

K-no.: K30717

**100A Open Loop Current Sensor  
for industrial application**

Date 06.12.2024

DC, AC, pulsed and mixed electric current measurement  
with a galvanic insulation, analog voltage output, integrated primary busbar

Customer: Standard type

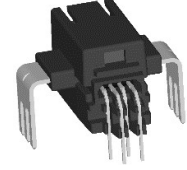
Customer part no:

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Erstmuster zur Produktionsfreigabe / First articles for Production release

**Further remarks on sample status:**

Bisher wurden noch keine Erstmuster gefertigt. Im Zuge der Fertigung und Prüfung der Erstmuster können sich noch kleinere Änderungen am Datenblatt ergeben / First articles have not been produced yet. In the course of the production and the inspection of first articles minor changes at the data sheet may arise. (red and with \* marked values are target/expected values.)



Electrical Data – Ratings			Unit
$I_{PN}$	Primary nominal current value	100	A
$V_{OUT}$	Output Voltage @ $I_P$ against $V_{REF}$	$V_{REF} \pm G \cdot I_P$	V
$V_{OUT(0)}$	Output Voltage @ $I_P=0A$ , $\vartheta_A=25^\circ C$	$V_{REF} \pm tbd$	V
$V_{REF}$	External Reference voltage range	0.5 ... 2.65	V
	Internal Reference voltage	$2.5 \pm 0.02^*$	V
G	Sensitivity	8.0	mV / A

Accuracy & Dynamic performance data				min.	typ.	max.	Unit
$I_{P,max}$	Max. Measuring range			-250		+250	A
X	Accuracy @ $I_{PN}$ for $\vartheta_A = 25^\circ C$			-1.0 *		1.0 *	%
$\epsilon_G$	Sensitivity error @ $\vartheta_A = 25^\circ C$ (factory adjusted)			-0.5 *		0.5 *	%
$\epsilon_L$	Linearity error @ $\vartheta_A = 25^\circ C$			-0.5 *		0.5 *	% of $I_{PN}$
$V_{OUT}-V_{REF}$	Offset voltage @ $\vartheta_A = 25^\circ C$ , $I_P = 0A$			-5		5	mV
$I_{OM}$	Magnetic offset (hysteresis after 3 x $I_{PN}$ calc. to primary)			-0.7 *		0.7 *	A
$TC_G$	sensitivity drift over temperature -40 to 105°C			-200 *		200 *	ppm/K
$TC_0$	offset drift for $\vartheta_A = -40$ to 105°C			-9.0 *		9.0 *	mA/K
$t_{r80}$	Response time @ 80% of $I_{PN}$ (50A/ $\mu s$ 300A)					1.4 *	$\mu s$
$t_{r90}$	Response time @ 90% of $I_{PN}$ (50A/ $\mu s$ 300A)					1.5 *	$\mu s$
f	Frequency bandwidth (-3dB)			200			kHz

General data				min.	typ.	max.	Unit
$\vartheta_A$	Ambient operating temperature			-40		+105	°C
$\vartheta_{Storage}$	Ambient storage temperature acc. VAC M3101			-45		+105	°C
m	Mass				6.0	7.0	g
$V_{CC}$	Supply voltage			4.5		5.5	V
$I_{C0}$	Current consumption for $I_P = 0A$				16	23	mA

REMARK: The temperature of the primary conductor must not exceed **140°C \*** (hottest point in the middle of the sensor) for verification: the measured temperature at the kink of the primary conductor should not exceed **125°C \***

Constructed, manufactured and tested in accordance with IEC 61800-5-1 (Material group 1, Pollution degree 2, OVC III, altitude  $\leq 2000m$ )

$S_{clear}^{[1]}$	Clearance distance			8			mm
$S_{creep}^{[1]}$	Creepage distance			8			mm
$V_{sys}$	System voltage	basic insulation				1000	$V_{RMS/DC}$
		reinforced insulation				600	$V_{RMS}$
$V_{work}$	Working voltage	basic insulation				1600	$V_{RMS/DC}$
		reinforced insulation				800	$V_{RMS}$
UL508	max. potential difference according UL 508					600	$V_{AC}$

