

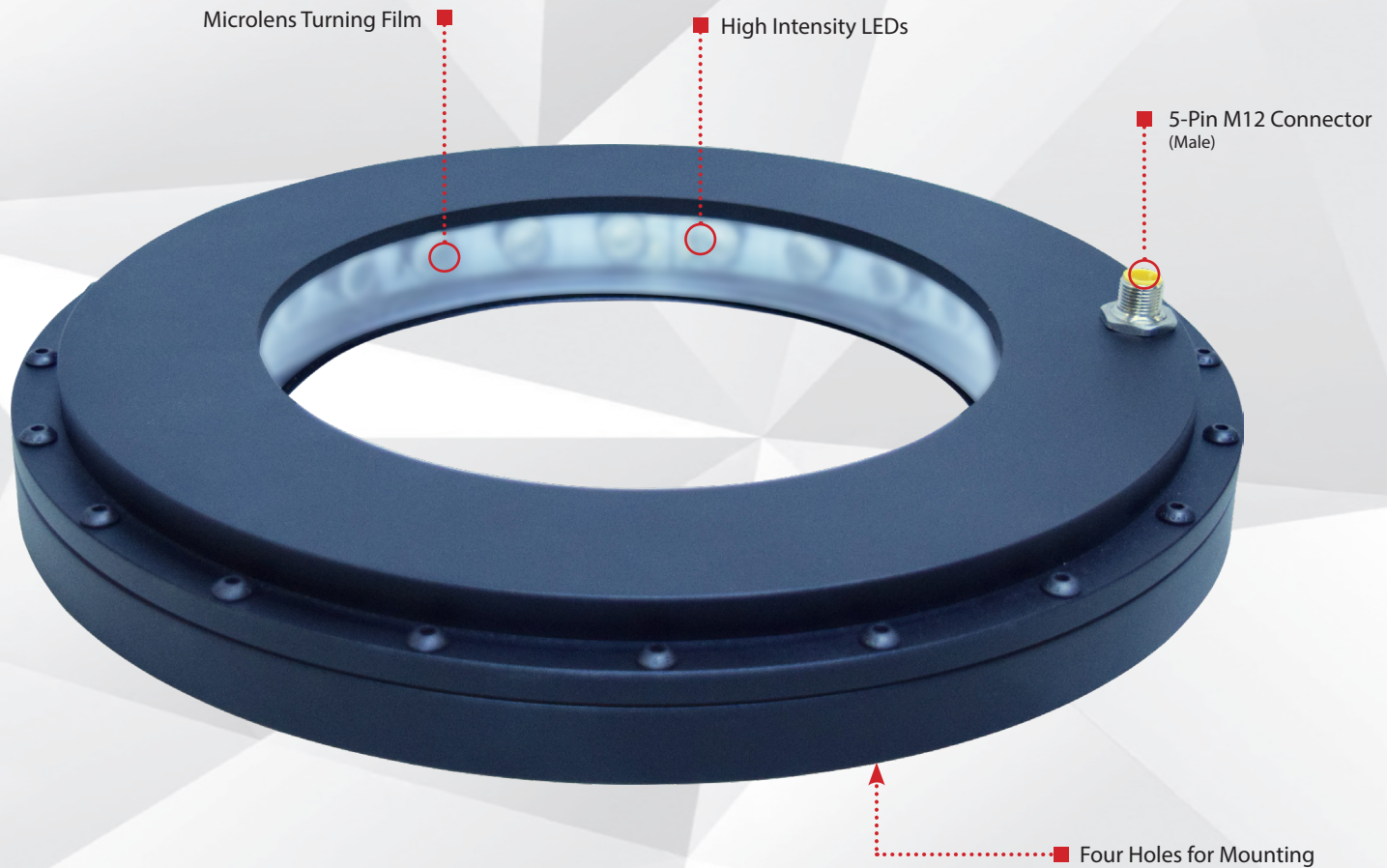


smart vision lights

# DFLW-200 Dark Field RING LIGHT

MULTI-DRIVE™ | WASHDOWN

## P R O D U C T D A T A S H E E T



Warranty  
**10**  
YEAR

Compliant  
**IEC**  
62471

Compliant  
**CE**  
RoHS

Rated  
**IP**  
68

Connector  
**5-PIN**  
M12

### PRODUCT HIGHLIGHTS

- ✓ Built-in Multi-Drive™ allows the light to work in continuous operation or OverDrive™ strobe mode
- ✓ Microlens turning film directs a beam of light at a 20° angle towards an object, resulting in a high concentration and uniform field of illumination
- ✓ SafeStrobe™ technology ensures protected operation of LEDs
- ✓ Built-in driver
- ✓ PNP and NPN trigger signal input





