

LML-1 v2

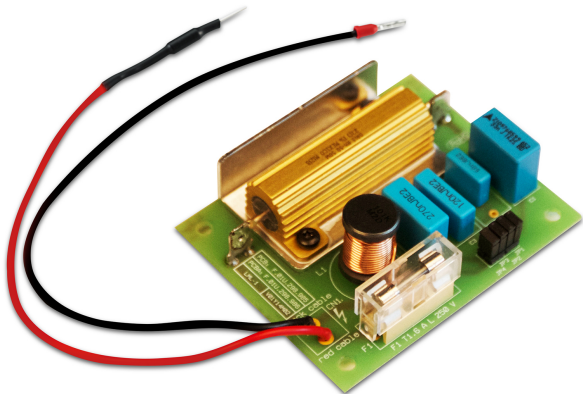


- Permanent supervision of loudspeaker lines
- Represents tuned and defined load at 20 kHz
- High accuracy supervision even on long cable runs
- For 100 V loudspeaker lines powered by amplifiers up to 1000 W
- EN 54-16: 2008

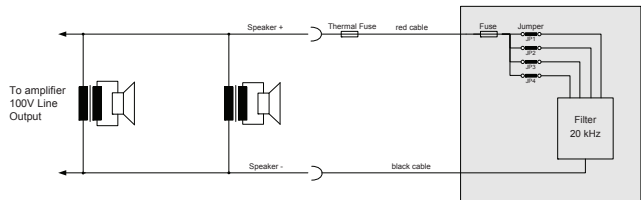
The LML-1 can be used with all Electro-Voice CPS Series multi channel amplifiers in 100 V line mode for loudspeaker line supervision. These amplifiers provide, together with RCM-810 modules, a convenient loudspeaker line supervision based on impedance measurement. The impedance of a loudspeaker line, however, depends on many factors, such as cable length, cable capacitance, speaker impedance, temperature, etc., and therefore can vary greatly. The LML-1 is connected to the end of a 100 V loudspeaker line to generate stable conditions. At 20 kHz the LML-1 represents a defined load, while having minimal load over the normal audio frequency range. With the LML-1 thus the accuracy of the impedance measurement is increased, and broken or shorted speaker lines can be detected reliably even on long cable runs.

Technical specifications

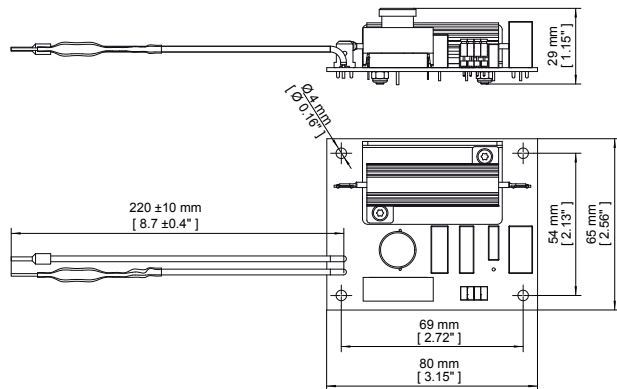
Operating Voltage	100 V
Impedance	5 Ω at 20 kHz
Wiring	Class 2
Connection	2 free wire ends for screw terminals
Product dimensions (Width × Height × Depth)	80 × 29 × 59 mm
Operating temperature	-5° to +45° C



Net weight	85 g
Shipping weight (includes 4 modules)	615 g



Circuit diagram



Dimensions

Certifications and approvals

EN 54-16: 2008

Installation/configuration notes

Warning!



Note the accompanying Safety Instructions. The LML-1 must only be installed by trained electricians or qualified service personnel.

Danger!

To protect against hazardous voltages, the LML-1, including the terminals, must be mounted in a case that can only be opened by use of a tool (screwdriver or similar).

Make sure that the LML-1 is securely mounted inside the enclosure. For metal enclosures it is particularly important that the printed circuit board and components do not come into contact with the enclosure (risk of short-circuit!).



For the speaker leads Class 2 wiring must be used.

