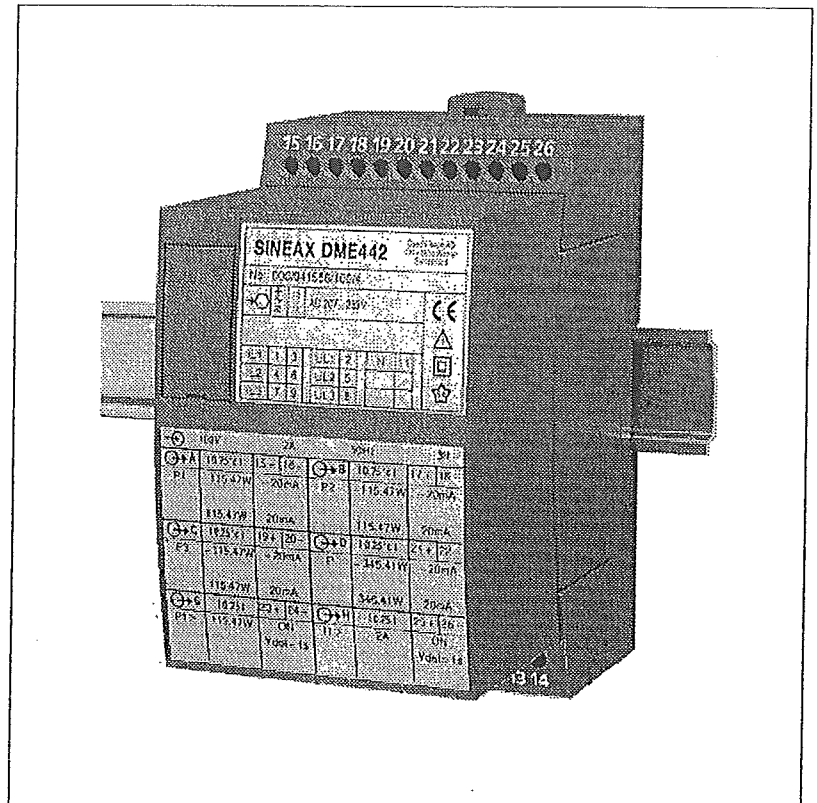


Betriebsanleitung
Programmierbare Multi-Messumformer
SINEAX DME 424/442

Mode d'emploi
Convertisseurs de mesure multiples
programmables SINEAX DME 424/442

Operating Instructions
Programmable multi-transducers
SINEAX DME 424/442



DME 424/442-1 B d-f-e

122 250

11.98

Betriebsanleitung Programmierbare Multi-Messumformer SINEAX DME 424/442

Deutsch

Mode d'emploi Convertisseurs de mesure multiples programmables SINEAX DME 424/442

Français

Operating Instructions Programmable multi-transducers SINEAX DME 424/442

English

Sicherheitshinweise, die unbedingt beachtet werden müssen, sind in dieser Betriebsanleitung mit folgenden Symbolen markiert:

Les conseils de sécurité qui doivent impérativement être observés sont marqués des symboles ci-contre dans le présent mode d'emploi:

The following symbols in the Operating Instructions indicate safety precautions which must be strictly observed:



Operating Instructions

Programmable multi-transducers SINEAX DME 424/442

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1. Read first and then ...



The proper and safe operation of the device assumes that the Operating Instructions are **read** and the safety warnings given in the various Sections

- 4. Physical installation**
- 5. Electrical connections**
- 6. Commissioning**
- 12. Safety notes**

are **observed**.

The device should only be handled by appropriately trained personnel who are familiar with it and authorised to work in electrical installations.

2. Scope of supply (Figs. 1, 2 and 3)

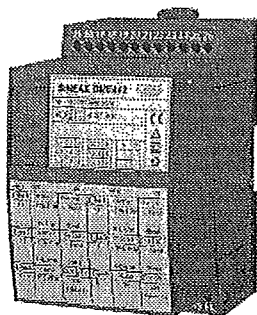


Fig. 1

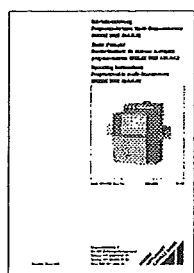


Fig. 2

| | | | |
|-----|-----|-----|-----|
| 15+ | 16- | 17+ | 18- |
| 19+ | 20- | 21+ | 22- |
| 23+ | 24- | 25+ | 26- |

Fig. 3

Transducer (Fig. 1)

1 **Operating Instructions** (Fig. 2) in three languages: German, French, English

1 **blank type label** (Fig. 3), for recording programmed settings

3. Brief description

The **SINEAX DME 4** multi-transducers **simultaneously** measure several variables of an electric power system and process them to produce 2 resp. 4 analogue output signals.

2 or 4 digital outputs are available for signalling limits or power metering. For two of the limit outputs up to three measurands can be logically combined.

The multi-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 modes of connection, the types of measured variables, their ratings, the transfer characteristic for each output etc. are the main parameters that have to be programmed.

Ancillary functions include a power system check, provision for displaying the measured variable on a PC monitor, the simulation of the outputs for test purposes and a facility for printing nameplates.

4. Physical installation

The transducer can be mounted either on a top-hat rail or directly onto a wall or mounting surface.



Note "Environmental conditions" in Section "6.1 Technical data" when determining the place of installation!

4.1 Mounting on top-hat rails

Simply clip the device onto the top-hat rail (EN 50 022) (see Fig. 4).

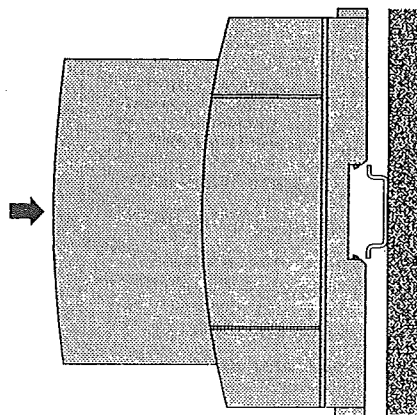


Fig. 4. Mounting on top-hat rail 35 x 15 or 35 x 7.5 mm.

4.2 Fastening on a mounting surface

While pressing the latch (4) in the base of the device (Fig. 5, left) pull out the isolating amplifier securing brackets (1). To return the brackets to their original positions, the latch (5) in the base of the device has to be depressed before applying pressure to the securing brackets (1) (see Fig. 5, right).

