

# Universal Fiber Coupler (Prototype)

Mirror Fiber Coupler adjustable for any FTIR spectrometer  
**user manual**



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# Table of contents

I	Introduction.....	<b>Fehler! Textmarke nicht definiert.</b>
I.1	Safety Instructions .....	3
I.2	Safety type and class.....	4
I.3	Customer service and warranty .....	4
I.4	Operating conditions .....	4
I.5	Storage and Transport .....	5
I.6	Handling fiber couplers and cables .....	5
II	Specifications .....	6
II.1	Mechanical parts.....	6
II.2	Optical parts.....	6
II.2.1	Parabolic mirrors.....	6
III	Content of Delivery .....	7
IV	Installation of the Coupler.....	8
IV.1	Positioning of the coupler.....	8
IV.2	Connecting the reference cable .....	8
IV.3	Fiber Coupler alignment.....	8
IV.4	Storage configuration.....	10
V.1	How to store the Fiber Coupler safely.....	9
V.2	Cleaning of mirrors.....	9
V.3	Spare parts .....	9
VI	Trouble Shooting .....	100
VII	Attachments .....	<b>Fehler! Textmarke nicht definiert.1</b>
VII.1	New safety regulations for servicing laboratory equipment.....	111
VII.2	Confirmation on Decontamination.....	111

# I Introduction

The Universal Fiber Coupler (Prototype) is a product of **art photonics** company.

It is intended to attach any fibre cable or fibre probe terminated with SMA905 connectors to the FTIR spectrometer. Coupler can be adjusted to any FTIR spectrometer using customized baseplates.

## I.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 [abbr.: 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 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 and 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 self service the guarantee by art photonics will be no longer valid.

Only the manufacturer and persons authorised 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 against dirt.

Environmental temperature for the coupler (not for coupled equipment): + 0° C to + 50° C

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

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

## I.5 Storage and Transport

Before starting the accessory the specified temperature range has to be reached. Therefore 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, jolts and rough handling should be avoided.

## I.6 Handling fiber couplers and cables



Handle parabolic mirrors with care.

- Do not touch optical surface of parabolic mirrors with fingers/napkin/any tool !  
The surface can be easily scratched resulting in reflection (transmission through the coupler) drop.

- Do not poke in the fiber ports with any tool !
- Do not rinse fiber coupler. Do not immerse fiber coupler into liquids. Ask the manufacturer for the advice if fiber coupler need cleaning.



Handle fiber cable with care.

- For optical reference cable in use: avoid tension, torsion and bending for radius less than 50mm. 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 which is not in use in its protective storage cartons.
- Prevent impacts and drop of the coupler.

Be careful inserting the fiber cable into the coupler.

# II Specifications

Universal Fiber Coupler (Prototype) is intended to attach any fibre cable or fibre probe terminated with SMA905 connectors to FTIR spectrometer. Coupler should be supplied with a baseplate to fit into defined device. To fit the coupler into Nicolet iS5 spectrometer no any baseplate is required.

## II.1 Mechanical parts

Axis-to-axis:	48 mm (between fiber connectors)
Connectors:	SMA905
Box material:	Polymer
Weight:	2.26 kg

