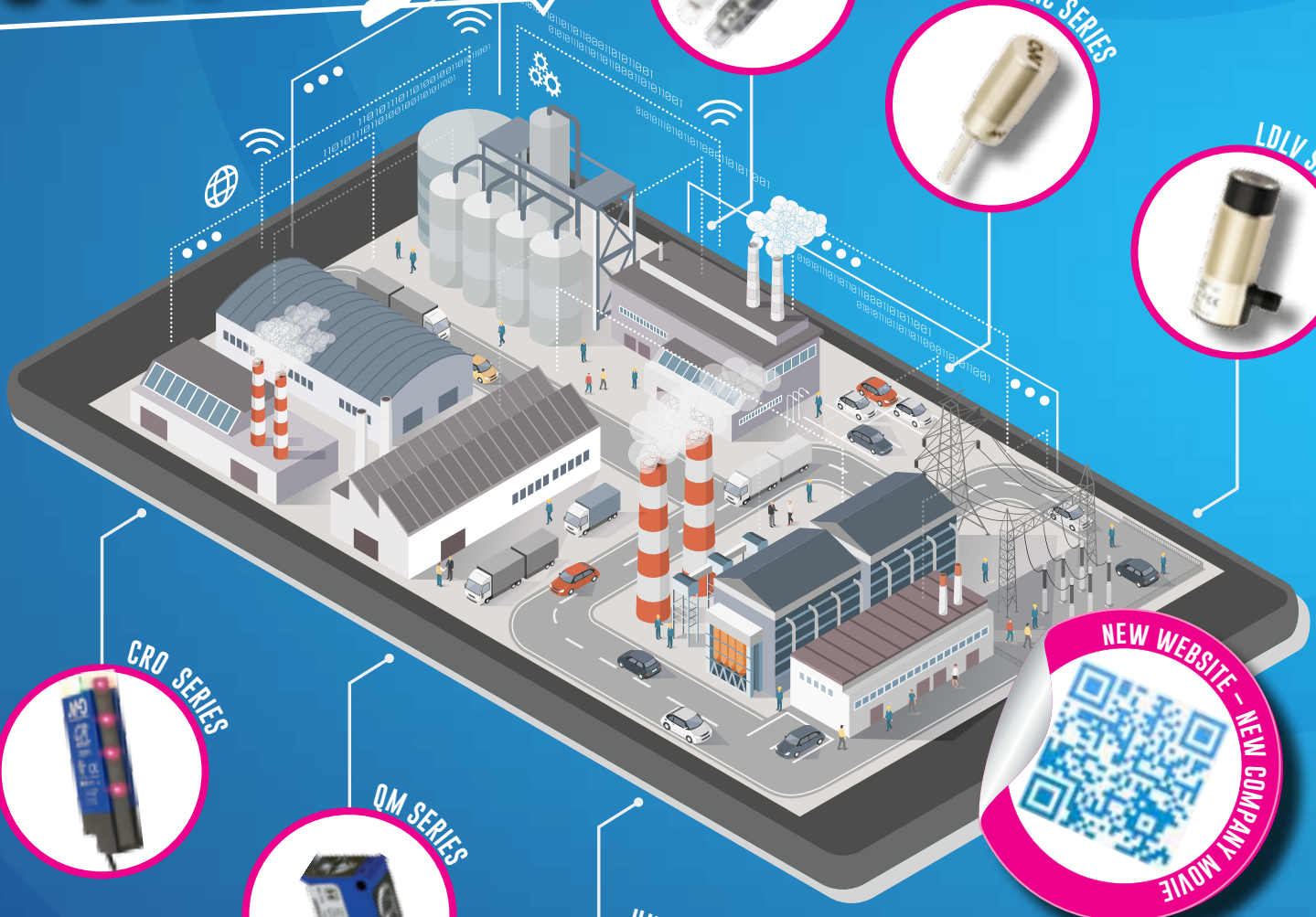
MD news

M.D. Micro Detectors Magazine n°15- 26/11/2019 - English edition

APPLICATIVE SOLUTIONS

15



UK1 SERIES

INC SERIES

LDLV SERIES

CRO SERIES

QM SERIES

UK6 SERIES

NEW WEBSITE - NEW COMPANY MOVIE

sps
smart production solutions

NUREMBERG
26 / 28 - November 2019
Hall 7A -Stand 510

Micro Detectors
Italian Sensors Technology

INDEX

STAY IN TOUCH WITH M.D. WORLD.

There are different ways to stay in touch with M.D. Micro Detectors' world.

In addition to M.D. NEWS, you can meet us at trade fairs, visit our website and also visit our social channels: our linkedin page and our youtube channel. Finally, you can subscribe to our newsletter, available in Italian, English, Spanish, Chinese, French, German and Portuguese.

Write to info@microdetectors.com to ask for access.

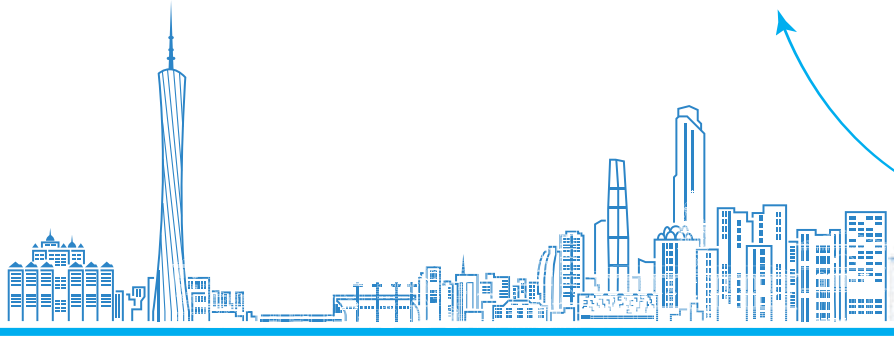
SAVE THE DATE!

SIAF GUANGZHOU
SPS– Industrial Automation Fair Guangzhou
广州国际工业自动化技术及装备展览会

GUANGZHOU
26 / 28 february 2020

MECSPE

PARMA
26 / 28 march 2020



M.D. MICRO DETECTORS HAVE BEEN AWARDED THE EMILIA ROMAGNA CHAMPION AWARD!!!!

italypost

L'Economia
del CORRIERE DELLA SERA

CONFINDUSTRIA ROMAGNA

175 champions of Emilia Romagna were brought to light by the analysis conducted over the period 2011-2017 by "L'Economia del Corriere della Sera" in collaboration with "Italypost".

M.D. Micro Detectors are part of this Club of Excellence!

This award was given to the best companies in Emilia-Romagna, with sales between 20 and 500 million, selected on the basis of specific economic and financial criteria evaluated over a period of 7 years!

EMILIA ROMAGNA

FOR MORE DETAILS...

sps ipc drives
ITALIA

PARMA
26 / 28 may 2020

IAS **SHANGHAI**
15 / 19 september 2020

BUSINESS AND HUMANITAS

GIACOMO VILLANO SPEAKING, M.D.'S C.E.O.

Giacomo Villano's speech - M.D.'s C.E.O. – during convention "Enterprise and Humanitas" held on 23rd May 2019 at the Faculty of Law of the University of Modena

PRIVATE COMPANIES AND PUBLIC ADMINISTRATION

A world, that of private Italians companies, living the relationship with Public Administration with a true difficulty for many years. In the brochure of this conference speech we talk about "Burocratura" not by chance, that is dictatorship of bureaucracy, which subtracts a lot of working days to many companies, thus a lot of resources, which can be used differently. I would say: we burn a great deal of resources, which can be dedicated to activities creating added value and wealth.
In a highly competitive panorama like current one, what we just described is a true criticality.
What I can testify about my multiannual daily experience is that in Italy and especially in some Northern regions we have a top level industrial base. Our Emilia Romagna, a rich and generous land, is one of the most industrialized of Europe, world-famous for the numerous excellences and rooted culture of work. A land full of passionate, creative, enterprising, brave, jovial, generous, honest and respectful people.
In a competitive globalized panorama, our companies have to cope with concrete competitive disadvantages not attributable to them directly or to the Market, compared to many foreign competitors. Among these competitive disadvantages, the following are well identifiable:

- a very high labor cost due to very high tax withholdings and contributions in face of net wages, which are among the lowest ones compared to other industrialized countries (the so called "tax wedge");
- a direct and indirect varied taxation and overall a very high one;
- excessive bureaucracy, that is the existence of a large number of formal and substantial fulfilments, of a plethora of statements and in general of a more complex and invasive legislative and control system;
- a usually lacking infrastructure and often obsolete system, where present;
- high cost of utilities (gas and electric Energy);
- a very complex and invasive legislation in environmental matter and occupational safety. Who knows the Single Text for occupational Health and Safety can also perfectly understand the content of this statement.
- times of criminal and civilian justice are overly long;
- the diffuculties and huge cumbersome nature in construction industry and especially in the execution of public works.

As you can well understand, above obstacles are directly and indirectly linked to the Public Sector and to the Public Administration, which proves unwilling to facilitate the world of private companies especially in these last years.
A specification: it is evident that there were a lot of competition problems for private companies, due to companies themselves or to the Market, therefore they have nothing to do with Public Administration. But the point is that above critical effects also afflict and burden Excellent Companies thus making the competition harder and harder for Italians Companies.
The private companies have to work hard to offset the increasing overt and hidden costs, just described. And this is the reason for we have to push hard those concepts of Product, Creativity, Organization, Quality, Technology, Efficiency, Speed and Flexibility to stay on the market and compete. So far we have made it but: guys, how hard!!! Morover the above concepts are also applied and developped by our foreign competitors, but they do not have to bear for above mentioned disadvantages. You can realize that this is often an unequal battle. The reality is that our industrial fabric has been shrinking progressively (de-industrialization) and it is losing competitiveness, mostly for exogenous factors thus producing less and less wealth in absolute value. Our reality is that in Italy we have less and less companies and a lot of them are sold to foreign ownerships, interested in our technology and in our brands. And don't tell me this is a physiological trend or an irreversible process; or else that in Italy we only have to keep those activities with a greater added value, creative activities and the research and development ones. Because, if we did this way today, we would see our employment base drastically reduced. Instead, in my opinion, we have to do our best to maintain and develop also the basic industrial activities and more in general those having a strong employment impact.
A sort of mistrust between companies and public administration has been evident for many years but it is not logical and it is counterproductive. A typical example is: the reversal of the burden of proof as part of tax process.
The so-called Country System should require a Public Administration that facilitate doing, doing a lot and doing right. Public and Private should collaborate to maximize the growth, also because resources produced by factories are the main source of income for public apparatus.
On the contrary private companies are often considered as places of exploitation (active and passive) and places where rules are violated. Consequently hundreds of billions have been wasted during last ten years to create and to operate complex legislative and control systems, that have produced an expensive and often ineffective bureaucratic system, which usually obstructs "people who do". My university and professional training led me to develop a strong attention towards the control activity. During my first working years I was grown with a based control culture. Therefore I matured the conviction that control is fundamental. Yet it is fundamental if it assists doing, if it is functional to do more and better. If control either substitutes or obstructs doing, it means there is something wrong. It is instead undoubted that, particularly during the last few years, system has been considerably overbalancing towards controlling rather than doing, or at least tends to limit doing, to enclose it.
Here I associate this illogically conflictive relationship to the dramatic picture of Saturn eating his own son. Here in Modena we have a wonderful statue in front of

the "Accademia delle Belle Arti" about this theme, but regarding this subject there are also two beautiful and shocking paintings drawn by Goya and Rubens. Here is the hungry father that, crazy and desperate because he thinks only about the survival of his own body, resolves his quota problem, feeding himself with his son and so destroying what inbreeding represents, by definition: the Future. By analogy it seems that the State wants to progressively gobble up the companies considering them a priori as preys to devour piece by piece, not realizing that, devouring them, it destroys also his source of income and his Future.

FROM PASCAL SALIN'S THOUGHT

I go on by paying my greetings to professor Salin. Gathering information about his works, I must say that during last month I found out I have a strong affinity towards him regarding economic thoughts.
I entirely agree with him when he states, and forgive me the extreme synthesis, that to obtain an economic raise sustained and sustainable, it is fundamental to:

- Have a long-term strategy and not focusing on the maximization of the short-term results too much;
- Create wealth, saving and investments through the income of the companies. Saving is a fundamental link of our economies. Saving is a virtue that has to be encouraged rather than stimulate the consumption at most and at all costs to make the economy raise;
- Pursue the balancing of the budget at a public level.

