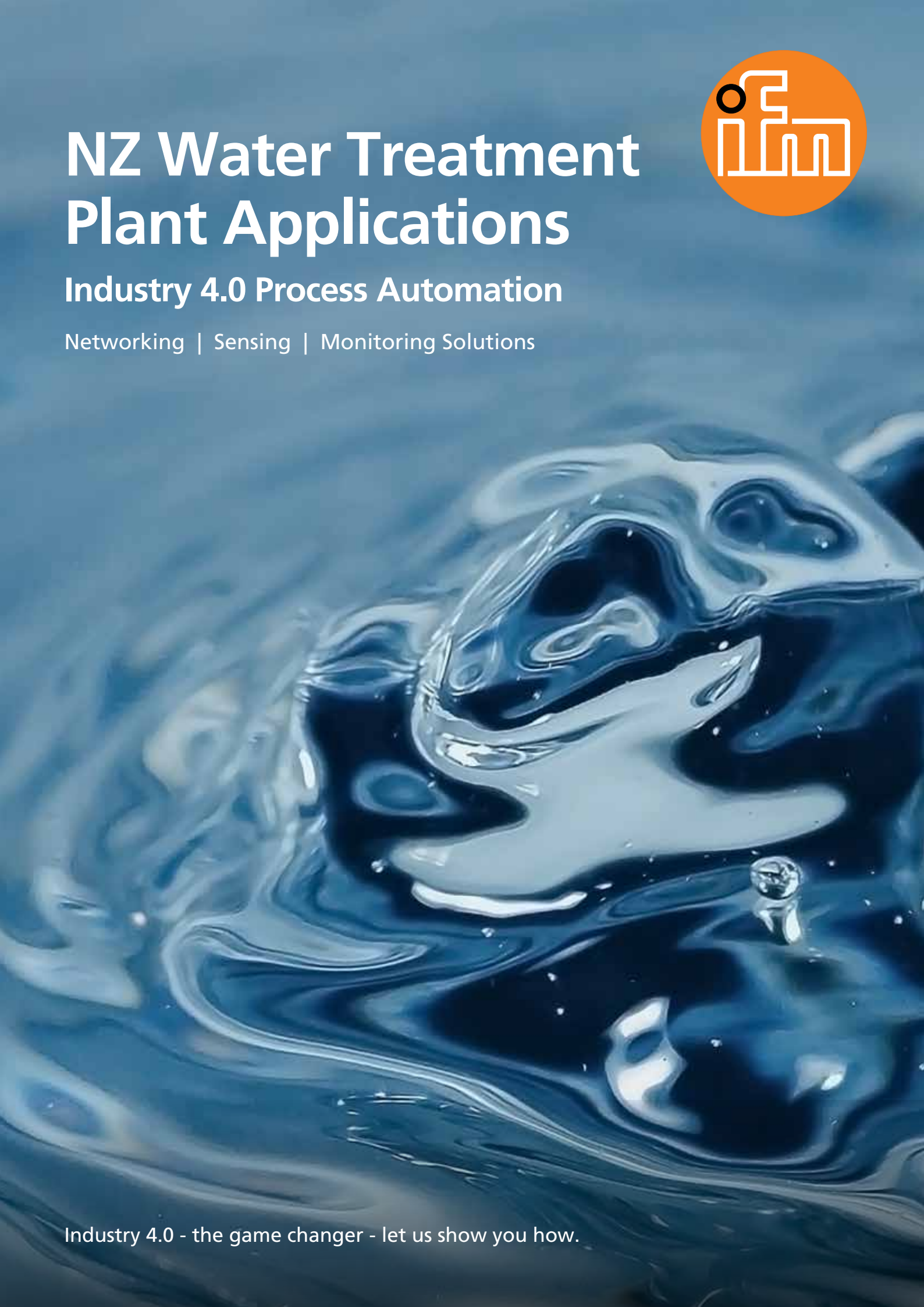
NZ Water Treatment Plant Applications

Industry 4.0 Process Automation

Networking | Sensing | Monitoring Solutions



Industry 4.0 - the game changer - let us show you how.

Acting sustainably is ifm's motto

Chairmen of the Board and Co-CEOs: Martin Buck and Michael Marhofer

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What will the world look like in the future? We at ifm ask ourselves this question not only when it comes to product development, innovative technologies and new ways of working. Environmental issues also play a leading role in our daily decisions and actions.

“Because we are all responsible for the future which takes social, economic, and ecological aspects into consideration.“

We can only fulfill this responsibility when we are aware of the consequences of our actions and in time start looking for solutions and new ways to minimise their impact. For us, this also means responsibly and reliably following long-term goals instead of resting on short-term successes. In the course of this, we would like to recommend our fourth Sustainability report (reporting year 2022) which contains a comprehensive sustainability programme in addition to our strategic approaches and measures.

Acting sustainably is the motto - and in all respects. This is already stated in the corporate philosophy, first written down in 1990:

"*ifm demands and promotes ecologically conscious decisions and conduct.*" ***ifm corporate philosophy***

The group of companies has been following this guiding principle for over 50 years. In doing so, we often go beyond the legal requirements and feel further encouraged in our thinking by the increasing attention to issues such as the protection of biodiversity, energy and mobility, which are emerging, among other things, from a global climate movement and also from pioneering measures of the European Green Deal.

The 3 pillars of sustainability

One thing is certain for us:

"*Efficient, socially balanced and ecologically compatible development is needed, whereby social interaction, economic strength and environmental protection are not contradictory for us.*"
ifm corporate philosophy

At the same time, we are aware that we must contribute more. Only then can we master the global social and ecological challenges. Up until now, we have seen ourselves as a company that operates sustainably in an integrated manner. Now we want to actively advance our sustainability activities and pursue the issues that are essential for us in the coming years. You can find out here what this means in detail for the ifm group.

As a company that operates sustainably, we at ifm set ourselves the goal of harmonising economic, ecological and social aspects and anchoring them more firmly in our organisation.

The guiding principle of corporate sustainability describes a principle of action which is based in a balanced way on the three pillars of sustainability - Economy, Environment (ecology) and Social issues - in all corporate decisions and actions. Issues such as environmental protection, upholding social principles and economic stability are not fundamentally new, but they have become much more important in the past years.

ifm acts according to the principle of economic optimum and against this background strives for balance as well as commitment in all three dimensions.

"Looking to the future, we are also following our guiding principle growing successfully in security."

ifm is committed to help your business succeed!

German quality industrial product, ex-stock NZ

Personal service:

Either by phone, email, in person or via an MS Teams online meeting, ifm is always there for you – anywhere, anytime. We process your purchase orders, issue test samples and provide accurate technical and pricing information to support your business as efficiently as we can.

Workshops / Seminars:

To help introduce the pipeline of new ifm products and technology innovations, we can support you with hands-on workshops at your company, or at our training centre.

Meet an ifm engineer:

Interested in discovering new possibilities for your business or production process? Wish to discuss advanced technologies and solve technical problems? Or seek practical insights into the latest automation practices? Why not meet one of our engineers - either at your premises, or at our customer service centre. Or visit us at a Tradeshow. Whichever is your preference - we will look forward to hearing from you!

Go ifmonline!

Browse, select, order in the ifm webshop

ifm.com/nz

Purchasing via ifm's webshop is fast, convenient, open 24/7, "standard" bags are delivered at 50% off freight costs.

Overview:
ifm's wide product range is clearly structured via individual Product Groups.

Product Selector:
Allows you to select important technical data. Narrowing options for the optimum product selection.

Compare:
The "comparator" function, allows you to compare 3 products simultaneously, with differences highlighted!

Search engine:
The "full-text" search function, selects all products & topics related to your area of interest.

Purchase 24/7:
Log-in and purchase on-line 24/7 @ www.ifm.com/nz
Save time & reduce courier costs!

Reduce costs:
1% rebate on every eShop order.

Introduction

ifm electronic ltd:

Proudly support the New Zealand potable water and waste water treatment industry with high quality instrumentation and control products. We carry an enormous local stock to ensure fast delivery.

We wish to thank our customers for their support and loyalty over the years. This wouldn't happen without the incredible group of Kiwis that have developed the business into the successful operation it has become over the last three decades.

We employ a dedicated team of 24 local employees, committed to helping you and your business succeed. Our team is located throughout the country in Auckland, Hamilton, Hastings, Levin and Christchurch. Servicing thousands of local businesses, by delivering 73% of all PO's overnight via couriers - nationwide!

