

Load strain transducer integration with Beandevice[®] AN-mV

Berlin - October 2018 / Shimon Abadi – Applications Engineer





BeanAir 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



BeanAir 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







M12 Plug	ST350 Sensor wiring code
PIN1 – PWR+	Red color
PIN2 – Sensor signal -	White
PIN3 - GND	Black
PIN4 – Sensor signal +	Green

Figure 11: Wiring code (sensor side) – Analog bipolar

For more info about the sensor wiring code :

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



Sensor Integration



Load strain transducer combines with the Beandevice AN-mV



Load strain sensor reacting to a traction effort

BeanAir Sensor configuration from BeanScape® software

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





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



This example is using a ST350 with a supplied GGF = 525.3.32 $\mu\epsilon$ /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 ($\mu\epsilon$ /mV) = 525.3/5VDC = 105.6 $\mu\epsilon$ /mV Reading($\mu\epsilon$) = GFF*Vout(mV)/5 = 105.6 x 3.2312 = 341.21 $\mu\epsilon$



Applying calibration settings on BeanScape[®] software (2/2)

Enter here GGF ($\mu\epsilon/mV$) = 105.6 $\mu\epsilon/mV$

Drop your sensor on a flat surface and avoid to apply a load on it. Enter Initial Offset in $\mu\epsilon$ here



BeanAir How to mount the Load transducer



Glued on steel structure



Mounted with a bracket



Strain Transducer extension



Crack Monitoring inside Tunnels









