univox
BY EDIN

Univox® PLS-6

High-Power
Class D Tech Series

Installation Guide

Univox® PLS-6 part no. 225060

Table of Contents

Introduction

Univox® PLS-6

Univox® PLS-6 is a unique Class D Tech loop driver suitable for a wide range of loop configurations. Single-, two-turn perimeter loops and multi-loops enable flexibility to easily modify system performance.

The high efficiency design has resulted in a series of loop drivers considerably smaller and lighter than their predecessors, with enhanced output power optimized for modern hearing loop system design.

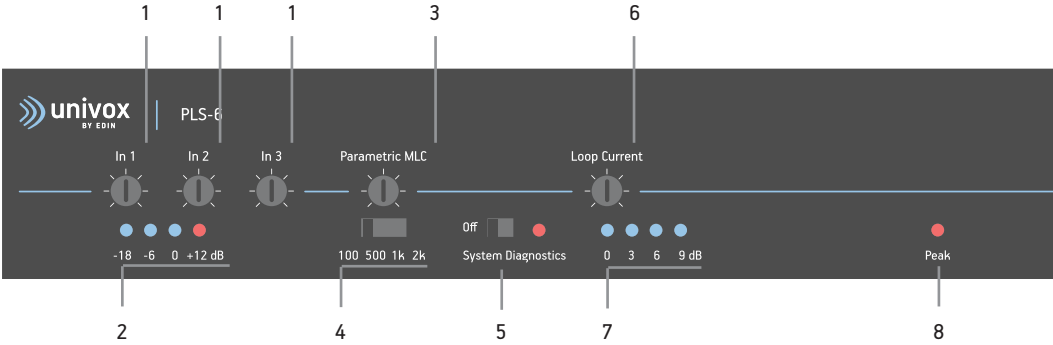
As all PLS-series drivers, the PLS-6 is designed for durable performance and easy installation. The combination of Univox technology, electronic transformer and silent, fan-free operation delivers an unsurpassed loop driver with high audio quality.

The external power supply increases the total efficiency compared to traditional built-in transformers. Our Engineering Simplicity philosophy is shown in the functionality and usability of each model.

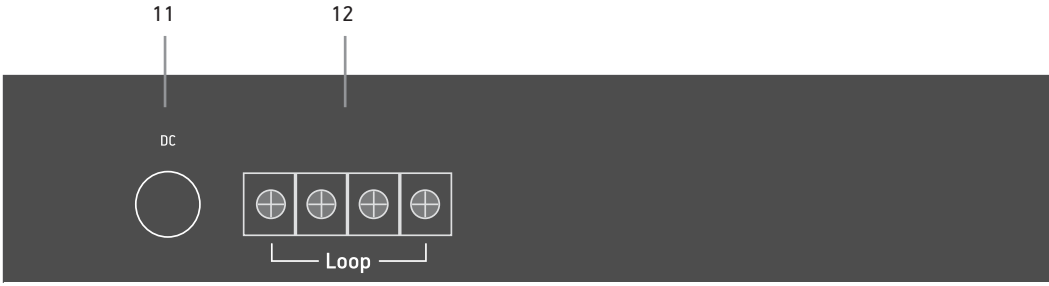
Included in package

- Loop driver
- DC Power Supply
- Power cable
- 3 pcs of phoenix screw terminals
- 4 pcs of rubber feet (preassembled)
- T-Sign according to ETSI-standard
- Rack mounting plate with 8 screws
- DC Power supply mounting plate with 4 screws
- Certificate/Measuring protocol
- Installation guide

Connections and controls **Overview**



1. Input level potentiometers
2. Input level LED bar graph
3. Parametric MLC control
4. Parametric MLC knee point switch
5. System diagnostics switch and LED



