

JWN 489 489

Technical Delivery Conditions for Component Marking

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1 Scope

This Jenbacher Company standard (JWN) applies to the following Jenbacher Engines

- Type 2 engines
- Type 3 engines
- Type 4 engines
- Type 6 engines
- Type 9 engines

2 Purpose

This standard is an integral part of external orders and internal factory orders, and is also to be used throughout the production process.

Component marking allows a component to be identified and traced throughout its life cycle (delivery of goods, storage, production, assembly, shipping, spare parts, return delivery, claims processing).

These rules are also designed to ensure compliance with minimum statutory requirements (e.g. product liability, warranty and guarantee) in relation to component identification and traceability.

3 Information given on design drawings

The position of the marking on drawing components is suggested on the design drawing. The following is noted on the drawing: **marking in accordance with JWN 489 489**

4 Applying the marking

The marking must be legible under operating conditions throughout the service life of the component.

The operation of the component must not be adversely affected by the marking (type, position, method, etc.), e.g. the marking must not weaken or distort it, or be applied to surfaces subjected to wear during normal operation.

The location or the surface for the marking should be even, and preferably a machined surface.

The type of marking (acid stamp, embossing stamp, electronic writer, laser marker, etc.) depends on the equipment available and is determined, among other things, in accordance with the economic considerations of the production planning department.

The **size** (letter size, word-wrap, font) depends on the component size and marking type and is laid down by the production planning department and or defined by standard specifications (Data Matrix Code) for the marking method.

5 Marking data

The stated marking data are minimum requirements. Depending on the component (crankshaft, piston, etc.), more extensive or different markings may be specified on the drawing or in the quality plan, or planned by the supplier. e.g. unmachined part numbers, various verification stamps, etc.

5.1 Components produced in-house

Manufacturer code (optional, if required)

Factory order number

Consecutive number - based on batch size (optional as required)

Batch number (optional, if necessary)

Component number, including revision index, 2-digit

responsible ⇒ INNIO Jenbacher GmbH & Co OG

5.2 Outsourced items

- Manufacturer's code (will be given by INNIO Jenbacher GmbH & Co OG)
- Serial number
- Batch number (may include production date)
- Part number, including revision index (INNIO Jenbacher GmbH & Co OG part number)
- Production date CWY

CA Calendar week:

J Year code (**S**=2019, **T**=2020, **U**=2021...etc.)

responsible ⇒ **supplier**

Any additional inscriptions / markings / manufacturer logos require consent by INNIO Jenbacher GmbH & Co OG

6 Marking Using Data Matrix Code (DMC):

A data matrix code is a 2-dimensional software-generated barcode applied directly to a component or substrate with special marker equipment (see Section ⇒ Marking procedure, size and scaling).

The DMC must be applied to listed parts (see Section ⇒ Marking data) by the manufacturer/supplier in addition to the marking (see Section ⇒ List of parts to be marked using Data Matrix Code), and enables error-free digital data capture and processing.

The contents of the code describe all the elements required for marking, identifying and tracing components. DMC is used for applying permanent direct part marks (DPM) to component surfaces with or without a substrate.

6.1 Standardisation

Data Matrix Code ECC200 - Direct Part Mark Identification (DPMI) - 2D Barcode

The ECC200 comprises 24 square and 6 rectangular formats. Depending on the coding required (see section ⇒ Encoding) and component geometry (flat or curved surfaces where the code is to be applied), the format used can be either square (for flat surfaces) or rectangular (for curved surfaces). The format used will be the one that results in the best and quickest reading results.

The Table here explains the connection between the data to be coded (numbers, characters or quantity of bytes) and the resulting dot matrix (lines × columns). The Table here explains the connection between the data to be coded (numbers, characters or quantity of bytes) and the resulting dot matrix (lines × columns).

If a 39-character sequence has to be encoded in a DMC (with letters, numbers and possibly special characters), the result could be for example a 22 × 22 or 24 × 24 dot matrix, depending on the quantity of bytes to be encoded (see ISO 16022, Section 5.1, Table 1).

