CIP Process Innovation for Food & Beverage

ifm's CIP Process Innovation for Food & Beverage online Webinar

Wednesday

09 December

14H00 PM

Food Specialist

Raegan Ramsunder

Presenter

New Business Development Manager

Johan van Niekerk

Host

Raegan Ramsunder

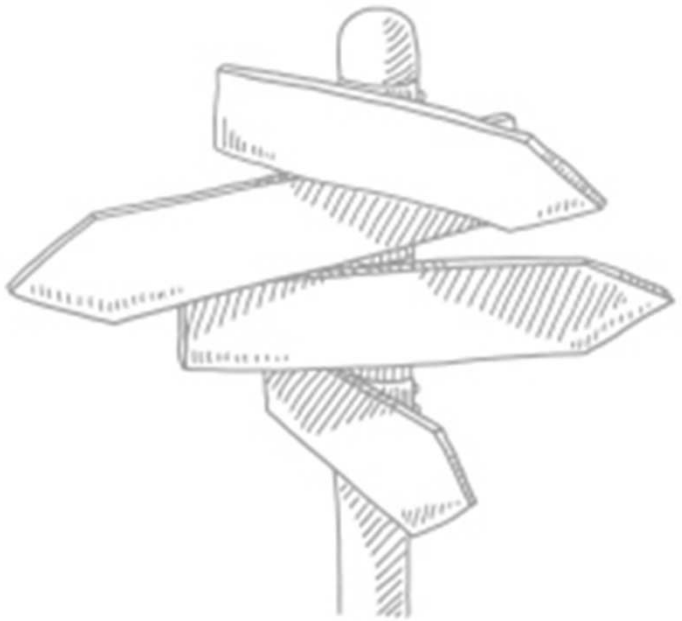
Sales Engineer – Food and Beverage

ifm electronic ZA
112 Sovereign Drive
R21 Corportate Park
Irene Centurion
Phone 012 450 0400
E-Mail: Raegan.Ramsunder@ifm.com
Internet www.ifm.com

CIP Process Innovation for the F&B

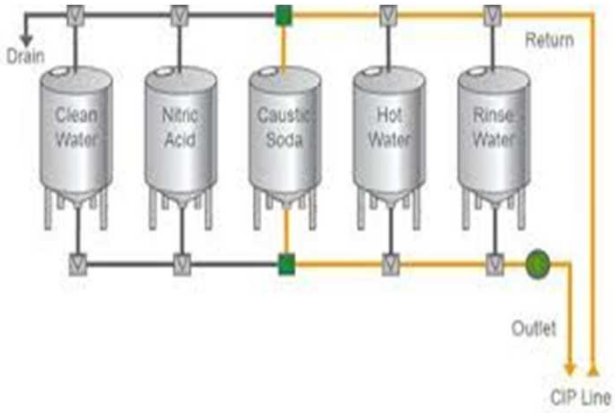
Overview

1. Introduction
2. MVQ smart valve sensor
3. LDL Conductivity sensors
4. TCC temperature sensors
4. PM pressure sensors
5. IO link masters
6. Connection technology
7. Q&A Session



Introduction

CIP, or Cleaning-in-Place is a critical hygiene process that helps to ensure the health and safety of the consumer. CIP refers to the use of a mix of chemicals, heat and water to clean equipment. The best results are obtained by ensuring a suitable combination of temperature, time, physical action and chemical concentration



Overall Equipment Effectiveness

A AVAILABILITY

... takes into account Unplanned and Planned Stops. An Availability score of 100% means the process is always running during Planned Production Time.

P PERFORMANCE

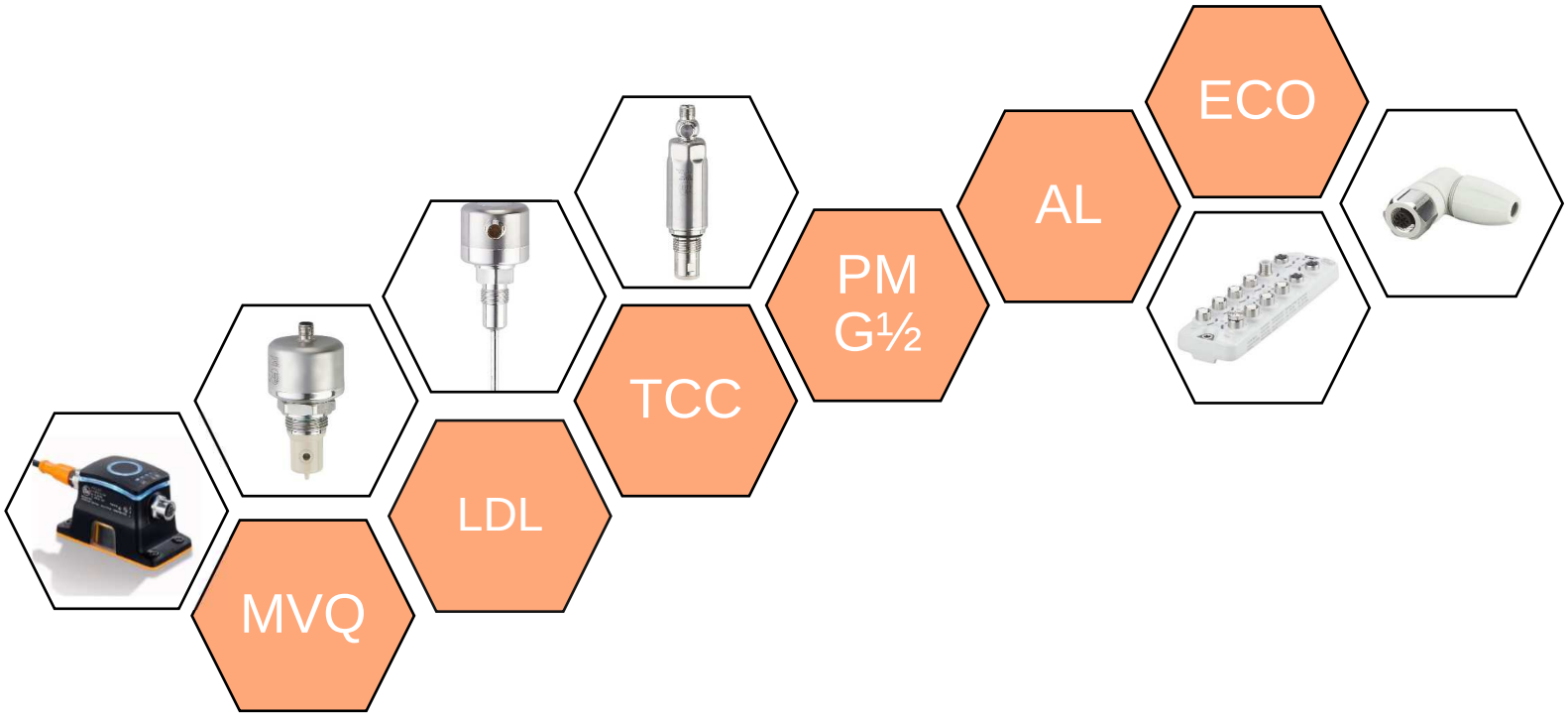
... takes into account Slow Cycles and Small Stops. A Performance score of 100% means when the process is running, it is running as fast as possible.

Q QUALITY

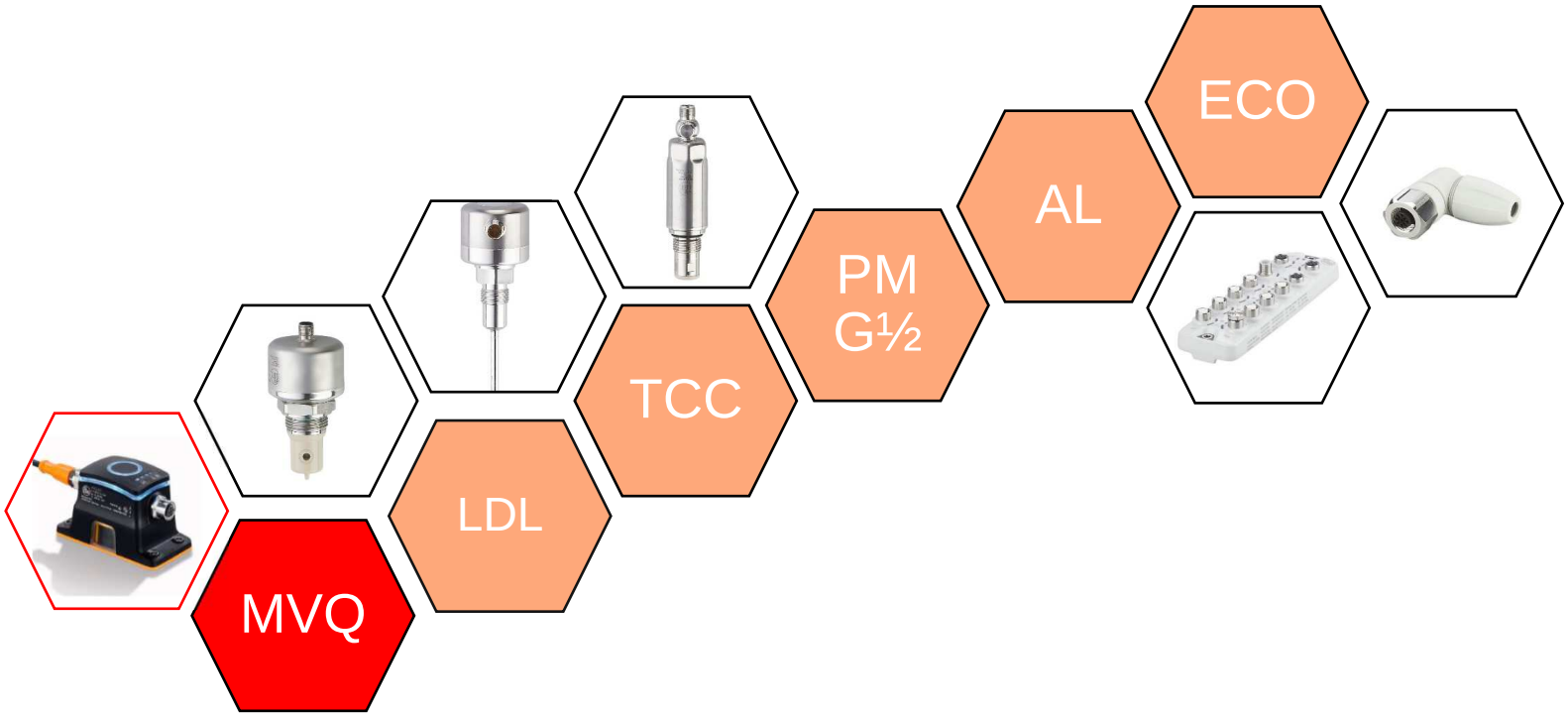
... takes into account Defects (including parts that need Rework). A Quality score of 100% means there are no Defects (only Good Parts are being produced).

