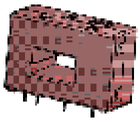
VACUUMSCHMELZE	**SPECIFICATION**	**Item no.:**	**T60404-N4646-X200**

K-No.: 25150

125 A Current Sensor

For the electronic measurement of currents:
DC, AC, pulsed, mixed ..., with a galvanic isolation
between the primary circuit (high power)
and the secondary circuit (electronic circuit)



Date: 20.10.2010

Customer: Standard type	Customers Part no.:	Page 1 of 2

Description

- Closed loop (compensation) Current Sensor with magnetic field probe
- Printed circuit board mounting
- Casing and materials UL-listed

Characteristics

- Excellent accuracy
- Very low offset current
- Very low temperature dependency and offset current drift
- Very low hysteresis of offset current
- Short response time
- Wide frequency bandwidth
- Compact design
- Reduced offset ripple

Applications

Mainly used for stationary operation in industrial applications:

- AC variabel speed drives and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Switched Mode Power Supplies (SMPS)
- Power Supplies for welding applications
- Uninterruptable Power Supllies (UPS)

Electrical data – Ratings

I_{PN}	Primary nominal r.m.s. current	125	A
R_M	Measuring resistance V_C=± 12V	5 ... 250	Ω
	V_C=± 15V	18…400	Ω
I_{SN}	Secondary nominal r.m.s. current	125	mA
K_N	Turns ratio	1: 1000	

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range				
	@ V_C = ±12V, R_M = 14 Ω (t_{max} = 10sec)	±201			A
	@ V_C = ±15V, R_M = 25 Ω (t_{max} = 10sec)	±214			A
X	Accuracy @ I_{PN}, T_A= 25°C		0.1	0.5	%
ε_L	Linearity			0.1	%
I_0	Offset current @ I_P=0, T_A= 25°C		0.03	0.1	mA
t_r	Response time		1		µs
Δt ($I_{P,max}$)	Delay time at di/dt = 100 A/µs		0.5		µs
f	Frequency bandwidth	DC...100			kHz

General data

		min.	typ.	max.	Unit
T_A	Ambient operating temperature	-40		+85	°C
T_S	Ambient storage temperature	-40		+90	°C
m	Mass		30		g
V_C	Supply voltage	±11.4	±12/±15	±15.75	V
I_C	Current consumption		18		mA
	Constructed and manufactored and tested in accordance with EN 61800-5-1 (Pin 1- 4 to inner hole)				
	Reinforced insulation, Insulation material group 1, Pollution degree 2				
S_{clear}	Clearance (component without solder pad)	12			mm
S_{creep}	Creepage (component without solder pad)	12			mm
V_{sys}	System voltage overvoltage category 3	RMS		600	V
V_{work}	Working voltage (table 7 acc. to EN61800-5-1)				
	Over voltage category 2	RMS		1000	V
U_{PD}	Rated discharge voltage	peak value		1225	V

Maximal continuous and peak currents at defined temperatures

Supply voltage ±12V:

T_A	85 °C	85 °C	70 °C	55 °C
I_P	125 A	100 A	130 A	150 A
$I_{P,max}$	205 A	224 A	255 A	262 A
R_M	14 Ω	10 Ω	5 Ω	5 Ω

Supply voltage ±15V:

T_A	85 °C	85 °C	70 °C	55 °C
I_P	125 A	80 A	100 A	125 A
$I_{P,max}$	176 A	218 A	223 A	255 A
R_M	39 Ω	25 Ω	25 Ω	18 Ω

Date	Name	Isue	Amendment
20.10.10	Le	81	Mechanical outline – Error correction – distance of fastening bores (41,4 to 40,64) lapidary change.