Clear, simple and efficient concepts. Concepts that are also mainly valid for private companies.
I also like the quote "the regulatory prevents the regulation, the deregulation is the best way to make the self-regulation possible".
Let me say a few more words about the creation of profits (that are the primary factor for execution of investments and therefore of growth) and about the balancing of the budget. There is a very spread concept that is very dangerous to me, mainly for the future generations: it is to operate on deficit, to produce wealth through indebtedness. At a public level, we hear a lot of times that deficit must not go over a certain percentage. Companies cannot work perpetually under deficit: sooner or later they will go bankrupt. Families or individuals are not able to survive if they spend more than what they gain: they are bound to go bankrupt. Why do we have to strive to believe that the rest of the world, other than families, individuals and private companies can work differently? Who is able to explain to the undersigned and to my grandmothers (if only they were alive), women nearly analphabet but really sharp and wise, that it is possible to live with debts and that they can be increased forever, without reaching a breaking point, a bankrupt?

MY WISH

Having said all that, do we limit ourselves to complain and/or do we raise the white flag? Never! In front of difficulties efforts must be multiplied. But let me express a wish about the topic under discussion.
Then I say that my wish is that the State System and the Public Administration put us in the position to work more and work better.
They should allow million people to give free rein in the professional scope to creativity, to capacity, to courage, to fatigue, to the desire to express and realize themselves through work and the professional scope, the desire to always improve, sacrifice and accept new challenges. All these are elements part of the glorious tradition, which was settled through the centuries in our Country, which comes from the Renaissance Period and from its shops. Let us create an added value and wealth for our companies and for our families linked to them. This is a wealth that also the whole Country can benefit from. Let us spend what we gain and not one more euro, but rather one euro less, so that we will be able to give our children a future, that will not be made of enormous masses of debt that have to be paid back.
Is it an utopia? Certainly not! Give us a simple, lean, clear, efficient regulatory framework, made by certainties and with an equally clear, fast, efficient penalty system. But then let us do our work. You understood right: W-O-R-K.
We ask for this and nothing more. Without anyone's help and without advantages or contributions at lost fund, or in capital account.
And to do what? To produce the required wealth for the historic continuation of our civilization. The wealth needed so we can also honor the unwritten Deal between the Generations; it means transmitting to our future generations an at least equal, but hopefully increased, heritage compared to the one we received from our fathers and these, in turn, from our grandfathers. And so on. This is the history of humanity that we, in a simple and natural way, want to perpetuate! Without helps and without favors. With a lot of courage, sacrifices and desire to build for ourselves and the others.

CASE HISTORY IO-LINK

M18 ULTRASONIC SENSORS

By **Isabel Salgado** - Technical Support at Micro Detectors Ibérica

WHAT IS IO-LINK IN 3 SENTENCES?

1. It is a way to save money and increase the degree of technology (related to I4.0) for the machine manufacturer.
2. It is the key point for the approach of sensors to Industry 4.0. IO-Link sensors are able to supply really deep and useful information about the sensor (state, reference, version, working hours, measure without loss of accuracy…).
3. From the technical point of view, it is a point to point communication between sensors and IO-Link inputs able to manage IO-Link communication. It's not a field bus.

HOW CAN IO-LINK HELP IN REAL APPLICATIONS?

First of all it is important you know you can buy a sensor IO-Link, install it and don't use this specific function at all. The sensor could always be used as if IO-link were not inside. But then, you can be discarding a lot of possibilities, let's have a look at some of them.

IO-LINK IN THE START-UP OF MACHINES

IO-Link helps and makes you save money in the start-up of machine in 2 ways

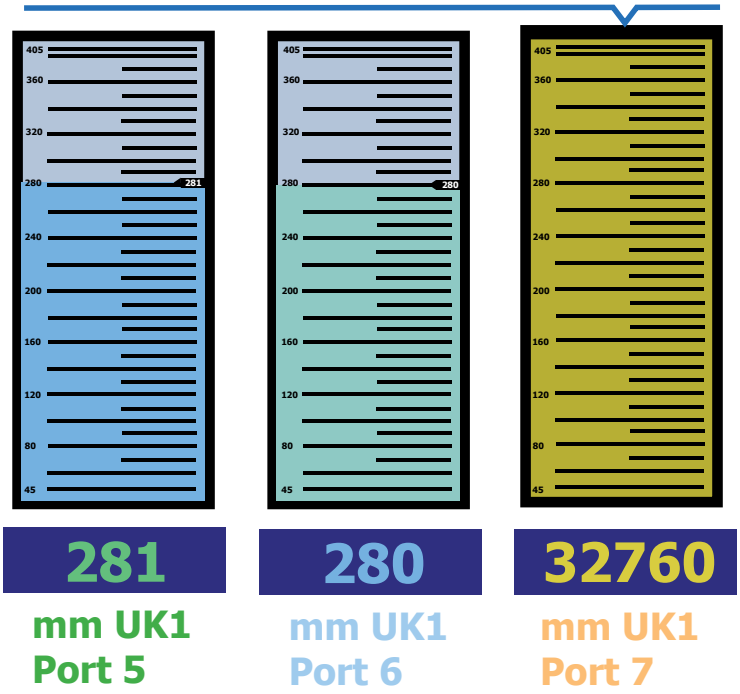
1. Very fast and safety adjustment of multiple sensors just loading the set of parameters via a converter IO-Link to USB or Ethernet. Chain production lines. Save a lot of time.
2. Ensuring the correct position of sensors looking directly at the application to be monitored and returning measurements in real time.

IO-LINK IN THE PRODUCTION STAGE, RELATED TO I4.0

You will receive directly the measure of the sensor in the units you need for monitoring your application. That means if the sensor measures a certain distance, you will have in your PLC "mm" instead 4..20mA or 0..10Volts, avoiding the programming work of conversions, with the loss of accuracy and the probability of mistakes. This is made without any programming instruction, directly on the PLC memory.

But if you want to go deeper, programming few lines, specially if you work with Siemens PLC, it's really easy with IO-Link to get all the parameter / statistics that the manufacturer of sensor offers you in the IODD file. Many of these data could be used in the digital transformation, element at the basis of Industry 4.0 revolution (picture 2).

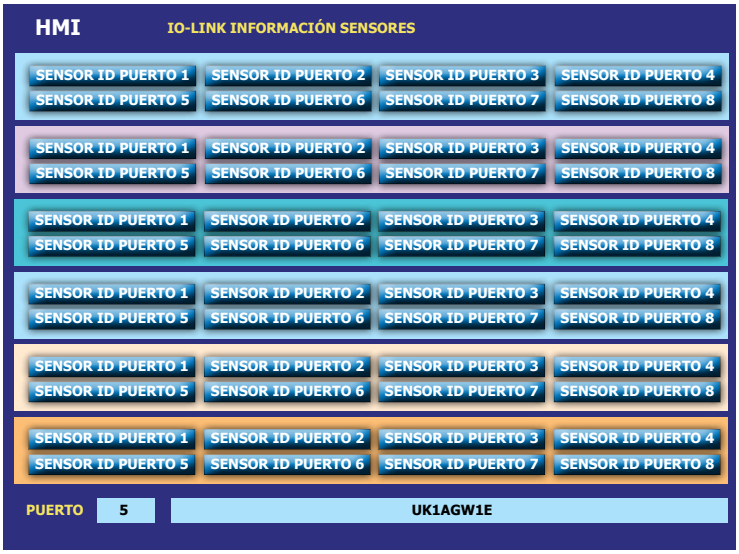
PICTURE 1



Here you can find a summary of some simplifications resulting:

- Reference and manufacturer of sensor allows stocks / purchases / spare parts control.
- Software and hardware version of sensor: maintenance purpose
- Working hours: evolution of sensor in time for a better maintenance
- Internal temperature, fail: maintenance purpose, "on time" diagnosis of sensor.

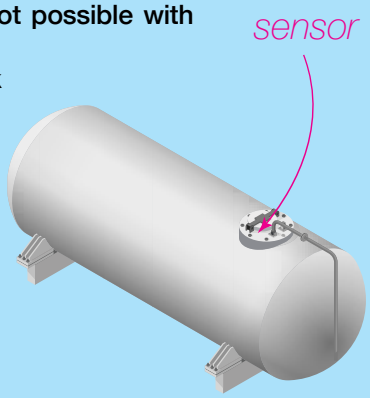
PICTURE 2



APPLICATION SAMPLES

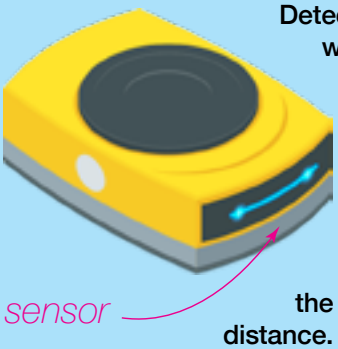
LEVEL IN OIL TANKS.

Target: Detecting 2 level points, with 2 digitals in different type of tanks.
UK1A (400 mm distance sensor): IO-Link allow them to get the combination of NO+NC of the 2 outputs they needed, not possible with other models.
They use also IO-link to avoid adjusting points with the button, and with the IO-link they just select the distance, saving time and error possibilities.



DETECTING OBSTACLES IN FRONT OF AGV

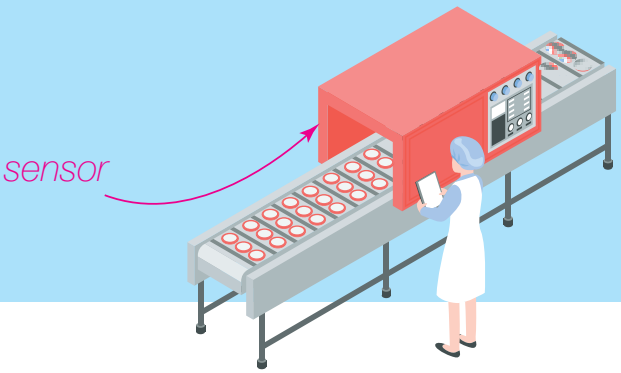
Target: detecting obstacles in front of AGV
UK1F (2200 mm distance sensor). This customer only wants sensors if the switching distances of the outputs can be set via a programming tool. The cost of adjusting distance one by one with the push button was not acceptable for them. Since Micro Detectors offers this possibility, we have been considered to win the project.



They are considering to use the measure in "mm" supplied via IO-link to an IO-Link input in the PLC, in order to take different actions in the vehicle depending on the distance.

MINIMUM LEVEL OF A YOGURT GLASSES MATRIX

Target: detecting level of filling in yogurts
UK1A (400 mm distance sensors): it was needed to narrow the beam in order to avoid the interference due to the wall of the glasses and the proximity between the sensors. This is only available in IO-link models



UK1 and UKR1 series

M18 cylindrical ulltrasonic sensor
with Teach-In button

- **Models with digital programmable output**
- **Models with current or voltage analogue outputs**
- **Working area adjusting (window teach or single point teach) by Teach-in button suitable**
- **Multifunction LED indicator: output type, adjustment procedure, NO/NC selection and reverse analog output slope**
- **Plastic and AISI 316L stainless steel housing, plug M12 or cable exit**

IO-Link CE cULus Ex

	UK1A	UK1F
		
nominal sensing distance	400 mm(1)	2,200 mm(2)
minimum sensing distance	50 mm	200 mm
sensing range	50...400 mm	200...2,200 mm
beam angle	15° ± 2°	14° ± 2°
hysteresis	1%	
repeatability	0.5%	
resolution	± 1 mm	± 3 mm
linearity error	1%	
switching frequency	10 Hz	2 Hz
response time analogue output (10...90% final value)	500 ms	
operating voltage	10...30 Vdc	
max. ripple content	5%	
output current	100 mA (digital output)	
minimum load resistance (analog voltage output)	3 k Ω	
set point adjustment	Teach-In button	
output voltage drop	≤ 2.2 V (@ I = 100mA)	
no-load supply current	≤ 50 mA	
leakage current	≤ 10 µA @ 30V	
power on delay	≤ 300 ms	
ambient temperature range	- 20°C...+ 70°C	
temperature drift of Sr	± 2%	
short-circuit protection	● (autoreset)	
induction protection	●	
voltage reversal protection	●	
EMC	conforming to EMC Directive, according to EN 60947-5-2	
LEDs	green: echo - yellow: output	
protection degree	IP67 (EN 60529)(3)	
housing material	PBT / AISI316L	
active head material	epoxy glass resin	
connection	M12 plug cable exit	
storage temperature	- 30°C...+80°C	
tightening torque	1 Nm (plastic housing) 50 Nm (metallic housing)	

(1) Metallic target 100 x 100 mm (2) Metallic target 200 x 200 (3) Protection guarantee only with plug cable well mounted

CRO SERIES AREA SENSORS

INNOVATIVE SOLUTIONS FOR AUTOMATIC SORTING SYSTEMS

By **Gualtiero Bernacchi Mendonza** M.D. Brand, Export Area Manager

The customer's need to develop systems that guarantee high performance combined with maximum reliability and a reduced project budget is growing more and more.

