

Table of Contents

- 1 Scope
- 2 Glossary
- 3 Module Requirements
 - 3.1 User View
 - 3.2 Requirements
 - 3.3 Module Context
- 4 Analysis
- 5 Design
 - 5.1 Risk
- 6 Implementation
- 7 Module Tests
 - 7.1 Module Test Plan
 - 7.2 Module Test Report
- 8 Summary

Changelog

Version	Date	Author	Comment
1.0	25.10.2022	Maris Koch	Chapters 1
1.1	26.10.2022	Maris Koch	Chapter 2-5
1.2	10.05.2023	Maris Koch	Reworked content and added implementation information
1.3	11.05.2023	Janin Ahlemeyer	Added Module Tests

1 Scope

This module focuses on generating the nameplate for an asset chosen by the user. The generated nameplate is complying to IEC 63365 standard. The nameplate can be downloaded in `.png` and `.svg` format. The download is available in the asset view for the chosen asset.

2 Glossary

- **AAS** - asset administration shell
- **AASX** - file format to store an asset
- **AASX server** - server, that can store AAS assets and has a standardized API specified in the GitHub repository

3 Module Requirements

3.1 User View

When the user enters the asset view for a chosen asset, the option to download the nameplate shall be visible. The realization of the download dialog is done in MOD01 and is part of the asset view. In addition to that, a preview of the nameplate is shown right over the download buttons.

Below, an example nameplate is shown.

CD55B20-50

Kompaktzylinder nach ISO 21287

SMC

63329 Egelsbach, Boschring 13-15

Deutschland

+49 (0) 61 03 / 402 - 0

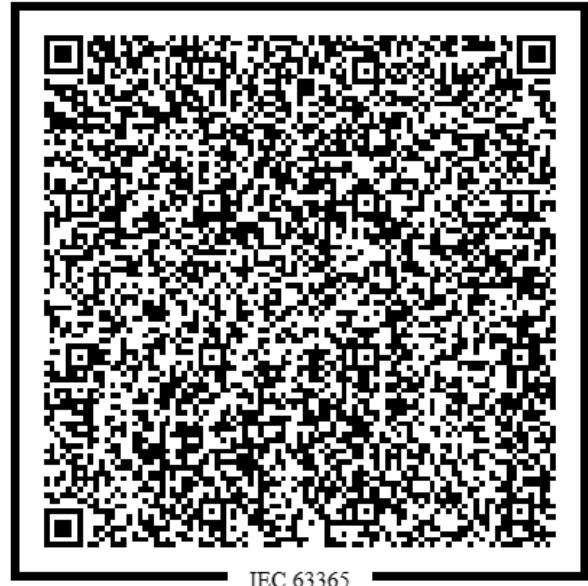
info@smc.de

www.example.com/ids/aas/7031_8082_3022_7912

ManufacturerProductFamily: C55

YearOfConstruction: 2022

VATNumber: DE 0123456789



3.2 Requirements

DNG.GUI.005 QR-code generator

The application is able to generate QR-codes for the nameplates. QR-codes shall be generated for every asset and visible on the detail page. They shall correspond to the DIN Standard.

DNG.GUI.006 Nameplate generator

The software create nameplates for the chosen asset. Nameplates according to the IEC 63365 standard shall be generated out of the asset the user chose. It shall contain all the necessary information such as general Information, warning signs, certificates and a QR-code.

DNG.GUI.007 Error handling

The system has an error handling. It needs to be able to respond to keys being added and keys being removed due to new versions of the aas.

3.3 Module Context

The download menu is realized in MOD01 as part of the asset view.

When a user chooses an asset from the asset list, MOD02 supplies this module with the necessary data to generate the nameplate. The required data format by MOD02 is the following.

```
{
  "idShort": "AAS_Type_CD55B20_50",
  "id": "www.example.com/ids/aas/7031_8082_3022_7912",
  "num": 8,
  "productImages": [
    "<url>"
  ],
  "Nameplate": {
    "idShort": "Nameplate",
    "id": "www.example.com/ids/sm/0000_4121_5022_2603",
    "ManufacturerName": "SMC",
    "ManufacturerProductDesignation": "Kompaktzylinder nach ISO 21287",
    "ManufacturerProductFamily": "C55",
    "OrderCode": "CD55B20-50",
    "SerialNumber": "",
    "YearOfConstruction": "2022",
    "Address": {
      "Department": "Kontakt zu SMC",
      "Street": "Boschring 13-15",
      "ZipCode": "63329",
      "City_Town": "Egelsbach",
      "State_County": "Deutschland",
      "VATNumber": "DE 0123456789",
      "AddressOfAdditionalLink": "info@smc.de",
      "Phone": {
        "TelephoneNumber": "+49 (0) 61 03 / 402 - 0",
        "TypeOfTelephone": ""
      }
    }
  },
  "Markings": {
    "Marking00": {
      "MarkingName": "nach EU-Maschinen-Richtlinie",
      "FilePath": "<url>",
      "MarkingFile": "/aasx/Nameplate/CE_Marking_2016.png"
    },
    "Marking01": {
      "MarkingName": "nach EU-RoHS-Richtlinie",
      "FilePath": "<url>"
    },
    "Marking02": {
      "MarkingName": "nach EU-EMV-Richtlinie",
      "FilePath": "<url>",
      "MarkingFile": "/aasx/Nameplate/CE_Marking_2016.png"
    },
    "Marking03": {
      "MarkingName": "RCM Mark"
    },
    "Marking04": {
      "MarkingName": "c UL us - Listed (OL)"
    },
    "Marking05": {
      "MarkingName": "TÜV"
    }
  }
}
```

```

},
"ArticleInformation": {
    // more key-value pairs
},
"ContactInformation": {
    // more key-value pairs
}
// more submodels
}

