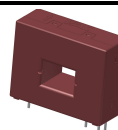


**K-No.: 24959**
**100 A Current Sensor Module for 5V-Sply Voltage**

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

**Date: 07.04.2015**
**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 variable 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
- Uninterruptible Power Supplies (UPS)

**Electrical data – Ratings**

		min.	typ.	max.	Einheit
$I_{PN}$	Primary nominal r.m.s. current			100	A
$V_{out}$	Output voltage @ $I_P$			$V_{Ref} \pm (0.625 \cdot I_P / I_{PN})$	V
$\bar{V}_{out}$	Output voltage @ $I_P=0, T_A=25^\circ C$			$V_{Ref} \pm 0.0025$	V
$V_{Ref}$	Reference voltage external	0		4	V
$\bar{V}_{Ref}$	Reference voltage internal			$2.5 \pm 0.005$	V
$K_N$	Turns ratio			1 : 1000	

**Accuracy – Dynamic performance data**

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range	$\pm 230$			
X	Accuracy @ $I_{PN}, T_A=25^\circ C$			1	%
$\epsilon_L$	Linearity			0.1	%
$V_{out} -2,5V$	Offset voltage @ $I_P=0, T_A=25^\circ C$			$\pm 2.5$	mV
$\Delta V_{out} / 2,5V / \Delta T$	Temperature drift of $V_{out}$ @ $I_P=0, T_A=-40 \dots 85^\circ C$		3	10	ppm/K
$t_r$	Response time @ 80% von $I_{PN}$		1		$\mu s$
$\Delta t (I_{P,max})$	Delay time at $di/dt = 100 A/\mu s$		1		$\mu s$
f	Frequency bandwidth	DC...100			kHz

**General data**

		min.	typ.	max.	Unit
$T_A$	Ambient operating temperature	-40		+85	$^\circ C$
$T_S$	Ambient storage temperature	-40		+85	$^\circ C$
m	Mass		18		g
$V_C$	Supply voltage	4.75	5	5.25	V
$I_{C0}$	Current consumption		16		mA
$S_{clear}$	Clearance (component without solder pad)	12			mm
$S_{creep}$	Creepage (component without solder pad)	12			mm
$V_{sys}$	System voltage overvoltage category III			600	$V_{RMS}$
$V_{work}$	Working voltage (table 3 acc. to IEC 61800-5-1:2007) overvoltage category 2			1000	$V_{RMS}$
$U_{PD}$	Rated discharge voltage			1414	$V_{peak}$
	Max. potential difference acc to UL 508			600	$V_{RMS}$

Constructed and manufactured and tested in accordance with IEC 61800-5-1:2007 (Primary to Secondary)  
 Reinforced insulation, Insulation material group 1, Pollution degree 2, Overvoltage category III

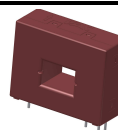
Date	Name	Issue	Amendment
07.04.15	DJ	81	Sensor changed back to issue "81". Data sheet changed. CN-15-276
11.11.14	DJ	82	Sensor optimised Marking changed from 4646X160 → 4646-X160. CN-14-123

