Hotel and Conference Center

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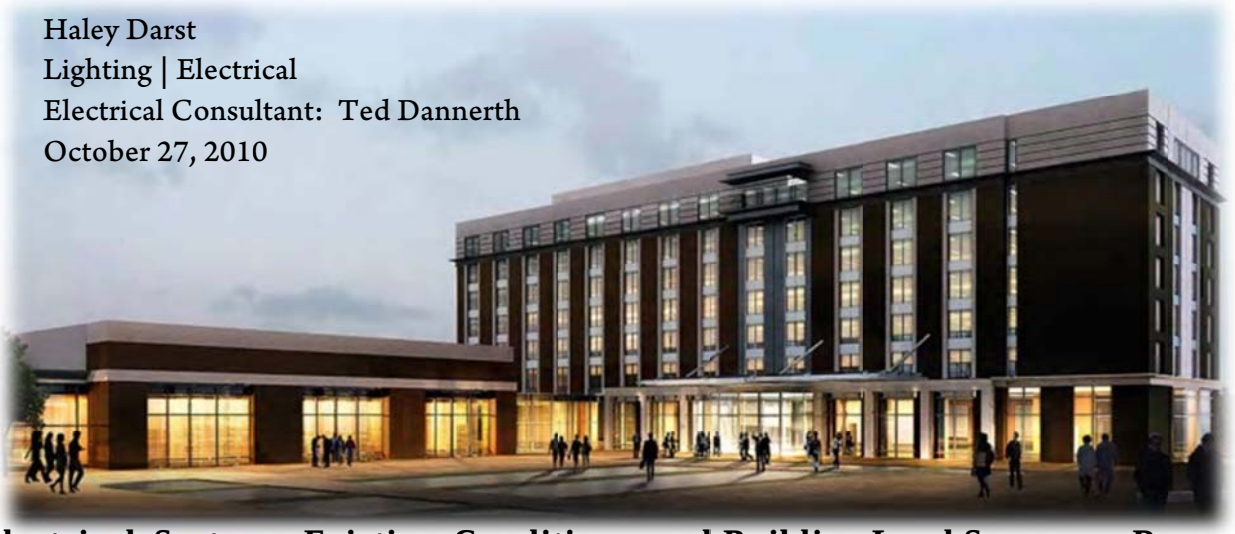

Electrical Systems Existing Conditions and Building Load Summary Report
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Building Information and Statistics

The recently opened Hotel and Conference Center, on the outskirts of one of the country's most respected universities, embodies the notions of comfort and relaxation with professionalism and academic success. The Hotel and Conference Center provides a luxurious and warm atmosphere to all patrons, whether residing in the hotel or merely attending a business or private event in the conference center. Although the exterior façade of the facility does not boast any discrepancies from the architecture of the university, the handsome interior spaces display the epitome of bringing the campus landscape indoors. Rich colors and woodwork dominate each of the spaces alike, reminding one of the outdoors and the campus setting which provided inspiration to the interior décor. The elegant inn houses 148 guest rooms, a lounge and bar area, a restaurant, ballroom, 24-hour fitness facility, and various meeting rooms in the conference center. Hotel guests not only become immersed in the sophisticated atmosphere, but are reminded of the spirit and vivacity of the university when visiting.

Building Name: Hotel and Conference Site
Location: Virginia, USA
Occupancy Type: Mixed Use – Hotel (R-1) and Conference (A-3)
Size: 174,000 SF
Number of Stories: 7 + 1 below grade
Dates of Construction: Fall 2008 - Summer 2010
Cost: $50 million
Project Delivery Method: GMP
Primary Project Team:

Owner: Information Withheld
Contractor: Balfour Beatty
Architect: Gensler
MEP Engineers: GHT Limited
Interior Designer: Gensler
Structural Engineers: Thornton Tomasetti and Abel Consulting Engineers
Civil Engineer: Christopher Consultants
Lighting Designer: Horton Lees Brogden Lighting Design
Landscape Architect: ParkerRodriguez
Fire/Life-Safety Consultant: Schirmer Engineering
Vertical Transportation: Lerch Bates & Associates
AV/Acoustics/IT/Telecom/Security: Cerami & Associates

Executive Summary

The following report provides a thorough analysis of the existing electrical systems in the Hotel and Conference Center located in Virginia, USA. With both a hotel tower and conference center portions of the facility, the 174,000 square foot building provides comfort and relaxation to both visitors of the university and professionals.

This detailed report describes the electrical distribution system within the building and the various communications systems implemented. Documentation on the building's current mechanical, plumbing, and lighting systems was also done, including the full service kitchen and architectural equipment. Service entrance sizing was calculated using three separate methods, although comparison to the actual entrance size cannot be done at this time as information is still pending. A complete single-line diagram was created after further analysis of the entire distribution system, and is included as well.

Section 1 | Power Distribution Systems

Summary Description of Distribution System

The Hotel and Conference Center has a simple radial electrical system with one service entrance on the outside of the building (exact location cannot be released per Owner's request). A pad-mounted transformer owned by Dominion Virginia Power distributes power to the building by two locations. Normal power flows from the secondary side of the transformer to the metered CT cabinet portion of the main switchboard. Tap sections for the fire pump and life safety are ahead of the main switch. A 3000A, 480Y/277V, 3PH, 4W main switchboard distributes power to the equipment loads throughout the building. Panel DPL steps down the voltage and feeds panels and loads on each floor of the hotel tower. A generator producing 150kW of continuous standby power at 480Y/277V distributes emergency power to three separate locations: the fire pump controller, life safety automatic transfer switch in the emergency electrical room, and the stand-by power wire trough. Loads the generator provides backup power for include emergency lighting, the fire alarm system, hotel elevators, and fire pump.

Utility Company Information

Dominion Virginia Power provides power to the service entrance of the Hotel and Conference Center. Their address and website are as follows:

120 Tredegar Street
Richmond VA 23219
http://www.dom.com/dominion-virginia-power

Bundled rates are available to those who wish to purchase both the delivery and supply of electricity to their building. The Hotel and Conference Center utilizes Bundled Rate Schedule GS-4, "Large General Secondary Voltage", meaning it receives secondary voltage to its main transformer. The 30-day rate breakdown of the distribution and electricity supply service charges are the following:

Distribution Service Charges
- Basic Customer Charge: $119.80 per billing month
- Plus Distribution Demand Charge:
  All kW of Distribution Demand @ $2.120 per kW
- Plus rkVA Demand Charge @ $0.15 per rkVA

Electricity Supply (ES) Service Charges
On-Peak Generation Demand Charge
- All On-Peak ES kW @ $11.322 per kW

Plus Off-Peak Generation Demand Charge
- All Off-Peak ES kW @ $0.656 per kW

Plus Generation Adjustment Demand Charge
- All kW of Demand @ ($0.640) per kW

Plus Generation kWh Charge
- All On-peak ES kWh @ 0.404¢ per kWh
- All Off-peak ES kWh @ 0.272¢ per kWh

Because the Hotel and Conference Center just opened in July 2010, a summary of the Electric Utility Load Data will be unavailable.

Service Entrance

Dominion Virginia Power has the incoming primary conductors running through a concrete ductbank, a minimum of 36" below finished grade, to the pad-mounted transformer. Dominion Virginia Power owns the transformer, so the primary voltage is unknown (information regarding the exact location of the utility-owned transformer will not be disclosed per the Owner's request). The incoming service feeds to a C/T cabinet portion of the main switchboard, located in the main electrical room on the first floor of the building. The main switchgear is comprised of four distinct sections: C/T, Emergency, Main, and Distribution.

A separate tap at the utility transformer feeds first a wall-mounted C/T cabinet sized by the utility, which distributes power to the fire pump controller.

Voltage Systems

The service entrance size from the utility is unknown at this time. However, the main switchboard is a 3000A, 480Y/277V, 3PH, 4W system. This switchboard distributes power to a variety of equipment in the Hotel and Conference Center that has several different operating voltages as well.

Lighting equipment located on the exterior of the building operates at 277V off of a 1PH, 3W feeder. Some of the interior lighting also operates with this system as well as at 120V off of a 1PH, 3W feeder. Equipment located in the Restaurant and Lounge on the first floor operates at 120V off of a 208Y/120V, 1PH, 3W feeder, too. Equipment in the Kitchen operates on four different voltage systems including at both 120V and 208V on 1PH, 3W feeders, and on 208V and 480V on 3PH, 4W feeders. A couple of the machines in the Laundry room operate at 120V on a 1PH, 3W system, but the majority runs on 480V on 3PH, 4W feeders. HVAC equipment in the building utilizes six different voltage systems. Most of the fans run on 120V, 1PH, 3W feeders. Both of the split system heat pump/AC units operate on 208V, 1PH, 3W feeders. Water source heat pumps operate on 265V, 1PH, 3W feeders. Three of the four electric heaters operate at 277V on 1PH, 3W feeders. Other major equipment, including the cooling tower and make-up air units, run on either 460V or 480V, on 3PH, 4W feeders.

Emergency Power Systems

A 150kW, 480Y/277V, 3PH, 4W diesel generator located outside distributes emergency power to automatic transfer switch ATS LS (life safety). The 600V, 100A, 4-pole automatic transfer switch then distributes emergency power to panel board EMH, which is 480Y/277V. Egress and exterior emergency lighting and a 45kVA transformer are fed from panel board EMH. The 45kVA transformer steps the voltage down to 208Y/120V and feeds panel EML. EML distributes panel to the jockey pump, elevator lighting, and the Fire Alarm Control Panel (FACP).

The generator also provides emergency power to the Fire Pump Controller, a combination of a transfer switch and built-in disconnect switch.

The Emergency section in the main switchgear feeds normal power underground to ATS LS, which is protected by a fused safety switch upstream (100A, 3PH, 600V).

Locations of Switchgear

Both the main transformer, supplied by Dominion Virginia Power and the generator are located outside of the building (exact location cannot be disclosed per request of the Owner). All of the other major equipment is located in dedicated electrical or mechanical rooms throughout the building. Lighting and appliance panels designated for each floor of the hotel tower are located in electrical closets on their respective floor. Other panels are located in electrical rooms or closets on the first floor or penthouse of the building.

Please note that panel LL was not found on the floor plans or riser diagram provided by the architect. Also, panel schedules for MGH, MGL, and EML were not given so some information remains unknown.

Major Equipment Schedule

Tag	Type of Equipment	Floor Level	Room No.	Room Name	Drawing No.	Other Notes
G	Generator	Exterior - On Grade	--	SW of Bldg	E02.01B	
T	Transformer	Exterior - On Grade	--	SW of Bldg	E02.01B	
T7.5	Transformer	Roof	8003	Elev. Mach. Rm	E02.04	T on plan
T15	Transformer	P1	B104	Mech Plant	E02.01	T30 on plan
T15	Transformer	1	1402	Electrical 1	E02.01A	T or T75 on plan
T15	Transformer	Roof	8002	Penthouse	E02.04	T75 on plan
T45	Transformer	1	1401	Electrical 2	E02.01A	
T150	Transformer	1	1023	Elec. Trans.	E02.01B	T on plan
T150	Transformer	1	1703	Elec. Room	E04.03	T on plan
T150	Transformer	1	1402	Electrical 1	E02.01A	T or T75 on plan
DPL	Distribution Panel	1	1023	Elec. Trans.	E02.01B	
P	Main switchboard	1	1402	Electrical 1	E02.01A	
ATS Elev	Transfer Switch	1	1402	Electrical 1	E02.01A	
ATS Standby	Transfer Switch	1	1402	Electrical 1	E02.01A	
ATS LS	Transfer Switch	1	1401	Electrical 2	E02.01A	

Panelboards

Tag	Voltage System	Main Size	Floor Level	Room No.	Room Name	Dwg No.
KH	480Y/277V 3ϕ 4W	400A	1	1703	Electrical	E04.03
KLA	208Y/120V 3ϕ 4W	600A	1	1703	Electrical	E04.03
KLB	208Y/120V 3ϕ 4W	150A	1	1703	Electrical	E04.03
KLC	208Y/120V 3ϕ 4W	150A	1	1703	Electrical	E04.03

