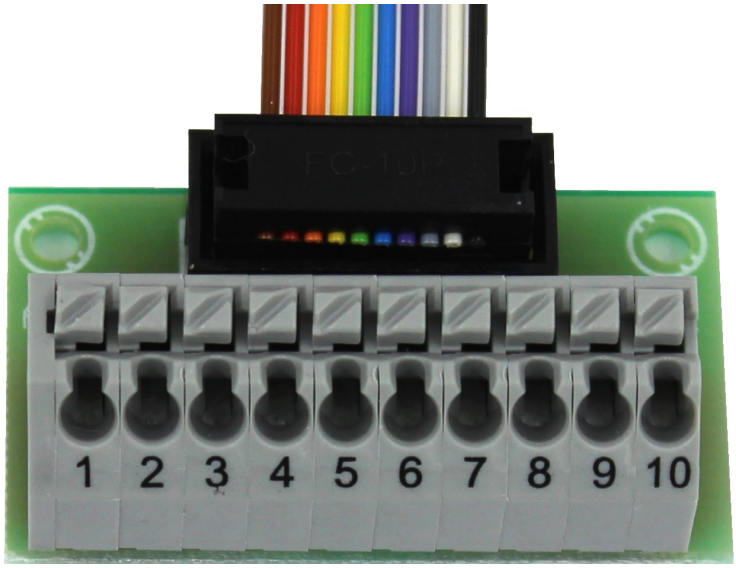
Operating Manual

Terminal Clamp AKL-8



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Function

The AKL-8 terminal clamp was specially designed to connect LEDs, relays, smoke generators and other consumers easily and without soldering to the switching outputs of the BEIER-modules.

The terminal clamp is suitable for following BEIER-modules:

- Sound speed controller SFR-1
- Double sound speed controller SFR-1-D
- Sound speed controller for Torro / Taigen and Heng Long SFR-1-HL
- Speed controller UFR-1230
- Double speed controller UFR-1230-D
- Light modules LM-BT-16-4 and LM-IR-16-4

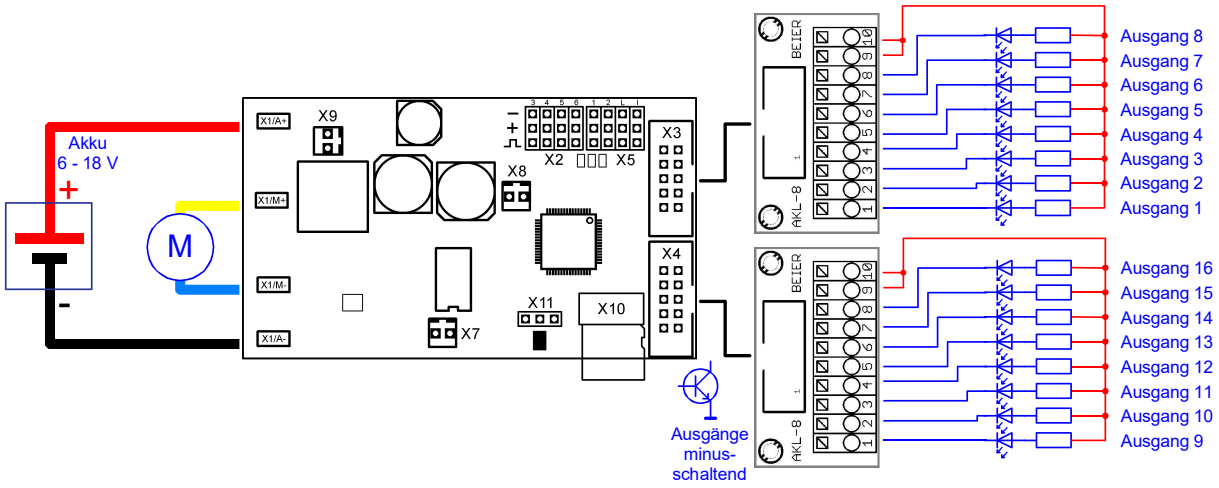
All BEIER-modules are minus switching, consequently the negative pole of a consumer is connected to the switching output at the module. With the terminal clamp, the negative-switching outputs are available directly on a spring-loaded terminal. The common positive terminal is at terminals 9 and 10, they are internally connected to the positive line of the supply voltage (battery+).

The connection terminal is plugged directly onto the module with the ribbon cable and the IDC connector.

Technical data

Terminal clamp:	<u>Sound speed controller (SFR-series):</u> Clamp 1 to 8: Switching outputs X3 (1 – 8) and X4 (9 – 16) of sound speed controller (minus-switching) Clamp 9 and 10: Plus pole of supply voltage <u>Speed controller (UFR-series):</u> Clamp 1 to 8: Switching outputs 1 – 8 of speed controller (minus-switching) Clamp 9 and 10: Plus pole of supply voltage <u>Bluetooth / Infrared light modules (LM-IR/BT-16-4):</u> Clamp 1 to 8: Switching outputs X3 (1 – 8) and X4 (9 – 16) of light module (minus-switching) Clamp 9 and 10: Plus pole of supply voltage
Connection cables:	10-pin Ribbon cable, 20cm long, directly pluggable to the modules
Size:	40 x 23 x 17 mm
Weight:	15 g

Connection example with sound speed controller SFR-1



Connection of LEDs and other consumers

The connection cables of the consumer/component/light can be connected to the spring-loaded terminals of the AKL-8. To insert or remove a cable, just press from above with a small screwdriver on the operating lever of the terminal. This opens the clamp and the cable can be plugged in or out.

The cables should be stripped approx. 7 - 8 mm and be tinned with solder. The cable cross-section can be between 0.14 mm² and 1.0 mm².

The switching outputs of BEIER-modules are negative switching, i.e. the negative lead of the consumer is always connected to the outputs 1-8 of the terminal clamp. The positive lead of the consumer to output 9 or 10 of the terminal clamp.

The switched voltage at the eight outputs is always as high as the SFR, UFR or LM supply voltage! Therefore, it is important to have the correct in series resistors when connecting LEDs!

Use for each LED an own in series resistor.

The required value of the series resistor depends on 3 different factors:

- Level of the supply voltage (U_B)
- Voltage of the LED (U_L). Added together when connecting several LEDs in series the individual stresses.
- Current of the LED (I)

The series resistance value (R) can be calculated using the following formula:

$$R = \frac{U_B - U_L}{I} \qquad U_L = (U_{L1} + U_{L2} + U_{L3} + U_{Ln})$$

Example:
We have a supply voltage of 7.2 V and want a white LED with a supply voltage 3.4 V and 12 mA (= 0.012 A).

$$R = \frac{7.2\ V - 3.4\ V}{0.012\ A} = 317\ Ohms$$

However, since there is no resistance value of 317 Ohms available, we take the closest available value of 330 Ohms.

Then the necessary power (P) of the resistor should also be checked:

$$P = (U_B - U_L) \times I$$
$$P = (7.2\ V - 3.4\ V) \times 0.012\ A = 0.046\ W$$

In this example, a standard resistor with a power of 0.250 W (1/4 W) can be used.

When connecting relays or other inductive loads (e.g. motors) free-wheeling diodes (e.g. 1N4007) must be used.
The free-wheeling diodes must be connected in blocking direction parallel to the consumer.