

High-Precision Bi-Directional Force Sensor for Motorsport & Industrial Testing

1. PRODUCT OVERVIEW & APPLICATIONS

The GP-GS-TAS514-100K is a compact, high-precision bi-directional load cell engineered for accurate tension and compression force measurement in motorsport telemetry, automotive R&D, and automated industrial testing. Manufactured from high-tensile alloy steel with an IP67 environmental sealing, the sensor withstands severe shocks, vibration, and harsh operating environments. Featuring dual M6 threaded mounting studs and an integrated 4-core shielded cable, it seamlessly connects to the Gubellini Electronics CAN-BOARD-LOADCELL to transmit real-time force data directly over the CAN bus to GUBELOG and MICROLOG acquisition systems.

2. KEY FEATURES

- **100 kg Rated Capacity:** Engineered for precise bi-directional force measurement in both tension and compression (± 100 kg / ~ 980 N).
- **Compact Low-Profile Design:** $\varnothing 25.4$ mm outer diameter and 37.5 mm overall height for integration into tight mechanical spaces and pushrods.
- **Rugged Alloy Steel Body:** High-grade alloy steel construction with IP67 protection, designed for harsh motorsport and industrial environments.
- **Dual M6 Threaded Studs:** Precision M6 $\times$ 10.5 mm threaded studs on both ends for direct coupling with spherical rod ends (uniball) or linkages.
- **Full Wheatstone Bridge:** 350 Ω input / 300 Ω output strain gauge bridge with 1.5 ± 0.5 mV/V rated sensitivity and exceptional repeatability.
- **High Overload Safety:** Safe overload margin of 150% FS and ultimate overload limit of 200% FS to protect against sudden peak forces.
- **Shielded 2.0 m Cable:** Factory-fitted 4-core shielded PVC cable ensuring high noise immunity against ignition and electrical interference.

3. DIMENSIONAL & MECHANICAL SCHEMATIC

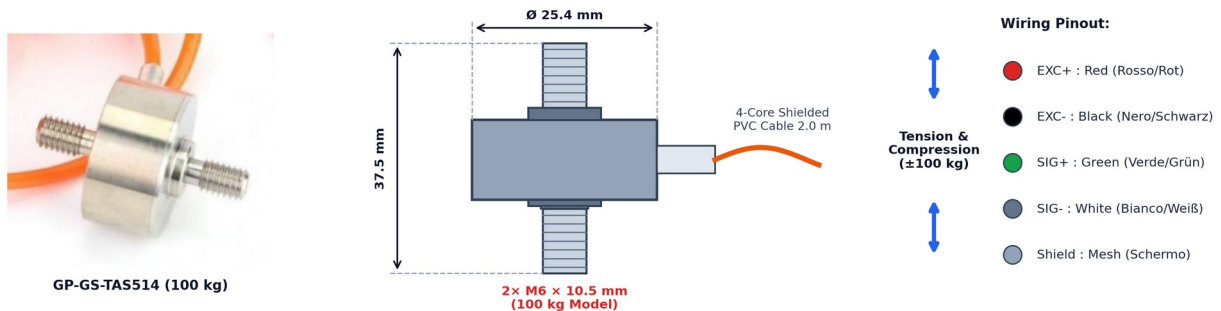


Figure 1: GP-GS-TAS514-100K Product view, mechanical dimensions ($\varnothing 25.4$ mm, dual M6 threads), and 4-wire bridge pinout.

4. ORDERING INFORMATION & ACCESSORIES

Part Number	Description	Compatible System
GP-GS-TAS514-100K	Miniature Load Cell 100 kg, Tension/Compression, M6 studs, 2m Cable	CAN-BOARD-LOADCELL / GUBELOG
GE-CB-LOADCELL	CAN Bus Interface Board for Strain Gauge / Bridge Load Cells	CAN 2.0A/B Telemetry Bus
GE-ROD-M6	Precision M6 Female Spherical Rod End (Uniball) for Axial Linkage	Suspension pushrod / pedal assembly

5. TECHNICAL SPECIFICATIONS

Parameter	Specification
Rated Capacity	100 kg (~ 980.7 N / 0.98 kN)
Measurement Mode	Bi-directional: Tension and Compression (T&C)
Rated Output (Sensitivity)	1.5 ± 0.5 mV/V
Excitation Voltage	5 to 15 V DC (Recommended: 10 V DC or 5 V DC regulated)
Zero Balance	± 2.0 % FS
Combined Error	± 0.30 % FS
Non-Linearity	± 0.30 % FS
Hysteresis	± 0.30 % FS
Repeatability	± 0.30 % FS
Creep (30 minutes)	± 0.10 % FS / 30 min
Safe Overload Rating	150 % FS (150 kg)
Ultimate Overload Limit	200 % FS (200 kg)
Input Bridge Resistance	350 ± 25 Ω
Output Bridge Resistance	300 ± 1 Ω
Insulation Resistance	≥ 5000 MΩ at 100 V DC
Compensated Temperature Range	-10°C to +40°C (+14°F to +104°F)
Operating Temperature Range	-20°C to +60°C (-4°F to +140°F)
Temp. Coefficient of SPAN	± 0.30 % FS / 10°C
Temp. Coefficient of ZERO	± 0.30 % FS / 10°C

6. SYSTEM INTEGRATION & WIRING (GUBELLINI DAQ)

The GP-GS-TAS514-100K connects directly to the Gubellini Electronics CAN-BOARD-LOADCELL module. The board supplies a stable, low-noise bridge excitation voltage, amplifies the microvolt differential signal via a precision 24-bit delta-sigma ADC, and broadcasts calibrated real-time force data onto the CAN 2.0A/B bus directly to GUBELOG and MICROLOG data loggers at frequencies up to 200 Hz.

Lead Wire Color	Signal Function	Bridge Connection	CAN-BOARD-LOADCELL Terminal
Red	Excitation Positive (EXC+)	Bridge Supply Voltage (+)	Terminal V_EXC+ (Regulated Supply)
Black	Excitation Negative (EXC-)	Bridge Ground Return (-)	Terminal V_EXC- / GND
Green	Signal Positive (SIG+)	Differential Output (+)	Terminal IN+ (Differential Input)
White	Signal Negative (SIG-)	Differential Output (-)	Terminal IN- (Differential Input)
Bare / Shield	Cable Shield (GND)	Chassis / Cable Drain	Terminal SHIELD / Earth Ground

7. INSTALLATION & HANDLING GUIDELINES

- Axial Load Alignment:** Ensure applied forces are strictly coaxial with the sensor centerline. Avoid side loads, eccentric forces, and bending moments (use spherical rod ends / uniballs).
- Torque Limits on M6 Studs:** When threading jam nuts or rod ends onto the M6 studs, hold the adjacent hex/flat boss with a counter-wrench. Do not transmit tightening torque through the load cell body (max torque: 6.5 Nm).
- Cable Strain Relief:** Anchor the 2.0 m shielded cable close to the side exit to protect the internal potting from cyclic fatigue and vibration pull.