Panelboards						
Tag	Voltage System	Main Size	Floor Level	Room No.	Room Name	Dwg No.
SBH	480Y/277V 3ϕ 4W	125A	1	1402	Electrical 1	E02.01A
SBL	208Y/120V 3ϕ 4W	50A	1	1402	Electrical 1	E02.01A
HH	480Y/277V 3ϕ 4W	225A	1	1402	Electrical 1	E02.01A
M2	480Y/277V 3ϕ 4W	400A	2	2103	Elec. Closet	E02.03
M2 (SECT. 2)	480Y/277V 3ϕ 4W	600A	2	2103	Elec. Closet	E02.03
HM	480Y/277V 3ϕ 4W	400A	1	1402	Electrical 1	E02.01A
HM (SECT. 2)	480Y/277V 3ϕ 4W	400A	1	1402	Electrical 1	E02.01A
L2	208Y/120V 3ϕ 4W	200A	2	2103	Elec. Closet	E02.03
L2 (SECT. 2)	208Y/120V 3ϕ 4W	200A	2	2103	Elec. Closet	E02.03
L3	208Y/120V 3ϕ 4W	200A	3	3103	Elec. Closet	E02.03
L3 (SECT. 2)	208Y/120V 3ϕ 4W	200A	3	3103	Elec. Closet	E02.03
L4	208Y/120V 3ϕ 4W	200A	4	4103	Elec. Closet	E02.03
L4 (SECT. 2)	208Y/120V 3ϕ 4W	200A	4	4103	Elec. Closet	E02.03
L5	208Y/120V 3ϕ 4W	200A	5	5103	Elec. Closet	E02.03
L5 (SECT. 2)	208Y/120V 3ϕ 4W	200A	5	5103	Elec. Closet	E02.03
L6	208Y/120V 3ϕ 4W	200A	6	6103	Elec. Closet	E02.03
L6 (SECT. 2)	208Y/120V 3ϕ 4W	200A	6	6103	Elec. Closet	E02.03
L7	208Y/120V 3ϕ 4W	200A	7	7103	Elec. Closet	E02.03
L7 (SECT. 2)	208Y/120V 3ϕ 4W	200A	7	7103	Elec. Closet	E02.03
M3	480Y/277V 3ϕ 4W	400A	3	3103	Elec. Closet	E02.03
M3 (SECT.2)	480Y/277V 3ϕ 4W	400A	3	3103	Elec. Closet	E02.03
M6	480Y/277V 3ϕ 4W	400A	6	6103	Elec. Closet	E02.03
M6 (SECT. 2)	480Y/277V 3ϕ 4W	600A	6	6103	Elec. Closet	E02.03
PHM	480Y/277V 3ϕ 4W	400A	Roof	8002	Penthouse	E02.04
PHL	208Y/120V 3ϕ 4W	50A	Roof	8002	Penthouse	E02.04
EMH	480Y/277V 3ϕ 4W	250A	1	1401	Electrical 2	E02.01A
EL	240Y/120V 1ϕ 3W	35A	Roof	8003	Elevator Machine Room	E02.04
HL (SECT. 1)	208Y/120V 3ϕ 4W	600A	1	1402	Electrical 1	E02.01A
HL (SECT. 2)	208Y/120V 3ϕ 4W	600A	1	1402	Electrical 1	E02.01A
HL (SECT. 3)	208Y/120V 3ϕ 4W	600A	1	1402	Electrical 1	E02.01A
UDS	208Y/120V 3ϕ 4W	60A	1	1703	Electrical	E04.03
DMB	208Y/120V 3ϕ 4W	100A	1	1402	Electrical 1	E02.01A
DML	208Y/120V 3ϕ 4W	100A	1	1005	Storage	E02.01A

Over-current Devices

Both circuit breakers and fused safety switches are the main forms of over-current protection in the Hotel and Conference Center. The main switchboard has a trip unit rated at 100kAIC and

consists of a switch and fuse unit. Fused safety switches inside the main switchboard are used to protect the main panels, ATS ELEV (automatic transfer switch for the elevators) and STANDBY, and both of the make-up air units. The normal distribution panels typically have enclosed circuit breakers. Emergency distribution panels EMH and EML both have enclosed circuit breakers as well; however their AIC ratings are unknown. The majority of the panel boards consist of main circuit breakers, with a few as main lugs only. Major equipment is protected with fused safety switches. Electricity to the two main public service elevators first runs through an elevator distribution wire trough, with an enclosed circuit breaker and fused safety switches. The switches have an RMS symmetrical amp rating of 200,000. The elevators also contain a shunt trip feature. However, the third elevator uses a non-fused safety switch.

Transformers

Hotel and Conference Center has a total of nine transformers for its electricity distribution. Main transformer T, from Dominion Virginia Power, is located on the outside of the building (exact location cannot be disclosed per request of the Owner). Although the majority of the transformers are on the first floor of the building, two are located on the roof and one is on the parking garage level. Transformers are located in various electrical rooms throughout the entirety of the building.

Individual Transformer Schedule								
Tag	Primary Voltage	Secondary Voltage	Size	Type	Temp. Rise	Taps	Mounting	Remarks
T	N/A	N/A	N/A	Dry	N/A	N/A	Pad-Mounted	
T7.5	480V, 3PH, 3W	208V, 3PH, 4W	7.5	Dry	80 Degree C	(2) 2.5%	Pad-Mounted	
T15-a	480V, 3PH, 3W	208V, 3PH, 4W	15	Dry	115 Degree C	(2) 2.5%	Pad-Mounted	
Individual Transformer Schedule								
Tag	Primary Voltage	Secondary Voltage	Size	Type	Temp. Rise	Taps	Mounting	Remarks
T15-b	480V, 3PH, 3W	208V, 3PH, 4W	15	Dry	115 Degree C	(2) 2.5%	Pad-Mounted	
T15-c	480V, 3PH, 3W	208V, 3PH, 4W	15	Dry	115 Degree C	(2) 2.5%	Pad-Mounted	
T45	480V, 3PH, 3W	208V, 3PH, 4W	45	Dry	150 Degree C	(2) 2.5%	Pad-Mounted	
T150-a	480V, 3PH, 3W	208V, 3PH, 4W	150	Dry	150 Degree C	(2) 2.5%	Pad-Mounted	
T150-b	480V, 3PH, 3W	208V, 3PH, 4W	150	Dry	150 Degree C	(2) 2.5%	Pad-Mounted	
T150-c	480V, 3PH, 3W	208V, 3PH, 4W	150	Dry	115 Degree C	(2) 2.5%	Pad-Mounted	K-13

Grounding

All transformers are grounded by grounding bars and grounding electrode conductors to the main electric room ground bus bar (shown on Riser Diagram – DWG E00.02). The main electric ground bus bar is composed of copper grounding electrode conductors which run to the electric service ground ring below the P-1 level slab. Typical ground rods for the base of each exterior wall column in the building are also utilized. The interior columns are also connected to the main electric service ground ring.

Special Equipment

Main switchboard P is split up into four distinct compartments, one of which includes an integral transient voltage surge suppressor (TVSS). The purpose of the TVSS is to protect the electrical equipment downstream from any current or voltage changes beyond the normal tolerances. Incoming power from the utility first reaches the TVSS in the C/T cabinet of the main switchboard.

Lighting Loads

The lighting in the Hotel and Conference Center is highly decorative and sophisticated, yet practical in all of the spaces. The most common lamp types utilized are fluorescent and incandescent. Fluorescent coves are utilized in the public spaces of the building, including the Main Lobby and Conference Center. Most of the incandescent sources are either candelabras or MR-16s. Warmer color temperatures were selected for the lamps to add to the overall impression of relaxation. Through the use of coves, specialty branding walls, decorative sconces and chandeliers, and accent lights, guests feel welcome and relaxed.

The exterior lighting is primarily fluorescent, though high pressure sodium, incandescent, LED, and metal halide are also utilized. Bollards, step lights, ground and building-mounted accent lighting, and landscape lighting are all incorporated into the exterior lighting design.

The luminaire schedule given below is a documentation of all of the lamps and ballasts utilized in the Hotel and Conference Center. All HID ballasts specified are included in the Appendix with their respected cut sheets.

Lighting Fixture Schedule

Tag	Lamps				Ballast	Voltage	Input Watts	Ballast Factor	Current	PF
	No.	Type	Source	Wattage						
F1	1	F32T8/TL830ALTO	FLUOR	32	Integral HPF Lutron Hi-lume	120	35	1.00	0.30	0.95
F1A	1	F32T8/TL830ALTO	FLUOR	32	Electronic, Programmed Start	277	34	0.98	0.13	0.98
F1C	1	F32T8/TL830ALTO	FLUOR	32	None	277	34	0.98	0.13	0.98
F2	1	F26TBX/SPX30 GE	FLUOR	26	None	120	26	1.00	0.26	0.98
F3	12	40BC11C/HAL/BL	INCAN	40	None	120	480	None	4.00	1.00
F4	1	FMV/FG/ULTRA Titan-35MR16NFL-18k hrs USHIO	INCAN	35	None	120	35	None	0.29	1.00
F5	2	FMV/FG/ULTRA Titan-35MR16NFL-18k hrs USHIO	INCAN	35	None	120	70	None	0.58	1.00
F5	2	35 W PAR30L	MH	35	Electronic	120	89	1.00	0.74	0.90

Lighting Fixture Schedule										
Tag	Lamps				Ballast	Voltage	Input Watts	Ballast Factor	Current	PF
	No.	Type	Source	Wattage						
F6	2	F32T8/SPX30 GE	FLUOR	32	Electronic, Programmed Start	277	63	0.88	0.23	0.99
F6A	2	F32T8/TL830ALTO Phillips	FLUOR	32	Electronic, Programmed Start	277	63	0.88	0.23	0.99
F7	1	40A/99-120V GE	INCAN	40	None	120	40	None	0.33	1.00
F8	1	OSRAM 58634 37MR16/IR/C-Titan	INCAN	37	None	120	37	None	0.31	1.00
F9	1	F26TBX/SPX30 GE	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98
F10	4	F26TBX/SPX30 GE	FLUOR	26	Electronic, Programmed Start	120	55	1.00	0.46	0.98
F11	4	F26TBX/SPX30 GE	FLUOR	26	Electronic, Programmed Start	120	55	1.00	0.46	0.98
F12	4	F13BX/830/ECO GE	FLUOR	13	Electronic, Programmed Start	120	29	1.00	0.25	0.99
F13	2	F32TL830/ALTO Phillips	FLUOR	32	Electronic, Rapid Start	277	63	0.88	0.23	0.99
F13A	2	F14T5/SPX30	FLUOR	14	Electronic, Programmed Start	277	34	1.06	0.13	0.98
F14	2	40B11C/HAL/BL	INCAN	40	None	120	80	None	0.67	1
F15	1	OSRAM 58634 37MR16/IR/C-Titan	INCAN	37	None	120	45	None	0.67	1.00
F16	1	CANF-3500K-1WATT LED	LED	1	None	120	1	None	0.03	1.00
F17	4	F13BX/830/ECO GE	FLUOR	13	None	120	29	1.00	0.25	0.99
F18	1	F26TBX/SPX30 GE (26W CFL)	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98
F19	1	F26TBX/SPX30 GE (26W CFL)	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98
F20	1	F26TBX/SPX30 GE (26W CFL)	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98

Lighting Fixture Schedule										
Tag	Lamps				Ballast	Voltage	Input Watts	Ballast Factor	Current	PF
	No.	Type	Source	Wattage						
F21	1	CFL14ELA/19/830 GE #29468	FLUOR	14	Electronic	120	14	1.00	0.26	0.98
F25	8	60A/S-130V 8300HR LIFE GE #40325	INCAN	60	None	120	480	None	4.00	1.00
F26	1	60PAR38FL (60WATT)	INCAN	60	None	120	60	None	0.50	1.00
F30	1	1-2800K LED 5W/LF	LED	5W/LF	None	120	5W/LF	None	0.03	1.00
F32	1	60PAR38FL/HIR/FL (GE)	INCAN	60	None	120	60	None	0.50	1.00
F34	1	37MR16NFL/IR/C-TITAN (OSRAM)	INCAN	37	None	120	37	None	0.31	1.00
F35	1	37MR16NFL/IR/C-TITAN (OSRAM)	INCAN	37	None	120	37	None	0.31	1.00
F36	1	F32T8/SPX30 GE	FLUOR	32	Integral HPF Lutron Hi-lume	120	35	1.00	0.30	0.95
F37	1	20T3Q/MINISTAR/S GE	INCAN	20	None	120	20	None	0.17	1.00
F38	2	F32T8/SPX30	FLUOR	64	Integral HPF Lutron Hi-lume	277	67	1.00	0.24	0.95
F39	2	F17T8/SPX30 GE	FLUOR	34	None	277	34	0.90	0.24	0.99
F40	6	40A/DL/SW/2PK/RP	INCAN	40	None	120	240	None	2.00	1.00
F41	4	25CAC/L-4000HRS GE #16365	INCAN	25	None	120	100	None	0.83	1.00
F43	1	20T3Q/MINISTAR/S GE	INCAN	20	None	120	20	None	0.17	1.00
F44	3	37MR16NFL/IR/C-TITAN	INCAN	37	None	120	111	None	0.93	1.00
F45	1	37MR16NFL/IR/C-TITAN	INCAN	37	None	120	37	None	0.31	1.00
F47	1	20T3Q/MINISTAR/S GE	INCAN	20	None	120	20	None	0.17	1.00
F49	2	F24T5HO/SPX30 GE	FLUOR	24	Electronic, Programmed Start	277	52	1.00	0.10	0.98
F53	1	F40 CIRCLINE 3000K	FLUOR	40	Electronic	120	40	1.00	0.30	0.98
F54	1	75W A-19	INCAN	75	None	120	75	None	0.63	1.00
F54	1	F32T8/TL830ALTO	FLUOR	32	Electronic, Programmed Start	277	34	0.98	0.13	0.98
F55	1	75W MAX A19	INCAN	75	None	120	75	None	0.63	1.00

Lighting Fixture Schedule										
Tag	Lamps				Ballast	Voltage	Input Watts	Ballast Factor	Current	PF
	No.	Type	Source	Wattage						
XA	1	LU400/HPS	HPS	400	Magnetic	277	464	1.00	1.35/1.70	0.90
XB	1	LU100/HPS	HPS	100	Magnetic	277	130	1.00	0.60/0.50	0.90
XC	1	F27TT-4P-830 GE	FLUOR	27	Electronic, Programmed Start	277	31	1.05	0.11	0.98
XC-1	1	MR1650W-FL GE	INCAN	50	None	277	50	None	0.18	1.00
XD	1	F26TBX/SPX30 GE	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98
XD-1	1	F26TBX/SPX30 GE	FLUOR	26	Electronic, Programmed Start	277	26	1.00	0.26	0.98
XE	1	CMH35/T/U/803/G12 GE	CMH	35	Electronic	277	48	1.00	0.30/0.19	0.90
XH	1	CMH20/TCU/830/G8.5	CMH	20	Integral HPF Electronic	277	24	1.00	0.09	0.95
XI	--	WARM WHITE LED (WET LOCATION)	LED	LED	None	277	--	None	0.03	1.00
XJ	2	F32T8/SPX30 GE	FLUOR	32	Electronic, Programmed Start	277	63	0.88	0.23	0.99
XK	2	F14T5/TL830	FLUOR	14	Electronic, Programmed Start	277	34	1.06	0.13	0.98
XN	--	WHITE LED 3.6W	LED	LED	None	120	3.6	None	0.03	1.00
XO	1	20W MH 12 DEGREE SPOT	MH	20	Electronic	120	24	1.00	0.21	0.90
XP	--	WHITE LED 6.4W	LED	6.4	None	120	6.4	None	0.03	1.00
XQ	1	CMH70/T6/G12/830 PHILLIPS	CMH	70	Magnetic	277	94	1.00	0.45/0.35	0.90
XR	1	F42TT-830-GE	FLUOR	42	Electronic, Programmed Start	277	38	1.05	0.18	0.98
XS	1	CMH150T/U/830/G12 150W T6 MET HALIDE	CMH	150	Magnetic	277	185	1.00	0.80/0.70	0.90

Lighting Control

For the most part, the rooms are equipped with switches to control the luminaires. However, two dimming panels are provided for many of the public facilities on the first floor. The first dimming panel has main units for the each of the Small Ballrooms A and B and Large Ballrooms A and B. Control stations with preset scenes are also specified for these spaces. The Prefunction area in the Conference Center also has dimming available.