## II.2 Optical parts

### II.2.1 Parabolic mirrors

Light Diameter:	Ø 25 mm
Effective Focus:	25 mm

### II.2.2 Spherical mirrors

Diameter:	50mm
Focus:	100mm

### II.2.3 Flat mirrors

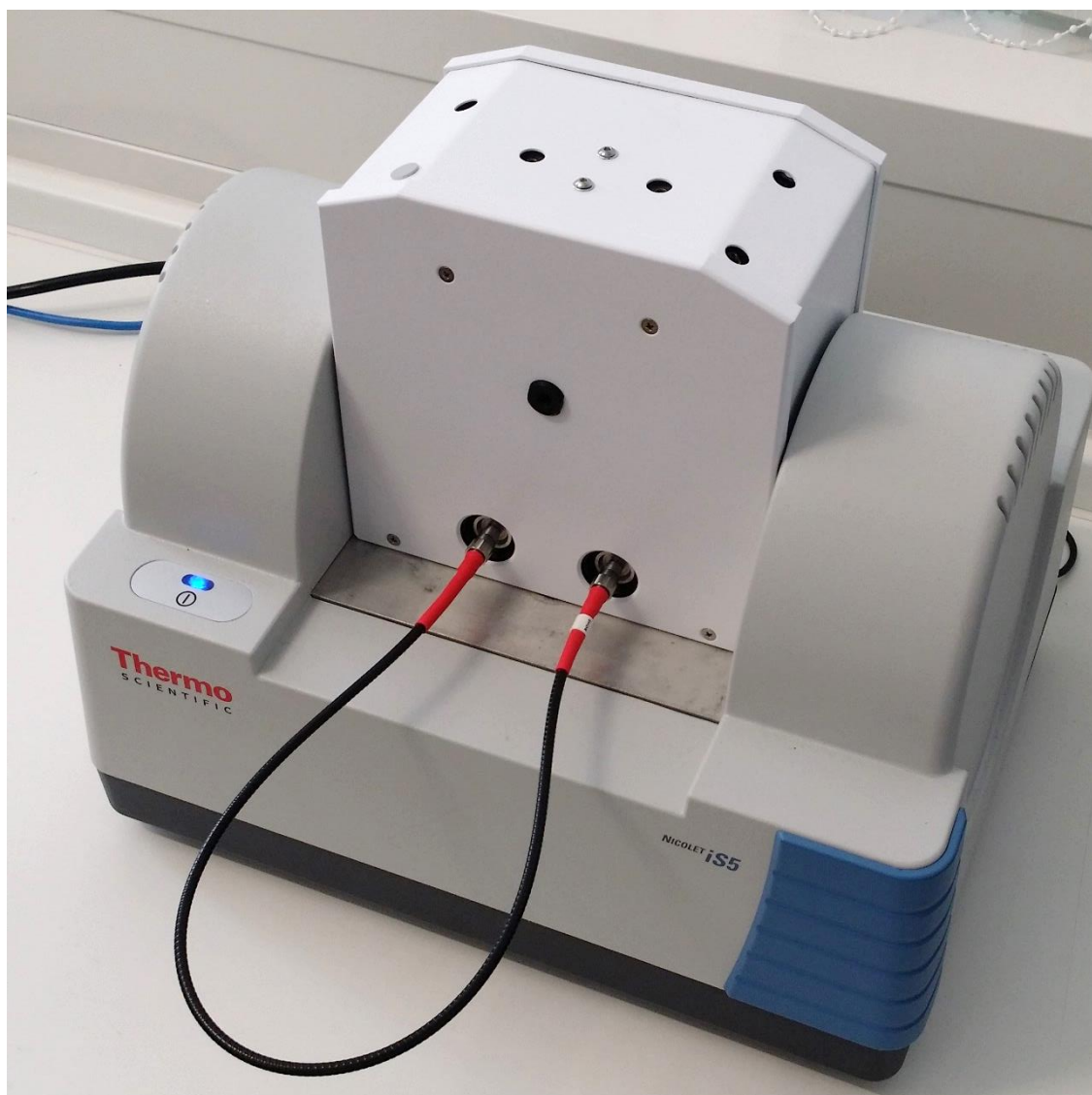
Diameter:	20mm
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### III Content of Delivery

The Fiber Coupler FPC-2M package should include the following items:

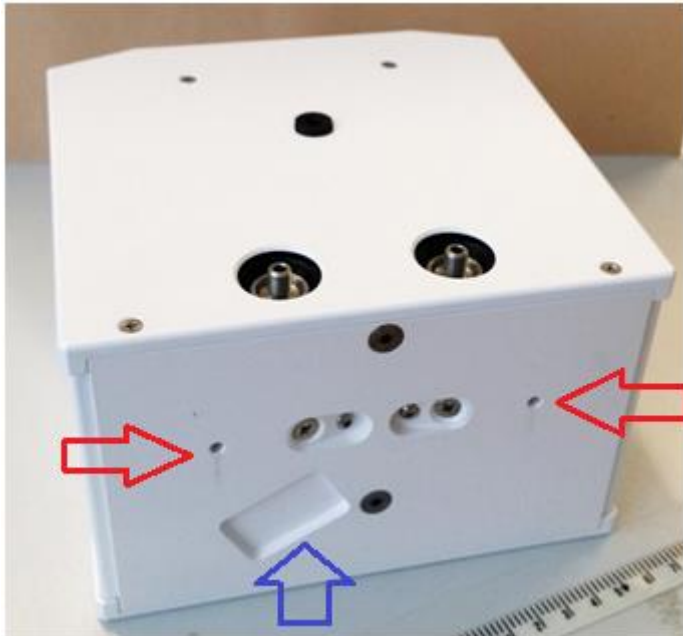
- 1 x Fiber Coupler
- 1 x Reference fiber cable

Fiber Coupler is shown the coupler mounted in up-right position in the sample compartment of Nicolet iS5 spectrometer.



## IV Installation of the Coupler

This chapter describes which parts are needed to install the fibre coupler.



Holes for positioning pins are shown with red arrows, the groove for the electronic chip is shown with blue.

### IV.1 Positioning of the coupler

Install the coupler into the sample compartment exactly onto positioning pins with fiber connectors faced to the operator. The coupler should not move or rock.

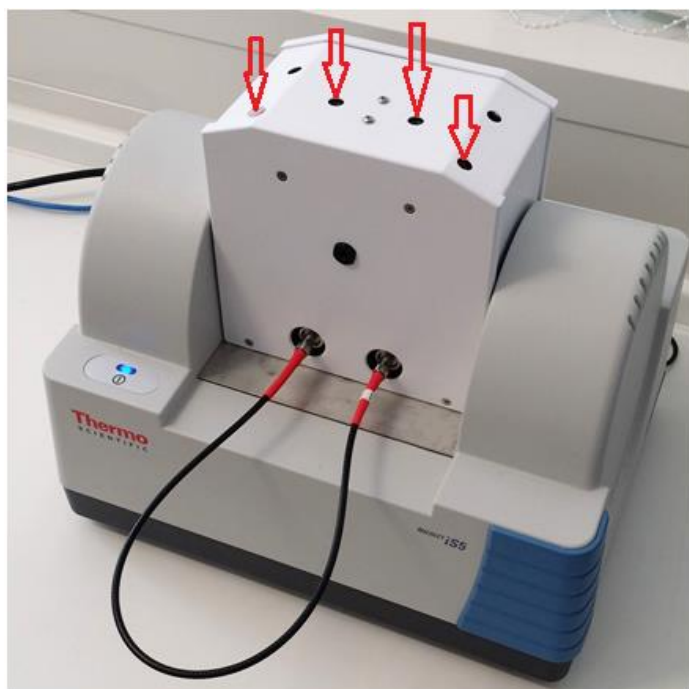
### IV.2 Connecting the reference cable

Attach connectors of the reference cable into SMA adaptors of the coupler.

