SINEAX DME 406 with PROFIBUS-DP
Programmable multi-transducer

for the measurement of electrical variables in heavy-current power system

Application

SINEAX DME 406 (Fig. 1) is a programmable transducer with a PROFIBUS-DP connection that simultaneously measures all variables of a heavy-current power system.

The device conforms to the PROFIBUS standard EN 50 170. The PROFIBUS is an open field-bus standard independent of manufacturers with a wide range of applications. The PROFIBUS supports the communication of devices from different manufacturers without special adaptations to the interface.

The transducers are also equipped with an **RS 232** serial interface to which a PC with the corresponding software can be connected for programming or accessing and executing useful ancillary functions.

The usual methods of connection, the rated values of the input variables and the type of internal energy metering are the main parameters that can be programmed.

The ancillary functions include a power system check, a facility for printing rating labels and provision for reading and setting the power meter.

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

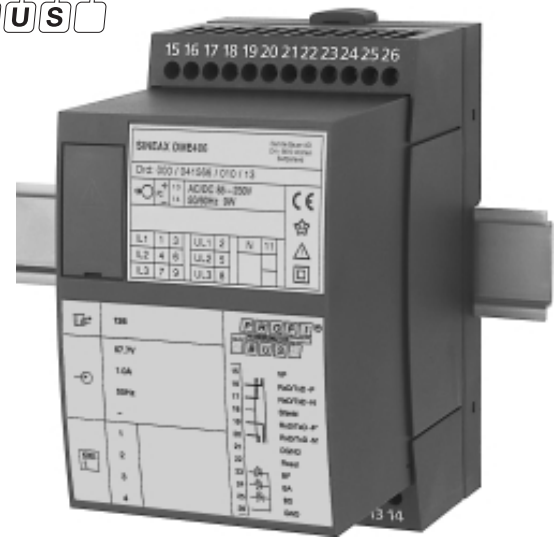


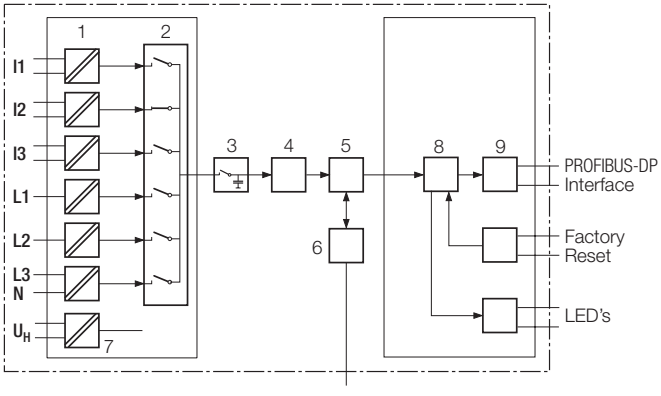
*Fig. 1. SINEAX DME 406 in housing **T24,** clipped onto a top-hat rail.*

Features / Benefits

- **Communication capability via PROFIBUS-DP or RS 232 C interface**
- **Measurement of current, voltage, and active, reactive and apparent power, power factor, frequency and energy, as well as special current functions (bimetal, slave pointer and signed or unsigned average value)**

Measured variables	Output	Types
Current, voltage (rms), active/reactive/apparent power cosφ, sinφ, power factor RMS value of the current with wire setting range (bimetal measuring function) Slave pointer function for the measurement of the RMS value IB Frequency Average value of the currents with sign of the active power (power system only)	**PROFIBUS DP**	**DME 406**
	Without analogue outputs, with bus RS 485 (MODBUS) see data sheet DME 401-1 Le	DME 401
	4 analogue outputs and bus RS 485 (MODBUS) see data sheet DME 440-1 Le	DME 440
	2 analogue outputs and 4 digital outputs **or**	DME 424
	4 analogue outputs and 2 digital outputs see data sheet DME 424/442-1 Le	DME 442
	Data bus LON see data sheet DME 400-1 Le	DME 400

- **Accuracy class 0.2**
- **Adjustable conversion factor for current and voltage transducers**
- **Up to 4 integrated energy meters, storage every each 203 s, storage for: 20 years**
- **Windows software with password protection for programming, data analysis, power system status simulation, acquisition of meter data and making settings**
- **Power supply DC or AC with a very large voltage range, or AC power supply/universally applicable**
- **Provision for either snapping the transducer onto top-hat rails or securing it with screws to a wall or panel**



1 = Input transformer
2 = Multiplexer
3 = Latching stage
4 = A/D and D/A converter
5 = Microprocessor
6 = Programming interface RS-232 (electrically insulated)
7 = Power supply
8 = Microprozessor
9 = SPC 4

Fig. 2. Block diagram.

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Symbols

Symbols	Meaning
X	Measured variable
X0	Lower limit of the measured variable
X1	Break point of the measured variable
X2	Upper limit of the measured variable
U	Input voltage
Ur	Rated value of the input voltage
U 12	Phase-to-phase voltage L1 – L2
U 23	Phase-to-phase voltage L2 – L3
U 31	Phase-to-phase voltage L3 – L1
U1N	Phase-to-neutral voltage L1 – N
U2N	Phase-to-neutral voltage L2 – N
U3N	Phase-to-neutral voltage L3 – N
UM	Average value of the voltages (U1N + U2N + U3N) / 3
I	Input current
I1	AC current L1
I2	AC current L2
I3	AC current L3
Ir	Rated value of the input current
IM	Average value of the currents (I1 + I2 + I3) / 3
IMS	Average value of the currents and sign of the active power (P)
IB	RMS value of the current with wire setting range (bimetal measuring function)
BS	Slave pointer function for the measurement of the RMS value IB
φ	Phase-shift between current and voltage
F	Frequency of the input variable
P	Active power of the system P = P1 + P2 + P3
P1	Active power phase 1 (phase-to-neutral L1 – N)
P2	Active power phase 2 (phase-to-neutral L2 – N)
P3	Active power phase 3 (phase-to-neutral L3 – N)

