SENECA

T Line - Loop powered in-field converters

EN

T201DC

patented

Contact-less direct current transducer

General Specifications

- Isolated, contact-less loop powered direct current transducer.
- The device's function and look are similar to a standard alternating current active CT, but with the feature of measuring the continuous component the current.
- No shunt, no wasted power of primary current circuit.
- Powered by the 4 – 20 mA loop, from 6 to 100 V, polarity reversal, transients to 120 V and surges to 1.5 J protected.
- Eight ranges, unipolar or bipolar, dip-switch selectable.
- Damping filter availability to improve stable reading.
- Superimposed alternating current tolerance and pulsed current operation to 50 A pk (AC + DC).
- Built-in µC system fault check.
- Over-temperature protection.
- Quick response for over-current (~ 40 ms).
- Suitable for batteries , battery chargers, solar panels, power units and generic dc loads.
- Single wire possible cabling, by powering the device from the measuring current itself, and closing to the system common return.
- Compact size: overall dimensions less than 40 x 40 x 20 mm.
- Electrical endurance and easy to use this device fits every kind of current measurement to 40 Adc.

LISTED 3LUT

ISO 9001:2008

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Manuals and configuration software are available at website: www.seneca.it/products/t201dc
Technical support: support@seneca.it. Product Informations: sales@seneca.it

Technical features

INPUT	
Connection	Pass-trough hole; the current enters from the DIP-switch
Hole diameter	12.5 mm, 1/2'.
Ranges	- Single polarity: 0 – 5 A, 0 – 10 A, 0 – 20 A e 0 – 40 A. - Dual polarity: -5 – +5 A, -10 – +10 A, -5 – +20 A, -10 – +40 A. DIP-Switches selectable.
Maximum rating	> 1000 A; correct reading range: ± 300 A.
Superimposed AC (f > 35 Hz)	- Allowable peak value: -15, +50 A. - Full-wave rectified: -10 – 32 A. - Half-wave rectified: -5 – 16 A.
Insulation	When a sheathed wire is used, the insulation voltage is set by sheath properties. On a bare wire, it's stated 1 kV⎓
OUTPUT AND POWER SUPPLY	
Type	Passive current loop 4 – 20 mA. Terminals ⊕ and ⊖.
Terminals	Screw terminal pitch 5.08mm for max 2.5mm^2 cables.
Polarity	1 (+) incoming current, 2 (-) outgoing current.
Limits	- Internal fault / Over-temperature: 3.5 mA. - Under-range / Over-range: 3.6 / 21.0 mA. - True reading: 3.8 / 20.5 mA.
Minimum voltage	6 V.
Maximum voltage	- 28 V directly wired (R_{EXT}=0). Compliant to UL standard. - 100 V with added resistor (see below). Not UL standard compliant.
Other protections	- Polarity reversal. - Loop current limiting on hardware fault. - Over-temperature protection.
Maximum dissipation power	- 650 mW continuous. - 2.5 W pulsed (10 s). - 1500 W.ms on surge (500 V, 40 Ω).
ACCURACY	
Max Errors	- Input section: 0.1 % + 14 mA. - Output section: 0.05 % + 4 µA.
Temperature Coefficent	< 150 ppm/K.
Error due to EMI	< 50 µA, tested on bare wire Φ = 10mm.
Response Time	- Without damping filter: 100 ms. - With damping filter: 600 ms.
OVERVOLTAGE CATEGORY	
Bare conductor	CAT. III 300V
Insulated conductor	CAT. III 600V

OPERATING CONDITION	
Protection index	IP20.
Temperature	-10 – +70 °C.
Storage Temperature	-40 – +85 °C.
Humidity	10 – 90 % non-condensing
Altitude	Up to 2000 m a.s.l.
CASE	
Screw fix	- Distance between centers: 30 mm. - Self-tapping screw diameter: 2.9 mm. - Depth of thread: 6 mm.
Weight	51 g.
Overall dimensions	38 x 40 x 20 mm (without terminals).
Box material	PA6, black.
STANDARDS	
CE cULus LISTED 3LUT	**EN61000-6-4** (electromagnetic emission, industry environment). **EN61000-6-2** (electromagnetic immunity, industry environment). **EN61010-1** (sicurezza).