To comply with British Standard BS5839:Part8 the LML-1 must be connected to the speaker cable using a ceramic terminal block. It is the installer's responsibility to ensure that suitable terminal blocks are used and that the LML-1 is terminated correctly. Country specific safety standards and local regulations/codes must be adhered to.

Notice!



A thermal fuse is pre-fitted to the red connecting cable. Do not bend, solder, heat or damage the fuse during installation.

Installation

1. The LML-1 can be used with following amplifier types (including RCM-810 module) only: DYNACORD DSA 8405, DSA 8410, DSA 8805 or Electro-Voice CPS4.5, CPS4.10, CPS8.5.
2. Check that the loudspeaker line is not live before connecting. If the line is connected to an amplifier ensure that it is switched off.
3. Configure the LML-1 using jumpers JP1...4 for the length and cross-section of the loudspeaker line (see diagrams below).
4. Fix the LML-1 at the end of the loudspeaker line using the self-adhesive mounting studs provided. If the final loudspeaker in the circuit is a type with an accessible enclosure, such as a ceiling speaker or wall mount speaker, then it should be possible to mount the

LML-1 inside the enclosure. If the loudspeaker is a horn type, or similar, mount the LML-1 in an external connection box (minimum dimensions 100 x 100 x 60 mm).

5. Connect the red cable to the + side of the loudspeaker line. Connect the black cable to the - side of the loudspeaker line.
6. When the amplifier is operating at very high volume levels the LML-1 can get quite warm. This is normal, but as a useful precaution care should be taken to avoid pinching cables over the components on the circuit board when fastening the mounting enclosure. Cables or flammable materials should not touch components of the LML-1.

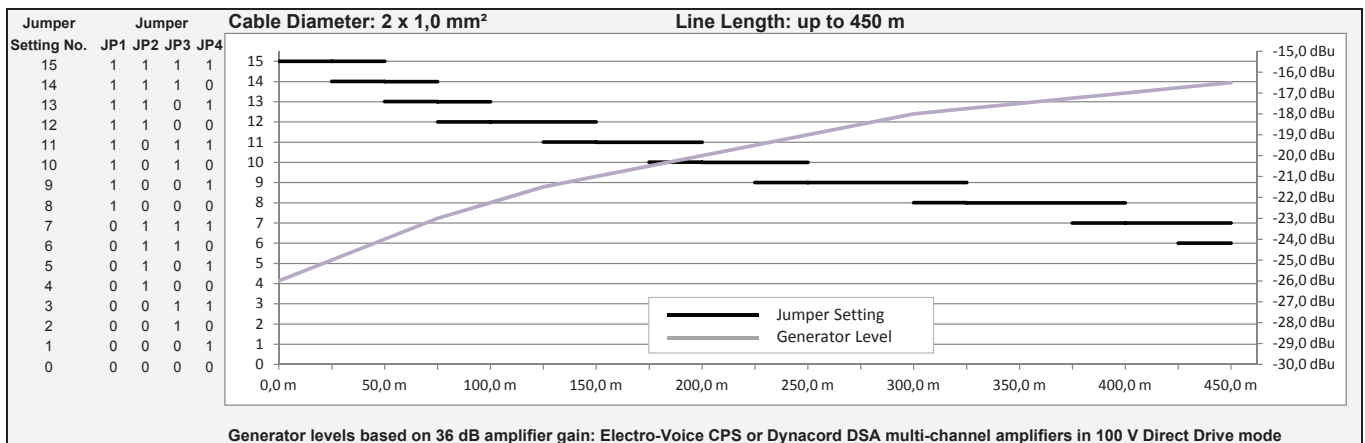
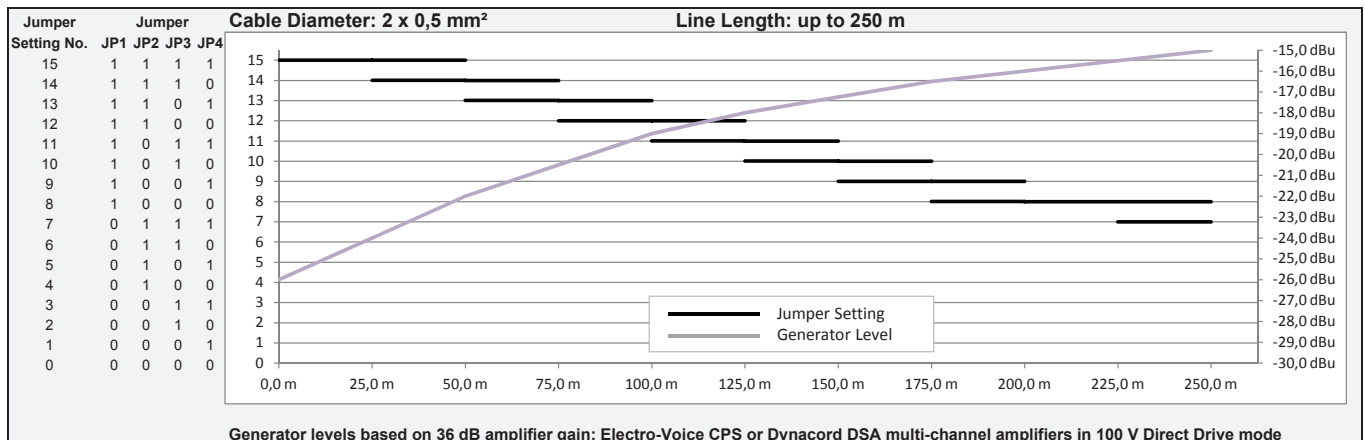
Operation