### IV.3 Fiber Coupler alignment

The coupler is pre-aligned but all devices have slightly different optical properties. Therefore, align the SMA connectors as shown at the picture below:





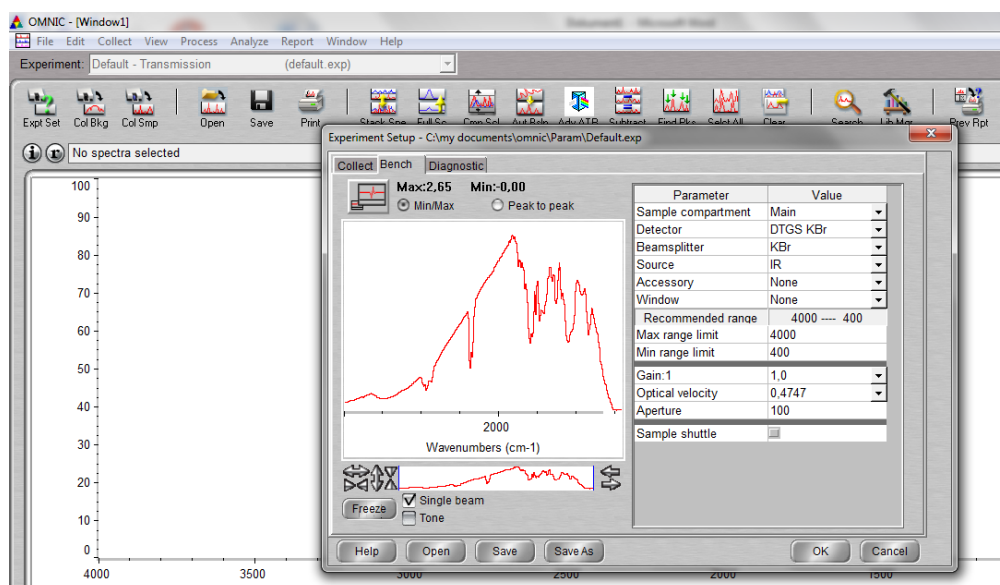
Delete small plugs from the holes with tuning screws.

Start the alignment mode of the spectrometer.

Rotate slightly tuning screws one by one to get maximum signal. Continue the alignment until you have achieved the highest possible single beam or interferogram intensity. The typical throughput of the accessory is shown in the attached test report.

Put all the small plugs onto the place in the coupler case after the alignment.

The alignment window is shown at the picture below.



## IV.4 Storage configuration

- Put the protective caps onto the SMA adapters when the coupler is not in work.
- Put the coupler into the box when it is not in use.

## IV.5 How to store the Fiber Coupler safely

If not in use then the Fiber Coupler should be stored in a dry place. Protection against dust is recommended.

Store the reference cable with Fiber Coupler.

## IV.6 Cleaning of mirrors

Clean the mirrors only with compressed air flow.

## IV.7 Spare parts

Reference cables

PIR 400/500 0.5m long, SMA connectors AP10680

CIR 250/300 0.5m long, SMA connectors AP11124

NIR 200/220 0.5m long, SMA connectors AP 11140

# Trouble Shooting

Too low signal

Check the system using reference cable with known signal

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

Check if the connectors are in good condition.

No signal

Check position of the coupler in the spectrometer

# Attachments

## IV.8 New safety regulations for servicing laboratory equipment

## IV.9 Confirmation on Decontamination

Form sheet for return

### 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.

## Confirmation on Decontamination

If you return an instrument or component (e.g. accessory) to AP for servicing purposes which is not properly decontaminated, there will be a health risk for AP 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. We kindly ask you for your understanding.

Instrument / component _____ _____	Serial no. _____ _____
Instrument or component has come into contact with:	
<input type="checkbox"/> radioactive substances Isotope _____ _____ _____	How decontaminated / cleaned: _____ _____ _____
<input type="checkbox"/> chemical reagents R-and S-rules _____ _____ _____	How decontaminated / cleaned: _____ _____ _____
<input type="checkbox"/> biological material specify _____ _____ _____	How decontaminated / cleaned: _____ _____ _____
<input type="checkbox"/> contagious agents specify _____ _____	How decontaminated / cleaned: _____ _____

<hr/> <hr/>	
<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.	
Date: _____ _____	signature: _____ _____
(please print)	
name: _____ _____	address: _____ _____
_____	_____
title: _____ _____	_____
	phone: _____ _____
	fax: _____ _____