



> Solutions for
Industry 4.0

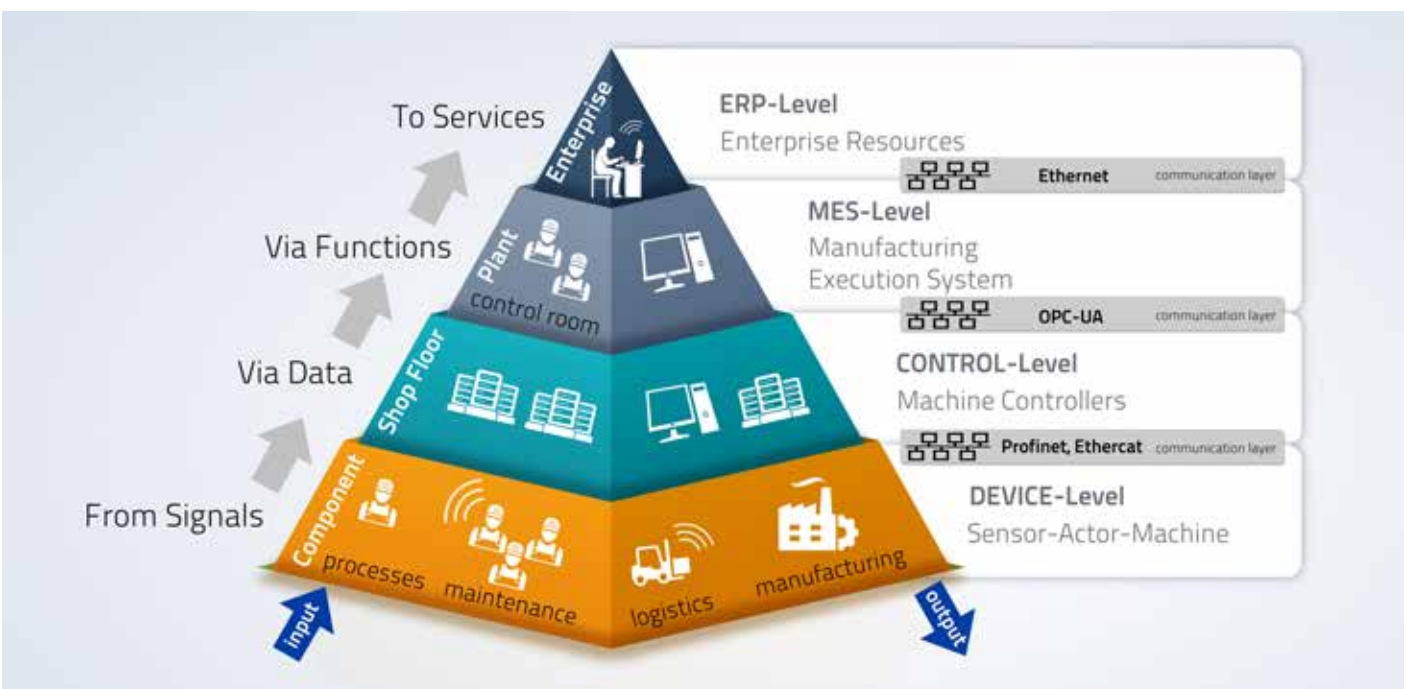


Applying the Internet of Things to industrial production plays a key role within the concept of Industry 4.0. In this concept, a connection is established between machines, products and systems all along the value chain, beyond the individual company. These connected mechanisms, also known as Cyber Physical Systems, will allow for interaction, data analysis to forecast errors, and self-configuration to adjust to change. Collecting and analyzing “big data” will make processes faster, more flexible and efficient.

A crucial role in the creation of “smart factory” for Industry 4.0 will be played by companies that are able to generate data. One of them is Datalogic, located in Italy and a global leader in the production of Bar Code Readers, Mobile Computers, Sensors, Vision and Laser Marking Systems for a wide range of applications in manufacturing, retail, transport and logistics, and healthcare. Established in Bologna in 1972, Datalogic started producing sensors for automated machinery in the Packaging Valley of Emilia. In 1978 it launched the first European bar code readers. That led the company to become a global leader in Automatic Identification (AutoID), with a worldwide presence and substantial market share.



