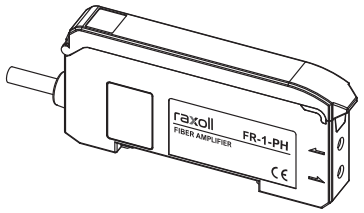
raxoll

FR *Series*

raxoll.com

Ultra High Speed Digital Fiber Ampfilier



CE

INSTRUCTION MANUAL

Thank you for choosing raxoll fiber optic amplifier. Please read the manual before using this product.

- The product should be applied by someone with a certain level of electrical knowledge.
- Please read and make sure that you understand how to operate the product before using it.
- Please keep this manual readily accessible for future reference when needed.

⚠ WARNING

Please do not exceed maximum rated voltage during usage in order to prevent tester malfunction or fire.
Please do not apply AC power supply to avoid breakage.
Please do not subject the product to high temperature to avoid scalding.

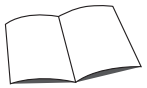
SAFETY PRECAUTIONS

It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
Make sure to use the product with the protective cover attached and closed.
Installing in the following places may result in malfunction:

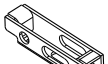
1. A dusty or steamy place.
2. A place generating corrosive gas.
3. A place directly receiving scattering water or oil.
4. A place suffered from heavy vibration or impact.

The product is not designed for outdoor use.
Do not use the sensor in transient state after power on(approx. 300ms.)
Do not wire with the high voltage cable or the power line.
Failure to do this will cause malfunction by induction or damage.
The sensor performance or digital display values may depend on the individual units or the condition of detected product.
This product in not an explosion-proof construction.
Do not use the product under flammable, explosive gas or liquid environment.
Do not use the product in water.
Do not disassemble, repair or convent the product.
Failure to do this may cause failure, fire or electric shock.
Operate within the rated range.

ACCESSORIESS LIST



1 PCS INSTRUCTION MANUAL



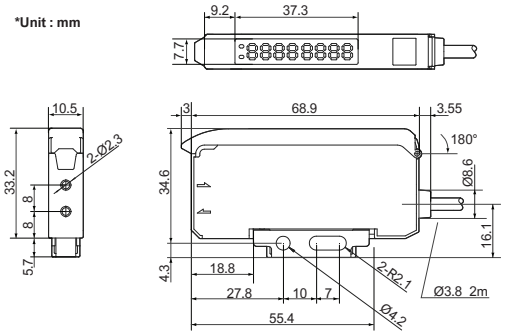
1 PCS BRACKET

TECHNICAL SPECIFICATIONS

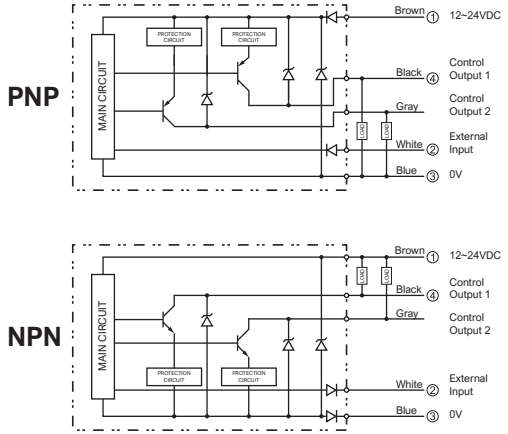
Power Source Voltage		12-24VDC±10%including a ripple
Power Consumption	Normal	864mW max.(36mA or less/24V)
	Eco All	600mW max.(25mA or less/24V)
Response Time		**1-HS :** 16μs(no interconnection), 22μs(interconnected) / **2-FS :** 70μs(no interconnection) ,85μs(interconnected) **3-ST :** 250μs / **4-LG :** 500μs / **5-PL :** 1ms / **6-UL :** 2ms / **7-EL :** 8ms
Control Output		PNP / NPN Open collector 100mA / 30V or less Load Current : 100mA or less, Residual Voltage : 1.8V or less
Output Method		Light ON / Dark ON Switching type in the function
Short-circuit Protection		Incorporated
Light Source		Red LED (632nm)
Indicator Light / Display		Output indicator light : Orange (Ch 1) / 7 segment 8 digit display
Sensitivity Setting		Teaching / Manual Adjustment
Timer Function		OFF, On delay timer, Off delay timer, One-shot timer, On delay-off delay timer, On delay-one shot timer
Timer Time		0.1ms~9.999s
External Input Setting		Teach-in, Emitter stop, Synchronous, Counter reset (only for 2 output type)
Operating Temperature / Humidity		-25~+55C° / 35~85%RH (No freezing and No condensation)
Store Temperature / Humidity		-30~+70C° / 35~85%RH (No freezing and No condensation)
Shock Resistance		10~55Hz Amplitude 1.5mm 2 hours for each direction of X,Y and Z
Protective Category		IP50
Material		PC : Cover, Case
Connection Type		2m Cable
Weight		71g (Including cordes)

