WDI
WISE DEVICE INC

RGB FPHPLED Illuminator Datasheet

2025

RGB FPHPLED Illuminator Description

The RGB FPHPLED Illuminator is composed of a three channel LED driver with three individually controlled LEDs (Red, Green, Blue). The integrated PFABUS FPHPLED controller provides power and also controls the individual LEDs' intensity, timing, and mode of operation (i.e., Continuous, Pulse Width Modulation, Pulse Follow and Pulse Trigger modes). The controller comes with a PFABUS connector kit for manual wiring. Alternatively, refer to cable options under *"Accessories" on page 9*.

Ordering Info

NOTE: *The RGB FPHPLED Illuminator is available with a choice of different light concentrating optics to accommodate different working distances. The working distance is measured from the last lens of the LED assembly to the back-aperture of the objective lenses. Please contact Sales for more information.*

Table 1 RGB FPHPLED Illuminator Types

Type	Part Number
RGB FPHPLED Illuminator (ILL-PBI-RGB-FPHPLED-MHR)	977800

Product Specifications

Table 2 RGB FPHPLED Illuminator Specifications

Parameter	Value
Max Current (Continuous, Pulse, Surge)	Red (1A, 8A, 10A) Green (1A, 12A, 14A) Blue (1A, 12A, 14A)
Minimum Pulse Width	1.3 µs
Surge Mode Maximum Pulse Width	50 µs (Maximum Duty Cycle 5%)
Pulse Mode Maximum Pulse Width	1000 µs (Maximum Duty Cycle 10%)
Pulse Width Resolution	0.1 µs
Pulse Trigger Delay Resolution	0.01 µs
Camera Trigger Delay Resolution	0.01 µs
Typical Scanning Speeds[a]	Mitutoyo 5X 303 to 384 mm/s Mitutoyo 10X 152 to 192 mm/s
Working Distance Range	The working distance is adjustable from 101 mm to 132 mm
Compliance	Clean Room Class 1000 (ISO6)

a. Based on Sony IMX535 and GPixel GMAX0505 sensors.

Electrical Connections

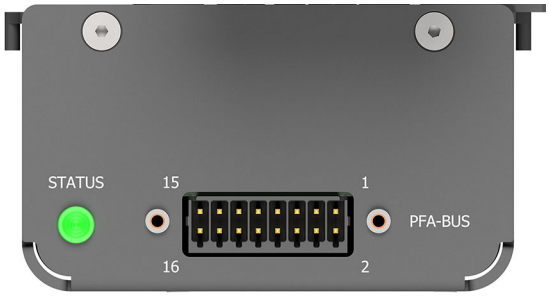


Figure 1 *Controller Connector*

Table 3 Controller Connector Pin Outs

Pin #	Signal Name	Description
1,2	+24V	+24V Power Supply.
3,4	GND	Power Supply Return
5	Reserved	Reserved
6	Reserved	Reserved
7	IO1	Digital Input/Output 1
8	GND	IOs Return
9	IO3	Digital Input/Output 3
10	IO2	Digital Input/Output 2
11	RS485-	Inverting RS485 Receiver Input and Driver Output
12	RS485+	Non Inverting RS485 Receiver Input and Driver Output
13	GND	IOs Return
14	IO4	Enable IN (optional – not used with factory settings)
15	IO5-	Inverting Differential IO5 Receiver Input and Driver Output
16	IO5+	Non Inverting Differential IO5 Receiver Input and Driver Output

Electrical Specifications

Table 4 RGB FPHPLED Illuminator and Integrated Controller Electrical Specifications

Parameter	Condition	Minimum	Typical	Maximum	Units
Input Voltage		21.6	24	26.4	V
Input Current				0.8	A
Output Ripple			3		%
Duty Cycle	0.1% increment. Pulse width condition applies.	0.1		100	%
PWM Frequency		1.526		100,000	Hz
Analog Dimming	0.1% increment.	2		100	%
Optical Output Rise Time			0.2		µs

Table 4 RGB FPHPLED Illuminator and Integrated Controller Electrical Specifications (continued)

