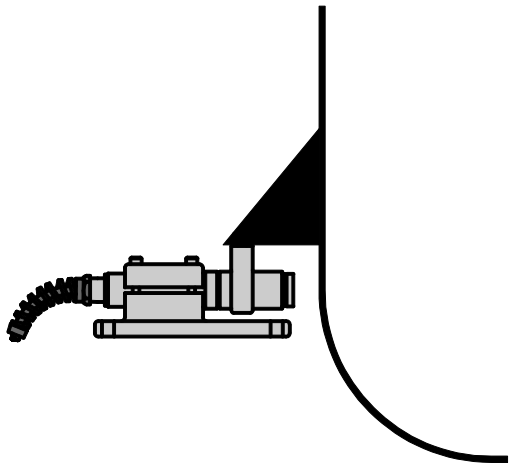
Precision Force and Weight Measurement Technologies

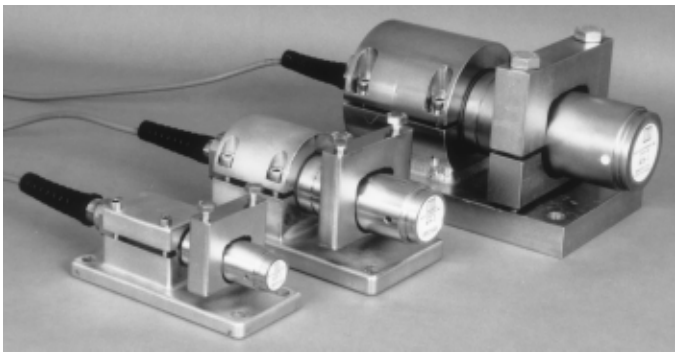
KIS® Beam Load Cell Weigh Modules

Applications:

Batchers
Blenders
Reactors



- **Capacities from 110 to 45,000 lb**
- **Checkless Design - No Stay or Check Rods Required**
- **Designed to Meet ANSI/UBC Wind and Seismic Load Requirements**
- **Insensitive to Side Loads of up to 100% Capacity**
- **High Accuracy: Combined Error Less Than 0.05%, Repeatability of 0.01%**
- **FM Approved for Hazardous Locations, Meets all NEMA 4 and IP67 Requirements**



Product Description

KIS® Weigh Modules combine patented KIS® force transducers and specially designed mounting hardware to satisfy the challenging requirements of industrial process weighing. The unique KIS® design rejects measurement errors caused by sideloads, vibration, thermal influences, and occasional overload. Superb accuracy and repeatability make KIS® the ideal transducer for weighing dynamic process vessels.

Strain gage technology measures shear* stress in the cylindrical beam constructed of stainless (0.5 thru 50 kN) or alloy (50 thru 200 kN) steel. Measuring shear, instead of moment stress, ensures constant beam output regardless of load application point. This allows the module to measure weight and force accurately in applications where vibration or thermal expansion is encountered.

A unique S³™ Super Sealing System protects KIS® Beam electronics from environmental moisture and caustic washdowns. This multilevel sealing system includes extruded cable, neoprene cable glands, mylar internal wrapping, teflon O rings, and a coated strain gage region. Stainless steel construction of KIS®-2 and -3 modules is perfect for food and pharmaceutical installations. The cylindrical beam and single piece mounting base eliminates cracks and crevices where process residue can accumulate.

Simple rugged mounting arrangements, four bolts to the base and two bolts to the vessel gusset or plate, makes installation robust and quick. The sliding yoke design accommodates minor mounting variances without extensive rework.