The second dimming panel is for the Restaurant, Lounge, and Lobby. Main units are also provided for each of these spaces. Eight preset scenes and a couple of control stations are provided for the Restaurant lighting. The Lounge and Lobby both have four preset scenes with one control station per room.

Mechanical and Other Loads

Mechanical equipment in the Hotel and Conference Center includes four electric heaters, over twenty fans, and a couple of pumps and make-up air units. The facility is equipped with fourteen rooftop units atop the conference center portion of the building. Both the rooftop units and outdoor air units provide gas heat. There are also numerous mechanical and plumbing pumps that require power.

Kitchen and Lounge equipment are also specified for the building. Ovens and steamers, and even mixers and toasters are all accounted for and require power to operate. The facility also has a Laundry room that has dryers and washers and other specific types of equipment that need electricity.

Mechanical, plumbing, kitchen, laundry, and other architectural equipment schedules are provided below. The equipment in the tables all require electricity to operate. Each piece of equipment includes its respective tag and electrical description.

Please note that further information could not be found regarding the plumbing equipment.

Mechanical Equipment

Equipment Tag	Load Description	Load	Load Unit	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
CH-1	Electric Heater	12000	VA	--	277	1ϕ	0.95	12.00	11.40
WH-1	Electric Heater	3000	VA	--	277	1ϕ	0.95	3.00	2.85
EBH-1	Electric Heater	45500	VA	--	277	1ϕ	0.95	45.50	43.23
UH-1	Electric Heater	6000	VA	--	480	3ϕ	1.25	6.00	7.50
1	Cooling Tower	7.5	HP	11	480	3ϕ	0.95	5.28	5.02
F-GC	Fan	1.5	HP	3.0	460	3ϕ	0.85	1.38	1.17
F0-MP	Fan	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
F-FP	Fan	1/8	HP	--	120	1ϕ	0.75	--	0.13
F-GE	Fan	5.0	HP	7.6	460	3ϕ	0.85	3.50	2.97
F-GE-1	Fan	1/20	HP	--	120	1ϕ	0.75	--	0.05
F-PH-1	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40

Mechanical Equipment									
Equipment Tag	Load Description	Load	Load Unit	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
F-PH-2	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
F-PH-3	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
F-PH-4	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
F-PH-5	Fan	3/4	HP	13.8	120	1ϕ	0.85	1.66	1.41
F-PH-6	Fan	1/3	HP	7.2	120	1ϕ	0.75	0.86	0.65
F-TE-1	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
F-TE-2	Fan	1/2	HP	9.8	120	1ϕ	0.85	1.18	1.00
F-TE-3	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
F-MR-1	Fan	1/12	HP	--	120	1ϕ	0.75	--	0.08
F-DW-1	Fan	1/2	HP	9.8	120	1ϕ	0.85	1.18	1.00
F-KE-1	Fan	7.5	HP	11	460	3ϕ	0.95	5.06	4.81
F-EL-1	Fan	1/12	HP	--	120	1ϕ	0.75	--	0.08
F-EL-2	Fan	1/4	HP	5.8	120	1ϕ	0.75	0.70	0.52
F-LF-1	Fan	7.5	HP	11	460	3ϕ	0.95	5.06	4.81
F-TR-1	Fan	1/12	HP	--	120	1ϕ	0.75	--	0.08
F-LD-1	Fan	1/12	HP	--	120	1ϕ	0.75	--	0.08
F-GI-1	Fan	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
F-E-1	Fan	1/6	HP	4.4	120	1ϕ	0.75	0.53	0.40
MUA-1	Make-up Air Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
MUA-2	Make-up Air Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
TWP-1,2	Pump	20	HP	27	480	3ϕ	0.95	12.96	12.31
CWP-1,2	Pump	50	HP	65	480	3ϕ	0.95	31.20	29.64
HWP-1,2	Pump	7.5	HP	11	480	3ϕ	0.95	5.28	5.02
OAU-1	Outdoor Air Unit	81894	VA	96	480	3ϕ	0.85	81.89	69.61
OAU-2	Outdoor Air Unit	91788	VA	124	480	3ϕ	0.85	91.79	78.02
RTU-1	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-2	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
RTU-3	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
RTU-4	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
RTU-5	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
RTU-6	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82
RTU-7	Rooftop Unit	1.0	HP	2.1	460	3ϕ	0.85	0.97	0.82

Mechanical Equipment									
Equipment Tag	Load Description	Load	Load Unit	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
RTU-8	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-9	Rooftop Unit	5.0	HP	7.6	460	3ϕ	0.95	3.50	3.32
RTU-10	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-11	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-12	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-13	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
RTU-14	Rooftop Unit	2.0	HP	3.4	460	3ϕ	0.85	1.56	1.33
ACU-1	Split System Heat Pump/AC Unit	3536	VA	18.7	208	1ϕ	0.85	3.54	3.01
ACU-2	Split System Heat Pump/AC Unit	2932	VA	18.7	208	1ϕ	0.85	2.93	2.49
HP-1	Water Source Heat Pump	5	HP	7.6	460	3ϕ	0.95	3.50	3.32
HP-2	Water Source Heat Pump	1/3	HP	3.6	265	1ϕ	0.75	0.95	0.72
HP-3	Water Source Heat Pump	5.0	HP	7.6	460	3ϕ	0.95	3.50	3.32
HP-4	Water Source Heat Pump	15.0	HP	21	460	3ϕ	0.95	9.66	9.18
HP-7	Water Source Heat Pump	3.0	HP	4.8	460	3ϕ	0.85	2.21	1.88
HP-8	Water Source Heat Pump	1/3	HP	3.6	265	1ϕ	0.75	0.95	0.72
HP-9	Water Source Heat Pump	1/3	HP	3.6	265	1ϕ	0.75	0.95	0.72
HP-A	Water Source Heat Pump	1/8	HP	--	265	1ϕ	0.75	--	0.13
HP-B	Water Source Heat Pump	1/5	HP	2.2	265	1ϕ	0.75	0.95	0.71
								Total kW	**333.72**

Kitchen and Lounge Equipment										
Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
6	1	Tea Brewer	2150	2.88	--	120V	1ϕ	1	2.15	2.15
7	1	Warmer Drawer	1020	1.37	--	120V	1ϕ	1	1.02	1.02
8	1	Conveyer Toaster	4660	6.25	--	120V	1ϕ	1	4.66	4.66

Kitchen and Lounge Equipment										
Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
10	1	Coffee Brewer for Satelites	7020	8.94	--	208V	3ϕ	0.95	7.02	6.67
11	1	Soda Machine	360	0.48	--	120V	1ϕ	0.95	0.36	0.36
17	1	P.O.S.	1440	1.93	--	120V	1ϕ	0.95	1.44	1.44
21	1	Reach in Refrigerator	960	1.29	16	120V	1ϕ	0.95	0.96	0.96
23	1	Drop in Food Warmer	2282	3.06	--	208V	1ϕ	1	2.28	2.28
28	1	Hot Well	2282	3.06	--	208V	1ϕ	1	2.28	2.28
30	1	Bain Marie Heater	6750	8.6	--	208V	3ϕ	0.95	6.75	6.41
31	2	Reach in Refrigerator/Freezer	1280	1.72	20	120V	1ϕ	0.95	1.28	1.28
32	1	Printer	2282	3.06	--	120V	1ϕ	0.95	2.28	2.28
33	2	Sandwich Prep Table	1440	1.93	20	120V	1ϕ	1	1.44	1.44
35	1	Heat Lamp, Rod Type	2282	3.06	--	208V	1ϕ	1	2.28	2.28
36	1	Exhaust Hood	360	0.48	7.2	120V	1ϕ	1	0.36	0.36
37	1	Microwave/Convection Oven	4800	6.44	--	208V	1ϕ	0.95	4.80	4.8
38	1	Fire Extinguishing System	--	--	--	120V	1ϕ	1	2.40	2.28
39	1	Convection Steamer	1500	1.91	--	208V	3ϕ	0.95	1.50	1.43
40	1	Range	576	0.77	--	120V	1ϕ	1	0.58	0.58
48	1	Ref. Equip. Stand	804	1.08	16	120V	1ϕ	1	0.80	0.8
50	1	Fryer/Filter	--	--	--	120V	1ϕ	1	0.68	0.68
51	1	Holding Cabinet with Warmer	825	1.11	--	120V	1ϕ	1	0.83	0.83
53	1	Exhaust Hood	1150	1.54	20	120V	1ϕ	1	1.15	1.15
54	1	Tiliting Skillet/Braising Pan	675	0.91	--	120V	1ϕ	1	0.68	0.68
57	1	60 Gallon Kettle	675	0.91	--	120V	1ϕ	1	0.68	0.68
66	2	Convection Oven	2400	3.22	34	120V	1ϕ	1	2.40	2.4
67	1	Roll in Combi Oven	1100	1.48	--	120V	1ϕ	1	1.10	1.1
72	1	Bain Marie Heater	6750	8.6	--	208V	3ϕ	0.95	6.75	6.41
74	7	Drop Cord	360	0.48	--	120V	1ϕ	1	0.36	0.36
76	3	Heated Banquet Cabinet Cart	3660	4.91	--	120V	1ϕ	1	3.66	3.66
77	3	Cooked/Hold Oven Cabinet	18000	24.1	--	208V	1ϕ	1	18.00	18
83	1	Disposer	1740	2.22	7.5	208V	3ϕ	0.95	1.74	1.65
88	1	Food Slicer	660	0.89	13.8	120V	1ϕ	1	0.66	0.66
88A	1	Drop Cord	180	0.24	--	120V	1ϕ	1	0.18	0.18

Kitchen and Lounge Equipment										
Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
90	1	Food Mixer	660	0.89	13.8	120V	1ϕ	1	0.66	0.66
90A	1	Drop Cord	180	0.24	--	120V	1ϕ	1	0.18	0.18
92	1	Food Processor	990	1.26	4.6	208V	3ϕ	0.95	0.99	0.94
93A	1	Drop Cord	180	0.24	--	120V	1ϕ	1	0.18	0.18
94	1	Food Cutter	1170	1.57	--	120V	1ϕ	1	1.17	1.17
95	1	Salad Spinner	345	0.46	--	120V	1ϕ	1	0.35	0.35
103	1	Carbonator	1725	2.31	--	120V	1ϕ	1	1.73	1.73
105	1	Remote Beer System-Powerpak	2100	2.82	--	120V	1ϕ	1	2.10	2.1
107	1	Beer Cooler	1200	1.61	20	120V	1ϕ	1	1.20	1.2
108	1	Evaporator Coil	444	0.6	--	120V	1ϕ	1	0.44	0.44
110	1	Evaporator Coil	444	0.6	--	120V	1ϕ	1	0.44	0.44
111	1	Walk In Cooler	1200	1.61	20	120V	1ϕ	1	1.20	1.2
116	1	Walk In Cooler	1200	1.61	20	120V	1ϕ	1	1.20	1.2
118	1	Evaporator Coil	540	0.72	--	120V	1ϕ	1	0.54	0.54
122	1	Walk In Combination Cooler/Freezer	2000	2.68	24	120V	1ϕ	1	2.00	2
123	1	Evaporator Coil	1404	1.88	--	120V	1ϕ	1	1.40	1.4
124	1	Evaporator Coil	540	0.72	--	120V	1ϕ	1	0.54	0.54
129	1	Beverage Cooler	1200	1.61	20	120V	1ϕ	1	1.20	1.2
131	1	Evaporator Coil	432	0.58	--	120V	1ϕ	1	0.43	0.43
134	1	Evaporator Coil	432	0.58	--	120V	1ϕ	1	0.43	0.43
135	1	Finished Cooler	1200	1.61	20	120V	1ϕ	1	1.20	1.2
140	1	Cube Style Ice Maker	3480	4.43	10.6	208V	3ϕ	0.95	3.48	3.31
141	1	Flake Style Ice Maker	1620	2.17	24	208V	1ϕ	1	1.62	1.62
147	1	Coffee Brewer for Satelites	7020	8.94	--	208V	3ϕ	0.95	7.02	6.67
148	1	Conveyor Toaster	4660	5.94	--	208V	3ϕ	0.95	4.66	4.43
154	1	Drop In Pot Washer Agitator	672	0.9	--	120V	1ϕ	1	0.67	0.67
157	1	Reach-In Refrigerator	960	1.29	16	120V	1ϕ	1	0.96	0.96
163	1	Conveyor Dishmachine With Roller Table and 90 Unloader	40000	45.6	--	480V	3ϕ	0.85	40.00	34
166	1	Disposer	3150	4.01	10.6	208V	3ϕ	0.95	3.15	2.99
167	1	Remote Refrigerator Rack	32400	36.9	--	480V	3ϕ	0.85	32.40	27.5
186	1	Glass Washer	800	1.07	--	120V	1ϕ	1	0.80	0.8
188	1	Backbar Storage Cabinet	800	1.07	--	120V	1ϕ	1	0.80	0.8

