# *Load strain transducer integration with Beandevice® AN-mV*

## *Berlin - October 2018 / Mathias Grueman – Applications Engineer*

# *About Load strain transducer*

## *ST350 Model from BDI*

| Model | ST350 |
|---|---|
| Range (Resistance) | 350 Ω |
| Excitation Voltage | +1.0 to +10.0 Vdc (output is ratiometric) |
| Power Rating Max: Typical: Intelliducer: | 300 mW 72 mW @ +5.0 Vdc 13 mW @ +5.0 Vdc* |
| Circuit | Full Wheatstone bridge with four active 350Ω foil gages |
| Strain Range | ±4000με (Calibrated to ±2000με) |
| Force required for 1000με | ~17lbs. (~76N) |
| Typical Sensitivity | ~500 με/mV/V (individually calibrated to N.I.S.T. standards) |

| Accuracy | < ±1% |
|---|---|
| Effective Gage Length | 3.0 in (76.2 mm) [Extensions available for use with R/C structures] |
| Cable Length | IC-02-187 (0.187 in diameter, 22awg, 2 pair, shielded with drain wire, red PVC jacket) or IC-02-250 (0.250 in diameter, 22awg, 2 pair, shielded with drain wire, blue PVC jacket) |
| Housing | 6061-Aluminum |
| Weather Proofing | IP67 Rated (waterproof to 70 meters available) |
| Operating Temperature | -58°F to +185°F (-50°C to +85°C) |
| Weight | 3 oz. (85 grams) |
| Mounting | BDI mounting Tab and adhesive, mechanical connection |

# BeanDevice AN-mV – Wireless DAQ designed for strain transducer

- Wireless analog data acquisition system with low voltage inputs (±20 mV), 4 analog channels
- Ultra-Power and license-free 2.4Ghz radio technology (IEEE 802.15.4E)
- Maximum Radio Range: 650 m (Line of Sight) , 30-100m (Non Line of Sight)
- Excellent radio link budget thanks to our antenna diversity innovative design
- High measurement accuracy: < 0.08%, 16-bit of resolution
- Programmable power supply (4.5VDC to 20VDC) for external sensors
- Maximum sampling rate: 400 samples per second
- Current consumption in sleep mode: < 45 uA @3.3V, external sensor is switched off
- Embedded Data Logger: up to 1 million data points (with events dating)
- Integrated Lithium-Polymer rechargeable battery with industrial battery charger (8-28VDC)
- Watertight (IP65 | Nema 4) aluminum casing

**More information here:**
**http://beanair.com/wireless-daq-mv-over.html**

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# Sensor Wiring code



Wiring code (sensor side)
Sensor with analog bipolar output

Sensor wiring code
Pin 2 : Sens-
1 : Pwr+
Pin 4 : Sens+
3 : Gnd

Caption :
PIN1 (Pwr+ ): Sensor power supply
PIN4 (Sens+): Sensor signal + input
PIN2 (Sens-): Sensor signal - input
PIN3 (Gnd): Electrical Ground

M12 - 4pins Plug
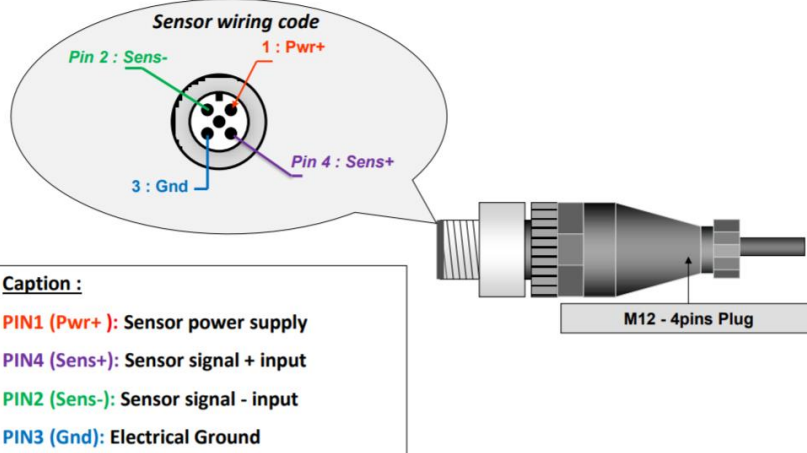
Figure 11: Wiring code (sensor side) – Analog bipolar

| M12 Plug | Sensor wiring code |
| --- | --- |
| PIN1 – PWR+ | |
| PIN2 – Sensor signal - | |
| PIN3 - GND | |
| PiN4 – Sensor signal + | |

*For more info about the sensor wiring code :*

http://beanair.com/wa_files/UM-RF-02-ENG-ProcessSensor-Wireless-DAQ.pdf

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BeanAir



**Load strain tranducer combines with the Beandevice AN-mV**



**Load strain sensor reacting to a traction effort**

# Sensor configuration from BeanScape® software

## Bipolar Polarity, Excitation Voltage : 5V, Sensor warm-up time : 40 ms

DAQ Info Area

Configuration Area

# Applying calibration settings on BeanScape® software (1/2)

⚠️ **Do not change DAQ Calibration Settings**

**Use GFF Value displayed on BDI calibration file**

**BDI** DATA. REFINED RESULTS.

Certificate of Calibration

Transducer Model: BDI ST350

Serial Number: B7181
General Gage Factor: 525.3 $\mu\varepsilon/mV/V_{exc}$
Initial Offset Voltage: -0.129 mV/$V_{exc}$