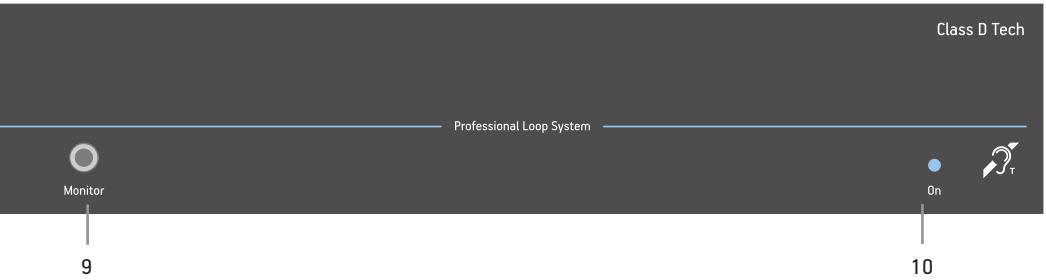
11. DC supply input
12. Loop screw terminals
13. Monitor volume control for both headphones and speaker output

A. MISCELLANEOUS OUTPUTS

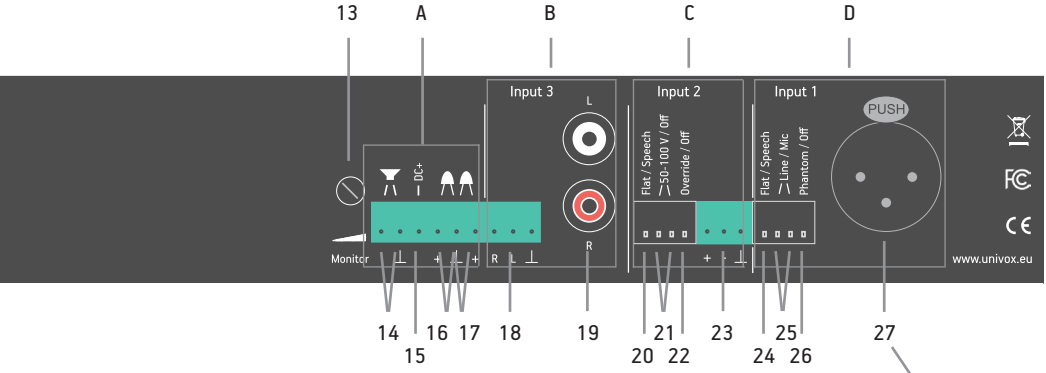
14. Monitor speaker connector
15. Auxiliary DC power output
16. Remote input monitor connector
17. Remote output monitor connector

B. INPUT 3

18. Phoenix screw terminal
19. Unbalanced RCA

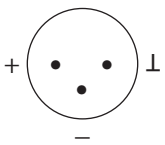


6. Loop current potentiometer
7. Loop current LED bar graph
8. Peak LED
9. Loop monitor headphones socket
10. Power LED



C. INPUT 2

20. Speech enhancement switch (Flat/Speech)
21. 50-100 V Line switches On/Off
22. Override switch On/Off (Input 3)
23. Phoenix screw terminal



D. INPUT 1

24. Speech enhancement switch (Flat/Speech)
25. Line/Mic sensitivity switches
26. Phantom power voltage switch On/Off
27. Balanced XLR

Description

1-2. *Input level* **(1)** should be set to 0 dB. (i.e. the 0 dB LED should be lit most of the time during the audio programme. The +12 dB *LED indicator* **(2)** should not be lit at any time.)

3-4. *Parametric MLC control* **(3)** makes it possible to fine tune the frequency response, compensating for the effects of different metal types and configurations.
There are 4 parametric curves starting from; 2 kHz, 1 kHz, 500 Hz and 100 Hz. These set the frequency at which the metal loss correction control starts to compensate. This function is powerful. Excessive compensation can however lead to signal limiting in the treble range. If signal limiting occurs, the red peak LED illuminates.

5. *System Diagnostics* **(5)** verifies the integrity and function of the loop driver - inputs, output and the loop condition.
   - *Set the switch on the front panel to right position. A built-in 1.6kHz signal pulses at 2 seconds intervals at 0 dB, regardless of the adjusted sensitivity.*
   - *If the input and output LEDs flashes in unison, the loop drivers functionality can be confirmed.*
   - *If only the input LEDs flashes it indicates that the loop is not connected or the current potentiometer setting needs to be readjusted..*
   - *Switch to left position "Off", for normal use.*

6. The *loop current potentiometer* **(6)** set the output current, i.e. the field strength of the loop.

7. *Loop current LED bar graph* **(7)** indicates the level of the loop current, not the field strength. The field strength is measured using a Field Strength Meter, like the Univox FSM.

