High precision AC/DC leakage current sensor for galvanically isolated measurement up to 1.5 A

Features

- 1 A rms AC nominal current
- 10 V output at 1.5 A through D-sub-9 connector
- Ø41 mm aperture
- 1 % total accuracy
- Low offset and drift
- Status signal and LED
- Compact aluminium housing



CE RoHS 2011/65/EU UKCA

Description

High precision DC current transducer (DCCT) measuring up to 1.5 A currents. With a large aperture and removable isolation insert allowing wide cable terminals, the DN1-5UD-10V is a stable solution for residual current measurements.

Based on the ultra stable Danisense closed loop flux gate technology, the DN1-5UD-10V has very low offset and ultra low drift.
It provides high resolution for precise monitoring, reliable and consistent performance, and a compact and rugged design for easy installation and durability.

Applications

Residual/leakage current measurement in:

- Electrical distribution panels
- Data centers
- Electricity substations
- Industrial facilities
- Heavy machinery
- Electrical installation monitoring
- Electric vehicle (EV) test bench
- Battery testing and evaluation systems

Electrical specifications at 23 °C, $V_S = \pm$ 15 V supply voltage

Parameter		Symbol	Unit	Min	Typ.	Max	Comment
Nominal primary AC current	Continuous	$I_{PN\ AC}$	Arms			1	
Nominal primary DC current	Continuous	$I_{PN\ DC}$	A	-1.5		1.5	
Measuring range		I_{PM}	A	-1.5		1.5	
Overload capacity		I_{OL}	A	-1000		1000	
Nominal secondary voltage		V_O	V	-10		10	At nominal primary DC current
Transfer ratio			A/V	0.15		0.15	$I_{primary}/V_{secondary}$
Output resistance		R_o	kΩ		10		At DC
Total accuracy					1 %		
Linearity error		ϵ_L	%	-0.01		0.01	% refers to reading
Ratio error			%	-0.5		0.5	% refers to reading
Ratio temperature coefficient			ppm/K	-25		25	ppm refers to reading
Ratio stability			%/month	0.1		0.1	% refers to reading
Offset (including earth field)		I_{OE}	%	-0.5		0.5	% refers to $I_{PN\ DC}$
Offset temperature coefficient		TC_{IOE}	%/K	-0.01		0.01	% refers to $I_{PN\ DC}$
Offset stability over time			%/month	-0.01		0.01	% refers to $I_{PN\ DC}$
Bandwidth		f(±3dB)	kHz		10		
Phase shift	50-60 Hz				0.5°		
Fluxgate excitation frequency		f_{exc}	kHz		31.25		
Power supply voltages		V_S	V	±14.25		±15.75	
Idle current consumption			mA		±81		Primary current = 0 A

Environmental and mechanical characteristics

Parameter	Unit	Min	Typ	Max	Comment
Altitude	m			2000	
Usage					Designed for indoor use
Pollution degree				2	
Operating temperature range	°C	-40		85	
Storage temperature range	°C	-40		85	
Relative humidity	%	20		80	Non-condensing
Ingress protection rating				IP20	
Mass	kg		0.75		

Isolation specifications according to IEC 61010-1

⚠ When using *REINFORCED insulated* wire, all wiring must be insulated for the highest voltage used. When using *BASIC insulated* or *uninsulated* wire, follow the specified voltages in the table below:

Parameter		Unit	Value
Clearance		mm	11
Creepage distance		mm	11
Comparative tracking index (CTI)		V	> 600
Continuous working voltage according to IEC 61010-1 with:			
Uninsulated wire:	Non mains	V	1000
	CAT II (dc and rms)		1000
	CAT III (dc and rms)		600
BASIC insulated wire:	Non mains		2000
	CAT II (dc and rms)		1000
	CAT III (dc and rms)		1000
Transient voltage according to IEC 61010-1 with:			
Uninsulated wire:	Non mains	V	5000
	CAT II		9500
	CAT III		9500
BASIC insulated wire:	Non mains		7500
	CAT II		6000
	CAT III		8000

⚠ Do not connect the transducer to signals or use for measurements within Measurement Category IV, or for measurements on MAINs circuits or on circuits derived from Overvoltage Category IV which may have transient overvoltages above what the product can withstand. The product must not be connected to circuits that have a maximum voltage above the continuous working voltage, relative to earth or to other channels, or this could damage and defeat the insulation.