Parameter	Condition	Minimum	Typical	Maximum	Units
Optical Output Fall Time			0.2		µs
Minimum Pulse Width	Minimum pulse width is defined as time between rising and falling edges crossing 50% of the peak level.		1.3		µs
Trigger to Optical Pulse Latency	Time measured between the rising edge of the external trigger signal on DIO and rising edge of the optical pulse read on an oscilloscope with a photodiode.		0.5		µs
RS485, DIO5					
Differential Driver Output Voltage		2.0		3.3	V
Receiver Differential Threshold Voltage		10	105	200	mV
Differential Termination Resistor	Turned on under software control. Not applicable for DIO5		120		Ω
RS485 Baudrate	Not applicable for DIO5		115,200		bps
Digital Inputs (IO1,IO2,IO3,IO4)					
Input Voltage High (VIH)	All IOs except IO4	2		5.5	V
Input Voltage Low (VIL)	All IOs except IO4	-0.5		0.7	V
Input Voltage High (VIH)	IO4	2.8		28	V
Input Voltage Low (VIL)	IO4	-0.5		1	V
Input Resistance			5		KΩ
Output Voltage High (VOH)		4.5	5		V
Output Voltage Low (VOL)		0		0.4	V
Output Impedance	All IO except IO4 which is 6KΩ		40.2		Ω

Optical Specifications

Red LED

Table 5 Luminous Flux Parameters – Red LED

Parameter	Value
Wavelength (Dominant)	614 nm
Total Radiant Flux (Minimum)	Approximately 4.1 W @ I = 6 A
Total Radiant Flux (Maximum)	Approximately 4.4 W @ I = 6 A
Relative Luminous Flux vs Forward Current	See *Figure 2*
Typical Spectrum	See *Figure 3*

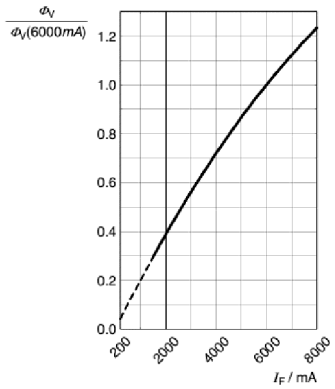


Figure 2 *Relative Luminous Flux vs Forward Current – Red LED*

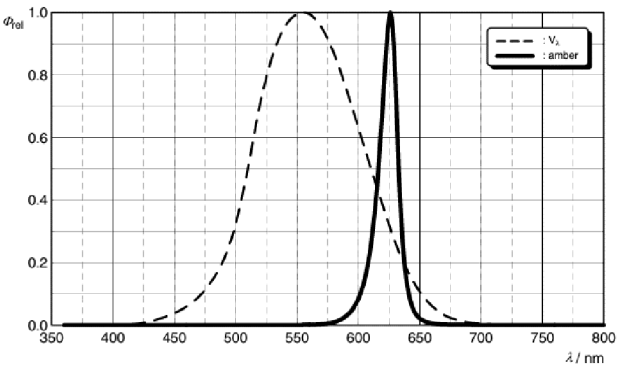


Figure 3 *Typical Spectrum – Red LED*

Green LED

Table 6 Luminous Flux Parameters – Green LED

Parameter	Value
Wavelength (Dominant)	520 nm
Total Radiant Flux (Minimum)	Approximately 5.7 W @ I = 6 A
Total Radiant Flux (Maximum)	Approximately 6.2 W @ I = 6 A
Relative luminous Flux vs Forward Current	See *Figure 4*
Typical Spectrum	See *Figure 5*

