19th July. 2019

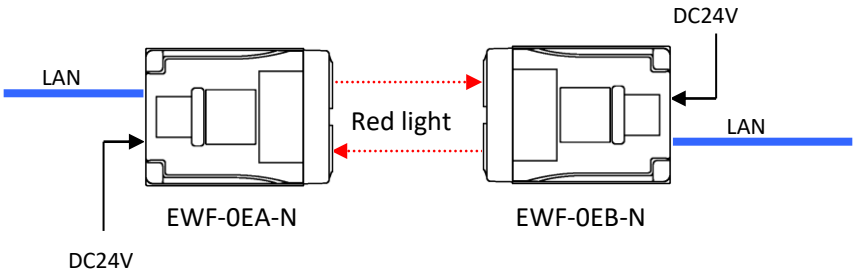
OPTICAL DATA TRANSMISSION DEVICE
For Ethernet
EWF-0EA/B-N
(Master/Normal/Slave mode)
SPECIFICATION

Symbol	Amended reason	Pages	Date	Corrector	Amended No
△2×					
△1× 1	Supported network	4	30th Aug. 2019	Oka	FA-8271

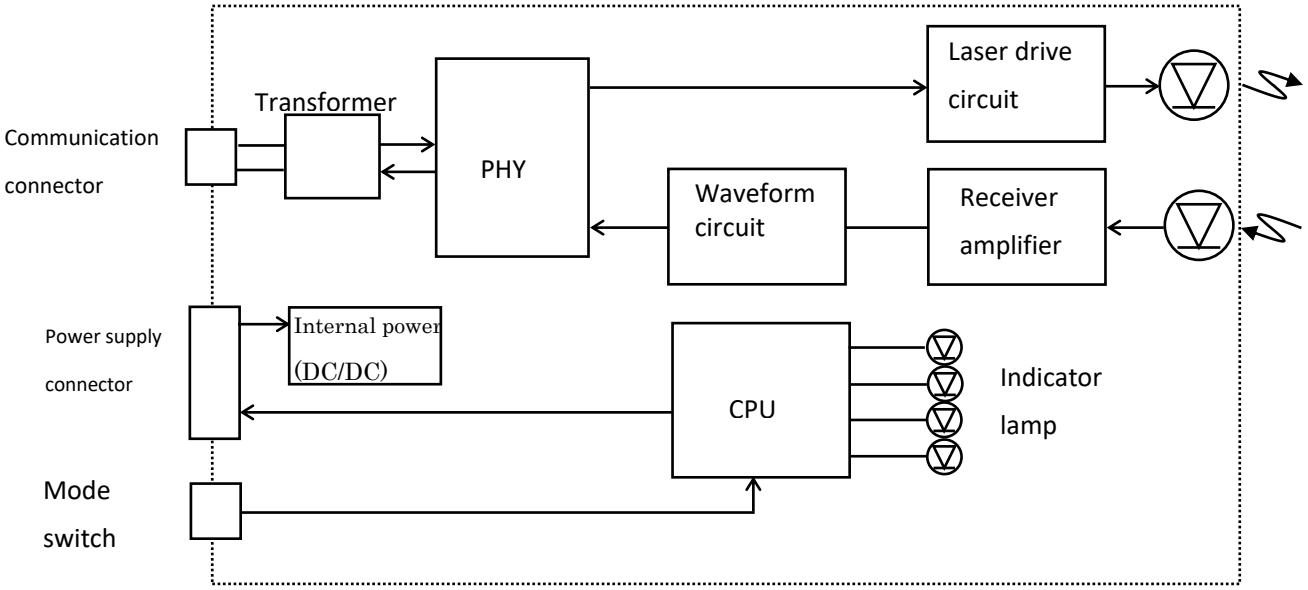
Approved by	Checked by	Drawn by	Designed by	Title	Optical Data Transmission Device for Ethernet EWF-0EA/B-N Specification	
M.Hino	T.Iguchi	Oka	Tamaki	Drawing No.	C-42-04433	1／9