DIP-switches

Single and dual polarity ranges								*Damping filter*	
DIP-SWITCHES			single polarity range	DIP-SWITCHES			Dual polarity range		Filter
1	2	3		1	2	3		4	
			0 – 5 A	⬆			25 A	⬆	With filter
		⬆	0 – 10 A	⬆		⬆	30 A		Without filter
	⬆		0 – 20 A	⬆	⬆		35 A		
	⬆	⬆	0 – 40 A	⬆	⬆	⬆	40 A		

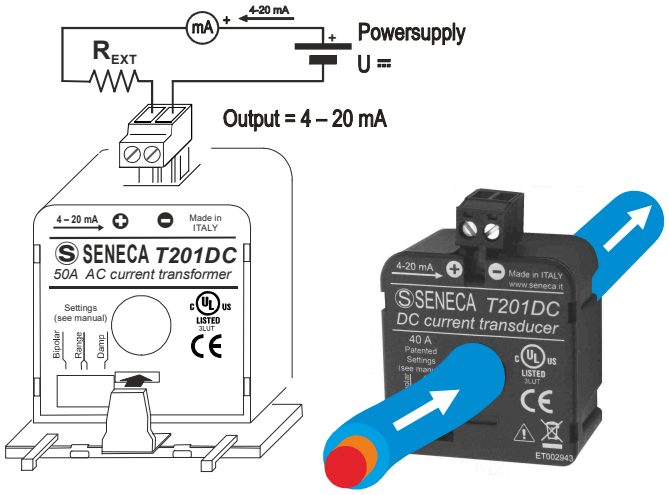
The symbol ⬆ in the above table means switch in ON position(▯).
The device is factory setted to 0 – 40 A range, with damping filter (▯▯▯▯).

External resistor for voltage > 30 V (R_{EXT} for U_{LOOP} > 30 V)

It's possible to extend the loop supply voltage to 100 V, simply adding an external resistor in series with the device, in order to dissipate excess supplied power. The total loop resistance must comply with the following limits:

$$\frac{U^2_{LOOP}}{2.6} \le R_{TOT} \le \frac{U_{LOOP}-6}{0.022}$$ [Ω] The maximum dissipation on R_{EXT} is: $P_{Rext} \approx 0.5\ R_{EXT}$ [mW].

For the resistor choose a power rating at least double of that calculated P_{Rext}.
EXAMPLE: With V_{LOOP}= 92 V, R_S=250 Ω. you have: 3255 ≤ R_{TOT} ≤ 3909 [Ω] and 3005 ≤ R_{EXT} ≤ 3659 [Ω]
So you have to take a 4 W resistor: 4 W: R_{EXT} = 3.3 kΩ, 5%, <100 ppm/K
For variable supply voltage, R_{EXT} must be valid for both range limits.



Mounting

The device can be located in any position and place, in accordance with the operating conditions above stated. Use the included holder bracket when fixing to a DIN rail.
WARNING: High-strength static magnetic fields may change the output value: let avoid closeness to permanent magnets, electromagnets or iron bulks that cause such a modification of the surrounding magnetic field; try a different arrangement or orientation if zero error was greater than expected.

Multi-turn primary winding to improve sensibility

You can increase the sensibility of T201DC simply passing several times in the hole with the measuring current, realizing turns with multiplicative effect: for example, passing 5 times in the hole, as to see 4 turns, choosing a 5 A range, you get an equivalent sensibility of 1 A full-scale. When you make this, let dispose the turns with symmetry in order to preserve accuracy: use diametric contraposition with 2 turns, cross disposition with 4 turns, 60° with 6 turns, and so on.

Disposal of electrical & electronic equipment (applicable throughout the EU and other countries wit separate collection programs). This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of it. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.