AEP
AMERICAN ELECTRIC POWER

Legal Department

September 24, 2018

Chairman Asim Z. Haque
Public Utilities Commission of Ohio
180 East Broad Street
Columbus, OH 43215-3793

Re: **In the Matter of the Application of**	)	
The Ohio State University	)	
and Ohio Power Company	)	**Case No. 18-0811-EL-EEC**
for Approval of a Special Arrangement	)	
Agreement with a Mercantile Customer	)	

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Dear Chairman Haque,

Attached please find the Joint Application of Ohio Power Company (AEP Ohio) and the above-referenced mercantile customer for approval of a Special Arrangement of the commitment of energy efficiency/peak demand reduction (EE/PDR) resources toward compliance with the statutory benchmarks for 2018 (hereinafter "Joint Application").

Amended Substitute Senate Bill 221, codified at R.C. 4928.66, sets forth EE/PDR benchmarks that electric distribution utilities are required to meet or exceed. The statute allows utilities to include EE/PDR resources committed by mercantile customers for integration into the utilities' programs to be counted toward compliance with a utility's EE/PDR benchmarks. The statute also enables the Commission to approve special arrangements for mercantile customers that commit EE/PDR resources to be counted toward compliance with EE/PDR benchmarks.

The Commission's Order in Case No. 10-834-EL-EEC established a streamlined process to expedite review of these special arrangements by developing a sample application process for parties to follow for consideration of such programs implemented during the prior three calendar years. The attached Joint Application and affidavit conforms with AEP Ohio's version of the streamlined sample application. As requested by Commission Staff, any confidential information referenced in the Joint Application has been provided confidentially to Commission Staff for filing in Commission Docket 10-1599-EL-EEC and subject to the confidentially protections of R.C. 4901.16 and OAC 4901-1-24(E). AEP Ohio respectfully requests that the Commission treat the two cases as associated dockets and that any confidential information provided to Staff for filing in connection with the Joint Application be subject to the protective order requested in Docket 10-1599-EL-EEC.

Cordially,

/s/ Tanner Wolffram
TAnner Wolffram

Attachments

Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 18-0811-**EL-EEC**

Mercantile Customer: THE OHIO STATE UNIVERSITY

Electric Utility: Ohio Power

Program Title or Description: AEP Ohio Business Incentives for Energy Efficiency: Self Direct Program

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. 10-834-EL-POR

Completed applications requesting the cash rebate reasonable arrangement option (Option 1) in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible. Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of incomplete applications may result in a suspension of the automatic approval process or denial of the application.
Any confidential or trade secret information may be submitted to Staff on disc or via email at ee-pdr@puc.state.oh.us.

Section 1: Company Information

Name: THE OHIO STATE UNIVERSITY

Principal address: 2003 Millikin Rd, Columbus, Oh 43210

Address of facility for which this energy efficiency program applies: 1735 Cannon Dr, Columbus, Oh 43210

Name and telephone number for responses to questions:

John Rappleye, The Ohio State University, (614) 292-6240

Electricity use by the customer (check the box(es) that apply):

☒ The customer uses more than seven hundred thousand kilowatt hours per year at our facility. (Please attach documentation.)

See Confidential and Proprietary Attachment 4 – Calculation of Rider Exemption and UCT which provides the facility consumption for the last three years, benchmark kWh, and the last 12 months usage.

☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.) When checked, see Attachment 6 – Supporting Documentation for a listing of the customer's name and service addresses of other accounts in the AEP Ohio service territory.

Section 2: Application Information

A) The customer is filing this application (choose which applies):

☐ Individually, on our own.

☒ Jointly with our electric utility.

B) Our electric utility is: Ohio Power Company

The application to participate in the electric utility energy efficiency program is "Confidential and Proprietary Attachment 3 - Self Direct Program Project Completed Application."

C) The customer is offering to commit (choose which applies):

☐ Energy savings from our energy efficiency program. (Complete Sections 3, 5, 6, and 7.)

☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)

☒ Both the energy savings and the demand reduction from the customer's energy efficiency program. (Complete all sections of the Application.)

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (choose whichever applies):

☐ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)).

☐ Installation of new equipment to replace equipment that needed to be replaced. The customer installed new equipment on the following date(s):

☒ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): 8/1/2016

☐ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by your energy efficiency program:

1) If you checked the box indicating that your project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) - (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: kWh

2) If you checked the box indicating that you installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: kWh

Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.

3) If you checked the box indicating that your project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Unit Quantity (watts) = Existing (watts x units) - Installed (watts x units)

kWh Reduction (Annual Savings) = Unit Quantity x (Deemed kWh/Unit)

Annual savings: 151,996 kWh

See Confidential and Proprietary Attachment 5 - Self Direct Program Project Calculation for annual energy savings calculations and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.

The less efficient new equipment is the minimum required by Ohio State code or Federal Standard whichever is more stringent. For those measures where no code applies the baseline equipment is assumed to be the least efficient equipment available in the marketplace or standard practice, whichever results in the most conservative annual savings. Any information available describing the less efficient new equipment option is provided in 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures.

4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies)::

☒ Coincident peak-demand savings from the customer's energy efficiency program.

☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)

☐ Potential peak-demand reduction (choose which applies):

- Choose one or more of the following that applies:

  ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.

  ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

The coincident peak-demand savings are permanent installations that reduce demand through energy efficiency and were installed on the date specified in Section 3 A above.

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

Unit Quantity (watts) = Existing (watts x units) – Installed (watts x units)

KW Demand Reduction = Unit Quantity (watts) x (Deemed KW/Unit (watts))

34.2 kW

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for peak demand reduction calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

☒ A cash rebate of $ 11,763.68. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for incentive calculations for this mercantile program.

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for ____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

☐ A commitment payment valued at no more than $_____. (Attach documentation and calculations showing how this payment amount was determined.)

OR

☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of an ongoing efficiency program that is practiced by our organization. (Attach documentation that establishes your organization's ongoing efficiency program. In order to continue the exemption beyond the initial 24 month period your organization will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____ (Continue to Subsection 1, then skip Subsection 2)

☒ Utility Cost Test (UCT) . The calculated UCT value is: 4.12 (Skip to Subsection 2.)

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The utility's incremental measure costs were _____.

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were $ 52,246.08

The utility's program costs were $ 911.98

The utility's incentive costs/rebate costs were $ 11,763.68.

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment.

  See Attachment 1 - Self Direct Project Overview and Commitment for a description of the project. See Attachment 6 – Supporting Documentation, for the specifications of the replacement equipment 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed. Due to the length of time since the equipment replacement, the make, model and year of the replaced equipment is not available.

- A copy of the formal declaration or agreement that commits your program to the electric utility, including:

  1) any confidentiality requirements associated with the agreement;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All confidentially requirements are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.)

  2) a description of any consequences of noncompliance with the terms of the commitment;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All consequences of noncompliance are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

  3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;

     None required because the resources committed are permanent installations that reduce demand through increased efficiency during the Company's peak summer demand period generally defined as May through September and do not require specific coordination and communication to provide demand reduction capabilities to the Company.

4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,

   See Attachment 2 – Self Direct Program Blank Application including Rules and Requirements granting such permission pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

5) a commitment by you to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.

   See Attachment 1 - Self Direct Project Overview and Commitment for the commitment to comply with any information and compliance reporting requirements imposed by rule or as part of the approval of this arrangement by the Public Utilities Commission of Ohio.

- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.

  The Company applies the same methodologies, protocols, and practices to Self Direct Program retrospective projects that are screened and submitted for approval as it does to prospective projects submitted through its Prescriptive and Custom Programs. The Commission has not published a technical reference manual for use by the Company so deviations can not be identified. The project submitted is a prescriptive project and energy savings are determined as described in Confidential and Proprietary Attachment 5 - Self Direct Program Project Calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 18-0811-EL-EEC

State of Ohio :

Nigma Mustafa, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   DNV GL Energy Services USA Inc. agent of Ohio Power

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

Nigma Mustafa Engineer
Signature of Affiant & Title

Sworn and subscribed before me this 9th day of August, 2018 Month/Year

Linda M. Schmidt
Signature of official administering oath

LINDA M. SCHMIDT
Admin. Assistant
Print Name and Title

My commission expires on 7/31/2022

NOTARIAL SEAL STATE OF OHIO

LINDA M. SCHMIDT
Notary Public, State of Ohio
My Commission Expires 7-31-2022

AEP OHIO
A unit of American Electric Power

Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	THE OHIO STATE UNIVERSITY	
Project Number	AEP-18-22678	
Customer Premise Address	1735 CANNON DR, COLUMBUS, OH 43210	
Customer Mailing Address	2003 Millikin Rd, Columbus, OH 43210	
Date Received	2/15/2018	
Project Installation Date	8/1/2016	
Annual kWh Reduction	151,996	
Total Project Cost	$44,440.55	
Unadjusted Energy Efficiency Credit (EEC) Calculation	$15,684.90	
Simple Payback (yrs)	5.9	
Utility Cost Test (UCT) for EEC	4.12	
Utility Cost Test (UCT) for Exemption	N/A	
		Please Choose One Option Below and Initial
Self Direct EEC: 75%	**$11,763.68**	☑ **Initial:** MLR
EE/PDR Rider Exemption	**12 Months (with possible extension up to N/A months after PUCO Approval)**	☐ **Initial: N/A**

Note: *This is a one time selection. By selecting EEC, the customer will receive payment in the amount stated above. Selection of EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If EEC has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

___YES ☑ NO

Note: Exemptions for periods beyond 24 months are subject to look-back or true-up adjustments every year to ensure that the exemption accurately reflects the EEDR savings. Applicants must file for renewal for any exemption beyond 12 months.

Project Overview:

The Self Direct (Prescriptive and Custom) project that the above has completed and applied is as follows.
Installed lighting in a 115,439 square foot new dormitory. The new lighting draws 63.156 Watts of power, which is 45% lower than the ASHRAE 90.1-2007 maximum allowed lighting connected load.

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

By: Jon F. Williams

Title: Manager

Date: 05/31/2018

THE OHIO STATE UNIVERSITY

By: John Fogglyer

Title: ENERGY PROGRAMS MANAGE

Date: MAY 31, 2018

Application Guidelines

An AEP Company

Final Applications must be submitted before November 16, 2018 in order to qualify for incentives identified in this application.

Step 1. Verify Eligibility

- Customer must have a valid AEP Ohio account.
- Equipment/measure must be installed at facilities served by the AEP Ohio account.
- Project must produce permanent reduction in electrical energy use (kWh).
- All installed equipment must meet or exceed the specifications in the application.
- Please see Efficient Products for Business, Process Efficiency and New Construction Terms and Conditions or Self-Direct Terms and Conditions for program rules and regulations.

Step 2. Complete Applicant Information

- All fields in customer and project information sections must be completed.
- Contractor information must be completed if project is not self-performed.

Step 3. Complete the Incentive Worksheet(s)

- Find and read specifications related to the project.
- Choose the incentive category on the worksheet based on installed equipment and specifications.
- Complete all fields (fixture description, operating hours, etc.) on the related worksheet.

Step 4. Sign Customer Agreement

- Read the Terms and Conditions before signing and submitting the application.
- Sign Pre-Approval Agreement and submit the application to reserve funds.
- Sign Final Application Agreement and submit the application after the project is completed to receive funds.
- Complete Third Party Payment Release Authorization ONLY if incentive payment is to be paid to an entity other than AEP Ohio customer listed on the Applicant Information page.

Step 5. Submit Pre-Approval Application[1]

(For Self-Direct applications, skip to Step 6)

- Submitting a Pre-Approval Application to determine qualification and reserve program funds for a project is strongly recommended.
- All process efficiency projects require pre-approval.
- Complete all fields in Pre-Approval Agreement.
- Pre-Approval Application must be submitted with:
  - Proposed scope of work (type and quantity of old and new equipment must be listed)
  - Specification sheets for all proposed equipment
  - W-9 form
- Submit application via email, fax or mail.
- An inspection may be required during application review; applicants requiring inspection will be contacted for scheduling.

Step 6. Submit Final Application

- Complete all fields for Final Application Agreement.
- Update the application if measures/equipment differs from pre-application.
- Final Application must be submitted with:
  - Dated and itemized material invoice
  - External labor invoice (if applicable)
  - If Pre-Approval Application was not submitted, include the documents listed on Step 5
- Submit application via email, fax or mail.
- An inspection may be required during application review; applicants requiring inspection will be contacted for scheduling.
- Self-Direct applications require additional steps. Please see the Self-Direct Terms and Conditions for details.

AEP Ohio Business Incentives Program
445 Hutchinson Avenue, Suite 300
Columbus, Ohio 43235
877-541-3048 | aepohiosolutions@clearesult.com
Visit our website at AEPohio.com/solutions

[1]A Pre-Approval Application is not a guarantee of an incentive; the actual incentive will be based on the energy savings and equipment installed as determined in the Final Application. Funds are reserved for 90 days, unless an applicant is granted an extension. The program team reserves the right to contact the customer before the reservation expiration date to ensure that the project is moving forward. If the project is not underway, the reservation may be cancelled. Reserved funds are not transferable to other projects, facilities and/or customers. A waiting list will be established when funds become fully subscribed.

Application Checklist

An AEP Company

Pre-Approval

- ☐ Completed Applicant Information
- ☐ Estimated Total Project Cost
- ☐ Estimated Completion Date
- ☐ Completed Incentives Requested Section of Application
- ☐ Applicable Incentive Worksheets Completed
- ☐ Completed and Signed Customer Agreement
- ☐ Equipment Specifications
- ☐ Proposed Scope of Work
- ☐ W-9 Form (Business Name Must Match Line 1 or 2 on the Form)

Final Application Only (Without Pre-Approval)

- ☐ Completed Applicant Information
- ☐ Completed Incentives Requested Section of Application
- ☐ Applicable Incentive Worksheets Completed
- ☐ Total Project Cost
- ☐ Completion date
- ☐ Completed and Signed Customer Agreement
- ☐ Completed Third-Party Payment Release Authorization (optional)
- ☐ Itemized Invoices
- ☐ Equipment Specifications
- ☐ Scope of Work
- ☐ W-9 Form (Business Name Must Match Line 1 or 2 on the Form)

Final Application (With Pre-Approval)

- ☐ Completed Applicant Information
- ☐ Assigned Project Number on Signature Page
- ☐ Total Project Cost
- ☐ Project Completion Date
- ☐ Completed and Signed Final Payment Agreement
- ☐ Completed Third-Party Payment Release Authorization (optional)
- ☐ Installed Equipment Specifications (if there were changes from pre)
- ☐ Itemized Invoices
- ☐ Updated Scope of Work (if there were changes from pre)
- ☐ Applicable Incentive Worksheets (if there were changes from pre)

Applicant Information

AEP OHIO
An AEP Company

AEP Application Number AEP - _ _ - _ _ _ _ _

Application Type (Select One)

CUSTOMER INFORMATION

Business Name _____

Name as It Appears on Utility Bill _____

How many AEP Ohio Accounts are at the Project Site? _____

AEP Ohio Account Numbers for this Project[1] _____ _____ _____

Taxpayer ID _____ - _____ W-9 Tax Status (Select One)

MAILING ADDRESS - WHERE CHECK WILL BE SENT

Contact Name _____ Contact Title _____

Mailing Address _____ City _____ State OH Zip _____

Phone _____ Ext. _____ Contact Email _____

How Did You Hear About the Program? (Select One) AEP OH Energy Advisor _____

PROJECT INFORMATION

Project Name (if applicable) _____

☐ Check if mailing address and project site address are the same.

Project Site Address _____ City _____ State OH Zip _____

Building Type (Select One) Shift (Select One)

Annual Operating Hours _____ Building Area (sq. ft.) _____

Construction Type (Select One) Does the facility have a data center? (Select One)

[1]Please only enter the first eleven digits of the account number.

Applicant Information

AEP OHIO
An AEP Company

CONTRACTOR INFORMATION

Company Name _____

Contact Name _____ Title of Contact _____

Mailing Address _____ City _____ State OH Zip _____

Phone _____ Ext. _____ Contact Email _____

PRIMARY CUSTOMER CONTACT INFORMATION

Contact Name _____ Title of Contact _____

Phone _____ Ext. _____ Contact Email _____

Who should we contact with questions about the application? ❒ Customer ❒ Contractor

Incentive Summary Table

INCENTIVE CATEGORY	TOTAL INCENTIVES
LIGHTING	
HVAC	
MOTORS & DRIVES	
COMPRESSED AIR	
REFRIGERATION/FOOD SERVICE	
AGRICULTURE	
MISCELLANEOUS	
PROCESS EFFICIENCY	
NC LIGHTING (SELF-DIRECT ONLY)	
TOTAL INCENTIVES	

AEP Application Number AEP - _ _ - _ _ _ _ _

Customer Agreement

An AEP Company

APPLICATION AGREEMENT

By signing this document, I agree to program requirements outlined in the measure specifications, Terms and Conditions for the applicable program and Final Application Agreement. As an eligible customer, I verify the information is correct and request consideration for participation under this program. Furthermore, I concur that I meet all eligibility criteria in order to receive payment under this program.

Link to Efficient Products for Business/Process Efficiency Terms and Conditions, and Final Application Agreement

Link to Self-Direct Terms and Conditions, and Final Application Agreement

☐ **Pre-Application** ☐ **Final-Application**

Project Completion Year (Select One) _____ **Self-Direct** _____

Project Completion Date _____ **Total Project Cost** _____

Total Requested Incentive[1] _____ **Total Self-Direct Requested Incentive**[2] _____

Print Name	**Date**	**AEP Ohio Customer Signature**
_____	_____	_____

PRINT APPLICATION

[1]Incentives have a threshold of 50% of the project cost and total incentives paid to a threshold of $25,000 and Bid4Efficiency above that.
[2]Self-Direct incentives are 75% of Total Requested Incentive, after 50% of the project cost threshold and tiering is applied.

Third Party Payment Release

An AEP Company

THIRD PARTY PAYMENT RELEASE AUTHORIZATION (NOT APPLICABLE TO SELF-DIRECT)

Complete this section ONLY if incentive payment is to be paid to an entity other than the AEP Ohio customer.

Make checks payable to: Company/Individual _____

Mailing Address _____ City_____ State OH Zip_____

Phone _____ Ext. _____

Taxpayer ID of 3rd Party ____ - _____ W-9 Tax Status _____

By signing this document, I authorize the payment of the incentive to the third party named above and understand that I will not receive the incentive payment from AEP Ohio. I also understand that my release of the payment to a third party does not exempt me from the program requirements outlined in the measure specifications, Terms and Conditions, and Final Application Agreement.

Print Name	**Date**	**AEP Ohio Customer Signature**
_____	_____	_____

PRODUCT DATA SHEETS

PANEL LUMINAIRES

LM22 - 2 X 2 LIGHT PANEL SERIES

Project Name	OSU - NRDT
Date	
Type	A1

T/LT

TILT Part Number	L GM 22 35 W
TILT Driver	LD60
	CM22 DCOS

FEATURES

CONSTRUCTION

- Side lit design for an ultra thin profile
- IC rated. IP44-suitable for damp or dry locations
- Wide beam angle (120°) for better spacing
- CE and cULus rated
- RoHS compliant
- 5 year warranty (standard)

ELECTRICAL

- Dimmable (via driver or using PWM)
- Constant voltage design allows for multiple lights per driver
- LM-80 and LM-79 available
- Panels should be placed within 50 feet of driver
- Rated at 60W max AC power (51W DC)

2X2

LUMEN PACKAGES (2X2) (3)

CCT		50,000 hours (L70)			
		STANDARD 90+ CRI, R9 >50			
5000k	Lumens	4700	4157	3736	2775
	LPW	74.1	79.2	82	87.5
4000k	Lumens	4550	4298	3837	2847
	LPW	77.3	78.4	80.4	87.7
3500k	Lumens	4225	3829	3426	2542
	LPW	72.5	75.2	77.4	84.8
3000k	Lumens	3900	3360	3016	2237
	LPW	67.6	71.5	73.9	81.4

ORDERING INFORMATION

L GM 22 50 W

Fixture Type	Mounting Type	Size	CCT	Frame Color (4)
L - Light	GM - Grid Mount	22 - 2' x 2'	50 - 5,000K 40 - 4,000K 35 - 3,500K 30 - 3,000K	W - White B - Black + S - Silver + + - special order

USE WITH

Driver	
LD60	LD60PE7
LD60P	LD90PE7
LD90	LD100PE7
LD100P	

DRIVER SPECIFICATION

NOTE on DRIVERS: UL 8750, short circuit, over current, over voltage, and over temperature protection
UL recognized and CE rated, RoHS compliant
Class II, SELV, IP67

Model (5)	Size in Inches (LxWxH)	AC Input	DC Output	Dimming (9)	Temp	Max Fixtures (8)
LD60	6.50 x 1.63 x 1.26	90 - 305V	60W	1-10V	-40C - 60C	1
LD60P	12.50 x 2.38 x 1.50	90 - 305V	60W	1-10V	-40C - 70C	1
LD90	6.34 x 2.40 x 1.26	90 - 305V	90W	1-10V	-40C - 60C	1
LD100P	14.50 x 2.63 x 1.58	90 - 305V	100W	1-10V	-40C - 60C	2

Emergency (7)	Size in Inches (LxWxH)	AC Input	Output (6)	Lumens	Temp	Max Fixtures (8)
LD60PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	1
LD90PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	1
LD100PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	2

NOTES (NUMBERS)

(1) See driver or dimming product sheet for specific details

(2) AC W used for circuit power, DC W used for driver circuit

(3) Lumen packages provided using Dim Chip with driver

(4) Colors other than white are custom

(5) "P" designation after watt rating denotes Plenum Rated

(6) Based on watt load of fixtures and driver output

(7) See Product Sheet for Emergency Drivers

(8) Safe amount of fixtures per driver

(9) TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458

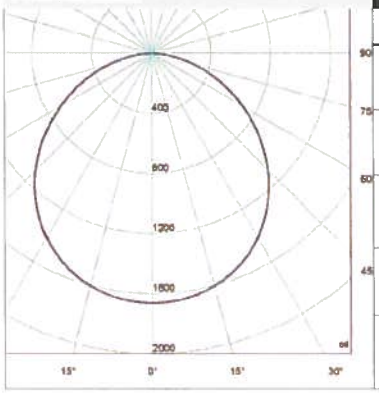
LAUREN ILLUMINATION

TILT PANEL LUMINAIRES LM22

PHOTOMETRIC CHARTS WITH TESTING DATA. CALL FOR SPECIFIC INFORMATION NOT LISTED HERE: 855.440.8458

LM2250W

PHOTOMETRY



ZONAL LUMEN SUMMARY		
DEGREES	LUMENS	%
0-30	1300	28
0-40	2126	45
0-60	3725	79
0-90	4700	100
90-180	0	0
0-180	4700	100

LUMINANCE SUMMARY CD./SQ.M.	
ANGLE	MEAN CD/SQ.M
45	4997
55	4708
65	4309
75	3742
85	2819

COEFFICIENT OF UTILIZATION

	80%			70%			50%		
	70	50	30	70	50	30	70	50	30
0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11
1	1.09	1.05	1.01	1.07	1.03	0.99	0.98	0.95	0.92
2	1.00	0.92	0.86	0.98	0.90	0.85	0.87	0.82	0.78
3	0.91	0.81	0.74	0.89	0.80	0.73	0.77	0.71	0.66
4	0.84	0.73	0.65	0.82	0.72	0.64	0.69	0.62	0.57
5	0.78	0.65	0.56	0.75	0.64	0.56	0.62	0.55	0.49
6	0.71	0.58	0.50	0.69	0.57	0.49	0.56	0.48	0.43
7	0.66	0.52	0.44	0.64	0.51	0.43	0.50	0.42	0.37
8	0.61	0.47	0.39	0.59	0.47	0.39	0.45	0.38	0.33
9	0.56	0.43	0.35	0.55	0.42	0.35	0.41	0.34	0.29
10	0.52	0.39	0.31	0.51	0.39	0.31	0.38	0.31	0.26

NOTES

- Lifespan: 50,000 hrs (L70)
- LM79 and LM80 available upon request. Call 855.440.8458
- IES files availble online at: laurenillumination.com/resources

2162 Reiser Avenue SE | New Philadelphia, OH 44663 P: 855.440.8458 | F: 330.339.1515
laurenillumination.com | laureninternational.com

Contractor: Vaughn Industries

SURFACE MOUNT KIT

PRODUCT DATA SHEETS

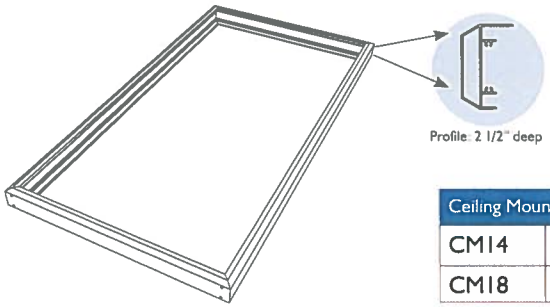
FEATURES

- Designed for use with TILT panels and drivers
- Multi-purpose hanging configurations for:
  - Mounting light to ceiling
  - As a down-lighted hanging fixture
  - As a two-way, up and down-lighted fixture
- Frame profile: 2-1/2" deep
- Screw location guide included in flange for mounting
- Heavy-duty frame construction
- Easily adapted for conduit feed

Project Name	OSU - NRDT
Date	
Type	A1

T/LT

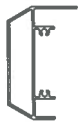
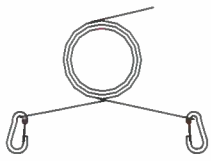
TILT Part Number	CM22



Ceiling Mount and Hanging Kit Models:		
CM14	CM22	CM24
CM18	Custom[1]	HK02

Part Number Example: CM14

CM	14		
Name	**Model**	**Description**	**Use**
CM - Surface Mount **HK** - Hanging Kit	CM14 CM18 CM22 CM24 Custom[1] HK02	Accessories, 1' x 4' Surface Mount Accessories, 1' x 8' Surface Mount Accessories, 2' x 2' Surface Mount Accessories, 2' x 4' Surface Mount Made to order sizes 2 pcs. Hanging Mount Kit*	Use to surface mount or for hanging* panel lights. Call for details

SURFACE MOUNT	MODEL	DESCRIPTION	WIDTH	LENGTH	USE
 Profile: 2 1/2" deep 	CM14	Accessories, 1'X4' Surface Mount	13.075"	49.075"	Use to surface mount or hang panel lights. NOTE: Hanging mount requires use of HK02.
	CM22	Accessories, 2'X2' Surface Mount	25.075"	25.075"	
	CM24	Accessories, 2'X4' Surface Mount	25.075"	49.075"	
	CM18	Accessories, 1'X8' Surface Mount	13.075"	96.825"	
	CUSTOM[1]	Made to order	Custom[1]	Custom[1]	Call for details
	HK02	2 pcs Hanging Mount Kit	Specify 5-foot or 10-foot lengths for cables		Use to hang* Surface mount kit from Surface or substrate

NOTES

* When hanging light panels, Surface Mount Kit requires the use of HK02

[1] Custom sizes available - call when ordering 855.440.8458

LAUREN ILLUMINATION

PRODUCT DATA SHEETS

DIM CHIP

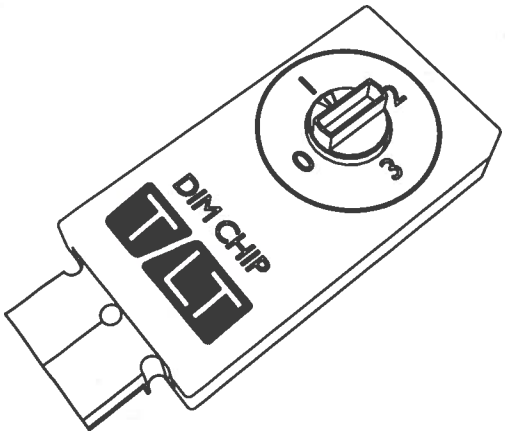
Project Name	OSU - NRDT
Date	
Type	A1

T/LT

TILT Part Number	DCO

FEATURES

- Dim Chips are designed to be used with TILT drivers
- Limits driver wattage through control circuit
- Four level options available per chip
- Custom settings available with driver wattage levels set to customer request
- Limits both light output and corresponding wattage with no efficiency loss
- 5 year warranty



Dim Chip Models:
DC01
DC02
DC03
CUSTOM +

SPECIFICATIONS

	PERCENT OF DRIVER WATTAGE			
ALL DIM CHIP MODELS	DC01	DC02	DC03	CUSTOM+
Dim Chip Setting 0	100%	100%	100%	Contact Lauren at 855.440.8458 for a custom Dim Chip, to set wattage or lumen levels for your application
Dim Chip Setting 1	85%	75%	50%	
Dim Chip Setting 2	75%	50%	30%	
Dim Chip Setting 3	50%	25%	10%	

FOR USE WITH

DOWNLIGHTS	PANELS
LCLCV6 LCLCV8	LGM14, LFM14 LGM22, LFM22 LGM24

DIMMER COMPATIBILITY CHART*

DRIVER	DIMMING
NOTE: Driver selection may be specific to your installation configuration. For complete listing of driver and its particular dimming compatibility, see individual TILT driver sheet.	

NOTES

***TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458**

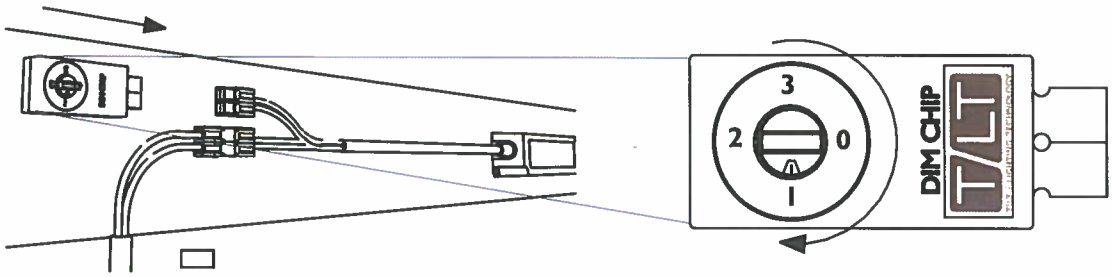
+For custom Dim Chip settings, call Customer Service at 855.550.8458

LAUREN ILLUMINATION

DIM CHIP DC01, DC02, DC03

WIRING DETAIL & SETTING CONTROL

SEE INSTALLATION MANUAL FOR APPROVED INSTALLATION METHODS AND OTHER DETAILS FOR ALL DRIVERS



SETTING DIAGRAM

DC01 Setting	DC01 % of driver Wattage	DC02 Setting	DC02 % of driver Wattage	DC03 Setting	DC03 % of Driver Wattage
0	100	0	100	0	100
1	85	1	75	1	50
2	75	2	50	2	30
3	50	3	25	3	10

CUSTOM+

Setting	% of Driver Wattage

Contact Lauren at 855.440.8458 for a custom Dim Chip, to set wattage or lumen levels for your application.

NOTES

- For details specific to your system, call us at 855.550.8458
+ For custom Dim Chip settings, call Customer Service at 855.550.8458
* TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

CONSTANT VOLTAGE DRIVERS

PRODUCT DATA SHEETS

FEATURES

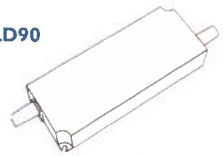
- 24V constant voltage power supply
- Protections include
  - Short circuit / over current / over voltage / over temperature
- Class II power unit, SELV rated
- Built in active PFC function
- Dimmable (see chart below)
- UL recognized
- RoHS compliant
- CE rated
- 5-year warranty

Project Name	OSU - NRDT
Date	
Type	A1

T/LT

TILT Part Number	LD60

LD90



LD60

LD16

LDND16

Constant Voltage Driver Models:
LD90
LD60
LD16
LDND16 (Non Dim)

SPECIFICATIONS

ALL PLENUM MODELS	LD60	LD90	LD16	LDND16 (Non Dim)
Length x Width (in)	6.500" x 1.750"	6.500" x 2.375"	6.00" x 1.625"	3.00" x 1.50"
Height (in)	1.250"	1.500"	1.250"	1.125"
IP Rating	IP67	IP67	IP30	IP30
DC output supply (W)	60	90	16	16
AC input voltage range	90 - 305VAC	90-305VAC	90-305VAC	90 - 264VAC
AC inrush current (max) Cold start	75A @ 230VAC	70A @ 230VAC	50A @ 230VAC	70A @ 230VAC
Safety standards	UL 8750	UL 8750	UL 8750	UL 8750
Protections	Short circuit/over current/over voltage/over temperature			
Thermal Operation	-40°C - 50°C	-40°C - 50°C	-40°C - 50°C	-40°C - 50°C
Thermal Shutdown	75°C	70°C	70°C	70°C

FOR USE WITH

LUMINAIRE	CV DRIVER	MAX # UNITS	CV DRIVER	MAX # UNITS	CV DRIVER	MAX # UNITS
LCLCV6	LD16, LDND16	1	LD60	5	LD90	8
LCLCV8	LD16, LDND16	1	LD60	4	LD90	6
LGM22	LD16, LDND16	0	LD60	1	LD90	1
LGM24	LD16, LDND16	0	LD60	0	LD90	1
LGM14	LD16, LDND16	0	LD60	1	LD90	1

DIMMER COMPATIBILITY CHART

BRAND	MODEL
TILT	WLVD
TILT	DIM CHIP (DC01, DC02, DC03)
LEVITON (0-10V)	IP-710*
LUTRON (0-10V)	DVSTV*

***TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458**

LAUREN ILLUMINATION

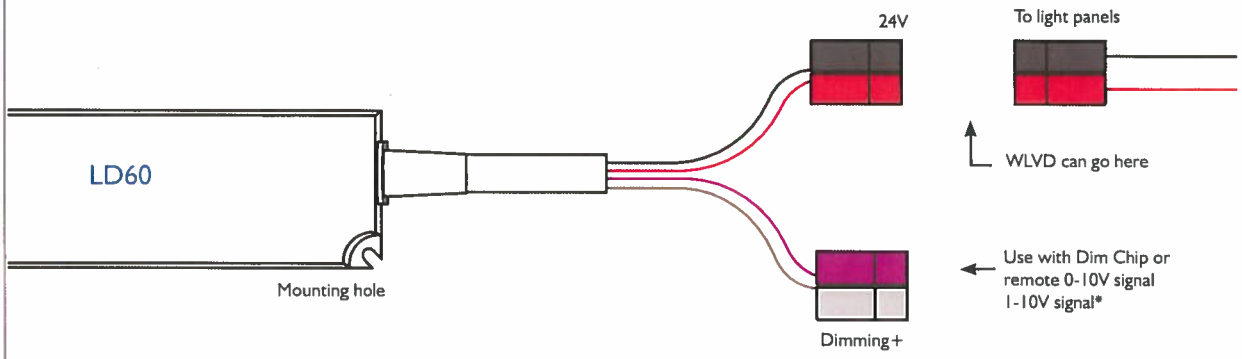
Date Submitted: Aug. 26, 2015
Distributor: C.E.D. Columbus, Oh 43207

CONSTANT VOLTAGE DRIVERS LD90, LD60, LD16, LDND16

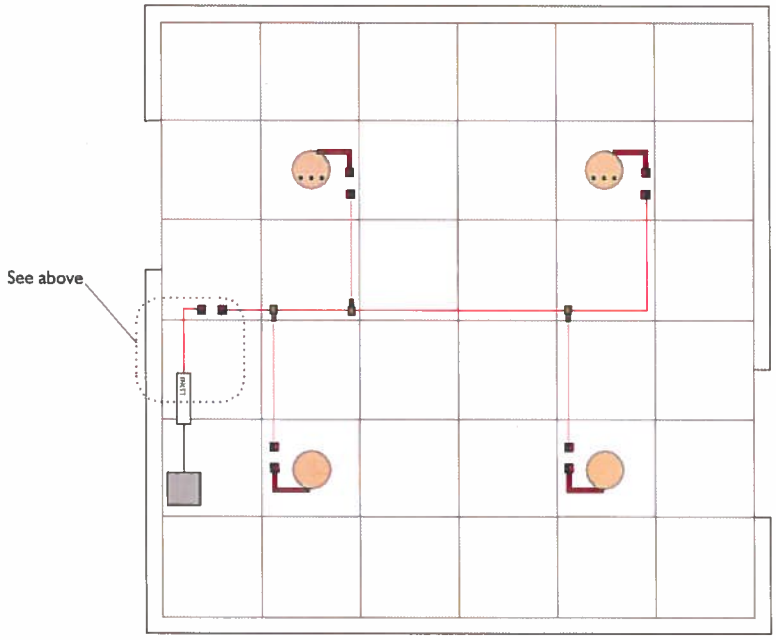
CONNECTING CONSTANT VOLTAGE DRIVERS - DC WIRING

CLOSE-UP DC WIRING DETAIL

SEE INSTALLATION MANUAL FOR APPROVED INSTALLATION METHODS AND OTHER DETAILS FOR ALL DRIVERS



SAMPLE ROOM LAYOUT WITH DRIVERS INSTALLED

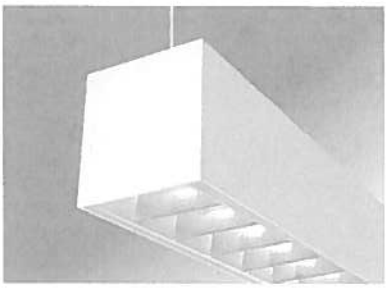


NOTES

- Lights should be placed within 50 feet of driver
- Wattage load (lights) should not exceed wattage of driver

\+ TILT drivers use 1-10V. They will accept 0-10V signals. Operation from 0-1V will depend on the system being used. For details specific to your system, call us at 855.440.8458

Lauren Illumination is a Lauren International Company
2162 Reiser Avenue SE | New Philadelphia, OH 44663
P: 855.440.8458 | F: 330.339.1515
laurenillumination.com | laureninternational.com



CONSTRUCTION 6063-T5 extruded aluminum housing. Highly reflective die-formed white painted aluminum reflector. Die-formed anodized snap-in aluminum semi-specular parabolic louver, removable for lamp replacement.

ELECTRICAL Standard T5 and T5HO: Program start 120/277 volt integral electronic ballast with less than 10% THD. Standard T8: Instant start 120/277 volt electronic ballast with less than 10% THD. Through wiring with quick connects standard. Standard single circuit. Each ballast provided with disconnects to meet luminaire disconnect code requirement.

MOUNTING Aircraft cable and wall mount available. Adjustable aircraft cable mounts on 4'-0" and 8'-0" centers (See back page for MR16 mounting detail). Aircraft Cable supplied with 5" power and 2" non-power canopies. Refer to installation instructions for appropriate ceiling detail. Canopies are painted white unless otherwise specified.

FINISH Standard powder-coat white painted finish. Consult factory for custom colors.

LABELS UL and cUL Listed, approved for dry/damp location unless otherwise noted.

LUMINAIRE SPECIFICATION

Sample Catalog #: EX4-A-N-1T5-24-AC48G1-120-1C-W

EX4_- __- N- _T___-

EX4-
Edge EX 4, Straight Lamp

N- None, Closed

1T5- (1) T5
2T5- (2) T5[1,8]
1T5HO- (1) T5HO
2T5HO- (2) T5HO[1,8]
1T8- (1) T8[8]
2T8- (2) T8[1,8]

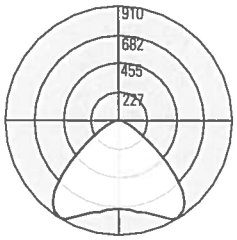
LO- Lens Overlay
M__- MR16 Lamp[7]
CN- Non-Illuminated Connector

P- Parabolic Louver
L- White Louver
WP- Asymmetric with Acylic Lens[8]
WL- Asymmetric with Acylic Lens[8]

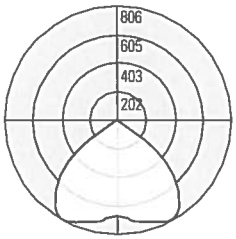
Individual Units
4- 4'
8- 8'

Continuous Runs
xx'- Specify nominal overall row length in 4' increments

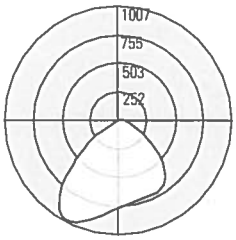
[1]Not available with Asymmetric Lamp option (WP and WL). [2]Consult factory for additional lengths. [3]Consult factory for tegular edged tiles. [4]Replaces standard 2" canopy. [5]347 volt and UNV not available with MR16 and battery packs. [6]Some Edge EX configurations will not accommodate all electrical options. Consult factory. [7]See Back Page for Layout and Ordering Information. [8]WP, WL, 2T5/2T5HO, and T8 lamps are not available with staggered lamp option (EX4S).



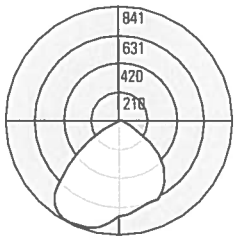
Test # 202436
Part # EX4-P-N-1T5
Total Luminaire Efficiency 74.5%



Test # 202438
Part # EX4-P-N-1T8
Total Luminaire Efficiency: 61.6%

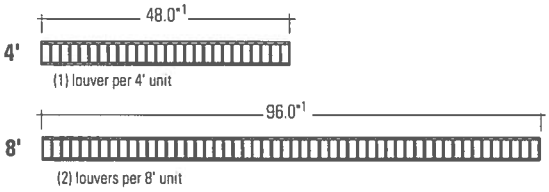


Test # 202442
Part # EX4-WP-N-1T5
Total Luminaire Efficiency: 72.9%



Test # 202444
Part # EX4-WP-N-1T8
Total Luminaire Efficiency: 59.5%

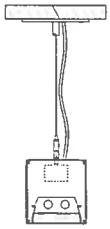
• INDIVIDUAL MODULES[1]



See Straight or Staggered Lamp Guide for row configuration, wattage and number of lamps per run.

