

We pioneer motion

Data matrix code at Schaeffler

Marking technology for digitalization



Data matrix code on rolling bearings



The data matrix code (DMC) has been used on Schaeffler products for some time and can be found on all product packaging. Some rolling bearing products also receive a direct DMC marking in the form of a laser engraving. The relevance of this marking technology has steadily increased during the past few years and new applications are being added all the time.

In this article, you can learn more about DMC technology and how you can make use of it.

What is the data matrix code?

A data matrix code (DMC) is a frequently used and well-known marking technology. The DMC is produced using a machine and can only be read without errors using end devices, which can read and interpret the DMC. The marking is usually printed or lasered directly on the component.

Another well-known marking technology is the quick response code (QR). The DMC mainly differs from the QR code through its dimensions. The QR code contains more characters and is therefore larger, but can also contain more information, such as the link to a website.

The main purpose of the DMC is to serialize a product in a unique and traceable manner. However, other applications are also possible and are explained in more detail later in this article.

The codes generated at Schaeffler follow the GS1 standard are described in S103020-2 and S120070-2. Furthermore, Schaeffler DMCs also conform with ECC200.

ECC200

This standard describes the data matrix symbols, which were generated using the latest error correction method. The predecessors were, for example, ECC 000,050, 080, etc.

GS1 data matrix (ECC200)

The GS1 or EAN data matrix code is a code with a GS1 identifier in the data structure.

These are sometimes **block 01 as the global trade item number (GTIN or EAN)** and **block 21 as the individual serial number of the product**.

These two form the sGTIN and more details about this can be found in Schaeffler standard S 103020-2.

How can a DMC be read?

There are several ways to read a DMC manually or automatically. Put simply, a DMC is an image, which can be read and interpreted according to a defined standard by a machine. This always requires a device that has an optical reader. This is usually a camera. Ultimately, scanners should also be understood as cameras, whose technical design differs from that of a smartphone camera, but the way they work is identical.

Mobile end devices

Thanks to the GS1-ECC200 standard for describing a DMC, DMCs can also be read with standard end devices such as smartphones and tablets based on Android and IOS without additional hardware or software. The installation of third-party software is not necessary. Only a modern camera with the highest possible resolution is required on the end device.

DMCs can also be read by means of installed third-party software in the form of apps. This applies to a wide range of scan applications as well as to OriginCheck. The OneIdentity+ app deserves a special mention here. It has a very high-performance algorithm for cameras in mobile end devices and thus enables problem-free scanning of especially small DMCs even in difficult lighting conditions.

Stationary or mobile scanners

Another option is the use of stationary or mobile scanners, which are hardwired with a computer as an input device. These have significantly higher performance and due to their resolution and sampling rate, they can also cope with difficult lighting conditions, such as a small DMC that is marked directly on the inner or outer ring of a bearing.

Scanners can be used as additional hardware and this is the most effective but also the most costly solution. The scanner model required depends on the application, process, and level of automation. Modern high-performance models are able to capture several dozen DMCs and feed them back to the process control system in fractions of a second. If you have any questions, Schaeffler's experts will be happy to advise you.



Why do we mark products with a DMC?

There are various reasons for marking a Schaeffler product with a DMC and making it uniquely identifiable. These are, in particular, counterfeit protection and traceability but also track and trace functionalities and the provision of data. This is not just of benefit to Schaeffler, the end customer can also use these advantages.

What benefits does the DMC have for the end customer and for Schaeffler?

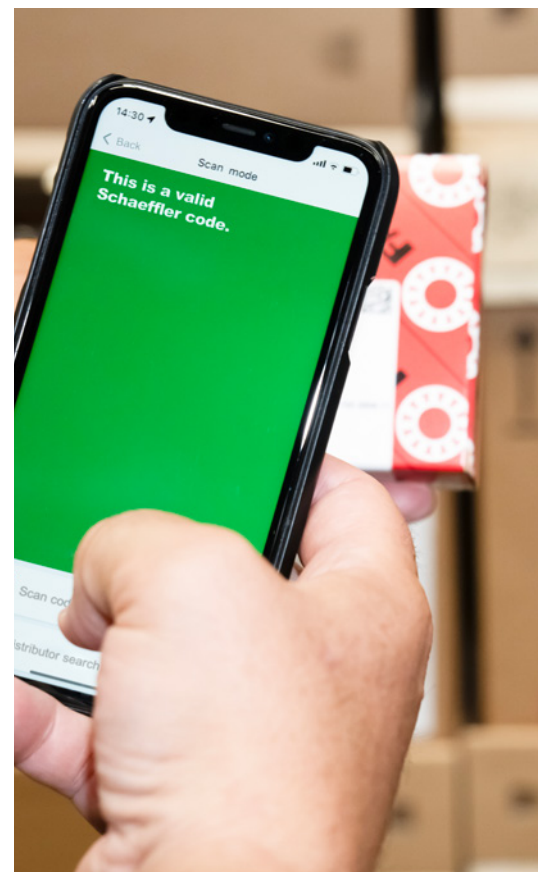
The major advantage offered by the serialization of products is the clarity in the customer's goods received process. The DMC on the product packaging as well as the DMC on the product itself ensure clarity for the customer in the area of inbound logistics, warehousing, and other downstream processes such as assembly. The DMC and its internal structure mean that each marked product is globally unique and unmistakable during handling. This allows, for example, warehouse inventory management based on serial numbers or the linking of a DMC on a bearing product with a shaft or axle and a housing. This means that traceability can be established in more complex systems. A connection to process control systems and a direct data connection to a machine are also possible.

Traceability at individual part level also results in further benefits in the flow of goods and the logistics between Schaeffler and its customers.

