High Performance Current Transducer ITN 600-S ULTRASTAB

I_{PM} = 0 .. 600 A

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic isolation between the primary circuit and the secondary circuit.

Electrical data

I_{PN}	Primary nominal current DC	600	A
I_{PN}	Primary nominal current rms	424	A
I_{PM}	Primary current, measuring range	0 .. ± 600	A
$\hat{I}_P$	Max overload capability 100 ms [1]	± 3000	A
R_M	Measuring resistance	$R_{M\,min}$ $R_{M\,max}$	
	Over operating current, temperature and supply voltage range	0 5	Ω
I_S	Secondary current	0 .. ± 400	mA
I_{SN}	Secondary nominal current rms	283	mA
K_N	Conversion ratio	1 : 1500	
V_C	Supply voltage (± 5 %)	± 15	V
I_C	Current consumption ± 15 V	≤ 150 + I_S	mA

Accuracy - Dynamic performance data

ε_L	Linearity error, DC input [2]	≤ 1.5	ppm
I_{OE}	Electrical offset current + self magnetization + effect of earth magnetic field @ T_A = 25°C [2]	< 15	ppm
ΔI_{OE}	Offset stability (no load) [2]	< 0.8	ppm/month
TCI_{OE}	Temperature coefficient of I_{OE} (10°C .. 50°C) [2]	< 0.5	ppm/K
	Offset vs. power supply stability @ T_A = 25°C [2] @ V_C = ± 15 V ± 5 %	< 0.5	ppm/% of V_C = ± 15 V

General data

T_A	Ambient operating temperature	10 .. + 50	°C
	Humidity (non condensing)	20 - 80 %	RH
T_S	Ambient storage temperature	- 20 .. + 70	°C
	Humidity (non condensing)	20 - 80 %	RH
R_S	Secondary coil resistance @ T_A = 25°C	18	Ω
m	Mass	0.7	kg

Notes: [1] Single pulse only, not AC.
Overload conditions of use as described page 4.
[2] All ppm figures refer to secondary measuring range 400 mA.

Features

- Closed loop (compensated) current transducer using an extremely accurate zero flux detector
- Electrostatic shield between primary and secondary circuit.
- 9-pin D-sub male secondary connector
- Galvanically-isolated optocoupler output indicates transducer state
- LED indicator confirms normal operation.

Advantages

- Very high accuracy
- Excellent linearity
- Extremely low temperature drift
- Wide frequency bandwidth
- High immunity to external electrostatic and magnetic fields interference
- No insertion losses
- High resolution
- Low noise on output signal
- Low noise reflected back onto primary conductor.

Applications

- Feed back element in precision current regulated devices (power supplies...)
- Calibration unit
- Precision and high-stability inverters
- Energy measurement
- Medical equipment.

Application domain

- Industrial and Medical.

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Isolation characteristics

V_b	Rated isolation voltage rms, reinforced isolation	300	V
	Rated isolation voltage rms, single isolation	1600	V
	with IEC 61010-1 standards and following conditions		
	- Over voltage category III		
	- Pollution degree 2		
V_d	Rms voltage for AC isolation test, 50/60 Hz, 1 min	4.6 [1)]	kV
$\hat{V}_w$	Impulse withstand voltage 1.2/50 µs	8.5	kV
V_b	Rated isolation voltage rms, reinforced isolation	600	V
	Rated isolation voltage rms, single isolation	1000	V
	with EN 50178 standards and following conditions		
	- Over voltage category III		
	- Pollution degree 2		
dCp	Creepage distance	9	mm
dCl	Clearance	9	mm
CTI	Comparative Tracking Index (Group I)	600	V

If isolated cable is used for the primary circuit, the voltage category could be improved with the following table (for single isolation) (IEC 61010-1 standard):

Cable isolated (primary)	Category
HAR03	1750 V CAT III
HAR05	1850 V CAT III
HAR07	1950 V CAT III

Note: [1)] Between primary and secondary + shield.

Safety

This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

Caution, risk of electrical shock

When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply).
Ignoring this warning can lead to injury and/or cause serious damage.
This transducer is a build-in device, whose conducting parts must be inaccessible after installation.
A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

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Output noise figures: @ 25°C

Random Noise ppm (rms):

0 – 10 Hz	0 – 100 Hz	0 – 1 kHz	0 – 10 kHz	0 – 100 kHz
< 0.08	< 0.3	< 1	< 6	< 15

Re-injected noise measured on primary cable (DC - 50 kHz)		< 5	μV_{RMS}

Dynamic performance data

BW	Frequency bandwidth for small signal 0.5 %, of I_{PN} (DC) [1]		
	(± 1 dB)	DC .. 100	kHz
	(± 3 dB)	DC .. > 300	kHz
di/dt	di/dt accurately followed	> 100	A/µs
t_r	Response time [2] to 90 % of I_{PN} step	< 1	µs

Notes: [1] Derating applies for large signal AC operation
[2] With a di/dt of 100 A/µs.

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Over current protection - Electrical specification - Status

As soon as electrical saturation occurs, the transducer switches from normal operation to over current mode.
This electrical saturation happens in any case beyond 1.1 times the current range. The primary current corresponding to this trip level is related to the temperature inside the transducer.

Under these conditions:

- the semiconductor contact (operational status) between pin 3 to 8 (of the D-sub connector) becomes open (high impedance).
- the green LED indicators (operational status) turns off.