The remainder come to our customers after 7 to 10 days via UPS courier shipments from Germany.

ifm electronic - global:

ifm electronic gmbh remains a family owned private business, founded in Germany in 1969. From the start, the company has continuously invested in R&D product development & automated manufacturing.

While marketing an incredible range of electronic sensors, control products & connection solutions for industrial automation and process control applications. The company now supports customers from virtually every industry, especially those where quality and reliability are not negotiable!

ifm employ 7,600 dedicated staff, located in 90 countries and servicing >180,000 customers worldwide. But despite having grown into a large company, we maintain the virtues of the founding years. The flexibility and individuality of a small enterprise, with quality and professionalism central to the group. Our customers remain today in the centre of our work - close to you.

ifm Innovation:

As one of the world's largest manufacturers of industrial sensors & control products, ifm made its name by developing robust, compact industrial quality products with user friendly interfaces, and flexible electronic outputs. With massive annual investments in R&D, ifm currently owns >1000 registered world-wide patents. Regularly winning numerous prestigious design awards for innovations & break-through technologies!

5 YEARS Warranty on ifm products

Our commitment to you:

ifm products are distinguished by the highest precision & reliability. You have our word on that – hence the 5-year factory under written warranty!

We want you to use our products, confident that ifm is the right partner for your automation goals.

ifm – close to you!

Powerful PLC Controllers

With integrated HMI for Standalone Machine Applications

ifm has traditionally been known as a specialist sensor supplier, however we also manufacture state of the art "robust" PLC controllers that are designed for heavy industry. Many New Zealand OEM's use our PLC and integrated HMI controllers for machine control. This allows them to reduce the cabinet size on their machines, and in some cases replace the cabinet altogether with these field mountable IP67 controllers.

- Perfect IO-Link integration
- All-in-one: Different sizes combined into one device.
- Protection rating IP65 or IP67, eliminates need for control cabinets.
- Programmable via CODESYS V3.5 (no software licensing fees)
- Reduce the size of your electrical cabinets by field mounting your HMI controller close to your process within easy reach of operators.
- Support multiple protocols: Modbus TCP, Ethernet/IP, OPC UA, CAN, CANopen, and J1939
- High-brightness HMI/PLC display for maximum readability even in daylight conditions

Application One

Live access to plant performance data via mobile phone

CR1203

Application Two

Live access to plant performance data via mobile phone

AE3100

- PLC solution and IIoT controller in machine and plant digitalisation
- Access to I/O level via Ethernet
- I/Os can be read and controlled by using Industrial Ethernet protocols such as Profinet, EtherCAT, EtherNet/IP or Modbus TCP.
- Programmable using the Free CODESYS V3.5. which is bundled in the controller

Water Treatment System

Auckland City Council: Piha Drinking Water Treatment Plant

This water treatment OEM ensures safe and palatable drinking water by removing contaminants and microorganisms, prioritizing public health, and transforming water into a refreshing experience.

Products used on site

SM9400
Magnetic-inductive flow meter

SM8120
Magnetic-inductive flow meter

DX2053
Multifunction display for monitoring analogue standard signals

PS3607
Hydrostatic submersible pressure transmitter

LDL100
Conductive conductivity sensor

LDL101
Conductive conductivity sensor

SI6600
Flow monitor

TA2842
Temperature transmitter

TA2802
Temperature transmitter

PA3024
Pressure transmitter with ceramic measuring cell

Waste Water Treatment

WaterCare, Mangere Waste Water Treatment Plant

Pukeke Water Treatment Plant in Mangere has been using ifm sensors in many applications over decades. These solutions have generally replaced mechanical instruments that were prone to failure, resulting in avoidable plant stoppages.

Products used on site

PN2093
Pressure sensor with display

SA4100
Flow sensor

UGT205
Ultrasonic sensor

LMT100
Sensor for point level detection

KI6000
Capacitive sensor

IN5224
Inductive dual sensor for valve actuators

LMC400
Sensor for point level detection

SD5500
Compressed air meter

EVM004
Connecting cable with socket

Water Treatment System

Watercare Karaka

Karaka is a relatively modern Waster Water Treatment Plant that uses ifm instrumentation throughout the site.

Products used on site

PN2093
Pressure sensor with display

EVT005
Connecting cable with socket

PS4506
Hydrostatic submersible pressure transmitter

SA4100
Flow sensor

UGT513
Ultrasonic sensor

PI1704
Flush pressure sensor with display

PI1709
Flush pressure sensor with display

PK6524
Pressure switch with intuitive switch point setting

EVM004
Connecting cable with socket

Water Treatment System

Watercare: Meremere WWTP MBR Upgrade

Contracting company Apex Water completed the recent upgrade of Meremere wastewater treatment plant for Watercare. To improve effluent quality and cater for future population growth in the area. The facility was expanded with a new membrane bioreactor (MBR) designed and constructed by Apex, along with other upgrades to ancillary processes.

Guided wave radar level sensor:

- Rods can be cut to size as required.
- Some customers use teflon coated probes to measure the level of corrosive media.
- Measuring principle independent of temperature influences.
- Versions with two or four switching outputs, IOLink or analogue output 4...20 mA / 0...10
- Designs with and without display.

Products used on site

DX2053
Multifunction display for monitoring analogue standard signals

LR2750
Continuous level sensor (guided wave radar)

PG2452
Pressure sensor with analogue display

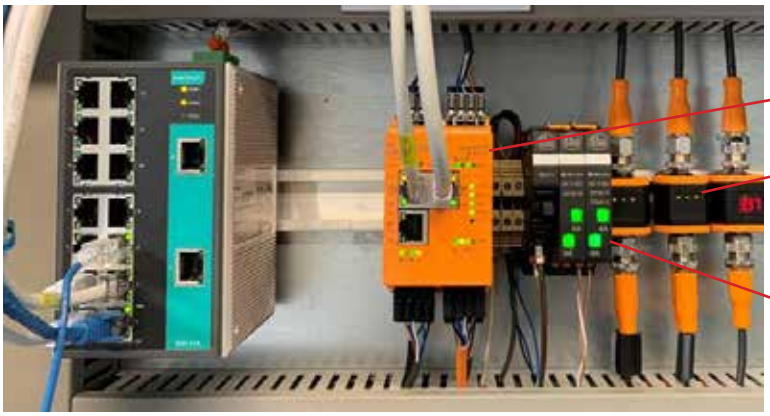
PI1709
Flush pressure sensor with display

EVT006
Connecting cable with socket

Potable Water Treatment Plant

Wellington Water, Martinborough District Council: Industry 4.0 networking system and sensors

High tech containerised Water Treatment plant employing ifm Dataline Masters and ifm IO-Link fuses. Process sensors and precision MVQ IO-Link valve actuator position feedback sensors. This installation includes legacy 4...20 mA instruments, so IO-Link signal converters were used to bring these signals into the IO-Link network, without the need for analogue input cards.



IO-Link panel mount master

Legacy 4...20 mA instruments to IO-Link signal converters

IO-Link resettable panel mount electronic fuses

Products used on site

AL1920
IO-Link master with Ethernet/ IP interface

AL1326
IO-Link master with EtherNet/ IP interface

PN7094
Pressure sensor with display

MVQ201
Position sensor for valve actuators

DF2101
Power supply module for electronic circuit breaker

DF2220
Circuit protection module for an uninterrupted power supply

Waste Water Treatment

Hamilton City Water: Waste Water Treatment Plant

Hamilton Water Treatment Plant has been using ifm sensors in multiple applications for the last decade. These solutions have generally replaced mechanical instruments that were prone to failure, resulting in avoidable stoppages.

