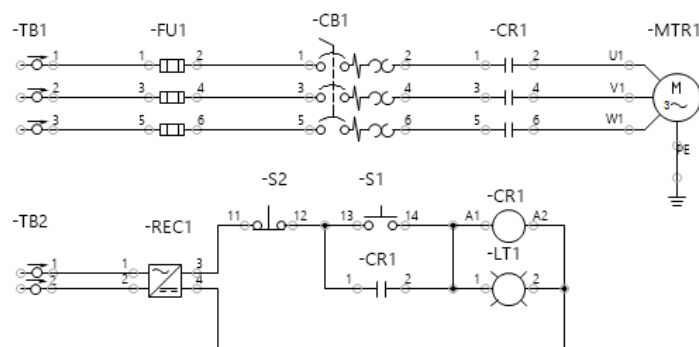




FluidDraw

Symbol library - Northern American standard ANSI/IEEE (NFPA)



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1 Introduction

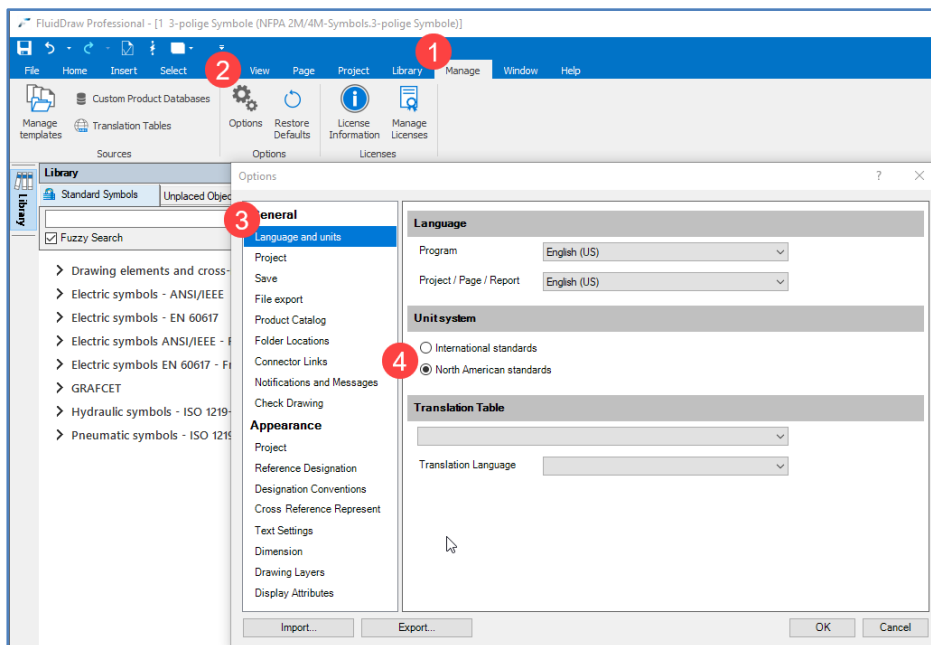
The NFPA-79 standard - "Electrical Standard for Industrial Machinery" describes rules for the installation and documentation of electrical systems. NFPA stands for National Fire Protection Association. Various standards have evolved over time.

The appendices to this standard contain circuit examples, circuit symbols and identification letters. However, the appendices themselves are not part of the NFPA 79 standard. There are no differences between the NFPA 79 editions of 2007 and 2024 regarding the circuit symbols and identification letters.

The American standards or the examples in these standards are not so detailed and comprehensive that they completely cover the scope of the ISO standard (based on EN 81346 and EN 60617). Therefore, there are some deviations in the documentation and examples of other companies (Siemens, Eaton-Moeller, Eplan) in both the symbols and the identification letters.

The fluid power symbols according to ISO 1219 correspond to the representation commonly used in North America.

