

K-no.: K30718/03

**120A 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

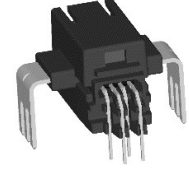
Customer part no:

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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	120	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	6.67	mV / A

Accuracy & Dynamic performance data		min.	typ.	max.	Unit
$I_{P,max}$	Max. Measuring range	-300		+300	A
X	Accuracy @ I_{PN} for $\vartheta_A = 25^\circ C$	-1.0 *		1.0 *	%
ϵ_G	Sensitivity error @ $\vartheta_A = 25^\circ C$ (factory adjusted)	-0.5 *		0.5 *	%
ϵ_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)	-0.8 *		0.8 *	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/ μs 300A)			1.4 *	μs
t_{r90}	Response time @ 90% of I_{PN} (50A/ μs 300A)			1.5 *	μs
f	Frequency bandwidth (-3dB)	200			kHz

General data		min.	typ.	max.	Unit
ϑ_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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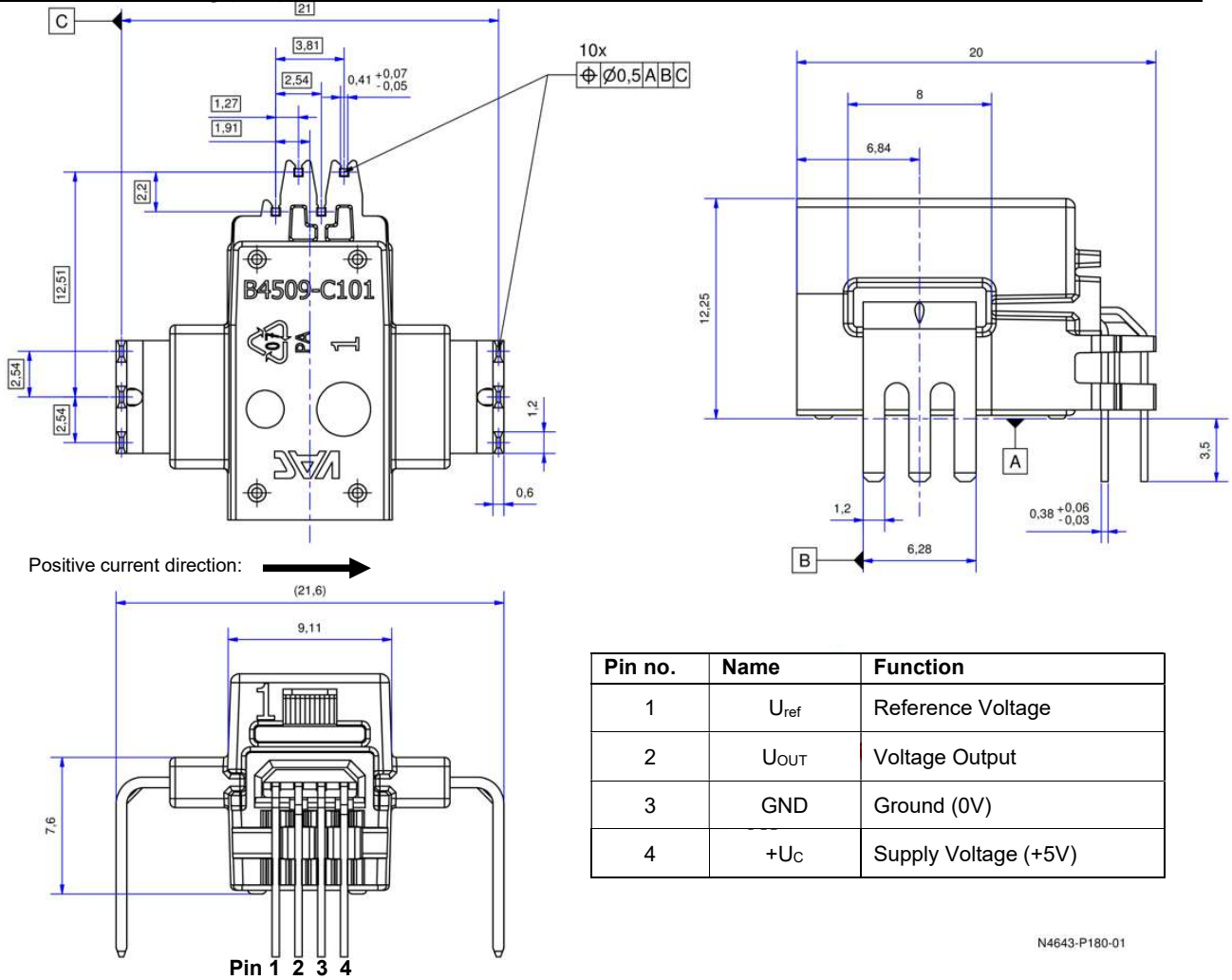
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Mechanical drawing (mm): General tolerance DIN ISO 2768-c