Hrsg.: KB-E editor	Bearb: Le. designer		KB-PM: KRe check			freig.: prs. released

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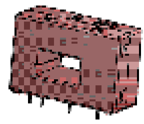
K-No.: 25150	**125 A Current Sensor** For the electronic measurement of currents: DC, AC, pulsed, mixed ..., with a galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit)	Date: 20.10.2010



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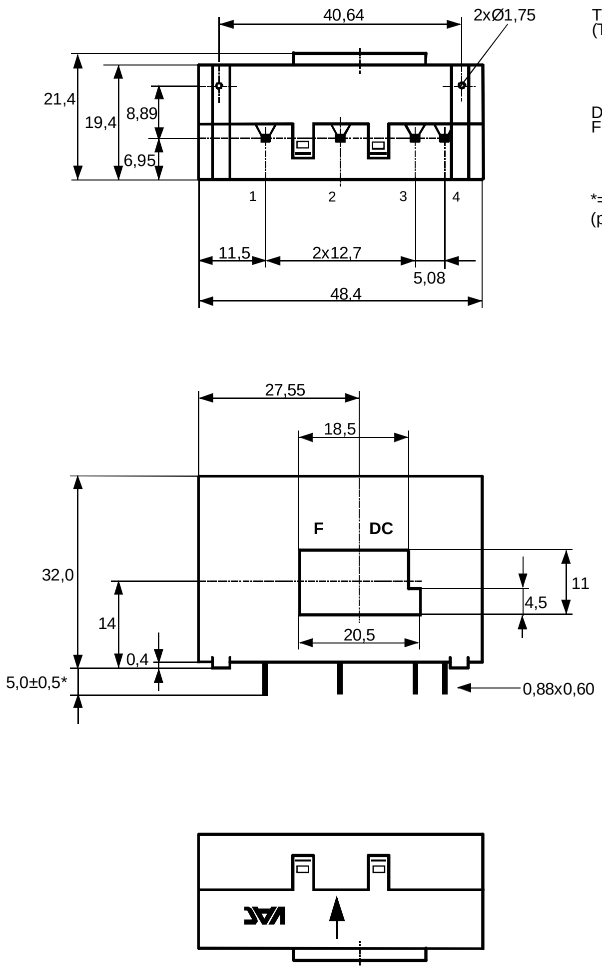
Mechanical outline (mm): General tolerances DIN ISO 2768-c



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

DC = Date Code
F = Factory

*= vorläufig
(preliminary)

Connections:

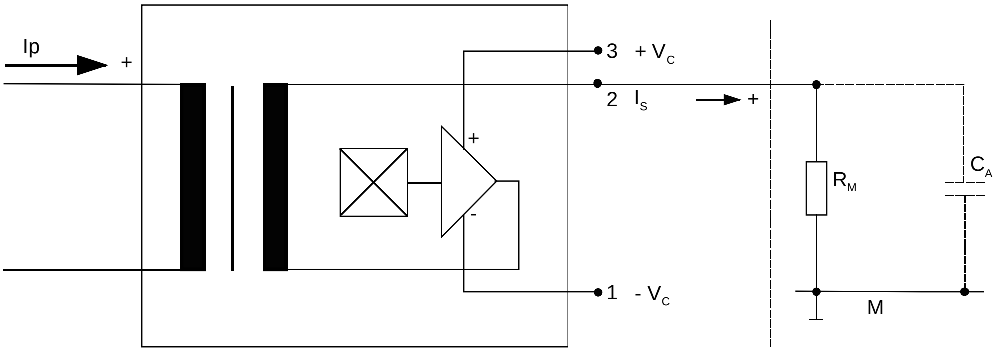
1...4: 0,6 x 0,88 mm

Marking:

4646X200
F DC

Schematic diagram

4 NC Leerstift (not connected)



Temperature of the primary conductor should not exceed 110°C
Additional indications are obtainable on request.
This specification is no declaration of warranty acc. BGB §443 dar.

