EURAX F 535
Transducer for measuring frequency difference

EURAX plug-in module in Euro format

CE

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.

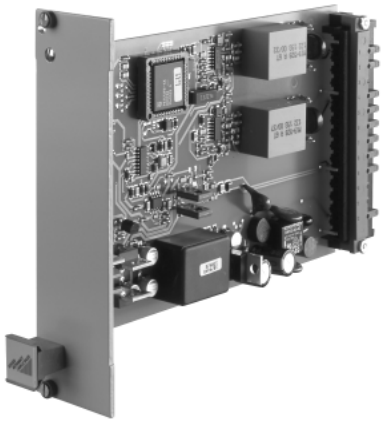

*Fig. 1. EURAX F 535 as plug-in module for 19˝ rack-mounted case, front plate width **7 TE**.*

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 ⊖

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 ⊕

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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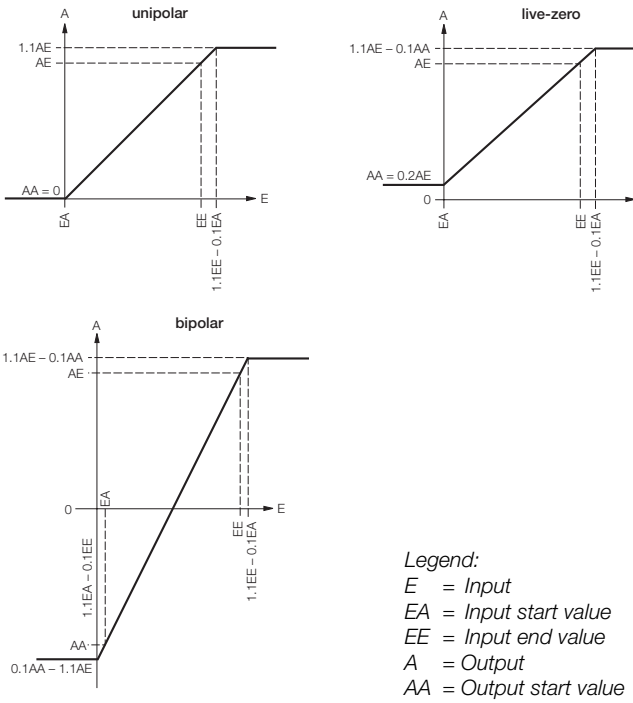
Behaviour of output current in different operating states:

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



Legend:
E = Input
EA = Input start value
EE = Input end value
A = Output
AA = Output start value
AE = Output end value

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% AC ± 15%
24 … 60 V DC, AC	

or

power supply from voltage measuring input:	24…60 V AC or 85…230 V AC Note: 40 Hz ≤ f ≤ 400 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	
1. Mechanical design			
2) Plug-in module for 19″ rack-mounted case			2 . . . . .
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 Hz / f_G = 49.5 … 50 … 50.5 Hz			. . 1 . . . .
2) f_S = 50 Hz / f_G = 47.5 … 50 … 52.5 Hz			. . 2 . . . .
3) f_S = 50 Hz / f_G = 45 … 50 … 55 Hz			. . 3 . . . .
4) f_S = 50 Hz / f_G = 40 … 50 … 60 Hz			. . 4 . . . .
5) f_S = 60 Hz / f_G = 57.5 … 60 … 62.5 Hz			. . 5 . . . .
9) Non-standard limit values [Hz]			. . 9 . . . .
Δf ± 1% f_S to ± 80% f_S			
f_S and f_G ≥ 10 Hz to ≤ 1.5 kHz			
With power supply from measuring input min. 40 Hz, max. 400 Hz			
see feature 5, lines 3 and 4			
4. Output signal			
1) 0 … 20 mA			. . . 1 . . .
2) 4 … 20 mA			. . . 2 . . .
9) Non-standard 0…1.00 to 0…< 20, [mA]			. . . 9 . . .
–1.00…0…1.00 to –20…0…20 (symmetrical)			
0.2…1 to < (4…20) (AA/AE = 1/5)			
A) 0 … 10 V			. . . A . . .
Z) Non-standard 0…1.00 to 0…< 10, [V]			. . . Z . . .
–1.00…0…1.00 to –10…0…10 (symmetrical)			
0.2…1 to 2…10 (AA/AE = 1/5)			
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

