Current transformer GSRF XXX with fluxgate technology (GSRF XXX FGT)

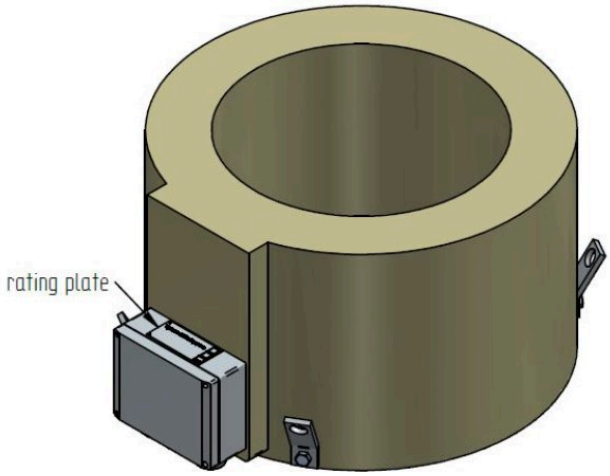
The GSRF are cast-resin insulated ring-type current transformers and can be used for measurement and protection in outdoor application. They are suitable for insulated cables or bushings in high voltage applications. The GSRF can be equipped with conventional measuring and protection cores acc. IEC 61869-2 and one fluxgate transducer head with external electronic box

Features

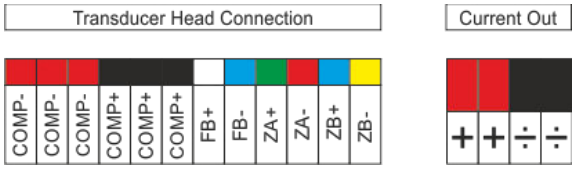
- Linearity error maximum 1.5 ppm
- Fluxgate, closed loop compensated technology with fixed excitation frequency and second harmonic zero flux detection for best in class accuracy and stability
- High voltage applications
- Standardized cast resin body
- DCCT + traditional cores for hybrid solution

Applications:

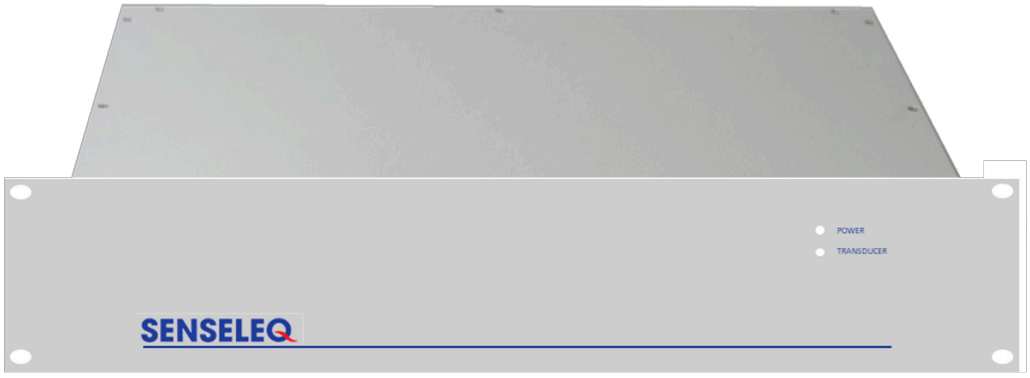
- High accuracy metering
- Power Quality measurements DC up to 150 kHz
- DC component measurements
- Metering including small DC components
- Test benches
- DC measurements up to rated current
- Current calibration purposes