Connections:	DSUB-9
EMC:	EN 61326-1:2013-2021
Safety:	IEC 61010-2-030:2021/A11:2021 and IEC 61010-1:2010/A1:2019
Random vibration test:	IEC 60068-2-64:2008
Shock test:	IEC 60068-2-27:2009
External devices:	External devices connected to current transducers must comply with the standards IEC61010-1 and IEC62368-1 and be energy-limited circuitry
Cleaning:	The transducer should only be cleaned with a damp cloth. No detergent or chemicals should be used.
Temperature:	When multiple primary turns are used or high primary currents are applied the temperature around the transducer will increase. Please monitor to ensure that the maximum ratings are not exceeded. It is recommended to have minimum 1 mm^2 per ampere in the primary bus bar.

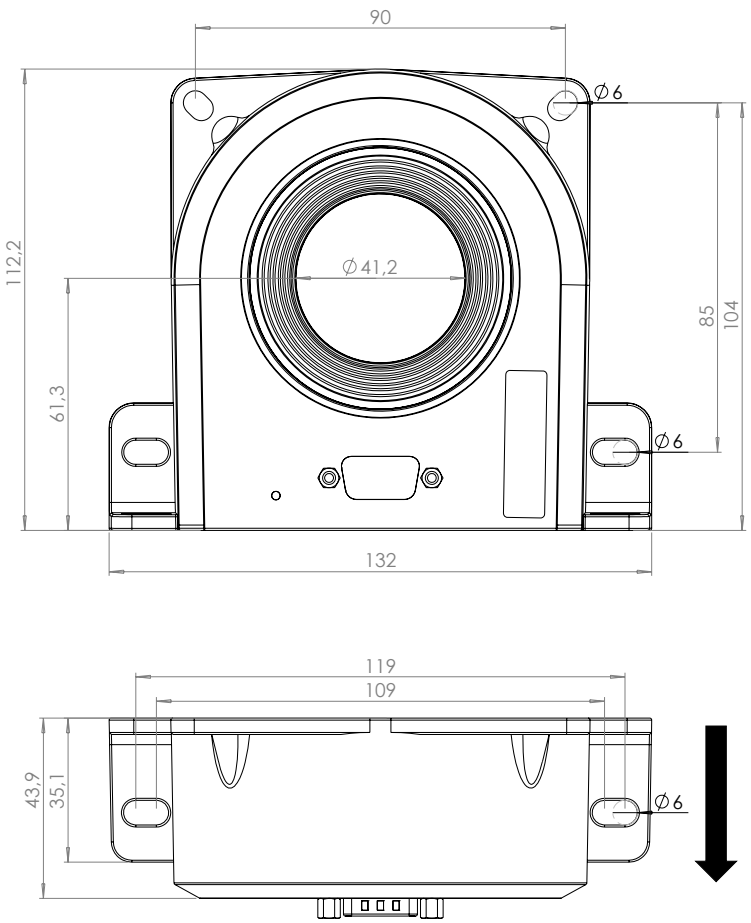


Figure 1: Dimensions of transducer. 0.3 mm Tolerance

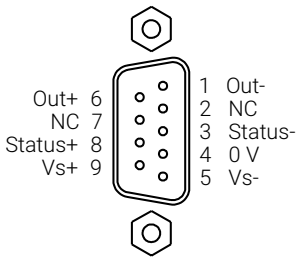


Figure 2: DSUB-9 connection pinout

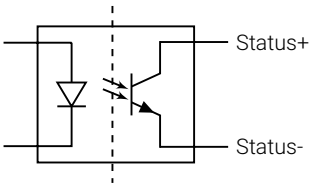


Figure 3: Status signal optocoupler

Mounting

Base plate mounting:	2 slotted holes Ø6 mm
Back plate mounting:	4 slotted holes Ø6 mm
Fastening torque:	5.5 Nm

Pin out description

1	Out-	Measurement output negative terminal
2	NC	No connection
3	Status-	Status signal negative terminal
4	0 V	0 V connection for supply voltage
5	V_S-	Negative supply voltage
6	Out+	Measurement output positive terminal
7	NC	No connection
8	Status+	Status signal positive terminal
9	V_S+	Positive supply voltage

Positive current direction

Is identified by an arrow on the back side isolation plastic insert.

Status signal and LED

When the sensor is operating in normal condition the status pins (Status+ and Status-) are shorted by an optocoupler and the green status LED is ON, see Fig. 3. When a fault is detected, or the power is off, the status pins are opened and the green status LED is OFF. Status signal optocoupler ratings found below:

Forward direction:	Status+ to Status- (Pin 8 to pin 3)
Maximum forward current:	10 mA
Maximum forward voltage:	60 V
Maximum reverse voltage:	5 V