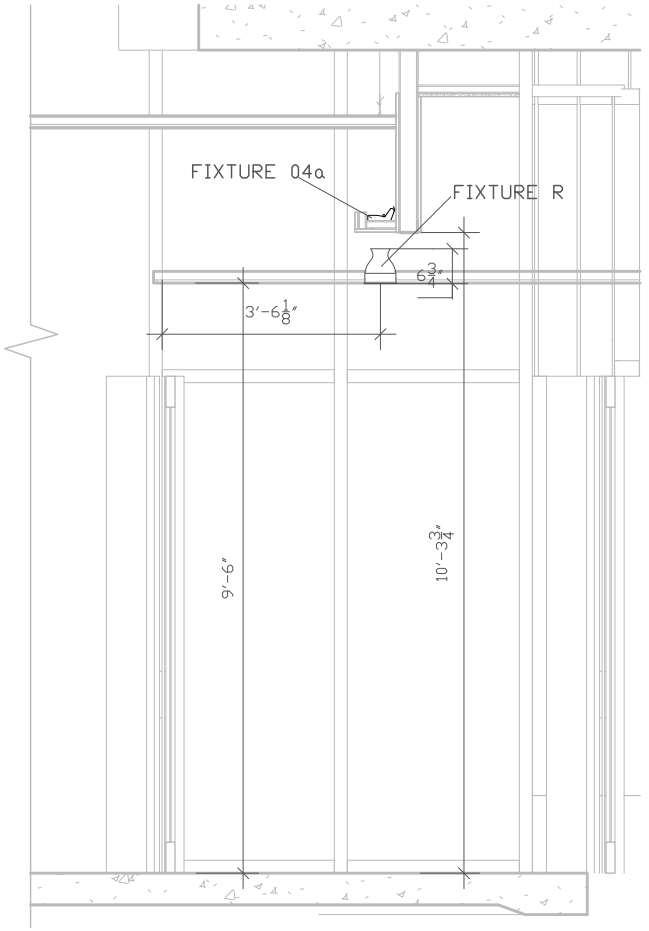
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Coffee Shop Counter Section
1/2" = 1'



Vestibule Section
1/2" = 1'

N

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NOTES:

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SCALE: AS NOTED

LOBBY
LIGHTING
DETAILS

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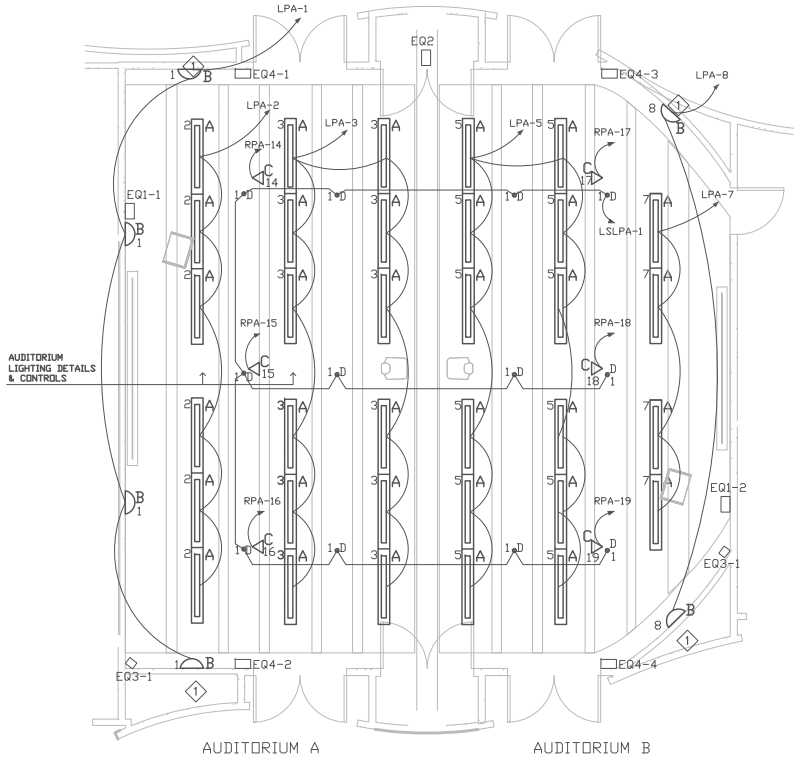
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



NOTES:

1. MOUNT 6.5' O.C. AFF

All fixtures run through EQ4 and EQ1. Control depends on status of partition. (See control description in report.)

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SCALE: 1/8"=1'

FIRST FLOOR AUDITORIUM LIGHTING PLAN

N

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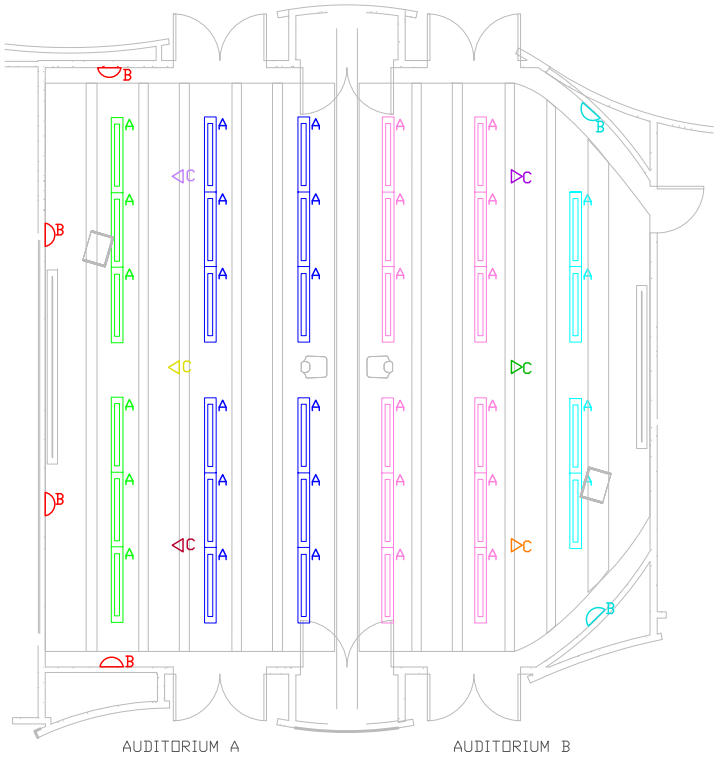
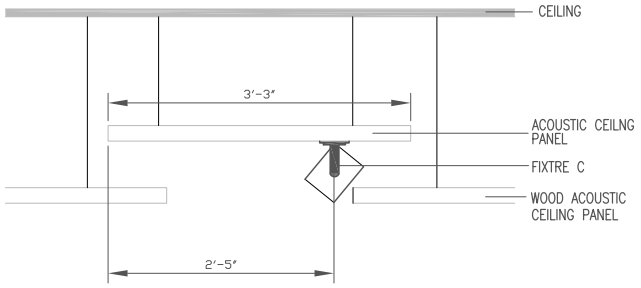
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
Zone 7
Zone 8
Zone 9
Zone 10
Zone 11
Zone 12

Zoning Diagram
1/8" = 1'



Fixture C Detail
3/4"=1'

N

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NOTES:

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SCALE: AS NOTED

AUDITORIUM LIGHTING DETAILS & CONTROLS

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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

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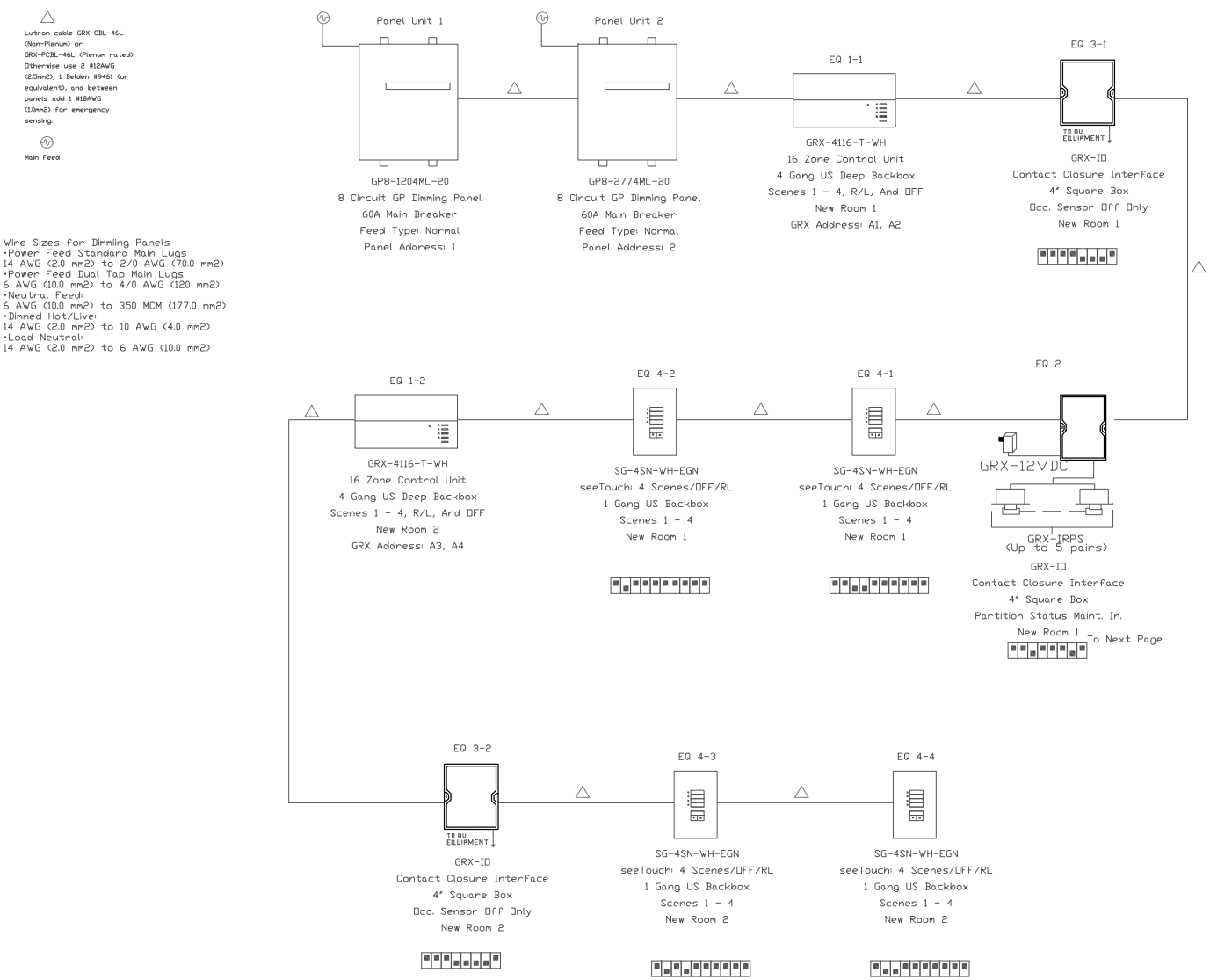

Auditorium Control System
NTS

N

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NOTES:

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SCALE: NTS

AUDITORIUM LIGHTING CONTROLS

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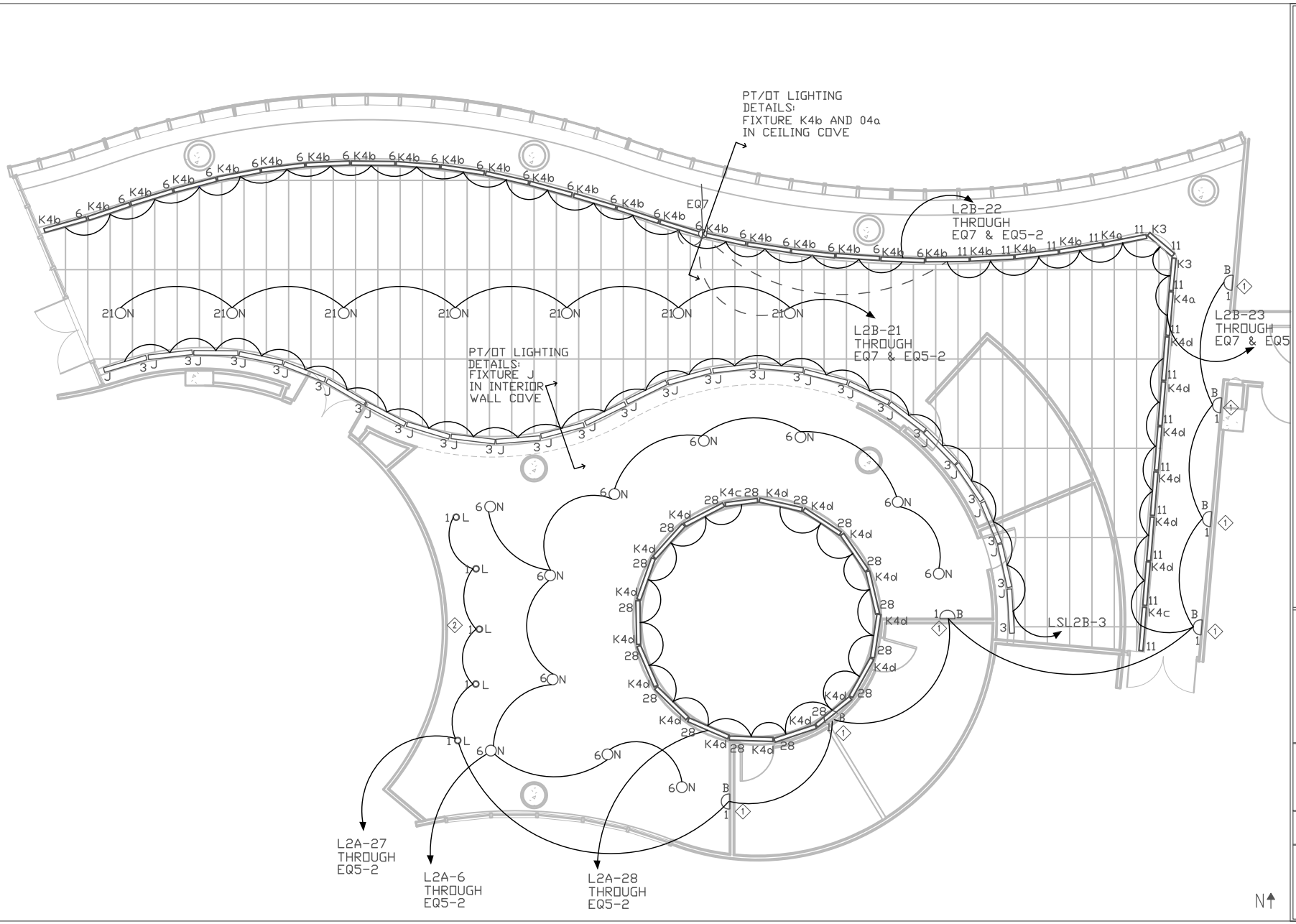
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



NATIONAL INTREPID CENTER OF EXCELLENCE
Bethesda, MD

NOTES:
1. MOUNT 6.5' O.C. AFF
2. MOUNT 7' O.C. AFF

Christine Clowes
AE Senior Thesis
Penn State University

SCALE: 1/8"=1'

SECOND FLOOR
PT/OT
LIGHTING PLAN

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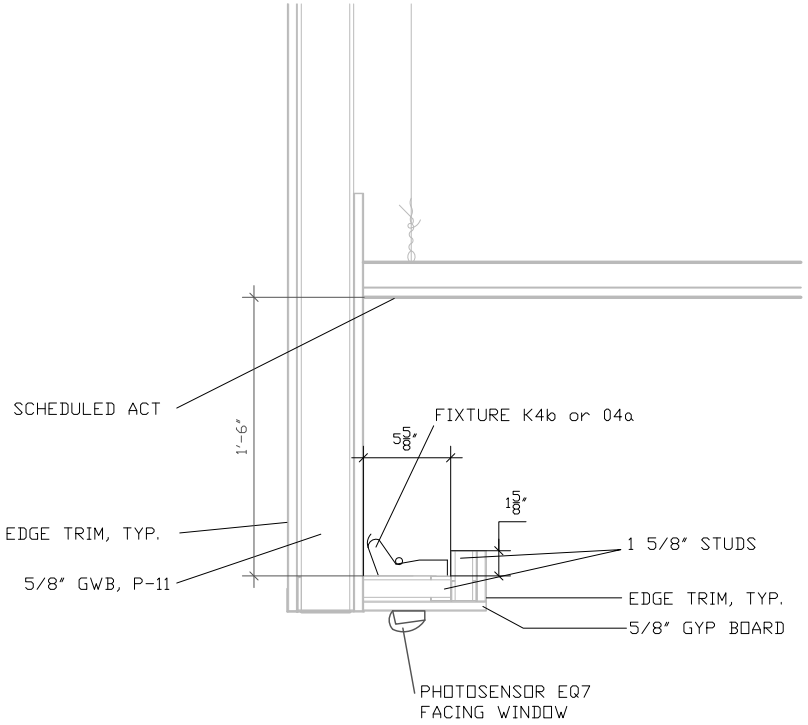
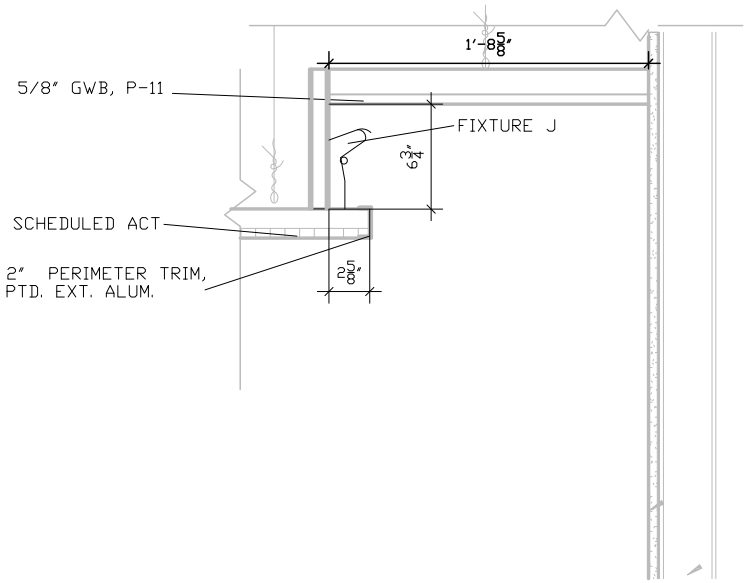
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



Fixture K4b and 04a in Ceiling Cove
1-1/2" = 1'



Fixture J in Interior Wall Cove
1-1/2" = 1'

N

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NOTES:

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Penn State University

SCALE: AS NOTED

PT/OT
LIGHTING
DETAILS

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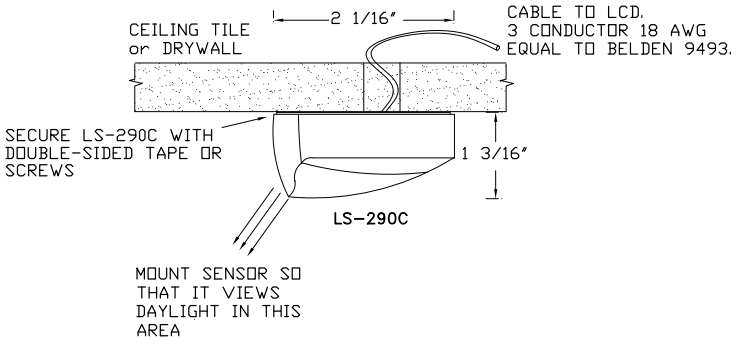
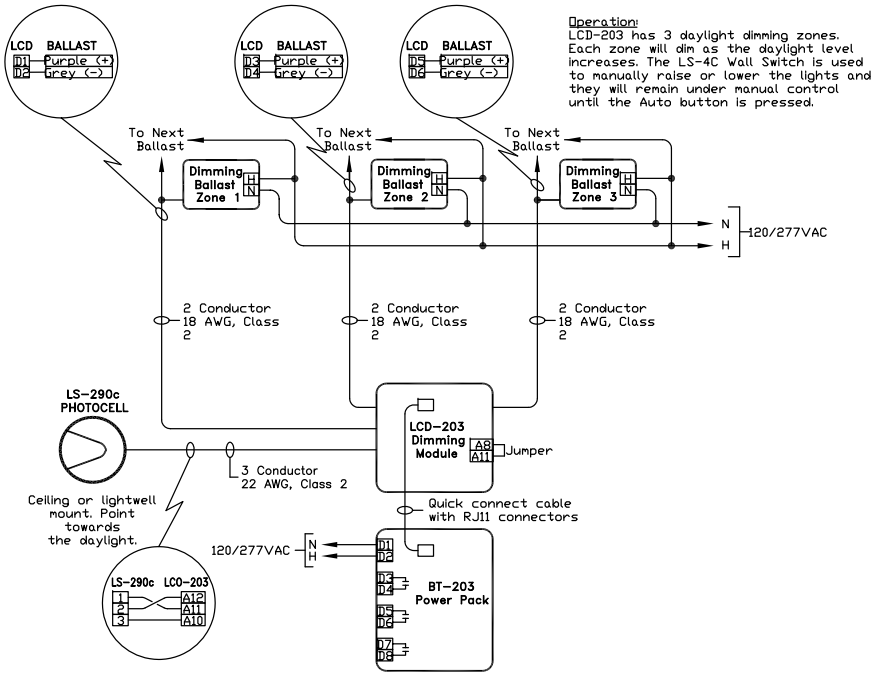
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



EQ 7 Detail
NTS



Photosensor Control Diagram of EQ7, EQ8, and EQ9
NTS

N

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NOTES:

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Penn State University

SCALE: NTS

CONTROL DETAILS

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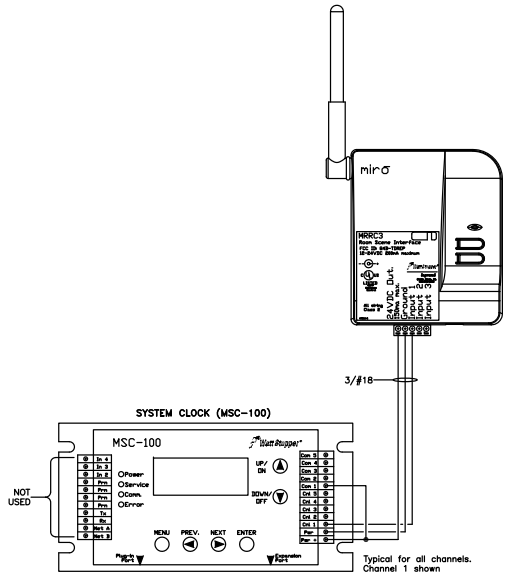
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



MSC-100 to MRR/HC3

EQ 5 Detail
NTS

EQ 6 Diagram
NTS

N

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Bethesda, MD

NOTES:

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Penn State University

SCALE: NTS

CONTROL DETAILS

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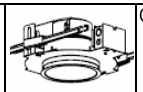
Appendix B: Luminaire Schedule and Cut Sheets

Luminaire Schedule

Type		Manufacturer	Product Name	Catalog Number	Description	Lamp	Voltage	Ballast/Power Supply	Watts	Location
A		FOCAL POINT	Louver VERVE III	FV3S-DR2-1T5-1C-277-D-C24-TS-4' Custom Fixture with 1 T5 lamp	-Suspended linear direct/indirect fluorescent with radial parabolic louver -Radial parabolic louver utilizes high-quality low brightness aluminum that provides comfortable direct illumination -One-piece steel housing with 5" die-cast end caps -UL and CUL listed -Pre-wired with factory installed branch circuit wiring and over-molded quick connects	FP28/830/ECO Osram Sylvania: 20868 PENTRON High Performance T5 Lamp	277	ECO-T528-277-1 Lutron Eco-10 277 Volt 3-Wire Dimming Ballast	39	AUDITORIUM - Suspended from ceiling panels 2'
B		WINONA LIGHTING	4614 Triad	4614-F-277V-OA-PC-STD	-UL listed and CUL approved -Custom sizes and finishes available upon request -Polished chrome clips (other options available) -Etched opal acrylic lens	CF13DS/830/ECO Osram Sylvania: 20283 Dulux S Preheat 2-pin Ecologic CFL	277	VH-2B13-TP-BLS ADVANCE CFL Magnetic Ballast	27	AUDITORIUM, LOBBY, OT, THERAPY WAIT - Walls - 6.5' on center
C		Lighting Services Inc.	CP100 SERIES	C100-2G-CC-WL-B	-Sturdy aluminum housing -Rugged steel self-locking yoke allows for horizontal and vertical focusing -On/off safety switch -Integral dimmer available -Various finishes and accessory clips available	35PAR20/HAL/NSP10 Osram Sylvania: 14467 Capsylite PAR 20	120	N/A	35	AUDITORIUM - Ceiling Panels
D		Gotham	4" AFV	AFV-26TRT-4AR-277	-Self-flanged, semi-specular or matte-diffuse reflector -Rugged aluminum lampholder housing - Vertically -mounted, positive-latch, thermoplastic socket -Class P, thermally-protected, high power factor ballast mounted to the junction box	CF26DT/E/827/ECO Osram Sylvania: 20767 DULUX D/E 4-pin Ecologic CFL	277	ICF2S26M1BSQS @277 ADVANCE Electronic Rapid Start Ballast	29	AUDITORIUM - Emergency Lighting
E		KIM Lighting	Solitaire	FM-SRS4F5-100PMH277-PS-P	-Die-cast aluminum top -White acrylic lens - Vertical lamp orientation -Symmetric diffused downlight distribution -Sealed housing and split beam reflector technology -Post-top mounting	MPD/100/U/MED/840 Osram Sylvania: 64426 Metalarc Pro-Tech Pulse Start	277	71A5337BP ADVANCE Metal Halide Lamp Ballast	118	EXTERIOR - Along sidewalk
F		KIM Lighting	Round Steel (Non-Tapered) Pole	KRS10-4120-FM-PS	-Luminaire is flush mounted directly to top of pole - Platinum silver finish -Cast aluminum anchor bolt covers and pole cap included -Standard thermoset polyester powder coat paint	N/A	N/A	N/A	N/A	EXTERIOR - Support structure for fixture type E
G		PHILIPS Color Kinetics	eW Graze Powercore	523-000030-09 4000K, 10ºx60º, 1' fixture	-Linear lighting fixture optimized for surface grazing and wall-washing applications requiring high-quality white light. -Processes power directly from the line voltage, eliminating the need for low-voltage, external power supplies. -Aluminum housing and flexible mounting options.	14.3W White LEDs Included with luminaire	277	Included with luminaire	14.3	EXTERIOR - Building Façade
H		PHILIPS Color Kinetics	eW Graze Powercore	523-000030-11 4000K, 10ºx60º, 4' fixture	-Linear lighting fixture optimized for surface grazing and wall-washing applications requiring high-quality white light. -Processes power directly from the line voltage, eliminating the need for low-voltage, external power supplies. -Aluminum housing and flexible mounting options.	57.2W White LEDs Included with luminaire	277	Included with luminaire	57.2	EXTERIOR - Building Façade, Overhang

I		Iagotronics	Dot 21/42 Waterproof IP67	DecaLED Dot 21/42 95129249	-Multiple LED cluster, mounted onto the surface of a building -Can be controlled directly by DMX and capable of operating in indoor and outdoor environments -High manufacturing standards and a solid weatherproof housing ensure a long and maintenance-free lifespan	4W White LEDs Included with luminaire	24	Included with luminaire	300 per controller	EXTERIOR - Building Façade
J		Elliptipar	Style 306	F-306-A132-S-00-V-000	-Compact and flexible - effective slot and valance lighting using T5 for precise optical or widely utilized T8 -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Integral electronic ballast thru wiring for easy installation -Durable - all parts are aluminum or stainless steel	FO32/835/XPS/ECO Osram Sylvania: 21697 Octron 800 XPS Lamp	277	ICN-3P32-SC@277V ADVANCE 2 Lamp Electronic Ballast	2 lamps: 65	PT - Interior curved wall
K3a		Elliptipar	Style 305	F-305-T139-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves - Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP39/835/HO/ECO Osram Sylvania: 20933 Pentron High Output, High Performance T5 Lamp	277	ECO-T539-277-2 Lutron Hi-Lume, Compact SE, Eco-10 3-Wire Dimming Ballast	2 lamps: 85.87	PT - Ceiling cove
K3b		Elliptipar	Style 305	F-305-T139-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves - Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP39/835/HO/ECO Osram Sylvania: 20933 Pentron High Output, High Performance T5 Lamp	277	ICN-2S39@277V ADVANCE Electronic Programmed Start Ballast	43	OT - Ceiling cove
K4a		Elliptipar	Style 305	F-305-T154-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves - Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP54/835/HO/ECO Osram Sylvania: 20904 Pentron High Output, High Performance T5 Lamp	277	ECO-T554-277-1 Lutron Hi-Lume, Compact SE, Eco-10 3-Wire Dimming Ballast	69.25	LOBBY - Ceiling cove PT - Ceiling cove
K4b		Elliptipar	Style 305	F-305-T154-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves - Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP54/835/HO/ECO Osram Sylvania: 20904 Pentron High Output, High Performance T5 Lamp	277	ECO-T554-277-2 Lutron Hi-Lume, Compact SE, Eco-10 3-Wire Dimming Ballast	2 lamps: 124.65	PT - Ceiling cove
K4c		Elliptipar	Style 305	F-305-T154-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves - Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position - Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP54/835/HO/ECO Osram Sylvania: 20904 Pentron High Output, High Performance T5 Lamp	277	ICN-2S54@277V ADVANCE 1 Lamp Electronic Programmed Start Ballast	62	PT - Ceiling cove

K4d		Elliptipar	Style 305	F-305-T154-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP54/835/HO/ECO Osram Sylvania: 20904 Pentron High Output, High Performance T5 Lamp	277	ICN-2S54@277V ADVANCE 2 Lamp Electronic Programmed Start Ballast	2 lamps: 117	PT - Ceiling cove
L		LIGHTOLIER	FP01 Vetro Architectural Decorative	FP1-PM32SA-PG01-26CFL-277V-SK01	-Satin machined aluminum and hand-blown opal glass -Handsome proportion of materials engineered to provide a functional design element and an efficient luminaire -Brushed and clear lacquer finish	CF26DT/E/830/ECO Osram Sylvania: 20880 Dulux T/E/IN Amalgam 4-Pin Ecologic Compact Fluorescent Lamp	277	ICF2S26H1LDQS@277 ADVANCE Programmed Start Ballast	29	OT - countertop
N		Gotham Lighting	8" AF Lensed Reflector Compact Fluorescent Downlights	AF-2/42TRT-8AR-T73-277-ADEZ	-Fluted vertical upper section works in conjunction with Bounding Ray Optical Principle design to provide lamp before lamp image and smooth transition from top of reflector to bottom -Minimum flange matches reflector finish -Semi-specular clear upper reflector -Lens position at optical break provides optimal visual comfort and improved aperture aesthetics	CF42DT/E/835/ECO Osram Sylvania: 20871 Dulux T/E/IN Amalgam 4-Pin Ecologic Compact Fluorescent Lamp	277	VEZ-2T42-M3-LD ADVANCE Electronic Dimming Ballast	2 lamps: 98	PT
O3a		Elliptipar	Style 305	F-305-T121-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP21/835/ECO Osram Sylvania: 20921 Pentron, High Performance T5 Lamp	277	ECO-T521-C-277-2 Lutron Hi-Lume, Compact SE, Eco-10 3-Wire Dimming Ballast	2 lamps: 52.63	LOBBY - Ceiling cove
O3b		Elliptipar	Style 305	F-305-T121-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP21/835/ECO Osram Sylvania: 20921 Pentron, High Performance T5 Lamp	277	ICN-2S28-N@277 ADVANCE Electronic Programmed Start Ballast	25	RECEPTION - Ceiling cove
O4a		Elliptipar	Style 305	F-305-T128-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP28/835/ECO Osram Sylvania: 20901 Pentron, High Performance T5 Lamp	277	ECO-T528-277-2 Lutron Hi-Lume, Compact SE, Eco-10 3-Wire Dimming Ballast	2 lamps: 69.25	LOBBY - Ceiling cove
O4b		Elliptipar	Style 305	F-305-T128-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP28/835/ECO Osram Sylvania: 20901 Pentron, High Performance T5 Lamp	277	ICN-2S28@277V ADVANCE 1 Lamp Electronic Programmed Start Ballast	31	LOBBY - Ceiling cove

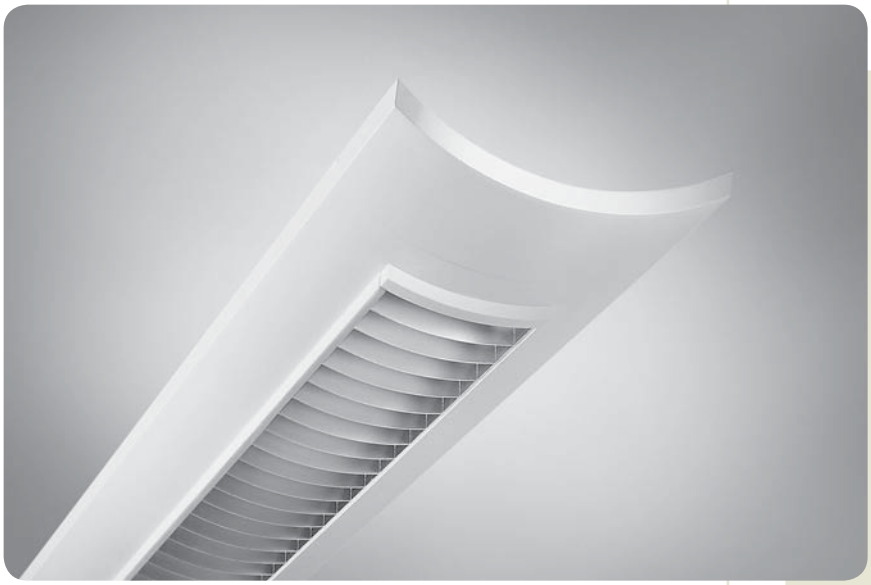
O4c		Elliptipar	Style 305	F-305-T128-S-00-V-000	-T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves -Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position -Only 2-5/8" high - fits in low profile coves -Integral electronic ballast, thru wiring for easy installation	FP28/835/ECO Osram Sylvania: 20901 Pentron, High Performance T5 Lamp	277	ICN-2S28@277V ADVANCE 2 Lamp Electronic Programmed Start Ballast	2 lamps: 60	LOBBY - Ceiling cove
P		LIGHTOLIER	FP01 Vetro Architectural Decorative	FP1-PM32SA-PG01-32CFL-277V-SK01	-Satin machined aluminum and hand-blown opal glass -Handsome proportion of materials engineered to provide a functional design element and an efficient luminaire -Brushed and clear lacquer finish	CF32DT/E/835/ECO Osram Sylvania: 20885 Dulux T/E/IN Amalgam 4-Pin Ecologic Compact Fluorescent Lamp	277	ICF2S26H1LDQS @277 ADVANCE Electronic Programmed Start Ballast	36	LOBBY - Info desk, reception desk, coffee shop
Q		Birchwood Lighting	WP System	WP-T5-US-AC-277-STD-121-HRW	-20 gauged steel construction -Uses standard or high output T5 fluorescent lamps, other lamp types available -Formed snap-on acrylic cover -Standard finish is high reflectivity white powder coat done post production -Treated with a multi-stage phosphate process which ensures proper finish bonding and inhibits rust	FP21/835/ECO Osram Sylvania: 20921 Pentron, High Performance T5 Lamp	277	ICN-2S28-N@277 ADVANCE Electronic Programmed Start Ballast	25	COFFEE SHOP
R		Gotham Lighting	6" AF Lensed Reflector Compact Fluorescent Downlights	AF-1/26TRT-6AR-T73-277	-Fluted vertical upper section works in conjunction with Bounding Ray Optical Principle design to provide lamp before lamp image and smooth transition from top of reflector to bottom -Minimum flange matches reflector finish -Semi-specular clear upper reflector -Hinged lamp door seals upper trim for optimal fixture efficiency and the reduction of stray light in the plenum	CF26DT/E/835/ECO Osram Sylvania: 20881 Dulux T/E/IN Amalgam 4-Pin Ecologic Compact Fluorescent Lamp	277	ICF2S26H1LDQS @277 ADVANCE Programmed Start Ballast	29	VESTIBULE, COFFEE SHOP, LOBBY
S1		RSA Lighting	LEDeon	LEDEON-W-12'	-A totally flexible, sealed 24V DC LED strip for indoor applications -Super bright LEDs with close 1/2" o/c spacing for uniform illumination -Two inch mounting clips (P9) for freeform flexed installation or six food mouting channels (P9CH) for rigid linear installation are available with through holes for screw mounting -May be cut to size in the field.	Included with luminaire	24VDC to 277V through driver	LEDINTA-0024-41FO 277V Xitanium ADVANCE LED Driver	117	LOBBY - Info desk
S2		RSA Lighting	LEDeon	LEDEON-W-15'	-A totally flexible, sealed 24V DC LED strip for indoor applications -Super bright LEDs with close 1/2" o/c spacing for uniform illumination -Two inch mounting clips (P9) for freeform flexed installation or six food mouting channels (P9CH) for rigid linear installation are available with through holes for screw mounting -May be cut to size in the field.	Included with luminaire	24VDC to 277V through driver	LEDINTA-0024-41FO 277V Xitanium ADVANCE LED Driver	117	LOBBY - Info desk

Type A

FOCAL POINT®

louver

verve™ III



Covered by the following U.S. Patents: 5,658,066; D481,824; D480,499; D481,820.

FEATURES

Suspended linear direct/indirect fluorescent with radial parabolic louver.

Verve™ III offers variable distribution optics which include 70/30, 20/80, 10/90 and 100% direct illumination.

Radial parabolic louver utilizes a high-quality low brightness aluminum that provides comfortable direct illumination.

One-piece steel housing with 5" die-cast end caps.

Optional Downlight Reflector Optic separates center lamp for direct distribution and two outer lamps for indirect distribution on 3-lamp configurations.

1 lamp T5HO and 2 lamp T8 configurations are RP1 compliant.

Verve™ III is an excellent choice for open areas, small offices, lobbies, corridors, conference areas and educational facilities.

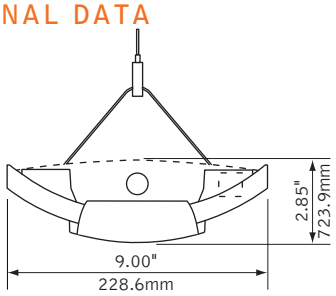
companion luminaire

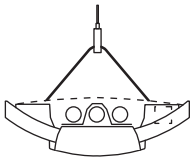
wall mount

sensor options

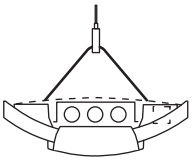
daylight / occupancy sensor

DIMENSIONAL DATA





downlight reflector-PDR



downlight reflector-DR0, DR1 & DR2

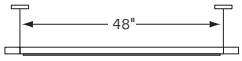
lamping options

parabolic louver

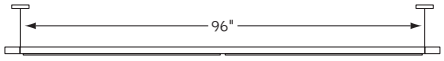
T5/T5HO LAMPS

T8 LAMPS

fixture information

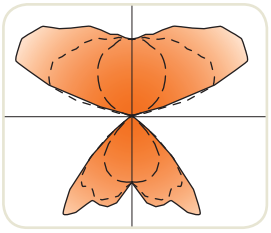


4' (4' 10")



8' (8' 10")

PERFORMANCE



1–Lamp T5HO
93.6% Efficiency
1097 cd @ 125°

71% Indirect
29% Direct

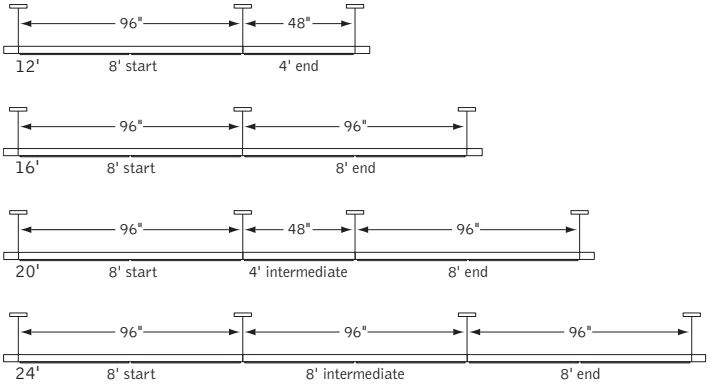
See **Photometric** section for additional performance data.

january 2008

fixture type:

project name:

MOUNTING INFORMATION



Consult factory for additional row length information.

SPECIFICATIONS

construction
One-piece 20 Ga. steel housing.
Die-cast 5" end cap fastened to housing.
Ends of louver finished with die-cast trim piece.
For row installation, internal brackets form hairline joint.
All luminaires are provided with Y-cable suspension mounted on 48" or 96" centers.

4' unit weight: 22 lbs.
8' unit weight: 32 lbs.

optic
Radial parabolic louver: 1.4"H x 1.8" frequency.
Louver and reflector are fabricated of low iridescent, semi-specular premium grade aluminum.
1-lamp T5HO and 2-lamp T8 configurations are RP1 compliant.
Optional Downlight Reflector optic fabricated of die-formed aluminum.
Downlight reflector separates center lamp for direct distribution and two outer lamps for indirect distribution.

electrical
Luminaires are pre–wired with factory installed branch circuit wiring and over-molded quick connects.
Factory installed SJT power cord at feed location is included.
Electronic ballasts are thermally protected and have a Class "P" rating.
Optional DALI and other dimming ballasts available.
Consult factory for dimming specifications and availability.
UL and cUL listed.

emergency
Emergency battery packs provide 90 minutes of one lamp illumination.
Initial lumen output for lamp types are as follows:

T8 Lamp: Up to 425 lumens
T5 Lamp: Up to 500 lumens
T5HO Lamp: Up to 825 lumens

Battery pack requires unswitched hot from same branch circuit as AC ballast.

sensors
Lutron™ Daylight sensor: a directional sensor with an integrated IR receiver. Operates with a Lutron EcoSystem ballast.
Lutron™ IR sensor: controls individual or grouped EcoSystem ballasts.

Wattstopper™ Daylight sensor: a closed loop system that measures total light level from daylight and electric light, a 0-10V dimming ballast is required. Wattstopper daylight setup remote required for programming; one included per order.
Wattstopper™ Occupancy sensor: a passive infrared sensor designed for cubicles and small offices. It has built-in daylight sensing that will hold lights off when adequate ambient light exists.

finish
Polyester powder coat applied over a 5-stage pretreatment.
Standard luminaire housing finished in Matte Satin White or Titanium Silver.

ORDERING

		FV3S
luminaire series		
Verve III	FV3S	
shielding		
Semi-Specular, Parabolic Louver 70% uplight, 30% downlight	PL	____
Parabolic Louver with Downlight Reflector (3-lamp options only)	PDR	
*Parabolic louver with 100% downlight	DR0	
*Parabolic louver with 10% uplight, 90% downlight	DR1	
*Parabolic louver with 20% uplight, 80% downlight *(Lamp type will effect actual percentage values. See IES file for exact uplight/ downlight %)	DR2	
lamping		
2 Lamp T5	2T5	____
3 Lamp T5	3T5	
1 Lamp T5HO	1T5HO	
2 Lamp T5HO	2T5HO	
3 Lamp T5HO	3T5HO	
2 Lamp T8	2T8	
3 Lamp T8	3T8	
circuit		
Single Circuit	1C	____
Dual Circuit (Multiple lamp luminaires only)	2C	
voltage		
120 Volt	120	____
277 Volt	277	
347 Volt (Consult factory for availability)	347	
ballast		
Electronic Instant Start <20% THD (T8 Only)	E	____
Electronic Program Start <10% THD	S	
Electronic Dimming Ballast	D	
mounting		
24" Cable Suspension	C24	____
48" Cable Suspension	C48	
96" Cable Suspension (Specify "J" in place of "C" for 5" dia. canopies at power feed and 2" dia. canopies at non–feed locations) (Consult factory for sloped ceiling applications)	C96	
factory options		
Emergency Circuit	EC	____
Emergency Battery Pack	EM	
HLR/GLR Fuse	FU	
Include 3000K Lamp	L830	____
Include 3500K Lamp	L835	
Include 4100K Lamp	L841	
Lutron™ Daylight Sensor (Ecosystem ballast required)	LY1	____
Lutron™ IR Receiver (Ecosystem ballast required)	LIR	
Wattstopper™ Daylight Sensor (0–10V dimming ballast required)	WY1	____
Wattstopper™ Occupancy Sensor	W01	
finish		
Matte Satin White	WH	____
Titanium Silver	TS	
luminaire run length		
4'	4'	____
8'	8'	
12' (8'+4')	12'	
16' (8'+8')	16'	
20' (8'+4'+8')	20'	
24' (8'+8'+8')	24'	
integrator options		
90-degree Corner	FV3–90	____
remotes (specify quantity)		
Wattstopper™ Daylight Setup Remote (required for daylight programming, one included per order;	WYSR	____
Wattstopper™ Occupant Controller	W0R	____
Lutron™ IR Remote	L0R	

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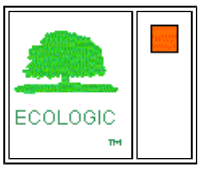
Product Number: 20868
Order Abbreviation: FP28/830/ECO
General Description: 28W, T5 PENTRON fluorescent lamp, 3000K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP28830ECO 40/CS 1/SKU
Actual Length (in)	45.8
Actual Length (mm)	1163.2
Average Rated Life (hr)	20000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3000
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	2600
Initial Lumens at 35C	2900
Mean Lumens at 25C	2418
Mean Lumens at 35C	2697
Nominal Length (in)	48
Nominal Wattage (W)	28.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please

Hi-lume®, Compact SE™, Eco-10®
277 volt 3-wire dimming ballasts

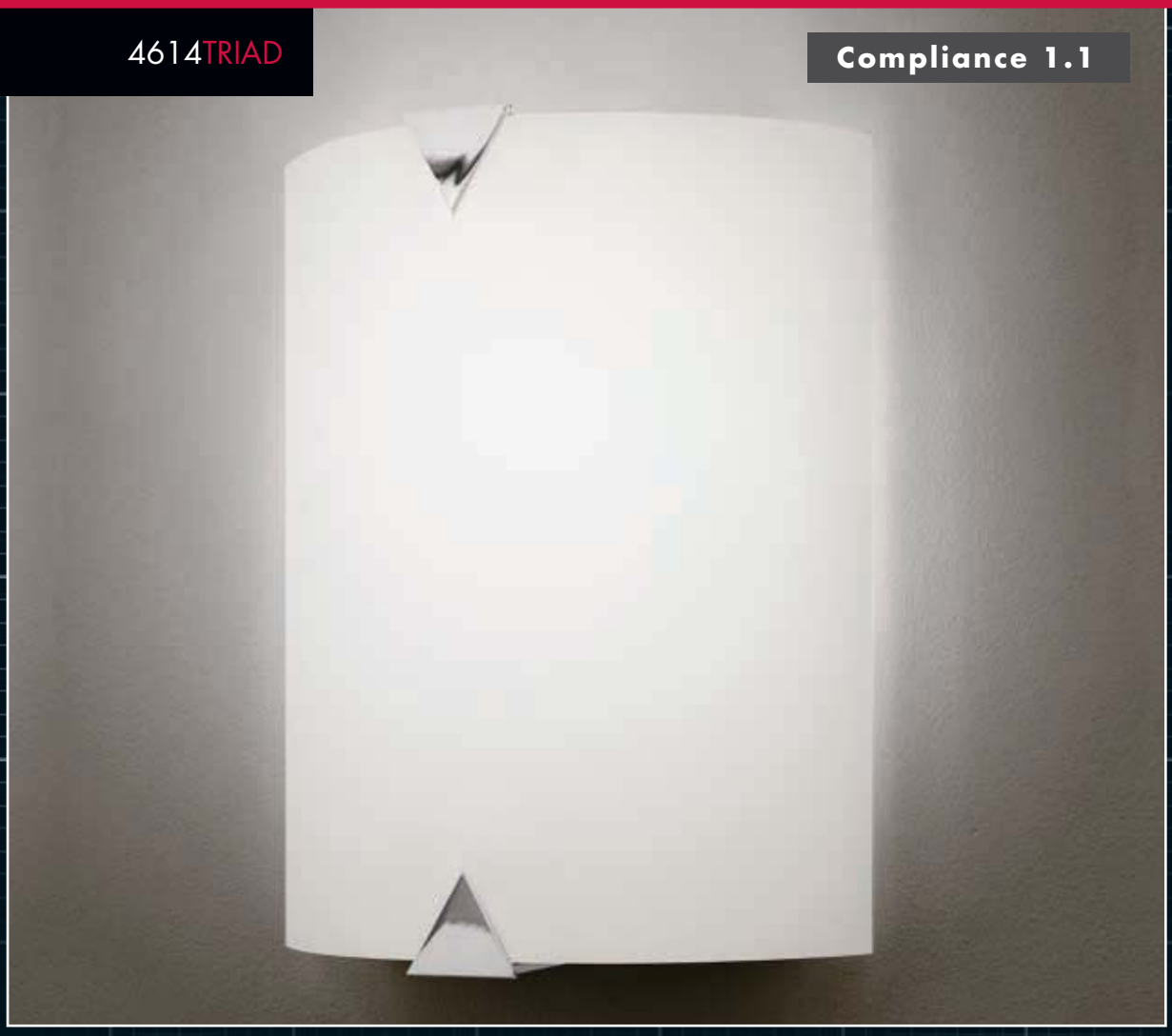
For the latest model numbers: www.lutron.com/ballasts

Lamp Type	Lamp Watts (Length)	Lamps per Ballast	Case Type[1]	**1 %** Dimming **Hi-lume**	5 % Dimming	**10 %** Dimming **Eco-10**	Ballast Current[2] – Amps
T5 Linear  5/8 in Dia	14 W (21.6 in)	1	C[3]	—		**E 3 T514 C 277 1**	.08
		2	C[3]	—		**E 3 T514 C 277 2**	.14
	21 W (33.4 in)	1	C[3]	—		**E 3 T521 C 277 1**	.11
		2	C[3]	—		**E 3 T521 C 277 2**	.19
	28 W (45.2 in)	1	C[3]	—		**ECO-T528-277-1**	.14
		2	C[3]	—		**ECO-T528-277-2**	.25
T5-HO Linear  5/8 in Dia	24 W (21.6 in)	1	C[3]	**FDB-T524-277-1**		**ECO-T524-277-1**	.13
		2	C[3]	**FDB-T524-277-2**		**ECO-T524-277-2**	.20
	39 W (33.4 in)	1	C[3]	**FDB-T539-277-1**		**ECO-T5H39-277-1**	.17
		2	C[3]	**FDB-T539-277-2**		**ECO-T5H39-277-2**	.31
	54 W (45.2 in)	1	C[3]	**FDB-T554-277-1**		**ECO-T554-277-1**	.25
		2	C[3]	**FDB-T554-277-2**		**ECO-T554-277-2**	.45
T8 Linear and U-Bent  1 in Dia	17 W (24 in)	1	F	**FDB-2427-277-1**		**ECO-T817-277-1**	.08
		2	F	**FDB-2427-277-2**		**ECO-T817-277-2**	.15
		3	F	**FDB-2427-277-3**		**ECO-T817-277-3**	.20
	25 W (36 in)	1	F	**FDB-3627-277-1**		**ECO-T825-277-1**	.12
		2	F	**FDB-3627-277-2**		**ECO-T825-277-2**	.19
		3	F	**FDB-3627-277-3**		—	.28
	32 W (48 in)	1	F	**FDB-4827-277-1**		**ECO-T832-277-1**	.14/.15[4]
		1	D	—		**ECO-T832-277-1-L**	.14
		1	D	—		**ECO-T832-277-1-T**	.14
		2	F	**FDB-4827-277-2**		**ECO-T832-277-2**	.25/.22[4]
		2	D	—		**ECO-T832-277-2-L**	.23
		2	D	—		**ECO-T832-277-2-T**	.23
		3	F	**FDB-4827-277-3**		**ECO-T832-277-3**	.35
	40 W (60 in)	1	F	**FDB-6027-277-1**		—	.16
		2	F	**FDB-6027-277-2**		—	.30

1 For case type information, see pages 36 and 37.
2 To calculate ballast input power, use the following formula: Watts = Ballast Current x 277.
3 Standard with terminals. Leaded options available. Please consult Lutron.
4 Eco-10 ballast current.

4614TRIAD

Compliance 1.1



Fixture shown with Polished Chrome clip and Etched Opal Acrylic lens. Polished Brass clip also available.

Need a different lamping? Modified Standard combines Custom and Standard to create unique lighting solutions.

4612 • BOHTON (See page 174)

4613 • MEDALLION (See page 172)

4615 • TENOR (See page 168)

MODIFIED STANDARD (See page 290)

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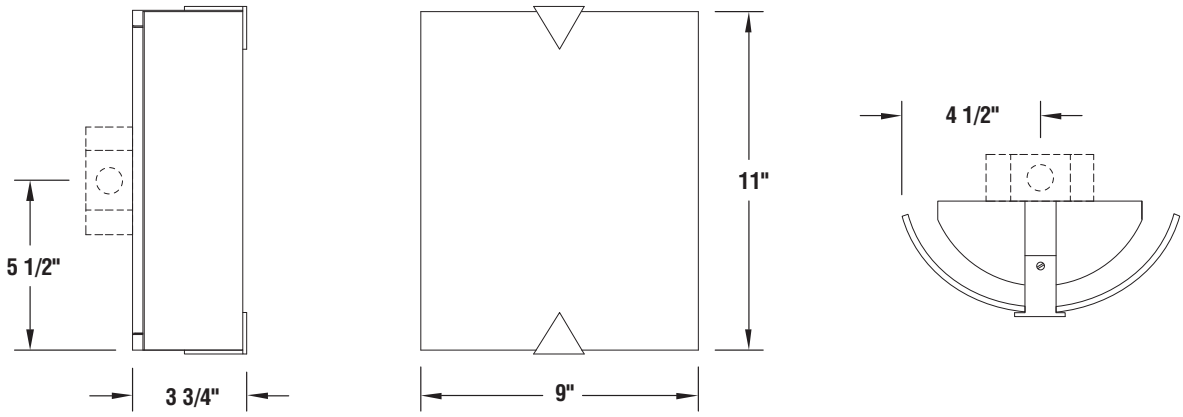
winona lighting

Technical Data:

4614



Product Specifications:

Catalog #: 4614

Lamping: 4614
- **I -** (1) 60W T-10/Med.
- **F -** (2) CFT13W/GX23

Voltage: **120V or 277V, Incandescent 120 Volt Only**

Lens Options:
- **OA:** Opal Acrylic (Etched)
- **FAH:** Hand Painted Faux Alabaster
  - **FAH4:** White Vein
  - **FAH5:** Antique Alabaster (Beige)
  - **FAH6:** Gray Vein
  - **FAH7:** Beige Vein
- **FGH:** Faux Glass

Finishes: Standard
- **PB:** Polished Brass
- **PC:** Polished Chrome

Custom
- **CPF:** Custom Paint Finish (Consult Factory)
- **CMF:** Custom Metal Finish (Consult Factory)

Special:
- **STD:** Standard
- **MOD:** Modified Standard

Weight: 4614
- **I:** 8 lbs.
- **F:** 8 lbs.

How to Specify:

EXAMPLE: 4614 - F - 120V - OA - PC - STD

- Catalog Number
- Lamping Option
- Voltage
- Lens Option
- Finish
- Special (STD or MOD)

NOTES:

- UL LISTED AND CUL APPROVED.
- ALL WINONA LIGHTING PRODUCTS ARE UNION MADE.
- CUSTOM SIZES AND FINISHES AVAILABLE UPON REQUEST.
- ALL FLUORESCENT FIXTURES AVAILABLE IN 120 VOLT OR 277 VOLT. INCANDESCENT IN 120 VOLT ONLY.
- WINONA LIGHTING RESERVES THE RIGHT TO MAKE DESIGN CHANGES WITHOUT PRIOR NOTICE.
- LAMPS NOT INCLUDED.
- COMPACT FLUORESCENT LAMP BASE INFORMATION: CFT13W (GX23). SEE PAGE 337 OF TECHNICAL SECTION FOR MORE INFORMATION.
- BALLAST INFORMATION: MAGNETIC

TO USE AS YOUR SUBMITTAL FORM, SIMPLY PHOTOCOPY THIS PAGE, FILL IN YOUR SPECIFICATIONS, AND FAX SUBMITTAL TO (507) 452-8528. A WINONA LIGHTING SALES REP WILL RESPOND TO YOUR REQUEST.

PRODUCT SPECIFICATIONS: 4614 - ____ - _____ - _____ - _____ - _____ - _____ TYPE: _____

TO VIEW OUR LATEST FIXTURES, CURRENT SPECIFICATIONS, FEATURE PROJECTS, AND MORE, VISIT US ONLINE AT WWW.WINONALIGHTING.COM

(FOR MORE INFORMATION ABOUT OUR WEBSITE SEE PAGES 346-349 FOR ALL THE DETAILS.)

Return to search | Print Page

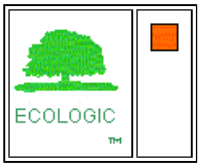
Product Number: 20283
Order Abbreviation: CF13DS/830/ECO
General Description: DULUX 13W single compact fluorescent lamp with 2-pin base, 3000K color temperature, 82 CRI, ECOLOGIC for use on magnetic ballast

Product Information	
Abbrev. With Packaging Info.	CF13DS830ECO 50/CS 1/SKU
Average Rated Life (hr)	10000
Base	GX23
Bulb	S (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3000
Family Brand Name	Dulux® S
Industry Standards	ANSI C78.901 - 2001, IEC 60901- 0013
Mean Lumens at 25C	688
Maximum Overall Length - MOL (in)	7.1
Maximum Overall Length - MOL (mm)	180
Nominal Wattage (W)	13.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- 2 pin CF lamps are not suitable for use in frequently cycled applications or with occupancy sensors. 2 pin CF lamps should never be installed in 4 pin sockets regardless if lamp will fit.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- 2 pin CF lamps should never be installed in 4 pin sockets regardless if lamp will fit.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
- Minimum starting temperature: CF5: -22 degrees F; CF7: -4 degrees F; CF9: 14 degrees F; CF13DS: 14 degrees F; CF13DD: -4 degrees F; CF18DD: 5 degrees F; CF18DT: -4 degrees F; CF26: 14 degrees F.

Print Page

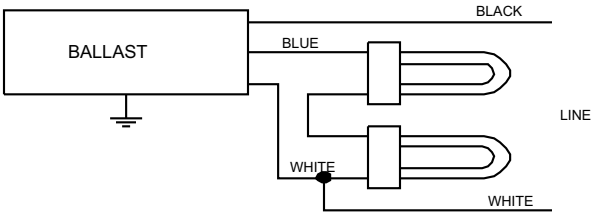
VH-2B13-TP-BLS

Brand Name	COMPACT-HPF
Ballast Type	Magnetic
Starting Method	Pre-Heat
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Starting Current (Amps)	Open Circuit (Amps)	Input Power (Watts)	Ballast Factor	MAX THD %	Power Factor
* CFQ13W/GX23	2	13	0/-18	0.10	0.35	0.21	27	0.91	35	0.97
CFT13W/GX23	2	13	0/-18	0.10	0.35	0.21	27	0.92	25	0.98

Wiring Diagram



Diag. 50

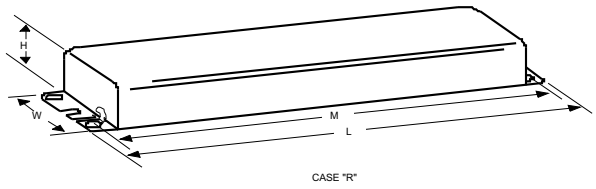
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	7	17.8
White	7	17.8
Blue	7	17.8
Red		0
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (std)/(TP)	Height (H)	Mounting (M)
4.75 "	2.21875 "/0 "	1.625 "	4.375 "
4 3/4	2 7/32 / 0	1 5/8	4 3/8
12.1 cm	5.6 cm / 0 cm	4.1 cm	11.1 cm

Revised 07/01/1999

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C100 SERIES • 120V • PAR16/20

Type C

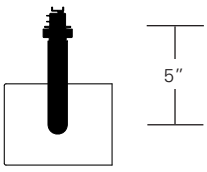
The clean, understated lines of this versatile fixture are ideal for accent or general lighting in many of interior spaces, from galleries and boutiques to private residences

- Designed for PAR16 or PAR20 Tungsten Halogen medium screw-base lamps up to 75 watts
- Sturdy aluminum housing
- Rugged steel self-locking yoke for horizontal and vertical focusing
- On/off safety switch (on most mounting types)
- External multiple accessory clips accept all size A LSI filters and accessories
  - Integral dimmer is available
  - Finishes: LSI Black, White, Silver and Graphite
  - Fixture weight: 1.5 lbs.
  - c UL us IBEW

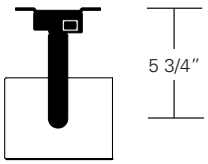
MOUNTING OPTIONS

C100-00
Lexan fitting for 1 and 2 circuit LSI Track. With On/Off switch.

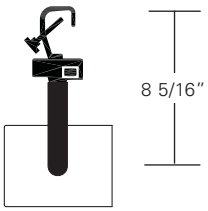
C100-00F
Same as above, with fuse.



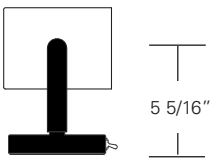
C100-2G
Universal fitting for Unistrut Systems and any screw or bolt-up applications. With switch, straight 6-foot 3-wire grounding cord and NEMA 5-15P plug.



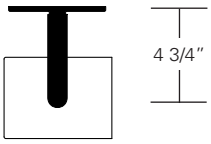
C100-3G
C-clamp for pipes from 5/8" to 2" O.D. With switch, straight 6-foot 3-wire grounding cord and NEMA 5-15P plug.



***C100-4G**
Cushioned weighted base for floor or table use. With switch, straight 6-foot 3-wire grounding cord and NEMA 5-15P plug.

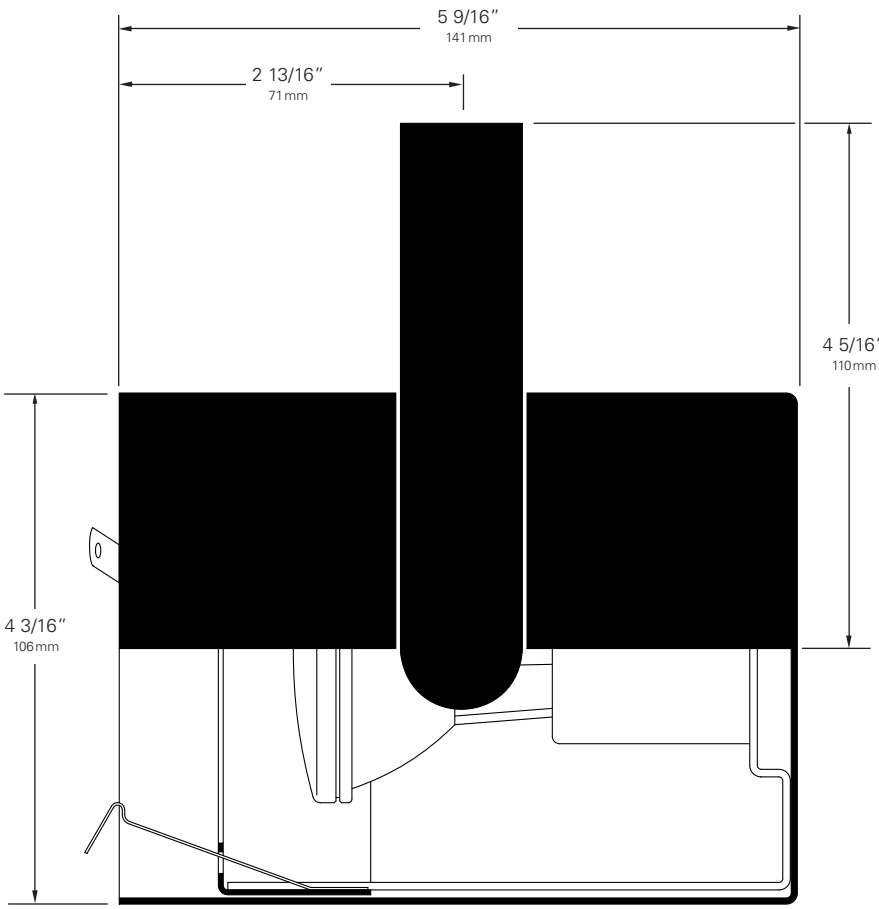


C100-5A
Canopy for permanent mounting on standard 4" octagonal outlet boxes.



Other Options (Consult Factory):
- Stems, specify length
- Custom color, RAL palette
- Emergency Fixture, add suffix **EF** (for use with 00 Track fitting only)

* Non-UL and Non-CUL



ORDERING INFORMATION

1. Select your **Mounting Option.**

2. Choose other fixture **Options** (add suffix):
   - For Coiled Cord, add **CC**

   Coiled Cord is 18/3 105ºC, 18" retracted, 6 foot extended. White fixtures are supplied with white cord, all other finishes are supplied with black cord. Available only with **2G**, **3G** and **4G** mounting options. (When a coiled cord is not specified, a straight cord is provided.)
   - For Wrench Locking, add **WL**
   - For Integral Dimmer, add **FD**

3. Choose a **Finish** for your fixture:
   Black (**B**) White (**W**) Silver (**S**) Graphite (**G**)

   Example: **SB20** — **2G** **CC** **WL** **FD** **B**
   (SB20: FIXTURE; 2G: FITTING; CC: COILED CORD; WL: WRENCH LOCKING; FD: DIMMER; B: FINISH)

   Blue fields are optional. Leave blank if not required.

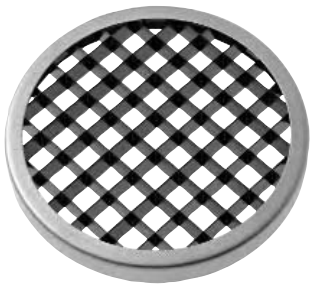
4. Don't forget your **Accessories!**
   LSI features the widest range of accessories in the industry to help you modify the light's intensity, color, texture and pattern.

PAR16/20 LAMPS

Watts	Spread	CBCP	
35	8°	3000	35PAR20/CAP/NSP
35	30°	900	35PAR20/CAP/NFL
35	40°	600	35PAR20/CAP/WFL
50	10°	6000	50PAR20/H/SP10
50	25°	1500	50PAR20/H/FL25
75	10°	7500	75PAR16/CAP/NSP
75	30°	1900	75PAR16/CAP/NFL

Click for detailed photometrics

ACCESSORIES



Louver A

1/2" cellular black metal louver, controls spill light & glare. 45° cutoff, rim finish to match fixture.

Other accessories:

- **Glass Color Filters A**
- **Spread Lenses A990, A992, A995, A996**
- **Beam Softener A998**
- **Light Blocking Screens A801S, A802S, A803S**
- **OPTIVEX™ UV Filter A962**

Click for complete accessories and descriptions

Return to search | Print Page

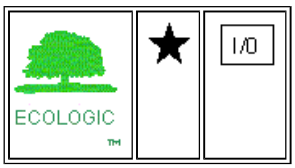
Product Number: 14467
Order Abbreviation: 35PAR20/HAL/NSP10 120V
General Description: Tungsten Halogen CAPSYLITE PAR20 Reflector Lamp Medium Base 35Watt 120Volt Narrow Spot Beam

Product Information	
Abbrev. With Packaging Info.	35PAR20HALNSP10 120V 15/CS 1/SKU
Approx. Lumens	360
Average Rated Life (hr)	2500
Base	E26 Medium
Beam Angle (deg)	10
Beam Type	NSP
Bulb	PAR20
Centerbeam Candlepower (cp)	3000
Class	C (gas)
Color Rendering Index (CRI)	100
Color Temperature/CCT (K)	2775
Diameter (in)	2.5
Diameter (mm)	63.5
Ecologic	YES
Family Brand Name	CAPSYLITE® PAR20 SPL
Filament	CC-8
Horizontal Beam Angle (deg)	10
Lamp Finish	Reflector
Maximum Overall Length - MOL (in)	3.250
Maximum Overall Length - MOL (mm)	79.375
Nominal Voltage (V)	120.00
Nominal Wattage (W)	35.00
Vertical Beam Angle (deg)	10

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- State of the Art SPL Optics
- In base up operation, heat may eventually deteriorate paper-lined or plastic sockets.

Print Page

FEATURES

OPTICAL SYSTEM

- Self-flanged, semi-specular or matte-diffuse reflector. Patented Vertisys-Bounding Ray™ Optical Principle design (US Patent #5,800,050) provides lamp before lamp image. Lamp image that reflects smoothly from the top of the reflector to the aperture, providing optimal fixture performance and efficiency.

MECHANICAL SYSTEM

- 16-gauge galvanized steel mounting/plaster frame with integral yoke and flat spring to retain optical system. Maximum 1-5/8" ceiling thickness.
- 16-gauge galvanized steel mounting bars with continuous 4" vertical adjustment are shipped pre-installed. Post installation adjustment possible without the use of tools from above or below the ceiling.
- Galvanized steel junction box with bottom-hinged access covers and spring latch. Two combination 1/2"-3/4" and three 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors rated for 90°C.

ELECTRICAL SYSTEM

- Rugged aluminum lampholder housing.
- Vertically-mounted, positive-latch, thermoplastic socket.
- Class P, thermally-protected, high power factor ballast mounted to the junction box.
- Simply5™ technology available. SIMPLY5 LIGHTING INTELLIGENCE

LISTING

- Fixtures are UL Listed for thru-branch wiring, Non-IC recessed mounting and damp locations. Listed and labeled to comply with Canadian Standards.

Type **Catalog number** Type D

.....

.....

.....

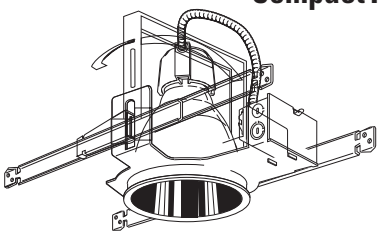
.....

