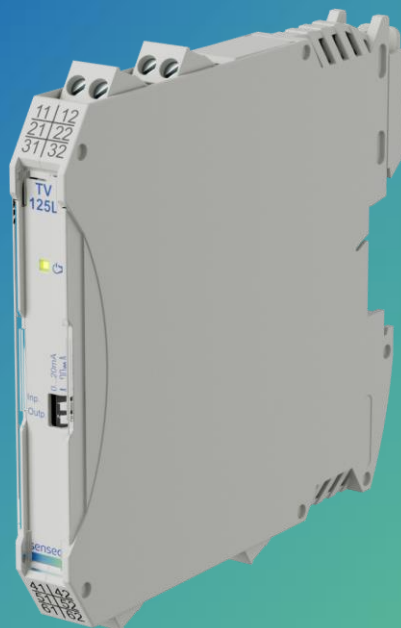


OPERATING MANUAL

TV125L

Universal isolating amplifier



umn_fam_tv125l_vs1.05_en
07/2025



Table of contents

1	Intended use (areas of application)	4
1.1	General safety instructions, use.....	4
1.2	Safety signs and symbols.....	5
1.3	Safety instructions.....	5
1.4	Product liability and warranty	5
2	Product description	7
2.1	Scope of Delivery	7
2.2	Principle of operation.....	7
2.3	Layout of the measuring system	8
2.4	Block circuit diagram.....	9
2.5	Type Label	10
2.6	Power Rail	11
3	Assembly and installation	12
3.1	Mechanical assembly.....	12
3.2	Electrical Installation.....	12
3.3	Connection Diagram.....	13
4	Operating steps, functional description, output	14
4.1	Control elements, functional description.....	14
4.2	Output Configuration.....	15
5	Commissioning, Maintenance and Service	15
5.1	Commissioning.....	15
5.2	Maintenance.....	15
5.3	Service.....	15
5.4	Error and System Messages.....	16
6	Technical Data	17
6.1	Mechanical design / dimensions.....	18

7	Accessories and replacement.....	19
8	Order Code.....	19
9	Device transport and storage.....	20
10	Returns	20
11	Disposal	20
12	EU-Declaration of conformity.....	22

1 Intended use (areas of application)

Note

Refer to the chapter 2 for detailed specifications for the area of application. The operational safety of the device is only assured when used as intended in accordance with the specifications in the operating manual. Intervention beyond the actions described in the operating manual may only be carried out by personnel authorised by the manufacturer for safety and warranty reasons. Conversions or modifications made on one's own authority are expressly prohibited.



Caution!

Application-specific dangers can emanate from this device when used improperly or not as intended. The device is not intended for use in explosion-prone areas and safety-related system parts in accordance with SIL.

1.1 General safety instructions, use

This operating manual must be kept in a location such that qualified personnel can refer to it at all times. Any processes described in this operating manual may only be carried out by trained, qualified personnel who are authorised by the owner and wearing protective clothing. All rights reserved.

1.2 Safety signs and symbols

Warning notices are identified in this document as described hereunder:

Danger!

This symbol warns of imminent danger which can result in death, severe bodily injury, or severe property damage in case of non-observance.

Attention!

This symbol warns of potential dangers or harmful situations which can cause damage to the device or to the environment in case of non-observance.

Note

Blue underlining indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

1.3 Safety instructions

Danger!

Read the product description before commissioning the device. Ensure that there are no limitations for use of the product for the relevant applications. The owner is responsible for ensuring the fault-free operation of the device. The owner is obligated to ensure compliance and to observe the required work and safety measures of the current applicable regulations for the entire duration of use.

1.4 Product liability and warranty

Exclusion of liability:

The contents of the operating manual have been checked to ensure conformity with the described device. However, deviations cannot be entirely ruled out. Therefore, we cannot assume any guarantee for complete conformity. The specifications in this document are checked regularly and any necessary corrections are incorporated into subsequent versions. This document is subject to technical changes. In addition, all claims are based on the valid 'Standard Terms for the Supply of Products and Services of the Electrical Industry'.

