MD news 13

M.D. Micro Detectors Magazine n°13 - 27/11/2018 - English edition

INDUSTRY 4.0

WE ARE M.D.
ARE FINMASI GROUP

NUREMBERG
27-29/11/2018
HALL 7A - STAND 510

Micro Detectors
Italian Sensors Technology

M.D. HAS RECEIVED THE RECOGNITION OF COMPANY OF EXCELLENCE!

"Millions of individuals work, produce and save despite everything we can invent to harass, jam and discourage them. It is their natural vocation that drives them, not just their thirst for profit. The taste, the pride of seeing one's own company prosper, acquire credit, inspire confidence in ever-greater clients, expand systems, constitute a spring of progress just as powerful as profit. If this were not the case, it would not be explained how there are entrepreneurs in their own company who devote all their energy and invest all their capital to often withdraw profits far more modest than those that could certainly and comfortably achieve with other uses."

Luigi Einaudi, 2nd President of the Italian Republic

M.D. Micro Detectors have recently received another very important recognition and have been listed in the Italian Companies of Excellence.
Tuesday, 26th September 26, Global Strategy, a strategic and financial consulting firm founded and led by Antonella Negri-Clementi, on the occasion of the "Bespoke Companies: focus on customer in 10 years of success stories" conference, presented the results of the tenth edition of the SME Observatory at Palazzo Mezzanotte at the Milan Stock Exchange.
The presentation event was organized in partnership with Intesa Sanpaolo and in collaboration with Borsa Italiana, Confindustria, Elite, Nedcommunity and Les Hénokiens.

The method for selecting this initiative is based on the analysis of a database of 60,000 Italian capital companies containing data and balance sheets of the last five with a turnover of over 5 million euros. Of these, over 10,000 make up the Mid Cap landscape, with turnover between 20 and 250 million in manufacturing and services and between 20 and 500 in the trade.

In this tenth edition 724 Excellent companies were identified, which in the last 5 years have shown systematically better results than their competitors in terms of growth, profitability and financial solidity. Of these, 40 were called on the stage of Borsa Italiana to receive the award directly from the other sponsors of the initiative Bureau van Dijk, Classis Capital, IC & Partners and Negri-Clementi Studio Legale Associato.

M.D. Micro Detectors have also joined the group of 40 awarded companies. The award was collected directly by the Managing Director, Dr. Giacomo Villano, who expressed his happiness and pride for this recognition of the work of the Company, of the the Property and of all the people who contributed to the development of M.D. Micro Detectors S.p.A.

Global Strategy

OSSERVATORIO PMI
LE ECCELLENZE ITALIANE

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LET'S MEET AT THE EXHIBITION!

CHINA INTERNATIONAL IMPORT EXPO
SHANGHAI
8-11 NOVEMBER

SPS IPC DRIVES
NURMEBERG
27-29 NOVEMBER

SIAF
GUANGZHOU
10 - 11 MARCH

sps ipc drives
ITALIA

SPS IPC DRIVES
PARMA
28-30 MAY

IAS
INDUSTRIAL AUTOMATION SHOW

IAS
SHANGHAI
17-21 SEPTEMBER

PHOTOFLIGHT

THE FIRST TIME-OF-FLIGHT SENSOR IN M18 BODY

By **Jessica Galantucci** - Sales Manager Brand Label and Subsidiaries and **Marco Messori** - Responsible for Ultrasonic and Photoelectric Sensor Development

The latest innovation developed by M.D. Micro Detectors consists in the introduction of Time-of-Flight (ToF) technology inside the M18 cylindrical body: the tradition of this mechanical structure combined with innovation of the high technological content of this product. Target: to create products that are always high-performing, with high quality and rigorously Made in Italy!

The application of thisToF technology allows to overcome the typical obstacles for the operation of a traditional photocell: the dependence of performance on the color of target; the impossibility of covering high sensitivity ranges with compact bodies. Overcoming the complications related to the development of the mechanical structure, it was possible to achieve the high technological standards required by this innovative technology.
The new product has been implemented in four different operating modes:

- Standard:

1. Single Point
2. Window Mode
3. Two Point Mode

- Background suppression (BGS).

The new M18 ToF is made with IO-Link technology, to fully comply with the standards set by the Industry 4.0. In this way it is possible to configure the sensors remotely and have visibility of the data detected by simply connecting to the network. The resulting benefits are considerable: gathering, organizing and analyzing large amounts of data; control of operational status of the machines; organization of predictive maintenance.

Why ToF?

Like all new products developed by M.D. Micro Detectors, also the Photo-flight aims to be a high performance sensor, with compact structure, durable and easy to use.

Where does the need to have a new photocell with ToF technology arise from? The first obstacle to be overcome, compared to traditional photoelectric sensors, is represented by the color of target which greatly influences the sensor's field of action, given the different absorption/reflection capacity of the various colors. To date, the technique used to overcome this problem is background suppression (BGS). In this way it is possible to detect an object regardless of the color of the background.

The realization of these solutions requires, however, the use of expensive detection circuits and involves considerable mechanical complications.

The second obstacle is characterized by the range of action. If you want to exceed the 500 mm of sensitivity, it would take considerable distance between the photoelements.
The sensor with ToF technology is able to overcome the above obstacles, because it can detect even dark targets, and has a compact mechanism.
Furthermore, the product range has different types of emissions:

- emission with infrared LED
- emission with infrared laser VCSEL
- emission with standard red LED
- emission with standard red laser

This range flexibility, in terms of the wavelength used for the emission section, guarantees the customer the possibility of using the most appropriate product for his specific application.
In the case of long-distance detection of large-sized targets, it is possible to use the Infrared LED emission models (850nm) that guarantee great precision, immunity to ambient lighting and maximum operating temperature range. If the detection of small or medium-sized objects is required and if it is not necessary to have a visible emission, Class 1 or 1M Infrared Laser light models are available which have high sensitivity combined with small-sized optical spots.

- Emission with infrared LED (850nm) to detect big targets at a long distance;
- Emission with infrared laser in Class 1N or 3B for detecting small/medium size objects;
- Emission with visible red laser (650 nm) for detection of very small objects.

