

DIFFERENTIAL CURRENT SENSORS FOR HIGH POWER PV STRING INVERTERS

VACUUMSCHMELZE developed a completely new differential current sensor series to fulfill the requirements of the largest available photovoltaic string inverters on the market and even to fulfill the requirements of upcoming developments of high power inverters above 255 kW.

The trend in PV string inverters for large solar power plants is towards higher power classes. The currently largest inverters have an output of 255 kW and the trend in development points to a further increase of output. This requires current sensors with a higher current capability. The new VAC differential current sensor series T60404-N4647-P98x was specially developed to fulfill the requirements of string inverters from 80 kW to 255 kW and upcoming developments. The newest models of this sensor are designed for phase currents up to $200 A_{rms}$. Designs are available with integrated primary conductors for PCB mounting or with pass-through opening. The large inner hole for primary conductors of 35 mm x 16.5 mm enables individual solutions for different customer requirements. For upcoming string inverter developments it will be possible to increase the current capability of this series to even higher phase currents than $200 A_{rms}$.

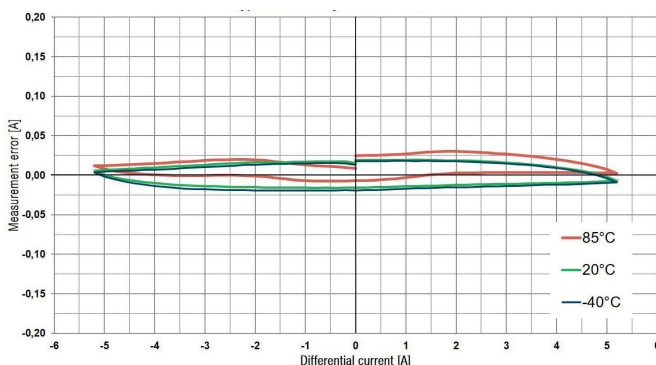
Differential current sensors are used in the RCMU (Residual Current Monitoring Unit) in PV inverters. Leakage currents represent safety risks and thus impact the whole system. When the leakage current exceeds the limit acc. to IEC 62109 the inverter should shut down and disconnect. Therefore, the current sensors need to detect very small leakage currents while very high phase currents must not affect them. Hence, VAC sensors have a metal screen against external fields and several self-optimizing functions. This allows to

measure the differential current with an excellent accuracy. The total measurement error is $\leq 1.5\%$ (@ I_{PN} ; 25 °C). The existing models measure a differential nominal current of $I_{\Delta N} = 1 - 3 A_{rms}$ (tailored to IEC 62109) and have a measuring range of 1.7 - 5 A_{PEAK} .

TYPICAL PROPERTIES AND ADVANTAGES OF T60404-P4647-P98X SERIES

- For high power applications
- Sensitive DC/AC differential current detection ($I_{\Delta N} = 1 - 3 A_{rms}$) with galvanic isolation
- Excellent accuracy – total measurement error $\leq 1.5\%$ (I_{PN} ; 25 °C)
- Single +5 V supply voltage
- Wide frequency bandwidth DC to 10 kHz
- Operating temperature range: -40 to +85 °C
- Large inner hole 35 mm x 16.5 mm
- System Voltage up to 1,500 V
- UL approval acc. to UL508
- Automatic demagnetization for offset reduction
- Self-monitoring and test functions
- Superior metal screen against external fields
- Very low offset current temperature dependency
- Short response time
- Red phosphorous free

TYPICAL ACCURACY OF 4647-P982/P985 WITH ELIMINATED GAIN AND OFFSET CURRENT



VACUUMSCHMELZE CHINA MAGNETICS

Shanghai Sales Office
Room 06, 19F
Zhongrong Hengrui International Plaza
620 Zhangyang Road, Pudong District
Shanghai, PRC 200122
Phone +86 21 58 31 98 37
Fax +86 21 58 31 99 37
vac_china@vacuumschmelze.com

VACUUMSCHMELZE GMBH & CO. KG

Grüner Weg 37
D 63450 Hanau / Germany
Phone +49 6181 38 0
Fax +49 6181 38 2645
info@vacuumschmelze.com
www.vacuumschmelze.com

VAC MAGNETICS LLC

2935 Dolphin Drive
Suite 103
Elizabethtown, KY 42701
Phone +1 270 769 1333
Fax +1 270 769 3118
info-usa@vacmagnetics.com

Published by VACUUMSCHMELZE GmbH & Co. KG, Hanau, February 2022
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