

A contact free flux gate based current measurement sensor – 200A_{rms}

DS 200 is member of the small housing sensor family. The family includes a 200A (1:500) and a 600A (1:1500) version.

Features

- Closed loop compensated current transducer
- Zero flux technology for extreme accuracy
- Industry standard DSUB 9 pin connection
- Green diode for normal operation indication
- Aluminum body for shielding against EMI
- Each sensor is delivered with a gain/phase response



Applications:

- Power analysis
- Stable power supplies
- MRI gradient amplifiers
- Reference transducer for calibration purposes

Specification highlights

- Linearity error 3ppm
- Offset is maximum 12uA
- Operating temperature range -40°C to 85°C
- Turns ratio 1:500
- Aperture size 27.6mm
- 400A peak at 25°C ambient temperature and 1Ω measurement resistor

DC Specifications at Ta=25°C, Supply voltage $\pm 15V$

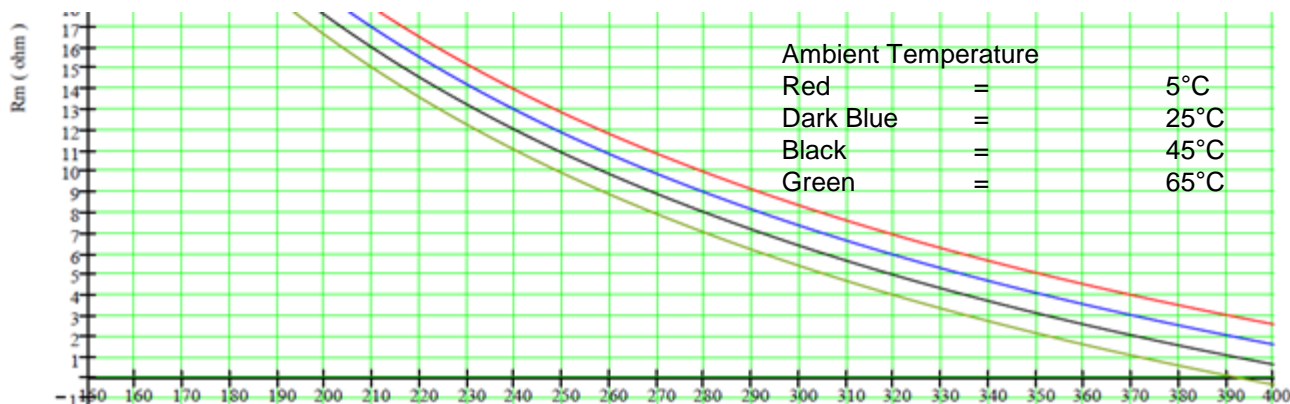
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current	I _p	A	-370		370	*
Secondary Current	I _s	mA	-740		740	*
Measuring resistance		Ω	0		3	*
Supply voltage		V	± 14.25		± 15.75	
Linearity error	ε_{Lin}	μA	-1.2		1.2	Measured on secondary side
Offset current	I _{Offset}	μA	-12		+12	Including earth field. Measured on secondary side
Turns Ratio	Turns		1:500		1:500	
Noise 0-100Hz 0-1kHz 0-10kHz 0-100kHz	Noise	μA rms			0.02 0.04 0.4 1.5	Measured on secondary side
Primary current Overload		kA			1,5	Maximum pulse length 100ms
Positive supply current	I _{ps}	mA		94	102	Add secondary current (if secondary current is positive)
Positive supply current	I _{ns}	mA		86	92	Add secondary current (if secondary current is negative)
Re-injected noise onto primary busbar	U _n	μV rms			5	
Zero Flux Frequency	kHz			31.25		
Stability						
Offset stability over time		$\mu A/Year$			0.48	Measured on I _s
Offset change with external magnetic field vertical		$\mu A/mT$		0.6	2,4	Magnetic field perpendicular to busbar
Offset change with external magnetic field horizontal		$\mu A/mT$		2,4	6	
Offset change with power supply voltage changes voltage		$\mu A/V$		0.012	0.12	
Offset change with difference between positive and negative power supply voltage (absolute)		$\mu A/V$		0,036	0,12	

