4-WIRE LOAD CELL TERMINAL MARKINGS

Technical Reference for Wiring, PLC Integration, and Field Troubleshooting

Sensor Type	Signal Level	Typical Interface
Full Wheatstone bridge strain-gage sensor	Millivolt output, usually 1-3 mV/V	Load-cell transmitter, indicator, or PLC weigh module

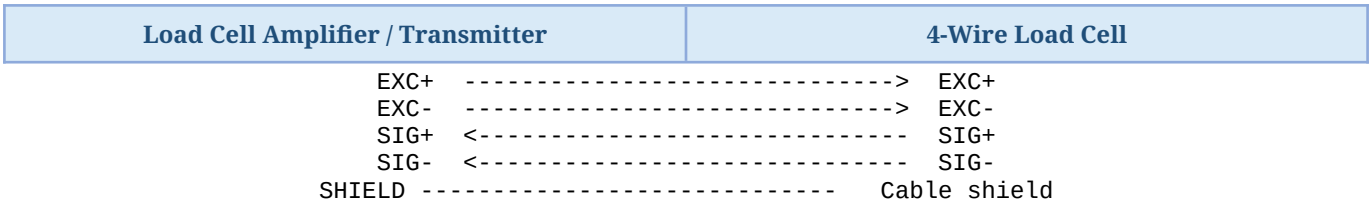
1. Purpose

A 4-wire load cell is normally a full Wheatstone bridge sensor. The excitation terminals power the bridge, while the signal terminals return a very small differential millivolt signal proportional to applied load. This reference identifies the common terminal markings and explains how they should be connected in an industrial control system.

2. Terminal Marking Reference

Terminal marking	Also shown as	Function	Connects to
EXC+	E+, V+, +IN, +SUPPLY	Positive excitation voltage into bridge	Amplifier/transmitter excitation +
EXC-	E-, V-, -IN, -SUPPLY, GND	Negative excitation voltage into bridge	Amplifier/transmitter excitation -
SIG+	S+, OUT+, +OUT, +SIGNAL	Positive differential signal output	Amplifier/transmitter signal +
SIG-	S-, OUT-, -OUT, -SIGNAL	Negative differential signal output	Amplifier/transmitter signal -
SHIELD	Shield, drain, screen	Cable shield only; not a signal conductor	Earth/chassis ground at one end only

3. Typical Wiring Layout



The excitation pair powers the bridge. The signal pair is a low-level, differential measurement output. The signal is not referenced like a standard single-ended voltage output and should be read by proper load-cell electronics.

Important: Do not connect a bare load cell directly to a standard 4-20 mA PLC analog input. A bare load cell produces millivolts, not loop current.

4. Signal Level Example

Load-cell output is commonly specified in millivolts per volt of excitation. For example, a 2 mV/V load cell excited with 10 VDC produces approximately 20 mV at full scale:

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2 mV/V x 10 V = 20 mV full-scale output
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5. Common Wire Colors

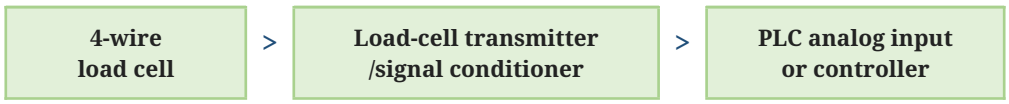
Common colors are shown below, but color codes are not universal. Always verify with the specific load-cell datasheet before wiring or applying excitation voltage.

Common wire color	Typical function
Red	**EXC+**
Black	**EXC-**
Green	**SIG+**
White	**SIG-**
Bare / shield	**Shield**

6. Field Troubleshooting Notes

Symptom / topic	Recommended check
Reading goes negative when load is applied	SIG+ and SIG- are likely reversed. Swap the signal wires, not the excitation wires.
No reading or unstable reading	Confirm excitation voltage at the load cell and verify that the shield is not being used as a signal conductor.
Excessive noise	Use shielded cable, route away from VFD/motor leads, and ground the shield at one end only unless the equipment documentation requires otherwise.
PLC integration	Use a load-cell transmitter, weigh module, or signal conditioner to convert the mV bridge signal into 4-20 mA, 0-10 V, Modbus, or another PLC-friendly format.

7. Preferred Industrial Arrangement



For most machine-control applications, the most reliable approach is to use a dedicated load-cell transmitter or PLC weigh module. This prevents the PLC from trying to interpret a microvolt/millivolt bridge signal directly and provides better zero/span adjustment, filtering, calibration, and noise immunity.

Practical rule: If the destination is a standard PLC analog input, convert the load-cell signal first. The transmitter output should match the PLC input configuration, such as 4-20 mA or 0-10 V.

8. Pre-Power Wiring Checklist

- ☐ Confirm the load-cell datasheet and wire color code.
- ☐ Verify the amplifier/transmitter supports 4-wire bridge input.
- ☐ Confirm excitation voltage is within the load-cell rating.
- ☐ Connect EXC+ and EXC- before evaluating signal output.
- ☐ Connect SIG+ and SIG- as a differential pair.
- ☐ Terminate the shield as recommended by the equipment manufacturer, commonly at one end only.
- ☐ Calibrate zero and span after mechanical installation.