Thermo BLH
An ISO 9001 Registered Company

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*Not applicable to 0.5 kN beam

The Double Cantilever Advantage

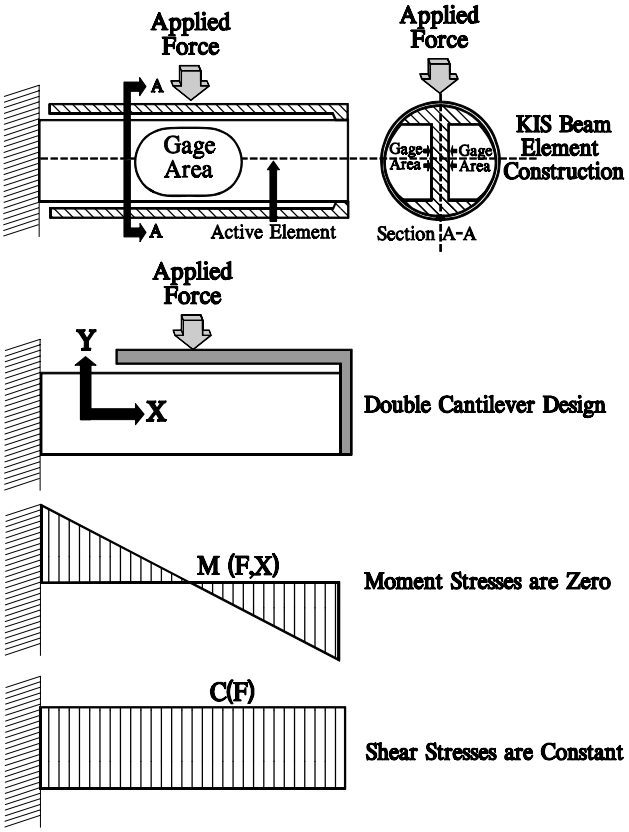
Double cantilever shear beams measure the shear component of force without errors caused by changing point or moment stresses.

The KIS Weigh Module incorporates an outer sleeve that can be thought of as a second cantilever, rigidly attached to the free end of the first cantilever. Thus the term double cantilever.

With this design, rather than applying force at the free end of the beam, the point of load application is brought back to a point directly over the gaged area. The result is that bending moment is close to zero across the gaged area. Because a shear beam is designed to measure shear, not bending, any reduction in bending moment stress is desirable. The second cantilever also is effective at isolating load application point stresses from the active element.

Reducing the force due to bending moment in a cantilever beam has a side benefit - a reduction in the beam's strength requirements. By reducing the bending moment induced at the weakest part of the shear beam (section A-A), a double cantilever shear beam can be operated at a stress level well below that of a single cantilever shear beam. The result is a more conservative structural design with high overload capacity and fatigue resistance.

Double cantilever shear beams approach the ideal in load cell design: they measure the desired force while ignoring any extraneous forces that may be present.



Product Specifications

Available Capacities	KIS-1	50 kN - 200 kN
	KIS-2	0.5 kN - 50 kN
	KIS-3*	1 kN - 20 kN
Excitation Voltage-	10 Vac-dc recommended	
	18 Vac-dc maximum	
Input Resistance	350 +/-3.0 ohms	
Output Resistance	350 +/-3.0 (+/-0.5 KIS-3) ohms	
Insulation Resistance	4 G-ohms minimum	
Rated Output (RO)	2.0394 mV/V +/-0.1%	
	(+/-0.25% KIS - 2)	
Zero Balance - %RO	KIS-1	1.0
	KIS-2	5.0
	KIS-3	1.0
Error- Max. - %RO	KIS-1	0.03 (Combined error)
(best fit through zero)	KIS-2	0.05 (Combined error)
	KIS-3	0.02 (Combined error)
Creep - %RO (Minutes)	KIS-1	+/-0.02 (5)
	KIS 2	+/-0.02 (5)
	KIS-3	+/-0.0075 (5)
Compensated Temp.	-10 to +50°C (+15 to +120°F)	
Safe Temp.	-40 to +105°C (-40 to 220°F)	
Temperature Effects:		
Zero Balance - %RO	KIS-1	0.003/°C (0.0017/°F)
	KiS-2	0.0014/°C (0.0008/°F)
	KIS-3	0.0014/°C (0.0008/°F)
Output- % Reading	KIS-1	0.0015/°C (0.0008/°F)
	KIS-2	0.0033/°C (0.0018/°F)
	KIS-3	0.0014/°C (0.0008/°F)
Repeatability	KIS-1,2,3	0.01% Rated Capacity

*KIS 3 (NTEP) Weigh Modules are designed for applications requiring ultra-high accuracy, as reflected by their superior specifications.

