

**Public Service
of New Hampshire**

The Northeast Utilities System

nhsaves@work
large business retrofit

2009 Lighting Rebate

Section A: CUSTOMER INFORMATION

Customer Name <i>City of Dover - Public Works</i>	Electric Account Number <i>56632841078</i>	Rate	Application Number
Facility Address <i>271 Mast Road</i>	City <i>Dover</i>	State <i>NH</i>	Zip Code <i>03820</i>
Service Location Identification <i>Department of Public Works</i>			
Mailing Address (if different from above)	City	State	Zip Code
Contact Person/Title <i>Rick Jones CD Coordinator</i>	Telephone Number <i>(603) 516-6008</i>	Incorporated? (Check one.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Exempt	
Federal Tax Identification Number <i>02-6000230</i>	Rebate Payment Preference (Check one.) <input checked="" type="checkbox"/> Check <input type="checkbox"/> Bill Credit <input type="checkbox"/> Pay Contractor	Please Assign Payment to Contractor. Customer Signature:	

Section B: CONTRACTOR INFORMATION

Contractor Name <i>Johnson Controls</i>	Contact Person/Title (Print) <i>Kevin Strongren Project Manager</i>	Contact Person Signature <i>Kevin Strongren</i>	
Mailing Address <i>39 Salem Street</i>	City <i>Lynnfield</i>	State <i>MA</i>	Zip Code <i>01940</i>
Federal Tax Identification Number <i>39-0380010</i>	Incorporated? (Check one.) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Exempt	Telephone Number <i>860-335-6341</i>	

Section C: DOCUMENT APPROVALS

PRE-INSTALLATION INSPECTION

Utility Signature	Date
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PRE-APPROVAL OFFER

Technical Review - Utility Signature	Date		
Utility Signature	Date	Amount of Rebate Offer (\$)	Completion Date

By signing and dating below, customer accepts this rebate offer and agrees to the Utility Terms and Conditions attached hereto. Pursuant to a Commission order, customer also agrees that the utility will capture all kW and kWh savings and to forgo applying directly or indirectly for any ISO-NE capacity payments resulting from this energy efficiency project. This agreement is contingent upon continued approval and authorization by the Commission to recover said amounts from the System Benefits Charge. The rebate amount cannot exceed the total project costs.

Customer Signature: *[Signature]*

Date: *12/15/09*

POST-INSTALLATION INSPECTION

Utility Signature	Date	Total Project Cost (\$)	Amount of Rebate (\$)
Customer Signature	Date		

MANAGEMENT APPROVAL

Utility Signature	Date
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Public Service of New Hampshire
2009 Lighting Rebate

PROJECT NAME: City of Dover, - Dept of Public Works - Dover, NH

RETROFIT LIGHTING REBATE WORKSHEET

Existing Lighting					New Lighting					
Item	Existing Fixture Code	Fixture Description	Quantity	Annual Hours of Operation	Measure Code	Retrofit Fixture Code	Fixture Description	Quantity of Fixtures	Per Unit Rebate (\$)	Total Rebate (\$)
1	110150	150W Inc.	4	2600	21	1C0042E	1/42W Compact HW E	4	\$ 25.00	\$ 100.00
2	2F32SSE	2L4' T8/ELIG	2	200	10	1F32EEE	1L4' T8EE/ELEE	2	\$ 12.50	\$ 25.00
3	2F32SSE	2L4' T8/ELIG	14	500	10	1F32EEE	1L4' T8EE/ELEE	14	\$ 12.50	\$ 175.00
4	2F32SSE	2L4' T8/ELIG	10	1000	10	1F32EEE	1L4' T8EE/ELEE	10	\$ 12.50	\$ 125.00
5	2F32SSE	2L4' T8/ELIG	12	2250	10	1F32EEE	1L4' T8EE/ELEE	12	\$ 12.50	\$ 150.00
6	2F32SSE	2L4' T8/ELIG	20	4500	10	1F32EEE	1L4' T8EE/ELEE	20	\$ 12.50	\$ 250.00
7	2F32SSE	2L4' T8/ELIG	2	8760	10	1F32EEE	1L4' T8EE/ELEE	2	\$ 12.50	\$ 25.00
8	2F32SSE	2L4' T8/ELIG	2	1600	41	1F32EEL	1L4' T8EE/ELEE LBF	2	\$ 30.00	\$ 60.00
9	2F32SSE	2L4' T8/ELIG	4	2000	41	1F32EEL	1L4' T8EE/ELEE LBF	4	\$ 30.00	\$ 120.00
10	3F32SSE	3L4' T8/ELIG	2	1000	10	2F28EEL	2L4' T8EE/ELEE LBF	2	\$ 20.00	\$ 40.00
11		2L8' T8/ELIG	2	500	10	2F32EEE	2L4' T8EE/ELEE	2	\$ 20.00	\$ 40.00
12		2L8' T8/ELIG	3	8760	10	2F32EEE	2L4' T8EE/ELEE	3	\$ 20.00	\$ 60.00
13	2F32SSE	2L4' T8/ELIG	1	100	10	2F32EEL	2L4' T8EE/ELEE LBF	1	\$ 20.00	\$ 20.00
14	2F32SSE	2L4' T8/ELIG	2	200	10	2F32EEL	2L4' T8EE/ELEE LBF	2	\$ 20.00	\$ 40.00
15	2F32SSE	2L4' T8/ELIG	1	500	10	2F32EEL	2L4' T8EE/ELEE LBF	1	\$ 20.00	\$ 20.00
16	2F32SSE	2L4' T8/ELIG	4	1000	10	2F32EEL	2L4' T8EE/ELEE LBF	4	\$ 20.00	\$ 80.00
17	2F32SSE	2L4' T8/ELIG	1	2250	10	2F32EEL	2L4' T8EE/ELEE LBF	1	\$ 20.00	\$ 20.00
18	2F32SSE	2L4' T8/ELIG	1	8760	10	2F32EEL	2L4' T8EE/ELEE LBF	1	\$ 20.00	\$ 20.00
19	3F32SSE	3L4' T8/ELIG	20	1000	10	2F32EEL	2L4' T8EE/ELEE LBF	20	\$ 20.00	\$ 400.00
20	3F32SSE	3L4' T8/ELIG	20	1600	10	2F32EEL	2L4' T8EE/ELEE LBF	20	\$ 20.00	\$ 400.00
21	3F32SSE	3L4' T8/ELIG	13	2000	10	2F32EEL	2L4' T8EE/ELEE LBF	13	\$ 20.00	\$ 260.00
22	3F32SSE	3L4' T8/ELIG	38	2250	10	2F32EEL	2L4' T8EE/ELEE LBF	38	\$ 20.00	\$ 760.00
23	3F32SSE	3L4' T8/ELIG	4	3000	10	2F32EEL	2L4' T8EE/ELEE LBF	4	\$ 20.00	\$ 80.00
24	3F32SSE	3L4' T8/ELIG	16	8760	10	2F32EEL	2L4' T8EE/ELEE LBF	16	\$ 20.00	\$ 320.00
25	2F96HEM	2L8' HO/EE/EEMAG	6	1600	10	4F32EEE	4L4' T8EE/ELEE	6	\$ 20.00	\$ 120.00
26	2F96HEM	2L8' HO/EE/EEMAG	6	8760	10	4F32EEE	4L4' T8EE/ELEE	6	\$ 20.00	\$ 120.00
27	2F96HEM	2L8' HO/EE/EEMAG	8	1600	41	4F32EEL	4L4' T8EE/ELEE LBF	8	\$ 30.00	\$ 240.00
28		2L8' T8/ELIG	7	1600	10	4F32EEL	4L4' T8EE/ELEE LBF	7	\$ 20.00	\$ 140.00
29		2L8' T8/ELIG	10	3000	10	4F32EEL	4L4' T8EE/ELEE LBF	10	\$ 20.00	\$ 200.00
30	1MO400S	400W Metal Halide	27	2250	57	6F32EEH	6L4' T8EE/ELEE HBF	27	\$ 100.00	\$ 2,700.00
31	1MO400S	400W Metal Halide	17	4500	57	6F32EEH	6L4' T8EE/ELEE HBF	17	\$ 100.00	\$ 1,700.00
32										\$ -
33										\$ -
34										\$ -
35										\$ -
									\$ -	\$ -
										\$ 8,810.00

LIGHTING CONTROLS REBATE WORKSHEET

Item	Lighting Control Measure Code	Lighting Code Description	Quantity	Lighting Fixture Code	Quantity of Fixtures	Annual Hours of Reduction	Per Unit Rebate (\$)	Total Rebate (\$)
15	61	Ceiling Mount Occupancy Sensor	1	2L32EEL	8	640	\$ 55.00	\$ 55.00
17	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	448	\$ 25.00	\$ 25.00
19	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	448	\$ 25.00	\$ 25.00
21	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	448	\$ 25.00	\$ 25.00
23	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	448	\$ 25.00	\$ 25.00
25	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	400	\$ 25.00	\$ 25.00
27	64	Wall Mount Occupancy Sensor	1	2F28EEL	2	400	\$ 25.00	\$ 25.00
29	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	2	400	\$ 55.00	\$ 55.00
32	64	Wall Mount Occupancy Sensor	1	1F32EEL	2	960	\$ 25.00	\$ 25.00
34	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	600	\$ 25.00	\$ 25.00

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PROJECT NAME: **City of Dover, - Dept of Public Works - Dover, NH**

38	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	600	\$ 25.00	\$ 25.00
41	61	Ceiling Mount Occupancy Sensor	1	1F32EEL	3	1000	\$ 55.00	\$ 55.00
41	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	4	1000	\$ 55.00	\$ 55.00
47	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	1000	\$ 25.00	\$ 25.00
47	64	Wall Mount Occupancy Sensor		1F32EEL	1	1000		\$ -
51	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	4	800	\$ 55.00	\$ 55.00
54	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	5	400	\$ 55.00	\$ 55.00
57	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	675	\$ 25.00	\$ 25.00
59	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	4	900	\$ 55.00	\$ 55.00
64	64	Wall Mount Occupancy Sensor	1	2F32EEL	2	900	\$ 25.00	\$ 25.00
67	61	Ceiling Mount Occupancy Sensor	2	2F32EEL	7	675	\$ 55.00	\$ 110.00
67	61	Ceiling Mount Occupancy Sensor	2	1F32EEE	12	675	\$ 55.00	\$ 110.00
72	64	Fixture Mount Occupancy Sensor	6	4F32EEE	6	3504	\$ 25.00	\$ 150.00
74	64	Fixture Mount Occupancy Sensor	27	6F32EEH	27	1125	\$ 25.00	\$ 675.00
78	64	Fixture Mount Occupancy Sensor	5	1F32EEE	5	600	\$ 25.00	\$ 125.00
84	64	Fixture Mount Occupancy Sensor	1	6F32EEH	1	2250	\$ 25.00	\$ 25.00
87	64	Fixture Mount Occupancy Sensor	6	6F32EEH	6	1800	\$ 25.00	\$ 150.00
90	64	Fixture Mount Occupancy Sensor	10	6F32EEH	10	2250	\$ 25.00	\$ 250.00
93	64	Fixture Mount Occupancy Sensor	10	1F32EEE	20	4050	\$ 25.00	\$ 250.00
96	61	Ceiling Mount Occupancy Sensor	1	2F32EEL	4	1200	\$ 55.00	\$ 55.00
98	64	Wall Mount Occupancy Sensor	1	2F32EEL	3	1000	\$ 25.00	\$ 25.00
100	61	Ceiling Mount Occupancy Sensor	2	4F32EEL	10	1500	\$ 55.00	\$ 110.00
								\$ -
								\$ -
								\$ -
								\$ 2,720.00

TOTAL COST OF PROPOSED PROJECT

Type of Measure	Equipment Costs	Labor Costs	Requested Incentive
Lighting Systems			\$ 8,810.00
Lighting Controls			\$ 2,720.00
TOTALS	\$ -	\$ -	\$11,530.00

2009 Lighting Rebate Table C: Lighting Systems Inventory

This table or similar document must be completed by the Customer/Contractor/Vendor. Attach additional sheets as necessary. Each room or area in which lighting changes are proposed should be listed separately. When completed, submit this form or similar document to your Utility Representative along with manufacturer cut sheets showing photometrics.

Customer/Facility Name: City of Dover, Dept of Public Works, Dover, NH

Project Description: Lighting

Date: _____

Existing Lighting System										Proposed Lighting System									
Room/Area	Qty	Description of Fixture	Fixture Code	Watts	Annual Hours of Operation	Qty	Description of Fixture	Fixture Code	Watts	Annual Hrs	Watts Reduction								
Map#1 Open Office Area	4	3L4' T8/ELIG	3F32SSE	88	8760	4	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	8760								
Map#1 Open Office Area	1	2L4' T8/ELIG	2F32SSE	60	2250	1	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	2250								
Map#1 Open Office Area	23	3L4' T8/ELIG	3F32SSE	88	2250	4	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	2250								
Map #2 Conference Room	8	3L4' T8/ELIG	3F32SSE	88	1600	8	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1600								
Map #2 Conference Room	1			48	1600	1	CEILING SENSOR		61	48	640								
Map #3 Comm Service Director Off	2	3L4' T8/ELIG	3F32SSE	88	1600	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1600								
Map #3 Comm Service Director Off	1			48	1600	1	WALL SENSOR		64	48	448								
Map #4 Assistant City Eng Office	2	3L4' T8/ELIG	3F32SSE	88	1600	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1600								
Map #4 Assistant City Eng Office	1			48	1600	1	WALL SENSOR		64	48	448								
Map #5 City Eng Office	2	3L4' T8/ELIG	3F32SSE	88	1600	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1600								
Map #5 City Eng Office	1			48	1600	1	WALL SENSOR		64	48	448								
Map #6 Env Proj Mgr's Office	2	3L4' T8/ELIG	3F32SSE	88	1600	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1600								
Map #6 Env Proj Mgr's Office	1			48	1600	1	WALL SENSOR		64	48	448								
Map #7 File Storage Room	2	3L4' T8/ELIG	3F32SSE	88	1000	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #7 File Storage Room	1			48	1000	1	WALL SENSOR		64	48	448								
Map #8 Archive Room	2	3L4' T8/ELIG	3F32SSE	88	1000	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #8 Archive Room	1			48	1000	1	WALL SENSOR		64	48	400								
Map #9 Blueprint Room	1	3L4' T8/ELIG	3F32SSE	88	1000	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #9 Blueprint Room	1			48	1000	1	WALL SENSOR		64	48	400								
Map #10 Storage	1	2L4' T8/ELIG	2F32SSE	60	500	1	CEILING SENSOR		61	48	400								
Map #11 Housekeeping	2	2L4' T8/ELIG	2F32SSE	60	1600	2	1L4' T8EE/ELEEE LBF	1F32EEL	41	25	1600								
Map #11 Housekeeping	1			48	1600	1	WALL SENSOR		64	48	960								
Map #12 Unisex Bathroom	2	2L4' T8/ELIG	2F32SSE	60	1000	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #12 Unisex Bathroom	1			48	1000	1	WALL SENSOR		64	48	600								
Map #13 Corridor	4	3L4' T8/ELIG	3F32SSE	88	8760	4	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	8760								
Map #13 Corridor	9	3L4' T8/ELIG	3F32SSE	88	1000	9	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #14 Storage	2	2L4' T8/ELIG	2F32SSE	60	1000	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1000								
Map #14 Storage	1			48	1000	1	WALL SENSOR		64	48	600								
Map #15 Men's Locker Room	4	3L4' T8/ELIG	3F32SSE	88	2000	4	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	2000								
Map #15 Men's Locker Room	3	2L4' T8/ELIG	2F32SSE	60	2000	3	1L4' T8EE/ELEEE LBF	1F32EEL	41	25	2000								
Map #15 Men's Locker Room	2			48	2000	2	CEILING SENSOR		61	48	1,000								
Map #15.1 Men's Locker Room	2	3L4' T8/ELIG	3F32SSE	88	8760	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	8,760								
Map #15.1 Men's Locker Room	1	3L4' T8/ELIG	3F32SSE	88	1600	1	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	1,600								
Map #15.1 Men's Locker Room	2	2L4' T8/ELIG	2F32SSE	60	200	2	2L4' T8EE/ELEEE LBF	2F32EEL	10	48	200								

2009 Lighting Rebate

Table C: Lighting Systems Inventory

This table or similar document must be completed by the Customer/Contractor/Vendor. Attach additional sheets as necessary.

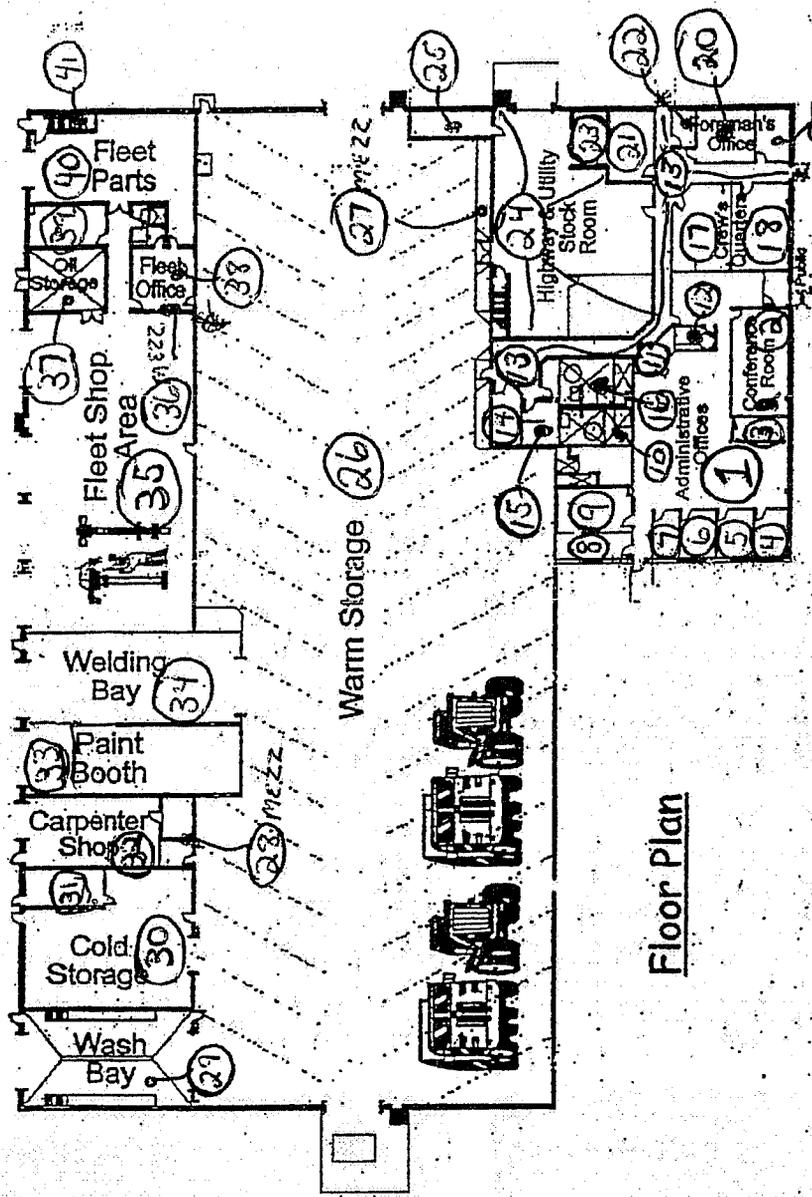
Map #16 Women's Locker Room	2 3L4' T8/ELIG	3F32SSE	88	2000	2 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2000	40
Map #16 Women's Locker Room	1 2L4' T8/ELIG	2F32SSE	60	2000	1 1L4' T8EE/ELEE LBF	1F32EEL	41	25	2000	35
Map #16 Women's Locker Room	1		48	2000	1 WALL SENSOR		64	48	1,000	-
Map #16.1 Women's Locker Room	2 3L4' T8/ELIG	3F32SSE	88	8760	2 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8,760	40
Map #16.1 Women's Locker Room	1 2L4' T8/ELIG	2F32SSE	60	100	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	100	12
Map #17 Break Area	4 3L4' T8/ELIG	3F32SSE	88	2000	4 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2000	40
Map #17 Break Area	1		48	2000	1 CEILING SENSOR		61	48	800	-
Map #17.1 Break Room	1 3L4' T8/ELIG	3F32SSE	88	8760	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8,760	40
Map #18 Training Room	5 3L4' T8/ELIG	3F32SSE	88	1000	5 2L4' T8EE/ELEE LBF	2F32EEL	10	48	1000	40
Map #18 Training Room	1		48	1000	1 CEILING SENSOR		61	48	400	-
Map #18.1 Training Room	1 3L4' T8/ELIG	3F32SSE	88	8760	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8760	40
Map #19 Utility Supervisor's Office	2 3L4' T8/ELIG	3F32SSE	88	2250	2 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2250	40
Map #19 Utility Supervisor's Office	1		48	2250	1 WALL SENSOR		64	48	675	-
Map #20 Office	4 3L4' T8/ELIG	3F32SSE	88	2250	4 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2250	40
Map #20 Office	1		48	2250	1 CEILING SENSOR		61	48	900	-
Map #21 Command Center	2 3L4' T8/ELIG	3F32SSE	88	1600	2 2L4' T8EE/ELEE LBF	2F32EEL	10	48	1600	40
Map #21 Command Center	1 3L4' T8/ELIG	3F32SSE	88	8760	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8760	40
Map #22 Recycling Office	1 3L4' T8/ELIG	3F32SSE	88	1600	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	1,600	40
Map #23 Inventory Coordinator Off	2 3L4' T8/ELIG	3F32SSE	88	2250	2 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2250	40
Map #23 Inventory Coordinator Off	1		48	2250	1 WALL SENSOR		64	48	900	-
Map #24 Stockroom	7 3L4' T8/ELIG	3F32SSE	88	2250	7 2L4' T8EE/ELEE LBF	2F32EEL	10	48	2250	40
Map #24 Stockroom	12 2L4' T8/ELIG	2F32SSE	60	2250	12 1L4' T8EE/ELEE	1F32EEE	10	28	2250	32
Map #24 Stockroom	4		48	2250	4 CEILING SENSOR		61	48	675	-
Map #24.1 Stockroom	1 3L4' T8/ELIG	3F32SSE	88	8760	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8760	40
Map #24.1 Stockroom	2 2L4' T8/ELIG	2F32SSE	60	8760	2 1L4' T8EE/ELEE	1F32EEE	10	28	8760	32
Map #25 Electrical Room	2 2L4' T8/ELIG	2F32SSE	60	200	2 1L4' T8EE/ELEE	1F32EEE	10	28	200	32
Map #26 Warm Storage Area	6 2L8' HO/EE/EEMAG	2F96HEM	207	8760	6 4L4' T8EE/ELEE	4F32EEE	10	108	8760	99
Map #26 Warm Storage Area	6		108	8760	6 FIXTURE SENSOR		64	108	3504	-
Map #26 Warm Storage Area	27 400W Metal Halide	1M0400S	455	2250	27 6L4' T8EE/ELEE HBF	6F32EEH	57	222	2,250	233
Map #26 Warm Storage Area	27		222	2250	27 FIXTURE SENSOR		64	222	1,125	-
Map #27 Mezzanine Storage	14 2L4' T8/ELIG	2F32SSE	60	500	14 1L4' T8EE/ELEE	1F32EEE	10	28	500	32
Map #27 Mezzanine Storage	1 2L4' T8/ELIG	2F32SSE	60	8760	1 2L4' T8EE/ELEE LBF	2F32EEL	10	48	8760	12
Map #28 HVAC Mezzanine	10 2L4' T8/ELIG	2F32SSE	60	1000	10 1L4' T8EE/ELEE	1F32EEE	10	28	1000	32
Map #28 HVAC Mezzanine	5		28	1000	5 FIXTURE SENSOR		64	28	600	-
Map #29 Wash Bay	8 2L8' HO/EE/EEMAG	2F96HEM	207	1600	8 4L4' T8EE/ELEE LBF	4F32EEL	41	96	1600	111
Map #30 Storage Area	6 2L8' HO/EE/EEMAG	2F96HEM	207	1600	6 4L4' T8EE/ELEE	4F32EEE	10	108	1,600	99
Map #31 Storage	2 2L8' T8/ELIG		109	500	2 2L4' T8EE/ELEE	2F32EEE	10	55	500	54
Map #32 Carpenter Shop	7 2L8' T8/ELIG		109	1600	7 4L4' T8EE/ELEE LBF	4F32EEL	10	96	1,600	13
Map #33 Area Behind Paint Booth	1 400W Metal Halide	1M0400S	455	4500	1 6L4' T8EE/ELEE HBF	6F32EEH	57	222	4,500	233
Map #33 Area Behind Paint Booth	1		222	4500	1 FIXTURE SENSOR		64	222	2,250	-
Map #33.1 Area Behind Paint Booth	1 2L8' T8/ELIG		109	8760	1 2L4' T8EE/ELEE	2F32EEE	10	55	8,760	54
Map #34 Maintenance Bay	6 400W Metal Halide	1M0400S	455	4500	6 6L4' T8EE/ELEE HBF	6F32EEH	57	222	4,500	233
Map #34 Maintenance Bay	6		222	4500	6 FIXTURE SENSOR		64	222	1,800	-
Map #34.1 Maintenance Bay	1 2L8' T8/ELIG		109	8760	1 2L4' T8EE/ELEE	2F32EEE	10	55	8,760	54
Map #35 Fleet Shop Area	10 400W Metal Halide	1M0400S	455	4500	10 6L4' T8EE/ELEE HBF	6F32EEH	57	222	4,500	233
Map #35 Fleet Shop Area	10		222	4500	6 FIXTURE SENSOR		64	222	2,250	-

