

Modular Housings for Hazardous Areas

Knick >

For transmission of 0(4) ... 20-mA signals from hazardous areas or supply of intrinsically safe 2-wire transmitters.

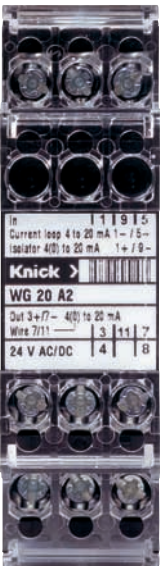
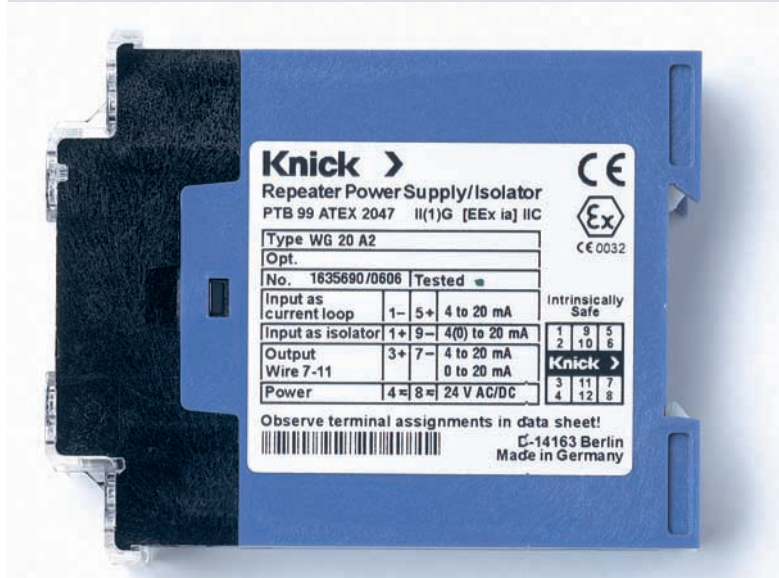
The Task

The WG 20 power supply/isolator is used to supply intrinsically safe 2-wire transmitters. It supplies the transmitter with power and transmits the measurement signal to the output with high accuracy.

The Advantages

The WG 20 provides Safe Isolation and high insulation from the input to the output and to the power supply.

WG 20



The Technology

An additional measurement current input allows use as a highly accurate standard-signal isolator in hazardous areas.

High supply voltage, good hazardous area ratings and the simple LiveZero (4...20 mA) / Dead Zero (0...20 mA) switching allow universal applications.

The WG 20 achieves an extraordinarily high transmission accuracy for hazardous-area applications.

The control range of the measuring circuit extends to the negative values and allows strictly linear transmission also in the zero range.

The encapsulation technique allows maximum operating safety, long-time stability, and disruptive strength even under extreme conditions.

Warranty
5 years!

Defects occurring within 5 years from delivery are remedied free of charge at our works (carriage and insurance paid by sender).

Repeater Power Supplies

Isolation Amplifiers
Transmitters

Indicators

Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



Knick >

■ The Facts

Universal use for 2-wire transmitters or as standard-signal isolators

Low stockkeeping costs with many application possibilities

Safe Isolation according to EN 61140

Protection of maintenance staff and subsequent devices against non-permitted high voltages

3-port isolation

Protection against incorrect measurements or damage to the equipment due to parasitic voltages

High transmission accuracy

Exact transmission of measured values

Explosion protection according to ATEX

Trouble-free use in hazardous areas

Output 0 ... 20 mA or 4 ... 20 mA, switchable

Universal adaptation to the following devices

Measuring circuit with linear zero crossing

No transmission loss in the zero range

Modular housing 22.5 mm

Straightforward installation due to compact design

5-year warranty



■ Product Line

Devices

WG 20

Power supply

24 V AC/DC

Order No.

WG 20 A2

Modular Housings for Hazardous Areas

WG 20

■ Specifications

Operation as a repeater power supply

Input (current loop)	4 ... 20 mA, intrinsically safe
Output	4 ... 20 mA/0 ... 20 mA, switchable ¹⁾
Current loop	Intrinsically safe supply voltage 20 V, constant for 0 ... 22 mA, floating, resistant to continuous short-circuit, current limited to 30 mA, residual ripple < 10 mV _{pp}

Operation as isolation amplifier

Input ²⁾	0 ... 20 mA, intrinsically safe	4 ... 20 mA, intrinsically safe
Output	0 ... 20 mA	4 ... 20 mA/0 ... 20 mA, switchable ¹⁾
Overload capacity (at input)	≤ 300 mA, limited by diode ≤ 1 V, 13 ohms	
Input voltage drop	≤ 300 mV	

Output data

Load	≤ 12 V
Offset	< 10 μA
Residual ripple at output	≤ 10 mV _{pp}

Transmission behavior

Transmission error (at output)	0.1% meas. val.
Cutoff frequency	1 kHz, -3 dB
Temperature coefficient (at output)	≤ 1 μA/K (reference temperature 23 °C)

Power supply

Power supply	24 V AC/DC AC -15 % +10 %, 48 ... 62 Hz, approx. 3.3 VA	DC -15% +20%, approx. 2.2 W
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1) Additional error at output 10 μA

2) Transmission of negative signals up to approx. 3% full scale

Specifications (continued)

Isolation

Galvanic isolation	3-port isolation between input, output and power supply
Test voltage	4 kV AC (current loop, input / output / power supply)
Working voltages (basic insulation)	1000 V AC/DC current loop, input against output and power supply 800 V AC/DC output against power supply with overvoltage category II and pollution degree 2 according to EN 61010-1. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. For hazardous area applications the maximum working voltage is 250 V.
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with EN 61010-1. Working voltages with overvoltage category II and pollution degree 2: up to up to 600 V AC/DC across current loop, input, and output / power supply, as well as 250 V AC/DC across output and power supply. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. For hazardous area applications the maximum working voltage is 250 V.

Standards and approvals

Explosion protection	II (1) G [EEx ia] IIC current loop, input intrinsically safe, PTB 99 ATEX 2047, for further details see certificates of conformity at our website: www.knick.de
EMC	89/336/EEC directive ³⁾

Other data

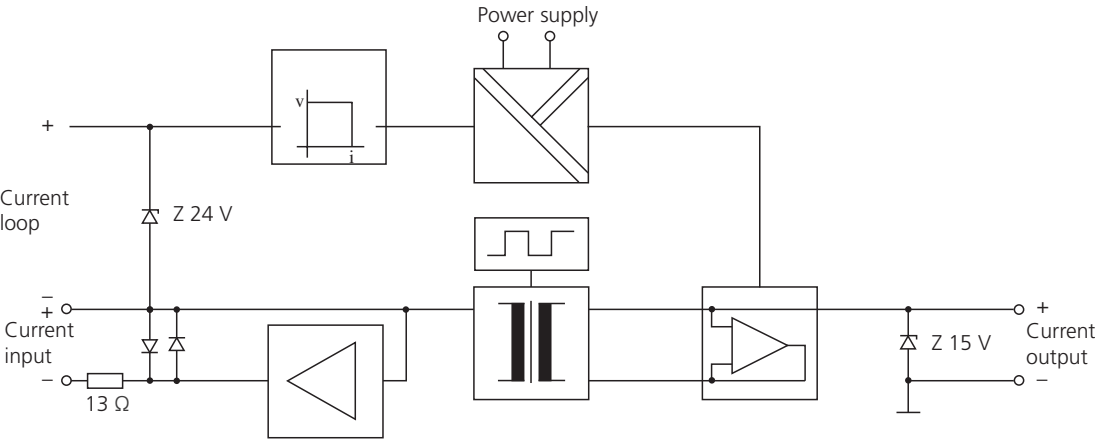
Ambient temperature	Operation: -10 ... +60 °C Transport and storage: -30 ... +80 °C
Design	Modular housing, width 22.5 mm, screw terminals See dimension drawings for further measurements
Ingress protection	Housing IP 40, terminals IP 20
Mounting	With snap-on mounting for 35 mm top hat rail according to EN50022 or M4 screw mounting, see dimension drawings for conductor cross section
Weight	Approx. 250 g

³⁾ Deviations are possible while there is interference

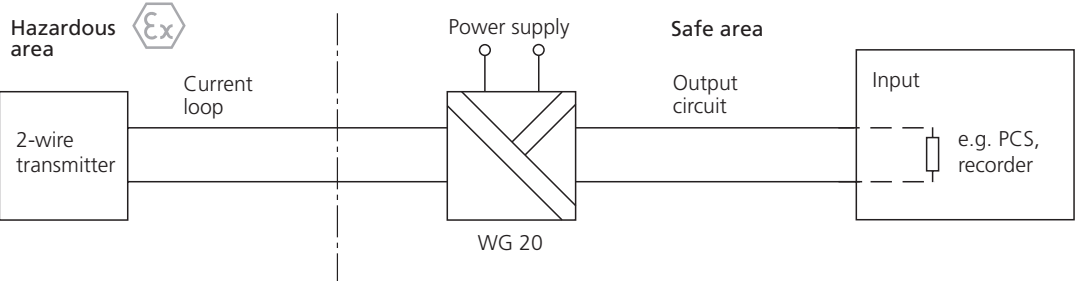
Modular Housings for Hazardous Areas

WG 20

■ **Block Diagram**



■ **Application Example**



Repeater Power Supplies

Isolation Amplifiers
Transmitters

Indicators

Process Analytics

Portable Meters

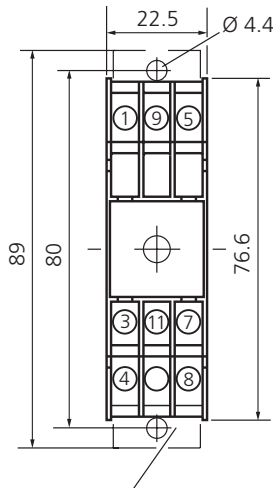
Laboratory Meters

Sensors

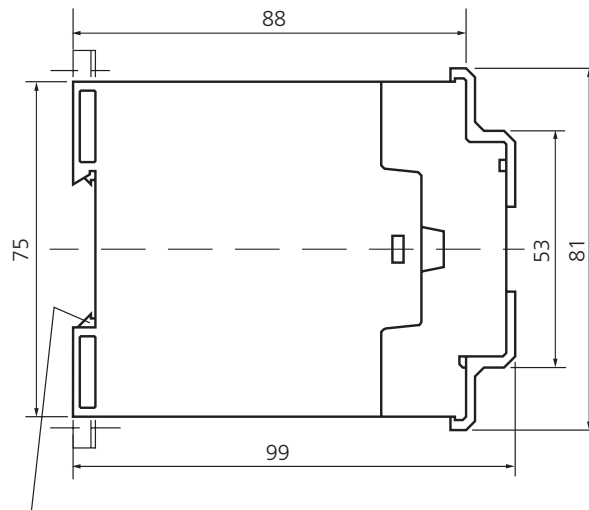
Fittings

Knick 

■ Dimension Drawings and Terminal Assignments



Screw mounting with extending lugs



Snap-on mounting for 35 mm top-hat rail (EN 50022)

- 1 Current loop -;
Input +
- 5 Current loop +
Input -
- 3 Output +
- 7 Output -; jumper
- 11 Jumper (for output
0 ... 20 mA: jumper 7-11)
- 4 Power supply ≈
- 8 Power supply ≈

M3x8 connecting screws with self-releasing clamping pieces,
max. conductor cross-section 2x.1.5 mm² solid
or 2x 1.0 mm² stranded wire with ferrule

All dimensions in mm!

Modular Housings for Hazardous Areas

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WG 21



For supply of intrinsically safe 2-wire transmitters and SMART transmitters.

The Task

The WG 21 repeater power supply is used to supply intrinsically safe 2-wire transmitters. It supplies the transmitter with power and transmits the measurement signal to the output galvanically isolated and with high accuracy.

In addition to the analog signal, the WG 21 also optionally transmits data protocols for SMART transmitters (HART®). It allows bidirectional communication with the field device from every point of the cabling.



The Advantages

The WG 21 provides Safe Isolation and high insulation between the input, output, and power supply.

The Technology

The high supply voltage, the good hazardous area ratings and the broad-range power supply allow universal use. Cables 1400 m in length can therefore be used without any problems.

Thanks to a new transformer transmission technique, the WG 21 achieves an extraordinarily high transmission accuracy for hazardous-area applications.

The encapsulation provides maximum operating safety, long-term stability, and disruptive strength even under extreme ambient conditions.



Repeater Power Supplies

Isolation Amplifiers
Transmitters

Indicators

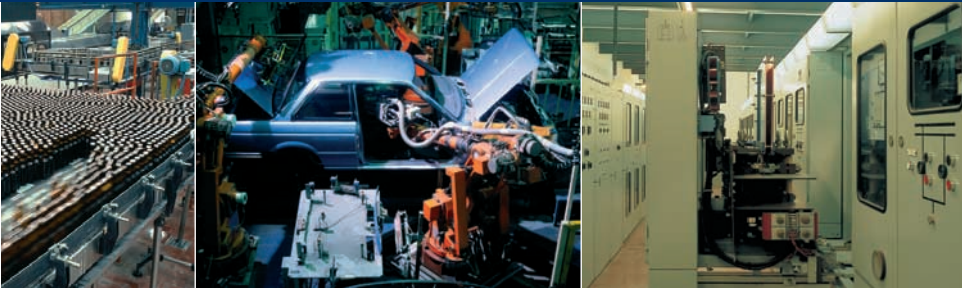
Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



Knick >

■ The Facts

SMART transmission

(Optional) bidirectional point-to-point transmission of digital data according to HART® specification

High supply voltage and good hazardous area ratings

Universal use

Broad-range power supply

Just 2 versions for all mains voltages

Safe Isolation according to EN 61140

Protection of maintenance staff and subsequent devices against non-permitted high voltages

3-port isolation

Protection against incorrect measurements or damage to the equipment due to parasitic voltages

High transmission accuracy

Exact transmission of measured values

Explosion protection according to ATEX

Trouble-free use in hazardous areas

Modular housing 22.5 mm

Straightforward installation due to compact design

5-year warranty

HART® is a registered trademark of the HART Communication Foundation

Warranty
5 years!

Defects occurring within 5 years from delivery are remedied free of charge at our works (carriage and insurance paid by sender).



Modular Housings for Hazardous Areas

WG 21

■ Product Line

Devices	Order No.
WG 21	WG 21 A7
Power supply	
90 ... 253 V AC	
24 V AC/DC	336
Options	
Transmission of data protocols for SMART transmitters (HART®)	470

■ Specifications

Input data

Current loop Intrinsicly safe supply voltage ≥ 18 V, constant for 0 ... 22 mA, floating, current limited to approx. 30 mA; residual ripple 10 mV

Output data

Output 4 ... 20 mA¹⁾

Load ≤ 13 V

Offset < 20 μ A

Residual ripple at output < 10 mV

Transmission behavior

Transmission error 0.2 % meas. val.

Response time < 10 ms

Temperature coefficient < 0.5 μ A/K + 0.005 %/K meas. val. (average TC), (reference temperature 23 °C)

Communication (Option 470) Bidirectional transmission of FSK signals according to the HART® specification between output and current loop

Power supply

Power supply 90 ... 253 V AC, 48 ... 62 Hz, approx. 3 VA

Option 336: 24 V AC/DC AC: -15 % +10 %, 48 ... 500 Hz, approx. 3 VA
DC: -15 % +20%, approx. 2 W

1) Linear transmission of 3.6 ... 22 mA

Specifications (continued)

Isolation

Galvanic isolation	3-port isolation between input, output and power supply
Test voltage	4 kV AC (current loop against output and power supply) 3 kV AC (power supply against output)
Working voltages (basic insulation)	1000 V AC/DC current loop against output and power supply, 600 V AC/DC output against power supply with overvoltage category II and pollution degree 2 according to EN 61010-1. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. Permitted working voltage for other overvoltage categories and pollution degrees on request. For hazardous area applications the maximum working voltage is 250 V.
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with EN 61010-1. 600 V AC/DC working voltage with overvoltage category II and pollution degree 2, 300 V AC/DC current loop against output and power supply, output against power supply. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.

Standards and approvals

Explosion protection	II (1) G [EEx ia] IIC PTB 01 ATEX 2059 current loop intrinsically safe For further details see certificates of conformity at our website: www.knick.de
EMC ²⁾	89/336/EEC directive, EN 61326, NAMUR NE 21

Other data

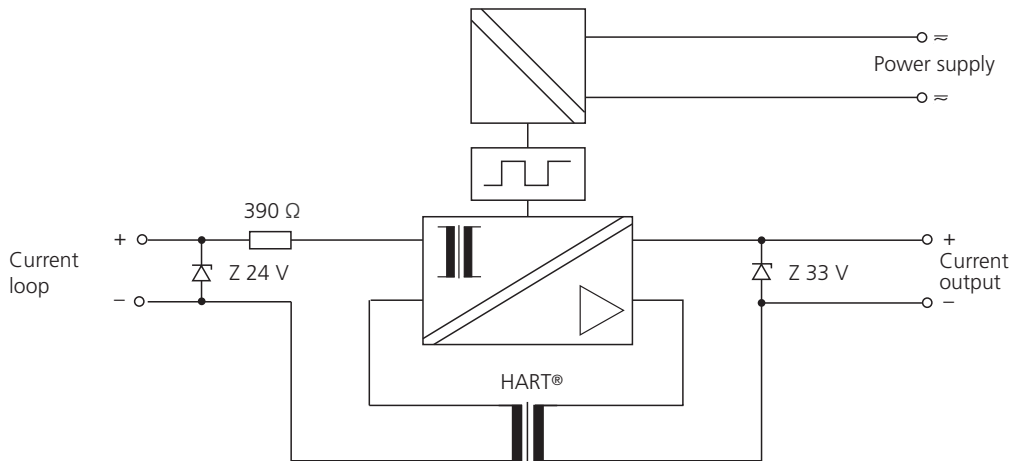
Ambient temperature	Operation: -10 ... +60 °C Transport and storage: -30 ... +80 °C
Design	Modular housing, width 22.5 mm, screw terminals See dimension drawings for further measurements
Ingress protection	Housing IP 40, terminals IP 20
Mounting	With snap-on mounting for 35 mm top hat rail according to EN 50022 See dimension drawings for conductor cross section
Weight	Approx. 250 g

²⁾ Slight transmission errors are possible while there is interference

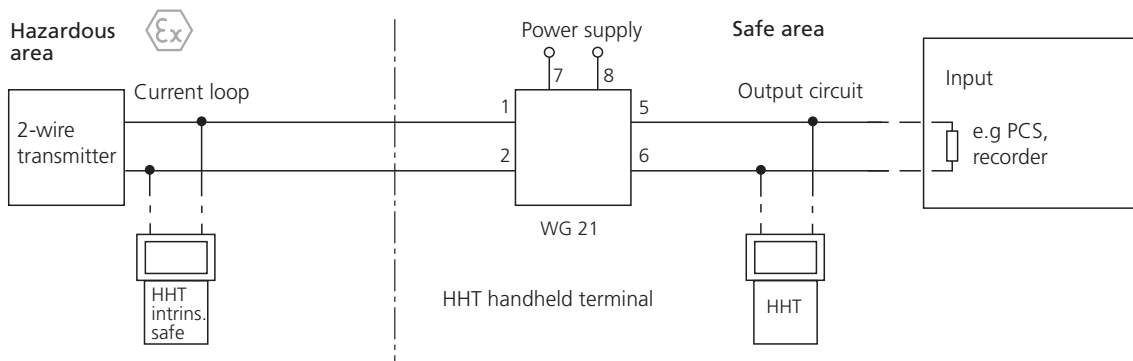
Modular Housings for Hazardous Areas

WG 21

■ Block Diagram



■ Application Example



HART® communication between transmitter and HHT at intrinsically safe current loop.

The communication signals are also transmitted to the non-intrinsically safe output circuit. A HART® resistor of 390 Ω is integrated in the WG 21.

HART® communication between transmitter and PCS, HHT at non-intrinsically safe output circuit.

The communication signals are transmitted bidirectionally via the WG 21. A minimum load resistance of 230 Ω is required. It should be added if necessary.

Repeater Power Supplies

Isolation Amplifiers
Transmitters

Indicators

Process Analytics

Portable Meters

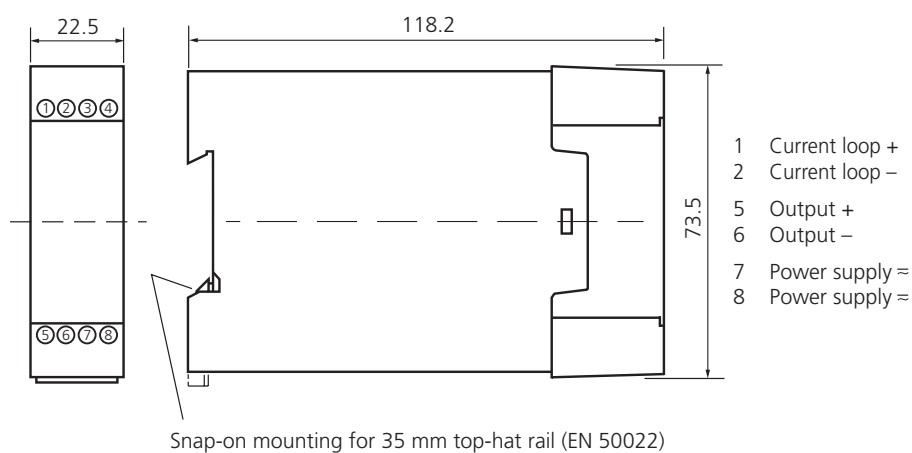
Laboratory Meters

Sensors

Fittings

Knick 

■ Dimension Drawings and Terminal Assignments



Captive M3x8 clamping screws, box terminals with self-releasing wire protection

Max. conductor cross-section 1 x 4 mm² solid
1 x 2.5 mm² stranded wire with ferrule
2 x 1.5 mm² stranded wire with ferrule

Installation, commissioning, and maintenance may only be carried out by trained personnel!

All dimensions in mm!

Modular Housings for Hazardous Areas

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WG 25



For supply of intrinsically safe 2-wire transmitters and SMART transmitters.

The Task

The passive WG 25 repeater power supply is loop-powered. It is used for galvanic hazardous area isolation of a 2-wire supply line and transmits both 4 ... 20 mA and HART® signals in each direction. With a voltage drop of just 4.2 V, the WG 25 uses the supply optimally so that all common 2-wire transmitters can be connected.

The Advantages

Compared with active repeater power supplies, it has considerable price and reliability advantages.

For example, only a central, safe-area power supply that does not even need Safe Isolation is required even for multi-channel systems.

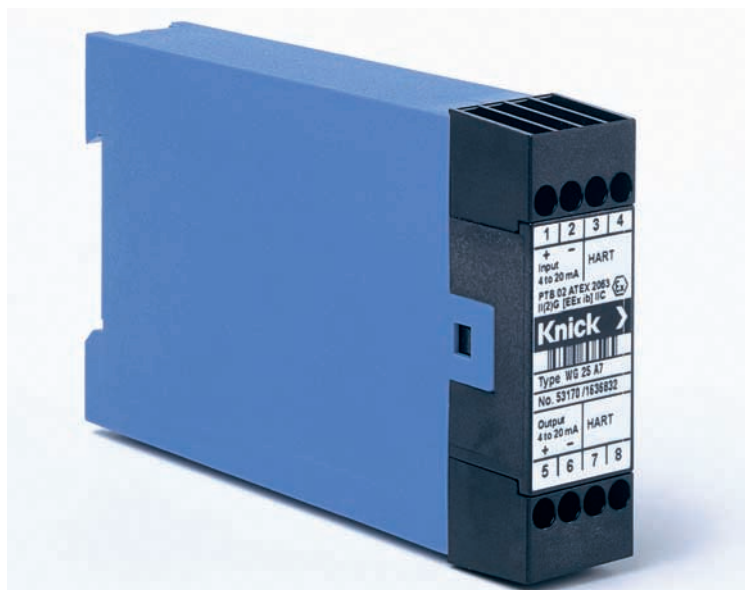
- Extremely high reliability, MTTF of 300 years
- Safe Isolation, transient protection
- 10 kV test voltage (optional)
- High electromagnetic compatibility
- Extremely low residual ripple and common-mode interference
- Excellent pulse formation
- HART® transmission
- Hazardous-/safe-area isolation

The Technology

Using Knick TransShield® technology, the WG 25 has specifications that have not yet been achieved by passive repeater power supplies:

**Warranty
5 years!**

Defects occurring within 5 years from delivery are remedied free of charge at our works (carriage and insurance paid by sender).



Loop-Powered Supplies

Isolation Amplifiers
Transmitters

Indicators

Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



Knick >

■ The Facts

Low-cost

Good price due to omission of integrated power supply

No mains supply required

Cost saving due to lower wiring requirement, no mains influences

Low power loss

No unnecessary heating in enclosure

Safe Isolation according to EN 61140

Protection of maintenance staff and subsequent devices against non-permitted high voltages

HART® transmission

Bidirectional point-to-point transmission of digital data according to HART® specification

EMC tested

RFI suppressed and surge proof, reliable operation even with electromagnetic interference

Maximum reliability

No maintenance work, therefore the related costs are not incurred

5-year warranty

HART® is a registered trademark of the HART Communication Foundation



Modular Housings for Hazardous Areas

WG 25

■ Product Line

Devices	Order No.
WG 25	WG 25 A7
Power supply	
None, supply from output signal	
Options	
Increased test voltage 10 kV AC	471

■ Specifications

Input data

Input (current loop)	4 ... 20 mA (transmission up to 22 mA possible), intrinsically safe
Supply voltage	≥ 17 V, short-circuit-proof, see diagram on page 244
Operating current	< 1 mA
Input short-circuit current	≤ 28 mA
Voltage drop	< 4.2 V at 20 mA and supply ≤ 20 V, see diagram on page 244

Output data

Output	4 ... 20 mA, 1:1 transmission (22 mA)
Overload	50 mA, 30 V (corresponds to 600 ohm load)
Offset	< 20 µA
Residual ripple V_{rms}	< 1.5 mV/mA

Transmission behavior

Transmission error	0.2 % meas. val.
Supply voltage influence	< 15 µA/V
HART® attenuation	< 10 dB

Specifications (continued)

Isolation

Test voltage	4.4 kV AC 10 kV AC with option 471
Working voltages (basic insulation)	1000 V AC/DC with overvoltage category II and pollution degree 2 according to EN 61010-1. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. Permissible working voltage for other overvoltage categories and pollution degrees on request. For hazardous area applications the maximum working voltage is 250 V.
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with EN 61010-1. Working voltage up to 600 V AC/DC with overvoltage category II and pollution degree 2. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks. For hazardous area applications the maximum working voltage is 250 V.

Standards and approvals

Explosion protection	II (2) G [EEx ib] IIC PTB 02 ATEX 2063 For further details see certificates of conformity at our website: www.knick.de
EMC	89/336/EEC directive, EN 61326, NAMUR NE 21

Other data

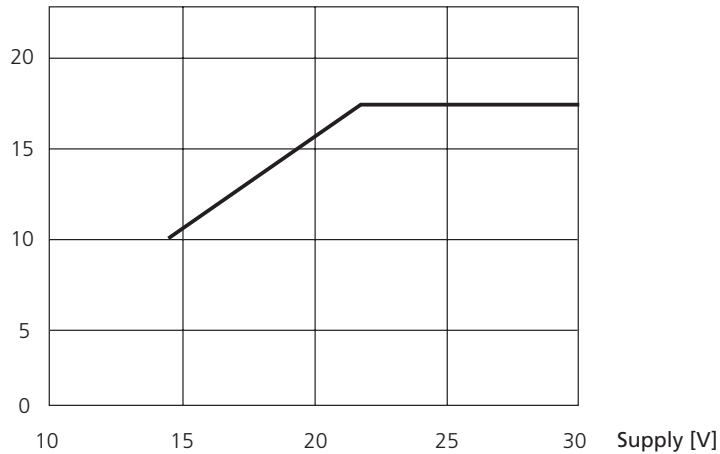
Ambient temperature	Operation: -10 ... +50 °C Transport and storage: -30 ... +80 °C
Design	Modular housing, width 22.5 mm, screw terminals See dimension drawings for further measurements
Ingress protection	Housing IP 40, terminals IP 20
Mounting	With snap-on mounting for 35 mm top hat rail according to EN 50022 See dimension drawings for conductor cross section
Weight	Approx. 120 g

Modular Housings for Hazardous Areas

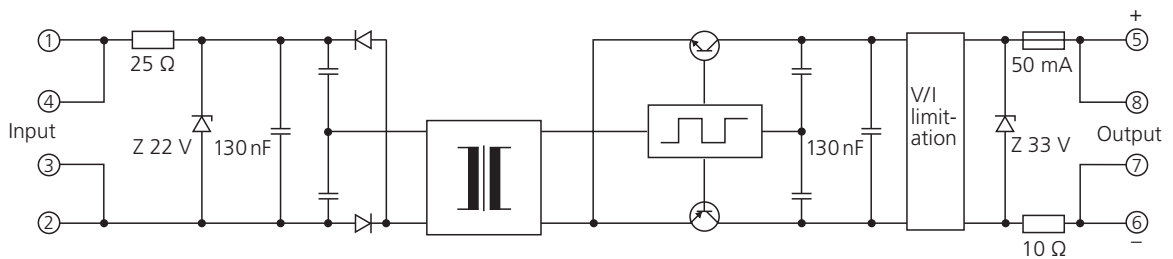
WG 25

Supply Voltage versus Supply

Supply voltage at 2-wire transmitter [V]

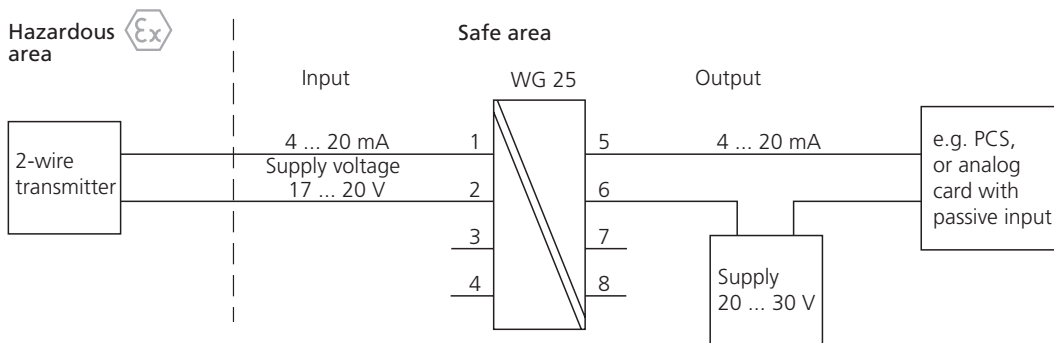


Block Diagram



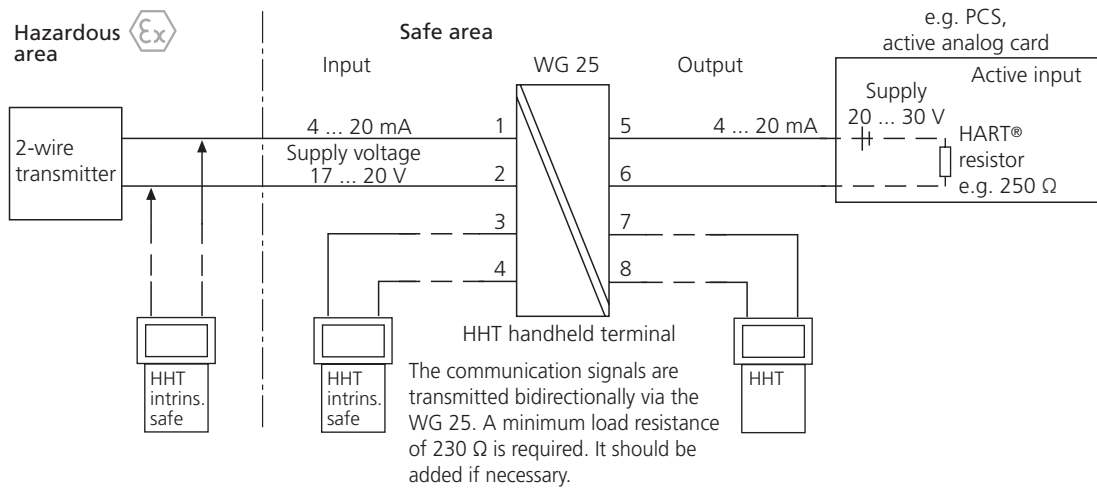
Application Examples

Without HART® communication

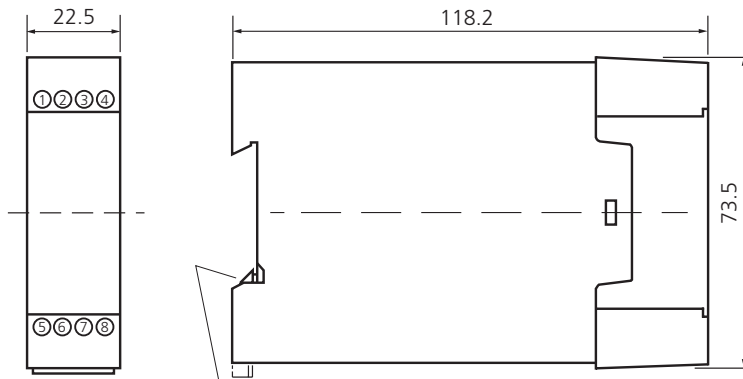


Application Examples (continued)

With HART® communication



■ Dimension Drawings and Terminal Assignments



- | | | |
|---|----------|---|
| 1 | Input + | |
| 2 | Input - | |
| 3 | HHT IS | Captive M3x8 clamping screws, box terminals with self-releasing wire protection |
| 4 | HHT IS | |
| 5 | Output + | Max. conductor cross-section 1 x 4 mm ² solid |
| 6 | Output - | 1 x 2.5 mm ² stranded wire with ferrule |
| 7 | HHT | 2 x 1.5 mm ² stranded wire with ferrule |
| 8 | HHT | |

Installation, commissioning, and maintenance may only be carried out by trained personnel!

All dimensions in mm!