

INTERFACE LOAD SHACKLE CHEAT SHEET

COMMON ABBREVIATIONS

pound-force	lbf	Volt (Direct Current)	VDC
kilopound-force	K lbf	Millivolt per Volt	mV/V
Newton	N	Full Scale	FS
kilonewton	kN	Ohm	Ω
gram-force	gf	Megohm	M Ω
kilogram-force	kgf	Milliampere	mA
kilogram	kg	Rated Output	RO
hertz	Hz	Degree Fahrenheit	°F
kilohertz	kHz	Degree Celsius	°C

ACCURACY

Rated Load	The maximum load the load cell is designed to measure accurately during normal use
Proof Load	Used to verify the product's structural integrity and ensure it can withstand working loads without permanent deformation. It acts as a quality control test, proving a component meets specified strength
Ultimate Breaking Load	The load at which the load cell will physically fail or break
Nonlinearity	The deviation from a perfectly straight calibration curve, expressed as a percentage of full scale
Nonrepeatability	The variation in output when the same load is applied repeatedly under identical conditions, expressed as a percentage of rated output
Transmission Distance	The maximum distance a signal can travel from the load cell to the receiver without loss or degradation

TEMPERATURE PERFORMANCE

Compensated Range	The range of ambient temperatures over which the load cell is guaranteed to maintain its specified accuracy
Operating Range	The full range of ambient temperatures over which the load cell can safely function without physical or electrical damage
Zero Temperature Coefficient	How much the zero output, the output signal when no load is applied, changes with temperature
Span Temperature Coefficient	Describes how the sensitivity or output signal changes as temperature varies, while under load

MECHANICAL

Safe Overload	Max load it can handle without damage
Ultimate Overload	The maximum load the pin can withstand before permanent structural failure (fracture or catastrophic yielding)
Environmental Rating	An IP (Ingress Protection) rating defines how effectively an electrical enclosure seals against solids (dust) and liquids (water), classified under international standard
Weight	How much the load cell itself weighs
Dimensions	Physical size details
Calibration	Verified output under known loads
Material	What the load cell is made of
Telemetry Housing	The protective enclosure that contains the wireless electronics, shielding them from dust, water, vibration, or harsh environments
Connection Type	The method used to connect the load cell to power or data systems (e.g., cable, connector, wireless)
Wiring Connections	The physical wires used for power, excitation, and signal output from the load cell
Resolution	The smallest change in load that the system can detect or display

CALIBRATION

System Calibration	Verifies the performance of the load cell and entire system, ensuring accuracy and reliable performance
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SPECIAL OPTIONS

Special Ranges	Custom or non-standard load capacities designed for specific applications
Special Electrical	Custom electrical requirements or outputs, such as unique voltage levels or signal formats
Integral Signal Conditioning	Electronics built directly into the load cell that amplify, filter, or convert the signal before output
Centralizing Bobbin	A mechanical component that keeps the strain gauge or sensing element properly aligned, ensuring accurate and repeatable load measurements
Radio Telemetry	A wireless method of transmitting load data using radio frequency instead of cables
Submersible	Designed for underwater or marine environments, resistant to pressure, corrosion, and moisture
ATEX	Hazardous Location options available
Analog Signals	A continuous electrical output that changes proportionally with load (e.g., mV/V, 4–20 mA)
Digital Signals	A data-based output that sends load information as numbers or packets (e.g., CAN, RS-485, Ethernet)
Multi-Shackle Systems	Systems that use multiple shackles with load cells working together to measure total or distributed loads

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TYPES OF LOAD SHACKLES

BOW SHACKLE (ANCHOR SHACKLE)

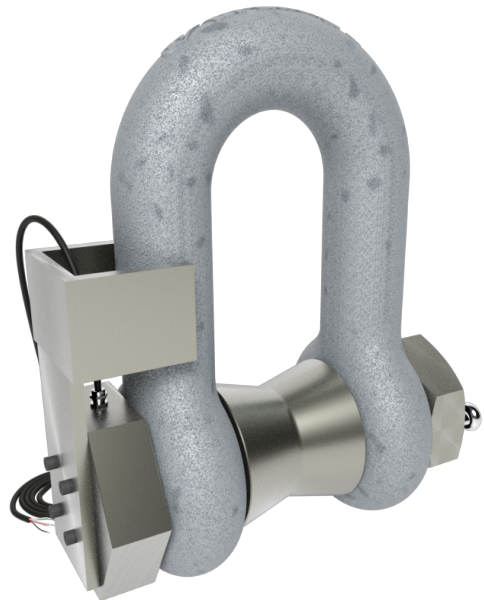
- Definition: A heavy duty shackle with a wide, rounded bow or "O" design, made to handle multi-directional loading and allow connection of multiple slings or components.
- Design: Large curved bow with a straight pin (screw pin or bolt-type). Greater internal space than D-type.
- Material: Typically forged carbon steel or alloy steel; often galvanized or stainless for corrosion resistance.
- Best Use: Angled loads, bridles, or applications where load direction may shift.
- Limitations: Lower working load limit (WLL) than a same-size D-shackle when side-loaded excessively; not ideal for constant high side-loading without rating verification.
- Common Applications: Rigging assemblies, lifting systems, load cell test setups, bridle connections, marine and offshore lifting.



ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE

D-TYPE SHACKLE (CHAIN SHACKLES)

- Definition: A shackle with a narrow "D" shape designed primarily for straight-line, in-line loading.
- Design: Straight sides with a tight internal width; pin may be screw or bolt-type. Minimal side-to-side movement.
- Material: Forged carbon or alloy steel; may be galvanized or stainless depending on environment.
- Best Use: Single-line tension applications where the load is applied in-line with the shackle body.
- Limitations: Not suitable for side-loading or multi-directional forces; can cause bending damage or failure.
- Common Applications: Chain connections, tie-down systems, single-point lifting, tension testing with load cells where alignment is controlled.



ISHK-D "D" TYPE CROSBY™ CABLED LOAD SHACKLE