CIP Process

System Solution



MVQ – Precise Valve Monitoring and Controlling



MVQ: Smart Valve Sensor

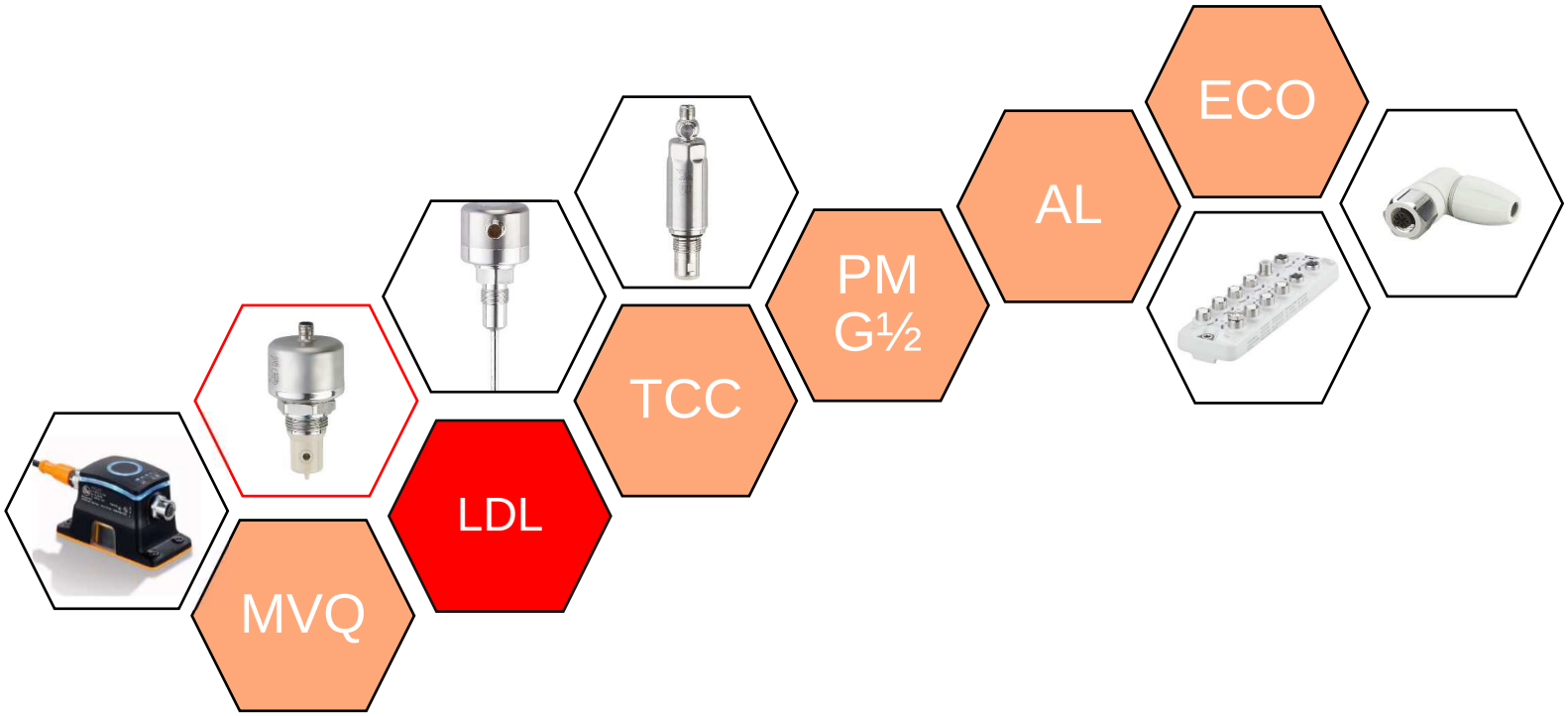
Features on IO link :

1. Reducing of cabling (single M12 connector for the solenoid & Feedback)
2. Automatic teach of the end positions of the valve by directly controlling the solenoid valve via the MVQ
3. LED ring light for easy detection in the plant
4. Prevention of defects by early detecting of wear or adhesion
5. Cycle counter for monitoring
6. Cost and time savings due to more precise planning of maintenance

***Webinar available on ifm webpage

LDL – Conductivity Measurement in Food & Beverage

- Classic Example: CIP Process



CIP Process

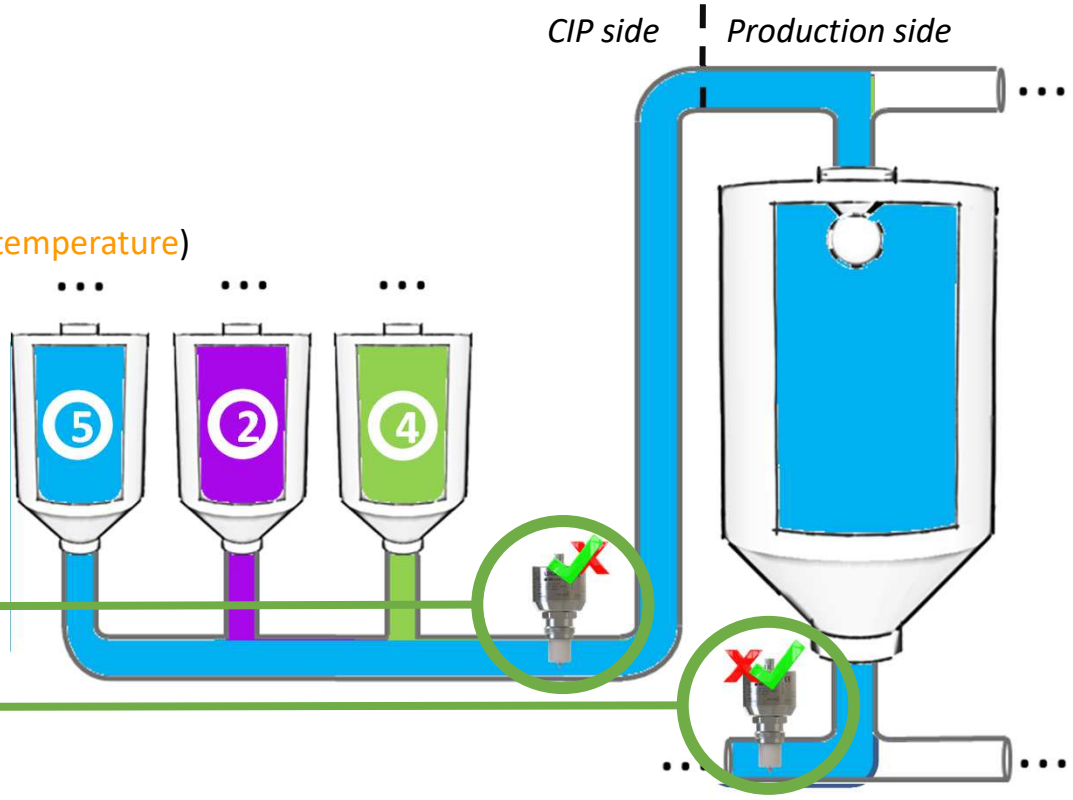
① Rinse with process water

② Cleaning with alkaline solution (high temperature)

③ Flush with process water

④ Clean with acid

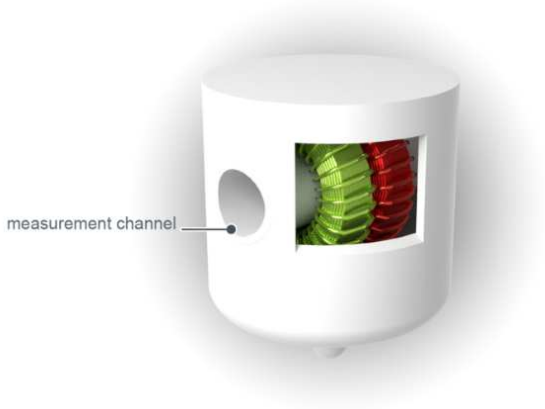
⑤ Flush with process water



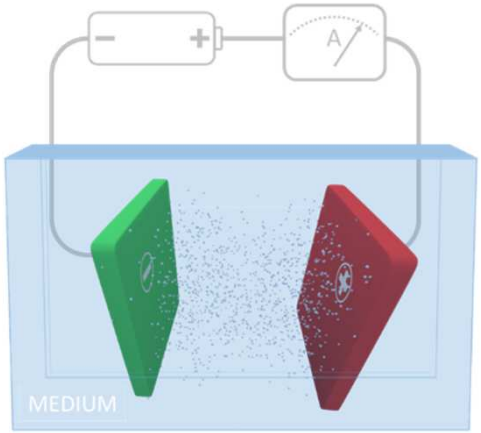
The use of conductivity sensors can reduce the consumption of water and chemicals

ifm Conductivity Sensors

Inductive
(Toroidal)