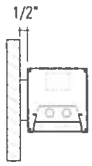
[1]Add 1/16" for each end plate or 1/8" to the overall length of the row.

• MOUNTING OPTIONS

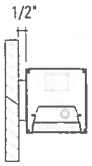


AC - Aircraft Cable

Wall Mount Options (WA)

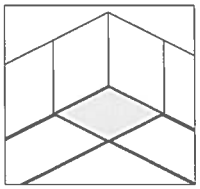


(EX4-P-N)



(EX4-WP-N)

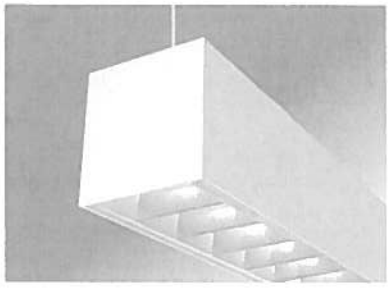
• NON-ILLUMINATED CONNECTOR



APPLICATION: Utilize non-illuminated connectors to create unique configurations.

INSTALLATION: Non-illuminated connector easily joins to linear fixtures using standard Pinnacle Lighting joiner kits.

ORDERING INFORMATION: Specify Non-Illuminated Connector (CN) in the options section of the part number. Sample Catalog #: EX4-P-N-1T5-24-AC48G1-120-1C-W-**CN**.



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MOUNTING Aircraft cable and wall mount available. Adjustable aircraft cable mounts on 4'-0" and 8'-0" centers (See back page for MR16 mounting detail). Aircraft Cable supplied with 5" power and 2" non-power canopies. Refer to installation instructions for appropriate ceiling detail. Canopies are painted white unless otherwise specified.

FINISH Standard powder-coat white painted finish. Consult factory for custom colors.

LABELS UL and cUL Listed, approved for dry/damp location unless otherwise noted.

LUMINAIRE SPECIFICATION

Sample Catalog #: EX4-A-N-1T5-24-AC48G1-120-1C-W

EX4_- __- N- _T___-

EX4- Edge EX 4, Straight Lamp

N- None, Closed

1T5- (1) T5
2T5- (2) T5[1,8]
1T5HO- (1) T5HO
2T5HO- (2) T5HO[1,8]
1T8- (1) T8[8]
2T8- (2) T8[1,8]

LO- Lens Overlay
M__- MR16 Lamp[7]
CN- Non-Illuminated Connector

P- Parabolic Louver
L- White Louver
WP- Asymmetric with Acylic Lens[8]
WL- Asymmetric with Acylic Lens[8]

Individual Units
4- 4'
8- 8'

Continuous Runs
xx'- Specify nominal overall row length in 4' increments

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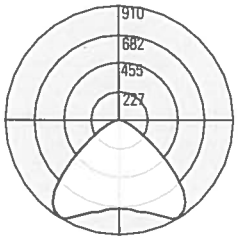
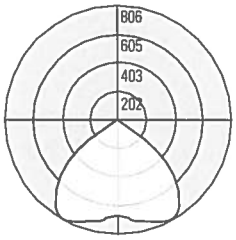
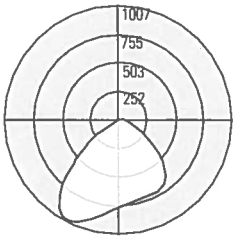


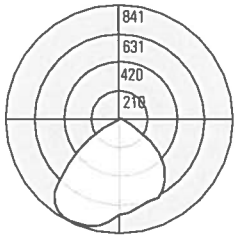
Test # 202436
Part # EX4-P-N-1T5
Total Luminaire Efficiency: 74.5%



Test # 202438
Part # EX4-P-N-1T8
Total Luminaire Efficiency: 61.6%

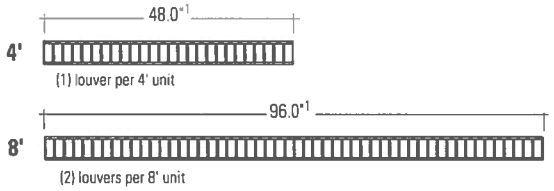


Test # 202442
Part # EX4-WP-N-1T5
Total Luminaire Efficiency: 72.9%



Test # 202444
Part # EX4-WP-N-1T8
Total Luminaire Efficiency: 59.5%

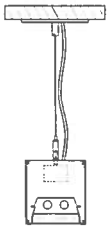
• INDIVIDUAL MODULES[1]



See Straight or Staggered Lamp Guide for row configuration, wattage and number of lamps per run.

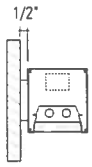
[1]Add 1/16" for each end plate or 1/8" to the overall length of the row.

• MOUNTING OPTIONS



AC - Aircraft Cable

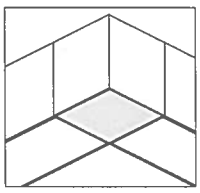
Wall Mount Options (WA)



(EX4-P-N)

(EX4-WP-N)

• NON-ILLUMINATED CONNECTOR



APPLICATION: Utilize non-illuminated connectors to create unique configurations.

INSTALLATION: Non-illuminated connector easily joins to linear fixtures using standard Pinnacle Lighting joiner kits.

ORDERING INFORMATION: Specify Non-Illuminated Connector (CN) in the options section of the part number. Sample Catalog #: EX4-P-N-1T5-24-AC48G1-120-1C-W-**CN**.

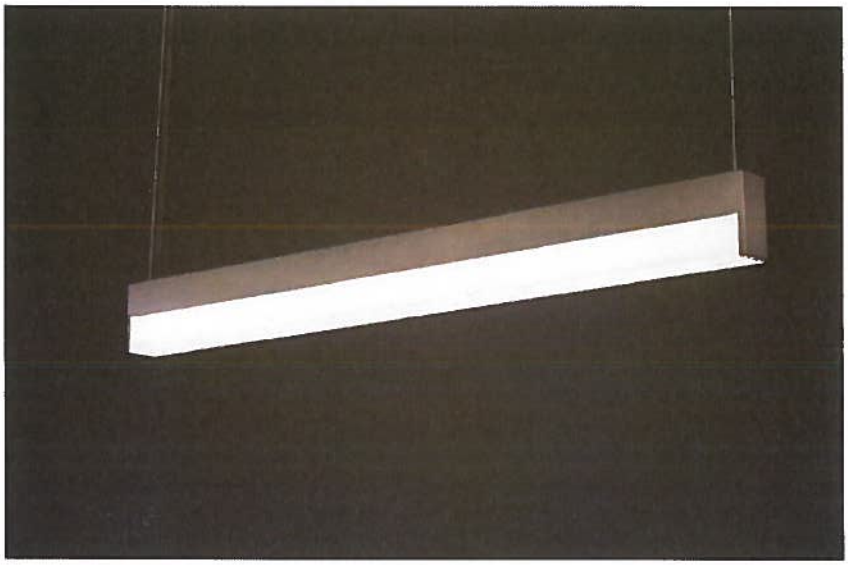
Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** O34SUSSW Notes:	**Type:** **A17** LSC14-37947

O3 | allège³

elements

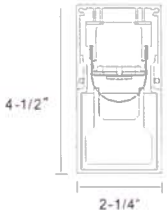
omni-direct

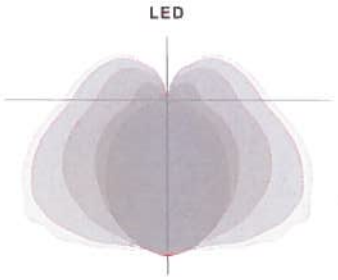


suspended

ceiling

wall





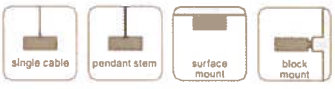
LED per foot	*1 board in cross* watts/ft	lumens/ft
LS	5	600
LH	10	1200

Lumens at board at 4000k
Consult IES files online for delivered lumens
Specifications subject to change

Available Light Platforms:

LED T5 T8

Available Mounting:



Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: O34SUSSW

Notes:

Type: A17

LSC14-37947

O3 | allège³

project | type | quantity

interior

Mounting:
Single Cable: (1) 4', 1mm stainless steel aircraft cable w/ fully adjustable grippers and locking device. 5' plastic-coated, silver-braided, flexible cord. Satin white, square canopy is standard.

Pendant/Stem: 3/8" stem and round canopy, painted white. Indicate pendant length. If specified for earthquake zone, a light will provide swivel canopies.

Wall Blocks: Precisely milled aluminum block mounts provide minimalistic appearance. 3/8", 1/2", 1" or 2" deep. ADA compliant with 3/8", 1/2" or 1" blocks. (2) blocks provided per fixture, lengths 8ft or less; (3) blocks per 12ft. Direct-to-wall mounting is not available due to lens proximity to wall.

Ceiling/Surface Mount: Fixture mounts directly to ceiling, power connects inside fixture using BX or MX style wiring.

Lengths:
All length dimensions are nominal, used for general length identification purposes. Actual lengths may vary by several inches. Lengths to 12' are individual fixtures and do not connect. Lengths beginning with "R" designate standard, nominal rows comprised of 4' and/or 8' sections, 3/8" mid plate joiners are visible between sections.

Specify all modifications with the "integrations" specification sheet: nominal lengths other than the standards available here, rows longer than 24', exact lengths, span mount, mullion mount, etc.

LED:
5yr warranty. >60,000hr LED life. Tested to LM-79 and LM-80. See wattage/lumen table for specifications per foot. All specifications are subject to change.

T5/T5HO:
Single lamp in cross section. Program start is factory standard.

T8:
Single lamp in cross section. Instant start is factory standard: choose low <0.8BF; standard 0.8-1.0BF; high >1.0BF. Specify if program start or custom ballast factor is required.

Construction:
60% recycled aluminum extruded housing. Precision milled endcaps. 180° omni-directional 3D lens.

Finish:
Electrostatically applied powder coat finish.

Listing:
UL/CUL. Damp Location.

Companion Luminaires:
O2 sconce

Legend:
1. Emergency ballast not applicable on lengths 3ft or less
2. Standard multi-circuiting, see fixture chart below.

Multi-circuit standards
2', 3', 4':
8':

Series: O3

Dimension: 4'

advise length ?

nominal 2' [1]	2
[1]	3
nominal 4'	4
nominal 8'	8
nominal 12'	12
nominal 16' row	R16
nominal 20' row	R20
nominal 24' row	R24

Lamping:

LED standard output	LS
LED high output	LH
T5 (1)	S
T5HO (1)	H
T8 (1) low output	T8L
T8 (1) standard output	T8S
T8 (1) high output	T8H

LED Temp (If applicable):

3000k	30
3500k	35
4000k	40

Voltage:

universal 120V - 277V	U
120V	1
277V	2
347V	3

Optics:

WISP™ lens	S
WISP™ + HTLO™ lens	SH

Mounting:

single aircraft cable	S
pendant / rigid stem - indicate stem length	P__
pendant / rigid stem for earthquake zone - indicate stem length	PV__
wall mount blocks 1"	M1
wall mount blocks 2"	M2
wall mount blocks 3/8"	M3
wall mount blocks 1/2"	M5
ceiling/surface mount	F

Finish:

a·lightanium™	T
satin white	W
satin black	B
textured eggshell white	E
other - specify RAL#	O

Options:

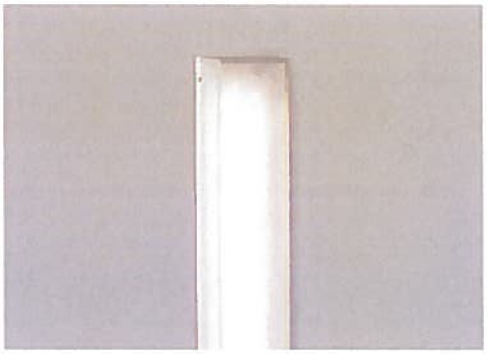
dimming - specify manufacturer, model/series and voltage	D
emergency (fluorescent only) - specify model/series or lumens [1]	E
external fusing	F
multi-circuit [2]	M
new york city code	N

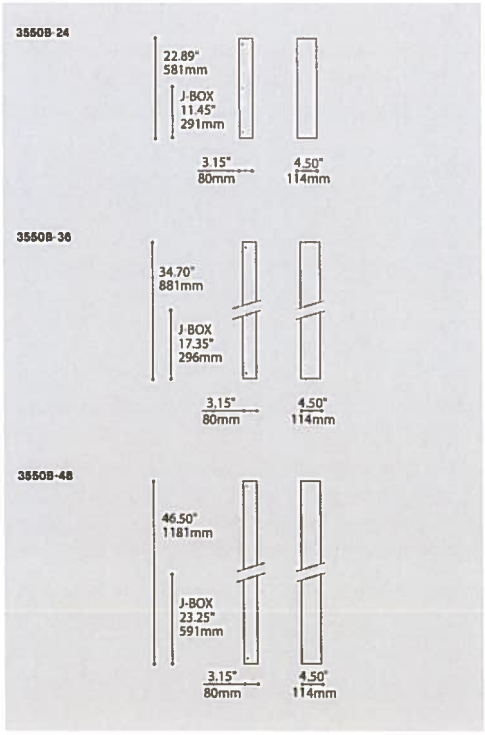
suspended
ceiling
wall

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor: Vaughn Industries OSU NRDT BUILDING	Catalog Number Job Name: OSU NRDT Building 3550B-48 2XF.T5.28.120V-FRO	Type A18
	Submitted By LIGHTING UNLIMITED INC	Notes	

DOUBLE FLARE 3550B





ORDERING SPECIFICATION SPÉCIFICATION DE COMMANDE		CODE
MODEL MODÈLE		3550B
3550B	DOUBLE FLARE	
LUMINAIRE LENGTH LONGUEUR DU LUMINAIRE		48
24	24"	
36	36"	
48	48"	
LIGHT SOURCE SOURCE LUMINEUSE		2XF.T5.28
(WATTAGE, LAMP TYPE, LAMP FORM, BASE TYPE, OTHER INFO)		
3550B-24		
2XF.T5.14	14W X 2, T5	
2XF.T5.24	24W X 2, T5 HO	
3550B-36		
2XF.T5.21	21W X 2, T5	
2XF.T5.39	39W X 2, T5 HO	
3550B-48		
2XF.T5.28	28W X 2, T5	
2XF.T5.54	54W X 2, T5 HO	
VOLTAGE VOLTAGE		120V
120V	120 VOLT	
277V	277 VOLT	
347V*	347 VOLT	
*ONLY AVAILABLE WITH 2XF.T5.54 (NON-DIMMING BALLAST)		
DIMMING OPTION OPTION DE GRADATION		
AVAILABLE WITH 2XF.T5.24 AND 2XF.T5.54		
DM1	ADVANCE MARK 10 ELECTRONIC DIMMING BALLAST	
AVAILABLE WITH 2XF.T5.14, 2XF.T5.21, 2XF.T5.28 AND 2XF.T.54		
DM7	ADVANCE MARK 7 ELECTRONIC DIMMING BALLAST	
AVAILABLE WITH ALL LIGHT SOURCES		
D3D	LUTRON HI-LUME 3D ELECTRONIC DIMMING BALLAST (ECOSYSTEM DIGITAL LINK WIRING)	
D33	LUTRON HI-LUME 3D ELECTRONIC DIMMING BALLAST (3-WIRE WIRING)	
EMERGENCY BATTERY BATTERIE D'URGENCE		
AVAILABLE WITH ALL LIGHT SOURCES. 120V OR 277V ONLY NOT AVAILABLE WITH A DIMMING BALLAST		
EM	EMERGENCY BATTERY	
STRUCTURE FINISH FINI STRUCTURE		FRO
FRO	FROSTED	

PRODUCT CHARACTERISTICS CARACTÉRISTIQUES DU PRODUIT

ADA BIM DIM IES EM

DESIGN:	Modern rectangular profile available in three lengths and updated performance. ADA compliant.
LIGHT SOURCE:	Highly efficient fluorescent T5 and T5 HO light sources. Dimming and emergency available.
STRUCTURE:	Structure in extruded aluminum & die-stamped steel. Injection moulded plastic end caps.
DIFFUSER:	Machined & frosted acrylic housing with snap-fit, extruded micro-prism acrylic lens.
CERTIFIED:	c-UL-us
CONCEPTION:	Profil carré et contemporain plus performant offert en trois longueurs. Conforme à la norme ADA
SOURCE LUMINEUSE:	T5 et T5 HO à haute performance; ballasts à gradation et d'urgence disponibles.
STRUCTURE:	Structure en acier extrudé et en acier embouti. Embouts injectés en plastique.
DIFFUSEUR:	Boîtier d'acrylique usiné et givré avec fixé par enclenchement. lentille extrudée en acrylique avec micro-prismes.
CERTIFIÉ:	c-UL-us

FAMILY FAMILLE

74040B

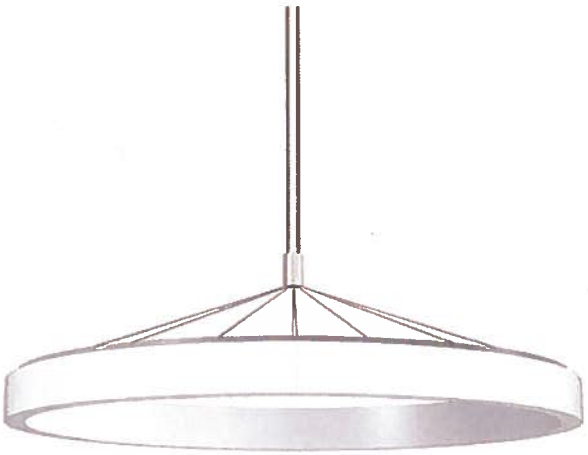
3550B

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** Notes: BCBBWH276 BCLED10R MEC1745AE	**Type:** A22 LSC14-37947

BUBBLE

WEB PIN™ 298



GENERAL SPECIFICATION

Housing: Round metal frame consisting of modules combined together for electrical and mechanical connections. Bubble comes in the following diameters: 600mm (23.6"), 1000mm (39.4"), 1800mm (70.9") and 2800mm (110.0").

Diffusers: Injection molded, UV stabilized, opal polycarbonate. Diffusers are sectional with subtle but visible seams. Bubble 600, 3 diffusers; Bubble 1000, 3 diffusers; Bubble 1800, 8 diffusers and Bubble 2800, 16 diffusers.

Power cables: Luminaires supplied with 7.8m/20' of cable. Cables can be extended to a maximum overall distance of 20m/64'. Custom cable lengths can be supplied to special order.

Drivers: Luminaires supplied with HPF electronic drivers, 120/277V. 0-10V dimming standard.

Mechanical: Luminaires mount directly over a junction box.

Finish: White RAL 9003.

Approvals: ETL.

BETACALCO.COM

US Jul 21, 2014 12:52 PM

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** BCBBWH526-BCLED18/IN Notes:	**Type:** A22 LSC14-37947

BUBBLE

WEB PIN™ 298

DIAMETER: 600/1000/1800

A SPECIFY LAMP/LUMINAIRE TYPE

Code:	Lamp:	Color CCT:	Delivered lms:	Efficacy LPW:	L70 @25°C (77°F):	Diameter (A):	Diameter (B):	Depth (D):
BCBBWH156	100W LED	3000K	3836	38.2	> 50,000 hrs	600mm/23.6"	440mm/17.3"	191mm/7.5"
BCBBWH276	180W LED	3000K	6900	38.2	> 50,000 hrs	1000mm/39.4"	800mm/31.5"	241mm/9.5"
BCBBWH526	350W LED	3000K	13300	38.2	> 50,000 hrs	1800mm/70.9"	1600mm/63.0"	241mm/9.5"

B SPECIFY POWER SUPPLY AND ACCESSORIES

Bubble LED integral power supply in canopy.

BCLED6/IN	Canopy with driver for Bubble 600
BCLED10/IN	Canopy with driver for Bubble 1000
BCLED18/IN	Canopy with driver for Bubble 1800

Bubble LED remote power supply (specify mounting canopy from bubble accessories as a separate line item).

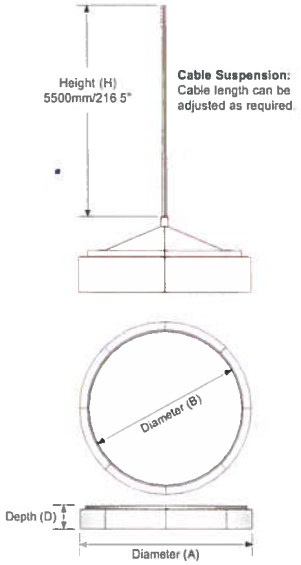
BCLED6/R	Remote power supply for Bubble 600
BCLED10/R	Remote power supply for Bubble 1000
BCLED18/R	Remote power supply for Bubble 1800

Bubble LED accessories (for luminaires with remote power supplies only).

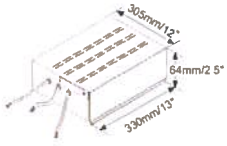
MEC1745AE	Ceiling canopy for installation to load bearing ceilings (max 32kg/70lbs) for Bubble 600 and Bubble 1000.
MEC2112AE	Ceiling canopy for installation to load bearing ceilings (max 100kg/220lbs) for Bubble 1800.
MEC1823AE	Ceiling canopy for installation into false ceilings or similar (cables are anchored to the load bearing ceiling).

Surface mounting kits for remote power supply.

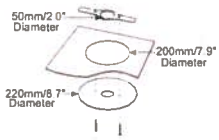
BCLED6/SK	Surface mounting kit for Bubble 600
BCLED10/SK	Surface mounting kit for Bubble 1000
BCLED18/SK	Surface mounting kit for Bubble 1800



BCLED6/IN
BCLED10/IN
BCLED18/IN



BCLED6/R
BCLED10/R
BCLED18/R



MEC1823AE

Weights:

BCBBWH156	8.1kg/17.9lbs
BCBBWH276	16.1kg/35.5lbs
BCBBWH526	33.0kg/72.8lbs

Note: *Due to constant changes in LEDs, please check our website for current product specifications.*

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US Jul 21, 2014 12:52 PM

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** BCBBWH526-BCLED18/IN Notes:	**Type:** A22 LSC14-37947

BUBBLE

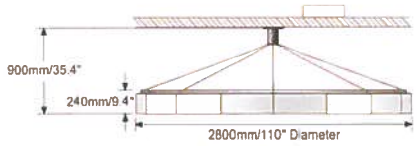
WEB PIN™ 298

DIAMETER: 2800

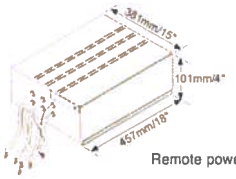
A SPECIFY LAMP/LUMINAIRE TYPE

LOW PROFILE PENDANT Luminaire complete with 8 suspension cables connected to the central joint for ceiling mounting.

Code:	Lamp:	Color CCT:	Delivered lms:	Efficacy LPW:	L70 @25°C (77°F):	Weight:
BCBBWH886R	590W LED, remote power supply	3000K	22500	38.2	> 50,000 hrs	63kg/138.9lb



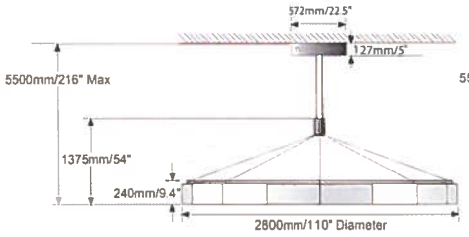
BCBBWH886R



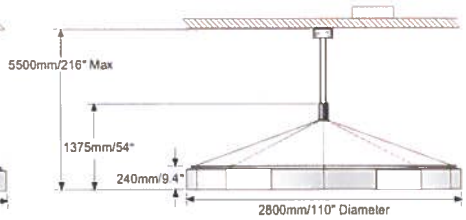
Remote power supply included.

ADJUSTABLE PENDANT Luminaire complete with 8 cables connected to the central joint and 4 adjustable cables for ceiling mounting.

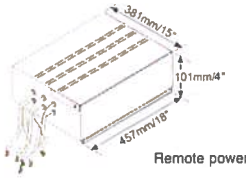
Code:	Lamp:	Color CCT:	Delivered lms:	Efficacy LPW:	L70 @25°C (77°F):	Weight:
BCBBWH886PIN	590W LED, integral power supply	3000K	22500	38.2	> 50,000 hrs	75kg/165.3lb
BCBBWH886PR	590W LED, remote power supply	3000K	22500	38.2	> 50,000 hrs	67kg/147.7lb



BCBBWH886PIN



BCBBWH886PR



Remote power supply included.

Note: *Due to constant changes in LEDs, please check our website for current product specifications.*

BETACALCO.COM

US Jul 21, 2014 12:52 PM

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** BCBBWH526-BCLED18/IN Notes:	**Type:** A22 LSC14-37947

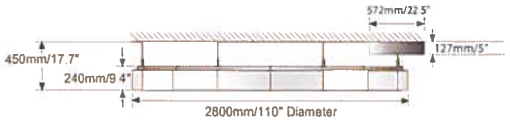
BUBBLE

WEB PIN™ 298

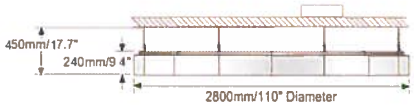
DIAMETER: 2800

CEILING MOUNTED Luminaire complete with 8 suspension cables L=2000mm/79".

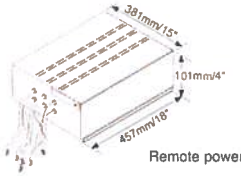
Code:	Lamp:	Color CCT:	Delivered lms:	Efficacy LPW:	L70 @25°C (77°F):	Weight:
BCBBWH886CIN	590W **LED**, integral power supply	3000K	22500	38.2	> 50,000 hrs	74kg/163.1lb
BCBBWH886CR	590W **LED**, remote power supply	3000K	22500	38.2	> 50,000 hrs	66kg/145.5lb



BCBBWH886CIN



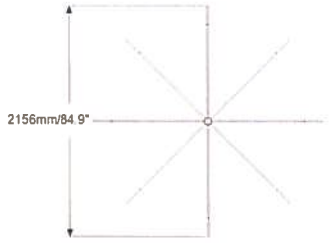
BCBBWH886CR

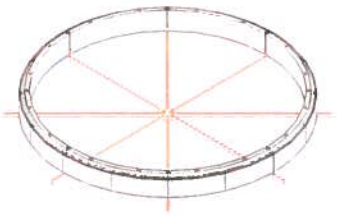


Remote power supply included.

B SPECIFY ACCESSORIES (REQUIRED)

150A031VE Umbrella tool for assembly.





Note: *Due to constant changes in LEDs, please check our website for current product specifications.*

BETACALCO.COM

US Jul 21, 2014 12:52 PM

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** P2851-09 Notes:	**Type:** A40 LSC14-37947

PROGRESS LIGHTING

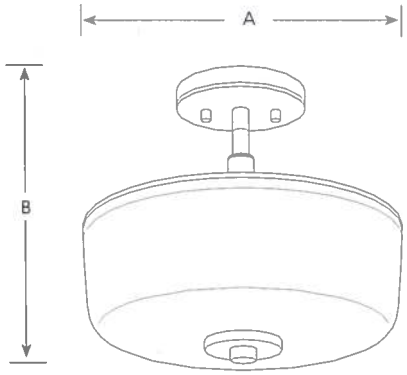
Incandescent **Alexa** **Close-To-Ceiling**

Type _____

-09

P2851 ☐

Catalog No.	Finish: Brushed Nickel	Lamping	Dimensions (Inches) A	B
P2851	-09	2 (m) 100w	12-1/4	11



Specifications:

General

- White linen glass bowl: 12-1/4" dia., 4-1/2" ht.
- A crisp, clear edge accent strip complements the etched and clear glass
- Plated Brushed Nickel (-09) finish
- Steel construction
- Companion Bath and Vanity, Chandelier, Close-to-ceiling, Hall and Foyer, Pendant, Wall bracket, fixtures are available

Mounting

- Ceiling mount
- Canopy covers a standard 4" hexagonal recessed outlet box
- Mounting strap for outlet box included

Electrical

- Medium base ceramic sockets
- Pre-wired

Labeling

- UL-CUL Dry location listed

Progress Lighting
701 Millennium Blvd.
Greenville, South Carolina
29607

www.progresslighting.com

Rev. 08/13

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
44 0902

Notes:

Type:
A45

LSC14-37947

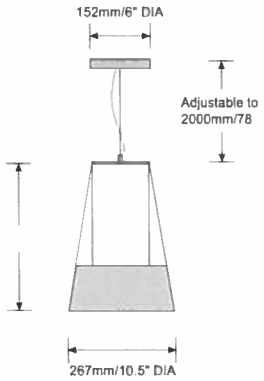
KIORA

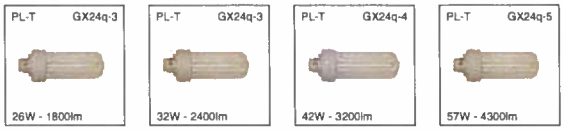
INTERIOR
PENDANTS

A SPECIFY LAMP/LUMINAIRE TYPE

Code:	Lamp:	Weight:	Photometry:
44 0902	1 x 26/32/42W **PL-T**	2.0Kg/4.4lb	File# **440902**
44 0903	1 x 57W **PL-T**	2.0Kg/4.4lb	File# **440903**

Example Specification Code: 44 0902





Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
44 0902 LP32T35KSYL FSDFI

Notes:

Type:
A45

LSC14-37947

GENERAL SPECIFICATION

Outer diffuser: Injection moulded clear acrylic with an etched lower band.

Internal diffuser: Injection moulded opal acrylic.

Suspension: Single stainless steel cable.

Power cable: Silver braided.

Canopy finish: White powder coated paint.

Reflector: Aluminum, frosted finish with vertical facets.

Ballasts: HPF, high frequency electronic ballasts for mu types and voltages 120-277V.

Mechanical: Mounts directly to a junction box (by others) hardware (by others).

Approvals: ETL.

MULTI-ARM
Page 206

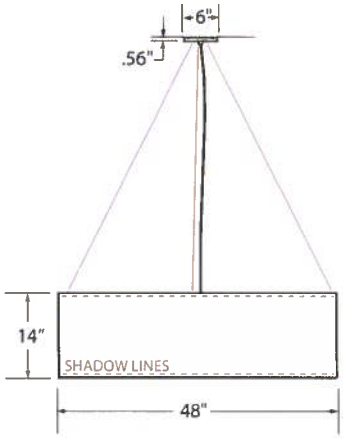
Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

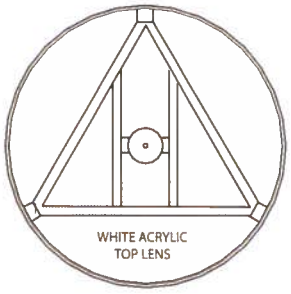
LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor: Vaughn Industries OSU NRDT BUILDING Job Name: OSU NRDT Building Submitted By LIGHTING UNLIMITED INC	Catalog Number P54814-XX-XX-CFL-3/32WTBX 120 LTC5 LBA5 Notes	Type A63

Drum 48" Pendant P54814

Design modifications are always welcome.



TOP VIEW



BOTTOM VIEW

- Welded steel or aluminum
- LUMENATE® washable diffuser
- Lift & Shift etched white acrylic bottom lens
- White acrylic top lens
- 6' black or white cord
- Three SS cables
- Canopy finished to match frame
- Mounts to standard J-box
- Suitable for damp locations

weight: 29 lbs

c UL US LISTED

MADE IN USA

P54814 – PC Chrome – D60 MT Natural – CFL 3/32W TBX-GX24Q-3 – 120 – LTC5

CORD COLOR
- ☐ Black
- ☐ White

FINISHDIFFUSER
Frame & Canopy
Select from any of our Powder Coat Finish options.
PC Chrome

L
Select from any of our **LUMENATE®** Diffuser options.
D60 MT NATURAL

AMPING *(not included)*
- INC 3/Med. Base
- CFL 2/32W TBX-GX24Q-3
- CFL 3/32W TBX-GX24Q-3
- CFL 4/32W TBX-GX24Q-3
- LED 3/18.5W XICATO UNV *3500K 0-10V Dimmable*

VOLTAGE
- 120V
- 277V
- 347V *Consult Factory*

LBA5

**SPECIFY

+ OPTIONS

SUSPENSION OPTIONS

STM - Stem* (no SS cables)

CXX3 - Cord Extra*
CXS3 - Cord Braided Silver

**Specify length & color*

CANOPY OPTIONS

CAC - Canopy Alternative Color
CF105 - Flair Canopy 10.5" Dia
CSF6 - Swivel Stem on CF6
CSF105 - Swivel Stem on CF105
CR860 - Cluster Canopy* 8"x 60"
C66 - Square Canopy 6"
C1010 - Square Canopy 10"

** Specify arrangement and heights.*

LENS OPTIONS

LTC5 - Top Lens Clear Acrylic
LTY5 - Top Lens Metal Perf.
LTO5 - Top Lens Opaque

LBY5 - Bottom Lens Metal Perf.
LBA5 - Bottom Lens Acrylic w/ applied LUMENATE®

Bottom Lumenate
D61 MT White

BALLAST OPTIONS

BDLI - Dimming Ballast Lutron Internal
BDAI - Dimming Ballast Advance Internal

BEI - E mergency Ballast I nternal - *Not for LED*

Lumetta

Lumetta Inc., 33 Minnesota Ave., Warwick, RI 02888 t 401-691-3994 f 401-921-1310 **www.lumettainc.com**

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Lumetta®

LUMENATE® Fiber *group 3*

TYPE A63

D61 MT White

D66 MT Bone

D60 MT Natural

D62 MT Amber

D64 MT Red

D68 MT Rust

D78 MT Brown

D83 MT Grey

D65 MT Blue

D49 MT Black

Lumetta®

TYPE A63

Frame Finish Options

Powder coating is a low VOC emitting process resulting in a high quality, long lasting finish.


F2 Powder Coat Chrome


F5 Powder Coat Copper


F8 Powder Coat Steel


F3 Powder Coat Black


F6 Powder Coat Brass


F10 PC Hammered Copper


F4 Powder Coat Earth


F7 Powder Coat Bronze


F11 Powder Coat White

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

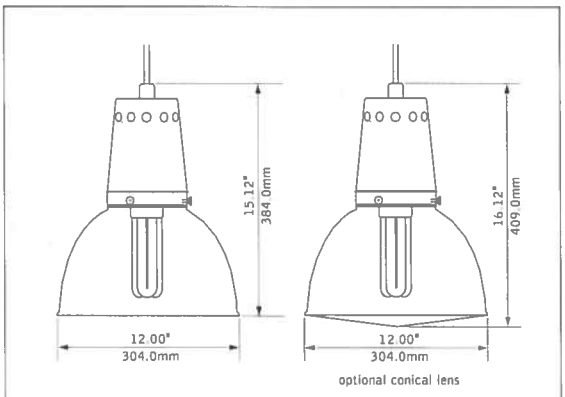
Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** FGR-G-W-1-42TT-S-120-C144-NA Notes:	**Type:** A74 SPEC14-5147

Groove™ G

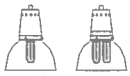
FLUORESCENT

FOCAL POINT

DIMENSIONAL DATA



lamping options



32W & 42W TRIPLE TUBE

A, BR, G, R & PS LAMPS

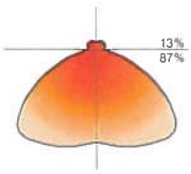
FEATURES

Pendant mount decorative luminaire available with compact fluorescent or incandescent lamps

Housing and canopy are high quality spun aluminum with acrylic refractor.

Ideally suited for retail, hospitality, lobbies, corridors, open ceiling areas and other specialty applications.

PERFORMANCE



1-Lamp 42W Triple Tube
86% Efficient
652 cd @ 35°

PRODUCT OVERVIEW

Lumen Output:	1436-6184lm
Wattage:	32-300W
Lamping:	TT, A, G, BR, R, PS

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: FGR-G-W-1-42TT-S-120-C144-NA

Notes:

Type: A74

SPEC14-5147

SPECIFICATIONS

Construction

Housing and canopy are each one-piece precision-spun 14Ga. aluminum. Housing: 7.62"H x 12" Dia. Canopy: 1.32"H x 4.52" Dia. stepped design with #8-32 recessed set screw. Weight: 10 lbs.

Optic

Molded acrylic prismatic refractor: 7.47"H x 12.00"Dia. aperture with fluted pattern. Optional frosted green or white acrylic diffusion disk with polished edges is retained by aluminum fasteners and (3) #8-32 thumb screws. Optional conical lens with stainless steel clamp band.

Electrical

Luminaires are pre-wired for single circuit with thermally protected Class "P" electronic ballast. Factory installed decorative metal braided power cord is included. White SJT power cord supplied for 347V. 144" cord is provided on all luminaires and may be cut to length in field. Incandescent: Medium base porcelain socket. For lamp types A, BR, G, R, and PS types. Fluorescent Lamp: One or two lamp triple tube compact fluorescent, 4-pin, 32W (GX24q-3) or 42W (GX24q-4). Optional dimming ballasts available. Consult factory for specifications and availability.

Labels

UL listed.

Finish

Luminaire housing and canopy are clear anodized with polished satin finish.

ORDERING

Luminaire Series		FGR
Groove	FGR	
Profile		G
Profile	G	
Shielding		W
Clear Prismatic Refractor	C	
Clear Prismatic Refractor with Metallized Interior	M	
White Prismatic Refractor (Contact factory for additional reflector colors)	W	
Lamp Quantity		1
One Lamp	1	
Two Lamp (CFL only)	2	
Lamp Type		42TT
32w, Triple Tube, GX24q-3	32TT	
42w, Triple Tube, GX24q-4	42TT	
120V Only, 60W Max., A15-Med	A15	
120V Only, 100W Max., A19-Med	A19	
120V Only, 100W Max., A21-Med	A21	
120V Only, 200W, A23-Med	A23	
120V Only, 60W, G25-Med	G25	
120V Only, 60W, G30-Med	G30	
120V Only, 150W, G40-Med	G40	
120V Only, 65W, BR30-Med	BR30	
120V Only, 125W, BR40-Med	BR40	
120V Only, 50W, R20-Med	R20	
120V Only, 75W, R25-Med	R25	
120V Only, 110W, R30-Med	R30	
120V Only, 300W, R40-Med	R40	
120V Only, 300W, PS25-Med	PS25	
120V Only, 300W, PS30-Med (Consult factory for wattages not listed)	PS30	
Ballast		S
Electronic Program Start<10% THD	S	
Electronic Dimming Ballast* (Fluorescent lamps only)	D	
Voltage		120
120 Volt	120	
277 Volt	277	
347 Volt	347	
Suspension		C144
Cable, Straight Feed (144" cable, cut in field)	C144	
Factory Options		
Frosted Green Diffusion Disk	GD	
Frosted White Diffusion Disk	WD	
Conical Lens (Conical lens not available with 2-lamp dimming) (Fluorescent lamps only)	CL	
Include 3000K Lamp*	L830	
Include 3500K Lamp*	L835	
Include 4100K Lamp* (fluorescent lamps only)	L841	
Finish		NA
Natural Anodized (contact factory for paint color options)	NA	

*For more information visit focalpointlights.com/reference or consult factory

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** FGR-G-W-1-42TT-S-120-C144-NA Notes:	**Type:** A74 SPEC14-5147

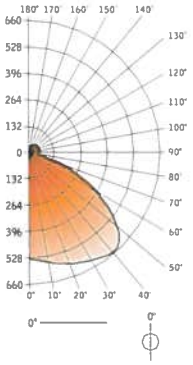
Groove™ G

FLUORESCENT

FGR-G-W-1-42TT-S-120-C144-NA

Filename FGRGW142IES Lumens 2751lm
Test # 12129 Efficiency 86%

CANDELPOWER DISTRIBUTION



Vertical Angle	Horizontal Angle 0°	Zonal Lumens
0°	540	
5°	552	53
15°	588	167
25°	618	286
35°	652	409
45°	651	504
55°	508	456
65°	320	318
75°	144	153
85°	58	63
90°	45	
95°	48	52
105°	54	57
115°	57	57
125°	59	53
135°	57	44
145°	58	36
155°	55	26
165°	50	14
175°	42	4
180°	37	

LUMEN SUMMARY

	Zone	Lumens	% Lamp	% Fixture
	0-30°	505	15 8	18 4
	0-40°	2408	75 2	87 5
	90°-130°	219	6 8	7 9
	90°-180°	343	10 7	12 5
Total Luminaire	0-180°	2751	86 0	100 0

LUMINANCE DATA (CD/M²)

Vertical Angle	0°
45°	6742
55°	5484
65°	3729
75°	1885
85°	886

CO-EFFICIENTS OF UTILIZATION

Floor		80				70			20		30		10		00
Ceiling									50						
Wall		70	50	30	10	70	50	10	50	10	50	10	50	10	00
RCR	0	100	100	100	100	96	96	96	90	90	83	83	78	78	75
	1	91	87	84	80	88	84	78	79	74	74	70	69	66	63
	2	83	76	71	66	80	74	64	69	61	65	58	61	55	53
	3	76	67	60	55	73	65	54	61	51	57	49	54	47	45
	4	69	59	52	46	66	57	45	54	43	51	42	48	40	38
	5	63	52	44	38	60	50	38	47	36	44	35	42	34	31
	6	57	46	38	33	55	44	32	42	31	39	30	37	29	27
	7	52	41	33	28	50	39	27	37	26	35	25	33	24	23
	8	48	36	29	24	46	35	23	33	22	31	21	29	21	19
	9	44	32	25	20	42	31	20	29	19	28	18	26	17	16
	10	41	29	22	17	39	28	17	26	16	25	16	23	15	14

Numbers indicate percentage values of reflectivity

Go to www.focalpointlights.com for additional photometric data

Note: Photometric testing performed in an independent lab with standard lamps and ballasts. Lamp and ballast type and configuration will affect photometric performance.

