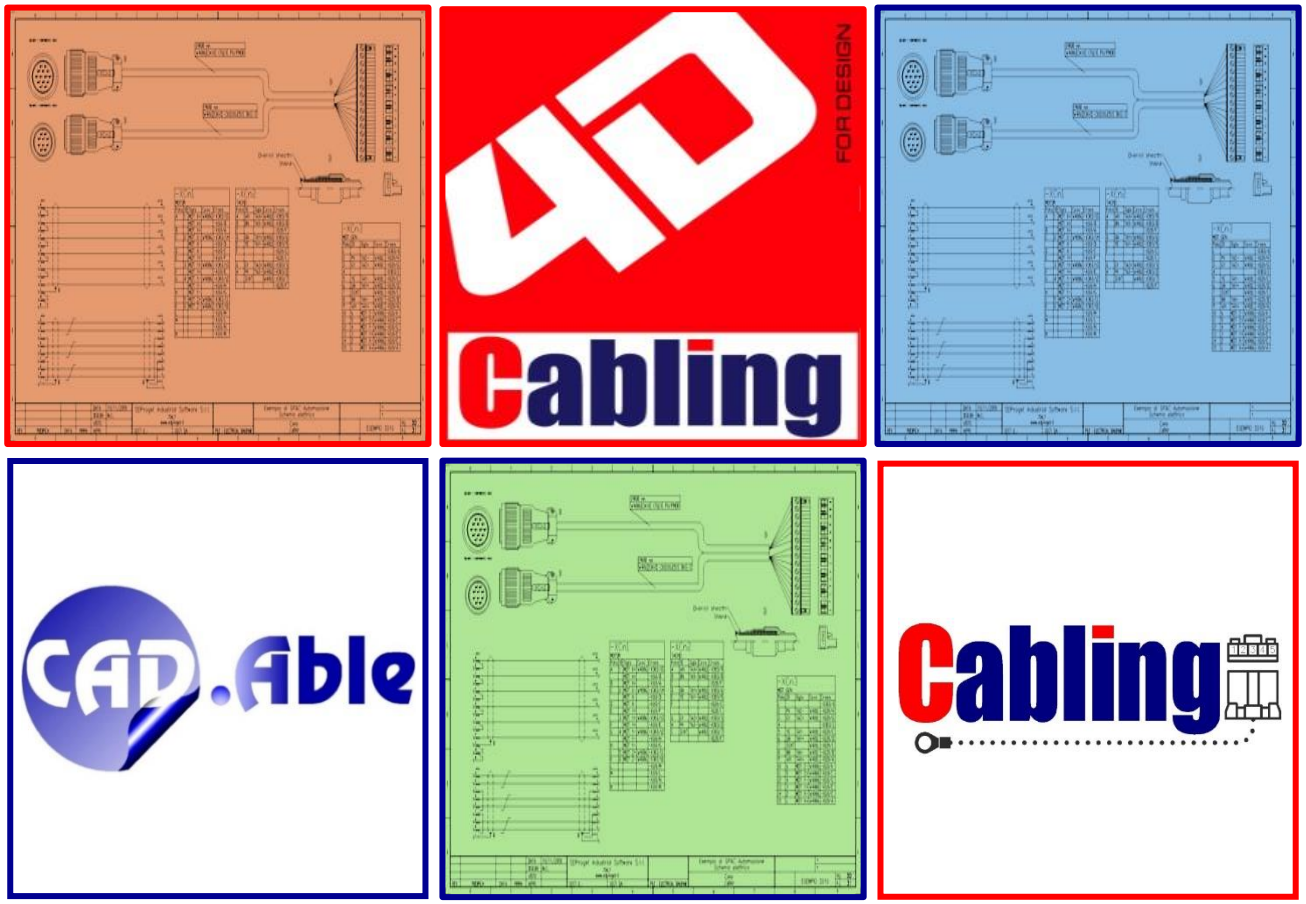
NEWS RELEASE 2021



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LA NEW RELEASE 2021

CABLING 4D 2021 represents a leap forward in terms of potential and integration with some very important innovations:

1. Integration with SPAC Automation
2. Automatic drawing of a Harness layout
3. 3D design

The objectives of the new version:

- Many of the things already present in CABLING have been improved both in terms of 'how to work' and messaging. Now everything becomes easier for those beginner users, for users who use the program occasionally and for users who use it intensively, optimizing working times.
- Our constant goal is to reduce more and more the number of clicks that the designer has to do to create a project.
- CAD.Able continues to develop CABLING, also welcoming the requests of numerous customers, increasing the potential of the product and making it more and more complete.

The content of this document reports most of the changes made to the product, but many others of lesser importance are not mentioned.

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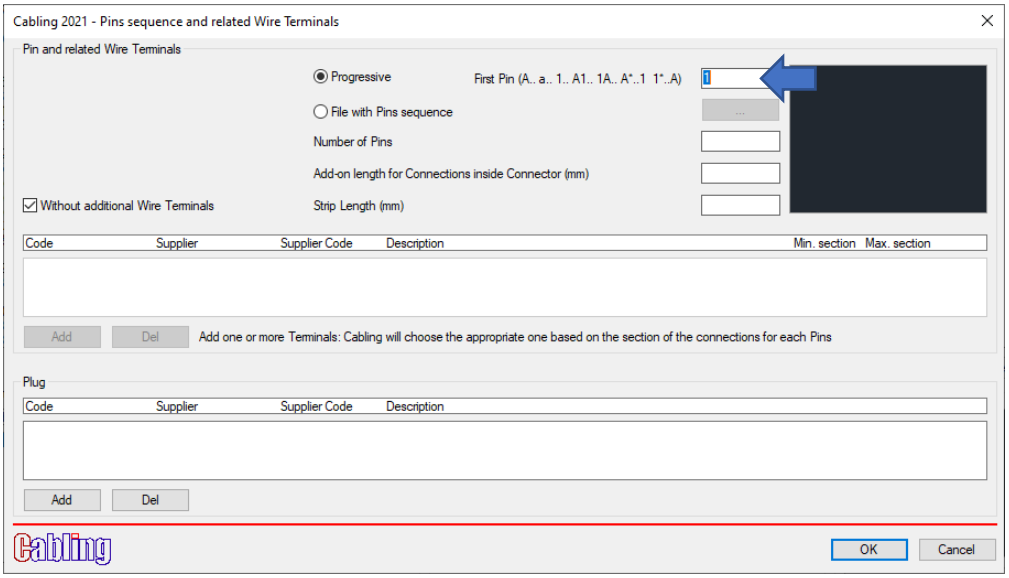
1 MATERIALS DATABASE

1.1 CONNECTORS – PINS SEQUENCE GENERATION

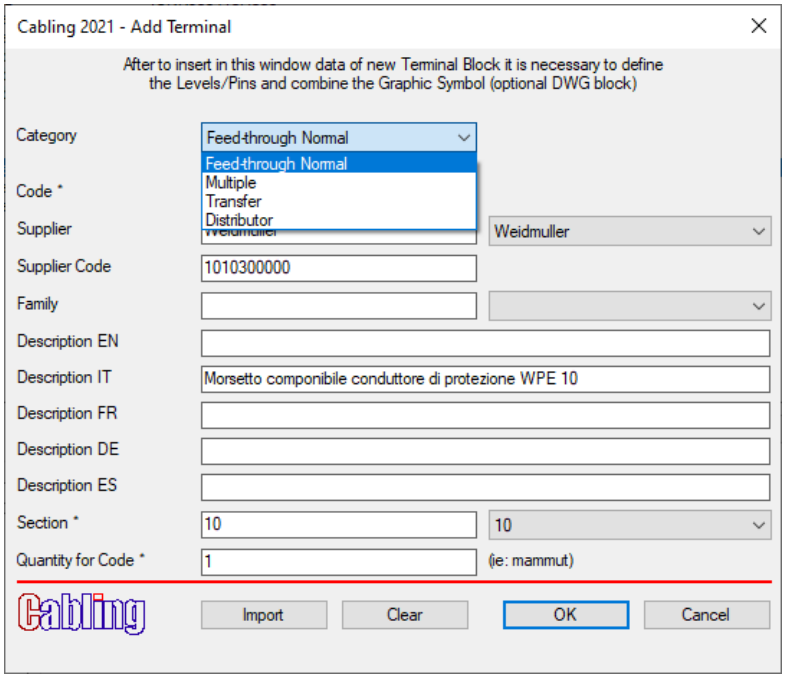
When you use the 'Sequence' button to generate the connector pins sequence, the following dialog box opens in which more possibilities have been given for the 'Progressive' option (highlighted in yellow).



Text in the edit box	Pins generated
A	A B C …
a	a b c …
1	1 2 3 …
A1	A1 A2 A3 …
1A	1A 1B 1C …
A*1	A1 B1 C1 …
1*A	1A 2A 3A …

1.2 MODULAR TERMINAL BLOCKS

When you add or modify a Terminal, you will be asked for its Category: Normal, Multiple, Transfer or Distributor.



For each of these categories a standard block is associated which identifies it:

Block name (* = 1 2 3 …)	Associated category
_MORS-N*	Feed-throught Normal Terminal
_MORSX*	Multiple Terminal
_MORSY*	Transfer Terminal
_MORSK*	Distributor Terminal

This subdivision into category needs to be compatible with the SPAC Automation archives and to manage the split levels in the Harness Layout.

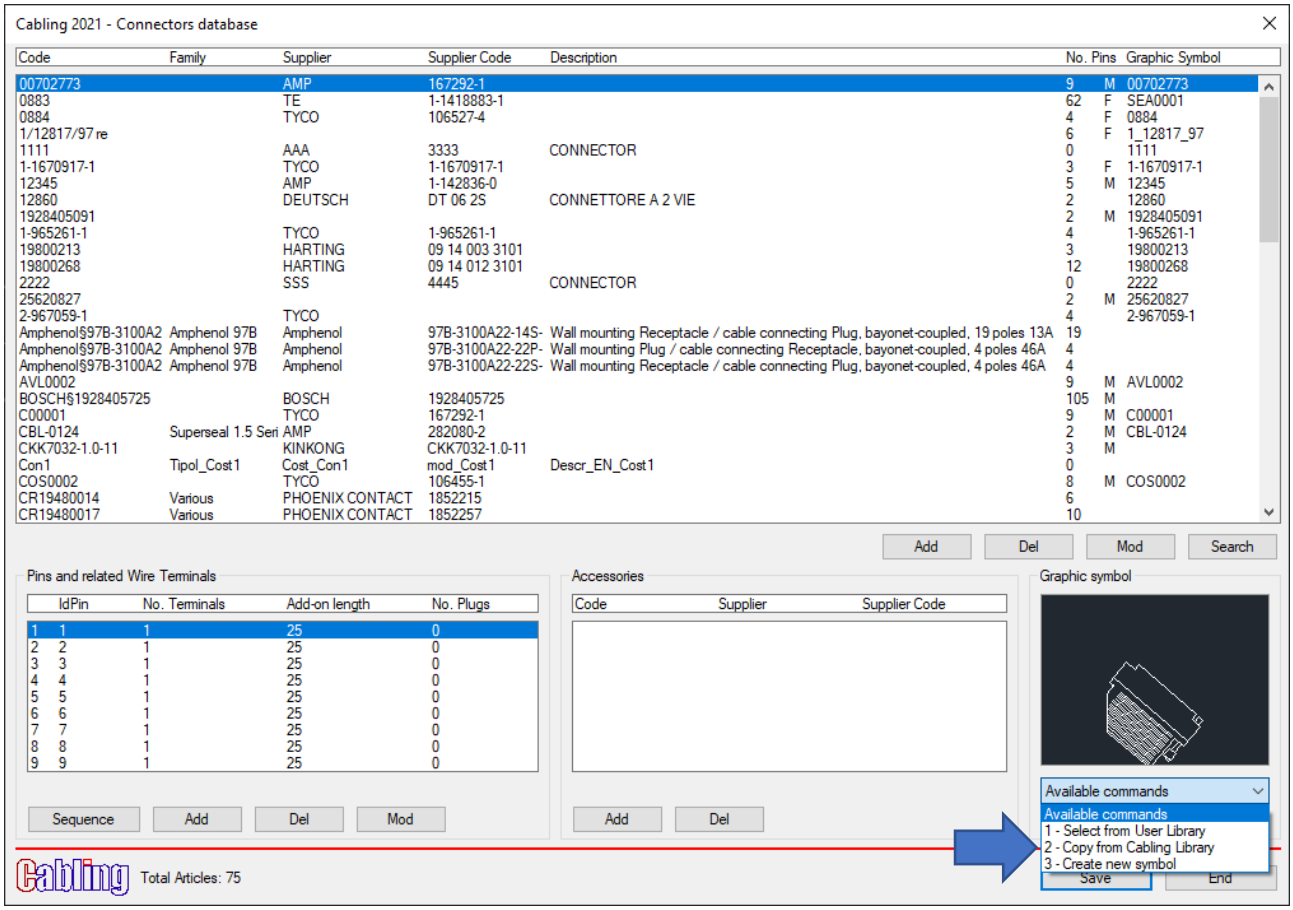
Since the Normal and Multiple terminals have an input and an output for each level (the Normal one is single-level), the wires connected to the inputs belong to a different harness than those connected to the output. In the CABLING Harness Layout a transformation takes place, i.e. each level is doubled with a suffix A and B:

Normal Terminal	Pins A e B
Multiple Terminal with 3 levels 1, 2 e 3	Pins 1_A and 1_B, 2_A and 2_B, 3_A and 3_B

For the other 2 categories (Transfer and Distributor) the levels / pins are not split.

1.3 GRAPHIC SYMBOLS COMMANDS

When you want to match a graphic symbol to a material code of Connectors, Terminals, Moulded Cables, Accessories and Wire Terminals, you can now do so with one of the available commands in the 'Graphic Symbol' section. The two old buttons [Choose] and [Create] have been replaced by a drop-down menu with the aim of simplifying the use of Cabling.



1 - Choose from Cabling_Blk: allows you to choose a graphic symbol previously defined in the Cabling_Blk library folder (or in one of its sub-folders). The same graphic symbol can be used for several material codes.

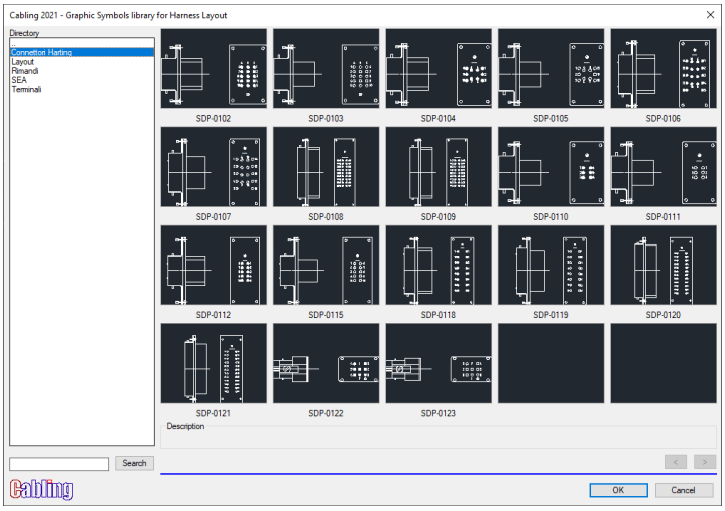
2 - Choose from Cabling Library: allows you to choose a graphic symbol from the library supplied with Cabling (Cabling_Blk_Lib folder). The dialog box that opens allows you to navigate between the various sub-folders by choosing the graphic symbol or search for it by entering the manufacturer's material code (or part of it) in the text box at the bottom left and pressing Search or Enter: if found, the graphic symbol is highlighted and pressing OK it is copied from the Cabling library to the user one (Cabling_Blk) changing the name according to your material code.

3 - Create new symbol: allows you to create a graphic symbol by selecting the entities (lines, circles, arcs, texts, etc.) from the current drawing. A window with further explanations helps the user on what to do.

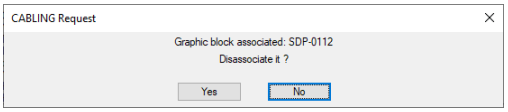
1. **Choose from Cabling_Blk (user library)**

When you choose a graphic symbol from the user library, a new dialog opens:

- you can browse the folders containing the DWG and SLD files that represent the graphic symbols
- it is easier to search for a graphic symbol because multiple images are visible at the same time
- the 'Search' button is available to search for a block.
- The [<] and [>] buttons allows you to scroll the previous or next graphic symbols.

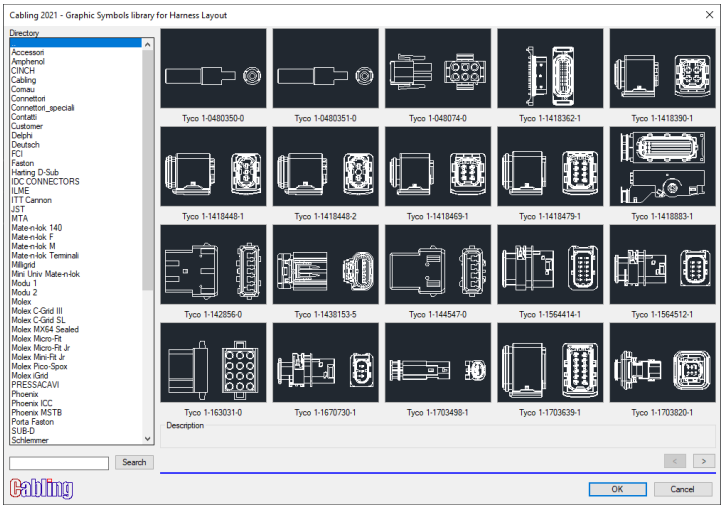


If a material already has an associated graphic symbol and this option is used, Cabling asks:



By answering Yes, the graphic symbol is disassociated from the material. It could still be combined if the name of the graphic symbol corresponds to the material code: in this case you can manually delete the two .DWG and .SLD files that represent the graphic symbol in the BLK_LIB folder or in one of the sub-folders.

1. **Choose from the Cabling Library**



2. **Create new symbol (which will be saved in Cabling_Blk or in a sub-folder):**

draw the graphic symbol or import it from another drawing or from a file in DXF format and follow the instructions.

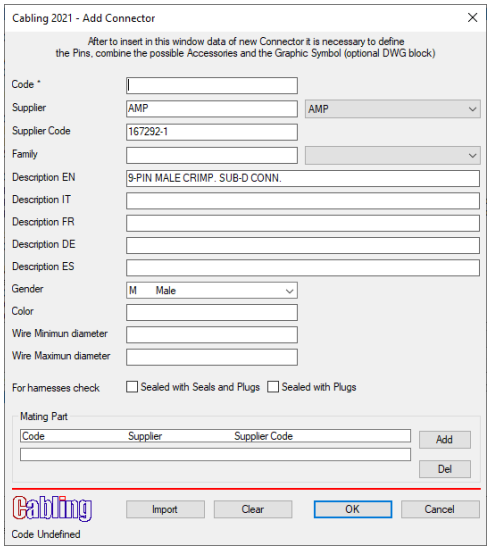
1.4 ASSEMBLIES WITH EMBEDDED BILL OF MATERIALS

CABLING 2021 allows to save an assembly as in previous versions, but with an important improvement: at the same time as saving the assembly, the bill of materials of the harness saved as assembly will also be generated.
We remind you that the Assemblies can be used both in CABLING 4D and in SPAC Automation.
In SPAC they can be inserted in the drawing of the wiring diagram along the connections (simple wires or conductors of multipolar cables) with a Name, taking the code from the CABLING Assemblies database. In addition to being counted in the SPAC bill of materials, the materials that make up the individual assemblies can be viewed in a dialog box and possibly saved in an Excel file.

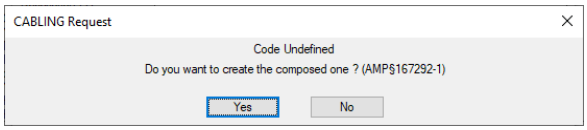
The integration of CABLING 4D with the outside world continues more and more: **if a company that uses SPAC or CABLING commissions the construction of a cable / harness to another company that uses CABLING, the last one can share also the project to allow the cable / harness to be used as assembly in SPAC**. This is possible choosing one of these levels:

- only with data
- with data and a PDF
- with data, a PDF and the DWG drawing of the Cable / Harness.