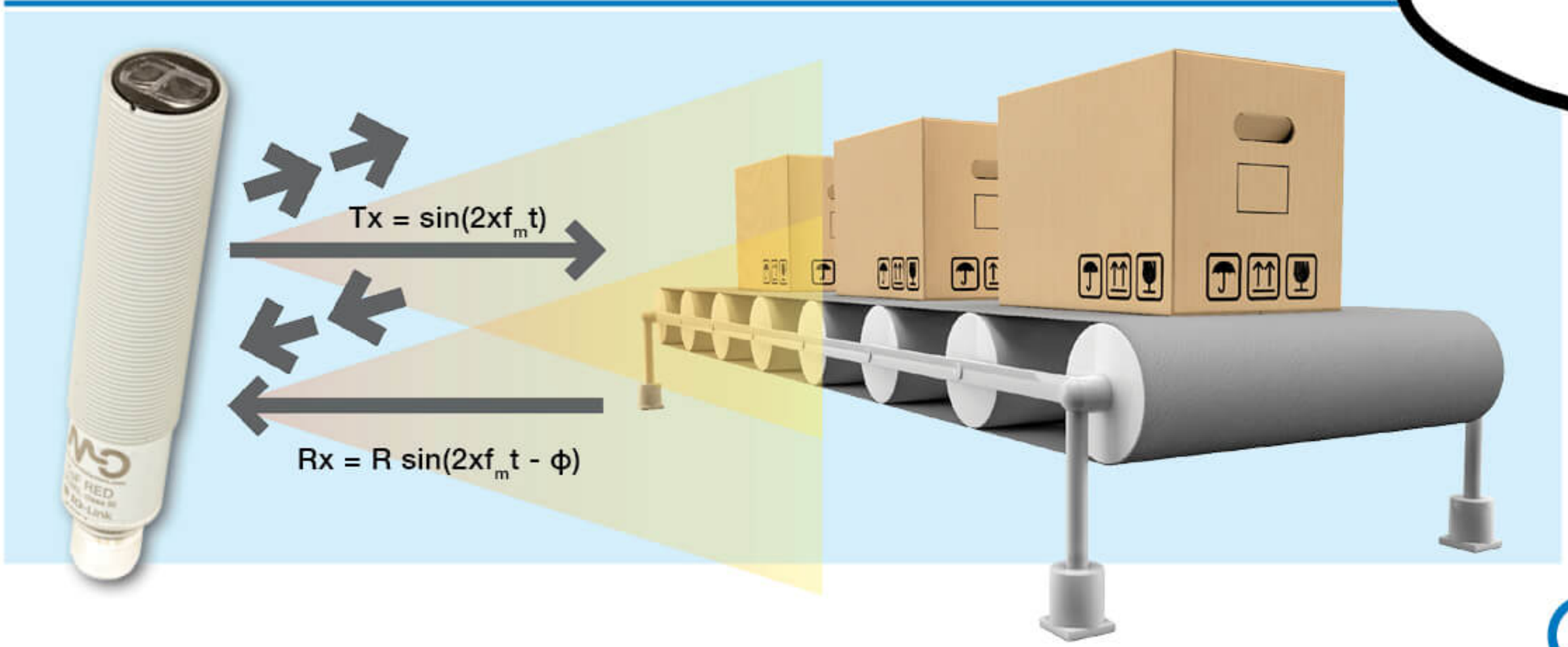
The new ToF sensors can be used in any detection situation and allow the operating modes typical of ultrasonic sensors using an intrinsic measurement principle.
The main technical specifications of this new range of products are shown below. Our Organization is available to introduce you fully into this absolute market news!

HOW DOES IT WORK?

The principle of operation of this new sensor is similar to the mechanism with which the radars operate: calculation of distance of the target based on time taken by the signal to reach the target itself and return to the emitter. In case of ToF, however, light is used. The distance can be calculated by multiplying the speed of light by the travel time and dividing by two.
Our sensor operates in the frequency domain and uses analog signal processing techniques to measure the distance based on the offset of the reflected signal.
Two main advantages of this solution are:

1. Independence of the measure from the reflexivity of the target surface;
2. Rejection against ambient light thanks to the presence of corrective algorithms that, dynamically, eliminate the disturbances introduced by external lighting.

SIGNAL TRANSMISSION AND RECEPTION IN A SYSTEM



NEW QF SERIES

MINIATURIZED CUBIC PHOTOSENSORS

By **Fabrizio Marchi** - Product Marketing & Application Engineer

The new QF photoelectric sensors enrich the range of products in miniaturized cubic body of M.D. Micro Detectors. In particular, the new models have been designed for applications in harsh environments, with particular attention to the Food & Beverage sectors, having AISI316L stainless steel housing and IP69K degree of protection.

The performance in terms of detection capacity is excellent. The small dimensions (11 x 21 x 31.4 mm) comply with industry standards and the 2 x M3 fixing holes guarantee quick and easy installation.

Different operating principles are available:

- Background suppression (both with red and infrared emission)
- Direct diffuse (with infrared emission, short and long distance);
- Polarized retro-reflective (with red emission);
- Polarized retro-reflective (with infrared emission);
- Through-beam (with infrared emission).

With its compact and optimized housing, the new sensor is able to withstand high pressure and high temperature washing. In addition, the product is resistant to the action of particularly aggressive chemicals, such as detergents and disinfectants. Among the other approvals obtained (CE and CULus), the QF family complies with the tests conducted by ECOLAB, details of which are given below. Compliance has been achieved by maintaining a stable and accurate detection of objects even in hostile working conditions.

Substance	Description	Concentration	Test duration	Result
Topax 56	Foam detergent, acid for the food industry	5%	240 h at 50°C	Test passed
P3 Hypochloran	Chlorine-containing disinfectant for the food industry	1%	240 h at 24°C	Test passed
TOPAZ CL1	Foam, alkaline and chlorine-containing detergent for the food industry	5%	240 h at 50°C	Test passed
TOPAZ AC1	Foam detergent, acid for the food industry	4%	240 h at 50°C	Test passed
TOPAZ MD3	Foam detergent, alkaline for the food industry	5%	240 h at 50°C	Test passed
P3-topactive OKTO	Foam disinfectant, acidic for the food industry	1%	240 h at 24°C	Test passed

applications

MEAT, FISH, POULTRY PRODUCTION

The food industry needs high standards of resistance, hygiene and cleaning. QF photoelectric sensors can perfectly work even in "harsh environments" thanks to their stainless steel body, above all.

PRODUCTION OF JUICES AND DAIRY PRODUCTS

Colored graphic of some packagings can be hardly detected. QF series with background suppression is able to solve this issue being this product designed to work in particularly difficult conditions, as it can also withstand high pressure water jets.

WATCH THE VIDEO ON OUR YOUTUBE CHANNEL

TRAINEE PROGRAM

EYES ALWAYS FOCUSED ON FUTURE

By **Giacomo Villano** - C.E.O., **Jessica Galantucci** - Brand Label Manager and Subsidiaries Sales Manager and **Roberto Bosani** - R&D Manager

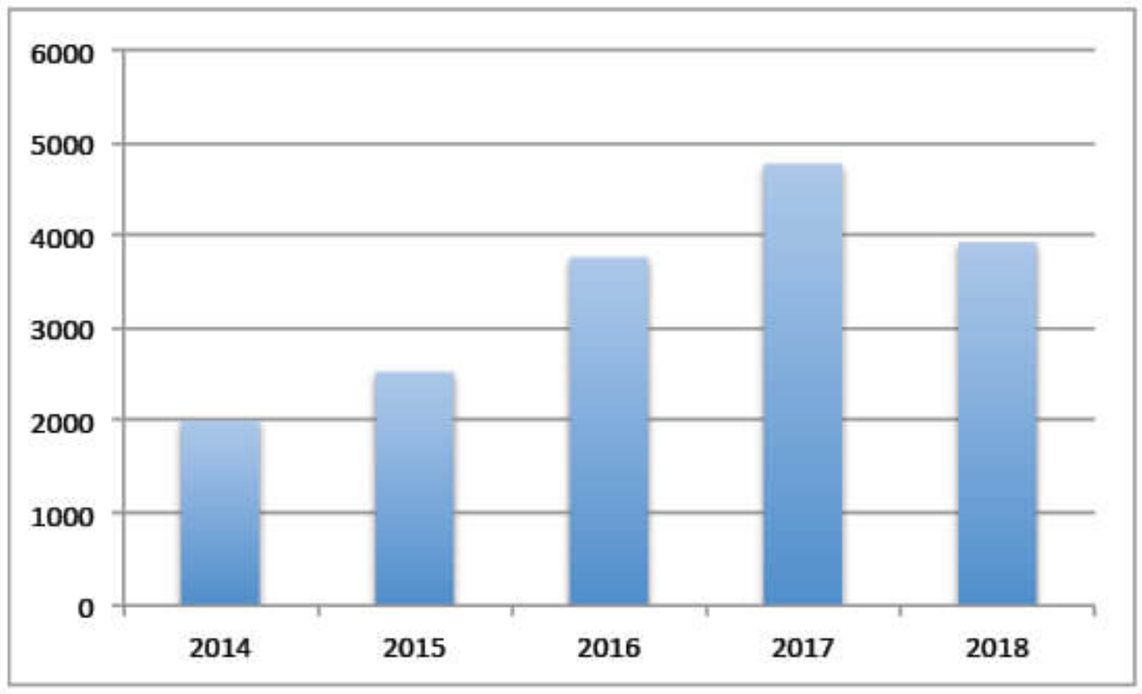
World of Work and World of Education can and must work in close connection. Companies and schools can benefit greatly from these collaborations and, more than any other, future generations can benefit from them and with them the entire national economy. In our experience these collaborations have required a huge use of human and material resources resulting in great benefits for our company.