Symbols	**Meaning** (continuation)
Q	Reactive power of the system Q = Q1 + Q2 + Q3
Q1	Reactive power phase 1 (phase-to-neutral L1 – N)
Q2	Reactive power phase 2 (phase-to-neutral L2 – N)
Q3	Reactive power phase 3 (phase-to-neutral L3 – N)
S	Apparent power of the system $S = \sqrt{I_1^2 + I_2^2 + I_3^2} \cdot \sqrt{U_1^2 + U_2^2 + U_3^2}$
S1	Apparent power phase 1 (phase-to-neutral L1 – N)
S2	Apparent power phase 2 (phase-to-neutral L2 – N)
S3	Apparent power phase 3 (phase-to-neutral L3 – N)
Sr	Rated value of the apparent power of the system
PF	Active power factor cosφ = P/S
PF1	Active power factor phase 1 P1/S1
PF2	Active power factor phase 2 P2/S2
PF3	Active power factor phase 3 P3/S3
QF	Reactive power factor sin φ = Q/S
QF1	Reactive power factor phase 1 Q1/S1
QF2	Reactive power factor phase 2 Q2/S2
QF3	Reactive power factor phase 3 Q3/S3
LF	Power factor of the system $LF = sgnQ \cdot (1 - \lvert PF \rvert)$
LF1	Power factor phase 1 $sgnQ1 \cdot (1 - \lvert PF1 \rvert)$
LF2	Power factor phase 2 $sgnQ2 \cdot (1 - \lvert PF2 \rvert)$
LF3	Power factor phase 3 $sgnQ3 \cdot (1 - \lvert PF3 \rvert)$
H	Power supply
Hn	Rated value of the power supply

Applicable standards and regulations

IEC 688 resp. EN 60 688	Electrical measuring transducers for converting AC electrical variables into analogue and digital signals
IEC 1010 resp. EN 61 010	Safety regulations for electrical measuring control and laboratory equipment
IEC 529 resp. EN 60 529	Protection types by case (code IP)
IEC 255-4 Part. E5	High-frequency disturbance test (static relays only)
IEC 1000-4-2/-3/-4/-6	Electromagnetic compatibility for industrial-process measurement and control equipment
EN 55 011	Electromagnetic compatibility of data processing and telecommunication equipment Limits and measuring principles for radio interference and information equipment
IEC 68-2-1/-2/-3/-6/-27 resp. EN 60 068-2-1/-2/-3/-6/-27	Ambient tests -1 Cold, -2 Dry heat, -3 Damp heat, -6 Vibration, -27 Shock
DIN 40 110	AC quantities
DIN 43 807	Terminal markings
IEC 1036	Alternating current static watt-hour meters for active energy (classes 1 and 2)
UL 94	Tests for flammability of plastic materials for parts in devices and appliances

Technical data

Inputs

Input variables:	See Table 4 and 5
Measuring ranges:	See Table 4 and 5
Waveform:	Sinusoidal
Rated frequency:	50, 60 Hz or 16 2/3 Hz
Consumption [VA] (at external power supply):	Voltage circuit: U^2 / 400 kΩ Current circuit: ≤ I^2 · 0,01 Ω

Continuous thermal ratings of inputs

Current circuit	10 A	400 V single-phase AC system 693 V three-phase system
Voltage circuit	480 V 831 V	single-phase AC system three-phase system

Short-time thermal rating of inputs

Input variable	Number of inputs	Duration of overload	Interval between two overloads
Current circuit	400 V single-phase AC system 693 V three-phase system		
100 A	5	3 s	5 min.
250 A	1	1 s	1 hour
Voltage circuit	1 A, 2 A, 5 A		
Single-phase AC system 600 V H_{intern}: 1.5 Ur	10	10 s	10 s
Three-phase system 1040 V H_{intern}: 1.5 Ur	10	10 s	10 s

PROFIBUS-DP (bus interface RS-485)

Bus connections:	Screw terminals on terminals 15 to 21
Protocole:	PROFIBUS-DP EN 50 170
Protocol chip:	SPC 4
Transmission rate:	9,6 kBaud … 12 MBaud automatic baud rate recognition
Addresses:	126 (default), set via Set_Slave_Address
Max. length of bus:	100 … 1200 m (dependent on the baud rate and cable type)
Interface:	RS 485, electrically insulated (500 V)
Configuration possibilities:	Locally from a PC, or via bus master

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Table 1: Measured values that are available at the bus interface, depending on the application

Symbols	Meaning	Application (see Table 5)		
		A11 … A16	A34	A24 / A44
U	Input voltage	●	—	—
U12	Phase-to-phase voltage L1 – L2	—	●	●
U23	Phase-to-phase voltage L2 – L3	—	●	●
U31	Phase-to-phase voltage L3 – L1		●	●
U1N	Phase-to-neutral voltage L1 – N	—	—	●
U2N	Phase-to-neutral voltage L2 – N	—	—	●
U3N	Phase-to-neutral voltage L3 – N	—	—	●
UM	Average value of the voltages	—	—	●
I	Input current	●	—	—
I1	AC current L1	—	●	●
I2	AC current L2	—	●	●
I3	AC current L3	—	●	●
IM	Average value of the currents	—	●	●
IMS	Average value of the currents and sign of the active power	—	●	●
IB	RMS value of the current with wire setting range (bimetal measuring function)	●	—	—
IB1	RMS value of the current with wire setting range (bimetal measuring function), phase 1	—	●	●
IB2	RMS value of the current with wire setting range (bimetal measuring function), phase 2	—	●	●
IB3	RMS value of the current with wire setting range (bimetal measuring function), phase 3	—	●	●
BS	Slave pointer function for the measurement of the RMS value IB	●	—	—
BS1	Slave pointer function for the measurement of the RMS value IB, phase 1	—	●	●
BS2	Slave pointer function for the measurement of the RMS value IB, phase 2	—	●	●
BS3	Slave pointer function for the measurement of the RMS value IB, phase 3	—	●	●
F	Frequency of the input variable	●	●	●
P	Active power of the system	●	●	●
P1	Active power phase 1 (phase-to-neutral L1 – N)	—	—	●

