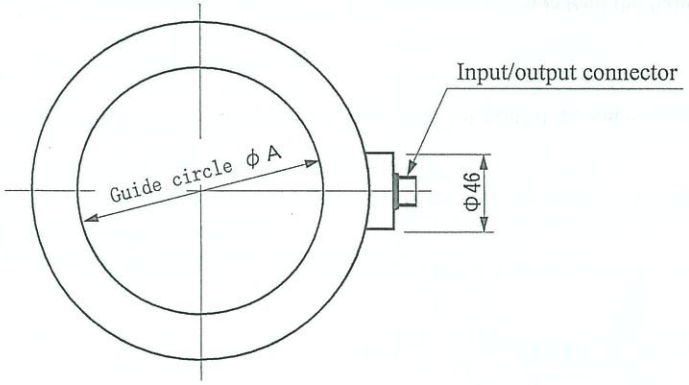
Operation Manual of TML Load Cells

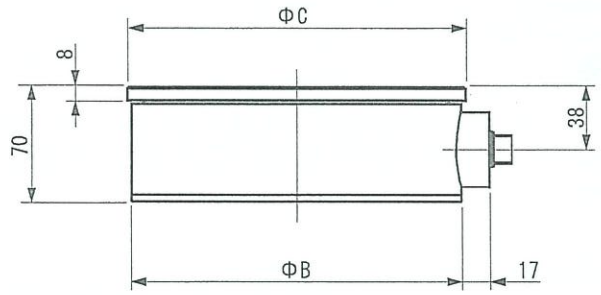
This operation manual applies to the following products but products with special specifications are partly out of the manual.

CLF-500KNA～2MNA / CLF-50～200

Before use, be sure to read the manual and retain it together with test data.

1. DIMENSIONS





Unit (mm)

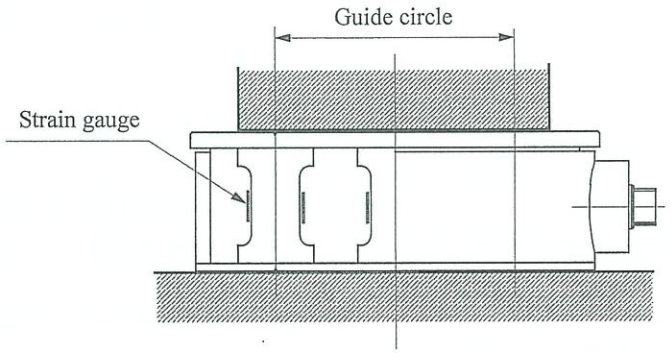
Type		A	B	C	Weight (kg)
SI	Gravitation				
CLF-500KNA	CLF-50	95	140	145	6
CLF-1MNA	CLF-100	130	180	185	8
CLF-1.5MNA	CLF-150	150	200	205	10
CLF-2MNA	CLF-200	170	220	225	13

2. INSTALLATION

The load cell should be correctly installed; otherwise precise measurement will not be performed and deformation or damage may occur.

① A load should be applied straightway along the axial line of the load cell. Take care not to exert side, eccentric or eccentric angular loading.

② A load should be applied uniformity to the whole sensing surface. Guide circles are indicated on the upper and bottom sensing surfaces. A load should be applied uniformity at least the surface in the guide circle. If a small object contacts the sensing surface, apply a thick plate bigger than the guide circle between the object and the sensing surface. If a load is applied directly by a mild metal such as copper or aluminum, a press mark may remain.



Bad example

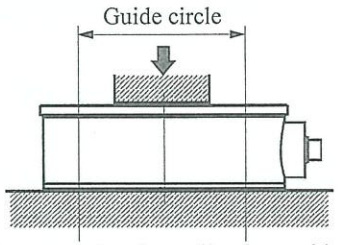


Fig. 1 (Contact surface is smaller than guide circle.)

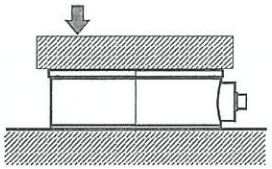


Fig. 2 (Eccentric and intensive loading)

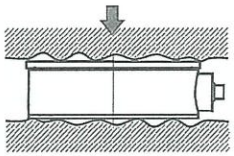


Fig. 3 (Non-flat surface)

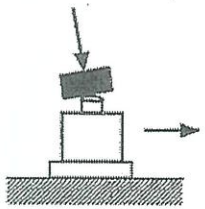
3. CAUTION

⚠ Caution

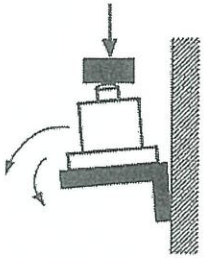
Our tension load cell does not incorporate a safety mechanism to prevent dropping on breaking the load cell. In case of hanging the load cell, consider sufficient safety ratio and install a safety device for prevention of dropping.

For accessories for our tension load cells, use our products. High tensile steel, etc. are adopted to make them small and light. If those accessories are made of mild steel with same figure, they may be deformed or broken.

Do not apply eccentric or side load to the load cell. Otherwise, the load cell, etc. may fly to injure persons.



Make sure that the fixing part of the load cell has sufficient strength. Deformation or damage may get the load cell to drop.



