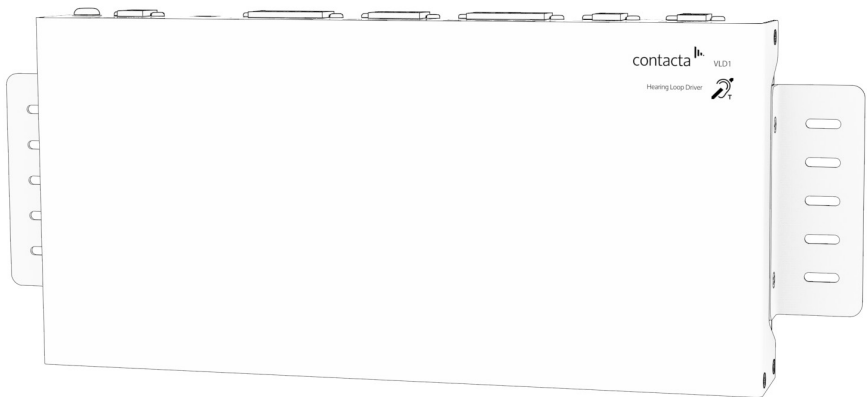


contacta^{ll.}

VLD1

Vehicle Hearing Loop Driver



Installation & User Guide

January 2025

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Contacta has a policy of continuous product development, therefore small specification changes may not be reflected in this manual. Images, labels, packaging, accessories and product colours are subject to change without notice.

Product Overview

The Contacta VLD1 is a compact dual output Audio Frequency Hearing Loop Driver for use on passenger vehicles.

It is designed to improve communication with all passengers through improved speech intelligibility and signal to noise ratio.

The driver uses advanced class D amplifiers and integrated switching power supply offering maximum efficiency. The power supply is capable operating from a vehicle power supply of 24V.

The audio subsystem is built around an advanced DSP core, this combined with microprocessor control ensures optimal performance.

Safety Instructions

1. Read and keep these instructions.
2. Heed all warnings.
3. Follow all instructions.
4. Do not use this apparatus near water.
5. Clean only with dry cloth.
6. Install in accordance with the manufacturer's instructions.
7. Do not install near any heat source.
8. Follow information for polarized connections.
9. Protect the power connections from being damaged/pinched.
10. Only use attachments/accessories specified by the manufacturer.
11. Refer to all qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as, liquid has been spilled or, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Power Sources - This product should be operated only from the type of power source indicated on the marking label.

Damage Requiring Service - The equipment should be serviced by qualified service personnel when:

- a. Liquid has spilled into the equipment, or
- b. The equipment has been exposed to rain, or
- c. The equipment does not appear to operate normally or exhibits a marked change in performance, or
- d. The equipment has been dropped or the enclosure damaged

CAUTION REGARDING PLACEMENT: To maintain proper ventilation, be sure to leave a space around the unit (from the largest outer dimensions including projections) that is equal to or greater than these measurements:

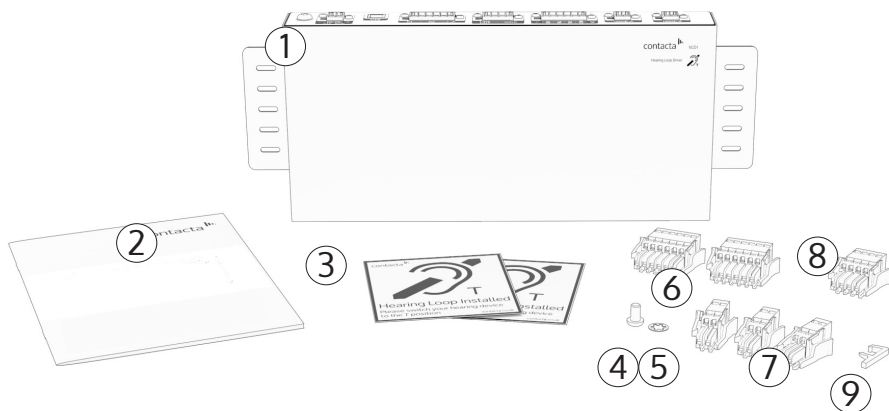
Left and Right Panels (from edge of brackets): 0.5cm (0.19")

Rear Panel (with connectors): 10cm (3.93")

Top Panel: 1.46cm (0.57")

Brackets for affixing this unit are pre-attached to the driver – these should be used to secure the driver in the desired location. Fixings are not provided for securing the driver in its end location.

