



LED Lighting Controller Advanced

OPPF Series

Increased-capacity controller with built-in sensing function

- Increased capacity with up to 48 W in PWM mode and up to 24 W in strobe mode
- “FALUX sensing” for monitoring brightness and temperature monitoring and for controlling feedback
- Support for RS232, parallel, and 0 to 5 V analog input for external dimming control



Specifications					
Type	Model	Type	Weight [g]	Illumination Output	Capacity
Standard type	OPPF-48MN	Master device NPN output	385	2ch	<PWM mode> Max. 30 W per channel Max. 48 W for 2 channels (total) See table 1
	OPPF-48MP	Master device PNP output			
	OPPF-48SN	Slave device NPN output	375		
	OPPF-48SP	Slave device PNP output			
Illumination control input TTL type	OPPF-48MN-TTL	Master device NPN output	385		
	OPPF-48MP-TTL	Master device PNP output			
	OPPF-48SN-TTL	Slave device NPN output	375		
	OPPF-48SP-TTL	Slave device PNP output			
PWM frequency 500 kHz type	OPPF-30MN-Pfr	Master device NPN output	385	2ch	See table 2
	OPPF-30MP-Pfr	Master device PNP output			
	OPPF-30SN-Pfr	Slave device NPN output	375		
	OPPF-30SP-Pfr	Slave device PNP output			

*When using NPN or PNP output for error output or illumination output, select the output according to the input device. NPN/PNP is common for lighting output and lighting/dimming control input.

Table 1
OPPF-48 <PWM mode>
Max. lighting combination examples

Lighting 1	Lighting 2	Total
24 W + 24 W	→	48 W
25 W + 20 W	→	45 W
26 W + 16 W	→	42 W
27 W + 12 W	→	39 W
28 W + 8 W	→	36 W
29 W + 4 W	→	33 W
30 W + 0 W	→	30 W

*Max 30 W/ch

Table 2
Pfr type capacity

Mode	Channel	When using master and slave devices alone	When linked
PWM	Using 1 channel only	Max. 25 W	Max. 20 W
	When using 2 channels	Individual: Max. 25 W Total: Max. 30 W	Max. 15 W Max. 25 W
Strobe	Using 1 channel only	Max. 15 W	
	When using 2 channels	Individual: Max. 15 W Total: Max. 30 W	Max. 30 W

Options

Connection cable

Type	Model	Specifications	Weight [g]
External lighting control	OP-ECBF14-3	MIL 14 → Loose wires	200
External dimming control	OP-ECBF26-3	MIL 26 → Loose wires	250
RS232 communication	OP-ECBF232-2	MIL 26 → 9-pin D-sub for PC	120
	OP-ECBF232ME-2	MIL 26 → 9-pin D-sub for MELSEC	



Features

Support for both PWM dimming and strobe illumination

PWM mode

High-brightness settings with 1,000 dimming steps are possible with a PWM frequency of 100 kHz. Lighting with up to 48 W total for 2 LAMP outputs can be connected. (Max. 30 W per channel)

Strobe mode

High-brightness settings with 1,000 dimming steps are possible. In addition, 1,000 steps with light emission widths from 10 μs to 9.99 ms at 10 μs intervals can be set. The minimum settable light emission width is 1 μs (light emission width: 10 μs, dimming setting: 10%). Light emission widths of 1 ms or less offer 3 times the brightness with 18 V overdrive output. Lighting with up to 24 W for each LAMP output can be connected.

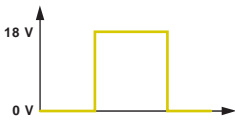
- Voltage of approx. 6 V is applied while the lighting is not lit in order to drive the internal circuit of the lighting. The LEDs will not be illuminated in this case.



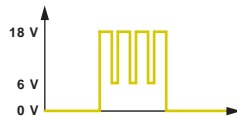
Conventional PWM output



OPPF PWM output



Conventional strobe output



OPPF strobe output

- In order to superimpose the communication signal, DC lighting is not initiated even with 100% dimming.



Conventional PWM output (at max. dimming)



OPPF PWM output (at max. dimming)

- Other settings
 - Automatic strobe flash cycle
 - Illumination control input polarity
 - Lighting delay time
 - PWM frequency switching
 - Illumination control input filter time (noise reduction)



Connect lighting equipped with “FALUX sensing” to monitor brightness and temperature and to control feedback

Patent registered

Monitoring function

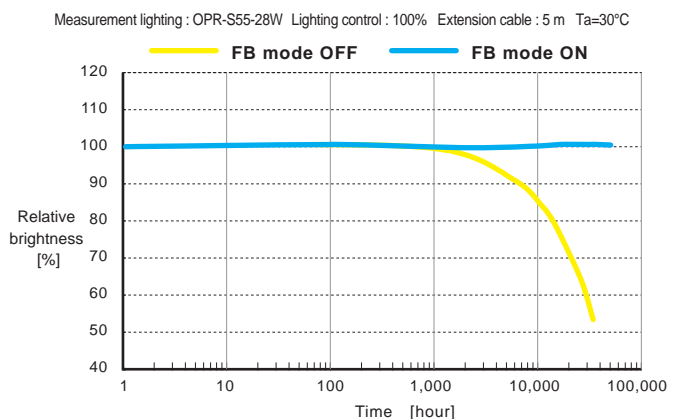
- Accurately measure brightness not only during continuous illumination but also with illumination control and strobe illumination.
- This makes it possible to output an alarm when brightness decreases to a predetermined value.
- Absolute brightness monitoring makes it possible to adjust for lighting instrumental errors.
- In addition to brightness, measurement of internal temperatures is also possible.