Continuation of Table 1:

Symbols	Meaning	Application (see Table 5)		
		A11 … A16	A34	A24 / A44
P2	Active power phase 2 (phase-to-neutral L2 – N)	—	—	●
P3	Active power phase 3 (phase-to-neutral L3 – N)	—	—	●
PF	Active power factor cosφ = P/S	●	●	●
PF1	Active power factor phase 1, P1/S1	—	—	●
PF2	Active power factor phase 2, P2/S2	—	—	●
PF3	Active power factor phase 3, P3/S3	—	—	●
Q	Reactive power of the system	●	●	●
Q1	Reactive power phase 1 (phase-to-neutral L1 – N)	—	—	●
Q2	Reactive power phase 2 (phase-to-neutral L2 – N)	—	—	●
Q3	Reactive power phase 3 (phase-to-neutral L3 – N)	—	—	●
S	Apparent power of the system	●	●	●
S1	Apparent power phase 1 (phase-to-neutral L1 – N)	—	—	●
S2	Apparent power phase 2 (phase-to-neutral L2 – N)	—	—	●
S3	Apparent power phase 3 (phase-to-neutral L3 – N)	—	—	●
LF	Power factor of the system	●	●	●
LF1	Power factor phase 1	—	—	●
LF2	Power factor phase 2	—	—	●
LF3	Power factor phase 3	—	—	●
QF	Reactive power factor sinφ = Q/S	●	●	●
QF1	Reactive power factor phase 1, Q1/S1	—	—	●
QF2	Reactive power factor phase 2, Q2/S2	—	—	●
QF3	Reactive power factor phase 3, Q3/S3	—	—	●
EA	Energy meter 1	●	●	●
EB	Energy meter 2	●	●	●
EC	Energy meter 3	●	●	●
ED	Energy meter 4	●	●	●

Where c.t's and/or v.t's are used for measurement, the values are referred to the primaries of the transformers.

Variables

– Energy meter reset
– Maximum value pointer reset

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Reference conditions

Ambient temperature:	+ 23 °C ± 1 K
Input variable:	Rated useful range
Power supply:	H = Hn ± 1%
Active/reactive factor:	cosφ = 1 resp. sinφ = 1
Frequency:	50 … 60 Hz, 16 2/3 Hz
Waveform:	Sinusoidal, form factor 1.1107
Miscellaneous:	EN 60 688

System response

Accuracy class:	0.2 resp. 0.4 at applications with phase-shift
Energy meter:	1.0 acc. to IEC 1036 (0.1 Ir ≤ I ≤ 1.5 Ir)
Duration of the measurement cycle:	Depending on measured variable and programming
Response time:	1 … 2 times the measurement cycle

Influencing quantities and permissible variations

Acc. to EN 60 688

Electrical safety

Protection class:	II	
Enclosure protection:	IP 40, housing IP 20, terminals	
Overvoltage category:	III	
Insulation test:	Input voltage:	AC 400 V
	Input current:	AC 400 V
	Output:	DC 40 V
	Power supply:	AC 400 V DC 230 V
Surge test:	5 kV; 1.2/50 µs; 0.5 Ws	
Test voltages:	50 Hz, 1 min. acc. to EN 61 010-1	
	5550 V, inputs versus all other circuits as well as outer surface	
	3250 V, input circuits versus each other	
	3700 V, power supply versus outputs and SCI as well as outer surface	
	490 V, outputs and SCI versus each other and versus outer surface	

Power supply →◯

AC voltage: 100, 110, 230, 400, 500 or 693 V, ± 10%, 45 to 65 Hz
Power consumption approx. 10 VA

DC, AC power pack (DC or 50 … 60 Hz)

Table 2: Rated voltages and tolerances

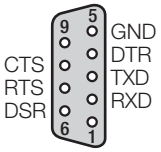
Rated voltage U_N	Tolerance
24 … 60 V DC, AC	DC – 15 … + 33% AC ± 10%
85 … 230 V DC, AC	

Consumption: ≤ 9 W resp. ≤ 10 VA

Programming connector on transducer

Interface: RS 232 C

DSUB socket: 9-pin



The interface is electrically insulated from all other circuits.

