

Automatic Mark & Read Solution

for Crank Housings

Improved quality control and product traceability. That was the goal of a leading German die casting company who approached Telesis late last year.

The need to satisfy end user requirements and together with achieving internal quality improvements had convinced our customer that a mark & read solution was the most effective method they could use to achieve the targets that they had set themselves. As the system had to operate within an existing foundry environment, the company approached Telesis as they were aware of Telesis's ability to install turn-key equipment which was reliable, low maintenance and robust.

Working closely with our customer, Telesis engineers developed a mark and read solution based on the 2D Data Matrix™ code. The product in question, a die cast crank housing would be permanently dot marked with a alphanumeric serial code and a machine readable 2D code. This marking operation would be carried out at the initial production stage, just after removal from the



TMP1700 Marking System in Position

die casting machines. The code would then be read by 12 quality control work-stations, positioned throughout the foundry. The 2D code would be read by a specialized camera system and the code information transmitted to a central database. The software system would then log the code information against time and date stamps, thus building up into a full production history for each part.

The use concept of the 2D Data Matrix code provides the most reliable and cost-effective solution in automated tracking and tracing of parts. The concept of Data Matrix proved to be crucial for this application. With the 2D Data Matrix code, Telesis was able to mark a 12 x 12 mm machine-readable code that contained 16 characters. In addition, this code needs only very little contrast, resulting in savings on the reading equipment and improved reliability on the reading side.

An additional alphanumeric code was marked as well for operator use.

The installed solution included the following:

- Provide a special marking system able to permanently mark on hot aluminium castings (350 Degrees Celsius);
- Provide a marking system able to mark both alphanumeric and 2D Data Matrix™ codes;

- Completely integrate the marking system into the customer's PC environment through RS232;
- Provide enough marking depth in the castings for the mark to remain visible throughout the production process;
- Provide a robust and reliable reading system able to seamlessly function within a rough working environment;
- Provide 12 camera systems to be installed at 12 inspection points throughout the foundry;
- Provide complete Project Management, Machine Building, Installation and Service;



Alphanumeric and 2D Data Matrix™ Code

The concept of 2D Data Matrix™ in combination with the Telesis marking and reading systems, enabled the customer to further optimize its Quality Assurance Process and to comply with its end users requirements for a production history of its crank housings castings.

MarkIT

TELESIS NEWSLETTER 02 2002

INTRODUCTION

Telesis is the worldwide leader in programmable, permanent marking and reading solutions. Every quarter we publish our Newsletter "MarkIT" that updates you with the latest industry trends and details recently completed projects in the field of permanent identification and traceability. This issue is dedicated to the developments in mark & read applications, an area in which Telesis has been successfully providing advanced solutions for more than 10 years.

Trends in Direct Permanent Part Marking: Automotive & Aerospace Industries Lead the Way

The use of ERP, MRP and quality assurance systems is now widespread throughout manufacturing supply chains. These management systems enable companies to increase efficiency, reduce costs and boost quality. The key to successful operation of such systems is product identification and traceability. Not only at the manufacturing stage but also throughout a products life cycle. Part recognition and traceability is seen as vitally important within the automotive and aerospace industries. To further optimize the Quality Assurance standards within their production and assembly processes, both industry groups constantly research ways to further

improve the traceability of their products throughout their complete supply chains. Both industries work closely together to find technologies that can accommodate these needs. The Automotive Industry Action Group (AIAG) and the Air Transport Association (ATA) have developed dedicated teams whose function is to develop workable standards for Direct Part Marking (DPM). The benefits to these industries and their 1st Tier suppliers can be measured in terms of:

- Improved Component Traceability;
- Better Quality Control;
- Seamless Inventory Control;
- Automated Manufacturing;
- Reduction in Counterfeiting;
- Reduction of Cost;

The ATA SPEC2000 set new standards for Direct Part Marking, based on a new generation of permanent bar coding. The automotive Direct Part Marking Group of the AIAG is also using these specifications. Both organizations standards of Direct Part Marking are based on machine-readable 2D Data Matrix and Quick Response (QR) codes.



QR Code



2D Code

These marking codes are seen as the future solution in permanent identification and traceability. A number of key automotive and aerospace manufacturers, such as Pratt & Whitney and Volkswagen have already implemented these technologies with impressive results. This success has lead supply chain OEMs to be required to supply their parts with these types of DPM codes as early as 2003.

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IDENTIFIABLY DIFFERENT

Perfect Traceability in a Challenging Environment

Turn-key Mark & Read Solution for Cam Shafts

> (Continued from page 1)

Throughout the early stages, Telesis has been heavily involved in developing the technologies needed to implement the new standards of DPM. Our vast experience in permanent identification & traceability has resulted in Telesis being a preferred supplier of 2D mark & read solutions.

