

19th July. 2019

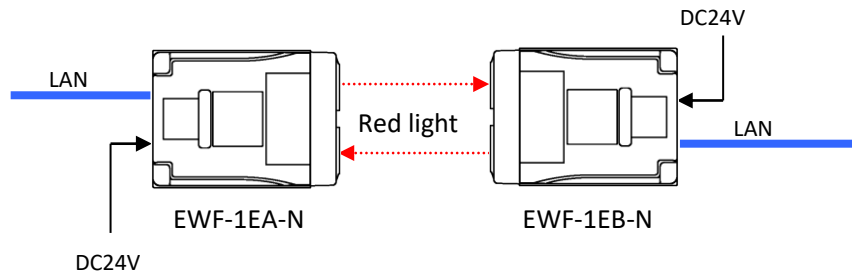
OPTICAL DATA TRANSMISSION
 DEVICE
 For Ethernet
 EWF-1EA/B-N
 (Master/Normal/Slave mode)

 SPECIFICATION

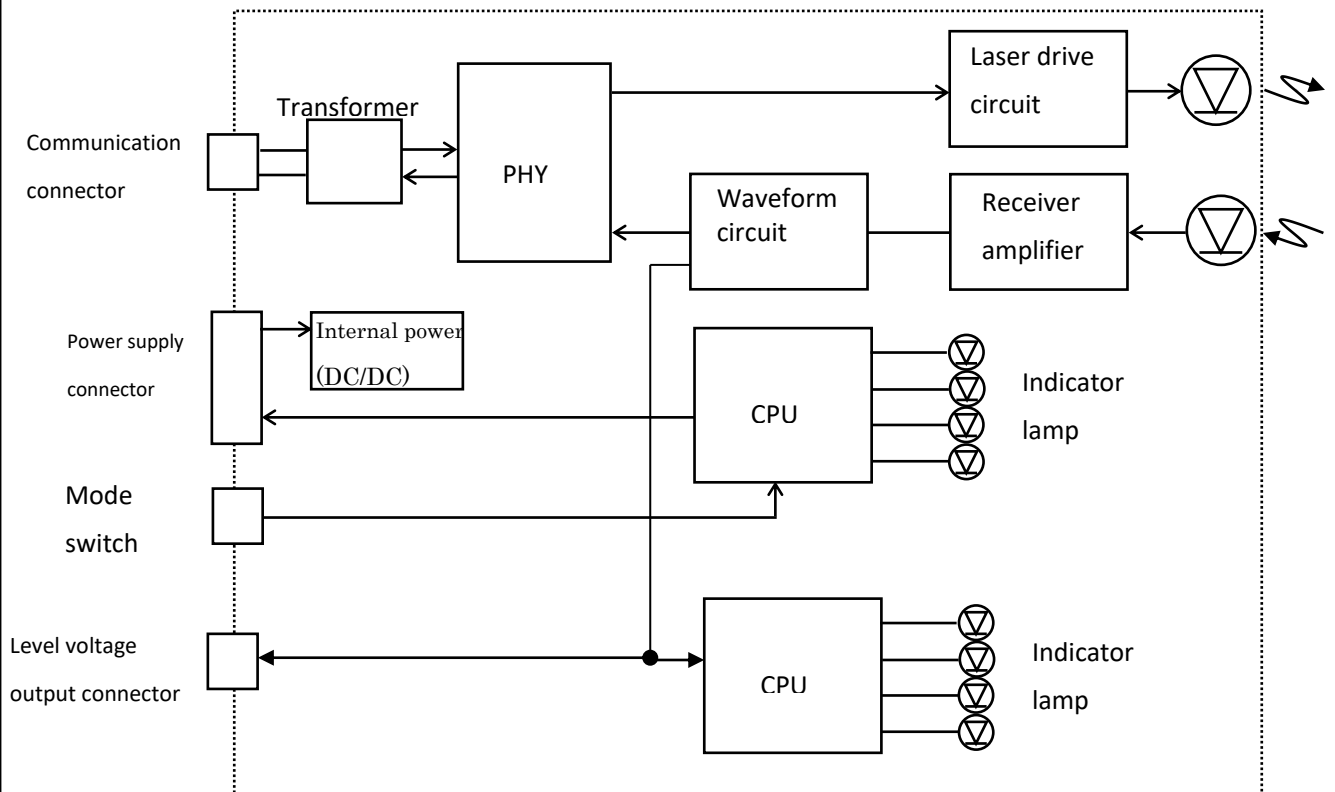
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① × 1	Supported network		4	30 th Aug. 2019	Oka FA-8271
Symbol	Amended reason		Pages	Date	Corrector Amended No
Approved by	Checked by	Drawn by	Designed by	Title Optical Data Transmission Device for Ethernet EWF-1EA/B-N Specification	
<i>M. Hino</i>	<i>T. Iguchi</i>	Oka	Tamaki		