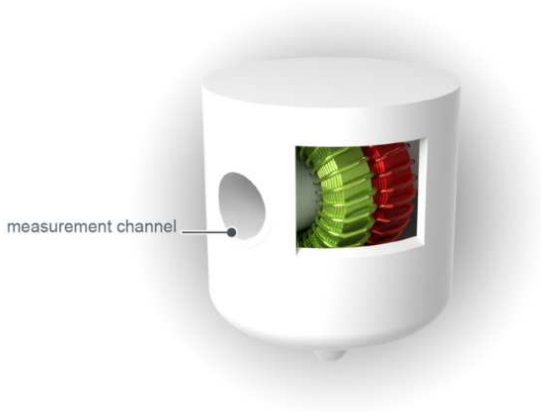


Conductive
(Contacting)



ifm Conductivity Sensors

Inductive
(Toroidal)



Conductive
(Contacting)

ifm Conductivity Sensors

- **Measuring Principles for Sanitary Applications : LDL100**

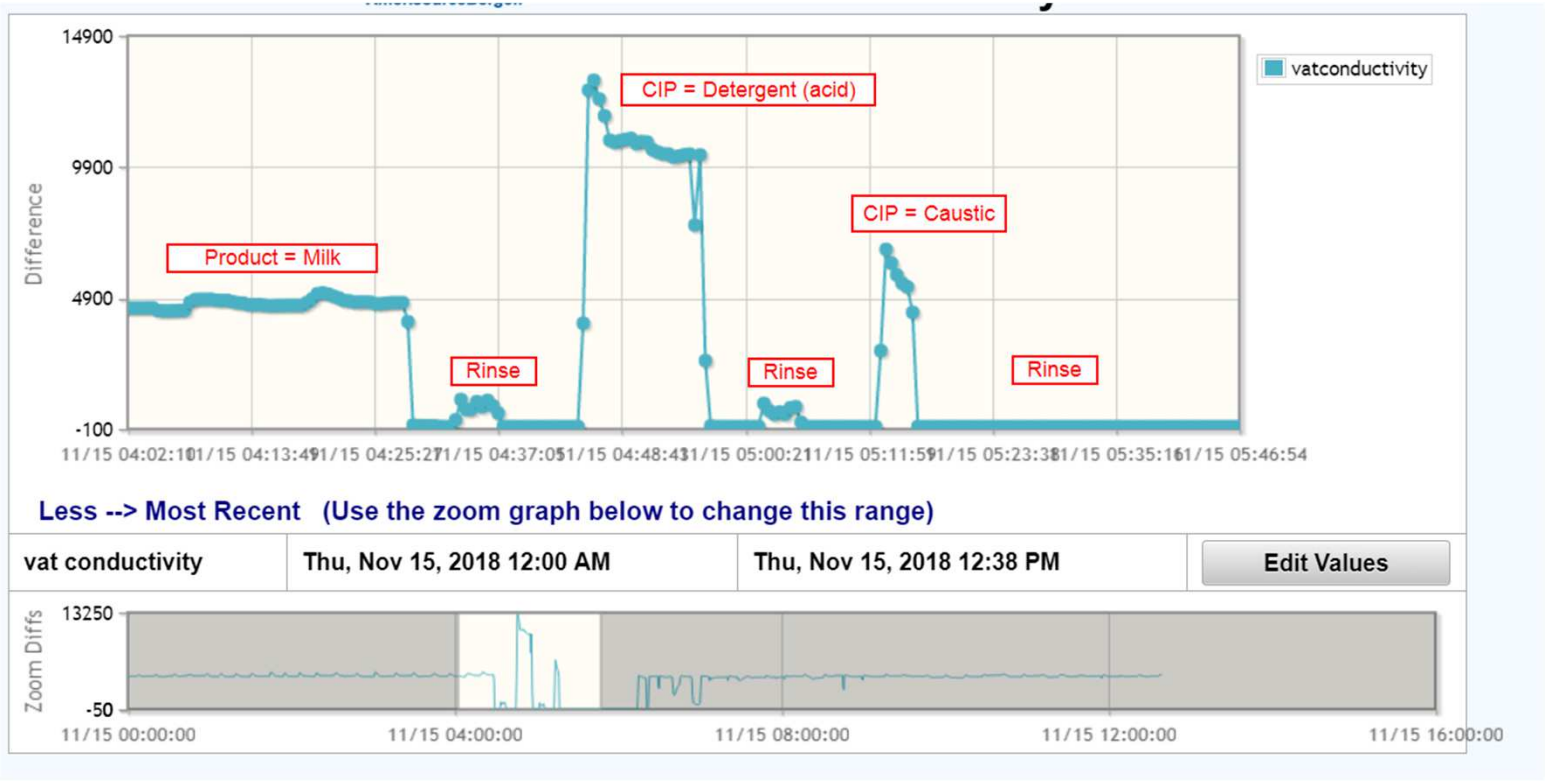
Conductive
(Contacting)

*Measurement environment varies with installation conditions

Simple solution for interphase detection and monitoring of products/CIP

- All-in-one transmitter
- Fast response to temperature
- Measuring range: 100...15000 µS/cm
- Sanitary design with 3A approval
- Can be installed in pipes down to 1" (DN25)

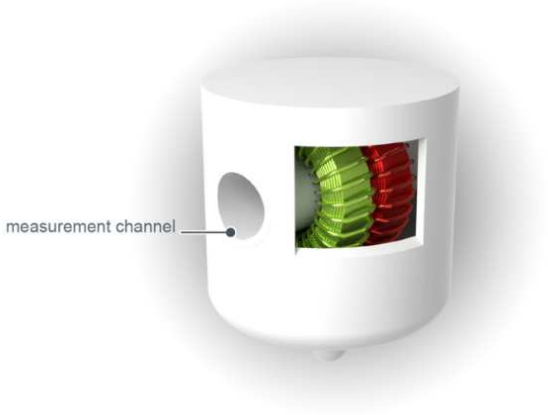
TREND OF PROCESS VALUES



ifm Conductivity Sensors

- **Measuring Principles for Sanitary Applications: LDL200**

Inductive
(Toroidal)



*Measurement channel is a fixed environment

Solution for chemical concentration and measurement of complete CIP cycle.

- All-in-one transmitter
- Machined PEEK probe
- Sanitary design with 3A approval
- Probe length up to 33.5 mm
- Measuring range 100 µS/cm to 1000 mS/cm

Digital vs Analog Resolution

Measuring range (µS/cm)	PLC analog input card (12 bit)	IO-Link *
0...500	1 µS/cm	
0...5,000	2 µS/cm	
0...15,000	4 µS/cm	1 µS/cm
0...100,000	25 µS/cm	
0...500,000	122 µS/cm	
0...1,000,000	244 µS/cm	

* LDL100 measuring range is limited to 15,000 µS/cm

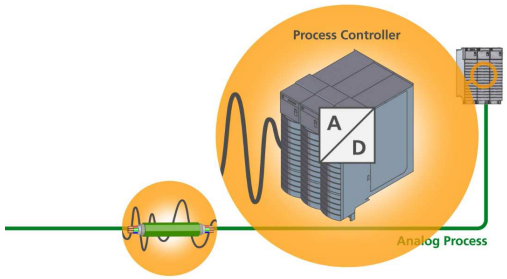
Example:

12 bit Analogue system (sensor output + analog input card)

