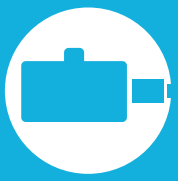
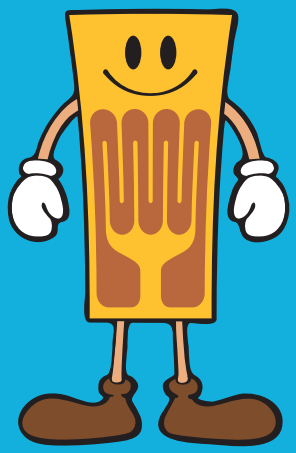
Transducers
(Strain gage based & others)

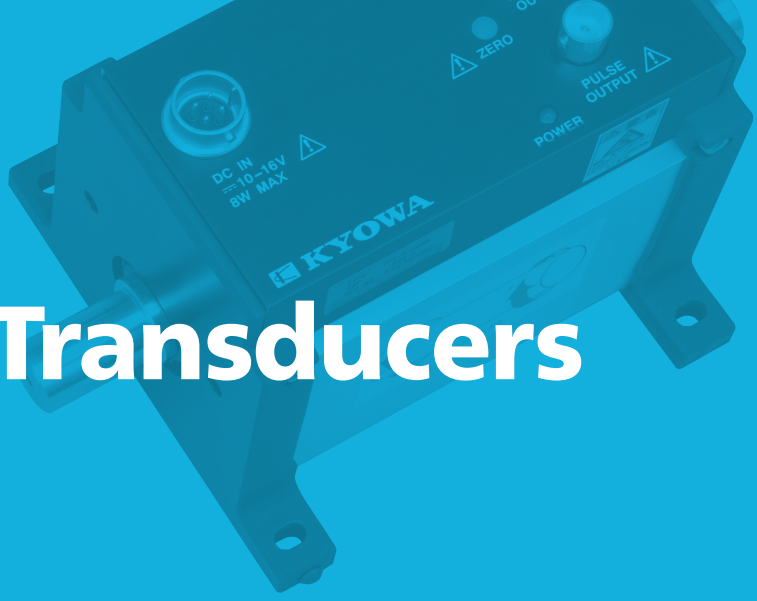
2





Note:
When using for special purposes, please contact us.
For prices and delivery date, please contact us.

Strain Gage Transducers



About strain & μm/m
Strain is an absolute value without unit.

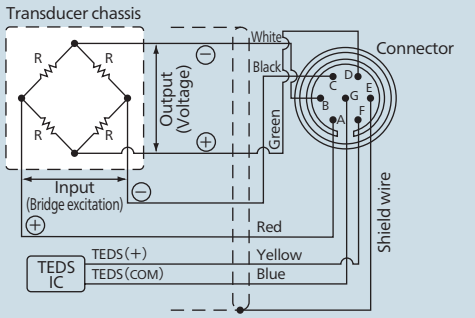
It expresses the ratio of elongation to the original length.
For example,
if a bar changed 0.001 mm from its original 1 m long,
then the strain is 0.001mm/1m=0.000001=1μm/m

Important Notice
Strain gage transducers cannot be used under hydrogen environment.

(For automotive test transducers, refer to chapter 5.)
(For civil engineering and architectural transducers, refer to chapter 7.)

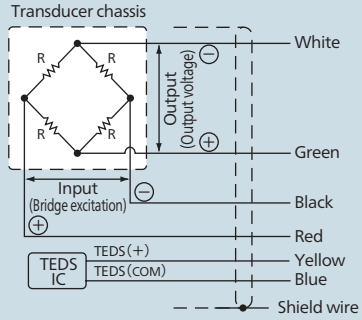
Transducer's Bridge Circuit and Cable Connection

●Cable terminated with an NDIS connector plug



TEDS(+) and TEDS(COM) are expressed as TEDS+ and TEDS- respectively in some measuring instruments.

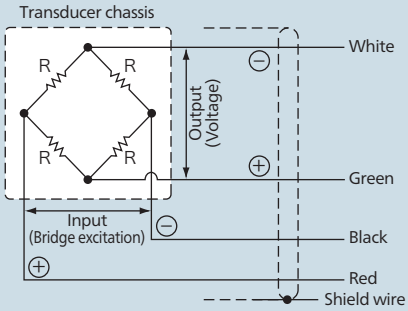
●Cable bared at the tip



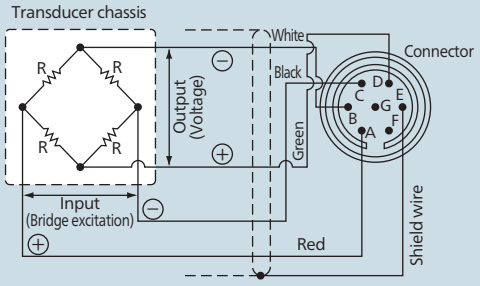
TEDS(+), TEDS(COM) are expressed as TEDS+,TEDS- respectively in some measuring instruments.

Transducer's Bridge Circuit and Cable Connection

●Cable bared at the tip



●Cable terminated with an NDIS connector plug



For most transducers, the shield wire is not connected to the case.

●Resistances between conductors or plug pins (In case of a 120 Ω or 350 Ω transducers)

Connector plug pins		Input (A-C)	Output (B-D)	A-B	A-D	B-C	C-D
Conductors		RD-BK	WT-GR	RD-WT	RD-GR	WT-BK	BK-GR
Bridge resistance (R)	350 Ω	350 Ω	350 Ω	262.5 Ω	262.5 Ω	262.5 Ω	262.5 Ω
	120 Ω	120 Ω	120 Ω	90 Ω	90 Ω	90 Ω	90 Ω

Strain gage transducers are designed to transduce physical variables such as load, force, pressure, acceleration, vibration, displacement and torque into electric signals by using strain gages as sensing elements. The electric output signals can be connected to various measuring instruments to monitor, record and control physical variables. Use of strain gages as sensing elements makes the transducers compact & lightweight while ensuring least mechanical displacement and superior linearity due to simple structure. Practically, strain gage transducers are widely used for research and as industrial measuring devices for production control. Among them, load cells are used to detect compressive or tensile force; pressure transducers, to detect water, oil or air pressure; acceleration transducers, to detect impact or vibration acceleration; displacement transducers, to detect displacement in various loading tests and materials tests; torque transducers, to detect torque such as twisting force of a rotating object; transducers for automotive tests; and civil engineering and architectural transducers, to measure soil pressure, stress, pore pressure, etc.

Conversion of Measured Strain or Output Voltage into Physical Quantity

Measured strain or output voltage can easily be converted into physical quantity by using the calibration constant written in the Test Data Sheet attached to each transducer.

●Measured strain on strain amplifiers
Wanted physical quantity = Measured strain (μm/m) x A
A: Calibration constant indicating the physical quantity corresponding to 1-μm/m equivalent strain.

●Output voltage on other type of amplifier or recorder

$$\text{Wanted physical quantity} = \frac{\text{Bridge output voltage } (\mu V)}{\text{Bridge voltage (V)}} \times B$$

B: Calibration constant indicating physical quantity corresponding to 1-μV output/1-V bridge voltage

Rated output of each transducer is stated in voltage(mV/V) and strain(μm/m).

Rated output of each transducer is stated in mV/V. It indicates the voltage (mV) which is output for the rated capacity with the bridge voltage at 1 V.
The output voltage has the following relation with a strain quantity (μm/m):
1 mV/V = 2000 μm/m

For details, refer to Technical Notes page 9-14.

Sensitivity Decrease due to Cable Extension

If a strain gage transducer is connected to a signal conditioner, digital indicator or strain amplifier via extension cable, we cannot ignore the sensitivity decrease due to the extension cable resistance which lowers the voltage applied to the transducer.
The rated output with lowered sensitivity can be obtained from the following equation:

$$\varepsilon_0 = \left(\frac{R}{R + (r \times L)}\right) \varepsilon_i$$

R: Transducer's input resistance (Ω)
r: Extension cable's reciprocating resistance (Ω) per meter
L: Extension cable length (m)
ε_i: Rated output written in the Test Data Sheet

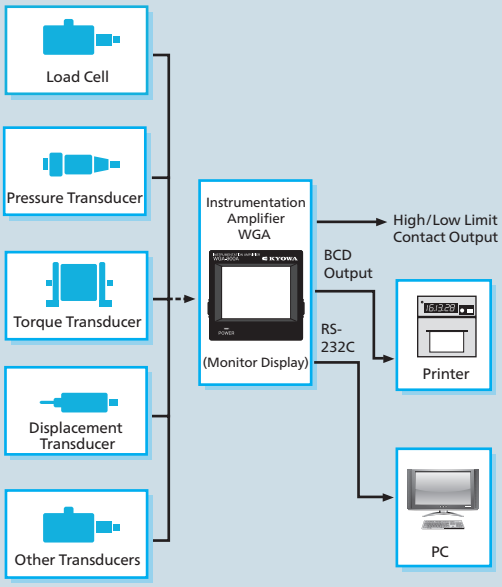
Sensitivity Decrease in Kyowa's Extension Cables

Models	Cable Length (L)	Sensitivity Dropped (Approx.)	Reference	
			r×L (Ω) (Approx.)	$\frac{R}{R+(r\times L)}$
N-82	10 m	0.2%	0.8	0.998
N-83	20 m	0.5%	1.6	0.995
N-84	30 m	0.7%	2.4	0.993
N-85	50 m	1.1%	4	0.989
N-100	100 m	2.2%	8	0.978

Bridge resistance R = 350Ω,
Reciprocating resistance per 1 m of 4-conductor (0.5 mm^2) chloroprene cabtyre extension cable: 0.0794 Ω ≈ 0.08Ω

■Measuring System Block Diagrams

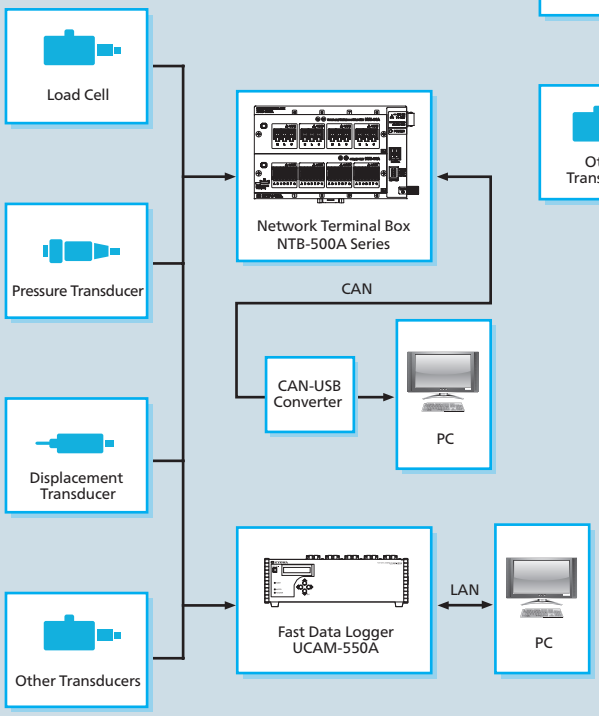
●Indication, Measurement, Control & Monitor



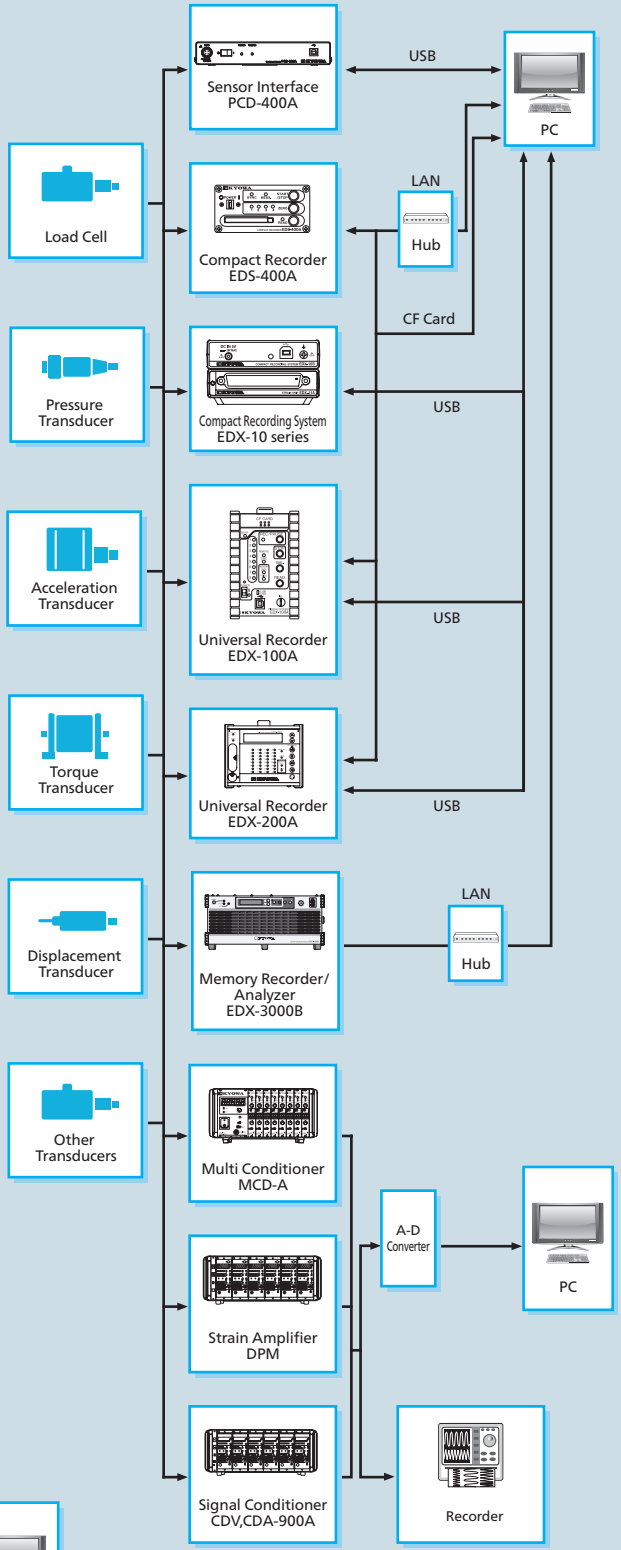
Transducer's connectors and cables differ depending on models. For details, refer to description of each model or pager 8-1.

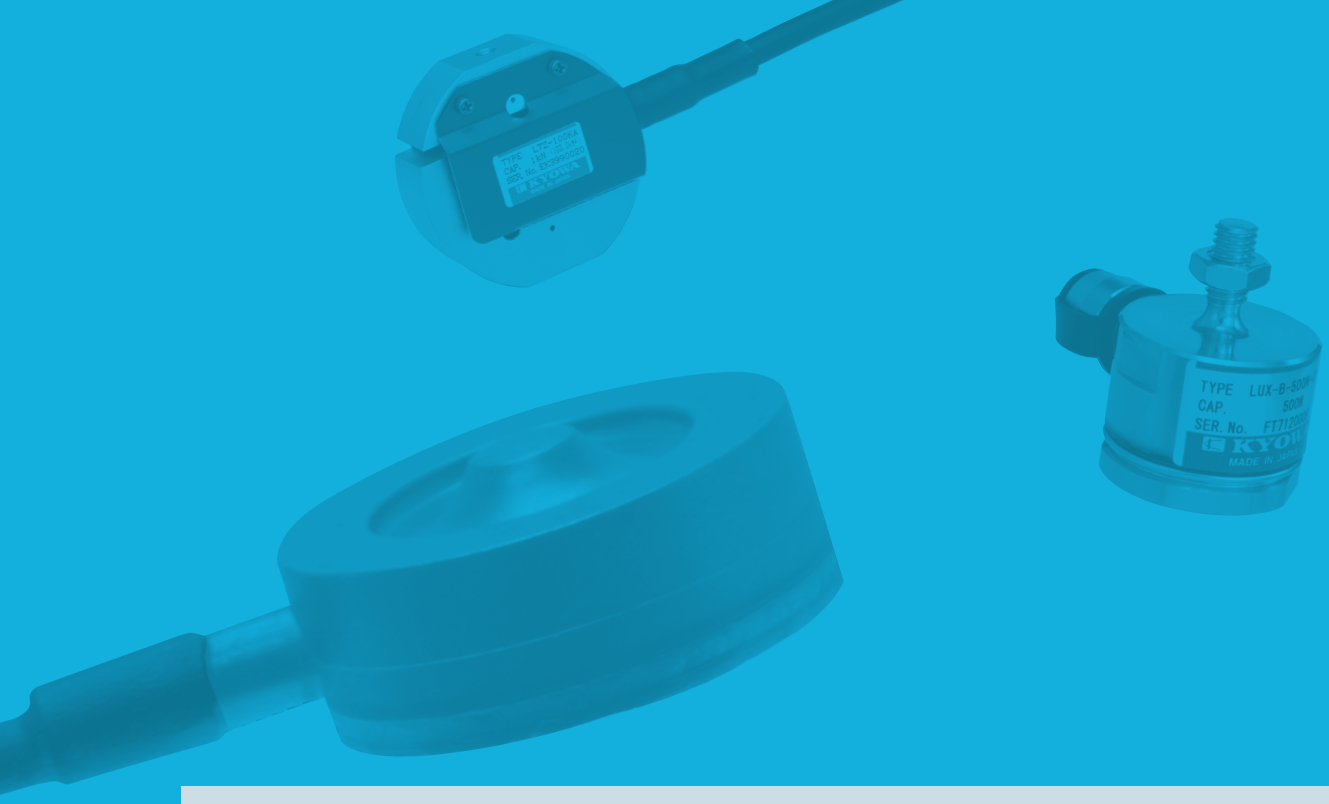
Note: In combination use of pressure transducers and instrumentation conditioners in WGA series, the measuring range is rarely exceeded due to initial unbalance of the transducer. For details, contact us.

●Measurement of Dynamic Phenomena at Medium Speed

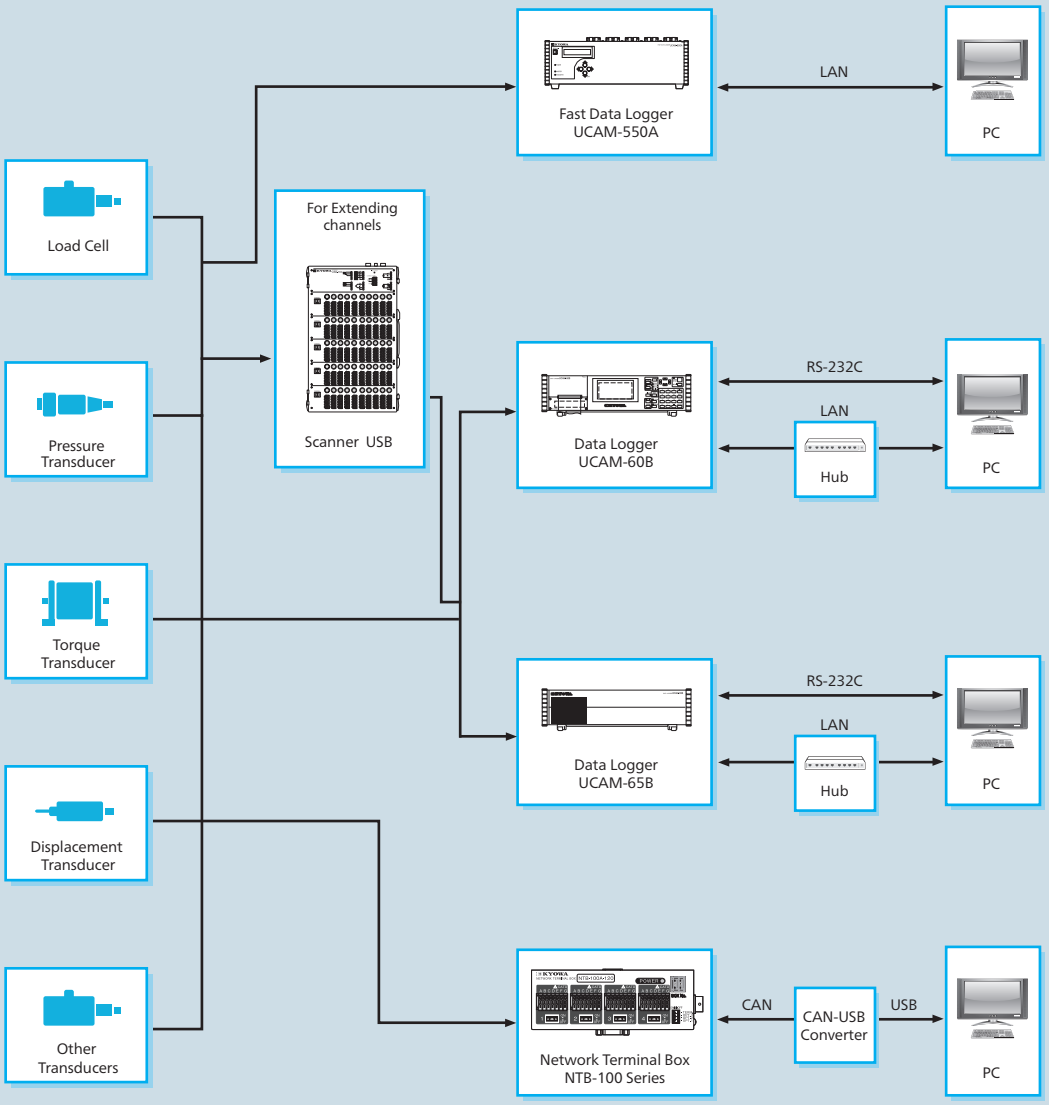


●Measurement of Dynamic Phenomena





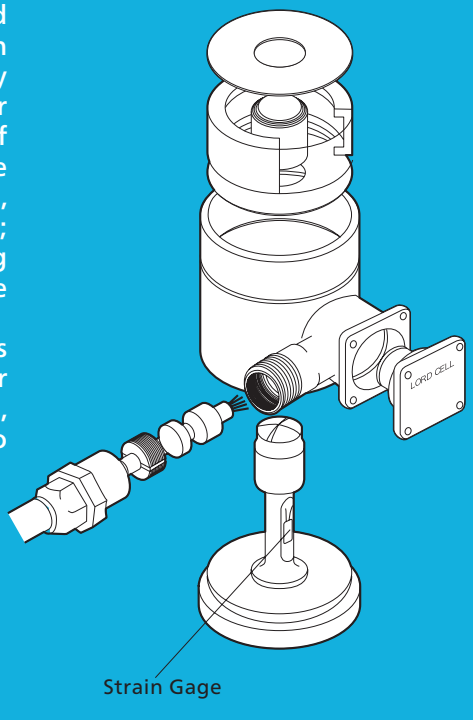
●Measurement of Static Phenomena



Load Cells (Load Transducers)

Kyowa's load cells offer outstanding and sustained performance over long-term usage even under harsh operating conditions by adopting our independently developed, dedicated strain gages of excellent accuracy, our superior production technologies, calibration equipment of supreme precision, and our rich experience in this field. We offer a full range of models to satisfy all industrial needs, including models for compression and tension applications; explosion-proof models usable in environments containing dangerously explosive liquids, gases, etc.; washer type models for measuring rolling pressure, etc.
Kyowa's load cells can be used in sensing applications ranging from general force measurement in testing or research to measuring and controlling weight (mass) in tanks, hoppers, mills, vehicles, etc. Discounted pricing is available to clients placing high-volume order. Inquiries are welcome.

■Typical Structure



Features

- Enable highly accurate measurement
- Stably operate for long-term usage even under harsh conditions
- Ensure long service life against repetitive loads

Important Notice
Load cells cannot be used under hydrogen environment.

To Ensure Safe Usage

1. The rated capacity of each load cell is designed for cases of center spindle loads only. In cases involving inclined loads, angular Moments, lateral force or bending Moments, the load cell may be damaged. Contact Kyowa for applications of these types.
2. Loads involving shock or vibration are measured as 'static load x acceleration.' When acceleration is unknown, be sure to prepare sufficient rated capacity.
3. With repetitive tensile load & compressive load use at below 1/2 of the rated capacity in order to extend the fatigue life.
4. Special accessories are designed only for use with Kyowa's load cells.
5. To avoid accidents, make sure to take precautionary measures against unexpected situations caused by a broken load cell.

1) Tension load cells

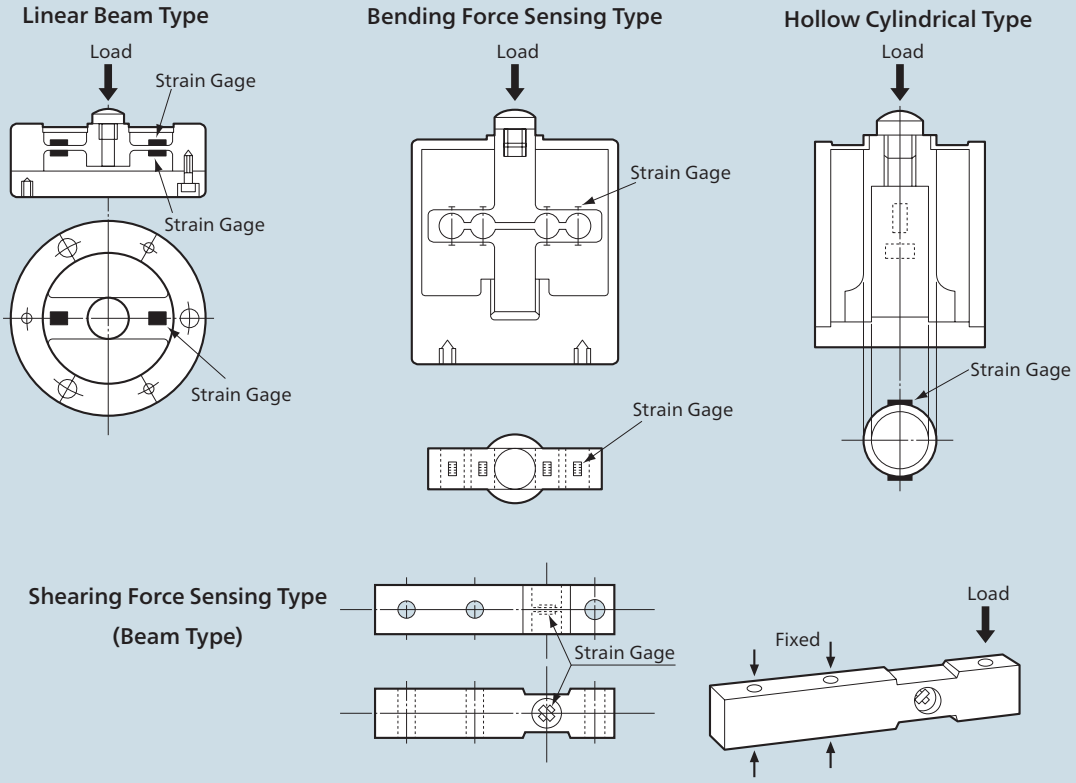
- Please use special accessories combined by Kyowa for tensile application.
  Tension load cell special accessories, ring (TRC, TRD), a hook (THC, THD), and a rotary attachment (RJ) are not applicable to compressive load measurement.
- When suspending a load, in the selection of rated capacity for the load cell, please ensure a full margin of safety, and add safety apparatus in order to prevent dropping, etc. (For static breaking load, refer to the special accessories combination measurement table.)
- The tension load cell is joined to the counterpart by screws. Be sure to prevent screws from loosening. If set screws are used for this purpose, counter bore the mating parts to fit set screws. Also, check regularly for any loosening of set screws.

2) Compression load cells

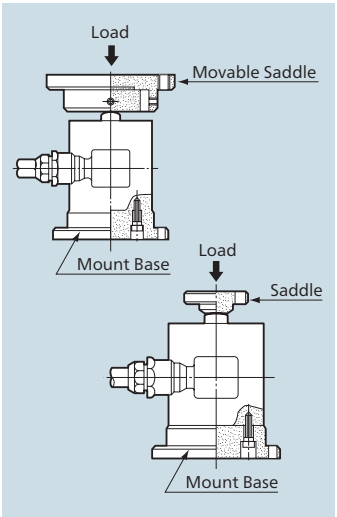
- In the event that the strain column of the load cell buckles, the height is reduced by up to several tens of mm. The load is thereafter supported by the outer case. Examine the effect of such dimensional changed on the load cell installation area and equipment.

6. Check periodically to make sure the load cell fixing screws have not become loose. If looseness is found, tighten completely.
7. Contact Kyowa concerning usages involving legal safety factors, etc. (cranes, etc.)

■Various Diaphragms of Load cells

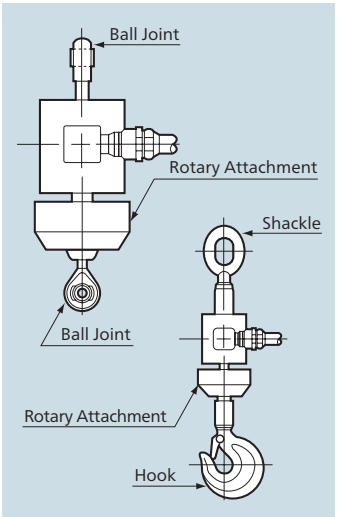


Installation of Load Cell and Special Accessories (For Accurate Measurement)



Compression Load Cell

1. Fix the steel plate to the load point of measuring object by welding or screwing. Mount the saddle to the steel plate. Grease the saddle to prevent it from rusting.
2. Install the saddle and mount base horizontal to the load cell so that a load is applied vertically to the load cell.
3. Each load cell is designed to detect only the force applied to the central axis. Since installation quality directly affects the measurement accuracy, install it carefully so that inclined loads, angular Moments, lateral force component and bending Moments may not affect the load cell.
4. Load cell is capable of compensating daily temperature changes. However, if it is partially heated, the accuracy may adversely be affected transiently. If it is not avoidable to use at temperatures beyond the operating temperature range, protect the load cell with a heat insulating material to keep it in the operating temperature range.
5. If there is impact or vibration in the loading direction, it is difficult to determine the rated capacity of load cell unless the magnitude of acceleration is known. In this case, select a load cell of which the rated capacity is sufficient enough. If the magnitude of acceleration is known, obtain the product of 'mass x acceleration' as the rated capacity. If the tare is included in the mass, determine the rated capacity by adding it to the net weight. For details, see page 9-16.



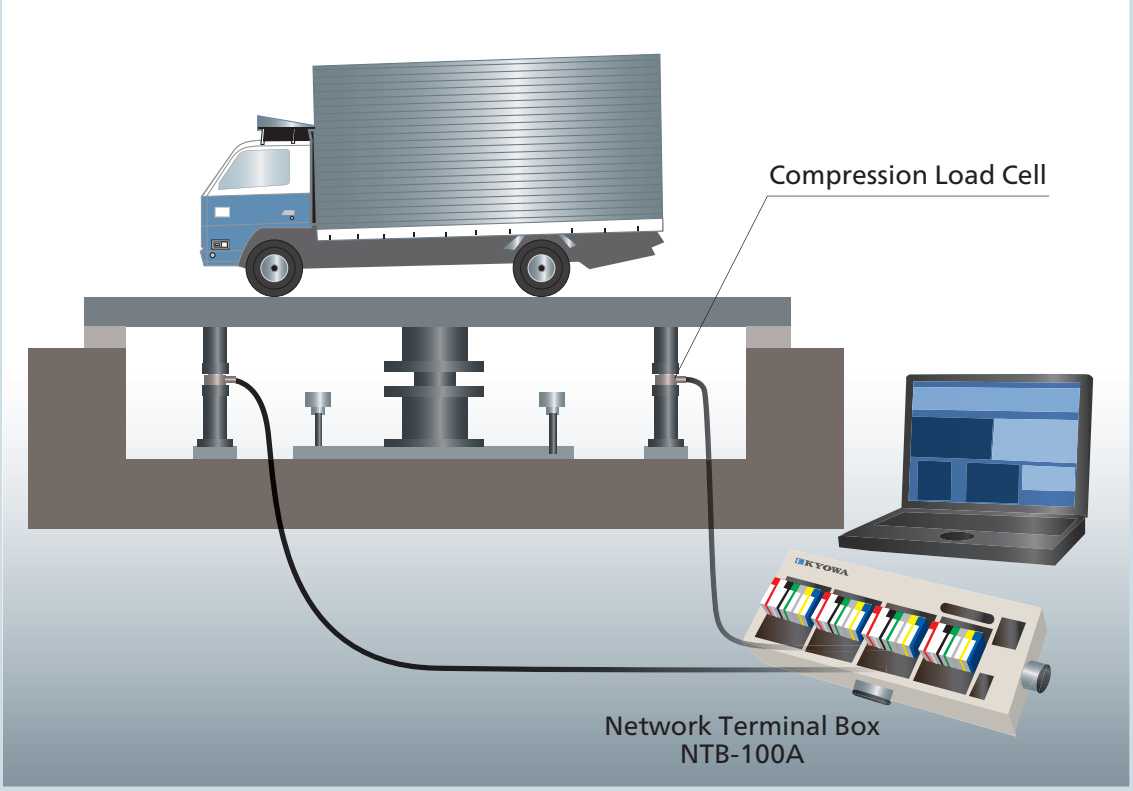
Tension Load Cell

1. Using the screw at the center of the top and the bottom, install the tension load cell carefully so that any bending or angular Moments may not be applied to the load cell during measurement. Such a moment not only affects the measurement accuracy but also causes an overload which may lead to breakage of the load cell.
2. For safe operation, select rated capacity sufficient enough to cover unsuspected loads. Also, prepare safety devices against accidental hazards such as dropping.
3. Operation near the rated capacity with a special accessory (TRC, TRD, THC, THD, TU, RJ or the like) attached or an overload may cause a problem on mechanical strength depending on the installation method. For solutions of such a problem, contact us.
4. When mounting the RJ-B rotary attachment, remove the coupling screw of load cell in advance. Proper tightening torque for mounting is shown at the right.
5. When screwing a ball joint into the load cell, take care not to apply any excess torque to the load cell. Especially, a small-capacity load cell may be damaged by an excess torque.

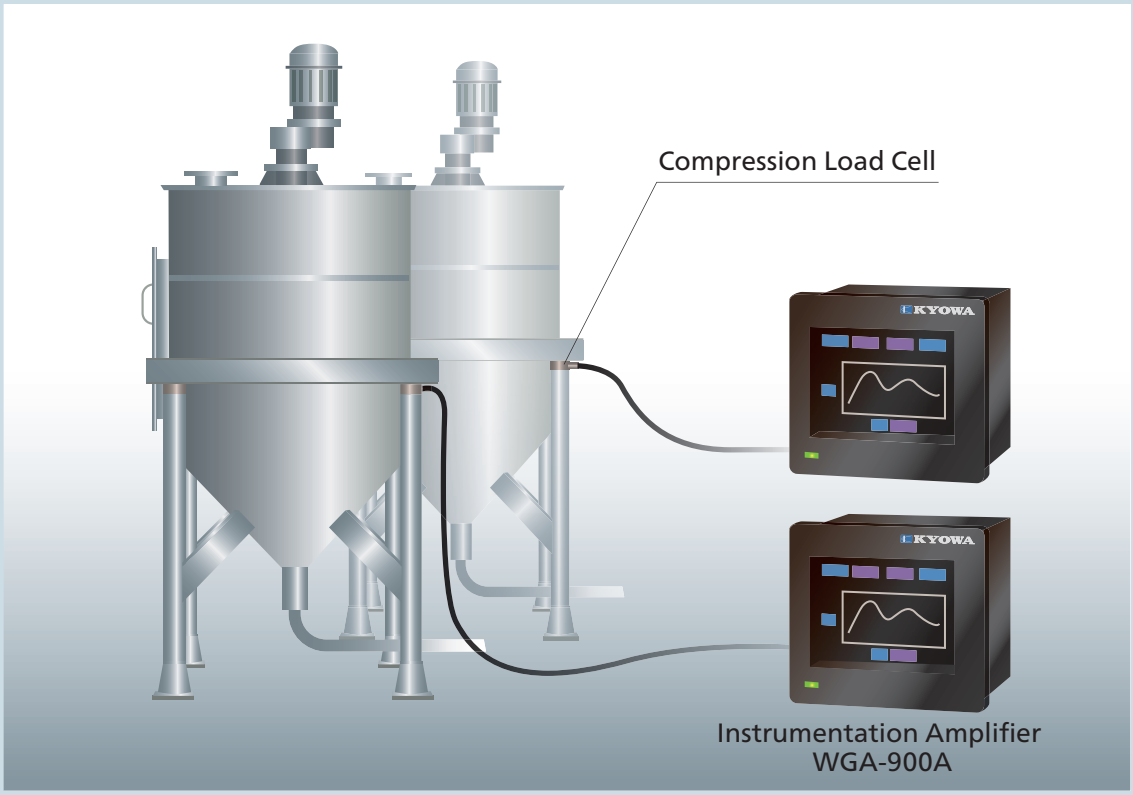
Rated Capacity	0.5 to 2 kN	5 to 20 kN	50 kN	100 kN	200 kN
Tightening Bolts	M6	M8	M10	M16	M20
Tightening Torques (Approx.)	10 N·m	30 N·m	70 N·m	270 N·m	560 N·m

Load Cells Measurement Examples

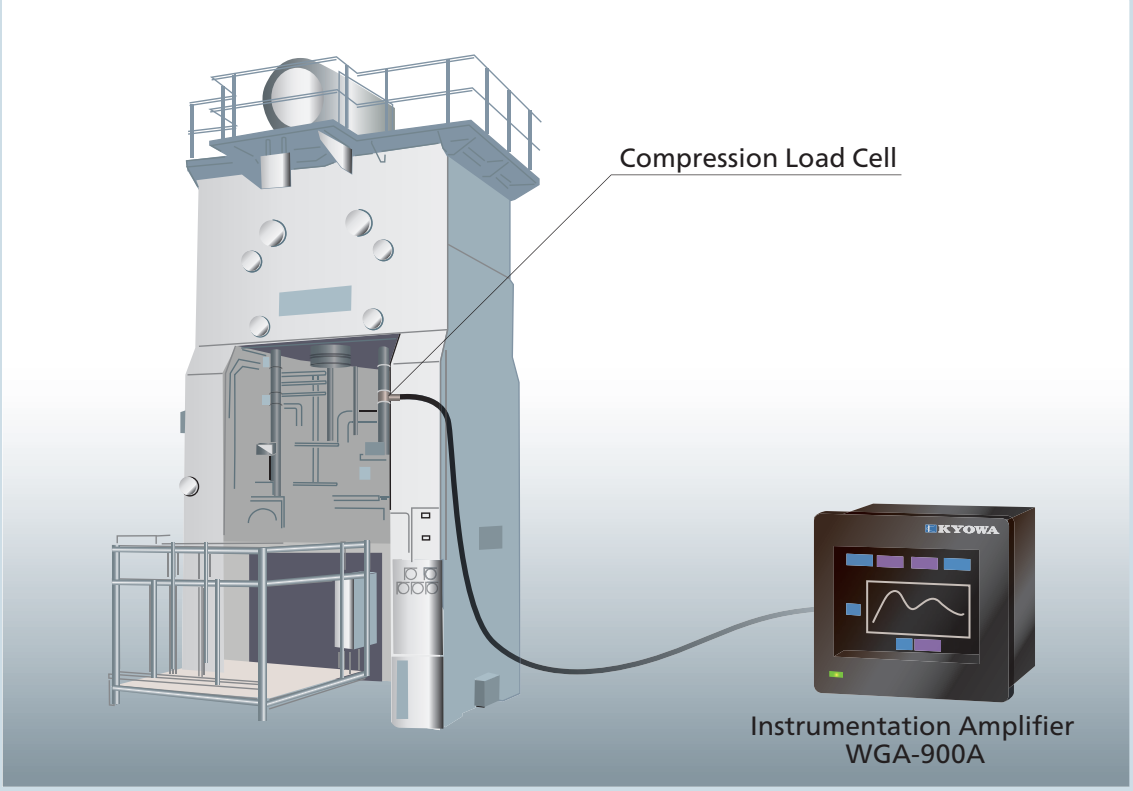
●Displacement Measurement of Plate Bearing Test



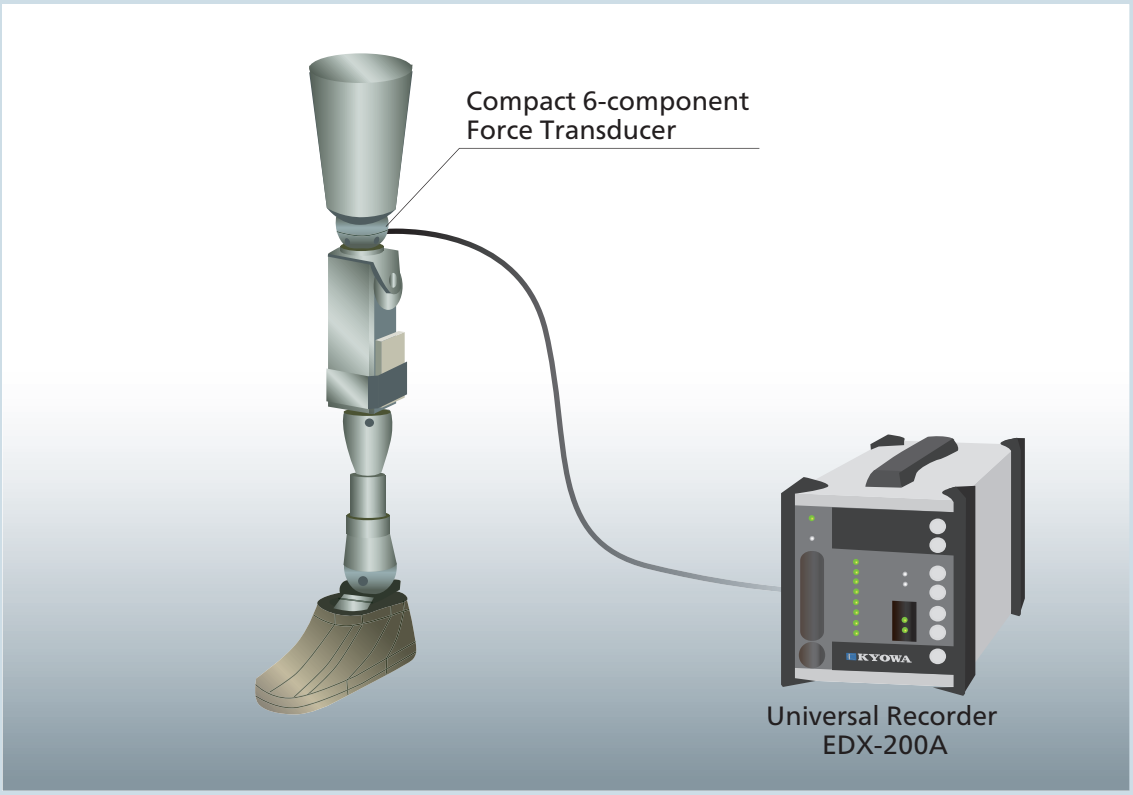
●Weight Control of Hoppers or Tanks



●Load Control of Press Machines



●6-component Force Measurement of an Artificial Leg or Robot with Built-in Cells



Load Cell Selection Chart

For Compressive Load Measurement	Models	Rated Capacity																					Pages
		N								kN									MN				
		5	10	20	50	100	200	300	500	1	2	5	10	20	30	50	100	200	500	1	2	5	
Small-sized Compression Load Cell	Small-sized for Load Distribution Measurement **LMA-A** 	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes													2-13
	Ultra-small **LMB-A** 		Yes		Yes	Yes	Yes		Yes	Yes	Yes												2-14
	Ultra-small **LMBT-A** 				Yes	Yes	Yes		Yes	Yes	Yes												2-15
Beam-type Load Cell	Compact & lightweight **LUB-B** 				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									2-59
Small-sized Compression Load Cell	Connector-equipped **LCX-A-ID** 								Yes	Yes	Yes	Yes	Yes	Yes									2-19
Small-sized Compression Load Cell	Stainless Steel Make **LCN-A** 								Yes	Yes	Yes	Yes	Yes	Yes									2-18
High Temp. Compression Load Cell	For High Temperature **LC-FH** 								Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes					2-26
Small-sized Compression Load Cell	Diameter: 21 mm **LMR-S-SA2** 										Yes	Yes	Yes	Yes									2-16
Small-sized Compression Load Cell	High Output & High Accuracy **LMC-A** NEW 											Yes	Yes	Yes		Yes							2-17
Beam-type Load Cell	Accuracy:1/2000 **LUB-C** 											Yes	Yes	Yes									2-60
Small-sized large-capacity Compression Load Cell	Diameter:20 or 25mm **LCR-G-SA2** 												Yes	Yes	Yes	Yes							2-24
Explosion-proof construction Compression Load Cell	Explosion-proof **LCS-D** 											Yes	Yes	Yes		Yes							2-29
Thin Compression Load Cell	As Thin as 25 to 50 mm in Total Height **LCK-A** 											Yes	Yes	Yes		Yes	Yes	Yes					2-27
Corrosion-resistant Compression Load Cell	Stainless Steel **LC-J** 											Yes	Yes	Yes		Yes	Yes	Yes					2-30
	High Accuracy 1/2000 **LC-V** 															Yes	Yes	Yes					2-21
	Accuracy 1/5000 **LCH-F** 																Yes	Yes					2-28
High-accuracy Compression Load Cell	Large Capacity High Accuracy: 1/1000 **LCV-A** 																		Yes	Yes			2-23
General-purpose Compression Load Cell	Large Capacity **LC-E** 																				Yes	Yes	2-25