Products used on site

AL1322
IO-Link master with Ethernet/ IP interface

AL1920
IO-Link master with Ethernet/ IP interface

VSE151
Diagnostic electronics for vibration sensors

VSA001
Acceleration sensor

LW2720
Continuous level sensor

PS3417
Hydrostatic submersible pressure transmitter

Water Treatment System

Hamilton City Water: Waste Water Treatment Plant (continued)

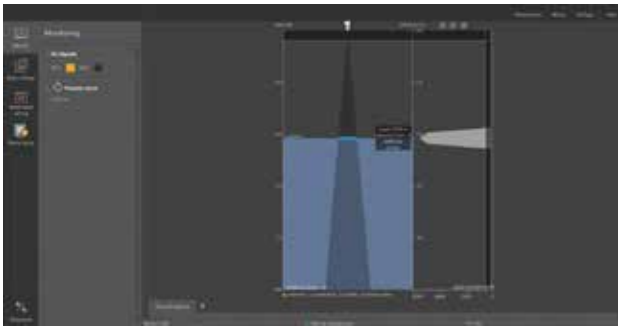
Non-contact, IP69K, trouble-free monitoring of large tanks

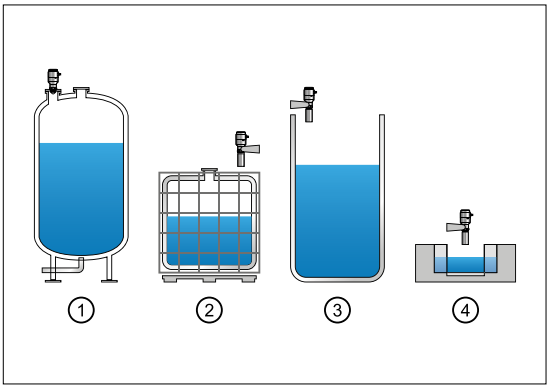
With the LW2720 level sensor, levels of liquid media in tanks with a height of up to 10 metres can be monitored precisely and without blind areas. The non-contact radar measuring principle prevents malfunctions or failures of the sensor caused by the adhesion of viscous media or damage from agitators.

The 80 GHz frequency used ensures stable and precise measurement results even in the presence of steam or condensate in the tank. The sensor is designed for use in hygienic areas, so that even CIP and SIP processes or the use of spray balls do not impair its proper functioning.

80 GHz Precise Level Measurement Radar (advert)

View measurement behaviour in real time: The freely available Vision Assistant software enables intuitive set-up of the sensor and clear visualisation of the process values. The behaviour of the sensor can be viewed in real time and reliable measurement ensured.





1) Storage tank
2) Plastic container
3) Outside use
4) Flow measurement

Products used on site

MVQ201
Position sensor for valve actuators

IN5225
Inductive dual sensor for valve actuators

PN2094
Pressure sensor with display

PG2454
Pressure sensor with analogue display

PM1707
Pressure sensor with analogue display G1

PM1504
Pressure sensor with analogue display G1/2

SU7020
Ultrasonic flow meter

UGT207
Ultrasonic sensor

KQ5100
Capacitive sensor

TP3232
Evaluation unit for PT100/ PT1000 temperature sensors

TS2229
Temperature cable sensor with bolt-on sensor

EVM006
Connecting cable with socket

Water Treatment System

Tauranga City Council: Te Maunga and Chapel Street

Tauranga City Council Chapel Street Water Treatment Plant has been fitting ifm sensors into applications for the last decade, especially where mechanical instruments would regularly fail, leading to plant down-time.

Chapel Street treatment plant

Te Maunga treatment plant

Products used on site

AL1123
IO-Link master with EtherNet/IP interface

AL2205
IO-Link input/output module

PG2453
Pressure sensor with analogue display

PN2024
Pressure sensor with display

MVQ101
Position sensor for valve actuators

PS3427
Hydrostatic submersible pressure transmitter

PT5443
Pressure transmitter

EVF551
Ethernet connection cable

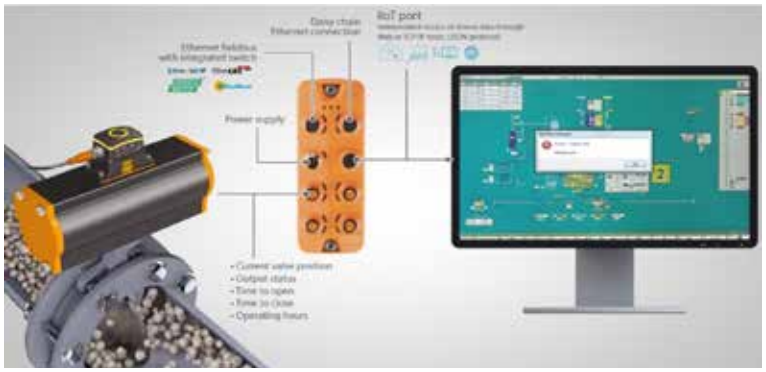
EVM006
Connecting cable with socket

Water Treatment System

Tauranga City Council: Waiāri WTP - continuous actuator position monitoring

The Waiāri Water Supply Scheme involved developing a water abstraction facility on the Waiāri Stream, a water treatment plant in No.1 Road, Te Puke, and an underground water pipeline from the plant to Papamoa.

The plant will mainly service the Papamoa coastal strip/Te Tumu growth areas and in time will provide a backup for Western Bay of Plenty District Council's Te Puke water supply.



MVQ101- smart valve sensor detects valve problems at an early stage.
MVQ301 has similar features to the MVQ101, c/w solenoid valve connection and control.

- Provide continuous position feedback of the valve actuator.
- Detect seal damage.
- Detect build-up of foreign materials
- Simplify installation and increase efficiency.

Products used on site

MVQ101
Position sensor for valve actuators

MVQ201
Position sensor for valve actuators

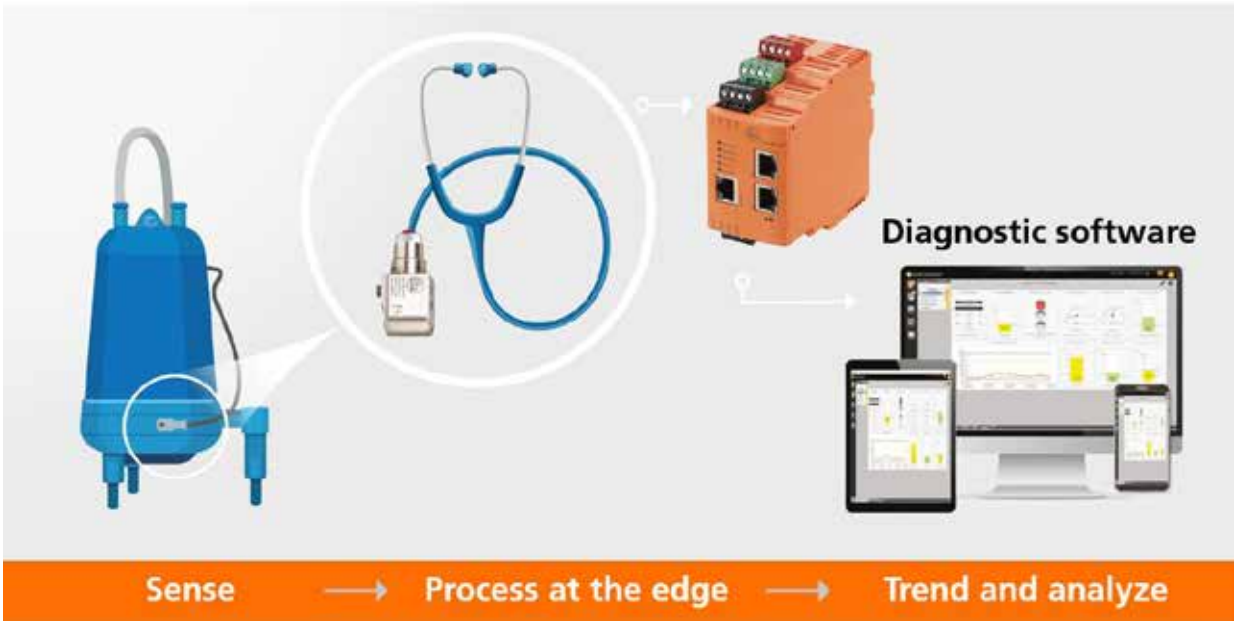
MVQ301
Position sensor for valve actuators

EVM006
Connecting cable with socket

Water Treatment System

New Plymouth District Council: Plant condition monitoring and flow measurement

NPDC selected an IO-Link system to simplify installation and collection of critical device data, while improving plant operations. IO-Link Performance-Line masters, simplified the design vs traditional designs. Specifically, by powering valves directly from the IO-Link Master. Components that are common points of failure - terminal strips and relays - were no longer required. In addition ifm's field masters now provide operators with immediate indication of where a sensor or wiring fault has occurred, resulting in improved plant up-time.