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 50m, 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



3. Specification

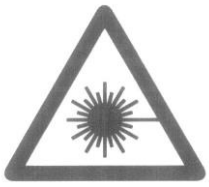
Model	EWF-0EA-N	EWF-0EB-N
Transmission distance	50m	
Directional angle	Full angle 1.4°	
Power supply	DC24V (±10%)	
Current consumption	120mA(DC24V)	
Transmission method	Full-duplex two-way transmission	
Transmission speed	100Mbps	
Laser safety	Class 1	
Interface	Ethernet	
Communication standard	IEEE802.3u 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. Please inquiry separately if needed.

About the laser safety

EWF-0EA/B-N laser safety standard is class 1.
Wavelength 658 nm (red)
Standard IEC60825-1 2007 & 2014

Caution



Class 1 Laser Product

Do not look directly into the laser beam.

・Supported network

EtherCAT®

EtherCAT® is a patent technology and registered trademark licensed by Beckhoff Automation GmbH, Germany.

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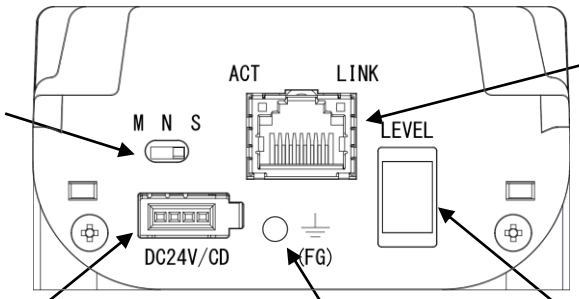
4. Connection

Mode switch
(Refer to section 6.
operation mode)



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

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

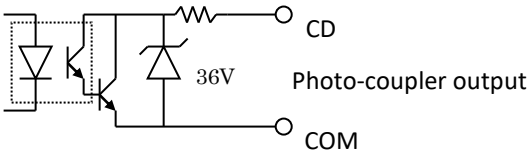
FG Terminal (M3 screw)

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 0.5mm²	1.6 to 2.0mm

Power supply pin assignment

Pin No.	Signal	I/O circuit
1	COM	 CD / 36V / Photo-coupler output / COM
2	CD	
3	-VIN (0V)	Power supply input
4	+VIN (DC24V)	

Connector pin assignment for level voltage output

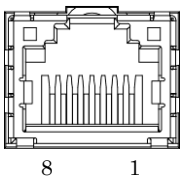
Pin No.	Signal
1	LEVEL
2	GND

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

If necessary, please contact us separately.

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

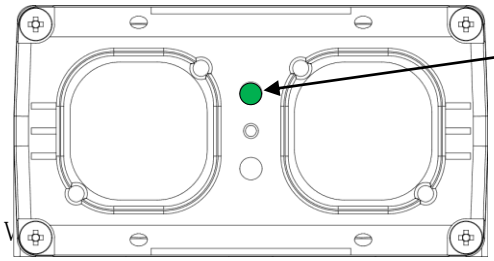
Pin No.	MDI Signal	Signal Function
1	TD +	Transmission Data (+)
2	TD -	Transmission Data (-)
3	RD +	Reception Data (+)
4	-----	Not Used
5	-----	Not Used
6	RD -	Reception Data (-)
7	-----	Not Used
8	-----	Not Used