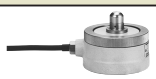
For Compressive Load Measurement

Models		Rated Capacity N 500	N 800	kN 1	kN 2	kN 3	kN 5	kN 10	kN 20	kN 30	kN 50	kN 100	kN 200	kN 300	Pages
Stainless Steel Load Cell	For Food Tanks and Hoppers **LCTS-B** 						Yes	Yes	Yes	Yes	Yes	Yes			2-33
Thin Load Cell	For Tanks and Hoppers **LCTA-A** 	Yes	Yes	Yes	Yes	Yes									2-35
	For Tanks and Hoppers **LCTB-A** 						Yes	Yes	Yes	Yes	Yes				2-37
	For Tanks and Hoppers **LCTE-A** 							Yes	Yes	Yes	Yes	Yes			2-39
	For Tanks and Hoppers **LCTD-A** 											Yes	Yes	Yes	2-41

For Tensile Load Measurement

Models		Rated Capacity mN 50	mN 100	mN 200	mN 500	N 1	N 2	N 5	N 10	N 20	N 50	N 100	N 200	N 500	kN 1	kN 2	kN 5	kN 10	kN 20	kN 50	Pages
Ultra Small-capacity Load Cell	Vertical Load to Rod **LVS-A** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes											2-58
	Horizontal Load to Rod **LTS-A** 				Yes	Yes	Yes	Yes	Yes	Yes											2-58
High-accuracy Tension Load Cell	High-accuracy 1/3333 **LTZ-A** 													Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-43
Tension Load Cell	LT-FH for High Temperature LT-FL for Low Temperature **LT-F (H·L)** 													Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-46

For Both Tensile and Compressive Load Measurement

Models		Rated Capacity N 50	N 100	N 200	N 500	kN 1	kN 2	kN 5	kN 10	kN 20	kN 50	kN 100	kN 200	kN 500	MN 1	MN 1.5	MN 2	Pages
Small-capacity Tension/ Compression Load Cell	Small Capacity **LU-A** 	Yes	Yes	Yes														2-57
Compact Tension/ Compression Load Cell	Diameter 28mm Weight 80g **LUR-A-SA1** 	Yes	Yes	Yes	Yes	Yes	Yes											2-51
	Compact **LUX-B-ID** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								2-47
Tension/ Compression Load Cell	Inert Gas Sealed **LU-E** 				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					2-52
High-accuracy Tension/ Compression Load Cell	Accuracy:1/5000 **LUH-F** 				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					2-53
Tension/ Compression Load Cell	Large Capacity Thin **LUK-A** 							Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-55

With tension/compression load cells, tension load causes plus output compression load, minus output

Load Cell Selection Chart

For Component Force Measurement

Models		Rated Capacity N 10	20	50	100	200	300	500	kN 1	3	Pages
3-component Force Transducer	3-component Force Measurement **LSM-B-SA1** 	Yes	Yes	Yes	Yes	Yes		Yes			2-65
6-component Force Transducer	6-component Force Measurement **LAT-1000A** 						Yes				2-63
Compact 6-component Force Transducer	6-component Force Measurement **LFM-A** 								Yes	Yes	2-61
Compact 6-component Force Transducer with Built-in Amplifier	6-component Force Measurement **LFX-A** 								Yes	Yes	2-62

For Special Purposes
(Load Cells for Steel making Lines)

Models		Rated Capacity kN 5	10	20	30	50	100	MN 1	2	3	5	Pages
Tension Meter Load Cell	For Tension Meter **LCR-B-S7** 	Yes	Yes	Yes	Yes	Yes	Yes					2-71
Washer-Type Load Cell	Washer-type for Rolling Mill **LCW-D-S** 							Yes	Yes	Yes	Yes	2-32
	Washer-type for Rolling Mill **LCW-E-S** 							Yes	Yes	Yes	Yes	2-32

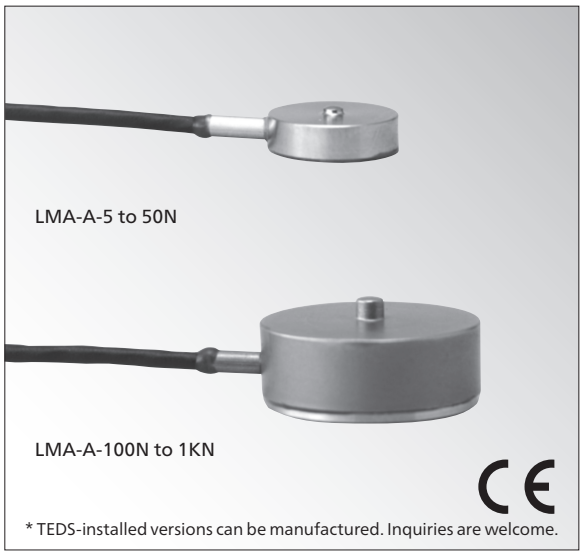
For Special purposes

Models		Rated Capacity kN 10	20	30	50	100	200	300	500	MN 1	1.5	2	Pages
Washer-type Load Cell	Different Diameters Available **LCW-C-SA3** 	Yes	Yes		Yes	Yes	Yes	Yes					2-31
Pin-type Load Cell	For Pulley Axis of Crane **LTP-S-S** 	Yes	Yes		Yes	Yes	Yes		Yes				2-69
Jack Load Cell	For Jack **LUR-B-SA1** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-66
One-end Revolving Tension Load Cell	For Rope Tension Measurement **LTR-S-SA1** 		Yes	Yes	Yes								2-68
Crane Load Cell	1 to 5V Output Available **LTA-C-S** 		Yes		Yes	Yes	Yes	Yes	Yes				2-67
Rectangular Load Cell	For Pillow Block Load **LCD-A-S** 			Yes	Yes	Yes							2-70

LMA-A

●ϕ12 mm ●Thickness: 4 mm (5N to 50N) ●5 N to 1 kN

Small-sized Compression Load Cell



* TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight Moderate Price Suitable for Load Distribution Measurement

Compact and lightweight LMA-A series load cells can be used by just putting or bonding on the measurement point or setting in a hollow.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Repeatability	1% RO or less
Rated Output	0.6 to 2 mV/V (1200 to 4000 μm/m) (LMA-A-5N)
	0.75 to 2 mV/V (1500 to 4000 μm/m) (LMA-A-10N to 1KN)

Environmental Characteristics

Safe Temperature Range	-10 to 60°C (Non-condensing)
Compensated Temperature Range	0 to 50°C (Non-condensing)
Temperature Effect on Zero Balance	
	Within ±0.3% RO/°C (LMA-A-5N)
	Within ±0.2% RO/°C (LMA-A-10N to 50N)
	Within ±0.05% RO/°C (LMA-A-100N to 1KN)
Temperature Effect on Output	
	Within ±0.2%/°C (LMA-A-5N to 50N)
	Within ±0.05%/°C (LMA-A-100N to 1KN)

Electrical Characteristics

Safe Excitation Voltage	7V AC or DC
Recommended Excitation Voltage	1 to 5 VAC or DC
Input Resistance	350 Ω±2.5%
Output Resistance	350 Ω±2.5%
Cable	4-conductor (0.035 mm²) vinyl shielded cable,
	1.7 mm diameter by 2 m long, bared at the tip
	(Shield wire is not connected to mainframe.)

Mechanical Properties

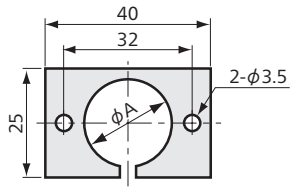
Safe Overload Rating	150%
Natural Frequency	See table below.
Weight	See table below. (Excluding cable)
Material	Copper alloy
Degree of Protection	IP64 (IEC 60529)
RoHS Directive	EN50581

Optional Accessories Mount Base CFM-A

Models	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)*	Mount Bases
LMA-A-5N	5 N	15.3 kHz	1.5 g	CFM-5A
LMA-A-10N	10 N	17.5 kHz		
LMA-A-20N	20 N	24.8 kHz		
LMA-A-50N	50 N	32.6 kHz		
LMA-A-100N	100 N	21.6 kHz	11 g	CFM-100A
LMA-A-200N	200 N	29.7 kHz		
LMA-A-500N	500 N	43.9 kHz		
LMA-A-1KN	1 kN	53 kHz		

*not including cable

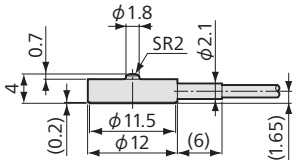
■Mount Base CFM-A



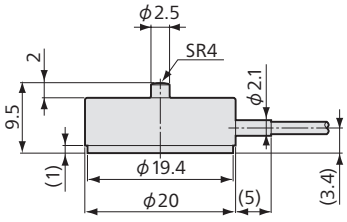
Models	ϕA	Thickness
CFM-5A	12.2	1.5
CFM-100A	20.2	3.0

Material: Aluminum alloy

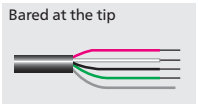
■Dimensions



LMA-A-5 to 50N

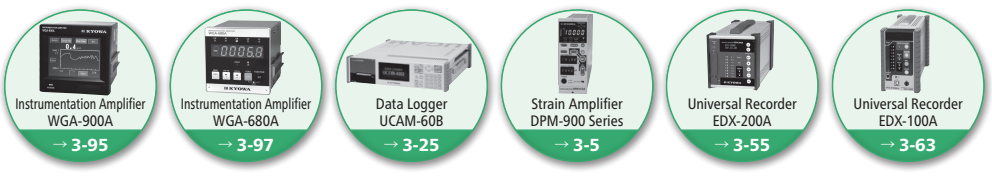


LMA-A-100N to 1KN



●Physical quantity indication ●Static measurement ●Dynamic measurement

LMA-A Recommended products for combination



LMB-A

●10 N to 2 kN

Small-sized Compression Load Cell

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight Moderate Price Suitable for Load Distribution Measurement

Ultra-small and lightweight LMB-A series load cells can be used by merely putting or bonding on the measurement point or setting in a hollow.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Repeatability	Within ±0.3% RO
Rated Output	1.4 mV/V(2800 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-10 to 80°C (Non-condensing)
Compensated Temperature Range	0 to 70°C (Non-condensing)
Temperature Effect on Zero Balance	
	Within ±0.05% RO/°C (100 N to 2 KN)
	Within ±0.1% RO/°C (50 N)
	Within ±0.2% RO/°C (10 N)
Temperature Effect on Output	
	Within ±0.05%/°C (50 N to 2 kN)
	Within ±0.1%/°C (10 N)

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±2.5%
Output Resistance	350 Ω±2.5%
Cable	4-conductor (0.035 mm²) vinyl shielded cable, 1.7 mm diameter by 2 m long, bared at the tip (Shield wire is not connected to mainframe.)

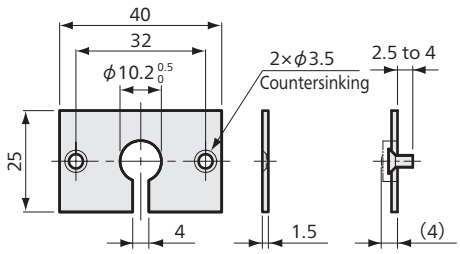
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Materials	Stainless steel
Weight	10 N to 200 N: Approx. 1.5 g (Excluding cable) 500 N to 2 kN: Approx. 6 g (Excluding cable)
Degree of Protection	IP64 (IEC 60529)
RoHS Directive	EN50581

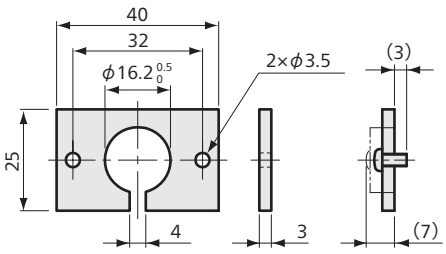
Optional Accessories: Mount Base CFM-B

Models	Rated Capacity	Natural Frequencies (Approx.)
LMB-A-10N	10 N	32 kHz
LMB-A-50N	50 N	40 kHz
LMB-A-100N	100 N	47 kHz
LMB-A-200N	200 N	59 kHz
LMB-A-500N	500 N	37 kHz
LMB-A-1KN	1 kN	45 kHz
LMB-A-2KN	2 kN	54 kHz

■Mount Base CFM-B

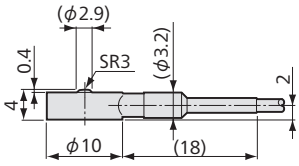


CFM-10B

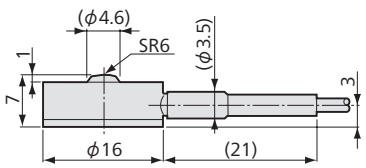


CFM-16B

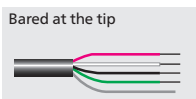
■Dimensions



LMB-A-50N to 200N

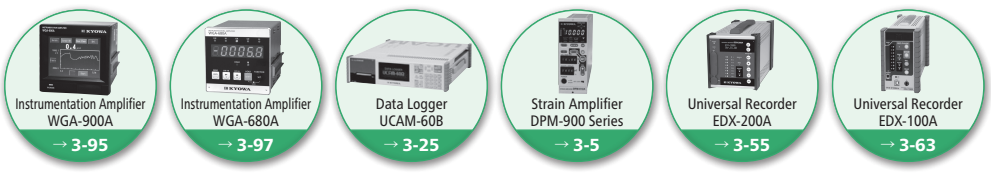


LMB-A-500N to 2KN



●Physical quantity indication ●Static measurement ●Dynamic measurement

LMB-A Recommended products for combination



LMBT-A

●High-temperature ●50 N to 2 kN

Small-sized Compression Load Cell

*TEDS-installed versions can be manufactured. Inquires are welcome

Ultra-small Sized Lightweight Suitable for Load Distribution Measurement

Ultra-small and lightweight. For high temperature up to 100°C. Merely putting or bonding on the measurement point or setting in a hollow.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.3% RO
Repeatability	Within ±0.3% RO
Rated Output	1.4 mV/V (2800 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-20 to 120°C (Non-condensing)
Compensated Temperature Range	-10 to 100°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±2.5%
Output Resistance	350 Ω±2.5%
Cable	4-conductor (0.035 mm²) vinyl shielded cable, 1.8 mm diameter by 2 m long, bared at the tip (Shield wire is not connected to mainframe.)

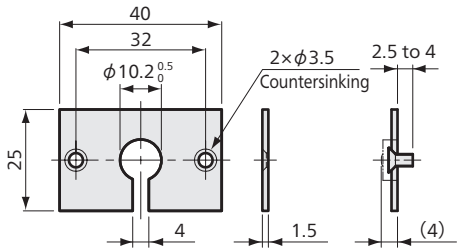
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Materials	Stainless steel
Weight	50 N to 200 N: Approx. 1.5 g (Excluding cable) 500 N to 2 kN: Approx. 6.5 g (Excluding cable)
Degree of Protection	IP64 (IEC 60529)
RoHS Directive	EN50581

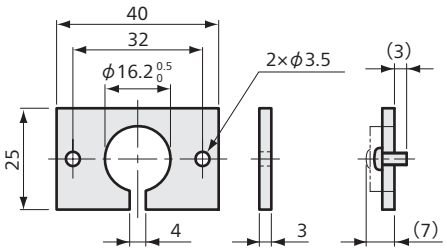
Optional Accessories Mount Base CFM-B

Models	Rated Capacity	Natural Frequencies (Approx.)
LMB-A-50N	50 N	40 kHz
LMB-A-100N	100 N	47 kHz
LMB-A-200N	200 N	59 kHz
LMB-A-500N	500 N	37 kHz
LMB-A-1KN	1 kN	45 kHz
LMB-A-2KN	2 kN	54 kHz

■Mount Base CFM-B

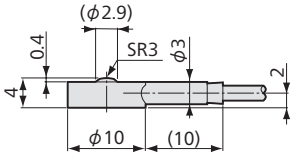


CFM-10B

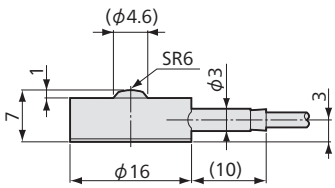


CFM-16B

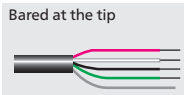
■Dimensions



LMBT-A-50N to 200N

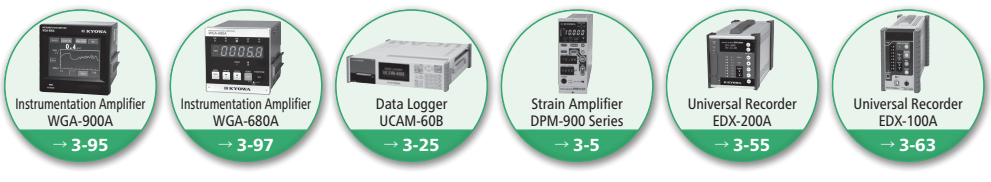


LMBT-A-500N to 2KN



●Physical quantity indication ●Static measurement ●Dynamic measurement

LMBT-A Recommended products for combination



LMR-S-SA2

●ϕ21 mm, thickness: 10 mm ●2 kN to 20 kN

Small-sized Compression Load Cell

LMR-S-20KNSA2

*TEDS-installed versions can be manufactured. Inquiries are welcome.
*High-temperature models up to 150 ˚C are available, contact us, please.

Compact & Lightweight
Moderate price
Suitable for Load Distribution Measurement

Compact & lightweight LMR-S-SA2 series load cells can be used by merely putting or bonding on the measurement point or setting in a hollow. Major applications include measurement of load distribution by using multiple units, load measurement in pipe making mills or where a measuring site or the weight of the load cell itself is limited.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO (2KNSA2 to 10KNSA2)
	Within ±2% RO (20KNSA2)
Hysteresis	Within ±1% RO (2KNSA2 to 10KNSA2)
	Within ±2% RO (20KNSA2)
Rated Output	1 mV/V (2000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-10 to 60°C
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.035 mm²) vinyl shielded cable,
	1.7 mm diameter by 2 m long, bared at the tip
	(Shield wire is not connected to mainframe.)

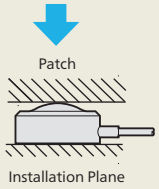
Mechanical Properties

Safe Overload Rating	120%
Natural Frequencies	Approx. 50 kHz
Weight	Approx. 25 g
Materials	Stainless steel

Models	Rated Capacity
LMR-S-2KNSA2	2 kN
LMR-S-5KNSA2	5 kN
LMR-S-10KNSA2	10 kN
LMR-S-20KNSA2	20 kN

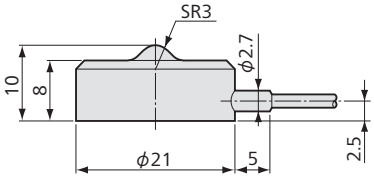
*Users should be cautioned that operating conditions may adversely affect the stated specifications.

To Ensure Safe Usage

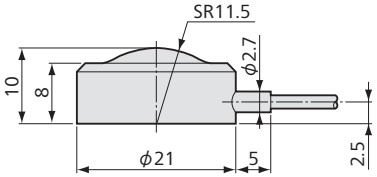


Compact large capacity load cells result in high surface pressure on the mounting surfaces under rated load. For the patch & installation plane material, use HRC40 to 44. Smoothness of mounting surfaces both patch and installation plane as smooth as Rz2.5S or so is recommended.

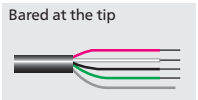
Dimensions



LMR-S-2KNSA2



LMR-S-5KNSA2 to 20KNSA2



●Physical quantity indication ●Static measurement ●Dynamic measurement

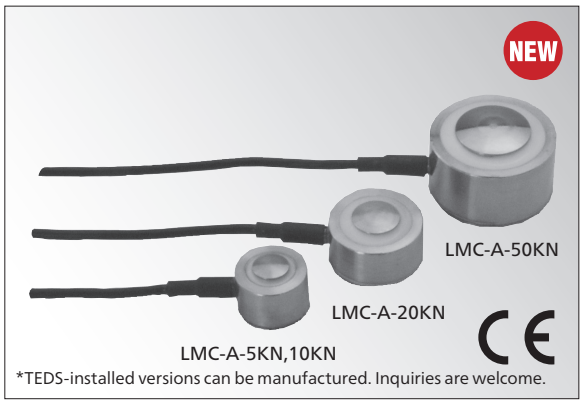
LMR-S-SA2 Recommended products for combination

- Instrumentation Amplifier WGA-900A → 3-95
- Instrumentation Amplifier WGA-680A → 3-97
- Data Logger UCAM-60B → 3-25
- Strain Amplifier DPM-900 Series → 3-5
- Universal Recorder EDX-200A → 3-55
- Universal Recorder EDX-100A → 3-63

LMC-A

●5 kN to 50 kN

Small-sized Compression Load Cell

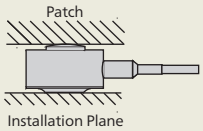


*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact
High Accuracy
Suitable for Load Distribution Measurement

Compact & lightweight load cells can be used by merely placing or bonding on the load site, setting in a hollow, or affixing with a mounting band. Major applications include measurement of load distribution by using multiple units, load measurement in pipe making mills, or where a measuring site or the weight of the load cell itself is limited.

To Ensure Safe Usage



Compact large capacity load cells result in high surface pressure on the mounting surfaces under rated load. For the mount base material, use HRC40 or better metals such as SUS630-H900.

Example of recommend materials
- Patch material: HRC (35 to 38), SCM440, etc.
- Installation Plane material: HRC40 or better, SUS630-H900 SCM440, etc.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (LMC-A-5KN, 10KN)
	Within ±1%RO (LMC-A-20kN, 50kN)
Hysteresis	Within ±0.5% RO (LMC-A-5KN, 10KN)
	Within ±1%RO (LMC-A-20kN, 50kN)
Repeatability	Within 0.5% RO
Rated Output	1.5 mV/V (3000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-10 to 80°C
Compensated Temperature Range	0 to 70°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 6 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.035 mm²) vinyl shielded cable, 1.7 mm diameter by 2 m long, bared at the tip (Shield wire is not connected to mainframe)

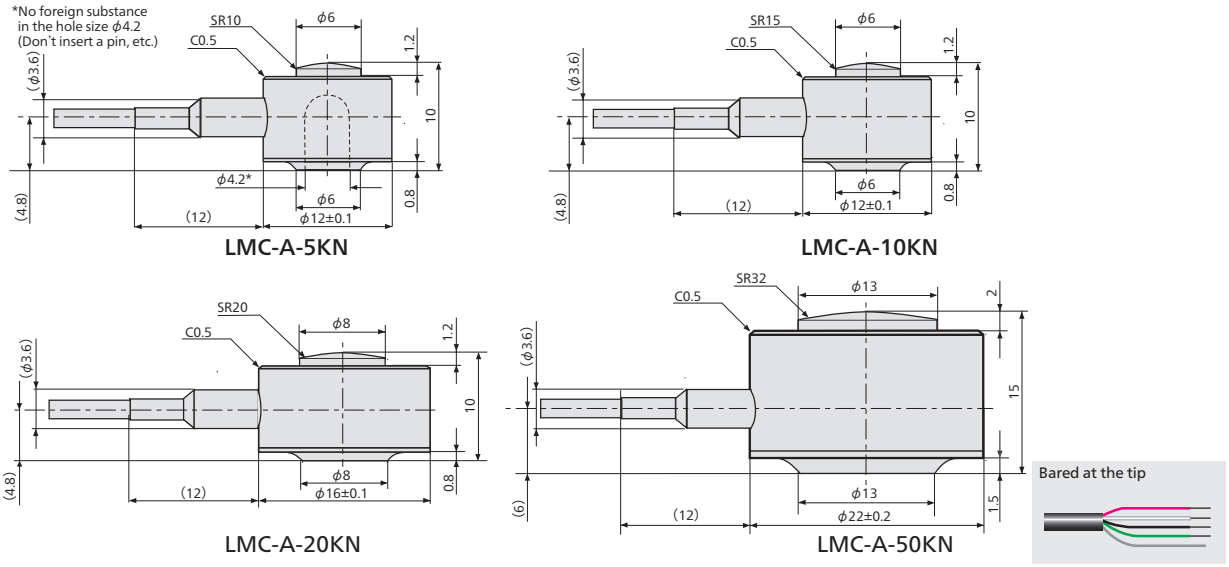
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below (Excluding cable).
Materials	Stainless steel
Degree of Protection	IP64 (IEC 60529)
RoHS Directive	EN50581

Models	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)
LMC-A-5KN	5 kN	32 kHz	5 g
LMC-A-10KN	10 kN	38 kHz	6 g
LMC-A-20KN	20 kN	41 kHz	10 g
LMC-A-50KN	50 kN	29 kHz	30 g

*Operating conditions may adversely affect characteristics. For details, please refer the instruction manual.

Dimensions



●Physical quantity indication ●Static measurement ●Dynamic measurement

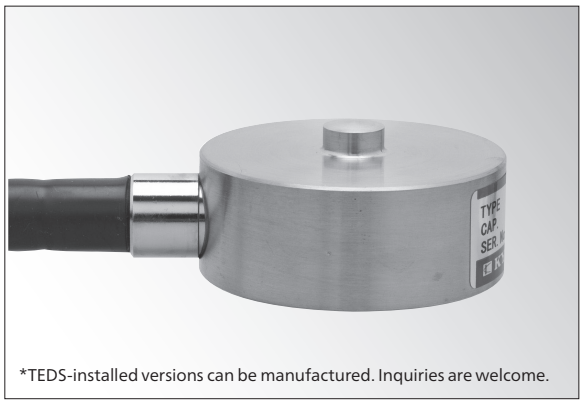
LMC-A Recommended products for combination

- Instrumentation Amplifier WGA-900A → 3-95
- Instrumentation Amplifier WGA-680A → 3-97
- Data Logger UCAM-60B → 3-25
- Strain Amplifier DPM-900 Series → 3-5
- Universal Recorder EDX-200A → 3-55
- Universal Recorder EDX-100A → 3-63

LCN-A

●Compact & Stainless Steel Case ●500 N to 20 kN

Small-sized Compression Load Cell



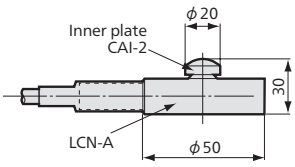
*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact Corrosion-resistant Stainless Steel Enclosure Hermetically Sealed Structure with Inert Gas Filled in

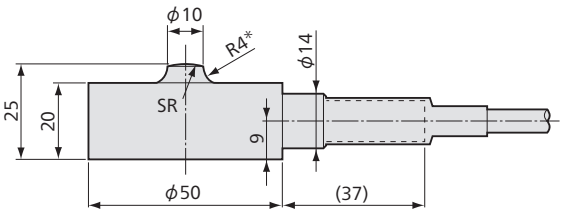
Compact & lightweight design facilitates installation into existing facilities. Excellent stability and reliability are ensured by the hermetically-sealed structure with inert gas filled in. Furthermore, the stainless steel (SUS 630) enclosure makes them widely usable as sensors for equipment requiring corrosion resistance.

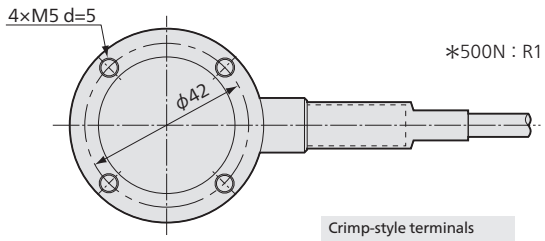
Inner Plate CAI-2

The inner plate is intended to protect the load sensing part at the top of load cell. It prevents the sphere from being flattened due to frequent impact loads.



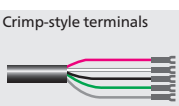
Dimensions





Models	SR
LCN-A-500N to 2KN	15
LCN-A-5KN to 20KN	30

Crimp-style terminals



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.15% RO
Hysteresis	Within ±0.1% RO
Repeatability	0.05% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.3%

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 12 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.5 mm²) chloroprene shielded cable, 8.5 mm diameter by 3 m long, with crimp-style terminals for 4 mm (Shield wire is not connected to mainframe.)

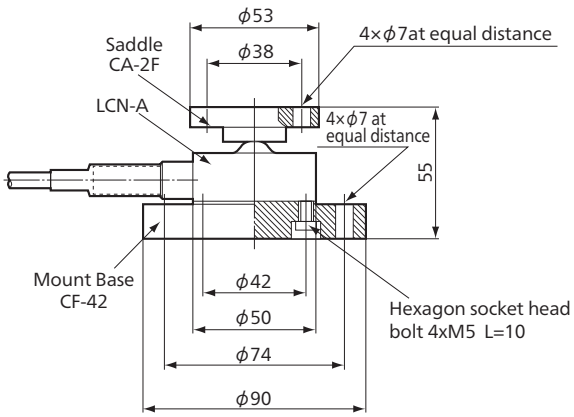
Mechanical Properties

Safe Overload Rating	200%
Natural Frequencies	See table below.
Weight	220 g
Materials	Main unit: SUS 630 Bottom plate: SUS 304
Degree of Protection	IP67 (IEC 60529)

Models	Rated Capacity	Natural Frequencies (Approx.)
LCN-A-500N	500 N	6.4 kHz
LCN-A-1KN	1 kN	5.3 kHz
LCN-A-2KN	2 kN	7.6 kHz
LCN-A-5KN	5 kN	13 kHz
LCN-A-10KN	10 kN	18 kHz
LCN-A-20KN	20 kN	24 kHz

Dimensions with Saddle and Mount Base Mounted

●In Combination with Saddle CA and Mount Base CF



Hexagon socket head bolts to connect the load cell and mount base are attached to the mount base.

Saddle and Mount Base

Models	Saddles	Mount Bases
Dedicated for LCN-A	CA-2F	CF-42

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCN-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

LCX-A-ID

- ϕ28 mm, Thickness: 18 mm (500 N to 2 kN)
- 500 N to 20 kN

Small-sized Compression Load Cell

*TEDS installed (For TEDS, refer to page 9-16)

Compact & Lightweight Easy to Incorporate into Equipment

This is a compact, lightweight, and thin load cell, easy to incorporate into existing equipment. The mainframe is an all-stainless steel product.
Additionally, the cable is connected using a connector, therefore there are no wring problems, and cable replacement is easy. Work is also possible if the cable is replaced with one resistant to repeated bending (flexible cable). Please attach a suffix of M1Z3K to the model name.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.1% RO
Repeatability	0.05% RO or less
Rated Output	1.0 mV/V (2000 μm/m) or more (LCX-A-500N-ID)
	1.5 mV/V (3000 μm/m) or more (LCX-A-1KN to 20KN-ID)

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	
Within ±0.01% RO/°C (LCX-A-500N-ID)	
Within ±0.005% RO/°C (LCX-A-1KN to 20KN-ID)	
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

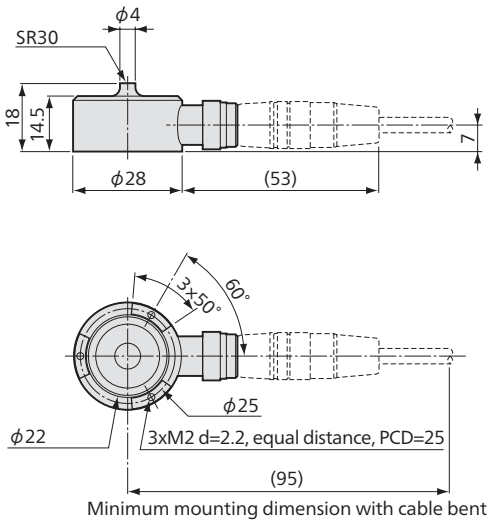
Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	375 Ω±5 Ω
Output Resistance	350 Ω±3.5 Ω
Dedicated connection cable	TE-45
Cable	6-conductor (0.08 mm²) chloroprene shielded cable, 4.4 mm diameter by 3 m long, terminated with a connector plug to the transducer side and bared at the other side (Shield wire is not connected to mainframe.)

Mechanical Properties

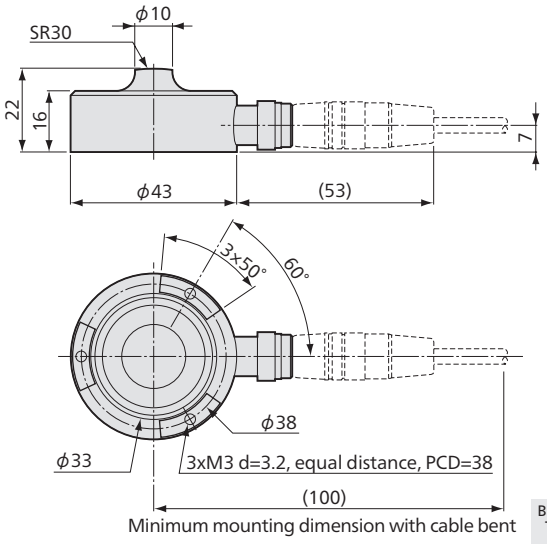
Safe Overload Rating	150%
Safe Lateral Load Rating	15% the rated capacity
Natural Frequencies	See table below.
Materials	Stainless steel
Weight	500 N to 2 kN: Approx. 45 g (Excluding cable) 5 kN to 20 kN: Approx. 120 g (Excluding cable)
Degree of Protection	IP67 (IEC 60529)

Models	Rated Capacity	Natural Frequencies (Approx.)
LCX-A-500N-ID	500 N	24 kHz
LCX-A-1KN-ID	1 kN	29 kHz
LCX-A-2KN-ID	2 kN	37 kHz
LCX-A-5KN-ID	5 kN	24 kHz
LCX-A-10KN-ID	10 kN	28 kHz
LCX-A-20KN-ID	20 kN	37 kHz

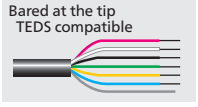
Dimensions



LCX-A-500N to 2KN

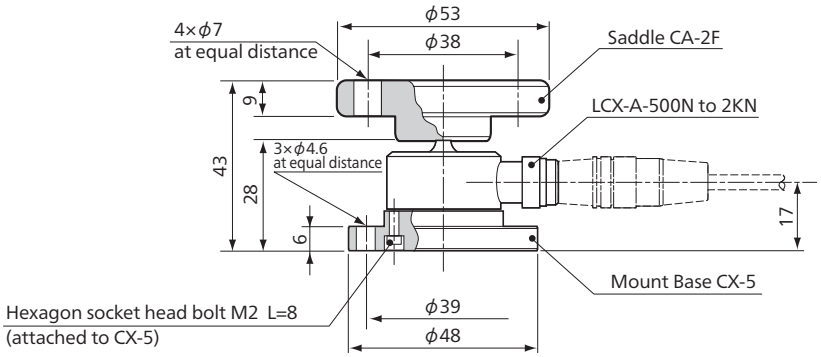


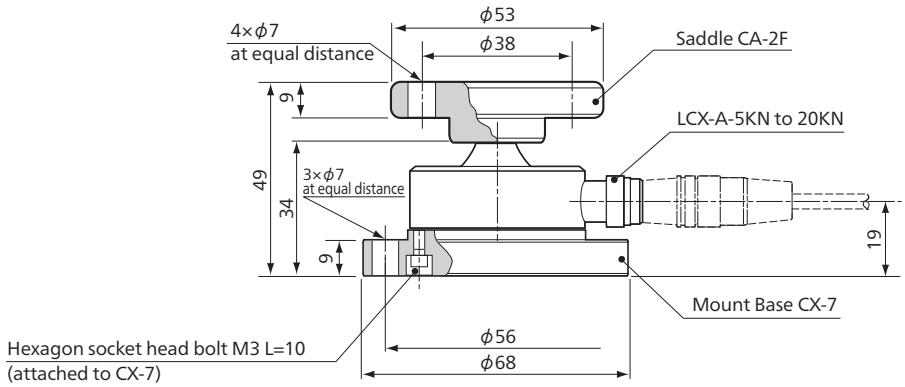
LCX-A-5KN to 20KN



Dimensions with Saddle and Mount Base Mounted

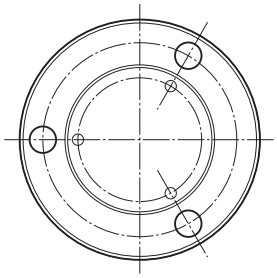
In Combination with Saddle (CA) and Mount Base (CX)

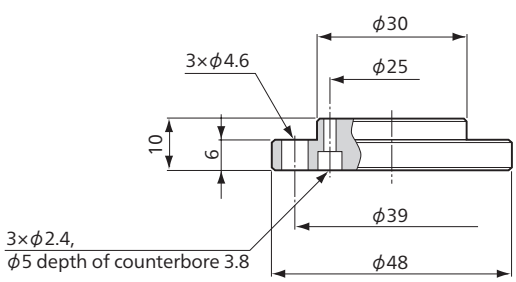




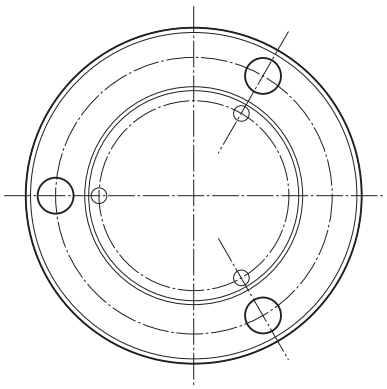
Dimensions for Mount Base

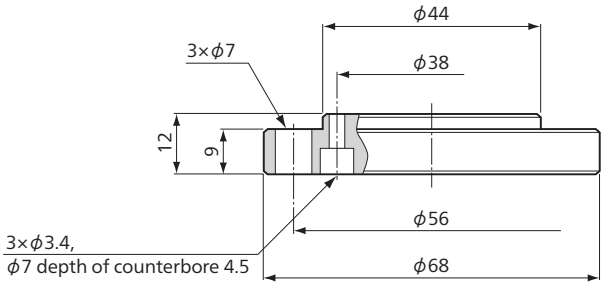
Mount Base CX-5 Weight: Approx. 100 g





Mount Base CX-7 Weight: Approx. 280 g





LC-V

●Nonlinearity: Within ±0.05%RO ●50 kN to 200 kN

Small-sized Compression Load Cell

*Steady brace CR is available. (See page 2-22)
*TEDS-installed versions can be manufactured.Inquiries are welcome.

Compact & Lightweight Nonlinearity: Within ±0.05%RO

●Hermetically sealed structure with inert gas filled in
●Service life: 10 million times or more
●BISELCOM® gages are used.

Compact & lightweight design facilitates installation into existing facilities. While nonlinearity of within 1/2000 is ensured, the hermetically-sealed structure with inert gas filled in enables highly stable and reliable measurement.

*BISELCOM gages are self-temperature-compensation strain gages with the sensitivity temperature compensation function added.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.05% RO
Hysteresis	Within ±0.05% RO
Repeatability	0.03% RO or less
Rated Output	2.5 mV/V (5000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

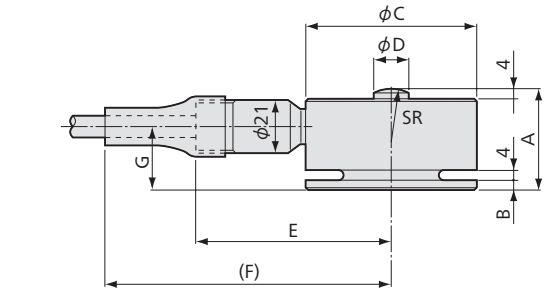
Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.5 mm²) chloroprene shielded cable, 8.5 mm diameter by 5 m long, with crimp-style terminals for 4 mm (Shield wire is not connected to mainframe.)

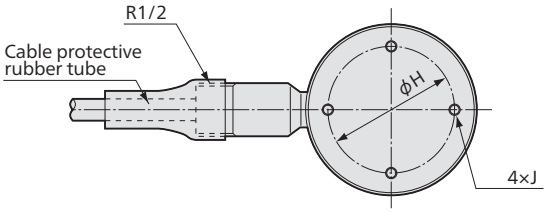
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.
Degree of Protection	IP67 (IEC 60529)

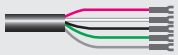
Optional Accessories **(For details, refer pages 2-72 to 2-76)**
Saddle CA-B
Mount Base CF

Dimensions





Crimp-style terminals



Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	ϕC	ϕD	E	(F)	G	ϕH	J	SR	Weight (Approx.)*
LC-5TV	50 kN	17 kHz	40	4	68	14	78	114	25	50	M5	40	1 kg
LC-10TV	100 kN	16 kHz	45	5	78	20	83	119	29	60	M6	70	1.3 kg
LC-20TV	200 kN	15 kHz	55	6	98	26	93	129	36	80	M8	120	3.1 kg

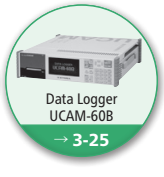
*Excluding cable

●Physical quantity indication ●Static measurement ●Dynamic measurement

LC-V Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

CR 《Special Accessories》

Steady Brace(Fitting Metal)

Steady Braces for Hopper Scales with Rolling Prevention Mechanism

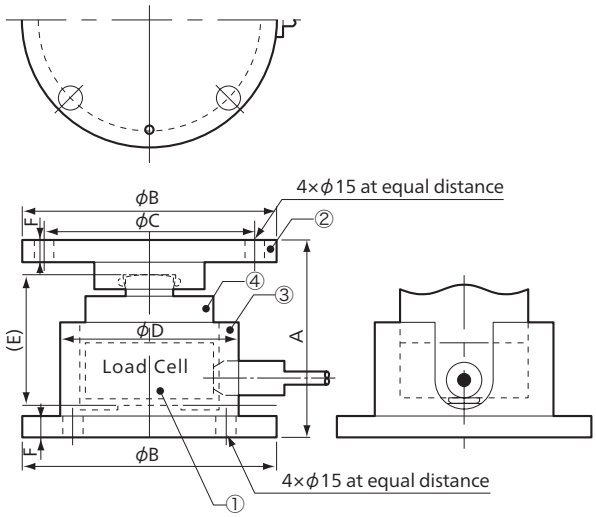
This product is a bracket used when fitting a hopper scale with a load cell in place of a load striker plate or mounting base. Using this product cancels out horizontal displacement caused by thermal expansion from the tank itself, and resulting lateral load.

