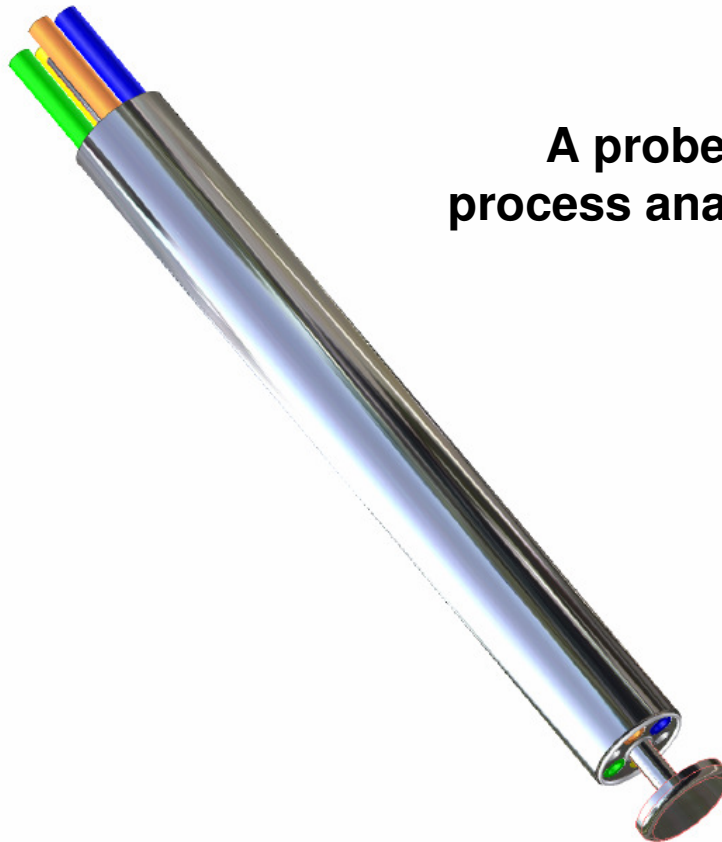


## IPACOS

**A probe carrier system for full automated  
process analytic and in place cleaning capabilities**



## Probe design for analysis in liquids and suspensions

### Features:

- **In-line window wash**
- **In-line window cleanness check**
- **In-line calibration**
- **In-line model development**
- **Full CIP**
- **Enables use off front window probes (IR, NIR RAMAN, UV/VIS etc.)**
- **Simultaneous use of various analytical methods (NIR, UV/VIS, RAMAN etc.)**

## Background:

Based on the ideas related to Lighthouse Probe™ J&M has developed a further probe which can be used in liquids and suspensions.

The German patent already exists.

The probe design has two main options:

1. As carrier for existing standard probes which enables now cleanability at any time. The IPACOS carrier can be opened and closed during the process. It should be able to carry any kind of front window probes like:

Reflection probes (ATR, IR, MIR, NIR, UV-VIS, Raman)

Transmittance probes

FBRM (Mettler Toledo)

