TMI-Orion

HIGH TECH DATA LOGGING SOLUTIONS
FOR FOOD PROCESSING

TMI-ORION

TMI-Orion

Our core business

- Design and manufacture of high tech embedded data logging solutions for data measurement, validation and quality control of processes in harsh and extreme conditions and environment.
- High and low temperature acquisition electronics operating without thermal shield
- Wide range of miniature and embedded loggers/ real time transmitters

TMI-Orion

The company

- Founded in 1994
- Pioneer in data logger business
- Headquarter in Castelnau Le Lez (France)
- 3 Subsidiaries
  - USA, Morocco, China
- 32 distributors worldwide
- ISO 9001: 2018 certification

TMI-Orion

Measured parameters

Parameters	Measuring range
Temperature	From -90°C to +1600°C
Pressure	From 30mbar to 30 Bar
Humidity	From 2% to 98% HR
Shrinkage	From 0 to 20mm
Air velocity	From 0 to 40m/s
Deformation	From 0 to 20mm
Rotating (nb of laps)	From 0 to 150 laps/ min

And more upon request…

➔ Including data logger acquisition electronics exposed to the temperature range -90°C to +140°C without thermal shield

TMI-Orion

Communication and operating modes

- Communication

Communication	Protocol
Wired	Proprietary protocol
Radio with wired start	2,4GHz
FullRadio (without contact)	2,4GHz

- Operating

Operating
Recording
Recording + radio transmission
Transmission

TMI-Orion

Applications

Many Industries addressed

- Food & Pharmaceutical
- Biotechnology
- Hospital
- Aerospace
- Brick, Tile, Ceramics
- High Heat 1300^{o}C for Metallurgy
- Automotive

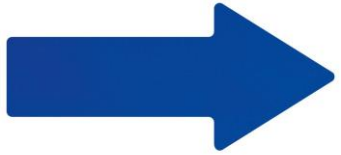
Measurements

- Temperature
- Pressure
- Humidity
- Distance – deformation
- Air Speed
- Rotation
- Force
- Weight

TMI-Orion

Applications

- Sterilization
- Pasteurization
- Cooking
- Freezing
- Freeze drying
- Cold chamber storage
- Drying
- Smoked house
- Transportation



- Thermal cycle validation (F0, PU, CV)
- Thermal distribution test
- Heat penetration test
- Process closed loop control
- Packaging deformation test
- Rotation monitoring
- Microwave cooking
- Oven baking

TMI-Orion

PicoVACQ

D.15mm x L.22mm

Temperature

Temperature / Pressure

Rotation

NanoVACQ

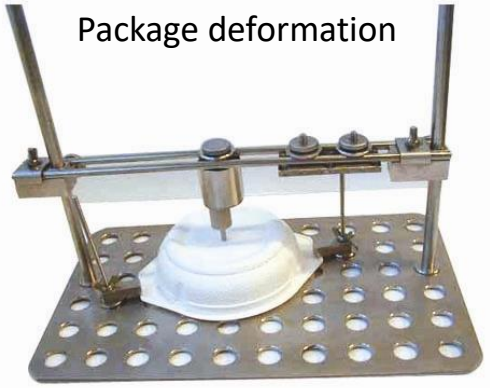
D.31mm x L.39mm

Temperature

Humidity

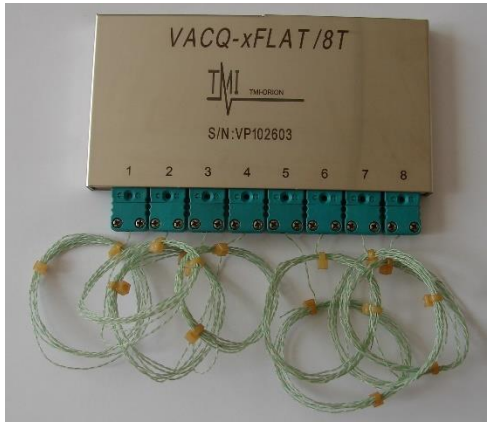
Pressure

Package deformation



Thermocouples

VACQ XFlat



VACQ

Autoclave

PicoVACQ and NanoVACQ loggers (temperature, pressure, humidity)

PicoVACQ
D.15mm or 16mm
Length from 22mm
Up to 2 Channels

NanoVACQ
D.31mm
Length from 39mm
Up to 3 Channels

PicoVACQ & NanoVACQ

- Watertight under pressure (except humidity and Tdi loggers)
- Biocompatible
- 0 to 140°C, +/-0.1°C accuracy
- RTD based (not thermocouple) – Calibration: once a year
- -80 to 350°C = Cold storage, Lyophilization, Autoclaves, Depyrogenation
- 30mbar to 5 Bar = Steam autoclaves
- 2 to 98% RH = Stability chamber, EtO sterilization, Incubators…

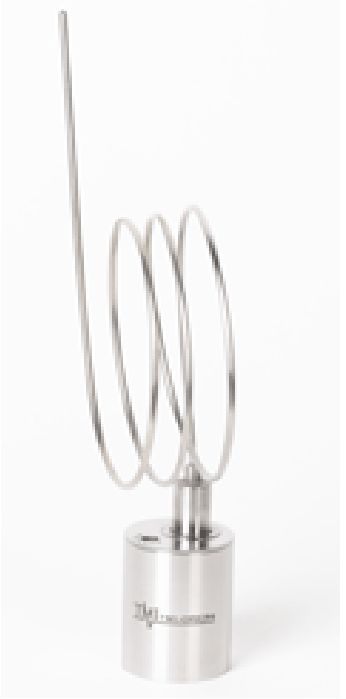
NanoVACQ

- Larger Battery for extended lifetime
- Available with 2.4 GHz FM and FullRadio for Real Time Data
- Recommended for Routine use
- Operating down to -90°C for low temperature freezers

PicoVACQ and NanoVACQ loggers (temperature)

PicoVACQ & NanoVACQ

- Available with different Pt100 rigid, flexible and semi rigid probes (SS316L, Viton, Teflon)
- Interchangeable probe on Tdi versions, non watertight
- Watertight under pressure (except Tdi versions)
- Biocompatible
- -80°C to 350°C depending on the versions
- Calibration: Once a Year



TMI-Orion

PicoVACQ & NanoVACQ Temperature Loggers

PicoVACQ

D.15mm x L. 22mm
Up to 2 channels

1Tc

1Td

Available with threaded base

1Tc = One Temperature Channel up to 220mm
1Td = One Long Probe up to 1000mm

NanoVACQ

D.31mm x L.39mm
Up to 3 Channels

1Tc

1Td: 316SS, PFA or Viton cables

PFA Flexible probe watertight

1, 2 or 3 Td

1Td

1Tc-2Tdi

Available with threaded base

TMI-Orion

PicoVACQ temperature probes

PicoVACQ

D.15mm x L.22mm

Up to 2 Channels

- 1,9mm probe, fits in Ellab packing glands. Needs a packing gland to operate (fragile), but quick response time
- Hybrid probe, for quicker response time vs 3mm diameter
- 3mm probe, standard logger, 10,15,20 or 30mm long, up to 220mm
- Flexible PFA probe, watertight inside autoclave, PicoVACQ 1Td, up to 1m
- Remote and interchangeable temperature Pt100 sensor, PicoVACQ 1Tdi, not watertight to steam
- Semi rigid SS316L probe, D.2mm, length up to 1m
- Threaded base to adapt on positioning kits on rigid sensors

TMI-Orion

PicoVACQ battery packs

PicoVACQ

D.15mm x L.22mm
Up to 2 Channels

Temperature	-70°C ~ +85°C	015 PW	D.15 mm - L.37.5 mm
	-70°C ~ +140°C	016 PTA	D. 16 mm - L.60.3 mm
	-40°C ~ +140°C	016T(*)	D.16 mm - L.35 mm
	-40°C ~ +100°C	015 M	D.15 mm - L.29.5 mm
	0°C ~ +140°C	015 P(**)	D.15 mm - L.13 mm

- Operating range from -80°C to 140°C
- User replaceable
- Threaded base to mount on positioning kits
- Length from 13mm to 63mm
- No wrench required

TMI-Orion

NanoVACQ temperature probes

NanoVACQ

D.31mm x L. 39mm

Up to 3 Channels

- Operating range from -90°C to 140°C, all watertight
- Rigid (D.3mm) or hybrid probe
- Flexible probe, combined with rigid probe, heat penetration and environment
- Threaded base to mount on positioning kits
- Up to 1m long

TMI-Orion

NanoVACQ battery packs

NanoVACQ

D.31mm x L. 39mm

Up to 3 Channels

NanoVACQ

Pressure Temperature	-30°C(*) ~ +85°C	014 ZFL	D.31 mm - L.125 mm
	-30°C(*) ~ +140°C	Routine-HE	D.31 mm - L.39 mm
	0°C ~ +125°C	014 Z	D.31 mm - L.31 mm
Pressure Temperature Radio and FullRadio	-30°C(*) ~ +85°C	014 ZFL	D.31 mm - L.129 mm
	-30°C(*) ~ +140°C	Radio-HE	D.31 mm - L.52.2 mm
Temperature	-90°C ~ +85°C	014 ZFL	D.31 mm - L.125 mm
	-55°C ~ +140°C	Routine-HE	D.31 mm - L.39 mm
	0°C ~ +125°C	014 Z	D.31 mm - L.31 mm
Temperature Radio and FullRadio	-90°C ~ +85°C	014 ZFL	D.31 mm - L.129 mm
	-55°C(**) ~ +140°C	Radio-HE	D.31 mm - L.52.2 mm

