



Figure 1

As easy as can be

With LOGO! 8 basic modules and a standard Ethernet cable, a multi-line design can be easily achieved.

Implementers of home automation are often faced with the question of how to make a multi-line LOGO! 8 design a reality in the building sub-distribution. Thanks to the mechanical coding of basic modules and expansion modules, it is easy to combine voltage levels in the right order using an Ethernet cable, cable to achieve multiple lines.

The maximum degree of expansion of a LOGO! 8 configuration consists of 24 digital inputs (DI), 20 digital outputs (DO), 8 analog inputs (AI), and 8 digital outputs. Provided that an AC basic unit is used, this means: 1 basic unit + 2 DM16 + 4 AI2 + 4 AO2, that is, 4+8+8+8 sub-units with the dimen-

sions 28 x 18 mm. The maximum space requirement is therefore 504 mm – with the power supply and communication modules not yet included (**Figure 1**).

A typical sub-distribution in the home area has busbars for 12 sub-units and requires 216 mm of space. The question, of course, arises immediately: "How is it possible for me to install my LOGO! 8 configuration in the control cabinet? I will need a cable from one line to the next!" Actually, such a cable does not exist – and will not exist for a technical reason: LOGO! is designed internally, so that there is no electrical isolation.



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Figure 2a: A permissible combination



Figure 2b: An impermissible combination



Figure 2c: An analog module that always fits

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LOGO! modules and expansion modules for various voltage ranges from 12/24 DC to 230 V AC/DC can be combined with each other under certain conditions. In order to ensure that the rules for operation of different voltages are adhered to, all modules are mechanically coded. Therefore, it is only possible to combine voltage levels in the permitted order next to each other (Figures 2a, 2b, 2c).



Figure 3

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You can start with the basic 230 V model and add all DM modules in 230 V as well as at least one analog module. Subsequently, the series can be supplemented with DM models in 12/24 V. The analog modules contain the required galvanic isolation of the voltage levels, with the coding on the modules only permitting this order. If you then use a simple cable for the multi-line structure, the coding is disabled, as the modules are no longer directly adjacent to each other. Thus, it is not permissible (**Figure 3**).

One alternative setup would be to equip the cables with mechanical coding elements, but this would be cost intensive. Three additional cable types of varied lengths would be necessary for the many voltage combinations that can occur. This would result in purchasing smaller quantities of the individual types and result in a high price of more than \$70 per cable. Additional space consumption at the beginning and end of the line also makes this solution uneconomical.



Figure 4

So, what is the solution? Through the Ethernet interface of LOGO! 8 – and with extremely easy networking using the network mode of LOGO! Soft Comfort – you can simply start the second line with a logic module without display and connect both LOGO! modules with a standard Ethernet cable (Figure 4).

At first glance, the cost of around \$120 for this connection appears to be quite high. However, considering that cables cost about \$75 each and the cost of at least one DM8 extension module is about \$75 as well, then the minimum cost for 4 digital inputs and 4 digital outputs in the second line would be over \$140.

If you compare this solution with a basic unit at the beginning of the second line, then you immediately end up with 8 inputs (which can be used on an analog basis in part) and 4 outputs (able to withstand 10 A), at a clearly more cost-efficient price. In addition, there is the advantage that this second logic

module also offers full program memory, so that the program memory is additionally available for more complex programs. Furthermore, each of the two LOGO! 8 modules can have different power voltages.

So the option exists for multi-line design with LOGO! 8 – and with no need for expensive specialty cables. It can be achieved quite simply using basic modules along with a standard Ethernet cable.

This allows you to set up a network with the “master/slave configuration,” where only one logic module executes the program and the other exclusively provides extended inputs/outputs. Alternatively, you can configure “client/server mode,” with both LOGO! 8 modules executing a program and only the pre-configured data being exchanged between them.

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