What follows are two recent 2D mark & read applications, where Telesis successfully implemented turn-key solutions, ultimately resulting in improved quality assurance and reduction of cost. We are also pleased to introduce our new TMC090 controller, offering advanced programming capabilities. ■

Show Calendar 2002

IMTS

Chicago, USA, Mc. Cormick North, B-6269
6 September - 13 September 2002

AMB

Stuttgart, Germany, Hall 3, no. 3.0.250
10 September - 14 September 2002

STP

Brussels, Belgium, Hall 3 no. 3661
17 September - 21 September 2002

Aluminium 2002

Essen, Germany, Hall 2, no. 2E02
18 September - 20 September 2002

TATEF

Istanbul, Turkey, Hall 7, no. A705
25 September - 29 September 2002

Elmia Subcontracting

Jonköping, Sweden, D02:71
12 November - 15 November 2002

Advanced user control... with the TMC090

Designed to meet the exacting industrial standards demanded by industrial sectors such as aerospace and medical. The TMC090 controller has been developed to provide the user with advanced programming control and graphical marking design. The unit will be of particular interest to users who wish to mark numerous different components each with a unique marking pattern or users who need to mark complex graphical information such as logos onto components.

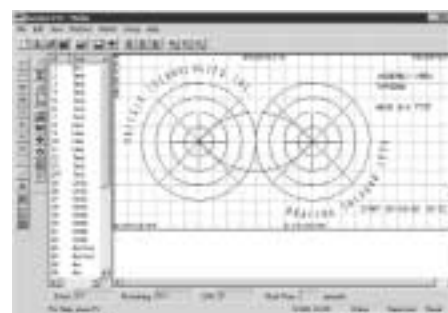
Linking to a Windows PC via USB ports, the TMC090 controller enables operator control of Telesis's TMP6100 & TMP1700 marking heads. The user's interface is via our Merlin software program, a 32-bit windows program,

which allows full WYSIWYG graphical design capabilities. The software will import graphical files in DXF and Bitmap formats thus speeding up the design process. The Merlin software also allows the user to precisely control the x-y coordinates and set up of the marking heads, thus producing perfectly reproducible marks with the minimum of design time.

The TMC090 USB connectivity gives the unit a unique capability in controlling integrated marking systems. It is an ideal solution for controlling large customised marking installations involving multiple marking units. Telesis's software designers are able to use the TMC090 to design and project manage solutions ranging from minor adjustments in

the standard programming software to complete customised factory-wide solutions.

The TMC090 designed to make the marking of difficult applications easy. Identifiably different solutions from Telesis, the Global leaders in marking technology.



In 2001, Europe's largest car manufacturer approached Telesis with the request to find a solution to internally track & trace the production process of its cam shafts manufactured in its plant in Krakow, Poland.

The ultimate goal was to optimize its quality assurance, by reducing scrap parts and optimize its inventory (including work in process) levels throughout its plant. Further, our client wanted to verify which point of processing could be optimized in its plant. The requested tracking & tracing solution was not supposed to cause any delays in the high-volume production process and our client required a traceability level of 99.5%.

Challenges Involved

One of the main challenges involved in this application was the constraint of marking space. The production line consists of a conveyor line with pallets. These pallets are dedicated to hold two horizontally mounted cam shafts. This meant that Telesis could only mark the ring space of the cam shafts, which had a width of only 4 mm. Upon each ring space of a cam shaft, our client wanted to mark a code of 16 characters.

The space constraint resulted in a second challenge: How to correctly position each cam shaft in front of the marking station in order to achieve a high quality mark.

The third challenge was the speed requirement. In order to maintain the required production levels, Telesis had to correctly mark each pallet, holding two cam shafts in less than one minute.

Solution

Based upon the requirements as set forth by our client, Telesis decided to use its TMP3100 marking system.

This system has a marking window large enough to mark both cam shafts with an alphanumeric and 2D Data Matrix code in 50 seconds.



TMP3100 with mounted camera

To solve the readability of the mark, Telesis combined the requested alphanumeric text with a 2D Data Matrix code containing 16 characters. Due to its low contrast requirement, this robust code could be used to trace all cam shafts throughout the entire production process with the requested reliability. Due to the space constraints, this Data Matrix code was as small as 3 mm x 3 mm.

To correctly position the marking system in front of each cam shaft, Telesis applied a camera, fixed to the cartridge of the marking system. This camera was used to find the center of each cam shaft. As soon as the center was known, we were able to correctly position the marking system to start the marking process.

Immediately after the marking system, Telesis installed a powerful Reading system, able to read the 3 mm x 3 mm Data Matrix code.

Throughout the production process, Telesis installed a total of 20 reading & verification stations at various quality check points. The complete mark & read system was connected to the data base information system of our client for online traceability.

Final Result



Final Mark Result

The solution as installed by Telesis proved to be highly successful for our client.

- Total marking cycle time of 50 seconds (requirement was 60 seconds);
- Reading Reliability of 99.9% (99.5% was required);
- Complete traceability of cam shafts throughout the entire production process.

The concept of Data Matrix in combination with the Telesis marking and reading systems, enabled the customer to trace the bottlenecks within its production process and optimize these were needed. This has already resulted in substantial cost savings.