Data Matrix ECC200, Square Formats

Rows x columns	Maximum coded		
	Numbers	Character	Bytes
18 x 18	36	25	16
20 x 20	44	31	20
22 x 22	60	43	28
24 x 24	72	52	34
26 x 26	88	64	42
32 x 32	124	91	60
36 x 36	172	127	84

Data Matrix ECC200, Rectangular Formats

Rows x columns	Maximum coded		
	Numbers	Character	Bytes
08 x 32	20	13	8
12 x 26	32	22	14
12 x 36	44	31	20
16 x 36	64	46	30

ISO/IEC 16022:2000	Barcode symbology specification (including laser coders) – data matrix
ISO/IEC 24720:2006	Barcode symbology specification (including dot peening stylus) – data matrix
ISO/IEC 15415	Barcode print quality test specification – 2D codes
AIM DPM-1-2006	Direct Part Mark (DPM) - Quality Guideline
SAE 9132	Data Matrix quality requirements for direct marking

6.2 Encoding

Version: Up to 40-character sequence consisting of up to 6 elements

1. Manufacturer's code/supplier ID //

The manufacturer's code will be given by INNIO Jenbacher GmbH & Co OG. Please ask the responsible Supplier Quality Engineer (SQE) for your individual code.

2. Serial number

A serial number (abbreviated to S/N) is a unique, generally consecutive number used as an identifier for an individual component of a series.

INNIO Jenbacher GmbH & Co OG

- Factory order number (JOB-nr.)

The factory order number is issued by the ERP system at INNIO Jenbacher GmbH & Co OG.

- Consecutive number

The consecutive number describes the product just manufactured from the total batch size specified in the ERP system (single part numbering)

External suppliers

- Manufacturer's serial number:

If the serial number requires more than 12 characters, the fields reserved for the consecutive number can be used.

- Consecutive number (additional identifier)

The additional identifier can contain any given additional information. Common is a consecutive number that describes the product manufactured in relation to the total batch size (single part numbering).

3. Manufacturer's batch ID

A batch number or lot (abbreviated to S/N) is a unique, generally consecutive, number used as an identifier for a series. A batch number describes e.g. the entirety of a production batch, casting batch, casting date or raw material batch.

4. Part number - INNIO Jenbacher GmbH & Co OG

The INNIO Jenbacher GmbH & Co OG E part number is a 6-, 7 or 8-digit number that describes the design and characteristics of a component, such as the nature, type, version, etc. It is quoted on every purchase order (PO).



If the part number is 6- or 7-digits, one or two blank spaces must be added to the standard code.

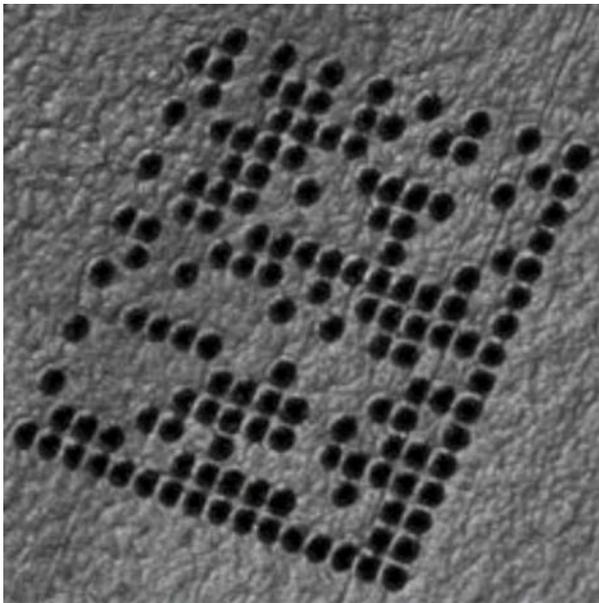
5. Revision index of drawing - INNIO Jenbacher GmbH & Co OG

Use two dashes ("- -") for the drawing revision status for 6, 7 or 8-digit part numbers (see example). Only use the revision status "- -" if no DrwRev has been carried out. "-A" after the first change to the revision status, "AA" after the 27th change to the revision status. etc.