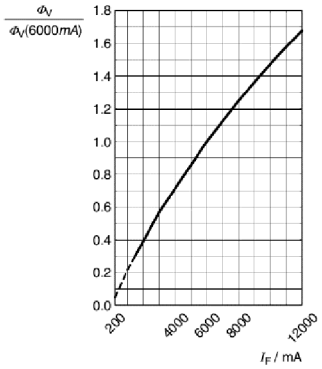


Figure 4 *Relative Luminous Flux vs Forward Current – Green LED*

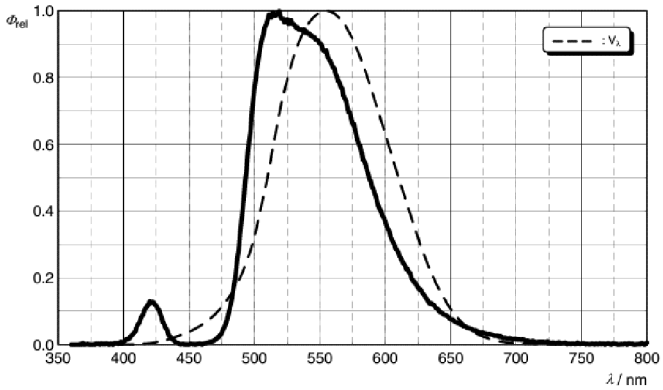


Figure 5 *Typical Spectrum – Green LED*

Blue LED

Table 7 Radiant Flux Parameters – Blue LED

Parameter	Value
Peak Wavelength	450 nm
Total Calculated Radiant Flux (Minimum)	Approximately 7.6 W @ I = 6 A
Total Calculated Radiant Flux (Maximum)	Approximately 8.2 W @ I = 6 A
Relative Radiant Flux vs Forward Current	See *Figure 6*
Typical Spectrum	See *Figure 7*

