A contact free flux gate based current measurement sensor – 600A_{rms}

DS 600 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 1ppm
- Offset is maximum 4uA
- Operating temperature range -40°C to 85°C
- Turns ratio 1:1500
- Aperture size 27.6mm
- 1200A peak at 25°C ambient temperature and 1Ω measurement resistor

DC Specifications at Ta=25°C, Supply voltage ± 15V

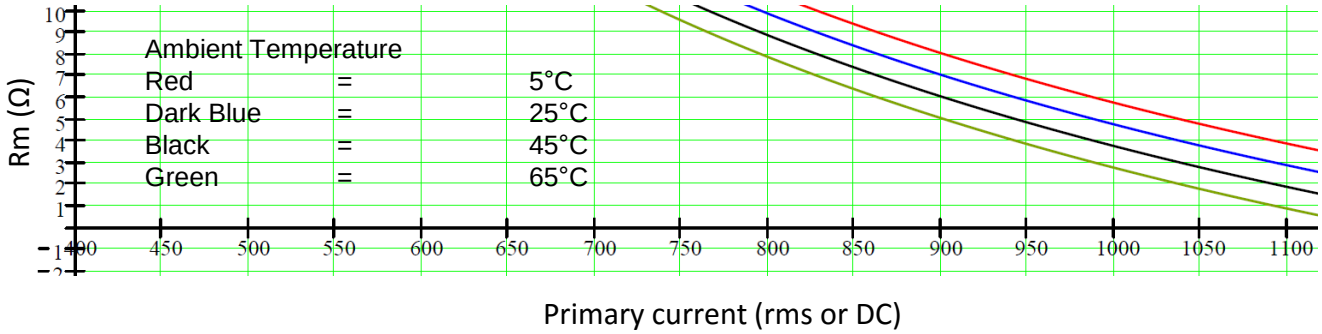
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current	Ip	A	-1050		1050	*
Secondary Current	Is	mA	-700		700	*
Measuring resistance		Ω	0		3	*
Supply voltage		V	±14.25		±15.75	
Linearity error	ƐLin	ppm	-1		1	
Offset current	IOffset	uA	-4		+4	Including earth field. Measured on secondary current
Turns Ratio	Turns		1:1500		1:1500	
Noise 0-100Hz 0-1kHz 0-10kHz 0-100kHz	Noise	uA rms			 0.004 0.04 0.4 1.2	Measured on secondary current
Primary current Overload		kA			4.5	Maximum pulse length 100ms
Positive supply current	Ips	mA		98	105	Add Is (if Is is positive)
Positive supply current	Ins	mA		89	96	Add Is (if Is is negative)
Re-injected noise onto primary busbar	Un	uV rms			5	
Zero Flux Frequency	kHz			31.25		
Stabilty						
Offset stability over time		uA/Year			0.16	Measured on secondary current
Offset change with external magnetic field vertical		uA/mT		0.2	0.8	Magnetic field perpendicular to busbar
Offset change with external magnetic field horizontal		uA/mT		0.8	2	
Offset change with power supply voltage changes voltage		uA/V		0.004	0.04	
Offset change with difference between positive and negative power supply voltage (absolute)		uA/V		0.012	0.04	

* Check burden resistor graph for more information page 3

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

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current*	Ip	A	-900		900	See graph below
Secondary Current	Is	mA	-600		600	See graph below
Measuring resistance		Ω	0		3	See graph below
Supply voltage		V	±14.25		±15.75	
Linearity error	ƐLin	ppm	-1		1	
Offset current @25°C	IOffset	uA	-4		+4	Including earth field. Measured on secondary current
Stabilty						
Offset change with temperature		uA/°C	-0.04		0.04	

Below is a graph showing the maximum DC and peak current in the DS600 transducer depending on the measurement resistor (Rm) value and ambient temperature with a power supply of ±15V.