1.5 COMPOSED MATERIAL CODE



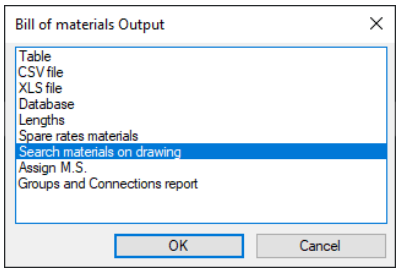
When add a new material in the material database, if the Manufacturer and the Manufacturer Code are available but not the company code, the following question is asked:

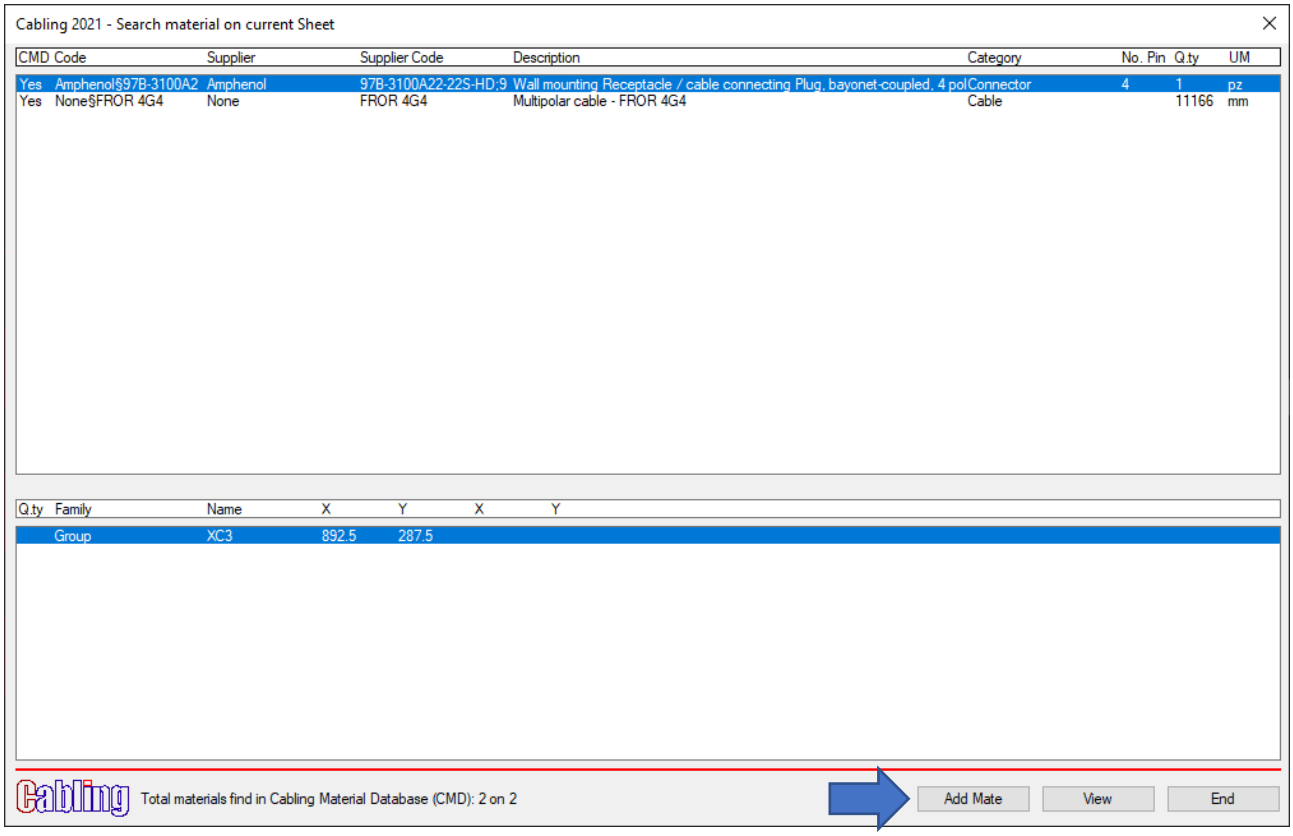


This simplifies the use of CABLING 2021 even for less experienced users. Applies to all category of materials.

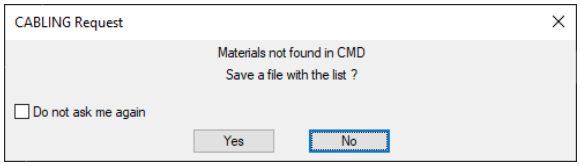
1.6 ADD MATERIALS FROM DRAWING PRODUCED BY THIRD PARTIES

In CABLING 2021 the option to search the materials on the current sheet of the Bill of Materials command has been revised.





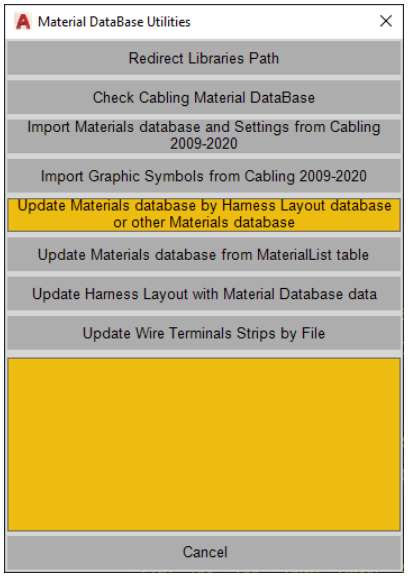
The request for automatic creation of a file for missing materials in the CABLING Materials Database has been added.



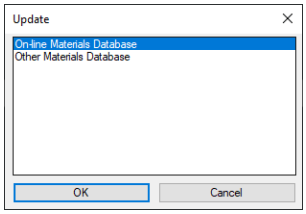
The 'Add Mate' button has been provided to add materials not found in the CABLING Materials Database.
A drawing from third parties can be easily managed and modified if the missing materials are added to the materials archive.

1.7 TRASFER MATERIALS FROM A MATERIALS DATABASE TO ANOTHER ONE

In CABLING 2021 it is possible to update a Materials Database with the data of another database. The utility is especially important in this smart-working period to allow you to update databases modified by various users. We remind you that a Materials Database can also be updated with the data of a Construction database exported from a CABLING harness layout: the company that designs and intends to share a project with another can send the drawing and the export of the layout to a Construction database. Who receives them can open the drawing, import the materials and continue to design or modify the existing layout.

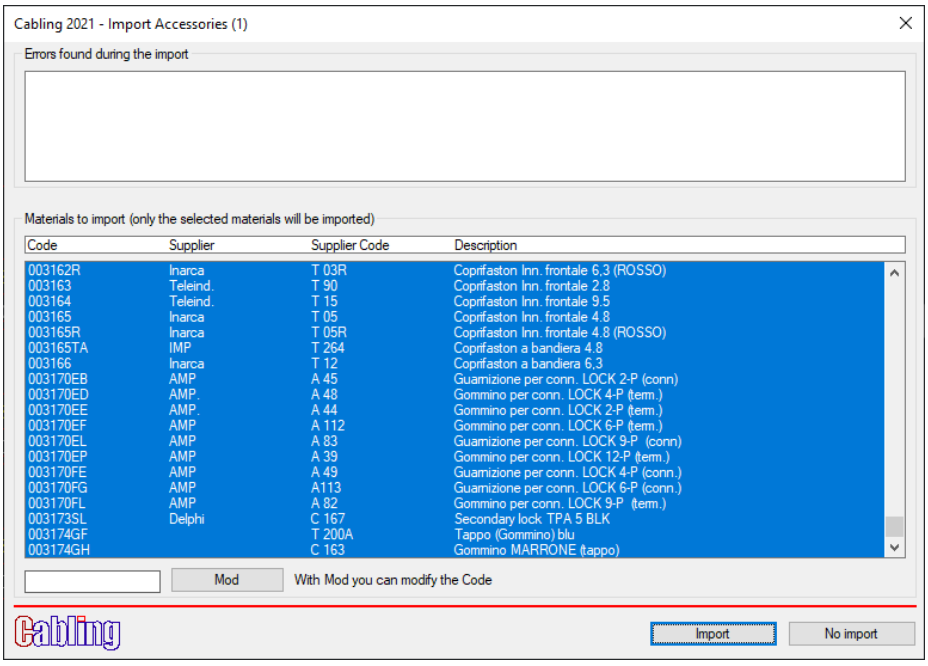


After asking for the name of the .MDB database that represents the database to be imported, the following window opens:

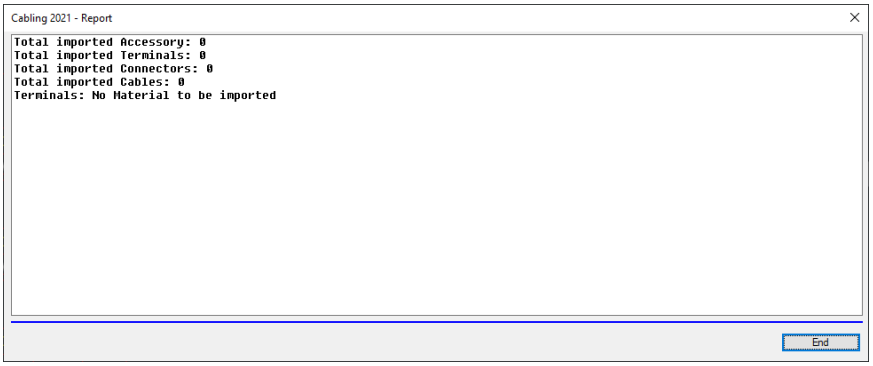


In the case of 'Online materials Database, the materials database of the current installation is updated with the data of the chosen database, after saving the file in a ZIP file with date (eg CABLING 161220.ZIP).
In the case of 'Other Materials Database, the database to be updated will be requested and will be updated with a report of the additions made. For this case, the save ZIP file will not be created.

Finally, remember that for each category of material a dialog box opens with the list of materials to be imported. It is possible to change the code of each individual material to customize it according to your company code.



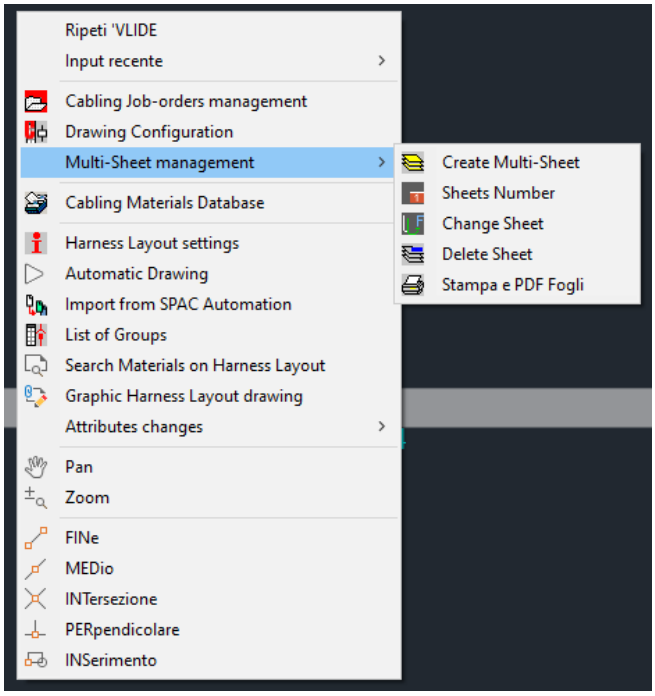
Finally, a window opens with the report of the operations carried out.



2 HARNESS LAYOUT

2.1 DRAWING AREA MENU

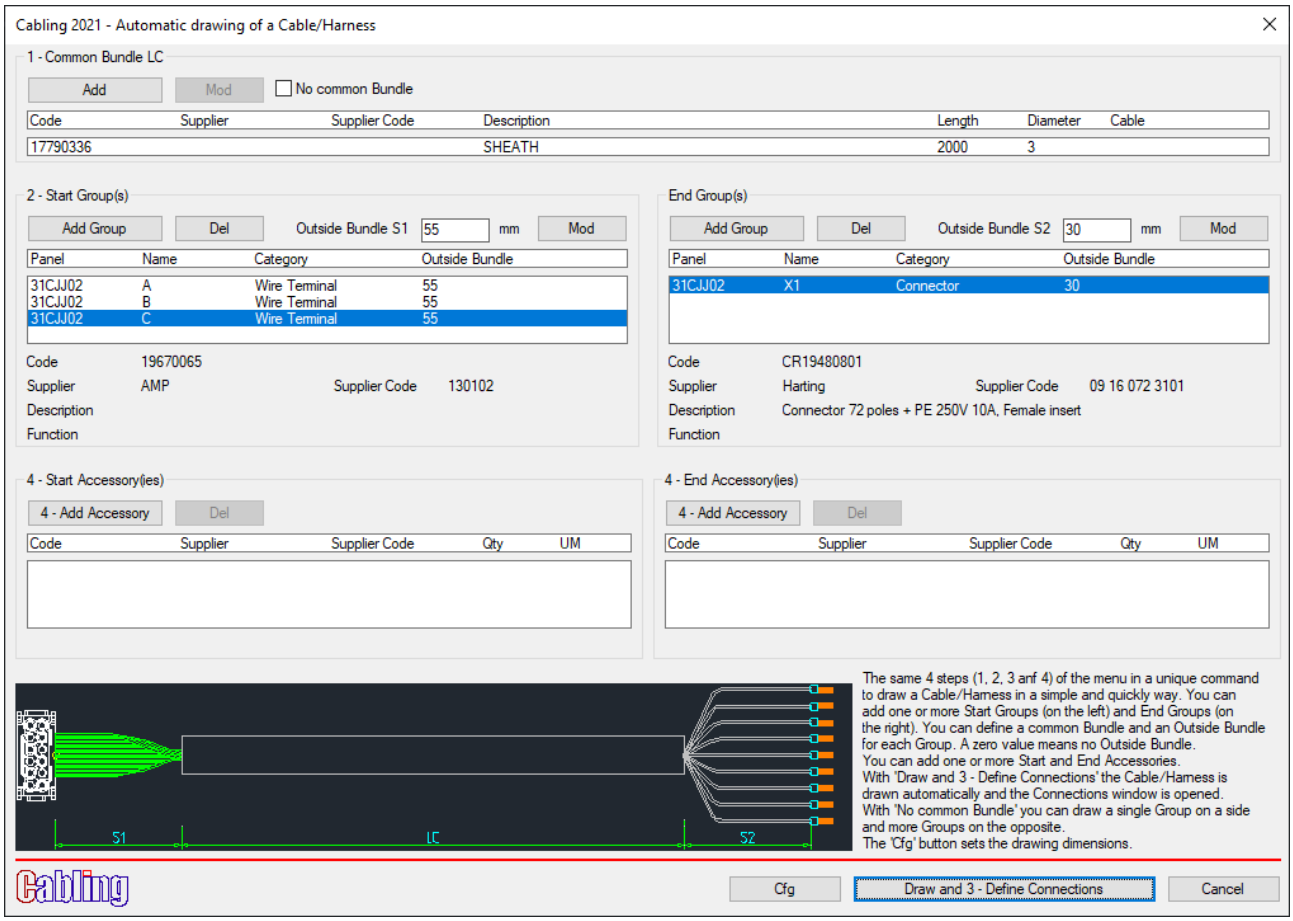
Just click with the right mouse button in the void and the context menu will open, within which the main CABLING 4D commands have been added. A couple of items have a sub-menu, as can be seen from the image. A small but interesting tool to improve the use of CABLING.



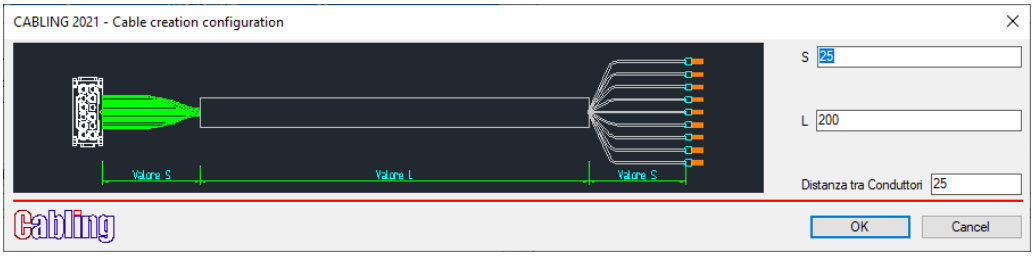
2.2 AUTOMATIC DRAWING OF A CABLE/HARNESS

In order to simplify and speed up the use of CABLING 4D 2021, the new 'Automatic Design' command has been introduced, added both in the menu and in the toolbar.

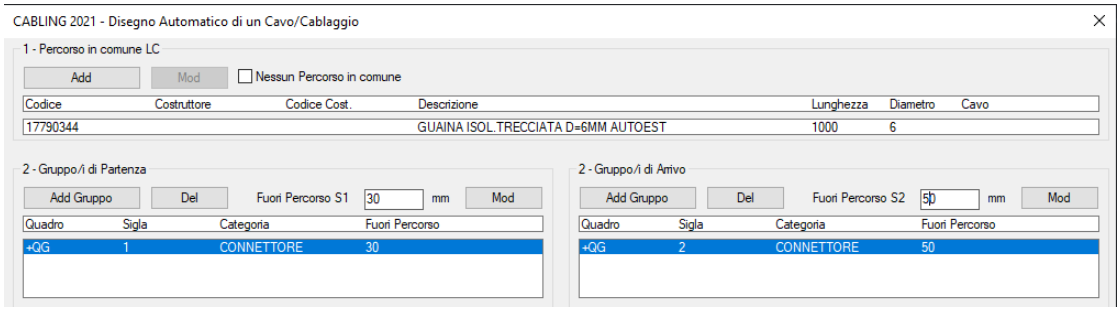
The same 4 steps (1, 2, 3 and 4) of the menu are now in a single command to draw a Cable / Harness in a simple and fast way. You can add one or more Start (left) and End (right) Groups. You can define a common path and an Offside Bundle for each group. A zero value means no Outside Bundle. You can add one or more Start and End Accessories. With 'Draw and 3 - Lay Connections' the Cable / Harness is drawn automatically and the Connections window opens. With 'No Common Bundle' you can draw only one Group on one side and several Groups on the opposite.

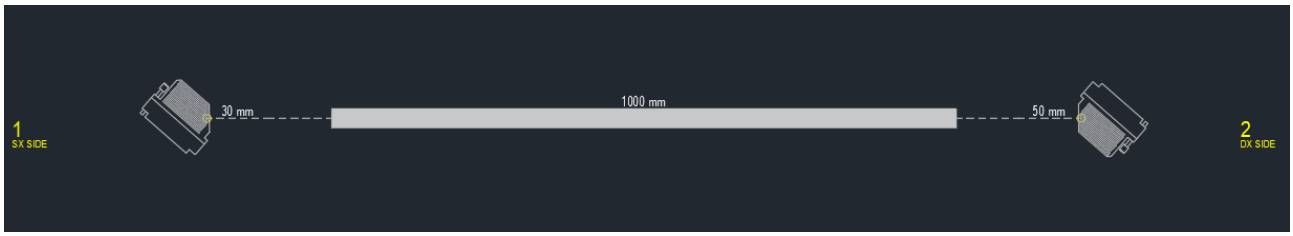


Use the 'Cfg' button to set the size of the drawing.

