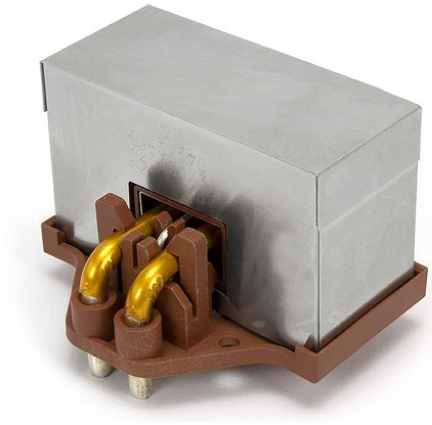
AC/DC-sensitive Differential Current Sensors (DI-Sensors)

- Closed loop sensors with magnetic probe for highest accuracy and reliability
- Differential current range typically 30 to 300 mA
- Full load current to 50 A
- Single +5 V voltage supply
- Voltage output for direct connection at A/D – converters
- Automatic demagnetization of the sensor core for offset decrease
- Self-monitoring and test functions
- Measuring accuracy 1.5%
- Smallest temperature drift, highest long-term stability
- Metal screen against external fields
- Frequency range DC to 10 kHz
- Variants with passing through opening and with integrated primary conductors, with or without test winding
- Active sensors with integrated electronics
- Economical construction



Applications

Control devices with AC/DC-sensitive differential current sensors are used primarily in transformerless solar inverters. An important safety function of these
devices is the monitoring of the leakage current of the entire system from photovoltaic - modules and inverter against earth. A defective system can become dangerous for people or release fires. Before it comes so far, the inverter must disconnect from the grid. The leakage current contains DC and AC components. Therefore an AC/DC-sensitive monitoring unit is necessary. Their heart is the VAC differential current sensor, whose output voltage is evaluated by the control system of the solar inverter.

Generally protection devices with AC/DC-sensitive differential current sensors can be used everywhere, where flat or pulsating DC can develop, whose amount is permanently greater than zero. Further examples are power supplies producing high DC voltages or uninterruptable power supplies.

Variants of the VAC Sensors

It is both a type available with an opening for the primary conductor, as well as types with built-in primary conductors for PCB mounting. There are versions with two or four conductors for single and three phase systems.

The additional functions demagnetization, error signaling and internal test power are accessible through defined levels at the inputs / outputs Vout and Vref.

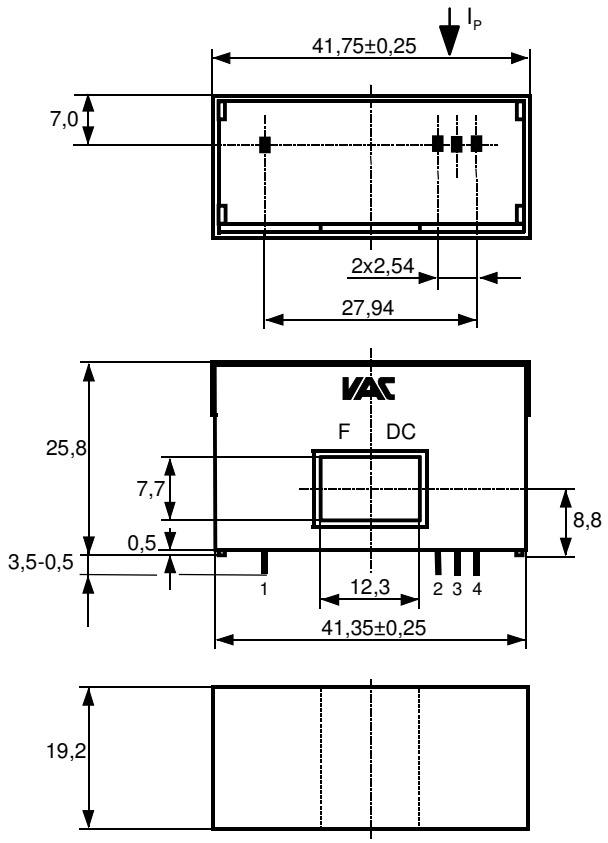
Functional description, technical data, available Types