Feedback (FB) control

- FB control eliminates not only variations over long periods but also the need to perform periodic adjustments to the dimming setting. By comparing the measured emission brightness with the lighting’s recorded reference brightness, FB control fine tunes the output voltage to match the standard brightness.
- FB control also allows for compensation of reductions in brightness due to a voltage drop in the extension cable.
- A signal is output as a feedback error when the upper or lower output voltage adjustment limit is reached.

- Output voltage
 PWM mode: 11 to 18 VDC
 Strobe mode: 16 to 22 VDC
- FB accuracy: ±1.5% or less (typ.)

Comparison of relative brightness with and without feedback control (estimated values)



The OPPF Series not only provides power for illuminating lighting from two conventional main line cables but also superimposes lighting and communication signals. This allows for conventional use even with lighting that is not equipped with “FALUX sensing”.

Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF



Features

External dimming control

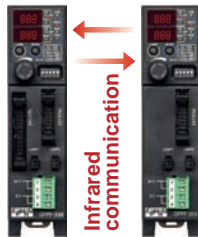
Using RS232 communication and external pulse input, centralized dimming control of all lamps is possible from the master device. Dimming is possible by 0 to 5 V analog input to the individual lamps of each unit.

External dimming control

- Pre-set dimming values can be configured and saved in the main unit, allowing for switching between dimming values with fewer inputs.
- Up to 16 banks can be registered for each LAMP.
- In addition to settings from the operation panel, switching is also possible through external parallel input and RS232 communication.

Multi-channel support

- With 2 channels per unit, support for up to 8 channels is possible by linking (DIN mounting) 3 master and slave devices.
- Communication between units is connector-less and uses infrared.
- A setting copy function allows settings to be batch copied to all channels.
- Connecting a single slave device or just a slave device is possible.



Surprisingly low price for provided functionality

- Progressively expanding functionality to meet the diverse needs of customers.
- Even with these functions, prices are kept lower than general-purpose power supplies.
- Lowest price range available for strobe-equipped devices.

Part Names

OPPF-48M Master device

OPPF-48S Slave device

READY status display

LAMP1 monitor

LAMP2 monitor

MODE switch button

LAMP switch button

Value setting dial confirmation button

MIL 26-pin connector EXT CTRL (Master device only)

- Parallel input
- RS232
- Error output

FB (feedback) status display

Infrared communication between COM master/slave device status display

LAMP1/2 selection display

Mode display

DIP SW DIP switch

MIL 14-pin connector EXT SYNC

- Illumination control input
- Analog 0 to 5 V input
- Error output

See the page to the right for a list of I/O functions

Illumination output connector (2 ch)

24 VDC connector

DIN rail mounting hook (Rear)

FB (feedback) status display

Infrared communication between COM master/slave device status display

LAMP1/2 selection display

Mode display

DIP SW DIP switch

MIL 14-pin connector EXT SYNC

- Illumination control input
- Analog 0 to 5 V input
- Error output

See the page to the right for a list of I/O functions

Illumination output connector (2 ch)

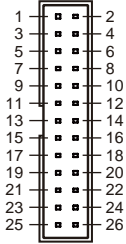
24 VDC connector

DIN rail mounting hook (Rear)