2 Program Settings for Language and Units



The choice of the "North American Standard" has the following effects:

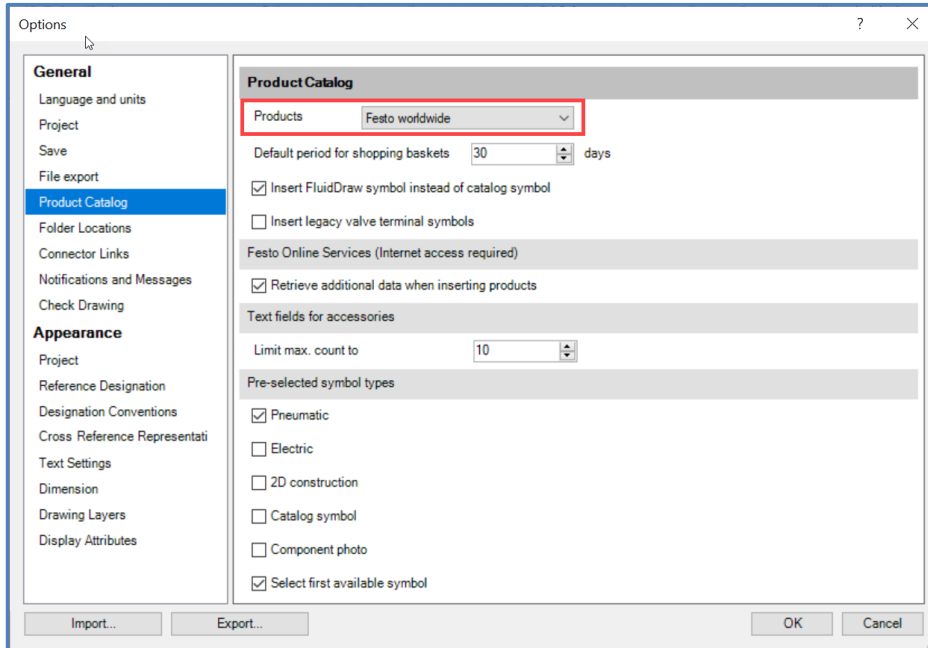
2.1 Units

In all relevant places, the unit of length is switched from "mm" (millimeters) to "in":

- Drawing sizes (if a US paper format was selected)
- Predefined base length units
- Dimensions
- Geometry properties of symbols and drawing elements (positions, length, width, height, radius)

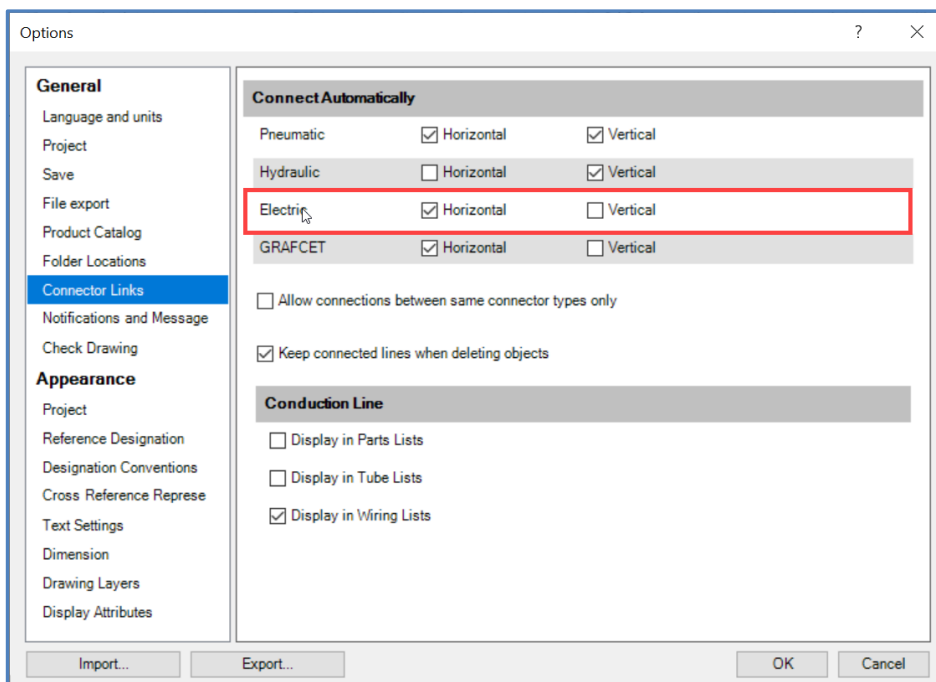
2.2 Worldwide Parts Scope of the Festo Product Catalogue