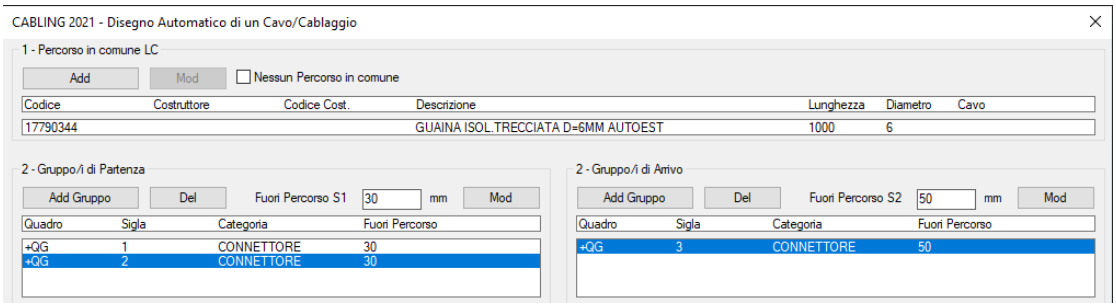


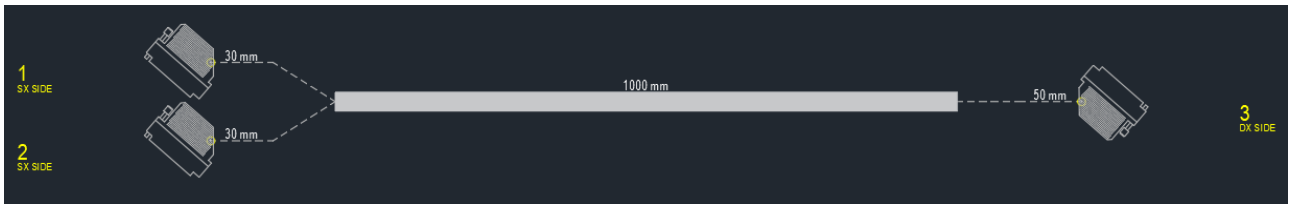
Example 1



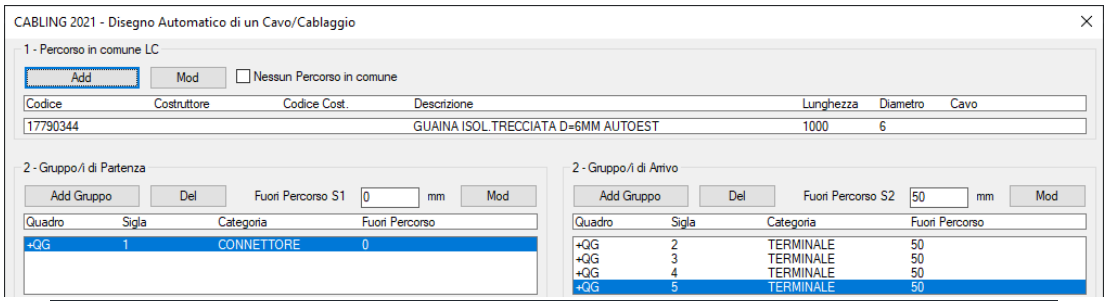


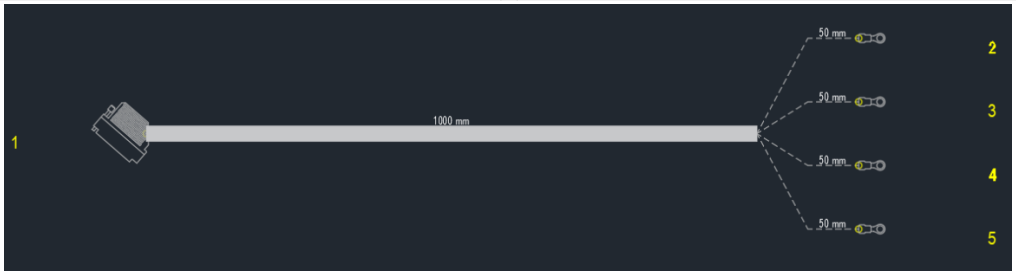
Example 2



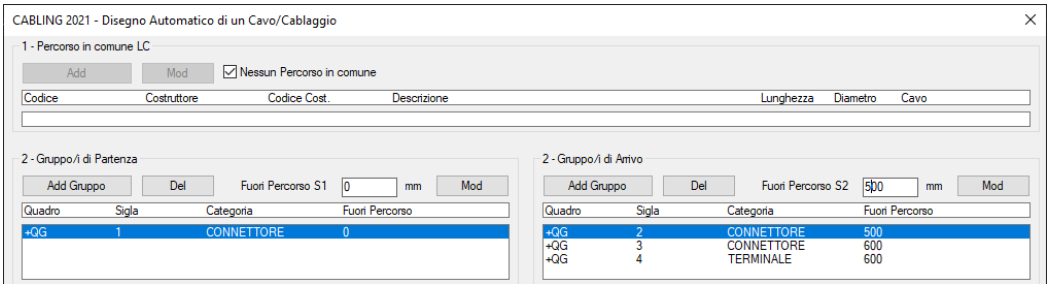


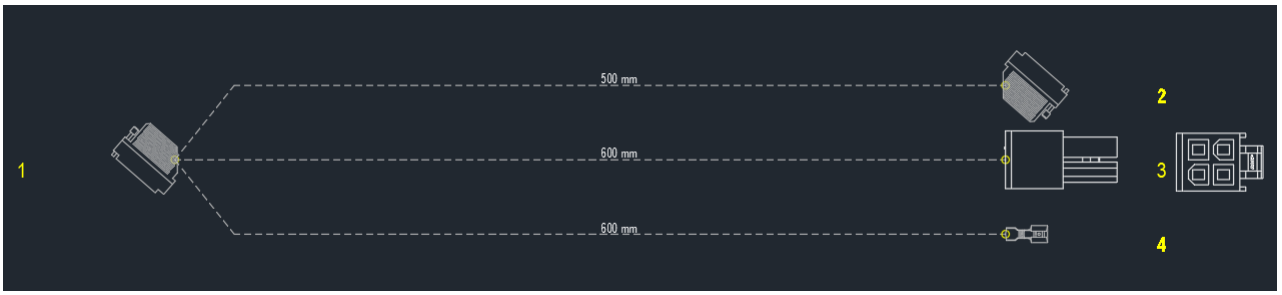
Example 3



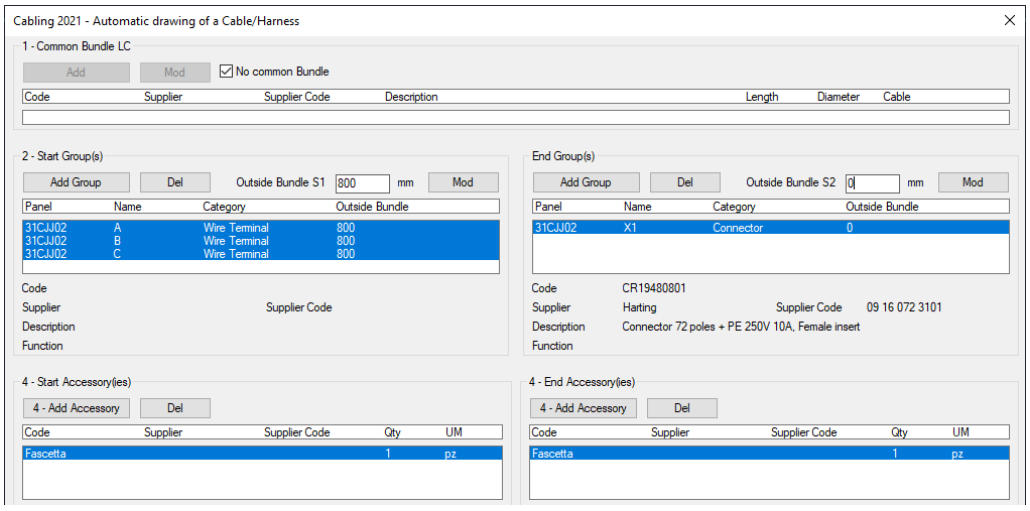


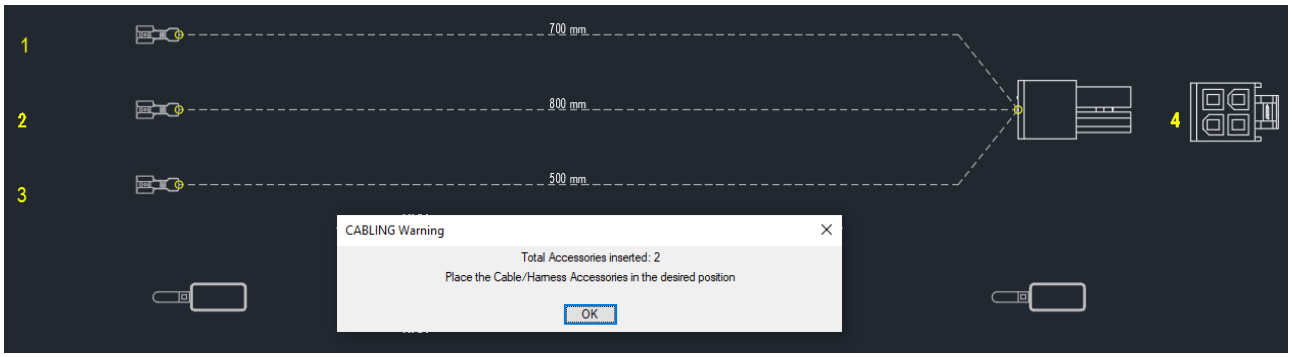
Example 4





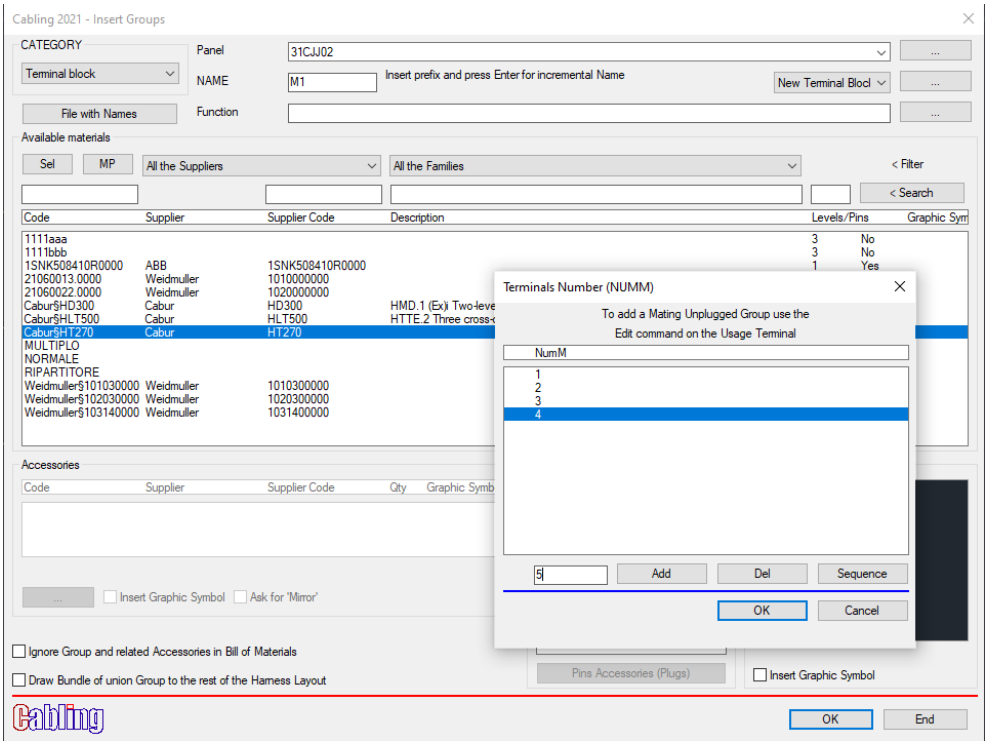
Example 5





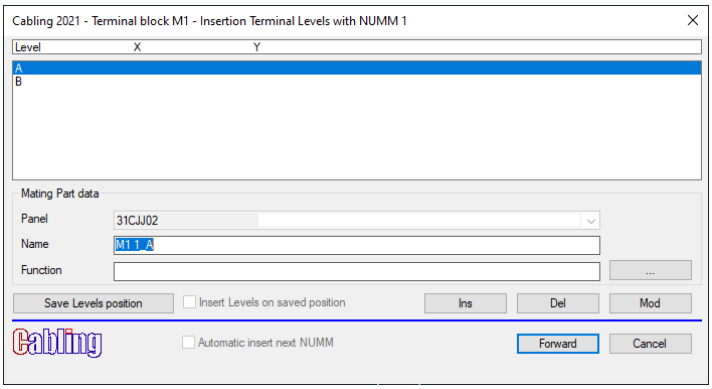
2.3 INSERT MODULAR TERMINAL BLOCKS

When you want to create a terminal block with modular terminals use the command 2 - Groups, choose the category Terminal block and one of the available materials. Choose whether to insert the graphic symbol (if associated) and whether to ignore the material in the Bill of Materials. If you want to continue with a terminal block already inserted, you can choose it from the 'New Terminal Block' drop-down list and press 'OK'.



After defining the NUMM (Terminal NUMBER) to be used (which cannot be repeated), if the graphic symbol is associated and the 'Insert Graphic Symbol' flag is activated, the new advanced mode is used directly, otherwise the old mode is used which provides only for the insertion of the mating part nodes of the cables / harnesses.

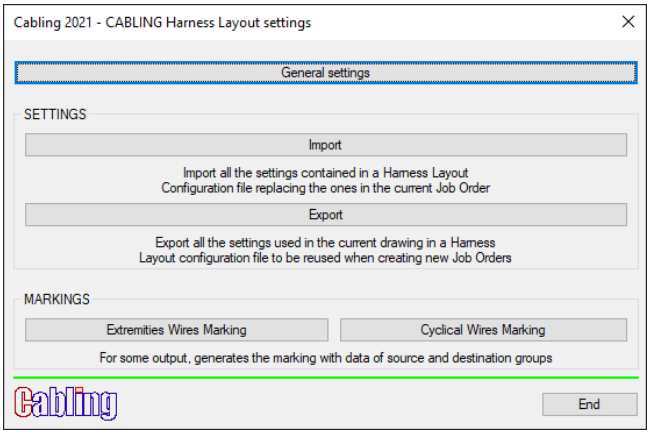
In the advanced mode the graphic symbol of the terminal is inserted without the node (it itself becomes the node) and a direction of insertion of the subsequent terminals is requested. The dialog box that opens allows numerous actions:

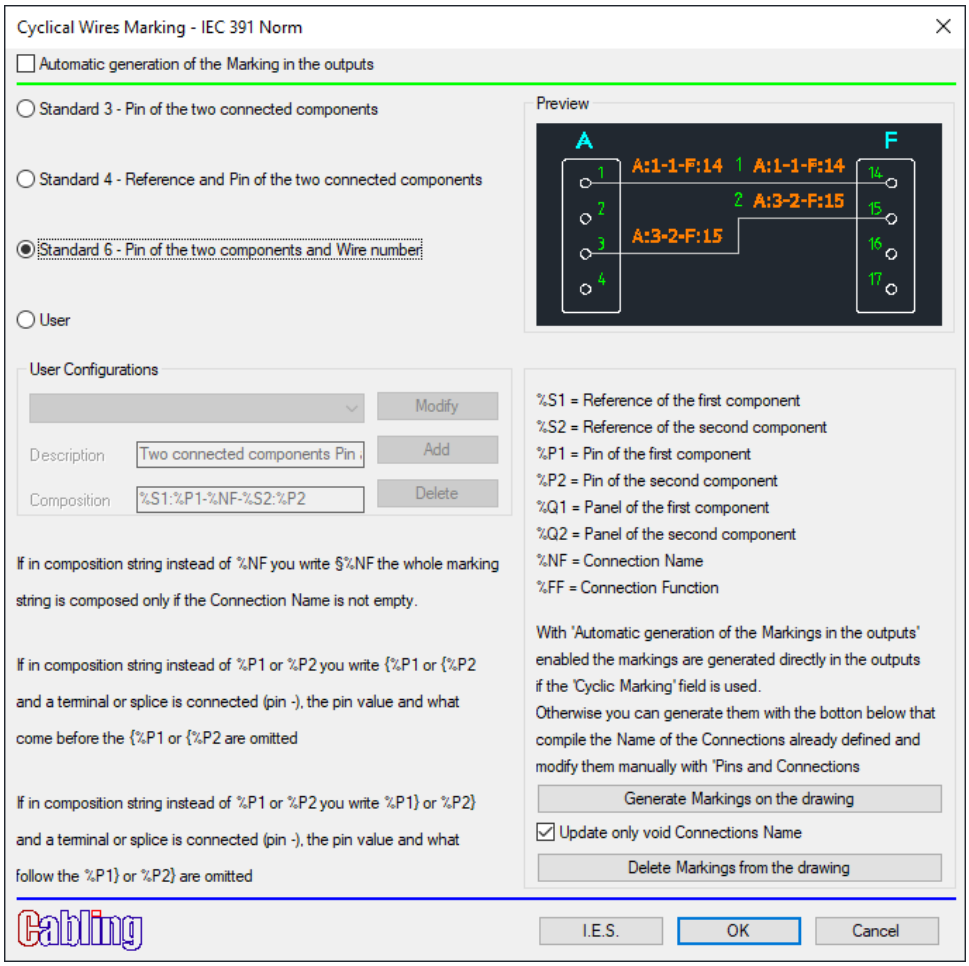


- List of levels (remember that they are duplicated to indicate the Upper and Lower part: a single-level through terminal will present levels A and B)
- Data of the mating part Unplugged Group, whose initials are filled in with the name of the terminal block, space, Terminal number, underscore and level. Obviously the name can be changed according to your needs
- Button 'Ins' to enter the node of the Unplugged group that represents the level. If the flag 'Insert Levels on saved position' is active, the levels will be entered automatically with the saved position with standard names
- With the 'Del' and 'Mod' buttons, you can respectively delete a previously inserted node and change its position
- It is possible to save the position of the levels with the relative button
- After entering the nodes of the levels of the first NUMM (Terminal Number), you can press the 'Next' button to enter the next ones (if any). If the flag 'Automatic insert of next NUMM' is active, the insertion of subsequent terminals is done automatically in the direction indicated with the nodes in the same position as the first and standard names.

2.4 CYCLIC MARKING

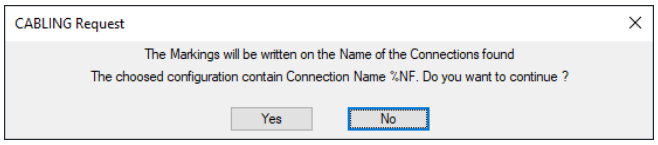
The cyclical marking of the Connections in the Harness Layout settings of CABLING has been enhanced.





With the checkbox 'Automatic generation of Marking in the outputs' is activated, the markings are generated directly in the outputs, if the 'Cyclical Marking' field is present. You can also generate them with the 'Generate Markings on the drawing' button which compiles the Name of the Connections already defined and manually modify them with ‘Pins and Connections management'.

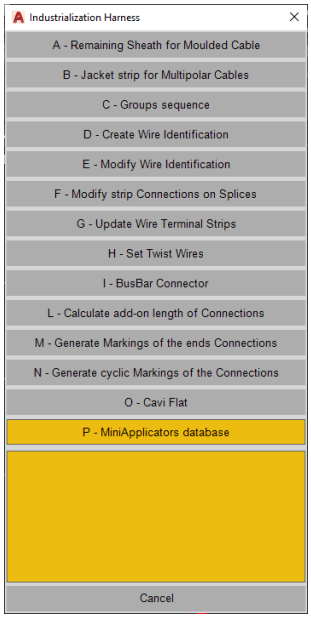
Since the generated marking is written in the connection name, if the chosen configuration contains the %NF field, a potential conflict is created. For this reason a message is given:

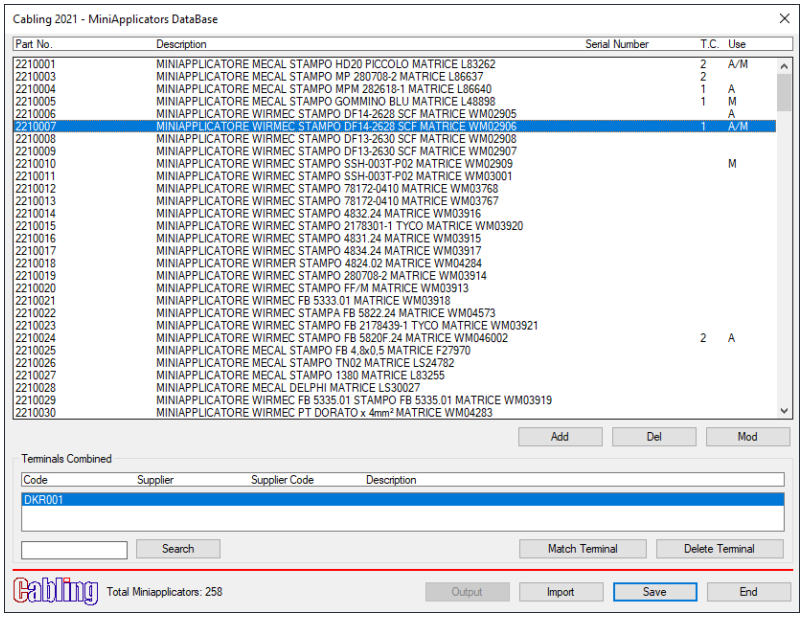


With this new option, the naming/marking of the connections is complete allowing to automate many of the situations requested by users. With the button 'Delete Markings from the drawing' it is possible to delete the connection name.

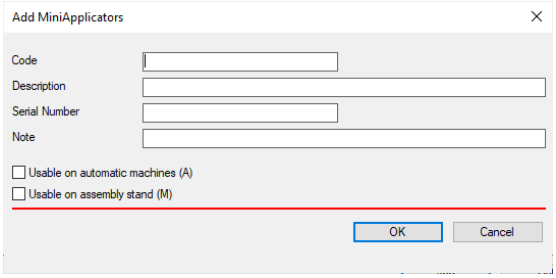
2.5 MINI-APPLICATORS MANAGEMENT

In CABLING 4D 2021 the database of mini-applicators has been added, the tools that can be used for crimping wire terminals and contacts.



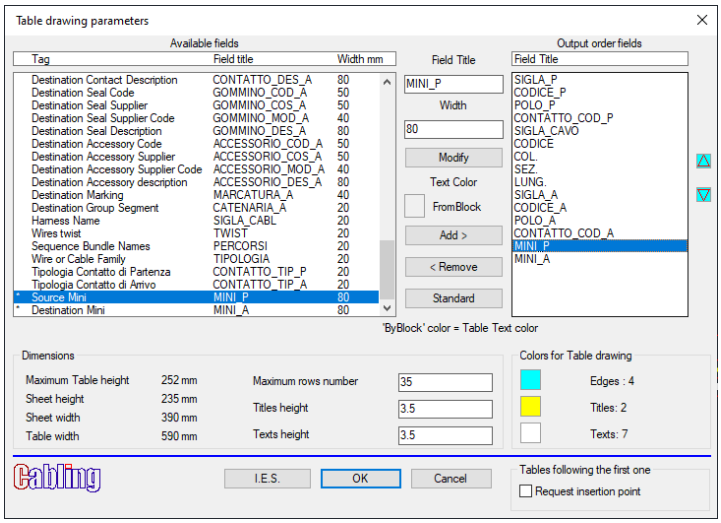


La nuova feature lavora in abbinata all'archivio materiali di CABLING permettendo di abbinare ad un codice
The new feature works in conjunction with the CABLING materials database, allowing you to combine one or more wire terminal/contact codes with a mini-applicator code.
Each mini-applicator must be managed with a unique code, a description and a possible serial number and note. In addition, two flags can be used that distinguish use on automatic cutting/stripping/crimping machines (A) or on semi-automatic desk machines and manual crimping tools, for example nippers (M).



Both flags can be used if a mini-applicator is usable both on automatic machines and on the assembly desk. If both are disabled it means that the mini-applicator is still present but not available (for example it is under repair).
The list of mini-applicators available in a company can also be imported from an external file using the 'Import' button.
This new command is mainly addressed to companies that produce the harnesses because in most of the List of Connections outputs it is now possible to add two fields with the list of mini-applicators to be used for the source and destination wire terminals/contacts, if any.

