

Reduced size, ultra-stable, high precision (ppm class) fluxgate technology DT Series current transducer for isolated DC and AC current measurement up to 50Arms



Features

- Fluxgate, closed loop compensated technology with fixed excitation frequency and second harmonic zero flux detection for best in class accuracy and stability
- 2 MHz high frequency bandwidth
- Excellent linearity, better than 1.5 ppm
- Industry standard DSUB 9 pin connection
- Green diode for normal operation indication
- Large aperture Ø20.7mm for cables and bus bars
- Weighs only 0.15 kg

Applications

- Optimized for space constraint applications
- MPS for particles accelerators
- Gradient amplifiers for MRI devices
- Stable power supplies
- Precision drives
- Batteries testing and evaluation systems
- Power measurement and power analysis
- Variable speed drives
- Calibration unit

Specification highlights	Symbol	Unit	Min	Typ	Max
Nominal continuous primary AC current	$I_{PN AC}$	Arms			50
Nominal continuous primary DC current	$I_{PN DC}$	A	-50		50
Measuring range	\hat{I}_{PM}	A	-75		75
Primary / secondary ratio	$n1 : n2$		1:500		1:500
Linearity error	ϵ_L	ppm	-1.5	0.7	1.5
Offset current (including earth field)	I_{OE}	ppm	-100		100
DC-10Hz Overall accuracy @25°C (= $\epsilon_L + I_{OE}$)	$acc\epsilon$	ppm	-101.5		101.5
Bandwidth	$f(\pm 3dB)$	kHz		2000	
AC typical gain error 10Hz to 5kHz	ϵ_G	%		± 0.01	
Operating temperature range	T_a	°C	-40		85
Power supply voltages	U_c	V	± 14.25		± 15.75

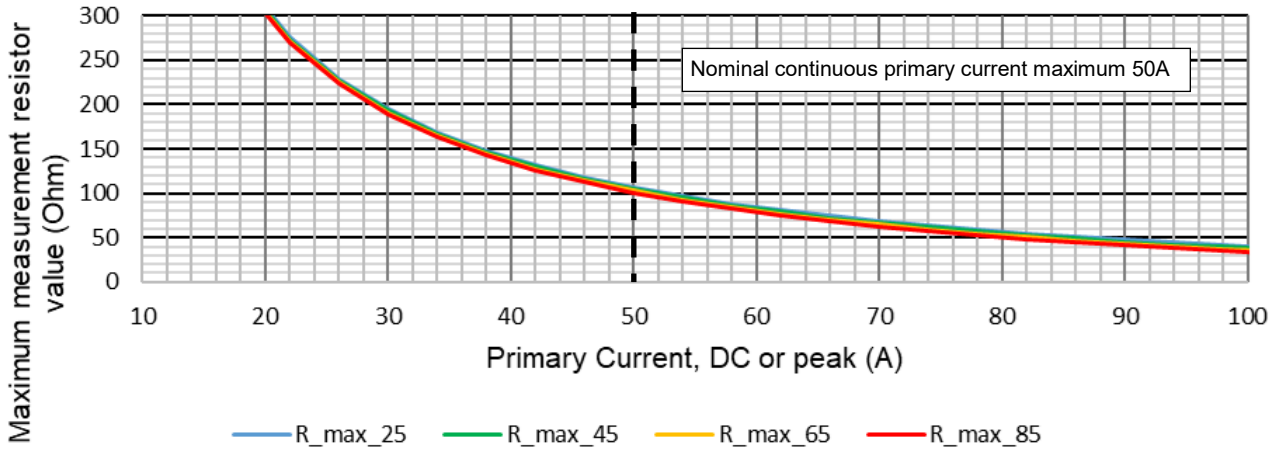
All ppm (or %) values refer to nominal current

Electrical specifications at Ta=23°C, supply voltage = ± 15V unless otherwise stated

