Transmission Dynamics®

Digital Load Cell Amplifier (DLCA)

OVERVIEW

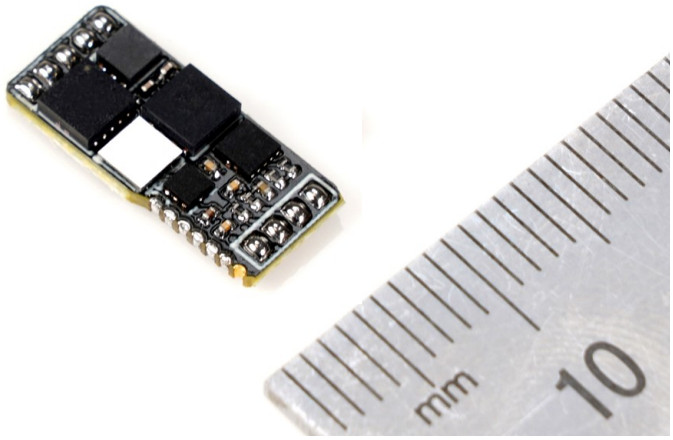

Figure 1: Digital Load Cell Amplifier (DLCA)

Transmission Dynamics (TD)'s advanced Digital Load Cell Amplifier (DLCA) enables precise force and load measurements, with seamless integration and built-in communication interfaces.

Applications

Ideal for demanding industrial environments, the DLCA supports strain measurements where miniature size and easy setup are critical. Its robust design ensures reliable performance, making it suitable for various applications requiring precise strain gauge conditioning and high-quality signal output.

Product Overview

TD's Ultra-Miniature DLCA is engineered for maximum flexibility, offering a range of configurations by populating various components on the PCB. This system supports either analogue 0-5/0-10 V voltage output, or a 4-20 mA current output*. A digital RS485 connection is available in addition to the analogue outputs, allowing data to be monitored on-screen, as well as logging to hard drive via the included PC Application Client.

Note — TD's USB to RS485 transceiver is required to connect to and configure the device via the PC Application Client.

**Voltage or current output configurations are set in our lab and must be specified when placing an order.*

KEY FEATURES

- Multiple Output Options: Analogue 0-5 V, 0-10 V, or 4-20 mA current loop, plus digital RS485 output.
- Stable Bridge Excitation: User-selectable excitation voltages (2.5, 2.0, 1.25 V).
- Easy, digital functionality: Automated bridge balancing, electrical shunt calibration, and gain setting via PC application, with values saved/retained on the amplifier.
- Wide Input Voltage Range: Operates from 5-24 VDC (9-12 VDC recommended).
- Low-noise, high-precision, amplified output.
- Temperature Compensation: An optional external temperature sensor can be sited by the strain gauge for enhanced accuracy.

