LEHLE

OPERATING INSTRUCTIONS
P-SPLIT III

Dear Musician!
Thank you for purchasing your LEHLE P-SPLIT III!
I have been building units that switch, split and route signals with no technical compromises and with maximum musical fidelity since 1999. Your new LEHLE P-SPLIT III comprises only the very best components.

Every assembly of your LEHLE P-SPLIT III has been made and tested in Germany.
Your LEHLE P-SPLIT III is of extremely robust design and construction, to make sure that you get absolutely years and years of enjoyment from it. If you should nonetheless have a problem, or simply a question, just mail me or a member of the Lehle team at:

support@lehle.com

I wish you the very greatest pleasure and success using your LEHLE P-SPLIT III!

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INTRODUCTION

The LEHLE P-SPLIT III combines passive splitting with the highest possible signal fidelity.

Its applications range from splitting signals and eliminating hum, to balancing and re-amping along with any signal routing that requires a clean signal free from noise.

At its core is the high-end LEHLE TRANSFORMER HZ, which galvanically isolates the two outputs, eliminating any possibility of ground loops. The LEHLE TRANSFORMER HZ was specially designed for use with high-impedance signals but also splits low-impedance signals with uncompromising sound quality. The signal can be picked off either symmetrically or asymmetrically from the ISO output.

By using the phase inverter switch with gold-plated contacts you can flip the signal phase at the ISO output, preventing phase cancellation from impairing signal reproduction.

The classic application for the LEHLE P-SPLIT III is splitting an input signal to two outputs, enabling you to connect an instrument to two devices, which may, for example, be two amplifiers, or an amp and a mixer/recording unit (PC/DAW). Thanks to its ability to pick off the balanced signal on the ISO output, the LEHLE P-SPLIT III is also eminently suitable for use as a high-quality compact DI box for all types of signal.

Another useful application for the LEHLE P-SPLIT III is as a hum suppressor. Frequently background noise, caused by ground loops occurs when two electronic devices are connected to each other. The LEHLE P-SPLIT III provides a simple, but extremely effective remedy when installed between the two units. Using the ISO output, the devices are galvanically isolated and background noise becomes a thing of the past.

You can even use the versatile LEHLE P-SPLIT III as a passive mono summing unit for a stereo signal by using the DIR output as second input.

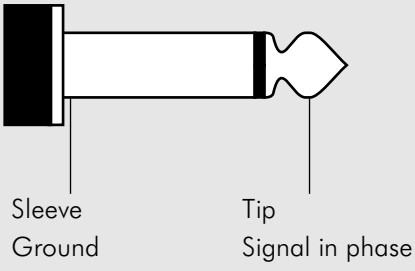
And just in case you are looking for a power connection: the LEHLE P-SPLIT III performs all its functions without any need for a power supply.

TECHNICAL DATA

Weight	375 g
Length	3.55“
Width	3.6“
Overall height	1.45“
Max Level	+20 dBu (THD < 1%, 50 Hz - 20 kHz)
Total harmonic distortion	0.003 % (0 dBu, 1 kHz)
Frequency range	20 Hz – 100 kHz -0.1/ +0.4 dB (source 600 Ω, load 1 MΩ)
Input impedance (transformer load impedance)	min. 2 MΩ at 2 kHz

UNBALANCED SIGNAL ROUTING

Unbalanced signal lines predominate when instruments such as guitars, basses and keyboards are used.
These signal lines have two conducting cores.
The signal itself is present on the signal conductor and is connected to the tip of the jack plug.
The second core, which is connected to the sleeve of the jack plug, screens the signal conductor and constitutes the signal ground.