- 12 bits (4096 steps) available
- Assuming 500mS/cm scaling

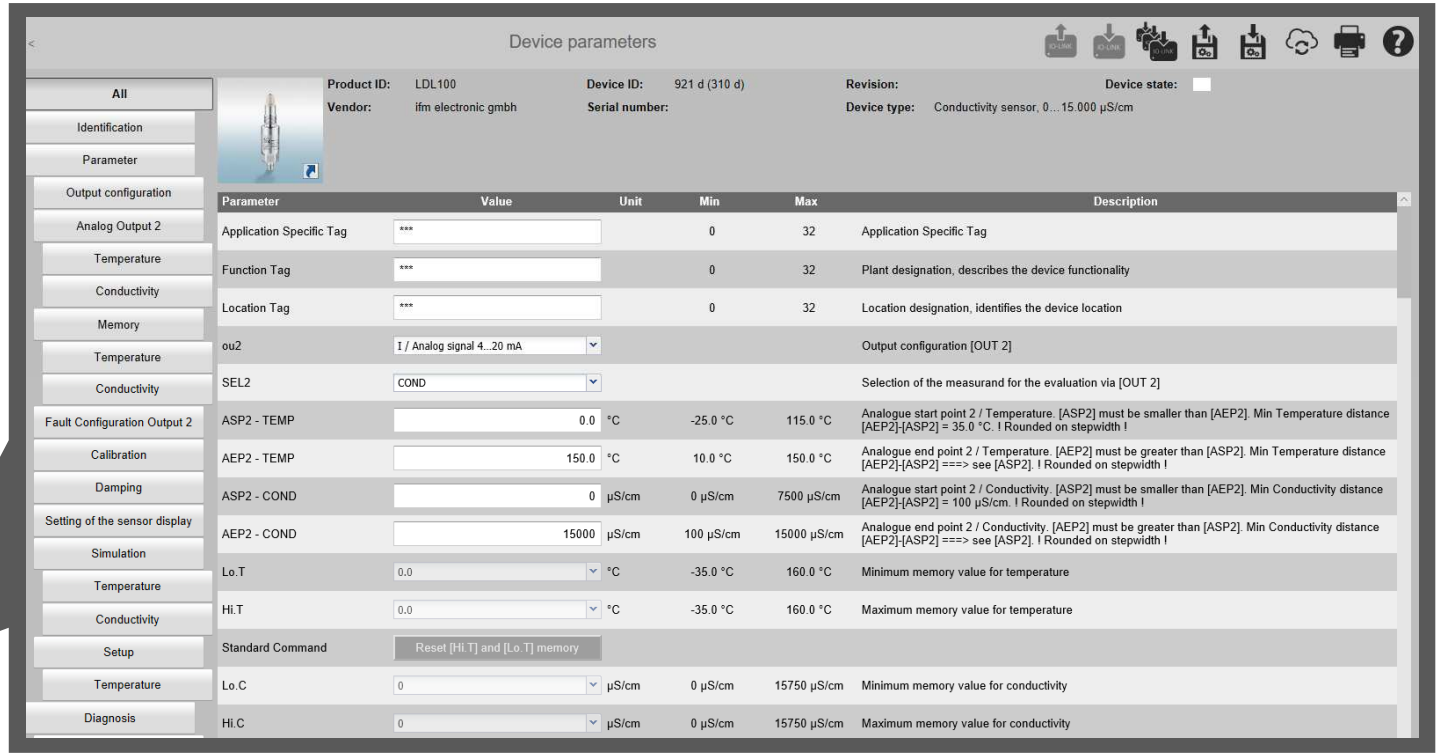
500,000/4096 = 122 µS/cm per step

>25% ERROR (water)



IO link Resolution = 1µS/cm

ifm LR Device Software



Conductivity sensor for clamp and hygienic pipe fittings

Analytical sensors

TOP PRODUCT

UPDATE

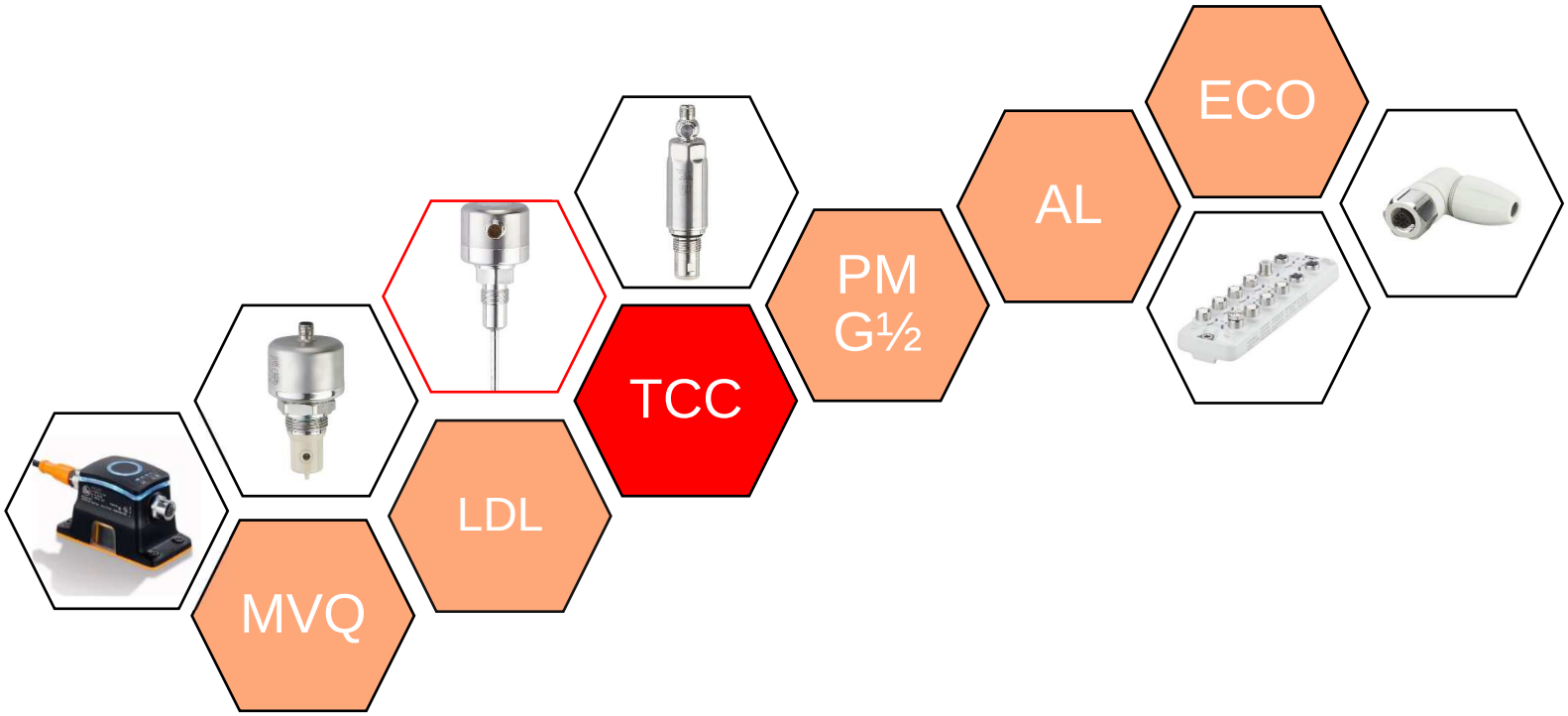
Product launch LDL201

- **Solid tip prevents breakage**
- **Reduce inaccuracies associated with a time-based cleaning process**
- **Flexible process adjustments increase system efficiency**
- Easily adapted to new recipes and media
- Loss-free digital transmission of measured values

Process adapters clamp and hygienic pipe fittings

	Clamp – G 1 Aseptoflex Vario DN50 with leakage port	E33309
	Tri-clamp – G 1 Aseptoflex Vario 2" with leakage port	E33209
	Tri-clamp – G 1 Aseptoflex Vario 2"	E33202
	Tri-clamp – G 1 Aseptoflex Vario 1.5" with leakage port	E33208
	Tri-clamp – G 1 Aseptoflex Vario 1 – 1.5" with leakage port	E33201
	Hygienic pipe fitting – G 1 Aseptoflex Vario 1.5"	E33212
	Hygienic pipe fitting – G 1 Aseptoflex Vario 2"	E33213
	Hygienic pipe fitting – G 1 Aseptoflex Vario 1.25"	E33211
	Pipe fitting – G 1 Aseptoflex Vario DN33,7 Series B with leakage port	E33304
	Pipe fitting – G 1 Aseptoflex Vario DN40 with leakage port	E33302
	Clamp connection with notch – G 1 Aseptoflex Vario DN40 with leakage port	E33308

TCC – Reliable Temperature Measurement in Food & Beverage



Importance of Temperature Measurement

Wrong temperature readings have a major impact on product quality and safety for the consumer – Critical processes eg: CIP, Sterilization, Pasteurization

There are two types of internal factors to secure procedures

1) Redundancy of measurement
2) Calibration of the sensors

**Both can contain a false sense of safety

Car Service

1974 - 2005

Past

TIME-BASED
(Yearly)

KILOMETER-BASED
(Fixed intervals every
10.000/15.000km)

Present

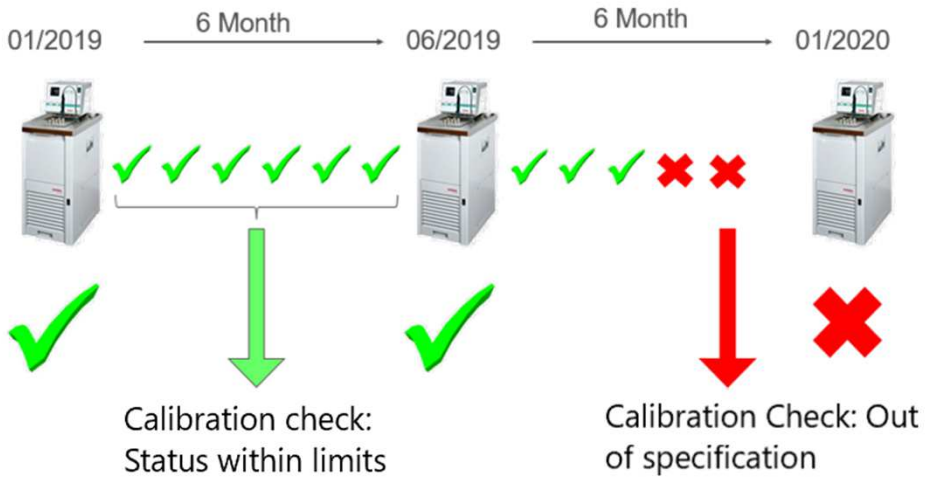
TIME-BASED
(Yearly)

SIGNAL-BASED
(Flexible intervals calculated
based on driving behavior)

Calibration of Temperature Sensors

With calibration it is only possible to determine a drift when it has already happened.

How much of product is out in the market??



