univox
BY EDIN

Univox® PLS-X1-5

Induction Loop Drivers

Installation Guide



Univox® PLS-X1	Part No 217100
Univox® PLS-X3	Part No 217300
Univox® PLS-X5	Part No 217500

Content

Introduction 4
Package contents 4
Connections and controls 5
1. Input level control 6
2. Input level LEDs 6
3-4. Parametric MLC 6
5. System Diagnostics 6
6. Loop Current Control 7
7. Loop Current LEDs 7
8. Voltage Clipping/Peak LED 7
9. Loop Monitor/Headphones Socket 8
10. Power LED 8
11. Loop Terminals 8
12. DC Supply socket 9
13. Monitor Speaker Connector 9
14. Auxiliary DC Power Output 9
15. Remote Input Monitor Connector 9
16. Remote Output Monitor Connector 9
17. Monitor Volume Control 10
18. Input Power Amplifier (In Pow Amp) 10
19. Output Pre-amplifier (Out Pre Amp) 10
20. Input 3 11
21. Input 2 11
22. Speech Enhancement (Flat/Speech) DIL Switch 11
23. 50-100 V/Line DIL Switch 11
24. Override On/Off DIL Switch 12
25. Input 1 12
26. Speech Enhancement (Flat/Speech) DIL Switch 12
27. Line/Mic DIL Switch 12
28. Phantom Power 12

Technical Specification 13
Audio Input 1 13
Audio Input 2 13
Input 3 14
Out Pre Amp 14
In Pow Amp 14
Supplementary Outputs 15
Loop Output 15
Default Settings 16
Rear panel 16
Front panel 16
Installation 16
Commissioning 18
General Notes 18
Trouble shooting 19
Safety 21
Maintenance and care 21
Service 21
Technical data 21
Environment 22
Warranty 22

Introduction

Thank you for choosing Univox.

The new Univox® PLS-X series loop drivers combine nearly 50 years of experience with the latest in electronic design to deliver unrivaled sound clarity, power and performance in a compact stylish housing.

Our Engineering Simplicity philosophy is evident in the functionality and ease of use of each model.

The 3 models in the series, PLS-X1, PLS-X3 and PLS-X5 are identical with the exception of output power. Each offers 3 inputs, 2 of which are programmable including a 100 V line setting, a self-test mode, loop monitor and 10 W monitor speaker amplifier. With LED indicators for input and output levels, optimizing system performance is simple.

The PLS-X Series is integrated into Univox® Loop Designer, a free, web-based project planning and design tool that quickly and accurately assists in the design of loop systems.

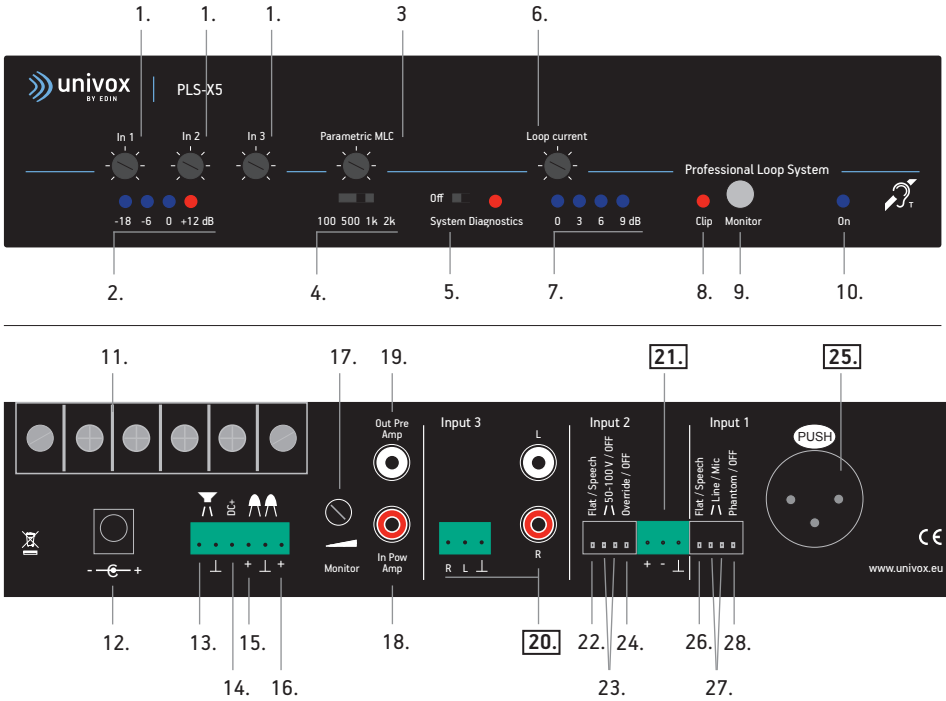
Please read this user guide carefully before (installation and) use of this product. All Univox® loop drivers have a very high output power resulting in products capable of fulfilling standards.