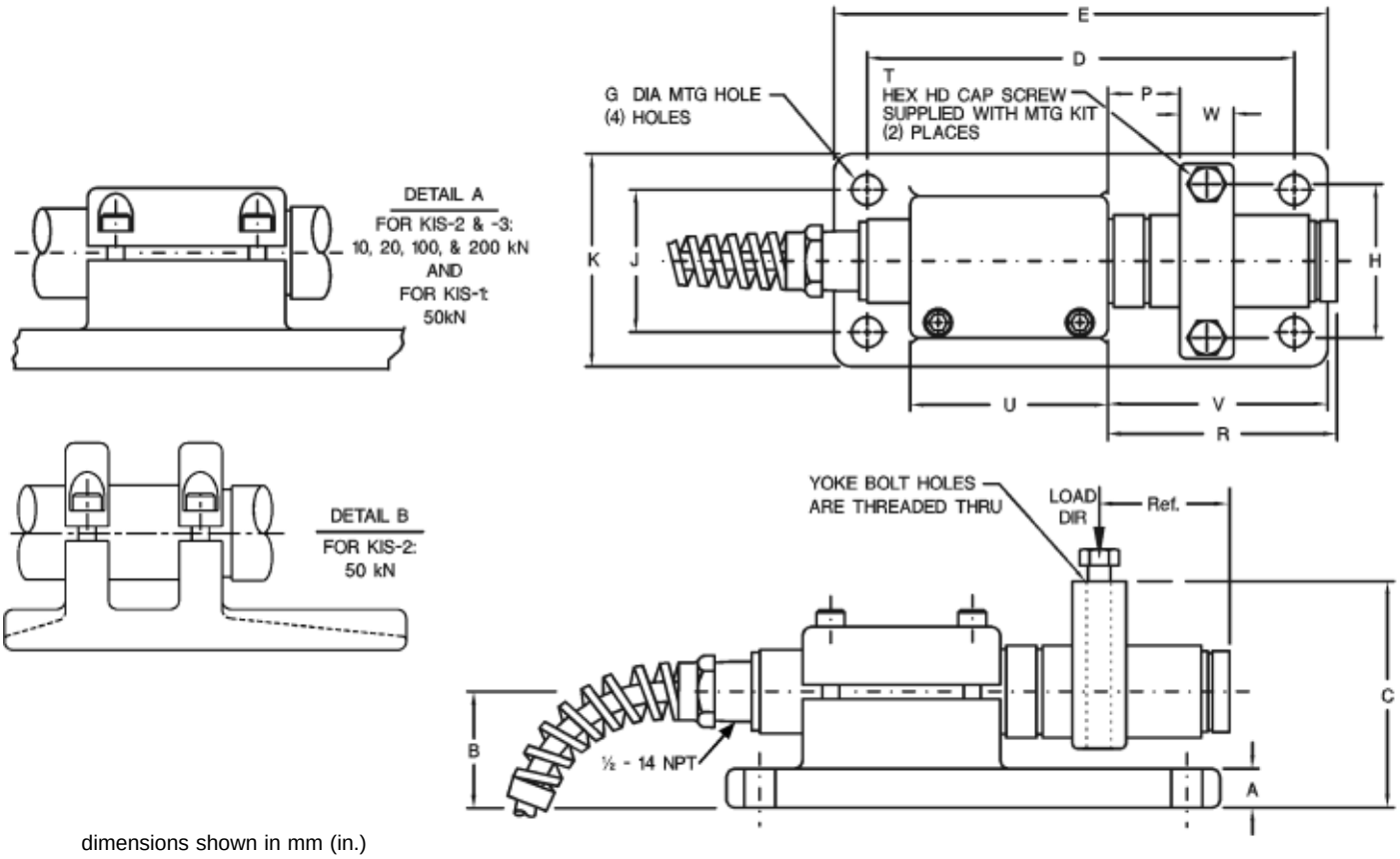
Strength Factors - %Rated Capacity		
Capacity Selection	0.5-50kN	100-200kN
Safe Load	150	150
Ultimate Load	300	300
Safe Sideload	100	100
Ultimate Sideload	200	175
Safe Uplift	100	70
Ultimate Uplift	120	85