Note

Senseca Germany cannot inspect or repair any devices without the required form having been filled in completely (see 10 Returns).

2 Product description

Isolating amplifiers of the series TV125L are suitable for potential isolation or for conversion of unit signals. The universal configuration of the inputs and the output limit the number of types to one version.

The input measuring ranges can be switched between 0 ... 20 mA and 4 ... 20 mA or 0 ... 10 V and 2 ... 10 V with a DIP switch on the front. The input measuring ranges can be switched between 0 ... 20 mA and 4 ... 20 mA with a DIP switch on the front.

With the microprocessor-controlled measurement logging, undercutting and exceeding of the measurement range are detected and indicated via a two-colour status LED on the front side. Then the current output is also set to a defined starting or final value.

The current input is protected with an automatically resetting fuse (PTC) against static overvoltage up to 32 V AC/DC.

2.1 Scope of Delivery

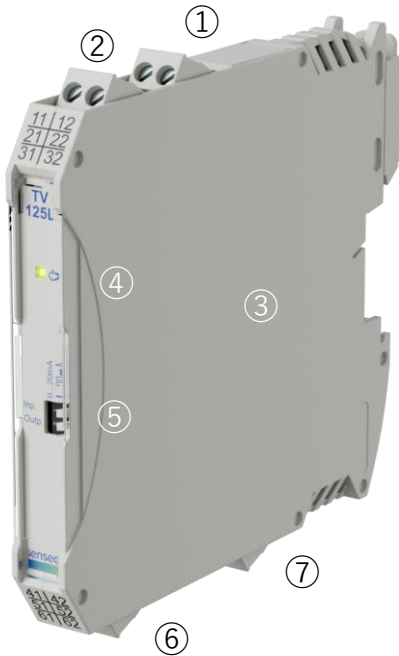
- TV125 according to ordering code
- Power Rail DIN rail adapter (available for LP version, only)
- this operating manual
- further document if applicable

2.2 Principle of operation

The input signals are amplified in the input stage, with amplitude limiting and band limiting with an analogue filter. The filtered signal is digitalised by the analogue-digital converter of the microprocessor with a resolution of 14 bits. After scaling and a measurement range check, the signal is transmitted by an optocoupler to the output stage by means of pulse width modulation. The output stage converts the PWM signal into a proportional analogue value at which the current output is emitted. The output current is limited to a defined starting and end value.

The three circuits: Inputs, outputs, and auxiliary voltage, are galvanically separated with amplified isolation.

2.3 Layout of the measuring system



①	Terminals for auxiliary voltage
②	Terminals for current output
③	Type plate
④	Status-LED
⑤	DIP switches for configuration
⑥	Terminals for voltage input
⑦	Terminals for current input

