



INSTRUCTIONS MANUAL

LTLNM series

Flicker free high power focused modular LED line lights





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1. Product overview

LTLNM series are high power LED line illuminators designed for linescan applications. These lights are flickerfree and meet the needs of demanding applications with reduced exposure times (tens of μ s) ensuring very constant illumination and repeatable acquisition. Their modular design provides size flexibility without any compromise in terms of light uniformity.

LTLNM are available with an emitting surface up 2 meters in 200 mm increments (custom sizes and colours can be requested).

LTLNM series can be supplied with three different light angles/focusing distances: near field focused (N) with converging rays (10-100 mm), far field focused (F) with converging rays (100 - 200 mm) and collimated (C) working at a distance between 10 and 200 mm.

An optional diffusive sheet (D) can be integrated in any model to obtain the best illumination uniformity. These lights feature 24V supply voltage and can be easily dimmed through an analogue signal. LTLNM series can efficiently dissipate the generated heat thanks an efficient forced-air cooling system (fans). The on-board electronics constantly monitor the LED temperature and drives the fans only if needed, in order to minimize noise and increase fan life.

These line lights are perfect for applications that require high speed image processing such as fabrics and web inspection.

2. Disclaimer

Always deploy and store Opto Engineering® products in the prescribed conditions in order to ensure proper functioning. Failing to comply with the following conditions may shorten the product lifetime and/or result in malfunctioning, performance degradation or failure.

Ensure that incorrect functioning of this equipment cannot cause any dangerous situation or significant financial loss to occur. It is essential that the user ensures that the operation of the illuminator is suitable for their application. All trademarks mentioned herein belong to their respective owners.

Except as prohibited by law:

- All hardware, software and documentation are provided on an "as is" basis
- Opto Engineering® accepts no liability for consequential loss, of any kind

Upon receiving your Opto Engineering® product, visually examine the product for any damage during shipping. If the product is damaged upon receipt, please notify Opto Engineering® immediately.

3. Safety notes

Please read the following notes before using this controller. Contact your distributor or dealer for any doubts or further advice.

This device must not be used in an application where its failure could cause a hazard to human health or damage to other equipment. Keep in mind that if the device is used in a manner not foreseen by the manufacturer, the protection provided by its circuits and by its enclosure may be impaired.

The illuminator must be adequately shielded if employed in dusty and humid places.

When operating at the maximum ratings the illuminator can get very hot. The illuminator should be positioned where personnel cannot accidentally touch it and away from flammable materials. Never exceed the power ratings stated in the manual.

4. Product warranty

4.1. Warranty

The device warranty is 12 months from the effective delivery date with reference to the device serial number. The warranty covers the replacement or repairs of the defective part (components, device or part of it) with the exclusion of dismantling and shipping costs.

The replacement of one or more components does not renew the warranty period of the entire device. The manufacturer cannot be held liable for any compensation for whatever reason and the buyer renounces any claims for costs or damages to third parties due to any machine downtime.

The electronics and parts subjected to normal use or deterioration due to atmospheric agents and the external environment are excluded from the warranty. Also, all failure caused by the lack of, insufficient or incorrect maintenance performed by unskilled or unauthorized personnel or due to unintended use or unauthorized replacements, alterations or repairs is excluded from the warranty.

4.2. Product end-of-life handling

Observe the following guidelines when recycling this equipment or its components.

Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



This symbol indicates that this product complies with the applicable European Union requirements according to the WEEE (Waste Electrical and Electronic Equipment) Directive 2012/19/EU

5. Optical specifications

The following table depicts all optical information on LTLNM modular high-power LED line lights.

