VARIMETER
Active Power Transducer
MH 9398

Translation of the original instructions

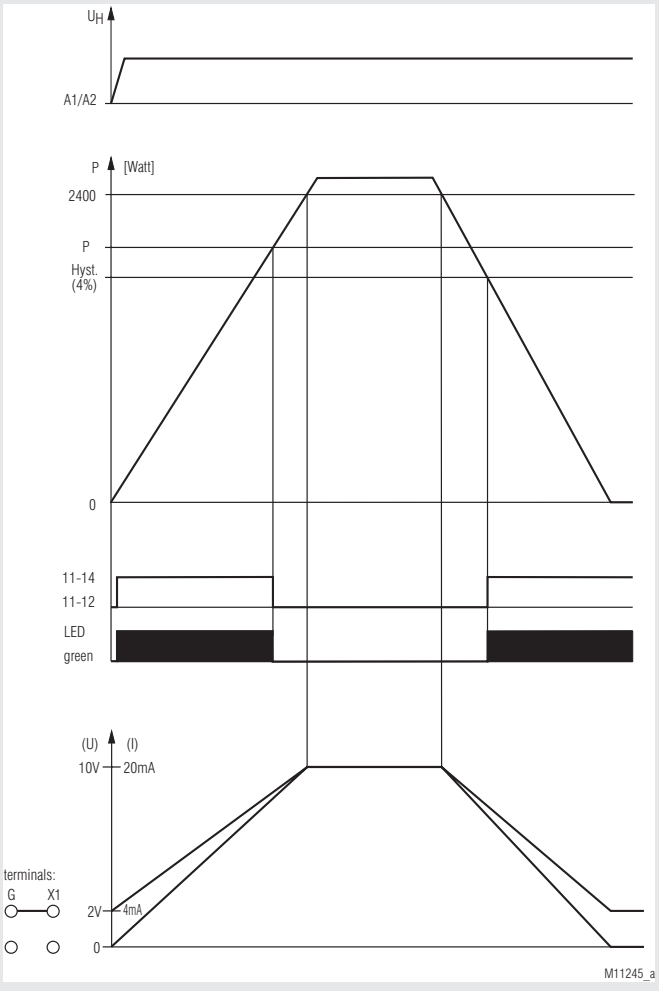
0272133



Product Description

The active power transducer MH 9398 of the VARIMETER-family monitors reliably the effective power of single phase electric consumers. Adjustment is simply done via 2 rotary switches. When exceeding the adjusted threshold the output relay switches. In addition the unit has 2 galvanic separated analogue outputs. These provide the momentary active power value. LEDs indicate the connected supply and the state of the output relay.

Function Diagram



Your Advantages

- Universal use because of relay- and analogue outputs
- Reliability overload detection by active power measuring
- To extend the life of your electric drives
- Preventive maintenance
- Quicker fault locating

Features

- According to IEC/EN 60255-1
- Measurement procedures: active power measuring
- Detection of overload
- Galvanic separate analogue signals, optionally with
  - 0 … 20 mA and 0 … 10 V or
  - 4 … 20 mA and 2 … 10 V
- Adjustable response value
- Fixed hysteresis
- Single-phase
- LED indication for auxiliary voltage and contact position
- De-energized on trip
- As option with pluggable terminal blocks for easy exchange of devices
  - With screw terminals
  - Or with cage clamp terminals
- Width: 45 mm

Approvals and Markings

AE68 *) pending

Applications

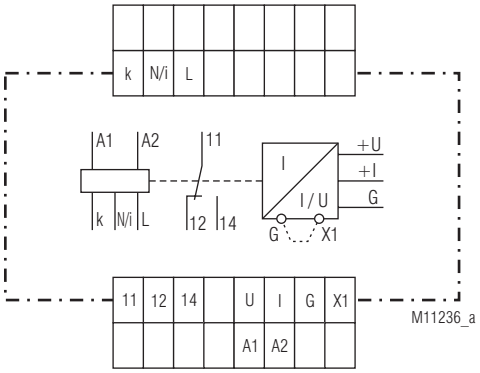
The active power transducer can be used to monitor single phase electrical motors with variable load and other single phase loads.

Notes

The relay also responds to overload on reverse power. Overload in the current path is indicated by a fast flashing of the LEDs.