Parameter	Symbol	Unit	Min	Typ.	Max	Comment
Nominal continuous primary AC current	$I_{PN AC}$	Arms			50	Refer to fig. 1 & 2 for derating
Nominal continuous primary DC current	$I_{PN DC}$	A	-50		50	Refer to fig. 1 for derating
Measuring range	I_{PM}	A	-75		75	Refer to fig. 1 & 2 for derating
Overload capacity	\hat{I}_{OL}	A	-250		250	Non-measured, 100ms
Nominal secondary current	I_{SN}	mA	-100		100	At nominal primary DC current
Primary / secondary ratio			1:500		1:500	
Measuring resistance	R_M	Ω	0	50		Refer to fig. 1 for details
Linearity error	ϵ_L	ppm μA	-1.5 -0.15	0.7 0.07	1.5 0.15	ppm refers to nominal current μA refers to secondary current
Offset current	I_{OE}	ppm μA	-100 -10		100 10	ppm refers to nominal current μA refers to secondary current
DC-10Hz Overall accuracy @25°C (= ϵ_L + IOE)	acc ϵ	ppm	-101.5		101.5	ppm refers to nominal DC current
Offset temperature coefficient	TC_{IOE}	ppm/K $\mu A/K$	-0.8 -0.08	0.4 0.04	0.8 0.08	ppm refers to nominal current μA refers to secondary current
Bandwidth	$f(\pm 3dB)$	kHz		2000		Small signal, graphs figure 3
Amplitude error	ϵ_G	%		10Hz - 5kHz	0.01%	See notes in fig. 3 % refers to nominal current
5kHz - 100kHz				1%		
100kHz - 1000kHz				10%		
1000kHz - 2000kHz				30%		
Phase shift	θ	°		10Hz - 5kHz	0.01°	See notes in fig. 3
5kHz - 100kHz				1°		
100kHz - 1000kHz				10°		
1000kHz - 2000kHz				30°		
Response time to a step current I_{PN}	$t_r @ 90\%$	μs		1		
RMS noise	noise	ppm RMS		0.1Hz - 10Hz	0.04	ppm RMS refers to nominal current
0.1Hz - 100Hz				0.4		
0.1Hz - 1kHz				0.6		
0.1Hz - 10kHz				1.1		
0.1Hz - 100kHz				9.3		
Peak-to-peak noise	noise	ppm p-p		0.1Hz - 10Hz	0.4	ppm peak-to-peak refers to nominal current
0.1Hz - 100Hz				1.6		
0.1Hz - 1kHz				3.1		
0.1Hz - 10kHz				4.9		
0.1Hz - 100kHz				50		
Fluxgate excitation frequency	f_{Exc}	kHz		31.25		
Induced rms voltage on primary conductor		μV rms			5	
Power supply voltages	U_c	V	± 14.25		± 15.75	
Positive current consumption	I_{ps}	mA		40		Add I_s (if I_s is positive)
Negative current consumption	I_{ns}	mA		35		Add I_s (if I_s is negative)
Operating temperature range	T_a	°C	-40		85	
Stability						
Offset stability over time		ppm/month $\mu A/month$	-0.1 -0.01		0.1 0.01	ppm refers to nominal current μA refers to secondary current
Impact of external magnetic field		ppm/mT $\mu A/mT$	-16 -1.6	4 0.4	16 1.6	ppm refers to nominal current μA refers to secondary current
Offset change with power supply voltages changes		ppm/mV $\mu A/mV$		0.0052 0.0005		ppm refers to nominal current μA refers to secondary current

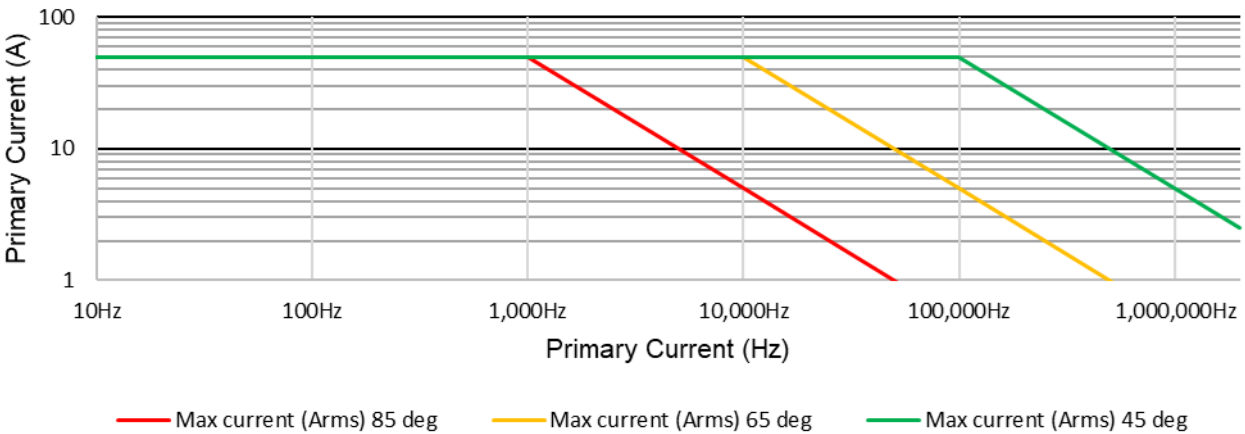
Measurement resistor RM and ambient temperature derating (Fig. 1)