The Festo product catalog is being converted to the worldwide parts scope, as many products with inch connection sizes are not included in the European parts scope. Regardless of this, this setting can also be made manually in the “Product catalog” section:



2.3 Connector Links

The automatic line connection (Auto-Connect) is set according to the standard: to “Horizontal” for North American standards and to “Vertical” for European standards. Regardless, this setting can also be made manually in the “Connection Connections” section:





2.4 Identification Characters

The preset code letters for connection lines, cables, terminal blocks, pneumatic distributors and symbol groups (automatically generated circuit diagrams for complex Festo products such as valve terminals) are changed. They can be changed manually independently of this. Manual changes are saved separately for the selected standard - so they are retained even after repeated switching between standards.

European Standard

Options

General

- Language and units
- Project
- Save
- File export
- Product Catalog
- Folder Locations
- Connector Links
- Notifications and Messages
- Check Drawing

Appearance

- Project
- Reference Designation**
- Designation Conventions
- Cross Reference Representati
- Text Settings
- Dimension
- Drawing Layers
- Display Attributes

Default Settings

- ☒ Enumerate Automatically
- ☒ Consider All Project Files
- ☒ Consider new connection segments (hoses, wires, pipes)
- ☒ Line designations based on connected components

Letter Codes (International standards)

Line (pneumatic)	WP	Cable	WD
Line (hydraulic)	WP	Terminal Strip	XD
Line (electric)	WD	Pneumatic Distributor	XM
Symbol Group	AZ		

☒ Two-letter designations

Reset

Maintain letter codes for components...

Import... Export... OK Cancel

North American Standard

Options

General

- Language and units
- Project
- Save
- File export
- Product Catalog
- Folder Locations
- Connector Links
- Notifications and Messa
- Check Drawing

Appearance

- Project
- Reference Designation**
- Designation Conventions
- Cross Reference Repres
- Text Settings
- Dimension
- Drawing Layers
- Display Attributes

Default Settings

- ☒ Enumerate Automatically
- ☒ Consider All Project Files
- ☒ Consider new connection segments (hoses, wires, pipes)
- ☒ Line designations based on connected components

Letter Codes (North American standards)

Line (pneumatic)	W	Cable	W
Line (hydraulic)	W	Terminal Strip	TB
Line (electric)	W	Pneumatic Distributor	X
Symbol Group	A		

☒ Two-letter designations

Reset

Maintain letter codes for components...