Costs

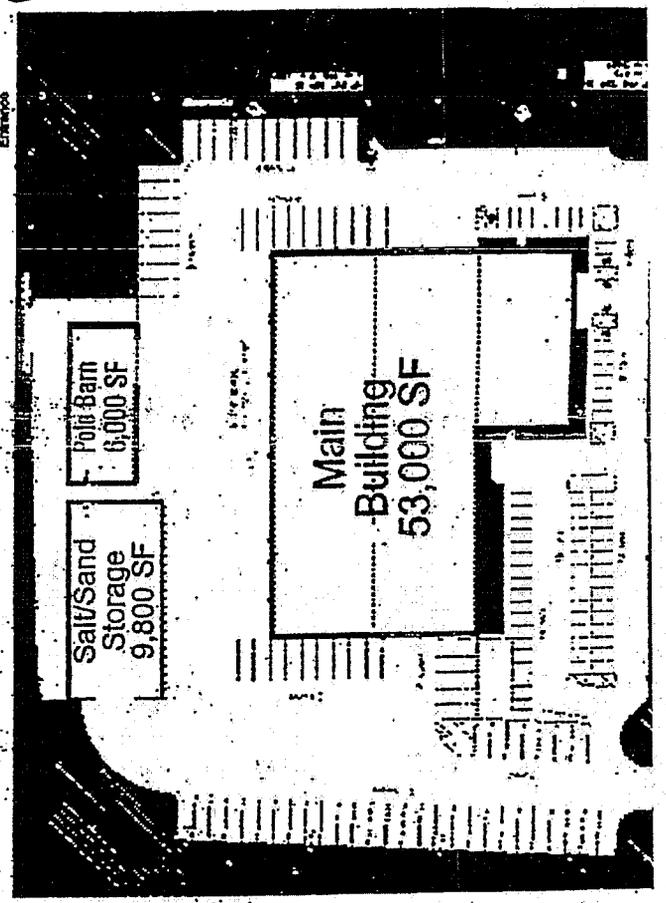
Main Bldg	\$3.570M
Salt/Sand Storage	\$ 260K
Pole Barn	\$ 135K
Emergency Generator	\$ 70K
Site Work	\$ 538K
Design Fees	\$ 205K
Offsite Sewer	\$ 120K
Total	\$4.897M

Design/Build Team

- Contractor**
Horne Construction Company
- Architect**
Lassel Architects PA
- Civil & Structural Engineer**
Kimball Chase Company
- Mechanical & Electrical Engineer**
Brenex Consulting



Floor Plan



Site Plan

Material Purchasing
City of Dover - Dept of Public Works - S1

Bldg Name	Component	PO Order Total	Vendor	Mfg Name	Mfg #	Notes
DPW	Ballast 2 lamp Electronic UNV QHEL Super Saver	122	WESCO	Advance	IOP-2P32-1W-SC	
DPW	Ballast 2 lamp Electronic UNV QHEN Super Saver	35	WESCO	Advance	IOP-2P32-SC	
DPW	Ballast 320 Watt Metal Halide Pulse Start	21	WESCO	Advance	ADV 71A-5892-001D	
DPW	Ballast 4 lamp Electronic UNV QHEL Super Saver	17	WESCO	Advance	IOP-4P32-1W-SC	
DPW	Ballast 4 lamp Electronic UNV QHEN Super Saver	12	WESCO	Advance	IOP-4P32-SC	
DPW	Fixture Mounted Occupancy Sensor	44		Do Not Order Comes on Fixture		
DPW	Reflector Kit 2x4 Micro-4 2-Lamp	112	EPA	EPA	RTR2402T832ENLSS	
DPW	Reflector Kit 4' 1 lamp Micro-4	60	EPA	EPA	RST1401T832ENCCLSLST	
DPW	Reflector Kit 8' 2 lamp Micro-4	5	EPA	EPA	RST1802T832ENCCLSLST	
DPW	Reflector kit 8' 4 lamp Micro-4	17	EPA	EPA	RST1804T832ENCCLSLST	
DPW	Reflector kit 8' 4 lamp Polished Alum	12	EPA	EPA	RST1804T832ENCCLSLST	
DPW	PLATE - please buy me!! Thanks Rebeccal	1		Labor to Purchase Wall Sensor Plates		
DPW	Lamp 320 Watt Metal Halide Pulse Start	21	WESCO	Philips	MS320/U/PS	
DPW	Lamp 4' T8 XP/Advantage 5000K	4	WESCO	Philips	F32T8/ADV850/ALTO	
DPW	Lamp 4' T8 XP/Advantage 5000K	464	WESCO	Philips	F32T8/ADV850/ALTO	
DPW	Lamp 4' T8 XP/Advantage 5000K	264	WESCO	Philips	F32T8/ADV850/ALTO	
DPW	New LowBay Fixture 42w CF w/(1) ballast	4	MUNRO	RAB	RAB VAN13F42QT/PC	
DPW	New Fixture 4' 6 lamp strip UNV QHEH HQ w/Ref & Sensor	44	Re-Nova	Re-Nova	ECS-ECO4-M-N-632-UNV-23H-QWW & Sensor & No Guard	
DPW	New Fixture 4'1 lamp wrap UNV QHEL with reflector	2	Re-Nova	Re-Nova	ECS-NPW4-MN-132-UNV-1L-IOP	
DPW	New Fixture 4' 1 lamp wrap UNV QHEL w/Ref Vanity	4	Re-Nova	Re-Nova	ECS-SBW-4-M-N-132-UNV-1L-IOP	
DPW	New Fixture 8' 4 lamp wrap UNV QHEL w/Ref Vapor	8	Re-Nova	Re-Nova	ECS-SVT8-MN-432-UNV-4L-IOP	
DPW	Fixture Mounted Occupancy Sensor Separate from Fixture	21	MUNRO	Sensor Switch	CM-9	
DPW	Ceiling mounted occupancy sensor	11	MUNRO	Sensor Switch	CM-PDT-9	
DPW	Power Pack for Ceiling or Hallway Sensor	14	MUNRO	Sensor Switch	MP-20	
DPW	Slave Pack 120/277	1	MUNRO	Sensor Switch	MP-20	
DPW	Vending Machine Miser VM150	1	MUNRO	Vending Miser	VM150	
DPW	Wall switch occupancy sensor SensorSwitch	11	MUNRO	Sensor Switch	WSD-1	
DPW	Wall switch occupancy sensor SensorSwitch	1	MUNRO	Sensor Switch	WSD-1 PHOTO	
DPW	Wall switch occupancy sensor Dual Tech SensorSwitch	1	MUNRO	Sensor Switch	WSD-PDT-1	
DPW	Ceiling mounted occupancy sensor	2	MUNRO	Sensor Switch	WV-16	

Material Purchasing
City of Dover - Dept of Public Works - S1

Bldg Name	Component	PO Order Total	Vendor	Mfg Name	Mfg #	Notes
DPW	Ceiling mounted occupancy sensor	1	MUNRO	Sensor Switch	WV-PDT-16	

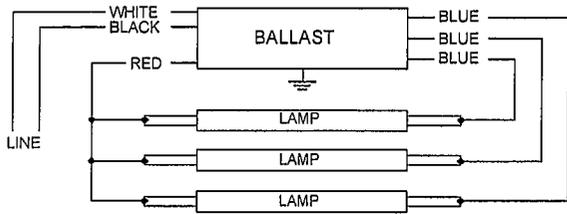
PHILIPS ADVANCE

Electrical Specifications

IOP3P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8	2	32	-20/-29	0.46	55	0.85	10	0.99	1.6	1.55
* F32T8	3	32	-20/-29	0.62	73	0.77	10	0.99	1.6	1.05

Wiring Diagram



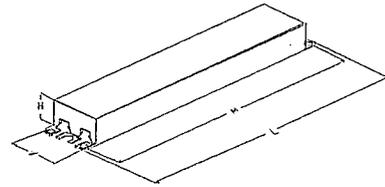
Diag. 65

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

Standard Lead Length (inches)

	in.	cm.		in.	cm.
Black	25	63.5	Yellow/Blue		0
White	25	63.5	Blue/White		0
Blue	31	78.7	Brown		0
Red	37	94	Orange		0
Yellow		0	Orange/Black		0
Gray		0	Black/White		0
Violet		0	Red/White		0

Enclosure



Enclosure Dimensions

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

Revised 08/23/2006



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

PHILIPS ADVANCE

IOP3P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

- 1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.
- 1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

- 2.1 Ballast shall be _____ (Instant or Programmed) Start.
- 2.2 Ballast shall provide Independent Lamp Operation (ILO) for Instant Start ballasts allowing remaining lamp(s) to maintain full light output when one or more lamps fail.
- 2.3 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.
- 2.4 Ballast shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.
- 2.5 Ballast shall be high frequency electronic type and operate lamps at a frequency between 42 kHz and 52 kHz to avoid interference with infrared devices, eliminate visible flicker and avoid Article Surveillance System, such as anti-theft devices.
- 2.6 Ballast shall have a Power Factor greater than 0.98 for primary lamp.
- 2.7 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.77 for Low Watt, 0.87 for Normal Light Output, and 1.18 for High Light for Instant Start ballasts or 0.71 for Low Watt and 0.88 for Normal Light Output for Programmed Start ballasts.
- 2.8 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.
- 2.9 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% when operated at nominal line voltage with primary lamp.
- 2.10 Ballast shall have a Class A sound rating for all 4-foot lamps and smaller.
- 2.11 Ballast shall have a minimum starting temperature of -20F (-29C) on Instant Start Ballasts or 0F (-18C) Programmed Start ballasts for standard T8 lamps and 60F (16C) for energy-saving T8 lamps. Consult lamp manufacturer for temperature versus light output characteristics.
- 2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.
- 2.13 Ballast shall contain an anti-striation circuitry to reduce striation on energy-saving T8 lamps.
- 2.14 Programmed Start ballasts shall provide lamp EOL protection circuitry.
- 2.15 Ballast can be Remote or Tandem wired as follows:
Instant Start ballasts - Remote or Tandem wiring allowed to a maximum of 20 feet between ballast and lamp socket. For Tandem wiring, any lamp can be remote mounted.
Programmed Start 2-lamp ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, BLUE lamp must be in same fixture as the ballast.
Programmed Start 3 & 4-lamp (Normal Light) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.
Programmed Start 3 & 4-lamp (Low Watt) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for all T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.

Section III - Regulatory Requirements

- 3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).
- 3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.
- 3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.
- 3.4 Ballast shall comply with ANSI C82.11 where applicable.
- 3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18,

Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating (with the exception of IOPA models).

3.7 Ballast shall meet NEMA/CEE High Performance T8 Lighting System Specifications.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a 90 C designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90 C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance part # _____ or approved equal.

NOTE: The use of Optanium IOP and ICN-2P32-N models is recommended to reduce striation in energy-saving T8 lamps (25W, 28W or 30W). Remote or tandem wiring of energy-saving T8 lamps (25W, 28W or 30W) is only recommended for Optanium 2.0 (IOP) models.

Consult lamp manufacturer for applications with Ballast Factor > 1.2

Revised 08/23/2006



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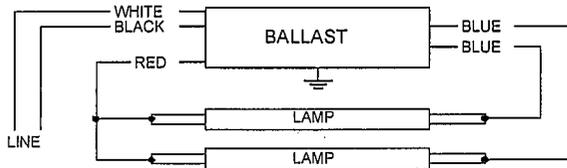
SED CODE: V, W, X, AB,
AD, AE

IOP-2P32-SC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (28W)	1	28	60/16	0.26	31	1.05	10	0.99	1.6	3.39
*F32T8/ES (28W)	2	28	60/16	0.41	48	0.87	10	0.99	1.6	1.81

Wiring Diagram



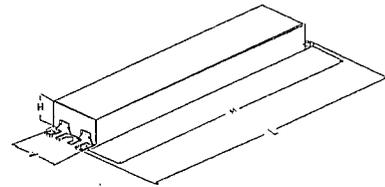
Diag. 64

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

Standard Lead Length (inches)

	in.	cm.		in.	cm.
Black	25	63.5	Yellow/Blue		0
White	25	63.5	Blue/White		0
Blue	31	78.7	Brown		0
Red	37	94	Orange		0
Yellow		0	Orange/Black		0
Gray		0	Black/White		0
Violet		0	Red/White		0

Enclosure



Enclosure Dimensions

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

Revised 08/23/2006



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IOP-2P32-SC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

- 1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.
- 1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

- 2.1 Ballast shall be _____ (Instant or Programmed) Start.
- 2.2 Ballast shall provide Independent Lamp Operation (ILO) for Instant Start ballasts allowing remaining lamp(s) to maintain full light output when one or more lamps fail.
- 2.3 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.
- 2.4 Ballast shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.
- 2.5 Ballast shall be high frequency electronic type and operate lamps at a frequency between 42 kHz and 52 kHz to avoid interference with infrared devices, eliminate visible flicker and avoid Article Surveillance System, such as anti-theft devices.
- 2.6 Ballast shall have a Power Factor greater than 0.98 for primary lamp.
- 2.7 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.77 for Low Watt, 0.87 for Normal Light Output, and 1.18 for High Light for Instant Start ballasts or 0.71 for Low Watt and 0.88 for Normal Light Output for Programmed Start ballasts.
- 2.8 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.
- 2.9 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% when operated at nominal line voltage with primary lamp.
- 2.10 Ballast shall have a Class A sound rating for all 4-foot lamps and smaller.
- 2.11 Ballast shall have a minimum starting temperature of -20F (-29C) on Instant Start Ballasts or 0F (-18C) Programmed Start ballasts for standard T8 lamps and 60F (16C) for energy-saving T8 lamps. Consult lamp manufacturer for temperature versus light output characteristics.
- 2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.
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Programmed Start 2-lamp ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, BLUE lamp must be in same fixture as the ballast.
Programmed Start 3 & 4-lamp (Normal Light) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.
Programmed Start 3 & 4-lamp (Low Watt) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for all T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.

Section III - Regulatory Requirements

- 3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).
- 3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.
- 3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.
- 3.4 Ballast shall comply with ANSI C82.11 where applicable.
- 3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18,

Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating (with the exception of IOPA models).

3.7 Ballast shall meet NEMA/CEE High Performance T8 Lighting System Specifications.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a 90 C designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90 C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance part # _____ or approved equal.

NOTE: The use of Optanium IOP and ICN-2P32-N models is recommended to reduce striation in energy-saving T8 lamps (25W, 28W or 30W). Remote or tandem wiring of energy-saving T8 lamps (25W, 28W or 30W) is only recommended for Optanium 2.0 (IOP) models.

Consult lamp manufacturer for applications with Ballast Factor > 1.2

Revised 08/23/2006



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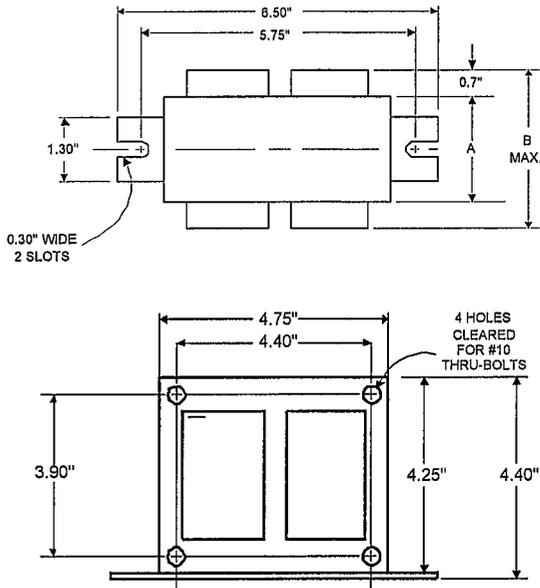


Metal Halide Lamp Ballast

Catalog Number 71A5892
For 320W M132/M154 (P.S.)
60 Hz SUPER-CWA
Status: Active

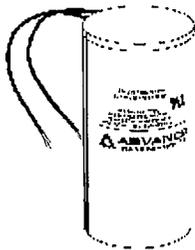
DIMENSIONS AND DATA

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



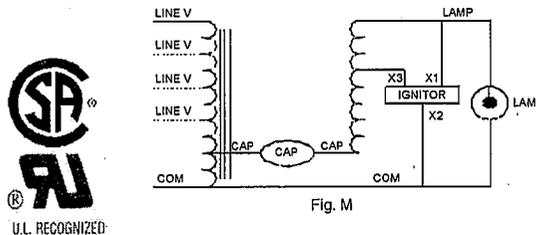
	120	208	240	277
INPUT VOLTS				
CIRCUIT TYPE	SUPER-CWA			
POWER FACTOR (min)	90%			
REGULATION				
Line Volts	±10%			
Lamp Watts	±10%			
LINE CURRENT (Amps)				
Operating.....	3.25	1.90	1.65	1.40
Open Circuit.....	2.30	1.35	1.15	1.00
Starting.....	1.80	1.05	0.90	0.80
UL TEMPERATURE RATINGS				
Insulation Class	H(180°C)			
Coil Temperature Code	1029			
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C			
NOM. OPEN CIRCUIT VOLTAGE	270			
INPUT VOLTAGE AT LAMP DROPOUT.....	60	104	120	138
INPUT WATTS	368			
RECOMMENDED FUSE (Amps).....	8	6	5	3
CORE and COIL				
Dimension (A)	1.77			
Dimension (B)	3.65			
Weight (lbs.)	11			
Lead Lengths	12"			
CAPACITOR REQUIREMENT				
Microfarads	21.0			
Volts (min.)	400			
Fault Current Withstand (amps)	400			
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)				
High Potential Test (Volts)				
1 minute				
2 seconds	2000			
Open Circuit Voltage Test (Volts)	2500			
Short-Circuit Current Test (Amps)	240-290			
Secondary Current				
Input Current.....	3.00-3.70			
	1.30	0.75	0.65	0.60
	2.00	1.15	1.00	0.90

Capacitor: 7C210P40R



Capacitance: 21
 Dia/Oval Dim: 1.75
 Height: 5.12
 Temp Rating: 105°C

Wiring Diagram:



Ignitor: LI533-H4



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

Typical Ordering Information

(please call Advance for suffix availability)

Order Suffix	Description
500D.	Ballast With Ignitor and Dry Film Capacitor
510D.	Ballast w/Welded Bracket, Ignitor, & Dry Film Capacitor
600.	Ballast and Ignitor, No Capacitor
610.	Ballast with Welded Bracket and Ignitor, No Capacitor

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 Corporate Offices: Phone: 800-322-2086

11/22/05

SED CODE: L, T, Y, AA

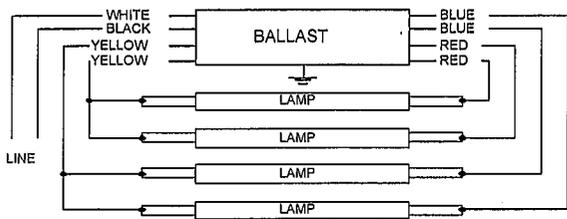
PHILIPS ADVANCE

IOP4P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (28W)	3	28	60/16	0.58	69	0.85	10	0.99	1.6	1.23
*F32T8/ES (28W)	4	28	60/16	0.71	84	0.77	10	0.99	1.6	0.92

Wiring Diagram



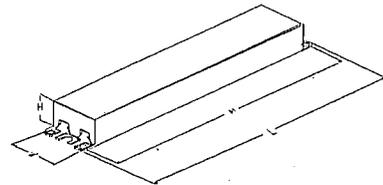
Diag. 66

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

Standard Lead Length (inches)

	in.	cm.		in.	cm.
Black	25	63.5	Yellow/Blue		0
White	25	63.5	Blue/White		0
Blue	31	78.7	Brown		0
Red	31	78.7	Orange		0
Yellow	39	99.1	Orange/Black		0
Gray		0	Black/White		0
Violet		0	Red/White		0

Enclosure



Enclosure Dimensions

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

Revised 08/23/2006



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PHILIPS ADVANCE

IOP4P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

- 1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.
- 1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

- 2.1 Ballast shall be _____ (Instant or Programmed) Start.
- 2.2 Ballast shall provide Independent Lamp Operation (ILO) for Instant Start ballasts allowing remaining lamp(s) to maintain full light output when one or more lamps fail.
- 2.3 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.
- 2.4 Ballast shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.
- 2.5 Ballast shall be high frequency electronic type and operate lamps at a frequency between 42 kHz and 52 kHz to avoid interference with infrared devices, eliminate visible flicker and avoid Article Surveillance System, such as anti-theft devices.
- 2.6 Ballast shall have a Power Factor greater than 0.98 for primary lamp.
- 2.7 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.77 for Low Watt, 0.87 for Normal Light Output, and 1.18 for High Light for Instant Start ballasts or 0.71 for Low Watt and 0.88 for Normal Light Output for Programmed Start ballasts.
- 2.8 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.
- 2.9 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% when operated at nominal line voltage with primary lamp.
- 2.10 Ballast shall have a Class A sound rating for all 4-foot lamps and smaller.
- 2.11 Ballast shall have a minimum starting temperature of -20F (-29C) on Instant Start Ballasts or 0F (-18C) Programmed Start ballasts for standard T8 lamps and 60F (16C) for energy-saving T8 lamps. Consult lamp manufacturer for temperature versus light output characteristics.
- 2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.
- 2.13 Ballast shall contain an anti-striation circuitry to reduce striation on energy-saving T8 lamps.
- 2.14 Programmed Start ballasts shall provide lamp EOL protection circuitry.
- 2.15 Ballast can be Remote or Tandem wired as follows:
Instant Start ballasts - Remote or Tandem wiring allowed to a maximum of 20 feet between ballast and lamp socket. For Tandem wiring, any lamp can be remote mounted.
Programmed Start 2-lamp ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, BLUE lamp must be in same fixture as the ballast.
Programmed Start 3 & 4-lamp (Normal Light) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for energy-saving T8 lamps or 20 feet for standard T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.
Programmed Start 3 & 4-lamp (Low Watt) ballast - Remote or Tandem wiring allowed to a maximum of 10 feet between ballast and lamp socket for all T8 lamps. For Tandem wiring, RED and YELLOW lamps must be in the same fixture as the ballast.

Section III - Regulatory Requirements

- 3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).
- 3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.
- 3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.
- 3.4 Ballast shall comply with ANSI C82.11 where applicable.
- 3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18,

Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

3.6 Ballast shall comply with UL Type CC rating (with the exception of IOPA models).

3.7 Ballast shall meet NEMA/CEE High Performance T8 Lighting System Specifications.

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9002 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a 90 C designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90 C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance part # _____ or approved equal.

NOTE: The use of Optanium IOP and ICN-2P32-N models is recommended to reduce striation in energy-saving T8 lamps (25W, 28W or 30W). Remote or tandem wiring of energy-saving T8 lamps (25W, 28W or 30W) is only recommended for Optanium 2.0 (IOP) models.

Consult lamp manufacturer for applications with Ballast Factor > 1.2

Revised 08/23/2006



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

PHILIPS LIGHTING ELECTRONICS N.A.

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

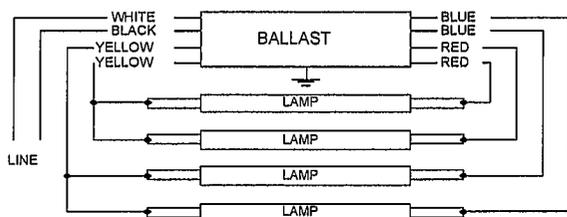
PHILIPS ADVANCE

IOP-4P32-SC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (28W)	3	28	60/16	0.66	79	0.97	10	0.99	1.6	1.23
* F32T8/ES (28W)	4	28	60/16	0.81	96	0.87	10	0.99	1.6	0.91

Wiring Diagram



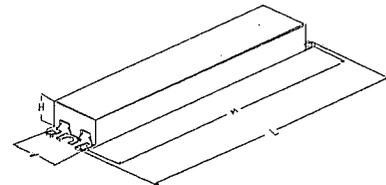
Diag. 66

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

Standard Lead Length (inches)

	in.	cm.		in.	cm.
Black	25	63.5	Yellow/Blue		0
White	25	63.5	Blue/White		0
Blue	31	78.7	Brown		0
Red	31	78.7	Orange		0
Yellow	39	99.1	Orange/Black		0
Gray		0	Black/White		0
Violet		0	Red/White		0

Enclosure



Enclosure Dimensions

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

Revised 08/23/2006



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Starting Method	Instant Start
Lamp Connection	Parallel
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4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a 90 C designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90 C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance part # _____ or approved equal.

NOTE: The use of Optanium IOP and ICN-2P32-N models is recommended to reduce striation in energy-saving T8 lamps (25W, 28W or 30W). Remote or tandem wiring of energy-saving T8 lamps (25W, 28W or 30W) is only recommended for Optanium 2.0 (IOP) models.

