

K-No.: 25440

100 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: 17.04.2013

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
- Uninterruptable Power Supplies (UPS)

Electrical data – Ratings

I_{PN}	Primary nominal r.m.s. current	100	A
R_M	Measuring resistance $V_C = \pm 12V$ $V_C = \pm 15V$	0 ... 200 5 ... 400	Ω Ω
I_{SN}	Secondary nominal r.m.s. current	50	mA
K_N	Turns ratio	1:2000	

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range @ $V_C = \pm 12V, R_M = 5 \Omega$ ($t_{max} = 10sec$) @ $V_C = \pm 15V, R_M = 5 \Omega$ ($t_{max} = 10sec$)	± 188 ± 236			A A
X	Accuracy @ $I_{PN}, T_A = 25^\circ C$		0.1	0.5	%
ϵ_L	Linearity			0.1	%
I_0	Offset current @ $I_P = 0, T_A = 25^\circ C$		0.02	0.05	mA
t_r	Response time		1		μs
Δt ($I_{P,max}$)	Delay time at $di/dt = 100 A/\mu s$		200		ns
f	Frequency bandwidth	DC...200			kHz

General data

		min.	typ.	max.	Unit
T_A	Ambient operating temperature	-40		+85	$^\circ C$
T_S	Ambient storage temperature	-40		+90	$^\circ C$
m	Mass		15		g
V_C	Supply voltage	± 11.4	± 12 or ± 15	± 15.75	V
I_C	Current consumption		18		mA
	Constructed and manufactured and tested in accordance with EN 61800-5-1 (primary vs. 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) over voltage category 2	RMS		1000	V
U_{PD}	Rated discharge voltage	peak value		1225	V
	Max. potential difference acc. to UL 508	RMS		600	V_{AC}

Maximale Dauer- und Spitzenströme bei bestimmten Temperaturen

 Supply voltage $\pm 12 V$:

 Supply voltage $\pm 15V$:

T_A	85 $^\circ C$	85 $^\circ C$	70 $^\circ C$	55 $^\circ C$
I_P	100 A	125 A	150 A	150 A
$I_{P,max}$	188 A	183 A	185 A	194 A
R_M	5 Ω	5 Ω	5 Ω	5 Ω

T_A	85 $^\circ C$	85 $^\circ C$	70 $^\circ C$	55 $^\circ C$
I_P	100 A	125 A	150 A	150 A
$I_{P,max}$	236 A	204 A	232 A	244 A
R_M	5 Ω	20 Ω	5 Ω	5 Ω

Date	Name	Issue	Amendment
17.04.13	KRe.	81	Mechanical outline: marking with UL-sign and max. potential difference acc. to UL 508 added. CN-651
05.02.13	Le	81	Mechanical outline changed (the reference line at the standoff is just a bit down-eccentric). Lapidary change.

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

K-No.: 25440

100 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: 17.04.2013

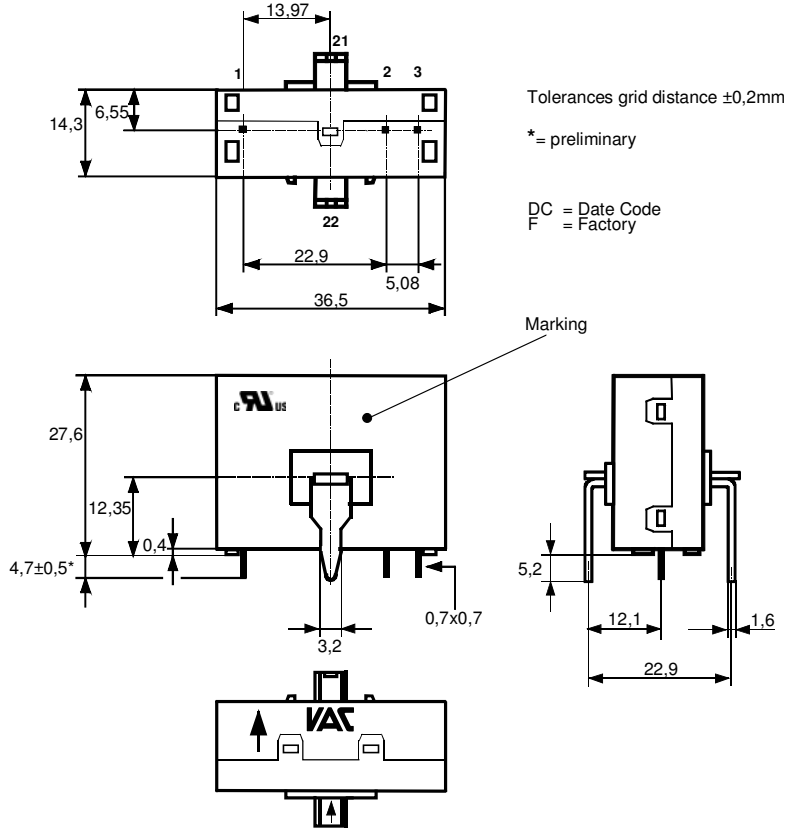
Customer: Standard type

Customers Part no.:

Page 2 of 2

Mechanical outline (mm):

General tolerances DIN ISO 2768-c



Connections:

1...3: 0,7 x 0,7 mm

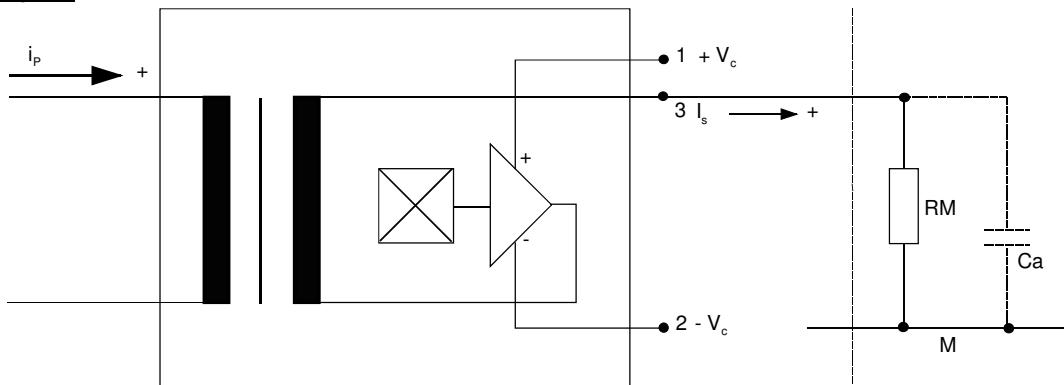
Marking:

UL-sign
4646X111
F DC

Explanation:

DC = Date Code [Format YWW]

Schematic diagram



Temperature of the primary conductor should not exceed 100°C
 Additional indications are obtainable on request.
 This specification is no declaration of warranty acc. BGB §443 dar.

Hrsg.: KB-E
editor

Bearb.: Le
designer

KB-PM IA: KRe.
check

freig.: HS
released

K-No.: 25440

100 A Current Sensor

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

Date: 17.04.2013

Customer:

Customers Part No.:

Page 1 of 3

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 @ $T_A=85^\circ\text{C}$			114	Ω
R_P	Primary resistance @ $T_A=25^\circ\text{C}$		0,1		m Ω
X_{Ti}	Temperature drift of X @ $T_A = -40 \dots +85^\circ\text{C}$			0.1	%
I_{0ges}	Offset current (including I_0, I_{0t}, I_{0T})			0.07	mA
I_{0t}	Long term drift Offset current I_0		0.025		mA
I_{0T}	Offset current temperature drift I_0 @ $T_A = -40 \dots +85^\circ\text{C}$		0.025		mA
I_{0H}	Hysteresis current @ $I_P=0$ (caused by primary current $10 \times I_{PN}$)		0.025	0.05	mA
$\Delta I_0/\Delta V_C$	Supply voltage rejection ratio			0.01	mA/V
i_{loss}	Offset ripple (with 1 MHz- filter first order)			0,17	mA
i_{loss}	Offset ripple (with 100 kHz- filter first order)		0.025	0.05	mA
i_{loss}	Offset ripple (with 20 kHz- filter first order)		0.008	0.013	mA
C_K	Maximum possible coupling capacity (primary – secondary)			6	pF

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

$K_N(N_1/N_2)$	(V)	M3011/6	Transformation ratio ($I_P=100\text{A}$, 40-80 Hz)	$1 : 2000 \pm 0,5$	%
I_0	(V)	M3226	Offset current	< 0.05	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	Amendment			
17.04.13	Le	81	Applicable documents: Further standards added. CN-651			
05.02.13	Le	81	Date updated.			
Hrsg.: KB-E editor	Bearb: Le designer		KB-PM IA: KRe check			freig.: HS released

K-No.: 25440

100 A Current Sensor

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

Date: 17.04.2013

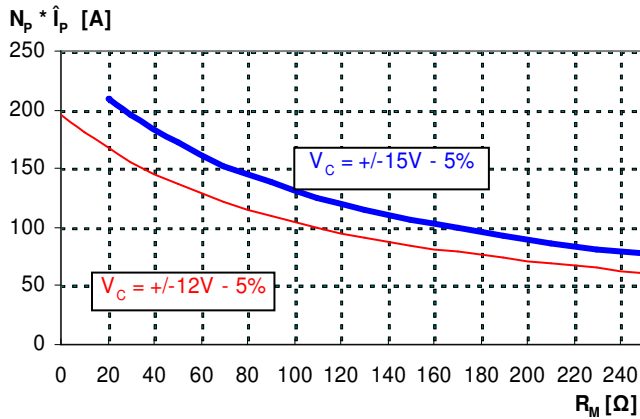
Customer:

Customers Part No.:

Page 2 of 3

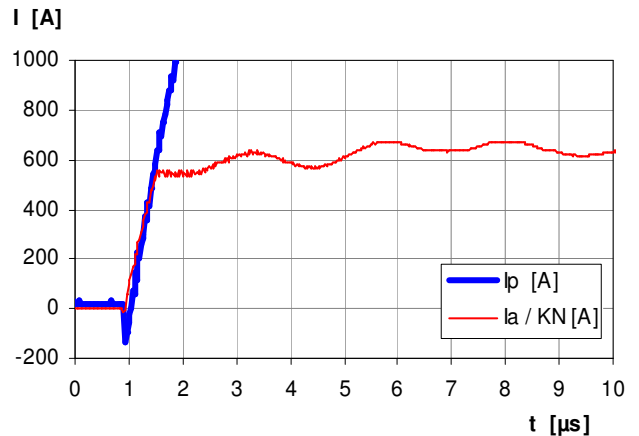
Limit curve of measurable current $\hat{I}_p(R_M)$

@ ambient temperature $\leq 85\text{ }^\circ\text{C}$



Maximum measuring range (μs -range)

Output current behaviour of a 3kA current pulse
@ $V_C = \pm 15\text{V}$ und $R_M = 100\Omega$



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

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

In this case the response time is enlarged.

It is calculated from:

$$t'_r \leq t_r + 2,5R_M C_a$$

Applicable documents

Current direction: A positive output current appears at point I_S , by primary current in direction of the arrow.
Further standards UL 508 ; file E317483, category NMTR2 / NMTR8

Hrsg.: KB-E
editor

Bearb: Le
designer

KB-PM IA: KRe
check

freig.: HS
released