	Modules	Emitting length	Light colour	Projection lens	Suggested working distance	Diffuser
		(mm)			(mm)	
Part Number						
LTLNM-0200-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-0200-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-0200-F-FC-W	1	200	200 white 6200 K -	converging	100 – 200 far field focusing	no
LTLNM-0200-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-0200-C-FC-W				collimated	10 – 200	no
LTLNM-0200-C-D-FC-W				collimated	10 – 200	yes
LTLNM-0400-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-0400-N-D-FC-W			100 white	converging	10 – 100 near field focusing	yes
LTLNM-0400-F-FC-W	2	400		converging	100 – 200 far field focusing	no
LTLNM-0400-F-D-FC-W			0200 K	converging	100 – 200 far field focusing	yes
LTLNM-0400-C-FC-W				collimated	10 – 200	no
LTLNM-0400-C-D-FC-W				collimated	10 – 200	yes
LTLNM-0600-N-FC-W	3	600	white 6200 K	converging	10 – 100 near field focusing	no



LTLNM-0600-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-0600-F-FC-W				converging	100 – 200 far field focusing	no
LTLNM-0600-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-0600-C-FC-W				collimated	10 – 200	no
LTLNM-0600-C-D-FC-W				collimated	10 – 200	yes
LTLNM-0800-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-0800-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-0800-F-FC-W	4	800	white 6200 K	converging	100 – 200 far field focusing	no
LTLNM-0800-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-0800-C-FC-W				collimated	10 – 200	no
LTLNM-0800-C-D-FC-W				collimated	10 – 200	yes
LTLNM-1000-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-1000-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-1000-F-FC-W	5	1000	white 6200 K	converging	100 – 200 far field focusing	no
LTLNM-1000-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-1000-C-FC-W				collimated	10 – 200	no
LTLNM-1000-C-D-FC-W				collimated	10 – 200	yes
LTLNM-1200-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-1200-N-D-FC-W		1200	white 6200 K	converging	10 – 100 near field focusing	yes
LTLNM-1200-F-FC-W	6			converging	100 – 200 far field focusing	no
LTLNM-1200-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-1200-C-FC-W				collimated	10 – 200	no
LTLNM-1200-C-D-FC-W				collimated	10 – 200	yes
LTLNM-1400-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-1400-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-1400-F-FC-W	7	1400	white 6200 K	converging	100 – 200 far field focusing	no
LTLNM-1400-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-1400-C-FC-W				collimated	10 – 200	no
LTLNM-1400-C-D-FC-W				collimated	10 – 200	yes
LTLNM-1600-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-1600-N-D-FC-W			white	converging	10 – 100 near field focusing	yes
LTLNM-1600-F-FC-W	8	1600	6200 K	converging	100 – 200 far field focusing	no
LTLNM-1600-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-1600-C-FC-W				collimated	10 – 200	no

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LTLNM-1600-C-D-FC-W				collimated	10 – 200	yes
LTLNM-1800-N-FC-W				converging	10 – 100 near field focusing	no
LTLNM-1800-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-1800-F-FC-W	9	1800	white	converging	100 – 200 far field focusing	no
LTLNM-1800-F-D-FC-W			0200 K	converging	100 – 200 far field focusing	yes
LTLNM-1800-C-FC-W				collimated	10 – 200	no
LTLNM-1800-C-D-FC-W				collimated	10 – 200	yes
LTLNM-2000-N-FC-W		2000	white 6200 K	converging	10 – 100 near field focusing	no
LTLNM-2000-N-D-FC-W				converging	10 – 100 near field focusing	yes
LTLNM-2000-F-FC-W	10			converging	100 – 200 far field focusing	no
LTLNM-2000-F-D-FC-W				converging	100 – 200 far field focusing	yes
LTLNM-2000-C-FC-W				collimated	10 – 200	no
LTLNM-2000-C-D-FC-W					10 - 200	yes

Table 1: optical specifications

6. Electrical specifications

This section reports all electrical information on LTLNM modular high-power LED line lights.