Date	Name	Issue	Amendment

Hrg R&D-PD CS editor	Bearb: Ku. designer	MC-PM: FS check	freig.: SB released
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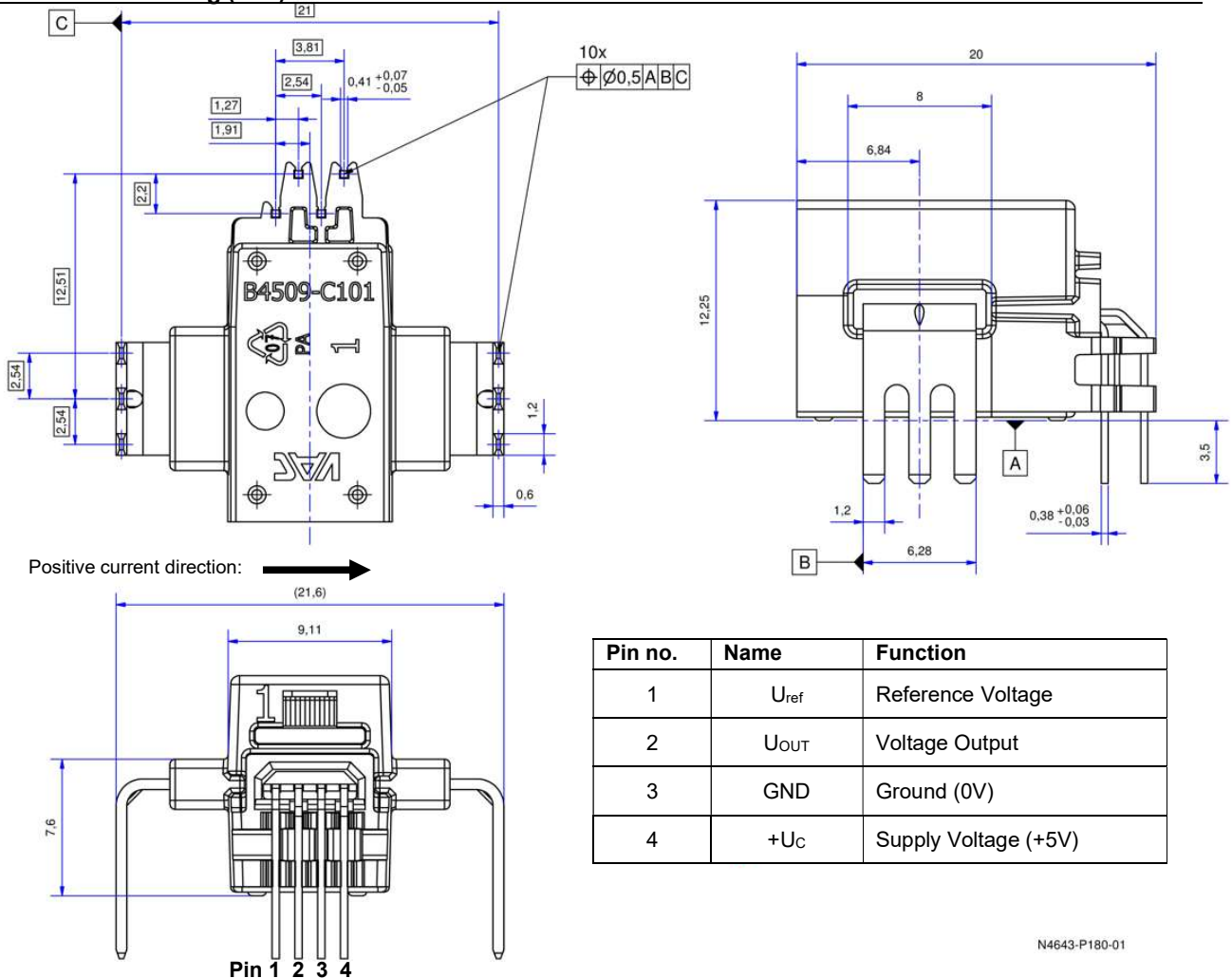
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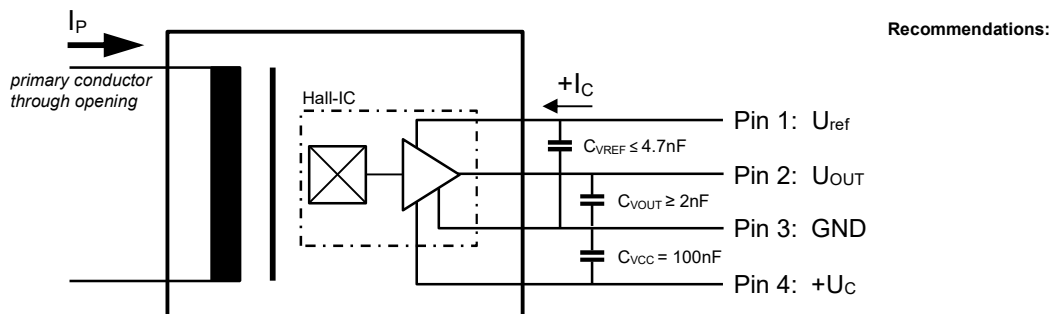
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**Mechanical drawing (mm):** General tolerance DIN ISO 2768-c



