

Project: _____
 Location: _____
 Cat. #: _____
 Type: _____
 Quantity: _____

LED

FFR 24 | LED Lay-In Retrofit Kit

Features:

- High performance LED technology
- 0-10V dimming drivers standard
- Field replaceable LED boards and drivers
- Frosted diffuser optimized to balance efficiency and aesthetics
- Available in a wide variety of lumen outputs for maximum flexibility
- Quick and easy installation helps save on labor costs
- Advanced controls available

Applications:

Suitable for most commercial and institutional applications

- Office
- Retail
- Classrooms
- Healthcare Facilities

Predicted L70 Lifetime:

- Up to 189,000 hrs (calculated)
 - For BAA compliant configurations - up to 189,000 hrs (calculated)
- (L70 information for specific configurations available upon request)*

Construction:

- Die-formed heavy-gauge cold rolled steel ballast housing with precision brake formed aluminum LED tray
- Frosted Acrylic Diffuser
- White enamel finish

Certifications:

- UL 1598 listed for US and Canada, suitable for damp locations
- DesignLights Consortium qualified on specific configurations (refer to DLC qualified products list for exact model numbers) <http://designlights.org/>



Warranty:

- 5 year limited system warranty - see www.LumenFocus.com for complete warranty terms and conditions
- 10 year warranty option available on specific models *(Not available on all models. Certain conditions apply. Consult factory or sales representative for details.)*



Ordering Guide:

example: FFR 24 MD UV FA 835 EM1

Series	Size	Output	Voltage	Shielding	CRI/CCT	Controls	Options															
FFR	24			FA																		
FFR	24 2' x 4'	SL Super Low	UV 120-277	FA Frosted Acrylic	830 80 CRI/3000K	Blank No Controls	Blank No Options															
		VL Very Low						835 80 CRI/3500K	ZSOL Leviton Programmable PIR Occupancy/Daylight Harvesting Sensor ⁽¹⁾	EXT10 10-Year Extended Warranty ⁽⁴⁾												
		LW Low									840 80 CRI/4000K	ZES2 Philips EasySense Occupancy/Daylight sensor with advanced grouping ⁽²⁾	SD Step Dimming									
		ML Medium Low												850 80 CRI/5000K	ZES3 Philips EasySense Occupancy/Daylight sensor for Zigbee networks ⁽²⁾	EM1 Emergency Kit - 12W 1200 nominal lumens ⁽⁵⁾						
		MD Medium															ZIFS Douglas IFS Sensor with Dimming/Occupancy/Daylight Harvesting with Newtork Capabilities ⁽³⁾	F Fuse				
		HI High																	ZIFC Douglas IFC Controller with Newtork Capabilities ⁽³⁾	SM Easy Access Side Mounted Driver		
		VH Very High																			ZENLO Enlighted One Micro Sensor with Dimming/Occupancy/Daylight Harvesting ⁽³⁾	AR Plenum Ceiling Air Return
		SH Super High																				
	ZENLI Enlighted IoT Micro Sensor with Dimming/Occupancy/Daylight Harvesting ⁽³⁾	BAA Buy American Act Compliant																				

Controls Accessories (order separately)



For Leviton Programmable Sensor (OS)
ZLSOR-RA1 IR Programming Remote



For Philips EasySense Controls
ZBT-S1AWH Illumra Single Rocker Self-Powered Zigbee Wall Switch
ZBT-S2AWH Illumra Double Rocker Self-Powered Zigbee Wall Switch



For Douglas Controls
BT-DMSW-U-A Bluetooth 1 Zone Dimmer
BT-4BTSW-U-A Bluetooth 4-Button Wall Station
BT-8BTSW-U-A Bluetooth 8-Button Wall Station

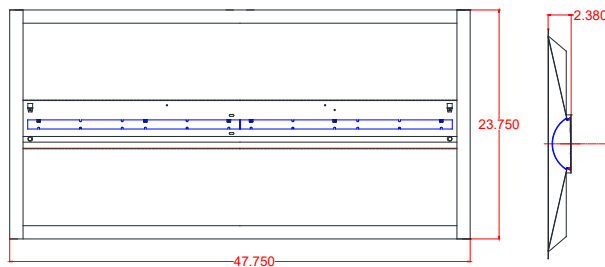


For Enlighted Controls
WS-2-00 Enlighted Remote Control Wall Switch (for Enlighted Connected & IoT)
WS-2-00-IL Enlighted Remote Control Wall Switch (for Enlighted One)