Therefore we continue to work alongside the main technical institutes operating in the local area and with some of the most renowned Italian universities. Thanks to these collaborations the results obtained in recent years make it clearer and clearer in us that a company can't disregard these activities to continue in its development process and also to have access to resources that grow and are formed, according to the different opportunities that our company can offer, thanks to direct activities carried out within MD as well.

Below we report the data related to the activities carried out from 2014 to September 2018.

Classroom and support activities for school projects also continue.

	2014	2015	2016	2017	2018*
Number of interns	15	21	25	39	25
Hours of internships	2.000	2.520	3.756	4.765	3.920



updated at 30/09/2018

We also remind that M.D. Micro Detectors:

- is part of the Technical Scientific Committee of the ITIS Fermi and the Guidance Committee for the Degree Course in Electronic Engineering of the University of Modena and Reggio Emilia;
- has an agreement with the University of Modena and Reggio Emilia and with the University of Bologna to host trainees / undergraduates;
- supports the school / work alternation project of the ITIS Da Vinci's III Classes in Carpi, of the Institute Enrico Fermi in Modena and of the Institute Fermo Corni in Modena;
- has an agreement with the Polytechnic Institute in Milan, with which it has carried out two strategic projects.

TRAINEE PROGRAM

INTERNSHIP OPPORTUNITY FOR STUDENTS

M.D. Micro Detectors also offers university students the opportunity to realize their degree thesis in the company. Below we summarize the topics of potential interest on which a thesis can be developed:

- Development of firmware microcontrollers ARM (M0 – M4)
- MEMS technology (Micro Electro-Mechanical Systems).
- Realization of APP for operating system Android or iOS
- Realization of GUI of configuration of sensors in C#
- Bluetooth communication for industrial sensors
- Development of a Linux embedded system for pattern recognition of laser focusing image in an industrial production system.

SERIES FL

"T-STYLE" BODY PHOTOELECTRIC SENSORS WITH M18 OPTICAL HEAD FOR CAR WASH

NEW!!

FL series

"T-style" body photoelectric sensors with M18 optical head for car wash

- Sensors for car washes
- IP protection degree: head IP69K (sensor IP67)
- Wide angular range for an easy allignment
- Totally fullfilled with resin
- Two versions: high and standard distance
- Syncronization through cable
- Coded emission: anti mutual-interference

Micro Detectors

Italian Sensors Technology

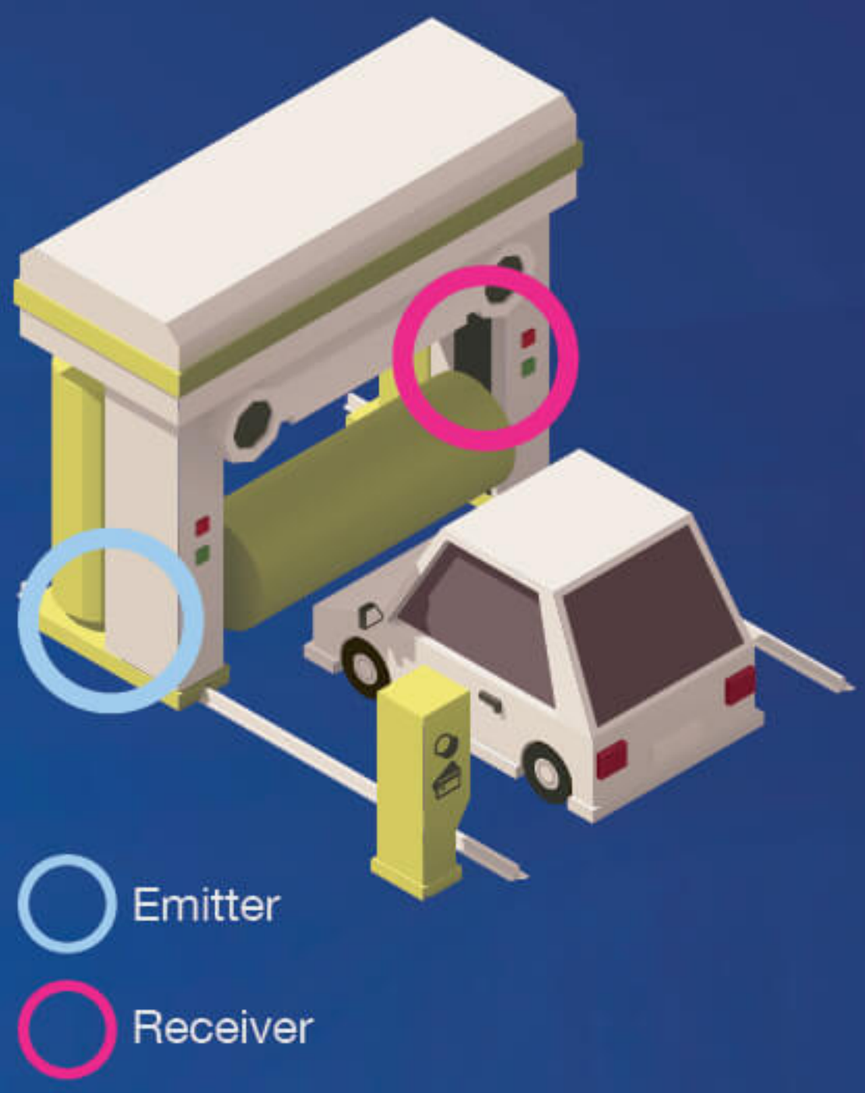
CE

WARRANTY 3 YEARS WARRANTY

MADE IN ITALY • MADE IN ITALY •

SPECIFIC FOR CAR WASH....

The new Photoelectric Applicative Sensors of FL family are “through-beam” sensors with infrared emission and with a “T-style” shape factor, in which the pair of sensors can be installed as normal M18 but with minimum overall dimensions. They can be used in all installations with stringent space constraints and where an excellent immunity to ambient light and other environmental factors (dust, water drops) is required. Both the emission and the reception have been optimized in order to work in conditions of high brightness and in harsh environments such as those in which we find the presence of water spray. The body is made of plastic and the electronics are completely encapsulated in epoxy resin, ensuring a high level of robustness. The sensors are easy to install and do not require configuration or teach-in. Both the emitter and the receiver are synchronized and encoded via cable and this allows them to be more immune to external disturbances and not to interfere in the case of sensors mounted close together. This product is available in two versions: “Standard” and “High Flow”



...AND FOR THE CONTROL OF ACCESSES!

The FL series sensors can be used to detect the presence of people, vehicles and objects in the working area of the automatic sliding doors. If the sensors detect a presence, the descending motion of the door is blocked, thus avoiding accidents and damage. Since the sensors are synchronized, there are no mutual interference problems and so you can use multiple sensors side by side without any problem.
The extremely compact body, the degree of protection of the front up to IP69K, the temperature range from -20 ° C ... + 70 ° C, the long range (up to 30 m for a high immunity to dirt, powders, mists, etc.) allows its use even in outdoor environments.