From signals to data, data to functions, functions to services, the Pyramid Model is typical of an integrated technical production process and corporate management system. Datalogic covers the base layer of the pyramid where everything starts. Its technology generates data and brings it to the next level. The company manufactures Sensors, Bar Code Readers, Machine Vision and Laser Marking Systems that are fundamental to generating and capturing data, allowing objects and machines to communicate. These components are integrated at field level and interfaced via an industrial Ethernet system (Profinet, EtherNet/IP, EtherCAT, Modbus TCP, Powerlink, etc). From here the data are processed at the control level (industrial PLC or PC) then at the Manufacturing Execution System, and up to the Enterprise Resource Planning (ERP) level.



TECHNOLOGIES FOR DATA GENERATION...

The technologies used to generate data by Datalogic can be divided into five categories. They depend on the type and function of the product data or production process: marking (Laser Markers), scanning (Bar Code Readers and Vision Systems), writing and reading (Readers and RFID tags), object and physical feature scanning (Photoelectric Sensors, Smart Cameras and Vision Systems).

...AND AUTOMATION ENABLING

Datalogic products also detect and locate parts during the manufacturing process enabling the robot guidance and full automation of process (Sensors, Smart Cameras and Vision Systems). All this process can be safely automatized thanks to solutions for machine safeguarding and robotic cell protection (Safety Barriers and Laser Scanners).

In all these cases the Datalogic components are perfectly integrated within the systems described by Industry 4.0 through interfaces and standard Industrial Ethernet protocols. In accordance with another Industry 4.0 requirement, Datalogic solutions include smart functions for communication, self-configuration, and self diagnostics.



DATA TYPE AND FUNCTION	PRODUCT AND TECHNOLOGY		INTERFACE / PROTOCOL INDUSTRIAL ETHERNET
Product or Production data marking systems	Laser Marker		Ethernet TCP/IP EtherNet IP Profinet
Product or Production data capture	Bar Code Reader Mobile Computers Vision Systems		Ethernet TCP/IP EtherNet IP Profinet
Product or Production data Write and reading	RFID TAG and antennas		Ethernet TCP/IP
Object Detection and Safety solutions	Photoelectric Sensors Vision Sensors Safety Light Curtain Safety Laser Scanner		EtherNet/IP IO-Link to Profinet Powerlink
Physical features detection	Color Sensors Dimensional Sensors Vision Sensors		EtherNet/IP EtherCAT IO-Link to Profinet

Automotive Smart Manufacturing

SENSORS ENABLING INDUSTRY 4.0

Driven by Industry 4.0, Automotive production is aiming to highly flexible workflows, maximum productivity and efficiency.

Sensors and Safety devices in a smart factory, are the key enabler that will help to realize the biggest benefits of this revolution.

Sensors can provide continuous status updates which can then be compared with a "digital twin" – a simulation of the system that runs at 100% efficiency. Through this, deviations can be quickly flagged, and trends can be more easily identified.

Datalogic complete Sensor Portfolio is perfectly fitting this requirement providing state-of-the-art solutions for detection and inspection on automated production line.



AUTOMOTIVE FULL DPM TRACEABILITY

In production and assembly of automotive components, an application of the smart factory is the Laser Marking of 2D Datamatrix bar codes directly onto mechanical parts such as pistons, bearings, gears and other components. Datamatrix codes include all information about the item and production process; there is no need for any additional label or tag.

In this way the mechanical component is able to introduce itself for manufacturing purposes, stating where it comes from, what needs to be done and where it has to go once the process has been completed. These data are read and sent to the machines through an integrated Vision System, a Smart Camera or a 2D Bar code Imager. This information can then be used, also in logistics, to store and even manage spare parts.



MARK&READ COMPLETE SOLUTION

Datalogic presents a full traceability solution for automotive parts.

Datalogic P-Series Smart Cameras locate the position/orientation of a part to drive the Laser Marker accordingly. This guarantees a flexible and effective manufacturing method.

Datalogic Laser Markers (Uniq, Arex) provides an high quality marking solution on every surface.

Datalogic 2D imager Matrix Series will than verify the readability of the bar code, while MX-E machine Vision System are able to detect logos and parts personalization.

All these devices are integrated and connected by main industrial Ethernet Interfaces to communicate data to plant ERP and MES.



