DM1200UB-10V

Ultra-stable, high precision (ppm class) fluxgate technology DM Series current transducer for non-intrusive, isolated DC and AC current measurement up to 1320A

Features

- Ø45mm aperture enabling large isolated cables and the possibility to measure leakage current at high precision.
- 15 ppm linearity
- 10 ppm offset
- 10V 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

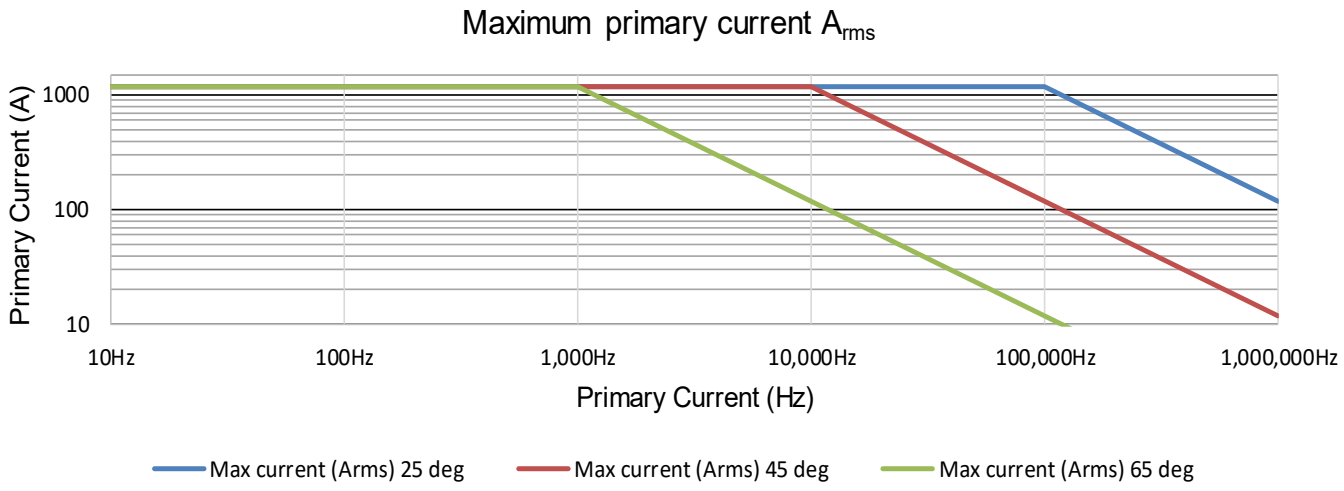
Specification highlights	Symbol	Unit	Min	Typ.	Max
Nominal primary AC current	I_{PN} AC	Arms			850
Nominal primary DC current	I_{PN} DC	A			1200
Measuring range	I_{PM}	A	-1320		1320
Primary / secondary ratio		V/kA	8.3333		8.3333
Linearity error (Best fit)	ε_L	ppm	-15		15
Offset Voltage	V_{OE}	uV	-100		100
Operating temperature range	Ta	°C	-40		65
Power supply voltages	Uc	V	±14.25		±15.75

All ppm (or %) values refer to nominal current

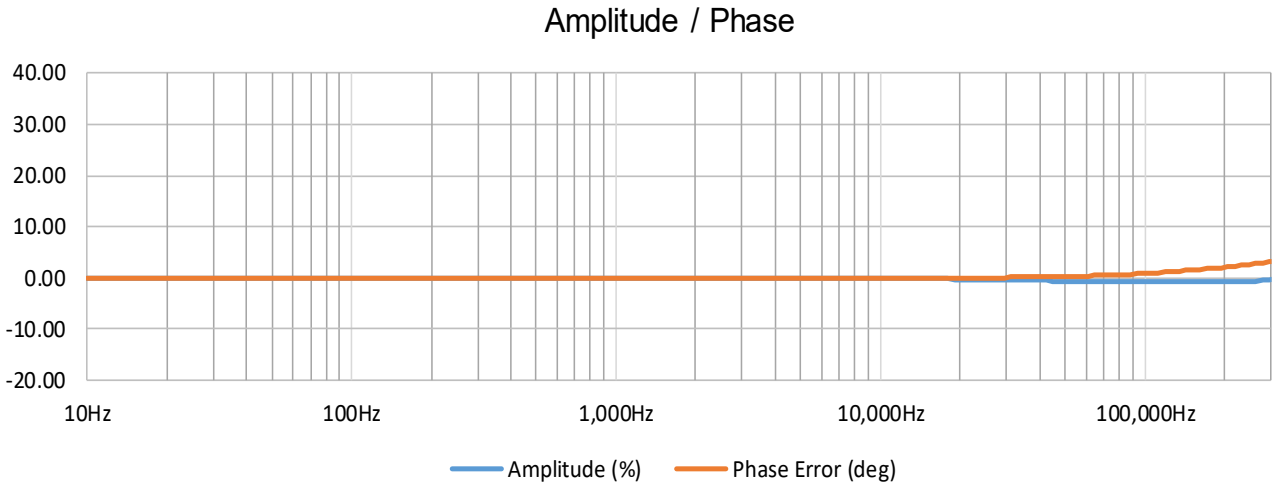
Electrical specifications at Ta=23°C, supply voltage = ± 15V unless otherwise stated

