

## Operating manual

### Universal buffer amplifier **TV125L**



Companies / brands of GHM

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AUTOMATION

**IMTRON**

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## 1. Intended use (areas of application)

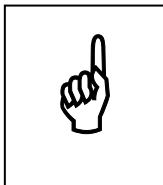


Refer to the chapter 'Product description' for detailed specifications for the area of application.

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.

Application-specific dangers can emanate from this device when used improperly or not as intended.



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.




### 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.

### 1.1 Safety signs and symbols

Warning notices are identified in this document as described under Table 1:

	<p>Warning! This symbol warns of imminent danger which can result in death, severe bodily injury, or severe property damage in case of non-observance.</p>
	<p>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.</p>
	<p>Note! This symbol indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.</p>

## 1.2 Safety instructions

Read the product description before commissioning the device. Ensure that there are no limitations for use of the product for the relevant applications.

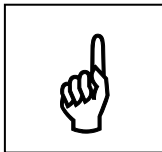


The owner is responsible for ensuring the fault-free operation of the device. The owner is obligated to ensure compliance and to observe the required work and safety measures of the current applicable regulations for the entire duration of use.

## 1.3 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'.



GHM Messtechnik GmbH cannot inspect or repair any devices without the required form having been filled in completely (refer to page 16 'Returns').

## 1.4 Standards and directives

Conformity with Directive	2014/30/EU,
CE Conformity	EN 61326-1: 2013, Class A.

Conformity with Directive	2014/35/EU,
Insulation coordinates	EN 61010-1: 2010,
Measuring input protection	EN 61010-2-030: 2010