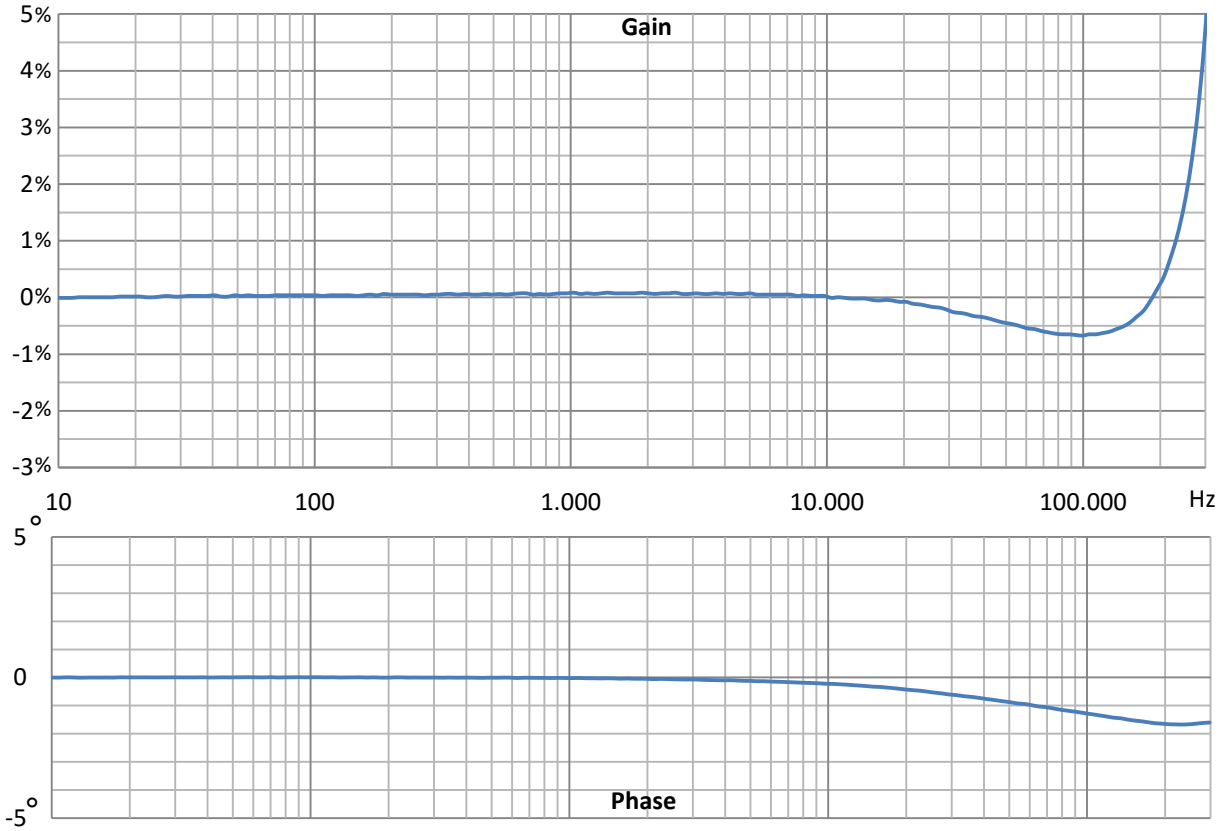
For temperatures above 65 degrees Celsius it is important not to exceed 600A rms or DC.

