Quality Assurance Definition

LHC PART IDENTIFICATION

Abstract
This document defines the LHC Project part identifier which shall be used to identify uniquely, as individual pieces or as lots of identical pieces, all the physical parts that will be manufactured and installed on the LHC.

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## History of Changes

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<th>Rev. No.</th>
<th>Date</th>
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<th>Description of Changes</th>
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Table of Contents

1. PURPOSE ................................................................................................ 4
2. SCOPE..................................................................................................... 4
3. POLICY ................................................................................................... 4
4. RESPONSIBILITIES .............................................................................. 4
5. STRUCTURE OF THE PART IDENTIFIER ................................................... 5
   5.1 IDENTIFIER FOR MANUFACTURED ITEMS ........................................ 5
   5.1.1 RULES AND EXPLANATIONS ......................................................... 6
   5.2 IDENTIFIER FOR OFF-THE-SHELF COMPONENTS ............................... 7
   5.2.1 CERN STORES COMPONENTS ....................................................... 7
   5.2.2 INSTITUTES AND COMMERCIAL SUPPLIER COMPONENTS .......... 8
6. RELATED DOCUMENTATION .................................................................. 8
1. PURPOSE

This document defines the LHC Project part identifier which shall be used to identify all physical components of the LHC. It provides rules to:

- Create part identifiers that are unique throughout the LHC machine, the LHC detectors and any other machine using the CERN Engineering Data management System (EDMS) for its data management.
- Uniquely identify all instances of parts as individual items or as lots of many identical items.

The main function of the part identifier is to serve as a unique key to search for, and retrieve, all pertinent information gathered and stored in the EDMS during the production, transport, installation, commissioning, operation, maintenance and re-cycling or dismantling of a part.

2. SCOPE

The part identifier described in this document shall be used for:

- All parts manufactured for the construction of LHC and installed on the LHC and that are by their function or physical characteristics specific to LHC.
- All parts manufactured for the construction of LHC and installed on the LHC but which are not specific to LHC and may be used on other machines.
- All off-the-shelf components, i.e. items which are not made to order but are in stock and ready for use, that are installed on the LHC and have to be uniquely identified.

3. POLICY

A policy for a general part identification scheme to be used for all items produced and installed for the LHC and its detectors has been defined by the CERN EDMS coordination team[1]. The scheme uniquely identifies each item and will be used to track all data and documents related to the item in the EDMS and other databases.

The agreed scheme is an alphanumeric code where the first two characters are centrally controlled and identify a machine, and where the remaining part of the code is left free to be defined by the project team in charge of the machine construction. In this context a machine is either the collider or one of its detectors.

4. RESPONSIBILITIES

Project Engineers at CERN and in Collaborating Institutes shall verify that suppliers:

- Are aware of and understand the LHC part identification scheme.
- Implement the necessary quality assurance procedures to identify parts and related documentation and data.

Suppliers and subcontractor shall plan and implement the necessary procedures to ensure that:

- CERN requirements for part identification are fulfilled.
- The elements of the part identification code placed under their responsibility respect the requirements for uniqueness.
5. STRUCTURE OF THE PART IDENTIFIER

Based on the scheme described in [1], two part identifiers are defined, one for manufactured (made to order) parts, the other for off-the-shelf components.

5.1 IDENTIFIER FOR MANUFACTURED ITEMS

The identifier has a fixed length of 19 alphanumeric characters. It is composed of two main parts, the **part number** and the **serial number**.

The **part number** itself is further split in two parts, a prefix which is assigned by CERN and a sequential number generated by CERN or the manufacturer. The prefix is built by the concatenation of a machine code and an equipment code.

The **serial number** is also split in two parts, a production site code assigned by CERN and a sequential number generated by the manufacturer.

Together the machine code, the equipment code and the number form a unique part number. All instances of that part will carry the same part number.

Together the production site and the sequential number form the serial number.

Joined together the part number and the serial number form a complete and unique part identifier.

The identifier structure is shown in figure 1 and an example of its use is shown in figure 2.

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**Figure 1 - Structure of the manufactured parts identifier**

**Example:**

```
HC MCM E001 - A A 000001
```

**Figure 2 - Identifier for a manufactured part**
5.1.1 RULES AND EXPLANATIONS

5.1.1.1 MACHINE CODE

The **machine code** has a fixed length of 2 characters. It identifies the machine for which the equipment designated by the equipment code can fulfil its intended function.

For the LHC, i.e. the collider itself, the machine code to use is **HC**.