Package contents

The X series package contains the following components:

- Loop driver
- DC Power Supply
- Power cable
- Three pieces of phoenix screw terminals
- Four pieces of rubber feet
- T Sign
- Rack mounting plate with 8 screws
- DC Power supply mounting plate with 4 screws (including two pieces of 3M Scotchmate that can be used to fix the power supply to the mounting plate)
- Measuring protocol/certificate
- Quick Installation Guide

Connections and controls



1. Input Level Control
2. Input Level LEDs
3. Parametric MLC Control
4. Parametric MLC Knee Point Switch
5. System Diagnostics Switch
6. Loop Current Control
7. Loop Current LEDs
8. Voltage Clipping/Peak LED
9. Loop Monitor Jack
10. Power LED
11. Loop Terminals
12. DC Supply Jack
13. Monitor Speaker Connector
14. Auxiliary DC Power Output
15. Remote Input Monitor Connector
16. Remote Output Monitor Connector
17. Monitor Volume Control
18. Input Power Amplifier (In Pow Amp)
19. Output Pre-amplifier (Out Pre Amp)+
20. **Input 3** (Phoenix Screw Terminal/RCA)
21. **Input 2** (Phoenix Screw Terminal)
22. Speech Enhancement DIL Switch (Flat/Speech)
23. 50-100 V Line DIL Switch On/Off
24. Override DIL Switch On/Off (Input 3)
25. **Input 1** (Balanced XLR)
26. Speech Enhancement DIL Switch (Flat/Speech)
27. Line/Mic Sensitivity DIL Switch
28. Phantom Power On/Off

1. Input level control

Each of the 3 inputs can be set to the correct input level using the appropriate single turn potentiometer on the front panel. Use a small flat blade screwdriver.

2. Input level LEDs

The 3 blue and 1 red LEDs indicate the signal level at the output of the pre-amplifier.

To ensure the AGC function is optimised, the signal level should be set at 0 dB with maximum peaks reaching +12 dB (i.e. the 0 dB LED should be on most of the time during the audio programme and the +12 dB indicator should flicker occasionally).

3-4. Parametric MLC

The parametric metal loss control function provides the ultimate in signal level correction for signal loss due to the interference of metal. By selecting the appropriate parametric curve, the installer can fine tune the frequency response, compensating for the effects of different metal types and configurations.

There are 4 parametric curves to choose from; 2 kHz, 1 kHz, 500 Hz and 100 Hz. This setting sets the frequency at which the metal loss control starts to compensate.

The function is powerful, however, excessive compensation can lead to signal limiting in the treble range. If signal limiting occurs, the red Clip LED (8.) will illuminate.

5. System Diagnostics

Univox PLS-X series has a built-in system test. We recommend that this feature is used periodically, at least monthly, to check the integrity of the loop driver, its inputs and the loop condition.

To access the system diagnostics mode, set the switch on the front panel to the right. All the inputs are now disabled and an internal 1 KHz oscillator is connected to the input instead. The oscillator pulses at 2 second intervals with a 0 dB level activating the AGC regardless of the adjusted sensitivity.

If the input level LED's and at least one output loop current LED flash in unison the system is functioning correctly.

If the input and output LEDs do not flash, check that the loop is connected and not open circuit.

If only the input LEDs flash, and the loop is connected, the output current is set too low. Increase the output current.