To Ensure Safe Usage

- To prevent the hopper from falling down, the hopper's center of gravity should be low enough from the installation position of load cells.
- When the stirrer etc. are carried in equipment, it is not suitable for use under oscillating environment.
- Steady braces and load cell will be assembled and shipped out. (The upper and the lower part are fixed)(Fig.1.)
- Please be sure to order an assembled load cell with steady braces. (It is option)
- Please do not take it apart before installation.
- If you already have the load cell (LC-V), we take it and have it assembled with steady braces. (it is option)

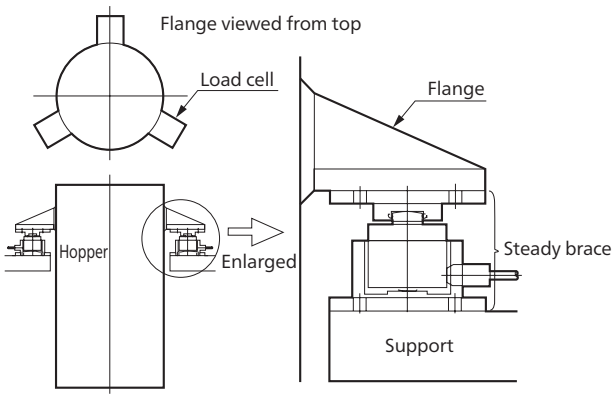
Dimensions in Combination

●Load Cell LC-V in Combination with Steady Brace CR



① Load Cells	②③④ Steady Braces	A	ϕB	ϕC	ϕD	(E)	F	Weight (Approx.)
LC-5TV	CR-5	120	148	126	96	80	13	7 kg
LC-10TV	CR-10	120	158	136	110	80	13	8.5 kg
LC-20TV	CR-20	145	187	164	136	95	15	15.6 kg

Installation Example



Behavior of Steady Brace Against Lateral Force

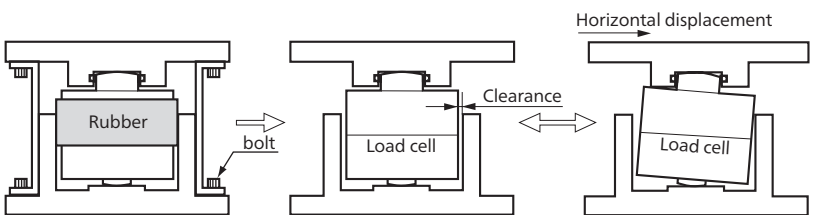


Fig. 1. When at the installation　Fig. 2. Normal condition　Fig. 3. At horizontal displacement

①In the event of horizontal displacement as in Fig. 2 happened, the internal load cell will tilt as in Fig. 3, and in this example, the top of the vibration prevention bracket will move to the right.
②When the lateral force is removed, the load cell and steady brace return to the normal condition shown in Fig. 2.

LCV-A

●Compact and Large Capacity ●500 kN & 1 MN

Small-sized Compression Load Cell

*TEDS-installed versions can be manufactured.Inquiries are welcome.

Compact & Lightweight Nonlinearity: 1/1000

●Service life: 10 million times or more
●BISELCOM® gages are used.

LCV-A series is a compact & lightweight load cell developed for large capacity of 500 kN and 1 MN. They can easily be installed into existing facilities. The hermetically-sealed structure with inert gas filled in ensures stable and reliable performance with 1/1000 nonlinearity. Use of BISELCOM gages ensures increased output and improved reliability.

*BISELCOM gages are self-temperature-compensation gages with the sensitivity temperature compensation function added.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.1% RO
Repeatability	0.05% RO or less
Rated Output	2.5 mV/V (5000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.5 mm²) chloroprene shielded cable, 8.5 mm diameter by 5 m long, with crimp-style terminals for 4 mm (Shield wire is not connected to mainframe.)

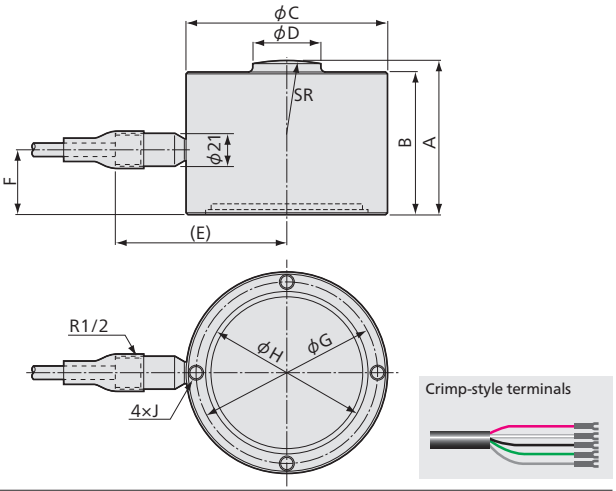
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies & Weight	See table below.
Degree of Protection	IP67 (IEC 60529)

Optional Accessories **(For details, refer pages 2-72 to 2-76)**

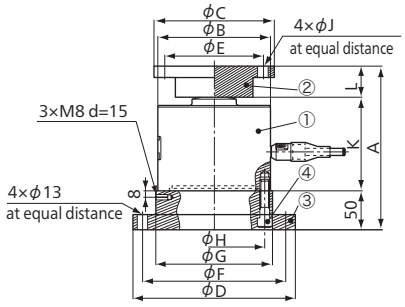
Saddle CA-B
Mount Base CF

■Dimensions



Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	ϕC	ϕD	(E)	F	ϕG	ϕH	J	SR	Weight (Approx.)
LCV-A-500KN	500 kN	13 kHz	95	88	126	42	107	40	113	101	M10 d=12	125	6 kg
LCV-A-1MN	1 MN	12 kHz	120	110	146	58	117	50	130	115	M12 d=18	180	10 kg

■Dimensions in Combination with Accessories



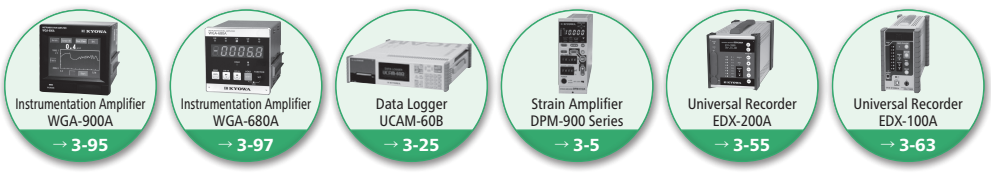
●In Combination with Saddle CA and Mount Base CF

① Load Cells	② Saddles	③ Mount Bases	④ Hex. socket Head Bolts	A	ϕB	ϕC	ϕD	ϕE	ϕF	ϕG	ϕH	ϕJ	K	L
LCV-A-500KN	CA-50B	CF-113F	4xM10 L=45	173	126	118	178	100	154	130	113	11	95	28
LCV-A- 1MN	CA-1MH	CF-130F	4xM12 L=50	210	146	156	208	128	184	150	130	13	120	40

Hexagon socket head bolts to connect the load cell to the mount base are attached to the mount base.

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCV-A Recommended products for combination



LCR-G-SA2

●ϕ20 or ϕ25 ●10 kN to 50 kN

Small-sized large-capacity Compression Load Cell

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	1 mV/V (2000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-10 to 70°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.1% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±5%
Output Resistance	350 Ω±5%
Cable	4-conductor (0.05 mm²) chloroprene shielded cable, 3 mm diameter by 5 m long, terminated with a connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	120%
Weight	See table below.
Materials	Metallic

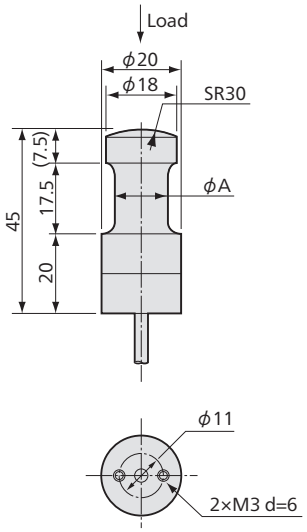
Models	Rated Capacity	Weight (Approx.)*
LCR-G-10KNSA2	10 kN	100 g
LCR-G-20KNSA2	20 kN	
LCR-G-30KNSA2	30 kN	
LCR-G-50KNSA2	50 kN	130 g

*Excluding cable

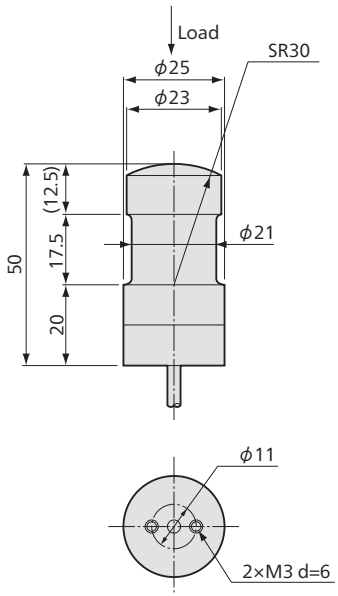
Compact Lightweight Large Capacity Measurement for Cylinder.

Since the diameter is small and the cable comes from the bottom, LCR-G-SA2 series load cells can be inserted into cylindrical objects for measurement.

Dimensions



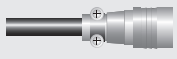
LCR-G-10KNSA2 to 30KNSA2



LCR-G-50KNSA2

Models	ϕA
LCR-G-10KNSA2	11
LCR-G-20KNSA2	14
LCR-G-30KNSA2	16.5

Connector plug



●Physical quantity indication

LCR-G-SA2 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Instrumentation Amplifier WGA-100B → 3-108


4-Channel Signal Conditioner WGC-140A → 3-110


Measuring Instrument Controller WDC-810C1 → 3-114

LC-E

●Large Capacity ●2 MN & 5 MN

General-purpose Compression Load Cell

*Watertight type (IEC 60529) is also available.
*TEDS-installed versions can be manufactured.Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.2% RO
Repeatability	0.1% RO or less
Rated Output	2 mV/V (4000 μm/m) ±1%

Environmental Characteristics

Safe Temperature Range	-30 to 85°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with a connector plug (Shield wire is connected to mainframe.)

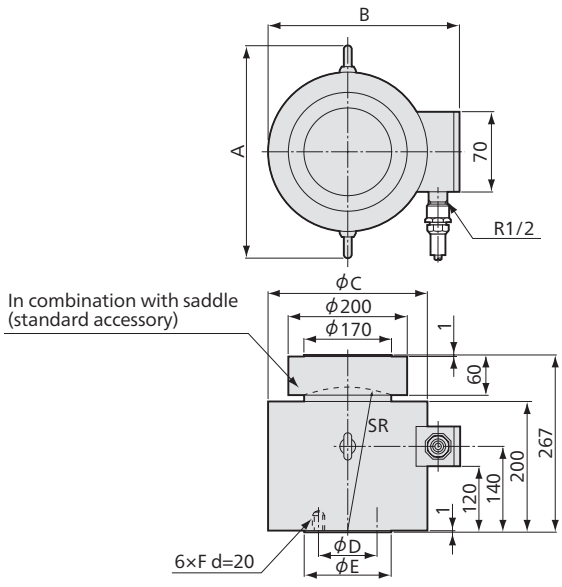
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.

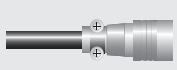
High Stability Hermetically Sealed Structure with Inert Gas Filled in.

Inert gas is filled in the detector portion, thereby preventing aging deterioration and ensuring a stable and reliable operation.

■Dimensions



Connector plug



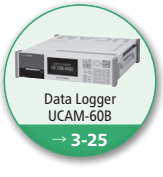
Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	ϕC	ϕD	ϕE	F	SR	Weight (Approx.)*
LC-200TE	2 MN	3.5 kHz	310	246	210	90	135	M14	180	49 kg
LC-500TE	5 MN	4 kHz	340	277	240	130	170	M16	230	65 kg

*Excluding cable

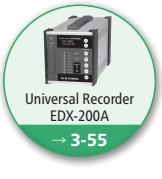
●Physical quantity indication ●Static measurement ●Dynamic measurement

LC-E Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LC-FH

●High-temperature: Up to 150˚C ●500 N to 200 kN

High Temp. Compression Load Cell

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5%RO
Hysteresis	Within ±0.5%RO
Repeatability	0.05% RO or less
Rated Output	1.5 mV/V (3000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-10 to 150°C (Excluding connector)
Compensated Temperature Range	-10 to 150°C (Excluding connector)
Temperature Effect on ZERO Balance	Within ±0.005%RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.03mm²) fluoroplastic shielded cable, 5 mm diameter by 5 m long, terminated with a connector plug (Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	200%
Natural Frequencies	See table below.
Weight	See table below.

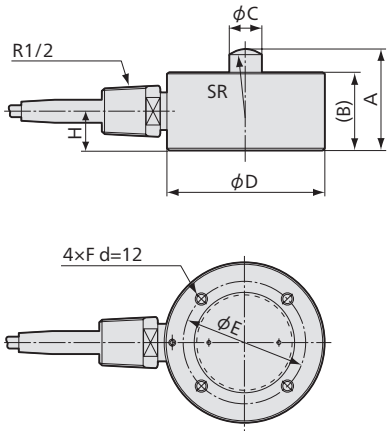
Models	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)*
LC-50KFH	500 N	3.2 kHz	800 g
LC-100KFH	1 kN	5.1 kHz	
LC-200KFH	2 kN	7.2 kHz	
LC-500KFH	5 kN	11 kHz	800 g
LC-1TFH	10 kN	17 kHz	
LC-2TFH	20 kN	21 kHz	
LC-5TFH	50 kN	16 kHz	2.0 kg
LC-10TFH	100 kN	11 kHz	3.4 kg
LC-20TFH	200 kN	8.6 kHz	7.0 kg

*Excluding cable

High Reliability
Airtight Structure
Selectable from a Wide Range of Rated Capacities.

Able to continuously operate under temperatures up to 150°C without any external cooling.

■Dimensions

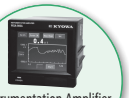


Models	A	(B)	ϕC	ϕD	ϕE	F	F	H
LC-50KFH	44	32	14	68	52	M5	12	17
LC-100KFH								
LC-200KFH								
LC-500KFH	44	32	14	68	52	M5	30	17
LC-1TFH	44	34	14	68	52	M5	30	17
LC-2TFH								
LC-5TFH	60	45	18	96	80	M8	70	17
LC-10TFH	75	55	26	116	100	M8	100	17
LC-20TFH	95	70	36	156	130	M8	100	25

Connector plug

●Physical quantity indication ●Static measurement ●Dynamic measurement

LC-FH Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LCK-A

●Thickness: 25 mm(5 kN to 20 kN) ●5 kN to 200 kN

Thin Compression Load Cell

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Thin
High Reliability, Hermetically-sealed Structure with Inert Gas Filled in

The LCK-A series load cells have excellent accuracy, reliability, stability, and response. They also have a thin design for convenient installation as detection terminals of weighing systems. This thin design makes them suitable for applications such as conveyors, vehicles, cranes, hoppers, and tanks where the space, especially the height, is limited and the detecting part needs to be downsized.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO (LCK-A-5KN to 100KN)
	Within ±0.5% RO (LCK-A-200KN)
Hysteresis	Within ±0.2% RO (LCK-A-5KN to 100KN)
	Within ±0.5% RO (LCK-A-200KN)
Repeatability	0.05% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.5%

Environmental Characteristics

Safe Temperature Range	-30 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.007% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, with bared at the tip (Shield wire is not connected to mainframe.)

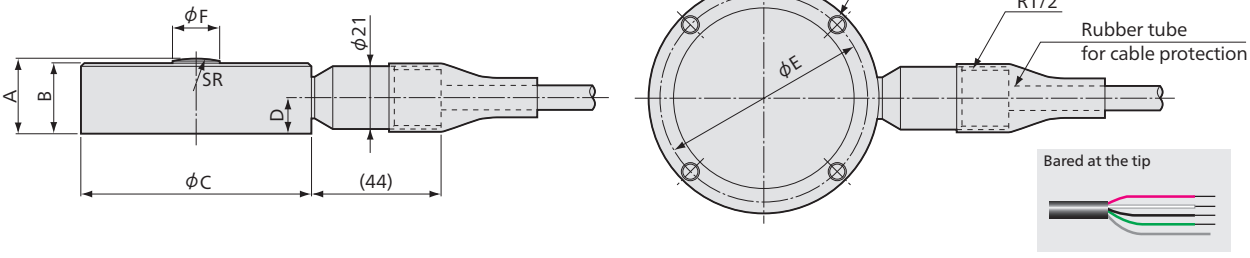
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.
Degree of Protection	IP67 (IEC 60529)

Optional Accessories (For details, refer pages 2-72 to 2-76)

Saddle CA-B

■Dimensions



Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	ϕC	D	ϕE	ϕF	G	H	SR	Weight (Approx.)*
LCK-A-5KN	5 kN	10.7 kHz	25	23.5	78	12	70	16	M5	8	50	700 g
LCK-A-10KN	10 kN	11.4 kHz										
LCK-A-20KN	20 kN	14.2 kHz										
LCK-A-50KN	50 kN	24.2 kHz	30	28	98	14.5	80	18	M8	12	70	1.5 kg
LCK-A-100KN	100 kN	14.8 kHz	35	33	108	17.5	90	25	M8	12	70	2.2 kg
LCK-A-200KN	200 kN	12.6 kHz	50	45	118	25	100	35	M8	12	100	3.5 kg

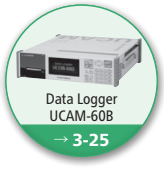
*Excluding cable

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCK-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5

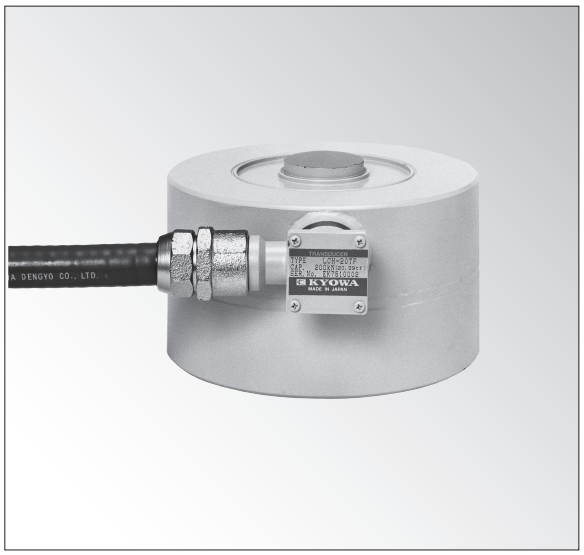

Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

LCH-F

●Nonlinearity: 1/5000 ●100 kN & 200 kN

High-accuracy Compression Load Cell



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.02% RO
Hysteresis	Within ±0.02% RO
Repeatability	0.02% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.1%

Environmental Characteristics

Safe Temperature Range	-35 to 80°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.0015% RO/°C
Temperature Effect on Output	Within ±0.001%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	6-conductor (0.5 mm²) chloroprene shielded cable, 9.5 mm diameter by 5 m long with crimp-style terminals for 4 mm (Shield wire is not connected to mainframe.)

Mechanical Properties

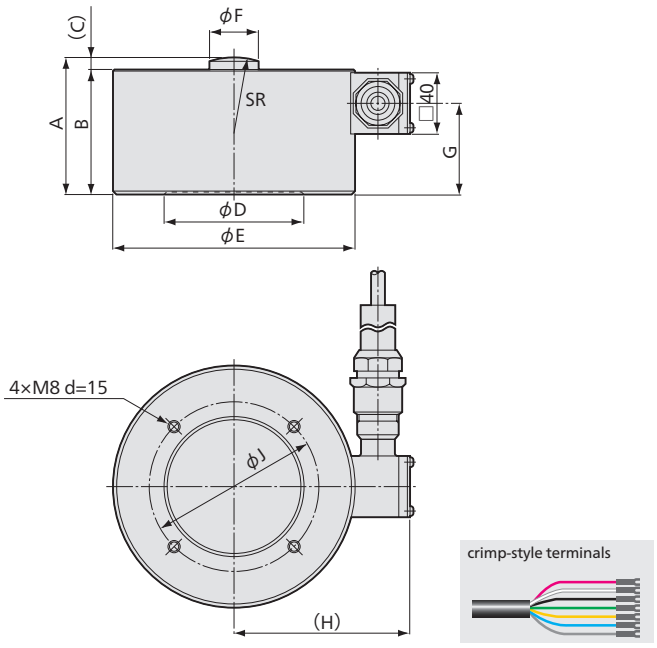
Safe Overload Rating	200%
Natural Frequencies	See table below.
Weight	See table below.
Degree of Protection	IP67 (IEC 60529)

Able to Measure Compression Loads with Nonlinearity 1/5000.

●Remote sensing possible
●Watertight structure

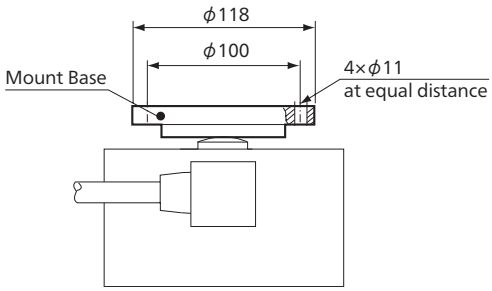
Useable in high humidity.

■Dimensions



■Dimensions for the Mount Base

CA-50B

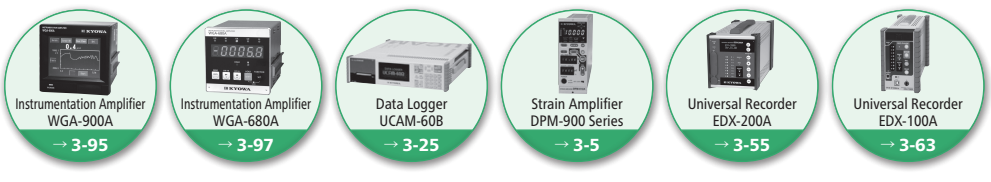


Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	(C)	ϕD	ϕE	ϕF	G	(H)	ϕJ	SR	Weight (Approx.)*	Movable Saddles
LCH-10TF	100 kN	7.5 kHz	90	82	8	90	156	32	60	113.5	110	50	12 kg	CA-50B
LCH-20TF	200 kN	7 kHz	110	100	10	110	176	45	75	123.5	130	70	17 kg	——

*Excluding cable

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCH-F Recommended products for combination



LCS-D

●5 kN to 50 kN

Explosion-proof construction Compression Load Cell

Dedicated Compression Load Cell with Explosion-proof Construction.

*Please contact us for details

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2%RO
Hysteresis	Within ±0.2%RO
Repeatability	0.2% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-15 to 75°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on ZERO Balance	Within ±0.007%RO/°C
Temperature Effect on Output	Within ±0.005%/°C
Explosion-proof Environmental Conditions	
Ambient Temperature: -10 to 40°C	
Relative Humidity: 45 to 85%RH	

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 5 mm diameter by 7.6 m long, terminated with a connector plug (Shield wire is connected to mainframe)

Mechanical Properties

Safe Overload Rating	120%
Natural Frequencies	See table below.
Weight	See table below.

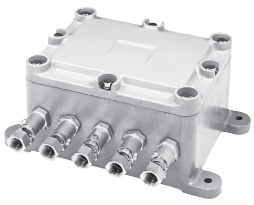
Optional Accessories **(For details, refer pages 2-73 to 2-78)**

Saddle CA-B
Mount Base CF
Movable Saddle ER-B

■Junction Box for Explosion-proof JBS-1C, 4C

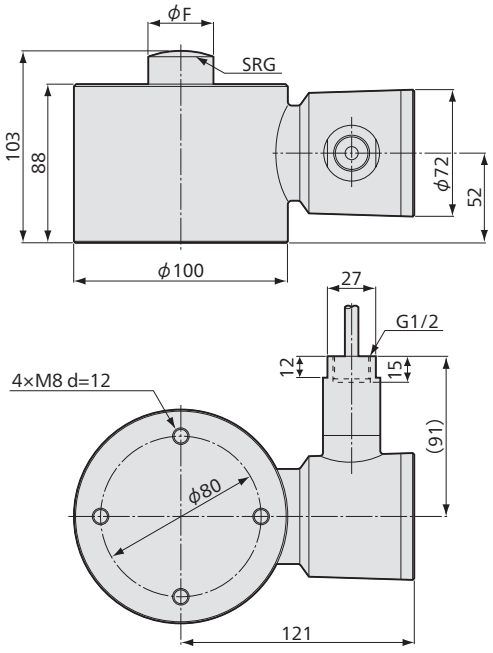
JBS-1C 1 CH
JBS-4C 4 CH

JBS-1C



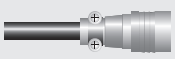
JBS-4C

■Dimensions



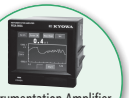
Models	Rated Capacity	SRG	Natural Frequencies (Approx.)	ϕF	Weight (Approx.)	Lord-bearing Unit	Movable Saddles	Mount Bases
LCS-500KD	5 kN	30	4 kHz	18	4 kg	——	——	CF-80
LCS-1TD	10 kN		5.3 kHz					
LCS-2TD	20 kN	50	6.2 kHz	23	4 kg	CA-10B	ER-5B	CF-80
LCS-5TD	50 kN		6 kHz	24				

Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

LCS-D Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LC-J

●Stainless Steel ●5 kN to 200 kN

Corrosion-resistant Compression Load Cell

*TEDS-installed versions can be manufactured.Inquiries are welcome.

Suited for Weighing in Food Processing or Where They are Exposed to Corrosive Liquid and Gas.

●Corrosion-resistant
●Hermetically-sealed structure with inert gas filled in
●High overload rating of 400%

The hermetically-sealed stainless steel structure with inert gas filled in enables use for weighing in food processing or where they are exposed to corrosive liquid and gas. The high overload rating minimizes the ratio of breakdown due to overload.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Repeatability	0.1% RO or less
Rated Output	1 mV/V (2000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-35 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

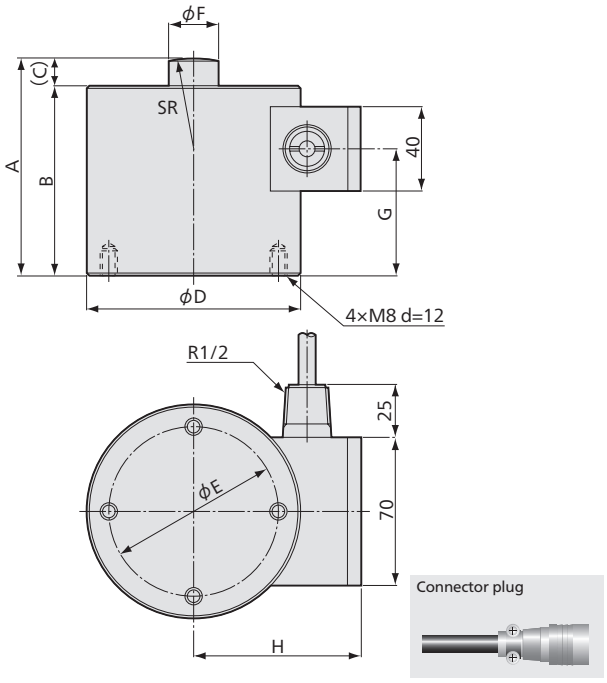
Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 12 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with a connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	400%
Natural Frequencies	See table below.
Weight	See table below.

Dimensions



Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	C	ϕD	ϕE	ϕF	G	H	SR	Weight (Approx.)*
LC-500KJ	5 kN	5.2 kHz	103	90	13	100	80	24	60	77	50	3 kg
LC-1TJ	10 kN	6 kHz									70	
LC-2TJ	20 kN	5.8 kHz										
LC-5TJ	50 kN	5.7 kHz										
LC-10TJ	100 kN	5.5 kHz	110	95	15	120	90	36		90	100	5 kg
LC-20TJ	200 kN	6 kHz	135	115	20			46	80		130	6 kg

Movable Saddles are available for LC-1TJ/2TJ, please contact us.

*Excluding cable

●Physical quantity indication ●Static measurement ●Dynamic measurement

LC-J Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LCW-C-SA3

Washer-type Load Cell

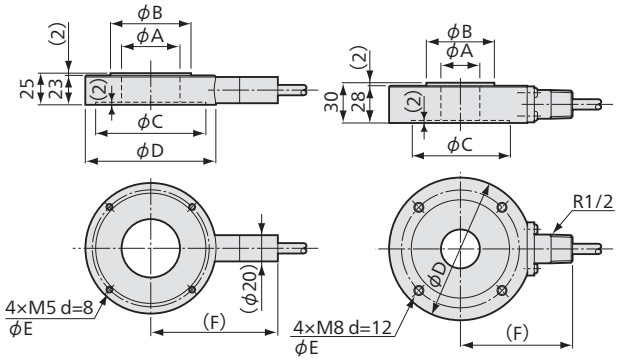
●For Press Forming ●10 kN to 300 kN

*High-temperature models up to 150 °C are available, please contact us.

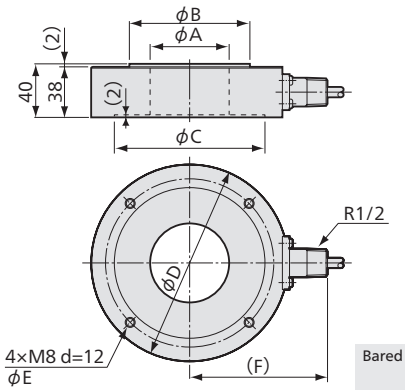
Thin
High Stability
Wide Range of Rated Capacities

Extremely simple structure facilitates handling and maintenance. Widely applicable for bolt tension control, press forming, etc.

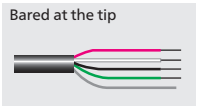
■Dimensions



LCW-C-10, 20KNSA3 LCW-C-50, 100KNSA3



LCW-C-200, 300KNSA3



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	Approx. 1 mV/V (2000 μm/m)

Environmental Characteristics

Safe Temperature Range	-35 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Weight	See table below.

Models	Rated Capacity	ϕA	ϕB	ϕC	ϕD	ϕE	(F)	Weight (Approx.)*
LCW-C-10KN25SA3	10 kN	25	42	64	80	70	87	0.6 kg
LCW-C-10KN35SA3		35	52	74	90	80	92	0.7 kg
LCW-C-10KN45SA3		45	62	84	100	90	97	0.8 kg
LCW-C-10KN55SA3		55	72	94	110	100	102	0.9 kg
LCW-C-10KN65SA3		65	82	104	120	110	107	1.0 kg
LCW-C-20KN25SA3	20 kN	25	42	64	80	70	87	0.6 kg
LCW-C-20KN35SA3		35	52	74	90	80	92	0.7 kg
LCW-C-20KN45SA3		45	62	84	100	90	97	0.8 kg
LCW-C-20KN55SA3		55	72	94	110	100	102	0.9 kg
LCW-C-20KN65SA3		65	82	104	120	110	107	1.0 kg
LCW-C-50KN30SA3	50 kN	30	52	74	108	90	85	1.7 kg
LCW-C-50KN40SA3		40	62	84	118	100	90	1.9 kg
LCW-C-50KN50SA3		50	72	94	128	110	95	2.1 kg
LCW-C-50KN60SA3		60	82	104	138	120	100	2.3 kg
LCW-C-50KN70SA3		70	92	114	148	130	105	2.5 kg
LCW-C-50KN80SA3		80	102	124	158	140	110	2.7 kg
LCW-C-100KN30SA3	100 kN	30	52	74	108	90	85	1.7 kg
LCW-C-100KN40SA3		40	62	84	118	100	90	1.9 kg
LCW-C-100KN50SA3		50	72	94	128	110	95	2.1 kg
LCW-C-100KN60SA3		60	82	104	138	120	100	2.3 kg
LCW-C-100KN70SA3		70	92	114	148	130	105	2.5 kg
LCW-C-100KN80SA3		80	102	124	158	140	110	2.7 kg
LCW-C-200KN60SA3	200 kN	60	92	114	148	130	105	3.7 kg
LCW-C-200KN70SA3		70	102	124	158	140	110	4.1 kg
LCW-C-200KN80SA3		80	112	134	168	150	115	4.4 kg
LCW-C-200KN90SA3		90	122	144	178	160	121	4.8 kg
LCW-C-200KN100SA3		100	132	154	188	170	126	5.1 kg
LCW-C-300KN60SA3	300 kN	60	92	114	148	130	105	3.7 kg
LCW-C-300KN70SA3		70	102	124	158	140	110	4.1 kg
LCW-C-300KN80SA3		80	112	134	168	150	115	4.4 kg
LCW-C-300KN90SA3		90	122	144	178	160	121	4.8 kg
LCW-C-300KN100SA3		100	132	154	188	170	126	5.1 kg

*Excluding cable

●Physical quantity indication

LCW-C-SA3 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Instrumentation Amplifier WGA-100B → 3-110


4-Channel Signal Conditioner WGC-140A → 3-109


Measuring Instrument Controller WDC-810C1 → 3-114

LCW-D-S/E-S

Washer-type Load Cell

- For Rolling & Depressing Pressure Measurement under Harsh Envrionment
- 1 MN to 5 MN

*Load cells which meet individual rolling mills can also be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Repeatability	0.3% RO or less
Rated Output	1 mV/V (2000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-20 to 100°C
Compensated Temperature Range	-10 to 80°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.75 mm²) fluonlex shielded cable, 8 mm diameter by 15 m long, bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

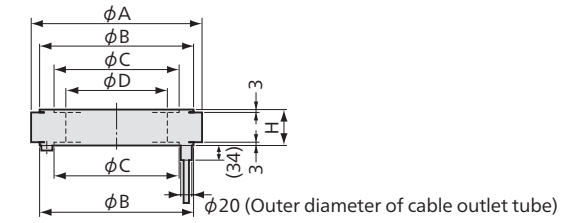
Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.
Degree of Protection	IP64 (IEC 60529)

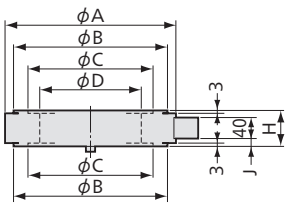
The Flat Washer-type Structure of Load Cell Well Suited to Rolling Mills.

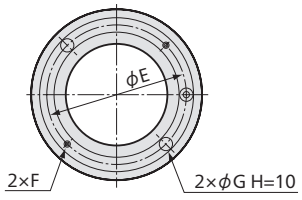
- Hermetically-sealed structure with inert gas filled in
- Heat and oil resistant cable.
- High reliability

The hermetically-sealed structure with inert gas filled in ensures a reliable and stable operation under harsh conditions. The flat washer type structure only requires processing of the screw nuts for installation to existing rolling mills.

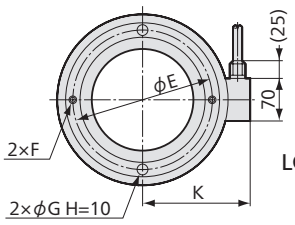
Dimensions





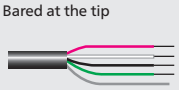


LCW-D-S



LCW-E-S

Bared at the tip



Models	Rated Capacity	Natural Frequencies (Approx.)	ϕA	ϕB	ϕC	ϕD	ϕE	F	ϕG	H	J	K	Weight (Approx.)*
LCW-D-1MNS	1 MN	16 kHz	241	202	178	140	190	M8 d=8	8	64	—	—	7 kg
LCW-D-2MNS	2 MN	14 kHz	355	307	277	230	292	M10 d=10	12	70	—	—	15 kg
LCW-D-3MNS	3 MN	15 kHz	355	314	270	230	292	M10 d=12	20	70	—	—	17 kg
LCW-D-5MNS	5 MN	16 kHz	355	312	252	210	282	M10 d=12	20	70	—	—	20 kg
LCW-E-1MNS	1 MN	16 kHz	241	202	178	140	190	M8 d=8	8	64	16	154	7 kg
LCW-E-2MNS	2 MN	14 kHz	355	307	277	230	292	M10 d=10	12	70	18	212	15 kg
LCW-E-3MNS	3 MN	15 kHz	355	314	270	230	292	M10 d=12	20	70	18	212	17 kg
LCW-E-5MNS	5 MN	16 kHz	355	312	252	210	282	M10 d=12	20	70	18	212	20 kg

*Excluding cable

- Physical quantity indication

LCW-D-S/E-S Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Instrumentation Amplifier WGA-100B → 3-110


4-Channel Signal Conditioner WGC-140A → 3-109


Measuring Instrument Controller WDC-810C1 → 3-114

LCTS-B

Stainless Steel Load Cell

●Stainless Steel ●5 kN to 100 kN

*TEDS-installed versions can be manufactured.Inquiries are welcome.

For Weighing Hoppers and Tanks With Steady Brace Mechanism.

●Stainless steel structure enables use under conditions where the load cell is exposed to moisture and corrosive gases.
●"Thin" and "Top and Bottom plates integrated" design facilitates installation to hopper brackets or tank's feet.
●Hermetically-sealed structure (IP67)
●Built-in steady brace mechanism makes LCTS-B suitable for weighing stirring tanks or tanks with feet, while simplifying peripheral facilities by eliminating check rods, etc.
●Since the load cell can be fixed with bolts, dropping or floating of the load cell can be prevented.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.05% RO
Hysteresis	Within ±0.05% RO
Repeatability	0.02% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.1%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	700 Ω±0.7%
Output Resistance	700 Ω±0.7%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 5 m long (10 m long with 50KN and 100KN),
	bared at the tip (Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	150%
Critical Lateral Load	10 kN (30 kN with 50KN and 100KN)
	(Maximum load which does not cause any mechanical damage)
Weight	See table below.
Materials	Stainless steel alloy
Degree of Protection	IP67 (IEC 60529)

Models	Rated Capacity	Weight (Approx.)*
LCTS-B-5KN	5 kN	5 kg
LCTS-B-10KN	10 kN	
LCTS-B-20KN	20 kN	
LCTS-B-30KN	30 kN	6 kg
LCTS-B-50KN	50 kN	11 kg
LCTS-B-100KN	100 kN	13 kg

*Excluding cable

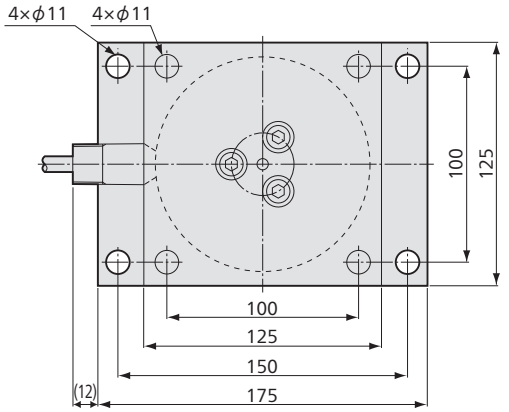
To Ensure Safe Usage

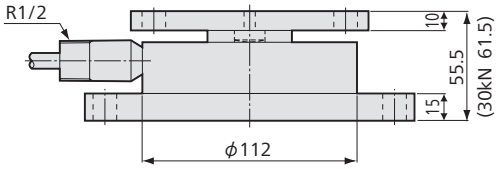
■Accessories to Load Cells
Do not disassemble or remodel accessories such as top plate and mounting plate designed for installation of LCTS-B series load cells.

■Installation of Floating Prevention Stoppers
Install the hazard prevention stopper when using in an environment where the load cell may be damaged or the hopper or tank may overturn due to lateral loads or lateral displacement caused by thermal expansion of structure or vibration of stirrers.

Precautions
1. LCTS-B cannot be used for any onboard measurement.
2. LCTS-B cannot be used in an environment where it is frequently exposed to lateral loads.
3. LCTS-B cannot be installed to any inclined or vertical surfaces.

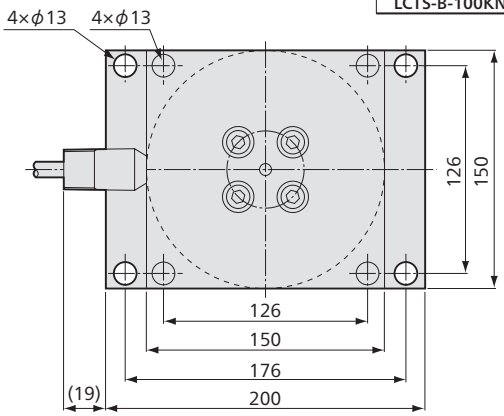
Dimensions

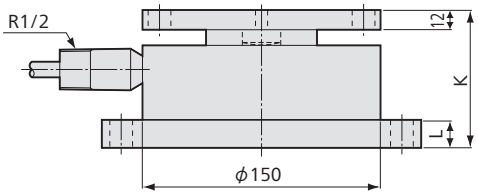




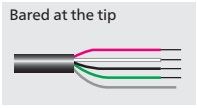
LCTS-B-5KN to 30KN

Models	K	L
LCTS-B-50KN	87	20
LCTS-B-100KN	95	28

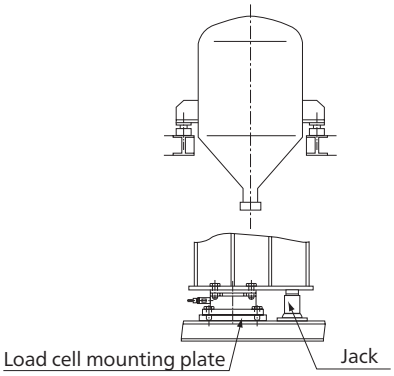




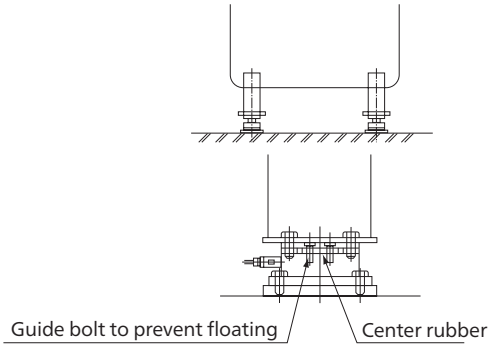
LCTS-B-50KN & 100KN



Installation Examples

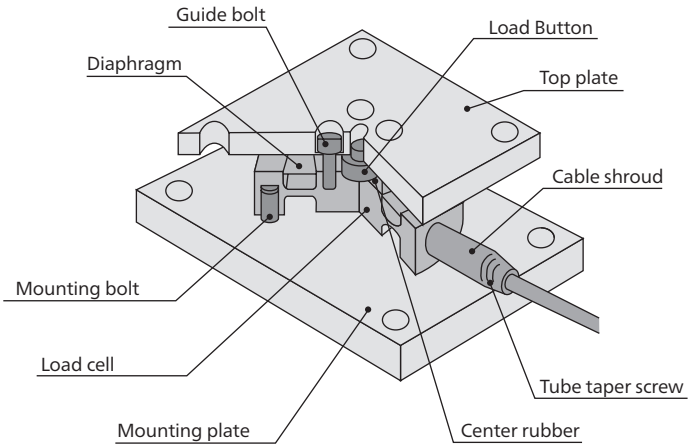


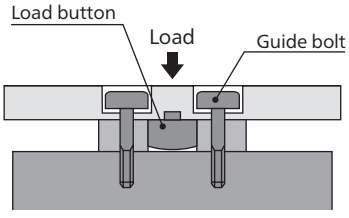
Installation to Tank's Brackets



Installation to Tank's Feet

Internal Structure





Mechanical stopper(steady brace)

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCTS-B Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

LCTA-A

●Thin ●500 N to 3 kN

Thin Load Cell "Multi Force Sensor"

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Advanced Thin Design 1/2 to 1/3 height to the Conventional one More Applications are possible

Original ideas and advanced technologies cultivated in weight control of large scale airplanes made the revolutionary thin design of the LCTA-A series load cells possible. The integrated design and rubber attachment enable use with the top and bottom fixed and provide excellent buffer.