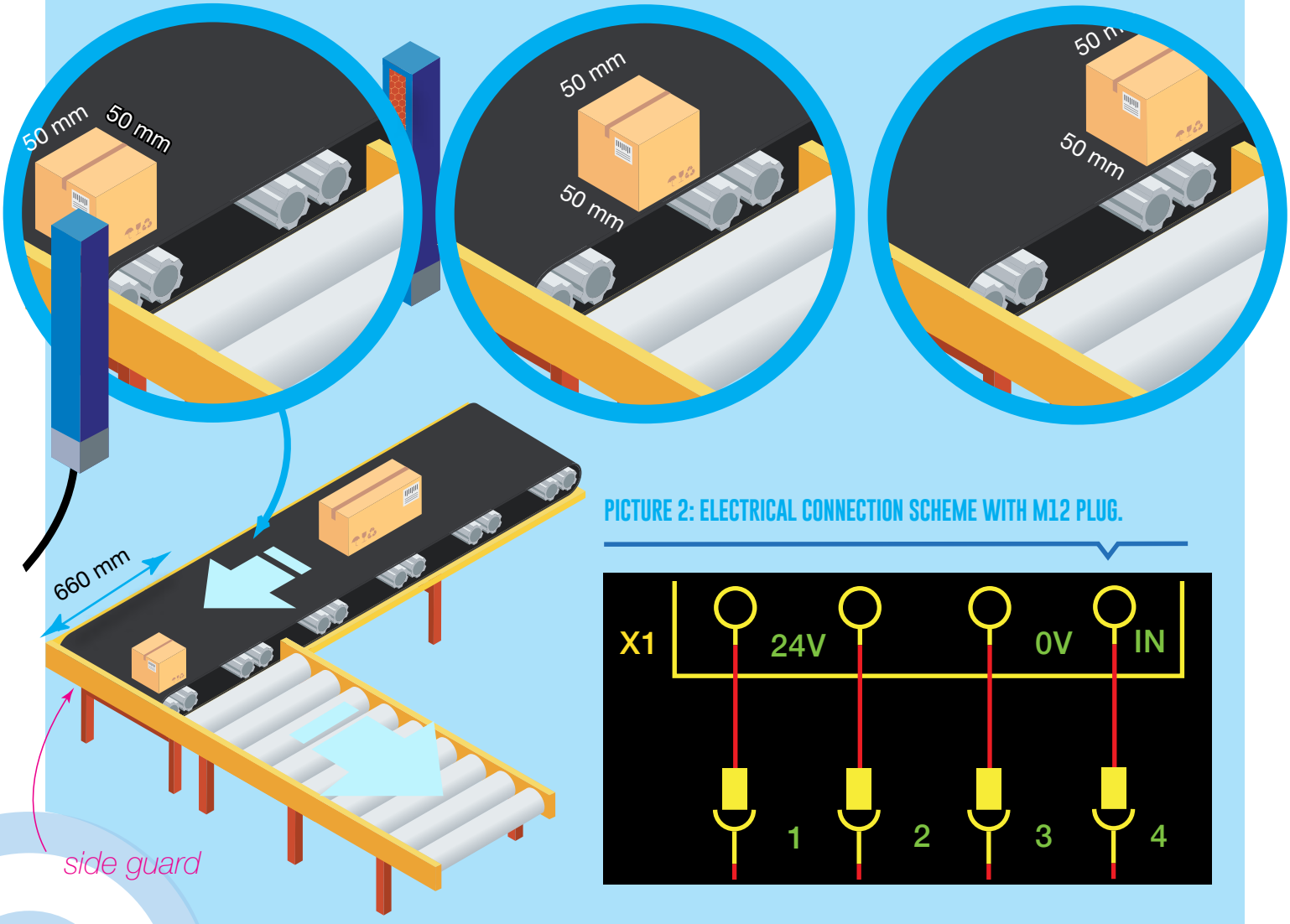
Consequently, the level of difficulty of the requests we receive daily is higher and higher. In this regard, two years ago we were put to the test by a company that develops automatic sorting systems mainly for multinationals in the postal sector.

The Customer turned to M.D. Micro Detectors, because needing to find a sensor that took up little space, was easy to install and able to detect envelopes of letters with a thickness of 2.5 mm for the entire width of the conveyor belt equal to 660 mm (see pic.1).

In addition to these requests, the multiple difficulties of the logistics sector faced by photoelectric sensors must be considered: transparent and perforated objects, items of different heights, disturbances deriving from the unraveling of conveyor belts, false alarms given by the deposit of dirt on optics. Faced with all these problems, we have offered a unique solution in the world of area sensors, namely the new CR0. This reflex sensor is able to guarantee detection performance similar to a barrier, with the advantage, compared to traditional area sensors, of having four emitters and three receivers and a single connection cable in the same body.

These features translate into simplification and reduction of costs and installation times. It is sufficient, in fact, to connect an M12 cable to a standard 4-pole

PICTURE 1: DETECTION POINTS OF SENSOR.



PICTURE 2: ELECTRICAL CONNECTION SCHEME WITH M12 PLUG.

connector and do the Teach-in by pressing the single button on the sensor. The fact that the sensor is so easily configurable in turn allows the installation to be done even by less experienced operators.

Furthermore, the CR0 is already available with IO-Link, this makes it ready in case the customer decides to make changes to the machine to adhere to the industry 4.0 protocols.

The advantage created by CR0 in this application can be defined as bivalent. While CR0 has benefited the customer by brilliantly solving and simplifying its application, on the other hand it has opened up to M.D. Micro Detectors the doors to new business opportunities. With this new sensor we can propose presenting a new solution, concrete and capable of solving the problems common to many companies in this sector. The capacity of M.D. Micro Detectors to solve problems and turn them into new growth opportunities has become a fundamental key.

OVERVIEW

APPLICATION:
automatic sorting systems

SECTOR:
Logistics

DIMENSION OF MINIMUM DETECTABLE OBJECT:
- Height min. 2,5 mm
- Length min. 50 mm
- Width min. 50 mm

SPECIFIC REQUIREMENTS OF THIS SENSOR:
- Depth max. 37,8 mm
- Length max. 128 mm (not critical)
- Width max. 40 mm (not critical)
- Easy to connect and configure on site (by simple learning buttons or comparable solution)
- The sensor must detects objects placed against protection of left side (near the sensor), in the centre of the belt and against the right side protection, see Pic.1.
- Working distance: 660 mm between sensor and reflector
- Input signal 24V, M12 plug output (24V on pin 4 and 0V on pin 3) see Pic. 2.

SOLUTION:
CR0, new Reflex Area sensor

BENEFITS:
- High resolution
- Time and cost saving for installation
- Detection of irregular objects

CR0 series
Polarized retro-reflective area sensors

- **Controlled area height: 69 mm**
- **Maximum operating distance up to 4,5 m**
- **Minimum detectable object: 6 mm diameter**
- **Two types of Teach-in: fine and standard**
- **Optics pitch: 10 mm**
- **IP67 protection degree**
- **Blanking function**

IO-Link CE cULus

	CR0
nominal sensing distance (Sn)	0,2…4,5 m (RL106G - ExG 2)
emission	red (617 nm)
operating voltage	12...30 Vdc
ripple	≤ 10%
no load supply current	100 mA
load current	100 mA
leakage current	≤ 100 µA (Vdc max)
output voltage drop	3 V max (100mA)
adjustment	Teach-in: fine < 3 s; standard > 6 s
output type	PNP; NPN; Push-pull; (NO+NC) compl. output (NO+NC)
switching frequency	400 Hz
time delay before available	300 ms
minimum object detection	Dinamic: 1...3 mm @ 2 m RL106G(1) 4 mm @ 4,5 m RL106G(1) Static: 3...6 mm @ 2 m RL106G(1) 3...10 mm @ 4,5 m RL106G(1
power supply protections	polarity reversal, transient
output protection	short circuit (autoreset)
interference external light	5000 lux (fluorescent lamp); 50000 lux (sunlight)
operative temperature range	-10°C….+55°C (without freeze)
temperature drift	10% Sr
LED indicators	green: power supply red: dark/light status
protection degree	IP67 (EN60529)
housing material	aluminium
optical material	PMMA

FOR THE SECOND CONSECUTIVE YEAR M.D. HAVE BEEN NAMED ITALIAN COMPANY OF EXCELLENCE!!!

On Wednesday, 25 September 2019, Global Strategy, a strategic and financial consulting firm, presented the results of the eleventh edition of the SME Observatory at the conference "Sustainability and value creation: a combination to be sought" at Palazzo Mezzanotte at the Milan Stock Exchange, in a completely crowded room. During this event, about 70 Italian Companies of Excellence were awarded, including M.D. Micro Detectors.

On that occasion, our CEO, Dr. Giacomo Villano, took part in the debate entitled "Environmental sustainability and the importance of the supply chain".
This round table, masterfully conducted by the talented Fulvio Giuliani (journalist, radio host and TV host), was also attended by Riccardo Illy, former governor of the Friuli Venezia Giulia Region and President of Polo del Gusto, Alberto Bertone CEO of Fonti di Vinadio, Federico Dodero CEO of Everton, and Marta Testi, Country Head Italy & Europe Elite.

OSSERVATORIO PMI
LE ECCELLENZE ITALIANE

INCLINATION SENSOR

B I A X I A L

INC4 SERIES

SMART SENSOR

technology MEMS

INC4 series

Biaxial inclination sensor

CE

Micro Detectors

Italian Sensors Technology

characteristics

- Dimensions 50 x 75 x 19,5 mm
- BUS RS485 (addressable) + analogic 4...20 mA / 0...10 V (programmable)
- 1,2 axis of measures
- Technology MEMS
- Smart sensor
- M12 plug 4, 5 and 8 pins
- Housing material: zama

SMART SENSOR

SPECIAL VENDING MACHINE

SOLUTIONS FOR VENDING MARKET

By **Fabrizio Marchi** - Product Marketing & application Engineering

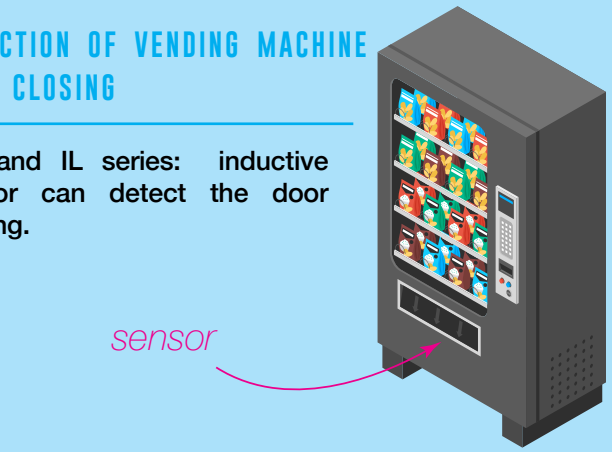
The vending machine market is not only one of the most prosperous in the world, but knows no decline. On the contrary, it is constantly growing, driven also by the consolidation of some consumer needs that have established thanks above all to the new generations (who prefer the so-called “grab and go” rather than to wait at the restaurant).
The new technologies making it possible to pay directly, conveniently and quickly by an app, that is “smart” vending machines, will also allow producers to reach a total turnover of 30 billion dollars by 2024.
The good news is that Italy in particular is at the forefront of production of vending machines (about two thirds of vending machines produced in the World are “Made in Italy” and our country is the record holder in Europe for units installed on the territory).
The very good news is that M.D. Micro Detectors provides different technological solutions to support operators in this sector.

For example, for delivery of hot beverages our capacitive sensors (CQ50 and CQ55 series) are used to detect the level of liquid outside tanks and our direct diffusion or retroreflection photosensors (FA and QM series) for detection of glasses.
For supply of other food & beverage, pharmaceuticals and tobacco products, M.D. offers instead the inductive sensors of our AM and IL series detecting the door closing and our tropicalized (and not tropicalized) NX area sensors for detection of falling objects, even small ones and with irregular shapes or different colors thanks to crossed rays (snacks, DVDs, bottles, cigarette packs, bags, etc. ..).

In the tobacco sector, the FA and QM series direct diffusion photosensors are also used to detect cigarette packets.
Some particular applications have required the use of other sensors. For example, some citrus juicers use SS1 photocells to detect oranges, while in the waste recycling industry UK1 sensors and NX barriers can be used to detect PET bottles.
FA2 Cylindrical Photoelectric Sensors have also been used to detect the operator’s hand in order to maximize the delivery of soft ice-cream and frozen yoghurt.
M.D., thanks to their research and development department and their flexibility, are also able to find customized solutions for the customer to meet their specific needs.