Kitchen and Lounge Equipment										
Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
189	1	P.O.S.	1000	1.34	--	120V	1ϕ	1	1.00	1
190	1	Backbar Storage Cabinet	2362	3.17	--	120V	1ϕ	1	2.36	2.36
193	2	(2) P.O.S.	1000	1.34	--	120V	1ϕ	1	1.00	1
197	2	Pop Up Toaster	2700	3.62	--	120V	1ϕ	1	2.70	2.7
200	10	Induction Burner	14760	19.8	--	120V	1ϕ	1	14.76	14.8
241	1	Microwave Station With Sink	360	0.48	--	120V	1ϕ	1	0.36	0.36
242	1	Microwave Oven	1680	2.25	--	120V	1ϕ	1	1.68	1.68
244	1	Survey Counter With Tray Slide	360	0.48	--	120V	1ϕ	1	0.36	0.36
245	1	Drop-In Hot Food Well	1300	1.74	--	208V	1ϕ	1	1.30	1.3
246	1	Soup Well	624	0.84	--	208V	1ϕ	1	0.62	0.62
247	1	Drop-In Cold Food Pan	276	0.37	--	120V	1ϕ	1	0.28	0.28
251	1	Soda Ice & Beverage Dispenser	420	0.56	--	120V	1ϕ	1	0.42	0.42
252	1	Ice Maker, Under Cabinet	1320	1.77	20	120V	1ϕ	1	1.32	1.32
254	1	Coffee Brewer	6840	8.71	--	208V	3ϕ	0.95	6.84	6.5
255	1	Refrigerated Merchandiser	600	0.8	13.8	120V	1ϕ	1	0.60	0.6
									Total kVA	**223**

Laundry Equipment										
Equipment Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
L4	2	135lb SM Washer Extractor	31542	40.18	52	480V	3ϕ	0.95	31.54	29.96
L5	1	Liquid Chemical Supply System	--	--	--	120V	1ϕ	--	--	--
L6	1	55-60lb SM Washer Extractor	8838	10.07	14	480V	3ϕ	0.85	8.84	7.51
L8	2	175lb Gas Dryer	19956	25.42	34	480V	3ϕ	0.95	19.96	18.96
L9	1	75-80lb Gas Dryer	2700	3.08	4.8	480V	3ϕ	0.85	2.70	2.30
L10	1	Lint Collector (10,000CFM)	500	--	--	120V	1ϕ	0.75	0.50	0.38
L11	1	Automatic Towel Folder	2820	3.21	4.8	480V	3ϕ	0.85	2.82	2.40
L12	1	One Roll Gas Ironer	6000	6.84	7.6	480V	3ϕ	0.85	6.00	5.10
L14	1	Sewing Machine With Stand	1175	--	--	120V	1ϕ	0.85	1.18	1.00

Laundry Equipment										
Equipment Tag	No.	Load Description	VA	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
L18	1	10HP Air Comp. With Dryer	11640	10	14	480V	3ϕ	0.95	11.64	11.06
									Total kW	**78.66**

Architectural Equipment									
Equipment Tag	No.	Load Description	HP	Motor Amps	Voltage	Phase(s)	Assumed PF	kVA	kW
1	1	Elevator	25	34	480	3ϕ	0.95	16.32	15.50
2	1	Elevator	25	34	480	3ϕ	0.95	16.32	15.50
3	1	Elevator	40	52	480	3ϕ	0.95	24.96	23.71
								Total kW	**54.72**

Service Entrance Size

Three different methods of sizing the service entrance were used. Each calculation method is done during a certain phase of the project. The Square Foot Method is a rough approximation of the size of the service entrance used during the conceptual and schematic design phase. It is calculated using the square footage of the building multiplied by the VA/SF of the type of building. The NEC Loading Method is used during the design development phase. This phase uses the VA/SF of the various load categories used in the building, such as lighting, receptacles, and HVAC, kitchen, plumbing, and architectural equipment. These values, found in demand loading tables, are multiplied by the square footage of the building or specific area of the load type. The third and final method was calculated using the Actual Loading Method. This method is the most accurate, as it uses the actual loads of lighting, receptacles, and equipment from the panel board schedules. It is calculated when the construction documents are produced.

As seen from the tables below, the sizing of the service entrance changed quite a bit from phase to phase. A breakdown of each of the three methods is seen below.

Conceptual Schematic Design			
Gross SF of Building	VA/SF	Load - VA	kVA
174000	13	2262000	**2262**

Design Development | NEC Loading	
Lighting | Hotels	
Gross SF of Building	174000

Design Development | NEC Loading	
Lighting | Hotels	
VA/SF	2
kVA	348
kVA with Demand Factor - 50%	10
kVA with Demand Factor - 40%	32
kVA with Demand Factor - 30%	74.4
Total kVA	**116.4**
Receptacles	
Gross SF of Building	174000
VA/SF	0.5
kVA	87
kVA with first 10kVA - 100%	10
kVA with remaining kVA - 50%	38.5
Total kVA	**48.5**
HVAC | Exhaust Fans	
Gross SF of Building	174000
VA/SF	2
Total kVA	**348**
HVAC | Electric Heating	
Gross SF of Building	174000
VA/SF	15
Total kVA	2610
HVAC | Cooling	
Gross SF of Building	174000
VA/SF	8
Total kVA	**1392**

Design Development | NEC Loading	
Full Service Kitchen	
Gross SF of Kitchen	1950
VA/SF	20
kVA	39
Equipment Demand Factor - 65%	25.4
Total kVA	**25.4**
Elevators (3)	
kw per	50
Total kW	150
Total kVA	**187.5**
Total kVA	**4728**

Working Drawings | Actual Loading		
Load	Connected Load (kVA)	Demand Load (kVA)
Lighting	203.2	254.0
Receptacles	244.3	305.4
Mechanical Equipment	1099.6	1374.5
Kitchen Equipment	607.4	759.3
Guest Rooms	340.4	425.5
Other	129.9	162.4
Total kVA		**3281.1**

Summary Table			
Phase	Load - kVA	Voltage System	Load - Amps
Conceptual/Schematic Design	2262	480Y/277V, 3PH, 4W	2720.8
Design Development	4728	480Y/277V, 3PH, 4W	5686.9
Working Drawings	3281	480Y/277V, 3PH, 4W	3946.5
Actual Conditions – Main Switchboard	2494	480Y/277V, 3PH, 4W	3000.0

VA/SF (174000 SF)	**14.3**

Comparing the three final numbers calculated for each service entrance sizing method, it is obvious that some value may be askew. An assumption of 15VA/SF was used for electric heating during the Design Development method which is why this amperage is so high. That assumption alone was greater than the 13VA/SF value used to calculate the service entrance in the first method.

Environmental Stewardship Design

The Hotel and Conference Center is LEED certified at the silver level, incorporating sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. However, no electrical systems described as "green" were implemented into the design.

ASHRAE Standard 90.1 was closely followed in the design of the lighting systems. About half of the lamps specified were either compact fluorescent or fluorescent, too, making them more energy efficient.

Design Issues

There were no major issues concerning the electrical design of the Hotel and Conference Center.

Section 2 | Communications Systems

Fire Alarm System

Manual pull fire alarm stations are located at every entrance of the hotel tower and conference center. There are also two per floor in the hotel tower. Speaker and strobe combination units are common in most rooms of the conference center and first floor of the hotel, with typically three per guest floor of the hotel. In case of emergencies in the hotel tower on the guest floors, magnetic door hold open devices are installed in every elevator lobby. Fire alarm speakers and system smoke detectors are typical in each guestroom. Photo-electric smoke detectors and heat detectors are placed in the service elevator. Duct smoke detectors, graphic fire alarm annunciator panels, voice evacuation panels, sprinklers, and ADA compliant strobes are also common.

Audiovisual System

The use of audiovisual systems is only on the public first floor of the Hotel and Conference Center. Recessed ceiling speakers are located throughout much of this floor, including the main lobby, Lounge, Restaurant, and ballrooms and meeting rooms in the conference center. Both button based and touch panel based control systems are utilized. The Ballroom uses recessed ceiling projection screens, whereas the other typical meeting rooms generally use flat panel displays or projectors. Microphone usage is also prevalent in the conference center portion of the building.

Telecommunications System

A main telecommunications room is located in the conference center portion of the building. There is also one telecommunications room per floor of the hotel tower. Voice and data outlets are located on the walls of rooms, although in the more public areas (meeting rooms, ballrooms, etc), they are mounted into the floor. Wall-mounted television outlets are in the Lounge and in all guest rooms. Wireless internet is available in most rooms in the building, including all of the conference center rooms, the lounge, and all of the guest rooms.

Security System

Security systems are very important in hotels. The Hotel and Conference Center implements both an intercom entry and card reader entry into the parking garage below grade. Card readers are also used for the guest elevators, hallways of the conference center, and guest rooms. Exterior cameras are extensively used around the perimeter of the building, especially around the back-of-house area.

Appendix A:
Single-Line Diagram and Existing Riser Diagram

SORRY | THESE DOCUMENTS ARE UNAVAILABLE PER THE OWNER'S REQUEST

Appendix B:
H.I.D. Lamps/Ballasts

Fixture Tag: F5
Lamp quantity and type: (2) Metal Halide
Ballast Type: Electronic

2010, August 23
data subject to change

High efficiency with a crisp, sparkling light

MasterColor® CDM PAR30L

Philips MasterColor® Ceramic Metal Halide PAR30L Lamps offer high-efficiency, ceramic metal halide reflector lamps with a stable color over lifetime and a crisp, sparkling light.

Benefits

- Philips MC PAR30L lamps deliver improved lumen maintenance over standard metal halide PAR lamps.
- Philips MC PAR30L lamps reduce lighting cost of ownership - they are an energy efficient alternative to incandescent or halogen PAR lamps.

Features

- Superior color stability— within ±200K
- Lamp to lamp color consistency over life higher lumen maintenance
- Improved lumen maintenance over standard metal halide
- Feature ALTO lamp technology with reduced mercury
- Operate on existing ballasts
- Lamps feature integrated UV blocking medium for reduced fading of fabrics and paintings
- 35 and 70 watt flood and spot, 3000, and 4000K versions

Application

- Ideal for retail accent and display lighting and architectural lighting for interior and exterior applications.

PHILIPS
sense and simplicity

Fixture Tag: F5
Lamp quantity and type: (2) Metal Halide
Ballast Type: Electronic

MasterColor® CDM PAR30L 2

Dimensional drawing

Compare table

Product number	Full product name
22300	MasterColor CDM 35W/830 Mini PAR30L FL 1CT
23221	MasterColor CDM 70W/830 Mini PAR30L FL 1CT
23224	MasterColor CDM 70W/830 Mini PAR30L SP 1CT
22329	MasterColor CDM 35W/830 Mini PAR30L SP 1CT
15142	MasterColor CDM 70W/942 Mini PAR30L Spot Univ
15143	MasterColor CDM 70W/942 Mini PAR30L Flood Univ
21149	MasterColor CDM 20W/830 Mini PAR30L FL 1CT
21149	MasterColor CDM 20W/830 Mini PAR30L SP 1CT

www.philips.com/lighting

2010, August 23
data subject to change

Fixture Tag: F5
Lamp quantity and type: (2) Metal Halide
Ballast Type: Electronic

Revised: 3/6/2009

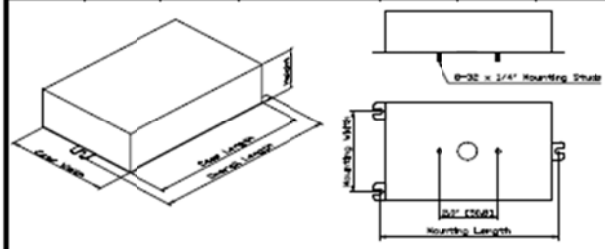
PHILIPS ADVANCE

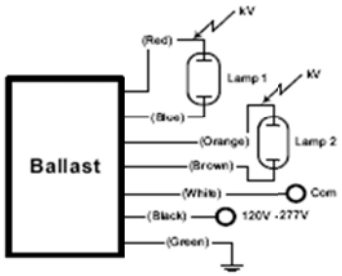
e-Vision® Electronic Ballast for Metal Halide Lamps

Catalog Number: IMH-239-A
For (2) 39W Metal Halide Lamps
ANSI M130
120-277 50/60Hz Electronic
Status: RELEASED