- Operating range from -90°C to 140°C
- User replaceable
- Threaded base to mount on positioning kits
- Length from 31mm to 129mm
- Special opening wrench supplied

TMI-Orion

MiniVACQ, NanoVACQ Flat loggers

MiniVACQ

D.15mm x L.40mm

- -40°C to 100°C, +/-0,5°C accuracy
- Watertight under pressure
- 316SS Food compatible
- RTD based (not thermocouple)
- Calibration, once a year
- Freezers, pasteurization…

NanoVACQ Flat

D.40mm x L.11mm

- 0°C to 140°C, +/-0,1°C accuracy
- Watertight under pressure
- 316SS Food compatible
- Available with threaded base
- RTD based (not thermocouple)
- Calibration, once a year
- Autoclave,…

TMI-Orion

PicoVACQ Rotation

PicoVACQ Rotation

D.15mm x L.22mm

- 0°C to 140°C
- Up to 150 rpm
- Résolution : ½ tour
- Watertight under pressure
- 316SS Food compatible
- Continuous sterilizer

PicoVACQ and NanoVACQ loggers (temperature, pressure)

PicoVACQ & NanoVACQ

- Operating from -30°C to 140°C, and from 30mbar to 15 Bar (30 Bar upon request)
- Watertight under pressure up to 30 Bar
- Biocompatible
- Calibration: Once a Year
- Autoclave, pasteurizers, filling processes…

PicoVACQ PT

D.16 or 17mm x L.35mm

2 Channels

Operating from -30 to140°C, Uncertainty +/-0,1°C
Operating from 30mbar to 15bar, Uncertainty +/- 30mbar
Operating from 30mbar to 30bar, Uncertainty +/- 100mbar

Up to 4Hz Sampling Rate

NanoVACQ PT-TC

D.31mm x L.39mm

3 Channels

Operating from -30 to140°C, Uncertainty +/-0,1°C
Operating from 30mbar to 5bar, Uncertainty +/- 10mbar
Operating from 30mbar to 15bar, Uncertainty +/- 12mbar

Up to 10Hz Sampling Rate

Configurations

- PT
- PT-TC
- PT-Td
- Radio and FullRadio

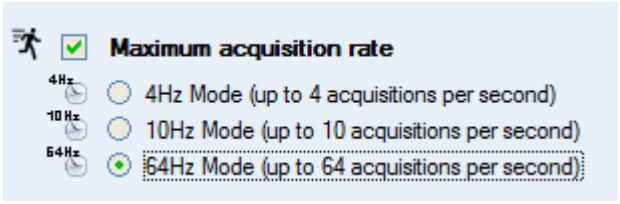
TMI-Orion

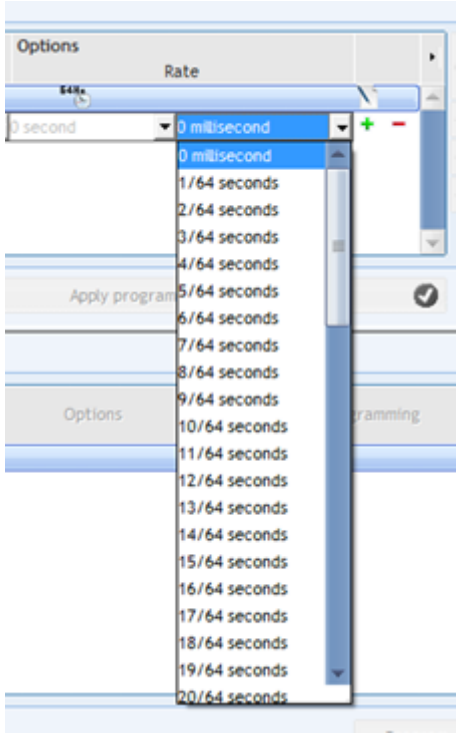
PicoVACQ PT 64Hz

PicoVACQ PT 64Hz

D.16mm x L.57mm

2 Channels





Needs Qlever software to operate

TMI-Orion

NanoVACQ Deformation - Distorsion

NanoVACQ Deformation

D.31mm x L.62mm

- From 0°C to 140°C,
- From – 10mm to +10mm, uncertainty +/-0,1mm
- Radio transmission available
- Watertight
- Calibration, once a year
- Rotative and static autoclaves

PicoVACQ and NanoVACQ loggers (temperature, humidity)

PicoVACQ & NanoVACQ

- Operating from 0°C to 80°C or 140°C, and from 2 to 98% RH
- Non watertight under pressure
- Biocompatible
- Calibration: Once a Year

PicoVACQ HT

Operating from 0°C to 80°C, Uncertainty +/-0,1°C
Operating from -30°C to 0°C, Uncertainty +/-0,2°C

Operating from 2 to 98% RH, Uncertainty +/- 3,5% RH (2% RH as an option)

NanoVACQ HT

Operating from 0°C to 140°C, Uncertainty +/-0,1°C
Can operate down to -60°C if required

Configurations:
- HT
- HT-TC
- HT-Td

Operating from 2 to 98% RH, Uncertainty +/- 3,5% RH (2% RH as an option)

ATEX compliance: PicoVACQ and NanoVACQ loggers
(temperature, pressure, humidity)

PicoVACQ EX versions, ATEX marking II 1 G Ex ia IIC T6 Ga

- Available in temperature, temperature/pressure and temperature/humidity versions
- Operating from -30°C to 70°C, from 30mbar to 15 Bar and from 2% to 98% RH

➔ *Thus, PicoVACQ 1Tc Ex and PicoVACQ PT Ex used with 015P battery pack, can be used in non explosive environment up to 140°C*

NanoVACQ EX versions, ATEX marking II 1 G Ex ia IIC T3 Ga

- Available in temperature, temperature/pressure and temperature/humidity versions
- Operating from -30°C to 140°C, from 30mbar to 15 Bar and from 2% to 98% RH

NanoVACQ EX

Available versions :
1Tc
1Td
PT
PT-TC
HT

PicoVACQ EX

Available versions:
1Tc
PT
HT

TMI-Orion

VACQ Xflat, thermocouples

- Operating range without protection, from -55°C to 140°C,
- Available with 4, 8 and 16 thermocouples
- Type T, K, B, S, N or R thermocouples
- Height 20mm
- Not watertight
- Calibration, once a year
- Ovens mapping or baking processes…

VACQ XFlat loggers (temperature)- Thermal shield

Thermal shield S045160204

Dimensions:
45mm high
160mm wide
204mm long

- Up to 400°C with special shields designed for baking processes
- For 4 thermocouple VACQ Xflat for instance, thermal shield S045160204

Materials	Performances
PEEK, Microtherm, SS	60 mn @ 250°C 30 mn @ 350°C

TMI-Orion

Glass

Pouch

Can

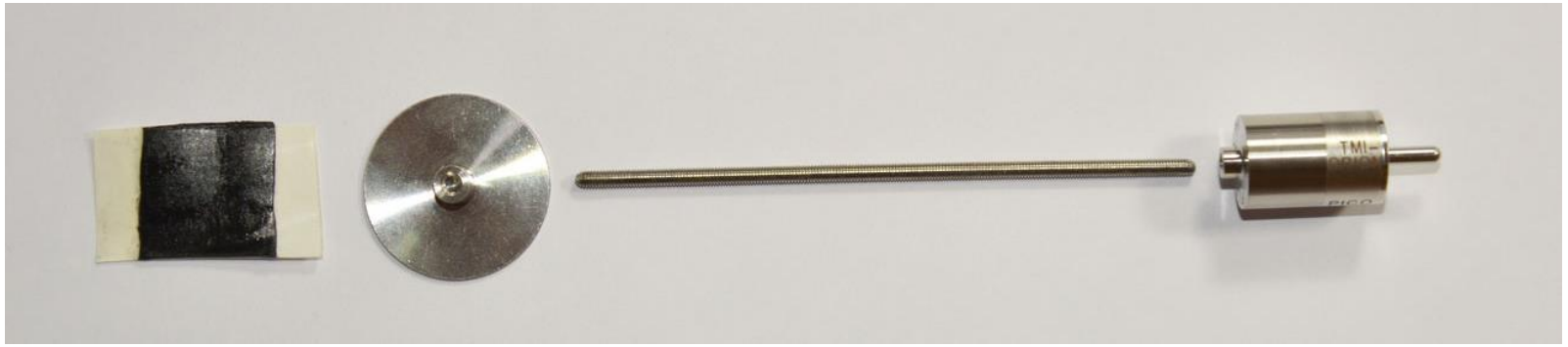
TMI-Orion

Stick the logger

- Cans
- Glass and plastic bottles
- Glass jars
- Plastic containers

Needed:

- A piece of high temperature double side tape
- Plate
- Threaded rod, used to adjust the height
- Logger like PicoVACQ or NanoVACQ Flat



➔ No hole to the container

Stick the logger

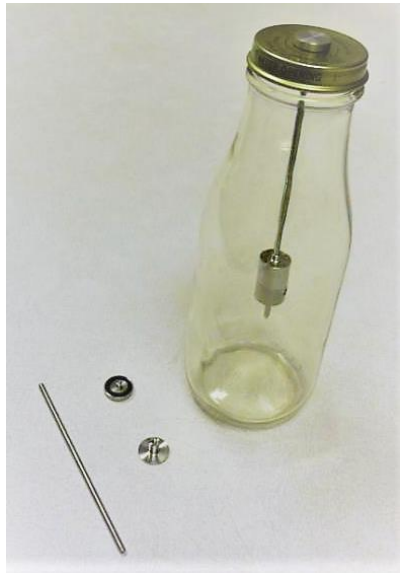
Needed:

- A piece of high temperature double side tape
- Logger like PicoVACQ (light logger)

➔ No hole to the container

- Cans
- Glass and plastic bottles
- Glass jars
- Plastic containers

Pierce a hole in the container



Needed:

- An external plate with a thread (D.3mm), round or square
- An o’ring
- The internal plate
- A Threaded rod
- A PicoVACQ logger

➔ Diameter of the two plates can be adjusted to fit any container

TMI-Orion

- Cans
- Glass and plastic bottles
- Glass jars
- Plastic containers

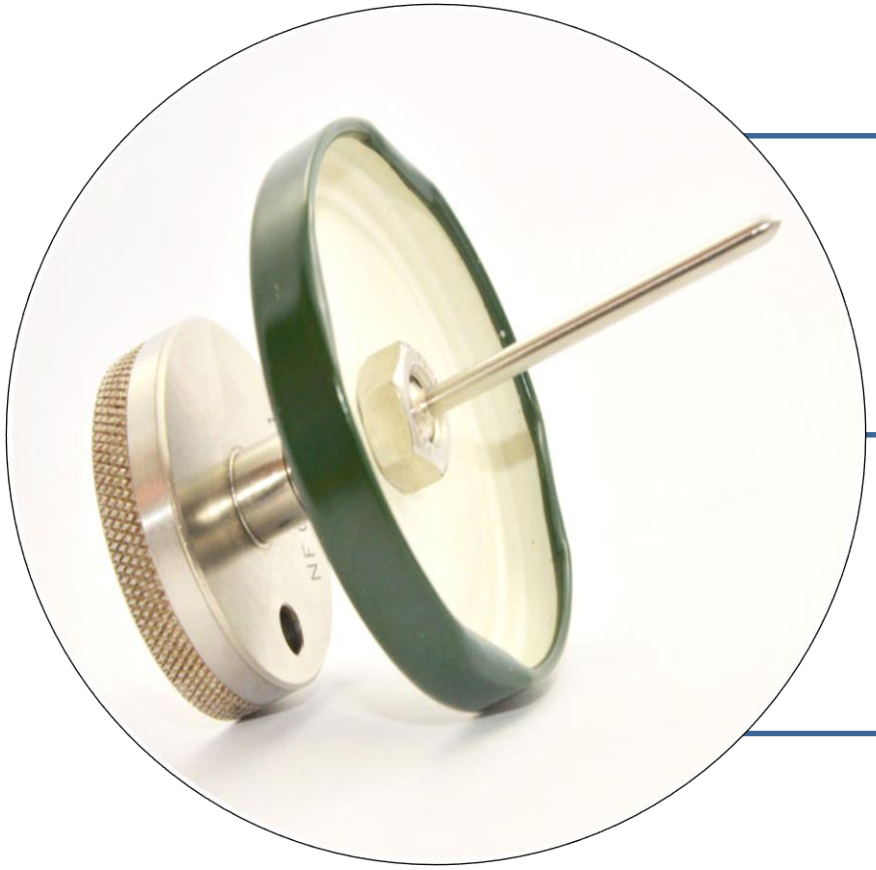
Pierce a hole in the container

Needed:

- A sheath, length to figure out
- An o'ring
- A milled nut
- A 15mm diameter spacer
- A logger with M5 threaded base

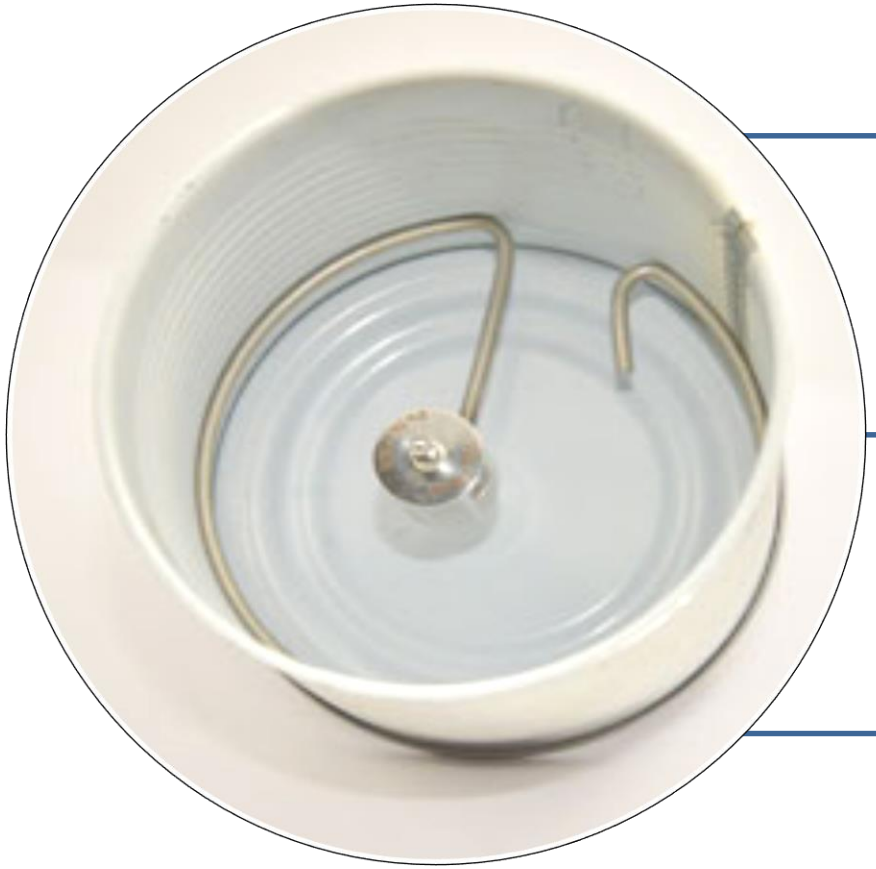
➔ Logger is kept outside of the container