In the 'Semi-finished' output it is possible to add the two new fields %M1% and %M2%, in the Table, CSV File and XLS File outputs the Source Mini and Destination Mini fields.

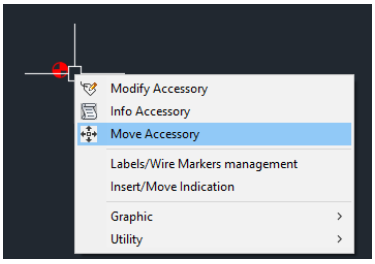


The new feature, derived from the procedures for the management of the automatic cutting / stripping / crimping machines that our company has for customers who want to automate the manufacturing processes of the harnesses, goes in the direction of using CABLING 4D increasingly connected to external environments of the company, in this case the manufacturing.

2.6 MODE ACCESSORY BY CONTEXTUAL MENU

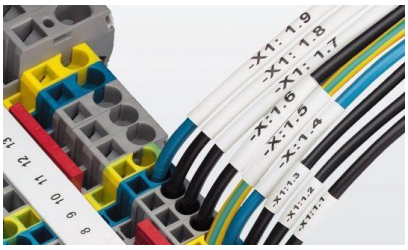
In CABLING 2021 the possibility to move an accessory from the context menu has been added. Moving an accessory is obviously also possible with the AutoCAD commands, but doing it with this new command guarantees these additional capabilities:

1. movement and possible rotation in a single command
2. automatic movement of any indications and shot peening
3. if the movement takes place on a Bundle, rotation is requested and the block is automatically aligned with the Bundle, even on curvilinear sections.



2.7 EXTREMITIES MARKING AND WIRE MARKERS

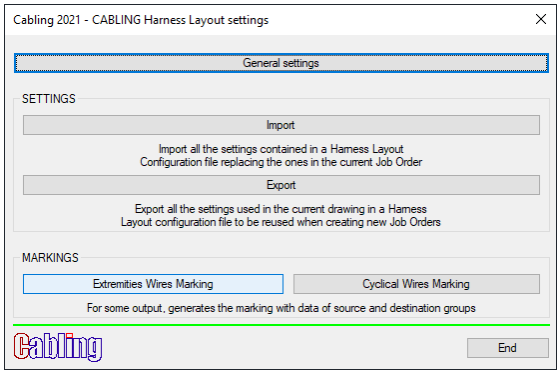
In CABLING 2021 the management of extremities markings and wire markers has been reviewed.

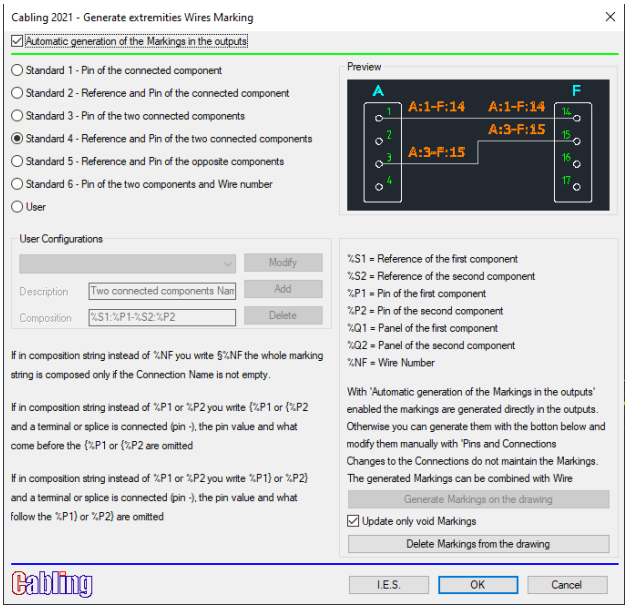


There are two working mode:

1. automatic management of markings
2. manual management of markings.

You can set one of the two modes with the checkbox 'Automatic generation of Markings in the outputs' in the window Generate extremities Wires Marking.





In the first case, the markings are automatically generated by CABLING based on the settings, in the second case manually by the user. There is also the possibility (in manual mode) to generate the markings on the drawing based on the settings (button 'Generate Markings on the drawing') and then modify them later with the 'Create / Modify Connection' and 'Pins and Connections management' commands.

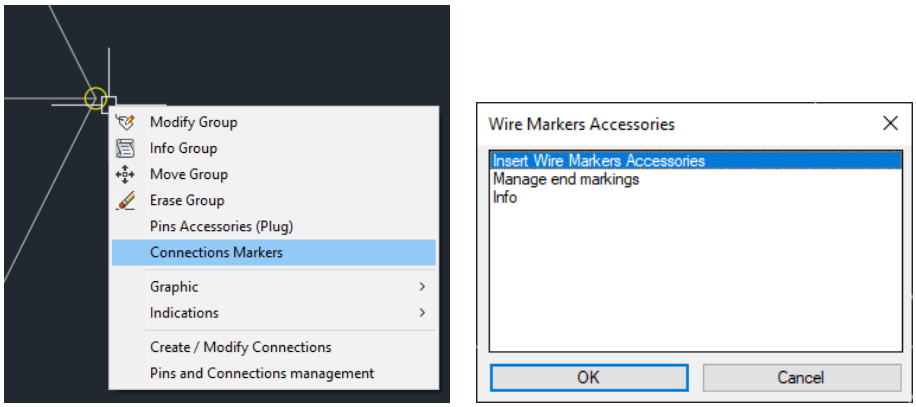
With the generation of end markings without Wire Markers management, both automatically and manually, CABLING considers that they are made directly on the connection, for example with inkjet or laser printing, therefore without additional material. It changes if the material of a Wire Marker is matched to the Groups to which the connections arrive: in this case CABLING counts the materials and creates an output for the marking systems (such as Grafoplast).

If necessary, you can then manage mixed head and / or tail markings, some with Wire Markers, others with inkjet / laser markings, based on the material associated with the groups from which the connections start or arrive.

How do you combine a wire marking material with a Group

There are two ways:

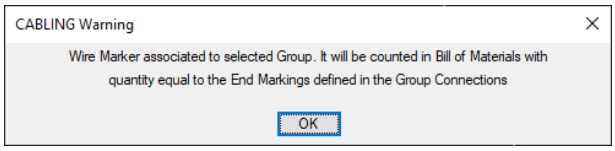
- with the Accessories command by checking the 'Manage as Wiring Marker' box
- with the 'Wiring Markers for Connections' option in the contextual menu of the Groups



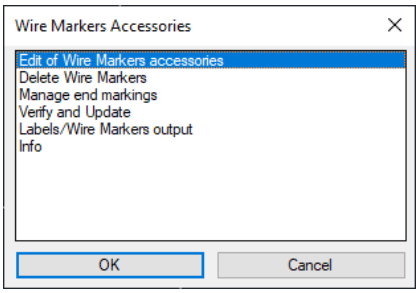
Wire Marker accessories can be:

- materials taken from the Accessories database (with possibility of additional accessory materials)
- pieces of thermo-shrinking sheath taken from the Sheaths database (marked later manually)

Whenever you associated a material to a Group, this message will be given:



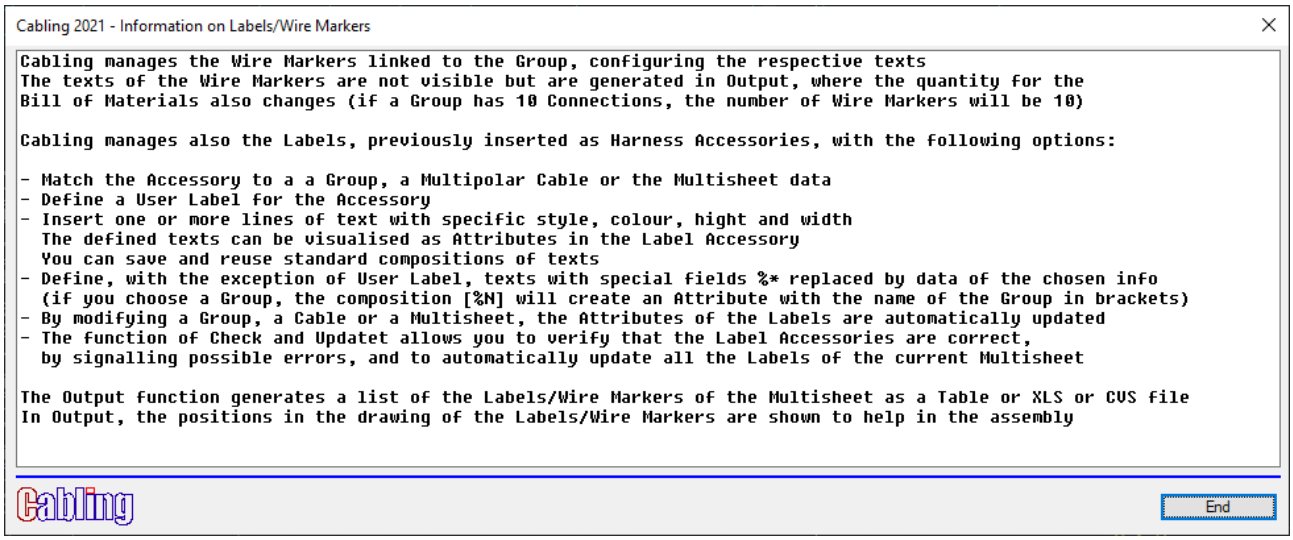
It is possible to modify or delete a Wire Markers associated with a Group using the options of the contextual menu



In the context menu there are also other options:

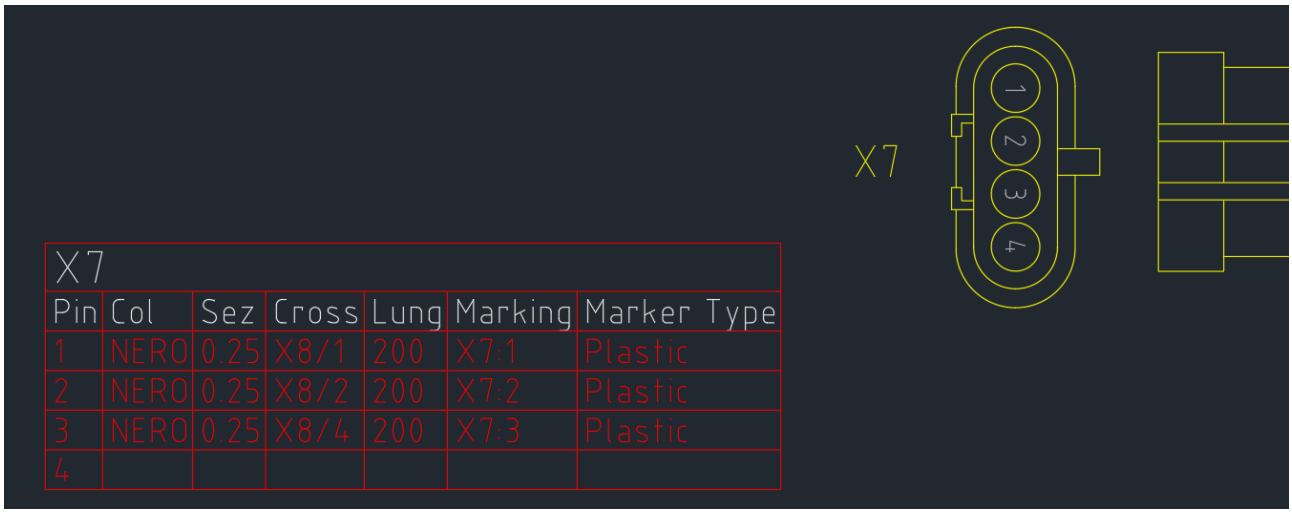
- Manage end markings: opens the dialog box for their management
- Verify and update: allows you to verify and update the Markings of the current drawing
- Labels / Wire Markers Output: allows you to create outputs with the list of Labels and Wire Markers
- Info: help about Labels / Wire Markers.

If Labels or Wire Markers have not yet been inserted in the current drawing, CABLING will not present the options 'Check and Update' and 'Labels / Wire Markers Output' in the context menu of the Group.



In the outputs List of Connections → Semi-finished drawing, Splices drawing and Drawing of Connector wiring, it is now possible to display the start / end markings (tags of the tables Tbl_Wire: %M1% and %M2%), the materials of the Wire Marking (tag %T1% and %T2%) and the insertion of the CBL_LABEL graphic symbol (%BT1% and %BT2% tags) if the wire marker is present at the start and / or end.

In the Indications of the Groups it was already possible to view the marking at the end of the Group connections. In the 2021 version, the new field Extr. Markings material Type' (Marker Type) which allows you to view the type of material, the one defined in the materials database. In the absence of this information, an asterisk will in any case be inserted to indicate that the marking must be made with a Wire Marker material, which we remember can be an accessory or a piece of typically thermo-shrinking sheath.



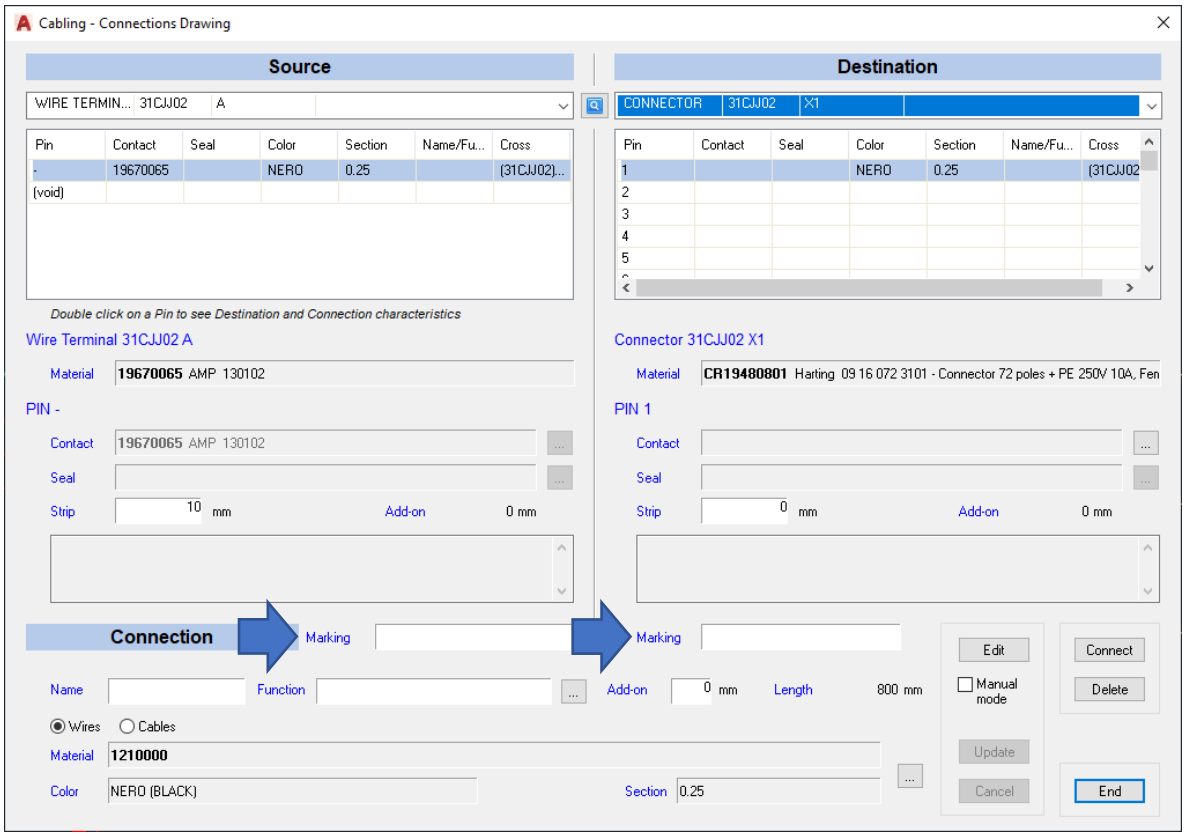
X7

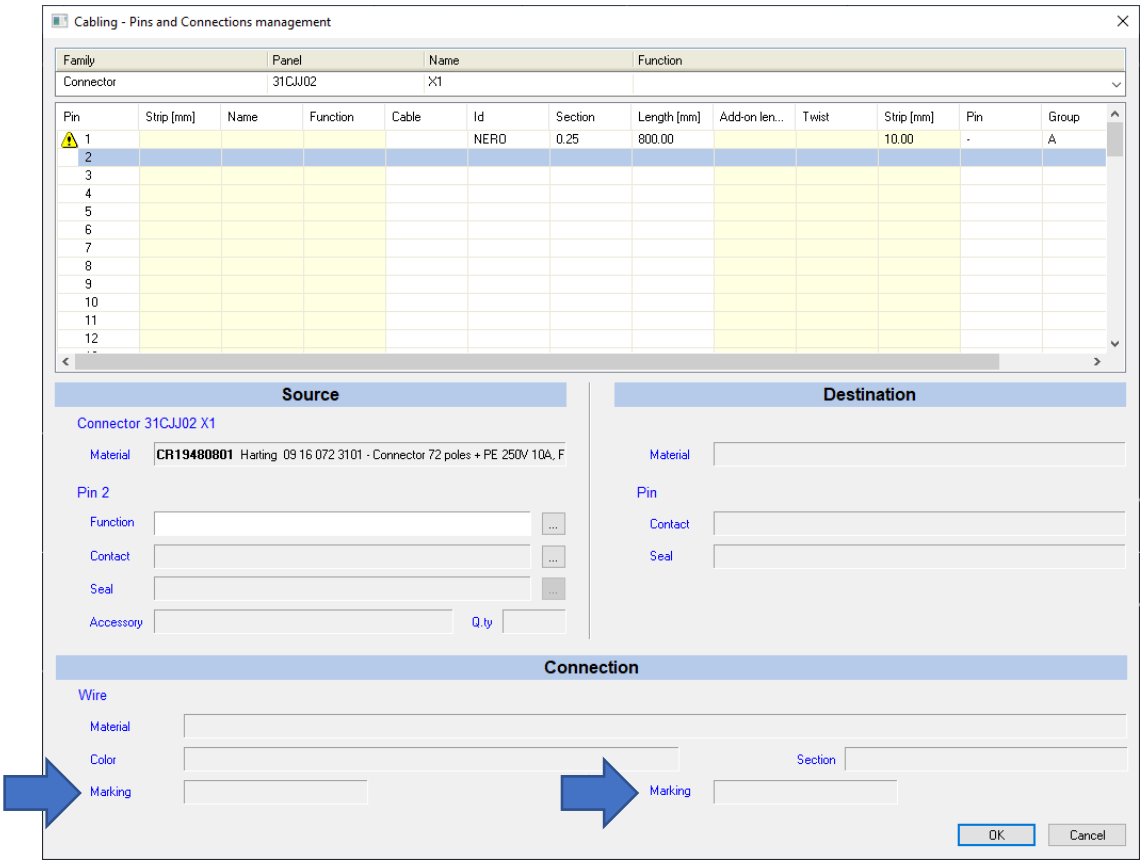
Pin	Col	Sez	Cross	Lung	Marking	Marker Type
1	NERO	0.25	X8/1	200	X7:1	Plastic
2	NERO	0.25	X8/2	200	X7:2	Plastic
3	NERO	0.25	X8/4	200	X7:3	Plastic
4						

X8

Pin	Col	Sez	Cross	Lung	Marking	Marker Type
1	NERO	0.25	X7/1	200	X8:1	×
2	NERO	0.25	X7/2	200	X8:2	×
4	NERO	0.25	X7/3	200	X8:4	×

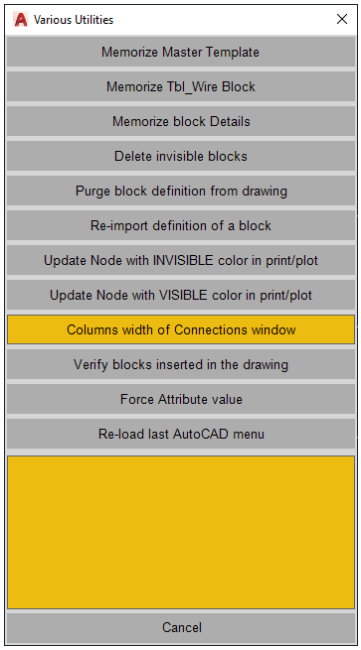
Two other commands changes according to the 'Automatic generation of the Marking in the Outputs' setting: if the checkbox is disabled, there are two additional dialog boxes in the 'Connections' and 'Pins and Connections management' commands.



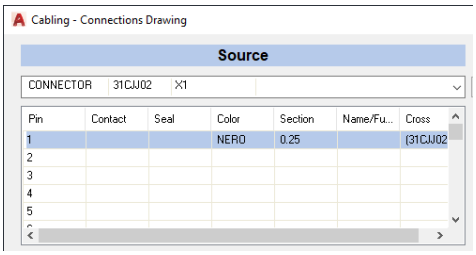


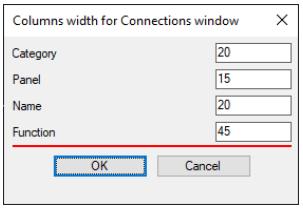
The management of markings is now complete and allows everyone to correctly define this important aspect of the construction of cables and harnesses.

