SENSOR PROBES

Accessories
Adapters, Weights, and POF

Instruction Manual

PreSens
PRECISION SENSING

Accessories

Adapters, Weights, and POF

Specification:

Accessories used with sensor probes

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Specifications may change without prior notice.

Manufacturer
PreSens
Precision Sensing GmbH
Am BioPark 11
93053 Regensburg, Germany
Phone +49 941 94272100
Fax +49 941 94272111
info@PreSens.de
www.PreSens.de

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1 Preface

You have chosen a new, innovative technology for measuring oxygen, pH and / or CO_2.

The accessories CFG, ARC, SOA, and VA facilitate reading the response of chemical optical sensors integrated in transparent glass or plastic vessels. A POF is needed as a light guide between the transmitter and the sensor foil. The weights for dipping probes keep the probes in a stable, fixed position, when applying them underwater.

Chemical optical sensors (also called optrodes) have several important features:

- They are small.
- Their signal does not depend on the flow rate of the sample.
- They can be physically divided from the measuring system which allows a non-invasive measurement.
- They can be used in disposables.

Therefore, they are ideally suited for the examination of small sample volumes, for highly parallelized measurements in disposables, and for biotechnological applications.
A set of different minisensors, flow-through cells and integrated sensor systems is available to make sure you have the sensor which matches your application.

Please feel free to contact our service team to find the best solution for your application.

Your PreSens Team

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE WORKING WITH THIS ITEM.

2 The Coaster CFG

The coaster CFG is used for online measurement of oxygen, pH and / or CO_2 in transparent vessels with integrated sensors. The coaster is placed underneath the vessel and can be adjusted to different vessel sizes. Two different coasters are available. The single coaster is used for one sensor spot; the dual coaster is used for two different sensor spots in the same vessel. An optical fiber with an SMA connector is integrated into the adapter.

Fig. 2 Coaster CFG

Fig. 1 Coaster CFG dual

2.1 Scope of Delivery

- CFG guide rail
- CFG optical module with integrated polymer optical fiber (fiber length 2.5 m)

Additionally required equipment (not supplied):

- Fiber optic transmitter (e. g. Fibox 3 and / or pH-1 mini)
- Respective transmitter software
- PC / Notebook
- Fitting screws and a screw driver / double sided adhesive tape
- Adhesive tape to fasten the polymer optical fiber inside the shaker / incubator
- Vessel with integrated sensor spot(s)

2.2 Measurement Set-up

2.2.1 Coaster CFG

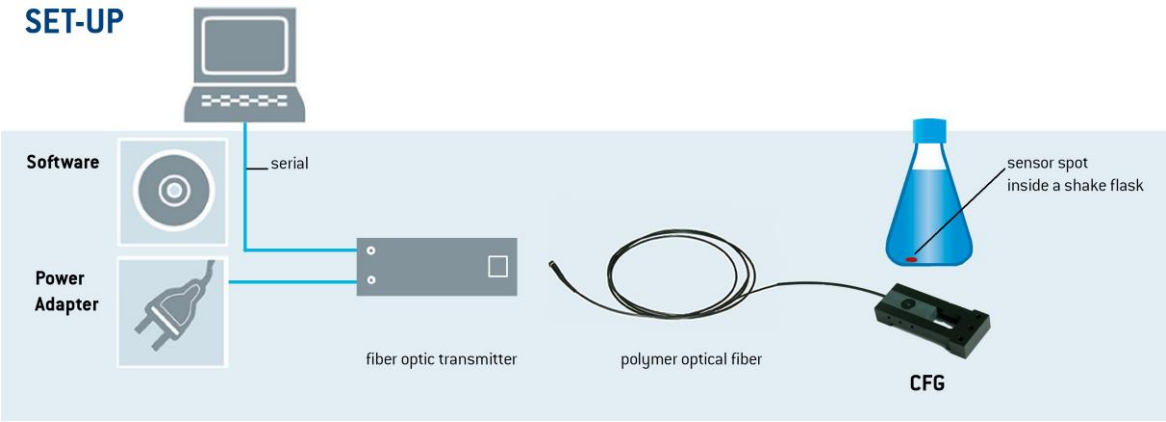

Fig. 3 Set-up for measurement with a coaster CFG

The sensor spot in the vessel is placed over the optical module of the CFG. With its polymer optical fiber the CFG is connected to the transmitter. The transmitter is connected to a PC / notebook via serial cable and using the respective transmitter software measurement values can be displayed and stored.