Installation data

Housing:	Housing **T24** See Section "Dimensioned drawings"
Housing material:	Lexan 940 (polycarbonate), flammability class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen
Mounting:	For snapping onto top-hat rail (35 × 15 mm or 35 × 7.5 mm) acc. to EN 50 022 or directly onto a wall or panel using the pull-out screw hole brackets
Orientation:	Any
Weight:	With supply transformer approx. 1.1 kg With AC/DC power pack approx. 0.7 kg

Terminals

Type:	Screw terminals with wire guards
Max. wire gauge:	≤ 4.0 mm² single wire or 2 × 2.5 mm² fine wire

Ambient tests

EN 60 068-2-6:	Vibration
Acceleration:	± 2 g
Frequency range:	10 … 150 … 10 Hz, rate of frequency sweep: 1 octave/minute

Number of cycles:	10, in each of the three axes
EN 60 068-2-27:	Shock
Acceleration:	3 × 50 g 3 shocks each in 6 directions
EN 60 068-2-1/-2/-3:	Cold, dry heat, damp heat

Nominal range of use for temperature:	0…15…30…45 °C (usage group II)
Storage temperature:	– 40 to + 85 °C
Annual mean relative humidity:	≤ 75%

Ambient conditions

Variations due to ambient temperature:	± 0.1% / 10 K

Table 3: SINEAX DME 406 with PROFIBUS-DP

The versions of the transducer below programmed with the **basic** configuration are available as standard versions. It is only necessary to quote the **Order No.**:

Description / Basic configuration		Marking	Order No.
1. Mechanical design:	Housing T24 for rail and wall mounting	406 - 1	
2. Rated frequency:	50 Hz	1	
3. Power supply:	**230 V AC, 45 … 65 Hz**	**3**	**146 903**
	24 … 60 V DC/AC	**7**	**146 896**
	85…230 V DC/AC	**8**	**146 911**
4. Power supply connection:	External connection (standard)	1	
5. Test certificate:	None supplied	0	
6. Configuration:	Basic configuration programmed	0	
See Table 4 “Ordering Information”			
Basic configuration			
1. Application:	4-wire, 3-phase system, asymmetric load (NPS)	A 44	
2. Input voltage:	Design value Ur = 100 V	U 21	
3. Input current:	Design value Ir = 2 A	V 2	
4. Primary data:	Without specification of primary rating	W 0	
5. Energy meter 1:	Not used	EA 00	
6. Energy meter 2:	Not used	FA 00	
7. Energy meter 3:	Not used	GA 00	
8. Energy meter 4:	Not used	HA 00	
See Table 5 “Programming”			

Table 4: Ordering Information

DESCRIPTION	MARKING
1. Mechanical design	
Housing T24 for rail and wall mounting	406 - 1
2. Rated frequency	
1) 50 Hz (60 Hz possible without additional error; 16 2/3 Hz, additional error 1.25%)	1
2) 60 Hz (50 Hz possible without additional error; 16 2/3 Hz, additional error 1.25%)	2
3) 16 2/3 Hz (not re-programming by user, 50/60 Hz possible, but with additional error 1.25%)	3

Table 4 continued on next page!

Continuation “Table 4: Ordering Information”

DESCRIPTION	MARKING
3. Power supply	
Nominal range	
1) AC 90 … 110 V H_n = 100 V	1
2) AC 99 … 121 V H_n = 110 V	2
3) AC 207 … 253 V H_n = 230 V	3
4) AC 360 … 440 V H_n = 400 V	4
5) AC 450 … 550 V H_n = 500 V	5
6) AC 623 … 762 V H_n = 693 V	6
7) DC/AC 24 … 60 V	7
8) DC/AC 85 … 230 V	8
4. Power supply connection	
1) External connection (standard)	1
2) Internal from voltage input	2
Line 2: Not available for rated frequency 16 2/3 Hz and applications A15 / A16 / A24 Caution: The power supply voltage must agree with the input voltage (Table 5)!	
5. Test certificate	
0) None supplied	0
D) With test certificate in German	D
E) With test certificate in English	E
6. Configuration	
0) **Basic** configuration programmed (see Table 3)	0
9) Programmed to order	9
Line 0: Not available if the power supply is taken from the voltage input Zeile 9: **All the programming data must be entered on Form W 2410 e and the form must be included with the order, if the primary values of the measured variables or meter readings have to be transferred.**	

Tabelle 5: Programming

DESCRIPTION	Application		
	A11 … A16	A34	A24 / A44
1. Application (system)			
Single-phase AC	A11	—	—
3-wire, 3-phase symmetric load, phase-shift U: L1-L2, I: L1	A12	—	—
3-wire, 3-phase symmetric load	A13	—	—
4-wire, 3-phase symmetric load	A14	—	—
3-wire, 3-phase symmetric load, phase-shift U: L3-L1, I: L1	A15	—	—
3-wire, 3-phase symmetric load, phase-shift U: L2-L3, I: L1	A16	—	—
3-wire, 3-phase asymmetric load	—	A34	—
4-wire, 3-phase asymmetric load	—	—	A44
4-wire, 3-phase asymmetric load, open Y	—	—	A24

Table 5 continued on next page!

Continuation «Table 5: Programming»

DESCRIPTION	Application A11 … A16	A34	A24 / A44
2. Input voltage			
Rated value Ur = 57.7 V	U01	—	—
Rated value Ur = 63,5 V	U02	—	—
Rated value Ur = 100 V	U03	—	—
Rated value Ur = 110 V	U04	—	—
Rated value Ur = 120 V	U05	—	—
Rated value Ur = 230 V	U06	—	—
Rated value Ur [V]	U91	—	—
Rated value Ur = 100 V	U21	U21	U21
Rated value Ur = 110 V	U22	U22	U22
Rated value Ur = 115 V	U23	U23	U23
Rated value Ur = 120 V	U24	U24	U24
Rated value Ur = 400 V	U25	U25	U25
Rated value Ur = 500 V	U26	U26	U26
Rated value Ur [V]	U93	U93	U93
Lines U01 to U06: Only for single phase AC current or 4-wire, 3-phase symmetric load Line U91: Ur [V] 57 to 400 Line U93: Ur [V] > 100 to 693			
3. Input current			
Rated value Ir = 1 A V1	V1	V1	
Rated value Ir = 2 A V2	V2	V2	
Rated value Ir = 5 A V3	V3	V3	
Rated value Ir > 1 to 6 [A]	V9	V9	V9
4. Primary rating (voltage and current transformer)			
Without specification of primary rating	W0	W0	W0
VT = kV CT = A	W9	W9	W9
Line W9: Specify transformer ratio primary, e.g 33 kV, 1000 A The secondary ratings must correspond to the rated input voltage and current specified for feature 2 respectively 3.			

