

EMBSIN

Measuring transducers for electrical variables



MBS's measuring transducers of the type EMBSIN transforms an input alternating voltage and/or an input alternating current, received as a standard signal from a current transformer, – or voltage transformer, or from the power system, into a load imprinted output voltage.

The various EMBSIN units are arranged to collate all measuring variables, which are necessary to monitor and to control, the power supply and consumption, to display the output signals, or to accept these into other units of the measuring- and control technic.

Several units such as indicators, recorders or signal processing systems can be connected to the output. The transducer's configuration assures a safe diversion for all functions for a galvanic separation between inputs and outputs. The most important applications for the transducers are in the generation and distribution of energy, in the manufacturing industry, and panel building enterprises.

The transducers have been developed upon an entirely new housing technology concept and are available in 5 different sizes.

The housing material made of high quality polycarbonate are free of silicon as well as halogen and, are flame resistant. High quality screw terminals are provided for the safe connections of inputs and outputs. Fitment onto the base wall is made with a 35 mm DIN rail. All electrical connections are made at the top of the units for safe and easy access.

The transducers bear the CE symbol. This symbol provides the highest level of protection for humans, the machine, as well as the environment, and of course, comply with all applicable safety regulations. MBS's production of high current measuring transducers, made of the finest quality enjoy a long tradition and a distinguished world wide reputation. The encapsulated housing design, the carefully chosen material and the construction principles, contribute that the measuring transducers are protected against climatic conditions (temperature and humidity), atmospheric conditions (chemical processes, dust and salt), vibration and shocks, interruptions (electrical or mechanical), HF interferences (communications) as well as permanent or transient interference voltages on all electrical connections.

• Compact • Safety • Easy to use • Accurate • Better

Safety

EN 61010 also on the terminals!
 690 V max. input voltage
 housing material: Polycarbonate
 fire resistance class: V-0 acc. to UL94
 (self-extinguishing, halogen-free, silicon-free)

Easy to use

Units with two wide-and auxiliary power ranges
 24 ... 65 V AC/DC or 85 ... 230 V AC/DC auxiliary
 power, to be connected either on the top or on the bot-
 tom $\cos \varphi$ or linear recalibrating/ can be synchronized
 without opening the unit and without AC calibrators!
 mounting onto 35 mm DIN rail
 operating instructions are included

Compact

height 75 mm, V-series
 height 60 mm
 depth 105 mm, V-series
 depth 112 mm
 width 45 mm, V-series
 width 105 mm for power,
 70 mm for frequency and phase as well as
 U and I with wide-range auxiliary
 power
 35 mm two-wire feed 24 V DC or 230 V AC
 35 mm for current and voltage without
 auxiliary power supply
 100 mm EMBSIN 391 PV

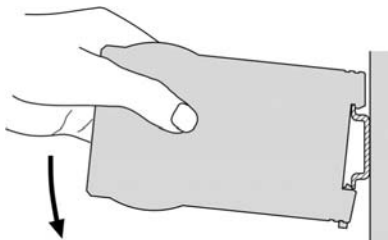
Accuracy

All units class 0.5
 EMBSIN 241 FV class 0.2
 EMBSIN 241 F class 0.2
 EMBSIN 241 FD class 0.2

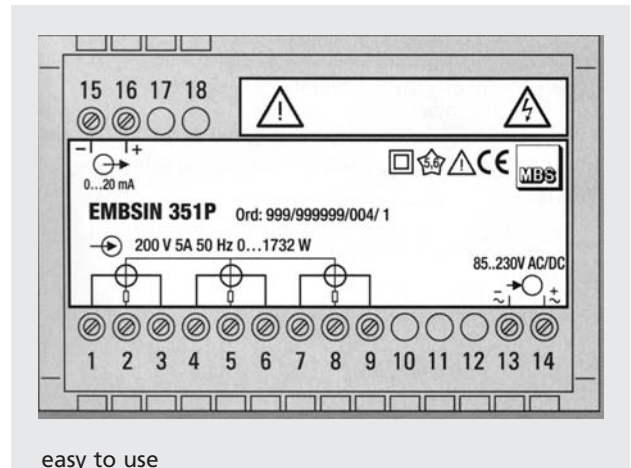
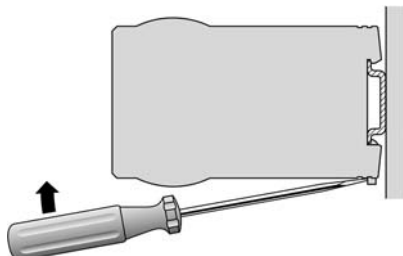
Better

Highest quality and safety at very competitive prices

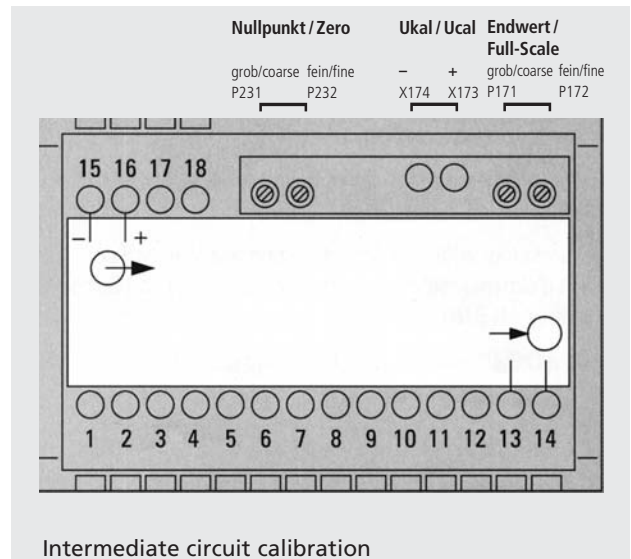
assembly



dismantling



easy to use



Intermediate circuit calibration

Nullpunkt / Zero		Ukal / Ucal		Endwert / Full-Scale	
grob/coarse	fein/fine	-	+	grob/coarse	fein/fine
P231	P232	X174	X173	P171	P172

EMBSIN 100 IV

Measuring transducers for AC current



- without auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating current (0...1 or 0...5 A) programmable at source
- measuring output: Unipolar output signal
- measuring principle: Rectifier mean value measurement process
- without auxiliary voltage supply
- economic consumption

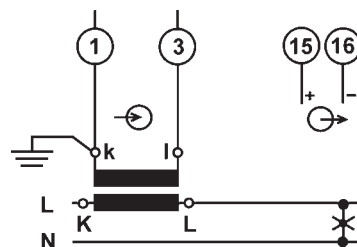
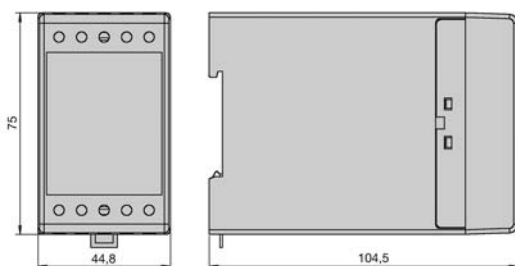
Application

Measuring transducer for the proportional transformation of sinus-shaped alternating currents into a load-independent DC signal. The output signal is adjustable for analogue and digital units.

Technical data EMBSIN 100 IV

measuring input		connection conditions	
rated frequency f_N	50/60 Hz	low voltage application	feed by means of a low voltage current transformer
rated input current I_N	0...1 bis 0...7.5 A	high voltage application	feed by means of a high voltage current transformer
consumption	≤ 2 VA	connection terminals	≤ 4.0 mm ² solid wire $\leq 2 \times 2.5$ mm ² fine wire
overload capacity	$1.2 \cdot I_N$, constant $20 \cdot I_N$, 1 sec.	safety	
measuring output		protection class	II, (protection isolated, DIN EN 61010)
load-independent DC current I_{ON}	0...5, 0...10 or 0...20 mA	nominal isolation voltage	300 V, rms, connection category III 500 V, rms, connection category II
burden voltage	≤ 15 V	test voltage	3.7 kV, rms in acc. with EN 61010-1:1990
burden resistance	$R_{Bmax} = \frac{15V}{I_{ON} [mA]}$ k Ω	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
residual ripple of the output current	≤ 1 % p.p.	weight	≤ 250 g
response time	≤ 300 ms		
accuracy			
reference value	output end value		
accuracy class	class 0.5		
measuring range	0...100 %		
reference conditions			
ambient temperature	15...30 °C		
input signal	0...100 %		
frequency	45...65 Hz		

Order information see page 271



EMBSIN 100 I

Measuring transducers for AC current



- without auxiliary voltage supply
- with 2 measuring ranges
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating current (0...1/5 A or 0...1.2/6 A, selectable at terminals), arithmetical mean value measurement, effective value calibration
- measuring output: Output signal unipolar
- measuring principle: Rectifier mean value measurement process
- without auxiliary voltage supply
- economic consumption

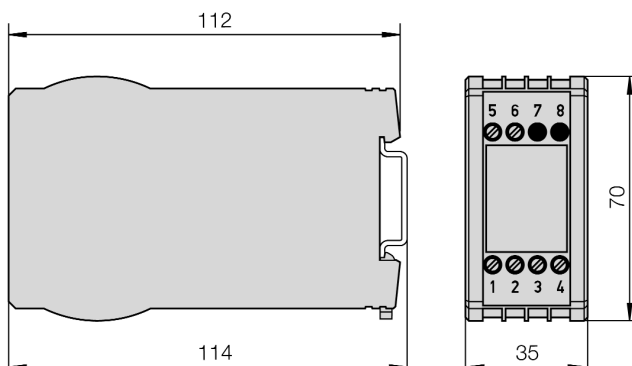
Application

Measuring transducer for the transformation of sinus-shaped alternating current. A load-independent DC signal which is proportional to the measurement value serves as an output signal, and allows for display, recording, monitoring and/or control functions. This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 and EN 61010).

Technical data EMBSIN 100 I

measuring input →		accuracy →	
rated frequency f_N	50/60 Hz	reference value	output end value
rated input current I_N	1/5 A or 1.2/6 A, selectable	accuracy class	class 0.5
consumption	≤ 2.5 VA	input	0 ... 100 %
overload capacity	1.2 · I_N , constant, 20 · I_N , 1 sec.	temperature influence (-10 ... + 55 °C)	0.2 % / 10 K
measuring output →		safety	
load-independent	0 ... 5, 0 ... 10 or	protection class	II, (protection isolated, DIN EN 61010)
DC current	0 ... 20 mA	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
burden voltage	≤ 15 V	contamination class	2
voltage limit		overvoltage category	III
by $R_{ext} = \infty$	≤ 30 V	nominal isolation	250 V input
current limit		voltage (to earth)	40 V output
under overload	≤ 34 mA	weight	270 g
residual ripple			
of the output current	≤ 1 % p.p.		
response time	≤ 300 ms		

Order information see page 271





EMBSIN 101 I

Measuring transducers for AC current

- with auxiliary voltage supply optional with measuring output 4...20 mA and / or 2-wire technic
- housing for 35 mm DIN rail mounting

Features/benefits

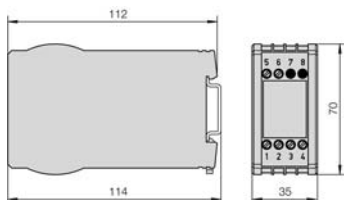
- measuring input: Sinus-shaped alternating current, arithmetical mean value measurement, effective value calibration
- measuring output: Unipolar and live-zero output signals
- measuring principle: Rectifier mean value measurement process
- AC or DC auxiliary power supply

Application

Measuring transducer for the transformation of sinus-shaped alternating current. A load-independent DC signal or imprinted DC voltage signal is available, which stands proportionally to the measurement value of the input volume. This measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 and EN 61010).

Technical data EMBSIN 101 I

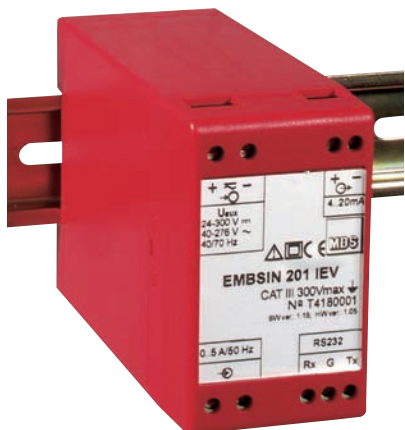
measuring input \rightarrow		auxiliary power \rightarrow	
rated frequency f_N	50/60 Hz	AC	24, 110, 115, 120, 230 or 400 V, $\pm 15\%$, 50 or 60 Hz; P_v approx. 3 VA
rated input current I_N	0 ... 0.8 to 0 ... 1.2 A or 0 ... 4 to 0 ... 6 A	DC	24 V, - 15 / + 33 % or 24 V, - 50 / + 33 % by 2-wire feed and output 4 ... 20 mA; P_v approx. 1.5 W
consumption	≤ 5 mV I_N	universal power supply ranges	DC or AC 40 ... 400 Hz 85 ... 230 V 24 ... 60 V
overload capacity	$2 \cdot I_N$, constant	accuracy	
measuring output \rightarrow		reference value	output end value
load-independent DC current	0 ... 2.5 mA to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	accuracy class	class 0.5
burden voltage	≤ 15 V	safety	
by 2-wire connection	standard range 4 ... 20 mA, external resistance R_{ext} , dependent of the auxiliary supply H (12 ... 32 V DC) $R_{ext, max} [k\Omega] = \frac{H [V] - 12 V}{20 \text{ mA}}$	protection class	II, (protection isolated, DIN EN 61010)
imprinted DC voltage	0 ... 5 to 0 ... 10 V or live-zero 1 ... 5 to 2 ... 10 V	electrocution protection	IP 40, housing (test wire, EN 60529), IP 20 connection terminals (test digit, EN 60529)
load capacity	max. 20 mA	contamination class	2
voltage limit by $R_{ext} = \infty$	≤ 40 V	overvoltage category	III
current limit under overload	< 30 mA by current output approx. 20 mA by voltage output	nominal isolation voltage (to earth)	300 V, input 300 V, auxiliary power AC 50 V, auxiliary power 24 V DC 50 V, output
residual ripple of the output current	$\leq 1\%$ p.p.	weight	195 g
response time	< 300 ms		



Order information see page 272

EMBSIN 201 IEV

Measuring transducers for AC current



- with auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating current (0...6 A)
- measuring of the true rms value of alternating currents!
- programmable measuring inputs and measuring outputs via RS232 or RS485 interface (option)
- low consumption
- universal AC/DC auxiliary voltage supply or AC auxiliary voltage

Application

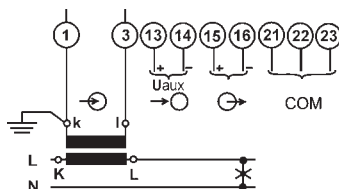
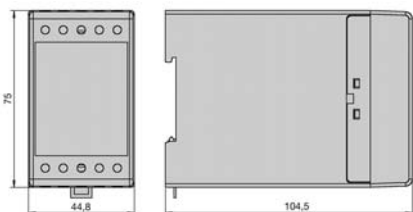
Measuring transducer for the proportional transformation of sinus-shaped alternating currents into a load-independent DC current signal or AC voltage signal. The analogue output signal is proportionable to the true rms value of the measuring variables and can be used for regulating analogue and digital units.

