

EURAX F 535

Transducer for measuring frequency difference

EURAX plug-in module in Euro format



Application

The transducer **EURAX F 535** (Fig. 1) converts the frequency difference of two synchronised supplies into a **load independent** DC current or a **load independent** DC voltage proportional to the measured value.

The transducer fulfils all the important requirements and regulations concerning electromagnetic compatibility **EMC** and **Safety** (IEC 1010 resp. EN 61 010). It was developed and is manufactured and tested in strict accordance with the **quality assurance standards** ISO 9001.

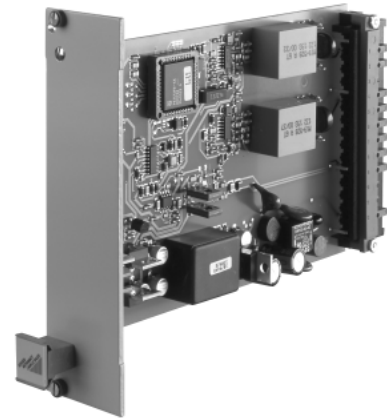


Fig. 1. EURAX F 535 as plug-in module for 19" rack-mounted case, front plate width 7 TE.

Features / Benefits

- **Measuring inputs:** Sine, rectangular or distorted wave forms of nominal input voltages with dominant fundamental waves

| Measured variables | Nominal input voltages | Measuring range limits |
|----------------------|------------------------|--|
| Frequency difference | 10 to 690 V | $\Delta f = \pm 1\% f_s$ to $\pm 80\% f_s$ f_s and $f_G \geq 10$ Hz to ≤ 1.5 kHz |

- **Measuring output:** Unipolar, bipolar or live zero output variables
- **Measuring principle:** Digital period measurement
- **Wide DC, AC power pack tolerance / Universal**
- **Plug-in module (front plate width 7 TE) for 19" rack-mounted case / Ease of mounting in rack system**

Technical data

General

Measured quantity: Frequency difference Δf
 Measuring principle: Digital period measurement

Measuring inputs \rightarrow

Measuring range (f_s = bus bar, f_G = generator): See section "Specification and ordering information"

Nominal input voltages U_N : Generator and bus bar 10...230 V or 230...690 V (max. 230 V with power supply from voltage measuring input)

Own consumption: $< U_N \cdot 1.5$ mA per measuring input

Overload capacity:

| Measured quantities U_N | Number of applications | Duration of one application | Interval between two successive applications |
|---------------------------|------------------------|-----------------------------|--|
| $1.2 \times U_N^1$ | --- | continuously | --- |
| $2 \times U_N^1$ | 10 | 1 s | 10 s |

¹ But max. 264 V with power supply from voltage measuring input.

Wave form: Any; fundamental wave only taken into account

Measuring output \rightarrow

Load independent DC current: 0...1 to 0...20 mA resp. live-zero 0.2...1 to 4...20 mA ± 1 to ± 20 mA

Burden voltage: + 15 V, resp. - 12 V

Load independent DC voltage: 0...1 to 0...10 V resp. live zero 0.2...1 to 2...10 V ± 1 to ± 10 V

Load capacity: Max. 4 mA

Voltage limit under $R_{ext} = \infty$: ≤ 25 V

Current limit under overload: Approx. $1.3 \times I_{AN}$ at current output
Approx. 30 mA at voltage output

Residual ripple in output current: $< 0.5\%$ p.p.