- ●Optional dedicated rubber attachment enables fixing the top and bottom with bolts, thereby making it possible to design the system with no tension rod or stay rod used.
- ●Safety factor is 3 to 5 times higher than conventional type. Endures lateral loads up to 20% of the rated capacity.
- ●Rubber attachment attenuates impact energy and lessens the effects of thermal expansion of system and the moment of fixed section.
- ●Rubber attachment enables easy installation without concern for parallelism.
- ●Varieties of accuracies and output signals are available, enabling configuration of the most suitable system for each application.
- ●Combination instruments such as amplifiers can easily be connected since the wirings are the same as conventional load cells.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.05% RO
Hysteresis	Within ±0.05% RO
Repeatability	0.03% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V DC
Recommended Excitation Voltage	1 to 10 V DC
Input Resistance	350 Ω±1.5%
Output Resistance	350 Ω±1.5%
Dedicated connection cable	HW005-40AD
Cable	4-conductor (0.5 mm²) shielded vinyl sheath, 8.5 mm diameter by 5 m long, bared at the tip (Shield wire is not connected to mainframe)

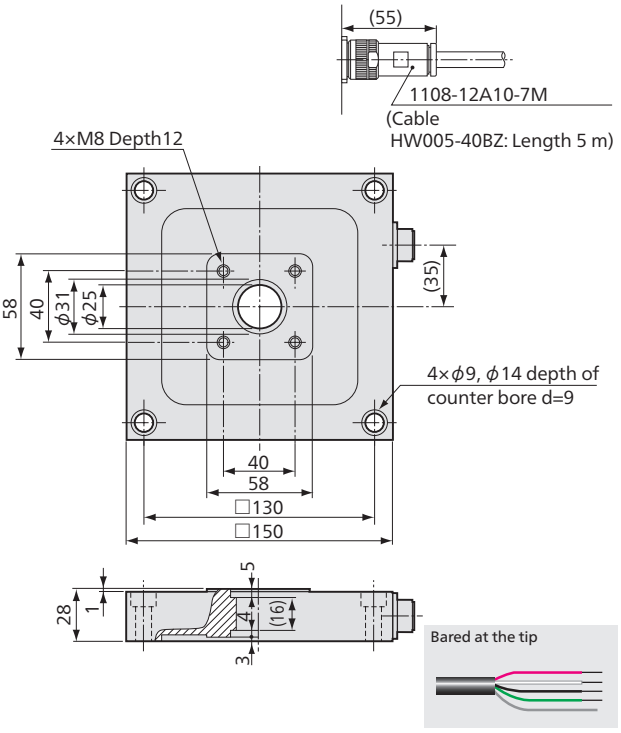
Mechanical Properties

Safe Overload Rating	150%
Critical Lateral Load	20% (maximum load which does not cause any mechanical damage)
Weight	Approx. 1.1 kg (Excluding cable)
Materials	Aluminum alloy

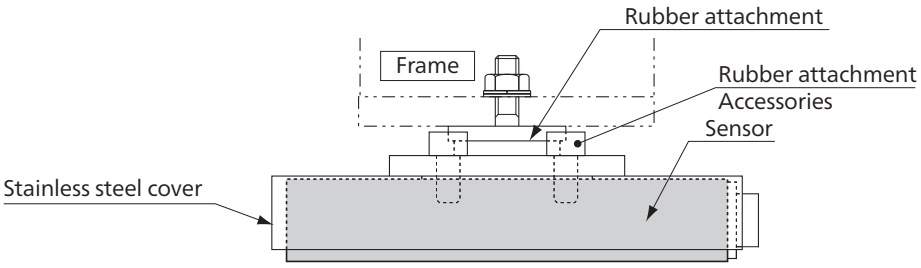
Precautions
1. LCTA-A cannot be used for any onboard measurement.
2. LCTA-A cannot be used in an environment where it is frequently exposed to lateral loads.
3. LCTA-A cannot be installed to any inclined or vertical surfaces.

Models	Rated Capacity
LCTA-A-500N	500 N
LCTA-A-800N	800 N
LCTA-A-1KN	1 kN
LCTA-A-2KN	2 kN
LCTA-A-3KN	3 kN

■Dimensions

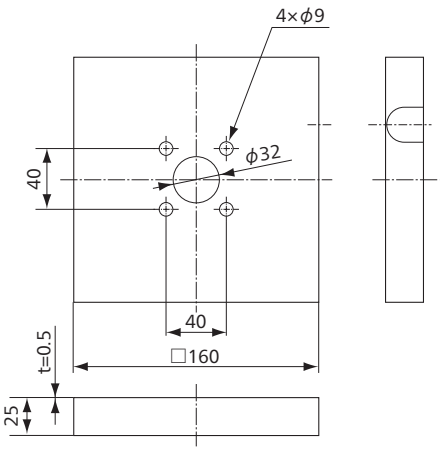


Accessories



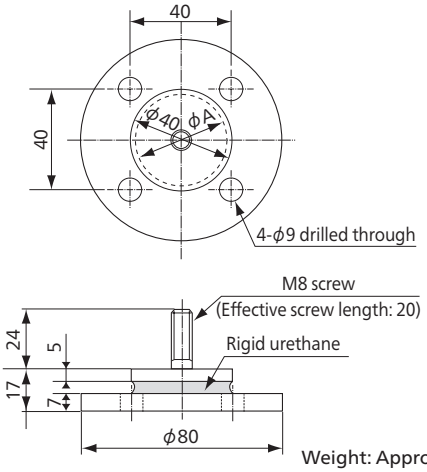
Applicable Accessories

Models	Stainless Steel Covers	Rubber Attachments
LCTA-A-500N	COV03-300K	RA02-100K
LCTA-A-800N		
LCTA-A-1KN		
LCTA-A-2KN		RA02-300K
LCTA-A-3KN		



Weight: Approx. 180 g

Stainless Steel Cover



Weight: Approx. 500 g

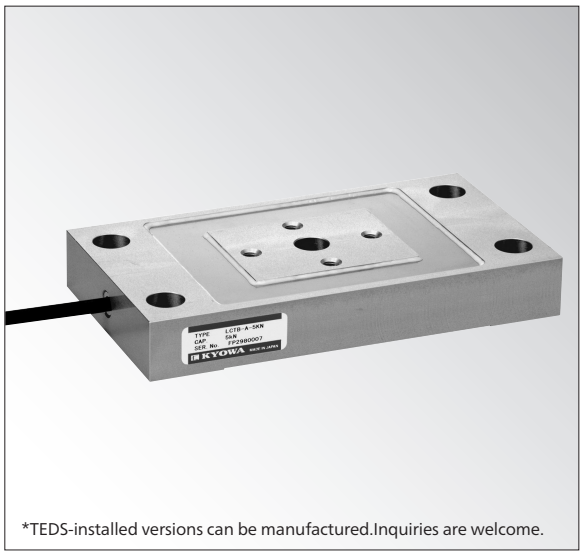
Rubber Attachment

Models	ϕA
RA02-100K	30
RA02-300K	36

LCTB-A

●Thin ●5 kN to 50 kN

Thin Load Cell "Multi Force Sensor"



*TEDS-installed versions can be manufactured.Inquiries are welcome.

Advanced Thin Design 1/2 to 1/3 height to the Conventional one More Applications are possible

- ●Optional dedicated rubber attachment enables fixing the top and bottom with bolts, thereby making it possible to design the system with no tension rod or stay rod used.
- ●Safety factor is 3 to 5 times higher than conventional type. Endures lateral loads up to 20% of the rated capacity.
- ●Rubber attachment attenuates impact energy and lessens the effects of thermal expansion of system and the moment of fixed section.
- ●Rubber attachment enables easy installation without concern for parallelism.
- ●Varieties of accuracies and output signals are available, enabling configuration of the most suitable system for each application.
- ●Combination instruments such as amplifiers can easily be connected since the wirings are the same as conventional load cells.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.03% RO
Hysteresis	Within ±0.03% RO
Repeatability	0.02% RO or less
Rated Output	1.5 mV/V (3000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V DC
Recommended Excitation Voltage	1 to 10 V DC
Input Resistance	350 Ω±1.5%
Output Resistance	350 Ω±1.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 6 mm diameter by 5 m long, bared at the tip (Shield wire is not connected to mainframe)

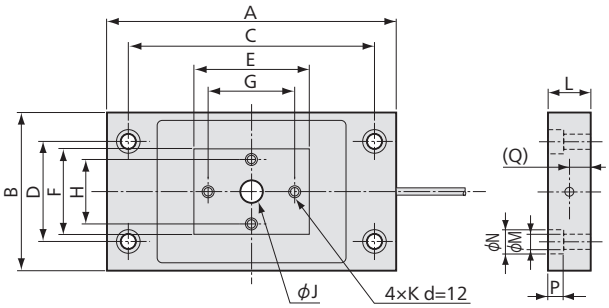
Mechanical Properties

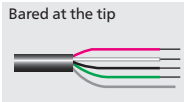
Safe Overload Rating	150%
Critical Lateral Load	50% (maximum load which does not cause any mechanical damage)
Weight	See table below.
Materials	Aluminum alloy

Precautions
1. LCTB-A cannot be used for any onboard measurement.
2. LCTB-A cannot be used in an environment where it is frequently exposed to lateral loads.
3. LCTB-A cannot be installed to any inclined or vertical surfaces.

*Model for intrinsic safety construction is "M4AL2".

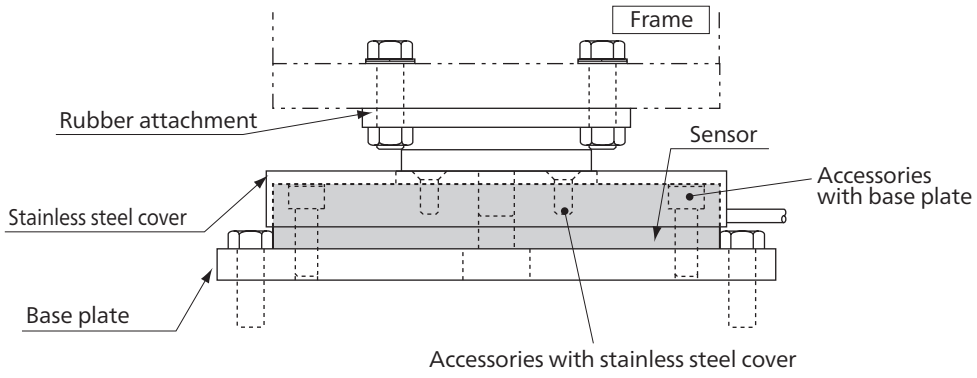
■Dimensions





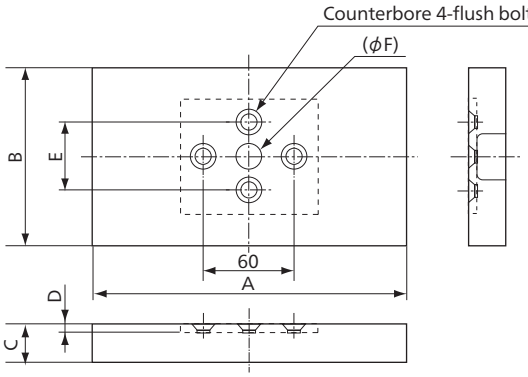
Models	Rated Capacity	A	B	C	D	E	F	G	H	ϕJ	K	L	ϕM	ϕN	P	(Q)	Weight (Approx.)*
LCTB-A-5KN	5 kN	200	110	170	70	80	60	60	45	16	M8	29	11	17	11	15	1.8 kg
LCTB-A-10KN	10 kN																
LCTB-A-20KN	20 kN											35				16.5	2.3 kg
LCTB-A-30KN	30 kN	260	150	220	90	90	80	60	60	20	M10	39	13	19	13	19	4.3 kg
LCTB-A-50KN	50 kN											49				24	5.3 kg

*Excluding cable



Applicable Accessories

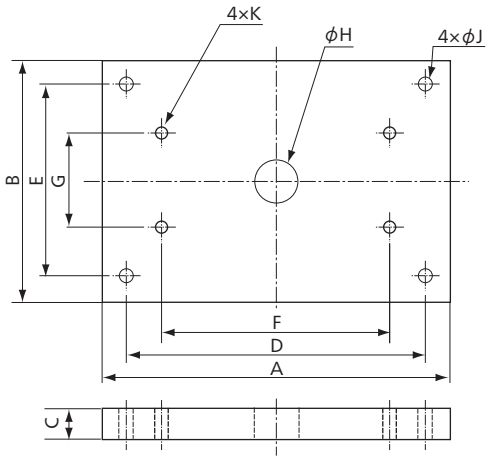
Models	Stainless Steel Covers	Rubber Attachments	Base Plates
LCTB-A-5KN	COV01-2T	RA01-2T	BP01-2T
LCTB-A-10KN			
LCTB-A-20KN			
LCTB-A-30KN	——	RA01-5T	——
LCTB-A-50KN			



Stainless Steel Cover

Models	A	B	C	D	E	(ϕF)	G	Weight(Approx.)
COV01-2T	206	116	25	5.5	45	18	M8	400 g
COV01-5T	270	160	35	9.5	60	22	M10	900 g

Base plate



Load Cell Models	Base plate Models	A	B	C	D	E	F	G	ϕH	ϕJ	K
LCTB-A-5KN LCTB-A-10KN LCTB-A-20KN	BP01-2T	250	250	14	220	138	170	70	30	13	M10

●Physical quantity indication ●Static measurement ●Dynamic measurement

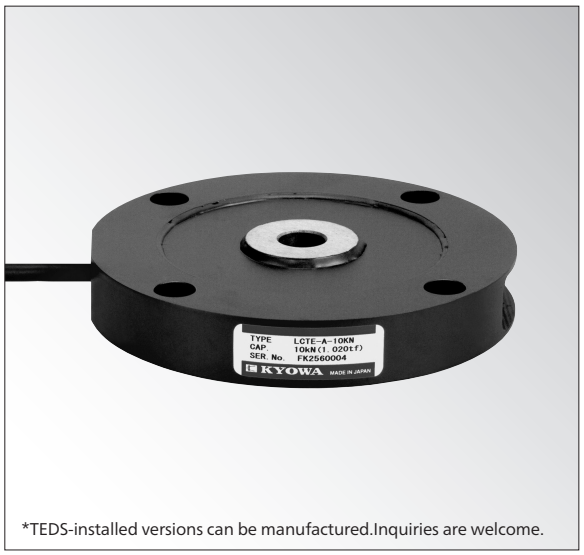
LCTB-A Recommended products for combination

Instrumentation Amplifier WGA-900A → 3-95
Instrumentation Amplifier WGA-680A → 3-97
Data Logger UCAM-60B → 3-25
Strain Amplifier DPM-900 Series → 3-5
Universal Recorder EDX-200A → 3-55
Universal Recorder EDX-100A → 3-63

LCTE-A

●Thin ●10 kN 100 kN

Thin Load Cell "Multi Force Sensor"



*TEDS-installed versions can be manufactured.Inquiries are welcome.

Advanced Thin Design 1/2 to 1/3 height to the Conventional one More Applications are possible

- ●Optional dedicated rubber attachment enables fixing the top and bottom with bolts, thereby making it possible to design the system with no tension rod or stay rod used.
- ●Safety factor is 3 to 5 times higher than conventional type. Endures lateral loads up to 20% of the rated capacity.
- ●Rubber attachment attenuates impact energy and lessens the effects of thermal expansion of system and the moment of fixed section.
- ●Rubber attachment enables easy installation without concern for parallelism.
- ●Varieties of accuracies and output signals are available, enabling configuration of the most suitable system for each application.
- ●Combination instruments such as amplifiers can easily be connected since the wirings are the same as conventional load cells.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.05% RO (LCTE-A-10KN to 50KN)
	Within ±0.1% RO (LCTE-A-100KN)
Hysteresis	Within ±0.05% RO (LCTE-A-10KN to 50KN)
	Within ±0.1% RO (LCTE-A-100KN)
Repeatability	±0.03% RO or less (LCTE-A-10KN to 50KN)
	±0.05% RO or less (LCTE-A-100KN)
Rated Output	2 mV/V (4000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

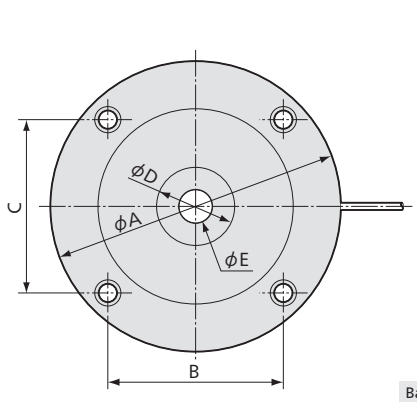
Safe Excitation Voltage	20 V DC
Recommended Excitation Voltage	1 to 10 V DC
Input Resistance	350 Ω±1.5%
Output Resistance	350 Ω±1.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	6 mm diameter by 5 m long (10 m long for 100KN),
	bared at the tip (Shield wire is not connected to mainframe)

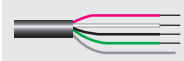
Mechanical Properties

Safe Overload Rating	150%
Critical Lateral Load	50% (maximum load which does not cause any mechanical damage)
Weight	See table below.
Materials	Special steel

Precautions
1. LCTE-A cannot be used for any onboard measurement.
2. LCTE-A cannot be used in an environment where it is frequently exposed to lateral loads.
3. LCTE-A cannot be installed to any inclined or vertical surfaces.

Dimensions

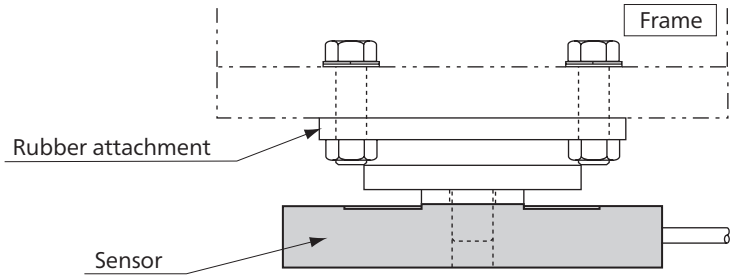




Models	Rated Capacity	ϕA	B	C	ϕD	ϕE	F	G	(H)	ϕJ	ϕK	L	Weight (Approx.)*
LCTE-A-10KN	10 kN	148	90	90	40	16	25	1	13	9	14	8.5	3.2 kg
LCTE-A-20KN	20 kN	178	110	110	62		31		15	11	18	11	5.1 kg
LCTE-A-30KN	30 kN					20							
LCTE-A-50KN	50 kN	198	124	124	80		35		17	14	20	13	6.9 kg
LCTE-A-100KN	100 kN						37	3					7.2 kg

*Excluding cable

Accessories



Applicable Accessories

Models	Rubber Attachment
LCTE-A-10KN	RA01-2T
LCTE-A-20KN	
LCTE-A-30KN	RA01-5T
LCTE-A-50KN	RA01-5T, RA01-10T
LCTE-A-100KN	

LCTE-A Recommended products for combination

●Physical quantity indication

Instrumentation Amplifier WGA-900A → 3-95

Instrumentation Amplifier WGA-680A → 3-97

●Static measurement ●Dynamic measurement

Data Logger UCAM-60B → 3-25

Strain Amplifier DPM-900 Series → 3-5

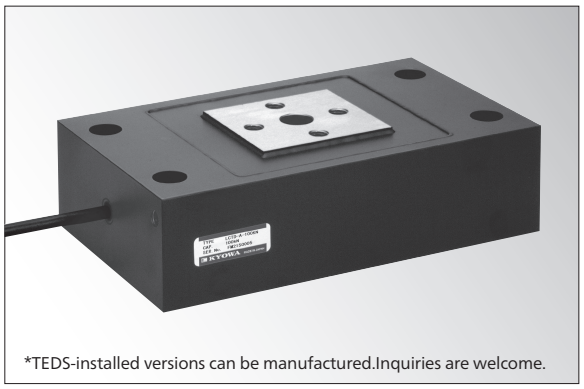
Universal Recorder EDX-200A → 3-55

Universal Recorder EDX-100A → 3-63

LCTD-A

●Thin ●100 kN to 300 kN

Thin Load Cell "Multi Force Sensor"

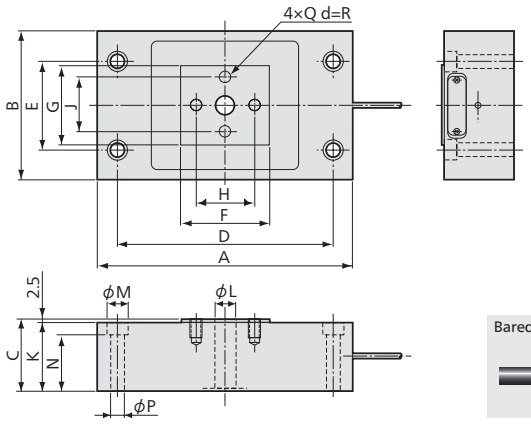


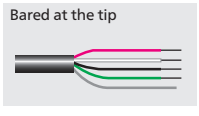
*TEDS-installed versions can be manufactured.Inquiries are welcome.

Advanced Thin Design 1/2 to 1/3 height to the Conventional one More Applications are possible

- ●Optional dedicated rubber attachment enables fixing the top and bottom with bolts, thereby making it possible to design the system with no tension rod or stay rod used.
- ●Safety factor is 3 to 5 times higher than conventional type. Endures lateral loads up to 20% of the rated capacity.
- ●Rubber attachment attenuates impact energy and lessens the effects of thermal expansion of system and the moment of fixed section.
- ●Rubber attachment enables easy installation without concern for parallelism.
- ●Varieties of accuracies and output signals are available, enabling configuration of the most suitable system for each application.
- ●Combination instruments such as amplifiers can easily be connected since the wirings are the same as conventional load cells.

■Dimensions





Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.03% RO
Hysteresis	Within ±0.03% RO
Repeatability	0.02% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

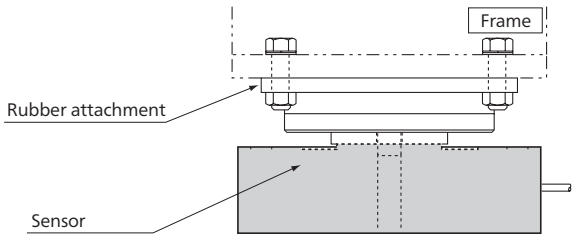
Safe Excitation Voltage	20 V DC
Recommended Excitation Voltage	1 to 10 V DC
Input Resistance	350 Ω±1.5%
Output Resistance	350 Ω±1.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 10 m long, bared at the tip
	(Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	150%
Critical Lateral Load	50% (maximum load which does not cause any mechanical damage)
Weight	See table below.
Materials	Special steel

Precautions
1.LCTD-A cannot be used for any onboard measurement.
2.LCTD-A cannot be used in an environment where it is frequently exposed to lateral loads.
3. LCTD-A cannot be installed to any inclined or vertical surfaces.

■Accessories



Applicable Accessories

Models	Rubber Attachments
LCTD-A-100KN	RA01-10T
LCTD-A-200KN	RA01-30T
LCTD-A-300KN	

For rubber attachments and base plates, refer to page 2-42.

Models	Rated Capacity	A	B	C	D	E	F	G	H	J	K	ϕL	ϕM	N	ϕP	Q	R	Weight (Approx.)*
LCTD-A-100KN	100 kN	260	150	74	220	90	90	80	60	56	71.5	20	20	58.5	14	M12	18.5	18 kg
LCTD-A-200KN	200 kN			93							90.5	36	26	73	18			23 kg
LCTD-A-300KN	300 kN	300	200	94	250	140	100	130	70	80	91.5			74		M16	28.5	33 kg

*Excluding cable

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCTD-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25

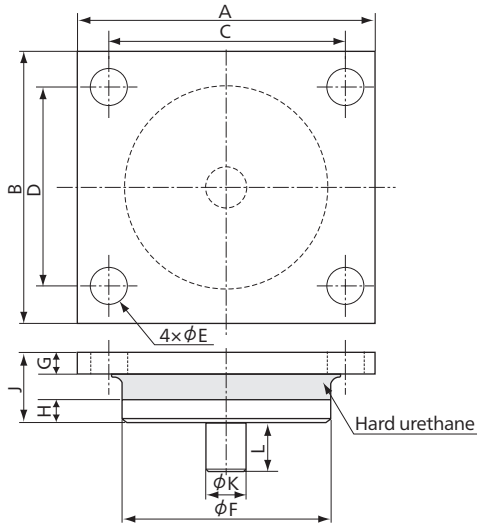

Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

Accessories

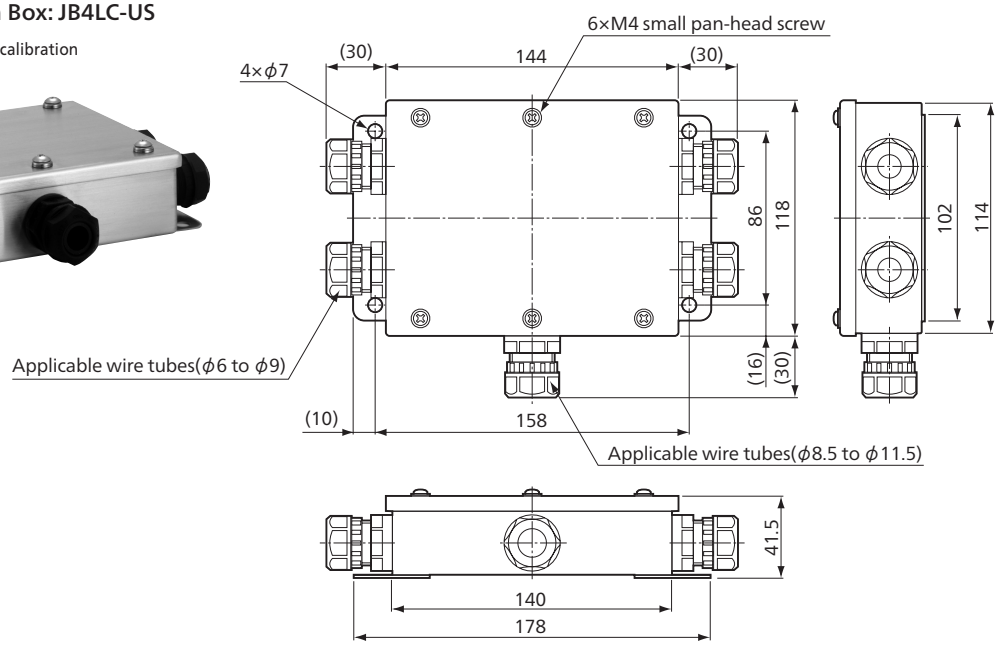
●Rubber Attachments



Models	A	B	C	D	ϕE	ϕF	G	H	J	ϕK	L	Weight (Approx.)
RA01-2T	120	110	95	80	14	85	8.5	9.5	28	16	20	1.4 kg
RA01-5T	170	150	140	120		130		12.5	35	20		3.2 kg
RA01-10T	220	200	186	140	18	180	11.5	15.5	45			7.4 kg
RA01-30T	300	250	250	200	23	240	18.5	20.5	63	35	40	19.2 kg

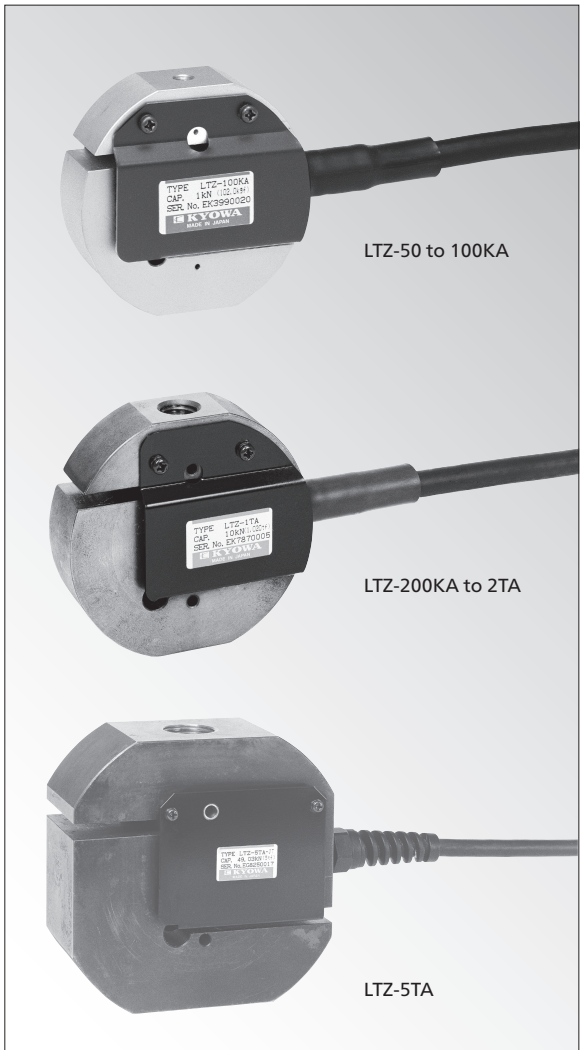
●4-channel Junction Box: JB4LC-US

Note: Adjustment through calibration with actual load is required.



LTZ-A
High-accuracy Tension Load Cell

●Small-sized ●High-accuracy ●500 N to 50 kN



*TEDS-installed versions can be manufactured. Inquiries are welcome.
*Usable also for compressive load measurement.
(Extra calibration and patch are required.)

Nonlinearity: Within ±0.03%RO available

●Compact & lightweight
●Large output
●Usable also for compressive load measurement
(Extra calibration and patch are required.)

The LTZ-A series load cells adopt a Roberval's mechanism to ensure 1/3333 nonlinearity and easy handling and maintenance. Since they can be installed with less burden to existing facilities, they are used as compact, lightweight load cells with excellent cost performance for weighing or testing systems in various fields.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.03% RO (LTZ-50KA to 200KA)
	Within ±0.05% RO (LTZ-500KA to 5TA)
Hysteresis	Within ±0.03% RO (LTZ-50KA to 200KA)
	Within ±0.05% RO (LTZ-500KA to 5TA)
Repeatability	0.03% RO or less
Rated Output	3 mV/V (6000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.5 mm²) chloroprene shielded cable,
	8.5 mm diameter by 3 m long, with crimp-style terminals for 4 mm
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Materials	Aluminum alloy (mainframe of 50KA to 200KA)
Natural Frequencies	See table below.
Weight	See table below.
Degree of Protection	IP64 (IEC 60529)

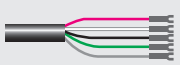
Optional Accessories **(For details, refer pages 2-72 to 2-76)**

Saddle CA-B Movable saddle ER-B
Patch CWM Boll Joints TU

Models	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)*
LTZ-50KA	500 N	1.25 kHz	300 g
LTZ-100KA	1 kN	1.75 kHz	
LTZ-200KA	2 kN	2 kHz	350 g
LTZ-500KA	5 kN	2.5 kHz	700 g
LTZ-1TA	10 kN	2.8 kHz	
LTZ-2TA	20 kN	2.6 kHz	1.5 kg
LTZ-5TA	50 kN	4.3 kHz	4.4 kg

*Excluding cable

Crimp-style terminals



■In Combination with Ball Joints

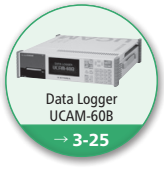
*Note: Don't use other accessories for tensile load except the ball joints.

●Physical quantity indication ●Static measurement ●Dynamic measurement

LTZ-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97

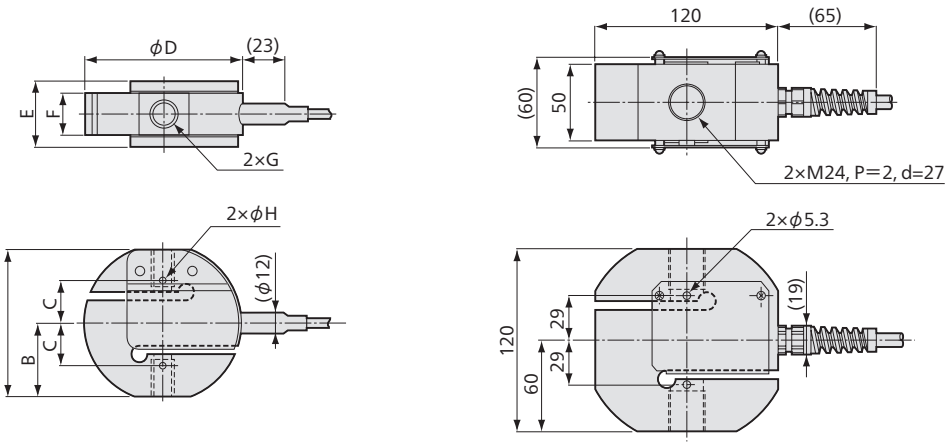

Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

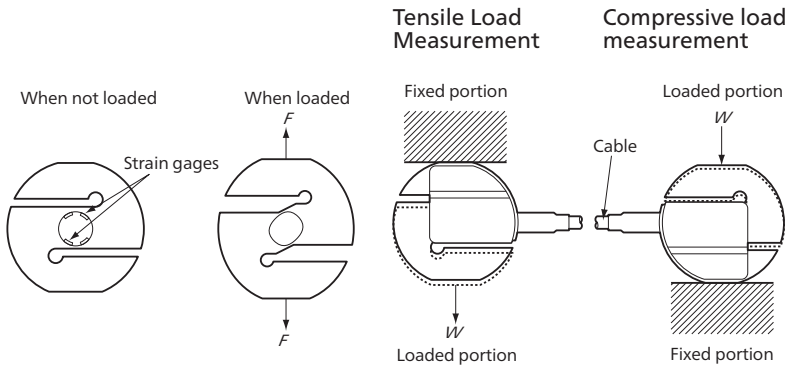

Universal Recorder EDX-100A → 3-63

Dimensions

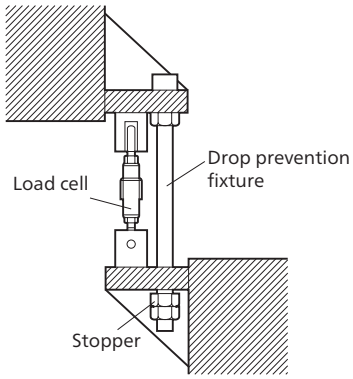


LTZ-50KA to 2TA　　LTZ-5TA

Models	A	B	C	ϕD	E	F	G	ϕH
LTZ-50KA	64	32	19	68	32	22	M6, P=1, d=14	1.6
LTZ-100KA								
LTZ-200KA	74	37	21	78	32	22	M12, P=1.75, d=18	3.5
LTZ-500KA								
LTZ-1TA								
LTZ-2TA	94	47	23	98	40	30	M18, P=1.5, d=25	3.5
LTZ-5TA	See the above dimensions.							



Principle Image　　Standard Installation

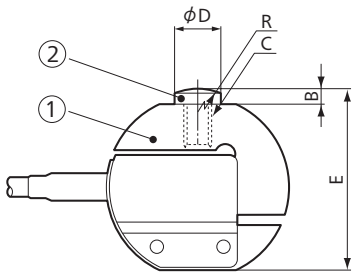


Example of Drop Prevention

Dimensions in Combination with Special Accessories

Contact us for using the tension load cell in combination with special accessories.

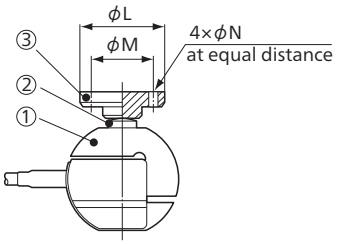
●In Combination with Patch CWM



① Load Cells	②Patches	B	C	ϕD	E	R
LTZ-50KA	CWM-6	4	M6, P=1	10	68	SR30
LTZ-100KA						
LTZ-200KA	CWM-12	7	M12, P=1.75	19	81	SR30
LTZ-500KA						
LTZ-1TA						
LTZ-2TA	CWM-18	10	M18, P=1.5	26	104	SR30
LTZ-5TA	CWM-24	17	M24, P=2	36	137	

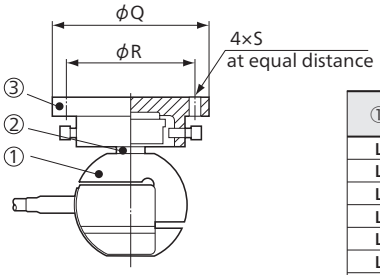
■Dimensions in Combination with Special Accessories

●In Combination with Patch CWM, Mount Base CF and Saddle CA



①Load Cells	②Patches	③Mount Bases	ϕL	ϕM	ϕN
LTZ-50KA	CWM-6	CA-2B	53	38	7
LTZ-100KA					
LTZ-200KA	CWM-12	CA-2B	53	38	7
LTZ-500KA					
LTZ-1TA					
LTZ-2TA	CWM-18	CA-2B	53	38	7
LTZ-5TA	CWM-24	CA-10B	98	80	11

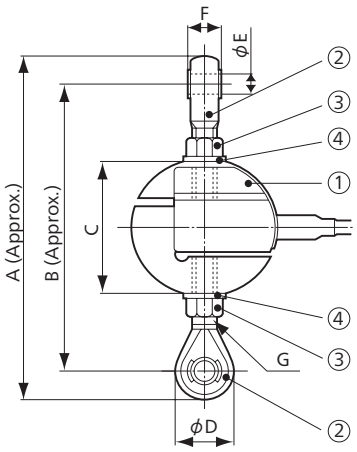
●In Combination with Patch CWM, Mount Base CF and Movable Saddle ER



①Load Cells	②Patches	③Movable Saddles	ϕQ	ϕR	S
LTZ-50KA	CWM-6	ER-2B	108	90	M8
LTZ-100KA					
LTZ-200KA	CWM-12	ER-2B	108	90	M8
LTZ-500KA					
LTZ-1TA					
LTZ-2TA	CWM-18	ER-2B	108	90	M8
LTZ-5TA	CWM-24	ER-5B	148	128	M12

●In Combination with Ball Joint TU

Note: Ball joints(TU) should be mounted to load cells at our factory.



①Load Cells	②Ball Joints	③Hexagon Nuts	④Spring Washers	A	B	C	ϕD	ϕE	F	G	Static Breaking Loads(Approx.)
LTZ-50KA	TU-6C	M6, P=1	2# 6S	128	110	64	18	6	9	M6, P=1	1.4 kN
LTZ-100KA											2.9 kN
LTZ-200KA	TU-12C	M12, P=1.75	2# 12S	196	166	74	30	12	16	M12, P=1.75	5.8 kN
LTZ-500KA											14.7 kN
LTZ-1TA											29.4 kN
LTZ-2TA	TU-18C	M18, P=1.5	2# 18S	232	190	94	42	18	23	M18, P=1.5	58.8 kN
LTZ-5TA	TU-24C	M24, P=2	3# 24S	346	276	120	70	25	37	M24, P=2	147 kN

Dimensions A and B are approximate, since the ball joint is screw-in type.

LT-FH/FL

●LT-FH: -10 to 150°C
●LT-FL: -196 to 30°C ●500 N to 50 kN

High/Low Temp. Tension Load Cell

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5%RO
Hysteresis	Within ±0.5%RO
Repeatability	0.05% RO or less
Rated Output	1.5 mV/V (3000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	
FH: -10 to 150°C (Excluding connector)	
FL: -200 to 80°C (Excluding connector)	
Compensated Temperature Range	
FH: -10 to 150°C (Excluding connector)	
FL: -196 to 30°C (Excluding connector)	
Temperature Effect on ZERO Balance	Within ±0.005%RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.03 mm²) fluoroplastic shielded cable,
	5 mm diameter by 5 m long, terminated with a connector plug
	(Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	200%
Critical Overload	500%
Natural Frequencies	See table below.
Weight	See table below.

Optional Accessories **(For details, refer pages 2-72 to 2-76)**

Rotating Attachment RJ
Ball Joint TU
Hook THD
Shackle TRD

Models(FH)	Models(FL)	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)*
LT-50KFH	LT-50KFL	500 N	1.5 kHz	1.7 kg
LT-100KFH	LT-100KFL	1 kN	2.6 kHz	
LT-200KFH	LT-200KFL	2 kN	4.1 kHz	
LT-500KFH	LT-500KFL	5 kN	5.0 kHz	2.0 kg
LT-1TFH	LT-1TFL	10 kN	5.2 kHz	2.1 kg
LT-2TFH	LT-2TFL	20 kN	5.8 kHz	2.4 kg
LT-5TFH	LT-5TFL	50 kN	4.5 kHz	7.0 kg

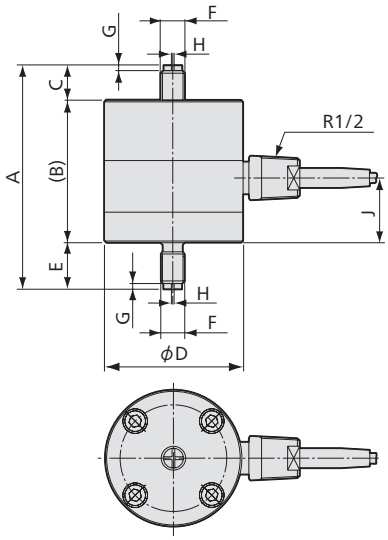
*Excluding cable

High Reliability
Airtight Structure
Selectable from a Wide Range of Rated Capacity.

●The mechanical stopper that activates at 500% overload

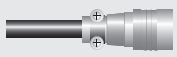
LT-FH series enables continuous operation under temperature as high as 150°C with no external cooling. LT-FL series enable operation at ultra-low temperature of -196°C.

■Dimensions



Models		A	(B)	C	ϕD	E	F	G	H	J
LT-50KFH	LT-50KFL	111	71	17	68	23	M12, P=1.75	3	1.6	32
LT-100KFH	LT-100KFL									
LT-200KFH	LT-200KFL									
LT-500KFH	LT-500KFL	129	82	20		27	M14, P=2	5	3	36
LT-1TFH	LT-1TFL	143	84	26		33	M18, P=1.5			
LT-2TFH	LT-2TFL	168	89	35		44	M24, P=2			
LT-5TFH	LT-5TFL	236	126	55	96	55	M39, P=3	6	6	48

Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

LT-FH/FL Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

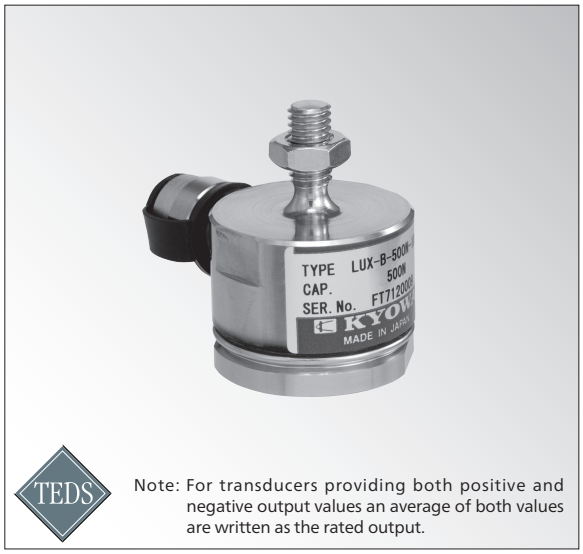

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LUX-B-ID

●Compact ●50 N to 20 kN

Compact Tension/Compression Load Cell



TEDS

Note: For transducers providing both positive and negative output values an average of both values are written as the rated output.

Suitable for Measuring and Controlling Loads Applied to Small-scale Presses and Press-fitting Devices

●High sensitivity
●Waterproof connector
●Stainless steel
●Easy installation

Compact & lightweight design with a screw-shape load receiving portion facilitates easy installation to equipment. Furthermore, the cable is connected using a connector, therefore there are no wring problems, and cable replacement is easy. Work is also possible if the cable is replaced with one resistant to repeated bending (flexible cable). Please attach a suffix of M1Z3K to the model name.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.15% RO (LUX-B-50N to 2KN)
	Within ±0.1% RO (LUX-B-5KN to 20KN)
Hysteresis	Within ±0.15% RO (LUX-B-50N to 2KN)
	Within ±0.1% RO (LUX-B-5KN to 20KN)
Repeatability	0.05% RO or less
Rated Output	±0.85 mV/V (±1700 μm/m) or more (LUX-B-50N)
	±0.9 mV/V (±1800 μm/m) or more (LUX-B-100N to 1KN)
	±1.3 mV/V (±1900 μm/m) or more (LUX-B-2KN to 20KN)

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C (LUX-B-50N to 200N)
	Within ±0.005% RO/°C (LUX-B-500N to 20KN)
Temperature Effect on Output	Within ±0.005%/°C

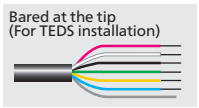
Electrical Characteristics

Safe Excitation Voltage	10 V AC or DC (LUX-B-50N to 200N)
	15 V AC or DC (LUX-B-500N to 20KN)
Recommended Excitation Voltage	1 to 5 V AC or DC (LUX-B-50N to 200N)
	1 to 10 V AC or DC (LUX-B-500N to 20KN)
Input Resistance	375 Ω±1.5%
Output Resistance	350 Ω±1%
Dedicated connection cable	TE-45
Cable	6-conductor (0.08 mm²) chloroprene shielded cable, 4.4 mm diameter by 3 m long, with connector plug to mainframe side, and bared to amplifier side (Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Materials	SUS (Metallic finish)
Weight	Approx. 260 g (5 kN to 20 kN)
	Approx. 90 g (500 N to 2 kN)
	Approx. 50 g (200 N or less), (Excluding cable)
Degree of Protection	IP67 (IEC 60529)

Models	Rated Capacity	Natural Frequencies (Approx.)	*Recommended Tightening Torque (N.m)
LUX-B-50N-ID	±50 N	8 kHz	3 N·m
LUX-B-100N-ID	±100 N	11 kHz	
LUX-B-200N-ID	±200 N	14 kHz	
LUX-B-500N-ID	±500 N	16 kHz	10 N·m
LUX-B-1KN-ID	±1 kN	21 kHz	
LUX-B-2KN-ID	±2 kN	27 kHz	
LUX-B-5KN-ID	±5 kN	18 kHz	80 N·m
LUX-B-10KN-ID	±10 kN	21 kHz	
LUX-B-20KN-ID	±20 kN	25 kHz	



To Ensure Safe Usage

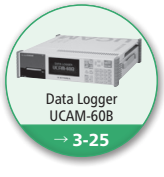
If impact is expected in receiving tensile loads, select a load cell with the rated capacity higher by one rank than the operating load.