2.8 COLUMNS WIDTH OF CONNECTIONS WINDOW



To give greater possibility of product customization, CABLING 2021 offers the possibility to change the width of the columns of the Connections window command (menu Util → Cabling Utilities → Column width of Connections window)



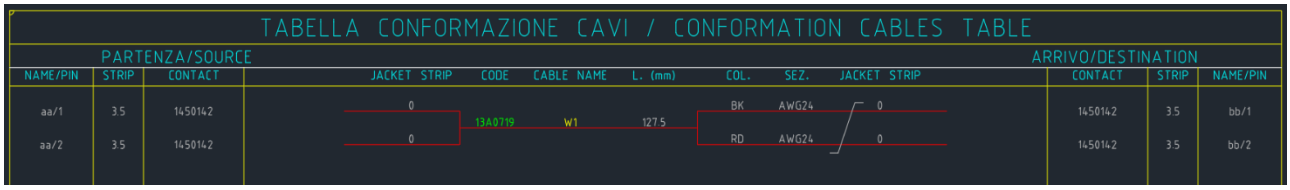


2.9 DRAWING OF LIST OF CONNECTIONS AND CABLES CONFORMATION

In CABLING 2021 these two outputs have the TAG (attribute) %TW% available, which highlights any twistings of wires or conductors of multipolar cables.

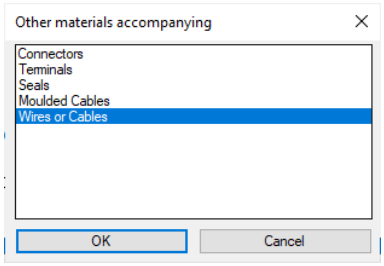
In the case of wires, the name of the twist is entered:

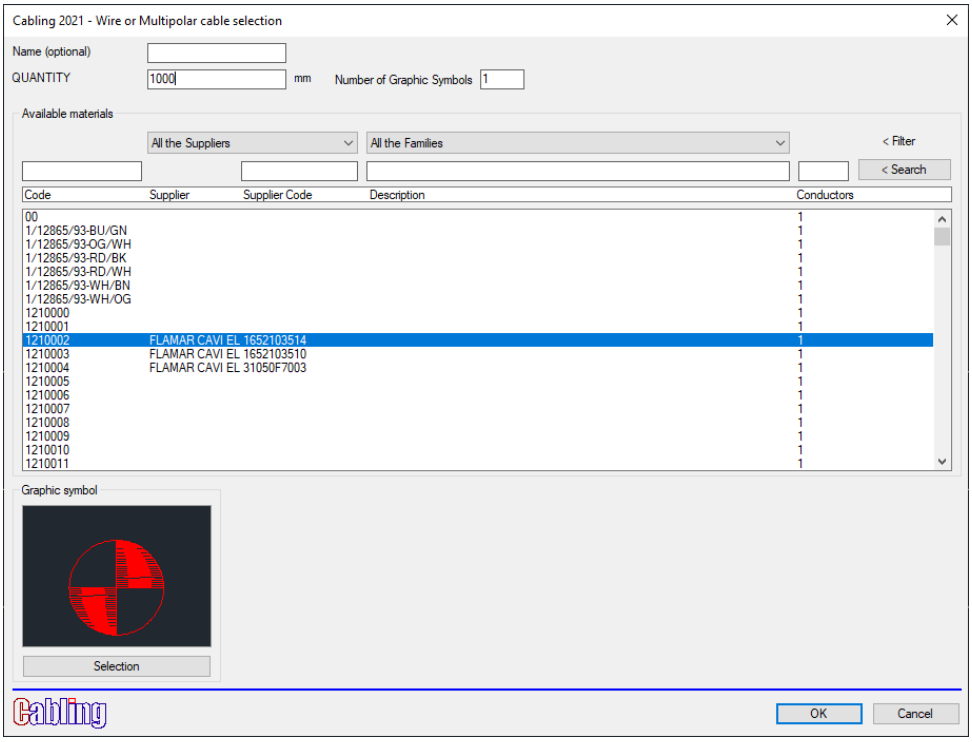
In the case of multipolar cable conductors, the twist symbol is inserted:



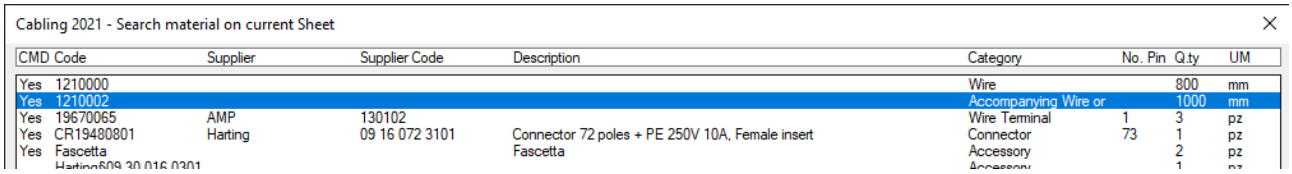
2.10 ACCOMPANYING MATERIALS IN INSERT ACCESSORIES

In CABLING 2021, the option has been added that allows you to insert a wire or multi-polar cable as accompanying material.



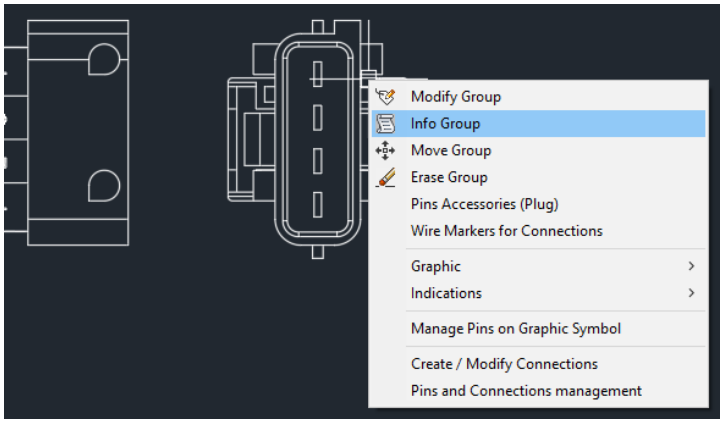


They are counted in the bill of materials and in 'Search of materials' command are classified as 'Accompanying wire or cable'.

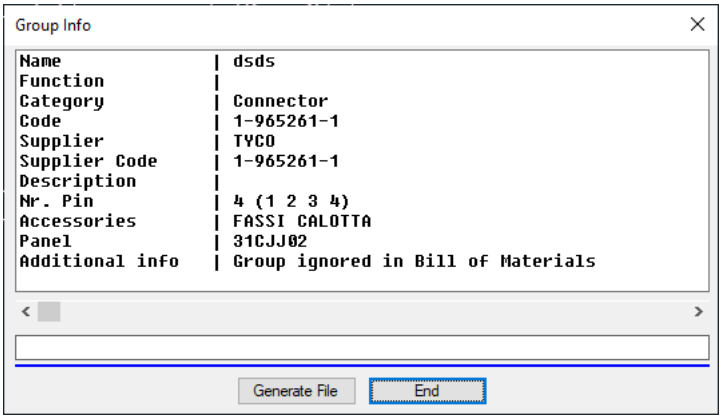


2.11 GROUP INFO

In CABLING 2021, additional items regarding the bill of material and industrialization have been added in the Group Info command of the contextual menu.



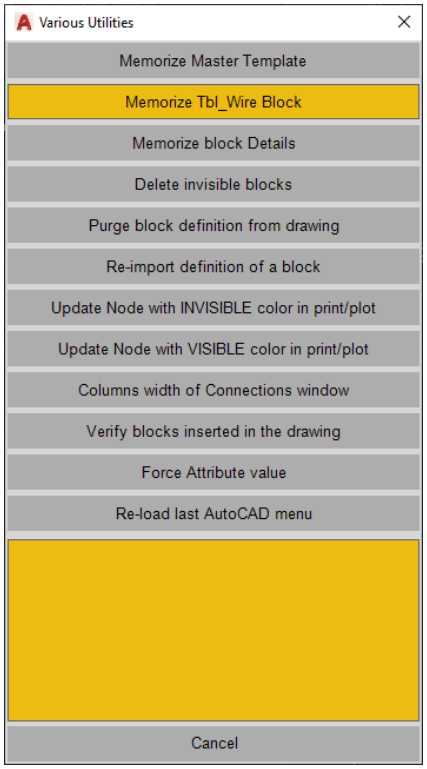
The last two items in the window below are an example.

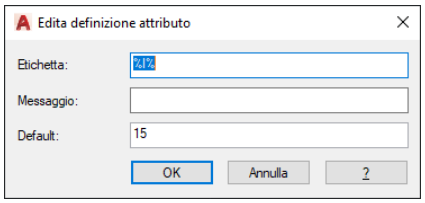


It becomes easier and easier to consult all the information related to the Groups included in CABLING.

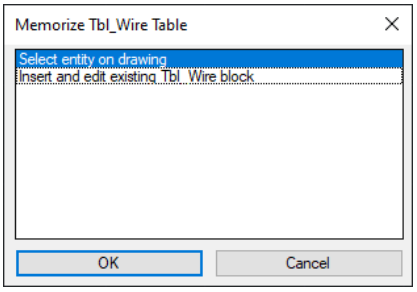
3 ADDITIONALS

3.1 SAVE TBL_WIRE TABLE





If you want to customize a TBL_WIRE* table you now have an advanced command that will make it easier for you. The command starts from UTIL → Cabling Utilities → Memorize Tbl_Wire Block.
You are immediately asked whether to select the entities of a previously exploded block or to insert and modify a saved block.

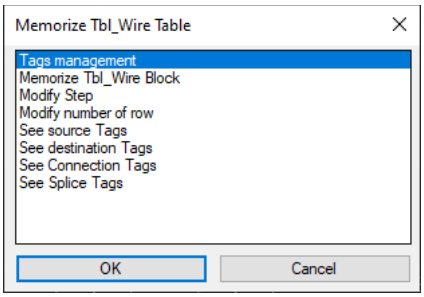


The system is based on TAGs enclosed between two % characters. For example %I% means 'Wire Color or Conductor Name': in the outputs, for each connection, a text is inserted with the graphic characteristics of the tag and its Wire Color or Conductor Name as text. The tag value is the maximum width of the text.

The tags are divided into 3 categories:

- Tag with texts
- Tag with graphic symbols
- Service tag

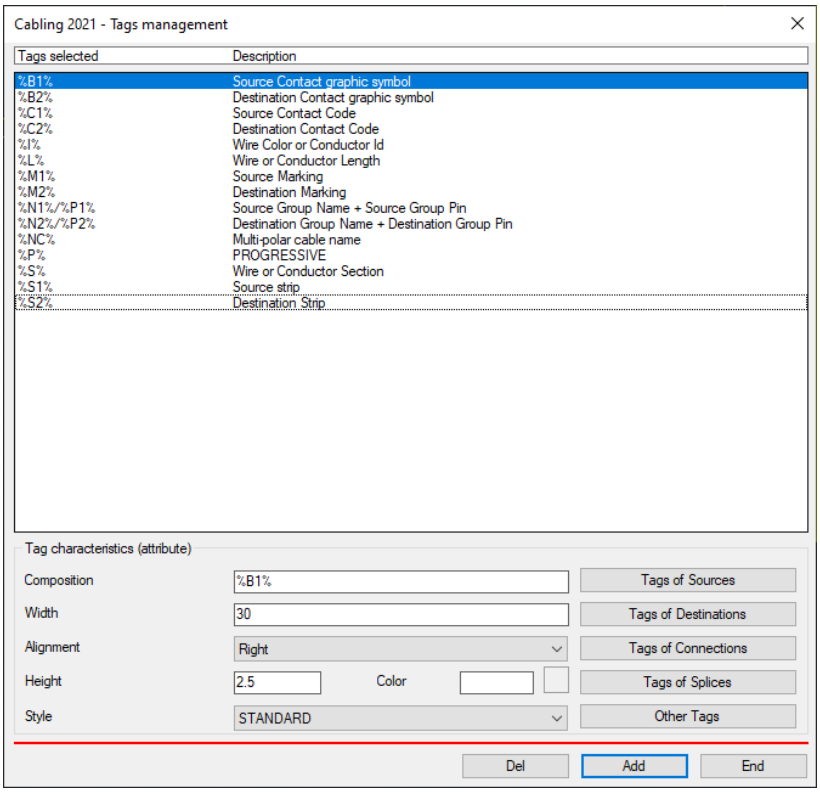
After the selection of the entities or the explosion of an existing Tbl_Wire*, a simulation (if possible) of how the table will be compiled is performed and in the command line is asked '... press a key to continue ...', followed by the open of a dialog with the options:



The 'Tag Management' option is new and opens a dialog box to add and delete tags.

There are 5 service tags:

- %AREA%
  meets 3 needs: the starting point of the first of the connecting lines, the color of the line and the length of the line, half on one side and half on the other with respect to the insertion point of the tag
- %STEP%
  meets 2 needs: the step between the lines of connection lines and the orientation of the table, which can be Vertical, Horizontal to the Right or Horizontal to the Left
- %ROWS% matches the number of rows of Connections in the table
- %XBH%
  satisfies the height of the graphic symbols of the Groups inserted with the tags %XB1%, %XB2%, %XS1% and %XS2%
- % SP% space between Tags



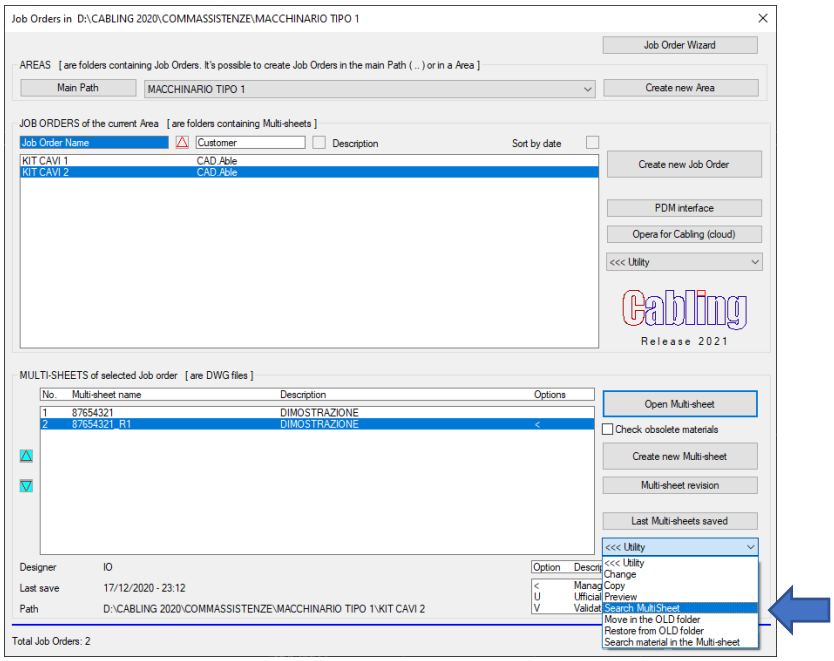
The new window lists the tags selected or found in the existing Tbl_Wire* block (excluding the service ones) with their description. With the five buttons ‘Tag of Sources’, ‘Tags of Destinations’, ‘Tags of Connections’, ‘Tags of Splices’ and ‘Other Tag’ the relative dialog box are opened with the Tags that you can add in the Composition text box.

With the 'Add' button you can add a new Tag, with the 'Del' button you can delete one. The tags, if strictly necessary, can be duplicated: confirmation is requested.

Remember the importance of alignment: on the right for the graphic symbols that are to the left of the connection lines, on the left for the graphic symbols that are to the right of the connection lines.

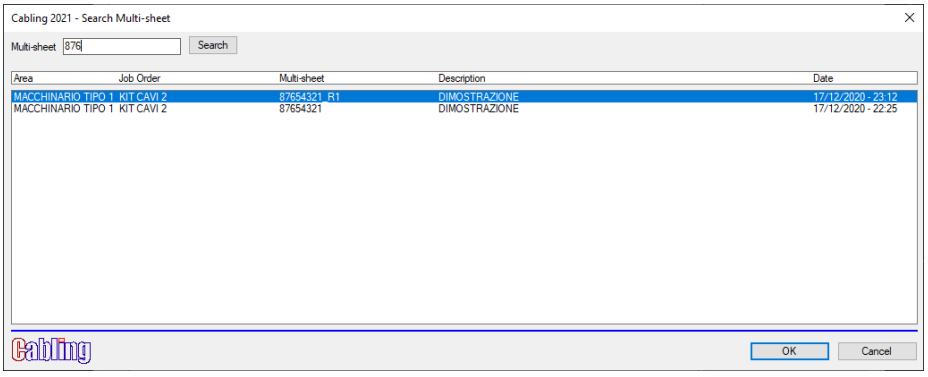
3.2 UTILITIES FOR JOB-ORDERS E MULTI-SHEET

In CABLING 4D 2021 the Job-Order and Multi-Sheet '<<< Utility' buttons have been transformed into a drop-down box: it avoids the opening of another window where you can choose the command as was the case until now.

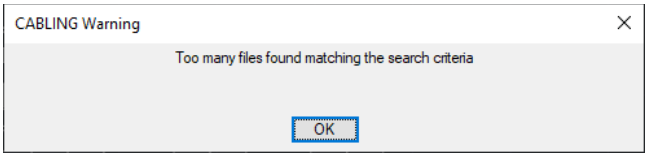


3.3 SEARCH MULTI-SHEET

In CABLING 4D 2021 it is possible to search for a multisheet by choosing the relative option in the command list of the multisheet '<<< Utility' drop-down box (see previous image).
The following window opens with the multisheets that match the search string or the begin of it.

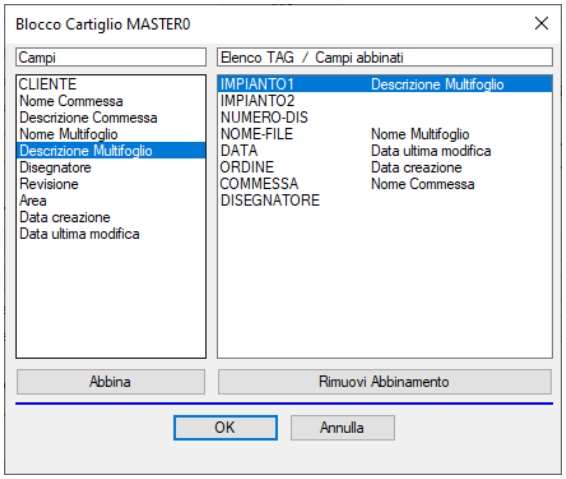


If the search return more than 100 multisheets, the following message is returned:

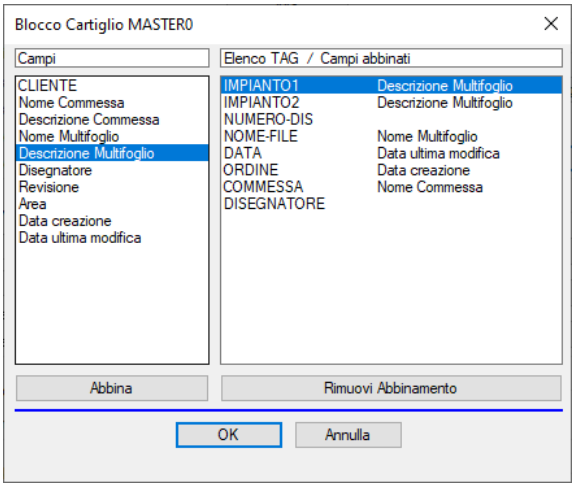


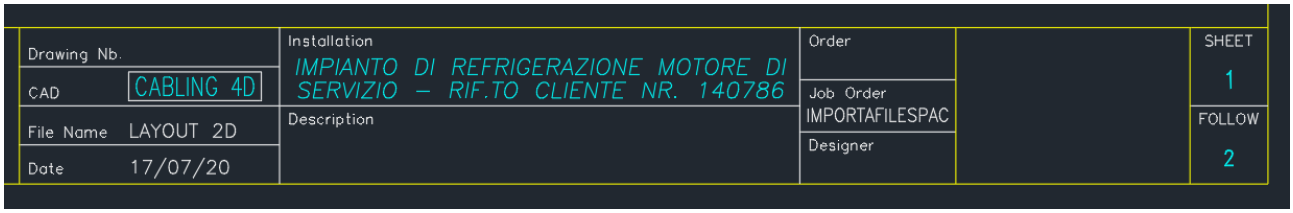
3.4 UPDATE OF MASTER TITLE ATTRIBUTES

Until now, with 'Match Job Order Management Data' of the Sheets → CONFIGURATION command it was possible to match a field defined in job management, in particular Job-Order Description and Multi-sheet Description, to a single tag of the title block, but it is often too long compared to the width of the title block fields.