Nominal value of response time: 4 periods of the measuring frequency

Other ranges: 2, 8 or 16 periods of the measuring frequency

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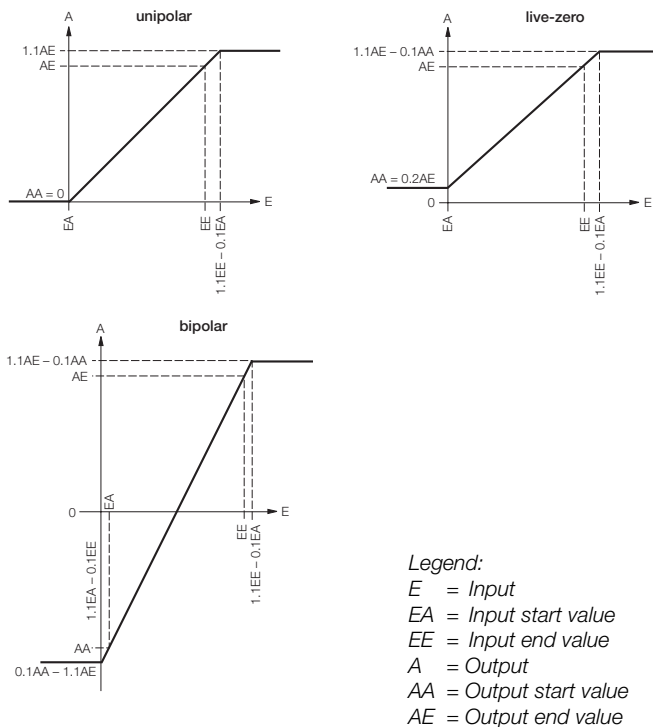
Behaviour of output current in different operating states:

| Operating state ¹ | | Output | Display |
|------------------------------|----------------------|----------|--------------------------|
| Generator frequency | Bus frequency | | |
| $f_G > f_s$ | | unipolar | $> I_{AN} / 2$ |
| | | bipolar | positive |
| missing ² | Nom. value | unipolar | approx. 0 |
| | | bipolar | approx. $- 110\% I_{AN}$ |
| Nom. value | missing ² | unipolar | approx. $+ 110\% I_{AN}$ |
| | | bipolar | |
| missing ² | missing ² | unipolar | approx. $I_{AN} / 2$ |
| | | bipolar | approx. 0 |

¹ With power supply switched on

² e.g. switched off or fault condition

Output characteristic



Accuracy (acc. to IEC 688)

Reference value: Output span
 Basic accuracy: Class 0.2

Reference conditions:

Ambient temperature: 15...30 °C
 Input voltage: U_{min} to U_{max}
 Distortion factor: No influence
 Power supply: At nominal range
 Output burden: ΔR_{ext} max.

Safety

Protection class: II (protection isolated, EN 61 010)
 Pollution degree: 2

Installation category: III

Rated insulation voltage (against earth): 230 resp. 400 V, input
 230 V, power supply
 40 V, output

Test voltage: 50 Hz, 1 min. acc. to EN 61 010-1
 3700 resp. 5550 V, input versus all other circuits
 3700 V, power supply versus output

Power supply →○

AC, DC power pack (DC or 40 ... 400 Hz)

Table 1: Rated voltages and permissible variations

| Rated voltage | Tolerance |
|---------------------|-------------------|
| 85 ... 230 V DC, AC | DC - 15 ... + 33% |
| 24 ... 60 V DC, AC | AC ± 15% |

or

power supply from voltage measuring input: 24...60 V AC or 85...230 V AC
 Note: $40 \text{ Hz} \leq f \leq 400 \text{ Hz}$

Power consumption: Approx. 2 W resp. 4 VA

Installation data

Mechanical design: Plug-in module for 19" rack-mounted case, Euro format 100 × 160 mm

Space requirements: 7 TE (35.26 mm)
 (see section "Dimensional drawing")

Front plate colour: Grey RAL 7032

Designation: EURAX F 535

Mounting position: Any

Electrical connections: 32-pole plug acc. to DIN 41 612, pattern F
 Contact fitting see section "Electrical connections"

Coding: By coding pins, removed / not removed, see section "Electrical connections"