●Physical quantity indication ●Static measurement ●Dynamic measurement

LUX-B-ID Recommended products for combination


Instrumentation Amplifier WGA-900A
→ 3-95


Instrumentation Amplifier WGA-680A
→ 3-97

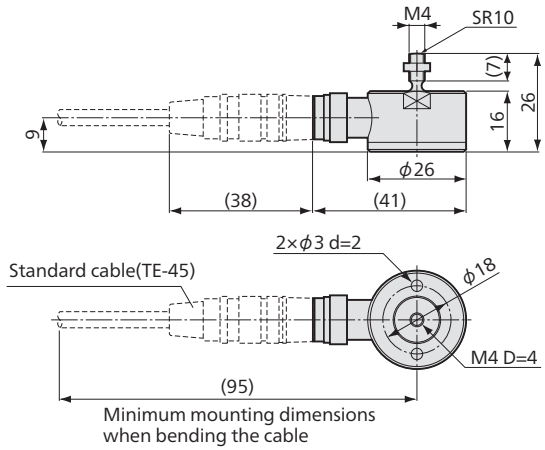

Data Logger UCAM-60B
→ 3-25


Strain Amplifier DPM-900 Series
→ 3-5

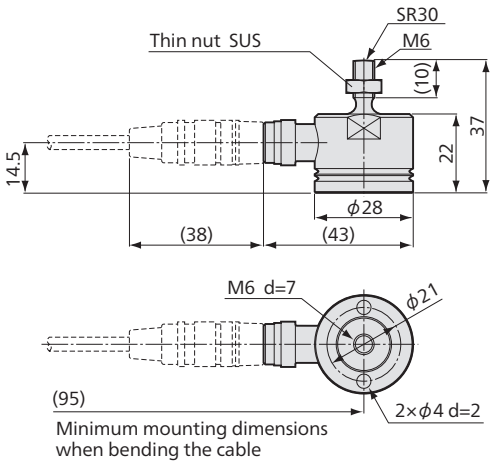

Universal Recorder EDX-200A
→ 3-55


Universal Recorder EDX-100A
→ 3-63

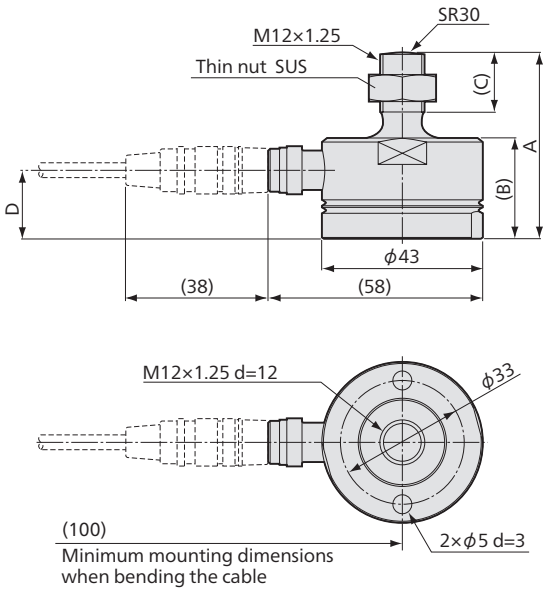
Dimensions



LUX-B-50N to 200N-ID



LUX-B-500N to 2KN-ID

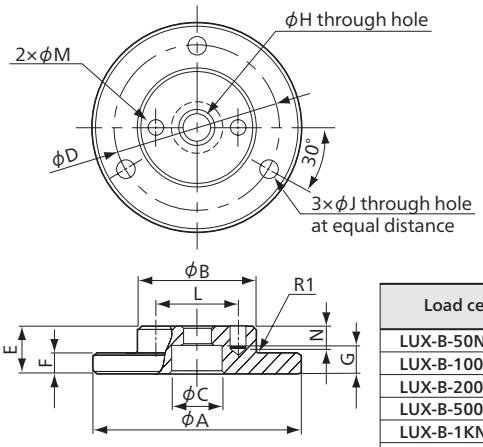


LUX-B-5KN to 20KN-ID

Models	A	B	C	D
LUX-B-5KN-ID	49	26.5	15	19.5
LUX-B-10KN-ID	51	27.5	16	18
LUX-B-20KN-ID	53	27	16	18

Dimensions of Mount Base

●Mount Base CX



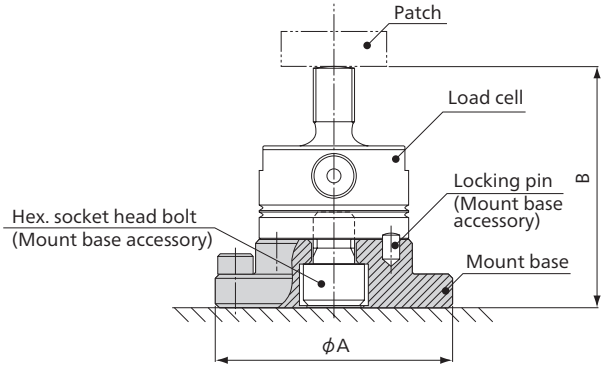
Load cells	Mount Bases	ϕA	ϕB	ϕC	ϕD	E	F	G	ϕH	ϕJ	L	ϕM	N	Weight (Approx.)
LUX-B-50N-ID	CX-2	43	26	9	35	7	2.5	4.5	4.5	5	18±0.1	3 $^{0.20}_{0.06}$	4.5	40 g
LUX-B-100N-ID														
LUX-B-200N-ID														
LUX-B-500N-ID	CX-4	48	29	13	39	12	5	7	7	5	21±0.1	4 $^{0.2}_{0.1}$	6	100 g
LUX-B-1KN-ID														
LUX-B-2KN-ID														
LUX-B-5KN-ID	CX-6	68	44	20	57	20	10	13	13	7	33±0.1	5 $^{0.2}_{0.1}$	6	350 g
LUX-B-10KN-ID														
LUX-B-20KN-ID														

Hexagon socket head bolts for connection among load cells, mount bases, and locking pins are attached to the mount base.

■Dimensions in Combination with Special Accessories

●In Combination with Mount Base CX

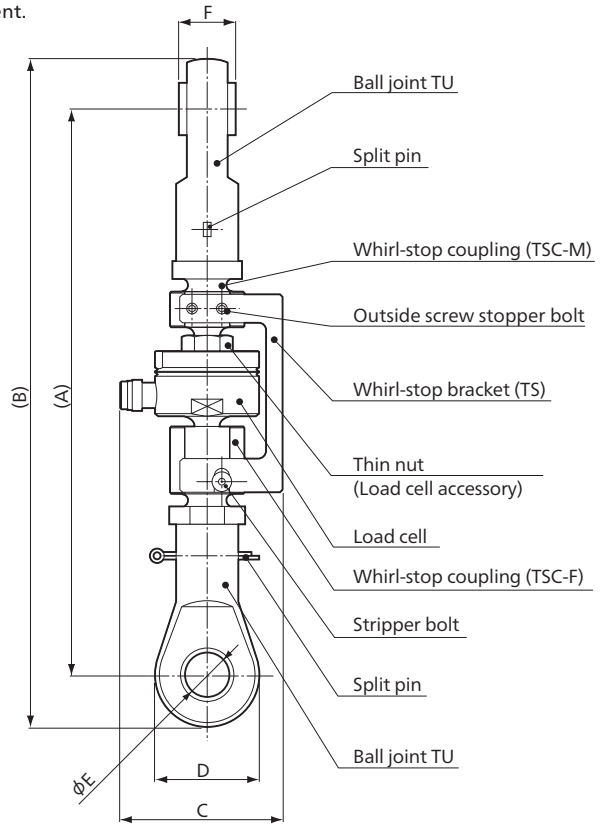
The patch should be prepared by user or CA-2F or the equivalent should be used.
This combination does not apply to tensile load measurement.



Load Cells	Mount Bases	(A)	(B)
LUX-B-50N-ID	CX-2	43	33
LUX-B-100N-ID			
LUX-B-200N-ID			
LUX-B-500N-ID	CX-4	48	49
LUX-B-1KN-ID			
LUX-B-2KN-ID			
LUX-B-5KN-ID	CX-6	68	69
LUX-B-10KN-ID			71
LUX-B-20KN-ID			73

●In Combination with Ball Joint TU, Whirl-stop Coupling TSC and Whirl-stop Bracket TS

This combination does not apply to compressive load measurement.



*Note that the Whirl-stop Bracket TS is not a safety device to be used when a load exceeding the safe overload is applied. If exceeding safe overload is applied, install a safety device on customer side before use.

Load Cells	Whirl-stop Couplings	Whirl-stop Brackets	Ball Joints	(A)	(B)	C	D	ϕE	F
LUX-B-50N-ID	TSC-2M TSC-2F	TS-2	TU-6B	102	120	44.7	18	6	9
LUX-B-100N-ID									
LUX-B-200N-ID									
LUX-B-500N-ID	TSC-4MB TSC-4FB	TS-4B	TU-12B	165	195	50.5	30	12	16
LUX-B-1KN-ID									
LUX-B-2KN-ID									
LUX-B-5KN-ID	TSC-6MB TSC-6FB	TS-6B	TU-18B	237	279	67	42	18	23
LUX-B-10KN-ID				239	281				
LUX-B-20KN-ID				241	283				

To Ensure Safe Usage

Check the strength of the material to which the load cell is tightened.

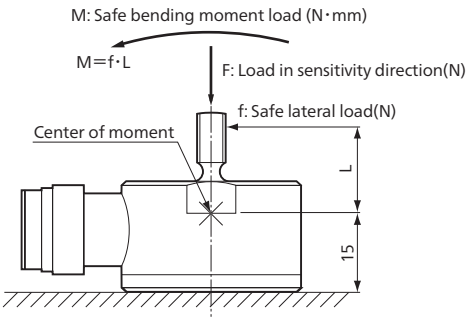
Pay attention to strength of fastened parts which is screwed into the LUX-B. When using the LUX-B with rated capacity more than 2 kN or more, use the fastened parts made of a material with tension strength more than 800 N/mm^2

Typical recommended material: SUS630(H900) HRC40 to 47
SCM435 HRC30 to 38

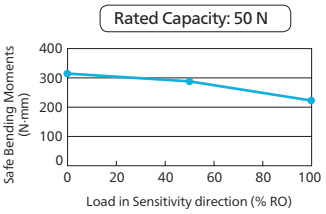
*For tensile load measurement, take care never to exceed the safe overload rating.

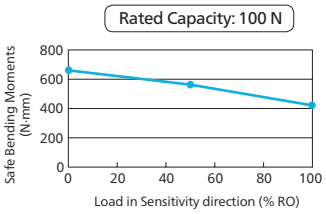
LUX-B Safe Bending Moments

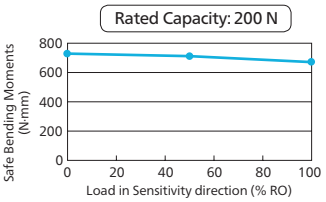
●Figures below show the safe bending moments against lateral loads with a load applied in sensitivity direction (vertical direction)

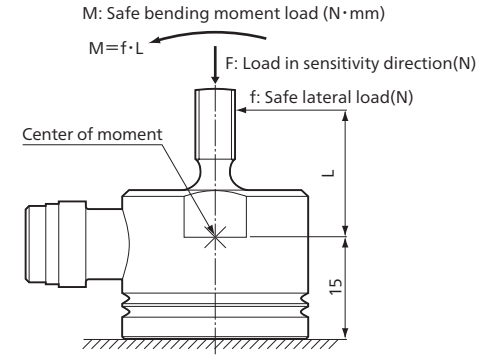


LUX-B-50N to 200N

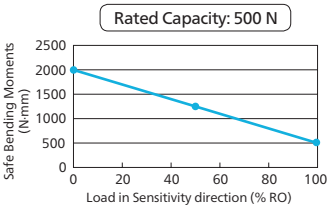


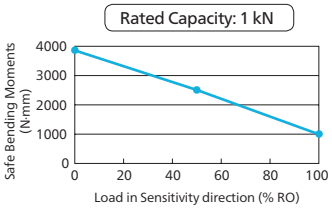


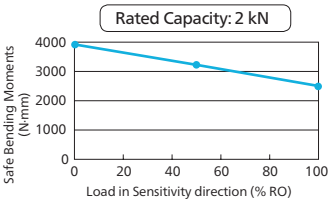


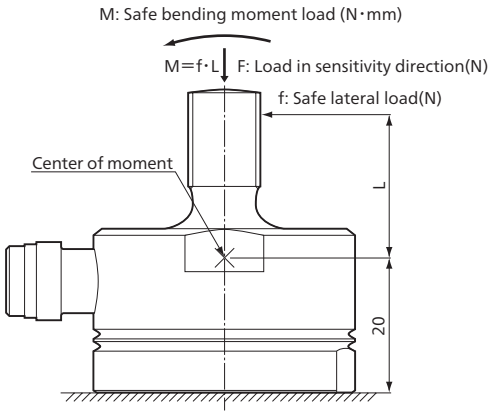


LUX-B-500N to 2kN

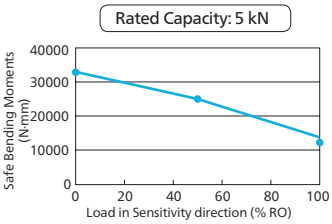


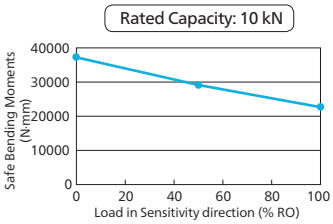


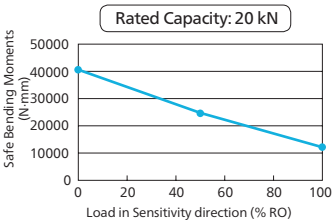




LUX-B-5 kN to 20 kN







How to Obtain Safe Lateral Loads

Shown here is an example calculating the safe lateral load when the LUX-B-1KN receives a load in sensitivity direction (vertical direction). (See Fig. 1.)

The safe lateral load f (N) which can be applied to the screw at the distance of 17 mm from the center of moment when a load of 500 N (50% the rated capacity) is applied in sensitivity direction and is obtained as follows:

According to Graph-1, safe bending moment, M, is approximately 2500 N·m when a load of 50% the rated capacity is applied in sensitivity direction. Since the relation between safe lateral load f, and safe bending moment M is M = f·L,

$$f = \frac{M}{L} = \frac{2500}{17} = 147.1\text{N}$$

Therefore, the safe lateral load f is 147.1 N.

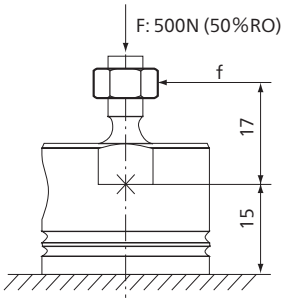
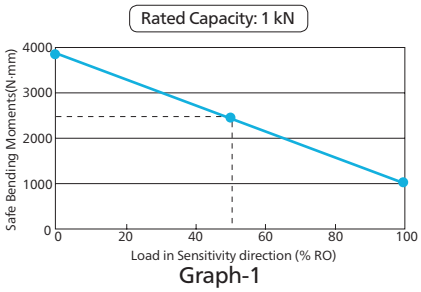


fig:1

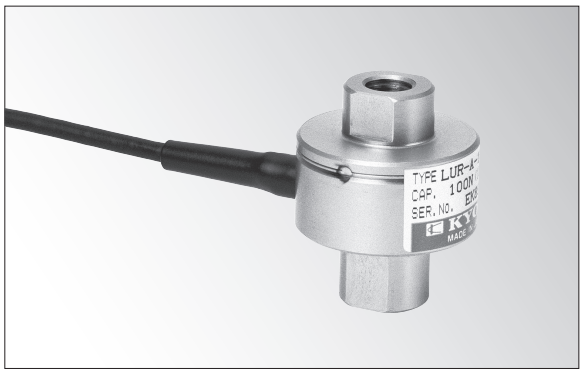


Graph-1

LUR-A-SA1

●φ28 mm, 80g ●50 N to 2 kN

Compact Tension/Compression Load Cell



Compact Lightweight Tension & Compression Load Cells

Compact & lightweight LUR-A-S1 series are easy to use tension/compression load cells, which can be used in various fields ranging from production lines to experiments.

Note:
The models for high-temperature up to 150°C are available, contact us, please.
The connector plug at the cable tip may be replaced with R05-PB5M, when ordering, suffix "-R " to the model number.

To Ensure Safe Usage

- ●Consult with our sales engineer when using in combination with special accessories.
- ●Special accessories for tensile loads should be mounted to the load cell at our factory.
- ●When using for tensile loads, be sure to fix the load cell with accessory hexagon socket head setscrews (M3, L=4).

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Rated Output	±0.5 mV/V (±1000 μm/m) or more (LUR-A-100NSA1 to 2KNSA1)
	Approx. ±0.4 mV/V (±800 μm/m) (LUR-A-50NSA1)

Environmental Characteristics

Safe Temperature Range	-10 to 70°C
Compensated Temperature Range	0 to 70°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C (LUR-A-100NSA1 to 2KNSA1)
	Within ±0.1% RO/°C (LUR-A-50NSA1)
Temperature Effect on Output	Within ±0.05%/°C (LUR-A-100NSA1 to 2KNSA1)
	Within ±0.1% /°C (LUR-A-50NSA1)

Electrical Characteristics

Safe Excitation Voltage	7 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.05 mm²) chloroprene shielded cable, 3 mm diameter by 5 m long, terminated with an NDIS connector plug (Shield wire is connected to mainframe.)

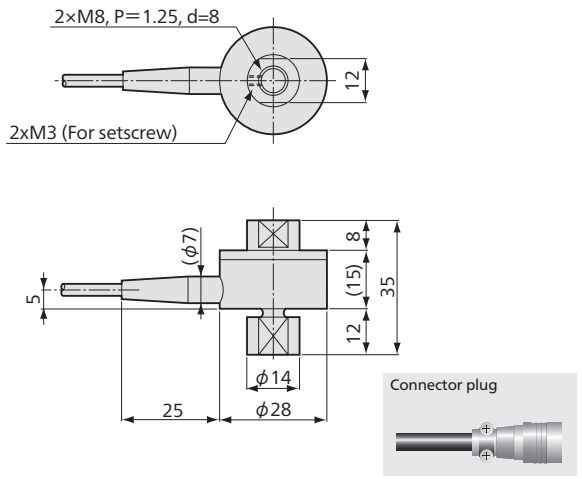
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	Approx. 80 g (Excluding cable)

Standard Accessories: Hexagon socket head setscrew M3, L=4

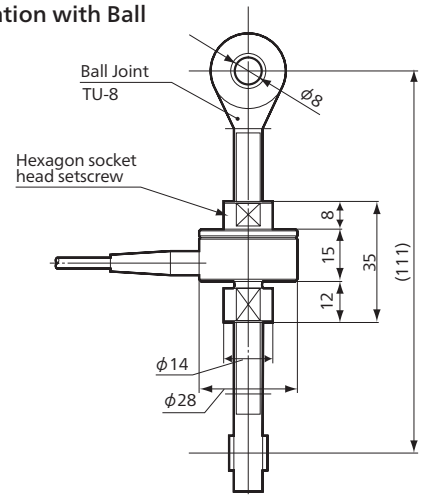
Models	Rated Capacity	Natural Frequencies (Approx.)
LUR-A-50NSA1	±50 N	2 kHz
LUR-A-100NSA1	±100 N	4 kHz
LUR-A-200NSA1	±200 N	5 kHz
LUR-A-500NSA1	±500 N	9 kHz
LUR-A-1KNSA1	±1 kN	14 kHz
LUR-A-2KNSA1	±2 kN	20 kHz

■Dimensions



■Dimensions in Combination with Ball Joint

●In Combination with Ball Joint TU-8



●Physical quantity indication ●Static measurement ●Dynamic measurement

LUR-A-SA1 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LU-E

●Tension/Compression Load Cells ●500 N to 200 kN

Tension/Compression Load Cell

* TEDS-installed versions can be manufactured. Inquiries are welcome.

Hermetically-seal Structure with Inert Gas Filled in. Usable for both Tensile Loads and Compressive Loads.

The detection portion is hermetically sealed with inert gas filled in to prevent aging deterioration and to ensure reliability and stability for a long period of time.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.1% RO
Repeatability	0.1% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.2%

Environmental Characteristics

Safe Temperature Range	-30 to 85°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with an NDIS connector plug. (Shield wire is connected to mainframe.)

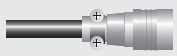
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.

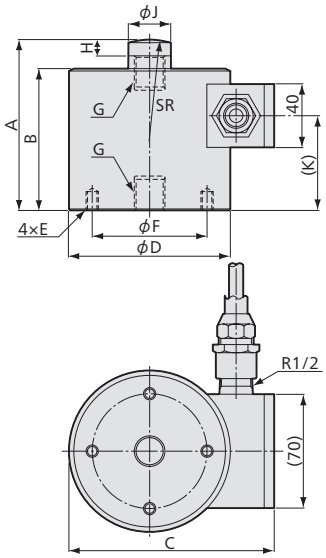
Optional Accessories (For details, refer pages 2-72 to 2-76)

Saddle CA-B, Mount Base CF,
Rotating Attachment RJ
Ball Joint TU, Hook THC, Shackle TRC

Connector plug



■Dimensions

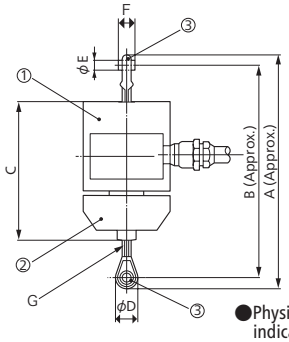


Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	C	ϕD	E	ϕF	G	H	ϕJ	(K)	SR	Weight (Approx.)*	Saddles	Mount Bases
LU-50KE	±500 N	1.54 kHz	91.5	77.5	114	80	M5 d=8	50	M8 P=1.25 d=12	10	12	32.5	30	2.8 kg	CA-1B	CF-50
LU-100KE	±1 kN	2.16 kHz														
LU-200KE	±2 kN	3.28 kHz														
LU-500KE	±5 kN	2.66 kHz	105	90	134	100	M8 d=8	80	M12 P=1.75 d=17	10	19	40	30	2.8 kg	CA-1B	CF-80
LU-1TE	±10 kN	4.2 kHz	108	90	130	100	M8 d=12	80	M14 P=2 d=22	10	26	60	50	2.8 kg	——	——
LU-2TE	±20 kN	4.97 kHz	108	90	130	100	M8 d=12	80	M18 P=1.5 d=22	10	26	60	70	2.8 kg		
LU-5TE	±50 kN	3.5 kHz	167	140	144	112	M8 d=15	95	M26 P=2 d=35	17	36	100	70	5.0kg		
LU-10TE	±100 kN	3.14 kHz	220	190	172.5	138	M8 d=15	120	M36 P=2 d=45	20	50	145	70	9.5 kg		
LU-20TE	±200 kN	2.5 kHz	277	235	221	186	M8 d=15	160	M50 P=3 d=65	27	64	190	100	22.0 kg		

*Excluding cable

■Dimensions in Combination with Special Accessories

●In Combination with Rotating Attachment RJ and Ball Joint TU



①Load Cells	②Rotating Attachments	③Ball Joints	A	B	C	ϕD	ϕE	F	G	Static Breaking Loads (Approx.)
LU-50KE	RJ-02	TU-8	217	195	125	22	8	11	M8, P=1.25	1.4 kN
LU-100KE										2.9 kN
LU-200KE										5.8 kN
LU-500KE	RJ-05	TU-12	262	232	140	30	12	16	M12, P=1.75	14.7 kN
LU-1TE	RJ-1	TU-14	283	246	160	37	14	17	M14, P=2	29.4 kN
LU-2TE	RJ-2	TU-18	304	262	160	42	18	23	M18, P=1.5	58.8 kN
LU-5TE	RJ-5	TU-26	463	393	235	70	25	37	M26, P=2	136.3 kN
LU-10TE	RJ-10	TU-36	678	573	315	105	40	60	M36, P=2	——
LU-20TE	RJ-20	TU-50	842	706	414	136	50	75	M50, P=3	——

Notes: 1. Rotation attachment RJ is not applicable for compressive load measurement.
2. Special accessories for tensile loads should be mounted at our factory.
3. Dimensions A and B are approximate, since the ball joint is screw-in type.

●Physical quantity indication ●Static measurement ●Dynamic measurement

LU-E Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

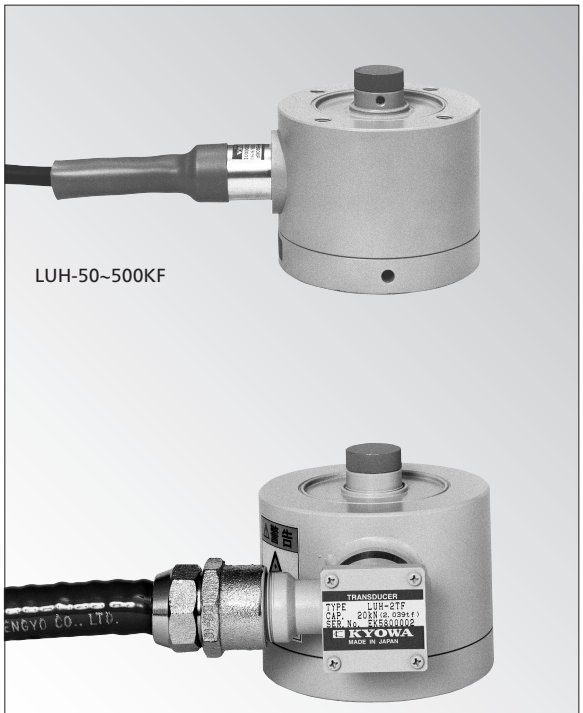

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LUH-F

●Nonlinearity: Within ±0.02%%RO ●500 N to 200 kN

High-accuracy Tension/Compression Load Cell



*Ball joint is required for tensile load measurement.
Remote sensing possible (Refer to page 9-13.)

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.02% RO
Hysteresis	Within ±0.02% RO
Repeatability	0.02% RO or less
Zero Float	0.02% RO or less (LUH-50KF to 500KF)
Rated Output	2 mV/V (4000 μm/m) ±0.1%

Environmental Characteristics

Safe Temperature Range	-35 to 80°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.0015% RO/°C
Temperature Effect on Output	Within ±0.001%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	6-conductor (0.5 mm²) chloroprene shielded cable, 9.5 mm diameter by 5 m long, with Crimp-style terminals for 4 mm (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below.
Others	Drop prevention stopper mountable(*)
Critical overload	1000% (LUH-50KF to 500KF)

Standard Accessories: 4 hexagon socket head setscrews M5, L=10 mm (30 mm with LUH-10TF and 20TF)
1 hexagon bar (opposite side 25 mm)

Optional Accessories **(For details, refer pages 2-72 to 2-76)**

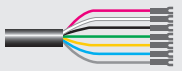
Saddle CA-B
Mount Base CF
Movable Saddle ER-B
Ball Joint TU

Models	Rated Capacity	Natural Frequencies (Approx.)	Weight (Approx.)*
LUH-50KF	±500 N	1.4 kHz	2.1 kg
LUH-100KF	±1 kN	2.2 kHz	
LUH-200KF	±2 kN	3.1 kHz	
LUH-500KF	±5 kN	4.6 kHz	
LUH-1TF	±10 kN	4.2 kHz	4 kg
LUH-2TF	±20 kN	6 kHz	4 kg
LUH-5TF	±50 kN	5.2 kHz	9 kg
LUH-10TF	±100 kN	4.5 kHz	18 kg
LUH-20TF	±200 kN	3.7 kHz	38 kg

*Excluding cable

(*)Customers have to prepare anti-dropping stoppers by themselves.

Crimp-style terminals
(For remote sensing)



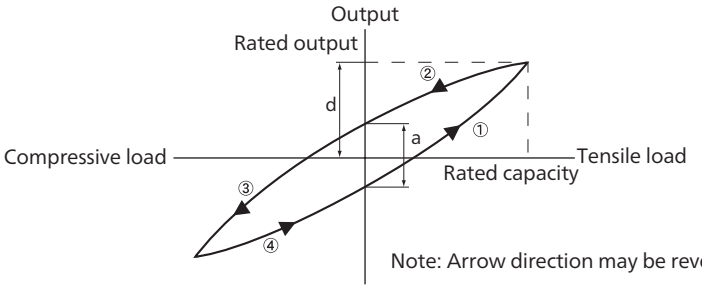
Excellent Zero Float Characteristics (LUH-50KF to 500KF) Tension/Compression Load Cells

●Remote sensing possible (Refer to page 9-13.)

LUH-F series are tension/compression load cells featuring within ±0.02%RO nonlinearity. The hermetically-sealed structure with inert gas filled in ensures stable performance.

ZERO FLOAT

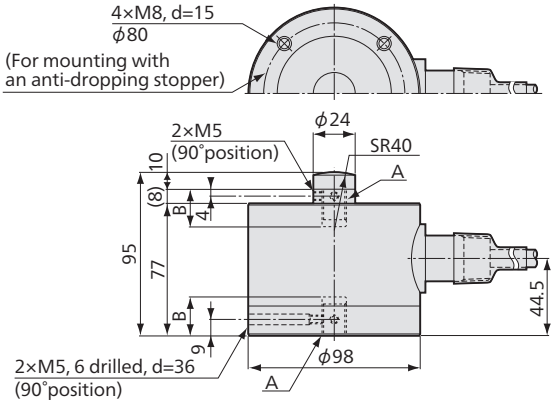
Zero float means such a phenomenon that a cycle of continuously applied tensile & compressive loads causes the zero to float. The value is expressed in percentage of the rated output. It is also called cyclic zero shift.



Note: Arrow direction may be reverse.

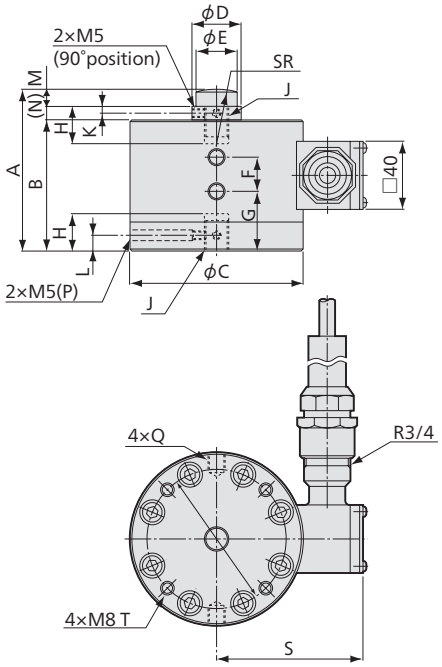
$$\text{Zero Float} = \frac{a}{d} \times 100(\%RO)$$

Dimensions



Models	A	B
LUH-50KF	M12, P=1.75	17
LUH-100KF		
LUH-200KF		
LUH-500KF	M18, P=1.5	22

LUH-50KF to 500KF



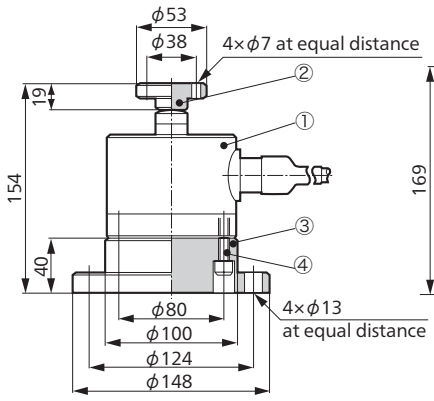
LUH-1TF to 20TF

Models	A	B	ϕC	ϕD	ϕE	F	G	H	J	K	L	M	(N)	(P)	Q	SR	S	T	U	ϕV
LUH-1TF	95	77	100	24	24	20	35	22	M14, P=2	4	9	10	8	6 drilled, d=36	M8, d=10	40	84.5	d=12	24.5	80
LUH-2TF	95	77	100	24	24	20	35	22	M18, P=1.5	4	9	10	8	6 drilled, d=36	M8, d=10	40	84.5	d=12	24.5	80
LUH-5TF	127	100	130	36	36	30	50	30	M26, P=2	5	13	17	10	9 drilled, d=42	M16, d=16	60	99.5	d=15	40	95
LUH-10TF	170	135	160	50	50	40	60	45	M36, P=2	8	17	20	15	9 drilled, d=54	M20, d=15	70	115.5	d=15	60	120
LUH-20TF	228	175	200	68	64	50	80	65	M50, P=3	12	23	28	25	9 drilled, d=65	M24, d=20	100	135.5	d=15	80	160

LUH-50KF to 5TF Dimensions in Combination with Mount Base

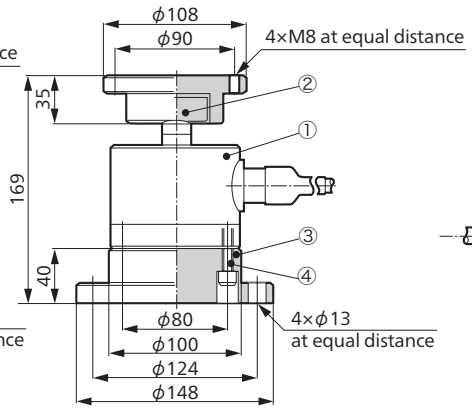
When using in combination with special accessories, consult with our sales engineer.

●In Combination with Saddle CA and Mount Base CF (LUH-50KF to 500KF)



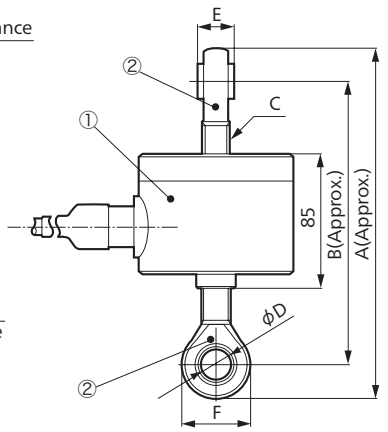
① Load cell LUH-F
② Saddle CA-2B
③ Mount base CF-80
④ Hexagon socket head bolt
4xM8, L=30
(Including in standard accessories of mount base)

●In Combination with Movable Saddle ER and Mount Base CF (LUH-50KF to 2TF)



① Load cell LUH-F
② Movable saddle ER-2B
③ Mount base CF-80 (1T, 2T)
④ Hexagon socket head bolt
4xM8, L=30
(Including in standard accessories of mount base)

●In Combination with Ball Joint TU



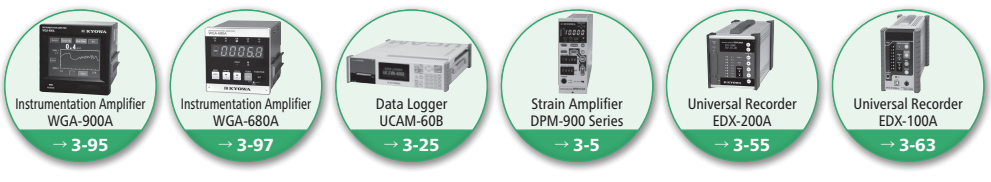
①Load Cells	② Ball Joints	A	B	C	D	E	F	Static Breaking Load (Approx.)
LUH-50KF	TU-12	207	177	M12, P=1.75	12	16	30	1.4 kN
LUH-100KF								2.9 kN
LUH-200KF								5.8 kN
LUH-500KF	TU-18	231	189	M18, P=1.5	18	23	42	14.7 kN

*From the viewpoint of guaranteed accuracy, hook and shackle cannot be combined.

Note: Special accessories for tensile load measurement should be assembled at our factory.

●Physical quantity indication ●Static measurement ●Dynamic measurement

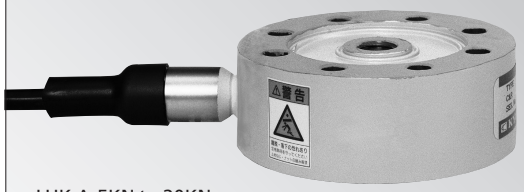
LUH-F Recommended products for combination



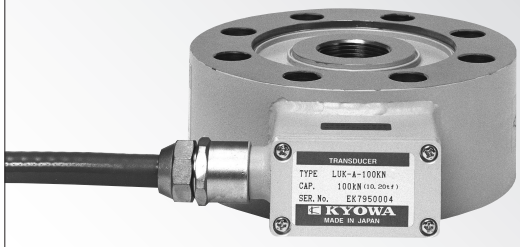
LUK-A

●Thin ●5 kN to 2 MN

Tension/Compression Load Cell



LUK-A-5KN to 20KN



LUK-A-50KN to 500KN

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight Tension/Compression Load Cells

The thin structure is suitable for installation where the height is limited. The service life can be extended by using with one-half the rated capacity if repetitive loads are applied continuously.

*When used for tension, make sure not to use special accessories such as ball-joint and rotating attachment.
The LUK-A is not applicable to setscrews.

To Ensure Safe Usage

Be sure to prevent the shaft from turning when using for hanging load measurement.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO (LUK-A-5KN to 200KN)
	Within ±0.2% RO (LUK-A-500KN to 2MN)
Hysteresis	Within ±0.1% RO (LUK-A-5KN to 200KN)
	Within ±0.2% RO (LUK-A-500KN to 2MN)
Repeatability	0.05% RO or less (LUK-A-5KN to 200KN)
	0.1% RO or less (LUK-A-500KN to 2MN)
Rated Output	±2 mV/V (±4000 μm/m) ±0.1%
	(±2.4 mV/V (±4800 μm/m) ±10% with 5 KN to 20 KN)

Environmental Characteristics

Safe Temperature Range	-35 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

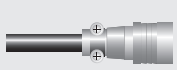
Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 5 m long, terminated with a connector plug
	(Shield wire is not connected to mainframe.)

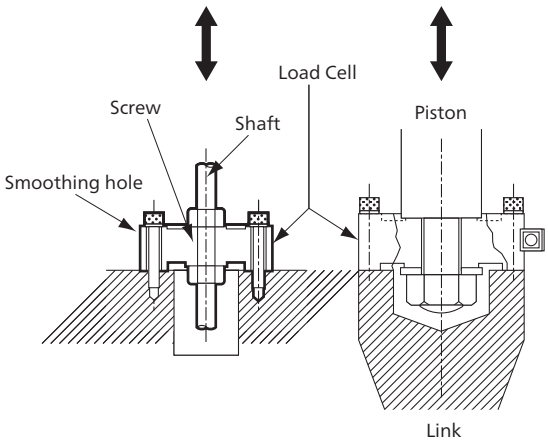
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below (Excluding cable).
Safe Lateral Force Component	See table below.
Safe Moments	See table below.
Degree of Protection	IP64 (IEC 60529)

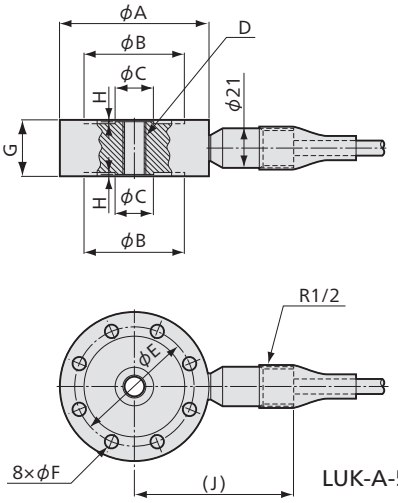
Connector plug



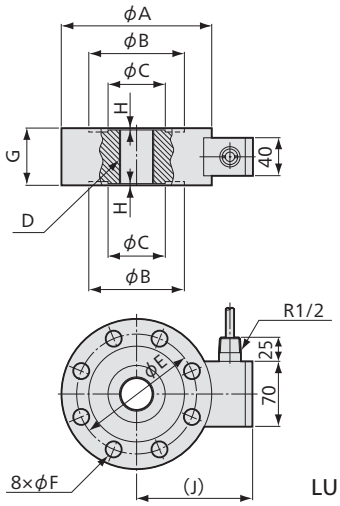
■Installation Example



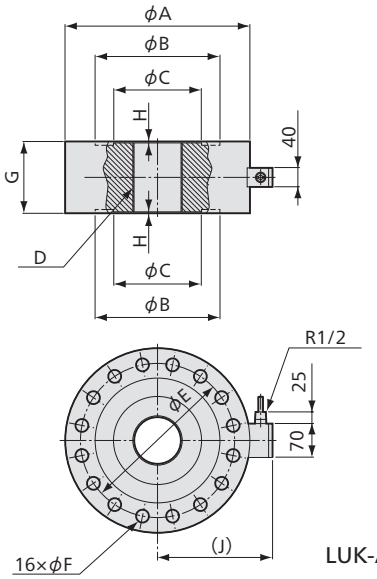
Dimensions



LUK-A-5KN to 20KN



LUK-A-50KN to 500KN



LUK-A-1M to 2MN

Models	Rated Capacity	Natural Frequencies (Approx.)	Safe Moments	Safe Lateral Force Component	ϕA	ϕB	ϕC	D	ϕE	ϕF	G	H	(J)	Weight (Approx.)
LUK-A-5KN	±5 kN	7.4 kHz	15 N·m	250 N	77	52	20	M12, P=1.75	62	7	30	1	82	900 g
LUK-A-10KN	±10 kN	10.8 kHz	30 N·m	500 N										
LUK-A-20KN	±20 kN	8.5 kHz	60 N·m	1 kN	107	70	34	M18, P=1.5	85	9	40	1	97	2 kg
LUK-A-50KN	±50 kN	11 kHz	150 N·m	2.5 kN	127	77	40	M24, P=1.5	95	13	50	2	102	4 kg
LUK-A-100KN	±100 kN	9 kHz	500 N·m	5 kN	157	100	60	M36, P=2	125	17	60	2	119	7 kg
LUK-A-200KN	±200 kN	7.5 kHz	1 kN·m	10 kN	227	136	90	M50, P=2	180	22	70	2	157	18 kg
LUK-A-500KN	±500 kN	5.2 kHz	2.5 kN·m	25 kN	307	200	138	M76, P=3	256	26	105	3	198	50 kg
LUK-A-1MN	±1 MN	5 kHz	5 kN·m	50 kN	375	254	180	M100, P=3	314	26	150	3	233	90 kg
LUK-A-2MN	±2 MN	3.9 kHz	10 kN·m	100kN	560	410	260	M150, P=4	485	36	200	3	326	245 kg

LUK-A can be customized for a rated capacity exceeding 2 MN. Inquiries are welcome.

LU-A

●Straight Beam System ●50N to 200 N

Small-capacity Tension/Compression Load Cell

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.2% RO
Repeatability	0.2% RO or less
Rated Output	1.5 mV/V (3000 μm/m) ±0.5%

Environmental Characteristics

Safe Temperature Range	-20 to 75°C
Compensated Temperature Range	-10 to 65°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, with a connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	120%
Natural Frequencies	See table below.
Weight	Approx. 2.3 kg

Optional Accessories **(For details, refer pages 2-72 to 2-76)**

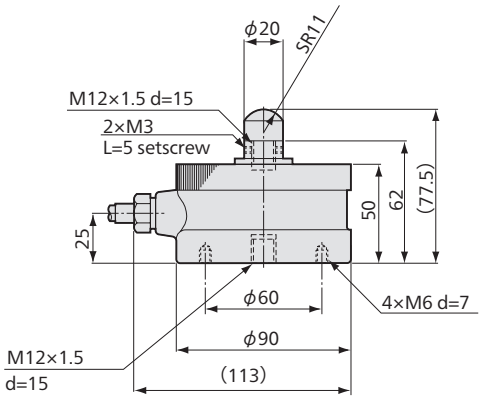
Mount Base CF

Models	Rated Capacity	Natural Frequencies(Approx.)
LU-5KA	±50 N	200 Hz
LU-10KA	±100 N	330 Hz
LU-20KA	±200 N	500 Hz

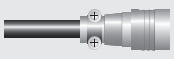
Small capacity High sensitivity Tension/Compression Load Cells

A straight beam is used as the diaphragm to enable highly accurate measurement of small loads.