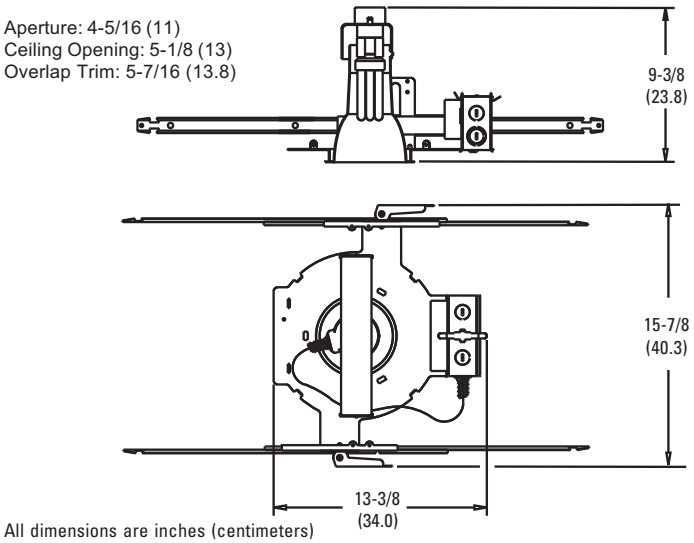
Compact Fluorescent Downlights

4" AFV

Open Reflector

Vertical
Triple-Tube Lamp





All dimensions are inches (centimeters)

ORDERING INFORMATION

Example: **AFV 26TRT 4AR MVOLT WLP**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

AFV

Series	Wattage/ Lamp	Aperture/ Trim color	Finish	Voltage	Ballast[3]	Options
AFV	**18TRT**	**4AR** Clear	(blank) Semi-specular	**MVOLT[2]**	(blank) Electronic ballast	**ELR[6]** Emergency battery pack with remote test switch
	26TRT	**4PR** Pewter	**LD** Matte-diffuse	**120**	**DMHL[4]** Lutron Compact SE™ electronic dimming ballast. Minimum dimming level 5%	**ELRHL[6]** High lumen output emergency battery pack with remote test switch
	32TRT	**4UBR** Umber		**277**	**ADEZ[4]** Advance Mark 10® electronic ballast. Minimum dimming level 5%	**GMF[7]** Single, slow-blow fuse
		4WTR Wheat		**347**	**S5[5]** SIMPLY5™ system ballast	**GLR[7]** Single, fast-blow fuse
		4MB[1] Black baffle				**TRW** White painted flange (standard on MB and WB)
		4WB[1] White baffle				**TRBL** Black painted flange
						GSKT Foam gasketing
						WLP 3500°K lamp (shipped separately)
						LRC[8] Provides compatibility with Lithonia Reloc® wiring system; access above ceiling required
						CP[9] Chicago plenum
						BDP[10] Ballast disconnect plug
						HW Hardwire for S5 system; replaces Reloc

NOTES:
1 Not available with finishes.
2 Multi-volt electronic ballast capable of operating on any line voltage from 120V through 277V, 50 or 60Hz.
3 For additional ballast types, refer to Technical Bulletins tab.
4 120V or 277V only.
5 SIMPLY5 includes 9' S5 MLC Reloc wiring system (shipped separately). Available in 26W or 32W; 120V or 277V only. See simply5.net for more information.
6 For dimensional changes, refer to Technical Bulletins tab.
7 Not available with MVOLT.
8 For compatible Reloc systems, refer to Technical Bulletins tab.
9 Not available with ELR or ELRHL options.
10 Meets codes that require in-fixture disconnect.

Accessories

Order as separate catalog numbers.

SCA4 Sloped ceiling adapter. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D). Ex: SCA4**10D**

Return to search | Print Page

Product Number: 20767

Order Abbreviation: CF26DT/E/827/ECO

General Description: DULUX 26W triple compact fluorescent lamp with 4-pin base, integral EOL, 2700K color temperature, 82 CRI, for use with electronic and dimming ballasts, ECOLOGIC

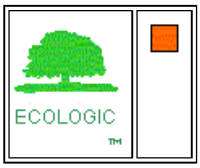
Product Information	
Abbrev. With Packaging Info.	CF26DTE827ECO 50/CS 1/SKU
Average Rated Life (hr)	12000
Base	GX24Q-3
Bulb	T (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	2700
Family Brand Name	Dulux® T/E
Industry Standards	IEC 60901- 3426
Mean Lumens at 25C	1548
Maximum Overall Length - MOL (in)	5.2
Maximum Overall Length - MOL (mm)	124
NEMA Generic Designation (old)	CFM26W/GX24Q/827
Nominal Wattage (W)	26.00

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- This 4-pin DULUX lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp)sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.

Print Page

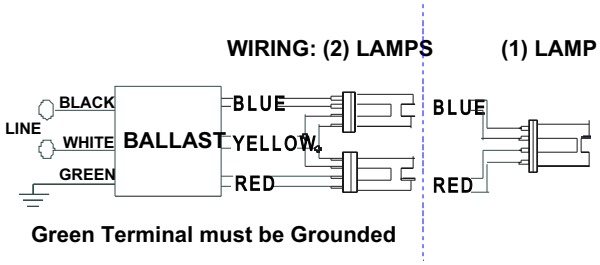
ICF2S26M1BSQS@277

Brand Name	SMARTMATE-QS
Ballast Type	Electronic
Starting Method	Rapid 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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
CFQ26W/G24Q	1	26	0/-18	0.10	27	1.00	10	0.99	1.7	3.70
CFQ26W/G24Q	2	26	0/-18	0.19	51	1.00	10	0.99	1.7	1.96
* CFTR26W/GX24Q	1	26	0/-18	0.11	29	1.10	10	0.99	1.7	3.79
CFTR26W/GX24Q	2	26	0/-18	0.20	54	1.00	10	0.99	1.7	1.85
CFTR32W/GX24Q	1	32	0/-18	0.13	36	0.98	10	0.98	1.7	2.72
CFTR42W/GX24Q	1	42	0/-18	0.17	46	0.98	10	0.98	1.7	2.13

Wiring Diagram



Green Terminal must be Grounded

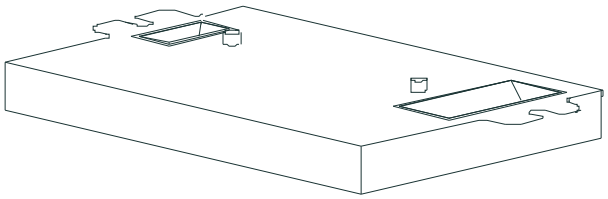
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
4.98 "	2.40 "	0.98 "	2.00 "
4 49/50	2 2/5	0 49/50	2
12.6 cm	6.1 cm	2.5 cm	5.1 cm

Revised 06/24/2008

Data is based upon tests performed by Advance Transformer in a controlled environment and 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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Solitaire™

Type E

Five Variations

Solitaire™

Inspired by lantern style gas luminaires, Solitaire is a classic, yet relevant to current architecture. The optical systems are identical to those used in many other Kim luminaires, requiring in a perfect blend of aesthetics and performance. Should a little more traditional appearance be desired, the luminous top adds definition without reducing area lighting capability. A lower white acrylic lens produces even more identity, and when combined with the luminous white acrylic top, produces a decided jewel-like appearance to the luminaire. Finally, an induction fluorescent lamp option provides 100,000 hours of trouble free operation, and instant-on capability. Solitaire is inspired by designs past, classically rendered, and infused with all the modern performance features you have come to know from Kim.

SRS1

Die-Cast Aluminum Top

Clear Acrylic Lens

Horizontal
or Vertical Lamp
70 - 200 watt H.I.D.

SRS2

White Acrylic Glow Top

Clear Acrylic Lens

Horizontal Lamp
70 - 175 watt H.I.D.

SRS3

White Acrylic Glow Top

White Acrylic Lens

Horizontal Lamp
70 - 175 watt H.I.D.

SRS4

Die-Cast Aluminum Top

White Acrylic Lens

Vertical Lamp
70 - 200 watt H.I.D.

SRS5

Vertical Lamp
85 watt Induction Lamp

Table of Contents

Photometrics – See separate NS/SRS Photometric Catalog.

ISO 9001:2000

KIM LIGHTING

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PARKING STRUCTURE
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ARCHITECTURAL FLOOD
ACCENT
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U.S.A.
PHONE 626 / 968-5666
FAX 626 / 369-2695

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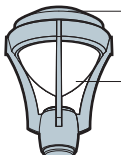


Ordering Information

SRS4 Solitaire - H.I.D.

Ordering Example:
For Standard Fixture and Pole

Mounting	Fixture	Electrical Module	Finish	Options	Pole
FM /	SRS4F5 /	100HPS277 /	PS-P /	A-33 /	PRA14-4125 / PS-P
1	2	3	4	5-8	See Kim Pole Catalog (**PRA**, **KRS** for **NS**) Omit for **1W** Wall Mount

1 Mounting:

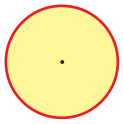
	Flush Mount 4″ O.D. Poles only	Tenon Mount For Poles with 2″ Pipe-size Tenon	Twin Mount 4″ or 5″ O.D. Poles only	Wall Mount
Cat. No.:	**FM**	**PT**	**2SB**	**1W**
EPA:	1.5	1.5	4.25	n/a

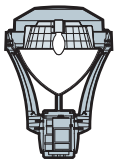
2 Fixture:

Cat. No. designates **SRS4** fixture and light distribution.

See the Kim Site/Roadway Optical Systems Catalog for detailed information on reflector design and application.

Vertical Lamp

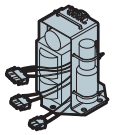




Light Distribution: Symmetric Diffused
Cat. No.: **SRS4F5**

3 Electrical Module:

HPS = High Pressure Sodium
MH = Metal Halide
PMH = Pulse Start Metal Halide



Lamp Watts	Lamp Type	Line Volts
100	**HPS**	**277**

70HPS120	**100HPS120**	**150HPS120**	**175MH120**	
70HPS208	**100HPS208**	**150HPS208**	**175MH208**	
70HPS240	**100HPS240**	**150HPS240**	**175MH240**	
70HPS277	**100HPS277**	**150HPS277**	**175MH277**	
70HPS347	**100HPS347**	**150HPS347**	**175MH347**	
70HPS480[2]	**100HPS480**[2]	**150HPS480**[2]	**175MH480**[2]	
70PMH120	**100PMH120**	**150PMH120**	**175PMH120**[1]	**200PMH120**[1]
70PMH208	**100PMH208**	**150PMH208**	**175PMH208**[1]	**200PMH208**[1]
70PMH240	**100PMH240**	**150PMH240**	**175PMH240**[1]	**200PMH240**[1]
70PMH277	**100PMH277**	**150PMH277**	**175PMH277**[1]	**200PMH277**[1]
70PMH347	**100PMH347**	**150PMH347**	**175PMH347**[1]	**200PMH347**[1]
70PMH480[2]	**100PMH480**[2]	**150PMH480**[2]	**175PMH480**[1,2]	**200PMH480**[1,2]

[1] Not for use in horizontal lamp reflectors.

[2] Check with local codes for use of medium base sockets with the 480 volt.

4 Finish:

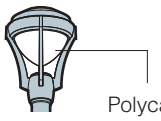
Super TGIC powder coat paint over Titanated Zirconium conversion coating.

Color:	Black	Dark Bronze	Light Gray	Platinum Silver	White	Custom Colors
Cat. No.:	**BL-P**	**DB-P**	**LG-P**	**PS-P**	**WH-P**	**CC-P** Consult representative or custom colors.

5 Optional Photocell:

Line Volts:	120V	208V	240V	277V	347V	480V
Cat. No.:	**A-30**	**A-31**	**A-32**	**A-33**	**A-35**	**A-34**

6 Optional Polycarbonate Lens:



Polycarbonate Lens

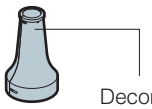
Cat. No.: **WP** White Polycarbonate Lens replaces white acrylic lens.

7 Optional Fusing:

Line Volts:	120V	208V	240V	277V	347V	480V
Cat. No.:	**SF**	**DF**	**DF**	**SF**	**SF**	**DF**

8 Optional Decorative Base Cover:

Ordered with fixture.



Decorative Base Cover

Cat. No.: **DBC4** Decorative Base Cover for 4″ Poles.
Cat. No.: **DBC5** Decorative Base Cover for 5″ Poles.
Replaces standard base cover.

Return to search | Print Page

Product Number: 64426
Order Abbreviation: MPD100/U/MED/840
General Description: 100W, 4000K, high CRI, reduced color shift, high performance, open fixture rated metal halide lamp, clear, universal burn

Product Information	
Abbrev. With Packaging Info.	MPD100UMED840 100V 20/CS 1/SKU
ANSI Code	M90/O
Approx. Lumens (initial - horizontal)	8400
Approx. Lumens (initial - vertical)	8400
Approx. Lumens (mean - horizontal)	5800
Approx. Lumens (mean - vertical)	5800
Arc Length (in)	0.45
Arc Length (mm)	11.5
Average Rated Life - Horizontal (hr)	6000
Average Rated Life - (hr)	6000
Average Rated Life - Vertical (hr)	7500
Base	E26 Medium
Bulb	E17
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	4200
Diameter (in)	2.125
Diameter (mm)	54
Family Brand Name	Designer Series Metalarc® Pro-Tech
Fixture Requirement	O
Hot Restrike Time (min)	5-7
Lamp Finish	Clear
Light Center Length - LCL (in)	3.39
Light Center Length - LCL (mm)	86
Maximum Base Temperature - Fahrenheit	410
Maximum Base Temperature - Celsius	210
Maximum Bulb Temperature - Fahrenheit	752
Maximum Bulb Temperature - Celsius	350
Maximum Overall Length - MOL (in)	5.43
Maximum Overall Length - MOL (mm)	138
Nominal Voltage (V)	95.00
Nominal Wattage (W)	100.00
Operating Position	Universal
Warm-up Time (min)	2-4

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information

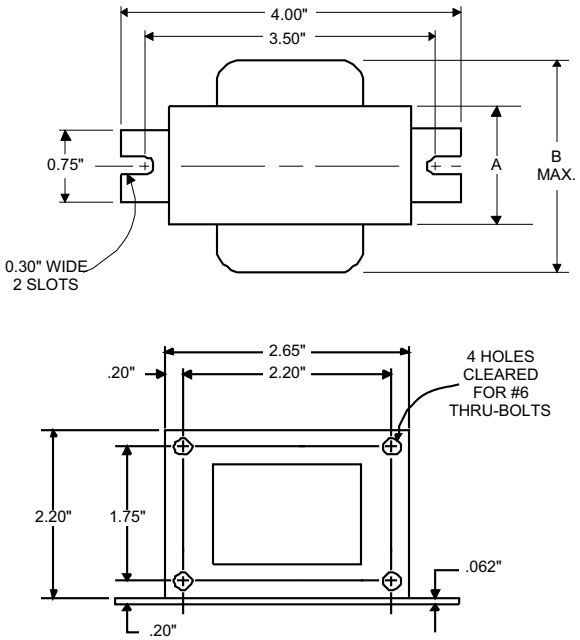
Footnotes

Metal Halide Lamp Ballast

Catalog Number 71A5337BP
For 100W M90/M140
60 Hz R-HPF
Status: Active

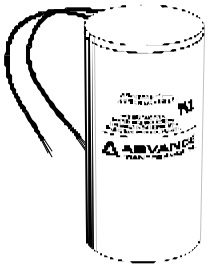
DIMENSIONS AND DATA

2 5/8 X 2 3/16 CORE



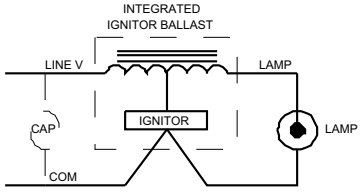
INPUT VOLTS		277					
CIRCUIT TYPE	R-HPF						
POWER FACTOR (min)	90%						
REGULATION							
Line Volts	±5%						
Lamp Watts	±10%						
LINE CURRENT (Amps)							
Operating		0.45					
Open Circuit		1.05					
Starting		0.70					
UL TEMPERATURE RATINGS							
Insulation Class	H(180°C)						
Coil Temperature Code	1029	A					
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C						
NOM. OPEN CIRCUIT VOLTAGE	277						
INPUT VOLTAGE AT LAMP DROPOUT		190					
INPUT WATTS	118						
RECOMMENDED FUSE (Amps)		3					
CORE and COIL							
Dimension (A)	1.80						
Dimension (B)	3.10						
Weight (lbs.)	3.2						
Lead Lengths	12"						
CAPACITOR REQUIREMENT							
Microfarads							
Volts (min.)	10.0						
Fault Current Withstand (amps)	280						
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)							
High Potential Test (Volts)							
1 minute	2000						
2 seconds	2500						
Open Circuit Voltage Test (Volts)	260-290						
Short-Circuit Current Test (Amps)							
Secondary Current							
Input Current	1.05-1.55	0.25 0.35	-	-	-	-	

Capacitor: 7C100M33-R



Capacitance: 10
Dia/Oval Dim: 1.5
Height: 2.9
Temp Rating: 105°C

Wiring Diagram:



U.L. RECOGNIZED

Fig. H

Ignitor: INTEGRAL

An ignitor integral to the core and coil assembly is used to start the lamp.

Ballast to Lamp Distance (BTL) = 2 feet
Temp Rating: 125°C

Typical Ordering Information

(please call Advance for suffix availability)

Order Suffix	Description
500DB	Ballast With Integral Igniter and Dry Film Capacitor
510DB	Ballast w/Welded Bracket, Integral Igniter & Dry Film Cap.
600B	Ballast and Integral Igniter, No Capacitor
610B	Ballast w/Welded Bracket and Integral Igniter, No Capacitor

Data is based upon tests performed by Advance Transformer in a controlled environment and representitive of relative performance.
Actual performance can vary depending on operating conditions. Specifications are subject to change without notice.

ADVANCE
O'HARE INTERNATIONAL CENTER · 10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
Customer Support/Technical Service: Phone: 800-372-3331 · Fax: 630-307-3071
Corporate Offices: Phone: 800-322-2086

08/12/04

Type F

KRS

Round Steel (Non - Tapered) Poles

1 Pole Cat. No.

Allowable Pole EPA - Refer to wind map on p. 75

	X	Y	A.B. Size	85 (38m/s)	90 (40m/s)	100 (45m/s)	110 (49m/s)	120 (54m/s)	130 (58m/s)	140 (63m/s)	150 (67m/s)
KRS10-4120	10'	4" x 11ga.	¾" x 15 + 3	21.61	19.07	17.41	14.07	11.53	9.63	8.22	7.09
KRS12-4120	12'	5" x 11ga.	¾" x 15 + 3	17.33	15.22	13.84	11.05	8.94	7.38	6.26	5.37
KRS14-4120	14'	4" x 11ga.	¾" x 15 + 3	14.18	12.37	11.18	8.79	6.98	5.67	4.78	4.06
KRS16-4120	16'	4" x 11ga.	¾" x 15 + 3	11.72	10.13	9.09	7.01	5.42	4.30	3.58	3.01
KRS20-4120	19.5'	4" x 11ga.	¾" x 30 + 4	7.77	6.55	5.75	4.13	2.91	2.10	1.65	1.31
KRS20-4180	19.5'	4" x 7ga.	¾" x 30 + 4	12.67	10.92	9.77	7.46	5.70	4.48	3.70	3.09
KRS20-5120	19.5'	5" x 11ga.	¾" x 30 + 4	13.57	11.62	10.35	8.26	6.73	5.56	4.65	3.93
KRS20-5180	19.5'	5" x 7ga.	¾" x 30 + 4	21.60	18.79	16.94	13.71	11.31	9.47	8.02	6.86
KRS25-5120	25'	5" x 11ga.	¾" x 30 + 4	8.46	6.97	6.00	4.61	3.63	2.88	2.31	1.87
KRS25-5180	25'	5" x 7ga.	¾" x 30 + 4	14.59	12.44	11.03	8.77	7.12	5.86	4.88	4.10
KRS30-5180	30'	5" x 7ga.	¾" x 30 + 4	9.84	8.12	6.99	5.37	4.23	3.36	2.70	2.18

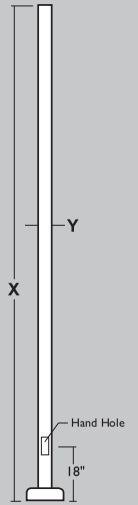
2 Plan View *Cat. No. Mounting Orientations

- FM: Luminaire is flush mounted directly to top of pole
- PT: Luminaire is tenon mounted with a slip-fitter or a cluster is used for floodlights. 2" pipe x 4" long (2.375" O.D.)
- A/SA: Pole is drilled to mount a single luminaire directly to the side of pole
- B/SB: Pole is drilled to mount two luminaires directly to the side of pole, 180 degrees apart
- L/SL: Pole is drilled to mount two luminaires directly to the side of pole, 90 degrees apart
- T/ST: Pole is drilled to mount three luminaires directly to the side of pole, 90 degrees apart
- Y/SY: Pole is drilled to mount three luminaires directly to the side of pole, 120 degrees apart
- C/SC: Pole is drilled to mount four luminaires directly to the side of pole, 90 degrees apart

Structural Luminaires Only - Examples:

TS:	Single Tension for small and large Structural - KRS20-5120B-TS
TD:	Double Tension for small and large Structural - KRS20-5120B-TD
TR:	Truss for small and large Structural - KRS20-5120SB-TR
XTS:	Single Tension for 1000W Structural - KRS20-5120B-XTS
XTD:	Double Tension for 1000W Structural - KRS20-5120B-XTD
XTR:	Truss for 1000W Structural - KRS20-5120B-XTR

* See luminaire drilling requirements in luminaire catalog.



3 Finish

Super TGIC powder coat paint over titanated zirconium conversion coating

Color:	Black	Dark Bronze	Light Gray	Stealth Gray	Platinum Silver	White	Custom Colors
Cat No.:	BL	DB	LG	SG	PS	WH	CC - Consult representative for custom colors.

4 Options

Anchor Bolt Covers

(Full base cover is standard.)
Four cast aluminum anchor bolt covers finished to match pole, fastened to base with stainless steel screws.
BC4 4" pole Bolt Covers
BC5 5" pole Bolt Covers

Duplex Receptacle

Mounted opposite the handhole, at 22½" from base of pole, in a cast aluminum box that is internally welded and sealed with a gasketed self-closing cover and locking bracket. When decorative base cover is ordered, the receptacle is above the cover.
DR Duplex Receptacle rated 20A., 125V.
DR-GFI Duplex Receptacle with Ground Fault Circuit Interrupter rated 20A., 125V.

ORDERING EXAMPLE: Pole-Orientation KRS20-5120B (1-2) / Finish SG (3) / Options HBC-1 / DR-GFI (4)

Specifications

Pole Construction: One piece non-tapered round shaft of low carbon steel (ASTM-A500 Grade B, 42,000 PSI min. yield) with one flush-welded vertical seam. Shaft is welded to a flat steel anchor base (ASTM-36, 36,000 PSI min. yield).

Base Cover: Base has a two piece cast aluminum full cover of 319 alloy, secured by stainless steel screws. Optional anchor bolt covers available.

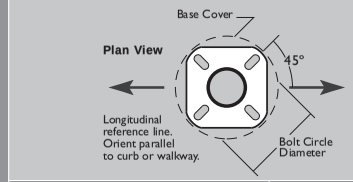
Pole Cap: A flush-sided cast aluminum pole cap is provided for side arm mounted luminaires. A rounded cast aluminum pole cap is provided for twin mounted luminaires (NS only).

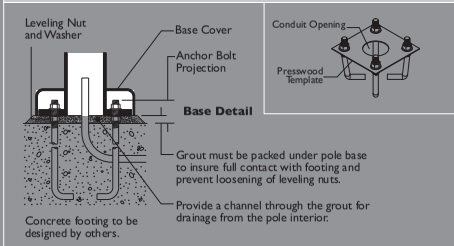
Handhole: 18" up from base, with a gasketed cover and ground lug. 2" x 4" handhole provided on poles up to 16'. Reinforced 3" x 6" handhole provided on poles 20' and taller.

Anchor Bolts: Four fully galvanized anchor bolts provided (ASTM-36, 36,000 PSI min. yield), complete with eight galvanized nuts, eight galvanized flat washers, and a presswood template.

Strength: Poles will withstand wind loads as listed in chart when luminaires are mounted per fixture installation instructions.

Finish: Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness. 5 stage steel pretreatment to include phosphoric acid etch, followed by iron phosphate bath and chromate sealer for corrosion resistance. Custom colors are available and subject to additional charges, minimum quantities and longer lead times. Consult representative.





Anchor Base and Bolt Detail (mm)

Pole Diameter	Bolt Circle Diameter	Anchor Bolt Projection	Bolt Cover Size	Conduit Opening
4"(102)	7-8.5"(178-216)	3.25"(83)	11.88"(302)	3"(76)
5"(127)	7.5-8.5"(191-216)	3.25"(83)	11.88"(302)	3"(76)

Date: _____ Type: Type G & H

Firm Name: _____

Project: _____

eW Graze Powercore

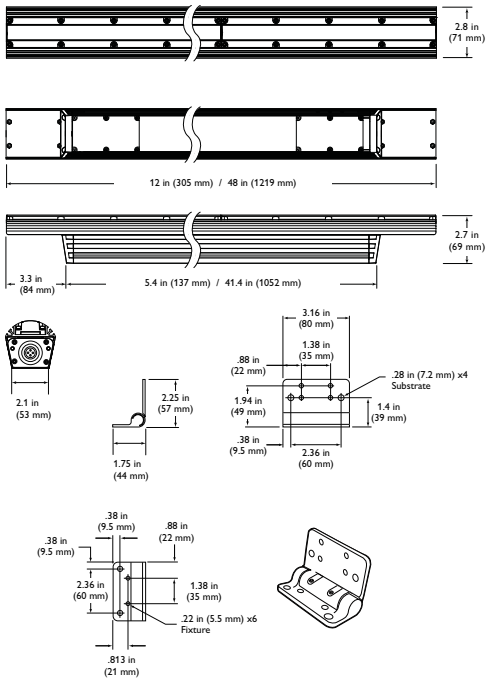
4000 K, 10° x 60° Lens

Linear, white LED surface light for wall washing and grazing

eW® Graze Powercore is a linear lighting fixture optimized for surface grazing and wall-washing applications requiring high-quality white light. Featuring Powercore® technology, eW Graze Powercore processes power directly from line voltage, eliminating the need for low-voltage, external power supplies. Available in 2700 K or 4000 K color temperatures, eW Graze Powercore offers superior illumination quality and dramatic energy savings for new installations and retrofit upgrades. Combining a space-efficient, low-profile aluminum housing and flexible mounting options allows for discrete placement within a wide range of compact architectural details

.• Tailor light output to specific applications — eW Graze Powercore is available in 1 ft and 4 ft exterior-rated housings, with 10° x 60° and 30° x 60° beam angle options.

- High-performance illumination and beam quality — eW Graze Powercore offers superior beam quality for striation-free saturation as close as 6 in (152 mm) from fixture placement. With a 60° horizontal beam angle, eW Graze Powercore accommodates end-to-end or incremental placement without visible light scalloping between fixtures.
- Supports new applications for white light— Long-life LEDs (50,000 hours at 50% lumen maintenance) significantly reduce or eliminate maintenance problems, allowing the use of white lighting in spaces where bulb maintenance may be limited or unfeasible.
- Universal power input range — eW Graze Powercore accepts line voltage input of 100, 120, 220 – 240, and 277 VAC.
- Versatile installation options — Constant torque, locking hinges offer simple position control from various angles, without special tools. The low-profile extruded aluminum housing accommodates installation within wide-ranging architectural niches.
- "Cool lighting" functionality — eW Graze Powercore fixtures do not heat illuminated surfaces, discharge infrared radiation or emit ultraviolet light.
- Dimming capable — Patented DIMand™ technology offers smooth dimming capability with standard ELV-type dimmers.
- Trouble-free, code-compliant installation — IP66, UL wet location ratings. UL / cUL, FCC, CE, RoHS, WEEE certified.



For detailed product information, please refer to the eW Blast Powercore Product Guide at www.colorkinetics.com/support/productguides.

PHILIPS

Specifications

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

Item	Specification	1 ft	4 ft
Output	Beam Angle	10° x 60°	
	Color Temperature	4000 K (+400 / -500)	
	Lumens[1]	477	1908
	Efficacy (Lm/W)	33.4	
	Mixing Distance	6 in (152 mm) to uniform beam saturation	
	Lumen Maintenance	100,000+ hours $L70^2$ @ 25° C (typical application) 50,000 hours $L70^2$ @ 50° C	
Electrical	Input Voltage	100 / 120 / 220 – 240 / 277 VAC	
	Power Consumption	14.3 W maximum at full output, steady state	57.20 W maximum at full output, steady state
Control		Commercially available ELV control dimmers	
Physical	Dimensions *(Height x Width x Depth)*	2.7 x 12 x 2.8 in (69 x 305 x 71 mm)	2.7 x 48 x 2.8 in (69 x 1219 x 71 mm)
	Weight	2.7 lb (1.2 kg)	10.8 lb (4.9 kg)
	Housing	Extruded anodized aluminum	
	Lens	Clear polycarbonate	
	Fixture Connectors	Integral male / female waterproof connectors	
	Mounting	Multi-positional, constant torque locking hinges	
	Temperature	-40° – 122° F (-40° – 50° C) Operating -4° – 122° F (-20° – 50° C) Startup	
	Humidity	0 – 95%, non-condensing	
	Maximum Fixture Series Length	85 ft (26 m) at 100 VAC 100 ft (30 m) at 120 VAC 170 ft (52 m) at 220 – 240 VAC 200 ft (60 m) at 277 VAC	
Certification and Safety	Certification	UL / cUL, FCC Class A, CE, RoHS, WEEE	
	LED Class	Class 2 LED product	
	Environment	Dry / Damp / Wet Location, IP66	

[1] Lumen measurement complies with IES LM-79-08

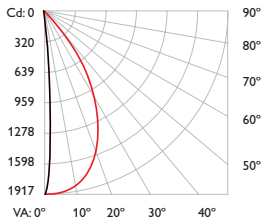
[2] L_{70} = 70% maintenance of lumen output. (When light output drops below 70% of initial output.)

OPTIBIN® CK TECHNOLOGY | POWERCORE® CK TECHNOLOGY | DIMAND® CK TECHNOLOGY

Photometrics

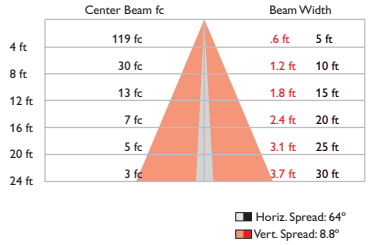
4000 K, 1 ft, 10° x 60° lens

Polar Candela Distribution



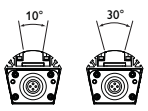
	0	22.5	44	67.5	90
0	1902	1902	1902	1902	1902
5	782	870	1135	1596	1896
15	98	107	156	570	1734
25	45	51	73	160	1356
35	25	29	42	76	774
45	12	14	25	47	261
55	4	6	13	29	66
65	1	2	6	14	26
75	0	0	1	5	10
85	0	0	0	0	1
90	0	0	0	0	0

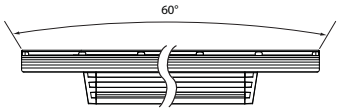
Illuminance at Distance



For lux multiply fc by 10.7

Power Consumption	14.3 W
Lumens	477
Efficacy	33.4 Lm/W





Fixtures

Item	Beam Angle	Voltage	Size	Item Number	Philips 12NC
eW Graze Powercore, 4000 K	10° x 60°	120 VAC	1 ft	523-000030-01	910503700277
			4 ft	523-000030-03	910503700279
		277 VAC	1 ft	523-000030-09	910503700285
			4 ft	523-000030-11	910503700287
		220 – 240 VAC	1 ft	523-000030-17	910503700293
			4 ft	523-000030-19	910503700295
		100 VAC	1 ft	523-000030-25	910503700301
			4 ft	523-000030-27	910503700303

Use Item Number when ordering in North America.

Accessories

Item	Type	Size	Item Number	Philips 12NC
Leader Cable	UL / cUL	50 ft (15.2 m)	108-000041-00	910503700320
	CE		108-000041-01	910503700320
Jumper Cable	UL / cUL	End-to-End	108-000039-00	910503700314
		1 ft (305 mm)	108-000039-01	910503700315
		5 ft (1.5 m)	108-000039-02	910503700316
	CE	End-to-End	108-000040-00	910503700317
		1 ft (305 mm)	108-000040-01	910503700318
		5 ft (1.5 m)	108-000040-02	910503700319

Philips Color Kinetics
3 Burlington Woods Drive
Burlington, Massachusetts 01803 USA
Tel 888.Full.RGB
Tel 617.423.9999
Fax 617.423.9998
www.colorkinetics.com

DAS-000009-02 R00 12-08

Dot 21/42

Waterproof IP67

The lighting industry sets new standards for architectural lighting. Any building can be transformed into a striking landmark when a smart lighting concept is applied.

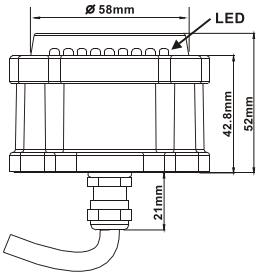
DecaLED® Dots are perfect light sources to develop innovative lighting situations. Multiple LED clusters, mounted onto the surface of a building, can create artistic lighting effects, project images or even transmit messages to the viewer.

By exploring digital images as a control medium for light, the idea of transmitting images through multiple lighting devices was a well-received concept. The DecaLED® Dot 21/42 meets all those requirements. Each Dot can be controlled directly by DMX and is capable of operating in both indoor and outdoor environments.
High manufacturing standards and a solid weatherproof housing ensure a long and maintenance-free lifespan.

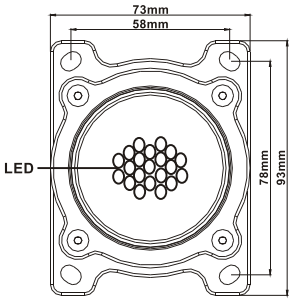
DecaLED® Dot 21/42 Product Specification		
Code	95129249	95128249
Description	DecaLED® Dot 42 black	DecaLED® Dot 21 black
Type	DECA.Dot.42BL	DECA.Dot.21BL
Operating voltage	24VDC	24VDC
Current	0.2A	0.1A
Power consumption	4W	2W
max. chainable	30	30
Current at max. chain	6A	3A
Power consumption at max. chain	144W	72W
Control	USB-i 505	USB-i 505
total per controller	60	120
total per output	15	30
Max. per PSU 24V 80W	20	40
Max. per 24V 300W	75	150
LED properties	9x R - 6x B - 6x G	18x R - 12x B - 12x G
Dimensions	93 x 73 x 52 mm	93 x 73 x 52 mm
Weight	350g	275g
IP rating	IP67	IP67

Accessories

Control	Setup tool
 P. 25	
USB-i 505 95380247	Setup tool 95350247



SIDE VIEW



TOP VIEW

Photometric Data

Light source specifications

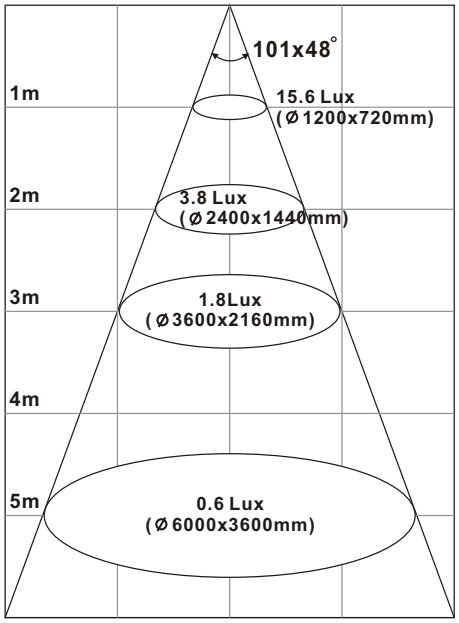
Optics:	tempered polycarbonate
Light source:	43 high power led (15 red, 14 green, 14 blue)
Beam angle:	101 x 48 deg
Light distribution:	symmetric direct illumination

Illuminance

DISTANCE / COLOR	1m		2m		3m		5m	
	Lux	Size (mm)	Lux	Size (mm)	Lux	Size (mm)	Lux	Size (mm)
RED	5.0	1140x600	1.2	2280x1200	0.6	3420x1800	0.2	5700x3000
GREEN	9.6	1190x790	2.4	2395x1595	1.0	3590x2390	0.4	5990x3990
BLUE	3.4	1205x725	0.8	2410x1445	0.4	3610x2170	0.2	6010x3610
WHITE	15.6	1200x720	3.8	2400x1440	1.8	3600x2160	0.6	6000x3600

* light pattern indicates the size at 50% of peak intensity

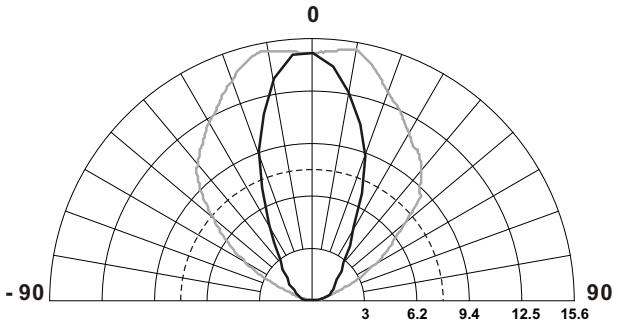
Full intensity in white color



Light output

COLOR	Total (lumens)	Power(watts)	Efficacy(lm/W)
RED	6.53	1	6.53
GREEN	14.96	1	14.96
BLUE	4.3	1	4.3
WHITE	22.9	2.4	9.5

Light distribution

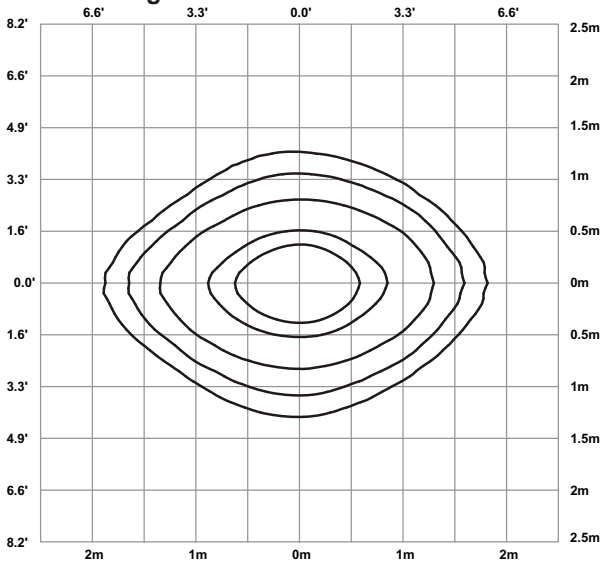


Measured on: White
Beam center: 15.6 cd
Thin dashed lined: Indicates 50% of Peak

Beam angle: 101 x 48 degree

IES file is also avai lable

Isolux diagram

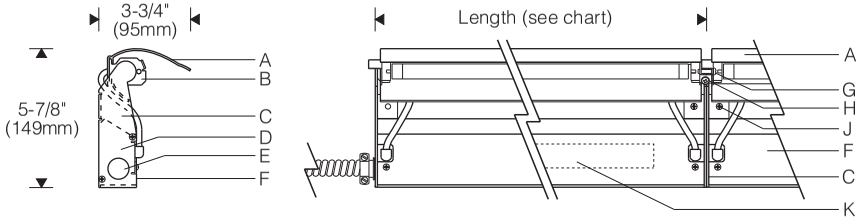


At 1m distance

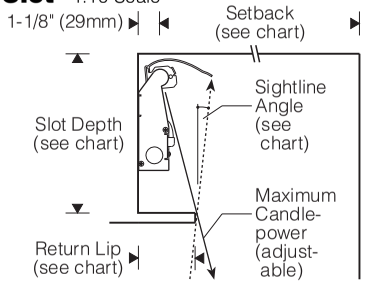
3% 0.5lx
5% 0.8lx
10% 1.6lx
30% 4.7lx
50% 7.8lx

Type J

Style 306 1:8 Scale

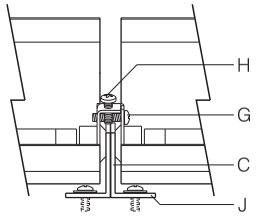


Slot 1:10 Scale



Joint 1:4 Scale

(Ballast compartment not shown for clarity.)



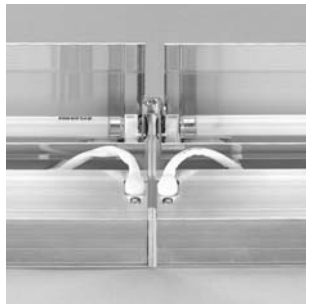
Nominal Lamp Length	Luminaire Length	
	T5	T8
1 x 2'	23-1/16" (586mm)	24-3/4" (628mm)
1 x 3'	34-7/8" (886mm)	36-3/4" (932mm)
1 x 4'	46-11/16" (1186mm)	48-3/4" (1237mm)
1 x 5'	58-1/2" (1486mm)	60-1/2" (1537mm)
2 x 3'	69-1/2" (1765mm)	73-3/16" (1859mm)
2 x 4'	93-1/8" (2365mm)	97-3/16" (2468mm)
2 x 5'	116-5/8" (2963mm)	120-7/8" (3069mm)

Slot Dimensions

(Max. candlepower aimed 15° above nadir)

Sight-line	0° (vert. cutoff)	5°	10°
Depth (inside)	10-5/8" (270mm)	8-1/4" (210mm)	6-3/4" (171mm)
Lip (inside)	3-3/4" (95mm)	3" (76mm)	2-5/8" (67mm)
Setback (varies)	Recommended minimum: 12" T5 & T8, 18" T5HO		

Note: Finish interior of slot matte white for best results.



Specifications

A Specular extruded aluminum reflector

B Stainless steel lamp-holder/support brackets

C Aluminum sidearm with mounting tab

D Extruded aluminum ballast/ wireway compartment

E Conduit entry (one each end, conduit and connector by others)

F Extruded aluminum ballast/wireway channel cover

G Joiner/alignment screw

H Rotation locking screw

J Mounting tab (fastener by others)

K Integral electronic ballast

Finish:
Reflector - extruded high purity aluminum with clear anodized specular finish. Sidearms and ballast/ wireway compartment - mill finish aluminum. All luminaire hardware - stainless steel.

Mounting:
Sidearms with mounting tabs can be wall or ceiling mounted. Luminaires can be mounted individually or joined together to form a continuous row.

Reflector aiming is adjustable and is fixed in position by rotation locking screws at each sidearm. When mounted in a continuous row, joiner screws lock reflectors together allowing all in the row to be aimed together.

Standard:
UL listed or CSA certified for damp locations. (Style 124 painted model with lens recommended for damp locations.)

Electrical:
Use 90°C wire for supply connections.

Integral electronic HPF thermally protected class P ballast (with end-of-life protection for T5 lamps). Ballast/wireway compartment includes one conduit entry at each end. Channel cover removes for access to ballast and wiring. Luminaires may be butted end-to-end (connectors by others) for through wiring. Optional #12 AWG prewired modular through wiring with quick connectors.

Master/satellite combination is available (Configuration **3**, see ordering information). Master supplied with 2-lamp ballast. (Wiring, conduit and connectors between master and satellite units by others.)

Optional electronic dimming ballast; compatible dimmer switch required (by others). Consult sales representative for compatibility and specifications.

Optional integral emergency battery operates one lamp. Separate unswitched supply is required.

For complete ballast specifications, see Accessories Section.

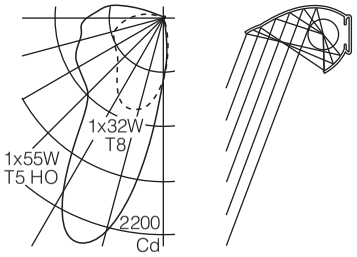
Features

- *Compact and flexible - effective slot and valance lighting using T5 for precise optical or widely utilized T8*
- *Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position**
- *Integral electronic ballast thru wiring for easy installation*
- *Durable - all parts are aluminum or stainless steel*

W 30.0

Performance

Two parabolic reflector sections drive light to the bottom of the wall. An elliptical section shields the lamp from normal viewing angles and redirects its light to a parabola. Glare is minimized and asymmetry of the beam is maximized resulting in high beam efficiency and superior surface uniformity.



For complete photometrics, see www.elliptipar.com.

 U.S. Patent No. 5,550,725 and foreign.

elliptipar

To form a Catalog Number

F	3 0 6	-			S	-	0 0	-		-		
1	2		3		4		5		6		7	8

Project: Type:

1 Source

F = Linear fluorescent

2 Style

306 = Small concealed, **integral** ballast

3 Lamp

Note: To order by overall row length, enter **ROW CODE** in place of Lamp Code below (see Row Charts on page W-30.2 for T8 or W-30.4 for T5). Row Code specifies a row complete with all necessary reflectors and ballasts.

[ ][ ][ ] = **Lamp Code**

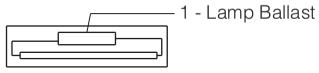
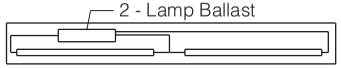
Lamp Wattage (see chart below)

Reflector Configuration, specify **1**, **2** or **3** (see chart below)

A = T8 Fluorescent
T = T5 Fluorescent

Example: **A325** = two nominal 3' reflectors, each for use with one 25W T8 lamp; one 2-lamp ballast

Reflector Configuration

1	 1-Lamp Reflector
2	 2-Lamp Reflector
3	 1-Lamp Reflector (Master) 1-Lamp Reflector (Satellite)

Lamp Wattage

Lamp Length (nominal)	*Lamp Wattage (Lamp Number)*		
	T8	*T5*	*T5 HO*
2'	**17** (F17T8)	**14** (F14T5)	**24** (F24T5/HO)
3'	**25** (F25T8)	**21** (F21T5)	**39** (F39T5/HO)
4'	**32** (F32T8)	**28** (F28T5)	**55** (F54T5/HO)
5'	**40** (F40T8)	**35** (F35T5)	**80** (F80T5/HO)

For complete lamp and ballast information, see Accessories Section.
Standard T5 and T5HO lamp color is 3000K / 80+ CRI.
T8 lamps by others.

4 Mounting

S = Sidearms with mounting tabs for wall or ceiling mounting

5 Finish

00 = Bright anodized reflector with mill finish ballast compartment

6 Voltage/Ballast

Electronic	*Dimming**
1 = 120V	**T** = 120V
2 = 277V	**V** = 277V
3 = 347V (Canada)	

* Consult sales representative for dimming 5' lamps (lamp codes **Ax40**, **Tx35**, **Tx80**). Consult factory for dimming for Reflector Configuration **3**. Dimming availability for wattages and voltages varies with ballast manufacturer and control type - see **www.elliptipar.com** for dimming specifications and limitations

7 Option (See Accessories Section for specifications)

00 = No options
0E = Integral emergency battery pack with indicator lamp and test button. Operates one lamp. Available in nominal 4', 6' and 8' units only (lamp codes **A132**, **A225**, **A232**, **A332**, **T128**, **T221**, **T228**, **T328**, **T155**, **T239**, **T255** and **T355**).
0K = Prewired modular #12 AWG through wiring with quick connectors
EK = Combination of emergency battery pack and prewired modular through wiring as described above
XX = For modification not listed, include detailed description. Consult factory prior to specification.

8 Standard

0 = UL, Underwriters Laboratories
J = CSA, Canadian Standards Association

Example

F306 - T321 - S - 00 - 2 - 000

Small concealed fluorescent consisting of two nominal 3' luminaires (one master, one satellite), each for use with one 21W T5 lamp. 277V electronic 2-lamp ballast integral to master unit. Sidearms with mounting tabs. UL.

REV. 7/07 elliptipar

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Return to search | Print Page

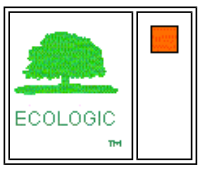
Product Number:	21697
Order Abbreviation:	FO32/835/XPS/ECO3
General Description:	32W, 48" MOL, T8 OCTRON XPS Extended Performance Super fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, suitable for IS or RS operation, ECOLOGIC®3

Product Information	
Abbrev. With Packaging Info.	FO32835XPSECO3 30/CS 1/SKU
Actual Length (in)	47.78
Actual Length (mm)	1213.6
Average Rated Life (hr)	36000
Base	Medium Bipin
Bulb	T8
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	1.10
Diameter (mm)	27.9
Family Brand Name	OCTRON® 800 XPS ECOLOGIC®3
Industry Standards	ANSI C78.81 - 2001
Initial Lumens at 25C	3100
Mean Lumens at 25C	2945
Nominal Length (in)	48
Nominal Wattage (W)	32.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- The 36,000 hour average rated life of the linear 2,3 and 4 foot OCTRON® XPS/ECO lamps is based on operation at 3 hours per start on a QUICKTRONIC® programmed start ballast. If operated on other ballasts for T8 OCTRON lamps, lamp life will be 36,000 hours for programmed rapid start operation and 24,000 hours for instant start operation at 3 hours per start.
- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- OCTRON lamps should be operated only with magnetic rapid start ballasts designed to operate 265 mA, T-8 lamps or high frequency (electronic) ballasts that are either instant start, or rapid start, or programmed rapid start specifically designed to operate T8 lamps. OCTRON lamps may be operated on instant start ballasts with ballast factors ranging from a minimum of 0.71 to a maximum of 1.20 at the nominal ballast input voltage. When OCTRON lamps are operated in the instant start mode, the two wires or two contacts of each socket should be connected to each other. They should then be connected to the appropriate ballast lead wire using National Electric Code techniques.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- The lamp lumen maintenance factor used to determine the mean lumen value was 95%. This is the lamp lumen maintenance factor at 8000 hours, 40% of 20,000 hours. It was used for comparison to standard OCTRON(R) lamps with an average rated life of 20,000 hours. The lamp lumen maintenance factor at 40% of 24,000 hours, 9600 hours, would be 94%. The lamp lumen maintenance factor at 40% of 30,000 hours, 12,000 hours, would be 93%. The lamp lumen maintenance factor at 40% of 36,000 hours, 14,400 hours would also be 93%.

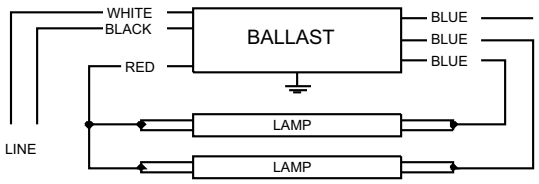
PHILIPS
ADVANCE

ICN-3P32-SC@277V	
Brand Name	CENTIUM
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
* F32T8	2	32	0/-18	0.24	65	1.01	10	0.98	1.7	1.55
F32T8	3	32	0/-18	0.31	85	0.88	10	0.99	1.7	1.04

Wiring Diagram



Diag. 70

Insulate unused blue lead for 1000V

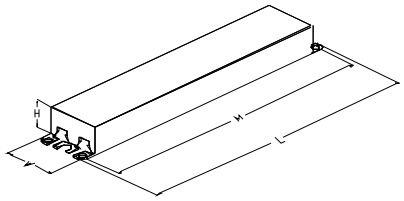
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25.0	
White	25.0	
Blue	31.0	
Red	37.0	
Yellow		
Gray		
Violet		

	in.	cm.
Yellow/Blue		
Blue/White		
Brown		
Orange		
Orange/Black		
Black/White		
Red/White		

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 02/26/2009

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.

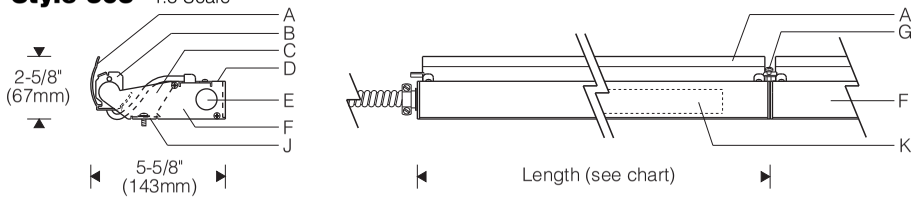
PHILIPS LIGHTING ELECTRONICS N.A.

10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018

Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance

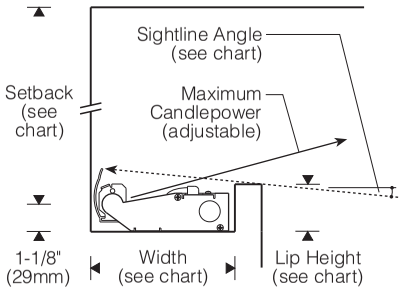
Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

Style 305 1:8 Scale



Lamp Length	*Luminaire Length*
1 x 2'	23-1/16" (586mm)
1 x 3'	34-7/8" (886mm)
1 x 4'	46-11/16" (1186mm)
1 x 5'	58-1/2" (1486mm)
2 x 3'	69-1/2" (1765mm)
2 x 4'	93-1/8" (2365mm)
2 x 5'	116-5/8" (2963mm)

Cove



Cove Dimensions

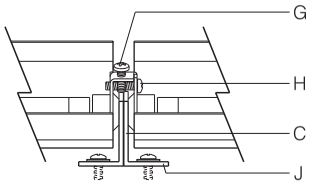
(Max. candlepower aimed 15° above horiz.)

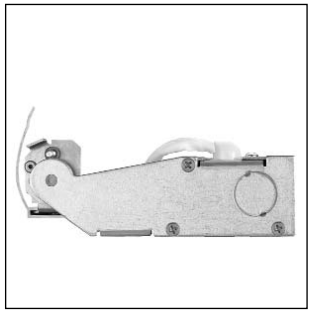
Sight-line	0°(horiz. cutoff)	5°	10°
Width (inside)	6-1/2" (165mm)	5-7/8" (150mm)	5-7/8" (150mm)
Lip (inside)	2-5/8" (67mm)	2-1/8" (54mm)	1-5/8" (41mm)
Setback (varies)	Recommended minimum: 12" T5, 18" T5HO		

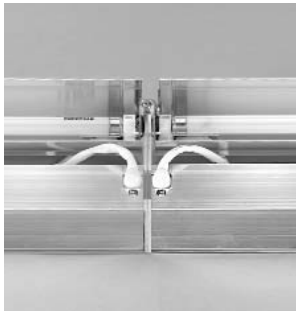
Note: Finish interior of cove matte white for best results.

Joint 1:4 Scale

(Ballast compartment not shown for clarity.)







Specifications

- **A** Specular extruded aluminum reflector
- **B** Stainless steel lamp-holder/support brackets
- **C** Aluminum sidearm with mounting tab
- **D** Extruded aluminum ballast/wireway channel cover
- **E** Conduit entry (one each end, conduit and connector by others)
- **F** Extruded aluminum ballast/wireway compartment
- **G** Rotation locking screw
- **H** Joiner/alignment screw
- **J** Mounting tab (fastener by others)
- **K** Integral electronic ballast

Finish:
Reflector - extruded high purity aluminum with clear anodized specular finish. Sidearms and ballast/wireway compartment - mill finish aluminum. All luminaire hardware - stainless steel.

Mounting:
Lay-in installation requires only one fastener per joint (by others). Sidearms with mounting tabs can be base or wall mounted. Luminaires can be mounted individually or joined together to form a continuous row.

Reflector aiming is adjustable and is fixed in position by rotation locking screws at each sidearm. When mounted in a continuous row, joiner screws lock reflectors together allowing all in the row to be aimed together.

Standard:
UL listed or CSA certified for damp locations. (Style 124 painted model with lens recommended for damp locations.)

Electrical:
Use 90°C wire for supply connections.

Integral electronic HPF thermally protected class P ballast with end-of-life protection. Ballast/wireway compartment includes one conduit entry at each end. Channel cover removes for access to ballast and wiring. Luminaires may be butted end-to-end (connectors by others) for through wiring. Optional #12 AWG prewired modular through wiring with quick connectors.

Master/satellite combination is available (Configuration **3**, see ordering information). Master supplied with 2-lamp ballast. (Wiring, conduit and connectors between master and satellite units by others.)

Optional electronic dimming ballast; compatible dimmer switch required (by others). Consult sales representative for compatibility and specifications.

Optional integral emergency battery operates one lamp. Separate unswitched supply is required.

For complete ballast specifications, see Accessories Section.

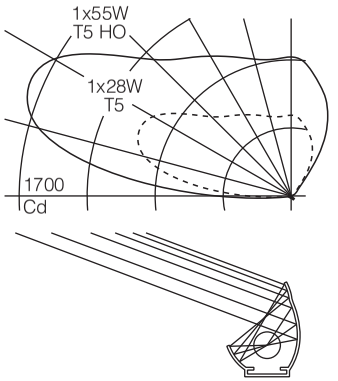
Features

- *T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves*
- *Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position**
- *Only 2-5/8" high - fits in low profile coves*
- *Integral electronic ballast, thru wiring for easy installation*

C 19.0

Performance

Two parabolic reflector sections drive light across the ceiling from one edge. An elliptical section shields the lamp from normal viewing angles and redirects its light to a parabola. Glare is minimized and asymmetry of the beam is maximized resulting in high beam efficiency and superior surface uniformity.



For complete photometrics, visit www.elliptipar.com

elliptipar

*U.S. Patent No. 5,550,725 and foreign.

To form a Catalog Number

F 3 0 5 - T ____ - ____ - ____ - ____ - ____ - ____
1 2 3 4 5 6 7 8

Project: _____ Type: _____

1 Source

F = Linear fluorescent

2 Style

305 = Xtra small concealed, **integral** ballast

3 Lamp

Note: To order by overall row length, enter **ROW CODE** in place of Lamp Code below (see Row Charts on page C-19.2). Row Code specifies a row complete with all necessary reflectors and ballasts.

T ____ ____ = **Lamp Code** (to specify individual units)

Lamp Wattage (see chart below)

Reflector Configuration, specify **1**, **2** or **3** (see chart below)

Example: **T228** = two 28W T5 lamps in nominal 8' reflector; one 2-lamp ballast

Reflector Configuration

1	1 - Lamp Ballast 1-Lamp Reflector
2	2 - Lamp Ballast 2-Lamp Reflector
3	2 - Lamp Ballast 1-Lamp Reflector (Master) 1-Lamp Reflector (Satellite)

Lamp Wattage	*Lamp Length*	*Lamp Number*
T5 Fluorescent		
14	2'	F14T5
21	3'	F21T5
28	4'	F28T5
35	5'	F35T5
T5 HO Fluorescent *		
24	2'	F24T5/HO
39	3'	F39T5/HO
54	4'	F54T5/HO
80	5'	F80T5/HO

For complete lamp and ballast information, see Accessories Section. Standard T5 and T5HO lamp color is 3000K / 80+ CRI.

4 Mounting

S = Sidearms with mounting tabs

5 Finish

00 = Bright anodized reflector with mill finish ballast compartment

6 Voltage/Ballast

Electronic
1 = 120V
2 = 277V
3 = 347V (Canada)

*Dimming**
T = 120V
V = 277V

* Consult sales representative for dimming 5' lamps (lamp codes **Tx35**, **Tx80**) and for Reflector Configuration **3**. Availability for wattages and voltages varies with ballast manufacturer and control type - see **www.elliptipar.com** for additional dimming specifications and limitations.

7 Option (See Accessories Section for specifications)

00 = No options
0E = Integral emergency battery pack with indicator lamp and test button. Operates one lamp. Available in nominal 4', 6' and 8' units only (lamp codes **T128**, **T221**, **T228**, **T328**, **T155**, **T239**, **T255** and **T355**).
0K = Prewired modular #12 AWG through wiring with quick connectors
EK = Combination of emergency battery pack and prewired modular through wiring as described above
XX = For modification not listed, include detailed description. Consult factory prior to specification.

8 Standard

0 = UL, Underwriters Laboratories
J = CSA, Canadian Standards Association

Example

F305 - T221 - S - 00 - 1 - 000

Xtra small concealed fluorescent unit consisting of one nominal 6' reflector with two 21W T5 lamps. Integral 120V electronic 2-lamp ballast. Sidearms with mounting tabs. UL.

C 19.1

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Return to search | Print Page

Product Number: 20933

Order Abbreviation: FP39/835/HO/ECO

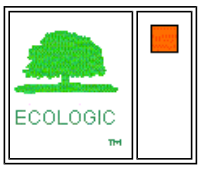
General Description: 39W, T5 PENTRON high output (HO) fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP39835HOECO 40/CS 1/SKU
Actual Length (in)	34
Actual Length (mm)	863.2
Average Rated Life (hr)	20000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	3100
Initial Lumens at 35C	3500
Mean Lumens at 25C	2883
Mean Lumens at 35C	3255
Nominal Length (in)	36
Nominal Wattage (W)	39.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please

Return to search | Print Page

Product Number: 20904

Order Abbreviation: FP54/835/HO/ECO

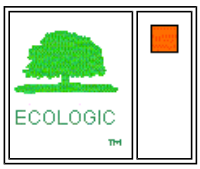
General Description: 54W, T5 PENTRON high output (HO) fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP54835HOECO 40/CS 1/SKU
Actual Length (in)	45.8
Actual Length (mm)	1163.2
Average Rated Life (hr)	25000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	4450
Initial Lumens at 35C	5000
Mean Lumens at 25C	4138
Mean Lumens at 35C	4650
Nominal Length (in)	48
Nominal Wattage (W)	54.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please

Hi-lume®, Compact SE™, Eco-10®
277 volt 3-wire dimming ballasts

For the latest model numbers: www.lutron.com/ballasts

Lamp Type	Lamp Watts (Length)	Lamps per Ballast	Case Type[1]	**1 %** Dimming **Hi-lume**	5 % Dimming	**10 %** Dimming **Eco-10**	Ballast Current[2] – Amps
T5 Linear  5/8 in Dia	14 W (21.6 in)	1	C[3]	—		**E 3 T514 C 277 1**	.08
		2	C[3]	—		**E 3 T514 C 277 2**	.14
	21 W (33.4 in)	1	C[3]	—		**E 3 T521 C 277 1**	.11
		2	C[3]	—		**E 3 T521 C 277 2**	.19
	28 W (45.2 in)	1	C[3]	—		**ECO-T528-277-1**	.14
		2	C[3]	—		**ECO-T528-277-2**	.25
T5-HO Linear  5/8 in Dia	24 W (21.6 in)	1	C[3]	**FDB-T524-277-1**		**ECO-T524-277-1**	.13
		2	C[3]	**FDB-T524-277-2**		**ECO-T524-277-2**	.20
	39 W (33.4 in)	1	C[3]	**FDB-T539-277-1**		**ECO-T5H39-277-1**	.17
		2	C[3]	**FDB-T539-277-2**		**ECO-T5H39-277-2**	.31
	54 W (45.2 in)	1	C[3]	**FDB-T554-277-1**		**ECO-T554-277-1**	.25
		2	C[3]	**FDB-T554-277-2**		**ECO-T554-277-2**	.45
T8 Linear and U-Bent  1 in Dia	17 W (24 in)	1	F	**FDB-2427-277-1**		**ECO-T817-277-1**	.08
		2	F	**FDB-2427-277-2**		**ECO-T817-277-2**	.15
		3	F	**FDB-2427-277-3**		**ECO-T817-277-3**	.20
	25 W (36 in)	1	F	**FDB-3627-277-1**		**ECO-T825-277-1**	.12
		2	F	**FDB-3627-277-2**		**ECO-T825-277-2**	.19
		3	F	**FDB-3627-277-3**		—	.28
	32 W (48 in)	1	F	**FDB-4827-277-1**		**ECO-T832-277-1**	.14/.15[4]
		1	D	—		**ECO-T832-277-1-L**	.14
		1	D	—		**ECO-T832-277-1-T**	.14
		2	F	**FDB-4827-277-2**		**ECO-T832-277-2**	.25/.22[4]
		2	D	—		**ECO-T832-277-2-L**	.23
		2	D	—		**ECO-T832-277-2-T**	.23
		3	F	**FDB-4827-277-3**		**ECO-T832-277-3**	.35
	40 W (60 in)	1	F	**FDB-6027-277-1**		—	.16
		2	F	**FDB-6027-277-2**		—	.30

1 For case type information, see pages 36 and 37.
2 To calculate ballast input power, use the following formula: Watts = Ballast Current x 277.
3 Standard with terminals. Leaded options available. Please consult Lutron.
4 Eco-10 ballast current.

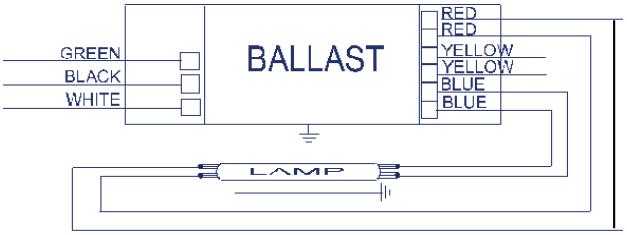
PHILIPS ADVANCE

ICN-2S39@277V	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
* F39T5/HO	1	39	0/-18	0.16	43	1.02	10	0.98	1.7	2.37
F39T5/HO	2	39	0/-18	0.31	85	1.00	10	0.98	1.7	1.18

Wiring Diagram



For 1 lamp operation, do not use yellow leads

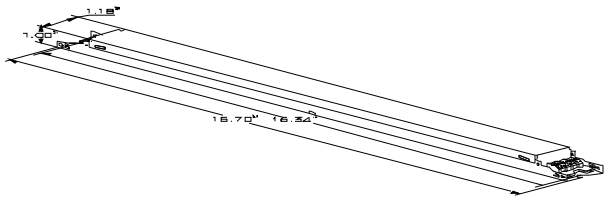
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray	0	0
Violet	0	0

	in.	cm.
Yellow/Blue	0	0
Blue/White	0	0
Brown	0	0
Orange	0	0
Orange/Black	0	0
Black/White	0	0
Red/White	0	0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.70 "	1.18 "	1.00 "	16.34 "
16 7/10	1 9/50	1	16 17/50
42.4 cm	3 cm	2.5 cm	41.5 cm

Revised 09/01/2004

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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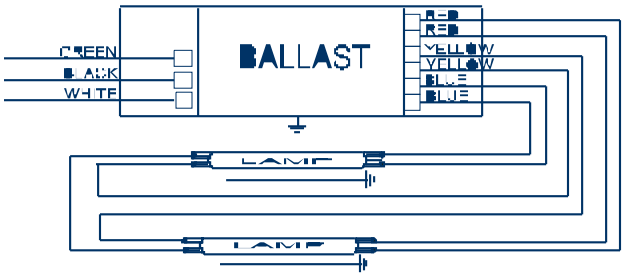
PHILIPS ADVANCE

ICN-2S54@277V	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series/Parallel
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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F54T5/HO	1	54	-20/-29	0.23	62	1.02	15	0.96	1.7	1.65
* F54T5/HO	2	54	-20/-29	0.43	117	1.00	10	0.98	1.7	0.85

Wiring Diagram



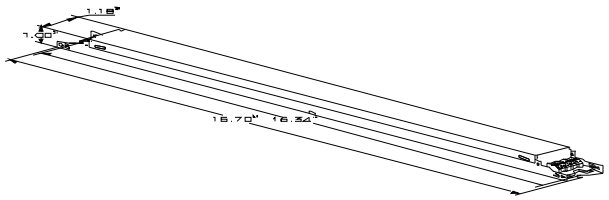
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	31	78.7
White	31	78.7
Blue	28	71.1
Red	28	71.1
Yellow	48	121.9
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.70 "	1.18 "	1.00 "	16.34 "
16 7/10	1 9/50	1	16 17/50
42.4 cm	3 cm	2.5 cm	41.5 cm

Revised 03/11/2009

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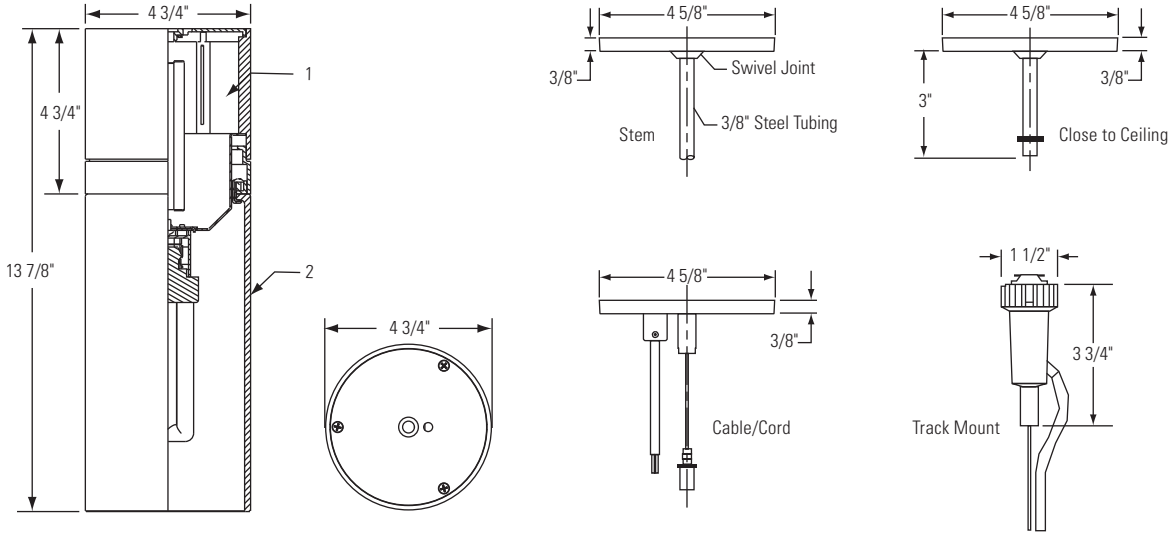

Ordering Information: Complete fixture consists of Powerhead + Inner Glass + Suspension Kit. Each sold separately (ie **PM32SA** + **PG01** + **SK01**).