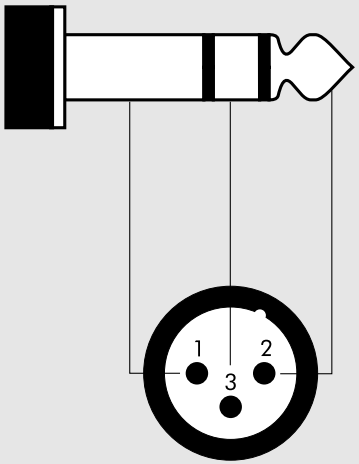
UNBALANCED SIGNAL ROUTING

JACK	Cable	JACK
Sleeve	Ground	Sleeve
Tip	Signal in phase	Tip

BALANCED SIGNAL ROUTING

Balanced signal lines are used to cross larger distances without interference. They are generally fitted with XLR connectors or TRS (Tip Ring Sleeve) jack plugs.

Here, three cores are required:
there are two signal conductors. In a balanced signal line, the signal is present in phase at the tip, as in the case of an unbalanced signal line (XLR Pin 2).
The second signal conductor carries the same signal, but with the opposite polarity or mirror-image phase (Ring, XLR Pin 3).
The third conductor is the screening, and again constitutes the signal ground (Sleeve, XLR Pin 1).



BALANCED SIGNAL ROUTING

JACK	Cable	XLR
Sleeve	Ground	Pin 1
Ring	Signal in mirrored phase	Pin 3
Tip	Signal in phase	Pin 2

PRECONDITIONS FOR PASSIVE SPLITTING:

The LEHLE P-SPLIT III is a passive splitter which can be used to split high-impedance signals to high-impedance inputs. There are certain preconditions which must be met to ensure that this is accomplished without problems and no loss of sound.

HIGH-IMPEDANCE SIGNAL SOURCES AND INPUTS

Passive magnetic pickups as generally used - in the form of single-coil and humbucker pickups, on electric guitars and basses - supply high-impedance signals. High-impedance signals have an output impedance in a range of 10 kΩ (10,000 Ω); the higher this figure, the more sensitive the signal is to interference.

High-impedance inputs are found on guitar and bass amplifiers, and on sound cards with a "Hi-Z" input; "Z" stands for the impedance, which is the physical expression for the internal resistance of a signal source or a signal input, and thus defines its low/high-impedance performance.

High-impedance signals are generally transmitted unbalanced and are relatively susceptible to interference. Long cable routings audibly attenuate high frequencies. Electromagnetic interference from the environment then becomes more noticeable than in the case of low-impedance and balanced signals. There are, nonetheless, very many musicians who swear by the sound of an electric guitar or bass with passive pickups connected directly to a tube amplifier via a good cable.

The input impedance of high-impedance inputs is generally 1 MΩ (1,000,000 Ω) or more. Here, too, the input becomes more sensitive, the higher this figure is.

LOW-IMPEDANCE SIGNAL SOURCES AND INPUTS

Keyboards, active pickups, preamp outputs, sound cards and mixers supply low-impedance signals. The output impedance of such signals is typically 100 Ω to around 600 Ω.

Low-impedance inputs predominate in the line input of mixing desks, power amps and sound cards with no Hi-Z inputs, and also in microphone inputs and in virtually all balanced inputs. Low-im-

pedance inputs have input impedances of around 600 Ω to 10 kΩ.

WHAT IS POSSIBLE

The LEHLE P-SPLIT III can be used to split the signal from an electric guitar or electric bass with passive magnetic pickups to two amplifiers, each of which has high-impedance inputs. Please use the shortest, best-quality possible cables for this purpose. You will hear the 100% original signal on both amps.

Instead of an amplifier, you can also split the signal to the Hi-Z input of a sound card.

It's important to remember: a high-impedance signal can be passively split if you connect only high-impedance inputs. You can split a low-impedance signal, such as the output from a preamp, e.g. the LEHLE SUNDAY DRIVER II or the output from a sound card, to a tube amp with a high-impedance input and the low-impedance input of a power amp. Since the signal to be split is a low-impedance one, you can connect low-impedance and high-impedance inputs behind this if you wish - there won't be any problems!

WHAT IS NOT POSSIBLE

Audible sound losses will occur if you use long cable routings from the passive guitar to the splitter and from the splitter to the amps. The sum of all cable lengths to the splitter and to the amps should generally not be more than 10m.