## PRODUCT DESCRIPTION

The DFLW-200 Dark Field Washdown Ring Light is IP68 rated and comes in an anodized black aluminum housing. The built-in Multi-Drive™ driver allows the light to work in continuous operation or OverDrive™ strobe mode, depending on the wiring configuration. The industry-standard 5-pin M12 connector makes for simple wiring. The 1–10V DC analog signal line gives the user total control over intensity in continuous operation mode. Grounding the analog signal line put the light into OverDrive™ strobe mode.



## PRODUCT SPECIFICATIONS

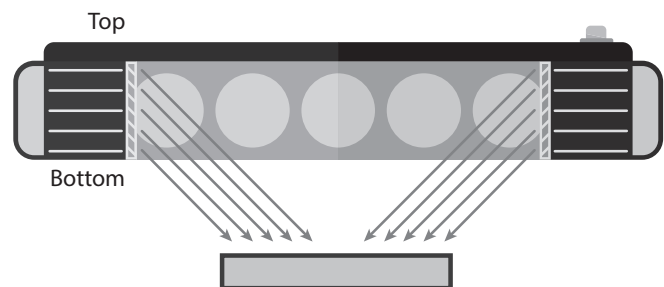
|                     | CONTINUOUS OPERATION  | OVERDRIVE™ STROBE MODE  |
|---------------------|---|---|
| Electrical Input    | 24V DC +/- 5%   |   |
| Input Current       | Max. 1.48 A   | Max. 12.35 A  |
| Input Power         | Max. 35.5 W   | Max. 296.4 W  |
| PNP Trigger         | 2.8 mA @ 4V DC   8.8 mA @ 12V DC   17.6 mA @ 24V DC                               |   |
| NPN Trigger         | 14.4 mA @ Ground (0V DC)  |   |
| Mode Control        | NPN can be tied to ground <b>OR</b> PNP can be tied to 24V DC ( <b>not both</b> ) | Connect pin 5 to GND (see Wiring Configuration for more information)      |
| Strobe Duration     | <b>Not applicable</b>   | Min. 10 µs   Max. 50 ms (see SafeStrobe™ Technology for more information) |
| Duty Cycle          | <b>Not applicable</b>   | Max. 10%  |
| Strobe Input        | <b>Not applicable</b>   | PNP: +4V DC or greater to activate<br>NPN: GND (<1V DC) to activate       |
| On/Off Input        | PNP: +4V DC or greater to activate<br>NPN: GND (<1V DC) to activate               | <b>Not applicable</b>   |
| Connection          | 5-pin M12 connector   |   |
| Ambient Temperature | 0°–45°C (32°–114°F)   |   |
| IP Rating           | IP68  |   |
| Weight              | Anodized Black Aluminum: 5.55 lbs   2.51 kg                                       |   |
| Compliances         | CE, RoHS, IEC 62471   |   |



## MICROLENS TURNING FILM

When combined with high-power LEDs, the microlens turning film directs a beam of light at a 20° angle toward the object, resulting in a high concentration and uniform field of illumination. This technique allows for a large-diameter dark field ring light to have an extended working distance while maintaining light intensity and uniformity.

The microlens requires the bottom of the light to be pointed towards the object being inspected. The bottom is the side without the connector.



## RESOURCE CORNER

Additional resources, including CAD files, videos, and application examples, are available on our website.