ROBOTS AND AUTOMATION SMART MANUFACTURING CYBER PHYSICAL SYSTEM MOBILE DEVICES ROBOTS
AGILE PROCESSES FULL TRACEABILITY INDUSTRY 4.0 FULL TRACEABILITY AU
REAL TIME ANALYTICS HORIZONTAL / VERTICAL SOFTWARE INTEGRATION INDUSTRY 4.0 AGIL

Food & Beverage/Pharma: Full Traceability

FOOD TRACEABILITY FROM PRODUCTION...

In the food industry there are several requirements and types of bar codes. The most widespread, required due to the most recent regulations on food safety, is known as OCR (Optical Character Recognition) marking code, with characters which can be read by the human eye provides information regarding items such as expiry date, batch number and production factory. For this type of application Datalogic recently introduced the new P-Series OCR, an ultra-compact Smart Camera ideal for OCR print inspections on labels for the food industry, and the Advanced OCR solution for very demanding applications with low quality printed codes.

Another food industry code is the traditional bar code, legible exclusively with a bar code reader. These codes are labeled or printed on the product and allow for automation of production processes and logistics in a Smart Factory as well as extending traceability to the final consumer. Datalogic 2D imager Matrix Series enable a full traceability from the manufacturing plant to the warehouse.



...TO CONSUMER

Same code it is used for logistics applications including automated reading at the supermarket checkout. Use is increasingly being made of the QR code (Quick Response Code) which contains more information, also in terms of marketing, and can be read by a smartphone or self-shopping device like the Joya™ Touch multipurpose retail device from Datalogic.



PHARMACEUTICAL INDUSTRY: DATAMATRIX PHARMACODE

The pharmaceutical industry has substantial requirements in terms of product traceability from manufacturing to the point of sale. There are currently different standards depending on the country. European regulations have long since introduced convergence towards a standard based on the Datamatrix 2D code. These codes have pharmaceutical applications covering traceability, serializing (which means a different code for each individual product for anti-forgery inspections), production and logistics. These codes are also used to check the correct matching between medication, instruction leaflet and package; including verification of multiple packing. Datalogic bar code Matrix Series imagers ensure full compliance with standards and regulations, while offering smart functions like liquid lens auto-focus and the ability to automatically scan and decode all different types of codes.



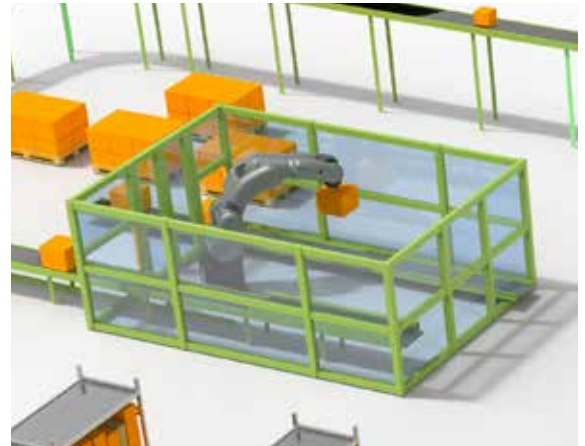
IIOT 4.0: New Intralogistic Solutions

ENABLING FLEXIBLE ROBOTICS IN INTRALOGISTIC

Intralogistics is living the fast adoption of several new technologies to change the efficiency and increase the productivity, from Cloud Computing and Big Data, to Artificial Intelligence and Internet of Things. The new intralogistics robots make use of machine vision and sensors to allow them to do things like work safely alongside humans and move through warehouses in efficient safe patterns.

The new Datalogic Pattern Sorting Tool allows object location ensuring robot guidance for automatic palletizing or de-palletizing.

In the receiving area, manually-operated trucks or forklifts and AGVs deliver pallets to a depalletizing station for unloading. A SLS Safety Laser Sentinel and SG4 BASE Safety Light Curtain provide area guarding as cartons are removed and placed onto conveyors.



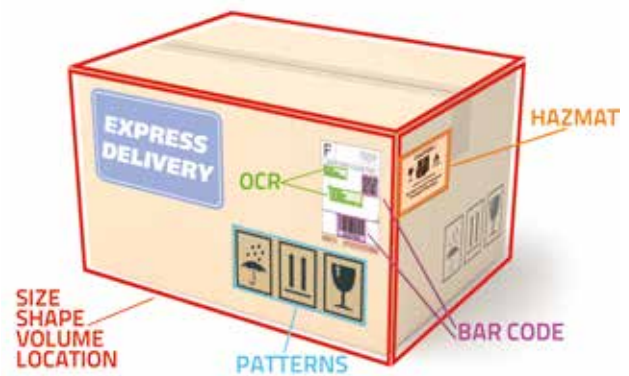
UNIQUE TRACEABILITY

Datalogic enables a unique traceability beyond simple identification (bar code reading). Objects and packages can be identified through bar codes and 2D codes by Matrix Series imager.