DIMENSIONS

*Unit : mm

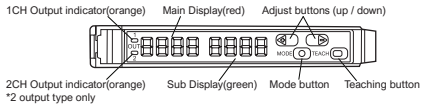


OUTPUT CIRCUIT DIAGRAM



*Gray line(Control output 2) is only for the 2 output type.

DISPLAY / INDICATOR / BUTTONS

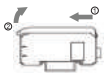


INSTALLATION

Mounting and Removing to/from DIN rail

Mounting of Amplifier Unit
Hook the claw on the connecting side of fiber cable to the DIN rail. Then press down the hook until it locks.

Removing of Amplifier Unit
Pushing the unit to the direction of ①, hold up the connecting side of fiber cable and remove the unit.

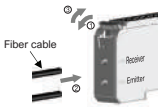


How to connect the fiber cables

① Open fiber lock lever.
② Insert fiber into holes to stop.
③ Return fiber lock lever until it stops.

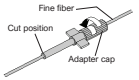
CAUTION

With Coaxial reflection fiber, set single core fiber or white-lined fiber to the emitter. Then set multi core fiber to the receiver.



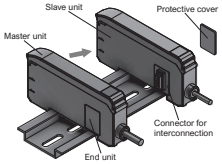
How to use Fine fiber

1- Turn adapter cap anticlockwise completely, then appropriately insert the fiber.
2- Cut the excess fiber with fiber cutter.



Interconnection

Mount each sensor on DIN rail and slide to interconnect one by one. Mount the End Plates at both ends. * Up to 16 units can be interconnected.



NOTE

Confirm that power supply is OFF while Installation.
Use DIN rail and End Plates for installation.
Confirm that environmental temperature is in specification.
Install the protective cover at the end connector of slave unit.
Do not remove sensors from DIN rail while it's interconnected.
Remove the End Plates, slide the sensor and remove one by one from DIN rail.

DISPLAY AND BUTTONS

Switching Display

Display shows as follows according to its mode

Operating (RUN Mode)	Setup	Teaching
It shows as example when it's actually detecting object. It goes to this mode after power up. Example	It shows as example when it's actually detecting object. It goes to this mode after power up.	It shows as example when it's actually detecting object. It goes to this mode after power up.
200 100	L--d Lon	2Pt 1Pt
Sensing Threshold Level	Function / Setup Value	Mode of Teaching

Buttons

Buttons work as follows according to its mode

Buttons	Operating (RUN Mode)	Setup / Teaching
Adjust(+ UP)	Increase threshold level	Change the Setup function and mode of Teaching
Adjust(+ DOWN)	Decrease threshold level	
MODE	Switch to Setup mode	Set the setup
TEACHING	Switch to Teaching mode	Execute Teaching

SETUP MENU

BASIC MENU

There are basic menu that to be setup before using.
Please refer Expert menu for further setup function.

Display	Menu	Function
L--d	Output Mode	Switch Light ON and Dark ON
rESP	Response Speed	Set Response Speed
dELY	Timer / Delay	Set Timer and Delay
EPrt	Expert Mode	Enter to Expert Mode(refer Expert menu)
rSEt	Initialize	Initialize Setup to Default
End	Exit	Exit Setup Mode

EXPERT MENU

There are menu for function that setup in detail.
Expert menu is avaliable from "EPrt" in Basic menu.