6. Loop Current Control

The loop current can be adjusted by turning the loop current control (6.) potentiometer with a small flat blade screwdriver.

7. Loop Current LEDs

The current output level is indicated by the loop current LEDs in 3 dB increments. The LED dB scale is relative to the loop output current and is based on the available current of the particular model. However, the only way to set the output level to the correct IEC level is to use a professional field strength meter, preferably Univox FSM 2.0.

8. Voltage Clipping/Peak LED

The voltage clipping/peak LED will illuminate when the voltage is clipped, i.e. there is insufficient voltage to maintain a constant current.

Momentary short term voltage clipping is unlikely to be audible in hearing aids, but if clipping occurs for any length of time (the Clip LED (8.) remains on) the audio quality will suffer and remedial action should be taken to reduce or eliminate the problem.

Voltage clipping will occur at higher frequencies first. It causes distortion of the audio signal. Situations that require higher voltages from the loop driver and where voltage clipping may occur are typically where:

- The loop has a high impedance. The impedance of the cable is determined by its length and cross sectional area. The longer and thinner the cable, the higher its impedance. The feed cable must also be considered when calculating the loop impedance. A 2-turn loop will have an impedance more

than double that of a single turn loop of the same length and cross-section due to mutual inductance.
- Strong compensation from the parametric MLC control is applied

Note
In some cases metal reinforcement can actually reduce the voltage requirement.

9. Loop Monitor/Headphones Socket

Univox® PLS-X series has a powerful 10 W speaker amplifier and a 3.5 mm headphone socket built-in. The headphone socket is on the front panel, the speaker connectors and volume control are on the rear. (See 12.) Both are fed directly from the loop providing an accurate reproduction of the loop signal. A distorted, poor quality signal or lack of audio input is easily identified by use of this feature.

Note 1
The volume control is located on the rear panel and controls the volume level of both the external speaker, if attached, and the headphones.

Note 2
Excessive output to speaker may reduce the overall loop output power.

10. Power LED

The Blue Power LED is illuminated at all times when the unit is connected to a working power supply.

The units are designed to run 24/7. They do not have a separate on off switch and can only be turned off by disconnecting or turning off the power supply.

11. Loop Terminals

The two outer terminals (screw 1 and 4) are used for connecting a single turn loop. The two inner centre terminals (screw 2 and 3) provide a shorting bar to couple a 2-turn loop where a twin core cable is used (see page 17).

12. DC Supply socket

The external DC power supply provided with the loop driver is connected via the DC supply socket on the rear panel.

The voltage rating of the supply is dependent on the model.

Only Univox approved power supplies correctly rated for the Loop driver model should be used. The use of incorrectly rated, or third party power supplies will invalidate your 5 year warranty.

13. Monitor Speaker Connector

A monitor speaker may be permanently connected providing some sound reinforcement in smaller rooms. In this case, care needs to be taken to avoid acoustic feedback. Alternatively, the monitor speaker may be connected through a test switch and used for routine testing of the system.

14. Auxiliary DC Power Output

The DC output is available to power compatible accessories. The output voltage is dependent on the loop driver model/external power supply; X1 20V, X3/X5 36V.

15. Remote Input Monitor Connector

A LED connected to this terminal will mirror the operation of the -6 dB input Level LED on the front panel, thus allowing the monitoring of the presence of an input signal in a more convenient location.

16. Remote Output Monitor Connector

A LED connected to this terminal will mirror the operation of the 0 dB output current Level LED on the front panel, thus allowing the monitoring of the presence of output current in a more convenient location.

17. Monitor Volume Control

Controls the volume for the headphone output and the external speaker where fitted.

See (8.) Loop Monitor and (12.) Monitor Speaker Connector.

18. Input Power Amplifier (In Pow Amp)

This input allows connection into the audio chain after the pre-amplification and automatic gain control stages. It is typically used when daisy chaining loop drivers.