Socket view

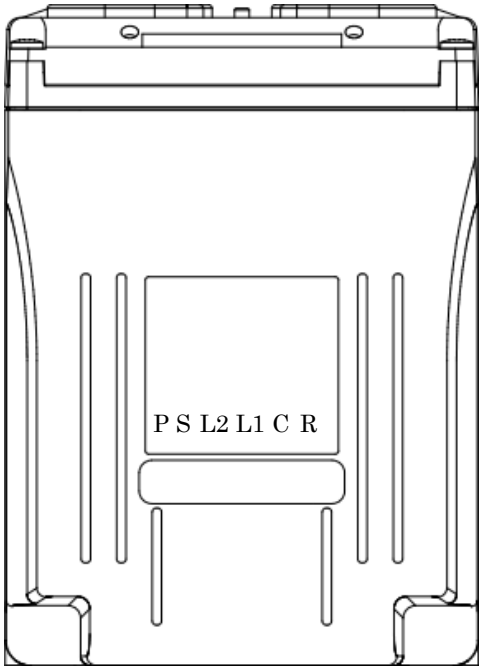
View from the matting side

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)

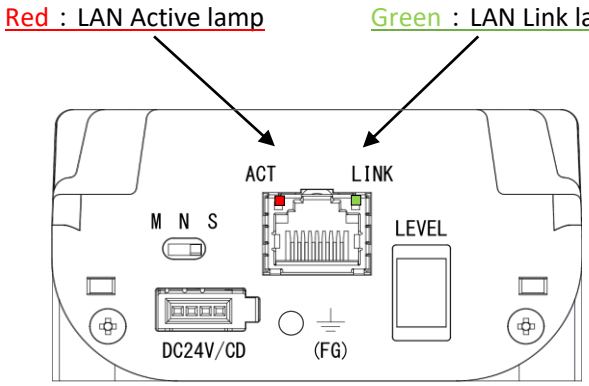
C: Carrier detection indicator lamp (CD) (led up when level margin 1 time)

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

*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.



Active : Led up when transmitting/receiving data.
Link : Led up when link is established.

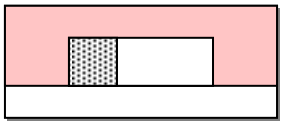
6. Operation mode

Slide switch which is located beside RJ connector, it can change to master mode, normal mode and slave

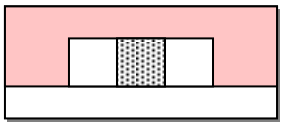
mode. During power supply, mode is set according to switch state.

Mode switching position

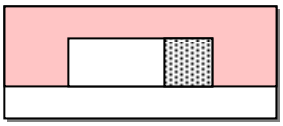
Master mode （M）



Normal mode （N）



Slave mode （S）



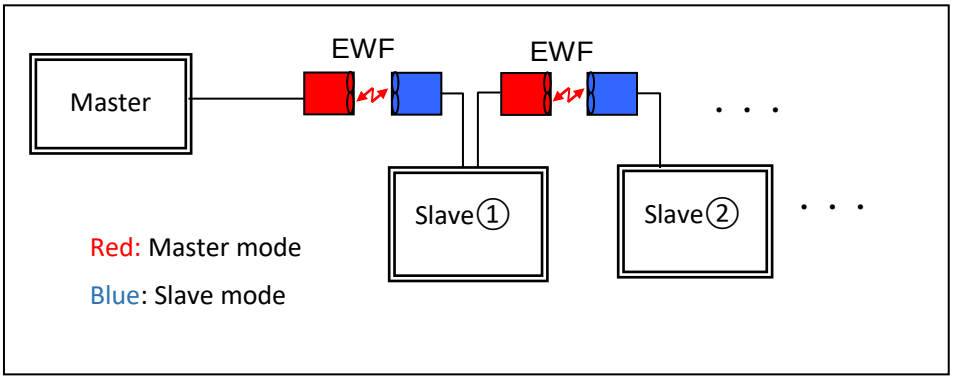
The possible data communication combinations are as follows