Technical data EMBSIN 201 IEV

measuring input	
rated frequency f_N	50/60 Hz
Rated input current I_N	0...0.2 A to 0...6 A
own consumption	< 0,5 VA
operating temperature range	-10 °C ≤ ϑ ≤ +55 °C
overload capacity	2 · I_N , constant 20 · I_N , 1 sec.
measuring output	
load-independent DC current	0 ... 1 to 0 ... 20 mA or live-zero 0.2 ... 1 to 4 ... 20 mA
burden voltage	≤ 15 V
imprinted DC voltage	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 bis 2 ... 10 V
load capacity	max. 20 mA
output signal limit	
current output	125 % I_{AN}
voltage output	125 % U_{AN}
residual ripple	
of the output current	≤ 1 % p.p.
response time	< 300 ms
auxiliary power	
universal power supply	DC or AC 40...70 Hz universal
voltage ranges	24 ... 300 V DC and 40 ... 276 V AC
AC power supply	45 ... 65 Hz
rated voltages:	57,74 V, 100 V, 230 V, 400 V, 500 V
power input	≤ 3 VA

accuracy	
reference value	end value of input signal
accuracy class	class 0.5
reference conditions	
ambient temperature	15...30 °C
input signal	0...100 % I_N
frequency	45...65 Hz
protection	
protection class	II
	300 V, rms, connection category III
	500 V, rms, connection category II
contamination class	2
test voltage	3 kV, rms (acc. IEC 61010-1: 1990)
electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
interface	RS232, MODBUS RTU
(optional)	RS485, MODBUS RTU
connection terminals	≤ 4.0 mm ² single wire ≤ 2 x 2.5 mm ² Litze
weight	approx. 300 g

Order information see page 273



	RS232	
	9-pole plug (SUB-D)	25-pole plug
Rx (21)	Tx (3)	Tx (2)
⊥ (22)	GND (5)	GND (7)
Tx (23)	Rx (2)	Rx (3)
RS485		
A (21)	DATA +	
C (22)	NC ¹⁾	
B (23)	DATA -	

1) -NC- do not connect!

EMBSIN 201 IE

Measuring transducers for AC current



- with auxiliary voltage supply
- effective value measuring
- with 2 measuring ranges
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating current (0...1/5 A or 0...1.2/6 A, selectable at terminals), or distorted, effective value measuring
- measuring output: Unipolar and live-zero output signals
- measuring principle: Logarithmetical process
- universal power supply

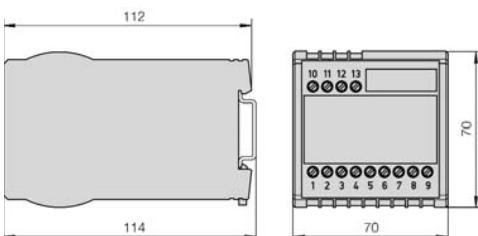
Application

Measuring transducer for the transformation of sinus-shaped or distorted alternating currents. A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the rms input volume. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 201 IE

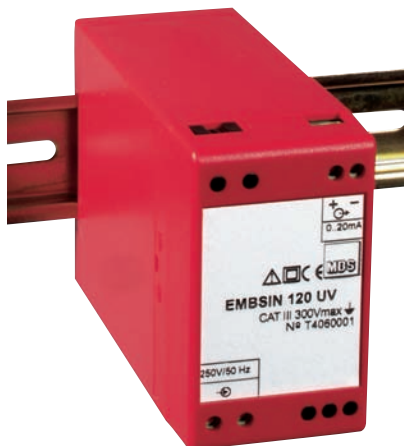
measuring input \oplus		auxiliary power \oplus	
rated frequency f_N	50 / 60 or 400 Hz	universal power supply	DC or 40 ... 400 Hz
rated input current I_N	1/5 A or 1.2/6 A, selectable	AC / DC ranges	24 ... 60 V or 85 ... 230 V
consumption	≤ 1 VA	AC power supply	45 ... 65 Hz
operating temperature range	-10 °C $\leq \vartheta \leq +55$ °C	power input	≤ 1.5 W (3 VA)
overload capacity	$1.2 \cdot I_N$, constant $20 \cdot I_N$, 1 sec.	accuracy	
measuring output \ominus		reference value	output end value
load-independent DC current	0 ... 1 to 0 ... 20 mA or live-zero 0.2 ... 1 to 4 ... 20 mA	accuracy class	class 0.5
burden voltage	≤ 15 V	peak value factor	$\sqrt{2}$
external resistance	$R_{Bmax} = \frac{15V}{I_{AN}[mA]}$ k Ω	warming-up time	≤ 5 min
imprinted DC voltage	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	safety	
load capacity	max. 2 mA	protection class	II, (protection isolated, DIN EN 61010)
external resistance	$R_{Bmin} = \frac{U_A[V]}{2 \text{ mA}}$ k Ω	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
voltage limit		contamination class	2
by $R_{ext} = \infty$	≤ 25 V	overvoltage category	III
current limit	approx. $1.5 \cdot I_{AN}$	nominal isolation voltage	300 V, input (to earth) 230 V, auxiliary power 40 V, output
under overload	by current output, approx. 10 mA, by voltage output	weight	250 g
residual ripple	≤ 0.5 % p.p. by response time 300 ms		
of the output current	≤ 2 % p.p. bei response time 50 ms		
response time	50 ms or 300 ms		

Order information see page 275



EMBSIN 120 UV

Measuring transducers for AC current



- without auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating voltage (0...20 A or 0...500 V)
- measuring output: Unipolar output signal
- measuring principle: Rectifier mean value measurement process
- without auxiliary voltage supply
- economic consumption

Application

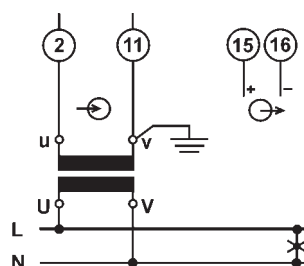
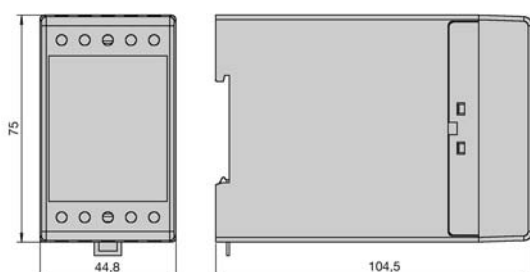
Measuring transducer for the transformation of sinus-shaped alternating currents into a load-independent DC current signal, which is arranged proportionally to the input volume and is adaptable to be used for analogue and digital units.

Technical data EMBSIN 201 IE

measuring input	
rated frequency f_N	50/60 Hz
rated input voltage U_N	0 ... 20 to 0 ... 500 V
	linked voltage!
	max. input voltage
	to earth 250 V
consumption	≤ 2 VA
operating temperature range	-10 °C $\leq \vartheta \leq +55$ °C
relative average humidity	≤ 75 %
overload capacity	$1.2 \cdot U_N$, constant
	$2.0 \cdot U_N$, 1 sec.
measuring output	
load-independent	0 ... 5, 0 ... 10 or
DC current I_{ON}	0 ... 20 mA
burden voltage	≤ 15 V
residual ripple	
of the output current	≤ 1 % p.p.
response time	≤ 300 ms
external resistance	$R_{Bmax} = \frac{15V}{I_{AN}[mA]}$ k Ω
accuracy	
reference value	output end value
accuracy class	class 0.5

reference conditions	
ambient temperature	15 ... 30 °C
input signal	20 ... 100 % U_N
frequency	45 ... 65 Hz
connection conditions	
low voltage application	direct or via voltage transformer with a nominal performance
	$P \geq 5$ VA
high voltage application	via high voltage current transformer with $P \geq 5$ VA
connection terminals	$\leq 4,0$ mm ² solid wire
	$\leq 2 \times 2,5$ mm ² Litze
safety	
protection class	II, (protection isolated, DIN EN 61010)
nominal isolation voltage	300 V, rms, connection category III
	500 V, rms, connection category II
test voltage	3.7 kV, rms
	acc. to EN 61010-1: 1990
electrocution protection	IP 50, housing
	(test wire, EN 60529)
	IP 20, connection terminals
	(test digit, EN 60529)
weight	250 g

Order information see page 276



EMBSIN 120 U

Measuring transducers for alternating voltage



- without auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating voltage (0...20 A to 0...500 V), arithmetical mean value measurement, effective calibrated
- measuring output: Unipolar output signal
- measuring principle: Rectify process
- without auxiliary voltage supply
- minimal wiring

Application

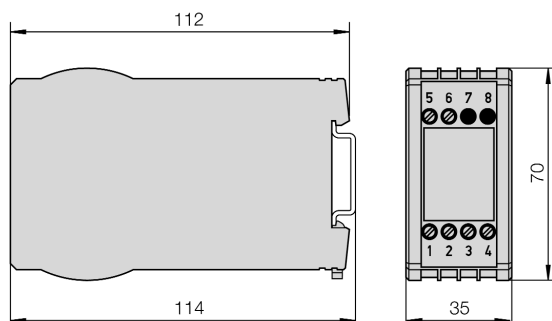
Measuring transducer for the transformation of sinus-shaped alternating voltage. A load-independent DC current signal, which is proportionally to the measurement value, serves as an output signal, and allows for the display, recording, monitoring and/or control function.

The measuring transducer fulfills the requirements and regulation with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 120 U

measuring input		accuracy	
rated frequency f_N	50/60 Hz	reference value	output end value
rated input voltage U_N	0 ... 20 to 0 ... 500 V	accuracy class	class 0.5
	linked voltage!	input signal	20 ... 100 %
	max. input voltage to earth 250 V	temperature influence (-10 ... +55 °C)	0.2 % / 10 K
consumption	≤ 2 VA	safety	
overload capacity	1.2 · U_N , constant 2.0 · U_N , 1 sec.	protection class	II, (protection isolated, DIN EN 61010)
measuring output		electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
load-independent DC current I_{AN}	0 ... 5, 0 ... 10 or 0 ... 20 mA	contamination class	2
burden voltage	≤ 15 V	nominal isolation voltage	300 V, rms, connection categorie III 500 V, rmsm connection categorie II
burden resistance	$R_{Bmax} = \frac{15V}{I_{AN}[mA]}$ k Ω	weight	260 g
voltage limit			
$R_{ext} = \infty$	≤ 54 V		
current limit			
under overload	$\leq 1.7 \cdot I_N$		
residual ripple			
of the output current	≤ 1 % p.p.		
response time	≤ 300 ms		

Order information see page 276



EMBSIN 121 U

Measuring transducers for alternating voltage



- with auxiliary voltage supply
optional measuring output 4...20 mA and/or
2-wire technic
- housing for 35 mm DIN rail mounting

Features/benefits

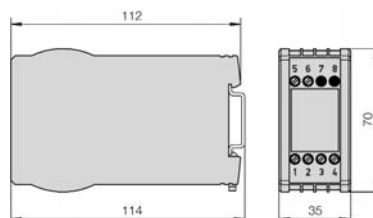
- measuring input: Sinus-shaped alternating voltage
arithmetic mean value measurement, effective calibrated
- measuring output: Unipolar and live-zero output signal
- measuring principle: Rectifier process
- AC or DC auxiliary power

Application

Measuring transducer for the transformation of sinus-shaped alternating voltage. A load-independent DC current signal or imprinted DC voltage signal is available which stands proportionally to the measurement value of the input volume. The measuring transducer fulfills the requirements and regulation with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

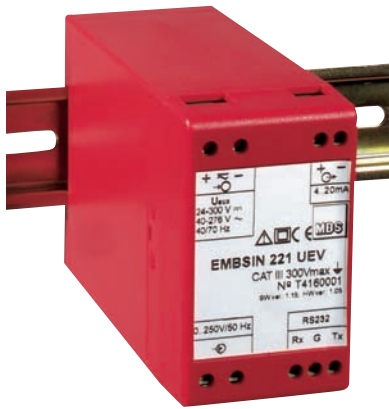
Technical data EMBSIN 201 IE

measuring input \rightarrow		auxiliary power \rightarrow	
rated frequency	50/60 Hz	AC	24, 110, 115, 120, 230 or 400 V, $\pm 15\%$, 50/60 Hz; approx. 3 VA
rated input voltage U_N	0 ... 50 to 0... 600 V linked voltage! max. 300 V nominal value of the mains to earth (operating voltage acc. to EN 61010)	DC	24 V, $-15/+33\%$ or 24 V, $-50/+33\%$ by 2-wire feed and output 4 ... 20 mA; approx. 1.5 W
consumption by		universal power supply ranges	DC or AC 40 ... 400 Hz 85 ... 230 V 24 ... 60 V
$U_N \leq 150$ V	$< U_N \cdot 50 \mu\text{A}$	accuracy	
$150 \text{ V} < U_N \leq 400$ V	$< U_N \cdot 20 \mu\text{A}$	reference value	output end value
$400 \text{ V} < U_N \leq 600$ V	$< U_N \cdot 5 \mu\text{A}$	accuracy class	class 0.5 ($U_N \leq 500$ V) class 1 ($U_N > 500$ V)
overload capacity	$1.2 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec.	safety	
measuring output \rightarrow		protection class	II, (protection isolated, DIN EN 61010)
load-independent DC current	0 ... 2.5 mA to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	electrocution protection I	P 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
burden voltage	≤ 15 V	contamination class	2
by 2-wire connection	standard range 4 ... 20 mA external resistance R_{ext} , dependent of the auxiliary power H (12 ... 32 V DC) $R_{\text{ext,max.}}[\text{k}\Omega] = \frac{H[\text{V}] - 12 \text{ V}}{20 \text{ mA}}$	overvoltage category	III
imprinted DC voltage	0 ... 5 bis 0 ... 10 V or live-zero 1 ... 5 to 2 ... 10 V	nominal isolation voltage (to earth)	300 V, input 300 V, auxiliary power AC 50 V, auxiliary power 24 V DC 50 V, output
load capacity	max. 20 mA	weight	280 g
voltage limit			
by $R_{\text{ext}} = \infty$	≤ 40 V		
current limit	< 30 mA by current output		
under overload	approx. 20 mA by voltage output		
residual ripple			
of the output current	$\leq 1\%$ p.p.		
response time	< 300 ms		



EMBSIN 221 UEV

Measuring transducers for alternating voltage



- with auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped alternating voltage (0...50 to 0...500 V)
- measuring output: Unipolar and live-zero output signal
- measuring principle: Digital, true rms measuring
- with auxiliary voltage supply via AC/DC supply or AC supply
- economical consumption
- programmable measuring input and output via optional serial interface RS 232/ RS485

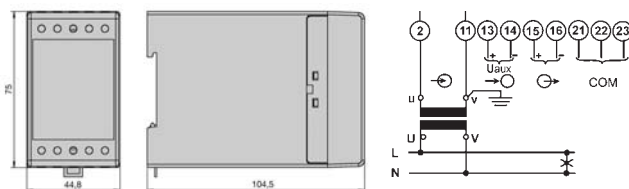
Application

Measuring transducer for the transformation of sinus-shaped or distorted alternating voltage into a load-independent DC current- or DC voltage signal. The analogue output signal is proportionally to the true rms value of the measuring variables and can be used for regulating analogue and digital units. The input and output volumes can be configured via an interface RS232 or RS485 by means of a parametrical software „MBSET“. Before setting the parameter, the output ranges have to be tuned via jumpers. There is a choice of 3 output signals.

