

# Fiber Coupler FPC-Alpha User Manual

Dual-mirror Fiber Probe Coupler for  
ALPHA and ALPHA II FTIR spectrometers



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## 1. Introduction

The Fiber probe Coupler FPC-Alpha is a product of **art photonics GmbH**.

It is intended to attach any fibre cable or fibre probe terminated with SMA905 connectors to FTIR spectrometers ALPHA or ALPHA II from Bruker.

### 1.1. Safety instructions

These units are not designed for use in hazardous areas.

The units supplied should not be repaired by anyone other than art photonics engineers or technicians authorized by art photonics.

In case of operation trouble, please address to our Customer service department using the form for Confirmation on Decontamination [refer to: Attachments].

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#### Conditions for operation

To operate the fiber coupler with a spectrometry system, all specified conditions have to meet the requirements. Otherwise, trouble or defects may occur.



#### Sensitive optical elements

Please note the advice given below concerning the handling of sensitive optical elements.



### **Spare parts**

Only use original spare parts. If it is necessary to change parts not listed in the following chapters, please refer to **art photonics** customer service.

Do not repair or change parts which are not explicitly mentioned in this manual.



### **Components designed to fit together**

Always use the spectrometer units which have been assembled for you at the original installation. Only use original spare parts. If it is necessary to change parts not listed in the following chapters, please refer to **art photonics** customer service. Do not repair or change parts which are not explicitly mentioned in this manual. Always contact **art photonics Customer Services** if you are considering an exchange.

### **Record the operating parameters of your spectrometer setup**

The operating parameters of the system should be checked, defined and recorded each time a change is made to the measurement system (e.g., change of parabolic mirrors, precision sliders etc.). This can either be done by carrying out the measurements described in the following chapters or individually defined standard measurements.

## **1.2. Safety type and class**

The modular spectrometer systems or accessories were constructed and tested according to our test procedures and left our factory in perfect technical condition according to related safety regulations. If this condition is to be maintained and in order to guarantee safe operation, you must comply with all advice and warning notes in this manual.

## 1.3. Customer service and warranty

With the exception of o-rings, protective caps, changes as well as the maintenance and service tasks mentioned in the following chapters, it is not allowed to service or repair components or accessories. In case of any attempt of self service, the warranty by **art photonics** will be no longer valid.

Only the manufacturer and persons authorized by the manufacturer are permitted to carry out repairs.

Please contact Customer Services in case of problems with your system or individual components.

## 1.4. Operating conditions

Install your device with Fiber Coupler in easily accessible place. Avoid contact of inside of the coupler with water or chemicals. Protect optic elements from dust and dirt.

Ambient temperature for the coupler (not for coupled equipment) is +0 °C to +50 °C

Working temperature for the coupler (not for coupled equipment) is 0°C to + 50 °C

**Do not use this Fiber Coupler in hazardous areas!**

## 1.5. Storage and Transport

The specified temperature range has to be reached before starting to use the accessory. Allow the accessory to acclimatize for at least 0.5 hours to its new environment. Store the coupler in dry places only. No further safety measures are required. Although the components are robust, avoid shake-ups and rough handling.

## 1.6. Handling fiber couplers and cables



### Handle parabolic mirrors with care

- Do not take the coupler out of the sampling module case.
- Do not touch optical surface of parabolic mirrors with fingers or napkins or any tools! The surface can be easily scratched resulting in reflection (transmission through the coupler) decrease.
- Do not poke the fiber ports with any tools.
- Do not rinse fiber coupler. Do not immerse fiber coupler into liquids. The fiber probe coupler is not sealed in the sampling module, thus the penetration of water or chemicals inside the coupler will result in its damage. Ask the manufacturer for the advice if fiber probe coupler needs cleaning.



### Handle fiber cable with care

- avoid tension, torsion and bending for radius less than 50 mm. Hold the connector, not cable protective tube when pulling it out of the adaptor. For handling with other optical cables and probes refer to handling rules for them.
- Store fiber coupler in its protective storage box when not in use.
- Prevent impacts or dropping of the coupler.
- Be careful inserting the fiber cable into the coupler.

## 2. Specifications

Fiber Probe Coupler FPC-Alpha is to attach any fiber cable or fiber probe terminated with SMA905 connectors to ALPHA or ALPHA II FTIR spectrometers.