Maximum measurement resistor vs. ambient temperatures



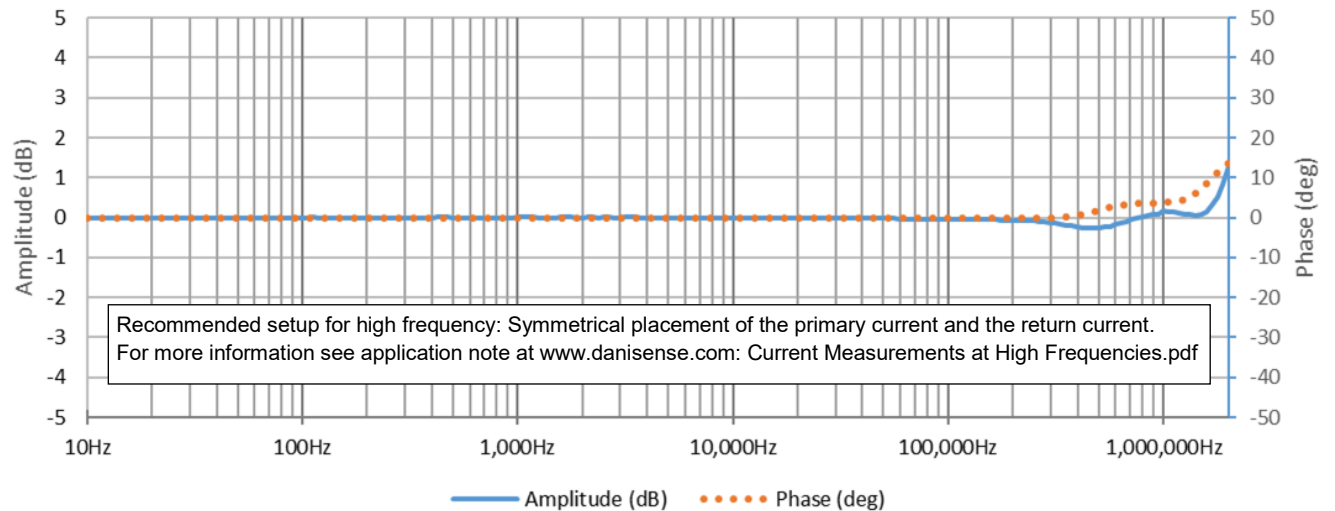
Frequency and ambient temperature derating (Fig. 2)

Maximum primary current A_{rms}



Frequency characteristics (Fig. 3)

Typical Amplitude / Phase response



Isolation specifications

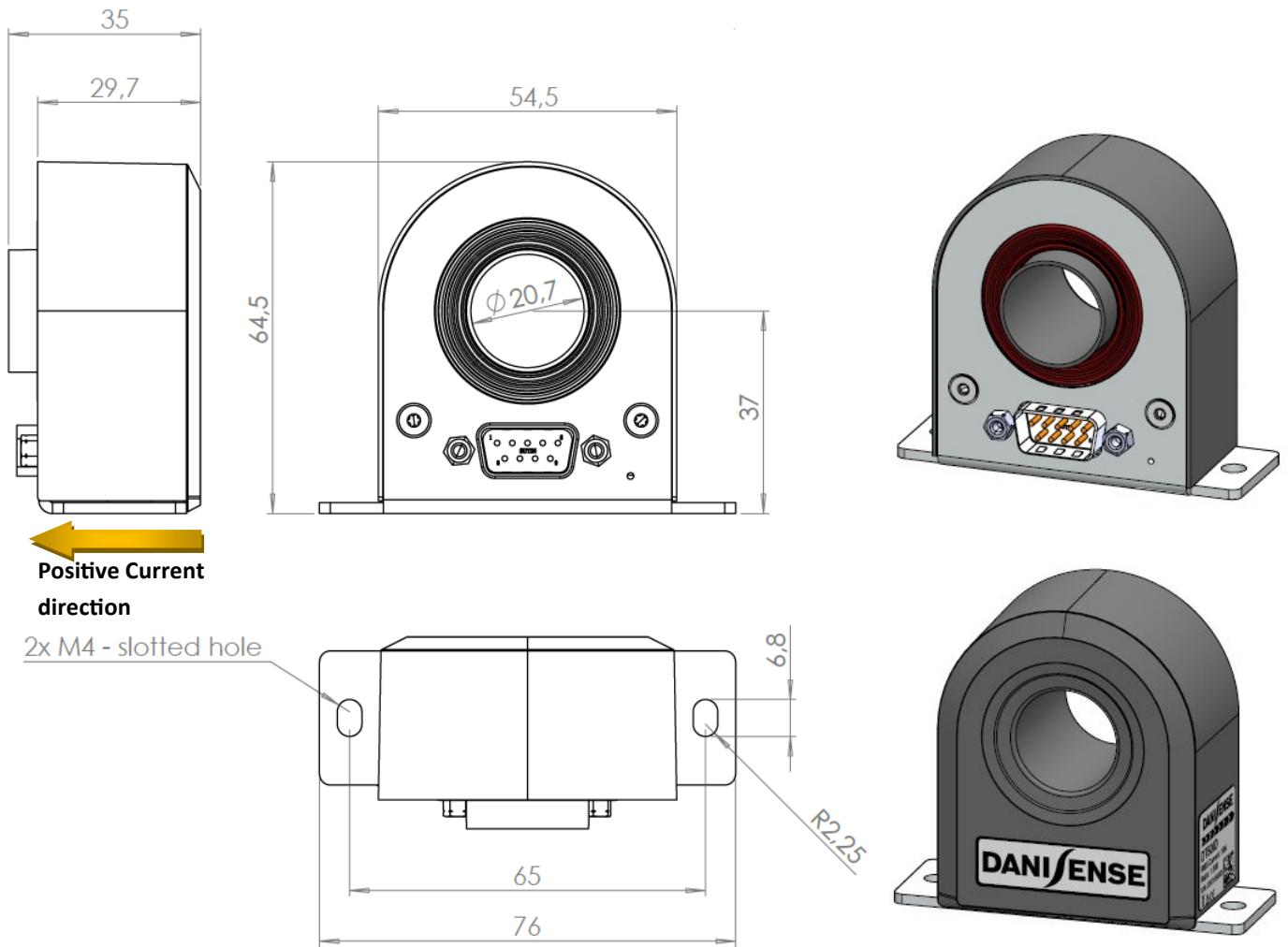
Parameter	Unit	Value
Clearance	mm	11.5
Creepage distance	mm	11.5
Rms voltage for AC isolation test, 50/60 Hz, 1 min - Between primary and (secondary and shield)	kV	5.7
Impulse withstand voltage (1.2/50µs)	kV	10.4
Rated rms isolation voltage reinforced isolation, overvoltage category III, Pollution degree 2 according to - IEC 61010-1 - EN50780	V	300 600