This information can be enriched adding special info or symbol (Fragile, This side up, weight, etc.) on every surface or even under plastic films. Datalogic Machine Vision solutions (P-Series and MX-E) enables Character reading (OCR) or not standard OCR in every conditions.

Automatic recognition of HAZMAT (Hazardous Material) is required for potential dangerous material handling. This increase the operator security and avoids transportation penalty clauses.

Size, shape and volume location complete the unique set of information to be used for efficient material handling.



AUTOMATIC RADIO-FREQUENCY IDENTIFICATION

The bar code is still the most flexible and economical solution for component level auto identification because of its low cost. RFID technology needs a tag on each item and tags are costly than the ink to print a bar code. Datalogic sees radiofrequency identification not an alternative, but rather a complementary technology to the bar code that is preferably used in specific situations. RFID can be used where dirt or dust could prevent optical reading, where temperatures are very high, when data is to be overwritten and updated in process, when codes which are not visible (for example inside the item) must be read, or in conjunction with a bar code for safety checks. RFID technology with the availability of inexpensive tags for finished products allows for product traceability to the point of sale, and the possibility of helping operators manage warehouse, stock, sale and anti-shoplifting systems.



Safety Technology to improve Flexibility

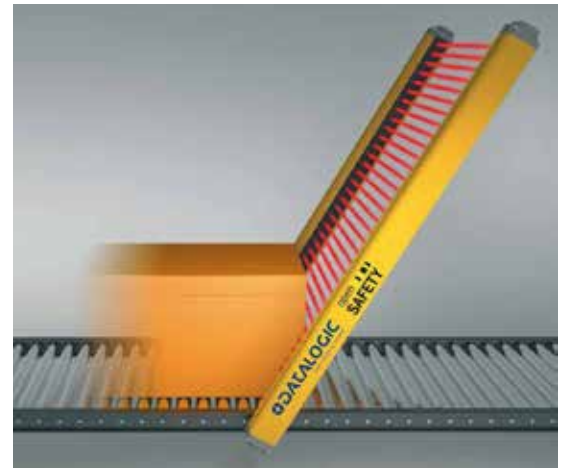
ADVANCED SAFETY

The new concept for robot evolution expects to replace the contest from isolated robotic cells to robot like part of Industrial Automation architecture following demanding safety regulations. The Datalogic's safety product line up expands towards more safe sophisticated devices, introducing the new Laser Sentinel, as the most complete solution for safe area monitoring. The range includes safety industrial solutions based on light curtains, safety control unit and photocells.



INCREASED SAFETY WITH FEWER COMPONENTS

The introduction of smart sensors, apart from providing additional information, also allows for cost reduction in terms of components and installation times. Datalogic has developed a new safety barrier SG4 Fieldbus, using an openSAFETY protocol for connection to the Powerlink network which also includes a smart version of the muting function. This function helps to block the safety barrier while the product is going through, allowing access by an operator. It is also possible to control the direction, speed and height of the products handled. These new barriers are therefore smart sensors which, apart from their basic accident prevention function, allow for connection within an industrial Ethernet network to send data about the product and process, eliminating components which are not integrated within the network and the associated cabling.



AGV CONTOUR NAVIGATION IN SHIPPING/RECEIVING

In loading and unloading areas, Safety Laser Sentinels are used to ensure safe movement of goods. The SLS Safety Laser Sentinel is used for collision prevention at the front and back of the AGV. Thanks also to its resident position and distance info, SLS can be used for vehicle guidance.

ROBOT CELL ACCESS PROTECTION

The 2 sides access of robot cell can be protected by a SLS Safety Laser Sentinel. Each access is controlled by 1 Laser Sentinel programmed with 2 different zone sets that can be separately activated by selection inputs accordingly with working station position or can be left contemporaneously active. In this kind of applications, as in horizontal ones, the possibility to have two safety areas active in the same time or even separately will allow to protect two independent areas with just one device.





www.datalogic.com



Rev. 00, 11/2017