Fig. 1 Isolating Amplifier TV125L

2.4 Block circuit diagram

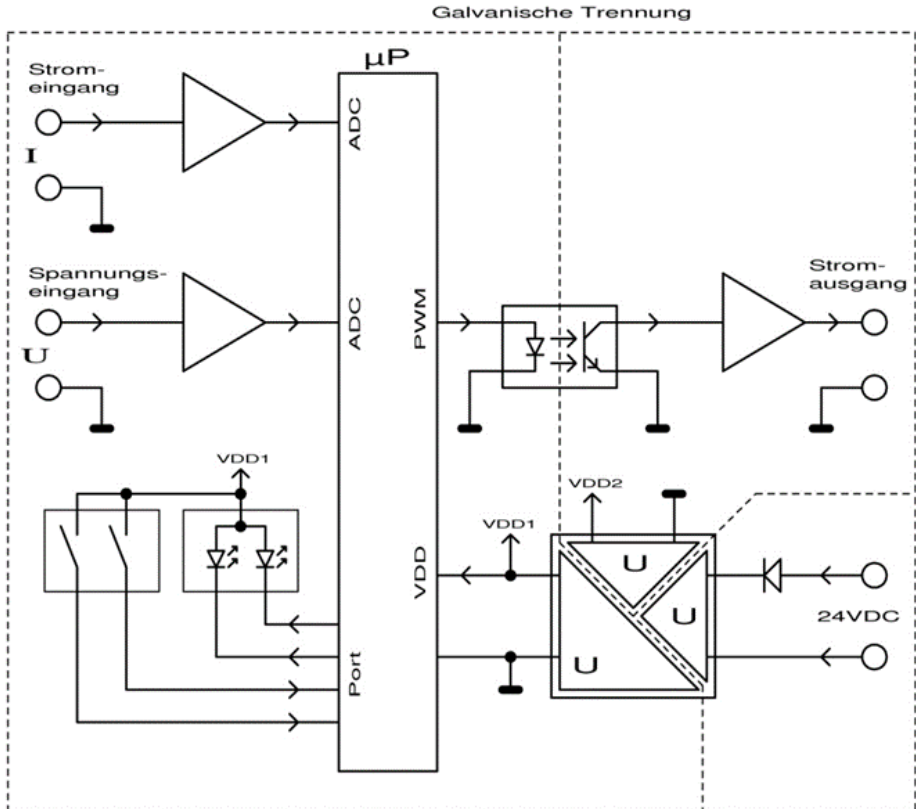


Fig. 2 Block circuit diagram

2.5 Type Label

The type plate contains the most important identification data:

- Connection diagram
- Manufacturer
- Type and article description
- Technical specifications
- Serial number / barcode

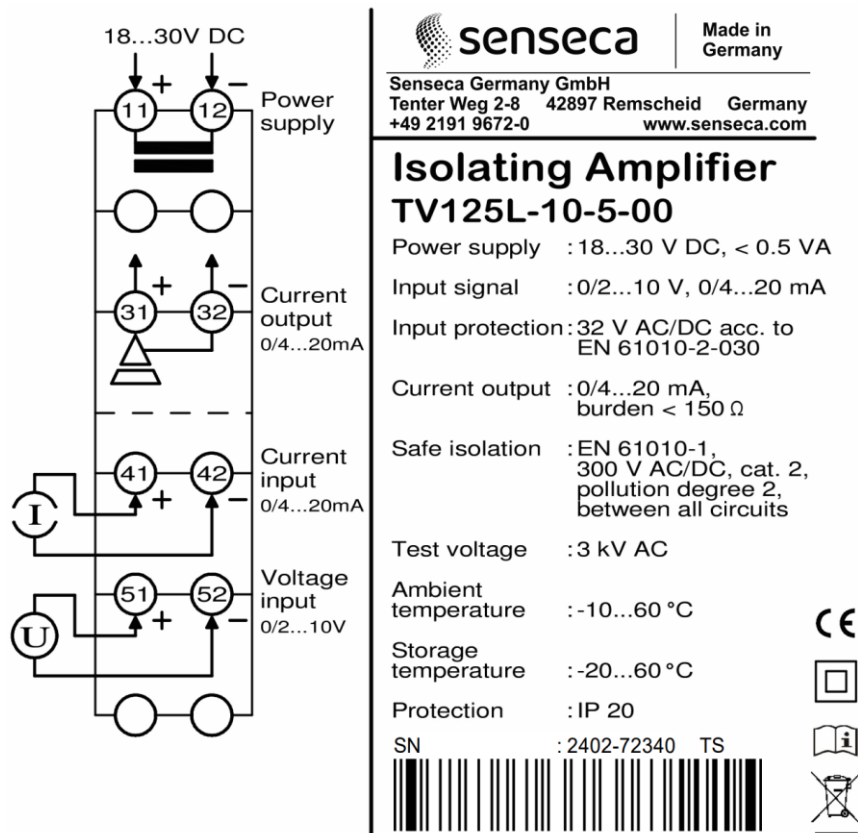


Fig. 3 Type Plate

2.6 Power Rail

The supply of multiple devices can be combined and simplified via a bus system in the carrier rail (TS35). A corresponding version is available for the entire LP series of our rail devices in a housing with 12.5 mm width.

A bus adapter compatible with series connection is clamped on the carrier rail before installation of the device to be supplied with power.