Spec ID (reference only)	**Powerhead**	**Inner Glass**	**Outer Glass**	**Suspension Kit**	**Lamp**	**Volts**
FP01	**PM32SA**	**PG01**	**NA**	*See suspensions below	CFL, 26/32	120-277V
FP01MX1	**PM32MX1SA**	**PG01**	**NA**		Mark X Dimming 26/32W	120V
FP01MX2	**PM32MX2SA**	**PG01**	**NA**		Mark X Dimming 26/32W	227V
IPO1	**PM150SA**	**PG01**	**NA**		T-4 Mini-Can 150W	120V

Suspension Kit:

Cat. No	**Finish**	**Description**
SK01	Satin Aluminum	Clear Metallic Straight Cord/Cable, 120" Length, (10') with canopy
SK02	Satin Aluminum	Clear Metallic Straight Cord/Cable, 300" Length, (25') with canopy
ST01	Satin Aluminum	36" Length 3/8" Stem with canopy
ST02	Satin Aluminum	60" Length 3/8" Stem with canopy
CTC	Satin Aluminum	Close To Ceiling Kit with canopy
TM01	Satin Aluminum	Silver Track Mounting Kit with Clear Metallic Straight Cord/Cable, 120" Length, (10') (120V only)
SMK	Satin Aluminum	Flush Mounting Kit

Features

1. **Power Compartment:** Die Cast and Machined Aluminum Components. Brushed and Clear Lacquer Finish.
2. **Primary Glass:** Triplex Hand Blown Glass.

Lamping (by others)

Incandescent: 50W Max. T-4 Mini Candelabra

Compact Fluorescent:

General Electric	Osram/Sylvania	Philips
(1) 26W Triple Tube 4-Pin (Amalgam) Compact Fluorescent Lamp		
F26TBX/*/A/4P	CF26DT/E/IN/*	PL-T26W/*/4P
(1) 32W Triple Tube 4-Pin (Amalgam) Compact Fluorescent Lamp		
F32TBX/*/A/4P	CF32DT/E/IN/*	PL-T32W/*/4P

*Manufacturers Color Temperature Designation

Electrical

Lampholders

Incandescent: E11 Base, Porcelain, Plated Copper Alloy Screw Shell

Compact Fluorescent: 4-Pin, 26/32 watt base: GX24q-3

Electrical (continued)

Ballasts: Fluorescent: Electronic	**26 Watts**		**32 Watts**	
Voltage	120	277	120	277
Total Input Watts	28	28	38	36
Max. Line Current (Amps)	.25	.11	.30	.13

Labels

cULus Listed. Suitable for Damp Locations.

Job Information **Type:**

Job Name:

Cat. No.:

Lamp(s):

Notes:

631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710

Return to search | Print Page

Product Number: 20880

Order Abbreviation: CF26DT/E/IN/830/ECO

General Description: DULUX 26W triple compact fluorescent amalgam lamp with 4-pin base, integral EOL, 3000K color temperature, 82 CRI, for use with electronic and dimming ballasts, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	CF26DTEIN830ECO 50/CS 1/SKU
Average Rated Life (hr)	12000
Base	GX24Q-3
Bulb	T (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3000
Family Brand Name	Dulux® T/E
Industry Standards	IEC 60901- 3426
Mean Lumens at 25C	1501
Maximum Overall Length - MOL (in)	5.0
Maximum Overall Length - MOL (mm)	126
NEMA Generic Designation (old)	CFM26W/GX24Q/830
Nominal Wattage (W)	26.00

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information

Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- This 4-pin DULUX lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp)sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
- Optimum light output for DULUX T/E IN amalgam compact fluorescent lamps occurs at approximately 35 deg. C/ 95 deg. F ambient temperature when the lamp is operated in the base up position. The lumen value listed refers to the optimum light output. Non-amalgam compact fluorescent lamps provide atleast 90% light output from 60-

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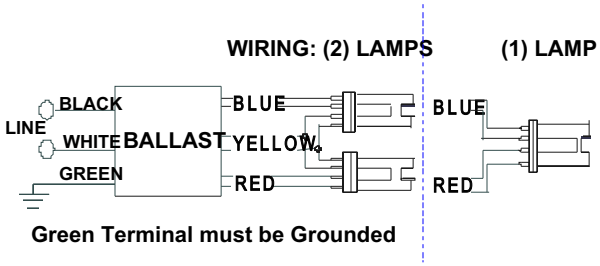
ADVANCE

ICF2S26H1LDQS@277	
Brand Name	SMARTMATE-QS
Ballast Type	Electronic
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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
CFQ26W/G24Q	2	26	0/-18	0.19	51	1.00	10	0.99	1.7	1.96
* CFTR26W/GX24Q	1	26	0/-18	0.11	29	1.10	10	0.99	1.7	3.79
CFTR26W/GX24Q	2	26	0/-18	0.20	54	1.00	10	0.99	1.7	1.85
CFTR32W/GX24Q	1	32	0/-18	0.13	36	0.98	10	0.98	1.7	2.72
CFTR42W/GX24Q	1	42	0/-18	0.17	46	0.98	10	0.98	1.7	2.13

Wiring Diagram



Green Terminal must be Grounded

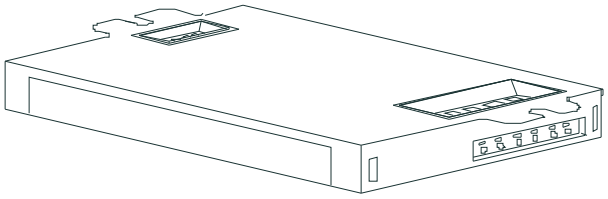
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
4.98 "	2.4 "	1.0 "	4.6 "
4 49/50	2 2/5	1	4 3/5
12.6 cm	6.1 cm	2.5 cm	11.7 cm

Revised 08/05/2008

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

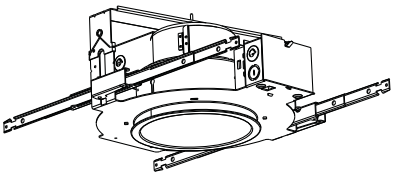
Type | Catalog number | Type N

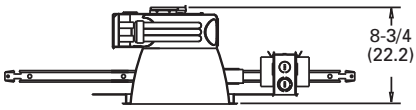
Compact Fluorescent Downlights

8" AF

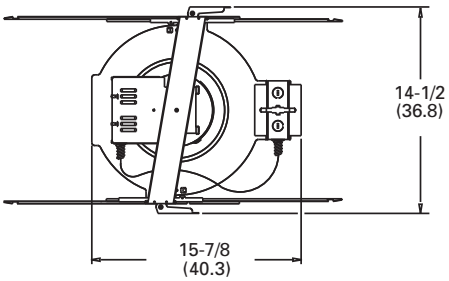
Lensed Reflector

Horizontal Lamp
Triple-Tube





Aperture:	7-7/8 (20.1)
Ceiling Opening:	8-7/8 (22.5)
Overlap Trim:	9-1/4 (23.5)



All dimensions are inches (centimeters)

FEATURES

OPTICAL SYSTEM

- Reflector - Self-flanged, semi-specular or matte diffuse reflector. Fluted vertical upper section works in conjunction with patented Bounding Ray™ Optical Principle design (U.S. Patent No. 5,800,050) to provide lamp before lamp image and smooth transition from top of reflector to bottom. Minimum flange matches reflector finish.
- Baffle/cone – Semi-specular clear upper reflector. Microgroove baffle with white painted flange or specular black cone with flange that matches cone finish.
- Lens - Position at optical break provides optimal visual comfort andimproved aperture aesthetics.
- Hinged lampdoor seals upper trim for optimal fixture efficiency and the reduction of stray light in the plenum.

MECHANICAL SYSTEM

- 16-gauge galvanized steel mounting/plaster frame with integral yoke to retain optical system. Maximum 1-1/2" ceiling thickness.
- 16-gauge galvanized steel mounting bars with continuous 4" vertical adjustment are shipped pre-installed. Post installation adjustment possible without the use of tools from above or below ceiling.
- Galvanized steel J-box with hinged access covers and spring latch. Two combination ½"-3/4" and three ½" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors rated for 90°C.

ELECTRICAL SYSTEM

- Horizontally-mounted, positive latch thermoplastic socket(s).
- Class P, thermally-protected, high power factor ballast mounted to the junction box.
- Simply5™ technology available. SIMPLY5 LIGHTING INTELLIGENCE

LISTING

- Fixtures are UL Listed for thru-branch wiring, Non-IC recessed mounting and damp locations. Listed and labeled to comply with Canadian Standards.

ORDERING INFORMATION

Example: **AF 2/32TRT 8AR CGL MVOLT**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number (shipped separately).

AF

Series	Wattage/ Lamp	Aperture/ Trim color	Finish	Lens type	Voltage	Ballast[4]	Options
AF	**1/18TRT**	**8AR** Clear	(blank) Semi-specular	**CGL** Clear glass lens	**MVOLT**[3]	(blank) Electronic ballast	**ELR**[7] Emergency battery pack. Remote test switch
	1/26TRT	**8PR** Pewter	**LD** Matte-diffuse	**PCL**[2] Clear polycarbonate lens	**120**	**DMHL**[5] Lutron Compact SE™ electronic dimming ballast. Minimum dimming level 5%	**GMF** Single, slow-blow fuse (not available with MVOLT)
	1/32TRT	**8UBR** Umber		**T73** Tempered prismatic lens	**277**		**GLR** Single, fast-blow fuse (not available with MVOLT)
	1/42TRT	**8WTR** Wheat		**PPC**[2] Prismatic polycarbonate lens	**347**		**TRW** White painted flange (standard on MB and WB)
	1/57TRT	**8MB**[1,2] Black baffle				**ADEZ**[5] Advance Mark 10® electronic dimming ballast. Minimum dimming level 5%	**TRBL** Black painted flange
	2/18TRT	**8WB**[1] White baffle					**WLP** With 3500°K lamp (shipped separately)
	2/26TRT	**8BC**[1,2] Black cone				**S5**[6] SIMPLY5™ system ballast	**LRC**[7] Provides compatibility with Lithonia Reloc System. Reloc System can be installed less this option with connectors provided by others. Access above ceiling required
	2/32TRT						**CP**[8] Chicago Plenum
	2/42TRT						**CSA** CSA Certified
							BDP[9] Ballast disconnect plug
							HW Hardwire for S5 system; replaces Reloc
							ELRHL[10] High lumen output emergency battery pack. Remote test switch provided

NOTES
1 Not available with finishes.
2 Lens positioned below optical break.
3 Multi-volt electronic ballast capable of operating on any voltage from 120V through 277V, 50 or 60 Hz.
4 For additional ballast types, refer to Technical Bulletins tab.
5 Available in 120V or 277V only. Minimum dimming level 5%.
6 Simply5™ includes 9' S5 MLC Reloc wiring system (shipped separately). Available in 120V or 277V only. Not available in 18W or 57W. See simply5.net for more information.
7 For compatible Reloc systems, refer to Technical Bulletins tab.
8 Not available with ELR option.
9 Meets codes that require in-fixture disconnect.
10 For dimensional changes, refer to Technical Bulletins tab.

Accessories

Order as separate catalog number.

SCA8 Sloped ceiling adapter. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D). Ex: SCA8 **10D**

Return to search | Print Page

Product Number: 20871

Order Abbreviation: CF42DT/E/IN/835/ECO

General Description: DULUX 42W triple compact fluorescent amalgam lamp with 4-pin base, integral EOL, 3500K color temperature, 82 CRI, for use with electronic and dimming ballasts, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	CF42DTEIN835ECO 50/CS 1/SKU
Average Rated Life (hr)	12000
Base	GX24Q-4
Bulb	T (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3500
Family Brand Name	Dulux® EL
Mean Lumens at 25C	2670
Maximum Overall Length - MOL (in)	6.5
Maximum Overall Length - MOL (mm)	163
Nominal Wattage (W)	42.00

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information

Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- This 4-pin DULUX lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp)sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
- Optimum light output for DULUX T/E IN amalgam compact fluorescent lamps occurs at approximately 35 deg. C/ 95 deg. F ambient temperature when the lamp is operated in the base up position. The lumen value listed refers to the optimum light output. Non-amalgam compact fluorescent lamps provide atleast 90% light output from 60-100 degrees F in the base up position, the temperature range is narrower for horizontal or base down position.

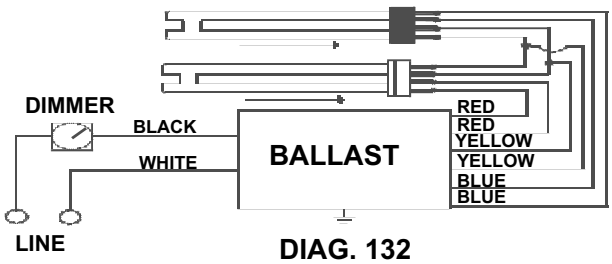
PHILIPS ADVANCE

VEZ-2T42-M3-LD	
Brand Name	MARK 10 POWERLINE
Ballast Type	Electronic Dimming
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	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.
CFTR32W/GX24Q	2	32	50/10	0.28	20/76	0.05/1.00	10	0.98	1.6	1.32
CFTR42W/GX24Q	2	42	50/10	0.36	20/98	0.05/1.00	10	0.98	1.6	1.02
CFTR57W/GX24Q	1	57	50/10	0.24	18/66	0.05/1.00	10	0.98	1.6	1.52
CFTR70W/GX24Q	1	70	50/10	0.29	18/80	0.05/1.00	10	0.98	1.6	1.25

Wiring Diagram

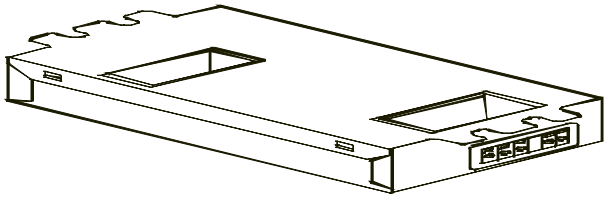


DIAG. 132

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)
6.28 "	3.00 "	1.29 "	6.0 "
6 7/25	3	1 29/100	6
16 cm	7.6 cm	3.3 cm	15.2 cm

Revised 08/17/2006

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.

PHILIPS LIGHTING ELECTRONICS N.A.

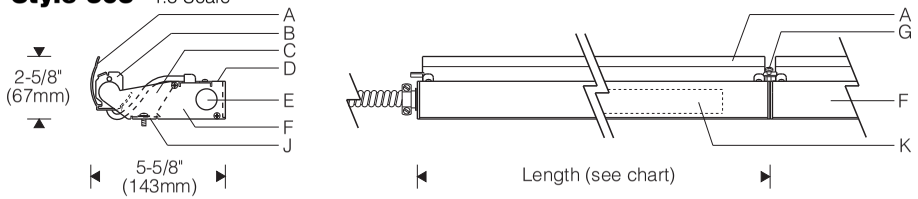
10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018

Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance

Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

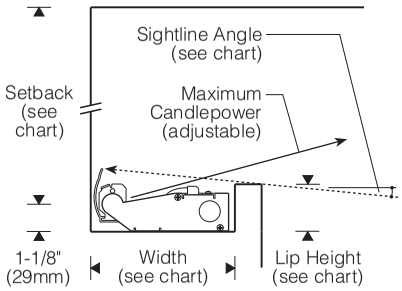
Type O3a-b & O4a-d

Style 305 1:8 Scale



Lamp Length	*Luminaire Length*
1 x 2'	23-1/16" (586mm)
1 x 3'	34-7/8" (886mm)
1 x 4'	46-11/16" (1186mm)
1 x 5'	58-1/2" (1486mm)
2 x 3'	69-1/2" (1765mm)
2 x 4'	93-1/8" (2365mm)
2 x 5'	116-5/8" (2963mm)

Cove



Cove Dimensions

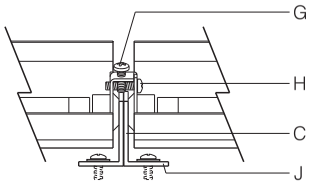
(Max. candlepower aimed 15° above horiz.)

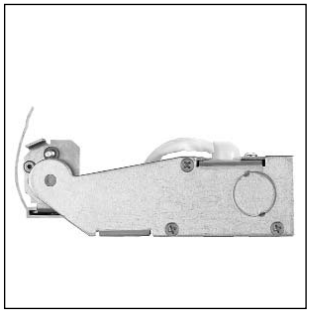
Sight-line	0°(horiz. cutoff)	5°	10°
Width (inside)	6-1/2" (165mm)	5-7/8" (150mm)	5-7/8" (150mm)
Lip (inside)	2-5/8" (67mm)	2-1/8" (54mm)	1-5/8" (41mm)
Setback (varies)	Recommended minimum: 12" T5, 18" T5HO		

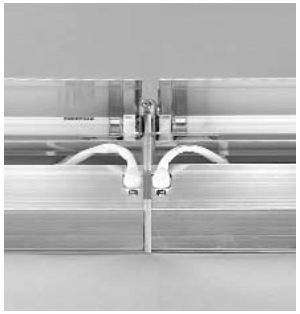
Note: Finish interior of cove matte white for best results.

Joint 1:4 Scale

(Ballast compartment not shown for clarity.)







Specifications

- **A** Specular extruded aluminum reflector
- **B** Stainless steel lamp-holder/support brackets
- **C** Aluminum sidearm with mounting tab
- **D** Extruded aluminum ballast/wireway channel cover
- **E** Conduit entry (one each end, conduit and connector by others)
- **F** Extruded aluminum ballast/wireway compartment
- **G** Rotation locking screw
- **H** Joiner/alignment screw
- **J** Mounting tab (fastener by others)
- **K** Integral electronic ballast

Finish:
Reflector - extruded high purity aluminum with clear anodized specular finish. Sidearms and ballast/wireway compartment - mill finish aluminum. All luminaire hardware - stainless steel.

Mounting:
Lay-in installation requires only one fastener per joint (by others). Sidearms with mounting tabs can be base or wall mounted. Luminaires can be mounted individually or joined together to form a continuous row.

Reflector aiming is adjustable and is fixed in position by rotation locking screws at each sidearm. When mounted in a continuous row, joiner screws lock reflectors together allowing all in the row to be aimed together.

Standard:
UL listed or CSA certified for damp locations. (Style 124 painted model with lens recommended for damp locations.)

Electrical:
Use 90°C wire for supply connections.

Integral electronic HPF thermally protected class P ballast with end-of-life protection. Ballast/wireway compartment includes one conduit entry at each end. Channel cover removes for access to ballast and wiring. Luminaires may be butted end-to-end (connectors by others) for through wiring. Optional #12 AWG prewired modular through wiring with quick connectors.

Master/satellite combination is available (Configuration **3**, see ordering information). Master supplied with 2-lamp ballast. (Wiring, conduit and connectors between master and satellite units by others.)

Optional electronic dimming ballast; compatible dimmer switch required (by others). Consult sales representative for compatibility and specifications.

Optional integral emergency battery operates one lamp. Separate unswitched supply is required.

For complete ballast specifications, see Accessories Section.

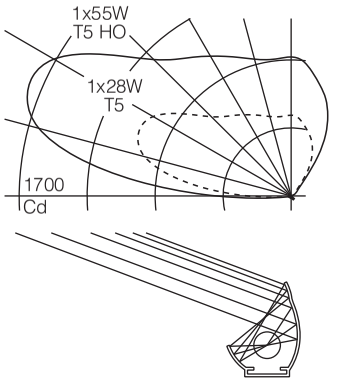
Features

- *T5 fluorescent - precise optical control for unequaled projection of light from perimeter coves*
- *Adjustable - all reflectors in a row join and aim together; rotation locking screws secure position**
- *Only 2-5/8" high - fits in low profile coves*
- *Integral electronic ballast, thru wiring for easy installation*

C 19.0

Performance

Two parabolic reflector sections drive light across the ceiling from one edge. An elliptical section shields the lamp from normal viewing angles and redirects its light to a parabola. Glare is minimized and asymmetry of the beam is maximized resulting in high beam efficiency and superior surface uniformity.



For complete photometrics, visit www.elliptipar.com

*U.S. Patent No. 5,550,725 and foreign.

elliptipar

To form a Catalog Number

F 3 0 5 - T ____ - ____ - ____ - ____ - ____ - ____
1 2 3 4 5 6 7 8

Project: _____ Type: _____

1 Source

F = Linear fluorescent

2 Style

305 = Xtra small concealed, **integral** ballast

3 Lamp

Note: To order by overall row length, enter **ROW CODE** in place of Lamp Code below (see Row Charts on page C-19.2). Row Code specifies a row complete with all necessary reflectors and ballasts.

T ____ ____ = **Lamp Code** (to specify individual units)

Lamp Wattage (see chart below)

Reflector Configuration, specify **1**, **2** or **3** (see chart below)

Example: **T228** = two 28W T5 lamps in nominal 8' reflector; one 2-lamp ballast

Reflector Configuration

1	1 - Lamp Ballast 1-Lamp Reflector
2	2 - Lamp Ballast 2-Lamp Reflector
3	2 - Lamp Ballast 1-Lamp Reflector (Master) 1-Lamp Reflector (Satellite)

Lamp Wattage	*Lamp Length*	*Lamp Number*
T5 Fluorescent		
14	2'	F14T5
21	3'	F21T5
28	4'	F28T5
35	5'	F35T5
T5 HO Fluorescent *		
24	2'	F24T5/HO
39	3'	F39T5/HO
54	4'	F54T5/HO
80	5'	F80T5/HO

For complete lamp and ballast information, see Accessories Section. Standard T5 and T5HO lamp color is 3000K / 80+ CRI.

4 Mounting

S = Sidearms with mounting tabs

5 Finish

00 = Bright anodized reflector with mill finish ballast compartment

6 Voltage/Ballast

Electronic
1 = 120V
2 = 277V
3 = 347V (Canada)

*Dimming**
T = 120V
V = 277V

* Consult sales representative for dimming 5' lamps (lamp codes **Tx35**, **Tx80**) and for Reflector Configuration **3**. Availability for wattages and voltages varies with ballast manufacturer and control type - see **www.elliptipar.com** for additional dimming specifications and limitations.

7 Option (See Accessories Section for specifications)

00 = No options
0E = Integral emergency battery pack with indicator lamp and test button. Operates one lamp. Available in nominal 4', 6' and 8' units only (lamp codes **T128**, **T221**, **T228**, **T328**, **T155**, **T239**, **T255** and **T355**).
0K = Prewired modular #12 AWG through wiring with quick connectors
EK = Combination of emergency battery pack and prewired modular through wiring as described above
XX = For modification not listed, include detailed description. Consult factory prior to specification.

8 Standard

0 = UL, Underwriters Laboratories
J = CSA, Canadian Standards Association

Example

F305 - T221 - S - 00 - 1 - 000

Xtra small concealed fluorescent unit consisting of one nominal 6' reflector with two 21W T5 lamps. Integral 120V electronic 2-lamp ballast. Sidearms with mounting tabs. UL.

C 19.1

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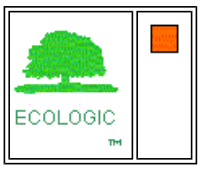
Product Number: 20921
Order Abbreviation: FP21/835/ECO
General Description: 21W, T5 PENTRON fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP21835ECO 40/CS 1/SKU
Actual Length (in)	34
Actual Length (mm)	863.2
Average Rated Life (hr)	20000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	1900
Initial Lumens at 35C	2100
Mean Lumens at 25C	1767
Mean Lumens at 35C	1953
Nominal Length (in)	36
Nominal Wattage (W)	21.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please

Return to search | Print Page

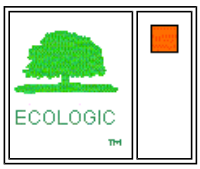
Product Number: 20901
Order Abbreviation: FP28/835/ECO
General Description: 28W, T5 PENTRON fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP28835ECO 40/CS 1/SKU
Actual Length (in)	45.8
Actual Length (mm)	1163.2
Average Rated Life (hr)	20000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	2600
Initial Lumens at 35C	2900
Mean Lumens at 25C	2418
Mean Lumens at 35C	2697
Nominal Length (in)	48
Nominal Wattage (W)	28.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
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Hi-lume®, Compact SE™, Eco-10®
277 volt 3-wire dimming ballasts

For the latest model numbers: www.lutron.com/ballasts

Lamp Type	Lamp Watts (Length)	Lamps per Ballast	Case Type[1]	**1 %** Dimming **Hi-lume**	5 % Dimming	**10 %** Dimming **Eco-10**	Ballast Current[2] – Amps
T5 Linear  5/8 in Dia	14 W (21.6 in)	1	C[3]	—		**E 3 T514 C 277 1**	.08
		2	C[3]	—		**E 3 T514 C 277 2**	.14
	21 W (33.4 in)	1	C[3]	—		**E 3 T521 C 277 1**	.11
		2	C[3]	—		**E 3 T521 C 277 2**	.19
	28 W (45.2 in)	1	C[3]	—		**ECO-T528-277-1**	.14
		2	C[3]	—		**ECO-T528-277-2**	.25
T5-HO Linear  5/8 in Dia	24 W (21.6 in)	1	C[3]	**FDB-T524-277-1**		**ECO-T524-277-1**	.13
		2	C[3]	**FDB-T524-277-2**		**ECO-T524-277-2**	.20
	39 W (33.4 in)	1	C[3]	**FDB-T539-277-1**		**ECO-T5H39-277-1**	.17
		2	C[3]	**FDB-T539-277-2**		**ECO-T5H39-277-2**	.31
	54 W (45.2 in)	1	C[3]	**FDB-T554-277-1**		**ECO-T554-277-1**	.25
		2	C[3]	**FDB-T554-277-2**		**ECO-T554-277-2**	.45
T8 Linear and U-Bent  1 in Dia	17 W (24 in)	1	F	**FDB-2427-277-1**		**ECO-T817-277-1**	.08
		2	F	**FDB-2427-277-2**		**ECO-T817-277-2**	.15
		3	F	**FDB-2427-277-3**		**ECO-T817-277-3**	.20
	25 W (36 in)	1	F	**FDB-3627-277-1**		**ECO-T825-277-1**	.12
		2	F	**FDB-3627-277-2**		**ECO-T825-277-2**	.19
		3	F	**FDB-3627-277-3**		—	.28
	32 W (48 in)	1	F	**FDB-4827-277-1**		**ECO-T832-277-1**	.14/.15[4]
		1	D	—		**ECO-T832-277-1-L**	.14
		1	D	—		**ECO-T832-277-1-T**	.14
		2	F	**FDB-4827-277-2**		**ECO-T832-277-2**	.25/.22[4]
		2	D	—		**ECO-T832-277-2-L**	.23
		2	D	—		**ECO-T832-277-2-T**	.23
		3	F	**FDB-4827-277-3**		**ECO-T832-277-3**	.35
	40 W (60 in)	1	F	**FDB-6027-277-1**		—	.16
		2	F	**FDB-6027-277-2**		—	.30

1 For case type information, see pages 36 and 37.
2 To calculate ballast input power, use the following formula: Watts = Ballast Current x 277.
3 Standard with terminals. Leaded options available. Please consult Lutron.
4 Eco-10 ballast current.

PHILIPS
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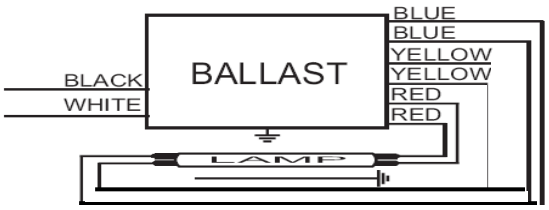
ICN-2S28-N@277	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F14T5	1	14	0/-18	0.07	17	1.07	10	0.98	1.7	6.29
F14T5	2	14	0/-18	0.12	33	1.04	10	0.98	1.7	3.15
* F21T5	1	21	0/-18	0.10	25	1.06	10	0.98	1.7	4.24
F21T5	2	21	0/-18	0.18	49	1.02	10	0.98	1.7	2.08
F28T5	1	28	0/-18	0.12	31	1.05	10	0.98	1.7	3.39
F28T5	2	28	0/-18	0.22	60	1.00	10	0.98	1.7	1.67

Wiring Diagram



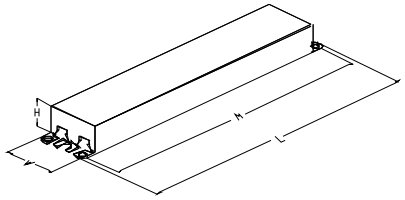
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	23	58.4
White	23	58.4
Blue	27	68.6
Red	27	68.6
Yellow	42	106.7
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.5 "	1.3 "	1.0 "	8.9 "
9 1/2	1 3/10	1	8 9/10
24.1 cm	3.3 cm	2.5 cm	22.6 cm

Revised 03/03/2009

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: 866-915-5886

PHILIPS
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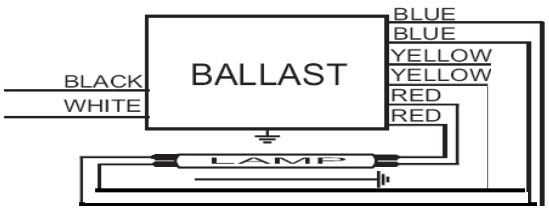
ICN-2S28-N@277	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F14T5	1	14	0/-18	0.07	17	1.07	10	0.98	1.7	6.29
F14T5	2	14	0/-18	0.12	33	1.04	10	0.98	1.7	3.15
F21T5	1	21	0/-18	0.10	25	1.06	10	0.98	1.7	4.24
F21T5	2	21	0/-18	0.18	49	1.02	10	0.98	1.7	2.08
* F28T5	1	28	0/-18	0.12	31	1.05	10	0.98	1.7	3.39
F28T5	2	28	0/-18	0.22	60	1.00	10	0.98	1.7	1.67

Wiring Diagram



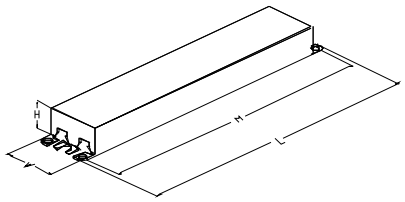
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	23	58.4
White	23	58.4
Blue	27	68.6
Red	27	68.6
Yellow	42	106.7
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.5 "	1.3 "	1.0 "	8.9 "
9 1/2	1 3/10	1	8 9/10
24.1 cm	3.3 cm	2.5 cm	22.6 cm

Revised 03/03/2009

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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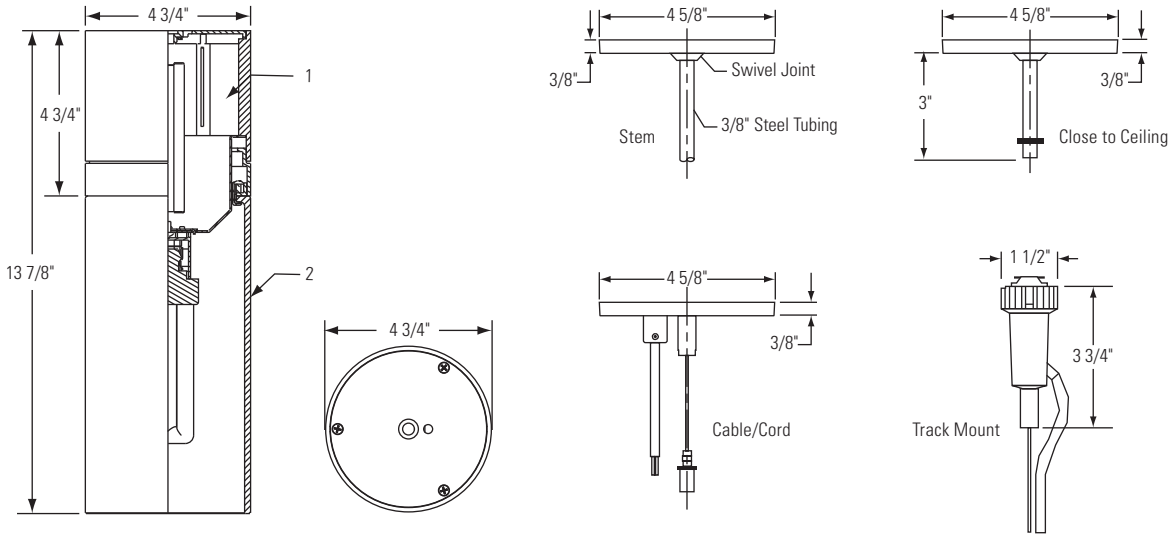

Ordering Information: Complete fixture consists of Powerhead + Inner Glass + Suspension Kit. Each sold separately (ie **PM32SA** + **PG01** + **SK01**).

Spec ID (reference only)	**Powerhead**	**Inner Glass**	**Outer Glass**	**Suspension Kit**	**Lamp**	**Volts**
FP01	**PM32SA**	**PG01**	**NA**	*See suspensions below	CFL, 26/32	120-277V
FP01MX1	**PM32MX1SA**	**PG01**	**NA**		Mark X Dimming 26/32W	120V
FP01MX2	**PM32MX2SA**	**PG01**	**NA**		Mark X Dimming 26/32W	227V
IPO1	**PM150SA**	**PG01**	**NA**		T-4 Mini-Can 150W	120V

Suspension Kit:

Cat. No	**Finish**	**Description**
SK01	Satin Aluminum	Clear Metallic Straight Cord/Cable, 120" Length, (10') with canopy
SK02	Satin Aluminum	Clear Metallic Straight Cord/Cable, 300" Length, (25') with canopy
ST01	Satin Aluminum	36" Length 3/8" Stem with canopy
ST02	Satin Aluminum	60" Length 3/8" Stem with canopy
CTC	Satin Aluminum	Close To Ceiling Kit with canopy
TM01	Satin Aluminum	Silver Track Mounting Kit with Clear Metallic Straight Cord/Cable, 120" Length, (10') (120V only)
SMK	Satin Aluminum	Flush Mounting Kit

Features

1. **Power Compartment:** Die Cast and Machined Aluminum Components. Brushed and Clear Lacquer Finish.
2. **Primary Glass:** Triplex Hand Blown Glass.

Lamping (by others)

Incandescent: 50W Max. T-4 Mini Candelabra

Compact Fluorescent:

General Electric	Osram/Sylvania	Philips
(1) 26W Triple Tube 4-Pin (Amalgam) Compact Fluorescent Lamp		
F26TBX/*/A/4P	CF26DT/E/IN/*	PL-T26W/*/4P
(1) 32W Triple Tube 4-Pin (Amalgam) Compact Fluorescent Lamp		
F32TBX/*/A/4P	CF32DT/E/IN/*	PL-T32W/*/4P

*Manufacturers Color Temperature Designation

Electrical

Lampholders

Incandescent: E11 Base, Porcelain, Plated Copper Alloy Screw Shell

Compact Fluorescent: 4-Pin, 26/32 watt base: GX24q-3

Electrical (continued)

Ballasts: Fluorescent: Electronic	**26 Watts**		**32 Watts**	
Voltage	120	277	120	277
Total Input Watts	28	28	38	36
Max. Line Current (Amps)	.25	.11	.30	.13

Labels

cULus Listed. Suitable for Damp Locations.

Job Information **Type:**

Job Name:

Cat. No.:

Lamp(s):

Notes:

631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710

Return to search | Print Page

Product Number:	20885
Order Abbreviation:	CF32DT/E/IN/835/ECO
General Description:	DULUX 32W triple compact fluorescent amalgam lamp with 4-pin base, integral EOL, 3500K color temperature, 82 CRI, for use with electronic and dimming ballasts, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	CF32DTEIN835ECO 50/CS 1/SKU
Average Rated Life (hr)	12000
Base	GX24Q-3
Bulb	T (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3500
Family Brand Name	Dulux® T/E
Industry Standards	IEC 60901- 7432
Mean Lumens at 25C	2002
Maximum Overall Length - MOL (in)	5.6
Maximum Overall Length - MOL (mm)	142
NEMA Generic Designation (old)	CFM32W/GX24Q/835
Nominal Wattage (W)	32.00

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information

Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- This 4-pin DULUX lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp)sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
- Optimum light output for DULUX T/E IN amalgam compact fluorescent lamps occurs at approximately 35 deg. C/ 95 deg. F ambient temperature when the lamp is operated in the base up position. The lumen value listed refers

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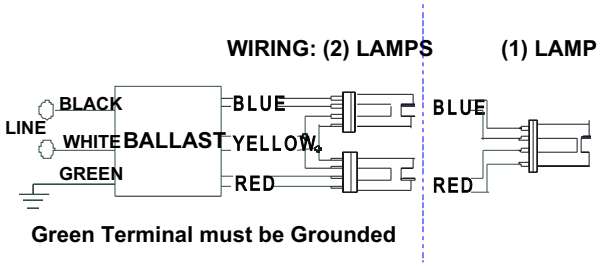
ICF2S26H1LDQS@277	
Brand Name	SMARTMATE-QS
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
CFQ26W/G24Q	2	26	0/-18	0.19	51	1.00	10	0.99	1.7	1.96
CFTR26W/GX24Q	1	26	0/-18	0.11	29	1.10	10	0.99	1.7	3.79
CFTR26W/GX24Q	2	26	0/-18	0.20	54	1.00	10	0.99	1.7	1.85
* CFTR32W/GX24Q	1	32	0/-18	0.13	36	0.98	10	0.98	1.7	2.72
CFTR42W/GX24Q	1	42	0/-18	0.17	46	0.98	10	0.98	1.7	2.13

Wiring Diagram



Green Terminal must be Grounded

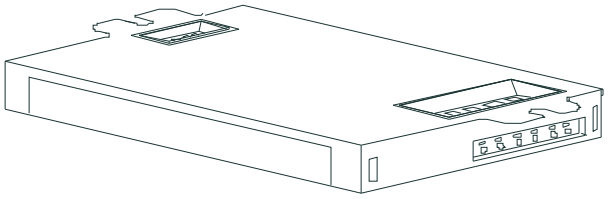
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
4.98 "	2.4 "	1.0 "	4.6 "
4 49/50	2 2/5	1	4 3/5
12.6 cm	6.1 cm	2.5 cm	11.7 cm

Revised 08/05/2008

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WP SYSTEM

WP-T5-US-AC
WP-T5HO-US-AC

UNDER SHELF WITH ACRYLIC COVER

T5 or T5HO LINEAR LAMP

- 20 gauge steel construction, also available in aluminum, add "**AL**" in "Options" space
- uses standard or high output T5 fluorescent lamps, other lamp types available
- formed snap-on acrylic cover, contact factory for acrylic options
- standard ballasts are integral electronic, consult the factory for available types of regular, dimming and emergency ballasts
- fixtures are available in nominal lengths of 1, 2, 3, 4, 5 and 8 feet, see part numbers to the right for actual fixture lengths
- standard finish is High Reflectivity White powder coat done post production, decorative Large Pattern Galvanize and other custom colors and finishes are also available
  all WP System fixtures are treated with a multi-stage phosphate process which ensures proper finish bonding and inhibits rust
- available with optional white on-off rocker switch
- UL and C-UL Listed for Dry and Damp Locations

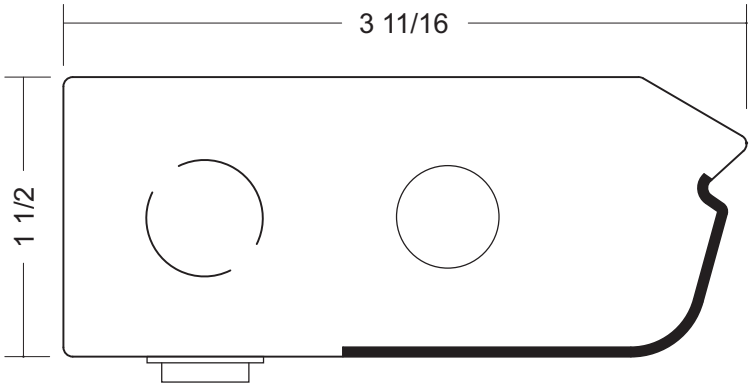
Job Information

Type _____

Job Name _____

Location _____

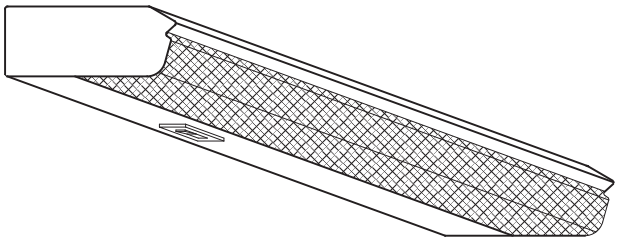
Type Q



On/Off rocker switch option: **RS1**

K.O. on end cap (shown above) option: **KO**

no K.O. on end cap (shown below) option: **NK**



WP | **US-AC-** | Voltage | Ballast | Length | Finish | Options

Family
WP

Lamp Type
T5 - Standard T5
T5HO - T5 High Output

Model
US-AC - Under Shelf with Acrylic Cover
W - white textured
C - clear
P - clear prismatic
O - other_____

Voltage
120
277
347
UNV

Ballast
STD - electronic
DIM - dimming
EM - emergency consult factory for available **STD**, **DIM** and **EM** options

Length

T5	T5HO
108 - 12 3/16"	
114 - 22 1/2"	**124** - 22 1/2"
121 - 34 5/16"	**139** - 34 5/16"
128 - 46 1/8"	**154** - 46 1/8"
135 - 57 7/8"	**180** - 57 7/8"
228 - 92 1/16"*	**254** - 92 1/16"*

*(*4' lamps end-to-end)*

Finish
HRW - High Reflectivity White
LPG - Large Pattern Galvanize
CU - Custom (please specify)

Options

BIRCHWOOD LIGHTING
714.550.7118 • fax 714.550.7151 • www.BirchwoodLighting.com

Return to search | Print Page

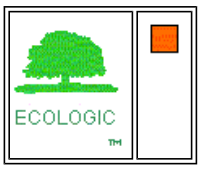
Product Number: 20921
Order Abbreviation: FP21/835/ECO
General Description: 21W, T5 PENTRON fluorescent lamp, 3500K color temperature, rare earth phosphor, 85 CRI, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	FP21835ECO 40/CS 1/SKU
Actual Length (in)	34
Actual Length (mm)	863.2
Average Rated Life (hr)	20000
Base	Miniature Bipin
Bulb	T5
Color Rendering Index (CRI)	85
Color Temperature/CCT (K)	3500
Diameter (in)	0.67
Diameter (mm)	17.0
Family Brand Name	PENTRON® ECO®
Initial Lumens at 25C	1900
Initial Lumens at 35C	2100
Mean Lumens at 25C	1767
Mean Lumens at 35C	1953
Nominal Length (in)	36
Nominal Wattage (W)	21.00

Additional Product Information

Product Documents, Graphs, and Images

Packaging Information



Footnotes

- Approximate initial lumens after 100 hours operation.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Lumen output and life rated on high frequency operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please

PHILIPS
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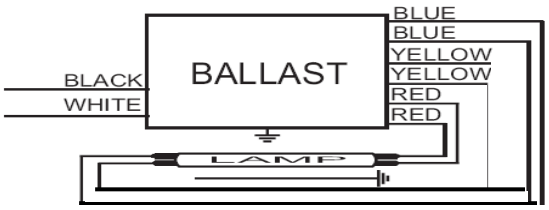
ICN-2S28-N@277	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F14T5	1	14	0/-18	0.07	17	1.07	10	0.98	1.7	6.29
F14T5	2	14	0/-18	0.12	33	1.04	10	0.98	1.7	3.15
* F21T5	1	21	0/-18	0.10	25	1.06	10	0.98	1.7	4.24
F21T5	2	21	0/-18	0.18	49	1.02	10	0.98	1.7	2.08
F28T5	1	28	0/-18	0.12	31	1.05	10	0.98	1.7	3.39
F28T5	2	28	0/-18	0.22	60	1.00	10	0.98	1.7	1.67

Wiring Diagram



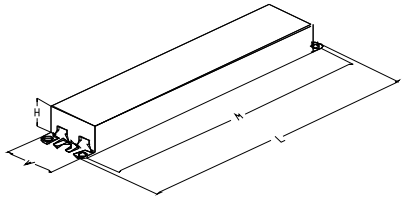
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	23	58.4
White	23	58.4
Blue	27	68.6
Red	27	68.6
Yellow	42	106.7
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.5 "	1.3 "	1.0 "	8.9 "
9 1/2	1 3/10	1	8 9/10
24.1 cm	3.3 cm	2.5 cm	22.6 cm

Revised 03/03/2009

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.

PHILIPS LIGHTING ELECTRONICS N.A.

10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018

Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance

Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

Type Catalog number

Type R

FEATURES

OPTICAL SYSTEM

- Reflector - Self-flanged, semi-specular clear or matte-diffuse reflector. Fluted vertical upper section works in conjunction with Patented Bounding Ray™ Optical Principle design (U.S. Patent No. 5,800, 050) provides lamp before lamp image and smooth transition from top of reflector to bottom. Minimum flange matches reflector finish.
- Lens position at optical break provides optimal visual comfort and improved aperture aesthetics.
- Baffle/cone - Semi-specular upper reflector. Microgroove baffle with white painted flange or specular black cone with flange that matches cone finish.
- Hinged lampdoor seals upper trim for optimal fixture efficiency and the reduction of stray light in the plenum.

MECHANICAL SYSTEM

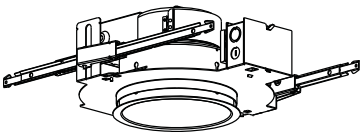
- 16-gauge galvanized steel mounting/plaster frame with integral yoke to retain optical system. Maximum 1-1/2" ceiling thickness.
- 16-gauge galvanized steel mounting bars with continuous 4" vertical adjustment are shipped pre-installed. Post installation adjustment possible without the use of tools from above or below the ceiling.
- Galvanized steel junction box with hinged access covers and spring latch. Two combination 1/2"–3/4" and three 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors, rated for 90°C.

ELECTRICAL SYSTEM

- Horizontally-mounted, positive-latch, thermoplastic socket.
- Class P, thermally-protected high power factor electronic ballast mounted to the junction box.
- Simply5™ technology available. SIMPLY5 LIGHTING INTELLIGENCE

LISTING

- Fixtures are UL Listed for thru-branch wiring, Non-IC recessed mounting and damp locations. Listed and labeled to comply with Canadian Standards.

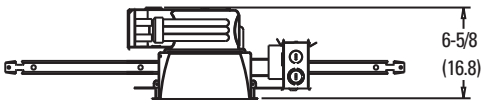


Compact Fluorescent Downlighting

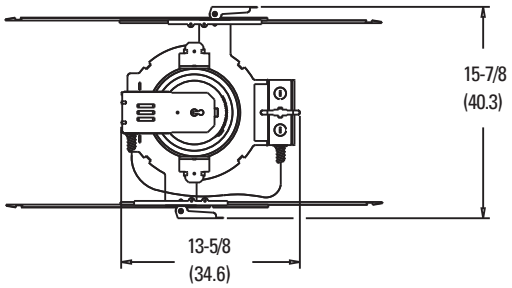
6" AF

Lensed Reflector

Horizontal Lamp
Triple-Tube



Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap Trim: 7-1/2 (19.1)



All dimensions are inches (centimeters)

ORDERING INFORMATION

Example: **AF 1/26TRT 6AR CGL MVOLT**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number (shipped separately).

AF

Series	Wattage/ Lamp	Aperture/Trim color	Finish	Lens type	Voltage	Ballast[4]	Options
AF	**1/18TRT**	**6AR** Clear	(blank) Semi-specular	**CGL** Clear glass lens	**MVOLT[3]**	(blank) Electronic ballast	**ELR[7]** Emergency battery pack. Remote test switch provided
	1/26TRT	**6PR** Pewter	**LD** Matte-diffuse	**PCL[2]** Clear polycarbonate lens	**120**	**DMHL[5]** Lutron Compact SE® electronic dimming ballast. Minimum dimming level 5%	**GMF** Single, slow-blow fuse
	1/32TRT	**6UBR** Umber		**T73** Tempered prismatic lens	**277**	**ADEZ[5]** Advance Mark 10™ electronic dimming ballast. Minimum dimming level 5%	**GLR** Single, fast-blow fuse
	1/42TRT	**6WTR** Wheat		**PPC[2]** Prismatic polycarbonate lens	**347**	**S5[6]** SIMPLY5™ system ballast	**TRW** White painted flange
		6MB[1,2] Black Baffle					**TRBL** Black painted flange
		6WB[1,2] White Baffle					**WLP** With 3500°K lamp (shipped separately)
		6BC[1,2] Black Cone					**LRC[8]** Provides compatibility with Lithonia Reloc® System. Lithonia Reloc System can be installed less this option with connectors provided by others. Access above ceiling required
							CP[9] Chicago Plenum (consult factory)
							CSA CSA Certified
							BDP[10] Ballast disconnect plug
							HW Hardwire for S5 system; replaces Reloc
							ELRHL[7] High lumen output emergency battery pack. Remote test switch provided

NOTES
1 Not available with finishes.
2 Lens positioned below optical break.
3 Multi-volt electronic ballast capable of operating on any line voltage from 120V through 277V, 50 or 60Hz.
4 For additional ballast types, refer to Technical Bulletins tab.
5 Available in 120V or 277V only.
6 Simply5™ includes 9' S5 MLC Reloc wiring system (shipped separately). Available in 120V or 277V only. Not available in 18W. See simply5.net for more information.
7 For dimensional changes, refer to Technical Bulletins tab.
8 For compatible Reloc systems, refer to Technical Bulletins tab.
9 Not available with EL or ELR option.
10 Meets codes that require in-fixture disconnect.

Accessories

Order as separate catalog number.

SCA6 Sloped ceiling adapter. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D). Ex: SCA6 **10D**

Return to search | Print Page

Product Number: 20881

Order Abbreviation: CF26DT/E/IN/835/ECO

General Description: DULUX 26W triple compact fluorescent amalgam lamp with 4-pin base, integral EOL, 3500K color temperature, 82 CRI, for use with electronic and dimming ballasts, ECOLOGIC

Product Information	
Abbrev. With Packaging Info.	CF26DTEIN835ECO 50/CS 1/SKU
Average Rated Life (hr)	12000
Base	GX24Q-3
Bulb	T (T4)
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3500
Family Brand Name	Dulux® T/E
Industry Standards	IEC 60901- 3426
Mean Lumens at 25C	1501
Maximum Overall Length - MOL (in)	5.0
Maximum Overall Length - MOL (mm)	126
NEMA Generic Designation (old)	CFM26W/GX24Q/835
Nominal Wattage (W)	26.00

Additional Product Information

Product Documents, Graphs, and Images

Compatible Ballast

Packaging Information

Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature is a function of the ballast; consult the ballast manufacturer.
- There is a NEMA supported, industry issue where T2, T4, and T5 fluorescent and compact fluorescent lamps operated on high frequency ballasts may experience an abnormal end-of-life phenomenon. This end-of-life phenomenon can resultin one or both of the following: 1. Bulb wall cracking near the lamp base. 2. The lamp can overheat in the base area and possibly melt the base and socket. NEMA recommends that high frequency compact fluorescent ballasts have an end-of-life shutdown circuit which will safely and reliably shut down the system in the rare event of an abnormal end-of-life failure mode described above. The final requirements of this system are yet to be defined by ANSI. For additional information refer to NEMA papers on their WEBSITE at www.NEMA.org.
- SYLVANIA ECOLOGIC fluorescent lamps are designed to pass the Federal Toxic Characteristic Leaching Procedure (TCLP) criteria for classification as non-hazardous waste in most states. TCLP test results are available upon request. Lamp disposal regulations may vary, check your local & state regulations. For more information, please visit www.lamprecycle.org
- This 4-pin DULUX lamp has an internal end-of-life mechanism (EOL) that shuts down the lamp preventing abnormal end-of life failure modes. This lamp was designed for use with high frequency ballasts that do not have their own end-of-life (lamp)sensing circuits, but it is also compatible with high frequency ballasts that have their own end-of-life (lamp) sensing circuits.
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.
- Optimum light output for DULUX T/E IN amalgam compact fluorescent lamps occurs at approximately 35 deg. C/ 95 deg. F ambient temperature when the lamp is operated in the base up position. The lumen value listed refers to the optimum light output. Non-amalgam compact fluorescent lamps provide atleast 90% light output from 60-

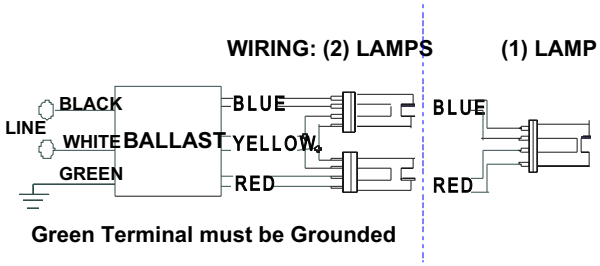
PHILIPS
ADVANCE

ICF2S26H1LDQS@277	
Brand Name	SMARTMATE-QS
Ballast Type	Electronic
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 (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
CFQ26W/G24Q	2	26	0/-18	0.19	51	1.00	10	0.99	1.7	1.96
* CFTR26W/GX24Q	1	26	0/-18	0.11	29	1.10	10	0.99	1.7	3.79
CFTR26W/GX24Q	2	26	0/-18	0.20	54	1.00	10	0.99	1.7	1.85
CFTR32W/GX24Q	1	32	0/-18	0.13	36	0.98	10	0.98	1.7	2.72
CFTR42W/GX24Q	1	42	0/-18	0.17	46	0.98	10	0.98	1.7	2.13

Wiring Diagram



Green Terminal must be Grounded

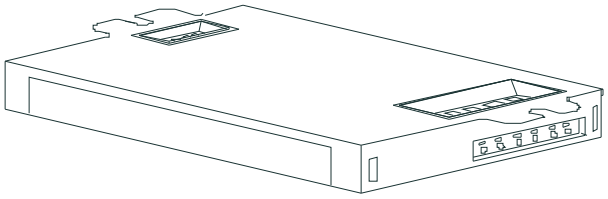
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
4.98 "	2.4 "	1.0 "	4.6 "
4 49/50	2 2/5	1	4 3/5
12.6 cm	6.1 cm	2.5 cm	11.7 cm

Revised 08/05/2008

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: 866-915-5886

DESCRIPTION

Flexible linear 24V DC LED light strip with continuous even illumination. Suitable as an alternative to neon lighting systems.

Catalog #		**Comments**	Type S1 & S2
Project		**Prepared By**	
Type		**Date**	

SPECIFICATION FEATURES

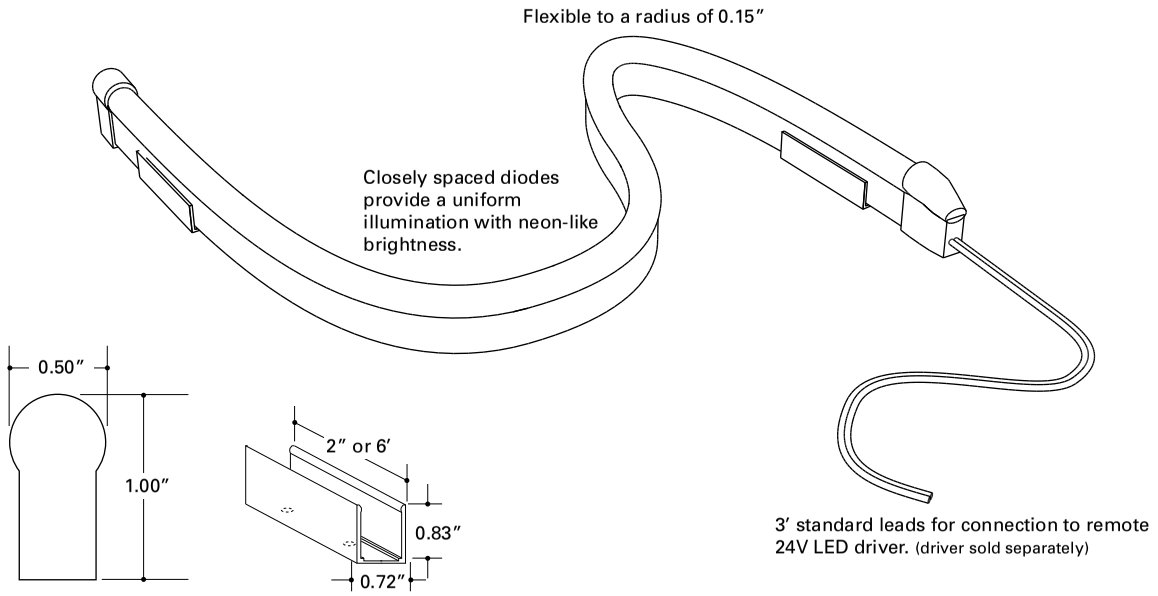
A ...Strip:
A totally flexible, sealed 24V DC LED strip for indoor and outdoor use as an alternative to neon. 40' maximum single run with 96 watt maximum load.

B ...LED:
Super bright LEDs with close 1/2" o/c spacing for uniform illumination. 2.16W/ft output in red, yellow and amber colors. 2.4W/ft output in blue, green & white colors.

C ...Mounting:
Two inch mounting clips (P9) for freeform flexed installation or six foot mounting channels (P9CH) for rigid linear installation are available with through holes for screw mounting.

D ...Driver:
Requires remote Class II 24V DC LED driver.

E ...Field Cuttable:
May be cut to size in the field. Cut location indicators are on the bottom of the strip and must be adhered to. Cut m arkers are located every 4" on red, yellow and amber strips and every 3" on green, blue and white strips.



LED
LEDEON

Flexible LED Neon Alternative

2.16W/Ft
Red / Yellow / Amber

2.4W/Ft
Blue / Green / 6500K White

40' Max.

Suitable for interior and exterior installations.

ORDERING INFORMATION

LEDEON		
Fixture Flexible LEDEON LED System	**Diode Color** **R** = Red **B** = Blue **A** = Amber **G** = Green **W** = White (6500K)	**Strip Length** Specify quantity in feet

LED Driver Data				Min. / Max. Ambient Temperature (°C / °F)	Input Volts	Catalog Number	Certifications			Input Current Max (A)	Input Power Max (W)	Max. THD %	Power Factor	Dim./ Wiring Dia.	Env. Rating
Output Power (W)		Output Voltage (V)	Output Current (Amps)						UL48						
Max.	Min.														
Luxeon™ Drivers															
10.0	1.0	2.8 ~ 28.0	0.35	-40°C / 60°C -40°F / 140°F	120	LED120A0350C28FO	✔	✔	✔	0.12	12.5	20	0.9	Fig. A/01	Dry, Damp
12.0	1.0	2.8 ~ 32.6	0.35		120	LED120A0350C33F	✔	✔	✔	0.14	15.0	20	0.9	Fig. A/01	Dry
17.2	2.0	2.8 ~ 24.6	0.70		120	LED120A0700C24F	✔	✔	✔	0.20	21.5	20	0.9	Fig. A/02	Dry
17.2	2.0	2.8 ~ 24.6	0.70		120	LED120A0700C24FO	✔	✔	✔	0.20	21.5	20	0.9	Fig. A02	Dry, Damp
25.5	3.0	2.8 ~ 24.6	1.05		120	LED120A0024V10F	✔	✔	✔	0.30	31.9	20	0.9	Fig. B/01	Dry
40.8	5.0	2.8 ~ 24.6	1.75		120	LED120A0024V18F	✔	✔	✔	0.47	51.0	20	0.9	Fig. B/01	Dry
			-		120		✔	✔	✔	0.98				Fig. D/05	
100.0	0.1	2.8 ~ 24.0	4.16		230	LEDINTA0024V41FO				0.51	117.0	20	0.9	Fig. D/05	Dry, Damp
			-		277		✔	✔	✔	0.42				Fig. D/05	
12VDC LED Systems															
12.0	2.0	12	-	-40°C / 60°C -40°F / 140°F	120	LED120A0012V10F	✔	✔	✔	0.13	15.0	20	0.9	Fig. C/05	Dry, Damp
25.5	2.3	12	-		120	LED120A0012V21F	✔	✔	✔	0.18	21.5	20	0.9	Fig. B/02	Dry
60.0	10.0	12	-		120	LED120A0012V50F	✔	✔	✔	0.63	75.0	20	0.9	Fig. D/05	Dry, Damp
		12	-		120		✔	✔	✔	0.61				Fig. D/05	
60.0	0.1	12	-		230	LEDINTA0012V50FO				0.32	73.0	20	0.9	Fig. D/05	Dry, Damp
		12	-		277		✔	✔	✔	0.26				Fig. D/05	
24VDC LED Systems															
17.0	2.4	24	-	-40°C / 60°C -40°F / 140°F	120	LED120A0024V07F	✔	✔	✔	0.18	21.5	20	0.9	Fig. A/01	Dry
17.0	2.4	24	-		120	LED120A0700C24FO	✔	✔	✔	0.18	21.5	20	0.9	Fig. A/02	Dry, Damp
25.5	2.3	24	-		120	LED120A0024V10F	✔	✔	✔	0.27	31.9	20	0.9	Fig. B/02	Dry
40.8	5.6	24	-		120	LED120A0024V18F	✔	✔	✔	0.43	51.0	20	0.9	Fig. B/05	Dry
80.0	10	24	-		120	LED120A0024V33F	✔	✔	✔	0.83	100.0	20	0.9	Fig. D/05	Dry
			-		120		✔	✔	✔	0.98				Fig. D/05	
100.0	0.1	24	-		230	LEDINTA0024V41FO				0.51	117.0	20	0.9	Fig. D/05	Dry, Damp
			-		277		✔	✔	✔	0.42				Fig. D/05	
Dimming (0-10V Dimming)															
25.5	15	10.4 ~ 24.6	1.05	-40°C / 60°C -40°F / 140°F	120	LED120A0024V10D*	✔	✔	✔	0.30	31.9	20	0.9	Fig. B/03	Dry
25.5	15	24	-		120	LED120A0024V10D*	✔	✔	✔	0.27	31.9	20	0.9	Fig. B/03	Dry

* For complete specifications on dimming driver, see Advance, Form No. LE-6010 available at www.ledcentral.com

Appendix C: Equipment Schedule and Cut Sheets

Equipment Schedule

Type	Manufacturer	Product Name	Catalog Number	Description	Location
EQ 1	LUTRON	GRAFIK Eye 4000 Series Control Unit	GRX-4116-T-WH	-Provides pushbutton recall of four preset lightnig scenes, plus Off -Allows setup of lighting scenes using buttons on the Control Unit -Controls virtually any light source via dimming ans switching panels -Provides lockout options to prevent accidental changes -Includes built-in infrared receivre for operation with an optional remote control	AUDITORIUM A & B
EQ 2	LUTRON	Infrared Transmitter/ Receiver Pair	GRX-IRPS-WH	-Detects partition movement and, in conjunction with other Lutron products, coordinates lighting present functions in areas such as partitioned meeting rooms	AUDITORIUM A
EQ 3	LUTRON	Dual Technology Wall Mount Occcupancy Sensor	LOS-WDT-WH	-Ultrasonic combined with passive infrared sensing provide high sensitivity, high noise immunity, and excellent false tripping immunity -Suited for complex environments that are difficult to control with single-technology sensors - Flexible base mounting on wall or ceiling -1600 sq.ft. of coverage	AUDITORIUM A & B
EQ 4	LUTRON	seeTouch Wallstation	SG-4SN-WH-EGN	-Used to select and adjust scenes in GRAFIK Eye Control Units -Can be set up to select scenes in just one Control Unit or a group of up to eight Control Units	AUDITORIUM A & B
EQ 5	Watt Stopper	MSC-100 Astronomic Time Clock	MSC-100	-Five-channel clock used with Watt Stopper's wireless RF lighting control systems -Provides ON/OFF control signals based on time of day, day of week, holiday, and calculated sunrise/sunset (astronomic) time	Main Electrical Room 1124
EQ 6	Lagotronics	USB-i 505	95380247	-Allows unlimited access to DMX-i Strips by using any of the available control devices within the DMX-i system -Built-in power supply unit provides power and data for up to eight strip per output	Main Electrical Room 1124
EQ 7	Watt Stopper	LightSaver LS-290C Photosensor	LS-290C	-Provides the daylight data necessary for operation of LCD-203 daylighting control system -Utilizes a photodiode element to continuously measure ambient light levels - Positioned to "see" incoming daylight from either a window or skylight without seeing electrical light -Users select the applicable footcandle range by a jumper beneath the front cover	PT 2104 and Lobby 1001
EQ 8	Watt Stopper	LightSaver LCD-203 Dimming Controller	LCD-203	-Provides automatic dimming control for fluorescent and HID fixtures -Open loop controller providing up to three zones of control from a single photocell -Simplified setup and calibration -Seven individually adjuatable parameters for each chanel -Automatic internal calculation for dimming requirements of individual channels for simplified setup	Electrical Room 2018
EQ 9	Watt Stopper	LightSaver BT-203 Power Pack	BT-203	-Powers the LightSaver LCD-203 control module - Connects via a quick connect cable -Has three normally open relays used to switch line voltage in response to signals from the connected controller -Automatically resetting fuse	Electrical Room 2018

EQ 10	Lutron	GP Dimming Panels	GP8-1204ML-20	-Provide power and dimming for up to 144 load circuits and control any light source, including full-conduction non-dim - Panel current ratings are listed for continuous operation - UL-listed specifically for each light source	Storage 1010A
EQ 11	Lutron	GP Dimming Panels	GP8-2774ML-20	-Provide power and dimming for up to 144 load circuits and control any light source, including full-conduction non-dim - Panel current ratings are listed for continuous operation - UL-listed specifically for each light source	Storage 1010A

Type EQ 1

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

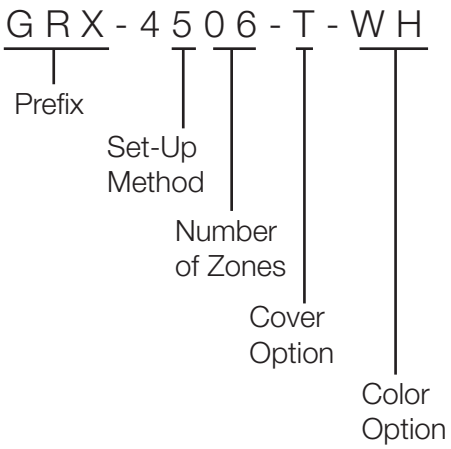
- Low-voltage type Class 2 (PELV) wiring connects Control Units, Wallstations, and Control Interfaces.
- Up to 8 Control Units may be linked to control up to 64 zones.
- Up to 16 total Wallstations and Control Interfaces may be added for a total of 24 control points.

Environment

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

Job Name:	Model Numbers:	
Job Number:		

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

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

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-_-__

Job Name:	Model Numbers:	
Job Number:		

Type EQ 2

GRX-IRPS-WH
Infrared Transmitter/Receiver Pair

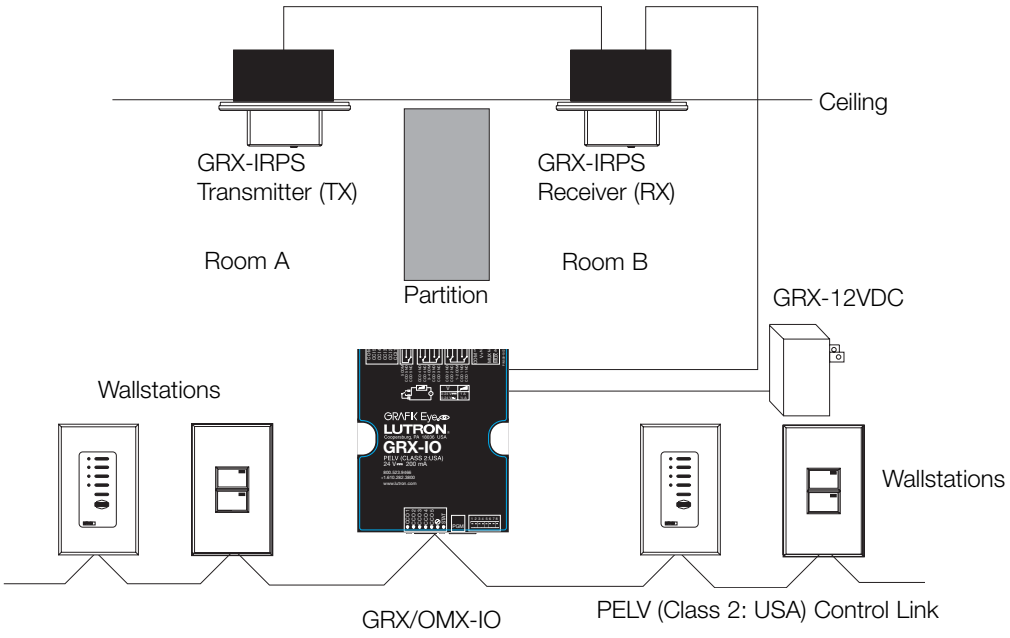
Description

Infrared transmitter/receiver pair detects partition movement and, in conjunction with other Lutron products, coordinates lighting preset functions in areas such as partitioned meeting rooms or ballrooms. Sensors may be used with *GRAFIK Eye* 3000 or 4000 Systems, *GRAFIK Eye* QS, as well as *GRAFIK* 5000/6000®/7000 Systems.

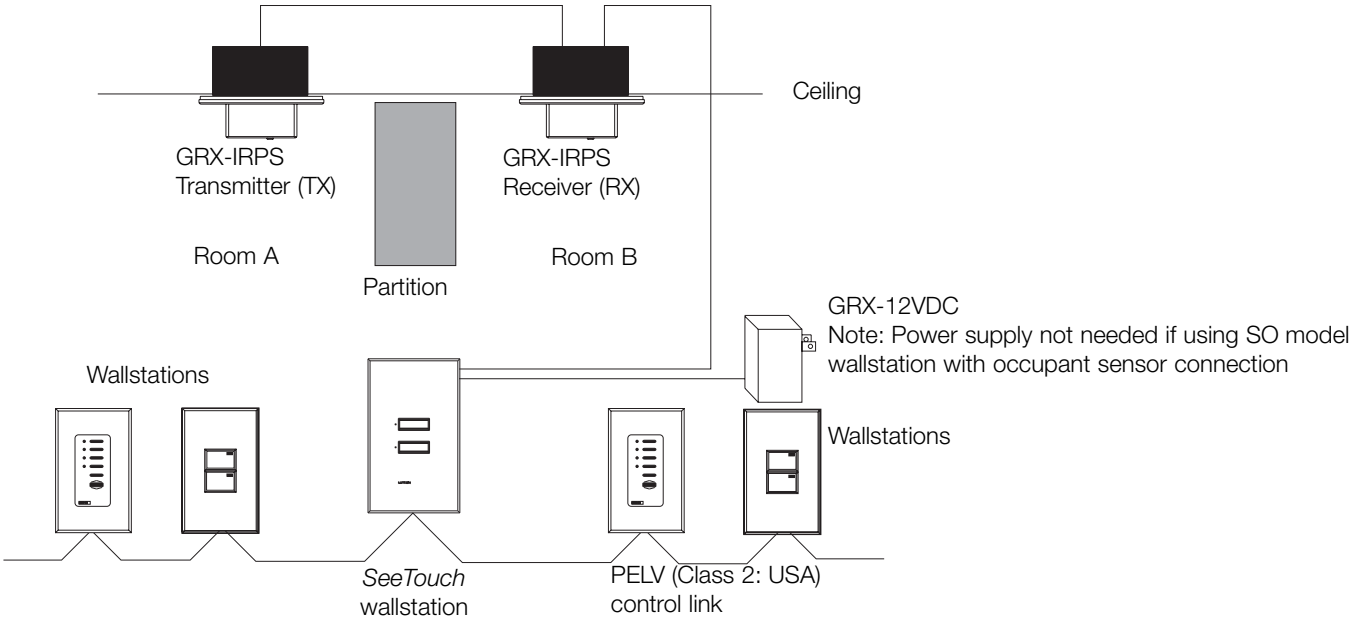
- Automatically combines lighting preset functions when partition is open creating one large space.
- Lighting preset functions become independent as partition is closed creating several smaller spaces.
- Sensors require additional Lutron interface (GRX-IO or OMX-IO) and power supply (GRX-12VDC) for proper operation with *GRAFIK Eye* 3000/4000 system.
- Sensors also work with a *GRAFIK Eye* QS system, with a QSWS2-2B wallstation and power supply.
- Sensors function with *SeeTouch* SO series wallstation with occupant sensor connection if used with GRAFIK 5000/6000/7000 system. One SO series wallstation with occupant sensor connection (ordered separately) can accommodate and supply power for one transmitter/receiver pair for one moveable wall. This will count as two devices on the link.

