

Industrial Load Cell Reference: Strain-Gauge, Compression, Tension, Weighbridge

cBallast · 2026 edition · Selection reference

Topology — pick by mechanical loading

Topology	Loading mode	Capacity	Typical use
Single-point	Off-centre compression	1 - 500 kg	Platform / bench scales
S-beam	Tension or compression	50 kg - 20 t	Hopper suspension, tension
Shear beam	Bending / shear	250 kg - 10 t	Silo, tank, floor scales
Double-ended shear beam	Bending, symmetric	5 - 100 t	Weighbridge, rail scales
Compression canister	Axial compression	5 - 500 t	Heavy silo, industrial press
Compression disk (button)	Axial compression	100 kg - 500 t	Force cal, press-fit
Ring torsion	Radial + axial	500 kg - 200 t	Rail, road weighbridge
Hydraulic	Fluid pressure	1 - 1000 t	Legacy weighbridge, hazardous

OIML R60 accuracy classes

Class	n_max divisions	Combined error	Typical use
C1	1 000	+/-0.10% FS	Process control, not legal-for-trade
C2	2 000	+/-0.06% FS	Non-approved industrial
C3	3 000	+/-0.023% FS	Legal-for-trade platform, hopper
C4	4 000	+/-0.017% FS	Legal-for-trade weighbridge
C6	6 000	+/-0.010% FS	High-accuracy legal-for-trade

Output signal

Analogue strain-gauge cells output differential voltage proportional to excitation and load. Standard sensitivity 2 mV/V — 10 V excitation gives 20 mV FS. 3 mV/V and 4 mV/V cells trade linearity for output level. Digital cells (RS-485, CAN, PROFIBUS) integrate the ADC in the cell body and eliminate summing-box wiring for cable runs > 30 m.

4-wire vs 6-wire

4-wire: excitation and signal on two twisted pairs. 6-wire adds sense lines measuring the voltage actually at the cell terminals, allowing the indicator to compensate for cable voltage drop — mandatory over 5 m cable runs. All modern OIML-approved cells ship with 6-wire terminals.

Summing box

Multi-cell installations route every cell output through a summing box. Parallels the excitation, sums the signals; trim-pot versions allow corner adjustment for uneven load distribution. IP68 mandatory outdoors and in washdown.

IP rating

IP	Water	Dust	Use
IP65	Low-pressure jets	Dust-tight	Indoor industrial
IP67	1 m 30 min immersion	Dust-tight	Outdoor, occasional flood
IP68	Continuous immersion	Dust-tight	Buried weighbridge, marine
IP69K	High-P high-T wash	Dust-tight	Food processing, pharma

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