TMI-Orion

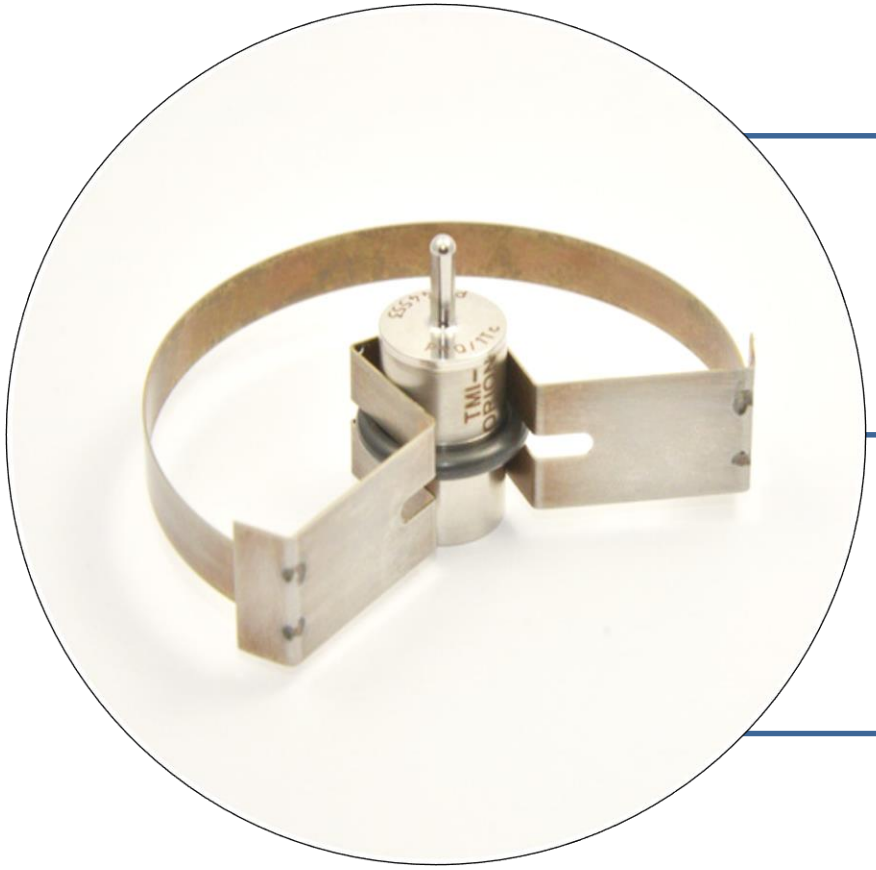


TMI-Orion

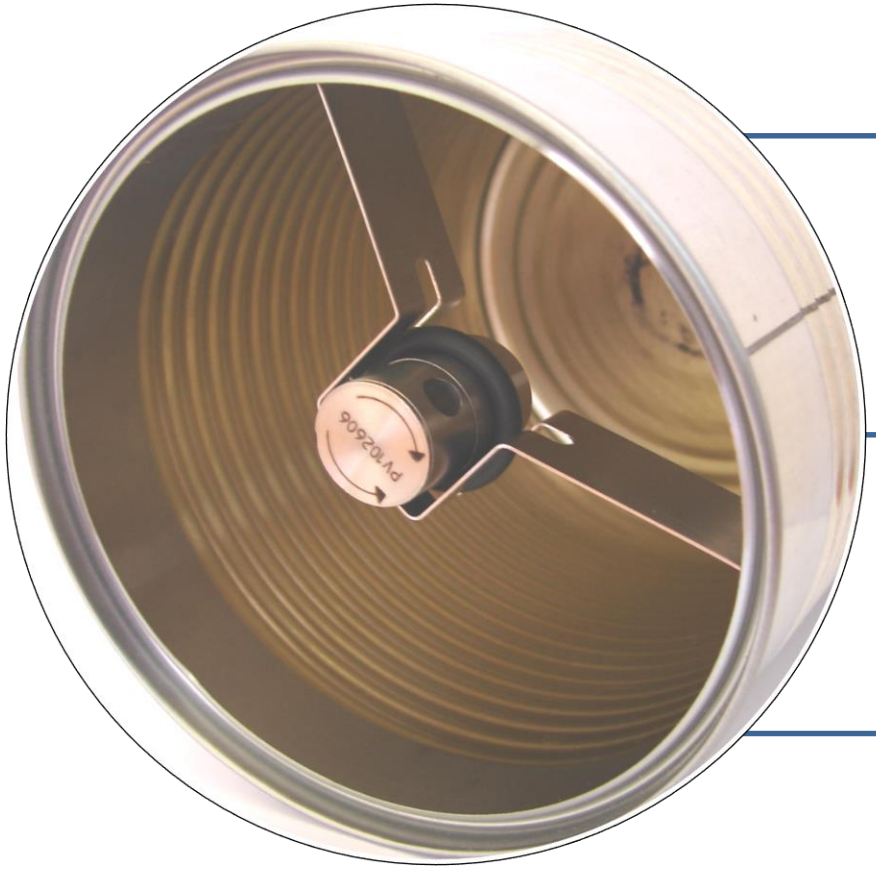
TMI-Orion

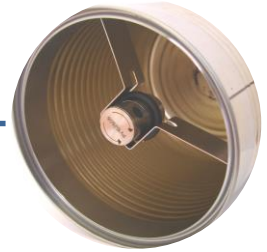


TMI-Orion

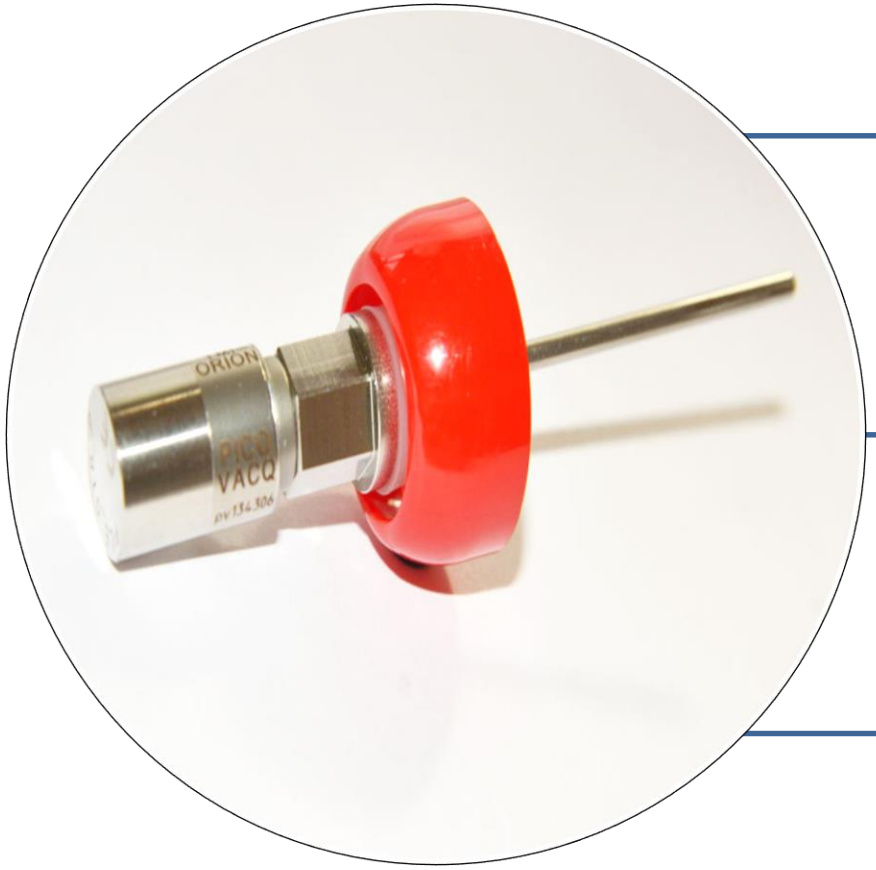


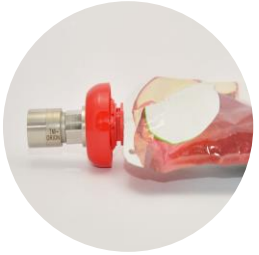
TMI-Orion



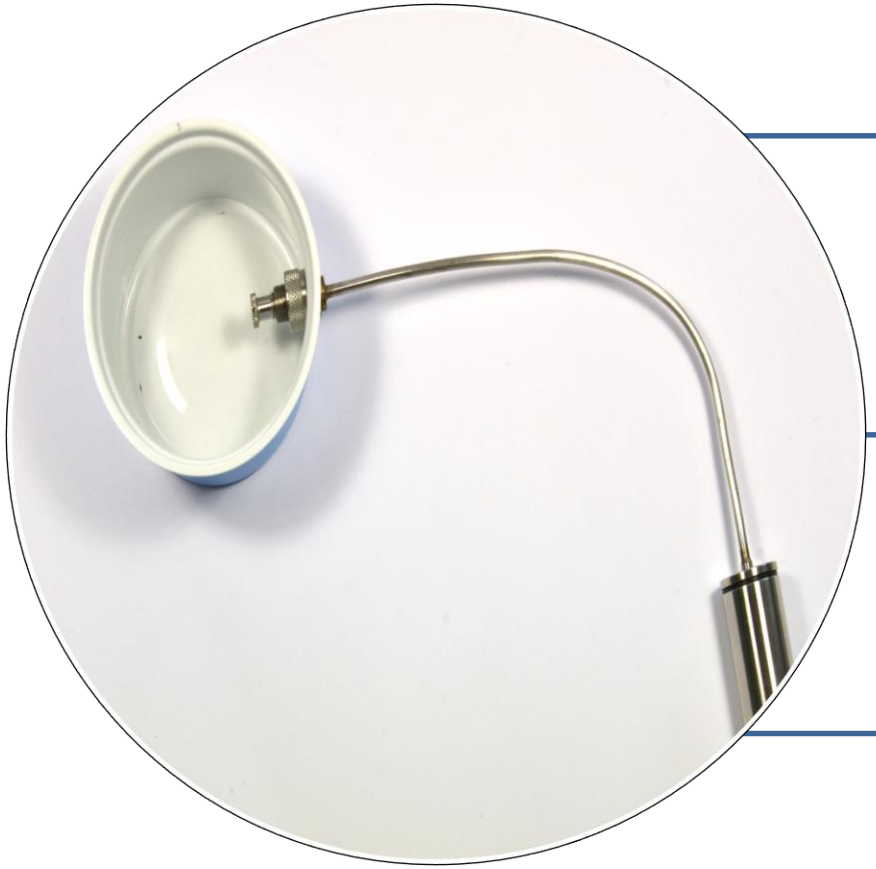


TMI-Orion

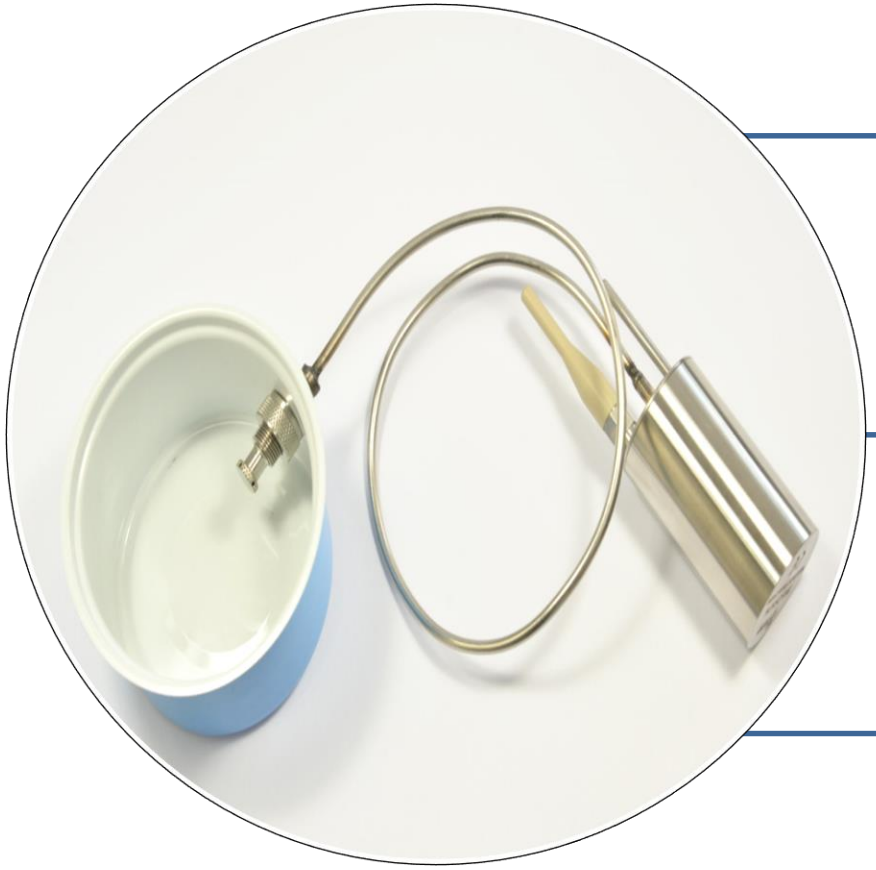




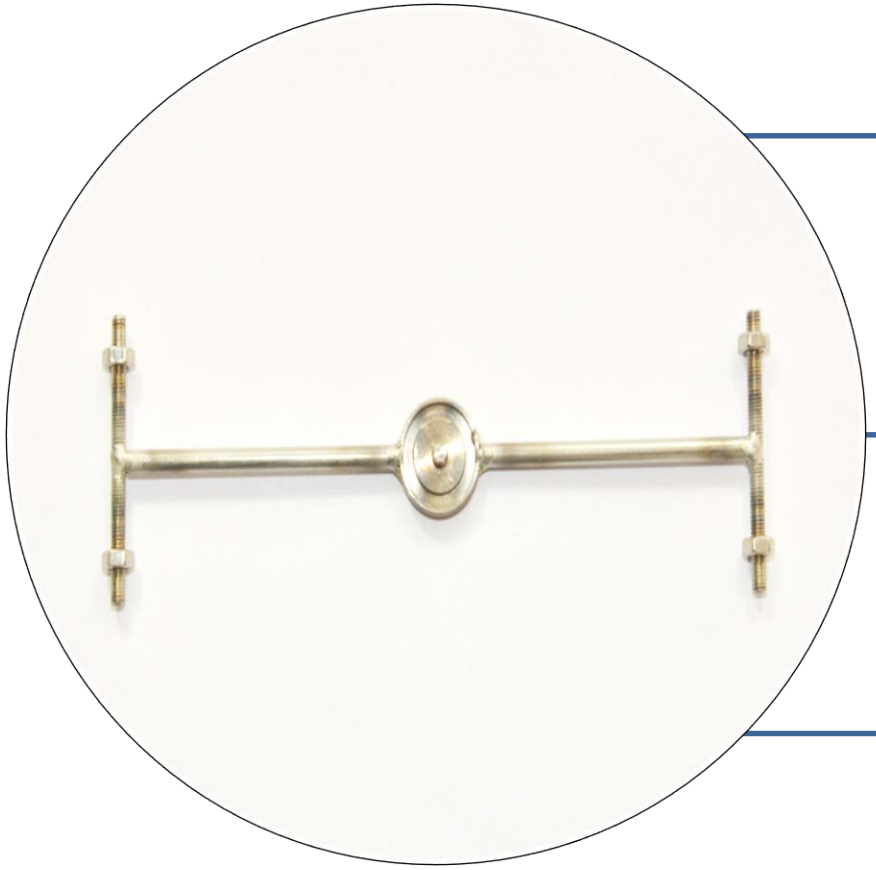
TMI-Orion



TMI-Orion

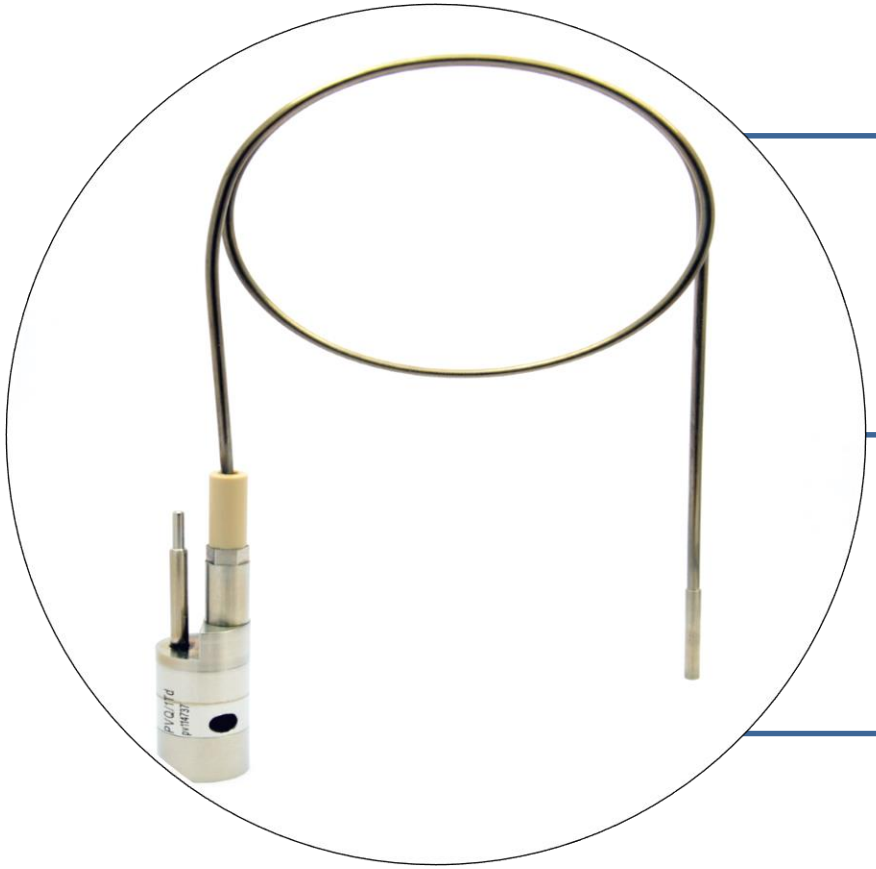


TMI-Orion

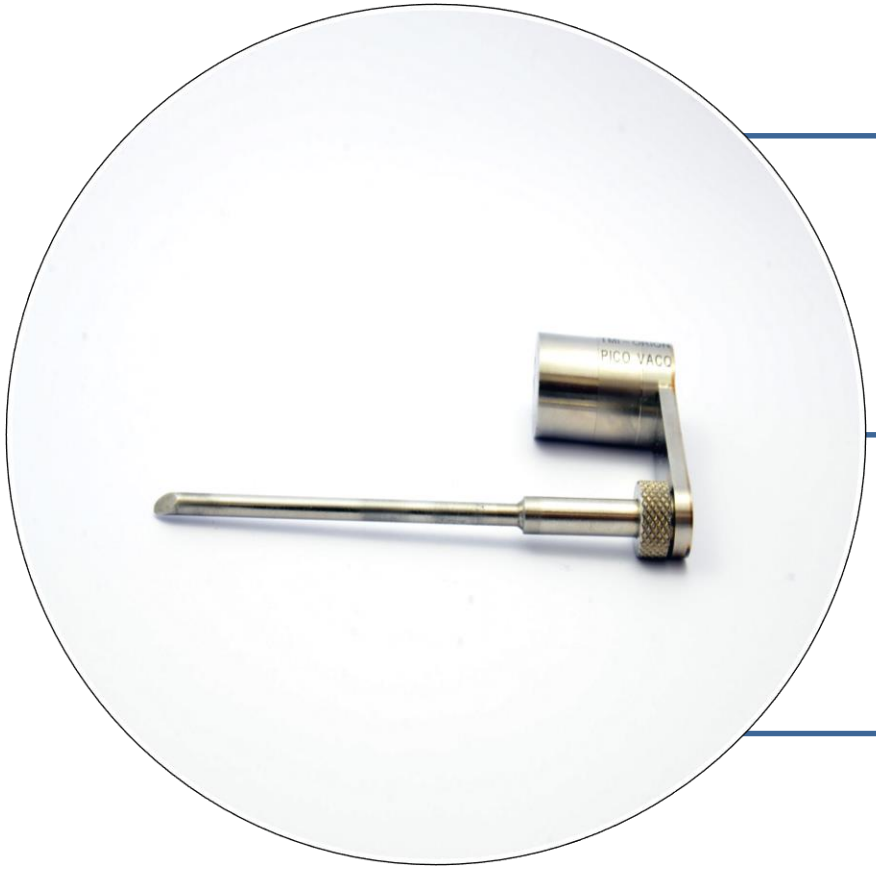


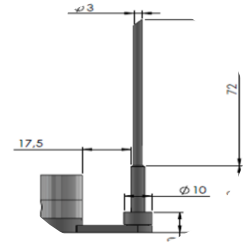
TMI-Orion

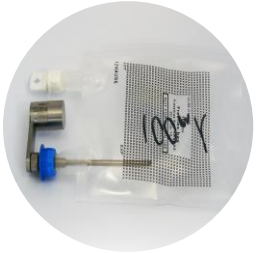
TMI-Orion



TMI-Orion







Wireless data logging systems: recording and REAL TIME READING

- NanoVACQ Radio or FullRadio

- VACQ Xflat Radio or FullRadio

Wireless data logging systems: recording and REAL TIME READING

Radio & FullRadio

- Simultaneous recording and real time reading
- Radio receiver/transmitter required
- Similar operating ranges to standard loggers
- Longer metallic cover on NanoVACQ's compared to standard ones
- Qlever software **mandatory**

- Applications: similar to standard loggers but taking in account radio transmission limitations