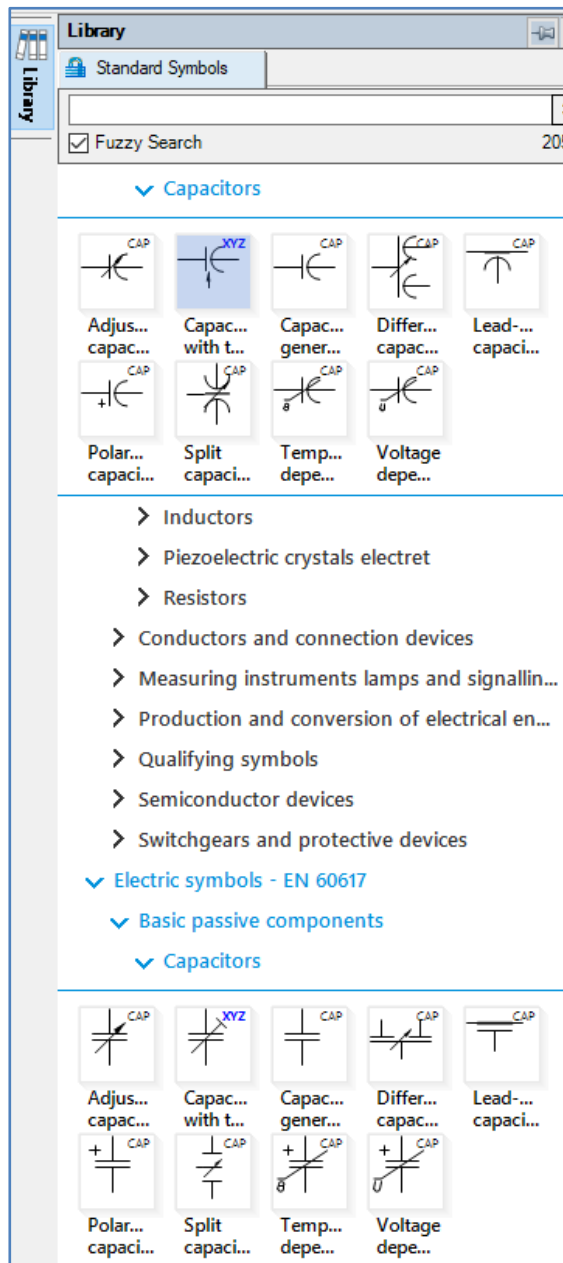
Import... Export... OK Cancel

The preset identification letters for library symbols are also changed.

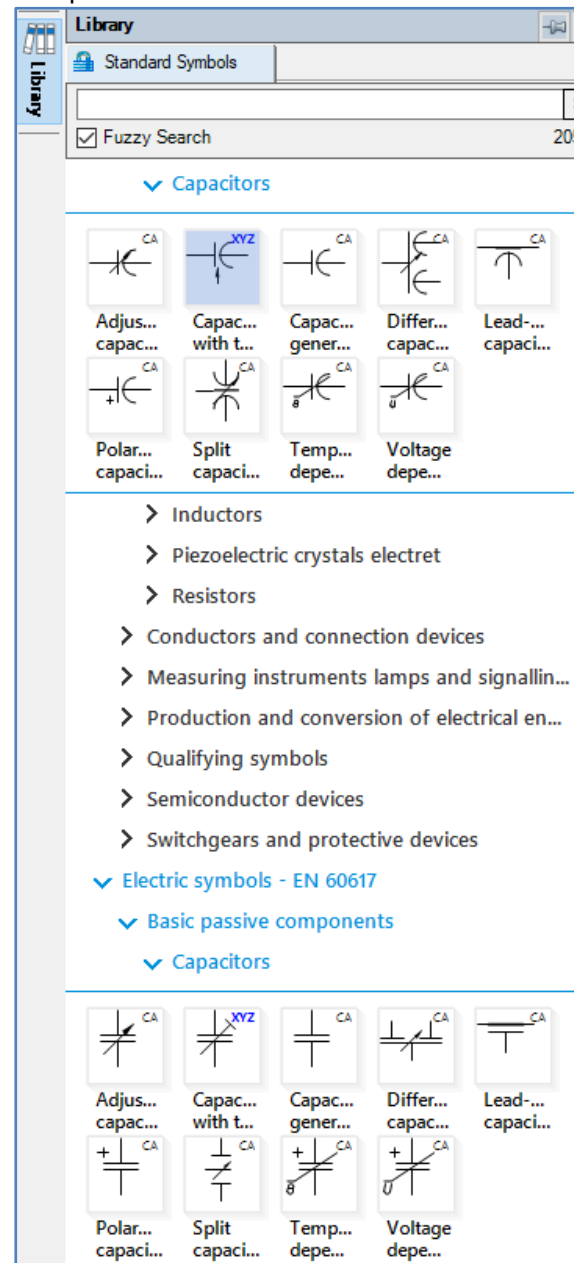
The change always affects ALL symbols, regardless of the standard, i.e. regardless of the graphic symbol representation. Manually assigned identification letters remain unaffected - in the following example, this is the designation "XYZ" for the second (marked) capacitor symbol. In the example, the capacitor symbols according to the North American standard can be seen above and those according to the European standard can be seen below. Both have the same designation.

