

## 3-Phase A.C. Current &amp; Voltage Measurement

## Features

- Multi-function measuring instrument for A.C. power line parameters
- Voltage measurement with limit detection
- Current measurement with user-selectable current transformer ratio
- Averaged current measurement (bimetallic function) and peak value detection
- Measurement and display of active power, with limit relay output
- Energy measurement with unit pulse relay output
- Parameter settings via front panel key-switches, menu assisted

## Description

The **MINI-D A.C.** Power Line Info Centre measures effective (RMS) voltages and currents in 3-phase A.C. mains. It also measures active power based on power factor, and integrates this to totalise energy consumption.

The measured values are displayed sequentially by the instrument, either by pressing the key-switches, or by automatic stepping at a user-programmed display interval. Illuminated symbols, arrayed on both sides of the front panel, clearly indicate which value the LED digits currently display.

The user can select any one of 34 standard current transformer ratios in the range 1A to 4000A which are pre-programmed in the instrument (see Connection Diagram).

Individual parameters, limit set-points, current transformer ratio, etc., are user programmable via 3 front panel key-switches. Key-switch combinations allow setting and recalling of stored peak values and averaged values. The stored measurements, calculated values, accumulated kWh, and instrument settings are stored in non-volatile memory, protected against power interruptions.

Energy consumption (kWh) is integrated over 1-minute intervals, and is also available as energy unit pulses by a signalling relay. The pulses-per-kWh factor is

user programmable. Voltage and power (load) limits can be set by the user, with separate relays which are actuated when these limits are crossed.

Relay functions are as follows:

- Relay 1: de-energised on under- or over-voltage detection
- Relay 2: de-energised on power overload detection
- Relay 3: energised/de-energised to generate pulses with a user-programmable factor of 1 to 2000 pulses per kWh

The **MINI-D** has been specifically designed for electrical power system panel applications.

All connections to the instrument are via plug-in spring-clamp connectors (no screws).

An optional IP65 protective hood protects the front panel against harsh environments.

The instrument and the internal memory are maintenance free.

Up to six 0- or 4-20 mA outputs for re-transmission of current and voltage measurements, and an RS-485 serial data interface are also available as options.



## Functions

## Measurement Functions:

- Phase-to-phase and phase-to-neutral voltages
- Phase currents, through 5A (optionally 1A) secondary current transformer
- Active power (kW)
- Energy consumption (MWh)
- Cos  $\Phi$  inductive and capacitive
- Line frequency
- 15-minute averaged current values (bimetallic function)
- Peak current values (drag pointer function)

## Programmable Parameters:

- Over- and under-voltage limits ; including error messages
- Power (load) limit (KWh / Time)
- Pulses per kWh (relay output)
- Current transformer ratio, from 34 standard pre-programmed values

