

## Tunnel Entrance / Interior, Railway & Airport runway

# Photometer FM-1/6, FG-8/10

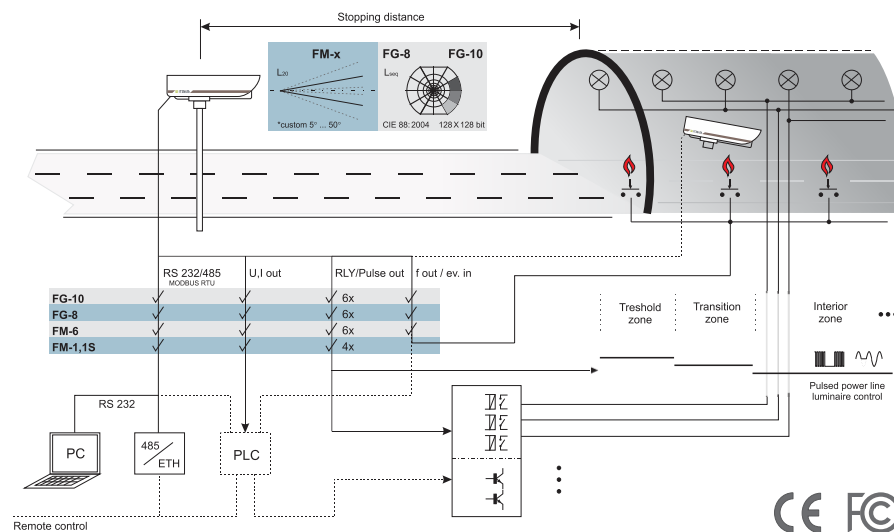
Photometers FM-1/6; FG-8/10 offer a unique solution for a complete tunnel lighting control as stand-alone system. They as well perform superb accuracy measurements in complex regulation systems i.e. railway, metro, airports,... FG-10 also with programming bitmap view-field section filters for real-view lighting analysis.

Built-in, remotely-programmable controller integrates functions covering lighting-control needs of almost any tunnel and traffic lighting application.

Sensor exactly matched to CIE human eye response fits ideally with new LED lighting approaches and is fully compatible with any light source in photopic or mesopic light-intensity area.

Multi channel 230 VAC outputs are directly compatible with main lighting contactors and can also be set for pulsed-power-line control signals.

Serial Modbus communication supports remote control, supervision and device programming. Isolated, floating and user scalable active-analog outputs make connections to dimming control and other PLC systems.



Tunnel lighting application

FM-6 and FG-8/10 features »event in-put« to initiate special, programmable lighting modes for extraordinary situations (e.g. fire or accident).

Any in- or out-put port is fitted with overvoltage and surge protection.

Sunshade protection against overheating, de-condensation heater and sensor temperature control provides extremely stable and reliable operation for many years of service.



## FEATURES

- Superb match to CIE human eye response
- High accuracy optics & measurement  $\pm 3\%$  typical
- Temperature controlled sensor chamber
- Anti-condensation heater
- 0 - 10kCd/m<sup>2</sup>; user scalable
- Custom range / viewing angles; FG-10 programmable bitmap pattern filtered view-field
- Complete stand-alone tunnel lighting control
- Embedded controller; I/O: RS232/485 MODBUS; Analog: Voltage, Current, Frequency; Contactor or Pulsed luminaire control: n x 230 VAC out
- Embedded overvoltage & surge protection
- Robust stainless steel housing AISI 316; IP 68; -40..+70°C
- Easy setup / software included
- Long life, highly stable, reliable and maintenance free
- Wiper-Washer unit available
- Field setup & calibration verification kit available

## APPLICATIONS

- Tunnel entrance, threshold zone or interior photometer
- Stand-alone or complex tunnel lighting control
- Metro / Railway and Traffic area lighting control
- Airport runway lighting control
- High accuracy lighting meas.

## MAINTENANCE FREE HOUSING

Made of dust-coated everlasting Stainless steel / PC combination is designed for toughest environmental conditions and easy mounting and connection. View-line pointers make accurate targeting easy.