2.2.2 Coaster CFG dual

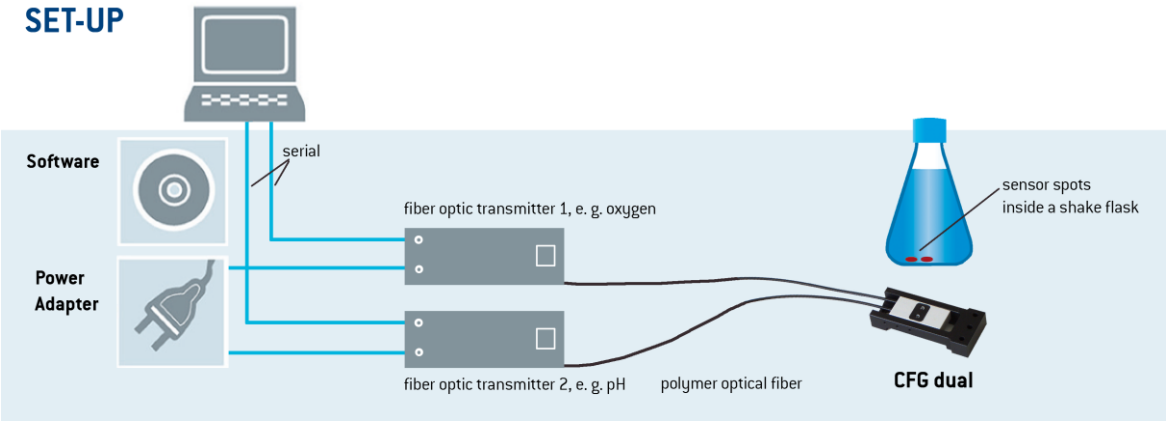

Fig. 4 Set-up for measurement with a coaster CFG dual

The two sensor spots in the vessel are placed over the optical modules of the CFG dual. With its polymer optical fibers the CFG dual is connected to e.g. an oxygen and a pH transmitter.

! Please make sure that the optical module reading the oxygen sensor is connected to the oxygen transmitter and the optical module reading the pH sensor is connected to the pH transmitter.

The transmitters are connected to a PC / notebook via serial cable and using the respective transmitter software oxygen and / or pH values can be measured and displayed.

The coaster CFG can be used with different kinds of vessels, in which a sensor spot is integrated, like e.g. 6-well multidishes. The optical module of the CFG has to be placed under the vessel right opposite to the sensor spot (Fig. 5). Connect the CFG via polymer optical fiber to a transmitter that is connected to a PC / notebook.

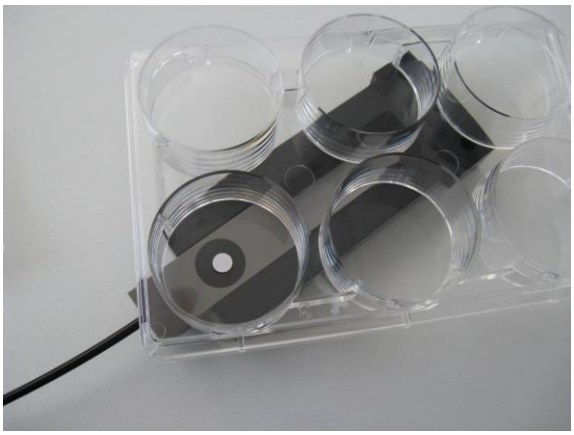

Fig. 5 Coaster CFG placed under a sensor spot integrated in a 6-well multidish

Most commonly the coaster CFG is used with sensor spots integrated in shake flasks and in the following chapters it is described how to use the CFG in a shaker.

2.3 Operation in a Shaker

You can watch our video about how to use the coaster CFG with sensor spots integrated into shake flasks on www.presens.de/support-services/videos.html.

2.3.1 Mounting the CFG on a Shaker Tray

Attach a shake flask clamp to your shaker tray, and insert the CFG guide rail into the clamp. The CFG guide rail should be placed over the base plate of the clamp.