Technical data EMBSIN 221 UEV

measuring input \oplus		auxiliary power $\rightarrow \bigcirc$	
rated frequency	50/60 Hz	universal power supply	DC or AC 40...70 Hz universal
rated input voltage U_N	0 ... 50 to 0 ... 500 V	voltage ranges	24 ... 300 V DC and 40 ... 276 V AC
consumption	< 0.5 VA	AC power supply	45 ... 65 Hz
overload capacity	1.2 · U_N , constant 2.0 · U_N , 1 sec.	rated voltages:	57,74 V, 100 V, 230 V, 400 V, 500 V
measuring output \rightarrow		power input	≤ 3 VA
load-independent DC current I_{ON}	0 ... 1 to 0 ... 20 mA or live-zero 0.2 ... 15 to 4 ... 20 mA	accuracy	
burden resistance	$R_{b,max.} = \frac{15 \text{ V}}{I_{ON}[mA]} \text{ k}\Omega$	reference value	output end value
burden voltage	≤ 15 V	accuracy class	class 0.5
imprinted DC voltage U_{ON}	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	reference conditions	
burden resistance voltage	$R_{b,min.} = \frac{U_{ON}[V]}{20 \text{ mA}}$	ambient temperature	15 ... 30 °C
load capacity	max. 20 mA	input signal	0 ... 100 % I_N
output signalling limit		frequency	45...65 Hz
current output	125 % I_{AN}	safety	
voltage output	125 % U_{AN}	protection class	II 300 V, rms, connection category III 500 V, rms, connection category II
residual ripple of the output current	≤ 1 % p.p.	contamination class	2
response time	≤ 300 ms	test voltage	3 kV, rms, (acc. to IEC 61010-1:1990)
		electrocution protection I	P 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
		interface (optional)	RS232, MODBUS RTU RS485, MODBUS RTU
		connection terminals	≤ 4.0 mm ² single wire ≤ 2 x 2.5 mm ² Litze
		weight	approx. 300 g

Order information see page 273

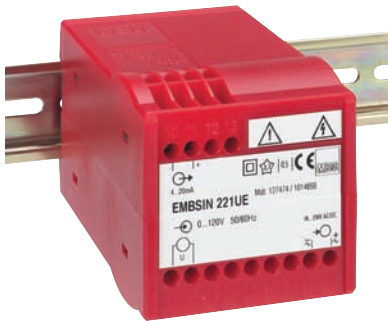


	RS232	
	9-pole plug (SUB-D)	25-pole plug
Rx (21)	Tx (3)	Tx (2)
\perp (22)	GND (5)	GND (7)
Tx (23)	Rx (2)	Rx (3)
RS485		
A (21)	DATA +	
C (22)	NC ¹⁾	
B (23)	DATA -	

1) -NC- do not connect !

EMBSIN 221 UE

Measuring transducers for alternating voltage



- with auxiliary voltage supply
- effective value measuring
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Alternating voltage (0...20 to 0...690 V) sinus-shaped or distorted, effective value measuring
- measuring output: Unipolar and live-zero output signals
- measuring principle: Logarithmetical process
- AC/DC auxiliary power by means of universal power supply

Application

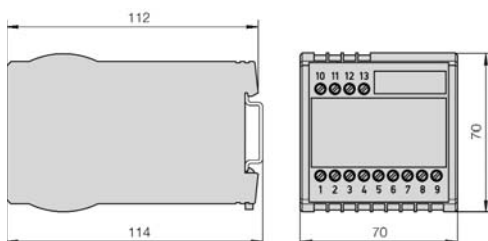
Measuring transducer for the transformation of sinus-shaped or distorted alternating voltages. A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the rms measurement value of the input volume.

The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 221 UE

measuring input \rightarrow		auxiliary power \rightarrow	
rated frequency f_N	50/60 Hz or 400 Hz	universal power supply	DC or AC (40 ... 400 Hz)
rated input voltage U_N	0 ... 20 to 0 ... 690 V (max. 264 V by auxiliary power from voltage measuring input) max. input voltage to earth 400 V	AC/DC ranges	85 ... 230 V or 24 ... 60 V DC - 15 % / + 33 % AC \pm 15 %
consumption	\leq 1 VA	power input	\leq 1.5 W (3 VA)
overload capacity	1.2 · U_N , constant, 2.0 · U_N , 1 sec.	accuracy	
measuring output \rightarrow		reference value	output end value
load-independent DC current	0 ... 1 to 0 ... 20 mA or live-zero 0.2 ... 1 to 4 ... 20 mA	accuracy class	class 0.5
burden voltage	\leq 15 V	peak value factor	$\sqrt{2}$
imprinted DC voltage	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	warming-up time	\leq 5 min.
load capacity	max. 2 mA	safety	
voltage limit bei $R_{ext} = \infty$	\leq 25 V	protection class	II, (protection isolated, DIN EN 61010)
current limit under overload	approx. 1.5 · I_{AN} by current output approx. 10 mA by voltage output	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
residual ripple of the output current	\leq 0.5 % p.p. by response time 300 ms \leq 2 % p.p. by response time 50 ms	contamination class	2
response time	50 ms or 300 ms	overvoltage category	III
		nominal isolation voltage (to earth)	400 V, input 230 V, auxiliary power 40 V, output
		weight	300 g

Order information see page 275



EMBSIN 241 FV

Measuring transducers for frequency



- with auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- Measuring transducer for measuring the frequency of sinus-shaped alternating voltages
- programmable measuring inputs and outputs by means of optional available serial interface RS232 or RS485
- low consumption
- accuracy class 0.2
- digital measuring process
- auxiliary voltage supply by means of universal AC/DC or AC supplies.

Application

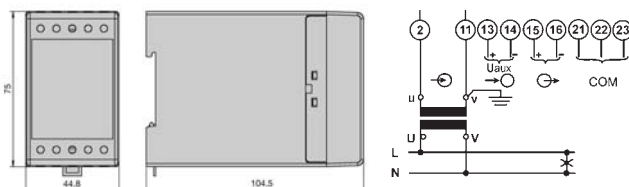
The programmable measuring transducer type EMBSIN 241 FV is being used for converting the frequency of sinus-shaped AC alternating voltage signals into a load-independent output volume. The analogue output signals (current or voltage) are arranged proportionally to the frequency of the voltage input and can be used for regulating analogue or digital units. The input volumes and output volumes can be configured via the available interface RS232 or RS484 with "MBSET" parametic software.

Technical data EMBSIN 241 FV

measuring input \ominus	
measuring range	40 ... 70 Hz
input voltage (U _i)	3 ... 500 V
consumption	< 0.5 VA
overload capacity	1.2 · U _N , constant
(acc. to IEC 60688, 1992)	2.0 · U _N , 1 sec.
measuring output $\ominus \rightarrow$	
load-independent DC current	0 ... 1 mA to 0 ... 5 mA or 0 ... 5 mA to 0 ... 20 mA
burden resistance	$R_{Bmax} = \frac{15[V]}{I_{ON} [mA]} \text{ k}\Omega$
current output	
burden voltage	≤ 15 V
imprinted DC voltage	0 ... 1 V or 0 ... 10 V
burden resistance	$R_{Bmin} = \frac{U_{ON} [V]}{20[mA]} \text{ k}\Omega$
voltage output	
output signalling limit	
current output	125 % I _{AN}
voltage output	125 % U _{AN}
residual ripple	
of the output current	≤ 1 % p.p.
response time	≤ 300 ms

auxiliary power $\rightarrow \ominus$	
universal power supply	DC or AC 40...70 Hz universal
voltage ranges	24 ... 300 V DC and 40 ... 276 V AC
AC power supply	45 ... 65 Hz
nominal voltages:	57,74 V, 100 V, 230 V, 400 V, 500 V
power input	≤ 3 VA
accuracy	
reference value	input end value
accuracy class	class 0.2
reference conditions	
ambient temperature	15 ... 30 °C
input signal	0 ... 100 % I _N
frequency	45 ... 65 Hz
safety	
protection class	II
	300 V, rms, connection category III
	500 V, rms, connection category II
contamination class	2
test voltage	3 kV, rms (acc. to IEC 61010-1:1990)
electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
interface	RS232, MODBUS RTU
(optional)	RS485, MODBUS RTU
connection terminals	≤ 4.0 mm ² single wire ≤ 2 x 2.5 mm ² Litze
weight	approx. 300 g

Order information see page 277

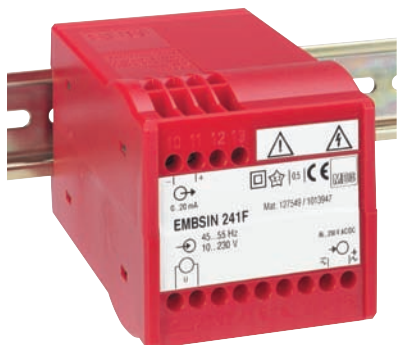


	RS232	
	9-pole plug (SUB-D)	25-pole plug
Rx (21)	Tx (3)	Tx (2)
⊥ (22)	GND (5)	GND (7)
Tx (23)	Rx (2)	Rx (3)
RS485		
A (21)	DATA +	
C (22)	NC ¹⁾	
B (23)	DATA -	

1) -NC- do not connect!

EMBSIN 241 F

Measuring transducers for frequency



- with auxiliary voltage supply
- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: sinus-shaped, rectangular shaped or distorted input voltage (10 to 690 V, 10 Hz to ...1.5 kHz) with dominant basic wave
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Digital constant period measuring
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducer for frequency

A load-independent DC signal or an imprinted DC voltage signal is available which stands proportional to the frequency of the input volume. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility of (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 241 F

measuring input →		auxiliary power →	
rated frequency	selectable between $f_u = 10 \text{ Hz}$ and $f_o = 1500 \text{ Hz}$	universal power supply	DC or AC (40 ... 400 Hz) DC -15 % / + 33 % 1.5 W AC ±15 % 3 VA
min. range	$f_u / (f_o - f_u) < 50$	AC / DC	24 ... 60 V or 85 ... 230 V
rated input voltage U_N	10 ... 230 V or 230 ... 690 V	or AC-auxiliary power from	24 ... 60 V or 85 ... 230 V,
consumption	$< U_N \cdot 1.5 \text{ mA}$	voltage measuring input	(40 Hz ≤ f ≤ 400 Hz) ± 15 %
overload capacity	1.2 · U_N , constant 2.0 · U_N , 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	accuracy	
wave shape	any, only basic wave will be considered	reference value	output range
measuring output →		accuracy class	class 0.2
load-independent DC current	0 ... 1 to 0 ... 20 mA or unipolar live-zero 1 ... 5 to 4 ... 20 mA	safety	
bipolar	± 1 to ± 20 mA	protection class	II, (protection isolated, DIN EN 61010)
burden voltage	≤ +15 V, resp. -12 V	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
imprinted DC voltage	0 ... 1 to 0 ... 10 V or	contamination class	2
unipolar	live-zero 0.2 ... 1 to 2 ... 10 V	overvoltage category	III
bipolar	± 1 to ± 10 V	nominal isolation voltage	230 or 400 V, input (to earth) 230 V auxiliary power 40 V output
load capacity	max. 4 mA	weight	230 g
voltage limit			
by $R_{ext} = \infty$	≤ 25 V		
current limit	approx. 1.3 · I_{AN} by current output		
under overload	approx. 30 mA by voltage output		
residual ripple			
of the output current	< 0.5 % p.p.		
nominal value response time	4 periods of the measuring frequency		
other ranges	2, 8 or 16 periods of the measuring frequency		

Order information see page 278

EMBSIN 241 FD

Measuring transducers for frequency difference



- housing for 35 mm DIN rail mounting

Features/benefits

- measuring inputs: Sinus-shaped, rectangular or distorted input voltage (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) with dominant basic wave
- measuring output: Unipolar, bipolar, or live-zero output signal
- measuring principle: Digital, constant period measuring
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducers for monitoring the frequency difference between two synchronized supplies. A load-independent DC signal or an imprinted DC voltage signal is available as an output signal, which stands proportionally to the measuring value. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 241 FD

measuring input \oplus			
measuring range	$\Delta f = \pm 1 \% f_s$ to $\pm 80 \% f_s$; f_s and $f_G \geq 10$ Hz to ≤ 1.5 kHz	nominal value of the response time	4 periods of the measuring frequency
input voltage U_N	generator or bus bar 10 ... 230 V or 230 ... 690 V Three-phase system! Input voltage = linked voltage (max. 230 V by auxiliary power from voltage measuring input)	other ranges	2, 8 or 16 periods of the measuring frequency
consumption	$< U_N \cdot 1.5$ mA per measuring input	auxiliary power $\rightarrow \odot$	
overload capacity	$1.2 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	universal power supply	DC or AC (40 ... 400 Hz)
wave shape	any, only basic wave will be considered	AC/DC ranges	85 ... 230 V or 24 ... 60 V
Measuring output \rightarrow		or auxiliary power from voltage measuring input	24 ... 60 V to 85 ... 230 V at $40 \text{ Hz} \leq f \leq 400 \text{ Hz}$
load-independent DC current unipolar	0 ... 1 to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	power input	approx. 2 W or 4 VA
bipolar	$\pm (1 \dots 20)$ mA	accuracy	
burden voltage	≤ 15 V or ≥ -12 V	reference value	nominal value output
imprinted DC voltage unipolar	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	accuracy class	class 0.2
bipolar	$\pm (1 \dots 10)$ V	safety	
load capacity	max. 4 mA	protection class	II, (protection isolated, DIN EN 61010)
voltage limit by $R_{ext} = \infty$	≤ 25 V	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
current limit under overload	approx. $1.3 \cdot I_{AN}$ by current output approx. 30 mA at voltage output	contamination class	2
residual ripple of the output current	$< 0.5 \%$ p.p.	overvoltage category	III
		nominal isolation voltage (to earth)	230 V or 400 V, input 230 V, auxiliary power 40 V, output
		weight	270 g