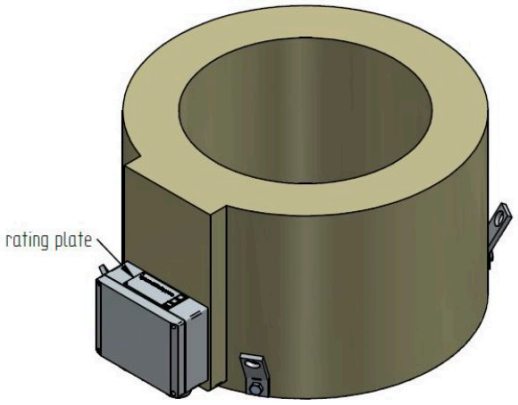


Special terminal for the DCCT core



19 “ electronic box





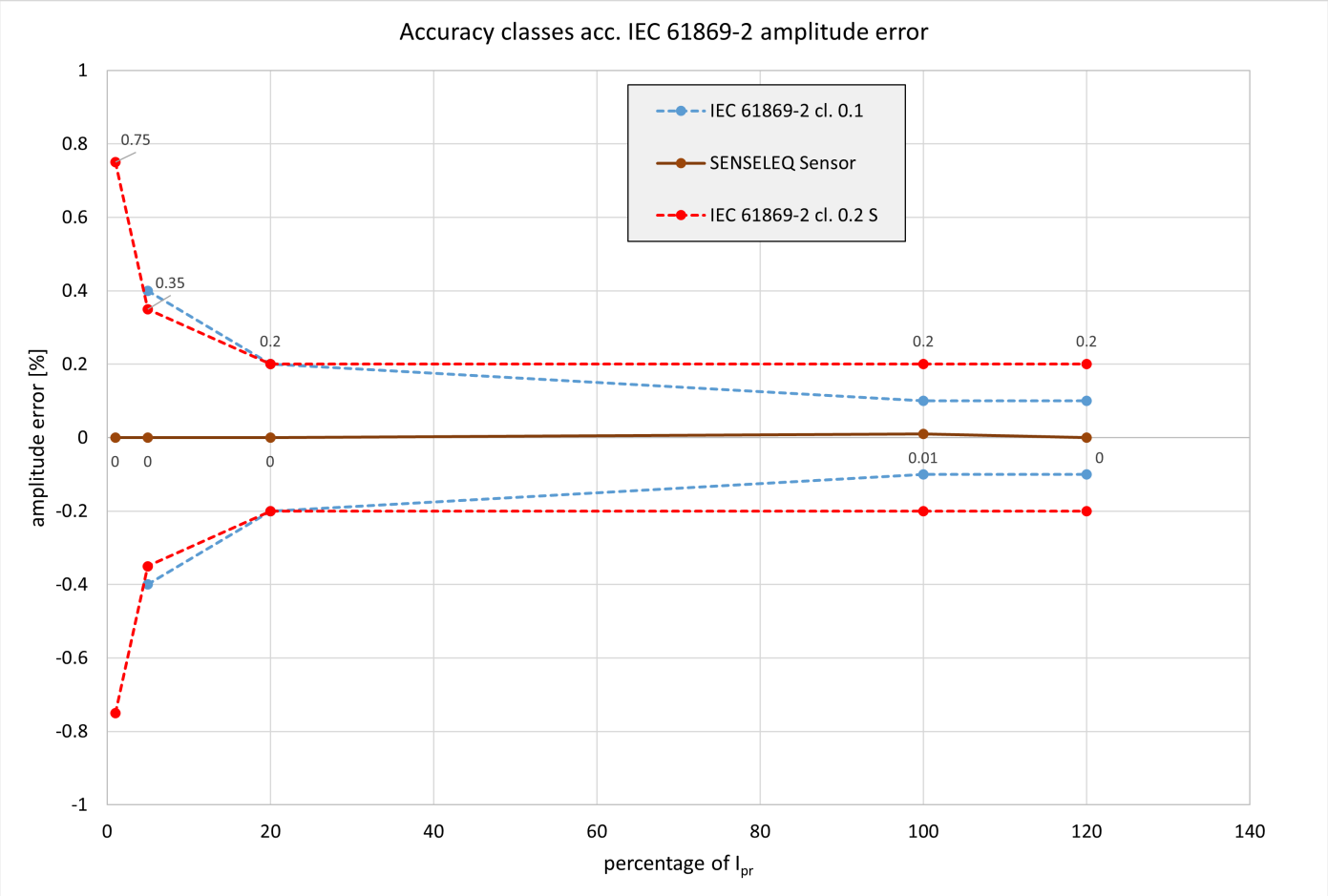
Environmental conditions

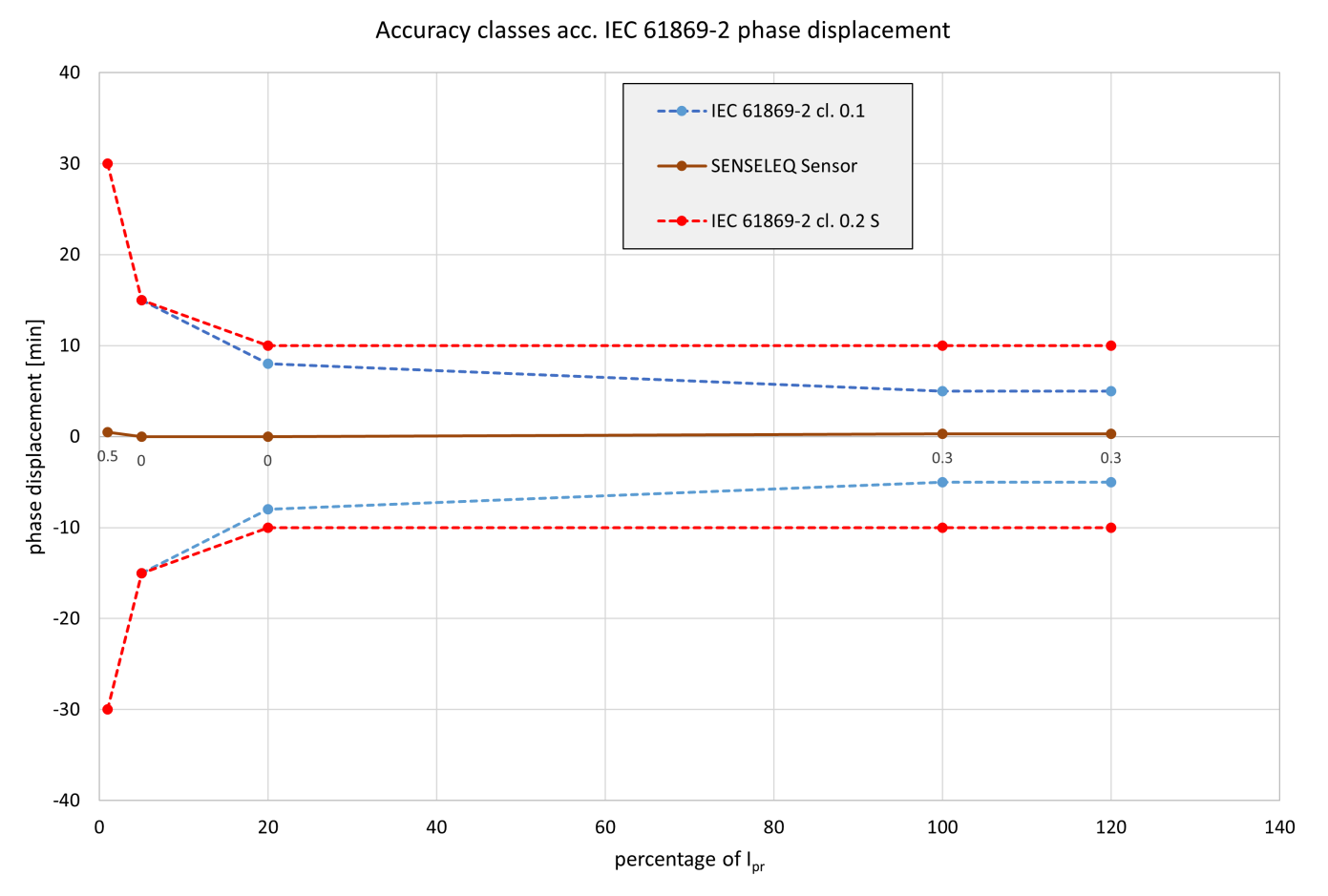
	Cast resin body	Electronic box
Location	Outdoor use	Indoor use
Ambient air temperature	-40°C … +45°C; other temperatures on request	-40°C … +45°C
Storage and transport temperature	-50°C … +55°C	-40°C … +55°C
Relative humidity	5% … 95%, non-condensing	
Altitude	Max. 1000 m above NN; at > 1000 m data required	Max. 2000 m above NN
Protection degree (secondary terminal)	IP54	IP20
Application standard	IEC 61869-2 / IEEE C57.13	As far as possible acc. IEC 61869