DIMENSIONS AND DATA

Lamp Number	Lamp Watts	Input Volts	Catalog Number*	Line Current (Amps)	Input Power (Watts)	Min Power Factor	Wiring Diag	Fig.	Weight (lb)	Max. Distance to Lamp (ft)
39W Watt Lamp, ANSI Code M130 Minimum Starting Temp -30°C/-20°F										
2	39	120	IMH-239-A-XXX	0.74	89	0.9	5	A/B	1.6	6
		277		0.31	86					





Wiring Diagram 5

Case Figure	Overall Length	Case Length	Case Width	Height	Mountin Length	Mounting Width
A/B	140mm [5.5"]	120mm [4.7"]	92mm [3.6"]	38mm [1.5"]	132mm [5.2"]	73mm [2.9"]

HOT SPOT MEASUREMENT LOCATION

INSTALLATION & APPLICATION NOTES:

1. Maximum allowable case temperature is 85°C. See figure above for measurement location
2. Ignition pulse is 4 kV max
3. All leads are 12 inches long
4. Ballast output will shutdown after 20 minutes if lamp fails to ignite
5. Power must be cycled off – then on, after replacing lamp
6. When one lamp fails, the other lamp remains lit
7. Connect the red and orange leads to the center terminals of their respective lamps when using screw base lamps

*Ordering Information

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

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

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

Fixture Tag: XA
Lamp quantity and type: (1) High Pressure Sodium
Ballast Type: Magnetic

LUMALUX PLUS® AND LUMALUX PLUS® ECO®
Non-Cycling High Pressure Sodium

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Rx Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
100	E17	E26 Medium	67323	LU100/PLUS/MED	S54	20	Clear	Universal	O	30000	10000	9000	22	2100	4,8
	ET23.5	E39 Mogul	67559	LU100/PLUS/ECO	S54	20	Clear	Universal	O	30000	10000	9000	22	2100	4,7,8
150	ET23.5	E39 Mogul	67494	LU150/55/PLUS/ECO	S55	20	Clear	Universal	O	30000	16000	14400	22	2100	4,7,8,13, 36
200	ET18	E39 Mogul	67495	LU200/PLUS/ECO	S66	20	Clear	Universal	O	30000	22000	19800	22	2100	4,7,8
250	ET18	E39 Mogul	67572	LU250/PLUS/ECO	S50	20	Clear	Universal	O	30000	29000	26100	22	2100	4,7,8
310	ET18	E39 Mogul	67660	LU310/PLUS/ECO	S67	20	Clear	Universal	O	30000	37000	33300	22	2100	4,7,8
400	ET18	E39 Mogul	67312	LU400/PLUS/ECO	S51	20	Clear	Universal	O	30000	50000	45000	22	2100	4,7,8
1000	E25	E39 Mogul	67316	LU1000/PLUS	S52	6	Clear	Universal	O	30000	130000	124000	22	2100	4,8

LUMALUX® STANDARD AND LUMALUX® ECO®

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Rx Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
35	E17	E26 Medium	67500	LU35/MED	S76	20	Clear	Universal	O	16000+	2250	2050	22	1900	4,22
			67501	LU35/D/MED	S76	20	Coated	Universal	O	16000+	2100	1935	22	1900	4,22
50	E17	E26 Medium	67502	LU50/MED	S68	20	Clear	Universal	O	24000+	4000	3600	21	1900	4,22
			67503	LU50/D/MED	S68	20	Coated	Universal	O	24000+	3700	3420	22	1900	4,22
	ET23.5	E39 Mogul	67510	LU50/ECO	S68	20	Clear	Universal	O	24000+	4000	3600	22	1900	4,7,22
			67511	LU50/D	S68	20	Coated	Universal	O	24000+	3700	3420	22	1900	4,22
70	E17	E26 Medium	67504	LU70/MED	S62	20	Clear	Universal	O	24000+	6300	5350	22	1900	4,22
			67505	LU70/D/MED	S62	20	Coated	Universal	O	24000+	5800	4900	22	1900	4,22
	ET23.5	E39 Mogul	67512	LU70/ECO	S62	20	Clear	Universal	O	24000+	6300	5500	22	1900	4,7,22
			67513	LU70/D	S62	20	Coated	Universal	O	24000+	5500	4900	22	1900	4,22
100	E17	E26 Medium	67506	LU100/MED	S54	20	Clear	Universal	O	24000+	9500	8000	22	2100	4,22
			67507	LU100/D/MED	S54	20	Coated	Universal	O	24000+	8800	7500	22	2100	4,22
	ET23.5	E39 Mogul	67514	LU100/ECO	S54	20	Clear	Universal	O	24000+	9500	8000	22	2100	4,7,22
			67515	LU100/D	S54	20	Coated	Universal	O	24000+	8800	7500	22	2100	4,22
150	E17	E26 Medium	67508	LU150/55/MED	S55	20	Clear	Universal	O	24000+	15800	13400	22	2100	4,13,22,36
			67509	LU150/55/D/MED	S55	20	Coated	Universal	O	24000+	14500	12300	22	2100	4,13,22,36
	ET23.5	E39 Mogul	67516	LU150/55/ECO	S55	20	Clear	Universal	O	24000+	16000	13800	22	2100	4,7,13,22, 36
			67517	LU150/55/D	S55	20	Coated	Universal	O	24000+	14000	12500	22	2100	4,13,22,36
	BT28	E39 Mogul	67518	LU150/100	S56	10	Clear	Universal	O	24000+	15700	14100	22	2100	4,14,22,36
200	ET18	E39 Mogul	67576	LU200/ECO	S66	20	Clear	Universal	O	24000+	22000	19800	22	2100	4,7,22
250	ET18	E39 Mogul	67578	LU250/ECO	S50	20	Clear	Universal	O	24000+	29000	26100	22	2100	4,7,22
	BT28	E39 Mogul	67521	LU250/D	S50	10	Coated	Universal	O	24000+	26000	23400	22	2100	4,22
310	ET18	E39 Mogul	67580	LU310/ECO	S67	20	Clear	Universal	O	24000+	37000	32300	22	2100	4,7,22
400	ET18	E39 Mogul	67533	LU400/ECO	S51	20	Clear	Universal	O	24000+	50000	45000	22	2100	4,7,22
	BT37	E39 Mogul	67524	LU400/D	S51	10	Coated	Universal	O	24000+	47500	40000	22	2100	4,22
600	T14.5	E40 Mogul	67610	LU600 SUPER	S108	12	Clear	Universal	O	24000	90000	81000	25	2200	3
750	BT37	E39 Mogul	67547	LU750	S111	6	Clear	Universal	O	24000+	105000	94500	22	2100	3,22
1000	E25	E39 Mogul	67307	LU1000/ECO	S52	6	Clear	Universal	O	24000+	130000	124000	22	2100	3,22

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 101-102

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HID

Fixture Tag: XA
Lamp quantity and type: (1) High Pressure Sodium
Ballast Type: Magnetic

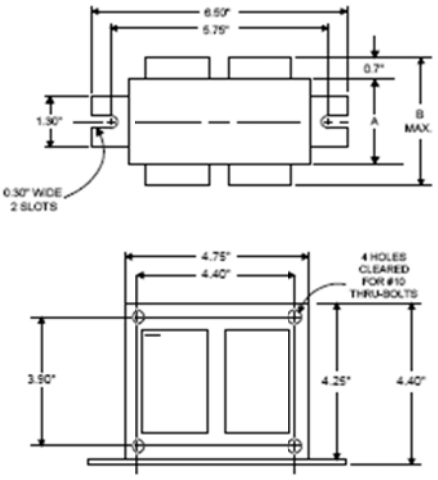
PHILIPS ADVANCE

High Pressure Sodium Lamp Ballast

Catalog Number 71A9937
For 400W S-51
60 Hz CWA
Status: Active

DIMENSIONS AND DATA

4 1/4 X 4 3/4 CORE - 2 COIL UNIT



		127	220	240	277
INPUT VOLTS					
CIRCUIT TYPE	CWA				
POWER FACTOR (min)	90%				
REGULATION					
Line Volts	±10%				
Lamp Watts	±10%				
LINE CURRENT (Amps)					
Operating		3.55	2.10	1.90	1.70
Open Circuit		1.62	0.95	0.90	0.75
Starting		2.92	1.70	1.58	1.35
UL TEMPERATURE RATINGS					
Insulation Class	H(180°C)				
Coil Temperature Code	1029	D	D	D	D
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C				
NOM. OPEN CIRCUIT VOLTAGE	190				
INPUT VOLTAGE AT LAMP DROPOUT		90	160	180	210
INPUT WATTS	464				
RECOMMENDED FUSE (Amps)		10	8	5	5
CORE and COIL					
Dimension (A)	2.29				
Dimension (B)	4.00				
Weight (lbs.)	13.5				
Lead Length	12"				
CAPACITOR REQUIREMENT					
Microfarads	55.0				
Volts (min.)	240				
Fault Current Withstand (amps)					
60 Hz TEST PROCEDURES (Refer to Philips Lighting Electronics N.A. TEST Procedure for HID Ballasts - Form 127					
High Potential Test (Volts)					
1 minute	2000				
2 seconds	2500				
Open Circuit Voltage Test (Volts)	170-210				
Short-Circuit Current Test (Amps)					
Secondary Current	6.00-7.50				
Input Current		2.35-3.50	1.35-2.05	1.25-1.90	1.10-1.60

Capacitor: 7C550P24

Capacitance: 55
Dia/Oval Dim: 1.75
Height: 5.15
Temp Rating: 105°C

Wiring Diagram:

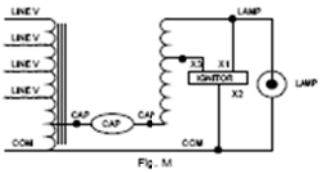


Fig. M

Ignitor: LI501-H4

Ballast to Lamp Distance (BTL) = 2 feet
Temp Rating: 105°C

Typical Ordering Information
(please call Philips Lighting Electronics N.A. for suffix availability)

Order Suffix	Description
500DM	Dry cap, NOM (Mexico) Label, No flag terminals

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

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

Revised: 02/18/10

Fixture Tag: XB
Lamp quantity and type: (1) High Pressure Sodium
Ballast Type: Magnetic

LUMALUX PLUS® AND LUMALUX PLUS® ECO®
Non-Cycling High Pressure Sodium

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Rx Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
100	E17	E26 Medium	67323	LU100/PLUS/MED	S54	20	Clear	Universal	O	30000	10000	9000	22	2100	4,8
	ET23.5	E39 Mogul	67559	LU100/PLUS/ECO	S54	20	Clear	Universal	O	30000	10000	9000	22	2100	4,7,8
150	ET23.5	E39 Mogul	67494	LU150/55/PLUS/ECO	S55	20	Clear	Universal	O	30000	16000	14400	22	2100	4,7,8,11, 36
200	ET18	E39 Mogul	67495	LU200/PLUS/ECO	S66	20	Clear	Universal	O	30000	22000	19800	22	2100	4,7,8
250	ET18	E39 Mogul	67572	LU250/PLUS/ECO	S50	20	Clear	Universal	O	30000	29000	26100	22	2100	4,7,8
310	ET18	E39 Mogul	67660	LU310/PLUS/ECO	S67	20	Clear	Universal	O	30000	37000	33300	22	2100	4,7,8
400	ET18	E39 Mogul	67312	LU400/PLUS/ECO	S51	20	Clear	Universal	O	30000	50000	45000	22	2100	4,7,8
1000	E25	E39 Mogul	67316	LU1000/PLUS	S52	6	Clear	Universal	O	30000	130000	124000	22	2100	4,8

