

Emphatec DePro® - FM5/CLSI : Control Loop Indicator / Fuse Module

Application Note



#330287

The Emphatec DePro®- FM5/CLSI is a compact module that incorporates a fuse and a current monitoring circuit.

It is designed for AC and DC control loop applications where a fuse rating of 500mA is sufficient.

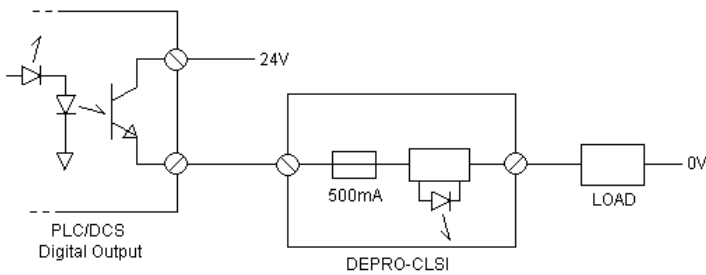


Figure 1: Connection to PLC/DCS Sourcing Digital Output

There are just two terminations – an input and an output. There is no need for a neutral or 0V terminal.

Connections are very straight forward – the module is installed between the PLC output and the load or between the power source and the field device.

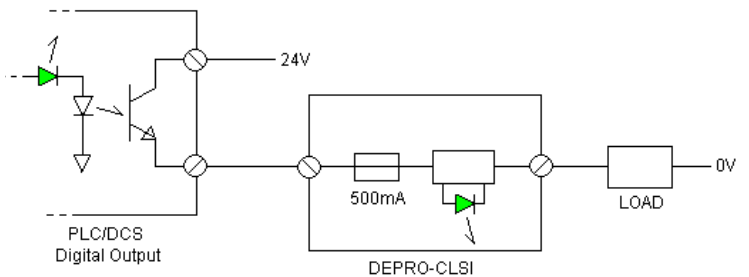


Figure 2: LED Status Indication

As figure 2 shows, when both LEDs, the one on the PLC/DCS output card associated with the channel used and the LED on the Emphatec DePro® - FM5/CLSI, are illuminated the control loop is active i.e. the output is on, the fuse is good, the wiring is intact, and the load is drawing a current.

As figures 3a-c show, if the PLC/DCS output LED is on the LED on the Emphatec DePro® - FM5/CLSI should be on – if not there is a fault in the circuit.

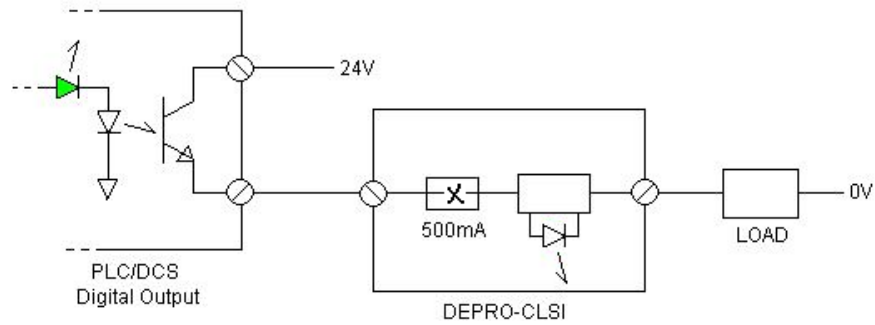


Figure 3a: LED Status Indication - Brown Fuse

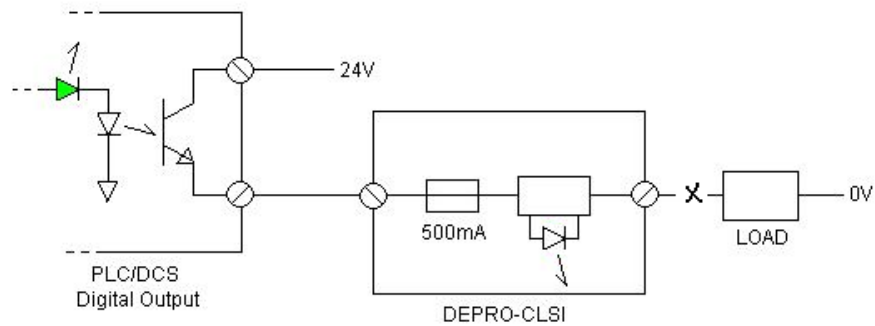


Figure 3b: LED Status Indication- Broken Load Wire

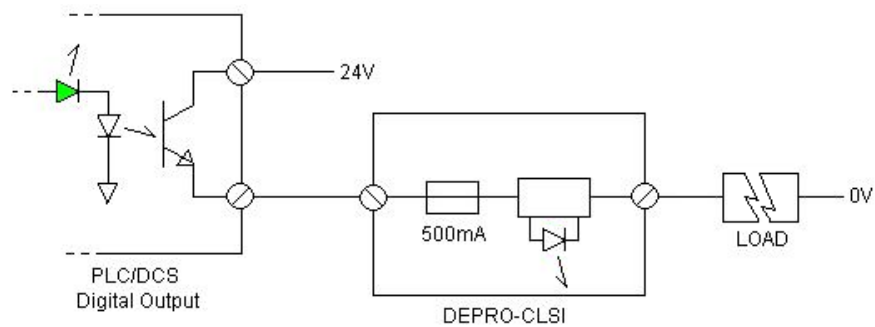


Figure 3c: LED Status Indication - Defective Load (Open Circuit)

