DANFYSIK

ULTRASTAB 866 Precision Current Transducer

The Ultrastab 866 Current Transducer is the most proven fluxgate transducer with onboar electronics in the Danfysik Current Transducer program. It is the first transducer of its class with transducer head and SMD based electronics integrated in one assembly.

The model 866 is based on the proven high performance current measurement system in the Ultrastab program, and it is used as a current feed back element in precision power supplies or gradient amplifiers.

It ranges 0-600A from DC to 100 kHz with a temperature drift lower than 0.2 ppm/K. Powered with ±15V it produces an analog current of 400mA at 600 A primary current.

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

The 866 features

- Bandwidth DC to 100 kHz
- Linearity better than 1 ppm
- Absolute calibration traceable to NIST
- Temperature drift less than 0.2 ppm/°C
- Noise feed-back to main conductor < 10 µV
- Resolution better than 0.05 ppm
- Bipolar, up to 400mA output current at 600A primary current
- Low noise on the output signal

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

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 counter-balancing the primary ampere turns.

A very sensitive and extremely low noise detector circuit (patented) 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 866 unit is fully self-contained, requiring only ±15V voltage supply. All connections via a 9-pole D-SUB socket.

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

With the 866 delivered with the standard current transfer ratio of 1500:1, a 600A primary current will generate a 400mA compensation current. Wired up with a 2.5 Ohm Burden resistor, a 1V analog output signal will be available.

If e.g. a max. 450A primary current shall be measured, the Burden resistor can be increased to 3.3 Ohm producing a 1V analog signal. From Fig. 1 on the attached installation data sheet it can be seen that the 866 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 866 is equipped with opto isolator for status interlock reading, and has a built-in scanning lock in circuit for automatic recovery to normal operation after overload condition.

Optional features

The Ultrastab 866 has a built-in free-running oscillator, which drives the zero flux detector circuitry.

In cases where the application requires synchronization with external oscillator frequencies, e.g. in gradient amplifiers, the 866 can be delivered with a fibre optics trigger input for the frequency range 35 to 45 kHz.

Accessories

- Mounting bracket
- 2.5 Ohm Burden resistor (4 x 10 Ohm//), 0.1%, Tc < 3 ppm/°C
- 9-pole D-sub with 2 m shielded cable
- ø25 busbar

Ordering information standard

- 866 current transducer
- 866-SC, 2m shielded cable
- 866-BR 2.5 Burden resistor
- 866-BB, busbar
- 866-BR 5.0 Burden Resistor
- 866-MB, mounting bracket

Optional

- 866-FIB, fibre optics trigger input

Ultrastab 866-600

Last update: 15.03.2007

Current transducer

Parameter	Symbol	Condition	Value	Unit
Primary current	I_p			
Nominal primary current			± 600	A
Polarity			Bipolar	
Secondary current	I_s			
Nominal secondary current			± 400	mA
External burden resistor	R_b			
Max.	$R_{b,\ max}$		2.5	Ω
Min.	$R_{b,\ min}$		0	Ω
Current transfer ratio	N		1500	
Overload capacity				
Max. nondestructive overload	$I_{p,\ max}$	@ 0.1s	500	%Ipn
Min. overload trip value	$I_{p,\ trip}$		110	%Ipn
DC accuracy				
Offset				
Initial	I_{so}		< 20	ppm
Drift vs. Temp.	$I_{so,\ temp}$		< 0.2	ppm / K
Drift vs. Time	$I_{so,\ time}$		< 1	ppm / month
Drift vs.supply voltage	$I_{so,\ supply}$		< 1.5	ppm / %
Transfer ratio				
Deviation	N_d		< 2	ppm
Deviation vs. Temp.	$N_{d,\ temp}$		< 0.3	ppm / K
Linearity				
Deviation	X_d		< 1	ppm
Output noise	$I_{s,\ noise}$			
		0 - 10Hz	< 0.05	ppm (RMS)
		0 - 10kHz	< 3	ppm (RMS)
		0 - 50kHz	< 10	ppm (RMS)