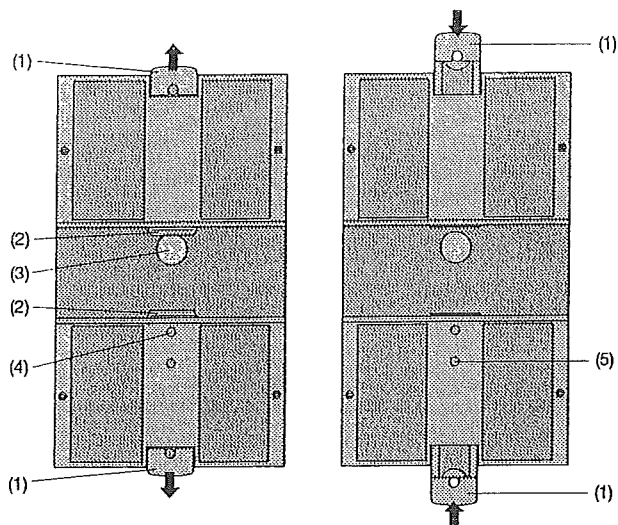


Fig. 5. Rear of device.
(1) Screw hole brackets
(2) Top-hat rail clips
(3) Rubber buffers

(4) Latch for pulling the screw hole brackets out
(5) Latch for pushing the screw hole brackets in.

Drill 2 holes in the wall or panel as shown in the drilling pattern (Fig. 6). Now secure the power pack to the wall or panel using two 4 mm diameter screws.

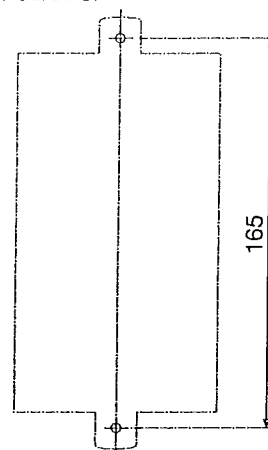


Fig. 6. Drilling plan.




5. Electrical connections

The connectors are designed as screw terminals. They are suited for single-wire leads of 4 mm² or multiple-wire leads of 2 × 2.5 mm² cross section.

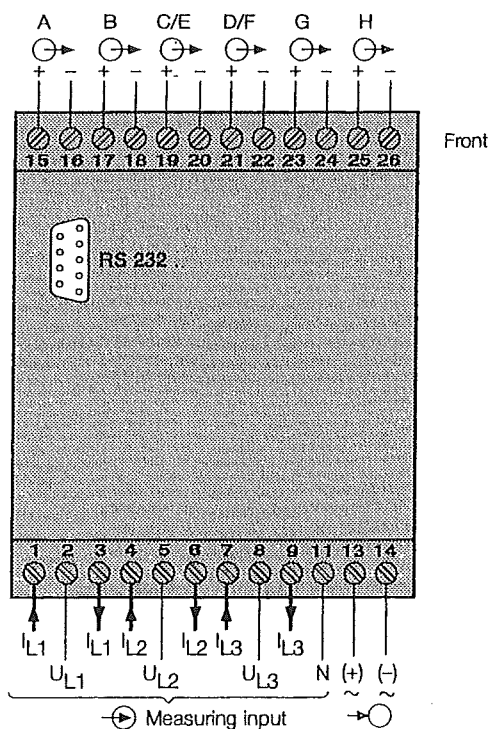


Make sure that the cables are not live when making the connections!

Connect the leads according to the table.

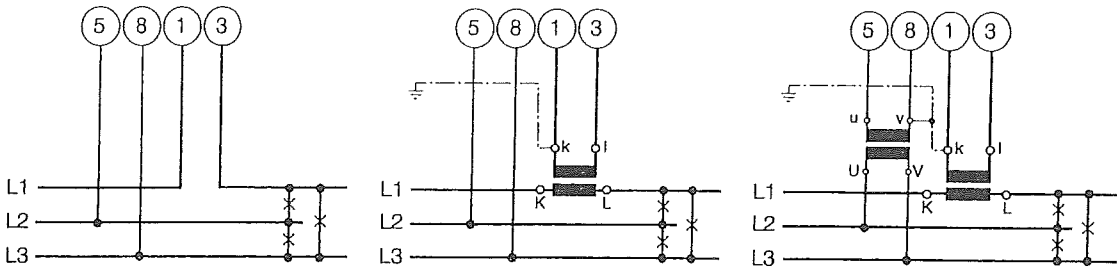
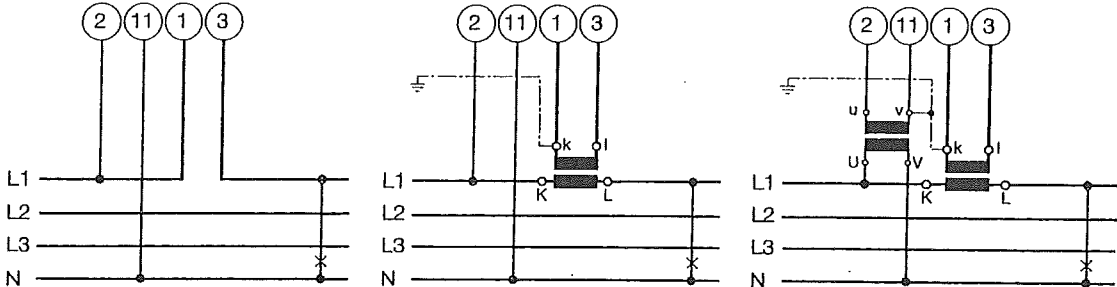
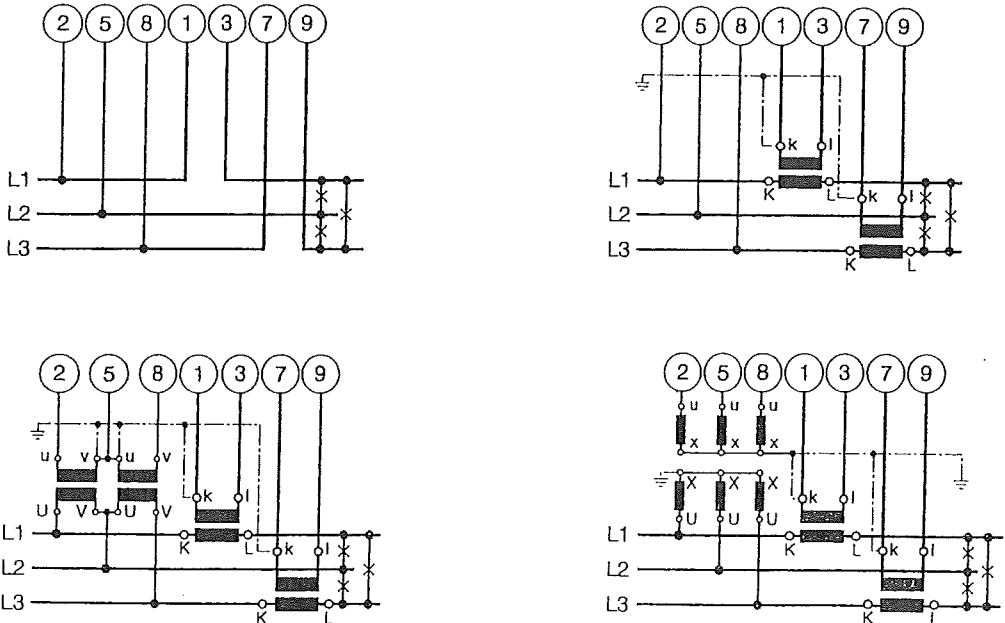
| Function | | | Connection | |
|--|------------|-----|------------|----|
| Meas. input  | AC current | IL1 | 1 / 3 | |
| | | IL2 | 4 / 6 | |
| | | IL3 | 7 / 9 | |
| | AC voltage | UL1 | 2 | |
| | | UL2 | 5 | |
| | | UL3 | 8 | |
| | | N | 11 | |
| Outputs | | | | |
|  | Analogue | A | + | 15 |
| | | | - | 16 |
| | | B | + | 17 |
| | | | - | 18 |
| | | C | + | 19 |
| | | | - | 20 |
| | Digital | E | + | 21 |
| | | | - | 22 |
| | | F | + | 23 |
| | | | - | 24 |
| | | G | + | 25 |
| | | | - | 26 |
| Power supply AC  | ~ | | 13 | |
| | ~ | | 14 | |
| | DC | + | 13 | |
| | | - | 14 | |

