

## Knick

**For transmission and conversion of impressed signals.**

The DC isolation amplifiers of the IsoAmp® 3000/4000 series transmit and convert impressed 0(4) ... 20 mA or 0 ... 10 V standard signals according to our German patent DBP 34 12 843 with maximum accuracy.

They provide Safe Isolation and high insulation from input to output to power supply.

### The Advantages

The control range extends into the negative values and allows strict linear transmission in the zero range. Compared with conventional unipolar amplifiers, this has a great advantage: The often asymptotic setting of the zero point, for example, when calibrating with a sensor, is ruled out.

The number of transmission errors is unusually low. The reason for this is mainly a negative feedback circuit that is incorporated in the electrical isolation. It has no sensing resistor with 1:1 transmission and just one sensing resistor for current/voltage conversion. Differentiated signal return allows the circuit to remain stable even with strong complex loads.

The components required in conventional concepts for matching amplifiers and resistor networks are omitted. The reliability is accordingly high. The computer-aided production control and final inspection ensure high and

## IsoAmp® 3000/4000



For Safe Isolation according to EN 61140, the required clearance and creepage distances should be taken into consideration.

### The Models

**IsoAmp® 3820** transforms the input current 1:1 into an impressed output current without negative feedback resistors by means of negative-feedback current transformation.

**IsoAmp® 4820** converts the input current 2:1 into an impressed output voltage with just one precision resistor after current transformation.

**IsoAmp® 3310** converts the input voltage 3:1 into an impressed output current with just a precision resistor after voltage transformation.

**IsoAmp® 4310** converts the input voltage 1:1 into an impressed output voltage without negative-feedback resistors after voltage transformation.

constant quality. The full encapsulation guarantees maximum safety and reliability even in extreme conditions.

### The Applications

The devices can be used for many galvanic isolation applications, for example:

- in measuring and control engineering
- for linking measurement signals to different potentials
- for removal of double ground compensation currents
- for isolation of dangerous touch voltages
- for computer interfacing
- for increase of load voltage and decoupled signal transmission

Each Eurocard can be equipped with up to four channels. The 16-mm-high channel design even allows just 4 TE rack width. Therefore 21 cards with 84 channels can be accommodated per 19" rack.

**Warranty  
5 years!**

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

# Isolation Amplifiers for Standard Signals

Isolation Amplifiers  
Transmitters

Indicators

Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



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## ■ The Facts

### 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

### Decoupled

No load effect on the signal source

### Maximum reliability

No maintenance work, therefore the related costs are not incurred

**High accuracy:** No distortion of measurement signal

### Simple live zero/dead zero switching option

Multiple application possibilities due to optional switching of input or output

### 5-year warranty

## ■ Product Line

Devices		Order No.
IsoAmp® 3000/4000	For up to 3 channels	EK 8 <sup>-1)2)</sup>
Eurocards	For up to 4 channels	EK 9 <sup>-1)2)</sup>
Channels for Eurocards	Input: 0 ... 20 mA, output: 0 ... 20 mA Input: 0 ... 20 mA, output: 0 ... 10 V	3820 Mh 4820 Mh
	Input: 0 ... 10 V, output: 0 ... 20 mA Input: 0 ... 10 V, output: 0 ... 10 V	3310 Mg 4310 Mg

### Power supply

24 V AC/DC

### Options

Input 0 ... 20 mA or 4 ... 20 mA, switchable	250 <sup>3)</sup>
Output 0 ... 20 mA or 4 ... 20 mA, switchable	251 <sup>3)</sup>
INTERMAS front panel, width 25 mm, for EK 8 or EK 9 Eurocard, mounted	174
INTERMAS front panel, width 20 mm, for EK 8 or EK 9 Eurocard, when equipped with 3820 Mh and 4820 Mh only	301

1) Please indicate the required channel configuration when ordering. Any channel combination possible.

2) ±10 V or 20 V unipolar (note power supply!)

3) Options 250 and 251 cannot be combined; additional error at output: ±10 µA, with Model 4820: ±10 mV

## IsoAmp® 3000/4000

### Product Line (continued)

#### Accessories

Inspection Certificate 3.1 B according to EN 10204	ZU 0267
Inspection Certificate 3.1 B according to EN 10204, with description and results of inspections performed	ZU 0268

### ■ Selection Aid for Modules and Options

		Output		
		0 ... 20 mA	0 ... 20 mA/ 4 ... 20 mA <sup>4)</sup>	0 ... 10 V
Input	0 ... 20 mA	3820 Mh	3820 Mh Option 251	4820 Mh
	0/4 ... 20 mA <sup>4)</sup>	3820 Mh Option 250	3820 Mh <sup>5)</sup>	4820 Mh Option 250
	0 ... 10 V	3310 Mg	3310 Mg Option 251	4310 Mg

4) Selectable

5) 1:1 transmission

### ■ Specifications

Input data	3820 Mh	4820 Mh	3310 Mg	4310 Mg
Input <sup>6)</sup>	0 ... 20 mA impressed current Option 250: 0/4 ... 20 mA, switchable <sup>7)</sup>		0 ... 10 V	
Input voltage drop	Approx. 100 mV, open output: approx. 750 mV, power fail- ure: approx. 750 mV	Approx. 150 mV, power failure: approx. 750 mV	-	
Input resistance	-		> 5 Mohms	> 2 Mohms
Offset current <sup>8)</sup>	-		< 500 nA ±10 nA/K	< 1 nA ±10 nA/K
Overload	≤ 300 mA Limited to 750 mV by diode		≤ 100 mA Limited to 13 V by suppressor diode	

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

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## Specifications (continued)

Output data	3820 Mh	4820 Mh	3310 Mg	4310 Mg
Output <sup>6)</sup>	0 ... 20 mA, 14 V <sup>9)</sup> Option 251: 0/4 ... 20 mA selectable <sup>7)</sup>	0 ... 10 V, 10 mA	0 ... 20 mA, 10 V Option 251: 0/4 ... 20 mA selectable <sup>7)</sup>	0 ... 10 V, 20 mA
Residual ripple	< 10 mV <sub>pp</sub>			
Transmission error	0.01 % meas. val.	0.1 % meas. val.	0.1 % meas. val.	0.02 % meas. val.
Offset	< 2 µA	< 2 mV	< 5 µA	< 2 mV
Cutoff frequency	5 kHz, -3 dB	10 kHz, -3 dB/ V <sub>out</sub> ≤ 3 V <sub>pp</sub> ; 3 kHz, -3 dB/ V <sub>out</sub> ≤ 10 V <sub>pp</sub>	10 kHz, -3 dB	10 kHz, -3 dB/ V <sub>out</sub> ≤ 3 V <sub>pp</sub> ; 3 kHz, -3 dB/ V <sub>out</sub> ≤ 10 V <sub>pp</sub>
Temperature coefficient <sup>8)</sup>	< 10 nA/K	< 40 µV/K ±0.0025 %/K m. val.	< 100 nA/K ±0.0025 %/K m. val.	< 40 µV/K
<b>Power supply</b>				
Power supply	24 V AC/DC	AC: -15 % +10 %, 48 ... 500 Hz, approx. 1.3 VA DC: -15 % +20%, approx. 0.6 VA		
<b>Isolation</b>				
Galvanic isolation	3-port isolation between input, output and power supply			
Test voltage	4 kV AC (input / output / power supply)			
Working voltages (basic insulation)	According to EN 61010-1			
	<b>Type EK8</b>	Overvoltage category / Perm. pollution degree	Permitted working voltage	
	Each input against all other circuits	II / degree 2 II / degree 3	1000 V DC 660 V DC / 630 V AC	
	Each output against all other circuits	I / degree 1 II / degree 2	1000 V DC 660 V AC/DC	
	Power supply against all other circuits	II / degree 1 III / degree 2	1000 V DC 600 V AC/DC	

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

7) Options 250 and 251 cannot be combined.

8) Reference temperature for TC specifications: 23 °C

## IsoAmp® 3000/4000

### Specifications (continued)

#### Isolation (continued)

Working voltages (basic insulation)	According to EN 61010-1		
	<b>Type EK9</b>	Overvoltage category / Perm. pollution degree	Permitted working voltage
	Each input against all other circuits	II / degree 1 III / degree 2	1000 V DC 600 V AC/DC
	Each output against all other circuits	I / degree 1 II / degree 1	1000 V DC 600 V AC/DC
	Power supply against all other circuits	II / degree 1 II / degree 2	1000 V DC 600 V AC/DC
	Permissible working voltages for other overvoltage categories and pollution degrees and for reinforced insulation/Safe Isolation on request. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.		
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with 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.		

#### Standards and approvals

Surge withstand	5 kV, 1.2/50 µs according to IEC 255-4
EMC	European EMC regulations, 89/336/EEC directive <sup>10)</sup>

#### Other data

Ambient temperature	Operation: -10 ... +70 °C Transport and storage: -30 ... +80 °C
Design	Eurocard 5 TE (opt. 174) / 4 TE (opt. 301)
Pin connector	Type F according to DIN 41612, see also dimension drawings
Socket connector <sup>11)</sup>	Type F according to DIN 41612 (wire-wrap connection), see also dimension drawings
Front plate	Option 174: INTERMAS, SP / K3-n05T, plastic, gray, see also dimension drawings Option 301: INTERMAS, SP / K3-n04T, plastic, gray, see also dimension drawings
Weight	Approx. 60 g – 73 g per channel

10) Deviations are possible while there is interference

11) The socket connector belongs to package contents

# Isolation Amplifiers for Standard Signals



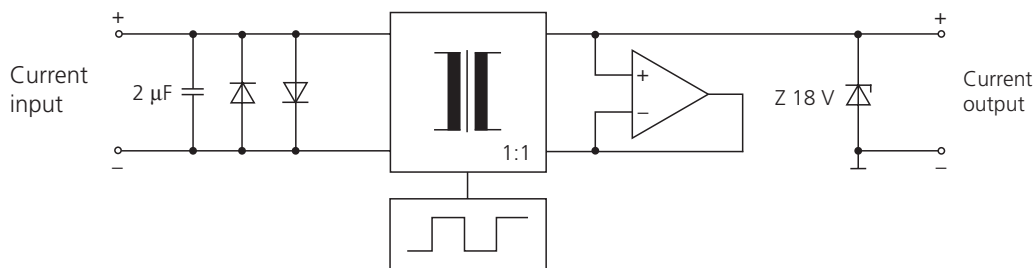
## Terminal Assignments for Options 250 and 251

Model	Option	Input <sup>*)</sup>	Output	Output connection	Jumper (output)
3820	250	0 ... 20 mA	0 ... 20 mA	dz	
		4 ... 20 mA	0 ... 20 mA	dz	db
3820	251	0 ... 20 mA	0 ... 20 mA	dz	
		0 ... 20 mA	4 ... 20 mA	db	
4820	250	0 ... 20 mA	0 ... 10 V	dz	db
		4 ... 20 mA	0 ... 10 V	dz	
3310	251	0 ... 10 V	0 ... 20 mA	dz	
		0 ... 10 V	4 ... 20 mA	db	

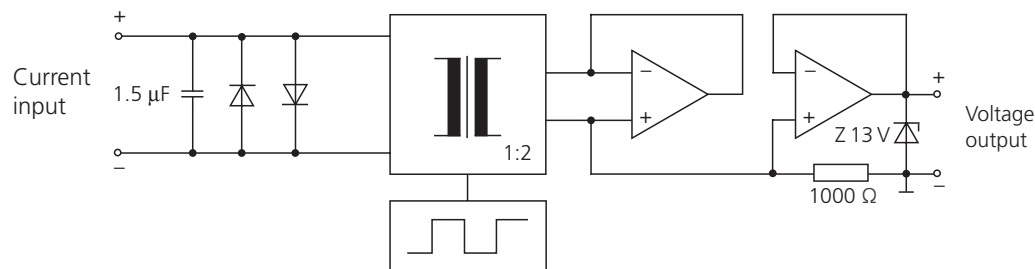
\*) See dimension drawing

## Block Diagrams

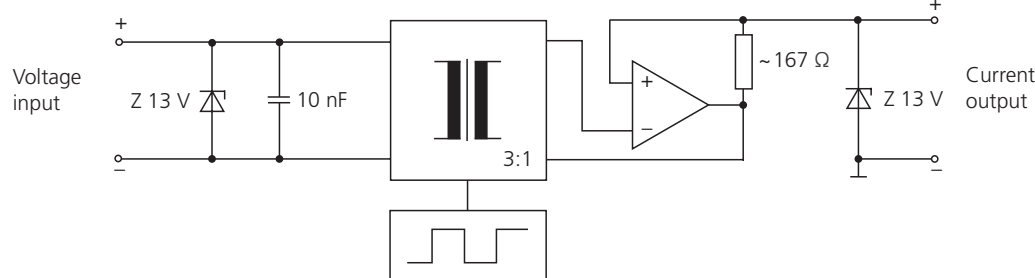
### Model 3820



### Model 4820



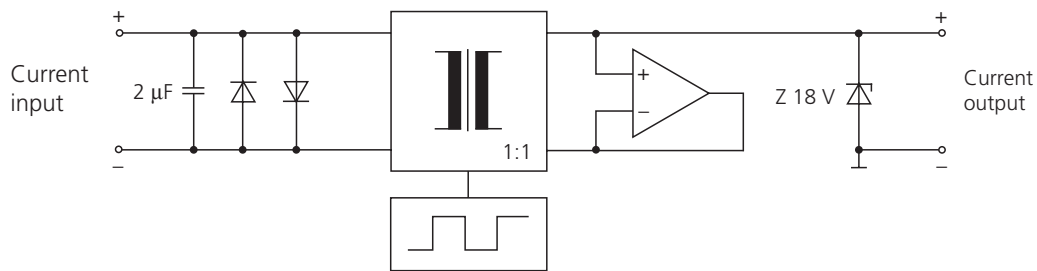
### Model 3310



## IsoAmp® 3000/4000

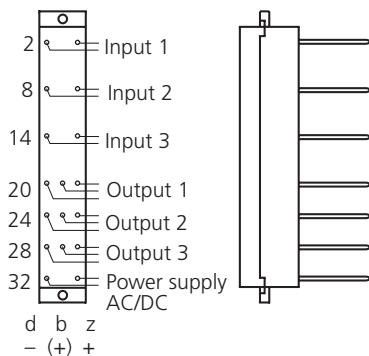
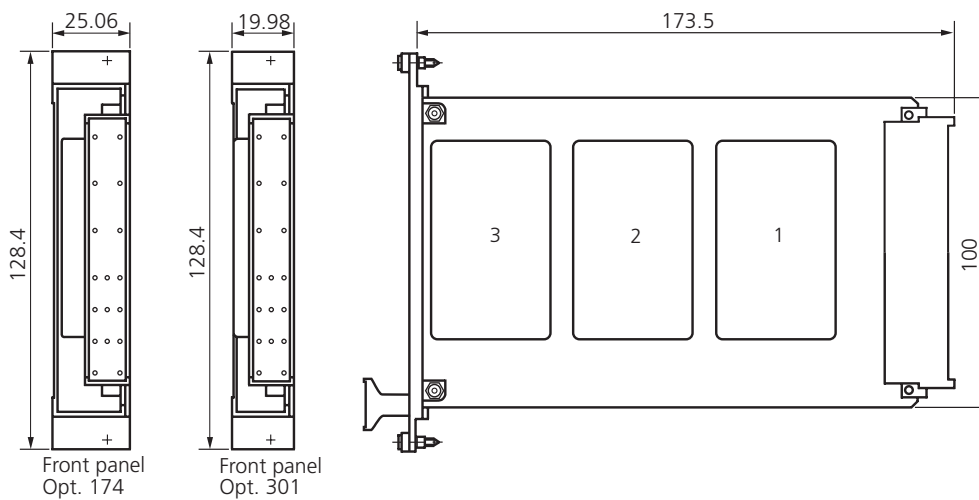
### Block Diagrams (continued)

#### Model 4310



### Dimension Drawings and Pin Assignments

#### For EK 8 Eurocard



Plug-in connection: Type F according to DIN 41612

Front panel Opt. 174: INTERMAS SP/K3-n05T, plastic, gray

Front panel Opt. 301: INTERMAS SP/K3-n04T, plastic, gray

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

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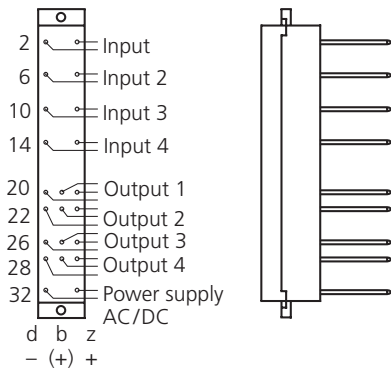
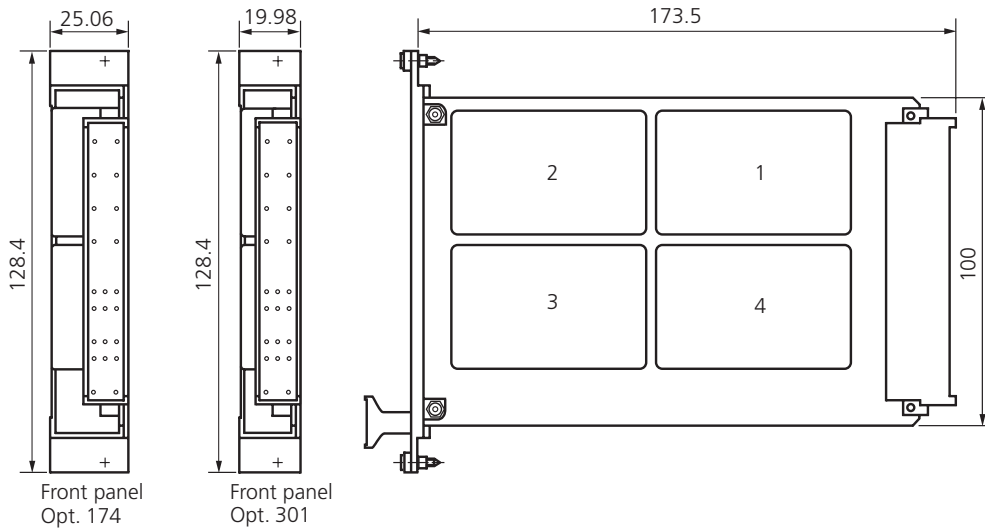
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## Dimension Drawings and Pin Assignments (continued)

### For EK 9 Eurocard



Plug-in connection: Type F according to DIN 41612

Front panel Opt. 174: INTERMAS SP/K3-n05T, plastic, gray

Front panel Opt. 301: INTERMAS SP/K3-n04T, plastic, gray

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All dimensions in mm!