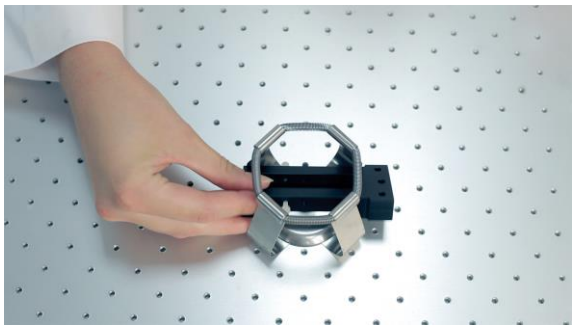

Fig. 6 Placing the CFG guide rail in a shake flask clamp

There are three drill holes in the CFG guide rail. Find a matching hole that allows attaching the guide rail to the shaker tray with a screw. The screw has to be tightened so the CFG guide rail is attached firmly to the shaker tray.

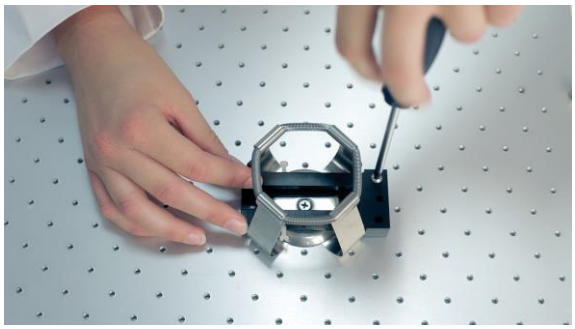

Fig. 7 Fastening the CFG guide rail to the shaker tray with a screw

If screws are not applicable, double sided adhesive tape can be used to attach the CFG to the shaker tray. The tape can be stuck to any part of the guide rail bottom.
Cut the tape no larger than the guide rail. Otherwise it might interfere when putting the optical module into the guide rail.

Fig. 8 Double sided adhesive tape attached to the bottom of the CFG guide rail

Position the CFG guide rail in the clamp (Fig. 6) and push down on it to make sure it is attached firmly.

! Please make sure the CFG is attached correctly and firmly to avoid detachment during shaking movements in the shaker.

2.3.2 Adjustment of the Optical Module to the Vessel Used

Insert the optical module facing upwards into the CFG guide rail.

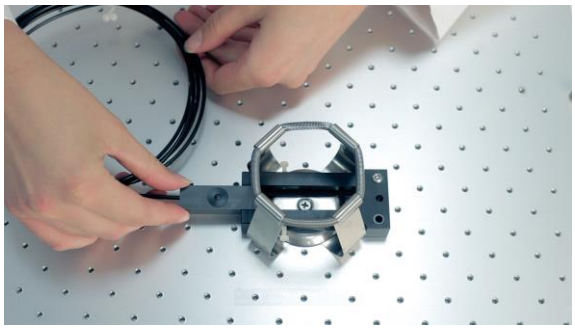

Fig. 9 Placing the optical module in the CFG guide rail

Put the shake flask with the integrated sensor into the clamp on top of the CFG.
The position of the optical module has to be adjusted to the vessel used; the module has to be placed directly under the sensor.

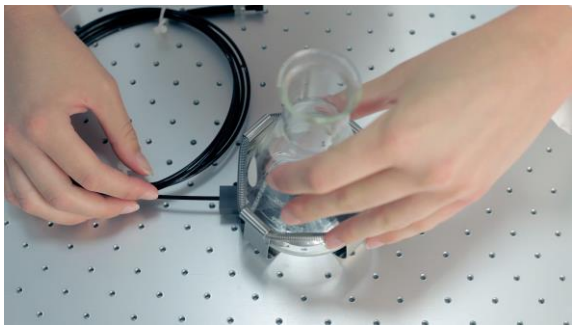

Fig. 10 Positioning the optical module and the sensor integrated in a shake flask

The best position for the optical module can be determined by watching the sensor readout. Carefully move the optical module back and forth in its guide rail and turn the flask until the sensor has the highest measured amplitude. Then the optical module is in optimal position. When the correct position of sensor and optical module is determined, fasten the module in place with the plastic screws on the side of the CFG guide rail.