INDUSTRY 4.0

FEEL THE NEW ULTRASONIC WAVE

general catalogue ed. 01/2017

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100% TESTED

WARRANTY 3 YEARS WARRANTY

MADE IN ITALY

SOLUTIONS FOR YOUR APPLICATIONS

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

UK6 and UKR6 series

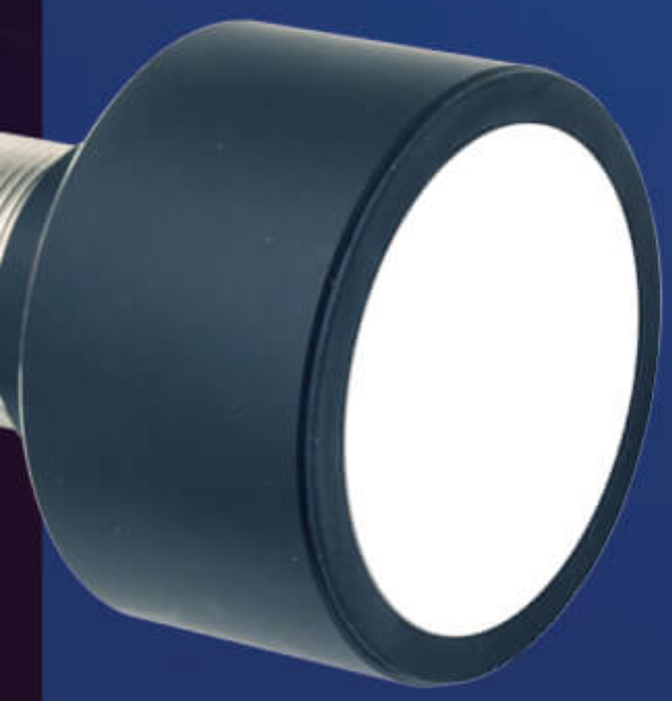
M18 cylindrical short body ultrasonic sensor

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

UT and UTR series

M30 cylindrical utrasonic sensor
with Teach-In button

- 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



NEW !!

DETECTION OF THE HEIGHT OF ARMS IN AGRICULTURAL MACHINERY

The ultrasonic sensors can be used to detect the distance from the ground and automatically adjust the correct height of the devices to distribute the fertilizing substances

DETECTION OF TREES / OBSTACLES TO ACTIVATE JETS OF FERTILIZING SUBSTANCES

Thanks to ultrasonic sensors you can reduce the waste of fertilizer / pesticide substances by starting the jet of different substances only when the sensor detects the element to be treated

DETECTION OF PAVING HEIGHT ON ASPHALT MACHINES

Since operating in harsh conditions (temperature, atmospheric conditions, etc.), the M.D.'s sensors used in these applications are required to have a high strength, so as to guarantee a stable reading and facilitate the correct performance of the operating machines

EXTENDED TEMPERATURE RANGE

The new ultrasonic sensors have extended working temperature range (from -20 ° C to + 70 ° C), they can guarantee greater reliability on more complex applications and a greater accuracy even for analog versions.

IO-Link CE cULus Ex

SPECIAL VBR SERIES

VIBRATION SENSOR APPLICATIONS

By **Giovanni Di Lorenzo** - Product Manager Applicative Sensors and **Rocco Trivigno** - Responsible for Applicative Sensors Development.

In May 2016 M.D. Micro Detectors launched the VBR series of vibration sensors.
Thanks to the MEMS (Micro Electro-Mechanical Systems) accelerometers, the VBR sensor uses the acceleration information to monitor all the accelerations (and therefore vibrations) of the machine. MEMS are in fact able to capture information from the environment by translating the physical quantities into electrical pulses, processing this information.

We can measure phenomena of various kinds: mechanical (sounds, accelerations and pressures), thermal (temperature and heat flow), magnetic (intensity of flow). The main advantage of MEMS technology, however, lies in the ability to perform the same functions of detection, processing and implementation that are traditionally made with much larger and more expensive devices.
There are many possibilities of use for VBR and INC; here below, we will illustrate some application cases.

CASE HISTORY: SEOUL SUBWAY

The VBR Vibration Sensor by M.D. Micro Detectors has been successfully tested and installed in the escalators of one of the most important and crowded subways on the planet.

Seoul subway in South Korea has 607 stations and is one of the most used urban transport systems in the world, with more than 8 million daily trips on a system of 19 lines.
In October 2017, IoT (Internet Of Things) technology was applied, extending the Internet to the world of concrete objects and places, to 100 escalators on line 7 of the metro, reducing repair times from 56 minutes to 37 minutes per fault. The number of problem reports also decreased by 15% from an average of 20.5 to 17.4.

The escalator uses IoT technology and installs 20 to 40 sensors (including our VBR), which allow to identify the reason for faults immediately after they occur.

In this way, the operators are able to immediately send the necessary spare parts where the fault has occurred, thus significantly reducing the recovery time. In the past, however, the procedure adopted consisted in reporting the malfunction to the dedicated site, checking the malfunction and, only then, preparing the necessary equipment for repair.

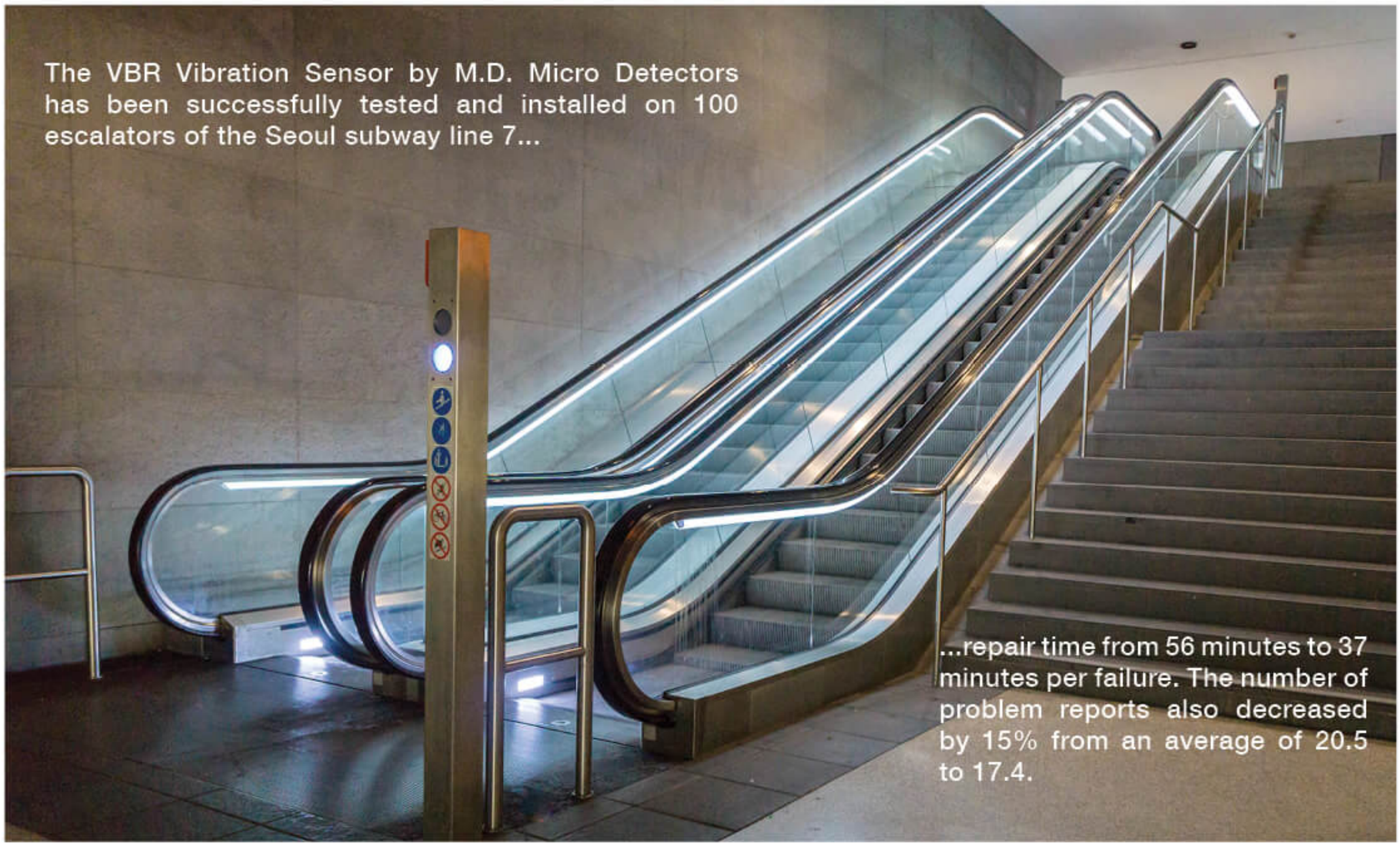
Information collected using IoT technology are used in preventive maintenance. For example, the Seoul metro analyzed the vibration frequency data of the drive part of escalator at the Canton Station of Line 5, avoiding an accident by intervening on the basis of engine.
The IoT escalator technology device and vibration analysis system are applied to escalator equipment by a digital system designed to analyze and maintain the condition of machines.
The company is planning to promote a digital innovation project of the metro by implementing the system to the metro infrastructure, power supply, signal control and information communication area.