Ultrastab 866-600

Last update: 15.03.2007

Current transducer

Parameter	Symbol	Condition	Value	Unit
Dynamic response				
Slew rate	dI/dt	10 - 90%	> 100	A / µS
Bandwidth	**f**			
±3dB		< 0.5% Ipn	100	kHz
Busbar noise	**U_b**			
Measured on primary cable, one turn		DC - 50kHz	< 10	µV RMS
Busbar free zone				
Lenght	l		150	mm
Radius	r		75	mm
Test voltages				
Busbar to GND	$V_{t, b}$		5000	VAC RMS
Power supply				
Supply voltage	V_s	± 5%	± 15	V
Maximum quiescent current	I_q		± 200	mA
Maximum current consumption	I_{max}		± 600	mA
Operating environment				
Temperature	T_a		10 - 50	ºC
Humidity	RH_a	Noncondensing	20 - 80	%RH
Storage environment				
Temperature	T_s		−20 - 85	ºC
Humidity	RH_s	Noncondensing	20 - 80	%RH

Ultrastab 866-600

Last update: 15.03.2007

Current transducer

Parameter	Symbol	Condition	Value	Unit
Mechanical dimension				
Width	W		122	mm
Height	H		98	mm
Depth	D		65	mm
Weight (approx.)	m		1	kg
Inner hole diameter	O		25	mm

Notes:

1: All ppm figures refer to nominal current

2: Specifications are subject to change without notice

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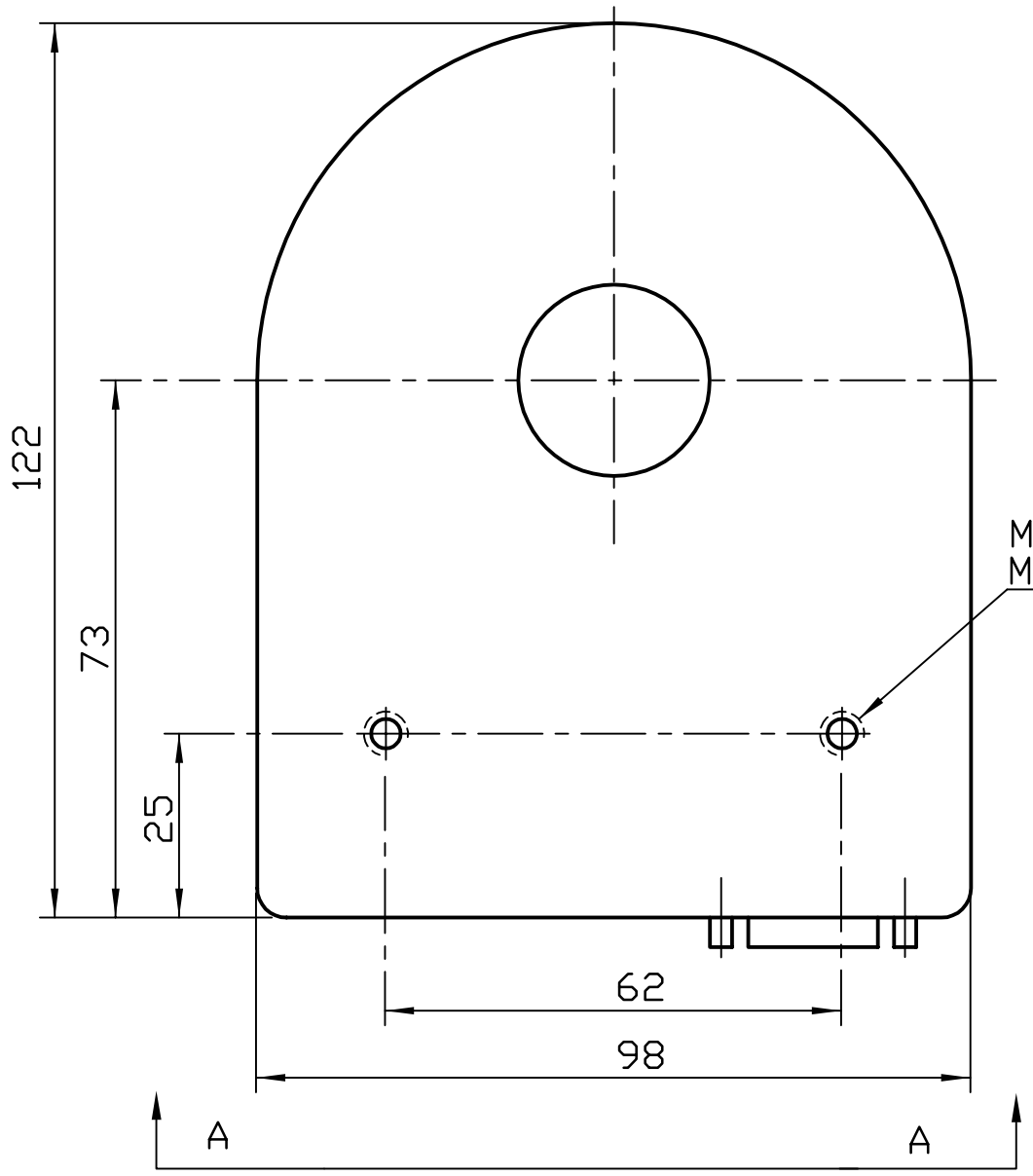
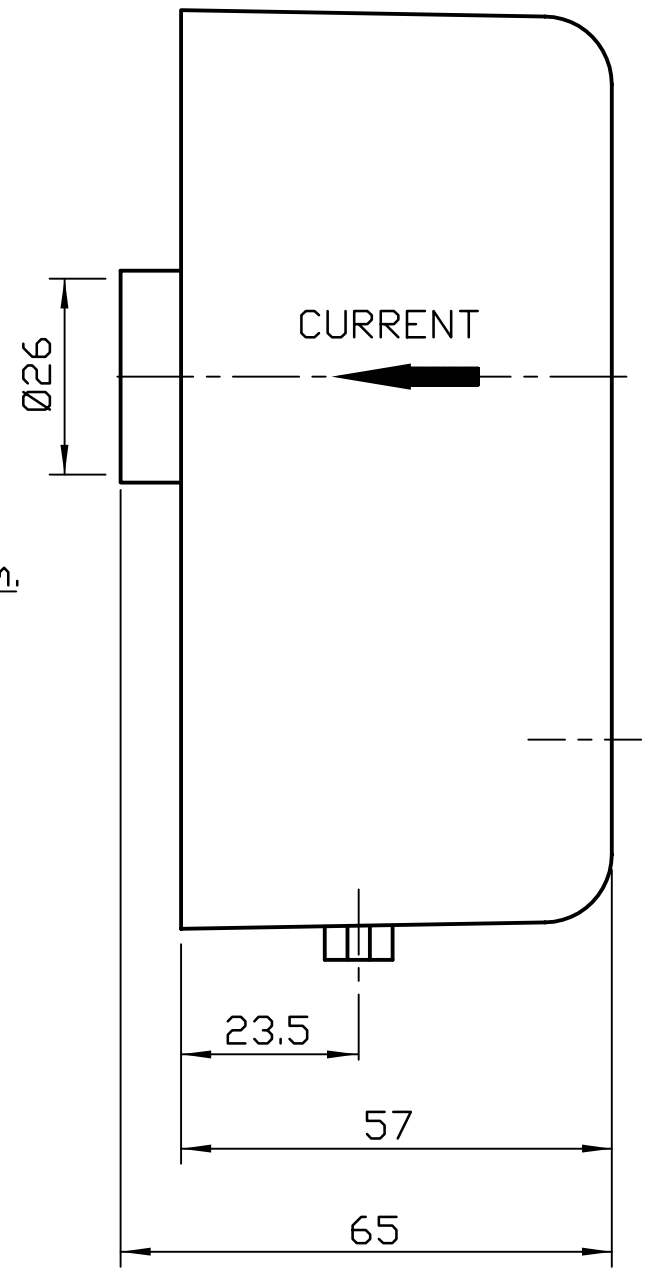
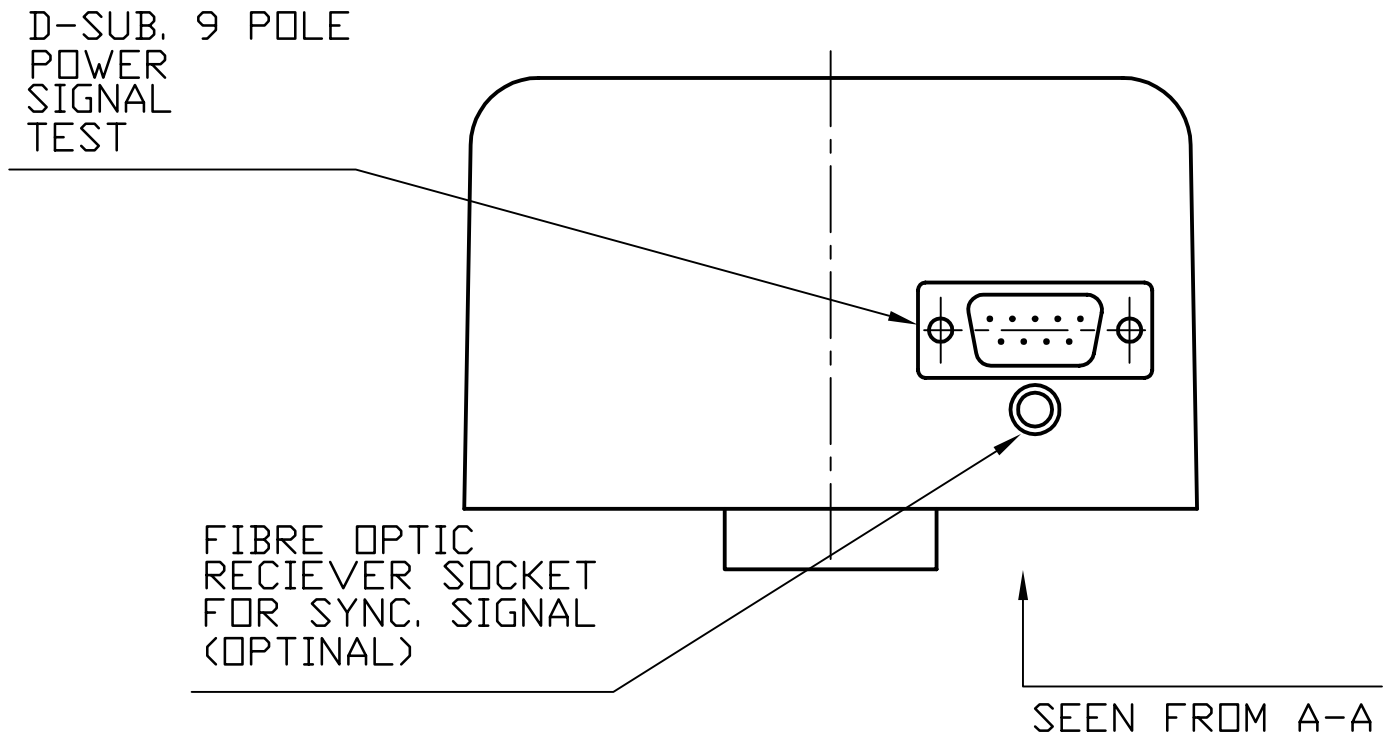