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor: Vaughn Industries OSU NRDT BUILDING Submitted By LIGHTING UNLIMITED INC	Catalog Number Job Name: OSU NRDT Building I L5257 Notes	Type A75

LIMBURG Collection

Pendant luminaires for fluorescent lamps

Material: Housing and canopy constructed of aluminum with a painted silver RAL 9006 finish and black cable.

Glass: Crystal glass with light-diffusing texture, satin matte finish, and screw neck.

Reflector: Anodized specular reflector of pure aluminum.

Electrical: One (1) 26W triple 4-pin GX24q-3 base compact fluorescent lamp (by others). GX24q-3 4-pin socket and electronic ballast, 120V or 277V – specify.

Installation: Mounts directly to standard 4" octagonal wiring box.

U.L. listed, suitable for damp locations.

Please note: Rod suspension ϕ .31".

	lamp		lumen	A	B	L
L5257	1	26 W CF triple-4p	1800	7¼	12⅝	79

BEGA/US
1000 BEGA Way, Carpinteria, CA 93013 (805)684-0533 FAX (805)566-9474

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: 112252MC9MWHMP

Notes:

Type: A77

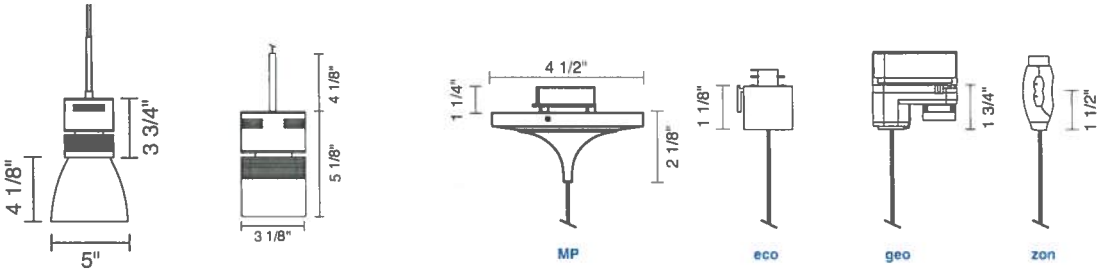
LSC14-37947

Job Name: | Contact:

Ordering Code: | Fixture Type:

Z15 LED Pendant Cylinder

BRUCK LEDRA brands



Applications

The Z15 Pendant Cylinder with Chroma technology provides energy efficient light using a cold remote phosphor module by XICATO® with an industry best SDCM of 1 x 2 Macadam ellipses. The housing is machined aluminum and seconds as its heat sink and driver housing. It is offered in matte chrome, white and black with either snoot aperture or white or blue frosted glass shade optic. The Z15 Pendant Cylinder is fully dimmable and offered in 4 color temperatures. The 3" Z15 Pendant Cylinder carries a 5 year NO COLOR SHIFT AND FIXTURE WARRANTY.

LED Performance

LED: Patented Cold Remote Phosphor, XICATO®
SDCM: 1 x 2 MacAdam Elipse, +/- 50 Kelvin
CCT: 2700k, 3000k, 3500k, or 4000k
CRI: >80 - typically 82, >95 - typically 97
LIFE: 85% at 50k hrs based on LM-80 testing
5 year "no color shift" warranty

lumens	+82 CRI	+97 CRI
700lm		15W
1000 lm	15W	

Chroma made in the USA Qship LM-79

Housing

Machined aluminum housing with white, matte chrome, or black finish. Optional cast glass shade.

Mounting

Pendant provided with a cable length of 60". Canopy over a 3" - 4" recessed round junction box. Optional Track mounting: Global Trac Systems, GEO track and ECO track, Halo® Power Trac track, and Zonyx track.

Reflector

Reflectors are provided with computer designed, lamp specific, post Alzak anodized reflectors of pure aluminum (99.98%). Available in Specular aluminum (SA) to provide glare and iridescence free performance.

LiteOptics / Accessories

Optical attachments allow for tool-less access to LED components and reflector. Ease of maintenance with field interchangeable optics when performance variations and lighting requirements of the space change. Optional dust protective lens provided on snoot aperture.

Electrical / LED Driver

120Vac input, 50/60Hz, 15W, 16VA. Electronic 120V driver. Trailing Edge (ELV) dimming. *Consult factory for other voltage options.

Listings

ETLus Listed to UL1598 (suitable for dry and damp locations).
UL1574 (track suitable for dry locations only)
cETL Listed to CSA C22.2 #250.0 and #9.0
Made in the USA - meets the requirements of the Buy American provision within the ARRA.

Ordering Codes

Follow the steps to specify your luminaire.

example: 112 - 250 - mc - 2a - m - zonmc

① Light Source	② Shade	③ Finish	④ Color Temperature	⑤ Reflector / Glass*	⑥ Mounting Option
112 LED	250 * 252 with glass	bk black mc matte chrome wh white	2 >80 CRI, 2700k, 1000lm 2a >95 CRI, 2700k, 700lm 3 >80 CRI, 3000k, 1000lm 3a >95 CRI, 3000k, 700lm 3V >80 CRI, 3000k Vibrant, 1000lm 9 >80 CRI, 3500k, 1000lm 9a >95 CRI, 3500k, 700lm 4 >80 CRI, 4000k, 1000lm 4a >95 CRI, 4000k, 700lm	fl flood, 60° m medium, 40° s spot, 20° bl blue wh white	MP 4" Kiss Canopy ecobk ECO/Halo black ecosv ECO/Halo matte silver ecowh ECO/Halo white geobk GEO black geosv GEO matte silver geowh GEO white zonmc Zonyx matte chrome

NOTES:
****specify reflector degree for 250 only***
****specify glass color for 252 glass only***

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
112252MC9MWHMP

Notes:

Type:
A77

LSC14-37947

Job Name:

Contact:

Ordering Code: -

Fixture Type:

250 no shade, standard

252 - bl blue glass shade

252 - wh white glass shade

Snoot

Louver

Barn Doors

Lens Options

Accessory Code	Accessory Code*	Accessory Code**	Accessory Code*
900300bk black 900300mc matte chrome 900300wh white	900310 black	900305bk black	900321 diffuser lens 900322 frosted lens 900320 linear lens

NOTES:

****Accessories available for 250 Snoot aperture only.***

*****Requires 900300 Snoot Accessory.***

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** 112252MC9MWHMP Notes:	**Type:** A77 LSC14-37947

LED Driver

LP1020-xx Series Switch-Mode LED Driver	
Total Power	20 Watts
Input Voltages	100 ~ 277 VAC
Number of Outputs	One

Product Specifications

ANZ#: Z095k, September 7, 2011

SPECIAL FEATURES

- UL1310, Class 2 and UL879 recognized
- Single output, constant current or constant voltage design
- IP66 compliant
- Suitable for dry and damp locations
- Designed for outdoor or indoor applications
- Suitable in standard electrical junction boxes
- ELV (trailing-edge) dimmable - Optional
- Active PFC reduces power consumption

ENVIRONMENTAL

Operating temperature: -30 to 50 ° C
(De-rating : 2% per ° C from 50~70°C)
Storage temperature: -40 to +85° C
Humidity (Non-Condensing): 5% to 95%
Cooling: Convection
Vibration Frequency: 5 to 50 Hz
MTBF: >100,000 Hours at full load and 25°C ambient conditions (MIL-217F)
EMC : Compliant to 47CFR, Part 2, Part15 and Cispr PUB, 22 Class B
Acoustic Noise: Less than 24db (20~20K Hz)

ELECTRICAL SPECIFICATIONS

Input range	100 ~ 304 VAC
Frequency	47 to 63 Hz
PF and THD	> 0.92 at full load, 115VAC; <20% full load, 230VAC
Crest Factor	1.5 max.
Inrush current	10.0 Amps maximum at 230VAC, cold start, 25° C
Input current	0.3 Amps maximum at 115VAC
Efficiency	85% typical at maximum load
EMI filtering	47CFR, Part 2, Part 15 and Cispr PUB, 22 Class B
Maximum power	20W
Current Accuracy	±1% (when applicable)
Load regulation	±3%
Leakage Current	300uA typ.
Hold up time	Half cycle minimum at 120 VAC and 80% of rated load
Protection	Over-voltage, Over current and Short circuit protection: Auto-recovery

SAFETY

UL	UL1310, Class 2 and UL879 recognized
cUL	UL1310, Class 2 and UL879 recognized
CE	

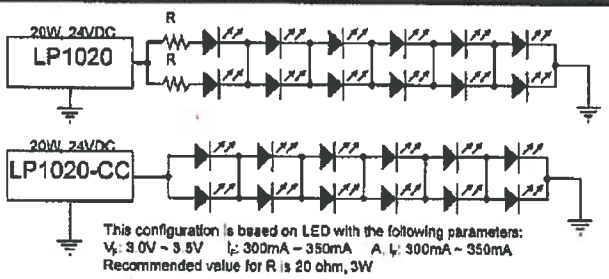
Note: 52VDC output is not cUL recognized

Model Number	Constant Voltage Mode Output			Model Number	Constant Current Mode Output		
	V (DC)	A (mA)	Watts		V (DC)	mA(Max.)	Watts
LP1020-36	36, ±5%	550	20	LP1020-36-Cxxxx	18~ 36	550, ±5%	20
LP1020-22	22, ±5%	910	20	LP1020-22-Cxxxx	12 ~ 22	910, ±5%	20
LP1020-17	17, ±5%	1250	21	LP1020-17-Cxxxx	9 ~ 17	1250, ±5%	20
LP1020-13	13, ±5%	1540	20	LP1020-13-Cxxxx	7 ~ 13	1540, ±5%	20
LP1020-10	10, ±5%	2000	20	LP1020-10-Cxxxx	7 ~ 10	2000, ±5%	20

Note: The Constant Voltage models are not compatible with ELV dimmer

Note: The output current of Constant Current models are adjustable at factory from 50% ~ 100%.

RECOMMEND APPLICATION SCHEMATICS



This configuration is based on LED with the following parameters:
V_f: 3.0V ~ 3.5V I_f: 300mA ~ 350mA $A_{-}I_f$: 300mA ~ 350mA
Recommended value for R is 20 ohm, 3W

MAGTECH INDUSTRIES CORP. 5625-A S. Arville, Las Vegas, NV 89118 Tel:702-364-9998 Fax: 702-364-1562 www.magtechind.com Anz095k

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** 112252MC9MWHMP Notes:	**Type:** A77 LSC14-37947

MECHANICAL DRAWING

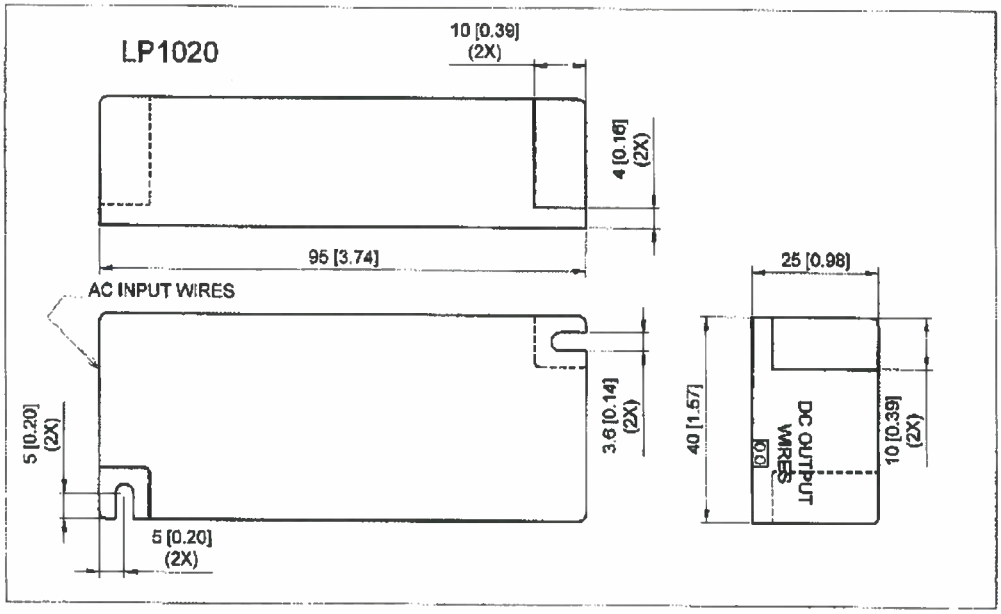
Model Information – Single DC output

LP1020-XX – Constant Voltage Model
XX – Available Output Voltage, refer to chart above

LP1020-XXC (YYY) – Constant Current Model
C – Stands for Constant Current Model
XX – Available Output Voltage
YYY – Available Constant Current Settings, 350mA or 700mA or 1050mA

AC input cable
AWG #20, two conductors UL PLTC type or equiv.

DC output cable
AWG #20, two conductors UL PLTC type or equiv.



PRODUCT DATA SHEETS

PANEL LUMINAIRES

LM22 - 2 X 2 LIGHT PANEL SERIES

Project Name	OSU - NRDT
Date	
Type	B1

T/LT

TILT Part Number	L GM 22 35 W
TILT Driver	LD60

FEATURES

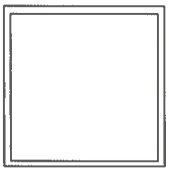
CONSTRUCTION

- Side lit design for an ultra thin profile
- IC rated, IP44 suitable for damp or dry locations
- Wide beam angle (120°) for better spacing
- CE and cULus rated
- RoHS compliant
- 5 year warranty (standard)

ELECTRICAL

- Dimmable (via driver or using PWM) [1]
- Constant voltage design allows for multiple lights per driver
- LM-80 and LM-79 available
- Panels should be placed within 50 feet of driver
- Rated at 60W max AC power (51W DC) [2]

2X2



LUMEN PACKAGES (2X2) [3]					
CCT	50,000 hours (L70)				
	STANDARD 90+ CRI, R9 >50				
5000k	Lumens	4700	4157	3736	2775
	LPW	74.1	79.2	82	87.5
4000k	Lumens	4550	4298	3837	2847
	LPW	77.3	78.4	80.4	87.7
3500k	Lumens	4225	3829	3426	2542
	LPW	72.5	75.2	77.4	84.8
3000k	Lumens	3900	3360	3016	2237
	LPW	67.6	71.5	73.9	81.4

ORDERING INFORMATION

L GM 22 50 W

Fixture Type	Mounting Type	Size	CCT	Frame Color [4]
L - Light	**GM** - Grid Mount	**22** - 2' x 2'	**50** - 5,000K **40** - 4,000K **35** - 3,500K **30** - 3,000k	**W** - White **B** - Black + **S** - Silver + + - special order

USE WITH

Driver	
LD60	LD60PE7
LD60P	LD90PE7
LD90	LD100PE7
LD100P	

DRIVER SPECIFICATION

NOTE on DRIVERS: UL 8750, short circuit, over current, over voltage, and over temperature protection
UL recognized and CE rated, RoHS compliant
Class II, SELV, IP67

Model [5]	Size in Inches (LxWxH)	AC Input	DC Output	Dimming [9]	Temp	Max Fixtures [8]
LD60	6.50 x 1.63 x 1.26	90 - 305V	60W	1-10V	-40C - 60C	1
LD60P	12.50 x 2.38 x 1.50	90 - 305V	60W	1-10V	-40C - 70C	1
LD90	6.34 x 2.40 x 1.26	90 - 305V	90W	1-10V	-40C - 60C	1
LD100P	14.50 x 2.63 x 1.58	90 - 305V	100W	1-10V	-40C - 60C	2

Emergency [7]	Size in Inches (LxWxH)	AC Input	Output [6]	Lumens	Temp	Max Fixtures [8]
LD60PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	1
LD90PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	1
LD100PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	2

NOTES (NUMBERS)

(1) See driver or dimming product sheet for specific details

(2) AC W used for circuit power, DC W used for driver circuit

(3) Lumen packages provided using Dim Chip with driver

(4) Colors other than white are custom

(5) "P" designation after watt rating denotes Plenum Rated

(6) Based on watt load of fixtures and driver output

(7) See Product Sheet for Emergency Drivers

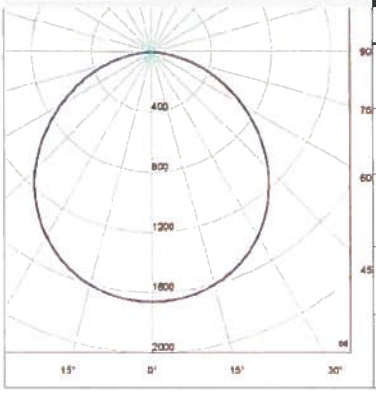
(8) Safe amount of fixtures per driver

(9) TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458

LAUREN ILLUMINATION

TILT PANEL LUMINAIRES LM22

PHOTOMETRIC CHARTS WITH TESTING DATA. CALL FOR SPECIFIC INFORMATION NOT LISTED HERE: 855.440.8458

LM2250W	ZONAL LUMEN SUMMARY		
PHOTOMETRY	DEGREES	LUMENS	%
	0-30	1300	28
	0-40	2126	45
	0-60	3725	79
	0-90	4700	100
	90-180	0	0
	0-180	4700	100

LUMINANCE SUMMARY CD /SQ.M.	
ANGLE	MEAN CD/SQ.M
45	4997
55	4708
65	4309
75	3742
85	2819

COEFFICIENT OF UTILIZATION

	80%			70%			50%		
	70	50	30	70	50	30	70	50	30
0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11
1	1.09	1.05	1.01	1.07	1.03	0.99	0.98	0.95	0.92
2	1.00	0.92	0.86	0.98	0.90	0.85	0.87	0.82	0.78
3	0.91	0.81	0.74	0.89	0.80	0.73	0.77	0.71	0.66
4	0.84	0.73	0.65	0.82	0.72	0.64	0.69	0.62	0.57
5	0.78	0.65	0.56	0.75	0.64	0.56	0.62	0.55	0.49
6	0.71	0.58	0.50	0.69	0.57	0.49	0.56	0.48	0.43
7	0.66	0.52	0.44	0.64	0.51	0.43	0.50	0.42	0.37
8	0.61	0.47	0.39	0.59	0.47	0.39	0.45	0.38	0.33
9	0.56	0.43	0.35	0.55	0.42	0.35	0.41	0.34	0.29
10	0.52	0.39	0.31	0.51	0.39	0.31	0.38	0.31	0.26

NOTES

- Lifespan: 50,000 hrs (L70)
- LM79 and LM80 available upon request. Call 855.440.8458
- IES files availble online at: laurenillumination.com/resources

2162 Reiser Avenue SE I New Philadelphia, OH 44663 P: 855.440.8458 I F: 330.339.1515
laurenillumination.com I laureninternational.com

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

CONSTANT VOLTAGE DRIVERS

PRODUCT DATA SHEETS

FEATURES

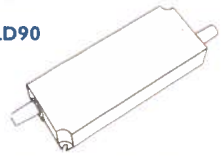
- 24V constant voltage power supply
- Protections include
  - Short circuit / over current / over voltage / over temperature
- Class II power unit SELV rated
- Built in active PFC function
- Dimmable (see chart below)
- UL recognized
- RoHS compliant
- CE rated
- 5 year warranty

Project Name	OSU - NRDT
Date	
Type	A1

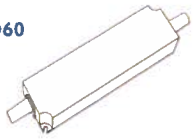
T/LT

TILT Part Number	LD60

LD90



LD60



LD16

LDND16

Constant Voltage Driver Models:
LD90
LD60
LD16
LDND16 (Non Dim)

SPECIFICATIONS

ALL PLENUM MODELS	LD60	LD90	LD16	LDND16 (Non Dim)
Length x Width (in)	6.500" x 1.750"	6.500" x 2.375"	6.00" x 1.625"	3.00" x 1.50"
Height (in)	1.250"	1.500"	1.250"	1.125"
IP Rating	IP67	IP67	IP30	IP30
DC output supply (W)	60	90	16	16
AC input voltage range	90 - 305VAC	90-305VAC	90-305VAC	90 - 264VAC
AC inrush current (max) Cold start	75A @ 230VAC	70A @ 230VAC	50A @ 230VAC	70A @ 230VAC
Safety standards	UL 8750	UL 8750	UL 8750	UL 8750
Protections	Short circuit/over current/over voltage/over temperature			
Thermal Operation	-40°C - 50°C	-40°C - 50°C	-40°C - 50°C	-40°C - 50°C
Thermal Shutdown	75°C	70°C	70°C	70°C

FOR USE WITH

LUMINAIRE	CV DRIVER	MAX # UNITS	CV DRIVER	MAX # UNITS	CV DRIVER	MAX # UNITS
LCLCV6	LD16, LDND16	1	LD60	5	LD90	8
LCLCV8	LD16, LDND16	1	LD60	4	LD90	6
LGM22	LD16, LDND16	0	LD60	1	LD90	1
LGM24	LD16, LDND16	0	LD60	0	LD90	1
LGM14	LD16, LDND16	0	LD60	1	LD90	1

DIMMER COMPATIBILITY CHART

BRAND	MODEL
TILT	WLVD
TILT	DIM CHIP (DC01, DC02, DC03)
LEVITON (0-10V)	IP-710*
LUTRON (0-10V)	DVSTV*

***TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458**

LAUREN ILLUMINATION

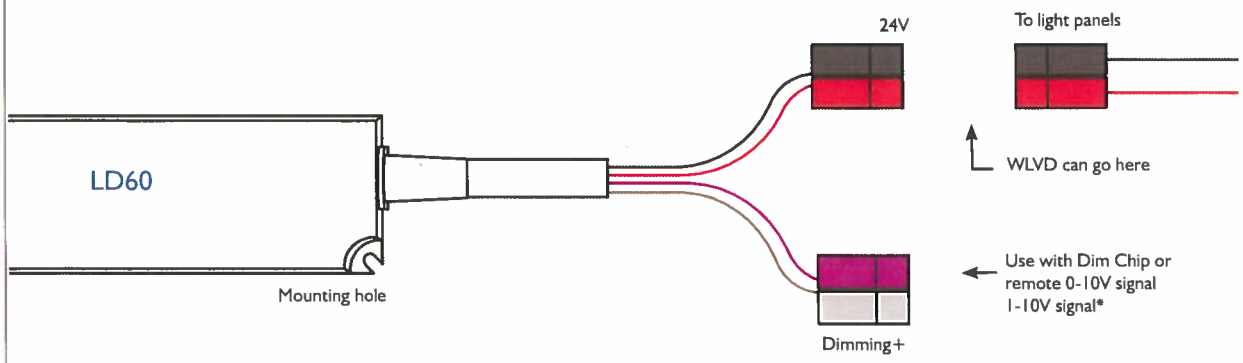
Date Submitted: Aug. 26, 2015
Distributor: C.E.D. Columbus, Oh 43207

CONSTANT VOLTAGE DRIVERS LD90, LD60, LD16, LDND16

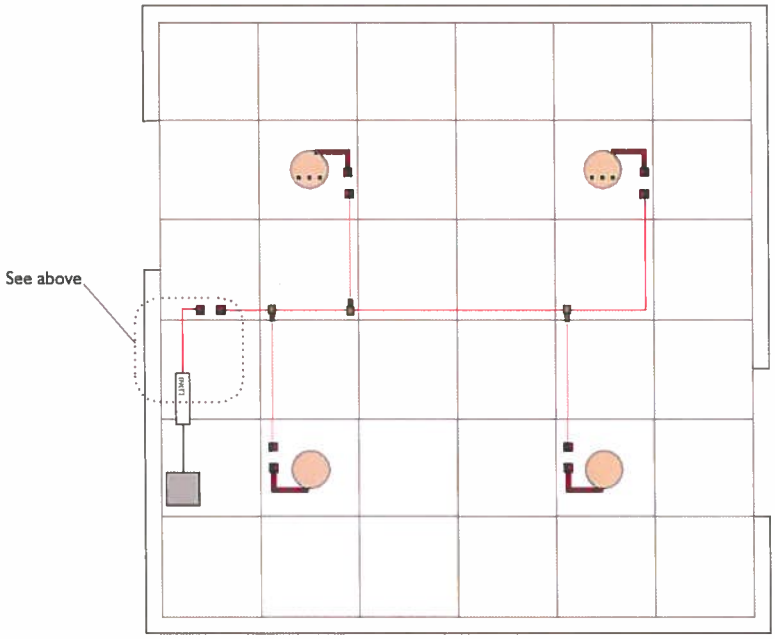
CONNECTING CONSTANT VOLTAGE DRIVERS - DC WIRING

CLOSE-UP DC WIRING DETAIL

SEE INSTALLATION MANUAL FOR APPROVED INSTALLATION METHODS AND OTHER DETAILS FOR ALL DRIVERS



SAMPLE ROOM LAYOUT WITH DRIVERS INSTALLED



NOTES

- Lights should be placed within 50 feet of driver
- Wattage load (lights) should not exceed wattage of driver

\+ TILT drivers use 1-10V. They will accept 0-10V signals. Operation from 0-1V will depend on the system being used. For details specific to your system, call us at 855.440.8458

Lauren Illumination is a Lauren International Company
2162 Reiser Avenue SE | New Philadelphia, OH 44663
P: 855.440.8458 | F: 330.339.1515
laurenillumination.com | laureninternational.com

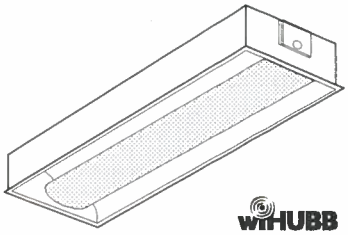
Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** STE14-232G-MPO-EPUQHEPSN-FO835SYL Notes:	**Type:** B2 LSC14-37947

Columbia LIGHTING

STE14

1' x 4' Stratus® Recessed Indirect / 1, 2, or 3-Lamp T5, T5HO, T8



- Precision optical design produces high efficiency in a high visual comfort architecturally styled direct/indirect distribution
- Custom perforated metal basket with high transmission lamp-obscuring overlay
- Optimized coating process and unique paint formulation provide exceptional reflectivity in a matte finish for a soft visual image and balanced basket and reflector illumination
- Completely recessed, provides a clean ceiling with uniform illumination at mounting heights as low as 8 feet
- Available for use with T8, T5 or T5HO linear fluorescent lamps
- Optional acrylic dust guard pivots to seal lamp compartment against contaminants especially for schools, medical facilities and public spaces
- Companion Louvered (STEL), side basket (STS) and pendant (STP) models available
- Available with exclusive wiHUBB technology preinstalled
  - Peer to peer, self-healing wireless mesh network
  - Integrated control system for 0-10VDC or step dimming, or On/Off

PROJECT INFORMATION

Project Name

Type

Catalog No.

Date

CONSTRUCTION
Luminaire housing and end caps are die formed code gauge cold rolled steel. The sturdy reflector is stiffened with linear forms, profiled to a precision curve. Perforated basket with high transmission overlay for improved optical efficiency plus lamp obscuration. Basket and all reflective surfaces are finished after fabrication with unique formula high reflectivity matte white paint for soft, uniform indirect illumination.

Thermoplastic light traps snap into the housing at both ends of the basket to prevent light leaks. Basket hinges down for easy access to center wireway.

INSTALLATION
An access plate is furnished with each luminaire for fast wiring access from the plenum. No need to open fixture.

BALLASTS
Energy efficient, thermally protected, automatic resetting, Class P, high power factor, sound rated A, magnetic or electronic ballasts. CEE NEMA Premium compliant.

ELECTRICAL
Standard class "P", thermally protected, autoresetting HPF ballast, sound rated A. CEE NEMA Premium compliant. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

CEILING COMPATIBILITY
NEC-compliant T-Bar clips supplied with all grid trim fixtures. See ceiling details on reverse. For type SG ceilings order G trim. Fixture will be regressed 3/8" from the face of the ceiling tee. For hard ceilings order G trim and FK flange accessory. Assemble then support FK accessory at the ceiling plane using tie wires (by others). Contact your Columbia representative for compatibility information for specific ceiling types or for continuous row applications in hard ceilings.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Damp location labeling is standard. Emergency-equipped fixtures labeled UL 924.

ORDERING INFORMATION

EXAMPLE **STE14-232G-MPO-EU**

STE 14 - - MPO - -

MODEL
- **STE** Stratus® E-Series Recessed Indirect

NO. OF LAMPS IN CROSS SECTION
- **1** One
- **2** Two
- **3** Three

CEILING TYPE
- **G** Grid Lay-in
- **SM** Surface Mount

SHIELDING
- **MPO** Metal Perf w/Overlay

VOLTAGE
- **U** 120V-277V
- **347** 347V

OPTIONS
- **GLR** Fast Blow Fuse
- **GMF** Slow Blow Fuse
- **EL** Emergency Battery Pack
- **ELS** Emergency Battery Pack, T5
- **DG** Dust Guard Clear Acrylic
- **NYC** NYC Compliant
- **NYCU** NYC Compliant, Union Label
- **WIH** wiHUBB Enabled [1]

SIZE
- **14** 1' × 4'

LAMP TYPE
- **28** 4', T5: 28 Watt
- **32** 4', T8: 32, 30, 28 or 25 Watt
- **54** 4', T5HO: 54 or 51 Watt

BALLAST
- **E** Electronic T8, Instant Start
- **ED** Electronic Dimming, T8 and T5
- **EP** Electronic T5, T5HO or T8, Programmed Start

EPUQHESPN - Sylvania Programmed Start Ballast

FO835SYL- Sylvania Lamps Installed

ACCESSORIES (ORDER SEPARATELY)
- **FK14** 1' × 4' Single Flange Kit

[1] Not available with Surface Mount Ceiling Types

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: STE14-232G-MPO-EPUQHEPSN-FO835SYL
Notes: 2-F32T8/835 LAMPS INCLUDED

Type: B2
LSC14-37947

Columbia LIGHTING

STE14

1' x 4' Stratus® Recessed Indirect / 1, 2, or 3-Lamp T5, T5HO, T8

PHOTOMETRIC DATA

Test **3849** Test Date **2/4/11**

LUMINAIRE DATA

Luminaire	**STE14-232G-MPO-EU** **STE Stratus® E-Series, Recessed Architectural** **1 x 4 2-lamp with perforated metal basket and opal overlay**
Ballast	**B232IUNVHP-B**
Ballast Factor	**0.88**
Lamp	**F28T8**
Lumens per Lamp	**2725**
Watts	**47**
Shielding Angle	**0° = 90 90° = 90**
Spacing Criterion	**0° = 1.23 90° = 1.21**
Luminous Opening in Feet	**Length: 4.00** **Width: 0.92** **Height: 0.00**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	1137	20.9	29.1
0-40	1842	33.8	47.2
0-60	3164	58.1	81.1
0-90	3903	71.6	100.0
0-180	3903	71.6	100.0

ENERGY DATA

Total Luminaire Efficiency	**71.6%**
Luminaire Efficacy Rating (LER)	**73**
IESNA RP-1-1993 Compliance	**Noncompliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$3.29 based on 3000 hrs. and $0.08 per KWH**

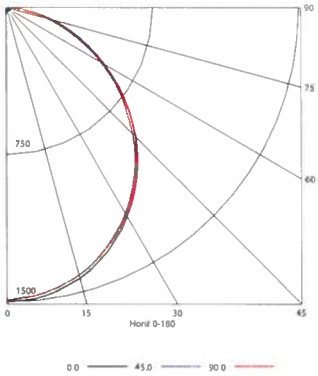
COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
1	78	75	72	69	76	73	70	68	70	68	66	60
2	71	65	61	57	69	64	60	56	62	58	55	51
3	65	58	52	47	63	57	51	47	54	50	46	43
4	60	51	45	40	58	50	45	40	48	43	40	37
5	55	46	40	35	53	45	39	35	44	38	34	32
6	51	41	35	31	49	41	35	30	39	34	30	28
7	47	38	31	27	46	37	31	27	36	31	27	25
8	44	34	28	24	43	34	28	24	33	28	24	22
9	41	32	26	22	40	31	26	22	30	25	22	20
10	39	29	24	20	38	29	23	20	28	23	20	18

RCR

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

INDOOR CANDELA PLOT

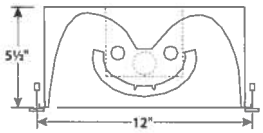


AVG. LUMINANCE (Candela/Sq. M.)

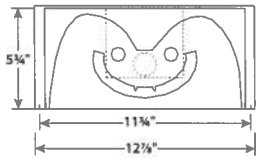
Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	4361	4361	4361	4361	4361
30	4151	4114	4087	4104	4107
40	3979	3914	3902	3898	3914
45	3872	3789	3773	3814	3843
50	3731	3640	3613	3704	3709
55	3585	3473	3488	3514	3493
60	3387	3264	3305	3270	3253
65	3177	2997	3066	3018	2983
70	2968	2771	2797	2720	2685
75	2712	2486	2475	2418	2396
80	2274	2173	2173	2139	2139
85	1510	1913	2114	2114	2114

DIMENSIONAL DATA

1' x 4', 2-Lamp, Lay-in Recessed

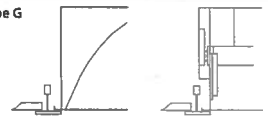


Surface



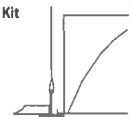
CEILING COMPATIBILITY

Type G



For lay-in installation in exposed grid ceilings. Maximum tee widths of 1" and maximum heights of 1½" allowed.

FK14 Flange Kit



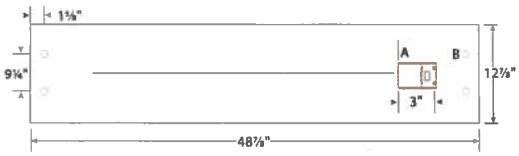
For hard ceiling applications, fixtures must be ordered with a flange kit that wires directly into the concealed ceiling opening for a clean finished appearance. For row configurations contact your local Columbia Representative.

Type SG

For 9/16" slot grid type ceilings. Luminaire will be regressed 3/8" horizontal surface of the tee.

Flange kit cut out dimension for single FK14 only: 12⅞" x 48⅞"

Top View



Surface Mount K.O. Dimensions
A: 2" x 3" Access with (2) ⅞" Mount Supply Knockouts
B: ¼" Mounting holes (4) for surface or cable mounting

NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

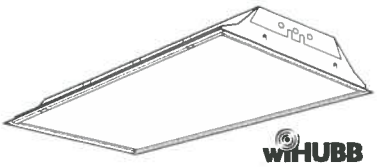
Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** ST824-232G-FSA12125-EPUQHEPSN-PW-SLL-FO835SYL Notes: 2-F32T8/835 LAMPS INCLUDED	**Type:** B5 LSC14-37947

Columbia LIGHTING

ST824-2, ST824-3

2' x 4' Shallow Specification Troffer / 2 or 3-Lamp T5, T5HO, T8



PROJECT INFORMATION

Project Name

Type

Catalog No.

Date

FEATURES

- Optical performance designed for T8 and T5 lamp technology
- 2⅛" minimum spacing from bottom of lamp to bottom of lens
- Mechanical light seal
- Mitered corners on door present a clean uninterrupted appearance
- Spring loaded latches optional
- Rolled fixture edges reduce risk of injury during fixture handling and installation
- Integral T-Bar clips quickly secure fixture to grid system without the need for time consuming loose parts
- Snap-on ballast covers can be removed with lamps installed
- Corner hinging for easy insertion and removal of door frame from either side
- Optional flush or regressed aluminum shielding frames available with positive action or spring loaded latches
- Housing ends secured by unique corner interlock and screws
- Available with exclusive wiHUBB technology preinstalled
  - Peer to peer, self-healing wireless mesh network
  - Integrated control system for 0-10VDC or step dimming, or On/Off

HOUSING
Heavy gauge steel. Die formed for extra rigidity. Grid housings are designed for installation in standard 15/16" T-Bar ceilings. Integral T-Bar clips are located in the end of the housing. Flanged housings for hard ceilings feature overlap flange trim and wing hangers.

BALLASTS
Energy efficient, thermally protected, automatic resetting, Class P, high power factor, sound rated A, magnetic or electronic ballasts. CEE NEMA Premium compliant.

ELECTRICAL
Standard class "P," thermally protected, autoresetting HPF ballast, sound rated A. CEE NEMA Premium compliant. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

FINISH
All parts are pre-painted with high gloss baked white enamel, minimum reflectance 86%, applied over iron phosphate pretreatment for maximum adhesion and resistance.

SHIELDING
100% clear prismatic acrylic, extruded and roll-embossed, diagonally oriented female prisms, unless otherwise specified.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Damp location labeling is standard. Emergency-equipped fixtures labeled UL 924.

ORDERING INFORMATION

EXAMPLE ST824-232G-FSA12-EU-F0735-C388

ST8 24 – – – – –

MODEL
- ST8 Shallow Specification Troffer

NO. OF LAMPS
- 2 Two
- 3 Three

CEILING TYPE
- G Inverted T-Bar (Std.)
- F Overlap Flange (4½" overall fixture height)

SHIELDING
- A12 Pattern 12 Acrylic 0.100" Nominal (Standard)
- A12.125 Pattern 12 Acrylic 0.125" Nominal
- A19 Pattern 19 Acrylic 0.15" Male Prism
- PC1 Silver Parabolic Louver ½" × ½" × ½"
- PC2 Silver Parabolic Louver 1½" × 1½" × 1"

For more shielding see Options and Accessories

VOLTAGE
- U 120V-277V
- 347 347V

OPTIONS
- F830 T8, 80CRI, 3000K Lamps, Furnished/Installed
- F835 T8, 80CRI, 3500K Lamps, Furnished/Installed
- F841 T8, 80CRI, 4100K Lamps, Furnished/Installed
- GLR Fast Blow Fuse
- EL Emergency Battery Pack
- PAF Paint After Fabrication
- SLL Spring Loaded Latches
- MSP Master/Satellite Pair w/9' Harness
- C388 3/8" Flex with 3 No. 18 Wires
- C384 3/8" Flex with 3 No. 14 Wires
- C488 3/8" Flex with 4 No. 18 Wires
- C424 1/2" Flex with 4 No. 14 Wires
- M4R Miro®-4 Aluminum Reflector
- SAR Low Iridescent Specular Alum Reflector
- NYC NYC Compliant
- NYCU NYC Compliant, Union Label
- WIH wiHUBB Enabled[1]
- CP Chicago Plenum

For a complete set of options, see Options and Accessories

SIZE
- 24 2' × 4'

LAMP TYPE
- 28 4', T5, 28 Watt
- 32 4', T8, 32, 30, 28 or 25 Watt
- 54 4', T5HO, 54 or 51 Watt

DOOR STYLE
- FS Flush Steel
- FA Flush Aluminum
- RA Regressed Aluminum
- RS Premium Steel

BALLAST
- E Electronic T8, Instant Start
- ELW 2-Lamp Electronic T8, 0.77 Ballast Factor, Low Wattage, Instant Start
- 3E 3-Lamp Electronic T8, Instant Start
- 3ELW 3-Lamp Electronic T8, 0.77 Ballast Factor, Low Wattage, Instant Start
- EP Electronic T5HO or T8, Programmed Start
- 3EP 3-Lamp Electronic T5HO or T8, Programmed Start

For specific ballast vendor, show as option

EPUQHEPSN- Sylvania Programmed Start Ballast

FO835SYL Sylvania Lamps Installed

[1] Not available with Surface Mount Ceiling Types

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: ST824-232G-FSA12125-EPUQHEPSN-PW-SLL-FO835SYL

Notes: 2-F32T8/835 LAMPS INCLUDED

Type: B5

LSC14-37947

Columbia LIGHTING

ST824-2, ST824-3

2' x 4' Shallow Specification Troffer / 2 or 3-Lamp T5, T5HO, T8

PHOTOMETRIC DATA

Test **12581** Test Date **1/08/03**

LUMINAIRE DATA

Luminaire	**ST824-332G-FSA12 ST8 Lensed Troffer 2' x 4' 3-Lamp with A12 Lens**
Ballast	**B332I120RH**
Ballast Factor	**0.88**
Lamp	**F32T8**
Lumens per Lamp	**2900**
Total Input Watts	**84**
Mounting	**Recessed**
Shielding Angle	**N/A**
Spacing Criterion	**0° = 1.24 90° = 1.35**

AVG. LUMINANCE (Candela/Sq. M.)