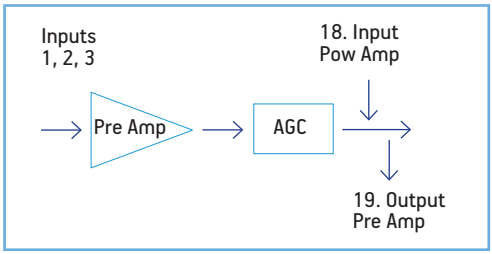


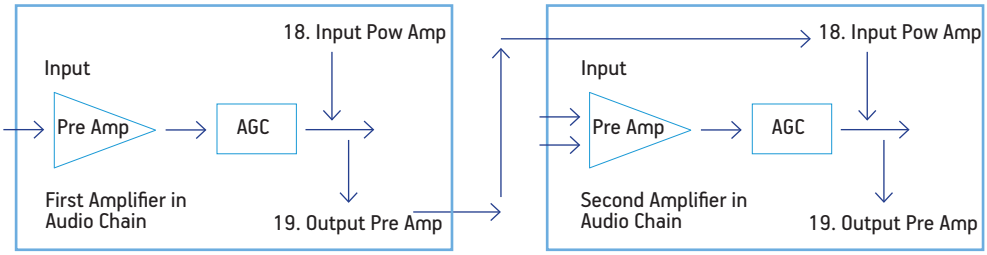
Fig 1. Input and Output Connections on PLS-X Series

19. Output Pre-amplifier (Out Pre Amp)

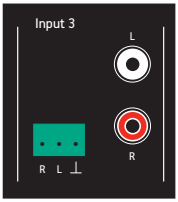
This output is tapped from the audio chain after the pre-amplification and automatic gain control stage.

This output provides a feed for an additional loop driver. It should be connected to the additional loop driver at a point that is after the pre-amplification and AGC. For the PLS-X series this is input (17.) In Pow Amp.

Fig 2. Daisy chaining PLS-X Series Loop Drivers



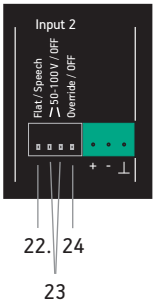
20. Input 3



Input 3 is an unbalanced line input. The sensitivity is adjusted using the control on the front panel.

The source may be connected using the RCA connector or the Phoenix screw terminal.

21. Input 2



Input 2 is a switchable Line/50-100 V line input. The sensitivity is adjusted using the control on the front panel.

The source is connected using Phoenix screw terminal.

22. Speech Enhancement (Flat/Speech) DIL Switch

The speech enhancement function works by filtering low frequencies (<150Hz) which can mask the intelligible sound. It is recommended to use this function for all normal loop systems.

With the DIL switch in the ‘down’ position, speech enhancement is OFF.

With the DIL switch in the ‘up’ position, speech enhancement is ON.

Note
When commissioning the loop system in accordance with the performance standard IEC 60118-4, the speech enhancement function must be switched off.

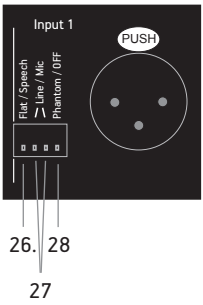
23. 50-100 V/Line DIL Switch

With the 2 DIL switches in the ‘down’ position, Input 2 is set to 100 V line sensitivity. With the 2 DIL switches in the ‘up’ position, Input 2 is set to line sensitivity. (See technical specification for sensitivity levels.)

Caution!
The DIL switch should be set in the appropriate position before connecting the input signal to avoid causing damage to the input.

24. Override On/Off DIL Switch

With the DIL switch in the ‘down’ position, Input 3 is set as the Priority Input. In this case, when a signal is detected, all other inputs will be suppressed. This functionality is ideal when connecting to an alarm system such as a voice alarm. To turn off this feature, set the DIL switch to the ‘up’ position.



25. Input 1

Input 1 is a balanced switchable Line/Mic input. The sensitivity is adjusted using the control on the front panel.

The source is connected to the XLR socket.

26. Speech Enhancement (Flat/Speech) DIL Switch

The speech enhancement function works by filtering low frequencies (<150Hz) which can mask the intelligible sound. It is recommended to use this function for all normal loop systems.

With the DIL switch in the ‘down’ position, speech enhancement is OFF.

With the DIL switch in the ‘up’ position, speech enhancement is ON.