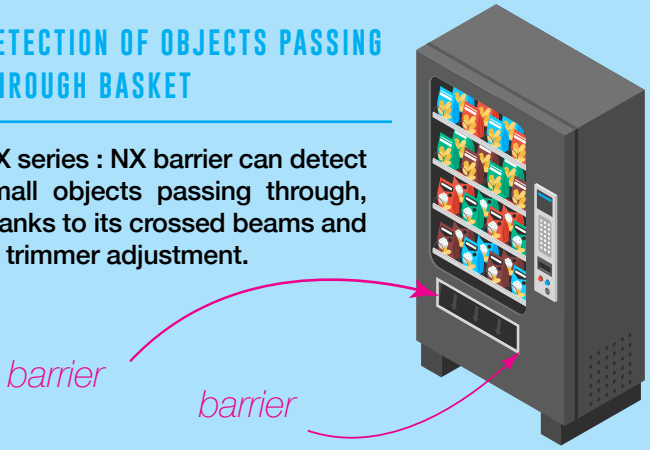
DETECTION OF VENDING MACHINE DOOR CLOSING

AM and IL series: inductive sensor can detect the door closing.



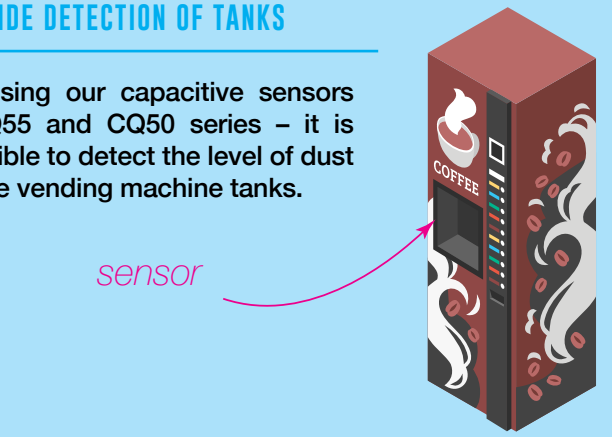
DETECTION OF OBJECTS PASSING THROUGH BASKET

NX series : NX barrier can detect small objects passing through, thanks to its crossed beams and to trimmer adjustment.



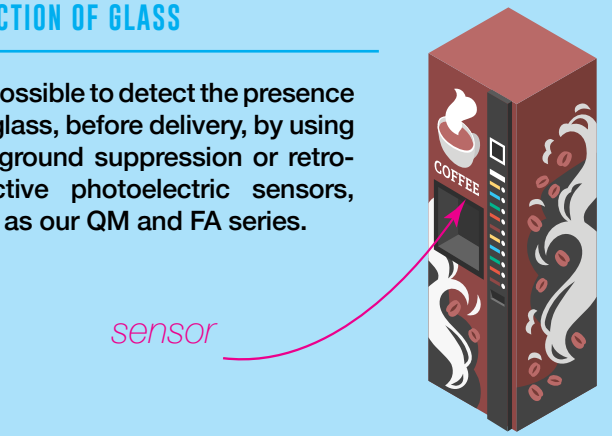
OUTSIDE DETECTION OF TANKS

By using our capacitive sensors - CQ55 and CQ50 series – it is possible to detect the level of dust inside vending machine tanks.



DETECTION OF GLASS

It is possible to detect the presence of a glass, before delivery, by using background suppression or retro-reflective photoelectric sensors, such as our QM and FA series.



QM series

Miniaturized photoelectric sensors
with high performance

- **Cubic miniaturized photoelectric high-performance sensors with long sensing distance**
- **2 kHz switching frequency, background suppression with mechanical adjustment**
- **Wide range of models: diffuse reflection with short, medium and long sensing distance, polarized, reflective for transparent objects, through-beam and background suppression**
- **Available with cable and M8 plug exit or with M8-M12 pig-tail**

	QMRS/0*-0*	QMIS/0*-0*	QMRG/0*-0*	QMRN/0*-0*
nominal sensing distance	30...200 mm (1)	30...400 mm (1)	1,5 m	5 m (1)
minimum sensing distance	5 mm		0,05 m	0,1 mm
sensibility adjustment	●			
emission	red (630 nm)	infrared (850 nm)	red (630 nm)	
hysteresis	≤ 10 %			
repeatability	5 %			
rotary switch	●			
operating voltage	10...30 Vcc			
power on delay	≤ 100 ms			
ripple	≤ 10 %			
no-load supply current	≤ 30 mA	≤ 45 mA	≤ 30 mA	-
load current	≤ 100 mA			
supply current	≤ 10 µA			
output voltage drop	2 V max. @ 100 mA			
maximum load current	≤ 100 mA			
output type	PNP or NPN NO or NC			
switching frequency	1 kHz		2 kHz	
power on delay	≤ 100 ms		≤ 100 ms	
power supply protections	polarity reversal, over voltage pulses			
output protection	short circuit (auto reset), over voltage pulses			
operating temperature range	- 25°C...+ 70°C (without freeze)			
temperature range	- 30°C...+ 80°C			
temperature drift	≤ 10%			
protection degree	IP67 (EN60529) (2)			
EMC	in conformity with the EMC Directive according to EN 60947-5-2			
external light interference	3.000 lux (incandescence lamp), 10.000 lux (sunlight)			
LEDs	yellow (LO/DO output state)			yellow (LO/DO output state) green (excess gain)
housing material	PA66			
optic material	PMMA			
tightening torque	1 Nm (3)			
weight (approximate)	10 g connector / 52 g cable			

(1) With RL 110 reflector EG = 2; (2) protection guaranteed only with plug cable well mounted; (3) screws, nuts and mounting brackets are not included with the sensor (accessories).

FA BGS series

M18 direct diffuse with adjustable background suppression

- **up 300 mm adjustable reading distance**
- **Cable or M12 plastic plug versions**
- **Supply voltage 10...30 Vdc, output current 100 mA**
- **LED light status indicator**
- **IP67 protection degree**
- **Complete protection against electrical damages**
- **ATEX models, cat.3, available on request**

	FARS/**-**	FAR2/B*-**	FARP/B*-** (1)	FARL/B*-** (
nominal sensing distance	30...130 mm	100 mm (1)	3 m (axial), 2.5 m (radial)	1,5 m
scanning adjustable range Sd	30...130 mm (white paper)	-		
emission	red light (660 nm)			
hysteresis	≤ 10 %			
repeatability	10 %	5 %		
operating voltage	10...30 Vcc			
ripple	≤ 10 %			
no-load supply current	25 mA	30 mA		
load current	100 mA			
leakage current	≤ 10 µA (@ 30 Vcc)	10 µA	≤ 10 µA	
output voltage drop	2 V max. IL = 100 mA			
output type	NPN o PNP; NO+NC			
switching frequency	1 kHz	250 Hz		
power on delay	200 ms			
power supply protections	short circuit (auto reset)	polarity reversal, impulsive overvoltage		
output protection		short circuit (auto reset)		
sensitivity adjustment	-			•
operating temperature range	- 25°C...+ 70°C (without freeze)			
temperature drift	≤ 10 % Sd (≤ 3 % Sd per Sd 60...110 mm)	10 % Sr		
distance adjustment	potentiometer	-		
protection degree	IP67 (EN60529)			
EMC	in conformity with the EMC Directive according to EN 60947-5-2			
external light interference	5,000 lux (incandescence lamp), 10,000 lux (sunlight)	3.000 lux (incandescence lamp), 10.000 lux (sunlight)	5,000 lux (incandescence lamp), 10,000 lux (sunlight)	
LEDs	yellow / light status / short circuit / internal error	Yellow (Light status) or (output status in the LO/DO special versions)		
cable exit	PVC 4x0, 34 mm[a]; Ø 4,7 mm; 2m	-		
plug exit	M12 4 pins, male	-		
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit and plug)	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)		
optic material	plastic	PC	PMMA	PC
tightening torque	25 Nm (metallic)	1 Nm (plastico), 40 Nm (metallico)	1 Nm (plastic), 25 Nm (metallic)	
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable			
yellow LED status	sensor status	-		
ON	light status	-		
OFF	dark status	-		
flashing slowly	output short circuit detected	-		
flashing 3 of 10	internal error	-		

SS series

M18 DC with lateral adjustment

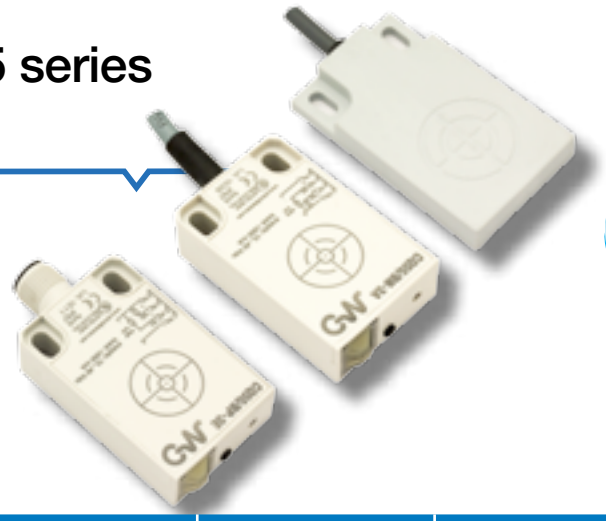
- **Models with side sens. adjustment on axial and right angle optic**
- **LO/DO selectable output**
- **ATEX models, cat. 3, available on request**
- **LED status indicator for all versions**
- **Complete protection against electrical damages**
- **IP67 protection degree for all models**
- **Approvals: CE and cULus listed**

	SS0/**-**	SS1/**-**
nominal sensing distance	50 mm	100 mm
emission	red (660 nm)	
spot diameter	see diagram	
minimum detectable object	1 mm	3.5 mm
dfferential travel	≤ 10 %	
repeatability	5 %	
operating voltage	10...30 Vdc	
ripple	≤ 10 %	
supply current	≤ 30 mA	
load current	100 mA	
leakage current	10 µA	
output voltage drop	1.2 V max. IL = 100 mA	
output type	NPN or PNP - LO/DO selectable	
switching frequency	1 kHz	
power on delay	200 ms	
power supply protections	polarity reversal, transient	
output protection	short circuit (autoreset)	
operating temperature range	- 25°C...+ 70°C (without freeze)	
temperature drift	10 % Sr	
protection degree	IP67 (EN60529)	
EMC	in conformity with the EMC Directive according to EN 60947-5-2	
external light interference	3,000 lux (incandescence lamp) 10,000 lux (sunlight)	
LEDs	yellow	
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit))	
optic material	plastic	
tightening torque	25 Nm (metallic housing), 1 Nm (plastic housing)	
weight (approx)	plastic version: 30 g connector / 70 g cable metallic version: 100 g connector / 130 g cable	

CQ50 and CQ55 series

Cubic capacitive sensors

- **DC supply voltage**
- **No adjustable sensitivity**
- **Flat polycarbonate plastic housing**



FOR MORE DETAILS...

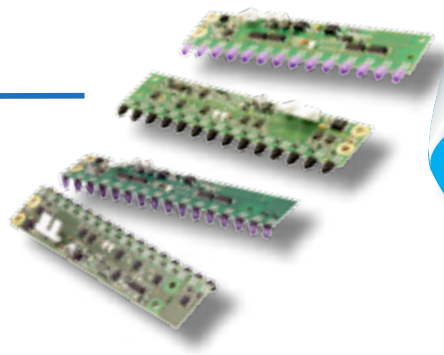
CE

	CQ50/**-1A	CQ50/**-2A	CQ50/**-3A	CQ50/**-4A	CQ55/**-3*
nominal sensing distance Sn	5 mm	6 mm	7 mm	10 mm	25 mm
hysteresis	≤ 20%				
repeatibility	5%				
operating voltage	5 Vcc	10 ... 30 Vcc			10...40 Vcc
max ripple content	≤ 10 %				
no-Load supply current	≤ 10 mA				
load current	≤ 50 mA				≤ 200 mA
leakage current	≤ 100 µA				≤ 10 µA
output voltage drop Ud	1,5 V max @ IL= 50 mA				2,5 V max @ IL= 200 mA
output type	NPN o PNP - NO o NC				NPN or PNP - NO + NC
switching frequency	10 Hz				50 Hz
power on delay	≤ 100 ms				
power supply protections	polarity reversal, impulsive overvoltage				
output protection	autoreset short circuit, overvoltage				
sensitivity adjustment	-				•
storage temperature	≤ 20%				
operating temperature range	0 ...+ 60° C (without freeze)				-40 ... +85° C
temperature drift	-30 ...+ 75° C				-25 ... +80° C (without freeze)
EMC	in conformity with the EMC Directive, according to EN 60947-5-2				
protection degree	IP67 (EN 60529) NEMA 1,3,4,6,13				
LED indicator	-				yellow (output status LOn/ DOn)
housing material	noryl				PC
active head material	noryl				PC
weight	70 g				65 g connector / 150 g cable