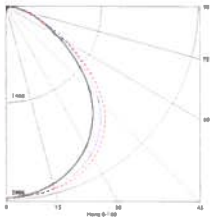
Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	4282	4282	4282	4282	4282
30	4165	4260	4415	4515	4538
40	3967	4106	4326	4471	4523
45	3767	3920	4154	4322	4387
50	3462	3637	3851	4009	4084
55	3075	3282	3478	3559	3616
60	2696	2863	3045	3079	3098
65	2338	2412	2528	2565	2572
70	2036	2005	1987	2122	2140
75	1838	1784	1659	1921	1909
80	1841	1761	1770	1903	1956
85	1967	1825	2002	1967	2038

COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
RCR 1	93	89	86	83	91	87	84	81	84	81	79	72
2	85	78	73	69	83	77	72	68	74	70	66	61
3	78	69	63	58	76	68	62	57	66	60	56	53
4	72	62	55	49	70	61	54	49	59	53	48	45
5	66	55	48	43	64	55	48	43	53	47	42	39
6	61	50	43	37	59	49	42	37	48	42	37	35
7	57	45	38	33	55	45	38	33	44	37	33	31
8	53	42	35	30	51	41	34	30	40	34	29	27
9	49	38	31	27	48	38	31	27	37	31	27	25
10	46	35	29	24	45	35	28	24	34	28	24	22

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

INDOOR CANDELA PLOT



ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	2213	25.4	30.0
0-40	3657	42.0	49.6
0-60	6242	71.7	84.7
0-90	7373	84.7	100.0
0-180	7373	84.7	100.0

ENERGY DATA

Total Luminaire Efficiency	**84.7%**
Luminaire Efficacy Rating (LER)	**77**
IESNA RP-1-1993 Compliance	**Noncompliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$3.12 based on 3000 hrs. and $0.08 per KWH**

Test **12583** Test Date **1/8/03**

LUMINAIRE DATA

Luminaire	**ST824-232G-FSA12 ST8 Lensed Troffer 2' x 4' 2-Lamp with A12 Lens**
Ballast	**REL-2P32-SC**
Ballast Factor	**0.88**
Lamp	**F32T8**
Lumens per Lamp	**2900**
Total Input Watts	**58**
Shielding Angle	**N/A**
Spacing Criterion	**0° = 1.22 90° = 1.35**

AVG. LUMINANCE (Candela/Sq. M.)

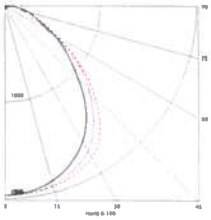
Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	3037	3037	3037	3037	3037
30	2885	2962	3095	3208	3240
40	2619	2711	2877	3058	3104
45	2387	2524	2723	2878	2891
50	2184	2318	2537	2631	2643
55	1995	2062	2202	2261	2318
60	1767	1739	1745	1838	1952
65	1553	1418	1297	1494	1666
70	1485	1242	1047	1341	1540
75	1545	1259	1175	1354	1587
80	1601	1378	1352	1432	1699
85	1683	1559	1400	1577	1736

COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
RCR 1	94	90	87	84	92	88	85	82	85	82	80	73
2	86	79	74	70	84	78	73	69	75	71	67	62
3	79	71	64	59	77	69	63	58	67	62	57	54
4	73	63	56	51	71	62	55	50	60	54	49	46
5	67	57	49	44	65	56	49	44	54	48	43	41
6	62	51	44	39	61	50	44	39	49	43	38	36
7	58	47	39	34	56	46	39	34	45	38	34	32
8	54	43	36	31	53	42	35	31	41	35	31	29
9	50	39	32	28	49	39	32	28	38	32	28	26
10	47	36	30	25	46	36	29	25	35	29	25	23

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

INDOOR CANDELA PLOT



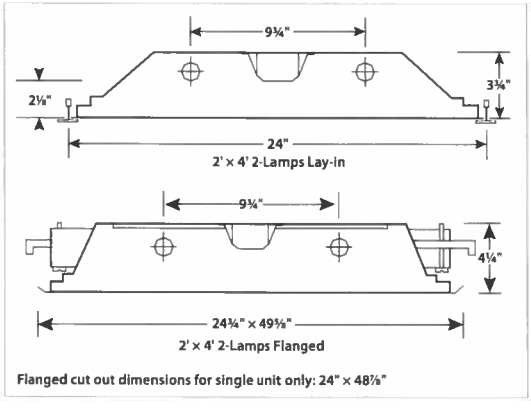
ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	1563	27.0	31.5
0-40	2561	44.2	51.6
0-60	4231	72.9	85.2
0-90	4967	85.6	100.0
0-180	4967	85.6	100.0

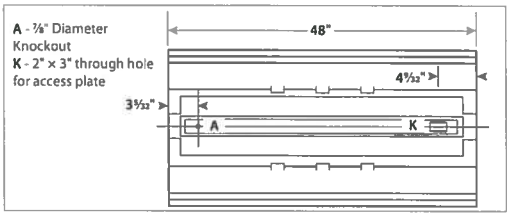
ENERGY DATA

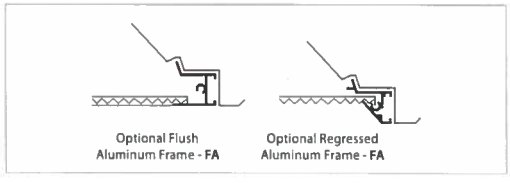
Total Luminaire Efficiency	**85.6%**
Luminaire Efficacy Rating (LER)	**75**
IESNA RP-1-1993 Compliance	**Noncompliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$3.20 based on 3000 hrs. and $0.08 per KWH**

DIMENSIONAL DATA



Flanged cut out dimensions for single unit only: 24" x 48⅞"





NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

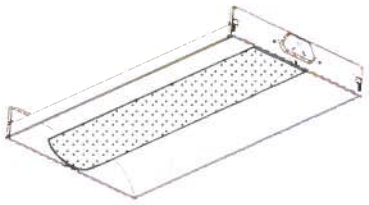
Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** STE24-232G-MPO-EPUQHEPSN--FK24 Notes:	**Type:** B10 LSC14-37947

Columbia LIGHTING

STE24-2

2' x 4' Stratus Recessed Indirect / 2-Lamp T5, T5HO, T8



PROJECT INFORMATION

Project Name

Type

Catalog No.

Date

FEATURES

- Precision optical design produces high efficiency in a high visual comfort architecturally styled direct/indirect distribution
- Custom perforated metal basket is backed by a high transmission lamp obscuring overlay
- Optimized coating process and unique paint formulation provide exceptional reflectivity in a matte finish for a soft visual image and balanced basket and reflector illumination
- Completely recessed, provides a clean ceiling with uniform illumination at mounting heights as low as 8 feet
- Available for use with T8, T5 or T5HO linear fluorescent lamps
- Optional acrylic dust guard pivots to seal lamp compartment against contaminants especially for schools, medical facilities and public spaces
- Companion Louvered (STEL), side basket (STS) and pendant (STP) models available

CONSTRUCTION
Luminaire housing and end caps are die formed code gauge cold rolled steel. The sturdy reflector is stiffened with linear forms, profiled to a precision curve. Perforated basket with high transmission overlay for improved optical efficiency plus lamp obscuration. Basket and all reflective surfaces are finished after fabrication with unique formula high reflectivity matte white paint for soft, uniform indirect illumination.

Thermoplastic light traps snap into the housing at both ends of the basket to prevent light leaks. Basket hinges down for easy access to center wireway.

INSTALLATION
An access plate is furnished with each luminaire for fast wiring access from the plenum. No need to open fixture.

BALLASTS
Energy efficient, thermally protected, automatic resetting, Class P, high power factor, sound rated A, magnetic or electronic ballasts. CEE NEMA Premium compliant.

ELECTRICAL
Standard class "P", thermally protected, autoresetting HPF ballast, sound rated A. CEE NEMA Premium compliant. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

CEILING COMPATIBILITY
NEC-compliant T-Bar clips supplied with all grid trim fixtures. See ceiling details on reverse. For type SG ceilings order G trim. Fixture will be regressed 3/8" from the face of the ceiling tee. For hard ceilings order G trim and FK flange accessory. Assemble then support FK accessory at the ceiling plane using tie wires (by others). Contact your Columbia representative for compatibility information for specific ceiling types or for continuous row applications in hard ceilings.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Damp location labeling is standard. Emergency-equipped fixtures labeled UL 924.

ORDERING INFORMATION

EXAMPLE **STE24-232G-MPO-EU**

STE 24 - 2 - MPO - -

MODEL
- **STE** Stratus E-Series Recessed Indirect

NO. OF LAMPS
- **2** Two

CEILING TYPE
- **G** Grid Lay-in
- **SM** Surface Mount

SHIELDING
- **MPO** Metal Perf w/Overlay

VOLTAGE
- **U** 120V-277V
- **347** 347V

OPTIONS
- **GLR** Fast Blow Fuse
- **GMF** Slow Blow Fuse
- **EL** Emergency Battery Pack
- **ELS** Emergency Battery Pack, T5
- **DG** Dust Guard Clear Acrylic
- **NYC** NYC Compliant
- **NYCU** NYC Compliant, Union Label

SIZE
- **24** 2' × 4'

LAMP TYPE
- **28** 4', T5, 28 Watt
- **32** 4', T8: 32, 30, 28 or 25 Watt
- **54** 4', T5HO: 54 or 51 Watt

BALLAST
- **E** Electronic T8, Instant Start
- **ED** Electronic Dimming T8 and T5 (specify series)
- **EP** Electronic T5, T5HO, or T8, Programmed Start

EPUQHEPSN - SylvannaProgrammed Start Ballasts

ACCESSORIES (ORDER SEPARATELY)
- **FK24** 2' × 4' Single Flange Kit (Shipped separately)

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: STE24-232G-MPO-EPUQHEPSN-FO835SYL-GLR-FK24

Notes:

Type: B10

LSC14-37947

Columbia LIGHTING

STE24-2

2' x 4' Stratus Recessed Indirect / 2-Lamp T5, T5HO, T8

PHOTOMETRIC DATA

Test **ITL65806** Test Date **8/24/10**

LUMINAIRE DATA

Luminaire	**STE24-232G-MPO-EU** **Stratus, Recessed/Architectural** **2 x 4 2-lamp with perforated metal basket and opal overlay**
Ballast	**B232IUNHP-B**
Ballast Factor	**0.88**
Lamp	**F28T8**
Lumens per Lamp	**2750**
Watts	**49**
Shielding Angle	**0° = 0 90° = 0**
Spacing Criterion	**0° = 1.23 90° = 1.30**
Luminous Opening in Feet	**Length: 3.93** **Width: 1.88** **Height: 0.00**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	1211	22.0	26.6
0-40	1990	36.2	43.8
0-60	3561	64.7	78.4
0-90	4543	82.6	100.0
0-180	4543	82.6	100.0

ENERGY DATA

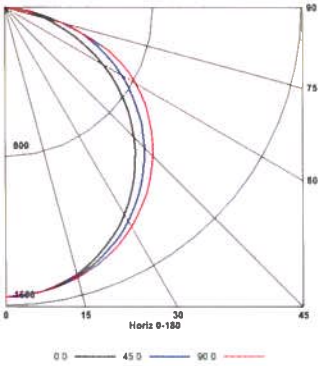
Total Luminaire Efficiency	**82.6%**
Luminaire Efficacy Rating (LER)	**82**
IESNA RP-1-1993 Compliance	**Noncompliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$2.93 based on 3000 hrs. and $0.08 per KWH**

COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
RCR 1	90	86	82	79	88	84	81	78	80	78	75	69
2	81	75	69	64	79	73	68	63	70	66	62	57
3	74	65	59	53	72	64	58	53	62	56	52	48
4	68	58	50	45	66	57	50	45	55	49	44	41
5	62	52	44	38	61	51	44	38	49	43	38	35
6	57	46	39	33	56	46	38	33	44	38	33	31
7	53	42	35	30	52	41	34	29	40	34	29	27
8	50	38	31	26	48	38	31	26	37	30	26	24
9	46	35	28	24	45	35	28	24	34	28	23	22
10	43	32	26	21	42	32	26	21	31	25	21	20

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

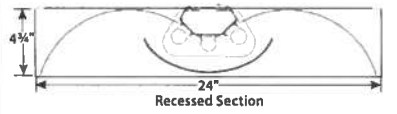
INDOOR CANDELA PLOT



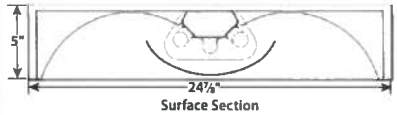
AVG. LUMINANCE (Candela/Sq. M.)

Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	2265	2265	2265	2265	2265
30	2160	2177	2229	2274	2288
40	2071	2124	2200	2284	2307
45	2027	2081	2190	2289	2324
50	1970	2038	2178	2296	2337
55	1887	1984	2144	2296	2360
60	1786	1906	2115	2305	2372
65	1641	1834	2079	2317	2348
70	1448	1729	2028	2198	2134
75	1306	1610	1846	1790	1807
80	1057	1393	1376	1485	1493
85	752	886	1036	1137	1103

DIMENSIONAL DATA



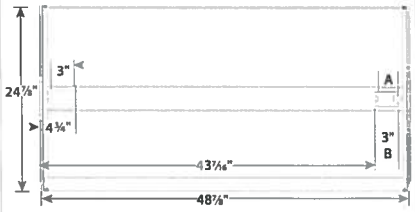
Recessed Section



Surface Section

Top View

Surface K.O. Dimensions
A: ⅞ K.O. Mount
B: 2" × 3" Access (Cover Removed)
C: 2" × 3" Rectangular Knockout



CEILING COMPATIBILITY

Type G Side

Type G Ceiling Mounting

For lay-in installation in exposed grid ceilings. Maximum tee widths of 1" and maximum heights of 1½" allowed.

Type SG Ceiling

Type SG Ceiling Mounting

For 9/16" slot grid type ceilings. Luminaire will be regressed ¾" horizontal surface of the tee. Slot grid tees must be field installed all around the fixture.

FK Flange Kit

For hard ceiling applications, fixtures must be ordered with a flange kit that wires directly into the concealed ceiling opening for a clean finished appearance. For row configurations contact your local Columbia Representative.

Flange kit cut out dimension for single FK22 only: 24⅛" × 48⅛"

NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
STE24-232G-MPO-EPUQHEPSN-FO835SYL-GLR-FK24
Notes:

Type:
B10
LSC14-37947

RECESSED ACCESSORIES

Flange Kit and Plaster Frame Information

TECHNICAL

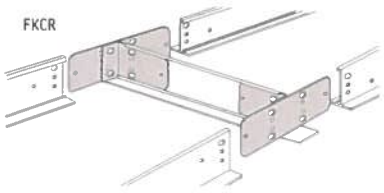
FLANGE KITS

Flange kits are extruded aluminum frames that act as individual fixture T-Bar frames to support the weight of any G (grid) trim recessed fixture in drywall or plaster ceilings. Kits snap together without the use of tools (18 gauge galvanized corner clips provided) and are hung by tie wire (by others) from the ceiling support structure.

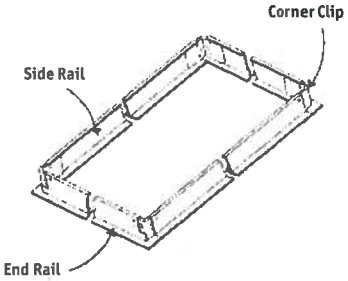
From the room side flange kits mimic the appearance of T-Bars in a baked white enamel finish. Consult chart for ceiling cut out dimension.

For continuous row applications order flange kits plus one FKCR, continuous row flange connector kit, for each joint between fixtures. (One less than the number of fixtures in the row.)

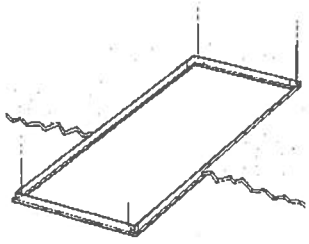
FLANGE KIT		CEILING OPENING	
Catalog No.	Size	Width	Length
FK14	1' × 4'	12⅜"	48⅜"
FK22	2' × 2'	24⅜"	24⅜"
FK24	2' × 4'	24⅜"	48⅜"
FK44	4' × 4'	48⅜"	48⅜"
FK81	8" × 1'	8⅜"	12⅜"
FK82	8" × 2'	8⅜"	24⅜"
FK84	8" × 4'	8⅜"	48⅜"



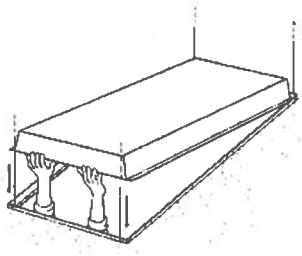
FLANGE KIT INSTALLATION INSTRUCTIONS



1. Cut ceiling opening to proper dimensions. Slip fit corner clips into side and end rails. No tools are required.



2. Place Flange Kit in ceiling opening and wire each corner to ceiling structure. Pull up tight against ceiling.



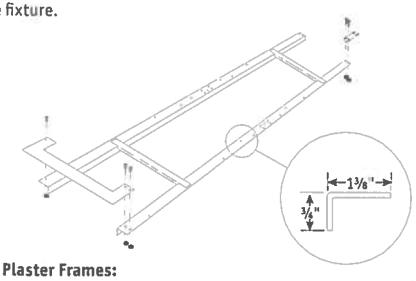
3. Place grid trim trofferin Flange Kit.

PLASTER FRAMES

Plaster frames are galvanized steel rails used to trim ceiling openings primarily in wet plaster applications. They are installed during ceiling construction and help maintain the correct opening dimensions for installation of flange ST8 trimmed recessed fixtures. See fixture specification sheet for dimensions required for framing to support the weight of the fixture.

Use plaster inside dimensions for framing opening in dry ceilings.
Framing (by others) required to support the weight of the fixture.

Catalog No.	Description	Nominal Size	Inside Dimension
PL14	Individual	1' × 4'	12" × 48⅞"
PL14R	For Rows	1' × 4'	-
PL22	Individual	2' × 2'	24" × 24⅞"
PL24	Individual	2' × 4'	24" × 48⅞"
PL24R	For Rows	2' × 4'	-
PL44	Individual	4' × 4'	48" × 48⅞"



Plaster Frames:

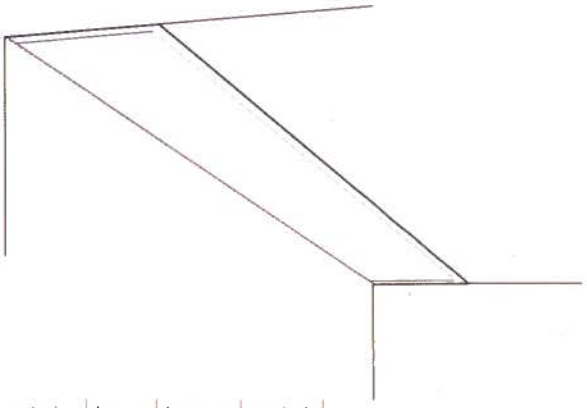
- For mounting any Columbia Lighting flanged troffer in a plaster ceiling
- Provides a clean, finished appearance

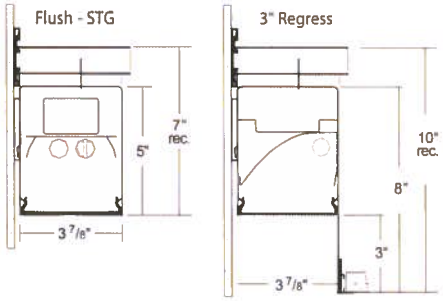
Columbia LIGHTING

Date Submitted: Aug. 26, 2015
Distributor: C.E.D. Columbus, Oh 43207

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor: Vaughn Industries OSU NRDT BUILDING Submitted By LIGHTING UNLIMITED INC	Job Name: OSU NRDT Building I Catalog Number P43-PSTD-FLSH-2T8-04'-BLW-TMW-D1G-SC-WTW-120-X1 Notes	Type B24

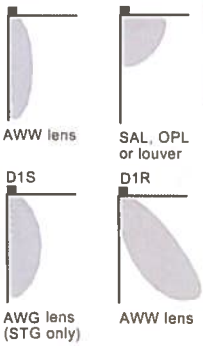
P43 Perimeter Cove & Perimeter





series/ style	lens position	Lamp Rows	nominal length	shielding	trim color	distribution	circuit-ing	mount-ing	voltage	ceiling system	options
P43-PSTD	FLSH	1T8	04'	BLW	TMW	D1G	SC	WTW	120	X1	
PSTD standard PSTG staggered (N/A D1R) (1 lamp only)	**FLSH** flush lens REG3 3" regress lens	1T8 **2T8** (N/A PSTG) 1T5/HO 2T5/HO (N/A PSTG)	02" 03" **04"** 06" 08" R__" "row length LED or staggered recommended beyond 8' to avoid socket shadow	AWW acrylic wall wash lens (use D1G or D1R dist) AWG acrylic wall graze lens (use D1S STG only) SAL satin acrylic lens OPL opal frost acrylic lens PRA prismatic acrylic lens SPL silver parabolic louver BLA bladed louver-anodized **BLW** bladed louver - white	**TMW"** textured matte white YGW gloss white Y_ premium Color CC custom color standard	D1 direct **D1G"** asymmetric 5' wall grazer D1S asymmetric with grazer (STG only) D1R" asymmetric to room (15') (N/A REG3) (N/A STG) 1 lamp only, must use AWW lens	**SC** single circuit DC dual circuit (2 lamp)	**WTW** wall to wall LP light pocket	**120** 277 347 UNV 120-277	**X1** exposed T-Bar X3B hard ceiling (overlapping flange) X6 slot grid X7 hard ceiling (concealed flange)	EML" emergency battery (600-700 lumens) EMH" emergency battery (1100-1400 lumens) DM dimming, specify manufacturer, voltage, and other requirements RSE rapid-start electronic 10THD ballast w/ < 10% total harmonic distortion B_ specify ballast, manufacturer & catalog # FH fixture fusing (slow blow) C2 90° 2-way corner w/ acrylic lens, lit corners on STG & DIG/D1R only QC quick-connect circuit assemblies "consult factory

Distribution (optics)



Features A narrow 4" wide recessed perimeter lighting system in either a standard or a staggered lamp configuration for single T8 or T5/HO lamp rows to provide continuous lighting without socket shadows along the entire row length. Standard lamping for 2T5 or T5HO lamp rows have offset lamps within modular rows to mitigate socket shadows. T8 lamps in standard configuration are end to end in modular rows and are not offset.

Construction The housing, available in 2-, 3-, 4-, 6- or 8-foot standard lengths, is made of die-formed 20-gauge steel. Louver material is semispecular, low iridescent aluminum. Snap-in prismatic lens is clear extruded acrylic. Snap-in satin acrylic lens is clear frost extruded acrylic with a matte finish for soft, even light transmission. AWW lens is designed with micro prisms for optical performance and **MUST** be used for D1G wall graze.
NOTE: All D1G/D1R & PSTG include gear trays.

Finish The standard housing and trim color is textured matte white (TMW) using polyester powder paint.

Electrical T8 fixtures have instant-start electronic ballasts with less than 20% THD. T5 and T5HO fixtures have programmed start electronic ballast with less than 10% THD. Fixtures are U.L. Damp labeled (non-emergency) and I.B.E.W. manufactured. Maximum ballast size available on non-staggered models: 2 3/8" width x 1 1/4" height. Maximum ballast size available on staggered models: 1 3/4" width x 1 1/4" height.

Mounting Fixture is to be recessed-mounted into exposed T-bar or hard ceiling applications.

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor Vaughn Industries OSO NRDT BUILDING Job Name OSO NRDT Building I Submitted By LIGHTING UNLIMITED INC	Catalog Number P43-PSTD-FLSH-2T5-04'-BLW-TMW-D1G-SC-WTW-120-X1 Notes	Type B24

Cove & Perimeter

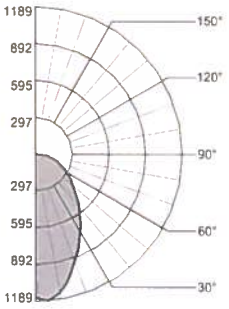
P43 Perimeter

photometric data

P43-PSTD-REG3-1T5HO-AWW-D1G

Report #LL16810714R01 D=100% I=0.0%
Spacing Criteria Along 1.00 Across 1.16

Delivered Lumens: 2011
Input Watts: 32.55
Efficiency: 77.30%



Candlepower Summary

Vertical Angle	Horizontal Angle 0°	22.5°	45°	67.5°	90°
0	1159	1159	1159	1159	1159
5	1189	1184	1181	1173	1150
10	1136	1139	1155	1159	1127
15	1038	1050	1089	1122	1090
20	928	942	995	1060	1037
25	826	839	890	978	970
30	729	740	784	879	888
35	635	646	682	770	793
40	546	557	587	659	687
45	466	474	499	552	576
50	395	401	418	454	466
55	341	345	354	377	376
60	287	289	290	300	288
65	240	240	234	230	201
70	197	195	186	170	147
75	154	152	141	120	95
80	113	110	99	79	54
85	73	69	59	46	24
90	35	33	28	15	9

Coefficients of Utilization (%)

Floor	effective floor cavity reflectance = 20									
Ceiling	80				70				50	
Wall	70	50	30	10	70	50	30	10	50	30 10
0	92	92	92	92	89	89	89	89	85	85 85
1	85	81	78	76	82	79	77	74	76	74 72
2	78	72	67	63	76	71	66	62	68	64 61
3	72	64	59	54	70	63	58	53	61	56 52
4	66	58	52	47	64	57	51	47	55	50 46
5	61	52	46	41	60	51	45	41	50	44 40
6	57	48	41	37	56	47	41	37	45	40 36
7	53	44	37	33	52	43	37	33	42	36 33
8	50	40	34	30	49	40	34	30	39	33 30
9	47	37	31	27	46	37	31	27	36	31 27
10	44	35	29	25	43	34	29	25	33	28 25

Zonal Lumen Summary

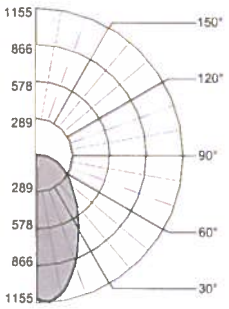
Zone%	%Lamp	% Luminaire
0-90	76.00	98.20
90-180	1.40	1.80

photometric data

P43-PSTG-REG3-1T5-04'-AWG-D1S

Report #LL81404201 D=97.30% I=2.70%
Spacing Criteria Along 1.2 Across 90

Delivered Lumens: 1745
Input Watts: 34.42
Efficiency: 51%



Candlepower Summary

Vertical Angle	Horizontal Angle 0°	25°	45°	65°	90°
0	1131	1131	1131	1131	1131
5	1144	1144	1146	1148	1120
10	1042	1066	1107	1132	1102
15	887	930	1008	1091	1080
20	726	770	870	1010	1035
25	640	656	731	908	984
30	590	593	627	794	912
35	535	543	555	669	821
40	481	486	492	562	705
45	424	428	431	472	578
50	976	376	375	398	452
55	333	331	322	328	341
60	302	295	282	273	257
65	271	260	239	216	178
70	238	229	202	171	116
75	210	197	168	131	71
80	178	166	136	96	37
85	142	132	105	67	13
90	98	90	71	42	0

Coefficients of Utilization (%)

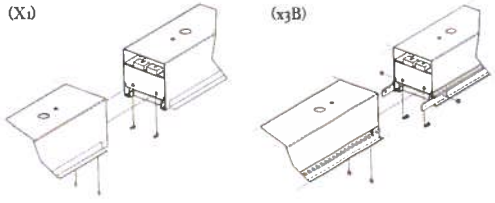
Floor	effective floor cavity reflectance = 20									
Ceiling	80				70				50	
Wall	70	50	30	10	70	50	30	10	50	30 10
0	118	118	118	118	115	115	115	115	110	110 110
1	109	104	100	97	106	102	98	95	97	94 91
2	100	93	86	81	97	90	85	80	86	82 78
3	92	83	75	69	90	81	74	69	78	72 67
4	85	75	67	60	83	73	66	60	70	64 59
5	79	68	59	53	77	66	59	53	64	57 52
6	74	62	54	48	72	61	53	47	59	52 47
7	69	57	49	43	67	56	48	42	54	47 42
8	65	52	45	39	63	52	44	39	50	43 39
9	61	49	41	36	60	48	41	35	47	40 35
10	58	45	38	33	56	45	38	33	44	37 33

Zonal Lumen Summary

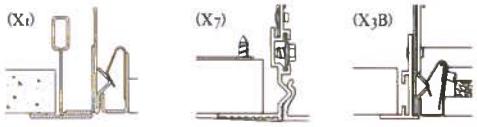
Zone%	Lumens	% Luminaire
0-90	1697.28	97.30
90-180	47.89	2.70

installation

Adjoining Detail

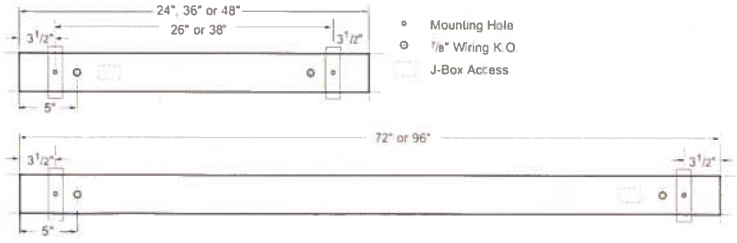


Ceiling Systems



Framing Dimensions X3B & X7
Add 1/2" in fixture **width**, Add 3/8" in fixture **length**.

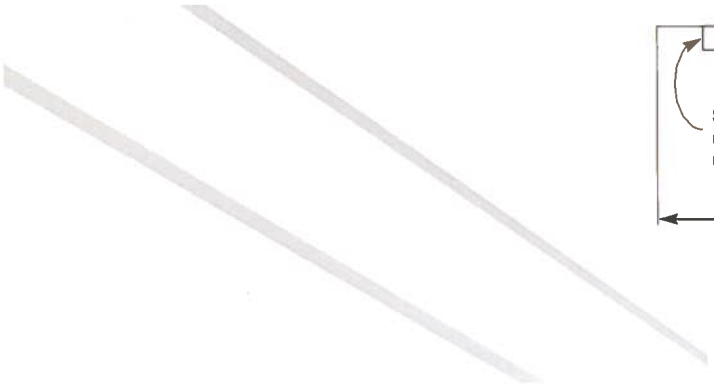
Mounting Locations

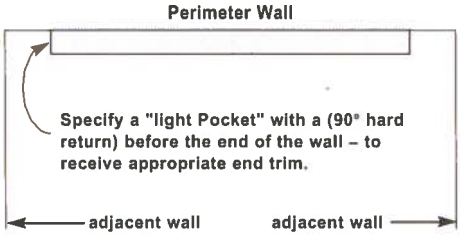


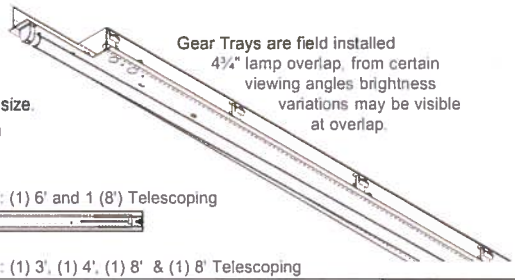
LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor: Vaughn Industries OSU NRDT BUILDING Job Name: OSU NRDT Building I Submitted By LIGHTING UNLIMITED INC	Catalog Number P43-PSTD-FLSH-2T8-04'-BLW-TMW-D1G-SC-WTW-120-X1 Notes	Type B24

P43 Perimeter Cove & Perimeter

Frosted







1 lamp Staggered System (STG)

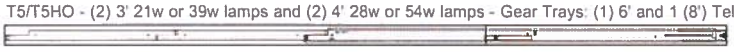
Typical Row Examples - Lamp quantities and wattages are dependant on row size.

T5/T5HO - (3) 3' 21w or 39w lamps - Gear Trays: (1) 3' and 1 (6') Telescoping

8'

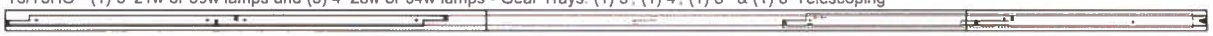
T5/T5HO - (2) 3' 21w or 39w lamps and (2) 4' 28w or 54w lamps - Gear Trays: (1) 6' and 1 (8') Telescoping

12'



T5/T5HO - (1) 3' 21w or 39w lamps and (5) 4' 28w or 54w lamps - Gear Trays: (1) 3', (1) 4', (1) 8' & (1) 8' Telescoping

20'

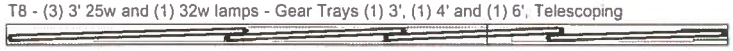


T8 - (3) 3' 25w lamp - Gear Tray: (1) 8' indiviual

8'

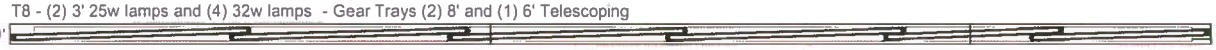
T8 - (3) 3' 25w and (1) 32w lamps - Gear Trays (1) 3', (1) 4' and (1) 6', Telescoping

12'



T8 - (2) 3' 25w lamps and (4) 32w lamps - Gear Trays (2) 8' and (1) 6' Telescoping

20'

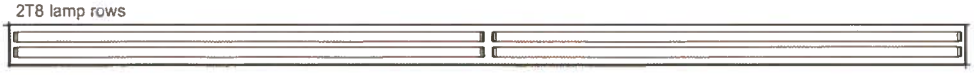


Standard System

Typical Row Examples

2T8 lamp rows

8'



2T5 or 2T5HO lamp rows

8'

2T5 or 2T5HO lamp rows

4'

Factory supplied submittal drawing will be provided. Lamps are not supplied.

Prudential reserves the right to change design specifications or materials without notice.

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
TMC-320-FL-1-T5 28W-SQHFR SURFACE MOUNT -4' BL-120
Notes:

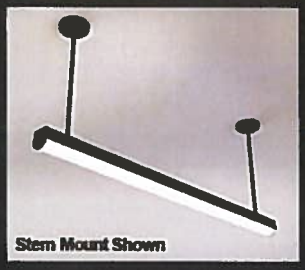
Type:
B25
LSC14-37947

COMMERCIAL


Suface Mount Shown


Suface Mount Shown


Aircraft Cable Mount Shown


Stem Mount Shown

Model
Timo Mini

- Lo-Profile Linear Fluorescent
- T5/T8 Lamping
- Shure Seal Powder Coat Finish - For long lasting finish
- Optional Integral battery back up
- Wet Location Rated
- Optional Vandal Proof

Applications:
- Offices • Corridors • Stairwells • Retail • Garage

Shure Seal Finish

Project
Notes

Configure product using standard options.
For other custom options contact Voigt.
Example: SQOP, 1-T8-17,DWM, 4',WH,120,PHC

fixture Series	lamp	lens	suspension	length	finish	voltage	options
TMC-320-FL-1T5-28W-4'-SQHFR (Surface Mount) - 4' 1 BL -120							PHC
TMC-320-FL	1-T8-17w 1-T8-25w 1-T828w 1-T832w 1-T8-28w 1-54T5HO Note: Fixture is single lamp cross section	SQHFR-High performance frost lens	surface mount P-Wall-Wall mount with arm-std extension 1". SRM-Semi Recess Mount SC- Swivel Canopy W/Stem (Specify Length) RC- Rigid Canopy W/Stem (Specify Length) AC- Air-Craft Cable (Specify Length) For other contact Voigt	4' Specify length of fixture: 4' 8' Other	WH-White BL-Black DB-Dark Bronze SIL-silver Custom available check with factory	120 277	PHC-Photo Sensor OCC-Occupancy Sensor F-Fuse VP-Vandal Proof

Date Submitted: Aug 26, 2015

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** TMC-320-FL-1-T5 28W-SQHFR SURFACE MOUNT -4' BL-120 Notes:	**Type:** **B25** LSC14-37947

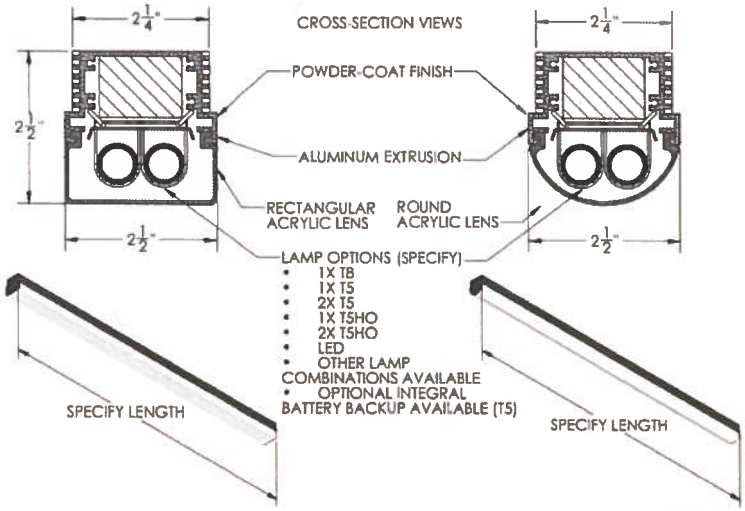
TIMO MINI

Timo Mini

- **Lo-Profile Linear Fluorescent**
- **T5/T8 Lamping Exclusive**
- **Shure Seal Powder Coat Finish - For long lasting finish**
- **Optional Integral battery back up**
- **Wet Location Rated**

Applications:
- **Offices • Corridors • Stairwells • Retail • Garage**

Shure Seal Finish



Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor Vaughn Industries OSU NRDT BUILDING Job Name OSU NRDT Building	Catalog Number DMW 2 32 MVOLT GEB10PS	Type C2
	Submitted By LIGHTING UNLIMITED INC	Notes	

LITHONIA LIGHTING®

FEATURES & SPECIFICATIONS

INTENDED USE — Intended for low to medium mounting heights where dust, dirt, humidity or moisture are present. Ideal for canopies, dock areas, wastewater treatment, refrigerated areas, food processing and other non-hazardous environments. Certain airborne contaminants can diminish integrity of acrylic. **Click here for Acrylic Environmental Compatibility table for suitable uses.**

CONSTRUCTION — Housing formed from impact resistant, UV stabilized, fiberglass reinforced polyester with cold-rolled steel enclosed wireway. Poured in place gasketing provides a seal between housing and diffuser. Captive, corrosion-resistant cam-action latches secure the diffuser; six on 4' units, and ten on 8' units. Stainless steel latches available.

Finish: Painted parts pretreated with a five-stage iron-phosphate process to ensure superior paint adhesion and corrosion resistance, then finished with a high-gloss, baked white enamel.

OPTICS — High-impact acrylic diffuser with a stippled interior surface to spread lamp image.

PLEASE NOTE: The standard 4' diffuser is 2-1/4" deep, and the standard 8' or 48T8HO diffuser is 3" deep. To order the 4' diffuser so that it matches the depth of the 8' diffuser, order the ARDP option. The 8' diffuser is not available in the 2-1/4" depth.

ELECTRICAL — Thermally protected, resetting, Class P, HPF, non-PCB, UL Listed and CSA Certified ballast is standard.

AWM, TFN, THHN wire throughout, rated for required temperatures.

INSTALLATION — For unit or row installations, surface (ceiling or wall) or suspended mounting. Wall mounting; horizontal orientation only for use in damp locations. Stainless steel surface spring-mounting brackets standard (2 included).

LISTINGS — 120V, 277V and MVOLT are UL Listed and CSA Certified (standard). 347V is CSA Certified (see Options). NOM Certified (see Options). Listed for 25°C ambient and wet locations for covered-ceiling applications. IP65 rated. Optional IP67 rating available (supplied with 8 latches on 4' units and 14 latches for 8' units, covered ceiling not required). Compliance to FDA/USDA requirements and/or NSF splash-zone certification.

WARRANTY — 1-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Actual performance may differ as a result of end-user environment and application.

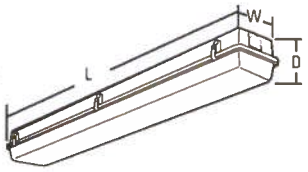
Note: Specifications subject to change without notice.

Enclosed and Gasketed Industrial

DMW

INSTANT, PROGRAMMED OR RAPID START

4' or 8' length
1, 2 or 3 lamps



Specifications	
Length:	50 (127.0) 98 (248.9)
Width:	8-1/8 (20.6)
Fixture depth:	5-5/8 (14.3) (deep lens) 4-3/4 (12.1) (standard lens)

All dimensions are shown in inches (centimeters) unless otherwise noted.

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: DMW 2 32 MVOLT GEB10IS

DMW	2	32		MVOLT	GEB10PS	
Series	**Number of lamps**	**Lamp type**	**Diffuser**	**Voltage**	**Ballast**	**Options**
DMW Wet location For tandem double-length unit, add prefix T. Example: TDMW[1]	1 2 3[2]	28T5 28W T5 (48")[3] 32 32W T8 (48") 48T8HO 44W T8HO (48") 54T5HO 54W T5HO (48")[4] 96T8 59W T8 slimline (96") 96T8HO 86W T8 380mA (96")	(blank) 2-1/4" Deep high-impact acrylic (50% DR) ARDP 3" Deep high-impact acrylic (50% DR)[5]	120 277 347 MVOLT others available	GEB10IS Electronic ballast, ≤10% THD, instant start GEB10RS Electronic ballast, ≤10% THD, rapid start[6] GEB10PS Electronic ballasts, ≤10% THD, programmed rapid start GEB10PS90 T5HO 90° case temperature ballast	ELDW Emergency battery pack (nominal 300 lumens)[7] EL5DW Emergency battery pack (nominal 500 lumens)[7] EL6DW Emergency battery pack (nominal 600 lumens)[7] EL14DW Emergency battery pack (nominal 1400 lumens)[7] GLR Internal fast-blow fusing[8] GMF Internal slow-blow fusing[8] RIF1 Radio interference filter, one per fixture STSL Stainless steel latches WLF Wet location fittings (one pair; installed, top, for use with 1/2" rigid conduit) IP67 IP67 rated, requires 8 latches for 4' fixtures and 14 latches for 8' fixtures CSA CSA certified (only required for 347V) NOM NOM certified CS89 6' white cord, 16/3, no plug, wet location CS88 6' Brad Harrison 16/3 cord and straight blade plug set wet location[8] MSI_ Wet location occupancy sensor pre-wired[8,9] DL Damp location[10]

Accessories: *Order as separate catalog number.*

BCD	Bracket for hanger chain mounting. Two per package[11]
HC36	Chain hangers (1 pair, 36" long); Requires BCD
WLF	Wet location fittings (1 pair, not installed, for use with 1/2" rigid conduit)
DMW/VRISMB	Surface mounting brackets (pair)[12]

Notes

1. Not available with 96T8 or 96T8HO.
2. 32W T8 and 28 T5 lamps only.
3. Must specify GEB10PS ballast.
4. Must specify GEB10PS90 ballast.
5. ARDP standard on 48T8HO and 8' fixtures.
6. Available 347V T8 only.
7. Must specify voltage: 120 or 277V only.
8. Must specify voltage. Not available with MVOLT.
9. For mounting up to 8' specify MSI8; for mounting up to 20' specify MSI20.
10. DL option required for batty packs, sensors, and cord sets that are not wet location listed.
11. For stainless steel, specify STS (ex: BCD STS).
12. Brackets ship standard with fixture. For replacement purposes only.