Consult lamp manufacturer for applications with Ballast Factor > 1.2

Revised 08/23/2006



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envirobrite

ENERGY PLANNING ASSOCIATES

RTR TROFFER REFLECTOR KIT

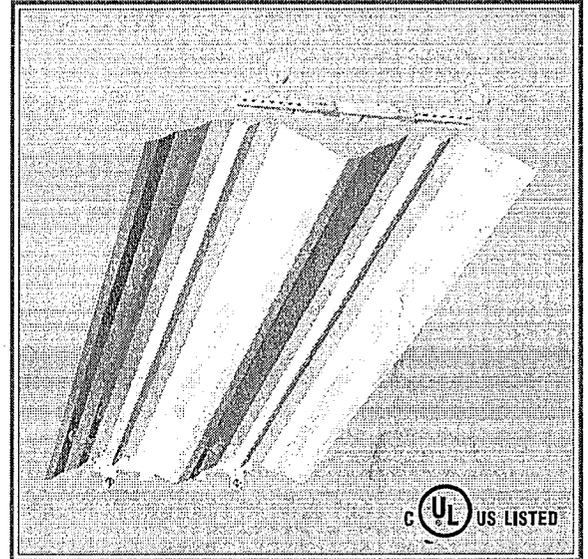
2x4 Troffer Fixture Retrofit Kit

Description

Envirobrite's® RTR Troffer Reflector kits dramatically enhance existing fixture efficiencies creating substantial energy savings with excellent return on investment. All Envirobrite® kits have four different specialized material options which offer various light distributions with minimal up-front investments. These kits, in conjunction with numerous ballast and lamp configurations, can easily produce ideal IES recommended light levels with minimized energy consumption. Envirobrite® kits will continue to provide consistent fixture performance and repeat annual energy savings for up to 25 years.

Application

Since 1994, millions of 2x4 lensed troffers and 18 cell parabolic louvers have been successfully de-lamped with Envirobrite® troffer kits. These kits are recognized worldwide as the industry leading retrofit kit for the majority of all commercial 2x4 fixtures. It's ideal optics, universal fit configuration and flexible stamped bracketing system allows proper fit in office spaces, classrooms, hospitals, and many other commercial locations.



Design

Envirobrite® kits are designed by our expert in house lighting engineers for ideal photometry and trouble-free installation. Every Envirobrite® kit is designed to meet UL 1570 specifications for safety. Integral to ideal kit functionality is the combination of our bracketing system which centers the lamps specifically to the optics of the reflector design. Envirobrite® reflectors are fabricated with Energy Planning Associates custom-made multi-stage progressive roll forming machinery. Our unique high speed equipment consistently produces multi-faceted linear fluorescent reflectors within precise quality tolerance. Our process enables us to add additional facets for superior reflector performance significantly reducing production cost and improving lead times. Our rigid, light weight bracketing systems are produced with custom designed stamping dies and are very easy to install. As with all Envirobrite® products Cost-A-Mized solutions are available to meet every customer's needs.

Primary Features & Benefits

- Proudly Designed, Made and Assembled in the USA
- Qualifies for maximum \$.60 square foot EPACT tax deduction
- Significant reduction in maintenance costs
- Reinforced multi function universal bracketing system
- Aluminum components generate a rust-free approach to less maintenance and lasting appeal
- Utility rebate friendly throughout the U.S.
- 25 facet optical design for maximum performance
- Superior lighting directly to the work plane
- Flexibility for tandem wiring applications

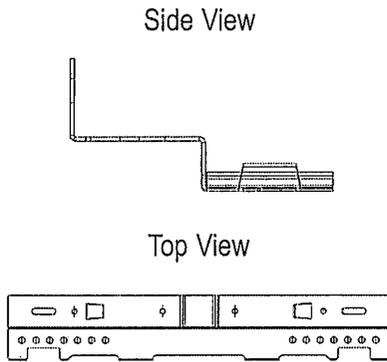
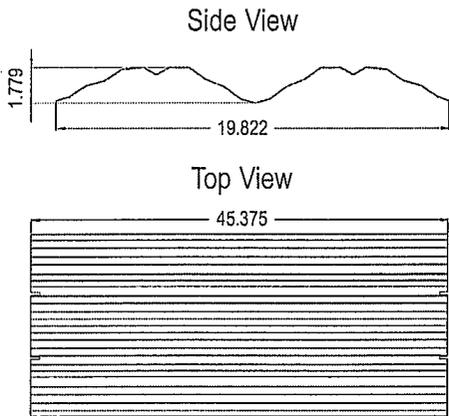
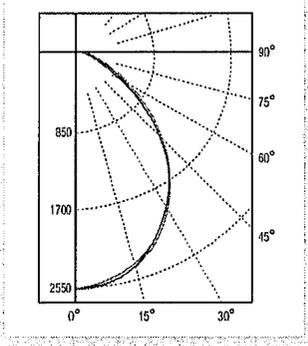
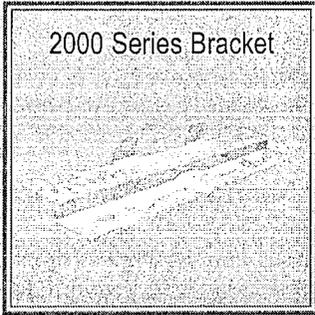
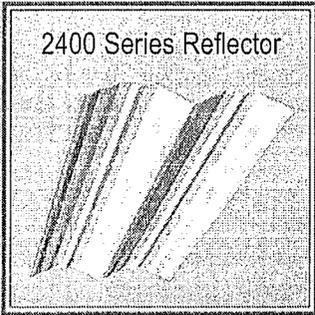
Quick, Safe and Labor Efficient Installation

- Variable tek screw slot locations for multiple mounting options
- Unique bracket design UL approved for no wire guard requirement
- Lance and form bracket design for easy pinch in reflector installation
- Snap-in lamp holders won't fall out during overhead installation
- Streamlined packaging for easy job site material management
- Slots, instead of holes, provided for easy end to end bracket to bracket centering
- With 1/3 the weight of steel aluminum components permit reduced shipping cost and simpler installation
- 25 facet reflectors for added rigidity and a sturdy fit
- Less than 2" reflector depth to fit shallow fixtures
- Toolless ballast access for simple maintenance
- Rounded-edged brackets to avoid injury during installation
- 9-3/4" lamp spacing enhances appearance of 18-cell parabolic retrofits

For added efficiency include high quality T5 or T8 lamps with either instant or programmed start ballasts. Adding an Envirobrite® approved motion sensor system to your retrofit project will further enhance energy savings and create an even faster payback.

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0° — Candela Plot
45° — 2 Lamp T8
90° —

Zonal Lumen Summary

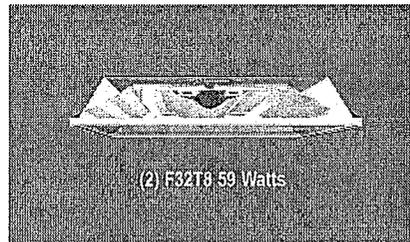
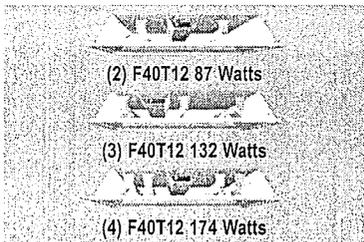
Zone	Lumens	% Lamp	Fixture
0-30	1895	31.1	35.3
0-40	2987	49.0	55.7
0-60	4630	75.9	86.3
0-90	5364	87.9	100.0

2x4 Kit includes

- (1 qty) 2400 series aluminum reflector made from your choice of specified material (95% Enhanced Miro4, 93% Micro Matte, 91% White-painted or 87% Anodized Aluminum)
- (2 qty) 2000 series white-painted stamped aluminum brackets
- (4, 6 or 8 qty) specified shunted or unshunted high quality chemical resistant thermoplastic body UL approved lamp holders
- (5 qty) tek screws

RTR2402T832ENLSS used for test
Total Luminaire Optical Efficiency = 87.9%

Luminaire Spacing Criterion
0 deg - 1.2 90 deg - 1.1
Call factory for full photometric report



"SAVINGS"

- 32% Energy Savings
- 55% Energy Savings
- 66% Energy Savings

Ordering Information
Sample number: RTR2402T832ENLSS

TYPE	DIMENSION	LAMPS	LAMP TYPE	REFLECTOR
○ RTR= Troffer Reflector Kit	○ 24=2x4	○ 02=2 Lamp	○ T832=32W	○ EN=95% MIRO 4 Enhanced
		○ 03=3 Lamp	○ T554=54W	○ MN=93% Micro Matte
		○ 04=4 Lamp		○ WN=91% White Aluminum
				○ AN=87% Anodized Aluminum

LAMPHOLDER TYPE	INSERTION METHOD
○ LS= Shunted	○ OS=T8 Short Twist Lock (Standard)
○ LU= Unshunted	○ ON=T8 Short Snap In Twist Lock
	○ OP=T5 Plunger Socket

enviro

ENERGY PLANNING ASSOCIATES

RST INDUSTRIAL STRIP KIT

4' & 8' Kits

Description

Envirobrite's® RST Industrial Reflector Strip Kits are used to re-lamp or de-lamp 4' and 8' T12 and older T8 industrial strip fixtures. The result is substantial energy savings, improved lighting with excellent returns on investments. All Envirobrite® strip kits have four different specialized material options and two up-light material options. Utilizing our Cost-A-Mized program will provide an endless variety of widths to fit any application. These kits, in conjunction with numerous ballast and lamp configurations, can easily produce ideal IES recommended light levels with minimized energy consumption. Envirobrite kits will continue to provide consistent fixture performance and repeat annual energy savings for up to 25 years.

Application

Since 1994, millions of reflector and industrial strips have been successfully de-lamped or re-lamped with Envirobrite® kits. These kits are recognized worldwide as the industry leading retrofit kit for the majority of all commercial 2x4 fixtures. It's ideal optics, universal fit configuration and flexible patented clip strip bracketing system allows proper fit in office spaces, hospitals, and many other commercial locations.

Design

Envirobrite® kits are designed by our expert in house lighting engineers for ideal photometry and trouble-free installation. Every Envirobrite® kit is designed to meet UL 1570 specifications for safety. Integral to ideal kit functionality is the combination of our "Clip Strip" bracketing system which was designed to handle unknown, or numerous channel sizes between 4.0"-5.25". Envirobrite® reflectors are fabricated with Energy Planning Associates custom-made multi-stage progressive roll forming machinery. Our unique high speed equipment consistently produces multi-faceted linear fluorescent reflectors within precise quality tolerance. Our process enables us to add additional facets for superior reflector performance significantly reducing production cost and improving lead times. Our rigid, light weight bracketing systems are produced with custom designed stamping dies and are very easy to install. As with all Envirobrite® products Cost-A-Mized solutions are available to meet every customer's needs.

Primary Features & Benefits

- Proudly Designed, Made and Manufactured in the USA
- Utility rebate friendly throughout the U.S.
- Significant reduction in maintenance costs
- Superior lighting directly to the work plane
- Unique and patented "Clip Strip" bracket is reversible for one, two or three lamp configurations
- Considerable reduction in energy costs
- Reflectors meet UL classified ballast covers – quarter turn
- 1, 2, or 3 lamp options available
- Aluminum components generate a rust-free approach to less maintenance and lasting appeal

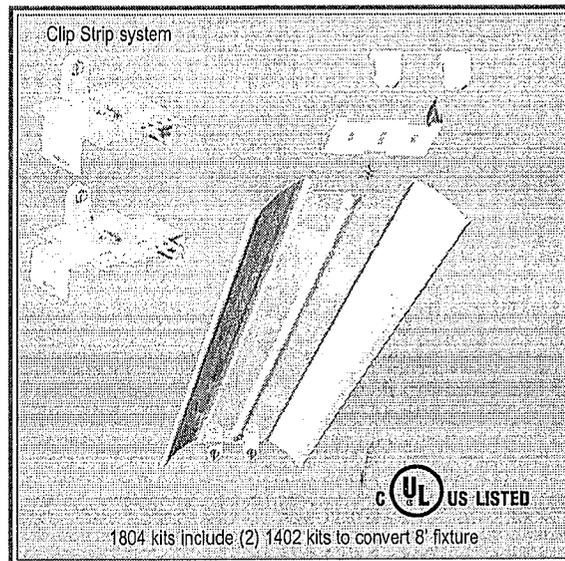
"Clip Strip" Bracket

- Adjusts to any channel size between 4.0" to 5.25"
- Tek screw slots for easy 48" lamp centering
- Rounded edges for installer safety
- Reversible for one, two or three lamp configurations
- Locking lampholder notches

Quick, Safe and Labor Efficient Installation

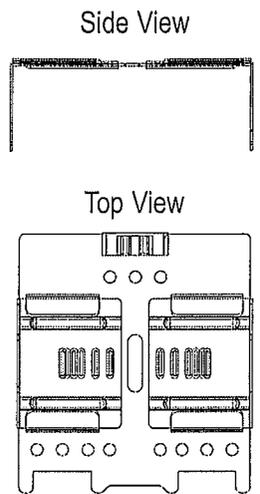
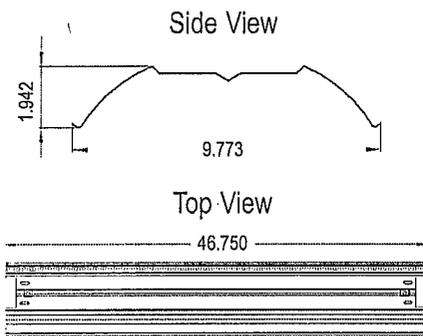
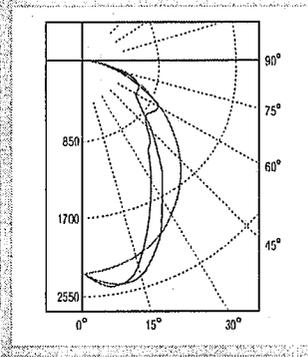
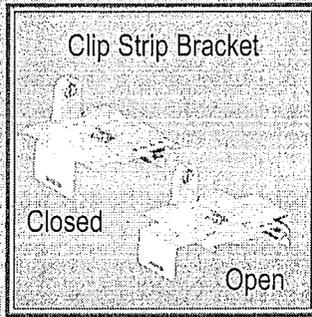
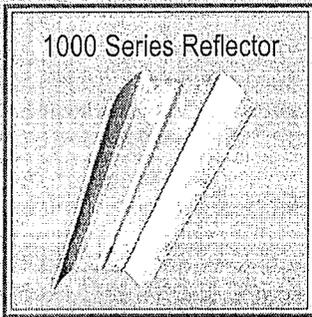
- Two 4' kits can be used to retrofit 8' sections
- Snap-in lamp holders won't fall out during overhead installation
- Streamlined packaging for easy job site material management
- With 1/3 the weight of steel aluminum components permit reduced shipping cost and simpler installation
- Quarter turn reflectors for easy installation
- Toolless ballast access for simple maintenance
- Rounded edge "Clip Strip" bracket adjust to any channel between 4.0" and 5.25"

For added efficiency include high quality T5 or T8 lamps with either instant or programmed start ballasts. Adding an Envirobrite® approved motion sensor system to your retrofit project will further enhance energy savings and create an even faster payback.



envirobrite





0° --- Candela Plot
45° --- 2 Lamp T8
90° ---

Zonal Lumen Summary

Zone	Lumens	% Lamp	Fixture
0-30	1810	30.7	31.5
0-40	2797	47.4	48.6
0-60	4527	76.7	78.7
0-90	5747	97.4	99.9

Standard RST 1400 4' Series Kit includes

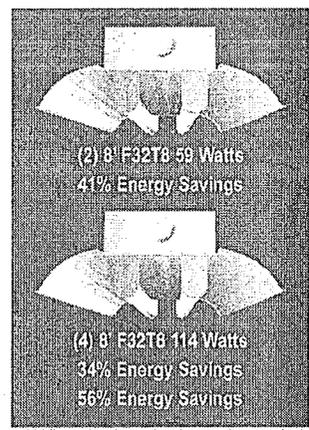
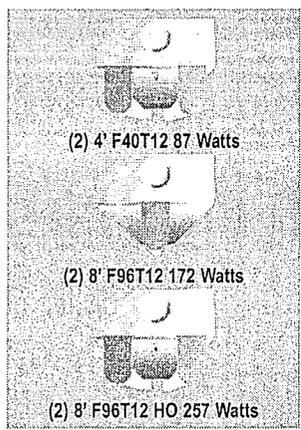
- (1) 1400 series aluminum reflector made from your choice of specified material (95% Enhanced Miro4, 93% Micro Matte, 91% White-painted or 87% Anodized Aluminum with two up-light options as well)
- (2 or 4) specified shunted or unshunted high quality chemical resistant thermoplastic body UL approved lamp holders
- (2) quarter turns when ordered with a reflector
- (5) tek screws

RST1402T832ENCCLSLST used for test
Total Luminaire Optical Efficiency = 97.5%

Luminaire Spacing Criterion
0 deg - 1.3 90 deg - 1.0
Call factory for full photometric report

Standard RST 1800 8' Series Kit includes

- (2) 1400 series reflector made from your choice of specified material (95% Enhanced Miro4, 93% Micro Matte, 91% White-painted or 87% Anodized Aluminum with two up-light options as well)
- (4, 6, or 8) specified shunted or unshunted high quality chemical resistant thermoplastic body UL approved lamp holders
- (4) quarter turns when ordered with a reflector
- (10) tek screws

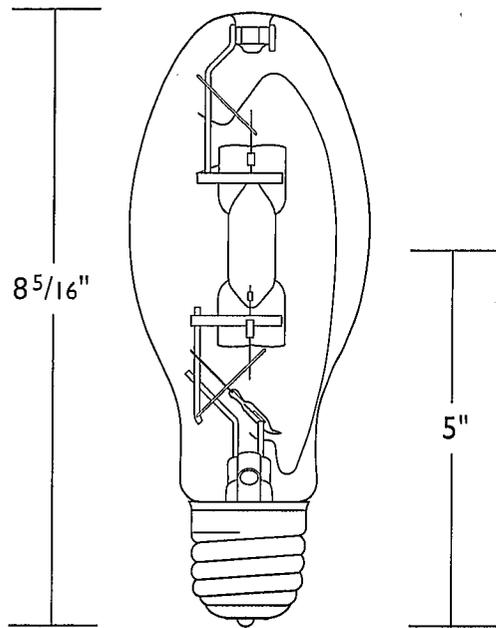


Ordering Information
Sample number: RST1402T832ENCCLSLST

TYPE	DIMENSION	LAMPS	LAMP TYPE	REFLECTOR
○ RST=Strip Reflector Kit (1000 series)	○ 14=1x4	○ 01=1 Lamp ○ 04=4 Lamp	○ T832=32W	○ EN=95% MIRO 4 Enhanced
	○ 18=1x8	○ 02=2 Lamp ○ 06=6 Lamp	○ T524=54W	○ WN=91% White
		○ 03=3 Lamp		○ MN=93% Micro Matte
				○ AN=87% Anodized Aluminum

REQUIRED FOR STRIP FIXTURE PRODUCTS	LAMPHOLDER TYPE	INSERTION METHOD
○ CCLS=Clip Strip	○ LS= Shunted	○ T=T8 Tall Twist Lock (Standard)
○ C043=4.3	○ LU= Unshunted	○ N=T8 Short Snap In Twist Lock
○ C050=5.0		○ P=T5 Plunger Socket

Pulse Start Metal Halide 320 Watt Clear Universal Lamp



■ Ordering Information

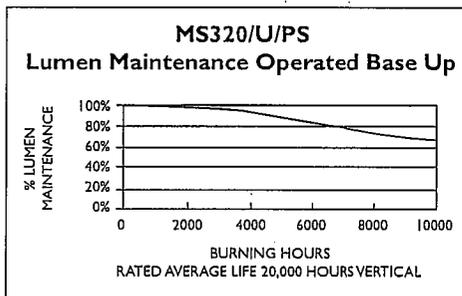
Ordering Code	MS320/U/PS
ANSI Designation	M132/E
Product Number	383810
Description	Pulse Start Metal Halide
Package Quantity	12

■ Physical Characteristics

Bulb Size	ED-28
Bulb Finish	Clear
Base (Nickel Plated Brass)	Mogul-Screw
Max. Overall Length (MOL)	8 5/16" (211mm)
Light Center Length (LCL)	5.0" (127mm)
Arc Length	1.42" (36mm)
Arc Tube Material	Quartz
Max. Permissible Bulb Temp.	400°C (752°F)
Max. Permissible Base Temp.	210°C (410°F)
Max. Bulb to Base Eccentricity	3°
Max. Arc Tube to Base Eccentricity	3°

■ Operating Characteristics (Photometric)

	Vertical	Horizontal
Rated Initial Lumens	31,700	28,800
Mean Lumens, Approximate	23,140	21,000
Rated Average Life, Hours	20,000	15,000
Correlated Color Temp. (CCT)	3900K	4300K
CIE Chromaticity, Approx.	x-.389, y-.397	x-.374, y-.396
Color Rendering Index (CRI)	65	65
Efficacy (lpw)	99	90



■ Operating Position

Universal-Enclosed Luminaires Only

Note: Pulse Start Metal Halide is Designed for Operation on Only Approved Ballasts with Metal Halide Pulse Igniters.

Let's make things better.



PHILIPS

Philips Lighting Company
200 Franklin Square Drive ■ P.O. Box 6800
Somerset, NJ 08875-6800
1-800-555-0050

www.lighting.philips.com/nam

A Division of Philips Electronics North America Corporation

Updated 2/02

PSM-H 003

Philips Lighting
281 Hillmount Road
Markham, Ontario L6C 2S3

A Division of Philips Electronics Limited

Pulse Start Metal Halide 320 Watt Clear Universal Lamp

Electrical Data (Subject to change without notice)

Lamp Watts (Nominal)	320
Lamp Operating Voltage (rms) (Nominal)	132
Initial Lamp Voltage Range (rms)	120-140
Lamp Operating Current (Amps) (rms) (Nominal)	2.65
Lamp Current Crest Factor (Maximum)	1.6
Warm-up Time to 90% of Output	2 Minutes
Re-strike Time for Hot Lamp	5-7 Minutes
Ballast Type	ANSI M132
Ballast Open Circuit Voltage (Minimum)	250 RMS Min.
Pulse Peak Volts	3000 Min., 4000 Max.
Pulse Width @ 90% Peak (micro sec)	1.3
Pulse Repetition Rate (Minimum)	1x/1/2cycle
Minimum Operating Temperature	-30°C
Advance Transformer Ballast Number	71A5892

Warnings, Cautions and Operating Instructions

"WARNING: These lamps can cause serious skin burn and eye inflammation from short wave ultraviolet radiation if outer envelope of the lamp is broken or punctured. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain lamps that will automatically extinguish when the outer envelope is broken or punctured are commercially available." This lamp complies with FDA radiation performance standard 21 CFR subchapter J. (USA: 21 CFR 1040.30 Canada: SOR/DORS/80-381)

If the outer bulb is broken or punctured, turn off at once and replace the lamp to avoid possible injury from hazardous shortwave ultraviolet radiation. Do not scratch the outer bulb or subject it to pressure as this could cause the outer bulb to crack or shatter. A partial vacuum in the outer bulb may cause glass to fly if the envelope is struck.

WARNING: The arc-tube of metal halide lamps are designed to operate under high pressure and at temperatures up to 1000°C and can unexpectedly rupture due to internal or external factors such as a ballast failure or misapplication. If the arc-tube ruptures for any reason, the outer bulb may break and pieces of extremely hot glass might be discharged into the surrounding environment. If such a rupture were to happen, THERE IS A RISK OF PERSONAL INJURY, PROPERTY DAMAGE, BURNS AND FIRE.

Certain lamps that will retain all the glass particles should inner arc-tube rupture occur are commercially available from Philips Lighting Company.

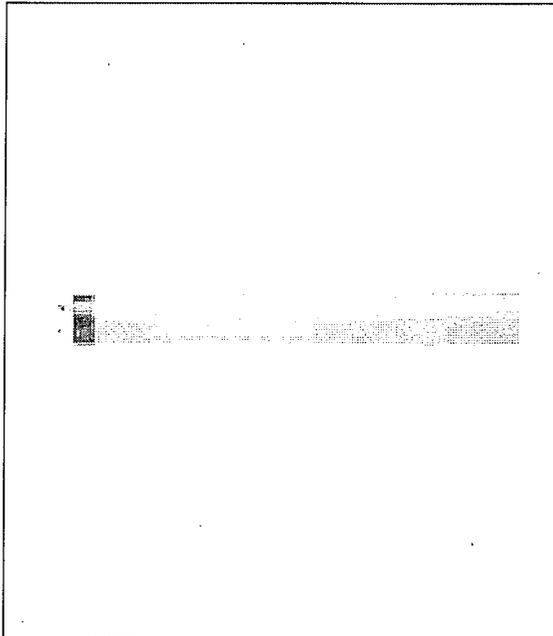
RELAMP FIXTURES AT OR BEFORE THE END OF RATED LIFE.

Allowing lamps to operate until they fail is not advised and may increase the possibility of inner arc tube rupture.

CAUTION: TO REDUCE THE RISK OF PERSONAL INJURY, PROPERTY DAMAGE, BURNS AND FIRE RESULTING FROM AN ARC-TUBE RUPTURE THE FOLLOWING LAMP OPERATING INSTRUCTIONS MUST BE FOLLOWED.