## **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 overvoltages up to 32 V AC/DC.

### **2.1. Scope of delivery**

- TV125L
- this operating manual
- further documents, if applicable

### **2.2. Functional principle**

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

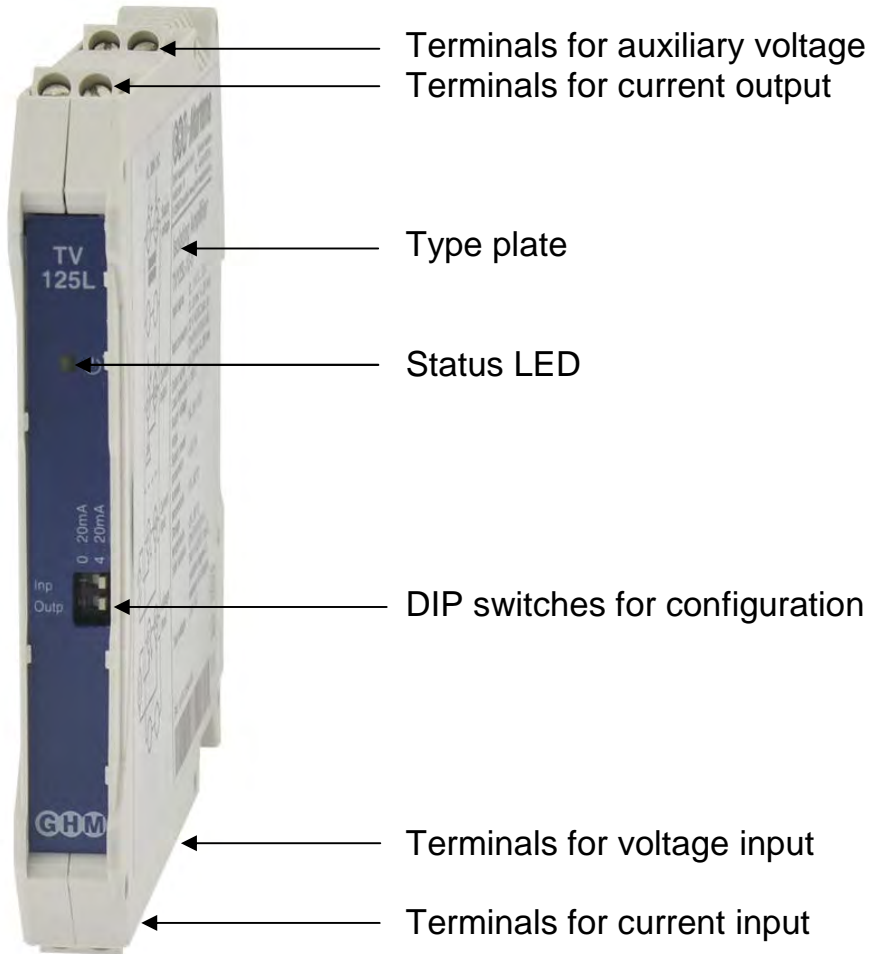
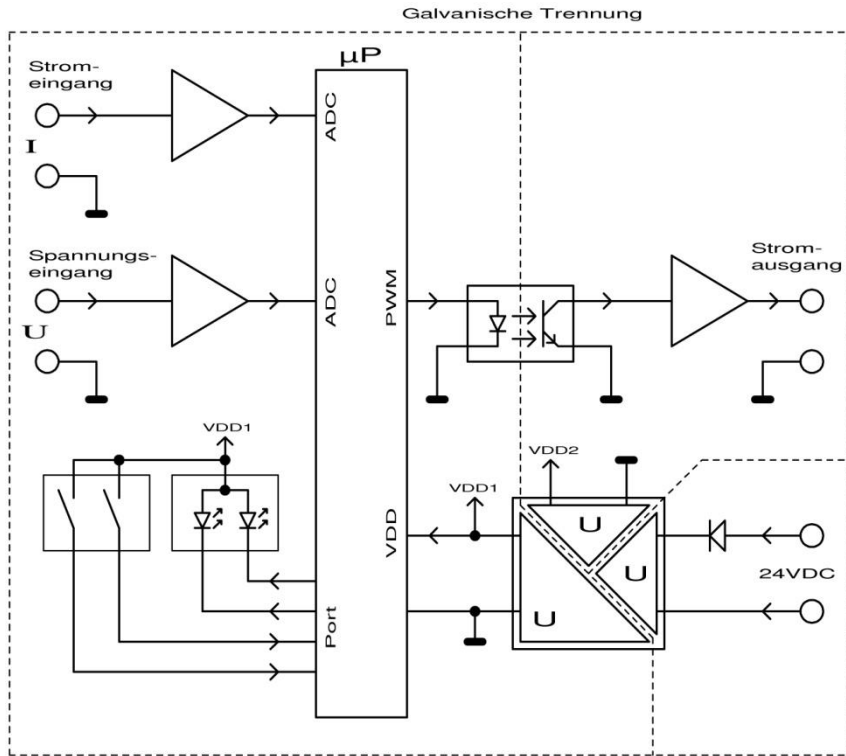


Fig. 1: Isolating Amplifier TV125L

## 2.4 Block circuit diagram



## 2.5 Type plate

The type plate includes the most important identification data

- Type and article name
- Technical data
- Serial number

18...30V DC	11	12	Power supply
	31	32	Current output 0/4...20mA
	41	42	Current input 0/4...20mA
	51	52	Voltage input 0/2...10V

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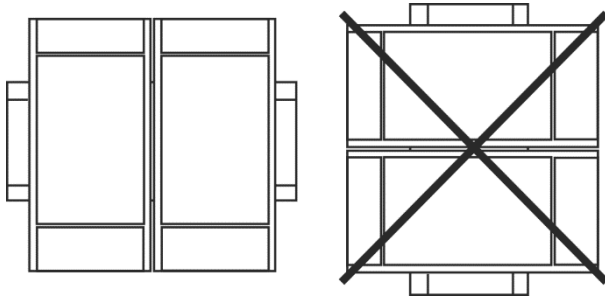
**Isolating Amplifier**  
**TV125L-10-5-00**

Power supply : 18...30 V DC, < 0.5 VA  
 Input signal : 0/2...10 V, 0/4...20 mA  
 Input protection : 32 V AC/DC acc. to EN 61010-2-030  
 Current output : 0/4...20 mA, burden < 150 Ω  
 Safe isolation : EN 61010-1, 300 V AC/DC, cat. 2, pollution degree 2, between all circuits  
 Test voltage : 3 kV AC  
 Ambient temperature : -10...60 °C  
 Storage temperature : -20...60 °C  
 Protection : IP 20  
 SN: 1532-12346-BC

Fig. 2: Type plate

### **3. Assembly and installation**

#### **3.1 Mechanical assembly**



Carrier rail mounting TS35, DIN EN 60715

The mounting of multiple devices without spaces is only permitted on horizontally mounted carrier rails.

