LUB-B 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 capacity, 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.. Installation

2.1 Install the load cell using hexagon socket bolts and spring washers as shown in Fig.1.

2.2 If the load cell is to be exposed to vibration, use conical spring washers (JIS B1252, Type 2H) to ensure firm installation.

2.3 In case stainless steel bolts are to be used to prevent rust, use heat-treated SUS630 H900 bolts.

2.4 The length of thread engagement must be larger than the nominal screw diameter.

2.5 Table 1 describes the usable hexagon socket bolts and tightening torques.

Type	Hexagon socket head bolt Designation(Strength)	Tightening torque (N•m)
LUB-5KB~50KB	M6 (12.9)	10~15
LUB-100KB, 200KB	M8 (12.9)	26~38
LUB-500KB, 1TB	M12 (12.9)	90~130
LUB-2TB	M16 (12.9)	220~320

Table 1. Correct tightening torque

2.6 With LUB-5KB~50KB, a load can be applied to a jig attached to the M8 screw's top. Fig. 2 illustrates how to give a knife-edge load onto a jig attached. In this case, observe the following precautions.

NOTES

(1) Attach a jig to the M8 screw before fixing the load cell while holding it at its front in order to keep the bellows free from torque and other external forces.

(2) The load cell has been calibrated with a load given to the center of the ø8.1 hole. If the loading point should shift from the hole center, output variations can accordingly occur. (Output variations will be about 0.1% with a 15mm shift.)

(3) In view of the load cell strength, a shift quantity of S of the loading axis from the hole center must not exceed 15mm.

The arrow mark on the front end label (side label on 50KB or smaller ones) must accord with the direction of load.

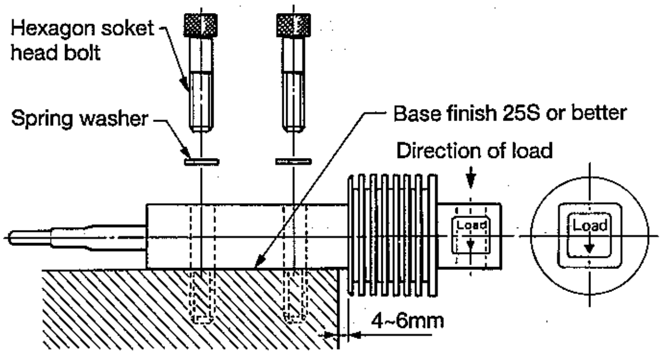


Fig. 1

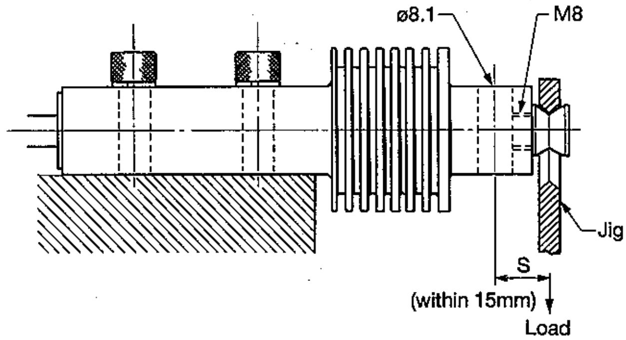
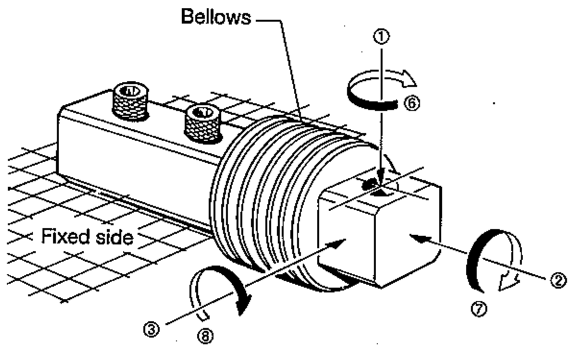


Fig. 2

3. Handling precautions

3.1 Such load as shown by ② ~ ⑧ should be reduced as much as possible, because the measuring accuracy can be adversely affected. If they are large, the load cell can be damaged. Table 2 shows the range of allowable loads which do not cause deterioration of the load cell performance. The structural failure will occur with loads about 1.5 times as large as those shown in Table 2.



