

# WIRELESS SERIES

## USER MANUAL

FOR THE

*WS 29*

DUAL CHANNEL WIRELESS BELTPACK



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## 1.0 GENERAL DESCRIPTION

The WS 29 is a portable, dual channel wireless user station housed in a strong aluminum case.

On the front panel is a Volume (listen level) control, a mix control, two Talk and two Call buttons with LED indicators.

Special attention has been paid to the intelligibility of speech. By applying low noise/high speed op-amps, a speech presence filter and a specially developed amplifier, communication is very comfortable even in environments with a very high background noise level.

The unique ASL CALL system provides both a flashing red LED and a very distinctive and characteristic sound signal. Smooth operation is guaranteed with the CALL button. A momentary push makes the red LED flash, whilst holding the button for two seconds it will activate the CALL sound signal. The volume of the sound signal (buzzer) can be adjusted at the side panel.

## 2.0 UNPACKING

The shipping carton contains the parts listed below:

- The WS 29
- User manual
- 6 NiMh rechargeable Batteries
- WS 29 Charger

If any are missing, contact your dealer.

ASL has taken great care to ensure this product reaches you in flawless condition. After unpacking the unit, please inspect for any physical damage. Retain the shipping carton and relevant packing materials in case the unit needs to be returned.

If any damage has occurred, please notify your dealer immediately so that a written claim can be initiated. Please also refer to the guarantee section of this manual.

## 3.0 INSTALLATION

**The supplied batteries are empty, insert them in the backpack and charge them before use.**

This WS 29 will form part of an existing or new intercom system in combination with a WS 200 or WS 400 base station. There are no separate power connections; the necessary DC voltages are derived from the internal batteries.

Adjust the channel select switch to match the

selected channel on the base station. After switching on the unit with the power switch at the rear panel, the unit should have contact with the base station. To check this, simply push the CALL or TALK button, and the LED's should indicate a normal functioning backpack.

## 4.0 FRONT PANEL CONTROLS

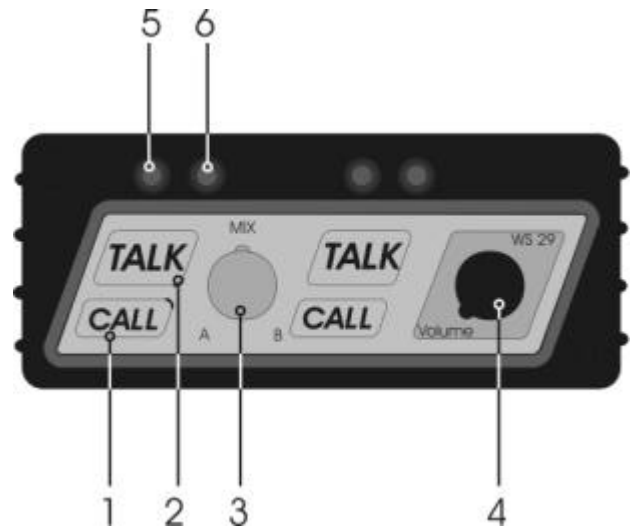
### 1 CALL button

This push button activates the call system. A momentary push will send a call signal to all stations connected to the intercom channel and the call LED (5) will start flashing.

Pressing the button for 2 seconds will activate the CALL buzzer.

After the CALL button is released the LEDs will continue to flash for further 2 seconds.

To send or receive a CALL signal, the beltpack must be in reach of the base station.



### 2 TALK button

This push button activates the headset microphone; the bright green LED (6) indicates if the microphone is switched on. The beltpack must be in reach of the base station for the microphone to be switched on.

If you lose your connection to the main station, the TALK function will be switched off until you are within reach again. You will notice that the LED is off, and you will not hear your own voice.

Once within reach, the functions are restored automatically.

### 3 MIX control knob

This knob mixes the audio level of channel A and B as send to your headset.

### 4 VOLUME control knob

This knob adjusts the listen level for the headset.

## 5.0 SIDE PANEL CONNECTORS

### 7 TONE VOLUME

This trimmer adjusts the level of the tones that the WS 29 produces in case of a low battery warning and at start up.