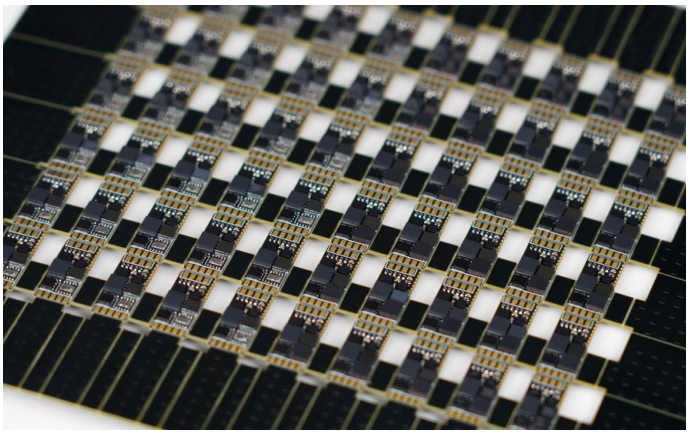

Figure 2: Higher volumes of DLCAs

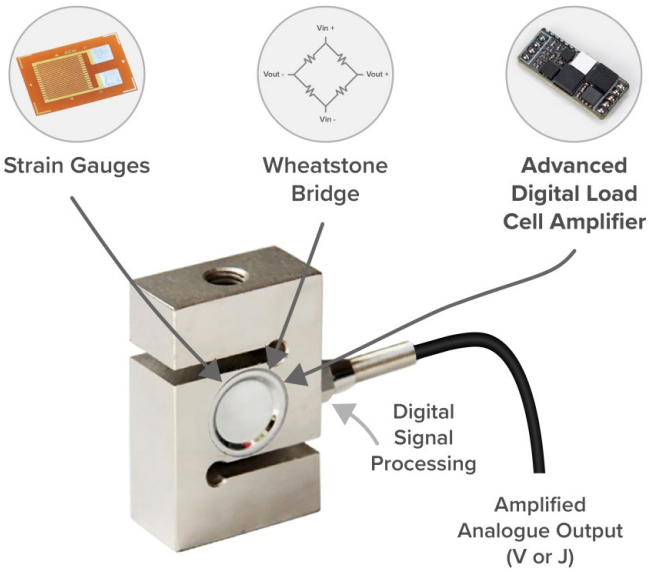

Figure 3: Example 'S' Load cell with integrated DLCA

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Design and Integration

The DLCA is designed to be integrated into load cells, or to operate as a standalone strain gauge amplifier. Its compact size (14.5 x 6.5 x 2.5 mm) allows easy integration into the majority of load cells down to small sizes.

The device features integrated stable bridge excitation and precision instrumentation amplifier circuitry, providing a reliable, high-level output signal with enhanced noise immunity, with a known gain and offset (output trimmed to mid-scale under no load), allowing the signal to be fed directly to any DAQ or SCADAS system with no external amplifier.

ELECTRICAL

Power supply	5-24 VDC *(9-12 VDC recommended)*
Digital resolution	True 24-bit *(at 2.5 kHz sampling rate)*
Output options	0-5 V, 0-10 V, 4-20 mA current plus digital RS485
Sensor excitation voltage	2.5 V, 2.0 V or 1.25 V (user selectable)
Operation temp.	-20 ºC to +85 ºC (higher ranges available on request)
Gain temperature drift (at 400X gain)	0.24 ppm/°C
Gain non-linearity	0.16% FSO
Input offset voltage temperature drift	0.06 µV/°C
Common-mode rejection ratio (of 50 Hz common mode noise at 5X gain)	110 dB
Gain bandwidth product	10 MHz
Input-referred noise density (from 0.1 Hz to 2 kHz, at 400X gain)	15 nV/√ Hz
Output (DAC) total unadjusted error	0.15% FSO

Housing Options

The DLCA can be supplied as PCBs for direct mounting, or pre-encapsulated into protective housings for additional EMC and NVH resilience. Housing options include versions with or without M2 bolt mounting lugs.

PHYSICAL

Dimensions (PCB)	14.5 x 6.5 x 2.5 mm
Mass	~0.36 grams

PC Application Client

The included PC application client allows for comprehensive software adjustment of bridge excitation (selectable from 2.5, 2.0, or 1.25 V), bridge balancing (automatic offset adjustment), shunt calibration of installed gauge to provide precise gain value, adjustable amplifier gain settings, and custom analogue output signal range scaling.

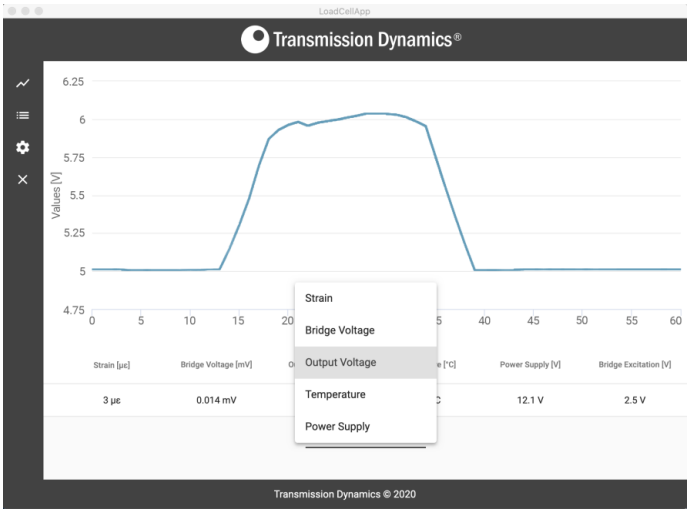

Figure 4: PC application client with strain gauge response

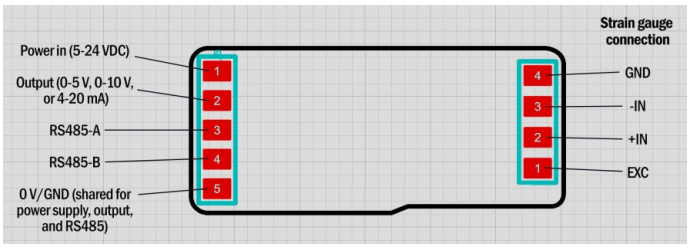

Figure 5: Solder terminal connections to device

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