Products used on site

VSE151
Diagnostic electronics for vibration sensors

VSP004
Acceleration sensor

AL1333
IO-Link master with EtherCAT interface

SM2000
Magnetic-inductive flow meter

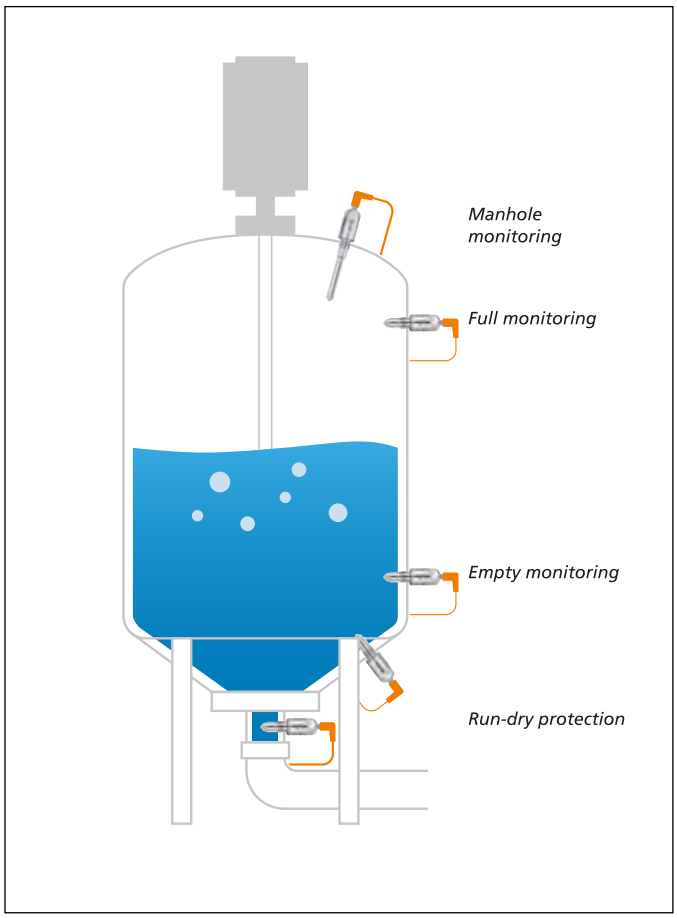
EVM005
Connecting cable with socket

Water Treatment System

Palmerston North District Council: Wet well level control and water overflow detection

LMC400 with back mounting thread

The district council selected LMC400 back mounted level switch. To give reliable switching during water overflow scenarios. This robust solution overcomes common issues experienced with the use of mechanical float level switches.



The simple way to achieve low or high level switching in a wet well application!

LMC400: Rear installation of the LMC400 sensor in a pipe allows variable installation depths.

Products used on site

AL1333
IO-Link master with EtherCAT interface

VSP001
Vibration Sensor

EVC018
Connection cable

PG2454
Pressure sensor with analogue display

EVM005
Connecting cable with socket

LMC400
Sensor for point level detection

Water Treatment System

Tararua District Council: Configurable Industrial flow sensor and level control for water supply

Potable Water town drinking supply flow/consumption metering using an SI-series Titanium flow switch.

Flow sensors type SA

Sensing head rotatable by 345°.

2 switching outputs.

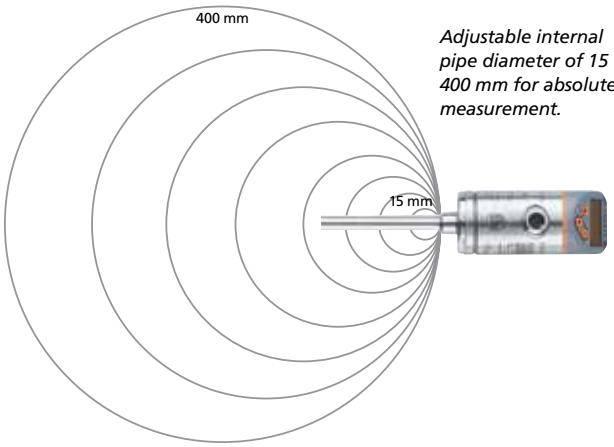
Easy switch-point setting via display

3-pushbutton operating concept.

Fast response time for flow and temperature measurement.

Individual serial number.

IO-Link



Adjustable internal pipe diameter of 15 to 400 mm for absolute measurement.

Products used on site

PS3417
Hydrostatic submersible pressure transmitter

SI5100
Titanium flow monitor

E40096
Screw-in adapter for process sensors

EVM005
Connecting cable with socket

Water Treatment System

Marton Water Treatment Pilot Plant

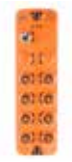
Marton WWTP plant utilizes an IO-link system, which is a modular installation ideal for remote locations. IO-Link facilitates both fast installation and commissioning, to save time on site. But also as an efficient, cost effective wiring solution.

The system harnesses industry 4.0 capability within the sensors, and allows this water treatment plant to be more accurate while treating and discharging clean water back into the environment. Technology used: DF fuses - remote power supply management: SM series magnetic flow meters - flow metering and consumption: PS series submersible hydrostatic level transmitters – Bore level: PV series pressure sensors – Pressure monitoring in case of blocked filters.

Products used on site

AL1322
IO-Link master with Ethernet/ IP interface

AL2303
IO-Link input/output module



DF2101
Power supply module for electronic circuit breaker

DF2214
Electronic circuit breaker

LW2720
Continuous level sensor

PS3208
Hydrostatic submersible pressure transmitter

PV8004
Pressure switch with IO-Link

EVC556
Connecting cable with plug

EVT045
Connecting cable

EVC927
Ethernet connection cable

Remote pump stations

Wellington Water: Remote pump station, 24/7 condition monitoring of critical assets

Ensuring a reliable town water supply. Proactive approach in Pump Maintenance and Data Collection

Wellington Water is responsible for providing safe and healthy drinking water, collection and treatment of wastewater, and to ensure that the stormwater network is well managed. Preventative pump maintenance is crucial to improve efficiency and reduce unplanned expenditures or defects.

Eliminate unplanned downtime due to equipment failures

- Monitor key machine condition indicators to predict and plan maintenance activities.
- Implement advanced real-time vibration monitoring without the complexity of traditional systems.
- Integrate easily into your process systems

Products used on site

VSE151
Diagnostic electronics for vibration sensors

VSA001
Acceleration sensor

SM4100
Magnetic-inductive flow meter

PG2453
Pressure sensor with analogue display

PG2794
Flush pressure sensor with analogue display

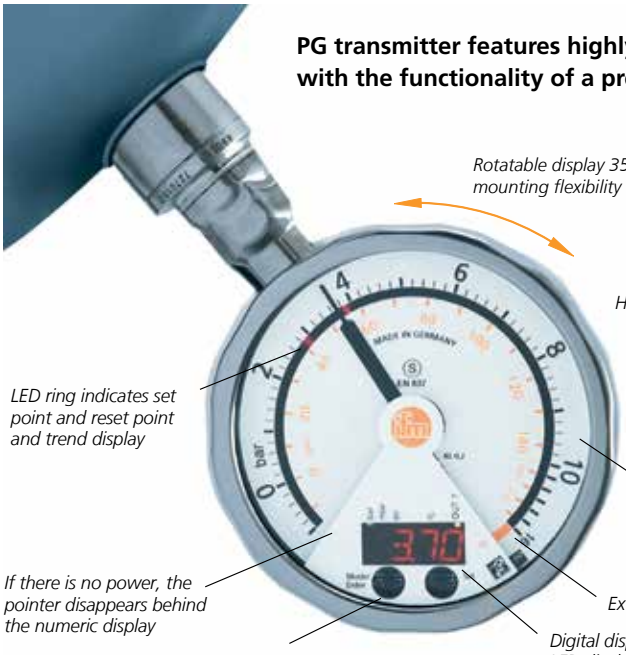
EVM005
Connecting cable with socket

Remote pump stations

Wellington Water: pressure monitoring with ceramic diaphragm pressure transmitters

Pressure spikes resulted in regular pressure sensor failures. ifm's PG series was found to be a reliable solution due to the robust ceramic sensing element and visual indication of analogue and digital set points. The PG sensor is their "go to product" due to easy set up and quality of the product.

PG transmitter features highly visible gauge with the functionality of a pressure sensor



High-precision measurement

ifm's PG Series pressure family offers a 3-in-1 solution for pressure applications. The PG is a transmitter, switch and gauge in a light-weight, stainless steel housing.

Products used on site

PG2453
Pressure sensor with analogue display

PG2794
Flush pressure sensor with analogue display

PN7094
Pressure sensor with display

PS4417
Hydrostatic submersible pressure transmitter

IM5129
Inductive sensor

EVM005
Connecting cable with socket

Water Treatment System

Nelson City Council: Instrumentation upgrades

Contractors to Nelson City Council Water and Waste Water Treatment Plants use ifm sensors for reliable monitoring of plant pressures and level control.