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

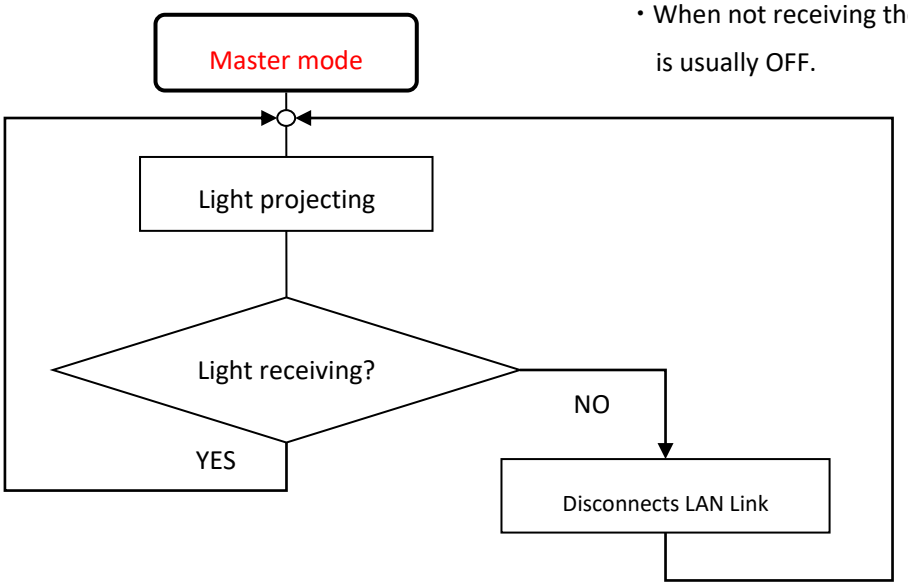
(In sleep mode, if LAN link is not ON, laser does not emits.)

Each mode operation is as the following flow chart

Master mode

・Usually light projecting.

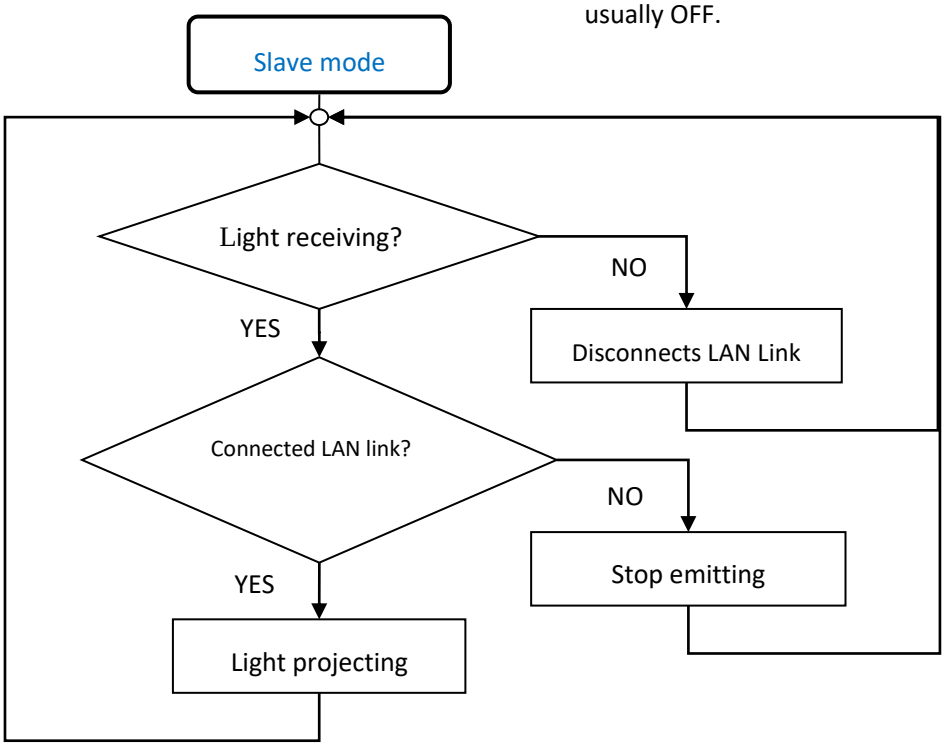
・When not receiving the light LAN link is usually OFF.



Slave mode

・Emits when light receiving and LAN link is ON.

・When not receiving the light LAN link is usually OFF.



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.