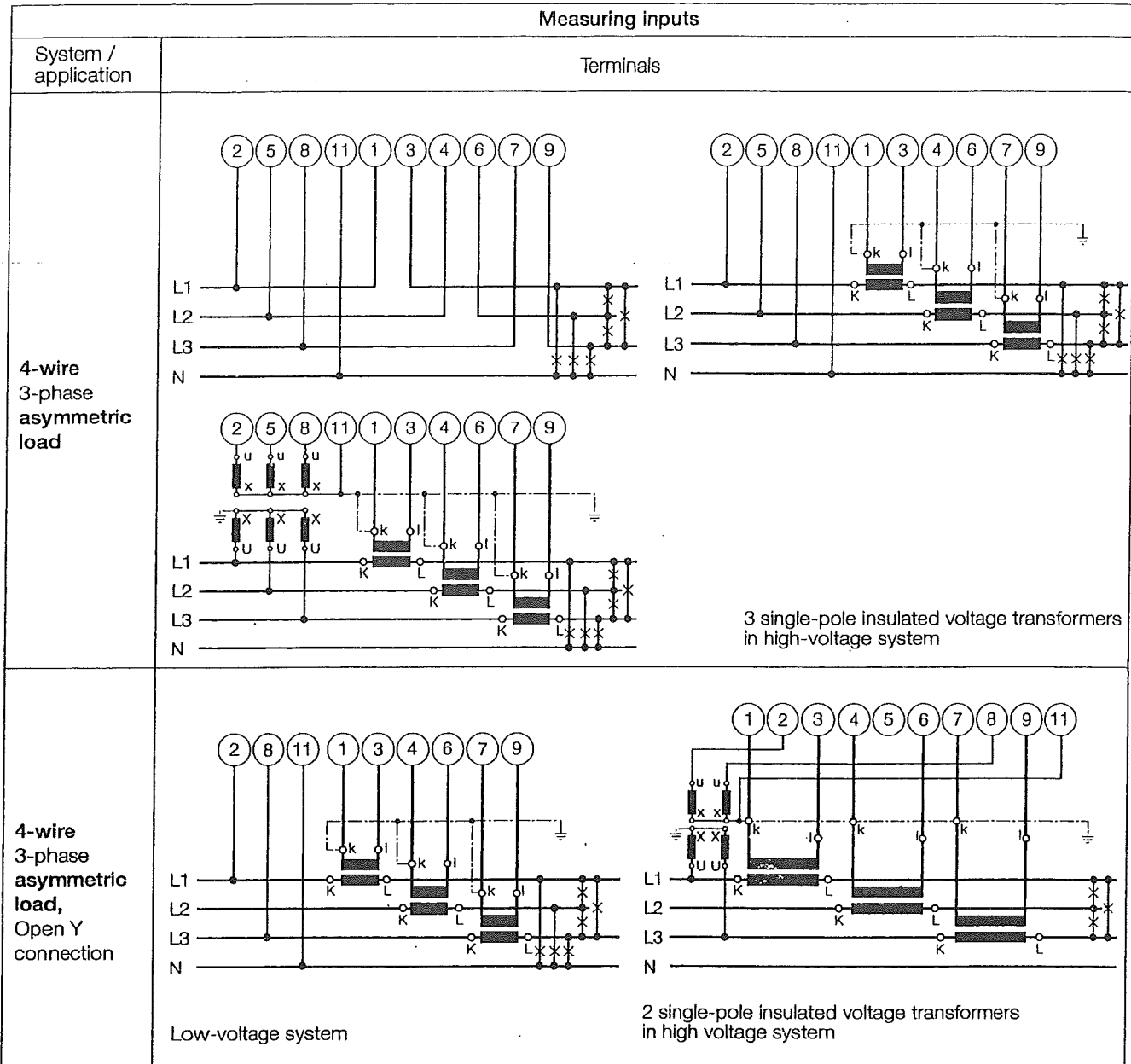
If power supply is taken from the measured voltage internal connections are as follow:



| 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) |

| Measuring inputs | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------|-----------|----|----|---|----|----|---|----|----|----|----|----|----|----|----|----|----|
| System / application | Terminals | | | | | | | | | | | | | | | | | | |
| Single-phase AC system | | | | | | | | | | | | | | | | | | | |
| 3-wire 3-phase symmetric load I: L1 | <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table><tr><th>Current transf.</th><th colspan="2">Terminals</th><th>2</th><th>5</th><th>8</th></tr><tr><td>L2</td><td>1</td><td>3</td><td>L2</td><td>L3</td><td>L1</td></tr><tr><td>L3</td><td>1</td><td>3</td><td>L3</td><td>L1</td><td>L2</td></tr></table> | Current transf. | Terminals | | 2 | 5 | 8 | L2 | 1 | 3 | L2 | L3 | L1 | L3 | 1 | 3 | L3 | L1 | L2 |
| 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 | <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table><tr><th>Current transf.</th><th colspan="2">Terminals</th><th>2</th><th>5</th></tr><tr><td>L2</td><td>1</td><td>3</td><td>L2</td><td>L3</td></tr><tr><td>L3</td><td>1</td><td>3</td><td>L3</td><td>L1</td></tr></table> | Current transf. | Terminals | | 2 | 5 | L2 | 1 | 3 | L2 | L3 | L3 | 1 | 3 | L3 | L1 | | | |
| 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 | <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table><tr><th>Current transf.</th><th colspan="2">Terminals</th><th>8</th><th>2</th></tr><tr><td>L2</td><td>1</td><td>3</td><td>L1</td><td>L2</td></tr><tr><td>L3</td><td>1</td><td>3</td><td>L2</td><td>L3</td></tr></table> | Current transf. | Terminals | | 8 | 2 | L2 | 1 | 3 | L1 | L2 | L3 | 1 | 3 | L2 | 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 |  <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table><tr><th>Current transf.</th><th colspan="2">Terminals</th><th>5</th><th>8</th></tr><tr><td>L2</td><td>1</td><td>3</td><td>L3</td><td>L1</td></tr><tr><td>L3</td><td>1</td><td>3</td><td>L1</td><td>L2</td></tr></table> | Current transf. | Terminals | | 5 | 8 | L2 | 1 | 3 | L3 | L1 | L3 | 1 | 3 | L1 | L2 |
| | Current transf. | Terminals | | 5 | 8 | | | | | | | | | | | |
| L2 | 1 | 3 | L3 | L1 | | | | | | | | | | | | |
| L3 | 1 | 3 | L1 | L2 | | | | | | | | | | | | |
| 4-wire 3-phase symmetric load I: L1 |  <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table><tr><th>Current transf.</th><th colspan="2">Terminals</th><th>2</th><th>11</th></tr><tr><td>L2</td><td>1</td><td>3</td><td>L2</td><td>N</td></tr><tr><td>L3</td><td>1</td><td>3</td><td>L3</td><td>N</td></tr></table> | Current transf. | Terminals | | 2 | 11 | L2 | 1 | 3 | L2 | N | L3 | 1 | 3 | L3 | N |
| | Current transf. | Terminals | | 2 | 11 | | | | | | | | | | | |
| L2 | 1 | 3 | L2 | N | | | | | | | | | | | | |
| L3 | 1 | 3 | L3 | N | | | | | | | | | | | | |
| 3-wire 3-phase asymmetric load |  | | | | | | | | | | | | | | | |



6. Commissioning



Prior to starting, check that the connection data of the transducer agrees with the system data (see type label).

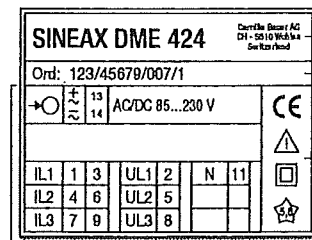
The power supply to the transducer can then be switched on and the signals applied to the measuring inputs.

Measuring input
 Input voltage
 Input current
 Nominal frequency
 System

Measuring output
 Output signal

Power supply

6 Manufacturer
 7 Works No.
 8 Conformity mark
 9 Terminals
 Input quantities and
 power supply
 10 Terminals
 Output quantities



| 100V | | | | 2A | | | | 50Hz | | | | 3N~ | | | |
|------|--|--|--|----------|--|--|--|------|--|--|--|-----------|--|--|--|
| → A | | | | 0.25 c | | | | → B | | | | 0.25 c | | | |
| P1 | | | | 115.47W | | | | P2 | | | | 115.47W | | | |
| | | | | 20mA | | | | | | | | 20mA | | | |
| → E | | | | 0.25 c | | | | → F | | | | 0.25 c | | | |
| P> | | | | 311.77kW | | | | Q> | | | | 34.84kvar | | | |
| | | | | ON | | | | | | | | ON | | | |
| | | | | Ydel=min | | | | | | | | Ydel=min | | | |
| → G | | | | 0.25 c | | | | → H | | | | 0.25 c | | | |
| P1> | | | | 115.47kW | | | | I1> | | | | 2A | | | |
| | | | | ON | | | | | | | | ON | | | |
| | | | | Ydel=min | | | | | | | | Ydel=min | | | |

Fig. 7. Declaration to type label.

6.1 Technical data

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 |
| Y | Output variable |
| Y0 | Lower limit of the output variable |
| Y1 | Break point of the output variable |
| Y2 | Upper limit of the output 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) |
| IBT | Response time for IB |
| BS | Slave pointer function for the measurement of the RMS value IB |
| BST | Response time for BS |
| φ | Phase-shift between current and voltage |
| F | Frequency of the input variable |
| F _n | Rated frequency |
| 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) |
| Q | Reactive power of the system Q = Q1 + Q2 + Q3 |
| Q1 | Reactive power phase 2 (phase-to-neutral L1 – N) |

| Symbols | Meaning |
|----------------|--|
| 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 $\cos \varphi = P/S$ |
| 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 $\sin \varphi = Q/S$ |
| 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 $LF = \text{sgn}Q \cdot (1 - PF)$ |
| LF1 | Power factor phase 1 $\text{sgn}Q1 \cdot (1 - PF1)$ |
| LF2 | Power factor phase 2 $\text{sgn}Q2 \cdot (1 - PF2)$ |
| LF3 | Power factor phase 3 $\text{sgn}Q3 \cdot (1 - PF3)$ |
| c | Factor for the intrinsic error |
| R | Output load |
| R _n | Rated burden |
| H | Power supply |
| H _n | Rated value of the power supply |
| CT | c.t. ratio |
| VT | v.t. ratio |

Input

Waveform: Sinusoidal

Nominal frequency: Acc. to type label

Consumption
(at external
power supply): Voltage circuit: $\leq U^2 / 400 \text{ k}\Omega$
Current circuit: $0.3 \text{ VA} \cdot I/5 \text{ A}$

Limit of transmission
range: 1.2 Ur
1.5 Ir

Continuous thermal ratings of inputs

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

Short-time thermal rating of inputs

| Input variable | Number of inputs | Duration of overloads | 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 $H_{\text{intern}}: 1.5 U_r$ | 10 | 10 s | 10 s |
| Three-phase system 1040 V $H_{\text{intern}}: 1.5 U_r$ | 10 | 10 s | 10 s |