An adapter is required for each device. The bus power supply is provided via a plug-type terminal strip.

The power supply terminals 11 and 12 on the upper device side are omitted in device version TV125LP designed for this purpose.

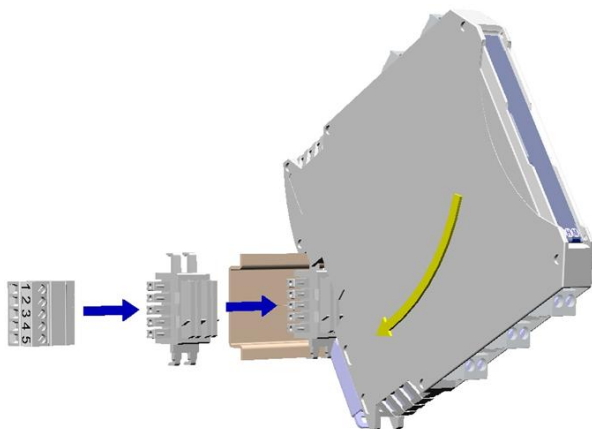


Fig. 4 Example: TV125LP with DIN rail connector and supply terminal PRVK (optional accessories)

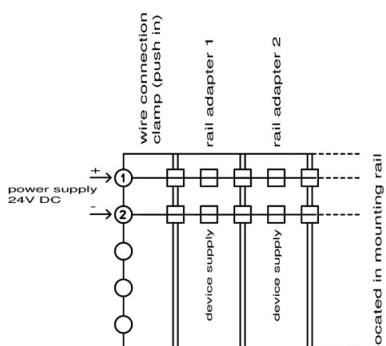


Fig. 5 Terminal Assignment PRVK

3 Assembly and installation

3.1 Mechanical assembly

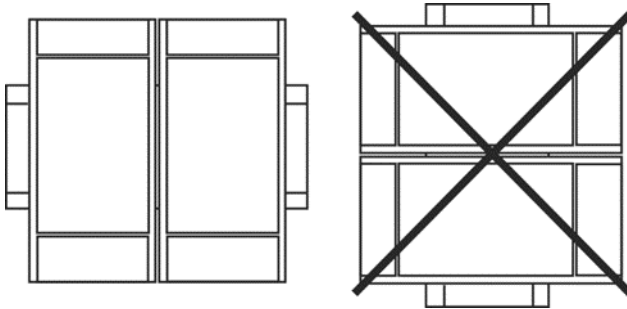


Fig. 6 rail mounting TH35

The installation of multiple devices without spacing is only permitted with a horizontally mounted DIN rail.

3.2 Electrical Installation

Danger!

The device may only be installed by a qualified electrician. The national and international regulations for the installation of electrical systems of the respective operator country apply.

Power supply according to DIN EN 60664-1.

The auxiliary voltage is connected at Connections 11 and 12 of the plug-in terminal strip. Terminals 41 and 42 are intended for current input and Terminals 51 and 52 are intended for voltage input. The active analogue output takes place at Terminals 31 and 32. There is a DIP switch for configuration of the input measuring range and a DIP switch for the output range in the front panel.

Electrical Connections

Terminal	Assignment	
11	Supply voltage +	18...30V DC
12	Supply voltage -	18...30V DC

Terminal	Assignment	
31	Current output +	0/4...20 mA
32	Current output -	0/4...20 mA
41	Current Input +	0/4...20 mA
42	Current Input -	0/4...20 mA
51	Voltage Input +	0/2...10 V
52	Voltage Input -	0/2...10 V