NX series

Medium resolution area sensors without housing

- **Complete protection against electrical damages**
- **LED indicators**
- **Crossed beams detection**
- **Without housing**
- **16 or 14 optics**
- **Detection of goods in automatic vending machines**
- **Detection of objects with irregular shape**



CE

	NX**SR/***-*****20	NX**SR/***-*****
type	medium resolution area sensor with 16/14 optics, step 10 mm	
nominal sensing distance	0.25...0.7 m 880 nm (beam pitch ≥10mm)	0.5...2 m 880 nm (beam pitch ≥10mm)
emission	infrared (880 nm), modulated	
controlled height	150 mm (16 optics) ; 132 mm (14 optics)	
minimum sensing distance	0.25 m	0.5 m
minimum detectable object	ø15 (1) / ø 7.5 (2) / ø 5 (3) mm	
hysteresis	< 10%	
supply voltage	10 – 26 Vdc	
ripple	10%	
no-load supply current	150 mA (emitter) – 25 mA (receiver)	
output current	100 mA	
leakage current	< 10 µA (a Vdc max.)	
voltage drop	2 V a 100 mA	
output type	NPN or PNP open collector, NO or NC	
input	check input	
response time (Light/Dark)	500 µsec	
response time (Light/Dark)	7 ms	
power on delay	< 85 ms (switch on delay)	
output delay	100 ms (according to models)	
power supply protections	polarity reversal - transient	
output protection	short circuit (autoreset)	
temperature range	-0 /+ 55 °C (without freeze)	
interference to external light	1000 lux (incandescent lamp) 1500 lux (sunlight)	
IP mechanical protection	not defined	
emitter LED	yellow (supply and emission active)	
receiver LED	red (signal level) – Yellow (output state active)	
housing material	No housing. Mechanical and electrical protections of the PCB have to be submitted to the machine structure	
connections	With PCB connectors / Emitter, Conn. 3 MOLEX 22-05-7038 - Positive, Check, Common / Receiver, Conn. 1 MOLEX 22-05-7038 - Positive, Check, Common / Receiver, Conn. 2 MOLEX 22-05-7048 Positive, Check, Output, Common	
dimensions	157 x 36 x 18 mm (16 optics) - 140 x 36 x 18 mm (14 optics)	
weight (approximate)	104 g	

CASE HISTORY ULTRASONICS

CLEANING OF SOLAR PANELS

Roberto Bosani - R&D Manager

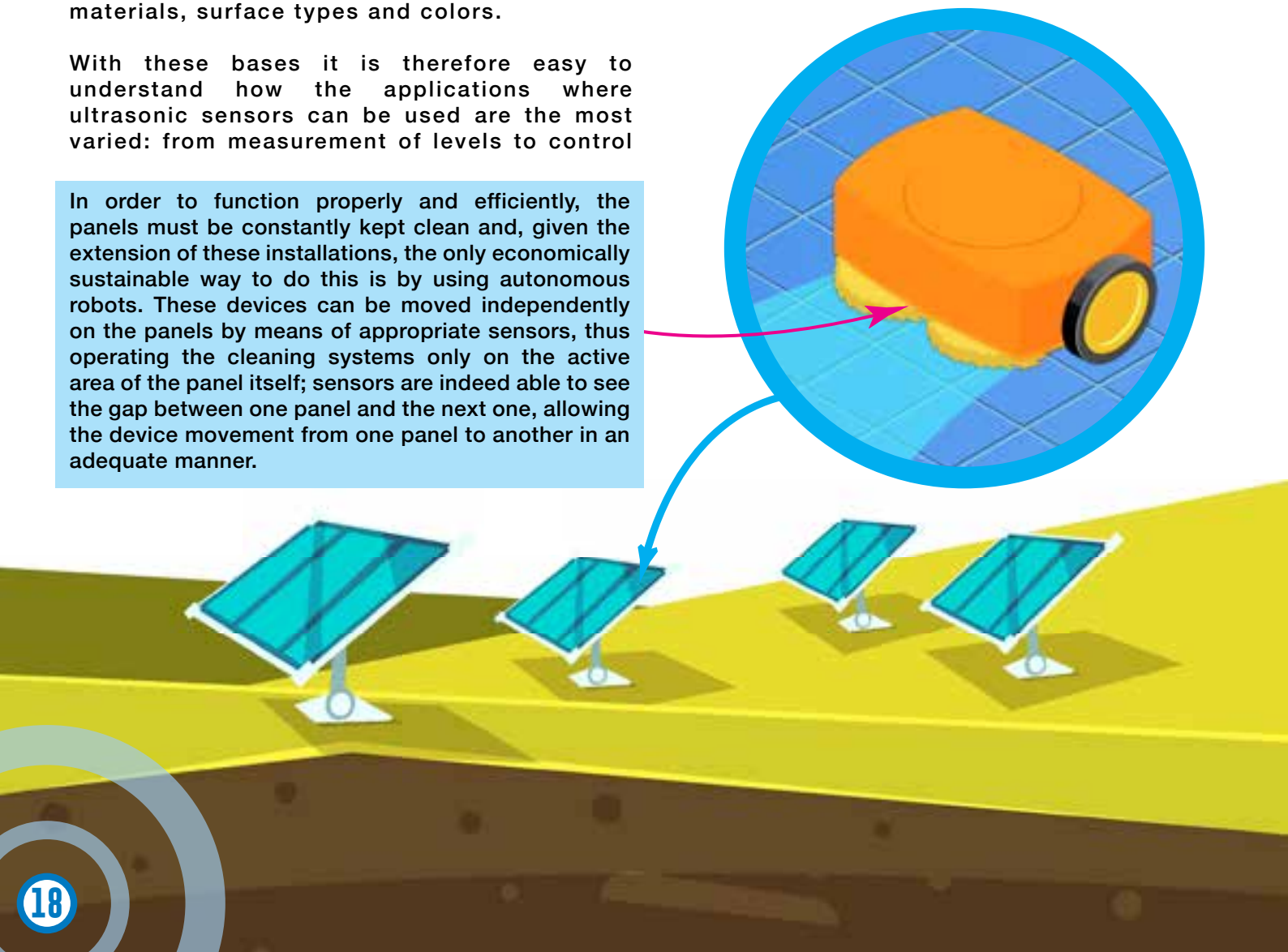
Thanks to a piezoelectric transducer, ultrasonic sensors emit acoustic waves, inaudible and not dangerous for humans; through emission and reception of these ultrasonic waves these sensors are able to detect the presence of an object without contact and to measure its distance.

Versatility is one of the main characteristics of ultrasound detection: in fact it is enough to have a target capable of reflecting a transmitted wave together with a means of transmission (air) for transmission and reception of wave. The material of the target (glass, metal, plastic, wood) is therefore not important, nor the characteristics of its surface (glossy and reflective, transparent, of different colors, ...), nor its state (solid, in granules, liquid, etc.): this technology is in fact insensitive to various materials, surface types and colors.

With these bases it is therefore easy to understand how the applications where ultrasonic sensors can be used are the most varied: from measurement of levels to control of the filling of containers (canisters, silos, tanks, etc.), in the agricultural field, in earth-moving machinery or in road-working machinery as distance measuring devices for parts that influence machining (distance of machines from asphalt or agricultural land, distance measurement of trees for application of nutrients and protective substances, etc. .), in anti-collision systems, in people and animal detection and counting systems and in various other applications, where ultrasonic technology can be the solution to technical problems not easily solvable up to now, since it does not have some limitations belonging to traditional technologies.

Technological versatility has therefore stimulated the use of ultrasonic sensors even in innovative and non-traditional applications: we are all aware of the need to adopt energy generation systems, that come from renewable sources; this energy is in fact less expensive and produces less pollution. Most common source of renewable energy is certainly the solar one, that is used for photovoltaic and solar systems: the former use solar radiation to transform solar energy into electricity, while the latter are used for domestic hot water heating, by means of solar panels with a water

In order to function properly and efficiently, the panels must be constantly kept clean and, given the extension of these installations, the only economically sustainable way to do this is by using autonomous robots. These devices can be moved independently on the panels by means of appropriate sensors, thus operating the cleaning systems only on the active area of the panel itself; sensors are indeed able to see the gap between one panel and the next one, allowing the device movement from one panel to another in an adequate manner.



storage tank.

One of the most important aspects in generating electricity through photovoltaic systems is the efficiency of photovoltaic panels, that must be installed and maintained, in order to convert the highest possible percentage of solar radiation into electricity. And precisely in routine maintenance we can classify the application presented in this article.
Everyone may have seen entire fields, of several thousand square meters, completely covered with photovoltaic panels; in order to function properly and efficiently, these panels must be constantly kept clean and, given the extension of these installations, the only economically sustainable way to do this is by using autonomous robots. These devices can be moved independently on the panels by means of appropriate sensors, thus operating the cleaning systems only on the active area of the panel itself; sensors are indeed able to see the gap between one panel and the next one, allowing the device movement from one panel to another in an adequate manner.

Also in these applications the versatility of ultrasonic technology can be exploited: in fact the edge of plastic panel does not allow the use of inductive sensors to detect the end of panel itself as well as reflective surfaces and solar light “blinding” photoelectric sensors make this technology not optimal in this application, too. Therefore ultrasonic sensors with a reduced blind area can represent the preferable solution.

In their own range of ultrasonic sensors M.D. Micro Detectors have a solution belonging to UK6 family (M18 in compact body) with a reduced blind area and a very narrow cone, suitable for detecting space between two contiguous solar panels and therefore providing the appropriate consents to the robot for a correct handling and cleaning of the panel itself. This is one of the many examples demonstrating M.D. Micro Detectors’ vast product range, which can be used in a great number of applications: high flow sensors to detect levels in 8m high tanks, but also sensors with very low flow rates to see objects from very close, or to detect very small spaces and holes. All this while maintaining a focus on quality of their products, which are completely 100% tested 2 times throughout their production process.

Get in touch with your sales contact for more information on the potential of ultrasonic technology and all other technologies implemented in M.D. Micro Detectors!

UK6 series custom

M18 cylindrical short body ultrasonic sensor

- **M18 diffuse sensors with short housing**
- **Digital output**

	UK6
	
nominal sensing distance	200 mm (1)
minimum distance from background	30 mm
beam angle	7° ± 2°
switching frequency	8 Hz
operating voltage	10...30 Vcc
max ripple content	5 %
output type	PNP or NPN - NO/NC selectable
output current	100 mA
output voltage drop	≤ 2,2 V (@ I = 100 mA)
no-load supply current	≤ 35 mA @ Val = 30 V
leakage current	≤ 10 µA @ 30 V
power on delay	≤ 100 ms
temperature range	-20°C...+70°C
temperature drift of Sr	≤ 5 %
short-circuit protection	● (autoreset)
induction protection	●
voltage reversal protection	●
weight	65 g
LEDs	yellow: output green: aligment
protection degree	IP67
EMC	conforming to EMC Directive, according to EN 60947-5-2
housing material	plastic housing: PTB
active head material	epoxy - glass resin
connection	M12 plug cable exit

(1) Metallic target 100 x 100 mm

FROM 0,25 TO 25 mm ALL STEEL YOU WANT

HRC	HOT ROLLED
HRPO	PICKLED AND OILED
CRC	COLD ROLLED
HDG	HOT DIP GALVANIZED
ALZ	ALUZINC®
ELZ	ELECTROGALVANIZED
ALU	ALUMINIZED
HRP	HOT ROLLED PLATES

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3..2..1 NEW WEBSITE!

M.D. Micro Detectors are pleased to announce that they have launched the new website.

It is a “Responsive” portal, which is able to adapt its content to any device being used (tablets and smatphones included), guaranteeing perfect indexing even for search engines.
In the “products” area the data-sheets are available for each article with all detailed information (including 3D drawings). Each data-sheet can be easily downloaded, printed and shared with a simple click thanks to the appropriate buttons.

This site is in Italian, English, Spanish, Chinese and German.

www.microdetectors.com

Micro Detectors
Italian Sensors Technology

UQ SERIES

NEW ULTRASONICS CUBIC SHAPE

Nominal sensing distance up to 1200 mm

M18 Front-Head

laser marking

UQ series
ultrasonic sensors cubic shape

features

- Housing compatto, con possibilità di installazione a ridotto ingombro
- Housing plastico, con costo e peso contenuti
- Collegamento a connettore, che permette di ridurre ulteriormente lo spazio occupato
- Modelli con uscita IO-Link
- Certificazione CuLus, con possibilità di vendita nel mercato Nordamericano.

CE cULus IO-Link

Micro Detectors
Italian Sensors Technology

IO-Link

M.D. present their new UQ1 series of cubic ultrasonic sensors with plastic compact housing. The reduced dimensions (53mmx20mmx37,7mm) and the plug connection allow a limited obstruction and a versatile usage.