Notes

- ⁽¹⁾ See page 5 for more details.
- ⁽²⁾ 120-277V only. See page 5 for more details.
- ⁽³⁾ See page 6 for more details.
- ⁽⁴⁾ Not available on all models. Certain conditions apply. Consult factory or sales representative for details.
- ⁽⁵⁾ 120-277V only / 0°C-50°C ambient.

Schematic:



Left: FFR with AR (Plenum Ceiling Air Return) option



Performance Chart:

Catalog #	Watts	Lumens (830)	LPW (830)	Lumens (835)	LPW (835)	Lumens (840)	LPW (840)	Lumens (850)	LPW (850)
FFR 24 SL UV FA xxx	26	3108	120.5	3160	122.5	3264	126.5	3362	130.3
FFR 24 VL UV FA xxx	28	3714	132.6	3763	134.4	3888	138.8	4004	143.0
FFR 24 LW UV FA xxx	33	4249	128.8	4288	129.9	4430	134.2	4563	138.3
FFR 24 ML UV FA xxx	36	4551	126.4	4597	127.7	4749	131.9	4891	135.9
FFR 24 MD UV FA xxx	46	5805	126.9	5903	129.1	6098	133.3	6281	137.3
FFR 24 HI UV FA xxx	52	6870	132.1	6929	133.2	7158	137.6	7372	141.8
FFR 24 VH UV FA xxx	60	7650	127.5	7747	129.1	8003	133.4	8243	137.4
FFR 24 SH UV FA xxx	68	8763	128.3	8911	130.4	9205	134.8	9481	138.8

Photometric Data:

FFR 24 SL UV FA 830

Test No.: LLIA000691-002

Luminaire Lumens: 3,108 lm

Luminaire Watts: 25.8W

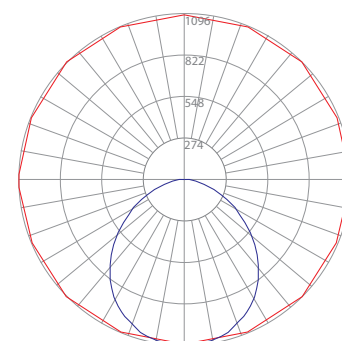
Efficacy: 120.5 LPW

Spacing Criterion (0-180): 1.24

Spacing Criterion (90-270): 1.30

Luminance Data (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	1544	1693	1785
55	1360	1620	1761
65	1130	1528	1719
75	877	1478	1698
85	620	1084	529



— Vert. Plane
— Horiz. Cone

Zonal Lumen Summary

Zone	Lumens	%Fixt
0-20	399.88	12.90
0-30	849.70	27.30
0-40	1390.60	44.70
0-60	2443.96	78.60
0-80	3051.15	98.20
0-90	3108.29	100.00
90-120	0.00	0.00
90-130	0.00	0.00
90-150	0.00	0.00
90-180	0.00	0.00
0-180	3108.29	100.00

Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50				30			
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10		
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106		
1	109	104	100	96	106	102	98	94	97	94	91	93	91	88		
2	99	90	84	78	96	88	82	77	85	80	75	82	77	73		
3	90	79	71	65	87	78	70	64	75	68	63	72	66	62		
4	82	70	61	55	80	69	61	54	66	59	53	64	58	53		
5	76	63	54	47	74	62	53	47	59	52	46	57	51	46		
6	70	56	47	41	68	56	47	41	54	46	40	52	45	40		
7	65	51	42	36	63	50	42	36	49	41	36	47	41	36		
8	60	47	38	32	59	46	38	32	45	37	32	43	37	32		
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29		
10	53	40	32	26	52	39	31	26	38	31	26	37	31	26		

Tested in accordance with IES standards utilizing absolute photometry per LM-79-08

LUMENFOCUS Re-boardABILITY

The FFR features field replaceable boards and drivers. This allows you to upgrade to more efficient technology in the future. Or, in the rare event of a failure, you can rapidly replace defective components. Re-boardABILITY helps to ensure you won't get stuck with an obsolete light fixture. [Learn more about Re-boardABILITY here.](#)



[Click here for a video demonstration of the re-boarding process on a FFR.](#)

Note: Exact time varies depending on the model.