### 8 OWN VOICE trimmer

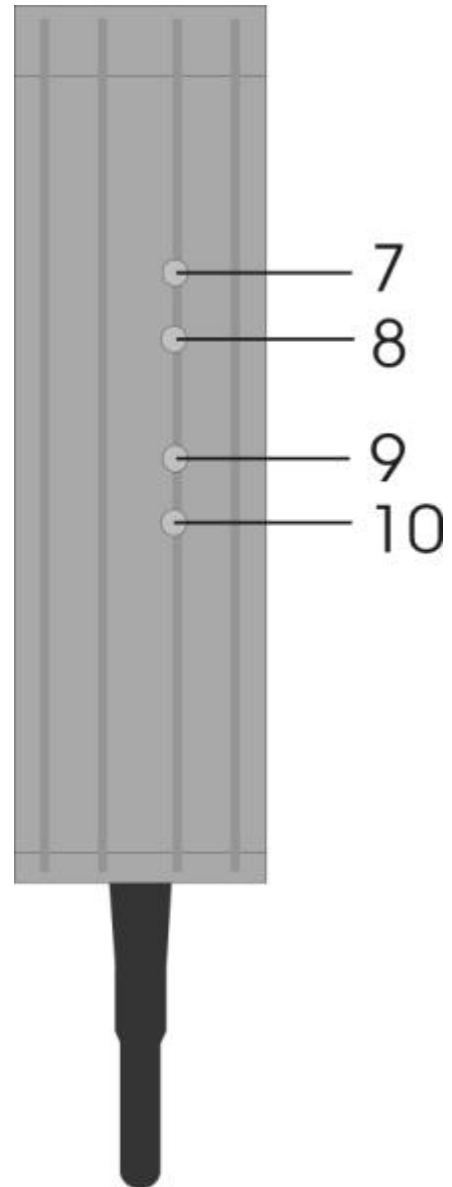
This trimmer adjusts the level of your own voice as you hear it in your headset. The operating area is between fully clockwise and minimum level. Adjusting this signal does not affect the level of your voice as it is heard by other stations.

### 9 BUZZER VOLUME trimmer

This trimmer adjusts the volume of the internal buzzer. The buzzer is activated by pressing the CALL button of the WS 29 (3) (or a CALL button of any other station connected to the same channel) for longer than 2 seconds.

### 10 MIC GAIN

The mic gain can be adjusted by this trimmer. To increase mic gain turn clockwise. To decrease mic gain turn counter-clockwise.



## 6.0 REAR PANEL CONNECTORS

### 11 Antenna

This small antenna is chosen to be very flexible and non-removable. For optimum performance keep the antenna clear from obstacles.

### 12 POWER on/off switch

This switch switches the unit on and off.

### 13 CHANNEL SELECT switch

With this switch the channel is selected on which the beltpack will communicate with the base station. The selected channel must match the channel at the base station.

### 14 DC INPUT connector

**Only use the supplied battery charger.**

Never try to use any other adapter or charger unit with this WS 29.

On the charger unit two leds will indicate the charging process.

The red led will be lit to indicate charging, the green led will be lit when the batteries are full.

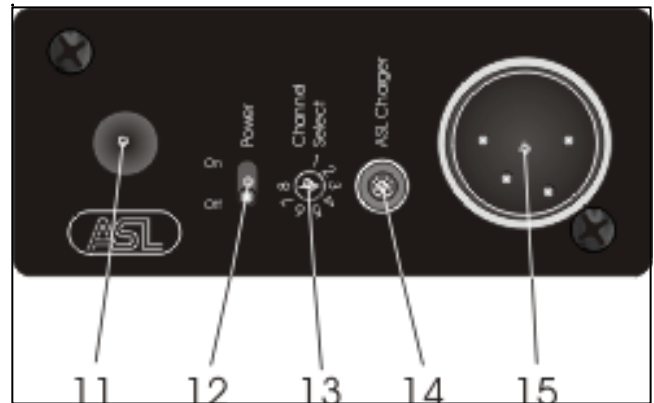
Please note that you can only charge the batteries when the WS 19 is switched off.

### 15 HEADSET CONNECTOR

An XLR-4 type connector for the connection of the headset. This must have a can impedance of 200 ohms (or greater), or each minimum 400 ohms when in parallel. The mic may be of the dynamic or electret type.

Pin assignments:

1. Shield mic. (GND)
2. mic. +
3. phones +
4. phones -



### 16 Battery compartment

This compartment will hold 6 penlight batteries of the AA type.

