VACUUMSCHMELZE	**SPECIFICATION**	**Item-No.:** **T60404-M4645-X601**

K-No.: **25152**	**6-15-25A Current-Sensor-Module** For the electronic measurement of currents: DC, AC, pulsed, mixed ..., with a galvanic Isolation between the primary circuit (high power) and the secondary circuit	Date: 02.10.2007
Customer: Standard Type	Cutomers Part No.:	

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	Ω
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 ±5%)

		min.	typ	max.	Unit
$I_{P,max}$	Max. measuring range @ R_M = 12,5 Ω	±85			A
X(T)	Measuring accuracy @ I_{PN}, T_A= -40… +85°C			0.5	%
ε_L	Linearity			0.1	%
$I_0(T)$	Offset current @ I_P=0, T_A= -40… +85°C		0.02	0.05	mA
I_{0H}	Hysteresis		0.02	0.05	mA
t_r	Response time		0.3		µs
$\Delta t(I_{p,max})$	Delay time at di/dt = 100 A/µs		0.2		µs
f	Frequency range	DC...100			kHz

General Data

		min.	typ.	max.	Unit
T_A	Ambient temperature	-40		+85	°C
T_S	Storage temperature	-40		+90	°C
m	Mass		12		g
R_S	Secondary coil resistance @ T_A=85°C			67	Ω
R_P	Primary coil resistance per turn @ T_A=25°C		1		mΩ
C_k	Coupling capacity		5		pF
	Mechanical Stress according to M3209/3 Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours			10g	
	Constructed and manufactored 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 EN 61800-5-1 (Pin 1 - 6 to Pin 7 - 10)

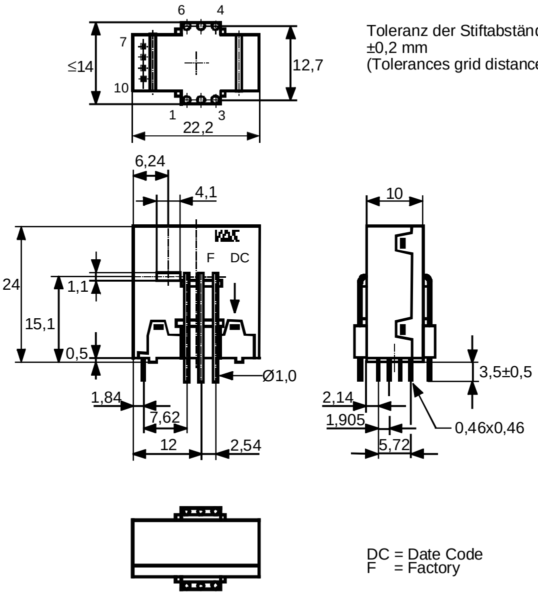
V_W	HV transient test according to M3064 (1,2 µs / 50 µs-wave form)		6	kV
V_d	Testing voltage to M3014	(5 s)	3	kV
V_e	Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)		1100 1375	V V

Datum	Name	Index	Änderung
		81	

Hrsg.: KB-E editor	Bearb: SA designer		KB-E: Le check	KB-PM: KRe. check		freig.: Heu. released

Mechanical outline (mm): General tolerances DIN ISO 2768-c

Connections:
1...6: ∅ 1 mm
7..10: 0,46*0,46 mm



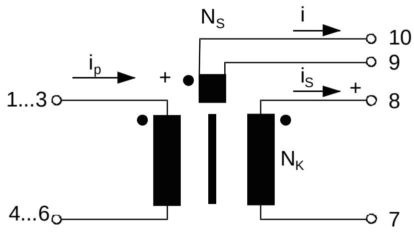
Toleranz der Stiftabstände
±0,2 mm
(Tolerances grid distance)

DC = Date Code
F = Factory

Marking:

VAC
4645X601
F DC

Schematic diagram



Pin 10 : S2 } Sensor Winding
Pin 9 : S1 }

Pin 8 : K2 } Compensation Winding
Pin 7 : K1 }

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
ΔΦ (K1-K2)	(V)	M3090:	Magnetic Flux compensation core	4.5...7	nVs
ΔΦ (S1-S2)	(V)	M3090:	Magnetic Flux sensor	20...35	nVs
R_S (K1-K2)	(V)	M3011/5:	Winding resistance compensation coil	44...52,5	Ω
R (S1-S2)	(V)	M3011/5:	Winding resistance magnetic probe coil	2.3...3.0	Ω
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)	>1100	V
			with V_{vor} (RMS)	1375	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.

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

I_{0H}: Zero variation of I_o after overloading with a DC of tenfold the rated value ($R_M = R_{MN}$)

I_{0t}: Long term drift of I_o after 100 temperature cycles in the range -40 bis 85 °C.

t_r: Response time (describe the dynamic performance for the specified measurement range), measured as delay time at $I_P = 0{,}9 \cdot I_{Pmax}$ between a rectangular current and the output current.

Δt (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 current i_a with a primary current rise of di_1/dt = 100 A/µs.

U_{PD} Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage V_e

$$U_{PD} = \sqrt{2} * V_e / 1{,}5$$

V_{vor} Defined voltage is the RMS valve of a sinusoidal voltage with peak value of 1,875 * U_{PD} required for partial discharge test in IEC 61800-5-1

$$V_{vor} = 1{,}875 * U_{PD} / \sqrt{2}$$

V_{sys} System voltage RMS value of rated voltage according to IEC 61800-5-1

V_{work} Working voltage voltage according to IEC 61800-5-1 which occurs by design in a circuit or across insulation

$X_{ges}(I_{PN})$: The sum of all possible errors over the temperature range by measuring a current I_{PN}:

$$X_{ges} = 100 \cdot \left| \frac{I_S(I_{PN})}{K_N \cdot I_{PN}} - 1 \right| \%$$

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_{SB} is the output DC value of an input DC current of the same magnitude as the (positive) rated current ($I_o = 0$)

X_{Ti}: Temperature drift of the rated value orientated output term. I_{SN} (cf. Notes on F_i) 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_L: Linearity fault defined by $e_L = 100 \cdot \left| \frac{I_P}{I_{PN}} - \frac{I_{Sx}}{I_{SN}} \right| \%$

Where I_P is any input DC and I_{Sx} the corresponding output term. I_{SN}: see notes of F_i ($I_o = 0$).

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