Installation Instructions:



1) Turn off power to luminaire, remove all fluorescent components, dispose of properly.



2) Insert endcaps between ceiling grid and troffer.



3) Slide LED panel between grid and troffer, fasten with provided quarter turns.



4) Connect LED panel with provided disconnect. Insert blank side panel between grid and troffer, fasten with provided quarter turns.



5) Insert lens material into track, turn on power.

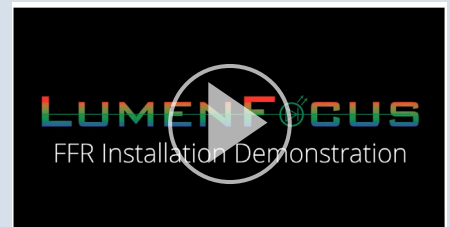


Total Install time: less than 5 minutes!



Installation Demo Online:

An online demonstration video can be found on our YouTube channel [at this link](#).



ZSOL option: Leviton Intellect Solo Sensor

The FFR can be equipped with an integrated Leviton Intellect Solo Sensor (“ZSOL” option). This is a 0-10V dimming Passive Infrared (PIR) occupancy and daylight harvesting sensor.

Other features:

- Partial-on
- Partial-off
- 8’ to 10’ mounting height
- IP20 rated
- Detection angle: 120 degrees
- IR remote available for programming sensor from the floor (sold separately)
- Can be used to comply with IECC, ASHRAE 90.1 and 2019 Title 24, Part 6 dimming, occupancy/vacancy sensing and daylight harvesting requirements.



FormFocus available with Philips EasySense Sensors

- Simple, cost effective way to add controls to every luminaire in order to maximize energy savings and address code-compliance strategies
- Occupancy sensing, daylight harvesting, and task tuning in one device
- Reduces installation time and eliminates the need to wire sensors outside the fixture in the ceiling
- Title 20 compliant
- Enables auto-off/manual-on and auto-off/partial-on application
- Easy field configuration from floor via smartphone with Easysense App
- Factory can pre-set max light levels



ZES2 (EasySense Fixture-Mount Sensor SNS200 with Philips SR Xitanium driver)

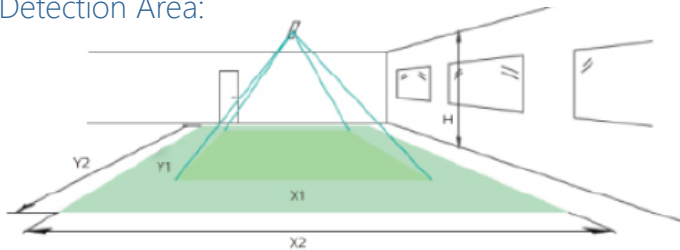
- Independent per-fixture control: Occupancy, Daylight Harvesting, Task Tuning
- Occupancy Sharing
 - Fixtures within a group can be programmed to remain at prescribed light levels so long as occupancy is detected anywhere in the group
- Scene Setting
- Advanced grouping to Illumra ZBT-S1AWH or ZBT-S2AWH wireless wall switch
 - Single (S1AWH) or Dual (S2AWH) Rocker Self-Powered Light Switch
 - Up to 40 sensors can be grouped to a single switch
 - Functions: On/Off, Dim-Up/Dim-Down, Scene 1, Scene 2
- DLC listed



ZES3 (EasySense Fixture-Mount Sensor for Networks SNS300 with Philips SR Xitanium driver)

- Occupancy & daylight sensing in one device
- Designed for applications with centralized lighting control through Zigbee wireless technology
 - Compatible with qualified third-party lighting control systems or building management systems (BMS)
 - Provides a simple solution to actively manage and control energy usage, while remotely adjusting light settings and determining service needs
 - Provides fixture-specific information into networks for centralized control and enables functionality such as energy monitoring, scheduling, and load shedding.
 - **Note:** SNS300 does not provide stand-alone operation based on occupancy or daylight. Status is provided to the network system for centralized control and command.