Components

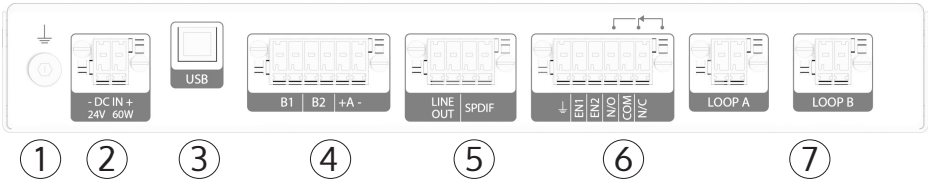





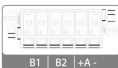



1. VLD1 Hearing Loop Driver
2. QR Code Sheet - Manuals
3. 2x IL-SN01 Signage
4. M6 Bolt
5. M6 Serrated Washer
6. 2x 6 Pin Connectors
7. 3x 2 Pin Connectors
8. 4 Pin Connector
9. Connector Tool

Related Document: VLD1 Software User Guide, available in the Resources section of the Contacta Systems Ltd website: www.contacta.co.uk/resources

Loop & Equipment: A hearing loop determined by the loop design is also required. Hearing loop drivers require ancillary equipment for audio feeds, such as a microphone or sound system.

Connections



1.  Earthing Point
2.  DC Power Input
3.  USB Input
4.  Audio Inputs - B1, B2, A
5.  Line Out and SPDIF Input
6.  Enables and Status
7.  Loop Outputs

1. Earthing Point

A location is provided for earthing the product to the vehicle; this is not a safety earth, but is required for EMC performance and is required for proper fault detection. An M6 bolt and serrated washer are included within the kit for this purpose.

2. DC Power Input

The driver is designed to operate on nominal supplies of 24V, but will operate in the range 9.5V to 35.5V.

The DC input has the following protections:

A) Reverse polarity protection – the unit will not power up under this condition.

B) Transient voltage – protected to +/-40% (7.6V – 49.5V)

C) Under voltage protection – the unit will not power up under this condition and will automatically recover when input reaches an in-range voltage.

Input Voltage Nominal	24V
Min/Max	(9.5V to 35.5V)

Current Typical	0.5A
Max @ 24V	3A

Connector Type	Wago 769
Mating half P/N	769-102_021-000
Cable Type	1.5mm (0.05") CSA to 4mm (0.15") CSA

3. USB Input

This allows connection to a PC in order to access the setup GUI. Refer to the “Software and Setup Guide” for more information.

Connector Type	USB Type B
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4. Audio Inputs - B1, B2, A

All adjustments for the audio inputs are made via the Contacta VLD1 GUI, accessed by connecting a PC to the USB connection.

Inputs B1 and B2 are connected in parallel.

Input B1

This input is transformer isolated and is designed to accept voltages from 1Vrms up to 20Vrms (line audio). This allows direct connection to speaker systems. Input adjustments are made from the GUI.

Input B2

This input is transformer isolated. It is designed to be used as a line level input. Adjustments are made from the GUI.

Input A

This input is not electrically isolated and is designed to be used primarily as a microphone input – it can also accept line level inputs. To use it as a microphone input, a 5V to 3V phantom power is available; this is selectable from the GUI.

	Pin No	Pin Description
B1	6	High Level Audio in (Hot)
	5	High Level Audio in (Cold)
B2	4	Line Level Audio in (Cold)
	3	Line Level Audio in (Hot)
A	2	Line/Mic in (Hot)
	1	Line/Mic in (GND)

	Voltage		Current		Frequency	Notes
	Nominal	Max/Min	Max	Typical		
B1	-	20Vrms-1Vrms	3mA	<1mA	100Hz -5000Hz	Transformer Isolated
B2	1Vrms (0dBV)	2Vrms-0.01Vrms	2mArms	0.5mArms	100Hz -5000Hz	Transformer Isolated
A	1Vrms (0dBV)	2Vrms-0.01Vrms	2mArms	0.5mArms	100Hz -5000Hz	Phantom Power (3.3V)

	Connector Type	Mating half P/N	Cable Type
B1	Wago 769	769-106_021-000	Twisted Pair 1 twist/ Inch (25.4mm (1"))
B2	Wago 769	769-106_021-000	Twisted Pair 1 twist/ Inch (25.4mm (1"))
A	Wago 769	769-106_021-000	Twisted Pair 1 twist/ Inch (25.4mm (1"))

5. Line Output and SPDIF Input

Line Output

This provides an unprocessed mix of the available audio inputs.

SPDIF - Sony/Philips Digital Interface

This interface is an optional feature which allows connection to equipment with an electrical digital audio output and offers greater noise immunity. Input adjustments are made from the GUI.

	Pin No	Pin Description
Line Out	4	Audio Line Out (Cold)
	3	Audio Line Out (Hot)
SPDIF	2	RX
	1	Digital Return

	Voltage		Current		Frequency	Notes
	Nominal	Max/Min	Max	Typical		
Line Out	1Vrms (0dBV)	2Vrms-0.01Vrms	2mArms	0.5mArms	100Hz-5000Hz	Feeds extra systems
SPDIF	0.5V - 0.6V pk-pk	-	-	-	-	-

	Connector Type	Mating half P/N	Cable Type
Line Out	Wago 769	769-104_021-000	Twisted Pair 1 twist/ Inch (25.4mm (1"))
SPDIF	Wago 769	769-104_021-000	Twisted Pair /Coax

6. Enables and Status

Status

The status output consists of a pair of relay contacts sharing a common pole.

One pair is normally open, and the other is normally closed. These can be connected to external circuits or systems.