Item no.	T60404-N4646-			
	… X950	… X960	… X975	…X976
Style				
Dimensional diagram no.	1	2	3	4
Primary conductor style	opening	via PCB. Two conductors A= 6,2 mm² for operating current	via PCB. Two conductors A= 6,2 mm² for operating current, one conductor for external test current	via PCB. Four conductors A= 4,9 mm² for operating current, one conductor for external test current
Properties				
Supply voltage	5 V			
Supply current	typ. 17 mA			
Maximum primary current	50 A			
Nominal differential current	300 mA			
Output voltage	reference voltage ± (0,74 x differential current / 300 mA)			
Measuring range	± 850 mA			
Output voltage range	0,5 V … 4,5 V			
Reference voltage	2,5 V reference voltage, internally generated or Vref=1.4 to 3.5 from external source			
Frequency range	0 … 10 kHz, limited by internal low pass filter. An additional external filter with e.g. 5 kHz roll off frequency is recommended.			
Measuring error at T_{amb} = 25°C	< 1,5 % of nominal differential current			
Temperature drift -40 … +85°C	< 0,1 mV/°C			
Response time (up to 90% of nominal differential current)	< 35 µs			
Isolation strength acc. to EN50178 (primary- and test current conductor vs. signal and supply voltage connections) - system voltage - working voltage	to be maintained by a proper insulation of the primary onductor	600 V 1.000 V		
Additional functions				
Error condition - indicated by - critieria	- output voltage < 0,5 V - break or short circuit of the magnetic probe, supply voltage smaller 4 Volts, during the demagnetization cycle.			
Demagnetization of the Sensor core - triggered by - duration of cycle	- feeding the supply voltage *or* transition from <1 V to 2,5 V (normal voltage) at the reference voltage input, i.e. after test current cycle - 120 ms			
Internal DC test current for self test - triggered by - output signal at test current	- setting reference voltage to 0 V (<1 V) - U_{DC} = +0,25 V at V_{ref} = 0 V. A possibly appearing primary current is superimposed			

Maßbilder

Maßbild Nr. 1

Typen
T60404-N4646-X950



Toleranz der Stiftabstände
±0,2mm
(Tolerances grid distance)

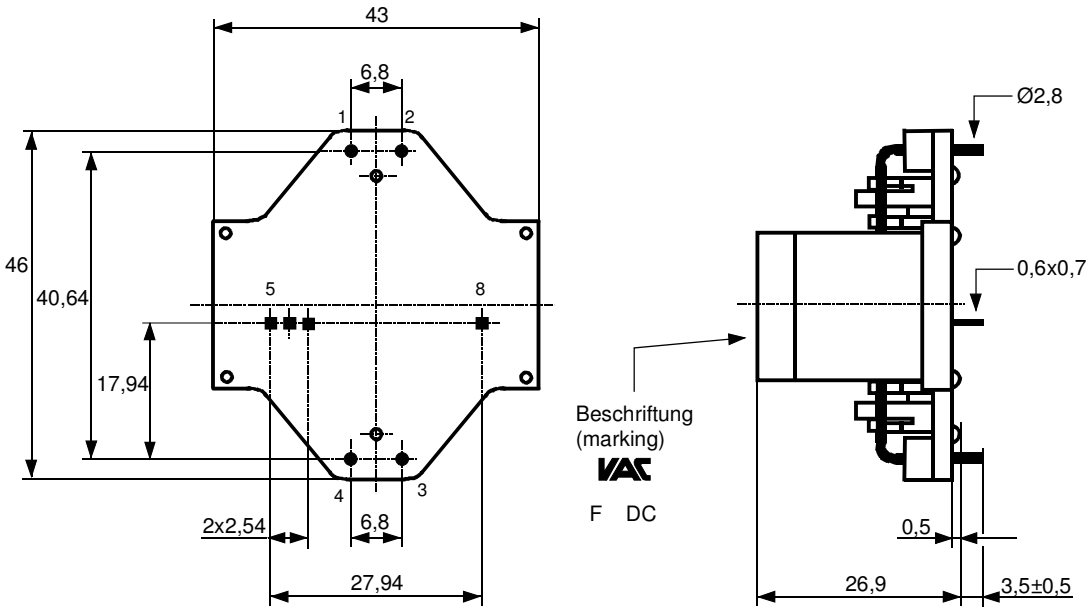
Marking:
UL Mark
Excerpt from
Item no.
F DC, in which
F = Factory
DC = Date Code