M6x10 FOR MOUNTING
MAX RECOMMENDED TORQUE 0.2kgm.





FIRST ANGLE PROJECTION

TOLERANCE: ±0.3	SURFACE TREATMENT: -	MATERIAL: -
SCALE: 1:1	MACHINING: -	DRAWN BY KP 11.03.97
		DESIGN APP. .
		PROD.APP. TS
		PROJ.ENGR. TS
CURRENT TRANSDUCER 150/600A ULTRASTAB 866		DWG.NO.: 88201G
DANFYSIK	CUSTOMER: . PROJECT NO. .	REVISION: G SHEET 1 OF 1
	FILE: .	DATE: MK 20.03.01 SIZE: A3

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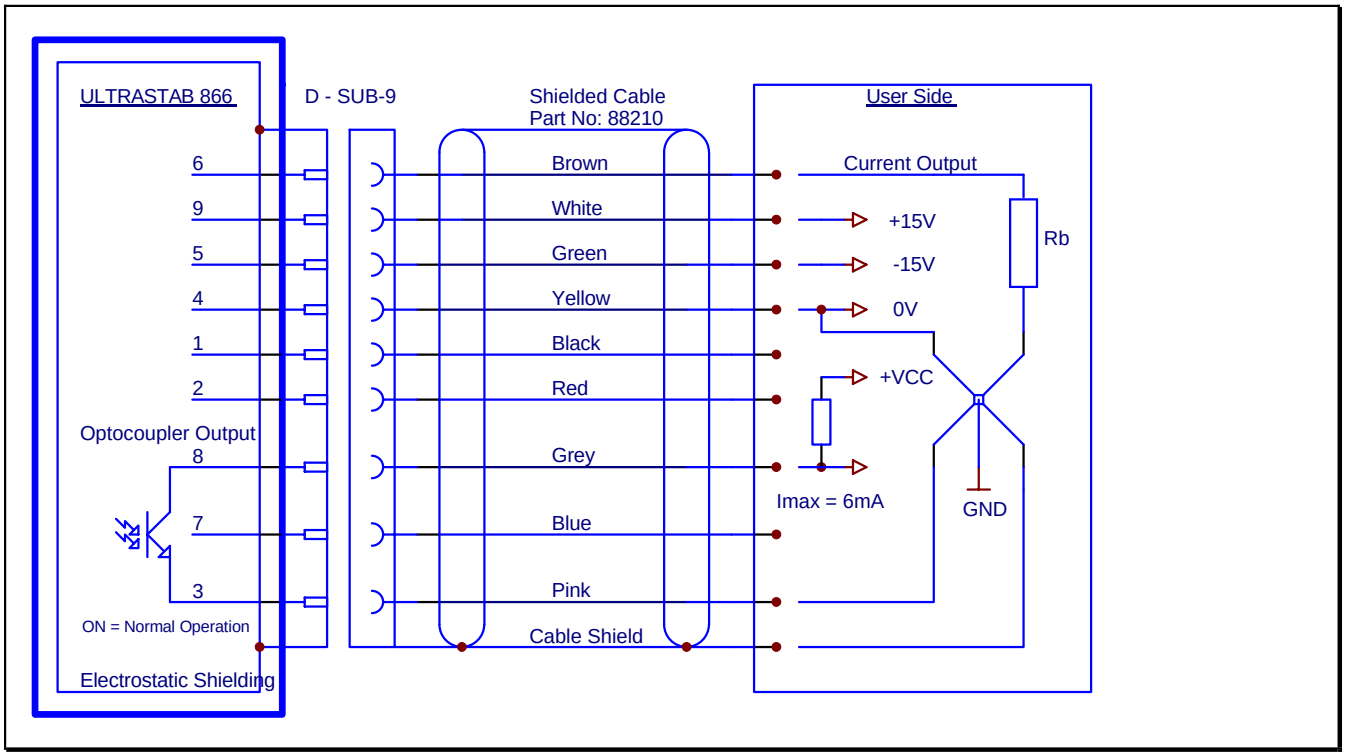
ULTRASTAB 866-600 INSTALLATION