Application conditions

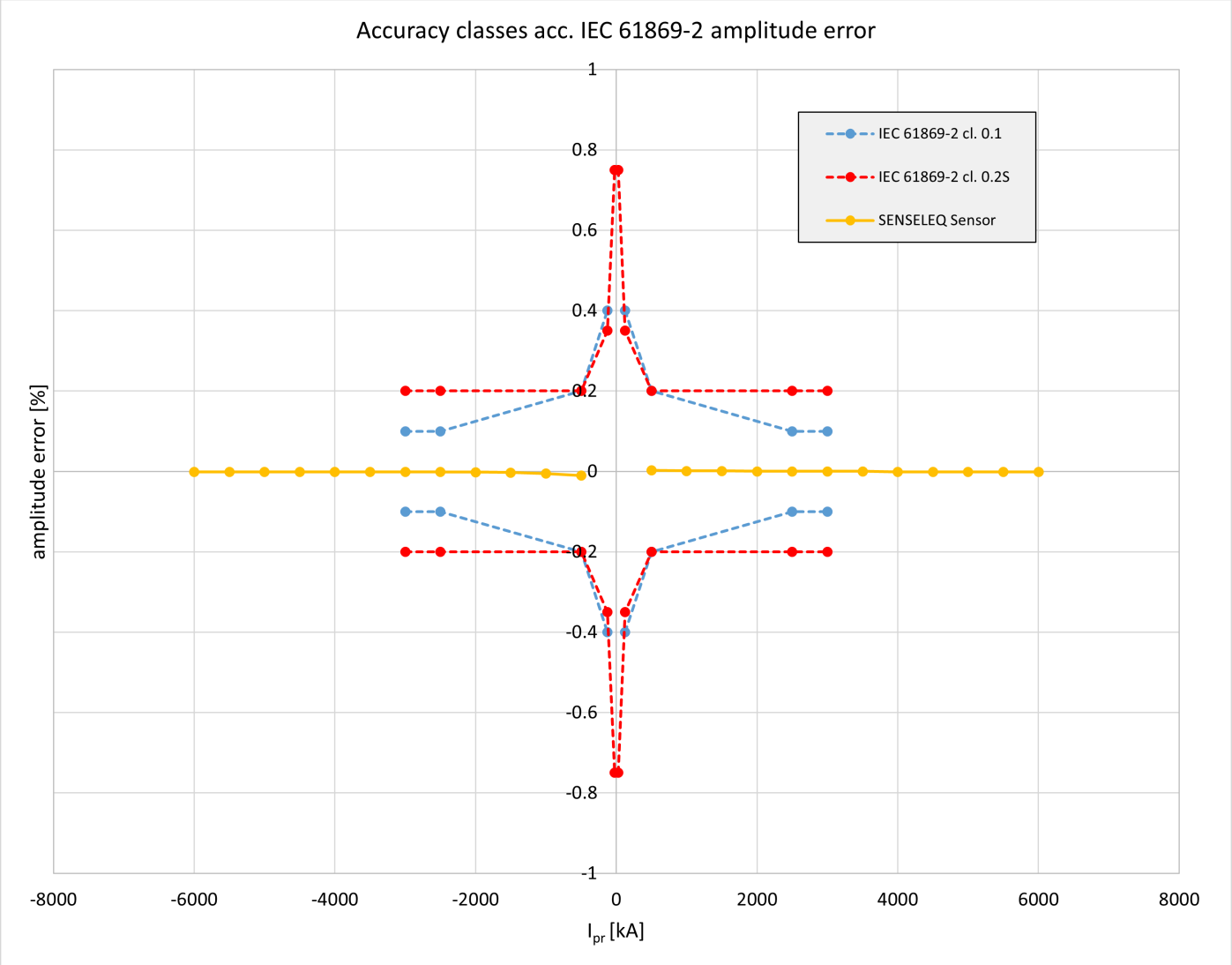
Rated short-time thermal current (I_{th})	100 x I_{pr}/1s, max. 100 kA/1s, other duration on request	
Rated dynamic current (I_{dyn})	2,5 x I_{th},	
Continuous thermal current (I_{cth})	up to 200%	
Rated insulation level (max)	0.72 / 3 / - kV	CAT level acc. to IEC 61010: III *If necessary surge protection devices (SPD) are recommended*
Rated frequency (f_r)	16.7 / 50 / 60 Hz	
Class of insulation	E	Not applicable
Rated primary current	100 A –15000 A	
Rated secondary current	1 A or 5 A; other options available on request	1 A or voltage output
Rated output / burden value	as required for example 2.5 VA, 5 VA up to 30 VA as required.	1 A: 4 Ohm (maximum value) voltage output: (100 kOhm)
Accuracy class	for example 0.2S, 5P10	
Secondary terminal	Screw terminal M5 (max. 2.5 Nm)	Screw
Auxiliary power supply	Not needed	100 … 240 VAC 120 … 370 VDC