Your individual taste will ultimately decide, however.

Splitting your high-impedance instrument signal to a low-impedance input, such as the line input of a mixing desk, for example, and to a high-impedance input on a tube amplifier using the LEHLE P-SPLIT III will result in the high-impedance input being attenuated by the low-impedance input of the mixing desk. The signal will become significantly quieter and will lose presence.

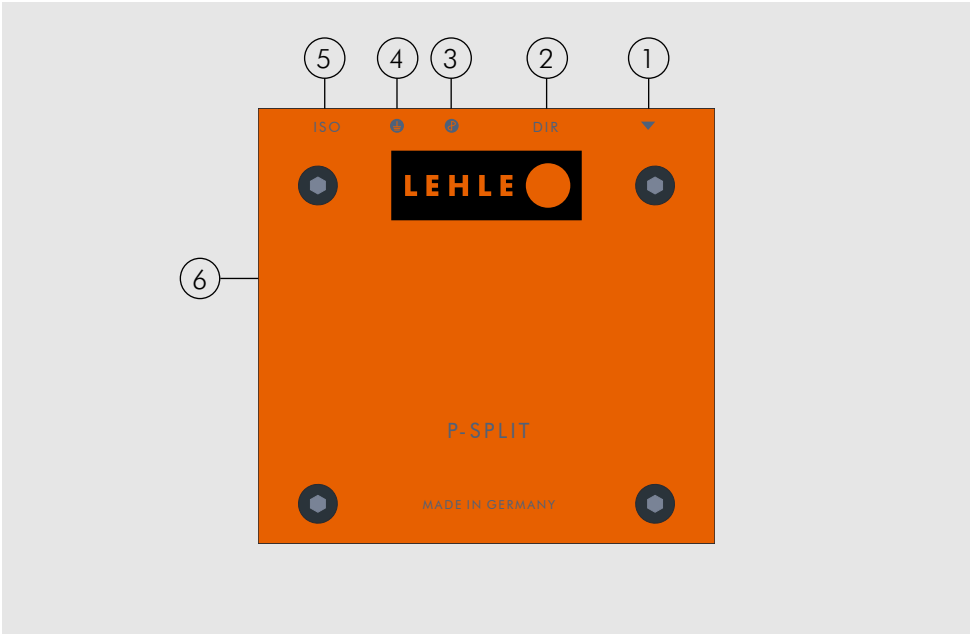
Solution: these problems can be effectively eliminated by connecting a preamp or a buffer, which will convert the high-impedance to a low-impedance signal, in the signal path.

The LEHLE SUNDAY DRIVER II, for example, can be used here.

INPUT	DIR	ISO	
Hi-Z	Hi-Z	Hi-Z	✓
Hi-Z	Low-Z	Hi-Z	!
Hi-Z	Hi-Z	Low-Z	!
Hi-Z	Low-Z	Low-Z	!

INPUT	DIR	ISO	
Low-Z	Hi-Z	Hi-Z	✓
Low-Z	Low-Z	Hi-Z	✓
Low-Z	Hi-Z	Low-Z	✓
Low-Z	Low-Z	Low-Z	✓

GENERAL DESCRIPTION



1. INPUT SOCKET

Connect your instrument or the output from an effects unit or DAW here.

The input signal is fed into this socket. The LEHLE P-SPLIT III operates entirely passively.
The input signal remains connected to the ISO and DIR outputs at all times, with no semiconductors or any other active components in the signal path.

Both balanced and unbalanced signals can be split, since the LEHLE TRANSFORMER HZ is capable of handling both types.

2. OUTPUT SOCKET DIR

Connect the input of an amplifier or effects unit to be connected directly to the LEHLE P-SPLIT III input here.

The input signal and its ground are present directly on the DIR socket. The signal

from the DIR output is always the same which is fed into the input (1).

If the input signal is unbalanced you will have an unbalanced direct signal at this socket. The same will occur with balanced signals.