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

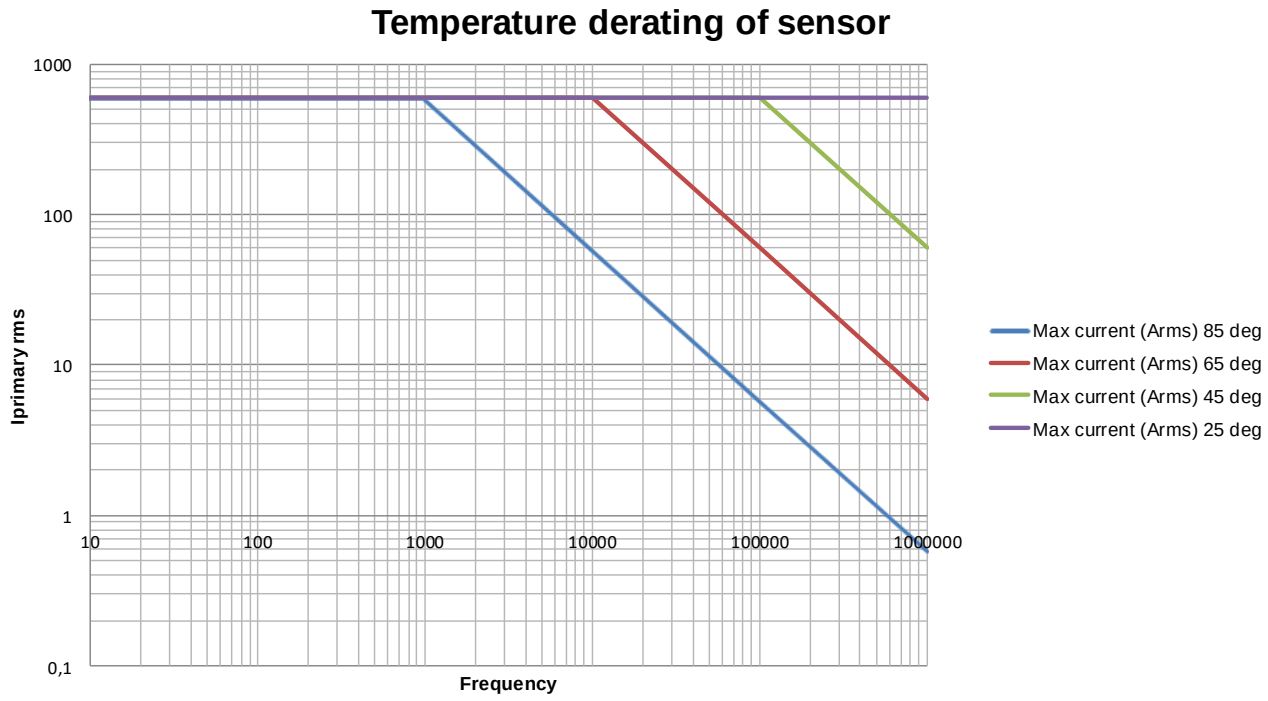
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current, rms	Ip	A	600		600	*
Secondary Current rms	Is	mA	-400		400	*
Measuring resistance		Ω	0		3	*
Gain error - DC to 2kHz - 2kHz to 10kHz - 8kHz to 100kHz		%			 0.01 0.5 3	Of measured value, down to a primary current of 10A pk-pk
Phase error - DC to 2kHz - 2kHz to 10kHz - 8kHz to 100kHz		Degree			 0.1 0.5 3	Of measured value, down to a primary current of 10A pk-pk

* Check burden resistor graph for more information page 3

Gain / Phase (typical)



Temperature derating with Iprimary rms, ambient temperature and frequency



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

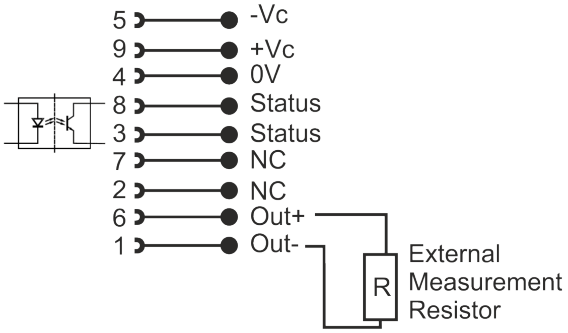
- Sensor
- Sensor specific test report with Gain / Phase analysis 1Hz-300kHz and CE certificate of conformance

Connection diagram

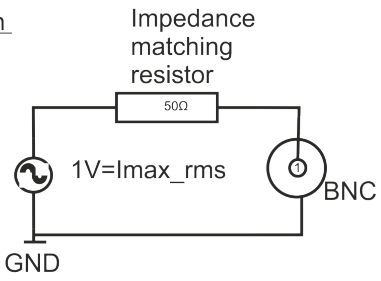
Standard DSUB-9 current output

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

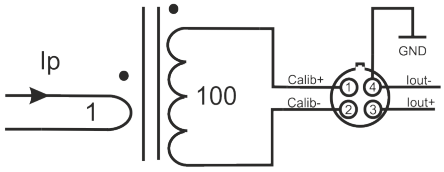
Status pin properties.
- Forward direction pin 8 to pin 3
- Maximum forward current 10mA
- Maximum forward voltage 60V
- Maximum reverse voltage 5V