6.1. Specification table

	Supply voltage	Continuous driving current max	Power consumption	Connection type
	(V)	(A)	(W)	
Part Number				
LTLNM-0200-N-FC-W				
LTLNM-0200-N-D-FC-W	24 ± 2 %			
LTLNM-0200-F-FC-W		2	70	2 pigtails terminated with
LTLNM-0200-F-D-FC-W		3	12	industrial connectors ⁽¹⁾
LTLNM-0200-C-FC-W				
LTLNM-0200-C-D-FC-W				
LTLNM-0400-N-FC-W				
LTLNM-0400-N-D-FC-W				
LTLNM-0400-F-FC-W	24 . 2.0/	6	144	2 pigtails terminated with industrial connectors ⁽¹⁾
LTLNM-0400-F-D-FC-W	24 ± 2 %			
LTLNM-0400-C-FC-W				
LTLNM-0400-C-D-FC-W				
LTLNM-0600-N-FC-W				
LTLNM-0600-N-D-FC-W	04 + 0.04	0	010	2 pigtails terminated with
LTLNM-0600-F-FC-W	24 ± 2 %	9	216	industrial connectors ⁽¹⁾
LTLNM-0600-F-D-FC-W				





LTLNM-0600-C-FC-W				
LTLNM-0600-C-D-FC-W				
LTLNM-0800-N-FC-W				
LTLNM-0800-N-D-FC-W				
LTLNM-0800-F-FC-W	24 . 2.0/	10		2 pigtails terminated with
LTLNM-0800-F-D-FC-W	24 ± 2 %	12	288	industrial connectors ⁽¹⁾
LTLNM-0800-C-FC-W				
LTLNM-0800-C-D-FC-W				
LTLNM-1000-N-FC-W				
LTLNM-1000-N-D-FC-W				
LTLNM-1000-F-FC-W	24 . 2.0/	45	200	2 pigtails terminated with
LTLNM-1000-F-D-FC-W	24 ± 2 %	15	360	industrial connectors ⁽¹⁾
LTLNM-1000-C-FC-W				
LTLNM-1000-C-D-FC-W				
LTLNM-1200-N-FC-W				
LTLNM-1200-N-D-FC-W	04 0.00	18		2 pigtails terminated with industrial connectors ⁽¹⁾
LTLNM-1200-F-FC-W			432	
LTLNM-1200-F-D-FC-W	24 ± 2 %			
LTLNM-1200-C-FC-W				
LTLNM-1200-C-D-FC-W				
LTLNM-1400-N-FC-W		21		
LTLNM-1400-N-D-FC-W				
LTLNM-1400-F-FC-W	24 . 2.0/		504	3 pigtails terminated with industrial connectors ⁽²⁾
LTLNM-1400-F-D-FC-W	24 ± 2 %			
LTLNM-1400-C-FC-W				
LTLNM-1400-C-D-FC-W				
LTLNM-1600-N-FC-W				
LTLNM-1600-N-D-FC-W				
LTLNM-1600-F-FC-W	24 . 2.0/	24	576	3 pigtails terminated with
LTLNM-1600-F-D-FC-W	24 ± 2 %	24	576	industrial connectors ⁽²⁾
LTLNM-1600-C-FC-W				
LTLNM-1600-C-D-FC-W				
LTLNM-1800-N-FC-W				
LTLNM-1800-N-D-FC-W				
LTLNM-1800-F-FC-W	24 . 2.0/	07	649	3 pigtails terminated with
LTLNM-1800-F-D-FC-W	24 ± 2 %	27	040	industrial connectors ⁽²⁾
LTLNM-1800-C-FC-W				
LTLNM-1800-C-D-FC-W				
LTLNM-2000-N-FC-W				
LTLNM-2000-N-D-FC-W	24 + 2.0/	20	700	3 pigtails terminated with
LTLNM-2000-F-FC-W	24 ± 2 %	30	720	industrial connectors ⁽²⁾
LTLNM-2000-F-D-FC-W				



v	

Table 2: electrical specifications

NOTE: (1) 1 pigtail terminated with industrial circular male connector for power supply,

1 pigtail terminated with industrial circular male connector for i/o signals

(2) 2 pigtails terminated with industrial circular male connector for power supply,

1 pigtail terminated with industrial circular male connector for i/o signals

6.2. Connections

The following tables detail the pinout of the connectors used for the power supply and for the control and state signals.

