

K-No.: 25102	100 A Current-Sensor-Module 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: 14.11.2007
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Description <ul style="list-style-type: none"> Closed loop (compensation) Current Sensor with magnetic field probe Printed circuit board mounting Casing and materials UL-listed 	Characteristics <ul style="list-style-type: none"> 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 	Applications Mainly used for stationary operation in industrial applications: <ul style="list-style-type: none"> AC variabel speed drives and servo motor drives Static converters for for DC motor drives Battery supplied applications Switched Mode Power Supplies (SMPS) Power Supplies for welding applications Uninterruptable Power Supplies (UPS)
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Electrical Data – Ratings

I_{PN}	Primary rated current, r.m.s	100	A
R_M	Load resistance	0 ... 200	Ω
I_{SN}	Output rated current, r.m.s	100	mA
K_N	Turns ratio	1 : 1000	

Accuracy – Dynamic performance data (with DRV401 @ $V_C = 5V \pm 5\%$)		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range @ $R_M = 12,5 \Omega$	± 230			A
$X(T)$	Measuring accuracy @ $I_{PN}, T_A = -40... +85^\circ C$			0.5	%
ϵ_L	Linearity			0.1	%
$I_o(T)$	Offset current @ $I_p=0, T_A = -40... +85^\circ C$		0.02	0.1	mA
I_{oH}	Hysteresis		0.06	0.1	mA
t_r	Response time		1		μs
$\Delta t(I_{p,max})$	Delay time at $di/dt = 100 A/\mu s$		1		μs
f	Frequency range	DC...100			kHz

General Data		min.	typ.	max.	Unit
T_A	Ambient temperature	-40		+85	$^\circ C$
T_S	Storage temperature	-40		+90	$^\circ C$
m	Mass		18		g
R_S	Secondary coil resistance @ $T_A=85^\circ C$			14	Ω
C_k	Coupling capacity		6		pF

Mechanical Stress according to M3209/3
Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours

Constructed and manufactured and tested in accordance with EN 61800-5-1 (primary to secondary)

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)	RMS		1000	V
U_{PD}	Rated discharge voltage	peak value		1225	V

Type Testing according EN 61800-5-1 (primary to secondary)

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)			1300	V
	with V_{vor} (RMS)			1625	V

Datum	Name	Index	Änderung				
		81					
Hrsg.: KB-E editor	Bearb: SA designer		KB-E: Le check	KB-PM IA: KRe. check		freig.: Heu. released	

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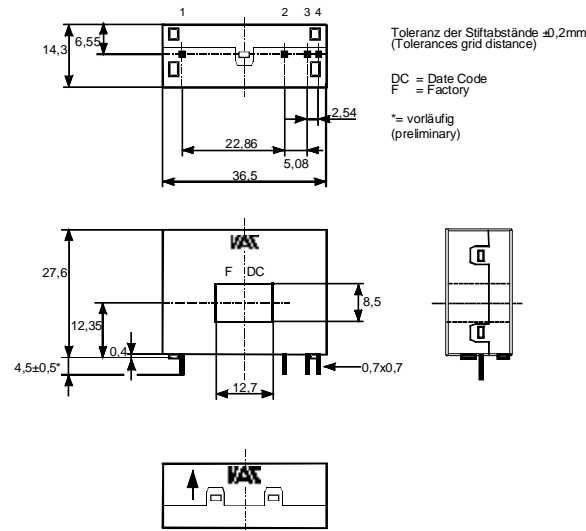
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Mechanical outline (mm):

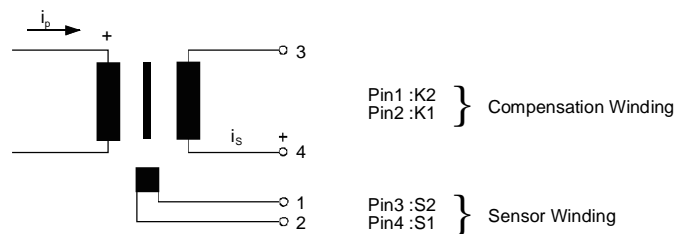
General tolerances DIN ISO 2768-c


Connections:

 1...6: \varnothing 1 mm
 7..10: 0,46*0,46 mm

Marking:

 4645X100
 F DC

Schematic diagram

Inspection (Measurements after temperature balance of the samples at room temperature.)

K_N (N1/N2)	(V)	M3011/6c:	Turns ratio ($I_p=100A$, 40...80 Hz)	1 : 1000 \pm 0,5	%
I_o		M3226:	Offset current	< 0.1	mA
$\Delta\Phi$ (K1-K2)	(V)	M3090:	Magnetic Flux compensation core	6...8	nVs
$\Delta\Phi$ (S1-S2)	(V)	M3090:	Magnetic Flux sensor	20...35	nVs
R_s (K1-K2)	(V)	M3011/5:	Winding resistance compensation coil	8.5...10,5	Ω
R (S1-S2)	(V)	M3011/5:	Winding resistance magnetic probe coil	2.5...3.5	Ω
V_d	(V)	M3014:	Testing voltage, rms, 1s primary to secondary	1,8	kV
V_e	(AQL1/S4)	M3024:	Partial discharge voltage (RMS) with V_{vor} (RMS)	>1300 1625	V V

Applicable documents

 Current direction: A positive output current appears at point I_s , by primary current in direction of the arrow.

Temperature of the primary conductor should not exceed 110°C

Housing and bobbin material: UL-listed. Flammability class UL 94V-0.

Enclosures according to IEC 60529: IP50.

Additional data available on request.

This specification is no declaration of warranty acc. BGB §443.

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Explanation of several of the terms used in the tablets (in alphabetical order)
 I_{0H} : Zero variation of I_0 after overloading with a DC of tenfold the rated value ($R_M = R_{MN}$)

 I_{0t} : Long term drift of I_0 after 100 temperature cycles in the range -40 bis 85 °C.

 t_r : Response time (describe the dynamic performance for the specified measurement range), measured as delay time at $I_P = 0,9 \cdot I_{Pmax}$ between a rectangular current and the output current.

 $\Delta t (I_{Pmax})$: Delay time (describe the dynamic performance for the rapid current pulse rate e.g short circuit current) measured between I_{Pmax} and the output current i_a with a primary current rise of $di/dt = 100 A/\mu s$.

 U_{PD} Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage V_e
 $U_{PD} = \sqrt{2} \cdot V_e / 1,5$
 V_{vor} Defined voltage is the RMS value of a sinusoidal voltage with peak value of $1,875 \cdot U_{PD}$ required for partial discharge test in IEC 61800-5-1

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

 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} :

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

 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 ($I_0 = 0$)

 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 ($I_0 = 0$).

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