IoT technology will be applied to 250 escalators by the end of this year and will be introduced in 1334 vehicles by 2022.

TECHNICAL FEATURES

The main features of VBR sensor are:

- a programmable operating range: ±2g (resolution 15,625 mg), ±4 g (resolution 31,25 mg), ±8 g (resolution 62,5 mg), ±16 g (resolution 125 mg);
- MEMS technology with 3-axis accelerometer and ARM micro controller;
- frequency range: 0...400 Hz (VBR1) and 0...1250 Hz (VBR2);
- the complete programmability of all functions, thresholds, alarms and node addresses (max 128 nodes addressable on a single BUS);



- 1 RS485 output + 1 analog output (programmable tension or current);
- housing and head in stainless steel AISI316L, resistant to shocks, oils and aggressive chemicals;
- the fact that it does not require a specific programming software, but any program that can send characters via serial RS485 is enough.

M.D. provides a demonstration software with each Vibration 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.

	VBR1/D0-3*	VBR2/D0-3*
operating voltage	24 Vdc +/- 20%	
power consumption	< 1 W	
operative range	+/- 16 g (MAX)	
resolution	15,62 mg @ +/- 2 g 31,25 mg @ +/- 4 g 62,50 mg @ +/- 8 g 125 mg @ +/- 16 g	
detection axes	3 (X, Y, Z)	
frequency range	0...400 Hz	0...1.250 Hz
technology	MEMS (Micro Electro-Mechanical Systems)	
digital output	RS-485 (addressable) 57600 Baud rate - 1 bit stop - parity	RS-485 (addressable) 921600 Baud rate - 1 bit stop - parity
resolution digital output	16 bit @ RS-485 (complementary to 2) 12 bit @ analogue output	
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 freeze	
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	

NEW MINIATURIZED INDUCTIVE SENSORS

100% TESTED

WARRANTY 3 YEARS WARRANTY

MADE IN ITALY

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general catalogue ed. 01/2017

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AA series

Ø 3 mm cylindrical miniaturized inductive sensors

- Complete range of cylindrical ultraminiaturized inductive sensors ø 3
- PUR cable
- IP67 protection degree

AB series

M4 cylindrical miniaturized inductive sensors

- Complete range of cylindrical ultraminiaturized inductive sensors M4
- PUR cable
- IP67 protection degree

AC series

Ø 4 mm cylindrical miniaturized inductive sensors

- Smooth stainless steel housing
- Ø4 mm diameter
- Yellow output LED 360° visible
- Available 2 m PVC cable models or M8 connector models
- IP67 protection degree

AD series

M5 cylindrical miniaturized inductive sensors

- Extremely reduced models
- Operating voltage: 10...30 Vdc
- Output current: 100 mA
- LED output indicator
- Totally protected against electrical damages
- Cable and M8 plug output
- Stainless steel housing

AHS series

Ø 6.5 mm cylindrical miniaturized inductive sensors

- Extremely reduced models: Ø 6,5 x 20 mm (cable) / 30 mm (plug)
- Operating voltage: 10...30 Vdc
- Output current: 100 mA
- LED output indicator
- Totally protected against electrical damages
- Cable and M8 plug output
- Stainless steel housing

A WORLD OF SOLUTIONS
A WORLD OF APPLICATIONS

AES series

M8 cylindrical
miniaturized inductive sensors

- Extremely reduced models: M8 x 20 mm (cable) / 30 mm (plug)
- Operating voltage: 10...30 Vdc
- Output current: 100 mA
- LED output indicator
- Totally protected against electrical damages
- Cable and M8 plug output
- Stainless steel housing

IL5 series

5 x 5 mm cubic
miniaturized inductive sensors

- Complete range of cubic inductive sensors
  IL5 series: 5 x 5 x 25 mm
- IP67 protection degree

IL8 / IL9 series

8 x 8 mm cubic
miniaturized inductive sensors

- Complete range of cubic inductive sensors:
  1. IL8 series: 8 x 8 mm with sensing head at the top
  2. IL9 series: 8 x 8 mm with sensing head at the centre
- IP67 protection degree

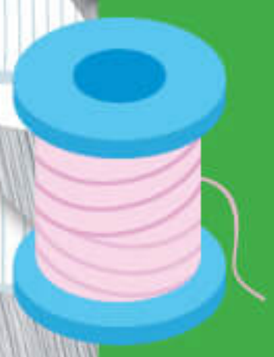
MOULDING

Detection of metal position guides to determine the correct position of mould parts.

ROBOTS

In order to determine the presence of an object between the pliers of a robot, the metal targets are directly detected. Thanks to the small dimensions it is possible to place the sensors inside the pliers directly.

MACHINES FOR SOCKS



It is possible to determine the position of needles, of wire cutters and of spool speed. The miniaturized inductive sensors can detect position of targets as well as the rotation speed of cogwheels .