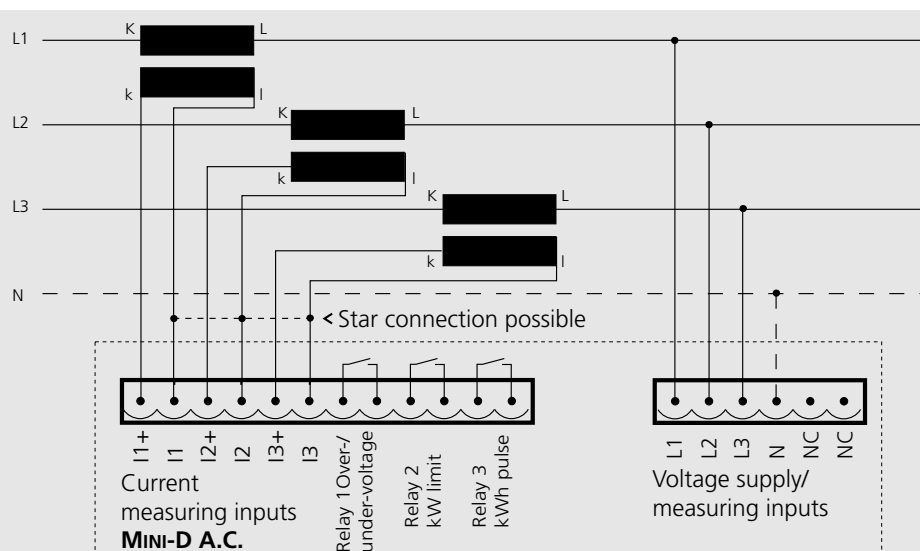
## Technical Data

|                           |  |
|---------------------------|--|
| Voltage range             | 0.8 x to 1.25x nominal voltage ( $U_N$ )   |
| Frequency range           | 50 / 60 Hz   |
| Power consumption         | Approx. 3 VA   |
| Input impedance           | Voltage inputs: 2 M $\Omega$<br>Cur. inputs (shunts): 0.01 $\Omega$ or 0.05 $\Omega$ |
| Operating limits          | Cur.: 2x, Volt.: 1.25x nom. rating   |
| Ambient temperature       | +5 °C to +50 °C  |
| Storage temperature       | -20 °C to +70 °C   |
| Isolation voltage         | 250 V, nominal   |
| Creep and air paths       | Group III per VDE 0110<br>Pollution level 2  |
| Test voltage              | 2000 V per VDE 0435  |
| Voltage high & low limits | Adjustable over $\pm$ 25% of nominal rating  |
| Power overload limit      | KWh/ Time: 1-60 min  |
| Energy pulse rate         | Adjustabl. fr. 1 to 2000 p. per kWh  |
| Relay contacts rating     | 250 V <sub>AC</sub> , 1 A, 100 VA;<br>30 V <sub>DC</sub> , 0.5 A, 20 W               |
| Relay logic               | Normally energised   |

## Measuring ranges:

|                       |   |
|-----------------------|---|
| Voltage               | 0 to 600 V <sub>AC</sub><br>(or 0.8x to 1.25x $U_N$ ; L1-L2)                                  |
| Current               | 0 to 5 A <sub>AC</sub> (0.01 $\Omega$ shunt).<br>0 to 1 A <sub>AC</sub> (0.05 $\Omega$ shunt) |
| Frequency             | 20.0 to 99.0 Hz   |
| Cos $\Phi$            | +/- 0.5 (capacitive, inductive)   |
| Energy                | Max. 9999.9 MWh; floating point   |
| Accuracy              | Class 1   |
| Temperature effect    | <0,01 % /K  |
| Display range         | 0 bis 19999   |
| Digits                | 7-segment red LED, 14mm height  |
| Protection class      | Front IP 20. Terminals: IP 00.<br>Per DIN VDE 0470-1 (11/92)                                  |
| Voltage inputs        | Plug-in spring-clamp con. (no screws)   |
| Wire cross section    | 2.5 mm <sup>2</sup> fine-stranded wire;<br>max. 7.0 mm, stripped                              |
| RS-485 interface      | 9-pin D-type sub. connector (option)  |
| 0- or 4-20 mA outputs | 15-pin D-type sub. connector (opt.)   |
| Weight                | Approx. 470 g   |

## Connection Diagram



The following current transformer values are stored in the instrument and can be set by the user:

### Primary current (A<sub>AC</sub>):

1 / 2.5 / 5 / 10 / 15 / 20 / 25 / 30 / 40 / 50 / 60 / 75 / 80 / 100 / 125 / 150 / 200 / 250 / 300 / 400 / 500 / 600 / 750 / 800 / 1000 / 1200 / 1250 / 1500 / 1600 / 1800 / 2000 / 2500 / 3000 / 4000 A<sub>AC</sub>

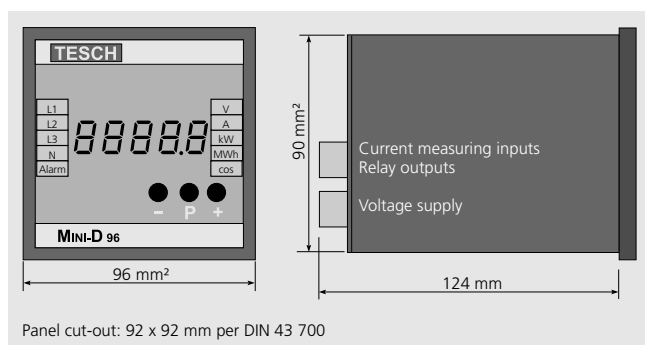
### Current transformer secondary:

Standard: 5A. Optional: 1A (on special order)

### Supply voltage:

Standard: from phases L1-L2  
Optional: through separate terminals (on special order)

## Dimensions



## Models and Ordering Data

| MINI -D                                    | Order No.                    |
|--|------------------------------|
| Basic instrument 400 V <sub>AC</sub> / 5 A | 082 00157                    |
| Options:                                   |                              |
| 0- or 4-20 mA outputs (1,2,4 or 6)         | Please specify when ordering |
| RS-485 interface                           |                              |
| Shunts for 1A current inputs               |                              |
| Accessories:                               |                              |
| DIN rail mounting adaptor EN 50022-35x7.5  | 953 00026                    |
| IP65 protective hood                       | 919 00552                    |