8. *Peak* (clip) *LED* **(8)** illuminate when there is insufficient voltage to maintain a constant loop current. Momentary short term voltage clipping is unlikely to be audible in hearing aids, but if clipping occurs for any length of time (the Peak LED remains on) the audio quality will suffer.
Peak clipping will typically occur when using long thin wires, two-turn loops and for signals with high frequency spectrum, like modern music. Speech has a small amount of high frequency content. Strong compensation from the parametric MLC control may increase the risk of clipping.
Note: use ULD for simulation guidance before installation and commissioning.

9,13,14 Loop *Monitor*, supports headphone **(9)** and speaker outputs **(14)** representing the sound quality of the loop. Volume control for both headphones and speakers, is set by the potentiometer **(13)**.

10. *Power LED* **(10)** verifies power supply connection.

11. *4 pin DC Supply socket* **(11)** for secure connection of Univox approved power supplies 90-260VAC, 50-60Hz, only. Connect the power to the amplifier before connecting to the network, otherwise there may be a risk of sparking.

12. *Loop scew terminals* **(12)** for loop connection.

A. MISCELLANEOUS OUTPUTS - PHOENIX SCREW TERMINAL (6 connectors/screws)

14. *Monitor speaker connector*
Pin 1+2 (2=GND), speaker output 8-32 Ω

15. *Auxiliary DC power output* 24V
Pin 3+2 (2=GND), DC 12-18V output, 100mA

16. *Remote Input Monitor Connector* **(16)** gives an indication at -6dB input level.
    Pin 4+5 (5=GND) = LED connection , indication/diagnostic test.
17. *Remote Output Monitor Connector* **(17)** gives an indication at 0 dB output level.
    Pin 5+6 (5=GND) = LED connection, indication/diagnostic test.

B. INPUT 3 (PHOENIX SCREW TERMINAL/RCA)

18. Balanced Line: 30 mVrms-5Vrms (-28dBu to 17dBu).
19. Unbalanced RCA left/right.

C. INPUT 2 (PHOENIX SCREW TERMINAL)

Switchable between line and 50-100V speaker line input.
Note: The speaker line MUST be balanced at the Phoenix connector (connect (+) and (–) terminal). Use earth ONLY for free-floating screen or leave unconnected.

20. Speech filter: Low cut filter 130-170Hz On/Off.
    Speech Enhancement (Flat/Speech) attenuates low frequencies (<150Hz) increasing speech intelligibility for microphone use.
    Note: When commissioning field strength level and frequency response this feature must be switched to Flat postition.
21. Speaker 50-100V balanced Line, sensitivity On/Off.
    Caution! 50-100 V/Line must be set prior to any further settings.
22. Override/Priority function mutes inputs and is typically used for voice alarm systems. Signals higher than -6dB on input 2 activates the priority function.
23. Balanced Line: -15dBu (50mVrms) to +20.6dBu (8.3Vrms).

D. INPUT 1 (BALANCED XLR)

Balanced XLR. Switchable between Line- and Mic sensitivity and with or without Phantom voltage.
Note: With unbalanced connection (not recommended) the pin not in use should be grounded.

24. Speech filter: Low cut filter 130-170Hz, On/Off.
    Speech Enhancement (Flat/Speech) attenuates low frequencies (<150Hz) to increase speech intelligibility for microphone use.
    Note: When commissioning field strength level and frequency response this feature must be switched to *"Flat"* position.
25. Line/Mic sensitivity switches: -55dBu (1.5 mVrms) to +10dBu (2.6Vrms).
26. Phantom voltage 12V, On/Off.
27. Balanced XLR.