Connection diagram

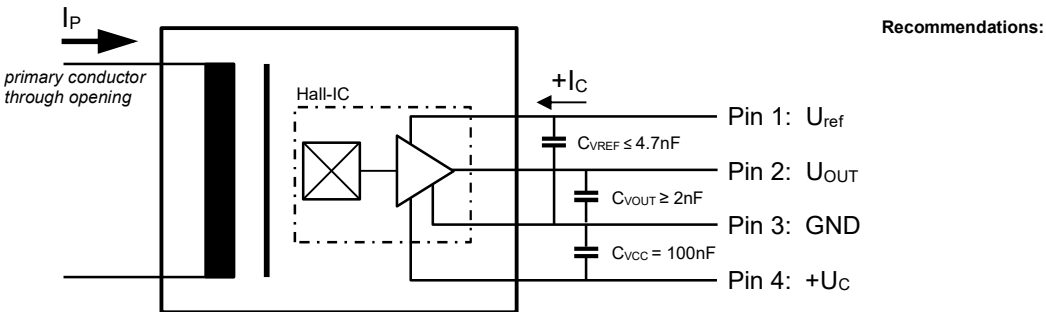


Fig. 6: functional block diagram of the sensor

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Marking

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

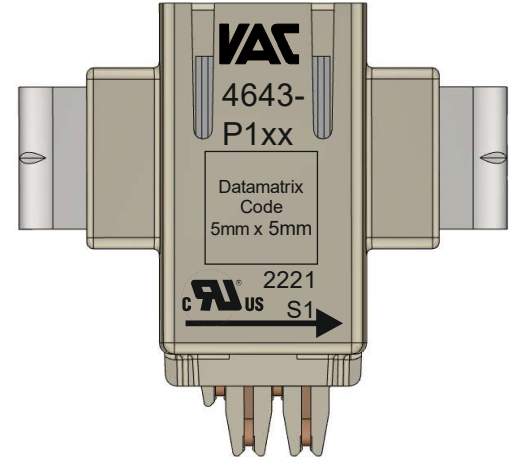
Datamatrix code:



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 1 (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 ($I_{PN} = 120A_{DC}$)	± 0.5	% (SC)
I_{0M} (IPN)	(100%) M3226	Magnetic Offset voltage ($I_{PN} = 120A_{DC}$)	1.85	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 μ s / 50 μ 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}

ϵ_s : Sensitivity error after factory adjustment.

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

Offset, hysteresis and drift

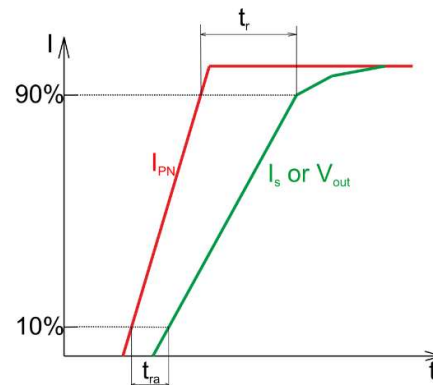
I_{SO} : Offset current

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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