

Operating manual

Limit switch GS125



Ventures / brands of GHM

TA TELEMETRIE &
AUTOMATION

IMTRON

Martens

HONSBERG

GREISINGER

www.ghm-messtechnik.de

Keep for future reference.

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1. Intended use (areas of application)

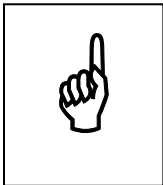


Refer to the chapter 'Product description' for detailed specifications for the area of application.

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.




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:

 Danger	Warning! 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! This symbol indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

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.

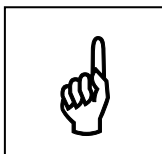


The owner is responsible for ensuring the fault-free operation of the device. The owner is obligated to ensure compliance and to observe the required work and safety measures of the current applicable regulations for the entire duration of use.

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

1.4 Standards and directives

Low-voltage Directive 2014/35/EU
Testing standard 60664-1: 2007

EMC Directive 2014/30/EU
Testing standard EN 61326-1: 2013

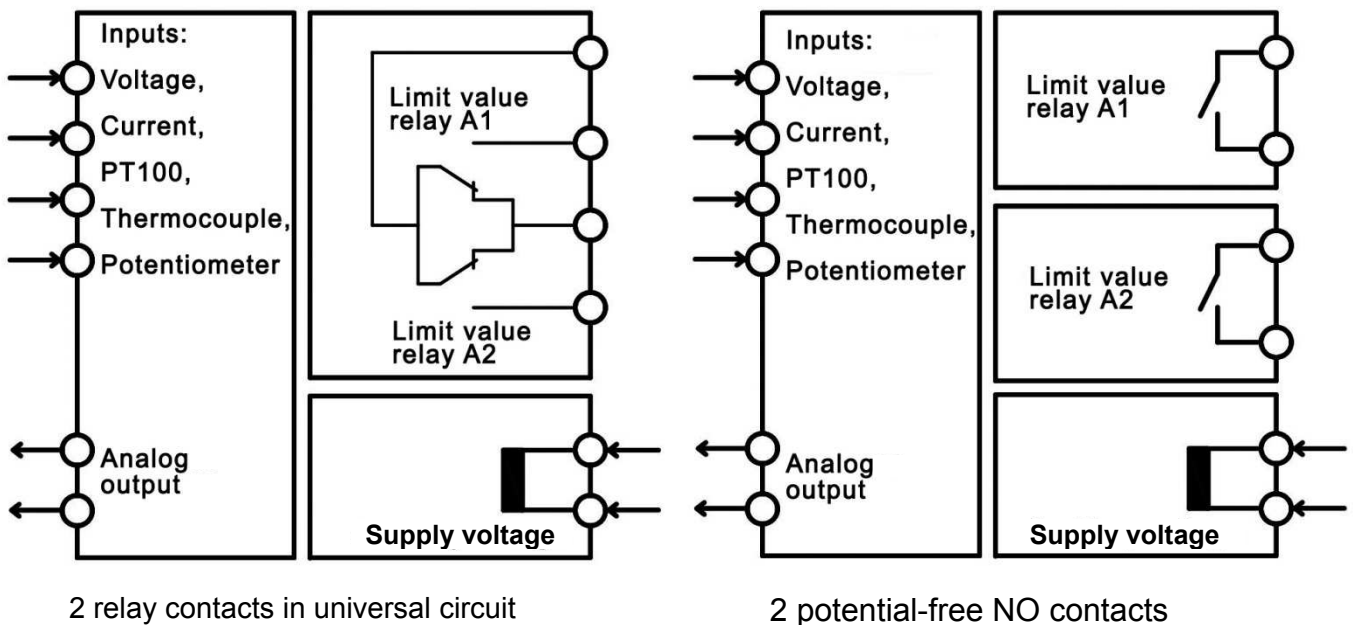
RoHS Directive 2011/65/EU
Testing standard EN50581: 2012

Functional safety
Testing standards EN61508-1: 2010

(Issue years for testing standards belong to german versions)

2. Product description

Limit switches of the series GS125 are used in switch cabinets for process monitoring or even for simple process regulation. Temperatures and derived signals such as voltage, current and resistance can be used as control signals. In the process, 1 or 2 limit values can be monitored. With the universal configurability of the measuring inputs, the need to stock multiple parts for various applications is reduced. The housing width of only 12.5mm allows space-saving installation in the switch cabinet. The limit value adjustment scales which are illuminated red or green depending on the switching status also enable operation in dark environments.