Thermal Shock Impact on Drift and Sensor Life

CIP processes are extremely harsh to instruments that are exposed.
The constant cycling between hot and cold temperatures can quickly cause fatigue of the electronic components and therefore, lead to drift and failure.

ifm Solution: TCC

*3-Point calibration certificate included

Temperature Sensor with drift monitor detection:

Key Features:

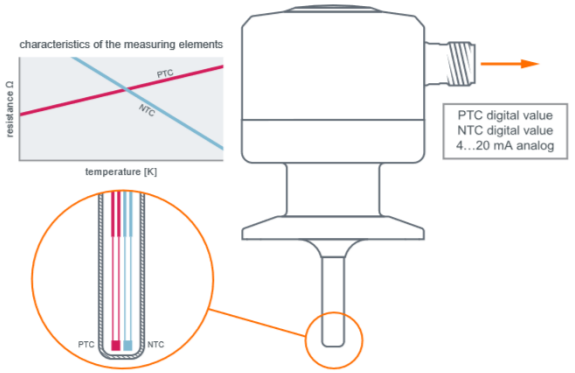
Range: -25…160˚C

Output: 4…20mA / IO-Link

T05 / T09: 1,5sec / 4sec

Accuracy: 0,2K (-10…130˚C)

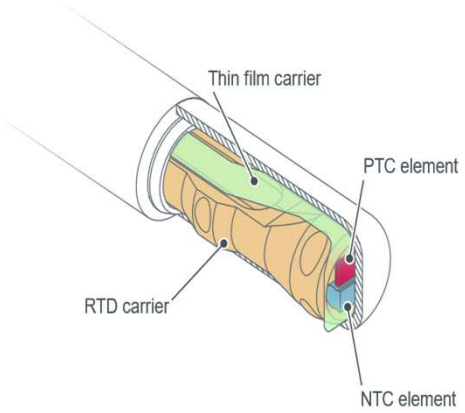
‘Calibration Check’ technology provides real-time continuous monitoring of instrument accuracy and measurement uncertainty. A large, bright LED dome provides an immediate signal of any deviation from the specified tolerance



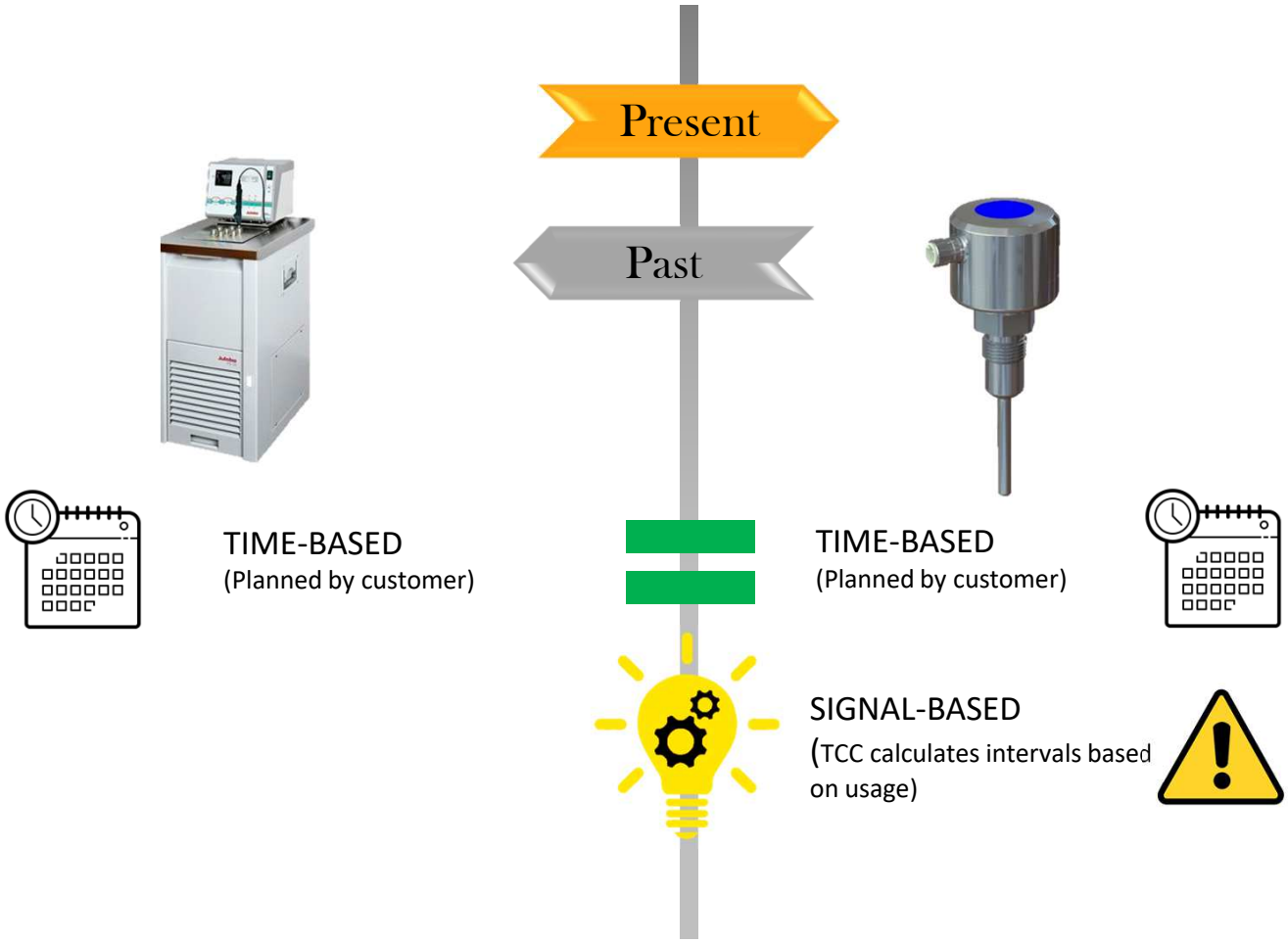
TCC health status “healthy”

TCC health status “warning”

TCC health status “error”

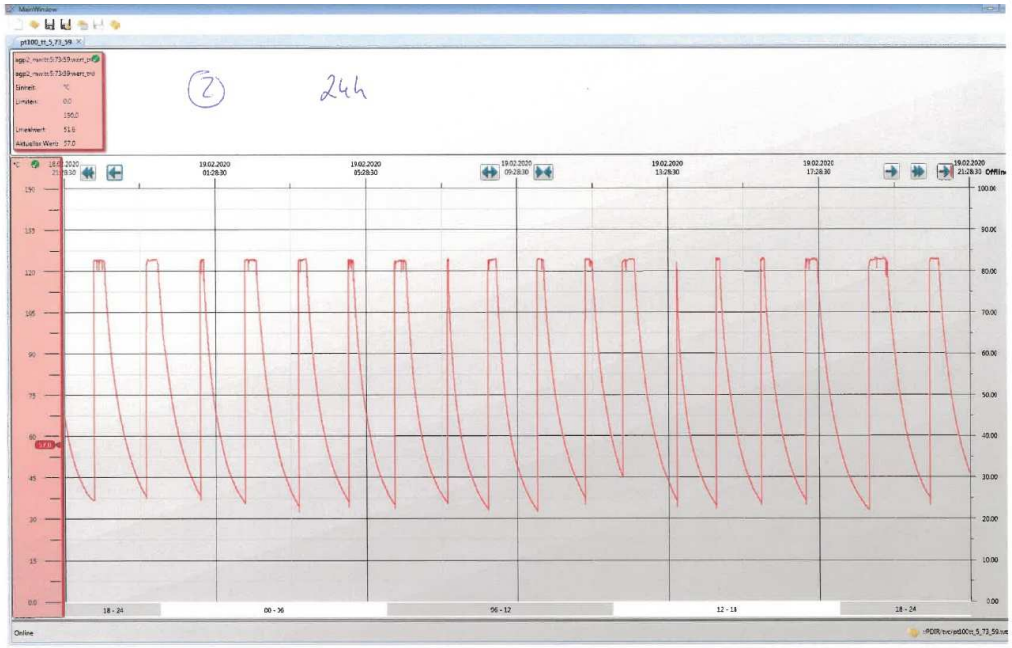


Smart Sensor Calibration

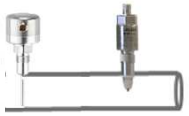


Relax: Lean back while the TCC monitors itself

CIP Process : Energy Saving



return



Process

Process optimization:

to heat 1m³ of water by only 1 Kelvin the required energy is 1.16kw/h

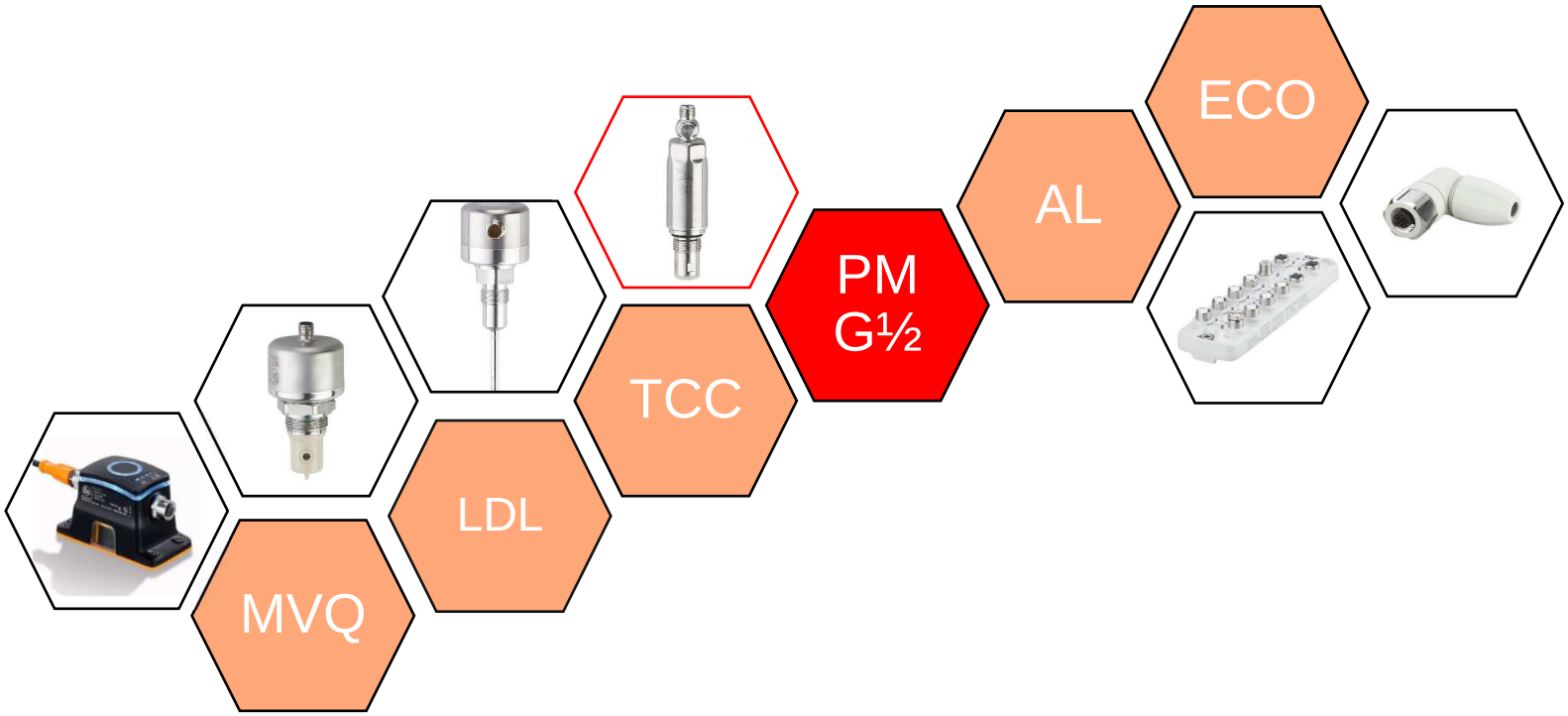
overheated by 1 kelvin
x18 times per day

365 days a year = 7000Kw energy saving

Fast response saves energy!

Process

PM G1/2“ – Precise Pressure Measurement in Food & Beverage



G1/2 Flush

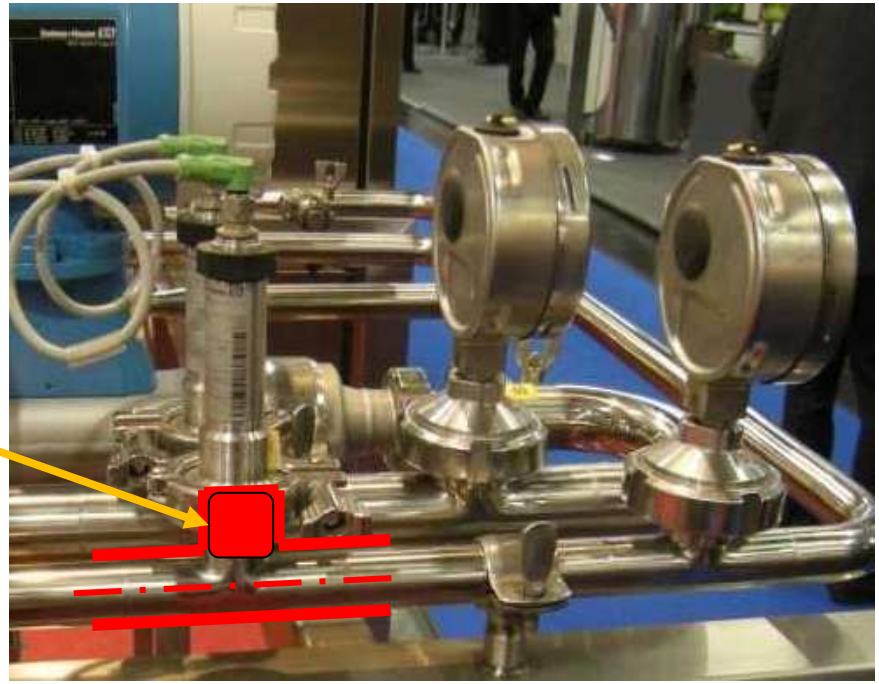
For Hygienic Applications

Challenges For Small Pipes

Expensive and complex adapters for pressure sensors in pipes

Challenges For Small Pipes

Difficult to clean:
Dead space



Solution : PM15**

- Better cleaning: Less dead space
- Direct weld on adaptation
- Medium temperature measurement integrated

Product Benefits

Cost savings

The G1/2“ adaptation leads to considerable cost savings for Pipe Installation

Increased process reliability

Improved cleanability: The small measuring cell means improved flush mounting of sensors

Approvals

Approvals for food sector (EHEDG, 3A, FDA, EG1935)