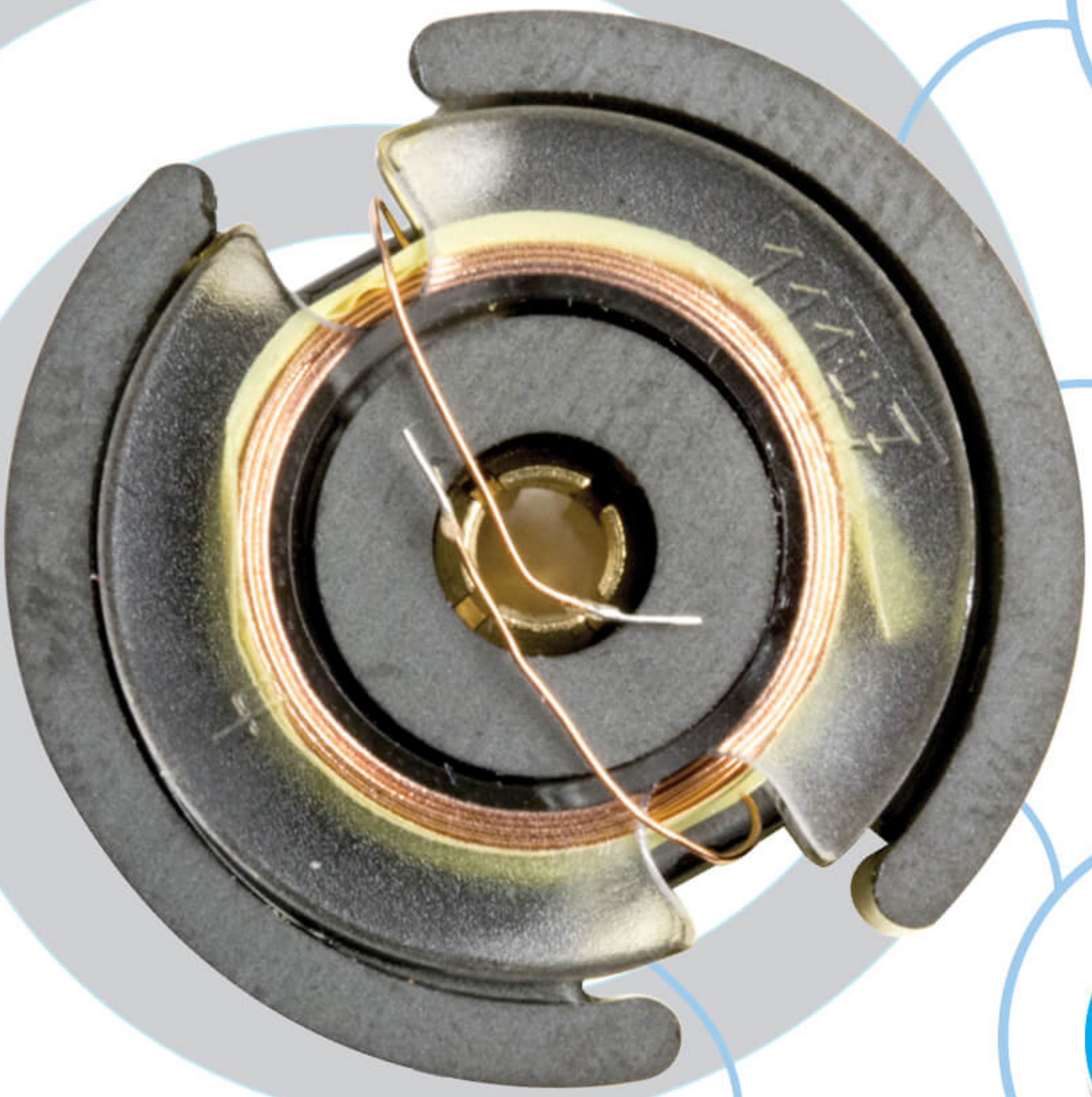
PACKAGING MACHINES

Due to reduced spaces and high speed of processes, highly performing sensors are required. The miniaturized sensors can be easlily installed and their high working frequency can guarantee a correct detection.

WRAPPING MACHINES FOR FOODSTUFFS

To detect position and speed of metal targets, stainless steel miniaturized sensors are nrecessary. Their long working distance allows detection of targets in steel.

YOUR SENSOR, OUR COIL



PLANNING STAGE

CONSULTATION AND TECHNICAL SUPPORT

RAW MATERIAL SEARCH

PRODUCTION

100% TESTED

Micro Detectors

Italian Sensors Technology

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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ROBERTO BOSANI

THIS IS M.D.'S R&D MANAGER

Interview with **Roberto Bosani** - M.D. Micro Detectors S.p.A. R&D Manager

ENG. ROBERTO BOSANI, PRESENT YOURSELF!

I was born in Milan on 7th November 1973. My father, Giuseppe, worked as a craftsman for 50 years. Angela, my mother, has always followed the family business from an administrative point of view, as well as having grown me and my two brothers, Stefano and Maurizio, who are carrying out the work started by my father.
Growing up in a family of workers "on their own" made me immediately perceive work as a fundamental part of our existence. Not simply a means of living, but something that can allow each of us to realize ourselves as people. An instrument that can improve both professionally and personally.
After graduating as an Expert in Telecommunications, I realized that deepening my studies in Electronics and Telecommunications would not be enough for my future. I did not know in detail what I wanted to do "when I was older", but I knew that a partial, though in-deep, vision of the world would not have satisfied all my curiosities. For this reason I decided to follow the degree course in Management Engineering at the Polytechnic Institue in Milan and with hindsight I am very satisfied with the choice made, especially for the open mind that the University has been able to give me.

ENG. ROBERTO BOSANI, DESCRIBE YOUR PROFESSIONAL CAREER TO THE READERS.

Immediately after graduation I started working at a research institute belonging to the National Research Council. After a few months, at the suggestion of the Director of this Institute and together with other colleagues, I opened a small company that offered consulting services to companies that wanted to overlook the world of Industrial Research.
Among my customers I was lucky to have M.D. Micro Detectors, which I therefore met first of all from the outside. This possibility, however, made me immediately understand that it was not a company like any other. For the type of services offered by my company, I immediately met Giacomo Villano - who at that time was the Administration, Finance and Control Manager of M.D. Micro Detectors and other companies of Finmasi Group - and Marcello Masi, owner and President of the group.
In the spring / summer of 2010, following some interviews, I was asked to join M.D. Micro Detectors. After 10 years of self-employment, as a consultant and based in Milan, I was offered a job as an employee in a manufacturing company in Modena. The change of life required was not unconcerned, but I felt that it was the right time for my professional career and above all I felt that M.D. Micro Detectors was the right reality for such a radical change.

WHAT IS YOUR CURRENT ROLE IN M.D. MICRO DETECTORS?

I am M.D. Micro Detectors' Head of Research & Development, that is the area in which new products and customizations are born. The development activities are born from different triggers, internal or external to the company, but have as common line a business strategy defined by the Direction of M.D.
My role is that of managing resources within the R & D area, in order to develop products that are in line with the technical standards required by the market and that show all those characteristics having always distinguished MD products: ease of use, durability and high quality standards. In a company such as M.D., the management role should not however be seen as the classic indirect work, but as active service and support to all resources inside and outside the R & D area. I have to stimulate the designers and technicians, create the boundary conditions so that they can use their high skills and be more effective and efficient in designing new sensors, more ready to solve particular applications through the creation of specific and customized solutions that are one of the points of strength of the new M.D..

DESCRIBE THE ORGANIZATION OF THE RESEARCH AND DEVELOPMENT DEPARTMENT OF M.D. MICRO DETECTORS

Currently in R & D, besides me, there are 23 resources divided as follows:

- Electronic / firmware designers: 13 resources (including 9 Engineering graduates) who deal with the concept, prototyping, development and refinement of all the products developed by M.D. Micro Detectors. One of these resources is responsible for drafting the technical documentation necessary for production area.
- Optical Designer / Technician: 2 resources (including a Ph.D. in Physics and with a Master in Optics) who deal with all the activities related to optical design such as the design of lenses and their consequent optimization, the realization of opto-mechanic prototypes for the evaluation of optical properties, constant monitoring of the photo-element market, optical measurements, etc.
- Mechanical Designers: 5 resources (including 3 Engineering graduates) involved in product design (from prototypes to finished products, including testing phases) and in design, in collaboration with the Industrialization area of equipments needed for production.
- PCB designers: 3 resources that deal with the definition of layouts of PCBs used in M.D. sensors, as well as with management and maintenance of product codes and the relative bills in the

company management system.

Following the revolution that transformed our company from 2011 to 2013, also the organization of the research and development area has undergone profound changes and today the technical resources are organized by product technology. In particular we have:

- Photoelectric Sensors Design Area
- Ultrasonic Sensors Design Area
- Inductive Sensors Design Area
- Area Sensors Design Area
- Applicative/Custom Sensors Design Area
- Product Variants Design Area.

In each of these working groups there are all the skills needed for product development: electronics, mechanics and PCBs. Some resources are shared between various groups, but the company's goal is to have specific skills for each product technology.
A fundamental element for the R&D area is represented by the laboratories, the software supporting the product development process and the equipment in general. The ownership and management of M.D. Micro Detectors have always been a consequence of strategies defined in the three-year roadmap, investing many resources to increase the technological level of our company and to allow the best designers to emerge with new product families with high technical performance and the right positioning in comparison with our main competitors.

What do you like best about the current MD? What do you think are the strengths of your company?

Indeed, there are many positive aspects that I find in our company, but I would say that they can be summarized in the continuous vitality, freedom of action (obviously within the strategic objectives defined at corporate level) and in the non-stop process of continuous improvement at all levels. In M.D. each of us has the opportunity to demonstrate our value and is always faced with new and stimulating professional challenges that we have the honor and burden of having to collect, resolve and make operational, in order to further consolidate our strengths and our excellence. The transition to Lean Manufacturing has in fact brought us efficiency at the production level, speed in responding to customers, punctuality and respect for deliveries to very high standards, speed in creating small product variants, reducing the development time of new product families. Aspects that the market and our customers recognize us, strengths that when our customers come to visit us emphasize with an "impressive" that must make us proud and stimulate us to do more and better.