■Dimensions

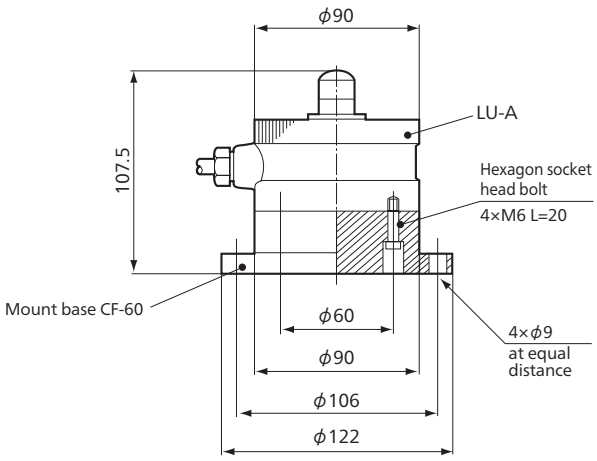


Connector plug



■Dimensions in Combination with Mount Base

●In Combination with Mount Base CF-60



Hexagon socket head bolts for connection between load cells and mount bases are standard accessories to mount bases.

●Physical quantity indication ●Static measurement ●Dynamic measurement

LU-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

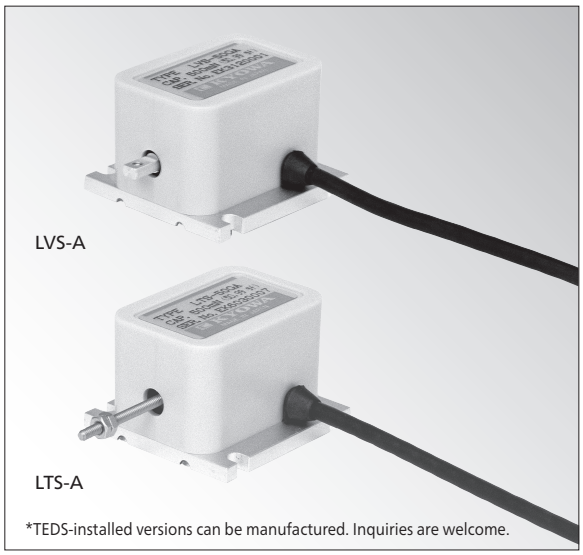

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LVS-A/LTS-A

Ultra Small-capacity Load Cell

●Compact & Lightweight
●50 mN to 20 N



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Repeatability	0.5% RO or less
Rated Output	1.2 mV/V (2400 μm/m) or more (LVS-5GA & 10GA)
	1.5 mV/V (3000 μm/m) or more (LVS/LTS-20GA to 2KA)

Environmental Characteristics

Safe Temperature Range	-10 to 70°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.1%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	120 Ω±10%
Output Resistance	120 Ω±10%
Cable	4-conductor (0.05 mm²) chloroprene shielded cable,
	3 mm diameter by 1 m long, terminated with a connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	120%
Critical Overload	See table above.
Weight	Approx. 50 g (Excluding cable)

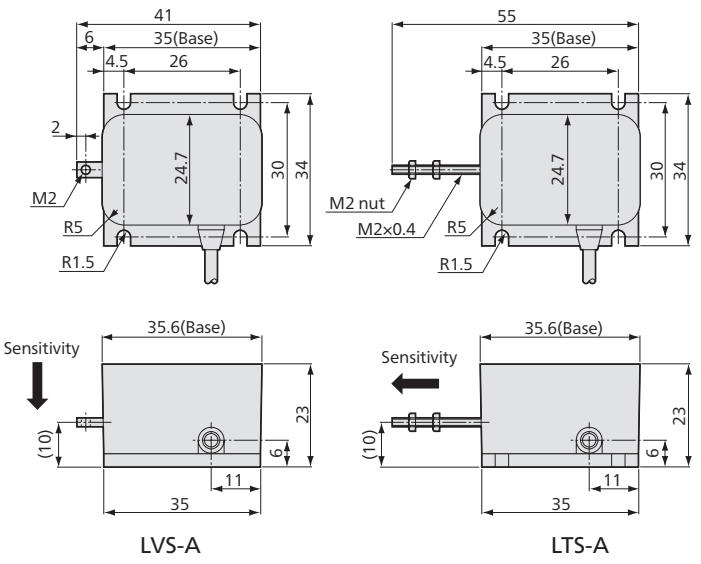
These Load Cells are Designed to Accurately Measure Small Loads Ranging from 50 mN to 20 N

- Compact & lightweight
- High accuracy
- Easy to handle

These load cells are designed to accurately measure small loads ranging from 50 mN to 20 N. Easy to install and handle, the LVS-A series measures loads in vertical direction to the mounted surface and the LTS-A series, in horizontal direction.

Models	Natural Frequencies (Approx.)	Rated Capacity	Critical Overload
LVS-5GA	50 Hz	50 mN	1000%
LVS-10GA	111 Hz	100 mN	
LVS-20GA	147 Hz	200 mN	
LVS-50GA	294 Hz	500 mN	500%
LVS-100GA	455 Hz	1 N	
LVS-200GA	667 Hz	2 N	
LVS-500GA	1220 Hz	5 N	250%
LVS-1KA	1600 Hz	10 N	
LVS-2KA	2500 Hz	20 N	
LTS-50GA	256 Hz	500 mN	500%
LTS-100GA	385 Hz	1 N	
LTS-200GA	625 Hz	2 N	
LTS-500GA	1000 Hz	5 N	250%
LTS-1KA	1670 Hz	10 N	
LTS-2KA	1700 Hz	20 N	

Dimensions

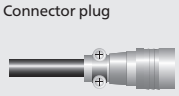


LVS-A LTS-A

To Ensure Safe Usage

●The load cell should be carefully installed. Especially, never apply any impact (force) in sensitivity direction.
●When mounting the rod to the measuring object, do not apply any bending or twisting force.

Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

LVS-A/LTS-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

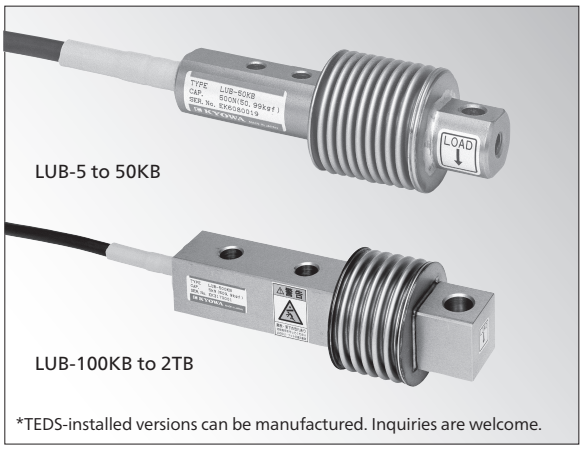

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LUB-B

Beam-type Load Cell

●Nonlinearity: Within ±0.03%RO(50 N to 500 N)
●50 N to 20 kN



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight Metal Bellows

●Nonlinearity: Within ±0.03%RO*1
● Special steel body*1
●Corrosion-resistant*2
*1: 5KB to 50KB *2: 100KB to 2TB

LUB-5KB to 50KB feature an nonlinearity of within ±0.03%RO and LUB-100KB to 2TB feature corrosion-resistant stainless steel body and bellows. As load detectors, they enable configuration of accurate and stable weighing systems for conveyors and tanks.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.03% RO (LUB-B-5KB to 50KB)
	Within ±0.05% RO (LUB-B-100KB to 2TB)
Hysteresis	Within ±0.03% RO (LUB-B-5KB to 50KB)
	Within ±0.05% RO (LUB-B-100KB to 2TB)
Repeatability	0.03% RO or less
Rated Output	2 mV/V (4000 μm/m)±0.3%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

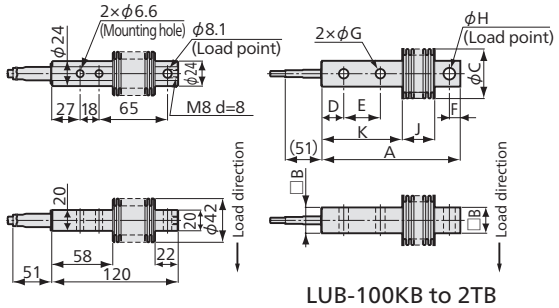
Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 12 V AC or DC
Input Resistance	435 Ω±60Ω(LUB-B-5KB to 50KB)
	400 Ω±50Ω(LUB-B-100KB to 2TB)
Output Resistance	350 Ω±2 Ω
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 3 m long (5 m long with LUB-B-100KB to 2TB), bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below (Excluding cable).
Degree of Protection	IP67 (IEC 60529)

Optional Accessories (For details, refer pages 2-72 to 2-76)
Saddle CA-B, Patch CW, Spacer LE, Hanger TW

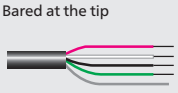
Dimensions



LUB-5KB to 50KB

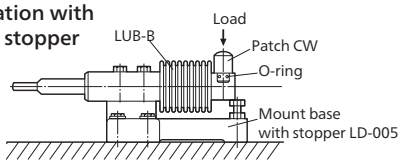
LUB-100KB to 2TB

Bared at the tip

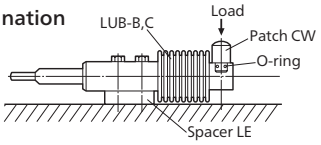


In Combination with Special Accessories

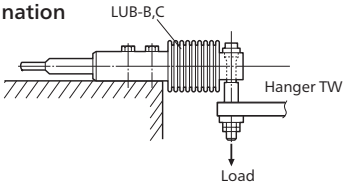
●LUB-B in combination with mount base with stopper



●LUB-B/C in combination with spacer



●LUB-B/C in combination with hanger



Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	φC	D	E	F	φG	φH	J	K	Weight (Approx.)	Patches	Mount Bases with Stopper	Spacers	Hangers
LUB-5KB	50 N	250 Hz	See dimensions above.										350 g	CW-005	LD-005	LE-005	TW-002 (For 5KB to 20KB) TW-005 (For 5KB to 50KB)
LUB-10KB	100 N	350 Hz															
LUB-20KB	200 N	500 Hz															
LUB-30KB	300 N	650 Hz															
LUB-50KB	500 N	800 Hz															
LUB-100KB	1 kN	1.8 kHz	120	20	42	25	20	10	8.4	10.1	36	60	350 g	CW-02	——	LE-02	TW-02
LUB-200KB	2 kN	1.9 kHz															
LUB-500KB	5 kN	1.1 kHz	190	35	67	30	50	15	13	16.1	45	110	1.5 kg	CW-1	——	LE-1	TW-1
LUB-1TB	10 kN	1.2 kHz															
LUB-2TB	20 kN	1.1 kHz	220	44	84	30	60	20	17	20.2	54	124	2.8 kg	CW-2	——	LE-2	TW-2

●Physical quantity indication ●Static measurement ●Dynamic measurement

LUB-B Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

LUB-C

Beam-type Load Cell

●Nonlinearity: Within ±0.05%RO ●5 kN to 20 kN

LUB-500KC to 2TC

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Developed as OEM-oriented Industrial Beam-type Load Cells

●Low price
●Compact & lightweight
●Nonlinearity: Within ±0.05%RO

Developed as OEM-oriented industrial beam-type load cells with nonlinearity of within ±0.05%RO. As load detectors, LUB-C series enables configuration of accurate and stable weighing systems for conveyors and tanks.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.05% RO
Hysteresis	Within ±0.05% RO
Repeatability	0.03% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.5%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.003% RO/°C
Temperature Effect on Output	Within ±0.003%/°C

Electrical Characteristics

Safe Excitation Voltage	20 V AC or DC
Recommended Excitation Voltage	1 to 12 V AC or DC
Input Resistance	380 Ω±8%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.14 mm²) chloroprene shielded cable, 6 mm diameter by 2 m long, bared at the tip (Shield wire is not connected to mainframe.)

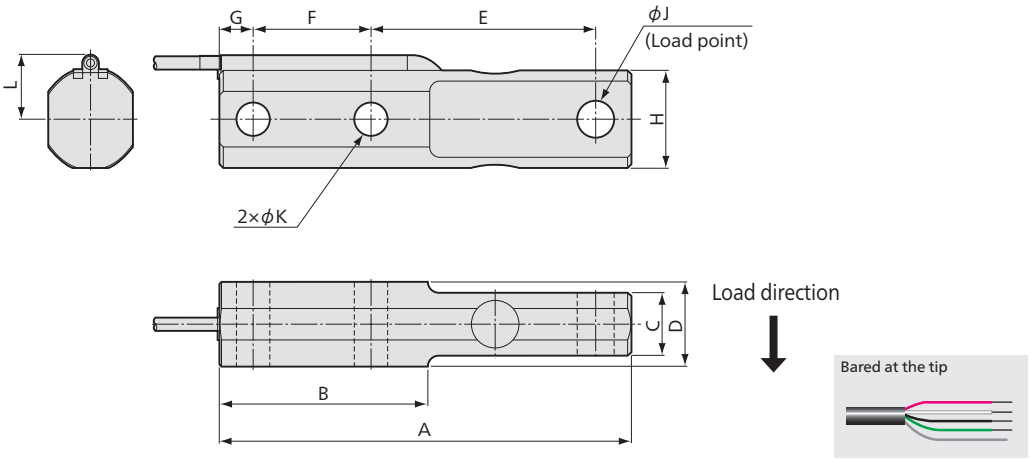
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below (Excluding cable).

Optional Accessories **(For details, refer pages 2-72 to 2-76)**

Saddle CA-B
Patch CW
Spacer LE
Hanger TW

■Dimensions



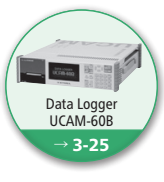
Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	C	D	E	F	G	H	ϕJ	ϕK	L	Weight (App.) including cable	Patches	Spacers	Hangers
LUB-500KC	5 kN	1.3 kHz	174	88	23.4	35	95	50	14	38	16.1	14	27	1.3 kg	CW-1	LE-1	TW-1
LUB-2TC	20 kN	1.3 kHz	206	106	32.6	44	110	60	16	53	20.2	18	34	2.7 kg	CW-2	LE-2	——

●Physical quantity indication ●Static measurement ●Dynamic measurement

LUB-C Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5

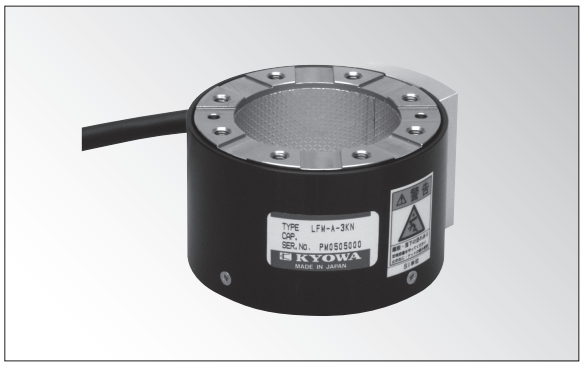

Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

LFM-A

●Compact & Lightweight ●1 kN & 3 kN

Compact 6-component Force Transducer



Compact High Sensitivity Center Hole Type of 6-component Force Transducers

Enables simultaneous measurement of 3 components of force (Fx, Fy, Fz) in 3 axial directions orthogonal to the transducer and 3 moments (Mx, My, Mz) around the axes. An 8-channel measuring instrument amplifies the transducer's 8 output components in strain quantity and calculates 6-component force.

*The equation is described in the instruction manual of LFM-A

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Interference	±1.5% RO (after correction by interference compensated coefficients stated in the Test Data Sheet)
Rated Output	See table below.

Environmental Characteristics

Safe Temperature Range	-10 to 70°C (Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C or less
Temperature Effect on Output	Within ±0.05%/°C or less

Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
I/O Resistance	350 Ω±3%
Cable	16-conductor (0.11 mm²) twisted pair vinyl shielded cable, 6.6 mm diameter by 55 cm long, bared at the tip (Shield wire is not connected to mainframe)

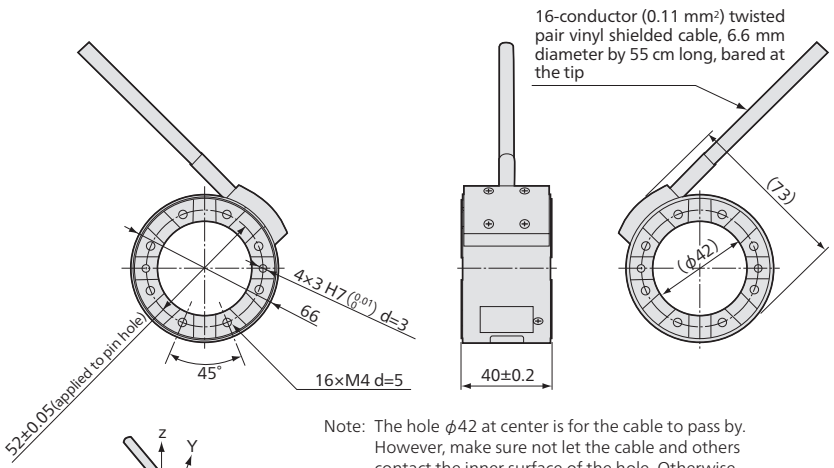
Mechanical Properties

Safe Overload Rating	150%
Materials	Main unit LFM-A-1KN: Aluminum (Metallic finish)
	Main unit LFM-A-3KN: SUS (Metallic finish)
	Cover: Black anodic oxide coating aluminum
	Cable holder: Anodic oxide coating aluminum
Weight	See table below (Excluding cable).
Degree of Protection	IP40 (IEC 60529)

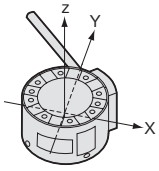
Models	Rated Capacity	Rated Output	Natural Frequencies (Approx.)	Weight (Approx.)
LFM-A-1KN	FX: ±1000 N FY: ±1000 N FZ: ±1000 N MX: ±50 N·m MY: ±50 N·m MZ: ±25 N·m	FX: ±1.5 mV/V or more FY: ±1.5 mV/V or more FZ: ±1.8 mV/V or more MX: ±4.0 mV/V or more MY: ±4.0 mV/V or more MZ: ±2.4 mV/V or more	5 kHz	160 g
LFM-A-3KN	FX: ±3000 N FY: ±3000 N FZ: ±3000 N MX: ±100 N·m MY: ±100 N·m MZ: ±50 N·m	FX: ±1.6 mV/V or more FY: ±1.6 mV/V or more FZ: ±1.6 mV/V or more MX: ±2.4 mV/V or more MY: ±2.4 mV/V or more MZ: ±1.6 mV/V or more	5 kHz	360 g

*The rated output is interference compensated output.

Dimensions



Note: The hole φ42 at center is for the cable to pass by. However, make sure not let the cable and others contact the inner surface of the hole. Otherwise, may down the performance of the LFX-A or even damage it.



Original point and moment center of x-, y- and z-axes coincide with transducer height and circumferential center.

To Ensure Safe Usage

Prepare a plate for installing the LFM-A with sufficient strength. It is recommendable that LFM-A-3KN should be applied on the steel plate whose thickness is more than 10mm. With same reason, we recommend as follows. LFM-A should be applied on an aluminum alloy board which is not less than 15 mm thick. If the LFM-A is installed on a low rigid mounting plate, interference may be increased.

●Dynamic measurement

LFM-A Recommended products for combination


Universal Recorder EDX-200A
→ 3-55

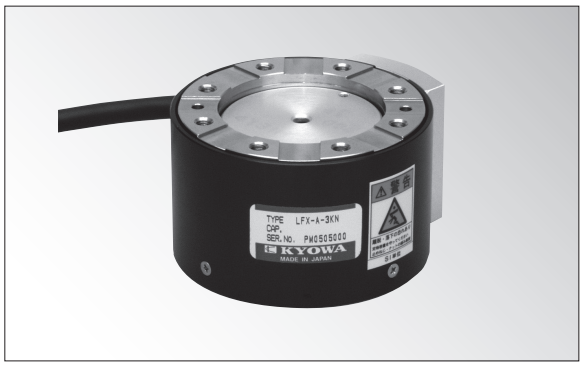

Universal Recorder EDX-100A
→ 3-63


Memory Recorder/Analyzer EDX-3000B
→ 3-69

LFX-A

●With Built-in Amplifiers

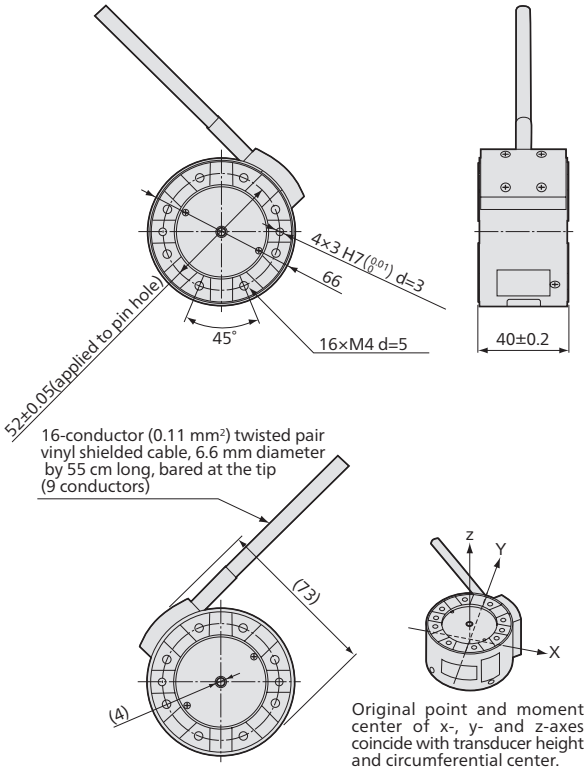
Compact 6-component Force Transducer with Built-in Amplifier



Compact
Built in Amplifiers
ϕ4 Center Hole for Wiring

Enables simultaneous measurement of 3 components of force (Fx, Fy, Fz) in 3 axial directions orthogonal to the transducer and 3 moments (Mx, My, Mz) around the axes. It outputs 6 voltage signals proportionated to 6 detected components.

■Dimensions



Specifications

Performance

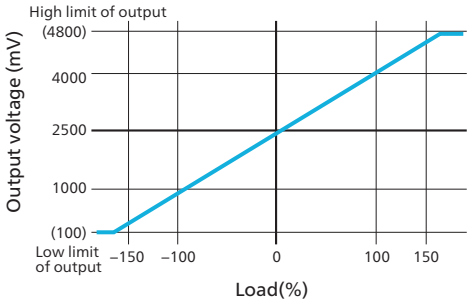
Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Interference	±1.5% RO (after correction by interference compensated coefficients stated in the Test Data Sheet)
Note	Output voltage signals of 6-component force should be compensated by using the interference compensated coefficients. the output interfere with each other.
Rated Output	Approx. ±1500 mV (from 2500 mV output with no load at the center, after compensation)

Environmental Characteristics

Safe Temperature Range	-10 to 70°C (Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

No-load Output: 2500 mV at the center (See figure below.)



Frequency Response	DC to 500 Hz (+1 dB to -3dB)
Power Supply	5V DC±10%, 160 mA or less
Cable	16-conductor (0.11 mm²) twisted pair vinyl shielded cable, 6.6 mm diameter by 55 cm long, bared at the tip (9 conductors) (Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	150%
Materials	Main unit LFX-A-1KN: Aluminum (Metallic finish) Main unit LFX-A-3KN: SUS (Metallic finish) Cover : Black anodic oxide coating aluminum Cable holder : Anodic oxide coating aluminum
Weight	See table below (Excluding cable).
Degree of Protection	IP40 (IEC 60529)

*To obtain the rated output of ±1500 mV for each of 6-component force, zero drift due to installation conditions including tightening and loading should be made within ±200 mV.

Models	Rated Capacity	Weight (Approx.)
LFX-A-1KN	FX: ±1000 N FY: ±1000 N FZ: ±1000 N MX: ±40 N·m MY: ±40 N·m MZ: ±25 N·m	210 g
LFX-A-3KN	FX: ±3000 N FY: ±3000 N FZ: ±3000 N MX: ±100 N·m MY: ±100 N·m MZ: ±50 N·m	420 g

To Ensure Safe Usage

●Prepare a plate for installing the LFX-A with sufficient strength. It is recommendable that LFX-A-3KN should be applied on the steel plate whose thickness is more than 10 mm.
With same reason, we recommend as follows. LFX-A should be applied on an aluminum alloy board which is not less than 15 mm thick. If the LFX-A is installed on a low rigid mounting plate, interference may be increased.

●Dynamic measurement

LFX-A Recommended products for combination


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

LAT-1000A Series

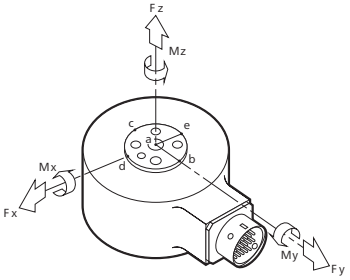
●300 N

6-component Force Measuring System

Enables Highly Accurate Measurement Possible to compensate interference by Arithmetic Processing.

Each system in the LAT-1000A series consists of the LAT-A 6-component force transducer and the FDP-106A signal processor. The LAT-A simultaneously detects 3-component force in 3 axial directions orthogonal (at the right angle) to the transducer and 3 moments around the 3 axes. The FDP-106A automatically eliminates interference components contained in transducer output by calculation. By minimizing errors due to interference, the system enables highly accurate measurement of both single and multiple component force loads.

- ●5-V output available at the rated load
- ●To guarantee measurement accuracy, performance with multiple component force loaded is indicated as a maximum error (see note in the next page).
- ●Highly accurate measurement possible even under multiple component force loaded
- ●Simultaneous sampling of 6-component force and processing signals up to approximately 300 Hz possible
- ●The compact & lightweight transducer is strain gage based and is cased with a highly rigid special aluminum alloy.
- ●Calibration coefficient is preset in the signal processor, enabling immediate measurement by connecting a monitor indicator.
- ●Force and moment can be read directly on a PC if connected.
- ●Direct reading mode is provided to read force and moment at the load point.
- ●High & low limit and hysteresis width of the high & low limit are set to alarm output.



Configuration

- ■ 6-component force transducer LAT-A
- ■ Signal processor FDP-106A
- ■ PC (not included)

General Specifications

Rated Capacity	See table below.
Safe Overload Rating	120%
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Interference	±0.8% RO
Maximum Error	±1.5% RO (±3% RO with LAT-KA-2)
Resolution	0.05% FS
Temperature Effect on Zero Balance	Within ±0.25% RO/°C
Temperature Effect on Output	Within ±0.05%/°C
Compensated Temperature Range	0 to 50 °C

Specifications stated above are values measured with our calibrators under Kyowa's standard conditions.

Models	Rated Capacity					
	Fx N	*Fy* N	*Fz* N	*Mx* N·m	*My* N·m	*Mz* N·m
LAT-1030KA-1	300	300	300	10	10	10
LAT-1030KA-2	300	300	300	20	20	20

6-component Force Transducer LAT-A Specifications

Rated Capacity	*Fx, Fy, Fz*=300 N
	Mx, My, Mz=10, 20 N·m
	See table above for combinations.
Safe Overload Rating	120%
Natural Frequencies (With all models)	*Fx, Fy* : Approx. 2.3 kHz, Fz: Approx. 5.5 kHz
	Mx, My : Approx. 8 kHz, Mz: Approx. 4 kHz
Recommended Excitation Voltage	2.5 VDC
Safe Excitation Voltage	5 VDC
Input Resistance	58.3 Ω±10%
Output Resistance	350 Ω±2%
Compensated Temperature Range	0~60°C
Safe Temperature Range	0~70°C
Temperature Effect on Zero Balance	Within 0.05% RO/°C
Temperature Effect on Output	Within 0.05%/°C
Weight	Each model approx. 250 g (Excluding cable)
Degree of Protection	IP30 (IEC 60529)
Cable	14-conductor (0.3 mm^2) PVC shielded cable, 9 mm diameter, with connector plugs at both ends. N-78 for connection to FDP-106A (Shield wire is not connected to mainframe) For displacement and angle of inclination, contact us.

Standard Accessories Communications program (Windows version), torque wrench, hexagon socket wrench, parallel pins ϕ4 and ϕ8, connection cable N-78

Signal Processor FDP-106A Specifications

Input	Number of channels: Max. 6 (6-component force)
	Zero balance adjustment: Automatic (true electron method)
	Bridge excitation voltage: 2.5 VDC
Analog Output	Number of channels: 6
	Output: ±5 V (150% the rated output of 6-component force transducer may be made ±5 V)
	Resolution: 0.05% FS
	Frequency response range: DC to approx. 300 Hz
	Initial setting: ±5V analog output for the rated capacity of 6-component force transducer, 0 mm for coordinates X, Y and Z at the load point
Serial Interface	RS-232C
	Transmission mode: Start-stop synchronized mode
	Baud rate: 9600 bps fixed
	Data: 8 bits, Parity: None, Stop bit: 1
	Transmission contents: Data, setting conditions
	Data format: Binary or ASCII
	Connector: D-Sub 25 pin, female
	PC connection: Optional interface cable for RS-232C
Sampling Frequency	When not using digital output
	0.72 ms/6-channel (cutoff frequency 366 Hz)
	When using digital output
	22.9 ms/6-channel in binary format (cutoff frequency 11 Hz)
	45.7 ms/6-channel in ASCII format (cutoff frequency 6 Hz)
Nonlinearity	Within ±0.05% FS
Calculation Error of compensating Interference	Within ±0.1% FS
Stability	Zero ±0.25 μV/V per °C
	Sensitivity ±0.01%/°C
Functions	Over input checking, automatic zero balance, load point correction, alarm
Monitor Indicator	LED
Alarm Output	Open collector
Operating Temperature Range	0 to 50°C
Operating Humidity	95% RH or less (Non-condensing)
Power Supply	100 VAC±10%
Dimensions	255 (W) x 180 (D) x 88 (H) mm (Excluding protrusions)
Weight	Approx. 2.5 kg

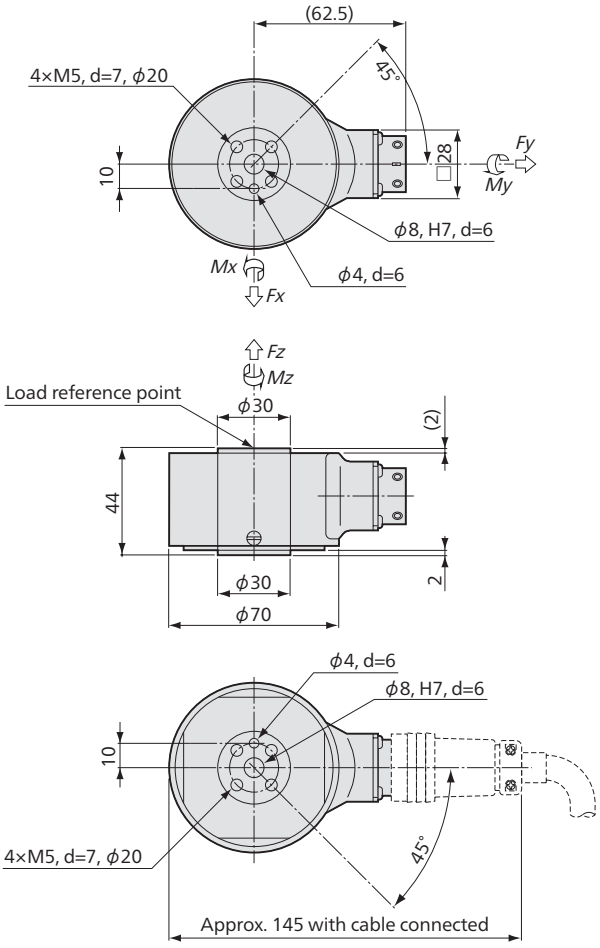
Standard Accessories Output cable U-58 (6 PC.)
AC power cable P-18 with conversion adapter CM-39

Options RS cross cable N-23, Mounting fixture FL-1A

Communication Program(Attached to LAT-A)

(Windows Version)	
Operating Environment	
OS	Windows 7
Memory	64 MB or more
Display	800×600 pixels or more

■Dimensions



Note on Maximum Error

■Definition

A maximum error denotes a maximum deviation in plus and minus directions from the characteristic curve observed when testing devices or equipment according to specified procedures under standard operating conditions.

■Description

Performance specifications of a load cell include nonlinearity hysteresis and repeatability. In the case of a 6-component force transducer, interference is added to these performance specifications. All these specifications apply to a single component force, that is, force or moment in a single direction. However, the 6-component force transducer rarely receives a single component force and detects 2 or more component force. Accordingly, characteristic values for multiple component force should be considered. To solve the problem, a maximum error is newly included in performance specifications of the LAT-A series. The maximum error is obtained as follows: Apply external force F_M of known value to the 6-component force transducer and read resultant output values of *Fx*, *Fy*, *Fz*, *Mx*, *My* and *Mz*. Referring to the magnitude and direction of the external force F_M, calculate 6-component force F_{xM}, F_{yM}, F_{zM}, M_{xM}, M_{yM} and M_{zM}.

A maximum error of *Fx* is calculated using the following equation:
Maximum error of $F_x = (F_x - F_{xM})/F_{xO} \times 100$ (% RO)
for the force in X direction.

Maximum errors of other components are calculated in the same way.

Practically, we tested through simultaneous application of 3-component force in 3 directions and 6-component force/moment in 3 directions and confirmed that the calculated maximum errors satisfy the stated specification.

Thus, the LAT-A series 6-component force transducers are assured of the accuracy in measurement of multiple component force loads, enabling safe operation under any loading conditions.

●Static measurement

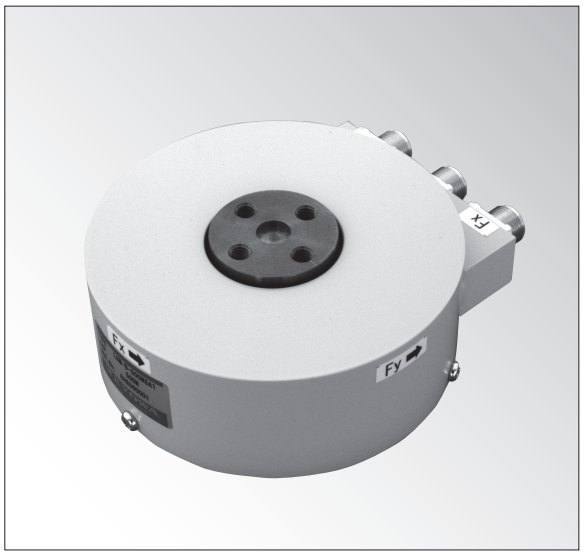
LAT-1000A Recommended products for combination


Signal processor FDP-106A
→ 2-63

LSM-B-SA1

●10 N to 500 N

3-component Force Transducer



Enables Force Measurement in X, Y and Z Directions. The Compact & Lightweight Strain Gage Based Design is Suitable for Model Experiments.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Rated Output	Approx. 0.5 mV/V (1000 μm/m)
Interference	Within ±3%RO

Environmental Characteristics

Safe Temperature Range	0 to 80°C
Compensated Temperature Range	0 to 70°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

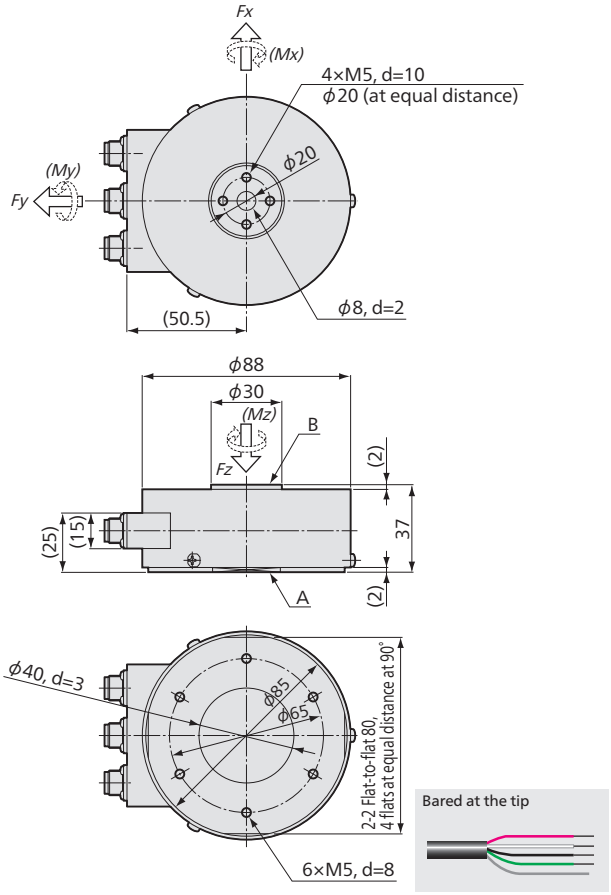
Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	240 Ω±5%
Output Resistance	240 Ω±5%
Cable	4-conductor (0.08 mm²) chloroprene shielded cable, 4 mm diameter by 5 m long, with a connector plug to the transducer side and bared to the amplifier side (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Weight	See table below (Excluding cable).
Safe Moments	See table below.

*As for the cable terminated with NDIS connectors suffix "-P" to the model number.

■Dimensions



To Ensure Safe Usage

LSM-B-SA1 series does not feature waterproof structure.

Note: 1. Moments of Mx, My, and Mz cannot be measured.
2. Arrows indicate directions of component force in plus polarity acting to the B plane with the A plane fixed.

Models	Rated Capacity	Natural Frequencies(Approx.)			Safe Moments(Approx.)	Weight
	Fx, Fy, Fz	X	Y	Z	*Mx, My, Mz*	(Approx.)
LSM-B-10NSA1	10 N	0.3 kHz		0.2 kHz	1.2 N·m	600 g
LSM-B-20NSA1	20 N	0.4 kHz		0.3 kHz	2.4 N·m	
LSM-B-50NSA1	50 N	0.8 kHz		0.6 kHz	5.9 N·m	
LSM-B-100NSA1	100 N	1.3 kHz		0.9 kHz	9.8 N·m	
LSM-B-200NSA1	200 N	2.5 kHz		2.0 kHz	24 N·m	
LSM-B-500NSA1	500 N	2.2 kHz		1.8 kHz	59 N·m	1.6 kg

Safe moments are stated for reference to strength.

●Dynamic measurement

LSM-B-SA1 Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

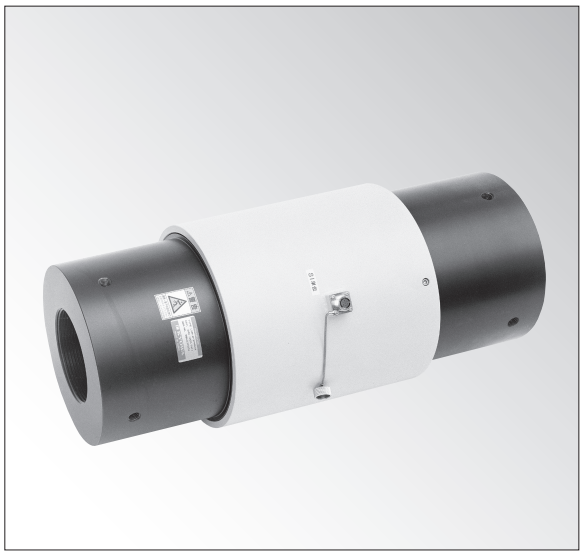

Memory Recorder/Analyzer EDX-3000B → 3-69


Sensor Interface PCD-400A → 3-77

LUR-B-SA1

Jack Load Cell

●10 kN to 2 MN



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO (LUR-B-10 to 200KNSA1)
	Within ±0.5% RO (LUR-B-300KNSA1 to 5MNSA1)
Hysteresis	Within ±0.1% RO (LUR-B-10 to 200KNSA1)
	Within ±0.5% RO (LUR-B-300KNSA1 to 5MNSA1)
Rated Output	±1 mV/V (2000 μm/m)±1%

Environmental Characteristics

Safe Temperature Range	-10 to 60°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 12 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 10 m long, terminated with a connector plug

Mechanical Properties

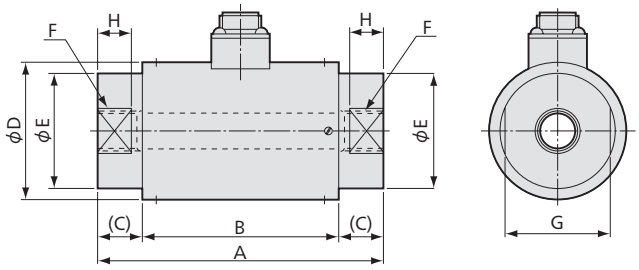
Safe Overload Rating	200%
Weight	See table below (Excluding cable).

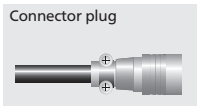
As for the capacity of 200 kN or more, calibration is performed for compressive load only.

Special Design for Jacks Moderate Price Variety of Capacity Range

LUR-B-SA1 series load cells are designed to measure loads applied to jacks when lifting up or moving a large machinery or structure in civil engineering and construction fields. These load cells enable the operators to prevent overloads, unbalanced loads, or movement of the center of gravity.

Dimensions





Models	Rated Capacity	A	B	(C)	ϕD	ϕE	F	G	H	Weight (Approx.)
LUR-B-10KNSA1	±10 kN	100	70	15	55	25	M12 P=1.75 d=15	20	10	1.4 kg
LUR-B-20KNSA1	±20 kN	110	70	20	60	50	M18 P=1.5 d=20	46	15	2.1 kg
LUR-B-30KNSA1	±30 kN	125	85	20	60	50	M24 P=2 d=30	46	15	2.2 kg
LUR-B-50KNSA1	±50 kN									
LUR-B-100KNSA1	±100 kN	175	105	35	65	55	M39 P=2 d=45	50	25	2.5 kg
LUR-B-200KNSA1	±200 kN	255	125	65	80	70	M50 P=2 d=65	65	40	5.2 kg
LUR-B-300KNSA1	±300 kN	255	125	65	100	90	M65 P=3 d=65	-	-	8 kg
LUR-B-500KNSA1	±500 kN	330	170	80	130	120	M85 P=3 d=85	-	-	15 kg
LUR-B-1MNSA1	±1 MN	430	210	110	188	158	M110 P=3 d=118	-	-	55 kg
LUR-B-1.5MNSA1	±1.5 MN	530	250	140	220	200	M140 P=4 d=140	-	-	85 kg
LUR-B-2MNSA1	±2 MN	590	270	160	260	228	M160 P=4 d=170	-	-	100 kg

●Physical quantity indication ●Static measurement ●Dynamic measurement

LUR-B-SA1 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

LTA-C-S

Crane Load Cell

●For Cranes ●20 kN to 500 kN

High Strength
High Reliability & Stability
Easy to Handle

These series of tension load cells can be used as detectors for jib crane weighing systems and for general tension measurement.

To Ensure Safe Usage

- ●Install the load cell carefully to avoid applying tensile and impact force to the cable and prevent the load cell from receiving bending or twisting force.
- ●Prepare a safety device such as a link against accidental hazards so that it supports loads in case of a broken load cell.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	Approx. 0.6 to 0.7 mV/V (1200 to 1400 μm/m)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

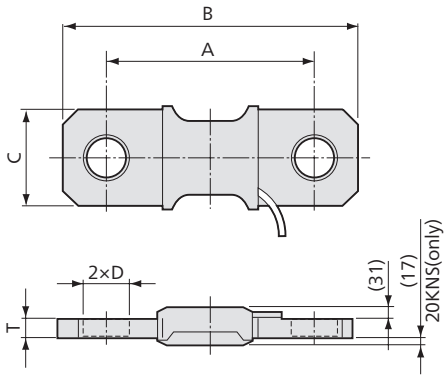
Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±5%
Output Resistance	350 Ω±5%
Cable	4-conductor (0.75 mm²) chloroprene shielded cable, 10 mm diameter by 10 m long, with crimp-style terminals (Shield wire is not connected to mainframe.)

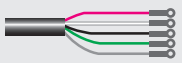
Mechanical Properties

Breaking Overload Rating	Approx. 500%
Safe Overload Rating	150%
Weight	See table below (Excluding cable).

