

K-No.: 25100	<b>50 – 100 A Current-Sensor-Module</b> 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: 26.10.2007
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Description	Characteristics	Applications
<ul style="list-style-type: none"> <li>Closed loop (compensation) Current Sensor with magnetic field probe</li> <li>Printed circuit board mounting</li> <li>Casing and materials UL-listed</li> </ul>	<ul style="list-style-type: none"> <li>Excellent accuracy</li> <li>Very low offset current</li> <li>Very low temperature dependency and offset current drift</li> <li>Very low hysteresis of offset current</li> <li>Short response time</li> <li>Wide frequency bandwidth</li> <li>Compact design</li> </ul>	Mainly used for stationary operation in industrial applications: <ul style="list-style-type: none"> <li>AC variabel speed drives and servo motor drives</li> <li>Static converters for for DC motor drives</li> <li>Battery supplied applications</li> <li>Switched Mode Power Supplies (SMPS)</li> <li>Power Supplies for welding applications</li> <li>Uninterruptable Power Supplies (UPS)</li> </ul>

**Electrical Data – Ratings**

$I_{PN}$	Primary rated current, r.m.s	50/100	A
$R_M$	Load resistance	0 ... 200	$\Omega$
$I_{SN}$	Output rated current, r.m.s	50/100	mA
$K_N$	Turns ratio	1...3 : 1000	

**Accuracy – Dynamic performance data** (with DRV401 @  $V_C = 5V \pm 5\%$ )

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range @ $R_M = 1.56 \Omega$	$\pm 175$			A
X(T)	Measuring accuracy @ $I_{PN}, T_A = -40... +85^\circ C$			0.5	%
$\epsilon_L$	Linearity			0.2	%
$I_o(T)$	Offset current @ $I_P=0, T_A = -40... +85^\circ C$		0.03	0.1	mA
$I_{oH}$	Hysteresis		0.04	0.1	mA
$t_r$	Response time		0.5		$\mu s$
$\Delta t(I_{P,max})$	Delay time at $di/dt = 100 A/\mu s$		0.2		$\mu s$
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		14.5		g
$R_S$	Secondary coil resistance @ $T_A=85^\circ C$			20.5	$\Omega$
$R_P$	Primary coil resistance per turn @ $T_A=25^\circ C$		0.35		m $\Omega$
$C_k$	Coupling capacity		5		pF
	Mechanical Stress according to M3209/3 Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours				10g
	Constructed and manufactured and tested in accordance with EN 61800-5-1 (Pin 1 - 6 to Pin 7 – 9) Reinforced insulation, Insulation material group 1, Pollution degree 2				
$S_{clear}$	clearance (component without solder pad)	10.2			mm
$S_{creep}$	creepage (component without solder pad)	10.2			mm
$V_{sys}$	System voltage overvoltage category 3	RMS		600	V
$V_{work}$	Working voltage (table 7 acc. to EN61800-5-1)	RMS		1020	V
$U_{PD}$	Rated discharge voltage	peak value		1414	V

**Type Testing** according to EN 61800-5-1 (Pin 1 - 6 to Pin 7 - 10)

$V_W$	HV transient test according to M3064 (1,2 $\mu s$ / 50 $\mu s$ -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)			1500	V
				1875	V

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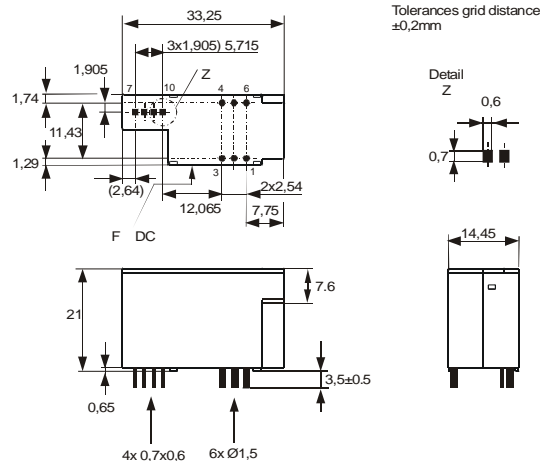
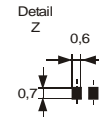
**Date:** 26.10.2007

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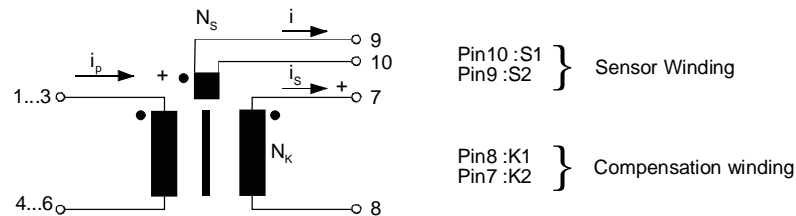
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**Mechanical outline (mm):**

General tolerances DIN ISO 2768-c


 Tolerances grid distance  
 $\pm 0.2\text{mm}$ 

**Connections:**  
 1...6:  $\varnothing 1.5\text{ mm}$   
 7..10:  $0.7 \times 0.6\text{ mm}$ 
**Marking:**
  
 4645X410  
 F DC

 DC = Date Code  
 F = Factory

**Schematic diagram**

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

$K_N$ (N1/N2)	(V)	M3011/6c:	Turns ratio ( $I_p=3 \times 9.8\text{A}$ , 40...80 Hz)	3 : 1000 $\pm 0.5$	%
$I_0$		M3226:	Offset current	< 0.1	mA
$\Delta\Phi$ (K1-K2)	(V)	M3090:	Magnetic Flux compensation core	4.5...7	nVs
$\Delta\Phi$ (S1-S2)	(V)	M3090:	Magnetic Flux sensor	20...35	nVs
$R_S$ (K1-K2)	(V)	M3011/5:	Winding resistance compensation coil	12...15	$\Omega$
$R$ (S1-S2)	(V)	M3011/5:	Winding resistance magnetic probe coil	2.3...3.0	$\Omega$
$V_d$	(V)	M3014:	Testing voltage, rms, 1s Pin 1 - 6 to Pin 7 - 10	1.8	kV
$V_e$	(AQL1/S4)	M3024:	Partial discharge voltage (RMS) with $V_{vor}$ (RMS)	>1500 1875	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  $I_o$  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 (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 ( $I_o = 0$ )
- $X_{Ti}$ : Temperature drift of the rated value orientated output term.  $I_{SN}$  (cf. Notes on  $F_i$ ) in a specified temperature range, obtained by:  

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