Your Technology Partner

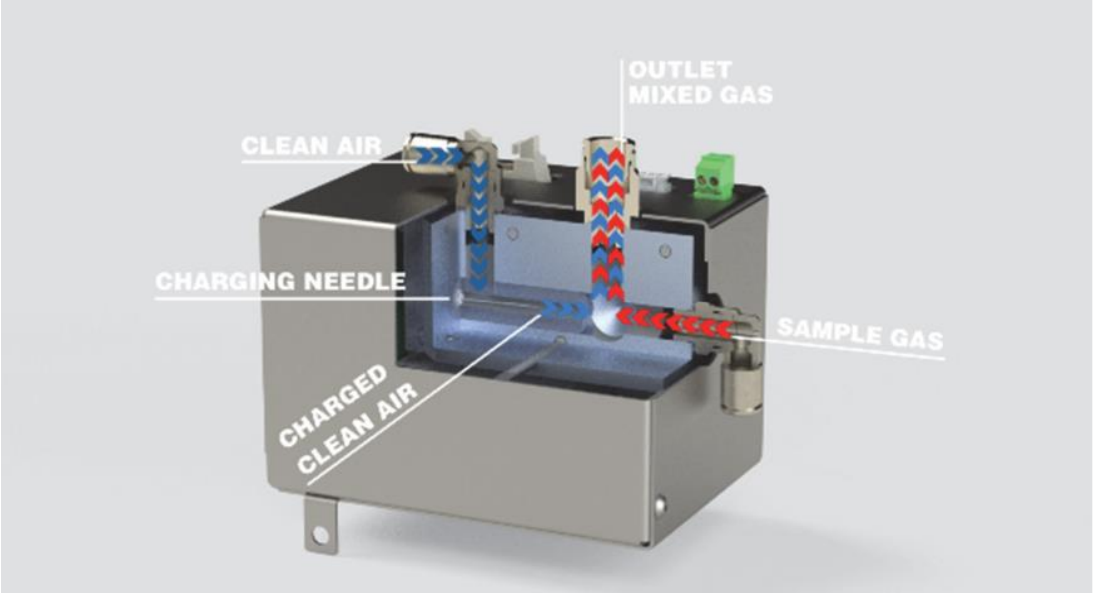
Who we are:

- **Technology partner for PTI equipment manufacturers.**
- **We collaborate with equipment manufacturers and complement their offerings.**
- **Our focus is on technology and development**

Knestel Diffusion Charger Technology

- **Clean Charging Technology**

→ High voltage needle protection



- **Advanced Diffusion charging**

→ Particle Number + Particle Size determination

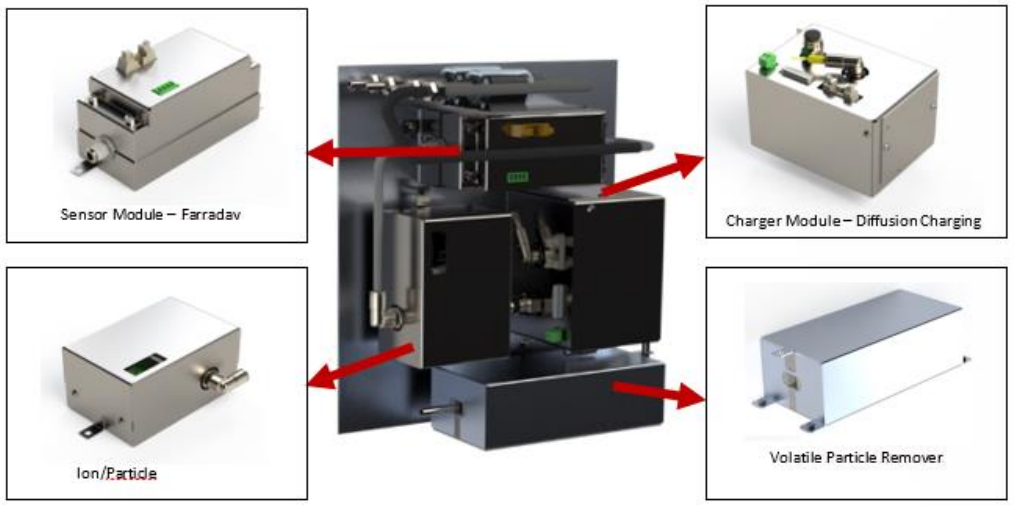
- **High Sensitivity even at small particles**

→ Built-in self-test with ions, sensitivity < 23nm (gasoline)