6.2.1. Illuminator connectors

Power is supplied by a single high-current circular connector. On the line light side there is a male Weipu SP2110/P2 2 poles connector. The pinout is listed in the following table.



Figure 1: power supply connector - illuminator side - front view

Power supply connector

Pin number	Name	Description
PIN 1	PWR+	Supply +24V
PIN 2	PWR-	Supply +0V

Table 3: pin out of power supply connector

Ensure that the polarity of PWR+ and PWR- terminals is correct. When the line light is correctly powered, the green LEDs are continuously lit.

Control and state signals are provided via a M12 connector. On the line light side there is a standard male M12 5 poles connector. The pinout is listed in the following table.



Figure 2: control and state signals connector - illuminator side - front view



Control connector

Pin number	I/O	Function	Mode	Note
PIN 1	Input	Enable	Active high	Connect to a +24V source to turn the light ON
PIN 2	Output	Fault	Active low	Internally pulled-up to supply +24V (PWR+)
PIN 3	-	Signal GND	-	Internally connected to supply ground (PWR-)
PIN 4	Output	10V reference for dimming	-	-
PIN 5	Input	Dimming control	0 to 10V	Usage of reference (pin 4) is suggested

Table 4: pin out of control and state signals connector

When the enable signal is at high level the yellow LEDs are continuously lit.

If fault condition is detected (i.e. high working temperature) the interested LED section is turned off and the corresponding red LED is lit. The remaining, unaffected, sections will continue operation. The affected section will automatically resume regular operation once the fault condition is solved.

6.2.2. Illuminator cables

The illuminator is provided with 2 cables (5 m length) for connection to the vision machine.

Power supply cable:

- side 1: 2 poles female connector WEIPU SP2111/S2 straight
- side 2: cable end

The pinout is listed in the following table.



Figure 3: power supply connector - cable side - front view

Power supply cable

Pin number	Colour	Name	Description
PIN 1	Brown	PWR+	Supply +24V
PIN 2	Blue	PWR-	Supply +0V

Table 5: pin out of power supply cable

Control and state signals cable:

- side 1: 5 poles M12 female connector straight
- side 2: cable end

The pinout is listed in Table 5.





Figure 4: control and state signals connector - cable side - front view

Control cable

Pin number	Colour	Name
PIN 1	Brown	Enable
PIN 2	White	Fault
PIN 3	Blue	Signal GND
PIN 4	Black	10 V reference for dimming
PIN 5	Green	Dimming control

Table 6: pin out of control and state signals cable

6.3. Dimming

Dimming of the line light is done with the dimming signal of the control connector.

If the dimming signal is left floating the line light will operate at lowest power level.

If the dimming signal is connected to a +10V source (i.e. pin 4 of the control connector) the line light will operate at the highest power level.

For dimming voltages between 0V and 10V the line light will operate at an intermediate power level.

The easiest way to adjust the light intensity is by connecting an external potentiometer. The wiper must be connected to the dimming control input (pin 5), while the terminals must be connected to the signal ground (pin 3) and to the +10V reference (pin 4). In order to have good regulation and not to overload the internal +10V reference regulator, the potentiometer should have a resistance of either 4.7 k Ω or 5 k Ω .

7. Mechanical specifications

This section reports all the mechanical information on LTLNM modular high-power LED line lights.