Job Name:	Model Numbers:	
Job Number:		

System Diagram: *GRAFIK Eye* 3000 and 4000 Systems
GRAFIK 5000/6000/7000 Systems



System Diagram: *GRAFIK* 5000/6000/7000 Systems



Job Name:	Model Numbers:	
Job Number:		

Specifications

Power

- Operating voltage: Low-voltage PELV (Class 2: USA) 12 - 24 V⎓ from GRX-12VDC plug-in power supply (ordered separately). One GRX-12VDC can supply power to five sensor transmitter/receiver pairs.
- Transmitter and receiver have reverse polarity and short-circuit protection.

Sensor Status Indicator

- Receiver includes an LED indicator that assists in sensor alignment during installation and provides sensor operating status.

System Capacity

- Each GRX-IO or OMX-IO Interface (ordered separately) can accommodate up to five transmitter/receiver pairs for five different moveable walls.
- Each QSWS2-2B wallstation (ordered separately) can accommodate one transmitter/receiver pair for one moveable wall.

Connection

Wire leads provided.

Finish

- White painted plastic.

Environment

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

Mounting

Surface mount indoors only.

Type EQ 3

Dual Technology Wall Mount Occupancy Sensor

The LOS-WDT Series wall-mount dual-technology sensors are used to control lighting in spaces that have pendant fixtures, ceiling fans, or high ceilings (more than 12 ft./ 3.7 m), where ceiling-mount occupant sensors would not function reliably. The adaptive technology eliminates manual sensitivity and timer adjustments during installation and over the life of the product.

Features

- Intelligent, continually adapting sensor
- Ultrasonic (US) combined with passive infrared (PIR) sensing provide high sensitivity, high noise immunity, and excellent false tripping immunity
- Suited for complex environments that are difficult to control with single-technology sensors
- Flexible base mounting on wall or ceiling
- Aim and lock: base mount permits fast alignment
- Non-Volatile Memory: settings saved in protected memory are not lost during power outages
- 1600 sq.ft. (488 m^2) of coverage when used where the ceiling height is between 8 - 12 ft. (2.4 - 3.7 m)
- Affords choice of turning lights off or dimming to a preset level in the unoccupied state when integrated with a Lutron system.

Models Available

Cat. No.	Color	Coverage	Field of View
LOS-WDT-WH	White	1600 sq.ft. (488 m^2)	110°
LOS-WDT-R-WH	White	1600 sq.ft. (488 m^2)	110°

Self-Adaptive Feature

The LOS-WDT Series wall-mount occupancy sensors combine both ultrasonic (US) motion detection for maximum sensitivity and passive infrared (PIR) motion detection for false triggering immunity. The self-adapting internal microprocessor analyzes the composite sum of both signals to eliminate time-consuming adjustments and callbacks found in non-intelligent sensors.

Job Name:	Model Numbers:	
Job Number:		

Specifications

Timer Settings

- Automatic mode: Continually adapting sensor automatically adjusts settings to the space
- Manual mode: 4 to 30 minutes
- Test mode: 8 seconds

LED Lamp

- Red: infrared motion
- Green: ultrasonic motion

Housing

- High-impact, injection molded plastic housing
- 6 in. (15 cm) color-coded lead wires

Power

- Operating voltage: 20 - 24 V⎓, Class 2 (PELV) low-voltage
- Operating current: 33 mA nominal
- Control output: 20 - 24 V⎓ active high logic control signal with short-circuit protection, open collector when unoccupied
- UL and CUL listed

Operating Environment

- Temperature: 32 to 104 °F (0 to 40 °C)
- Relative humidity: 0% to 95%, non-condensing
- For indoor use only

Contact Rating (R Models only)

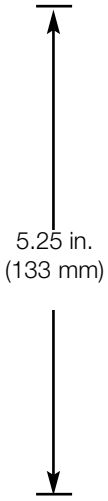
- SPDT 500 mA rated at 24 V⎓ isolated relay

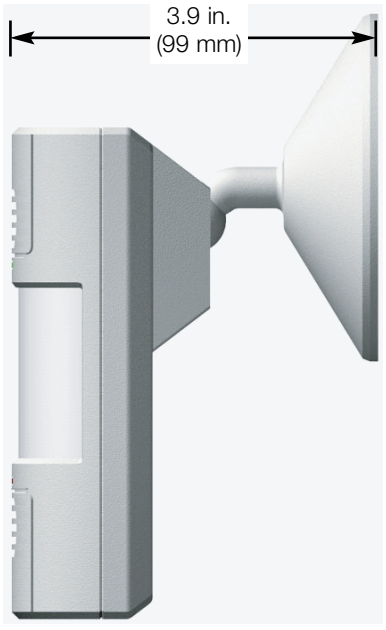
Photo Cell (R Models only)

- Prevents light from turning on when there is sufficient natural light
- Sensitivity: 20 - 3,000 LUX adjustable

Dimensions

Front View





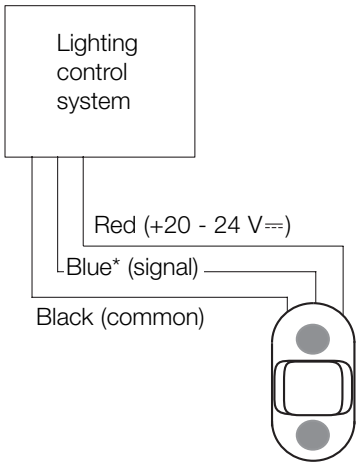
Side View

Job Name:	Model Numbers:	
Job Number:		

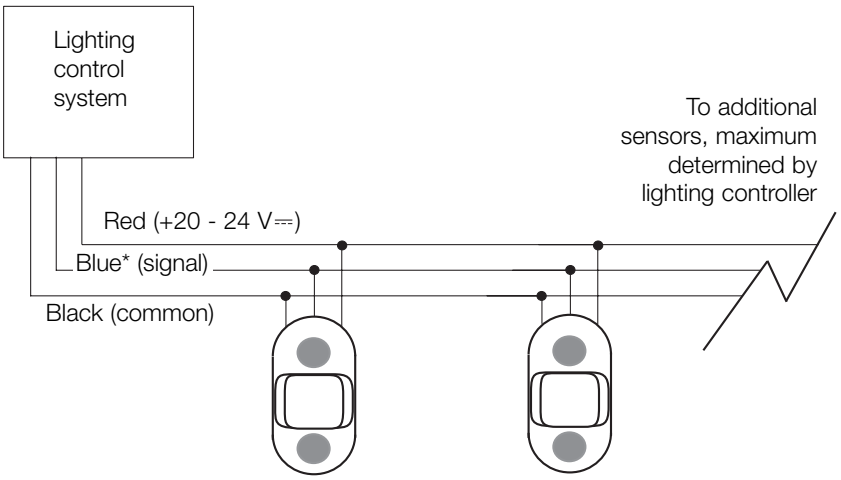
Wiring

Note: Power pack may be required when interfaced to lighting control system; see below.

Single Sensor to System



2 or More Sensors to System



*Note: Use gray wire for -R model.

Power Supply Options

Lutron Lighting Control System	Power Pack Required?
Digital microWATT™	No
EcoSystem®	No
GRAFIK 5000 / 6000 / 7000	No, when used with seeTouch® wallstations with occupant sensor connections.
GRAFIK Eye® 3000 / 4000	Yes
HomeWorks®	Yes
LCP128™	No, when used with *seeTouch* wallstations with occupant sensor connections.
microWATT®	No
RadioRA®	Yes
RadioTouch®	No
Softswitch128®	No, when used with *seeTouch* wallstations with occupant sensor connections.

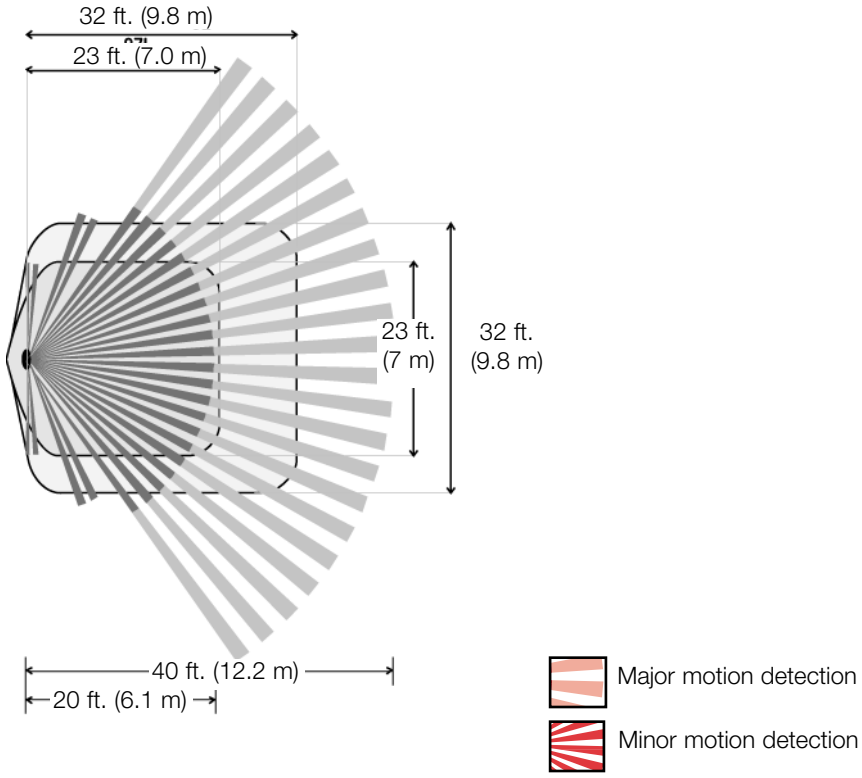
Job Name:	Model Numbers:	
Job Number:		

Installation

Sensor Placement

- The occupant sensor must have an unobstructed view of the room entrance. Do not mount behind or near tall cabinets, shelves, indirect hanging fixtures, etc.
- Keep the occupant sensor away from air flow from ventilation outlets, windows, fans, etc.
- Place the sensor on the same wall as the doorway so that traffic in a hallway will not affect the sensor.
- Closely follow the diagrams shown concerning major and minor motion coverage. The sensor can detect major motion (such as a person taking a half-step) at a greater distance than it can detect minor motion (such as writing or typing at a desk).
- Decrease total coverage area by 15% for “soft” rooms (for example, heavy draperies or heavy carpeting).

Range Diagrams

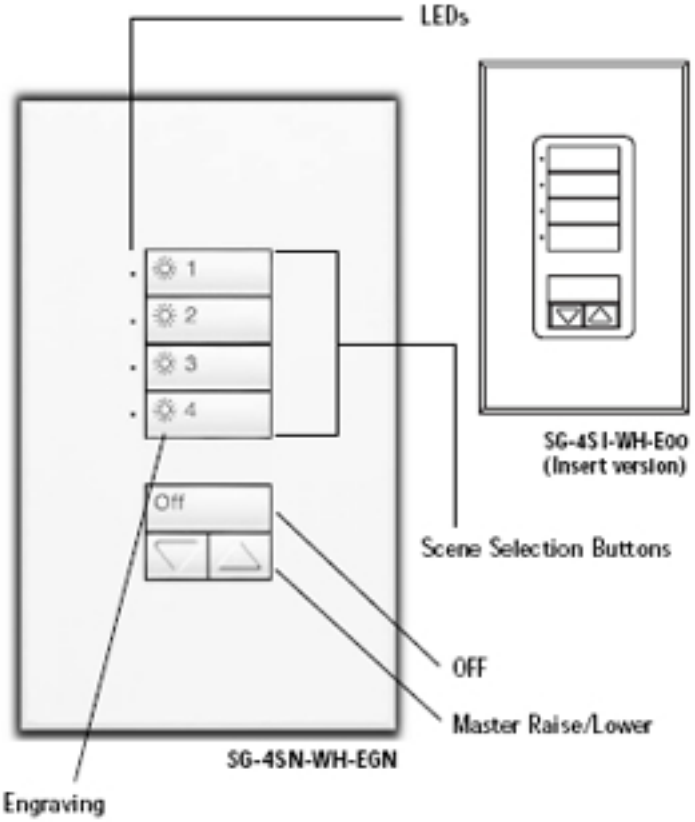


Job Name:	Model Numbers:	
Job Number:		

Type EQ 4

COLOR AND FINISH CODES

SG-4SN-___-___
5-Button Wallstation with Raise/Lower



DESCRIPTION

Used to select and adjust scenes in GRAFIK Eye Control Units.

- Large, rounded buttons are easy to touch.
- Backlit buttons with optional on-button engraving make it easy to find and operate the control in low light conditions.
- Optional on-button engraving is angled up to the eye for easy reading.
- Scene selection buttons activate scenes 1 to 4, 5 to 8, 9 to 12, or 13 to 16 depending on how you set DIP switches 5 and 6.
- Status LEDs show which scene is selected.
- Off button turns all lights off.
- Master raise/lower brightens or dims all lighting in the selected scene.

Works with GRX-3000 and GRX-4000 Control Units. Can be set up to select scenes in just one Control Unit or a group of up to eight Control Units.

SPECIAL FINISH AND ENGRAVING

- On-button engraving is available for improved clarity of control functions in low light conditions.
- 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**.

FUNCTIONS

DIP SWITCH SETTINGS 5 6	Scene selection buttons activate...
	Scenes 1 to 4
	Scenes 5 to 8
	Scenes 9 to 12
	Scenes 13 to 16

Please note: DIP Switches 7-10 are set at the factory. Consult Lutron when changing 7-9(may change functionality of control). Dip switch 10 controls the button backlight.All settings are explained in the product installation guide.

JOB NAME:	MODEL NUMBERS:	
JOB NUMBER:		

SPECIFICATIONS

Power
Operating voltage: Low-voltage type Class 2(PELV), 12VDC to 24VFW.

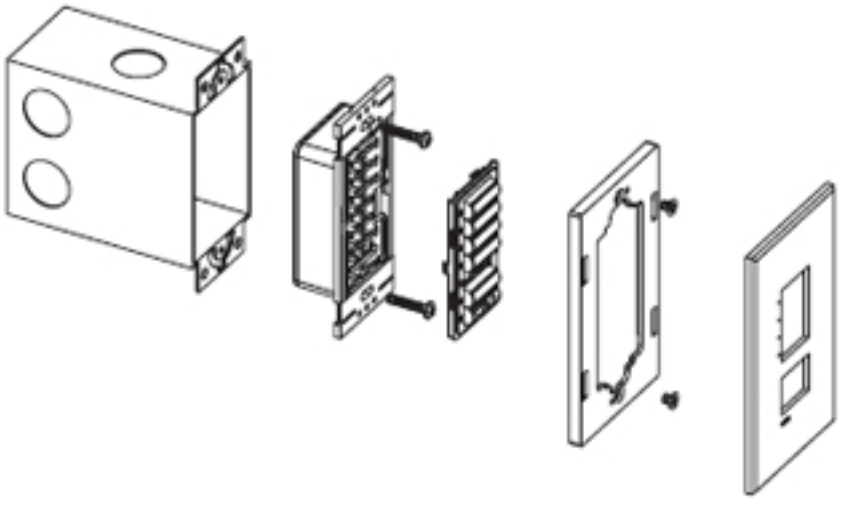
Key Design Features
- Field-changeable button and faceplate assemblies make for easy customization.
- Front accessible DIP switches allow change of function without removing the unit from the wall.
- Meets IEC 801-2. Tested to withstand 15kV electro-static discharge without damage or memory loss.
- Has faceplate that snaps on with no visible means of attachment.
- Available as an "insert" style control for multi-ganging.
- Can be ganged to share a common faceplate with NovaT☆ and Vareo Dimmers. To order new Wallplates for multi-ganging, specify "R3" openings in a Lutron NovaT multi-gang FB (fins broken) Series model number.
- Use Button Replacement Kits to change color, button configuration, engraving, or between insert and non-insert versions.
- 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.
- You can link up to 8 Control Units and up to 16 total Wallstations and/or Control Interfaces for a total of 24 control points.

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

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

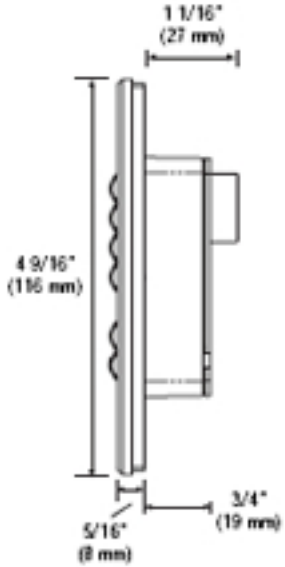
MOUNTING- Typical backbox dimensions: 95mm (3.74") high, 55mm (2.17") wide, 70mm (2.75") deep.



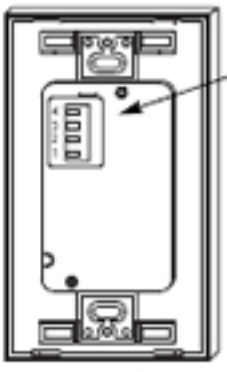
DIMENSIONS

Front View

Side View



Back View



JOB NAME:	MODEL NUMBERS:	
JOB NUMBER:		

Wallstation Installation

DIP SWITCHES

- Set DIP switches 1-4 to give the Wallstation the 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 switchbox or junction box with a maximum wire length of 8 feet (2.5m) from the link to the Wallstation.

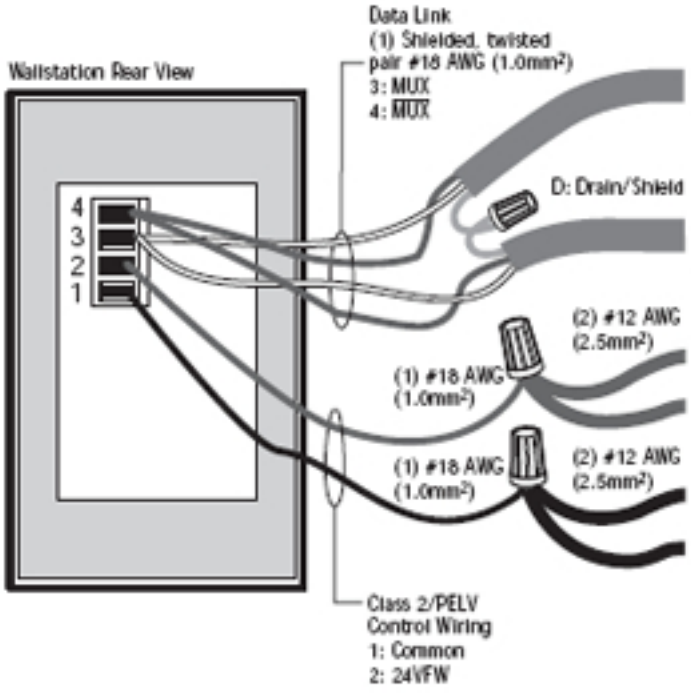
Note: EGRX Eurostyle Wallstations have a D terminal for Drain. You can connect the Drain/Shield at this terminal.

When used with GRX-3000 Control Units

- Two #18 AWG (1.0mm²) conductors for common (terminal 1) and 12VDC (terminal 2). Make sure you wire the the terminal 2 connection correctly. Refer to GRX-3000 Specification Submittal.
- One shielded, twisted pair #18 AWG (1.0mm²) for data link (terminals 3 and 4).

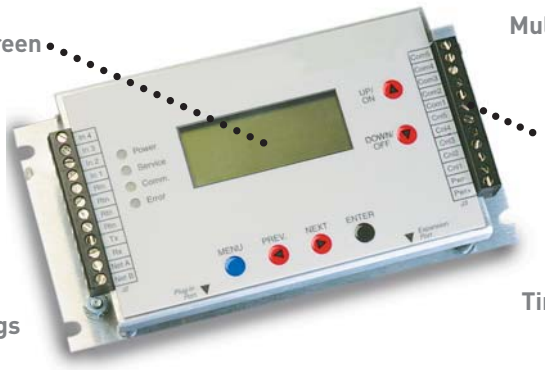
When used with GRX-4000 Control Units

- 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.



JOB NAME:	MODEL NUMBERS:	
JOB NUMBER:		

MSC-100 Astronomic Time Clock



PROJECT
LOCATION/TYPE

Product Overview

Description

Watt Stopper/Legrand's MSC-100 Astronomic Time Clock is a five-channel clock used with Watt Stopper's wireless RF lighting control systems. It offers simple programming yet advanced control features for fully automating a wireless RF lighting control system.

Operation

The MSC-100 provides ON/OFF control signals based on time of day, day of week, holiday, and calculated sunrise/sunset (astronomic) time. Control signals are transmitted via hardwire connection to relay channels, giving the clock the ability to work in a range of applications from simple to complex. Clock schedules are programmed events that command channels on or off. Each schedule is assigned a number, type, time of day, channel, day, and may include other information for specific clock event operation. Schedules can be assigned to operate any combination of days or holiday types.

Programming

Programming the MSC-100 is easy. Users simply complete fill-in-the-blank prompts on the device keypad and can follow along on the LCD screen. Each clock channel can be programmed independently. All programming is securely stored in non-volatile memory.

Applications

The clock is typically used in conjunction with Watt Stopper/Legrand Miro RF lighting controls. One MSC-100 will support connection to up to two Scene Interface modules, depending on the number of scenes required. Unused channels can be used to control third-party devices such as fountains or sprinklers.

Features

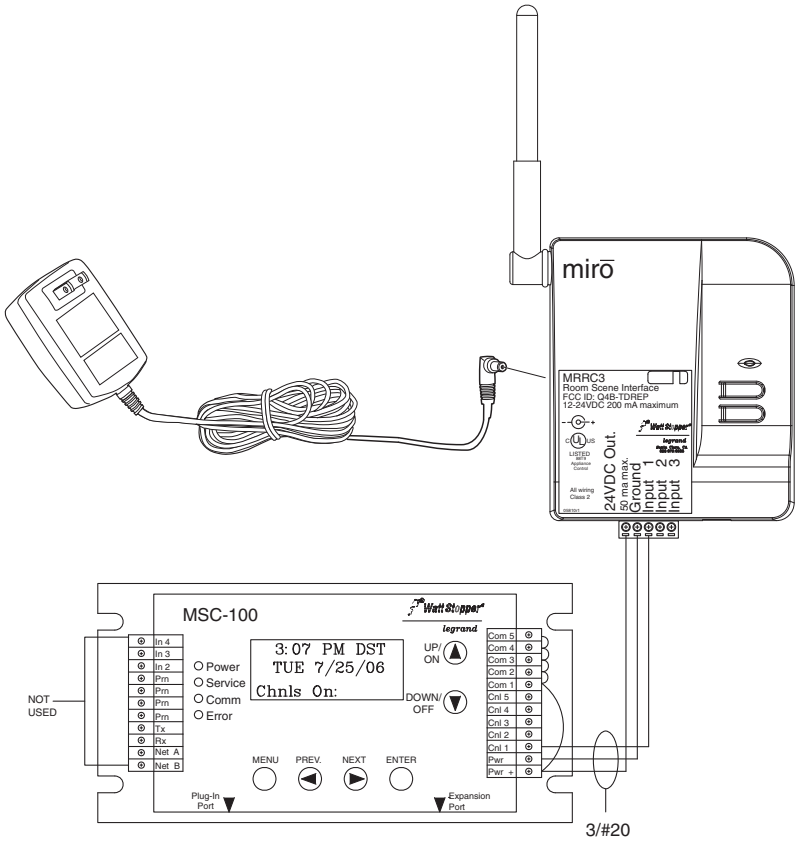
- Single date, perpetual date, perpetual day of week and perpetual Easter holidays
- 32 holidays, each up to 120 days with three holiday schedule types
- Temporary schedules that execute once then self-delete
- Repeating schedule 5 minutes to 10 hours
- 120 schedules assignable to one or more weekday or holiday
- Duration time scheduling from 1 second to 18 hours
- Continually self-adjusting astronomic control based on sunrise and sunset times
- Astronomic offset +/- 120 minutes
- Manual ON/OFF override from keypad
- Selectable 12- or 24-hour format
- Adjustable channel stagger from 1-60 seconds

Specifications

- Five normally open isolated relays rated 1 amp 24 VAC/VDC, assigned to channels 1-5
- Battery backed clock operation for up to 8 years
- Non-volatile program memory storage
- Power-up sequence, executes missed schedules following power outage
- Input power of 24 VAC or 24 VDC
- Dimensions: 3.6"L x 6.7"W x 1.3"D (91.4mm x 177.8mm x 33mm)
- FCC compliant; CE certified
- One-year warranty

System Layout & Wiring

MSC-100 Controls & Wiring



The MSC-100 Timeclock interfaces to the Miro wireless network through a Miro Room or House Scene Interface. Wiring shown is typical for one channel.

Ordering Information

Catalog No.	Product Description
☐ MSC-100	5-channel astronomic time clock

Works in conjunction with:

Product group	Catalog No.	Description
Miro	☐ MRRH3	House Scene Interface
Miro	☐ MRRC3	Room Scene Interface

Pub. No. 22402

USB-i 505

Software available at
www.lagotronics.com

LagoLED® USB-i 505
Product Specification

Code	95380247
Description	LagoLED® USB-i 505, Controller for DMX-i Strips
Type	DMX.USB.505
Input voltage	110 - 230V
Current	1.5A
Power consumption	300W
Control	DMX512 / LagoLED® Fader Panel
LED properties	applicable as 24VDC and DMX booster
Dimensions	294 x 218 x 98 mm
Weight	3800 g
Note	For DMX-i products and all products that require 24VDC and DMX512 input.

LagoLED® USB-i 505

The redesigned LagoLED® USB-i 505 controller allows unlimited access to DMX-i Strips by using any of the available control devices within the DMX-i system.

Connected strips can be controlled by DMX but also by computer, by the LagoLED® RC-i 500 remote control or by the LagoLED® LC-i 500 wall control panel.

A built-in power supply unit provides power and data for up to eight strips per output. Additionally, a DMX signal booster ensures the integrity of data signals even in complex systems when many DMX-i Strips are involved.

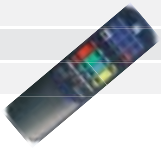
A new feature of the LagoLED® USB-i 505 is that it can be switched to a local mode, making a mix-up of DMX and IR-i signals a problem of the past. Local mode is developed for in-house use. Select your favourite program and run it without DMX intervention.

LagoLED® USB-i 505
Usable with the following products

Product	Max. load total	Max. load per output
LagoLED® DMX-i Strips 15 cm	60	14
LagoLED® DMX-i Strips 30 cm	32	8
LagoLED® Panel 33*33	32	8
LagoLED® Panel 63*63	8	2
LagoLED® Panel 93*93	4	1
LagoLED® Panel 123*63	4	1
DecaLED® Dot DMX	100	25
DecaLED® LEDbar 875 mm	28	6
DecaLED® LEDbar 1000 mm	24	6
DecaLED® LEDbar 1250 mm	20	5
DecaLED® Dot 21	125	30
DecaLED® Dot 42	60	15
DecaLED® Pixeldot Pro	28	7

LagoLED® RC-i 500
Product Specification

Code	95780800
Description	LagoLED® RC-i 500, remote for DMX-i System
Type	DMX.RCI.500
Input voltage	2x AA batteries



LagoLED® LC-i 500
control panel

This control panel can be mounted wherever most common wall light switches can. It offers remote access to the DMX-i Strips and enables users to either choose a program and its speed or simply a fixed colour.

A built-in IR sensor is prepared to receive commands by the LagoLED® RC-i 500 remote control.

The design is simple and timeless and fits into any interior. The LagoLED® LC-i 500 is the best choice for installations that require easy and fast access to the multiple features of the DMX-i Strips.

LightSaver® LS-290C Photosensor

Photosensor for LightSaver LCD-203 and LCO-203 Controllers

Mounts vertically or horizontally

Footcandle range from 3 - 6000

Architecturally attractive design

PROJECT
LOCATION/TYPE

Product Overview

Description

Watt Stopper/Legrand's LightSaver LS-290C Photosensor provides the daylight data necessary for operation of the LCD-203 and LCO-203 day-lighting control systems.

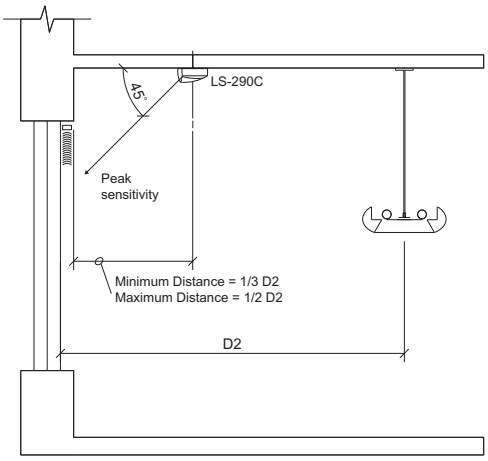
Operation

Utilizing a photodiode element, the LS-290C continuously measures ambient light levels. The Photosensor is positioned to 'see' incoming day-light from either a window or skylight without seeing electrical light. Users select the applicable footcandle range by a jumper beneath the front cover.

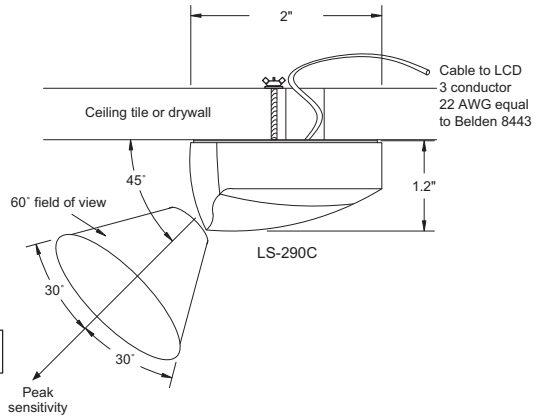
Specifications

- Three jumper-selectable footcandle ranges: 3-300 fc, 30-3000 fc, 60-6000 fc
- Low voltage, Class 2 device
- Protective hard plastic cover
- 3 conductor 22 AWG twisted cable equal to Belden 8443
- Maximum wire length is 250 feet (76.2m)
- Dimensions: 2" diameter x 1.2" deep (50.8mm diameter x 30.5mm deep)
- UL and CUL listed, five-year warranty

Photosensor Placement



Installation and Wiring



Ordering Information

Catalog No.	Description	Footcandle range
☐ LS-290C	Photosensor	3 - 6000 (32 - 64,000 lux)

WattStopper | legrand
www.wattstopper.com
800.879.8585

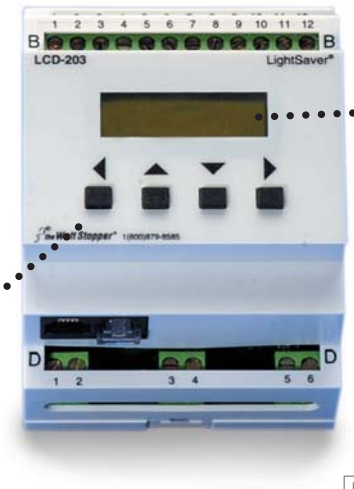
Pub. No. 9607

LightSaver® LCD-203 Dimming Controller

Low voltage automatic dimming control module

Three control channels with individually programmable settings

Push-button programming and automated setup



LCD display of photosensor readings

Optional wall switch override for manual control

Open loop control

PROJECT
LOCATION/TYPE

Product Overview

Description

Watt Stopper/Legrand's LightSaver LCD-203 daylighting controller provides automatic dimming control for fluorescent and HID fixtures. It is an open loop controller providing up to three zones of control from a single photocell. It also integrates with occupancy sensors and accommodates individual occupant overrides via an optional wall switch.

Operation

The LCD controller is part of a system that includes the LS-290C Photosensor and the BT-203 Power Pack. Each of the LCD controller's three channels has a 0-10 VDC output and connects to its own dedicated relay in the power pack. The photocell measures daylight and transmits the data to the controller. Each channel in the controller raises or lowers light levels, while the respective relays in the power pack switch lighting on or off. When daylight is adequate for a channel to fully dim, lights switch off after an adjustable time delay. This capability can be disabled for zones where lighting should remain on.

Multiple Channel Control

To achieve balanced dimming control, users group fixtures receiving comparable daylight levels into three control groups or zones. Zones closest to the daylight source are dimmed the most, while zones further away from the daylight source dim less. Unused channels may be disabled.

Applications

The LCD controller is suitable for a wide range of applications, such as open office areas, classrooms, retail stores, and any application with skylights. It is particularly suitable for applications that require independently dimming fixtures in adjoining zones. The load shedding capability can further reduce light levels during critical periods or during periods of reduced occupancy. If an occupancy sensor is used, its non-occupancy signal initiates dimming by the LCD controller prior to turning lighting off.

Features

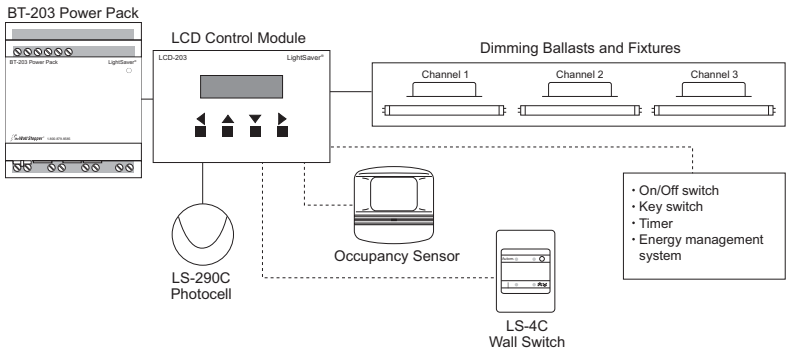
- Simplified setup and calibration
- Optional dimming wall switch (LS-4C) provides manual dimming and ON/OFF control so users can adjust lighting as desired
- Seven individually adjustable parameters for each channel: setpoint, minimum output, maximum output, ramp rate, fade rate, cutoff time delay, load shed limit
- Menu-driven, push-button programming without special tools
- Automatic internal calculation for dimming requirements of individual channels for simplified setup
- DIN rail mounting
- California Title 24-2005 compliant

Specifications

- Class 2 low voltage device
- Compatible with standard 0-10 volt dimming ballasts
- Controls up to 50 0-10 VDC ballasts per dimming channel
- Photocell range from 3 - 6,000 footcandles
- Programmable dimming and fade rates from 5-60 seconds
- Selectable cut off delay from 0-20 minutes or can be disabled
- Programmable minimum output from 0-4VDC
- Programmable maximum output from 6-10VDC
- Load shed output from 0-10 VDC
- Setpoint range from 5-60 fc
- 24VDC supply voltage provided by BT-203
- Control output voltage to ballasts 0-10VDC
- Dimensions: 3.5" x 2.81" x 2.5" (89mm x 71mm x 64mm) LxWxD
- UL and CUL listed; five-year warranty

System Layout & Wiring

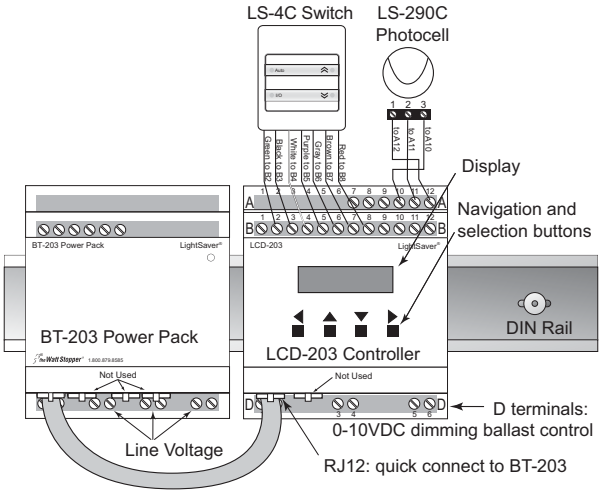
LCD System Layout



The LCD Dimming Control System consists of an LCD control module, an LS-290C Photosensor, and a BT-203 power pack.

Users may add options to the system to increase functionality, such as the LS-4C wall switch and occupancy sensors.

LCD-203 Wiring and Settings



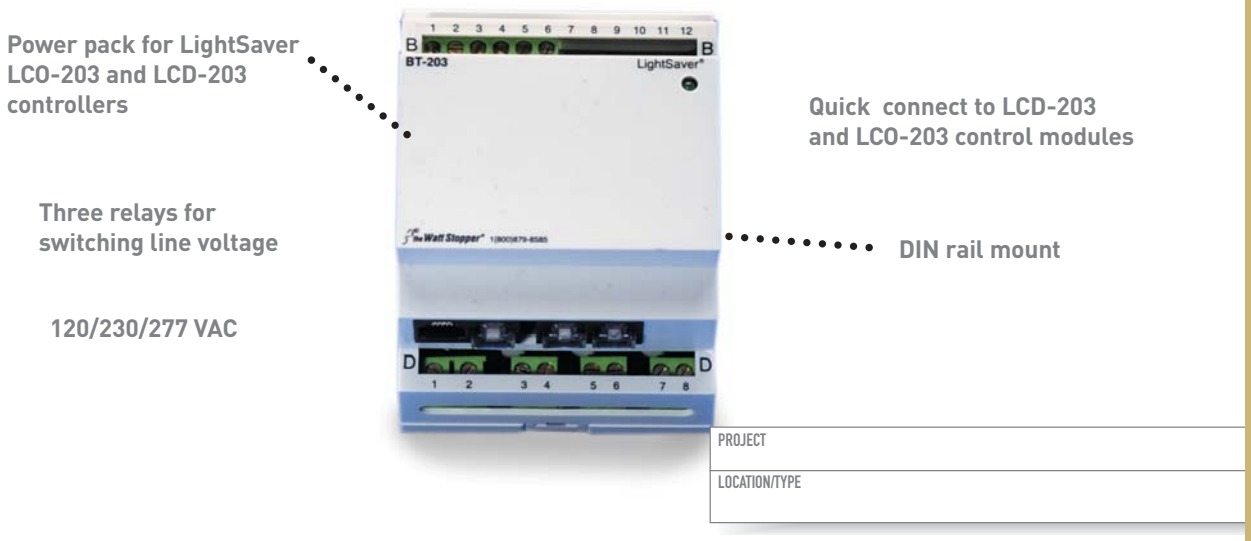
Ordering Information

Catalog No.	Description	Voltage	Control Channels
☐ LCD-203	Dimming control module	24 VDC	three
☐ LS-290C	Photosensor 3 - 6000 footcandle range		
☐ BT-203	Power Pack		

Dimming control system options:		
Product group	Catalog No.	Description
Switch	☐ LS-4C	Wall Switch
Enclosure	☐ LS-E8	Screw-cover enclosure 8" x 8" x 4" (203.2mm x 203.2mm x 101.6mm)
	☐ LS-E12	Screw-cover enclosure 12" x 12" x 4" (304.8mm x 308.8mm x 101.6mm)

Pub. No. 9106

LightSaver® BT-203 Power Pack



Product Overview

Description

Watt Stopper/Legrand's LightSaver BT-203 Power Pack powers the LightSaver LCO-203 and LCD-203 control modules.

Specifications

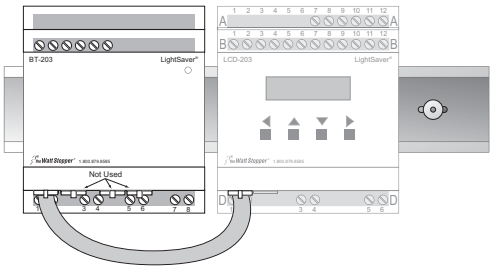
- Voltages: 120/230/277 VAC, 50/60 Hz
- Secondary power: 1000 mA @ 24 VDC (for control of larger loads, contact technical support)
- 3 normally open relays, 620 Va @ 120 or 277 VAC
- Dimensions: 2.76" x 3.57" x 2.36" (70.0mm x 90.5mm x 60.0mm) LxWxD
- UL and CUL listed, five-year warranty

Operation

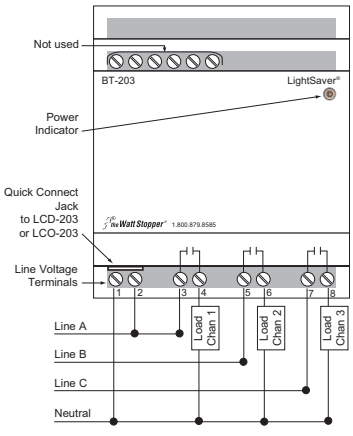
The BT-203 supplies low voltage power to LCO and LCD controllers. It connects via a quick connect cable. It has three normally open relays used to switch line voltage in response to signals from the connected controller. In addition, the power pack has an automatically resetting fuse. If the current drawn from the BT-203 exceeds the specifications, the +24VDC output will turn off and the LED will turn off. Upon removal of the fault condition and primary power, the BT-203 will restore the power.

Wiring & Mounting

Mounting



Wiring



Ordering Information

Catalog No.	Description	Input Voltage	Output
☐ BT-203	Power Pack	120/230/277 VAC, 50/60 Hz	1000mA @ 24 VDC

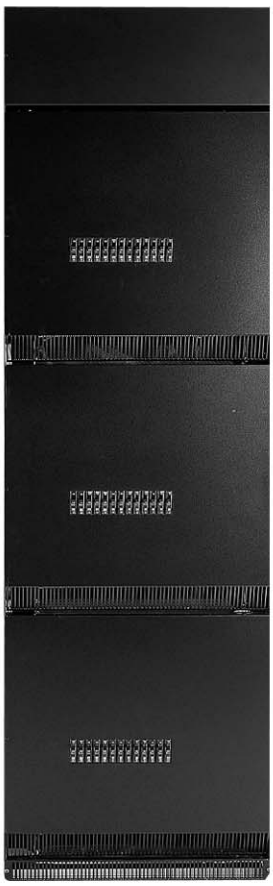
Pub. No. 9806

Type EQ 10 & 11

GP Dimming Panels
120-127 / 277 Volt

GP3/4 Mini Panels

GP8-24 Standard-Size Panels



GP36 Large-Size Panels

GP48-144 Large-Size Panels

GP Dimming Panels provide power and dimming for up to 144 load circuits and control any light source, including full-conduction non-dim.

Models available with:

- 120-127 V and 277 V input power.
- 3 to 144 circuits.
- Different feed types and breakers.

GP Dimming Panels work with:

- GRAFIK Eye® 4000 Control Units.
- GRAFIK 5000™, GRAFIK 6000®, and GRAFIK 7000™ Systems.
- LP Dimming Panels.
- XP Softswitch® Panels.
- DMX512 dimming systems via the 2LINK™ option.

Job Name:	Model Numbers:	
Job Number:		

Specifications - 120-127 / 277 Volt

Standards

- UL Listed
  (Reference: UL File 42071).
- Complies with CSA or NOM (where appropriate).
- California Energy Commission Listed

Power

- Input power: 100-127 V and 277 V, 50/60 Hz, phase-to-neutral.
- Branch Circuit Capacity:
  - 120-127 V - up to 2000 W/VA
  - 277 V - 4500 W/VA
- Number of Circuits: 3-144
- Branch Circuit Breakers: UL-rated thermal magnetic.
  AIC ratings (other ratings available):
  - 100-127 V – 10,000 A
  - 277 V – 14,000 A
- Lightning strike protection: Meets ANSI/IEEE standard 62.41-1980. Can withstand voltage surges of up to 6000 V and current surges of up to 3000 A.
- 10-year power failure memory: Automatically restores lighting to scene selected prior to power interruption.

Sources/Load Types

Operates these sources with a smooth continuous Square Law dimming curve or on a full conduction non-dim basis:

- Incandescent (Tungsten)/Halogen
- Magnetic Low Voltage Transformer
- Electronic Low Voltage Transformer[1]
- Lutron Electronic Fluorescent Dimming Ballasts
- Magnetic Fluorescent Lamp Ballasts
- Optional modules allow for control of 0-10 V, DSI, and PWM load types.
- Operates HID sources on a full conduction non-dim basis.

Wiring

- Internal: Prewired by Lutron.
- System communications: Low-voltage Class 2 (PELV) wiring connects Dimming Panels to other components.
- Line (mains) voltage: Feed, load, and control circuit wiring only. No other wiring or assembly required.

Filter Chokes

- Load current rise time is measured at a 90 degree conduction angle.
- 10-90% of load current waveform:
  - 350 µSec rise time at 50% dimmer capacity.
  - 400 µSec rise time at 100% dimmer capacity.
- 0-100% of load current waveform:
  - 525 µSec rise time at 50% dimmer capacity.
  - 600 µSec rise time at 100% dimmer capacity.
- At no point in the waveform can the rate of current change exceed 300 mA per µSec.
- Consult Lutron for higher rise time options.

Dimming Cards

- Panel current ratings are listed for continuous operation - UL-listed specifically for each light source.
- RTISS™ filter circuit technology compensates for incoming line voltage variations: No visible flicker with +/-2% change in RMS voltage/cycle and +/-2% Hz change in frequency/second.
- Arcless-relay air gap-off switches (one per load circuit) ensure open load circuits when off function selected. Eliminate arcing at mechanical contacts when loads are switched.

Physical Design

- Enclosure: NEMA-Type 1 (Type 2 available upon request), IP-20 protection; #16 U.S. Gauge Steel. Indoors only.
- Weight: 30-1300 pounds (14-590 kg).
- Mounting: Surface mount only. Allow space for ventilating.

Environment/Heat Dissipation

- Patented, ribbed aluminum heat sink base cools Panel by convection. No fans.
- 32-104 °F (0-40 °C). Relative humidity less than 90% non-condensing.

[1] Reverse-phase control transformers require an ELVI Power Interface. Check phase with transformer manufacturer.

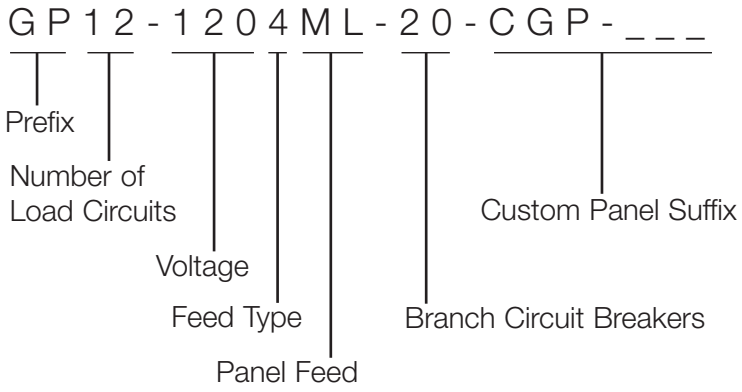
Job Name:	Model Numbers:	
Job Number:		

Specifications - 120-127 / 277 Volt *(continued)*

Short Circuit Current Ratings (other ratings available)

Panel Type	Voltage	Std. Min. SCCR Rating
GP Main Lug (standard & large size)	120, 277	25,000 A
GP Main Breaker (standard size)	120	10,000 A
GP Main Breaker (standard size)	277	18,000 A
GP Main Breaker (large size)	120	25,000 A
GP Main Breaker (large size)	277	25,000 A
GP Mini Size	120	10,000 A
GP Mini Size	277	14,000 A
GP Mini (feed through)	120	10,000 A
GP Mini (feed through)	277	14,000 A

How to Build a GP Model Number



Prefix:
GP for GP Dimming Panel

Number of Load Circuits:
Indicates number of load circuits in the panel

Voltage:
120 for 120-127 V
277 for 277 V

Feed Type:
2 for 1 phase 2 wire
3 for 1 phase 3 wire (split phase)
4 for 3 phase 4 wire

Panel Feed:
ML for Main Lugs only
Mxx for Main Breaker with **xx** = breaker size in Amps

Branch Circuit Breakers:
20 for 20 A branch circuit breakers
15 for 15 A branch circuit breakers

Custom Panel Suffix:
Indicates panel with special options

Job Name:	Model Numbers:	
Job Number:		

GP8-24 Standard-Size Models

Only standard panels listed. Consult Lutron for further options.

120-127 V Power

Number Of Circuits	Feed Type	Panel Feed	Maximum Feed	Panel Branch Ratings: Circuit Breakers[1]	Panel Branch Ratings: Maximum Dimmed Hot Load [2]
GP8	1Ø, 2 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
	1Ø, 3 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		60 A Main Breaker	60 A	15 A	1500 W/VA
		80 A Main Breaker	80 A	20 A	2000 W/VA
	3Ø, 4 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		50 A Main Breaker	50 A	15 A	1500 W/VA
		60 A Main Breaker	60 A	20 A	2000 W/VA
GP12	1Ø, 3 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
	3Ø, 4 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		60 A Main Breaker	60 A	15 A	1500 W/VA
		80 A Main Breaker	80 A	20 A	2000 W/VA
GP16	1Ø, 3 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		125 A Main Breaker	125 A	15 A	1500 W/VA
		175 A Main Breaker	175 A	20 A	2000 W/VA
	3Ø, 4 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		100 A Main Breaker	100 A	15 A	1500 W/VA
		125 A Main Breaker	125 A	20 A	2000 W/VA
GP20	3Ø, 4 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		110 A Main Breaker	110 A	15 A	1500 W/VA
		150 A Main Breaker	150 A	20 A	2000 W/VA
GP24	3Ø, 4 W	Main Lugs Only	175 A	15 A	1500 W/VA
			175 A	20 A	2000 W/VA
		125 A Main Breaker	125 A	15 A	1500 W/VA
		175 A Main Breaker	175 A	20 A	2000 W/VA

[1] 20/16 A, 15/12 A continuous load rating.

[2] Measured current will not exceed continuous load rating due to voltage drop in the dimmer.

Job Name:	Model Numbers:	
Job Number:		

GP8-24 Standard-Size Models

Only standard panels listed. Consult Lutron for further options.

277 V Power

Number Of Circuits	Feed Type	Panel Feed	Maximum Feed	Panel Branch Ratings: Circuit Breakers[1]	Panel Branch Ratings: Maximum Dimmed Hot Load[2]
GP8	1Ø, 2 W	Main Lugs Only	175 A	20 A	4500 W/VA
	3Ø, 4 W	Main Lugs Only	175 A	20 A	4500 W/VA
		60 A Main Breaker	60 A	20 A	4500 W/VA
GP12	3Ø, 4 W	Main Lugs Only	175 A	20 A	4500 W/VA
		80 A Main Breaker	80 A	20 A	4500 W/VA
GP16	3Ø, 4 W	Main Lugs Only	175 A	20 A	4500 W/VA
		125 A Main Breaker	125 A	20 A	4500 W/VA

[1] 20/16 A, 15/12 A continuous load rating.

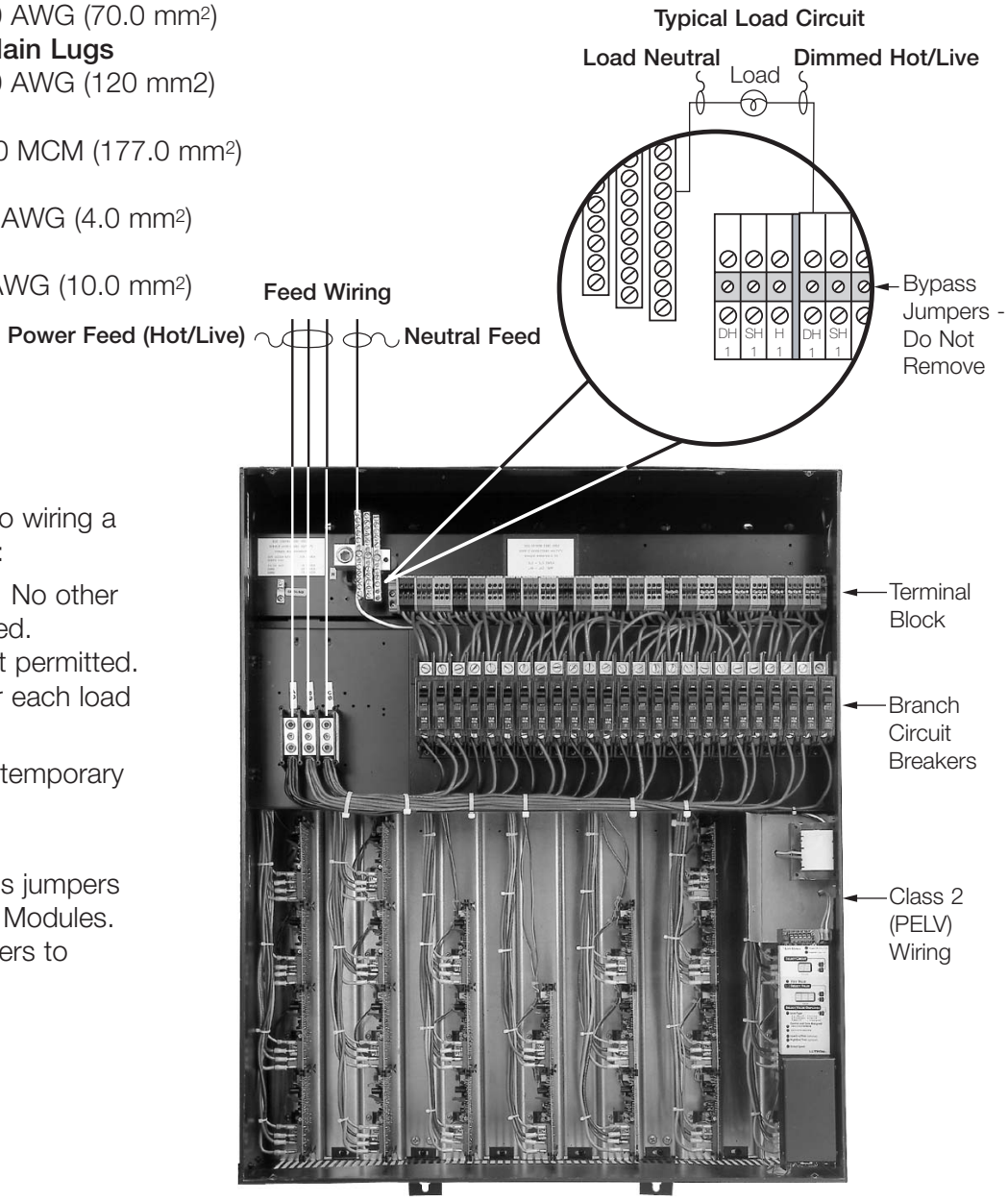
[2] Measured current will not exceed continuous load rating due to voltage drop in the dimmer.

Job Name:	Model Numbers:	
Job Number:		

GP8-24 Standard-Size Panel Wiring Overview

Wire Sizes

- **Power Feed Standard Main Lugs**
  14 AWG (2.0 mm²) to 2/0 AWG (70.0 mm²)
- **Power Feed Dual Tap Main Lugs**
  6 AWG (10.0 mm²) to 4/0 AWG (120 mm2)
- **Neutral Feed:**
  6 AWG (10.0 mm²) to 350 MCM (177.0 mm²)
- **Dimmed Hot/Live:**
  14 AWG (2.0 mm²) to 10 AWG (4.0 mm²)
- **Load Neutral:**
  14 AWG (2.0 mm²) to 6 AWG (10.0 mm²)



Wiring Tips

Wire the GP8-24 similar to wiring a lighting Distribution Panel:

- Run feed and load wiring. No other wiring or assembly required.
- Common Neutrals are not permitted. Run separate Neutrals for each load circuit.

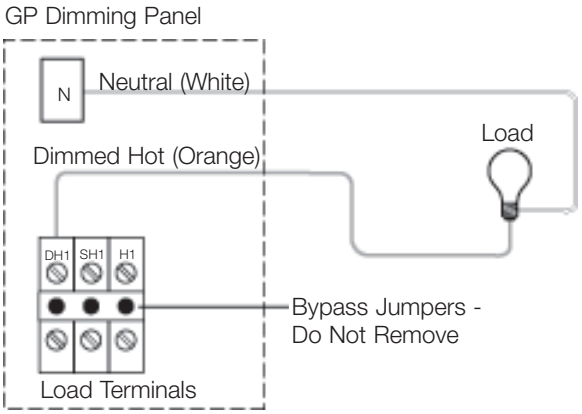
The GP8-24 can provide temporary lighting:

- Wire all loads.
- Do not remove the bypass jumpers that protect the Dimming Modules.
- Use Branch Circuit Breakers to switch lights on and off.

Job Name:	Model Numbers:	
Job Number:		

100-127 V and 277 V Load Circuits (GP3-144)

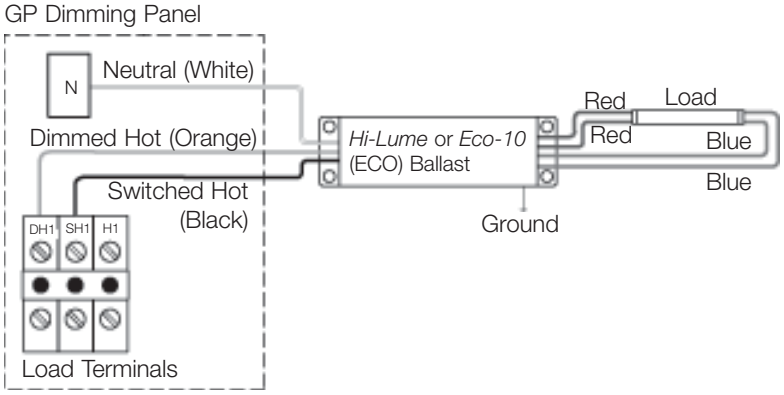
All Load Types except Lutron Hi-lume® or Eco-10® (ECO-Series) Fluorescent Dimming Ballasts



- Switched Hot (SH) must only be used for *Hi-lume* FDB or *Eco-10* loads. Use the Dimmed Hot (DH) for all Non-Dim Load Types.

All Load Circuit Wiring
14 AWG (2.0 mm²) to 10 AWG (4.0 mm²)

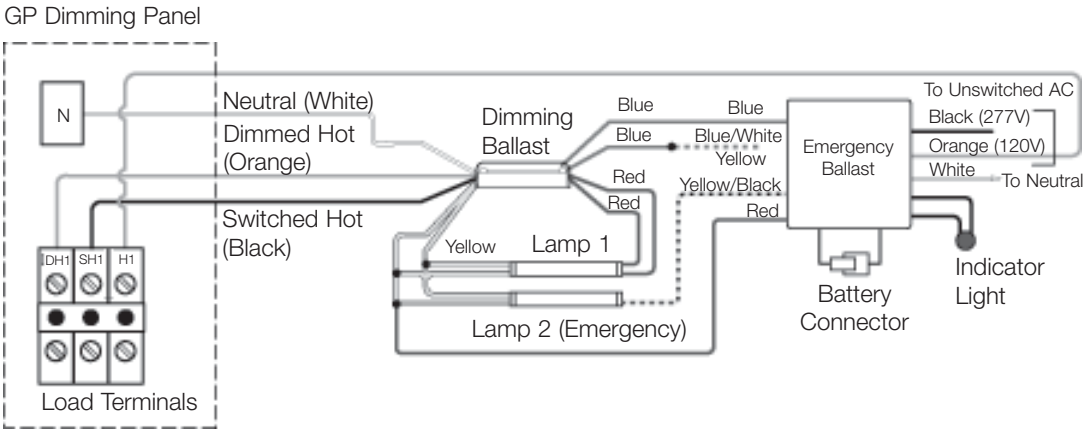
Lutron *Hi-lume* or *Eco-10* (ECO-Series) Fluorescent Dimming Ballasts



- Consult Lutron for approved manufacturers of emergency ballasts.
- Lutron *Hi-lume* 2-lamp, 120 VAC Dimming Ballast shown.
- Wire colors may vary depending on emergency ballast manufacturer.

Consult Wiring Overview page for appropriate Neutral location.

Load Circuits with Emergency Battery Pack Wiring



Job Name:	Model Numbers:	
Job Number:		

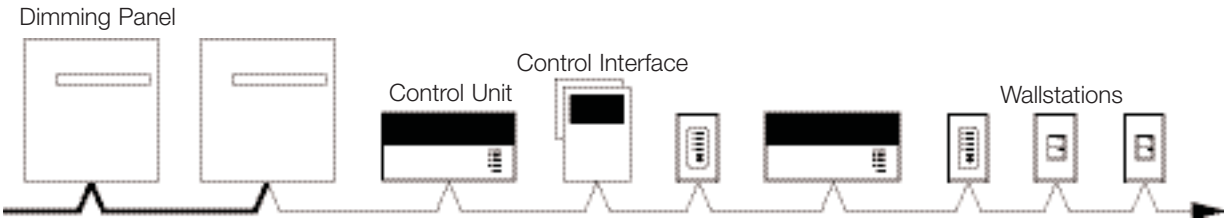
Low-Voltage Class 2 (PELV) Wiring (All Models)

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

GRAFIK Eye® 4000 System

Class 2 (PELV) wiring link requires:
Two 12 AWG (2.5 mm²) conductors for control power.
One twisted, shielded pair of 18 AWG (1.0 mm²) for data link.
One 18 AWG (1.0 mm²) conductor for Emergency (Essential) sense line, from panel to panel.

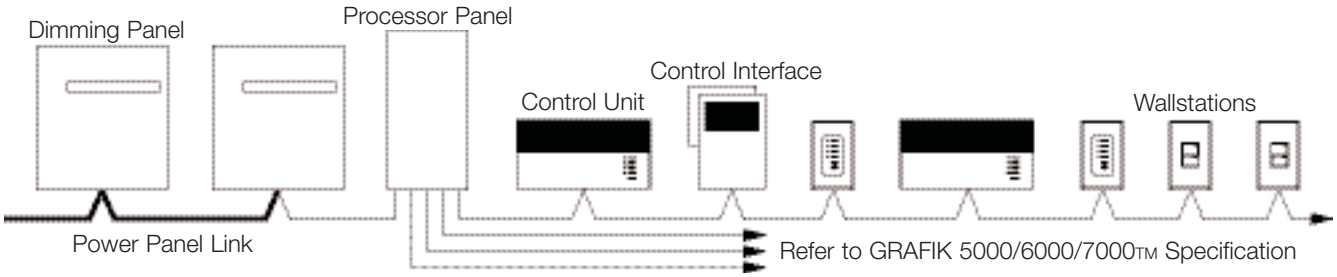
Total length of Control Link may be no more than 2000 ft. (610 m).
Approved low-voltage cable is available from Lutron,[1] Belden, and Liberty. These are approved with 22 AWG data link wires.



GRAFIK 5000™/6000®/7000® System

Class 2 (PELV) wiring link requires:
Two 12 AWG (2.5 mm²) conductors for control power.
One twisted, shielded pair of 18 AWG (1.0 mm²) for data link.
One 18 AWG (1.0 mm²) conductor for emergency (essential) sense line, from panel to panel.

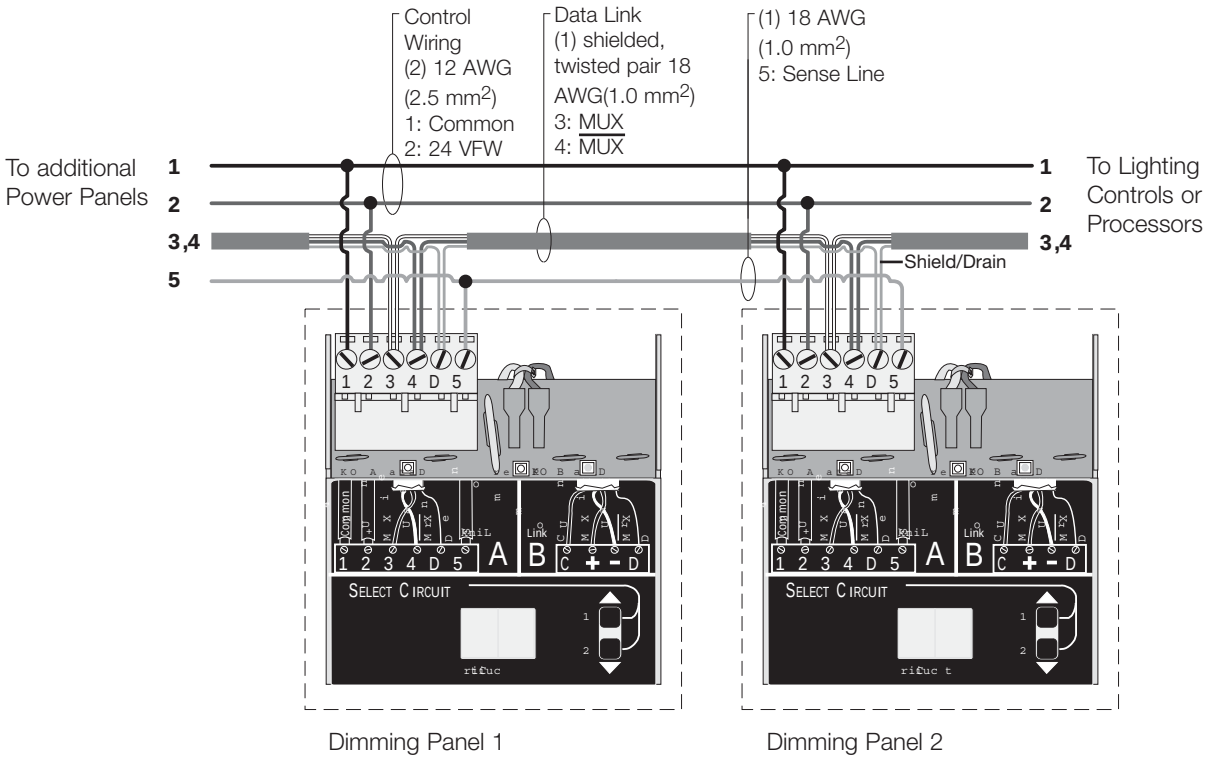
Total length of Control Link may be no more than 2000 ft. (600 m).
If MUX-RPTR interface and GRX-CBL-46L cable[1] is used, length may be up to 4000 ft. (1200 m).



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

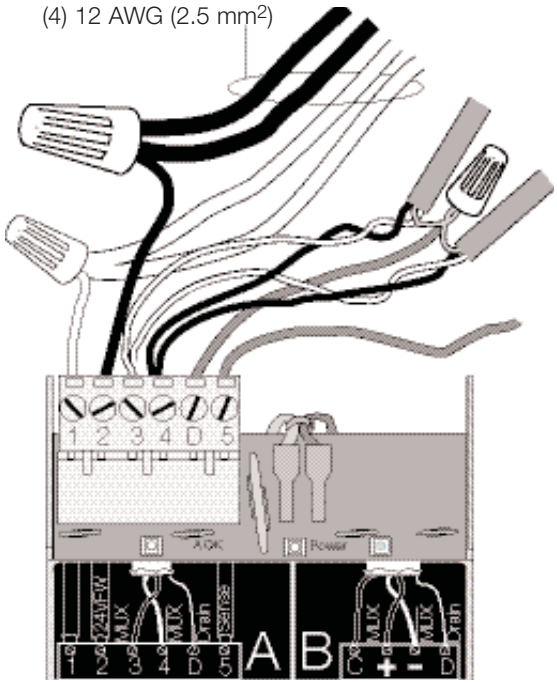
Job Name:	Model Numbers:	
Job Number:		

Class 2 (PELV) Panel-to-Panel Wiring (All Models)



Notes:

- Emergency Power: The additional 18 AWG (1.0 mm2) wire is a “sense” line from terminal 5 of another Panel. This sense line allows an Emergency (Essential) Lighting Panel to “sense” when Normal (Non-Essential) power is lost. If more than one Emergency Lighting Panel needs to sense from a specific Normal Panel, a dedicated wire between each pair of Normal (Non-Essential) and Emergency (Essential) panels may be required.
- Shield/Drain: Connect shielding as shown. Do not connect to Ground (Earth) or circuit board of Circuit Selector. Connect the bare drain wires and cut off the outside shield.



Class 2 (PELV) Terminal Connections

Each low-voltage Class 2 (PELV) terminal can accept only two 18 AWG (1.0 mm2) wires. Two 12 AWG (2.5 mm2) conductors will not fit. Connect as shown using appropriate wire connectors.