Order information see page 278

EMBSIN 271 G

Measuring transducers for phase angle



- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped, rectangular or distorted input volumes with dominant basic wave
- input signal: 1 A or 5 A, 10 V to 690 V
- measuring range: Phase angle $-180^\circ \text{ el} \leq \varphi \leq +180^\circ \text{ el}$
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Monitoring of the zero currents
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducers for measuring of phase angle between current and voltage of a sinus-shaped single-phase supply or a symmetric load of a three-phase supply. A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the phase angle between the measuring signal of current and voltage. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 271 G

measuring input \rightarrow		residual ripple of the output current	< 0.5 % p.p.
measuring range	- 175°el ... 0 ... + 175°el	nominal value of the response time	4 periods of the measuring frequency
phase angle	min. measuring range $\geq 20^\circ \text{el}$	other ranges	2, 8 or 16 periods of the measuring frequency
nominal frequency f_N	16 2/3 ... 400 Hz	auxiliary power \rightarrow	
input voltage U_N	10 ... 690 V (max. 230 V by auxiliary power from voltage measuring input)	universal power supply	DC or AC (40 ... 400 Hz)
rated input current I_N	1 A or 5 A	AC/DC ranges	85 ... 230 V or 24 ... 60 V
consumption	< 0.1 VA current path $U_N \cdot 1.5 \text{ mA}$ voltage path	or auxiliary power from voltage measuring input	85 ... 230 V or 24 ... 60 V
overload capacity	1.2 · I_N , constant 1.2 · U_N , constant 20 · I_N , 1 sec. 2.0 · U_N , 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	power input	$\leq 2 \text{ W}$ (4 VA)
measuring output \rightarrow		accuracy	
load-independent DC current unipolar	0 ... 1 to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	reference value	$\Delta\varphi = 90^\circ$
bipolar	$\pm (1 \dots 20) \text{ mA}$	accuracy class	class 0.5
burden voltage	$\leq +15 \text{ V}$ or $\geq -12 \text{ V}$	safety	
imprinted DC voltage unipolar	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	protection class	II, (protection isolated, DIN EN 61010)
bipolar	$\pm (1 \dots 10) \text{ V}$	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
load capacity	max. 4 mA	contamination class	2
voltage limit by $R_{\text{ext}} = \infty$	$\leq 25 \text{ V}$	overvoltage category	II
current limit under overload	approx. $1.3 \cdot I_{AN}$ by current output approx. 30 mA by voltage output	nominal isolation voltage (to earth)	230 or 400 V, input 230 V, auxiliary power 40 V, output
		weight	240 g

Order information see page 279



EMBSIN 271 GD

Measuring transducers for phase angle difference

• housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped, rectangular or distorted rated input voltages 10 to 690 V, $\pm 10^\circ \text{ el} \leq \varphi \leq \pm 180^\circ \text{ el}$ with dominant basic wave
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Monitoring of the zero currents
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducers for monitoring of the phase angle difference between two synchronized supplies. A load-independent DC current signal or imprinted DC voltage signal is available which is proportionally arranged to the measuring value. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

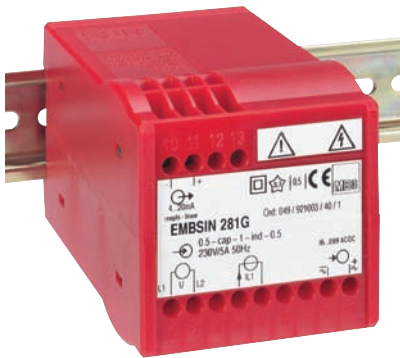
Technical data EMBSIN 271 GD

measuring input \oplus		auxiliary power $\rightarrow \oplus$	
measuring range	- 120° ... 0 ... 120° el	universal power supply	DC or AC (40 ... 400 Hz)
rated frequency f_N	50 or 60 Hz		DC (- 15 ... + 33 %)
input voltages U_N	generator and bus bar 10 ... 230 V or 230 ... 690 V Three-phase system! U_N = linked voltage (max. 230 V by auxiliary power from voltage measuring input)	AC/DC ranges	AC (± 15 %; 40 ... 400 Hz)
consumption	$< U_N \cdot 1.5 \text{ mA}$ per measuring input	power input	85 ... 230 V or 24 ... 60 V $\leq 2 \text{ W}$ (4 VA)
overload capacity	$1.2 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	accuracy	
		reference value	$\Delta\varphi = 90^\circ$
		accuracy class	class 0.5
measuring output $\rightarrow \oplus$		safety	
load-independent DC current	0 ... 1 to 0 ... 20 mA or	protection class	II, (protection isolated, DIN EN 61010)
unipolar	live-zero 1 ... 5 to 4 ... 20 mA	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
bipolar	$\pm (1 \dots 20) \text{ mA}$	contamination class	2
burden voltage	$\leq +15 \text{ V}$, resp. $\geq -12 \text{ V}$	overvoltage category	III
imprinted DC voltage	0 ... 1 to 0 ... 10 V or	nominal isolation voltage	230 V or 400 V, input (to earth) 230 V, auxiliary power 40 V, output
unipolar	live-zero 0.2 ... 1 to 2 ... 10 V	weight	270 g
bipolar	$\pm (1 \dots 10) \text{ V}$		
load capacity	max. 4 mA		
voltage limit by $R_{\text{ext}} = \infty$	25 V		
current limit	approx. $1.3 \cdot I_{\text{AN}}$ by current output		
under overload	approx. 30 mA by voltage output		
residual ripple			
of the output current	$< 0.5 \%$ p.p.		
nominal value of the	4 periods of the		
response time	measuring frequency		
other ranges	2, 8 or 16 periods of		
	the measuring frequency		

Order information see page 281

EMBSIN 281 G

Measuring transducers for power factor



- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped, rectangular or distorted rated input signal with dominant basic wave
- input signals: 1 A or 5 A, 10 V to 690 V
- power factor $\cos 0.5$ cap.-1-0.5 ind.
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Monitoring the distance of zero currents
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducers for the measuring of the power factor between current and voltage of a sinus-shaped single-phase supply or a symmetric load of a three-phase supply. A load-independent DC current signal or imprinted DC voltage signal is available which is proportionally arranged to the power factor between the measuring volumes of current and volt. The measuring transducer fulfills the requirements and regulations with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 281 G

measuring input \oplus		auxiliary power $\oplus\circ$	
power factor $\cos\varphi$	0.5-cap-1-ind-0.5	universal power supply	DC or AC (40 ... 400 Hz)
rated frequency f_N	16 2/3 ... 400 Hz	AC/DC ranges	85 ... 230 V or 24 ... 60 V
input voltage U_N	10 ... 690 V (max. 230 V by auxiliary power from voltage measuring input)	or auxiliary power from voltage input	85 ... 230 V or 24 ... 60 V
rated input current I_N	1 A or 5 A	power input	≤ 2 W (4 VA)
consumption	< 0.1 VA current path $U_N \cdot 1.5$ mA voltage path	accuracy	
overload capacity	1.2 · I_N , constant 1.2 · U_N , constant 20 · I_N , 1 sec. 2.0 · U_N , 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	reference value	$\Delta \cos\varphi = 0.5$
measuring output $\oplus\rightarrow$		accuracy class	class 0.5
load-independent DC current unipolar	0 ... 1 to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	safety	
bipolar	$\pm (1 \dots 20)$ mA	protection class	II, (protection isolated, DIN EN 61010)
burden voltage	$\leq +15$ V resp. ≥ -12 V	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
imprinted DC voltage unipolar	0 ... 1 to 0 ... 10 V or live-zero 0.2 ... 1 to 2 ... 10 V	contamination class	2
bipolar	$\pm (1 \dots 10)$ V	overvoltage category	III
load capacity	max. 4 mA	nominal isolation voltage (to earth)	230 V or 400 V, input 230 V, auxiliary power 40 V, output
voltage limit by $R_{ext} = \infty$	≤ 25 V	weight	260 g
current limit under overload	approx. 1.3 · I_{AN} by current output approx. 30 mA by voltage output		
residual ripple of the output current	< 0.5 % p.p.		
nominal value of the response time	4 periods of the measuring frequency		
other ranges	2, 8 or 16 periods of the measuring frequency		

Order information see page 279

EMBSIN 351 P

Measuring transducers for active power



- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped nominal input currents (1 A or 5 A) and nominal input voltages (100 V to 690 V)
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Impulse width modulation (TDM-process), TDM = time division multiplication
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducer for the transformation of the active power of a single-phase alternative AC current or three-phase current supply of equal or unequal phase load.

A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the measuring value of the active power.

The measuring transducers fulfill the requirements and regulations, with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 351 P

measuring input		auxiliary power	
rated frequency f_N	50 Hz or 60 Hz	universal power supply	DC or AC (40 ... 400 Hz)
rated input voltage U_N	3-phase system U_N = linked voltage 10 ... 690 V (max. 230 V by auxiliary power from voltage measuring input)	AC/DC	85 ... 230 V or 24 ... 60 V
rated input current I_N	1 A or 5 A	or auxiliary power from voltage measuring input	≥ 85 V to ≤ 230 V AC
calibration factor c	0.75 to 1.3 by active power	power input	≤ 2.5 W (4.5 VA)
permissible measuring range	by active power ≥ 0.75 to $1.3 \cdot \sqrt{3} \cdot U_N \cdot I_N$	accuracy	
consumption	< 0.1 VA per current path $U_N \cdot 1$ mA per voltage path	reference value	output end value
overload capacity	$1.2 \cdot I_N$, constant; 20 I_N , 1 sec. $1.2 \cdot U_N$, constant; 2.0 U_N , 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	accuracy class	class 0.5
measuring output		safety	
load-independent DC current unipolar	0 ... 2.5 to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	protection class	II, (protection isolated, DIN EN 61010)
bipolar	$\pm (2.5 \dots 20)$ mA	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
burden voltage	± 15 V	contamination class	2
imprinted DC voltage unipolar	0 ... 10 V or live-zero 2 ... 10 V	overvoltage category	III
bipolar	± 10 V	nominal isolation voltage (to earth)	400 V, input 230 V, auxiliary power 40 V, output
load capacity	max. 4 mA	weight	700 g
voltage limit by $R_{ext} = \infty$	≤ 40 V		
current limit under overload	approx. $1.3 \cdot I_{AN}$ by current output approx. 30 mA by voltage output		
residual ripple of the output current	< 2 % p.p.		
response time	< 300 ms		

Order information see page 282

EMBSIN 361 Q

Measuring transducers for re-active power



- housing for 35 mm DIN rail mounting

Features/benefits

- measuring input: Sinus-shaped nominal input currents (1 A or 5 A) and nominal input voltages (100 V to 690 V)
- measuring output: Unipolar, bipolar or live-zero output signal
- measuring principle: Impulse width modulation (TDM-process), TDM = time division multiplication
- AC/DC auxiliary power by means of universal power supply

Application

Measuring transducer for the transformation of the re-active power of a single-phase alternative AC current or three-phase current supply of equal or unequal phase load.

A load-independent DC current signal or imprinted DC voltage signal is available, which is proportionally arranged to the measuring value of the re-active power.

The measuring transducers fulfill the requirements and regulations, with regard to the electromagnetic compatibility (EMV) and safety (IEC 1010 or EN 61010).

Technical data EMBSIN 361 Q

measuring input		auxiliary power	
rated frequency f_N	50 Hz	universal power supply	DC or AC (40 ... 400 Hz)
rated input voltage U_N	Three-phase system U_N = linked voltage 10 ... 690 V (max. 230 V by auxiliary power from voltage measuring input)	AC/DC	85 ... 230 V or 24 ... 60 V
rated input current I_N	1 A or 5 A	or auxiliary power from voltage measuring input	≥ 85 V to ≤ 230 V AC
calibration factor c	0.5 to 1.0 by re-active power	power input	≤ 2.5 W (4.5 VA)
permissible measuring range end values	by re-active power ≥ 0.5 to $1.0 \cdot \sqrt{3} \cdot U_N \cdot I_N$	accuracy	
consumption	< 0.1 VA per current path $U_N \cdot 1$ mA per voltage path	reference value	output end value
overload capacity	$1.2 \cdot I_N$, constant; 20 I_N , 1 sec. $1.2 \cdot U_N$, constant; 2.0 U_N , 1 sec. (max. 264 V by auxiliary power from voltage measuring input)	accuracy class	class 0.5
measuring output		safety	
load-independent DC current unipolar	0 ... 2.5 to 0 ... 20 mA or live-zero 1 ... 5 to 4 ... 20 mA	protection class	II, (protection isolated, DIN EN 61010)
bipolar	$\pm (2.5 \dots 20)$ mA	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
burden voltage	± 15 V	contamination class	2
imprinted DC voltage unipolar	0 ... 10 V bzw. live-zero 2 ... 10 V	overvoltage category	III
bipolar	± 10 V	nominal isolation voltage (to earth)	400 V, input 230 V, auxiliary power 40 V, output
load capacity	max. 4 mA	weight	700 g
voltage limit by $R_{ext} = \infty$	≤ 40 V		
current limit under overload	approx. $1.3 \cdot I_N$ by current output approx. 30 mA by voltage output		
residual ripple of the output current	< 2 % p.p.		
response time	< 300 ms		

Order information see page 282

EMBSIN 301

Programmable measuring transducers for alternating current



Features/benefits

- auxiliary power supply 230 V AC or 24 V DC.
- two remote controlable measuring ranges from 20...600 A AC
- two simultaneously available analogue measuring outputs
- programmable output characteristic curves
- current circuit control by means of programmable control circuits
- information of the actual operation conditions through two open collector transistors in connection with simultaneous signalling of colored light emittance diodes

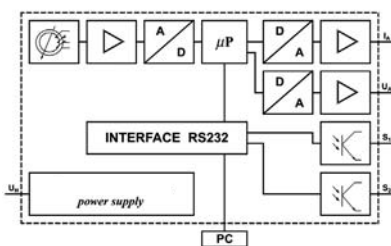
Application

Programmable measuring transducer for monitoring sinus-shaped as well as distorted AC currents in the rated current range of 20 ... 600 A. Inductive, galvanically separated measuring value collection is secured by means of an integrated current transformer.

As an output signal, proportionally arranged to the measurement value (rms) a DC current signal and an imprinted DC voltage signal is available. By means of an integrated interface RS232 the following additional power features can be realized:

- adjustment of the output characteristics of the analogue outputs 0(4) ...20 mA or 0(2) ...10 V
- nominal current control by means of two programmable control circuits
- optimal signaling of the actual value of the measuring volumes in realiance to the tuned control circuits by means of three-coloured light emittance diodes
- energizing of the switch operations (i.e. I_{Min}/I_{Max} -monitoring) by means of two open collector transistors, designated to the tuned switch circuits
- measuring value continuous monitoring of measuring values and data saving, when interacting with external computers.