Various brackets align the photometer perfectly to any surface, allowing adjustment and fixation in any axes.

Front screen Wiper / Washer option and Tank / Pump units are available.



## TECHNICAL SPECIFICATIONS

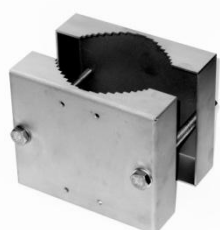
PHOTOMETER	FM-1	FM-1S	FM-6	FG-8	FG-10
Sensor:	silicon photodiode, $\lambda$ filter			$\lambda$ fixed pattern section filter	$\lambda$ programmable bitmap pattern filter
Spectral range / error:	F <sub>0</sub> 555 nm -human eye like / < 5 % according to CIE				
Full viewing angle:	L <sub>20</sub> = 20° -as standard; (5° - 50° available)			L <sub>seq</sub> = $\Sigma$ 56,8°/104° sections according to CIE88:2004	L <sub>seq</sub> = $\Sigma$ < 60°; 128 x 128 bit pattern
Measuring range:	0 .. 10.000 cd/m <sup>2</sup> ; user scalable				
Accuracy ; linearity:	> 3 % +0,5 % of range; > 1 %				
Communication port:	RS-485 / 232 - 9600 bps; MODBUS RTU option				
<b>ANALOG OUTPUTS</b>	✓	✓	✓	✓	✓
Voltage output:	0 - 10 V; R <sub>min</sub> 1000 $\Omega$	0 - 5 V / 0 - 1k cd/m <sup>2</sup> 5 - 10 V / 1k-10k cd/m <sup>2</sup>	0 - 10 V; R <sub>min</sub> 1000 $\Omega$	0 - 10 V; R <sub>min</sub> 1000 $\Omega$	0 - 10 V; R <sub>min</sub> 1000 $\Omega$
Current output:	4 .. 20 mA; R <sub>max</sub> 650 $\Omega$	4 - 12 mA / 0 - 1k cd/m <sup>2</sup> 12 - 20 mA / 1k-10k cd/m <sup>2</sup>	4 .. 20 mA; R <sub>max</sub> 650 $\Omega$	4 .. 20 mA; R <sub>max</sub> 650 $\Omega$	4 .. 20 mA; R <sub>max</sub> 650 $\Omega$
Frequency output /event input:	/	/	1 ..10.000 Hz; 15 V <sub>sqr</sub> open col./Logic-IN	1 ..10.000 Hz; 15 V <sub>sqr</sub> open col./Logic-IN	1 ..10.000 Hz; 15 V <sub>sqr</sub> open col./Logic-IN
<b>Contactors / Pulse 230 V AC OUTPUTS ;</b> *24 VAC optional	4	4	6	6	6
Control Current:	0,5A / channel nominal (16 A peak)				
Overall control current/power:	2 A / 460 W	2 A / 460 W	3 A / 700 W	3 A / 700 W	3 A / 700 W
Time averaging; pulse length	0 .. 24 min; min. 20ms				
<b>TEMPERATURE RANGE</b>	<b>-40 .. +70 °C</b>				
Sensor-room temperature stability:	$\pm 1$ °C				
De-condensation & Temp. control:	Heater 25 W				
Power supply / consumption:	230V AC $\pm 15$ %; 50 .. 60 Hz; optional 24 V AC $\pm 15$ % / < 30 W				
Protection degree; Material:	IP68; Stainless steel AISI 316 / PC				
Compliance:	FCC, CE; EN 61010, EN 60529, EN 6100-3/2, 3, -6/1, 3				
Dimensions (W x H x D), Weight:	Approx. 395 x 135 (230) x $\varnothing$ 145 mm; 4,3 kg / 5,1 kg with wiper set				



Wall Bracket



Tilt-Wall Bracket



Wall-to-Pole Adapter  
 $\varnothing$ 70 – 110 mm



Pole-side Bracket  
 $\varnothing$ 70 – 110 mm



Pole On-Top Bracket  
 $\varnothing$ 80 – 99 /  $\varnothing$ 114 – 125 mm