ULTRASTAB 868-20I
PCB Mounted Precision Current Transducer

INTRODUCTION:

ULTRASTAB 868-20I Current Transducer is not only a new model in the *ULTRASTAB* Current Transducer program, but the first high precision current transducer mountable directly on to a PCB.

Further more the 868-20I carries the third generation flux-gate detector, based on a new patented serial Zero-flux detector principle.

The *868-20I* measures currents in the range of 0-12,5A from DC to 100kHz with a temperature drift less than 2 ppm/K. Powered with ±15V it provides an analogue output of 50 mA at FS.

As with our other transducer products Output noise and noise feed back to the main conductor are extremely low. Further more the metal housing ensures the highest immunity against external interference.

THE *868* FEATURES:

- PCB mounted Current transducer
- Bipolar – up to 12,5 A primary current with 50mA output
- Overload capability 200%
- Compact design (66 x 46 x 64 mm)
- Temperature drift less than 2ppm/K
- Linearity better than 4ppm
- Bandwidth DC to 100kHz
- Low noise on the output signal
- Noise to main conductor < 5μV

APPLICATIONS:

- Feed back element in high performance shim amplifiers
- Feed back element in Micro positioning amplifiers

WORKING PRINCIPLE:

The DANFYSIK *ULTRASTAB 868-201* Current Transducer is a unique design, based on the zero flux principle for galvanic isolated current measurement.

The *ULTRASTAB 868-201* has a built-in quartz driven oscillator, which drives the zero flux detector circuitry.

With the primary current conductor through the transducer head 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 868-201* unit is fully self-contained, requiring only ±15V voltage supply. All connections are made via the pins facing the PCB.

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

With the *868-201* delivered with the standard transfer ratio of 250:1, a 12,5A primary current will generate a 50 mA compensation current. Wired up with a 20 Ohm Burden resistor, a 1V analogue output signal will be available.

On the attached installation data sheet it can be seen that the *868-201* 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.

ACCESSORIES

- 20 Ohm Burden resistor (2 x 10 Ohm), 0.1%, T_c < 3ppm/°C

ORDERING INFORMATION STANDARD:

- 868-20I current transducer part no. 8100089463

Manufacturer: Danfysik A/S • Møllehaven 31 • DK-4040 Jyllinge • Denmark
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Ultrastab 868-20I

PRELIMINARY DRAFT: 18.01.2008 R01
Part no.:8100089463

Current transducer

Parameter	Symbol	Condition	Value	Unit
Primary current	$\mathbf{I_p}$			
Nominal primary current	I_{pn}		12.5	A
Polarity			Bipolar	
Secondary current	$\mathbf{I_s}$			
Nominal secondary current	I_{sn}		± 50	mA
External burden resistor	$\mathbf{R_b}$			
Max.	$R_{b,\,max}$		31	Ω
Min.	$R_{b,\,min}$		0	Ω
Current transfer ratio	N		250	
Overload capacity				
Max. nondestructive overload	$I_{p,\,max}$	@ 0.1s	500	%Ipn
Min. overload trip value	$I_{p,\,trip}$		200	%Ipn
DC accuracy				
Offset				
Initial	I_{so}		< 500	ppm
Drift vs. Temp.	$I_{so,\,temp}$		< 2	ppm / K
Drift vs. Time	$I_{so,\,time}$		< 5	ppm / month
Drift vs.supply voltage	$I_{so,\,supply}$		< 1	ppm / %
Transfer ratio				
Deviation	N_d		< 4	ppm
Deviation vs. Temp.	$N_{d,\,temp}$		< 0.5	ppm / K
Deviation vs. Time	$N_{d,\,time}$		< 2	ppm / month
Linearity				
Deviation	X_d		< 4	ppm
Deviation vs. Temp.	$X_{d,\,temp}$		< 0.5	ppm / K