Lamp Operating Instructions:

- 1) Turn off lamps at least once a week for at least 15 minutes in systems which are operating on a continuous basis (24 hours/day, 7 days/week). FAILURE TO TURN OFF LAMPS FOR THE MINIMUM RECOMMENDED TIME MAY INCREASE THE POSSIBILITY OF AN INNER ARC-TUBE RUPTURE.
- 2) RELAMP FIXTURES AT OR BEFORE THE END OF RATED LIFE. Allowing lamps to operate until they fail is not advised and may increase the possibility of inner arc tube rupture.
- 3) Use only in an enclosed fixture capable of withstanding particles of glass having temperatures up to 1000°C.
- 4) Before lamp installation/replacement, shut power off and allow lamp and fixture to cool to avoid electrical shock and potential burn hazards.
- 5) Use only auxiliary equipment meeting Philips and/or ANSI standards.
Use within voltage limits recommended by ballast manufacturer.
 - A. Operate lamp only within specified limits of operation.
 - B. For total supply load refer to ballast manufacturer's electrical data.
 - C. All Pulse Start mogul based lamp require a socket rated to withstand a 4000 volt pulse.
- 6) Periodically inspect the outer envelope. Replace any lamps that show scratches, cracks or damage.
- 7) If a lamp bulb support is used, be sure to insulate the support electrically to avoid possible decomposition of the bulb glass.
- 8) Protect lamp base, socket and wiring against moisture, corrosive atmospheres and excessive heat.
- 9) Time should be allowed for lamps to stabilize in color when turned on for the first time. This may require several hours of operation, with more than one start. Lamp color is also subject to change under conditions of excess vibration or shock, and color appearance may vary between individual lamps.
- 10) Lamps may require 5 to 7 minutes to re-light if there is a power interruption.
 - I 1) Take care in handling and disposing of lamps. If an arc tube is broken, avoid skin contact with any of the contents or fragments.
 - I 2) Use this lamp only in fixtures that contain a Pulse Start metal halide ballast and are specifically designed for use with Pulse Start metal halide lamps.



Features/Benefits

- Ultimate System solution
- High lumens enable multiple system options to maximize energy savings and reduce lighting costs.
- Fully dimmable without burn-in.
- Better for the environment
- Only 1.7mg of mercury with ALTO II™ Technology
- Reduced impact on the environment without sacrificing performance
- Warranty period: 36 months

Applications

- Ideal for applications requiring maximum light output.

Notes

- Rated average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently. (202)
- Average life under engineering data with lamps turned off and restarted once every 12 operating hours. (241)
- Approximate Initial Lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions. (203)
- For expected lamp lumen output, commercial ballast manufacturers can advise the appropriate Ballast Factor for each of their ballasts when they are informed of the designated lamp. The Ballast Factor is a multiplier applied to the designated lamp lumen output. (204)
- Design Lumens are the approximate lamp lumen output at 40% of the lamp's Rated Average Life. This output is based upon measurements obtained during lamp operation on a reference ballast under standard laboratory conditions. (208)
- Design lumens rated at 3 hours per start on Instant Start ballast. (239)
- Exclusive to Philips Lighting Company.

Product data

Product Number	139907
Full product name	F32T8 ADV850 ALTO

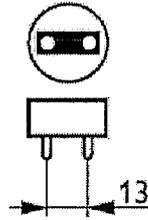
PHILIPS

Product data	
Ordering Code	F32T8/ADV850 /ALTO
Pack type	1 Lamp
Pieces per Sku	1
Skus/Case	25
Pack UPC	046677139902
EAN2US	
Case Bar Code	50046677139907
Successor Product number	
Base	Medium Bi-Pin [Medium Bi-Pin Fluorescent]
Base Information	Green Base
Bulb	T8
Packing Type	1LP [1 Lamp]
Packing Configuration	25
Type	F32T8
Feature	ALTO II™
Ordering Code	F32T8/ADV850 /ALTO
Pack UPC	046677139902
Case Bar Code	50046677139907
Energy Saving	Energy Saving
Rated Avg Life [12-Hr Prog St]	36000 hr
Rated Avg Life [12-Hr Inst St]	30000 hr
Rated Avg Life [3-Hr Prog St]	30000 hr
Rated Avg Life [3-Hr Inst St]	24000 hr
Watts	32W
Mercury (Hg) Content	1.7 mg
Picogram per Lumen Hour	24 p/LuHr
Color Code	Advantage 850 [CCT of 5000K]
Color Rendering Index	82 Ra8
Color Designation	Advantage 850
Color Temperature	5000 K
Initial Lumens	3100 Lm
Design Mean Lumens	3000 Lm
Nominal Length [Inch]	48
Product Number	139907

PHILIPS



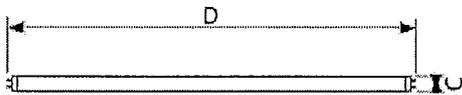
F-T8-Adv Med Bipin/GB



Base Medium Bi-Pin



Energy Saving Energy Saving

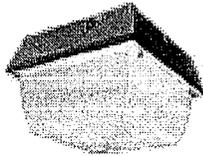


F-T8-Adv Med Bipin





VAN3F42QT



JOB NAME: _____

DATE: _____

TYPE: _____

DESCRIPTION

Medium size ceiling mount fixture: 26, 32 and 42 watt compact fluorescent available. Housing is die cast aluminum with clear vandalproof polycarbonate refractor. Photocontrol, Sensor (CFL 120v only) models available. Lamps supplied.

SPECIFICATIONS

HID Quartz restrike:

Add suffix "/QR" to Van3 (50w restrike) or Van5 (100w restrike) for HOT restrike. Provides immediate illumination in case of momentary power failure

Housings:

Die cast aluminum with powder coat bronze or white finish

Reflectors / Backplate:

Heavy gauge cold rolled steel with high reflectance baked white enamel

Refractor:

Injection molded polycarbonate, designed for maximum structural strength

Sockets:

Medium base 4kv Pulse Rated Glazed porcelain
Bronze

Screws:

Tamperproof center pin Torx-head and slotted Phillips head stainless steel screws provided. Be sure to order your Torx screwdriver (Catalog # VANDRIVER)

UL Listing:

Suitable for wet locations. Fixtures can be wired with 90° C supply wiring if supply wires are routed 3" away from ballast.

Patents:

RAB sensor and fixture designs are protected under U.S. and International Intellectual Property laws

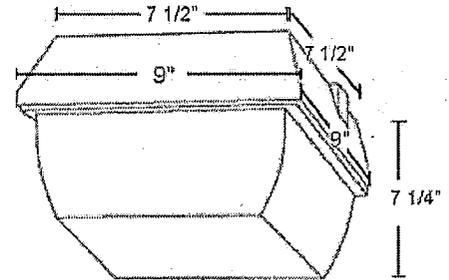
Quad Tap:

Fixture works with 120, 208, 240 and 277 Volts

Weight:

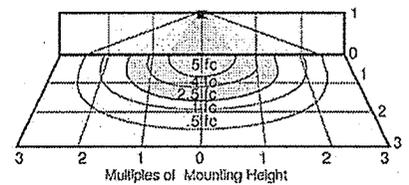
6.5

DIMENSIONS



PHOTOMETRIC

70w HPS @ 8' Mounting Height



Mounting Height	Multiplier	Multiplier		
		Watts	HPS	MH CFL
8'	1.0	26		.3
9'	.8	32		.4
10'	.7	42		.5
12'	.4	35	.4	
14'	.3	50	.6	.5
		70	1.0	.9

ORDERING INFORMATION

Compact Fluorescent
Lamp supplied with fixture

Total Watts	Lamp Type	Lamp Base	Ballast
42	42W	GX24q-4	Elec HPF QT Triple

Starting Amps/ Operating Amps			
120V	208V	240V	277V
0.38	0.3	0.2	0.17

Input Watts	LAMP ANSI	Initial Lumens	Lamp Hours
46	0	3200	12000

Factory Installed Options
Add suffix to Catalog Number

Swivel Photocontrol (/PCS)
Quartz Restrike (HPS & MH only) (/QR)

Mini Motion Sensor (/MS)
Button Photocontrol (/PC)

Note: Specifications may change without notice

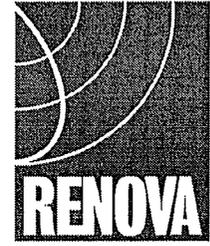
RAB Lighting, Inc. • 170 Ludlow Ave • Northvale, NJ 07647 • Tel: 888 RAB-1000 • Fax: 888 RAB-1232 • www.rabweb.com

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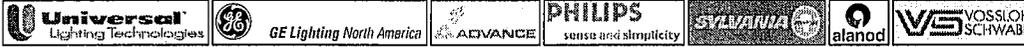
Category: ECS
Energy
Conservation
Series

Prefix:
ECO

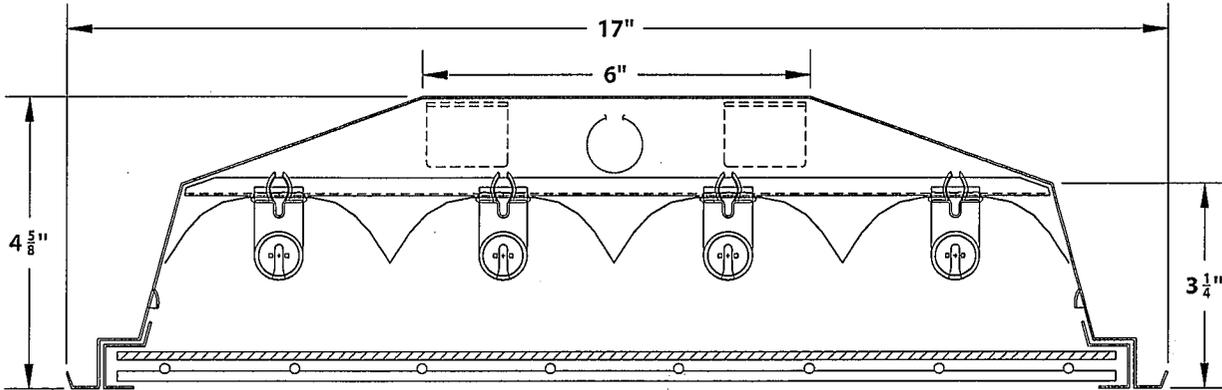
Fixture Series (Name):
EcoLyte



Innovative Lighting Ideas
Energy Efficient Solutions

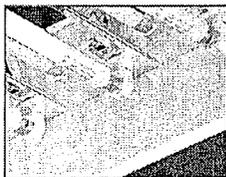


4-Lamp T5 HO EcoLyte Cross Section Shown

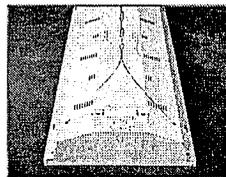


ORDERING GUIDE

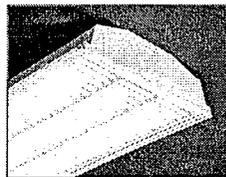
CATEGORY	SERIES	SIZE	REFLECTOR MATERIAL	REFLECTOR PHOTOMETRY	NUMBER OF LAMPS	LAMP TYPE (WATTAGE)	BALLAST VOLTAGE	NUMBER OF BALLASTS	LAMPS PER BALLAST	BALLAST FACTOR	OPTIONS
ECS	ECO	4	M	N	4	54	UNV	2	2	H	AWW
Energy Conservation Series	ECO - ECOLYTE	4 - 48" 8 - 96"	M - MIRO4 (95% TR) E - ENHANCED ALUMINUM (92% TR min.) W - WHITE (91% TR) A - ALUMINUM (87% TR min.) R - MIRO4 MICRO-MATT (95% TR)	F - FOCUSED N - NORMAL S - SPREAD C - CUSTOM OPTICS *N - NORMAL IS STANDARD *(BLANK)=N *C - CUSTOM OPTICS ARE DESCRIBED IN OPTIONS BOX	2 - 2L 3 - 3L 4 - 4L 5 - 5L 6 - 6L 4 - 4L 6 - 6L 8 - 8L 10 - 10L 12 - 12L	32 32w T8 54 54w T5HO	120 - 120v, 60 Hz 277 - 277v, 60 Hz 347 - 347v, 60 Hz UNV - 120v - 277v, 60 Hz 480 - 480v, 60 Hz xxx - Less Ballast	(BLANK) - 1 2 - 2 3 - 3 4 - 4	1 - 1 2 - 2 3 - 3 4 - 4	L - Low N - Normal H - High	<p>IES SUSTAINING MEMBER</p> <p>MADE IN THE USA</p> <p>UL LISTED</p> <p>Photometric data, IES files and all other information is available upon request.</p> <p>Veteran OWNED AND OPERATED</p> <p>OOW - Open Style OWW - White Wire-Guard AOW - Clear Acrylic Lens AWW - White Wire-Guard & Clear Acrylic Lens</p> <p>*ADDITIONAL OPTIONS (See "Options" sheet for all available options)</p>



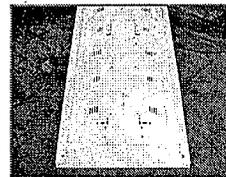
Vossloh Locking Lampholders (Standard)



Custom V-Cables (Optional) (Installed or Separate)



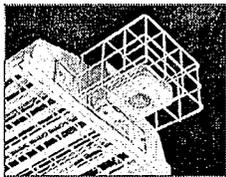
White Cross-Blade Louver (Optional)



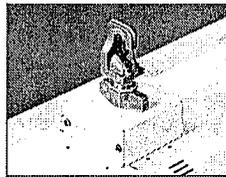
10%-20% Uplight (Optional)



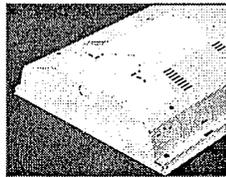
Center Mounting Detail (Standard) (Accepts Optional J-Box)



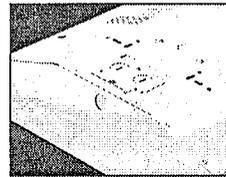
Sensor & Guard (Optional)



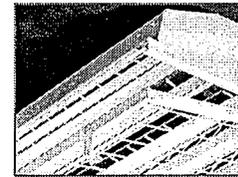
Center-Mount J-Box & Heavy-Duty Hanging Hook (Optional)



Dual Vented Housing (To Control Lamp/Ballast Temp.)



Quick Wire Access Plate (Standard)



Frame Door (Optional) (Cam Latch Provides Quick Access)

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

RENOVA Lighting Systems, Inc. 300 Highpoint Avenue Portsmouth, RI 02871 (800) 635-6682 www.renova.com

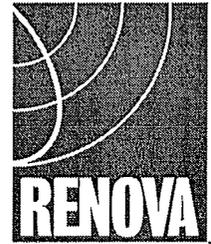
Category: ECS
Energy
Conservation
Series

Prefix:
NPW

Fixture Series (Name):
Narrow Profile Wrap



GE Lighting North America



renova ve L ight ng deas
Energy Eff c ent So ut ons

Narrow Profile Wrap Series general purpose fluorescent luminaire

GENERAL DESCRIPTION

The Narrow Profile Wrap (NPW) Series has been developed for general illumination for surface or pendant mounted applications. This series utilizes computer designed reflector technology for optimal fixture efficiency, reduction of energy consumption and improved quality of light. It also provides instant-on operation and offers many other energy saving options.

Typical applications for this type of product are interior spaces where finished ceilings exist. Applications include:

- Corporate / Office Buildings
- Hospitals, Government Facilities and Military Bases
- Retail and Industrial Facilities
- Schools, Colleges and Universities

DESIGN FEATURES / SPECIFICATIONS

CONSTRUCTION

- Precision die formed from 22 ga. cold rolled steel.
- Mechanically fastened or resistance welded depending on model.
- Heavy gauge steel (CRS) may be custom ordered.
- Finish to be pre-painted gloss white polyester powder coat.
- Post-painted polyester powder coat finishes are available. Consult factory for all special colors and finishes.
- Heavy gauge steel (NYC) and heavy gauge aluminum are available as alternate materials.

REFLECTOR

- Precision die formed optics which has been designed for maximum efficiency and photometric properties using the latest CAD software.
- Choice of optics includes focused, normal and spread beam distribution. Consult factory for custom optics design and spacing criteria options.
- Choice of materials include:
 - Alanod Miro4® Enhanced Specular Aluminum, 95% total reflectance, 25 year warranty.
 - Enhanced Specular Aluminum, 92% total (min.) reflectance, 25 year warranty.
 - High Reflectance White Powder Coated Aluminum, 91% total reflectance, 10 year warranty.
 - Polished Aluminum, 87% total (min.) reflectance, 25 year warranty.
- Consult factory for availability of all other material choices.

LAMP HOLDERS

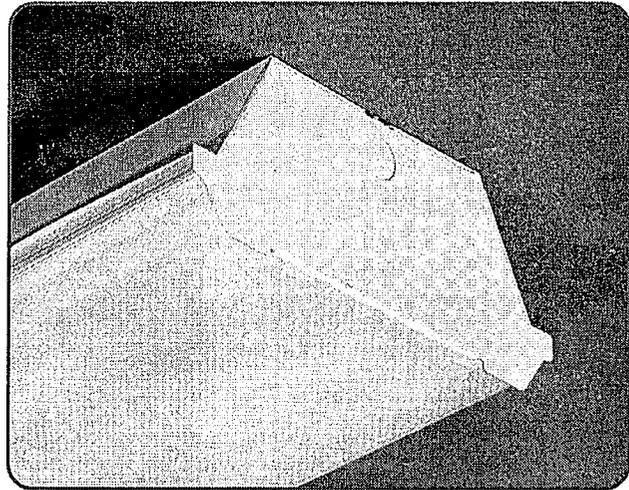
- Vossloh-Schwabe® premium type featuring:
 - Anti-vibration internal lamp locking design
 - High temperature resistant ("T" marking).
 - Heat and UV blocking shield to prevent degradation of material.
 - Multi-point contact design for optimum lamp pin contact.
 - Produced in accordance with DIN ISO 9001 and IEC standards.

BALLASTS

- All standard ballasts are electronic, energy saving, thermally protected, Class-P, non-PCB, Sound Rated "A", 0 degree (Type 1 Outdoor). Verify with factory for latest information regarding High Temperature (HT) or Extreme Low Temperature (XLT) rated ballast options.
- UL/CSA certified, where applicable. Compliant with Federal Ballast Law (Public Law 100-357, 1988).
- Choice of ballast factors. L=Low, N=Normal, H=High.
- Choice of dedicated, universal or special voltage - Consult factory for available options.
- Warranted by ballast manufacturer. Typical ballast warranty is for 5 years (120-277v) and 3-years (347-480v). Consult factory for latest warranty information.

LAMPS

- Supplied by others unless otherwise specified.
- Factory installed if required - Consult factory.
- Lamp type, CRI ratings, temperature colors, lamp life ratings are all viable options which can be supplied - Consult factory for information.



LENS (Diffuser)

- Extruded profile for precision fit.
- 100% virgin clear acrylic resin (for max. optical clarity).
- Linear prisms extruded into sides of lens.
- Pattern 12 prisms embossed into bottom of lens
- 30% "DR" additive (standard) to resist breakage (50% "DR" additive optional).
- Consult factory for all available lens options.

MOUNTING

- The luminaire may be surface mounted or may be suspended by pendant, threaded rod, hook, chain or cable. (Mounting hardware supplied by others unless otherwise specified).

ELECTRICAL

- Luminaire is bi-national listed and labeled (UL 1598 and CSA C22.2 No. 250.0-00) and is suitable for damp locations.
- Product includes luminaire disconnect as specified in NEC 410.73(G), 2005 Edition, and CEC part I, rule 30-308(4), 2006 Edition.

QUALITY CONTROL

- All fixtures and retrofit kits are designed, fabricated, assembled and tested at RENOVA's manufacturing facility. All fixtures are 100% lamp tested, inspected and labeled prior to shipment.

GUARANTEE

- RENOVA warrants all fixtures to be free of defects in manufacturing and workmanship for a period of (1) year from date of purchase. This warranty excludes damage of any kind resulting from improper installation, misuse, abuse, accidents, mis-application, or natural disasters. Please refer to the "Terms and Conditions" section of the RENOVA website for additional information.

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

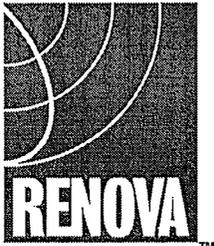
RENOVA Lighting Systems, Inc. 300 Highpoint Avenue Portsmouth, RI 02871 (800) 635-6682 www.renova.com

RLS-5015A-3

Category: ECS
Energy
Conservation
Series

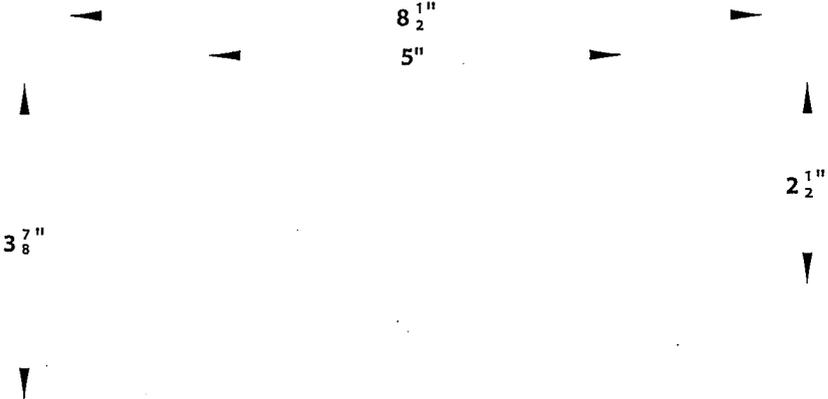
Prefix:
NPW

Fixture Series (Name):
Narrow Profile Wrap



innovative Lighting Ideas
Energy Efficient Solutions

2-Lamp T8 Narrow Profile Wrap Cross Section Shown

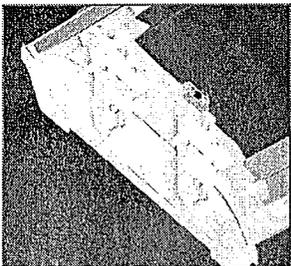


ORDERING GUIDE

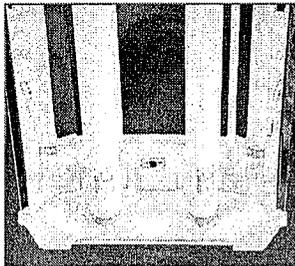
CATEGORY	SERIES	SIZE	REFLECTOR MATERIAL	REFLECTOR PHOTOMETRY	NUMBER OF LAMPS	LAMP TYPE (WATTAGE)	BALLAST VOLTAGE	NUMBER OF BALLASTS	LAMPS PER BALLAST	BALLAST FACTOR	OPTIONS
ECS	NPW	4	M	N	2	32	UNV	1	2	N	
Energy Conservation Series	NPW - NARROW PROFILE WRAP	2 - 24" 3 - 36" 4 - 48" 6 - 72" 8 - 96"	M - MIRO4 (95% TR) E - ENHANCED ALUMINUM (82% TR min.) W - WHITE (91% TR) A - ALUMINUM (87% TR min.) B - BALLAST COVER (White) (83% TR min.) R - MIRO4 MICRO-MATT (95% TR)	F - FOCUSED N - NORMAL S - SPREAD C - CUSTOM OPTICS *N - NORMAL IS STANDARD *(BLANK)=N *C - CUSTOM OPTICS ARE DESCRIBED IN OPTIONS BOX	1 - 1L 2 - 2L 3 - 3L 2 - 2L 4 - 4L 6 - 6L 24 24w T5HO 39 39w T5HO 54 54w T5HO	17 17w T8 25 25w T8 32 32w T8 14 14w T5 21 21w T5 28 28w T5	120 - 120v, 60 Hz 277 - 277v, 60 Hz 347 - 347v, 60 Hz UNV - 120v - 277v, 60 Hz 480 - 480v, 60 Hz xxx - Less Ballast	S - SLAVE (BLANK) - 1 2 - 2 3 - 3 4 - 4	(BLANK) - 0 1 - 1 2 - 2 3 - 3 4 - 4	L - Low N - Normal H - High	*ADDITIONAL OPTIONS (See "Options" sheet for all available options)



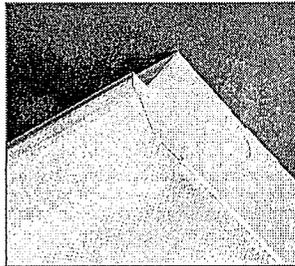
Photometric data, IES files and all other information is available upon request.



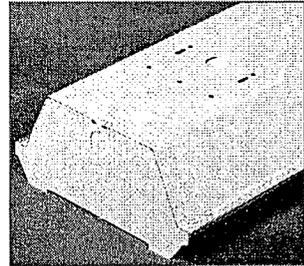
Vossloh Locking Lampholders (Standard)



Multi-Faceted Reflector (Designed for Maximum Efficiency)



Standard Lens (Bottom: Pattern 12 Prismatic Embossment) (Side: Linear Prisms)



Mounting Details (Included in all Housings)

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

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RLS-5015A-3

Category: ECS
Energy
Conservation
Series

Prefix:
SBW

Fixture Series (Name):
Standard Box Wrap



GE Lighting North America



Renovative Lighting Ideas
Energy Efficient Solutions

Standard Box Wrap Series general purpose fluorescent luminaire

GENERAL DESCRIPTION

The Standard Box Wrap (SBW) Series has been developed for general illumination for surface (wall or ceiling) or pendant mounted applications. This series utilizes computer designed reflector technology for optimal fixture efficiency, reduction of energy consumption and improved quality of light. It also provides instant-on operation and offers many other energy saving options.

