LUB-C LOAD CELL— INSTRUCTION MANUAL

Thank you for purchasing the KYOWA product. Before using it, please read this instruction manual carefully. Also, keep the manual within easy reach so that you can refer to it whenever necessary.

1. Safety precautions

Warning! Improper handling may cause serious injury to the operator. To avoid harm, be sure to observe the accompanying instructions.

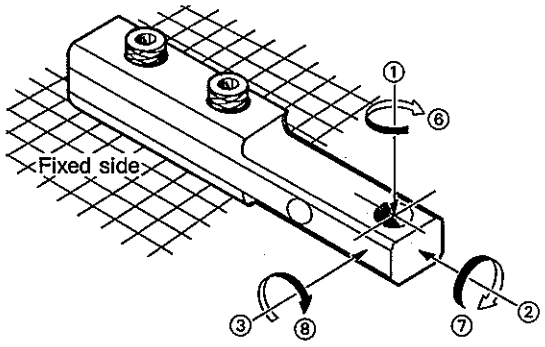
- Avoid pressure in excess of the rated loads, or the instrument may break and fall.
  Provide a safety device to prevent the load cell installation from falling.
- Loose setscrews and nuts may cause dismounting and falling of the load cell installation. Be sure to check that they are right.

2. Handling precautions

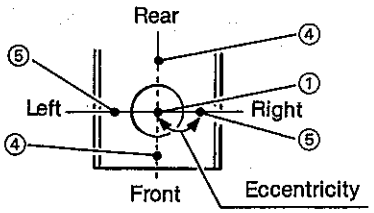
2.1 Do NOT disassemble the load cell.
2.2 Do NOT drop object on the load cell, and avoid shocks on it.
2.3 If there is an impact load or vibration, a dynamic load (static load multiplied by acceleration) is applied to the load cell. In this case, take proper care that the dynamic load does not exceed the rated capacity of the load cell.
If an excessive load may be applied to it, use a safety device to prevent its failure.
2.4 The installation base must be strong enough.
2.5 Avoid abrupt temperature changes and direct heat.
2.6 Avoid strong electric or magnetic fields which will cause noise.
2.7 Because the load cell bellows is made of rubber, avoid organic solvents such as benzene and toluene on it. Also avoid deposits on its pleats.
2.8 Do NOT bend the cable exit too much or do not pull it strongly.
2.9 In vibration environments, fix the cable at its outlet and use a proper lock.
2.10 Tighten the screw again at regular intervals in environments where they tend to loosen.
2.11 For combination with the load cell, use constant-voltage type instruments. Constant-current type instruments cannot be used.

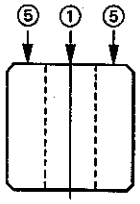
3. Load-applying precautions

3.1 Such loads as shown by ② to ⑧ in the figure below must be avoided because the measuring accuracy may be adversely affected.
The table shows the range of allowable loads which does not cause deterioration of the load cell performance when the load is removed. The structural failure will occur with loads about 1.5 times as large as those shown in the table.



Enlarged view of loading points





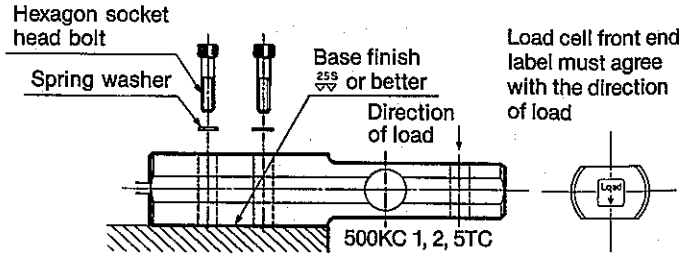
① Center load ② Axle load ③ Lateral load
④ Axial eccentric load ⑤ Lateral eccentric load
⑥ Center load axial torsional moment
⑦ Axial torsional moment
⑧ Lateral load torsional moment

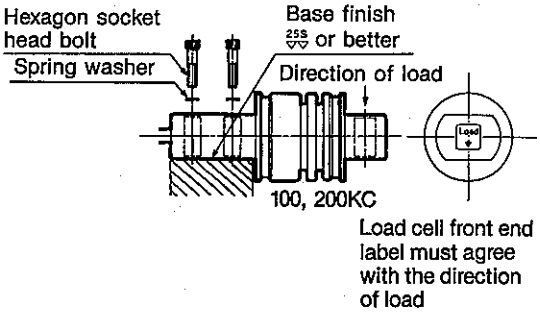
	②Axial load (kN)	③Lateral load (kN)	④ Axial eccentricity(mm)		⑤Lateral eccentricity (mm)
			Front	Rear	
LUB-100KC	1	0.5	10	30	10
LUB-200KC	2	1	10	30	10
LUB-500KC	5	2.5	15	40	15
LUB-1TC	10	5	15	40	15
LUB-2TC	20	10	15	40	15
LUB-5TC	50	25	15	40	15

NOTE1: Values of ② and ③ are the values with the center load at zero.
NOTE2: Values of ④ and ⑤ are those with the rated load.
NOTE3: Loads of ② and ③ will cause no malfunction of the load cell, but they may cause slip on the bolt-tightened part.