The supplied rechargeable NiMH batteries are the preferred types for the maximum duration. Please take special attention in your choice of batteries! The WS 29 uses a high discharge current that the batteries need to sustain over the whole lifespan. Batteries that can only supply a high current for a short time will be exhausted very quickly.

When the batteries reach the end of their capacity the beltpack will warn you with 4 short tones, the interval of the tones will shorten when the batteries wear out.

### 17 Dipswitch

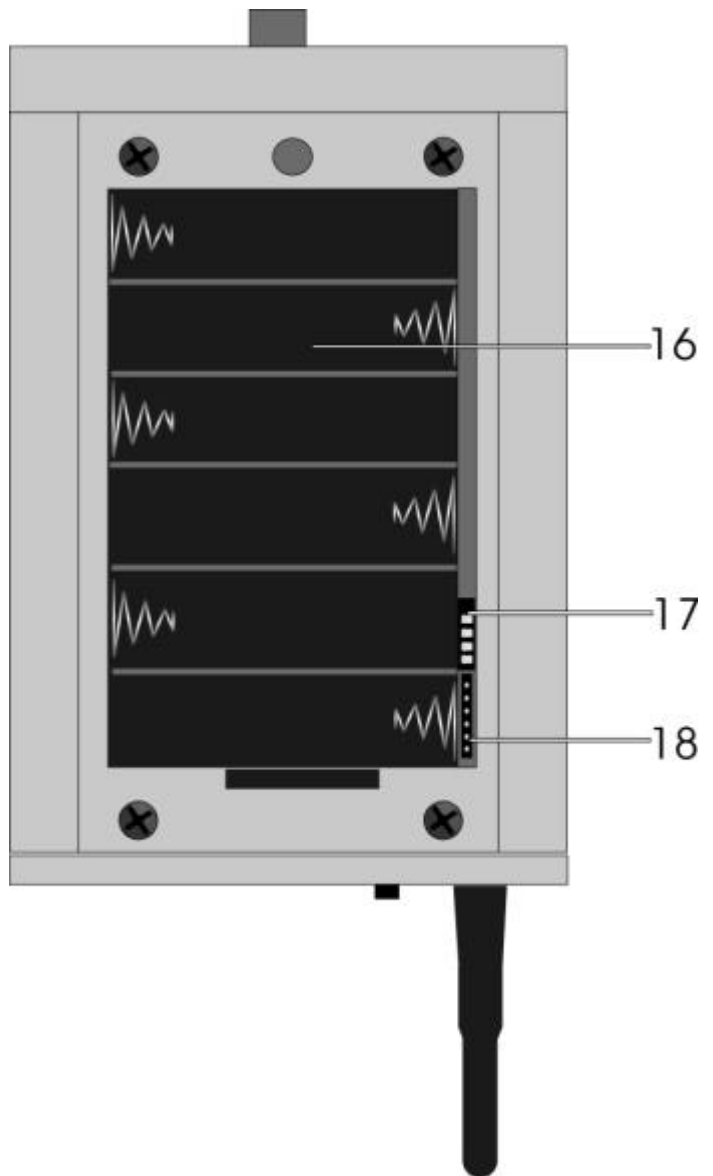
This dipswitch controls four functions of the WS 29, these are:

- A Talk function only momentary
- B Talk function disabled.
- C Buzzer function disabled.
- D Battery save mode.

The dipswitches are turned on by sliding them towards the side panel of the beltpack; they are turned off when slid towards the battery compartment.

### 18 Service connector.

This connector is to be used **only** for factory service. Do not connect anything to it and do not short-circuit any of the pins!



## 8.0 SETTING UP A CONNECTION

### 8.1 BASE STATION SETTINGS

A) The base station must be set up properly according to the user manual. Give each TX/RX unit of the base station its own channel by rotating the 'Channel select' switch.

Try to avoid concurrent channels to be physically next to each other, e.g. in a setting of two WS 400's try to set them in this order: 2, 4, 6, 8, 1, 3, 5, 7

If you use a WS 200 with only two beltacks use channels 1 and 6.

B) Connect the base station to the partyline intercom or 4 wire system and make sure the interface mode switch at the back is set accordingly.

C) turn the sidetone trimmers counter clockwise.

### 8.2 BELTPACK SETTINGS

Select with the 'Channel select' switch at the rear of the beltack the channel according to the WS 200 or WS 400 setting.

Connect a headset to the beltack and insert fully charged batteries.