* Check burden resistor graph for more information page 3

DC Specifications at Ta=-40°C to 85°C, Supply voltage $\pm 15V$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current DC	I _p	A	-300		300	See graph below
Secondary Current	I _s	mA	-600		600	See graph below
Measuring resistance		Ω	0		3	See graph below
Supply voltage		V	± 14.25		± 15.75	
Linearity error	ϵ_{Lin}	μA	1.2		1.2	Measured on secondary side
Offset current	I _{Offset}	μA	-12		+12	Including earth field. Measured on I _s
Stability						
Offset change with temperature		$\mu A/^{\circ}C$	-0.04		0.04	

Below is a graph showing the maximum DC and peak current in the DS200 transducer depending on the measurement resistor value and ambient temperature with a power supply of $\pm 15V$.



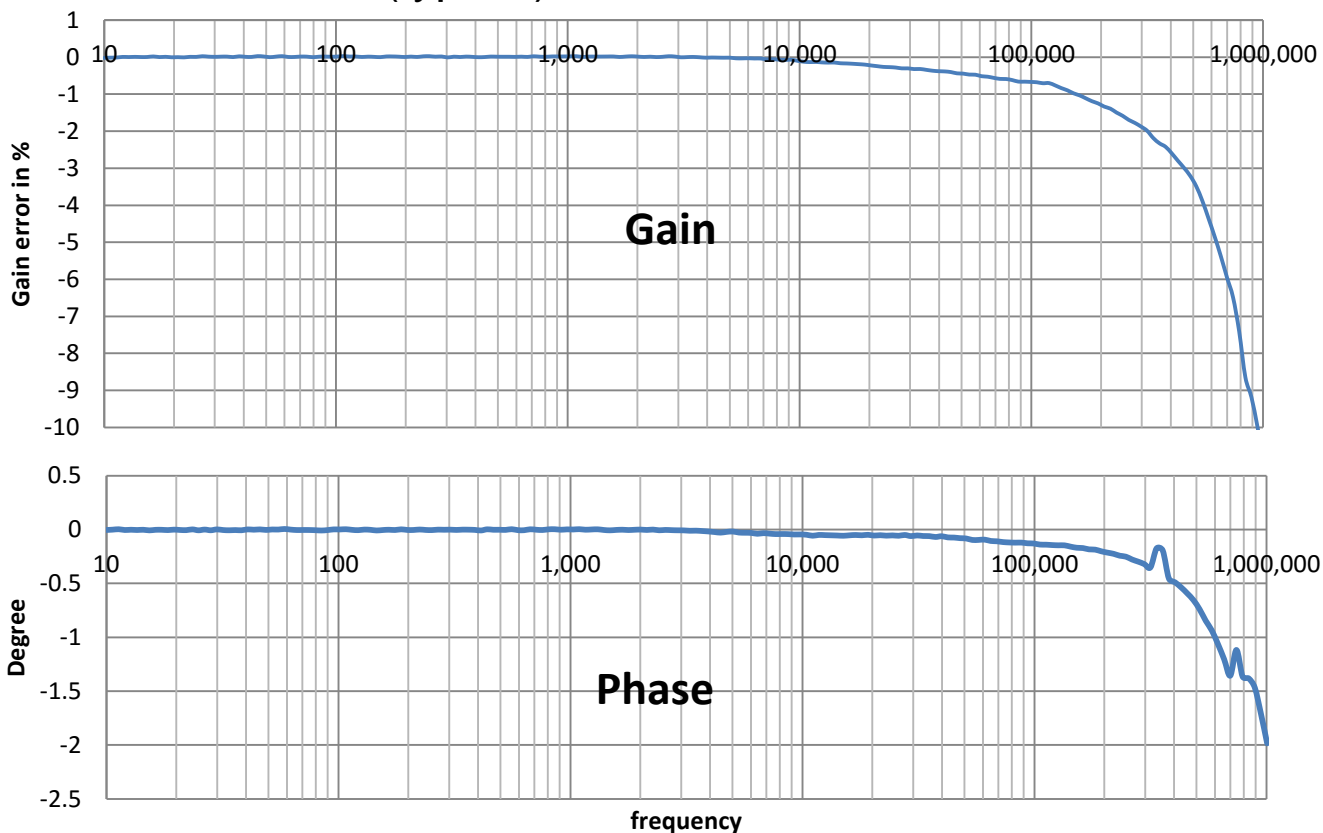
For temperatures above 65 degrees Celsius it is important not to exceed 200 Arms and 300A peak or 200A DC and a maximum measurement resistor value of 3 Ohm.