Job Name:	Model Numbers:	
Job Number:		

Appendix D: Cost Benefit Analysis of Wire Upsizing Calculations

COST ANALYSIS at 30% of Demand Load

TAG	FROM	TO	NO. OF CONDUCTORS	NO. OF SETS	LENGTH (FEET)	LOAD (AMPS)	% OF LOAD	AVERAGE LOAD (AMPS)
25A-1	CL1B	T-13	3	1	8.00	19.79	0.30	5.94
25A-2	LSL1B	T-12	3	1	7.75	2.78	0.30	0.83
25A-3	CL1A	T-11	3	1	7.25	16.74	0.30	5.02
50-1	T-13	CR1B	4	1	8.00	19.79	0.30	5.94
50-2	T-12	LSR1B	4	1	8.00	2.78	0.30	0.83
50-3	LSL1B	LSL2B	4	1	35.00	1.50	0.30	0.45
50-4	LSL1A	LSLPA	4	1	210.00	0.58	0.30	0.18
50-5	T-11	CR1A	4	1	7.50	16.74	0.30	5.02
50-6	LSL1A	LSL2A	4	1	212.00	4.27	0.30	1.28
50-7	R-GEN	LSR1A	4	1	310.00	-	0.30	-
50A-1	L1	T-5	3	1	8.00	106.72	0.30	32.02
50A-2	LSL1A	T-10	3	1	150.00	34.70	0.30	10.41
90A-1	SWBD	T-2	3	1	32.00	54.13	0.30	16.24
90A-2	SWBD	T-3	3	1	12.00	97.24	0.30	29.17
100-1	T-5	R1	4	1	8.00	70.64	0.30	21.19
100-2	DP1	LPA	4	1	44.75	3.97	0.30	1.19
100-3	DP2	RPB	4	1	58.00	0.00	0.30	0.00
100-4	LSL1A	LSL1B	4	1	277.00	20.93	0.30	6.28
100-5	EDP1	CL1B	4	1	260.00	52.56	0.30	15.77
100-6	T-10	LSR1A	4	1	7.25	34.70	0.30	10.41
100B	DP3	MEG	5	1	68.00	80.59	0.30	24.18
125-1	WIREWAY	R2A1	4	1	5.50	108.53	0.30	32.56
125-2	WIREWAY	R2A2	4	1	5.50	113.64	0.30	34.09
125-3	R2B2	R2B3	4	1	22.00	91.71	0.30	27.51
125-4	WIREWAY	R1A1	4	1	5.50	110.08	0.30	33.02
125-5	WIREWAY	R1A2	4	1	5.50	52.63	0.30	15.79
125-6	WIREWAY	R1B1	4	1	5.50	84.08	0.30	25.22
125-7	WIREWAY	R1B2	4	1	5.50	47.13	0.30	14.14
125-8	WIREWAY	ELEV. #1	4	1	8.00	64.95	0.30	19.49
125-9	WIREWAY	ELEV. #2	4	1	8.00	64.95	0.30	19.49
125A-1	L2A	T-8	3	1	42.00	222.17	0.30	66.65
125A-2	L1A	T-6	3	1	32.75	252.92	0.30	75.88
125A-3	L1B	T-7	3	1	25.00	221.42	0.30	66.43
150-1	SWBD	L1	4	1	34.00	86.34	0.30	25.90
150-2	DP2	RPC	4	1	110.00	19.21	0.30	5.76
150-3	SWBD	L1A	4	1	168.10	288.50	0.30	86.55
150-4	SWBD	L1B	4	1	287.20	164.80	0.30	49.44
150B-1	T-2	RPVL	5	1	35.00	0.00	0.30	0.00
150B-2	T-3	DP3	5	1	297.30	97.24	0.30	29.17
150B-3	DP2	RPA	5	1	43.00	17.46	0.30	5.24
150B-4	DP2	SNW MELT	5	1	55.00	99.93	0.30	29.98
175-1	SWBD	FLUROSC.	4	1	197.00	139.53	0.30	41.86
175-2	SWBD	PET/CT	4	1	330.00	139.53	0.30	41.86
175-3	SWBD	MRI	4	1	268.00	139.53	0.30	41.86
175-4	WIREWAY	R2B1	4	1	5.50	76.69	0.30	23.01
175A	L2B	T-9	3	1	35.00	389.14	0.30	116.74
200-1	SWBD	ATS-LS	4	1	33.00	63.10	0.30	18.93
200-2	DP1	LPC	4	1	98.00	0.00	0.30	0.00
225-1	SWBD	H2	4	1	131.60	358.92	0.30	107.68
225-2	DP2	RPD	4	1	52.00	20.65	0.30	6.20
225-3	SWBD	L2A	4	1	199.00	126.13	0.30	37.84
225-4	SWBD	L2B	4	1	318.00	162.39	0.30	48.72
225-6	WIREWAY	R2B2	4	1	5.50	177.13	0.30	53.14
225-7	G	ATS-LS	4	1	165.00	-	0.30	-
225-8	ATS-LS	LSL1A	4	1	4.75	63.10	0.30	18.93
225-9	EDP1	CL1A	4	1	141.00	140.61	0.30	42.18
225A	SWBD	T-4	3	1	15.00	337.67	0.30	101.30
250-1	T-8	WIREWAY	4	1	18.25	222.17	0.30	66.65
250-2	T-6	WIREWAY	4	1	18.25	162.71	0.30	48.81
250-3	SWBD	WIREWAY	4	1	228.00	129.90	0.30	38.97
250-4	T-7	WIREWAY	4	1	25.00	131.21	0.30	39.36
250-5	UPS	BATT CAB 1	4	1	43.00	-	0.30	-
250-6	UPS	BATT CAB 2	4	1	50.00	-	0.30	-
250-7	DP-UPS	PDU1	4	1	55.00	110.42	0.30	33.13
250-8	DP-UPS	PDU2	4	1	65.00	103.68	0.30	31.10
400-1	SWBD	DP1	4	2	181.00	3.97	0.30	1.19
400-2	T-9	WIREWAY	4	2	18.25	253.82	0.30	76.15
500-1	EDP1	UPS	4	2	269.00	270.63	0.30	81.19
500-2	EDP1	BY-PASS	4	2	279.00	300.70	0.30	90.21
500-3	UPS	BY-PASS	4	2	10.00	300.70	0.30	90.21
500-4	BY-PASS	DP-UPS	4	2	22.00	300.70	0.30	90.21
500B-1	T-4	DP2	5	2	181.00	157.25	0.30	47.18
600-1	G	ATS-EM	4	2	162.00	-	0.30	-
600-2	SWBD	ATS-EM	4	2	36.00	508.79	0.30	152.64
600-3	ATS-EM	EDP1	4	2	8.25	508.79	0.30	152.64
3000	T-1	SWBD	4	9	107.20	2398.99	0.30	719.70

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

CU=COPPER

COST ANALYSIS at 30% of Demand Load

	EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**10 AWG**	3/4"	0.198	0.09	0.00	0.67	0.67	18.90	40.74
25A-2	**10 AWG**	3/4"	0.198	0.01	0.00	0.01	0.01	18.31	39.46
25A-3	**10 AWG**	3/4"	0.198	0.07	0.00	0.43	0.43	17.13	36.92
50-1	**6 AWG**	1"	0.0809	0.04	0.00	0.27	0.27	48.58	52.05
50-2	**6 AWG**	1"	0.0809	0.01	0.00	0.01	0.01	48.58	52.05
50-3	**6 AWG**	1"	0.0809	0.01	0.00	0.01	0.01	212.55	227.73
50-4	**6 AWG**	1"	0.0809	0.03	0.00	0.01	0.01	1275.31	1366.41
50-5	**6 AWG**	1"	0.0809	0.03	0.00	0.18	0.18	45.55	48.80
50-6	**6 AWG**	1"	0.0809	0.22	0.00	0.34	0.34	1287.46	1379.42
50-7	**6 AWG**	1"	0.0809	-	-	-	-	1882.61	2017.08
50A-1	**6 AWG**	3/4"	0.0809	0.21	0.01	7.97	7.97	36.44	40.74
50A-2	**6 AWG**	3/4"	0.0809	1.26	0.01	15.80	15.80	683.20	763.83
90A-1	**2 AWG**	1 1/4"	0.0342	0.18	0.00	3.47	3.47	280.64	265.55
90A-2	**2 AWG**	1 1/4"	0.0342	0.12	0.00	4.20	4.20	105.24	99.58
100-1	**1 AWG**	1 1/2"	0.0279	0.05	0.00	1.20	1.20	113.16	77.70
100-2	**1 AWG**	1 1/2"	0.0279	0.01	0.00	0.02	0.02	632.99	434.65
100-3	**1 AWG**	1 1/2"	0.0279	0.00	0.00	0.00	0.00	820.41	563.35
100-4	**1 AWG**	1 1/2"	0.0279	0.49	0.00	3.66	3.66	3918.17	2690.47
100-5	**1 AWG**	1 1/2"	0.0279	1.14	0.02	21.68	21.68	3677.70	2525.35
100-6	**1 AWG**	1 1/2"	0.0279	0.02	0.00	0.26	0.26	102.55	70.42
100B	**1 AWG**	1 1/2"	0.0279	0.46	0.01	13.33	13.33	1202.33	660.48
125-1	**1/0 AWG**	2"	0.0229	0.04	0.00	1.60	1.60	94.39	65.87
125-2	**1/0 AWG**	2"	0.0229	0.04	0.00	1.76	1.76	94.39	65.87
125-3	**1/0 AWG**	2"	0.0229	0.14	0.00	4.58	4.58	377.58	263.47
125-4	**1/0 AWG**	2"	0.0229	0.04	0.00	1.65	1.65	94.39	65.87
125-5	**1/0 AWG**	2"	0.0229	0.02	0.00	0.38	0.38	94.39	65.87
125-6	**1/0 AWG**	2"	0.0229	0.03	0.00	0.96	0.96	94.39	65.87
125-7	**1/0 AWG**	2"	0.0229	0.02	0.00	0.30	0.30	94.39	65.87
125-8	**1/0 AWG**	2"	0.0229	0.04	0.00	0.84	0.84	137.30	95.81
125-9	**1/0 AWG**	2"	0.0229	0.04	0.00	0.84	0.84	137.30	95.81
125A-1	**1/0 AWG**	1 1/2"	0.0229	0.64	0.04	51.34	51.34	540.62	407.94
125A-2	**1/0 AWG**	1 1/2"	0.0229	0.57	0.04	51.89	51.89	421.56	318.10
125A-3	**1/0 AWG**	1 1/2"	0.0229	0.38	0.03	30.36	30.36	321.80	242.82
150-1	**1/0 AWG**	2"	0.0229	0.20	0.01	6.28	6.28	583.53	407.19
150-2	**1/0 AWG**	2"	0.0229	0.15	0.00	1.01	1.01	1887.89	1317.37
150-3	**1/0 AWG**	2"	0.0229	3.33	0.29	346.53	346.53	2885.03	2013.18
150-4	**1/0 AWG**	2"	0.0229	3.25	0.16	193.19	193.19	4929.10	3439.54
150B-1	**1/0 AWG**	2"	0.0229	0.00	0.00	0.00	0.00	750.86	419.16
150B-2	**1/0 AWG**	2"	0.0229	1.99	0.06	69.63	69.63	6378.05	3560.49
150B-3	**1/0 AWG**	2"	0.0229	0.05	0.00	0.32	0.32	922.49	514.97
150B-4	**1/0 AWG**	2"	0.0229	0.38	0.01	13.60	13.60	1179.93	658.69
175-1	**2/0 AWG**	2"	0.019	1.57	0.07	78.81	78.81	4124.12	2359.29
175-2	**2/0 AWG**	2"	0.019	2.62	0.11	132.01	132.01	6908.42	3952.11
175-3	**2/0 AWG**	2"	0.019	2.13	0.09	107.21	107.21	5610.47	3209.59
175-4	**2/0 AWG**	2"	0.019	0.02	0.00	0.66	0.66	115.14	65.87
175A	**2/0 AWG**	2"	0.019	0.78	0.09	108.91	108.91	549.53	419.16
200-1	**3/0 AWG**	2"	0.0158	0.10	0.00	2.25	2.25	840.21	395.21
200-2	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	2495.18	1173.66
225-1	**4/0 AWG**	2 1/2"	0.0133	1.88	0.20	243.86	243.86	4070.44	2730.17
225-2	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	0.32	0.32	1608.38	1078.79
225-3	**4/0 AWG**	2 1/2"	0.0133	1.00	0.04	45.54	45.54	6155.15	4128.45
225-4	**4/0 AWG**	2 1/2"	0.0133	2.06	0.10	120.62	120.62	9835.87	6597.23
225-6	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	2.48	2.48	170.12	114.10
225-7	**4/0 AWG**	2 1/2"	0.0133	-	-	-	-	5103.52	3423.09
225-8	**4/0 AWG**	2 1/2"	0.0133	0.01	0.00	0.27	0.27	146.92	98.54
225-9	**4/0 AWG**	2 1/2"	0.0133	0.79	0.03	40.10	40.10	4361.19	2925.19
225A	**4/0 AWG**	2"	0.0133	0.20	0.02	24.60	24.60	347.97	179.64
250-1	**250 KCMIL**	2 1/2"	0.012	0.15	0.01	11.69	11.69	653.97	378.61
250-2	**250 KCMIL**	2 1/2"	0.012	0.11	0.01	6.27	6.27	653.97	378.61
250-3	**250 KCMIL**	2 1/2"	0.012	1.07	0.04	49.93	49.93	8170.15	4730.09
250-4	**250 KCMIL**	2 1/2"	0.012	0.12	0.00	5.59	5.59	895.85	518.65
250-5	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1540.86	892.08
250-6	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1791.70	1037.30
250-7	**250 KCMIL**	2 1/2"	0.012	0.22	0.01	8.70	8.70	1970.87	1141.03
250-8	**250 KCMIL**	2 1/2"	0.012	0.24	0.01	9.07	9.07	2329.21	1348.49
400-1	**3/0 AWG**	2"	0.0158	0.03	0.00	0.05	0.10	9216.88	4335.35
400-2	**3/0 AWG**	2"	0.0158	0.22	0.02	20.09	40.18	929.33	437.13
500-1	**250 KCMIL**	2 1/2"	0.012	2.62	0.21	255.70	511.40	19278.69	11161.35
500-2	**250 KCMIL**	2 1/2"	0.012	3.02	0.27	327.42	654.83	19995.37	11576.27
500-3	**250 KCMIL**	2 1/2"	0.012	0.11	0.01	11.74	23.47	716.68	414.92
500-4	**250 KCMIL**	2 1/2"	0.012	0.24	0.02	25.82	51.64	1576.70	912.82
500B-1	**250 KCMIL**	3"	0.012	1.02	0.05	58.09	116.18	16214.89	9046.20
600-1	**350 KCMIL**	3"	0.0096	-	-	-	-	15276.60	8096.60
600-2	**350 KCMIL**	3"	0.0096	0.53	0.08	96.76	193.52	3394.80	1799.24
600-3	**350 KCMIL**	3"	0.0096	0.12	0.02	22.17	44.35	777.98	412.33
3000	**500 KCMIL**	4"	0.008	6.17	4.44	5338.03	48042.25	60047.22	31388.32

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 30% of Demand Load

	1 SIZE GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**8 AWG**	3/4"	0.126	0.06	0.00	0.43	0.43	26.71	40.74
25A-2	**8 AWG**	3/4"	0.126	0.01	0.00	0.01	0.01	25.87	39.46
25A-3	**8 AWG**	3/4"	0.126	0.05	0.00	0.28	0.28	24.20	36.92
50-1	**4 AWG**	1 1/4"	0.0522	0.02	0.00	0.18	0.18	67.29	66.39
50-2	**4 AWG**	1 1/4"	0.0522	0.00	0.00	0.00	0.00	67.29	66.39
50-3	**4 AWG**	1 1/4"	0.0522	0.01	0.00	0.00	0.00	294.40	290.44
50-4	**4 AWG**	1 1/4"	0.0522	0.02	0.00	0.00	0.00	1766.43	1742.66
50-5	**4 AWG**	1 1/4"	0.0522	0.02	0.00	0.12	0.12	63.09	62.24
50-6	**4 AWG**	1 1/4"	0.0522	0.14	0.00	0.22	0.22	1783.25	1759.26
50-7	**4 AWG**	1 1/4"	0.0522	-	-	-	-	2607.58	2572.50
50A-1	**4 AWG**	1"	0.0522	0.13	0.00	5.14	5.14	50.47	52.05
50A-2	**4 AWG**	1"	0.0522	0.82	0.01	10.19	10.19	946.30	976.01
90A-1	**1 AWG**	1 1/4"	0.0279	0.14	0.00	2.83	2.83	339.48	265.55
90A-2	**1 AWG**	1 1/4"	0.0279	0.10	0.00	3.42	3.42	127.31	99.58
100-1	**1/0 AWG**	1 1/2"	0.0229	0.04	0.00	0.99	0.99	137.30	77.70
100-2	**1/0 AWG**	1 1/2"	0.0229	0.01	0.00	0.02	0.02	768.03	434.65
100-3	**1/0 AWG**	1 1/2"	0.0229	0.00	0.00	0.00	0.00	995.43	563.35
100-4	**1/0 AWG**	1 1/2"	0.0229	0.40	0.00	3.01	3.01	4754.04	2690.47
100-5	**1/0 AWG**	1 1/2"	0.0229	0.94	0.01	17.79	17.79	4462.28	2525.35
100-6	**1/0 AWG**	1 1/2"	0.0229	0.02	0.00	0.22	0.22	124.43	70.42
100B	**1/0 AWG**	2"	0.0229	0.38	0.01	10.94	10.94	1458.82	814.37
125-1	**2/0 AWG**	2"	0.019	0.03	0.00	1.33	1.33	115.14	65.87
125-2	**2/0 AWG**	2"	0.019	0.04	0.00	1.46	1.46	115.14	65.87
125-3	**2/0 AWG**	2"	0.019	0.12	0.00	3.80	3.80	460.56	263.47
125-4	**2/0 AWG**	2"	0.019	0.03	0.00	1.37	1.37	115.14	65.87
125-5	**2/0 AWG**	2"	0.019	0.02	0.00	0.31	0.31	115.14	65.87
125-6	**2/0 AWG**	2"	0.019	0.03	0.00	0.80	0.80	115.14	65.87
125-7	**2/0 AWG**	2"	0.019	0.01	0.00	0.25	0.25	115.14	65.87
125-8	**2/0 AWG**	2"	0.019	0.03	0.00	0.69	0.69	167.48	95.81
125-9	**2/0 AWG**	2"	0.019	0.03	0.00	0.69	0.69	167.48	95.81
125A-1	**2/0 AWG**	1 1/2"	0.019	0.53	0.04	42.60	42.60	659.44	407.94
125A-2	**2/0 AWG**	1 1/2"	0.019	0.47	0.04	43.05	43.05	514.21	318.10
125A-3	**2/0 AWG**	1 1/2"	0.019	0.32	0.02	25.19	25.19	392.52	242.82
150-1	**2/0 AWG**	2"	0.019	0.17	0.00	5.21	5.21	711.78	407.19
150-2	**2/0 AWG**	2"	0.019	0.12	0.00	0.83	0.83	2302.81	1317.37
150-3	**2/0 AWG**	2"	0.019	2.76	0.24	287.51	287.51	3519.11	2013.18
150-4	**2/0 AWG**	2"	0.019	2.70	0.13	160.29	160.29	6012.42	3439.54
150B-1	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	915.89	419.16
150B-2	**2/0 AWG**	2"	0.019	1.65	0.05	57.77	57.77	7779.82	3560.49
150B-3	**2/0 AWG**	2"	0.019	0.04	0.00	0.27	0.27	1125.23	514.97
150B-4	**2/0 AWG**	2"	0.019	0.31	0.01	11.29	11.29	1439.25	658.69
175-1	**3/0 AWG**	2"	0.0158	1.30	0.05	65.53	65.53	5015.82	2359.29
175-2	**3/0 AWG**	2"	0.0158	2.18	0.09	109.78	109.78	8402.13	3952.11
175-3	**3/0 AWG**	2"	0.0158	1.77	0.07	89.15	89.15	6823.55	3209.59
175-4	**3/0 AWG**	2"	0.0158	0.02	0.00	0.55	0.55	140.04	65.87
175A	**3/0 AWG**	2"	0.0158	0.65	0.08	90.57	90.57	668.35	419.16
200-1	**4/0 AWG**	2 1/2"	0.0133	0.08	0.00	1.89	1.89	1020.70	684.62
200-2	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	3031.18	2033.11
225-1	**250 KCMIL**	2 1/2"	0.012	1.70	0.18	220.02	220.02	4715.75	2730.17
225-2	**250 KCMIL**	2 1/2"	0.012	0.04	0.00	0.29	0.29	1863.37	1078.79
225-3	**250 KCMIL**	2 1/2"	0.012	0.90	0.03	41.09	41.09	7130.97	4128.45
225-4	**250 KCMIL**	2 1/2"	0.012	1.86	0.09	108.83	108.83	11395.21	6597.23
225-6	**250 KCMIL**	2 1/2"	0.012	0.04	0.00	2.24	2.24	197.09	114.10
225-7	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	5912.61	3423.09
225-8	**250 KCMIL**	2 1/2"	0.012	0.01	0.00	0.25	0.25	170.21	98.54
225-9	**250 KCMIL**	2 1/2"	0.012	0.71	0.03	36.18	36.18	5052.59	2925.19
225A	**250 KCMIL**	2"	0.012	0.18	0.02	22.20	22.20	403.13	179.64
250-1	**300 KCMIL**	2 1/2"	0.0106	0.13	0.01	10.33	10.33	757.23	378.61
250-2	**300 KCMIL**	2 1/2"	0.0106	0.09	0.00	5.54	5.54	757.23	378.61
250-3	**300 KCMIL**	2 1/2"	0.0106	0.94	0.04	44.11	44.11	9460.18	4730.09
250-4	**300 KCMIL**	2 1/2"	0.0106	0.10	0.00	4.93	4.93	1037.30	518.65
250-5	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	1784.16	892.08
250-6	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	2074.60	1037.30
250-7	**300 KCMIL**	2 1/2"	0.0106	0.19	0.01	7.69	7.69	2282.06	1141.03
250-8	**300 KCMIL**	2 1/2"	0.0106	0.21	0.01	8.01	8.01	2696.98	1348.49
400-1	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	0.04	0.08	11196.80	7510.05
400-2	**4/0 AWG**	2 1/2"	0.0133	0.18	0.01	16.91	33.82	1128.96	757.23
500-1	**300 KCMIL**	2 1/2"	0.0106	2.32	0.19	225.87	451.74	22322.70	11161.35
500-2	**300 KCMIL**	2 1/2"	0.0106	2.67	0.24	289.22	578.43	23152.54	11576.27
500-3	**300 KCMIL**	2 1/2"	0.0106	0.10	0.01	10.37	20.73	829.84	414.92
500-4	**300 KCMIL**	2 1/2"	0.0106	0.21	0.02	22.81	45.61	1825.65	912.82
500B-1	**300 KCMIL**	3"	0.0106	0.91	0.04	51.31	102.62	18775.13	9046.20
600-1	**400 KCMIL**	3"	0.00907	-	-	-	-	17109.79	8096.60
600-2	**400 KCMIL**	3"	0.00907	0.50	0.08	91.42	182.83	3802.18	1799.24
600-3	**400 KCMIL**	3"	0.00907	0.11	0.02	20.95	41.90	871.33	412.33
3000	**500 KCMIL**	4"	0.008	6.17	4.44	5338.03	53380.28	66719.14	34875.91

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 30% of Demand Load

	2 SIZES GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**6 AWG**	3/4"	0.0809	0.04	0.00	0.27	0.27	36.44	40.74
25A-2	**6 AWG**	3/4"	0.0809	0.01	0.00	0.01	0.01	35.30	39.46
25A-3	**6 AWG**	3/4"	0.0809	0.03	0.00	0.18	0.18	33.02	36.92
50-1	**3 AWG**	1 1/4"	0.0432	0.02	0.00	0.15	0.15	78.46	66.39
50-2	**3 AWG**	1 1/4"	0.0432	0.00	0.00	0.00	0.00	78.46	66.39
50-3	**3 AWG**	1 1/4"	0.0432	0.01	0.00	0.00	0.00	343.25	290.44
50-4	**3 AWG**	1 1/4"	0.0432	0.02	0.00	0.00	0.00	2059.51	1742.66
50-5	**3 AWG**	1 1/4"	0.0432	0.02	0.00	0.10	0.10	73.55	62.24
50-6	**3 AWG**	1 1/4"	0.0432	0.12	0.00	0.18	0.18	2079.13	1759.26
50-7	**3 AWG**	1 1/4"	0.0432	-	-	-	-	3040.23	2572.50
50A-1	**3 AWG**	1"	0.0432	0.11	0.00	4.26	4.26	58.84	52.05
50A-2	**3 AWG**	1"	0.0432	0.67	0.01	8.44	8.44	1103.31	976.01
90A-1	**1/0 AWG**	1 1/4"	0.0229	0.12	0.00	2.32	2.32	411.90	265.55
90A-2	**1/0 AWG**	1 1/4"	0.0229	0.08	0.00	2.81	2.81	154.46	99.58
100-1	**2/0 AWG**	2"	0.019	0.03	0.00	0.82	0.82	167.48	95.81
100-2	**2/0 AWG**	2"	0.019	0.01	0.00	0.01	0.01	936.82	535.93
100-3	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	1214.21	694.61
100-4	**2/0 AWG**	2"	0.019	0.33	0.00	2.49	2.49	5798.88	3317.38
100-5	**2/0 AWG**	2"	0.019	0.78	0.01	14.76	14.76	5443.00	3113.79
100-6	**2/0 AWG**	2"	0.019	0.01	0.00	0.18	0.18	151.78	86.83
100B	**2/0 AWG**	2"	0.019	0.31	0.01	9.07	9.07	1779.44	814.37
125-1	**3/0 AWG**	2"	0.0158	0.03	0.00	1.11	1.11	140.04	65.87
125-2	**3/0 AWG**	2"	0.0158	0.03	0.00	1.21	1.21	140.04	65.87
125-3	**3/0 AWG**	2"	0.0158	0.10	0.00	3.16	3.16	560.14	263.47
125-4	**3/0 AWG**	2"	0.0158	0.03	0.00	1.14	1.14	140.04	65.87
125-5	**3/0 AWG**	2"	0.0158	0.01	0.00	0.26	0.26	140.04	65.87
125-6	**3/0 AWG**	2"	0.0158	0.02	0.00	0.66	0.66	140.04	65.87
125-7	**3/0 AWG**	2"	0.0158	0.01	0.00	0.21	0.21	140.04	65.87
125-8	**3/0 AWG**	2"	0.0158	0.02	0.00	0.58	0.58	203.69	95.81
125-9	**3/0 AWG**	2"	0.0158	0.02	0.00	0.58	0.58	203.69	95.81
125A-1	**3/0 AWG**	2"	0.0158	0.44	0.03	35.43	35.43	802.02	503.00
125A-2	**3/0 AWG**	2"	0.0158	0.39	0.03	35.80	35.80	625.39	392.22
125A-3	**3/0 AWG**	2"	0.0158	0.26	0.02	20.94	20.94	477.39	299.40
150-1	**3/0 AWG**	2"	0.0158	0.14	0.00	4.33	4.33	865.67	407.19
150-2	**3/0 AWG**	2"	0.0158	0.10	0.00	0.69	0.69	2800.71	1317.37
150-3	**3/0 AWG**	2"	0.0158	2.30	0.20	239.09	239.09	4279.99	2013.18
150-4	**3/0 AWG**	2"	0.0158	2.24	0.11	133.29	133.29	7312.40	3439.54
150B-1	**3/0 AWG**	2 1/2"	0.0158	0.00	0.00	0.00	0.00	1113.92	726.11
150B-2	**3/0 AWG**	2 1/2"	0.0158	1.37	0.04	48.04	48.04	9461.94	6167.79
150B-3	**3/0 AWG**	2 1/2"	0.0158	0.04	0.00	0.22	0.22	1368.53	892.08
150B-4	**3/0 AWG**	2 1/2"	0.0158	0.26	0.01	9.38	9.38	1750.44	1141.03
175-1	**4/0 AWG**	2 1/2"	0.0133	1.10	0.05	55.17	55.17	6093.29	4086.96
175-2	**4/0 AWG**	2 1/2"	0.0133	1.84	0.08	92.41	92.41	10207.03	6846.18
175-3	**4/0 AWG**	2 1/2"	0.0133	1.49	0.06	75.05	75.05	8289.35	5559.93
175-4	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.47	0.47	170.12	114.10
175A	**4/0 AWG**	2"	0.0133	0.54	0.06	76.24	76.24	811.92	419.16
200-1	**250 KCMIL**	2 1/2"	0.012	0.07	0.00	1.71	1.71	1182.52	684.62
200-2	**250 KCMIL**	2 1/2"	0.012	0.00	0.00	0.00	0.00	3511.73	2033.11
225-1	**300 KCMIL**	2 1/2"	0.0106	1.50	0.16	194.35	194.35	5460.35	2730.17
225-2	**300 KCMIL**	2 1/2"	0.0106	0.03	0.00	0.25	0.25	2157.58	1078.79
225-3	**300 KCMIL**	2 1/2"	0.0106	0.80	0.03	36.29	36.29	8256.91	4128.45
225-4	**300 KCMIL**	2 1/2"	0.0106	1.64	0.08	96.13	96.13	13194.46	6597.23
225-6	**300 KCMIL**	2 1/2"	0.0106	0.03	0.00	1.98	1.98	228.21	114.10
225-7	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	6846.18	3423.09
225-8	**300 KCMIL**	2 1/2"	0.0106	0.01	0.00	0.22	0.22	197.09	98.54
225-9	**300 KCMIL**	2 1/2"	0.0106	0.63	0.03	31.96	31.96	5850.37	2925.19
225A	**300 KCMIL**	2 1/2"	0.0106	0.16	0.02	19.61	19.61	466.79	311.19
250-1	**350 KCMIL**	2 1/2"	0.0096	0.12	0.01	9.35	9.35	860.49	378.61
250-2	**350 KCMIL**	2 1/2"	0.0096	0.09	0.00	5.02	5.02	860.49	378.61
250-3	**350 KCMIL**	2 1/2"	0.0096	0.85	0.03	39.95	39.95	10750.20	4730.09
250-4	**350 KCMIL**	2 1/2"	0.0096	0.09	0.00	4.47	4.47	1178.75	518.65
250-5	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2027.45	892.08
250-6	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2357.50	1037.30
250-7	**350 KCMIL**	2 1/2"	0.0096	0.17	0.01	6.96	6.96	2593.25	1141.03
250-8	**350 KCMIL**	2 1/2"	0.0096	0.19	0.01	7.25	7.25	3064.75	1348.49
400-1	**250 KCMIL**	2 1/2"	0.012	0.03	0.00	0.04	0.07	12971.91	7510.05
400-2	**250 KCMIL**	2 1/2"	0.012	0.17	0.01	15.26	30.52	1307.94	757.23
500-1	**350 KCMIL**	2 1/2"	0.0096	2.10	0.17	204.56	409.12	25366.70	11161.35
500-2	**350 KCMIL**	2 1/2"	0.0096	2.42	0.22	261.93	523.86	26309.70	11576.27
500-3	**350 KCMIL**	2 1/2"	0.0096	0.09	0.01	9.39	18.78	943.00	414.92
500-4	**350 KCMIL**	2 1/2"	0.0096	0.19	0.02	20.65	41.31	2074.60	912.82
500B-1	**350 KCMIL**	3"	0.0096	0.82	0.04	46.47	92.94	21335.38	9046.20
600-1	**500 KCMIL**	3"	0.008	-	-	-	-	20165.11	8096.60
600-2	**500 KCMIL**	3"	0.008	0.44	0.07	80.63	161.26	4481.14	1799.24
600-3	**500 KCMIL**	3"	0.008	0.10	0.02	18.48	36.96	1026.93	412.33
3000	**500 KCMIL**	4"	0.008	6.17	4.44	5338.03	58718.30	73391.05	38363.50

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 30% of Demand Load

TAG	3 SIZES GREATER THAN EXISTING WIRE SIZE WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**4 AWG**	1"	0.0522	0.02	0.00	0.18	0.18	50.47	52.05
25A-2	**4 AWG**	1"	0.0522	0.00	0.00	0.00	0.00	48.89	50.43
25A-3	**4 AWG**	1"	0.0522	0.02	0.00	0.11	0.11	45.74	47.17
50-1	**2 AWG**	1 1/4"	0.0342	0.02	0.00	0.12	0.12	93.55	66.39
50-2	**2 AWG**	1 1/4"	0.0342	0.00	0.00	0.00	0.00	93.55	66.39
50-3	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.00	0.00	409.26	290.44
50-4	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.00	0.00	2455.57	1742.66
50-5	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.08	0.08	87.70	62.24
50-6	**2 AWG**	1 1/4"	0.0342	0.09	0.00	0.14	0.14	2478.96	1759.26
50-7	**2 AWG**	1 1/4"	0.0342	-	-	-	-	3624.89	2572.50
50A-1	**2 AWG**	1 1/4"	0.0342	0.09	0.00	3.37	3.37	70.16	66.39
50A-2	**2 AWG**	1 1/4"	0.0342	0.53	0.01	6.68	6.68	1315.49	1244.76
90A-1	**2/0 AWG**	1 1/2"	0.019	0.10	0.00	1.93	1.93	502.43	310.81
90A-2	**2/0 AWG**	1 1/2"	0.019	0.07	0.00	2.33	2.33	188.41	116.55
100-1	**3/0 AWG**	2"	0.0158	0.03	0.00	0.68	0.68	203.69	95.81
100-2	**3/0 AWG**	2"	0.0158	0.01	0.00	0.01	0.01	1139.38	535.93
100-3	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	1476.74	694.61
100-4	**3/0 AWG**	2"	0.0158	0.27	0.00	2.07	2.07	7052.70	3317.38
100-5	**3/0 AWG**	2"	0.0158	0.65	0.01	12.28	12.28	6619.86	3113.79
100-6	**3/0 AWG**	2"	0.0158	0.01	0.00	0.15	0.15	184.59	86.83
100B	**3/0 AWG**	2 1/2"	0.0158	0.26	0.01	7.55	7.55	2164.19	1410.73
125-1	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.93	0.93	170.12	114.10
125-2	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	1.02	1.02	170.12	114.10
125-3	**4/0 AWG**	2 1/2"	0.0133	0.08	0.00	2.66	2.66	680.47	456.41
125-4	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.96	0.96	170.12	114.10
125-5	**4/0 AWG**	2 1/2"	0.0133	0.01	0.00	0.22	0.22	170.12	114.10
125-6	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.56	0.56	170.12	114.10
125-7	**4/0 AWG**	2 1/2"	0.0133	0.01	0.00	0.18	0.18	170.12	114.10
125-8	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.49	0.49	247.44	165.97
125-9	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.49	0.49	247.44	165.97
125A-1	**4/0 AWG**	2"	0.0133	0.37	0.02	29.82	29.82	974.31	503.00
125A-2	**4/0 AWG**	2"	0.0133	0.33	0.03	30.13	30.13	759.73	392.22
125A-3	**4/0 AWG**	2"	0.0133	0.22	0.01	17.63	17.63	579.95	299.40
150-1	**4/0 AWG**	2 1/2"	0.0133	0.12	0.00	3.65	3.65	1051.63	705.36
150-2	**4/0 AWG**	2 1/2"	0.0133	0.08	0.00	0.58	0.58	3402.34	2282.06
150-3	**4/0 AWG**	2 1/2"	0.0133	1.94	0.17	201.26	201.26	5199.40	3487.40
150-4	**4/0 AWG**	2 1/2"	0.0133	1.89	0.09	112.20	112.20	8883.21	5958.25
150B-1	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	1353.21	726.11
150B-2	**4/0 AWG**	2 1/2"	0.0133	1.15	0.03	40.44	40.44	11494.51	6167.79
150B-3	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	0.19	0.19	1662.51	892.08
150B-4	**4/0 AWG**	2 1/2"	0.0133	0.22	0.01	7.90	7.90	2126.47	1141.03
175-1	**250 KCMIL**	2 1/2"	0.012	0.99	0.04	49.77	49.77	7059.30	4086.96
175-2	**250 KCMIL**	2 1/2"	0.012	1.66	0.07	83.38	83.38	11825.22	6846.18
175-3	**250 KCMIL**	2 1/2"	0.012	1.35	0.06	67.71	67.71	9603.51	5559.93
175-4	**250 KCMIL**	2 1/2"	0.012	0.02	0.00	0.42	0.42	197.09	114.10
175A	**250 KCMIL**	2"	0.012	0.49	0.06	68.78	68.78	940.64	419.16
200-1	**300 KCMIL**	2 1/2"	0.0106	0.07	0.00	1.51	1.51	1369.24	684.62
200-2	**300 KCMIL**	2 1/2"	0.0106	0.00	0.00	0.00	0.00	4066.22	2033.11
225-1	**350 KCMIL**	2 1/2"	0.0096	1.36	0.15	176.02	176.02	6204.94	2730.17
225-2	**350 KCMIL**	2 1/2"	0.0096	0.03	0.00	0.23	0.23	2451.80	1078.79
225-3	**350 KCMIL**	2 1/2"	0.0096	0.72	0.03	32.87	32.87	9382.85	4128.45
225-4	**350 KCMIL**	2 1/2"	0.0096	1.49	0.07	87.07	87.07	14993.70	6597.23
225-6	**350 KCMIL**	2 1/2"	0.0096	0.03	0.00	1.79	1.79	259.33	114.10
225-7	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	7779.75	3423.09
225-8	**350 KCMIL**	2 1/2"	0.0096	0.01	0.00	0.20	0.20	223.96	98.54
225-9	**350 KCMIL**	2 1/2"	0.0096	0.57	0.02	28.94	28.94	6648.15	2925.19
225A	**350 KCMIL**	2 1/2"	0.0096	0.15	0.01	17.76	17.76	530.44	311.19
250-1	**400 KCMIL**	3"	0.00907	0.11	0.01	8.84	8.84	963.75	456.06
250-2	**400 KCMIL**	3"	0.00907	0.08	0.00	4.74	4.74	963.75	456.06
250-3	**400 KCMIL**	3"	0.00907	0.81	0.03	37.74	37.74	12040.22	5697.61
250-4	**400 KCMIL**	3"	0.00907	0.09	0.00	4.22	4.22	1320.20	624.74
250-5	**400 KCMIL**	3"	0.00907	-	-	-	-	2270.74	1074.55
250-6	**400 KCMIL**	3"	0.00907	-	-	-	-	2640.40	1249.48
250-7	**400 KCMIL**	3"	0.00907	0.17	0.01	6.58	6.58	2904.44	1374.42
250-8	**400 KCMIL**	3"	0.00907	0.18	0.01	6.85	6.85	3432.52	1624.32
400-1	**300 KCMIL**	2 1/2"	0.0106	0.02	0.00	0.03	0.07	19116.50	7510.05
400-2	**300 KCMIL**	2 1/2"	0.0106	0.15	0.01	13.48	26.96	1927.49	757.23
500-1	**400 KCMIL**	3"	0.00907	1.98	0.16	193.27	386.53	28410.70	13444.35
500-2	**400 KCMIL**	3"	0.00907	2.28	0.21	247.47	494.94	29466.86	13944.14
500-3	**400 KCMIL**	3"	0.00907	0.08	0.01	8.87	17.74	1056.16	499.79
500-4	**400 KCMIL**	3"	0.00907	0.18	0.02	19.51	39.03	2323.55	1099.54
500B-1	**400 KCMIL**	3"	0.00907	0.77	0.04	43.91	87.81	23895.62	9046.20
600-1	**600 KCMIL**	3 1/2"	0.0074	-	-	-	-	20165.11	9624.26
600-2	**600 KCMIL**	3 1/2"	0.0074	0.41	0.06	74.58	149.17	4481.14	2138.72
600-3	**600 KCMIL**	3 1/2"	0.0074	0.09	0.01	17.09	34.18	1026.93	490.12
3000	**500 KCMIL**	4"	0.008	6.17	4.44	5338.03	64056.33	80062.96	41851.09

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 50% of Demand Load

TAG	FROM	TO	NO. OF CONDUCTORS	NO. OF SETS	LENGTH (FEET)	LOAD (AMPS)	% OF LOAD	AVERAGE LOAD (AMPS)
25A-1	CL1B	T-13	3	1	8.00	19.79	0.50	9.90
25A-2	LSL1B	T-12	3	1	7.75	2.78	0.50	1.39
25A-3	CL1A	T-11	3	1	7.25	16.74	0.50	8.37
50-1	T-13	CR1B	4	1	8.00	19.79	0.50	9.90
50-2	T-12	LSR1B	4	1	8.00	2.78	0.50	1.39
50-3	LSL1B	LSL2B	4	1	35.00	1.50	0.50	0.75
50-4	LSL1A	LSLPA	4	1	210.00	0.58	0.50	0.29
50-5	T-11	CR1A	4	1	7.50	16.74	0.50	8.37
50-6	LSL1A	LSL2A	4	1	212.00	4.27	0.50	2.13
50-7	R-GEN	LSR1A	4	1	310.00	-	0.50	-
50A-1	L1	T-5	3	1	8.00	106.72	0.50	53.36
50A-2	LSL1A	T-10	3	1	150.00	34.70	0.50	17.35
90A-1	SWBD	T-2	3	1	32.00	54.13	0.50	27.06
90A-2	SWBD	T-3	3	1	12.00	97.24	0.50	48.62
100-1	T-5	R1	4	1	8.00	70.64	0.50	35.32
100-2	DP1	LPA	4	1	44.75	3.97	0.50	1.98
100-3	DP2	RPB	4	1	58.00	0.00	0.50	0.00
100-4	LSL1A	LSL1B	4	1	277.00	20.93	0.50	10.47
100-5	EDP1	CL1B	4	1	260.00	52.56	0.50	26.28
100-6	T-10	LSR1A	4	1	7.25	34.70	0.50	17.35
100B	DP3	MEG	5	1	68.00	80.59	0.50	40.29
125-1	WIREWAY	R2A1	4	1	5.50	108.53	0.50	54.27
125-2	WIREWAY	R2A2	4	1	5.50	113.64	0.50	56.82
125-3	R2B2	R2B3	4	1	22.00	91.71	0.50	45.85
125-4	WIREWAY	R1A1	4	1	5.50	110.08	0.50	55.04
125-5	WIREWAY	R1A2	4	1	5.50	52.63	0.50	26.31
125-6	WIREWAY	R1B1	4	1	5.50	84.08	0.50	42.04
125-7	WIREWAY	R1B2	4	1	5.50	47.13	0.50	23.57
125-8	WIREWAY	ELEV. #1	4	1	8.00	64.95	0.50	32.48
125-9	WIREWAY	ELEV. #2	4	1	8.00	64.95	0.50	32.48
125A-1	L2A	T-8	3	1	42.00	222.17	0.50	111.08
125A-2	L1A	T-6	3	1	32.75	252.92	0.50	126.46
125A-3	L1B	T-7	3	1	25.00	221.42	0.50	110.71
150-1	SWBD	L1	4	1	34.00	86.34	0.50	43.17
150-2	DP2	RPC	4	1	110.00	19.21	0.50	9.60
150-3	SWBD	L1A	4	1	168.10	288.50	0.50	144.25
150-4	SWBD	L1B	4	1	287.20	164.80	0.50	82.40
150B-1	T-2	RPVL	5	1	35.00	0.00	0.50	0.00
150B-2	T-3	DP3	5	1	297.30	97.24	0.50	48.62
150B-3	DP2	RPA	5	1	43.00	17.46	0.50	8.73
150B-4	DP2	SNW MELT	5	1	55.00	99.93	0.50	49.96
175-1	SWBD	FLUROSC.	4	1	197.00	139.53	0.50	69.76
175-2	SWBD	PET/CT	4	1	330.00	139.53	0.50	69.76
175-3	SWBD	MRI	4	1	268.00	139.53	0.50	69.76
175-4	WIREWAY	R2B1	4	1	5.50	76.69	0.50	38.34
175A	L2B	T-9	3	1	35.00	389.14	0.50	194.57
200-1	SWBD	ATS-LS	4	1	33.00	63.10	0.50	31.55
200-2	DP1	LPC	4	1	98.00	0.00	0.50	0.00
225-1	SWBD	H2	4	1	131.60	358.92	0.50	179.46
225-2	DP2	RPD	4	1	52.00	20.65	0.50	10.33
225-3	SWBD	L2A	4	1	199.00	126.13	0.50	63.07
225-4	SWBD	L2B	4	1	318.00	162.39	0.50	81.19
225-6	WIREWAY	R2B2	4	1	5.50	177.13	0.50	88.57
225-7	G	ATS-LS	4	1	165.00	-	0.50	-
225-8	ATS-LS	LSL1A	4	1	4.75	63.10	0.50	31.55
225-9	EDP1	CL1A	4	1	141.00	140.61	0.50	70.30
225A	SWBD	T-4	3	1	15.00	337.67	0.50	168.84
250-1	T-8	WIREWAY	4	1	18.25	222.17	0.50	111.08
250-2	T-6	WIREWAY	4	1	18.25	162.71	0.50	81.36
250-3	SWBD	WIREWAY	4	1	228.00	129.90	0.50	64.95
250-4	T-7	WIREWAY	4	1	25.00	131.21	0.50	65.61
250-5	UPS	BATT CAB 1	4	1	43.00	-	0.50	-
250-6	UPS	BATT CAB 2	4	1	50.00	-	0.50	-
250-7	DP-UPS	PDU1	4	1	55.00	110.42	0.50	55.21
250-8	DP-UPS	PDU2	4	1	65.00	103.68	0.50	51.84
400-1	SWBD	DP1	4	2	181.00	3.97	0.50	1.98
400-2	T-9	WIREWAY	4	2	18.25	253.82	0.50	126.91
500-1	EDP1	UPS	4	2	269.00	270.63	0.50	135.32
500-2	EDP1	BY-PASS	4	2	279.00	300.70	0.50	150.35
500-3	UPS	BY-PASS	4	2	10.00	300.70	0.50	150.35
500-4	BY-PASS	DP-UPS	4	2	22.00	300.70	0.50	150.35
500B-1	T-4	DP2	5	2	181.00	157.25	0.50	78.63
600-1	G	ATS-EM	4	2	162.00	-	0.50	-
600-2	SWBD	ATS-EM	4	2	36.00	508.79	0.50	254.39
600-3	ATS-EM	EDP1	4	2	8.25	508.79	0.50	254.39
3000	T-1	SWBD	4	9	107.20	2398.99	0.50	1199.50

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

CU=COPPER

COST ANALYSIS at 50% of Demand Load

	EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**10 AWG**	3/4"	0.198	0.16	0.00	1.86	1.86	18.90	40.74
25A-2	**10 AWG**	3/4"	0.198	0.02	0.00	0.04	0.04	18.31	39.46
25A-3	**10 AWG**	3/4"	0.198	0.12	0.00	1.21	1.21	17.13	36.92
50-1	**6 AWG**	1"	0.0809	0.06	0.00	0.76	0.76	48.58	52.05
50-2	**6 AWG**	1"	0.0809	0.01	0.00	0.01	0.01	48.58	52.05
50-3	**6 AWG**	1"	0.0809	0.02	0.00	0.02	0.02	212.55	227.73
50-4	**6 AWG**	1"	0.0809	0.05	0.00	0.02	0.02	1275.31	1366.41
50-5	**6 AWG**	1"	0.0809	0.05	0.00	0.51	0.51	45.55	48.80
50-6	**6 AWG**	1"	0.0809	0.37	0.00	0.94	0.94	1287.46	1379.42
50-7	**6 AWG**	1"	0.0809	-	-	-	-	1882.61	2017.08
50A-1	**6 AWG**	3/4"	0.0809	0.35	0.02	22.14	22.14	36.44	40.74
50A-2	**6 AWG**	3/4"	0.0809	2.11	0.04	43.89	43.89	683.20	763.83
90A-1	**2 AWG**	1 1/4"	0.0342	0.30	0.01	9.63	9.63	280.64	265.55
90A-2	**2 AWG**	1 1/4"	0.0342	0.20	0.01	11.66	11.66	105.24	99.58
100-1	**1 AWG**	1 1/2"	0.0279	0.08	0.00	3.35	3.35	113.16	77.70
100-2	**1 AWG**	1 1/2"	0.0279	0.02	0.00	0.06	0.06	632.99	434.65
100-3	**1 AWG**	1 1/2"	0.0279	0.00	0.00	0.00	0.00	820.41	563.35
100-4	**1 AWG**	1 1/2"	0.0279	0.81	0.01	10.18	10.18	3918.17	2690.47
100-5	**1 AWG**	1 1/2"	0.0279	1.91	0.05	60.21	60.21	3677.70	2525.35
100-6	**1 AWG**	1 1/2"	0.0279	0.04	0.00	0.73	0.73	102.55	70.42
100B	**1 AWG**	1 1/2"	0.0279	0.76	0.03	37.02	37.02	1202.33	660.48
125-1	**1/0 AWG**	2"	0.0229	0.07	0.00	4.46	4.46	94.39	65.87
125-2	**1/0 AWG**	2"	0.0229	0.07	0.00	4.89	4.89	94.39	65.87
125-3	**1/0 AWG**	2"	0.0229	0.23	0.01	12.73	12.73	377.58	263.47
125-4	**1/0 AWG**	2"	0.0229	0.07	0.00	4.59	4.59	94.39	65.87
125-5	**1/0 AWG**	2"	0.0229	0.03	0.00	1.05	1.05	94.39	65.87
125-6	**1/0 AWG**	2"	0.0229	0.05	0.00	2.67	2.67	94.39	65.87
125-7	**1/0 AWG**	2"	0.0229	0.03	0.00	0.84	0.84	94.39	65.87
125-8	**1/0 AWG**	2"	0.0229	0.06	0.00	2.32	2.32	137.30	95.81
125-9	**1/0 AWG**	2"	0.0229	0.06	0.00	2.32	2.32	137.30	95.81
125A-1	**1/0 AWG**	1 1/2"	0.0229	1.07	0.12	142.62	142.62	540.62	407.94
125A-2	**1/0 AWG**	1 1/2"	0.0229	0.95	0.12	144.13	144.13	421.56	318.10
125A-3	**1/0 AWG**	1 1/2"	0.0229	0.63	0.07	84.32	84.32	321.80	242.82
150-1	**1/0 AWG**	2"	0.0229	0.34	0.01	17.44	17.44	583.53	407.19
150-2	**1/0 AWG**	2"	0.0229	0.24	0.00	2.79	2.79	1887.89	1317.37
150-3	**1/0 AWG**	2"	0.0229	5.55	0.80	962.58	962.58	2885.03	2013.18
150-4	**1/0 AWG**	2"	0.0229	5.42	0.45	536.64	536.64	4929.10	3439.54
150B-1	**1/0 AWG**	2"	0.0229	0.00	0.00	0.00	0.00	750.86	419.16
150B-2	**1/0 AWG**	2"	0.0229	3.31	0.16	193.41	193.41	6378.05	3560.49
150B-3	**1/0 AWG**	2"	0.0229	0.09	0.00	0.90	0.90	922.49	514.97
150B-4	**1/0 AWG**	2"	0.0229	0.63	0.03	37.78	37.78	1179.93	658.69
175-1	**2/0 AWG**	2"	0.019	2.61	0.18	218.91	218.91	4124.12	2359.29
175-2	**2/0 AWG**	2"	0.019	4.37	0.31	366.70	366.70	6908.42	3952.11
175-3	**2/0 AWG**	2"	0.019	3.55	0.25	297.81	297.81	5610.47	3209.59
175-4	**2/0 AWG**	2"	0.019	0.04	0.00	1.85	1.85	115.14	65.87
175A	**2/0 AWG**	2"	0.019	1.29	0.25	302.53	302.53	549.53	419.16
200-1	**3/0 AWG**	2"	0.0158	0.16	0.01	6.24	6.24	840.21	395.21
200-2	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	2495.18	1173.66
225-1	**4/0 AWG**	2 1/2"	0.0133	3.14	0.56	677.39	677.39	4070.44	2730.17
225-2	**4/0 AWG**	2 1/2"	0.0133	0.07	0.00	0.89	0.89	1608.38	1078.79
225-3	**4/0 AWG**	2 1/2"	0.0133	1.67	0.11	126.50	126.50	6155.15	4128.45
225-4	**4/0 AWG**	2 1/2"	0.0133	3.43	0.28	335.06	335.06	9835.87	6597.23
225-6	**4/0 AWG**	2 1/2"	0.0133	0.06	0.01	6.90	6.90	170.12	114.10
225-7	**4/0 AWG**	2 1/2"	0.0133	-	-	-	-	5103.52	3423.09
225-8	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.76	0.76	146.92	98.54
225-9	**4/0 AWG**	2 1/2"	0.0133	1.32	0.09	111.39	111.39	4361.19	2925.19
225A	**4/0 AWG**	2"	0.0133	0.34	0.06	68.34	68.34	347.97	179.64
250-1	**250 KCMIL**	2 1/2"	0.012	0.24	0.03	32.47	32.47	653.97	378.61
250-2	**250 KCMIL**	2 1/2"	0.012	0.18	0.01	17.42	17.42	653.97	378.61
250-3	**250 KCMIL**	2 1/2"	0.012	1.78	0.12	138.71	138.71	8170.15	4730.09
250-4	**250 KCMIL**	2 1/2"	0.012	0.20	0.01	15.52	15.52	895.85	518.65
250-5	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1540.86	892.08
250-6	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1791.70	1037.30
250-7	**250 KCMIL**	2 1/2"	0.012	0.36	0.02	24.17	24.17	1970.87	1141.03
250-8	**250 KCMIL**	2 1/2"	0.012	0.40	0.02	25.19	25.19	2329.21	1348.49
400-1	**3/0 AWG**	2"	0.0158	0.06	0.00	0.14	0.27	9216.88	4335.35
400-2	**3/0 AWG**	2"	0.0158	0.37	0.05	55.81	111.62	929.33	437.13
500-1	**250 KCMIL**	2 1/2"	0.012	4.37	0.59	710.28	1420.56	19278.69	11161.35
500-2	**250 KCMIL**	2 1/2"	0.012	5.03	0.76	909.49	1818.97	19995.37	11576.27
500-3	**250 KCMIL**	2 1/2"	0.012	0.18	0.03	32.60	65.20	716.68	414.92
500-4	**250 KCMIL**	2 1/2"	0.012	0.40	0.06	71.72	143.43	1576.70	912.82
500B-1	**250 KCMIL**	3"	0.012	1.71	0.13	161.36	322.72	16214.89	9046.20
600-1	**350 KCMIL**	3"	0.0096	-	-	-	-	15276.60	8096.60
600-2	**350 KCMIL**	3"	0.0096	0.88	0.22	268.77	537.55	3394.80	1799.24
600-3	**350 KCMIL**	3"	0.0096	0.20	0.05	61.59	123.19	777.98	412.33
3000	**500 KCMIL**	4"	0.008	10.29	12.34	14827.85	133450.69	60047.22	31388.32

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 50% of Demand Load

	1 SIZE GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**8 AWG**	3/4"	0.126	0.10	0.00	1.19	1.19	26.71	40.74
25A-2	**8 AWG**	3/4"	0.126	0.01	0.00	0.02	0.02	25.87	39.46
25A-3	**8 AWG**	3/4"	0.126	0.08	0.00	0.77	0.77	24.20	36.92
50-1	**4 AWG**	1 1/4"	0.0522	0.04	0.00	0.49	0.49	67.29	66.39
50-2	**4 AWG**	1 1/4"	0.0522	0.01	0.00	0.01	0.01	67.29	66.39
50-3	**4 AWG**	1 1/4"	0.0522	0.01	0.00	0.01	0.01	294.40	290.44
50-4	**4 AWG**	1 1/4"	0.0522	0.03	0.00	0.01	0.01	1766.43	1742.66
50-5	**4 AWG**	1 1/4"	0.0522	0.03	0.00	0.33	0.33	63.09	62.24
50-6	**4 AWG**	1 1/4"	0.0522	0.24	0.00	0.61	0.61	1783.25	1759.26
50-7	**4 AWG**	1 1/4"	0.0522	-	-	-	-	2607.58	2572.50
50A-1	**4 AWG**	1"	0.0522	0.22	0.01	14.29	14.29	50.47	52.05
50A-2	**4 AWG**	1"	0.0522	1.36	0.02	28.32	28.32	946.30	976.01
90A-1	**1 AWG**	1 1/4"	0.0279	0.24	0.01	7.86	7.86	339.48	265.55
90A-2	**1 AWG**	1 1/4"	0.0279	0.16	0.01	9.51	9.51	127.31	99.58
100-1	**1/0 AWG**	1 1/2"	0.0229	0.06	0.00	2.75	2.75	137.30	77.70
100-2	**1/0 AWG**	1 1/2"	0.0229	0.02	0.00	0.05	0.05	768.03	434.65
100-3	**1/0 AWG**	1 1/2"	0.0229	0.00	0.00	0.00	0.00	995.43	563.35
100-4	**1/0 AWG**	1 1/2"	0.0229	0.66	0.01	8.35	8.35	4754.04	2690.47
100-5	**1/0 AWG**	1 1/2"	0.0229	1.56	0.04	49.42	49.42	4462.28	2525.35
100-6	**1/0 AWG**	1 1/2"	0.0229	0.03	0.00	0.60	0.60	124.43	70.42
100B	**1/0 AWG**	2"	0.0229	0.63	0.03	30.38	30.38	1458.82	814.37
125-1	**2/0 AWG**	2"	0.019	0.06	0.00	3.70	3.70	115.14	65.87
125-2	**2/0 AWG**	2"	0.019	0.06	0.00	4.05	4.05	115.14	65.87
125-3	**2/0 AWG**	2"	0.019	0.19	0.01	10.56	10.56	460.56	263.47
125-4	**2/0 AWG**	2"	0.019	0.06	0.00	3.80	3.80	115.14	65.87
125-5	**2/0 AWG**	2"	0.019	0.03	0.00	0.87	0.87	115.14	65.87
125-6	**2/0 AWG**	2"	0.019	0.04	0.00	2.22	2.22	115.14	65.87
125-7	**2/0 AWG**	2"	0.019	0.02	0.00	0.70	0.70	115.14	65.87
125-8	**2/0 AWG**	2"	0.019	0.05	0.00	1.93	1.93	167.48	95.81
125-9	**2/0 AWG**	2"	0.019	0.05	0.00	1.93	1.93	167.48	95.81
125A-1	**2/0 AWG**	1 1/2"	0.019	0.89	0.10	118.33	118.33	659.44	407.94
125A-2	**2/0 AWG**	1 1/2"	0.019	0.79	0.10	119.58	119.58	514.21	318.10
125A-3	**2/0 AWG**	1 1/2"	0.019	0.53	0.06	69.96	69.96	392.52	242.82
150-1	**2/0 AWG**	2"	0.019	0.28	0.01	14.47	14.47	711.78	407.19
150-2	**2/0 AWG**	2"	0.019	0.20	0.00	2.32	2.32	2302.81	1317.37
150-3	**2/0 AWG**	2"	0.019	4.61	0.66	798.64	798.64	3519.11	2013.18
150-4	**2/0 AWG**	2"	0.019	4.50	0.37	445.25	445.25	6012.42	3439.54
150B-1	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	915.89	419.16
150B-2	**2/0 AWG**	2"	0.019	2.75	0.13	160.47	160.47	7779.82	3560.49
150B-3	**2/0 AWG**	2"	0.019	0.07	0.00	0.75	0.75	1125.23	514.97
150B-4	**2/0 AWG**	2"	0.019	0.52	0.03	31.35	31.35	1439.25	658.69
175-1	**3/0 AWG**	2"	0.0158	2.17	0.15	182.04	182.04	5015.82	2359.29
175-2	**3/0 AWG**	2"	0.0158	3.64	0.25	304.94	304.94	8402.13	3952.11
175-3	**3/0 AWG**	2"	0.0158	2.95	0.21	247.65	247.65	6823.55	3209.59
175-4	**3/0 AWG**	2"	0.0158	0.03	0.00	1.54	1.54	140.04	65.87
175A	**3/0 AWG**	2"	0.0158	1.08	0.21	251.57	251.57	668.35	419.16
200-1	**4/0 AWG**	2 1/2"	0.0133	0.14	0.00	5.25	5.25	1020.70	684.62
200-2	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	3031.18	2033.11
225-1	**250 KCMIL**	2 1/2"	0.012	2.83	0.51	611.18	611.18	4715.75	2730.17
225-2	**250 KCMIL**	2 1/2"	0.012	0.06	0.00	0.80	0.80	1863.37	1078.79
225-3	**250 KCMIL**	2 1/2"	0.012	1.51	0.09	114.13	114.13	7130.97	4128.45
225-4	**250 KCMIL**	2 1/2"	0.012	3.10	0.25	302.31	302.31	11395.21	6597.23
225-6	**250 KCMIL**	2 1/2"	0.012	0.06	0.01	6.22	6.22	197.09	114.10
225-7	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	5912.61	3423.09
225-8	**250 KCMIL**	2 1/2"	0.012	0.02	0.00	0.68	0.68	170.21	98.54
225-9	**250 KCMIL**	2 1/2"	0.012	1.19	0.08	100.50	100.50	5052.59	2925.19
225A	**250 KCMIL**	2"	0.012	0.30	0.05	61.66	61.66	403.13	179.64
250-1	**300 KCMIL**	2 1/2"	0.0106	0.21	0.02	28.69	28.69	757.23	378.61
250-2	**300 KCMIL**	2 1/2"	0.0106	0.16	0.01	15.39	15.39	757.23	378.61
250-3	**300 KCMIL**	2 1/2"	0.0106	1.57	0.10	122.52	122.52	9460.18	4730.09
250-4	**300 KCMIL**	2 1/2"	0.0106	0.17	0.01	13.71	13.71	1037.30	518.65
250-5	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	1784.16	892.08
250-6	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	2074.60	1037.30
250-7	**300 KCMIL**	2 1/2"	0.0106	0.32	0.02	21.35	21.35	2282.06	1141.03
250-8	**300 KCMIL**	2 1/2"	0.0106	0.36	0.02	22.25	22.25	2696.98	1348.49
400-1	**4/0 AWG**	2 1/2"	0.0133	0.05	0.00	0.11	0.23	11196.80	7510.05
400-2	**4/0 AWG**	2 1/2"	0.0133	0.31	0.04	46.98	93.96	1128.96	757.23
500-1	**300 KCMIL**	2 1/2"	0.0106	3.86	0.52	627.41	1254.83	22322.70	11161.35
500-2	**300 KCMIL**	2 1/2"	0.0106	4.45	0.67	803.38	1606.76	23152.54	11576.27
500-3	**300 KCMIL**	2 1/2"	0.0106	0.16	0.02	28.79	57.59	829.84	414.92
500-4	**300 KCMIL**	2 1/2"	0.0106	0.35	0.05	63.35	126.70	1825.65	912.82
500B-1	**300 KCMIL**	3"	0.0106	1.51	0.12	142.53	285.07	18775.13	9046.20
600-1	**400 KCMIL**	3"	0.00907	-	-	-	-	17109.79	8096.60
600-2	**400 KCMIL**	3"	0.00907	0.83	0.21	253.93	507.87	3802.18	1799.24
600-3	**400 KCMIL**	3"	0.00907	0.19	0.05	58.19	116.39	871.33	412.33
3000	**500 KCMIL**	4"	0.008	10.29	12.34	14827.85	148278.55	66719.14	34875.91

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 50% of Demand Load

	2 SIZES GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**6 AWG**	3/4"	0.0809	0.06	0.00	0.76	0.76	36.44	40.74
25A-2	**6 AWG**	3/4"	0.0809	0.01	0.00	0.01	0.01	35.30	39.46
25A-3	**6 AWG**	3/4"	0.0809	0.05	0.00	0.49	0.49	33.02	36.92
50-1	**3 AWG**	1 1/4"	0.0432	0.03	0.00	0.41	0.41	78.46	66.39
50-2	**3 AWG**	1 1/4"	0.0432	0.00	0.00	0.01	0.01	78.46	66.39
50-3	**3 AWG**	1 1/4"	0.0432	0.01	0.00	0.01	0.01	343.25	290.44
50-4	**3 AWG**	1 1/4"	0.0432	0.03	0.00	0.01	0.01	2059.51	1742.66
50-5	**3 AWG**	1 1/4"	0.0432	0.03	0.00	0.27	0.27	73.55	62.24
50-6	**3 AWG**	1 1/4"	0.0432	0.20	0.00	0.50	0.50	2079.13	1759.26
50-7	**3 AWG**	1 1/4"	0.0432	-	-	-	-	3040.23	2572.50
50A-1	**3 AWG**	1"	0.0432	0.18	0.01	11.83	11.83	58.84	52.05
50A-2	**3 AWG**	1"	0.0432	1.12	0.02	23.44	23.44	1103.31	976.01
90A-1	**1/0 AWG**	1 1/4"	0.0229	0.20	0.01	6.45	6.45	411.90	265.55
90A-2	**1/0 AWG**	1 1/4"	0.0229	0.13	0.01	7.81	7.81	154.46	99.58
100-1	**2/0 AWG**	2"	0.019	0.05	0.00	2.28	2.28	167.48	95.81
100-2	**2/0 AWG**	2"	0.019	0.02	0.00	0.04	0.04	936.82	535.93
100-3	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	1214.21	694.61
100-4	**2/0 AWG**	2"	0.019	0.55	0.01	6.93	6.93	5798.88	3317.38
100-5	**2/0 AWG**	2"	0.019	1.30	0.03	41.00	41.00	5443.00	3113.79
100-6	**2/0 AWG**	2"	0.019	0.02	0.00	0.50	0.50	151.78	86.83
100B	**2/0 AWG**	2"	0.019	0.52	0.02	25.21	25.21	1779.44	814.37
125-1	**3/0 AWG**	2"	0.0158	0.05	0.00	3.08	3.08	140.04	65.87
125-2	**3/0 AWG**	2"	0.0158	0.05	0.00	3.37	3.37	140.04	65.87
125-3	**3/0 AWG**	2"	0.0158	0.16	0.01	8.78	8.78	560.14	263.47
125-4	**3/0 AWG**	2"	0.0158	0.05	0.00	3.16	3.16	140.04	65.87
125-5	**3/0 AWG**	2"	0.0158	0.02	0.00	0.72	0.72	140.04	65.87
125-6	**3/0 AWG**	2"	0.0158	0.04	0.00	1.85	1.85	140.04	65.87
125-7	**3/0 AWG**	2"	0.0158	0.02	0.00	0.58	0.58	140.04	65.87
125-8	**3/0 AWG**	2"	0.0158	0.04	0.00	1.60	1.60	203.69	95.81
125-9	**3/0 AWG**	2"	0.0158	0.04	0.00	1.60	1.60	203.69	95.81
125A-1	**3/0 AWG**	2"	0.0158	0.74	0.08	98.40	98.40	802.02	503.00
125A-2	**3/0 AWG**	2"	0.0158	0.65	0.08	99.44	99.44	625.39	392.22
125A-3	**3/0 AWG**	2"	0.0158	0.44	0.05	58.18	58.18	477.39	299.40
150-1	**3/0 AWG**	2"	0.0158	0.23	0.01	12.03	12.03	865.67	407.19
150-2	**3/0 AWG**	2"	0.0158	0.17	0.00	1.93	1.93	2800.71	1317.37
150-3	**3/0 AWG**	2"	0.0158	3.83	0.55	664.14	664.14	4279.99	2013.18
150-4	**3/0 AWG**	2"	0.0158	3.74	0.31	370.26	370.26	7312.40	3439.54
150B-1	**3/0 AWG**	2 1/2"	0.0158	0.00	0.00	0.00	0.00	1113.92	726.11
150B-2	**3/0 AWG**	2 1/2"	0.0158	2.28	0.11	133.44	133.44	9461.94	6167.79
150B-3	**3/0 AWG**	2 1/2"	0.0158	0.06	0.00	0.62	0.62	1368.53	892.08
150B-4	**3/0 AWG**	2 1/2"	0.0158	0.43	0.02	26.07	26.07	1750.44	1141.03
175-1	**4/0 AWG**	2 1/2"	0.0133	1.83	0.13	153.24	153.24	6093.29	4086.96
175-2	**4/0 AWG**	2 1/2"	0.0133	3.06	0.21	256.69	256.69	10207.03	6846.18
175-3	**4/0 AWG**	2 1/2"	0.0133	2.49	0.17	208.47	208.47	8289.35	5559.93
175-4	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.29	1.29	170.12	114.10
175A	**4/0 AWG**	2"	0.0133	0.91	0.18	211.77	211.77	811.92	419.16
200-1	**250 KCMIL**	2 1/2"	0.012	0.12	0.00	4.74	4.74	1182.52	684.62
200-2	**250 KCMIL**	2 1/2"	0.012	0.00	0.00	0.00	0.00	3511.73	2033.11
225-1	**300 KCMIL**	2 1/2"	0.0106	2.50	0.45	539.87	539.87	5460.35	2730.17
225-2	**300 KCMIL**	2 1/2"	0.0106	0.06	0.00	0.71	0.71	2157.58	1078.79
225-3	**300 KCMIL**	2 1/2"	0.0106	1.33	0.08	100.82	100.82	8256.91	4128.45
225-4	**300 KCMIL**	2 1/2"	0.0106	2.74	0.22	267.04	267.04	13194.46	6597.23
225-6	**300 KCMIL**	2 1/2"	0.0106	0.05	0.00	5.50	5.50	228.21	114.10
225-7	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	6846.18	3423.09
225-8	**300 KCMIL**	2 1/2"	0.0106	0.02	0.00	0.60	0.60	197.09	98.54
225-9	**300 KCMIL**	2 1/2"	0.0106	1.05	0.07	88.77	88.77	5850.37	2925.19
225A	**300 KCMIL**	2 1/2"	0.0106	0.27	0.05	54.47	54.47	466.79	311.19
250-1	**350 KCMIL**	2 1/2"	0.0096	0.19	0.02	25.98	25.98	860.49	378.61
250-2	**350 KCMIL**	2 1/2"	0.0096	0.14	0.01	13.93	13.93	860.49	378.61
250-3	**350 KCMIL**	2 1/2"	0.0096	1.42	0.09	110.96	110.96	10750.20	4730.09
250-4	**350 KCMIL**	2 1/2"	0.0096	0.16	0.01	12.41	12.41	1178.75	518.65
250-5	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2027.45	892.08
250-6	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2357.50	1037.30
250-7	**350 KCMIL**	2 1/2"	0.0096	0.29	0.02	19.34	19.34	2593.25	1141.03
250-8	**350 KCMIL**	2 1/2"	0.0096	0.32	0.02	20.15	20.15	3064.75	1348.49
400-1	**250 KCMIL**	2 1/2"	0.012	0.04	0.00	0.10	0.21	12971.91	7510.05
400-2	**250 KCMIL**	2 1/2"	0.012	0.28	0.04	42.39	84.77	1307.94	757.23
500-1	**350 KCMIL**	2 1/2"	0.0096	3.49	0.47	568.22	1136.45	25366.70	11161.35
500-2	**350 KCMIL**	2 1/2"	0.0096	4.03	0.61	727.59	1455.18	26309.70	11576.27
500-3	**350 KCMIL**	2 1/2"	0.0096	0.14	0.02	26.08	52.16	943.00	414.92
500-4	**350 KCMIL**	2 1/2"	0.0096	0.32	0.05	57.37	114.75	2074.60	912.82
500B-1	**350 KCMIL**	3"	0.0096	1.37	0.11	129.09	258.17	21335.38	9046.20
600-1	**500 KCMIL**	3"	0.008	-	-	-	-	20165.11	8096.60
600-2	**500 KCMIL**	3"	0.008	0.73	0.19	223.98	447.96	4481.14	1799.24
600-3	**500 KCMIL**	3"	0.008	0.17	0.04	51.33	102.66	1026.93	412.33
3000	**500 KCMIL**	4"	0.008	10.29	12.34	14827.85	163106.40	73391.05	38363.50