4. Installation

4.1 Install the load cell using hexagon socket bolts and spring washers as shown in the figure below.
4.2 To insure its locking in vibration environments, use conical spring washers (JIS B12 52 TYPE 2H).
4.3 When using rustproof stainless steel bolts, choose SUS630 H900 heat-treated ones.
4.4 The length of thread engagement should be larger than the nominal diameter of screw.
4.5 The tsble below shows the usable hexagon socket bolts tightening torque.

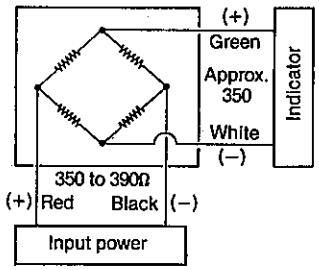




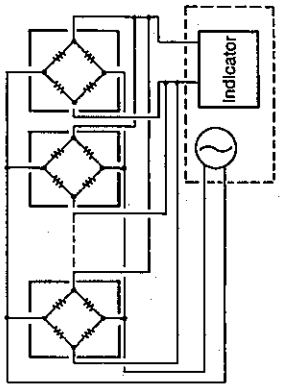
Model	Hexagon socket head bolt		Tightening torque (N•m)
	Nominal size	Strength	
LUB-100KC, 200KC	M8	12.9	26 to 38
LUB-500KC, 1TC	M12	12.9	90 to 130
LUB-2TC	M16	12.9	220 to 320
LUB-5TC	M22	12.9	540 to 840

5. Connection

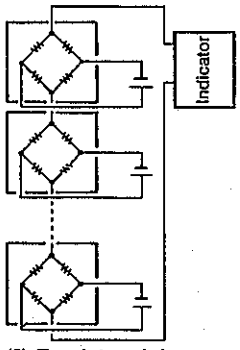
5.1 Connect the load cell to an amplifier. When connectiing, make sure of the colors of conductor wires. Note that the shield wire is not connected with the load cell proper.



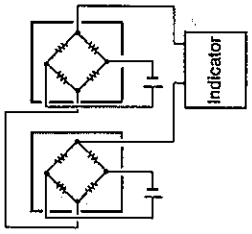
5.2 If you are using several load cells, you may use a junction box to obtain a mean measurement value. Or, you may provide DC stabilized power supplies to respective load cells, and thereby obtain an integrated or difference value. Choose the method which suits your measurement requirements.
If the load cell output is connected in parallel to indicators, the combined input impedance is 350 to 390Ω/number of load cells. Take care for the impedance that matches the indicators in use. If you are using separate bridge power supplies, choose highly stable ones.



(1) For determining the average value



(2) For determining the addition value



(3) For determining the subtraction value

6. Conversion

6.1 Use the calibration coefficient described in the inspection sheet for conversion of a reading into a load value.

6.2 In case a strain amplifier is in use, output reads in $\varepsilon \times 10^{-6}$ equivalent strain. The inspection sheet describes the load value which corresponds to 1×10^{-6} equivalent strain. Use the equation below to obtain a load value.

$$\text{Load} = (\text{Amplifier's output}, \varepsilon \times 10^{-6}) \times (\text{Calibration coefficient, kN/1} \times 10^{-6})$$

6.3 In case an amplifier of other type or a recorder is in use, it is necessary to measure the applied bridge voltage accurately. The inspection sheet describes the load value which corresponds to 1μV output voltage against 1V voltage applied. Use the equation below to obtain a load value.

$$\text{Load} = \frac{\text{Output bridge voltage, } \mu V}{\text{Applied bridge voltage, V}} \times (\text{Calibration coefficient, kN/1}\mu V/V)$$

7. Storage precautions and inspection

7.1 Recalibrate the load cell once a year or so. In case the load cell was subjected to an overload or an excessive load other than on the center, be sure to calibrate and check to be sure that load cell provides proper performance.