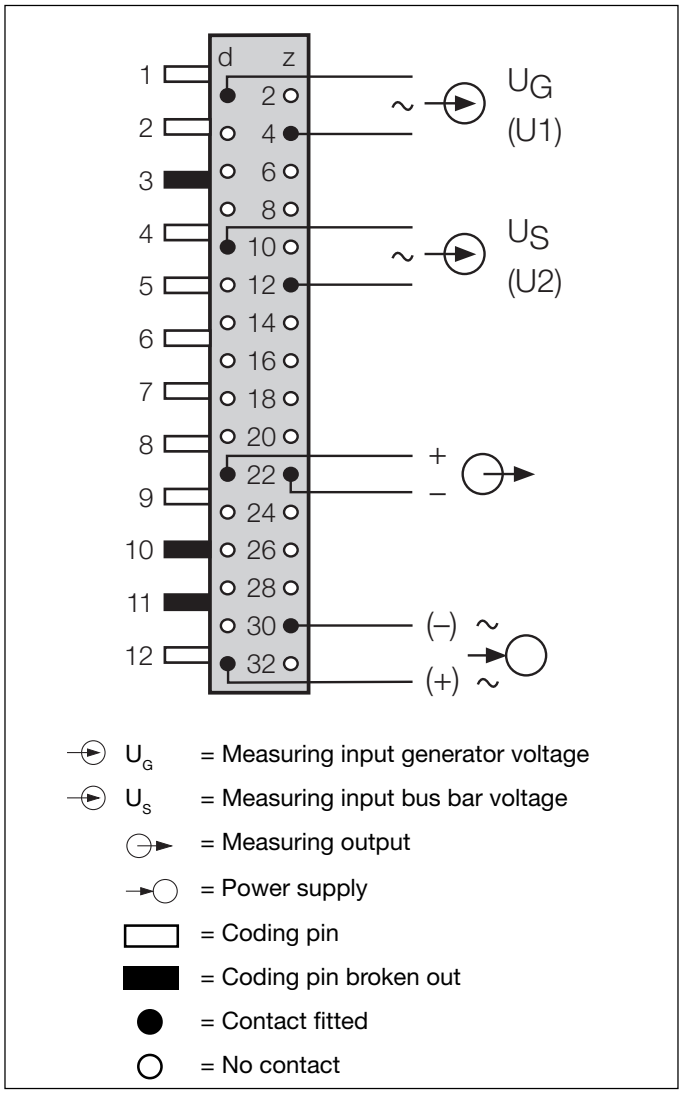

Fig. 2. EURAX F 535, view of the rear of plug-in module.

Dimensional drawing

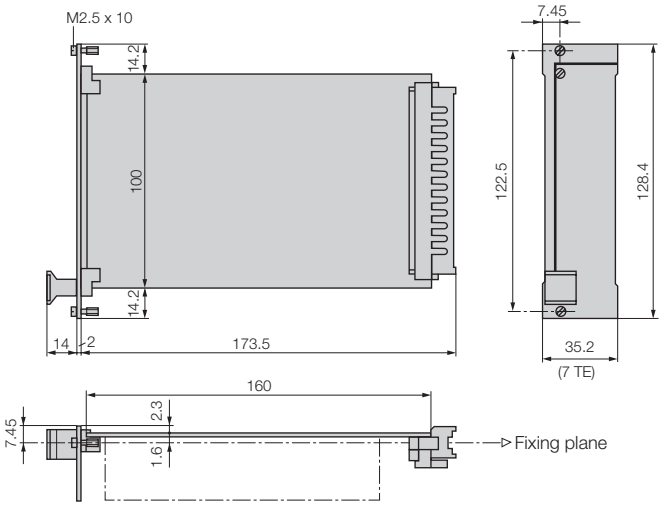

*Fig. 3. EURAX F 535, front plate width **7 TE.***

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