Identification code INNIO Jenbacher GmbH & Co OG

1. **Manufacturer's identification** (6-digit, running from characters 1 to 6)
2. **Serial number** (16-digit, (division 12 + 4) running from characters 7 to 22)
3. **Batch number** (8-digit, running from characters 23 to 30)
4. **Part number** (8-digit, running from characters 31 to 38)
5. **Revision index** (2-digit, running from characters 39 to 40)

Application examples



Direct data matrix markings on castings



Examples of poorly legible codes



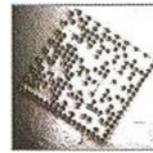
Poor focus



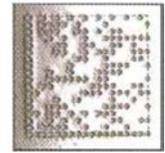
Washed out



Low contrast



Unfavourable
 surface shape



Poor background

6.3 Marking procedure, size and scaling

Methods and systems

Dot peening (electromagnetic, pneumatic), laser, etching, electrolytic etching, printing, or other non-destructive permanent marking methods.

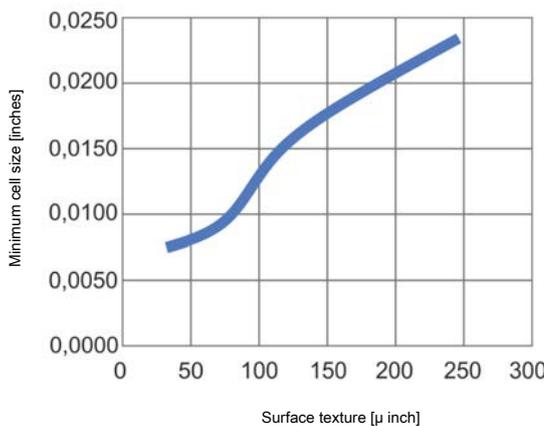
With portable as opposed to stationary marking systems, care must be taken to ensure that the marker is firmly secured in a jig or stand to prevent wobbling.

Portable or stationary dot peening systems by BORRIES, TECHNIFOR, GRAVOGRAPH, RETEC-AUTOMARK or similar are frequently used.

Size

The final size of the matrix depends on the resolution (size of the module) of the marking system used and is generally determined by the quantity of data being encoded and the roughness of the surface to which the code is to be applied.

Recommended cell size for specific surface qualities



Guidelines:

- Module width > 10 times the dot size
- "Penetration depth" > 10 times the surface roughness
- Quiet zone > twice the module width

Scaling and area

The DMC is made up of modules (dots) of the same size. This property makes the DMC scalable. As the smallest unit, the module can be big or small, round or square, or it can be a depression, elevation, hole or rivet. It can even be a round drop, a depression made by a stylus, or a laser-etched dot.



The area of the DMC should be not smaller than 1 cm² (10 × 10 mm) and not bigger than 4 cm² (20 × 20 mm). In exceptional cases, a one-off ruling can be made after consulting the responsible designer and SQE.

6.4 Implementation

The reproduction quality of the data matrix code must always be confirmed with the first sample. Suppliers will be given a request (order) by INNIO Jenbacher GmbH & Co OG to produce a DMC sample as per the present specification (JWN 489 489) and asked to send it our DMC test department. This will then be the subject of an internal examination in accordance with the Initial Sample Inspection Report for Data Matrix Parts (ISIRDMC). Once the technical requirements (marking system, code content and legibility) for the introduction and use of DMC have been met, the marking is released by the SQE and GlobalSupplyChain-Quality. Release for series production will be confirmed in our ISIRDMC document.

The legibility and quality of every DMC on series parts must be verified by the manufacturer/supplier after marking. Successful code reading (reading > decoding > output) must not take longer than 2 seconds.

Factors such as inadequate clamping of the component or marker, and equipment faults such as broken, blunt or obscured styluses can adversely affect the legibility of a DMC or even render it illegible.

To ensure the legibility of the DMC at INNIO Jenbacher GmbH & Co OG, we recommend suppliers to use the same or identical readers as used at INNIO Jenbacher GmbH & Co OG

Contact your relevant Supplier Quality Engineer (SQE) for list of corresponding readers.