See the page to the right for a list of I/O functions

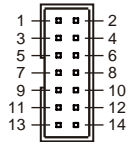


I/O Function List



Master device MIL 26-pin connector — EXT CTRL

Pin No.	Name	Input/output	Signal name	Description
1	D0	Input	Dimming bit 0 / Bank selection 0 (LSB)	Corresponds to lower bits 0 to 3 when switching the dimming value through external pulse input if not in bank mode (DSW3=OFF) with external dimming (DSW2=ON). The bank number can be specified if not in bank mode (DSW3=OFF) with external dimming (DSW2=ON).
2	D1	Input	Dimming bit 1 / Bank selection 1	
3	D2	Input	Dimming bit 2 / Bank selection 2	
4	D3	Input	Dimming bit 3 / Bank selection 3	
5	D4	Input	Dimming bit 4	Corresponds to upper bits 4 to 9 when switching the dimming value through external pulse input. Values are specified in binary. Enabled if not in bank mode (DSW3=OFF) with external dimming (DSW2=ON).
6	D5	Input	Dimming bit 5	
7	D6	Input	Dimming bit 6	
8	D7	Input	Dimming bit 7	
9	D8	Input	Dimming bit 8	
10	D9	Input	Dimming bit 9	
11	L0	Input	LAMP select 0	Specifies the station number of the target lamp with external dimming or when switching banks. With a master device, LAMP1 is selected if L2, L1, and L0 = OFF, and LAMP2 is selected if L2 and L1 = OFF while L0 = ON.
12	L1	Input	LAMP select 1	
13	L2	Input	LAMP select 2	
14	WR	Input	Dimming writing	Turning ON this input allows dimming values to be written. If bank numbers are specified, this function is not necessary.
15	COMINA	-	Input COM	This is the common terminal for input. This input can be turned ON by applying 5 to 24 V between each input and this common terminal. (No polarity)
16	COMOUTA	-	Output COM	This is the common terminal for output. When output is ON, the current flows from the output toward this common terminal. (Opposite direction for PNP types)
17	ERR	Output	Error output (FB, overcurrent)	This output turns ON when a feedback error or monitor brightness alarm occurs, when the internal temperature is abnormal, or when the overcurrent protection circuit of the lighting is operating. Error output also turns on if an error is output for any connected slave device. (A delay of up to 250 ms will occur before a slave device error status is reflected.)
18 to 23	-	-	-	-
24	TXD	Output	Serial TXD	This is the transmission output for RS232.
25	RXD	Input	Serial RXD	This is the reception input for RS232.
26	SG	-	Serial GND	This is the common terminal for RS232.



Master/slave device MIL 14-pin connector — EXT SYNC

Pin No.	Name	Input/output	Signal name	Description
1	SYNC1	Input	LAMP1 illumination control input	With external illumination control (DWS1=ON), the polarity can be switched from \bar{L} in the PRM settings while this input is ON. LAMP1 becomes illuminated. In strobe mode (DSW4=ON), LAMP1 illuminates on the leading edge of this input.
2	SYNC2	Input	LAMP2 illumination control input	With external illumination control (DWS1=ON), the polarity can be switched from \bar{L} in the PRM settings while this input is ON. LAMP2 becomes illuminated. In strobe mode (DSW5=ON), LAMP2 illuminates on the leading edge of this input.
3	COMINB	-	Input COM	This is the common terminal for input. This input can be turned ON through illumination control input or analog dimming select input, or by applying 5 to 24 V between each input and this common terminal. (No polarity)
4	COMOUTB	-	Output COM	This is the common terminal for output. When each output is ON, the current flows from the output toward this common terminal. (Opposite direction for PNP types)
5	OVC	Output	Overcurrent error	Overcurrent error output turns ON if an overcurrent occurs for either LAMP1 or LAMP2 lighting.
6	FBERR1	Output	LAMP1 feedback error	This output turns ON when a LAMP1 feedback error or monitor brightness alarm occurs.
7	LON1	Output	LAMP1 outputting	This output turns ON while LAMP1 is output.
8	FBERR2	Output	LAMP2 feedback error	This output turns ON when a LAMP2 feedback error or monitor brightness alarm occurs.
9	LON2	Output	LAMP2 outputting	This output turns ON while LAMP2 is output.
10	ANALOG	Input	Analog dimming switching input	Turning ON this input allows dimming to be performed using analog input AIN1 or AIN2 voltage. Switching individually between LAMP1 and LAMP2 is not possible. Inputting 5 to 24 V to 3 COMINB will turn ON analog dimming. Setting PRM to \bar{L} will also force analog dimming to be enabled.
11	AIN1	Input	LAMP1 analog input	This is the analog input for LAMP1. At 0 to 5 V, the corresponding dimming value will be between 0 and 999.
12	5 V	Output	Service 5 V output	This is the 5 V output for using analog input.
13	AIN2	Input	LAMP2 analog input	This is the analog input for LAMP2. At 0 to 5 V, the corresponding dimming value will be between 0 and 999.
14	ACOM	-	Analog common	This is the common terminal for analog input.

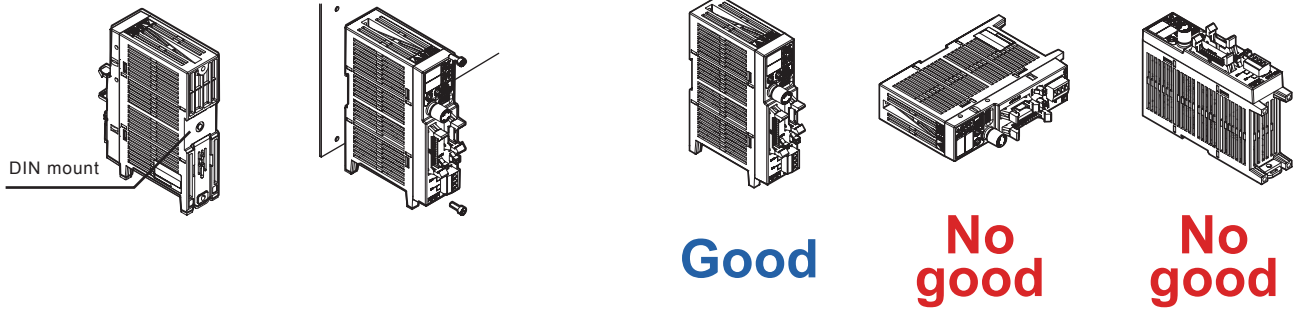
Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF



Installation

■ Installation examples

Rear DIN mounting or screw mounting is possible.