Typical applications for this type of product are interior spaces where finished ceilings and walls exist. Applications include:

- Corridors and Stairwells in Corporate / Office Buildings
- Hospitals, Government Facilities and Military Bases
- Public Areas, Bathrooms and Lavatories
- Schools, Colleges and Universities

DESIGN FEATURES / SPECIFICATIONS

CONSTRUCTION

- Precision die formed from 22 ga. cold rolled steel.
- Mechanically fastened or resistance welded depending on model.
- Heavy gauge steel (CRS) may be custom ordered.
- Finish to be pre-painted gloss white polyester powder coat.
- Post-painted polyester powder coat finishes are available. Consult factory for all special colors and finishes.
- Heavy gauge steel (NYC) and heavy gauge aluminum are available as alternate materials.

REFLECTOR

- Precision die formed optics which has been designed for maximum efficiency and photometric properties using the latest CAD software.
- Choice of optics includes focused, normal and spread beam distribution. Consult factory for custom optics design and spacing criteria options.
- Choice of materials include:
 - Alanod Miro4® Enhanced Specular Aluminum, 95% total reflectance, 25 year warranty.
 - Enhanced Specular Aluminum, 92% total (min.) reflectance, 25 year warranty.
 - High Reflectance White Powder Coated Aluminum, 91% total reflectance, 10 year warranty.
 - Polished Aluminum, 87% total (min.) reflectance, 25 year warranty.
- Consult factory for availability of all other material choices.

LAMP HOLDERS

- Vossloh-Schwabe® premium type featuring:
 - Anti-vibration internal lamp locking design
 - High temperature resistant ("T" marking).
 - Heat and UV blocking shield to prevent degradation of material.
 - Multi-point contact design for optimum lamp pin contact.
 - Produced in accordance with DIN ISO 9001 and IEC standards.

BALLASTS

- All standard ballasts are electronic, energy saving, thermally protected, Class-P, non-PCB, Sound Rated "A", 0 degree (Type 1 Outdoor). Verify with factory for latest information regarding High Temperature (HT) or Extreme Low Temperature (XLT) rated ballast options.
- UL/CSA certified, where applicable. Compliant with Federal Ballast Law (Public Law 100-357, 1988).
- Choice of ballast factors. L=Low, N=Normal, H=High.
- Choice of dedicated, universal or special voltage - Consult factory for available options.
- Warranted by ballast manufacturer. Typical ballast warranty is for 5 years (120-277v) and 3-years (347-480v). Consult factory for latest warranty information.

LAMPS

- Supplied by others unless otherwise specified.
- Factory installed if required - Consult factory.
- Lamp type, CRI ratings, temperature colors, lamp life ratings are all viable options which can be supplied - Consult factory for information.

LENS (Diffuser)

- Extruded profile for precision fit.
- 100% virgin clear acrylic resin (for max. optical clarity).
- Linear prisms extruded into sides of lens.
- Pattern 12 prisms embossed into bottom of lens
- 30% "DR" additive (standard) to resist breakage (50% "DR" additive optional).
- Consult factory for all available lens options (materials & prism patterns).

MOUNTING

- The luminaire may be surface mounted or may be suspended by pendant, threaded rod, hook, chain or cable. (Mounting hardware supplied by others unless otherwise specified).
- Custom mounting options / accessories are available - Consult factory.

ELECTRICAL

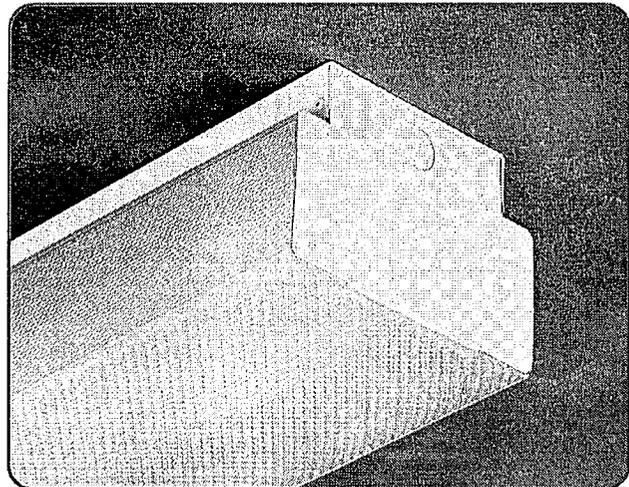
- Luminaire is bi-national listed and labeled (UL 1598 and CSA C22.2 No. 250.0-00) and is suitable for damp locations.
- Product includes luminaire disconnect as specified in NEC 410.73(G), 2005 Edition, and CEC part I, rule 30-308(4), 2006 Edition.

QUALITY CONTROL

- All fixtures and retrofit kits are designed, fabricated, assembled and tested at RENOVA's manufacturing facility. All fixtures are 100% lamp tested, inspected and labeled prior to shipment.

GUARANTEE

- RENOVA warrants all fixtures to be free of defects in manufacturing and workmanship for a period of (1) year from date of purchase. This warranty excludes damage of any kind resulting from improper installation, misuse, abuse, accidents,



Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

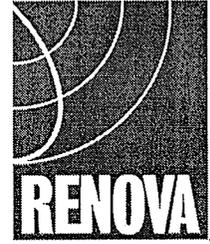
RENOVA Lighting Systems, Inc. 300 Highpoint Avenue Portsmouth, RI 02871 (800) 635-6682 www.renova.com

RLS-5090A-3

Category: ECS
Energy
Conservation
Series

Prefix:
SBW

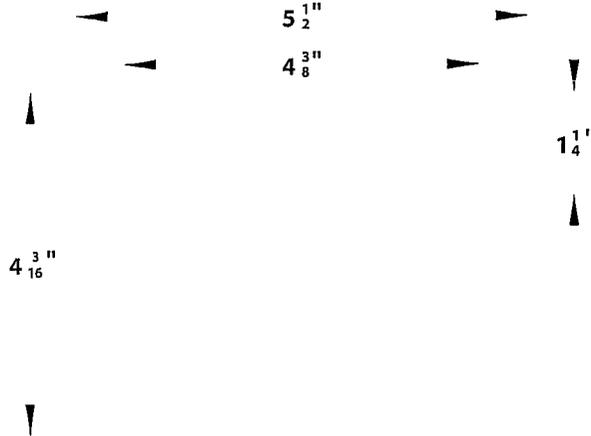
Fixture Series (Name):
Standard Box Wrap



renovat ve L ght ng deas
Energy Eff c ent So ut ons



2-Lamp T8 Standard Box Wrap Cross Section Shown

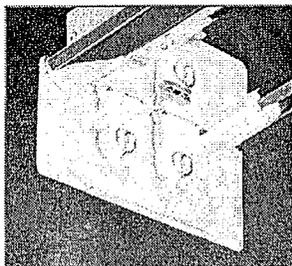


ORDERING GUIDE

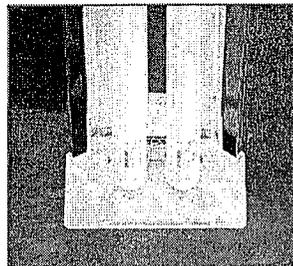
CATEGORY	SERIES	SIZE	REFLECTOR MATERIAL	REFLECTOR PHOTOMETRY	NUMBER OF LAMPS	LAMP TYPE (WATTAGE)	BALLAST VOLTAGE	NUMBER OF BALLASTS	LAMPS PER BALLAST	BALLAST FACTOR	OPTIONS
ECS	SBW	4	M	N	2	32	UNV	1	2	N	
Energy Conservation Series	SBW - STANDARD BOX WRAP	2 - 24" 3 - 36" 4 - 48" 6 - 72" 8 - 96"	M - MIRO4 (95% TR) E - ENHANCED ALUMINUM (92% TR min.) W - WHITE (91% TR) A - ALUMINUM (87% TR min.) B - BALLAST COVER (White) (83% TR min.) R - MIRO4 MICRO-MATT (95% TR)	F - FOCUSED N - NORMAL S - SPREAD C - CUSTOM OPTICS *N - NORMAL IS STANDARD *(BLANK)=N *C - CUSTOM OPTICS ARE DESCRIBED IN OPTIONS BOX	1 - 1L HSG 2 - 2L 3 - 3L 2 - 2L HSG 4 - 4L 6 - 6L	17 17w T8 25 25w T8 32 32w T8 14 14w T5 21 21w T5 28 28w T5 24 24w T5HO 39 39w T5HO 54 54w T5HO	120 - 120v, 60 Hz 277 - 277v, 60 Hz 347 - 347v, 60 Hz UNV - 120v - 277v, 60 Hz 480 - 480v, 60 Hz xxx - Less Ballast	S - SLAVE (BLANK) - 1 2 - 2 3 - 3 4 - 4	(BLANK) - 0 1 - 1 2 - 2 3 - 3 4 - 4	L - Low N - Normal H - High *Use Suffix *M" for Master (Example: 4M)	*ADDITIONAL OPTIONS (See "Options" sheet for all available options)



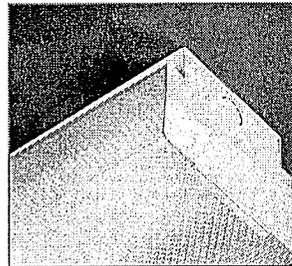
Photometric data, IES files and all other information is available upon request.



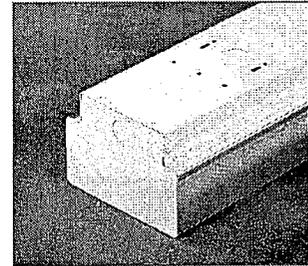
Vossloh Locking Lampholders (Standard)



Multi-Faceted Reflector (Designed for Maximum Efficiency)



Standard Lens (Bottom: Pattern 12 Prismatic Embossment) (Side: Linear Prisms)



Mounting Details (Included in all Housings)

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

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RLS-5090A-3

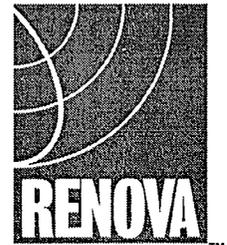
Category: ECS
Energy
Conservation
Series

Prefix:
SVT

Fixture Series (Name):
Standard Vapor Tight



GE Lighting North America



renovat ve L ght ng deas
Energy Eff c ent So ut ons

Standard Vapor Tight Series general purpose fluorescent luminaire

GENERAL DESCRIPTION

The Standard Vapor Tight (SVT) Series has been developed for all dust, damp/wet, vapor proof, cold weather and outdoor applications. Fixture can be surface (wall or ceiling), pendant, chain or cable mounted. This series utilizes computer designed reflector technology for optimal fixture efficiency, reduction of energy consumption and improved quality of light. It also provides instant-on operation and offers many other energy saving options.

Typical applications for this type of product are interior and exterior spaces where dust, moisture and vapor infiltration must be avoided. Applications include:

- Parking Garages, Car Washes, Shipping Docks and Outdoor Locations
- Government / Industrial Facilities, Gas Stations and Subways
- Swimming Pool Facilities, Locker / Shower Rooms
- Food and Drug Handling Areas, Public Areas and Commercial Kitchens

DESIGN FEATURES / SPECIFICATIONS

CONSTRUCTION

- Housing is precision injection molded from fiber-glass reinforced polyester resin. Approval and / or listings as follows:
- UL/CUL/NSF International
- U.S. Department of Agriculture
- Canadian Standards Association
- Achieves IP65 / IP67 Rating (Certain models only)
- Housing matl. is self-extinguishable (ASTM D635-74)
- Internal housing and brackets to be precision die formed from 22 ga. cold rolled steel. Finish to be pre-painted gloss white polyester powder coat.

GASKETING

- New technology molecular structure gasket material is poured into pre-treated housing channel to insure stronger adhesion and to provide maximum protection against moisture and dust.

REFLECTOR

- Precision die formed optics which has been designed for maximum efficiency and photometric properties using the latest CAD software.
- Choice of optics includes focused, normal and spread beam distribution. Consult factory for custom optics design and spacing criteria options.
- Choice of materials include:
 - Alanod Miro4® Enhanced Specular Aluminum, 95% total reflectance, 25 year warranty.
 - High Reflectance White Powder Coated Aluminum, 91% total reflectance, 10 year warranty.
 - Consult factory for all other material choices.

LAMP HOLDERS

- Vossloh-Schwabe® premium type featuring:
 - Anti-vibration internal lamp locking design
 - High temperature resistant ("T" marking).

- Heat and UV blocking shield to prevent degradation of material.
- L/H contact design for optimum lamp pin contact.
- Manufactured to DIN ISO 9001 and IEC standards.

BALLASTS

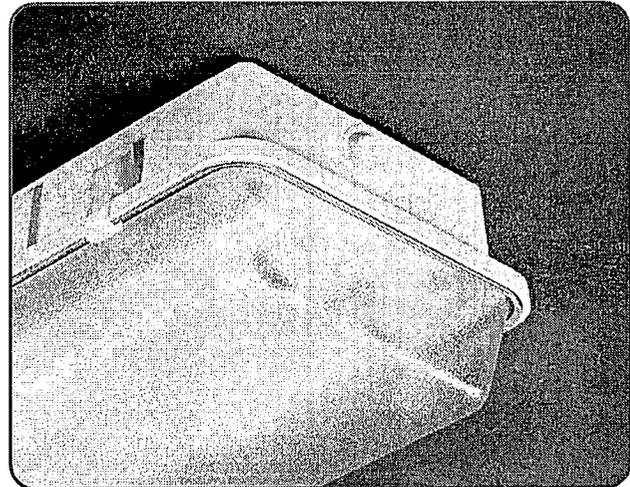
- All standard ballasts are electronic, energy saving, thermally protected, Class-P, non-PCB, Sound Rated "A", 0 degree (Type 1 Outdoor). Verify with factory for latest information regarding High Temperature (HT) or Extreme Low Temperature (XLT) rated ballast options.
- UL/CSA certified, where applicable. Compliant with Federal Ballast Law (Public Law 100-357, 1988).
- Choice of ballast factors. L=Low, N=Normal, H=High.
- Choice of dedicated, universal or special voltage - Consult factory for available options.
- Warranted by ballast manufacturer. Typical warranty is for 5 years (120-277v) and 3-years (347-480v). Consult factory for latest warranty information.

LATCHES

- Standard Latch - Acetal copolymer offers increased strength over conventional plastic latches.
- Stainless Steel Latch - Designed for maximum maintainability and corrosion resistance. Tamperproof screws & tool available as option.
- Additional latches to achieve IP65 and IP67 Rating. Consult factory for all available configurations.

LAMP SHIELDING (LENS)

- Clear Acrylic with an internal crepe pattern to provide general lamp obscurity. Lenses are thermoformed for precision fit.
- Smooth exterior surface for ease of cleaning.
- "HI" - High Impact "DR" Additive to resist breakage is optional.



LAMPS

- Supplied by others unless otherwise specified.
- Factory installed if required - Consult factory.
- Lamp type, CRI ratings, temperature colors, lamp life ratings are all viable options which can be supplied - Consult factory for information.

MOUNTING

- The luminaire may be surface mounted or may be suspended by pendant, threaded rod, chain or cable. (Mounting hardware supplied by others unless otherwise specified).
- Custom mounting options / accessories are available - Consult factory.

ELECTRICAL

- Luminaire is bi-national listed and labeled (UL 1598 and CSA C22.2 No. 250.0-00) and is suitable for damp locations.
- Product includes luminaire disconnect as specified in NEC 410.73(G), 2005 Edition, and CEC part I, rule 30-308(4), 2006 Edition.

QUALITY CONTROL

- All fixtures and retrofit kits are designed, fabricated, assembled and tested at RENOVA's manufacturing facility. All fixtures are 100% lamp tested, inspected and labeled prior to shipment.

GUARANTEE

- RENOVA warrants all fixtures to be free of defects in manufacturing and workmanship for a period of (1) year from date of purchase. This warranty excludes damage of any kind resulting from improper installation, misuse, abuse, accidents, mis-application, or natural disasters. Please refer to the "Terms and Conditions" section of the RENOVA website for additional information.

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

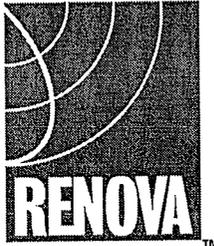
RENOVA Lighting Systems, Inc. 300 Highpoint Avenue Portsmouth, RI 02871 (800) 635-6682 www.renova.com

RLS-5165A-3

Category: ECS
Energy Conservation Series

Prefix:
SVT

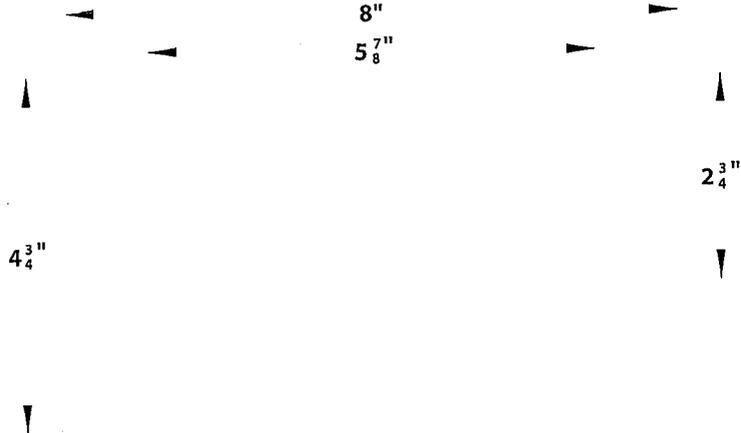
Fixture Series (Name):
Standard Vapor Tight



Renovate Lighting Ideas
Energy Efficient Solutions



2-Lamp T8 Standard Vapor Tight Cross Section Shown

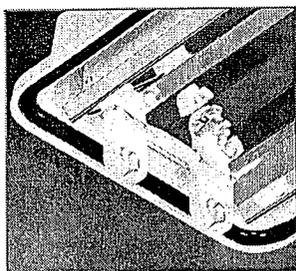


ORDERING GUIDE

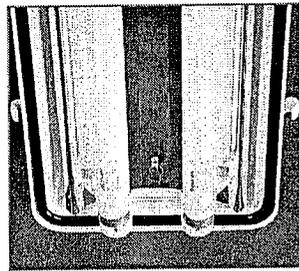
CATEGORY	SERIES	SIZE	REFLECTOR MATERIAL	REFLECTOR PHOTOMETRY	NUMBER OF LAMPS	LAMP TYPE (WATTAGE)	BALLAST VOLTAGE	NUMBER OF BALLASTS	LAMPS PER BALLAST	BALLAST FACTOR	OPTIONS
ECS	SVT	4	M	N	2	32	UNV	1	2	N	
Energy Conservation Series	SVT - STD VAPOR TIGHT	2 - 24" 4 - 48" 8 - 96"	M - MIRO4 (95% TR) E - ENHANCED ALUMINUM (92% TR min.) W - WHITE (91% TR) A - ALUMINUM (87% TR min.) B - BALLAST COVER (White) (83% TR min.) R - MIRO4 MICRO-MATT (95% TR)	F - FOCUSED N - NORMAL S - SPREAD C - CUSTOM OPTICS *N - NORMAL IS STANDARD (BLANK)-N *C - CUSTOM OPTICS ARE DESCRIBED IN OPTIONS BOX	1 - 1L 2 - 2L 3 - 3L 2 - 2L 4 - 4L 6 - 6L	17 17w T8 32 32w T8 14 14w T5 28 28w T5 24 24w T5HO 54 54w T5HO	120 - 120v, 60 Hz 277 - 277v, 60 Hz 347 - 347v, 60 Hz UNV - 120v - 277v, 60 Hz 480 - 480v, 60 Hz xxx - Less Ballast	(BLANK) - 1 2 - 2 3 - 3	1 - 1 2 - 2 3 - 3 4 - 4	L - Low N - Normal H - High	

Photometric data, IES files and all other information is available upon request.

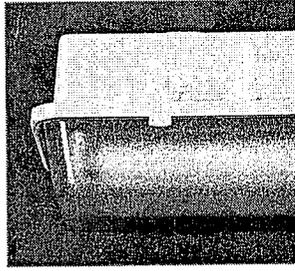
***ADDITIONAL OPTIONS**
(See "Options" sheet for all available options)



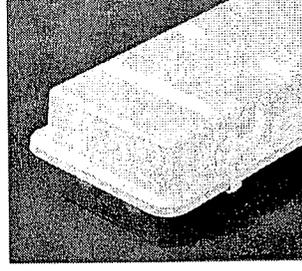
Vossloh Locking Lampholders (Standard)



Multi-Faceted Reflector (Designed for Maximum Efficiency)



Standard Lens (Crepe pattern provides lamp obscurity)



Mounting Details (Included in all Housings)

Note: RENOVA products are constantly being improved; therefore, the information shown is subject to change without notice. Always consult your lighting representative or RENOVA Lighting Systems, Inc. for the latest information.

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RLS-5165A-3

TECHNICAL DATA

TYPICAL APPLICATIONS

- Private Offices
- Storage Closet
- Conference Room
- Restroom w/o stalls

FEATURES

- PIR Occupancy Detection
- Communicates with Other Sensors
- Time Delay: 30 sec. to 20 minutes, selectable in 2.5 min increments
- Green LED Activity Indicator
- 100 Hr. Burn-in Timer Mode

AVAILABLE OPTIONS

- Isolated Low Voltage Relay (-R)
- Photocell Daylight Override (-P)
- Automatic Dimming Control (-ADC)
- Low Temp/Hi Humidity (-LT)

SPECIFICATIONS

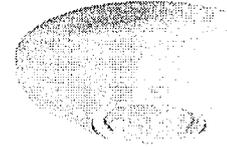
- Size: Circular, 4.55" Dia., 1.55" Deep (11.56 cm Dia., 3.94 cm Deep)
- Sensor Weight: 5 Ounces
- Sensor Color: White
- Mounting: Ceiling Tile Surface, Round Fixture or Junction Box
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 160° F (-10° to 71° C)
- Storage Temp: -14° to 160° F (-26° to 71° C)
- UL and CUL Listed
- 5 Year Warranty
- Made in U.S.A.

LOW TEMP/HI HUMIDITY(-LT)

- Conformally coated Circuit Board is corrosion resistant from moisture
- Operates down to -40° F (-40° C)

CM-9 SERIES

*w/ Enhanced Photocell
& Dimming Options!*



The *CM-9 Series* sensor offers amazing performance and sensitivity to small motions for a standard Passive Infrared (PIR) Ceiling Mount Sensor. Ideal for small rooms with drop ceilings and areas without obstructions, the *CM-9* is a snap to install. Its light weight allows surface mounting to drop ceilings or a ceiling grid. The *CM-9* sensor can cover entire private offices or smaller rooms by itself, however it is also the ideal lead sensor for odd shaped rooms. For example a *CM-9* in a restroom vestibule can communicate with a *CM-PDT* Dual Technology sensor in a main stall area. Another application is a *CM-9* controlling an entrance hall to a classroom and communicating with a *WV-PDT* controlling the main room. In both cases the lights would be activated "On" by the *CM-9*. For mounting above 15 feet, see the *CM-6* Technical Data Sheet.

SENSOR OPERATIONS

The sensor detects changes in the infrared energy given off by occupants as they move within the field-of-view. When occupancy is detected, a DC output goes high and can drive up to 200 mA of connected load. The sensor is powered with 12 to 24 VAC/VDC and typically operates with a *PP-20* or *MP-20* Power Pack; enabling complete 20 Amp circuits to be controlled. An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is selectable at 2.5 minute increments from 30 seconds to 20 minutes, and is reset every time occupancy is re-detected. This state-of-the-art design requires no manual field adjustments.

PHOTOCELL DAYLIGHT OVERRIDE / DIMMING OPTIONS

This series offers a Photocell (-P) option for spaces with abundant daylight and an Automatic Dimming Control (-ADC) option for use with dimmable ballasts. These options are ideal for public spaces with windows like vestibules, corridors, or bathrooms. As the daylight levels change in the room, both options insure that an adequate light level is maintained according to a programmable set-point value. The Photocell option provides two modes of operation; one simply inhibits the lights from turning on, while the other has full On/Off control of the lights. The -ADC option allows the sensor to control a dimmable ballast. It also provides a secondary dim time-out that enables the lights to go to a dim setting after one time-out and then turn fully off after a second time-out. For more detailed information on the operation of Photocell control and/or dimming, see the *CM-PC-ADC* Technical Data Sheet.

INTERNAL LOW VOLTAGE RELAY OPTION (CM-9-R)

To enable a sensor to interface with a building management system, the -R option provides dry contact closure via a SPDT, 1 Amp, 40 Volt relay. The relay coil is energized and changes state when ALL connected sensors register "Unoccupied". When using multiple sensors, only one sensor per zone needs to have a relay.

Note: Sensor must have power at all times for the relay to function .