#### **3.2 Electrical installation**



The device may only be installed by an electrician. The national and international regulations for connection of electrical systems in the respective user country apply.

Voltage 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.



### 3.3 Connection diagram

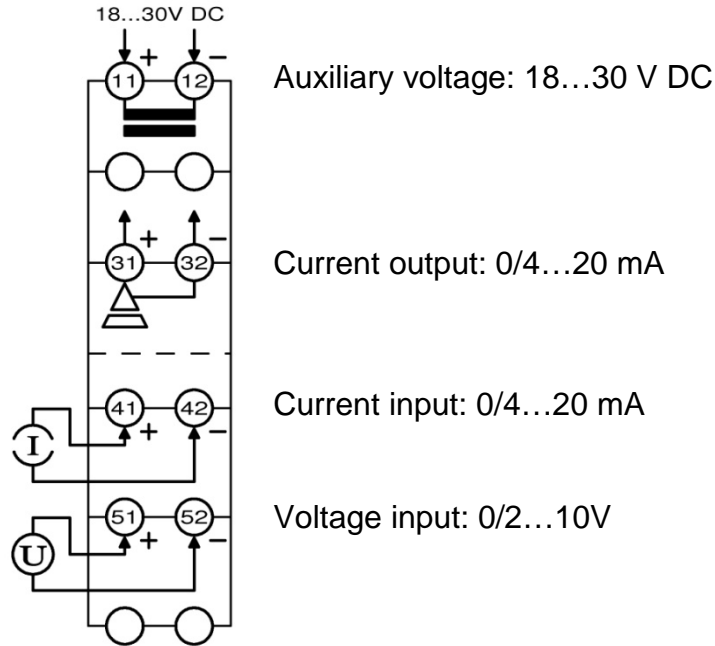
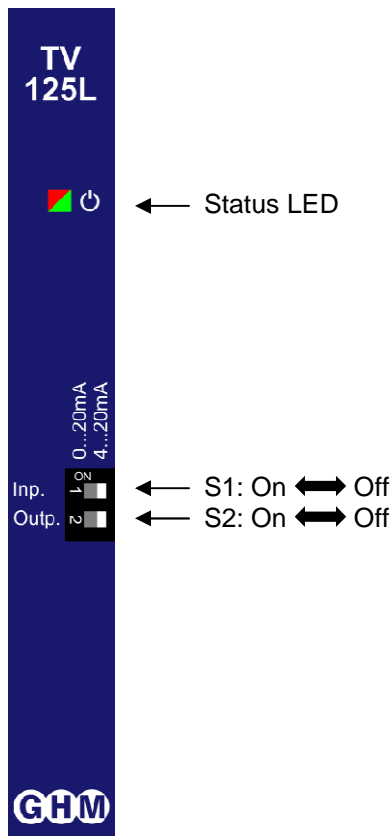


Fig. 3: Connection diagram

## 4. Controls, functional description and current output

### 4.1 Controls, functional description



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!

Tab. 1: 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

Tab. 2: Configuration

Fig. 4: Front panel

## 4.2 Current output

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

Output	Control range	Underload	Overload
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

Tab. 3: 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:

No cleaning or maintenance is required when operated as intended.