### 2.1. Mechanical parts

Axis-to-axis:	52 mm between fiber connectors
Connectors:	SMA 905
Case material:	Polymer
Weight:	1.95 kg

### 2.2. Optical parts

Parabolic mirrors:

Diameter:  $\varnothing$  25,4mm

Effective focus: 25,4 mm

### 3. Content of Delivery

The Fiber Probe Coupler FPC-Alpha package includes the following items:

- 1 x Fiber Probe Coupler inside QuickSnap sampling module
- 1 x Test report
- 1 x User manual
- 2 x Fiber adapters protective caps

#### Optional components:

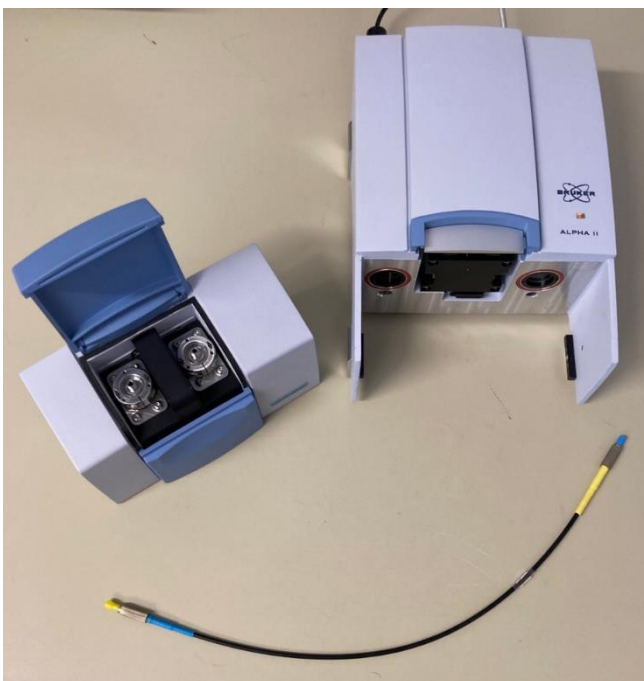
Reference fiber cables are available on request for the coupler alignment or testing.

AP10680 Fiber Cable PIR400/500-50-TI/SMA-TI/SMA-MP37

AP11124 Fiber Cable CIR250/300-50-SMA-SMA-MP37

### 4. Installation of the Coupler

The pictures below contain explanation how to insert and adjust the coupler step-by-step. Some important issues are mentioned as well.



- Spectrometer ALPHA.
- Reference cables
- QuickSnap sampling module with the coupler FPC-Alpha inside.

**Do not take the coupler out of the sampling module case.**

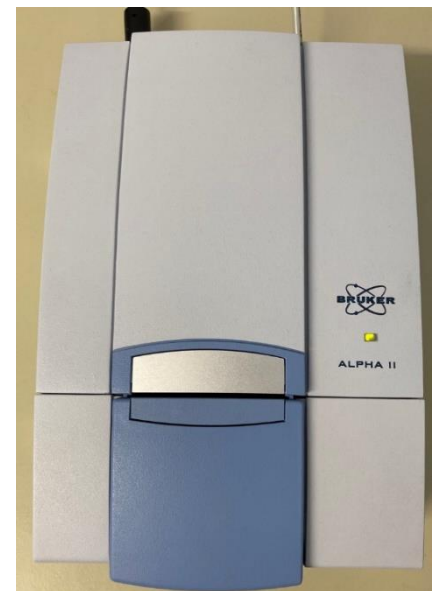
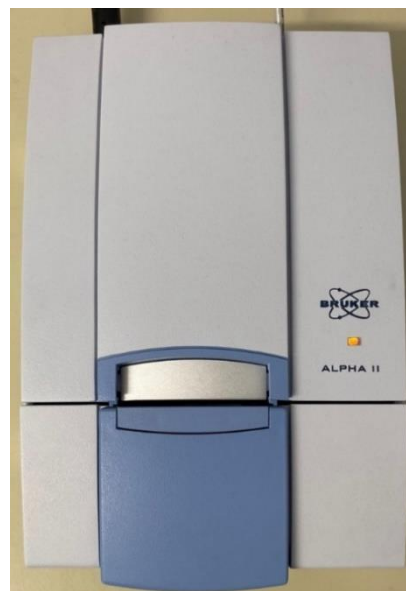
**Don't touch the mirrors with fingers. It could result in decrease of coupling efficiency.**



## 4.1. Positioning of the Fiber Coupler

Turn on the spectrometer, computer and software OPUS. Make sure that spectrometer is connected to the computer. Space for sampling module should be empty. The indicator light on the spectrometer is red. Big grey button is pressed down. This button fixes QuickSnap sampling module to the spectrometer. Insert the module with coupler into free space of the spectrometer. It should not move or wobble. The indicator light on the spectrometer is yellow now.