PN Series

2-color digital display is easier to see from a distance

Robust 316 stainless steel construction

Laser etched part numbers will not fade for future referencing

Sensor can be rotated 345° for optimum visibility after installation

Large bright LEDs can be seen from all angles indicating output status

Simple pushbutton setup allows the sensor to be parameterized in less than 5 minutes with new scroll and enter buttons

QR code for quick access to technical data and installation instructions

Atmospheric reference is achieved via the electrical connection for high IP67 rating

Process connection, G1/4" = 1/4" PSP-P

Ceramic diaphragm withstands pressure spikes

Products used on site:

PN2092
Pressure sensor with display

PS3427
Hydrostatic submersible pressure transmitter

LW2720
Continuous level sensor

PG2793
Flush pressure sensor with analogue display

E30043
Filter cover for pressure sensors

PT5403
Pressure transmitter

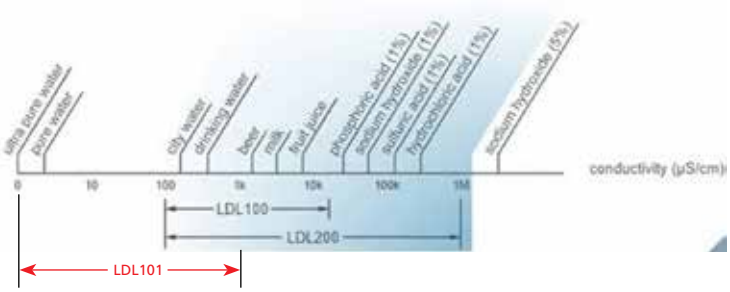
Water Treatment System

Grey District Council: Water conductivity monitoring

Grey District Council ensures every household in the Grey District has clean and fresh drinking water when they turn on the tap. They employed a high accuracy LDL101 to monitor ultra pure water quality after filtering.

LDL101

- Measuring range: 0.04...1000 µS/cm
- Effective, permanent control of water and process quality
- Conductivity sensor for Ultra-pure water



Conductivity sensor made of polypropylene - continuous corrosion resistance (advert)

IO-Link IP69K

LDL400 - inductive conductivity sensor

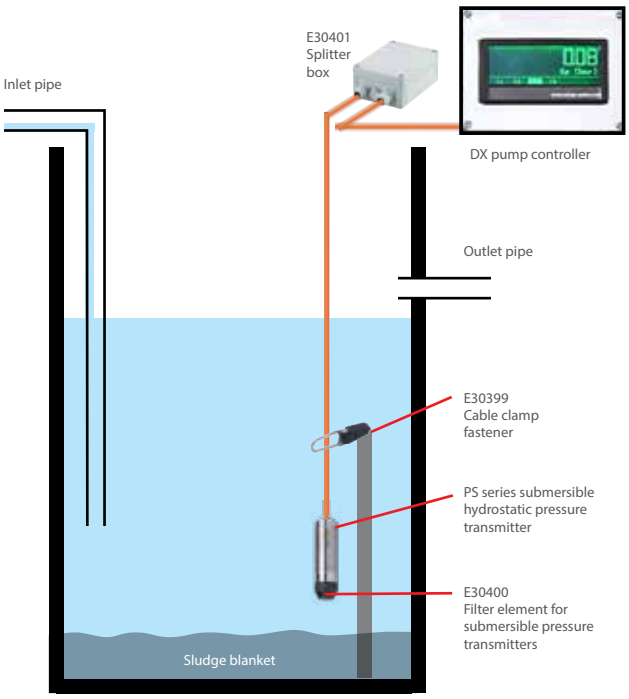
Conductivity sensor made of polypropylene.

- Resistant to salt and other aggressive media
- Detects conductivity using the tried-and-tested inductive measuring principle
- Compact design facilitating installation where space is limited

Water Treatment System

Christchurch City Council: Dam and wet well level monitoring and sensor upgrades

Submersible pressure sensor to monitor the level of a toe drain - stormwater drainage system. They use ifm submersible hydrostatic pressure transmitters for reliable level control.



Wet well level control

Products used on site:

PS3427
Hydrostatic submersible pressure transmitter

E30399
Cable clamp fastener

E30400
Filter element for submersible pressure transmitters

E30401
Splitter box

RMU100
Analogue 13 bit multiturn encoder with 4-20 mA output

IGS290
Inductive sensor

Flow rate and temperature monitoring system

Christchurch City Council: Biosolids renewable energy system

Christchurch City Council have employed an IO-Link system consisting of an IO-Link master and flow sensor, connected to MONEO IPC and monitoring software. This solution monitors Air flow and Temperature in the Christchurch Biosolids Drying Facility.

An advanced feature of an IO-Link sensor like SA4300, is that it provides outputs for both flow rate and temperature via an IO-Link master.

The IO-Link master allows this information to be seamlessly transferred to the Moneo IPC server, where the software is installed and trend data is saved for easy analysis.

Products used on site:

QHA210
Hardware for operating moneo in the production environment

AL1341
IO-Link master with Modbus TCP interface

SA4300
Flow sensor

SI5000
Flow monitor

O1D100
Photoelectric distance sensor

EVM005
Connecting cable with socket

IO-Link wiring system & instruments upgrade

Selwyn Council: Pines WWTP - Industry 4.0 networking system and sensors

In a new process to thicken the sludge for de-watering, which includes dosing liquid polymer. An IO-Link wiring solution reduced the project costs by eliminating analog input cards and reducing the size of control cabinets.

The automatic device replacement feature of IO-Link enables operators to back up the parameter settings of each sensor. Automatically downloading if a replacement device is required.

Digital real-time IO-Link communications are more accurate than traditional 4...20 mA analog signals.

Products used on site:

AL1920
IO-Link master with Ethernet/ IP interface

AL2205
IO-Link input/output module

DN4033
Switched-mode power supply 24 V DC

DF2101
Power supply module for electronic circuit breaker

DF2210
Electronic circuit breaker

DF3100
Feeding module for ground potential

E30443
IO-Link display

SM2000
Magnetic-inductive flow meter

AL1326
IO-Link master with EtherNet/ IP interface

DN4012
Switched-mode power supply 24 V DC

IO-Link wiring solution and instrumentation

Timaru District Council water: Industry 4.0 networking system and sensors

Using IO-Link as a wiring solution, the site gain more information from their IO-Link devices, compared to traditional analogue or digital devices, without increasing costs, engineering time or system complexity.

To explain, the IO-Link master replaces a traditional analogue input card which saves cost while allowing for significantly smaller sized control cabinets. It is well known that 100% digital communication is far more reliable, accurate and is 100% noise-immune compared to legacy analogue transmitter signals.

Advantages

- Good chemical resistance (99,9% ceramic)
- High pressure rating
- Long term stability
- No tiring of ceramic material
- Less temperature influence

The IO-Link communication protocol provides access down to each individual sensor. This creates maximum transparency and facilitates troubleshooting.

Products used on site:

AL1326
IO-Link master with EtherNet/IP interface

PN2093
Pressure sensor with display

PI1703
Flush pressure sensor with display

QMP010
moneo configure license: Stand-alone licence for online/offline parameter setting of IO-Link devices

- For all IO-Link devices and IO-Link masters
- Integrated, manufacturer-independent IODD management for time-saving sensor parameter setting.
- Cockpit for parallel display of parameters and process values.

Irrigation scheme instrumentation

Clutha District Council: Whitelea Road Water Treatment

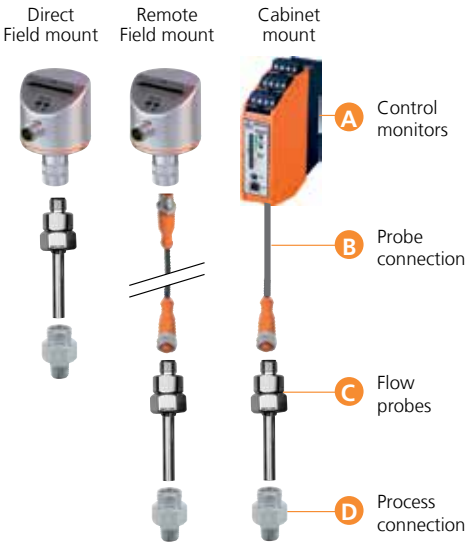
Chemicals are used in various water treatment processes to eliminate any remaining parasites, bacteria or viruses.

Aggressive media can cause corrosion to sensors used to monitor level and flow of these chemicals.

Titanium SI5100 probe was used as a standard flow switch for this project, given its good chemical resistance.

A non-contact laser sensor is used to measure the chemical dosing tank level. SA5000 series flow sensors are used for water flow measurement, given they have the option of different probe lengths to suit different pipe diameters.