Weight: Approx. 0.21 kg

Environmental conditions

Operating temperature: - 10 to + 55 °C

Storage temperature: - 40 to + 70 °C

Relative humidity of annual mean: ≤ 75%

Ambient tests

EN 60 068-2-6: Vibration

Acceleration: ± 2 g

Frequency range: 10 ... 150 ... 10 Hz, rate of frequency sweep: 1 octave/minute

Number of cycles: 10, in each of the three axes

EN 60 068-2-27: Shock

Acceleration: 3 × 50 g

3 shocks each in 6 directions

EN 60 068-2-1/-2/-3: Cold, dry heat, damp heat

Table 2: Specification and ordering information

| Order Code 535 - | | | | | | | | | |
|--|--------|-------|---|---|---|---|---|---|---|
| Features, Selection | *SCODE | no-go | 2 | 1 | 2 | 3 | 4 | 5 | 9 |
| 1. Mechanical design 2) Plug-in module for 19" rack-mounted case | | | | | | | | | |
| 2. Nominal input voltage Generator and bus bar: 1) U_N : 10 ... 230 V | | | | 1 | | | | | |
| 2) U_N : > 230 ... 690 V | A | | 2 | | | | | | |
| 3 phase system: Input voltage = phase to phase voltage Line 2: Not possible with power supply from measuring input | | | | | | | | | |
| 3. Measuring range Frequency: Bus bar = f_s / Generator = f_G 1) $f_s = 50 \text{ Hz} / f_G = 49.5 \dots 50 \dots 50.5 \text{ Hz}$ | | | | 1 | | | | | |
| 2) $f_s = 50 \text{ Hz} / f_G = 47.5 \dots 50 \dots 52.5 \text{ Hz}$ | | | | 2 | | | | | |
| 3) $f_s = 50 \text{ Hz} / f_G = 45 \dots 50 \dots 55 \text{ Hz}$ | | | | 3 | | | | | |
| 4) $f_s = 50 \text{ Hz} / f_G = 40 \dots 50 \dots 60 \text{ Hz}$ | | | | 4 | | | | | |
| 5) $f_s = 60 \text{ Hz} / f_G = 57.5 \dots 60 \dots 62.5 \text{ Hz}$ | | | | 5 | | | | | |
| 9) Non-standard limit values [Hz] <input type="text"/> $\Delta f \pm 1\% f_s$ to $\pm 80\% f_s$ f_s and $f_G \geq 10 \text{ Hz}$ to $\leq 1.5 \text{ kHz}$ With power supply from measuring input min. 40 Hz, max. 400 Hz see feature 5, lines 3 and 4 | | | | 9 | | | | | |
| 4. Output signal 1) 0 ... 20 mA | | | | | 1 | | | | |
| 2) 4 ... 20 mA | | | | | 2 | | | | |
| 9) Non-standard 0...1.00 to 0...< 20, [mA] <input type="text"/> -1.00...0...1.00 to -20...0...20 (symmetrical) 0.2...1 to < (4...20) (AA/AE = 1/5) | | | | | 9 | | | | |
| A) 0 ... 10 V | | | | | A | | | | |
| Z) Non-standard 0...1.00 to 0...< 10, [V] <input type="text"/> -1.00...0...1.00 to -10...0...10 (symmetrical) 0.2...1 to 2...10 (AA/AE = 1/5) | | | | | Z | | | | |
| AA = Output start value, AE = Output end value | | | | | | | | | |
| 5. Power supply 1) 85 ... 230 V DC, AC | | | | | | 1 | | | |
| 2) 24 ... 60 V DC, AC | | | | | | 2 | | | |
| 3) Internal from measuring input (24 ... 60 V AC) | | A | | | | 3 | | | |
| 4) Internal from measuring input (85 ... 230 V AC) | | A | | | | 4 | | | |
| 6. Response time 1) 4 periods of the input frequency (standard) | | | | | | | 1 | | |
| 2) 2 periods of the input frequency | | | | | | | 2 | | |
| 3) 8 periods of the input frequency | | | | | | | 3 | | |
| 4) 16 periods of the input frequency | | | | | | | 4 | | |
| 7. Test certificate 0) Without test certificate | | | | | | | | | 0 |
| D) Test certificate in German | | | | | | | | | D |
| E) Test certificate in English | | | | | | | | | E |

* Lines with letter(s) under "no-go" cannot be combined with preceding lines having the same letter under "SCODE".