Press big grey button. Fiber Probe Coupler with QuickSnap sampling module is fixed to the spectrometer. The indicator light on the spectrometer is green now.

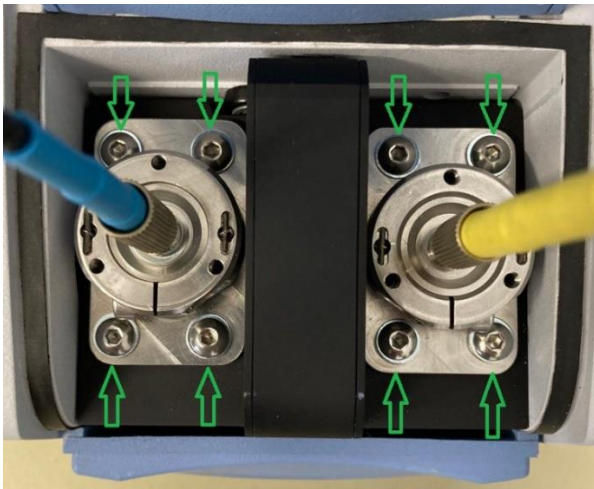


## 4.2. Connecting the reference cable

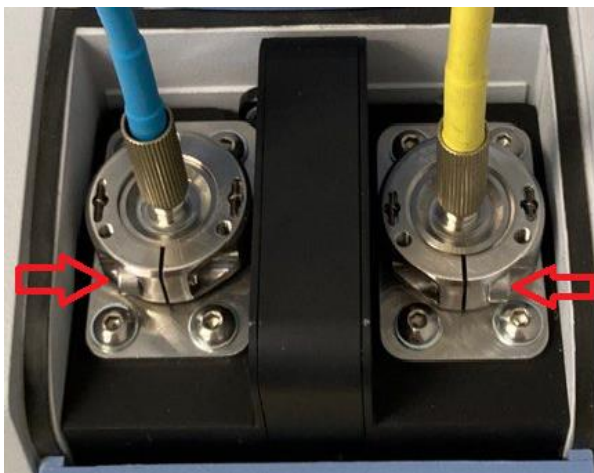
The next step is to insert the reference cable connectors into SMA adaptors of the coupler.

## 4.3. Fiber Coupler alignment

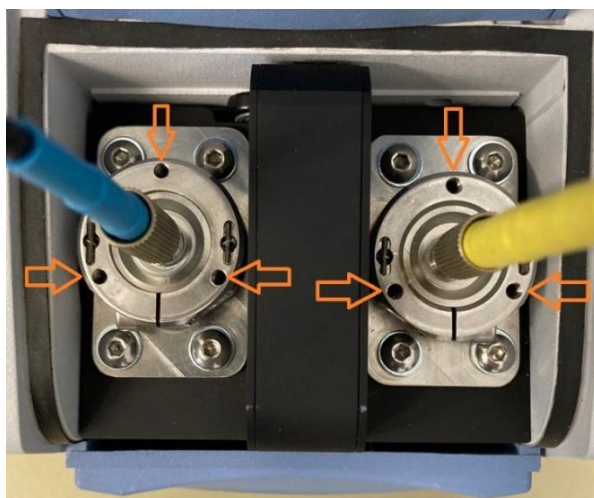
The coupler is pre-aligned, but all devices have slightly different optical properties. Check the signal value using “Check Signal” option in OPUS and make a measurement of single beam spectra. You can use coupler without additional alignments if signal value and single beam spectra look similar to the results mentioned at P.11 of this manual and coupler’s test report. If your result is much worse, additional alignment is required. Therefore, align the SMA connectors as shown at the pictures below:



Loose these screws for **X-Y-axis** alignment. Move the whole part with SMA-connectors carefully approx. 0,5-1mm for maximal signal. Tighten all screws after. Align the connectors one separately from the other.