3. PHASE INVERTER SWITCH

The phase of the input signal from the ISO output can be inverted if necessary.

This switch can be used to invert the phase of the input signal from the ISO output socket by 180°.
Splitting signals to two amps may sometimes cause phase cancellations, resulting, for most musicians, in a "thin" sound. Inverting the phase eliminates this problem.

Experiment to find out which position you prefer - as always, your individual taste is what counts!

4. GROUND LIFT SWITCH

Connect the grounds of the DIR and ISO output if necessary.

Pressing this switch connects the ground conductors of the ISO and DIR outputs.
Connecting the ground conductors of the DIR and ISO outputs can help in some situations, depending on the units connected and on their power supplies.

Use the ground lift switch to find out for yourself the position in which noise is minimised.

5. ISO OUTPUT ISO

Connect your amp or the audio input of a DAW or a mixer here.

The ISO output has an input signal which is isolated by means of the LEHLE TRANSFORMER HZ.
A balanced or an unbalanced signal is possible, irrespective of the type of signal fed from the input.

6. BASE AND FIXING

If required, mount the P-SPLIT III to a pedalboard using the mounting kit.

The P-SPLIT III can be mounted to a plate such as a pedalboard using the two holes in the bottom of the pedal.
You can find the optional LEHLE Mounting Kit V3 (order number 100981) online at www.lehle-components.com.

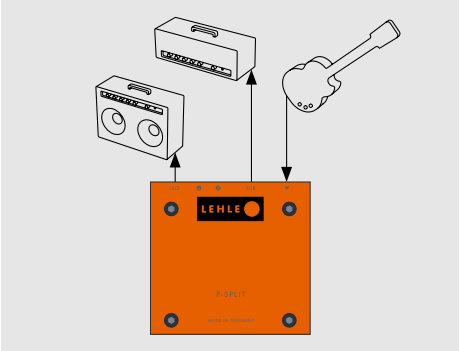
To mount, undo the four housing screws by using a 2.5 mm Allen Key and detach the cover.

Then fix the device base to a base plate using the two screws, the washers and the spacers of the Mounting Kit.
Attach the cover and tighten the four housing screws - done!

For flexible solutions we recommend using 3M Dual Lock™ instead of Velcro for stability, which you can also find in handy sizes at www.lehle-components.com

If you are using the Velcro / Dual Lock™ method, please make a note of the serial number on the bottom of the pedal before you cover it, in case you have a support question for us later and don't fancy dismantling your board!

TYPICAL USES
LEHLE P-SPLIT III AS A SPLITTER FOR TWO AMPS



DEVICE CONNECTION

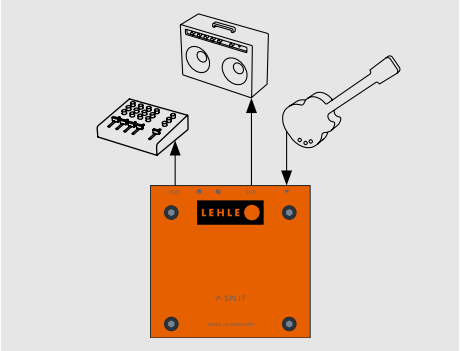
▼	Input	Instrument
DIR	Output	Amplifier 1
ISO	Output	Amplifier 2

The LEHLE P-SPLIT III operates as a splitter for one instrument to two amps. Use the shortest cables possible to connect instruments with passive pickups to the input of the LEHLE P-SPLIT III.
Most musicians find the sound of two amplifiers working in parallel extremely powerful and simply big.

HOW TO DO THIS

1. Connect your instrument to the input socket of the LEHLE P-SPLIT III.
2. Connect the first amplifier to the DIR socket (2).
3. Connect the ISO socket (5) to the input of the second amp.
4. Use the phase inverter switch (3) to determine which setting you prefer.
5. Use the ground lift switch (4) to find the position at which noise is minimised.
6. There you go!