### 5.3 Service

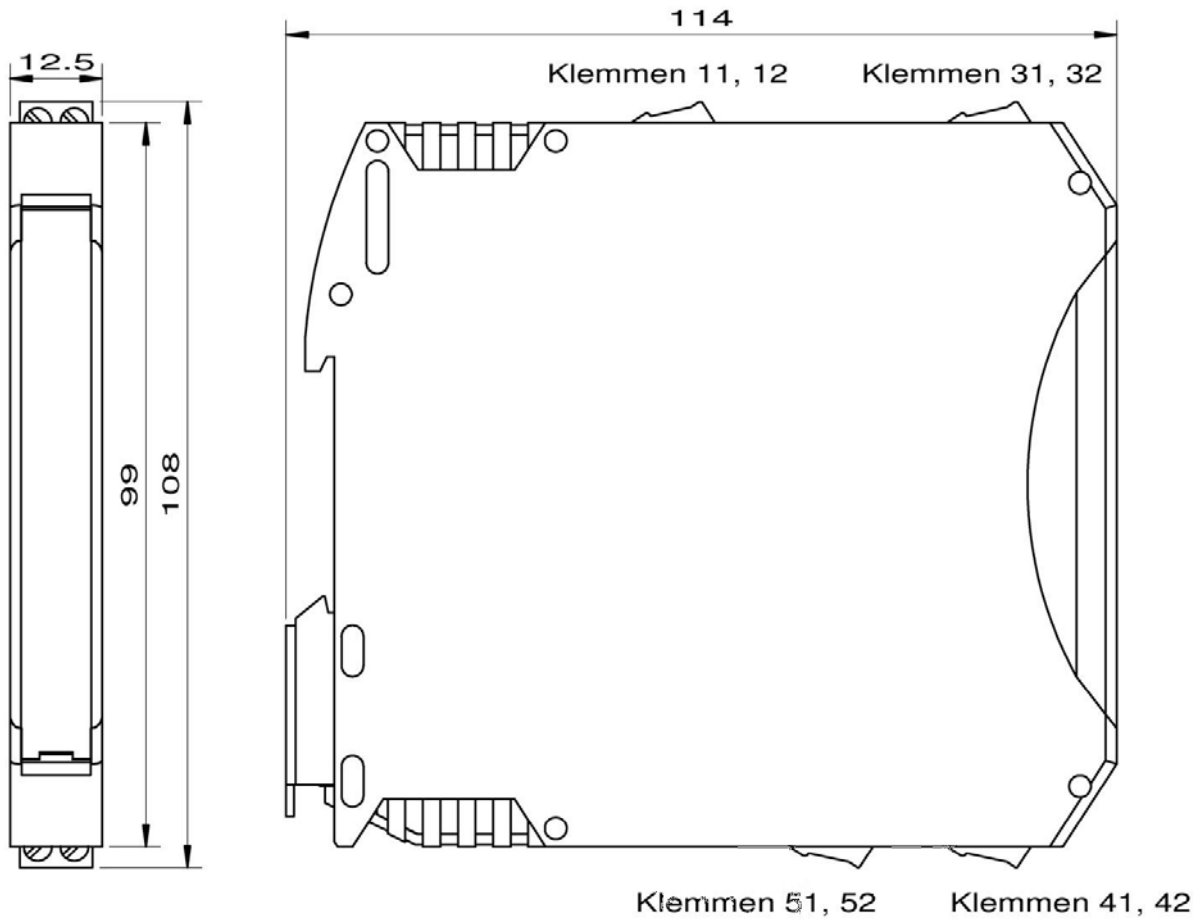


Service of the device is only possible at the factory.

## 6. Technical data

<b>Auxiliary energy</b>	
Auxiliary voltage	18...30 V DC
Power consumption	< 0.5 VA
Conformity	CE, Directive 2014/30/EU
EMC	EN 61326-1:2013, Class A
Standards	EN 61010-1:2010, EN 61010-2-030:2010
Rated voltage	300 V AC/DC according to EN 61010-1 with 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.
<b>Environmental conditions</b>	
Working temperature	-10...60 °C
Storage temperature	-20...60 °C
Relative air humidity	< 95 %
Condensation	not permitted
<b>Inputs</b>	
Voltage input	0...10V or 2...10 V switchable. Ri = 47 kΩ. Max. overload 32 V AC
Current input	0...20 mA or 4...20 mA switchable. Ri = 48 Ω + 15 Ω (RiPTC). Max. overload 32 V AC/DC according to DIN EN 61010-2-30
<b>Output</b>	
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
<b>Casing</b>	
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 <sup>2</sup> . Stripping length: 8 mm.
Installation	Carrier rail mounting TS35 DIN EN 60715

## 6.1 Mechanical design / dimensions



## 6.2 Ordering code

TV125L -  1. -  2. -  3.