Absolute maximum ratings

Parameter	Unit	Max	Comment
Primary	A	250	Maximum 100ms
Power supply	V	±16.5	

Environmental and mechanical characteristics

Parameter	Unit	Min	Typ	Max	Comment
Altitude	m			2000	
Usage					Designed for indoor use
Transient voltages					Up to overvoltage category III
Polution Degree				2	
Ambient operating temperature range	°C	-40		85	
Storage temperature range	°C	-40		85	
Relative humidity	%	20		80	Non-condensing
Mass	kg		0.15		
Connections	Power supplies: D-SUB 9 pins male				
Standards	EMC: IEC 61326-1:2013-2021 Safety: IEC 61010-2-30 and IEC 61010-1:2010 3rd Edition Random vibration test: IEC 60068-2-64:2008 Shock test: IEC 60068-2-27:2009 Transport test: IEC 60068-2-64:2008				



(general tolerance 0.3mm unless otherwise stated)

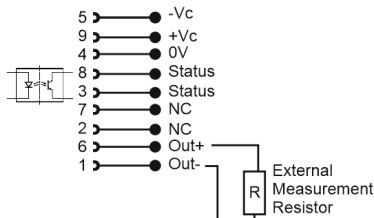
DSUB pin layout

Standard DSUB-9 current output



When sensor is operating in normal condition the status pins are shorted.

- Status pin properties.
- Forward direction pin 8 to pin 3
 - Maximum forward current 10mA
 - Maximum forward voltage 60V
 - Maximum reverse voltage 5V



Positive current direction

Is identified by an arrow on the transducer body

Mounting instructions

Base plate mounting:

2 x M4 - slotted holes

Suggested fastening torque: 5.5 Nm

Declaration of Conformity

Danisense A/S
Malervej 10
DK-2630 Taastrup
Denmark

Declares that under our sole responsibility that this product is in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:

Directive 2014/30/EU

Directive 2014/35/EU

And that the following harmonized standards have been applied

EN 61010-1 (Third Edition):2010, EN 61010-1:2010/A1:2019

EN 61010-2-030:2021/A11:2021

EN 61326-1:2013

All DANISENSE products are manufactured in accordance with RoHS directive 2011/65/EU. Annex II of the RoHS directive was amended by directive 2015/863 in force since 2015, expanding the list of 6 restricted substances (Lead, Hexavalent Chromium, PBB, PBDE and Cadmium)

Danisense follows the provision in EN 63000:2018



Place

Taastrup, Denmark

Henrik Elbæk

Date

2022-03-15