Table 5 continued on next page!

Continuation “Table 5: Programming”

DESCRIPTION				Application A11 … A16	Application A34	Application A24 / A44
5. Energy meter 1						
Not used				EA00	EA00	EA00
I	System		[Ah]	EA50	—	—
I1	L1		[Ah]	—	EA51	EA51
I2	L2		[Ah]	—	EA52	EA52
I3	L3		[Ah]	—	EA53	EA53
S	System		[VAh]	EA54	EA54	EA54
S1	L1		[VAh]	—	—	EA55
S2	L2		[VAh]	—	—	EA56
S3	L3		[VAh]	—	—	EA57
P	System	(incoming)	[Wh]	EA58	EA58	EA58
P1	L1	(incoming)	[Wh]	—	—	EA59
P2	L2	(incoming)	[Wh]	—	—	EA60
P3	L3	(incoming)	[Wh]	—	—	EA61
Q	System	(inductive)	[Varh]	EA62	EA62	EA62
Q1	L1	(inductive)	[Varh]	—	—	EA63
Q2	L2	(inductive)	[Varh]	—	—	EA64
Q3	L3	(inductive)	[Varh]	—	—	EA65
P	System	(outgoing)	[Wh]	EA66	EA66	EA66
P1	L1	(outgoing)	[Wh]	—	—	EA67
P2	L2	(outgoing)	[Wh]	—	—	EA68
P3	L3	(outgoing)	[Wh]	—	—	EA69
Q	System	(capacitive)	[Varh]	EA70	EA70	EA70
Q1	L1	(capacitive)	[Varh]	—	—	EA71
Q2	L2	(capacitive)	[Varh]	—	—	EA72
Q3	L3	(capacitive)	[Varh]	—	—	EA73
6. Energy meter 2 Same as energy meter 1, but markings start with a capital F				FA ..	FA ..	FA ..
7. Energy meter 3 Same as energy meter 1, but markings start with a capital G				GA ..	GA ..	GA ..
8. Energy meter 4 Same as energy meter 1, but markings start with a capital H				HA ..	HA ..	HA ..

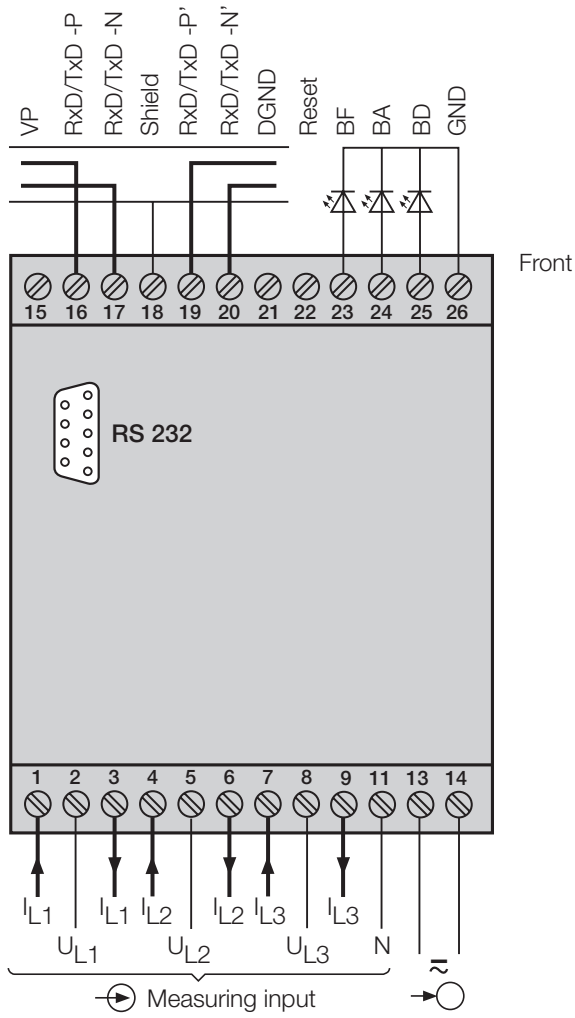
Note: The meter reading is referred to the power P = I · Up for I, respectively I1 · Up for I1, I2 · Up for I2 and I3 · Up for I3 where Up = the primary rated voltage or the secondary rated voltage if there is no v.t.

Electrical connections

Function			Connection
Measuring input	AC current	IL1	1 / 3
		IL2	4 / 6
		IL3	7 / 9
	AC voltage	UL1	2
		UL2	5
		UL3	8
		N	11
RS 485 (PROFIBUS DP)		VP	15
		RxD/TxD -P	16
		RxD/TxD -N	17
		Shield	18
		RxD/TxD -P'	19
		RxD/TxD -N'	20
		DGND	21
Power supply AC		~	13
		~	14
DC		+	13
		–	14

If power supply is taken from the measured voltage internal connections are as follow:

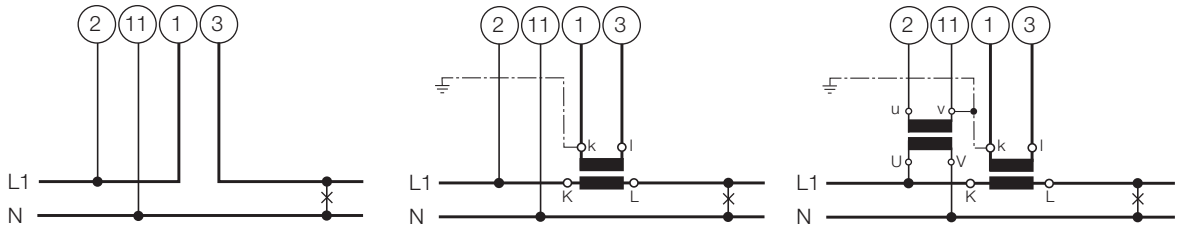
Application (system)	Internal connection Terminal / System
Single-phase AC current	2 / 11 (L1 – N)
4-wire 3-phase symmetric load	2 / 11 (L1 – N)
All other (apart from A15 / A16 / A24)	2 / 5 (L1 – L2)



Bus Cable Termination
Both ends of the bus cable must be fitted with bus terminators. This ensures that:
– the conductor has a fixed rest voltage,
– reflections in the cable are minimized and
– the bus has an almost constant load.