Dimensions



Crimp-style terminals



Models	Rated Capacity	A	B	C	D	T	Weight (Approx.)
LTA-C-20KNS	20 kN	310	410	90	ϕ45	14	5 kg
LTA-C-50KNS	50 kN	310	430	110	ϕ45	15	5.5 kg
LTA-C-100KNS	100 kN	330	470	126	ϕ60	30	11 kg
LTA-C-200KNS	200 kN	360	540	170	ϕ65	36	21 kg
LTA-C-300KNS	300 kN	400	610	195	ϕ75	47	35 kg
LTA-C-500KNS	500 kN	440	670	240	ϕ85	60	60 kg

●Physical quantity indication ●Dynamic measurement

LTA-C-S Recommended products for combination


Instrumentation Amplifier WGA-900A
→ 3-95


Instrumentation Amplifier WGA-680A
→ 3-97

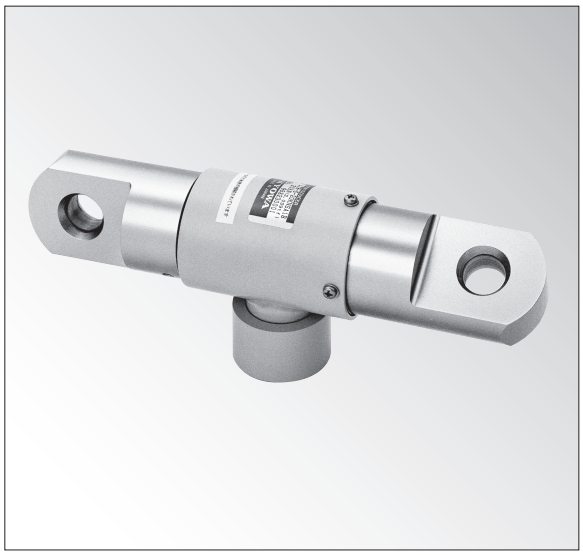

Instrumentation Amplifier WGI-400A
→ 3-103


Medium Speed Network Terminal Box NTB-500A
→ 3-35

LTR-S-SA1

●20 kN to 50 kN

One-end Revolving Tension Load Cell



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Rated Output	Approx. 1 mV/V (2000 μm/m)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with a connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Static Breaking Overload Rating	200% (150% with 50KNSA1)
Weight	Approx. 3.6 kg (Excluding cable)

Compact & Lightweight
Moderate price
For Measurement of Tractive Force and Tensile Force of Ropes

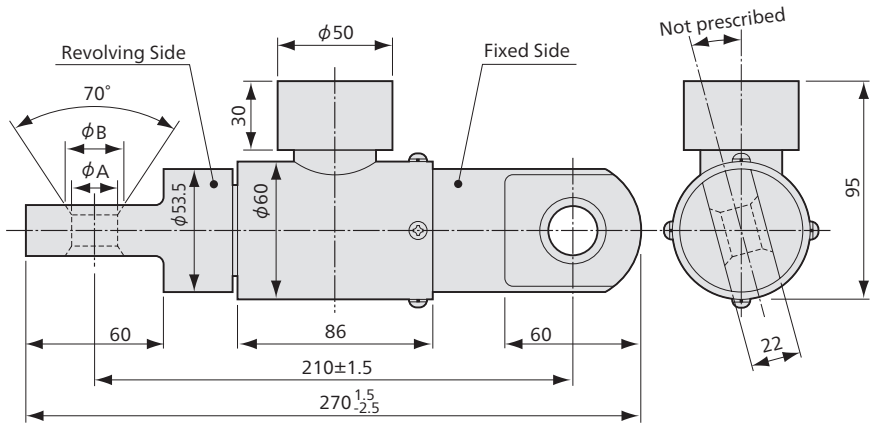
LTR-S-SA1 series load cells are suitable for measurement of tensile force of ropes. Since the hook at one end revolves together with the rope which may revolve due to twisting, easy installation and handling are ensured.

Models	Rated Capacity	ϕA	ϕB
LTR-S-20KNSA1	20 kN	20	26
LTR-S-30KNSA1	30 kN		
LTR-S-50KNSA1	50 kN	22	29

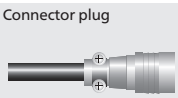
To Ensure Safe Usage

- ●When loaded, sliding friction prevents the revolving part from revolving.
- ●Do not use for measurement of hanging loads.

■Dimensions



Connector plug



●Physical quantity indication

LTR-S-SA1 Recommended products for combination


Instrumentation Amplifier WGA-900A
→3-95

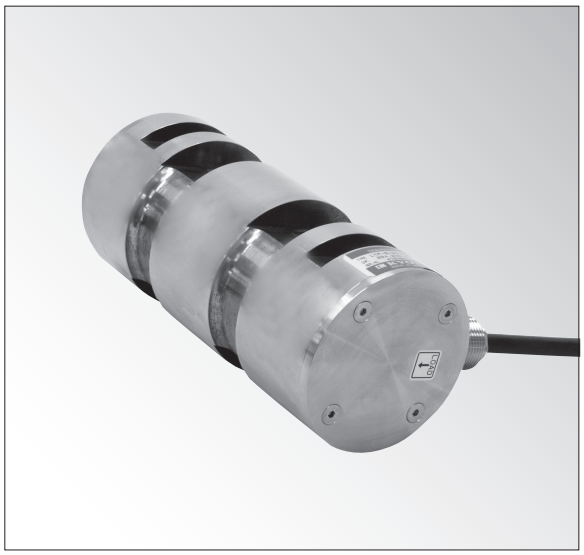

Instrumentation Amplifier WGA-680A
→3-97


Instrumentation Amplifier WGI-400A
→3-103

LTP-S-S

Pin-type Load Cell

●10 kN to 500 kN ●stainless steel



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1 to 2% RO (depends on user's spec.)
Hysteresis	Within ±1 to 2% RO (depends on user's spec.)
Rated Output	Approx. 0.5 to 1 mV/V (1000 to 2000 μm/m)

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	700 Ω±3%
Output Resistance	700 Ω±3%
Cable	4-conductor chloroprene shielded cable (length is as required)

Mechanical Properties

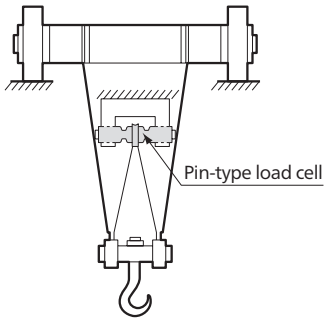
Safe Overload Rating	150%

Compact, Space saving Design For Mounted in the Place of the Axis of Crane's Pulley

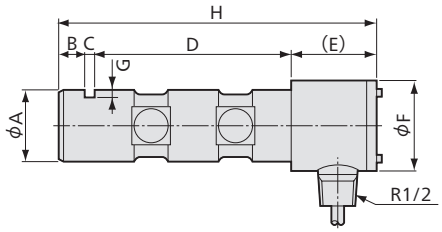
●Specially designed for installation to pin connection

Mounted in place of the axis of crane's pulley, LTP-S-S series pin-type load cells enable measurement of hanging loads. Such the feature ensures easy installation and handling. Since strain gages are used as the load detector, each load cell in this series is compact, lightweight and moderate price.

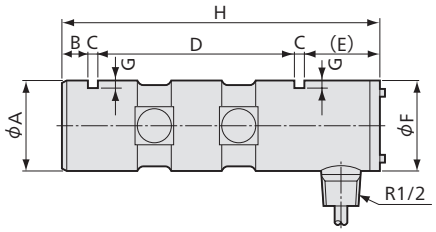
■Installation Examples



■Dimensions



LTP-S-10KNS to 50KNS



LTP-S-100KNS to 500KNS

Models	Rated Capacity	ϕA	B	C	D	(E)	ϕF	G	H
LTP-S-10KNS	10 kN	40	15	5	112	40	50	4	172
LTP-S-20KNS	20 kN								
LTP-S-50KNS	50 kN	50	15	7	140	40	55	6	202
LTP-S-100KNS	100 kN	60	20	8	168	40	60	8	244
LTP-S-200KNS	200 kN	70	20	10	212	40	70	8	292
LTP-S-500KNS	500 kN	95	22	12	262	45	95	10	341

●Physical quantity indication ●Dynamic measurement

LTP-S-S Recommended products for combination


Instrumentation Amplifier WGA-900A
→3-95

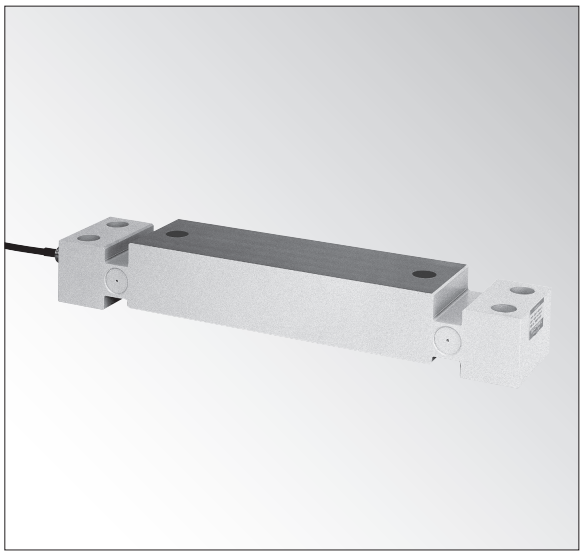

Instrumentation Amplifier WGA-680A
→3-97


Strain Amplifier DPM-900 Series
→3-5

LCD-A-S1 to S9

●30 kN to 100 kN

Rectangular Load Cell



For Measurement of Loads to Pillow Block

●Hermetically-sealed structure

Having a flat top and bottom, LCD-A-S series rectangular compression load cells enable stable installation of a flat board. They can be used for weighing systems of waste and ash cranes or for measurement of compression loads of pillow blocks placed on them.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	Approx. 1 mV/V (2000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±5%
Output Resistance	350 Ω±5%
Cable	4-conductor (0.75 mm²) fluonlex shielded cable, approx. 8 mm diameter by 10 m long, bared at the tip (Shield wire is not connected to mainframe.)

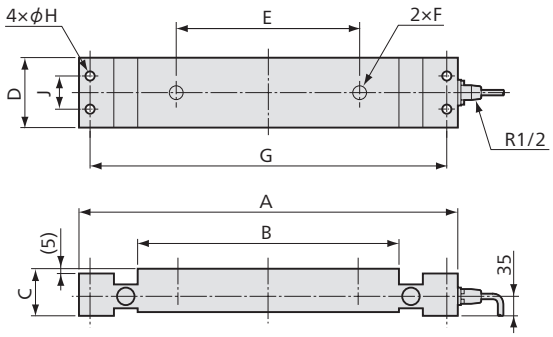
Mechanical Properties

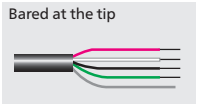
Safe Overload Rating	150%
Weight	See table below (Excluding cable).
Degree of Protection	IP64 (IEC 60529)

To Ensure Safe Usage

Take care that there is no foreign matter on the top and bottom of the load cell and the surface of mounting board.

Dimensions





Models	Rated Capacity	A	B	C	D	E	F	G	H	J	Weight (Approx.)
LCD-A-30KNS1	30 kN	520	340	70	95	280	M22 d=30	484	14	50	22 kg
LCD-A-30KNS2		580	400	70	105	280	M22 d=30	544	14	50	28 kg
LCD-A-30KNS3		580	400	70	105	330	M27 d=35	544	14	50	28 kg
LCD-A-50KNS4	50 kN	610	430	80	105	280	M22 d=30	574	14	50	35 kg
LCD-A-50KNS5		580	400	80	105	330	M27 d=35	540	26	60	33 kg
LCD-A-50KNS6		610	430	80	105	360	M27 d=35	550	26	60	35 kg
LCD-A-50KNS7		690	510	80	105	410	M30 d=35	626	26	50	40 kg
LCD-A-100KNS8	100 kN	690	510	80	105	410	M30 d=35	626	26	50	40 kg
LCD-A-100KNS9		690	510	80	105	430	M30 d=35	626	26	50	40 kg

●Physical quantity indication ●Static measurement ●Dynamic measurement

LCD-A-S1 to S9 Recommended products for combination


Instrumentation Amplifier WGA-900A
→ 3-95


Instrumentation Amplifier WGA-680A
→ 3-97


Data Logger UCAM-60B
→ 3-25


Strain Amplifier DPM-900 Series
→ 3-5

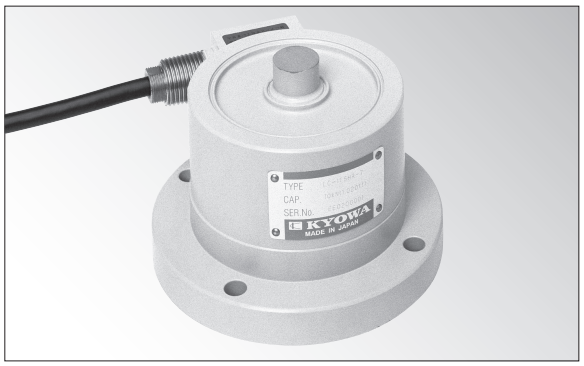

Universal Recorder EDX-200A
→ 3-55


Universal Recorder EDX-100A
→ 3-63

LCR-B-S7

Tension Meter Load Cell

●5 kN to 100 kN



Excellent Environmental Resistance Tension Meter Load Cells

- ●High safe overload rating of 300% max.
- ●Mechanical stopper activating against overloads of 150% to 200%
- ●Hermetically sealed structure with inert gas filled in
- ●Highly reliable structure (IP64)
- ●Corrosion resistant
- ●Cable direction selectable from either left or right

Designed for tension meters, LCR-B-S7 series load cells are suitable for load measurement under environments where heat resistance, oil resistance, corrosion resistance and high overload rating are required.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO (LCR-B-5 to 50KNS7)
	Within ±0.2% RO (LCR-B-100KNS7)
Hysteresis	Within ±0.1% RO (LCR-B-5 to 50KNS7)
	Within ±0.2% RO (LCR-B-100KNS7)
Repeatability	0.1% RO or less
Rated Output	1 mV/V (2000 μm/m) ±1%

Environmental Characteristics

Safe Temperature Range	-20 to 120°C
Compensated Temperature Range	-10 to 100°C
Temperature Effect on Zero Balance	Within ±0.005% RO/°C
Temperature Effect on Output	Within ±0.005%/°C

Electrical Characteristics

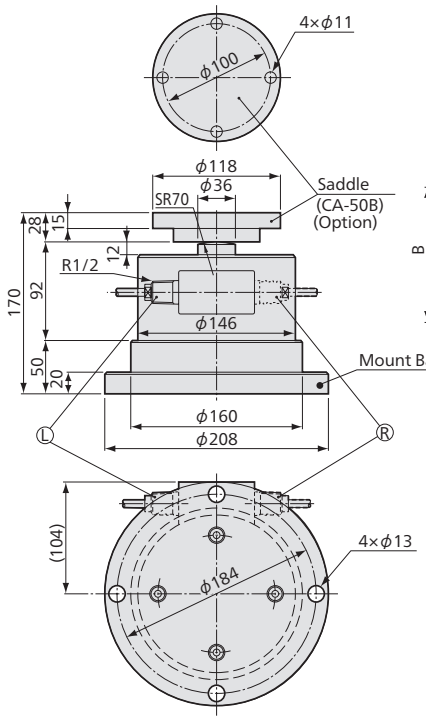
Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.75 mm²) fluonlex shielded cable, 8 mm diameter by 10 m long, bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

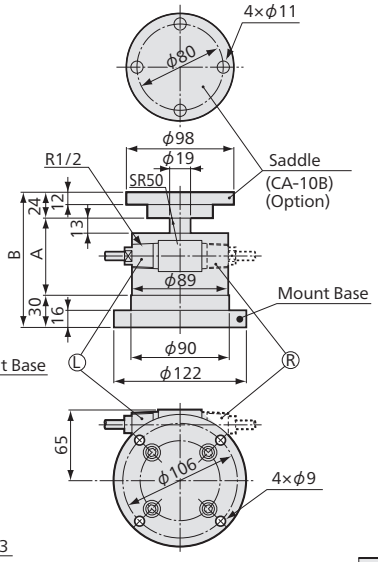
Critical Overload Rating	1000% (400% for 100KNS7)
Safe Overload Rating	300% (200% for 100KNS7)
Materials	Stainless steel (Excluding the mount base of 100 & 100KNS7)
Degree of Protection	IP64 (IEC 60529)
Weight	See table below (Excluding cable).

■Dimensions

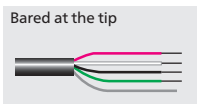
●The saddle is an optional accessory



LCR-B-100KNS7



LCR-B-5KNS7 to 50KNS7



To Ensure Safe Usage

Never disassemble the mount base, which has the stopper mechanism activating against overloads of 150% to 200%. Once removed, overload protection is not guaranteed.

Models	Rated Capacity	A	B	Weight (Approx.)
LCR-B-5KNS7(L, R)	5 kN	57	111	4 kg
LCR-B-10KNS7(L, R)	10 kN			
LCR-B-20KNS7(L, R)	20 kN			
LCR-B-30KNS7(L)	30 kN	70	124	4.5 kg
LCR-B-50KNS7(L, R)	50 kN			
LCR-B-100KNS7(L, R)	100 kN	See drawing lower left.		19 kg

●Physical quantity indication

LCR-B-S7 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Instrumentation Amplifier WGA-100B → 3-110

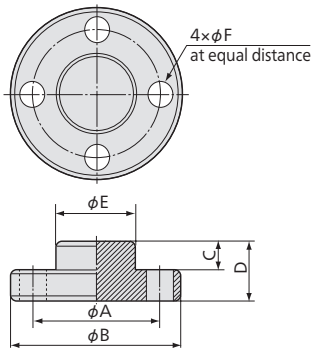

4-Channel Signal Conditioner WGC-140A → 3-109


Measuring Instrument Controller WDC-810C1 → 3-114

Dimensions of Special Accessories

Saddles

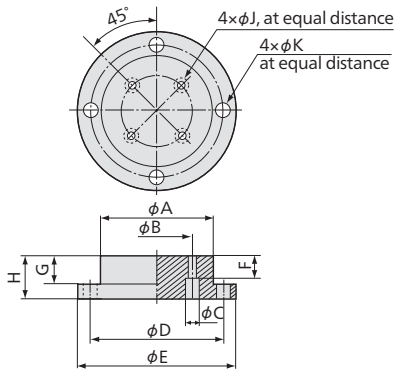
CA-B, CA-H



Models	Applicable Load Cells	ϕA	ϕB	C	D	ϕE	ϕF	Hexagon socket head bolts	Weight (Approx.)
CA-1B	LU-50KE to 500KE LCS-500KD, 1TD	43	58	9	19	27	7	M6	300 g
CA-2B	LCK-A-5KN to 20KN LTZ-50K to 2TA LUH-50KF to 500KF LUB-B	38	53	9	19	24	7	M6	200 g
CA-10B	LC-5,10TV LCK-A-50KN, 100KN LCS-2TD, 5TD LTZ-5TA	80	98	12	24	60	11	M10	1 kg
CA-50B	LC-20TV LCV-A-500KN LCK-A-200KN LCH-10TF, 20TF	100	118	13	28	80	11	M10	1.8 kg
CA-1MH	LCV-A-1MN	128	156	25	40	100	13	M12	4 kg

Mount Bases

CF

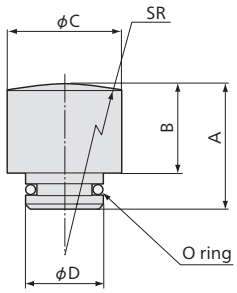


Models	Applicable Load Cells	ϕA	ϕB	ϕC	ϕD	ϕE	F	G	H	ϕJ	ϕK	Hexagon socket head bolts	Weight (Approx.)
CF-50	LC-5TV LU-50KE to 200KE	80	50	10	96	112	13	20	30	5.5	9	4×M5, L 20	1.5 kg
CF-60	LC-10TV LC-G LU-5KA to 20KA	90	60	13	106	122	13	20	30	7	9	4×M6, L20	1.8 kg
CF-80	LC-20TV LCS-500KD to 10TE LU-50KE to 500KE LUH-50KF to 1TF	100	80	16	124	148	18	25	40	9	13	4×M8, L25	3.9 kg
CF-110	LC-50TE, LCH-10TF	160	110	16	184	208	22	30	50	9	13	4×M8, L35	9.8 kg
CF-113F	LCV-A-500KN	130	113	18	154	178	35	30	50	11	13	4×M10, L45	7 kg
CF-130F	LCV-A-1MN	150	130	20	184	208	35	30	50	13	13	4×M12, L50	9 kg

The hexagon socket head bolts are standard provided.

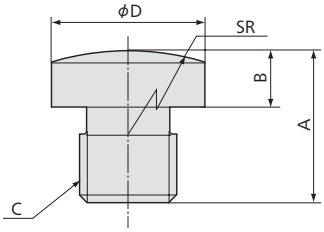
Patches

CW-005 to 2



Models	Applicable Load Cells	A	B	ϕC	ϕD	R	Weight (Approx.)
CW-005	LUB-5 to 50KB	22	15	13	8	20	18 g
CW-02	LUB-100KB, 200KB	22	15	16	10	30	27 g
CW-1	LUB-500KB, 1TB LUB-500KC	30	20	24	16	50	85 g
CW-2	LUB-2TB LUB-2TC	38	26	30	20	70	170 g

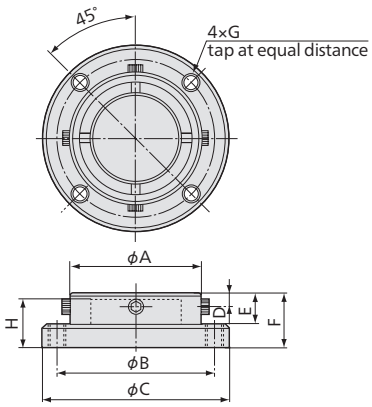
CWM-6 to 24



Models	Applicable Load Cells	A	B	C	ϕD	R	Weight (Approx.)
CWM-6	LTZ-50KA, 100KA	10	4	M6, P=1	10	30	2 g
CWM-12	LTZ-200KA to 1TA	19	7	M12, P=1.75	19	30	25 g
CWM-18	LTZ-2TA	28	10	M18, P=1.5	26	70	70 g
CWM-24	LTZ-5TA	37	17	M24, P=2	36	70	200 g

Movable Saddles

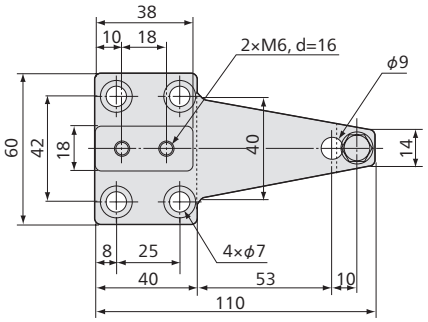
ER-B

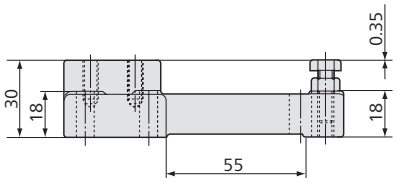


Models	Applicable Load Cells	ϕA	ϕB	ϕC	D	E	F	G	R	Weight (Approx.)
ER-2B	LUH-50KF to 500KF	75	90	108	10	22	35	M8	34	1.5 kg
ER-5B	LC-5TV, LUH-1TF to 5TF LCS-2TD, 5TD	110	128	148	15	30	50	M12	49	4.3 kg
ER-10B	LC-10TV, LCH-10TF, LUH-10TF	140	158	178	15	40	60	M12	59	7.5 kg
ER-20B	LC-20TV, LUH-20TF LCH-20TF	160	178	198	20	50	80	M12	78	13.1 kg

Mount Bases with a Stopper

LD-005

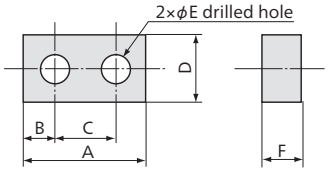




Applicable load cells: LUB-5KB to 50KB
Weight: Approx. 600 g

Spacers

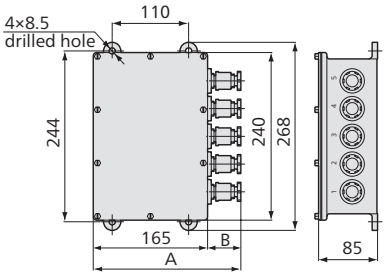
LE-005 to 2



Models	Applicable Load Cells	A	B	C	D	ϕE	F	Weight (Approx.)
LE-005	LUB-5KB to 50KB	36	9	18	22	6.6	13	74 g
LE-02	LUB-100KB, 200KB	40	10	20	22	9	13	77 g
LE-1	LUB-500K, 1TB LUB-500KC	100	25	50	40	13.5	20	590 g
LE-2	LUB-2TB LUB-2TC	118	29	60	50	17.5	25	1.1 g

Junction Boxes

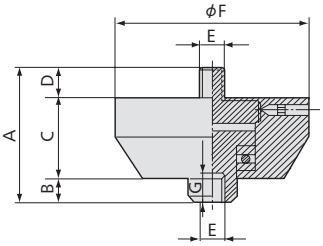
SJB-4C, 4D



Models	A	B	Through Fittings	Cables	Weight (Approx.)
SJB-4C	212	47	15c	4-conductor (0.5mm²) repletion cable	4.7 kg
SJB-4D	208	43	10b	4-conductor (0.3mm²) shielded cable	4.4 kg

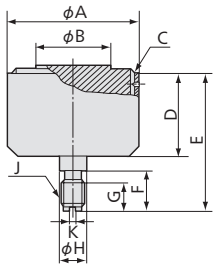
Rotating Attachments

RJ-02 to 20



Models	Applicable Load Cells	A	B	C	D	E	ϕF	G	Weight (Approx.)	Rated Capacity	Safe Static Overload
RJ-02	LU-50KE to 200KE	55	10	35	10	M8, P=1.25	80	12	1.2 kg	2 kN	11.7 kN
RJ-05	LU-500KE	58	10	35	13	M12, P=1.75	100	17	1.7 kg	5 kN	21.5 kN
RJ-1	LU-1TE	82	10	52	20	M14, P=2	100	22	2.8 kg	10 kN	37.2 kN
RJ-2	LU-2TE	82	10	52	20	M18, P=1.5	100	22	2.8 kg	20 kN	64.7 kN
RJ-5	LU-5TE	118	14	71	33	M26 P=2	112	35	5.1 kg	50 kN	136.3 kN
RJ-10	LU-10TE	158	19	96	43	M36, P=2	138	45	10.4 kg	100 kN	215.7 kN
RJ-20	LU-20TE	226	25	140	61	M50, P=3	186	65	28.3 kg	200 kN	431.4 kN

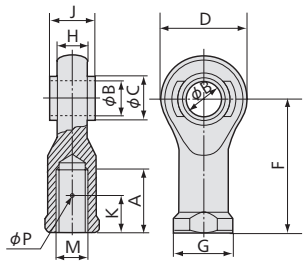
RJ-02 to 5B



Models	Applicable Load Cells	ϕA	ϕB	C	D	E	F	G	ϕH	J	K	Weight (Approx.)	Rated Capacity	Safe Static Overload
RJ-02B	LT-50KFH to 200KFH LT-50KFL to 200KFL	74	42.5	M68	48	78	23	17	15	M12, P=1.75	1.6	1.5 kg	2 kN	20.5 kN
RJ-05B	LT-500KFH LT-500KFL	78	42.5	M72	58	94	27	20	20	M14, P=2	3	1.9 kg	5 kN	31.3 kN
RJ-1B	LT-1TFH LT-1TFL	78	42.5	M72	65	109	33	26	25	M18, P=1.5	3	2.7 kg	10 kN	41.1 kN
RJ-2B	LT-2TFH LT-2TFL	82	42.5	M72	72	127	44	35	30	M24, P=2	3	2.8 kg	20 kN	48.0 kN
RJ-5B	LT-5TFH LT-5TFL	134	63	M110	107	179	55	45	50	M39, P=3	6	10.9 kg	50 kN	166.7 kN

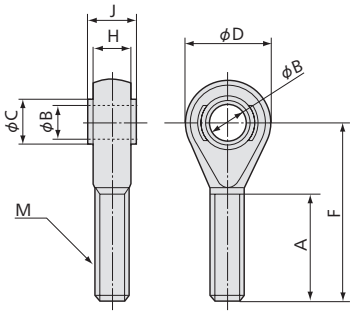
Ball Joints

TU-12 to 39B



Models	Applicable Load Cells	ϕA	ϕB	ϕC	D	F	G	H	J	K	M	ϕP	Weight (Approx.)	Rated Capacity	Safe Static Overload
TU-12B	LT-50KFH to 200KFH LT-50KFL to 200KFL	24	12	15.43	30	50	22	12	16	14.5	M12, P=1.75	1.8	200 g	2 kN	31.3 kN
TU-14B	LT-500KFH LT-500KFL	27	14	16.86	34	57	25	13.5	19	16	M14, P=2	3.2	200 g	5 kN	42.1 kN
TU-18B	LT-1TFH LT-1TFL	36	18	21.89	42	71	31	16.5	23	21	M18, P=1.5	3.2	300 g	10 kN	82.3 kN
TU-24B	LT-2TFH LT-2TFL	48	25	29.60	56	94	42	22	31	30.5	M24, P=2	3.2	700 g	20 kN	146.1 kN
TU-39B	LT-5TFH LT-5TFL	73	40	46.28	85	140	65	33	48	49.5	M39, P=3	6.3	2.2 kg	50 kN	160.0 kN

TU-8 to 50, 6C to 24C

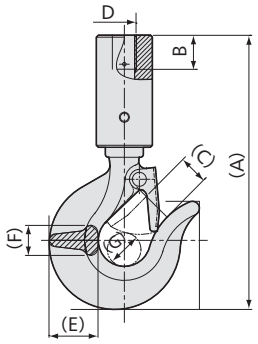


Models	Applicable Load Cells	A	ϕB	ϕC	ϕD	F	H	J	M	Weight (Approx.)	Rated Capacity	Safe Static Overload
TU-6C	LTZ-50, 100KA	22	6	9	18	36	6.7	9	M6, P=1	20 g	1 kN	4.9 kN
TU-8	LU-50KE to 200KE LUR-A-SA1	29	8	10.4	22	46	8.25	11	M8, P=1.25	100 g	2 kN	12.7 kN
TU-12	LU-500KE LUH-50KF to 200KF	37	12	15.43	30	62	13.25	16	M12, P=1.75	100 g	5 kN	31.3 kN
TU-12C	LTZ-200KA to 1TA											
TU-14	LU-1TE LUH-1TF	38	14	18	37	64	14.25	17	M14, P=2	200 g	10 kN	42.1 kN
TU-18	LU-2TE LUH-500KF, 2TF	44	18	21.89	42	72	16.5	23	M18, P=1.5	300 g	20 kN	82.3 kN
TU-18C	LTZ-2TA											
TU-24C	LTZ-5TA	66	25	35.5	70	113	26.5	37	M24, P=2	1 kg	50 kN	182.4 kN
TU-26	LU-5TE LUH-5TF	68	25	33.5	70	113	26.5	37	M26, P=2	1 kg	50 kN	182.4 kN
TU-36	LU-10TE LUH-10TF	115	40	54	105	173	39.5	60	M36, P=2	3.2 kg	100 kN	352.0 kN
TU-50	LU-20TE LUH-20TF	122	50	66.5	136	210	49	75	M50, P=3	7.2 kg	200 kN	672.7 kN

TU-6C, 12C, 18C, and 24C are designed for the LTZ-A series, and come standard with nuts.

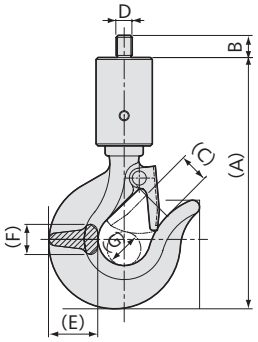
Hooks

THD



Models	Applicable Load Cells	A	B	C	D	E	F	G	Weight (Approx.)	Rated Capacity
THD-2	LT-50KFH to 200KFH LT-50KFL to 200KFL	135	17	13	M12×1.75	27	17	11	0.5 kg	2 kN
THD-5	LT-500KFH LT-500KFL	161	19	19	M14×2	32	19	16	0.6 kg	5 kN
THD-10	LT-1TFH LT-1TFL	224	25	26	M18×1.5	48	29	19	1.8 kg	10 kN
THD-20	LT-2TFH LT-2TFL	302	33	34	M24×2	69	46	34	5.8 kg	20 kN
THD-50	LT-5TFH LT-5TFL	397	54	41	M39×3	81	50	41	8.4 kg	50 kN

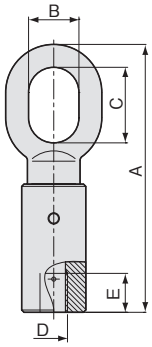
THC



Models	Applicable Load Cells	A	B	C	D	E	F	G	Weight (Approx.)	Rated Capacity
THC-2	LU-50KE to 200KE	124	12	13	M8×1.25	27	17	11	0.4 kg	2 kN
THC-5	LU-500KE	145	16	19	M12×1.75	32	19	16	0.6 kg	5 kN
THC-10	LU-1TE	216	20	26	M14×2	48	29	19	1.8 kg	10 kN
THC-20	LU-2TE	286	26	34	M18×1.5	69	46	34	5.7 kg	20 kN
THC-50	LU-5TE	352	35	41	M26×2	81	50	41	8.2 kg	50 kN

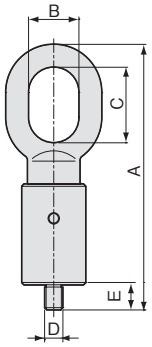
Hooks

TRD



Models	Applicable Load Cells	A	B	C	D	E	Weight (Approx.)	Rated Capacity
TRD-2	LT-50KFH to 200KFH LT-50KFL to 200KFL	126	23	34	M12×1.75	17	0.4 kg	2 kN
TRD-5	LT-500KFH LT-500KFL	155	28	42	M14×2	19	0.6 kg	5 kN
TRD-10	LT-1TFH LT-1TFL	211	38	60	M18×1.5	25	1.5 kg	10 kN
TRD-20	LT-2TFH LT-2TFL	306	58	91	M24×2	33	4.6 kg	20 kN
TRD-50	LT-5TFH LT-5TFL	414	82	110	M39×3	54	8.9 kg	50 kN

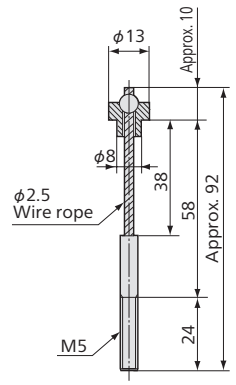
TRC



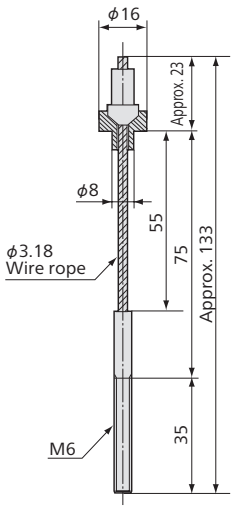
Models	Applicable Load Cells	A	B	C	D	E	Weight (Approx.)	Rated Capacity
TRC-2	LU-50KE to 200KE	115	23	34	M8×1.25	12	0.4 kg	2 kN
TRC-5	LU-500KE	139	28	42	M12×1.75	16	0.6 kg	5 kN
TRC-10	LU-1TF	199	38	60	M14×2	20	1.5 kg	10 kN
TRC-20	LU-2TF	290	58	91	M18×1.5	26	4.6 kg	20 kN
TRC-50	LU-5TF	369	82	110	M26×2	35	8.1 kg	50 kN

Hangers

TW-002, 005

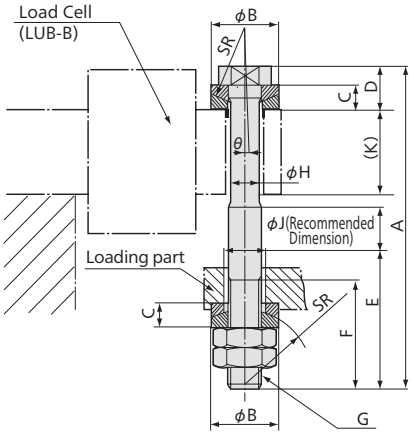


TW-002 (For LUB-5KB to 20KB)
Weight: Approx. 13 g



TW-005 (For LUB-5KB to 50KB))
Weight: Approx. 25 g

TW-02 to 2

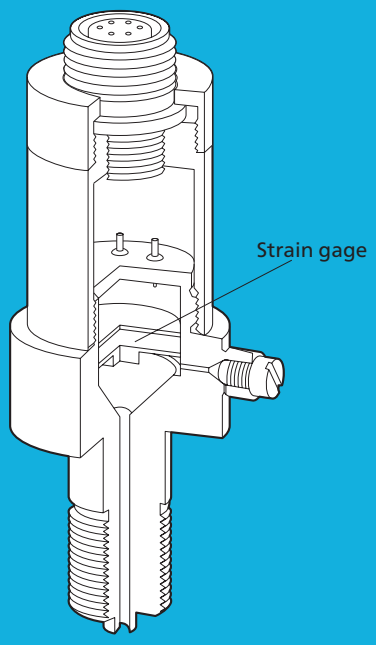


Models	Applicable Load Cells	A	ϕB	C	D	E	F	G	ϕH	ϕJ	(K)	R	θ	Lateral Movable Range	Weight (Approx.)
TW-02	LUB-100, 200KB	90	20	8	13	53	35	M8	6	12	20	20	2° 40′	3.5	70 g
TW-1	LUB-500KB,1TB LUB-500KC	133	28	10	18	75	45	M14	12	18	35	30	1° 40′	3.5	250 g
TW-2	LUB-2TB LUB-2TC	165	34	10	20	95	60	M18 P=1.5	15	22	44	40	1° 40′	4.5	500 g

Pressure Transducers

Pressure transducers convert liquid or gas pressures into electric quantities. According to measuring purposes, they are connected to various instruments for monitoring, recording and controlling pressures.
They have highly precise dedicated self-temperature-compensated strain gages incorporated as pressure detecting elements and feature a hermetically-sealed structure with inert gas filled in, ensuring superior linearity, thermal characteristics and waterproofness. Thus, they enable highly precise and stable pressure measurement for a long period of time in a wide range of fields including chemical, machinery and steelmaking.

■Pressure Transducers



Features

- Long-term stable operation
- Highly precise
- Excellent thermal characteristics

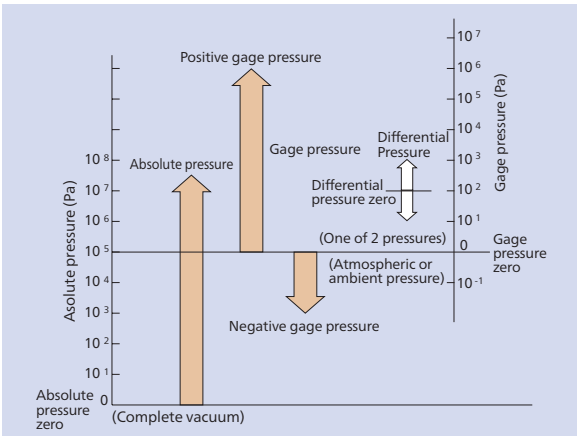
Important Notice
Pressure transducers cannot be used in hydrogen environment.
They cannot be used if the object pressure medium is hydrogen.

■Types of Pressure

1) Absolute Pressure
Absolute pressure is a pressure expressed by referring to vacuum (complete) pressure as zero. It is mainly used in physical science for expressing atmospheric pressure, etc. Absolute pressure is calculated by following formula :
absolute pressure = atmospheric pressure + gage pressure.
Kyowa mentions absolute pressure as “abs.” to differentiate absolute pressures to gage pressures.

2) Gage Pressure
Gage pressure is a pressure expressed by referring to atmospheric or ambient pressure as zero. Industrially, it is merely called pressure unless otherwise noted. Pressure higher than atmospheric or ambient pressure is called positive gage pressure and pressure lower than atmospheric or ambient pressure, negative gage pressure. Though ISO recommends to affix "Pe" or "Gauge" to gage pressure, Kyowa does not affix either of them to gage pressure.

3) Differential Pressure
Differential pressure is a difference between a specific pressure and other. Thus, it may be either positive or negative.



Relations between Pressure Units

Pa	bar	kgf/cm²	atm	mmH₂O(mmAq)
1	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}
1×10^{5}	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}
9.80665×10^{4}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^{4}
1.01325×10^{5}	1.01325	1.03323	1	1.03323×10^{4}
9.80665	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1

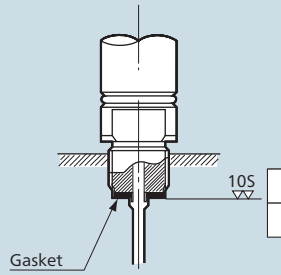
1 Pa=1 N/m²
1 Torr=1 mmHg=1.33322×10^{2} Pa=1.33322×10^{-3} bar=1.35951×10^{-3} kgf/cm²
=1.31579×10^{-3} atm=1.35951×10 mmH₂O(mmAq)
1 psi=6894.7 Pa=7.0307×10^{-2} kgf/cm²

To Ensure Safe Usage

- Install each pressure transducer with the tightening torque stated in the Instruction Manual.
- Do not apply any load exceeding the safe overload rating. Excess load may break the pressure transducer.
- If pressure is applied repetitively, select a model which satisfies the following 2 requirements:
  - The rated capacity covers the peak pressure.
  - 50% the rated capacity covers the maximum pressure amplitude.
- If the pressure transducer may receive an unexpected excess pressure, select a model with a higher rated capacity. Especially, in the case of a pressure transducer with a higher rated capacity, if there exists air in the measuring medium, install a protective case around the pressure transducer for safety assurance.

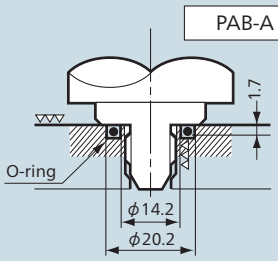
Typical Installation with Standard Accessories

For other methods of installation, contact us.