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Electrical connections

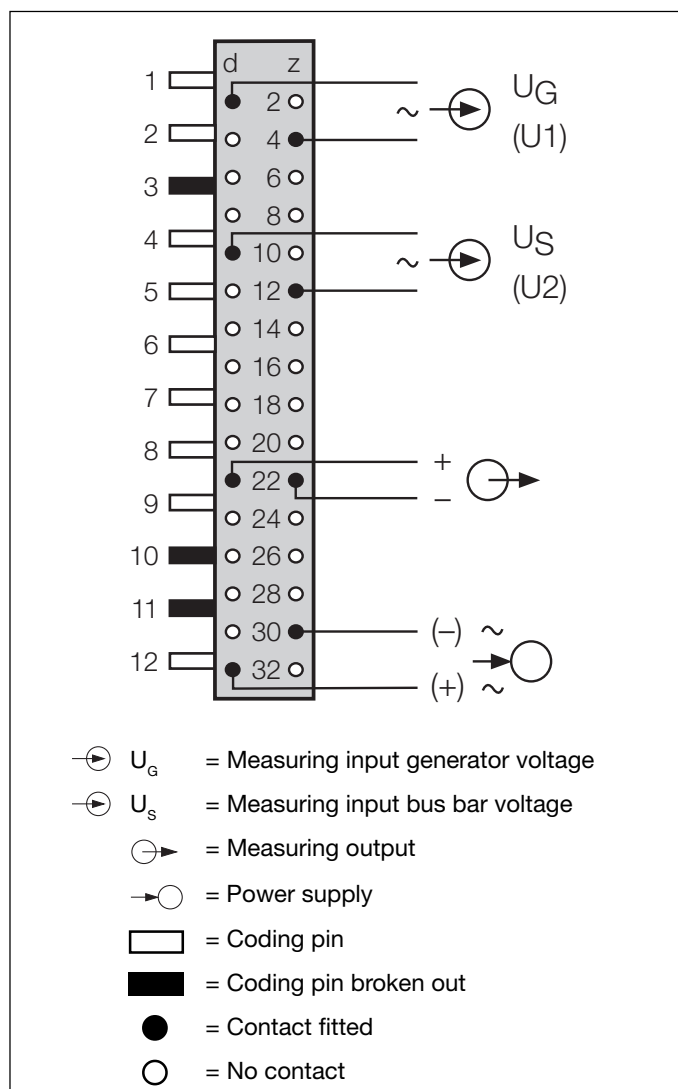


Fig. 2. EURAX F 535, view of the rear of plug-in module.

Dimensional drawing

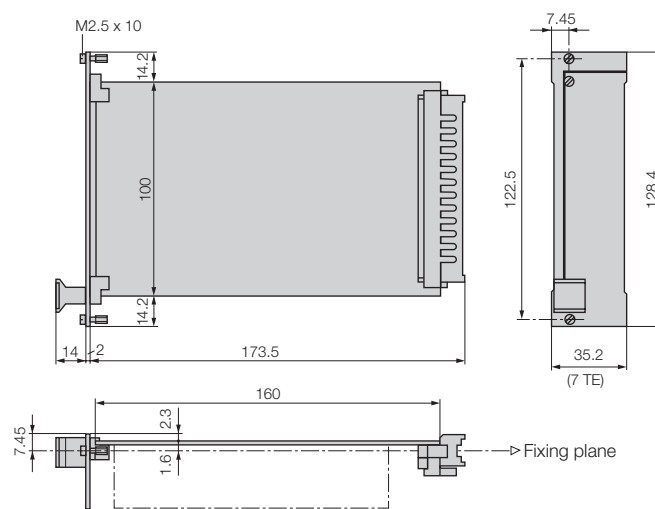


Fig. 3. EURAX F 535, front plate width 7 TE.