Note
When commissioning the loop system in accordance with the performance standard IEC 60118-4, the speech enhancement function must be switched off.

27. Line/Mic DIL Switch

With the 2 DIL switches in the ‘down’ position, Input 1 is set to Line sensitivity. With the 2 DIL switches in the ‘up’ position, Input 1 is set to Mic sensitivity. (See Technical Specification for sensitivity levels.)

28. Phantom Power

Electret microphones need a DC bias to function. This DC bias, when provided by the host amplifier, is commonly called phantom power.

With the DIL switch in the ‘down’ position phantom power is turned ON. With the DIL switch in the ‘up’ position, phantom power is turned OFF. The phantom power or bias voltage is approximately 12V (some variation occurs, depending on the loop driver model).

Note 1

Phantom Power should only be turned on when an electret microphone is connected.

Note 2

Before connection of an electret microphone needing more phantom power than 12V, a microphone pre-amplifier must be used.

Technical Specification

Audio Input 1

Connection Type:	Balanced XLR (socket)
Level:	Switchable between Line (DIL switches 2 and 3 ‘down’ and Mic (DIL switches 2 and 3 ‘up’)
Line sensitivity range:	40 mV-2.6 V (-25.7 dBu to 10.5 dBu) adjustable by control on front panel
Mic sensitivity range:	2.5 mV-160 mV (-50 dBu to -14 dBu) adjustable by control on front panel
Phantom power on/off:	DIL switch 4 ‘up’ = OFF, ‘down’ = ON
Speech Enhancement:	Flat (DIL switch 1 ‘down’) = OFF Low cut filter 60-80 Hz Speech (DIL switch 1 ‘up’) = ON Low cut filter 110-170 Hz

Audio Input 2

Connection Type:	Phoenix screw terminal
Level:	Switchable between 50-100V line and Line levels 50-100 V Line (DIL switches 2 and 3 down)

	Line (DIL switches 2 and 3 up) Balanced line sensitivity 140 mV-8.3 V (-15 dBu to 20.6 dBu)
Override:	Suppresses Inputs 1 and 2 and gives priority to Input 3 for use with voice alarms or other audio
	DIL switch 4 ‘down’ = ON
	DIL switch 4 ‘up’ = OFF
Speech Enhancement:	Flat (DIL switch 1 ‘down’) = OFF Low cut filter 60-80 Hz
	Speech (DIL switch 1 ‘up’) = ON Low cut filter 110-170 Hz

Input 3

Connection Type:	RCA (Phono) and Phoenix screw terminal
Level:	Unbalanced line
Sensitivity range:	30 mV-5 V (-28 dBu to 17 dBu) adjustable by control on front panel

Out Pre Amp

Connection Type:	RCA (Phono)
Output Level:	Approximately 0.5 V

Output signal after low pass filter and AGC. Can be used as the input to other loop drivers.

In Pow Amp

Connection Type:	RCA (Phono)
Input level:	Approximately 0.5V

Direct input to the power amplifier bypassing the pre-amplifier and AGC.

Supplementary Outputs

Connection Type: Phoenix screw terminal (6 connections)

Connection	Type	Function	Specification
1	Audio output	Monitor speaker	10 W IC power chip, 4-32 Ω
2	Ground	Ground	Ground
3	DC power supply	Auxiliary power supply	19-36 V, 100 mA DC
4,5	LED driver	Indicates output current = 0dB LED	Suitable for direct connection of LED or external diagnostic test
5,6	LED driver	Indicates input signal is > -6 dB	Suitable for direct connection of LED or external diagnostic test

Loop Output

Connection Type: Screw terminal (4 connections)

Use the two outer connections for a single turn loop (see page 17).

The two inner connections (center) are used as a shorting bar for configuring a 2-turn loop with twin core cable (see page 17).