Wireless data logging systems: Radio loggers

Radio

- Mandatory contact with the logger
- **USB communication interface** required to program, start/stop loggers and download data
- Radio receiver/transmitter required
- Similar operating ranges to standard loggers
- Longer metallic cover on NanoVACQ's compared to standard ones
- Qlever software mandatory
- Applications: similar to standard loggers but taking in account radio transmission limitations

Wireless data logging systems: FullRadio loggers

FullRadio

- No contact with the logger
- Communication done **through radio waves**
- Radio receiver/transmitter required as a communication interface
- Ethernet, USB, RS485 connections for the receiver

➔ No need to stand near the loggers to program/start/stop/read them

- Similar operating ranges to standard loggers
- Longer metallic cover on NanoVACQ's compared to standard ones
- Qlever software mandatory
- Applications: similar to standard loggers but taking in account radio transmission limitations

FullRadio loggers: Radio receiver/transmitter

Features

- Communication done **through radio waves**
- Ethernet, USB, RS485 connections for the receiver

➔ No need to stand near the loggers to program/start/stop/read them

- No limitation of the number of the managed loggers

FullRadio loggers operating mode

TMI ORION Full Radio
2.4GHz logger

Receiving the data

Programming the logger

TMI ORION Radio Receiver and
transmitter

FullRadio loggers

Applications:

- Real time data from loggers inside autoclaves
- Program, start, stop, read loggers without touching them
- Great feature for limited access applications such as low temperature freezer where opening the door requires an 8 hour stabilization time afterwards

FullRadio loggers

Typical Application:

- Program and set up **standard or radio data loggers** inside packagings on a basket takes a long time. When the sterilization cycle is about to start, if a problem occurs with the steam generator, then the cycle start is delayed for 3 hours. All loggers have to be retrieved, stopped and reprogrammed, which means: take all baskets out, open all packagings, remove and set the loggers back in place, close the packagings and push the baskets inside the autoclave… ➔ **Wasted time and money**
- With the **FullRadio data loggers**, all you need is to click on the Qlever software to stop the loggers and come back when the cycle is ready to start, then click on start button. It only takes a few minutes to restart the system and adapt your loggers to the new cycle parameters. ➔ **Save time and money**

FullRadio loggers

Radio standards

- R&TTE Directive 1999/5/CE (EU)
- FCC Part 15.247 (US)
- RSS-210 (Canada)
- ARIB TELEC (Japan)
- KCC RWA 58-2 (Korea)

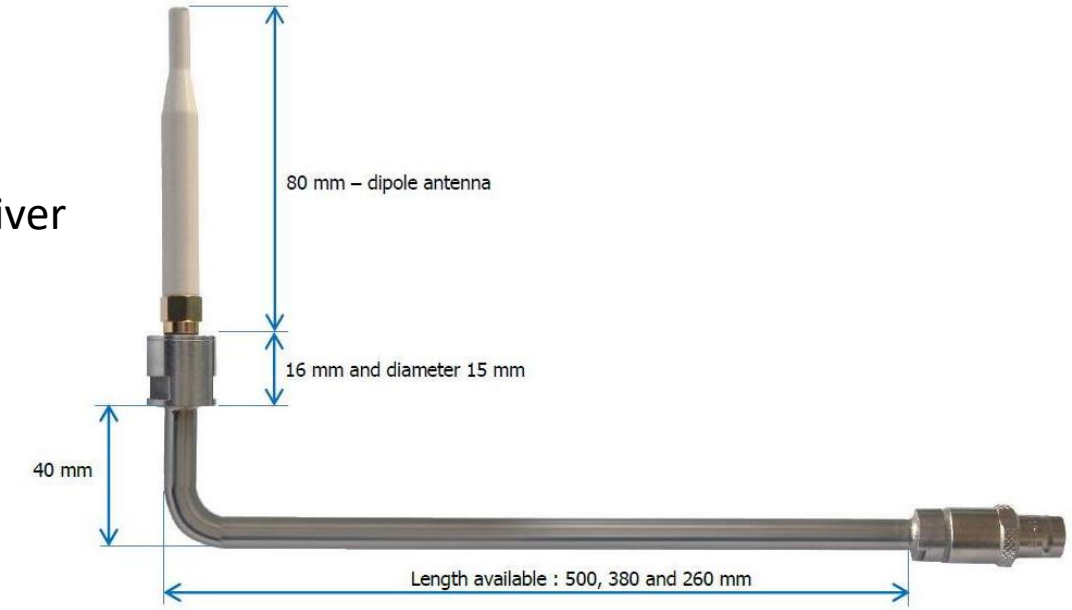
FullRadio loggers

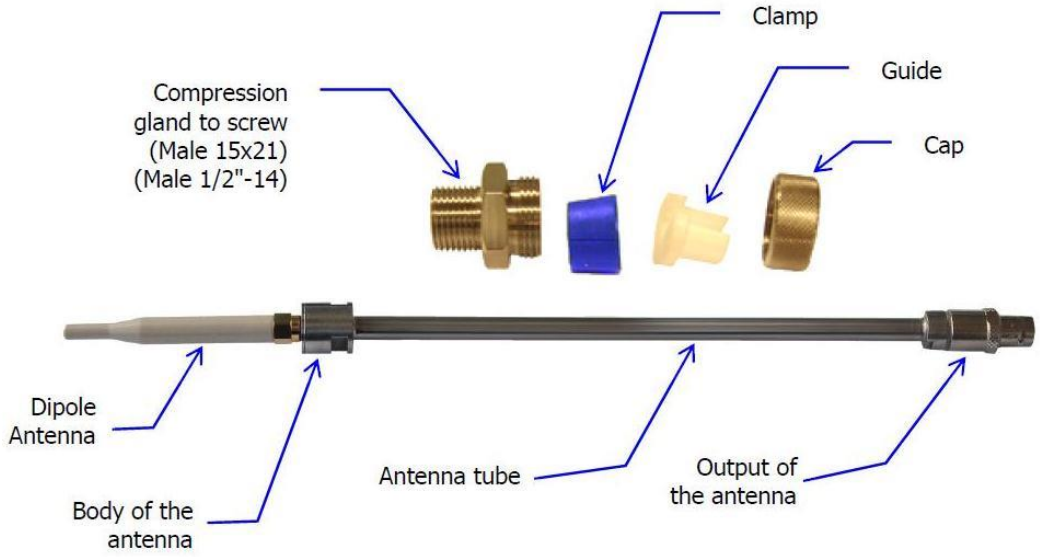
- Frequency Band: 2.4GHz ISM band (2.405 GHz to 2.480 GHz with 16 channels available for worldwide).
- Communication protocol : IEEE 802.15.4
- Frequency Band : 2.405 GHz to 2.475 GHz with 14 channels.
- Output power: Maximum 5 dBm (3.2mW).

Receiving antenna

Transmission efficiency

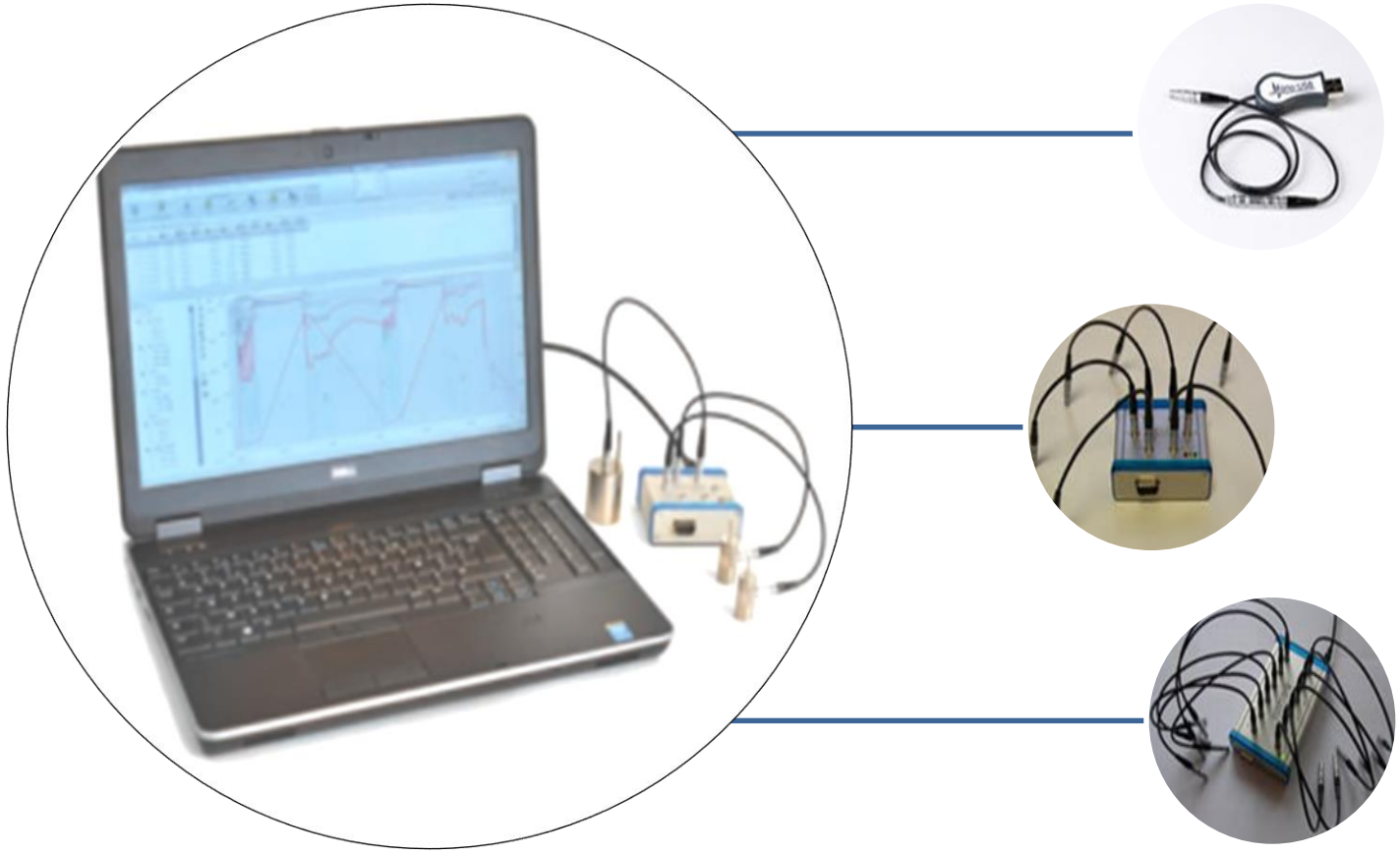
- To optimize data transmission between loggers and radio receiver
- Inserted inside vessels such as autoclaves
- Mounted on the vessel feed through devices
- Different adaptors available for the feed through devices
- Different shapes, straight or right angled
- Different lengths, up to 500mm