Basic circuit diagram



Dimensions:

Depth x length x height:
(87.5 x 70 x 114 mm)

Technical data EMBSIN 301

measuring input		accuracy	
measuring variable	sinus-shaped or distorted alternating current	reference value	nominal output value
measuring range	20 ... 600 A AC	accuracy class	class 0.5 (0.5 % from output end value)
rated frequency f_N	50 Hz	working range	1 ... 120 % I_N
consumption	< 0.5 VA	warming-up time	≤ 5 min
overload capacity	1.5 · I_N , constant 8.0 · I_N , 40 sec.	auxiliary power	
measuring output		AC	230 V ± 10 %
current output		DC (optional)	24 V ± 15 %
load-independent DC current	0...20 mA or live-zero 4...20 mA, programmable by means of software	operating conditions	
max. burden voltage	≤ 15 V DC	field of operation	indoors without humidity
max. burden resistance	$R_B \leq 500 \Omega$	working temperature	- 5 °C ≤ ϑ + 45 °C
residual ripple of the output current	< 0.5 % p.p.	storage temperature	- 40 °C ≤ ϑ + 70 °C
current limit under overload	≤ 30 mA	energizing	
voltage output		2 open-collector transistor outputs	for load current dependent monitoring of relay controls; programmable control circuits via units software
imprinted DC voltage, unipolar	0...10 V or live-zero 2...10 V, programmable by means of software	U_{CEmax}	50 V
min. burden resistance	≤ 10 kΩ	I_{CEmax}	35 mA
voltage limit by $R_{ext} = \infty$	≤ 15 V	interface	
response time of the output signal	50 ms	series	RS 232, connection via 9-pole SUB-D-plug
		standard	IEC 60688 IEC 61000

Order information see page 283

EMBSIN 391 PV

Programmable measuring transducers
for all electrical parameters



- with auxiliary voltage supply housing for 35 mm DIN rail mounting

Features/benefits

- multifunctional measuring transducer for the simultaneous distribution of 3 parameters of the electrical system
- monitoring of up to 50 different parameters (V, A, kW, kVA, ...)
- programmable measuring inputs and measuring outputs
- low power consumption
- auxiliary power supply by means of universal AC/DC or AC power
- accuracy class 0.5
- serial interface, RS 232 or RS 485 (optional)
- max. 3 analogue outputs

Application

The programmable measuring transducer EMBSIN 391 PV allows for the simultaneous distribution of 3 parameters of the electrical network. Large input ranges of the parameters allow for the monitoring of almost all standardized AC voltages and AC currents. At the measuring output of the transducer are three galvanically separated, load-independent, analogue output signals available, which are proportionally arranged to the input parameters. These output signals (DC voltage or DC current) can be used for monitoring/controlling of analogue or digital units.

Technical data EMBSIN 391 PV

measuring input \oplus		auxiliary power $\rightarrow \circ$	
rated input voltage	50 V to 500 V AC (phase against neutral)	universal power supply	DC or AC 40...70 Hz universal
rated input current	0.5 A to 5.0 A AC	voltage ranges	24 ... 300 V DC and 40 ... 276 V AC
overload capacity		AC power supply	45 ... 65 Hz
current input	$2 \cdot I_N$, constant $20 \cdot I_N$, 1 sec.	nominal voltages:	57.74 V, 100 V, 230 V, 400 V, 500 V
voltage input	$1.5 \cdot U_N$, constant $2.0 \cdot U_N$, 1 sec.	power input	≤ 3 VA
measuring output (analogue) $\rightarrow \oplus$		accuracy	
nominal current output range (I_{AN}), parametrical	0 ... 1 mA to 0 ... 20 mA	reference value	end value of the input volume
max. burden voltage	$U_B \leq 15$ V	accuracy class	class 0.5
burden resistance current	$R_{MAX} [k\Omega] = 15V / I_{AN} [mA]$	reference conditions	
nominal voltage output ranges (U_{AN}), parametrical	0 ... 1 V to 0 ... 10 V	ambient temperature	15 ... 30 °C
max. burden current	20 mA	input signal	0 ... 100 % I_N
burden resistance		frequency	45 ... 65 Hz
voltage	$R_{MIN} [k\Omega] = U_{AN} / 20$ mA	safety	
residual ripple of the output current	≤ 1 % p.p.	protection class	IP50 300 V, rms, connection category III 500 V, rms, connection category II
response time	≤ 300 ms	contamination class	2
		test voltage	3 kV, rms (acc. to IEC 61010-1: 1990)
		electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
		working temperature	-10 °C $\leq \vartheta \leq$ + 55 °C
		interface (optional)	RS232, MODBUS RTU RS485, MODBUS RTU
		connection terminals	≤ 4.0 mm ² single wire $\leq 2 \times 2.5$ mm ² Litze
		weight	
		with AC power supply	approx. 600 g
		with universal power supply	approx. 500 g

Order information see page 283

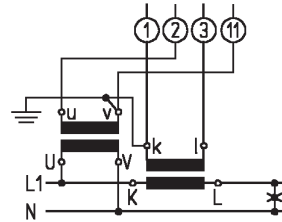
Connection diagram see page 266
Specification see page 267

EMBSIN 391 PV

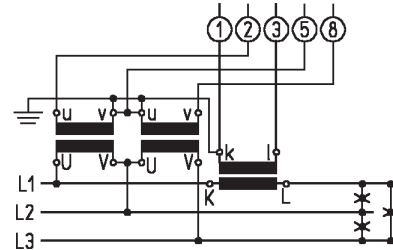
Programmable measuring transducers for all electrical parameters

Connection diagram

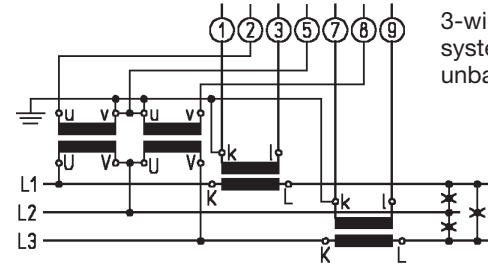
The voltage inputs of the measuring transducer can be connected directly to a low voltage network or to a high voltage network via a high voltage transformer. The current inputs of the measuring transducer can be directly connected to a low voltage network via a low voltage current transformer or to a high voltage network via a high voltage current transformer.



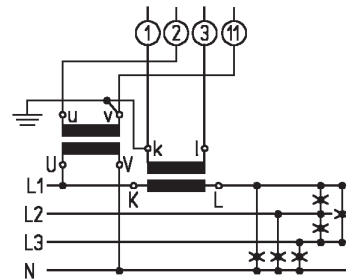
single-phase system - 1b



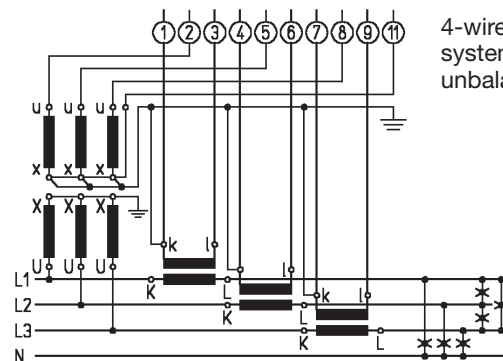
3-wire three-phase system - 3b, balanced load



3-wire three-phase system - 3u, unbalanced load



4-wire three-phase system - 4b, balanced load



4-wire three-phase system - 4u, unbalanced load

Function		Connection	
measuring input	AC current	I _{L1}	1/3
		I _{L2}	4/6
		I _{L3}	7/9
	AC voltage	U _{L1}	2
		U _{L2}	5
		U _{L3}	8
measuring outputs	output 1	+	15
		-	16
	output 2	+	17
		-	18
	output 3	+	19
		-	20
auxiliary voltage supply	DC +/- AC	13	
	- / AC	14	
interface (optional)	RS232/RS485	Rx / A	21
		≠ / NC ¹⁾	22
		Tx / B	23

1) -NC- do not connect!

EMBSIN 391 PV

Programmable measuring transducers
for all electrical parameters

Specifications		
Description		EMBSIN 391 PV
auxiliary voltage		with auxiliary voltage supply
measuring principle		microprocessor sampling
inputs		
rated input voltage		programmable, 0...50 V to 0...500 V
rated input current		programmable, 0...0.5 to 0...5 A
rated frequency		45...65 Hz
outputs		
number of available analogue outputs		3 with AC/DC power supply 1 with AC power supply
output voltage ranges		programmable, -10...+10 V to -1...+1 V
output current ranges		programmable, -20...+20 mA to -1...+1 mA
interface		RS232 or RS485
measuring variables		
current	phase current I ₁ , I ₂ , I ₃ and mean value current I _{avg}	
	phase to neutral voltage U ₁ , U ₂ , U ₃ and mean value to neutral value voltage	a, b
voltage	linked voltages U ₁ -U ₂ , U ₂ -U ₃ , U ₃ -U ₁ and mean value of the linked voltages U _{avg} (pp)	a, b
	frequency	a, b
active power		a, b
re-active power		a, b
apparent power		a, b
power factor		a, b
phase angle		a, b
% THD distortion factor		a, b
instantaneous value monitoring	phase current	a, b
	total apparent power	a, b
	total active power	a, b
	total re-active power	a, b
maximal value monitoring	phase current	a, b
	total apparent power	a, b
	total active power	a, b
	total re-active power	a, b

a - measuring value is available via analogue output

b - measuring value is visual via interface



EMBSIN 391

Programmable measuring transducers for all electrical parameters

- housing for 35 mm DIN rail

Features/benefits

- measuring inputs: Sinus-shaped input currents 0...7.5 A, sinus-shaped input voltages 0...690 V
- measuring outputs: 3 simultaneously available unipolar, bipolar or live-zero measuring outputs (current or voltage). The outputs can be assigned to several measuring parameters
- AC/DC auxiliary power supply, universal power supply
- programmable interface: Serial RS232 C

Application

The EMBSIN 391 is a programmable, multi measuring transducer for electrical power current variables. It monitors simultaneously 3 measuring variables of a single-phase AC current or three-phase AC current network of equal or unequal load. As an output signal 3 galvanically separated load independent DC current signals or imprinted DC voltage signals are available, which are proportionally arranged to the chosen measuring values of the input parameters. The measuring transducer fulfills all requirements and regulations with regard to the electro-magnetic compatibility (EMV) and safety (IEC 1010 and EN 61010).

Technical data EMBSIN 391

measuring input \oplus		auxiliary voltage supply, alternatively $\rightarrow \circ$	
rated frequency f_N	50/60 Hz	AC / DC power supply	24 ... 60 V AC / DC
sinus-shaped input current I_N	0 ... 7.5 A		85 ... 230 V AC / DC
sinus-shaped input voltage U_N	$U_N = \text{linked voltage}$ 0 ... 690V max. 400 V to earth !		(DC ... 50/60 Hz)
power input from measuring circuit			(DC -15 % ... + 33 %)
- current path	$\leq I_E^2 \cdot 0.01 \text{ W}$		(AC -15 % ... + 15 %)
- voltage path	$\leq U_E^2 / 400 \text{ kW}$	power input	$\leq 5 \text{ W (7 VA)}$
interface	serial, RS232 C	accuracy	
measuring output, user defined $\rightarrow \oplus$		reference value	measuring range end value
3 x load independent		accuracy class	class 0.5
DC current	-20 ... +20 mA	safety	
or		protection class	II, (protection isolated, EN 61010-1)
3 x imprinted DC current	-10 ... +10 V	electrocution protection	IP 40, housing (test wire, EN 60529) IP 20, connection terminals (test digit, EN 60529)
max. burden at current output	$R_B \leq \frac{15 \text{ V}}{I_{AN}} \text{ [k}\Omega\text{]}$	contamination class	2
min. burden by voltage output	$R_B \leq \frac{U_{AN}}{1 \text{ mA}} \text{ [k}\Omega\text{]}$	nominal isolation voltage	inputs: 300 V(2) 600 V(3) auxiliary power: 230 V outputs: 40 V
output signalling limit under overload :		weight	370 g
- current output	$1.2 \times I_{AN} (R_A = 0)$ $\leq 30 \text{ V (by } R_A = \infty)$	(2) overvoltage category III	
- voltage output	40 mA ($R_A = 0$) $1.2 \times U_{AN} (R_A = \infty)$	(3) overvoltage category II	
residual ripple of the output current	$\leq 1 \% \text{ p.p}$		
response time of the output signal	1...2 x measuring cyclus time		

Order information see page 286

Order Lists

	page
FASK	Flexible clip-on current transformer (Rogowski coil)270
EMBSIN 100 IV	Measuring transducer for AC current, without auxiliary voltage supply271
EMBSIN 100 I	Measuring transducer for AC current, without auxiliary voltage supply271
EMBSIN 101 I	Measuring transducer for AC current, with auxiliary voltage supply272
EMBSIN 201 IEV	Measuring transducer for AC current, rms measurement273
EMBSIN 201 IE	Measuring transducer for AC current, rms measurement275
EMBSIN 120 UV	Measuring transducer for AC voltage, without auxiliary voltage supply276
EMBSIN 120 U	Measuring transducer for AC voltage, without auxiliary voltage supply276
EMBSIN 121 U	Measuring transducer for AC voltage, with auxiliary voltage supply272
EMBSIN 221 UEV	Measuring transducer for AC voltage, with auxiliary voltage supply273
EMBSIN 221 UE	Measuring transducer for AC voltage, rms measurement275
EMBSIN 241 FV	Measuring transducer for frequency, with auxiliary voltage supply277
EMBSIN 241 F	Measuring transducer for frequency, with universal AC/DC power supply278
EMBSIN 241 FD	Measuring transducer for frequency difference with universal AC/DC power supply278
EMBSIN 271 G	Measuring transducer for phase angle, with universal AC/DC power supply279
EMBSIN 271 GD	Measuring transducer for phase angle difference, with universal AC/DC power supply281
EMBSIN 281 G	Measuring transducer for power factor, with universal AC/DC power supply279
EMBSIN 351 P	Measuring transducer for active power, with universal AC/DC power supply282
EMBSIN 361 Q	Measuring transducer for re-active power, with universal AC/DC power supply282
EMBSIN 301	Programmable measuring transducer for AC current283
EMBSIN 391 PV	Programmable measuring transducer for all electrical variables283

Order Lists

FASK – Current transformers with separable, flexible measuring system (Rogowski coils)

Features		Order no.										
		X	X	X	X	X	X	X	X	X	X	X
1.) Type / length l	Type	coil length										
	F30	30 cm	F	0	3	0						
	F40	40 cm	F	0	4	0						
	F60	60 cm	F	0	6	0						
	F75	75 cm	F	0	7	5						
	F100	100 cm	F	1	0	0						
	special types on request		F	9	0	0						
2.) Measuring current	measuring range	coil length										
	200 A AC	l = 30 cm				0	2	0	0			
	500 A AC	l = 30 cm				0	5	0	0			
	1000 A AC	l = 40 cm				1	0	0	0			
	2000 A AC	l = 60 cm				2	0	0	0			
	3000 A AC	l = 75 cm				3	0	0	0			
	3000 A AC	l = 100 cm				3	0	0	0			
	special value on request 100...3000 A					X	X	X	X			
3.) Output signal U _A / auxiliary voltage supply U _H	U _A [V AC]		U _H [V DC]									
	0.500 V AC		5 V DC								0	
	1.000 V AC		5 V DC								1	
	2.000 V AC		9 V DC								2	
	3.000 V AC		12 V DC								3	
	4...20 mA DC										4	
	0...1 V DC										5	
	0...5 V DC										6	
0.21 mV/A		without power supply								7		
4.) Lead / cord length	standard l				3 x 2.0 m						1	
	special length l				max. 3 x 15.0 m						9	

