

Ultra-stable, high precision (ppm class) fluxgate technology DM Series current transducer for non-intrusive, isolated DC and AC current measurement up to 1500A



Features

- Ø45mm aperture enabling large isolated cables and the possibility to measure leakage current at high precision.
- 1 ppm linearity
- 12 ppm offset
- Current output
- Fluxgate, closed loop compensated technology with crystal driven excitation frequency for increased stability
- Industry standard DSUB 9 pin connection
- Full aluminum body for superior EMI shielding and extended operating temperature range

Applications:

- Power measurement and power analysis
- Stable power supplies
- MPS for particles accelerators
- Gradient amplifiers for MRI devices
- Precision drives
- Batteries testing and evaluation systems
- Current calibration purposes

Specification highlights	Symbol	Unit	Min	Typ	Max
Nominal primary AC current	$I_{PN AC}$	A _{rms}			1200
Nominal primary DC current	$I_{PN DC}$	A	-1500		1500
Measuring range	\hat{I}_{PM}	A	-1800		1800
Primary / secondary ratio	$n1: n2$		1:1500		1:1500
Linearity error	ϵ_L	ppm	-1		1
Offset current (including earth field)	I_{OE}	ppm	-12		12
DC-10Hz Overall accuracy @25°C (= $\epsilon_L + I_{OE}$)	acc ϵ	ppm	-13		13
AC Maximum gain error 10Hz to 2kHz	ϵ_G	%			±0.01
Operating temperature range	T _a	°C	-40		65
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 primary AC current	$I_{PN AC}$	A _{rms}			1200	Refer to fig. 1 & 2 for derating
Nominal primary DC current	$I_{PN DC}$	A	-1500		1500	Refer to fig. 1 for derating
Measuring range	I_{PM}	A	-1800		1800	Refer to fig. 1 & 2 for derating
Overload capacity	\hat{I}_{OL}	kA			5	Non-measured, 100ms
Nominal secondary current	I_{SN}	mA	-1000		1000	At nominal primary DC current
Primary / secondary ratio			1:1500		1:1500	
Measuring resistance	R_M	Ω	0		3	Refer to fig. 1 for details
Linearity error	ε_L	ppm μ A	-1 -1		1 1	ppm refers to nominal current μ A refers to secondary current
Offset current	I_{OE}	ppm μ A	-12 -12		12 12	ppm refers to nominal current μ A refers to secondary current
DC-10Hz Overall accuracy @25°C (= $\varepsilon_L + I_{OE}$)	acc ε	ppm	-13		13	ppm refers to nominal DC current
Offset temperature coefficient	TC_{IOE}	ppm/K μ A/K	-0.1 -0.1		0.1 0.1	ppm refers to nominal current μ A refers to secondary current
Bandwidth	f(-3dB)	kHz	300			Small signal, graphs figure 3
Amplitude error	ε_G	%			0.01%	% refers to nominal current
10Hz–2kHz					1.50%	
2kHz-10kHz 10kHz - 100kHz					3.00%	
Phase shift	θ	°			0.04°	
10Hz–2kHz					0.5°	
2kHz-10kHz 10kHz - 100kHz					3°	
Response time to a step current I_{PN}	$t_r @ 90\%$	μ s		1		di/dt = 100A/ μ s
Noise	noise	ppm rms			0.02	Measured on secondary current
0 - 100Hz					0.10	
0 - 1kHz					1.20	
0 - 10kHz 0 - 100kHz					3.50	
Fluxgate excitation frequency	f_{exc}	kHz		32		
Induced rms voltage on primary conductor		μ V rms			5	
Power supply voltages	U_c	V	± 14.25		± 15.75	
Positive current consumption	I_{ps}	mA	100	110	120	Add I_s (if I_s is positive)
Negative current consumption	I_{ns}	mA	110	120	130	Add I_s (if I_s is negative)
Operating temperature range	T_a	°C	-40		65	
Stability						
Offset stability over time		ppm/month μ A/month	-0.1 -0.1		0.1 0.1	ppm refers to nominal current μ A refers to secondary current
Offset change with vertical external magnetic field		μ A /mT		0.2	0.8	(perpendicular to bus bar) μ A refers to secondary current
Offset change with horizontal external magnetic field		μ A /mT		0.8	2	(parallel to bus bar) μ A refers to secondary current
Offset change with power supply voltage changes		μ A /V		0	0.04	μ A refers to secondary current
Offset change with absolute power supply voltages tracking		μ A /V		0.01	0.04	μ A refers to secondary current

Isolation specifications

Parameter	Unit	Value
Clearance	mm	12
Creepage distance	mm	12
Comparative tracking index	CTI	> 600
Rms voltage for AC isolation test, 50/60 Hz, 1 min - Between primary and (secondary and shield) - Between secondary and shield	kV	14.4 0.2
Impulse withstand voltage (1.2/50µs)	kV	26.3
Rated DC or rms isolation voltage reinforced isolation, overvoltage category II, Pollution degree 2 according to - IEC 61010-1 - IEC 61010-2-30	V	1000

Absolute maximum ratings

Parameter	Unit	Max	Comment
Primary	kA	5	Maximum 100ms
Power supply	V	±16.5	

Environmental and mechanical characteristics

Parameter	Unit	Min	Typ	Max	Comment
Ambient operating temperature range	°C	-40		65	
Storage temperature range	°C	-40		65	
Relative humidity	%	20		80	Non-condensing
Mass	kg		1.5		
Connections	Power supplies: D-SUB 9 pins male				
Standards	EN 61326-1 EMC EN 61010-1:2010 Safety				

Advanced Sensor Protection Circuits “ASPC”

Developed to protect the current transducer from typical fault conditions:

- Unit is un-powered and secondary circuit is open or closed
- Unit is powered and secondary circuit is open or interrupted

Both DC and AC primary current up to 100% of nominal value can be applied to the current transducers in the above situations without damage to the electronics.