AC Specifications at Ta=-40°C to 85°C, Supply voltage $\pm 15V$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current, rms	I_p	A			200	*
Secondary Current rms	I_s	mA			400	*
Measuring resistance		Ω	0		3	*
Gain error - DC to 5kHz - 5kHz to 100kHz - 100kHz to 1MHz		%			0.01 1.0 20	Measured with 10Apeak primary current
Phase error - DC to 5kHz - 5kHz to 100kHz - 100kHz to 1MHz		Degree			0,1 0,5 5	

* Check burden resistor graph for more information page 3

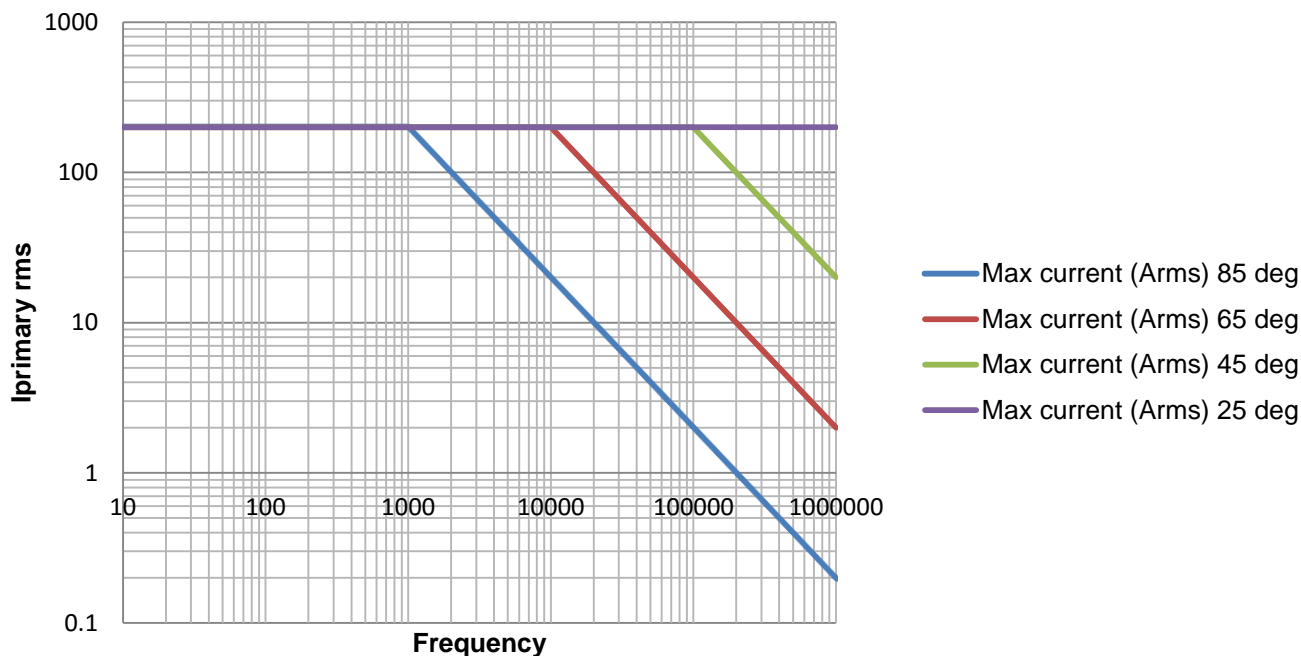
Gain / Phase (typical)



* The phase artifact at 350kHz and 750kHz is coming from the test system

Temperature derating with $I_{\text{primary rms}}$, ambient temperature and frequency

Temperature derating of sensor



Absolute maximum ratings

Parameter	Unit	Min	Typ	Max	Comment
Primary	kA			4.5	* Maximum 100ms
Power supply	V			±16.5	
Current in calibration winding	mA			100mA	