1. General

This device is a repeater that can connect to the Ethernet line directly. No need of MAC address or IP setting and it can be used as a LAN cable. It can use Ethernet line between network cameras and host/slave for the communication. Communication distance up to 100m, converts to optical wireless communication and possible to communicate between moving devices. Be sure to use A type and B type as a pair.



2. Structure



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3. Specification

Model	EWF-1EA-N	EWF-1EB-N
Transmission distance	100m	
Directional angle	Full angle 1°	
Power supply	DC24V (±10%)	
Current consumption	120mA(DC24V)	
Transmission method	Full-duplex two-way transmission	
Transmission speed	100Mbps	
Laser safety	Class 1	
Interface	Ethernet	
Communication standard	IEEE802.3u 100BASE-TX With Auto-Negotiation function	
Modulation method	Direct modulation	
Connection	Mini clamp connector (Power/CD signal), Modular jack RJ-45 (Ethernet)	
Ambient temperature/ humidity	-10°C to +50°C 85%RH or less (without dew, frost)	
Ambient illuminance	10000lux or less (Halogen/mercury lamp)	
Impact resistance	490m/s ² X, Y and Z directions each 10 times	
Vibration resistance	10 to 55Hz double amplitude of 1.5mm for 2 hours in each X, Y and Z direction	
Protective structure	IP40	
Reception output(CD)	Photo-coupler open collector (pressure resistant 36V), ON during light reception (Max.50mA, residual voltage 1.5V)	
Level voltage output (Analog output)	Approx.0 to 3V, connector S2B-PH-K-S(JST) Connection connector PHR - 2* Use during optical axis adjustment only. External wiring is not possible.	

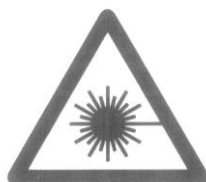
* Cables for connection are not included. If necessary, please contact us separately.

About the laser safety

EWF-1EA/B-N laser safety standard is class 1.

Wavelength 658 nm (red)

Standard IEC60825-1 2007 & 2014



Class 1 Laser Product

Do not look directly into the laser beam.

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- Supported network



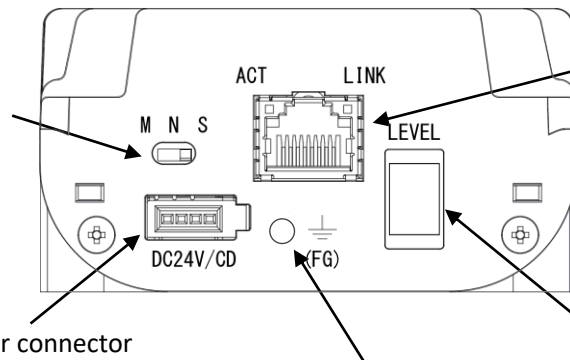
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4. Connection

Mode switch
(Refer to section 6.
operation mode)

Main body side power connector
37204-1BE0-004(3M)
Connection connector (attached)
37104-2206-000FL



RJ-45 communication connector
TM11R-5M2-88-LP (Hirose product)

FG Terminal (M3 screw)

Connector for level voltage output
S2B-PH-K-S (JST product)
(Use lid cover during normal operation)
Connection connector (not included)
PHR-2

* Attached connector cable dimension is as follows. If using the other cable, prepare suitable connector for the used cable.

Model No.	AWG No.	Nominal cross-section	Finished dimension
37104-2206-000FL	AWG 20 to 22	0.3 to 0.5mm ²	1.6 to 2.0mm

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Power supply pin assignment

Pin No.	Signal	I/O circuit
1	COM	
2	CD	
3	-VIN (0V)	Power supply input
4	+VIN (DC24V)	

Connector pin assignment for level voltage output

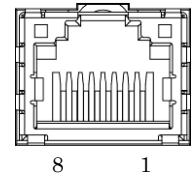
Pin No.	Signal
1	LEVEL
2	GND

*Connection connector PHR-2 and connection cable are not included.