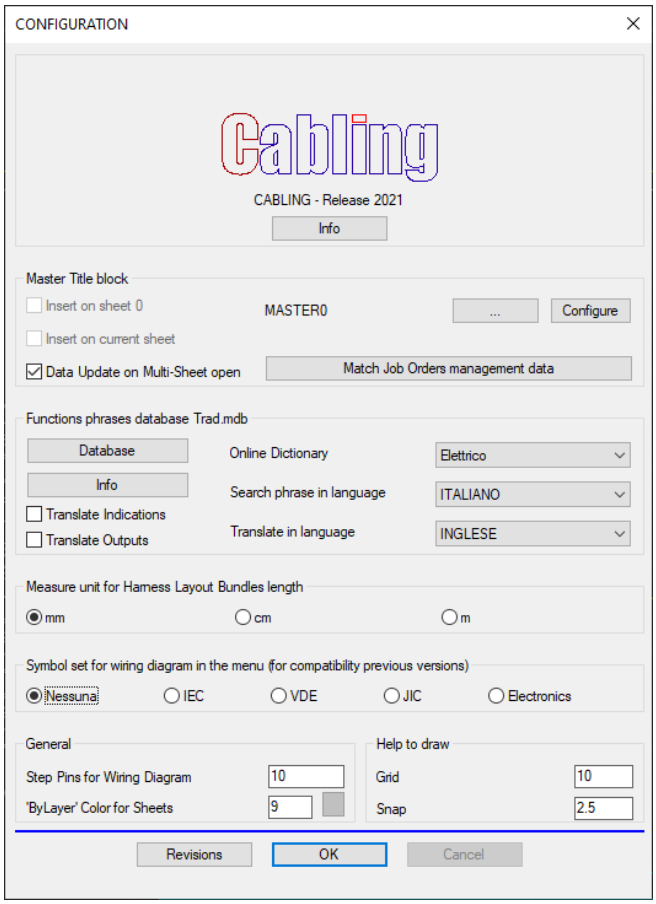


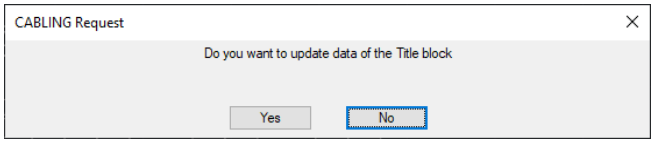
Now you can associate a field to multiple tags: Cabling splits equally the text on the associate tags, solving the problem.





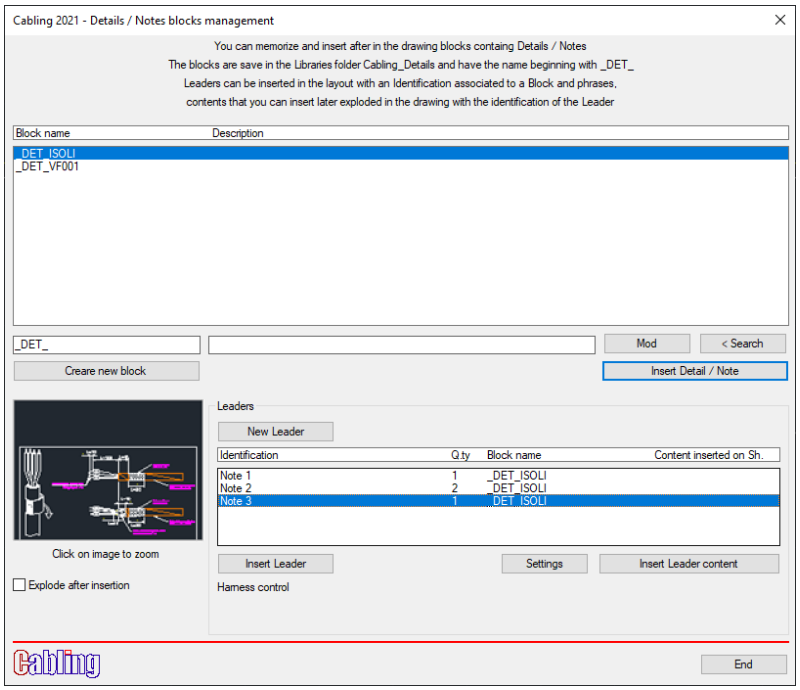
In addition, the 'Update data when window closes' checkbox has been removed and replaced by a confirmation request when you press OK.



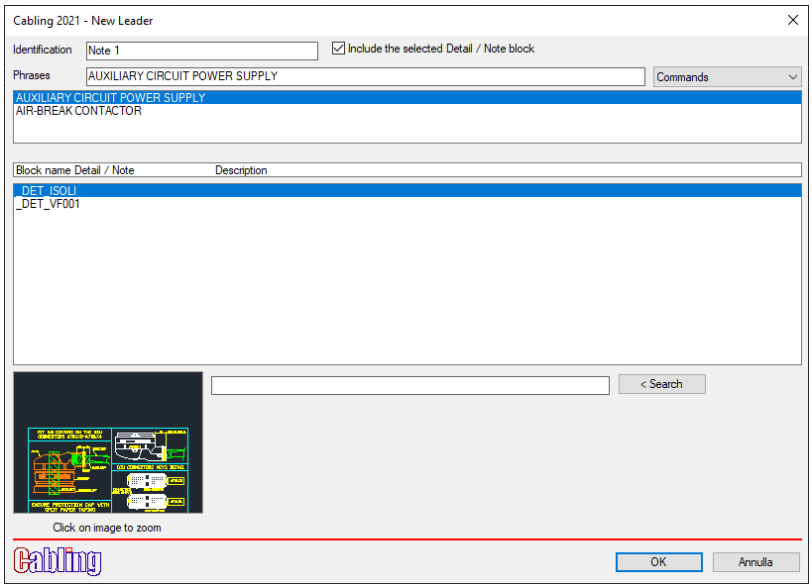


3.5 DETAIL / NOTE BLOCKS MANAGEMENT

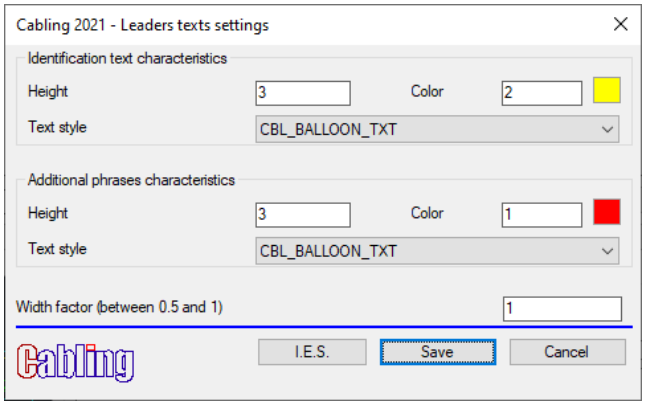
In CABLING 2021 the management of Details/Notes to be included on the Harness Layout has been enhanced. In the 'Graphic Harness Layout drawing' command, use the 'Details / Notes management' command in which it is now possible to insert Leaders in the layout of an harness with an identifier combined with a block and phrases (up to 4 of maximum length 255 characters).



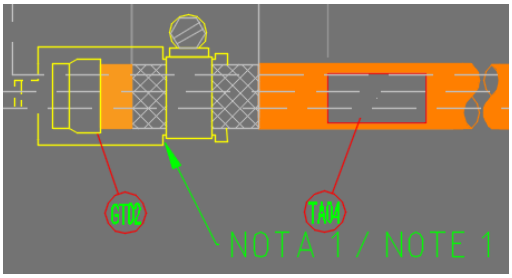
The options for managing the sentences are: 'Add', 'Modify' and 'Delete'. It is also possible to retrieve standard phrases with 'Search Phrase on Translator', 'Translate Current Phrase' and 'Acquire Phrase' from the drawing. The identifier is displayed in the Leader inserted and the associated information are saved.
After each definition of a 'New Leader' and insertion in the drawing, it is possible to re-insert it several times and the number of times is displayed in the 'Q.ty' field of the list.



The goal is to insert in the layout only the Leaders with the identifier (for example Note 1, Note 2, etc.) and to after display the content associated with the Leader in another position or in another sheet of the multisheet.
To do this, use the 'Insert Leader content' button: you will be asked to insert the eventual associated Detail / Note symbol (which can remain a block or exploded to be modified based on the 'Explode block after insertion' checkbox) and the Leader identifier including any associated Phrases.
Texts height, color, texts style and width factor can be configured with the 'Settings' button.



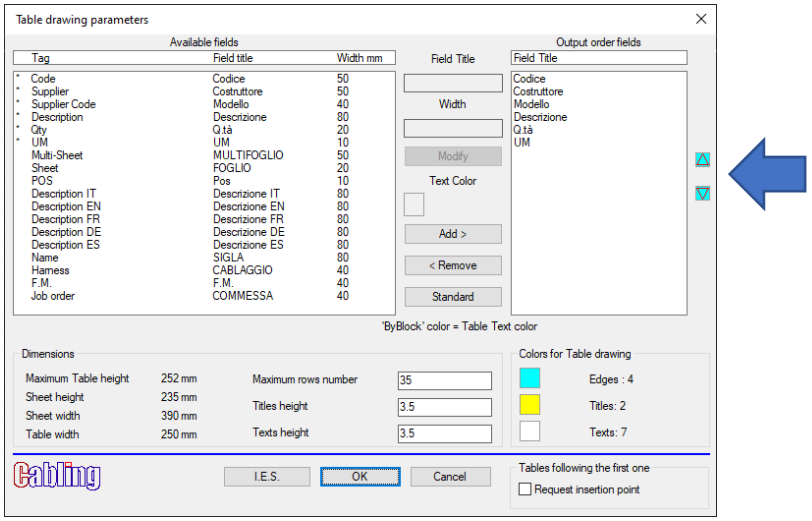
Leader inserted with Identifier

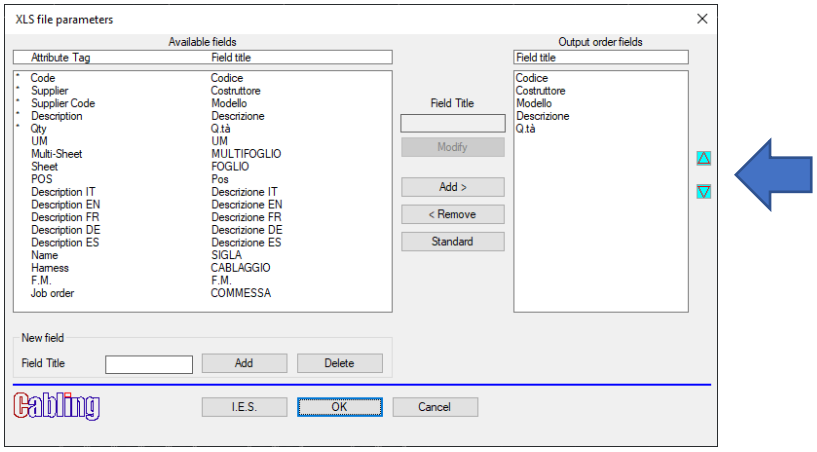


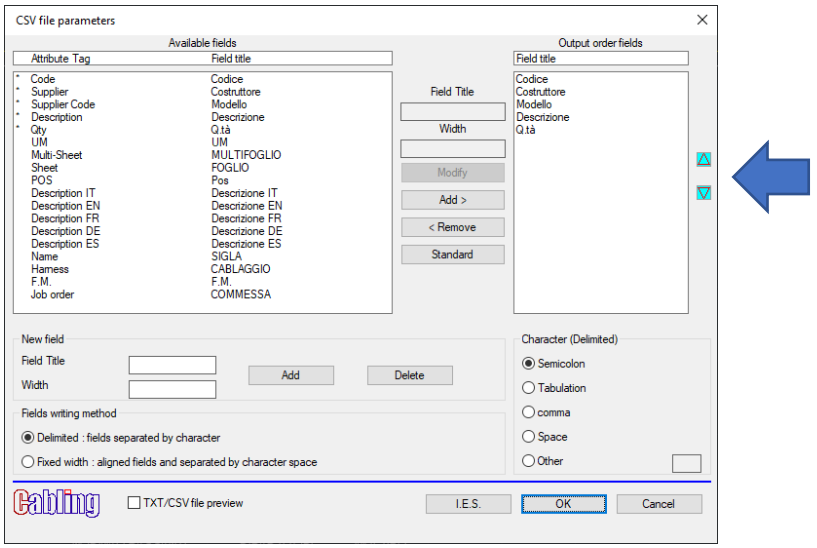
Leader content insertion with Block, identified and additional phrases

3.6 OUTPUT – MOVE THE POSITION OF THE OUTPUT FIELDS

In the windows for setting the fields for the outputs, two arrows have been added to move a field up and down. The question to add the field before the selected one has been eliminated: the field is added to the bottom and you can move it with the arrows.

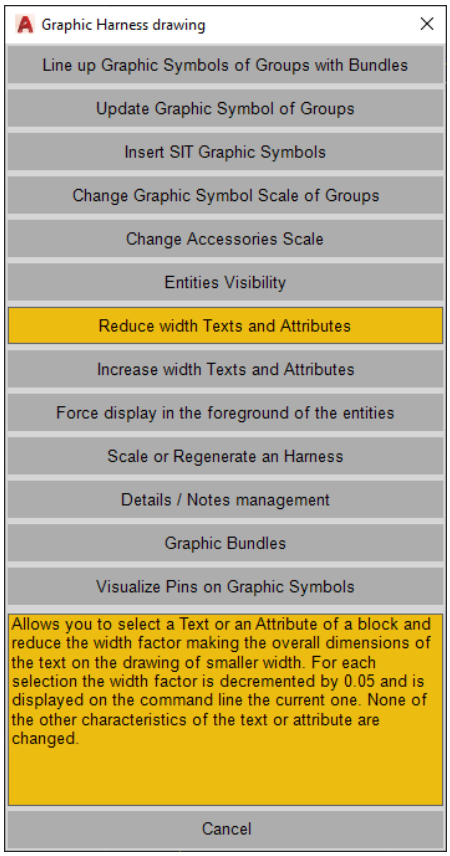






3.7 REDUCE AND INCREASE WIDTH OF TEXTS AND ATTRIBUTES

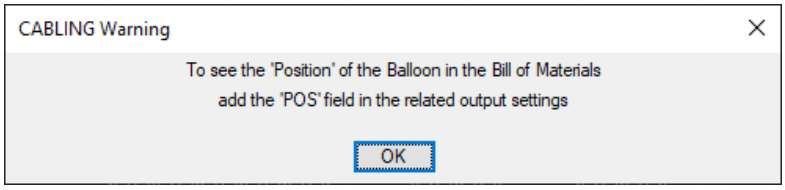
In CABLING 2021 these two functions have some improvements.



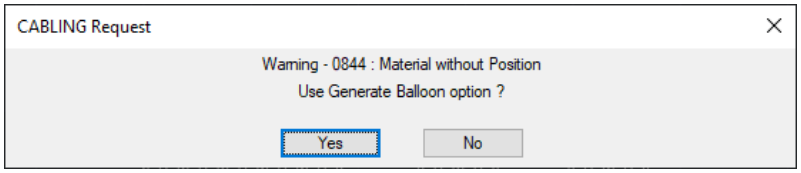
1. A breakpoint has been inserted so that in case of canceling the command, there will be no other repercussions on the drawing
2. If you increase or decrease the width of an attribute associated to an accessory managed as a Label, the change updates the internal data stored in the accessory: in case of updating of the labels, the width characteristics are maintained.

3.8 BALLOONS

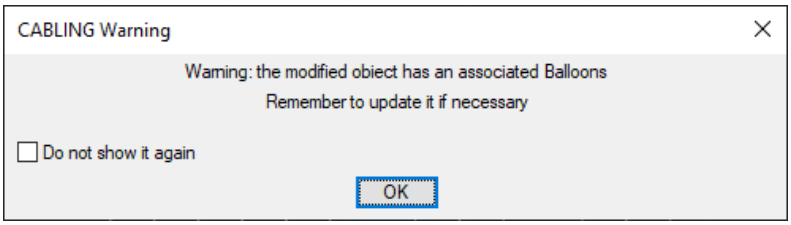
In CABLING 2021 the balloons command opens the 'Generate Balloons' window when no Position has yet been generated. After generating the first balloons, CABLING gives the following message:



In case of modification of a drawing it may happen to insert an object with a new material code to which a Position has not been assigned: if the new material is selected, the following message is given with the possibility of directly opening the 'Generate Balloons' window with the focus on the code itself. Associate a new position and re-select the object again: the balloon will be inserted.

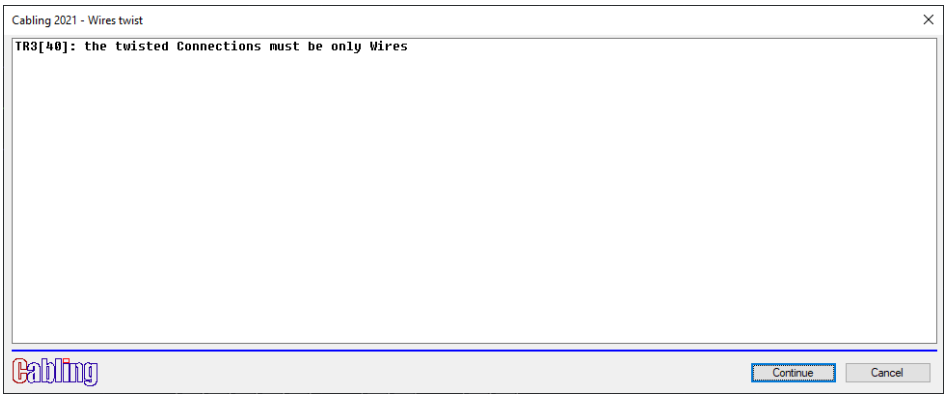


Finally, in case of modification of an object to which a balloon is linked, the following message is given, which can in any case be disabled for the current drawing session.



3.9 MESSAGING

In CABLING 2021 messaging and error checking was further implemented.
Many of the messages that were previously given on the AutoCAD command line or in the lower part of the dialog boxes are now displayed more clearly with an alert, making the use of CABLING more intuitive and clear.
Controls have been increased in the bill of materials but also in the other outputs and collected in a list that is displayed with a special dialog box, like the one below.

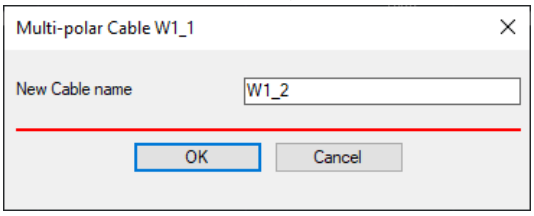


CABLING 2021 helps designers to work better and to ensure the results obtained.

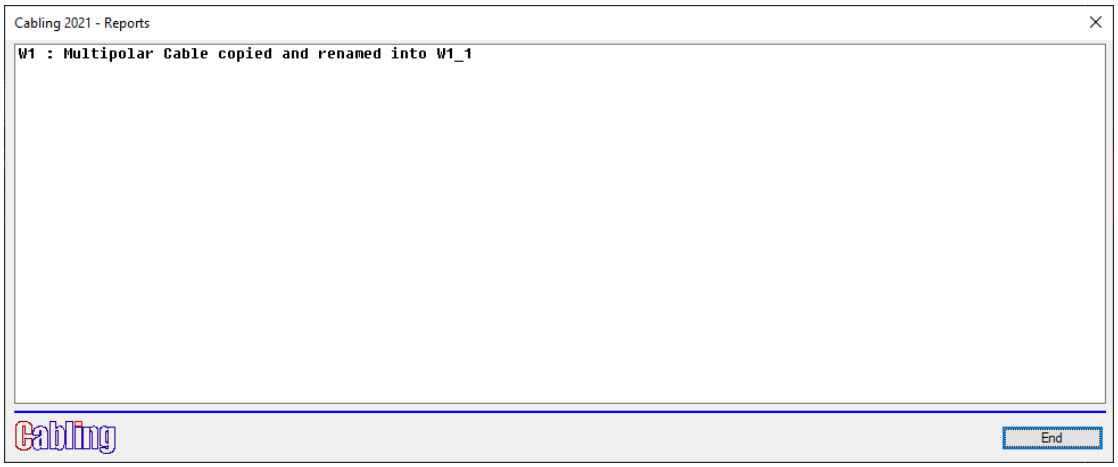
3.10 COPY BETWEEN SHEETS

In CABLING 2021 the copy between sheets of one or more harness layouts selected on the current sheet has been improved with these new features:

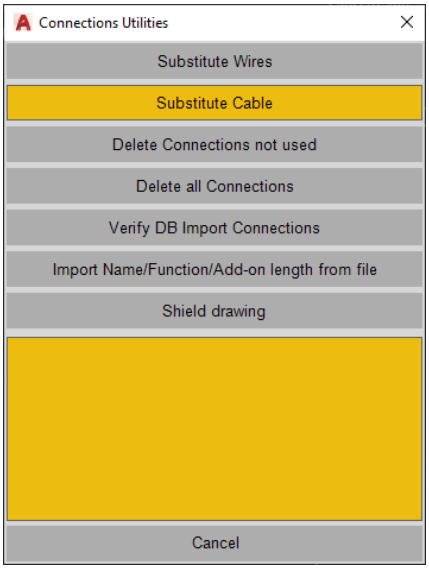
- If the copy is made on the same multisheet and the harnesses to be copied contain multipolar cables, a dialog box is opened for each cable where you can enter the new name (before it was asked on the AutoCAD command line)



- If the copy is made on another multisheet and the Harnesses to be copied contains multipolar cables, the copy is made without further requests (as it happened before) and at the end a dialog box is opened which summarizes how the multipolar cables have been renamed if they are already present in the destination multisheet: a '_' and a numeric index are added to the cable name.