Always use upright to allow for heat dissipation. Do not use in any position other than the upright.

■ Cable connectivity

Master/slave device: 24 VDC input (power source)
 Applicable wiring: 0.2 to 2.1 mm², 24 to 14 AWG
 Coated strip length: 7 mm
 Upper 2-pole: 24 VDC, Lower 2-pole: 0 V

Note: Use open terminals to pass power between units with 1 pole per wire.

Master device: MIL 26-pin connector (EXT CTRL)
 Master/slave device: MIL 14-pin connector (EXT SYNC)

[Optional cables]

MIL socket connector harness (type with one side trimmed)
 28 AWG twisted-pair double-shielded cable

For master device, MIL 26-pin (3 m) → OP-ECBF26-3
 For master/slave device, MIL 14-pin (3 m) → OP-ECBF14-3

Note: Please use shielded cables in environments susceptible to noise.

OPR	Ring
OPR-SF	
OPB	Bar
OPB-S	
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	
OPPCW	
OP	Options
MDF	

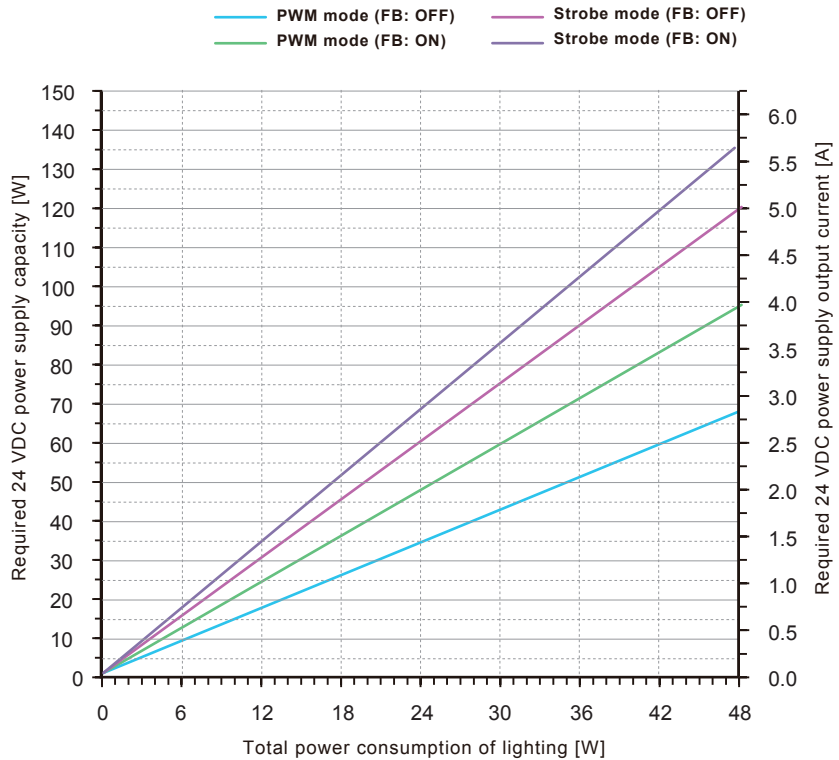


Required 24 VDC power supply capacity to handle power consumption of lighting

Based on the total power consumption of the LED lighting to be connected, select a 24 VDC power source that offers more than the required capacity.

Note: When using in conjunction with other equipment, the characteristics of the other equipment will affect the power supply, so be sure to choose a power supply that has a sufficient margin (about twice as much) as that shown in the table.

*Evaluation power source: IDEC PS5R-SF24 (120 W), PS5R-SG24 (240 W)



Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
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Controllers / Power Supplies	OPPD
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	OPPCW
Options	OP
	MDF