LEHLE P-SPLIT III AS A COMPACT PASSIVE DI BOX



DEVICE CONNECTION

▼	Input	Instrument (active)
DIR	Output	Amplifier
ISO	Output	Input mixer, stage box

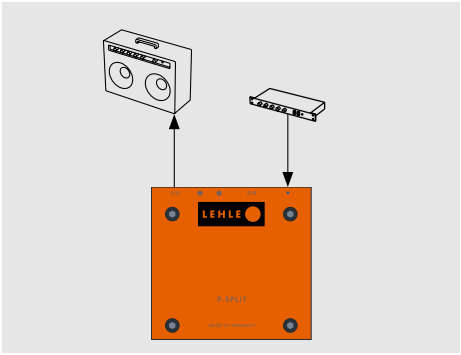
The LEHLE P-SPLIT III can be used as a passive DI box.
Balanced or unbalanced signals from the ISO output can be fed.
A TRS/XLR adapter will be needed if you want a balanced signal for an XLR input (please also see “Balanced signal routing” on page 7).

HOW TO DO THIS

1. Connect your active instrument or the output from a preamp or buffer to the input (1) of the LEHLE P-SPLIT III.
2. Connect your amp to the DIR output socket (2).
3. Connect the ISO socket (5) to the input of your mixer or stage box.
4. Use the phase switch (3) to find out which setting sounds better to you.
5. Use the ground lift switch (4) to determine which position eliminates the most background noise.
6. There you go!

The signal from a passive pickup cannot be split to an amp and mixer without negative effects on your sound, since balanced inputs are usually low impedance. The LEHLE P-SPLIT III functions excellently as a neutral splitter and as a high-quality DI box with instruments which have active pickups, and/or when another buffer, such as the LEHLE SUNDAY DRIVER II is positioned between the instrument and the input of the LEHLE P-SPLIT III. (!)

LEHLE P-SPLIT III AS A LINE ISOLATOR – THE UNIVERSAL CURE FOR HUM LOOPS



The LEHLE P-SPLIT III can be used in any scenario to eliminate noise resulting from ground loops or hum. Ground loops occur when units grounded by a protective earth conductor ("PE conductor") are connected to each other.

The protective earth conductor and the ground connection of the audio signal create a loop which will pick up external interference generated, for example, by coils. Such interference will impair the signal. The LEHLE TRANSFORMER HZ included in the LEHLE P-SPLIT III galvanically isolates the ground connection. The hum loop is thus broken at this point.

Both high- and low-impedance signals can be fed, the LEHLE P-SPLIT III has no problems with balanced or unbalanced signals.

DEVICE CONNECTION

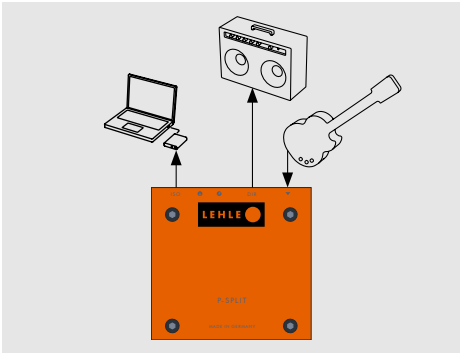
▼	Input	Signal source
ISO	Output	Signal input

In the above scenario, the LEHLE P-SPLIT III is grounded via the signal source input. In some cases, it may be a good idea to connect the ground to the other side, in order to eliminate even more interference. To do this, simply swap the input (1) and the ISO output (5).

HOW TO DO THIS

1. Connect the signal source to the input (1) of the LEHLE P-SPLIT III.
2. Do not use the DIR socket (2).
3. Connect the ISO socket (5) to the signal input.
4. Use the ground lift switch (4) to determine which position eliminates the most background noise.
5. There you go!