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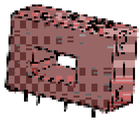
VAC VACUUMSCHMELZE	**Additional Information**	**Item No.:**	**T60404-N4646-X200**

K-No.: 25150	**125 A Current Sensor** For electronic current measurement: DC, AC, pulsed, mixed ..., with a galvanic isolation between primary circuit (high power) and secondary circuit		Date: 20.10.2010
Customer:	Customers Part No.:		

Electrical Data (investigate by a type checking)

		min.	typ.	max.	Unit
V_{Ctot}	Maximum supply voltage (without function) ±15.75 to ±18 V: for 1s per hour			±18	V
R_S	Secondary coil resistance @ T_A=85°C			41	Ω
X_{Ti}	Temperature drift of X @ T_A = -40 ... +85 °C			0.1	%
I_{0ges}	Offset current (including I_0, I_{0t}, I_{0T})			0.14	mA
I_{0t}	Long term drift Offset current I_0		0.05		mA
I_{0T}	Offset current temperature drift I_0 @ T_A = -40 ...+85°C		0.05		mA
I_{0H}	Hyteresis current @ I_P=0 (caused by primary current 10 x I_{PN})		0.05	0.1	mA
$\Delta I_0/\Delta V_C$	Supply voltage rejection ratio			0.01	mA/V
i_{oss}	Offset ripple (with1 MHz- filter first order)			0.1	mA
i_{oss}	Offset ripple (with 100 kHz- filter first order)		0.015	0.04	mA
i_{oss}	Offset ripple (with 20 kHz- filter first order)		0.007	0.01	mA
C_k	Maximum possible coupling capacity (primary – secondary)		7		pF

Inspection (Measurement after temperature balance of the samples at room temperature)

$K_N(N_1/N_2)$	(V)	M3011/6	Transformation ratio (I_P=100A, 40-80 Hz)	1: 995…1005	
IP	(V)	M3011/4	Primary current	100	A
I_0	(V)	M3226	Offset current	< 0.1	mA
V_d	(V)	M3014:	Test voltage, rms, 1 s pin 1 – 3 vs. hole	1.8	kV
V_e	(AQL 1/S4)		Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)	1300 1625	V V

Type Testing (Pin 1 - 3 to hole)

V_W	HV transient test according to M3064 (1,2 µs / 50 µs-wave form)		8	kV
V_d	Testing voltage to M3014	(5 s)	3.6	kV
V_e	Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)		1300 1625	V V

Datum	Name	Index	Änderung
20.10.10	Le	81	Date updated.

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VACUUMSCHMELZE	**Additional Information**	**Item No.:** **T60404-N4646-X200**

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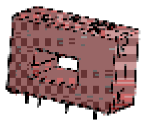
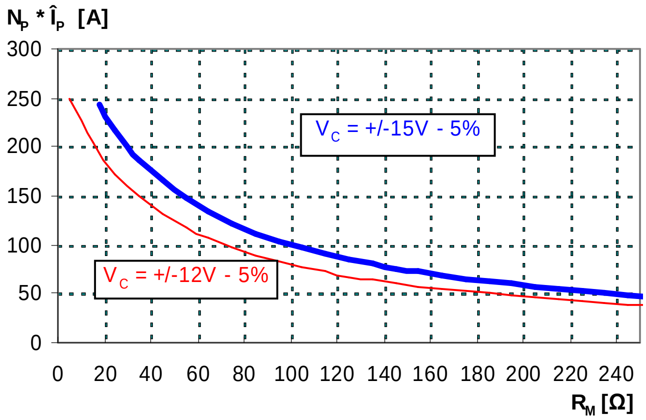


Customer:	Customers Part No.:	

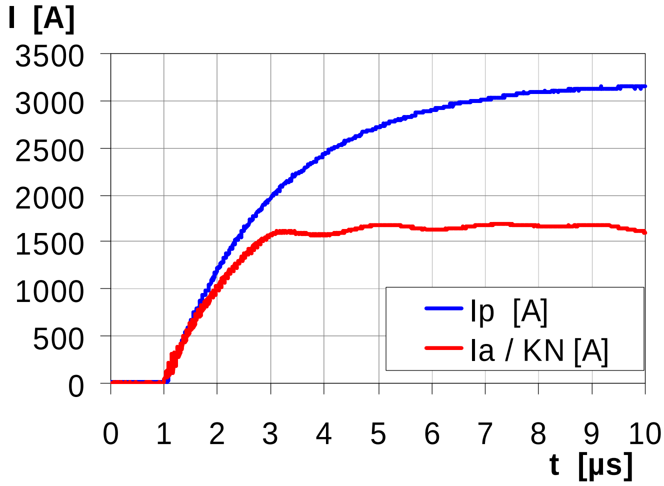
Limit curve of measurable current $\hat{I}_P(R_M)$