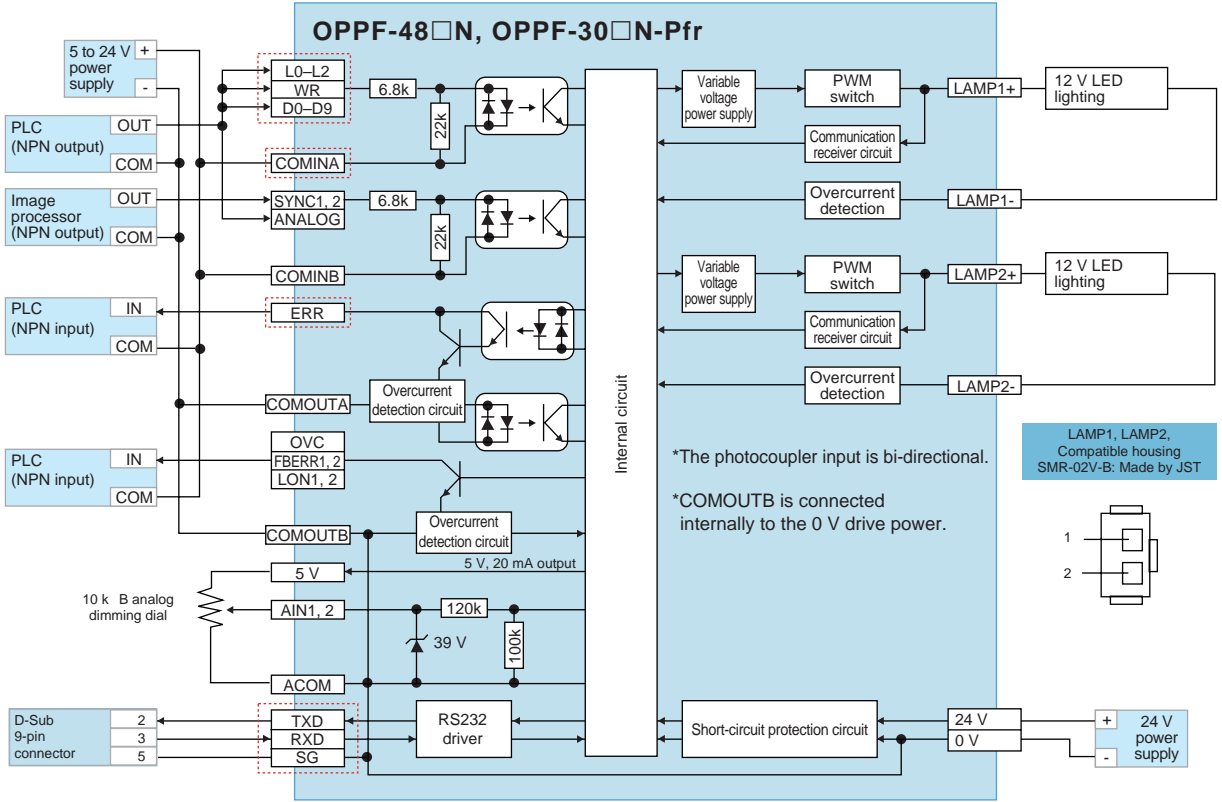


Connection to External Device

■ Standard type / 500 kHz type

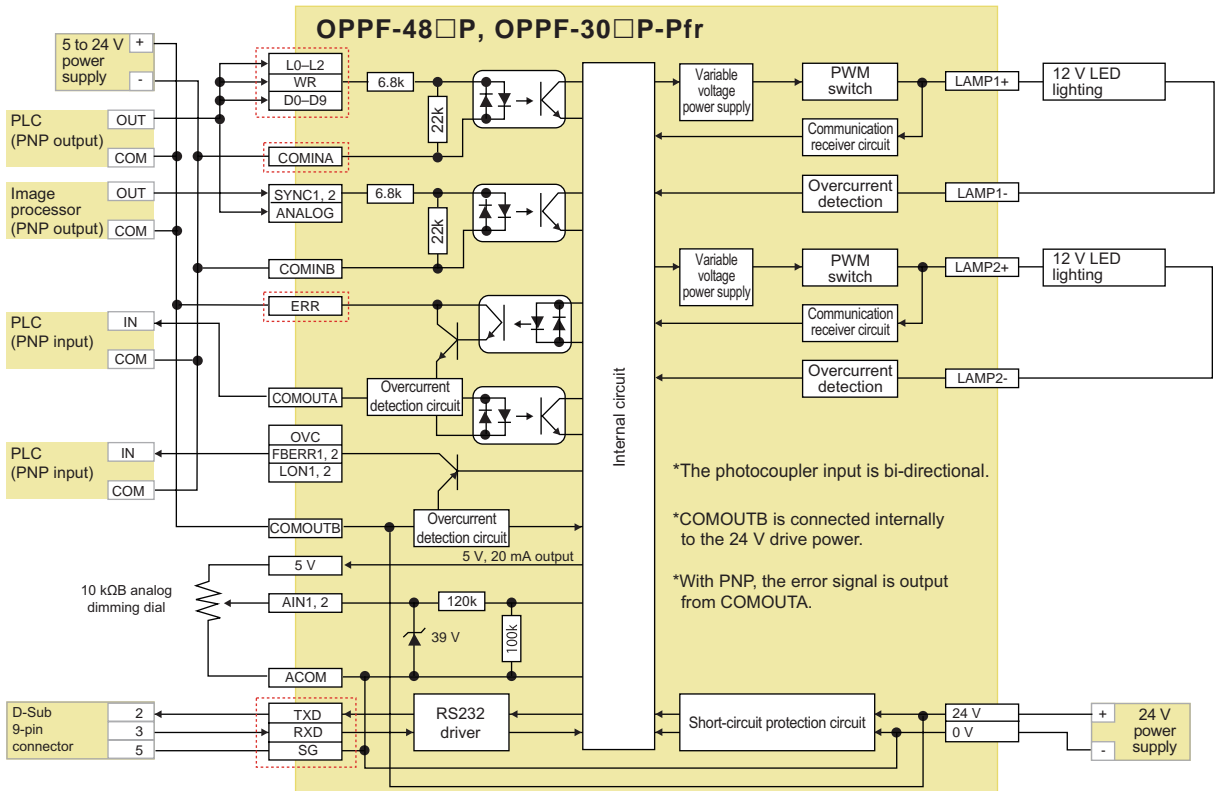
NPN type

 : Master device only



PNP type

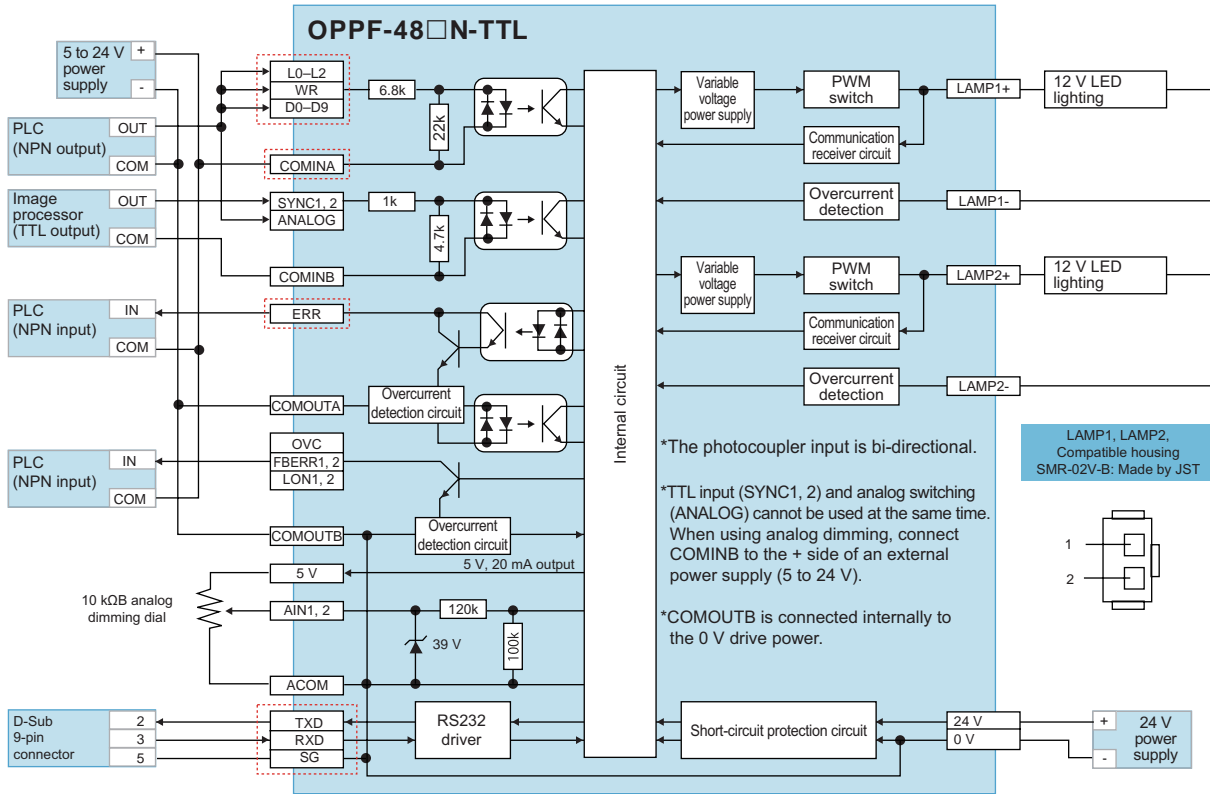
 : Master device only



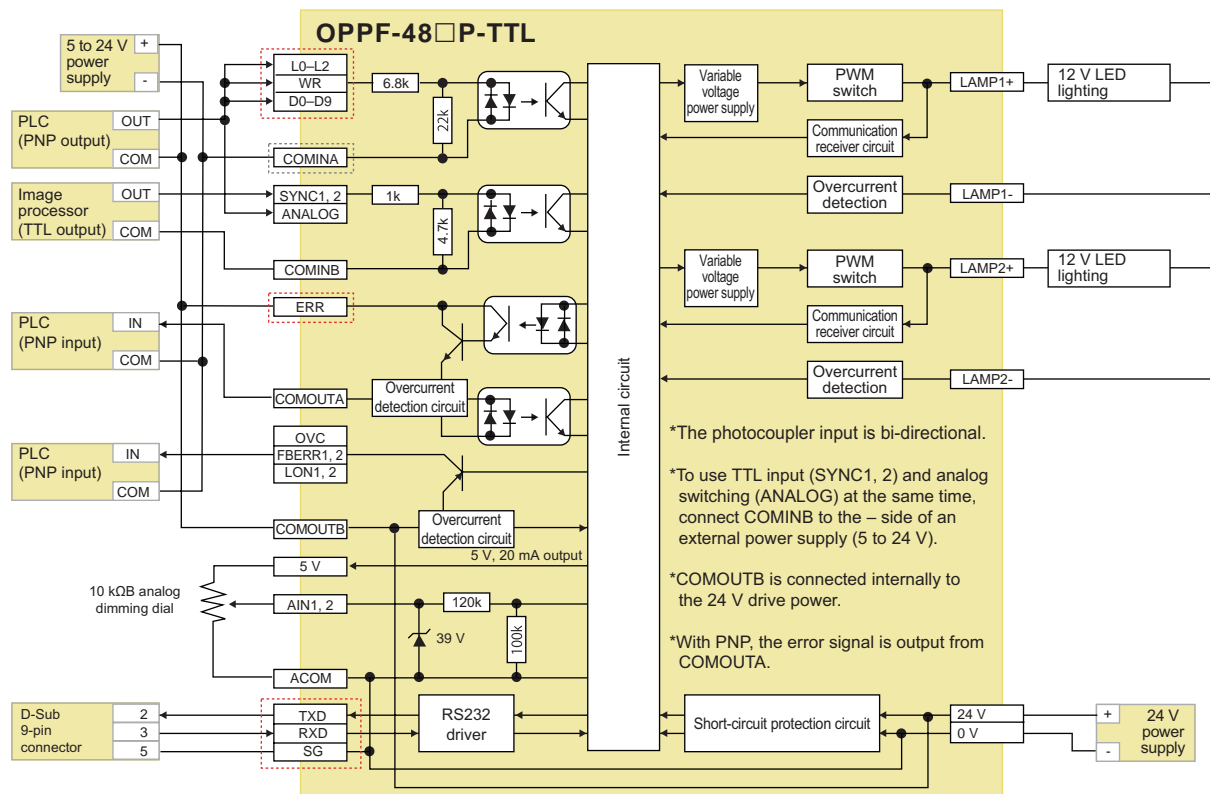


■ Illumination control TTL type

NPN type : Master device only



PNP type : Master device only



Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF



Specifications

Model	OPPF-48MN	OPPF-48MP	OPPF-48SN	OPPF-48SP
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Power supply voltage	24 VDC \pm 10%			
Current consumption	PWM mode — Feedback OFF: Max. 2.9 A, Feedback ON: Max. 4.0 A Strobe mode — Feedback OFF: Max. 5.0 A, Feedback ON: Max. 5.7 A			
Illumination output	2 channels			
Connectable lighting	PWM mode: Max. 48 W (2 ch total) *Max 30 W/ch, Strobe mode: Max. 24 W (per channel)			
Illumination output voltage	PWM mode: 12 VDC (standard), Strobe mode: 18 VDC (standard)			
Illumination output current	PWM mode: Max. 4.0 A (2 ch total), Strobe mode: 8.0 A (per channel)			
Dimming method	PWM dimming, Frequency: 20/50/100/99/98/97 kHz 1,000 steps *Common for PWM mode and strobe mode			
Strobe	Luminescence width: 10 μ s to 9.99 ms (10 μ s steps) or 1 ms to 999 ms (1 ms steps) *12 VDC driving when exceeding 1 ms Flash cycle limit at 18 VDC: 10% Duty (10 times or more the pulse width cycle required)			