Imaging probes like endoscopes

2. As special transmittance probe  
with adjustable path length

combination of transmittance and fluorescence

combination of transmittance and turbidity

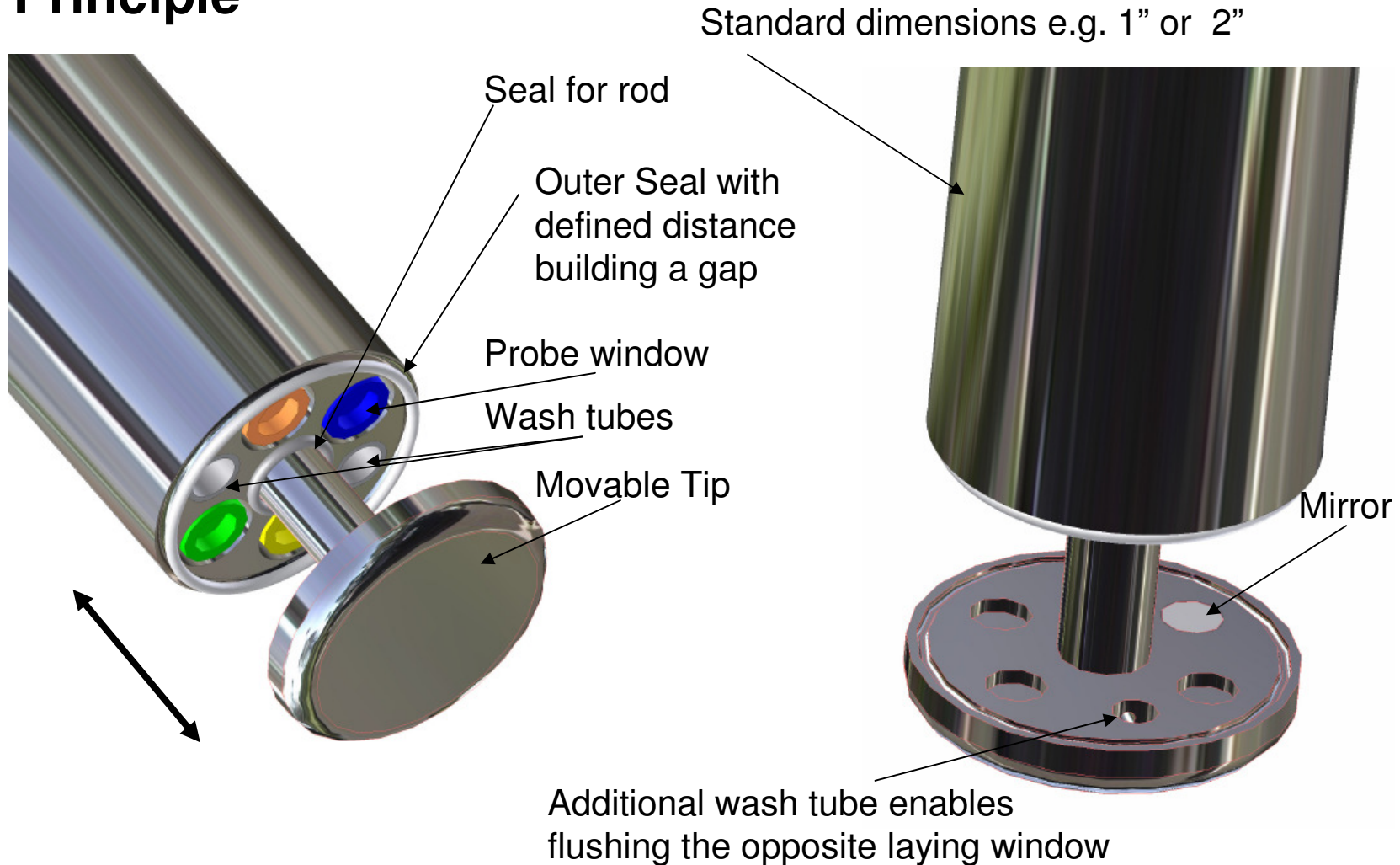
## Features of the Carrier Version

- **In-line window cleanness check**
- **In-line calibration**
- **In-line model development**
- **Manual operation with open - close positions**
- **Automated operation with pneumatic motion and full cleaning options**

## Features of the Transmission Probe Version

- In-line window cleanness check
- In-line calibration
- In-line model development
- Manual operation with 2 positions
- Automated operation with pneumatic motion and full cleaning options
- High precision motion and reproducible pathlength
- Transmission optics or mirror (reflected beam) optics