All technical data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.

Circuit Diagram



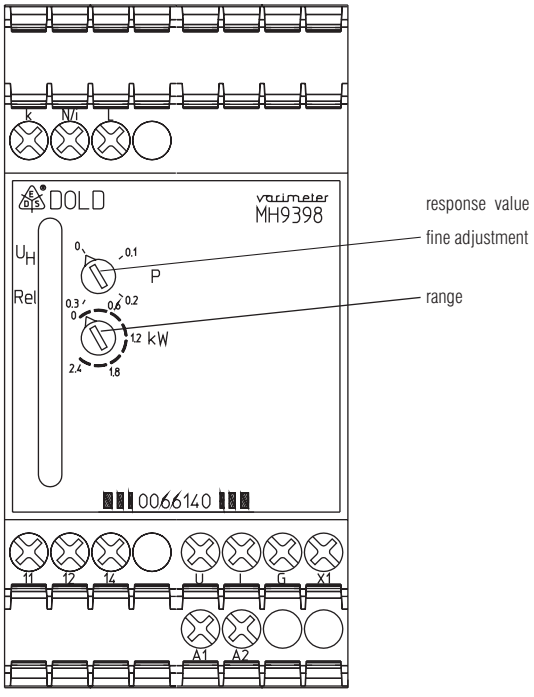
Connection Terminals

Terminal designation	Signal designation
A1 , A2	Auxiliary voltage AC
N/i, L	Voltage measuring input AC
N/i , k	Current measuring path AC
11, 12, 14	Indicator relay (C/O contact)
U, I, G, X1	Analogue output voltage / current

Set Up Procedure

The connection has to be made according to the connection examples. To connect the current of L1 the Terminals I and k are available. If the current to be measured exceeds the maximum continuous current of the input and external current transformer has to be used.

Setting



Setting

Setting facilities

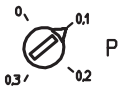
P:

Poti 1: Fine adjustment 0 ... 0.3 kW (endvalue = 0.3 kW):

Poti 2: 8 ranges adjustable:
- 0 … 0.3 kW
- 0.3 … 0.6 kW
- 0.6 … 0.9 kW
- 0.9 … 1.2 kW
- 1.2 … 1.5 kW
- 1.5 … 1.8 kW
- 1.8 … 2.1 kW
- 2.1 … 2.4 kW

Example **Response value: 1.6 kW**

Fine adjustment
(Upper rotary switch): 0.1 kW



Range selection
(Lower rotary switch): 1.5 ... 1.8 kW



Indicators

Green LED "U_H": On, when auxiliary voltage present

Green LED "P": Permanent on: Relay 1 active

Overload within the current range is indicated by fast flashing of the LED.

Technical Data

Measuring value: Effective power single-phase
Nominal measuring value: 2.4 kW

Auxiliary Voltage A1 / A2

Nom. auxiliary voltage U_H: AC 230 V (0,8 ... 1,1 x U_H)
Nominal frequency: 50 / 60 Hz
Input current
At AC 230 V: 15 mA
Nominal consumption: 2.5 W

Voltage Measuring Input N / L

Nominal voltage U_N: AC 230 V
Measuring range: AC 12 ... 230 V (0,8 ... 1,1 x U_H)

Current Measuring Input i / k

Nominal current I_N: AC 10 A
Measuring range: AC 100 mA ... 10 A
Max. overload
Continuously: 16 A
Short time < 10 s: Max. 25 A

Overload within the current range is indicated by fast flashing of the LED.

Nominal frequency: 50 / 60 Hz
Frequency range: 45 ... 400 Hz

Setting range (at absolute scale)

Response value: 0 ... 2.4 kW setting at absolute scale
Setting
Range: 8 ranges 0 ... 2.4 kW
Rel: Fine adjustment 0 ... 0.3 kW
Measuring accuracy
(In % of setting value): ± 4 %
Hysteresis
(In % of setting value): < 4 %
Reaction time: < 350 ms
Start up delay: 500 ms fixed

Output

Contact: 1 changeover contact
Thermal current I_{th}: 4 A
Switching capacity
To AC 15:

NO contacts:	3 A / AC 230 V	IEC/EN 60947-5-1
NC contacts:	1 A / AC 230 V	IEC/EN 60947-5-1
To DC 13:	1 A / DC 24 V	IEC/EN 60947-5-1

Electrical life

At 3 A, AC 230 V cos φ = 1:	2 x 10^5 switch. cycl.	IEC/EN 60947-5-1

Short circuit strength

max. fuse rating:	4 A gG / gL	IEC/EN 60947-5-1

Mechanical life: 30 x 10^6 switching cycles

Analogue output U / I / G

The analogue outputs are galvanic separated from the measuring circuit and indicate the actual value in the complete possible measuring range.