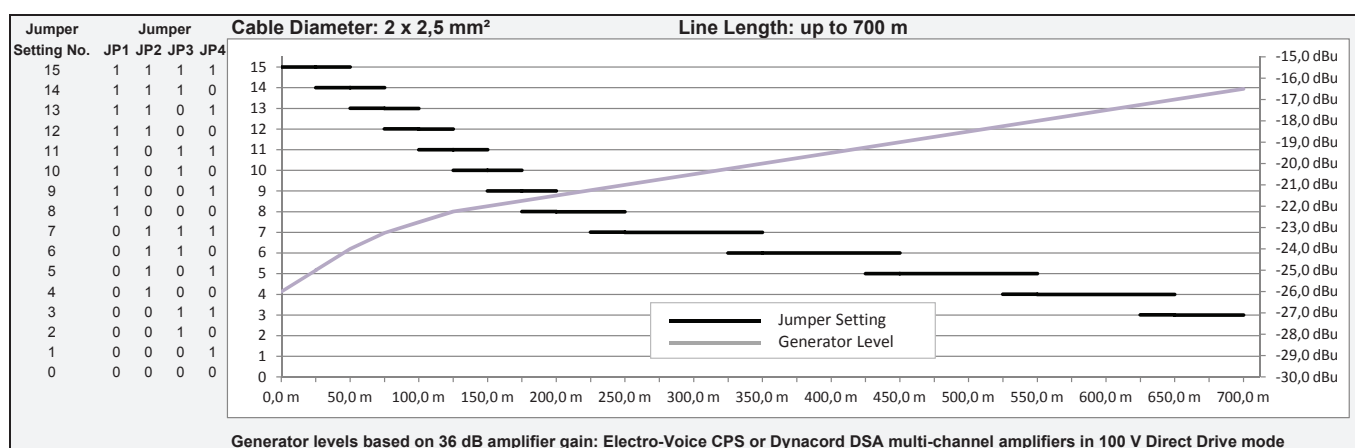
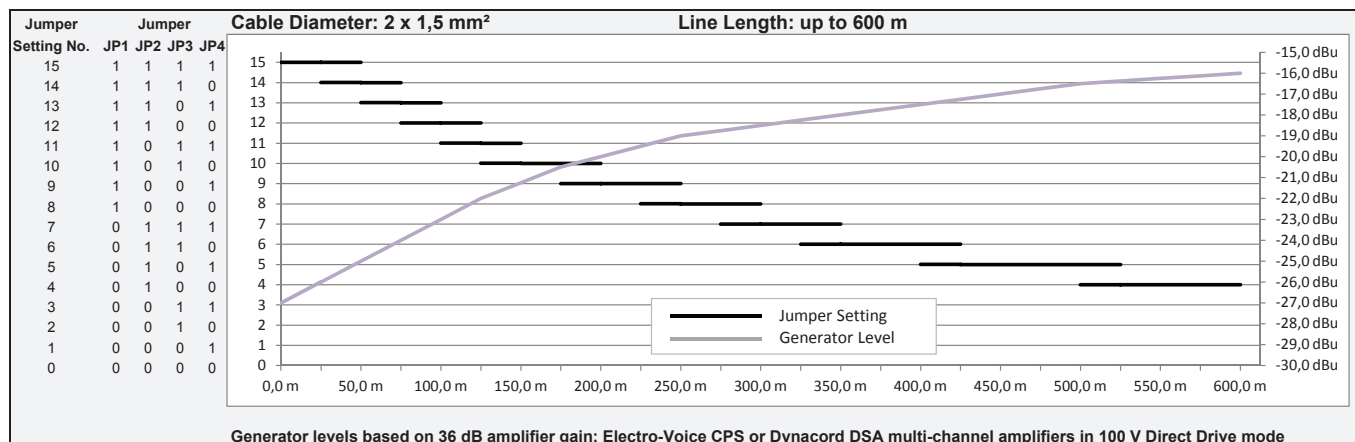
1. Set the output mode of the amplifier to 100 V (high impedance mode, Direct Drive).
 2. Set the pilot tone frequency to 20 kHz and the pilot tone level at 2.5-7.5 V (measured at the amplifier output) to get an accurate impedance measurement.
 3. Add a low pass filter (14 kHz, 24 dB Linkwitz-Riley) to the signal path in front of the amplifier input to avoid high signal levels at the LML-1.
 4. It is recommended to use a DYNACORD P 64 or Electro-Voice N8000 for signal processing. These devices allow easy configuration of the pilot tone and the low pass filter for each channel using the IRIS-Net software. The generator level to be set at the AO-1 Pilot tone generator can be found in the diagrams below for different line lengths and cross-sections.
 5. Check the current measured at the amplifier output in IRIS-Net. The current must be exactly 0.30 A. If the current is too low/high, the generator level must be increased/decreased.
 6. Set the EOL CURRENT parameter in the Supervision & Test panel of the amplifier to 0.2 A.
 7. Check the voltage value measured at the amplifier output in IRIS-Net, set the EOL VOLTAGE parameter to 85% of the measured value.
 8. Use music as input signal for the amplifier channel. Increase the signal level to just below the limit/clip threshold of the amplifier.
 9. Check the maximum impedance value measured at the amplifier output in IRIS-Net, set the HIGH THRESH parameter to 110% of the measured value.
 10. Mute the input signal of the amplifier channel.