Analogue outputs $\odot \rightarrow$

For the outputs A, B, C and D:

| Output variable Y | Impressed DC current | Impressed DC voltage |
|---|--|--|
| Full scale Y2 | see "Ordering information" | see "Ordering information" |
| Limits of output signal for input overload and/or $R = 0$ | $1.25 \cdot Y2$ | 40 mA |
| $R \rightarrow \infty$ | 30 V | $1.25 Y2$ |
| Rated useful range of output load | $0 \leq \frac{7.5 V}{Y2} \leq \frac{15 V}{Y2}$ | $\frac{Y2}{2 \text{ mA}} \leq \frac{Y2}{1 \text{ mA}} \leq \infty$ |
| AC component of output signal (peak-to-peak) | $\leq 0.005 \cdot Y2$ | $\leq 0.005 \cdot Y2$ |

The outputs A, B, C and D may be either short or open-circuited. They are electrically insulated from each other and from all other circuits (floating).

Digital outputs, pulse outputs, limit outputs $\odot \rightarrow$

The digital outputs conform to DIN 43 864. The pulse width can be neither programmed nor is there a hardware setting.

Type of contact: Open collector

Number of pulses: Programmable

Pulse duration: $\geq 100 \text{ ms}$

Interval: $\geq 100 \text{ ms}$

External power supply: 8 ... 40 V

Output current: ON 10 ... 27 mA
OFF $\leq 2 \text{ mA}$

System response

Duration of the measurement cycle: Approx. 0.25 to 0.5 s at 50 Hz, depending on measured variable and programming

Response time: 1 ... 2 times the measurement cycle

Accuracy class: (the reference value is the full-scale value Y2)

| Measured variable | Condition | Accuracy class* |
|--|---|--|
| System: Active power, reactive power, apparent power | $0.5 \leq X2/Sr \leq 1.5$ $0.3 \leq X2/Sr < 0.5$ | 0.25 c 0.5 c |
| Phase: Active power, reactive power, apparent power | $0.167 \leq X2/Sr \leq 0.5$ $0.1 \leq X2/Sr < 0.167$ | 0.25 c 0.5 c |
| Power factor, active power, reactive power | $0.5Sr \leq S \leq 1.5 Sr$, $(X2 - X0) = 2$ | 0.25 c |
| | $0.5Sr \leq S \leq 1.5 Sr$, $1 \leq (X2 - X0) < 2$ | 0.5 c |
| | $0.5Sr \leq S \leq 1.5 Sr$, $0.5 \leq (X2 - X0) < 1$ | 1.0 c |
| | $0.1Sr \leq S < 0.5Sr$, $(X2 - X0) = 2$ | 0.5 c |
| | $0.1Sr \leq S < 0.5Sr$, $1 \leq (X2 - X0) < 2$ | 1.0 c |
| AC voltage | $0.1Sr \leq S < 0.5Sr$, $0.5 \leq (X2 - X0) < 1$ | 2.0 c |
| | AC voltage | $0.1 U_r \leq U \leq 1.2 U_r$ |
| AC current / current averages | $0.1 I_r \leq I \leq 1.5 I_r$ | 0.25 c |
| System frequency | $0.1 U_r \leq U \leq 1.2 U_r$ resp. $0.1 I_r \leq I \leq 1.5 I_r$ | $0.15 + 0.03 c$ ($f_N = 50 \dots 60 \text{ Hz}$) $0.15 + 0.1 c$ ($f_N = 16 \frac{2}{3} \text{ Hz}$) |
| Pulse | acc. to IEC 1036 $0.1 I_r \leq I \leq 1.5 I_r$ | 1.0 |

* Basic accuracy 0.5 c for applications with phase-shaft

Factor c (the highest value applies):

Linear characteristic:

$$c = \frac{1 - \frac{Y_0}{Y_2}}{1 - \frac{X_0}{X_2}} \text{ or } c = 1$$

Bent characteristic:

$X_0 \leq X \leq X_1$

$$c = \frac{Y_1 - Y_0}{X_1 - X_0} \cdot \frac{X_2}{Y_2} \text{ or } c = 1$$

$X_1 < X \leq X_2$

$$c = \frac{1 - \frac{Y_1}{Y_2}}{1 - \frac{X_1}{X_2}} \text{ or } c = 1$$

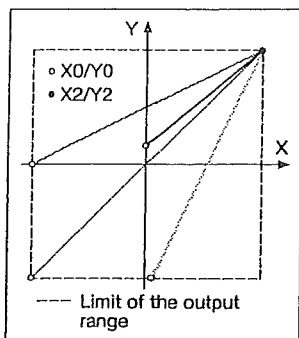


Fig. 8. Examples of settings with linear characteristic.

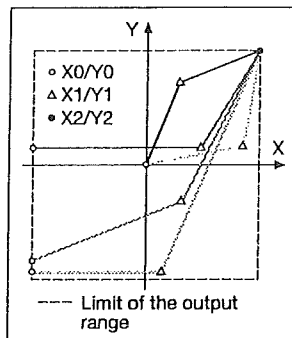


Fig. 9. Examples of settings with bent characteristic.

Influencing quantities and permissible variations

Acc. to DIN IEC 688

Electric 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 |

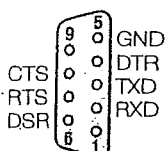
Power supply →

AC voltage: According to type label

Programming connector on transducer

Interface: RS 232 C

DSUB socket: 9-pin



The interface is electrically insulated from all other circuits

Ambient conditions

Climatic rating: Climate class 3 acc. to VDI/VDE 3540

Operating temperature: -10 to +55 °C

Storage temperature: -40 to +85 °C

Annual mean relative humidity: ≤ 75%

6.2 Programming the transducer

The transducers SINEAX DME 424/442 have an integrated RS 232 C interface (SCI).

The existing programming can be matched conveniently to a changed situation and stored via the "Programming software for SINEAX DME 4" (Order number 131 144).

For this purpose, the RS 232 output of the transducer must be connected to a PC via the RS 232 C (SCI) programming cable (Order Number 980 179) and the transducer must be supplied with power supply.