### Smart Vision Lights

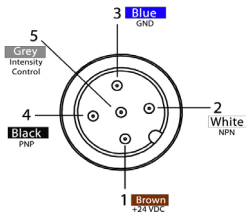
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Norton Shores, MI 49441  
P: +1 231.722.1199 | F: +1 231.722.9922  
[smartvisionlights.com](http://smartvisionlights.com)  
techsupport@smartvisionlights.com  
Hours: Monday — Friday | 8 am–5 pm ET





# WIRING CONFIGURATION

## CONTINUOUS OPERATION MODE



Pin layout for light (male connector)

| Pins | Function          | Signal          | Wire Color |
|------|-------------------|-----------------|------------|
| 1    | Power In          | +24 V DC        | BROWN      |
| 2    | NPN               | Sinking Signal  | WHITE      |
| 3    | GND               | Ground          | BLUE       |
| 4    | PNP               | Sourcing Signal | BLACK      |
| 5    | Intensity Control | 1-10 V DC**     | GREY*      |

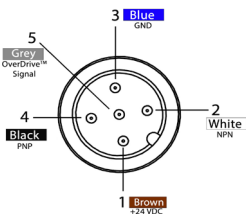
\* Some cables use green/yellow for pin 5

\*\* For maximum intensity, it is possible to tie pin 5 to pin 1 at +24 VDC.

For continuous mode: PNP (pin 4) can be tied to +24 V DC (pin 1) or NPN (pin 2) can be tied to Ground (pin 3).

For proper light function, apply either a PNP or NPN signal, not both. Failure to supply light with correct input current will result in inconsistent lighting behavior. (see Product Specifications for requirements)

## OVERDRIVE™ STROBE MODE



Pin layout for light (male connector)

| Pins | Function          | Signal          | Wire Color |
|------|-------------------|-----------------|------------|
| 1    | Power In          | +24 V DC        | BROWN      |
| 2    | NPN               | Sinking Signal  | WHITE      |
| 3    | GND               | Ground          | BLUE       |
| 4    | PNP               | Sourcing Signal | BLACK      |
| 5    | OverDrive™ Signal | Ground          | GREY*      |

To enable OverDrive™ mode, tie pin 5 to pin 3

Failure to supply light with correct input current will result in inconsistent lighting behavior. (see Product Specifications for requirements)



# LIGHT PATTERNS

Smart Vision Lights recommends the DFLW-200 be used at a working distance between 20 mm and 75 mm.

### LIGHTING ILLUMINATION FOR THE DFLW-200

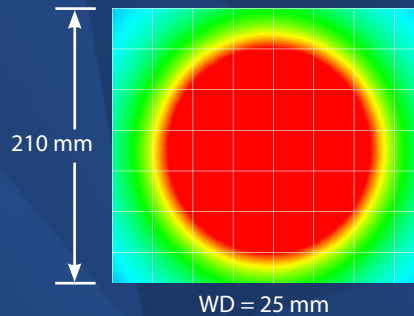
| Continuous Operation Mode                                   |                   |
|---|-------------------|
| Typical Output Performance                                  | Illuminance (Lux) |
| Distance = 25 mm  | 60,000            |
| <i>Illuminance measurement taken on White Light, 4800 K</i> |                   |

| OverDrive™ Mode   |                   |
|---|-------------------|
| Typical Output Performance                                  | Illuminance (Lux) |
| Distance = 25 mm  | 330,000           |
| <i>Illuminance measurement taken on White Light, 4800 K</i> |                   |

## The DFLW-200 Ring Light produces a uniform light pattern.

WD = Working Distance

Grid set to 30 mm x 30 mm





## MULTI-DRIVE™

Multi-Drive™ offers the best of both worlds. Continuous operation and OverDrive™ mode (HIGH output strobe/pulse) are available in a single light. Other advantages of Multi-Drive™ include faster imaging and capture/freeze motion on high-speed lines.



The Multi-Drive™ feature allows the user to run the light continuously or in OverDrive™ at the maximum allowed intensity by simply setting the product configuration. OverDrive™ strobe mode has **up to eight times** the power of continuous operation.



## SAFESTROBE™ TECHNOLOGY

SafeStrobe™ technology is a unique technology that applies safe working parameters to ensure high-current LED's are not damaged by driving them beyond their limits, such as maximum strobe time or duty cycle. This is especially beneficial for overdriving our high-current LED's.