Should the VLD1 detect a fault the relay will operate. This will open the normally closed contacts and close the normally open contacts.

For a detailed list of conditions that will cause the status relay to operate, see LED Indicators on page 34.

Enables EN1 and EN2

These inputs can be configured in the GUI to perform various operations such as muting inputs or enabling low power mode. For details on how to configure the enable please refer to the “Transport Driver Software and Setup Guide”.

	Pin No	Pin Description
RTN	6	Enable Return
EN1	5	Enable 1
EN2	4	Enable 2
N/O	3	Status (Normally Open Relay Contact)
Common	2	Status (Common Relay Contact)
N/C	1	Status (Normally Closed Relay Contact)

	Pin No	Voltage		Current		Notes
		Nominal	Max/Min	Max	Typical	
RTN	6	-	0V	1.2mA	-	-
EN1	5	-	24V DC	1.2mA	-	Enable Input
EN2	4	-	24V DC	1.2mA	-	Enable Input
N/O	3	-	24VDC	5A	-	Volt-less Relay Contacts
Common	2	-	24VDC	5A	-	
N/C	1	-	24VDC	5A	-	

	Connector Type	Mating half P/N
RTN	Wago 769	769-106_021-000
EN1		
EN2		
N/O		
Common		
N/C		

7. Status Output

The relay on the VLD1 has three terminals: **COM (Common)**, **NC (Normally Closed)**, and **NO (Normally Open)**.

- When no power is applied to the unit or if a fault is detected during start-up, the relay remains in its default state, with the COM and NC terminals connected.
- If no faults are detected during start-up, the relay energizes, switching the connection from COM-NC to COM-NO.

This ensures that the relay only switches when the unit is operating correctly, providing reliable fault detection and connection control.

8. Loop Output(s)

The loop outputs are configurable from the GUI and can be used in parallel, phased or separate. Loop drive level is also adjustable from the GUI.

These outputs are bridged tied meaning that each pin is floating and must not be connected to ground.

	Pin No	Pin Description
Loop A & B	1	Loop -
	2	Loop +

	Voltage		Current			Notes
	Pin No	Nominal	Max	Typical		
Loop A & B	1	-	15Vrms	5Arms	1.25Arms	Floating O/P (Do not ground)
	2	-	15Vrms	5Arms	1.25Arms	Floating O/P (Do not ground)

	Connector Type	Mating Half P/N	Cable Type
Loop A & B	Wago 769	769-102_021-000	Twisted Pair (1.5mm (0.05") CSA min) 1 twist / inch (25.4mm (1"))

Hearing Loop Setup & Commissioning

The initial set up of a hearing loop system should only be performed by a fully trained and qualified professional.

The results and settings for this initial setup procedure can be used on subsequent installations if:

- The vehicle type, design and layout are identical.
- The loops installed are identical and installed in identical locations.

This procedure should be followed in conjunction with the 'Large Area Vehicle Hearing Loop Driver Software and Setup Guide'.

Setup Procedure Steps

Required for Setup: Test and Measurement Tools (page 13)

Step 1: Metal Loss (page 15)

Step 2: Output Level (page 17)

Step 3: Field Uniformity (page 19)

Step 4: Final Output Level Adjustment (page 20)

Step 5: Audio I/O Configuration (page 20)

Step 6: Input Signal Level Adjustment (page 21)

Step 7: Signage (page 22)

Required for Setup: Test and Measurement Tools

- FSM - Contacta Field Strength Meter (IL-CONTACTA-FSM)
- Tripod or similar for mounting the FSM
- Windows computer with the Contacta VLD1 GUI installed

To ensure that the maximum benefit to end users is achieved, it is essential that the target vehicle is surveyed before the installation of a loop system.

Use the Contacta VLD1 GUI software to set up and program VLD1 drivers. This manual provides instructions and includes screenshots taken directly from the Contacta VLD1 GUI software.

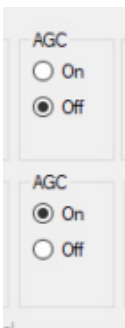
To access the Contacta VLD1 GUI, please get in touch with your main sales representative or point of contact at Contacta.

This survey should be performed by an engineer or technician trained in the design and installation of an AFILS (Audio Frequency Induction Loop System) to BS 60118-4:2014.

Note: Throughout set-up, record results whenever you see the following icon.



Important: The setup procedure should be performed with the AGC (Automatic Gain Control) ON in the VLD1 GUI.



Step 1: Metal Loss

Effect of magnetic and electrically conducting materials

Metal used in the construction of vehicles will have an impact on the frequency response performance of an AFILS system.