LUMALUX® STANDARD AND LUMALUX® ECO®

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Rx Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
35	E17	E26 Medium	67500	LU35/MED	S76	20	Clear	Universal	O	16000+	2250	2050	22	1900	4,22
			67501	LU35/O/MED	S76	20	Coated	Universal	O	16000+	2100	1935	22	1900	4,22
50	E17	E26 Medium	67502	LU50/MED	S68	20	Clear	Universal	O	24000+	4000	3600	21	1900	4,22
			67503	LU50/O/MED	S68	20	Coated	Universal	O	24000+	3700	3420	22	1900	4,22
	ET23.5	E39 Mogul	67510	LU50/ED0	S68	20	Clear	Universal	O	24000+	4000	3600	22	1900	4,7,22
			67511	LU50/O	S68	20	Coated	Universal	O	24000+	3700	3420	22	1900	4,22
70	E17	E26 Medium	67504	LU70/MED	S62	20	Clear	Universal	O	24000+	6300	5350	22	1900	4,22
			67505	LU70/O/MED	S62	20	Coated	Universal	O	24000+	5800	4900	22	1900	4,22
	ET23.5	E39 Mogul	67512	LU70/ED0	S62	20	Clear	Universal	O	24000+	6300	5500	22	1900	4,7,22
			67513	LU70/O	S62	20	Coated	Universal	O	24000+	5500	4900	22	1900	4,22
100	E17	E26 Medium	67506	LU100/MED	S54	20	Clear	Universal	O	24000+	9500	8000	22	2100	4,22
			67507	LU100/O/MED	S54	20	Coated	Universal	O	24000+	8800	7500	22	2100	4,22
	ET23.5	E39 Mogul	67514	LU100/ED0	S54	20	Clear	Universal	O	24000+	9500	8000	22	2100	4,7,22
			67515	LU100/O	S54	20	Coated	Universal	O	24000+	8800	7500	22	2100	4,22
150	E17	E26 Medium	67508	LU150/55/MED	S55	20	Clear	Universal	O	24000+	15800	13400	22	2100	4,13,22,36
			67509	LU150/55/O/MED	S55	20	Coated	Universal	O	24000+	14500	12300	22	2100	4,13,22,36
	ET23.5	E39 Mogul	67516	LU150/55/ECO	S55	20	Clear	Universal	O	24000+	16000	13800	22	2100	4,7,13,22, 36
			67517	LU150/55/O	S55	20	Coated	Universal	O	24000+	14000	12500	22	2100	4,13,22,36
	BT28	E39 Mogul	67518	LU150/100	S56	10	Clear	Universal	O	24000+	15700	14100	22	2100	4,14,22,36
200	ET18	E39 Mogul	67576	LU200/ECO	S66	20	Clear	Universal	O	24000+	22000	19800	22	2100	4,7,22
250	ET18	E39 Mogul	67578	LU250/ECO	S50	20	Clear	Universal	O	24000+	29000	26100	22	2100	4,7,22
	BT28	E39 Mogul	67521	LU250/D	S50	10	Coated	Universal	O	24000+	26000	23400	22	2100	4,22
310	ET18	E39 Mogul	67580	LU310/ECO	S67	20	Clear	Universal	O	24000+	37000	32300	22	2100	4,7,22
400	ET18	E39 Mogul	67533	LU400/ECO	S51	20	Clear	Universal	O	24000+	50000	45000	22	2100	4,7,22
	BT37	E39 Mogul	67524	LU400/D	S51	10	Coated	Universal	O	24000+	47500	40000	22	2100	4,22
600	T14.5	E40 Mogul	67610	LU600 SUPER	S106	12	Clear	Universal	O	24000	90000	81000	25	2200	3
750	BT37	E39 Mogul	67547	LU750	S111	6	Clear	Universal	O	24000+	105000	94500	22	2100	3,22
1000	E25	E39 Mogul	67307	LU1000/ECO	S52	6	Clear	Universal	O	24000+	130000	124000	22	2100	3,22

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 101-102

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HID

Fixture Tag: XB
Lamp quantity and type: (1) High Pressure Sodium
Ballast Type: Magnetic

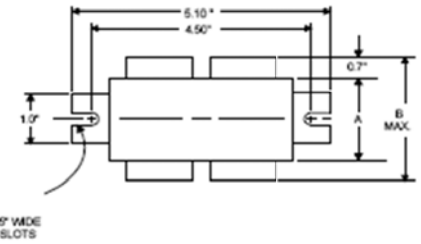
PHILIPS ADVANCE

High Pressure Sodium Lamp Ballast

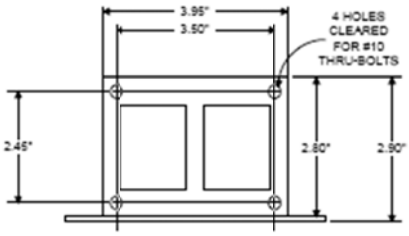
Catalog Number 71A8071
For 100W S54
60 Hz HX-HPF
Status: Active

DIMENSIONS AND DATA

3 X 4 CORE - 2 COIL UNIT



0.25" WIDE 2 SLOTS



INPUT VOLTS		120	208	240	277	
CIRCUIT TYPE	HX-HPF					
POWER FACTOR (min)	90%					
REGULATION						
Line Volts	±5%					
Lamp Watts	WITHIN TRAPEZOID					
LINE CURRENT (Amps)						
Operating		1.15	0.67	0.58	0.50	
Open Circuit		2.20	1.25	1.10	0.85	
Starting		1.30	0.75	0.65	0.60	
UL TEMPERATURE RATINGS						
Insulation Class	H(180°C)					
Coil Temperature Code	1029	D	F	D	D	
MIN. AMBIENT STARTING TEMP.	-40°F or -40°C					
NOM. OPEN CIRCUIT VOLTAGE	120					
INPUT VOLTAGE AT LAMP DROPOUT		96	165	192	222	
INPUT WATTS	130					
RECOMMENDED FUSE (Amps)		7	5	3	3	
CORE and COIL						
Dimension (A)	2.00					
Dimension (B)	3.60					
Weight (lbs.)	7.2					
Lead Lengths	12"					
CAPACITOR REQUIREMENT						
Microfarads	10.0					
Volts (min.)	280					
Fault Current Withstand (amps)						
60 Hz TEST PROCEDURES (Refer to Philips Lighting Electronics N.A. TEST Procedure for HID Ballasts - Form 127						
High Potential Test (Volts)						
1 minute	2000					
2 seconds	2500					
Open Circuit Voltage Test (Volts)	110-130					
Short-Circuit Current Test (Amps)						
Secondary Current	2.60-3.20					
Input Current		0.70-1.20	0.45-0.70	0.35-0.60	0.30-0.55	-

Capacitor: 7C100M33-R

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

Wiring Diagram:

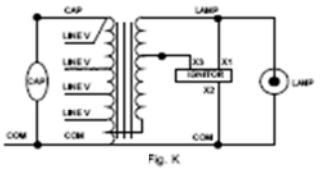


Fig. K

Ignitor: LI551-H4

Ballast to Lamp Distance (BTL) = 2 feet
Temp Rating: 105°C

Typical Ordering Information

(please call Philips Lighting Electronics N.A. for suffix availability)

Order Suffix	Description

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

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

Revised: 05/16/03

Fixture Tag: XE
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Electronic

The CMH range







Wattage [W]	Colour	Length [mm]	Product description	CCT [K]	CRI [Ra]	Initial Lumens/ candela for reflector [lm] or [cd]	Cap	Rated avg. life horizontal [h]	Rated avg. life vertical [h]	Pack qty.	Product code	
Single Ended Supermini												
20	WDL	52	CMH20/TC/UVC/830/GU6.5	3000	814	1615	GU6.5	12000	12000	12	40399	
35	WDL	52	CMH35/T/UVC/930/GU6.5	3000	88	3400	GU6.5	10000*	10,000*	12	88656	
35	WDL	52	CMH35/TC/UVC/U/930/GU6.5 Ultra	3000		3500	GU6.5	12000*	12000*	12	76122	NEW
35	NDL	52	CMH35/T/UVC/942/GU6.5	4200	90	3400	GU6.5	12000*	12,000*	12	88657	
MR 16 Precise												
20	WDL	54.5	CMH20/MR16/UVC/830/GX10/SP	3000	80	1000 (9000)	GX10	12000	12000	12	40400	
20	WDL	54.5	CMH20/MR16/UVC/830/GX10/FL GX10	3000	80	1000 (2900)	GX10	12000	12000	12	40401	
20	NDL	54.5	CMH20/MR16/UVC/830/GX10/WFL GX10	3000	80	1000 (1500)	GX10	12000	12000	12	42691	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/SP GX10	3000	90	2200 (16000)	GX10	10,000*	10,000*	12	88658	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/FL GX10	3000	90	2200 (5500)	GX10	10,000*	10,000*	12	88659	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/WFL GX10	3000	90	2200 (3000)	GX10	10,000*	10,000*	12	88660	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/SPUltra	3000	90	2200 (TBC)	GX10	12000	12000	12	76123	NEW
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/FL Ultra	3000	90	2200 (TBC)	GX10	12000	12000	12	76124	NEW
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/WFL Ultra	3000	90	2200 (TBC)	GX10	12000	12000	12	76125	NEW
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/SP GX10	4200	92	2200 (16000)	GX10	12,000*	12,000*	12	88661	
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/FL GX10	4200	92	2200 (5500)	GX10	12,000*	12,000*	12	88662	
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/WFL GX10	4200	92	2200 (3000)	GX10	12,000*	12,000*	12	88663	
* Initial rating at launch, testing continues to establish final design life												
Single Ended Mini												
20	WDL	85	CMH20/TC/UVC/U/830/GB.5 Plus	3000	804	1700	GB 5	12000	12000	12	39858	
35	WDL	85	CMH35/TC/UVC/U/830/GB.5 Plus	3000	804	3400	GB 5	15000	15000	12	43273	
35	NDL	85	CMH35/TC/UVC/U/942/GB.5	4200	884	3200	GB 5	15000	15000	12	26348	
35	WDL	85	CMH35/TC/UVC/U/930/GB.5 Ultra	3000	87	3500	GB 5	12000 *†	12000 *	12	76120	NEW
70	WDL	85	CMH70/TC/UVC/U/830/GB.5 Plus	3000	804	6200	GB 5	15000	15000	12	43274	
70	NDL	85	CMH70/TC/UVC/U/942/GB.5	4200	904	6200	GB 5	15000	15000	12	26349	
70	WDL	85	CMH70/TC/UVC/U/830/GB.5 Ultra	3000	88	6200	GB 5	15000	15000	12	96751	
* Initial rating at launch, testing continues to establish final design life of 15,000hrs † Data measured on electronic ballast only												
Single Ended												
20	WDL	90	CMH20/T/UVC/U/830/G12 Plus	3000	804	1700	G12	12000	12000	12	42708	
35	WDL	90	CMH35/T/UVC/U/830/G12 Plus	3000	804	3400	G12	15000	15000	12	43272	
35	NDL	90	CMH35/T/UVC/U/842/G12	4200	854	3200	G12	15000	15000	12	92141	
35	WDL	90	CMH35/T/UVC/U/930/G12 Ultra	3000	87	3500	G12	12000 * †	12000 *	12	76121	NEW
70	WDL	90	CMH70/T/UVC/U/830/G12	3000	804	6200	G12	15000	15000	12	20005	
70	NDL	90	CMH70/T/UVC/U/942/G12	4200	904	6300	G12	15000	15000	12	20013	
70	WDL	90	CMH70/TC/UVC/U/830/G12 Ultra	3000	87	6400	G12	15000	15000	12	96752	
150	WDL	100	CMH150/TW UVC/U/830/G12	3000	804	14000	G12	12000	12000	12	20012	
150	NDL	100	CMH150/TW UVC/U/942/G12	4200	904	13000	G12	12000	12000	12	20014	
* Initial rating at launch, testing continues to establish final design life of 15,000hrs † Data measured on electronic ballast only												
Double Ended												
35	WDL	118	CMH35/TD/UVC/830/RX7s	3000	804	3400	RX7s	15000	N/A	12	43278	
70	WDL	118	CMH70/TD/UVC/830/RX7s	3000	804	7000	RX7s	15000	N/A	12	36910	
70	NDL	118	CMH70/TD/UVC/942/RX7s	4200	904	6200	RX7s	15000	N/A	12	38698	
150	WDL	135	CMH150/TD/UVC/830/RX7s-24	3000	804	14500	RX7s-24	15000	N/A	12	36912	
150	NDL	135	CMH150/TD/UVC/942/RX7s-24	4200	904	12500	RX7s-24	15000	N/A	12	38692	
PAR 20												
20	WDL	92	CMH20/PAR20/UVC/830/E27/SP10	3000	804	1000 (13000)	E27	12000	12000	6	26478	
20	WDL	92	CMH20/PAR20/UVC/830/E27/FL25	3000	804	1000 (3750)	E27	12000	12000	6	26481	
35	WDL	92	CMH35/PAR20/UVC/830/E27/SP10	3000	804	2100 (22000)	E27	10000	10000	6	21684	
35	WDL	92	CMH35/PAR20/UVC/830/E27/FL25	3000	804	2100 (7500)	E27	10000	10000	6	21685	
35	NDL	92	CMH35/PAR20/UVC/942/E27/SP10	4200	904	1950 (19450)	E27	10000	10000	6	44890	
35	NDL	92	CMH35/PAR20/UVC/942/E27/FL25	4200	904	1950 (6950)	E27	10000	10000	6	44919	
35	WDL	92	CMH35/PAR20/UVC/930/E27/SP10	3000	89	2100 (22000)	E27	12000	12000	6	77405	
35	WDL	92	CMH35/PAR20/UVC/930/E27/FL 25	3000	89	2100 (7500)	E27	12000	12000	6	77406	
PAR 30												
20	WDL	124	CMH20/PAR30/UVC/830/E27/SP10	3000	804	1200 (19800)	E27	12000	12000	6	26497	
20	WDL	124	CMH20/PAR30/UVC/830/E27/FL25	3000	804	1200 (4900)	E27	12000	12000	6	26518	
35	WDL	124	CMH35/PAR30/UVC/830/E27/SP10	3000	804	2400 (39600)	E27	10000	10000	6	21689	
35	WDL	124	CMH35/PAR30/UVC/830/E27/FL25	3000	804	2400 (11000)	E27	10000	10000	6	21690	
35	NDL	124	CMH35/PAR30/UVC/942/E27/SP10	4200	89	2225 (36700)	E27	10000	10000	6	44939	
35	NDL	124	CMH35/PAR30/UVC/942/E27/FL25	4200	89	2225 (10200)	E27	10000	10000	6	44942	
35	WDL	124	CMH35/PAR30/UVC/930/E27/SP10	3000	89	2400 (44000)	E27	12000	12000	6	77407	
35	WDL	124	CMH35/PAR30/UVC/930/E27/FL25	3000	89	2400 (11000)	E27	12000	12000	6	77408	
70	WDL	124	CMH70/PAR30/UVC/830/E27/SP15	3000	804	4700 (43000)	E27	13000	13000	6	21683	
70	WDL	124	CMH70/PAR30/UVC/830/E27/FL40	3000	804	4700 (10000)	E27	13000	13000	6	21682	
70	NDL	124	CMH70/PAR30/UVC/942/E27/FL15	4200	89	4300 (33500)	E27	10000	10000	6	74619	
70	NDL	124	CMH70/PAR30/UVC/942/E27/SP40	4200	89	4300 (9000)	E27	10000	10000	6	74620	