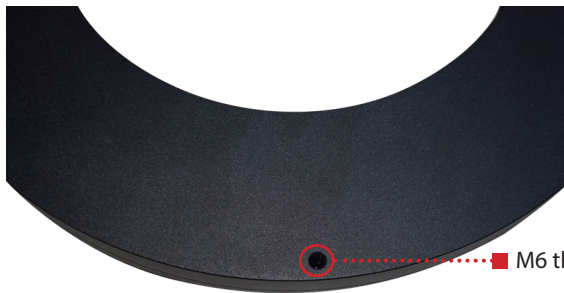


## MOUNTING

Mounting options include four M6 threaded holes located on the DFLW-200.

### Hardware included with light:

(2) M6 screws (hex)

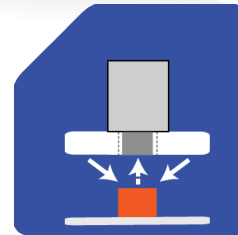


■ M6 threaded hole



## ILLUMINATION

The DFLW-200 Dark Field Ring Lights works best for:



Dark Field



## EYE SAFETY

According to IEC 62471:2006. Full documentation available upon request.



### Notice

**Exempt Group:** No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for wavelength 625.

### Caution

**Risk Group 1:** Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to eyes. Safe for most applications except prolonged exposure. Applicable for wavelengths 470, 530, and WHI.

## PART NUMBER

DFLW-200



COLOR:



HOUSING

Leave blank for Anodized Black Aluminum

SS = Stainless Steel

### Part Number Examples:

DFLW-200-625 (DFLW-200, 625 nm Red Wavelength)

DFLW-200-625-SS (DFLW-200, 625 nm Red Wavelength, Stainless Steel housing)

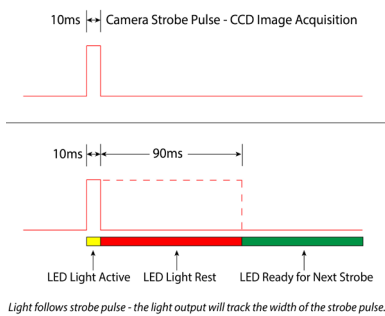
Additional wavelength and lens options available upon request

## DUTY CYCLE (OVERDRIVE™ MODE ONLY)

This section applies only if light is in OverDrive™ strobe mode.

Maximum Duty Cycle for OverDrive™ light is 10% (0.1)

The Duty Cycle (D) is related to the Strobe Time (ST) and Rest Time (RT).



### Calculating Rest Time

$$RT = \frac{ST}{D} - ST$$

RT = Rest Time  
ST = Strobe Time  
D = Duty Cycle

#### Example

$$90 \text{ ms} = \frac{10 \text{ ms}}{.1} - 10 \text{ ms}$$

Rest Time is 90 ms for 10 ms Strobe Time

### Calculating Strobe Rate

$$SR = \frac{D}{ST}$$

SR = Strobe Rate (strokes per second)  
ST = Strobe Time (seconds)  
D = Duty Cycle

#### Example

$$1000 = \frac{0.1}{0.0001}$$

Strobe Rate is 1000 strokes per second

### Calculating Duty Cycle

$$D = ST \times SR$$

SR = Strobe Rate (strokes per second)  
ST = Strobe Time (seconds)  
D = Duty Cycle

#### Example

$$0.1 = 0.0001 \times 1000$$

Duty Cycle is 10% (0.1)

Note: Strobe time is limited by the strobe rate.