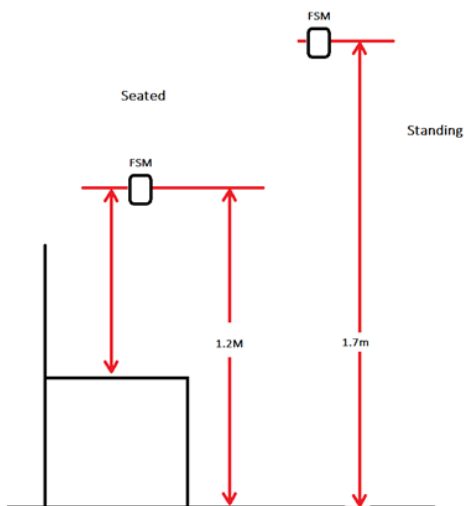
It is important that the final hearing loop system be designed to overcome the effects of metal loss, ensuring adequate field strength and frequency response. This will ensure the best experience for users with T-coil equipped devices.

The following tests will need repeating for each individual output (where used).

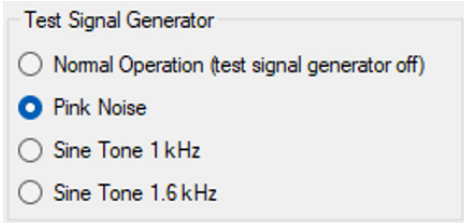
1. Set up the Field Strength Meter (FSM), ensuring that the two vertical arrows in the top-right corner of the device are placed at the correct height:

- ↑↑ • 1.2 metres (3' 9") for seated user.
- ↑↑ • 1.7 metres (5' 6") for standing users.

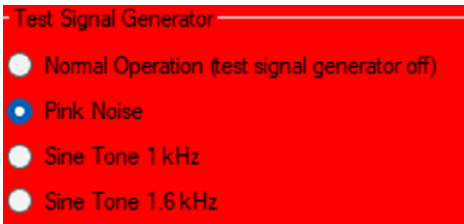
A tripod or similar for mounting the FSM is recommended.



- Place the FSM in the in the centre of the hearing loop under test.
- Switch on the Pink Noise Setting on the Test Signal Generator on the GUI.



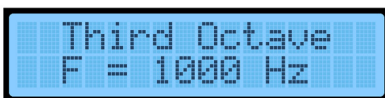
It will flash red to indicate once it is on.



- Adjust the drive level of the relevant output to -8dB.



- Set the FSM to the Frequency Octave F = 1000 Hz setting.

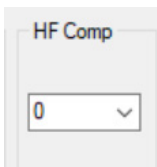



- Measure field strength and record the value.

7. Set the FSM to the Frequency Octave F = 5000 Hz setting.
8. Measure field strength and record the value.
9. Set the FSM to the Frequency Octave F = 100 Hz setting.
10. Measure field strength and record the value.

This concludes the testing.

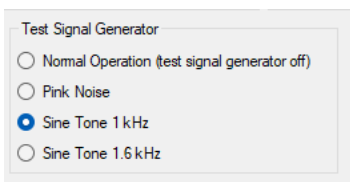
11. The difference between the measurement at 5KHZ and 100Hz relative to the measurement at 1KHz should not differ by more than $\pm 3\text{dB}$.
12. If the difference is less than $\pm 3\text{dB}$ move onto Step 2: Output Level.
13. If the difference is greater than $\pm 3\text{dB}$ then HF comp (compensation) will need to be applied.
14. Increase the setting and repeat steps 5 to 12.



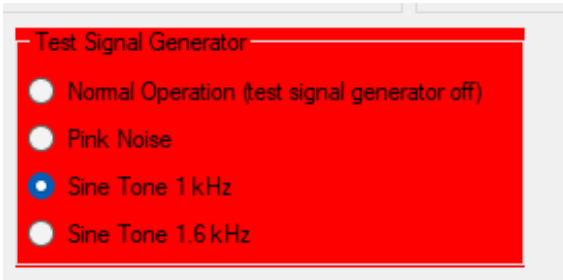
15.  Record the result, keeping the FSM in position for Step 2.

Step 2: Output Level

1. Set the Test Signal Generator (TSG) on the GUI to the Sine Tone 1KHz.



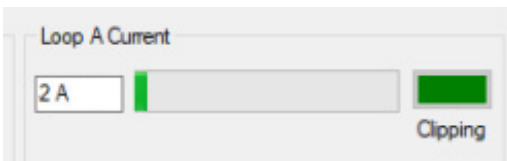
It will flash red to indicate it is on.



2. Set the FSM to Meter Mode.



3. Adjust the drive level to achieve 2A of output current.



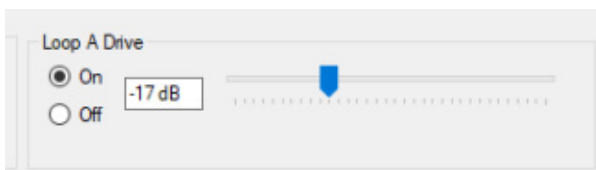
4. Measure the field strength.

Achieve 0dB by using the FSM's indicated field strength to work out the additional current required.

For example: if the measured field strength on the FSM is -6dB then 6dB (2X) extra current will be required to achieve 0dB. If the number was +4dB then 4dB (1.58X) less current is needed.


Note: If more than 7.9dB is required to achieve 0dB, a different loop design will be required.