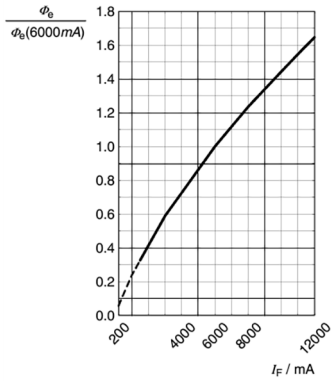


Figure 6 *Relative Radiant Flux vs Forward Current – Blue LED*

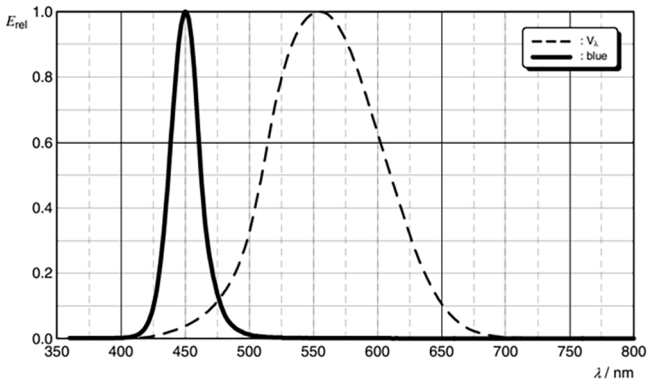


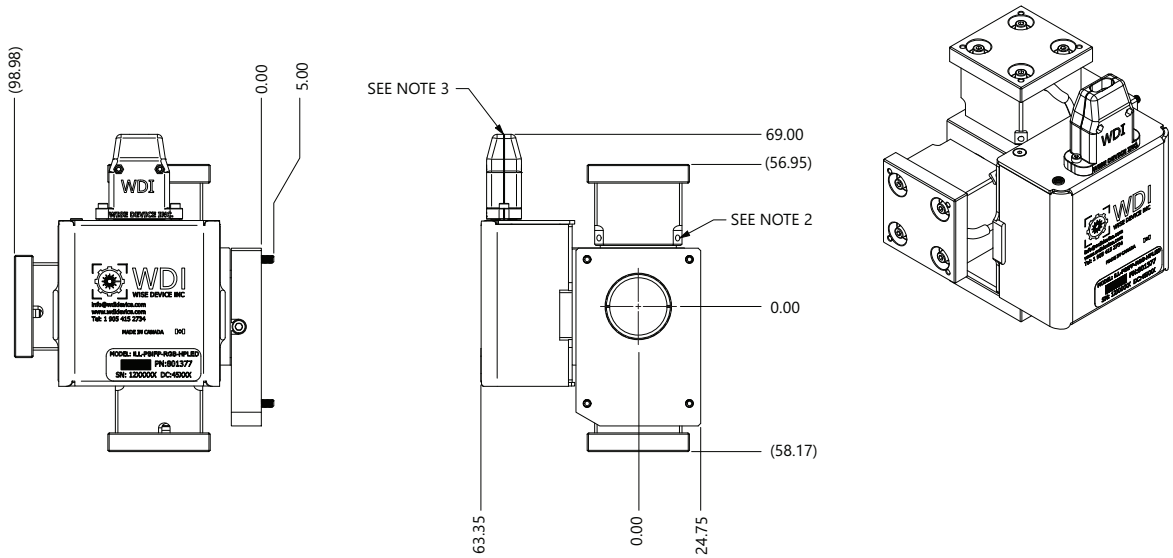
Figure 7 *Typical Spectrum – Blue LED*

Environmental Specifications

Table 8 RGB FPHPLED Illuminator Environmental Specifications

Description	Value
Operating Ambient Temperature	20ºC to 30ºC
Transport Temperature (sealed container)	-20ºC to 50ºC
Storage Temperature	10ºC to 40ºC
Humidity Temperature	10% to 80% non-condensing

Mechanical Dimensions



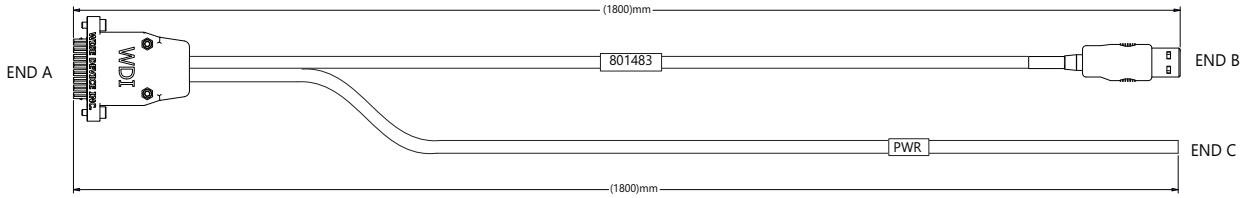
NOTES:
1. CABLE SHOWN FOR ILLUSTRATION, NOT TO SCALE.
2. ALL 3 INDIVIDUAL ILLUMINATORS UNITS ARE ADJUSTABLE DEPENDING ON REQUIREMENT. USE 1.5mm HEX KEY TO ACCESS THE LOCKING SCREWS.
3. ALLOW SPACE OF ATLEAST 60mm FOR CABLE BEND RADIUS AND CONNECTOR UNPLUGGING.

Figure 8 *RGB FPHPLED Illuminator Dimensions*

Accessories

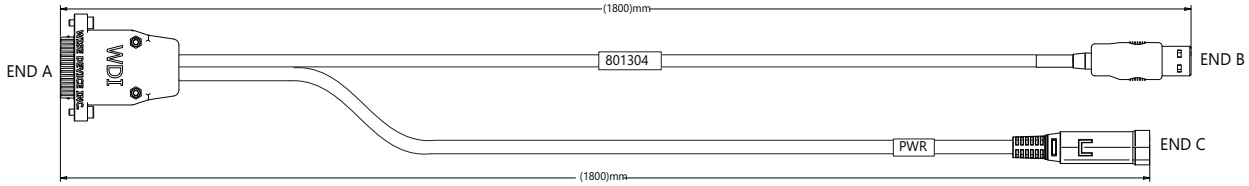
Table 9 RGB FPHPLED Illuminator Accessories

KIT Accessories	Part Number	Remarks
Cable (CAB-PFABUS-PWR/USB TO RS485),1800mm	801483	This is flying leads terminated.
Cable (CAB-PFABUS-PWR/USB TO RS485),DIN4,1800mm	801304	This is DIN4 terminated.

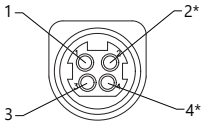


Pin# at end A	Signal	Wire color at end C
1	24V	Red
3	Ground	Black
14	E-Stop	White

Figure 9 *CAB-PFABUS-PWR/USB TO RS485 Cable Wiring*



Pin# at end A	Signal	Pin# at end C	Wire color at end C
1	24V	1	Red
3	Ground	3	Black
14	E-Stop	1	White



DIN4 front view

*Pins 2 and 4 not connected

Figure 10 *CAB-PFABUS-PWR/USB TO RS485 DIN4 Cable Wiring*