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Ultrastab 868-20I

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Current transducer

Parameter	Symbol	Condition	Value	Unit
Output noise	$I_{s,\ noise}$			
		0 - 10Hz	< 0.4	ppm (RMS)
		0 - 100Hz	< 0.5	ppm (RMS)
		0 - 1kHz	< 0.7	ppm (RMS)
		0 - 10kHz	< 5	ppm (RMS)
		0 - 100kHz	< 10	ppm (RMS)
Dynamic response				
Slew rate	dI/dt	10 - 90%	> 20	A / µS
Delay time	t_d		< 1	µS
Bandwidth	**f**			
±1dB			> 100	kHz
±3dB			> 500	kHz
B-field susceptibility	B_{ex}			
Max influence on sec. Current		DC / 40uT	< 0.1	ppm
Max influence on sec. Current		30Hz / 40uT	< 0.1	ppm (RMS)
Busbar noise	U_b			
Measured on primary cable, one turn		DC - 50kHz	< 5	µV RMS
Test voltages				
Busbar to GND	$V_{t,\ b}$		1683	VAC RMS
Power supply				
Supply voltage	V_s	± 5%	± 15	V
Maximum quiescent current	I_q		± 60	mA
Maximum current consumption	I_{max}		± 160	mA
Operating environment				
Temperature	T_a		10 - 45	ºC
Humidity	RH_a	Noncondensing	20 - 80	%RH

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Current transducer

Parameter	Symbol	Condition	Value	Unit
Storage environment				
Temperature	T_s		-20 - 85	ºC
Humidity	RH_s	Noncondensing	20 - 80	%RH
Mechanical dimension				
Width	W		66	mm
Height	H		46	mm
Depth	D		64	mm
Weight (approx.)	m		0.35	kg

Notes:

1: All ppm figures refer to nominal current

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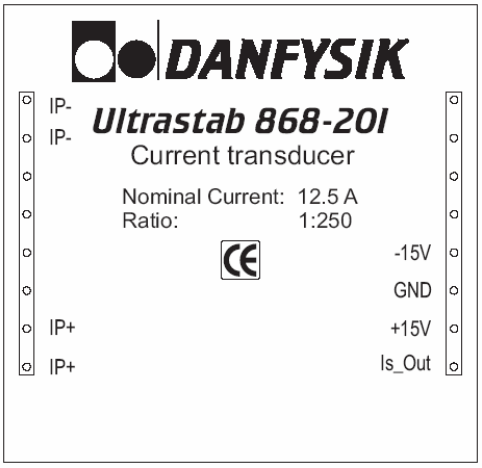
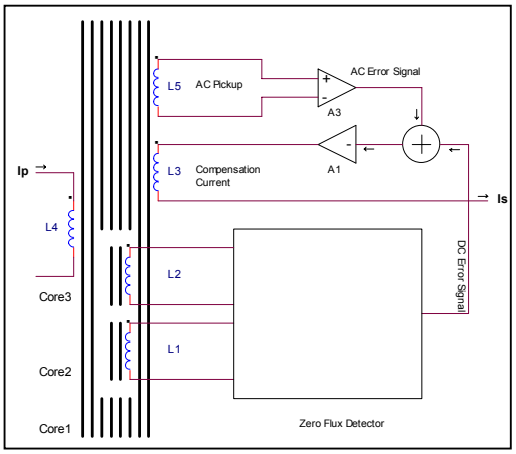
ULTRASTAB 868-20I TECHNICAL INFORMATION



Top view of physical device



Block diagram – Principle of work

Electrical specification - primary

Primary current [IP+] to [IP-]	:	± 12.5A nominal ; ± 25A max.

Electrical specification - secondary

Supply voltage [+ 15V] to [GND]	:	+ 15 V ± 5 %
Supply voltage [- 15V] to [GND]	:	- 15 V ± 5 %
Supply current [+ 15V] to [GND]	:	+ 60 mA + output current (+ 50 mA nom.)
Supply current [- 15V] to [GND]	:	- 60 mA + output current (- 50 mA nom.)
Output current [Is_Out] to [GND]	:	± 50 mA nominal ; ± 100 mA max.
Max. Supply Voltage Raise Time	:	100 ms
Test voltage primary to secondary	:	1683 VAC RMS
Test voltage primary to shield	:	1683 VAC RMS
Operating Temperature	:	10 to 45 ºC
Size (Width * Depth * Height)	:	66 * 64 * 46 mm (see page 2 for dimension drawing)
Weight	:	0.35 kg

