

ULTRASTAB 867-60I Precision Current Transducer

The Ultrastab 867-60I Current Transducer is a model in the Ultrastab Current Transducer program.

It is the second generation of current transducers from Danfysik with transducer head and SMD based electronics integrated in one assembly.

The 867-60I features a new zero flux detector construction with extreme low noise feed back, compact in size and competitive in price.

It ranges 0-60A from DC to 100kHz with a temperature drift lower than 0.1ppm/°C. Powered with ±15V it produces an analog output current of 100mA at 60A primary current.

Output noise and noise feed back to the main conductor are both extremely low, and electrostatic shielding ensures maximum immunity against external electrostatic fields.

The 867-60I features

- Bandwidth DC to 100kHz
- Linearity better than 20ppm
- Traceable absolute calibration
- Temperature drift less than 0.1ppm/°C
- Bipolar - up to 60A primary current with 100mA output current
- Low noise on output signal
- Noise feed-back to main conductor <30µV
- Resolution better than 1ppm

Applications

- Feed back element in high performance gradient amplifiers
- Feed back element in precision current regulated power supplies

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Working principle

The Ultrastab 867 Current Transducer system is a unique design, based on the zero flux principle for galvanically isolated current measurement.

The Ultrastab 867 has a built-in free-running oscillator, which drives the zero flux detector circuitry.

With the primary current conductor through the transducer head center hole and current flowing, the electronics will generate a current in the built-in compensation winding counterbalancing the primary ampere turns.

A very sensitive and extremely low noise detector circuit will detect when zero flux is obtained, and an analog current signal will be generated at the output terminals in direct proportion to the primary current.

Installation

The Ultrastab 867-60I unit is fully self-contained, requiring only $\pm 15V$ voltage supply. All connections via a 9-pole D-sub socket.

It can be installed in any orientation and has a high immunity against external magnetic and electrostatic fields.

With the 867 delivered with the standard transfer ratio of 600:1, a 60A primary current will generate a 100mA compensation current. Wired up with a 5 Ohm Burden resistor, a 0.5V analogue output signal will be available.

On the attached installation data sheet it can be seen that the 867-60I can operate with higher resistance values of Burden resistors, but in order to get the best performance out of the Burden resistors, we recommend to keep the power loss as low as possible.

Standard features

The Ultrastab 867 is equipped with opto insulator for status interlock reading. A LED on the front shows NORMAL OPERATION i.e. interlock status ok.

The Ultrastab 867 has a built-in scanning/lock in circuit for automatic recovery to normal operation after overload condition.

Accessories

- 9-pole D-sub with 2m shielded cable
- 5 Ohm Burden resistor (2 x 10 Ohm), 0.1%, $T_c < 3\text{ppm}/^\circ\text{C}$
- 10 Ohm Burden resistor (1 x 10 Ohm), 0.1%, $T_c < 3\text{ppm}/^\circ\text{C}$

Ordering information standard

- 867-60I current transducer
- 866/867-BR5 Burden resistor
- 866/867-BR10 Burden resistor
- 866/867-SC, 2m shielded cable
- 866/867-BB bus bar

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Current transducer

Parameter	Symbol	Condition	Value	Unit
Primary current	I_p		± 60	A
Nominal primary current				
Polarity			Bipolar	
Secondary current	I_s		± 100	mA
Nominal secondary current				
External burden resistor	R_b		10	Ω
Max.		$R_{b, \max}$	0	Ω
Min.	$R_{b, \min}$			
Current transfer ratio	N		600	
Overload capacity				
Max. nondestructive overload	$I_{p, \max}$	@ 0.1s	500	% I_{pn}
Min. overload trip value	$I_{p, \text{trip}}$		110	% I_{pn}
DC accuracy				
Offset				
Initial	I_{so}		< 250	ppm
Drift vs. Temp.	$I_{so, \text{temp}}$		< 2.5	ppm / K
Drift vs. Time	$I_{so, \text{time}}$		< 2.5	ppm / month
Drift vs. supply voltage	$I_{so, \text{supply}}$		< 2.5	ppm / %
Linearity				
Deviation	X_d		< 20	ppm
Output noise	$I_{s, \text{noise}}$	0 - 10Hz	< 1	ppm (RMS)
		0 - 100Hz	< 1	ppm (RMS)
		0 - 1kHz	< 4	ppm (RMS)
		0 - 10kHz	< 6	ppm (RMS)
		0 - 50kHz	< 15	ppm (RMS)

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Current transducer

Parameter	Symbol	Condition	Value	Unit
Dynamic response				
Slew rate	dI/dt	10 - 90%	> 25	kA / μ S
Bandwidth	f			
± 3 dB		<0.5%I _{pn}	DC to 100	kHz
Busbar noise	U_b			
Measured on primary cable, one turn		DC - 50kHz	< 30	μ V RMS
Busbar free zone				
Length	l		150	mm
Radius	r		150	mm
Test voltages				
Busbar to GND	V _{t, b}		2000	VAC RMS
Power supply				
Supply voltage	V _s	$\pm 5\%$	± 15	V
Maximum quiescent current	I _q		\pm TBD	mA
Maximum current consumption	I _{max}		\pm TBD	mA
Operating environment				
Temperature	T _a		10 - 50	$^{\circ}$ C
Humidity	RH _a	Noncondensing	20 - 80	%RH
Storage environment				
Temperature	T _s		-20 - 85	$^{\circ}$ C
Humidity	RH _s	Noncondensing	20 - 80	%RH

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Current transducer

Parameter	Symbol	Condition	Value	Unit
Mechanical dimension				
Width	W		93	mm
Height	H		78	mm
Depth	D		47	mm
Weight (approx.)	M		0.3	kg
Inner hole diameter	d		22	mm

Notes:

- 1: All ppm figures refer to nominal current
- 2: Specifications are subject to change without notice