BF = Bus Failure LED
The slave is in the state "Baud Search" and does not receive valid telegrams
BA = Bus Aktive
The slave is exchanging data cyclically
BD = Bus Diagnosis LED
Lit: Parameter error
Flashing: Configuration error

Measuring inputs

System / application	Terminals
Single-phase AC system (A11)	

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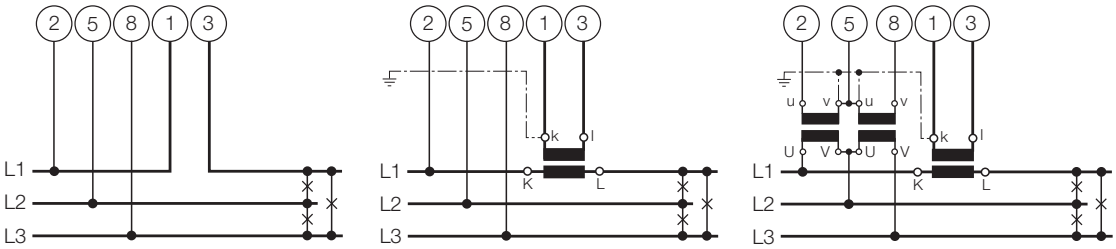
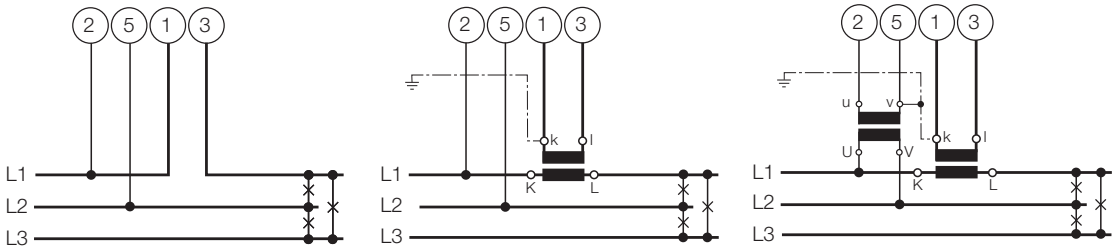
Measuring input

System / application	Terminals
3-wire 3-phase **symmetric load** I: L1 (A13)	

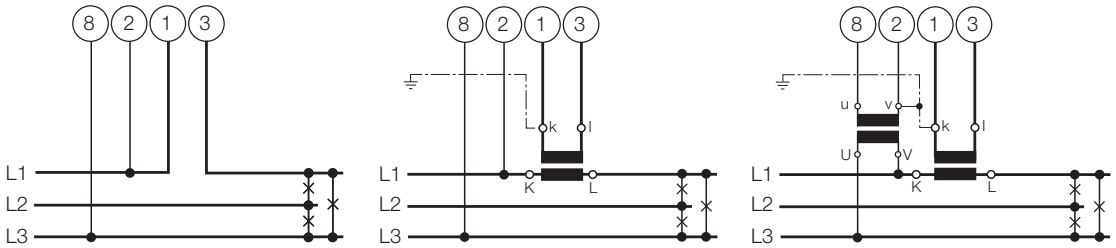
Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	5	8
L2	1	3	L2	L3	L1
L3	1	3	L3	L1	L2

3-wire 3-phase **symmetric load** Phase-shift U: L1 – L2 I: L1 (A12)	

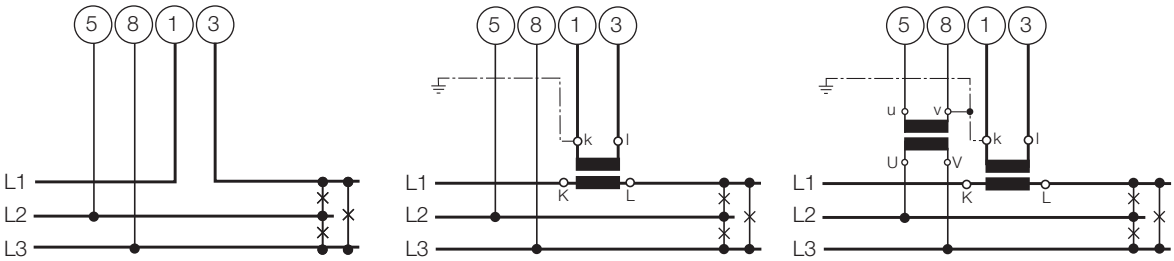
Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	5
L2	1	3	L2	L3
L3	1	3	L3	L1