	PLS-X1	PLS-X3	PLS-X5
Max Voltage	22 Vpp	31 Vpp	36.5 Vpp
Max Current	4.7 A RMS	6.5 A RMS	9.5 A RMS

Default Settings

Rear panel

Input 1

1. Flat/Speech; DOWN (= speech enhancement off)
2. Line/Mic; DOWN
3. Line/Mic; DOWN

(= line level is selected)

4. Phantom/off; UP (= phantom power off)

Input 2

1. Flat/Speech; DOWN (= speech enhancement off)
2. 50-100V/off; UP
3. 50-100V/off; UP

(= 100V line off)

4. Override/off; UP (= override off)

Monitor Control

Set fully anti-clockwise (factory default)

Front panel

All level controls are set to minimum (turned fully anti-clockwise).

System Diagnostic = Off (switch in left position).

Parametric MLC = 2 kHz (switch in right position).

Installation

1. Place the loop driver in a suitable location. There are three placement options for the PLS-X series drivers:

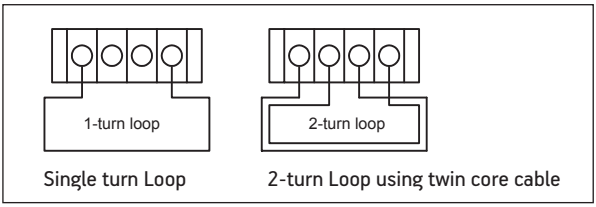
- In a 19" rack
- Hung on a vertical surface using the keyholes in the base of the unit
- On a flat level surface on the units rubber feet

Note

The PLS-X series is convection cooled for silent operation, improved reliability and longer operational life. The case forms part of the cooling system. The unit is very efficient and at minimum 0.3 Ω (PLS-X1), 0.4 Ω (PLS-X3) and 0.5 Ω (PLS-X5) loop resistance, no ventilation space in the rack is required. When placed on flat surfaces the little space given by the rubber feet is sufficient.

2. Connect the loop cable to the loop driver using the screw connections as shown in Figure 3.

Fig 3. Loop Connection



3. Connect the power supply, first to the loop driver and then to the wall outlet. The Blue ‘power On’ LED will illuminate.

4. Turn ‘System Diagnostics’ on by sliding the switch to the right. The signal input LEDs will begin to blink.

5. Adjust the loop current. Depending on the adjusted current level, 1, 2, 3 or 4 output current LEDs will blink in unison.

6. Set the current to achieve a field strength of the peaks to approximately -3 dB in the center of the loop.

The system is functioning correctly and is ready for commissioning in accordance with the IEC performance standard IEC 60118-4.

7. Turn ‘System Diagnostics‘ off, by sliding the switch to the left.

Commissioning

The process for commissioning a loop system to the IEC performance standard, IEC 60118-4, can be found in the user guide for the Univox FSM 2.0 field strength meter, on the Univox® Certificate of Conformity or in the equipment Logbook, if supplied. These documents are also available on our websites.

1. Set the loop current to minimum by setting the control fully anti-clockwise.
2. Connect the test signal source to the appropriate input.
3. Adjust the input level to the point at which the red, +12 dB LED flickers sporadically in sympathy with the highest signal peaks. Where a 1 kHz sine wave signal is used the level should be adjusted to 0 dB LED indication.
4. Follow the commissioning process.

General Notes

To listen to the sound quality, use high quality headphones with the FSM 2.0 or Univox® Listener loop receiver.

The 'Monitor' Output socket is a direct reflection of the loop signal current (volume control on rear panel). The sound quality can be easily assessed at this point in the audio chain aiding set up and problem solving.

When operating at maximum output on some loop types the automatic limit protection circuit may cut programme peaks. To rectify, reduce the loop current accordingly.

To adjust the frequency response of the system use the 'Parametric MLC'. The degree of compensation is adjusted with the potentiometer and the start or break frequency is determined by the 4 position switch marked: 100 Hz, 500 Hz, 1 kHz, 2 kHz. Start with the break frequency set to 2 kHz and adjust the level. If this is not sufficient, move to the next lower frequency and repeat as required.