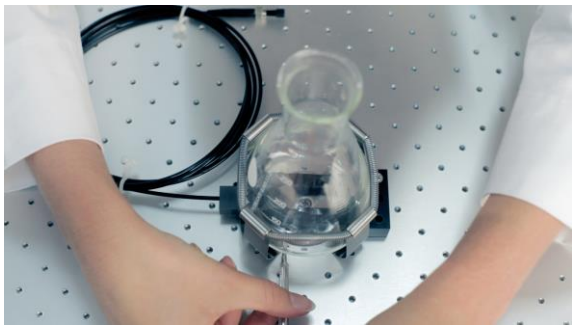

Fig. 11 Fastening the optical module in place

2.3.3 Positioning of the Optical Fiber in the Shaker

The optical fiber has to be lead outside the shaker chamber so it can be attached to the transmitter.

! The optical fiber should not beat against other parts during the shaking movements like other clamps, flasks, the tray or the shaker walls, because its cladding could get damaged by constant friction.

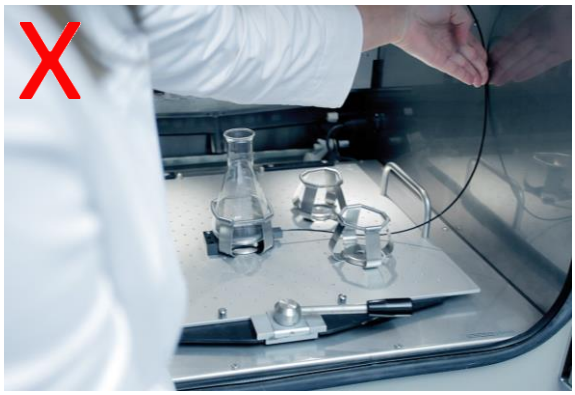

Fig. 12 Wrong positioning of the polymer optical fiber; it will beat against other parts during shaking movements

Run the optical fiber directly upwards and use adhesive tape to attach it to the ceiling of the shaker. The optical fiber should be fixed as far away from the CFG as possible so it hangs freely and shaking movements cause minimal friction at the fixing point. You can use adhesive tape and wrap it around the fiber in the place where it is attached to the ceiling to protect it from damage. Lead the optical fiber along the ceiling of the shaker chamber and outside the shaker.

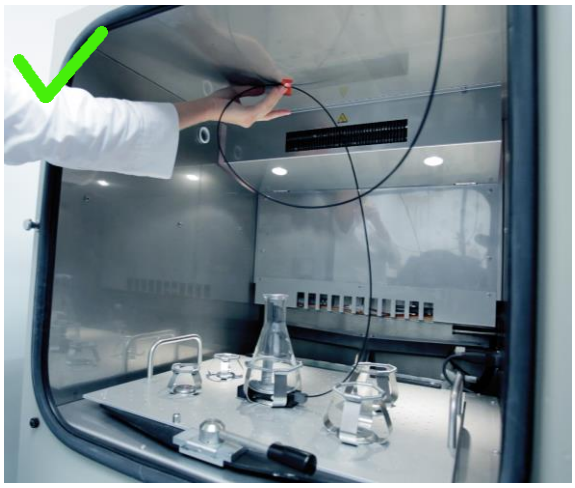

Fig. 13 Right positioning of the polymer optical fiber; adhesive tape is used to hold it in place

If the shaker has an opening, it can be used to run the optical fiber outside, otherwise just lead it out through the shaker door.

2.4 Measurement

Please see the respective fiber optic transmitter instruction manual for more information on sensor calibration and measurement.

In case you are using sensor flasks SFS see the respective instruction manual for more information on operation and sensor specifications.

2.5 Technical Data

	CFG
Specifications	
Dimensions (D x W x H)	Approx. 93.0 x 41.0 x 16.0 mm
Connector Type	SMA socket
Length of Fiber	2.5 m
Compatibility	All devices with SMA connectors, e. g. Fibox 3, pH-1 mini, OXY-4 mini, OXY-10 mini
Details	Compatible with shake / spinner flasks up to approx. 1l (depends on sensor spot position) and other transparent vessels

3 Adapter for Round Containers ARC

The adapter for round containers (ARC) is an adjustable Velcro®-type adapter. It can be used for round containers with diameters of 2.5 to 20 cm (1 to 8 inches). The SMA socket on this adapter must be connected to the polymer optical fiber (POF), which is available as a separate accessory.

Fig. 14 Adapter for round containers ARC

The SMA socket has to be placed right opposite the sensor spot inside the vessel. To hold the ARC in place and keep it from sliding the small rubber pieces are put between the vessel wall and the ARC. Make sure the rubber pieces are not blocking the SMA socket.