Table 2 Electrical Connections

3.3 Connection Diagram

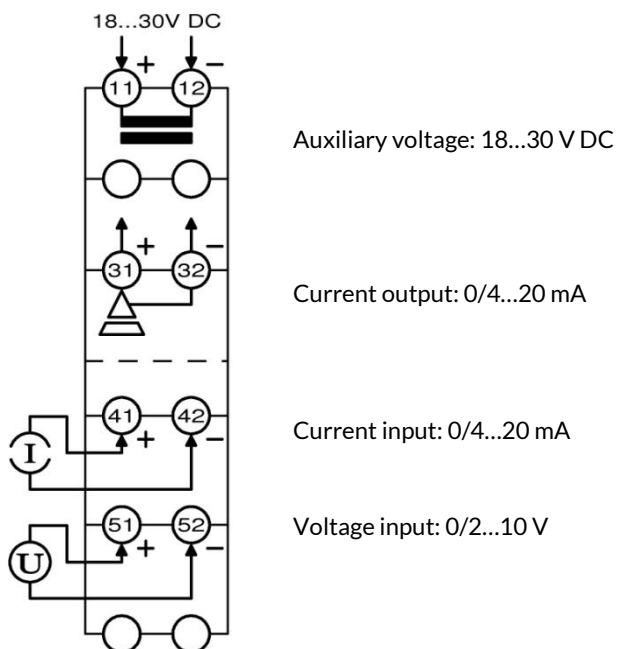



Fig. 7 Connection Diagram

4 Operating steps, functional description, output

4.1 Control elements, functional description



The front panel of the TV125L amplifier features the following elements:

- TV 125L** model name at the top.
- A power button icon.
- Status-LED** indicator.
- Input/Output range labels: **Inp. 0...20mA** and **Outp. 4...20mA**.
- Configuration switches **S1** and **S2**, each with an **On** and **Off** position.
- The **senseca** logo at the bottom.

Status LED	Message
Green LED illuminates	Operating voltage applied
Red and green LED blink alternately with 2 Hz	Measuring range undercut or measuring range exceeded
Red LED illuminates	Failure of the device, please send to manufacturer!

Table 13 Status-LED

S1	S2	Input	Output
Off	Off	4 ... 20 mA, 2 ... 10 V	4 ... 20 mA*
Off	On	4 ... 20 mA, 2 ... 10 V	0 ... 20 mA
On	Off	0 ... 20 mA, 0 ... 10 V	4 ... 20 mA
On	On	0 ... 20 mA, 0 ... 10 V	0 ... 20 mA

Table 4 Configuration

*configuration acc. to Fig. 8

Fig. 8 Front panel

4.2 Output Configuration

Behaviour of the current output when the range is undercut and exceeded:

Ausgang	Aussteuerungsbereich	Untersteuerung	Übersteuerung
0...20 mA	0...20,5 mA linear	0 mA	22 mA
4...20 mA	3,8...20,5 mA linear	3,6 mA	22 mA

Table 5 Control range

5 Commissioning, Maintenance and Service

5.1 Commissioning

- 1 Configure the device with the front-side DIP switches S1 and S2 for the desired input measuring range and output range.
- 2 Ensure that the connection assignment takes place according to the connection diagram and matches the auxiliary voltage.
- 3 Ensure that the terminals are firmly screwed in and that their terminals strips are inserted to the limit stop.
- 4 After switching on the auxiliary energy, check for the correct function.

5.2 Maintenance

Housing

When used as intended, no cleaning or maintenance is required.

5.3 Service

Note

Service of the device is only possible in the factory.

5.4 Error and System Messages

Error	Cause	Remedy
Status LED not illuminated	<ul style="list-style-type: none"> • Plug-in terminal strip of the auxiliary voltage input not plugged in 	▶ Check the plug-in terminal strip for firm seating
	<ul style="list-style-type: none"> • Auxiliary voltage < 18 V 	▶ Test auxiliary voltage at Terminal 11 and 12
	<ul style="list-style-type: none"> • Electronics defect 	▶ Failure of the unit, please return to manufacturer!!
Red and green LEDs blink alternatingly with 2Hz	<ul style="list-style-type: none"> • Plug-in terminal strip of the measuring input not plugged in. 	▶ Check the plug-in terminal strip for firm seating
	<ul style="list-style-type: none"> • Measuring range undercut or measuring range exceeded 	▶ Check the polarity and terminal assignment of the measuring inputs
	<ul style="list-style-type: none"> • Incorrect configuration 	▶ Check configuration of DIP switches
	<ul style="list-style-type: none"> • Simultaneous feed of the voltage input and current input 	▶ Only use one measuring input. Either the voltage input or the current input
	<ul style="list-style-type: none"> • Auxiliary voltage is not constant 	▶ Test AC component of DC voltage
Current output does not provide any current	<ul style="list-style-type: none"> • Plug-in terminal strip of the current output not plugged in 	▶ Check the plug-in terminal strip for firm seating
	<ul style="list-style-type: none"> • Short-circuit / conductor break 	▶ Check wiring and resistant
Red LED illuminates	<ul style="list-style-type: none"> • Electronics defect 	▶ Failure of the unit, please return to manufacturer!