Monitoring	Lighting brightness monitor / Lighting internal temperature monitor, Monitor brightness alarm lower limit value setting Update cycle per communication between lighting and power supply, Received light amount: 21 ms, Temperature: 105 ms			
Feedback	Voltage variable method — PWM mode: 11 to 18 VDC Strobe mode: 16 to 22 VDC, Accuracy: \pm 1.5% or less (typ.)			
Input	External illumination control \times 2, Analog dimming select \times 1, Parallel dimming input \times 10 (bank select \times 4 shared), Parallel dimming writing input \times 1, Channel select input \times 3		External illumination control \times 2, Analog dimming select \times 1	
Analog input	ON voltage: 5 V or more, OFF voltage: 1.2 V or less, Max. input voltage: 30 V Illumination control input response time (actual value) With 24 V input (OFF \rightarrow ON: 5 μ s, ON \rightarrow OFF: 60 μ s), With 5 V input (OFF \rightarrow ON: 44 μ s, ON \rightarrow OFF: 41 μ s) Input resistance: 6.8 k Ω , insulated; Other input response time: 1.1 to 14.8 ms			
Output	Lighting overcurrent error output \times 1, Feedback warning output \times 2, Lighting illumination output \times 2 Open collector, Max. 100 mA / 30 VDC, Residual voltage 1.0 V max.			
Communication interface	RS232: 1 ch, Baud rate: 4,800/9,600/19,200/38,400/ 57,600/115,200		—	