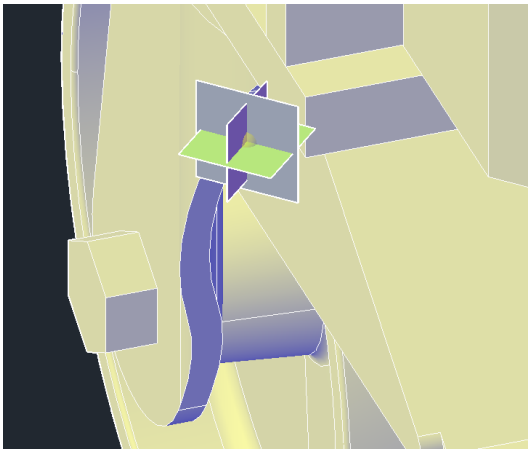
You can rename the copied multipolar cables with the appropriate 'Substitute Cable' option of the Connections utilities:

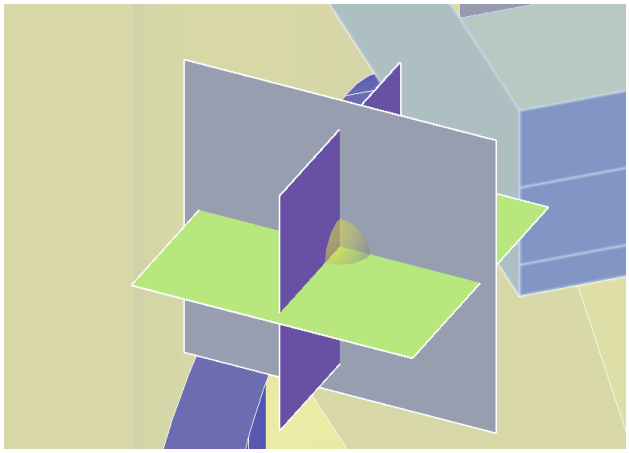


4 THE 3D

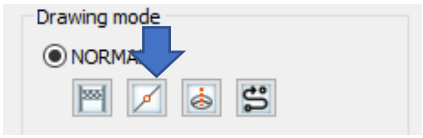
In CABLING 4D 2021 it is possible to insert 3D Reference blocks on which to pass a Spline curve. These are the news for these blocks:

- When drawing a spline the 3D Reference blocks are no longer zoomed as they did before: this facilitates the selection of insertion point and alignment face

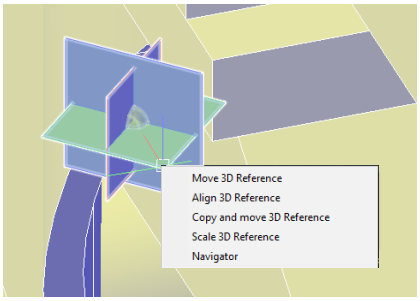




- While inserting a 3D reference, in addition to zooming as before, it is now possible to pan by pressing the mouse wheel
- During the insertion of a 3D reference, the insertion scale can be varied by pressing the CTRL key and rotating the wheel: the next insertions will use the last scale
- When inserting a 3D reference, you can use the 'midpoint between two points', icon in the side dialog box (for example to insert it at the end point of a tube)



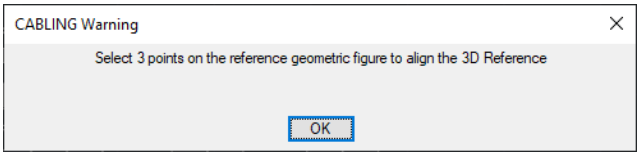
- After inserting a 3D reference, you can use the CTRL Z to go back to the last insertion (previously it deleted all the blocks inserted)
- Right-clicking on a 3D Reference block opens a specific contextual menu



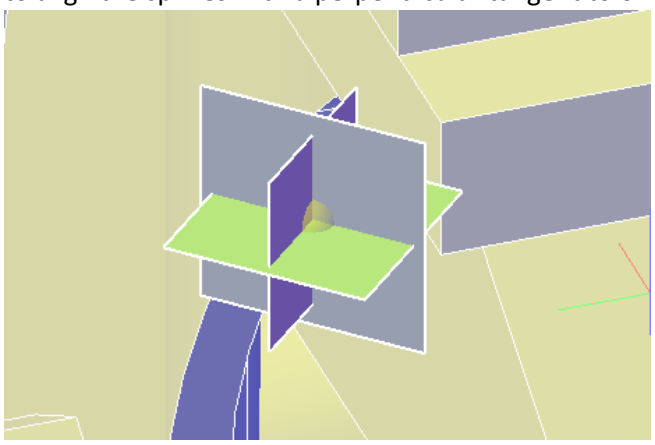
- In addition to the 'Move 3D Reference' already present in the previous version, it is now possible to Align, Copy and move, scale.

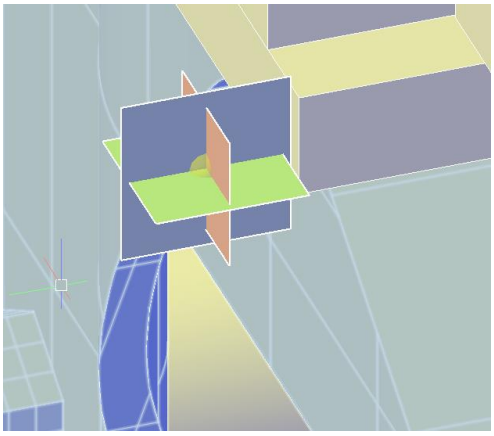
Align 3D Reference

First the following message is given:



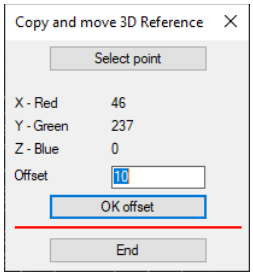
After selecting the 3 points, the 3D Reference is aligned on them keeping the same insertion point. It is used to align the splines with a perpendicular tangent to one of the faces.



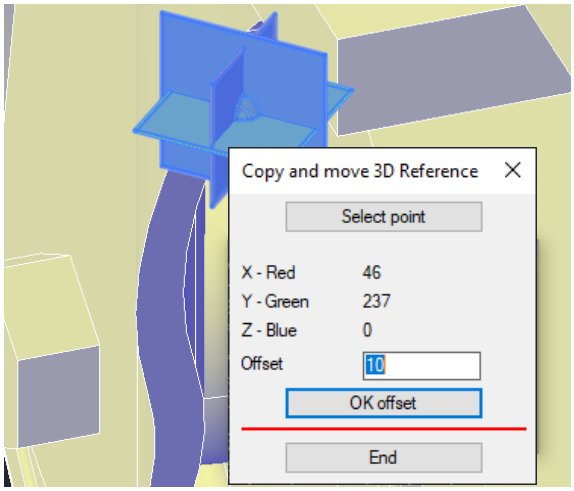


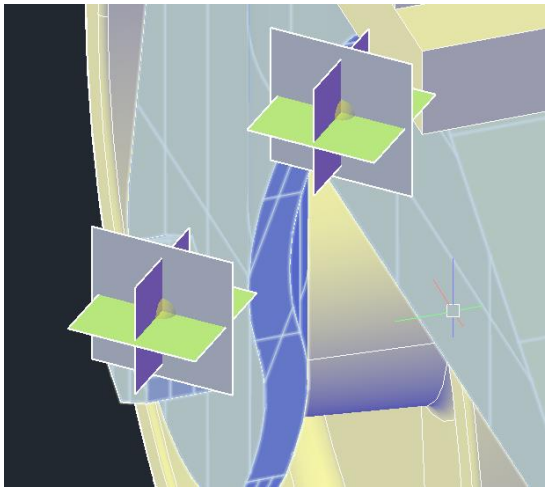
Copy and mode 3D Reference

Opens a following dialog:



It allows you to copy the selected 3D Reference with a certain offset parallel to one of its planes, planes whose normal vectors are aligned to the X, Y or Z axis of the 3D Reference itself. Alternatively, you can select a point: the block will be copied to the new position with the same vector alignment. If a block is copied to the position of an already inserted one, a message is given and the copied block is deleted.

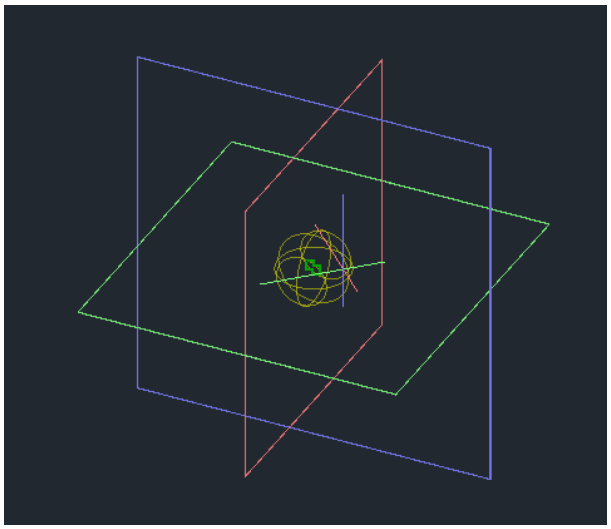




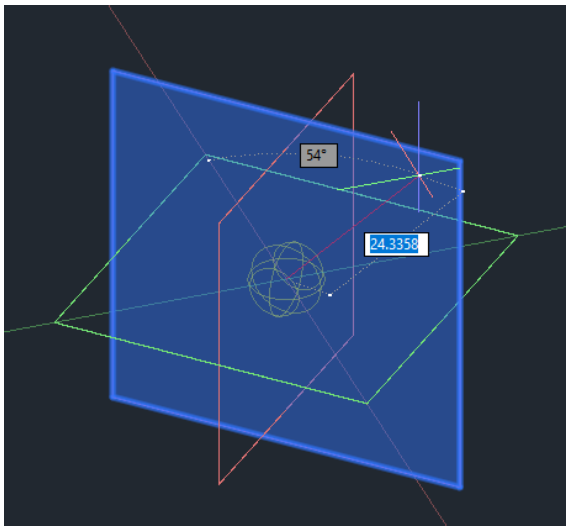
Scale 3D Reference

Opens a dialog where you can change the block scale.

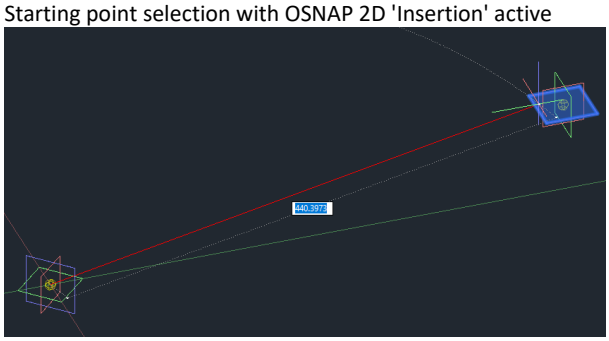
Draw Spline → sequence example



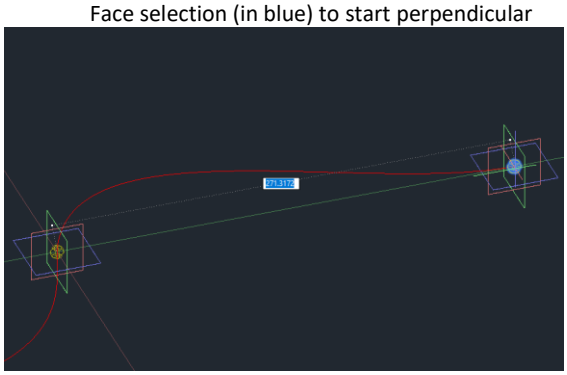
Starting point selection with OSNAP 2D 'Insertion' active



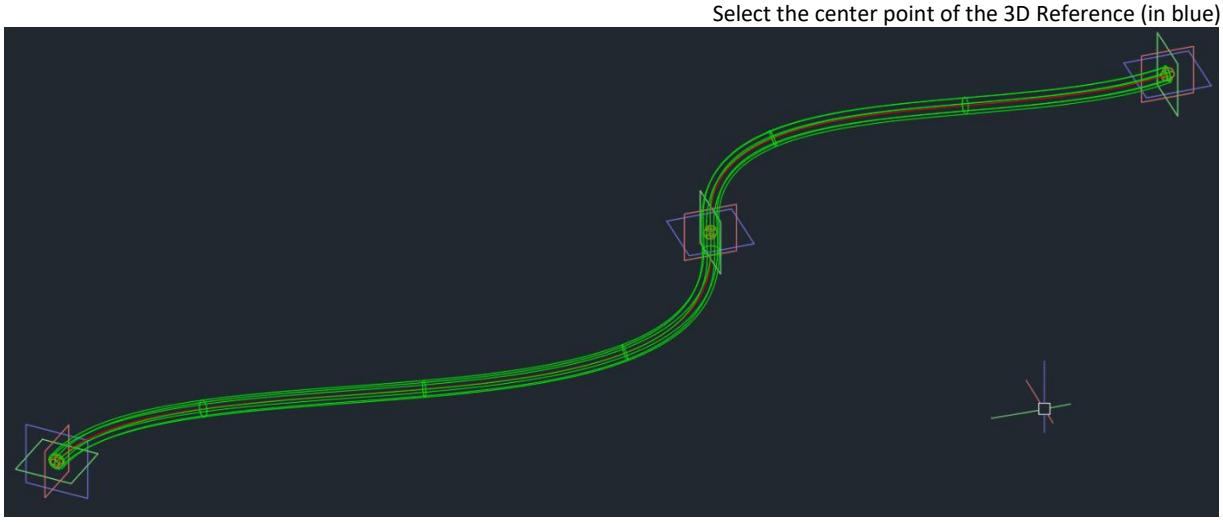
Face selection (in blue) to start perpendicular



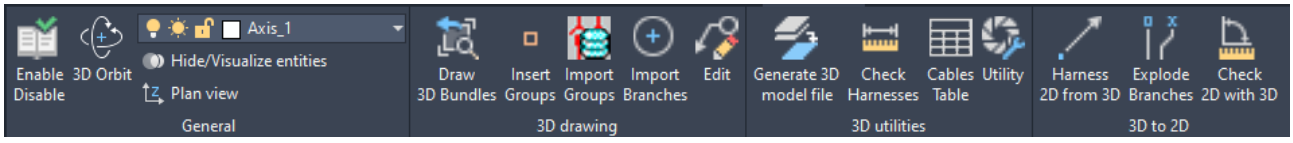
Face selection (in blue) to start perpendicular



Select the center point of the 3D Reference (in blue)



New Revised Ribbon



5 IMPORT FROM SPAC AUTOMATION

5.1 BASIC CONCEPTS

Designing a cable or harness starting from the information of an electrical diagram is simple if you work with simple multipolar cables, where the Cables Module of SPAC Automation is enough to provide all the necessary information.
When working with more complicated cables / harnesses it is necessary to give further information to those who produce them: drawing the layout of these cables / harnesses is the most exhaustive that can be done.
CABLING was developed for this and offers two working possibilities:

- Stand-alone, where the designer can independently design a cable / harness
- By importing data from SPAC Automation.

SPAC Automazione can export a file with all the information of a electrical diagram and CABLING is able to understand this information in an intelligent way to automate the design process.
Intelligence is given by these important features:

- A window with an advanced navigation system of the electrical diagram, which allows you to select a component and see all the connections and their destinations
- Converting components and terminals into harness elements
- Automatic import of materials from the SPAC electrical diagram
- The keeping of the name of the component to which one or more groups of the harness are joined.

The clearest example is represented by an electronic board (PCB) with multiple input / output ports: in SPAC it is necessary to define only the board block with its output pins and assign it a material.
Here's what CABLING can do:

- Will acquire the material (also for future imports)
- It will allow you to define the ports of the PCB board and which mating parts (for example connectors) must be provided to connect the board to the other components with cables / harnesses
- It will allow you to draw the cable / harness and to import the connections attesting them directly to the mating parts: on the connectors you can also automatically insert the wire terminals and / or the stripping required.

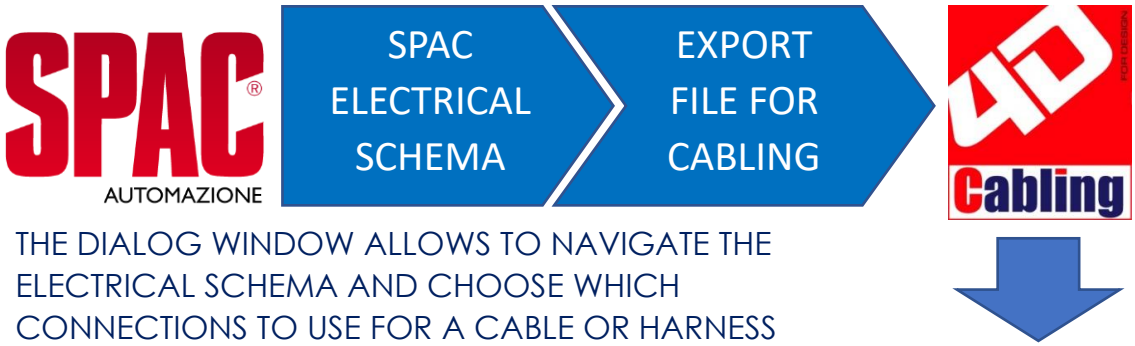
5.2 IMPORT OF MATERIALS

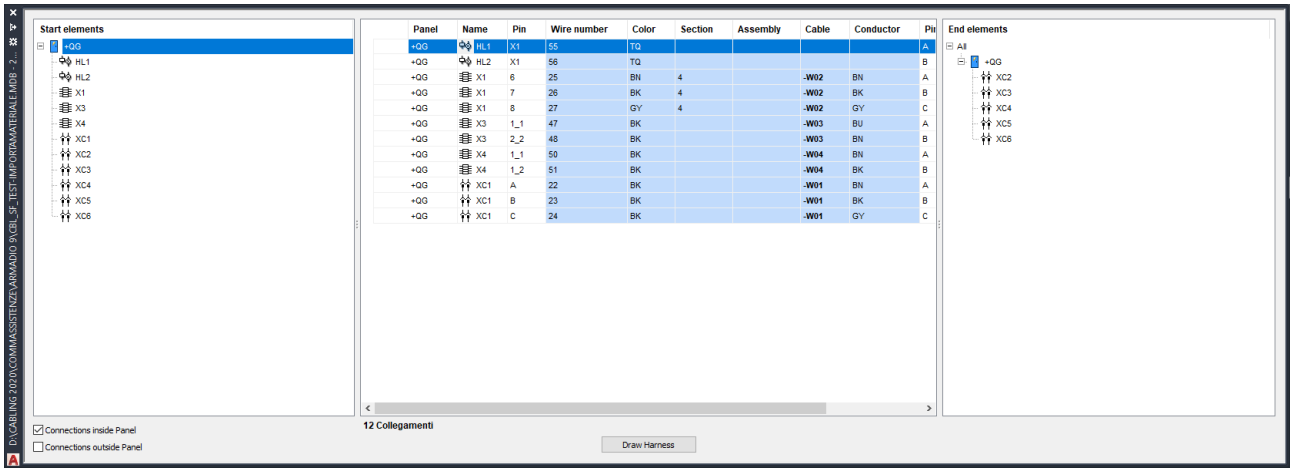
Importing an electrical schema means importing the materials and associate them the objects that are used for harness. Here is the summary of the possible conversions:

SPAC Automation	CABLING 4D
CONNECTOR	THE WIRES IN THE IMPORTED CONNECTOR MAY BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
FEED-THROUGH NORMAL TERMINAL (MONO-LEVEL)	TWO ENTRY POINTS ARE CONSIDERED: 'A' AND 'B' THE WIRES CAN BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
MULTIPLE MULTI-LEVEL TERMINAL	TWO ENTRY POINTS ARE CONSIDERED FOR EACH LEVEL: '1_A', '1_B', '2_A' AND '2_B' FOR A TWO LEVELS TERMINAL THE WIRES CAN BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
TRANSFER AND DISTRIBUTOR TERMINAL	THE DEFINED LEVELS ARE NOT DUPLICATED AND THE WIRES CAN BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
SIMPLE COMPONENT WITH MATERIAL	FOR EACH PIN OF THE COMPONENT THE WIRES CAN BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
COMPLEX COMPONENT WITH MATERIALE	THE COMPONENT PINS ARE GROUPED IN PORTS FOR EACH PORT IT IS POSSIBLE TO PROVIDE: • MATING PART CONNECTOR • UNPLUGGED MULTI-PIN GROUP FOR PORTS WITHOUT MATING PART • UNPLUGGED MONO-PIN GROUP FOR PORTS WITH ONE PIN FOR THE MATING PART CONNECTORS AND FOR THE UNPLUGGED GROUPS THE WIRES CAN BE STRIPPED OR WITH AUTOMATIC CHOICE OF A WIRE TERMINAL BASED ON THE SECTION OF THE WIRE
COMPONENT WITHOUT MATERIAL	FOR EVERY PIN OF THE COMPONENT AN UNPLUGGED GROUP IS PROVIDED ON THE HARNESS WITHOUT ANY AUTOMATION FOR STRIPPING OR WIRE TERMINALS

5.2 CABLES AND HARNESSES FROM ELECTRICAL SCHEMA OF SPAC AUTOMATION

In CABLING 4D 2020 it is possible to import the information from the SPAC Automation electrical schema to easily create cables and harnesses.