Installation

Planning

Calculations for coverage area, metal loss, signal sources, power outlets, dissipating heat, loop driver placement for optimal ventilation and other practical installation issues, must be done prior to the on-site installation. Please refer to **www.univox.eu/planning**

Use Univox Loop Designer (ULD), a free, web-based project planning and design tool that quickly and accurately assists in the design of loop systems.
www.univoxloopdesign.org

Tools required

Copper tape tools, e.g. crimping tool, double-sided adhesive tape, printed warning tape.

General audio installation tools, e.g. Ohm-meter.

Field strength meter, e.g. Univox FSM.

Listening device, e.g. Univox Listener.

Loop cable

Always install a twin core loop cable to secure necessary connection options, this is especially vital in environments with uneven metal loss. Univox twin core copper tape gives top efficiency with low induction loss. Use a junction box to alternate between single, double and twin turn loop connections.

Use a feed cable (twisted or twin wire) between the junction box and the loop driver, as well as between the loop figuration and the junction box or loop driver.

Placement of the driver

The Univox PLS-6 loop driver does not generate any excessive heat and can be mounted in 19" racks on top of or below other components mounted in the same rack (check that these don't generate excessive heat), on a wall or another flat surface. In a rack system it is often practical to attach the external power supply on the supporting metallic construction using straps. For mounting of the wall, you need to open the chassi-lid to get access to the mounting holes.

Note: Although there are several built-in protection systems for temperature, current and power etc. we recommend to plan for worst case scenario.

General basic audio practice should be followed when mounting the unit and installing the wiring and the loop cable. The loop cable must not be placed closer than 30 cm (12 in) to a parallel microphone or mixer cable, in order to avoid feedback interference between analog and the loop signal (crossing is allowed).

Placement of the microphones

Microphone placement and proximity between microphone and sound source is crucial for improved speech intelligibility. Use shortest distance possible between the microphone and the sound source.

Commissioning and certification

It's important to check the system when the installation is completed. To ensure that the system meets the requirements for field strength, consistency and frequency response, the loop system should be commissioned in accordance to the international standard IEC 60118-4.

A guide for commissioning a loop system to the IEC performance standard, can be found in the user guide for the Univox FSM 2.0 field strength meter and in the Univox® *Certificate of Conformity*. These documents are also available on www.univox.eu/certify.

Maximum recommended segment size *(in compliance with IEC 60118-4)*

Metallic environment	**Basic level (1000Hz)**	**IEC level (1600Hz)**	**Field Strength Attenuation**	**Important notes/requirements**
No metal	22m/70ft	22m/70ft	0	
Standard reinforced concrete	7m/23ft	5m/16ft	3.5-6dB	Increased current, voltage and power
Heavily reinforced concrete	5m/16ft	4m/13ft	3.5-6dB	Increased current, voltage and power
Suspended ceiling	4.8m/16ft	3,6m/12ft	4-10 dB	Conductor must be centered in the suspended ceiling framework (longest distance to metal) Increased current
Steel deck/ Metal system floor	4m/13ft	3m/10ft	6-10dB	Increased current
Iron bar construction	3m/10ft	2m/6.5ft	4-12dB	Medium/strong damping depending on placement of wire (avoid placement along metal bars)

System setup

Start-up procedure

1. Disconnect all input- and output connections.
2. Each loop cable must be securely isolated (particularly to safety-ground and other loop connections). Verify the resistance of the loop (approximately 1-3 Ohm).
3. Set all level controls to minimum setting:
   - **System Diagnostics (5)** = Off (switch to left position)
   - **Parametric MLC (4)** = 2kHz (switch to right position)
4. Connect the **Power supply (11)** and verify **Power LED** indication **(10)**
5. Activate **System Diagnostics** by sliding the switch to the right. Input level bar graph peaks **(2)** to 0dB . Output bar graph **(7)** does not indicate.
6. Connect **the loop(12)** and adjust the output level, making sure input and output bar graphs indicate in unison. Note: a 2-turn loop is often more efficient. See page 9.
7. Check field strength for all loop segments using a field strength meter, e.g Univox FSM. Verify low field strength directly above wires and high in between segments (peaks to approximately -2dB). If not, there might be a local short circuit between wires.
8. Basic function of the loop system is now verified. Turn the **System Diagnostics** off by sliding the switch to the left.