Typical accuracy measured with a 2500 / 1 A transducer head





Typical DC accuracy for a 2500 / 1 A transducer head



Additional data for the fluxgate transducer head (here example 2500 A / 1 A)

Specification highlights	Symbol	Unit	Min	Typ	Max
Nominal primary AC current	I_{PN} AC	Arms			2500
Nominal primary DC current	I_{PN} DC	A	-6000		6000
Measuring range	$\hat{I}_{PM}$	A	-6000		6000
Primary / secondary ratio	N1 : n2		1:2500		1:2500
Linearity error	ε_L	ppm	-10		10
Offset current (including earth field)	I_{OE}	ppm	-10		10
DC-10Hz Overall accuracy @25°C (= ε_L + I_{OE})	accε	ppm	-20		20
AC Maximum gain error 10Hz to 2kHz	εG	%			±0.05
Operating temperature range	Ta	°C	-40		65

Electrical specifications at Ta=23°C

Parameter	Symbol	Unit	Min	Typ.	Max	Comment
Nominal primary AC current	I_{PN} AC	Arms			2500	Refer to fig. 1 for derating
Nominal primary DC current	I_{PN} DC	A	-6000		6000	Refer to fig. 1 for derating
Measuring range	I_{PM}	A	-6000		6000	Refer to fig. 1 for derating
Overload capacity	$\hat{I}_{OL}$	kA			20	Non-measured, 1 s
Nominal secondary current [rms]	I_{SN}	mA	-1000		1000	At rated primary current AC
Primary / secondary ratio	Ratio		1:2500		1:2500	
Linearity error	ε_L	ppm µA	-10 -10		10 10	ppm refers to nominal current
Offset (including earth field)	I_{OE}	ppm µA	-10 -10		10 10	ppm refers to nominal current
DC-10Hz Overall accuracy @25°C (= ε_L + I_{OE})	accε	ppm	-20		20	ppm refers to nominal DC current
Offset temperature coefficient	TC_{IOE}	ppm/K µA/K	-0.1 -0.4		0.1 0.4	ppm refers to nominal current
Bandwidth	f(-3dB)	kHz	50			Small signal, graphs figure 3
Amplitude error 10Hz –2kHz 2kHz -10kHz 10kHz - 50kHz	εG	%			0.05% 1.50% 15.00%	% refers to nominal current
Phase shift 10Hz –2kHz 2kHz -10kHz 10kHz - 50kHz	θ	°			0.05° 0.5° 3°	
Response time to a step current IPN	tr @ 90%	µs		1		di/dt = 100A/µs
Noise 0 - 100Hz 0 - 1kHz 0 - 10kHz 0 - 100kHz	noise	ppm rms			0.10 0.70 5.00 7.00	Measured on secondary current
Fluxgate excitation frequency	f_{Exc}	kHz		7.82		
Induced rms voltage on primary conductor		µV rms			10	
Mains input voltage AC		V_{AC}	90		295	50/60 Hz
Mains input voltage DC		V_{DC}	127		417	
Transducer head temperature	Ta	°C	-40		65	
Stability						
Offset stability over time		ppm/month µA/month	-0.1 -0.32		0.1 0.32	ppm refers to nominal current µA refers to secondary current
Offset change with vertical external magnetic field		µA /mT			8	(perpendicular to bus bar) µA refers to secondary current
Offset change with horizontal external magnetic field		µA /mT			8	(parallel to bus bar) µA refers to secondary current