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 50% of Demand Load

	3 SIZES GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**4 AWG**	1"	0.0522	0.04	0.00	0.49	0.49	50.47	52.05
25A-2	**4 AWG**	1"	0.0522	0.01	0.00	0.01	0.01	48.89	50.43
25A-3	**4 AWG**	1"	0.0522	0.03	0.00	0.32	0.32	45.74	47.17
50-1	**2 AWG**	1 1/4"	0.0342	0.03	0.00	0.32	0.32	93.55	66.39
50-2	**2 AWG**	1 1/4"	0.0342	0.00	0.00	0.01	0.01	93.55	66.39
50-3	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.01	0.01	409.26	290.44
50-4	**2 AWG**	1 1/4"	0.0342	0.02	0.00	0.01	0.01	2455.57	1742.66
50-5	**2 AWG**	1 1/4"	0.0342	0.02	0.00	0.22	0.22	87.70	62.24
50-6	**2 AWG**	1 1/4"	0.0342	0.15	0.00	0.40	0.40	2478.96	1759.26
50-7	**2 AWG**	1 1/4"	0.0342	-	-	-	-	3624.89	2572.50
50A-1	**2 AWG**	1 1/4"	0.0342	0.15	0.01	9.36	9.36	70.16	66.39
50A-2	**2 AWG**	1 1/4"	0.0342	0.89	0.02	18.55	18.55	1315.49	1244.76
90A-1	**2/0 AWG**	1 1/2"	0.019	0.16	0.00	5.35	5.35	502.43	310.81
90A-2	**2/0 AWG**	1 1/2"	0.019	0.11	0.01	6.48	6.48	188.41	116.55
100-1	**3/0 AWG**	2"	0.0158	0.04	0.00	1.89	1.89	203.69	95.81
100-2	**3/0 AWG**	2"	0.0158	0.01	0.00	0.03	0.03	1139.38	535.93
100-3	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	1476.74	694.61
100-4	**3/0 AWG**	2"	0.0158	0.46	0.00	5.76	5.76	7052.70	3317.38
100-5	**3/0 AWG**	2"	0.0158	1.08	0.03	34.10	34.10	6619.86	3113.79
100-6	**3/0 AWG**	2"	0.0158	0.02	0.00	0.41	0.41	184.59	86.83
100B	**3/0 AWG**	2 1/2"	0.0158	0.43	0.02	20.96	20.96	2164.19	1410.73
125-1	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	2.59	2.59	170.12	114.10
125-2	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	2.84	2.84	170.12	114.10
125-3	**4/0 AWG**	2 1/2"	0.0133	0.13	0.01	7.39	7.39	680.47	456.41
125-4	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	2.66	2.66	170.12	114.10
125-5	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.61	0.61	170.12	114.10
125-6	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.55	1.55	170.12	114.10
125-7	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.49	0.49	170.12	114.10
125-8	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.35	1.35	247.44	165.97
125-9	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.35	1.35	247.44	165.97
125A-1	**4/0 AWG**	2"	0.0133	0.62	0.07	82.83	82.83	974.31	503.00
125A-2	**4/0 AWG**	2"	0.0133	0.55	0.07	83.71	83.71	759.73	392.22
125A-3	**4/0 AWG**	2"	0.0133	0.37	0.04	48.97	48.97	579.95	299.40
150-1	**4/0 AWG**	2 1/2"	0.0133	0.20	0.01	10.13	10.13	1051.63	705.36
150-2	**4/0 AWG**	2 1/2"	0.0133	0.14	0.00	1.62	1.62	3402.34	2282.06
150-3	**4/0 AWG**	2 1/2"	0.0133	3.23	0.47	559.05	559.05	5199.40	3487.40
150-4	**4/0 AWG**	2 1/2"	0.0133	3.15	0.26	311.67	311.67	8883.21	5958.25
150B-1	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	1353.21	726.11
150B-2	**4/0 AWG**	2 1/2"	0.0133	1.92	0.09	112.33	112.33	11494.51	6167.79
150B-3	**4/0 AWG**	2 1/2"	0.0133	0.05	0.00	0.52	0.52	1662.51	892.08
150B-4	**4/0 AWG**	2 1/2"	0.0133	0.37	0.02	21.94	21.94	2126.47	1141.03
175-1	**250 KCMIL**	2 1/2"	0.012	1.65	0.12	138.26	138.26	7059.30	4086.96
175-2	**250 KCMIL**	2 1/2"	0.012	2.76	0.19	231.60	231.60	11825.22	6846.18
175-3	**250 KCMIL**	2 1/2"	0.012	2.24	0.16	188.09	188.09	9603.51	5559.93
175-4	**250 KCMIL**	2 1/2"	0.012	0.03	0.00	1.17	1.17	197.09	114.10
175A	**250 KCMIL**	2"	0.012	0.82	0.16	191.07	191.07	940.64	419.16
200-1	**300 KCMIL**	2 1/2"	0.0106	0.11	0.00	4.18	4.18	1369.24	684.62
200-2	**300 KCMIL**	2 1/2"	0.0106	0.00	0.00	0.00	0.00	4066.22	2033.11
225-1	**350 KCMIL**	2 1/2"	0.0096	2.27	0.41	488.94	488.94	6204.94	2730.17
225-2	**350 KCMIL**	2 1/2"	0.0096	0.05	0.00	0.64	0.64	2451.80	1078.79
225-3	**350 KCMIL**	2 1/2"	0.0096	1.20	0.08	91.31	91.31	9382.85	4128.45
225-4	**350 KCMIL**	2 1/2"	0.0096	2.48	0.20	241.85	241.85	14993.70	6597.23
225-6	**350 KCMIL**	2 1/2"	0.0096	0.05	0.00	4.98	4.98	259.33	114.10
225-7	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	7779.75	3423.09
225-8	**350 KCMIL**	2 1/2"	0.0096	0.01	0.00	0.55	0.55	223.96	98.54
225-9	**350 KCMIL**	2 1/2"	0.0096	0.95	0.07	80.40	80.40	6648.15	2925.19
225A	**350 KCMIL**	2 1/2"	0.0096	0.24	0.04	49.33	49.33	530.44	311.19
250-1	**400 KCMIL**	3"	0.00907	0.18	0.02	24.55	24.55	963.75	456.06
250-2	**400 KCMIL**	3"	0.00907	0.13	0.01	13.17	13.17	963.75	456.06
250-3	**400 KCMIL**	3"	0.00907	1.34	0.09	104.84	104.84	12040.22	5697.61
250-4	**400 KCMIL**	3"	0.00907	0.15	0.01	11.73	11.73	1320.20	624.74
250-5	**400 KCMIL**	3"	0.00907	-	-	-	-	2270.74	1074.55
250-6	**400 KCMIL**	3"	0.00907	-	-	-	-	2640.40	1249.48
250-7	**400 KCMIL**	3"	0.00907	0.28	0.02	18.27	18.27	2904.44	1374.42
250-8	**400 KCMIL**	3"	0.00907	0.31	0.02	19.04	19.04	3432.52	1624.32
400-1	**300 KCMIL**	2 1/2"	0.0106	0.04	0.00	0.09	0.18	19116.50	7510.05
400-2	**300 KCMIL**	2 1/2"	0.0106	0.25	0.03	37.44	74.88	1927.49	757.23
500-1	**400 KCMIL**	3"	0.00907	3.30	0.45	536.85	1073.71	28410.70	13444.35
500-2	**400 KCMIL**	3"	0.00907	3.80	0.57	687.42	1374.84	29466.86	13944.14
500-3	**400 KCMIL**	3"	0.00907	0.14	0.02	24.64	49.28	1056.16	499.79
500-4	**400 KCMIL**	3"	0.00907	0.30	0.05	54.21	108.41	2323.55	1099.54
500B-1	**400 KCMIL**	3"	0.00907	1.29	0.10	121.96	243.92	23895.62	9046.20
600-1	**600 KCMIL**	3 1/2"	0.0074	-	-	-	-	20165.11	9624.26
600-2	**600 KCMIL**	3 1/2"	0.0074	0.68	0.17	207.18	414.36	4481.14	2138.72
600-3	**600 KCMIL**	3 1/2"	0.0074	0.16	0.04	47.48	94.96	1026.93	490.12
3000	**500 KCMIL**	4"	0.008	10.29	12.34	14827.85	177934.25	80062.96	41851.09

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 70% of Demand Load

TAG	FROM	TO	NO. OF CONDUCTORS	NO. OF SETS	LENGTH (FEET)	LOAD (AMPS)	% OF LOAD	AVERAGE LOAD (AMPS)
25A-1	CL1B	T-13	3	1	8.00	19.79	0.70	13.85
25A-2	LSL1B	T-12	3	1	7.75	2.78	0.70	1.94
25A-3	CL1A	T-11	3	1	7.25	16.74	0.70	11.72
50-1	T-13	CR1B	4	1	8.00	19.79	0.70	13.85
50-2	T-12	LSR1B	4	1	8.00	2.78	0.70	1.94
50-3	LSL1B	LSL2B	4	1	35.00	1.50	0.70	1.05
50-4	LSL1A	LSLPA	4	1	210.00	0.58	0.70	0.41
50-5	T-11	CR1A	4	1	7.50	16.74	0.70	11.72
50-6	LSL1A	LSL2A	4	1	212.00	4.27	0.70	2.99
50-7	R-GEN	LSR1A	4	1	310.00	-	0.70	-
50A-1	L1	T-5	3	1	8.00	106.72	0.70	74.70
50A-2	LSL1A	T-10	3	1	150.00	34.70	0.70	24.29
90A-1	SWBD	T-2	3	1	32.00	54.13	0.70	37.89
90A-2	SWBD	T-3	3	1	12.00	97.24	0.70	68.07
100-1	T-5	R1	4	1	8.00	70.64	0.70	49.45
100-2	DP1	LPA	4	1	44.75	3.97	0.70	2.78
100-3	DP2	RPB	4	1	58.00	0.00	0.70	0.00
100-4	LSL1A	LSL1B	4	1	277.00	20.93	0.70	14.65
100-5	EDP1	CL1B	4	1	260.00	52.56	0.70	36.79
100-6	T-10	LSR1A	4	1	7.25	34.70	0.70	24.29
100B	DP3	MEG	5	1	68.00	80.59	0.70	56.41
125-1	WIREWAY	R2A1	4	1	5.50	108.53	0.70	75.97
125-2	WIREWAY	R2A2	4	1	5.50	113.64	0.70	79.55
125-3	R2B2	R2B3	4	1	22.00	91.71	0.70	64.20
125-4	WIREWAY	R1A1	4	1	5.50	110.08	0.70	77.06
125-5	WIREWAY	R1A2	4	1	5.50	52.63	0.70	36.84
125-6	WIREWAY	R1B1	4	1	5.50	84.08	0.70	58.86
125-7	WIREWAY	R1B2	4	1	5.50	47.13	0.70	32.99
125-8	WIREWAY	ELEV. #1	4	1	8.00	64.95	0.70	45.47
125-9	WIREWAY	ELEV. #2	4	1	8.00	64.95	0.70	45.47
125A-1	L2A	T-8	3	1	42.00	222.17	0.70	155.52
125A-2	L1A	T-6	3	1	32.75	252.92	0.70	177.04
125A-3	L1B	T-7	3	1	25.00	221.42	0.70	155.00
150-1	SWBD	L1	4	1	34.00	86.34	0.70	60.44
150-2	DP2	RPC	4	1	110.00	19.21	0.70	13.45
150-3	SWBD	L1A	4	1	168.10	288.50	0.70	201.95
150-4	SWBD	L1B	4	1	287.20	164.80	0.70	115.36
150B-1	T-2	RPVL	5	1	35.00	0.00	0.70	0.00
150B-2	T-3	DP3	5	1	297.30	97.24	0.70	68.07
150B-3	DP2	RPA	5	1	43.00	17.46	0.70	12.23
150B-4	DP2	SNW MELT	5	1	55.00	99.93	0.70	69.95
175-1	SWBD	FLUROSC.	4	1	197.00	139.53	0.70	97.67
175-2	SWBD	PET/CT	4	1	330.00	139.53	0.70	97.67
175-3	SWBD	MRI	4	1	268.00	139.53	0.70	97.67
175-4	WIREWAY	R2B1	4	1	5.50	76.69	0.70	53.68
175A	L2B	T-9	3	1	35.00	389.14	0.70	272.40
200-1	SWBD	ATS-LS	4	1	33.00	63.10	0.70	44.17
200-2	DP1	LPC	4	1	98.00	0.00	0.70	0.00
225-1	SWBD	H2	4	1	131.60	358.92	0.70	251.24
225-2	DP2	RPD	4	1	52.00	20.65	0.70	14.46
225-3	SWBD	L2A	4	1	199.00	126.13	0.70	88.29
225-4	SWBD	L2B	4	1	318.00	162.39	0.70	113.67
225-6	WIREWAY	R2B2	4	1	5.50	177.13	0.70	123.99
225-7	G	ATS-LS	4	1	165.00	-	0.70	-
225-8	ATS-LS	LSL1A	4	1	4.75	63.10	0.70	44.17
225-9	EDP1	CL1A	4	1	141.00	140.61	0.70	98.43
225A	SWBD	T-4	3	1	15.00	337.67	0.70	236.37
250-1	T-8	WIREWAY	4	1	18.25	222.17	0.70	155.52
250-2	T-6	WIREWAY	4	1	18.25	162.71	0.70	113.90
250-3	SWBD	WIREWAY	4	1	228.00	129.90	0.70	90.93
250-4	T-7	WIREWAY	4	1	25.00	131.21	0.70	91.85
250-5	UPS	BATT CAB 1	4	1	43.00	-	0.70	-
250-6	UPS	BATT CAB 2	4	1	50.00	-	0.70	-
250-7	DP-UPS	PDU1	4	1	55.00	110.42	0.70	77.29
250-8	DP-UPS	PDU2	4	1	65.00	103.68	0.70	72.58
400-1	SWBD	DP1	4	2	181.00	3.97	0.70	2.78
400-2	T-9	WIREWAY	4	2	18.25	253.82	0.70	177.67
500-1	EDP1	UPS	4	2	269.00	270.63	0.70	189.44
500-2	EDP1	BY-PASS	4	2	279.00	300.70	0.70	210.49
500-3	UPS	BY-PASS	4	2	10.00	300.70	0.70	210.49
500-4	BY-PASS	DP-UPS	4	2	22.00	300.70	0.70	210.49
500B-1	T-4	DP2	5	2	181.00	157.25	0.70	110.08
600-1	G	ATS-EM	4	2	162.00	-	0.70	-
600-2	SWBD	ATS-EM	4	2	36.00	508.79	0.70	356.15
600-3	ATS-EM	EDP1	4	2	8.25	508.79	0.70	356.15
3000	T-1	SWBD	4	9	107.20	2398.99	0.70	1679.30

NOTES:

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

CU=COPPER

COST ANALYSIS at 70% of Demand Load

	EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**10 AWG**	3/4"	0.198	0.22	0.00	3.65	3.65	18.90	40.74
25A-2	**10 AWG**	3/4"	0.198	0.03	0.00	0.07	0.07	18.31	39.46
25A-3	**10 AWG**	3/4"	0.198	0.17	0.00	2.37	2.37	17.13	36.92
50-1	**6 AWG**	1"	0.0809	0.09	0.00	1.49	1.49	48.58	52.05
50-2	**6 AWG**	1"	0.0809	0.01	0.00	0.03	0.03	48.58	52.05
50-3	**6 AWG**	1"	0.0809	0.03	0.00	0.04	0.04	212.55	227.73
50-4	**6 AWG**	1"	0.0809	0.07	0.00	0.03	0.03	1275.31	1366.41
50-5	**6 AWG**	1"	0.0809	0.07	0.00	1.00	1.00	45.55	48.80
50-6	**6 AWG**	1"	0.0809	0.51	0.00	1.84	1.84	1287.46	1379.42
50-7	**6 AWG**	1"	0.0809	-	-	-	-	1882.61	2017.08
50A-1	**6 AWG**	3/4"	0.0809	0.48	0.04	43.40	43.40	36.44	40.74
50A-2	**6 AWG**	3/4"	0.0809	2.95	0.07	86.02	86.02	683.20	763.83
90A-1	**2 AWG**	1 1/4"	0.0342	0.41	0.02	18.88	18.88	280.64	265.55
90A-2	**2 AWG**	1 1/4"	0.0342	0.28	0.02	22.85	22.85	105.24	99.58
100-1	**1 AWG**	1 1/2"	0.0279	0.11	0.01	6.56	6.56	113.16	77.70
100-2	**1 AWG**	1 1/2"	0.0279	0.03	0.00	0.12	0.12	632.99	434.65
100-3	**1 AWG**	1 1/2"	0.0279	0.00	0.00	0.00	0.00	820.41	563.35
100-4	**1 AWG**	1 1/2"	0.0279	1.13	0.02	19.94	19.94	3918.17	2690.47
100-5	**1 AWG**	1 1/2"	0.0279	2.67	0.10	118.01	118.01	3677.70	2525.35
100-6	**1 AWG**	1 1/2"	0.0279	0.05	0.00	1.43	1.43	102.55	70.42
100B	**1 AWG**	1 1/2"	0.0279	1.07	0.06	72.55	72.55	1202.33	660.48
125-1	**1/0 AWG**	2"	0.0229	0.10	0.01	8.74	8.74	94.39	65.87
125-2	**1/0 AWG**	2"	0.0229	0.10	0.01	9.58	9.58	94.39	65.87
125-3	**1/0 AWG**	2"	0.0229	0.32	0.02	24.95	24.95	377.58	263.47
125-4	**1/0 AWG**	2"	0.0229	0.10	0.01	8.99	8.99	94.39	65.87
125-5	**1/0 AWG**	2"	0.0229	0.05	0.00	2.05	2.05	94.39	65.87
125-6	**1/0 AWG**	2"	0.0229	0.07	0.00	5.24	5.24	94.39	65.87
125-7	**1/0 AWG**	2"	0.0229	0.04	0.00	1.65	1.65	94.39	65.87
125-8	**1/0 AWG**	2"	0.0229	0.08	0.00	4.55	4.55	137.30	95.81
125-9	**1/0 AWG**	2"	0.0229	0.08	0.00	4.55	4.55	137.30	95.81
125A-1	**1/0 AWG**	1 1/2"	0.0229	1.50	0.23	279.54	279.54	540.62	407.94
125A-2	**1/0 AWG**	1 1/2"	0.0229	1.33	0.24	282.49	282.49	421.56	318.10
125A-3	**1/0 AWG**	1 1/2"	0.0229	0.89	0.14	165.28	165.28	321.80	242.82
150-1	**1/0 AWG**	2"	0.0229	0.47	0.03	34.17	34.17	583.53	407.19
150-2	**1/0 AWG**	2"	0.0229	0.34	0.00	5.47	5.47	1887.89	1317.37
150-3	**1/0 AWG**	2"	0.0229	7.77	1.57	1886.65	1886.65	2885.03	2013.18
150-4	**1/0 AWG**	2"	0.0229	7.59	0.88	1051.81	1051.81	4929.10	3439.54
150B-1	**1/0 AWG**	2"	0.0229	0.00	0.00	0.00	0.00	750.86	419.16
150B-2	**1/0 AWG**	2"	0.0229	4.63	0.32	379.08	379.08	6378.05	3560.49
150B-3	**1/0 AWG**	2"	0.0229	0.12	0.00	1.77	1.77	922.49	514.97
150B-4	**1/0 AWG**	2"	0.0229	0.88	0.06	74.05	74.05	1179.93	658.69
175-1	**2/0 AWG**	2"	0.019	3.66	0.36	429.06	429.06	4124.12	2359.29
175-2	**2/0 AWG**	2"	0.019	6.12	0.60	718.74	718.74	6908.42	3952.11
175-3	**2/0 AWG**	2"	0.019	4.97	0.49	583.70	583.70	5610.47	3209.59
175-4	**2/0 AWG**	2"	0.019	0.06	0.00	3.62	3.62	115.14	65.87
175A	**2/0 AWG**	2"	0.019	1.81	0.49	592.95	592.95	549.53	419.16
200-1	**3/0 AWG**	2"	0.0158	0.23	0.01	12.22	12.22	840.21	395.21
200-2	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	2495.18	1173.66
225-1	**4/0 AWG**	2 1/2"	0.0133	4.40	1.10	1327.68	1327.68	4070.44	2730.17
225-2	**4/0 AWG**	2 1/2"	0.0133	0.10	0.00	1.74	1.74	1608.38	1078.79
225-3	**4/0 AWG**	2 1/2"	0.0133	2.34	0.21	247.94	247.94	6155.15	4128.45
225-4	**4/0 AWG**	2 1/2"	0.0133	4.81	0.55	656.72	656.72	9835.87	6597.23
225-6	**4/0 AWG**	2 1/2"	0.0133	0.09	0.01	13.51	13.51	170.12	114.10
225-7	**4/0 AWG**	2 1/2"	0.0133	-	-	-	-	5103.52	3423.09
225-8	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.48	1.48	146.92	98.54
225-9	**4/0 AWG**	2 1/2"	0.0133	1.85	0.18	218.32	218.32	4361.19	2925.19
225A	**4/0 AWG**	2"	0.0133	0.47	0.11	133.95	133.95	347.97	179.64
250-1	**250 KCMIL**	2 1/2"	0.012	0.34	0.05	63.65	63.65	653.97	378.61
250-2	**250 KCMIL**	2 1/2"	0.012	0.25	0.03	34.14	34.14	653.97	378.61
250-3	**250 KCMIL**	2 1/2"	0.012	2.49	0.23	271.86	271.86	8170.15	4730.09
250-4	**250 KCMIL**	2 1/2"	0.012	0.28	0.03	30.41	30.41	895.85	518.65
250-5	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1540.86	892.08
250-6	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	1791.70	1037.30
250-7	**250 KCMIL**	2 1/2"	0.012	0.51	0.04	47.38	47.38	1970.87	1141.03
250-8	**250 KCMIL**	2 1/2"	0.012	0.57	0.04	49.37	49.37	2329.21	1348.49
400-1	**3/0 AWG**	2"	0.0158	0.08	0.00	0.27	0.53	9216.88	4335.35
400-2	**3/0 AWG**	2"	0.0158	0.51	0.09	109.39	218.77	929.33	437.13
500-1	**250 KCMIL**	2 1/2"	0.012	6.12	1.16	1392.15	2784.30	19278.69	11161.35
500-2	**250 KCMIL**	2 1/2"	0.012	7.05	1.48	1782.60	3565.19	19995.37	11576.27
500-3	**250 KCMIL**	2 1/2"	0.012	0.25	0.05	63.89	127.78	716.68	414.92
500-4	**250 KCMIL**	2 1/2"	0.012	0.56	0.12	140.56	281.13	1576.70	912.82
500B-1	**250 KCMIL**	3"	0.012	2.39	0.26	316.26	632.53	16214.89	9046.20
600-1	**350 KCMIL**	3"	0.0096	-	-	-	-	15276.60	8096.60
600-2	**350 KCMIL**	3"	0.0096	1.23	0.44	526.80	1053.59	3394.80	1799.24
600-3	**350 KCMIL**	3"	0.0096	0.28	0.10	120.72	241.45	777.98	412.33
3000	**500 KCMIL**	4"	0.008	14.40	24.18	29062.59	261563.35	60047.22	31388.32

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 70% of Demand Load

	1 SIZE GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**8 AWG**	3/4"	0.126	0.14	0.00	2.32	2.32	26.71	40.74
25A-2	**8 AWG**	3/4"	0.126	0.02	0.00	0.04	0.04	25.87	39.46
25A-3	**8 AWG**	3/4"	0.126	0.11	0.00	1.51	1.51	24.20	36.92
50-1	**4 AWG**	1 1/4"	0.0522	0.06	0.00	0.96	0.96	67.29	66.39
50-2	**4 AWG**	1 1/4"	0.0522	0.01	0.00	0.02	0.02	67.29	66.39
50-3	**4 AWG**	1 1/4"	0.0522	0.02	0.00	0.02	0.02	294.40	290.44
50-4	**4 AWG**	1 1/4"	0.0522	0.04	0.00	0.02	0.02	1766.43	1742.66
50-5	**4 AWG**	1 1/4"	0.0522	0.05	0.00	0.65	0.65	63.09	62.24
50-6	**4 AWG**	1 1/4"	0.0522	0.33	0.00	1.19	1.19	1783.25	1759.26
50-7	**4 AWG**	1 1/4"	0.0522	-	-	-	-	2607.58	2572.50
50A-1	**4 AWG**	1"	0.0522	0.31	0.02	28.01	28.01	50.47	52.05
50A-2	**4 AWG**	1"	0.0522	1.90	0.05	55.50	55.50	946.30	976.01
90A-1	**1 AWG**	1 1/4"	0.0279	0.34	0.01	15.40	15.40	339.48	265.55
90A-2	**1 AWG**	1 1/4"	0.0279	0.23	0.02	18.64	18.64	127.31	99.58
100-1	**1/0 AWG**	1 1/2"	0.0229	0.09	0.00	5.38	5.38	137.30	77.70
100-2	**1/0 AWG**	1 1/2"	0.0229	0.03	0.00	0.10	0.10	768.03	434.65
100-3	**1/0 AWG**	1 1/2"	0.0229	0.00	0.00	0.00	0.00	995.43	563.35
100-4	**1/0 AWG**	1 1/2"	0.0229	0.93	0.01	16.37	16.37	4754.04	2690.47
100-5	**1/0 AWG**	1 1/2"	0.0229	2.19	0.08	96.86	96.86	4462.28	2525.35
100-6	**1/0 AWG**	1 1/2"	0.0229	0.04	0.00	1.18	1.18	124.43	70.42
100B	**1/0 AWG**	2"	0.0229	0.88	0.05	59.55	59.55	1458.82	814.37
125-1	**2/0 AWG**	2"	0.019	0.08	0.01	7.25	7.25	115.14	65.87
125-2	**2/0 AWG**	2"	0.019	0.08	0.01	7.95	7.95	115.14	65.87
125-3	**2/0 AWG**	2"	0.019	0.27	0.02	20.70	20.70	460.56	263.47
125-4	**2/0 AWG**	2"	0.019	0.08	0.01	7.46	7.46	115.14	65.87
125-5	**2/0 AWG**	2"	0.019	0.04	0.00	1.70	1.70	115.14	65.87
125-6	**2/0 AWG**	2"	0.019	0.06	0.00	4.35	4.35	115.14	65.87
125-7	**2/0 AWG**	2"	0.019	0.03	0.00	1.37	1.37	115.14	65.87
125-8	**2/0 AWG**	2"	0.019	0.07	0.00	3.78	3.78	167.48	95.81
125-9	**2/0 AWG**	2"	0.019	0.07	0.00	3.78	3.78	167.48	95.81
125A-1	**2/0 AWG**	1 1/2"	0.019	1.24	0.19	231.93	231.93	659.44	407.94
125A-2	**2/0 AWG**	1 1/2"	0.019	1.10	0.20	234.38	234.38	514.21	318.10
125A-3	**2/0 AWG**	1 1/2"	0.019	0.74	0.11	137.13	137.13	392.52	242.82
150-1	**2/0 AWG**	2"	0.019	0.39	0.02	28.35	28.35	711.78	407.19
150-2	**2/0 AWG**	2"	0.019	0.28	0.00	4.54	4.54	2302.81	1317.37
150-3	**2/0 AWG**	2"	0.019	6.45	1.30	1565.34	1565.34	3519.11	2013.18
150-4	**2/0 AWG**	2"	0.019	6.30	0.73	872.68	872.68	6012.42	3439.54
150B-1	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	915.89	419.16
150B-2	**2/0 AWG**	2"	0.019	3.85	0.26	314.52	314.52	7779.82	3560.49
150B-3	**2/0 AWG**	2"	0.019	0.10	0.00	1.47	1.47	1125.23	514.97
150B-4	**2/0 AWG**	2"	0.019	0.73	0.05	61.44	61.44	1439.25	658.69
175-1	**3/0 AWG**	2"	0.0158	3.04	0.30	356.80	356.80	5015.82	2359.29
175-2	**3/0 AWG**	2"	0.0158	5.09	0.50	597.69	597.69	8402.13	3952.11
175-3	**3/0 AWG**	2"	0.0158	4.14	0.40	485.39	485.39	6823.55	3209.59
175-4	**3/0 AWG**	2"	0.0158	0.05	0.00	3.01	3.01	140.04	65.87
175A	**3/0 AWG**	2"	0.0158	1.51	0.41	493.08	493.08	668.35	419.16
200-1	**4/0 AWG**	2 1/2"	0.0133	0.19	0.01	10.29	10.29	1020.70	684.62
200-2	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	3031.18	2033.11
225-1	**250 KCMIL**	2 1/2"	0.012	3.97	1.00	1197.90	1197.90	4715.75	2730.17
225-2	**250 KCMIL**	2 1/2"	0.012	0.09	0.00	1.57	1.57	1863.37	1078.79
225-3	**250 KCMIL**	2 1/2"	0.012	2.11	0.19	223.70	223.70	7130.97	4128.45
225-4	**250 KCMIL**	2 1/2"	0.012	4.34	0.49	592.53	592.53	11395.21	6597.23
225-6	**250 KCMIL**	2 1/2"	0.012	0.08	0.01	12.19	12.19	197.09	114.10
225-7	**250 KCMIL**	2 1/2"	0.012	-	-	-	-	5912.61	3423.09
225-8	**250 KCMIL**	2 1/2"	0.012	0.03	0.00	1.34	1.34	170.21	98.54
225-9	**250 KCMIL**	2 1/2"	0.012	1.67	0.16	196.98	196.98	5052.59	2925.19
225A	**250 KCMIL**	2"	0.012	0.43	0.10	120.85	120.85	403.13	179.64
250-1	**300 KCMIL**	2 1/2"	0.0106	0.30	0.05	56.22	56.22	757.23	378.61
250-2	**300 KCMIL**	2 1/2"	0.0106	0.22	0.03	30.16	30.16	757.23	378.61
250-3	**300 KCMIL**	2 1/2"	0.0106	2.20	0.20	240.15	240.15	9460.18	4730.09
250-4	**300 KCMIL**	2 1/2"	0.0106	0.24	0.02	26.86	26.86	1037.30	518.65
250-5	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	1784.16	892.08
250-6	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	2074.60	1037.30
250-7	**300 KCMIL**	2 1/2"	0.0106	0.45	0.03	41.85	41.85	2282.06	1141.03
250-8	**300 KCMIL**	2 1/2"	0.0106	0.50	0.04	43.61	43.61	2696.98	1348.49
400-1	**4/0 AWG**	2 1/2"	0.0133	0.07	0.00	0.22	0.45	11196.80	7510.05
400-2	**4/0 AWG**	2 1/2"	0.0133	0.43	0.08	92.08	184.16	1128.96	757.23
500-1	**300 KCMIL**	2 1/2"	0.0106	5.40	1.02	1229.73	2459.46	22322.70	11161.35
500-2	**300 KCMIL**	2 1/2"	0.0106	6.23	1.31	1574.63	3149.25	23152.54	11576.27
500-3	**300 KCMIL**	2 1/2"	0.0106	0.22	0.05	56.44	112.88	829.84	414.92
500-4	**300 KCMIL**	2 1/2"	0.0106	0.49	0.10	124.16	248.33	1825.65	912.82
500B-1	**300 KCMIL**	3"	0.0106	2.11	0.23	279.37	558.73	18775.13	9046.20
600-1	**400 KCMIL**	3"	0.00907	-	-	-	-	17109.79	8096.60
600-2	**400 KCMIL**	3"	0.00907	1.16	0.41	497.71	995.42	3802.18	1799.24
600-3	**400 KCMIL**	3"	0.00907	0.27	0.09	114.06	228.12	871.33	412.33
3000	**500 KCMIL**	4"	0.008	14.40	24.18	29062.59	290625.95	66719.14	34875.91

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 70% of Demand Load

	2 SIZES GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**6 AWG**	3/4"	0.0809	0.09	0.00	1.49	1.49	36.44	40.74
25A-2	**6 AWG**	3/4"	0.0809	0.01	0.00	0.03	0.03	35.30	39.46
25A-3	**6 AWG**	3/4"	0.0809	0.07	0.00	0.97	0.97	33.02	36.92
50-1	**3 AWG**	1 1/4"	0.0432	0.05	0.00	0.80	0.80	78.46	66.39
50-2	**3 AWG**	1 1/4"	0.0432	0.01	0.00	0.02	0.02	78.46	66.39
50-3	**3 AWG**	1 1/4"	0.0432	0.02	0.00	0.02	0.02	343.25	290.44
50-4	**3 AWG**	1 1/4"	0.0432	0.04	0.00	0.02	0.02	2059.51	1742.66
50-5	**3 AWG**	1 1/4"	0.0432	0.04	0.00	0.53	0.53	73.55	62.24
50-6	**3 AWG**	1 1/4"	0.0432	0.27	0.00	0.98	0.98	2079.13	1759.26
50-7	**3 AWG**	1 1/4"	0.0432	-	-	-	-	3040.23	2572.50
50A-1	**3 AWG**	1"	0.0432	0.26	0.02	23.18	23.18	58.84	52.05
50A-2	**3 AWG**	1"	0.0432	1.57	0.04	45.93	45.93	1103.31	976.01
90A-1	**1/0 AWG**	1 1/4"	0.0229	0.28	0.01	12.64	12.64	411.90	265.55
90A-2	**1/0 AWG**	1 1/4"	0.0229	0.19	0.01	15.30	15.30	154.46	99.58
100-1	**2/0 AWG**	2"	0.019	0.08	0.00	4.47	4.47	167.48	95.81
100-2	**2/0 AWG**	2"	0.019	0.02	0.00	0.08	0.08	936.82	535.93
100-3	**2/0 AWG**	2"	0.019	0.00	0.00	0.00	0.00	1214.21	694.61
100-4	**2/0 AWG**	2"	0.019	0.77	0.01	13.58	13.58	5798.88	3317.38
100-5	**2/0 AWG**	2"	0.019	1.82	0.07	80.37	80.37	5443.00	3113.79
100-6	**2/0 AWG**	2"	0.019	0.03	0.00	0.98	0.98	151.78	86.83
100B	**2/0 AWG**	2"	0.019	0.73	0.04	49.41	49.41	1779.44	814.37
125-1	**3/0 AWG**	2"	0.0158	0.07	0.01	6.03	6.03	140.04	65.87
125-2	**3/0 AWG**	2"	0.0158	0.07	0.01	6.61	6.61	140.04	65.87
125-3	**3/0 AWG**	2"	0.0158	0.22	0.01	17.21	17.21	560.14	263.47
125-4	**3/0 AWG**	2"	0.0158	0.07	0.01	6.20	6.20	140.04	65.87
125-5	**3/0 AWG**	2"	0.0158	0.03	0.00	1.42	1.42	140.04	65.87
125-6	**3/0 AWG**	2"	0.0158	0.05	0.00	3.62	3.62	140.04	65.87
125-7	**3/0 AWG**	2"	0.0158	0.03	0.00	1.14	1.14	140.04	65.87
125-8	**3/0 AWG**	2"	0.0158	0.06	0.00	3.14	3.14	203.69	95.81
125-9	**3/0 AWG**	2"	0.0158	0.06	0.00	3.14	3.14	203.69	95.81
125A-1	**3/0 AWG**	2"	0.0158	1.03	0.16	192.87	192.87	802.02	503.00
125A-2	**3/0 AWG**	2"	0.0158	0.92	0.16	194.91	194.91	625.39	392.22
125A-3	**3/0 AWG**	2"	0.0158	0.61	0.09	114.03	114.03	477.39	299.40
150-1	**3/0 AWG**	2"	0.0158	0.32	0.02	23.58	23.58	865.67	407.19
150-2	**3/0 AWG**	2"	0.0158	0.23	0.00	3.78	3.78	2800.71	1317.37
150-3	**3/0 AWG**	2"	0.0158	5.36	1.08	1301.71	1301.71	4279.99	2013.18
150-4	**3/0 AWG**	2"	0.0158	5.23	0.60	725.70	725.70	7312.40	3439.54
150B-1	**3/0 AWG**	2 1/2"	0.0158	0.00	0.00	0.00	0.00	1113.92	726.11
150B-2	**3/0 AWG**	2 1/2"	0.0158	3.20	0.22	261.55	261.55	9461.94	6167.79
150B-3	**3/0 AWG**	2 1/2"	0.0158	0.08	0.00	1.22	1.22	1368.53	892.08
150B-4	**3/0 AWG**	2 1/2"	0.0158	0.61	0.04	51.09	51.09	1750.44	1141.03
175-1	**4/0 AWG**	2 1/2"	0.0133	2.56	0.25	300.35	300.35	6093.29	4086.96
175-2	**4/0 AWG**	2 1/2"	0.0133	4.29	0.42	503.12	503.12	10207.03	6846.18
175-3	**4/0 AWG**	2 1/2"	0.0133	3.48	0.34	408.59	408.59	8289.35	5559.93
175-4	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	2.53	2.53	170.12	114.10
175A	**4/0 AWG**	2"	0.0133	1.27	0.35	415.06	415.06	811.92	419.16
200-1	**250 KCMIL**	2 1/2"	0.012	0.17	0.01	9.28	9.28	1182.52	684.62
200-2	**250 KCMIL**	2 1/2"	0.012	0.00	0.00	0.00	0.00	3511.73	2033.11
225-1	**300 KCMIL**	2 1/2"	0.0106	3.50	0.88	1058.15	1058.15	5460.35	2730.17
225-2	**300 KCMIL**	2 1/2"	0.0106	0.08	0.00	1.38	1.38	2157.58	1078.79
225-3	**300 KCMIL**	2 1/2"	0.0106	1.86	0.16	197.61	197.61	8256.91	4128.45
225-4	**300 KCMIL**	2 1/2"	0.0106	3.83	0.44	523.40	523.40	13194.46	6597.23
225-6	**300 KCMIL**	2 1/2"	0.0106	0.07	0.01	10.77	10.77	228.21	114.10
225-7	**300 KCMIL**	2 1/2"	0.0106	-	-	-	-	6846.18	3423.09
225-8	**300 KCMIL**	2 1/2"	0.0106	0.02	0.00	1.18	1.18	197.09	98.54
225-9	**300 KCMIL**	2 1/2"	0.0106	1.47	0.14	174.00	174.00	5850.37	2925.19
225A	**300 KCMIL**	2 1/2"	0.0106	0.38	0.09	106.75	106.75	466.79	311.19
250-1	**350 KCMIL**	2 1/2"	0.0096	0.27	0.04	50.92	50.92	860.49	378.61
250-2	**350 KCMIL**	2 1/2"	0.0096	0.20	0.02	27.31	27.31	860.49	378.61
250-3	**350 KCMIL**	2 1/2"	0.0096	1.99	0.18	217.49	217.49	10750.20	4730.09
250-4	**350 KCMIL**	2 1/2"	0.0096	0.22	0.02	24.33	24.33	1178.75	518.65
250-5	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2027.45	892.08
250-6	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	2357.50	1037.30
250-7	**350 KCMIL**	2 1/2"	0.0096	0.41	0.03	37.91	37.91	2593.25	1141.03
250-8	**350 KCMIL**	2 1/2"	0.0096	0.45	0.03	39.50	39.50	3064.75	1348.49
400-1	**250 KCMIL**	2 1/2"	0.012	0.06	0.00	0.20	0.40	12971.91	7510.05
400-2	**250 KCMIL**	2 1/2"	0.012	0.39	0.07	83.08	166.16	1307.94	757.23
500-1	**350 KCMIL**	2 1/2"	0.0096	4.89	0.93	1113.72	2227.44	25366.70	11161.35
500-2	**350 KCMIL**	2 1/2"	0.0096	5.64	1.19	1426.08	2852.15	26309.70	11576.27
500-3	**350 KCMIL**	2 1/2"	0.0096	0.20	0.04	51.11	102.23	943.00	414.92
500-4	**350 KCMIL**	2 1/2"	0.0096	0.44	0.09	112.45	224.90	2074.60	912.82
500B-1	**350 KCMIL**	3"	0.0096	1.91	0.21	253.01	506.02	21335.38	9046.20
600-1	**500 KCMIL**	3"	0.008	-	-	-	-	20165.11	8096.60
600-2	**500 KCMIL**	3"	0.008	1.03	0.37	439.00	877.99	4481.14	1799.24
600-3	**500 KCMIL**	3"	0.008	0.24	0.08	100.60	201.21	1026.93	412.33
3000	**500 KCMIL**	4"	0.008	14.40	24.18	29062.59	319688.54	73391.05	38363.50

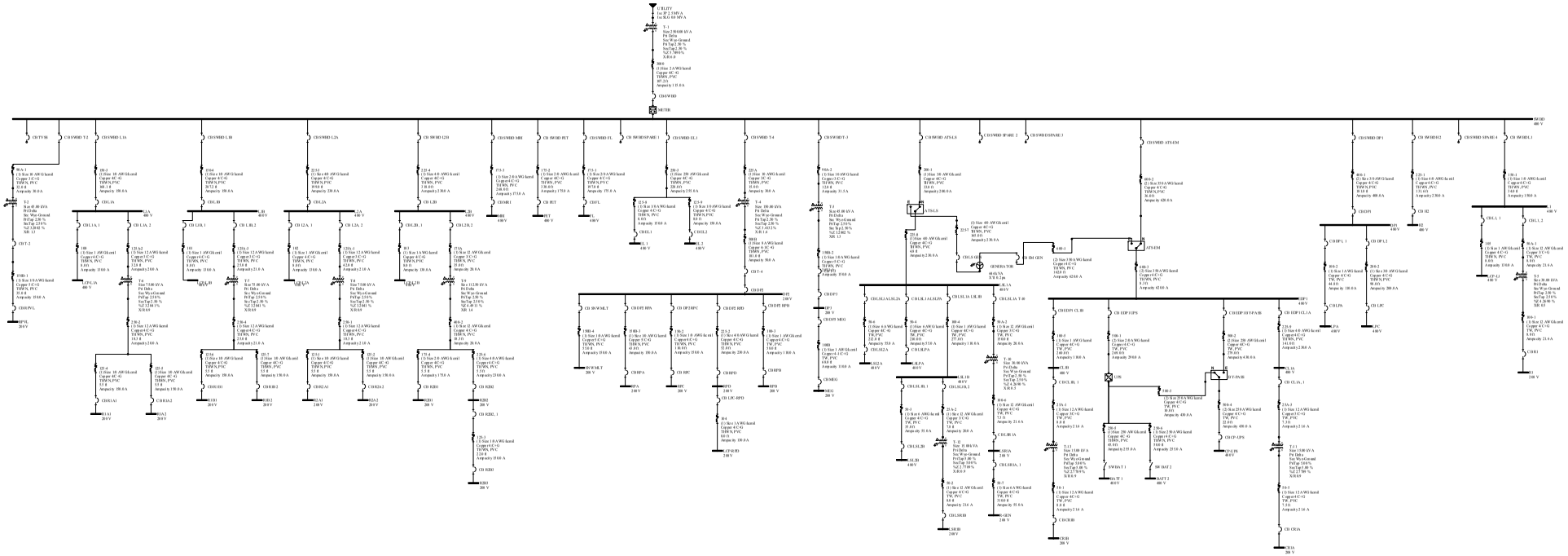
1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

COST ANALYSIS at 70% of Demand Load

	3 SIZES GREATER THAN EXISTING WIRE SIZE								
TAG	WIRE SIZE	CONDUIT SIZE	VD FACTOR	VOLTAGE DROP	POWER LOSS (KW)	COST OF ENERGY LOSS PER YEAR PER SET ($)	TOTAL COST OF ENERGY LOSS PER YEAR ($)	INITIAL COST OF CONDUCTORS ($)	INITIAL COST OF CONDUIT ($)
25A-1	**4 AWG**	1"	0.0522	0.06	0.00	0.96	0.96	50.47	52.05
25A-2	**4 AWG**	1"	0.0522	0.01	0.00	0.02	0.02	48.89	50.43
25A-3	**4 AWG**	1"	0.0522	0.04	0.00	0.62	0.62	45.74	47.17
50-1	**2 AWG**	1 1/4"	0.0342	0.04	0.00	0.63	0.63	93.55	66.39
50-2	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.01	0.01	93.55	66.39
50-3	**2 AWG**	1 1/4"	0.0342	0.01	0.00	0.02	0.02	409.26	290.44
50-4	**2 AWG**	1 1/4"	0.0342	0.03	0.00	0.01	0.01	2455.57	1742.66
50-5	**2 AWG**	1 1/4"	0.0342	0.03	0.00	0.42	0.42	87.70	62.24
50-6	**2 AWG**	1 1/4"	0.0342	0.22	0.00	0.78	0.78	2478.96	1759.26
50-7	**2 AWG**	1 1/4"	0.0342	-	-	-	-	3624.89	2572.50
50A-1	**2 AWG**	1 1/4"	0.0342	0.20	0.02	18.35	18.35	70.16	66.39
50A-2	**2 AWG**	1 1/4"	0.0342	1.25	0.03	36.36	36.36	1315.49	1244.76
90A-1	**2/0 AWG**	1 1/2"	0.019	0.23	0.01	10.49	10.49	502.43	310.81
90A-2	**2/0 AWG**	1 1/2"	0.019	0.16	0.01	12.70	12.70	188.41	116.55
100-1	**3/0 AWG**	2"	0.0158	0.06	0.00	3.71	3.71	203.69	95.81
100-2	**3/0 AWG**	2"	0.0158	0.02	0.00	0.07	0.07	1139.38	535.93
100-3	**3/0 AWG**	2"	0.0158	0.00	0.00	0.00	0.00	1476.74	694.61
100-4	**3/0 AWG**	2"	0.0158	0.64	0.01	11.29	11.29	7052.70	3317.38
100-5	**3/0 AWG**	2"	0.0158	1.51	0.06	66.83	66.83	6619.86	3113.79
100-6	**3/0 AWG**	2"	0.0158	0.03	0.00	0.81	0.81	184.59	86.83
100B	**3/0 AWG**	2 1/2"	0.0158	0.61	0.03	41.09	41.09	2164.19	1410.73
125-1	**4/0 AWG**	2 1/2"	0.0133	0.06	0.00	5.07	5.07	170.12	114.10
125-2	**4/0 AWG**	2 1/2"	0.0133	0.06	0.00	5.56	5.56	170.12	114.10
125-3	**4/0 AWG**	2 1/2"	0.0133	0.19	0.01	14.49	14.49	680.47	456.41
125-4	**4/0 AWG**	2 1/2"	0.0133	0.06	0.00	5.22	5.22	170.12	114.10
125-5	**4/0 AWG**	2 1/2"	0.0133	0.03	0.00	1.19	1.19	170.12	114.10
125-6	**4/0 AWG**	2 1/2"	0.0133	0.04	0.00	3.04	3.04	170.12	114.10
125-7	**4/0 AWG**	2 1/2"	0.0133	0.02	0.00	0.96	0.96	170.12	114.10
125-8	**4/0 AWG**	2 1/2"	0.0133	0.05	0.00	2.64	2.64	247.44	165.97
125-9	**4/0 AWG**	2 1/2"	0.0133	0.05	0.00	2.64	2.64	247.44	165.97
125A-1	**4/0 AWG**	2"	0.0133	0.87	0.14	162.35	162.35	974.31	503.00
125A-2	**4/0 AWG**	2"	0.0133	0.77	0.14	164.07	164.07	759.73	392.22
125A-3	**4/0 AWG**	2"	0.0133	0.52	0.08	95.99	95.99	579.95	299.40
150-1	**4/0 AWG**	2 1/2"	0.0133	0.27	0.02	19.85	19.85	1051.63	705.36
150-2	**4/0 AWG**	2 1/2"	0.0133	0.20	0.00	3.18	3.18	3402.34	2282.06
150-3	**4/0 AWG**	2 1/2"	0.0133	4.52	0.91	1095.74	1095.74	5199.40	3487.40
150-4	**4/0 AWG**	2 1/2"	0.0133	4.41	0.51	610.88	610.88	8883.21	5958.25
150B-1	**4/0 AWG**	2 1/2"	0.0133	0.00	0.00	0.00	0.00	1353.21	726.11
150B-2	**4/0 AWG**	2 1/2"	0.0133	2.69	0.18	220.17	220.17	11494.51	6167.79
150B-3	**4/0 AWG**	2 1/2"	0.0133	0.07	0.00	1.03	1.03	1662.51	892.08
150B-4	**4/0 AWG**	2 1/2"	0.0133	0.51	0.04	43.01	43.01	2126.47	1141.03
175-1	**250 KCMIL**	2 1/2"	0.012	2.31	0.23	270.99	270.99	7059.30	4086.96
175-2	**250 KCMIL**	2 1/2"	0.012	3.87	0.38	453.94	453.94	11825.22	6846.18
175-3	**250 KCMIL**	2 1/2"	0.012	3.14	0.31	368.65	368.65	9603.51	5559.93
175-4	**250 KCMIL**	2 1/2"	0.012	0.04	0.00	2.29	2.29	197.09	114.10
175A	**250 KCMIL**	2"	0.012	1.14	0.31	374.49	374.49	940.64	419.16
200-1	**300 KCMIL**	2 1/2"	0.0106	0.15	0.01	8.20	8.20	1369.24	684.62
200-2	**300 KCMIL**	2 1/2"	0.0106	0.00	0.00	0.00	0.00	4066.22	2033.11
225-1	**350 KCMIL**	2 1/2"	0.0096	3.17	0.80	958.32	958.32	6204.94	2730.17
225-2	**350 KCMIL**	2 1/2"	0.0096	0.07	0.00	1.25	1.25	2451.80	1078.79
225-3	**350 KCMIL**	2 1/2"	0.0096	1.69	0.15	178.96	178.96	9382.85	4128.45
225-4	**350 KCMIL**	2 1/2"	0.0096	3.47	0.39	474.02	474.02	14993.70	6597.23
225-6	**350 KCMIL**	2 1/2"	0.0096	0.07	0.01	9.75	9.75	259.33	114.10
225-7	**350 KCMIL**	2 1/2"	0.0096	-	-	-	-	7779.75	3423.09
225-8	**350 KCMIL**	2 1/2"	0.0096	0.02	0.00	1.07	1.07	223.96	98.54
225-9	**350 KCMIL**	2 1/2"	0.0096	1.33	0.13	157.58	157.58	6648.15	2925.19
225A	**350 KCMIL**	2 1/2"	0.0096	0.34	0.08	96.68	96.68	530.44	311.19
250-1	**400 KCMIL**	3"	0.00907	0.26	0.04	48.11	48.11	963.75	456.06
250-2	**400 KCMIL**	3"	0.00907	0.19	0.02	25.80	25.80	963.75	456.06
250-3	**400 KCMIL**	3"	0.00907	1.88	0.17	205.48	205.48	12040.22	5697.61
250-4	**400 KCMIL**	3"	0.00907	0.21	0.02	22.99	22.99	1320.20	624.74
250-5	**400 KCMIL**	3"	0.00907	-	-	-	-	2270.74	1074.55
250-6	**400 KCMIL**	3"	0.00907	-	-	-	-	2640.40	1249.48
250-7	**400 KCMIL**	3"	0.00907	0.39	0.03	35.81	35.81	2904.44	1374.42
250-8	**400 KCMIL**	3"	0.00907	0.43	0.03	37.32	37.32	3432.52	1624.32
400-1	**300 KCMIL**	2 1/2"	0.0106	0.05	0.00	0.18	0.36	19116.50	7510.05
400-2	**300 KCMIL**	2 1/2"	0.0106	0.34	0.06	73.39	146.77	1927.49	757.23
500-1	**400 KCMIL**	3"	0.00907	4.62	0.88	1052.23	2104.47	28410.70	13444.35
500-2	**400 KCMIL**	3"	0.00907	5.33	1.12	1347.34	2694.69	29466.86	13944.14
500-3	**400 KCMIL**	3"	0.00907	0.19	0.04	48.29	96.58	1056.16	499.79
500-4	**400 KCMIL**	3"	0.00907	0.42	0.09	106.24	212.48	2323.55	1099.54
500B-1	**400 KCMIL**	3"	0.00907	1.81	0.20	239.04	478.08	23895.62	9046.20
600-1	**600 KCMIL**	3 1/2"	0.0074	-	-	-	-	20165.11	9624.26
600-2	**600 KCMIL**	3 1/2"	0.0074	0.95	0.34	406.07	812.14	4481.14	2138.72
600-3	**600 KCMIL**	3 1/2"	0.0074	0.22	0.08	93.06	186.12	1026.93	490.12
3000	**500 KCMIL**	4"	0.008	14.40	24.18	29062.59	348751.14	80062.96	41851.09

1. REFER TO RISER DIAGRAM FOR FEEDER TAGS

Appendix E: SKM Reports



Mar 18, 2009 14:45:37

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED ENGINEER ONLY
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FROM THE USE AND INTERPRETATION OF THIS SOFTWARE.

SKM POWER*TOOLS FOR WINDOWS
SHORT CIRCUIT ANALYSIS REPORT

ALL PU VALUES ARE EXPRESSED ON A 100 MVA BASE

SWING GENERATORS

SOURCE NAME	VOLTAGE	ANGLE
UPS	1.00	0.00
GENERATOR	1.00	0.00
UTILITY	1.00	0.00

********** P R E - F A U L T V O L T A G E P R O F I L E **********

BUS# NAME	BASE VOLTS	PU VOLTS	ANGLE (D)
90A-1 to T-2	480.00	1.0000	0.
90A-1 to T-3	480.00	1.0000	0.
BATT 1	480.00	1.0000	0.
BATT 2	480.00	1.0000	0.
BUS-0011	480.00	1.0000	0.
BUS-0012	208.00	1.0000	0.
BUS-0013	208.00	1.0000	0.
BUS-0014	480.00	1.0000	0.
BUS-0015	208.00	1.0000	0.
BUS-0016	208.00	1.0000	0.
BUS-0017	480.00	1.0000	0.
BUS-0018	208.00	1.0000	0.
BUS-0019	208.00	1.0000	0.
BUS-0020	480.00	1.0000	0.
BUS-0021	208.00	1.0000	0.

BUS-0022	208.00	1.0000	0.
BUS-0023	480.00	1.0000	0.
BUS-0024	480.00	1.0000	0.
BUS-0040	480.00	1.0000	0.
BUS-0041	208.00	1.0000	0.
BUS-0054	208.00	1.0000	0.
BUS-0104	480.00	1.0000	0.
BUS-0105	480.00	1.0000	0.
BUS-0106	480.00	1.0000	0.
BUS-0107	480.00	1.0000	0.
BUS-0108	480.00	1.0000	0.
BUS-0109	480.00	1.0000	0.
BUS-0110	480.00	1.0000	0.
BUS-0118	480.00	1.0000	0.
BUS-0119	208.00	1.0000	0.
BUS-0121	480.00	1.0000	0.
BUS-0122	208.00	1.0000	0.
BUS-0127	480.00	1.0000	0.
BUS-0128	208.00	1.0000	0.
BUS-0129	480.00	1.0000	0.
BUS-0130	480.00	1.0000	0.
BUS-0131	208.00	1.0000	0.
BUS-0148	480.00	1.0000	0.
BUS-0149	208.00	1.0000	0.
BUS-0152	480.00	1.0000	0.
BUS-0153	480.00	1.0000	0.
BUS-0154	480.00	1.0000	0.
CD T-2, 2 to	208.00	1.0000	0.
CL1A	480.00	1.0000	0.

********** P R E - F A U L T V O L T A G E P R O F I L E **********

BUS# NAME	BASE VOLTS	PU VOLTS	ANGLE (D)
CL1B	480.00	1.0000	0.
CP-UPS	480.00	1.0000	0.
CR1A	208.00	1.0000	0.
CR1B	208.00	1.0000	0.
DP1	480.00	1.0000	0.
DP2	208.00	1.0000	0.
DP3	208.00	1.0000	0.
EDP1	480.00	1.0000	0.
EL 1	480.00	1.0000	0.
EL 2	480.00	1.0000	0.
FL	480.00	1.0000	0.
H2	480.00	1.0000	0.
L1	480.00	1.0000	0.
L1A	480.00	1.0000	0.
L1B	480.00	1.0000	0.
L2A	480.00	1.0000	0.
L2B	480.00	1.0000	0.
LCP-L1	480.00	1.0000	0.
LCP-L1A	480.00	1.0000	0.
LCP-L1B	480.00	1.0000	0.
LCP-L2A	480.00	1.0000	0.
LCP-L2B	480.00	1.0000	0.
LCP-RPD	208.00	1.0000	0.

SC

LPA	480.00	1.0000	0.
LPC	480.00	1.0000	0.
LSL1A	480.00	1.0000	0.
LSL1B	480.00	1.0000	0.
LSL2A	480.00	1.0000	0.
LSL2B	480.00	1.0000	0.
LSLPA	480.00	1.0000	0.
LSR1A	208.00	1.0000	0.
LSR1B	208.00	1.0000	0.
MEG	208.00	1.0000	0.
MRI	480.00	1.0000	0.
PET	480.00	1.0000	0.
R-GEN	208.00	1.0000	0.
R1	208.00	1.0000	0.
R1A1	208.00	1.0000	0.
R1A2	208.00	1.0000	0.
R1B1	208.00	1.0000	0.
R1B2	208.00	1.0000	0.
R2A1	208.00	1.0000	0.
R2A2	208.00	1.0000	0.
R2B1	208.00	1.0000	0.

********** P R E - F A U L T V O L T A G E P R O F I L E **********

BUS# NAME	BASE VOLTS	PU VOLTS	ANGLE (D)
R2B2	208.00	1.0000	0.
R2B3	208.00	1.0000	0.
RPA	208.00	1.0000	0.
RPB	208.00	1.0000	0.
RPC	208.00	1.0000	0.
RPD	208.00	1.0000	0.
RPVL	208.00	1.0000	0.
SNW MLT	208.00	1.0000	0.
SWBD	480.00	1.0000	0.
T-1 to CB SWBD	480.00	1.0000	0.
UTILITY to T-1	13800.00	1.0000	0.

********** F A U L T A N A L Y S I S R E P O R T **********

FAULT TYPE: 3PH
MODEL INDUCTION MOTOR CONTRIBUTION: YES
MODEL TRANSFORMER TAPS: YES
MODEL TRANSFORMER PHASE SHIFT: NO

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```
  BATT 1          VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    270.1 /  -80. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   77.230 +j 438.612 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     5.679

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       348.1       273.3       270.4       270.1       270.1

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    270.1 / -80.0      270.1 / 160.0       270.1 /  40.0

  BATT 1          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0024           480.0  0.0029 / -46.  0.0029 /-166.  0.0029 /  74.
    BATT 1           ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0024       BATT 1          250-5             480.   270.1/ -80.   270.1/ 160.
270.1/  40.


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 Mar 18, 2009     14:45:37                                                PAGE    8



  BATT 2          VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    270.0 /  -80. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   77.350 +j 438.694 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     5.672

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       347.9       273.2       270.4       270.0       270.0

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    270.0 / -80.0      270.0 / 160.0       270.0 /  40.0

  BATT 2          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
```

```
                                        SC
    BUS-0024          480.0  0.0033 / -46.  0.0033 /-166.  0.0033 /  74.
    BATT 2         ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                 FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0024       BATT 2          250-6            480.   270.0/ -80.   270.0/ 160.
270.0/  40.


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 Mar 18, 2009     14:45:37                                                PAGE    9



  CL1A           VOLTAGE BASE LL:                 480.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   2356.0 /  -66. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:   20.932 +j  46.566 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     2.225

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     2491.9      2356.0      2356.0      2356.0      2356.0

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  2356.0 / -65.8     2356.0 / 174.2      2356.0 /  54.2

  CL1A           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    EDP1                    480.0  0.0893 / -35.  0.0893 /-155.  0.0893 /  85.
    BUS-0129                480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    CL1A             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                 FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 EDP1           CL1A            225-9            480.  2356.0/ -66.  2356.0/ 174.
2356.0/  54.
 CL1A           BUS-0129        25A-3            480.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   10
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CL1B VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 1992.0 / -54. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 35.070 +j 49.154 (PU)
THEVENIN IMPEDANCE X/R RATIO: 1.402

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2014.4	1992.0	1992.0	1992.0	1992.0

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
1992.0 / -54.5	1992.0 /-174.5	1992.0 / 65.5

CL1B ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		---PHASE A---	---PHASE B---	---PHASE C---
EDP1	480.0	0.3099 / -39.	0.3099 /-159.	0.3099 / 81.
BUS-0127	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.

CL1B ========== INI. RMS SYSTEM BRANCH FLOWS (AMPS)
==========
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		BRANCH NAME	VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
EDP1	CL1B	100-5	480.	1992.0/ -54.	1992.0/-174.	1992.0/ 66.
CL1B	BUS-0127	25A-1	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.

CP-UPS VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 270.4 / -80. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 76.535 +j 438.135 (PU)
THEVENIN IMPEDANCE X/R RATIO: 5.725

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
349.2	273.8	270.8	270.4	270.4

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
270.4 / -80.1	270.4 / 159.9	270.4 / 39.9

```
  CP-UPS          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0154           480.0  0.0007 / -46.  0.0007 /-166.  0.0007 /  74.
    CP-UPS          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0154       CP-UPS          500-4             480.   270.4/ -80.   270.4/ 160.
270.4/  40.


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 Mar 18, 2009     14:45:37                                                PAGE   12



  CR1A            VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    989.6 /  -40. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  213.624 +j 181.763 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.851

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       990.2       989.6       989.6       989.6       989.6

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    989.6 / -40.4      989.6 /-160.4       989.6 /  79.6

  CR1A            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0131           208.0  0.1157 / -38.  0.1157 /-158.  0.1157 /  82.
    CR1A            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0131       CR1A            50-5              208.   989.6/ -40.   989.6/-160.
989.6/  80.


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 Mar 18, 2009     14:45:37                                                PAGE   13
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  CR1B            VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    940.3 /  -39. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  230.492 +j 184.453 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.800

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       940.6       940.3       940.3       940.3       940.3

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    940.3 / -38.7      940.3 /-158.7       940.3 /  81.3

  CR1B            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0128           208.0  0.1172 / -37.  0.1172 /-157.  0.1172 /  83.
    CR1B             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                 FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0128       CR1B            50-1             208.   940.3/ -39.   940.3/-159.
940.3/  81.


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 Mar 18, 2009     14:45:37                                                PAGE   14



  DP1             VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2426.6 /  -66. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   19.814 +j  45.435 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.293

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2578.6      2426.7      2426.6      2426.6      2426.6

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2426.6 / -66.4     2426.6 / 173.6      2426.6 /  53.6

  DP1             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
```

```
                                        SC
    SWBD              480.0  0.0711 / -40.  0.0711 /-160.  0.0711 /  80.
    LPA               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    LPC               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    DP1             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           DP1              400-1             480.  2426.6/ -66.  2426.6/ 174.
2426.6/  54.
 DP1            LPA              100-2             480.     0.0/   0.     0.0/   0.
0.0/   0.
 DP1            LPC              200-2             480.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   15



  DP2             VOLTAGE BASE LL:                 208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    714.8 /  -14. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  376.233 +j  96.158 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.256

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       714.8       714.8       714.8       714.8       714.8

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    714.8 / -14.3       714.8 /-134.3       714.8 / 105.7

  DP2             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0041          208.0  0.8775 /  -9.  0.8775 /-129.  0.8775 / 111.
    SNW MLT           208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    RPA               208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    RPC               208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    RPD               208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    RPB               208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    DP2             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0041       DP2              500B              208.   714.8/ -14.   714.8/-134.
714.8/ 106.
 DP2            SNW MLT          150B-4            208.     0.0/   0.     0.0/   0.
0.0/   0.
 DP2            RPA              150B-3            208.     0.0/   0.     0.0/   0.
```

0.0/   0.
 DP2   RPC   150-2   208.   0.0/   0.   0.0/   0.
0.0/   0.
 DP2   RPD   225-2   208.   0.0/   0.   0.0/   0.
0.0/   0.
 DP2   RPB   100-3   208.   0.0/   0.   0.0/   0.
0.0/   0.

  DP3   VOLTAGE BASE LL: 208.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT: 1345.2 / -40. (AMPS/DEG)
                THEVENIN EQUIVALENT IMPEDANCE: 157.450 +j 133.368 (PU)
                THEVENIN IMPEDANCE X/R RATIO: 0.847

                 ASYM   RMS   INTERRUPTING AMPS
                1/2 CYCLES   2 CYCLES   3 CYCLES   5 CYCLES   8 CYCLES
                    1346.0   1345.2   1345.2   1345.2   1345.2

                INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
                        AT TIME =   0.5 CYCLES
                ---PHASE A---   ---PHASE B---   ---PHASE C---
                0.0000 /   0.0   0.0000 /   0.0   0.0000 /   0.0

                INI.   RMS   FAULTED CURRENT (AMPS / DEG)
                        AT TIME =   0.5 CYCLES
                ---PHASE A---   ---PHASE B---   ---PHASE C---
                 1345.2 / -40.3   1345.2 /-160.3   1345.2 / 79.7

  DP3   ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
                    FIRST BUS FROM FAULT   AT TIME =   0.5 CYCLES
                          ---PHASE A---   ---PHASE B---   ---PHASE C---
    BUS-0054   208.0 0.4480 / -22. 0.4480 /-142. 0.4480 / 98.
    MEG   208.0 0.0000 /   0. 0.0000 /   0. 0.0000 /   0.
    DP3   ================ INI.   RMS   SYSTEM BRANCH FLOWS (AMPS)
================
                                 FIRST BUS FROM FAULT   AT TIME =   0.5 CYCLES
                                BRANCH NAME   VBASE LL -PHASE A-   -PHASE B-
-PHASE C-
 BUS-0054   DP3   150B-2   208. 1345.2/ -40. 1345.2/-160.
1345.2/ 80.
 DP3   MEG   100B   208.   0.0/   0.   0.0/   0.
0.0/   0.

  EDP1   VOLTAGE BASE LL: 480.0 (VOLTS)

SC
INI. SYM. RMS FAULT CURRENT: 2537.9 / -69. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 17.015 +j 44.234 (PU)
THEVENIN IMPEDANCE X/R RATIO: 2.600

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2755.0	2538.1	2537.9	2537.9	2537.9

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
2537.9 / -69.0	2537.9 / 171.0	2537.9 / 51.0

EDP1 ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		---PHASE A---	---PHASE B---	---PHASE C---
BUS-0108	480.0	0.0020 / -24.	0.0020 /-144.	0.0020 / 96.
CL1B	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.
BUS-0130	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.
CL1A	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.
BUS-0152	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.

EDP1 ================ INI. RMS SYSTEM BRANCH FLOWS (AMPS)
==========

FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

	BRANCH NAME	VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
BUS-0108	EDP1	600-3	480. 2537.9/ -69.	2537.9/ 171.	2537.9/ 51.
EDP1	CL1B	100-5	480. 0.0/ 0.	0.0/ 0.	0.0/ 0.
EDP1	BUS-0130	500-1	480. 0.0/ 0.	0.0/ 0.	0.0/ 0.
EDP1	CL1A	225-9	480. 0.0/ 0.	0.0/ 0.	0.0/ 0.
EDP1	BUS-0152	500-2	480. 0.0/ 0.	0.0/ 0.	0.0/ 0.

EL 1 VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 2276.8 / -65. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 22.558 +j 47.770 (PU)
THEVENIN IMPEDANCE X/R RATIO: 2.118

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2391.1	2276.8	2276.8	2276.8	2276.8

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

```
                                        SC
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2276.8 / -64.7     2276.8 / 175.3      2276.8 /  55.3

  EL 1            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0023            480.0  0.0088 / -47.  0.0088 /-167.  0.0088 /  73.
    EL 1              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0023       EL 1             125-8             480.  2276.8/ -65.  2276.8/ 175.
2276.8/  55.


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 Mar 18, 2009     14:45:37                                                PAGE   19



  EL 2            VOLTAGE BASE LL:                 480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2276.8 /  -65. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   22.558 +j  47.770 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.118

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2391.1      2276.8      2276.8      2276.8      2276.8

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2276.8 / -64.7     2276.8 / 175.3      2276.8 /  55.3

  EL 2            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0023            480.0  0.0088 / -47.  0.0088 /-167.  0.0088 /  73.
    EL 2              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0023       EL 2             125-9             480.  2276.8/ -65.  2276.8/ 175.
2276.8/  55.


--------------------------------------------------------------------------------
```

```
  FL              VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2238.8 /  -62. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   25.373 +j  47.356 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     1.866

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2314.8      2238.8      2238.8      2238.8      2238.8

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2238.8 / -61.8     2238.8 / 178.2      2238.8 /  58.2

  FL              ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD               480.0  0.1748 / -40.  0.1748 /-160.  0.1748 /  80.
    FL               ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           FL              175-1            480.  2238.8/ -62.  2238.8/ 178.
2238.8/  58.
```

```
  H2              VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2389.8 /  -66. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   20.307 +j  46.052 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.268

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2535.1      2389.9      2389.8      2389.8      2389.8

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0
```

```
                                        SC
                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2389.8 / -66.2     2389.8 / 173.8      2389.8 /  53.8

  H2              ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD               480.0  0.0845 / -35.  0.0845 /-155.  0.0845 /  85.
    H2              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           H2                 225-1            480.  2389.8/ -66.  2389.8/ 174.
2389.8/  54.


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 Mar 18, 2009     14:45:37                                                PAGE   22



  L1              VOLTAGE BASE LL:                 480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2495.7 /  -67. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   18.540 +j  44.487 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.399

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2671.5      2495.8      2495.7      2495.7      2495.7

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2495.7 / -67.4     2495.7 / 172.6      2495.7 /  52.6

  L1              ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD               480.0  0.0412 / -49.  0.0412 /-169.  0.0412 /  71.
    LCP-L1             480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0148           480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L1              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           L1                 150-1            480.  2495.7/ -67.  2495.7/ 173.
2495.7/  53.
 L1             LCP-L1             105              480.     0.0/   0.     0.0/   0.
0.0/   0.
 L1             BUS-0148           50A-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
```

L1A VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 2243.4 / -61. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 25.990 +j 46.896 (PU)
THEVENIN IMPEDANCE X/R RATIO: 1.804

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2311.3	2243.4	2243.4	2243.4	2243.4

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
2243.4 / -61.0	2243.3 / 179.0	2243.4 / 59.0

L1A ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		---PHASE A---	---PHASE B---	---PHASE C---
SWBD	480.0	0.1831 / -43.	0.1831 /-163.	0.1831 / 77.
LCP-L1A	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.
BUS-0011	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.