When a standard fuse terminal with blown fuse indication is used in the same application the LED (usually red) operation is as follows:

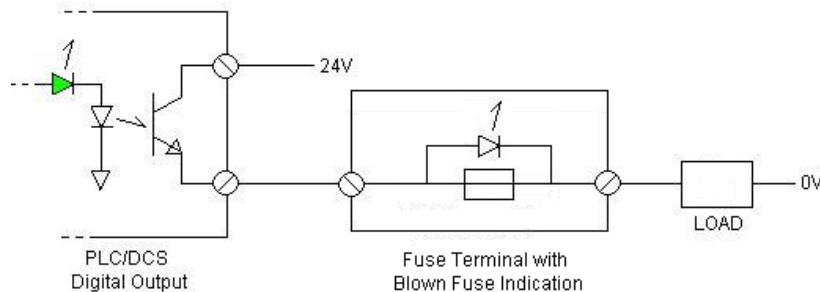


Figure 4a: Blown Fuse Indication - Fuse Healthy

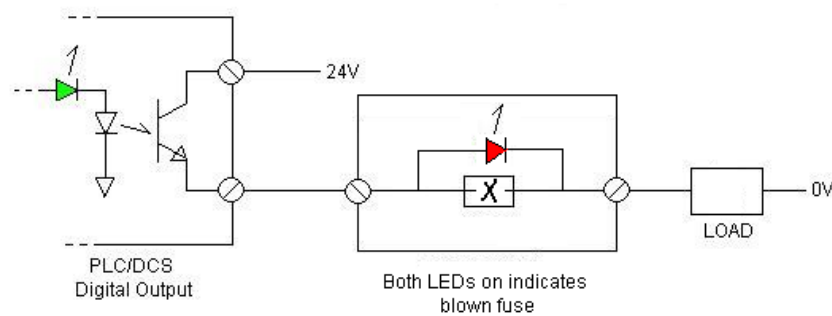


Figure 4b: Blown Fuse Indication - Fuse Blown

Loop Status	PLC/DLC LED	Fuse Terminal LED
Output Off	Off	Off
Output active, fuse good, load & wiring intact	On	Off
Output active, fuse good, load or wiring fault	On	Off
Output active fuse blown, load & wiring intact	On	On

The table shows that in both a fault condition (fuse good but a wiring or load fault) and when everything is okay the state of the LED's is the same. This cannot happen with the Emphatec DePro® - FM5/CLSI.

Another issue with blown fuse indication is the LED current. When the load and wiring is intact but the fuse is blown the LED current passes through the load. As this is a leakage current it is desirable to keep it at as low a level as possible. In 120Vac applications a high LED current could actually pose a safety hazard. LED currents of 1.5mA are common.

The Emphatec DePro® - FM5/CLSI has no leakage current!

An alternative could be to use a fuse terminal with fuse healthy indication as shown below in Figure 5. In this situation the status of the LED's would be as follows:

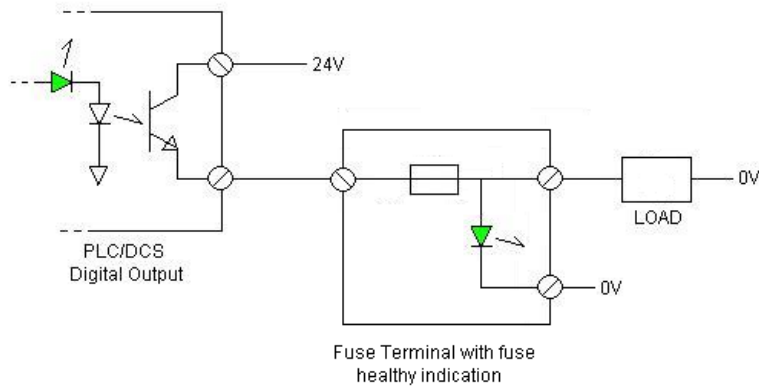


Figure 5: Fuse Healthy Indication

Loop Status	PLC/DLC LED	Fuse Terminal LED
Output Off	Off	Off
Output active, fuse good, load & wiring intact	On	On
Output active, fuse good, load or wiring fault	On	On
Output active fuse blown, load & wiring intact	On	Off

Better, but still not as informative as the Emphatec DePro® - FM5/CLSI. Also, a third connection is required meaning more labour and material to install.

The Emphatec DePro® - FM5/CLSI:

- Can be used in 12-230Vac/dc applications (one module, one part number!).
- Requires no additional wiring (no neutral / OV connection).
- Accepts a standard 5x20mm fuse.
- Is intended for control loop applications. It cannot be used with fuses rated over 500mA.
- Has a higher voltage drop across the module than that of blown fuse or fuse healthy indicating terminals. In 12Vdc or 24Vdc applications the power supply output voltage can be adjusted upwards to compensate if necessary.
- Occupies slightly more space on the DIN rail (11.2mm) than a typical fuse terminal (8mm) but provides more features.
- Is Class 1 Division 2 and Zone 2 certified.

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Subject to technical changes

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