If necessary, please contact us separately.

LAN connector (8P): RJ-45 8pin modular jack

Pin No.	MDI Signal	Signal Function
1	TD +	Transmission Data (+)
2	TD -	Transmission Data (-)
3	RD +	Reception Data (+)
4	----	Not Used
5	----	Not Used
6	RD -	Reception Data (-)
7	----	Not Used
8	----	Not Used

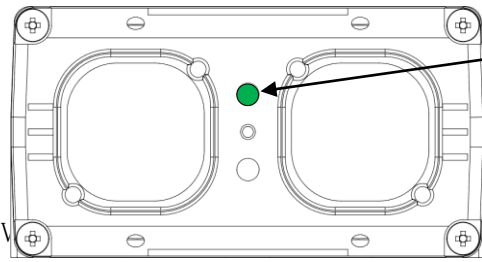


Socket view

View from the matting side

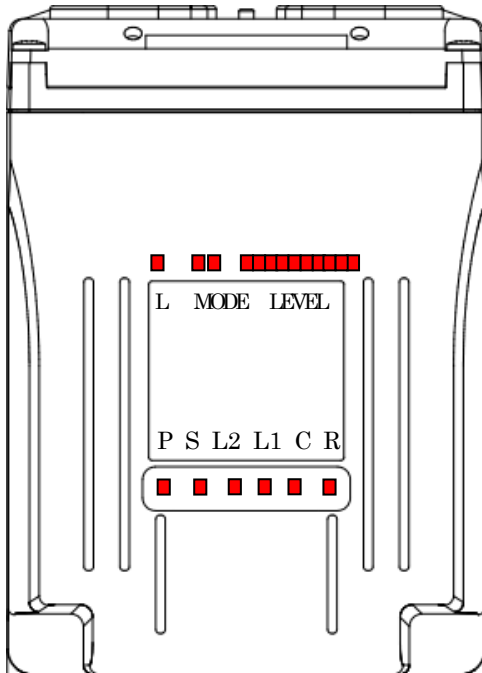
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5. Indicator lamp



Optical axis indicator lamp

Use to confirm from the opposite side facing device, same as level indicator lamp L2



P: Power supply indicator lamp

S : Status lamp (*)

L2: Level indicator lamp (led up when level margin 2 times)

L1: Level indicator lamp (led up when level margin 1.5 times)

C: Carrier detection indicator lamp (CD) (led up when level margin 1 time)

R: Optical link lamp (led up when optical link is established)

L: Link lamp (Similar to the LAN LINK lamp on the back)

MODE: Mode lamp

No led up during normal mode

1 lamp led up indicates slave mode

2 lamp led up indicates master mode

LEVEL: The indicator lamp led up maximum 10 lamp according to the RSSI voltage.

*This device contain a circuit which corrects the delay time during high speed stable communication. Status lamp (S) led up during normal circuit operation. Also, communication is possible when both status lamp and CD lamp led up.

Also, in this device, the light emission power is constantly monitored inside the device.

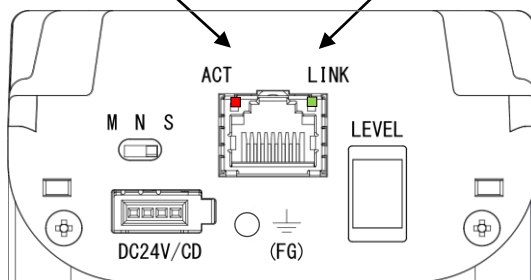
In the case, when the light emission power is other than allowable level, the indicator lights C, L1 and L2 blinks. Stops the emission and will be in error mode.

During error mode, check if the device returns to normal operation by restarting the power supply,

If error mode continues without recovery, please contact customer support.

Red : LAN Active lamp

Green : LAN Link lamp



Active : Led up when transmitting/receiving data.

Link : Led up when link is established.

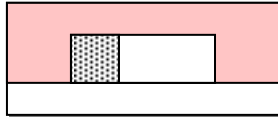
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6. Operation mode

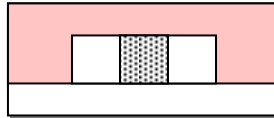
Slide switch which is located beside RJ connector, it can change to master mode, normal mode and slave mode. During power supply, mode is set according to switch state.