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

LIGHTING UNLIMITED	Project 14-16183-14 Date 10/29/2014 Contractor Vaughn Industries OSU NRDT BUILDING	Job Name OSU NRDT Building	Catalog Number DMW 2 32 MVOLT GEB10PS	Type C2
	Submitted By LIGHTING UNLIMITED INC		Notes	

DMW Instant, Programmed or Rapid Start

MOUNTING DATA

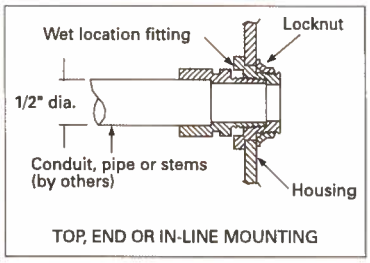
For unit or row installation, surface (ceiling or wall) or suspended mounting.

DMW — Drill holes through housing and channel at appropriate locations. Includes gasketed wet location fittings on ends for power feeding/mounting. Fitting is threaded for 1/2" rigid conduit (optional WLF for top mounting). Attach to surface using fasteners and sealing washers (by others) appropriate for ceiling materials.

Unit installation — Minimum of two hangers required.

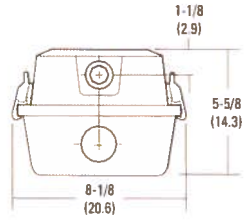
Row installation — Minimum of two hangers required. Recommended 1/2" nipple with union (by others) for DMW.

MOUNTING ACCESSORIES



DIMENSIONS

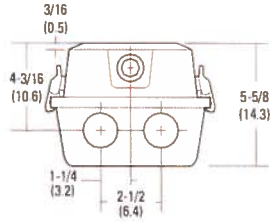
Inches (centimeters). Subject to change without notice.

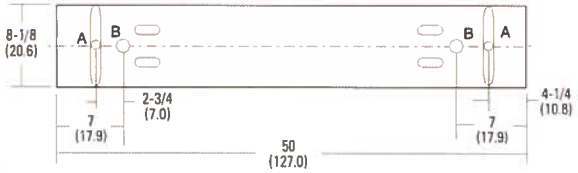


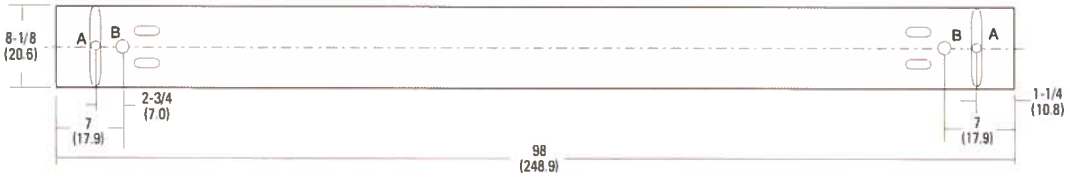
A = 11/16 (17) Dia.

B = 1-1/8 (29) Dia.

Recommended mounting locations (field drilling required)







PHOTOMETRICS

See www.lithonia.com.

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
KL4-232-U-EPUQHEPSN-KHC

Notes:

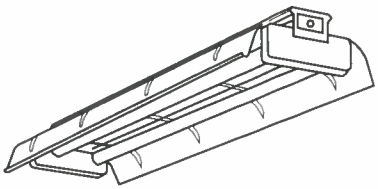
Type:
C8

LSC14-37947

Columbia LIGHTING

KL BI-PIN

Premium Industrial / 2, 3, or 4-Lamp T5, T5HO, T8



PROJECT INFORMATION

Project Name

Type

Catalog No.

Date

EATURES

- Available in 4' and 8' lengths
- Reflectors have 15% uplight
- Spring loaded turret lampholders
- 6' lamp spacing
- For individual or continuous row mounting
- Channel ends double as joiners
- Full depth end closures available
- T5/T5HO versions feature rotating locking sockets without turrets

CONSTRUCTION
Heavy steel housing with longitudinal reinforcing ribs for extra strength. Reflector die-embossed with transverse ribs for maximum rigidity. Solid top or 15% uplight versions with extruded openings available.

FINISH
White painted parts are treated with a five stage phosphate bonding process and finished with a high reflectance baked enamel.

ELECTRICAL
Standard class "P", thermally protected, auto-resetting HPF ballast, sound rated A. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Damp location labeling is standard. Emergency-equipped fixtures labeled UL 924.

ORDERING INFORMATION

EXAMPLE **KL4-232-U-EU-GLR-PAF**

KL – – – – –

MODEL
- KL Premium Industrial

SIZE
- 4 4'
- 8 8'

NO. OF LAMPS IN CROSS SECTION
- 2 Two
- 3 Three
- 4 Four

LAMP TYPE
- 28 4', T5: 28 Watt
- 32 4', T8: 32, 30, 28 or 25 Watt
- 54 4', T5HO: 54 or 51 Watt

REFLECTOR TYPE
- U Apertured Reflector for Uplight (Standard)
- ST Solid Top (No Uplight)
- SLR Specular Reflector with Uplight
- SLRST Specular Reflector Solid Top

VOLTAGE
- U 120V-277V
- 347 347V

OPTIONS
- GLR Fast Blow Fuse
- GMF Slow Blow Fuse
- EL Emergency Battery Pack
- BC Branch Circuit Plug-on Wiring System (See options section for details.)
- PAF Paint After Fabrication
- NYC NYC Compliant
- NYCU NYC Compliant, Union Label

BALLAST
- E Electronic T8, Instant Start
- 4E 4-Lamp Electronic T8, Instant Start
- EP Electronic T8, Program Start
- 4EP 4-Lamp Electronic T8, Program Start

For others available, see Ballast Options

EPUQHEPSN- Sylvania Programmed Start Ballast

ACCESSORIES (ORDER SEPARATELY)
- KZT Zip Tee Hanger - 1½" spacer on T-bar ceiling
- KTH Slide Clamp Tong Hanger
- S18 18" Stem, canopy and 8° aligner
- SS18 18", 45° Swivel Stem & Canopy
- KHC 24" Chain Hanging Assembly
- KLEC Full Depth End Closure
- KLWG4 Wire Guard 4' lg. - 2 required per 8' fixture
- KLEGG White Straight Blade Egg Crate Louver 4' - 2 required per 8' fixture

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: KL4-232-U-EPUQHEPSN-GLR KHC
Notes:

Type: C8

LSC14-37947

Columbia LIGHTING

KL BI-PIN

Premium Industrial / 2, 3, or 4-Lamp T5, T5HO, T8

PHOTOMETRIC DATA

LUMINAIRE DATA

Luminaire	**KL4-232-OCT-PAF** **KL Industrial** **1' x 4' 2-Lamp Industrial with Apertured White Reflector**
Ballast	**R2P32**
Ballast Factor	**0.95**
Lamp	**FO32/41K**
Lumens per Lamp	**2900**
Watts	**74**
Shielding Angle	**N/A**
Spacing Criterion	**0° = 1.27 90° = 1.30**
Luminous Opening in Feet	**Length: 4.00** **Width: 1.02** **Height: 0.00**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	1090	18.8	20.9
0-40	1807	31.1	34.7
0-60	3314	57.1	63.6
0-90	4396	75.8	84.3
90-120	179	3.1	3.4
90-130	263	4.5	5.0
90-150	518	8.9	9.9
90-180	817	14.1	15.7
0-180	5212	89.9	100.0

Test **10183** Test Date **1/8/03**

ENERGY DATA

Total Luminaire Efficiency	**89.9%**
Luminaire Efficacy Rating (LER)	**67**
IESNA RP-1-1993 Compliance	**Non-Compliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$3.58 based on 3000 hrs. and $0.08 per KWH**

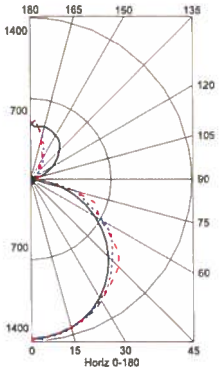
COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
1	94	90	86	82	90	86	83	79	80	77	74	62
2	85	78	71	66	81	75	69	64	69	64	61	51
3	77	68	60	54	74	65	58	53	60	55	50	42
4	71	60	52	46	67	58	50	45	53	47	42	36
5	65	53	45	39	62	51	44	38	48	41	36	31
6	60	48	39	34	57	46	38	33	43	36	32	27
7	55	43	35	30	53	42	34	29	39	32	28	24
8	51	39	31	26	49	38	31	26	35	29	25	21
9	48	36	28	23	46	35	28	23	33	26	22	19
10	45	33	26	21	43	32	25	21	30	24	20	17

RCR

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

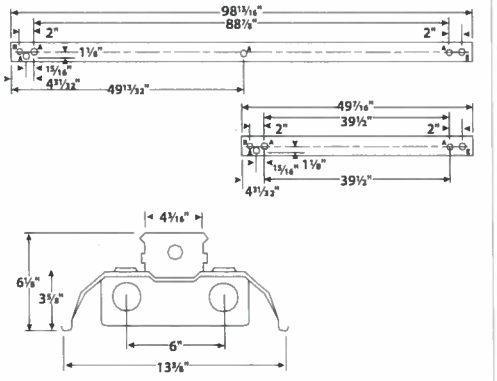
INDOOR CANDELA PLOT



AVG. LUMINANCE (Candela/Sq. M.)

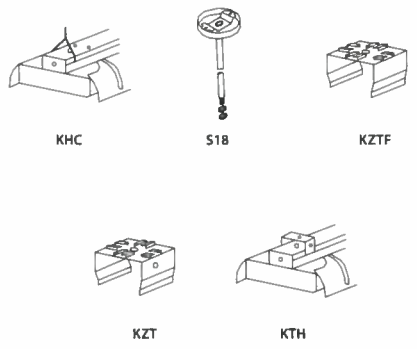
Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	3654	3654	3654	3654	3654
30	3616	3622	3671	3726	3717
40	3578	3595	3706	3788	3833
45	3544	3582	3712	3921	4000
50	3509	3579	3776	4104	4059
55	3459	3569	3923	3905	3827
60	3387	3493	3894	3704	3667
65	3296	3477	3652	3839	3964
70	3155	3595	3718	4327	4536
75	2956	3374	4210	4353	3955
80	2674	3464	3342	2370	2355
85	2149	2967	2876	2785	2815

DIMENSIONAL DATA



A: 7/8" Diameter knockout
B: .570" x .656" Strain Relief knockout
E: 1 1/8" Diameter knockout

MOUNTING ACCESSORIES



NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** CAD124-T817NUNV-B01X7 Notes:	**Type:** D2 LSC14-37947

VISIONEERING

CAD
Cadillac

Premium-Grade Surface-Mounted Cube Light With Opal Lens Retained By Spring Loaded Ends

Project	
Type	
Date	
Cat #	

Application Features

Premium-grade, surface-mounted ceiling/wall luminaire. For use with indoor applications where low-glare illumination is required. End caps are spring loaded for a clean look and allow for easy access to fixture for servicing or relamping.

Specifications

Optical System
Standard diffuser is soft matt white opal acrylic designed for even and low-glare illumination.

Mounting
Mounting holes are provided. Mounts over electrical junction box.

Construction
Die and brake-formed, heavy-gauge steel housing assembly. Spot-welded for rigidity and clean appearance. End-caps are spring loaded.

Finish
White, polyester powder painted housing. High-reflective coated surface for improved efficiency.

Electrical
Rotary lampholders ensure positive lamp retention. Sufficient knockouts are provided for connections and through wiring.

Approvals
Approved to CSA and UL standards.

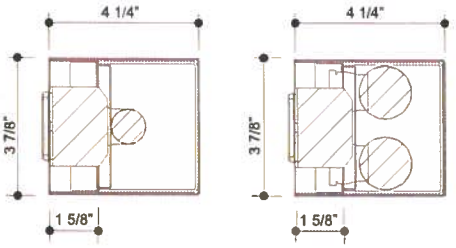
Features
- Heavy-duty construction
- Available with 1 or 2 lamps (T5 and T8 configurations)
- Easy re-lamping and re-ballasting
- Row-mountable (requires a joiner bracket)
- Soft matt white opal acrylic wrap-around diffuser

Options & Adders
- Multi-level switching
- Dimmable and Emergency ballast
- Radio interference filter (120V - 277V)
- Prismatic acrylic overlay
- Convenience outlet
- Pull chain switch

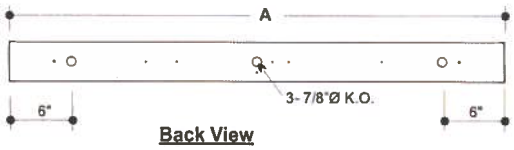
Applications
- Corridors
- Utility Areas
- Vanities

ARCHITECTURAL LIGHTING

Dimensions



1 LAMP **Cross Section** 2 LAMP



Back View

MODEL			
1 LAMP	*2 LAMP*	*NOMINAL LENGTH*	*Length A (in.)*
115	215	15"	15 1/16"
118	218	18"	18 1/16"
124	224	24"	24 1/16"
136	236	36"	36 1/16"
148	248	48"	48 1/16"

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name: OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number: CAD124-T817NUNV-B01X7
Notes:

Type: D2
LSC14-37947

Project	
Type	
Date	
Cat #	

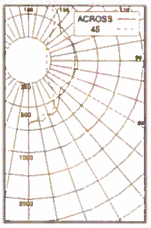
CAD
Cadillac

Premium-Grade Surface-Mounted Cube Light With Opal Lens Retained By Spring Loaded Ends

VISIONEERING

Photometrics - CAD248T832N120 - Efficiency 75.3%

Candle Distribution



Luminance Summary-CD. / SQ. M.

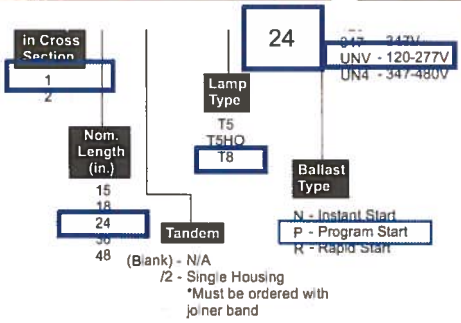
ANGLE	ALONG	45	ACROSS
45	4861	5676	7099
55	3145	5033	8420
65	2225	5906	12423
75	2074	9783	21195
85	1715	28657	64856

Candle Power Summary

ZONE	LUMENS	% LAMP	% LUMINAIRE
0 - 30	506.80	8.60	11.40
0 - 40	827.80	14.00	18.60
0 - 60	1388.80	23.50	31.30
0 - 90	2210.50	37.50	49.80
40 - 90	-	-	-
60 - 90	821.7	13.90	18.50
90 - 180	2232.60	37.80	50.30
0 - 180	4443.10	75.30	100.00

Ordering

ARCHITECTURAL LIGHTING



Example:
CAD248-T832PUNV-P12

Lamp Watts

Length	Nominal Lamp Watts T5	T5HO	T8
15	-	-	14
18			15
24	14	24	17
30	21	39	25
48	28	54	32

Other options may be available consult factory.
Specifications and data subject to change without notice.

- ☐ B01 Ballast Disconnect - In-line Power Disconnect (CSA-UL Rapid Fuse Voltages above 450v)
- ☐ B02 Dimming Addressable Digital (dali)
- ☐ B03 Dimming Low Voltage (0-10v)
- ☐ B04 Dimming Line Voltage
- ☐ B08 Ballast - High Ballast Factor
- ☐ B09 Ballast - Low Ballast Factor
- ☐ B30 Emergency Lighting Battery Pack Specification Grade
- ☐ B33 Emergency Lighting Battery Pack 1-lamp
- ☐ B34 Emergency Lighting Battery Pack 2-lamp

Finish Options (white is standard)
- ☐ F01 Black

Packaging Options (select one only)
- ☐ K0 Pack Bulk/ Pallet Packed and/or Wrapped

Mounting Options
- ☐ M15 Mounting Joiner Band

Lens and Shielding Options
(opal white acrylic is standard)
- ☐ P12 Lens Prismatic Acrylic - P12

Switch Options (select one only)
- ☐ S1 Switch Pull-chain
- ☐ S2 Switch Pull-chain three-way
- ☐ S5 Switch Toggle
- ☐ S6 Switch Turn

Wiring Options
- ☐ V02 Convenience Outlet
- ☐ V25 Radio Frequency Filter

Approval and Rating Options
- ☐ X7 Dual CSA and USA Markets

Sylvania QHE Ballast

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** CAD136-T825NUNV-B01X7 Notes:	**Type:** D3 LSC14-37947

VISIONEERING

CAD
Cadillac

Premium-Grade Surface-Mounted Cube Light With Opal Lens Retained By Spring Loaded Ends

Project
Type
Date
Cat #

Application Features

Premium-grade, surface-mounted ceiling/wall luminaire. For use with indoor applications where low-glare illumination is required. End caps are spring loaded for a clean look and allow for easy access to fixture for servicing or relamping.

Specifications

Optical System
Standard diffuser is soft matt white opal acrylic designed for even and low-glare illumination.

Mounting
Mounting holes are provided. Mounts over electrical junction box.

Construction
Die and brake-formed, heavy-gauge steel housing assembly. Spot-welded for rigidity and clean appearance. End-caps are spring loaded.

Finish
White, polyester powder painted housing. High-reflective coated surface for improved efficiency.

Electrical
Rotary lampholders ensure positive lamp retention. Sufficient knockouts are provided for connections and through wiring.

Approvals
Approved to CSA and UL standards.

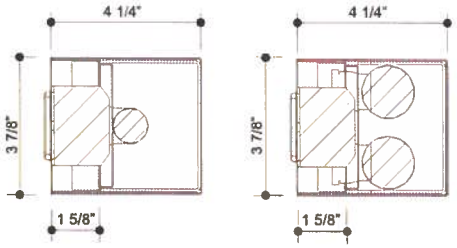
Features
- Heavy-duty construction
- Available with 1 or 2 lamps (T5 and T8 configurations)
- Easy re-lamping and re-ballasting
- Row-mountable (requires a joiner bracket)
- Soft matt white opal acrylic wrap-around diffuser

Options & Adders
- Multi-level switching
- Dimmable and Emergency ballast
- Radio interference filter (120V - 277V)
- Prismatic acrylic overlay
- Convenience outlet
- Pull chain switch

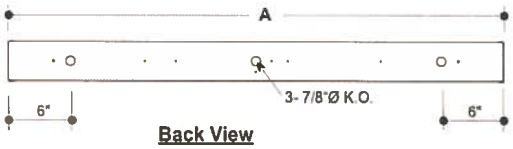
Applications
- Corridors
- Utility Areas
- Vanities

ARCHITECTURAL LIGHTING

Dimensions



1 LAMP **Cross Section** 2 LAMP



Back View

MODEL			
1 LAMP	*2 LAMP*	*NOMINAL LENGTH*	*Length A (in.)*
115	215	15"	15 1/16"
118	218	18"	18 1/16"
124	224	24"	24 1/16"
136	236	36"	36 1/16"
148	248	48"	48 1/16"

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus

Lighting Systems of Columbus, Inc.

Job Name:
OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION

Catalog Number:
CAD136-T825NUNV-B01X7
Notes:

Type:
D3
LSC14-37947

Project
Type
Date
Cat #

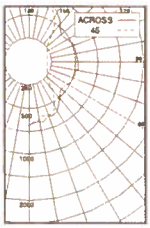
CAD
Cadillac

VISIONEERING

Premium-Grade Surface-Mounted Cube Light With Opal Lens Retained By Spring Loaded Ends

Photometrics - CAD248T832N120 - Efficiency 75.3%

Candle Distribution



Luminance Summary-CD. / SQ. M.

ANGLE	ALONG	45	ACROSS
45	4861	5676	7099
55	3145	5033	8420
65	2225	5906	12423
75	2074	9783	21195
85	1715	28657	64856

Candle Power Summary

ZONE	LUMENS	% LAMP	% LUMINAIRE
0 - 30	506.80	8.60	11.40
0 - 40	827.80	14.00	18.60
0 - 60	1388.80	23.50	31.30
0 - 90	2210.50	37.50	49.80
40 - 90	-	-	-
60 - 90	821.7	13.90	18.50
90 - 180	2232.60	37.80	50.30
0 - 180	4443.10	75.30	100.00

Ordering

in Cross Section: 1, 2

Nom. Length (in.): 15, 18, 24, 36, 48

Tandem: (Blank) - N/A; /2 - Single Housing *Must be ordered with joiner band

Lamp Type: T5, T5HO, T8

36

UNV - 120-277V
UN4 - 347-480V

Ballast Type: N - Instant Start; P - Program Start; R - Rapid Start

Example:
CAD248-T832PUNV-P12

Lamp Watts

Length	Nominal Lamp Watts T5	T5HO	T8
15	-	-	14
18	-	-	15
24	11	24	17
36	21	39	25
48	28	54	32

Other options may be available consult factory.
Specifications and data subject to change without notice.

- ☐ B01 Ballast Disconnect - In-line Power Disconnect (CSA UL Rated For Voltages above 450v)
- ☐ B02 Dimming Addressable Digital (dali)
- ☐ B03 Dimming Low Voltage (0-10v)
- ☐ B04 Dimming Line Voltage
- ☐ B08 Ballast - High Ballast Factor
- ☐ B09 Ballast - Low Ballast Factor
- ☐ B30 Emergency Lighting Battery Pack Specification Grade
- ☐ B33 Emergency Lighting Battery Pack 1-lamp
- ☐ B34 Emergency Lighting Battery Pack 2-lamp

Finish Options (white is standard)
- ☐ F01 Black

Packaging Options (select one only)
- ☐ K0 Pack Bulk/ Pallet Packed and/or Wrapped

Mounting Options
- ☐ M15 Mounting Joiner Band

Lens and Shielding Options
(opal white acrylic is standard)
- ☐ P12 Lens Prismatic Acrylic - P12

Switch Options (select one only)
- ☐ S1 Switch Pull-chain
- ☐ S2 Switch Pull-chain three-way
- ☐ S5 Switch Toggle
- ☐ S6 Switch Turn

Wiring Options
- ☐ V02 Convenience Outlet
- ☐ V25 Radio Frequency Filter

Approval and Rating Options
- ☐ X7 Dual CSA and USA Markets

Sylvania - QHE2x32 Ballast

ARCHITECTURAL LIGHTING

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries — Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: 5010-48-WEC-232L-UNV-ELBPR

Notes:

Type: D5

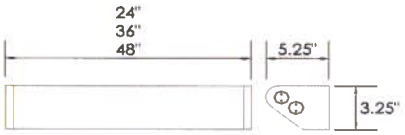
SPEC14-5147

5010

c SA us UL DAMP

Economical bath and vanity luminaire is available in a variety of lamp and ballast combinations to ensure just the right light for the task.

PROJECT:	
MODEL #:	
FIXTURE TYPE:	



STANDARD SPECIFICATIONS

HOUSING: Steel, white painted finish with chrome plated or white painted endcaps
DIFFUSER: White acrylic
BALLAST: 120-277V HPF Electronic
LAMP: Linear fluorescent (T8)

ORDERING INFORMATION

5010-48-WEC-232L-UNV-ELBPR

2. SIZE

24	L: 24"
36	L: 36"
48	**L: 48"**

3. WATTAGE

24 SIZE

17L	1-17W T8, elec. HPF
217L	2-17W T8, elec. HPF

36 SIZE

25L	1-25W T8, elec. HPF
225L	2-25W T8, elec. HPF

48 SIZE

32L	1-32W T8, elec. HPF
232L	**2-32W T8, elec. HPF**

4. ENDCAPS

CEC	Chrome
WEC	**White**

5. AVAILABLE OPTIONS

BAC	Buy American Compliant
BBI	Integral Battery Backup
BBIC	Integral Battery Backup, Cold Weather (36 or 48 size only)
CO	Convenience Outlet (120v)
ES4	ENERGY STAR® (elec., HPF) (120v only)
PC	Pull Chain (120 volt)

ELBPR = ELECTRONIC BALLAST PROGRAM RAPID START TO BE INSTALLED

BROWNLEE LIGHTING
www.brownlee.com

Specifications and dimensions subject to change without notice.
Consult your Brownlee Lighting representative for availability and ordering information

REVISED 2012.1.31

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

HALO®

Description

The Halo RL560 is a complete LED Baffle-Trim Module for 5" and 6" aperture recessed downlights; suitable for new construction, remodel and retrofit installation. The RL560 is cULus Listed for use with Halo and All-Pro, and is UL Classified for use with other compatible 5" and 6" housings. The RL560 with integral LED driver offers 120 volt dimming capability. The RL560 lens provides uniform illumination and wet location listing. Precision construction makes any housing AIR-TITE for added HVAC savings and code compliance.

Catalog #	H750ICAT RL560WH683	Type
Project	RL56TRIMSN	F2 + F11
Comments	OSU - NRDT	Date
Prepared by		

Specification Features

MECHANICAL

Module - Trim

- Module construction includes LED, heat sink, reflector, lens, baffle and trim ring
- Regressed baffle
- Heat sink designed to conduct heat away from the LED keeping the junction temperatures below specified maximums, even when installed in insulated ceiling environments
- Designer trim finish options (sold separately)
  - White (Paintable) Trim Ring
  - Satin Nickel Trim Ring
  - Tuscan Bronze Trim Ring

Lens

- Regressed lens
- Impact-resistant polycarbonate
- Convex form for lamp-like appearance
- High lumen transmission
- Diffusing for even illumination

Mounting

- Push-N-Twist universal installation clips
- Pre-installed clips designed to fit industry standard 5" and 6" recessed housings

Housing Compatibility

See Housing Compatibility

LED

- Color Temperature (CCT)†
  Options: 2700K, 3000K, 3500K, and 4000K
- CRI options: 80 and 90†
  - 90 CRI can be used for California Title 24 compliance/certified to Title 20
  - 80 CRI can be used to comply with California Title 24 Non-Residential Lighting Controls requirements as an LED luminaire

LED Chromaticity

- A tight chromaticity specification ensures LED color uniformity, sustainable Color Rendering Index (CRI) and Correlated Color Temperature (CCT) over the useful life of the LED
- LED chromaticity of 3 SDCM exceeds ENERGY STAR® color standards per ANSI C78.377- 2008
- 90 CRI model features high color performance with R9 greater than 50
- Every Halo LED is quality tested, measured, and serialized in a permanent record to register lumens, wattage, CRI and CCT
- Halo LED serialized testing and measurement ensures color and lumen consistency on a per-unit basis, and validates long-term product consistency over time

ELECTRICAL

Power Connections

- LED connector is a non-screw base luminaire disconnect offering easy installation with the matching Halo 5" and 6" LED housings
- LED Connector meets California Title-24 high efficacy luminaire requirement for a non-screw base socket, and where required to qualify as a high efficacy luminaire
- The included E26 medium screw-base Edison adapter provides easy retrofit of incandescent housings (see Housing Compatibility)

Ground Connection

Separate grounding cable included on the module for attachment to the housing during installation.

LED Driver

- Integral to the housing, 120V 50/60 Hz constant current dimmable driver provides high-efficiency operation
- Driver meets FCC 47CFR Part 15 EMI/RFI consumer limits for use in residential and commercial installations
- Driver features high power factor and low THD and has integral thermal protection in the event of over temperature or internal failure
- If dimming is not required the fixture can be operated from a standard wall switch

Dimming

- Designed for continuous dimming capability to nominally 5% with many 120V Leading Edge (LE) and Trailing Edge (TE) Phase Control dimmers. (Dimmers with low end trim adjustment offer greater assurance of achieving 5% level.)
- Consult dimmer manufacturer for compatibility and conditions of use

Note: some dimmers require a neutral in the wallbox.

Warranty

Cooper Lighting provides a five year limited warranty on RL56 LED.

Compliance

Labels

- UL/cUL Listed 1598 Luminaire (with listed housings)
- UL Classified (with other housings - see Housing Compatibility)
- UL/cUL Listed for Damp Location
- UL/cUL Listed for Wet Location – Shower Applications
- IP56 Ingress Protection rated
- May be installed in housings in direct contact with insulation** and combustible material

Compliance

- Airtight certified per ASTM E283 (not exceeding 2.0 CFM under 57 Pascals pressure difference)
- 90 CRI: Can be used to comply with California Title 24 High Efficacy requirements. Certified to California Title 20 Appliance Efficiency Database.*
- 80 CRI: Can be used to comply with California Title 24 Non-Residential Lighting Controls requirements as an LED luminaire
- Can be used for International Energy Conservation Code (IECC) high efficiency luminaire compliance.

RL560WH6†
White

600 Series 5/6-Inch LED Recessed Retrofit Module-Trim

80CRI
2700K, 3000K, 3500K, 4000K

90CRI
2700K, 3000K, 3500K, 4000K

FOR USE IN INSULATED CEILING AND NON- INSULATED CEILING RATED HOUSINGS

HIGH-EFFICACY LED WITH INTEGRAL DRIVER - DIMMABLE

80 CRI nominal CCT 2700K 3000K 3500K 4000K

ENERGY STAR | IECC | T24 | WSEC | RoHS Compliant | airtite | Shoemaker Light

Refer to ENERGY STAR® Certified Products List.
Can be used to comply with California Title 24 Non-Residential Lighting Controls requirements as a LED Luminaire.

90 CRI nominal CCT 2700K 3000K 3500K 4000K

ENERGY STAR | IECC | T24 Can be used to comply with California Title 24 High Efficacy requirements. T20 Certified to California Title 20 Appliance Database | WSEC | RoHS Compliant | airtite | Shoemaker Light

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

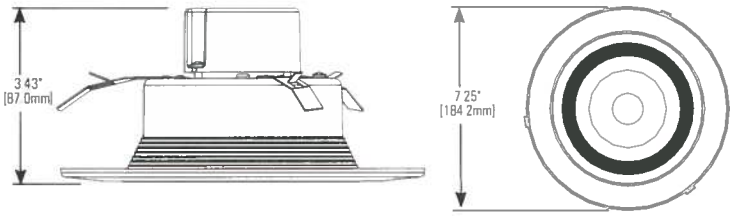
* Refer to ENERGY STAR® Certified Products List and CEC (T20) Appliance Database for listings.
** Not for use with housings in direct contact with spray foam insulation.
† See ordering information table for available models.

Specification Features Continued

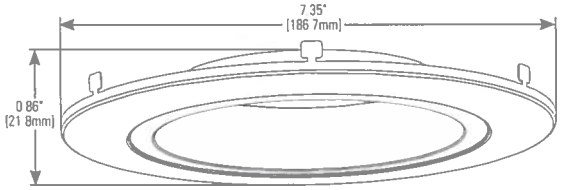
- Can be used for Washington State Energy Code compliance
- ENERGY STAR® Certified luminaire - consult ENERGY STAR® Certified Product List*
- EMI/RFI per FCC 47CFR Part 15 Class B Consumer limits, suitable for use in residential and commercial installations
- Contains no mercury or lead and RoHS compliant.
- Photometric testing in accordance with IES LM-79
- Lumen maintenance projections in accordance with IES LM-80 and TM-21

TYPES F2 + F11

RL56 Dimensions



Designer Trim Dimensions



RL56TRMWH
White (Paintable)

RL56TRMTBZ
Tuscan Bronze

RL56TRMSN
Satin Nickel

Energy Data

RL56 Series (Values at non-dimming line voltage)

Minimum Starting Temp: -30°C (-22°F)
EMI/RFI: FCC Title 47 CFR, Part 15, Class B (Consumer)
Sound Rating: Class A
Input Voltage: 120V
Power Factor: >0.90
Input Frequency: 60Hz
THD: <20%
Input Power: 10.5W - RL560WH6827, RL560WH6927, RL560WH6930, RL560WH6935 10W - RL560WH6940, RL560WH6940R, RL560WH6940C 9.4W - RL560WH6830, RL560WH6835 9W - RL560WH6840, RL560WH6840R, RL560WH6840C
Input Current: 0.15A
Maximum IC (Insulated Ceiling) Ambient Continuous Operating Temperature: 25°C (77°F)
Maximum Non-IC Ambient Continuous Operating Temperature 40°C (104°F)

E26 Screw base adapter for retrofit (included)

Ordering Information

Sample Number: **RL560WH6827-RL56TRMWH**

Complete unit includes a RL56 Baffle-Trim LED Module and a 5" or 6" compatible housing, ordered separately. Optional accessory designer trim ring ordered separately.

RL56 600 Series

80 CRI

RL560WH6827= 5"/6" Retrofit Baffle - Trim LED Module, 80CRI, 2700K, Matte White
RL560WH6830= 5"/6" Retrofit Baffle - Trim LED Module, 80CRI, 3000K, Matte White
RL560WH6835= 5"/6" Retrofit Baffle - Trim LED Module, 80CRI, 3500K, Matte White
RL560WH6840= 5"/6" Retrofit Baffle - Trim LED Module, 80CRI, 4000K, Matte White

90 CRI

RL560WH6927= 5"/6" Retrofit Baffle - Trim LED Module, 90CRI, 2700K, Matte White
RL560WH6930= 5"/6" Retrofit Baffle - Trim LED Module, 90CRI, 3000K, Matte White
RL560WH6935= 5"/6" Retrofit Baffle - Trim LED Module, 90CRI, 3500K, Matte White
RL560WH6940= 5"/6" Retrofit Baffle - Trim LED Module, 90CRI, 4000K, Matte White

Accessory (Order Separately)

RL56TRMSN=5/6" Satin Nickel Trim Ring
RL56TRMTBZ=5/6" Tuscan Bronze Trim Ring
RL56TRMWH=5/6" White Paintable Trim Ring
RL56CLIP=Replacement kit of 5" and 6" Friction Clips for retrofitting into an existing housing without torsion spring receiving brackets. (One set of clips included with the unit.)
OT400P=Oversize Flat White Metal Trim Ring 6" I.D. x 9-1/4" O.D. (ring slips behind RL56 ring, in stepped configuration)
OT403P=Oversize White Plastic Trim Ring 6" I.D. x 8" O.D. (ring slips behind RL56 ring, in stepped configuration)
TRM690WH=Oversize Matte White Metal Trim Ring. Designed for RL560 ring to inset into oversize ring for an even (non-stepped) trim surface
HE26LED=Replacement screw base adapter (one included with unit)

Housing Compatibility

RL56 Series LED Retrofit is UL Classified for retrofit in the follow 5/6" recessed housings:

The RL Series LED light module - trim combination is cULus Listed or UL Classified for use with any 5"/6" diameter recessed housing constructed of steel or aluminum with an internal volume that exceeds 107.9 in³ in addition to those noted above.