Titanium, Ceramic or 316SS Sensors available



Products used on site:

SA5000
Flow sensor

SI5100
Titanium flow monitor

O1D120
Photoelectric distance sensor

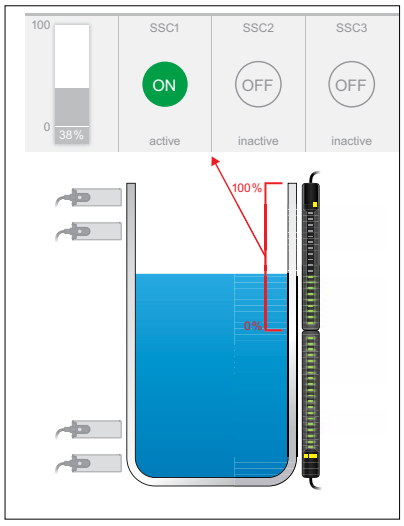
E21224
Mounting adapter for photoelectric level sensors

EVM005
Connecting cable with socket

Water Treatment System

Fairlie Water Treatment Plant: Instrumentation upgrades

Employs a number of modern ifm instruments, one being external level monitoring on non-metallic tanks.



- **Continuous level monitoring from outside the process**
- **No stress caused by the medium thanks to non-contact detection**
- **Three point level positions in one sensor**
- **Deposits can be detected and signalled to improve the quality of the process**
- **Several KQ10 units can be linked via IO-Link**

Products used on site:

KQ1000
Continuous level sensor

PI1717
Flush pressure sensor with display

LMT100
Sensor for point level detection display

Water Treatment System

UV Light Water Treatment Plant

Novolabs' globally patented Supercritical UV technology is at the forefront of UV disinfection technology. Supercritical UV is revolutionising the 40-year-old industry. This new technology can treat liquids with up to 100x lower clarity and 20x higher solids loading than legacy systems.

To develop Supercritical UV Novolabs had to do a ground-up redesign which allowed for an unprecedented level of automation. Working with global leaders such as ifm, Novolabs is integrating technologies such as IoT and Industry 4.0 into their systems allowing for increased efficiency and operator safety while giving clients significant OpEx savings and improved performance. A key part of Novolab's ability to rapidly innovate is its partnership with companies such as ifm who are leaders in their field to provide the best components available in the industry.

Products used on site:

SM2000
Magnetic-inductive flow meter

MN200S
Magnetically coded sensor

G1501S
Safety relay

EVC018
Connection cable

Water Treatment

Self-sufficient drinking and process water treatment

The Belgian company BOSAQ has developed a solution that can generate drinking water from water of any quality anywhere in the world. Self-sufficient, reliable, and maintenance-free.

Products used on site:

AL1300
IO-Link master with PROFINET interface

SU9000
Ultrasonic flow meter

SV3150
Vortex flow mete

SA5000
Flow sensor

PT5404
Pressure transmitter

EVM005
Connecting cable with socket

Water Treatment System

Olam Dairy MBR Wastewater Treatment Plant

Apex Water designed and constructed a turnkey wastewater treatment plant for Olam Food Ingredients (OFI) new Tokoroa dairy factory, which started processing in August 2023. An ifm non-contact Radar Level sensor was used to monitor the levels of the Acetic Acid and Sulfuric Acid tanks. ifm PI27 series pressure transmitters are used for DAF Feed pump outlet and balance tank hydrostatic level measurement.

Products used on site:

LW2120
Continuous level sensor

PI2794
Flush pressure sensor with display

SI5100
Titanium flow monitor

EVM005
Connecting cable with socket

Irrigation System

Kurow and Duntroon Irrigation Company Ltd (KDIC)

Kurow Duntroon Irrigation Company (KDIC) is a community owned irrigation scheme. KDIC has a siphon intake structure attached to the Waitaki Dam, on Lake Waitaki, however its command area is below the Dam.

The total irrigated area is 3,648 hectares, with the capacity to provide water to 3,992 hectares and the potential to irrigate up to 5,500 hectares following the completion of the piped irrigation scheme. This system uses ifm ceramic faced pressure transmitters to overcome unplanned surge pressures

Advantages

- Good chemical resistance (99,9% ceramic)
- High pressure rating
- Long term stability
- No tiring of ceramic material
- Less temperature influence

Products used on site:

PI1703
Flush pressure sensor with display

EVM005
Connecting cable with socket

Water Treatment System

Alliance Farmers Produce: Plant condition monitoring - Industry 4.0 networking system and sensors

ifm Vibration monitoring systems (VSE+VSA) is used for condition-based maintenance of Alliance Farmers Produce's critical effluent pumps 24/7. The site is also using IO-Link to connect multiple sensors to monitor Flow, Level, and Pressure of their effluent system.

IO-Link masters come with a separate IIoT port, with a dedicated IP address for the IT infrastructure. This allows the site to send information and data directly to Moneo, without the need for a PLC. ifm Moneo is used to monitor sensor data gathered from field based instruments, which can be read and processed easily and used as a basis for sustainable corporate decisions.

Products used on site:

DN4033
Switched-mode power supply 24 V DC

AL1326
IO-Link master with EtherNet/IP interface

AL3050
Ethernet switch

VSE151
Diagnostic electronics for vibration sensors

VSA001
Acceleration sensor

LW2720
Continuous level sensor

SA4300
Flow sensor

E40260
Progressive ring fitting

EVT003
Connecting cable with socket

EVF565
Wirable socket

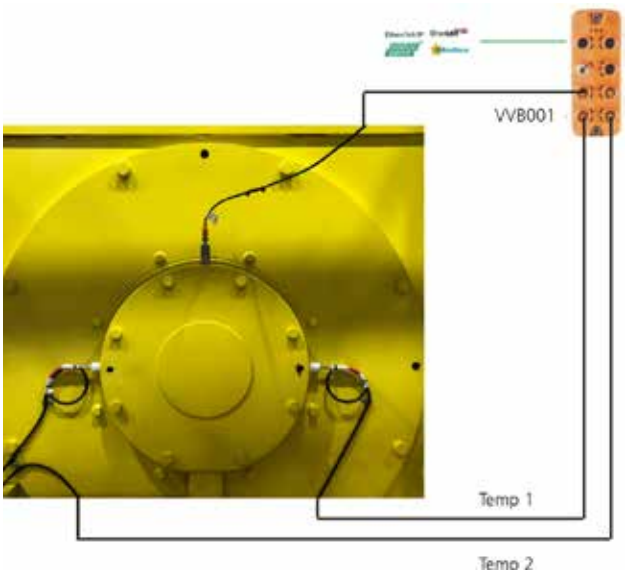
EVC927
Ethernet connection cable

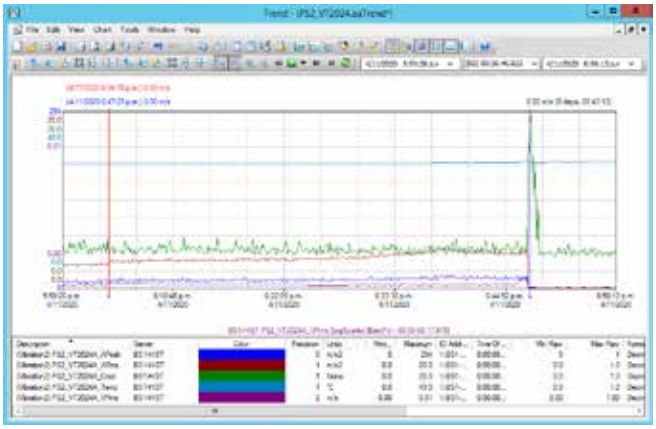
EVC029
Connection cable

Water Treatment

North Otago Irrigation: Plant condition monitoring - Industry 4.0 networking system and sensors

North Otago Irrigation pump station was built by the local authority to provide reliable irrigation to the region. They saw the advantages of using an IO-Link condition based monitoring system to continuously monitor the health of their primary plant 24/7. This state of the art pump station transfers 2.0 m3 per second.





Products used on site:

AL1324
IO-Link master with EtherNet/IP interface

VVB001
Vibration sensor

TA2105
Temperature transmitter

EVC006
Connecting cable with socket

About South West Water:
South West Water provides reliable, efficient and high-quality drinking water and wastewater services for a population of around 1.7 million in Cornwall, Devon, the Isles of Scilly and parts of Somerset and Dorset.

Condition monitoring across the entire water cycle

How South West Water achieves its business goals with vibration monitoring.

