Tension measurement selection notes

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Use these notes to prepare a force-measurement enquiry. Confirm model-specific dimensions, ratings, environmental limits and calibration before procurement.

1. Start with the force path

Geometry	Inputs for the review
S-beam	Force directions and peaks; exact thread pitch and engagement; installed height; articulated joints; bridge sensitivity.
Load link	Working load, proof-test target and breaking-load evidence separately; shackle pin and jaw dimensions; radio/readout compatibility.
Cantilever / wire guides	Tension, entry/exit geometry, roller weight, cantilever moment, speed, guide surfaces and control interface.
Permanent rope / dedicated chain	Actual rope construction or chain grade/pitch; permitted attachment; installed calibration. A rope clamp is not a chain fixture.

2. Keep force and mass distinct

At standard gravity: 1 kgf = 9.80665 N; 1 lbf ≈ 4.448221615 N; 1 metric tonne-force = 9806.65 N. Dynamic acceleration and support geometry need separate assessment.

3. Check the complete bridge interface

Ideal full-scale output (mV) = rated sensitivity (mV/V) × excitation (V). At an illustrative 10 V excitation, 2.0 mV/V yields 20 mV and 3.0 mV/V yields 30 mV. This example does not specify a sensor's allowed supply or accuracy.

Match E+/E− and S+/S−, any Sense+/Sense− leads, shield termination, excitation, bridge resistance and amplifier span using the actual pinout. Cable colour is not a universal pin assignment.

4. Calculate the ideal web-roller resultant

F = 2 × T × sin(θ / 2)

θ is the change in material travel direction: 0° straight through; 180° reversal. Equal tensions, negligible friction and a measuring axis aligned with the resultant are assumed.

Tension T	Deflection θ	Ideal resultant
100 N	0°	0 N
100 N	90°	141.421 N
100 N	180°	200 N

A factor such as 1.5 gives a screening target, not a universal approved sensor size. Add roller tare, actual support reactions, moments, acceleration and measured transients in the final engineering review. This formula is not a rope-clamp calibration or lifting rating.

5. Put the acceptance evidence in the enquiry

- Exact configuration/reference model and required force directions.
- Working force, peak events, nominal range sought and environmental conditions.
- Mechanical drawing, complete thread/pin/bore details and required installation space.
- Signal, excitation, protocol/device revision and controller/readout.
- Calibration/report scope, quantity, destination and requested trade/delivery terms.

Use the editable worksheet and current selector at tensionloadcell.com/cad-step-datasheets-downloads.

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Original engineering guidance. This is not an approved model datasheet, test result or calibration certificate.