TYPES F2 + F11

HOUSINGS - Halo and All-Pro UL Listed Compatibility

Compatible Halo LED Housings with LED luminaire connector (high efficacy compliant - Title 24, IECC, WSEC)

Recessed Can Size	Catalog Number	Description
5"	H550ICAT	5" LED, Insulated Ceiling, AIR-TITE, New Construction Housing
	H550RICAT	5" LED, Insulated Ceiling, AIR-TITE, Remodel Housing
6"	H750ICAT	6" LED, Insulated Ceiling, AIR-TITE, New Construction Housing
	H750RICAT	6" LED, Insulated Ceiling, AIR-TITE, Remodel Housing
	H750T	6" LED, Non-IC, AIR-TITE, New Construction Housing
	H750RINTD010	6" LED, Non-IC, AIR-TITE, Remodel International Housing
	H750TCP	6" LED, Non-IC, New Construction/Remodel Chicago Plenum Housing
	H2750ICAT	6" LED, Shallow, Insulated Ceiling, AIR-TITE, New Construction Housing

Compatible Halo Incandescent E26 Screwbase Housings

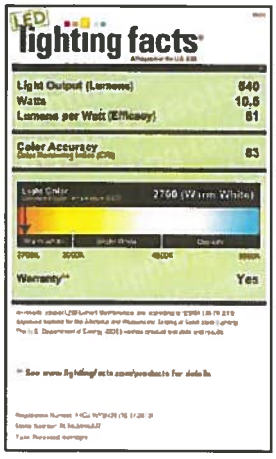
5"	H5ICAT	5" Insulated Ceiling, AIR-TITE New Construction Housing
	H5RICAT	5" Insulated Ceiling, AIR-TITE Remodel Housing
	H5T	5" Non-IC, New Construction Housing
	H5RT	5" Non-IC, Remodel Housing
	H5TM	5" Non-IC, New Construction Housing (metric version - Canada)
	H25ICAT	5" Shallow, Insulated Ceiling, AIR-TITE New Construction
6"	H7ICAT	6" Insulated Ceiling, AIR-TITE New Construction Housing
	H7RICAT	6" Insulated Ceiling, AIR-TITE Remodel Housing
	H7ICT	6" Insulated Ceiling, New Construction Housing
	H7RICT	6" Insulated Ceiling, Remodel Housing
	H7ICATNB	6" Insulated Ceiling, AIR-TITE New Construction Housing, No Socket Bracket
	H7ICTNB	6" Insulated Ceiling, New Construction Housing, No Socket Bracket
	H7T	6" Non-IC, New Construction Housing
	H7RT	6" Non-IC, Remodel Housing
	H7TNB	6" Non-IC, New Construction Housing, No Socket Bracket
	H7TCP	6" Non-IC, Chicago Plenum, New Construction/Remodel Housing
	H7UICT	6" Insulated Ceiling, Universal New Construction Housing
	H7UICAT	6" Insulated Ceiling, Universal, AIR-TITE, New Construction Housing
	H27ICAT	6" Shallow, Insulated Ceiling, AIR-TITE New Construction Housing
	H27RICAT	6" Shallow, Insulated Ceiling, AIR-TITE Remodel Housing
	H27ICT	6" Shallow, Insulated Ceiling, New Construction Housing
	H27RICT	6" Shallow, Insulated Ceiling, Remodel Housing
	H27T	6" Shallow, Non-IC, New Construction Housing
	H27RT	6" Shallow, Non-IC, Remodel Housing
	ML7BXRFK	6" Retrofit Enclosure, Non-IC, BX Whip
	ML7E26RFK	6" Retrofit Enclosure, Non-IC, E26 Screw base Interface

All-Pro Compatible Incandescent E26 Screwbase Housings

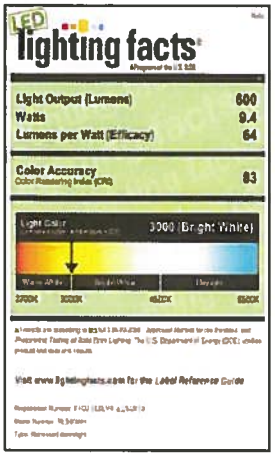
5"	EI500AT	5" Insulated Ceiling, AIR-TITE New Construction Housing
	EI500RAT	5" Insulated Ceiling, AIR-TITE Remodel Housing
	ET500	5" Non-IC, New Construction Housing
	ET500R	5" Non-IC, Remodel Housing
6"	EI700AT	6" Insulated Ceiling, AIR-TITE New Construction Housing
	EI700RAT	6" Insulated Ceiling, AIR-TITE Remodel Housing
	EI700	6" Insulated Ceiling, New Construction Housing
	EI700R	6" Insulated Ceiling, Remodel Housing
	EI700ATNB	6" Insulated Ceiling, AIR-TITE New Construction Housing, No Socket Bracket
	EI700NB	6" Insulated Ceiling, New Construction Housing, No Socket Bracket
	EI700U	6" Insulated Ceiling, Universal New Construction Housing
	EI700UAT	6" Insulated Ceiling, Universal, AIR-TITE, New Construction Housing
	ET700	6" Non-IC, New Construction Housing
	ET700R	6" Non-IC, Remodel Housing
	EI2700AT	6" Shallow, Insulated Ceiling, AIR-TITE New Construction Housing
	EI2700	6" Shallow, Insulated Ceiling, New Construction Housing
	EI2700R	6" Shallow, Insulated Ceiling, AIR-TITE Remodel Housing
	ET2700	6" Shallow, Non-IC, New Construction Housing
	ET2700R	6" Shallow, Non-IC, Remodel Housing

Lighting Facts

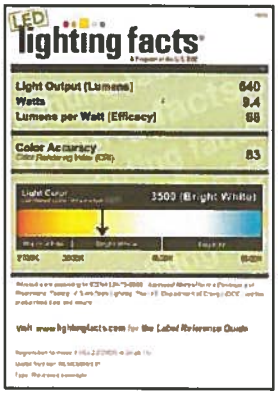
RL560WH6827
2700K Source



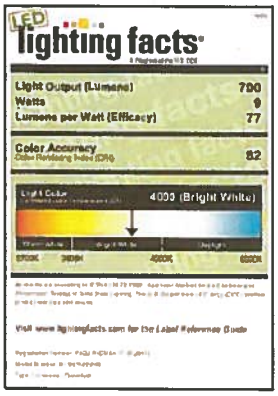
RL560WH6830
3000K Source



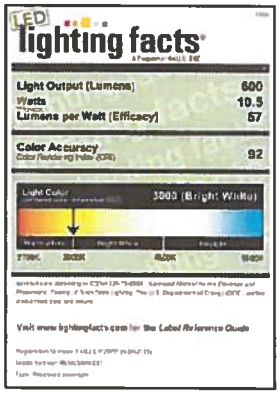
RL560WH6835
3500K Source



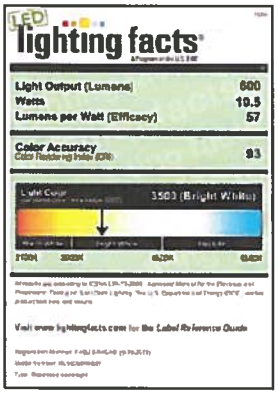
RL560WH6840
4000K Source



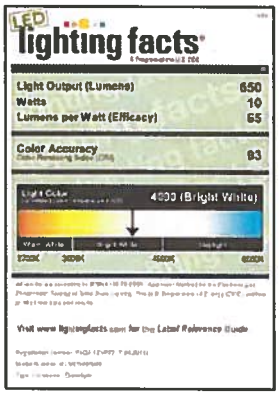
RL560WH6930
3000K Source



RL560WH6935
3500K Source



RL560WH6940
4000K Source



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

PRODUCT DATA SHEETS

DOWNLIGHTS

LCLCV6 - 6" DOWNLIGHT SERIES

Project Name	OSU NRDT
Date	
Type	F12

T/LT

TILT Part Number	LCL CV 6 35W
TILT Driver	LDND16

FEATURES

CONSTRUCTION

- Side lit design for an ultra thin profile
- IC rated, IP44-suitable for damp or dry locations
- Wide beam angle (120°) for better spacing
- CE and cULus rated
- RoHS compliant
- 5 year warranty (standard)

ELECTRICAL

- Dimmable (via driver or using PWM) (1)
- Constant voltage design allows for multiple lights per driver
- LM-80 and LM-79 available
- Downlights should be placed within 50 feet of driver
- Rated at 12W max AC power (10W DC) (2)

LUMEN PACKAGES (6" DOWNLIGHT) (3)				
CCT	50,000 hours (L70)			
	STANDARD 90+ CRI, R9 >50			
5000k	Lumens	750	696	439
	LPW	62.3	63.6	65.6
4000k	Lumens	700	550	352
	LPW	56.1	59.5	61.3
3500k	Lumens	675	514	329
	LPW	53.3	57.2	58.9
3000k	Lumens	650	478	306
	LPW	50.6	54.8	56.4

ORDERING INFORMATION

LCL CV 6 50 W

Fixture Type	Distribution Type	Size	CCT	Frame Color (4)
LCL - Light	**CV** - Constant Voltage	**6** - 6"	**50** - 5,000K **40** - 4,000K **35** - 3,500K **30** - 3,000k	**W** - White **B** - Black + **S** - Silver + + - special order

USE WITH

Driver	
LDND16	LD16PE7
LD16	LD60PE7
LD60	LD90PE7
LD60P	LD100PE7
LD90	
LD100P	

DRIVER SPECIFICATION

NOTE on DRIVERS: UL 8750, short circuit, over current, over voltage, and over temperature protection
UL registered and CE rated, RoHS compliant
Class II, SELV, IP67

Model (5)	Size in Inches (LxWxH)	AC Input	DC Output	Dimming (9)	Temp	Max Fixtures (8)
LDND16	3.00" x 1.50"	90 - 264VAC	16W	1-10V	-40C - 60C	1
LD16	6.00" x 1.625"	90 - 305VAC	16W	1-10V	-40C - 60C	1
LD60	6.50 x 1.63 x 1.26	90 - 305V	60W	1-10V	-40C - 60C	5
LD60P	12.50 x 2.38 x 1.50	90 - 305V	60W	1-10V	-40C - 70C	5
LD90	6.34 x 2.40 x 1.26	90 - 305V	90W	1-10V	-40C - 60C	8
LD100P	14.50 x 2.63 x 1.58	90 - 305V	100W	1-10V	-40C - 60C	8

Emergency (7)	Size in Inches (LxWxH)	AC Input	Output (6)	Lumens	Temp	Max Fixtures (8)
LD16PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	1
LD60PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	4
LD90PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	8
LD100PE7	13.00 x 5.50 x 1.75	90 - 305V	7W for 90 mins	400 - 600	0C - 50C	8

NOTES (NUMBERS)

(1) See driver or dimming product sheet for specific details

(2) AC W used for circuit power, DC W used for driver circuit

(3) Lumen packages provided using Dim Chip with driver

(4) Colors other than white are custom

(5) "P" designation after watt rating denotes Plenum Rated

(6) Based on watt load of fixtures and driver output

(7) See Product Sheet for Emergency Drivers

(8) Safe amount of fixtures per driver

(9) TILT drivers use a 1-10V control but are compatible with most 0-10V control systems. For details specific to your system, contact us at 855.440.8458

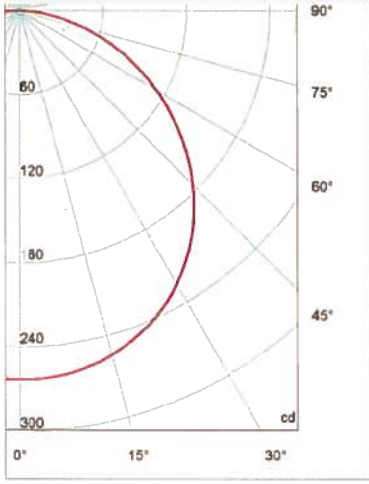
LAUREN ILLUMINATION

TILT DOWNLIGHT SERIES LCLCV6

PHOTOMETRIC CHARTS WITH TESTING DATA. CALL FOR SPECIFIC INFORMATION NOT LISTED HERE: 855.440.8458

LCLCV50W

PHOTOMETRY



ZONAL LUMEN SUMMARY		
DEGREES	LUMENS	%
0-30	206	27
0-40	337	45
0-60	594	79
0-90	750	100
90-180	0	0
0-180	750	100

LUMINANCE SUMMARY CD./SQ.M.	
ANGLE	ALONG
45	18713
55	17704
65	16293
75	14151
85	10051

COEFFICIENT OF UTILIZATION

	80%			70%			50%		
	70	50	30	70	50	30	50	30	10
0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11
1	1.10	1.05	1.01	1.07	1.03	0.99	0.99	0.96	0.93
2	1.00	0.93	0.87	0.98	0.91	0.85	0.87	0.83	0.78
3	0.92	0.82	0.74	0.90	0.80	0.73	0.78	0.72	0.66
4	0.85	0.73	0.65	0.83	0.72	0.65	0.70	0.63	0.58
5	0.78	0.66	0.57	0.76	0.64	0.56	0.62	0.55	0.50
6	0.72	0.59	0.50	0.70	0.58	0.50	0.56	0.49	0.43
7	0.66	0.53	0.44	0.64	0.52	0.44	0.50	0.43	0.38
8	0.61	0.48	0.39	0.60	0.47	0.39	0.46	0.38	0.33
9	0.57	0.43	0.35	0.55	0.43	0.35	0.41	0.34	0.29
10	0.53	0.40	0.31	0.51	0.39	0.31	0.38	0.31	0.26

NOTES

- Lifespan: 50,000 hrs (L70)
- LM79 and LM80 available upon request. Call 855.440.8458
- IES files availble online at: laurenillumination.com/resources

2162 Reiser Avenue SE I New Philadelphia, OH 44663 P: 855.440.8458 I F: 330.339.1515
laurenillumination.com I laureninternational.com

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** WMR-42F1-PC Notes: LAMP INCLUDED	**Type:** K1 LSC14-37947

WM SERIES
COMPACT
WALL SCONCE

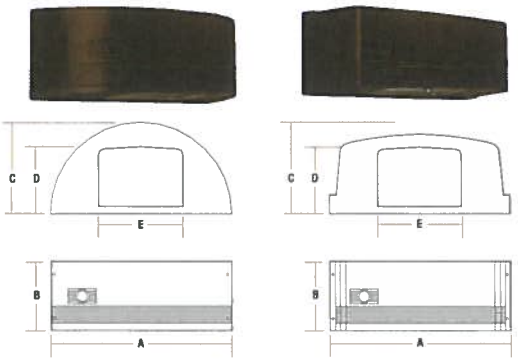
Cat. #		Approvals
Job	Type	

HUBBELL® Outdoor Lighting

APPLICATIONS
- Accent wall sconces for mounting heights on 8-12 ft.

SPECIFICATIONS
- Shipped as full cutoff downlight
  - Units have an internal shield that when removed allows up/down distribution
- UV stabilized polycarbonate front is decorative yet rugged.
- Die cast housing provides rigid mounting and dissipates ballast/lamp heat.
- Silicone gasket seals out moisture and insects.
- Fluorescent units feature 120V photocontrol for dusk to dawn energy saving control.
- 70 watt pulse start units have Tri-Tap® ballast (120, 277, 347V) and are shipped less photocontrol. PBT-1 or PBT-234 may be field installed if photocontrol is desired.
- All units include lamp(s).

LISTINGS
- All units are UL 1598 listed for USA and Canada.



	A	B	C	D	E
WMR	14 5/8"	5 1/2"	7 5/16"	4 13/16"	6 11/16"
	370 mm	140 mm	185 mm	121 mm	170 mm
WMS	14 5/8"	5 1/2"	6 5/16"	4 13/16"	6 11/16"
	370 mm	140 mm	160 mm	121 mm	170 mm

ORDERING INFORMATION

Catalog Number[1]	Shape	Wattage	Voltage	Photocontrol	Weight lbs	(kg)
		Radius Style				
WMR-213F1-PC	Radius	2X13 FLU	120	Yes	6.5	2.9)
WMR-42F1-PC	Radius	42 FLU	120	Yes	6.0	(2.7)
WMR-70P6	Radius	70 PS	120, 277, 347	No	11.0	(5.0)
		Soft Square Style				
WMS-213F1-PC	Square	2X13 FLU	120	Yes	6.5	(2.9)
WMS-42F1-PC	Square	42 FLU	120	Yes	6.0	(2.7)
WMS-70P6	Square	70 PS	120, 277, 347	No	11.0	(5.0)

1 All units have molded-in dark bronze finish and include lamps.

Due to our continued efforts to improve our products, product specifications are subject to change without notice.

HUBBELL®
Hubbell Outdoor Lighting • 701 Millennium Boulevard • Greenville, SC 29607 • PHONE: 864-678-1000
For more information visit our web site: **www.hubbell-ltg.com**

Date Submitted: Aug. 28, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Lighting Systems of Columbus			
Lighting Systems of Columbus, Inc.	**Job Name:** OHIO STATE UNIVERSITY NORTH RESIDENTIAL DISTRICT TRANSFORMATION	**Catalog Number:** WMR-42F1-PC Notes: LAMP INCLUDED	**Type:** K1 LSC14-37947

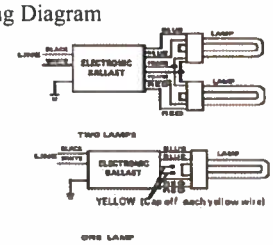
ANTRON ELECTRONICS CO. LTD.

CSS-UV42PS@277V	
Ballast Type	Electronic
Starting Method	Rapid Start
Lamp Connection	Series
Input Voltage	120-277
Input Frequency	60HZ
Status	Active
Safety Approval	UL/CUL

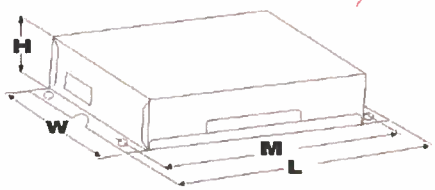
ELECTRICAL SPECIFICATIONS

Lamp Type	NO. of Lamps	Rated Lamp Watts	Min Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	BEF
PLT26W	2	26	-22/-30	0.18	53	0.86	15	0.99	1.7	1.62
PLT42W	1	42	-22/-30	0.14	39	0.8	15	0.98	1.7	2.05
PLT32W	1	32	-22/-30	0.11	30	0.8	15	0.98	1.7	2.67
PLT26W	1	26	-22/-30	0.1	27	0.88	15	0.98	1.7	3.26
PLL40W	1	40	-22/-30	0.13	37	0.78	15	0.98	1.7	2.11
PLL39W	1	39	-22/-30	0.11	29	0.49	15	0.98	1.7	1.69
PLL36W	1	36	-22/-30	0.1	28	0.73	15	0.98	1.7	2.61
PLL24W	1	24	-22/-30	0.08	22	0.8	30	0.95	1.7	3.64
2D28W	1	28	-22/-30	0.1	28	0.67	15	0.98	1.7	2.39

Wiring Diagram



Enclosure



Standard Lead Length(inch/cm)

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

Over All(L)	Width(W)	Height(H)	Mounting(M)
13.3cm	6.3cm	3cm	12.3cm
5.36"	2.48	1.18	4.84

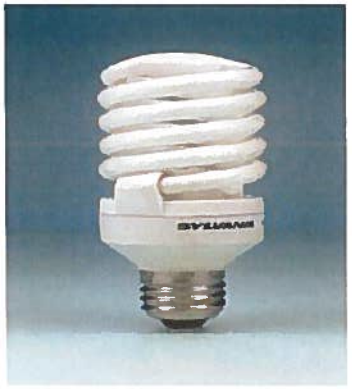
c UL us

Revised 03/22/2004

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

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Product Details



Product Number: 26928

Order Abbreviation: CF23EL/MICRO/835/RP3

General Description: 23W Compact Fluorescent Micro Mini with integral 120V ballast medium screw base color temperature 3500K 82 CRI 10,000 hour life

Job: OSU - NRDT
Lamp for Types:
A40

Product Information	
Abbrev. With Packaging Info.	CF23ELMICRO835RP3 18/CS 3/SKU
Average Rated Life (hr)	10000
Base	Medium
Bulb	MICROMINI
Color Rendering Index (CRI)	82
Color Temperature/CCT (K)	3500
Diameter (in)	2.047
Diameter (mm)	52.00
Initial Lumens at 25C	1630
Nominal Voltage (V)	120.00
Nominal Wattage (W)	23.00

Footnotes

- Approximate initial lumens after 100 hours operation.
- Minimum starting temperature for DULUX EL lamps is 0° F, unless otherwise specified in product literature. .
- DULUX ELs meet CSA, FCC and UL requirements.
- Caution: DULUX EL units cannot be used on dimming circuits (unless the lamp is labeled dimmable), emergency exit fixtures or lights, electronic timers, photocells, lighted switches or any other switches that do not meet UL20 Sec. 7.6.15. In outdoor applications, use only in enclosed fixtures to avoid exposure to weather. Use only on 120V, 60 Hz circuits. Never disassemble or modify lamp. Install or remove unit from fixture by grasping plastic base. Best performance achieved when operated at 77degrees F (25 degrees C). 40 Watt lamp is designed for base down orientation only
- The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
- Minimum starting temperature for DULUX EL lamps is 0 degrees F
- Rule of Thumb for Compact Fluorescent Lamps: Divide wattage of incandescent lamp by 4 to determine approximate wattage of compact fluorescent lamp that will provide similar light output.

2101 S High St. Columbus, Ohio 43207
Phone: 614/445-8871 Fax: 614/445-8871

www.sylvania.com

DULUX® T/E/IN ECOLOGIC®

4-Pin Amalgam Compact Fluorescent Lamps

Job: OSU - NRDT
Lamps for Types:
CF26DTEIN835ECO - TYPE A75
CF32DTEIN835ECO - TYPES A45 + A63
CF42DTEIN835ECO A74 + K1

SYLVANIA DULUX T/E/IN compact fluorescent lamps are ideal for use in a wide range of commercial and residential applications. They are designed to be operated on energy efficient electronic and dimming ballasts.

SYLVANIA DULUX T/E/IN lamps are long-life, energy-saving alternatives for incandescent lamps. Amalgam technology provides higher lumens over a much wider temperature range than non-amalgam lamps. The triple tube configuration of these lamps allows for single-lamp luminaire designs with improved efficacy and photometric performance.

Key Features & Benefits

- Improved lumen output vs. non-amalgam triple tube lamps
  - Maintains 90% lumens from 40° to 140°F ambient
- Long 12,000 to 16,000 hour average rated life
- Fast run-up to full brightness
- ECOLOGIC passes Federal TCLP Test*
- RoHS compliant
- Operates electronic ballasts systems
  - Flicker-free starting and dimmable
  - Compatible with QUICKTRONIC® PROStart CF
- High luminous efficacy
- Rare earth tri-phosphor with 82 CRI
- Less power consumption than incandescent of comparable light output

ECOLOGIC® is a comprehensive program of OSRAM SYLVANIA focused on addressing environmental issues at all stages of lamp life.

ECOLOGIC®

RoHS compliant
This light source meets restrictions on hazardous substances.

* Regulations may vary. Check your local and state regulations.

Product Offering

Lamp	Wattage	CCT
CF18DT/E/IN	18	2700K, 3000K, 3500K, 4100K
CF26DT/E/IN	26	2700K, 3000K, 3500K, 4100K
CF32DT/E/IN	32	2700K, 3000K, 3500K, 4100K
CF42DT/E/IN	42	2700K, 3000K, 3500K, 4100K
CF57DT/E/IN	57	3000K, 3500K, 4100K

Application Information

Applications

- Recessed downlights
- Surface mounted luminaires
- Wall sconces

Application Notes

1. 4-pin lamps are designed for use with programmed rapid start ballasts. Not recommended for use with IS ballasts.
2. Minimum starting temperature depends on ballast.
3. Rule of thumb: to estimate the appropriate compact fluorescent lamp wattage, divide the incandescent wattage by 4.
4. Equipment manufacturers are advised to consult ANSI and IEC standards for the maximum allowable dimensions and temperature to insure compatibility with similar products.
5. QUICKTRONIC PROStart CF electronic ballasts are UCSA Certified and FCC 47CFR Part 18 Consumer Rated.
6. For horizontal operation, install lamp with etch facing down.
7. QUICKTRONIC ballasts feature QUICKSENSE® circuitry for end-of-life protection required by NEMA.

Job: OSU - NRDT
Lamp for Fixtures Types:

2101 S High St. Columbus, Ohio 43207
Phone: 614/445-8871 Fax: 614/445-8871

Ordering Information

Item Number	Ordering Abbreviation	NEMA Generic Designation	Base	Watts	Volts[1]	Amps[1]	Initial Lumens	Mean Lumens[2]	CCT	CRI	Avg. Rated Life (hrs.)[3]
20875	CF18DT/E/IN/827/ECO	CFTR18W/GX24q/27	GX24q-2	18	80	.210	1,200	1,032	2700K	82	12,000
20876	CF18DT/E/IN/830/ECO	CFTR18W/GX24q/30	GX24q-2	18	80	.210	1,200	1,032	3000K	82	12,000
20877	CF18DT/E/IN/835/ECO	CFTR18W/GX24q/35	GX24q-2	18	80	.210	1,200	1,032	3500K	82	12,000
20878	CF18DT/E/IN/841/ECO	CFTR18W/GX24q/41	GX24q-2	18	80	.210	1,200	1,032	4100K	82	12,000
20879	CF26DT/E/IN/827/ECO	CFTR26W/GX24q/27	GX24q-3	26	80	.300	1,800	1,548	2700K	82	16,000
20880	CF26DT/E/IN/830/ECO	CFTR26W/GX24q/30	GX24q-3	26	80	.300	1,800	1,548	3000K	82	16,000
20881	CF26DT/E/IN/835/ECO	CFTR26W/GX24q/35	GX24q-3	26	80	.300	1,800	1,548	3500K	82	16,000
20882	CF26DT/E/IN/841/ECO	CFTR26W/GX24q/41	GX24q-3	26	80	.300	1,800	1,548	4100K	82	16,000
20883	CF32DT/E/IN/827/ECO	CFTR32W/GX24q/27	GX24q-3	32	100	.320	2,400	2,064	2700K	82	16,000
20884	CF32DT/E/IN/830/ECO	CFTR32W/GX24q/30	GX24q-3	32	100	.320	2,400	2,064	3000K	82	16,000
20885	CF32DT/E/IN/835/ECO	CFTR32W/GX24q/35	GX24q-3	32	100	.320	2,400	2,064	3500K	82	16,000
20886	CF32DT/E/IN/841/ECO	CFTR32W/GX24q/41	GX24q-3	32	100	.320	2,400	2,064	4100K	82	16,000
20887	CF42DT/E/IN/827/ECO	CFTR42W/GX24q/27	GX42q-3	42	135	.320	3,200	2,752	2700K	82	16,000
20888	CF42DT/E/IN/830/ECO	CFTR42W/GX24q/30	GX24q-4	42	135	.320	3,200	2,752	3000K	82	16,000
20871	CF42DT/E/IN/835/ECO	CFTR42W/GX24q/35	GX24q-4	42	135	.320	3,200	2,752	3500K	82	16,000
20890	CF42DT/E/IN/841/ECO	CFTR42W/GX24q/41	GX24q-4	42	135	.320	3,200	2,752	4100K	82	16,000
20896	CF57DT/E/IN/830/ECO	CFTR57W/GX24q/30	GX24q-5	57	182	.320	4,300	3,698	3000K	82	12,000
20897	CF57DT/E/IN/835/ECO	CFTR57W/GX24q/35	GX24q-5	57	182	.320	4,300	3,698	3500K	82	12,000
20899	CF57DT/E/IN/841/ECO	CFTR57W/GX24q/41	GX24q-5	57	182	.320	4,300	3,698	4100K	82	12,000

Notes:
1. Measured on high-frequency ballast
2. Measured at 40% of rated life.
3. Based on 3 hours per start. Number of operating hours when half have failed and half are still functional.

Ordering Guide

CF	26	DT	/	E	/	IN	/	835	/	ECO
Compact Fluorescent	Wattage 18, 26, 32, 42, 57	DULUX® Triple		Electronic Ballast		Amalgam		8 = 82 CRI 27=2700K CCT 30=3000K CCT 35=3500K CCT 41=4100K CCT		ECOLOGIC®

System Comparison

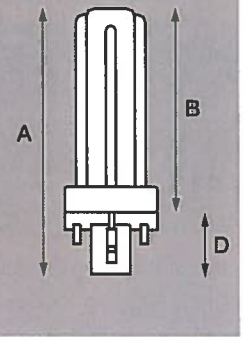
Compact Fluorescent vs. Incandescent

Lamp Type	Rated Lamp Life (hrs.)	System Lumens	System Wattage	System LPW	Energy Savings*
100W Incandescent	750	1,710	100	17	—
DULUX T/E/IN 26W w/QUICKTRONIC® CF	18,000	1,800	28	64	$115
150W Incandescent	750	2,740	150	18.5	—
DULUX T/E/IN 42W w/QUICKTRONIC CF	16,000	3,200	46	70	$66

* Based on an energy cost of $0.10/kWh over the life of the lamp.

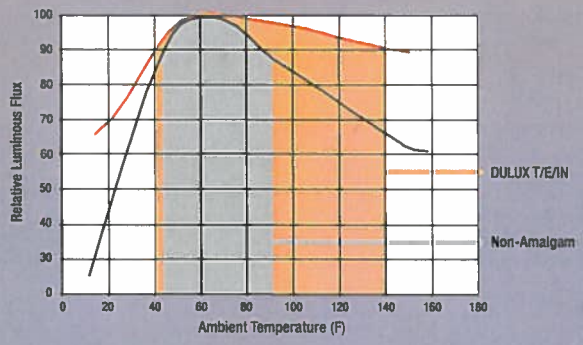
Lamp Dimensions

	(A) MOL [in. (mm)]	(B) Max. Base Face to Top of Lamp [in. (mm)]	(C) Max. Base Width [in. (mm)]	(D) Guide Post Length [in. (mm)]
CF18DT/E/IN	4.37 (111)	3.74 (95)	1.90 (48)	0.62 (16)
CF26DT/E/IN	4.96 (126)	4.33 (110)	1.90 (48)	0.62 (16)
CF32DT/E/IN	5.59 (142)	4.96 (126)	1.90 (48)	0.62 (16)
CF42DT/E/IN	6.42 (163)	5.78 (147)	1.90 (48)	0.62 (16)
CF57DT/E/IN	7.76 (197)	7.13 (181)	1.90 (48)	0.62 (16)

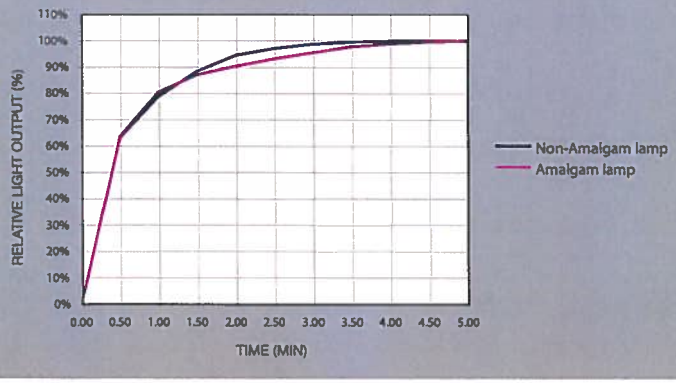


Technical Information

90% Lumen Performance Range
DULUX T/E/IN vs. Non-Amalgam Lamps



Lumen Run-Up Comparison



Related Literature

For maximum energy savings consider pairing with the following electronic ballast:

Ballast Technology Applications & Specification Guide (Literature Code: ECS-Electronic2009)
QUICK 60+® System Warranty (Literature Code: ECS140)

Sample Specification

Lamp(s) shall be (a) DULUX® (CF18DT/E/IN, CF26DT/E/IN, CF32DT/E/IN, CF42DT/E/IN or CF57DT/E/IN) ECOLOGIC® lamps and pass existing Federal TCLP limits. Lamp(s) shall have an average rated life of 12,000 to 16,000 hours, a correlated color temperature of (2700K, 3000K, 3500K or 4100K), and a CRI of 82. Lamps shall have a (GX24q-2, -3, -4 or -5) plug-in, 4-pin base and be suitable for use on electronic and dimming ballasts. Lamps shall be operated by QUICKTRONIC® ballasts. Both lamps and ballasts are covered by the QUICK 60+® system warranty.

United States
OSRAM SYLVANIA
100 Endicott Street
Danvers, MA 01923
1-800-LIGHTBULB

Trade
Phone: 800-255-5042
Fax: 800-255-5043

National Accounts
Phone: 800-562-4671
Fax: 800-562-4674

OEM/Special Markets
Phone: 800-762-7191
Fax: 800-762-7192

Retail
Phone: 800-842-7010
Fax: 800-842-7011

SYLVANIA Lighting Services
Phone: 800-323-0572
Fax: 800-537-0784

Display/Optic
Phone: 888-677-2627
Fax: 855-543-1043

Canada
OSRAM SYLVANIA LTD.
2001 Drew Road
Mississauga, ON L5S 1S4
1-800-LIGHTBULB

Trade
Phone: 800-263-2852
Fax: 800-667-6772

OEM/Special Markets/Display/Optic
Phone: 800-265-2852
Fax: 800-667-6772

Retail
Phone: 800-720-2852
Fax: 800-667-6772

SYLVANIA Lighting Services
Phone: 800-663-4268
Fax: 866-239-1278

Mexico
OSRAM MEXICO
Tultitlan/Edo de Mexico
Phone: 011-52-55-58-99-18-50

ENCELIUM Technologies
United States
Phone: 201-928-2400
Fax: 201-928-4028

Canada
Phone: 905-731-7678
Fax: 905-731-1401

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OCTRON® 800 ECOLOGIC®
Fluorescent Lamps

Job: OSU NRDT
Lamp for Types:

FO17/835/ECO - TYPE D2
FO25/835/ECO - TYPE D3
FO32/835/ECO - TYPES A5, A6, B2, B5, B10, B24, C2, C8, D5

Key Features & Benefits

- Passes Federal TCLP test*
- Energy efficient T8 lamp
- Made in the USA
- Lead free
- RoHS compliant
- Compatible with QUICKTRONIC® electronic ballasts
- QUICK 60+® System Warranty

ECOLOGIC® is a comprehensive program of OSRAM SYLVANIA focused on addressing environmental issues at all stages of lamp life.

* Regulations may vary. Check your local and state regulations.

RoHS compliant
This light source meets restrictions on hazardous substances.

MADE IN USA

LEAD-FREE

ECOLOGIC®

OCTRON 800 ECOLOGIC T8 lamps offer a high quality solution for general purpose fluorescent lighting applications where color is important. These lamps are available in a wide range of color temperatures: 3000K, 3500K, 4100K and 5000K that feature improved color rendering and lumen maintenance when compared to 700 series lamps. When paired with QUICKTRONIC electronic ballasts, these systems are a good alternative to T12 fluorescent systems and are covered by the comprehensive QUICK 60+ system warranty.

Product Offering

Ordering Abbreviation	Wattage	Lumens	CRI
FO17/800/ECO	17	1350	82
FO25/800/ECO	25	2150	82
FO32/800/ECO	32	2950	85
FO40/800/ECO	40	3650	82
FO96/800/ECO	96	5900	82

Application Information

Applications
- Cove
- Recessed troffer
- Strip light fixture
- Valance

Application Notes
1. Lamps starting down to -20°F (dependent on ballast)
2. Operation below 50°F may affect lumen output or lamp operation.
3. For cold temperature applications, use in enclosed fixture or use tube to maximize lamp performance.
4. For rapid start operation, check with ballast manufacturer for ground plane requirement.
5. For maximum energy savings, operate on electronic instant start ballast.

CED
2101 S High St. Columbus, Ohio 43207
Phone: 614/445-8871 Fax: 614/445-8871

Ordering Information

Job: OSU NRDT
Lamp for Types:

Item Number	Ordering Abbreviation	Nominal Length	Initial Lumens	Mean Lumens[1]	Rated Life: Instant Start 3 hrs/ start	Rated Life: Instant Start 12 hrs/ start	Rated Life: Programmed Rapid Start 3 hrs/ start	Rated Life: Programmed Rapid Start 12 hrs/ start	CCT	CRI
22135	FO17/830/ECO	24	1,350	1,269	24,000	28,000	30,000	36,000	3000K	82
22136	FO17/835/ECO	24	1,350	1,269	24,000	28,000	30,000	36,000	3500K	82
22137	FO17/841/ECO	24	1,350	1,269	24,000	28,000	30,000	36,000	4100K	82
22138	FO25/830/ECO	36	2,150	2,021	24,000	28,000	30,000	36,000	3000K	82
22139	FO25/835/ECO	36	2,150	2,021	24,000	28,000	30,000	36,000	3500K	82
22140	FO25/841/ECO	36	2,150	2,021	24,000	28,000	30,000	36,000	4100K	82
21777	FO32/830/ECO	48	2,950	2,773	24,000	28,000	30,000	36,000	3000K	85
21779	FO32/835/ECO	48	2,950	2,773	24,000	28,000	30,000	36,000	3500K	85
21781	FO32/841/ECO	48	2,950	2,773	24,000	28,000	30,000	36,000	4100K	85
22143	FO32/850/ECO	48	2,950	2,773	24,000	28,000	30,000	36,000	5000K	80
22144	FO40/830/ECO	60	3,650	3,431	24,000	28,000	30,000	36,000	3000K	82
22145	FO40/835/ECO	60	3,650	3,431	24,000	28,000	30,000	36,000	3500K	82
22146	FO40/841/ECO	60	3,650	3,431	24,000	28,000	30,000	36,000	4100K	82
22147	FO96/830/ECO	96	5,900	5,428	18,000	24,000			3000K	82
22148	FO96/835/ECO	96	5,900	5,428	18,000	24,000			3500K	82
22149	FO96/841/ECO	96	5,900	5,428	18,000	24,000			4100K	82
22173	FO96/850/ECO	96	5,900	5,428	18,000	24,000			5000K	82

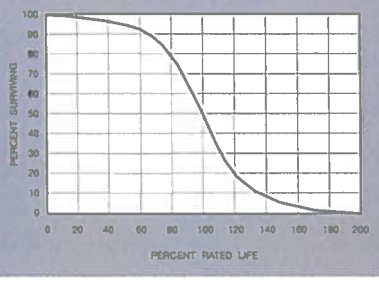
1. Mean lumens measured at 40% of rated life.

Ordering Guide

FO	32	/	8	35	/	ECO
Fluorescent OCTRON	Wattage: 17, 25, 32, 40 or 96 watts		8 = 80–85 CRI	30 = 3000K CCT 35 = 3500K CCT 41 = 4100K CCT 50 = 5000K CCT		ECOLOGIC

Technical Information

Typical Fluorescent Lamp Mortality



Related Literature

For maximum energy savings consider pairing with the following electronic ballast:

Ballast Technology Applications & Specification Guide (Literature Code: ECS-Electronic2009)
QUICK 60+® System Warranty (Literature Code: ECS140)

Sample Specification

Lamp(s) shall be an OCTRON® ECOLOGIC® lamp(s) (F017/ECO, F025/ECO, F032/ECO, F040/ECO and F096/ECO) having medium bi-pin bases. Lamp(s) shall be designed to pass the Federal TCLP test in force at the time of manufacture. Lamp(s) shall have a correlated color temperature of (3000K, 3500K, 4100K or 5000K) and a CRI of (80, 82 or 85). The OCTRON lamp(s) shall be operated on dedicated QUICKTRONIC® ballast(s) with complete system warranty from one manufacturer covering lamp(s) and ballast(s).

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Fax: 1-800-762-7192

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Fax: 1-800-667-6772

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Phone: 1-800-265-2852
Fax: 1-800-667-6772

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PENTRON® ECOLOGIC®
T5 Linear Fluorescent Lamps

Job: OSU NRDT
Lamp for Types:
FP28/835/ECO - TYPES A17, A18, B25

PENTRON ECOLOGIC T5 lamps offer a high quality lighting solution for linear fluorescent applications where luminaire design flexibility is important. These lamps are available in 2, 3, 4 and 5-foot lengths and offer a wide range of color temperatures: 2700K, 3000K, 3500K, 4100K, 5000K and 6500K. When paired with a QUICKTRONIC® T5 ballast, these systems are covered by the comprehensive QUICK 60+® system warranty.

Key Features & Benefits

- High Performance T5 lamps
  - Up to 104 LPW
  - 95% lumen maintenance
  - Peak lumen output at 35°C (95°F)
  - Dimmable
  - Ideal for occupancy sensor applications
- Up to 36,000 hours lamp life
- TCLP and RoHS compliant
- Made in the USA
- Lead free glass
- Greater luminaire design flexibility
- Nominal 2', 3', 4', and 5'
- QUICK 60+ system warranty offered when paired with QUICKTRONIC T5 electronic ballast

ECOLOGIC® is a comprehensive program of OSRAM SYLVANIA focused on addressing environmental issues at all stages of lamp life.

* Regulations may vary. Check your local and state regulations.

ECOLOGIC®

RoHS compliant
This light source meets restrictions on hazardous substances.

MADE IN USA

Product Offering

Ordering Abbreviation	Watts	CCT
FP14/800/ECO	14	3000K, 3500K, 4100K, 6500K
FP21/800/ECO	21	3000K, 3500K, 4100K, 6500K
FP28/800/ECO	28	2700K, 3000K, 3500K, 4100K, 5000K, 6500K
FP35/800/ECO	35	3000K, 3500K, 4100K

Application Information

Applications

- Cove and valance
- Direct / indirect luminaires
- Facade luminaires
- Low profile surface mount
- Shallow recessed fixtures
- Showcase
- Signage

Application Notes

1. PENTRON ECO lamps are about 2" shorter than T8 & T12 Bi-Pin lamps.
2. Miniature Bi-Pin bases will not install into T8 & T12 sockets.
3. Miniature Bi-Pin bases require UL Listed 600 Volt rated sockets.
4. Requires high frequency programmed rapid start electronic ballasts for T5s equipped with end-of-life sensing circuit.
5. PENTRON ECO operates at same current for uniform color and brightness between nominal 2', 3', 4', and 5' lengths.
6. Apply thermal factor in calculations for use in exterior or unheated applications.

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SEE THE WORLD IN A NEW LIGHT SYLVANIA

Job: OSU NRDT
Lamp for Types:

SYLVANIA

Ordering Information

Item Number	Ordering Abbreviation	Base	Watt	Nominal Length (in)	Initial Lumens @ 25°C	Mean Lumens @ 25°C	Initial Lumens @ 35°C	Mean Lumens @ 35°C	Programmed 3 hrs/start	Rapid Start 12 hrs/start	CCT	CRI
20907	FP14/830/ECO	Miniature Bi-Pin	14	24	1,200	1,140	1,350	1,285	25,000	28,000	3000K	85
20908	FP14/835/ECO	Miniature Bi-Pin	14	24	1,200	1,140	1,350	1,285	25,000	28,000	3500K	85
20914	FP14/841/ECO	Miniature Bi-Pin	14	24	1,200	1,140	1,350	1,285	25,000	28,000	4100K	85
20988	FP14/865/ECO	Miniature Bi-Pin	14	24	1,100	1,045	1,300	1,235	25,000	28,000	6500K	85
20919	FP21/830/ECO	Miniature Bi-Pin	21	36	1,900	1,805	2,100	1,995	25,000	28,000	3000K	85
20921	FP21/835/ECO	Miniature Bi-Pin	21	36	1,900	1,805	2,100	1,995	25,000	28,000	3500K	85
20924	FP21/841/ECO	Miniature Bi-Pin	21	36	1,900	1,805	2,100	1,995	25,000	28,000	4100K	85
20989	FP21/865/ECO	Miniature Bi-Pin	21	36	1,750	1,665	2,000	1,900	25,000	28,000	6500K	85
20975	FP28/827/ECO	Miniature Bi-Pin	28	48	2,600	2,470	2,900	2,755	30,000	36,000	2700K	85
20868	FP28/830/ECO	Miniature Bi-Pin	28	48	2,600	2,470	2,900	2,755	30,000	36,000	3000K	85
20901	FP28/835/ECO	Miniature Bi-Pin	28	48	2,600	2,470	2,900	2,755	30,000	36,000	3500K	85
20902	FP28/841/ECO	Miniature Bi-Pin	28	48	2,600	2,470	2,900	2,755	30,000	36,000	4100K	85
22203	FP28/850/ECO	Miniature Bi-Pin	28	48	2,545	2,420	2,840	2,700	30,000	36,000	5000K	85
20990	FP28/865/ECO	Miniature Bi-Pin	28	48	2,400	2,280	2,750	2,615	30,000	36,000	6500K	85
20925	FP35/830/ECO	Miniature Bi-Pin	35	60	3,300	3,135	3,650	3,470	25,000	28,000	3000K	85
20926	FP35/835/ECO	Miniature Bi-Pin	35	60	3,300	3,135	3,650	3,470	25,000	28,000	3500K	85
20927	FP35/841/ECO	Miniature Bi-Pin	35	60	3,300	3,135	3,650	3,470	25,000	28,000	4100K	85

Ordering Guide

FP	14	/	8	30	/	ECO®
Fluorescent PENTRON® T5	Wattage: 14, 21, 28 or 35 watts		8 = 85 CRI	27 = 2700K CCT, 30 = 3000K CCT 35 = 3500K CCT, 41 = 4100K CCT 50 = 5000K CCT, 65 = 6500K CCT		ECOLOGIC®

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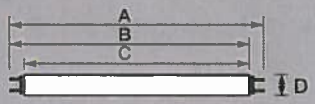
Technical Information

Dimensions

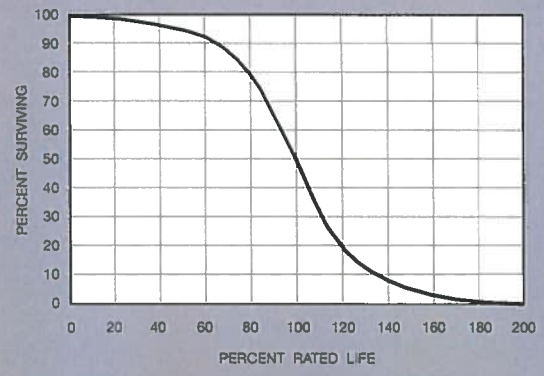
Ordering Abbreviation	(A) Max. Overall Length mm (in.)	(B) Base Face to Opposite Pin mm (in.)	(C) Base Face to Base Face mm (in.)	(D) Max. Outside Diameter mm (in.)
FP14	563.2 (22.17)	553.7 - 556.1 (21.80 - 21.89)	547.1 - 549.0 (21.54 - 21.61)	17.0 (0.67)
FP21	863.2 (33.89)	853.7 - 856.1 (33.61 - 33.70)	847.1 - 849.0 (33.35 - 33.43)	17.0 (0.67)
FP28	1163.2 (45.80)	1153.7 - 1156.1 (45.42 - 45.52)	1147.1 - 1149.0 (45.16 - 45.24)	17.0 (0.67)
FP35	1463.2 (57.61)	1453.7 - 1456.1 (57.23 - 57.33)	1447.1 - 1449.0 (56.97- 57.05)	17.0 (0.67)



Lumen Output vs. Temperature T8/T5

Fluorescent Lamp Lumen Maintenance

Typical Fluorescent Lamp Mortality



Related Literature

For optimum system performance and warranty pair with QUICKTRONIC® electronic ballast systems:

Ballast Technology Applications & Specification Guide (Literature Code: ECS-Electronic2009)
QUICK 60+® System Warranty (Literature Code: ECS140)

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QUICKTRONIC® PROStart® T5 Universal Voltage Systems

Job: OSU - NRDT
Ballast for Types
A17, A18, B25

RoHS compliant

Type CC
Programmed Rapid Start
Normal Ballast Factor

High Efficiency Series

QHE T5 PSN

Lamp / Ballast Guide

28W T5 – PENTRON® lamps
1 or 2 lamp QHE2x28T5/UNV PSN

Primary Lamp Type:
FP28

Also operates:
FP14, FP21, FP35

Two lamp fixed output model can be wired for one lamp operation.