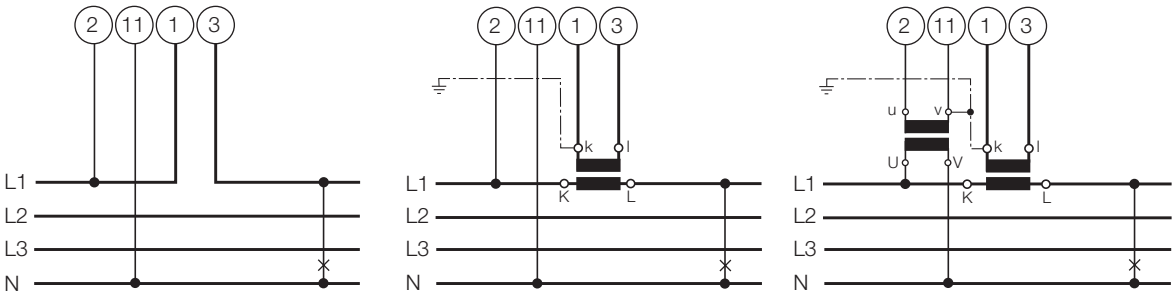
3-wire 3-phase **symmetric load** Phase-shift U: L3 – L1 I: L1 (A15)	

Connect the voltage according to the following table for current measurement in L2 or L3:

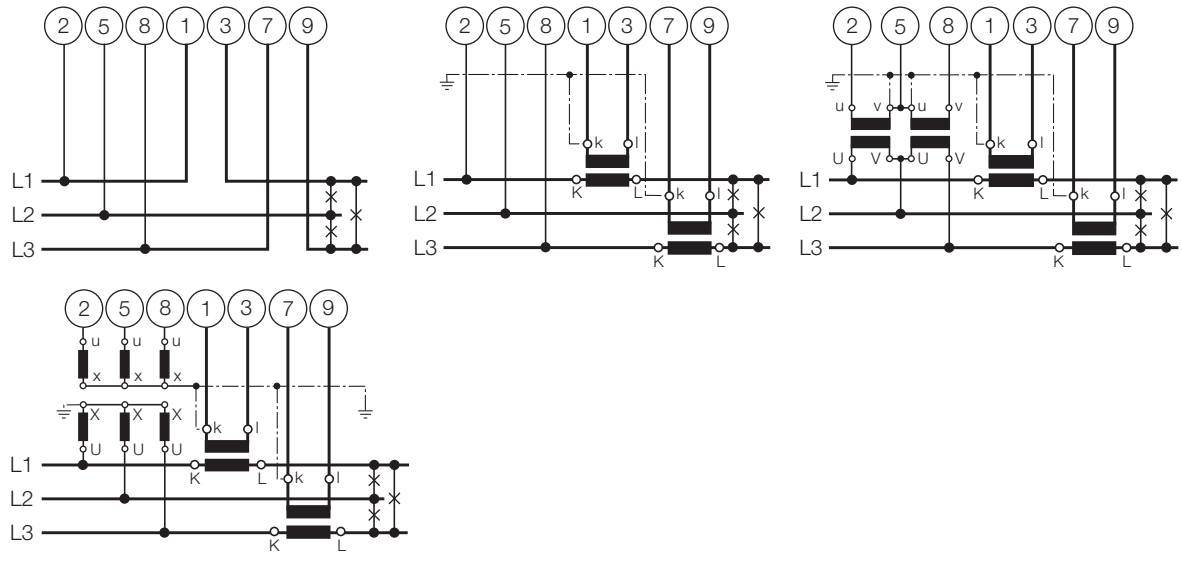
Current transf.	Terminals		8	2
L2	1	3	L1	L2
L3	1	3	L2	L3

Measuring inputs	
System / application	Terminals
3-wire 3-phase **symmetric load** Phase-shift U: L2 – L3 I: L1 (A16)	 Connect the voltage according to the following table for current measurement in L2 or L3:

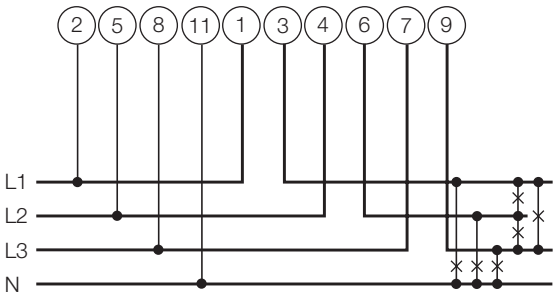
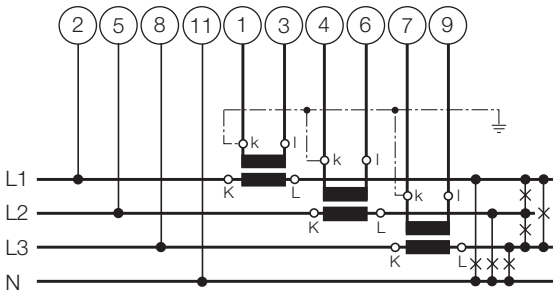
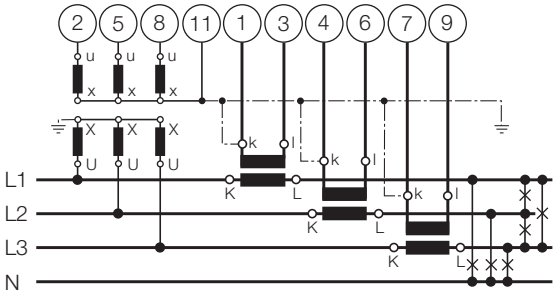
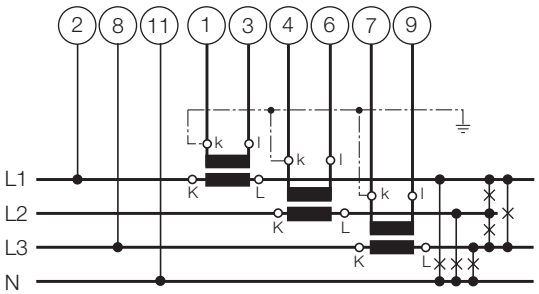
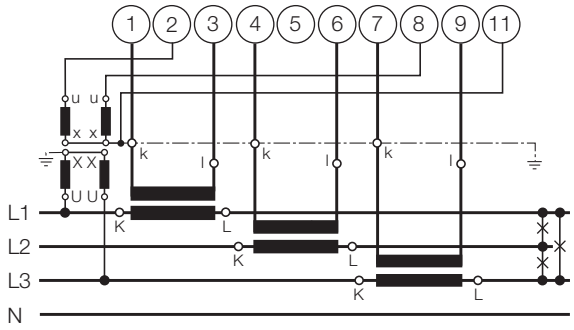
Current transf.	Terminals		5	8
L2	1	3	L3	L1
L3	1	3	L1	L2