Program setting:

North American Standard



European Standards



Regardless of the standard selected, symbols for Festo products are always marked according to EN 81346 - the European standard. This applies to inserting from the Festo catalog, from the shopping cart or from a file.

In rare cases, no code letters from the North American standard could be determined. Such symbols are assigned the code letters of the European standard.

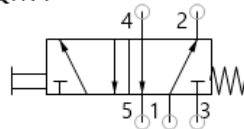
If the North American standard is selected, the identifier letters are positioned above the symbols. Regardless of this, the position of the identifier letters can be influenced via the project/page property "Show attributes".

2.5 Connection Designations of Pneumatic Symbols

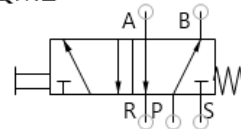
The connection designations of valves according to ISO 1219 are switched. In the European standard, the identification is done with numbers, in the North American standard with characters:

Connection	European Standard	North American Standard
Supply	1	P
Working ports	2, 4	A, B
Exhaust	3, 5	R, S
Pilot air	12, 14	Y, Z
Pilot supply air	12/14	Y
Pilot exhaust air	82/84	Z

-QM1



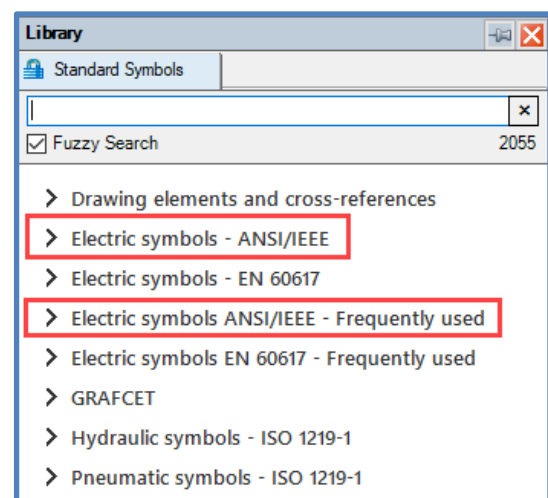
-QM2



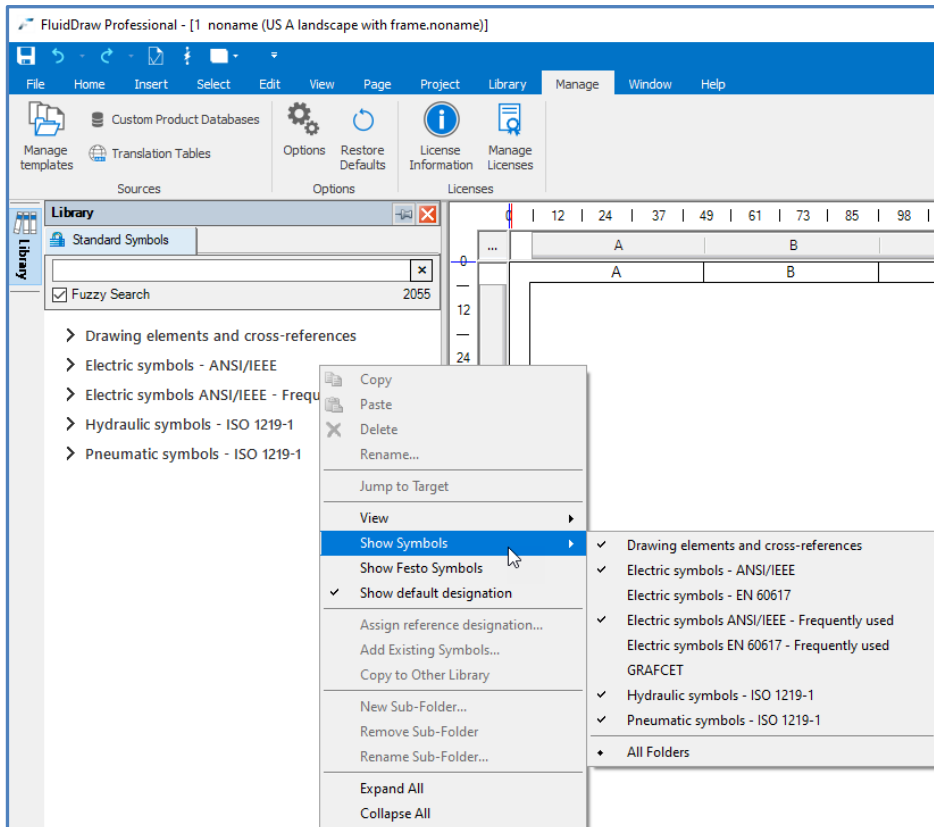