	Length	Width	Height	Clamping system
	(mm)	(mm)	(mm)	
Part Number				
LTLNM-0200-N-FC-W				
LTLNM-0200-N-D-FC-W				
LTLNM-0200-F-FC-W	250	80	130	4 threaded holes for M10 screw
LTLNM-0200-F-D-FC-W				
LTLNM-0200-C-FC-W				



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LTLNM-0200-C-D-FC-W				
LTLNM-0400-N-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-0400-N-D-FC-W				
LTLNM-0400-F-FC-W	450			
LTLNM-0400-F-D-FC-W				
LTLNM-0400-C-FC-W				
LTLNM-0400-C-D-FC-W				
LTLNM-0600-N-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-0600-N-D-FC-W				
LTLNM-0600-F-FC-W	650			
LTLNM-0600-F-D-FC-W	650			
LTLNM-0600-C-FC-W				
LTLNM-0600-C-D-FC-W				
LTLNM-0800-N-FC-W				
LTLNM-0800-N-D-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-0800-F-FC-W	850			
LTLNM-0800-F-D-FC-W				
LTLNM-0800-C-FC-W				
LTLNM-0800-C-D-FC-W				
LTLNM-1000-N-FC-W	1050	80	130	4 threaded holes for M10 screw
LTLNM-1000-N-D-FC-W				
LTLNM-1000-F-FC-W				
LTLNM-1000-F-D-FC-W				
LTLNM-1000-C-FC-W				
LTLNM-1000-C-D-FC-W				
LTLNM-1200-N-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-1200-N-D-FC-W				
LTLNM-1200-F-FC-W	1050			
LTLNM-1200-F-D-FC-W	1250			
LTLNM-1200-C-FC-W				
LTLNM-1200-C-D-FC-W				
LTLNM-1400-N-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-1400-N-D-FC-W				
LTLNM-1400-F-FC-W	1450			
LTLNM-1400-F-D-FC-W	1450			
LTLNM-1400-C-FC-W				
LTLNM-1400-C-D-FC-W				
LTLNM-1600-N-FC-W		80	130	4 threaded holes for M10 screw
LTLNM-1600-N-D-FC-W				
LTLNM-1600-F-FC-W	1650			
LTLNM-1600-F-D-FC-W				
LTLNM-1600-C-FC-W				





LTLNM-1600-C-D-FC-W				
LTLNM-1800-N-FC-W	1850	80	130	4 threaded holes for M10 screw
LTLNM-1800-N-D-FC-W				
LTLNM-1800-F-FC-W				
LTLNM-1800-F-D-FC-W				
LTLNM-1800-C-FC-W				
LTLNM-1800-C-D-FC-W				
LTLNM-2000-N-FC-W	2050	80	130	4 threaded holes for M10 screw
LTLNM-2000-N-D-FC-W				
LTLNM-2000-F-FC-W				
LTLNM-2000-F-D-FC-W				
LTLNM-2000-C-FC-W				
LTLNM-2000-C-D-FC-W				

Table 7: mechanical specifications

8. Environmental specifications

This section reports the environmental specifications on LTLNM modular high-power LED line lights.

Operating temperature (deg)	from 0 °C up to 40 °C		
Storage temperature (deg)	from 0 °C up to 50 °C		
Humidity	20-85%, non-condensing		
Installation	indoor use only		
Housing material	black and blue anodized aluminum		
Standards			

Table 8: environmental specifications

9. Compatibility

This section reports all the Opto Engineering® products compatible with the LTLNM modular high-power LED line lights.

	TC4K060-x TC4K090-x TC4K120-x, TC4K180-x, TC12K064, TC12K080, TC12K120,
Lenses	TC12K144, TC12K144, TC12K192, TC12K240, MC4K series, MC12K200X-x, MC12K150X-x, MC12K100X-x, MC12K067X-x, MC12K050X-x, MC12K025X-x

Table 9: Opto Engineering® products compatibility

10. Ordering information

Our part numbers are coded as LTLNM-aaaa-b-c-FC-d where:

- aaaa defines the illumination active area length (in mm)
- **b** defines the focusing distance, N = near field focusing, F = far field focusing, C = collimated



- **c** defines the presence of a diffusing sheet. Leave empty if no diffuser is required or D = with diffuser mounted in front of the LEDs
- **d** defines the colour -W = White.



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