CATALOG INFORMATION

MODEL #	DESCRIPTION	TEMPERATURE	OP. VOLTAGE	CURRENT
CM-9	Passive Infrared Ceiling Mount Sensor	14° to 160° F	12 to 24 VAC/VDC	4 mA
Add suffix				
-R	SPDT Relay, 1 Amp			16 mA
-P	Photocell Daylight Override			4 mA
-RP	Relay & Photocell			16 mA
-ADC	Automatic Dimming Control			4 mA
-LT	Low Temp/High Humidity	-40° to 160° F		

WIRING INSTRUCTIONS

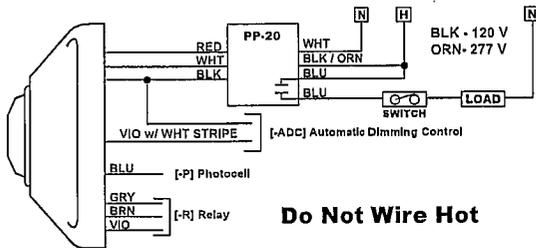
Wire lead connections are Class II, 18 to 22 AWG.

STANDARD CM-9

RED - 12 to 24 VAC/VDC

BLACK - Common

WHITE - Output (HI DC for Occupancy)



RELAY OPTION (-R)

GRAY / BROWN - Connected during Occupied state

VIOLET / BROWN - Connected during Unoccupied state

Note: Relay is energized during Unoccupied state

PHOTOCELL OPTION (-P)

BLUE - Photocell output (High: Occupied & Low Light)

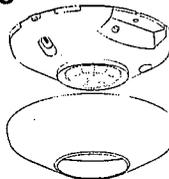
Use Blue wire from sensor in place of White wire. For multi-level control, use 2 Power Packs and connect White to primary load and Blue to daylight load.

AUTOMATIC DIMMING CONTROL (-ADC)

VIOLET/WHITE striped - Connect to Violet wire from 0-10 VDC dimmable ballast. Also connect ballast Gray wire to sensor Black wire. (Note: -ADC option disables Photocell inhibit mode of -P option.)

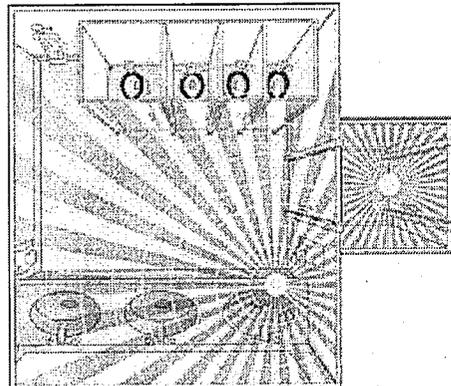
MOUNTING CONSIDERATIONS

The CM-9 is provided with 2 self tapping mounting screws. The sensor typically mounts directly to the ceiling tile or metallic grid. If desired, the mounting holes are slotted to line up with a standard round or rectangular box (screws not provided).



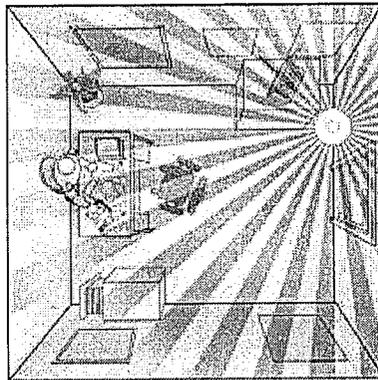
INSTALLATION CONSIDERATION

In smaller spaces like 12' x12' (3.66 x 3.66 m) private offices, it is best to locate the CM-9 along the entrance wall so that the occupant breaks the collector beams upon entrance, while passersby do not falsely trip the unit (see field-of-view diagram). The discrete outer beams used for initial detection can be aligned for maximum coverage.



PIR used with PDT

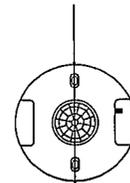
- CM-9 PIR in vestibule initiating the light "On"
- Microphonics™ in CM-PDT is activated by the CM-9.
- CM-PDT detects occupants in stalls



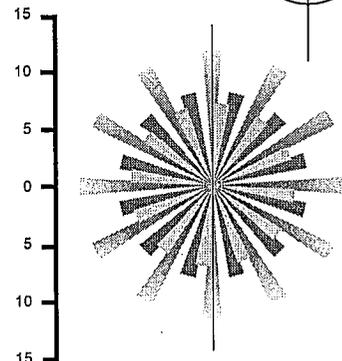
Small Office

- Mount sensor near entrance wall viewing entire room without seeing out doorway
- Low Voltage sensors provide easiest installation in drop Ceilings.

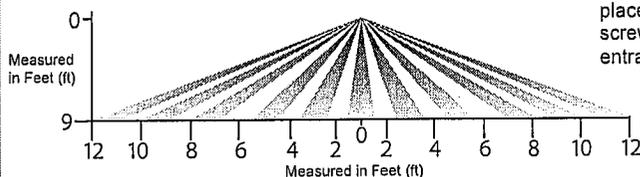
Note: Heat producing sources controlled by the sensor must not be in the view pattern of the sensor. Symptom: Sensor cycles or appears to continually stay "On". Solution: Move sensor or mask lens segments that view the source.



TOP VIEW



SIDE VIEW



Note: For maximum distance place the sensor so that the screw axis is aligned with the entrance axis.

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LIMITATIONS AND EXCLUSIONS: This Warranty is in full lieu of all other representation and expressed and implied warranties (including the implied warranties of merchantability and fitness for use) and under no circumstances shall Sensor Switch, Inc. be liable for any incidental or consequential property damages or losses.



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 www.sensorswitch.com

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TYPICAL APPLICATIONS

- Partitioned Cubical Spaces
- Restroom with Stalls
- Library Study Carrels & Stacks

FEATURES

- Patented Dual Technology with PIR/Microphonics™ Detection
- Communicates with Other Sensors
- Time Delay: 30 sec. to 20 minutes
- Push-Button Programmable
- Green LED Indicator
- 100 Hr. Lamp Burn-in Timer Mode

AVAILABLE OPTIONS

- Isolated SPDT Relay (-R)
- On/Off Photocell (-P)
- Auto Dimming Cntl. Photocell (-ADC)
- Low Temp/Hi Humidity (-LT)

SPECIFICATIONS

- Size: Circular, 4.55" Dia., 1.55" Deep (11.56 cm Dia., 3.94 cm Deep)
- Sensor Weight: 5 Ounces
- Sensor Color: White
- Mounting: Ceiling Tile Surface, Round Fixture or Junction Box
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 160° F (-10° to 71° C)
- Storage Temp: -14° to 160° F (-26° to 71° C)
- UL, CUL, and Title 24 Compliant
- 5 Year Warranty
- Made in U.S.A.

LOW TEMP/HI HUMIDITY(-LT)

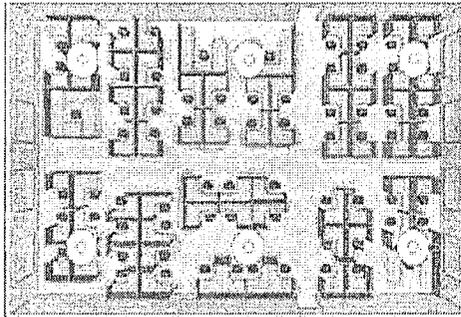
- Conformally coated Circuit Board is corrosion resistant from moisture
- Operates down to -4° F (-20° C)

CM-PDT SERIES

w/ Enhanced Daylighting Control Options!



Open area office lighting control is made cost effective with the use of the *CM-PDT Series* Passive Dual Technology occupancy sensor. This small, yet powerful sensor provides line of sight PIR detection of small motion in a circular pattern and combines overlapping Microphonics™ coverage for detection of occupants working in their cubical space. By installing multiple *CM-PDTs* on 30 foot centers, large zones are created (typically one per circuit of lighting). The lighting is then controlled in blocks similar to manual switching, only no one will ever have to remember to turn off the lights! Restrooms with stalls, large storage areas with shelving, and libraries with study carrels are also easily and cost effectively controlled by the *CM-PDT*.



SENSOR OPERATIONS

Sensors with Passive Dual Technology (PDT) first "See" motion using Passive Infrared (PIR) and then engage Microphonics™ to "Hear" sounds that indicate continued occupancy. This patented technology uses Automatic Gain Control (AGC) to dynamically self adapt a sensor to its environment by filtering out constant background noise and detecting only noises typical of

human activity. When occupancy is detected, a DC output goes high and can drive up to 200 mA of connected load. The sensor is powered with 12 to 24 VAC/VDC and typically operates with a PP-20 or MP-20 Power Pack; enabling complete 20 Amp circuits to be controlled. An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is selectable at 2.5 minute increments from 30 seconds to 20 minutes, and is reset every time occupancy is re-detected.

DAYLIGHTING CONTROL OPTIONS

For spaces with abundant natural light from windows or skylights, this series offers an On/Off Photocell (-P) option and an Automatic Dimming Control (-ADC) Photocell option. The -P option is ideal for public areas like vestibules, corridors, or restrooms;

while the -ADC option is perfect for classrooms and private offices. As the daylight levels change in the room, both options insure that an adequate light level is maintained according to a programmable set-point value. The -P option provides two modes of operation; one simply inhibits the lights from turning on, while the other has full On/Off control of the lights. The -ADC option allows the sensor to control a dimmable ballast. It also provides a secondary dim time-out that enables the lights to go to a dim setting after one time-out and then turn fully off after a second time-out. For more detailed information on these daylighting control features, see the CM-PC-ADC Technical Data Sheet.

SENSORS vs. LIGHTING PANELS

Lower cost, convenience, reliability, and greater energy savings are all provided by installing *CM-PDTs* rather than computer based lighting control panels. No programming, no confusing overrides, no chance of turning off while the area is still occupied, and no reason for leaving the lights on in "anticipation" of occupants! Real time detection of occupancy always outperforms a pre-programmed time clock. All this at a fraction of the total installed cost of a lighting panel!

CATALOG INFORMATION

MODEL #	DESCRIPTION	TEMPERATURE	OP. VOLTAGE	CURRENT
CM-PDT	Dual Technology Ceiling Mount Sensor	14° to 160° F	12 to 24 VAC/VDC	4 mA
Add suffix				
-R	SPDT Relay, 1 Amp			16 mA
-P	On/Off Photocell			4 mA
-RP	Relay & On/Off Photocell			16 mA
-ADC	Automatic Dimming Control Photocell			4 mA
-LT	Low Temp/High Humidity	-4° to 160° F		

WIRING INSTRUCTIONS

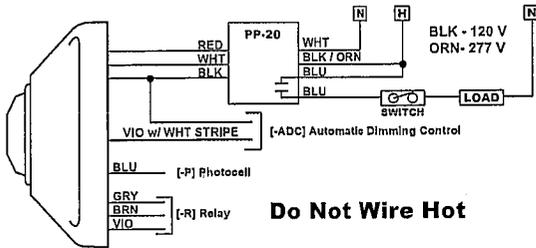
Wire lead connections are Class II, 18 to 22 AWG.

STANDARD CM-9

RED - 12 to 24 VAC/VDC

BLACK - Common

WHITE - Output (HI DC for Occupancy)



RELAY OPTION (-R)

GRAY / BROWN - Connected during Occupied state

VIOLET / BROWN - Connected during Unoccupied state

Note: Relay is energized during Unoccupied state

PHOTOCELL OPTION (-P)

BLUE - Photocell output (High: Occupied & Low Light)

Use Blue wire from sensor in place of White wire. For multi-level control, use 2 Power Packs and connect White to primary load and Blue to daylight load.

AUTOMATIC DIMMING CONTROL (-ADC)

VIOLET/WHITE striped - Connect to Violet wire from 0-10 VDC dimmable ballast. Also connect ballast Gray wire to sensor Black wire. Note: If both the -P and the -ADC options are selected the "Inhibit" mode of the -P option is not available.

INTERNAL LOW VOLTAGE RELAY OPTION

To enable a sensor to interface with a building management system, the -R option provides dry contact closure via a SPDT, 1 Amp, 40 Volt relay. The relay coil is energized and changes state when ALL connected sensors register "Unoccupied". When using multiple sensors, only one sensor per zone needs to have a relay.

Note: Sensor must have power at all times for the relay to function.

MOUNTING CONSIDERATIONS

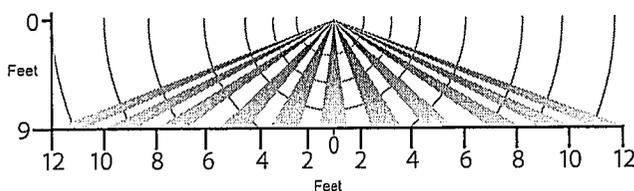
The CM-PDT is provided with 2 self tapping mounting screws. The sensor typically mounts directly to the ceiling tile, or to the metallic grid. However, if desired, the mounting holes are slotted to line up with a standard round or rectangular box (screws not provided).

Note: The ceiling tile provides insulation from stray plenum noises. Only penetrate tile to allow for mounting screws and wires (3 small holes).

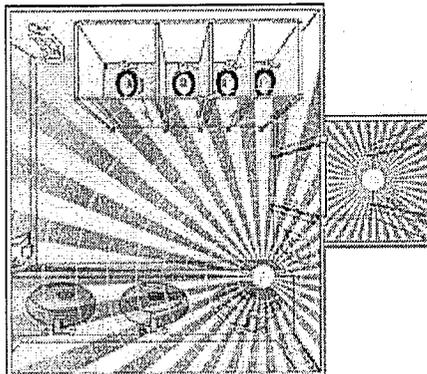
FIELD OF VIEW

The CM-PDT's dome lens provides a maximum viewing angle of 56° in a complete 360° conical pattern. The Microphonics™ detects normal human activity up to 20 feet, but will detect greater distances in spaces with hard floors or very quiet rooms with little or no background noise. Place the sensor along the entrance door wall to prevent it from viewing out into the hallway. Avoid locating the sensor near HVAC air diffusers because the "noise" generated from air flow will decrease the sensitivity of the Microphonics™ sensor.

SIDE VIEW



Multi-Stall Restroom w/Vestibule

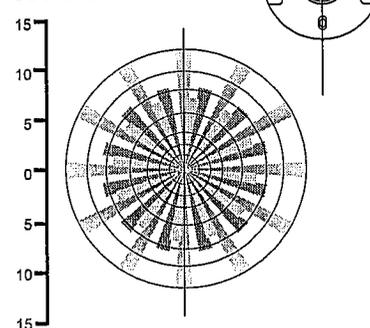


PIR used with PDT

- CM-9 PIR in vestibule initiating the light "On"
- Microphonics™ in CM-PDT is activated by the CM-9.
- CM-PDT detects occupants in stalls

Note: For maximum distance place the sensor so that the screw axis is positioned with the entrance axis.

TOP VIEW



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LIMITATIONS AND EXCLUSIONS: This Warranty is in full lieu of all other representation and expressed and implied warranties (including the implied warranties of merchantability and fitness for use) and under no circumstances shall Sensor Switch, Inc. be liable for any incidental or consequential property damages or losses.



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TECHNICAL DATA

TYPICAL APPLICATIONS

- Used with Low Voltage Sensors
- Multiple Sensors
- Multiple Loads

POWER PACK HIGHLIGHTS

- Dual Voltage Transformer
- Self-Contained Relay
- Powers up to 14 sensors

SPECIFICATIONS

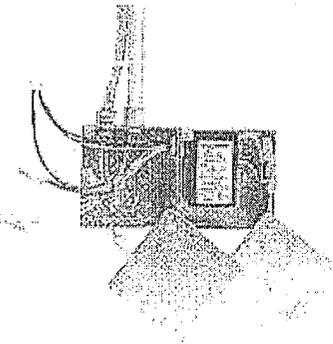
- Size: (1/2" Inch chase nipple not inc.) MP-20 & MSP-20, 4 1/8" x 3" x 1 7/8"
- Mounting: 1/2" inch chase nipple
- Operating Voltage: 120, 240, or 277 VAC
- Each Relay: 20 Amps
- 1 HP Motor Load
- Output Voltage: 15 VDC, 150 mA
- Class II 18 AWG, up to 2,000 ft.
- Plenum Rated
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 160° F
- Storage Temp: -14° to 160° F
- UL and CUL Listed
- 5 Year Warranty
- Made in U.S.A.

LOW TEMP/HI HUMIDITY(-LT)

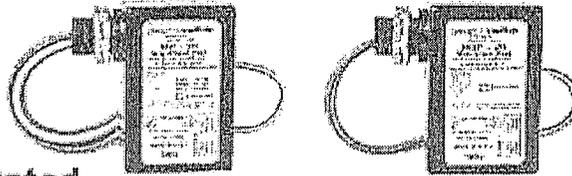
- Conformally Coated PCB
- Operates down to -40° F
- Corrosion resistant from moisture

PLENUM CONSIDERATIONS

Most local codes allow for small plastic controls in Return Air Plenums; Some Do Not! To meet local code, the Power Pack can be mounted inside an adjacent (Deep) junction box as shown below.



MP-20 MSP-20



Plenum Rated

Mini Power Packs are the heart of the Low Voltage Sensor System. The MP-20 transforms 120, 240 or 277 Volts to class II 15 VDC to power the remote sensors. Although Plenum Rated, the elongated mounting nipple allows for the MP-20 to be mounted either directly thru a 1/2" inch knockout in a junction box, or to be located inside an adjacent box for specific local code requirements. Up to 14 sensors may be connected to one MP-20. Multi-circuit control can be handled by multiple MP-20's and Slave Packs (MSP-20) may be configured. MP-20's can be wired continuously hot (line side), or on the switch leg (load side) without nuisance delays upon turn "On".

MINI POWER PACK OPERATION

The Mini Power Pack consists of a transformer and a relay. The transformer has a dual primary high voltage input, accepting 120, 240, or 277 VAC. The secondary voltage provides power to Sensor Switch low voltage heads. When the sensor head detects motion, they electronically signal the power pack to close the relay(s) connected to the lighting system.

LOW VOLTAGE OPERATION AND TEST

The Low Voltage Wires are color coded Red (15 VDC), Black (Common), and White (Occupancy Signal). With no sensors connected, touch the Red wire to the White. The lights should turn "On". Remove the connection and the lights should turn "Off". With the sensors connected, the Red and Black wires provide DC power to the remote sensors, and when there is occupancy detected, the White wire produces a 15 VDC signal from the sensor to the power pack initiating the lights to "On". Upon initial power up, the Sensors automatically send an "On" signal until the sensors have stabilized and "Timed Out".

SIZING OF THE SYSTEM - VARIOUS COMBINATIONS

Combining Power Packs provides for additional power to drive remote devices. Maximum numbers of remote sensors are shown below based on the Power Pack/Slave Pack being used. Maximum number of "Relays" is 30.

	Sensors	Sensors with Relay
1 MP-20	14	8
1 MP-20 w/MSP-20	7	6
2 MP-20	28	16

Note 1: Only three relays may be controlled with one Mini Power Pack. If more than three circuits are required, multiple MiniPower Packs must be used.

Note 2: Only one "Sensor with Relay" is required in most cases. See Technical Data on Low Voltage Sensors and SPDT EMS Interface Option.

SYSTEMS CONSIDERATIONS

The local override switch may be upstream or downstream of an MP-20. However, if an MSP-20 Auxiliary Relay controller is being used, the switch(es) should be downstream on the load side of the relay. If power is disconnected to the Power Pack all subsequent relays will open, turning off all of the loads. If wiring the local switches before the Power Pack and Slave Pack, use multiple MP-20's, one for each circuit. This will allow for one circuit to remain powered, keeping the system operational when the other is turned off. When controlling a dimming circuit, MP-20 must be wired before dimmer, or MSP-20 may be wired after dimmer.

CATALOG INFORMATION

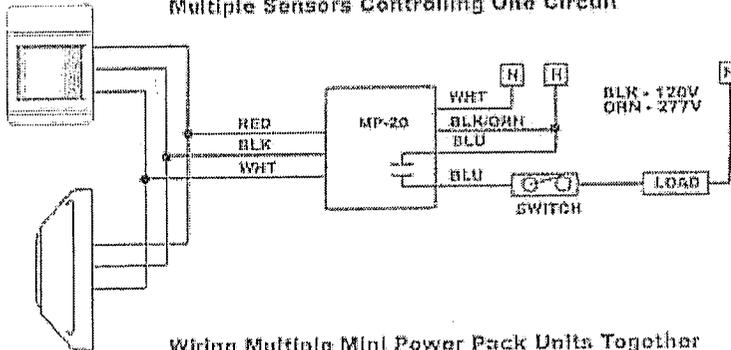
MODEL#	DESCRIPTION	OUTPUT VOLTAGE	OUTPUT CURRENT
MP-20	Power Pack with 20 Amp Relays	15 to 24 VDC	70 to 110 mA
MSP-20	Slave Pack with 20 Amp Relays	N/A	40 mA (consumption)

*Add suffix -LT for Low Temp/Hi Humidity

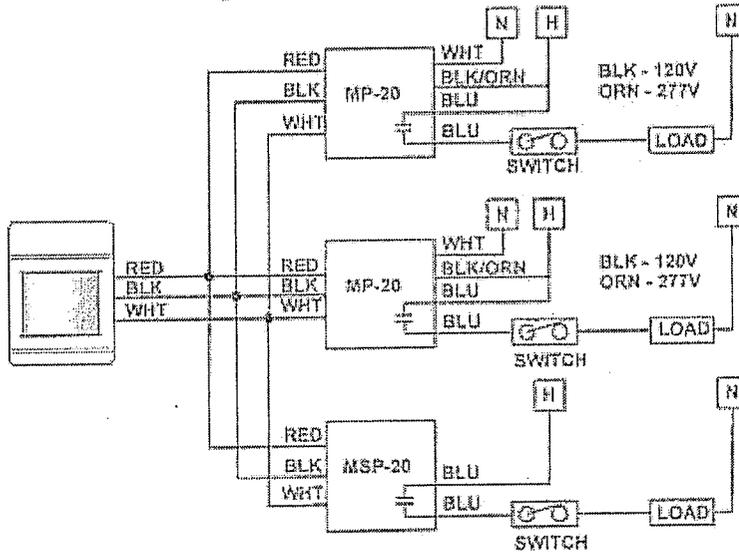
TYPICAL WIRING DIAGRAMS - DO NOT WIRE HOT

NOTE: The Power Pack must be connected to a single phase Hot and Neutral System. For 120 VAC, connect the Black wire to Hot, White wire to Neutral, and Cap off the Orange wire. For 240-277 VAC, connect the Orange to Hot, White to Neutral, and Cap off the Black wire. *Never connect both the Black and Orange wires!* Low Voltage wire can be 18 to 22 AWG; shielding is not necessary.

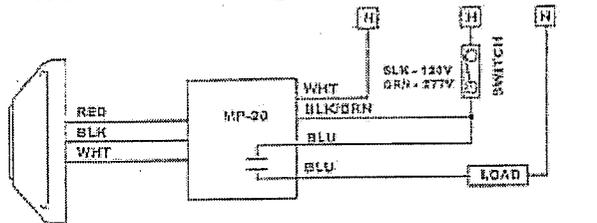
Multiple Sensors Controlling One Circuit



Wiring Multiple Mini Power Pack Units Together



One Sensor Controlling One Circuit



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VendingMISER™

"Save Energy, Save Money!"

Bayview's Miser family is a line of occupancy-based energy control products. VendingMiser™ (U.S. Patent No. 6,243,626) represents a breakthrough in the power control of cold beverage vending machines. It reduces energy consumption by an average of 46%, while maintaining the temperature of the vended product. VendingMiser typically has a short average payback of between one and two years.*

Utilizing a **Passive Infrared (PIR) Sensor**, VendingMiser powers down a vending machine when the area surrounding it is vacant. For a series of up to 4 machines, VendingMiser can utilize its unique embedded Sensor Repeater, which allows it to be controlled from the PIR sensor of any other Miser in the bank. VendingMiser monitors the room's temperature, and automatically re-powers the vending machine at one to three hour intervals, independent of occupancy, to ensure that the vended product stays cold.

VendingMiser's electrical current sensor will never power down a vending machine while the compressor is running, avoiding high head-pressure starts. In addition, when the vending machine is powered up, the cooling cycle is allowed to run to completion before again powering down. Additionally, VendingMiser's smart technology generates maintenance savings for the machine operator through reduced run time, estimated at \$40 - \$80 per year. Indicator lights on the unit will alert service personnel if the machine's cooling system is failing.

For outdoor locations and any other location where the VendingMiser may be exposed to water, a waterproof PIR sensor and controller housing are available. An Easy-Install VendingMiser is also available and allows for installation with no tools.

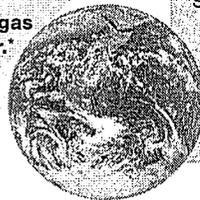
A cold beverage vending machine consumes on average 400 Watts, costing approximately \$300 per year to operate at 8¢ per kWh. Powering down such a vending machine when not in use provides savings of \$150 or more per year per machine. Additionally, other cooled product vending machines, such as refrigerated candy machines, can also be controlled by VendingMiser. Non-cooled product machines can be controlled by our companion product, SnackMiser™. VendingMiser is made in the USA.



VendingMisers Benefit the Environment

One VendingMiser reduces greenhouse gas emissions by 2200 lbs. of CO₂ each year.*

* Based on occupancy and the Environmental Information Administration's national average of Carbon emissions and electricity generation.