L1A ================ INI. RMS SYSTEM BRANCH FLOWS (AMPS)
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		BRANCH NAME	VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
SWBD	L1A	150-3	480.	2243.4/ -61.	2243.3/ 179.	2243.4/ 59.
L1A	LCP-L1A	100	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.
L1A	BUS-0011	125A-2	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.

L1B VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 2042.5 / -56. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 32.607 +j 49.036 (PU)
THEVENIN IMPEDANCE X/R RATIO: 1.504

```
                                    SC
                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    2073.6      2042.5      2042.5      2042.5      2042.5

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2042.5 / -56.4     2042.5 /-176.4      2042.5 /  63.6

  L1B           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD             480.0  0.2848 / -38.  0.2848 /-158.  0.2848 /  82.
    LCP-L1B          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0014         480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L1B            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                 FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           L1B             150-4            480.  2042.5/ -56.  2042.5/-176.
2042.5/  64.
 L1B            LCP-L1B         101              480.     0.0/   0.     0.0/   0.
0.0/   0.
 L1B            BUS-0014        125A-3           480.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   25



  L2A           VOLTAGE BASE LL:                480.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   2307.7 /  -65. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:   22.179 +j  47.167 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     2.127

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    2425.0      2307.7      2307.7      2307.7      2307.7

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2307.7 / -64.8     2307.7 / 175.2      2307.7 /  55.2

  L2A           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
```

```
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD             480.0  0.1234 / -34.  0.1234 /-154.  0.1234 /  86.
    LCP-L2A          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0017         480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L2A            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           L2A              225-3            480.  2307.7/ -65.  2307.7/ 175.
2307.7/  55.
 L2A            LCP-L2A          102              480.     0.0/   0.     0.0/   0.
0.0/   0.
 L2A            BUS-0017         125A-1           480.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   26



  L2B            VOLTAGE BASE LL:                 480.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   2173.1 /  -63. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:   25.485 +j  49.134 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     1.928

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     2255.1      2173.1      2173.1      2173.1      2173.1

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  2173.1 / -62.6     2173.1 / 177.4      2173.1 /  57.4

  L2B            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD             480.0  0.1857 / -32.  0.1857 /-152.  0.1857 /  88.
    LCP-L2B          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0020         480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L2B            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD           L2B              225-4            480.  2173.1/ -63.  2173.1/ 177.
2173.1/  57.
 L2B            LCP-L2B          103              480.     0.0/   0.     0.0/   0.
0.0/   0.
 L2B            BUS-0020         175A             480.     0.0/   0.     0.0/   0.
0.0/   0.
```

Mar 18, 2009 14:45:37 PAGE 27

LCP-L1 VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 2477.4 / -67. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 19.096 +j 44.638 (PU)
THEVENIN IMPEDANCE X/R RATIO: 2.338

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2640.6	2477.5	2477.4	2477.4	2477.4

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
2477.4 / -66.8	2477.4 / 173.2	2477.4 / 53.2

LCP-L1 ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		---PHASE A---	---PHASE B---	---PHASE C---
L1	480.0	0.0119 / -52.	0.0119 /-172.	0.0119 / 68.

LCP-L1 ========== INI. RMS SYSTEM BRANCH FLOWS (AMPS)
==========
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		BRANCH NAME	VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
L1	LCP-L1	105	480.	2477.4/ -67.	2477.4/ 173.	2477.4/ 53.

Mar 18, 2009 14:45:37 PAGE 28

LCP-L1A VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 2226.6 / -61. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 26.546 +j 47.048 (PU)
THEVENIN IMPEDANCE X/R RATIO: 1.772

ASYM 1/2 CYCLES	RMS 2 CYCLES	INTERRUPTING AMPS 3 CYCLES	5 CYCLES	8 CYCLES
2290.0	2226.6	2226.6	2226.6	2226.6

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---

```
                                        SC
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2226.6 / -60.6     2226.6 / 179.4      2226.6 /  59.4

  LCP-L1A       ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    L1A              480.0  0.0107 / -45.  0.0107 /-165.  0.0107 /  75.
    LCP-L1A        ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 L1A            LCP-L1A        100              480.  2226.6/ -61.  2226.6/ 179.
2226.6/  59.


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 Mar 18, 2009     14:45:37                                                PAGE   29



  LCP-L1B       VOLTAGE BASE LL:                 480.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   2027.6 /  -56. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:   33.163 +j  49.188 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     1.483

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    2056.7      2027.6      2027.6      2027.6      2027.6

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2027.6 / -56.0     2027.6 /-176.0      2027.6 /  64.0

  LCP-L1B       ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    L1B              480.0  0.0097 / -41.  0.0097 /-161.  0.0097 /  79.
    LCP-L1B        ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 L1B            LCP-L1B        101              480.  2027.6/ -56.  2027.6/-176.
2027.6/  64.


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```
 LCP-L2A        VOLTAGE BASE LL:                 480.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   2291.2 /  -64. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:   22.735 +j  47.318 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     2.081

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    2400.6      2291.3      2291.2      2291.2      2291.2

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2291.2 / -64.3     2291.2 / 175.7      2291.2 /  55.7

 LCP-L2A        ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
   L2A               480.0  0.0110 / -49.  0.0110 /-169.  0.0110 /  71.
   LCP-L2A         ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 L2A            LCP-L2A        102              480.  2291.2/ -64.  2291.2/ 176.
2291.2/  56.

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```



```
 LCP-L2B        VOLTAGE BASE LL:                 480.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   2157.8 /  -62. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:   26.040 +j  49.286 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     1.893

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    2234.5      2157.8      2157.8      2157.8      2157.8

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
```

```
                                        SC
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 2157.8 / -62.2     2157.8 / 177.9      2157.8 /  57.8

  LCP-L2B       ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    L2B              480.0  0.0103 / -47.  0.0103 /-167.  0.0103 /  73.
    LCP-L2B        ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 L2B            LCP-L2B        103              480.  2157.8/ -62.  2157.8/ 178.
2157.8/  58.


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 Mar 18, 2009     14:45:37                                                PAGE   32



  LCP-RPD       VOLTAGE BASE LL:                 208.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:    694.0 /  -15. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:  386.883 +j 101.544 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     0.262

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     694.0       694.0       694.0       694.0       694.0

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                  694.0 / -14.7      694.0 /-134.7       694.0 / 105.3

  LCP-RPD       ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    RPD              208.0  0.0077 /   1.  0.0077 /-119.  0.0077 / 121.
    LCP-RPD        ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 RPD            LCP-RPD        104              208.   694.0/ -15.   694.0/-135.
694.0/ 105.


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 Mar 18, 2009     14:45:37                                                PAGE   33
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  LPA             VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2328.8 /  -64. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   22.925 +j  46.283 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.019

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2430.2      2328.8      2328.8      2328.8      2328.8

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2328.8 / -63.7     2328.8 / 176.3      2328.8 /  56.3

  LPA             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP1                1.0  0.0624 / -48.  0.0624 /-168.  0.0624 /  72.
    LPA              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                   FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                  BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP1            LPA               100-2             480.  2328.8/ -64.  2328.8/ 176.
2328.8/  56.


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 Mar 18, 2009     14:45:37                                                PAGE   34



  LPC             VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2289.3 /  -64. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   23.238 +j  47.124 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     2.028

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2390.3      2289.3      2289.3      2289.3      2289.3

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2289.3 / -63.8     2289.3 / 176.2      2289.3 /  56.2
```

```
  LPC            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP1               480.0  0.0727 / -38.  0.0727 /-158.  0.0727 /  82.
    LPC             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP1            LPC              200-2             480.  2289.3/ -64.  2289.3/ 176.
2289.3/  56.


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 Mar 18, 2009     14:45:37                                                PAGE   35



  LSL1A          VOLTAGE BASE LL:                  480.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   2505.8 /  -68. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:   17.938 +j  44.524 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     2.482

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     2697.8      2505.9      2505.8      2505.8      2505.8

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  2505.8 / -68.1     2505.8 / 171.9      2505.8 /  51.9

  LSL1A          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0105          480.0  0.0032 / -37.  0.0032 /-157.  0.0032 /  83.
    LSL2A             480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    LSLPA             480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    LSL1B             480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0121          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    LSL1A           ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0105       LSL1A            225-8             480.  2505.8/ -68.  2505.8/ 172.
2505.8/  52.
 LSL1A          LSL2A            50-6              480.     0.0/   0.     0.0/   0.
0.0/   0.
 LSL1A          LSLPA            50-4              480.     0.0/   0.     0.0/   0.
0.0/   0.
 LSL1A          LSL1B            100-4             480.     0.0/   0.     0.0/   0.
0.0/   0.
```

SC

LSL1A	BUS-0121	50A-2	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.

LSL1B VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 1936.4 / -53. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 37.174 +j 49.766 (PU)
THEVENIN IMPEDANCE X/R RATIO: 1.339

ASYM RMS INTERRUPTING AMPS				
1/2 CYCLES	2 CYCLES	3 CYCLES	5 CYCLES	8 CYCLES
1954.0	1936.4	1936.4	1936.4	1936.4

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
1936.4 / -53.2	1936.4 /-173.2	1936.4 / 66.8

LSL1B ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		---PHASE A---	---PHASE B---	---PHASE C---
LSL1A	480.0	0.3210 / -38.	0.3210 /-158.	0.3210 / 82.
LSL2B	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.
BUS-0118	480.0	0.0000 / 0.	0.0000 / 0.	0.0000 / 0.

LSL1B ================ INI. RMS SYSTEM BRANCH FLOWS (AMPS) ================

FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

		BRANCH NAME	VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
LSL1A	LSL1B	100-4	480.	1936.4/ -53.	1936.4/-173.	1936.4/ 67.
LSL1B	LSL2B	50-3	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.
LSL1B	BUS-0118	25A-2	480.	0.0/ 0.	0.0/ 0.	0.0/ 0.

LSL2A VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 1475.7 / -37. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 64.865 +j 49.354 (PU)

```
                                    SC
                  THEVENIN IMPEDANCE X/R RATIO:     0.761

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1476.1      1475.7      1475.7      1475.7      1475.7

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1475.7 / -37.3     1475.7 /-157.3      1475.7 /  82.7

  LSL2A           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    LSL1A              480.0  0.5788 / -31.  0.5788 /-151.  0.5788 /  89.
    LSL2A            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 LSL1A          LSL2A           50-6              480.  1475.7/ -37.  1475.7/-157.
1475.7/  83.


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 Mar 18, 2009     14:45:37                                                PAGE   38



  LSL2B           VOLTAGE BASE LL:                  480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   1778.4 /  -48. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   44.921 +j  50.563 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     1.126

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1785.1      1778.4      1778.4      1778.4      1778.4

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1778.4 / -48.4     1778.4 /-168.4      1778.4 /  71.6

  LSL2B           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    LSL1B              480.0  0.1152 / -43.  0.1152 /-163.  0.1152 /  77.
    LSL2B            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
```

FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

BRANCH NAME		VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
LSL1B	LSL2B	50-3	480. 1778.4/ -48.	1778.4/-168.	1778.4/ 72.

LSLPA VOLTAGE BASE LL: 480.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 1482.6 / -37. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 64.422 +j 49.309 (PU)
THEVENIN IMPEDANCE X/R RATIO: 0.765

ASYM RMS INTERRUPTING AMPS

1/2 CYCLES	2 CYCLES	3 CYCLES	5 CYCLES	8 CYCLES
1483.0	1482.6	1482.6	1482.6	1482.6

INI. SYM. RMS FAULTED BUS VOLTAGES (PU / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
0.0000 / 0.0	0.0000 / 0.0	0.0000 / 0.0

INI. RMS FAULTED CURRENT (AMPS / DEG)
AT TIME = 0.5 CYCLES

---PHASE A---	---PHASE B---	---PHASE C---
1482.6 / -37.4	1482.6 /-157.4	1482.6 / 82.6

LSLPA ==== INI. SYM. RMS SYSTEM BUS VOLTAGES (PU / DEG) =======
FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

	---PHASE A---	---PHASE B---	---PHASE C---
LSL1A	480.0 0.5760 / -32.	0.5760 /-152.	0.5760 / 88.

LSLPA ========== INI. RMS SYSTEM BRANCH FLOWS (AMPS) ==========

FIRST BUS FROM FAULT AT TIME = 0.5 CYCLES

BRANCH NAME		VBASE LL	-PHASE A-	-PHASE B-	-PHASE C-
LSL1A	LSLPA	50-4	480. 1482.6/ -37.	1482.6/-157.	1482.6/ 83.

LSR1A VOLTAGE BASE LL: 208.0 (VOLTS)
INI. SYM. RMS FAULT CURRENT: 851.2 / -22. (AMPS/DEG)
THEVENIN EQUIVALENT IMPEDANCE: 302.564 +j 121.672 (PU)
THEVENIN IMPEDANCE X/R RATIO: 0.402

ASYM RMS INTERRUPTING AMPS

```
                                        SC
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       851.2       851.2       851.2       851.2       851.2

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    851.2 / -21.9      851.2 /-141.9       851.2 /  98.1

  LSR1A           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0122           208.0  0.0968 / -20.  0.0968 /-140.  0.0968 / 100.
    R-GEN              208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    LSR1A            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                   FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                  BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0122       LSR1A          100-6             208.   851.2/ -22.   851.2/-142.
851.2/  98.
 LSR1A          R-GEN          50-7              208.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   41



  LSR1B           VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    934.3 /  -39. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  232.433 +j 185.058 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.796

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       934.6       934.3       934.3       934.3       934.3

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    934.3 / -38.5      934.3 /-158.5       934.3 /  81.5

  LSR1B           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0119           208.0  0.1165 / -36.  0.1165 /-156.  0.1165 /  84.
    LSR1B            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
```

```
                                    SC
                                FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                               BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0119       LSR1B          50-2             208.   934.3/ -39.   934.3/-159.
934.3/  81.

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 Mar 18, 2009     14:45:37                                                PAGE   42



  MEG            VOLTAGE BASE LL:                 208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   1198.9 /  -38. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  182.598 +j 142.327 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.779

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     1199.3      1198.9      1198.9      1198.9      1198.9

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  1198.9 / -37.9     1198.9 /-157.9      1198.9 /  82.1

  MEG            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP3               208.0  0.1153 / -18.  0.1153 /-138.  0.1153 / 102.
    MEG            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                               BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP3            MEG            100B             208.  1198.9/ -38.  1198.9/-158.
1198.9/  82.

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 Mar 18, 2009     14:45:37                                                PAGE   43



  MRI            VOLTAGE BASE LL:                 480.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   2134.3 /  -60. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:   28.516 +j  48.610 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     1.705

                  ASYM    RMS   INTERRUPTING AMPS
```

```
                                        SC
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2187.1      2134.3      2134.3      2134.3      2134.3

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2134.3 / -59.6     2134.3 /-179.6      2134.3 /  60.4

  MRI             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD               480.0  0.2267 / -38.  0.2267 /-158.  0.2267 /  82.
    MRI              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 SWBD          MRI               175-3            480.  2134.3/ -60.  2134.3/-180.
2134.3/  60.


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 Mar 18, 2009     14:45:37                                                PAGE   44



  PET             VOLTAGE BASE LL:                 480.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   2048.4 /  -58. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   31.261 +j  49.705 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     1.590

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      2087.5      2048.4      2048.4      2048.4      2048.4

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   2048.4 / -57.8     2048.4 /-177.8      2048.4 /  62.2

  PET             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    SWBD               480.0  0.2679 / -36.  0.2679 /-156.  0.2679 /  84.
    PET              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
```

```
                                                   SC
 SWBD            PET             175-2               480.  2048.4/ -58.  2048.4/-178.
2048.4/  62.


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```
  R-GEN            VOLTAGE BASE LL:                   208.0 (VOLTS)
                   INI. SYM. RMS FAULT CURRENT:    404.2 /  -13. ( AMPS/DEG )
                   THEVENIN EQUIVALENT IMPEDANCE:  667.994 +j 159.290 (PU)
                   THEVENIN IMPEDANCE X/R RATIO:     0.238

                    ASYM    RMS   INTERRUPTING AMPS
                   1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                        404.2       404.2       404.2       404.2       404.2

                   INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                           AT TIME =     0.5 CYCLES
                   ---PHASE A---      ---PHASE B---      ---PHASE C---
                   0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                   INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                           AT TIME =     0.5 CYCLES
                   ---PHASE A---      ---PHASE B---      ---PHASE C---
                     404.2 / -13.4      404.2 /-133.4       404.2 / 106.6

  R-GEN            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                       FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                             ---PHASE A---     ---PHASE B---     ---PHASE C---
    LSR1A               208.0  0.5349 /  -8.  0.5349 /-128.  0.5349 / 112.
    R-GEN            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                               BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 LSR1A           R-GEN           50-7              208.   404.2/ -13.   404.2/-133.
404.2/ 107.


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  R1               VOLTAGE BASE LL:                   208.0 (VOLTS)
                   INI. SYM. RMS FAULT CURRENT:   1238.2 /  -32. ( AMPS/DEG )
                   THEVENIN EQUIVALENT IMPEDANCE:  190.940 +j 117.458 (PU)
                   THEVENIN IMPEDANCE X/R RATIO:     0.615

                    ASYM    RMS   INTERRUPTING AMPS
                   1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       1238.2      1238.2      1238.2      1238.2      1238.2
```

```
                                    SC
                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1238.2 / -31.6     1238.2 /-151.6      1238.2 /  88.4

  R1              ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0149           208.0  0.1544 / -29.  0.1544 /-149.  0.1544 /  91.
    R1                ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0149       R1                 100-1            208.  1238.2/ -32.  1238.2/-152.
1238.2/  88.


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 Mar 18, 2009     14:45:37                                                PAGE   47



  R1A1            VOLTAGE BASE LL:                 208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   1494.6 /  -26. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  167.237 +j  80.775 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.483

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1494.6      1494.6      1494.6      1494.6      1494.6

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1494.6 / -25.8     1494.6 /-145.8      1494.6 /  94.2

  R1A1            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0013           208.0  0.0092 /  -8.  0.0092 /-128.  0.0092 / 112.
    R1A1              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0013       R1A1               125-4            208.  1494.6/ -26.  1494.6/-146.
1494.6/  94.
```

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 Mar 18, 2009     14:45:37                                              PAGE   48



  R1A2           VOLTAGE BASE LL:                 208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   1494.6 /  -26. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  167.237 +j  80.775 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.483

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     1494.6      1494.6      1494.6      1494.6      1494.6

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  1494.6 / -25.8     1494.6 /-145.8      1494.6 /  94.2

  R1A2           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0013          208.0  0.0092 /  -8.  0.0092 /-128.  0.0092 / 112.
    R1A2            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                 FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0013       R1A2            125-5             208.  1494.6/ -26.  1494.6/-146.
1494.6/  94.


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 Mar 18, 2009     14:45:37                                              PAGE   49



  R1B1           VOLTAGE BASE LL:                 208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   1299.6 /  -23. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  196.483 +j  83.757 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.426

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     1299.6      1299.6      1299.6      1299.6      1299.6

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
```

```
                                        SC
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 1299.6 / -23.1     1299.6 /-143.1      1299.6 /  96.9

  R1B1          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0016          208.0  0.0080 /  -5.  0.0080 /-125.  0.0080 / 115.
    R1B1          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0016       R1B1             125-6            208.  1299.6/ -23.  1299.6/-143.
1299.6/  97.


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 Mar 18, 2009     14:45:37                                                PAGE   50



  R1B2          VOLTAGE BASE LL:                 208.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   1299.6 /  -23. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:  196.483 +j  83.757 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     0.426

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    1299.6      1299.6      1299.6      1299.6      1299.6

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---       ---PHASE B---       ---PHASE C---
                 1299.6 / -23.1     1299.6 /-143.1      1299.6 /  96.9

  R1B2          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0016          208.0  0.0080 /  -5.  0.0080 /-125.  0.0080 / 115.
    R1B2          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0016       R1B2             125-7            208.  1299.6/ -23.  1299.6/-143.
1299.6/  97.


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  R2A1           VOLTAGE BASE LL:                  208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   1466.6 /  -25. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  170.893 +j  81.323 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.476

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     1466.7      1466.6      1466.6      1466.6      1466.6

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  1466.6 / -25.4     1466.6 /-145.4      1466.6 /  94.6

  R2A1           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0019          208.0  0.0090 /  -8.  0.0090 /-128.  0.0090 / 112.
    R2A1            ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0019       R2A1           125-1            208.  1466.6/ -25.  1466.6/-145.
1466.6/  95.
```

```
  R2A2           VOLTAGE BASE LL:                  208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   1466.6 /  -25. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  170.893 +j  81.323 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.476

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     1466.7      1466.6      1466.6      1466.6      1466.6

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
```

```
                               SC
                AT TIME =     0.5 CYCLES
            ---PHASE A---      ---PHASE B---      ---PHASE C---
             1466.6 / -25.4     1466.6 /-145.4      1466.6 /  94.6

  R2A2          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0019         208.0  0.0090 /  -8.  0.0090 /-128.  0.0090 / 112.
    R2A2          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                               FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                              BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0019      R2A2           125-2            208.  1466.6/ -25.  1466.6/-145.
1466.6/  95.


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```
  R2B1          VOLTAGE BASE LL:                       208.0 (VOLTS)
                INI. SYM. RMS FAULT CURRENT:   1532.9 /  -29. ( AMPS/DEG )
                THEVENIN EQUIVALENT IMPEDANCE:  158.194 +j  88.114 (PU)
                THEVENIN IMPEDANCE X/R RATIO:     0.557

                 ASYM    RMS   INTERRUPTING AMPS
                1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                    1532.9      1532.9      1532.9      1532.9      1532.9

                INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---      ---PHASE B---      ---PHASE C---
                0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                ---PHASE A---      ---PHASE B---      ---PHASE C---
                 1532.9 / -29.1     1532.9 /-149.1      1532.9 /  90.9

  R2B1          ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                          ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0022         208.0  0.0077 /  -7.  0.0077 /-127.  0.0077 / 113.
    R2B1          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                               FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                              BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0022      R2B1           175-4            208.  1532.9/ -29.  1532.9/-149.
1532.9/  91.


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```

```
  R2B2            VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   1536.6 /  -29. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  157.711 +j  88.080 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.558

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1536.6      1536.6      1536.6      1536.6      1536.6

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1536.6 / -29.2     1536.6 /-149.2      1536.6 /  90.8

  R2B2            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    BUS-0022           208.0  0.0052 /   2.  0.0052 /-118.  0.0052 / 122.
    R2B3               208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    R2B2             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 BUS-0022       R2B2             225-6            208.  1536.6/ -29.  1536.6/-149.
1536.6/  91.
 R2B2           R2B3             125-3            208.     0.0/   0.     0.0/   0.
0.0/   0.

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 Mar 18, 2009     14:45:37                                              PAGE   55



  R2B3            VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   1481.5 /  -29. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  164.220 +j  90.186 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.549

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1481.6      1481.5      1481.5      1481.5      1481.5

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
```

```
                                        SC
                        AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1481.5 / -28.8     1481.5 /-148.8      1481.5 /  91.2

  R2B3            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    R2B2               208.0  0.0365 / -11.  0.0365 /-131.  0.0365 / 109.
    R2B3             ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 R2B2           R2B3           125-3            208.  1481.5/ -29.  1481.5/-149.
1481.5/  91.


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 Mar 18, 2009     14:45:37                                                PAGE   56



  RPA            VOLTAGE BASE LL:                 208.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:    691.0 /  -14. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:  388.955 +j 100.273 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     0.258

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      691.0       691.0       691.0       691.0       691.0

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                        AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                        AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                   691.0 / -14.5      691.0 /-134.5       691.0 / 105.5

  RPA            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP2                208.0  0.0333 /   3.  0.0333 /-117.  0.0333 / 123.
    RPA              ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP2            RPA            150B-3           208.   691.0/ -14.   691.0/-134.
691.0/ 106.


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 Mar 18, 2009     14:45:37                                                PAGE   57
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```
  RPB             VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    676.1 /  -14. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  397.682 +j 102.003 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.256

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       676.1       676.1       676.1       676.1       676.1

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    676.1 / -14.4      676.1 /-134.4       676.1 / 105.6

  RPB             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP2                  208.0  0.0542 /   1.  0.0542 /-119.  0.0542 / 121.
    RPB                ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP2            RPB                100-3             208.   676.1/ -14.   676.1/-134.
676.1/ 106.


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 Mar 18, 2009     14:45:37                                                PAGE   58



  RPC             VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    657.0 /  -15. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  408.777 +j 106.684 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.261

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       657.0       657.0       657.0       657.0       657.0

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    657.0 / -14.6      657.0 /-134.6       657.0 / 105.4
```

```
  RPC             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP2                 208.0  0.0810 /   3.  0.0810 /-117.  0.0810 / 123.
    RPC               ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP2            RPC              150-2             208.   657.0/ -15.   657.0/-135.
657.0/ 105.


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 Mar 18, 2009     14:45:37                                                PAGE   59



  RPD             VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    699.3 /  -15. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  383.925 +j 100.737 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.262

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       699.3       699.3       699.3       699.3       699.3

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    699.3 / -14.7      699.3 /-134.7       699.3 / 105.3

  RPD             ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP2                 208.0  0.0226 /  16.  0.0226 /-104.  0.0226 / 136.
    LCP-RPD             208.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    RPD               ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP2            RPD              225-2             208.   699.3/ -15.   699.3/-135.
699.3/ 105.
 RPD            LCP-RPD          104               208.     0.0/   0.     0.0/   0.
0.0/   0.


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 Mar 18, 2009     14:45:37                                                PAGE   60
```

```
  RPVL            VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:   1964.6 /  -50. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:   90.090 +j 108.836 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     1.208

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                      1975.4      1964.6      1964.6      1964.6      1964.6

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                   1964.6 / -50.4     1964.6 /-170.4      1964.6 /  69.6

  RPVL            ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                      FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                            ---PHASE A---     ---PHASE B---     ---PHASE C---
    CD T-2, 2  to     208.0  0.0770 / -32.  0.0770 /-152.  0.0770 /  88.
    RPVL          ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                   FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                  BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 CD T-2, 2  to  RPVL              150B-1           208.  1964.6/ -50.  1964.6/-170.
1964.6/  70.


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 Mar 18, 2009     14:45:37                                                PAGE   61



  SNW MLT         VOLTAGE BASE LL:                  208.0 (VOLTS)
                  INI. SYM. RMS FAULT CURRENT:    684.7 /  -14. ( AMPS/DEG )
                  THEVENIN EQUIVALENT IMPEDANCE:  392.505 +j 101.421 (PU)
                  THEVENIN IMPEDANCE X/R RATIO:     0.258

                   ASYM    RMS   INTERRUPTING AMPS
                  1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                       684.7       684.7       684.7       684.7       684.7

                  INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                  0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                  INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                          AT TIME =     0.5 CYCLES
                  ---PHASE A---       ---PHASE B---       ---PHASE C---
                    684.7 / -14.5      684.7 /-134.5       684.7 / 105.5
```

```
  SNW MLT        ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    DP2               208.0  0.0422 /   3.  0.0422 /-117.  0.0422 / 123.
    SNW MLT         ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                  FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                 BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 DP2            SNW MLT         150B-4            208.   684.7/ -14.   684.7/-134.
684.7/ 106.


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 Mar 18, 2009     14:45:37                                                PAGE   62



  SWBD           VOLTAGE BASE LL:                  480.0 (VOLTS)
                 INI. SYM. RMS FAULT CURRENT:   2563.0 /  -69. ( AMPS/DEG )
                 THEVENIN EQUIVALENT IMPEDANCE:   16.652 +j  43.876 (PU)
                 THEVENIN IMPEDANCE X/R RATIO:     2.635

                  ASYM    RMS   INTERRUPTING AMPS
                 1/2 CYCLES    2 CYCLES    3 CYCLES    5 CYCLES    8 CYCLES
                     2789.2      2563.2      2563.0      2563.0      2563.0

                 INI. SYM. RMS FAULTED BUS VOLTAGES ( PU / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                 0.0000 /    0.0     0.0000 /    0.0     0.0000 /    0.0

                 INI.    RMS   FAULTED CURRENT ( AMPS / DEG )
                         AT TIME =     0.5 CYCLES
                 ---PHASE A---       ---PHASE B---       ---PHASE C---
                  2563.0 / -69.2     2563.0 / 170.8      2563.0 /  50.8

  SWBD           ==== INI. SYM. RMS SYSTEM BUS VOLTAGES ( PU / DEG ) =======
                     FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                           ---PHASE A---     ---PHASE B---     ---PHASE C---
    T-1 to CB SWBD    480.0  0.2051 / -57.  0.2051 /-177.  0.2051 /  63.
    90A-1 to T-2      480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L1A               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L1B               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L2A               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L2B               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0023          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0040          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    90A-1 to T-3      480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0104          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    BUS-0110          480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    DP1               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    H2                480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    L1                480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    MRI               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    PET               480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
    FL                480.0  0.0000 /   0.  0.0000 /   0.  0.0000 /   0.
 Mar 18, 2009     14:45:37                                                PAGE   63
```

```
    SWBD           ================ INI.    RMS   SYSTEM BRANCH FLOWS ( AMPS )
================
                                    FIRST BUS FROM FAULT    AT TIME =     0.5 CYCLES
                                   BRANCH NAME   VBASE LL  -PHASE A-     -PHASE B-
-PHASE C-
 T-1 to CB SWBD SWBD               3000             480.  2563.0/ -69.  2563.0/ 171.
2563.0/  51.
 SWBD           90A-1 to T-2       90A-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           L1A                150-3            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           L1B                150-4            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           L2A                225-3            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           L2B                225-4            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           BUS-0023           250-3            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           BUS-0040           225A             480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           90A-1 to T-3       90A-2            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           BUS-0104           200-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           BUS-0110           600-2            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           DP1                400-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           H2                 225-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           L1                 150-1            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           MRI                175-3            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           PET                175-2            480.     0.0/   0.     0.0/   0.
0.0/   0.
 SWBD           FL                 175-1            480.     0.0/   0.     0.0/   0.
0.0/   0.

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 Mar 18, 2009     14:45:37                                                PAGE   64


 ***************** F A U L T    A N A L Y S I S    S U M M A R Y ***************
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 -------------------------------------------------------------------------------
  BUS NAME              VOLTAGE            AVAILABLE FAULT CURRENT
                          L-L           3 PHASE      X/R LINE/GRND    X/R