Figure 1: Typical Temperature Derating (5000 A Transducer Head)

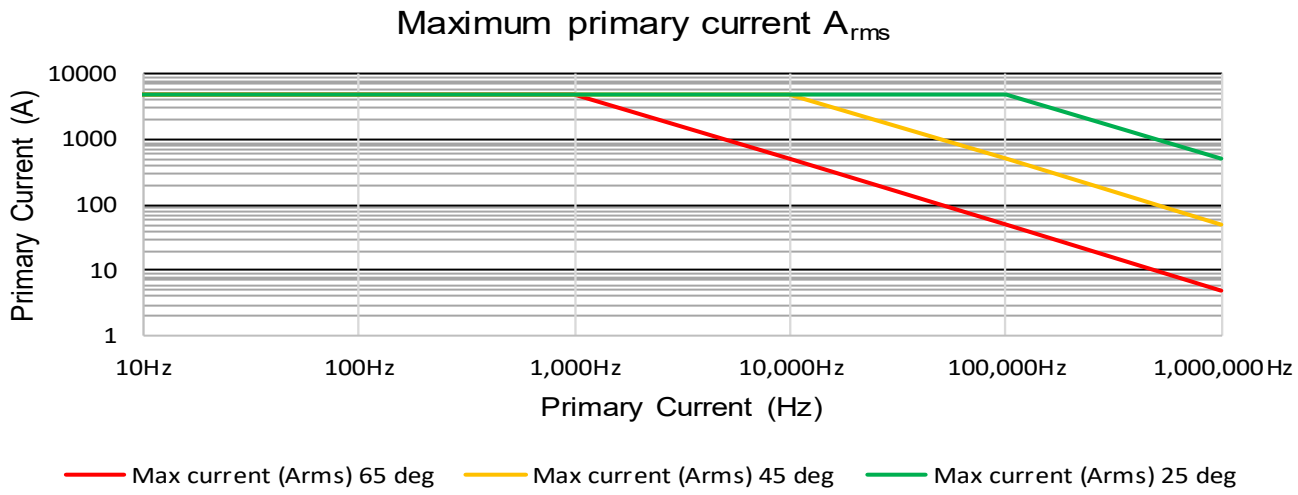
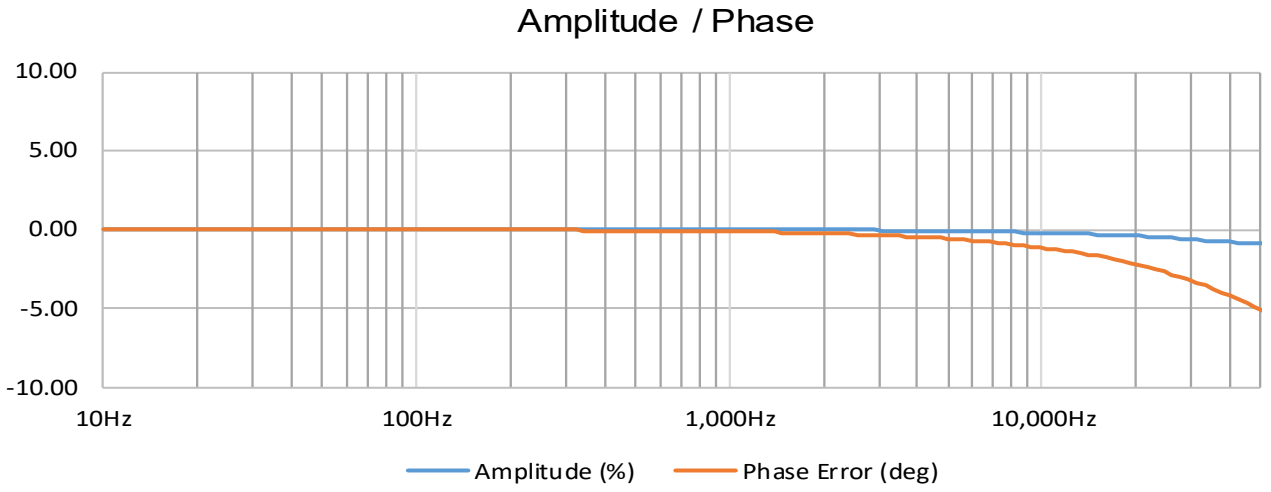
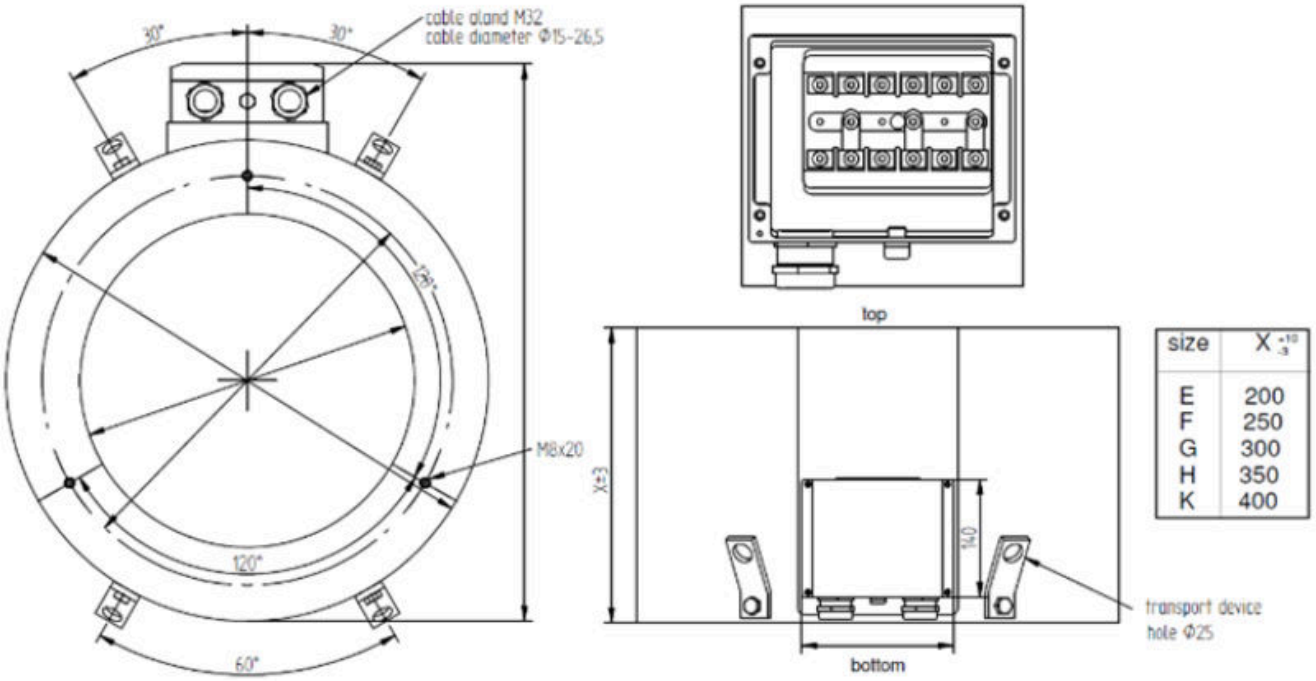


Figure 2: Typical frequency response for a 2500 / 1 A transducer head



Dimensions [mm]

Cast resin body (GSRF 570)



Type (GSRF)	380	450	540	570	630	720	810	880	1080	1150
I Ø [mm]	240	290	380	395	470	560	650	650	840	920
O Ø [mm]	380	450	540	570	630	720	810	880	1080	1150
Hight max [mm]	300			400	300					

Electronic box 19 “