① Use the load cell and accessories within the rated capacity.
In case of exceeding the allowable overload,
the performance of the load cell and accessories may deteriorate. In the event of exceeding the breaking overload, there is a possibility of damage or break.

② When a shock is expected, take care so that the shock load does not exceed the rated capacity.

Shock load = Mass × Shock Acceleration

③ In case of long-term cycle loading, use within half of the rated capacity to extend the fatigue life.

④ Securely fasten the fixing screws of the load cell and also use a loosing stopper.

4. CAUTION FOR PRECISE MEASUREMENT

① Do not use in excess of allowable temperature range.

② Take care so that a thermal stress does not occur to the load cell owing to temperature variations around the load cell and its surrounding structures. A drastic temperature change makes the output of the load cell unstable. In order to avoid radiation or direct sunlight from some heat source, put a cover, etc. if necessary.

③ Surely connect the load cell connector receptacle with cable in order for dust and waterproof. When the cable is detached, apply a connector cap.

④ Take care of immersion of water or oil from the end of input / output cable.

⑤ Do not forcibly bend near the root of the cable.

⑥ Do not use beyond the allowable excitation voltage.

⑦ Continuous operation in excess of the recommended excitation voltage may drive drift, etc. to make the load cell out of the specification.

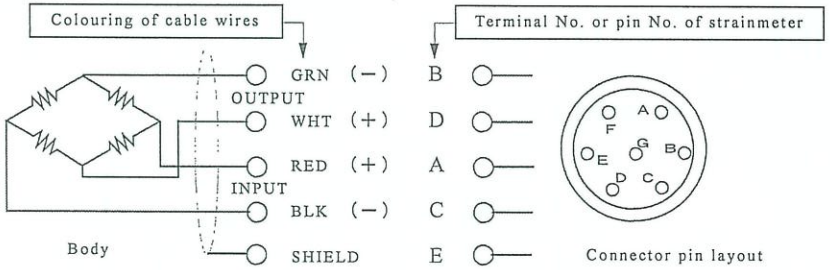
⑧ In case of using other instruments than strain meter, employ an instrument having well stable excitation voltage to the electrical bridge circuit.

⑨ Never disassemble or alter the load cell.

5. MEASUREMENT

① The load cell is calibrated with a constant voltage excitation type strainmeter using the supplied cable. The rated output and sensitivity shown on the test data are found with an instrument gauge factor of 2.00 (In case of using TML data logger, its coefficient should be set to 1.00.)

② One end of the supplied cable is usually supplied without connector plug. The cable is connected to a strainmeter or its switching box by screwing or soldering. In case of using NDIS 7-pin connector plug, refer to the following connection layout.



N.B. The shielded wire of the cable is not connected to the load cell body.

상기 배선 기준 인장시 + 값으로 증가합니다.

③ Measured value shows '-' polarity with increase in load. When reverse polarity is required, change connections with the terminals B and D.

④ Set necessary measuring parameters to a strainmeter, recorder, computer, etc. (For strainmeter, for example, initial balancing, sensitivity adjustment, settings of unit, coefficient and measure mode, initial value measurement and so on.)

⑤ In ordinary measurement, it is recommended that the strainmeter is previously set to direct measure mode in physical unit. In case of strain reading, load can be found using the following equation.

Load	=	Measured Value	×	Calibration Coefficient	
[kN,MN]		[$\times 10^{-6}$]		[kN,MN／$\times 10^{-6}$]	—— International system of unit (SI)
[tf]		[$\times 10^{-6}$]		[tf ／$\times 10^{-6}$]	—— Gravitational system of unit

⑥ In case that the cable is extended under constant voltage excitation, correct the lowering of sensitivity using the following equation

$$\text{Equation} : \quad \varepsilon_o = \left\{ 1 + \frac{r}{R} \right\} \varepsilon$$

where
- ε_o = Real value after correction [kN,MN] [tf] [μ]
- ε = Measured value [kN,MN] [tf] [μ]
- R = Input resistance of transducer [Ω]
- r = Resistance value of extended cable (Total resistance at input) [Ω]

Sectional area of wire of extended cable (mm^2)	0.05	0.08	0.3	0.35	0.5
Total resistance value per meter (Ω)	0.63	0.44	0.12	0.11	0.071

6. CHECK AND STORING

① Measure an initial unbalance value [$\times 10^{-6}$] in DIRECT mode of the strainmeter. The initial unbalance value means strain output [$\times 10^{-6}$] at no load.

② Using an insulation resistance tester with an excitation voltage of 50VDC or less, measure insulation resistance [MΩ] between input / output wires of the cable (Red, Green, Black and White) and the load cell body.

③ With a digital voltmeter or tester, measure resistance values [Ω] between each input / output wire. Make sure that the measured values ①, ②, ③ are not largely different from the values shown on the test data.

④ For storing, avoid high or low temperature, high humid place, dust, water drop, vibration, shock, etc. Handle the supplied cable as well but with a cable cap put.

7. STANDARD ACCESSORIES

- Test data 1 copy
- Operation manual 1 copy
- Cable 1 pc. (ϕ 9, 0.5mm^2, 10m, Free end)

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