Parameter	Symbol	Unit	Min	Typ.	Max	Comment
Nominal primary AC current	I_{PN} AC	Arms			850	Refer to fig. 1 & 2 for derating
Nominal primary DC current	I_{PN} DC	A	-1200		1200	Refer to fig. 1 for derating
Measuring range	I_{PM}	A	-1320		1320	Refer to fig. 1 & 2 for derating
Overload capacity	$\hat{I}_{OL}$	A			1500	Non-measured, 100ms
Nominal voltage output	V_O	V	-10		10	At nominal primary DC current
Primary / secondary ratio		V/kA	8.3333		8.3333	
Linearity error	ε_L	ppm	-15		15	ppm refers to nominal current
		µV	- 150		150	µA refers to secondary current
Bandwidth	f(-1dB)	kHz	300			Small signal, graphs figure 3
Response time to a step current IPN	tr@90%	µs		1		di/dt = 100A/µs
Noise 0 - 100Hz	noise	ppm rms			0.15	
0 - 1kHz					0.2	
0 - 10kHz					0.3	
0 - 100kHz					2	
Noise 0 - 100Hz	noise	ppm p-p			0.8	
0 - 1kHz					1	
0 - 10kHz					1.7	
0 - 100kHz					8	
Fluxgate excitation frequency	f_{Exc}	kHz		15.6		
Power supply voltages	Uc	V	±14.25		±15.75	
Positive current consumption	Ips	mA			141	Add Vo/12.5 (A)
Negative current consumption	Ins	mA			133	Add Vo/12.5 (A)
Operating temperature range	Ta	°C	-40		65	
Offset error						
Initial	V_{OE}	ppm	-10		10	ppm refers to nominal DC current
Versus temperature	TC_{VOE}	ppm/K	-3		3	ppm refers to nominal DC current
Versus time	V_{OE}/time	ppm/ month	-0.3		0.3	ppm refers to nominal DC current
Versus supply voltage		ppm/V	-0.1		0.1	ppm refers to nominal DC current
Ratio Error						
Initial @23°C	ε_C	ppm	-5		5	ppm refers to nominal DC current
Versus temperature	$TC\varepsilon_C$	ppm/K	1		1	ppm refers to nominal DC current
Versus time	ε_C/time	ppm/ month	-5		5	ppm refers to nominal DC current

Frequency and ambient temperature derating (Fig. 2)



Frequency characteristics (Fig. 3)



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	 5.7 0.2
Impulse withstand voltage (1.2/50µs)	kV	10.4
Continous working voltage with uninsulated wire • Non mains • CAT II (DC and rms) • CAT III (DC and rms) Insulated wire • Non mains • CAT II (DC and rms) • CAT III (DC and rms)	V	 1000 600 300 2000 1000 1000
Transient voltage with uninsulated wire • Non mains • CAT II • CAT III Insulated wire • Non mains • CAT II • CAT III	V	 4500 6000 6000 6000 6000 8000

Caution: Do not connect the transducer to signals or use for measurements within Measurement Category IV, or for measurements on MAINs circuits or on circuits derived from Overvoltage Category IV which may have transient overvoltages above what the product can withstand. The product must not be connected to circuits that have a maximum voltage above the continuous working voltage, relative to earth or to other channels, or this could damage and defeat the insulation. The product can only withstand transients up to the transient overvoltage rating without breakdown or damage to the insulation. An analysis of the working voltages, loop impedances, temporary overvoltages, and transient overvoltages in the system must be conducted prior to making measurements.

Caution: When using insulated wires all wiring must be insulated for the highest voltage used.