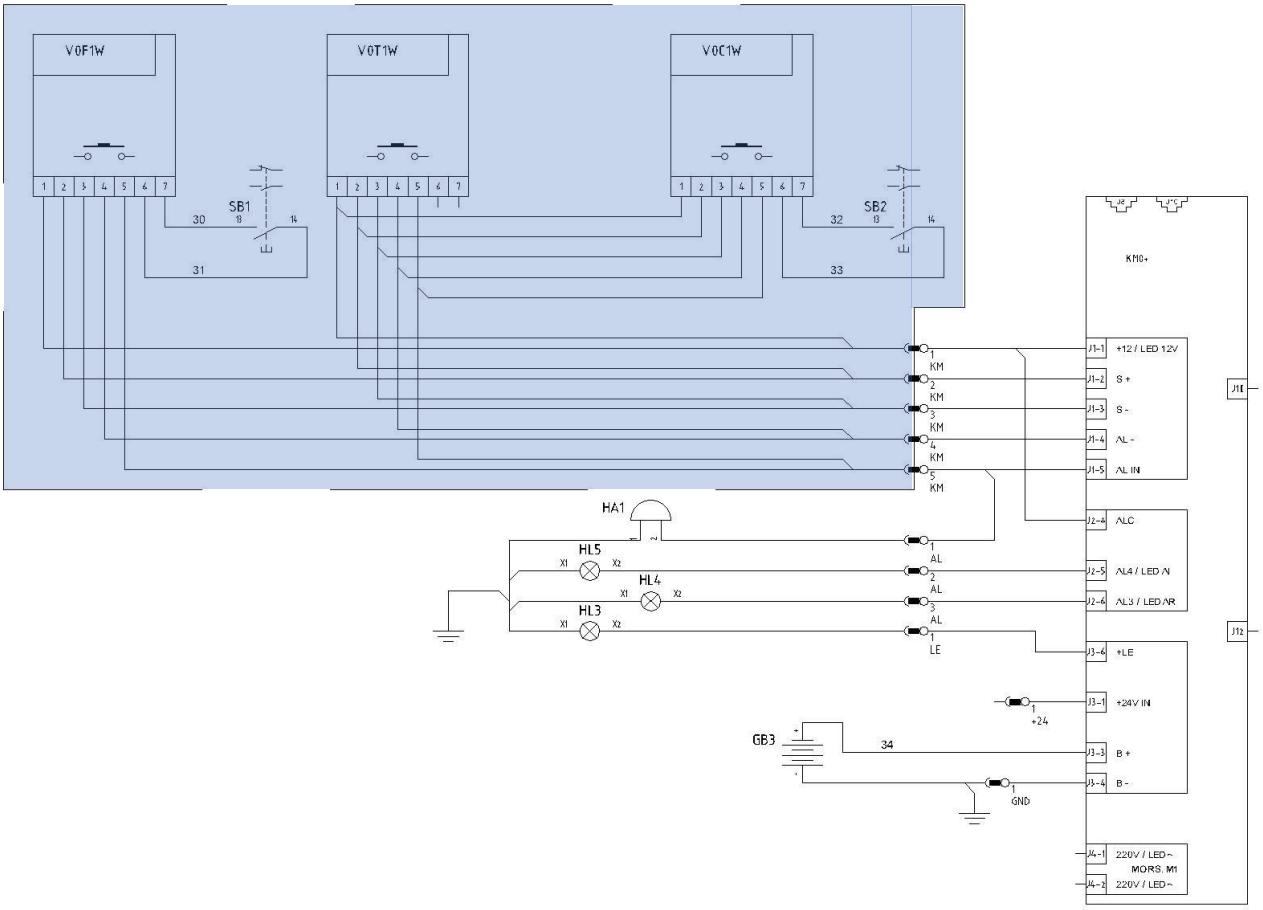




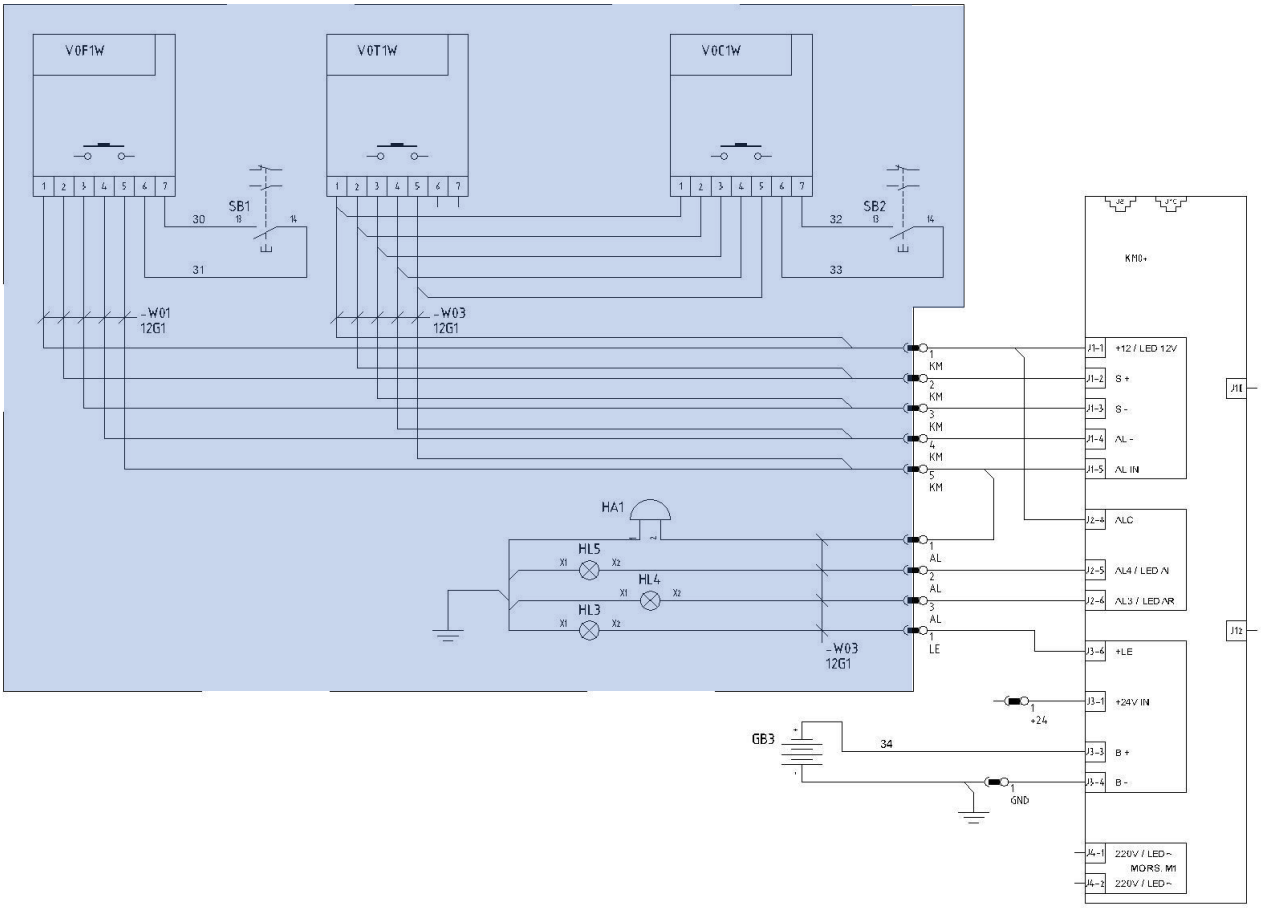
In CABLING the components and terminals strips of SPAC electrical schema are automatically converted into 'objects' that make up the ends of a cable or harness. The ends of connections connected to terminals strip can acquire a stripping or adopt a wire terminal. The ends of links connected to a component can acquire a stripping, adopt a wire terminal or be joined to a mating part connector.

Based on how the electrical schema was drawn, CABLING groups objects in order to insert them in a harness. A series of examples follow.

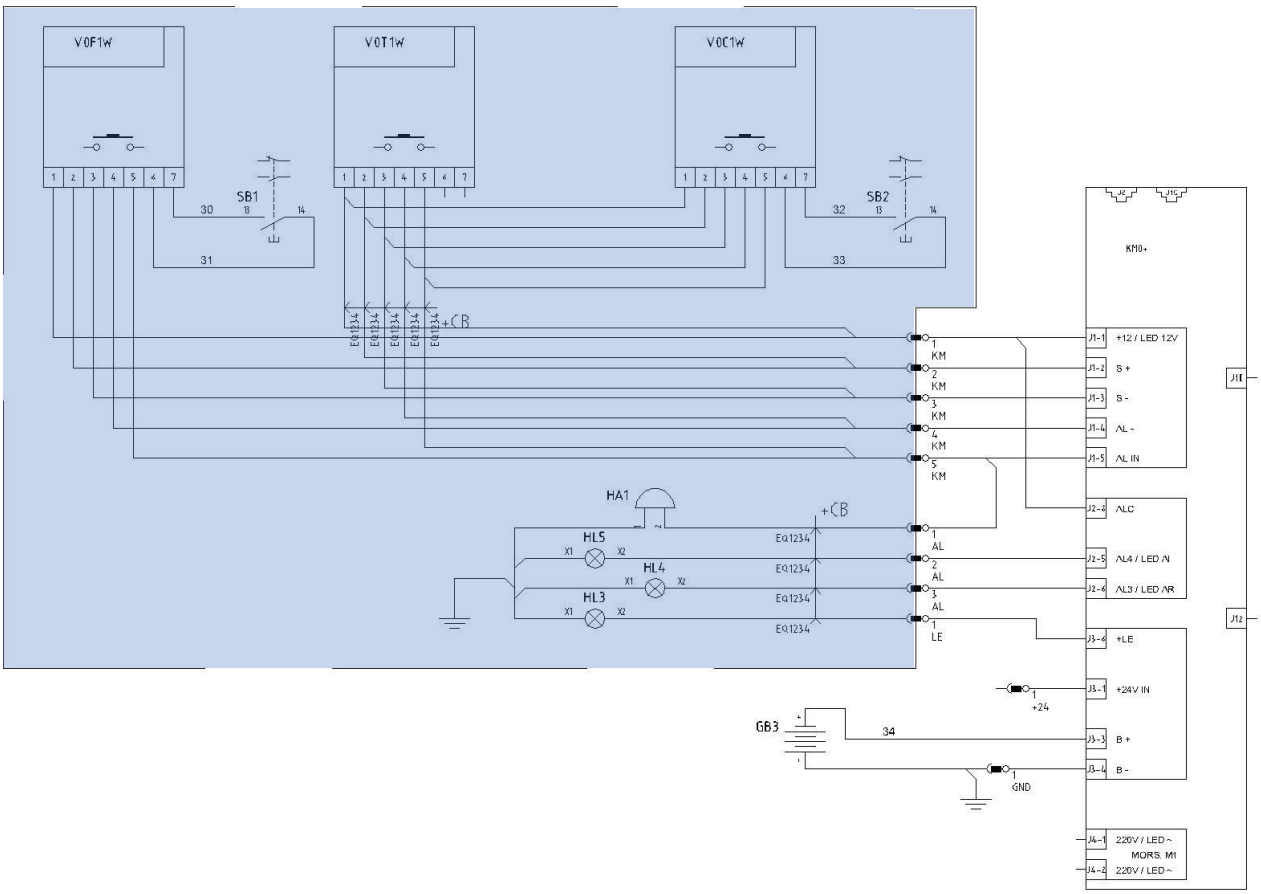
Automatic grouping with components only: by choosing the V0F1W component, the components of the highlighted area are considered



Automatic grouping with components and multipolar cables: by choosing the V0F1W component, the components of the highlighted area are considered also thanks to the -W03 cable which has conductors both horizontally and vertically.


V0F1W
V0T1W
V0C1W
SB1
SB2
30
31
32
33
-W01
12G1
-W03
12G1
HA1
HL5
HL4
HL3
KM
AL
LE
GB3
34
+24
GND
KM0+
J1-1 +12 / LED 12V
J1-2 S +
J1-3 S -
J1-4 AL -
J1-5 AL IN
J2-4 ALC
J2-5 AL4 / LED AL
J2-6 AL3 / LED AR
J3-6 +LE
J3-1 +24V IN
J3-3 B +
J3-4 B -
J4-1 220V / LED ~
MORS: M1
J4-2 220V / LED ~
J11
J12

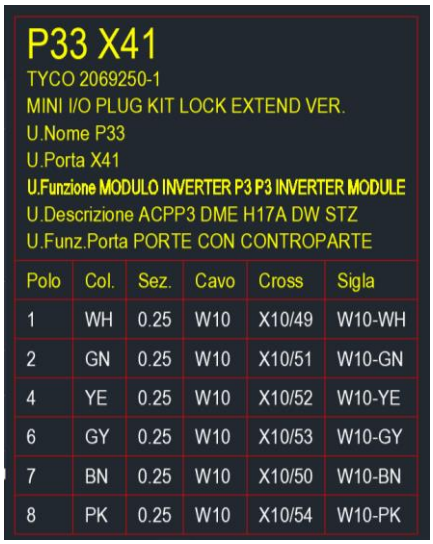
Automatic grouping with components and assemblies: by choosing component V0F1W the components of the highlighted area are considered also thanks to the indications of the assembly +CB EQ1234 which has markers both horizontally and vertically.



THE ADVANTAGES:

- IN SPAC AUTOMATION IT IS NOT NECESSARY TO DEFINE ANY MATING PARTIES OF THE COMPONENTS
- IN SPAC IT IS NOT NECESSARY TO MANUALLY DEFINE THE WIRE TERMINALS FOR TERMINALS STRIP AND CONNECTORS
- CABLING, USING THE MATERIAL CODE, ALLOWS TO COMBINE TO THE COMPONENTS AND TERMINALS THE MATING PARTS OF THE HARNESS: WORK IN SPAC IS SIMPLIFIED AND CABLING AUTOMATES THE DESIGN OF CABLE AND WIRING OF A SYSTEM
- CABLING MAINTAINS THE LINKS BETWEEN THE MATING PARTIES AND THE CONNECTED USAGE COMPONENTS, WHICH CAN BE DISPLAYED IN THE HARNESS LAYOUT

ALSO THE INDICATIONS OF THE GROUPS HAVE BEEN MODIFIED TO ALLOW THE DISPLAY OF USER DATA (U. Name, etc.)

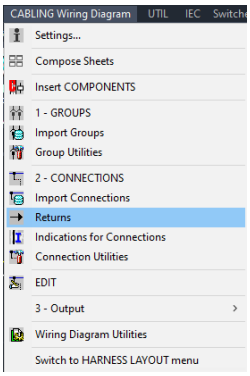


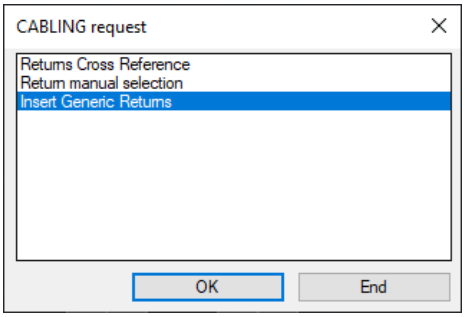
Polo	Col.	Sez.	Cavo	Cross	Sigla
1	WH	0.25	W10	X10/49	W10-WH
2	GN	0.25	W10	X10/51	W10-GN
4	YE	0.25	W10	X10/52	W10-YE
6	GY	0.25	W10	X10/53	W10-GY
7	BN	0.25	W10	X10/50	W10-BN
8	PK	0.25	W10	X10/54	W10-PK

6 WIRING DIAGRAM

6.1 INSERT GENERIC RETURNS

In the CABLING 2021 wiring diagram it is now possible to insert a new category of Generic Returns.

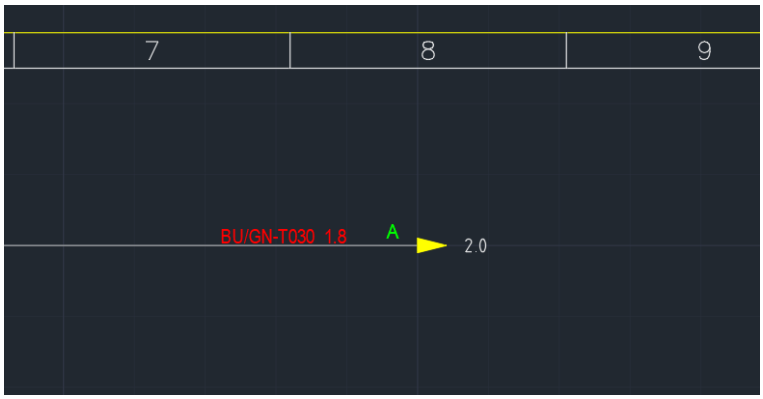


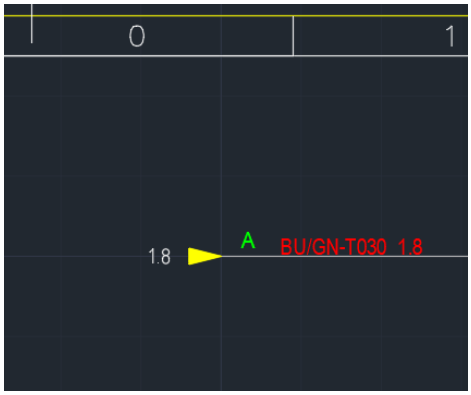


By giving a Enter to the request 'Select the end of a Connection / Enter for options' on the command line, a window opens in which to choose 'Insert Generic Returns'. The insertion works like the other returns, but they have special characteristics:

- They are yellow in color
- They are subject to Cross-Reference
- THEY CANNOT BE USED TO JOIN WIRES

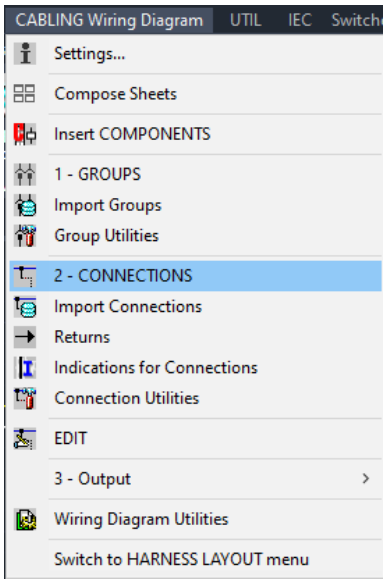
These references have been added to allow users to insert them even without respecting the CABLING rule which provides for a single start and a single end on the wiring diagram to guarantee the continuity of a connection on several sheets of the same multi-sheet.

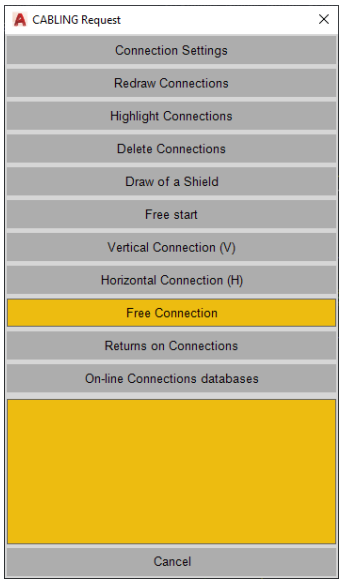




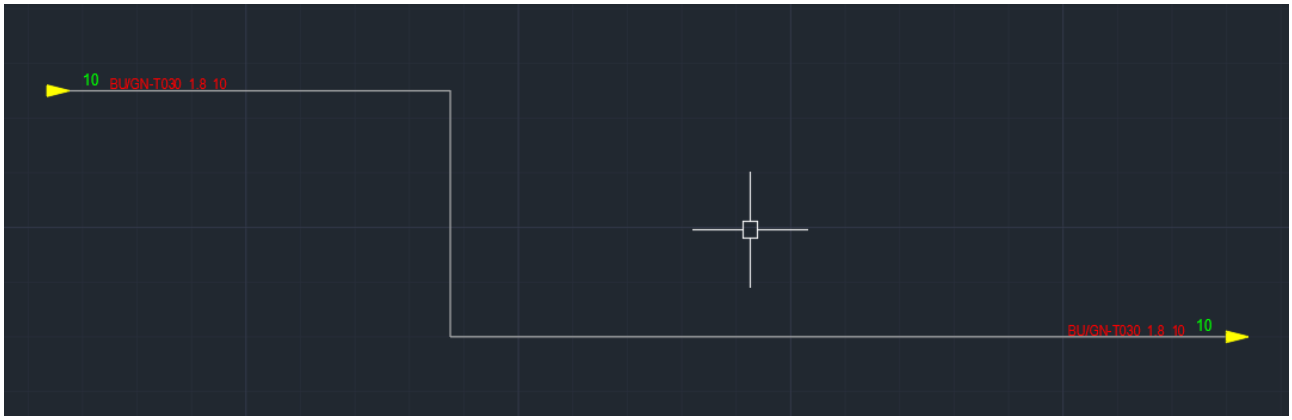
6.2 FREE CONNECTION

In the CABLING 2021 wiring diagram it is now possible to draw a free connection.





Pressing Enter to the 'Semi-Automatic Drawing - Select Start / Enter for options' request on the command line, a window opens in which to choose 'Free Connection'. The connection points are requested, checking to not repeat a point. At the end, the window opens to define the connection material and eventual connection name / function.



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