Input connection and adjustments

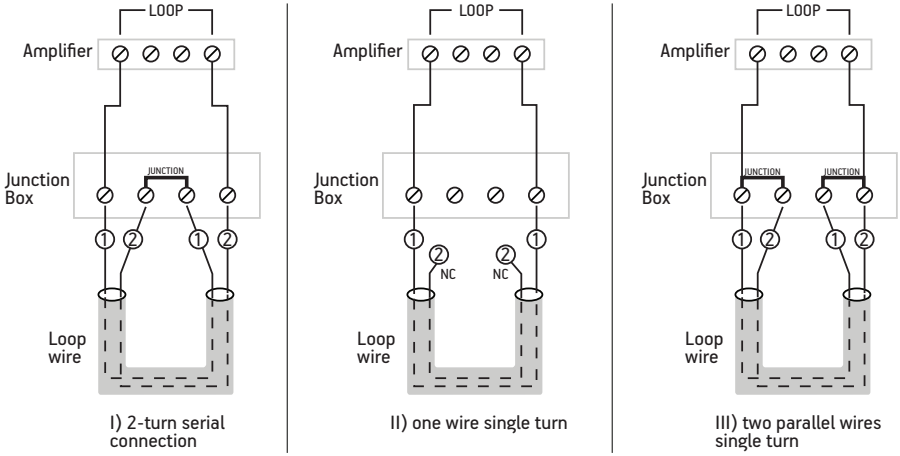
9. Set all level controls to the minimum setting:
   - **System Diagnostic (5)** = Off (switch to the left position)
   - **Parametric MLC (4)** = 2kHz (switch to the right position)
10. Connect the main audio source to the amplifiers input (B, C or D)
11. Adjust the input level **(1)** to 0dB at input bar graph **(2)**. If using a 1kHz pulsed sine wave signal, simply set to 0dB.

Output connection and adjustments

12. Field strength setting: Start with the highest efficiency connection, **I)** 2-turn serial connection, in the junction box.

13. Set the field strength **(6)** to -3dB to 0dB at the peaks. If **Peak (8)** LED flickers only momentarily the connection is acceptable. If the **Peak** LED indicates continuously, try rewiring the connections in the junction box in subsequent order: **II)** one wire single turn and then **III)** two parallel wires single turn.

    With this procedure the unit will operate at the highest output possible without generating any excessive heat.
    Note: To quickly set up the field strength for a real program source, a PPM instrument is helpful. The Univox Listener has a calibrated level indicator that quickly finds the highest peak.



    Note: When adjusting the field strength peaks, -2dB field strength works best, due to different dynamic headrooms in hearing aids.

14. Check basic frequency response according to IEC 60118-4, using a field strength meter, e.g Univox FSM. If necessary, follow **Frequency adjustment procedure** (see page 10).
15. Check the sound quality by using an external listening device (Univox Listener or FSM), **Monitor speaker connector (14)** or **Monitor (9)** for headphone (volume control on rear panel **Monitor (13)**). When operating at maximum output on low impedance, i.e single turn loops, the automatic limit protection circuit may cut programme peaks. This can be avoided by changing to a 2-turn loop or reduce the output current setting.
16. Start the Commissioning process to certify the installation (see page 7).

Metal Loss Correction frequency setting

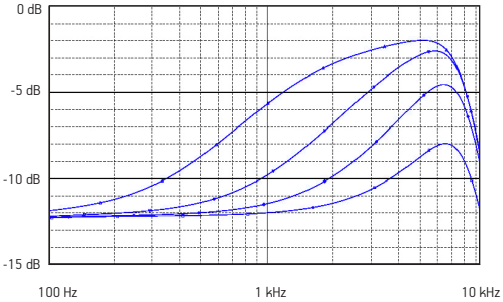
The degree of compensation for metal loss is adjusted with the **MLC potentiometer (3)**. The start/break frequency is set with the **Parametric MLC knee point switch (4)** marked: 100Hz, 500Hz, 1kHz, 2kHz.