South West Water provides reliable, efficient and high-quality drinking water and wastewater services for a population of around 1.7 million in Cornwall, Devon, the Isles of Scilly and parts of Somerset and Dorset. To meet the needs of its customers the company stores water in more than 20 reservoirs and treats it in around 40 water treatment works to produce drinking water for the region.

South West Water also operates 650 wastewater treatment works. Among them is the Marsh Mills facility on the outskirts of the city of Plymouth. Around one third of the wastewater of the city's 230,000 inhabitants is treated here in several stages before being fed back into the water cycle. After initial mechanical treatment, South West Water relies on a biological treatment using the activated sludge process at Marsh Mills. Microorganisms decompose the organic substances dissolved in the water.

"As these are aerobic microorganisms, it is crucial that sufficient oxygen is permanently added to the water so that the decomposition process can take place in the required quality," says Brendon Teague, Condition Based Maintenance Manager at South West Water. This task is performed by nine Roots blowers, which supply a large volume of air at low pressure. With a total power of 615 kW, they pump up to 390 cubic litres of air per minute into the activated sludge tanks.

Fans – an unjustly overlooked piece of equipment

So far, each blower and motor were checked about once a month in terms of their need for maintenance. Nevertheless, plant failures between maintenance intervals could not be excluded, as bearing damage was either unforeseen or developed between the intervals."

Another problem exists in that the noise which could indicate deterioration of the motor condition cannot be heard from the outside. "The motors are soundproofed, so people can literally walk past them undisturbed. Perhaps this is also one reason why fans and blowers in the water and wastewater treatment industry are often overlooked, even though they perform a task that is just as critical as, for example, the work of the pumps used in the drinking water supply."

Brendon Teague finally decided to equip nine blower units in Marsh Mills with vibration diagnostics from ifm This first step is, therefore, logical and does not come as a surprise.

"I have been working with ifm for a long time to safeguard South West Water's plants against unforeseen downtime by using condition monitoring."

Scan here to visit
the ifm Water page

Condition monitoring: keeping an eye on the health of the plant

"I have been working with ifm for a long time to safeguard South West Water's plants against unforeseen downtime by using condition monitoring," says Brendon Teague. Together with his team, he has installed over 200 VSE100 evaluation unit devices, plus the acceleration sensors connected to it, in South West Water's water and wastewater treatment works.

The vibration monitoring system consists of acceleration sensors and an evaluation unit. The sensors – South West Water uses sensors of the types VSA001 – are positioned at relevant positions in the system and transmit the data to the evalu- ation unit, in this case the VSA001. The latter permanently evaluates information from up to four sensors and sends corresponding switching signals to the control system when limit values are exceeded. The data and alarms can also be transmitted to a central control room via an Ethernet interface.

Easier troubleshooting and maintenance planning remotely

By means of vibration diagnostics, the state of health of a machine is permanently recorded. Thanks to the monitoring of the occurring vibrations in the time and frequency range, incipient damage is registered at an early stage and can be analysed in real time by ifm's own software in a more detailed FFT analysis (Fast Fourier Transformation). As an exact frequency can be assigned to the individual plant components or damage patterns, the sometimes time-consuming trouble-shooting on site is no longer necessary and maintenance work can be prepared effectively, even remotely. This drastically minimises the amount of work and downtime.

Sensors help to achieve the company goals

"It is a real benefit to have a central overview of the status of all relevant machines via the software and to be notified as soon as a value exceeds a critical limit," says Brendon. The site Maintenance Manager can thus quickly get an update of the situation, assess the need for action and, in an emergency, inform the maintenance team on site. "Condition monitoring in this form is already helping us to achieve the company goals relating to the environmentally friendly handling of water and wastewater.

By detecting damage at an early stage, we have often been able to react in time and thus avoid downtime and costly repairs. Overall, we expect that due to the implementation of condition monitoring, we can reduce the cost of maintenance and replacement of damaged assets on average by between £100,000 to £150,000 per year.

"Every new plant must be equipped accordingly with sensor and evaluation technology that can be integrated into our existing infrastructure."

Condition monitoring: standard on newly installed machines

In order to benefit even more comprehensively from the advantages of condition monitoring in the future, South West Water has defined condition monitoring on pumps and fans as a technical standard. "Every new plant must be equipped accordingly with sensor and evaluation technology that can be integrated into our existing infrastructure. This not only creates more operational certainty for large, important treatment works, but also helps us to efficiently and effectively maintain the quality and keep everything in perfect condition at smaller treatment works in rural areas."

The future: collaboration via the IoT platform As a further development step, Brendon Teague can very well imagine switching to the new ifm moneo IoT platform. With moneo, even complex sensor infrastructures can be easily mastered, while the optional moneo RTM module offers far-reaching possibilities for an even more comprehensive vibration analysis. "In combination with the new edgeGateways from ifm and thus the possibility of making the data available in a cloud environment, I would be able to share the relevant data even more effectively with my maintenance colleagues in the supply area, so that the maintenance quality and the reaction speed in the event of an alarm would again increase significantly."

Conclusion

South West Water has been able to effectively prevent serious failures of critical water supply and wastewater treatment equipment such as pumps, centrifuges and fans with their comprehensive condition monitoring system. This saves the company significant costs for repair or replacement of equipment. At the same time, plant monitoring supports the company's goals regarding the responsible use of water as a resource

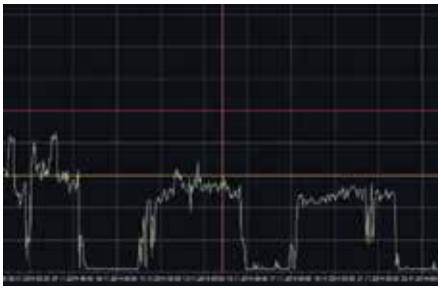
Plant condition monitoring: component overview

Vibration accelerometers for all applications

*Not compatible with VSE15x

Vibration sensors on the drives detect even smallest vibrations.

The VSE100 evaluation unit evaluates the signals from up to four vibration sensors.



Vibration characteristics can be visualised via PC in a control room. Operators can set limits (yellow and red lines for pre-alarm and main alarm).

Plant condition monitoring

Motor monitoring

Electric motors drive nearly all industrial machines and processes. We depend on motors to run without interruption. Like any machine, motors are subjected to damaging forces such as misalignment, shaft overload, and lack of lubrication to name a few.

How could you improve your overall operational effectiveness?

Motors are often overlooked or are located in inaccessible locations. Implementing RtM strategy can safeguard your motors and prevent common failures. This reduces unplanned downtime and secondary damage which, in turn, reduces your maintenance cost and loss of production.

Ducted fan monitoring

Fans are used in virtually every manufacturing plant and typically, they are located out of sight of normal daily traffic. Remote monitoring for wear on bearings, shaft or blade unbalance, etc. can reduce unplanned downtime events and improve your overall plant efficiency.

Centrifugal pump monitoring

Pumps are one of the most common pieces of equipment in all sectors of industry. Uninterrupted flow from pumps is vital to keep operations running in applications from heating and cooling systems to product storage and delivery.

How can you improve your overall operational effectiveness? Most often, pumps are overlooked until they stop working. Remote monitoring for wear on motors, bearings, shafts, impeller unbalance, or cavitation can reduce unplanned downtime events.

Submersible pump

Submersible pumps do the essential – but dirty work – of transporting sewage to treatment plants. Prone to blockages, ragging, and general wear and tear, pumps need to be monitored to avoid events such as overflow and environmental contamination of public and residential areas.

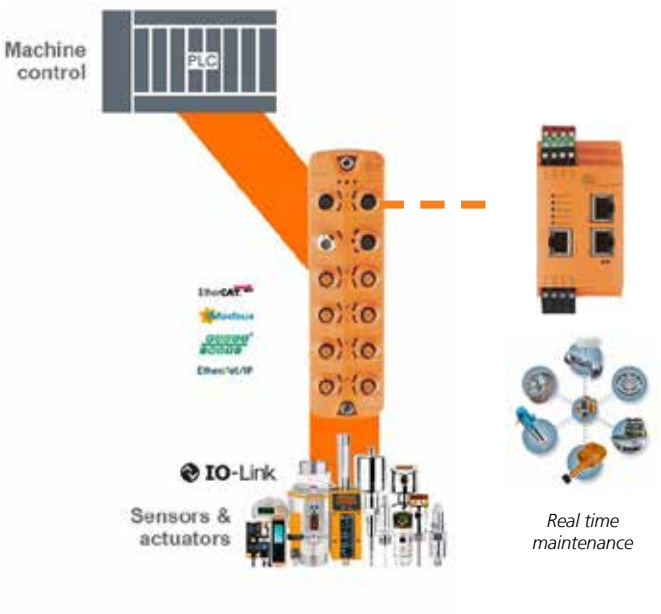
Wireless vibration monitoring System + IoT Core For Moneo implementation

- Battery-powered vibration sensor VWV
- For overall vibration and temperature monitoring in places that are difficult to access
- Radio technology with intelligent mesh topology for efficient data transmission
- Easy implementation from sensor to data visualisation

Moneo: IIoT platform for industry and production

A new approach to collecting sensor data

Talk directly to your IIoT system without PLC intervention



The PLC only uses 5% of the sensor information.
Data size is in bytes and cycle time in msec.