  BATT 1                   480.            270.1      5.7
  BATT 2                   480.            270.0      5.7
  CL1A                     480.           2356.0      2.2
```

		SC	
CL1B	480.	1992.0	1.4
CP-UPS	480.	270.4	5.7
CR1A	208.	989.6	0.9
CR1B	208.	940.3	0.8
DP1	480.	2426.6	2.3
DP2	208.	714.8	0.3
DP3	208.	1345.2	0.8
EDP1	480.	2537.9	2.6
EL 1	480.	2276.8	2.1
EL 2	480.	2276.8	2.1
FL	480.	2238.8	1.9
H2	480.	2389.8	2.3
L1	480.	2495.7	2.4
L1A	480.	2243.4	1.8
L1B	480.	2042.5	1.5
L2A	480.	2307.7	2.1
L2B	480.	2173.1	1.9
LCP-L1	480.	2477.4	2.3
LCP-L1A	480.	2226.6	1.8
LCP-L1B	480.	2027.6	1.5
LCP-L2A	480.	2291.2	2.1
LCP-L2B	480.	2157.8	1.9
LCP-RPD	208.	694.0	0.3
LPA	480.	2328.8	2.0
LPC	480.	2289.3	2.0
LSL1A	480.	2505.8	2.5
LSL1B	480.	1936.4	1.3
LSL2A	480.	1475.7	0.8
LSL2B	480.	1778.4	1.1
LSLPA	480.	1482.6	0.8
LSR1A	208.	851.2	0.4
LSR1B	208.	934.3	0.8
MEG	208.	1198.9	0.8

********** F A U L T A N A L Y S I S S U M M A R Y **********

BUS NAME	VOLTAGE L-L	AVAILABLE FAULT CURRENT 3 PHASE	X/R	LINE/GRND	X/R
MRI	480.	2134.3	1.7		
PET	480.	2048.4	1.6		
R-GEN	208.	404.2	0.2		
R1	208.	1238.2	0.6		
R1A1	208.	1494.6	0.5		
R1A2	208.	1494.6	0.5		
R1B1	208.	1299.6	0.4		
R1B2	208.	1299.6	0.4		
R2A1	208.	1466.6	0.5		
R2A2	208.	1466.6	0.5		

		SC	
R2B1	208.	1532.9	0.6
R2B2	208.	1536.6	0.6
R2B3	208.	1481.5	0.5
RPA	208.	691.0	0.3
RPB	208.	676.1	0.3
RPC	208.	657.0	0.3
RPD	208.	699.3	0.3
RPVL	208.	1964.6	1.2
SNW MLT	208.	684.7	0.3
SWBD	480.	2563.0	2.6

********** FAULT ANALYSIS REPORT COMPLETED **********

Arc Flash Evaluation IEEE 1584 - 2002/2004a Edition Bus Report (80% Cleared Fault Threshold, include Ind. Motors for 5.0 Cycles), mis-coordination not checked

	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	Required Protective FR Clothing Category	Label #	Cable Length From Trip Device (ft)	Incident Energy at Low Marginal	Incident Energy at High Marginal
1	BATT 1	MaxTripTime @2.0s	0.48	0.27	0.27	0.27	0.27	2	0.000	No	PNL	25	13	18	0.63	Category 0 (*N11) (*N2) (*N9)	# 0001			
2																				
3	BATT 2	MaxTripTime @2.0s	0.48	0.27	0.27	0.27	0.27	2	0.000	No	PNL	25	13	18	0.63	Category 0 (*N11) (*N2) (*N9)	# 0002			
4																				
5	CL1A	CB EDP1 CL1A	0.48	2.36	1.91	2.36	1.91	0.05	0.000	Yes	PNL	25	7.4	18	0.28	Category 0	# 0003	141.00		
6																				
7	CL1B	CB EDP1 CL1B	0.48	1.99	1.65	1.99	1.65	0.05	0.000	Yes	PNL	25	6.7	18	0.24	Category 0	# 0004	260.00		
8																				
9	CP-UPS	CB CP-UPS	0.48	0.27	0.27	0.27	0.27	2	0.000	No	PNL	25	13	18	0.64	Category 0 (*N11) (*N9)	# 0005			
10																				
11	CR1A	CB CR1A	0.208	0.99	0.86	0.99	0.86	0.05	0.000	Yes	PNL	25	4.4	18	0.12	Category 0	# 0006			
12																				
13	CR1B	CB CR1B	0.208	0.94	0.83	0.94	0.83	0.05	0.000	Yes	PNL	25	4.3	18	0.11	Category 0	# 0007			
14																				
15	DP1	CB SWBD DP1	0.48	2.43	1.96	2.43	1.96	0.15	0.000	Yes	PNL	25	15	18	0.85	Category 0	# 0008	181.00		
16																				
17	DP2	CB T-4	0.208	0.71	0.68	0.71	0.68	2	0.000	Yes	PNL	25	36	18	3.6	Category 1 (*N9)	# 0009			
18																				
19	DP3	CB T-3	0.208	1.35	1.06	1.35	1.06	0.065	0.000	Yes	PNL	25	5.9	18	0.19	Category 0	# 0010			
20																				
21	EDP1	CB SWBD ATS-EM	0.48	2.54	1.73	2.54	1.73	0.649	0.000	Yes	PNL	25	33	18	3.2	Category 1 (*N3)	# 0011	44.30		
22																				
23	EL 1	CB EL1	0.48	2.28	1.57	2.28	1.57	0.15	0.000	Yes	PNL	25	13	18	0.67	Category 0 (*N3)	# 0012			
24																				
25	EL 2	CB EL2	0.48	2.28	1.57	2.28	1.57	0.15	0.000	Yes	PNL	25	13	18	0.67	Category 0 (*N3)	# 0013			
26																				
27	FL	CB SWBD FL	0.48	2.24	1.83	2.24	1.83	0.051	0.000	Yes	PNL	25	7.3	18	0.27	Category 0	# 0014	197.00		
28																				
29	H2	CB SWBD H2	0.48	2.39	1.93	2.39	1.93	0.05	0.000	Yes	PNL	25	7.4	18	0.28	Category 0	# 0015	131.60		
30																				
31	L1	CB SWBD L1	0.48	2.50	2.00	2.50	2.00	0.065	0.000	Yes	PNL	25	8.9	18	0.38	Category 0	# 0016	34.00		
32																				
33	L1A	CB SWBD L1A	0.48	2.24	1.83	2.24	1.83	0.065	0.000	Yes	PNL	25	8.4	18	0.34	Category 0	# 0017	168.10		
34																				
35	L1B	CB SWBD L1B	0.48	2.04	1.69	2.04	1.69	0.065	0.000	Yes	PNL	25	8.0	18	0.32	Category 0	# 0018	287.20		
36																				

Arc Flash Evaluation IEEE 1584 - 2002/2004a Edition Bus Report (80% Cleared Fault Threshold, include Ind. Motors for 5.0 Cycles), mis-coordination not checked

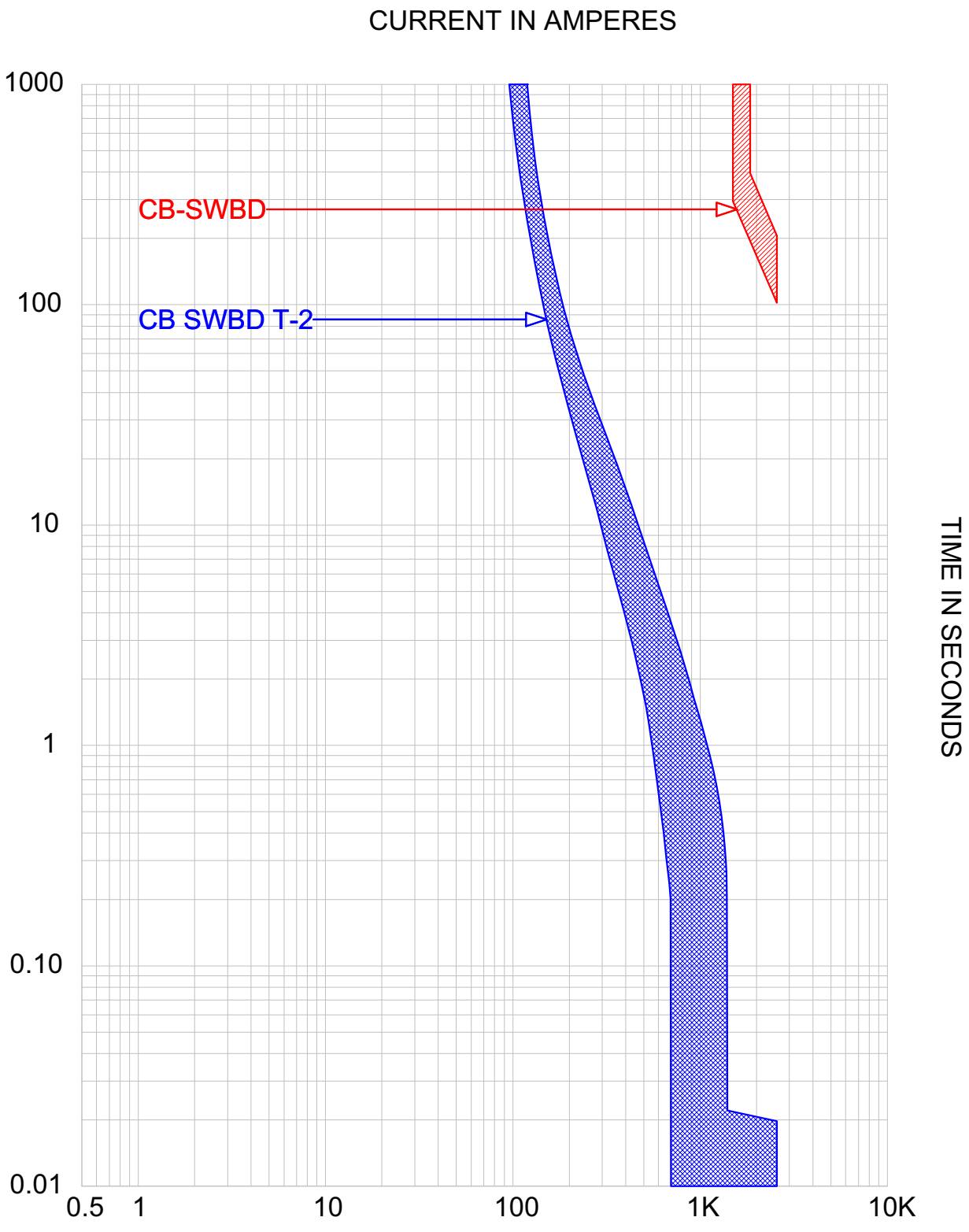
	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	Required Protective FR Clothing Category	Label #	Cable Length From Trip Device (ft)	Incident Energy at Low Marginal	Incident Energy at High Marginal
37	L2A	CB SWBD L2A	0.48	2.31	1.87	2.31	1.87	0.05	0.000	Yes	PNL	25	7.3	18	0.27	Category 0	# 0019	199.00		
38																				
39	L2B	CB SWBD L2B	0.48	2.17	1.78	2.17	1.78	0.05	0.000	Yes	PNL	25	7.1	18	0.26	Category 0	# 0020	318.00		
40																				
41	LCP-L1	CB L1, 1	0.48	2.48	1.99	2.48	1.99	0.05	0.000	Yes	PNL	25	7.6	18	0.29	Category 0	# 0021	8.00		
42																				
43	LCP-L1A	CB L1A, 1	0.48	2.23	1.82	2.23	1.82	0.05	0.000	Yes	PNL	25	7.2	18	0.26	Category 0	# 0022	8.00		
44																				
45	LCP-L1B	CB L1B, 1	0.48	2.03	1.68	2.03	1.68	0.05	0.000	Yes	PNL	25	6.8	18	0.24	Category 0	# 0023	8.00		
46																				
47	LCP-L2A	CB L2A, 1	0.48	2.29	1.86	2.29	1.86	0.05	0.000	Yes	PNL	25	7.3	18	0.27	Category 0	# 0024	8.00		
48																				
49	LCP-L2B	CB L2B, 1	0.48	2.16	1.77	2.16	1.77	0.05	0.000	Yes	PNL	25	7.0	18	0.26	Category 0	# 0025	8.00		
50																				
51	LCP-RPD	CB	0.208	0.69	0.69	0.69	0.69	0.056	0.000	Yes	PNL	25	2.3	18	0.02	Category 0 (*N11)	# 0026	8.00		
52																				
53	LPA	CB DP1, 1	0.48	2.33	1.89	2.33	1.89	0.05	0.000	Yes	PNL	25	7.3	18	0.27	Category 0	# 0027	44.80		
54																				
55	LPC	CB LPC	0.48	2.29	1.86	2.29	1.86	0.05	0.000	Yes	PNL	25	7.3	18	0.27	Category 0	# 0028	98.00		
56																				
57	LSL1A	CB SWBD ATS-LS	0.48	2.51	2.01	2.51	2.01	0.175	0.000	Yes	PNL	25	16	18	1.0	Category 0	# 0029	37.80		
58																				
59	LSL1B	CB LSL1A LSL1B	0.48	1.94	1.61	1.94	1.61	0.05	0.000	Yes	PNL	25	6.6	18	0.23	Category 0	# 0030	277.00		
60																				
61	LSL2A	CB LSL1A LSL2A	0.48	1.48	1.09	1.48	1.09	0.264	0.000	Yes	PNL	25	14	18	0.80	Category 0 (*N3)	# 0031	212.00		
62																				
63	LSL2B	CB LSL1B, 1	0.48	1.78	1.50	1.78	1.50	0.024	0.000	Yes	PNL	25	4.0	18	0.10	Category 0	# 0032	35.00		
64																				
65	LSLPA	CB LSL1A LSLPA	0.48	1.48	1.09	1.48	1.09	0.26	0.000	Yes	PNL	25	14	18	0.79	Category 0 (*N3)	# 0033	210.00		
66																				
67	LSR1A	CB LSR1A	0.208	0.85	0.66	0.85	0.66	0.19	0.000	Yes	PNL	25	8.2	18	0.33	Category 0 (*N3)	# 0034			
68																				
69	LSR1B	CB LSR1B	0.208	0.93	0.70	0.93	0.70	1.201	0.000	Yes	PNL	25	26	18	2.2	Category 1 (*N3)	# 0035			
70																				
71	MEG	CB DP3	0.208	1.20	0.98	1.20	0.98	0.051	0.000	Yes	PNL	25	4.8	18	0.14	Category 0	# 0036	68.00		
72																				
73	MRI	CB SWBD MRI	0.48	2.13	1.75	2.13	1.75	0.051	0.000	Yes	PNL	25	7.1	18	0.26	Category 0	# 0037	268.00		
74																				

Arc Flash Evaluation IEEE 1584 - 2002/2004a Edition Bus Report (80% Cleared Fault Threshold, include Ind. Motors for 5.0 Cycles), mis-coordination not checked

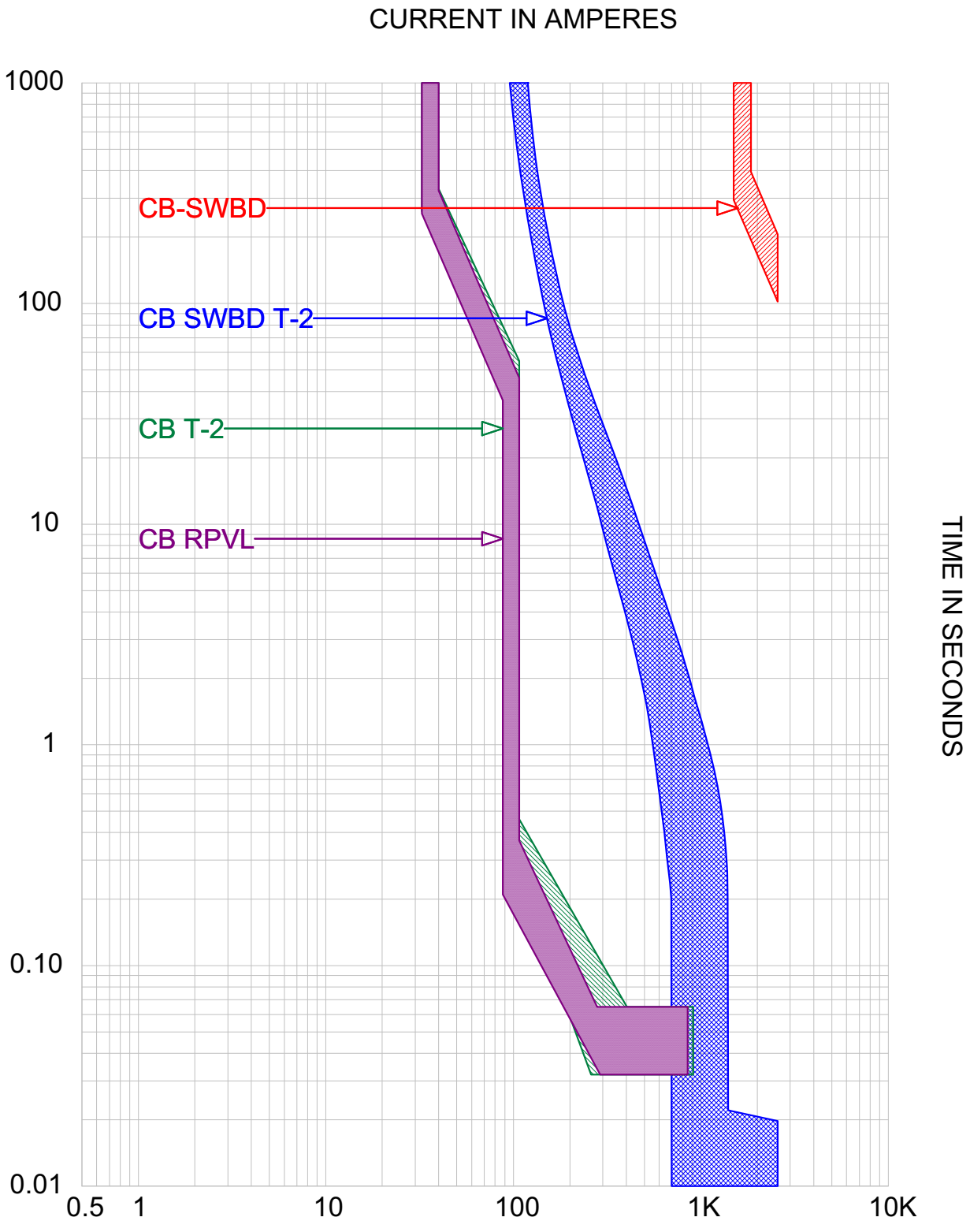
	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	Required Protective FR Clothing Category	Label #	Cable Length From Trip Device (ft)	Incident Energy at Low Marginal	Incident Energy at High Marginal
75	PET	CB SWBD PET	0.48	2.05	1.69	2.05	1.69	0.052	0.000	Yes	PNL	25	7.0	18	0.25	Category 0	# 0038	330.00		
76																				
77	R-GEN	CB LSR1A, 1	0.208	0.40	0.40	0.40	0.40	2	0.000	Yes	PNL	25	11	18	0.41	Category 0 (*N11) (*N9)	# 0039	310.00		
78																				
79	R1	CB R1	0.208	1.24	1.00	1.24	1.00	0.051	0.000	Yes	PNL	25	4.9	18	0.14	Category 0	# 0040			
80																				
81	R1A1	CB R1A1	0.208	1.49	1.14	1.49	1.14	0.15	0.000	Yes	PNL	25	10	18	0.48	Category 0	# 0041			
82																				
83	R1A2	CB R1A2	0.208	1.49	1.14	1.49	1.14	0.15	0.000	Yes	PNL	25	10	18	0.48	Category 0	# 0042			
84																				
85	R1B1	CB R1B1	0.208	1.30	1.04	1.30	1.04	0.15	0.000	Yes	PNL	25	9.7	18	0.43	Category 0	# 0043			
86																				
87	R1B2	CB R1B2	0.208	1.30	1.04	1.30	1.04	0.15	0.000	Yes	PNL	25	9.7	18	0.43	Category 0	# 0044			
88																				
89	R2A1	CB R2A1	0.208	1.47	1.13	1.47	1.13	0.15	0.000	Yes	PNL	25	10	18	0.47	Category 0	# 0045			
90																				
91	R2A2	CB R2A2	0.208	1.47	1.13	1.47	1.13	0.15	0.000	Yes	PNL	25	10	18	0.47	Category 0	# 0046			
92																				
93	R2B1	CB R2B1	0.208	1.53	0.99	1.53	0.99	0.19	0.000	Yes	PNL	25	11	18	0.52	Category 0 (*N3)	# 0047			
94																				
95	R2B2	CB R2B2	0.208	1.54	1.17	1.54	1.17	0.05	0.000	Yes	PNL	25	5.3	18	0.16	Category 0	# 0048			
96																				
97	R2B3	CB R2B3	0.208	1.48	1.14	1.48	1.14	0.05	0.000	Yes	PNL	25	5.3	18	0.16	Category 0	# 0049	22.00		
98																				
99	RPA	CB DP2 RPA	0.208	0.69	0.69	0.69	0.69	0.101	0.000	Yes	PNL	25	3.1	18	0.04	Category 0 (*N11)	# 0050	43.00		
100																				
101	RPB	CB DP2 RPB	0.208	0.68	0.68	0.68	0.68	0.058	0.000	Yes	PNL	25	2.3	18	0.02	Category 0 (*N11)	# 0051	58.00		
102																				
103	RPC	CB DP2 RPC	0.208	0.66	0.66	0.66	0.66	0.108	0.000	Yes	PNL	25	3.1	18	0.04	Category 0 (*N11)	# 0052	110.00		
104																				
105	RPD	CB DP2 RPD	0.208	0.70	0.67	0.70	0.67	0.05	0.000	Yes	PNL	25	3.7	18	0.09	Category 0	# 0053	52.00		
106																				
107	RPVL	CB RPVL	0.208	1.96	1.39	1.96	1.39	0.065	0.000	Yes	PNL	25	7.0	18	0.26	Category 0	# 0054			
108																				
109	SNW MLT	CB SNW MLT	0.208	0.68	0.68	0.68	0.68	0.376	0.000	Yes	PNL	25	6.0	18	0.13	Category 0 (*N11)	# 0055	55.00		
110																				
111	SWBD	CB-SWBD	0.48	2.56	2.05	2.56	2.05	2	0.000	Yes	PNL	25	73	18	12	Category 3 (*N9)	# 0056			
112																				

Arc Flash Evaluation IEEE 1584 - 2002/2004a Edition Bus Report (80% Cleared Fault Threshold, include Ind. Motors for 5.0 Cycles), mis-coordination not checked

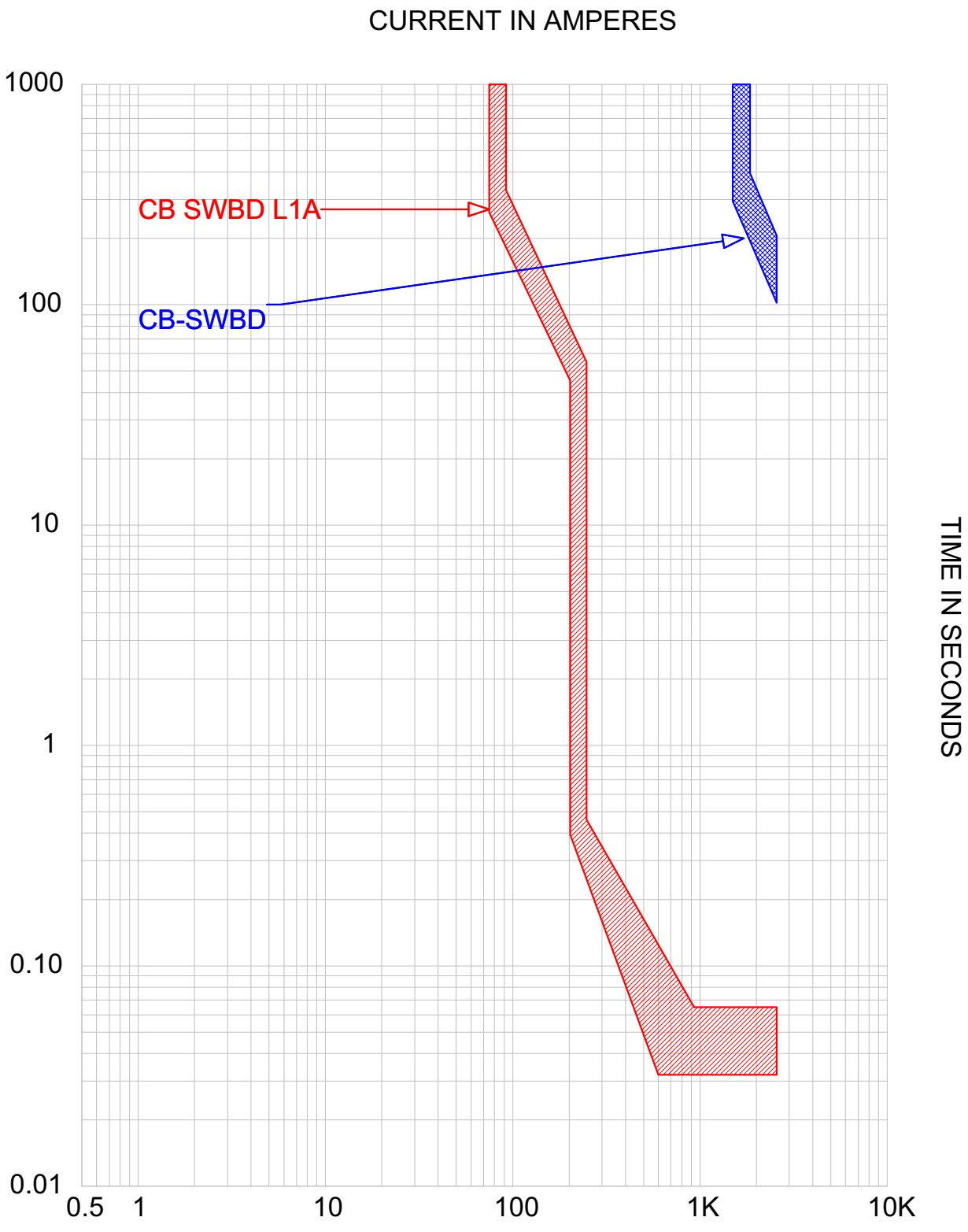
	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	Required Protective FR Clothing Category	Label #	Cable Length From Trip Device (ft)	Incident Energy at Low Marginal	Incident Energy at High Marginal
113	Category 0: Nonmelting, Flammable Materials with Weight >= 4.5 oz/sq yd															(*N11) - Out of IEEE 1584 Range, Lee Equation Used. Applicable for Open Air only. Existing Equipment type is not Open Air!				
114	Category 1: Arc-rated FR Shirt & Pants															(*N2) < 80% Cleared Fault				
115	Category 2: Arc-rated FR Shirt & Pants															(*N3) - Arcing Current Low Tolerances Used				
116	Category 3: Arc-rated FR Shirt & Pants & Arc Flash Suit															(*N9) - Max Arcing Duration Reached				
117	Category 4: Arc-rated FR Shirt & Pants & Arc Flash Suit																			
118	Category Dangerous!: No FR Category Found	Device with 80% Cleared Fault Threshold														IEEE 1584 - 2002/2004a Edition Bus Report (80% Cleared Fault Threshold, include Ind. Motors for 5.0 Cycles), mis-coordination not checked				



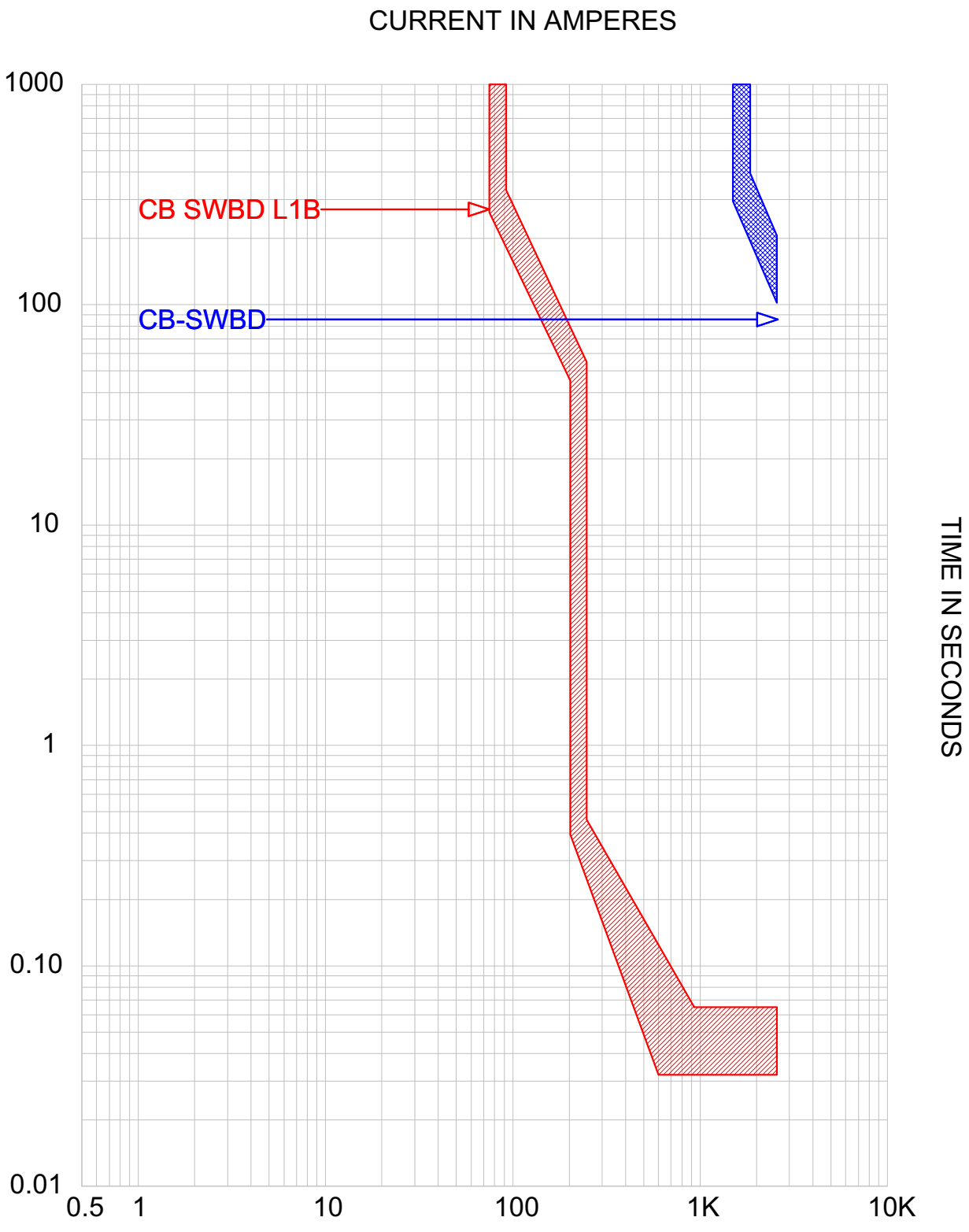
CB SWBD T-2.tcc Ref. Voltage: 480V Current in Amps x 1



CB RPVL.tcc Ref. Voltage: 480V Current in Amps x 1



CB SWBD L1A.tcc Ref. Voltage: 480V Current in Amps x 1



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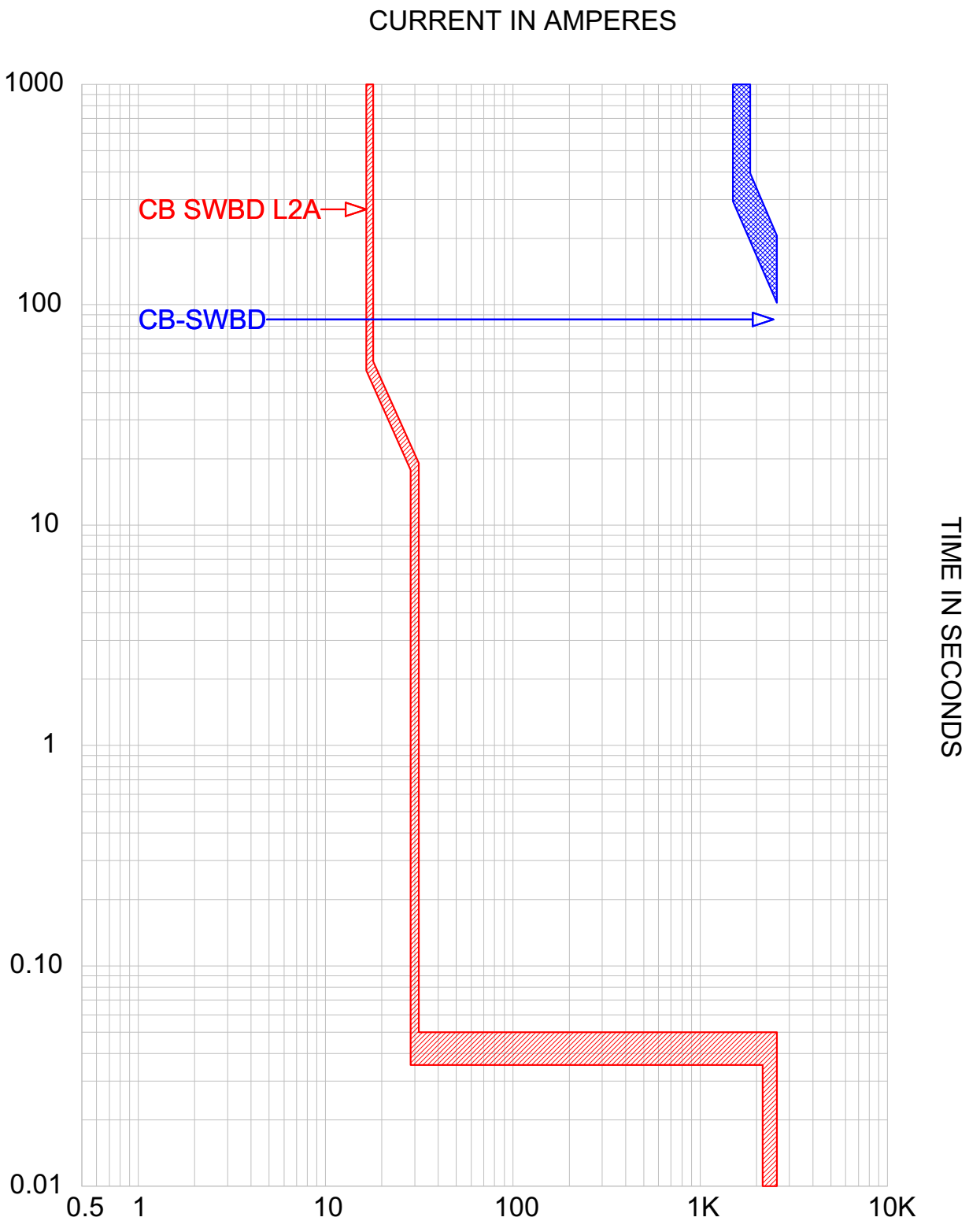
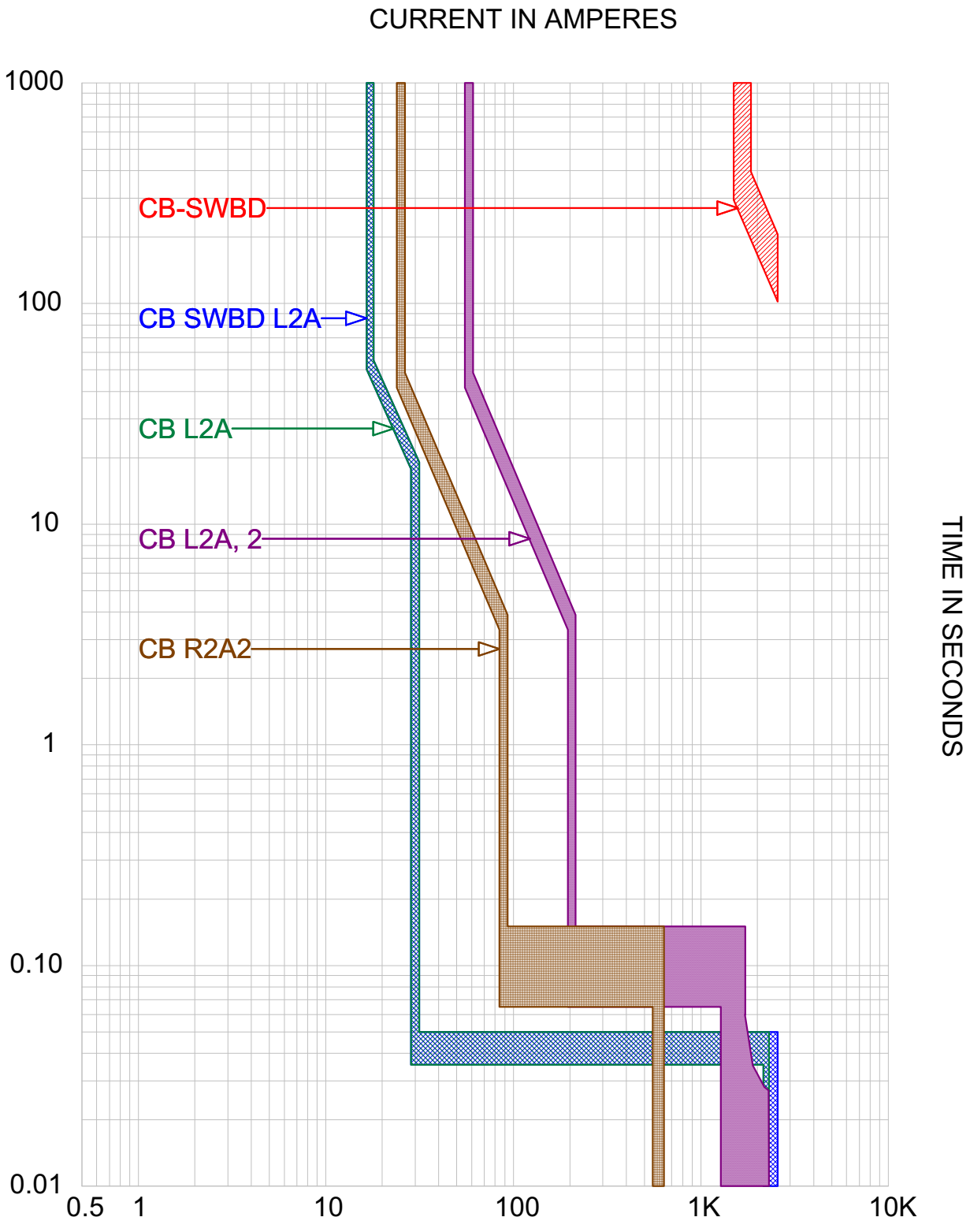


CB SWBD L2A.tcc Ref. Voltage: 480V Current in Amps x 1



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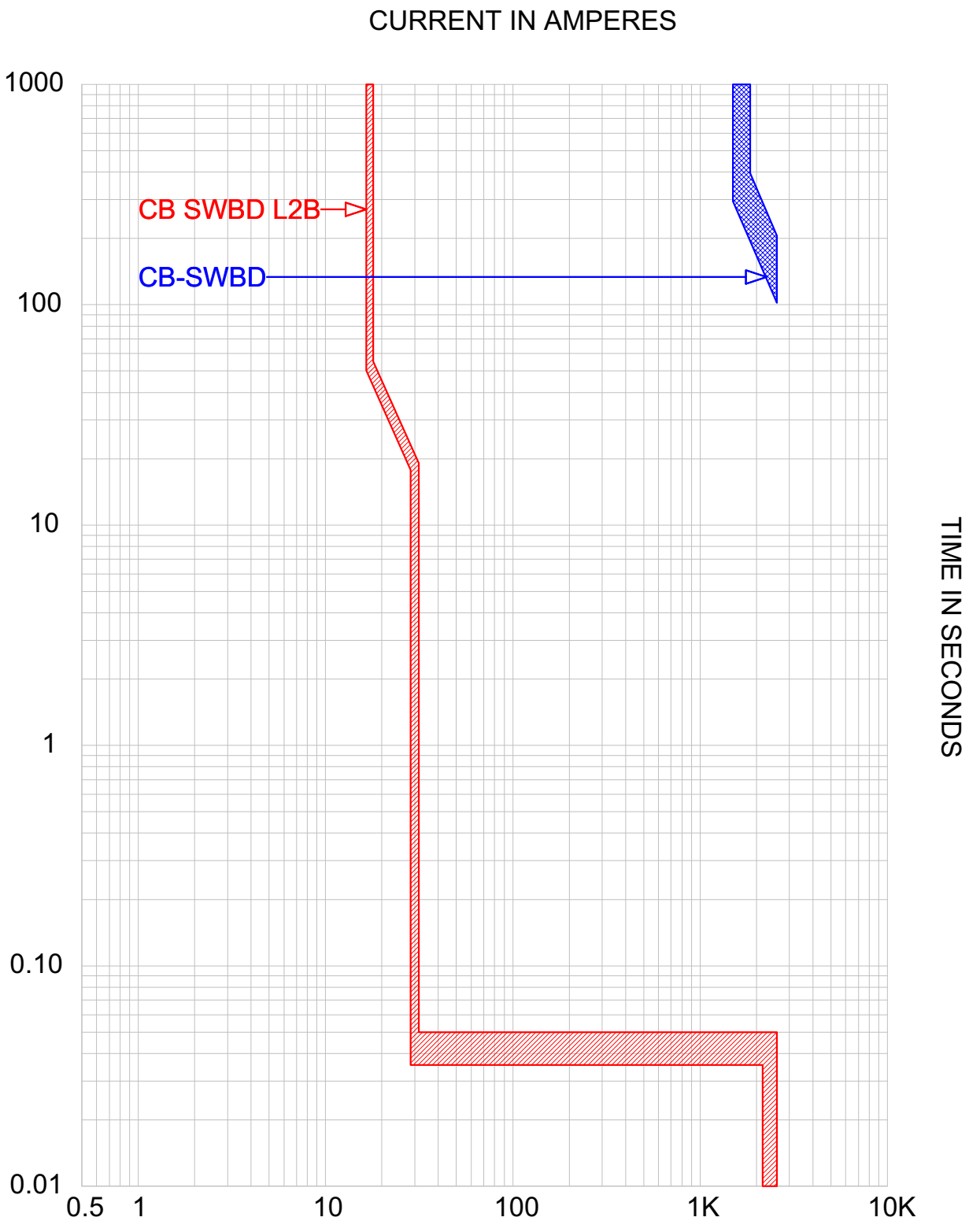

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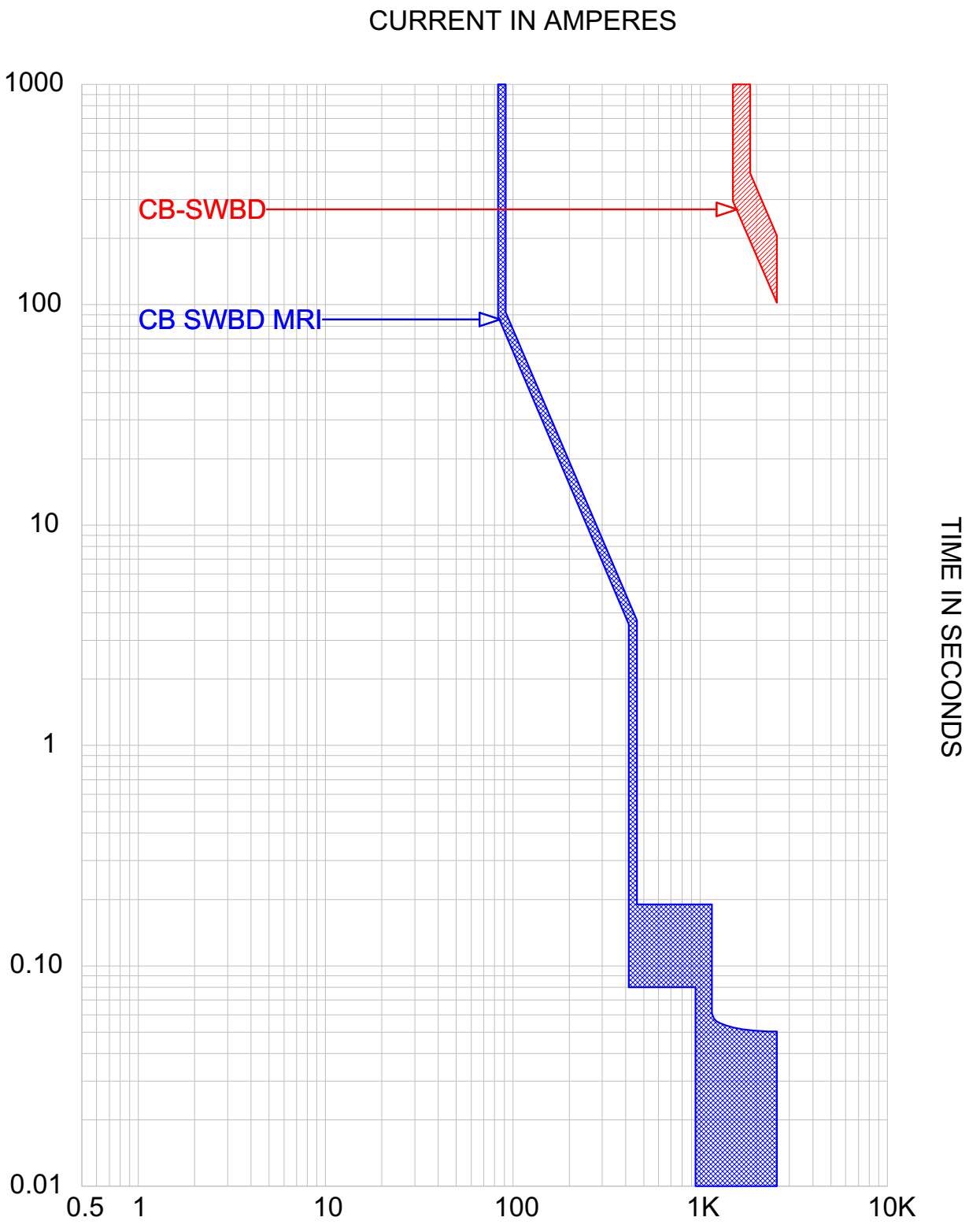
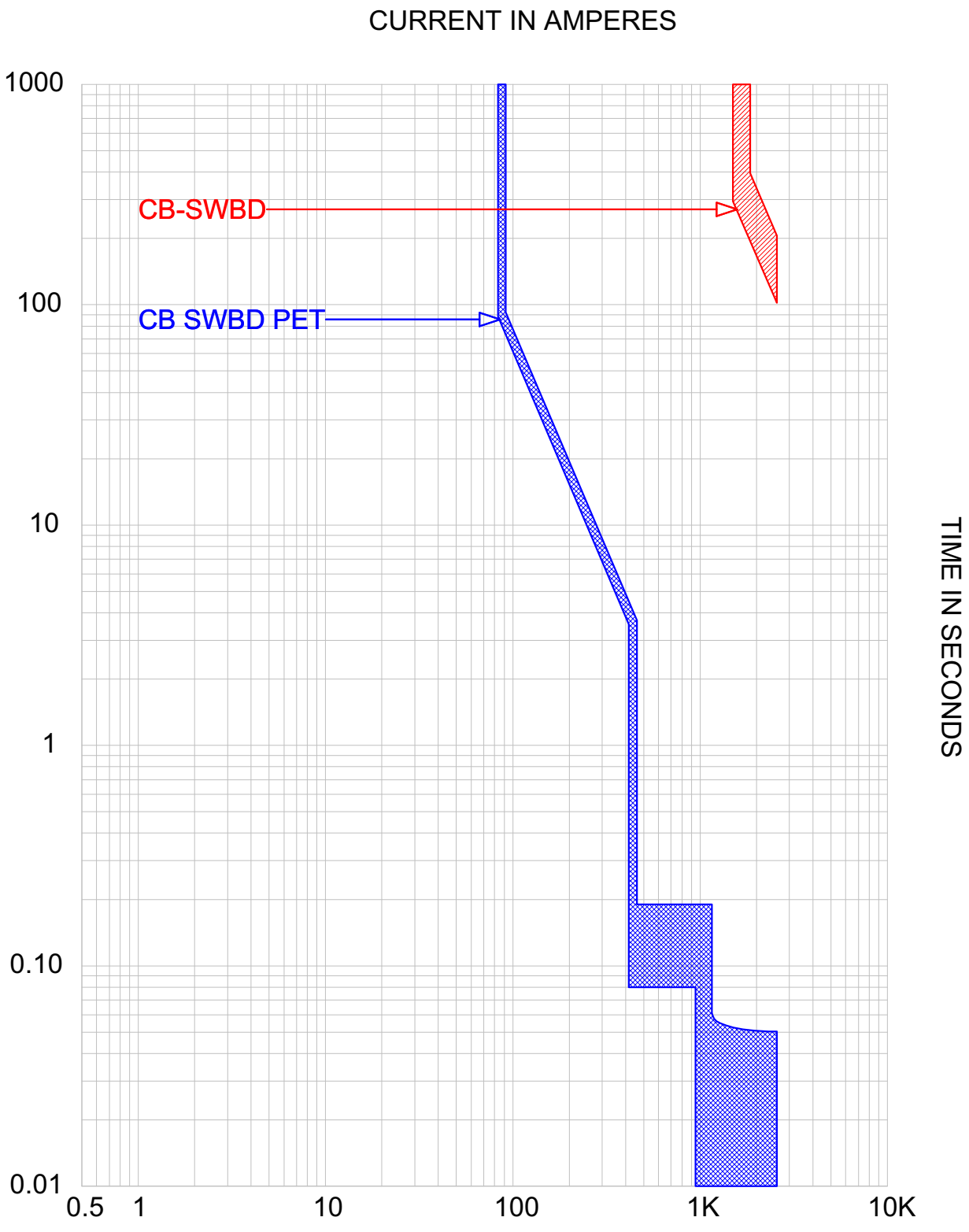


CB SWBD MRI.tcc Ref. Voltage: 480V Current in Amps x 1



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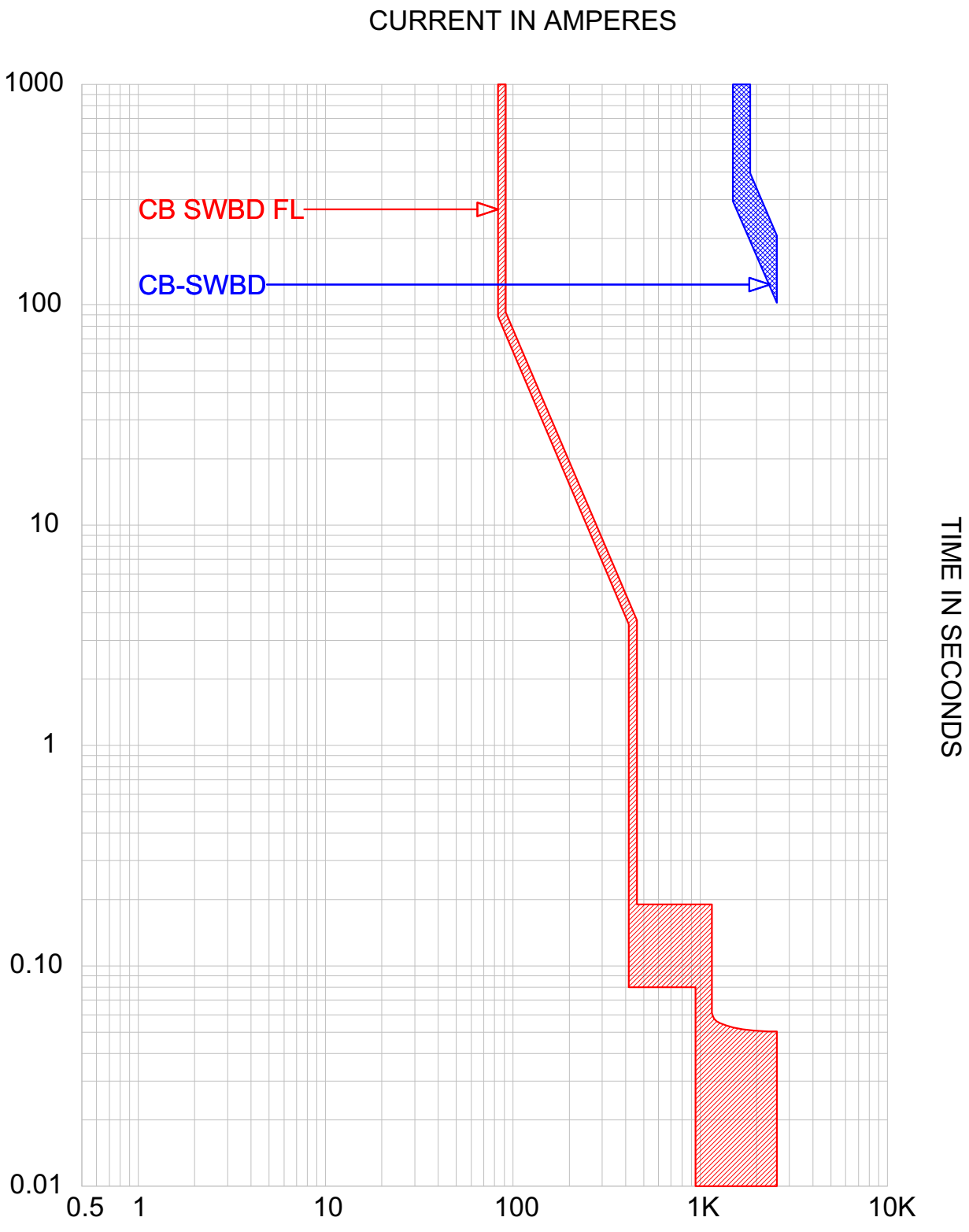

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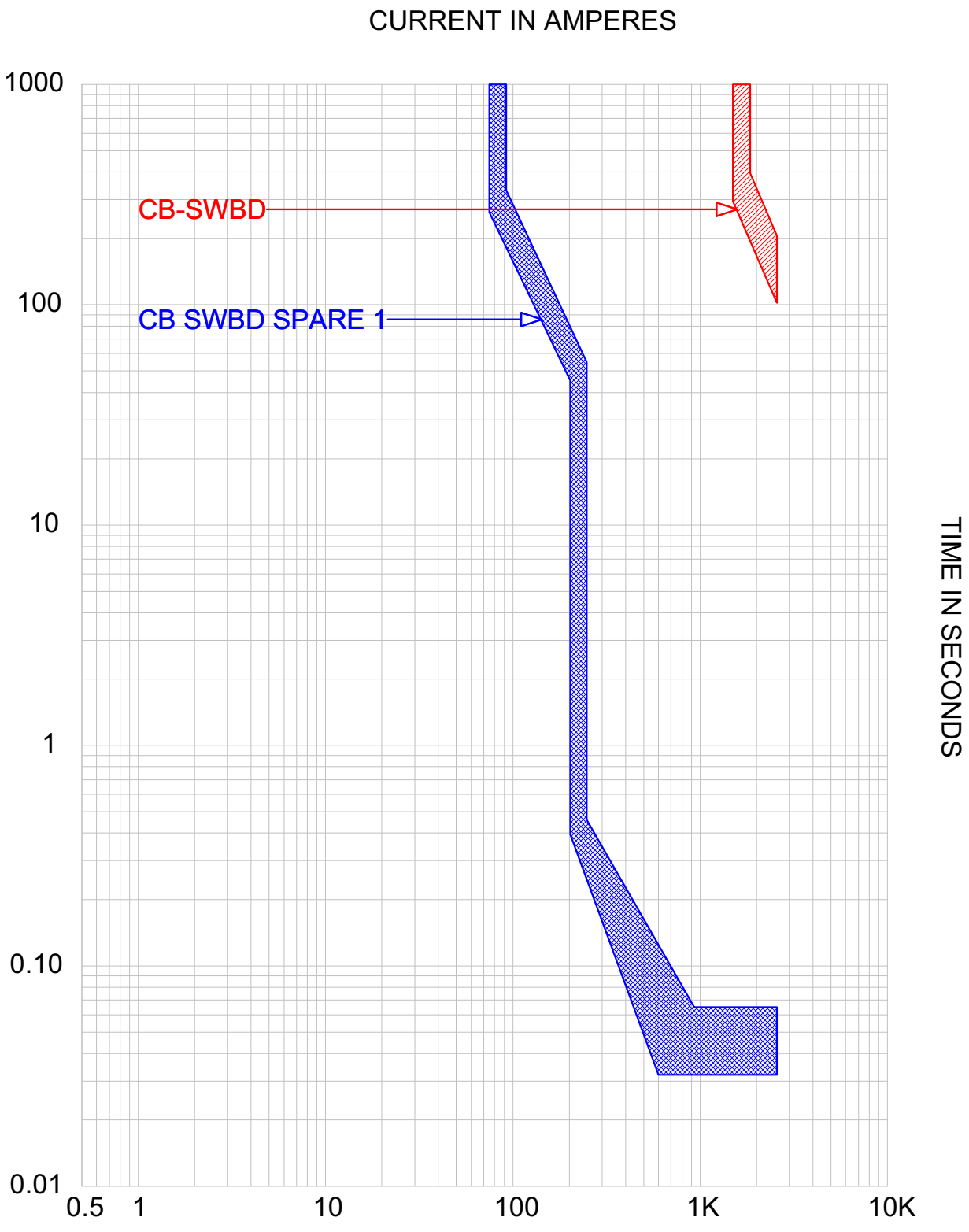
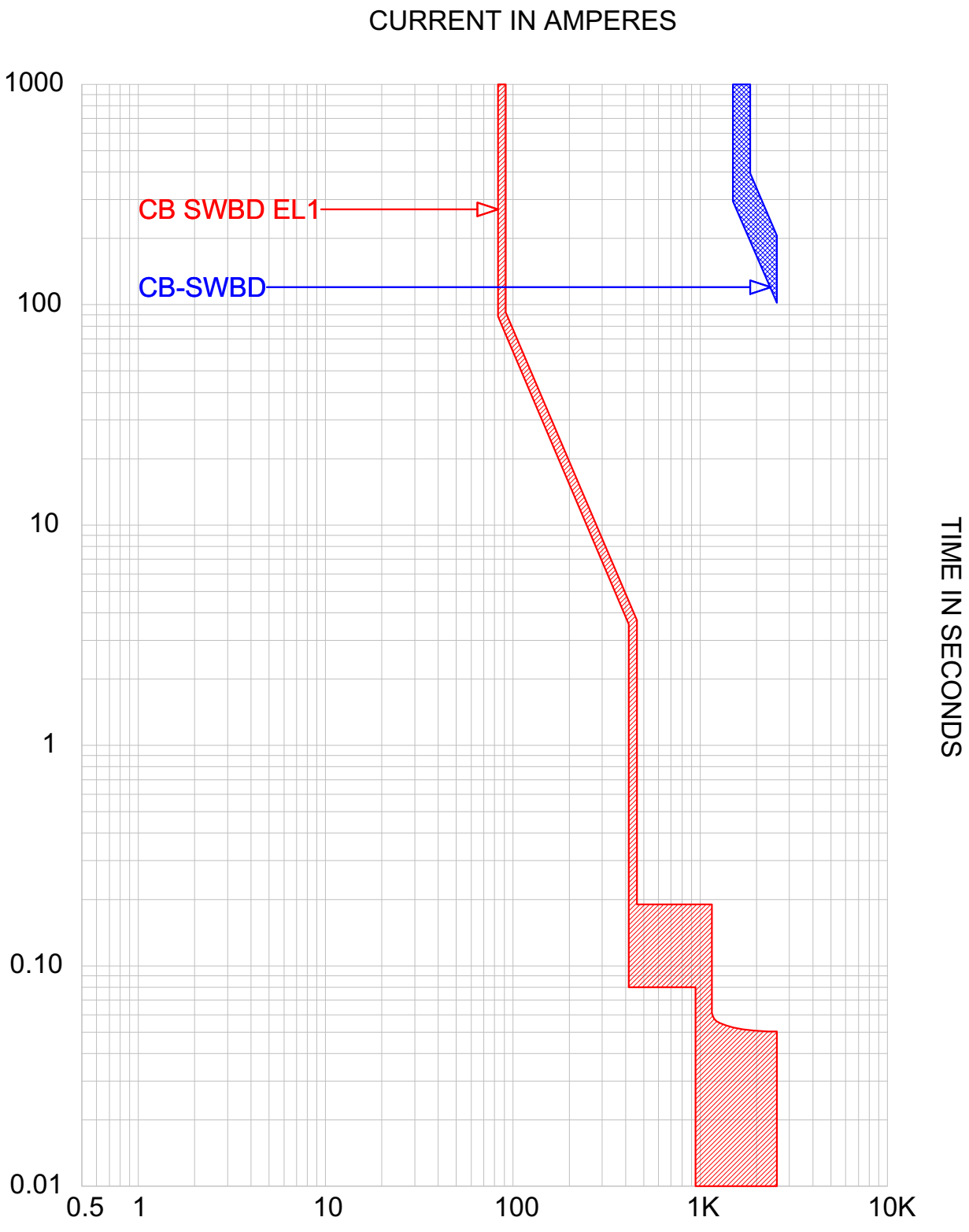
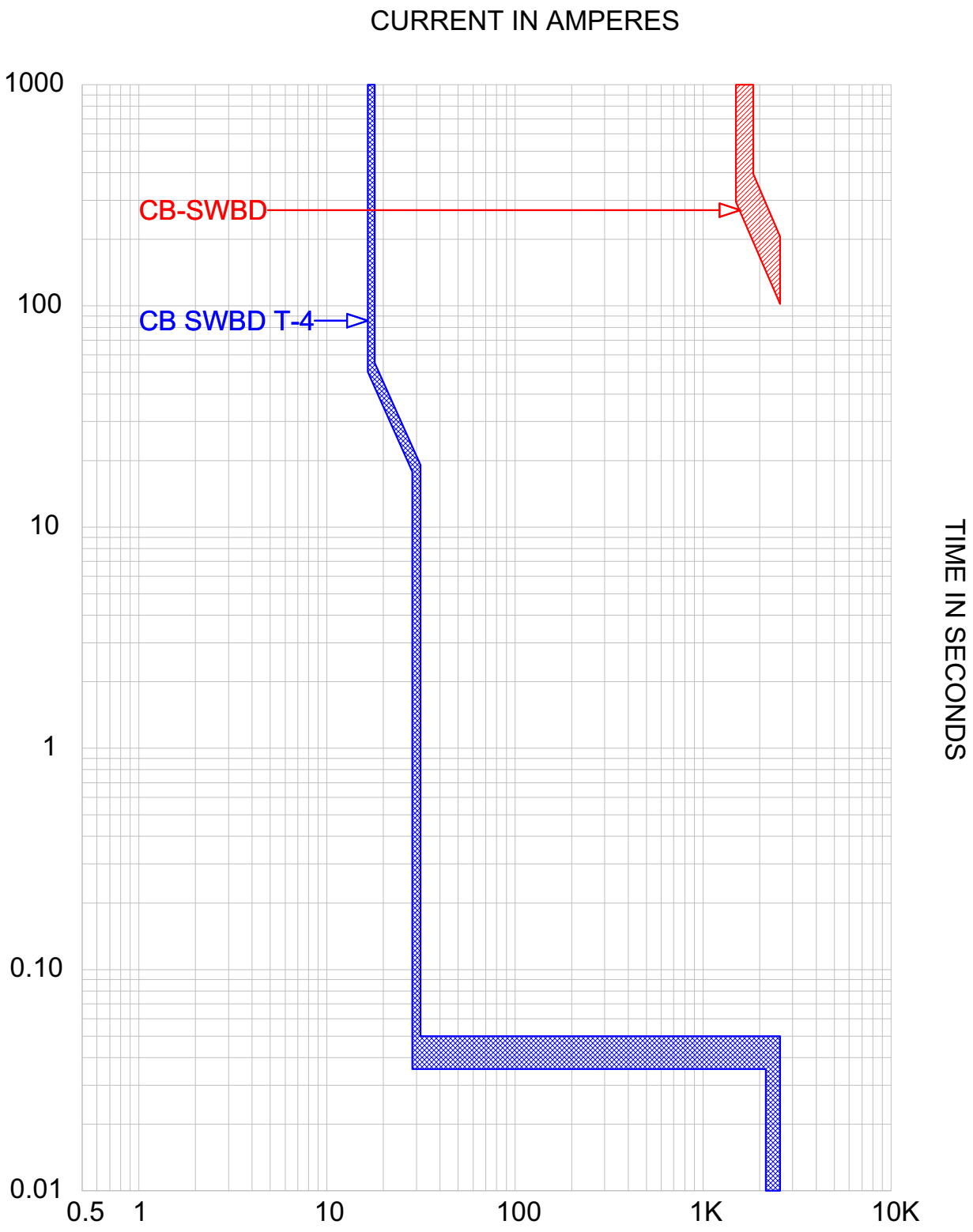


CB SWBD SPARE 1.tcc Ref. Voltage: 480V Current in Amps x 1



CB SWBD EL1.tcc Ref. Voltage: 480V Current in Amps x 1



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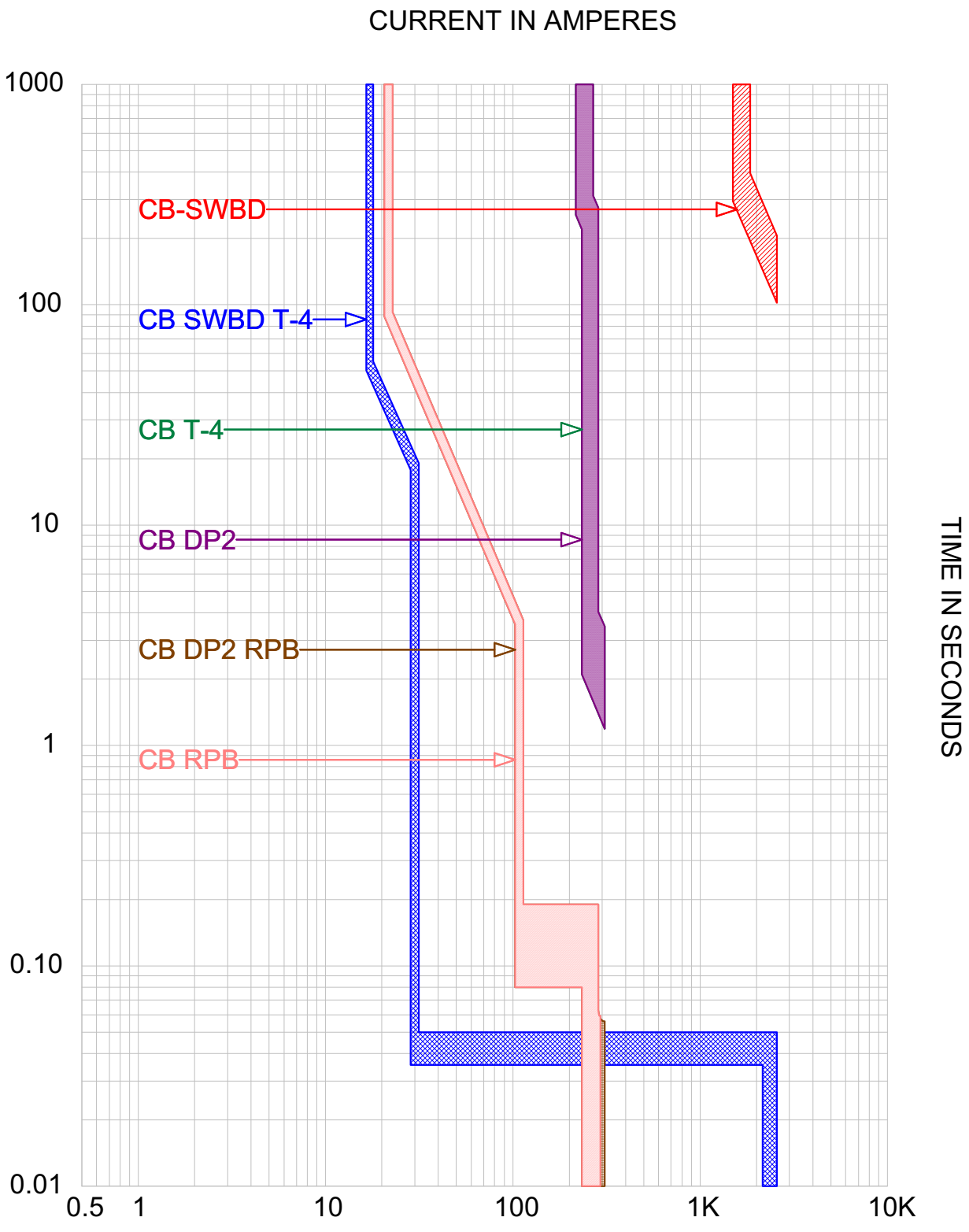

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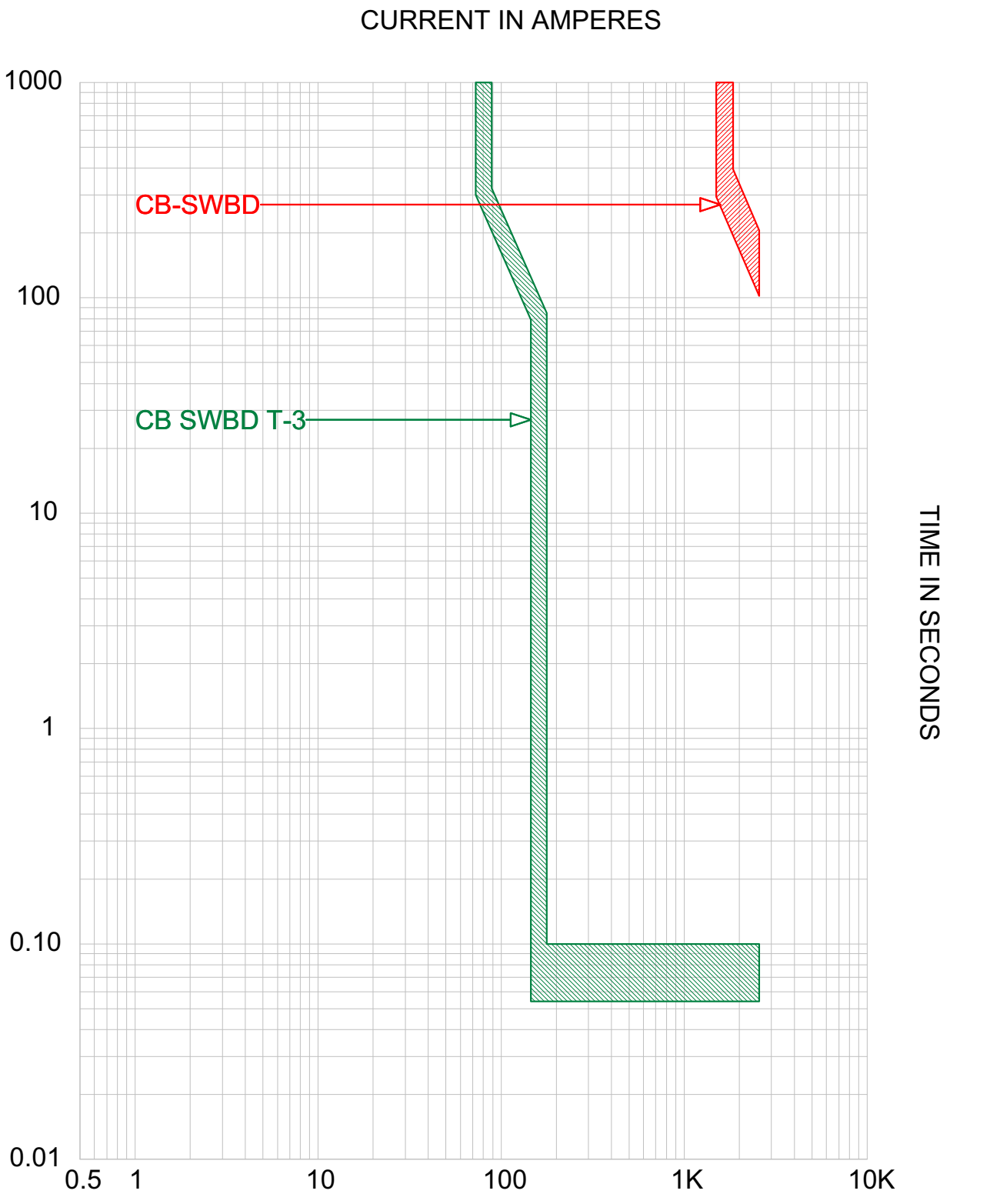

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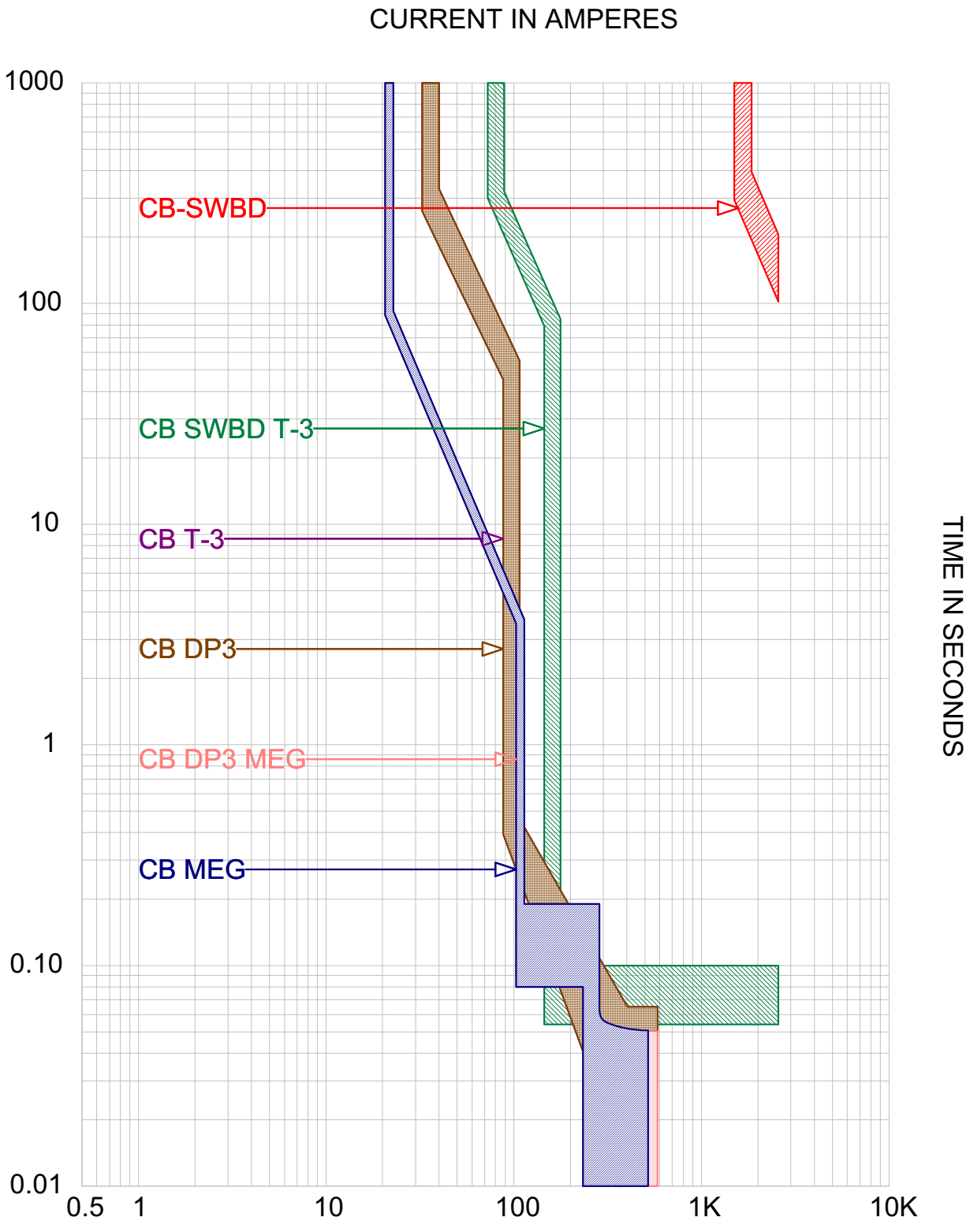
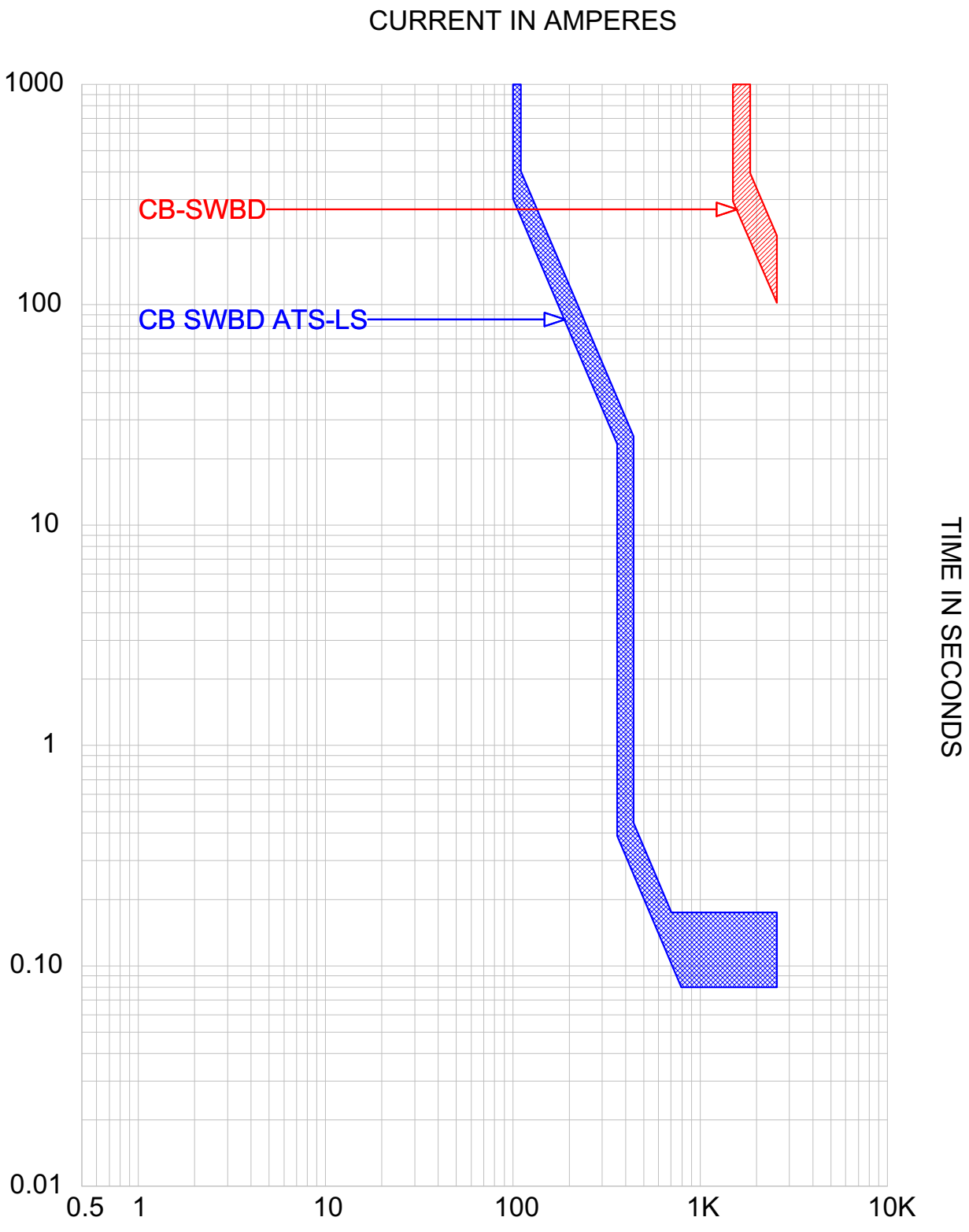
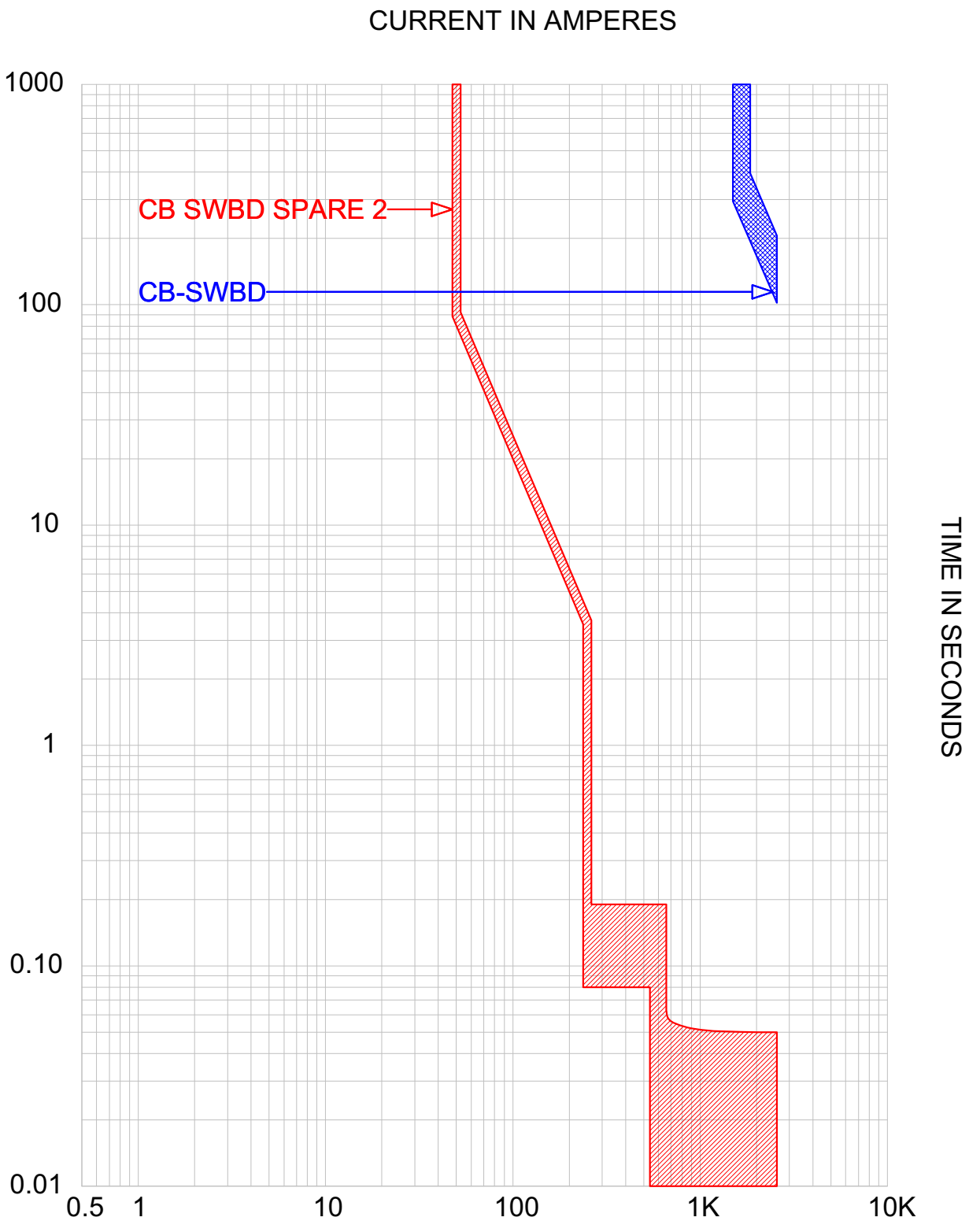


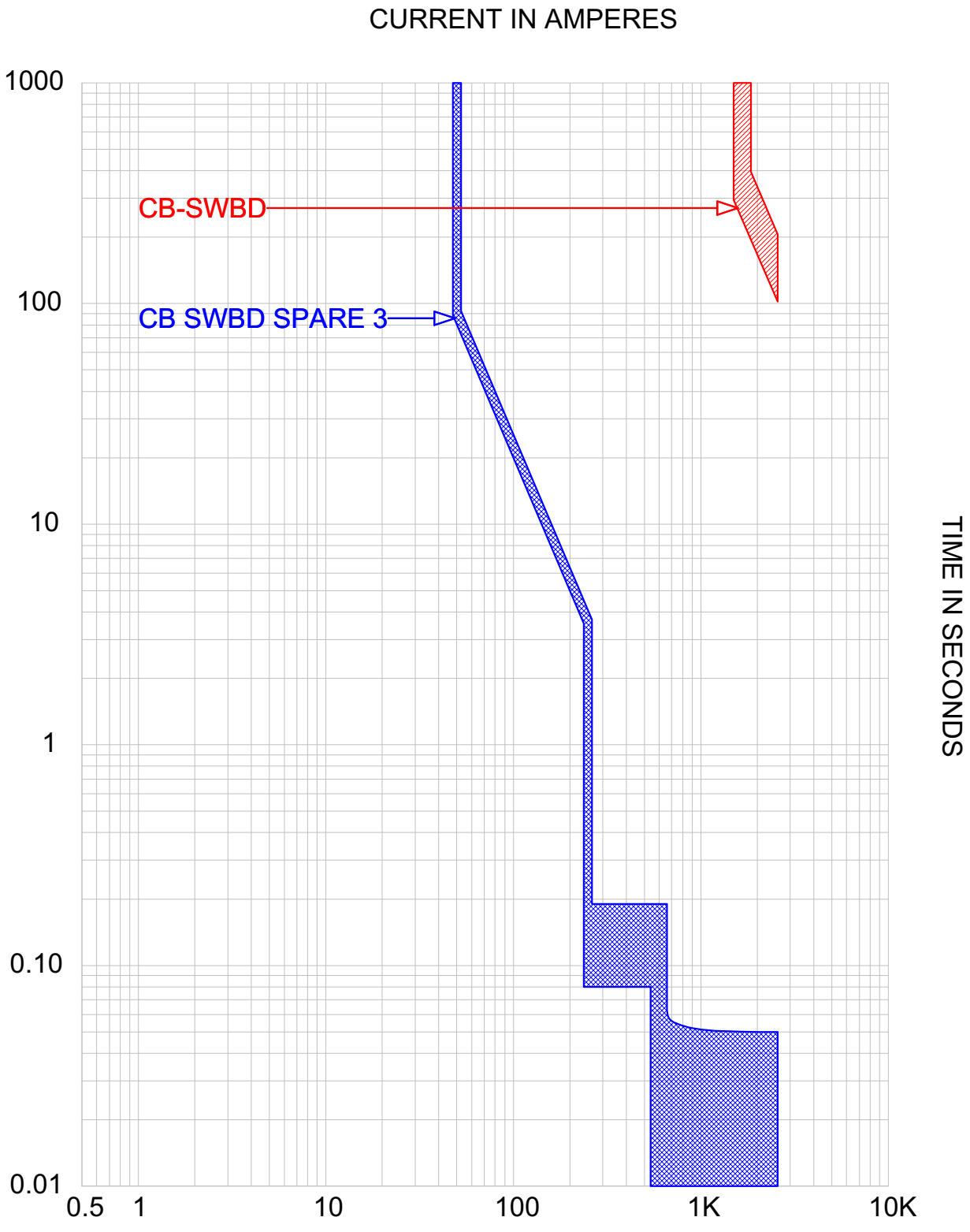
CB MEG.tcc Ref. Voltage: 480V Current in Amps x 1



CB SWBD ATS-LS.tcc Ref. Voltage: 480V Current in Amps x 1



CB SWBD SPARE 2.tcc Ref. Voltage: 480V Current in Amps x 1



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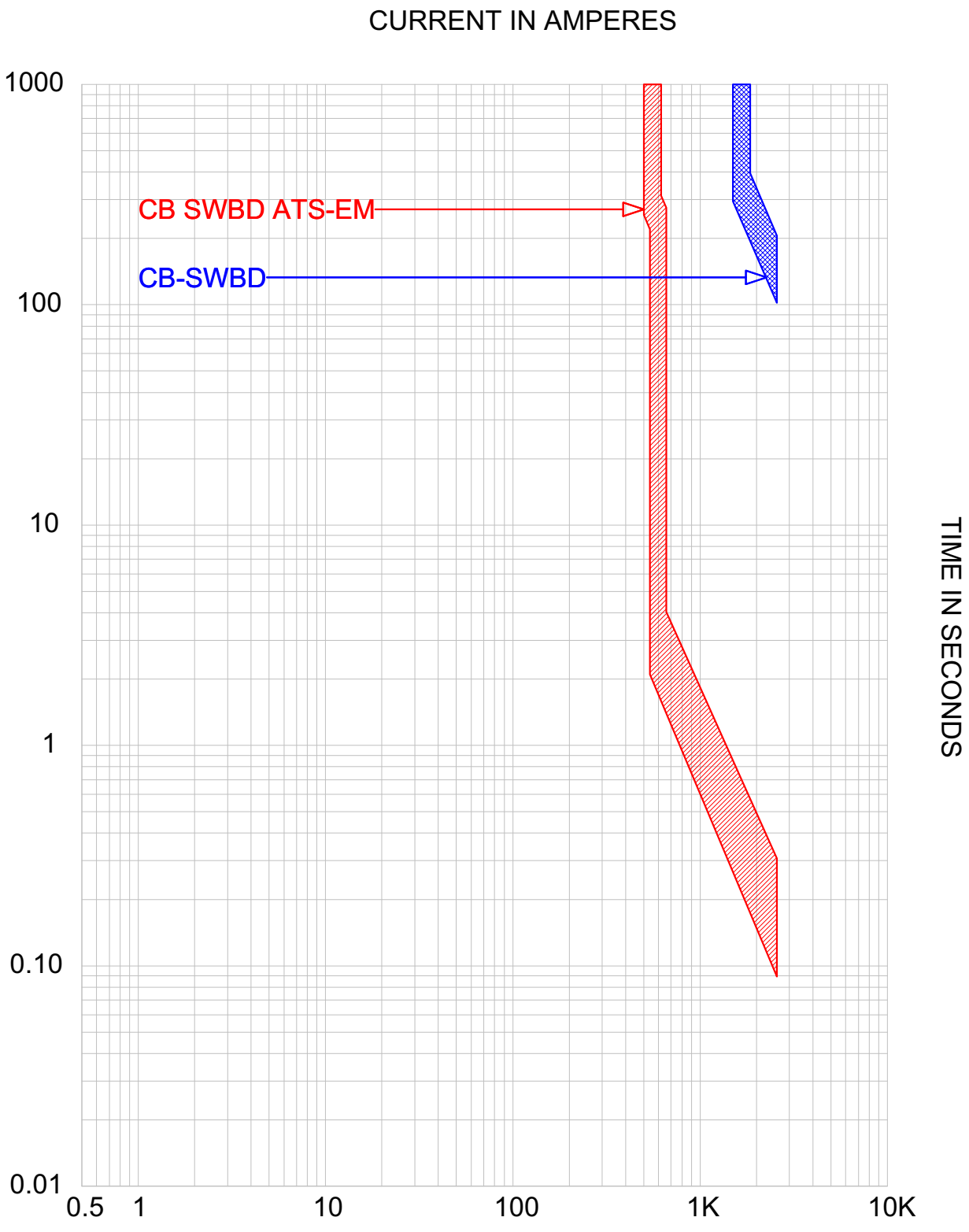
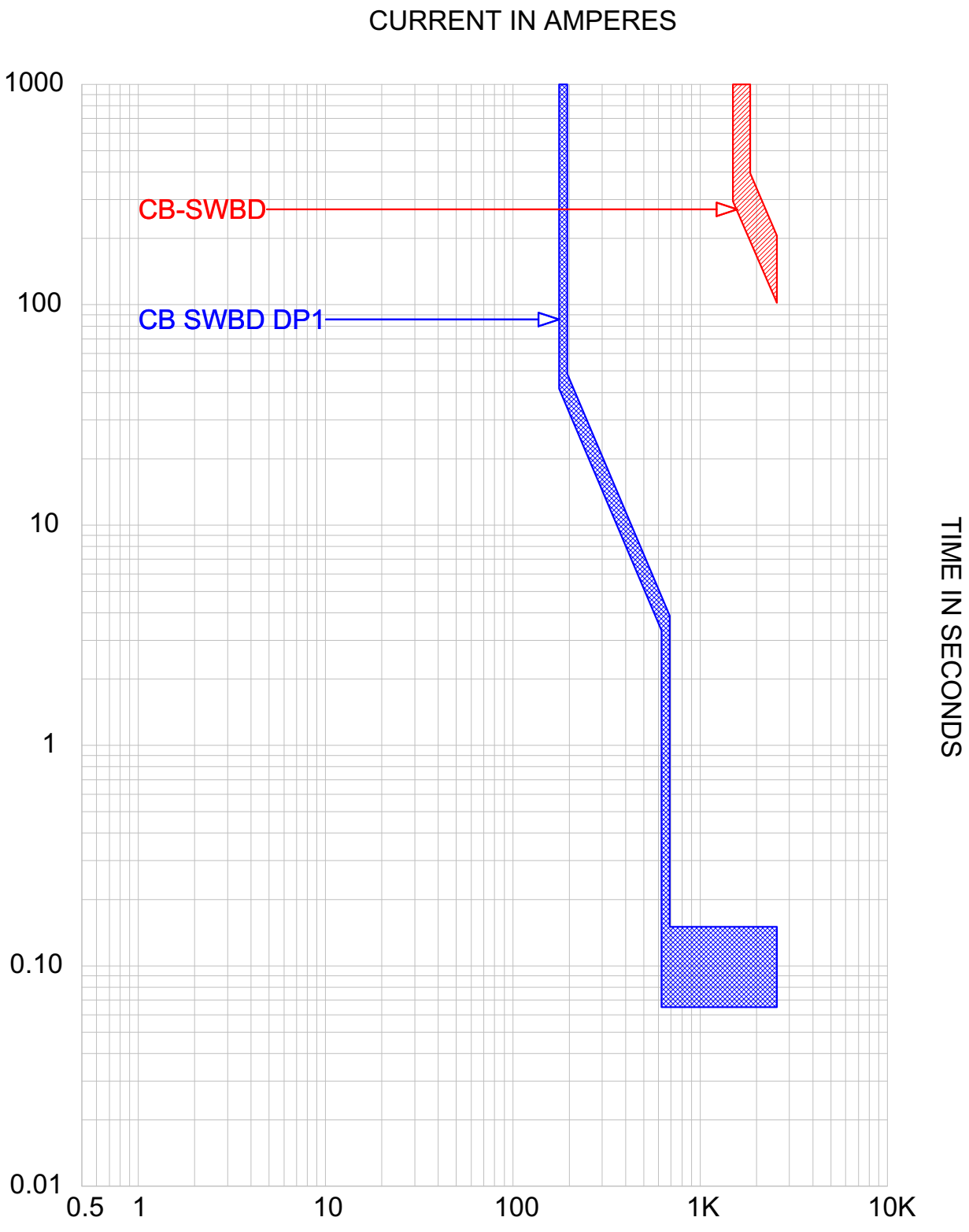
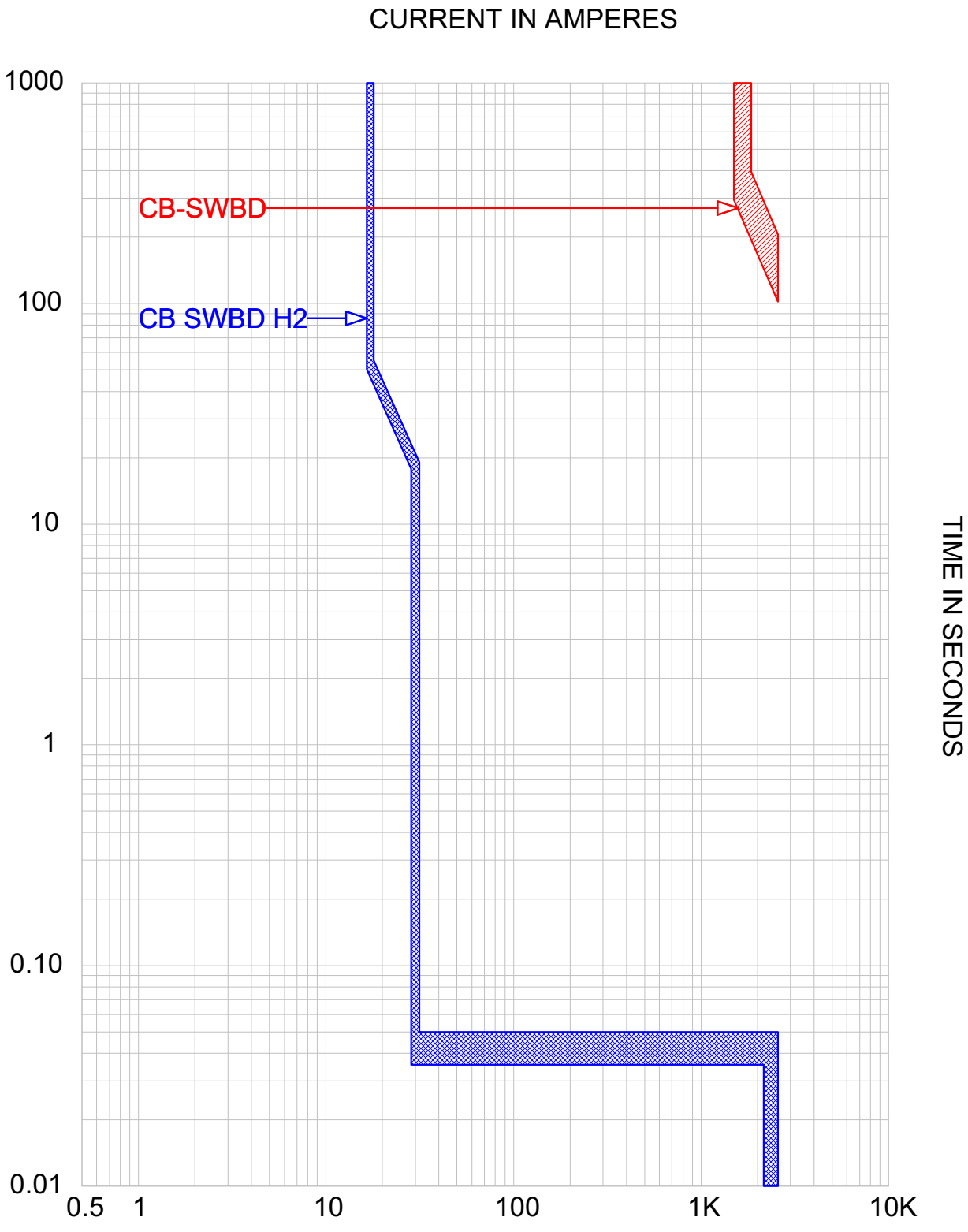


CB SWBD ATS-EM.tcc Ref. Voltage: 480V Current in Amps x 1



CB SWBD DP1.tcc Ref. Voltage: 480V Current in Amps x 1



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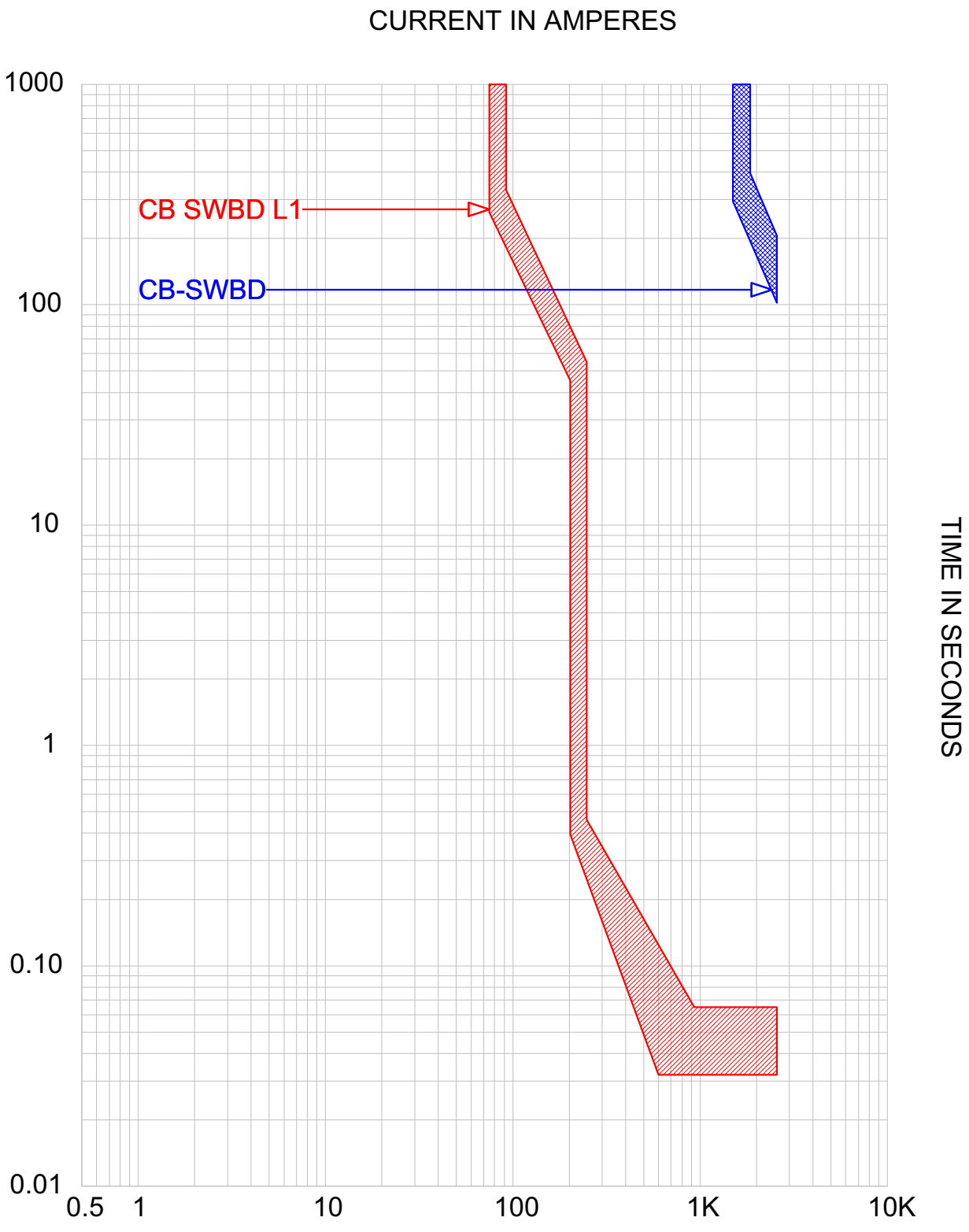
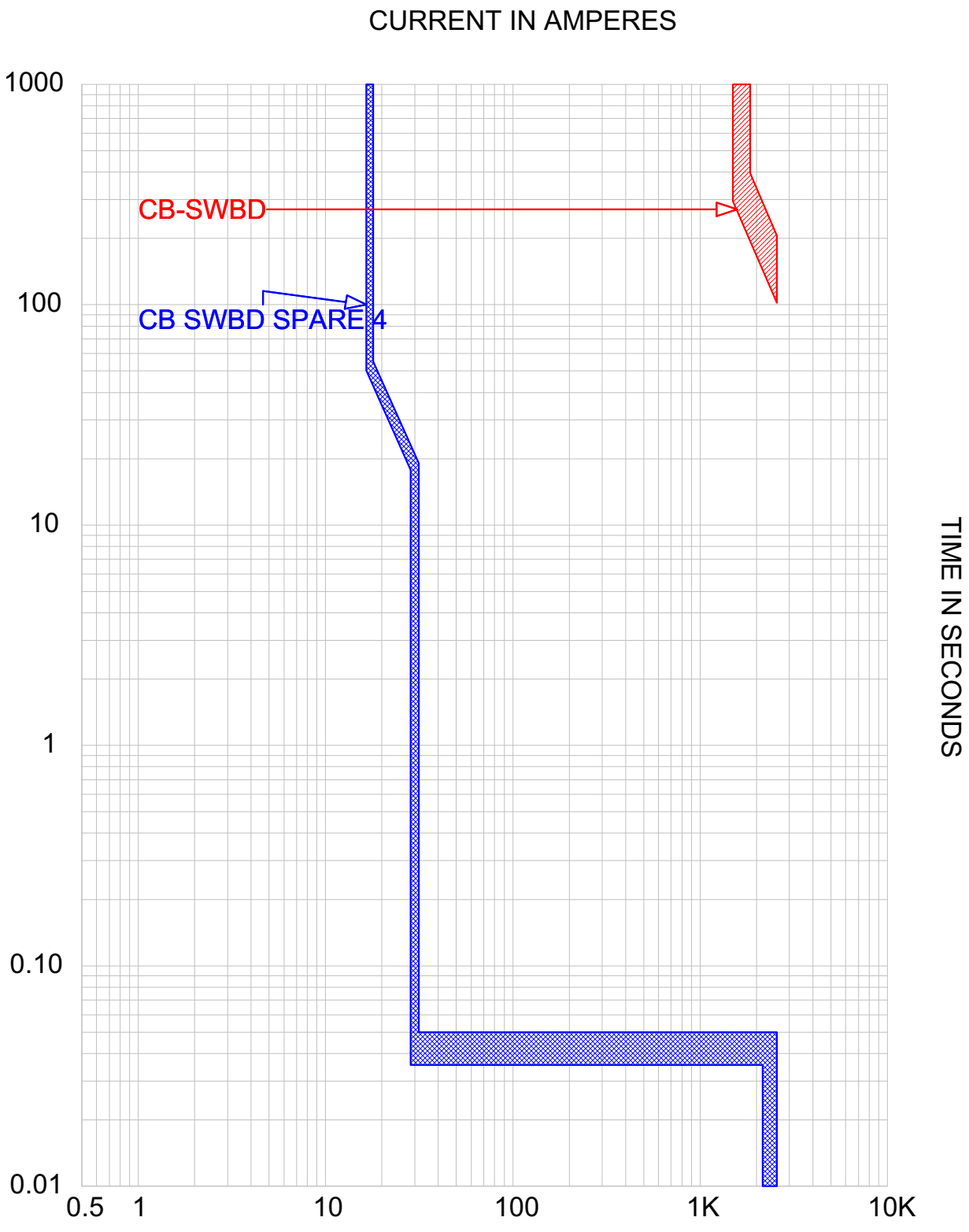


CB SWBD L1.tcc Ref. Voltage: 480V Current in Amps x 1



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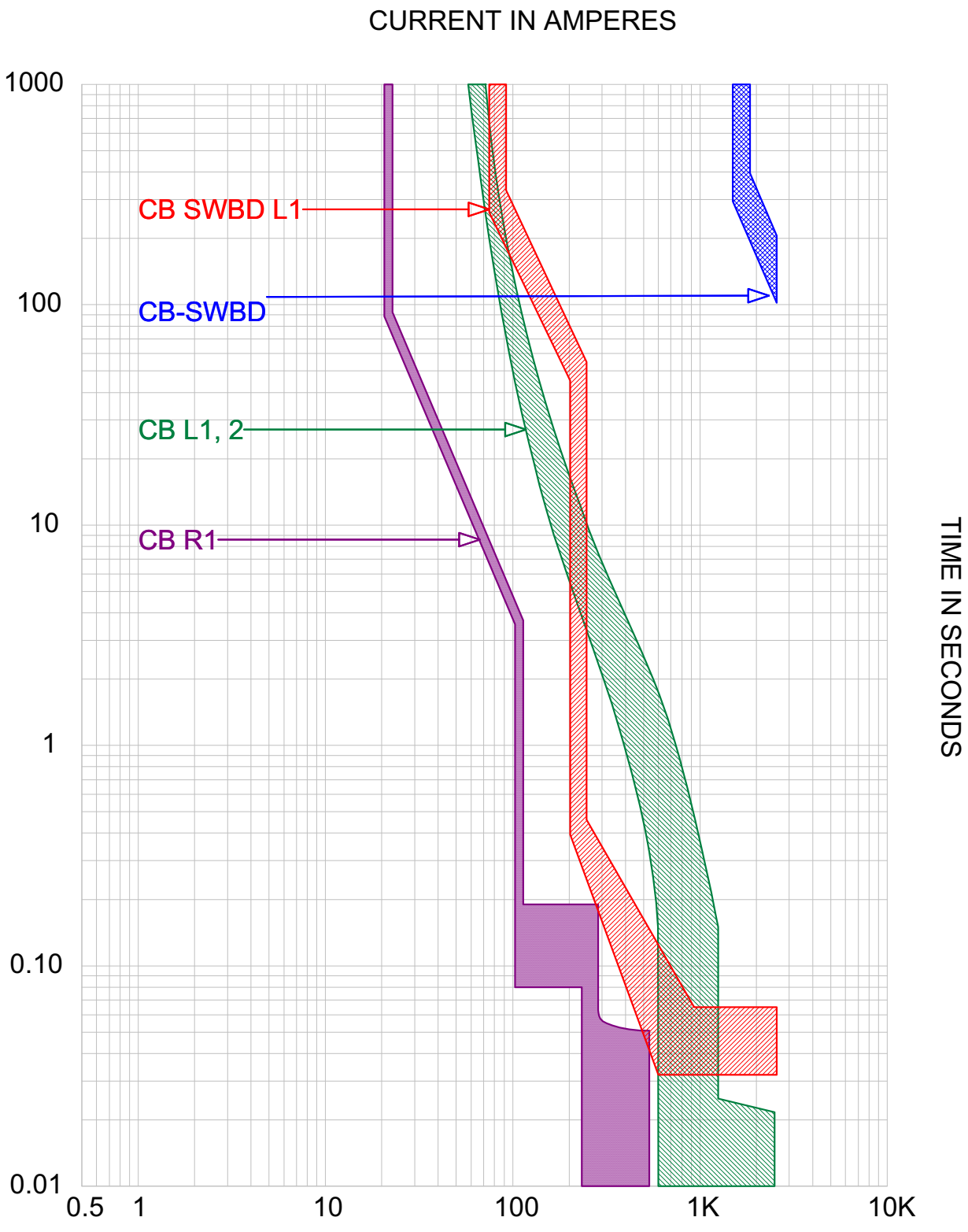

CB R1.tcc Ref. Voltage: 480V Current in Amps x 1