Order Lists

EMBSIN 100 IV – Measuring transducer for AC current, without auxiliary voltage supply

Features	Order no.				
EMBSIN 100 IV, measuring transducer for AC current order no.: 100 I - Vxxx	100 I -	V	X	X	X
1. construction housing MBS, for 35 mm DIN rail		V			
2. measuring range 0 ... 1 A			1		
0 ... 5 A			2		
nonstandard [A], 0 ... 1 A to 0 ... 7.5 A _____ A			9		
3. output signal 0 ... 5 mA				1	
0 ... 10 mA				2	
0 ... 20 mA				3	
4. additional text on the label without additional text					0
with additional text					1

rated frequency of the measuring signal: 50/60 Hz

EMBSIN 100 I – Measuring transducer for AC current, without auxiliary voltage supply

Features	Order no.					
EMBSIN 100 I, measuring transducer for AC current order no.: 100 I - Mxxxx	100 I -	M	X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		M				
2. measuring range 0 ... 1 / 5 A			1			
0 ... 1.2 / 6 A			2			
9) nonstandard [A] 0 ... 0.5 A to 0 ... 7.5 A (only one measuring range!) _____ A			9			
3. output signal 0 ... 5 mA, Ra <= 3 kOhm				1		
0 ... 10 mA, Ra <= 1.5 kOhm				2		
0 ... 20 mA, Ra <= 750 Ohm				3		
4. measuring range adjustable measuring range fixed					0	
measuring end value adjustable approx. ± 10 %					1	
5. test certificates without test certificate						0
with test certificate in German						D
with test certificate in English						E

rated frequency of the measuring signal: 50/60 Hz

Order Lists

EMBSIN 101 I – Measuring transducer for alternating current EMBSIN 121 U – Measuring transducer for alternating voltage

Features	Order no.							
EMBSIN 101 I , measuring transducer for AC current order no.: 101 I - Mxx xxx	101 I -	M	X	X		X	X	X
EMBSIN 121 U, measuring transducer for AC voltage order no.: 121 U - Mx xxxx	121 U-	M	X		X	X	X	X
1. construction housing MBS / SP1, for 35 mm DIN rail		M						
2. frequency of the input voltage / input current rated frequency 50 / 60 Hz			1					
3. measuring range								
0 ... 1 A				A				
0 ... 5 A				B				
Z: _____ A				Z				
! Z: Nonstandard [A] : 0 ... 0.8 to 0 ... 1.2 or 0 ... 4 to 0 ... 6								
0 ... 100 V					A			
0 ... 250 V					B			
Z: _____ V					Z			
! Z: Nonstandard [V] : 0 ... 50 to 0 ... 500								
max. 300 V rated voltage to earth (rated voltages acc. to EN 61010)								
4. output signal								
0 ... 20 mA						1		
4 ... 20 mA						2		
4 ... 20 mA , 2-wire connection / feed						3		
9: _____ mA						9		
! 9: Nonstandard [mA] : 0 ... 2.5 to 0 ... < 20								
0 ... 10 V						A		
Z: _____ V						Z		
1 ... 5 to < (4... 20)								
! Z: Nonstandard [V] : 0 ... 5.0 to 0 ... < 10								
1 ... 5 to 2 ... 10								
5. auxiliary power								
auxiliary voltage Uh : 24 V AC							1	
auxiliary voltage Uh : 110 V AC							2	
auxiliary voltage Uh : 115 V AC							3	
auxiliary voltage Uh : 120 V AC							4	
auxiliary voltage Uh : 230 V AC							5	
auxiliary voltage Uh : 400 V AC, ! max. 300 V to earth!							6	
auxiliary voltage Uh : 24 V DC							A	
auxiliary voltage Uh : 24 V DC via output circuit							B	
universal power supply 85 ... 230 V AC/DC							C	
universal power supply 24 ... 60 V AC/DC							D	
Uh ... rated voltage, permissible tolerances								
AC : - 15 % ... +15 %								
DC : - 15 % ... +33 %								
for DC via output circuit: - 50 % ... +33 %								
! 1 to A not to be combined with output signal, order-no.: 3								
! B not to be combined with output signal, order no.: 1, 2, 9, A, Z								
6. test certificates								
without test certificate								0
with test certificate in German								D
with test certificate in English								E

Order Lists

EMBSIN 201 IEV – Measuring transducer for alternating current, true rms measuring
EMBSIN 221 UEV – Measuring transducer for alternating voltage, true rms measuring

Features	Order no.											
EMBSIN 201 IEV, measuring transducer for AC current effective value, order no.: 201 IE - Vxxxxxxx	201 IE -	V	X		X	X	X	X	X	X	X	X
EMBSIN 221 UEV, measuring transducer for alternating voltage effective value, order no.: 221 UE - Vxxxxxxx	221 UE -	V		X	X	X	X	X	X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		V										
2. measuring range												
0 ... 1 A			1									
0 ... 5 A			2									
9) _____ A												
! 9) 0 ... 0.2 A to 0 ... 6 A			9									
0 ... 50 V				A								
0 ... 500 V				B								
Z) _____ V												
! Z) 0 ... 50 V to 0 ... 500 V				Z								
3. output signal												
mA				1								
V				2								
4. output signal, start value												
output unipolar, start value 0					1							
output live-zero, start value 20 %					2							
5. output signal, end value												
output signal end value: 20 mA					1							
output signal end value: 1 ... 20 mA, _____ mA					9							
output signal end value: 10 V					A							
output signal end value: 1 ... 10 V, _____ V					Z							
6. auxiliary voltage												
universal power supply 24 ... 300 V DC/ 40 ... 276 V AC						1	0					
AC power supply						2						
57 V							1					
100 V							3					
110 V							4					
230 V							5					
400 V							7					
500 V							8					
7. type of serial interface												
without interface										0		
RS 232										1		
RS 485										2		
8. type of output characteristics												
linear											L	
curved (1)												B

(1) Please take notice of the additional information in table 2 when ordering curved output characteristics.

Order Lists

EMBSIN 201 IEV – Measuring transducer for alternating current, true rms measuring EMBSIN 221 UEV – Measuring transducer for alternating voltage, true rms measuring

Table 2

Additional information when ordering measuring transducers with curved output characteristics
When ordering measuring transducers with curved output characteristics the start and end points as well as the position of the required curved break of the to be adjusted transmission ratio have to be defined. Measuring transducers of the type **EMBSIN 201 IEV / EMBSIN 221 UEV** allow the presentation of transmission characteristics of up to 5 curved breaks.

Description		Code
start value of the measuring value(s)	dependent on the measuring range	s
	0 ... +20 mA / 0 V ... +10 V	
start value of the output value	dependent on the output range	p
	$0 \leq p \leq +20 \text{ mA} / 0 \leq p \leq +10 \text{ V}$	
end value of the measuring value (s)	dependent on the measuring range	e
end value of the output value (rt) if measuring value (e)	1 mA ... +20 mA / 1 V ... +10 V	
	dependent on the output range	rt
		n1_____
		n2_____
value of the measuring value (n_x)	dependent on the measuring range	n3_____
		n4_____
		n5_____
		o1_____
	0 mA ... +20 mA/ 0 V ... +10 V	o2_____
value of the output value (o_x) if measuring value (n_x)	dependent on the output range	o3_____
	$0 \leq p \leq +20 / 0 \leq p \leq +10$	o4_____
		o5_____

Order Lists

EMBSIN 201 IE – Measuring transducer for alternating current EMBSIN 221 UE – Measuring transducer for alternating voltage

Features	Order no.									
EMBSIN 201 IE, measuring transducer for alternating current effective value, order no.: 201 IE - Mxx xx x	201 IE -	M	X	X		X	X		X	X
EMBSIN 221 UE, measuring transducer for alternating voltage effective value, order no.: 221 UE - Mx xx xx	221 UE-	M	X		X	X		X	X	X
1. construction housing MBS, for 35 mm DIN rail		M								
2. frequency of the input current/ input voltage rated frequency 50/60 Hz				1						
rated frequency 400 Hz				2						
3. measuring range 0 ... 1.0 / 5.0 A					1					
0 ... 1.2 / 6.0 A					2					
9: _____ / _____ A					9					
Lower/higher measuring range dependent on connection availability ! 9: nonstandard [A]: 0 ... 0.1 / 0.5 to 0 ... < 1.2 / 6 measuring range end value ratio 1 : 5										
0 ... 100 / $\sqrt{3}$ V						A				
0 ... 110 / $\sqrt{3}$ V						B				
0 ... 100 V						C				
0 ... 110 V						D				
0 ... 116.66 V						E				
0 ... 120 V						F				
0 ... 125 V						G				
0 ... 133.33 V						H				
0 ... 150 V						J				
0 ... 250 V						K				
0 ... 500 V ! Z) _____ V						L				
! Z: Nonstandard [V]: 0 ... 20 to 0 ... 690 * with auxiliary voltage from measuring input min. 24V/ max. 230V see selection criteria 5 digit 3+4 ! * > 400 V only linked voltage!						Z				
4. output signal 0 ... 20 mA							1			
4 ... 20 mA							2			
9: _____ mA							9			
0 ... 10 V							A			
Z: _____ V							Z			
! 9) Nonstandard [mA]: 0 ... 1.00 to 0 ... < 20 0.2 ... 1 to < (4 ... 20) ! Z) Nonstandard [V]: 0 ... 1.00 to 0 ... < 10 0.2 ... 1 to 2 ... 10										
5. auxiliary voltage U _h : 85 ... 230 V AC/DC							1	1		
U _h : 24 ... 60 V AC/DC							2	2		
from measuring input (>= 24 ... 60 V AC)								3		
from measuring input (>= 85...230 V AC)								4		
U _h : 24 V AC/ 24 ... 60 V DC							5	5		
from low voltage area U _h = rated voltage tolerances: DC -15 ... +33 %, AC -15 ... +15 % ! 3 not to be combined with measuring range order no.: C ... L ! 4 not to be combined with measuring range order no.: A , B , L										
6. response time 300 ms, standard									1	
50 ms									2	
7. test certificates without test certificate										0
with test certificate in German										D
with test certificate in English										E

Order Lists

EMBSIN 120 UV - Measuring transducer for alternating voltage, without auxiliary voltage supply

Features	Order no.				
EMBSIN 120 UV, measuring transducer for alternating voltage order no.: 120 U - Vxxx	120 U -	V	X	X	X
1. construction housing MBS, for 35 mm DIN rail		V			
2. measuring range					
0 ... 100 / $\sqrt{3}$ V			1		
0 ... 110 / $\sqrt{3}$ V			2		
0 ... 100 V			3		
0 ... 110 V			4		
0 ... 250 V			6		
0 ... 500 V !			8		
9: _____ V					
! 9: Nonstandard [V] 0 ... 20 to 0 ... 500 V					
! max. 250 V rated voltage to earth, working voltage acc. to EN 61010!			9		
3. output signal					
0 ... 5 mA				1	
0 ... 10 mA				2	
0 ... 20 mA				3	
4. additional text on the label					
without additional text					0
with additional text					1

rated frequency of the measuring signal: 50 / 60 Hz

EMBSIN 120 U - Measuring transducer for alternating voltage, without auxiliary voltage supply

Features	Order no.					
EMBSIN 120 U, measuring transducer for alternating voltage order no.: 120 U - Mxxxx	120 U -	M	X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		M				
2. measuring range						
0 ... 100 / $\sqrt{3}$ V			A			
0 ... 110 / $\sqrt{3}$ V			B			
0 ... 120 / $\sqrt{3}$ V			C			
0 ... 100 V			D			
0 ... 110 V			E			
0 ... 116.66 V			F			
0 ... 120 V			G			
0 ... 125 V			H			
0 ... 133.33 V			J			
0 ... 150 V			K			
0 ... 250 V			L			
0 ... 400 V			M			
0 ... 500 V			N			
Z: _____ V			Z			
! Z: Nonstandard [V] 0...20 to 0...500 V						
! max. 250 V rated voltage to earth, working voltage acc. to EN 61010!						
3. output signal						
0 ... 5 mA, Ra <= 3 kOhm				1		
0 ... 10 mA, Ra <= 1.5 kOhm				2		
0 ... 20 mA, Ra <= 750 Ohm				3		
4. measuring range adjustable						
measuring range fixed					0	
measuring end value adjustable approx. ± 10 %					1	
5. test certificates						
without test certificate						0
with test certificate in German						D
with test certificate in English						E

Order Lists

EMBSIN 241 FV - Measuring transducer for frequency

Features	Order no.									
EMBSIN 241 FV, measuring transducer for frequency order no.: 241 F - Vxxxxxxx	241 F-	V	X	X	X	X	X	X	X	X
1. construction										
housing MBS, for 35 mm DIN rail		V								
2. measuring range										
40 ... 70 Hz			1							
45 ... 55 Hz			2							
48 ... 52 Hz			3							
45 ... 65 Hz			4							
55 ... 65 Hz			5							
9: (40 Hz ≤ 70 Hz) fa ≤ fe ≤ 70 Hz fa _____ Hz fe _____ Hz			9							
3. output signal										
mA			1							
V			2							
4. output signal, start value										
output signal unipolar, start value			1							
output signal live-zero, start value 20 %			2							
5. output signal, end value										
output signal, end value: 5 mA					1					
output signal, end value: 10 mA					2					
output signal, end value: 20 mA					3					
output signal, end value: 1 ... 20 mA, _____ mA					9					
output signal, end value: 10 V					A					
output signal, end value: 1 ... 10 V, _____ V					Z					
6. auxiliary voltage										
universal power supply						1	0			
AC power supply						2				
57 V							1			
100 V							3			
110 V							4			
230 V							5			
400 V							7			
500 V							8			
7. type of serial interface										
without interface									1	
RS232									2	
RS485									3	
8. type of output characteristics										
linear										L
curved (1)										B

(1) Please take notice of the additional information in table 2 when ordering curved output characteristics.

Table 2

Additional information when ordering measuring transducers with curved output characteristics

When ordering measuring transducers with curved output characteristics the start and end points as well as the position of the required curved break of the to be adjusted transmission ratio have to be defined. Measuring transducers of the type EMBSIN 241 FV allow the presentation of transmission characteristics of up to 5 curved breaks.