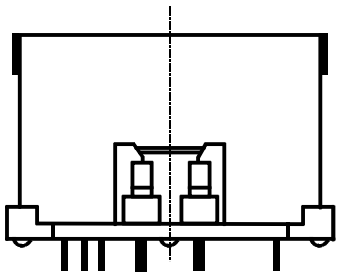
Connections:
1 … 4: 0,7 x 0,6 mm

Pin Assignments
1 Vc +5 V
2 GND
3 V_{ref} In/Out
4 V_{out}

Maßbild Nr. 2

Typ
T60404-N4646-X960





Toleranz der Stiftabstände ±0,2mm
(Tolerances grid distance)

Marking:
UL Mark
Excerpt from
Item no.
F DC, in which
F = Factory
DC = Date Code

Connections:
1 … 4: Ø 2,8 mm
5 … 8: 0,7 x 0,6 mm

Pin Assignments
1 … 4: primary current
5 V_{out}
6 V_{ref}
7 GND
8 Vc +5 V

Maßbild Nr. 3

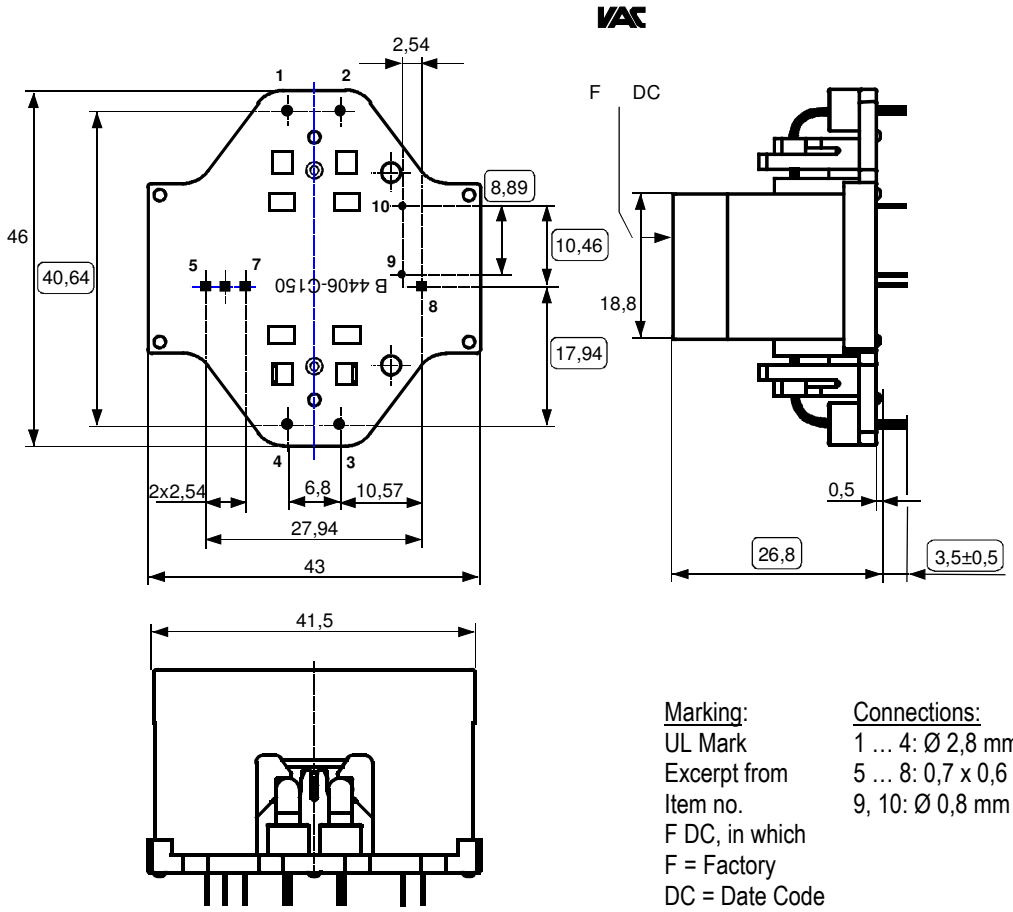
Typ
T60404-N4646-X975

Toleranz der Stiftabstände ±0,3mm
(Tolerances grid distance)