The max value is fixed and cannot be changed.

Galvanic separation AC 3750 V
to auxiliary, measuring and output circuit
Ternimal U(+) / G(-): 0 ... 10 V, max. 10 mA
Terminal I (+) / G(-): 0 ... 20 mA, max. burden 500 Ω
Selection to 2 ... 10 V / 4 ... 20 mA
by bridging terminals X1 and G

Technical Data

General Data
Nominal operating mode: Continuous operation
Temperature range
Operation: - 20 ... + 60 °C
Storage: - 20 ... + 60 °C
Altitude: < 2000 m
Clearance and creepage distance
Rated impulse voltage /
pollution degree: 4 kV / 2
EMC

Electrostatic discharge (ESD):	8 kV (air)	IEC/EN 61000-4-2
HF irradiation		
80 MHz ... 2,7 GHz:	10 V / m	IEC/EN 61000-4-3
Fast transients:	2 kV	IEC/EN 61000-4-4
Surge voltage		
Between		
wires for power sypply:	1 kV	IEC/EN 61000-4-5
Between wire and ground:	2 kV	IEC/EN 61000-4-5
HF-wire guided:	10 V	IEC/EN 61000-4-6

Interference suppression: Limit value class A*)
*) The device is designed for the usage under industrial conditions (Class A, EN 55011).
When connected to a low voltage public system (Class B, EN 55011) radio interference can be generated. To avoid this, appropriate measures have to be taken

Degree of protection:

Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529

Housing: Thermoplastic with VO behaviour according to UL Subject 94
Vibration resistance: Amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60068-2-6
Climate resistance: 20 / 060 / 04 IEC/EN 60068-1
Terminal designation: EN 50005
Wire connection DIN 46228-1/-2/-3/-4
Screw terminals
(integrated): 1 x 4 mm² solid or
1 x 2.5 mm² stranded wire with sleeve or
2 x 1.5 mm² stranded wire with sleeve or
2 x 2.5 mm² solid
Insulation of wires
or sleeve length: 8 mm
Plug in with screw terminals
Max. cross section: 1 x 2.5 mm² solid or
1 x 2.5 mm² stranded wire with sleeve
Insulation of wires
or sleeve length: 8 mm
Plug in with
cage clamp terminals
Max. cross section: 1 x 4 mm² solid or
1 x 2.5 mm² stranded wire with sleeve
Min. cross section: 0.5 mm²
Insulation of wires
or sleeve length: 12 $^{\pm 0,5}$ mm
Wire fixing: Plus-minus terminal screws M3.5 box terminals with wire protection or cage clamp terminals
Stripping length: 10 mm
Fixing torque: 0.8 Nm
Mounting: DIN-rail IEC/EN 60715
Weight: 360 g

Dimensions

Width x height x depth: 45 x 90 x 97 mm

Standard Type

MH 9398.11 AC 10 A AC 12 ... 230 V AC 230 V

Article number: 0066140

- Single-phase, with auxiliary voltage
- Output: 1 C/O contact and 2 analogue outputs
- Nominal current I_N: AC 10 A
- Nominal voltage U_N: AC 230 V
- Auxiliary voltage U_H: AC 230 V
- Width: 45 mm

Ordering Example

Ordering example for variants

MH 9398 .11 _ _ AC 10 A AC 12 ... 230 V AC 230 V

- Auxiliary voltage U_H
- Measuring voltage
- Measuring current
- Type of terminals
  - without indication: terminal blocks fixed with screw terminals
  - PC (plug in cage clamp): pluggable terminal blocks with cage clamp terminals
  - PS (plug in screw): pluggable terminal blocks with screw terminals
- Contacts
- Type

Connection Example