Display	Menu	Function
OrSt	Zero Reset	Set main display to 0 (zero)
diSP	Display Mode	Set display mode for operating (RUN mode)
Eco	Eco Mode	Set Eco Mode
turn	Rotation	Rotate the display 180 degree
HYS	Hysteresis	Specify hysteresis percentage
PrcS	Detection Mode	Set detection mode (edge/level)
cnt	Counter	Switch ON/OFF Counter and specify UP/DOWN direction
InPt	External Input	Set function of external input
coPy	Copy Setup	Copy setup the sensors interconnected
AL O	All Zero Clear/ Reset	Set all display of sensors interconnected to Zero "0"
Atch	All Teaching	Execute Teaching on every sensor interconnected
ASc	ASC	Set ON/OFF ASC (Automatic Sensitivity Control)
SPor	Emitter Power	Specify Emitter Power
LocL	Lock Level	Specify level of Key Lock
SAvE	Save	Save the current Setup
End EPrt	Exit	Exit Expert Menu
Loc	Lock	Lock buttons (refer useful function)

TEACHING MENU

Threshold level can be set by these menu.
Please refer "Teaching".

Display	Menu	Function
2Pt	2 Point Teaching	Set the threshold at the center between with object and without object.
1Pt	1 Point Teaching	Set the threshold at minimum level that can detect object stably with.
thru	Through Teaching	Set the threshold at at around 90% of sensing level without object object through beam application.
ZonE	Zone Teaching	Set the threshold at around sensing level ±10%
Auto	Automatic Teaching	Set the threshold at the center between maximum and minimum level.
P-t	Percent Teaching	Threshold can be set any percentage.
0P-t	Zero % Teaching	Set the threshold at any percentage and execute zero reset.
EndtEch	End of Teaching	Exit Teaching Mode.

BASIC SETUP

Press "MODE" button over 3 sec.

Choose the setup value by ◯ and ◯. Define the setup by ◯ and go back to top of each menu. "†" is default value.

1- Output Mode

L--d Lon

Top

◯/◯

Choose Light ON or Dark ON

Lon	ON by sensing light (Light ON)	†
don	ON by blocking light (Dark ON)	

2- Response Speed

rESP Stnd

Top

◯/◯

Choose Response Speed

1-HS	High Speed	response time: 16μs(no slave unit) 22μs(with slave unit)	
2-FS	Fast	response time: 70μs(no slave unit) 85μs(with slave unit)	
3-St	Standard	response time: 250μs	†
4-LG	Long	response time: 500μs	
5-PL	Power Long	response time: 1ms	
6-UL	Ultra Long	response time: 2ms	
7-EL	Extra Long	response time: 8ms	

*Choose faster mode when detect object moving fast at closer distance. Choose slower mode for detecting object at longer distance. The faster the shorter sensing distance.

for **2- Timer / Delay**

Please go to next page

3- Timer / Delay

Top

oFF	OFF †
oFdy	OFF delay timer
ondy	ON delay timer
Shot	One shot timer
onoF	ON delay and OFF delay timer
onSh	ON delay and One shot timer

Set Timer and/or Delay

Timer can be set from 0.1 to 9999ms.

0_1 0.1 ~ 9999 9999

*When choose "onoF" or "onSh", each ON delay/OFF delay and ON delay/One shot timer can be set individually.

4- Expert Mode

Top

A Enter the Expert mode (refer Expert Menu)

5- Initialize

Top

Set Timer and/or Delay

no	No initializing †
init	Setup to default
uSEr	Setup with saved parameters

"uSEr "is shown only when there is saved parameter by "SAVE" in Expert mode. Refer "Expert mode 4-15. Saving user parameter"

End

Exit Basic Menu

Go back to RUN mode.
It goes back to RUN mode when there is no button operation for 30 seconds. It can be changed to RUN mode by single action as well

SETUP THRESHOLD MANUALLY

At RUN mode, press or then, threshold display blinks that shows it can be adjusted. Adjust the threshold by or . You can adjust upper and lower threshold when it's Zone Teaching mode.