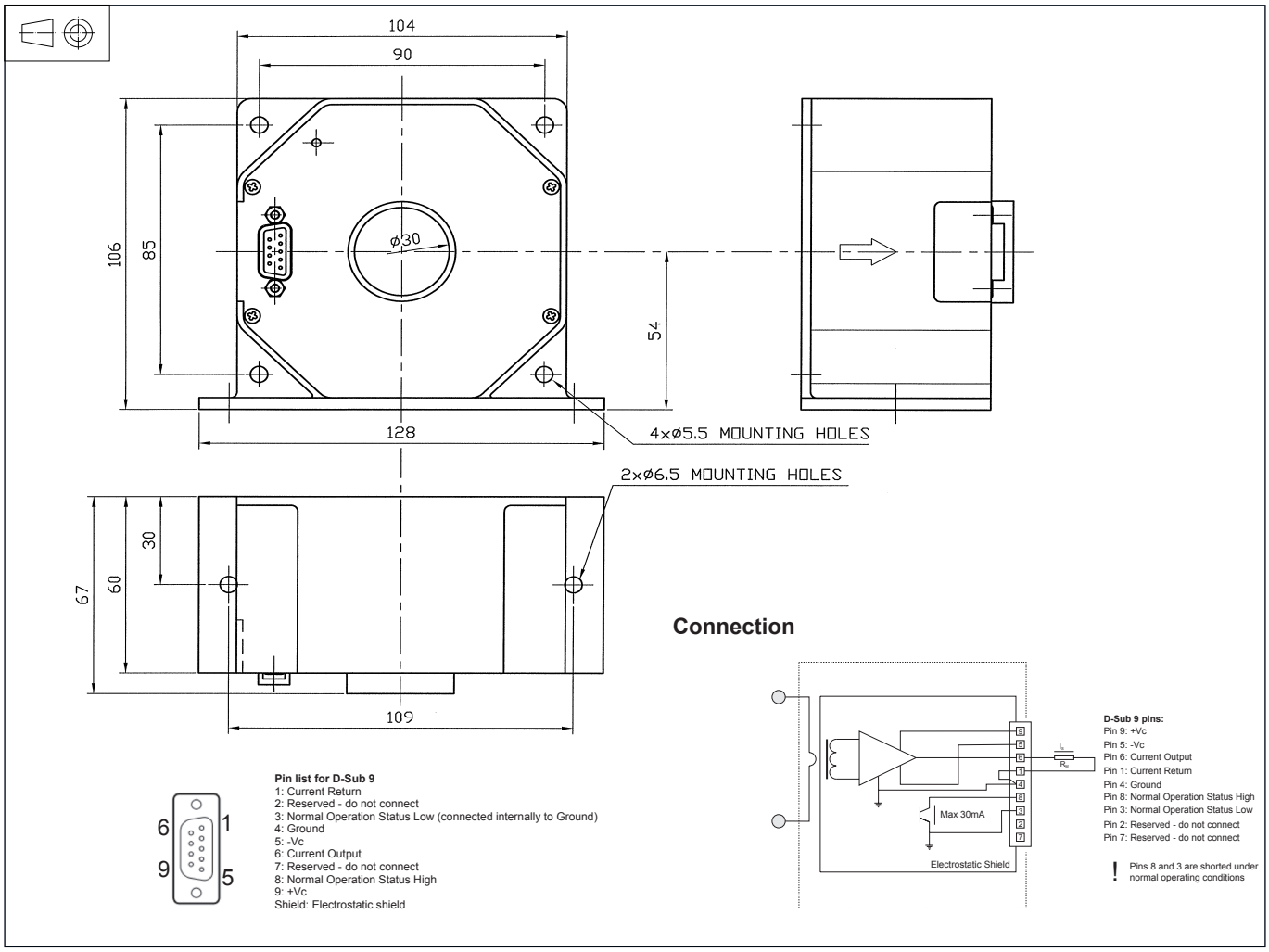
Fault level (off state)	I_P > 110 % of I_{PN} DC	
Max voltage pin 3 to pin 8, off-State	45	V
Max current pin 3 to pin 8, on-State	30	mA
Reverse voltage pin 3 to pin 8, off-State	5	V
On-voltage pin 3 to pin 8, 5 mA	1	V max

The over current mode remains until the primary current decreases to a value lower than the recovery current.

Miscellaneous

Bus bar free zone (length: 80 mm) (from center)	$r \geq 100$	mm

Dimensions ITN 600-S ULTRASTAB (in mm)



Mechanical characteristics

- General tolerance ± 0.3 mm
- Transducer fastening
  - Straight mounting 2 holes Ø 6.5 mm
    2 x M6 steel screws
    Recommended fastening torque 4.4 Nm
  - Flat mounting 4 holes Ø 5.5 mm
    4 x M5 steel screws
    Recommended fastening torque 3.7 Nm
- Connection of secondary connector on D-SUB-9, UNC 4-40
- All mounting recommendations are given for a standard mounting. Screws with flat and spring washers.
- Primary through hole Ø ≤ 30 mm

Connection

- Normal operation status (Pins 3 and 8)
  Normal operation means:- ± 15 V present
  - zero-flux detector is working
  - compensation current is
  ≤ 110 % of $I_{PN\ DC}$
  The normal operation pins (see pin list) are shorted under normal operation conditions.

Remarks

- I_S is positive when I_P flows in the direction of the arrow.
- We recommend that a shielded output cable and plug are used to ensure the maximum immunity against electrostatic fields.
- Pin 4 should be connected to cable - and connector shield to maintain lowest output noise.
- Temperature of the primary conductor should not exceed max ambient operating temperature (50°C).