Fixture Tag: XE
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Electronic

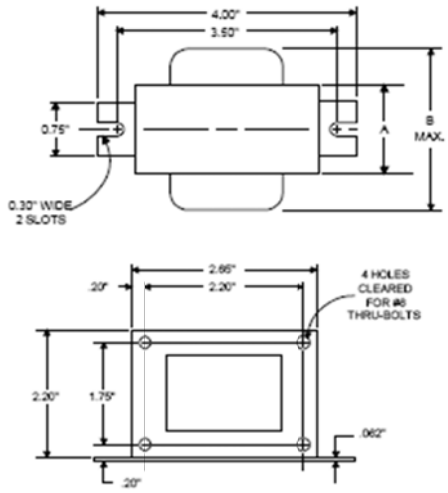
PHILIPS ADVANCE

Metal Halide Lamp Ballast

Catalog Number 71A5037BP
For 35/39W M130
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		0.19				
Open Circuit		0.52				
Starting		0.30				
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	48					
RECOMMENDED FUSE (Amps)		2				
CORE and COIL						
Dimension (A)	0.95					
Dimension (B)	2.70					
Weight (lbs.)	1.9					
Lead Lengths	12"					
CAPACITOR REQUIREMENT						
Microfarads	5.0					
Volts (min.)	280					
Fault Current Withstand (amps)						
60 Hz TEST PROCEDURES (Refer to Philips Lighting Electronics N.A. TEST Procedure for HID Ballasts - Form 127						
High Potential Test (Volts)						
1 minute	2000					
2 seconds	2500					
Open Circuit Voltage Test (Volts)	260-290					
Short-Circuit Current Test (Amps)						
Secondary Current	0.50-0.80					
Input Current		0.10-0.16	-	-	-	-

Capacitor: 7C050L30RA

Capacitance: 5
Dia/Oval Dim: 1.25
Height: 2.25
Temp Rating: 105°C

Wiring Diagram:

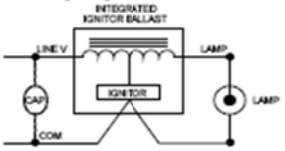


Fig. H

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 Philips Lighting Electronics N.A. for suffix availability)

Order Suffix	Description

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.

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Revised: 07/31/09

Fixture Tag: XH
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Integral HPF, Electronic

The CMH range







Wattage [W]	Colour	Length [mm]	Product description	CCT [K]	CRI [Ra]	Initial Lumen/candela for reflector [lm] or [cd]	Cap	Rated avg. life horizontal [h]	Rated avg. life vertical [h]	Pack qty.	Product code	
Single Ended Supermini												
20	WDL	52	CMH20/TC/UVC/830/GU6.5	3000	814	1615	GU6.5	12000	12000	12	40399	
35	WDL	52	CMH35/T/UVC/930/GU6.5	3000	88	3400	GU6.5	10000*	10,000*	12	88656	
35	WDL	52	CMH35/TC/UVC/U/930/GU6.5 Ultra	3000		3500	GU6.5	12000*	12000*	12	76122	NEW
35	NDL	52	CMH35/T/UVC/942/GU6.5	4200	90	3400	GU6.5	12000*	12,000*	12	88657	
MR16 Precise												
20	WDL	54.5	CMH20/MR16/UVC/830/GX10/SP	3000	80	1000 (9000)	GX10	12000	12000	12	40400	
20	WDL	54.5	CMH20/MR16/UVC/830/GX10/FL GX10	3000	80	1000 (2900)	GX10	12000	12000	12	40401	
20	NDL	54.5	CMH20/MR16/UVC/830/GX10/WFL GX10	3000	80	1000 (1500)	GX10	12000	12000	12	42691	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/SP GX10	3000	90	2200 (16000)	GX10	10,000*	10,000*	12	88658	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/FL GX10	3000	90	2200 (5500)	GX10	10,000*	10,000*	12	88659	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/WFL GX10	3000	90	2200 (3000)	GX10	10,000*	10,000*	12	88660	
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/SPUltra	3000	90	2200 (TBD)	GX10	12000	12000	12	76123	NEW
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/FL Ultra	3000	90	2200 (TBD)	GX10	12000	12000	12	76124	NEW
35	WDL	54.5	CMH35/MR16/UVC/930/GX10/WFL Ultra	3000	90	2200 (TBD)	GX10	12000	12000	12	76125	NEW
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/SP GX10	4200	92	2200 (16000)	GX10	12,000*	12,000*	12	88661	
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/FL GX10	4200	92	2200 (5500)	GX10	12,000*	12,000*	12	88662	
35	NDL	54.5	CMH35/MR16/UVC/942/GX10/WFL GX10	4200	92	2200 (3000)	GX10	12,000*	12,000*	12	88663	
* Initial rating at launch, testing continues to establish final design life												
Single Ended Mini												
20	WDL	85	CMH20/TC/UVC/U/830/GB.5 Plus	3000	804	1700	GB.5	12000	12000	12	39858	
35	WDL	85	CMH35/TC/UVC/U/830/GB.5 Plus	3000	804	3400	GB.5	15000	15000	12	43273	
35	NDL	85	CMH35/TC/UVC/U/942/GB.5	4200	884	3200	GB.5	15000	15000	12	26348	
35	WDL	85	CMH35/TC/UVC/U/930/GB.5 Ultra	3000	87	3500	GB.5	12000 *†	12000 *	12	76120	NEW
70	WDL	85	CMH70/TC/UVC/U/830/GB.5 Plus	3000	804	6200	GB.5	15000	15000	12	43274	
70	NDL	85	CMH70/TC/UVC/U/942/GB.5	4200	904	6200	GB.5	15000	15000	12	26349	
70	WDL	85	CMH70/TC/UVC/U/830/GB.5 Ultra	3000	88	6200	GB.5	15000	15000	12	96751	
* Initial rating at launch, testing continues to establish final design life of 15,000hrs † Data measured on electronic ballast only												
Single Ended												
20	WDL	90	CMH20/T/UVC/U/830/G12 Plus	3000	804	1700	G12	12000	12000	12	42708	
35	WDL	90	CMH35/T/UVC/U/830/G12 Plus	3000	804	3400	G12	15000	15000	12	43272	
35	NDL	90	CMH35/T/UVC/U/842/G12	4200	854	3200	G12	15000	15000	12	92141	
35	WDL	90	CMH35/T/UVC/U/930/G12 Ultra	3000	87	3500	G12	12000 * †	12000 *	12	76121	NEW
70	WDL	90	CMH70/T/UVC/U/830/G12	3000	804	6200	G12	15000	15000	12	20005	
70	NDL	90	CMH70/T/UVC/U/942/G12	4200	904	6300	G12	15000	15000	12	20013	
70	WDL	90	CMH70/TC/UVC/U/830/G12 Ultra	3000	87	6400	G12	15000	15000	12	96752	
150	WDL	100	CMH150/T/UVC/U/830/G12	3000	804	14000	G12	12000	12000	12	20012	
150	NDL	100	CMH150/T/UVC/U/942/G12	4200	904	13000	G12	12000	12000	12	20014	
* Initial rating at launch, testing continues to establish final design life of 15,000hrs † Data measured on electronic ballast only												
Double Ended												
35	WDL	118	CMH35/TD/UVC/830/RX7s	3000	804	3400	RX7s	15000	N/A	12	43278	
70	WDL	118	CMH70/TD/UVC/830/RX7s	3000	804	7000	RX7s	15000	N/A	12	36910	
70	NDL	118	CMH70/TD/UVC/942/RX7s	4200	904	6200	RX7s	15000	N/A	12	38698	
150	WDL	135	CMH150/TD/UVC/830/RX7s-24	3000	804	14500	RX7s-24	15000	N/A	12	36912	
150	NDL	135	CMH150/TD/UVC/942/RX7s-24	4200	904	12500	RX7s-24	15000	N/A	12	38692	
PAR 20												
20	WDL	92	CMH20/PAR20/UVC/830/E27/SP10	3000	804	1000 (13000)	E27	12000	12000	6	26478	
20	WDL	92	CMH20/PAR20/UVC/830/E27/FL25	3000	804	1000 (3750)	E27	12000	12000	6	26481	
35	WDL	92	CMH35/PAR20/UVC/830/E27/SP10	3000	804	2100 (12000)	E27	10000	10000	6	21684	
35	WDL	92	CMH35/PAR20/UVC/830/E27/FL25	3000	804	2100 (7500)	E27	10000	10000	6	21685	
35	NDL	92	CMH35/PAR20/UVC/942/E27/SP10	4200	904	1950 (19450)	E27	10000	10000	6	44890	
35	NDL	92	CMH35/PAR20/UVC/942/E27/FL25	4200	904	1950 (6950)	E27	10000	10000	6	44919	
35	WDL	92	CMH35/PAR20/UVC/930/E27/SP10	3000	89	2100 (12000)	E27	12000	12000	6	77405	
35	WDL	92	CMH35/PAR20/UVC/930/E27/FL 25	3000	89	2100 (7500)	E27	12000	12000	6	77406	
PAR 30												
20	WDL	124	CMH20/PAR30/UVC/830/E27/SP10	3000	804	1200 (19800)	E27	12000	12000	6	26497	
20	WDL	124	CMH20/PAR30/UVC/830/E27/FL25	3000	804	1200 (4900)	E27	12000	12000	6	26518	
35	WDL	124	CMH35/PAR30/UVC/830/E27/SP10	3000	804	2400 (19600)	E27	10000	10000	6	21689	
35	WDL	124	CMH35/PAR30/UVC/830/E27/FL25	3000	804	2400 (11000)	E27	10000	10000	6	21690	
35	NDL	124	CMH35/PAR30/UVC/942/E27/SP10	4200	89	2225 (16700)	E27	10000	10000	6	44939	
35	NDL	124	CMH35/PAR30/UVC/942/E27/FL25	4200	89	2225 (10200)	E27	10000	10000	6	44942	
35	WDL	124	CMH35/PAR30/UVC/930/E27/SP10	3000	89	2400 (44000)	E27	12000	12000	6	77407	
35	WDL	124	CMH35/PAR30/UVC/930/E27/FL25	3000	89	2400 (11000)	E27	12000	12000	6	77408	
70	WDL	124	CMH70/PAR30/UVC/830/E27/SP15	3000	804	4700 (43000)	E27	13000	13000	6	21683	
70	WDL	124	CMH70/PAR30/UVC/830/E27/FL40	3000	804	4700 (10000)	E27	13000	13000	6	21682	
70	NDL	124	CMH70/PAR30/UVC/942/E27/FL15	4200	89	4300 (33500)	E27	10000	10000	6	74619	
70	NDL	124	CMH70/PAR30/UVC/942/E27/SP40	4200	89	4300 (9000)	E27	10000	10000	6	74620	

Fixture Tag: XH
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Integral HPF, Electronic

Revised: 3/6/2009

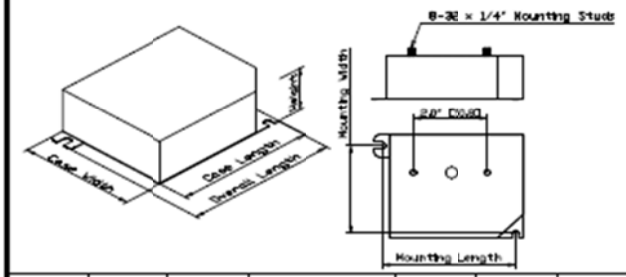
PHILIPS ADVANCE

e-Vision® Electronic Ballast for Metal Halide Lamps

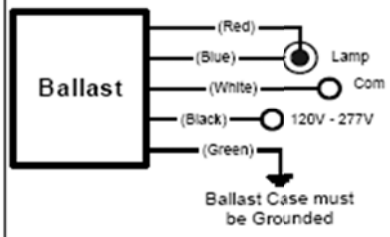
Catalog Number: IMH-G20-G
For 20W Metal Halide Lamps
ANSI M156
120-277 50/60Hz Electronic
Status: RELEASED

DIMENSIONS AND DATA

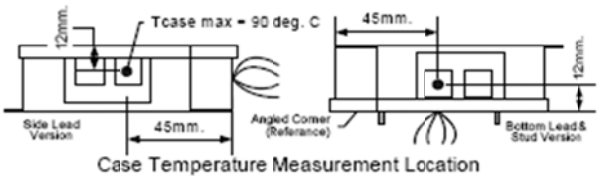
Lamp Number	Lamp Watts	Input Volts	Catalog Number*	Line Current (Amps)	Input Power (Watts)	Min Power Factor	Wiring Diag	Fig.	Weight (lb)	Max. Distance to Lamp (ft)
20W Watt Lamp, ANSI Code M156 Minimum Starting Temp -20°C/-4°F										
1	20	120	IMH-G20-G-XXX	0.2	24	0.95	3	G	0.9	5
		277		0.09	24					



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



Wiring Diagram 3



Case Temperature Measurement Location

INSTALLATION & APPLICATION NOTES:

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

*Ordering Information

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

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

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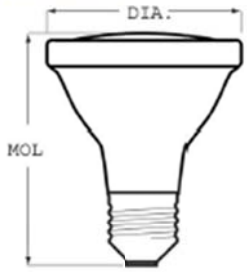
Fixture Tag: XO
Lamp quantity and type: (1) Metal Halide
Ballast Type: Electronic