RUN Mode

200 100

Press MODE button or leave for 5 seconds then, it goes back to RUN mode.

Zone Teaching

Lower (Far) — 200 FAr — Press MODE button whie "Far" is blinking. — 200 100 — Adjust the threshold

Upper (Near) — 200 nEAr — Press MODE button whie "Near" is blinking. — 200 100 — Adjust the threshold

TEACHING

Press TEACH button for 3 seconds.

Choose teaching mode by pressing or . Then, press to confirm. When teaching is done, it goes back to RUN mode after the threshold blinks. You can refer current sensing level by pressing MODE while teaching.

1- 2 Point Teaching

2Pt 1Pt — Press TEACH (1st) — 2Pt 2Pt — Press TEACH (2nd) — 2Pt 200

Top

Threshold is set at center of 1st and 2nd level.
Teach twice with object and without object.

Diffuse reflective

1st: With object to detect

2nd: Without object

2- 1 Point Teaching (1)

1Pt — Press TEACH — 1Pt 250

Top

Threshold is set at minimum level that enable stable detection.
Good for long distance

Thru-beam — With object to detect

Diffuse reflective — Without object and background

3- 1 Point Teaching (2)

1Pt — Press TEACH — 1Pt 250

Top

Teaching with only background for diffuse reflective mode. Threshold is set at minimum level that enable stable detection.

Diffuse reflective — Without object and background

4- Through Teaching

thru — Press TEACH — thru 250

Top

Threshold is set at around 90% of sensing level. Good for detecting transparent object like Glass and Film.

Thru-beam — Without object

Reflective — Without object and with reflector

5- Zone Teaching

ZonE — Press TEACH — ZonE 250

Top

Threshold is set at around sensing level ±10%. Good for detecting object in the are specified.

Diffuse reflective

Threshold sensing level

Threshold

Near
Upper
+10%
10%
Lower
Far
Zone

Teaching to be done with object or with only background.

*When Zone teaching is done with only background, threshold level will be set at around +/- 10% from the background.

6- Automatic Teaching

AutoStrt — Press TEACH (Start) — AutoStoP — Press TEACH (Stop) — Auto 250

Top

Threshold is set at the center between maximum and minimum level.
Good for teaching without stopping production line.

Diffuse reflective

Thru-beam

Teaching is executed while object is moving on the production line.

7- Percent Teaching

P-t 90_ — Press TEACH — P-t 90_ — Adjust Percentage — P-t 85_

Top

You can set threshold at any percentage adjusted. By setting sensing level without object that block the beam as 100%, it can detect the level as relative percentage level. Re-Teaching can be done by single button action while RUN mode. Refer "Useful function Fitting in".

Thru-beam — Without object

Press TEACH — Teaching — 100 85_

8- Zero Percent Teaching

OP-t 10_ — Press TEACH — OP-t 10_ — Adjust Percentage — OP-t 15_

Top

Set any percentage adjusted to 0% as threshold. For diffuse reflective mode, set the sensing level with only background 0% and detect the level as relative percentage level. Re-Teaching can be done by single button action while RUN mode. Refer "Useful function Fitting in".

Diffuse reflective — Without object and background

Press TEACH — Teaching — 0 85_

End tEch

Exit the Teaching mode

By pressing TEACH button, it goes back to RUN mode.

EXPERT MODE

Setup parameters for further function.

From A "Basic menu"

Choose the setup value by and . Define the setup by and go back to top of each menu. "†" is default value.

4-1. Zero Reset

OrSt oFF

Top

Set Timer and/or Delay

oFF	No action †
on	Reset the main display

Reset the sensing level shown on the main display to zero and shift the threshold shown on the sub display as much as the main display shifted. This function is not active when percent mode and edge detection mode.

