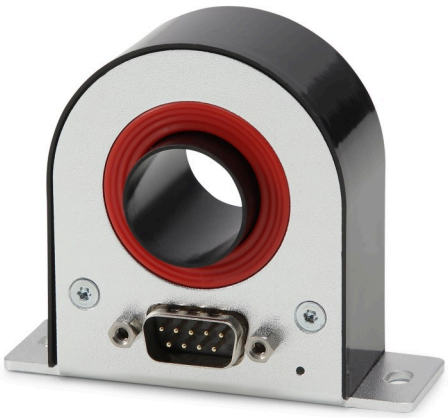
Reduced size, ultra-stable, high precision (ppm class) fluxgate technology DT Series current transducer for isolated DC and AC current measurement up to 50Arms



CE

RoHS 2011/65/EU

UK CA

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

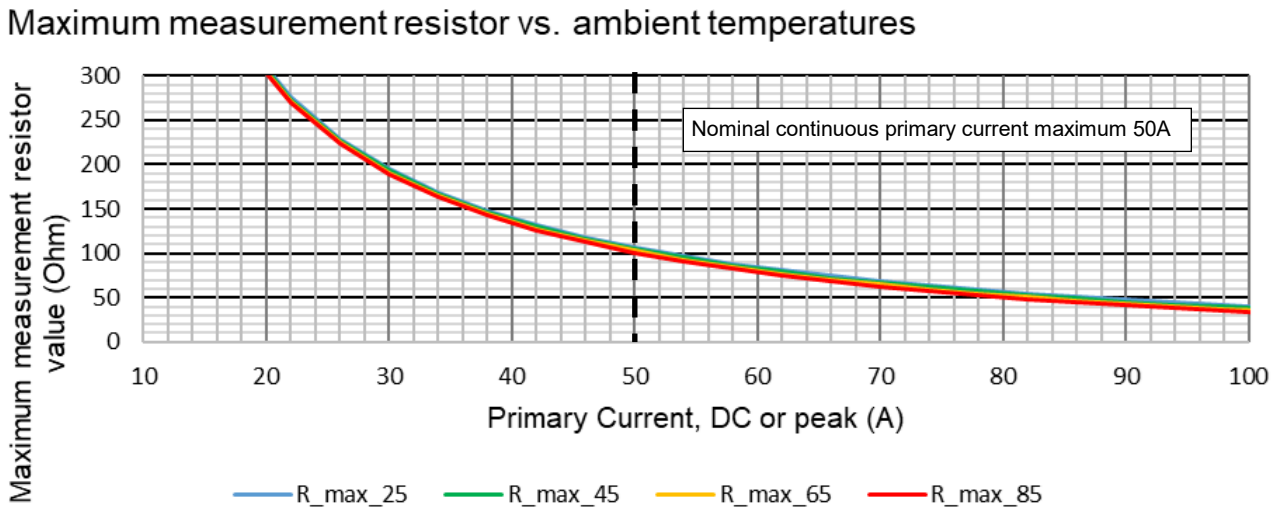
Specification highlights	Symbol	Unit	Min	Typ	Max
Nominal continuous primary AC current	I_{PN} AC	Arms			50
Nominal continuous primary DC current	I_{PN} DC	A	-50		50
Measuring range	$\hat{I}_{PM}$	A	-75		75
Primary / secondary ratio	n1 : n2		1:500		1:500
Linearity error	ε_L	ppm	-1.5	0.7	1.5
Offset current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

All ppm (or %) values refer to nominal current

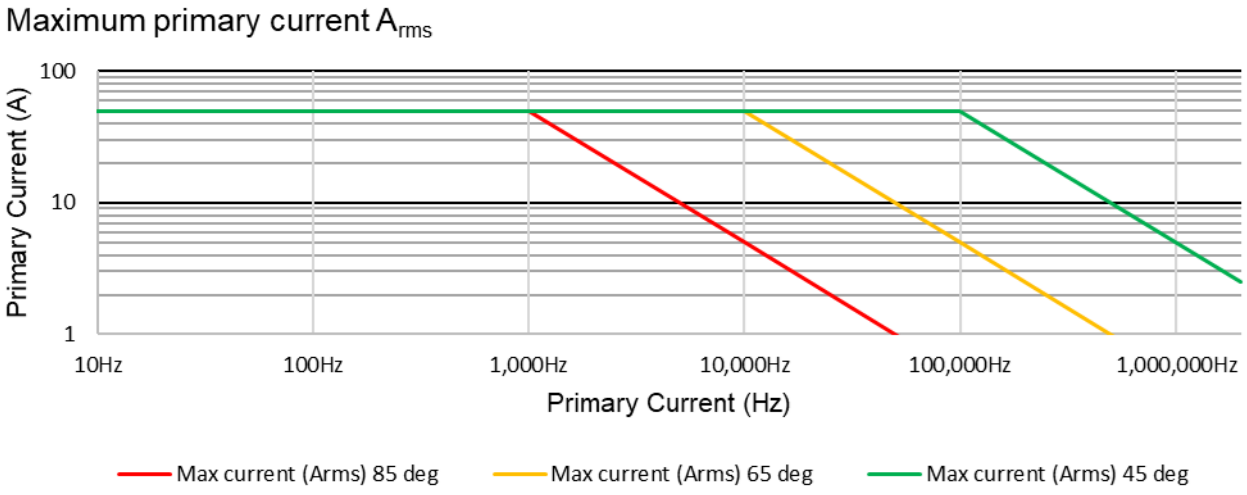
Electrical specifications at Ta=23°C, supply voltage = ± 15V unless otherwise stated