LEHLE P-SPLIT III AS A RECORDING SPLITTER



DEVICE CONNECTION

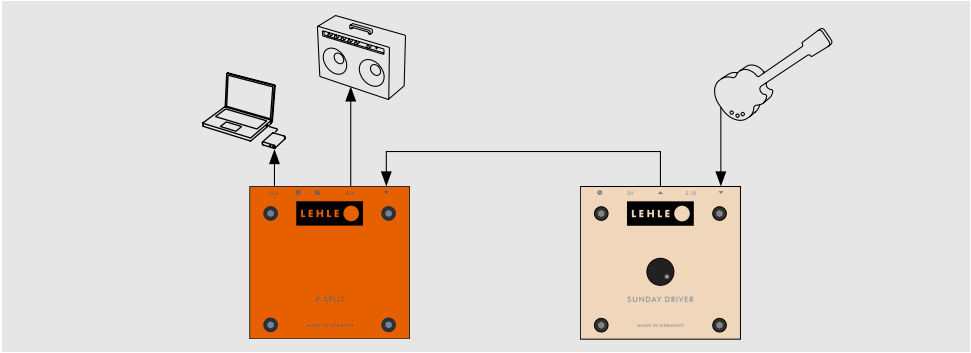
▼	Input	Instrument (active)
DIR	Output	Amplifier
ISO	Output	Sound card (Hi-Z)

It can be very useful, when recording guitar or bass, to record not only the amplified signal, but also the dry (unprocessed) signal. This signal can then be routed in the mix either to a real amplifier, or to a digital emulator, for editing.
It's also helpful to be able to hear your accustomed sound from an amp while recording the dry signal.

In this configuration, the LEHLE P-SPLIT III again functions as a neutral splitter.

HOW TO DO THIS

1. Connect your instrument to the input (1) of the LEHLE P-SPLIT III.
2. Connect your amp to the DIR output socket (2).
3. Connect the ISO socket (5) to the Hi-Z input of a sound card or DAW.
4. Use the ground lift switch (4) to determine which position eliminates the most background noise.
5. There you go!



DEVICE CONNECTION
LEHLE P-SPLIT III

▼	Input	Output LEHLE SUNDAY DRIVER II
DIR	Output	Amplifier
ISO	Output	Sound card Low-Z

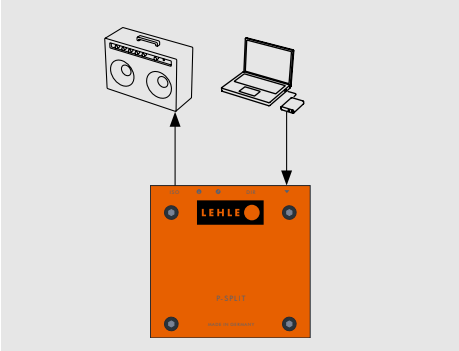
We recommend the use of a buffer between the instrument and the input of the LEHLE P-SPLIT III to convert the high-impedance instrument signal to a low-impedance signal in cases in which your sound card or DAW has no high-impedance input (Hi-Z) and you wish to record the dry signal from your passive pickups. The LEHLE SUNDAY DRIVER II is the perfect solution for this task.

DEVICE CONNECTION
LEHLE SUNDAY DRIVER II

▼	Input	Instrument (passive)
▲	Output	Input LEHLE P-SPLIT III

You can, of course, also use a balanced input on your sound card or DAW to record the dry signal. In this case, it's a good idea to take a balanced signal from the ISO output of the LEHLE P-SPLIT III (please also see "Balanced signal routing", page 7).

LEHLE P-SPLIT III AS A REAMPLIFICATION BOX



DEVICE CONNECTION

▼	Input	Signal source (un)balanced
ISO	Output	Signal input (un)balanced

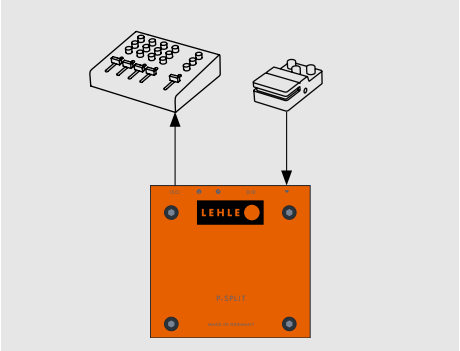
Once you've recorded the dry signal, it can be fed through an amplifier during mixing; connecting the amp to the sound card or DAW will almost certainly generate a ground loop, causing undesirable noise.
This problem can be effectively eliminated using the LEHLE P-SPLIT III. The built-in LEHLE TRANSFORMER HZ galvanically isolates the ground connections, and functions perfectly with both balanced and unbalanced signals from a sound card or a DAW.