6.5 List of parts to be marked using Data Matrix Code

Criteria (Evaluation per component)	Weighting	Assessment (please select) 1. Criterion applies - 10 2. Criterion applies in part = 5 3. Criterion does not apply = 0	Points
1 Data quantity (Is there a large amount/quantity of data to be captured in a short time? e.g. >2 components per engine?)	5	5	25
2 Data quality (Is absolutely error-free data capture necessary? For example, is data captured about components, the failure of which could result in personal injury or substantial damage to property?)	10	10	100
Result:			125

The use of a Data Matrix Code is: absolutely necessary

Legend

0-50	not necessary
51-150	absolutely necessary

Internal list from INNIO Jenbacher GmbH & Co OG

\\atjenb07nsvm01c.logon.ds.ge.com\Allgemein\Qualitätsstelle\Bauteilkennzeichnung\Bauteile_mit_DMC.xls

Information to be passed to suppliers

Specifications and conditions of purchase will be forwarded to suppliers by the responsible buyer. Queries concerning the location and nature of the marking will be settled directly with the supplier by Technology (Purchasing/SQE in CC).

7 Exceptions - examples

Bulk goods such as screws, gasket, various washers, small electrical parts, relays, handholds, etc. (at the same time the markings will, as hitherto, only be applied in a limited manner).

Outsourced items to which a marking cannot be applied.

e.g. O-rings (the sole exception would be a colour point in the case of the special risks involved in a mix-up).

INNIO Jenbacher GmbH & Co OG - **Individual components and welded assemblies to which a marking cannot be applied.** By reason of their form, size and function, these components cannot be marked or there is no space available (e.g. hardened ball-headed adjusting screws for the valve operating mechanism).

INNIO Jenbacher GmbH & Co OG - **Individual components**, which are further processed into a welded construction, unless this is desired for in-company reasons.

Ducts or duct components without drawing number, which in the case of equipment assembly are moulded individually.

INNIO Jenbacher GmbH & Co OG **assemblies** are *not* marked!

8 Reference to other standards

JWN 149 000	UNMACHINED COMPONENTS, unmachined ferrous castings, technical delivery conditions
JWN 489 000	CYLINDER BUSHING, technical delivery conditions
JWN 489 101	CYLINDER HEAD model LM, technical delivery conditions
ISO/IEC 16022:2000	Barcode symbology specification (including laser coders) – data matrix
ISO/IEC 24720:2006	Barcode symbology specification (including dot peening stylus) – data matrix
ISO/IEC 15415	Barcode print quality test specification – 2D codes
AIM DPM-1-2006	Direct Part Mark (DPM) - Quality Guideline
SAE 9132	Data Matrix quality requirements for direct marking

Should new requirements result from the component marking practice, this guideline will be updated accordingly.

9 Revision code

Revision history

Index	Date	Description/revision summary	Expert Auditor
7	30.09.2022	Zusammenführung der Kennzeichnungs-Code für interne und externe Lieferanten / Merging of the identification code for internal and external suppliers	Maurberger W. <i>Wild S.</i>
6	18.10.2019	GE durch INNIO ersetzt / GE replaced by INNIO	Fallzberger F. <i>Pichler R.</i>
5	30.03.2018	Korrektur Kapitel 3 / Correction of chapter 3 Ergänzung Kapitel 5.1 / Addition of chapter 5.1 Ersetzung und Ergänzung Kapitel 5.2 / Correction & Addition of chapter 5.2 Streichung Kapitel 5.2.1 / Cancellation chapter 5.2.1 Kapitel 5.3 zusammengeführt mit Kapitel 5.2 / chapter 5.3 connected with chapter 5.2 Ergänzung Kapitel 7 / Addition of chapter 7	Niederlechner A. <i>Pichler S. / Wild S.</i>
4	29.08.2017	Ergänzung von Kapitel 1 / Addition of chapter 1 Inhaltliche Änderungen in Kapitel 5.1 und 6.1 / Content-related changes in chapter 5.1 and 6.1 Inhaltliche Änderungen in Kapitel 6.2, Data matrix Code hinzugefügt/überarbeitet / Content-related changes in chapter 6.2, data matrix code added/reworked	Nocker A. <i>Nail J. / Janvier T.</i>
3	02.03.2012	Abschnitt 6: Verweis von "TPAS003" auf "WI_AMW003" GEÄNDERT/ Chapter 6: Link from "TPAS003" to "WI_AMW003" CHANGED	Provin <i>A. Leitner</i>
2	16.05.2011	Normen aktualisiert / Standards updated	Provin <i>Pichler</i>