Hrsg.: KB-E editor	Bearb: DJ designer		KB-PM: KRe. check		freig.: Berton released
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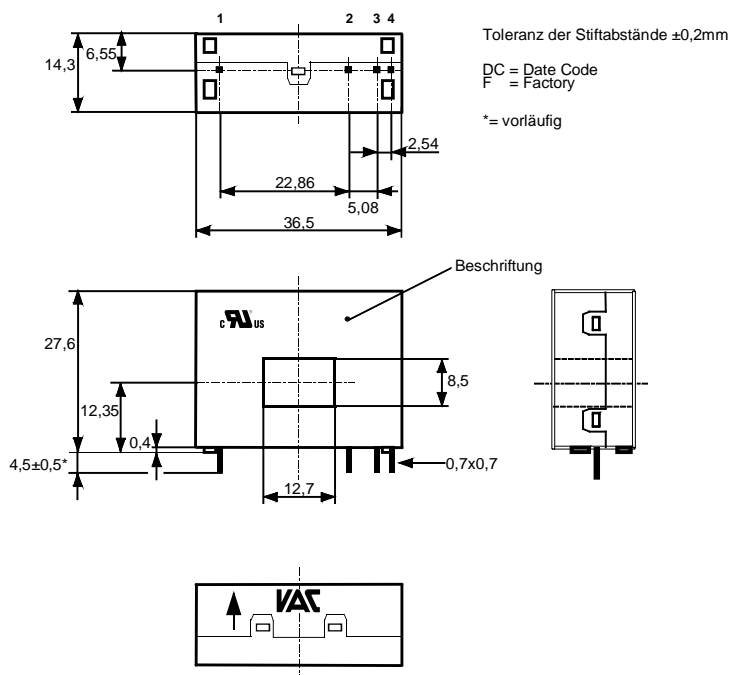
Customer: Standard type

Customers Part no.:

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**Mechanical outline (mm):**

General tolerances DIN ISO 2768-c



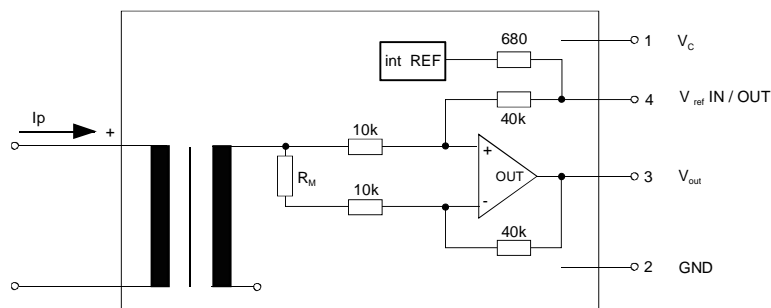
Connections:

1..4 = 0.7 x 0.7mm

Marking:

UL-sign  
 4646-X160  
 F DC

**Schematic diagram**



Additional information is obtainable on request.  
Temperature of the primary conductor should not exceed 110°C.

Hrsg.: KB-E  
editor

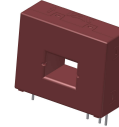
Bearb.: DJ  
designer

KB-PM: KRe.  
check

freig.: Berton  
released

**K-No.:** 24959

**100 A Current Sensor Module for 5V-Supply Voltage**

 For the electronic measurement of currents:  
 DC, AC, pulsed, mixed ...,  
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**Date:** 07.04.2015

**Customer:**
**Customers Part No.:**
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**Electrical Data**

		min.	typ.	max.	Unit
$V_{Ctot}$	Maximum supply voltage (without function)			6	V
$I_C$	Supply Current with primary current		$16mA + I_p \cdot K_N + V_{out}/R_L$		mA
$I_{out,SC}$	Short circuit output current		$\pm 20$		mA
$R_S$	Secondary coil resistance @ $T_A=85^\circ C$			14	$\Omega$
$R_{i,Ref}$	Internal resistance of Reference input		670		$\Omega$
$R_{i,(V_{out})}$	Output resistance of $V_{out}$			1	$\Omega$
$R_L$	External recommended resistance of $V_{out}$	1			k $\Omega$
$C_L$	External recommended capacitance of $V_{out}$			500	pF
$\Delta X_T/\Delta T$	Temperature drift of X @ $T_A = -40 \dots +85^\circ C$			40	ppm/K
$\Delta V_0 = \Delta(V_{out} - V_{Ref})$	Sum of any offset drift including:		2	6	mV
$V_{0t}$	Long term drift of $V_0$		1		mV
$V_{0T}$	Temperature drift von $V_0$ @ $T_A = -40 \dots +85^\circ C$		1		mV
$V_{0H}$	Hystereses of $V_{out}$ @ $I_p=0$ (after an overload of $10 \times I_{PN}$ )			0.7	mV
$\Delta V_0/\Delta V_C$	Supply voltage rejection ratio			1	mV/V
$V_{oss}$	Offsetripple (with 1 MHz- filter first order)			20	mV
$V_{oss}$	Offsetripple (with 100 kHz- filter first order)		2.5	6	mV
$V_{oss}$	Offsetripple (with 20 kHz- filter first order)		0.7	1.5	mV
$C_k$	Maximum possible coupling capacity (primary – secondary) Mechanical stress according to M3209/3 Settings: 10 Hz, 1 min/Oktave, 2 hours		6		pF