The programming software has an easy-to-operate, clear menu structure which allows for the following functions to be performed:

- Reading and displaying the programmed configuration of the transducer
- Clear presentation of the input and output parameters
- Transmission of changed programming data to the transducer and for archiving of a file
- Protection against unauthorized change of the programming by entry of a password
- Configuration of all the usual methods of connection (types of power system)
- Easy change of input and output parameters

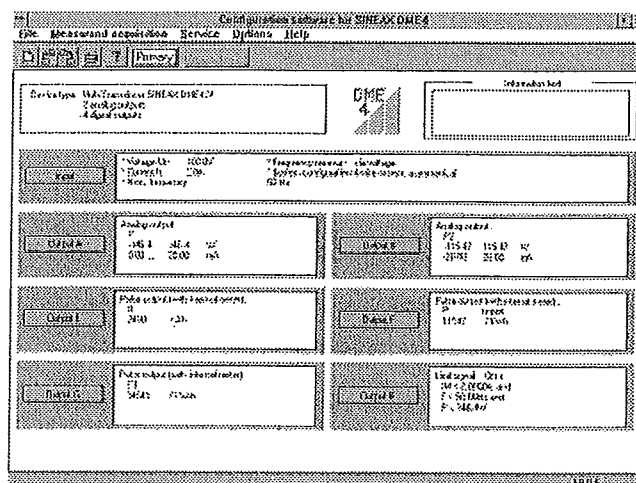


Fig. 10. Presentation of all programming parameters in the main menu.

- Selection possibility for frequency measurement via voltage or current
- Possibility to reset the slave pointer of the output quantity involved
- Parameter setting of outputs A and B resp. A to D (input of measured quantity, upper limits, limitation of upper limits and response time per output)

- Graphics display of the set system behaviour of each output
- Recording of measured variables

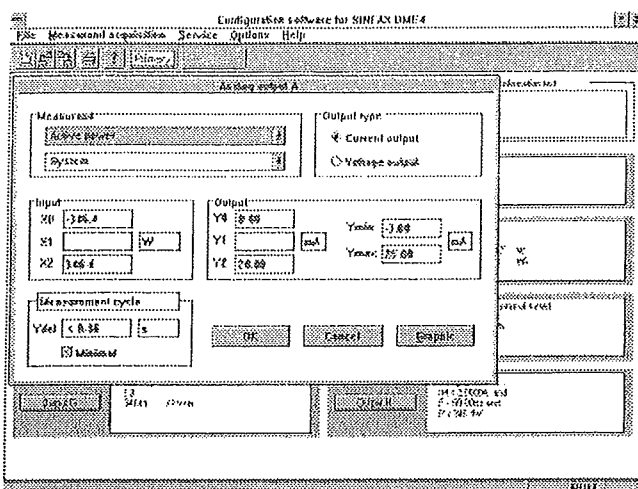


Fig. 11. Programming of the output quantities.

- Definition of the digital outputs G and H, respectively E to H, either to produce an output impulse (counter impulse) for measuring Ah, Wh, Varh and VAh or to monitor a limit. 2 limit monitor outputs (G and H) permit up to 3 measurements each to be logically interlocked.

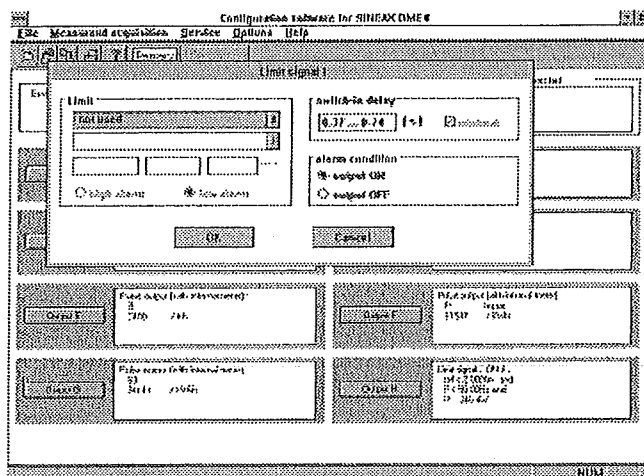


Fig. 12. Assignment of limits to outputs E to H.

Provision is also made for the following ancillary functions:

- The power system check
- Provision for displaying the measured variable on a PC monitor
- The simulation of the outputs for test purposes
- Printing of nameplates

6.3 Operation of the binary outputs

The binary outputs are electrically isolated from all other circuits via an optocoupler.

They therefore require an additional power supply to energise the output circuits.

Outputs $\odot \rightarrow$ E, F, G and H in the case of SINEAX DME 424 and outputs $\ominus \rightarrow$ G and H in the case of SINEAX DME 442 are available (see Section "Electrical connections").

External power supply: 8 ... 40 V

Output current: ON 10 ... 27 mA
OFF ≤ 2 mA

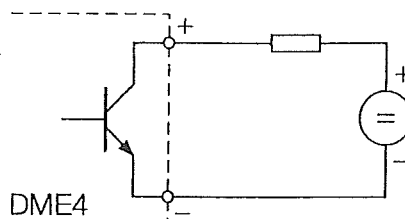


Fig. 13. Block circuit diagram for operation of the binary outputs.

7. Withdrawing and inserting the device (Fig. 14)

CAUTION! The warranty is void if the device is tampered with!

Remove the locking pins (11) on the rear of the transducer. Screw wood screws of about 2 mm diameter partly into the locking pin holes and pull them out using small pliers.

Press in the retaining hook (12) with a screwdriver and remove the cover.

To close the device, insert a guide rail into the base of the housing and press the two parts gently together until the hooks engage.

Replace the locking pins.

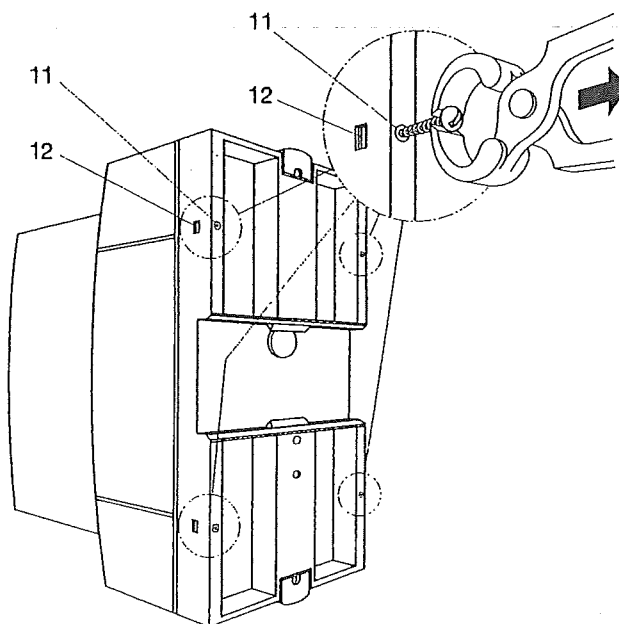


Fig. 14. Withdrawing the device.