5. Make any required adjustments.



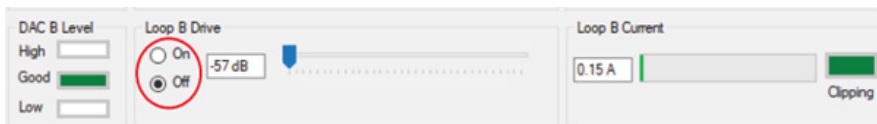
When adjusting the output current, if a level of 2.5A is reached and the field strength is still below -6dB, the correct field strength will not be achieved.

There is no need to go higher than +0dB ARMS.

6.  Record the value of current and setting in dB required for 0dB field strength, keeping the FSM in position for Step 3.
7. If using another output, repeat these steps, noting:

Under some circumstances (such as surveying) it may be necessary to use only a single loop output.

If a loop output is left unconnected the VLD1 will correctly detect that there is not a loop connected (open circuit) at start up and display a fault and lockout.





To prevent this, select "Off" on the unused output before the power is removed.

The VLD1 will remember this setting at start up and ignore testing on the selected output at start up (Example shown is for an unused output B).

Step 3: Field Uniformity

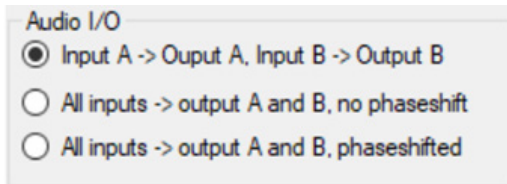
1. Reduce the loop output current to 2A.
2. Again set the FSM to Meter Mode.

3.  Move the FSM to other user positions within the looped area and record the values measured by the FSM.
4. The differences measured in other positions should not be greater than +/- 3dB of that measured in the first position.
5. Repeat steps 3 to 5 to create a suitable map of the area looped.
6.  Record the result, keeping the FSM in position.

Step 4: Final Output Level Adjustment

1. Adjust output current back to the level achieved in step 2.
2. Switch off the Test Signal Generator.

Step 5: Audio I/O Configuration



There are three modes to choose from.

1. Input A -> Output A, Input B -> Output B

Independent Input Routing: In this mode, the inputs are routed directly to their corresponding outputs. Input A goes to Output A, and Input B goes to Output B.

Individual Control: Each input/output pair has its own independent controls for AGC (Automatic Gain Control), HPF (High-Pass Filter), and HFC (High-Frequency Compensation).

2. All inputs -> Output A and B, no phase shift

Combined Inputs: Both inputs (A and B) are combined and sent to

both outputs (A and B) simultaneously.

No Phase Shift: The signal is combined then delivered to both outputs without any phase alteration.

Shared Controls: The inputs are combined; the controls for AGC, HPF, and HFC from Input B (AGC B, HPF B, HFC B) are therefore used to control the combined signal.

The controls for Input A are disabled in this mode.

3. All inputs -> Output A and B, phase shifted

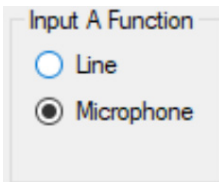
Combined Inputs: Inputs A and B are combined and sent to both outputs (A and B) simultaneously.

Phase Shift: The combined signal is delivered to both outputs with a phase shift applied.

Shared Controls: As with the previous mode, the controls for AGC, HPF, and HFC from Input B (AGC B, HPF B, HFC B) control the combined signal. The controls for Input A are disabled.

Step 6: Input Signal Level Adjustment

1. Connect the system signal source(s).
2. If using the microphone input set the input A function to 'Microphone'.



Test all the audio inputs being used; achieve this by either talking into the relevant microphone or activating the announcement system.

3. Adjust the input level (line/mic) level until "Good" is displayed on

audio peaks.



The high pass filter can be selected if required (usually when using the microphone) This should be assessed by listening to the audio from the loop.

4. Save the setting to a relevant location for future reference. Select 'Save settings from driver to config file'. Choose a name and location for the config file.
5. Setup of the VLD1 is now complete. Continue to Step 7.

Step 7: Signage

1. It is vital to make passengers aware that there is an AFILS installed and available in the vehicle.
2. Install signage areas where the loop system meets the required standards. Work with the client/vehicle owner to determine the most suitable and visible locations for the signage.

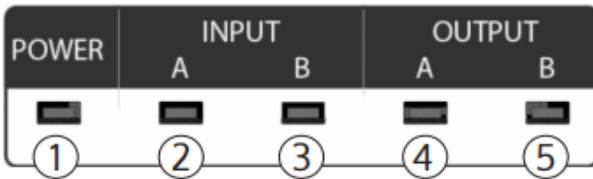
Troubleshooting

Required

- Windows computer with the latest version of the Contacta VLD1 GUI installed
- Multi-meter (capable of measuring DC voltage and resistance)
- Contacta Field Strength Meter [IL-CONTACTA-FSM],
or
Contacta Loop Listener

The following assumes the trouble shooting is being performed on a system that was set up correctly and had been worked correctly.

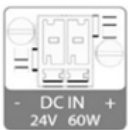
Reported Issue: There is no audio heard through the loop system



Step 1: Check there is power to the system, LED 1 should be illuminated when the power to the VLD1 is present and within the correct voltage range.