Table 6 Error and System Messages

6 Technical Data

Auxiliary energy	
Auxiliary voltage	18...30 V DC
Power consumption	< 0,5 VA
Conformity	CE
Rated voltage	300 V AC/DC Overvoltage Category 2 and Degree of Contamination 2 between all circuits. Safe separation with amplified isolation
Test voltage (input/output/auxiliary voltage)	3 kV AC, 50 Hz, 1 min.
Environmental conditions	
Working temperature	-10...60 °C
Storage temperature	-20...60 °C
Relative air humidity	< 95 %
Condensation	not permitted
Maximum operating height above sea level	≤ 2000 m
Inputs	
Voltage input	0...10V or 2...10 V switchable. R _i = 47 kΩ. Max. overload 32 V AC
Current input	0...20 mA or 4...20 mA switchable. R _i = 48 Ω + 15 Ω (RiPTC). Max. overload 32 V AC/DC
Output	
Current output	0...20 mA or 4...20 mA switchable. Load < 150 Ω.
Step response T90	40ms
Standard error	< 0,2 % of final value
Temperature coefficient	< 0,01 % / K
Casing	
Material	Polyamide (PA) 6.6, UL94V-0
Colour	Light grey

Installation width	12.5 mm
Dimensions (HxD)	108 x 114 mm
Weight	91 g
Protection type	Housing IP 30, terminals IP 20 BGV A3
Connection technology	Plug-in screw terminals with wire guard, 0.2...2.5mm ² . Stripping length: 8 mm.
Installation	Carrier rail mounting TS35

6.1 Mechanical design / dimensions

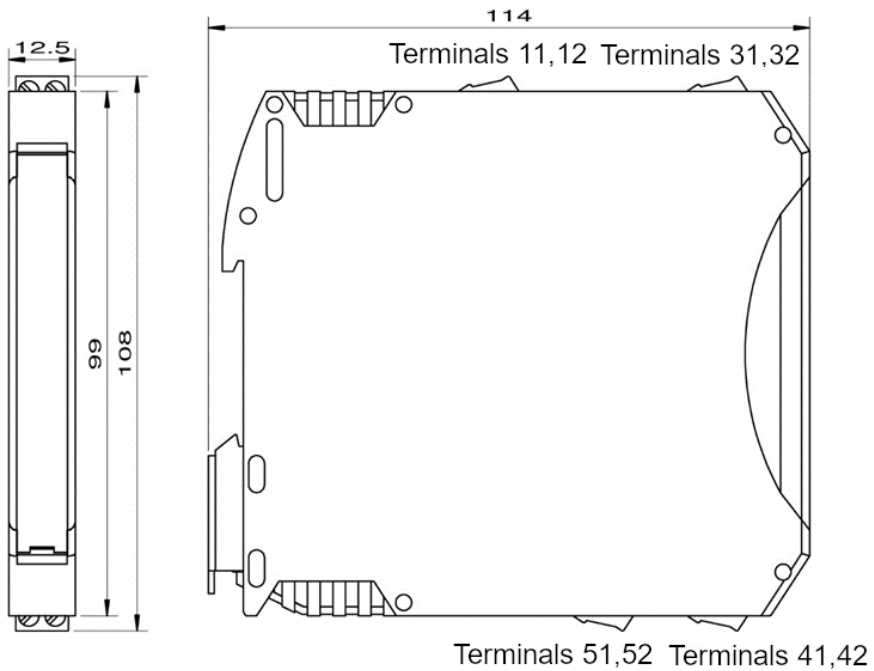


Fig. 9 Dimensions

7 Accessories and replacement

Ordering code	Description
PRVK	Power Rail, power connecting terminal Side of installation: left