1. Start with the break frequency set to 2kHz.
2. Adjust the level to -12dB. If this is not sufficient, move to the next lower frequency and repeat as required.
3. Verify that the loop driver's voltage doesn't saturate, i.e. that the peak indicator **(8)** only flickers temporarily.

Troubleshooting

Symptom	Possible cause	Solution
General malfunction	-	Check the system with the start-up procedure. See page 10.
Power LED is off	Power supply not connected Power supply faulty	Check the power connection Replace with approved power supply
Input and output LEDs flash on and off	System Diagnostics turned on	Turn off the System Diagnostics
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 the input signal level
Audio quality is poor, peak LED indicates	Loop cable malfunction Loop impedance is too high Loop current set too high Parametric MLC set too high	Re-run startup procedure. (page 10) Change the loop cable: use twin cores in parallel or use a cable with higher cross-section Adjust loop curremt Adjust the Parametric MLC
Audio quality is poor, 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

MLC function in maximum position



Symptom	Possible cause	Solution
Intelligibility of sound from microphone is poor	Low frequency masking Poor microphone user techniques	Turn speech enhancement filter on Instruct user/reduce speaking distance
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 DIP switch not set to allow this function	Set DIP 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

Safety

The equipment should be installed by an audio visual technician observing 'good electrical and audio practice' at all times and following all the instructions 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. Connect the power to the amplifier before connecting to the network, otherwise there is a risk of sparking.

The installer is responsible for installing the product in a way that may not cause risk of fire, electrical malfunctions or danger for the user. 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. There are no user serviceable parts inside. Refer servicing to qualified personnel. Please observe that the product warranty does not include faults caused by tampering with the product, carelessness, incorrect connection/mounting or maintenance.

Bo Edin AB shall not be held responsible or liable for interference to radio or TV equipment, and/or to any direct, incidental or consequential damages or losses to any person or entity, if the equipment has been installed by unqualified personnel and/or if installation instructions stated in the product Installation Guide have not been strictly followed.

Warranty

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

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
- Force majeure e.g. lightning strike
- Ingress of liquid
- Mechanical impact will invalidate the warranty.

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 any solvents or detergents.

Service

Should the system not work as expected, please follow *Checklist for installation* found on **www.univox.eu/support** or contact your local distributor for further instructions.
Before returning a product to Bo Edin AB 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 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, please dispose of the product responsibly by following statutory disposal regulations.

Measuring devices

Univox® FSM Basic, Field Strength Meter

Professional instrument for measurement and certification of loop systems in accordance with IEC 60118-4.

Univox® Listener, testing device

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

Technical data PLS-6

Product name	Univox PLS-6
Max Drive Voltage	50Vpp/17.7Vrms
Peak current (EHIMA speech)	14Arms
Power supply	110-240VAC primary switched class VI electronic power supply; Enhanced power connection with 4-pin DIN power connector
Frequency response	75-6800Hz
Distortion, Power Loop Driver	< 0.05%
Distortion, system	< 0.15%
Dual Action AGC	Dynamic Range: > 50-70dB (+1.5dB) Attack time: 2-500ms, Release time: 0.5-20dB/s
Cooling	Fan free convection cooling (chassis cooling)
IP class	IP20
Size	1U/19" rack mount
	Width 430mm, Depth 150mm, Height 44mm (incl. rubber feet)
Weight (net/gross)	1.9/3.55kg
Mounting options	Rack mount (brackets included), wall mount or freestanding (rubber feet pre-mounted)
Part No.	225060, *225060EU, 225060UK, 225060US, 225060AUS*

Product is designed to meet the system requirements of IEC60118-4, when correctly designed, installed, commissioned and maintained. Specification data complied according to IEC62489-1.

(Univox) Bo Edin AB
Stockby Hantverksby 3,
SE-181 75 Lidingö, Sweden

+46 (0)8 767 18 18
info@edin.se
www.univox.eu

Hearing excellence since 1965

univox BY EDIN