

**K-No.: 25152**
**6-15-25A Current-Sensor-Module**
**Date: 02.10.2007**

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

**Customer: Standard Type**
**Cutomers Part No.:**
**Page 1 of 3**
**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

**Applications**

Mainly used for stationary operation in industrial applications:

- 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)

**Electrical Data – Ratings**

$I_{PN}$	Primary rated current, r.m.s	25	A
$R_M$	Load resistance	0 ... 200	$\Omega$
$I_{SN}$	Output rated current, r.m.s	12.5	mA
$K_N$	Turns ratio	1...3 : 2000	

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

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range @ $R_M = 12,5 \Omega$	$\pm 85$			A
$X(T)$	Measuring accuracy @ $I_{PN}, T_A = -40... +85^\circ C$			0.5	%
$\epsilon_L$	Linearity			0.1	%
$I_0(T)$	Offset current @ $I_P=0, T_A = -40... +85^\circ C$		0.02	0.05	mA
$I_{0H}$	Hysteresis		0.02	0.05	mA
$t_r$	Response time		0.3		$\mu s$
$\Delta t(I_{p,max})$	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		12		g
$R_S$	Secondary coil resistance @ $T_A=85^\circ C$			67	$\Omega$
$R_P$	Primary coil resistance per turn @ $T_A=25^\circ C$		1		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 - 10) Reinforced insulation, Insulation material group 3a, Pollution degree 2				
$S_{clear}$	clearance (component without solder pad)		7		mm
$S_{creep}$	creepage (component without solder pad)		7		mm
$V_{sys}$	System voltage overvoltage category 3		RMS	300	V
$V_{work}$	Working voltage (table 7 acc. to EN61800-5-1)		RMS	350	V
$U_{PD}$	Rated discharge voltage		peak value	1040	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)			6	kV
$V_d$	Testing voltage to M3014		(5 s)	3	kV
$V_e$	Partial discharge voltage acc.M3024 (RMS) with $V_{vor}$ (RMS)			1100	V
				1375	V

Datum	Name	Index	Änderung
		81	

 Hrsg.: KB-E  
 editor

 Bearb: SA  
 designer

 KB-E: Le  
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 KB-PM: KRe.  
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 freig.: Heu.  
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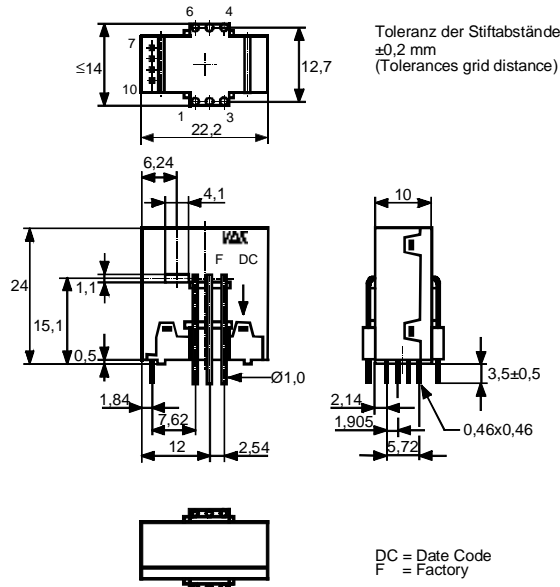
Customer: Standard Type

Customer Part No.:

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**Mechanical outline (mm):**

General tolerances DIN ISO 2768-c



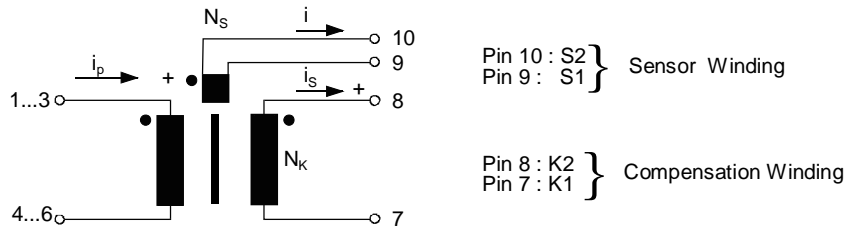
Connections:

1...6: Ø 1 mm  
7..10: 0,46\*0,46 mm

Marking:

**VAC**  
4645X601  
F DC

**Schematic diagram**



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

$K_N$ (N1/N2)	(V)	M3011/6c:	Turns ratio ( $I_p=3*8A$ , 40...80 Hz)	3 : 2000 ± 0,5	%
$I_0$		M3226:	Offset current	< 0.05	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	44...52,5	$\Omega$
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	1,5	kV
$V_e$	(AQL1/S4)	M3024:	Partial discharge voltage (RMS) with $V_{vor}$ (RMS)	>1100 1375	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<sub>0H</sub>:** Zero variation of I<sub>0</sub> after overloading with a DC of tenfold the rated value (R<sub>M</sub> = R<sub>MN</sub>)
- I<sub>0t</sub>:** Long term drift of I<sub>0</sub> after 100 temperature cycles in the range -40 bis 85 °C.
- t<sub>r</sub>:** Response time (describe the dynamic performance for the specified measurement range), measured as delay time at I<sub>P</sub> = 0,9 · I<sub>Pmax</sub> between a rectangular current and the output current.
- Δt (I<sub>Pmax</sub>):** Delay time (describe the dynamic performance for the rapid current pulse rate e.g short circuit current) measured between I<sub>Pmax</sub> and the output current i<sub>a</sub> with a primary current rise of di<sub>1</sub>/dt = 100 A/μs.
- U<sub>PD</sub>** Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage V<sub>e</sub>  

$$U_{PD} = \sqrt{2} \cdot V_e / 1,5$$
- V<sub>vor</sub>** Defined voltage is the RMS value of a sinusoidal voltage with peak value of 1,875 · U<sub>PD</sub> required for partial discharge test in IEC 61800-5-1  

$$V_{vor} = 1,875 \cdot U_{PD} / \sqrt{2}$$
- V<sub>sys</sub>** System voltage RMS value of rated voltage according to IEC 61800-5-1
- V<sub>work</sub>** Working voltage voltage according to IEC 61800-5-1 which occurs by design in a circuit or across insulation
- X<sub>ges</sub>(I<sub>PN</sub>):** The sum of all possible errors over the temperature range by measuring a current I<sub>PN</sub>:  

$$X_{ges} = 100 \cdot \left| \frac{I_S(I_{PN})}{K_N \cdot I_{PN}} - 1 \right| \%$$
- 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<sub>SB</sub> is the output DC value of an input DC current of the same magnitude as the (positive) rated current (I<sub>0</sub> = 0)
- X<sub>Ti</sub>:** Temperature drift of the rated value orientated output term. I<sub>SN</sub> (cf. Notes on F<sub>i</sub>) 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<sub>L</sub>:** Linearity fault defined by  

$$e_L = 100 \cdot \left| \frac{I_P}{I_{PN}} - \frac{I_{Sx}}{I_{SN}} \right| \%$$
  
 Where I<sub>P</sub> is any input DC and I<sub>Sx</sub> the corresponding output term. I<sub>SN</sub>: see notes of F<sub>i</sub> (I<sub>0</sub> = 0).

This "Additional information" is no declaration of warranty according BGB §443.

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