Mode switching position

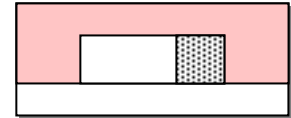
Master mode (M)



Normal mode (N)



Slave mode (S)



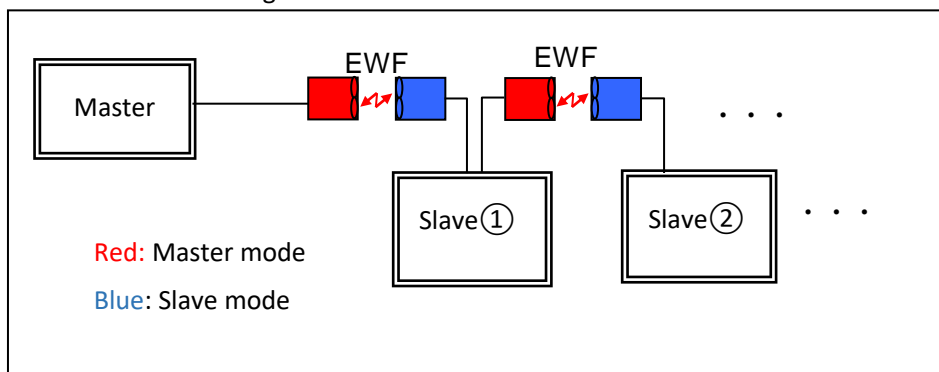
The possible data communication combinations are as follows

A Type or B Type	B Type or A Type	Communication	During light interruption LAN link	During light interruption emission state
Normal mode	Normal mode	Possible	Link connected	Emits on both side
Master mode	Master mode	Possible	Link disconnects	Emits on both side
Master mode	Slave mode	Possible	Link disconnects	Emission OFF of Slave only
Slave mode	Slave mode	Not possible	Both link does not connects	Does not emits on both side

***Do not use other operation mode combination than above. It may be the reason of data communication failure.**

In normal mode only, even the communication is interrupted LAN side link will not be disconnected.

While using in the Ether CAT network, make sure EWF connecting to the master side should be in master mode. EWF connecting to the slave should be in the slave mode.



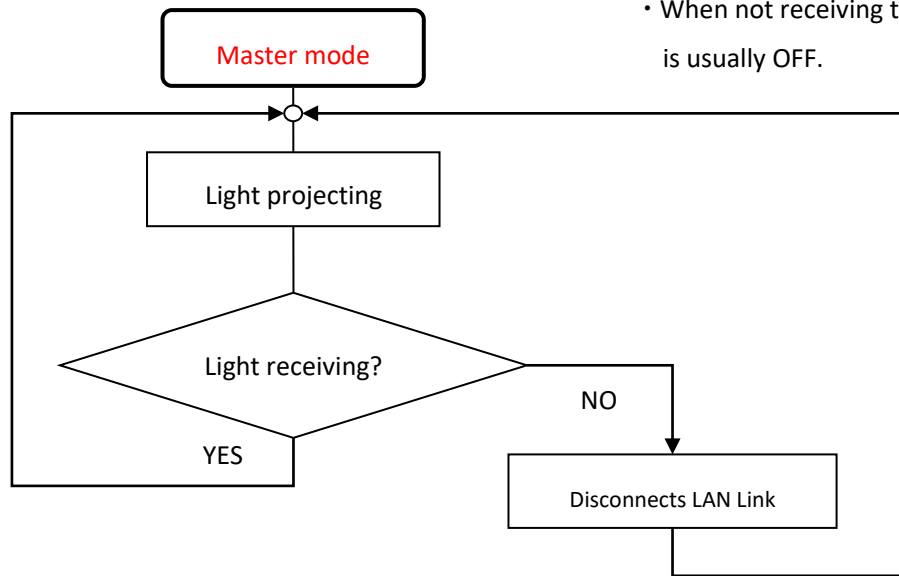
During EWF optical adjustment, make sure to use as master mode or normal mode as a pair
(In sleep mode, if LAN link is not ON, laser does not emits.)