HOW TO DO THIS

1. Connect your sound card or DAW to the input socket (1) of the LEHLE P-SPLIT III.
2. Do not use the DIR socket (2).
3. Connect the ISO socket (5) to the input of your amp.
4. Use the ground lift switch (4) to determine which position eliminates the most background noise.
5. There you go!

In this case, the LEHLE P-SPLIT III is grounded via the output of the sound card or DAW. It may, in some cases, be a good idea to connect the ground to the other side, to eliminate interference noise. To do this, simply swap the input (1) and the ISO output (5).

LEHLE P-SPLIT III AS A BALANCED/UNBALANCED SIGNAL CONVERTER



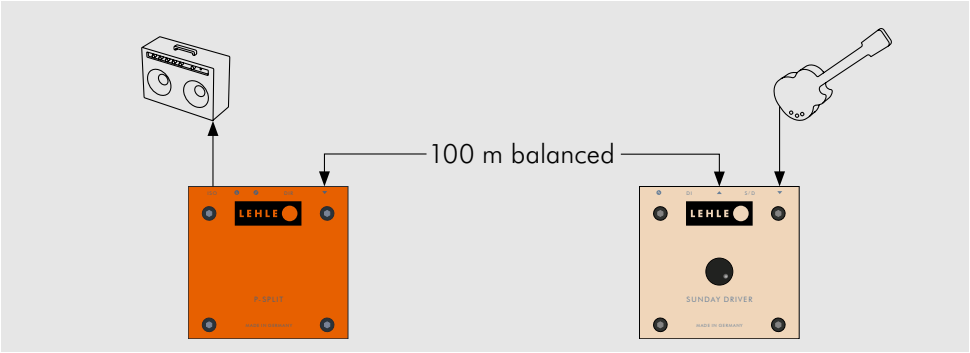
Some units feature only balanced inputs and outputs, whereas others have only unbalanced inputs and outputs. A LEHLE P-SPLIT III can be used to connect these, also enabling you to separate the ground connection (see “Types of signal routing”, pages 6 & 7).

DEVICE CONNECTION

▼	Input	Signal source (un)balanced
ISO	Output	Signal input (un)balanced

HOW TO DO THIS

1. Connect the balanced or unbalanced signal source to the input socket (1) of the Lehle P-Split III.
2. Do not use the DIR socket (2).
3. Connect the balanced or unbalanced signal input to the ISO socket (5).
4. Use the ground lift switch (4) to determine the position in which the most background noise is eliminated.
5. There you go!



DEVICE CONNECTION
LEHLE P-SPLIT III

▼	Input	Output LEHLE SUNDAY DRIVER II
ISO	Output	Amplifier

Unbalanced setups often include long cable runs from a pedalboard to an amp which, on large stages, can be some distance away.
Recording in a mixing room via an amp located in a separate soundproof booth will also necessitate long cable runs.

Long distances like these should be bridged using balanced lines, in order to keep interference as low as possible.
The solution is simple: use the LEHLE SUNDAY DRIVER II to convert the unbalanced instrument signal to a balanced signal.

