Repeater power supply

Type series WG21

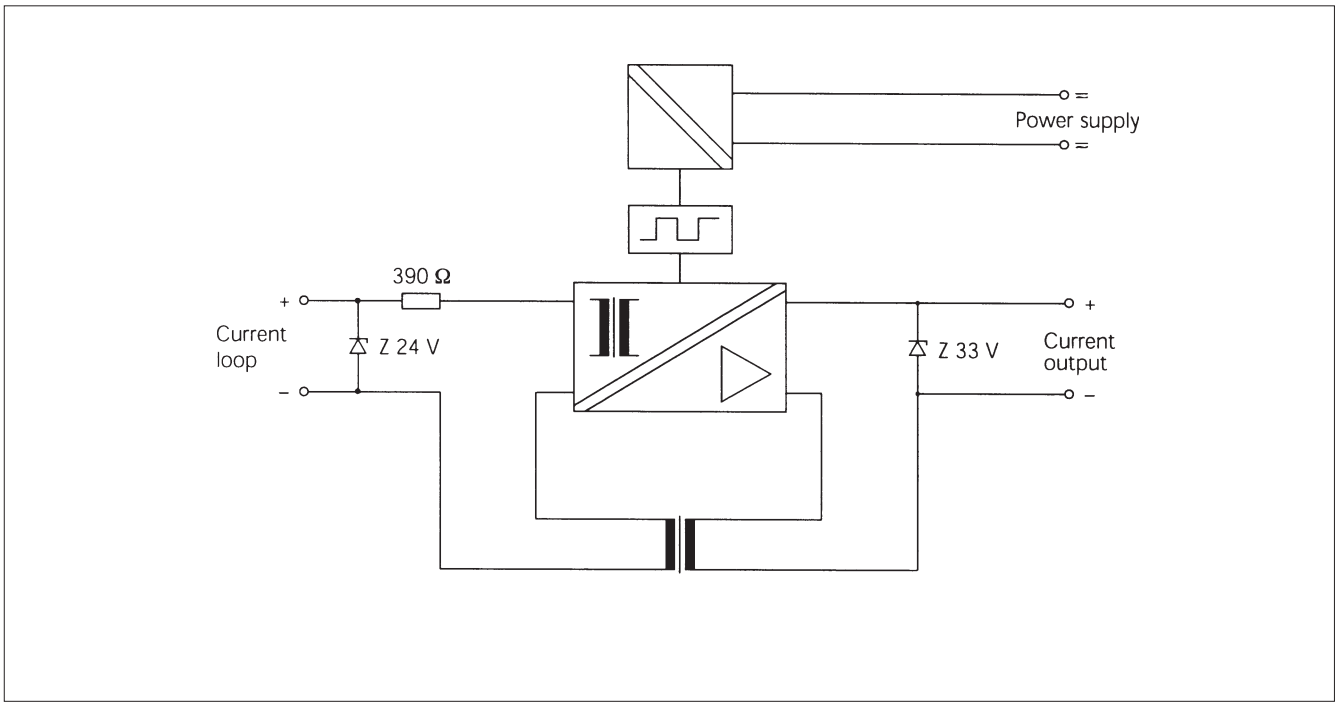
Features

- Compact housing for snap-on rail mounting (22.5 mm wide)
- 3-port isolation
- High transmission accuracy
- Protective separation to VDE 0100 Part 410
- Extended-range supply
- Ex-protection: II(1)G [EEx ia] IIC
- High supply voltage and favorable hazardous-area specifications
- SMART-transmission (HART, optional)

Application

The WG 21 Repeater Power Supply feeds intrinsically safe 2-wire transmitters. It powers the transmitter and delivers the measured signal galvanically isolated and at high accuracy to the output. Optionally the WG 21 also transmits data protocols for SMART transmitters (HART®) besides the analog signal. It allows bidirectional communication with a field unit from each point of the cabling. The WG 21 provides protective separation and high insulation between input, output and power supply. High supply voltage, favorable hazardous-area specifications and the new broad range mains adapter allow for universal applications. Long leads of 1400 m are no problem. Innovative transformer transmission technique provides transmission accuracy which is extraordinary high for hazardous area applications. New vacuum encapsulation technology offers optimum reliability, long-term stability and disruptive strength even under extreme ambient conditions.

Circuit diagram



Techn. Data

Construction
Compact housing A7, polycarbonate, with snap-on mounting for 35 mm top-hat rail to EN 50022,
protection: IP 40,
terminals: IP 20
width: 22.5 mm

Current loop
Intrinsically safe power supply ≥ 18 V, constant for 0...22 mA, floating,
current limited to 30 mA; ripple <10 mV_{pp}

Output
4 ... 20 mA
linear transmission from 3.6 to 22 mA

Load
≤ 13 V

Output ripple
< 10 mV_{pp}

Transmission error (at output)
< 20 µA + 2 · 10^{-3} of meas. value

Temperature coefficient (at output)
< 0.5 µA/K +50 ppm/K of meas. value (average TC)

Response time
< 10 ms

Communication (Option 470)
bidirectional transmission of FSK signals between output and current loop according to HART® specifications

Chopper frequency
approx. 100 kHz

Explosion protection
⟨Ex⟩ II(1)G [EEx ia] IIC
Certificate of Conformity
PTB 01 ATEX 2059
current loop intrinsically safe

Test voltage
4 kV AC (current loop against output and power supply)
3 kV AC (power supply against output)

Protection against electrical shock
reinforced insulation to EN 61010-1 and protective separation to VDE 0100 Part 410 as defined in VDE 0106 Part 101

EMC
to EN 50081-1 and EN 50082-2

Ambient temperature
Operation –10 ... +60 ºC
transport and storage –30 ... +80 ºC

Power Supply
90 ... 253 V AC, 48 ... 62 Hz, approx. 3 VA
Opt. 336: 24 V AC /DC
AC: –15 % +10 %, 48 to 500 Hz, approx. 3 VA
DC: –15 % +20 %, approx. 2 W

Weight
approx. 250 g

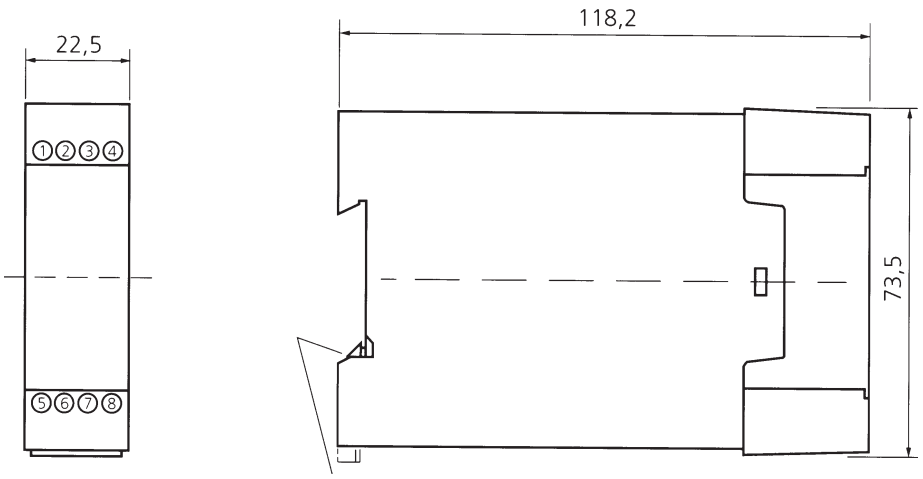
Permissible working voltages

	Overvoltage category / pollution degree	Current loop against output and power supply	Output against power supply
for basis insulation to EN 61010-1 or DIN VDE 0110 Part 1	II / degree 2	1 kV ≅; 2,2 kV~ [1]; 3,1 kV– [1]	600 V ≅
	II / degree 3	630 V ≅	300 V ≅
	III / degree 3	600 V ≅	300 V ≅
reinforced insulation to EN 61 010-1 and protective separation to VDE 0100 Part 410 as defined in VDE 0106 Part 101	II / degree 2	600 V ≅	300 V ≅
	III / degree 2	300 V ≅	150 V ≅

[1]) for circuits type 1 to EN 61 010-1, Table D.13

For applications with high working voltages take measures to prevent accidental contact and make sure that there is sufficient distance to adjacent instruments or sufficient insulation between them.
Permissible working voltages for other overvoltage categories and pollution degrees on request.
Max. permissible working voltage for application in hazardous area: 250 V

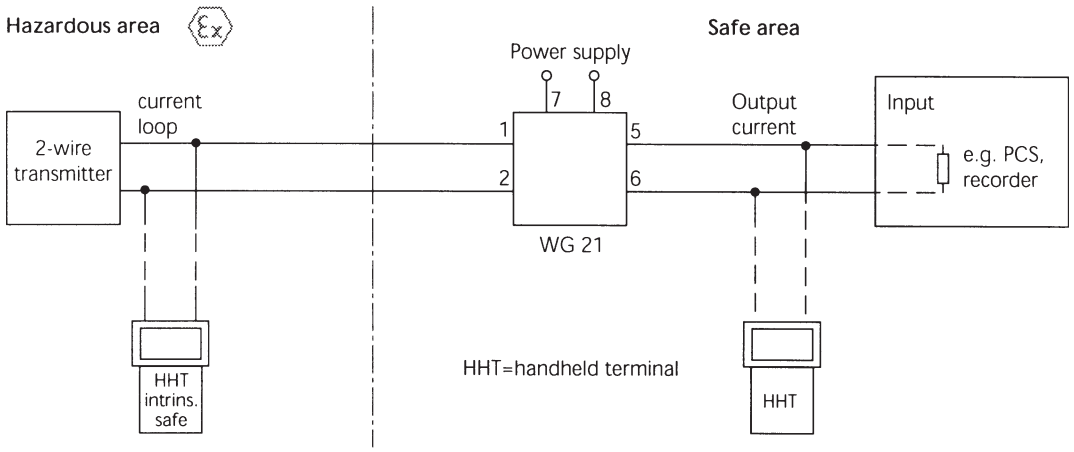
Dimension drawings and terminal assignment



1	current loop +	snap-on mounting on 35 mm
2	current loop –	top-hat rail to EN 50022
5	output +	
6	input –	Captive terminal screws M3x8
		Box terminals with self-releasing wire protection,
7	power supply –	max. conductor size each 1 x 4 mm² solid
8	power supply –	1x2,5 mm² stranded with ferrule
		2x1,5 mm² stranded with ferrule

Installation, commissioning and maintenance may only be performed by electricians!

Typical applications



HART communication between transmitter and HHT on the intrinsically safe input.

The signals are also transmitted to the not-intrinsically safe output. A HART resistor of 390 Ω is integrated.

HART communication between transmitter and PCS, HHT on the intrinsically safe output.

The WG 21 transmits the communication signals in both directions. A minimum load resistance of 230 W is required. (If not provided, a corresponding resistor must be inserted.)

Order Details - please give additional specifications for models not listed-

Repeater power supply WG 21		**WG21A7**		
options				
power supply	· 24 V AC/DC		**336**	
transmission of data protocols for SMART transmitters (HART)				**470**
order code (example):		**WG21A7**		

Certificate of Conformity

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

EC-TYPE-EXAMINATION CERTIFICATE
(Translation)

(1)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 01 ATEX 2059

(4) Equipment: Repeater power supply, type WG 21 A7 Opt. ...

(5) Manufacturer: Knick Elektronische Meßgeräte GmbH & Co.

(6) Address: Beuckestraße 22, 14163 Berlin, Deutschland

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 01-21018.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2 **EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

Ex II (1) G [EEx ia] IIC

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, July 19, 2001

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(13) **SCHEDULE**

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2059**

(15) Description of equipment

The repeater power supply, type WG 21 A7 Opt. ... is mainly used for the supply of intrinsically safe 2-wire measuring transducers and for the transmission of a measuring current into the electrically isolated output circuit.
Optionally data protocols for SMART-transmitters are transmitted bi-directionally between the supply measuring circuit and the output circuit.

The apparatus will be installed outside the hazardous area.

The maximum permissible ambient temperature is 60 °C.

Electrical data

Auxiliary power circuit (terminals 7, 8) ..... 90 ... 253 V AC, approx. 5 VA
24 V AC -15 % +10 %, approx. 3.5 VA
24 V DC -15 % +20 %, approx. 2.5 W
U_m = 253 V

Supply measuring circuit (terminals 1, 2) ..... type of protection Intrinsic Safety EEx ia IIC resp. EEx ib IIC

Maximum values:
U_o = 23.1 V
I_o = 82 mA
P_o = 643 mW
R_i = 386 Ω

trapezoidal characteristic

C_i negligibly low
L_i negligibly low

The correlation between type of protection and maximum permissible values for the external capacitances and inductances is shown in the following table:

	EEx ia IIC	EEx ia IIB	EEx ia IIB
C_o	87 nF	300 nF	200 nF
L_o	0.5 mH	1 mH	5 mH

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PTB

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2059

Output circuit (terminals 5,6)
I = 0 - 20 mA
U = 13 V
U_m = 250 V AC

The intrinsically safe supply measuring circuit is safely electrically isolated from the other non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.

(16) Test report PTB Ex 01-21018

(17) Special conditions for safe use

none

(18) Essential health and safety requirements

will be met by cited standards

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, July 19, 2001

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

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Safety and installation information

Be sure to read and observe the following instructions!

Safety information

Whenever it is likely that the protection has been impaired, the device shall be made inoperative and secured against unintended operation.
The protection is likely to be impaired if, for example:
- the device shows visible damage
- the device fails to perform the intended measurements
- after prolonged storage at temperatures above 80 °C
- after severe transport stresses

Before recommissioning the device, a professional routine test in accordance with EN 61010-1 must be performed. This test should be carried out at our factory.

Installation and commissioning

The Model WG 21 A7 is an associated equipment for operation outside hazardous locations. The intrinsically safe current loop may be led into hazardous locations. Only certified intrinsically safe circuits may be connected to the current loop. Before commissioning it must be established that the intrinsic safety is maintained when connecting the current loop to other equipment, including lines.

Be sure to observe the EC-Type-Examination Certificate and the regulations of EN 60079-14: 1996 and the following.

Assembly / dismantling, installation, operation and maintenance may only be carried out by qualified personnel as defined by the automation industry in compliance with the applicable regulations and the operating instructions. Be sure to observe the technical specifications and input ratings.

Proper use

The Model WG 21 A7 is used for the supply of intrinsically safe 2-wire transmitters.