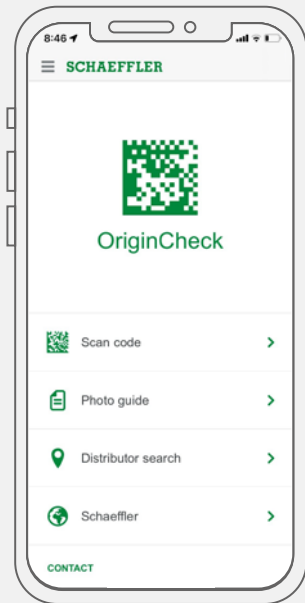
The DMCs on the packaging can be captured and linked with the handling unit or load carrier during the pick and pack process in Outbound Logistics at Schaeffler. Schaeffler therefore offers its end customers traceability from outbound logistics to individual part level. Schaeffler can also notify the customer of the handling units contained in the order and the linked serial numbers in the DMCs when the goods are shipped.

Bearing Data Service – Data provision

The DMC on the product packaging and the bearing product also allow additional functionalities. The Bearing Data Service is the primary example that should be mentioned here. In addition to the previously mentioned options for traceability and goods handling, individual measurement data for the respective bearing product can also be retrieved from Production in some cases. Initial onboarding and a customer-specific account are required for this purpose. The measurement data can then be accessed via an interface with the aid of the DMC. This allows the customer to adapt or provide the adjacent parts required for assembly at an early stage.



DMC applications at a glance

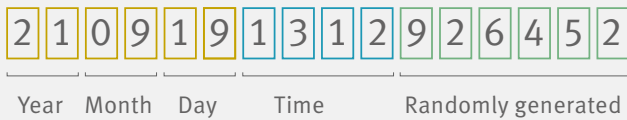


Protection against counterfeiting

Both the DMC marked directly on the product itself and the label on the product packaging allow a reliable check of whether a product is an original Schaeffler product. With the aid of the Schaeffler OriginCheck App customers can check the authenticity of a DMC or a product.

This check is only made possible by a complex IT infrastructure in the background. Every lasered and every printed DMC is individual and may only be applied once. Only in this way can we ensure that every product is identified as an original Schaeffler product.

Block 21



Traceability

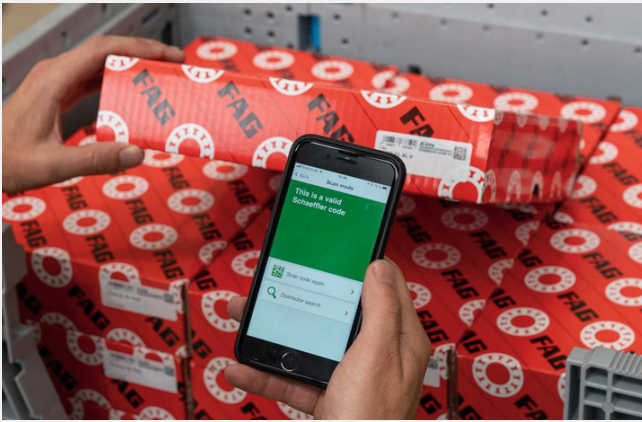
A marked product can be traced thanks to the unique serialization via DMC. The serial number in block 21 contains a time stamp in the form of the day and the time of serialization. The link to further internal information in the previously mentioned infrastructure allows the code to be traced back to the place where it was created, i.e. to plant level.



Logistics and Transport

By capturing the DMC on the product packaging, it can be linked to serialized handling units such as pallets and cartons in Outbound Logistics.

This allows track-and-trace functionality at individual part level or the smallest saleable unit. It includes both individual bearings in product packaging and low-value goods such as steel bushes, which comprise 50 in the smallest saleable unit.



Provision of data

The DMC can be used as an identifier to retrieve and integrate measurement data via an interface, taking into account measurement data capture and linking in the production environment.

Both the DMC marked directly on the product itself and the label on the product packaging can be used for this purpose. Linking both codes ensures that the user can access the same information in both ways, even if the packaging has already been disposed of.



Remanufacturing

By means of the DMC, Schaeffler, operators, and employees in Remanufacturing can capture all the relevant data and exchange these with one another without errors thanks to the standardized format. With just one scan of the code, all parties have full visibility of the order status and information from the remanufacturing process and on the product life cycle of each individual bearing. In this way, your documentation does not become a burden but the starting point for your digitalized maintenance with minimum maintenance times for applications.



Warehousing

Thanks to the unique serial number, the DMC supports the development and implementation of a warehouse inventory management based on serial numbers. It enables serial number-based monitoring of inventories, the integration of movement data from outbound logistics at Schaeffler, and the preparation of follow-up processes such as assembly and pairing by means of unique serial numbers.



Mounting of bearings

The Bearing Data Service enables the DMC to be read from rolling bearings or bearing packaging. With the DMC, Schaeffler customers can call up bearing-specific measurement data, for example, for super precision bearings directly via the Interface and save them for the purposes of documentation or optimize the pairing process with them.



Technical support

The mobile applications that support the DMC enable direct access to current product information in the Schaeffler Media Library with only one scan. There you will find, for example, the necessary mounting instructions and details on the recommended amounts of grease or grease distribution runs.



Purchasing of product

The GTIN or the EAN is contained in block 01 of the DMC. The customer can navigate within the medias platform with this established product type identification number. This makes it possible to find the required product within a very short time and to receive possible product recommendations for even better bearing selection.



The future of the DMC

The GS1-DMC is established and recognized as a technology element for serialization at Schaeffler and beyond. An increasing number of customers are now adopting this standard. The DMC is an essential enabler in our transformation into a digital company and therefore we would like to increasingly implement it in our own processes and products and expand the range of possible applications for our customers.

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