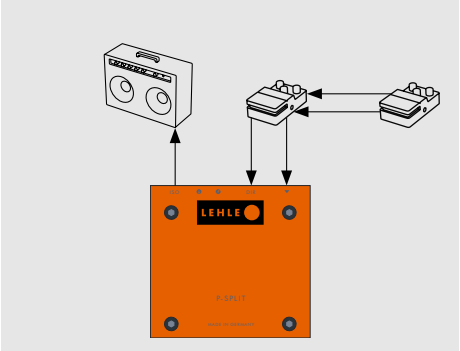
DEVICE CONNECTION
LEHLE SUNDAY DRIVER II

▼	Input	Instrument (passive)
▲	Output	Input LEHLE P-SPLIT III

Up to 100m of cable can be connected to the TRS output socket. The LEHLE P-SPLIT III can be used at the end of the line to convert the balanced signal back to an unbalanced signal for input to your amp.

This system makes it possible to convey the signal across great distances without signal losses.

LEHLE P-SPLIT III AS A PASSIVE SUMMING BOX FOR STEREO SIGNALS



DEVICE CONNECTION

▼	Input	Left signal
DIR	Output	Right signal
ISO	Output	Amplifier / Monitor speaker

If you are using a complex stereo setup but unfortunately there's only one amplifier available, it's possible to use the LEHLE P-SPLIT III as a passive summing box for a stereo signal.
Even for summing and isolating line signals sent by CD-players / laptops, connected to a mono monitor speaker without producing a ground loop, the LEHLE P-SPLIT III can be used.

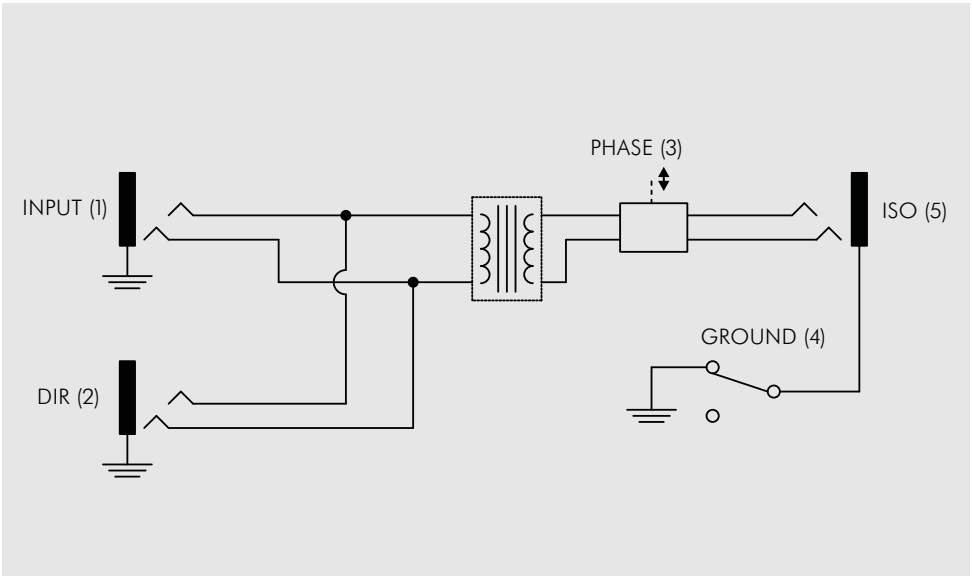
Please note that you will get best results if you are summing two signals coming out of one device (such as a stereo signal) since the impedance matches.

If you are passively summing mono signals out of two different devices, it can cause an impedance mismatch with the result that one signal is very low in volume and presence.

HOW TO DO THIS

1. Connect the left side of the stereo signal to the input socket (1) of the LEHLE P-SPLIT III.
2. Connect the right side of the stereo signal to the output socket DIR (2). Here, this socket is used as the second input.
3. Connect the ISO output (5) to the amplifier or monitor speaker.
4. Use the phase switch (3) to find out which setting sounds better to you.
5. Use the ground lift switch (4) to determine which position eliminates the most background noise.
6. There you go!

LEHLE P-SPLIT III
SIGNAL FLOW DIAGRAM



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LEHLE P-SPLIT III OPERATING INSTRUCTIONS EN V1.0 · 2019-08-01