When the beltack is switched on, a single short tone should be heard and both LEDs on the front panel of the unit will flash for half a second. This indicates that the beltack is functioning okay.

If you press the CALL or TALK button the LEDs on the front panel will be lit and the corresponding TX/RX unit of the base station will show a green ACTIVE led. This means that the beltack has connection with the base station.

### 8.3 SIDETONE ADJUSTMENT

Turn down the OWN VOICE volume trimmer at the side panel of the beltack (counter-clockwise).

Switch on the TALK function of the beltack (TALK button).

Talk in the microphone and listen to your own voice, you might hear a small delay in the signal.

Now turn down the volume of your own voice by adjusting the SIDE TONE trimmer at the base station of the TX/RX unit to which the beltack is connected.

Adjust the trimmer so that the level of your own voice is as low as possible.

Now turn up the volume of your own voice by adjusting the OWN VOICE trimmer to a level that you like.

### 8.4 FULL DUPLEX AND HALF DUPLEX USE

Although the system is designed to be used in full duplex use, there is a possibility to use the system in half duplex mode too.

Half duplex allows more than 1 beltack on the same frequency and therefore, on one TX/RX unit of a base station.

Every beltack will be able to listen to the base station, but only one of the beltacks can talk at a time and have a full duplex connection. As long as one of the beltacks has a full duplex connection, the others are not able to CALL or TALK.

In this mode it is useful not to adjust the sidetone trimmer on the base station, turn it fully counter clockwise.

Read the next chapter about communication modes carefully.

## 9.0 COMMUNICATION MODES

The system is designed to offer a

maximum of 8 wireless, full duplex beltpacks. Each beltpack may be a single channel beltpack WS 19 or a dual channel beltpack WS 29.

Each beltpack needs to be assigned to a unique channel. On this channel the communication between the beltpack and the base station will take place. If another base station is set to the same channel the communication will be garbled and will result in a non-functioning connection.

The base station will automatically select the right mode for a WS 29 or WS 29 beltpack. A WS 29 beltpack will always be connected to one channel at the base station, a WS 29 beltpack will be assigned to two channels on the base station.

### **9.1 FULL DUPLEX**

A connection of one WS 29 on e.g. Channel 1 will be accomplished by selecting channel 1 on the beltpack, and channel 1 on TX/RX unit 1 of the base station. The connection is a dedicated and full duplex connection. The sidetone needs to be adjusted at the front of the base station, and the user of the beltpack can adjust his own voice at the beltpack with the designated trimmer.

### **9.2 HALF DUPLEX**

A connection of several WS 29 beltpacks on e.g. Channel 1 to a TX/RX unit of a base station (also channel 1 selected) results in a half duplex connection.

This means that all the beltpacks can listen to the same TX/RX unit of the base station. Only one beltpack can TALK to the base station.

The beltpack that selects TALK mode will occupy the connection, and the

TALK function of all other listening beltpacks is disabled. The same for sending CALL signals, only one beltpack may send a call signal but all of them will receive it.

There is one major drawback to half duplex mode, due to the principle of the partyline concept.

In case of a very good adjusted sidetone trimmer at the base station this effect will be noticed:

When 2 or more beltpacks are using the same TX/RX unit of a base station (listening to the same signal), and one of the beltpacks is talking to the base station, the listening beltpack will not be able to hear the talking beltpack. This effect is caused by the adjusted sidetone that prevents the microphone signal of a beltpack to be heard by himself, and therefore, also heard by other beltpacks on the same TX/RX unit.

To solve this, the sidetone trimmer of the TX/RX unit should be turned fully counter clockwise.

This though has one disadvantage too; if a beltpack talks to the base station he will hear his own voice in his headset with a delay of 24 ms. The other listening beltpacks will not notice this delay.

By adjusting the OWN VOICE trimmer at the beltpack the effect can be made less.

## 10.0 PRINCIPLES OF OPERATION

The wireless system uses the 2,4 GHz band, which is freely available for WLAN (Wireless Local Area Networks).

The ASL-intercom system divides the available bandwidth into 16 overlapping parts, 8 of them are being used as upload channel from the beltacks and the other 8 are being used as download channel to the beltacks.

With the channel select switch you actually select an upload and download channel pair to be used for that beltack. On every channel **only one** section of a base station may be working.

More than one beltack on the same channel is possible as described in section 8.2.