Working distances expected in this new design are as follows:

- 40 mm – 300 mm for the UQ1A models
- 60 mm – 800 mm for the UQ1C models
- 80 mm – 1.200 mm for the UQ1D models.

Models with following outputs are available:

- Mixed current analog output + digital NPN
- Mixed current analog output + digital PNP
- Mixed voltage analog output + digital NPN
- Mixed voltage analog output + digital PNP
- IO-Link

In particular, mixed output allows to solve some applications, where not only the detection of target presence is important, but also its own distancing and approach. The IO-Link output allows to transfer sensor collected data in remote, in order to memorize, elaborate and configure them through specific parameters, which have been standardized and made universal thanks to this new communication module.

	UQ1A	UQ1C	UQ1D
type	Cubic Ultrasonic Sensor		
nominal sensing distance (Sn) flat metal target	40 mm - 300 mm (100 mm x100 mm)	60 - 800 mm (100 mm x 100 mm)	80 - 1.200 mm (200 mm x 200 mm)
adjustable range (Sd) flat metal target	40 mm – 300 mm (100 mm x 100 mm)	60 - 800 mm (100 mm x 100 mm)	80 - 1.200 mm (200 mm x 200 mm)
unusable area	0..40 mm	0..60 mm	0..80 mm
sensitivity adjustment	Teach-in button		
full beam angle	15°±2°		14°±2°
histeresys	1%		
repeat accuracy	1%		
resolution	3 mm		
linearity error	< 1%		
operating voltage	10.. 30 VDC		
ripple	5%		
no-load current	< 35 mA		
output current	100 mA		
leakage current	≤10 µA (VDC max)		
transducer frequency	300 kHz	230 kHz	200KHz
output voltage drop	2.2 V max. (Il=100mA)		
switching frequency digital output	8 Hz	5 Hz	3Hz
response time analog output (10..90% Vout)	≤ 400 ms		
time delay before availability digital output	100 ms		
supply electrical protections	Polarity reversal, transient		
digital output electrical protections	Short circuit (auto reset) , over voltage pulses		
analogical output electrical protections	Short circuit (auto reset) , over voltage pulses		
operating temperature range	-20°…+70° C		
storage temperature	-30…+80°C		
digital temperature compensation	•		
active head material	Epoxy- glass resin		
protection degree	IP67		

LDLV: LUMINESCENCE PHOTOSENSOR

APPLICATION EXAMPLES

By **Daniel Jornet** – General Manager of Micro Detectors Ibérica

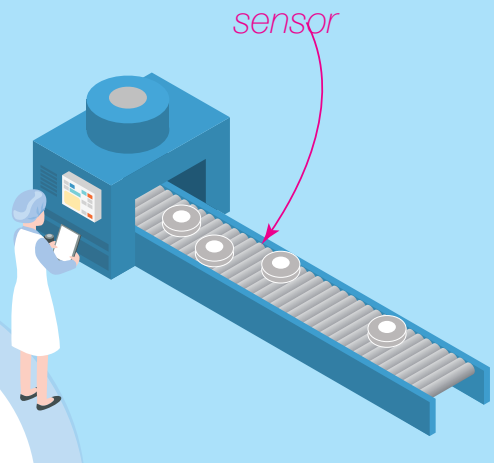
Looking at the flagship products recently developed in the field of photoelectric sensors (think, for example, of our "diamond tip" QMRS, the small cubic photosensor with background suppression), there are so many application cases in which LDLV, one of our historical products, has really shone in resolutions. Many of our customers consider this sensor to be high performance.

The LDLV is an emitter of UV light, and uses the luminescence property of some types of material. It was designed for detecting the not visible to human marks painted on ceramic tiles with luminescence pens. The good news is that paper, containing cellulose has this property, contrary to metal or plastic.

So, any label, no matter it's white, red, black, transparent, if it's attached on a glass, bottle, box, container, even if container is in paper, can be detected by LDLV sensor.

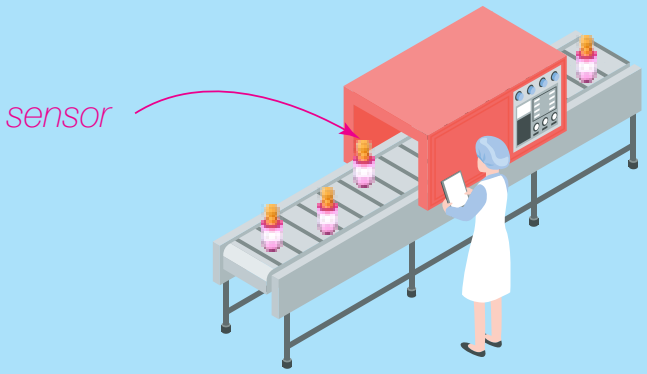
METAL PELLETS MANUFACTURER

Target: detecting the presence of a paper label in a metal box.
Metal is glossy, so the box returns a lot of light, thus it would be difficult to detect with a standard photo sensor. The label could be transparent, any colour, including silver colour, but it has always a percentage of cellulose. While the metal box has no luminescence feature. LDLV is perfect for this application: just with the factory adjustment, it can start to work.



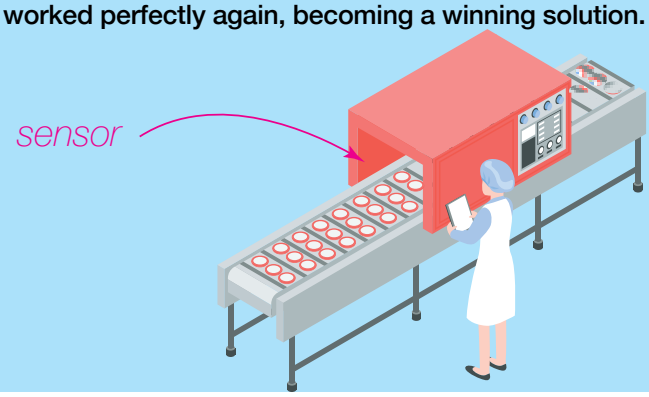
PERFUME MANUFACTURER

Target: detecting the presence of label with cellulose on perfume bottles.
The bottles are different colours, sizes, as also the labels: the force of LDLV is to take advantage of the cellulose component in the label.



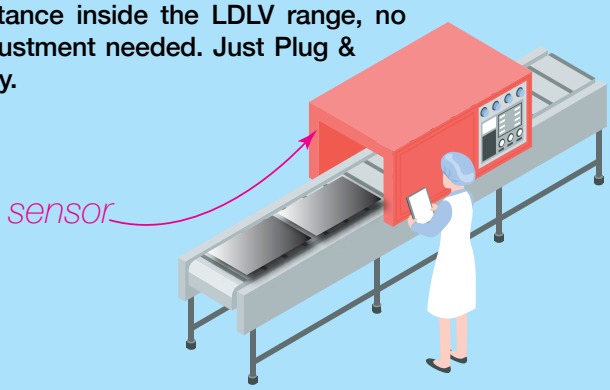
LABEL ON LIQUID YOGURT

Target: detecting label in manufacturer of liquid yogurt for different brand label products
The shapes, colour, sizes, made it difficult to use any photosensor, but, in this case, the yogurt label was not plastic; it had a percentage of cellulose and the LDLV worked perfectly again, becoming a winning solution.



ALUMINIUM PAPER

Target: detecting the presence of aluminium sheet over a paper pipe.
It couldn't be easier, LDLV just catch the internal pipe with cellulose at any distance inside the LDLV range, no adjustment needed. Just Plug & Play.



LDLV series

Special photoelectric sensors
M30 luminescence scanner - DC

- **Ultraviolet light emission**
- **Local and remote Teach-in function**
- **Multifunction LED status indicator**
- **LO/DO selectable outputs**
- **Delay selectable**
- **Complete protection against electrical damages**
- **IP65 protection degree**

	LDLV/**-**
nominal sensing distance [1]	30 mm
spot dimension	3 x 1 mm
operating voltage	10...30 Vdc
ripple	< 10 %
no-load supply corrent	20 mA
load current	100 mA
leakage current	< 10 µA
voltage drop	≤ 1,4 V max. IL = 100 mA
output type	NPN or PNP LO/DO selectable
switching frequency	400 Hz
response time	1,1 ms
time delay before availability	200 ms
power supply protections	polarity reversal, transient
output protection	short circuit (autoreset)
temperature range	-5°C...+55°C (without freeze)
EMC	in conformity with the EMC Directive according to EN 60947-5-2
temperature drift	10 %
interference to external light	3.000 lux (incandescent lamp), 10.000 lux (sunlight)
protection degree	IP65 (EN60529) [1]
LED indicators	yellow (output state) [2]
housing material	nickel-plated brass
cable exit material	polycarbonate
optical material	PMMA
tightening torque	50 Nm
weight (approximate)	400 g

[1] protection guaranteed only with plug cable well mounted
[2] LED's functions are: output state, signal level, teach function

APPLICATION MULTISENSORY:

HYDROGRAPH DAMS

Di **Jessica Galantucci** - Brand Label Manager and Subsidiaries Sales Manager

We are proud to report a quite special application using very different kind of sensors and all of them coming from M.D. Micro Detectors. Customer trusted our Italian sensors technology for this rough application and we are honored to participate in the success of this project

The sensors used were:

- INC1/D0-3V: Inclination sensor for measuring the angle of machine arms.
- UT2F/E6-0EUL and UK1F/EP-0EUL: Ultrasonic sensors for measuring water levels
- AM1/AP-2H + AT1/0P-3H: Inductive sensors for detecting stop positions.

APPLICATION DESCRIPTION

These 5 M.D. sensors have been used with different purposes in the automation of cleaning machines in hydrograph dams.

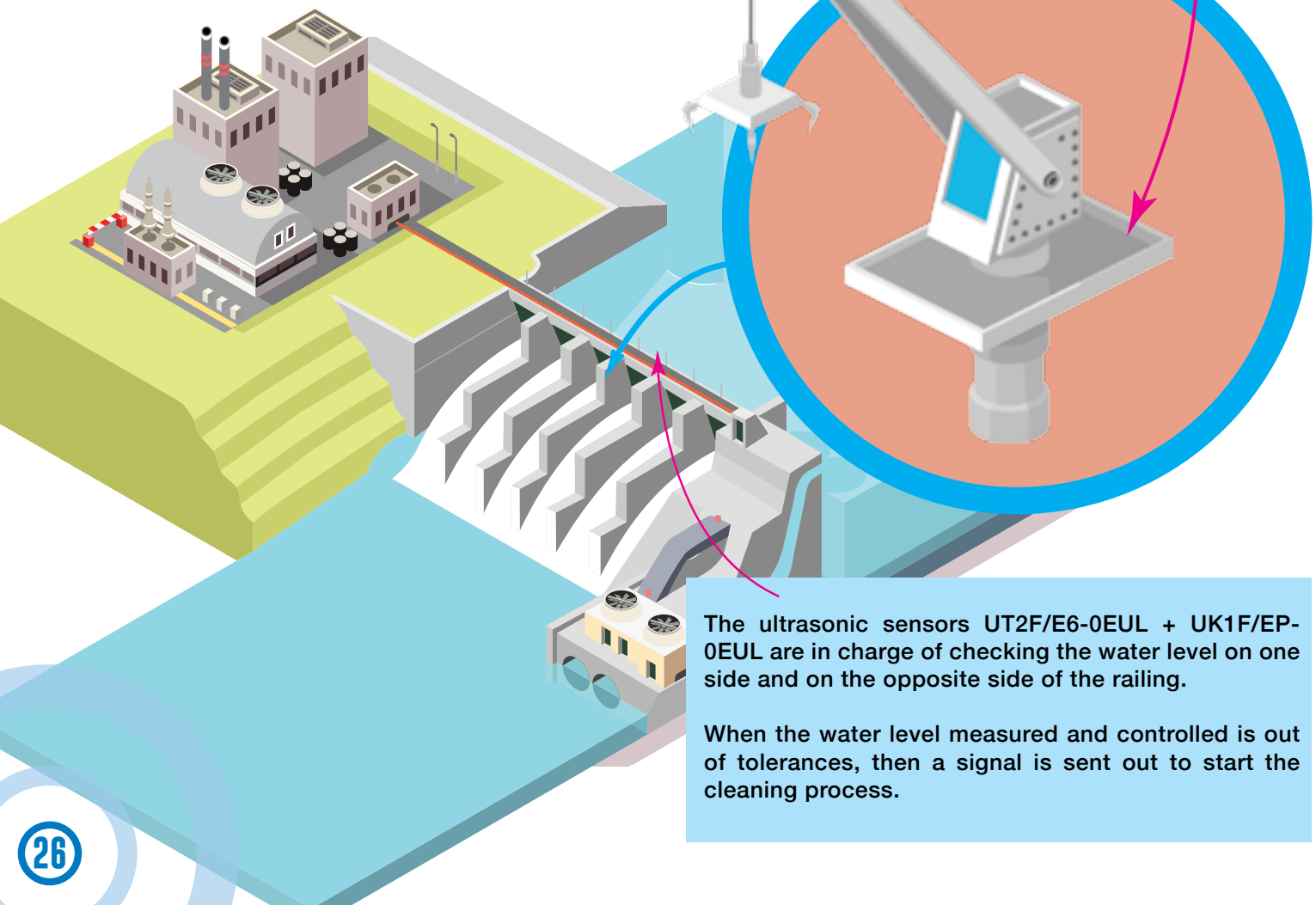
In dams there are areas between the original river and the water accumulation area with railings for letting the water pass from one side to the other but not the waste.