Master-slave communication	Infrared communication method — RS232 from master device to slave device, External input control (dimming, bank selection), Transmission from slave device to master device (error information, RS232 reading), Setting copy function Communication cycle: Approx. 15 ms (equivalent response time for controlling slave device with RS232, external input)			
Lighting output protection circuit	Overcurrent			
Signal output protection circuit	Overcurrent			
Other protective functions	Power supply internal temperature monitoring (PWM output cut to 1/4 at 105°C) Lighting internal temperature monitoring, Lighting brightness lower limit alarm			
Ambient temperature/humidity	0 to 45°C / 35 to 85% RH (no condensation)			
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)			
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions			
Shock resistance	Approximately 10 G, 3 times in each of the X, Y, and Z directions			
Insulation resistance	500 VDC, 10 M Ω or more			
Material	Polycarbonate			
Weight	385 g		375 g	
Protection rating	IP20 (IEC 60529: 1989 / A1: 1999 + A2: 2013)			
Applicable regulations	EMC (2014/30/EU) / RoHS (2011/65/EU, MIIT Order No.32)			
Applicable standards	EN 61000-6-2: 2005 / AC: 2005, EN 55011: 2009 / A1: 2010 (EN 55011 testing was performed with the lighting cable passed through shielded tubing grounded to FG.)			
Accessories	Simple Operation Guide, Instruction manual CD-ROM			