```

4 Analysis

The nameplate needs to meet the following requirements according to the mentioned standards:

- manufacturer name and -address
- product name and -type
- serial- and batchnumber
- country of origin
- year of construction
- markings, e.g. CE-Marking
- for electrical equipment:
 - supply voltage, frequency range, power and input current
 - connection parts
 - possibly special notes on the power supply
- for explosive-proof devices:
 - guideline 2014/34/EU: device group, category, area of application, type of protection, certificate identification number
 - IEC Ex: type of protection, device protection level, certificate identification number
 - North America: class, division, group, protection type
- pressure devices (guideline 2014/68/EU):
 - upper and lower limit values for temperature and pressure
 - pressure volume/nominal diameter
 - test pressure with date, response pressure of the safety device
 - fluid group

5 Design

The design of the nameplate is inspired by the examples given in the IEC 63365 standard. This includes the qr-code being oriented on the right side of the nameplate. The marking images are distributed underneath the qr-code. On the nameplate, there is space to display a maximum 7 marking images. If the amount of marking exceeds this, all marking names and additional information are saved in the qr-code and can be scanned any time.

The first heading of the nameplate shows the **OrderCode** of the asset. This code uniquely identifies the physical product. This code was chosen so that any person having to work with the nameplate in a e.g. a production facility can safely and easily identify the machine. In addition to that, order codes contain the product family of the manufacturer, making it possible to identify the category of the machine at a first look.

The second heading is the **ManufacturerProductDesignation** providing further information about the product at hand.

Under the second heading, the company name of the manufacturer and the address is shown. In addition to that, the telephone number as well as the e-mail address of the company is displayed for direct contact. Beneath that, the **AssetRef** is displayed as demanded by IED 63365.

Beneath that, the asset id is displayed. All further attributes are displayed underneath the previously described information until the space to the marking images is fully used.

5.1 Risk

Due to the fact, that the standards are under continues advancement, a breaking change in the nameplate specifications could lead to some parts of this module to be rewritten. Making this module highly dynamic and being able to work with varying levels of detail of an asset, this risk is considered minor. This means that it should be able to handle variations in the data returned e.g. new keys being added or current keys being removed.

6 Implementation

The concrete implementation of the nameplate generation is separated into 3 parts which can be found at `APPLICATION/src/NameplateGeneration`:

1. NameplateGenerator
2. NameplateSupplier
3. DataTransformer

NameplateGenerator

The NameplateGenerator is JavaScript class. It holds numerous functionalities. The most important one is coordinating the different steps of the nameplate generation. This includes the interaction with npm qr-code library which is responsible for creating the qr-code. This library is open source and published under the MIT license. Another important feature of the NameplateGenerator component is the download functionality. The web interface supplies the buttons for the download and in this part, the actual download functionality is implemented.

NameplateSupplier

This JavaScript class supplies a lot of functionalities needed by the previously explained class. E.g. this class prints the header onto the nameplate, which was discussed in the design section. Furthermore, it assembles the address as described previously. Also in this module, keeping the software dynamic was a major goal. To achieve this, if keys like the OrderCode or the telephone number of the manufacturer are not supplied in the asset, other attributes will move up into that space to not waste any space on the nameplate. Another important feature of this class is, that it converts the urls referring to the marking images into data-urls, which is necessary for the display of the markings.

DataTransformer

This JavaScript class provides numerous supportive functions for the nameplate generation. One of them is the separation of the markings from the rest of the supplied data. This is used for easier handling throughout the other two components mentioned above.

7 Module Tests

In this section all requirements will be tested separately on their functionality.

7.1 Module Test Plan

Req. - ID	Functionality
DNG.GUI.005	QR-code generator
DNG.GUI.006	Nameplate generator
DNG.GUI.007	Error handling

7.2 Module Test Report

Req. - ID	Pass / Fail	When failed: Observation	Tester
DNG.GUI.005	PASS		Maris Koch

Req. - ID	Pass / Fail	When failed: Observation	Tester
DNG.GUI.006	PASS		Mika Kuge
DNG.GUI.007	PASS		Mika Kuge

8 Summary

This module is generating the nameplate supplying a large functionality of the Nameplate Generator as a whole. It supports the IEC 63365 standard. Being separated from the data acquisition, this module can generate nameplates with any form of data supply module as long as the given data format is used.