If this LED is lit move to Step 4

Step 2: Check the power connection on the rear of the VLD1.



DC Power Input

Step 3: If the connection looks ok, disconnect the power connection

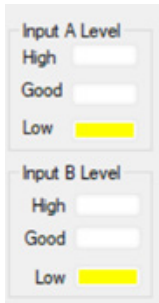
and check the voltage on the Wago connector with a multi-meter set to measure DC Voltage.

The Voltage should typically be between 24V and 30V on most vehicles, if it is outside this range or there is no voltage at all the fault is with the buses electrical system and should be investigated.

If the voltage is present and within-range, then there is an issue with the unit, and it should be removed for further investigation.

Step 4: If the LED is lit connect a windows laptop to the VLD1 and run and connect the GUI.

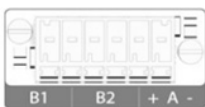
Check the status of LED's 2 and 3 when the inputs are being exercised.



This is achieved by either talking into the microphone or activating the announcement system.

If the required input LED is lit/flashing or the Input levels in the GUI are changing move to Step 8.

Step 5: If the LED is not lit or flashing when exercised. Check the audio input connections on the rear of the VLD1.



Audio Inputs - B1, B2, A

Step 6: If the connection looks ok then check the inputs using a known

good signal source such as a Contacta TSG set to a 1KHz sine signal.

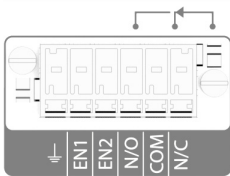
If the input LEDs are still not lit, then there is an issue with the unit, and it should be removed for further investigation.

Step 7a: The microphone input provides a DC supply voltage for the microphone. This can be checked using a multi-meter set to the DC voltage setting measure the voltage on pins A+ with respect to A- (with the microphone disconnected) this should be $3V \pm 50mV$.

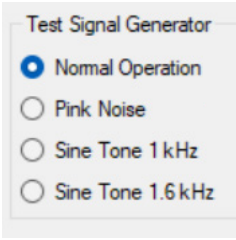


Step 7b: For the microphone input check the Enable status.

This can be checked using a multi-meter set to the DC voltage setting, measure the voltage on EN1 with respect to the earth pin. This will be either high (usually about 24V-28V) or low less than 1V dependant on system configuration.



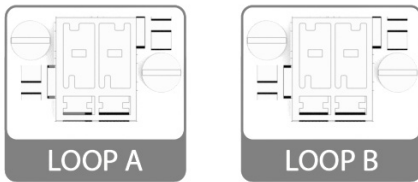
Step 8: If the input signal looks correct, check that LED 4 and 5 when the inputs are being exercised. This is achieved by switching on the Test signal Generator on the GUI; any signal will do.



If the LED is lit or the GUI is displaying output current means that there is output current flowing and may indicate that there is a short circuit on the connections between the Wago connector and the loop.

If the LED is not lit or the GUI does not show current it means that there is no output current flowing and may indicate that there is an open circuit between the Wago connector and the loop.

Step 9: Check the loop connections on the rear of the VLD1.



Step 10: If the connection looks ok, disconnect the loop connections and connect a Contacta IL-VLD-01 loops to the output.

Exercise the input as before and listen to the IL-VLD-01 loop using a Contacta FSM or Contacta Listener. If audio can be heard, then there is likely an issue with the loops or loop connections move to Step 11. If audio still cannot be heard then there is an issue with the unit.

Step 12: Using a multi-meter set to measure resistance measure the resistance between the two pins of the Wago connectors.

If the resistance shows as being greater than $10M\Omega$ or OC (open circuit) there is a break in either the feeder cable, loop or any connections between them. This should be investigated further.

If the measurement is less than 0.5Ω there could be a short between the conductors of the feeder cable or loop. This should be investigated further.

GUI Status and Fault Monitoring

If no faults are detected, then "No Fault Detected" is displayed in green.



At Start Up

The 'At Start up' general fault is triggered if:

- A. **Ground Fault:** A **ground fault is detected**, in which case "Ground Fault" will be displayed on the GUI.



Output A shown in the above example.

A ground fault occurs when either of the output connection of a loop output becomes electrically connected to the vehicle system ground.

For example, a poorly installed loop has been rubbing on the vehicle chassis, the insulation has become damaged allowing the internal wire to come into contact with the chassis.

This will require fault finding to rectify the situation before the driver will work again.

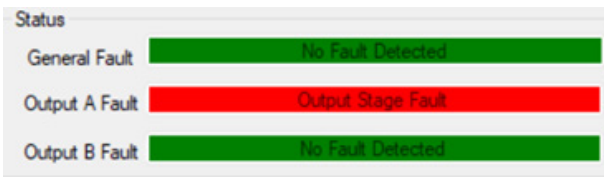
- B. **Open Circuit Loop Connection:** "Loop Open Fault" will be displayed on the GUI.



Output A shown in the above example.

A loop open fault occurs when there is a break in either the connection between the driver and the loop or the loop itself.