Description		Code
start value of the measuring value (s)	dependent on the measuring range	s
start value of the output value (p)	0 mA ... +20 mA / 0 V ... +10 V	
	dependent on the output range	p
	0 mA ≤ p ≤ +20 mA / 0 ≤ p ≤ +10 V	
end value of the measuring value (e)	dependent on the measuring range	e
end value of the output value (rt) if measuring value (e)	1 mA ... +20 mA / 1 V ... +10 V	
	dependent on the output range	rt
value of the measuring value (nx)	dependent on the measuring range	n1 ... n5
	0 mA ... +20 mA / 0 V ... +10 V	
value of the output value (ox) if measuring value (nx)	dependent on the output range	o1 ... o5
	0 ≤ p ≤ +20 / 0 ≤ p ≤ +10	

Order Lists

EMBSIN 241 F - Measuring transducer for frequency EMBSIN 241 FD - Measuring transducer for frequency difference

Features	Order no.								
EMBSIN 241 F, measuring transducer for frequency order no.: 241 F - Mxxxxxx	241 F -	M	X	X		X	X	X	X
EMBSIN 241 FD, measuring transducer for frequency difference order no.: 241 FD- Mxxxxxx	241 FD-	M	X			X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		M							
2. rated nominal voltage 241 FD -> generator and bus bar									
input voltage									
10 ... 230 V			1						
> 230 ... 690 V			2						
! Three-phase system: input voltage = linked voltage ! 2 not permissible by auxiliary voltage starting from measuring input									
3. measuring range									
45 ... 50 ... 55 Hz					1				
47 ... 49 ... 51 Hz					2				
47.5 ... 50 ... 52.5 Hz					3				
48 ... 50 ... 52 Hz					4				
58 ... 60 ... 62 Hz					5				
9: _____ Hz					9				
! 9: nonstandard [Hz]; limit values: start value $f_a > = 10$ Hz, end value $f_e < = 1500$ Hz $f_a / (f_e - f_a) < 50$									
$f_s = 50$ Hz / $f_g = 49.5 ... 50 ... 50.5$ Hz					1				
$f_s = 50$ Hz / $f_g = 47.5 ... 50 ... 52.5$ Hz					2				
$f_s = 50$ Hz / $f_g = 45 ... 50 ... 55$ Hz					3				
$f_s = 50$ Hz / $f_g = 40 ... 50 ... 60$ Hz					4				
$f_s = 60$ Hz / $f_g = 57.5 ... 60 ... 62.5$ Hz					5				
9: _____ Hz					9				
! 9: Nonstandard [Hz]: upon request									
4. output signal									
0 ... 20 mA					1				
4 ... 20 mA					2				
9: _____ mA					9				
0 ... 10 V					A				
Z: _____ V					Z				
! 9: Nonstandard [mA]: 0 ... 1.0 to 0 ... < 20 mA 1.0 ... 0 ... 1.0 to -20 ... 0 ... 20 mA 1 ... 5 to < (4 ... 20)									
! Z: Nonstandard [V] : 0 ... 1.0 to 0 ... < 10 V 0.2 ... 1 to 2 ... 10 V -1.0 ... 0 ... 1.0 to -10 ... 0 ... 10 V									
5. auxiliary voltage									
U_h : 85 ... 230 V AC/DC					1				
U_h : 24 ... 60 V AC/DC					2				
from measuring input ($\geq 24 ... 60$ V AC)					3				
from measuring input ($\geq 85...230$ V AC)					4				
auxiliary voltage U_h : 24 V AC / 24 ... 60 V DC from low voltage side					5				
U_h = rated voltage tolerances: DC -15 ... +33 %, AC -15 ... +15 % ! 3 + 4 not to be combined with input rated voltage, order no. 2									
6. response time									
4 periods of input frequency								1	
2 periods of input frequency								2	
8 periods of input frequency								3	
16 periods of input frequency								4	
! 1: 4 periods = standard									
7. test certificates									
without test certificate									0
with test certificate in German									D
with test certificate in English									E

Order Lists

EMBSIN 271 G - Measuring transducer for phase angle EMBSIN 281 G - Measuring transducer for power factor

Features	Order no.											
EMBSIN 271 G, measuring transducer for phase angle order no.: 271 G - Mxxxxxxx	271 G-	M	X	X	X	X	X	X	X	X	X	X
EMBSIN 281 G, measuring transducer for power factor order no.: 281 G - Mxxxxxxx	281 G-	M	X	X	X	X	X	X	X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		M										
2. type of measuring												
for phase angle (proportional phi)											1	
for power factor (proportional cos phi)											2	
3. application												
single-phase AC current											1	
3- or 4-phase DC current, balanced U:												
L1-L2; I : L1											2	
L2-L3; I : L2											3	
L3-L1; I : L3											4	
L1-L3; I : L1											5	
L2-L1; I : L2											6	
L3-L2; I : L3											7	
L1-L2; I : L3											A	
L2-L3; I : L1											B	
L3-L1; I : L2											C	
4. input rated frequency												
rated frequency 50 Hz											1	
rated frequency 60 Hz											2	
9: _____ Hz											9	
! 9: Nonstandard [Hz]: $10 \leq f_N \leq 400$												
by auxiliary voltage from measuring input min. 40 Hz												
5. input rated voltage												
input voltage U_N : 100 V											1	
input voltage U_N : 230 V											2	
9: input voltage U_N : _____ V											9	
! 3-wire system: U_N = linked voltage												
! 9: Nonstandard [V]: ≥ 10 to 690 V												
by auxiliary voltage from measuring input												
min. 24 V / max. 230 V, see selection criteria 9, digit 3 and 4												
6. input rated current												
I_N : 1 A											1	
I_N : 5 A											2	
9: I_N : _____ A ($> 0.5 \dots 6$ A)											9	
! 9: Nonstandard [A] upon request												
7. measuring range												
-60 ... 0 ... 60° el											1	
cos phi : 0.5 ... cap ... 1 ... ind ... 0.5											2	
9: Nonstandard: _____											9	
! 1 not to be combined with measuring type order no. 2												
! 2 not to be combined with measuring type order no. 1												
! 9 Nonstandard, measuring range within												
1 ... ind ... 0 ... cap ... 1 ... ind ... 0 ... cap ... 1												
or -180 ... 0 ... 180° el												
clear output value, only to 175 ... 0 ... 175° el;												
measuring range $\geq 20^\circ$ el												

Order Lists

Continuation from page 278

EMBSIN 271 G - Measuring transducer for phase angle

EMBSIN 281 G - Measuring transducer for power factor

Features	Order no.			
8. output signal				
0 ... 20 mA		1		
4 ... 20 mA		2		
9: _____ mA		9		
0 ... 10 V		A		
Z: _____ V		Z		
! 9: Nonstandard [mA]: 0 ... 1.0 to 0 ... < 20				
-1.0 ... 0 ... 1.0 to -20 ... 0 ... 20				
1 ... 5 to < (4 ... 20)				
! Z: Nonstandard [V]: 0 ... 1.0 to 0 ... < 10				
0.2 ... 1 to 2 ... 10				
-1.0 ... 0 ... 1.0 to -10 ... 0 ... 10				
9. auxiliary voltage				
U _h : 85 ... 230 V AC/DC		1		
U _h : 24 ... 60 V AC/DC		2		
from measuring input (>= 24 ... 60 V AC)		3		
from measuring input (>= 85...230 V AC)		4		
U _h : 24 V AC / 24 ... 60 V DC from		5		
low voltage side				
U _h = rated voltage				
tolerances: DC -15 ... +33 %, AC -15 ... +15 %				
! 3 not to be combined with input rated voltage, order-no. 1 and 2				
10. response time				
4 periods of the input frequency			1	
2 periods of the input frequency			2	
8 periods of the input frequency			3	
16 periods of the input frequency			4	
! 4 periods = standard				
11. test certificates				
without test certificate				0
with test certificate in German				D
with test certificate in English				E

Order Lists

EMBSIN 271 GD – Measuring transducer for phase angle difference

Features	order no.								
EMBSIN 271 GD, measuring transducer for phase angle-difference order no.: 271 GD - Mxxxxxxx	271 GD -	M	X	X	X	X	X	X	X
1. construction housing MBS, for 35mm DIN rail		M							
2. input rated frequency									
50 Hz			1						
60 Hz			2						
9: _____ Hz			9						
! 9: Nonstandard [Hz]: ≥ 10 to 1500 by auxiliary voltage from measuring input $40 \text{ Hz} \leq f_n \leq 400 \text{ Hz}$									
3. input rated voltage generator and bus bar									
Un : 100 V				1					
Un : 230V				2					
Un : _____ V				9					
3-phase system: Input voltage = linked voltage ! 9: Nonstandard [V]: ≤ 10 to 690 by auxiliary voltage from measuring input min. 24 V max 230 V ! -> see selection criteria 6, digit 3 and 4									
4. measuring range									
-120° ... 0° ... +120° el						1			
9: measuring range : _____ ° e						9			
! 9: Nonstandard [°el], measuring range within -10 ... 0 ... 10 to -180 ... 0 ... +180 clear output value, yet only up to -175° ... 0 ... +175° el									
5. output signal									
0 ... 20 mA							1		
4 ... 20 mA							2		
9: _____ mA							9		
0 ... 10V							A		
Z: _____ V							Z		
! 9: Nonstandard [mA]: 0 ... 1.00 to 0 ... < 20 -1.0 ... 0 ... 1.00 to -20 ... 0 ... 20 1 ... 5 to < (4 ... 20) ! Z: Nonstandard [V]: 0 ... 1.0 to 0 ... < 10 0.2 ... 1 to 2 ... 10 -1.0 ... 0 ... 1.0 to -10 ... 0 ... 10									
6. auxiliary voltage									
U _h : 85 ... 230 V AC/DC								1	
U _h : 24 ... 60 V AC/DC								2	
from measuring input ($\geq 24 \dots 60 \text{ V AC}$)								3	
from measuring input ($\geq 85\dots 230 \text{ V AC}$)								4	
U _h : 24 V AC / 24 ... 60 V DC from								5	
low voltage side U _h = rated voltage tolerances: DC -15 ... +33 %, AC -15 ... +15 % ! 3 and 4 not to be combined with input rated voltage order no. 2									
7. response time									
4 periods of the input frequency									1
2 periods of the input frequency									2
8 periods of the input frequency									3
16 periods of the input frequency									4
! 4 periods = standard									
8. test certificates									
without test certificate									0
with test certificate German									D
with test certificate English									E

Order Lists

EMBSIN 351 P – Measuring transducer for active power EMBSIN 361 Q – Measuring transducer for re-active power

Features	order no.											
EMBSIN 351 P - Measuring transducer for active power order no.: 351 P - Mx xxxxxxxx	351 P-	M	X	X	X	X	X	X	X	X	X	X
EMBSIN 361 Q - Measuring transducer for re-active power order no. : 361 Q - M xxxxxxxx	361 Q-	M		X	X	X		X	X	X	X	X
1. construction housing MBS, for 35 mm DIN rail		M										
2. Application 3-/4-wire AC current, balanced (U:L1,L2,L3 I:L1)						1						
3-wire AC current, unbalanced						2						
4-phase AC current, unbalanced						3						
3. rated input frequency 50 Hz							1					
60 Hz							2					
4. input rated voltage Un: 100 ... 115 V ; _____ V values to be stated!								1				
Un: 200 ... 230 V ; _____ V								2				
Un: 380 ... 440 V ; _____ V								3				
Un: 600 ... 690 V ; _____ V								4				
Nonstandard Un; _____ V								9				
! 1 ... 4: True effective nominal voltages to be stated ! 9: Nonstandard [V]: > 115 to < 600 Un = linked voltage!												
5. input current In: 1 A								1				
In: 5 A								2				
6. measuring range bipolar: _____ W									1			
unipolar: _____ W									2			
measuring range end values to be stated in Watt i.e. 500W by measuring range bipolar -500 ... 500 1000 W by measuring range unipolar 0 ... 1000 permissible end value : 0.75 ... 1.3 x Un x In x $\sqrt{3}$ [W]												
bipolar: _____ var										1		
unipolar: _____ var										2		
measuring range end values to be stated in var i.e. 500var by measuring range bipolar -500 ... 500 1000 Var by measuring range unipolar 0 ... 1000 permissible end value: 0.5 ... 1.0 x Un x In x $\sqrt{3}$ [Var]												
7. output signal, start value bipolar, start value -100 % end value										1		
unipolar, start value 0										2		
live-zero, start value = 20 % end value										3		
! 1 output bipolar not possible with measuring range unipolar measuring range-order no. 2)												
8. output signal, end value end value: 20 mA											1	
end value: 10 mA											2	
end value: 5 mA											3	
end value: 2.5 mA											4	
end value: 10 V											A	
9. auxiliary voltage supply Uh: 85 ... 230 V DC/AC												1
Uh: 24 ... 60 V DC/AC												2
from measuring input (\geq 85...230 V AC)												4
Uh: 24 V AC / 24 ... 60 V DC												5
connection via low voltage side tolerances: DC : -15 ... +33 % ; AC: -15 ... +15 % ! 4 not to be combined with rated input voltage order-no. 3 and 4												
10. test certificates without test certificate												0
with test certificate German												D
with test certificate English												E

Order Lists

EMBSIN 301 – Measuring transducer for alternating current / RMS effective value measuring

auxiliary voltage 230 V AC

auxiliary voltage 24 V DC

Order no.	Measuring range
137112	30 / 15 A
137113	40 / 20 A
137114	50 / 25 A
137115	60 / 30 A
137117	100 / 50 A
137118	150 / 75 A
137119	200 / 100 A
137120	250 / 125 A
137121	300 / 150 A
137122	400 / 200 A
137123	500 / 250 A
137124	600 / 300 A

Order no.	Measuring range
137212	30 / 15 A
137213	40 / 20 A
137214	50 / 25 A
137215	60 / 30 A
137217	100 / 50 A
137218	150 / 75 A
137219	200 / 100 A
137220	250 / 125 A
137221	300 / 150 A
137222	400 / 200 A
137223	500 / 250 A
137224	600 / 300 A

EMBSIN 391 PV – Programmable measuring transducer for all electrical parameters

Features	Order no.										
	391 P -	V	X	X	X	X	X	X	X	X	X
EMBSIN 391 PV, programmable measuring transducer for all electrical parameters order no.: 391 P - Vxxxxxxxx											
1. application											
single-phase alternating current			1								
3-wire direct current, balanced			2								
3-wire direct current, unbalanced			3								
4-wire direct current, balanced			4								
4-wire alternating current, unbalanced			5								
2. nominal range of the input voltage											
input voltage direct connection											
input voltage via voltage transformer				A							
0 ... 50 V AC (linked voltage!) please state value!						1					
0 ... 500 V AC (linked voltage!) please state value!						2					
3. nominal value of the input current											
input current via current transformer							B				
0 ... 0.5 A AC, please state value!								1			
0 ... 5.0 A AC, please state value!								2			
4. auxiliary voltage											
universal power supply (24 ... 300 V DC/ 40 ... 276 V AC)									1	0	
AC-voltage supply (!) (!) units with this type of auxiliary voltage supply have only one analogue measuring output											
AC-voltage supply									2		
57.74 V AC										1	
63.5 V AC										2	
100 V AC										3	
110 V AC										4	
230 V AC										5	
250 V AC										6	
400 V AC										7	
500 V AC										8	
5. type of serial interface											
RS232											1
RS485											2
6. state upon delivery											
transmission parameters are not set											0
parameters are arranged acc. to customer specification											1