8. Reconfiguring the analogue outputs

The alternative configurations for the analogue outputs can be seen from Table 1.

Table 1:

| Action | Procedure |
|---|---|
| Change the current full-scale value from, for example, 20 mA to 10 mA (a hardware setting always has to be made when changing from a lower to a higher value) | Reconfigure the software, but do not change the hardware setting. Accuracy is reduced (see Section 8.1) |
| | Reconfigure the software and change the hardware setting. Accuracy is not reduced (see Section 8.2) |
| Change a current output [mA] to a voltage output [V] or vice versa | Reconfigure the software, change the hardware setting and calibrate the output (see Section 8.2) |

8.1 Without hardware setting change

The PC software DME 4 (Order No. 131 144) and a programming cable (Order No. 980 179) are needed in order to reprogram the device. The reduced accuracy resulting from this change can be determined by printing a type label (see Fig. 15 and 16).

| 400kV/400V | 1000/1.0A | 50Hz | 3N~ |
|------------|-----------|------------|---------|
| 0.25c | 15+ 16- | 0.25c | 17+ 18- |
| P 0W | 0.0mA | U1N 215V | 0.0mA |
| 500W | 20.0mA | 240V | 20.0mA |
| 0.25c | 19+ 20- | 15+0.03c | 21+ 22- |
| I1 0.000A | 0.0mA | F 49.5Hz | 0.0mA |
| 0.500A | 20.0mA | 50.5Hz | 20.0mA |
| 1.0 | 23+ 24- | 0.25 | 25+ 26- |
| P 5000 | / kWh | I1< 0.225A | ON |
| R | | U1N> 233V | Ydel=0s |
| | | F> 50.0Hz | OR |

Fig. 15. Example of a type label with the present 20 mA output and an accuracy class of 0.25 c.

| 400kV/400V | 1000/1.0A | 50Hz | 3N~ |
|------------|-----------|------------|---------|
| 0.45c | 15+ 16- | 0.25c | 17+ 18- |
| P 0W | 0.0mA | U1N 215V | 0.0mA |
| 500W | 10.0mA | 240V | 20.0mA |
| 0.25c | 19+ 20- | 15+0.03c | 21+ 22- |
| I1 0.000A | 0.0mA | F 49.5Hz | 0.0mA |
| 0.500A | 20.0mA | 50.5Hz | 20.0mA |
| 1.0 | 23+ 24- | 0.25 | 25+ 26- |
| P 5000 | / kWh | I1< 0.225A | ON |
| R | | U1N> 233V | Ydel=0s |
| | | F> 50.0Hz | OR |

Fig. 16. Example of a type label with the new output of 10 mA and an accuracy class of 0.45 c.

8.2 With hardware setting change



Unauthorized repair or alteration of the unit invalidates the warranty!

The PC software DME 4 (Order No. 131 144) and a programming cable (Order No. 980 179) are needed in order to reprogram the device.

If modifying hardware range limits of analog outputs you have to change resistances on the output PCB. The range limit is realized by means of a resistance, which is separated in two resistances for better accuracy. The resistances must be selected for minimized error. The calculation of this values and the assembling of the other variable components is shown below. However, the consequence of every hardware modification is a new output calibration.

Output calibration

With this function you can perform a new calibration of the analog outputs. You can adjust the outputs to the given facts of subsequent devices as well. However, you have to calibrate every output after changing its hardware to achieve the desired accuracy.

To perform an output calibration you have to connect a voltmeter respectively ammeter of sufficient accuracy to the output terminals. On software demand you have to read measurands and put them to the software. If you adjust the output for subsequent devices, you have to take the measurands from these devices logically. The new calibration data will be stored as customer calibration. Any time you can load the factory calibration separately for each output.

Before performing any output calibration warm up the device to operating temperature first (min. 30 min. acc. to DIN EN 60 668).

For further informations see PC software DME 4, menu bar "Help".



To perform an output calibration you have to connect a voltmeter respectively ammeter of sufficient accuracy to the output terminals.

The instructions for opening the device are to be found in Section "7. Withdrawing and inserting the device".

Current output / Voltage output

(Output A: x = 1, Output B: x = 2, Output C: x = 3, Output D: x = 4)

Variantes

| Output | Brx01 | Rx43 | Rx34 | Rx44 | Rx45 | Rx46 |
|-----------|----------|-----------------------------------|-------------------|----------|-----------------------------------|---------------|
| Output mA | open | 0 Ω (950685) or soldered | 27 kΩ (951360) | open | variable | variable |
| Output V | soldered | open | variable | variable | 0 Ω (950685) or soldered | never mind |

Calculation of resistors Rx45 and Rx46 for the full-scale output currents Y2 in the range ≥ 1 to ≤ 20 mA:

| Current output | | | | |
|---|--------|-----------|--------|-----------|
| $Rx45 // Rx46 = \frac{1}{\frac{Y2 [mA]}{0.99158 V} - \frac{1}{27 k\Omega}}$ | | | | |
| Y2 | Rx45 | Order No. | Rx46 | Order No. |
| 20 mA | open | — | 49.9 Ω | 102 575 |
| 10 mA | open | — | 100 Ω | 951 089 |
| 5 mA | open | — | 200 Ω | 101 717 |
| 2.5 mA | 2.7 kΩ | 951 245 | 470 Ω | 951 162 |
| 1 mA | 3.3 kΩ | 951 253 | 1.5 kΩ | 951 211 |

Calculation of resistors Rx34 and Rx44 for the full-scale output voltages Y2 in the range ≥ 1 to ≤ 10 V:

| Voltage output | | | | |
|------------------------------------|--------|-----------|--------|-----------|
| $Rx34 // Rx44 = Y2 [V] - 27'229.4$ | | | | |
| Y2 | Rx34 | Order No. | Rx44 | Order No. |
| 10 V | 270 kΩ | 951 485 | open | — |
| 5 V | 270 kΩ | 951 485 | 270 kΩ | 951 485 |
| 2.5 V | 68 kΩ | 951 419 | open | — |
| 1 V | 27 kΩ | 951 360 | open | — |

The locations of the variable components on the plug-in output board are shown in Figures 17 and 18.