From time to time, these railings could be so dirty, that even the water is not able to pass, especially due to tree trunks.

Then it is necessary to clean the waste using these kind of machines showed in the pictures. The machines are cranes with a manipulator on one extreme to remove the trees.

Our inclinometer sensors type INC1/D0-3V are used to know the arms angles of the crane in every moment along the cleaning process.

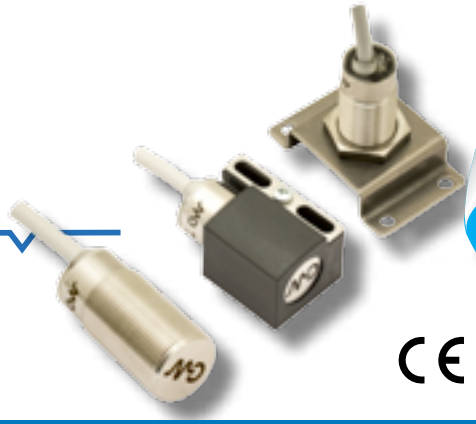
The inductive sensors AM1/AP-2H + AT1/0P-3H are located on the base of the crane for detecting start and cleaning positions.



The ultrasonic sensors UT2F/E6-0EUL + UK1F/EP-0EUL are in charge of checking the water level on one side and on the opposite side of the railing.

When the water level measured and controlled is out of tolerances, then a signal is sent out to start the cleaning process.

INC series
Inclination sensor



FOR MORE DETAILS...

- **M18 housing**
- **AISI316L stainless steel housing (front included)**
- **IP67 protection degree**

	INC1/D0-3V
operating voltage	24 Vdc +/- 20%
power consumption	< 1 W
operative range	360°
resolution	0,025° @ RS-485
detection axes	1
frequency range	< 3 msec
technology	MEMS (Micro Electro-Mechanical Systems)
digital output	RS-485 (addressable) 57600 Baud rate - 1 bit stop - parity
MEMS resolution digital output	14 bit
resolution digital output	12 bit
voltage analogue output	0..5 V / 0..10 V (programmable)
current analogue output	4..20 mA / 0..20 mA / 0..24 mA (programmable)
load resistor (voltage)	1k...1M Ohm
load resistor (current)	100...500 Ohm
humidity	< 80 % without condensation
temperature range	-25° C...+ 70°C
storage temperature	-30°...+90°C without freeze
electrical protections	polarity reversal transient
protection degree	IP 67 (EN60529)
housing material	AISI316L PA12
connections	cable 5 poles pig Tail M12 5 poles
dimensions	M18
weight	100 gr

M.D. provides a demonstration software with each Inclination sensor for a simple and immediate programmability of all functions and for analysis of the vibrational state of the machine. The sensor is supplied with factory programming that can normally be used without changes in most applications.

AM1 series
M12 cylindrical inductive sensors

- **Wide range of models: standard, short body, long distance**
- **Output: cable, M12 and M8 plug cable exit**
- **Models with 2, 3 wires**
- **ATEX models, cat. 3, available on request**

	AM1/AP-1H	AT1/0P-3H
nominal sensing distance Sn	2 mm	10 mm
operating distance	0...1.6 mm	0...8.1 mm
hysteresis	1...20%	
standard target	12 x 12 mm FE 360	30 x 30 mm FE 360
repeatibility	5% UB 20-30 V Ta = 23°C ± 5°C	
operating voltage	10...30 Vdc	
max ripple content	≤ 10%	
output type	NPN or PNP - NO or NC (3 wires models), NPN/PNP - NO (2 wires models)	
output current	≤ 200 mA (3...100 mA for 2 wires versions)	
output voltage drop	≤ 1.8 V @ 200 mA (2,8 V @ 100 mA for 2 wires versions)	
no-load supply current	10 mA	20 mA
leakage current	10 µA (0.8 mA for 2 wires versions)	
switching frequency	2 kHz (1.5 kHz for 2 wires)	200 Hz / 100 Hz for 2 wires versions
power on delay	50 ms	100 ms (50 ms for 2 wires versions)
ambient temperature range	-25...+70 °C	
temperature drift of Sr	10%	
short-circuit protection	●	
voltage reversal protection	●	
induction protection	●	
shocks and vibrations	IEC/EN60947-5-2	IEC 60947-5-2 / 7.4
weight	30 g connector (20 g short body) 70 g cable (60 g short body)	150 g connector, 230 g cable
LEDs	yellow LED output state	
protection degree	IP67[1] (EN60529)	
EMC	in conformity with the EMC Directive, according to IEC 60947-5-2	
housing material	nickel-plated brass	
active head material	PBT	
connection	cable 2 m PVC - plug M8 or M12	cable 2 m PVC - plug M12
tightening torque	10 Nm	50 Nm

[1] Protection guaranteed only with plug cable wall mounted

AT series
M30 cylindrical inductive sensors

- **Wide range of models: standard, long distance**
- **Output: cable, M12 and plug cable exit**
  - **Models with 2, 3, and 4 wires**
    - **ATEX models, cat. 3, available on request**
      - **Models with complementary output (NO + NC)**
        - **Complete protection against electrical damages**

UK1 series

M18 cylindrical direct diffuse & retro-reflective Ultrasonic Sensor UK1 with Teach-In button

- **Models with adjustable digital output**
- **Models with current or voltage analogue outputs**
- **Working area adjusting (single point teach, standard window, adjustable hysteresis) by Teach-in button suitable for all models for a fast coming into work**
- **Multifunction LED indicator: output state, echo presence, fw identification, teach block**
- **Plastic or metallic (AISI 316L) housing, M12 plug exit and PVC cable**

	UK1F/EP-0EUL	UT2F/E6-0EUL
maximum sensing distance	2,200 mm	6,000 mm
minimum sensing distance	200 mm	350 mm
sensing range (Sd)	200...2,200 mm	350...6,000 mm
beam angle	14° ± 2°	15° ± 2°
switching frequency (digital output)	2 Hz	1 Hz
response time analogue output (10...90% final value)	500 ms	1 s
hysteresis	1%	1 % off full scale value
repeatibility	0.5%	0.1 % off full scale value
resolution	± 3 mm	6 mm
linearity error	1%	1 % off full scale value
temperature range	- 20°C...+ 70°C	
temperature compensation		●
operating voltage	15 - 30 Vcc	12 - 30 Vcc
temperature drift	± 2 %	± 5 %
ripple	5%	
leakage current	10 µA @ 30 Vcc	
output voltage drop	2.2 V max. (IL = 100 mA)	
no-load supply current	≤ 50 mA	25 mA
output current (digital output)	100 mA	
minimum load resistance (analog voltage output)	3 k Ω	
set point adjustment	Teach-In button	
power on delay	≤ 300 ms	≤ 400 ms (digital output) ≤ 600 ms (analogue output)
short-circuit protection	● (autoreset)	
induction protection	●	
voltage reversal protection	●	
power supply protections	polarity reversal, transient	
EMC	conforming to EMC Directive, according to EN 60947-5-2	
protection degree	IP67 (EN60529)	IP67 (EN60529); NEMA 4X
housing material	PBT	PBT
active head material	Epoxy-Glass resin	epoxy-glass resin
tightening torque	1 Nm	1.5 Nm
weight	70 g	170 g
storage temperature	- 30°C...+ 80° without freeze	
LEDs	green: echo - yellow: output	

UT2F series

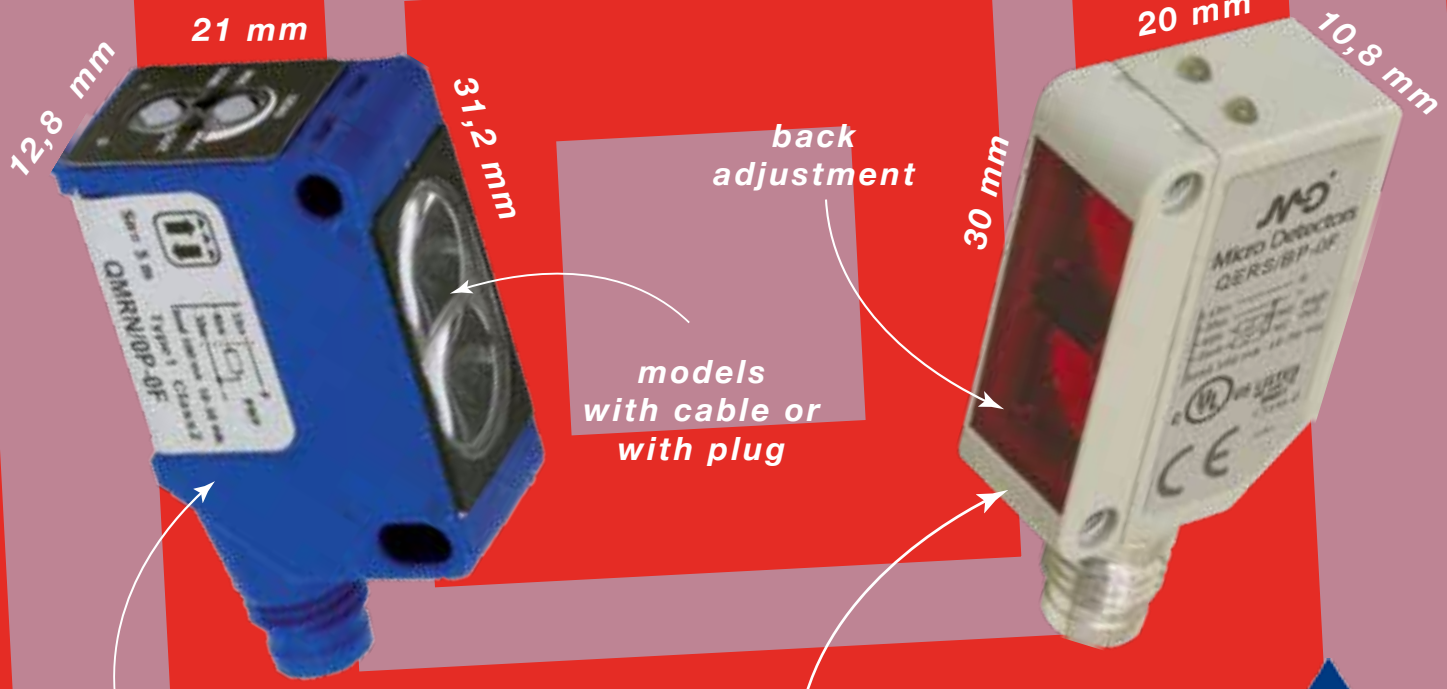
M30 Ultrasonic Sensor with Teach-In button

- **M30 ultrasonic sensor with large front with high performances and high sensing distances**
- **Adjustable hysteresis function: models with double digital programmable output specific for level detection**
- **Models with voltage or current output: programmable slope to optimize resolution**
- **Adjustable working area (window mode or object mode) by Teach-in button on all models for a quick and easy installation**

PHOTOELECTRIC SENSORS

CUBIC SHAPE

FOR MORE DETAILS...