Added-value with IO-Link

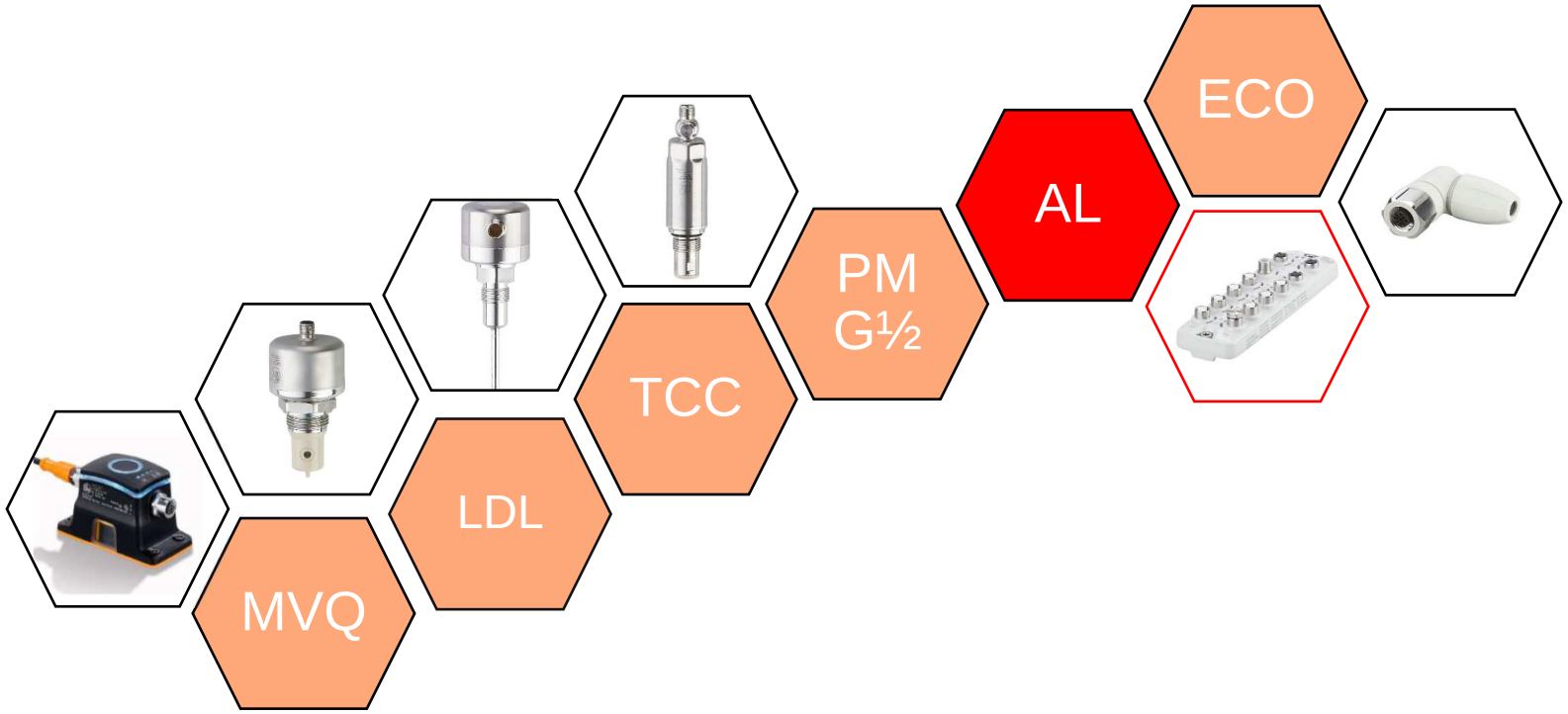
Temperature transferred using IO-Link

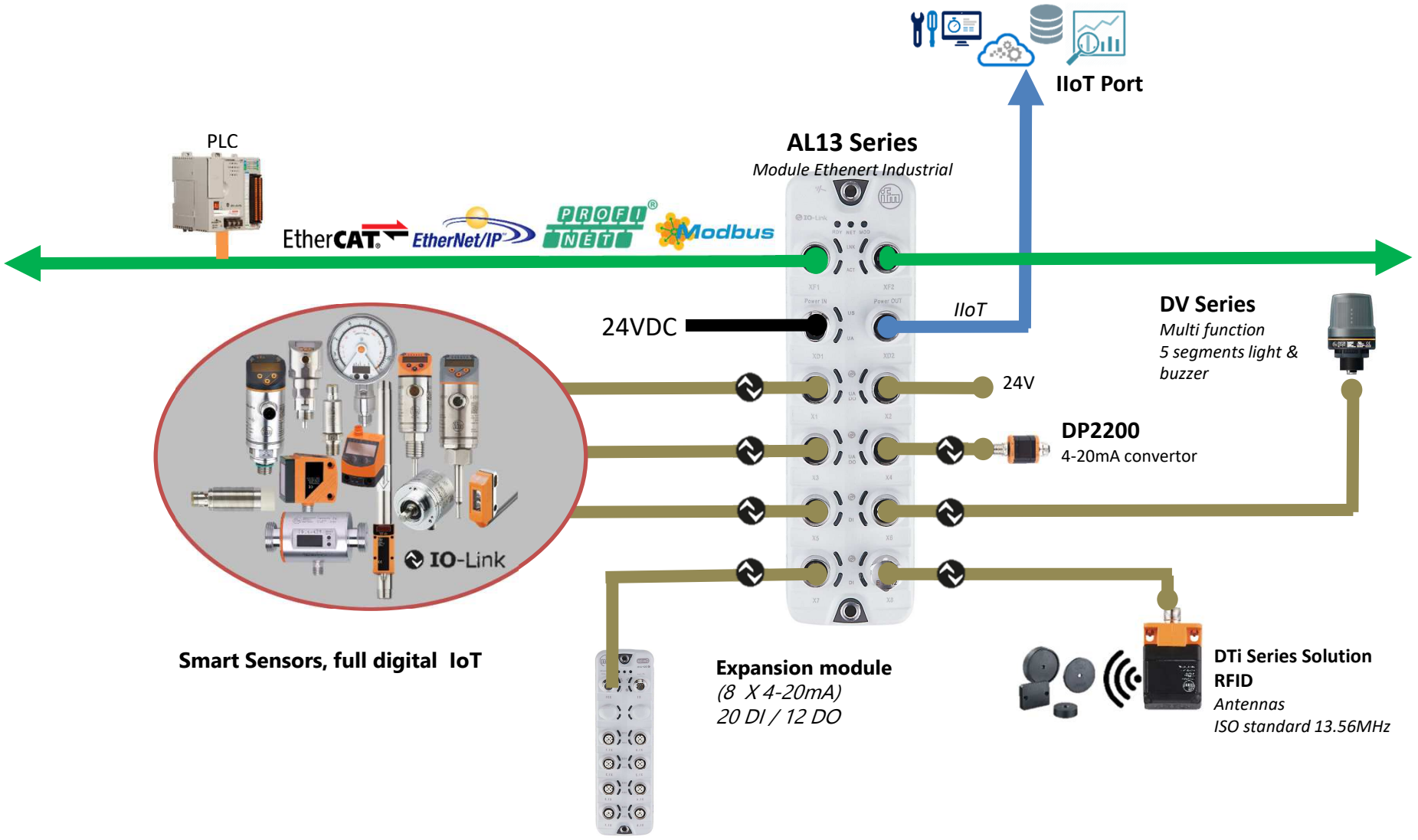
***Degrees C & Pressure Bar

Quality assurance

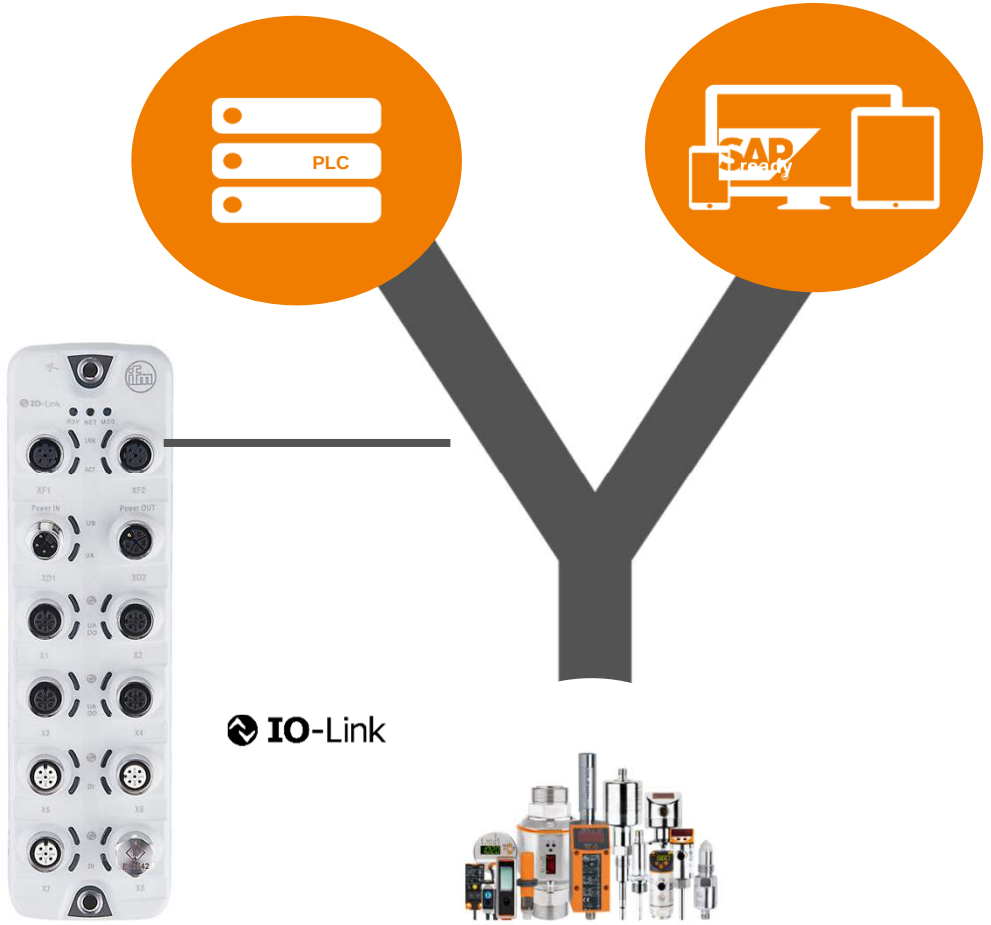
5 year warranty

Integration – Next Steps



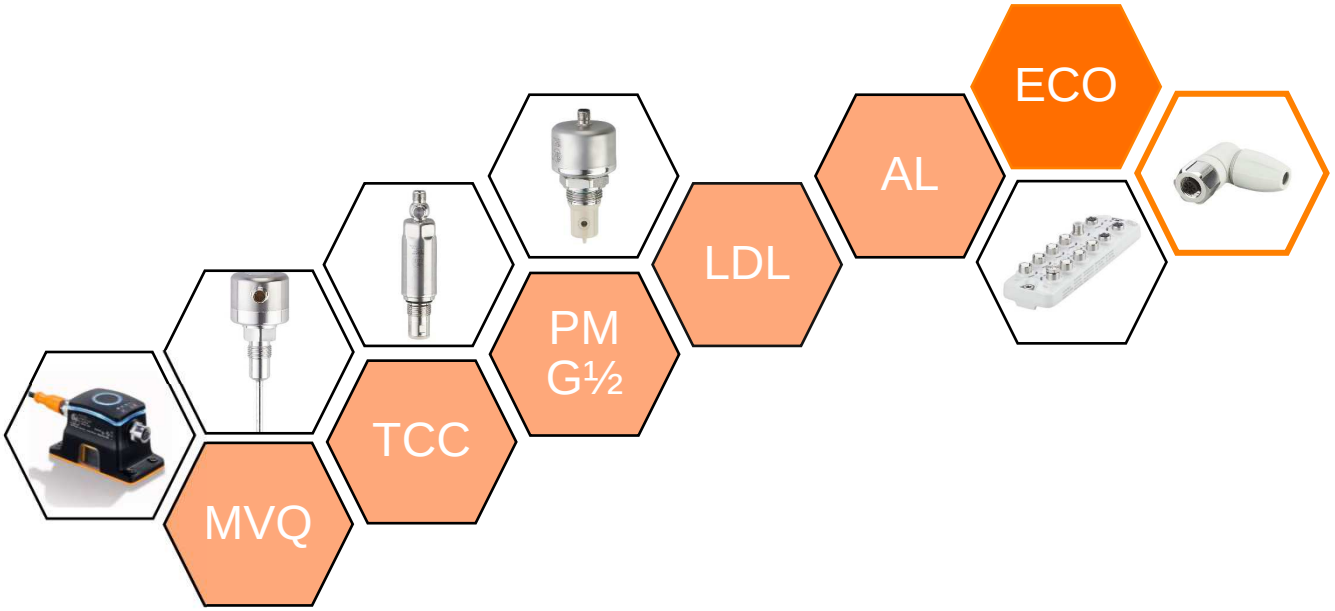

IIoT Port
PLC
AL13 Series
Module Ethenert Industrial
EtherCAT
EtherNet/IP
PROFINET
Modbus
24VDC
IIoT
24V
DV Series
Multi function
5 segments light & buzzer
DP2200
4-20mA convertor
IO-Link
Smart Sensors, full digital IoT
Expansion module
(8 X 4-20mA)
20 DI / 12 DO
DTi Series Solution
RFID
Antennas
ISO standard 13.56MHz

Y-path with Smart Devices



Smart Sensors & Actuators

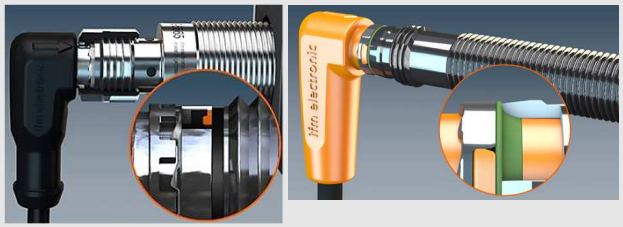
ECO–Link – Optimum Sealing



EVF: Hygienic Cables

What Does Ecolink Mean?