4-2. Display mode

diSP dig

Top

Choose display mode from following three

dig	Digital mode † (Sensing level 200 / Threshold 22)
bAr	Bar display mode (Bar increases according to sensing level from right)
Pct	Percent mode (Sensing level 100% / Threshold 110%)

"-" means it's percentage

4-3. Eco mode

Eco oFF

Top

Set Eco mode

oFF	No action †
diSP	Power of sub display(green) and darken main display(red).
rESP	This will work 20 seconds after the setup. Double emitting cycle. Actual response time will be doubled as well.
ALL	Power off sub display, darken main display and double emitting cycle. Actual response time will be doubled as well. Brightness of the display will be changed 20 seconds after the setup.

4-4. Rotation

turn oFF

Top

Rotate the display 180 degree

oFF	No action † (turn oFF)
on	Rotate the display (turn on)

This is effective when you have to mount the sensor opposite direction.

4-5. Hysteresis

HyS P

Top

Set Hysteresis percentage

P 5 † Set from 1% to 40%

P 1 (1%) ~ P40 (40%)

Set the hysteresis according to the condition. When it's unstable because of chattering, set bigger percentage. When to detect slight difference, set smaller percentage.

4-6. Detection mode

PrcS Stn

Top

Set Detection mode

Stnd	Detect by sensing level †
hd_F	Detect UP edge
hd7_	Detect DOWN edge
diFF	Differential mode

Set filter level for edge detection

F.Lt 1000	1,000 Hz †	Faster
F.Lt 200	200 Hz	
F.Lt 50	50 Hz	speed of edge detection
F.Lt 20	20 Hz	
F.Lt 5	5 Hz	Slower

Edge detection mode
Detect changes of sensing level in a certain period.
*Detect UP edge" : Detect the sensing level increasing.
*Detect DOWN edge" : Detect the sensing level decreasing.
*Only Automatic Teaching can be executed when edge detection is activated.
*Percent display mode is unavailable when edge detection is activated.
*Only CH1 can be set Edge detection for the 2 output type
*Hysteresis will be fixed to 1% when Edge detection is active.
*Edge detection won't work correctly when the sensing level is saturated or there is no light received.
*Filter to be "Slower" to detect sensing level that swings slower.

Differential mode
It detects difference of sensing level from the sensor unit next to it at master side. The display shows "1024" when sensing levels are same. When the sensing level is smaller than the sensor unit at master side,, the display shows smaller value than "1024". When its bigger, the display shows bigger value than "1024".
*Differential mode is available only for the slave unit.

4-7. Counter

cnt oFF

Top

Switch ON/OFF Counter and specify UP/DOWN direction

oFF	Counter OFF †
uPc	Set counting direction UP
dnc	Set counting direction DOWN

Set counter value from 2 to 9999
*This function is only for "CH2" of the 2 output type.
*Threshold of CH1 is used for this function so please change to CH1 when you set threshold.

4-8. External Input

inPt rtch

Top

Set function of external input

rtch	External Teaching †
tESt	Emitting OFF input
SYnc	Synchronous input(hold the output)
crSt	Counter reset

"crSt" is available only on the 2 output type.

4-9. Copy setup

coPy no

Top

Copy the master setup to other slave units

no	No action †
yES	Copy the setup

"Copy setup is available only on the master unit."
*The setup of slave unit that is locked by "Key Lock" function won't be changed.

4-10. All Zero Clear/Reset

AL 0 no

Top

Reset the displays of sensor units interconnected to Zero "0"

oFF	Counter OFF †
uPc	Set counting direction UP
dnc	Set counting direction DOWN

The display of master unit and other slave units interconnected will be reset to Zero "0". The reset functionality is same as "4-1. Zero reset". "All Zero Clear/Reset" is available only on the master unit. The display of slave unit that is locked as "Lock level 1" won't be changed.

4-11. All Teaching

AL 0 no

Top

Execute Teaching on every sensor interconnected

no	No action †
yES	Execute All Teaching

Teaching mode of each sensor unit can be independently set. When one of the master unit and slave units are set as 2 point Teaching, the display of the master unit shows "Atch 2Pt" so press MODE button for 2nd Teaching.
*The Teaching for the slave unit locked as "Lock level 1" by "Key Lock" function will be inactive.
**All Teaching" is available only on the master unit.