2.1. Scope of delivery

- GS125
- 24 transparent labels with measurement units and scale assignment
- This operating manual
- Additional documents, if applicable

2.2. Functional principle

One or two relays may be switched depending on the measurement at the device input.

Limit values can be adjusted with illuminated adjustment wheels. When the limit values are reached (depending on the input signal), relays are switched.

The relay status is indicated by a colour change in the scales of the adjustment wheels.

The switching behaviour of the relay can be specified as a minimum or maximum contact.

Device configuration will be done via DIP switches.

The relay is designed as a changeover contact for single-channel devices.

Two-channel devices can be optionally supplied with a universal connection of the relay contacts or with two potential-free NO contacts.

The universal connection enables use of the device with 2 independent NO contacts or in window range monitoring in which the two contact relays can be open or closed within the target range.

The application is selected with the wiring of the outer connection terminals.

A device version is available with analog output that reproduces the respective input signal to 4-20mA. The analog output is not galvanically isolated from the input signal!

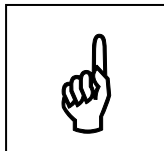
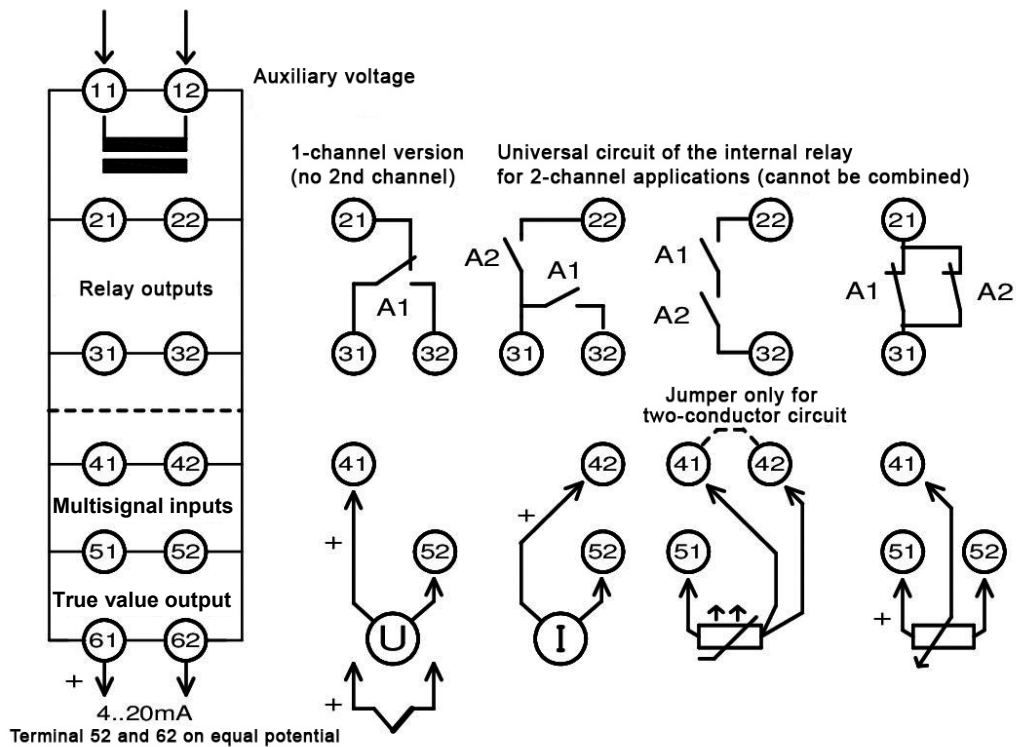
The device may be supplied in a wide range between 20..125V DC or 20..253V AC.

A low cost version with 24V DC power supply is available.

Another version allows a 24V power supply via a mounting rail bus (Power Rail)

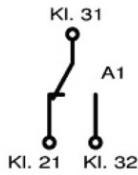
Twenty-four transparent adhesive labels are provided for assigning the unit of measure for the scale labelling. They can be affixed between the adjustment wheels on the front panel, depending on requirements.

2.3. Connection diagram

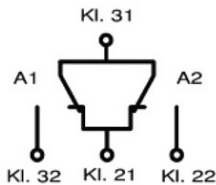


Input signals should be connected via separate 2 or 3 core cables. Grounded leads may cause problems with the not galvanical isolated analog true value output.

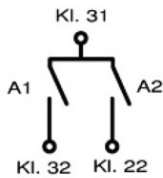
2.4. Limit value contacts



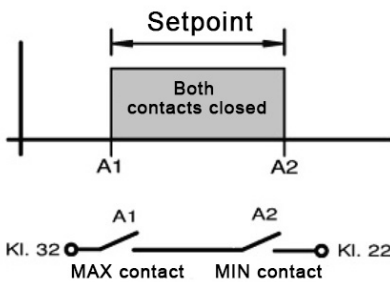
1 relay output



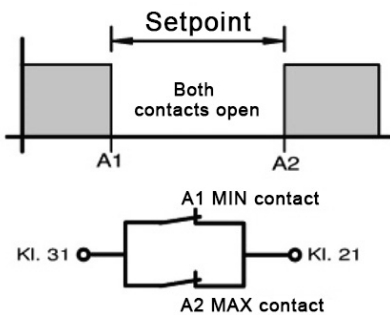
2 relay outputs
 in universal circuit
 enable the following
 applications:



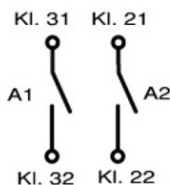
Two independent
 NO contacts



Window range monitoring
 - normally open / n.o.



Window range monitoring
 - normally closed / n.c.



Version with
 2 potential-free NO contacts

2.5. PowerRail

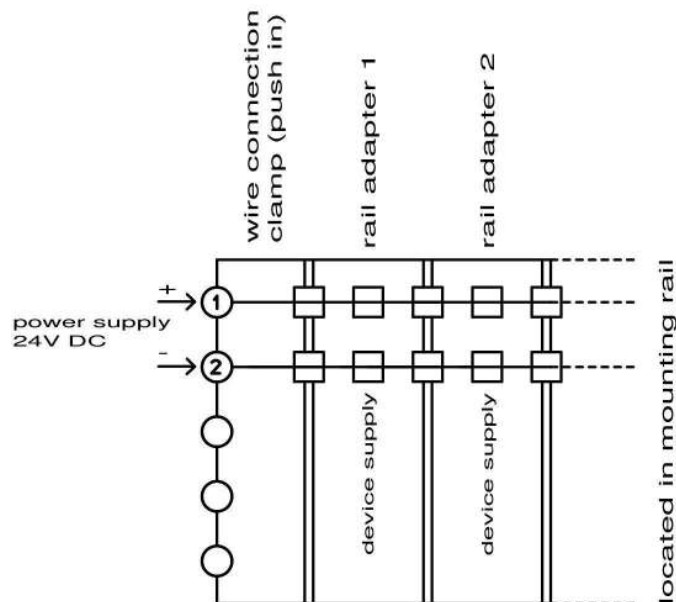
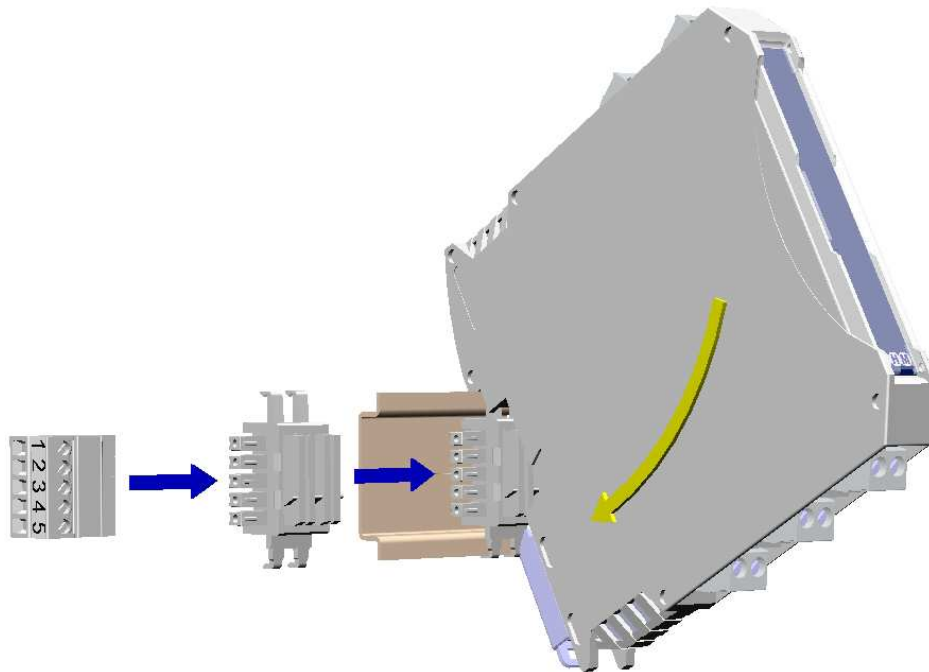
The supply of multiple devices can be combined and simplified via a bus system in the carrier rail (TS35).

An equivalent version is available for the entire LP series of GHM carrier rail devices in 12.5mm wide housing.

Before mounting the device to be supplied, a series-compatible bus adapter must be connected on the carrier rail.

For this purpose, an adapter piece is required for each device. The supply of the bus then takes place via a plug-in terminal strip.

In the device version GS125LP provided for this purpose, the supply terminals 11 and 12 on the upper side of the device are omitted.



3. Assembly and installation

3.1. Mechanical assembly

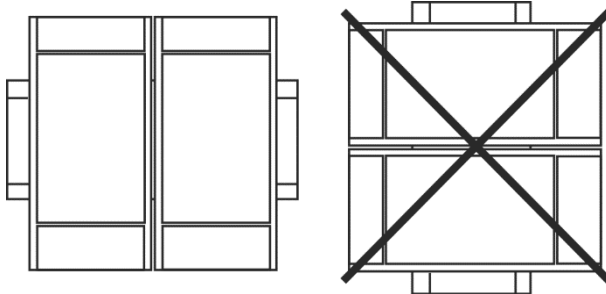


Fig. 4

Mounting rail assembly TS35, DIN EN 60715

Gapless installation of several devices is only permitted with horizontally installed mounting rails.

3.2. Electrical installation



The device may only be installed by an electrician. Compliance with the national and international regulations for installation of electrical and electronic systems applicable in the respective country of use is mandatory.

Voltage supply in accordance with DIN EN60664-1, SELV, PELV.

Observe the connection diagram for installation of the inputs and outputs.

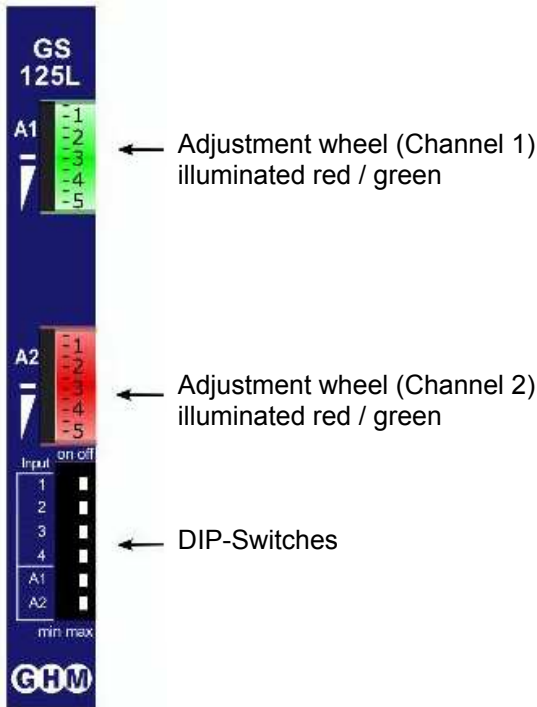
The supply voltage is connected to pins 11 and 12 of the plug-in terminal strip.

Terminals 41, 42, 51 and 52 are provided for sensor connection

Terminals 21, 22, 31 and 32 are provided for the relay output

Terminals 61 and 62 are provided for the actual value output

4. Controls and functional description



← Adjustment wheel (Channel 1)
illuminated red / green

← Adjustment wheel (Channel 2)
illuminated red / green

← DIP-Switches

Selection of the measuring range takes place with DIP switches 1-4:
current / voltage, potentiometer, Pt100, thermocouple

off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I: 0..20mA, U: 0..10V
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I: 4..20mA, U: 2..10V
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Poti : 1k..10kOhm nom.
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : -50..50°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..50°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..100°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..150°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..200°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..300°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pt100 : 0..500°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FeCuNi: 0..250°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FeCuNi: 0..500°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NiCrNi : 0..500°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NiCrNi : 0..750°C
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NiCrNi : 0..1000°C
on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PtRhPt: 0..1500°C

The black fields symbolize the position of the DIP switches

(When voltage and current are injected simultaneously the result is an addition of the input related signals)

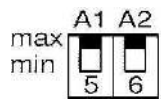
The respective limit values can be adjusted with wheels A1 and A2.

The illuminated scales serve as an operating indicator.

When a limit value relay is not active, the adjustment wheel scale illuminates green.

When a limit value relay is active, the adjustment wheel scale illuminates red.

The switching behaviour of the relays can be determined with DIP switches 5 and 6:



max: The relay is activated when the input signal is equal or above the limit

min: The relay is activated when the input signal is equal or below the limit



For applications with functional safety (SIL2), the device must be configured that the relay is deactivated in the event of an error!

With use of the analog output for SIL2, the evaluation unit must be configured that values > 21 mA and values < 1 mA are recognized as errors.

Sensor break and sensor short-circuit

In the measuring ranges with Pt100 sensors, breaks and short-circuits are monitored.

In this case, the relays are deactivated and the scale lighting blinks red.

The analog output drops to approx. 0mA.

5. Commissioning, maintenance and service

5.1 Commissioning

1. Ensure that the connections have been made as indicated in the connection diagram and the supply voltage is correct.
2. Make sure that the terminals are firmly screwed in.
3. After switching on the power, check to ensure the correct device 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 in the factory.

6. Technical data

Wide-range power supply

Supply Voltage : 20..125 V DC and
20..250V AC, (47..63Hz), max. 1.5W

24 V power supply

Supply voltage : 24 V DC +/-15%, max. 1.5W

Combined data

Rated voltage : 253V AC (acc. to EN60664-1; pollution degree 2,
overvoltage category II)
Test voltage : 3kV AC between input / relay output / supply voltage
Working temperature : -10..60 °C
Storage temperature : -20..80 °C
Air humidity : 10..90 % (no condensation)
EMC : acc. to EN61326-1

Measurement inputs

Voltage : 0/2..10 V, Ri approx. 20 kΩ
Current : 0/4..20 mA, Ri approx. 60 Ω
Pt100 : Linearised, measuring current approx. 1.6 mA
Relays are deactivated if there is a sensor
break or short circuit
Thermocouple : Linearised with reference junction compensation
(optional without internal compensation)
Resistance : Potentiometer (3-wire), rated value 500 Ω - 20 kΩ internal
reference voltage approx. 1.5 V

Relay outputs

Switching voltage : <250 V AC <2 A <500 VA
<125 V DC <0.2 A <25 W
< 30 V DC <2 A <60 W
Switching frequency : max. 5 Hz
Switching hysteresis : approx. 1%

Limit value adjustment: Scale precision: 2 %

Analog output : 4..20 mA, max. burden 120 Ω
(burden failure at 120 Ω max. 0,1%)
No galvanic isolation from the input signal

Input signal	Basic precision actual value output	Temperature deviation *)
0/2..10V	0.2%	0.004%/K
0/4..20mA	0.2%	0.004%/K
Potentiometer	1.0%	0.007%/K
Pt100 -50.. 50°C	0.5%	0.03%/K
Pt100 0.. 50°C	0.9%	0.04%/K
Pt100 0..100°C	0.5%	0.03%/K
Pt100 0..150°C	0.2%	0.02%/K
Pt100 0..200°C	0.4%	0.02%/K
Pt100 0..300°C	0.3%	0.01%/K
Pt100 0..500°C	0.2%	0.007%/K
FeCuNi 0..250°C	1.0%	0.04%/K
FeCuNi 0..500°C	0.5%	0.03%/K
NiCrNi 0..500°C	0.5%	0.04%/K
NiCrNi 0..750°C	0.4%	0.03%/K
NiCrNi 0..1000°C	0.3%	0.02%/K
PtRhPt 0..1500°C	1.0%	0.04%/K

*) Measurement deviation depending on the environmental temperature in the switch cabinet (-10 - +60°C)

Casing

- Dimensions (WxDxH) : 12.5 x 115 x 108 mm
- Material : PA6.6, light grey, flammability class V0 (UL94)
- Weight : 120 g
- Protection rating : IP20
- Screw terminal connection : 0.2..2.5 mm², AWG 24 - 14, removable, coded
- Push-in terminals (Spring terminals) : 0.5..1.5 mm², AWG 25 - 16, double connection (12A between connections), removable, coded
- Power Rail : 8A over the entire bus system (supply via removable terminals 0.2..2.5 mm², AWG 24 - 14)

Functional safety

- Functional safety : SIL2 (parameters in accordance with EN61508 and SN29500)

Device type : B

HFT : 0

Response time

- Standard Mode -> Error : 500ms for temperature measurement
100ms for voltage, current, poti measurement
- Error -> Standard Mode : ca. 2s (self resetting)

24V mains adapter without analog output

- 1-channel version : SFF 92,0%; DC 75,9%; PFH 3,36E-8 /h;
PFD_{avg} 1 year 2 years 5 years
 1,47E-04 2,94E-04 7,36E-04
- 2-channel version : SFF 91,5%; DC 73,0%; PFH 4,12E-8 /h;
PFD_{avg} 1 year 2 years 5 years
 1,80E-04 3,61E-04 9,02E-04

7. Order code

GS

1.	2.	3.	4.

1. Device version	
125L	Supply voltage 24V DC +/-15%
125LP	Supply voltage 24V DC +/-15% with mounting rail bus connection *)
125M	Wide-range power supply 20..125VDC / 20..253V AC
2. Limit value contacts	
1	1 Relay (changeover contact)
2	2 Relays (universal circuit)
3	2 Relays (potential-free NO contacts)
3. Actual value output	
0	not provided
1	Output 4..20 mA
4. Options	
00	No options
01	Push-in terminals (plug-in)

*) Delivery including matching bus adapter piece, see also page 9

8. 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.

9. Return to manufacturer



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.

10. 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 described in the chapter 'Returns' filled in. We will then arrange for the proper disposal.

11 Imprint

GHM Messtechnik GmbH
Standort Martens, Kiebitzhörn 18, 22885 Barsbüttel, Germany
Managing Director: Günther Oehler
Registered office: Schloßstr. 6, 88453 Erolzheim / Germany
Amtsgericht Ulm, Commercial Register Section B 730462

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12. Certificate of conformity

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

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

Dokument-Nr. / Monat.Jahr: **3045 / 04.2016**
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: **GS125L / GS125LP / GS125M**
Product identifier:

Produktbeschreibung: **Grenzwertschalter**
Product description: **Limit switch**

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 60664-1:2007	Allgemeine Isolationsanforderungen / General isolating requirements
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, 18. April 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.