QM series

Miniaturized photoelectric sensors with high performance

- Cubic miniaturized photoelectric high-performance sensors with long sensing distance
- 2 kHz switching frequency
- Background suppression with mechanical adjustment
- Available with cable and M8 plug exit or with M8-M12 pig-tail
- Wide range of models: diffuse reflection with short, medium and long sensing distance, polarized, reflective for transparent objects, through-beam and background suppression

QE series

Plastic cubic miniaturized photo-electric sensors ECO

- Direct Diffuse, Background Suppression, Polarized Through- beam
- Switching Frequency 1Khz
- Complete protection against electrical damages
- Adjustment by trimmer on the back
- Voltage Supply: 10-30 VDC
- Fixing holes 2 x M3

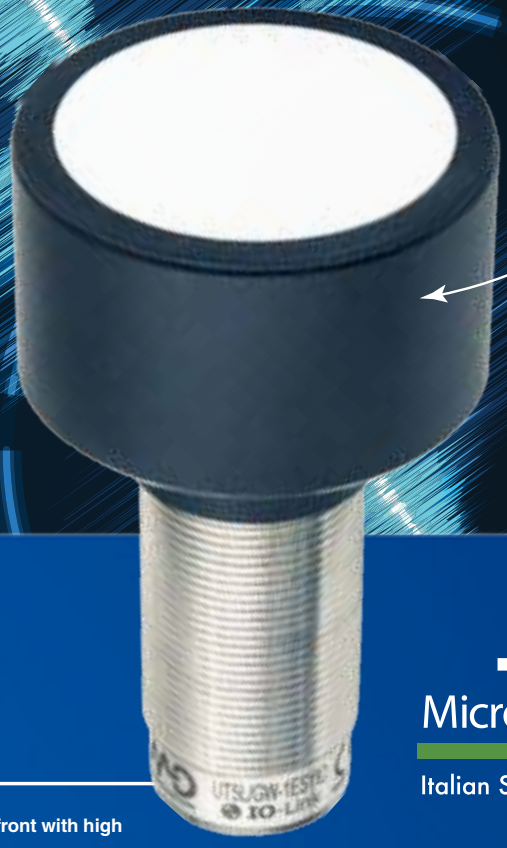
Micro Detectors

Italian Sensors Technology

IO-Link

NEW ULTRASONIC SENSORS

M30



plastic and metal models

sensing distance:: 8000 mm

laser marking

UT series

M30 cylindrical utrasonic sensor

Micro Detectors

Italian Sensors Technology

features

- M30 ultrasonic sensor with standard housing and with large front with high performances and high sensing distances
- Adjustable hysteresis function: models with double digital programmable output specific for level detection
- Models with voltage or current output: programmable slope to optimize resolution
- Multifunction LED indicator: output type, adjustment procedure, NO/NC selection and reverse analog output slope
- Plastic and AISI 316L stainless steel housing, plug M12 or cable exit 4 pin

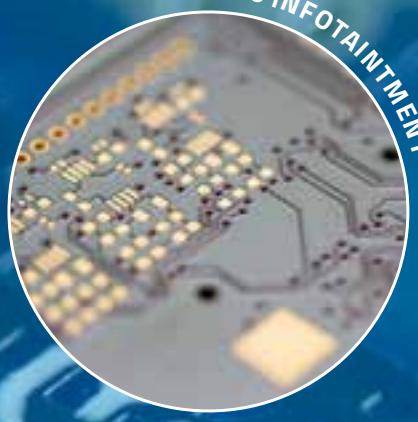
IO-Link CE cULus Ex

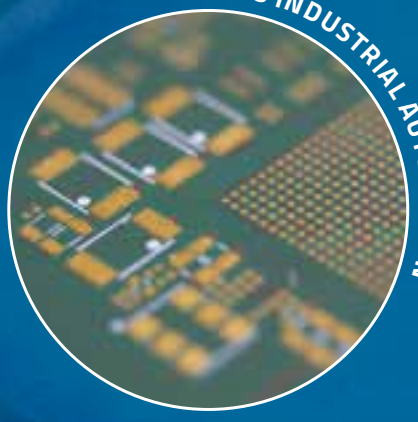
WARRANTY 3 YEARS

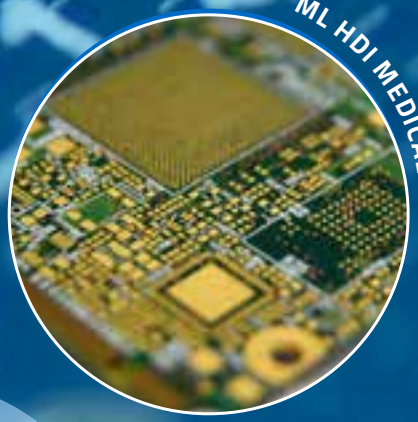
MADE IN ITALY

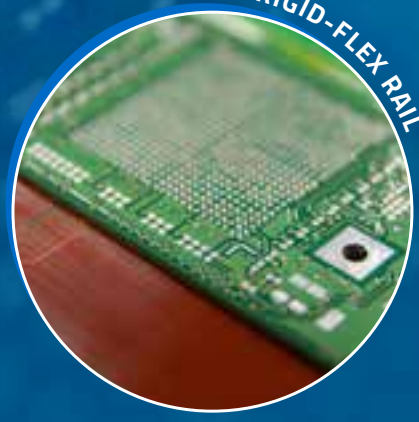
CISTELAIER | TECHCI | EPN

The PCB Division offers a "one stop shoppackage" of services and PCBs ranging from standard products to leading edge technology products for any kind of volumes, guaranteeing the highest quality level









THINK GLOBAL, ACT LOCAL!

The target of the PCB Division of Finmasi Group is to give to its partners a "global service" where "global" means that it is able and it want to provide our partners with:

All services

- Design Rule Check
- Design For Manufacturing
- Co-design support
- Electro Magnetic Check Analysis
- Fast Prototyping Service (QTA)

All technologies

- Rigid, Rigid-Flex, HDI, Microwave and "special" products
- Length/width combination up to 855/464 mm
- Thickness up to 5 mm
- Copper thickness up to 0,5 mm
- Copper coins and bus bar implementation
- More than 100 different kind of base materials
- ENIG, ENEPIG, chemical tin, lead and lead free HAL, silver, OSP, hot oil reflow finishes
- Green, red, blue, black, white, grey and specific RAL solder mask on request

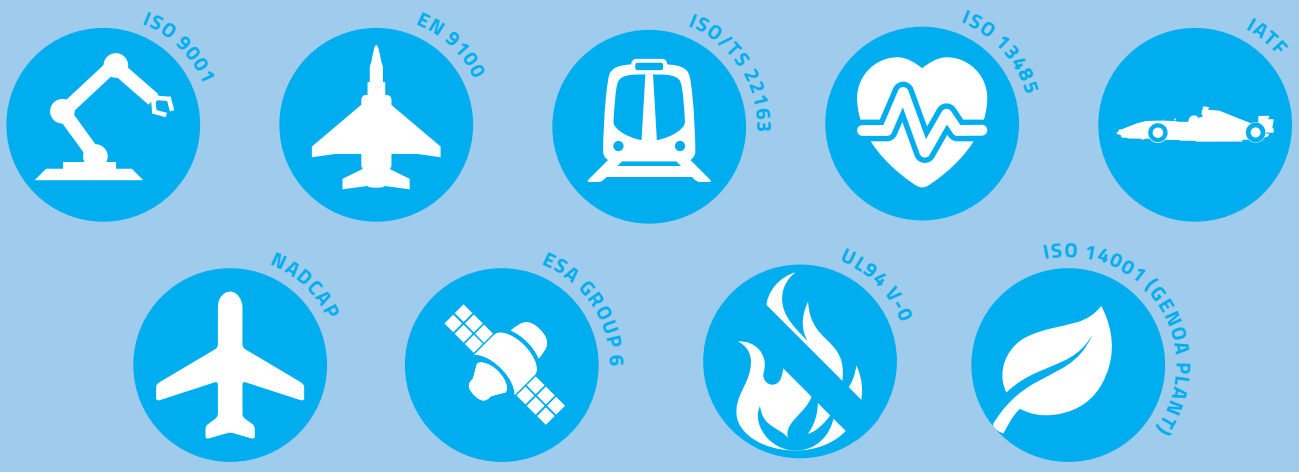
All markets/applications

What makes the PCB Division a "unique" interlocutor is to be homologated for

- Industrial sector: ISO 9001
- Aeronautic, Space and Defence sector: UNI EN 9100
- Civil avionic: NADCAP
- Automotive sector: IATF:2016
- Medical devices: ISO 13485
- Railway sector: ISO/TS 22163
- Space sector: trough ESA ECSS Group 6 rules

and to be able to produce according to the following standards

- IPC-A-600, class 2, 3 or class 3DS(A)
- IPC 6012 (Rigid), IPC 6013 (Rigid-Flex), IPC 6016 (HDI) and IPC 6018 (Microwave)
- MIL-P-55110 (Rigid) and MIL-P-50884 (Rigid-Flex)
- ESA-ECSS - Q – ST – 70 – 10C / 11C / 12C
- ESA-ECSS - Q – ST – 70 – 60C



Our people are IPC certified:

- 4 of them are qualified IPC trainers
- 9 of them are qualified IPC specialists

YOUR SENSOR OUR COIL

PLANNING STAGE

CONSULTATION AND TECHNICAL SUPPORT

RAW MATERIAL SEARCH

PRODUCTION

100% TESTED

Since mid 2012, M.D. Micro Detectors S.p.A. has established the new Chinese facility for the production of coils for inductive sensors.

The Company M.D. Micro Detectors (TianJin) Co, Ltd. is entirely owned by M.D. Micro Detectors S.p.A. This means that the concepts of Total Quality, High Technology and Lean Manufacturing are fully applied in the Chinese Manufacturing Plant as they are applied in the Italian Manufacturing Plant.

The coil is a fundamental component to guarantee high performances of the inductive sensors. This is why M.D. decided to rule this technology setting a manufacturing unit in Tianjin where they produce 100% of the coils needed by M.D. Italy.

Yes it is!! Since 2013, with the full sup port of more than 40 years of experience and know-how in inductive sensors, M.D. Tianjin is the sole supplier for coils for M.D. Micro Detectors, providing the utmost level of satisfaction in term of Technology and of Quality. M.D. Italy is relying on M.D. Tianjin 100% tested products and a short supply chain working with the philosophy of LEAN manufacturing concepts, M.D. Micro Detectors is now offering to his partners and valued customers the opportunity to access to the services of M.D. Tianjin for the manufacturing of coils.

The main features offered by M.D. Tianjin are:

- a stable manufacturing process, compliant to lean manufacturing principles and M.D. control protocols. Totally controlled by our people;
- quality of raw materials used;
- competence of our operators in China;
- reliability: all the products manufactured are subject to quality and functional tests;
- technology and know-how: more than 40 years of experiences in the design and production of coils for inductive sensors;
- services: fast production and fast delivery worldwide;
- customization: production of coils with diameter and number of windings according to customer's request.

With the development of Coils production, M.D. Micro Detectors is now "SENSORS AND MORE".

Micro Detectors

Italian Sensors Technology

EXÉ 1985
RISTORANTE & PIZZA GOURMET

via Boschetti - 41042 - Fiorano Modenese - Italy
Tel.: +39 0536 030013
www.exe1985.it - info@exe1985.it

IN FIORANO

We will be pleased
to present you
our menu and
our famous
PIZZA GOURMET

TO MAKE PEOPLE TOUCH WITH HAND WHAT M.D. MICRO DETECTORS IS, WE RECORDED A NEW CORPORATE VIDEO.TO SEE IT, VISIT OUR WEB PAGE, OUR YOUTUBE CHANNEL OR USE THE QR CODE ABOVE. THIS VIDEO WAS SHOT FOR THE FIRST TIME IN ALL OUR LOCATIONS.

M.D. Micro Detectors is an industrial group which has designed and produced a wide range of industrial sensors since 1971. M.D. has a great tradition but also a very visionary approach,
thanks to their great entrepreneurship and innovating spirit. The Group is composed of the head office, M.D. Micro Detectors S.p.A. (Modena), along with subsidiaries Micro Detectors Iberica SA (Barcelona) and M.D. Micro Detectors (Tianjin) Co. Ltd.

Our catalogue is composed of following product ranges:

- Photoelectric Sensors
- Proximity Sensors
- Ultrasonic Sensors
- Area Sensors
- Safety Devices
- Applicative Sensors
- Encoders
- Accessories
- Coils for inductive sensors

Technology, Quality, Service, Efficiency and Speed are the key words distinguishing our products and our companies. In addition to the catalogue products, an important share of our activity is dedicated to special versions and custom products, with the aim to satisfy our customer's specific application needs. Made in M.D. is another key point: from development of new products (or special version of catalogue products) up to final shipment, all activities are carried out internally by our staff. The integrating strategy enables us to be present on the market with great Flexibility, Speed and Efficiency. This way we have a total control on our processes and technology, too. The companies of our Group are organized and operate following the Lean Thinking principles, allowing us to offer our customers, our suppliers and all our partners an excellent service level. More than 1.3 million pieces per year are completely realized in our plant in Modena. The Made in Italy featuring our production means Quality, Accuracy and Reliability. All products manufactured by our factory are subject to precise control standards during the production process, before the final test. Working culture, focus on customer and on constant improvement, passion and excellence aptitude, continuous research: all of that is part of our staff professional background. All of that belongs to M.D. Style.

M.D. Micro Detectors Quality is also guaranteed by all the certificates our Company has achieved over time: our quality management system is ISO 9001:2015 certified and many products are CE, ATEX, UL, cULus,Diversey, TÜV and ECOLAB certified.

Micro Detectors

Italian Sensors Technology

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