- C. **Output Stage Fault:** "Output stage fault" will be displayed on the GUI.

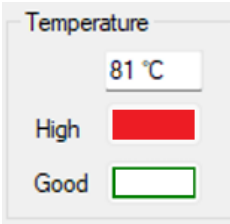


Output A shown in the above example.

An Output stage fault occurs when the power output amplifiers that drive the loops, detect an error that causes them to shut down.

One cause of the output amplifier shutting down is over temperature caused either by a fault or by being driven at full output with a sine signal or excessive noise (unlikely).

If the temperature is above 75°C then 'High' will be lit red.



Remove the power and allow the unit to cool for 10 minutes, then reapply the power and check for correct operation.

Status Relay and LEDs

If any of the above faults are detected at start up, the outputs will be disabled, and the relay will change the status of the connected LED to red from green.

The fault condition must be rectified and the power cycled before normal operation will resume.

When Operating

When the unit is operating and the bus is in service, it is a requirement that no faults are indicated via the status relay output.

However, the unit will protect itself from faults that may cause damage, including:

- O/P Stage Faults
- Ground Faults
- Over Temperature
- Internal power supply voltage out of range.

If any of these faults remain after the power is cycled, the relay will be triggered and the GUI will display the error.

The fault condition must be rectified and the power cycled for normal operation to resume.

Internal PSU Voltage

If the internal PSU is below 20V the output amplifiers will be shut down as the PSU is out of regulation.

If the voltage is found to be below this level, this indicates an internal error.

Increasing Current Output

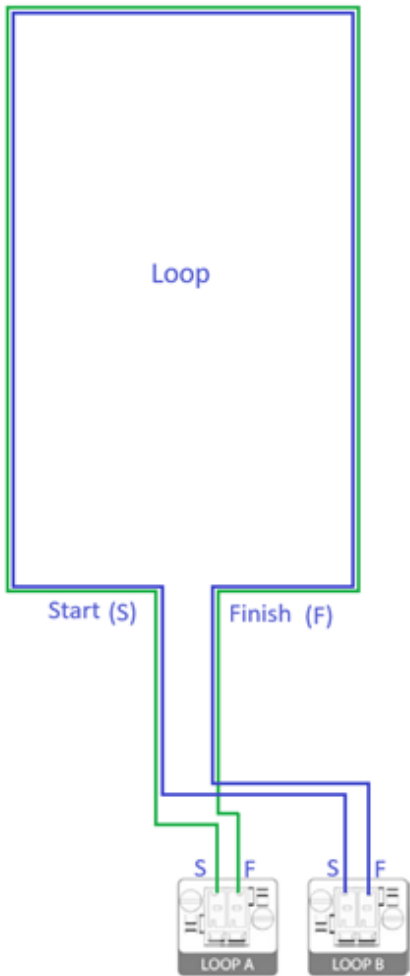
An installation may require more current than is available from a single output and x number loop turns can provide.

This includes situations where because of the length and width of the area that needs coverage from the loop, the number of turns in the loop cannot be increased (increasing turns in a loop increases the current and thus field strength) as the voltage required to drive the loop would exceed that available from the VLD1.

For example a loop with dimensions 4100mm (161.4") X 450mm (17.7") using 5 turns of 2.5csa cable and driven at 5A requires 11.14 volts, adding another turn requires 16 volts, the VLD1 maximum output is 15 volts.

What to do if more current is required

The recommended solution is to run two loops in parallel (see image on the following page).



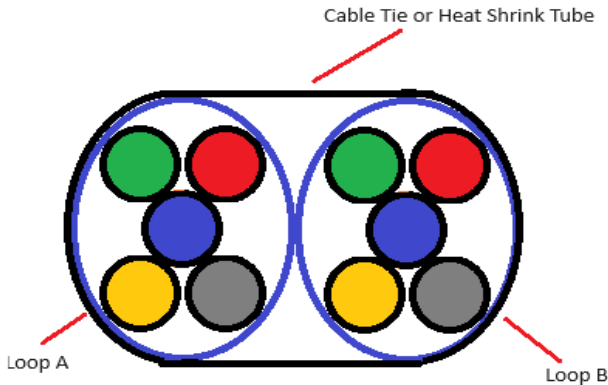
VLD1 Loop Outputs (Note Polarity of Connections)

This image shows how the connections needed to run two loops in parallel.

It is important that the loops are connected exactly as shown. If one of the loop connections are reversed, then the field strength will be reduced due to cancellation as the currents will flow in opposite directions.

(Continued on the next page.)

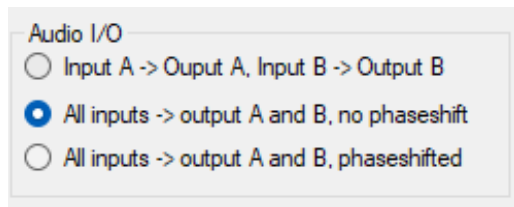
The diagram below is a cross-section of the internal wiring



If two different types of loops are being used together, the image above displays the correct way to install them alongside each other so they work in parallel. Imagine two cables side by side, loop A and loop B; this diagram demonstrates the wiring of two cables running in the same direction.

