

## Frequency / Analog Converter with direction of rotation detector

**FW4**

Characteristics:

- Linearity error < 0,2%
- Input frequency 10Hz to 200kHz
- Input frequency arbitrary configurable
- Output voltage/current switchable
- Status display of the input frequency
- Direction of rotation detector
- Supply 20...253Vuc
- Mountable on 35mm cap rail TS35
- Clear terminal labeling
- Narrow design
- Shape 22,5mm
- High reliability, 5 years warranty



Description:

The devices of the series FW4 frequency / analog converter have been developed for proportional converting of square wave frequencies 0...10Hz to 0...200kHz into norm signals 0...±10V or 0/4...±20mA. In the measurement range 10Hz to 8 kHz the input signal is detected according to the principle of the pulse-width- measurement and additionally by a peak time measurement.

If both inputs A and B are connected with 90° phase shifting, for example from an encoder, depending to the type of unit, the direction of rotary signal is signaled via an optocoupler or by changing of the polarity of the analog output. Thereby an analog tachometer signal can be simulated by a digital pulse generator.

If the device should be used as a normal frequency analog converter without direction of rotation analysis, the frequency signal must be connected to input B.

The nominal input voltage is 24V, the signal form is set to square wave pulses.

The measurement range can be roughly adjusted by the rotary switch S1, and by potentiometer "V" (R1) you will be able to do the fine adjustment. The offset of the analog output is factory-adjusted.

Via Dip-Switch S2 the output can be switched configured to the standard norm signals 0...10V and 0/4...20mA.

The LED's H1 and H2 display the status of the input frequency, H3 displays the direction of rotary.

Application:

Signal switching frequency/analog; Monitoring of slowly rotating machine parts; Speed-zero recording of engines; Over- speed detection at drives; Stop detection; Speed monitoring of gears by means of gearwheel-edge detection. Simulation of an analog tachometer.

### Notice:

If the input frequency is lost the analog output will be held for 1 to 205 seconds, depending on the measurement range

$$\text{Holding time} = \frac{1}{\text{Measurement range} / 2047} \text{ seconds}$$

### Order code:

	Output:	Direction of rotary analysis:
<b>FW4-1</b>	bipolar: 0...±10V / 0...±20mA	via analog signal and optocoupler
<b>FW4-2</b>	unipolar: 0...10V / 0...20mA / 4...20mA	only via optocoupler