→ From our point of view both a PN Diesel and Gasoline measurement for PTI could be done with the same DC technology core

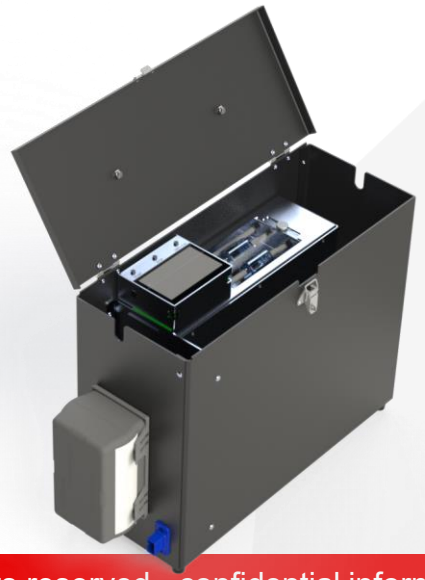
Packaging options

- Type approvals for DE, NL, CH
- For integration into customer housings
- Flexible Module arrangement in every dimension
- **Different configurations available to adapt to the broad range of field environments (water trap, filtering, additional heating, different counting efficiency curves).**



Example customer projects with different packaging options

- Very compact in size
- German type approval



- Box version
- Printer + Display
- Battery operation 10V – 30VDC
- Type approval for CH
- Standalone useage - PTI Software controlled – App controlled

Knestel Salt Particle Calibration Technology

- 1st generation
- **2nd generation**

Adaptions to customer experiences:

- Much smaller and lightweight
- Battery operation
- Additional heating
- Display + PC control

- **Adaptions to future regulations:**
- Extended range possible up to 2M particles
- 70 + 80 nm available, 50 nm option

- As in previous version: continuous particle size monitoring!

Calibration Experience

- Salt calibration well established and proven reliable in field in Germany and Netherlands
- Improved and established traceability chain among different laboratories
- **→ A salt particle calibration still is the most feasible way to perform calibrations in the field**

Setup Correction Factors

→ Field particle counters require an aerosol depending correction factor if calibrated different in the field than for type approval

- Salt is not soot → correction factor required
- soot is not soot! → correction factor required also required for different soot generators
- Salt is (?) salt! → uniform correction factor for salt generators might be feasible based on current studies

Calibration Experience

Size dependancy

- The German legislation allows for calibration in a wide range of particle size 50 – 90 nm
- The difference in counting efficiency can be more than 30% based on recent studies

→ **We recommend a smaller particle size range and a continuous GMD monitoring to ensure repeatable and defined calibration conditions**

Knestel = Technology Partner for Future PTI

→ Visit our booth for further information!

PTI Emission Testing

- NDIR bench for emission tester **(new, check at our booth!)**
- NDUV NO/NO2 sensor for PTI NOx
- CLD Kickdown NOx

Remote Emission Testing

- Photoacoustic NO2 sensor
- CLD Kickdown NOx
- → Both tested for Plume Chasing and extractive road emission monitoring

Condition testing

- Battery state of health
- ADA system testing
- Leakage test for hydrogen tanks
- Electronic OEM equipment for light testing, brake tester safety, suspension tester and many more…

PTI NDIR bench

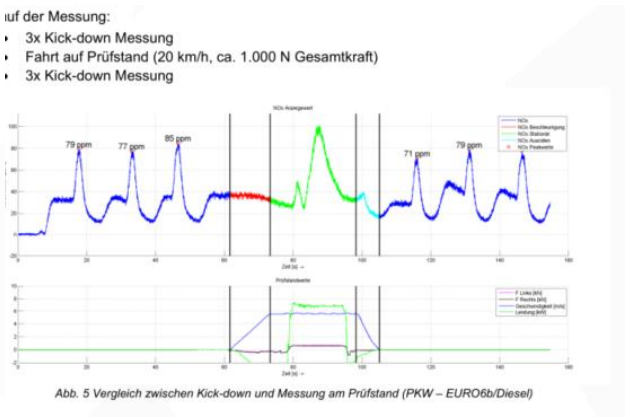


Abb. 5 Vergleich zwischen Kick-down und Messung am Prüfstand (PKW – EURO6b/Diesel)

KickDown NOx measurements

NOx equipment demonstrator

This is how you reach us

KNESTEL Technologie & Elektronik GmbH
Osterwalder Straße 12
D-87496 Hopferbach

Telefon: +49 (0) 83 72 - 70 80
E-Mail: info@knestel.de
Web: www.knestel.de