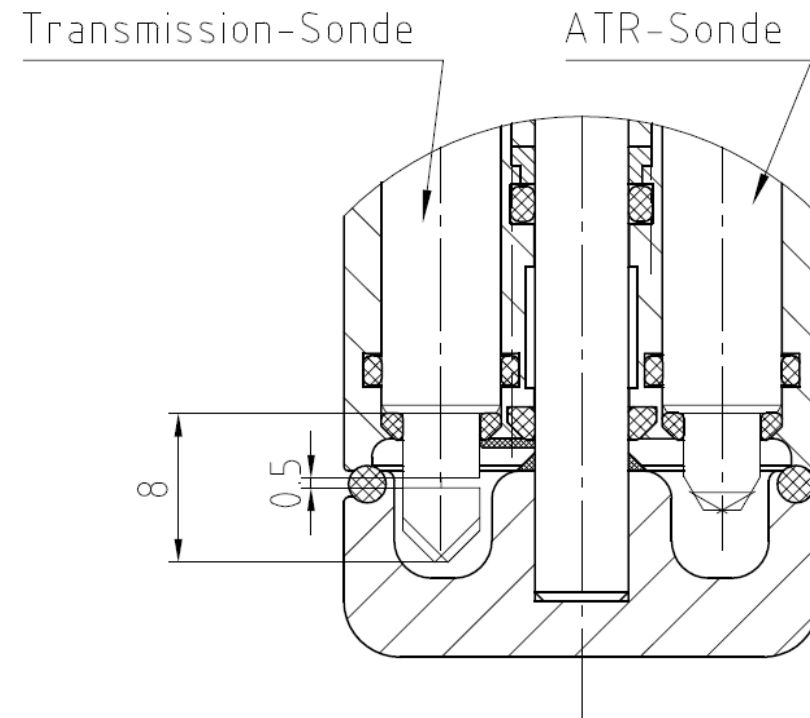
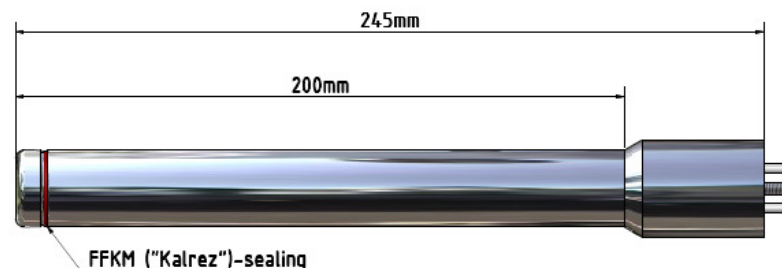
## Principle



## Example with two probes inserted to the IPACOS carrier

The example shows an inserted transmittance probe with 0,5 mm path length and one ATR-probe.

The cap of the carrier is in closed position.



## Principle



The probe carrier can be opened and closed during process. If a cleaning is necessary the tip can be closed by motion. The open position is precise fixed as well as the closed position.

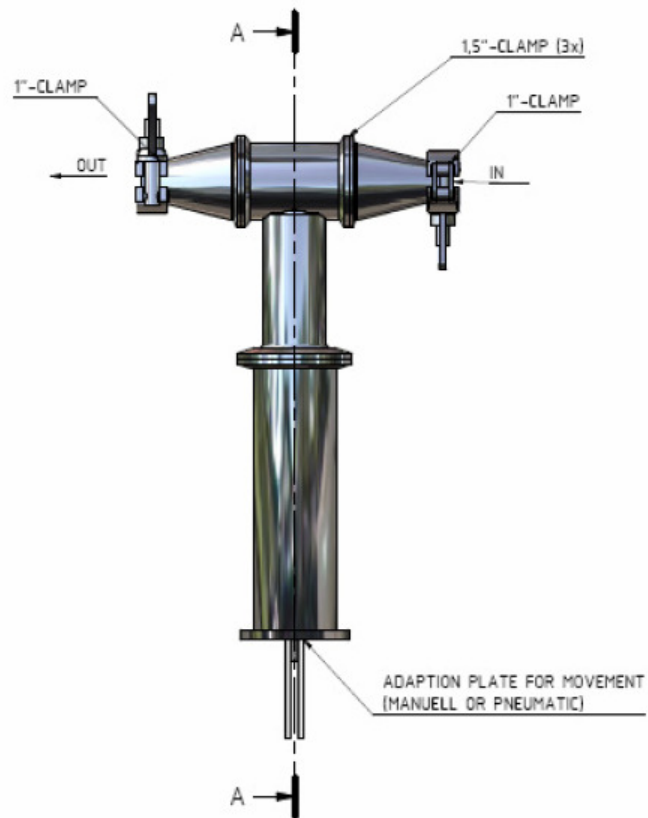
In closed position the tip is pressed against the outer seal and builds a defined gap. This gap can be filled with wash solution. A continuous flow driven by under-pressure cleans the windows.

When the cleaning process has finished a dry process starts (similar to the wash cycle of LHP)

The gap can be used to fill it with reference or calibration solutions. This enables the in-line recalibration but as well the development of models (e.g. without disassembling the probe from a reactor)



## Example adaptation into pipes



Possible flanges are: TC, Swage lock, DIN, others on request

Adaptation to process equipment (pipes, bowls, reactor chambers etc.)

## **Applications:**

- **Crystallisation processes**
- **Fermentation processes**
- **Cleaning Validation**
- **Quality control of raw, intermediate and finished material also under high/total containment**

## **Products:**

- **manual operated for lab applications**
- **fully automated for process applications**