Table 1 – Representative Calibration Data

This example is using a ST350 with a supplied GGF = 525.3.32 µε/mVout/Vexc. The BeanDevice AN-mV supplies a +5VDC excitation voltage. The current reading on the data acquisition system is
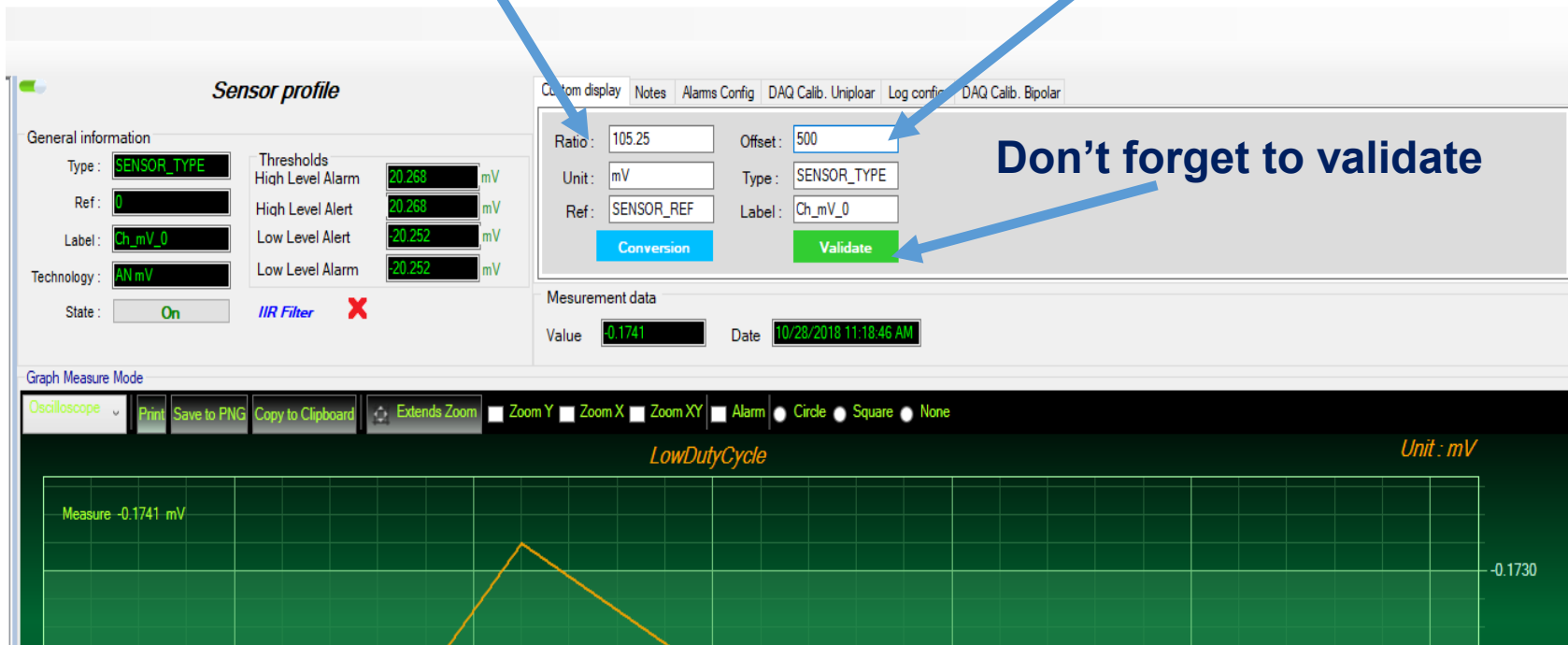3.2312 mV

If the Excitation Voltage is 5VDC , GGF (**µε/mV**) = 525.3/5VDC = 105.6 **µε /mV**
Reading(µε) = GFF*Vout(mV)/5 = 105.6 x 3.2312 = 341.21 µε

# Applying calibration settings on BeanScape® software (2/2)

Enter here GGF (µε/mV) = 105.6 µε /mV

Drop your sensor on a flat surface and avoid to apply a load on it.
Enter Initial Offset in µε here

Don't forget to validate

# How to mount the Load transducer
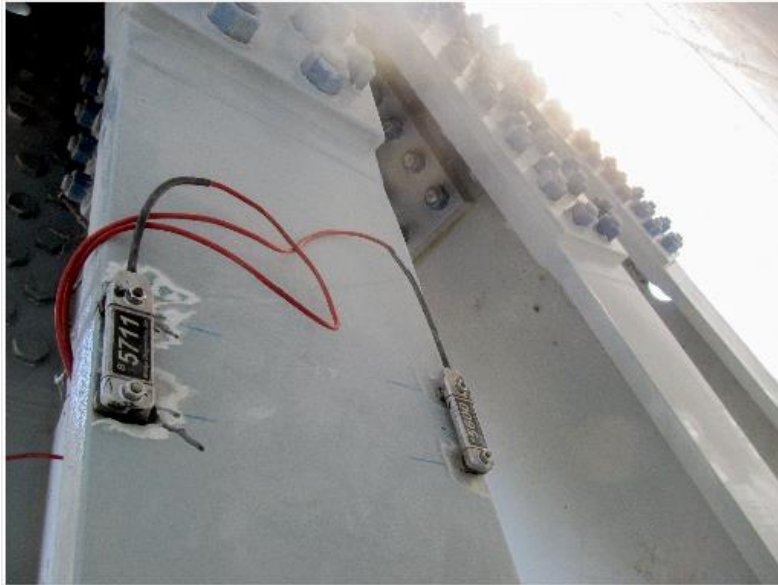


**Glued on steel structure**



**Mounted with a bracket**



**Strain Transducer extension**