The Wiring diagram shows:

- Power connections
- Connection of Burden Resistor (Rb)
- Connection of opto-coupler output (status)

Re. Status: Normal Operation means:

+/- 15V present

- Zero detectors are working.

Output Current < 110%.

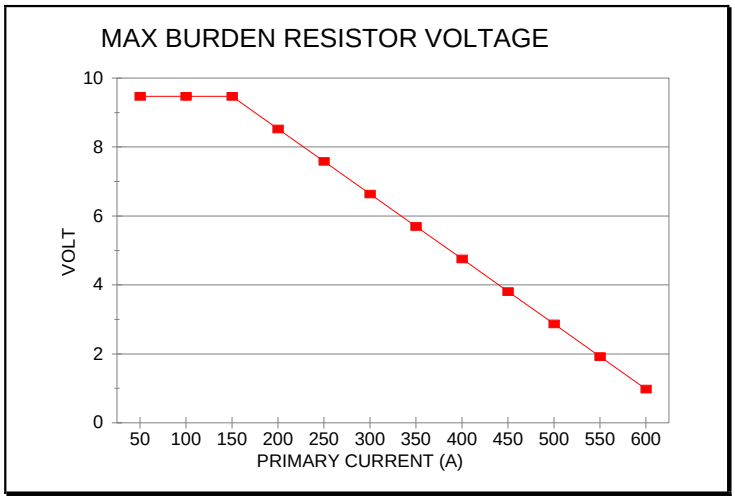


Figure 2: The graph shows the maximum voltage that can be achieved across the externally connected Burden Resistor as a function of the Primary current.

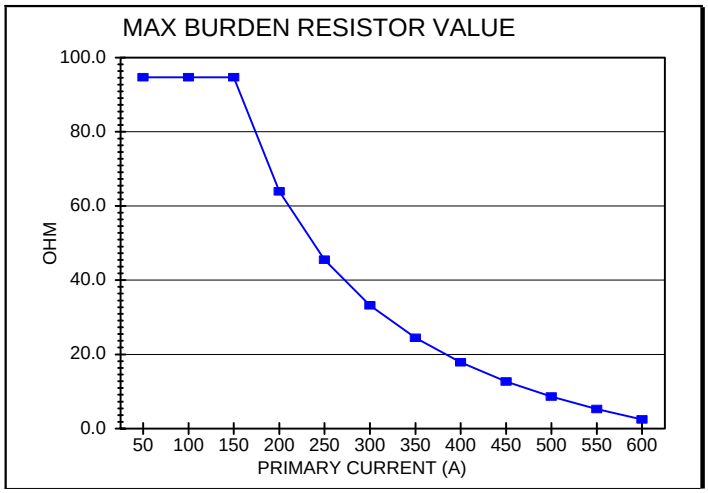


Figure 1: The graph shows the relationship between the Burden Resistor and the primary current.

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