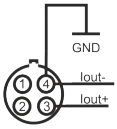
Voltage output in BNC connector



Calibration winding and current output in 4-pin LEMO



Current output in 4-pin LEMO connector



Options and ordering information

Product Description	Part Name	Part Number
DS 600 with current output in 4-pin LEMO connector	DS0600ILSA	1212100001
DS 600 with voltage output in BNC connector	DS0600UBSA	1212200001
DS 600 with calibration winding and current output in 4-pin LEMO	DS0600CLSA	1212400001
DS 600 with current output in 9-pin DSUB	DS0600IDSA	1212100002

Part Name

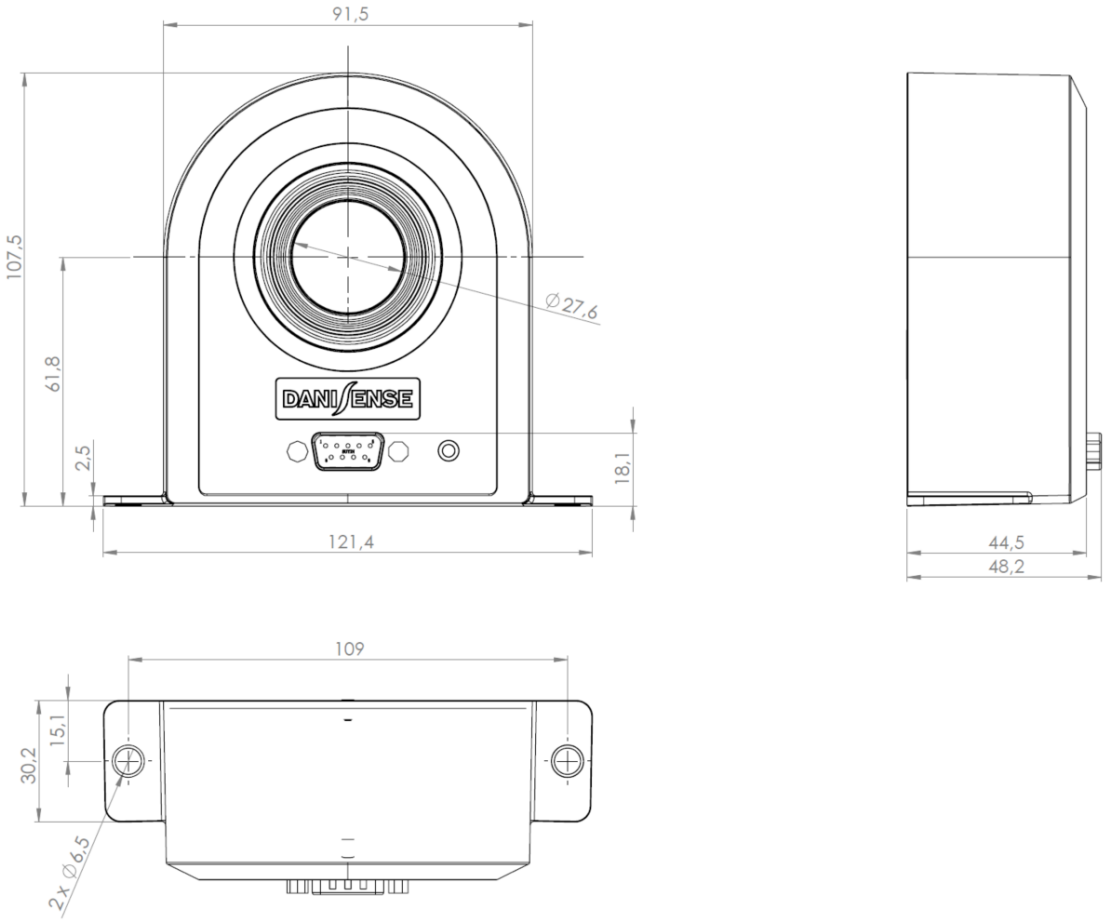
DS XXXX Y Z SA

Max Current RMS

I = current
U = Voltage
C = Calibration & current

L = LEMO type
B = BNC
D = 9 pin DSUB

Mechanical dimensions



Mounting bushings on the back