Detection Area:



Height	Minor Movement		Major Movement	
H	X1	Y1	X2	Y2
10'	12'	9'	18'	12'

Longer dimension of detection area (X1, X2) is parallel to longer dimension of EasySense

- Minor movement (person moving ≤ 3.0’ per second)
- Major movement (person moving ≥ 3.0’ per second)

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Douglas Lighting Controls, Inc.: Cloud-based controls

The FFR can be equipped with the Douglas Bluetooth Intelligent Fixture Sensor (IFS) as well as the Intelligent Fixture Controller.



IFS

- Occupancy, vacancy, partial-on and partial-off
- Occupancy timeout adjustable from 5 to 90 minutes
- Primary and secondary daylight harvesting
- Up to 16.4' (5m) mounting height



IFC

- Listed for emergency control when used on dedicated emergency power bus
- Same occupancy and daylight controls as the IFS when networked with one or more IFS sensors

Available with both IFS and IFC:

- 0-10V dimming with dim-to-off
- Bluetooth beacon for digital ceiling, IoT and location service strategies
 - 150-foot clear line of sight, 50 feet through standard walls
- May be used with dual-channel, tunable white LED drivers providing auxiliary power and dim-to-off capability
 - Commissioning through Douglas Lighting Controls, Inc. app from Apple app store
 - **Note:** Additional equipment required for IoT capabilities

CheckLight® Energy Management System

Douglas controls can be integrated with the CheckLight® Energy Management system. This system can help you uncover energy conservation opportunities, create conservation strategies, analyze lighting load inefficiencies, and make configuration changes from anywhere with Douglas' user-friendly interface. You can get measurements, reports, and control your system from a web-based application.

CheckLight® has the capability to look at different facilities within a portfolio and use data benchmarks to compare building performances.

- Find energy conservation opportunities
- Create energy saving strategies
- Analyze load inefficiencies
- Optimize energy management

Enlighted: All-in-one sensors, upgradeable systems

Enlighted's SMART Micro Sensor is an all-in-one unit: task tuning, high-end trimming, daylight harvesting, and occupancy/vacancy detection. Max installation height is 15 feet.



Enlighted sensors come standard with the Enlighted One system (the "ZENLO" option). Enlighted Connected ("ZENLC") offers even more options. The Enlighted IoT ("ZENLI") option allows the full implementation of Enlighted's services. Each system can be fully upgraded to the next tier in the future. So if you start with Enlighted One but want to add energy reporting or building management systems integration in the future, you can.

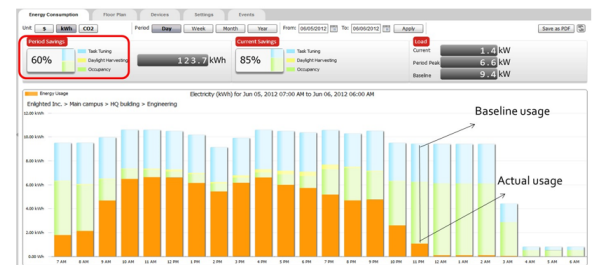
Enlighted Capabilities*	Enlighted One (ZENLO)	Enlighted Connected (ZENLC)	Enlighted IoT (ZENLI)
Motion and Switch Groups	✓	✓	✓
Daylight Harvesting	✓	✓	✓
Schedule Lighting		✓	✓
Energy Reporting & Optimization		✓	✓
Environment Data & Lighting Controls API		✓	✓
Building Management System Integration		✓	✓
Where & Space Applications			✓
Location & Occupancy APIs & Beacons			✓
Future App & API Ready			✓

Note: Additional equipment required ZENLC and ZENLI

Real-time data analytics

Enlighted's control units compile data in real-time, which can be viewed via the Energy Manager. The Energy Manager is part of the Enlighted Connected and Enlighted IoT configurations.

- Real-time measurements and verification of energy savings
- Space analytics - data can be compiled into motion trails and heat maps
- Analyze traffic density and congestion in a space



Learn more about our available advanced controls options here:

www.lumenfocus.com/controls-overview

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