**Inspection** (Measurement after temperature balance of the samples at room temperature, SC = significant characteristic)

$V_{out}(SC)$	(V)	M3011/6:	Output voltage vs. internal reference ( $I_p=100A$ , 40-80Hz)	$625 \pm 0.7\%$	mV
$V_{out} - V_{Ref}$	(V)	M3226:	Offset voltage	$\pm 0.0025$	V
$V_d$	(V)	M3014:	Test voltage, RMS, 1 s pin 1-4 to inner hole	1.8	kV
$V_e$	(AQL 1/S4):		Partial discharge voltage acc.M3024 with $V_{vor}$	1500 1875	$V_{RMS}$ $V_{RMS}$

**Type Testing** (Pin 1-4 to inner hole)

$V_W$			HV transient test according to M3064 (1,2 $\mu s$ / 50 $\mu s$ -wave form)	8	kV	
$V_d$			Testing voltage to M3024	(5 s)	3.6	kV
$V_e$			Partial discharge voltage acc.M3024 with $V_{vor}$	1500 1875	$V_{RMS}$ $V_{RMS}$	

**Applicable documents**

 Current direction: A positive output current appears at point  $I_s$ , by primary current in direction of the arrow.  
 Enclosures according to IEC529: IP50.

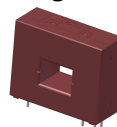
Further standards UL 508, file E317483, category NMTR2 / NMTR8

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

**t<sub>r</sub>:** Response time (describe the dynamic performance for the specified measurement range), measured as delay time at  $I_P = 0.8 \cdot I_{PN}$  between a rectangular current and the output voltage  $V_{out}(I_P)$

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

**U<sub>PD</sub>** Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage  $V_{work}$   
 $U_{PD} = \sqrt{2} \cdot V_{work}$

**V<sub>vor</sub>** 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 61800-5-1:2007  
 $V_{vor} = 1.875 \cdot U_{PD} / \sqrt{2}$

**V<sub>sys</sub>** System voltage value of rated voltage according to IEC 61800-5-1:2007.

**V<sub>work</sub>** Working voltage voltage according to IEC 61800-5-1:2007 which occurs by design in a circuit or across insulation.

**V<sub>0</sub>:** Offset voltage between  $V_{out}$  and the rated reference voltage of  $V_{ref} = 2.5V$ .  
 $V_0 = V_{out}(0) - 2.5V$

**V<sub>0H</sub>:** Zero variation of  $V_0$  after overloading with a DC of tenfold the rated value

**V<sub>0t</sub>:** Long term drift of  $V_0$  after 100 temperature cycles in the range -40 bis 85 °C.

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

$$X = 100 \cdot \left| \frac{V_{out}(I_{PN}) - V_{out}(0)}{0,625V} - 1 \right| \%$$

**X<sub>ges</sub>(I<sub>PN</sub>):** Permissible measurement error including any drifts over the temperature range by the current measurement  $I_{PN}$

$$X_{ges} = 100 \cdot \left| \frac{V_{out}(I_{PN}) - 2,5V}{0,625V} - 1 \right| \% \quad \text{or} \quad X_{ges} = 100 \cdot \left| \frac{V_{out}(I_{PN}) - V_{ref}}{0,625V} - 1 \right| \%$$

**$\epsilon_L$ :** Linearity fault defined by  $\epsilon_L = 100 \cdot \left| \frac{I_P}{I_{PN}} - \frac{V_{out}(I_P) - V_{out}(0)}{V_{out}(I_{PN}) - V_{out}(0)} \right| \%$

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