Absolute maximum ratings

Parameter	Unit	Max	Comment
Primary	kA	4.5	Maximum 100ms
Power supply	V	±16.5	

Environmental, safety and mechanical specifications

Parameter	Unit	Min	Typ	Max	Comment
Altitude	m			2000	
Usage					Designed for indoor use
Transient voltages					Up to overvoltage category III
Poution Degree				2	
Ambient operating temperature range	°C	-40		65	
Storage temperature range	°C	-40		65	
Relative humidity	%	20		80	Non-condensing
Mass	kg		2.0		
Connections	DSUB9 male and BNC connector				
Standards	IEC61010-2-30, IEC61326-1 EMC and EC61010-1:2010 3rd Edition				
External devices	External devices connected to current transducers must comply with the standards IEC61010-1, IEC60950 or IEC62368-1 and be energy-limited circuitry				
Cleaning	The transducer should only be cleaned with a damp cloth. No detergent or chemicals should be used.				
Temperature	When multiple primary turns are used or high primary currents are applied the temperature around the transducer will increase, please monitor to ensure that the maximum ratisngs are not exceeded. It is recommended to have minimum 1mm^2 per ampere in the primary busbar.				

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.

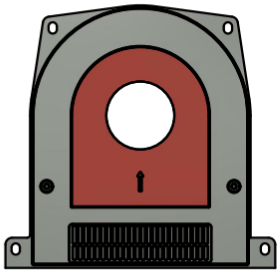
Please notice that the transducer core can be magnetized in all above cases, leading to a small change in output offset current (less than 10ppm)

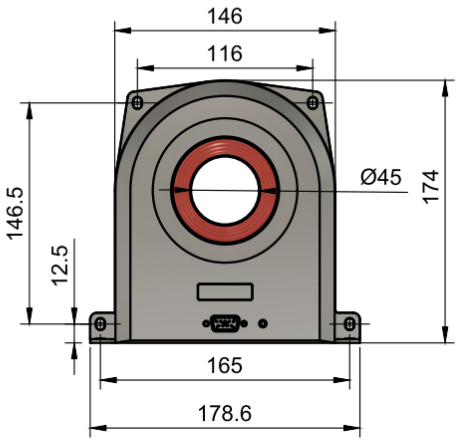
Accessories

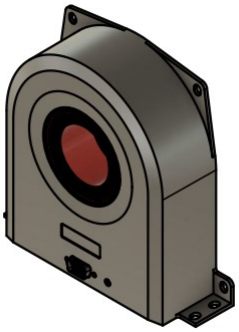
- 4-channel power supplies unit for connection up to 4xDM1200 : DSSIU-4
- 6-channel power supplies unit for connection up to 6xDM1200 : DSSIU-6
- Transducer cables in 5 lengths (2m - 5m - 10m - 15m - 20m): DSUB2 - DSUB5 - DSUB10 - DSUB15 - DSUB20
- Transducer cable 3m for connection to end-user’s power supply: Transducer cable for lab PS

  (with access to current output via ϕ4 banana jacks)

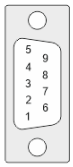
Please visit Danisense homepage for relevant datasheets





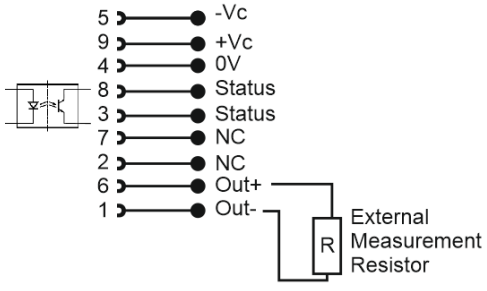


Standard DSUB-9 current output



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



Positive current direction

Is identified by an arrow on the transducers red isolation piece in the center

Mounting instructions

- Horizontal or vertical mounting — 4 holes ϕ6 x 11
  4 x M5 steel screws / 6N.m

Intended use:

The DS1200UB-10V is designed to measure current up to 1320A, and be powered by a DSSIU-4-1U or DSSIU-6-1U.

Instruction for use:

1. Do not power up the device before all cables are connected.
2. Only use Danisense cables to ensure correct impedance levels.
3. Place the primary conductor through the apperture of the transducer
4. If the DSSIU-4(6)-1U is intended for desk use, mount the rubber feet which are part of the package.
5. If the DSSIU-4(6)-1U is intended for Rack mounting, use the screw kit for mounting and do not mount the rubber feet.
6. Connect a DSUB cable between DSSIU-4(6)-1U and each sensor
7. Connect a low impedance amperemeter, measuring resistor or power analyzer on the secondary output (4mm red and black connectors)
8. Ensure that no calibration connectors are attached when measuring primary current. Always avoid to create a calibration short circuit, between + and — calibration connection.
9. There is a risk of electrical shock if an uninsulated busbar with high voltages is touching the metal enclosure of the transducer. Please ensure before powering up the system that no primary busbar can touch the metal enclosure.
10. When all connection are secured - connect mains power
11. Apply primary current

Safety Instructions:

DO NOT TRY TO DISASSEMBLE THE UNIT.

If the green transducer diode is not operating when the system is powered up, disconnect power and contact Danisense for further instruction.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.