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 (= εL + IOE)	accε	ppm	-101.5		101.5	ppm refers to nominal DC current
Offset temperature coefficient	TC_{IOE}	ppm/K µA/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(±3dB)	kHz		2000		Small signal, graphs figure 3
Amplitude error 10Hz –5kHz 5kHz -100kHz 100kHz - 1000kHz 1000kHz - 2000kHz	εG	%		0.01% 1% 10% 30%		See notes in fig. 3 % refers to nominal current
Phase shift 10Hz –5kHz 5kHz -100kHz 100kHz - 1000kHz 1000kHz - 2000kHz	θ	°		0.01° 1° 10° 30°		See notes in fig. 3
Response time to a step current IPN	tr @ 90%	µs		1		
RMS noise 0.1Hz - 10Hz 0.1Hz - 100Hz 0.1Hz - 1kHz 0.1Hz - 10kHz 0.1Hz - 100kHz	noise	ppm RMS		0.04 0.4 0.6 1.1 9.3	0.07 1.2 1.2 3 27	ppm RMS refers to nominal current
Peak-to-peak noise 0.1Hz - 10Hz 0.1Hz - 100Hz 0.1Hz - 1kHz 0.1Hz - 10kHz 0.1Hz - 100kHz	noise	ppm p-p		0.4 1.6 3.1 4.9 50	0.7 4 7 12 150	ppm peak-to-peak refers to nominal current
Fluxgate excitation frequency	f_{Exc}	kHz		31.25		
Induced rms voltage on primary conductor		µV rms			5	
Power supply voltages	Uc	V	±14.25		±15.75	
Positive current consumption	Ips	mA		40		Add Is (if Is is positive)
Negative current consumption	Ins	mA		35		Add Is (if Is is negative)
Operating temperature range	Ta	°C	-40		85	
Stability						
Offset stability over time		ppm/month µA/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 µA/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 µA/mV		0.0052 0.0005		ppm refers to nominal current µA refers to secondary current

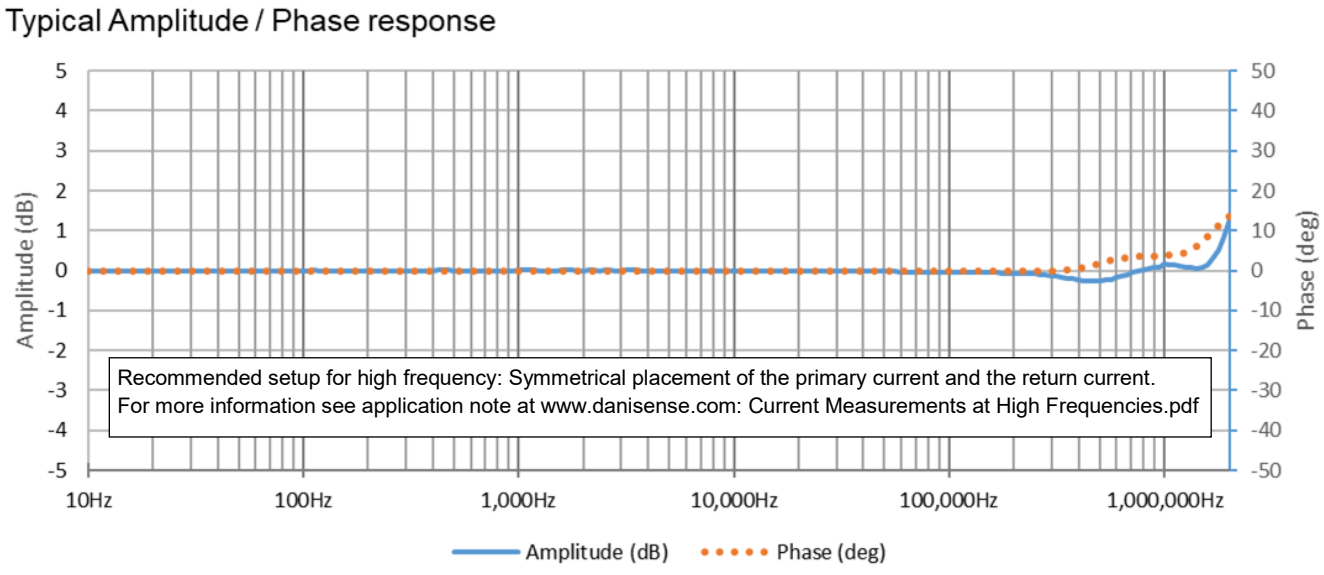
Measurement resistor RM and ambient temperature derating (Fig. 1)



Frequency and ambient temperature derating (Fig. 2)