**Connection diagram**



**Fig. 6:** functional block diagram of the sensor

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**Marking**

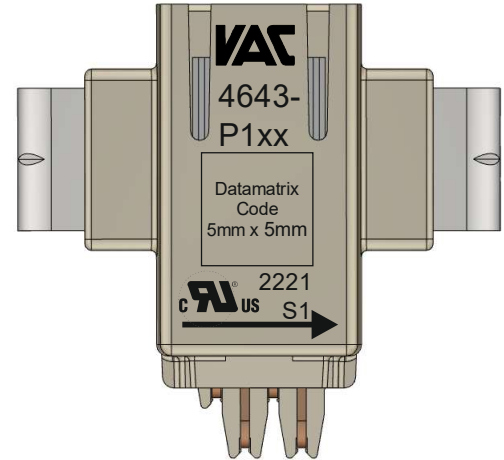
**Readable text:** Item-number "xxxxxxx"  
F = Factory code, e.g."HU"  
DC = Date code (YYWW) e.g. "2138"

**Datamatrix code:**



code size: 5.0mm x 5.0mm  
symbol size: 16 x 16 modules  
data region: 14 x 14 modules

data content:	1. Item number	IN	4 digits
	2. Reserved (std=1)	R1	1 digit
	3. Factory Code	FC	2 digits
	4. Reserved 2	R2	4 digits
	5. Serial no. (hex)	SN	5 digits



Format: "IN,R1,FC,R2,SN" example: P1801S12403C8FB3

- For a factory code of only 1 digit an underscore character "\_" is added

**Routine Test**

(Measurement after temperature balance of the samples at room temperature; SC = significant characteristic)

G	(100%) M3011/6	Sensitivity ( $I_{PN} = 100A_{DC}$ )	$\pm 0.5$	% (SC)
$I_{OM}$ (IPN)	(100%) M3226	Magnetic Offset voltage ( $I_{PN} = 100A_{DC}$ )	1.5	mV
$U_P$	(100%) M3014	Test voltage (1s) Pin 1,3,5 to primary opening	2.2	$kV_{rms}$
$U_{PDE}$	(AQL 1/S4)	Partial discharge voltage (extinction)	1590	$V_{rms}$
$U_{PD(rms)}$ · 1.875		*acc. table 24	1990	$V_{rms}$

**Type Test (Preconditioning acc. VAC M3236)**

(Pins to primary opening)

$\dot{U}_W$	M3064	HV transient test ( $1.2\mu s / 50\mu s$ , 5 pulses → polarity +, 5 pulses → polarity -)	8.0	kV
$U_P$	M3014	Test voltage (5s)	3.6	$kV_{rms}$
$U_{PDE}$	M3024	Partial discharge voltage (extinction)	1590	$V_{rms}$
$U_{PD(rms)}$ · 1.875		*acc. table 24	1990	$V_{rms}$

\* IEC61800-5-1:2007

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**Explanation to parameters used in this datasheet**

**Accuracy**

X: The sum of all errors at 25°C at nominal primary current  $I_{PN}$

$\epsilon_s$ : Sensitivity error after factory adjustment.

$\epsilon_L$ : Linearity error where  $I_P$  is any input DC and  $V_{OUT}(I_P)$  the corresponding output term.

**Offset, hysteresis and drift**

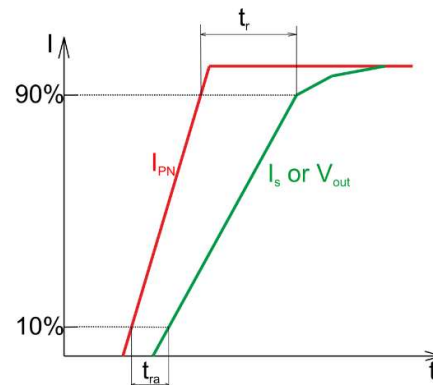
$I_{SO}$ : Offset current

$I_{SOH}$ : magnetic offset variation after overloading with a DC of threefold the rated value

**Dynamic properties**

$t_{ra}$  Reaction time, measured as a delay time between a rectangular primary current and the output current  $I_S$  at  $I_P = 0.1 * I_{PN}$

$t_{r80/90}$ : Response time, measured as a delay time between a rectangular primary current and the output current  $I_S$  at  $I_P = 0.8 * I_{PN}$  (respectively  $0.9 * I_{PN}$ )



**Voltage ratings** (according to IEC 61800-5-1:2007)

$U_{PD}$  Rated discharge voltage (recurring peak voltage separated by the insulation)

$U_{sys}$  System voltage: RMS value of rated voltage

$U_{AC}$  Working voltage: RMS voltage which occurs by design in a circuit or across an insulation

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