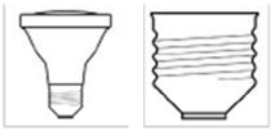
GE Lighting

29485 - CMH20PAR20/SP

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide PAR20

a product of ecomagination





CAUTIONS & WARNINGS

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

Caution

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

Warning

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

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide
Bulb	PAR20
Base	Medium Screw (E26)
Wattage	20
Rated Life	12000 hrs
Bulb Material	Hardglass
Lamp Enclosure Type (LET)	Open or enclosed fixtures
LEED-EB MR Credit	183 picograms Hg per mean lumen hour
Additional Info	UV control

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	1000
Nominal Initial Lumens per Watt	50
Beam Spread	8 °
Center Beam Candlepower (CBCP)	13000
Color Temperature	3000 K
Color Rendering Index (CRI)	81

ELECTRICAL CHARACTERISTICS

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

DIMENSIONS

Maximum Overall Length (MOL)	3.6 cm
Nominal Length	3.5 cm
Bulb Diameter (DIA)	2.5 cm
Bulb Diameter (DIA) (MAX)	2.5 cm

PRODUCT INFORMATION

Product Code	29485
Description	CMH20PAR20/SP
ANSI Code	M156
Standard Package	Case
Standard Package GTIN	10043168294857
Standard Package Quantity	15
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	15
UPC	043168294850

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Fixture Tag: XO
Lamp quantity and type: (1) Metal Halide
Ballast Type: Electronic

Revised: 3/4/2009

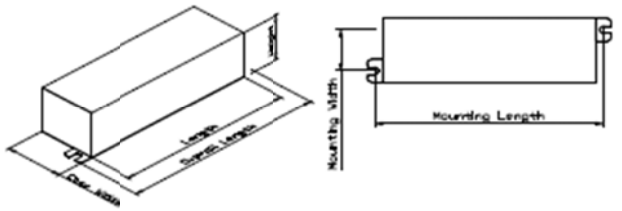
PHILIPS ADVANCE

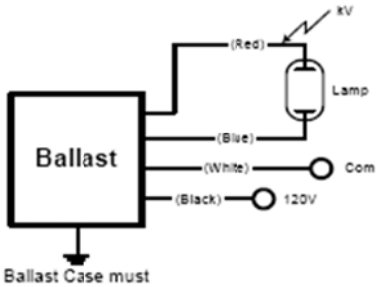
e-Vision® Electronic Ballast for Metal Halide Lamps

Catalog Number: RMH-G20-K
For 20W Metal Halide Lamps
ANSI M156
120V 50/60Hz Electronic
Status: RELEASED

DIMENSIONS AND DATA

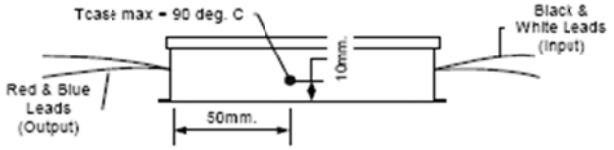
Lamp Number	Lamp Watts	Input Volts	Catalog Number*	Line Current (Amps)	Input Power (Watts)	Min Power Factor	Wiring Diag	Fig.	Weight (lb)	Max. Distance to Lamp (ft)
20W Watt Lamp, ANSI Code M156 Minimum Starting Temp -30°C/-20°F										
1	20	120	RMH-G20-K-XXX	0.21	24	0.9	4	K	0.4	6





Wiring Diagram 4

Case Figure	Overall Length	Case Length	Case Width	Height	Mountin Length	Mounting Width
K	119mm [4.74"]	104mm [4.1"]	33mm [1.1"]	30mm [1.2"]	114mm [4.5"]	13.5mm [0.5"]



Case Temperature Measurement Location

INSTALLATION & APPLICATION NOTES:

1. Maximum allowable case temperature is 90°C. See figure above for measurement location
2. Ignition pulse is 2 kV max
3. All leads are 9inches long
4. Ballast output will shutdown after 20 minutes if lamp fails to ignite
5. Power must be cycled off – then on, after replacing lamp
6. Connect the red lead to the center terminal of lamp when using screw base lamps

*Ordering Information

Order Suffix	Description
-LF	Ballast with side exit leads and mounting feet, Leads exit either end
-LFS	Ballast with side exit leads and mounting feet, Leads exit same end

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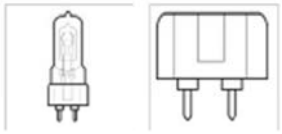
Fixture Tag: XQ
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Magnetic

GE Lighting

20016 - CMH70TU/830/G12

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide T6



CAUTIONS & WARNINGS

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

Caution

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

Warning

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

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide
Bulb	T6
Base	Bi-Pin (G12)
Wattage	70
Rated Life	15000 hrs
Bulb Material	Quartz
Lamp Enclosure Type (LET)	Enclosed fixtures only
LEED-EB MR Credit	65 picograms Hg per mean lumen hour
Additional Info	UV control

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	6200
Mean Lumens	4700
Nominal Initial Lumens per Watt	88
Color Temperature	3000 K
Color Rendering Index (CRI)	83

ELECTRICAL CHARACTERISTICS

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

DIMENSIONS

Maximum Overall Length (MOL)	3.5600 in(90.4 mm)
Light Center Length (LCL)	2.180 in(55.4 mm)

PRODUCT INFORMATION

Product Code	20016
Description	CMH70TU/830/G12
ANSI Code	C139/M139
Standard Package	Case
Standard Package GTIN	10043168200162
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168200165

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Fixture Tag: XQ
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Magnetic

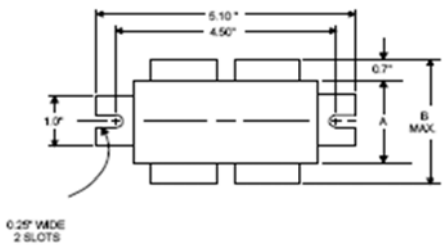
PHILIPS ADVANCE

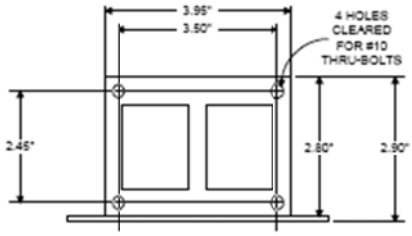
Metal Halide Lamp Ballast

Catalog Number 71A52A1
For 70W M139
60 Hz HX-HPF
Status: Active

DIMENSIONS AND DATA

3 X 4 CORE - 2 COIL UNIT





INPUT VOLTS		120	277	347		
CIRCUIT TYPE	HX-HPF					
POWER FACTOR (min)	90%					
REGULATION						
Line Volts	±5%					
Lamp Watts	±7%					
LINE CURRENT (Amps)						
Operating		0.61	0.35	0.28		
Open Circuit		1.90	0.80	0.65		
Starting		1.05	0.45	0.38		
UL TEMPERATURE RATINGS	H(180°C)					
Insulation Class	1029					
Coil Temperature Code	-30°F or -35°C	A	A	A		
MIN. AMBIENT STARTING TEMP.	255					
NOM. OPEN CIRCUIT VOLTAGE						
INPUT VOLTAGE AT LAMP DROPOUT		90	208	260		
INPUT WATTS	94					
RECOMMENDED FUSE (Amps)		4	2	2		
CORE and COIL						
Dimension (A)	1.50					
Dimension (B)	2.80					
Weight (lbs.)	5					
Lead Lengths	12"					
CAPACITOR REQUIREMENT						
Microfarads	8.0					
Volts (min.)	280					
Fault Current Withstand (amps)						
60 Hz TEST PROCEDURES (Refer to Philips Lighting Electronics N.A. TEST Procedure for HID Ballasts - Form 127						
High Potential Test (Volts)						
1 minute	1500					
2 seconds	2500					
Open Circuit Voltage Test (Volts)	230-280					
Short-Circuit Current Test (Amps)						
Secondary Current	1.10-1.40					
Input Current		0.85-1.25	0.35-0.55	0.30-0.45	-	-

Capacitor: 7C080L30RA

Capacitance: 8
Dia/Oval Dim: 1.25
Height: 2.75
Temp Rating: 105°C

Wiring Diagram:

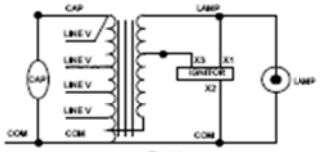


Fig. K

Ignitor: LI533-H4

Ballast to Lamp Distance (BTL) = 5 feet
Temp Rating: 105°C

Typical Ordering Information

(please call Philips Lighting Electronics N.A. for suffix availability)

Order Suffix	Description

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

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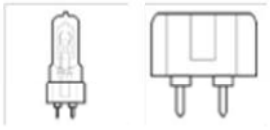
Revised: 07/31/09

Fixture Tag: XS
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Magnetic

GE Lighting

20018 - CMH150TU/942/G12

GE ConstantColor® PulseArc® CMH® Ceramic Metal Halide T6



CAUTIONS & WARNINGS

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

Caution

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

Warning

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

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Ceramic Metal Halide
Bulb	T6
Base	Bi-Pin (G12)
Wattage	150
Rated Life	12000 hrs
Bulb Material	Quartz
Lamp Enclosure Type (LET)	Enclosed fixtures only
LEED-EB MR Credit	68 picograms Hg per mean lumen hour
Additional Info	UV control

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	13000
Mean Lumens	11000
Nominal Initial Lumens per Watt	86
Color Temperature	4200 K
Color Rendering Index (CRI)	94

ELECTRICAL CHARACTERISTICS

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

DIMENSIONS

Maximum Overall Length (MOL)	3.9300 in(99.8 mm)
Light Center Length (LCL)	2.180 in(55.4 mm)

PRODUCT INFORMATION

Product Code	20018
Description	CMH150TU/942/G12
ANSI Code	M102/M142
Standard Package	Case
Standard Package GTIN	10043168200186
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168200189

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Fixture Tag: XS
Lamp quantity and type: (1) Ceramic Metal Halide
Ballast Type: Magnetic

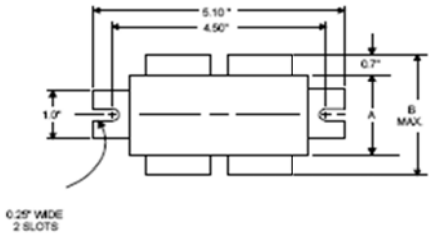
PHILIPS ADVANCE

Metal Halide Lamp Ballast

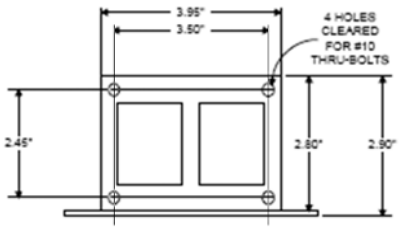
Catalog Number 71A5490
For 150W M81
60 Hz HX-HPF
Status: Active

DIMENSIONS AND DATA

3 X 4 CORE - 2 COIL UNIT



0.25" WIDE 2 SLOTS



INPUT VOLTS		120	208	240	277	
CIRCUIT TYPE	HX-HPF					
POWER FACTOR (min)	90%					
REGULATION						
Line Volts	±5%					
Lamp Watts	±10%					
LINE CURRENT (Amps)						
Operating		1.60	1.00	0.80	0.70	
Open Circuit		3.60	2.10	1.80	1.60	
Starting		1.70	1.00	0.85	0.80	
UL TEMPERATURE RATINGS						
Insulation Class	H(180°C)					
Coil Temperature Code	1029	C	C	A	A	
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C					
NOM. OPEN CIRCUIT VOLTAGE	240					
INPUT VOLTAGE AT LAMP DROPOUT		90	160	180	190	
INPUT WATTS	185					
RECOMMENDED FUSE (Amps)		9	6	5	4	
CORE and COIL						
Dimension (A)	2.50					
Dimension (B)	3.80					
Weight (lbs.)	8.5					
Lead Lengths	12"					
CAPACITOR REQUIREMENT						
Microfarads	16.0					
Volts (min.)	300					
Fault Current Withstand (amps)						
60 Hz TEST PROCEDURES (Refer to Philips Lighting Electronics N.A. TEST Procedure for HID Ballasts - Form 127						
High Potential Test (Volts)						
1 minute	2000					
2 seconds	2500					
Open Circuit Voltage Test (Volts)	215-265					
Short-Circuit Current Test (Amps)						
Secondary Current	2.10-2.60					
Input Current		1.00-1.60	0.75-1.10	0.50-0.80	0.45-0.65	-

Capacitor: 7C160M30RA

Capacitance: 16
Dia/Oval Dim: 1.65
Height: 2.75
Temp Rating: 105°C

Wiring Diagram:

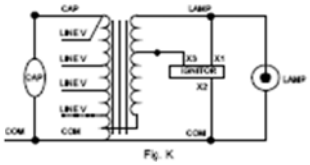
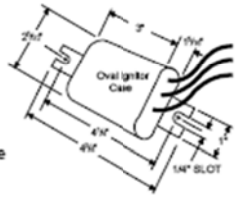


Fig. K

Ignitor: LI522-H5



Ballast to Lamp Distance (BTL) = 20 feet
Temp Rating: 105°C

Typical Ordering Information
(please call Philips Lighting Electronics N.A. for suffix availability)

Order Suffix	Description

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

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