Order Lists

ordering schedule 1

EMBSIN 391 PV – Programmable measuring transducer for all electrical parameters

Description	Code	
measuring volume		
true-rms-current		
application		
single-phase alternating current	L	I ₁ , I ₂ , I ₃
alternating current, three-phase system	L ₁ , L ₂ or L ₃	I _N or I
measuring range	0 ... 0.5 A to 0 ... 5 A	____ A
true-rms-voltage		
single-phase alternating current	U	____
alternating current	phase to N U ₁ , U ₂ or U ₃ linked voltage U ₁ -U ₂ , U ₂ -U ₃ or U ₃ -U ₁	____
measuring range	0 ... 50 V to 0 ... 500 V	0 - ____ V
frequency		
all connections	system frequency	____ Hz
measuring range	45Hz ≤ f ≤ 65 Hz (f ₁ ≤ f ≤ f ₂)	__ ≤ f ≤ __ Hz
phase angle		
single-phase alternating current		
alternating current, three-phase system	φ ₁ , φ ₂ , φ ₃ (U - I) φ ₁₂ , φ ₁₃ , φ ₂₃ (U ₁ -U ₂ , U ₁ -U ₃ , U ₂ -U ₃) average value φ	
measuring range	-180° ≤ φ ≤ 180° defined range (φ ₁ ≤ φ ≤ φ ₂)	
power factor		
single-phase alternating current	PF	
alternating current	PF ₁ , PF ₂ or PF ₃ PF total supply network	
measuring range	-1 ≤ PF ≤ +1 defined range	
active power		
single-phase alternating current	P	
alternating current, three-phase system	P ₁ , P ₂ or P ₃ P-total	____ W ____ W
measuring range	dependent on input value U, I (+/-) ... W	
re-active power		
single-phase alternating current	Q	
alternating current, three-phase system	Q ₁ , Q ₂ or Q ₃ Q-total	____ var ____ var
measuring range	dependent on input value U, I (+/-) ... var	

Order Lists

ordering schedule 2

EMBSIN 391 PV – Programmable measuring transducer for all electrical parameters

Description	Code	
measuring volume		
apparent power (VA)		
single-phase alternating current	S	_____
alternating current, three-phase system	S ₁ , S ₂ or S ₃ S total	_____
measuring range	dependent on value U, I (+/-) ... VA	___VA ... VA
retrievable available values		
current phases I ₁ , I ₂ , I ₃	I ₁ , I ₂ or I ₃	DDI ₁ , DDI ₂ , DDI ₃
mean value of the total apparent power	S total	DDSt
total active power	P-total positive P-total negative	DDPt+ DDPt-
total re-active power	Q-total -L Q-total +C	DDQtL DDQtC
measuring range	dependent on the type of inquiry	
type of output characteristic		
type of output characteristic	linear curved (1)	L B
(1) when ordering curved output characteristics please refer to the additional information in table 3		
outputs		
start value of the output signals	-20 mA ≤ I ≤ +20 mA current -10 V ≤ U ≤ +10 V voltage	_____mA _____V
output value	0 ... 20 mA current output 0 ... 10 V voltage output	_____mA _____V
standard output values		0 ... 1 mA 0 ... 5 mA 0 ... 10 mA 0 ... 20 mA 4 ... 20 mA -1 ... 0 ... +1 mA -10 ... 0 ... +10 mA -20 ... 0 ... +20 mA 0 ... 10 V -1 ... 0 ... +1 V -10 ... 0 ... +10 V

All output signals are limited to 120 % of the rated nominal value

ordering schedule 3

EMBSIN 391 PV - Programmable measuring transducer for all electrical parameters

Table 3

Additional information when ordering measuring transducers with curved output characteristics

When ordering measuring transducers with curved characteristics the start and end points as well as the position of the required curved break of the to be adjusted transmission ratio have to be defined. Measuring transducers of the type EMBSIN 391 PV allow the presentation of transmission characteristics of up to 5 curved breaks .

Description	Code	
start value of the measuring value (s)	dependent on measuring range s	
start value of the output value	-20 mA ... +20 mA/ -10 V ... +10 V dependent on output range -20 ≤ p ≤ +20/ -10 ≤ p ≤ +10	p
end value of the measuring value (e)	dependent on measuring range	
end value of the output value (rt) if measuring value (e)	-20 mA ... +20 mA/ -10 V ... +10 V dependent on output range	rt
value of the measuring value (n _x)	dependent on measuring range	
value of the output value (o _x) if measuring value (n _x)	-20 mA ... +20 mA/ -10 V ... +10 V dependent on output range -20 ≤ p ≤ +20/ -10 ≤ p ≤ +10	n ₁ ... n ₅ o ₁ ... o ₅

Ordering example:

The measuring transducer EMBSIN 391 PV is installed into a 4-wire alternating current supply network with balanced phase-loads. The measuring transducer is connected via a voltage transformer 100/0.11 kV as well as to a current transformer of 200/5 A. The auxiliary voltage supply of the measuring transducer is effected by means of an integrated power unit. For the communication an interface of RS485 is required. The following measuring values must be included in the measuring feeds:

Output 1	
total output of the system	-40 ... +40 MW
output current	-20...+20 mA
transmission ratio	linear

Output 2	
measuring value	phase angle
output voltage	0 ... 10 V
	start value: $-180^\circ = -10\text{ V}$
	curved point: $0^\circ = 10\text{ V}$
	end value: $179.9^\circ = 10\text{ V}$

Output 3	
measuring value	system frequency 45 ... 55 Hz
current output	0 ... 20 mA
	48 Hz = 2 mA
	52 Hz = 18 mA
	55 Hz = 20 mA

Ordering text: EMBSIN 391 P - V-4; A2, 110 V; B2, 5 A; 10; 2, 1
 output 1: P± 40 MW; L; -20...200 mA
 output 2: $\varphi \pm 180^\circ$; B; (180/-10; 0/0; 180/10)
 output 3: f 45...55 Hz; B; (45/0, 48/2, 52/18, 55/20)

type of circuit *

rated voltage range *

value of rated voltage *

rated current *

value of rated current *

auxiliary voltage supply *

serial interface *

state upon delivery *

EMBSIN 391P – V-4; A2, 110 V, B2, 5A; 10; 2; 1

* order code of table 1, page 282

Standard Units

EMBSIN 100 I	Measuring transducer for AC current, without auxiliary voltage supply	288
EMBSIN 101 I	Measuring transducer for AC current, with auxiliary voltage supply	288
EMBSIN 201 IE	Measuring transducer for AC current, rms measurement	288
EMBSIN 120 U	Measuring transducer for AC voltage, without auxiliary voltage supply	288
EMBSIN 121 U	Measuring transducer for AC voltage, with auxiliary voltage supply	289
EMBSIN 221 UE	Measuring transducer for AC voltage, rms measurement	289
EMBSIN 241 F	Measuring transducer for frequency for universal AC/DC power supply	289
EMBSIN 281 G	Measuring transducer for power factors, with universal AC/DC power supply	289
EMBSIN 351 P	Measuring transducer for active power, with universal AC/DC power supply	290
EMBSIN 361 Q	Measuring transducer for re-active power, with universal AC/DC power supply	290

Standard Units

EMBSIN 100 I Measuring transducer for alternating current, without auxiliary voltage, with 2 measuring ranges

Construction	Rated frequency	Measuring range	Output signal	Art.-no.
		0 ... 1.0 A / 5 A	0 ... 5 mA	127 698
housing		0 ... 1.0 A / 5 A	0 ... 10 mA	127 705
MBS	50/60 Hz	0 ... 1.0 A / 5 A	0 ... 20 mA	127 713
for 35 mm		0 ... 1.2 A / 6 A	0 ... 5 mA	127 721
DIN rail		0 ... 1.2 A / 6 A	0 ... 10 mA	127 739
		0 ... 1.2 A / 6 A	0 ... 20 mA	127 747

EMBSIN 101 I Measuring transducer for alternating current, with auxiliary voltage

Construction	Rated frequency	Measuring range	Output signal	Auxiliary voltage	Art.-no.
		0 ... 1 A	0 ... 20 mA	230 V AC	128 290
		0 ... 5 A	0 ... 20 mA	230 V AC	128 307
housing		0 ... 1 A	4 ... 20 mA	230 V AC	128 331
MBS	50/60 Hz	0 ... 5 A	4 ... 20 mA	230 V AC	128 349
for 35 mm		0 ... 1 A	0 ... 20 mA	24 V DC	128 315
DIN rail		0 ... 5 A	0 ... 20 mA	24 V DC	128 323
		0 ... 1 A	4 ... 20 mA, 2-wire	24 V DC	128 357
		0 ... 5 A	4 ... 20 mA, 2-wire	24 V DC	128 365

EMBSIN 201 IE Measuring transducer for alternating current, with auxiliary voltage, with 2 measuring ranges, effective value measuring

Construction	Rated frequency	Measuring range	Output signal	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
housing		0 ... 1.0 A / 5 A	0 ... 20 mA		128 232
MBS		0 ... 1.0 A / 5 A	4 ... 20 mA	85 ... 230 V	128 240
for 35 mm	50/60 Hz	0 ... 1.2 A / 6 A	0 ... 20 mA		128 258
DIN rail		0 ... 1.2 A / 6 A	4 ... 20 mA		128 266

Response time of the output value: 300 ms

EMBSIN 120 U Measuring transducer for alternating voltage, without auxiliary voltage supply

Construction	Rated frequency	Measuring range	Output signal	Art.-no.
		0 ... 100 / $\sqrt{3}$ V	0 ... 5 mA	127 854
		0 ... 100 / $\sqrt{3}$ V	0 ... 20 mA	127 862
		0 ... 110 / $\sqrt{3}$ V	0 ... 5 mA	127 870
		0 ... 110 / $\sqrt{3}$ V	0 ... 20 mA	127 888
housing		0 ... 100 V	0 ... 5 mA	127 896
MBS		0 ... 100 V	0 ... 20 mA	127 903
for 35 mm	50/60 Hz	0 ... 110 V	0 ... 5 mA	127 911
DIN rail		0 ... 110 V	0 ... 20 mA	127 929
		0 ... 120 V	0 ... 5 mA	127 953
		0 ... 120 V	0 ... 20 mA	127 961
		0 ... 250 V	0 ... 5 mA	127 937
		0 ... 250 V	0 ... 20 mA	127 945
		0 ... 500 V	0 ... 5 mA	127 979
		0 ... 500 V	0 ... 20 mA	127 987

Standard Units

EMBSIN 121 U Measuring transducer for alternating voltage, with auxiliary voltage supply

Construction	Rated frequency	Measuring range	Output signal	Auxiliary voltage	Art.-no.
		0 ... 100 V	0 ... 20 mA	230 V AC	127 341
		0 ... 250 V	0 ... 20 mA	230 V AC	127 359
housing		0 ... 500 V	0 ... 20 mA	230 V AC	127 383
MBS	50/60 Hz	0 ... 100 V	0 ... 20 mA	24 V DC	127 367
for 35 mm		0 ... 250 V	0 ... 20 mA	24 V DC	127 375
DIN rail		0 ... 100 V	4 ... 20 mA, 2-wire	24 V DC	127 391
		0 ... 250 V	4 ... 20 mA, 2-wire	24 V DC	127 408
		0 ... 500 V	4 ... 20 mA, 2-wire	24 V DC	127 416

EMBSIN 221 UE Measuring transducer for alternating voltage, with auxiliary voltage supply, effective value measuring

Construction	Rated frequency	Measuring range	Output signal	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
		0 ... 100 V	0 ... 20 mA		127 440
		0 ... 100 V	4 ... 20 mA		127 458
housing		0 ... 120 V	0 ... 20 mA		127 466
MBS	50/60 Hz	0 ... 120 V	4 ... 20 mA	85 ... 230 V	127 474
for 35 mm		0 ... 250 V	0 ... 20 mA		127 507
DIN rail		0 ... 250 V	4 ... 20 mA		127 515
		0 ... 500 V	0 ... 20 mA		127 482
		0 ... 500 V	4 ... 20 mA		127 490

response time of the output signal: 300 ms

EMBSIN 241 F Measuring transducer for frequency, with auxiliary voltage supply

Construction	Input voltage	Measuring range	Output signal	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
		45 ... 55 Hz	0 ... 20 mA		127 549
	10 ... 230 V	45 ... 55 Hz	4 ... 20 mA		127 557
housing		48 ... 52 Hz	0 ... 20 mA		127 573
MBS		48 ... 52 Hz	4 ... 20 mA	85 ... 230 V	127 565
for 35 mm		45 ... 55 Hz	0 ... 20 mA		127 581
DIN rail	230 ... 690 V	45 ... 55 Hz	4 ... 20 mA		127 606
		48 ... 52 Hz	0 ... 20 mA		127 599
		48 ... 52 Hz	4 ... 20 mA		127 614

response time of the output volume: 4 periods of the input frequency

EMBSIN 281 G Measuring transducer for active power factor, with auxiliary voltage supply

Construction	Input volumes	Output signal	Application	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
housing	230 V AC (L1-N)	0 ... 20 mA	single-phase		127 648
MBS	and 5 A (L1)	4 ... 20 mA	alternating current	85 ... 230 V	127 664
for 35 mm	400 V AC (L1-L2)	0 ... 20 mA	3- or 4-wire		127 656
DIN rail	and 5 A (L1)	4 ... 20 mA	direct current, balanced load		127 672

response time of the output volume: 4 periods of the input frequency
 rated frequency of the input volume: 50 Hz
 measuring range: 0.5...cap...1...ind...0.5 cos phi
 output volume: proportional cos phi

Standard Units

EMBSIN 351 P Measuring transducer for active power, with auxiliary voltage supply

Construction	Measuring inputs	Output signal	Application	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
housing	U_n : L ₁ , L ₂ , L ₃ I_n : L ₁	4 ... 20 mA	3-wire direct current balanced load		137 770
MBS for 35 mm	U_n : L ₁ , L ₂ , L ₃ I_n : L ₁ and L ₃	4 ... 20 mA	3-wire direct current unbalanced load	85 ... 230 V	137 788
DIN rail	U_n : L ₁ , L ₂ , L ₃ I_n : L ₁ , L ₂ , L ₃	4 ... 20 mA	4-wire direct current unbalanced load		137 796

input rated voltage U_n : 400 V (linked voltage!)
input rated current: 5 A
rated frequency measuring input: 50 Hz
measuring range: 0 ... 2 kvar

EMBSIN 361 Q Measuring transducer for re-active power, with auxiliary voltage supply

Construction	Measuring inputs	Output signal	Application	Auxiliary voltage DC or AC 40...400 Hz	Art.-no.
housing					
MBS for 35 mm	U_n : L ₁ , L ₂ , L ₃ I_n : L ₁ and L ₃	4 ... 20 mA	3-wire alternating current unbalanced load	85 ... 230 V	137 803
DIN rail					

input rated voltage U_n : 400 V (linked voltage!)
input rated current: 5 A
rated frequency measuring input: 50 Hz
measuring range: 0 ... 2 kvar