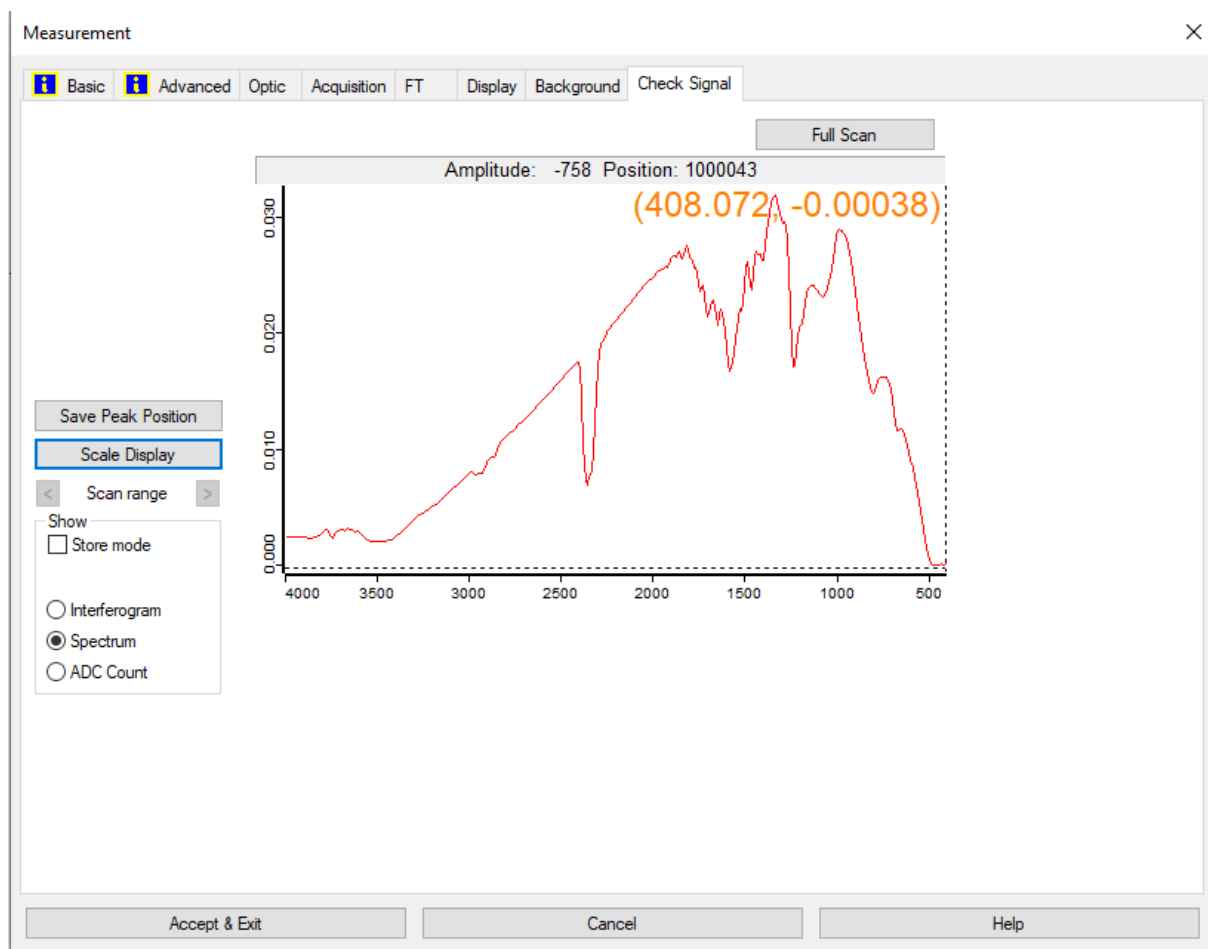


Loose these screws for **Z-axis** alignment. Move the part with SMA-connectors carefully up and down approx. 0,5-1mm for maximal signal. Tighten screw after. Align the connectors one separately from the other.



Rotate these screws for **Angle** alignment. Each screw regulates the height of the SMA-unit in this position. Align the screws one separately from the other.