① Center load ② Axial 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

Enlarged view of loading points

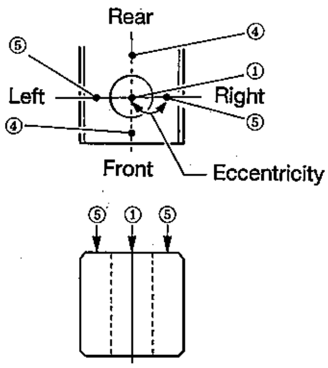


Fig. 3

Type	② Axial load (N)	③ Lateral load (N)	④ Axial eccentricity (mm)		⑤ Lateral eccentricity (mm)
			Front	Rear	
LUB-5KB	50	50	20	40	20
LUB-10KB	100	100	20	40	20
LUB-20KB	200	200	20	40	20
LUB-30KB	300	300	20	40	20
LUB-50KB	500	500	20	40	20
LUB-100KB	1000	500	10	30	10
LUB-200KB	2000	1000	10	30	10
LUB-500KB	5000	2500	15	40	15
LUB-1TB	10000	5000	15	40	15
LUB-2TB	20000	10000	15	40	15

Table 2

NOTES

(1) Values of ② and ③ are the values with a center load at zero.
(2) Values of ④ and ⑤ are those with a rated load.
(3) Loads of ② and ③ will cause no malfunction of the load cell, but they may cause slip on the bolt-tightened part according to tightness.

3.2 If there is an impact load or vibration, a dynamic load (static load multiplied by acceleration) is affected on the load cell. In this case, take proper care that the said load does not exceed the load cell's rated capacity.
If an excessive load is expected to apply to it, be sure to use a safety device to prevent the it's destruction.

3.3 The installation base must be strong enough.

3.4 Avoid abrupt temperature changes and direct heat.

3.5 Avoid strong electric or magnetic fields which will cause noise.

3.6 Carefully handle the load cell bellows because it is thin and can be easily damaged. Avoid deposits on its pleats. Or else, its characteristics may be deteriorated.

3.7 Do not bend the cable exit too much or do not pull it forcibly.

3.8 In vibration environments, fix the cable at its outlet and use a proper lock.

3.9 Tighten the screws again at regular intervals in environments where they tend to loosen.

3.10 For combination with the load cell, use a constant-voltage type amplifier. (A constant-current type amplifier cannot be used.)

4. Connection

4.1 Connect the load cell, observing the colors of conductors as illustrated in Fig.4. The shield wire is not connected to the transducer mainframe.

4.2 If you are using several load cells, use a junction box and determine the average value. It is also possible to provide DC stabilized power supply for each load cell and determine the addition value or subtraction value. Choose the method which suits your measuring requirements. (Fig.5)
If the load cell output is connected in parallel to indicators, the combined input impedance is: 350Ω~495Ω/number of load cells. Take care for the impedance matching with indicators.
In case you use independent bridge power supplies, they must be highly stable.

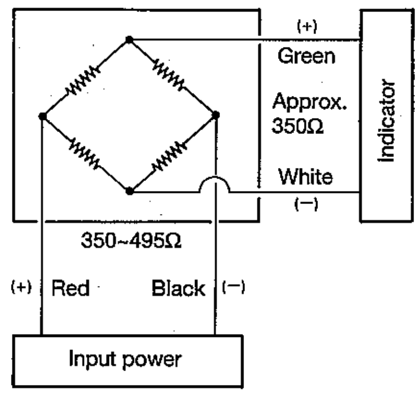


Fig. 4

Fig.5 (1) For determining the average value

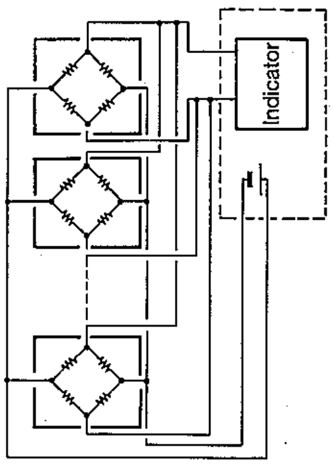


Fig.5 (2) For dtermining the addition value

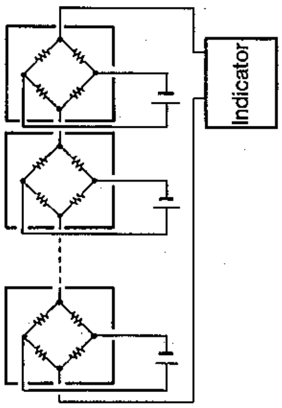


Fig.5 (3) For determining the subtraction value

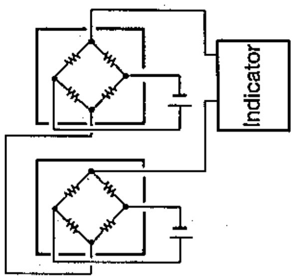


Fig. 5

5. Conversion

5.1 Use the calibration factor described in the calibration sheet to find a load value through calculation.

5.2 In case a strain amplifier is in use, its output reads in ($\varepsilon \times 10^{-6}$). To calculate a load value, find the value which corresponds to an equivalent strain of (1×10^{-6}), then multiply it using the following equation.

$$\text{Load} = (\text{Strain amplifier's output: } \varepsilon \times 10^{-6}) \times (\text{Calibration factor: N}/1 \times 10^{-6})$$

5.3 If a different type of amplifier or a recorder is in use, it is necessary to accurately measure the bridge exciting voltage in use.