Accessories

- 20 Ω Burden Resistor (2 x 10 Ω) , 0.05% , Tc < 3 ppm/°C

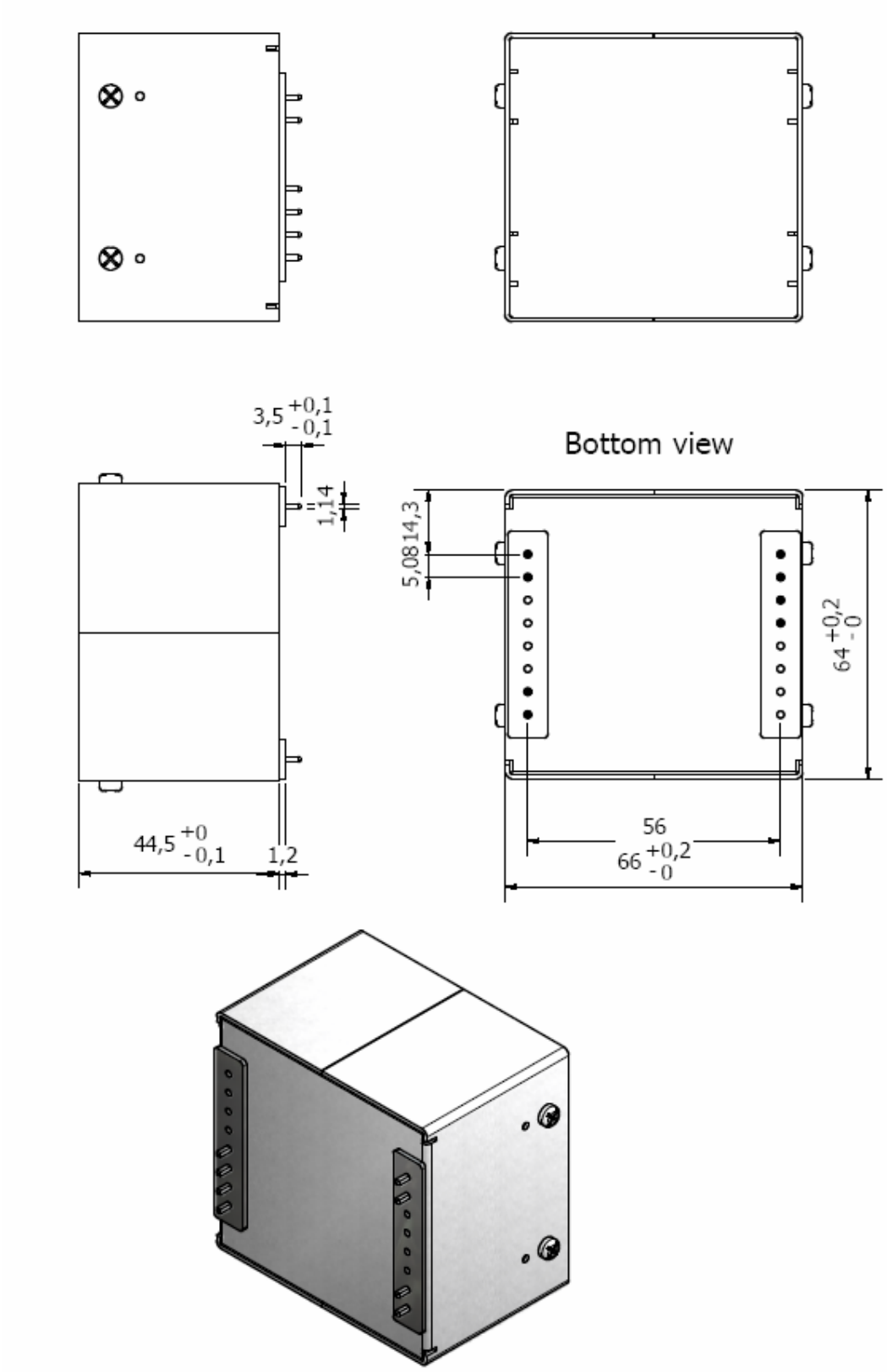
Precaution

- Do not apply primary current to unpowered device.
- Primary current must not exceed 25 A

Notice

- If the primary current has exceeded the max. Ip or the device has been powered up with primary current flowing; it will enter the overload state. In this situation the output current will remain higher than ±100 mA (max ±150 mA with 20 ohm burden resistor), independent of the primary current.
- Action in case of overload :
  1. Make sure the primary current is switched off.
  2. Power down the device for one second.
  3. Power up the device.
  4. Reestablish the primary current

Dimensions



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