Model	OPPF-48MN-TTL	OPPF-48MP-TTL	OPPF-48SN-TTL	OPPF-48SP-TTL
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Input	Illumination control input (TTL)	ON voltage: 2 V or more, OFF voltage: 0.9 V or less Max. input voltage: 16 V, Input resistance: 1 kΩ, Insulated Response time (actual value) — 5 V: 5 μs (OFF → ON) / 75 μs (ON → OFF) 3 V: 8 μs (OFF → ON) / 70 μs (ON → OFF) 2 V: 20 μs (OFF → ON) / 60 μs (ON → OFF)		
		Other inputs ON voltage: 5 V or more, OFF voltage: 1.2 V or less, Max. input voltage: 30 V Input resistance: 6.8 kΩ, insulated; Response time (actual value): 1.1 to 14.8 ms		

Model	OPPF-30MN-Pfr	OPPF-30MP-Pfr	OPPF-30SN-Pfr	OPPF-30SP-Pfr
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Power consumption of connectable lighting	PWM mode: When using master and slave devices alone: Max. 25 W when using 1 ch only Max. 25 W when using 2 ch (individual), Max. 30 W when using 2 ch (total) When linked: Max. 20 W when using 1 ch only, Max. 15 W when using 2 ch (individual) Max. 30 W when using 2 ch (total), Strobe mode: Max. 15 W (per channel)			
	Dimming method PWM dimming, Frequency: 50/100/500 kHz 1,000 steps (50/100 kHz), 240 steps (500 kHz) *Common for PWM mode and strobe mode Dimming value display at 500 kHz: (0 to 239) × 25/6 (truncated after decimal point) Display examples: 0, 4, 8, 12, 16, 20, 25, 29, ... 991, 995			

● Please note that specifications are subject to change without prior notice for product improvement purposes.

Dimensions

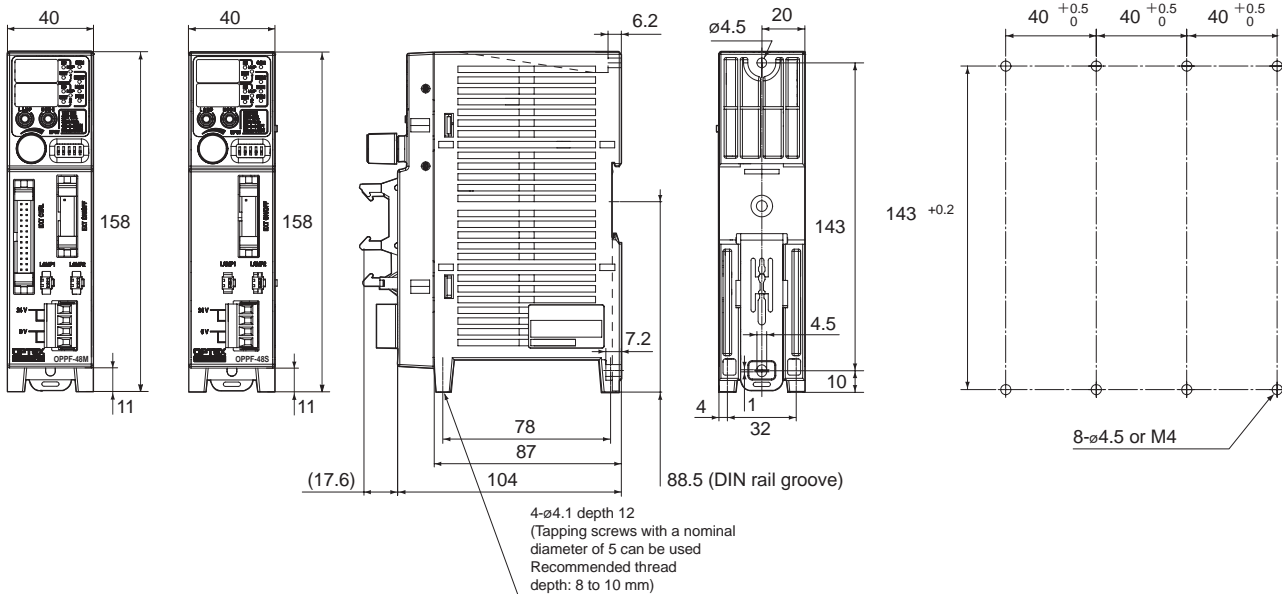
(unit: mm)

Main unit

Master device: OPFF-48M□
OPPF-30M□-Pfr
Slave device: OPFF-48S□
OPPF-30S□-Pfr



Rear mounting hole dimensions (with 4 linked devices)



Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF