

Analog signal isolators  
**WAVEANALOG PRO** Frequency  
from the WAVESERIES



## Analog signal isolators WAVEANALOG PRO Frequency from the WAVESERIES

Type	Cat. No.
Screw connection WAS4 PRO Freq.	8581180000
Tension clamp connection WAZ4 PRO Freq.	8581190000

Please read these instructions before using the product  
and retain for future information.

## 1. General instructions

**Warning!** The analogue signal isolators of the WAVE<sub>ANALOG</sub> PRO Frequency may only be installed by qualified personnel. Be sure not to connect the unit to power supply before appropriate installation. Do not select ranges during operation, because live parts are exposed during this process. Only use a screwdriver which is properly insulated against the voltage applied to the input when fine adjusting the potentiometers on the front.

Be sure to observe the national regulations for installation and selection of cables.



Appropriate safety measures against electrostatic discharge (ESD) should be taken during assembly and adjustment work on the WAVE<sub>ANALOG</sub> PRO Frequency.

## 2. Application

Analog signal isolators WAVE<sub>ANALOG</sub> PRO Frequency PRO are used for galvanic isolation and conversion of frequency signals.

Input and output signals can be calibrated/switched via DIP switches. It is **not** necessary to adjust the pre-settable measurement ranges.

The output signal is linear to the frequency.

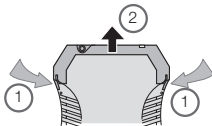
### 3. Configuration

#### 3.1 Equipment

A screwdriver with a width of 2.5 mm is required to adjust the unit and to connect the wires to the terminals.

#### 3.2 Opening the unit

Disconnect the plugs. Disengage the top part of the housing by carefully pressing the latches on both sides (1). Pull out the top part of the housing and the electronics section until they lock (2).



#### 3.3 Settings

Set input and output ranges, minimum input values and measuring span via the DIP switches SW1 and SW2.

Set the input range via the DIP switches (no frequency generator required):

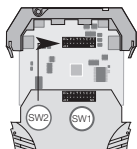
2 cases are to be distinguished:

1. below measurement frequency = 0 Hz

- Select operating mode "0...fmax". S2.3 = 0 and S2.4 = 0
- Set upper measurement frequency via the DIP switches S1 and S2.1, S2.2 (see table).
- Ready!

2. Lower measurement frequency  $\neq$  0 Hz

- First, the lower measurement frequency has to be saved. Select operating mode "save from fmin". S2.3 = 1 and S2.4 = 0



Set upper measurement frequency via the DIP switches S1 and S2.1, S2.2 (see table).

Connect the module to the power supply to save the frequency.

- Select operating mode "fmin...fmax". S2.3 = 0 and S2.4 = 1
- Set upper measurement frequency via the DIP switches S1 and S2.1, S2.2 (see table).
- Ready!

Setting the input range using a frequency generator:

- Select the switch setting for saving the min. frequency  
S2.1=0; S2.2=1; S2.3=1 and S2.4=1
- Apply min. frequency to the module
- Connect the module to the power supply.
- The LED lights up when the input frequency is measured.  
The frequency has been saved when the LED goes out;  
the module can be disconnected from the power supply.
- Repeat the process with the max. frequency: S2.1=1;  
S2.2=0; S2.3=1 and S2.4=1.
- Select special range: S2.1=1; S2.2=1; S2.3=1 and S2.4=1
- Ready!

## Selecting the operating mode

Switch 2		
Operating mode	3	4
0...fmax	0	0
fmin...fmax	0	1
save from fmin	1	0

$$f=(A+B) \times C$$

## Selecting the frequency

Switch 1				
A	1	2	3	4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

## Selecting the frequency

Switch 1				
B	5	6	7	8
0.0	0	0	0	0
0.1	0	0	0	1
0.2	0	0	1	0
0.3	0	0	1	1
0.4	0	1	0	0
0.5	0	1	0	1
0.6	0	1	1	0
0.7	0	1	1	1
0.8	1	0	0	0
0.9	1	0	0	1

## Selecting the frequency

Switch 2		
C	1	2
X1	0	0
X10	0	1
X100	1	0
X1000	1	1

## Selecting the output

Output	Switch 2			
	5	6	7	8
0...10 V	1	0	1	1
0...20 mA	0	0	0	0
4...20 mA	0	1	0	0
0...5 V	1	1	1	1

## Special range (frequency generator is required)

	Switch 2			
	1	2	3	4
Save min. frequency	0	1	1	1
Save max. frequency	1	0	1	1
Select special range	1	1	1	1

### 3.4 Example 1

Input frequency: 0...10.5 kHz

Output: 0...10 V

#### Selecting the operating mode

Switch 2		
Operating mode	3	4
0...fmax	0	0

Set max. frequency

#### Selecting the frequency

Switch 1				
A	1	2	3	4
10	1	0	1	0

#### Selecting the frequency

Switch 1				
B	5	6	7	8
0.5	0	1	0	1

#### Selecting the frequency

Switch 2		
C	1	2
x1000	1	1

#### Selecting the output

Switch 2				
Output	5	6	7	8
0...10 V	1	0	1	1

ready

### 3.5 Example 2

Input frequency: 3,6...810 Hz

Output: 0...20 mA

Set min. frequency

#### Selecting the operating mode

		Switch 2	
Operating mode		3	4
save from fmin		1	0

#### Selecting the frequency

		Switch 1			
A		1	2	3	4
3		0	0	1	1

#### Selecting the frequency

		Switch 1			
B		5	6	7	8
0.6		0	1	1	0

#### Selecting the frequency

		Switch 2	
C		1	2
x1		0	0

The module must be briefly connected to the power supply (5s) in order to save the min. frequency.

Set max. frequency

#### Selecting the operating mode

		Switch 2	
Operating mode		3	4
fmin...fmax		0	1

#### Selecting the frequency

		Switch 1			
A		1	2	3	4
8		1	0	0	0

#### Selecting the frequency

		Switch 1			
B		5	6	7	8
0.1		0	0	0	1

#### Selecting the frequency

		Switch 2	
C		1	2
x100		1	0

#### Selecting the output

		Switch 2			
Output		5	6	7	8
0...20 mA		0	0	0	0

ready

### 3.6 Example 3

Input frequency: 20 kHz...50 kHz

Output: 4...20mA

Special range min. frequency

**Special range  
(frequency generator is required)**

Switch 2				
Operating mode	1	2	3	4
Save min. frequency	0	1	1	1

Special range max. frequency

**Special range  
(frequency generator is required)**

Switch 2				
Operating mode	1	2	3	4
Save max. frequency	1	0	1	1

Selecting the special range

**Special range  
(frequency generator is required)**

Switch 2				
Operating mode	1	2	3	4
Special range	1	1	1	1

- Apply min. frequency to the module.
- Connect the module to the power supply.
- The LED lights up when the min. input frequency is measured. The frequency has been saved when the LED blinks; the module can be disconnected from the power supply.

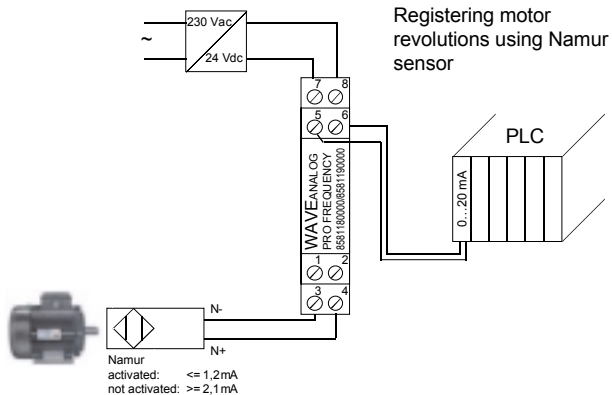
- Apply max. frequency to the module.
- Connect the module to the power supply.
- The LED lights up when the max. input frequency is measured. The frequency has been saved when the LED blinks; the module can be disconnected from the power supply.

### Selecting the output

Switch 2				
Output	5	6	7	8
4...20 mA	0	1	0	0

ready

### 3.7 Application



## 4. Mounting

The analogue signal isolators are mounted on standard TS 35 rails.

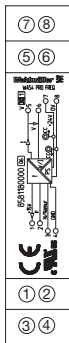
## 5. Electrical connection

### Terminal assignments

- 1 +15 V power supply for sensor
- 2 Input PNP
- 3 Input NPN / Namur
- 4 Input GND
- 5 Output (0...10 V; 0/4...20 mA)
- 6 Output GND
- 7 Supply voltage + 24 Vdc (cross-connected)
- 8 Power supply GND (cross-connected)

Wire cross-section max. 2.5 mm<sup>2</sup>

Multi-wire connection max. 1 mm<sup>2</sup>  
(two wires with same cross-section)



**Warning!** For applications with high isolation voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices!

### 5.1 Power supply

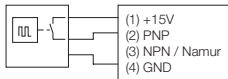
approx. 1 W

18...30 Vdc

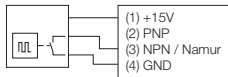
Voltage supply via cross-connections. Operating carrying capacity of cross-connection  $\leq 2$  A (see Cat. No. point 7)

## 5.2 Wiring diagram

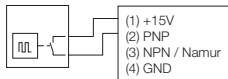
3-wire initiator with PNP output



3-wire initiator with NPN output

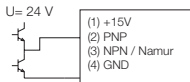


2-wire initiator

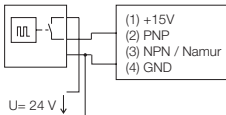


(residual current < 1 mA)

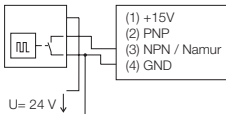
Push-pull output stage



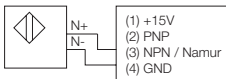
3-wire initiator with PNP output and external power supply



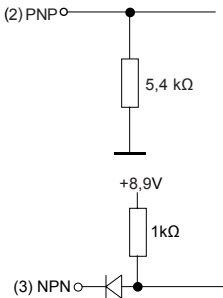
3-wire initiator with NPN output and external power supply



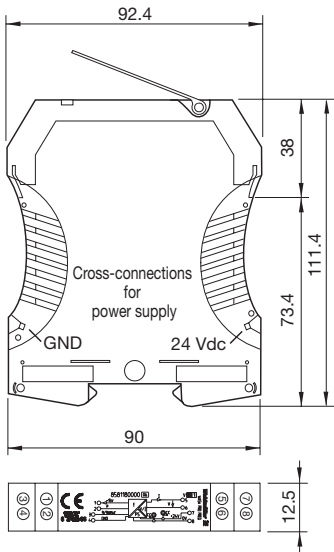
Namur initiator



### 5.3 Input circuitry



### 6. Dimensions in mm



## 7. Accessories (cross-connection)

<b>Designation</b>	<b>Cat. No.</b>
ZQV 2,5 N/2 yellow	1693800000
ZQV 2,5 N/2 red	1717900000
ZQV 2,5 N/2 blue	1717990000
ZQV 2,5 N/2 black	1718080000

## Connection markers

<b>Designation</b>	<b>Cat. No.</b>
WS 10/5 Multicard for plotter marking	1635010000
WS 10/5 Neutral	1060860000

## 8. Notes on CE marking

The WAS5/WAZ5 PRO Freq. analog signal isolators are marked CE in accordance with the EU directives 89/336/EEC "Electromagnetic Compatibility" and 73/23/EEC (low-voltage directive) detailing the Harmonized European Standards (EN).

The declarations of conformity are held, according the above mentioned EU directive, article 10, for the authorizing body by:

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