7.2 Avoid water on the cable end.

7.3 Do not raise the load cell by holding its cable.

7.4 If a suspicious initial value or reading appears, go back to the item 2: Handlding precautions and see if . Also measure input/output resistance and insualtion resistance (which should be 50MΩ or higher/50Vdc). If the measurements are abnormal, the cause may be failure of the sensing element.
Alsol check that the initial value (outputted with no load) stays within ±250μV/V (±500 x 10^{-6} strain). If these values are abnormal, contact your KYOWA representative for necessary inspection and repiar by the manufacturer.
NOTE: To measure insulation resistance, be sure to apply voltage below 50V to your insulation resistance tester.

8. Specifications

Model	Rated capacity	Natural freq. (app)	Weight (app.) (incl. cable)
LUB-100KC	1kN (102.0kgf)	1kHz	320g
LUB-200KC	2kN (203.9kgf)	1.3kHz	320g
LUB-500KC	5kN (509.9kgf)	1.3kHz	1.3kg
LUB-1TC	10kN (1.020tf)	2kHz	1.3kg
LUB-2TC	20kN (2.039tf)	1.3kHz	2.7kg
LUB-5TC	50kN (5.099tf)	—	5.7kg

Model	Cable (terminated in exposed wires)
LUB-100KC	0.08mm², 4-conductor shielded chloroprene 1m, ø4mm
LUB-200KC	0.08mm², 4-conductor shielded chloroprene 1m, ø4mm
LUB-500KC	0.14mm², 4-conductor shielded chloroprene 2m, ø6mm
LUB-1TC	0.14mm², 4-conductor shielded chloroprene 2m, ø6mm
LUB-2TC	0.14mm², 4-conductor shielded chloroprene 2m, ø6mm
LUB-5TC	0.3mm², 4-conductor shielded chloroprene 2m, ø8mm

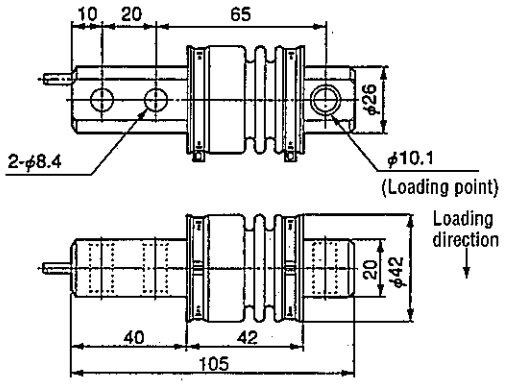
NOTE: The units and numerical values in brackets in [CAP.] column on the nameplate and in the above rated capacity column depend on the conventional unit expression method just for reference.

Safe overlod rating	150%
Rated output	2mV/V(4000x10^{-6} strain)±0.5%
Non-linearity	±0.05%RO or better
Hystereis	±0.05%RO or better
Repeatability	0.03%RO or better
Recommended bridge voltage	1 to 12V, AC or DC
Safe bridge voltage	20V, AC or DC
Input resistnace	370Ω±20Ω
Output resistance	350Ω±2Ω
Compensated temp. range	−10 to +60°C
Safe temperaturerange	−20 to +70°C
Thermal effect on zero balance	±0.003%RO/°C or better
Thermal effect on output	±0.003%/°C or better

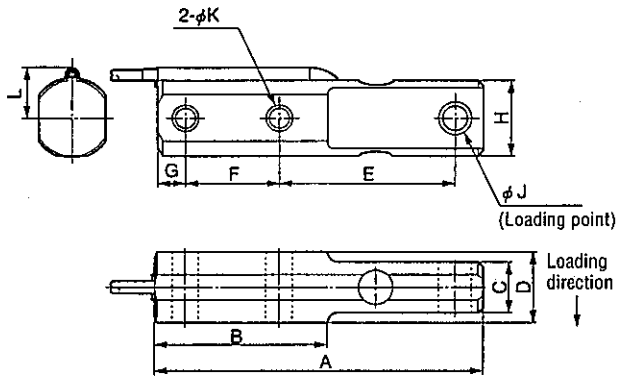
■ Accessories

Calibration sheet	1
Guarantee	1
Instruction manual	1

9. Dimensional drawing



LUB-100, 200KC



Model	A	B	C	D	E	F	G	H	J	K	L
LUB-500KC	174	88	23.4	35	95	50	14	38	16.1	14	27
LUB-1TC	174	88	25.8	35	95	50	14	38	16.1	14	27
LUB-2TC	206	106	32.6	44	110	60	16	53	20.2	18	34
LUB-5TC	292	150	44	58	160	80	25	69	28.2	24	44

LUB-500KC to 5TC

KYOWA

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