Key System Features

- High Efficiency Systems over 90% efficient
- Universal voltage (120-277V)
- Low-profile (0.87" High)
- 1.0 Ballast factor (see table)
- QUICKSENSE® ballast technology (end-of-lamp-life sensing)
- PROStart programmed rapid start
- Min. starting temperature
  - -20°F (-29°C)
- Operates at >42 kHz to reduce potential interference with infrared control systems
- Meet the most demanding utility rebate standards
- UL Type CC rated
- RoHS compliant
- Lead-free solder, printed circuit board and manufacturing process

Application Information

SYLVANIA QUICKTRONIC PS ballasts are ideally suited for:

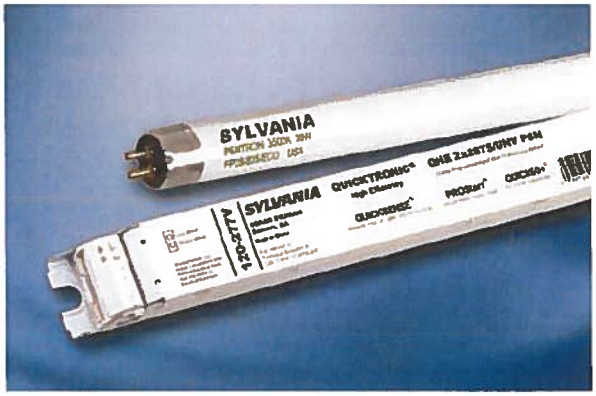
- Commercial
- Retail
- Hospitality
- Institutional
- New construction
- Direct lighting
- Indirect lighting
- Surface mount
- Cove lighting

SYLVANIA QUICKTRONIC High Efficiency (QHE) PROStart T5 Universal Voltage electronic ballasts operate PENTRON T5 lamps saving >2 watts as compared to standard T5 ballasts.

QUICKTRONIC PROStart T5 ballasts feature programmed rapid start lamp starting and operation which provides optimum conditions to deliver up to 100,000 switching cycles for use on occupancy sensors and building control systems.

QUICKTRONIC PROStart T5 ballasts are RoHS compliant and feature lead-free solder, printed circuit boards and manufacturing process.

Setting the standard for quality, QUICKTRONIC PROStart T5 systems are covered by the QUICK 60+® warranty, the first and most comprehensive system warranty in the industry.



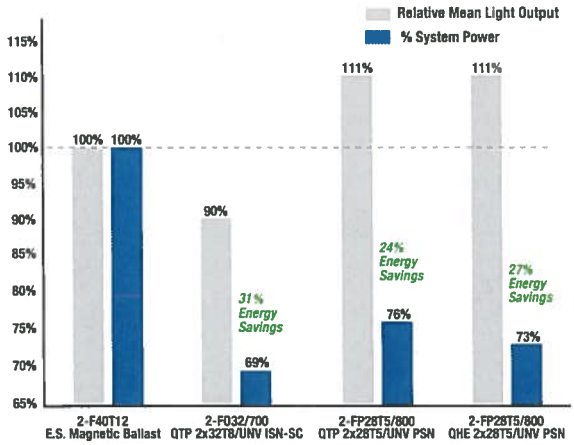
System Information

SYLVANIA QUICKTRONIC PS T5 High Efficiency (QHE) System advantages:

- Operate from 120V through 277V
  - Eliminates "wrong voltage" errors
  - Reduces inventory by 50%
- Utilizes Programmed Rapid Start operation for:
  - Highest System Efficacy
  - Longer Life
  - Over 100,000 switching cycles for occupancy sensor and building control systems applications

QUICKSENSE ballast technology helps to protect against overheated bases and sockets, as well as cracking of the glass wall, and uses dynamic end-of-lamp-life sensing to avoid false shutdowns caused by some static sensing methods. QUICKSENSE ballast technology will auto reset when the end-of-life lamps are replaced with new ones.

System Type (2-lamp)	Input Power (W)	Initial System Lumens	Initial System Efficacy (LPW)	Mean System Lumens	Relative Mean Light Output	Energy Savings (%)
2-F40T12 ES Mag. Ballast	86	5795	67	4925	100%	Baseline
2-FO32/700 QTP2x32T8/UNV ISN-SC	59	4930	84	4435	90%	31%
2-FP28T5/800 QTP2x28T5/UNV PSN	65	5800	89	5395	111%	24%
2-FP28T5/800 QHE2x28T5/UNV PSN	63	5800	92	5395	111%	27%



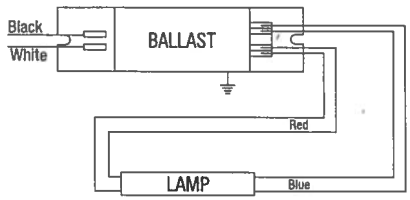
SEE THE WORLD IN A NEW LIGHT SYLVANIA

Job: OSU - NRDT
Ballast for Types:

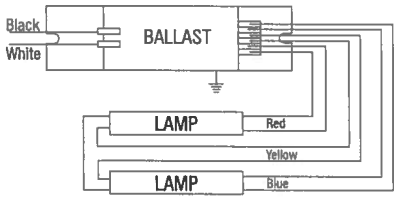
High Efficiency Type CC & Universal Voltage (120-277V)

Item Number	OSRAM SYLVANIA Description	Input Current (AMPS)	Lamp[1] Type	Rated[1] Lumens (lm)	No. of Lamps	Ballast[1] Factor (BF)	System[1] Lumens	Mean[1] Lumens	Input[1] Power (W) 120V	277V	System[3] Efficacy (lm/W)	BEF[2]
	QHE2x28T5/UNV PSN	0.55/0.23	FP28T5	2900	2	1.00	5800	5395	63	62	94	1.61
51473 O	*20-pack (without leads)*	0.68/0.29	FP35T5	3650	2	0.99	7225	6720	80	78	93	1.27
(51472) O	*10-pack (with leads)*	0.39/0.18	FP21T5	2100	2	1.01	4240	3945	47	46	92	2.20
		0.27/0.13	FP14T5	1350	2	1.03	2780	2585	32	32	87	3.22
		0.27/0.12	FP28T5	2900	1	1.00	2900	2695	33	32	91	3.13
		0.34/0.15	FP35T5	3650	1	1.02	3725	3460	41	40	93	2.55
		0.21/0.10	FP21T5	2100	1	1.04	2185	2030	25	24	91	4.33
		0.15/0.07	FP14T5	1350	1	1.03	1390	1295	17	17	82	6.06

1 At 35°C lamp ambient temperature.
2 Ballast Efficiency Factor (BEF) shown = (Ballast Factor x 100) divided by Input Power (Note: calculation based on lowest wattage value).
3 System Efficacy calculation based on lowest input power value.
O Preliminary specifications. Please contact OSRAM SYLVANIA for additional information.



1 LAMP

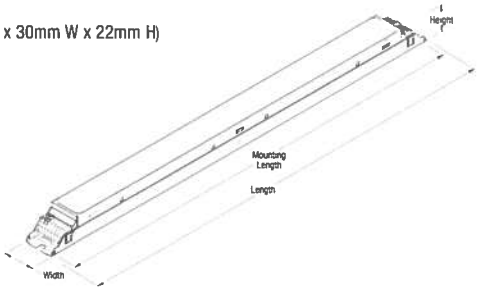


2 LAMP

Dimensions:
Model QHE2x28T5/UNV PSN enclosure size:
Overall: 14.17"L x 1.18"W x 0.87"H (360mm L x 30mm W x 22mm H)
Mounting: 13.74" (349mm)

Wiring:
51473: Push-in connectors
51472: Push-in connectors with leads
Use 18AWG solid copper wire only

Product Weight:
51473: 0.68 lb (0.30kg) each (approx.)
51472: 0.88 lb (0.40kg) each (approx.)



Item Number — 51473 QHE 2 x 28T5 / UNV PSN — Starting/Ballast Factor
QUICKTRONIC High Efficiency — Line Voltage (120-277V)
Number of Lamps (2) — Primary Lamp Wattage

Normal Ballast Factor

T5 PROStart®

High Efficiency

Performance Guide

Data based upon SYLVANIA PENTRON® lamps shown. QUICKTRONIC® ballasts are also compatible with other lamp manufacturers equivalent lamp types that meet ANSI specifications.

QHE T5 PSN

Specifications[4]

Starting Method: Programmed Rapid Start
Ballast Factor: 1.00 (see table)
Circuit Type: Series
Lamp Frequency: >42 kHz
Lamp CCF: Less than 1.6
Starting Temp: -20°F (-29°C)[5]
Input Frequency: 50/60 Hz
Low THD: <10%
Power Factor: >98%
Voltage Range: ±10% of 120-277V rated line (108-305V)

UL Type CC rated
UL Listed Class P, Type 1, Outdoor
CSA Certified
70°C Max Case Temperature
FCC 47CFR Part 18 Non-Consumer Class A Sound Rating
ANSI C62.41 Cat. A Transient Protection
QUICKSENSE Dynamic End-of-Lamp-Life Sensing
Remote Mounting (Max. wire length from ballast case to lampholder): up to 18 feet. Remote red leads up to 18 feet. Keep blue leads <10 feet.
RoHS Compliant[6]

4 Data based on PENTRON 28W lamp types for primary ballast application.
5 Operation below 50°F (10°C) may affect light output or lamp operation – see "Low Temp. Starting" definition.
6 Complies with European Union Restriction of Hazardous Substances Directive.

System Life / Warranty

QUICKTRONIC products are covered by the QUICK 60+® warranty, a comprehensive lamp and ballast system warranty. For additional details, refer to the QUICK 60+ warranty bulletin.

OSRAM SYLVANIA
National Customer Service and Sales Center
1-800-LIGHTBULB
(1-800-544-4828)
www.sylvania.com

Specifications subject to change without notice.

the system solution®

www.sylvania.com

QUICKTRONIC® PROStart® T8 Parallel Operation Systems

Job: OSU NRDT
Ballast for Types:
A5, A6, B2, B5, B10, B24, C2, C8, D2, D3, D5

Type CC, Lamp Striation Control
Parallel Operation
Normal Ballast Factor

NEMA Premium

RoHS compliant

High Efficiency Series

QHE T8 PSN

Lamp / Ballast Guide

Primary Systems
32W T8 - OCTRON® lamps
1-lamp QHE 1x32T8/UNV PSN-MC
2-lamp QHE 2x32T8/UNV PSN-MC
3-lamp QHE 3x32T8/UNV PSN-SC
4-lamp QHE 4x32T8/UNV PSN-SC

Also operates:
FO30/SS, FO28/SS, FO25/SS, FBO32, FBO31, FBO30/SS, FBO29/SS, FO25, FO17, FBO24 & FBO16

F40T8 operation:
1 lamp on 2L ballast; 2 lamps on 3L ballast; 3 lamps on 4L ballast

Key System Features

- High Efficiency Systems over 90% efficient
- NEMA Premium Electronic Ballast Program compliant
- PROStart programmed rapid start
  - Extends lamp life
- Parallel operation (one lamp out, remaining lamps stay lit)
- Normal ballast factor: 0.88
- UL Type CC
- LSC (Lamp Striation Control)
- Universal input voltage (120-277V)
- Minimum starting temperature:
  - -20°F (-29°C) for T8 lamps
  - 60°F (16°C) for energy saving T8 lamps
- RoHS compliant
- Lead-free solder, printed circuit board and manufacturing process

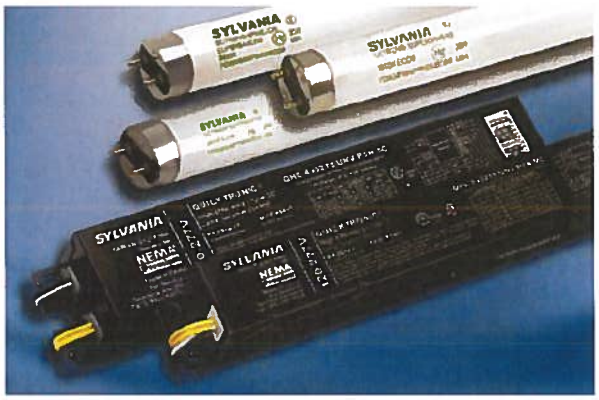
Application Information

SYLVANIA QUICKTRONIC PROStart T8 ballasts
are ideally suited for:

- Any application where extended lamp life is required to reduce maintenance costs
- Occupancy sensors
- Energy retrofits
- Building control systems

SYLVANIA QUICKTRONIC High Efficiency PROStart programmed rapid start electronic T8 ballast family offers several major advantages:

- High Efficiency: Operate 32W linear and U-bend equivalent T8 lamps, saving >2 watts as compared to standard T8 programmed rapid start ballasts.
- Parallel Circuitry: keeps remaining lamps lit if one or more go out.
- Lamp Striation Control (LSC): T8 energy saving lamps should be operated above 60°F, but under certain conditions, the lamps may striate. LSC circuitry will minimize or eliminate this condition in most applications. (Please consult lamp manufacturers for additional details.)
- Micro-Can Enclosure: the 1 & 2-lamp models are in the micro-can enclosure. This allows the ballast to fit in very small profile fixtures where standard can T8 ballasts are too large.
- NEMA Premium Electronic Ballast Program and RoHS compliant: These ballasts feature lead-free solder, printed circuit boards and manufacturing. The NEMA Premium Electronic Ballast Program promotes the use of high efficiency T8 electronic ballasts by meeting or exceeding the Ballast Efficiency Factors, (BEF) established by the CEE, (Consortium for Energy Efficiency). For addtional details on this program go to: *www.cee1.org or www.nema.org*
- Longer lamp life: PROStart technology extends lamp life compared to instant start models for long or short switching cycles, which is ideal for reducing maitenance costs or for saving energy when using occupancy sensors.
- UL Type CC compliant: ballasts utilize a micro-controller based circuit to reduce arcing caused by loose connections or improper lamp pin-to-socket connections.
- QUICK 60+® System Warranty: Setting the standard for quality the system is covered by the first and most comprehensive warranty in the industry.

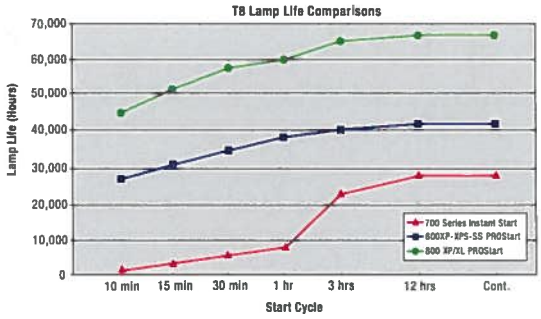


System Information

SYLVANIA QUICKTRONIC High Efficiency (QHE) System advantages:

- Operate from 120V through 277V
  - Eliminates "wrong voltage" errors
  - Reduces inventory by 50%
- Utilize Programmed Rapid Start operation for
  - Longer lamp life
  - Over 100,000 switching cycles for occupancy sensor and building control systems
- Operate at >42 kHz to reduce potential interference with infrared control systems

Lamp & Ballast Type	Input Power (W)	Initial Lumens	Initial LPW	Mean System Lumens	Relative Mean Light Output	% Energy Savings
3-FO32/700 QTP3x32T8/UNV ISN-SC	86	6865	80	6310	100%	0%
3-FO32/800/XP® QHE3x32T8/UNV PSN-SC	82	7920	97	7445	118%	5%
3-FO28/SS QHE3x32T8/UNV PSN-SC	72	7195	100	6760	107%	16%
3-FO25/SS QHE3x32T8/UNV PSN-SC	66	6535	99	6140	97%	23%



SEE THE WORLD IN A NEW LIGHT SYLVANIA

Job: OSU NRDT
Ballast for Types:

Normal Ballast Factor

T8 PROStart®

High Efficiency

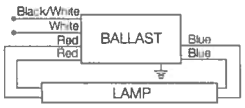
High Efficiency Parallel Wired, Type CC, Lamp Striation Control (120-277V)

RoHS compliant | NEMA Premium

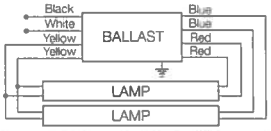
Item Number	OSRAM SYLVANIA Description	Input Current (AMPS)	Lamp Type	Rated Lumens (lm)	No. of Lamps	Ballast Factor (BF)	Initial System Lumens	Mean System Lumens	Input Power (W) 120V	Input Power (W) 277V	System Efficacy[1] (lm/W)	BEF[2]
	QHE1x32T8/UNV PSN-MC	0.26/0.11	F032/700	2600	1	0.88	2290	2105	30	29	79	3.03
51397 ○	*Banded 10-Pack*	0.26/0.11	F032XPS®	3100	1	0.88	2730	2565	30	29	94	3.03
51398 ○	*Pallet Pack*	0.26/0.11	F032XP®/XL	2950	1	0.88	2595	2440	30	29	90	3.03
		0.24/0.10	F030/SS	2850	1	0.88	2510	2360	28	26	97	3.38
		0.22/0.10	**F028/SS**	**2725**	**1**	**0.88**	**2400**	**2255**	**26**	**25**	**96**	**3.52**
		0.20/0.09	F025/SS	2475	1	0.88	2180	2045	23	23	95	3.83
	QHE2x32T8/UNV PSN-MC	0.48/0.21	F032/700	2600	2	0.88	4575	4205	57	55	83	1.60
51408 ○	*Banded 10-Pack*	0.48/0.21	F032XPS	3100	2	0.88	5455	5130	57	55	99	1.60
51409 ○	*Pallet Pack*	0.48/0.21	F032XP/XL	2950	2	0.88	5190	4980	57	55	94	3.03
		0.46/0.20	F030/SS	2850	2	0.88	5015	4715	55	53	95	1.66
		0.43/0.18	**F028/SS**	**2725**	**2**	**0.88**	**4795**	**4510**	**51**	**50**	**96**	**1.76**
		0.38/0.16	F025/SS	2475	2	0.88	4355	4095	45	44	99	2.00
	QHE3x32T8/UNV PSN-SC	0.69/0.29	F032/700	2600	3	0.88	6865	6310	83	82	84	1.07
51413 ○	*Banded 10-Pack*	0.69/0.29	F032XPS	3100	3	0.88	8185	7695	83	82	100	1.07
51414 ○	*Pallet Pack*	0.69/0.29	F032XP/XL	2950	3	0.88	7790	7320	83	82	95	3.03
		0.68/0.28	F030/SS	2850	3	0.88	7525	7075	80	78	96	1.13
		0.62/0.27	**F028/SS**	**2725**	**3**	**0.88**	**7195**	**6760**	**73**	**72**	**100**	**1.22**
		0.56/0.24	F025/SS	2475	3	0.88	6535	6140	67	66	99	1.33
	QHE4x32T8/UNV PSN-SC	0.93/0.39	F032/700	2600	4	0.88	9150	8415	111	108	85	0.81
51418 ○	*Banded 10-Pack*	0.93/0.39	F032XPS	3100	4	0.88	10,910	10,255	111	108	101	0.81
51419 ○	*Pallet Pack*	0.93/0.39	F032XP/XL	2950	4	0.88	10,385	9760	111	108	94	3.03
		0.89/0.38	F030/SS	2850	4	0.88	10,030	9430	105	103	97	0.85
		0.83/0.35	**F028/SS**	**2725**	**4**	**0.88**	**9590**	**9015**	**98**	**95**	**101**	**0.93**
		0.77/0.33	F025/SS	2475	4	0.88	8710	8190	91	89	98	0.99

Banded Pack contains 10 pieces each, (add "-B" to description). Pallet Pack contains 840 pieces, (add "-PAL" to description).
1 System Efficacy is based on the lowest Input Power
2 BEF (Ballast Efficiency Factor) shown = (Ballast Factor x 100) divided by Input Power (Note: calculation based on lowest input power)
○ *Preliminary specifications. Please contact OSRAM SYLVANIA for additional information.*

1 lamp



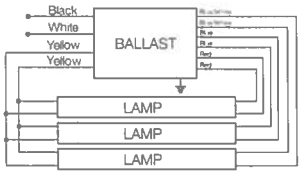
2 lamp



Note: For 1L application, individually cap both RED leads. Insulate to 600 volts.

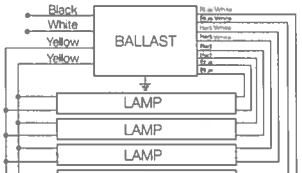
Installation Notes Lamp wiring for 3 & 4 lamp QHE PSX "parallel" models vary from QTP series models. Be sure to wire ballasts per label/schematics shown on this bulletin.

3 lamp



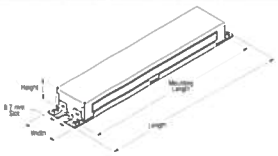
Note: For 2L application, individually cap both RED leads. For 1L operation, individually cap both RED and BLUE leads. Insulate to 600 volts.

4 lamp



Note: For 3L application, individually cap both RED leads. For 2L application, individually cap both RED and BLUE leads. For 1L application, individually cap both RED, BLUE and Red/White leads. For lamps approved for 1L operation, see QUICKSYSTEMS. Insulate to 600 volts.

"SC" Overall: 9.5" L x 1.68" W x 1.18" H
"MC" Overall: 9.5" L x 1.30" W x 1.00" H
Mounting: 8.90"



Product Weight:
QHE1xPSN & QHE2xPSN: 0.66 lbs. each
QHE3xPSN & QHE4xPSN: 1.27 lbs. each

Wiring:
Leads only (no connectors provided)

Item Number — 51408 QHE 2 x 32T8 / UNV PSN - MC
QUICKTRONIC High Efficiency
Number of Lamps
Case Size
Starting/Ballast Factor
Line Voltage (120-277V)
Primary Lamp Wattage

Performance Guide

Data based upon SYLVANIA OCTRON® lamps shown. QUICKTRONIC® QHE PROStart ballasts are also compatible with other lamp manufacturers equivalent lamp types that meet ANSI specifications.

QHE PROStart ballasts will operate F32 (and the SUPERSAVER® & U-Bend equivalent) T8 lamps. Complete performance data is available in the QUICKSYSTEMS section of the SYLVANIA Ballast Technology & Specification Guide.

Specifications

Data based on F32T8

Starting Method: Programmed Rapid Start
Ballast Factor: 0.88
Circuit Type: Parallel
Lamp Frequency: >42 kHz
Lamp CCF: Less than 1.7
Starting Temp:[3]
-20°F (-29°C) for OCTRON T8 lamps;
60°F (16°C) for SUPERSAVER® T8 lamps
Input Frequency: 50/60 Hz
Low THD: <10%
Power Factor: >98%
Voltage Range: ±10% of 120-277V rated line (108-305V)

UL Listed Class P, Type 1 Outdoor
UL Type CC Rated
Lamp Striation Control (LSC)
CSA Certified (where applicable)
70°C Max. Case Temperature
FCC 47 CFR Part 18 Non-Consumer Class A Sound Rating
NEMA Premium Electronic Ballast Program compliant
RoHS compliant[4]
ANSI C62.41 Cat. A Transient Protection
GFCI & emergency ballast compatible
Remote Mounting (Max wire length from ballast case to lampholder):
- 20 ft: full wattage T8s
- 10 ft: energy saving T8s
- 4 ft: 25W energy saving T8s

3 Operation below 50°F (10°C) may affect light output or lamp operation – see "Low Temp. Starting" definition.

4 Complies with European Union Restriction of Hazardous Substances Directive.

System Life / Warranty

QUICKTRONIC products are covered by the QUICK 60+® warranty, a comprehensive lamp and ballast system warranty. For additional details, refer to the QUICK 60+ warranty bulletin.

OSRAM SYLVANIA
National Customer Service and Sales Center
1-800-LIGHTBULB
(1-800-544-4828)
www.sylvania.com

Specifications subject to change without notice.

QHE T8 PSN

the system solution®

Job: OSU - NRDT
Ballast for Types:
A45, A63, A74, A5, K1

www.sylvania.com

QUICKTRONIC® PROStart® CF Universal Dual Entry Systems

<10% THD Electronic T4 Compact Fluorescent Programmed Rapid Start Systems Normal Ballast Factor

RoHS compliant

Professional Series

CF DUAL ENTRY

Lamp / Ballast Guide

Primary Systems

13W T4 – DULUX D/E, T/E lamps
1-lamp or 2-lamp QTP1/2x13CF/UNV

18W T4 – DULUX D/E, T/E lamps
1-lamp or 2-lamp QTP1/2x18CF/UNV

26W T4 – DULUX D/E, T/E lamps
1-lamp QTP2x26CF/UNV
2-lamp QTP2x26CF/UNV

32 or 42W T4 – DULUX T/E lamps
1-lamp QTP2x26CF/UNV
2-lamp QTP2x26/32/42CF/UNV

57W or 70W T4 – DULUX T/E lamp
1-lamp QTP2x26/32/42CF/UNV

For other lamp types, refer to the Performance Guide section on the next page.

Key System Features

- Universal Input Voltage (120-277V)
- Dual entry, color coded connectors
- PROStart Ballasts program rapid start
- QUICKSENSE ballast technology
- High Power Factor
- Low Harmonic Distortion
- Small size and lightweight
- Metal enclosure
- UL, CSA, FCC
- QUICK 60+ warranty
- RoHS compliant
- Lead-free solder, printed circuit board and manufacturing process

Application Information

SYLVANIA QUICKTRONIC CF ballasts
are ideally suited for:

- Recessed downlights
- Wall sconces
- Ceiling fixtures
- Commercial
- Retail, hospitality, institutional

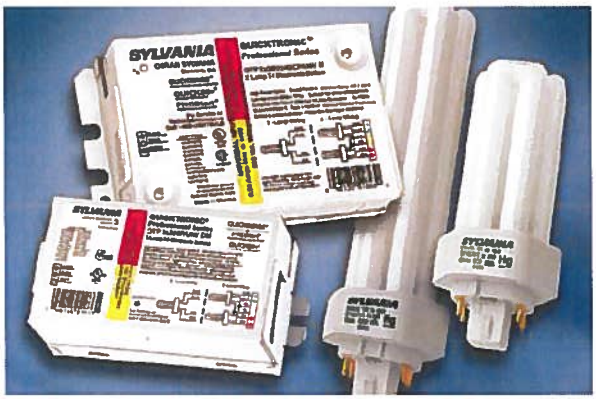
SYLVANIA QUICKTRONIC PROStart CF ballasts operate DULUX® D/E and T/E lamps with full lumen output and optimal system performance.

QUICKTRONIC CF ballasts feature one mounting style of low profile, lightweight enclosures to provide simple assembly for any fixture application.

Universal input voltage (120–277V) and multi-lamp multi-watt capability allow for fewer SKUs to support a wide range of applications.

Dual entry, color coded connectors located on the side and bottom allow for increased mounting flexibility with one ballast and also increased ease of installation.

These ballasts are RoHS compliant and feature lead-free solder, printed circuit boards and manufacturing process.



Setting the standard for quality, QUICKTRONIC PROStart CF Systems are covered by our QUICK 60+® warranty, the first and most comprehensive system warranty in the industry.

System Information

PROStart programmed rapid start is the optimum starting method, providing up to 100,000 switching cycles for use on occupancy sensors and building control systems.

QUICKSENSE® end-of-lamp-life sensing technology helps to protect against overheated bases and sockets, as well as cracking of the glass wall. QUICKSENSE ballast technology uses dynamic end-of-lamp-life sensing to avoid false shutdowns caused by some static sensing methods and will auto-reset when the end-of-life lamps are replaced with new ones.

QUICKTRONIC CF ballasts come with wire-trap connectors for quick and easy installation.

Small Metal Case

Dual Entry Metal with and without PEM Studs
Side & Bottom Mount Capabilities

QTP2x26/32/42CF/UNV Metal Case Models

Dual Entry Metal with and without PEM Studs
Side & Bottom Mount Capabilities

SEE THE WORLD IN A NEW LIGHT SYLVANIA

Job: OSU - NRDT
Ballast for Types:

Normal Ballast Factor

CF PROStart®

Professional Series

CF DUAL ENTRY

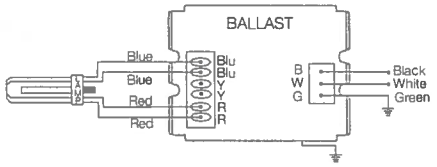
Universal Voltage (120-277V)

RoHS compliant

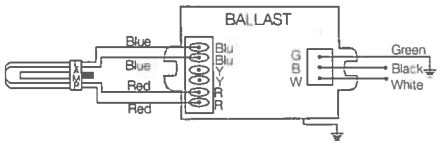
Item Number	Description[2]	Input Current (AMPS)	Lamp[1] Type	Rated[2] Lumens (lm)	No. of Lamps	Ballast Factor (BF)	System Lumens	Mean Lumens	Input Power (Watts)	System Efficacy (lm/W)	BEF[4]
51818	QTP1/2x13CF/UNV DM	0.25/0.11	13W DD/E,T/E	900	1	1.00	900	775	16	56	6.25
			13W DD/E,T/E	900	2	1.00	1800	1550	29	62	3.45
51823	QTP1/2x18CF/UNV DM	0.32/0.14	18W DD/E,T/E	1200	1	1.00	1200	1030	20	60	5.00
			18W DD/E,T/E	1200	2	1.00	2400	2065	38	63	2.63
51833	QTP2x26CF/UNV DM	0.50/0.22	26W DD/E,T/E	1800	1	1.00	1800	1550	28	64	3.57
51898	QTP2x26CF/UNV DM PEM		26W DD/E,T/E	1800	2	1.00	3600	3095	54	67	1.85
			32W DT/E	2400	1	0.98	2350	2025	35	67	2.80
			42W DT/E	3200	1	0.96	3070	2640	45	68	2.13
51843	QTP2x26/32/42CF/UNV DM	0.90/0.40	26W DT/E	1800	2	1.02	3670	3155	54	68	1.89
51863	QTP2x26/32/42CF/UNV DM PEM		32W DT/E	2400	2	0.96	4610	3965	69	67	1.39
			42W DT/E	3200	2	0.95	6080	5230	94	65	1.01
		0.53/0.23	57W DT/E	4300	1	1.00	4300	3700	62	69	1.61
		0.57/0.25	70W DT/E	5200	1	0.92	4780	4115	71	67	1.30

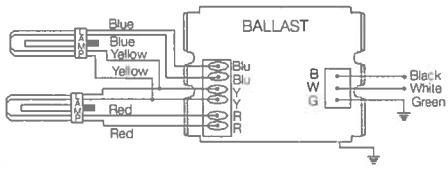
1 Also compatible with other manufacturers' equivalent 4 pin lamp types that meet ANSI specifications.
2 Rated lamp lumens and performance data based on DULUX T/E series 4 pin lamps.
3 Data is for all models within the brackets. The maximum input current is shown for maximum input power.
4 Ballast Efficiency Factor (BEF) shown = (Ballast Factor x 100) divided by Input Power (Note: calculation based on lowest wattage value).

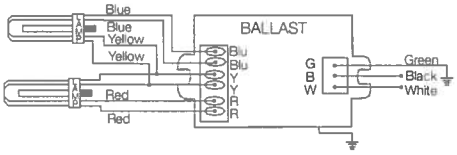
Metal Case (51843 & 51863)



Small Metal Case (51818, 51823, 51833 & 51898)







Dimensions:
Metal case (51843 & 51863): 4.95" L x 2.93" W x 1.35" H
Small Metal case (51818, 51823, 51833 & 51898): 4.95" L x 2.37" W x 1.10" H
Mounting: Utilize flanges (4.57" L), or (2) #8-32 x 0.375" Long
PEM studs on 2" centers

Packaging:
Quantity: 20 pieces per case
16 pieces per case for Item Number 51898
18 pieces per case for Item Number 51863
Weight: 0.40 lbs ea. (Small Metal case)
0.90 lbs ea. (Metal case)

Wiring:
Push-in connectors (no leads provided)
Use 18AWG solid copper wire only

Item Number — **51843 QTP 2 x 26/32/42 CF / UNV DM** — Case Type (Dual Mount)
QUICKTRONIC PROFESSIONAL — Line Voltage (120-277V)
Number of Lamps (1, 2) — Primary Lamp Wattage

Performance Guide

QTP 2x26CF/UNV models also operates:
1-lamp: CF28/2D, CF38/2D, FPC40/T5, FT40DL

1- or 2-lamp: FPC22/T5, FT24DL, FT24DF

2-lamp: CF13DSE, FT18DL, FT18DF, CF21/2D

QTP 2x26/32/42CF/UNV models also operates:
2-lamp: FT36DL, FT40DL, FPC40T5

1+1: FPC22/T5 / FPC40/T5

Specifications

Starting Method: Programmed Rapid Start
Circuit Type: Series
Lamp Frequency: >42 kHz
Lamp CCF: Less than 1.7
Starting Temp: -5°F/-20°C min.[5]
Input Frequency: 50/60 Hz
Low THD: <10%
Power Factor: >98%
Voltage Range: ±10% of 120-277V rated line (108-305V)

UL Listed Class P, Type 1 Outdoor
CSA or C/UL Certified
75°C Max Case Temp. (5 yr. warranty)
80°C Max Case Temp. (3 yr. warranty)
FCC 47CFR Part 18 Non-Consumer
Sound Rated A
RoHS Compliant[6]
ANSI C62.41 Cat. A Transient Protection
Dynamic End-of-Lamp-Life Sensing
Remote Mounting (Max. wire length from ballast case to lampholder): up to 15 feet for one lamp and up to 6 feet for two lamp.

5 Operation below 50°F (10°C) may affect light output or lamp operation – see Low Temperature Starting definition.

6 Complies with European Union Restriction of Hazardous Substances Directive (Directive EC 2002/95)

System Life / Warranty

QUICKTRONIC products are covered by the QUICK 60+® warranty, a comprehensive lamp and ballast system warranty. For additional details, refer to the QUICK 60+ warranty bulletin.

OSRAM SYLVANIA
National Customer
Service and Sales Center
1-800-LIGHTBULB
(1-800-544-4828)
www.sylvania.com

Specifications subject to change without notice.

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** MS-A102-IVORY Notes:	**Type:** SPEC14-5147

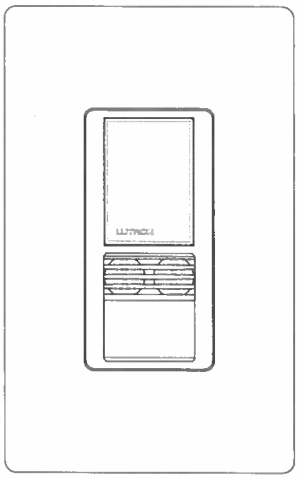
Maestro® **Dual Technology Occupancy Sensor Switch** **Sensor**

369773c 1 04.09.14

Maestro® Dual Technology Sensor Switch

The Maestro® Dual Technology (Dual Tech) Occupancy Sensor Switch applies our exclusive XCT™ Technology to the ultrasonic as well as the passive infrared technology in this sensor to create a product that can detect very fine motion, such as typing. This product also includes all of the great features found in the rest of the Maestro® sensor family, including: adaptive relay switching, smart ambient light detection, and simple button presses for changing settings. The Maestro® Dual Tech Occupancy Sensor Switch is available in single-circuit and dual-circuit versions.

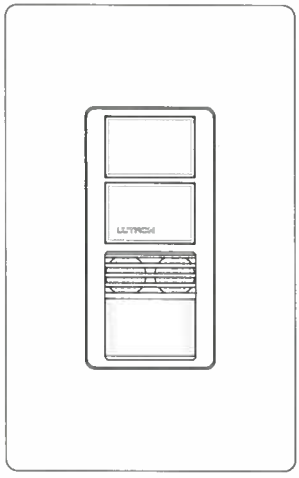
The single-circuit versions (MS-A102, MS-B102) can be used to meet many of the Title 20/24, ASHRAE 90.1, and IECC code requirements such as "automatic shutoff". The dual-circuit versions (MS-A202, MS-B202) can be used to meet many of the Title 20/24, ASHRAE 90.1, and IECC code requirements such as "automatic shutoff" and "multi-level lighting control". To find some examples of code-specific applications, visit www.lutron.com/energycodes



MS-A102-XX (Occupancy model)
MS-A102-V-XX (Vacancy model)
MS-B102-XX (Occupancy model)
MS-B102-V-XX (Vacancy model)

Features

- XCT™ Technology for major, minor, fine, and very fine motion detection
- 180° sensor field-of-view
- Tamper-resistant PIR lens
- Up to 900 ft² (81 m²) major motion coverage and 400 ft² (36 m²) minor motion coverage
- Two Ambient Light Detect (ALD) options:
  - Learning ALD Mode:
    Uses adaptive algorithm.
    Sensor learns user's preferred light level over time.
  - Fixed ALD mode:
    Four selectable light level thresholds: Hi, Med, Low, Min
- Occupancy models (MS-A102-XX, MS-B102-XX, MS-A202-XX, MS-B202-XX) can be set to Auto-ON/Auto-OFF or Manual-ON/Auto-OFF per circuit
- Dual-circuit models (MS-A202, MS-B202) meet Title 24 requirements for multi-level lighting control.
- Single-circuit "Vacancy" models (MS-A102-V-XX, MS-B102-V-XX) available to meet Title 24/Title 20 requirements for vacancy sensors.
- Adjustable timeout for each circuit (1, 5, 15, or 30 minutes)
- Sensitivity adjustment
  - PIR (Hi, Med, Low, Min)
  - Ultrasonic (Hi, Med, Low, Off)
- Switches all lighting loads: incandescent, halogen, ELV, MLV, CFL, LED, magnetic fluorescent, electronic fluorescent
- Switches fan loads at 120 V~
- MS-B102, MS-B102-V work with Maestro® accessory switches in multi-location applications
- MS-A models DO NOT require neutral wiring, while the MS-B models DO require neutral wiring.



MS-A202-XX (Occupancy model)
MS-B202-XX (Occupancy model)

Notes:

- "XX" in the model number represents color/finish code. See **Colors and Finishes** at end of document.
- Wallplate not included.

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** MS-A102- Notes:	**Type:** SPEC14-5147

Maestro® Dual Technology Occupancy Sensor Switch Sensor

369773c 2 04.09.14

Specifications

Regulatory Approvals

- UL Listed to U.S. and Canadian safety requirements (applies only to MS-B102, MS-B102-V, MS-B202)
- NOM certified
- Title 20/24 certified lighting control device
  – Complies with Title 20 and Title 24 section 110.9

Power/Load Control

- 120–277 V~ 50/60 Hz

Key Design Features

- Dual Sensing Technology
- Switches all lighting loads
- 6 A of lighting load per circuit at 120–277 V~
- 4.4 A (1/6 HP) of fan load per circuit at 120 V~
- Crush/tamper resistant lens
- Smart Ambient Light Detection (ALD)
- Fixed Ambient Light Detection
- Adaptive zero-cross switching algorithm for extended relay life (patent pending)
- XCT™ Technology for major, minor, fine, and very fine motion detection
- Programmable Circuit Swapping eliminates need for rewiring to reassign circuits after installation of a dual-circuit product. (patent pending)
- Product ground current does not exceed 0.5 mA

Environment

- Ambient operating temperature: 32 °F to 104 °F (0 °C to 40 °C), 0%–90% humidity, non-condensing. Indoor use only.

Warranty

- 5-Year Limited Warranty. For additional Warranty information, please visit www.lutron.com/TechnicalDocumentLibrary/Sensor_Warranty.pdf

Sensor Detection

Lutron Dual Tech sensors operate by triggering initial occupancy using PIR technology, and maintain occupancy using both ultrasonic and PIR technology.

Advanced Features

Switching

- Adaptive zero-cross switching—maximizes relay life by switching at the point of minimum energy on the AC power curve (patent pending). Actively adapts to variations in relay timing.

Additional Information on Sensors

- For single-circuit PIR Maestro Occupancy Sensor Switch models, please see Lutron P/N 369666
- For Maestro Occupancy Sensor C•L Dimmer models, please see Lutron P/N 369748
- For dual-circuit PIR Maestro Occupancy Sensor Switch, please see Lutron P/N 369758
- For more information, please see www.lutron.com/occvacsensors
- Lutron Technical Hotline: 1.800.523.9466.

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** MS-A102- Notes:	**Type:** SPEC14-5147

Maestro® Dual Technology Occupancy Sensor Switch Sensor

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Custom Settings

Default settings shown in bold

- Timeout

- 30 min
- **15 min**
- 5 min
- 1 min

Mode - **Sensor Modes**

Lights automatically turn off in all sensor modes

- **Occ -Occupancy mode (No ALD)** [1,2,3]
- Lrn - Occupancy with learning ALD mode
- Fixd - Occupancy with fixed ALD mode
- Vac - Vacancy mode (No ALD) [2,3]

1 MS-A102-XX, MS-B102-XX default is Occ
2 MS-A102-V-XX, MS-B102-V-XX is locked as Vac
3 MS-A202-XX, MS-B202-XX defaults are: Circuit 1 - Occ, Circuit 2 - Vac

- Ultrasonic Sensitivity

- High
- **Med**
- Low
- Off

PIR - **Passive Infrared Sensitivity**

- **High**
- Med
- Low
- Min

Additional Settings

Fixed ALD Light Level

- Hi
- Med
- **Low***
- Min

* "Low" is the default setting for any sensor that is set by the user to Occupancy with fixed ALD mode

f-While-Occupied

- **Enabled**
- Disabled

Walk-Thru Mode

- Enabled
- **Disabled**

Custom Settings - Details

Ambient Light Detection (ALD) mode

Lights turn on only when natural light in the room is below the set threshold.