3.1 Technical Data

	ARC
Specifications	
Dimensions (D x W x H)	Velcro® strip 1000.0 x 22.0 x 4.0 mm
Connector Type	SMA socket
Compatibility	All devices with SMA connectors, e. g. Fibox 3, pH-1 mini, OXY-4 mini,OXY-10 mini, and others

4 Stick-On Adapter SOA

The stick-on adapter (SOA) is used to attach the polymer optical fiber (POF) to a planar transparent glass or plastic container.
Because of different material combinations and application conditions no general recommendation can be given on what glue to use to attach the SOA to the vessel. Please contact our service team for more information or a specific recommendation!
The SOA is equipped with a SMA socket to connect the POF. The SMA socket has to be placed right opposite the sensor spot inside the vessel.

Fig. 15 Stick-On Adapter SOA

4.1 Technical Data

	SOA
Specifications	
Dimensions (D x W x H)	20.0 x 20.0 x 7.0 mm
Connector Type	SMA socket
Compatibility	All devices with SMA connectors, e. g. Fibox 3, pH-1 mini, OXY-4 mini,OXY-10 mini, and others

5 Vial Adapter for 20 mL SensorVials VA

The Vial Adapter (VA) is used to attach a polymer optical fiber to a 20 mL SensorVial (special glass vial with an integrated oxygen sensor stripe). It is attached to the SensorVial with its drilled hole at the respective position of the sensor stripe using a screwdriver to apply the 2 slotted-head plastic screws.

Fig. 16 Vial Adapter for 20 mL SensorVials VA

Fig. 17 Vial Adapter attached to a 20 mL SensorVial with integrated oxygen sensor stripe

! Do not use other vials or screws, as this might lead to cracking of the glass vial and can cause severe harm.

A POF with 2 SMA connectors is then attached to the Vial Adapter using a third screw. The Vial Adapter can be attached to the SensorVial in different heights for measurement in the liquid phase and the headspace and can also be used in a water bath (T = 2 – 50 °C). The POF is available as a separate accessory (see chapter 6).

5.1 Technical Data

	Vial Adapter VA
Specifications	
Dimensions (Diameter x H)	ø 41 mm x 11 mm, inner ø 28.5 mm
Connector Type	Slotted-head plastic screws
Compatibility	SensorVial-PSt3-20mL together with all oxygen transmitters with SMA connectors, e. g. Fibox 3, OXY-4 mini,OXY-10 mini, and others

6 Polymer Optical Fiber POF

A polymer optical fiber is needed as a light guide between the transmitter and the sensor foil (e.g. oxygen, pH or CO_2). This POF enables non-invasive and non-destructive measurements to be made from the outside through the transparent wall of the vessel. The POF is compatible with sensor devices using 2 mm SMA connectors like e.g. Fibox 3, pH-1 mini, or pCO2 mini.
Different standard lengths, e.g. 2.5 m, and fibers with SMA connectors on one or both sides are available, depending on your adapter or sensor application. For ARC or SOA you will need a polymer optical fiber with SMA connectors on both sides, because it has to be fastened not only to the transmitter but to the SMA socket of the adapter as well.

Fig. 18 Polymer optical fiber POF

6.1 Technical Data

	POF
Specifications	
Dimensions (D x W x H)	Optical diameter 2 mm, outer diameter including black cladding approx. 2.8 mm
Connector Type	SMA socket on one or both sides available for use with adapter for round containers and stick-on adapter
Length of Fiber	Available lengths for the POF are 1.0, 2.5 and 5.0 m (for lengths of more than 5 m please contact our service team)
Compatibility	All devices with SMA connectors, e. g. Fibox 3, pH-1 mini, OXY-4 mini,OXY-10 mini, and others
Details	Temperature stability: The POF is resistant to temperatures up to 70 °C

7 Weights for Dipping Probes

You can use the specially designed weights to keep dipping probes in a stable, fixed position when applying them underwater.

Delivered equipment:

- Metal weight
- 2 holders with socket screws

Additionally required:

- hex key (size 1.5 mm)

1. Put one of the holders over the metal housing of the dipping probe and slide it down to about 8 cm from the dipping probe tip.