@ ambient temperature ≤ 85 °C



Maximum measuring range (µs-range)

Output current behaviour of a 3kA current pulse
@ V_C = ±15V und R_M= 10Ω



Fast increasing currents (higher than the specified $I_{p,max}$), e.g. in case of a short circuit, can be transmitted because the currents are transformed directly and be limited by diodes only.

The offset ripple can be reduced by an external low pass. Simplest solution is a passive low pass filter of 1st order with

$$f_g = \frac{1}{2p \cdot R_M \cdot C_a}$$

In this case the response time is enlarged.
It is calculated from:

$$t_r' \leq t_r + 2{,}5 R_M C_a$$

Applicable documents

Current direction: A positive output current appears at point I_S, by primary current in direction of the arrow.
Housing and bobbin material UL-listed: Flammability class 94V-0.

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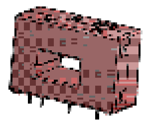

Customer:	Customers Part No.:	Page 3 of 3

Explanation of several of the terms used in the tablets (in alphabetical order)

I_{0H}: Zero variation after overloading with a DC of tenfold the rated value ($R_M = R_{MN}$)

I_{0t}: Long term drift of I_o after 100 temperature cycles in the range -40 bis 85 °C.

t_r: Response time, measured as delay time at $I_P = 0{,}8 \cdot I_{Pmax}$ between a rectangular current and the output current.

Δt (I_{Pmax}): Delay time between I_{Pmax} and the output current i_a with a primary current rise of $di_1/dt = 100$ A/µs.

U_{PD} Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage V_e

$U_{PD} = \sqrt{2} * V_e / 1{,}5$

V_{vor} Defined voltage is the RMS valve of a sinusoidal voltage with peak value of 1,875 * U_{PD} required for partial discharge test in IEC 61800-5-1

$V_{vor} = 1{,}875 * U_{PD} / \sqrt{2}$

V_{sys} System voltage RMS value of rated voltage according to IEC 61800-5-1

V_{work} Working voltage voltage according to IEC 61800-5-1 which occurs by design in a circuit or across insulation

$X_{ges}(I_{PN})$: The sum of all possible errors over the temperature range by measuring a current I_{PN}:

$$X_{ges} = 100 \cdot \left| \frac{I_S(I_{PN})}{K_N \cdot I_{PN}} - 1 \right|$$

X: Permissible measurement error in the final inspection at RT, defined by

$$X = 100 \cdot \left| \frac{I_{SB}}{I_{SN}} - 1 \right|$$

where I_{SB} is the output DC value of an input DC current of the same magnitude as the (positive) rated current ($I_o = 0$)

X_{Ti}: Temperature drift of the rated value orientated output term. I_{SN} (cf. Notes on F_i) in a specified temperature range, obtained by:

$$X_{Ti} = 100 \cdot \left| \frac{I_{SB}(T_{A2}) - I_{SB}(T_{A1})}{I_{SN}} \right|$$

ε_L: Linearity fault defined by $e_L = 100 \cdot \left| \frac{I_P}{I_{PN}} - \frac{I_{Sx}}{I_{SN}} \right|$

Where I_P is any input DC and I_{Sx} the corresponding output term. I_{SN}: see notes of F_i ($I_o = 0$).

This “Additional information“ is no declaration of warranty according BGB $443.

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ПОСТАВКА
ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный
+7 495 668 12 70
info@moschip.ru

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9