2017

Maintenance System Procedure

DECEMBER 2017

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1. Target

The purpose of this procedure is to define a maintenance procedure to ensure the correct operation of devices installed in the system that make up LDA PA/VA (Public Address and Voice Alarm) system.

In the following chapters the tests or specific checks to each part of installed device are detailed and the control points are numbered to make the maintenance report.

2. Maintenance frequency

The general maintenance guidelines according to their frequency are described below as a summary guide.

2.1. Daily

• Fault checking.

• Take record of detected failures. This record may be evaluated in subsequent checks.

2.2. Monthly

• Perform indicator test of fault signaling devices. NEO and VAP. TEST button

2.3. Quarterly

• Equipment check, review of failures reported by the system.

• Check link with fire panel, activation and monitoring.

• Check system operation, simulation execution or test from the different activation points or emergency microphones.

• Checking and maintenance of batteries, checking terminal status and cleaning, liquid level in case of being refillable and system test in reserve power.

• Audio level check in all zones

2.4. Annual

In addition to the above checks, it is indicated:

• Checking the operation of equipment fans. Cleaning of ventilation grilles.

• Checking power levels.

• Check voltage levels and battery expiration date.

• Audio level check at all sound points.

2.5. By 10 years

In addition to the above, the following is added:

• Checking the output gains.

• Measurement of line impedances, for comparison with the initial one.

3. Annual review

3.1. Checking power levels

It is verified that power supply voltage of the network panels in the racks is stable and within the range of values allowed.

To do this, we measure the voltage drop in the following cases, checking that it is true:

Measurement	Valid range
RS	360-400V
ST	
RT	
RN	210-240V
SN	
TN	

Where:

In the case of having a single-phase configuration the measurement would be limited to the voltage drop between the phase and the neutral.

3.2. Devices check

3.2.1. Ventilation

Checking operation of equipment fans. Cleaning of ventilation grilles.

3.2.2. Temperature

Check room temperature and device temperature.

3.2.3. LDA NEO 8060 device

Check that the front panel shows the planned firmware version. In some cases it may be necessary to update device by more recent update has been removed.

This can be done over Ethernet through the LDA NEO Config software.

3.2.4. LDA MPS-8K paging microphone

The correct operation of the microphones of the system will be verified by making test calls and checking that both level and quality of audio are correct.

A visual examination of device is carried out, checking that it does not suffer damage to the microphone's flex and other elements such as buttons, housing, connectors or cables that reach the equipment.

3.2.5. LDA VAP-1 fire alarm panel

The correct operation of the emergency PPT of the system will be checked by making test calls and checking that both level and quality of audio are correct.

It will be verified that the EMG button activates the emergency state in the NEO system.

It will be tried to send an evacuation message to selected zones and to all zones.

It will be proven to send alert message to selected zones and to all zones.

The EMG status must be disabled by the ACK button.

A visual examination of the equipment is carried out, checking that there is no damage to the PPT microphone and other elements such as buttons, housing, connectors or cables that reach device.

3.2.6. Battery charger EN 54-4

The system should fail if there is a problem in the battery charger. Only by way of additional check, it will be measured that output of the charger is between 20-28V, using a multimeter.

It will be checked that it is correctly connected to reserve power input of the LDA NEO 8060 unit and that the supervisory signals are connected accordingly.

If you also use LDA NEO-E, it will be checked that it is also correctly connected to the reserve power input of this equipment.

The expiration date of the batteries will be checked.

3.2.7. LDA ZES-22 matrix

The operation and connection indicators are correct.

The ventilation inlets are not obstructed and fans are functioning correctly.

3.2.8. Noise sensors

It will be verified that noise sensors are located of the probes and there are no modifications of the environment that could affect its correct functioning, whether physical elements or noise sources.

3.2.9. Audio sources (inputs)

The operation check and remote control of audio sources of the system will be carried out.

A test sound will be played and it will be checked that audio arrives at zones chosen for the test and that the audio quality and the level are correct.

3.2.10. Input gain

The gain settings configured during commissioning will be checked.It is checked that the inputs do not indicate clip in normal operation.

3.3. Checking emergency state

It will be checked that all elements of the system works correctly when the system is in a emergency state.

It will be verified that the emergency signals have priority over the signal of the public address system.

The priority of the microphone will be checked over the rest of audio signals.

4. From 10th year

In addition to the above, it is recommended to do the following:

4.1. Checking exit gains

As an extra check at 10th year, it will be verified that thresholds or gains configured for each zone are correct and conform as specified.

In emergency state, both evacuation message and VAP-1 audio source must have the following parameters:

• Minimum Intelligibility (STI) of 0.5 or 0.45 in complex areas.

• S / N > 10dB

• LAeq > 65dB for: warning tone + message (measured in a complete cycle).

• LAfmax <120dB for: warning tone + message.

Note: For this test it is necessary to perform an acoustic analysis on site (not included in this document).

4.2. Impedance measurement

The LDA NEO system measures the impedance of speaker line and will notify you with a fault if there is a problem with it. As an extra check at 10 years, the impedance of each of the lines will be measured with an external impedance meter, to make sure that the impedance of the line corresponds to the calculated theoretical impedance and verifying that this is the right one for each line.

It is necessary to check that there is no short circuit, open circuit or ground connection.

4.2.1. Speaker line impedance

Speaker line impedance is defined as the resistance to current flow as a function of frequency, whose analysis will be carried out with a component meter (LCR) in the frequency domain, not being valid an usual multimeter.

4.2.1.1. Theoretical impedance (Z)

The calculated impedance of a speaker line with speakers connected in parallel mode is obtain form equation Z = V2 / P. If we connect 20 speakers at 10W in a 100V speaker line, impedance will be:

Z = V2 / P = 1002 / (20 x 10) = 50 Ω.

4.2.1.2. Real impedance (Zreal)

In order to avoid problems in amplifier channels and to be ensure that there is not short circuit, open circuit or earth leakage in speaker lines, it is necessary to take measurements of impedance between line poles and between each pole and earth:

1) Z betweem poles: value must be the theoretical impedance, if the value is:
   a. Zreal ~ 0, there is a short circuit in the speaker line.
   b. Zreal ~ Ztheoretical, speaker line is correct.
   c. Zreal ~ ∞, there is an open circuit in the speaker line.

2) Z between ground and poles: the value must be infinitive, it must be avoid any conection between ground and poles of the speaker line, if the value is
   a. Zreal ≠ ∞, speaker line has problem with ground leakages.
   b. Zreal = ∞, speaker line is correct.