Technical Specifications

ELECTRICAL SPECIFICATIONS

Input Voltage: 115 Volts (230 Volts available)
 Input Frequency: 50/60 Hz
 Maximum Load: 12 Amps (Steady-State)
 Power Consumption: Less than 1 Watt (Standby)

ENVIRONMENTAL SPECIFICATIONS

Operating Temp: -15°C to 75°C
 Storage Temp: -40°C to 85°C
 Relative Humidity: 95% Maximum
 (Non-Condensing)

COMPATIBILITY

Vending Machines: Any machine, except those containing perishable goods such as dairy products.

INACTIVITY TIMEOUTS

Occupancy Timeout: 15 minutes
 Auto Repower: One to three hours, dynamically adjusted, based on ambient temperature

DIMENSIONS

Size: 4.5"W x 1.75"H x 3.25"D
 Weight: 2.2 lb. (including power cable)

REGULATORY APPROVALS

Safety: UL/C-UL Listed
 Information Technology Equipment (ITE) 9T79



* Based on electric rate and occupancy.

Dakota Electric Association
 4300 220th St W
 Farmington, MN 55024
 651-463-6212 . 1-800-874-3409
 www.dakotaelectric.com

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 Revision 01-03

Easy-Install MISERS™

"Save Energy, Save Money!"

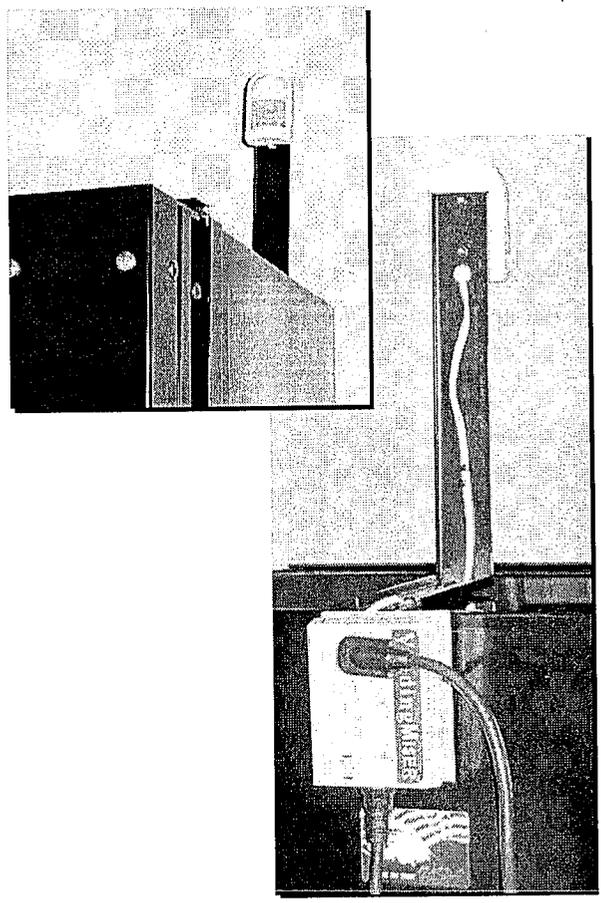
VendingMisers are available with Easy-Install d which is pre-assembled for tool-less installation. The Easy-Install pre-assembled system contains the controller, sensor repeater, and (if needed) an occupancy sensor.

To install the system, simply place the Easy-Install system on top of the vending machine. The system attaches to the back of the vending machine with the supplied Velcro. (See the photos.)

For placements where there are multiple vending machines side by side, the Easy-Install system is supplied without the sensor. A sensor repeater is already built into the Miser, so additional hardware is not required.

The Easy-Install system allows placement of the VendingMiser in under 5 minutes! Once in place, enjoy the energy savings that make Misers popular with so many customers.

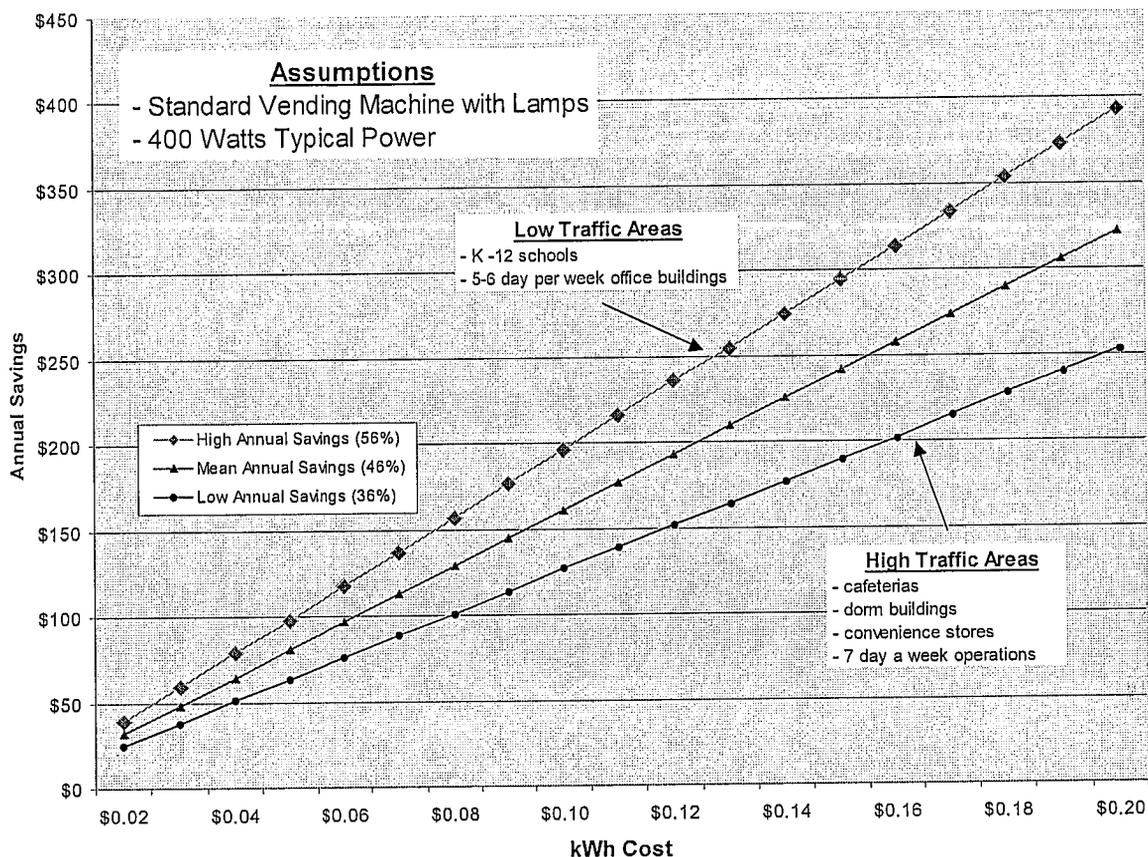
For further information about the Easy-Install system please call Dakota Electric at (800) 874-3409 or visit www.dakotaelectric.com.



ORDERING INFORMATION

VM170	Easy-Install VendingMiser with PIR Sensor
VM171	Easy-Install VendingMiser only

TYPICAL SAVINGS GENERATED WITH VendingMISER™



COMMON QUESTIONS ABOUT VendingMISER™

Will VendingMiser keep my drinks cold?

Absolutely - VendingMiser has been tested and approved for use by both major bottlers. Visit the web site at www.bayviewtech.com or contact us for more details.

Is the VendingMiser easy to install?

Yes! VendingMiser is a simple external plug-and-play product. The VendingMiser can be installed on the wall with simple hand tools or it can be attached to the vending machine without tools using the new **Easy-Install** system. The Easy-Install System allows quick installation in 5 minutes.

Is VendingMiser safe for all machines?

Yes! VendingMiser is compatible with all types of cold drink vending machines. In fact, by reducing run time of the machines, VendingMiser reduces maintenance costs.

Has VendingMiser been field tested?

Tens of thousands of VendingMisers have been operational in the field. Average energy savings have been independently

documented to be 46%. Measurement and verification test results as well as testimonials are available on the website.

Are any locations not appropriate for VendingMiser?

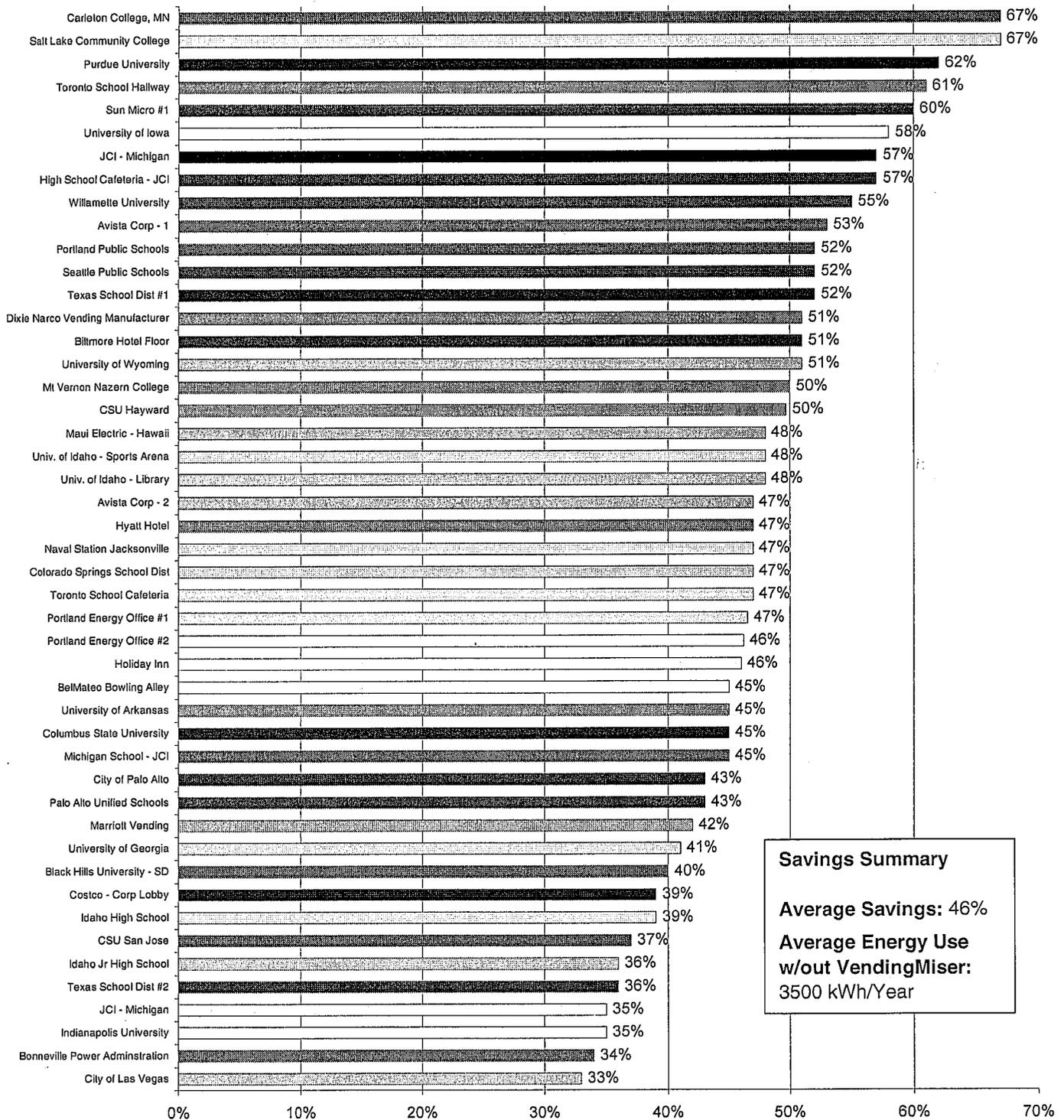
Just one - VendingMiser's savings are generated as a result of location vacancy. Therefore, a machine in a location that is occupied 24-hours, 7 days a week will likely generate little savings.

ORDERING INFORMATION

VM150	VendingMiser with PIR Sensor
VM151	VendingMiser only
VM160	Weatherproof VendingMiser with PIR Sensor
VM161	Weatherproof VendingMiser only
VM170	Easy-Install VendingMiser with PIR Sensor
VM171	Easy-Install VendingMiser only

VendingMISER Measurement and Verification Data

Submitted by Colleges, Universities, Municipalities, Utilities, Federal Agencies,
and Energy Service Companies Throughout the United States and Canada



Savings Summary

Average Savings: 46%

**Average Energy Use
w/out VendingMiser:**

3500 kWh/Year

Dakota Electric Association
4300 220th St W
Farmington, MN 55024
651-463-6212 . 1-800-874-3409
www.dakotaelectric.com

TYPICAL APPLICATIONS

- Private Offices
- Conference Rooms
- Individual Bathrooms w/o stalls
- Janitor Closets
- Hallways & Stairwells

FEATURES

- PIR Occupancy Detection
- Self Contained Relay, no Power Pack needed
- Patented Bi-Polar Wiring: Interchangeable Hot & Load wires
- Small Motion Detection up to 20 ft.
- Intrinsically Grounded
- No Minimum Load
- Push-Button Programmable
- Time Delay: 30 sec. to 20 minutes
- Three-Way & Multi-Level Switching
- Green LED Status Indicator

AVAILABLE OPTIONS

- Vandal-Resistant Lens (-V)
- Photocell Daylight Override (-P)
- Low Temp/Hi Humidity (-LT)

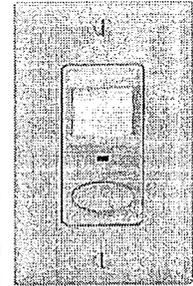
SPECIFICATIONS

- Size: 4.2"H x 1.8"W x 1.5"D
(10.67cm x 4.57cm x 3.81cm)
- Sensor Weight: 5 Ounces
- Colors: Ivory, White, Gray, Almond
- Mounting Height: 30 to 48 inches
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 85° F
(-10° to 29° C)
- Storage Temp: -14° to 160° F
(-26° to 71° C)
- Load Rating (1 phase only):
120 VAC @ 800 W
277 VAC @ 1200 W
347 VAC @ 1500 W
- Frequency: 50/60 Hz
(Timers are 1.2 x for 50 Hz)
- UL, CUL, & CSA Listed
- CA Title 24 Compliant
- 5 Year Warranty
- Made in U.S.A

LOW TEMP/HI HUMIDITY (-LT)

- Conformally coated Circuit Board is corrosion resistant from moisture
- Operates down to -40° F (-40° C)

WSD SERIES Programmable Edition!



The *WSD Series* is a stylish, easy to install, and simple to use Wall Switch Decorator style Passive Infrared (PIR) sensor. It is ideal for private offices, copy rooms, closets, or any small enclosed space without obstructions. A user programmable time delay ensures that once the room is vacated the sensor will time out and turn off the lights. Additionally, the *WSD Series* sensors have several On Modes and Switch Modes that can be programmed using the front push-button. For rooms with obstructions the WSD-PDT should be considered.

SENSOR OPERATIONS

The sensor detects changes in the infrared energy given off by occupants as they move within the field-of-view. When occupancy is detected, a self-contained relay switches the lighting "On". The sensor is line powered and can switch line voltage (see specifications). An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is push-button programmable from 30 seconds to 20 minutes, and is reset every time occupancy is re-detected. This state-of-the-art sensor requires no manual sensitivity adjustments.

OPERATIONAL MODES

On Modes (*Default)

Automatic On* - The sensor automatically turns the lights on when the sensor detects occupancy.

Reduced Turn-On - The sensor is set to initially only detect large motions, effectively ignoring any reflected PIR signals while still sensing occupants when they enter the room. Once on, the sensor returns to maximum sensitivity.

Switch Modes (*Default)

Predictive Off* - Pressing the switch overrides the lights off and temporarily disables the occupancy detection. After an exit time delay (default 10 seconds) the occupancy detection reactivates and monitors for an additional grace period time (default 5 seconds). If no occupancy is detected during this period, the sensor will revert to Automatic On operation. If occupancy is detected, the sensor will remain in Permanent Off mode requiring the switch to be pressed again in order to restore the sensor to Automatic On.

Permanent Off - Pressing the push-button switch will turn the lights off. The lights will remain off regardless of occupancy until the switch is pressed again, restoring the sensor to Automatic On mode.

Switch Disable - Prevents user from manually turning off the lights via the push-button.

PHOTOCELL DAYLIGHT OVERRIDE OPTION (WSD-P)

The *WSD* offers a Photocell Daylight Override option (-P) for spaces with abundant natural light. Ideal for public places with windows like vestibules, corridors, or bathrooms; this option inhibits the lights from turning on if there is sufficient daylight available. Once the lights turn on, however, the photocell function is disabled until the sensor's occupancy timer expires and turns the lights off. For more information on daylighting control, see the CM-PC-ADC technical datasheet.

Model Numbering System: WSD-[LENS]-[PHOTOCELL]-[VOLTAGE]-[COLOR*]-[TEMP/HUMIDITY]

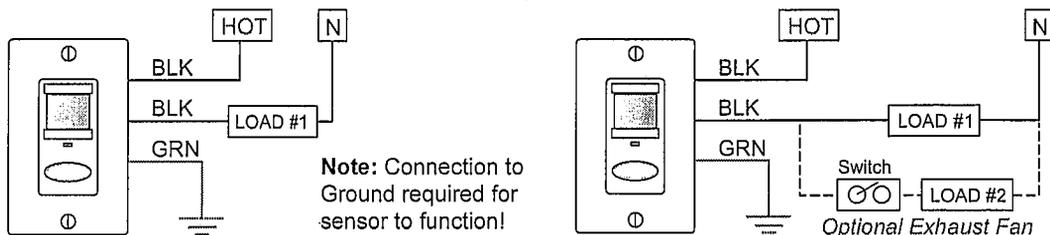
SERIES #	LENS	PHOTOCELL	VOLTAGE	COLOR	TEMP/HUMIDITY
WSD	Blank = Standard -V = Vandal Resistant	Blank = No Photocell -P = w/Photocell	Blank = 120-277 VAC -3 = 347 VAC**	-I = Ivory -W = White -G = Gray -A = Almond	Blank = 14° to 85° F -LT = -40° to 85° F

**347 VAC: Plate not provided

*Must specify color

T059-003-P

TYPICAL WIRING DIAGRAM (DO NOT WIRE HOT)

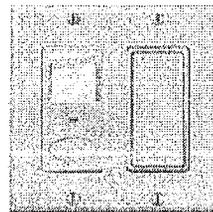


Note: Black wires are replaced with Red wires for 347 VAC.

WIRING TO A LIGHT AND A FAN

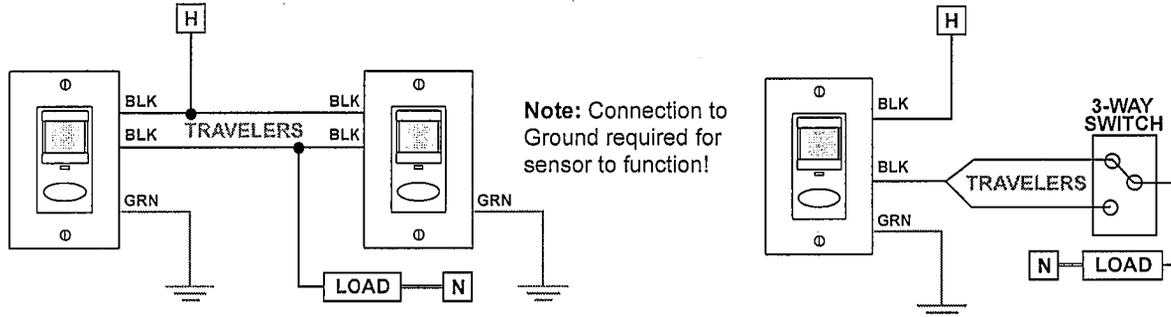
One of the sensor's Black wires connects to the Hot (Line) power feed. The sensor's other Black wire connects to the Light and the Toggle Switch controlling the Exhaust Fan. The sensor's Green wire connects to Ground. When the sensor is in the Occupied Mode, the Exhaust Fan may be overridden "Off" by the Toggle Switch.

Note: Standard 2-gang plate not included



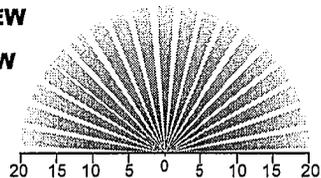
WIRING FOR 3-WAY SWITCHING

Travelers are used to wire sensors in parallel. If only one sensor is needed to view space, 3-way switch is non-functional.

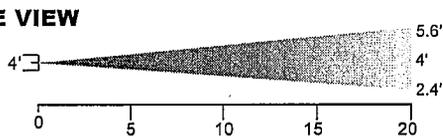


FIELD OF VIEW

TOP VIEW



SIDE VIEW



STANDARD vs. VANDAL RESISTANT LENS

The Standard lens provides maximum PIR detection sensing small movements up to 20 feet, and large motions up to 50 feet. This lens should be used in typical offices or rooms where occupants work for extended periods of time. The Vandal Resistant lens should be used in high abuse or public areas (copy rooms, small public restrooms, storage closets), where occupants simply come and go and make larger types of motions. A sensor with a Vandal Resistant lens will have its PIR detection range reduced by 50%.

WARNING

- Fire Hazard Caution: Maximum Lamps 1500 Watts, Type 347 VAC.
- Attention: Risque d'incendie : Puissance Maximales Des Lampes 1500 Watts, Type 347 VAC.
- Warning: The units are intended to be installed by a qualified person with properly rated branch circuit protectors as per applicable local and national regulations (CEC, NEC).

WARRANTY: Sensor Switch, Inc. warrants these products to be free of defects in manufacture and workmanship for a period of sixty months. Sensor Switch, Inc., upon prompt notice of such defect will, at its option, provide a Returned Material Authorization number and repair or replace returned product.
LIMITATIONS AND EXCLUSIONS: This Warranty is in full lieu of all other representation and expressed and Implied warranties (including the Implied warranties of merchantability and fitness for use) and under no circumstances shall Sensor Switch, Inc. be liable for any incidental or consequential property damages or losses.



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 www.sensorswitch.com

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TYPICAL APPLICATIONS

- Private Offices where occupant turns back to sensor
- Restroom with Stalls
- Storage rooms with shelving

FEATURES

- Patented Dual Technology with PIR/Microphonics™ Detection
- Self Contained Relay, no Power Pack needed
- Patented Bi-Polar Wiring: Interchangeable hot & load wires
- Intrinsically Grounded
- No Minimum Load
- Time Delay: 30 sec. to 20 minutes
- Push-Button Programmable
- Three-Way & Multi-Level Switching
- Green LED Activity Indicator

AVAILABLE OPTIONS

- Vandal-Resistant Lens (-V)
- Photocell Daylight Override (-P)
- Low Temp/Hi Humidity (-LT)

SPECIFICATIONS

- Size: 4.2" H x 1.8" W x 1.5" D (10.67cm x 4.57cm x 3.81cm)
- Sensor Weight: 5 Ounces
- Colors: Ivory, White, Gray, Almond
- Mounting Height: 30 to 48 inches
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 85° F (-10° to 29° C)
- Storage Temp: -14° to 160° F (-26° to 71° C)
- Load Rating (1 phase only):
120 VAC @ 800 W
277 VAC @ 1200 W
347 VAC @ 1500 W
- Frequency: 50/60 Hz (Timers are 1.2 x for 50 Hz)
- UL, CUL, & CSA Listed
- CA Title 24 Compliant
- 5 Year Warranty
- Made in U.S.A.

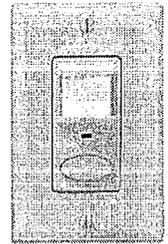
LOW TEMP/HI HUMIDITY(-LT)

- Conformally coated Circuit Board is corrosion resistant from moisture
- Operates down to -4° F (-20°C)

WSD-PDT Series

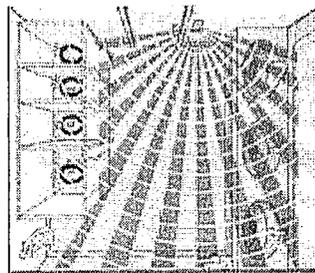
Programmable Edition!

Dual Technology in a Wall Switch Sensor! The *WSD-PDT Series* is by far the most powerful Decorator occupancy sensor ever invented. The combination of Passive Infrared and patented Microphonics™ detection, allows this sensor to literally "See & Hear" its occupants. The *WSD-PDT* is the ideal solution for restrooms with stalls, private offices where the occupant turns his back to the sensor, or storage rooms with obstructions. Additionally, the WSD Series sensors have several On Modes and Switch Modes that can be programmed using the front push-button.



SENSOR OPERATIONS

Sensors with Passive Dual Technology (PDT) first "See" motion using Passive Infrared (PIR) and then engage Microphonics™ to "Hear" sounds that indicate continued occupancy. This patented technology uses Automatic Gain Control (AGC) to dynamically self adapt a sensor to its environment by filtering out constant background noise and detecting only noises typical of human activity. When occupancy is detected, a self-contained relay switches the lighting "On". The sensor is line powered and can switch line voltage (see specifications). An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is push-button programmable from 30 seconds to 20 minutes, and is reset every time occupancy is re-detected. If needed, a 10 second grace period also allows the lights to be voice reactivated after shutting off.