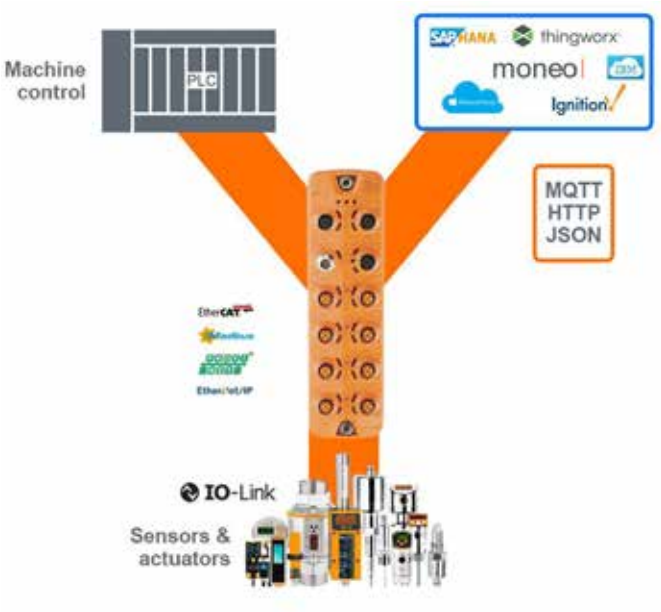
Digital communication technology allows you to get more detailed information from your sensors. But, overloading your PLC will limit the amount of that data you can actually receive and use.

Using IO-Link technology with a Y-path connection gives you full access to real-time machine information without overloading your system.

Don't let your PLC carry the entire burden!

The PLC has been a mainstay of automation since the 1970's and it is used to control industrial automated equipment. With the advent of Ethernet technologies and IIoT applications, the PLC has been forced to carry more and more information that is not necessarily used to control the machines.

Y-Path Connectivity



HMI, visualization computers, servers, PCs, etc. use 95% of the sensor information.
Data size is in Mbytes and cycle time is in seconds.

Imagine if your sensors could talk directly to your SCADA, MES, ERP, CMMS systems directly without the PLC intervention and still send the information to the PLC for machine control?

This is now possible with the Y-path from ifm.

Our IO-Link masters come with a separate IIoT port with a dedicated IP address for the IT infrastructure. This works in any number of industrial applications without affecting the machine control side of the system. This unique approach allows you to send information and data directly to where it is needed.

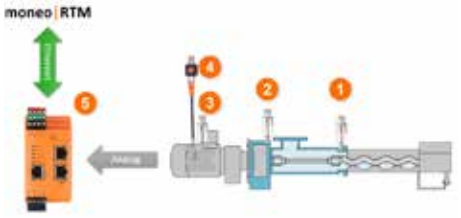
moneo | application reports

Continuous condition monitoring of sludge and drainage pumps in the waste water industry

Waste water treatment plant Kressbronn, Germany

At the waste water treatment plant Kressbronn, numerous pumps with various characteristics are used to convey liquid media through the various areas of the waste water treatment plant. Unplanned downtime can have severe repercussions, potentially disrupting the entire municipal waste water disposal system or even causing a complete halt to its operations.

In the case of liquid pumps, bubbles can form if the pressure difference between the inlet and outlet side is too high: Resulting in cavitation. The tiny bubbles filled with vapour collapse suddenly due to the high pressure. This sudden collapse creates shock waves that repeatedly erode the pump element and the pump housing from the inside. If the damage becomes too great, the pump can no longer work properly. In the worst case, expensive repairs or even the replacement of the pump may become necessary.

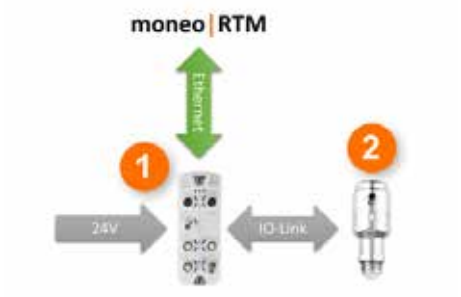


1. Vibration sensor pump bearing NDE VSA001
2. Vibration sensor pump bearing DE VSA001
3. Vibration sensor motor bearing VSA001
4. Temperature sensor motor TP3232 + TS2229
5. Diagnostic electronics for vibration sensors VSE150

1. Vibration motor bearing [mg]
2. Cavitation recognition pump DE [mg]
3. Time counter cavitation DE [h]
4. Vibration pump bearing DE [mg]
5. Cavitation recognition pump NDE
6. Time counter cavitation NDE [h]
7. Vibration pump bearing NDE [mg]
8. V-effective pump bearing NDE [mm/s]
9. V-effective pump bearing DE [mm/s]
10. V-effective motor bearing [mm/s]
11. Motor temperature [C°]

Continuous radar level measurement of CIP tanks, with moneo RTM

The non-contact level measurement principle with radar offers many advantages for monitoring a CIP system. Contact with media (acids, alkalis) and heating coils is avoided so that the measurement is independent of the temperature and density of the media. These advantages complete the quality assurance of the CIP cleaning process.



1. IO-Link master (e.g. AL1351)
2. 1 LW2720 level sensor LW2720

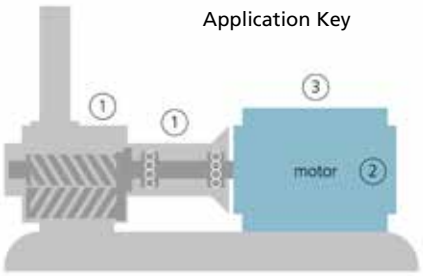
1. Level in metres
2. Volume in litres

moneo | application report

Continuous condition monitoring of a refrigeration system compressor set

- **Continuous diagnostics: Detection of motor damage with full coverage of the real operating hours.**
- **Early detection: Monitoring of unbalance, wear and overall vibration. Detection of unbalance vibration, shaft misalignment and rotor wear in the compressor.**
- **Maximum efficiency: Permanent diagnostics of winding problems or dirt accumulation in the electric motor by temperature measurement.**
- **Easy integration: ifm provides individual solutions suited for different types of compressors.**

ifm|moneo



Application for 1 compressor				Without additional service
Sensors for installation on the motor Variable design				+ Preconfigured hardware and software
	1 Vibration sensor screw mounting or vibration sensor adhesive mounting with cable		3 Temperature sensor and measured signal converter for temperature sensors	 moneo|appliance moneo|vAppliance
				 Diagnostic unit
	2 Inductive sensor for rotational speed detection		Connection cable with socket (cable length selectable)	 Power supply

Sensing Innovations for WT plants

Radar Area Sensor - R2D100

- Up to 30m range in any weather conditions
- Simultaneous detection of distance and speed
- Intuitive set-up and visualisation of the measured data using the ifm Vision Assistant software

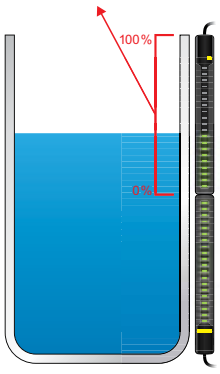
Conductivity sensor - LDL400

- Polypropylene conductivity sensor
- Resistant to salt and other aggressive media
- Detects conductivity using the tried-and-tested inductive measuring principle
- Compact design facilitating installation, when space is limited
- Suitable for outdoor installations

Magnetic-inductive flow meter - SM4120

- Precise measurement of flow, consumption and medium temperature
- High accuracy, repeatability and measurement dynamics
- Outputs: analogue, switch and pulse
- Large colour display with red/green colour change to indicate flow / no flow
- No inlet and output pipe lengths required!

Level Sensor - KQ1000



- Continuous level monitoring outside the tank!
- 3 x adjustable level positions from one sensor
- Deposits can be tuned out, and periodic build-up signalled to improve process quality
- Multiple KQ10 units can be linked via IO-Link, to monitor continuous level externally

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