Prüfmaß
(test dimension)

Beschriftung
(marking)

DC = Date Code
F = Factory



Marking:
UL Mark
Excerpt from
Item no.
F DC, in which
F = Factory
DC = Date Code

Connections:
1 … 4: Ø 2,8 mm
5 … 8: 0,7 x 0,6 mm
9, 10: Ø 0,8 mm

Pin Assignments
1 … 4: primary current
9, 10: test current
5 V_{out}
6 V_{ref}
7 GND
8 Vc +5 V

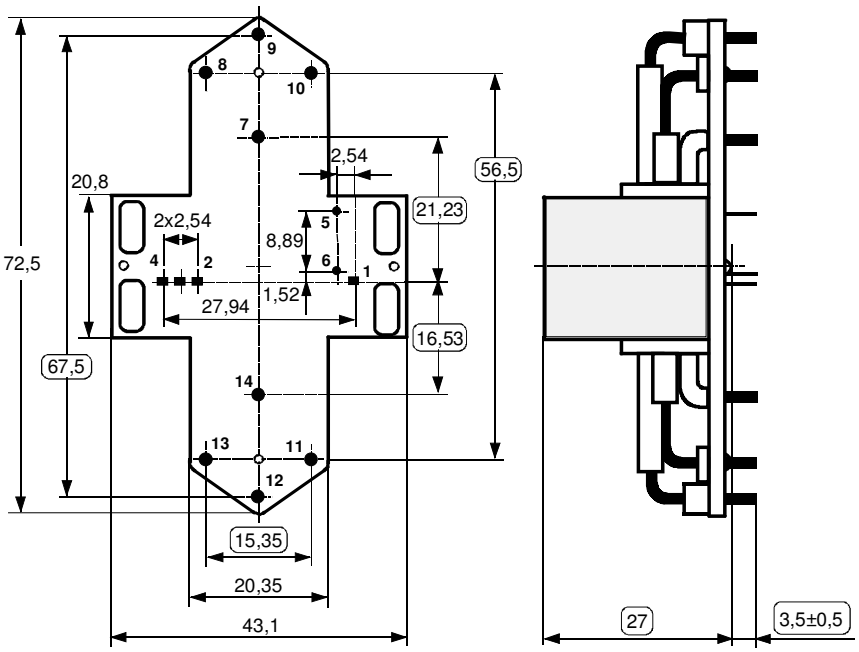
Maßbild Nr. 4

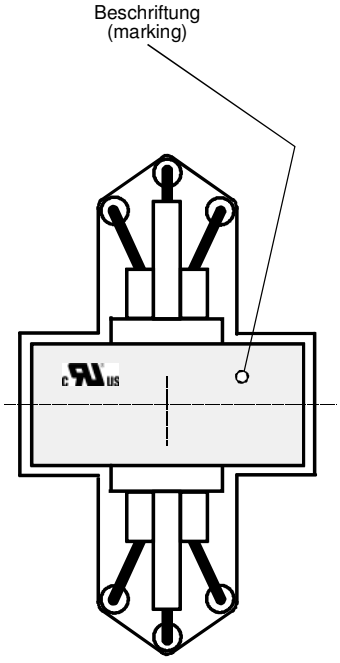
Typ
T60404-N4646-X976

Toleranz der Stiftabstände
Pin 1....6 = ±0,2mm
Pin 7...14= ±0,3mm
(Tolerances grid distance)

DC =Date Code
F =Factory

Prüfmaß
(test dimension)





Marking:
UL Mark
Excerpt from
Item no.
F DC, in which
F = Factory
DC = Date Code

Connections:
1 … 4: 0,6 x 0,7 mm
5 … 6: Ø 0,8 mm
7 … 14: Ø 2,5 mm

Pin Assignments
1 Vc +5 V
2 GND
3 V_{ref}
4 V_{out}
5, 6: test curent
7 … 14: primary current

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