The calibration sheet describes the load value corresponding to an output voltage of 1µV against a bridge exciting voltage of 1V. Use the following equation to calculate.

$$\text{Load} = \frac{\text{Bridge output voltage: } \mu V}{\text{Bridge voltage: V}} \times \text{Calibration factor: N}/1\mu V/V$$

6. Maintenance

6.1 Do not disassemble the load cell.

6.2 Do not drop objects on the load cell and avoid shocks on it.

6.3 Recalibrate the load cell about once a year.

6.4 If overloads (high than the allowable load) or excessive loads other than center loads are applied, always recalibrate the load cell and check to make sure that it functions properly.

6.5 Avoid water splashes on the cable terminal.

6.6 Do not suspend the load cell by holding its cable.

7. Inspection

In case of unstable indicator values or malfunction, check that the load cell is properly connected to the indicator and that the precautions in Section 2 have been observed, then make the following inspections on the load cell.

7.1 Check input/output resistance with a tester, etc. (See Fig. 6.)

7.2 Make sure the insulation resistance of the load cell itself and that of conductors are higher than 50MΩ/50Vdc. Do not use a megger for this measurement.

7.3 Make sure that the no-load output (initial unbalance) is within ±200µV/V (±400x10^{-6} strain).

If these measured values are abnormal, contact your KYOWA representative.

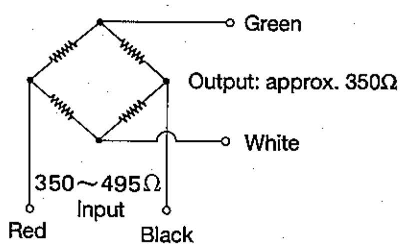
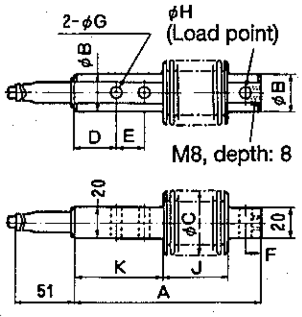


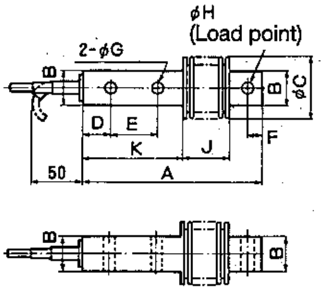
Fig. 6

If you are not sure about the connection method or others, contact your KYOWA representative.

8. Dimensional drawing



LUB-5KB~50KB



LUB-100KB~2TB

Model	A	B	C	D	E	F	G	H	J	K
LUB-5~50KB	120	ø24	ø42	27	18	10	ø6.6	ø8.1	40	58
LUB-100~200KB	120	20	ø42	25	20	10	ø8.4	ø10.1	36	60
LUB-500KB~1TB	190	35	ø67	30	50	15	ø13	ø16.1	45	110
LUB-2TB	220	44	ø84	30	60	20	ø17	ø20.2	54	124

9. Specifications

Model	Rated capacity	Natural freqency (approx.)	Weight (approx.)
LUB-5KB	50N (5.099kgf)	250Hz	0.53kg
LUB-10KB	100N (10.20kgf)	350Hz	0.53kg
LUB-20KB	200N (20.39kgf)	500Hz	0.53kg
LUB-30KB	300N (30.59kgf)	650Hz	0.53kg
LUB-50KB	500N (50.99kgf)	800Hz	0.53kg
LUB-100KB	1kN (102.0kgf)	1800Hz	0.8kg
LUB-200KB	2kN (203.9kgf)	1900Hz	0.8kg
LUB-500KB	5kN (509.9kgf)	1100Hz	1.9kg
LUB-1TB	10kN (1.020tf)	1200Hz	1.9kg
LUB-2TB	20kN (2.039tf)	1100Hz	3.2kg

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

Safe overload rating: 150%
Rated output: 2mV/V (4000 × 10^{-6} strain)±0.3%
Non-linearity: ±0.05%RO (±0.03%RO on 5~50KB)
Hysteresis: ±0.05%RO (±0.03%RO on 5~50KB)
Recommended excitation voltage: 1~12V, AC or DC
Safe excitation voltage: 20V, AC or DC
Input resistance: 400Ω±12.5% (435Ω±13.8%, approx. on 5~50KB) or better
Output resistance: 350Ω±0.57%
Repeatability: 0.03%RO or better
Compensated temperature range: −10~60°C
Safe temperature range: −20~70°C
Thermal effect on zero balance: ±0.003%RO/°C
Thermal effect on output: ±0.003%/°C
Waterproof: JIS C 0920 watertight
Cable: 0.3mm², 4-conductor shielded chloroprane 5m, ø7.6mm, terminated in soldered end (3m cable on 5~50KB)

■ Auxiliaries

Calibration sheet 1
Guarantee 1
Instruction manual 1

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