## STAINLESS-STEEL VERSION

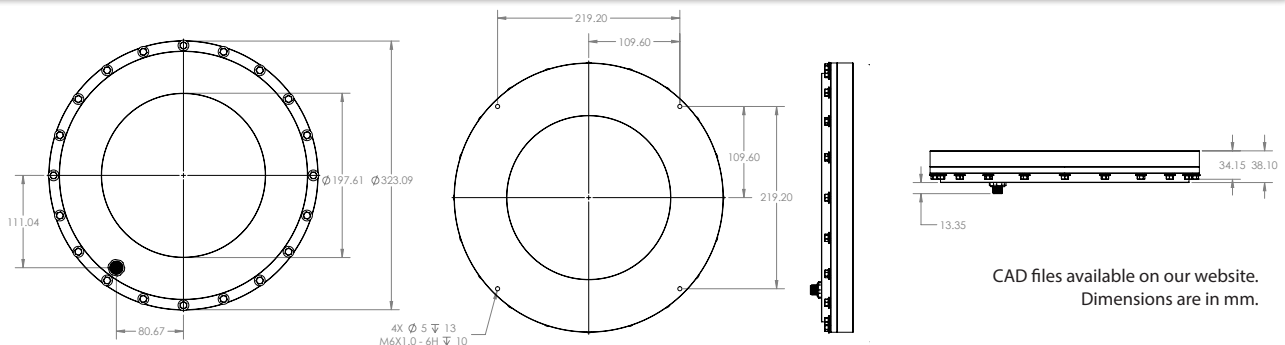
The DFLW-200 is available in a stainless-steel housing. Stainless-steel housing is recommended for any food grade application. Lead time for the stainless-steel version of the DFLW-200 is longer than that of the anodized black aluminum housing version.



316 Stainless-Steel Housing

Add -SS to end of part number for Stainless-Steel

## PRODUCT DRAWING



CAD files available on our website. Dimensions are in mm.



## ACCESSORIES

### Power Cables



| Lengths | Part Number |
|---------|-------------|
| 5 m     | 5PM12-5     |
| 10 m    | 5PM12-10    |
| 15 m    | 5PM12-15    |

### Power Cables (Washdown)



| Lengths | Part Number |
|---------|-------------|
| 15 m    | W5PM12-15   |

Washdown cables have a 316 stainless-steel connector(s).



## GLOSSARY

This glossary covers all Smart Vision Lights product families; some content in this section may not apply to this specific light.

### TERMINOLOGY

**OverDrive™** Light includes an integrated high-current strobe driver for complete LED light control.

**Continuous Operation** Light stays on continuously.

**Multi-Drive™** Combines continuous operation and OverDrive™ strobe (high-current strobe operation) modes into one easy-to-use light.

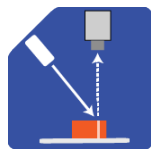
**Built-In Driver** The built-in driver allows full function without the need of an external driver.

**Camera to Light** Connecting the light directly to the camera, without the need for additional controllers or equipment.

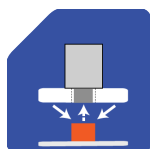
**Polarizers** Filters that reduce reflections on specular surfaces.

**Diffuser** Used to widen the angle of light emission, reduce reflections, and increase uniformity.

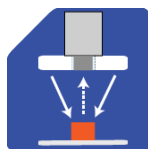
### TYPES OF ILLUMINATIONS



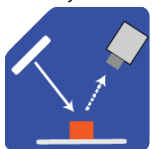
Projector



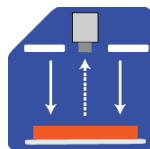
Dark Field



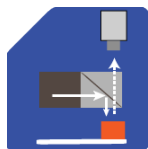
Radial



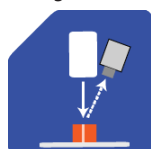
Bright Field



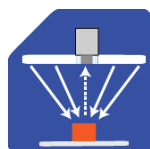
Direct



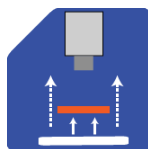
Axial



Line



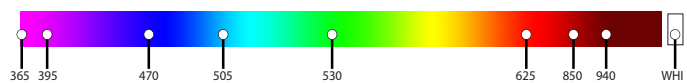
Diffuse Panel



Backlight

### COMMON COLOR/WAVELENGTHS LEGEND

Wavelength options range from 365 nm to 1550 nm.  
Additional wavelengths available for many light families.



\*See Part Number section for **this light's** available standard wavelengths.



Short Wave Infrared LEDs are available in 1050 nm, 1200 nm, 1300 nm, 1450 nm, 1550 nm, and 1650 nm.