How to read the taxonomy

The concepts in the EqHub taxonomy are a subset of the PCA RDL and have been developed according to the principles of the ISO15926 standard. The EqHub taxonomy has been extracted from the library so that it can be evaluated separately form the complete PCA RDL and without knowledge of the specialized application used to generate and record the PCA RDL.

A taxonomy in this context is a set of concepts arranged in a supertype-subtype structure, also called generalization-specialization relationships. In such an inheritance relationship, the specialization by definition has the same properties, behaviours, and constraints as the generalization plus one or more additional properties, behaviours, or constraints. For example, car is a specialization of vehicle. So any car is also a vehicle, but not every vehicle is a car. Therefore, a type needs to satisfy more constraints to be a car than to be a vehicle.

To explain how the concepts and definitions should be read, a subset of the EqHub taxonomy has been extracted. This example shows concepts that are specializations and generalizations of electric circuits. In Table 1 we see the structure of the hierarchy. From the structure it should be clear that an "ELECTRIC CIRCUIT" can be generalized as an "ELECTRICAL NETWORK" which again can be generalized as a "NETWORK". Hence the concept "ELECTRIC CIRCUIT" is a type of "NETWORK" and "ELECTRICAL NETWORK". Further, "ELECTRIC CIRCUIT" has a specialization "ELECTRONIC CIRCUIT" which again has two specializations, namely "ANALOG LOOP" and "CURRENT LOOP". When a concept is a specialization or subtype of another concept, this will always be considered true. Reading such a hierarchy of concepts can make errors of different types become visible for domain experts, e.g. if relevant concepts are missing, if a generalization-specialization relationship specified is not always true, if a concept is more or less general than shown in the hierarchy. All types of issues can be reported using the template for comments.

Table 1: Example – A typical record documenting network types

CONCEPT	DEFINITION
NETWORK	An interconnected chain or system of immaterial things
'ELECTRICAL NETWORK'	A 'network' that is an interconnection of electrical elements such as resistors, inductors, capacitors, transmission lines, voltage sources, current sources, and switches.
'ELECTRIC CIRCUIT'	arrangement of devices, media, or both, forming one or more conductive paths and where these devices and media can have capacitive and inductive coupling
'ELECTRONIC CIRCUIT'	An 'electric circuit' formed by the interconnection of electronic components through which an electric current can flow.
'ANALOG LOOP'	An 'electronic circuit' in which data is represented by continuously variable physical quantities, usually amplitude or frequency, that is varied in direct proportion to the quantity which it is desired to communicate.
'ANALOG CURRENT LOOP'	A 'current loop' in which current may vary continuously with time to correspond to the information being represented.
'10-50 MA SIGNAL LOOP'	An 'analog current loop' where 10 mA is representing 0 percent of measurement, 50 mA is representing 100 percent
'4-20 MA SIGNAL LOOP'	An 'analog current loop' where 4 mA is representing 0 percent of measurement, 20 mA is representing 100 percent
'CURRENT LOOP'	An 'electronic circuit' that uses current for signaling.
'ANALOG CURRENT LOOP'	A 'current loop' in which current may vary continuously with time to correspond to the information being represented.
'10-50 MA SIGNAL LOOP'	An 'analog current loop' where 10 mA is representing 0 percent of measurement, 50 mA is representing 100 percent
'4-20 MA SIGNAL LOOP'	An 'analog current loop' where 4 mA is representing 0 percent of measurement, 20 mA is representing 100 percent

The full taxonomy for the evaluation is presented in an excel spreadsheet (EqHubTaxonomy.xls). In this spreadsheet concepts and their definitions are presented as a tabular version of the taxonomy, as in Table 1. A concept is represented by a name and followed by a definition in column T. Each concept has a unique id (hierarchy.idPCA in column A), which implies that an id can appear one or more times. If a concept is a specialization of two or more general concepts, the same id is used for all entries for that particular concept. The two-dimensional structure in such a table is very suitable to show the specialization relationship between the selected concepts. Each indentation represents such a specialization, and implies that the indented concept is a subtype of the surrounding concept. Each indentation represents a new level of specialization in the hierarchy.