- |                                 |  |
|---------------------------------|--|
| <b>1. Metering range</b>        | Inputs 0/4...20 mA and 0/2...10 V,<br>Output 0/4...20 mA |
| <b>2. Electrical connection</b> | 18...30 V DC   |
| <b>3. Options</b>               | No options   |

### 6.3 Troubleshooting

Error	Cause	Remedy
Status LED not illuminated	Plug-in terminal strip of the auxiliary voltage input not plugged in	Check the plug-in terminal strip for firm seating
	Auxiliary voltage < 18 V	Test auxiliary voltage at Terminal 11 and 12
	Electronics defect	Failure of the unit, please return to manufacturer!
Red and green LEDs blink alternately with 2Hz	Plug-in terminal strip of the measuring input not plugged in.	Check the plug-in terminal strip for firm seating
	Measuring range undercut or measuring range exceeded	Check the polarity and terminal assignment of the measuring inputs
	Incorrect configuration	Check configuration of DIP switches
	Simultaneous feed of the voltage input and current input	Only use <u>one</u> measuring input. Either the voltage input <u>or</u> the current input
	Auxiliary voltage is not constant	Test AC component of DC voltage
Current output does not provide any current	Plug-in terminal strip of the current output not plugged in	Check the plug-in terminal strip for firm seating
	Short-circuit / conductor break	Check wiring and resistant
Red LED illuminates	Electronics defect	Failure of the unit, please return to manufacturer!

Tab. 4: Troubleshooting

## 7. 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.

## 8. Returns



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 GHM homepage under 'Downloads/forms' 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, and
3. a safety data sheet for the measuring medium is affixed to the outside of the package, if the device has come into contact with a critical substance.

## 9. 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.

## 10. Imprint

GHM Messtechnik GmbH

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Managing Director: Johannes Overhues

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Ulm District Court, Commercial Register Section B 730462

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## 11. EC Certificate of Conformity



**EU-KONFORMITÄTSERKLÄRUNG  
EU-DECLARATION OF CONFORMITY**

GHM Messtechnik GmbH Standort Martens, Kiebitzhörn 18, 22885 Barsbüttel, Germany

Dokument-Nr. / Monat.Jahr: **3042 / 10.2016**  
Document-No. / Month.Year:

Wir erklären hiermit als Hersteller in alleiniger Verantwortung, dass die folgenden Produkte konform sind mit den Schutzziele der Richtlinie des Europäischen Parlaments:  
*We declare as manufacturer herewith under our sole responsibility that the following products are in compliance with the protection requirements defined in the European Council directives:*

Produktbezeichnung: **TV125L / TV125LP**  
*Product identifier:*

Produktbeschreibung: **Universal-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 / EMC Directive
2014/35/EU	Niederspannungsrichtlinie / Low Voltage Directive
2011/65/EU	RoHS / RoHS

Angewandte harmonisierte Normen oder angeführte technische Normen:  
*Applied harmonized standards or mentioned technical specifications:*

Harmonisierte Normen / harmonized standards	
EN 61326-1:2013	Allgemeine EMV-Anforderungen / General EMC requirements
EN 61010-1:2010	Sicherheit (Niederspannungsrichtlinie) / Safety (Low Voltage Directive)
EN 61010-2-030:2010	
EN 50581:2012	Beschränkung der gefährlichen Stoffe / Restriction of hazardous substances

Diese Erklärung wird verantwortlich für den Hersteller abgegeben durch:  
*The manufacturer is responsible for the declaration released by:*

Michael Wulf

Standortleiter  
*Business unit manager*

Barsbüttel, 31. Oktober 2016

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.*