Innovative sealing concept



Innovative strain relief concept

Concept for vibrating protection and tool-free mounting

Special connector material for LED versions

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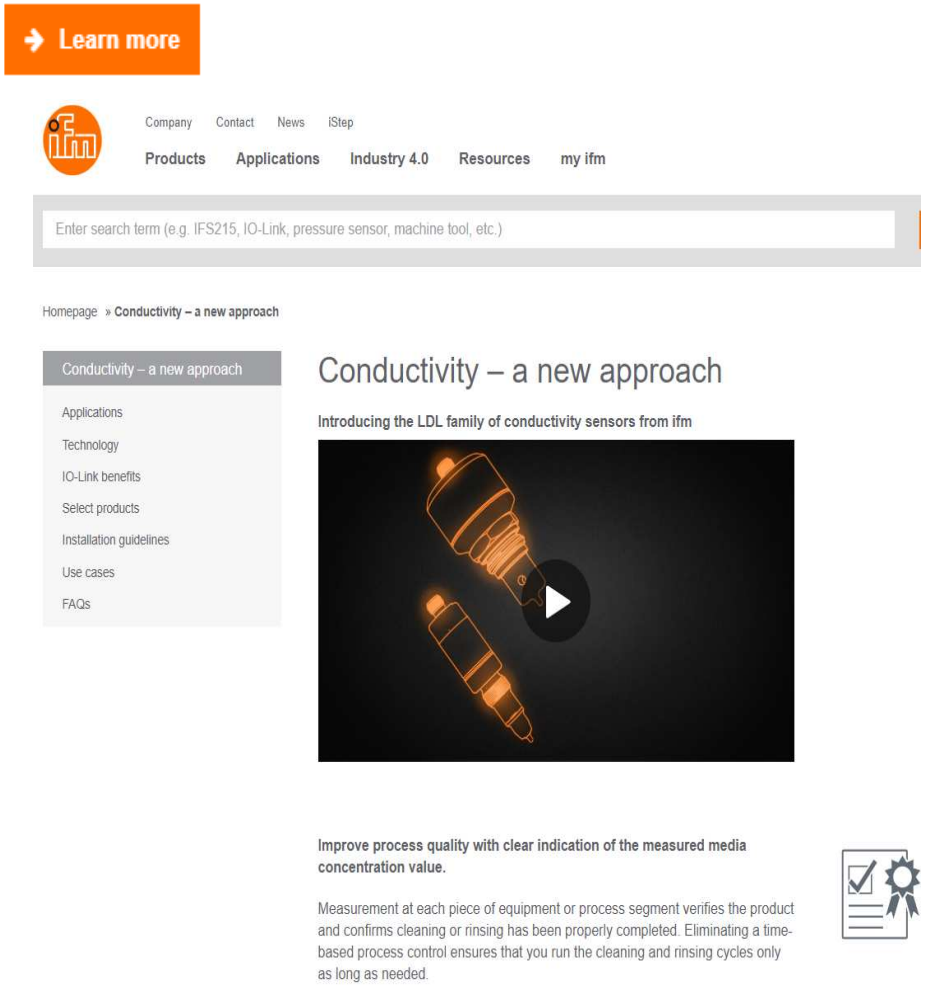
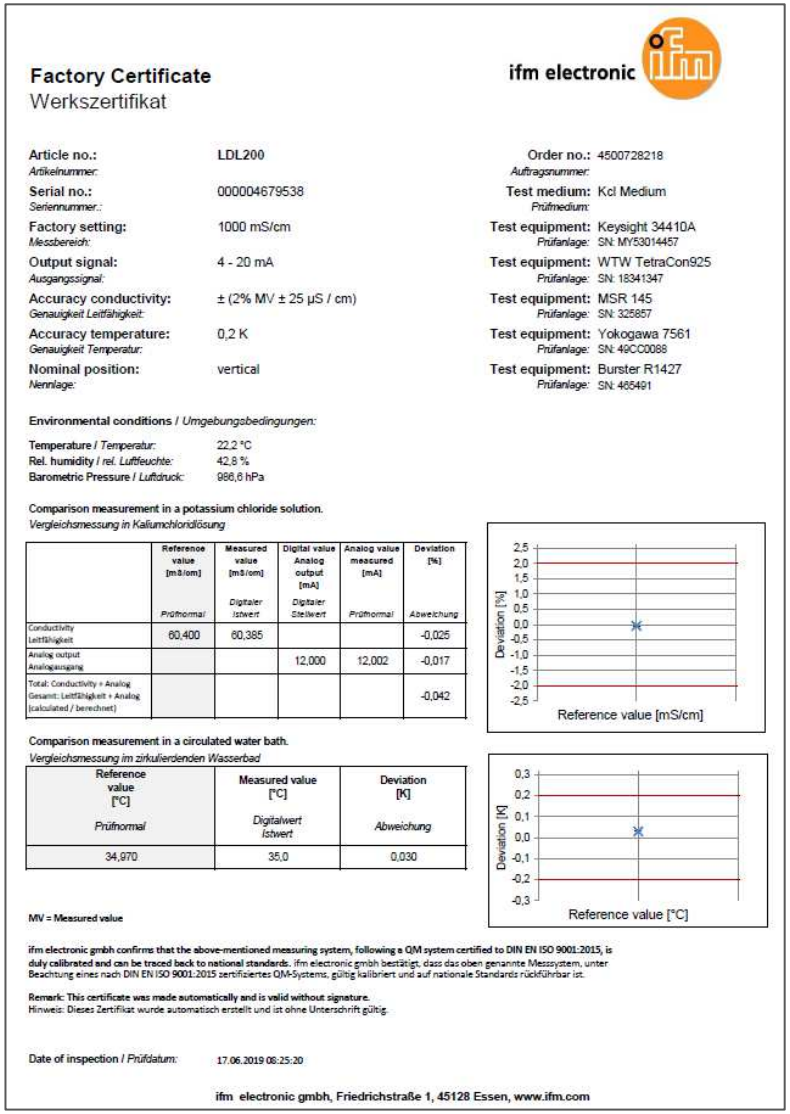


www.ifm.com/za

Factory Calibration

During the production process the measurement signal and the evaluation electronics are paired and verified to provide calibrated digital and analog outputs directly from the sensor.

- Out of the box performance
- No pairing to separate transmitters is required
- Verification of analog and digital accuracy
- Free downloadable Factory Certificate



Factory Certificate
Werkszertifikat

ifm electronic

Article no.: *Artikelnummer:*	LDL200	**Order no.:** *Auftragsnummer:*	4500728218
Serial no.: *Seriennummer.:*	000004679538	**Test medium:** *Prüfmedium:*	Kcl Medium
Factory setting: *Messbereich:*	1000 mS/cm	**Test equipment:** *Prüfanlage:*	Keysight 34410A SN: MY53014457
Output signal: *Ausgangssignal:*	4 - 20 mA	**Test equipment:** *Prüfanlage:*	WTW TetraCon925 SN: 18341347
Accuracy conductivity: *Genauigkeit Leitfähigkeit:*	± (2% MV ± 25 µS / cm)	**Test equipment:** *Prüfanlage:*	MSR 145 SN: 325857
Accuracy temperature: *Genauigkeit Temperatur:*	0,2 K	**Test equipment:** *Prüfanlage:*	Yokogawa 7561 SN: 49CC0088
Nominal position: *Nennlage:*	vertical	**Test equipment:** *Prüfanlage:*	Burster R1427 SN: 465491

Environmental conditions / *Umgebungsbedingungen:*

Temperature / *Temperatur:*	22,2 °C
Rel. humidity / *rel. Luftfeuchte:*	42,8 %
Barometric Pressure / *Luftdruck:*	986,6 hPa

Comparison measurement in a potassium chloride solution.
Vergleichsmessung in Kaliumchloridlösung

	Reference value [mS/cm] *Prüfnormal*	Measured value [mS/cm] *Digitaler Istwert*	Digital value Analog output [mA] *Digitaler Stellwert*	Analog value measured [mA] *Prüfnormal*	Deviation [%] *Abweichung*
Conductivity Leitfähigkeit	60,400	60,385			-0,025
Analog output Analogausgang			12,000	12,002	-0,017
Total: Conductivity + Analog Gesamt: Leitfähigkeit + Analog (calculated / berechnet)					-0,042

Comparison measurement in a circulated water bath.
Vergleichsmessung im zirkulierenden Wasserbad

Reference value [°C] *Prüfnormal*	Measured value [°C] *Digitalwert Istwert*	Deviation [K] *Abweichung*
34,970	35,0	0,030

MV = Measured value

ifm electronic gmbh confirms that the above-mentioned measuring system, following a QM system certified to DIN EN ISO 9001:2015, is duly calibrated and can be traced back to national standards. ifm electronic gmbh bestätigt, dass das oben genannte Messsystem, unter Beachtung eines nach DIN EN ISO 9001:2015 zertifizierten QM-Systems, gültig kalibriert und auf nationale Standards rückführbar ist.

Remark: This certificate was made automatically and is valid without signature.
Hinweis: Dieses Zertifikat wurde automatisch erstellt und ist ohne Unterschrift gültig.

Date of inspection / *Prüfdatum:* 17.06.2019 08:25:20

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ifm South Africa

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Please contact us:

Johan v Niekerk

New Business Development Manager:

Key Accounts

ifm electronic ZA
112 Sovereign Drive
R21 Corportate Park
Irene Centurion
Phone 012 450 0400
E-Mail:
Johan.vanniekek@ifm.com
Internet www.ifm.com

Raegan Ramsunder

**Sales Engineer –
Food and Beverage**

ifm electronic ZA
112 Sovereign Drive
R21 Corportate Park
Irene Centurion
Phone 012 450 0400
E-Mail:
Raegan.Ramsunder@ifm.com
Internet www.ifm.com