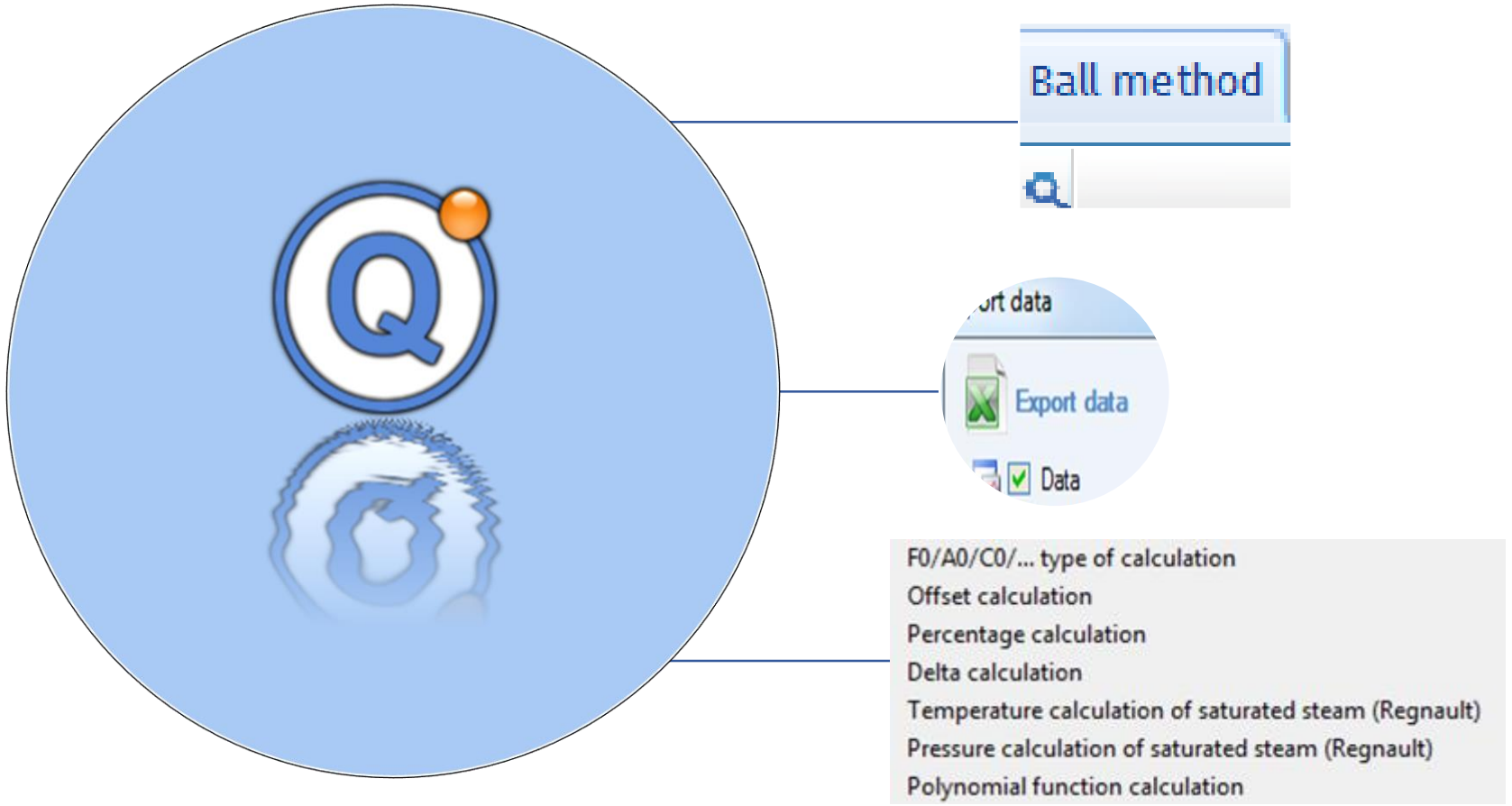
TMI-Orion

QLEVER Software



TMI-Orion

QLEVER Software



TMI-Orion

Qlever Modules

- FDA 21 CFR Part 11
- Pharma (Statistics + FDA 21 CFR Part 11)
- Autoclaves validation➔ ISO17665
- Washer disinfector validation➔ ISO15883
- Mapping➔ FDX 15 140
- Calibration (Expert, Automated or Manual mode)

TMI-Orion

Qlever Modules

		Pharma	Hospital	Food	Other industries
QLEVER Lite				X	X
QLEVER		X	X	X	X
QLEVER Modules	FDA 21 CFR Part 11	X			
	Statistics	X		X	X
	Pharma	X			
	Autoclaves ISO17665		X		
	Washer Disinfector ISO15883	X	X		
	Mapping FDX 15140	X	X	X	X
	Ceramics				X
	Calibration	X		X	X

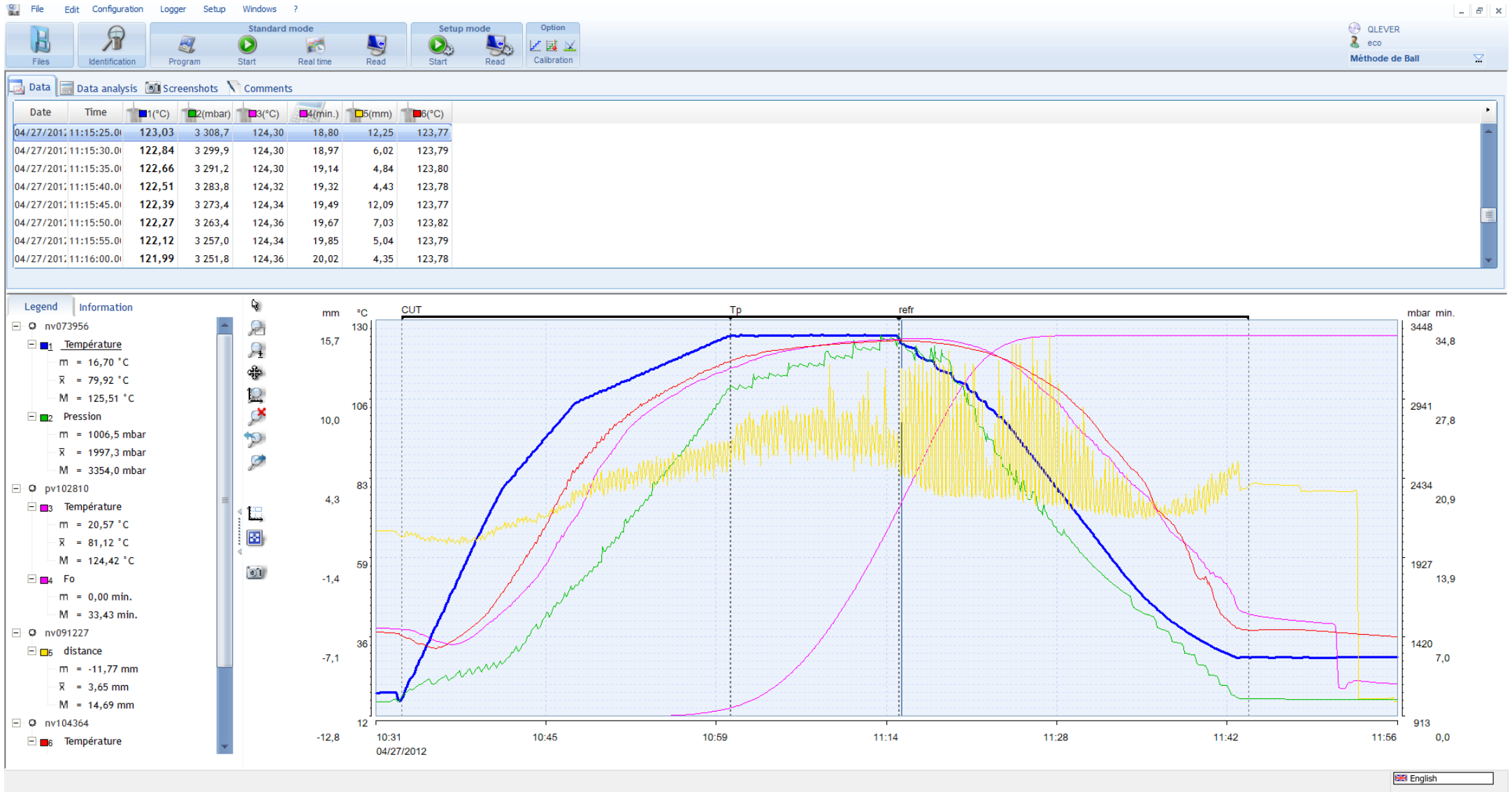
(X): Modules which can be or already sold to these industries