Switching of the connection designation only affects symbols that are inserted directly from the standard symbol library, but not symbols that are inserted in relation with Festo products (from the Festo library or by inserting Festo products from the catalog, from the shopping cart, from a file). In the latter case, the connection designations usually corresponds to the label on the product (if available).

2.6 Symbol Library

FluidDraw now contains two new library folders with electrical symbols according to the North American standard. By changing the standard in the program settings, the corresponding library folders are displayed and those of the previous/other standard are hidden. This does not apply to folders hidden manually by the user.



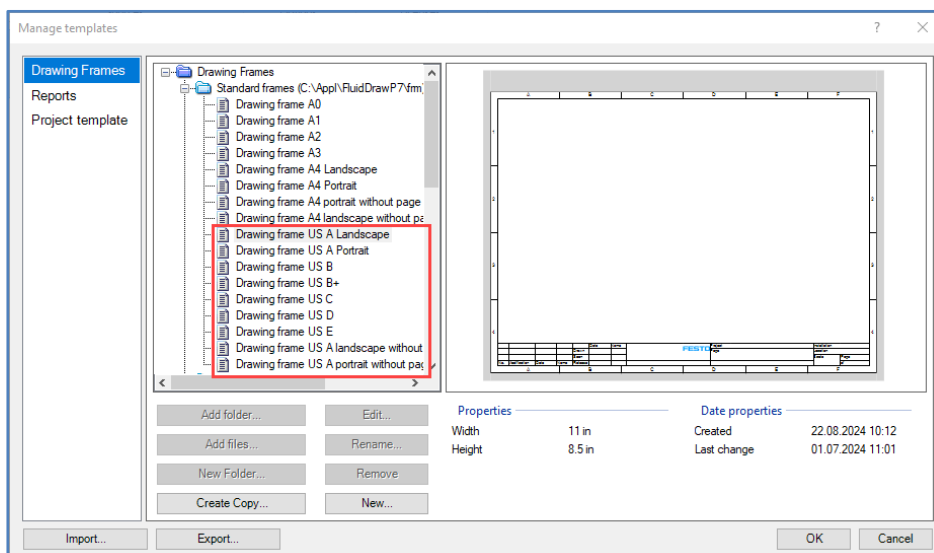
Note: You can use the context menu (right mouse button) in the symbol library to hide symbol folders that are not needed and display them again if necessary.



The symbols are horizontally oriented, i.e. suitable for the graphic representation of the current paths from left to right. In principle, the symbols can also be used to draw vertical current paths (i.e. from top to bottom) by rotating them. The permanently "burned in" texts cannot be rotated to a horizontal reading direction independently of the symbol.