What do you think are the strengths of M.D.'s products?

When defining the product development roadmap there are many aspects that are considered: the technology on which to invest resources, the type of product family that you want to develop, the main characteristics of new products, their positioning on the market, etc.. Then there are some essential aspects for us that are intrinsically contained in the technical specifications: robustness, quality assured by at least two in-depth tests during the production process, ease of use, ease of assembly and production, the right positioning on the market both technically and economically, and product versatility. These elements must always be our "beacon", because they allow us to have a level of customer service that in the current economic context is not so easy to replicate, high loyalty of end-users, the ability to create simple product variants in a few hours. Moreover, not requiring our customers to order minimum quantities, while at the same time having a production department that produces and ships the highest rotation sensors in a few days, offers our customers the opportunity to reduce the warehouse by delegating to M.D. Micro Detectors the prompt delivery of the sensors.

Can you tell us which direction you're traveling in, as one of the creators of the new M.D.?

The answer is perhaps trivial, but real: towards the future. Sensors are becoming more and more essential elements of today's world, because they are the means by which to detect information that can then be put into circulation and made available to interested persons.
The concept of a stand-alone sensor that carried out the surveys and provided feedback to the machine is gradually replaced by systems that can be adjusted remotely and that allow the collection of data in the field automatically and efficiently.
M.D. has decided for some years now to take up these new challenges and in particular is investing a lot of resources in the introduction of IO-Link technology in the different product families, in order to make its sensors systems with which it is possible to communicate and which can be constantly monitored in order to verify their proper functioning.
However, we must not forget that

there are some markets in which standard sensors are still in great demand and this is why M.D. is also moving to renew its standard product families. Electronics offers more and more advanced, miniaturized and highly competitive solutions that can therefore be used even in simple products, that are often considered as commodities in the industrial automation market, in order to make them more efficient, more accurate and more reliable.

You are considered to be an expert on Lean: what is your opinion on the matter?

Lean Manufacturing for M.D. Micro Detectors has been and still is an opportunity that we have been able to seize, but that we must continue to cultivate with a view to continuous improvement.
In my opinion, the main factor that allowed us to successfully apply the Lean paradigm was the commitment: the ownership and management of the Group have given each of us all the tools to revolutionize the company and have followed same policy continuously for the entire duration of the project, stimulating and supporting the changes that have had a heavy impact on the factory layout but also on the organizational fabric of the company. This was also essential to convince the most sceptical people that the way to Lean Manufacturing was the only possible way to make a change of gear and give M.D. the tools to fight in today's market.
We were also able to bring down the principles of Lean Manufacturing, adapting them to the specific characteristics of M.D. Micro Detectors and to the resources available in the company without applying the principles in a fundamentalist way, with the risk of not being able to reap all the benefits that the new organizational and production model has brought us.
Last but not least, I would like to underline the opportunities for professional growth that the Lean transition project has offered to each of us. Applying the Lean concepts in our industrial reality has certainly brought benefits to our professional growth and for this we must be grateful to those who lead M.D. Micro Detectors.

How do you judge today the situation of the Industrial Automation sector and its future?

According to ANIE data, since 2012 the Italian industry, which supplies automation technologies, has maintained a positive profile in the evolution of total turnover, which has long since recovered and exceeded pre-crisis levels, showing more dynamic trends than those expressed by the manufacturing average.
Now the industrial automation sector must be able to take advantage of Industry 4.0 to take a further step forward and make our companies more intelligent and profitable. M.D. Micro Detectors has been designing and manufacturing sensors with an IO-Link communication system for some time now, i.e. products that will be a fundamental element of this new industrial revolution. Communication makes the sensor not just a simple detector of a given size, but a system capable of interacting with the user by collecting, for example, real-time data on the performance of the machines, offering functions for self-diagnosis and thus facilitating the planning of routine maintenance activities.

What does Roberto Bosani recommend to young people who are approaching the world of work today?

To be hungry for knowledge, to put passion into our work, to never feel "arrived", to always set new and ambitious goals, to always put our duty before our right, not to accept the status quo or phrases like "it has always been done this way", not to be afraid to get involved, not to be afraid to take on our responsibilities. We all make mistakes, but it is the reaction that each of us has to the error made that differentiates us.
They may seem trivial concepts, but putting them into practice continuously, in daily operation, is a challenge that can bring great satisfaction.

Why do you think a young graduate should approach M.D. Micro Detectors?

I think there are two main reasons: the first is the technological sector to which we refer, namely that of sensors and more generally of industrial automation. It is a constantly evolving and growing sector, in which technological advances are continuous (in the fields of electronics, communication and mechanics) and in which the study of the new cannot be ignored. For a young graduate or graduate, it means being constantly faced with new challenges and for me this is an invaluable element.
The second reason is more related to our reality: in M.D. Micro Detectors you have the opportunity to see the development process produced from beginning to end. From the creation of the first prototypes until the products are brought into production thanks to our Industrialization Department. Each designer does not have a limited vision of a single portion of the project, but sees it in its entirety: this is a factor that must fill us with pride and stimulate us to do more and better!

TESTED TO WITHSTAND EXTREME CONDITIONS

NEW !!

FM** series

M5, M8, M12, M18, M30 Inductive sensors with full metal housing

characteristics

- Shock resistance degree: IK05, IK06, IK08, IK10
- Protection degree: IP68/IP69K
- M8, M12 plug exit
- Output logic PNP or NPN
- Output state NO or NO + NC

Micro Detectors

Italian Sensors Technology

CE cULus IP69K

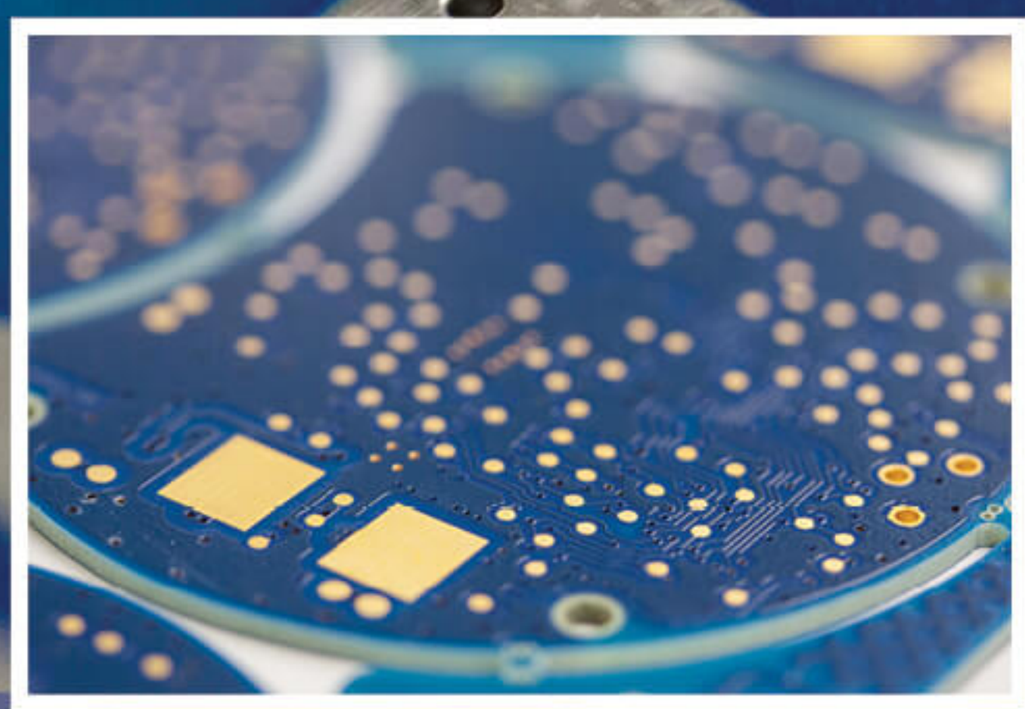
PCB Division supports his customers for any technological and service needs, always granting them excellent quality levels