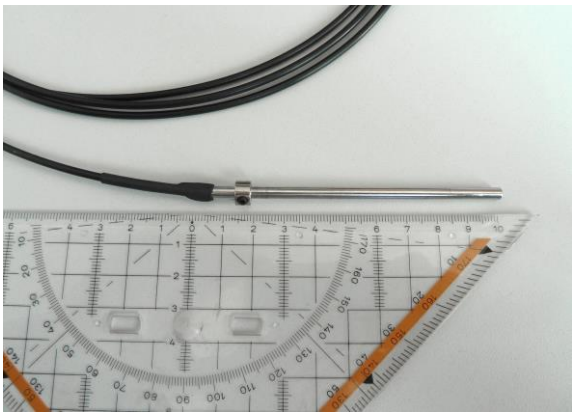

Fig. 19 First holder placed on the dipping probe

2. Then slide the weight over the metal housing of the dipping probe down to the first holder.

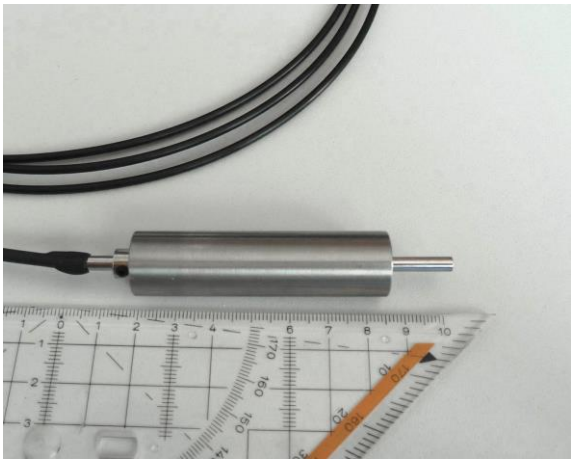

Fig. 20 Weight attached to the dipping probe

3. Afterwards, put on the second holder and place it so it touches the metal weight (about 1 cm from the dipping probe tip).

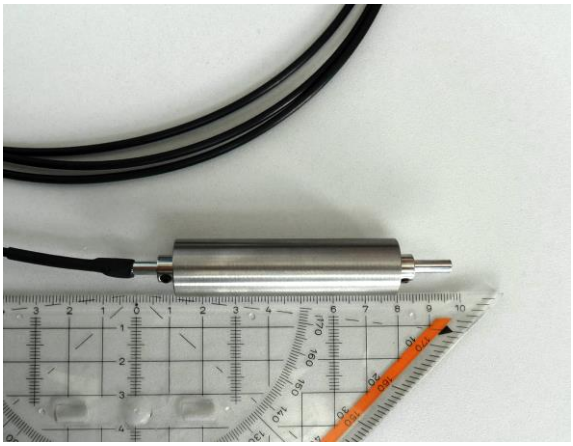

Fig. 21 Second holder placed on the dipping probe

4. Tighten the socket screw in both holders with a fitting hex key. Make sure the screws are fastened properly, so the weight does not move or slide off the dipping probe.

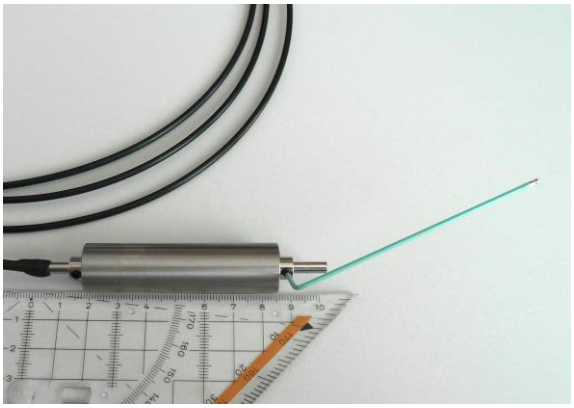

Fig. 22 Fastening the socket screws with a hex key

! Please handle the POF carefully after attaching the weight to the dipping probe to avoid breaking the fiber.

8 Concluding Remarks

Dear Customer,

With this manual, we hope to provide you with an introduction to work with the accessories CFG, ARC, SOA, VA and weights.

This manual does not claim to be complete. We are endeavored to improve and supplement this version.

We are looking forward to your critical review and to any suggestions you may have.

You can find the latest version at www.PreSens.de.

With best regards,

Your PreSens Team

Manufacturer

PreSens
Precision Sensing GmbH

Am BioPark 11
93053 Regensburg
Germany

Phone +49 941 94272100
Fax +49 941 94272111

info@PreSens.de
www.PreSens.de