- Learning: The ambient light threshold adjusts to the user's preference via manual interaction with the sensor switch.
- Fixed: Choose a fixed ALD light level from four pre-set options: High, Medium, Low, and Minimum

Manual Off-While-Occupied Options

ENABLED (default setting)

- When the sensor switch is manually turned off, the sensor switch will not turn the lights back on automatically while the room is occupied.
- Once the room is vacated, the Auto-On feature returns to normal operation after the timeout period has expired.
- This may be the preference in conference rooms or classrooms while viewing presentations. This feature requires motions to keep the lights off.

DISABLED

- When the sensor switch is manually turned off, the Auto-On feature will return to normal operation after 25 seconds.
- This may be the preference in a restroom if the user always wants the lights to turn on upon entering and the lights to turn off when the room is vacant.

Walk-Thru Mode

ENABLED [1]

- If motion is not detected within 3 minutes after initial occupancy, the lights will turn off after 3 minutes, instead of the current timeout.
- This setting may be the preference in commercial applications where personnel may briefly trigger sensors during non-working hours.

DISABLED (default setting)

- When motion is detected, the lights will ALWAYS remain on for the entire timeout duration, regardless of the duration of occupancy detection.

1 1 minute timeout would be overridden if walk-thru mode is also ENABLED

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** MS-A102- Notes:	**Type:** SPEC14-5147

Maestro® **Dual Technology Occupancy Sensor Switch** **Sensor**

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Load Type and Capacity

Control	Neutral Connection Required	Vacancy Only	Number of Circuits	Voltage / Load Type / Maximum Load (Anywhere in Gang) [1]	Minimum Load	3-Way with Mechanical Switch	Multi-Location with Accessory Switch
					0 A		
				Lighting 6 A [2]			
				120 V~ Fan 4.4 A (1/6 HP) [3]			

[1] Ratings shown are per circuit.

[2] Sensor Switch Load Type: Designed for use with permanently installed incandescent, halogen, MLV, ELV, CFL, LED, magnetic fluorescent, and electronic fluorescent lighting loads.

[3] When controlling light and fan loads simultaneously on a single-circuit, maximum load capacity per circuit is 4.4 A at 120 V~.

Sensor Switch Placement

- The sensor switch performs better with an unobstructed view of room occupants.
- Hot objects and moving air currents can affect the performance of the sensor switch. The sensor switch performs best when located 6 ft (1.8 m) or more away from hot objects or moving air currents.
- The PIR performance depends on a temperature differential between the ambient room temperature and that of room occupants. Warmer rooms may reduce the ability of the sensor switch to detect occupants.
- The ultrasonic performance can be affected by air currents and moving objects. Consider the effects of fans, HVAC vents, open windows, or moving objects when installing the sensor switch.
- If the sensor sees a specific area that is not desired (e.g., hallway), Lutron offers a lens mask kit (Lutron® P/N 50013614) that can be ordered through Tech Support (1.800.523.9466). Alternatively, selectively placing opaque tape (e.g., painter's tape, electrical tape, masking tape) over certain parts of the lens can limit it's field of vision to block undesired detection areas. Masking the lens may effect ALD performance, but DOES NOT block ultrasonic frequencies.

Definitions

Major motion: movement of a person entering or passing through an area.

Minor motion: movement of a person occupying an area and engaging in small activities (e.g., reaching for a telephone, turning the pages of a book, opening a file folder, picking up a coffee cup).

Fine Motion: movement of a person occupying an area and engaging in very small activities (e.g., reading a magazine).

Very Fine Motion: movement of a person occupying an area and engaging in very small activities (e.g., typing on a keyboard).

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015
Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: MS-A102-

Notes:

Type:

SPEC14-5147

Maestro® **Dual Technology Occupancy Sensor Switch** **Sensor**

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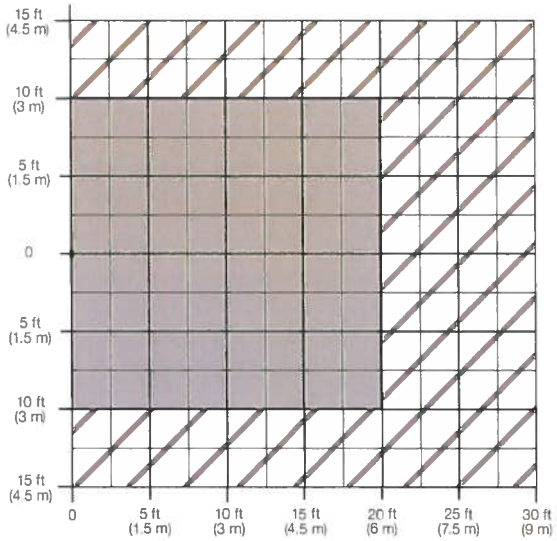
Sensor Switch Placement *(continued)*

NEMA WD7 Coverage

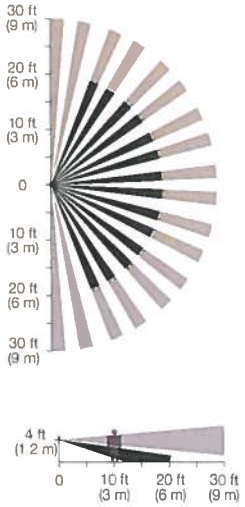
Major motion coverage: 900 ft² (81 m²)

Minor motion coverage: 400 ft² (36 m²)

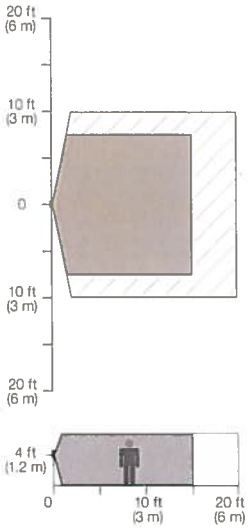


Test Room Dimensions: 37 ft x 38 ft (11.28 m x 11.6 m)
Test Floor Surface Material: Carpet
Sensor Coverage Angle: 180 °
Major motion coverage: Initial trigger motion detection
Minor motion coverage: Maintained motion detection

Passive Infrared Beam Diagram
(For Reference Only)



Ultrasonic Coverage
(For Reference Only)



Ultrasonic Frequency: 40 kHz

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015 Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.			
SPECTRUM LIGHTING	**Job Name:** OSU - NRDT BUILDINGS	**Catalog Number:** MS-A102- Notes:	**Type:** SPEC14-5147

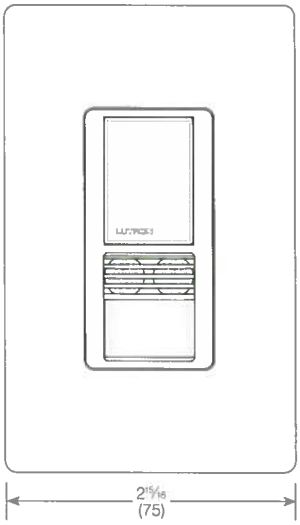
Maestro® Dual Technology Occupancy Sensor Switch Sensor

369773c 6 04.09.14

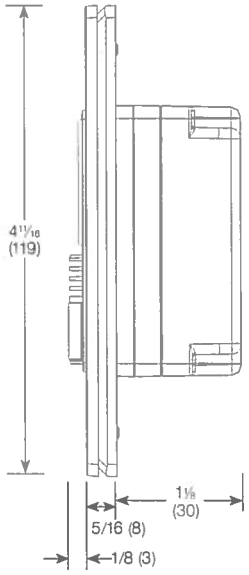
Dimensions - Single-Circuit
MS-A102, MS-A102-V, MS-B102, MS-B102-V

Measurements shown as: in (mm).

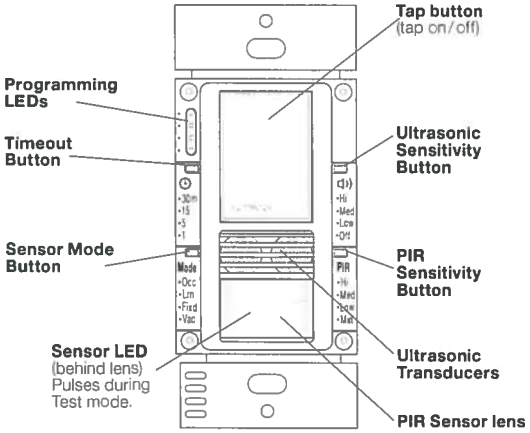
Front View



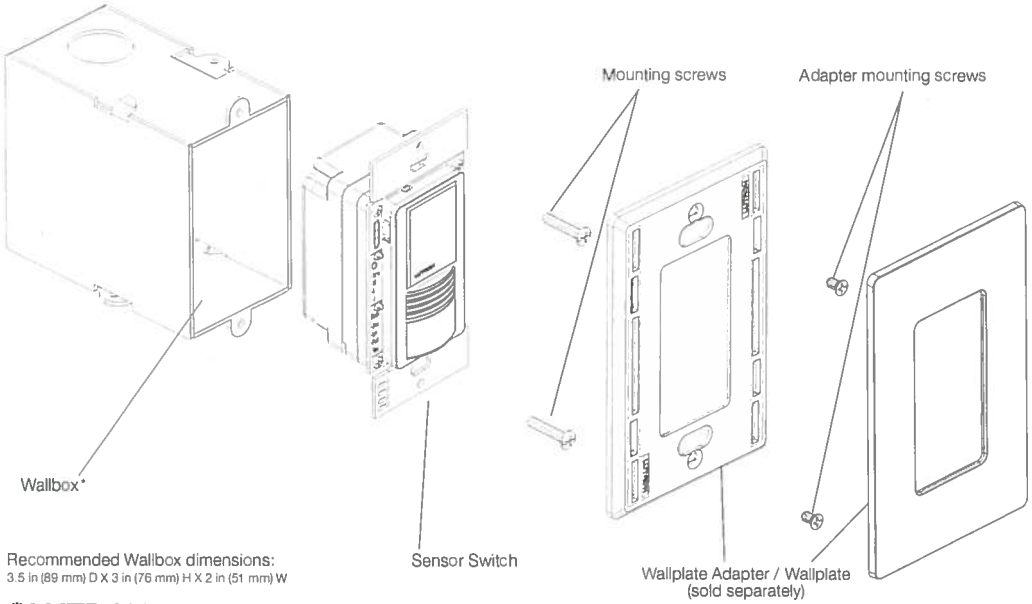
Side View



Operation



Mounting



* Recommended Wallbox dimensions:
3.5 in (89 mm) D X 3 in (76 mm) H X 2 in (51 mm) W

LUTRON® SPECIFICATION SUBMITTAL Page

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name:
OSU - NRDT BUILDINGS

Catalog Number:
MS-A102-

Notes:

Type:

SPEC14-5147

Maestro® **Dual Technology Occupancy Sensor Switch** **Sensor**

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Colors and Finishes

Gloss Finishes

White
WH

Ivory
IV

Almond
AL

Light Almond
LA

Gray
GR

Brown
BR

Black
BL

Satin Finishes

Hot
HT

Merlot
MR

Plum
PL

Turquoise
TQ

Taupe
TP

Eggshell
ES

Biscuit
BI

Snow
SW

Palladium
PD

Midnight
MN

Sienna
SI

Terracotta
TC

Greenbriar
GB

Bluestone
BG

Mocha Stone
MS

Goldstone
GS

Desert Stone
DS

Stone
ST

Limestone
LS

Sea Glass
SG

- Due to printing limitations, colors and finishes shown cannot be guaranteed to match actual product colors perfectly.
- Color chip keychains are available for more precise color matching:
  Gloss Finishes: DG-CK-1
  Satin Finishes: SC-CK-1

Job Name:	Model Numbers:
Job Number:	

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: OAC-DT-1000-R

Notes:

Type:

SPEC14-5147

Greengate

OAC-DT, MicroSet Dual Tech Ceiling Sensor Low Voltage

PIR Activated | Ultrasonic Activated | MicroSet Self-Adjusting | California Title 24 Compliant

- MicroSet self-adjusting Time Delay and sensitivity
- Optional built-in light level sensor
- Optional BAS/HVAC isolated relay
- NEMA WD7 Standard robotic method utilized to verify coverage patterns
- Selectable Walk Through Mode

Specifications:

Technology: Passive Infrared (PIR) and Ultrasonic (US)
Power Requirements:
Input:
- 10-30 VDC from Greengate Switchpack or Greengate system.
- Maximum current needed is 25mA per sensor.

Output:
- Open collector output to switch up to ten Greengate Switchpacks.
- BAS with Isolated Form C Relay in (-R) model.
- Isolated Form C Relay Ratings: 1A 30 VDC/VAC.

Time Delays: Self-adjustable, 15 seconds/test (10 min. Auto), or Selectable 5, 15, 30 minutes, or Zero Time Delay
Coverage: 500, 1000, and 2000 sq. ft.
Light Level Sensing (-R models): 0 to 300 foot-candles
Operating Environment:
- Temperature: 32°F - 104°F (0°C - 40°C)
- Relative humidity: 20% to 90%, non-condensing
- For indoor use only

Housing: Durable, injection molded housing. Polycarbonate resin complies with UL 94V0.
Size: 4.5"H x 1.42"W (114.3mm x 36.068mm)
LED lamp: Green LED for Ultrasonic
Red LED for Passive Infrared
Warranty: Five year

FCC Compliant
cULus Listed
RoHS Compliant c UL us RoHS

www.coopercontrol.com

Catalog #		Type	
Project			
Comments			
Prepared by		Date	

Overview

The Dual Technology sensor's combination of Ultrasonic and Passive Infrared technologies offers the most complete sensing equipment available today. This pairing helps eliminate false activations or deactivations for additional energy savings. The OAC-DT sensors are also equipped with MicroSet self-adjusting technology which provides an adaptive and airflow tolerant technology, making them ideal for spaces which have increased airflow due to higher occupant levels. MicroSet self-adjusting Dual Technology sensors drastically simplify and reduce a contractor's installation and adjustment time period.

Technology

The MicroSet self-adjusting technology continuously monitors multiple sub-frequencies in the event that if a continuous Doppler shift occurs, such as those created by airflow from an air duct, the sensor will identify the noise as continuous and then block it out of view at a select sub-frequency. It will continue to monitor other sub-frequencies for human motion. This avoids false-activation, while still maintaining the high level of sensitivity that is necessary for sensing minor motion in a changing environment. Separate concurrent time delays for both Passive Infrared and Ultrasonic technologies avoid false activations or deactivations. In Automatic ON Mode, the lights turn ON when a person enters the room. In Manual On Mode (-R model only), the lights are turned ON by activating a momentary switch (model # GMDS-*) that is connected to the sensor. When enabled, the daylighting feature (-R models only) prevents lights from turning ON when the room is adequately illuminated by natural light.

Applications

classrooms	common areas	hallways
conference rooms	computer rooms	other indoor office spaces
office spaces	break rooms	

Ordering

Catalog #	Recommended Room Size	Field of View	Frequency	Features
OAC-DT-2000-R	2,000 sq.ft.	Two Way (360°)	32 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-2000	2,000 sq.ft.	Two Way (360°)	32 kHz	
OAC-DT-1000-R	1,000 sq.ft.	Two Way (360°)	32 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-1000	1,000 sq.ft.	Two Way (360°)	32 kHz	
OAC-DT-0501-R	500 sq.ft.	One Way (180°)	40 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-0501	500 sq.ft.	One Way (180°)	40 kHz	

Occupancy Sensors - Ceiling Mount

203 Cooper Circle
Peachtree City, GA 30269
P: 800-553-3879
F: 800-954-7016

COOPER Controls

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: OAC-DT-1000-R

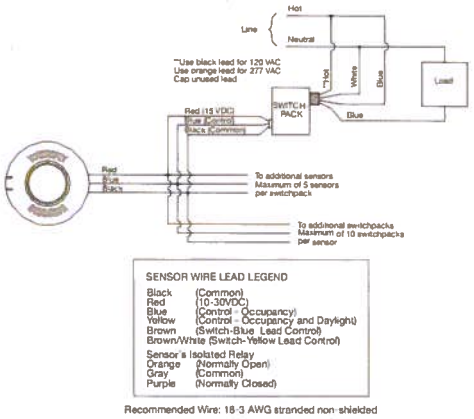
Notes:

Type: SPEC14-5147

OAC-DT, MicroSet Dual Tech Low Voltage

Wiring Diagrams

One Sensor, One Switchpack



SENSOR WIRE LEAD LEGEND

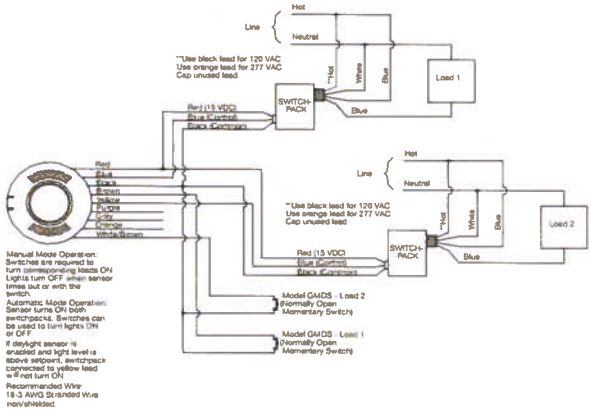
Black	(Common)
Red	(10-30VDC)
Blue	(Control - Occupancy)
Yellow	(Control - Occupancy and Daylight)
Brown	(Switch-Blue Lead Control)
Brown/White	(Switch-Yellow Lead Control)

Sensor's Isolated Relay

Orange	(Normally Open)
Gray	(Common)
Purple	(Normally Closed)

Recommended Wire: 18-3 AWG stranded non-shielded

Manual or Automatic-On Control of Two Standard Switchpacks

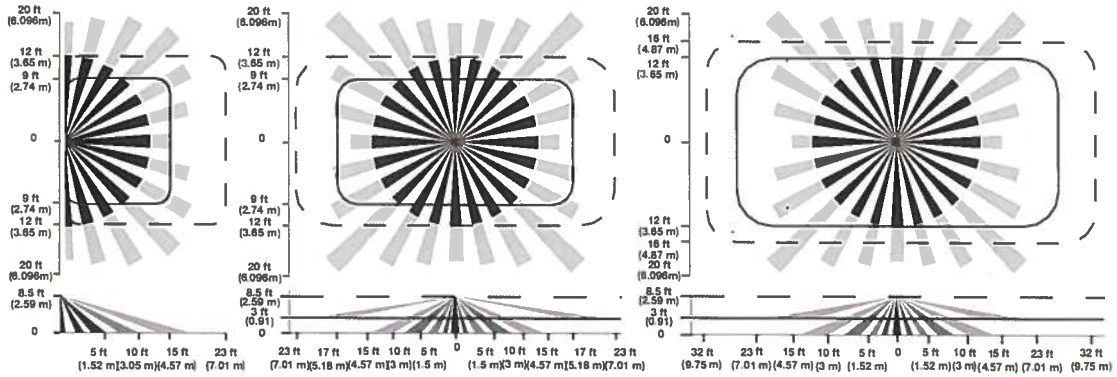


Coverage

OAC-DT-0501-R
500 sq. ft.

OAC-DT-1000-R
1,000 sq. ft.

OAC-DT-2000-R
2,000 sq. ft.



Recommended Mounting Height: 8 to 12 ft

Minor Motion, IR
Major Motion, IR
Minor Motion, Ultrasonic
Major Motion, Ultrasonic

Maximum coverage area may vary somewhat according to room shape and the presence of obstacles.

The NEMA WD 7 Standard and robotic method were utilized to verify coverage patterns.

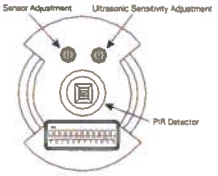
Controls

DIP Switch Legend

DIP Switch	Time Delay 1	Time Delay 2	Activation Relay 1 3	Activation Relay 2 4	PIR Sensitivity 5	Walk-Through Mode 6	LEDs 7	Override 8	Sweep 9	Full/Half Logic 10	HVAC/Tracking 11	Zero Time Delay 12
Auto*	▼	▼	Auto ▼	Auto ▼	Full ▼	Disable ▼	Enable ▼	Disable ▼	Disable ▼	Normal ▼	Disable ▼	Disable ▼
5 Minutes	▼	▲	Manual ▲	Manual ▲	50% ▲	Enable ▲	Disable ▲	Enable ▲	Enable ▲	Swap ▲	Enable ▲	Enable ▲
15 Minutes	▲	▼	(-R model only)	(-R model only)						(-R model only)	(-R model only)	
30 Minutes	▲	▲										

*Self-Adjusts to 10 min. user mode

Default =



www.coopercontrol.com
203 Cooper Circle Peachtree City, GA 30269
P: 800-553-3879 F: 800-954-7016

COOPER Controls

ACC120009

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: OAC-DT-0501-R

Notes:

Type:

SPEC14-5147

Greengate

OAC-DT, MicroSet Dual Tech Ceiling Sensor Low Voltage

PIR Activated | Ultrasonic Activated | MicroSet Self-Adjusting | California Title 24 Compliant

- MicroSet self-adjusting Time Delay and sensitivity
- Optional built-in light level sensor
- Optional BAS/HVAC isolated relay
- NEMA WD7 Standard robotic method utilized to verify coverage patterns
- Selectable Walk Through Mode

Specifications:

Technology: Passive Infrared (PIR) and Ultrasonic (US)
Power Requirements:
Input:
- 10-30 VDC from Greengate Switchpack or Greengate system.
- Maximum current needed is 25mA per sensor.

Output:
- Open collector output to switch up to ten Greengate Switchpacks.
- BAS with Isolated Form C Relay in (-R) model.
- Isolated Form C Relay Ratings: 1A 30 VDC/VAC.

Time Delays: Self-adjustable, 15 seconds/test (10 min. Auto), or Selectable 5, 15, 30 minutes, or Zero Time Delay
Coverage: 500, 1000, and 2000 sq. ft.
Light Level Sensing (-R models): 0 to 300 foot-candles
Operating Environment:
- Temperature: 32°F - 104°F (0°C - 40°C)
- Relative humidity: 20% to 90%, non-condensing
- For indoor use only

Housing: Durable, injection molded housing. Polycarbonate resin complies with UL 94V0.
Size: 4.5"H x 1.42"W (114.3mm x 36.068mm)
LED lamp: Green LED for Ultrasonic
Red LED for Passive Infrared
Warranty: Five year

FCC Compliant
cULus Listed
RoHS Compliant c UL us RoHS

www.coopercontrol.com

Catalog #		Type	
Project			
Comments			
Prepared by		Date	

Overview

The Dual Technology sensor's combination of Ultrasonic and Passive Infrared technologies offers the most complete sensing equipment available today. This pairing helps eliminate false activations or deactivations for additional energy savings. The OAC-DT sensors are also equipped with MicroSet self-adjusting technology which provides an adaptive and airflow tolerant technology, making them ideal for spaces which have increased airflow due to higher occupant levels. MicroSet self-adjusting Dual Technology sensors drastically simplify and reduce a contractor's installation and adjustment time period.

Technology

The MicroSet self-adjusting technology continuously monitors multiple sub-frequencies in the event that if a continuous Doppler shift occurs, such as those created by airflow from an air duct, the sensor will identify the noise as continuous and then block it out of view at a select sub-frequency. It will continue to monitor other sub-frequencies for human motion. This avoids false-activation, while still maintaining the high level of sensitivity that is necessary for sensing minor motion in a changing environment. Separate concurrent time delays for both Passive Infrared and Ultrasonic technologies avoid false activations or deactivations. In Automatic ON Mode, the lights turn ON when a person enters the room. In Manual On Mode (-R model only), the lights are turned ON by activating a momentary switch (model # GMDS-*) that is connected to the sensor. When enabled, the daylighting feature (-R models only) prevents lights from turning ON when the room is adequately illuminated by natural light.

Applications

classrooms	common areas	hallways
conference rooms	computer rooms	other indoor office spaces
office spaces	break rooms	

Ordering

Catalog #	Recommended Room Size	Field of View	Frequency	Features
OAC-DT-2000-R	2,000 sq.ft.	Two Way (360°)	32 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-2000	2,000 sq.ft.	Two Way (360°)	32 kHz	
OAC-DT-1000-R	1,000 sq.ft.	Two Way (360°)	32 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-1000	1,000 sq.ft.	Two Way (360°)	32 kHz	
OAC-DT-0501-R	500 sq.ft.	One Way (180°)	40 kHz	w/BAS Relay & Daylight Sensor
OAC-DT-0501	500 sq.ft.	One Way (180°)	40 kHz	

Occupancy Sensors - Ceiling Mount

203 Cooper Circle
Peachtree City, GA 30269
P: 800-553-3879
F: 800-954-7016

COOPER Controls

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: OAC-DT-0501-R

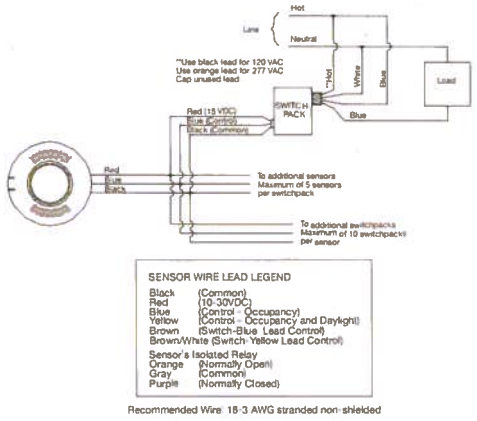
Notes:

Type: SPEC14-5147

OAC-DT, MicroSet Dual Tech Low Voltage

Wiring Diagrams

One Sensor, One Switchpack

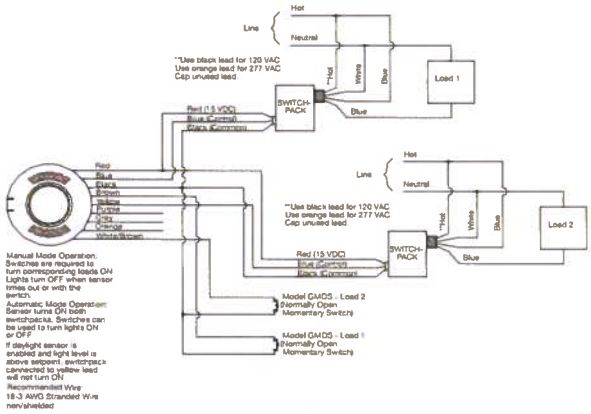


SENSOR WIRE LEAD LEGEND

Black	(Common)
Red	(10-30VDC)
Blue	(Control - Occupancy)
Yellow	(Control - Occupancy and Daylight)
Brown	(Switch-Blue Lead Control)
Brown/White	(Switch-Yellow Lead Control)
Sensor's Isolated Relay	
Orange	(Normally Open)
Gray	(Common)
Purple	(Normally Closed)

Recommended Wire: 18-3 AWG stranded non-shielded

Manual or Automatic-On Control of Two Standard Switchpacks

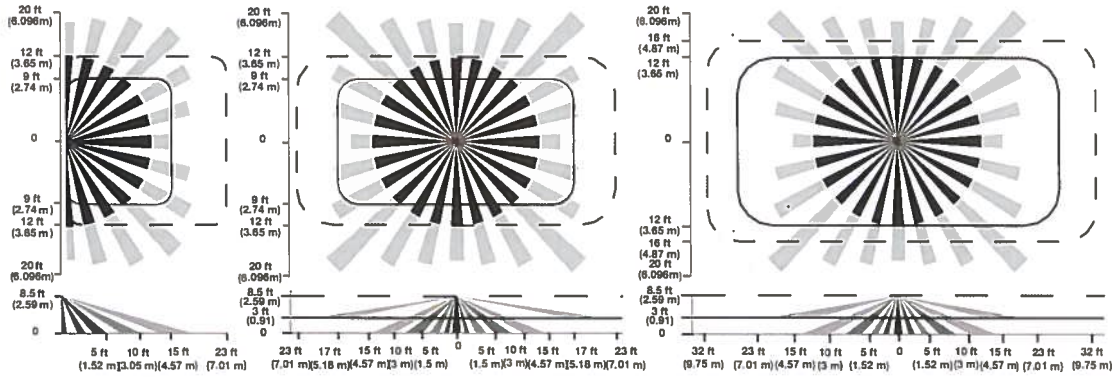


Coverage

OAC-DT-0501-R
500 sq. ft.

OAC-DT-1000-R
1,000 sq. ft.

OAC-DT-2000-R
2,000 sq. ft.



Recommended Mounting Height: 8 to 12 ft

Minor Motion, IR
Major Motion, IR
Minor Motion, Ultrasonic
Major Motion, Ultrasonic

Maximum coverage area may vary somewhat according to room shape and the presence of obstacles.

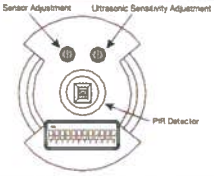
The NEMA WD 7 Standard and robotic method were utilized to verify coverage patterns.

Controls

DIP Switch Legend

DIP Switch	Time Delay 1	Time Delay 2	Activation Relay 1 (3)	Activation Relay 2 (4)	PIR Sensitivity (5)	Walk-Through Mode (6)	LEDs (7)	Override (8)	Sweep (9)	Full/Half Logic (10)	HVAC/Tracking (11)	Zero Time Delay (12)
Auto*	▼	▼	Auto ▼	Auto ▼	Full ▼	Disable ▼	Enable ▼	Disable ▼	Disable ▼	Normal ▼	Disable ▼	Disable ▼
5 Minutes	▼	▲	Manual ▲	Manual ▲	50% ▲	Enable ▲	Disable ▲	Enable ▲	Enable ▲	Swap ▲	Enable ▲	Enable ▲
15 Minutes	▲	▼	(-R model only)	(-R model only)						(-R model only)	(-R model only)	
30 Minutes	▲	▲										

*Self-Adjusts to 10 min. user mode



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COOPER Controls

ACC120009

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name: OSU - NRDT BUILDINGS

Catalog Number: SP20-MV

Notes:

Type: SPEC14-5147

Catalog #	Type
Project	
Comments	
Prepared by	Date

Greengate

SP15 & SP20, Heavy Duty Switchpacks

California Title 24 Compliant

- Replaces separate transformers and relays
- Zero-crossing circuit provides increased durability, especially with today's high inrush loads
- Capable of switching up to 20 Amps
- Suitable for Plenum use
- Rated for Ballast, Tungsten and Motor Loads

Can be easily mounted on or in a 4sq. junction box, via ½" in nipple

Reduces installation expense

Available for 120, 220, 240, 277 & 347 VAC operation

Specifications:

Electrical Ratings:
Input: (120/277 VAC-SP20-MV) (347 VAC- SP15-347) (220-240 VAC- SP20-240), 50/60 Hz operation. Contacts are isolated and may be used to control low voltage circuits.
Output: 15 VDC 125 mA to operate up to five Greengate sensors.
Control: Connecting the 22 AWG red and blue control leads to each other will close the relay contacts.
Ballast Compatibility: Compatible with magnetic and electronic ballasts.
NOTE: The life of some compact fluorescent lamps (CFLs) is shortened by frequent automatic or manual switching. Check with the CFL and ballast manufacturer to determine effects of cycling.
Operating Environment:
- Temperature: 32°F to 104°F (0°C to 40°C)
- Relative humidity: less than 95%, non-condensing
- For indoor use only

Housing: Medium impact injection molded housing. ABS resin complies with UL 94V0. Plenum rated for external junction box mounting, with Teflon coated leads.
Motor Load: 1 HP 120-240 VAC; 2 HP 250 VAC
Size: 2 15/16" x 2 7/16" x 1 11/16"
Warranty: Five year

UL, CSA listed

Overview

Switchpacks provide 15 VDC operating voltage to all low voltage, 15 VDC, occupancy sensors and daylighting controllers. A single switchpack can provide power for up to five sensors. Up to ten switchpacks can be connected to one sensor for control of multiple circuits. Isolated contacts may also be used to control HVAC, contactors, motors, etc.

Operation

The switchpack has two main components; a transformer and a high current relay. The transformer has a primary high voltage input and a low voltage output. The low voltage output, 15 VDC provides operating power to low voltage occupancy sensors manufactured by Cooper Controls. When a occupancy sensor detects motion, it electrically closes an internal circuit which pulls up the control signal between the sensor and the switchpack signaling the switchpack to close it's high current relay resulting in the lights being turned ON.

Application

The switchpack is designed to work with low voltage sensors which require switchpacks. It cannot be used with sensors designed for use with any other low voltage relay systems. Consult sensor spec sheets for other sensor/relay combinations.

Ordering

Catalog #	Ratings	Ballast	Tungsten	Motor (HP)	Output
SP20-MV	120/277 VAC	20A	15A, 120V	1HP-120V, 2HP-250V	15 VDC, 125mA
SP15-347	347 VAC	15A	NR	NR	15 VDC, 125mA
SP20-240	220-240 VAC	20A	NR	NR	15 VDC, 125mA

Occupancy Sensors - Switchpacks

www.coopercontrol.com

203 Cooper Circle
Peachtree City, GA 30269
P: 800-553-3879
F: 800-954-7016

COOPER Controls

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries
Job Name: OSU NRDT Building I

Submitted by Spectrum Lighting, Inc.

SPECTRUM LIGHTING

Job Name:
OSU - NRDT BUILDINGS

Catalog Number:
SP20-MV

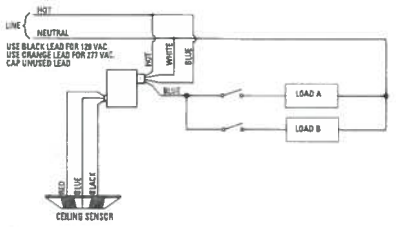
Notes:

Type:
SPEC14-5147

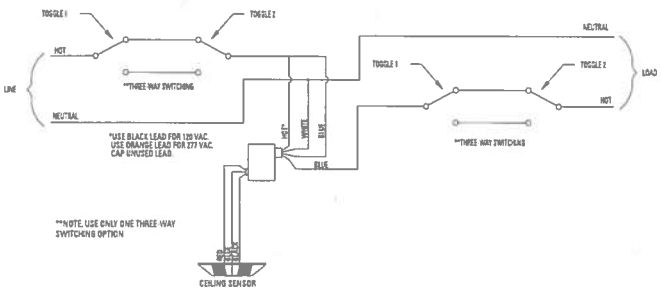
SP15 & SP20, Heavy Duty Switchpacks

Wiring Diagrams

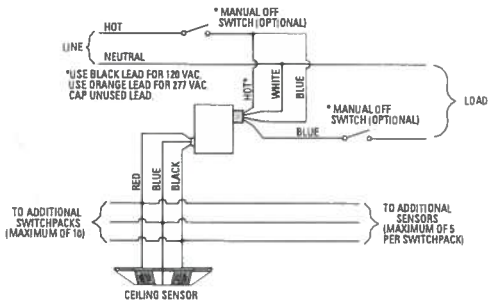
A/B Switching



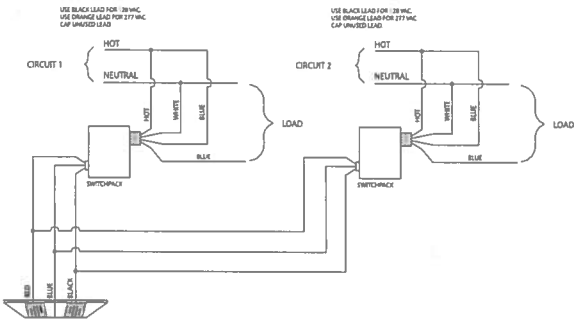
Three Way Switching



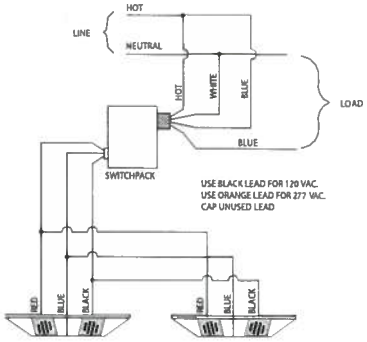
Standard Configuration



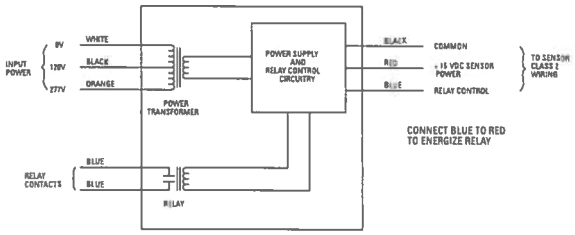
2 Circuits, 1 Sensor



1 Circuit, 2 or more sensors



SP20-MV Schematic

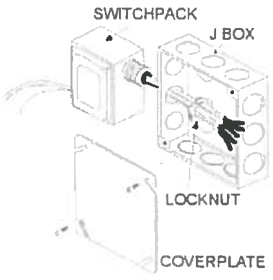


CONTACT RATINGS.

15A 120 VAC TUNGSTEN
20A 120 VAC BALLAST
20A 277 VAC BALLAST

1 HP 120 VAC
2 HP 250 VAC

Mounting



All connections are made via pigtails with twist-on wire connectors.

NOTE: Connect either the orange or black supply lead to the power source depending upon the power requirements. Cap the unused lead.

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P: 800-553-3879 F: 800-954-7016

COOPER Controls

ACC080177

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207

Contractor: Vaughn Industries Job Name: OSU NRDT Building I

UL924 Enclosed 20 AMP Bypass Relay with Remote Emergency Control

EMERGENCY LIGHTING BYPASS CONTROLS

CALIFORNIA TITLE 24 COMPLIANT | UL LISTED | 120 277 VAC

PROJECT INFORMATION

Project Name **OSU NRDT - Building I**

Catalog No. **UL924** Date

UL924BRUNV

Hubbell Building Automation's enclosed 20 Amp electrically held UL 924 Bypass Relay is specifically designed for projects requiring bypass utilizing an unswitched emergency circuit that is not controlled by a relay in a panel or power pack. The control of the lighting on the emergency circuit is switched ON and OFF based on the normal circuit switching input to the unit. When the loss of commercial power occurs, the contact returns to its normally closed state and bypasses control to the emergency egress lighting.

The unit includes an automatic test function that simulates utility power failure and holds emergency lighting on for 2.5 seconds each time the switched input is turned OFF.

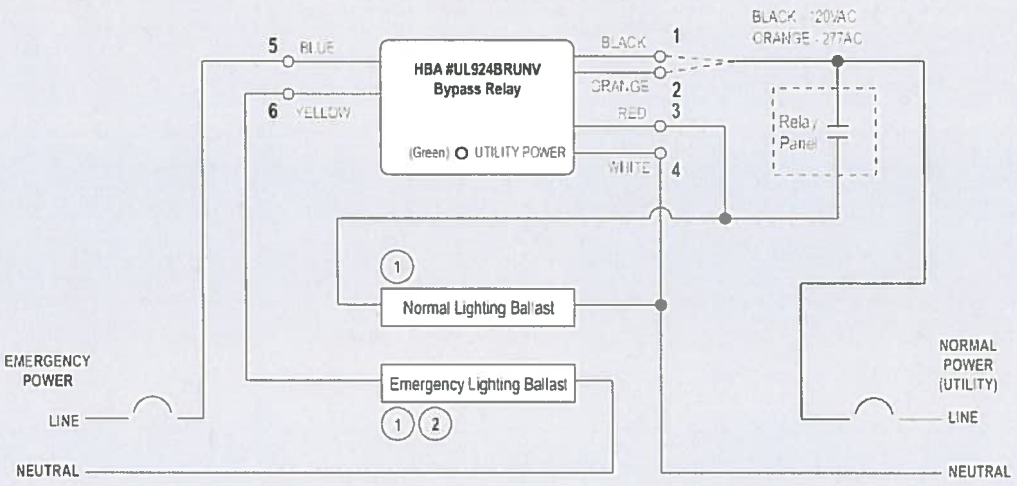
PRODUCT FEATURES

- 20 Amp 120/277VAC Relay
- Available with Dual Tap 120VAC or 277VAC Coil
- N/C isolated contacts
- UL listed
- No minimum load requirement
- Five-year warranty

HUBBELL Building Automation

Date Submitted: Aug. 26, 2015

Distributor: C.E.D. Columbus, Oh 43207



General Specifications

# Relays & Contact Type	One (1) SPST Continuous Duty Electrically Held Coil
Contact Ratings	1500 VA Tungsten @ 120VAC 20 Amp Ballast @ 120/277VAC 2 HP @ 277VAC 1 HP @ 120VAC
Coil Current	0.06 A @ 120VAC 0.06 A @ 277VAC
Coil Voltage Input	UL924BRUNV: 120 or 277VAC, 60Hz
Operating environment	Indoor use only 32° to 140°F Relative humidity (non-condensing): 0% to 95%
Dimensions	3.75" x 1.75" x 1.25" with mounting ears for 1-gang box
Housing Rating	Plenum, NEMA 1
Flame Rating	UL94V-0
Wires	7", 105° C, 600V Rated
Certifications	UL Listed, UL924
Warranty	Five years

Ordering Information

UL924BRUNV

MODEL	
UL924BRUNV	UL924 Emergency Control Relay (Shunt or Bypass) with auto test 120-277VAC Coil

Summary: Application - The Ohio State University and Ohio Power Company for approval of a special arrangement agreement with a mercantile customer electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company