Trouble shooting

Symptom	Possible cause	Solution
Power LED is off	Power supply not connected Power supply faulty	Connect power supply correctly Replace power supply
Power LED is on, Clip/Peak LED is on (brightly red)	Loop is not correctly connected	Check that loop wire is correctly connected to loop terminal
Input and output LEDs flash on and off	System Diagnostics turned on	Turn System Diagnostics off
Output current LEDs are off, input LEDs are on	Loop current turned down	Adjust Loop current
Output and input LEDs are off, power LED is on	No input signal Input signal set too low	Check if input signal is present Adjust level of input signal
Audio quality is poor, clip/peak LED is on	Loop impedance is too high Loop current set too high Parametric MLC set too high	Change the loop: use twin cores in parallel or use a cable with higher cross-section Turn loop current down Turn down Parametric MLC
Audio quality is poor, clip/peak LED is off, sound quality using headphone monitor is also poor	Input signal set too high Audio source is of poor quality	Reduce input signal level and check Line/Mic level setting Change/adjust audio source

Intelligibility of sound from microphone is poor	Low frequency masking Poor microphone user techniques	Turn speech enhancement filter on Train user
Microphone connected, input LEDs are off	Phantom power not turned on Input level too low Microphone needs higher phantom voltage Microphone/lead/ connectors faulty	Turn phantom power on Increase input level/reduce speaking distance Use valid microphone or connect a microphone mixer (amplifier) Exchange faulty part
Alarm/priority signal is not clear	Override DIL switch not set to allow this function	Set DIL switch to correct position
Cannot achieve required frequency response at 100 Hz	Speech enhancement filter turned on	Turn speech enhancement filter off
Cannot achieve required frequency response at 5 kHz	Parametric MLC not set correctly Frequency dependent losses too high for parametric compensation	Set Parametric MLC to correct level Use smaller/multiple loops, e.g. figure 8 or SLS systems

Safety and warranty

The equipment should be installed by a competent audio visual technician observing 'good electrical and audio practice' at all times and following all the instructions contained within this document.

Only use the power adapter supplied with the unit. If the power adapter or cable is damaged, replace with a genuine Univox part.

Power adapter must be connected to a mains outlet close to the amplifier and easily accessible.

The installer is responsible for installing the product in a way that may not cause risk of fire. Do not cover the power adapter or loop driver. Only operate the unit in a well ventilated, dry environment.

⚠ Do not remove any covers as there is a risk of electric shock. Please observe that the product warranty doesn't include faults caused by tampering with the product, carelessness, incorrect connection/mounting or maintenance.

Maintenance and care

Under normal circumstances the product does not need any special maintenance.

Should the unit become dirty, wipe it with a clean damp cloth. Do not use solvents or strong detergents.

Service

Should the system not work after having made the product test as described above, please contact the local distributor for further instructions. Before returning a product to us for service you will need a Service Number from your distributor. They will also send you a Service Report Form which must be completed and returned with the product.

Technical data

For additional information, please refer to product data sheet/brochure and CE certificate which can be downloaded from www.univox.eu/products. If required other technical documents can be ordered from support@edin.se.

Environment

To prevent possible harm to the environment and human health, at the end of serviceable life of the product, please dispose of responsibly by following statutory Disposal Regulations.

Measuring devices



Univox® FSM 2.0, Field Strength Meter

Instrument for the professional measurement and certification of loop systems in accordance with IEC 60118-4.



Univox® Listener

Loop receiver for fast and simple check of the sound quality and basic level control of the loop.

Warranty

This loop driver is supplied with a 5 year (return to base) warranty for parts and labour.

Misuse of the product in any way including but not limited to:

- Incorrect installation
- Connection to non approved power adapter
- Self oscillation resulting from feedback
- Act of God, e.g. lightning strike
- Ingress of liquid
- Mechanical impact

will invalidate the warranty.

Distributor

Univox by edin, the world's leading authority and producer of high quality hearing loop systems created the first true loop amplifier in 1969. With our strong emphasis on research and development, we have continued to innovate to deliver more firsts in the industry, constantly improving the performance of our products and service for hard of hearing communities worldwide.

Bo Edin AB
Sweden and International Sales
+46 (0)8 767 18 18
info@edin.se
www.univox.eu

UnivoxAudio Ltd.
UK Sales
+44 (0)1707 339216
writeto@univoxaudio.co.uk
www.univoxaudio.co.uk

Hearing excellence since 1965

univox BY EDIN

pls-x1-5-du-gb 150522 Copyright © Bo Edin AB