Environment and mechanical characteristics

Parameter	Unit	Min	Typ	Max	Comment
Ambient operating temperature	°C	-40		85	
Storage temperature	°C	-40		85	
Mass	kg		0.6		
Standards	EN 61326 EMC EN 61010 Safety				

Isolation and safety characteristics

Parameter	Unit	Min
Rated isolation voltage rms, reinforced isolation IEC 61010-1 standard and with following conditions - Overvoltage category II - Pollution degree 2	V	300
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	kV	10.4
Creepage distance / Clearance	mm	10 / 9
Comparative Tracking Index	CTI	600

Advanced Sensor Protection Circuits “ASPC”

Developed to protect your sensor from fault conditions typically harmful to flux-gate Sensors. Protection against damage to the electronics in the following situations.

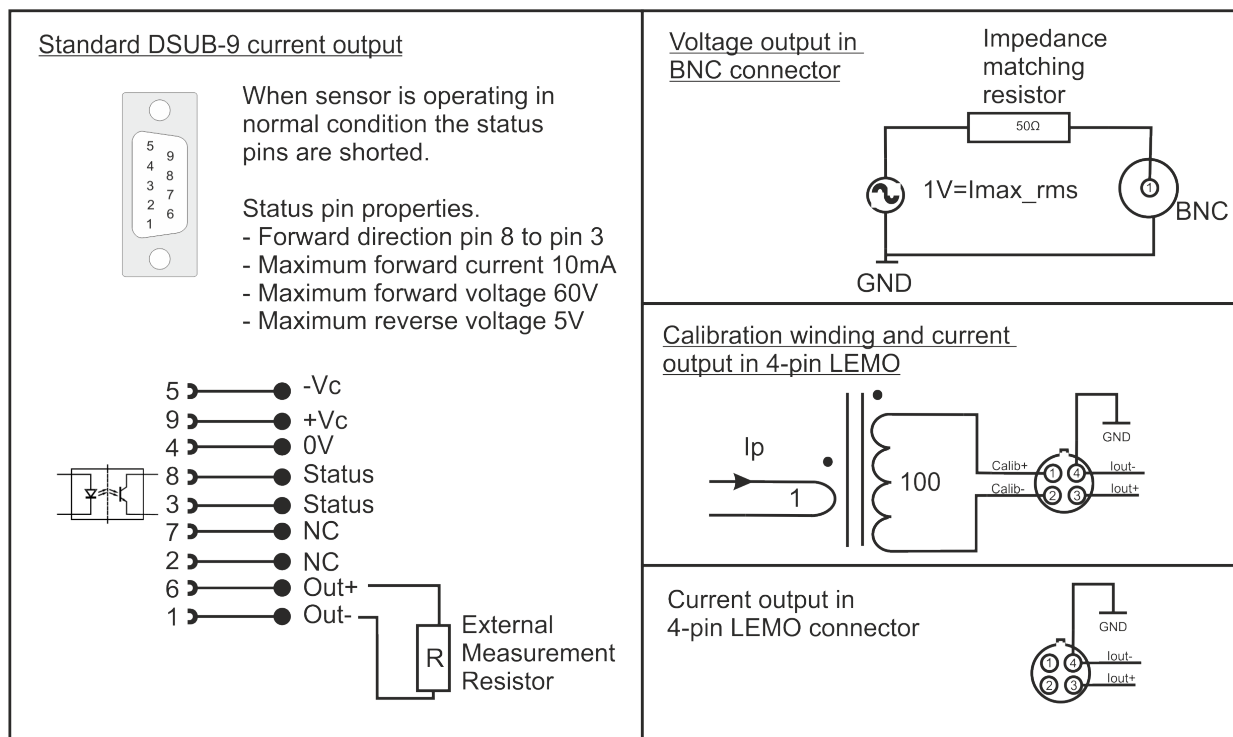
1. Unit is un-powered and secondary circuit is open*
Both DC and AC primary current can be applied up to 100% of nominal current.
2. Unit is un-powered and secondary circuit is closed*
Both DC and AC primary current can be applied up to 100% of nominal current.
3. Unit is powered and secondary circuit is open*
Both DC and AC primary current can be applied up to 100% of nominal current.
4. Unit is powered and secondary circuit is interrupted*
Both DC and AC primary current can be applied up to 100% of nominal current.