A single loop can be used instead if this suits installation needs.

GUI Settings



The signal routing of the VLD1 should be set to "All inputs -> output A and B, no phase shift" as shown in image 2 above.

If the current in both loops is in phase (flowing in the same direction) and the loops are in close physical proximity, then the field strength will be the result of the current flowing in both the loops.

If both loops have the same number of turns and the same current flowing in each, then the current will be effectively doubled giving a

6dB increase in field strength.

Table 1

	Turns	Driver Current	Loop Current	Total Loop Current	Field Strength Gain
Loop A	5	5.00A	25.00A	25.00A	0.00dB
Loop B	1	5.00A	5.00A	30.00A	1.58dB
Loop B	2	5.00A	10.00A	35.00A	2.92dB
Loop B	3	5.00A	15.00A	40.00A	4.08dB
Loop B	4	5.00A	20.00A	45.00A	5.11dB
Loop B	5	5.00A	25.00A	50.00A	6.02dB

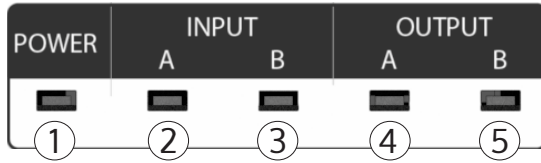
Table 1 shows the increase in loop current and therefore field strength that adding turns in parallel can give.

In table 1 both loops are driven at 5A, if the second loop is driven at a different current, then different gains in field strength can be achieved.

Table 2

	Turns	Driver Current	Loop Current	Total Loop Current	Field Strength Gain
Loop A	5	5.00A	25.00A	25.00A	0.00dB
Loop B	1	2.50A	2.50A	27.50A	0.83dB
Loop B	2	2.50A	5.00A	30.00A	1.58dB
Loop B	3	2.50A	7.50A	32.50A	2.28dB
Loop B	4	2.50A	10.00A	35.00A	2.92dB
Loop B	5	2.50A	12.50A	37.50A	3.52dB

LED Indicators



1. **Power** – Illuminated when the power to the VLD1 is present and within the correct voltage range.
2. **Input A** – Illuminated when there is a signal present at input A. The pre-amp gain must be set correctly.
3. **Input B** – Illuminated when there is a signal present at input B. The pre-amp gain must be set correctly.
4. **Output A** – Illuminated when output A is driving current into its loop load. Will not indicate if the loop is disconnected.
5. **Output B** – Illuminated when output A is driving current into its loop load. Will not indicate if the loop is disconnected.

Standards

- 2012/19/EU - The Waste Electrical & Electronic Equipment Directive
- 2015/863/EU - The Restriction of Hazardous Substances Directive
- EMC: EN/ECE R10 (EMC for vehicle components)
- 2014/53/EU Radio Equipment Directive (RED)
Test Standard: EN 303 348 V1.2.1

Specifications

Physical Data

Dimensions	Height – 143mm (5.62") Width – 294mm (11.57") [361mm (14.2") inc. brackets] Depth – 41mm (1.61")
Construction	Zintec / Mixed
Finish	Powder Coated

Technical Data

Audio Inputs	1 x Line Level Input (balanced and transformer isolated)	Voltage	-45dBV – 0dBV (optimized for -10dBV – 0dBV)
		Frequency Range	100Hz-6000Hz
		Topology	Balanced and transformer isolated
	1 x Line High Voltage Level Input (balanced and transformer Isolated)	Voltage	+5dBV – +45dBV (1Vrms - 20Vrms)
		Frequency Range	100Hz-6000Hz
		Topology	Balanced and transformer isolated
	1 x Universal Line or Microphone Input (microphone bias: optimized for Contacta microphones)	Voltage	-45dBV – 0dBV (optimized for -10dBV – 0dBV)
		Frequency Range	100Hz-9kHz
		Topology	Single-ended capacitively coupled
		Microphone Bias	Optimised for Contacta microphones
	[Optional extra feature] 1 x Digital Audio Input	Connection	SPDIF
		Encoding	PCM 16 bit
		Sample Rate	44.1kHz, 48kHz, 96kHz
Outputs	2 x Independent Loop Outputs (selectable 0° and 90° phase shift)	Voltage	>12Vrms
		Current	>4Arms
		Selectable 0° and 90° phase shift	
	1 x Line Level Output	The line outputs should have the following characteristics:	
		Format	Audio mix of all drivers
		Phase shift	0°
		Gain	0dB
System Connections	1 x Power Connection	Voltage	Nominal 24V (9.5V - 34.5V)
		Current	Maximum 6.6Arms @ 9VDC
		Connector	WAGO 769 series detachable 2-way block
	1 x USB Connection [for factory configuration and system setup, adjustments and updates]	The input should have the following characteristics:	
		Connector	USB Type B
	2 x Enable/Disable (Mute) Connections	The input should have the following characteristics	
		Trigger	Configurable (High-Low or Low-High)
Connector Type	WAGO 769 series		



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