Each mode operation is as the following flow chart

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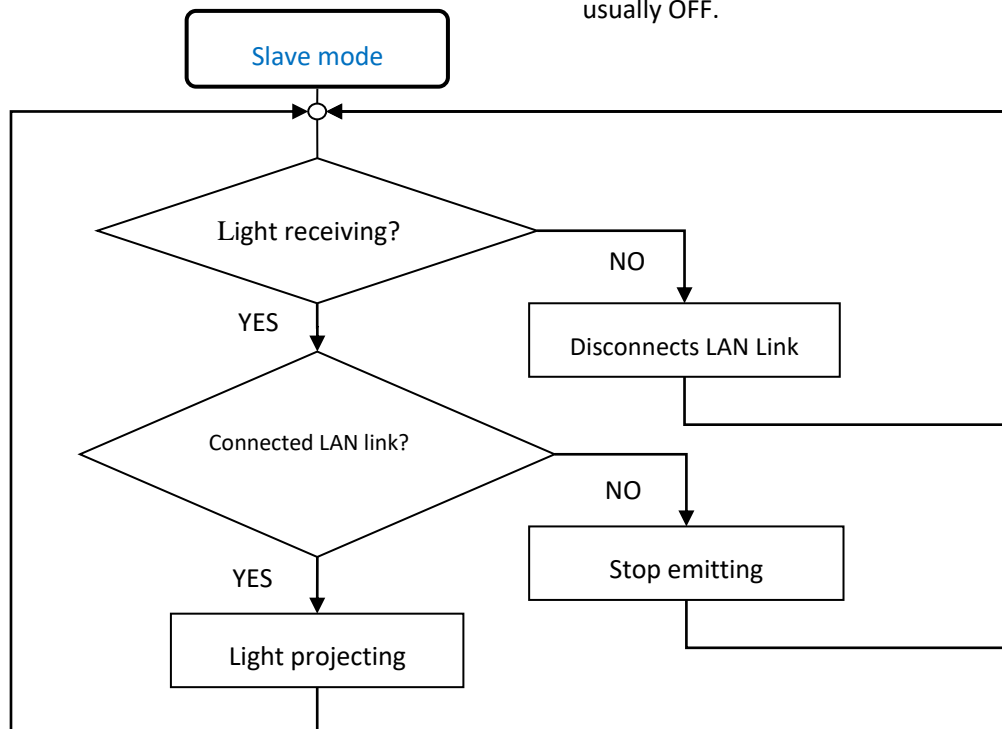
Master mode

- Usually light projecting.
- When not receiving the light LAN link is usually OFF.



Slave mode

- Emits when light receiving and LAN link is ON.
- When not receiving the light LAN link is usually OFF.



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7. Optical axis adjustment

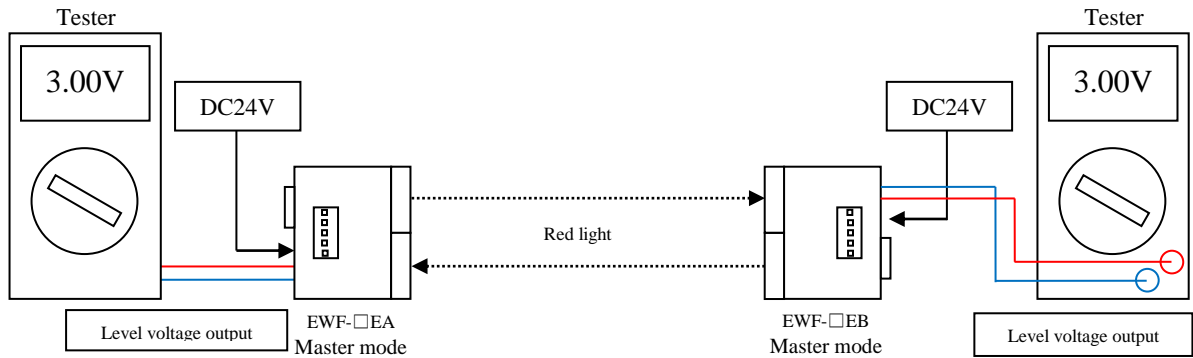
Change EWF operation mode to normal mode or master mode of both A and B.

Make sure that each level output voltage of A and B can be checked with a tester.