3 Paper Sizes, Drawing Frames, Project Templates

Regardless of the program settings, drawing frames and project templates with US paper sizes are now available for selection. In these drawing frames, the horizontal field dividers are marked with letters and the vertical field dividers with numbers.



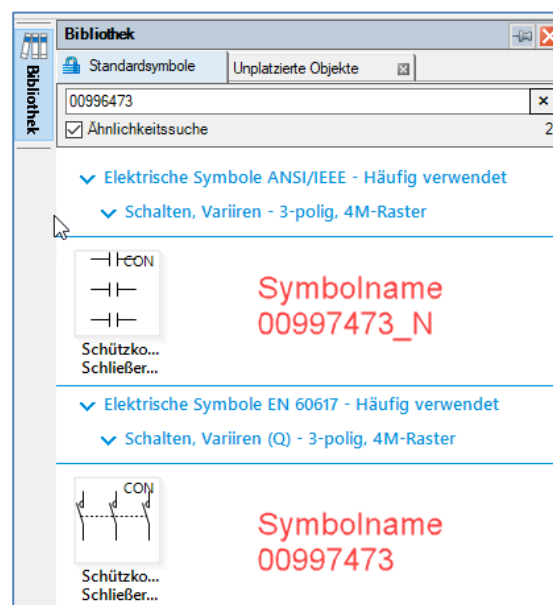
4 Additional Information

TERMINALS: Freely inserted terminals are oriented horizontally in the North American standard and vertically in the European standard. Regardless of this, terminals placed on cables are always aligned correctly.

CONTACT IMAGES are always displayed under the associated actuating element, regardless of the selected standard. If these are also to be used (displayed) for circuits according to the North American standard, they may need to be manually placed to the right of the actuating element. It should be noted that the contact mirror grows downwards as more contacts are assigned to the actuating element.

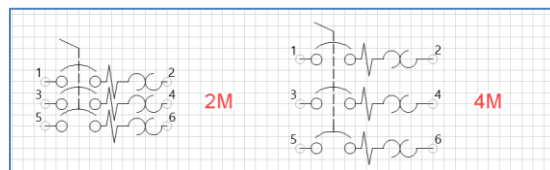
The contact image itself is generated using the general representation of the respective contact function (make contact, break contact, changeover contact), regardless of the associated graphical contact representation in the circuit diagram and regardless of the selected standard.

SYMBOL NAMES: The symbol names of the two standards are the same except for the ending. The symbol name of the North American standard has an “_N” appended to it. The symbol search makes it very easy to display the different symbols of the two standards. The prerequisite for this is that the library folders of the two standards are displayed:



SYMBOL SIZES: The standard base length unit in FluidDraw is M=1.5mm or M=0.06in. Change the size of symbols by selecting an appropriate base length unit in the project properties and not by scaling. This is the only way to ensure that newly inserted symbols match the size of the symbols already included in the circuit diagram and only in this way (the connection points of all symbols have the same grid size) does the autoconnect between connection points work.

FREQUENTLY USED SYMBOLS: These library folders contain a selection of the most commonly used symbols of the respective standards. There are subfolders with “2M grid” and “4M grid”. The grid corresponds to the distance between the connecting lines of 3- or multi-pole symbols. “M” stands for module and, in conjunction with the base length unit (project property), determines the absolute size of the symbol in mm or inch. The standard base length unit in FluidDraw is M=1.5mm or M=0.06in.





CONNECTIONS AND CONDUCTION LINE PROPERTIES: Component connections remember the properties of conduction lines that have been connected once. This means that if a conduction line is deleted, the identification rule is then changed and a new conduction line is connected to the same connection, then the changed identification rule (switching between “free input” and “Line designations based on connected components”) has no effect. When the standard is changed, all connections “forget” the properties of previously connected conduction lines.