

T Series - Loop powered in-field converters

ΕN

T201DC

Patented

Contact-less direct current transducer

Overall description

The T201DC is an isolated, contact-less loop powered direct current transducer. The device's function and look are very similar to those of an active standard CT, but with the remarkable feature of measuring the continuous component of the pass-trough current. For its electrical endurance, ease of use and compact dimensions, the T201DC fits every kind of current measurement to 40 Adc.

Key features

HW

- ✓ Similar usage to a standard alternating current active CT.
- ✓ No shunt, no wasted power of primary current circuit
- √ High accuracy rating: class |0.2|.
- ✓ 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, bipolar or not, dip-switch selectable.
- ✓ Damping filter availability to improve stable reading.
- Superimposed alternating current tolerance and pulsed current operation to 50 Apk (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 de 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.

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l'echnical features								
	INPUT							
Cabling	Pass-trough hole; current enters the DIP-switch side.							
Hole diameter	12.5 mm, 1/2'.							
Range	- Single polarity: 05 A, 010 A, 020 A e 040 A. - Dual polarity: -5+5 A, -10+10 A, -5+20 A, -10+40 A. - Dip-switch selectable.							
Maximum rating	> 1000 A; correct reading range: ± 300 A.							
Superimposed AC (f > 35 Hz)	- Allowable peak value: -15, +50 A. - Full-wave rectified: -1032 A. - Half-wave rectified: -516 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_{DC} .							
OUTPUT AND POWER SUPPLY								
Туре	Passive current loop 420 mA.							
Terminals	Screw terminal pitch 5.08mm for max 2.5mm ² cables							
Polarity	1 (+) incoming, 2 (-) outgoing.							
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	- 30 V directly wired (R _{EXT} = 0). - 100 V with added resistor (see below). - 120 V pulsed, directly wired (t < 10 s).							
Other protections	Polarity reversal. Loop current limiting on hardware fault. Over-temperature.							
Maximum power dissipation	- 650 mW continuous. - 2.5 W pulsed (10 s). - 1500 W.ms on surge (500 V, 40 Ω).							
ACCURACY								
Accuracy rating	[0.2]							
Max Errors	- Input section: 0.1 % + 14 mA. - Output section: 0.05 % + 4 μA.							
TempCo	< 150 ppm/K.							
Error due to EMI	< 50 μA, tested on bare wire Φ = 10 mm.							
Response Time	- Without damping filter: 100 ms With damping filter: 600 ms.							

	OPERATING CONDITION							
Protection index	IP20.							
Temperature	-10+65 °C.							
Storage Temperature	-40+85 °C.							
Humidity	1090 % 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	47 g.							
Overall dimensions	38 x 40 x 20 mm (without terminals).							
Box material	PBT, black							
STANDARDS								
Standards	EN61000-6-4/2007 (electromagnetic emission, industry). EN64000-6-2/2005 (electromagnetic immunity, industry). EN61010-1/2001 (safety). All circuits must be provided with double insulation from those sections at hazardous							

	DIP-switches													
Range								Damping filter						
DIP-SWITCH	1	2	3		_	1	2	3		_	4			
				05 A	DIP-SWITCH	•			-55 A	DIP-SWITCH	•	Filter on		
			٠	010 A		•		•	-1010 A			Filter off		
		•		020 A		•	•		-520 A					
		٠	٠	040 A		٠	٠	٠	-1040 A					
		•	•	040 A	П	•	٠	•	-1040 A	П				

transformers"

voltage. The power supply transformer must comply to EN60742 standard: " Insulation transformers and safety

The symbol • in the table above means switch in ON position; the T201DC factory setting is 0..40 A, filter on (-•••).

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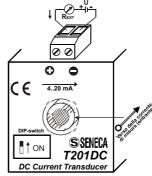
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R_{EXT} for U_{LOOP} > 30 V

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

$$\begin{aligned} & \frac{\textbf{U}_{\text{LOOP}}^2 - \textbf{E}}{2.6} \leq \textbf{R}_{\text{TOT}} \leq \frac{\textbf{U}_{\text{LOOP}} - \textbf{6}}{0.022} \quad [\Omega] \\ & \text{The maximum dissipation on R}_{\text{KrT} \ \text{Is:}} \\ & \textbf{P}_{\text{R}_{\text{EXT}}}^{} = \textbf{0.5} \, \textbf{R}_{\text{EXT}} [\ \text{mW}] \end{aligned}$$
 For the resistor choose a power rating at least

double of that calculated Boxt EXAMPLE: With V_{LOOP} = 92 V, R_b =250 Ω , have: $3255 \le R_{TOT} \le 3909$ $[\Omega]$ $3005 \! \leq \! \mathsf{R}_{\mathsf{EXT}} \leq \! 3659 \; [\varOmega]$

So have to take a 4 W resisto

 R_{EXT} = 3.3 k Ω ,5 %, <100 ppm/K

For variable supply voltage, R EXT must be valid for both range limits.

Mounting

The T201DC 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 zeroerror 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 sensibilit 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, with 6 turns as like as 4 + 2, and so on.

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