4-12. ASC

ASc oFF

Top

Set ON/OFF (Automatic Sensitivity Control)

oFF	ASC OFF †
on	Correction speed : Standart
FASt	Correction speed : Fast
Hi 9h	Correction speed : Fastest

ASC:
Adjust the threshold according to sensing level that is affected by environmental condition automatically. It corrects the threshold even when the sensing level changes quickly by cleaning up contamination. This is only for Through Teaching and Percent Teaching.

ASC speed:
"on" : adjust threshold "1" every three seconds.
"FASt" : adjust threshold "1" every one second.
"Hi 9h" : adjust threshold "1" every 0.25 seconds.
*ASC is not available after Zone Teaching is executed.
*ASC is not available on CH2 output.

4-13. Emitter power

SPor 1111

Top

Specify emitter power

1111	Maximum †
111	Three power level can be chosen
11	Minimum

Normally, maximum level is OK. Please lower the emitter power when sensing level is saturated.

Please go to next page

4-14. Lock Level

LocL L1

Top

Specify level of Key Lock

L1	Lock level 1 Lock whole Keys(buttons) †
L2	Lock level 2 Lock Keys except Teaching button and buttons for switching percent display and standart level display. Only channel of the 2 output type can be changed.

You can Lock buttons actually by pressing 3 seconds at a time.
*External inputs are active on any Lock level.

4-15. Save

SAvE no

Top

Save the current setup parameters.

no	No action †
yES	Save the current setup

End EPrt — **Exit Expert Menu**

EPrt — **Go to top of Expert Menu**

NOTE Some menu won't be shown depends on the setup. It's not a malfunction.
Time of pressing buttons to activate not specified on this manual is 0.3 seconds.
When the parameter value is ready to set, sub display will blink.
Following parameters of the 2 output type can be specified individually for Output 1(CH1) and Output 2(CH2). Other parameters are specified commonly.
Threshold, Output mode, Timer and its value, Teaching menu

USEFUL FUNCTION

Switch channel (only for the 2 output type)

Press button then, the channel number will be blinking and switch to the channel.

200 250 — CH2 — ch2 — 200 100

CH1 display — CH1 — ch1 — CH2 display

Thresholds is of CH2 will be copied to CH1 under following condition after external teaching.
This is useful when you want to set single threshold level to both CH1 and CH2.
-ASC and Edge detection are inactive.
-Teaching mode of CH1 is same as CH2.
-Display is showing level of CH2.
*You can switch channel from any setup menu.

Key Lock

Make the buttons unavailable to prevent operation mistake.
Press for 3 seconds to Lock buttons at a time while RUN mode.
Do same to cancel it.

Locked — Loc — Released — unLc

You can choose a Lock level from two in "Expert mode 4-14. Lock level".

Switching to RUN mode by single action

By pressing button for 3 seconds in setup menu while sub display is not blinking,

it switches to RUN mode withoutgoing through "End".

Switching to percent display by single action

Press and buttons at a time then, the display switches to percent display.

Sensing level 5000 4500 — Percent display 100_ 90_

You can setup this function at "Expert mode 4-2. Display mode" as well.
Do same to get back to standard display mode.

Fitting in (set sensing level to "100%"/"0%")

When "Percent Teaching" or "Zero % Teaching" is choosen in Teaching menu, you can set the sensing level to "100%" or "0%" by pressing and buttons at a time.
This is effective when detection get unstable.

Before Fitting 90_ 85_ — After Fitting 100_ 85_

ERROR

Following are error messages when error occured while Teaching, Please try again accordingly.

Err1	Sensing level is not enough
Err2	Sensing level is saturated
Err3	Difference of sensing level between two points

YOU CAN NOTE HERE

CONTACT US

› info@raxoll.com
› +90 (232) 457 22 84

PEAK OTOMASYON ELEKTRIK MAKINA IC VE DIS TIC. LTD. STI.
Halkapinar Mh. 1376 Sk. No:1/R
Konak/IZMIR

raxoll

raxoll.com