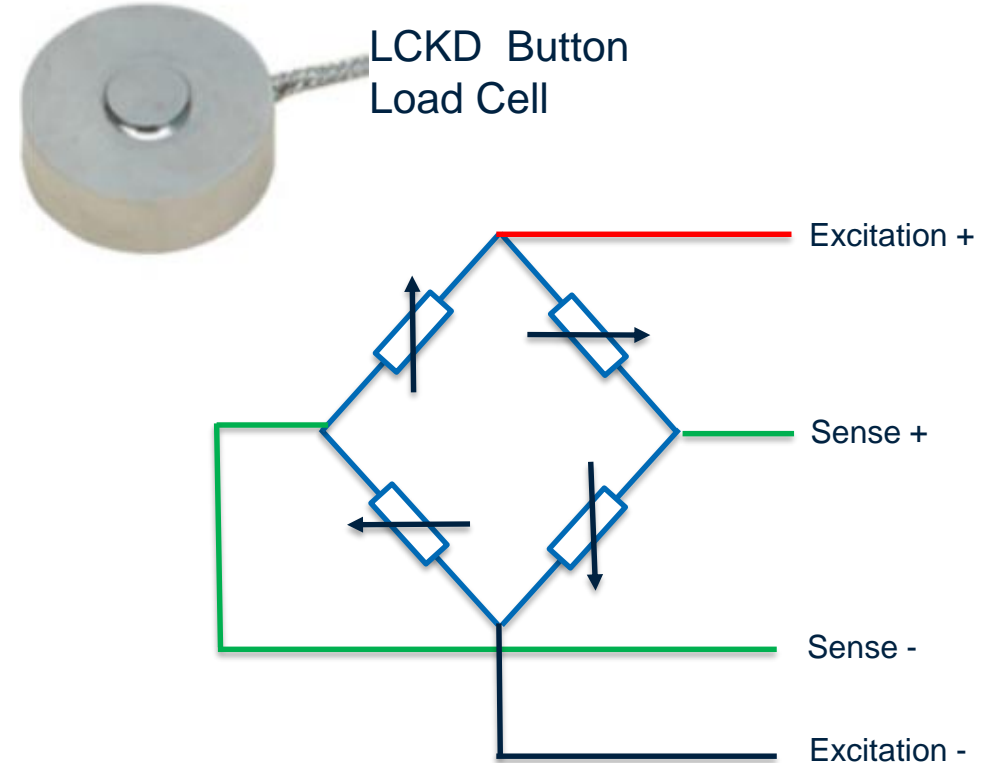


Load Cell – USB Smart Sensor Connectivity Kit

Load Cell (Bridge) Signals

What is a Bridge Interface

- A common means to detect small changes in resistance
- Resistance changes due to deformation of material due to applied force
- Common in **Load Cell and Pressure sensor** applications where sensor measurement is the deformation of material.
- The Excitation power causes voltage splitting across resistance elements. If all resistance elements are equal the voltage measured between Sense + and Sense - will be zero.
- Load Cell specific Parameters must be set
- Load Cell reading may be scaled to represent weight, volume ...

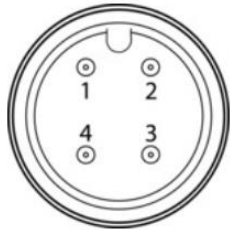


- **Excitation:** Applies a constant voltage or current to resistive bridge circuit
- **Sense:** Will vary depending on the change of the 4 resistive elements due to applied force

Load Cell – Modbus Smart Sensor Connectivity Kit

Excitation +
Sense +
Sense -
Excitation -

External Load Cell



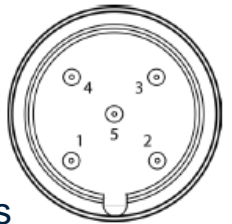
Pin	Connection
1	Excitation -
2	Sense +
3	Sense -
4	Excitation +



Load Cell – Modbus Smart Sensor Connectivity Kit



SmartEdge Gateway



Up to 32 RS485 Devices

Pin	Connection
1	Bus Power (5-36 Vdc)
2	RS485 Data + (A')
3	GND
4	RS485 Data - (B')
5	SHIELD

- **M12 -S-M-FM** provides 4 pin Screw Terminal connector
- **SP-010-1** converts Load Cell Bridge input to Smart Sensor digital interface
- **IF-002** → Smart Sensor to Modbus conversion
- **M12.5-B-S-M-FM** → 5 pin Screw Terminal connector (B type)
- **IF-002 Supports up to 32 devices on RS485 Serial Channel**

Load Cell – Scaling & Configuration

- External signals (mV) signal conveys information in terms of weight, which represent some other 'unit of measure'
 - Weight to Volume: 1 kg == 1 gal, 10 kg == 25 gal
- Smart Sensor allows linear **scaling** of measurement for **unit** conversion using simple $y = Mx + B$ formula, where M is the 'gain' and B is an offset.
 - Determine Gain: $(Actual_Hi - Actual_Lo) / (Reading_Hi - Reading_Lo) == (25 - 1) / (10 - 1) == 2.66667$
 - Determine Offset: use calculated Gain, with 0 as Actual == $-(1 - 2.66667 * 1) == -1.66667$
 - Change the 'units' string to 'gal'

- Must Match specific Load Cell characteristics

Impedance – automatically detected or may be set based on specific load cell

mV/V information determined by specific load cell

Full Scale determined by specific load cell

Sensor Input0	
Sensor	
Name	Input0
Measurement Type	BRIDGE
Advanced Scaling	<input checked="" type="checkbox"/>
Unit	gal
Lock	<input checked="" type="checkbox"/>
Scaling	
Gain:2.6667, Offset:-1.6667	
Apply Scaling	<input checked="" type="checkbox"/>
Gain	2.6667
Offset	-1.6667
Device Range/Type	
Range	

Advanced Scaling option opens the scaling options

Change **unit** to any string (maximum 4 characters)

Ensure **lock** option is set (retains across power reset)

Enter calculated **Gain** and **Offset** values

Parameters	
mV/V	10
Full Scale	1000
Impedance	359
TARE (Target)	0

TARE – allows cancelling out initial weight

Tank Volume	49.0 gal	Input1	IN0:0 IN1:0 DIN
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