Deflection - mm (in.)	0.5 kN	0.139 (0.0055)
(Beam Specification Only)	1 kN	0.101 (0.004)
	2 kN	0.101 (0.004)
	5 kN	0.152 (0.006)
	10 kN	0.203 (0.008)
	20 kN	0.304 (0.012)
	50 kN	0.457 (0.018)
	100 kN	0.558 (0.022)
	200 kN	0.812 (0.032)

Connection-4-Cond. Cable	KIS-1, 2, 3 10 m (32 ft. 10 in.)
Surface Conditioning/ Material	KIS-1 = Alloy Steel with Zinc Chromate Coating KIS-2, 3 = Electropolished Stainless Steel (15-5PH)
Moisture Protection	IEC IP67
Approvals	
FM (Factory Mutual)	3611 (Class I, II, III; Div.1,2; Groups A-G)
CSA	C22.2 (Class I, II,III; Div.1,2; Groups A-G)

NOTE: 1kN = approx. 225 lb

Outline Dimensions



dimensions shown in mm (in.)

Capacity kN	A	B	C	D	E	G	H	J	K
0.5-1-2-5	12.7 (0.50)	41.5 (1.63)	81.5 (3.21)	151 (5.94)	173 (6.8)	12 (0.47)	55 (2.16)	51 (2.01)	76.2 (3.0)
10-20	17.8 (0.70)	56.4 (2.22)	107 (4.23)	180 (7.09)	204 (8.03)	13 (0.512)	75 (2.95)	76 (2.99)	102 (4.0)
50	28.6 (1.125)	82.5 (3.25)	151.9 (5.98)	245 (9.65)	279 (11.0)	17.5 (0.69)	115 (4.53)	115 (4.53)	152.4 (6.0)
100	40 (1.58)	93 (3.66)	173 (6.81)	270 (10.63)	310 (12.20)	22 (0.87)	126 (4.96)	130 (5.12)	170 (6.69)
200	50 (1.97)	108 (4.25)	199 (7.83)	300 (11.81)	340 (13.39)	25 (0.98)	146 (5.75)	140 (5.51)	180 (7.09)

Capacity kN	P	R	T	U	V	W		WT-lb	Ref.
0.5-1-2-5	25 (0.99)	81 (3.19)	M8 1.25x35	60 (2.36)	78 (3.063)	19 (0.75)		7	46.4 (1.82)
10-20	45 (1.79)	115 (4.53)	M10 1.56x65	75 (2.95)	99 (3.89)	19 (0.75)		14	60 (2.375)
50	50 (1.97)	158 (6.22)	M16 2x60	109 (4.29)	128 (5.04)	31.8 (1.25)		28	93 (3.661)
100	45 (1.77)	172 (6.77)	M20 2.5x140	120 (4.72)	148 (5.827)	40 (1.575)		53	107 (4.212)
200	40 (1.58)	193 (7.60)	M24 3x160	129 (5.07)	156 (6.142)	50 (1.969)		73	128 (5.038)

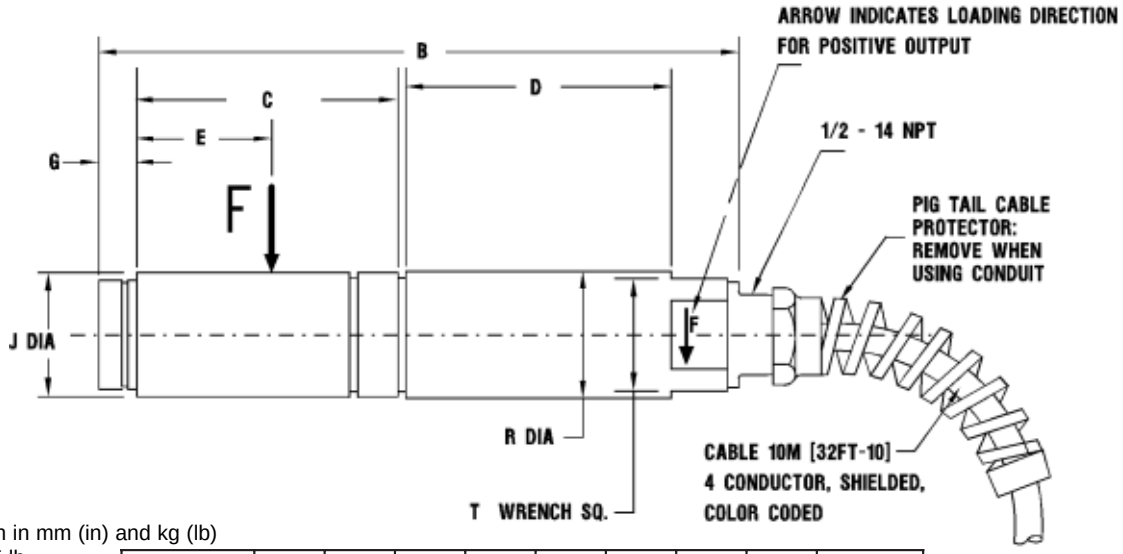
NOTES:

BLH supplied retainer-yoke bolts (T) have a minimum tensile strength of 100,000 psi

1 kN = approx. 225 lb

KIS 2, 3 (0.5 to 50 kN) modules ship with cast stainless steel mounting hardware. These units have a single piece retainer yoke assembly, threaded thru. KIS-1 50, 100, and 200 kN units are machined and have a two piece `split-block' retainer yoke assembly. In these units only the lower block is threaded thru. The upper block contains a machined through hole for the bolt to pass through.

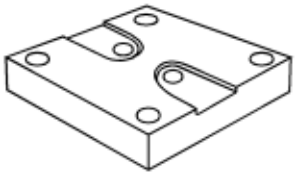
KIS Beam Dimensions



Dimensions shown in mm (in) and kg (lb)
1kN = approx. 225 lb

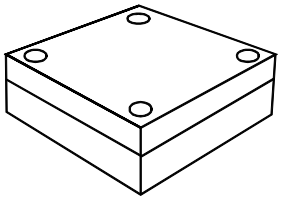
Capacity kN	B	C	D	E	G	J	R	T	Weight
0.5-1-2-5	169 (6.65)	69 (2.72)	70 (2.75)	36 (1.42)	10 (.394)	33 (1.30)	34 (1.33)	30 (1.18)	1.36 (3)
10-20	213 (8.38)	100 (3.94)	75 (2.95)	47 (1.85)	13 (.512)	50 (1.96)	51 (2.0)	46 (1.81)	3.18 (7)
50	295 (11.6)	144 (5.7)	110 (4.33)	81 (3.2)	12 (.472)	75 (2.95)	76.1 (3.03)	60 (2.36)	9.54 (21)
100	319 (12.6)	155 (6.7)	120 (4.72)	92 (3.6)	15 (.591)	90 (3.54)	91.9 (3.62)	70 (2.75)	15 (33)
200	350 (13.8)	176 (6.9)	130 (5.12)	113 (4.4)	15 (.591)	100 (3.93)	100.1 (3.97)	80 (3.15)	20 (44)

Accessories



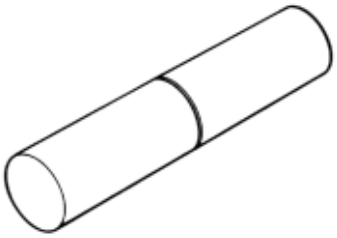
Mounting Plates

Mounting plates are available to provide a larger mounting surface with a square bolt hole pattern. These stainless steel or painted steel plates mount to the top of the yoke and attach with the standard bolts.



Thermal Insulation Kit

Thermal insulation kits (mounting plate and pad) reduce heat conducted from a heated vessel. The pads are made of rigid laminate with extremely low thermal conductivity.



Dummy Beams

Optional dummy beams are solid steel shafts with the same dimensions as the corresponding KIS beam. Dummy beams are used in place of the KIS beams during the installation process. Using dummy beams eliminates the risk of damaging precision KIS beams while welding and/or positioning the weigh vessel.

NOTE: Consult your local BLH Sales Representative for specific part number when ordering any KIS accessory.
BLH is continually seeking to improve product quality and performance. Specifications may change accordingly.

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