In cases where the same equipment may fulfil its function when installed on more than one machine, the pseudo machine code **ZZ** must be used.

**Explanation**

The equipment code is used to identify the function of a component. Some functions are specific to a particular machine, for example the beam bending function of a dipole magnet is specific to an accelerator, whereas other functions, for example evacuating the beam pipe, are not specific to a particular accelerator. For all equipment that is not specific to a particular machine a pseudo-machine code is used. This way it should be unnecessary to change the identifier when the equipment is moved from one machine to another.

**For general purpose items the machine code to use is ZZ.**

5.1.1.2 EQUIPMENT CODE

The equipment code is defined in the Quality Assurance Plan (QAP) document "Equipment Naming Conventions" [ 2 ]. It has a fixed length of 5 alphanumeric characters.

For all parts for which a manufacturing drawing with a Cern Drawing Directory (CDD) number exists, the equipment code to use is the one used for the drawing number.

In cases where no manufacturing drawing exists, but for which there is a Technical Specification, the equipment code to use is the one used for the Technical Specification LHC Project number. If the equipment code used has less than 5 characters, it must be completed with underscores.

5.1.1.3 SEQUENTIAL NUMBER

The sequential number has a fixed length of 3 alphanumeric characters. It identifies uniquely each part designated by a single equipment code.

In cases where all the parts carrying the same equipment code are manufactured by one manufacturer the responsibility for assigning sequential numbers may be given to the manufacturer.

In cases where the production of parts carrying the same equipment code is distributed to several manufacturers, the sequential numbers will be assigned by CERN.

5.1.1.4 SEPARATOR

The separator is a minus sign. It is used to separate the part number from the serial number.

5.1.1.5 PRODUCTION SITE

The production site code has a fixed length of 2 non-significant alphanumeric characters. It is used to identify on which contractor's or sub-contractor's site the part is manufactured. The production site code is assigned by the CERN EDMS administrator.
Explanation

When the manufacture of identical parts is carried out by more than one supplier, the different suppliers will use the same part number. It is essential to maintain the uniqueness of part identifier to be able to track a particular part or a set of parts to its production site.

5.1.1.6 SEQUENTIAL NUMBER

The sequential number part of the serial number has a fixed length of 6 digits. It is assigned by the manufacturer of the part. The sequential number is incremented for each manufactured instance of the part.

5.2 IDENTIFIER FOR OFF-THE-SHELF COMPONENTS

Off the shelf components are items not made to order but in stock and ready for use. They may come from different sources:
- CERN stores
- Collaborating Institutes stores
- Commercial suppliers

They may or may not have their own part identifier, but if they need to be registered in EDMS for provisioning, for maintenance, for making measurements or tests, or for any other reason, they must be given a part identifier because:
1. The supplier number cannot be guaranteed to be unique.
2. The identifier must follow the CERN-wide part identification scheme.

In cases where a single instance of an off-the-shelf component needs to be identified, e.g. because it has been modified in any way, it must be identified as a manufactured parts as described in 5.1.

5.2.1 CERN STORES COMPONENTS

The identifier has a fixed length of 16 alphanumeric characters and dots. It is composed of two parts, the machine code as defined in paragraph 5.1.1.1, and the CERN SCEM number.

Unless the component has been modified in a way that makes it specific for LHC use, the machine code to use is ZZ.

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MACHINE CODE

Figure 3 - Structure of the CERN stores component identifier

Example:
ZZ22.41.20.905.0

Figure 4 - Identifier for a manometer from the CERN stores
```

1 A codification scheme for standardized material at CERN
5.2.2 INSTITUTES AND COMMERCIAL SUPPLIER COMPONENTS

The identifier has a variable length. It is composed of three parts, the machine code as defined in paragraph 5.1.1.1, the first two digits of the CERN Classification Standard code (CCS), and a sequential number.

Unless the component has been modified in a way that makes it specific for LHC use, the machine code to use is ZZ.

The CERN Classification Standard code (CCS) is a 6 digit code aimed at classifying all goods acquired by CERN. The 6 digits are made out of a group, a subgroup and a sub-subgroup, each of which is coded with 2 digits. Using the first two digits allows for a broad classification of items used in the accelerator/detector construction field.

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Figure 5 - Structure the identifier for Institutes and commercial suppliers components

Example:

```
ZZ22000018
```

Figure 6 - Identifier for a manometer from a supplier

6. RELATED DOCUMENTATION

[ 1 ] 100236 Coding Schemes and Barcodes for Part Identifiers
[ 2 ] LHC-PM-QA-204.00 Equipment Naming Conventions