 11. Check the impedance value measured at the amplifier output in IRIS-Net, set the LOW THRESH parameter to 90% of the measured value.
 12. Test the error indications EOL OPEN (by disconnecting the LML-1) and EOL SHORTED (by short-circuiting the LML-1).
 13. If necessary the pilot tone level can be adjusted to optimize the error indication.
- * At high-power 100 V loudspeaker lines the fullrange impedance can be lower than the impedance at 20 kHz pilot tone. In this case the values of HIGH and LOW THRESH parameters have to be swapped.
- ** When using long-running 100 V loudspeaker lines a shortage can be indicated as „OPEN“, as the impedance of a shorted line can be higher than the impedance of a connected LML-1.

Check the manuals of the devices and IRIS-Net for more details about setting up a line measurement. A comprehensive description of this topic can be requested from the application design team (email: tobias.pirtsch@de.bosch.com)

Notice!

It is recommended to use the LML-1 only for the supervision of 100 V speaker lines with line lengths and cable diameters shown in the diagrams below. With longer cables and different cable diameters, the physical properties can lead to a monitoring by impedance measurement reaches its limits and can not be reliably ensured with an attached LML-1.





Parts included

Quantity	Component
4	LML-1
16	Self-adhesive mounting studs
1	Data sheet
1	Important safety instructions

Ordering information

LML-1 v2

Line measuring load

Order number **F.01U.266.132**

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