Frequency characteristics (Fig. 3)



Isolation specifications

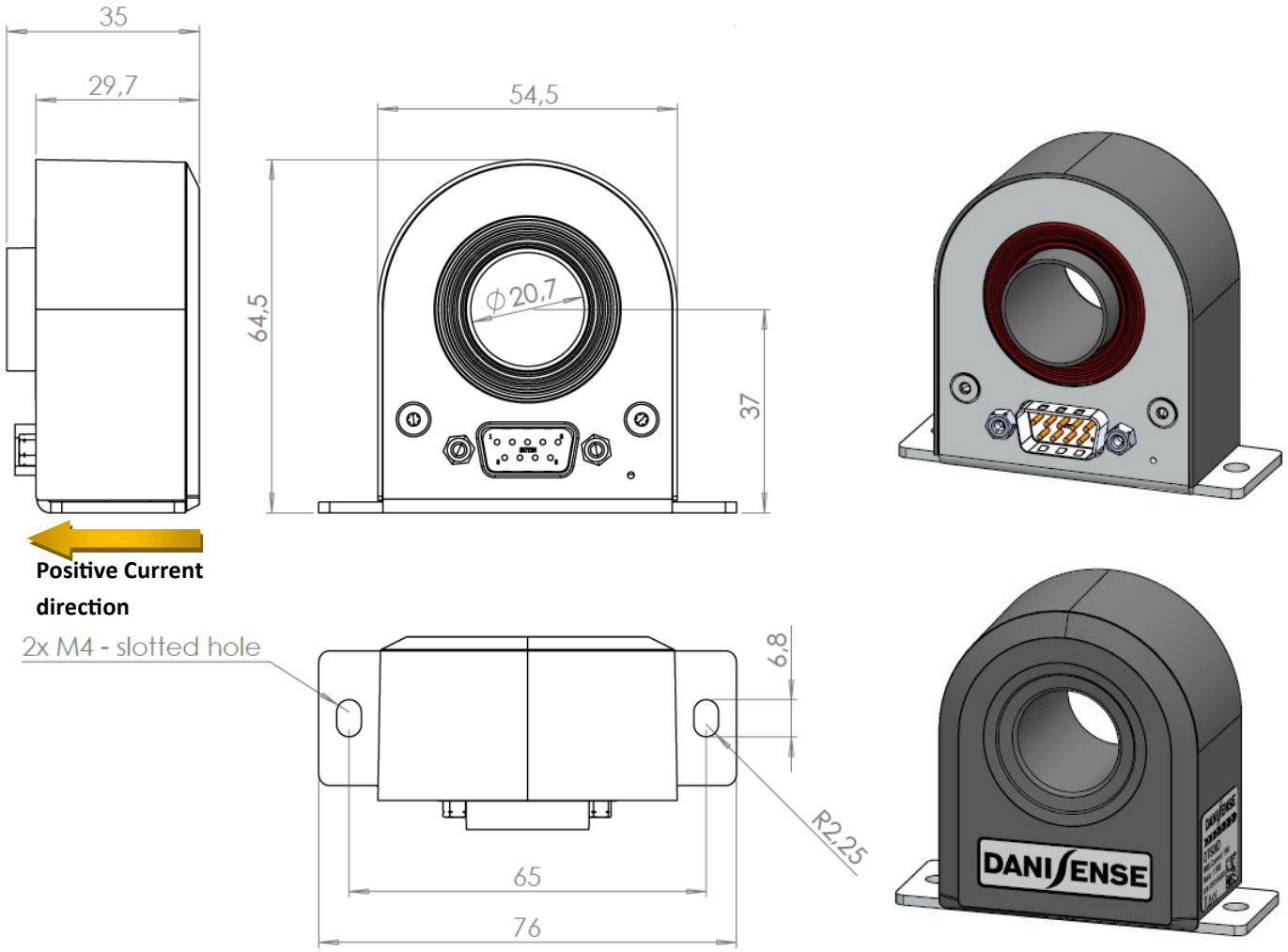
Parameter	Unit	Value
Clearance	mm	11.5
Creepage distance	mm	11.5
Rms voltage for AC isolation test, 50/60 Hz, 1 min - Between primary and (secondary and shield)	kV	5.7
Impulse withstand voltage (1.2/50µs)	kV	10.4
Rated rms isolation voltage reinforced isolation, overvoltage category III, Pollution degree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

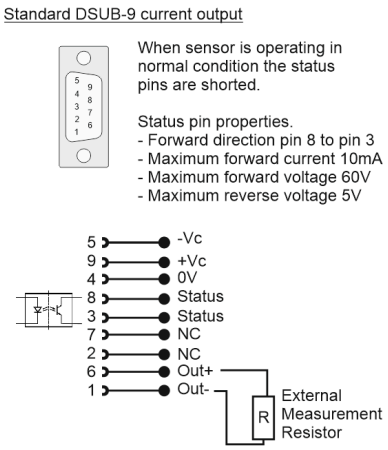
Environmental and mechanical characteristics

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



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		Date
Taastrup, Denmark	Henrik Elbæk	2022-03-15