4-wire 3-phase **symmetric load** I: L1 (A14)	 Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	11
L2	1	3	L2	N
L3	1	3	L3	N

3-wire 3-phase **asymmetric load** (A34)	

SINEAX DME 406 with PROFIBUS-DP
Programmable multi-transducer

Measuring inputs	
System / application	Terminals
4-wire 3-phase **asymmetric load** (A44)	   3 single-pole insulated voltage transformers in high-voltage system
4-wire 3-phase **asymmetric load,** Open-Y connection (A24)	 Low-voltage system  2 single-pole insulated voltage transformers in high-voltage system

Relationship between PF, QF and LF

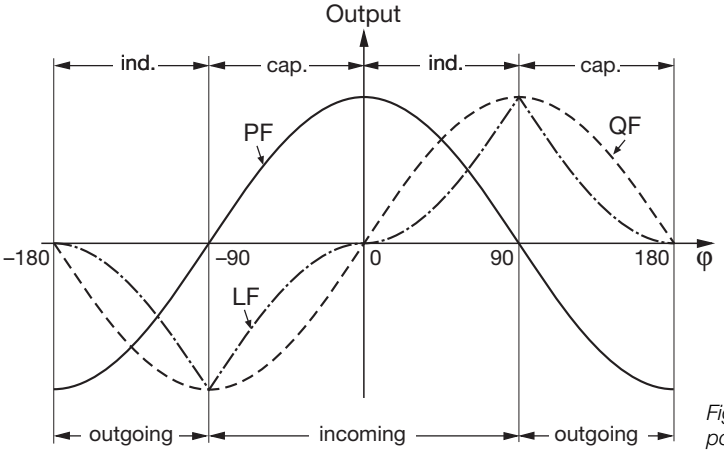


Fig. 3. Active power PF ——, reactive power QF ------, power factor LF – – – –.

Dimensioned drawings

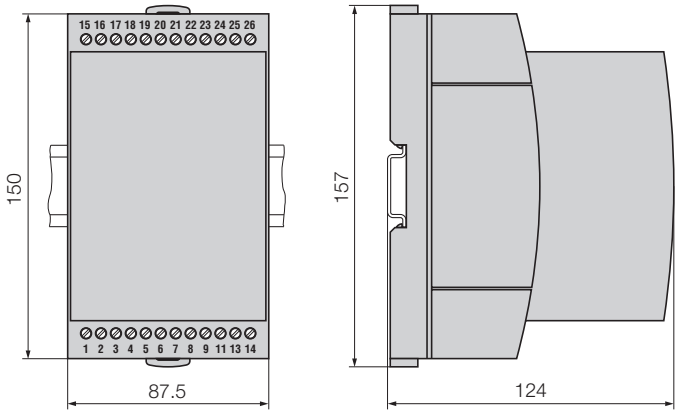


*Fig. 4. SINEAX DME 406 in housing **T24** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).*

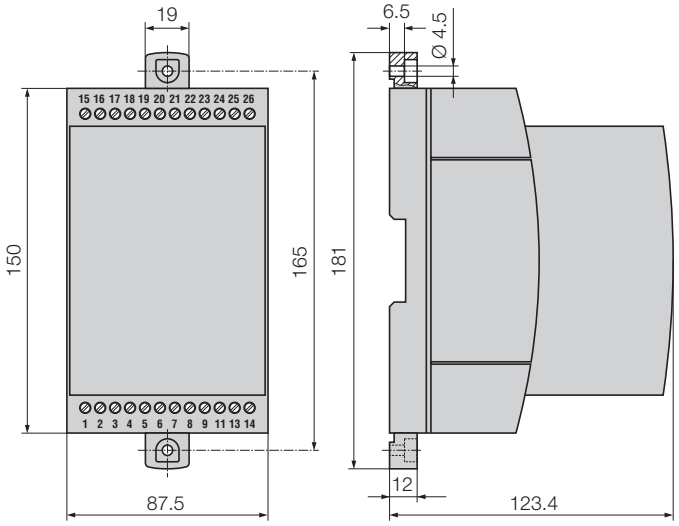


*Fig. 5. SINEAX DME 406 in housing **T24**, screw hole mounting brackets pulled out.*

Table 6: Accessories

Description	Order No.
Programming cable	980 179
Configuration software DME 4 for SINEAX/EURAX DME 424, 440, 442, SINEAX DME 400, 401 and 406 Windows 3.1x, 95, 98, NT and 2000 on CD in German, English, French, Italian and Dutch **(Download free of charge under http://www.gmc-instruments.com)** In addition, the CD contains all configuration programmes presently available for Camille Bauer products.	146 557
Operating Instructions DME 406-1 Bd-f-e	146 888

SINEAX DME 406 with PROFIBUS-DP
Programmable multi-transducer

Printed in Switzerland • Subject to change without notice • Edition 05.01 • Data sheet No. DME 406-1 Le

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