Continue the alignment until the highest possible single beam or interferogram intensity is achieved. The typical amplitude value of measured spectral module with coupler should be approx. 680 counts or 0,03 relative units of intensity on the single beam plot maximum. The alignment window is shown at the picture below. Please note that the window shows single beam live spectrum or interferogram intensity.



## 4.1. Storage configuration

- Put the protective caps onto the windows on both sides of QuickSnap sampling module.
- Close the cover of QuickSnap sampling module.

## 4.2. How to store the Fiber Coupler safely

Fiber Coupler should be stored in a dry place if not in use.

## 4.3. Cleaning of mirrors

Clean the mirrors only with compressed air flow. Do not touch lenses with any tool neither in SMA adaptors nor from the opposite side.

## 4.4. Spare parts

Reference cables:

- AP10680 - PIR 400/500 0.5m long, SMA connectors
- AP11124 - CIR 250/300 0.5m long, SMA connectors

# 5. Trouble Shooting

### In case of too low signal:

Check the system using reference cable with known signal

Check fiber ends quality at both ends of the cable/ probe

Check surface of the mirrors.

Check if the connectors are in good condition.

### In case of no signal:

Check position of QuickSnap sampling module in the spectrometer.

## **6. Attachments**

### **6.1. New safety regulations for servicing laboratory equipment**

#### **NEW SAFETY REGULATIONS FOR SERVICING LABORATORY EQUIPMENT**

Dear Customer,

For instruments used in analytical laboratories (e.g. bio-, chemical- or pharmaceutical environment), it cannot be ruled out that service personnel could be exposed to health risks by coming into contact with residues of hazardous substances, especially when the instrument or accessories have been used for making measurements using radioactive, infectious or toxic substances.

The current regulations and laws, as well as the extended guidelines and norms, stipulate that we, as a manufacturer of measuring systems, observe more stringent safety regulations in order to ensure the safety of our employees. These regulations and laws include:

- The chemicals ordinance for protection from hazardous substances;
- The hazardous substances ordinance, technical rules for hazardous substances;
- The radiological protection ordinance;
- The accident prevention regulations biotechnology, safety tests concerning biological safety according to UVV, VBG 102;
- The guidelines of the professional associations, working in contaminated areas.

Moreover, the environmental regulations issued by the environmental protection and industrial inspection board as well as the quality assurance system DIN/ISO 9001 which was awarded to **art photonics**, also have to be observed.



Therefore, prior to allowing any repair work in your laboratory or before returning the instrument to us we would ask you, either to carefully clean, disinfect or decontaminate the instrument or components to be serviced, or confirm that the instrument or components have not come into contact with any hazardous substances.

The enclosed "Confirmation on Decontamination" should be filled out and attached to the Shipping papers together with your repair order or handed out directly to our service technicians in your laboratory.

We are unable to commence repair work without a declaration that the instrument has been decontaminated. Should the declaration not be received within three weeks we regret that we must for safety reasons return the instrument unrepaired, at your cost.

For further questions, please do not hesitate to contact us directly.

## 6.2. Confirmation on Decontamination

If you return an instrument or component (e.g. accessory) to **art photonics** for servicing purposes which is not properly decontaminated, there will be a health risk for **art photonics** employees.

We therefore need your confirmation that the instrument or component was decontaminated and cleaned properly before shipping. If the form below is not filled in accordingly and completely, we will reject the instrument. This is needed to protect our employees.

<b>Instrument / component</b>	<b>Serial no.</b>
_____	_____
_____	_____
<b>Instrument or component has come into contact with:</b>	
<input type="checkbox"/> radioactive substances	How was decontaminated / cleaned:
Isotope _____	_____
_____	_____
<input type="checkbox"/> chemical reagents	How was decontaminated / cleaned:
R- and S-rules _____	_____
_____	_____
<input type="checkbox"/> biological material	How was decontaminated / cleaned:
Specify _____	_____
_____	_____
<input type="checkbox"/> contagious agents	How was decontaminated / cleaned:
Specify _____	_____
_____	_____
<input type="checkbox"/> I hereby confirm that the instrument or component specified above was not contaminated with any of the above mentioned substances / reagents / agents.	
<input type="checkbox"/> I hereby confirm that the instrument or component specified above was decontaminated / cleansed using the appropriate method.	
<b>Date</b> _____	<b>Signature</b> _____
Name _____	Address _____
_____	_____
Title _____	_____
_____	_____
	Phone _____
	Fax _____