Bathrooms (WSD-PDT-V)

- Senses partitioned spaces
- Most inexpensive sensor approach
- Voice sound activation prevents lights out condition

OPERATIONAL MODES

On Modes (*Default)

Automatic On* - The sensor automatically turns the lights on when the sensor detects occupancy.

Reduced Turn-On - The sensor is set to initially only detect large motions, effectively ignoring any reflected PIR signals while still sensing occupants when they enter the room. Once on, the sensor returns to maximum sensitivity.

Switch Modes (*Default)

Predictive Off* - Pressing the switch overrides the lights off and temporarily disables the occupancy detection. After an exit time delay (default 10 seconds) the occupancy detection reactivates and monitors for an additional grace period time (default 5 seconds). If no occupancy is detected during this period, the sensor will revert to Automatic On operation. If occupancy is detected, the sensor will remain in Permanent Off mode requiring the switch to be pressed again in order to restore the sensor to Automatic On.

Permanent Off - Pressing the push-button switch will turn the lights off. The lights will remain off regardless of occupancy until the switch is pressed again, restoring the sensor to Automatic On mode.

Switch Disable - Prevents user from manually turning off the lights via the push-button.

Model Numbering System: WSD-PDT-[LENS]-[PHOTOCELL]-[VOLTAGE]-[COLOR*]-[TEMP/HUMIDITY]

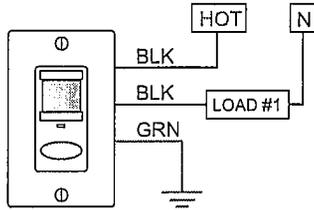
SERIES #	LENS	PHOTOCELL	VOLTAGE	COLOR	TEMP/HUMIDITY
WSD-PDT	Blank = Standard -V = Vandal Resistant	Blank = No Photocell -P = w/Photocell	Blank = 120-277 VAC -3 = 347 VAC**	-I = Ivory -W = White -G = Gray -A = Almond	Blank = 14° to 85° F -LT = -4° to 85° F

**347 VAC: Plate not provided

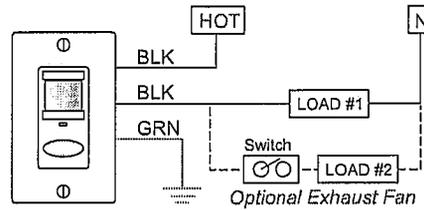
*Must specify color

T065-003-P

TYPICAL WIRING DIAGRAM (DO NOT WIRE HOT)



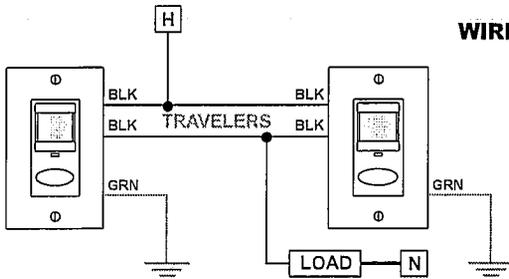
Note: Connection to Ground required for sensor to function!



Note: Black wires are replaced with Red wires for 347 VAC.

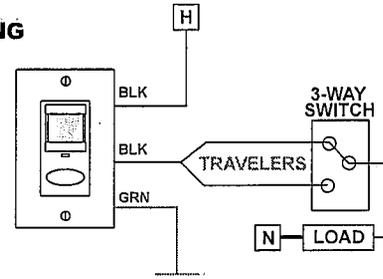
WIRING TO A LIGHT AND A FAN

One of the sensor's Black wires connects to the Hot (Line) power feed. The sensor's other Black wire connects to the Light and the Toggle Switch controlling the Exhaust Fan. The sensor's Green wire connects to Ground. When the sensor is in the Occupied Mode, the Exhaust Fan may be overridden Off by the Toggle Switch.



WIRING FOR 3-WAY SWITCHING

Travelers are used to wire sensors in parallel. If only one sensor is needed to view space, 3-way switch is non-functional.

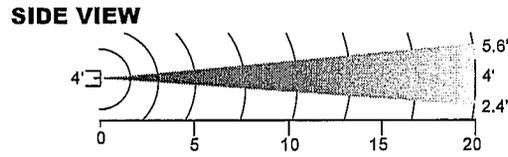
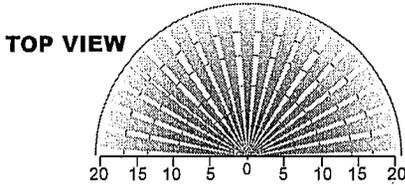


PHOTOCELL DAYLIGHT OVERRIDE OPTION (WSD-PDT-P)

The WSD-PDT offers a Photocell Daylight Override option (-P) for spaces with abundant natural light. Ideal for public places with windows like vestibules, corridors, or bathrooms; this option inhibits the lights from turning on if there is sufficient daylight available. Once the lights turn on, however, the photocell function is disabled until the sensor's occupancy timer expires and turns the lights off.

AREA OF COVERAGE

The PIR collector beams view out horizontally in a wall-to-wall pattern. The beams will see out to 50 feet, however, their effectiveness in the Standard product is 20 feet for small hand or body motions and 10 feet for the Vandal Resistant products. The Microphonics™ will detect normal human activity up to 20 feet, but will detect greater distances in spaces with hard floors or very quiet rooms with little or no background noise.



STANDARD vs. VANDAL RESISTANT LENS

The Standard lens provides maximum PIR detection sensing small movements up to 20 feet, and large motions up to 50 feet. This lens should be used in typical offices or rooms where occupants work for extended periods of time. The Vandal Resistant lens should be used in high abuse or public areas, where occupants simply come and go and make larger types of motions. Copy rooms, small public restrooms, storage or janitor's closets are ideal applications. A sensor with a Vandal Resistant lens will have its PIR detection range reduced by 50%, however the Microphonics™ range is not affected.

WARNING

Fire Hazard Caution: Maximum Lamps 1500 Watts, Type 347 VAC.

Attention: Risque d'incendie : Puissance Maximales Des Lampes 1500 Watts, Type 347 VAC.

Warning: The units are intended to be installed by a qualified person with properly rated branch circuit protectors as per applicable local and national regulations (CEC, NEC).

WARRANTY: Sensor Switch, Inc. warrants these products to be free of defects in manufacture and workmanship for a period of sixty months. Sensor Switch, Inc., upon prompt notice of such defect will, at its option, provide a Returned Material Authorization number and repair or replace returned product.

LIMITATIONS AND EXCLUSIONS: This Warranty is in full lieu of all other representation and expressed and implied warranties (including the implied warranties of merchantability and fitness for use) and under no circumstances shall Sensor Switch, Inc. be liable for any incidental or consequential property damages or losses.



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TECHNICAL DATA

TYPICAL APPLICATIONS

- Classrooms w/o Obstructions
- Large Conference Rooms
- Large Open Spaces
- Hallways

SENSOR HIGHLIGHTS

- Corner Mount PIR Sensor
- 120° by 40ft. Coverage for Small Motion
- Optional Photocell Daylight Override
- Optional Photocell On/Off
- Optional Isolated SPDT Relay
- Programable w/o removing cover

FEATURES

- Time Delay: 30 sec. to 20 minutes selectable in 2.5 min. increments
- Green LED Indicator

SPECIFICATIONS

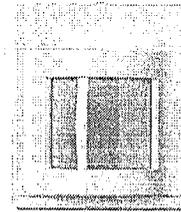
- Size: Rectangular, 3.0" x 3.6" x 1.75"
- Sensor Weight: 5 Ounces
- Sensor Color: White
- Mounting Height: 8 to 10 Feet
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 85° F
- Storage Temp: -14° to 160° F
- UL and CUL Listed
- 5 Year Warranty
- Made in U.S.A.

LOW TEMP/HI HUMIDITY(-LT)

- Conformally Coated PCB
- Operates down to -40° F
- Corrosion resistant from moisture

WV-16 SERIES

WV-BR (Bracket)



Programmable Edition!

able to fit in the palm of your hand, the *WV-16* Wide View Sensor unobtrusively mounts in a corner near the ceiling detecting small motions up to 40 feet away, and large motions up to 70 feet away. The unique "Tilting feature" allows this sensor to be mounted anywhere from 8 to 10 feet with excellent long-range coverage. In 30 by 30 ft. classrooms with no obstructions, this is all the sensor you will need. In corridors, the *WV-16* is mounted flat against the wall and volumetrically views up to 70 feet. (For specific long narrow hallway applications, see *HW-13* Technical Data Sheet). When corner or wall mounting is not possible, use ceiling bracket *WV-BR* accessory to locate the *WV-16* on the ceiling where desired. By using multiple Wide Views in combination with the *CM-9* PIR ceiling sensor, odd shaped rooms or corridors are also easily covered. For rooms with obstructions, the *WV-PDT* or *CM-PDT-10* Dual Technology sensors should be used.

SENSOR OPERATIONS

The *WV-16* detects changes in the Infrared energy given off by occupants as they move within the sensors field-of-view. This unique sensor is powered with 12 to 24 VAC/VDC (Red & Black wire inputs), and has one DC output (White wire). When occupancy is detected, this output goes high and can drive up to 200 mA of connected load. The *WV-16* typically operates with a *PP-20* or *MP-20* Power Pack enabling complete 20 Amp circuits to be controlled. An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is selectable at 2.5 minute increments from 30 seconds to 20 minutes, and is reset every time occupancy is detected. This state-of-the-art design requires no manual field adjustments.

PHOTOCELL OPTIONS (WV-16-P and WV-16-PF)

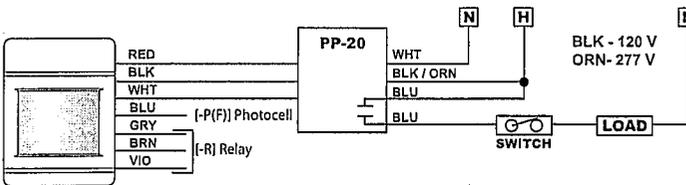
The *WV-16* offers two Photocell options for spaces with abundant natural light. It is ideal for public spaces with windows like vestibules, corridors, or bathrooms; however it is not recommended for work spaces where occupants set light levels manually. Each photocell option utilizes a set-point value that is programable by the user via a digital push button sequence. The **Photocell Daylight Override (-P)** option simply inhibits the lights from turning on, however once the lights are on, the photocell function is disabled until the sensor times out. The **Photocell On/Off (-PF)** option has full control of the lights; turning them on when the level is below the set-point and off when adequate ambient light is present. For more specific information on the operation of Photocell On/Off control and/or dimming, see the *CM-PC-ADC* Technical Data Sheet information.

CATALOG INFORMATION

MODEL #	DESCRIPTION	TEMPERATURE	OP. VOLTAGE	CURRENT
WV-16	Passive Infrared Wide View Sensor	14° to 160° F	12 to 24 VAC/VDC	3 mA
Add suffix				
-R	SPDT Relay, 1 Amp		12 to 24 VAC/VDC	13 mA
-P(F)	Photocell - Daylight Override (On/Off)		12 to 24 VAC/VDC	3 mA
-RP(F)	Relay & Override Photocell (On/Off)		12 to 24 VAC/VDC	13 mA
-LT	Low Temp/High Humidity	-40° to 160° F		
Accessory				
WV-BR	Ceiling Mount Bracket			

INPUT/OUTPUT

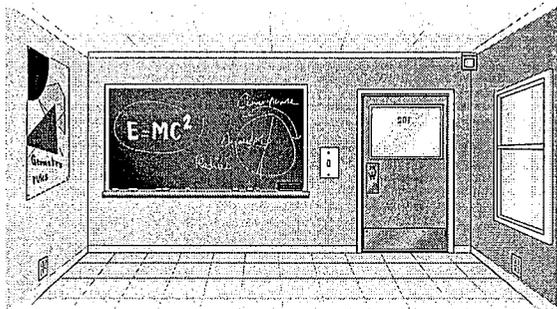
Wire lead connections are Class II, 18 to 22 AWG. The WV-16 uses 3 leads (Red, Black, and White); the Photocell options add a Blue lead, and the Relay Option adds 3 leads (Brown, Gray, and Violet). The connections are as follows:



Do Not Wire Hot

INSTALLATION CONSIDERATION

The WV-16's rear enclosure is beveled so as to be corner mounted at 8 to 10 feet (see tilt settings). Always mount sensor in a corner above the entrance door or in a corner along the same wall as the entrance. If the room is large and multiple sensors are needed, mount the second sensor in the opposite corner, however tilt sensor forward to ensure that the PIR collector beams are not viewing out the door. For mounting heights above 10 feet, use the WV-BR and mount sensor to angled side to provide an initial 30° look down.



STANDARD WV-16

- RED - 12 to 24 VAC/VDC
- BLACK - Common
- WHITE - Output (HI DC for Occupancy)

RELAY OPTION WV-16-R

- BROWN - Center tap of relay (SPDT)
- GRAY - High when Occupancy Contacts Closed
- VIOLET - High when Occupancy Contacts Open

PHOTOCELL OPTION WV-16-P(F)

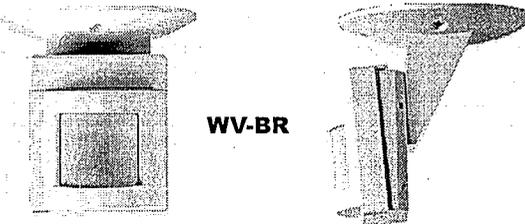
BLUE - Photocell Output (High: Occ/Low Light)
Use Blue wire from sensor in place of White Wire. For multi-level control, use 2 Power Packs and connect White to primary, and Blue to Daylight Load.

INTERNAL LOW VOLTAGE RELAY OPTION

Dry Contact Closure (-R) is provided through a SPDT, 1 Amp, 40 volt relay. The relay coil is energized and changes state when ALL sensors connected register "Unoccupied". Only one sensor per zone (if multiple sensors) needs to have this relay. Sensor must be powered from either a Power Pack, or Class 2 transformer.

CEILING MOUNT BRACKET (WV-BR)

The WV-BR Ceiling Mount Bracket allows the WV-16 to be mounted in the corner of the area from the ceiling for conditions where mounting to the wall is not possible.

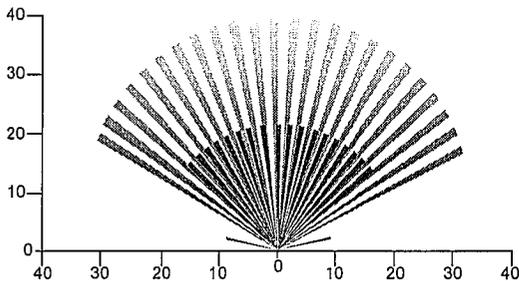


TILT ADJUSTMENT

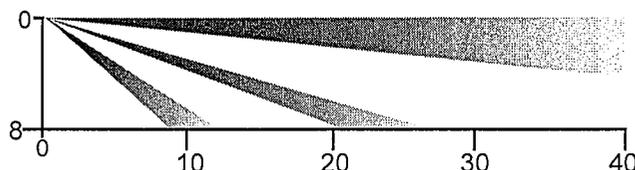
Mt. Ht.	Position
7' - 8'	Vertical
8' - 9'	Center
9' - 10'	Forward
Above 10'	Use WV-BR



TOP VIEW



SIDE VIEW



WARRANTY: Sensor Switch, Inc. warrants these products to be free of defects in manufacture and workmanship for a period of sixty months. Sensor Switch, Inc., upon prompt notice of such defect will, at its option, provide a Returned Material Authorization number and a replacement product.

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TECHNICAL DATA

TYPICAL APPLICATIONS

- Classrooms
- Large Storage Rooms
- Large Conference Rooms
- Hallways

SENSOR HIGHLIGHTS

- Corner Mount Dual Technology
- 120° by 40ft. PIR Coverage for Small Motions
- Patented PIR/Microphonics™
- Optional Photocell Daylight Override
- Optional Photocell On/Off
- Optional Isolated SPDT Relay

FEATURES

- Time Delay: 30 sec. to 20 minutes selectable in 2.5 min. increments
- Green LED Indicator
- Programable w/o removing cover

SPECIFICATIONS

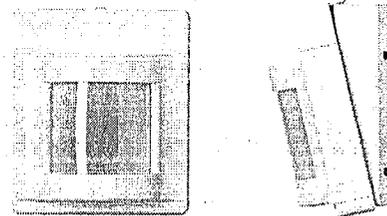
- Size: Rectangular, 3.0" x 3.6" x 1.75"
- Sensor Weight: 6 Ounces
- Sensor Color: White
- Mounting Height: 8 to 10 Feet
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 85° F
- Storage Temp: -14° to 160° F
- UL and CUL Listed
- 5 Year Warranty
- Made in U.S.A.

LOW TEMP/HI HUMIDITY(-LT)

- Conformally Coated PCB
- Operates down to -4° F
- Corrosion resistant from moisture

WV-PDT SERIES

WV-BR (Bracket)



Programmable Edition!

Classrooms are the ideal application for the *WV-PDT* Dual Technology Wide View Sensor. Installed in the corner of the room along the entrance wall, this inconspicuous sensor provides line of sight PIR detection of small movements up to 40 feet away, and combines overlapping Microphonics™ detection around obstructions. Many classrooms are filled with shelving, projects, or lab benches. Total coverage of the room is always maintained no matter how cluttered the space becomes! The *WV-PDT* is also used in corridors due to its ability to view up to 70 feet for walking motions, or large open storage areas where obstructions may block the PIR's ability to view. For large lecture halls, multiple *WV-PDTs* may be wired together, or along with any other low voltage sensors.

SENSOR OPERATIONS

The *WV-PDT* combines PIR (Passive Infrared) with Microphonics™ technology to literally "See & Hear" the occupant. The PIR first detects motion, initiating the lights to an "On" condition. The Microphonics™ then engages, detecting occupant "noise". Automatic Gain Control (AGC) allows the sensor to self adapt by ignoring constant background noise, and then detect only noise changes typical of human activity. An internal timer, factory set at 10 minutes, keeps the lights "On" during brief periods of no activity. This timer is selectable at 2.5 minute increments from 30 seconds to 20 minutes, and is reset every time occupancy is detected. Once the lights turn "Off", a 10 second grace period allows for the occupant to voice re-activate the lights back "On" if needed. This state-of-the-art design allows the sensor to adapt to its environment, eliminating the need for manual field adjustments. The *WV-PDT* is powered with 12 to 24 volts AC or DC (Red & Black wire inputs), and has one DC output (White wire). When occupancy is detected, this output goes high and can drive up to 200 mA of connected load. The *WV-PDT* typically operates with a PP-20 or MP-20 Power Pack enabling complete 20 Amp circuits to be controlled.

PHOTOCELL OPTIONS (WV-16-P and WV-16-PF)

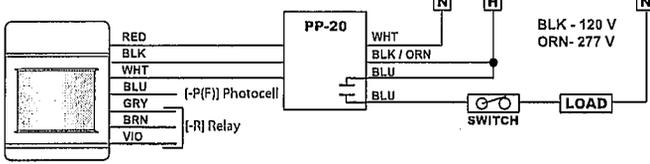
The *WV-PDT* offers two Photocell options for spaces with abundant natural light. It is ideal for public spaces with windows like vestibules, corridors, or bathrooms; however it is not recommended for work spaces where occupants set light levels manually. Each photocell option utilizes a set-point value that is programable by the user via a digital push button sequence. The **Photocell Daylight Override (-P)** option simply inhibits the lights from turning on, however once the lights are on, the photocell function is disabled until the sensor times out. The **Photocell On/Off (-PF)** option has full control of the lights; turning them on when the level is below the set-point and off when adequate ambient light is present. For more specific information on the operation of Photocell On/Off control and/or dimming, see the CM-PC-ADC Technical Data Sheet information.

CATALOG INFORMATION

MODEL #	DESCRIPTION	TEMPERATURE	OP. VOLTAGE	CURRENT
WV-PDT	Passive Dual Technology Wide View	14° to 160° F	12 to 24 VAC/VDC	3 mA
Add suffix				
-R	SPDT Relay, 1 Amp		12 to 24 VAC/VDC	13 mA
-P(F)	Photocell - Daylight Override (On/Off)		12 to 24 VAC/VDC	3 mA
-RP(F)	Relay & Override Photocell (On/Off)		12 to 24 VAC/VDC	13 mA
-LT	Low Temp/High Humidity	-4° to 160° F		
Accessory				
WV-BR	Ceiling Mount Bracket			

INPUT/OUTPUT

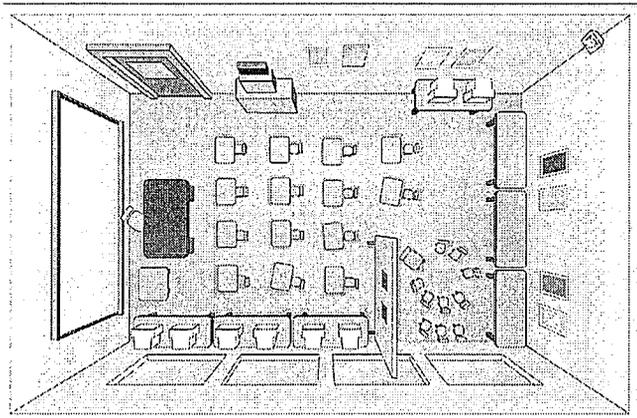
Wire lead connections are Class II, 18 to 22 AWG. The WV-PDT uses 3 leads (Red, Black, and White); the Photocell option adds a Blue lead, and the Relay Option adds 3 leads (Brown, Gray, and Violet). The connections are as follows:



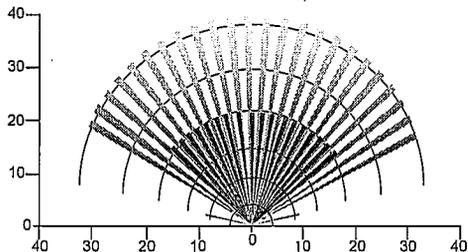
Do Not Wire Hot

INSTALLATION CONSIDERATION

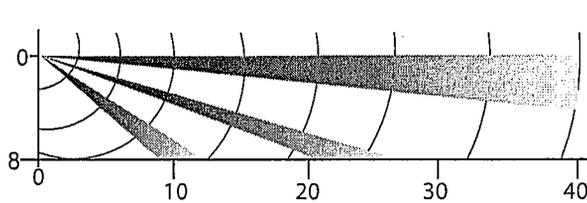
The WV-PDT's rear enclosure is beveled so as to be corner mounted at 8 to 10 feet (see tilt settings). Ideally, the sensor should mount, as shown below, in the corner above the entrance door or in the corner along the same wall as the entrance. If the room is large and multiple sensors are needed, mount the second sensor in the opposite corner, however tilt sensor forward to ensure that the PIR collector beams are not viewing out the door. For mounting heights above 10 feet, use the WV-BR and mount sensor to angled side to provide an initial 30° lookdown. The PDT line of sensors, unlike any other occupancy sensor, self adjusts to its environment. The Automatic Gain Control (AGC) feature allows the sensor to tune out constant background noise. However, changing noise signals like talking, shuffling of papers, and general human activities are readily detected. Avoid locating the sensor near Wall Clocks that make "Clicking Noises" every minute.



TOP VIEW



SIDE VIEW



STANDARD WV-PDT

RED - 12 to 24 VAC/VDC
 BLACK - Common
 WHITE - Output (HI DC for Occupancy)

RELAY OPTION WV-PDT-R

BROWN - Center tap of relay (SPDT)
 GRAY - Contacts Closed during Occupancy
 VIOLET - Contacts Open during Occupancy

PHOTOCELL OPTION WV-PDT-P(F)

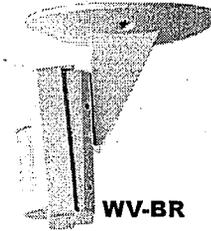
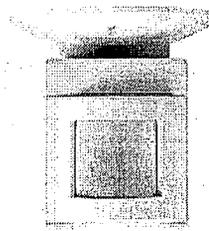
BLUE - Photocell Output (High: Occ/Low Light)
 Use Blue wire from sensor in place of White Wire. For multi-level control, use 2 Power Packs and connect White to primary, and Blue to Daylight Load.

INTERNAL LOW VOLTAGE RELAY OPTION

Dry Contact Closure (-R) is provided through a SPDT, 1 Amp, 40 volt relay. The relay coil is energized and changes state when ALL connected sensors register "Unoccupied". Only one sensor per zone (if multiple sensors) needs to have this relay. Sensor must be powered from either a Power Pack, or Class 2 transformer.

CEILING MOUNT BRACKET (WV-BR)

The WV-BR Ceiling Mount Bracket allows the WV-PDT to be mounted from the ceiling in rooms where mounting to the wall is not possible.



TILT ADJUSTMENT

Mt. Ht.	Position
7' - 8'	Vertical
8' - 9'	Center
9' - 10'	Forward
Above 10'	Use WV-BR



WARRANTY: Sensor Switch, Inc. warrants these products to be free of defects in manufacture and workmanship for a period of sixty months. Sensor Switch, Inc., upon prompt notice of such defect will, at its option, provide a Returned Material Authorization number and a replacement product.
LIMITATIONS AND EXCLUSIONS: This Warranty is in full lieu of all other representation and expressed and implied warranties (including the implied warranties of merchantability and fitness for use) and under no circumstances shall Sensor Switch, Inc. be liable for any incidental or consequential property damages or losses.



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