8 Order Code

1.	-	2.	-	3.	-
	-		-		-

1.	Device type	
	TV125L	Auxiliary voltage via terminal pins 11, 12
	TV125LP	Auxiliary voltage via Power Rail
2.	Measuring range	
	10	Inputs 0/4...20 mA and 0/2...10 V Outputs 0/4...20 mA
3.	Auxiliary voltage	
	5	24V DC +/- 15%
4.	Options	
	00	Without options
	01	Push-in terminals (plug-in)

9 Device transport and storage

Gentle and tension-free packaging of the housing must be ensured for transport (no machine wrapping of the package). The device must be stored in the environmental conditions specified in the technical data.

10 Returns



Danger!

The legal regulations for environmental protection and our personnel require that devices which are sent back which have come into contact with liquid are handled without risk to people or the environment.

If you send a device back to us for inspection or repair, we must request that you strictly observe the following requirements.

On the Senseca-Germany homepage a return shipment form can be downloaded.

The repair can be performed quickly and without call-back questions if:

- 1 a filled-in form is provided for each device,
- 2 the device has been cleaned and packaging which prevents damage to the device is used.

11 Disposal



Separation by material and recycling of device components and packaging must take place when the device is disposed of. The valid legal regulations and directives applicable at the time must be observed.

The device may not be disposed of with household waste. If the device should be disposed of, return it to us with the return shipment form filled in under section 8. We will then arrange for the proper disposal.

12 EU-Declaration of conformity


EU-KONFORMITÄTSERKLÄRUNG
EU-DECLARATION OF CONFORMITY

Senseca | Senseca Germany GmbH | Tenter Weg 2-8 | 42897 Remscheid | GERMANY

 Dokument-Nr. / Monat.Jahr: **2042 / 01.2024**
 Document-No. / Month.Year:

Wir erklären hiermit unter alleiniger Verantwortung, dass die folgenden Produkte konform sind mit den Schutzziele der Richtlinie des Europäischen Parlaments:

We declare herewith under our sole responsibility that the following products are in compliance with the protection requirements defined in the European Council directives:

 Produktbezeichnung: **TV125L**
 Product identifier:

 Produktbeschreibung: **Trennverstärker**
 Product description: **Isolating signal converter**

Die Produkte entsprechen den folgenden Europäischen Richtlinien:

The products conforms to following European directives:

Richtlinien / Directives	
2014/30/EU	EMV-Richtlinie / <i>EMC directive</i>
2014/35/EU	Niederspannungsrichtlinie / <i>Low Voltage Directive</i>
2011/65/EU	RoHS / <i>RoHS</i>

Angewandte harmonisierte Normen oder angeführte technische Normen:

Applied harmonized standards or mentioned technical specifications:

Harmonisierte Normen / <i>harmonized standards</i>	
EN 61326-1:2013	Allgemeine EMV-Anforderungen / <i>General EMC requirements</i>
EN 61010-1:2010+A1:2019+A1: 2019/AC:2019 EN 61010-2-030:2010	Allgemeine Isolationsanforderungen / <i>General isolating requirements</i>
EN IEC 63000:2018	Beschränkung der gefährlichen Stoffe / <i>Restriction of hazardous substances</i>

Diese Erklärung wird verantwortlich für den Hersteller abgegeben durch:

The manufacturer is responsible for the declaration released by:

 Walter Vogelsberger
 Senior Director Research & Development

Remscheid, 02. Januar 2024

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Harmonisierungsrechtsvorschriften, beinhaltet jedoch keine Zusicherung von Eigenschaften

This declaration certifies the agreement with the harmonization legislation mentioned, contained however no warranty of characteristics.

senseca.com



Senseca Germany GmbH

Tenter Weg 2-8

42897 Remscheid

GERMANY

INFO@SENSECA.COM