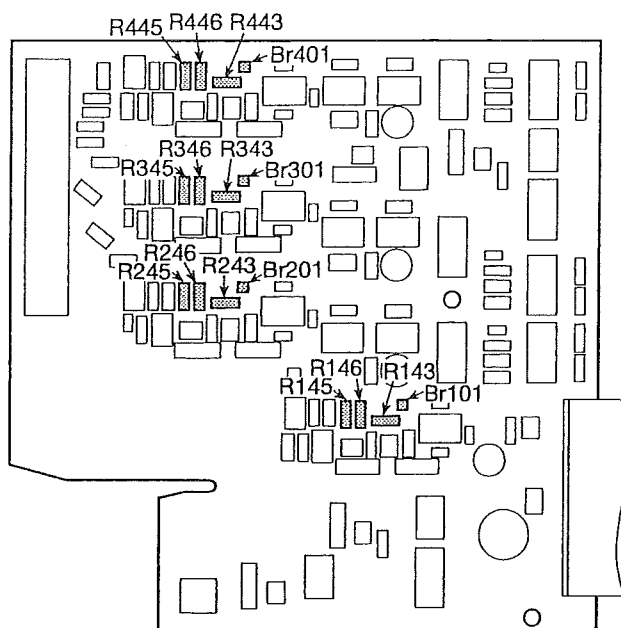


Fig. 17. Top view of the output board.

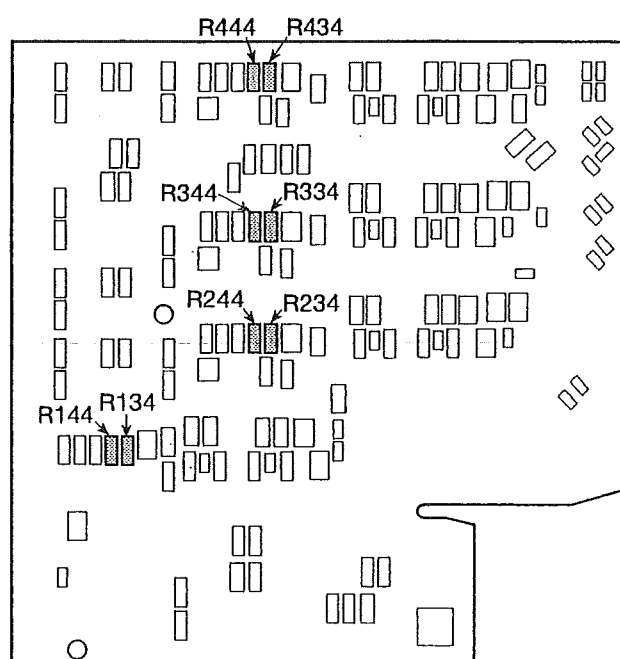


Fig. 18. Bottom view of the output board.

9. Maintenance

No maintenance is required.

10. Releasing the transducer

Release the transducer from a top-hat rail as shown in Fig. 19.

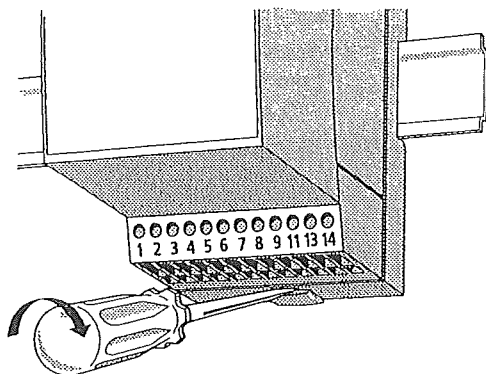


Fig. 19

11. Dimensional drawings

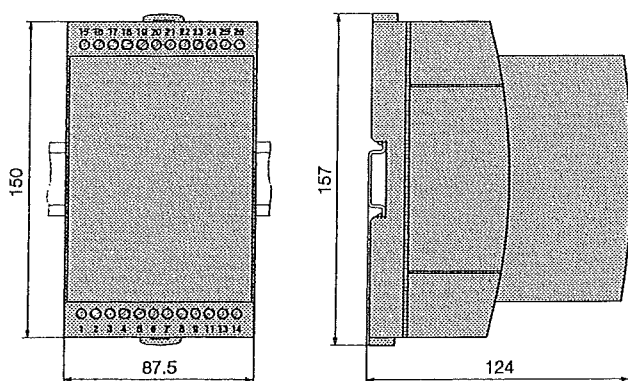


Fig. 20. SINEAX DME in housing T24 clipped onto a top-hat rail (35 x 15 mm or 35 x 7.5 mm, acc. to EN 50 022).

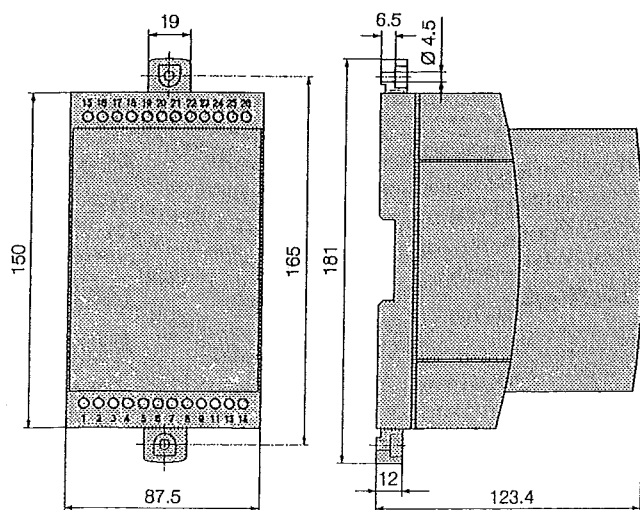


Fig. 21. SINEAX DME in housing T24 screw hole mounting brackets pulled out.

12. Safety notes

- Before you start the device check for which power supply it is built.
- Verify that the connection leads are in good condition and that they are electrically dead while wiring the device.
- When it must be assumed that safe operation is no longer possible, take the device out of service (eventually disconnect the power supply and the input voltage).

This can be assumed on principle when the device shows obvious signs of damage.

The device must only be used again after troubleshooting, repair and a final test of calibration and dielectric strength in our factory or by one of our service facilities.

- When opening the cover, live parts may be exposed.

Calibration, maintenance or repair with the device open and live must only be performed by a qualified person who understands the danger involved. Capacitors in the device may still be charged even though the device has been disconnected from all voltage sources.

- After repair on maintenance and closing of the device, the insulation must be tested with high voltage with the values listed in the technical data.

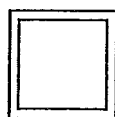
English

Meaning of the symbols on the device

The symbols on the device have the following meaning:



Warning of danger
(Caution, see documentation!)



Class II device