Please notice that the sensor core can be magnetized in all above cases, leading to a small change in output offset current (less than 10ppm)

Status pins

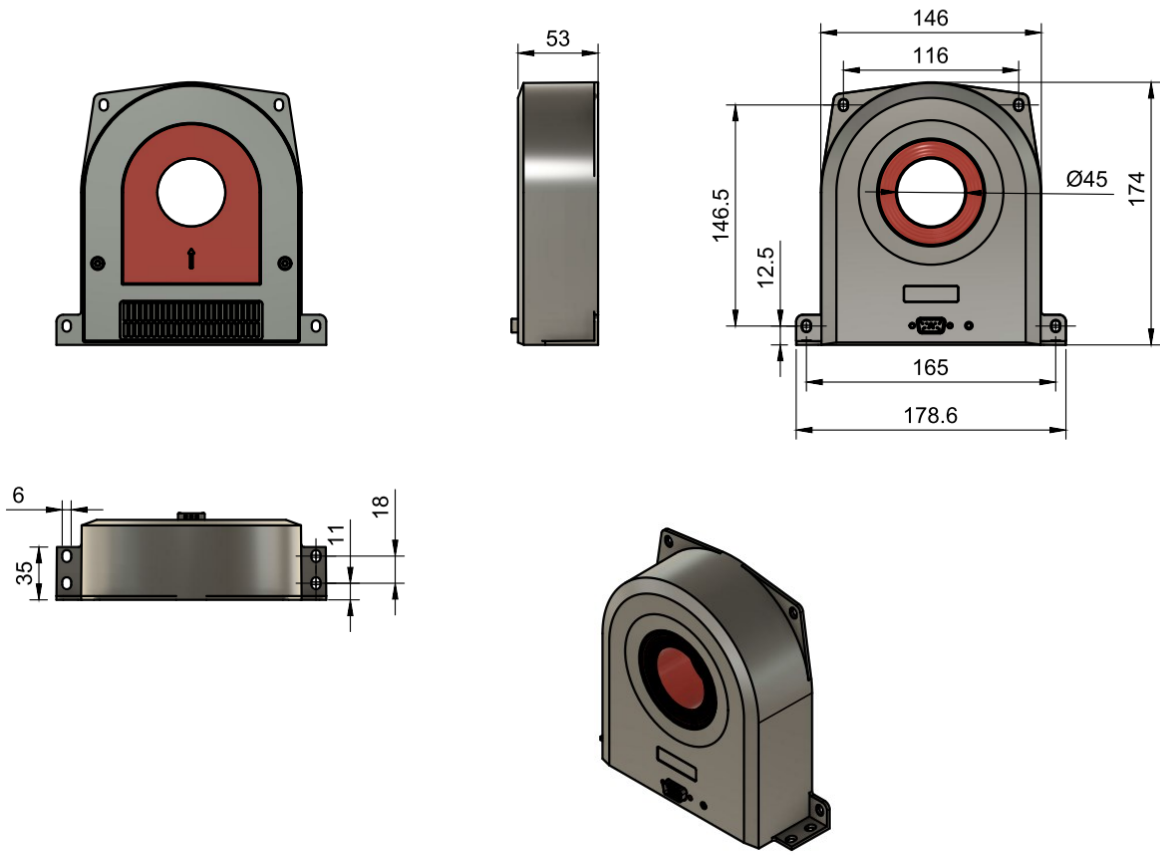
When transducer is operating in normal condition, the status pins (3 and 8) are shorted.

Status pins properties: - forward direction pin 8 to pin 3, maximum forward current 10mA
- maximum forward voltage 60V, maximum reverse voltage 5V

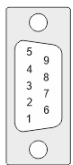
Accessories

- 4-channel power supplies unit for connection up to 4xDM1200 : DSSIU-4
- 6-channel power supplies unit for connection up to 6xDM1200 : DSSIU-6
- Transducer cables in 5 lengths (2m - 5m - 10m - 15m - 20m): DSUB2 - DSUB5 - DSUB10 - DSUB15 - DSUB20
- Transducer cable 3m for connection to end-user's power supply: Transducer cable for lab PS
(with access to current output via ϕ 4 banana jacks)

Please visit Danisense homepage for relevant datasheets



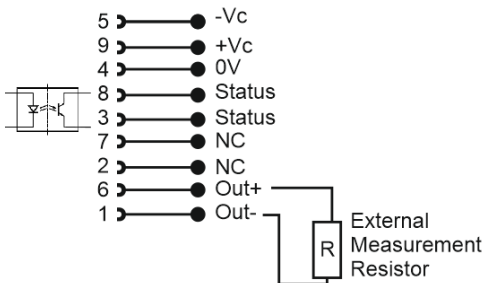
Standard DSUB-9 current output



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



Mounting instructions

- Horizontal or vertical mounting
- 4 holes $\phi 6 \times 11$
- 4 x M5 steel screws / 6N.m

Positive current direction

Is identified by an arrow on the transducer body