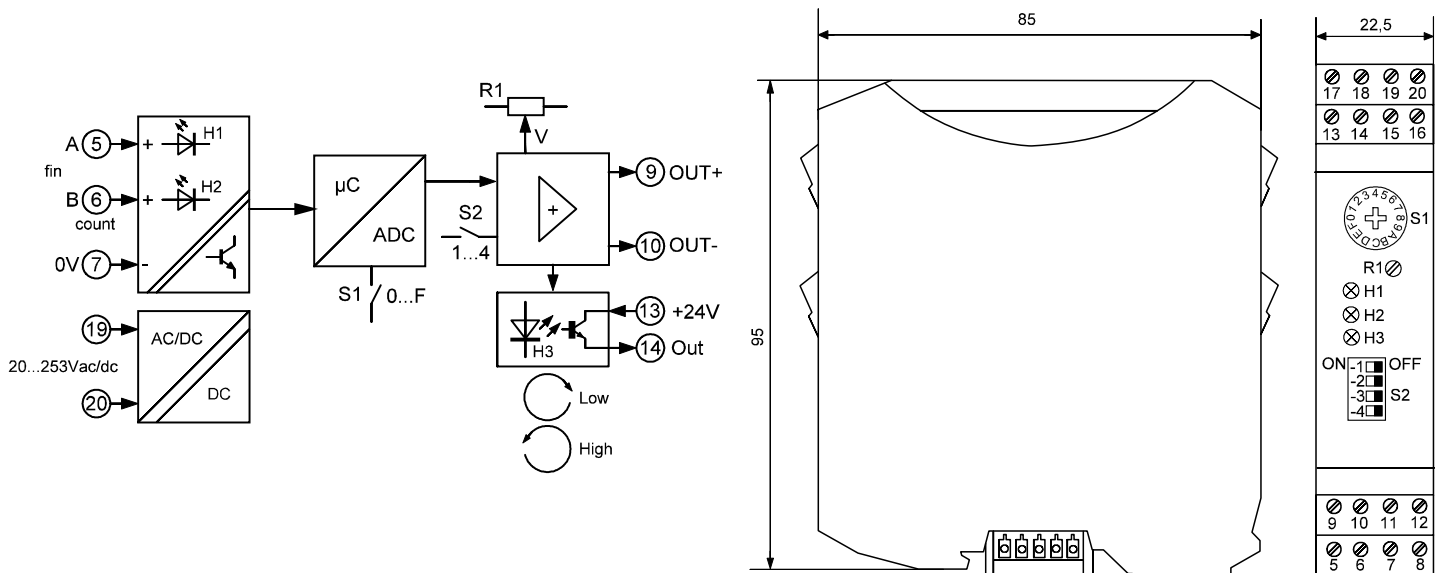
Rotary switch S1

Switch position S1	Measurement range	Measurement rate
0	Output on 0V	Not applicable
1	0.....10Hz to 0.....20Hz	2 x Period
2	0.....20Hz to 0.....40Hz	2 x Period
3	0.....40Hz to 0.....80Hz	2 x Period
4	0.....80Hz to 0....160Hz	2 x Period
5	0....150Hz to 0....300Hz	2 x Period
6	0....300Hz to 0....600Hz	2 x Period
7	0....600Hz to 0...1,2 kHz	2 x Period
8	0.....1kHz to 0.....2kHz	2 x Period
9	0.....2kHz to 0.....4kHz	2 x Period
A	0.....4kHz to 0.....8kHz	2 x Period
B	0.....8kHz to 0....16kHz	133ms
C	0...1..5kHz to 0....30kHz	66ms
D	0....30kHz to 0....60kHz	33ms
E	0....60kHz to 0...120kHz	18ms
F	0...100kHz to 0...200kHz	10ms

Dip-switch S2

Output	S2 - 1	S2 - 2	S2 - 3	S2 - 4
0...10V** / ±10V*	On	On	Off	Off
0...20mA** / ±20mA*	Off	Off	On	Off
4...20mA**	Off	Off	On	On

\*FW4-1 \*\*FW4-2



## Technical data

### Auxiliary power:

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Supply voltage : 19...255V<sub>uc</sub>  
Current consumption : 1W...2,5VA

### Inputs:

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Signal amplitude : 24V (16, 8...30V)  
Signal power : 5...8mA  
Frequency : 0...10Hz to 0...200 kHz adjustable via S1 and potentiometer V (R1)  
See table "switch position S1"  
Signal form : Square wave  
Setting time : See table + 500µs

### Analog output:

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Voltage output : 0...10V / ±10V max. 20mA  
Holding time : if input frequency is lost  
$$\text{Holding time} = \frac{1}{\text{Measurement range} / 2047} \text{ seconds}$$

Current output : 0(4)...20mA / ±20mA/ load resistor max. 500Ω

### Digital output:

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Optocoupler : 24DC / 100mA, short circuit proof  
Clockwise rotation : Low level  
Anti-clockwise rotation : High level

### Accuracy:

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Linearity error : < 0, 2%  
Measurement resolution: 11 Bit plus sign  
Temperature coefficient : < 50ppm / K

### General data:

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Operating temperature : 0...50°C  
Storage temperature : -25...+85°C, condensation before putting into operation is not allowed  
MTBF : 130 years Mean Time Between Failures – according to EN 61709 (SN29500).  
Requirements: Stationary operation in clean rooms, average ambient temperature 40 °C, no forced ventilation, continuous operation  
CE conformity : EN 61326-1, EN 61000-4-2/3\*/4/5/6\*, EN 61000-6-4  
\* during measurements small deviations are possible

### Body:

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Dimension : 22,5mm adjoin body, 22,5x114,5x104,5mm (with terminals)  
Material : PA / V0  
Protection category : IP20  
Fixing : M3-screw-type terminal 0, 14 - 2,5mm<sup>2</sup>, flexible or inflexible  
Fixing : Snap-on mounting for norm rail TS35  
Weight : 120g

**Note on safety:**

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Disconnect the power supply before attempting to open the unit.

During the operation of this module it is possible that parts of the module, even there is extra-low voltage, (for example shunt measurement) are under dangerous voltage! Therefore a non-observance of this caution may cause damage of property or physical injury.

Only trained qualified personnel should install or operate the unit. Before installation the qualified personnel should read the documentation and should familiarize themselves with the unit.

If there is visible damage to the body of the unit it should be immediately replaced and not put into operation.



Please ensure that there is a sufficient prevention against electrostatic discharge during installation of the unit.

**Installation Information:**

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Pay attention and make sure the unit is far away from mounted sources that may disturb the device such as magnetic coils, transformers, frequency converters etc.

**Wiring advice:**

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Use only shielded cables. The shield is to be connected extensively to ground. Do not mix power- and signal-wires/cables in the same cable tray.

**Limited warranty:**

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The LEG Industrie-Elektronik GmbH warranted that the product does not have any material or processing defects in a period of 5 years after date of delivery.

It is up to the choice of LEG to repair or to exchange an inoperative unit.

Subsequent damages or any claim for indemnification above the functionality of the unit are excluded.

This limited warranty is only valid if ...

1. the product was installed and put into operation according to the LEG operation documentation;
2. the technical configuration of the power supply was abided;
3. the product was not used for unintended purposes;
4. there were no unauthorized modifications or manipulations, misuse or repairs without previous agreement from LEG .

Our Terms of Trade are based on the “General Conditions for the supply of products and services of the Electrical and Electronics Industry” including the “Complementary Clause: Extended Reservation of Property” of the ZVEI e.V. (German Association of Electrical Manufacturers).

**Miscellaneous:**

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We expressly reserve the right, without previous notice, to correct errors contained in any data of this information brochure, and to make alterations to the program and technical modifications.