### 10.1 HF FREQUENCIES

Due to the very high frequency, the user must take precautions in placement. The frequency of 2,4 GHz is known to have difficulty in penetrating concrete walls, steel walls and other obstructions. Behind obstructions like these an "HF shadow" may occur where no communication is possible. Another point is that this frequency may have reflections more easily than lower frequencies. You might experience a dropout on a very specific spot in a building; moving the beltack only a few inches can be enough to solve the problem.

Because of the use of the WLAN frequencies, the units might experience interference from units like mobile telephones with bluetooth, computers with bluetooth or WLAN cards.

Try to change channels if you experience problems with these.

Another point is placing the unit in a 19" rack. The user needs to pay special attention to the placement of the antenna. The antenna of the base station needs to have a "line of sight" to the antenna of the beltack.

All objects that are within that path will make the connection less reliable. This starts with the 19" rack itself, the maximum available distance behind the rack will be less than in front of the rack. The base stations WS 200 and WS 400 are available either with antenna connectors at the front or at the rear panel. Choose whatever version is the most convenient to you.

All base stations are equipped with SMA connectors - female at the base station and male at the antenna.

If the antennas are not to be directly connected to the front or rear panel, the user must take care to use the right type of cable - it needs to be of the 50 ohm type. The 2,4GHz frequency experiences a big loss in any cable, e.g. a RG58 cable of 3 meters has a loss of 3 dB, so make sure that your cable is suited for this frequency, and that the cable is as short as possible. Make the cables in lengths that can be divided by 12cm, e.g. 24cm, 48cm, 120cm, 240cm.

### 10.2 ANTENNA'S

## 11.0 PARTY LINE, TECHNICAL CONCEPT

ASL's WIRELESS Series offers a complete two way ('full duplex') communication system. Users of the system are connected via a 'party line' base station (with built-in power supply); beltpacks and power supplies are interconnected via standard microphone cable. One wire is used as an audio line, one as a power line and the screen of the cable functions as earth/return. Current drive is used for signal transfer. Each station utilizes a current amplifier to amplify the microphone signal and place it on the common audio line where, due to the constant line impedance (situated in the power supply between XLR pin 3 and 1), a signal voltage is developed which can be further amplified and sent to the headphones.

This principle has three advantages:

- the use of a single audio line allows several stations to talk and listen simultaneously.
- due to the high bridging impedance offered by each station, the number of stations 'on line' has no influence on the level of the communications signal.
- power and audio to the intercom stations use the same cable.

The Call signal is also sent as a current on the audio line. It develops a DC potential over the line impedance, which will be sensed by each station and interpreted as a Call signal.

## 12.0 WARRANTY

ASL Intercom warrants this unit to the original end-user purchaser against defects in workmanship and materials in its manufacture for a period of two years from date of shipment to the end-user.

Faults arising from misuse, unauthorized modifications or accidents are not covered by this warranty. If the unit is faulty, it should be sent in its original packing to the supplier or your local ASL dealer, with shipping prepaid. A note must be included stating the faults found and a copy of the original suppliers invoice.

**THIS PRODUCT WAS DESIGNED, DEVELOPED AND MANUFACTURED BY:**

**ASL Intercom  
UTRECHT, HOLLAND.  
<http://www.asl-inter.com>**

## 13.0 TECHNICAL SPECIFICATIONS WS 29

### POWER CONSUMPTION

current (at 9 V DC)	200 mA quiescent
	240 mA signaling
	260 mA at max. output + signaling

### MIC. PREAMP

mic. impedance	200 ohms
gain	40 dB - 70 dB
presence filter	+6 dB at 5 kHz
frequency response	200 Hz - 12 kHz (-3 dB)
V electret mic	+9 V DC

### HEADPHONES DRIVER AMP

max. load	200 ohms
max. output level	4 V rms (200 ohms)
max. output power	0.16 W rms (each headset can)

### BUZZER

max. SPL	90 dBA
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### DIMENSIONS AND WEIGHT

width	88 mm
height	49 mm
depth	141 mm
weight	650 grams

### GENERAL SYSTEM SPECIFICATIONS

dynamic range	80 dB
Transceiver frequency	2400 – 2483.5 MHz
Transmit Power	10 mW E.I.R.P.
Number of channels	8
Channel separation	7 MHz
supply voltage	+7,2 V DC (4.2 V to 9 V)

Note : 0dBu = 775 mV into open circuit

ASL reserves the right to alter specifications without further notice.