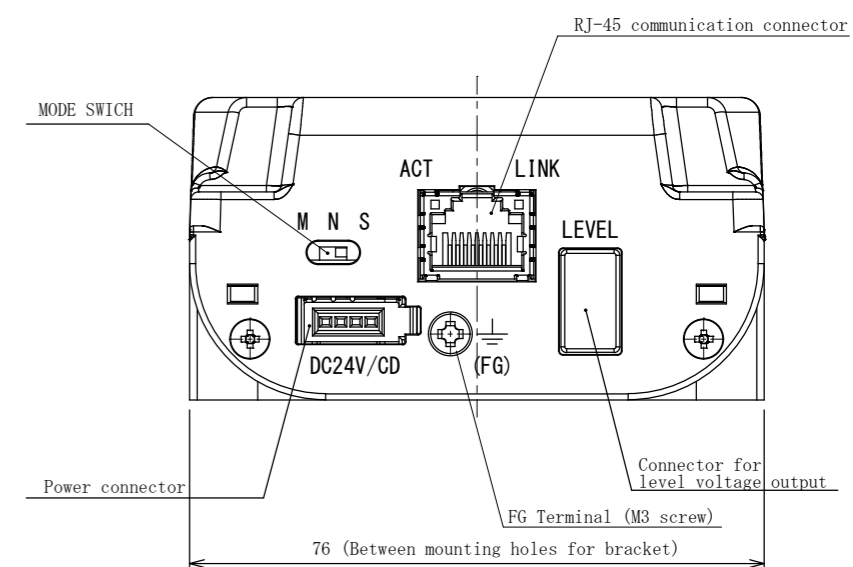
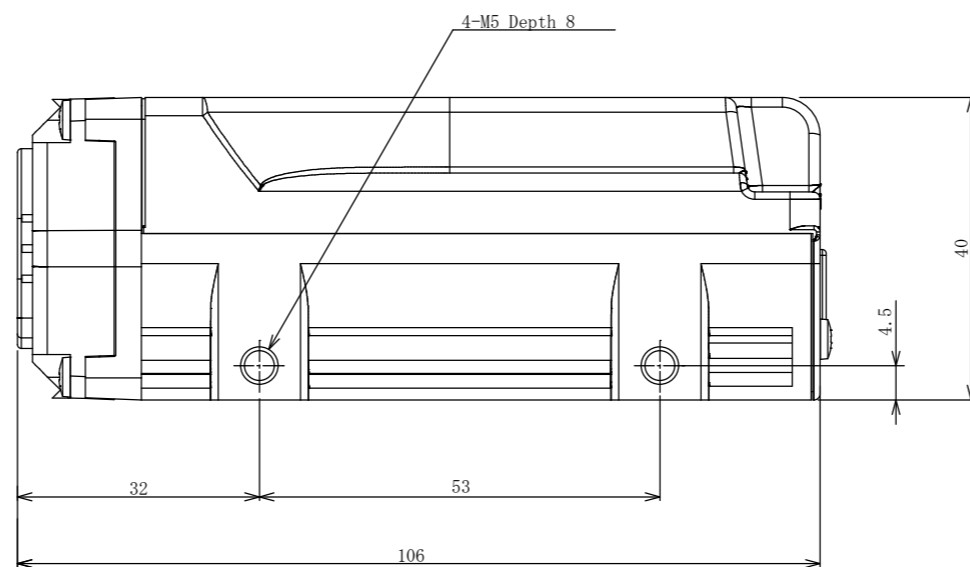
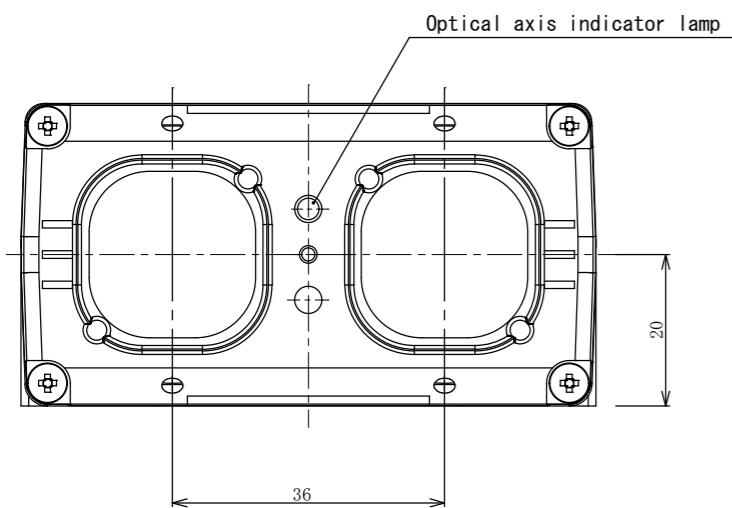
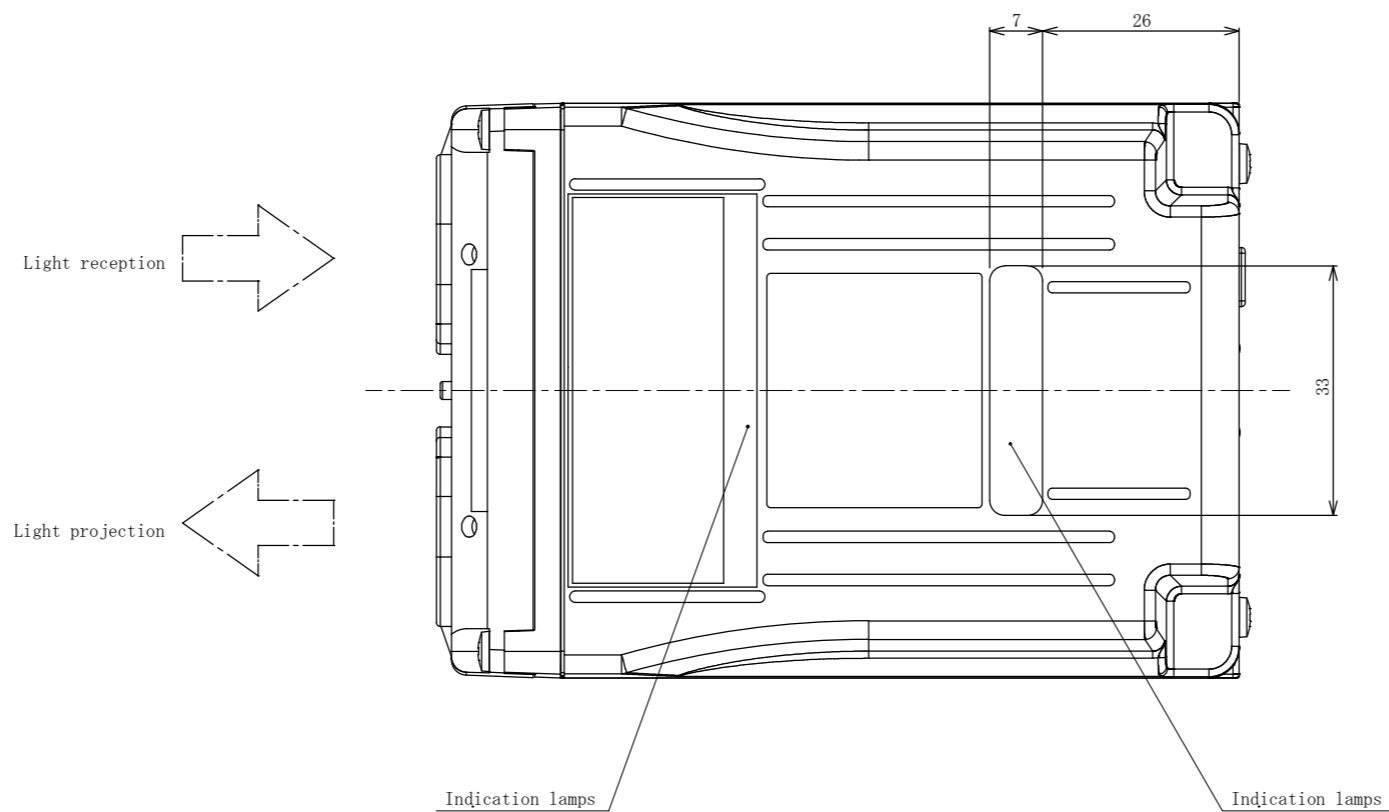
Swing sidewise A to adjust so that the level output voltage of B becomes maximum

Swing sidewise B to adjust so that the level output voltage of A becomes maximum

*If a reflector is installed on the optical axis or near EWF, the level output voltage cannot be measured properly due to the reflected light. Also, it may cause communication error. Please be careful while installing the reflector.



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△ ×						PROJECTION		SCALES	1 : 1	TITLE	OPTICAL DATA TRANSMISSION DEVICE For Ethernet		
△ ×						TOLERANCE	APPLY "JIS B 0419-vL-E" IF NOT SPECIFIED	APPROVED	<i>M.Hono</i>	RENEW DATE	2019.07.22		
△ ×						DATE	2017.6.30	DESIGNED	Tsukuda	CHECKED	<i>T.Syuchi</i>	DR. NO.	MC-40-3375A
AMENDED POINTS	AMENDED REASON	AMENDED DATE	CORRECTOR	AMENDED NO.	PARTICULARS OF DRAWING	DESIGN			DRAWING				