*Notice that the sensor core will be magnetized in all four cases, leading to a small change in output offset current (less than 10ppm)

Package content

- Sensor
- Sensor specific test report with Gain / Phase analysis 1Hz-1MHz and CE certificate of conformance

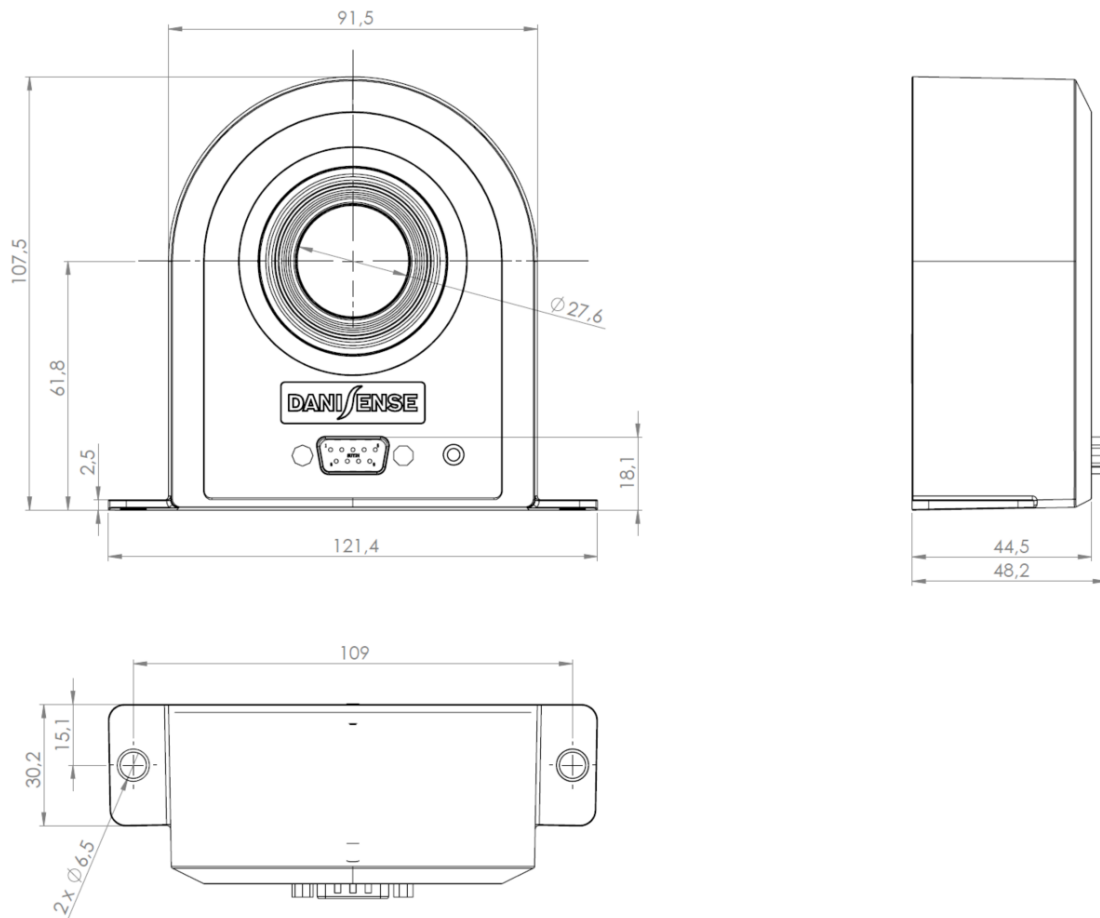
Connection diagram



Options and ordering information

Product Description	Part Name	Part Number
DS 200 with current output in 4-pin LEMO connector	DS200ILSA	1212100003
DS 200 with 1V voltage output in BNC connector	DS200UBSA-1	1212200003
DS 200 with 10V voltage output in BNC connector	DS200UBSA-10	1212200004
DS 200 with calibration winding and current output in 4-pin LEMO	DS200CLSA	1212400005
DS 200 with current output in 9-pin DSUB	DS200IDSA	1212100004

Mechanical dimensions



Mounting bushings on the back