QLEVER Software

- Encrypted database management
- Multi users license with one license per plant
- Operating on Windows 7, 8 and 10
- Audit trails and different access levels and rights (for FDA 21 CFR Part 11 compliance)
- Setup library in modules
- Specific reports including up to 3 different cycles in a row
- Ball method calculation

TMI-Orion

QLEVER Software



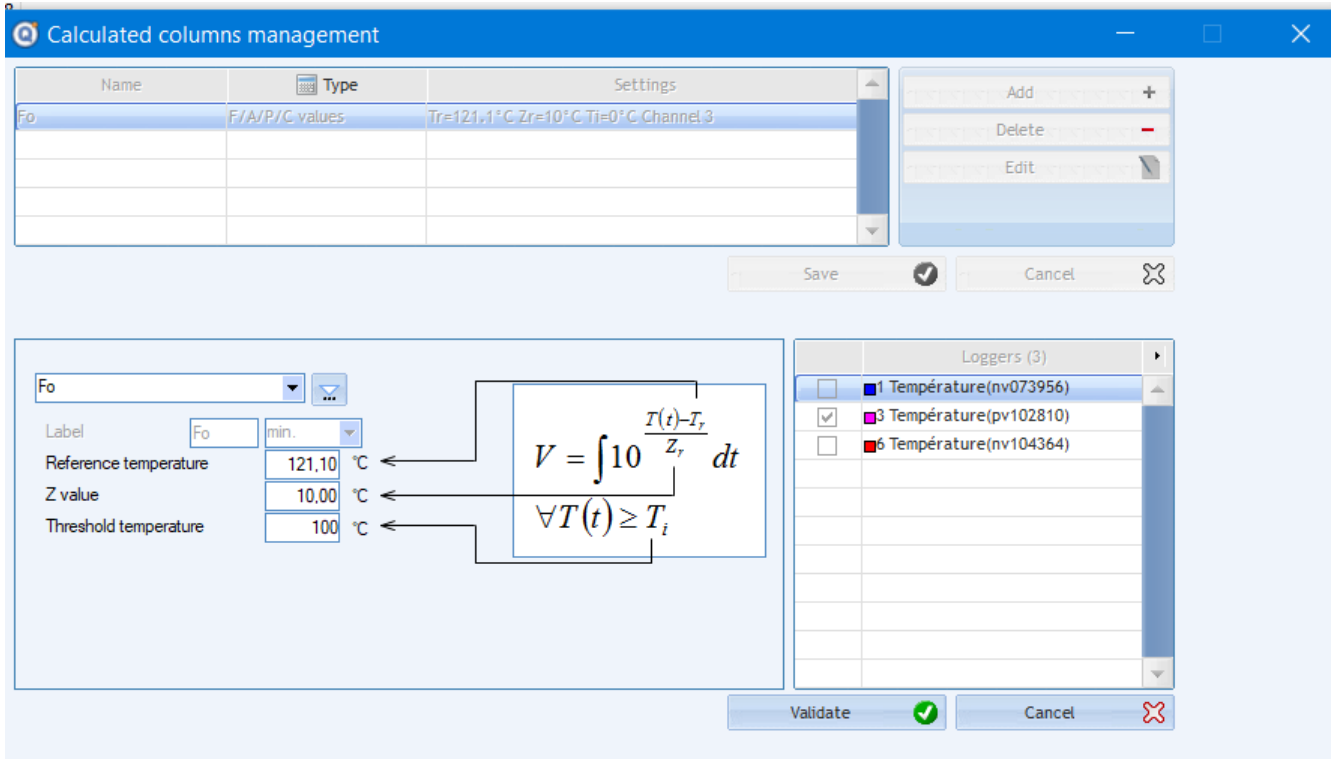
QLEVER Software: Food applications

- Sterilization, pasteurization, cooking values calculation
- Ball Method calculation
- Offset calculation
- Raw data export to Excel
- Shared database
- Encrypted database management
- Multi users license with one license per plant
- Operating on Windows 7, 8 and 10

QLEVER Software

F0 calculation:

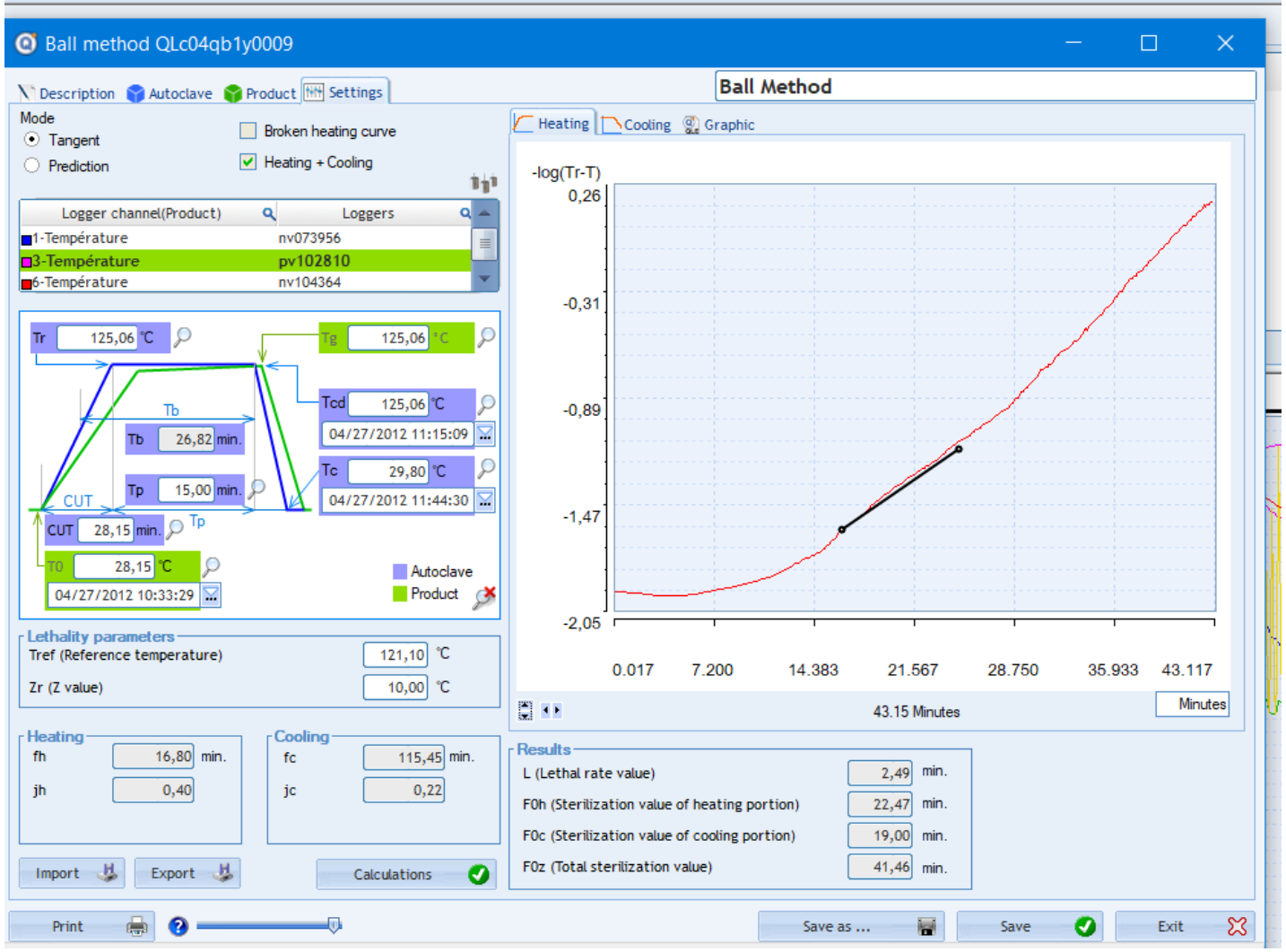
- Reference value, Z value
- Threshold temperature
- Apply to the right logger



QLEVER Software

Ball Method, 2 modes:

- Tangent, based on actual data
- Prediction, predict results based on cycle modification
- F0 calculation including heating and cooling phases
- Fh, Jh, Fc, Jc calculation



QLEVER Software: Food applications

- Manage all TMI-Orion loggers including Radio loggers
- Temperature, pressure, distortion, humidity, rotation…
- Different calculations available
- Raw data export to Excel
- User friendly
- IQ/OQ validation protocols
- Calibration/adjustment module as an option
- Continuously improved based on customer feedbacks

TMI-Orion

To come soon

- LDAP management
- Customer/Network version
- Validation report

TMI-Orion

Company commitments

- Customer Satisfaction
- Striving for Excellence
- Choice of best components and most advanced technologies
- Study and design upon request