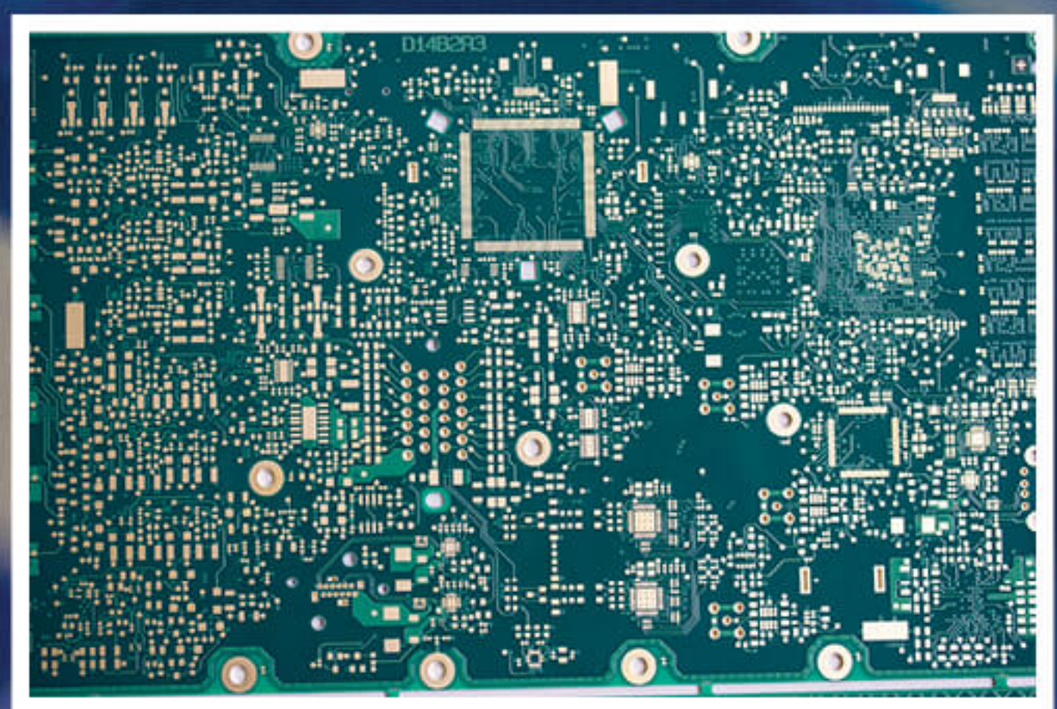
CISTELAIER
PCB leading technology

Techci
Rhône-Alpes

BridgEarth
GLOBAL PCB DISTRIBUTION

YOUR BUSINESS
OUR KNOW - HOW





In order to realize its Vision of being a truly capable player able to offer a "global" service, Finmasi Group' PCB Division, composed of two manufacturing companies - Cistelaier in Italy and Techci in France – and its exclusive sales agency for German market BridgEarth in Munich:

- has a Quality Assurance System qualified in following fields: Industrial (ISO 9001:2015), Aerospace & Defense (EN 9100:2016), Civil Avionics (NADCAP), Medical (ISO 13485:2016), Automotive (IATF 16949:2016) and Rail (IRIS)
- is present in all applicative markets of: Aerospace & Defense, Civil Avionics, Medical, Automotive and Rail; in Industrial Sensors, in Telecommunications, Home Automation Systems, in Energy Management sector, Infotainment and in many others
- is able to produce any types of circuit boards, rigid and flexible-rigid, up to 900 mm length and 5.5 mm thickness, with any type of finishing: ENIG, ENEPIG, chemical tin, HAL with and without lead recast with Tin-Lead alloy, chemical silver, and OSP
- is able to maching 100 different basic materials to guarantee its service to all applicative markets
- has a structure able to give support alla long the product life cycle: from Design for Manufacturing, to Co-Design and to prototype service with fast delivery, up to series volumes manufactured internally or, upon request, at the highest qualified Asian PCB manufacturer sites.

Our capacities are at your service. Test us.

A COMPLETE

RANGE OF AREA SENSORS

INDUSTRY 4.0

CR0 series

Retroreflective Polarized

Area sensors

- Area height controlled 69 mm
- Maximun operative distance up to 4.5 m
- Minimum object detection diam. 6mm
- Two teach-in types: fine and standard
- Optical pitch 10mm
- Protection degree IP67
- Blanking function

100% TESTED

WARRANTY 3 YEARS WARRANTY

MADE IN ITALY

IO-Link CE cULus

	CR0
nominal sensing distance (Sn)	0.2…4.5 m (RL106G - ExG 2)
emission	red (617 nm)
operating voltage	16...30 Vdc
no load supply current	≤ 10%
no load supply current	100 mA
load current	100 mA
leakage current	≤ 100 µA (Vdc max)
output voltage drop	3 V max (100 mA)
adjustment	Teach-in: fine < 3 sec; > 6 sec
output type	PNP; NPN ; Push-pull ; (NO+NC) compl. output (NO+NC)
switching frequency	600 Hz
time delay before available	300 ms
minimum object detection	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	5,000 lux (fluorescent lamp); 50,000 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

NEW FUNCTIONS

- STATIC AND DYNAMIC OPERATING MODE
- DE-ENERGIZING DELAY TO DETECT SMALL AND FAST OBJECTS

PACKAGING

Flow-pack machines work in loop by wrapping and sealing the product with coil film: BX10 area sensor can detect any type of object inside the film.

METAL INDUSTRY

CX0 area sensor can detect objects of small and thin dimensions which are ejected at high speed out, thanks to its crossed beams.

WOOD

On conveyors it is possible to detect wooden panels of any finishing and color by means of CR0 retroreflective area sensors.

PACKAGING

CX0 area sensor can detect very thin magazines or newspapers , thanks to its total crossed beams, even if wrapped inside plastic films.

VENDING MACHINE

M.D. Micro Detectors, which has always been a point of reference for the production and development of multi-beam detection barriers, offers NX series area sensors, specific for the sector of Automatic Distribution. The NX series products, installed at the edges of the vending machine drawer, are able to detect irregular shaped objects, such as snacks, cigarette packs, DVDs, bottles and generally objects with a minimum diameter of 5 mm over a working range up to 2 m. The absence of casing and the radial optics allow the installation of barriers in the typically reduced spaces of the machine. The models with tropicalization treatment, that is equipped with a protective layer deposited on the body of the product, are the ideal solution for those distributors equipped with a refrigerator, as they protect the area sensor from condensation that may form on them due to the opening of the nozzle.

ALTERNATING CURRENT

(DIRECT QUALITY)

NEW !!

PROTECTED AGAINST SHORT CIRCUIT BOTH WITH DIRECT AND ALTERNATING CURRENT

V3 series**
M8, M12, M18, M30 inductive
with AC/DC supply voltage

SHIELDED AND UNSHIELDED MODELS!

characteristics

- Operating voltage: 20…250 Vac / Vdc
- NO/NC output selectable, if DC supplied
- Cable or M12 plug exit
- IP67 protection degree

WARRANTY 3 YEARS

MADE IN ITALY

Micro Detectors

Italian Sensors Technology

EXÉ 1985

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Executive Hotel will close
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It will re-open before
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Micro Detectors

Italian Sensors Technology

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.

+ THAN 26 MILLION, OUR CONSOLIDATED TURNOVER

+ THAN 1.5 MILLION ITEMS MANUFACTURED EVERY YEAR

+ THAN 200 EMPLOYEES

+ THAN 70% OF OUR TURNOVER PRODUCED OUTSIDE ITALY

+ THAN 30% OF OUR TURNOVER MADE UP OF CUSTOM PRODUCTS

+ THAN 70, THE COUNTRIES WHERE WE ARE PRESENT

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FINMASI GROUP