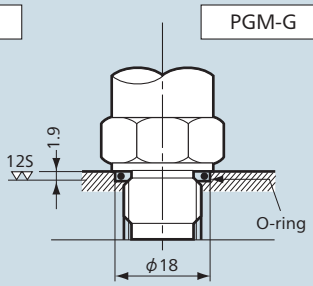


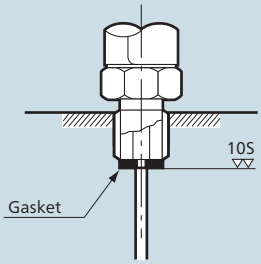
PG-U
PHB-A

PAB-A



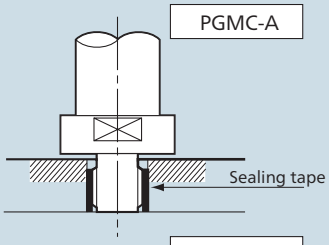
PGM-G



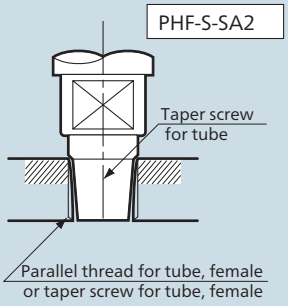


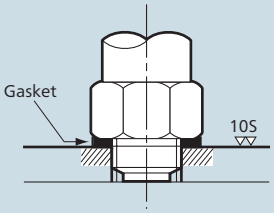
PGS-A	PAV-R,U
PG-H	PAA-R,U
PGR-A	PAG-A
PHS-A	

PGMC-A



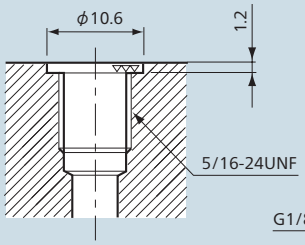
PHF-S-SA2



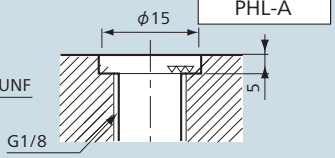


PGM-D	PHC-B
PGM-E	PVL-A,B,C,D
PGM-H	PAL-A,B
PE-RMT	
PE-F	

PHF-S-SA4

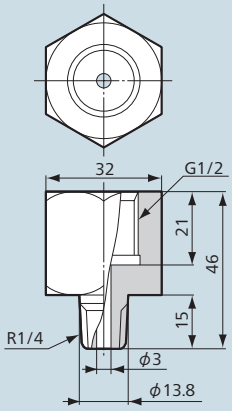


PGL-A
PHL-A



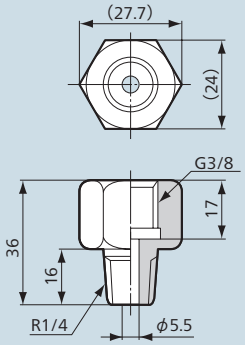
Screw Standard Conversion Adapters (G-to-R Conversion)

H-3832 G1/2→R1/4



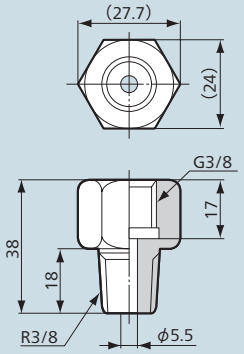
Material: SUS303

H-5237 G3/8→R1/4



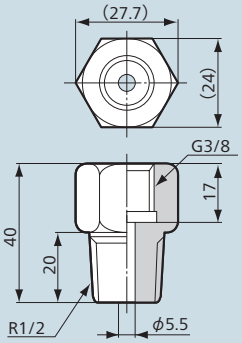
Material: SUS304

H-5238 G3/8→R3/8



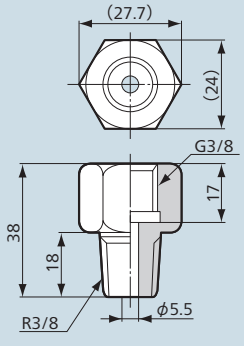
Material: SUS304

H-5239 G3/8→R1/2



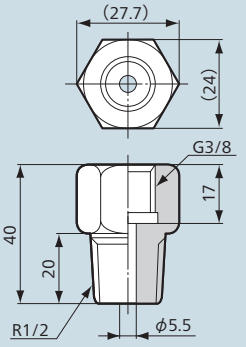
Material: SUS304

H-20109 G3/8→R3/8



Material: C3601-5B

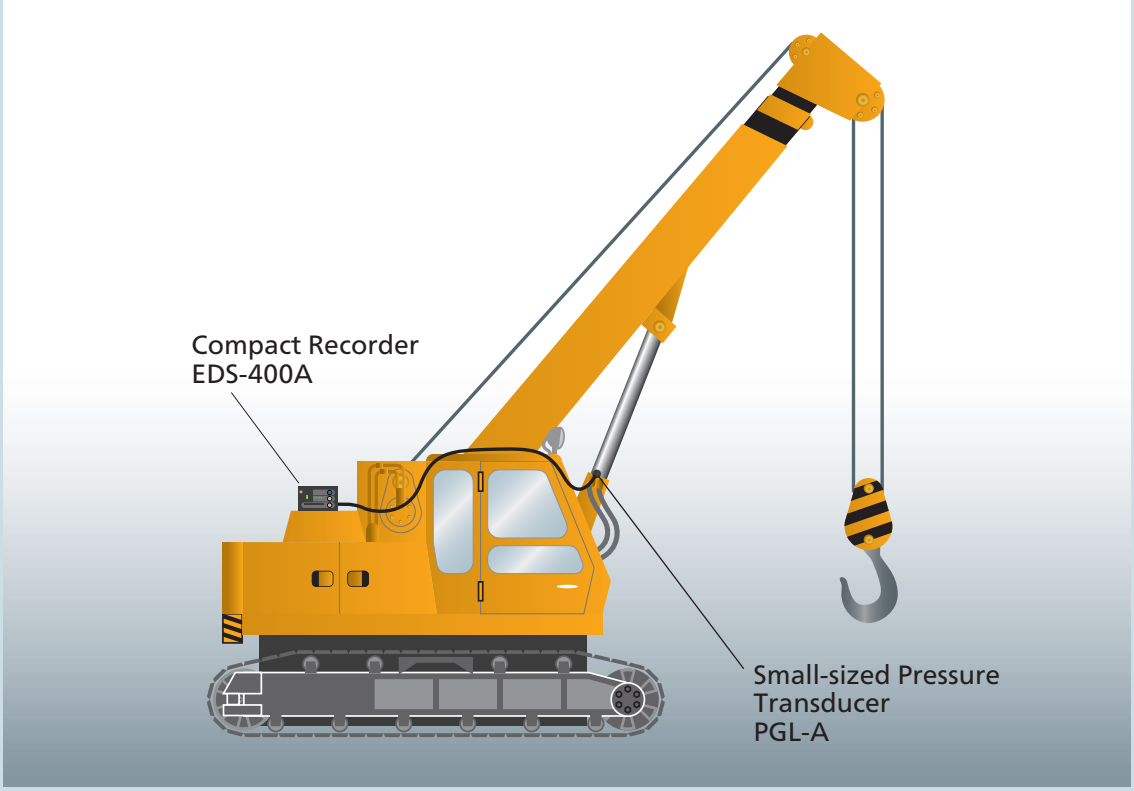
H-20110 G3/8→R1/2



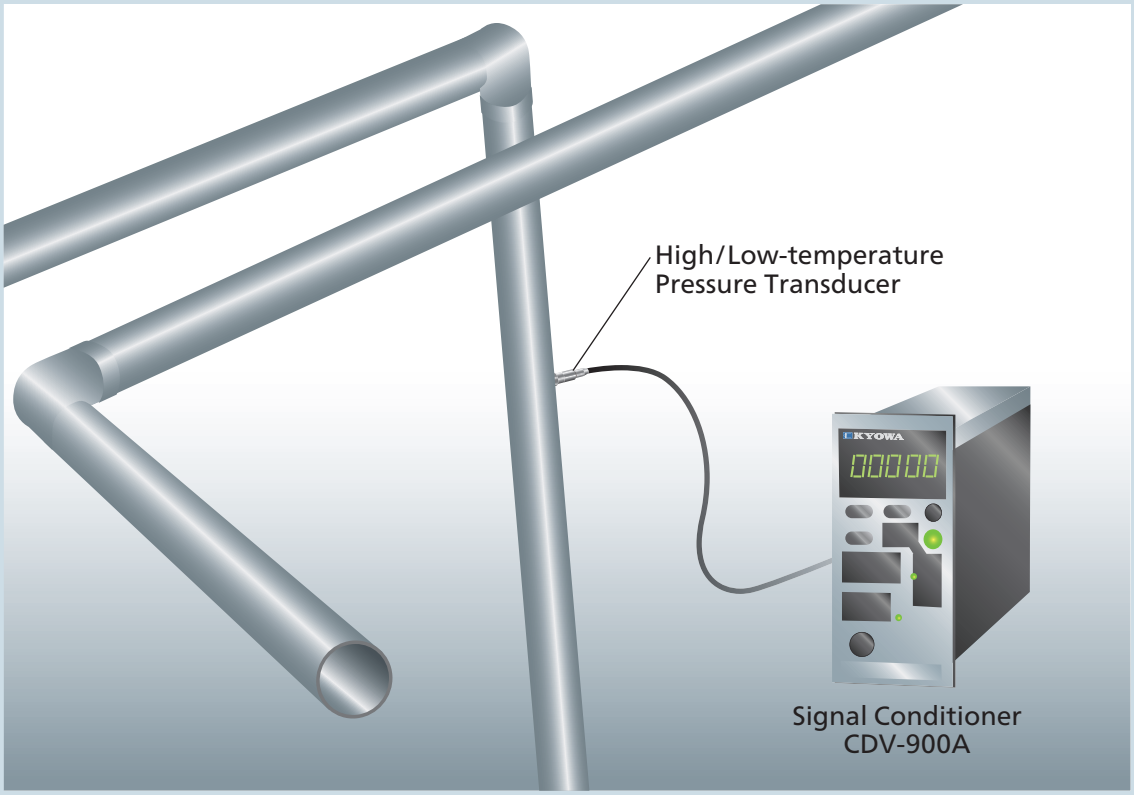
Material: C3601-5B

Pressure Transducers Examples of Measurement (Image)

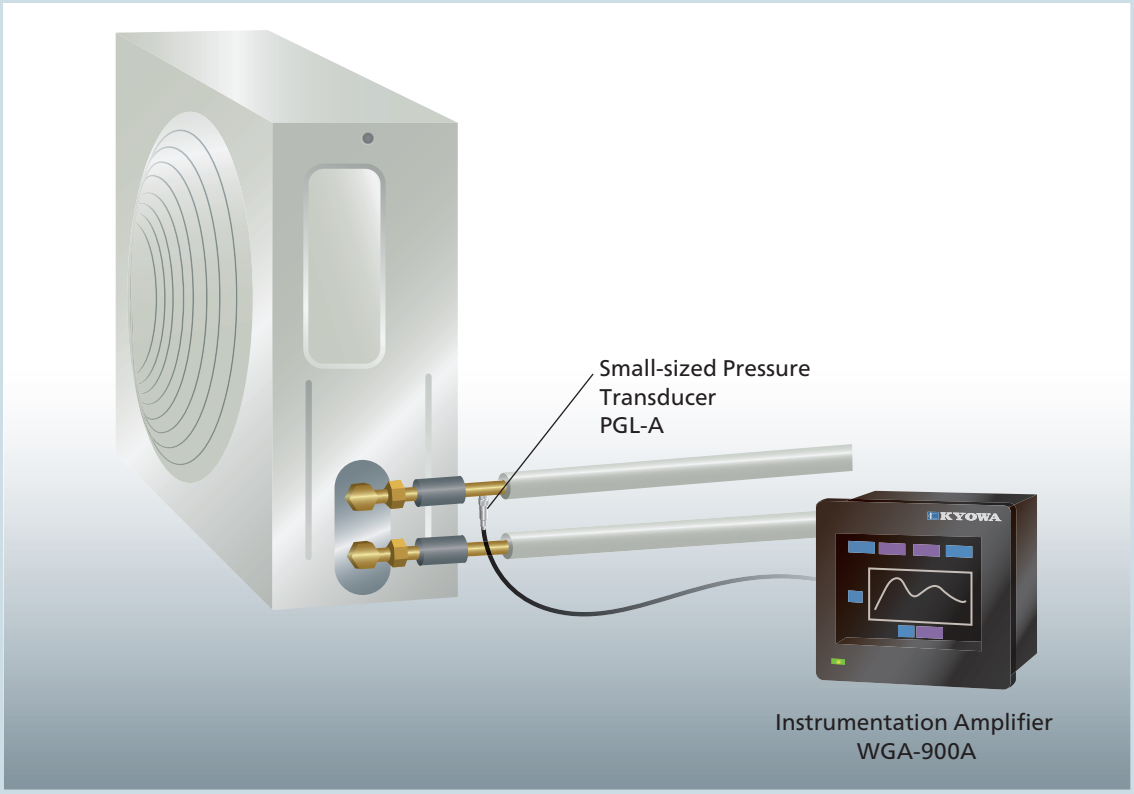
●Hydraulic Pressure monitor or control of construction machine



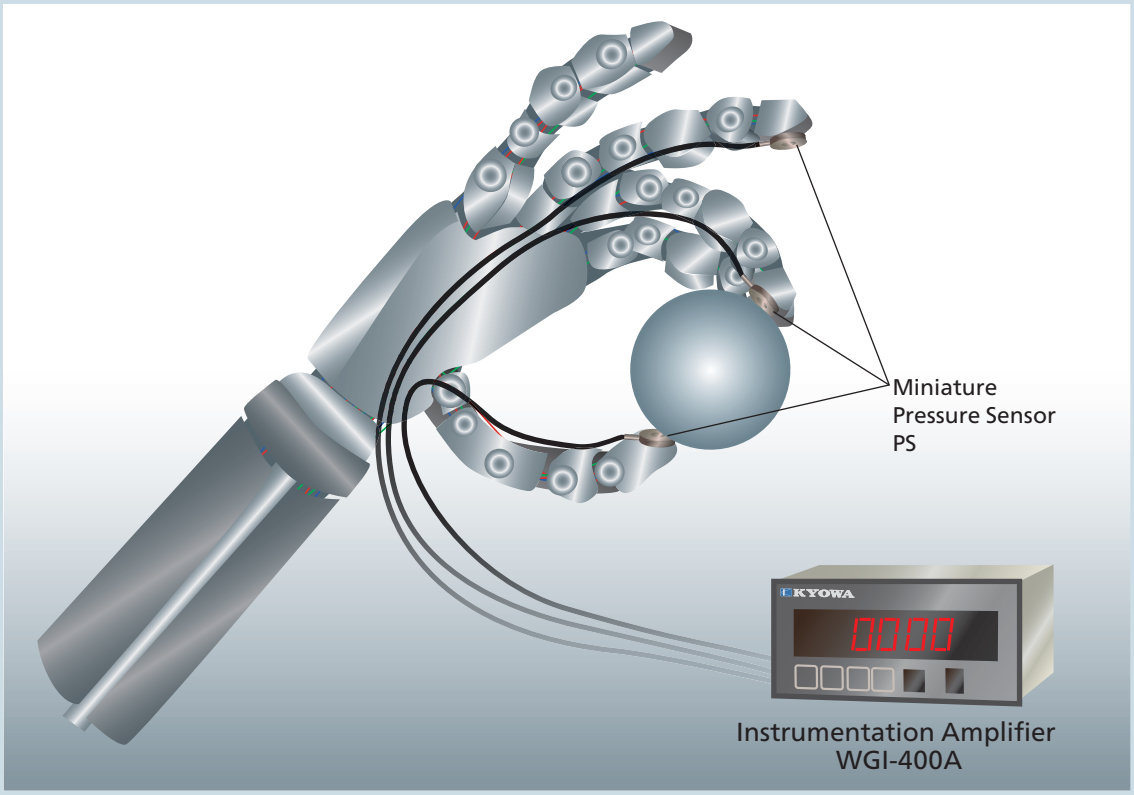
●Pressure measurement in pipes etc.



●Refrigerant pressure monitor of air conditioning facilities.



●Usable as a touch sensor for built-in robot parts.



Pressure Transducers Selection Chart

General Purpose	Models	Rated Capacity kPa 20	50	100	200	500	MPa 1	2	3	5	10	20	30	50	100	200	300	Pages
Low Pressure	Highly Accurate **PGM-G** 	Yes	Yes	Yes														2-90
Small-sized	Sensing Surface Diameter 5.5 mm **PGMC-A** 				Yes	Yes	Yes											2-91
	Highly Reliable **PG-U** 				Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes				2-85
	Highly Accurate **PGM-H** 					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				2-88
	Highly Accurate **PGL-A** 						Yes	Yes		Yes	Yes	Yes		Yes				2-83
	Flush Diaphragm Type **PGM-E** 						Yes	Yes		Yes	Yes	Yes		Yes				2-89
	Low-cost **PGS-A** 						Yes	Yes		Yes	Yes	Yes	Yes	Yes				2-86
	High Response Flush Diaphragm **PGM-D** 									Yes	Yes	Yes		Yes				2-92
High Pressure	High Pressure **PG-H** 														Yes	Yes		2-87
	-20 to 150°C NEW **PGH-S-100MPSA17** 														Yes			2-101
	Large Capacity NEW **PGH-S-300MPSA19** 																Yes	2-102

High/Low Temperature	Models	Rated Capacity MPa 1	2	3	5	10	20	30	50	Pages
High/Low Temperature	-196 to 200°C **PHB-A** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-97
High/Low Temperature Small-sized	-196 to 200°C **PHL-A** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-84
High/Low Temperature Small-sized	-40 to 150°C **PHF-S-S1 Series** NEW 		Yes		Yes	Yes	Yes			2-98
High/Low Temperature Small-sized	-40 to 150°C **PHF-S-SA2** 		Yes		Yes	Yes	Yes			2-99
High/Low Temperature Small-sized	-40 to 150°C **PHF-S-SA4** 		Yes		Yes	Yes				2-100
Flush diaphragm High Temperature	23 to 230°C **PHC-B** 		Yes		Yes	Yes	Yes			2-96

For Absolute·High Pressure	Models	Rated Capacity kPa 200	500	MPa 1	2	5	10	20	Pages
Absolute	Measurement Referring to Vacuum **PAB-A** 	Yes	Yes	Yes	Yes				2-94
High Reliable (Sputter Gage Type)	-30 to 200°C **PHS-B** 	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-95
High Pressure Resistant	Critical Overload 117.7 MPa **PGR-A** 			Yes	Yes	Yes	Yes	Yes	2-93

Water-cooled Type

Models		Rated Capacity kPa 200	Rated Capacity kPa 500	Rated Capacity MPa 3	Pages
Engine Pressure Transducer (Matsuoka Type)	300°C or Lower **PE-RMT** 	Yes	Yes		5-10
Engine Pressure Transducer	300°C **PE-F** 			Yes	5-11

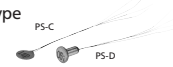
Pressure Transmitter

Models		Rated Capacity kPa 200	kPa 500	MPa 1	MPa 2	MPa 5	MPa 10	MPa 20	MPa 30	MPa 50	Pages
Highly Stable Current Output	Output 4 to 20 mA Highly Reliable **PAG-2KA** 	Yes									2-107
Voltage Output	Output 0 to 5 V **PAV-R/U** 			Yes		Yes	Yes	Yes	Yes	Yes	2-103
Current Output	Output 4 to 20 mA **PAA-R/U** 		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-104
Voltage Output	Output 0 to 50 V, 1 to 5 V **PVL** 		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-105
Current Output	Output 4 to 20 mA **PAL** 		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-106

Differential Pressure Measurement

Models		Rated Capacity kPa 1	kPa 2.5	kPa 5	kPa 7	kPa 10	kPa 20	kPa 50	kPa 100	kPa 200	kPa 500	MPa 1	MPa 2	Pages
Minute Differential Pressure Transducer	For Wind Pressure Measurement **PDS-A** 	Yes	Yes	Yes	Yes									2-111
	For Wind Pressure Measurement **PDV-A** 	Yes	Yes	Yes	Yes									2-112
Minute Differential Pressure	Max.Line Pressure 2.94MPa **PD-A** 					Yes	Yes	Yes	Yes	Yes				2-113
Stainless steel Differential Transducer	Max.Line Pressure 30 MPa **PDU-A** 							Yes	Yes	Yes	Yes	Yes	Yes	2-114

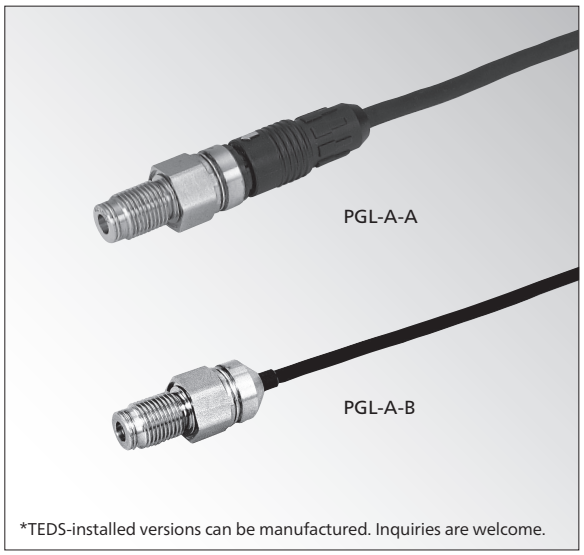
Distributed Pressure Measurement

Models		Rated Capacity kPa 20	kPa 50	kPa 100	kPa 200	kPa 500	MPa 1	MPa 2	MPa 3	MPa 5	MPa 7	Pages
Small -sized Type	For GAS **PSS** 	Yes	Yes	Yes								2-109
	Ultra-thin type **PS-C/D** 		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-108
	Smallest size **PSM-AB** 			Yes	Yes							2-110

PGL-A

Small-sized Pressure Transducer

●1 to 50 MPa



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight
Highly stable
High Frequency Response

PGL-A series pressure transducers are suitable for pressure measurement in limited space. The semi-flush diaphragm at the top end ensures excellent response and dynamic characteristics. There are 2 types: A type with removable cable and B type with integrated cable.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (PGL-A-1 and 2MP-A/B)
	Within ±0.3% RO (PGL-A-5 to 50MP-A/B)
Hysteresis	Within ±0.5% RO (PGL-A-1 and 2MP-A/B)
	Within ±0.2% RO (PGL-A-5 to 50MP-A/B)
Repeatability	0.2% RO or less
Rated Output	2 mV/V (4000 μm/m) ±20% (±30% with PGL-A-1 and 2MP-A/B)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C (PGL-A-1 to 2MP-A/B)
	Within ±0.03% RO/°C (PGL-A-5 to 50MP-A/B)
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	PGL-A-A: 4-conductor (0.18 mm²) vinyl shielded cable,
	4.6 mm diameter by 3 m long, terminated with connector plug
	PGL-A-B: 4-conductor (0.08 mm²) vinyl shielded cable,
	3.2 mm diameter by 30 cm long, terminated with connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

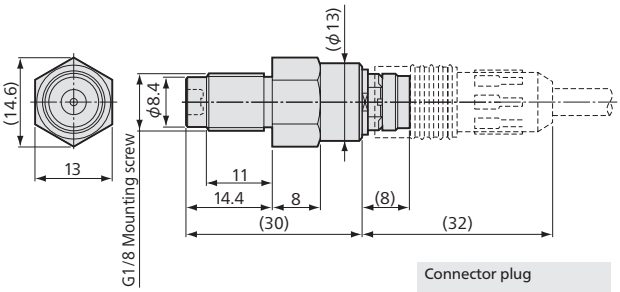
Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	SUS 630 (Liquid-contacting part)
Weight	Approx. 20 g (Excluding cable)
Degree of Protection	PGL-A-A: IP67 (IEC 60529)
	PGL-A-B: IP64 (IEC 60529)
Mounting Screw	G1/8, male

Standard Accessories

Gasket (Mild copper) (SS-105 O-ring is also usable.)

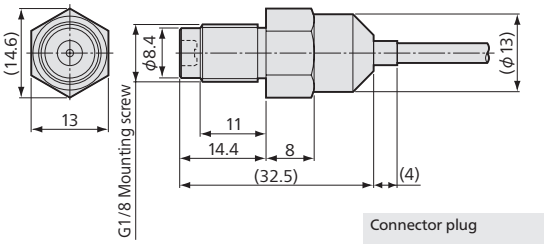
Models		Rated Capacity	Natural Frequencies (Approx.)
Connector Type	Cable Integrated Type		
PGL-A-1MP-A	PGL-A-1MP-B	1 MPa	48 kHz
PGL-A-2MP-A	PGL-A-2MP-B	2 MPa	74 kHz
PGL-A-5MP-A	PGL-A-5MP-B	5 MPa	122 kHz
PGL-A-10MP-A	PGL-A-10MP-B	10 MPa	149 kHz
PGL-A-20MP-A	PGL-A-20MP-B	20 MPa	210 kHz
PGL-A-50MP-A	PGL-A-50MP-B	50 MPa	294 kHz

Dimensions



PGL-A-A

Connector plug

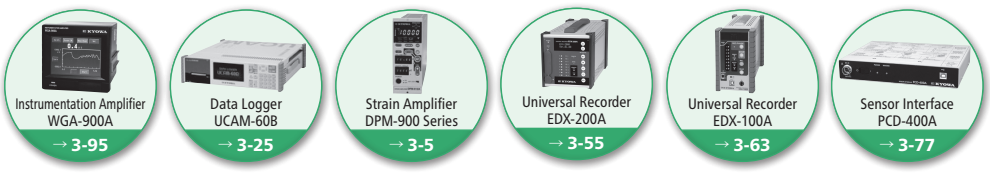


PGL-A-B

Connector plug

●Physical quantity indication ●Static measurement ●Dynamic measurement

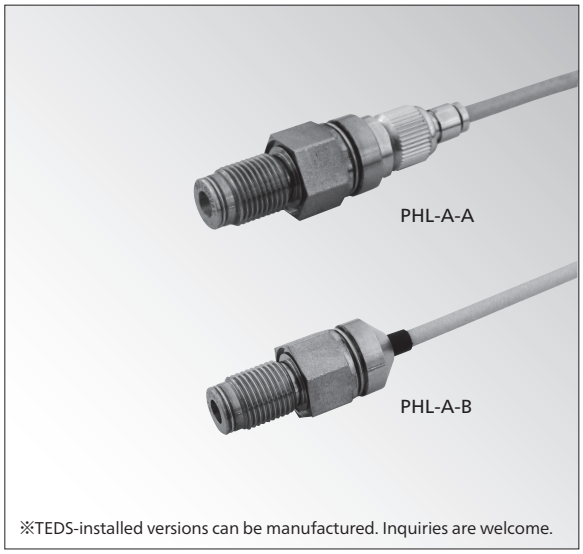
PGL-A Recommended products for combination



PHL-A

●1 to 50 MPa

Small-sized High/Low-Temperature Pressure Transducer



※TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight High and Low Temperature High Frequency Response

PHL-A- series pressure transducers are suitable for pressure measurement in not only limited space under both high and low temperature environments but also highly viscous heated fluids like melt resin, high-temperature gases and LPG/LNG tanks. A semi-flush diaphragm at the top not only ensures excellent response and dynamic characteristics.
Connector-equipped PHL-A-A is also available.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (PHL-A-1 and 2MP)
	Within ±0.3% RO (PHL-A-3 to 50MP)
Hysteresis	Within ±0.5% RO (PHL-A-1 and 2MP)
	Within ±0.2% RO (PHL-A-3 to 50MP)
Repeatability	0.2% RO or less
Rated Output	2 mV/V (4000 μm/m) ±20% (±30% with PHL-A-1 and 2MP)

Environmental Characteristics

Safe Temperature Range	PHL-A-A: -40 to 150°C
	PHL-A-B: -196 to 210°C
	Cable connectors:-25 to 85°C
Compensated Temperature Range	PHL-A-A: -20 to 150°C
	PHL-A-B: -196 to 200°C
	Cable connectors:-25 to 85°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C (PHL-A-1 and 2MP)
	Within ±0.03% RO/°C (PHL-A-3 to 50MP)
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	PHL-A-A: 4-conductor (0.09 mm²) fluoroplastic shielded cable,
	3.1 mm diameter by 4 m long,
	terminated with connector plug
	PHL-A-B: 4-conductor (0.09 mm²) fluoroplastic shielded cable,
	3.1 mm diameter by 30 cm long,
	terminated with connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

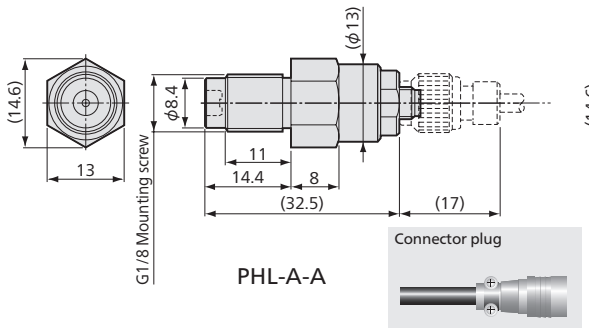
Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	SUS 630 (Liquid-contacting part)
Weight	Approx. 20 g ((Excluding cable)
Degree of Protection	PHL-A-A: IP67 (IEC 60529)
	PHL-A-B: IP64 (IEC 60529)
Mounting Screw	G1/8, male

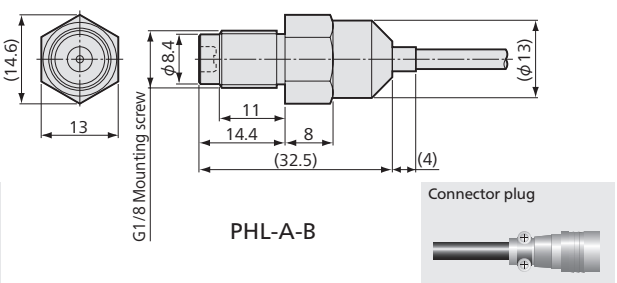
Standard Accessories

Gasket (Mild copper) (SS-105 O-ring is also usable.)

Models		Rated Capacity	Natural Frequencies (Approx.)
Connector Type	Cable Integrated Type		
PHL-A-1MP-A	**PHL-A-1MP-B**	1 MPa	48 kHz
PHL-A-2MP-A	**PHL-A-2MP-B**	2 MPa	74 kHz
——	**PHL-A-3MP-B**	3 MPa	94 kHz
PHL-A-5MP-A	**PHL-A-5MP-B**	5 MPa	122 kHz
PHL-A-10MP-A	**PHL-A-10MP-B**	10 MPa	149 kHz
PHL-A-20MP-A	**PHL-A-20MP-B**	20 MPa	210 kHz
——	**PHL-A-30MP-B**	30 MPa	250 kHz
PHL-A-50MP-A	**PHL-A-50MP-B**	50 MPa	294 kHz

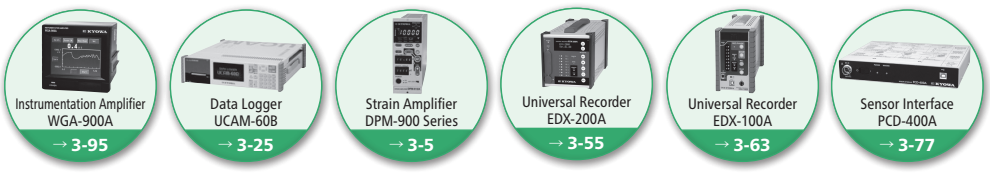
Dimensions





●Physical quantity indication ●Static measurement ●Dynamic measurement

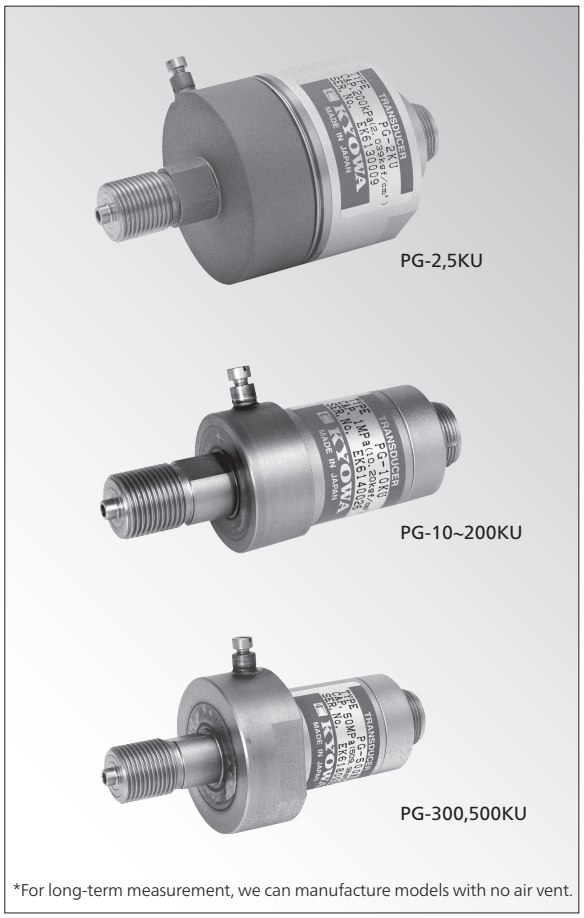
PHL-A Recommended products for combination



PG-U

Pressure Transducer

●Highly Reliable ●200 kPa to 50 MPa



*For long-term measurement, we can manufacture models with no air vent.

Highly Accurate and Reliable Pressure Transducers

●Hermetically-sealed structure with inert gas filled in
●Wide range of rated capacities
●Abundant application achievements

Highly accurate and reliable PG-U series pressure transducers are hermetically sealed with inert gas filled in to enable a long-term stable measurement. Typical applications include pressure measurement of hydraulic or pneumatic cylinder and pressure test of high-pressure water or gas pipe.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO (PG-2 to 10KU)
	Within ±0.2% RO (PG-20 to 500KU)
Hysteresis	Within ±0.3% RO (PG-2 to 10KU)
	Within ±0.2% RO (PG-20 to 500KU)
Repeatability	0.1% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.5% (±1% with PG-2 to 10KU)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.02%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Dedicated connection cable	TT-01
Cable	4-conductor (0.3mm²) chloroprene shielded cable,
	7.6 mm diameter by 3 m long, terminated with
	connector plug
	(Shield wire is connected to mainframe.)

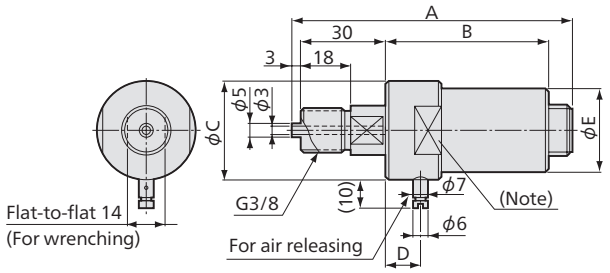
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: Anode oxide coated aluminum
	Liquid-contacting part: SUS 630
	For 10KU or more, the mainframe is die cast zinc alloy (chrome plated)
Weight	Approx. 300 g (2, 5KU is approx. 500 g) (Excluding cable)
Degree of Protection	IP54 (IEC 60529)
Mounting Screw	G3/8, male

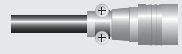
Standard Accessories Gasket (Mild copper)

*Do not use PG-200KU to PG-500KU for endurance/fatigue tests.
*Avoid using for a long-term measurement of gas pressure if much importance is attached to the stability of output in a minute range.

■Dimensions



Connector plug



Note: 2 flats are provided only for PG-300 and 500KU. Do not apply a wrench to the flats.

Models	Rated Capacity	Natural Frequencies (Approx.)	A	B	ϕC	D	ϕE
PG-2KU	200 kPa	2 kHz	104	63	54	4	54
PG-5KU	500 kPa	4 kHz					
PG-10KU	1 MPa	7 kHz	98	56	36	10	30
PG-20KU	2 MPa	13 kHz					
PG-50KU	5 MPa	21 kHz	102	60	36	13	30
PG-100KU	10 MPa	29 kHz					
PG-200KU	20 MPa	40 kHz					
PG-300KU	30 MPa	45 kHz	102	60	46	13	30
PG-500KU	50 MPa	50 kHz					

●Physical quantity indication ●Dynamic measurement

PG-U Recommended products for combination

PGS-A

●Compact & Lightweight ●1 to 50 MPa

Small-sized Pressure Transducer

Compact & Lightweight
High Vibration & Impact Resistance

●Not affected by atmospheric pressure change
●High vibration & impact resistance
Vibration acceleration 490.3 m/s² (50 G)
Impact acceleration 4903 m/s² (500 G)

PGS-A series pressure transducers are designed and manufactured to be especially compact and lightweight.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.4% RO (PGS-10KA)
	Within ±0.3% RO (PGS-20KA)
	Within ±0.2% RO (PGS-50 to 500KA)
Hysteresis	Within ±0.2% RO
Repeatability	0.1% RO or less
Rated Output	2 mV/V (4000 μm/m) ±0.5%

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	600 Ω±17.5%
Output Resistance	500 Ω±1%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	4.5 mm diameter by 3 m long, terminated with connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

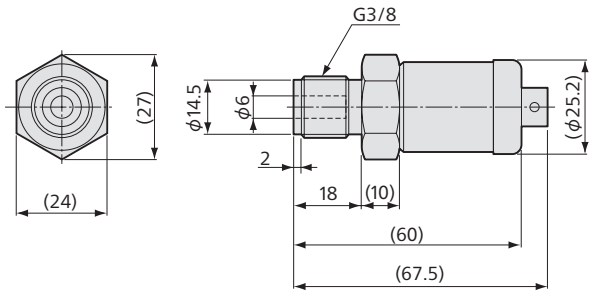
Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: Anode oxidized aluminum
	Liquid-contacting part: SUS 630
Weight	Approx. 120 g (Excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

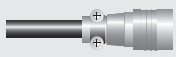
*We can also manufacture models with no air vent. When ordering, suffix "M1" to model numbers stated below.

Models	Rated Capacity	Natural Frequencies (Approx.)
PGS-10KA	1 MPa	11 kHz
PGS-20KA	2 MPa	17 kHz
PGS-50KA	5 MPa	27 kHz
PGS-100KA	10 MPa	35 kHz
PGS-200KA	20 MPa	52 kHz
PGS-300KA	30 MPa	64 kHz
PGS-500KA	50 MPa	85 kHz

Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGS-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PG-H

High Pressure Transducer

- Highly Reliable Inert Gas Sealed Structure
- 100 & 200 MPa

Compact, lightweight, highly accurate, and highly reliable

Available with rated capacities of 100 and 200 MPa, the PG-H series pressure transducers are hermetically sealed with inert gas filled in, enabling long-term stable measurement.

Specifications

Performance

Rated Capacity	PG-1TH: 100 MPa
	PG-2TH: 200 MPa
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.2% RO
Rated Output	1.5 mV/V (3000 μm/m)±0.5%

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

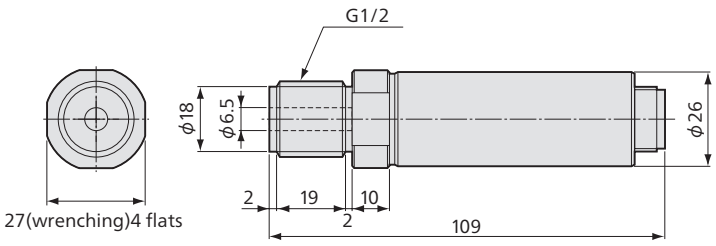
Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1.5%
Output Resistance	350 Ω±1.5%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 3 m long, terminated with waterproof connector plug to transducer and connector plug to amplifier (Shield wire is not connected to mainframe.)

Mechanical Properties

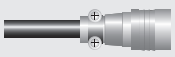
Safe Overload Rating	150%
Natural Frequencies	Approx. 250 kHz
Material	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 220 g (Excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G1/2, male

Standard Accessories Gasket (Mild copper)

Dimensions



Connector plug

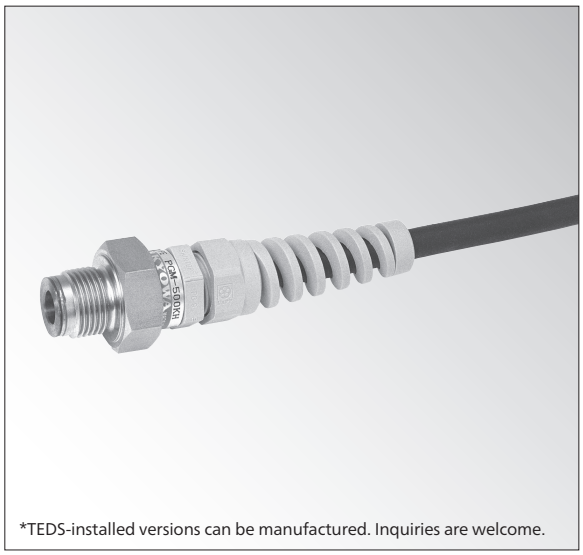


PG-H Recommended products for combination
- Physical quantity indication: Instrumentation Amplifier WGA-900A → 3-95
- Static measurement: Data Logger UCAM-60B → 3-25
- Dynamic measurement: Strain Amplifier DPM-900 Series → 3-5

PGM-H

●Highly Accurate ●500 kPa to 50 MPa

Small-Sized Pressure Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact Semiflush Diaphragm Type and Available in Various Rated Capacities

PGM-H series pressure transducers are suitable for pressure measurement in limited space. Because of a diaphragm at the end, it ensures excellent response and dynamic characteristics.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (PGM-5 to 20KH)
	Within ±0.3% RO (PGM-30 to 500KH)
Hysteresis	Within ±0.2% RO
Rated Output	1.5 mV/V (3000 μm/m) or more (PGM-5KH)
	2 mV/V (4000 μm/m) or more (PGM-10 to 500KH)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C(PGM-5 to 20 KH)
	Within ±0.03% RO/°C(PGM-30 to 500KH)
Temperature Effect on Output	Within ±0.02%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 3 m long, terminated with connector plug
	(Shield wire is not connected to mainframe.)

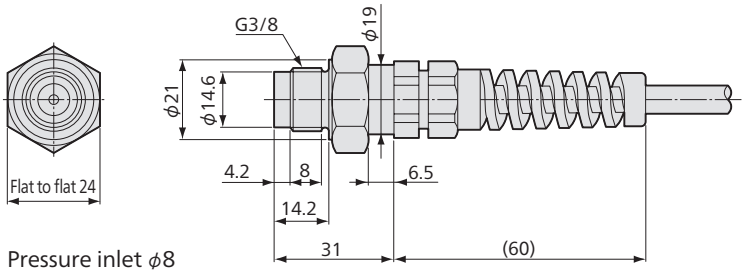
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: SUS metallic finish
	Liquid-contacting part: SUS 630
Weight	Approx. 65 g (Excluding cable)
Mounting Screw	G3/8, male

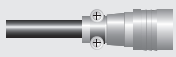
Standard Accessories: Gasket (Mild copper)

Models	Rated Capacity	Natural Frequencies (Approx.)
PGM-5KH	500 kPa	19 kHz
PGM-10KH	1 MPa	26 kHz
PGM-20KH	2 MPa	37 kHz
PGM-30KH	3 MPa	46 kHz
PGM-50KH	5 MPa	57 kHz
PGM-100KH	10 MPa	78 kHz
PGM-200KH	20 MPa	110 kHz
PGM-300KH	30 MPa	134 kHz
PGM-500KH	50 MPa	174 kHz

Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGM-H Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

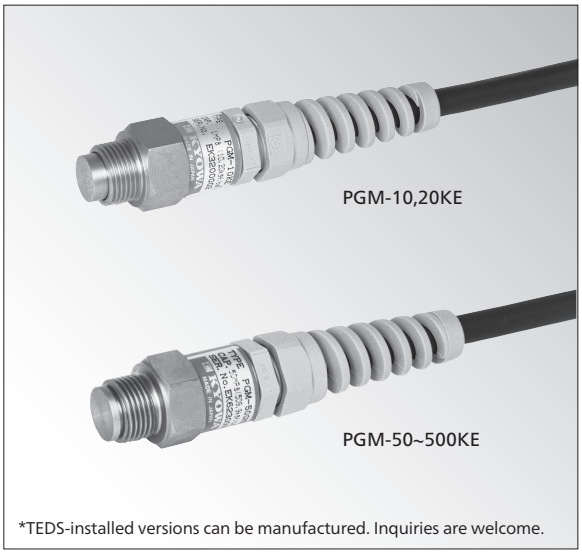

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGM-E

Small-sized Pressure Transducer

●Abundant Models from Low to High Pressures
●1 to 50 MPa



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact Semiflush Diaphragm Type and Available in Various Rated Capacities

PGM-E series pressure transducers are extremely effective for pressure measurement in limited space. A flush diaphragm ensures excellent response and dynamic characteristics. Since the pressure sensing part directly contacts the measuring object, they are applicable to highly viscous medium.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	1 mV/V (2000 μm/m) or more (PGM-10 to 200KE)
	1.4 mV/V (2800 μm/m) or more (PGM-500KE)

Environmental Characteristics

Safe Temperature Range	0 to 80°C
Compensated Temperature Range	0 to 60°C

Electrical Characteristics

Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	120 Ω±2%
Output Resistance	120 Ω±2%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 3 m long, terminated with connector plug
	(Shield wire is connected to mainframe.)

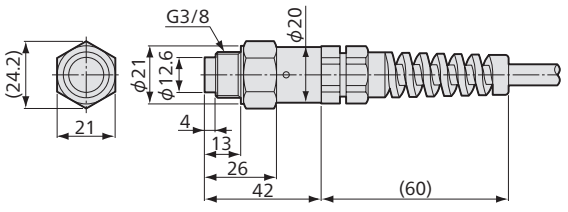
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: SUS304
	Liquid-contacting part: SUS 630
Weight	Approx. 65 g (Excluding cable)
Degree of Protection	IP64 (IEC 60529)
Mounting Screw	G3/8, male

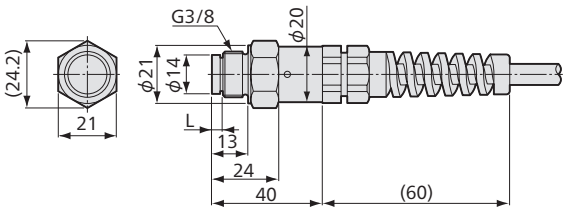
Standard Accessories Gasket (Mild copper)

Models	Rated Capacity	L	Natural Frequencies (Approx.)
PGM-10KE	1 MPa	—	22 kHz
PGM-20KE	2 MPa	—	23 kHz
PGM-50KE	5 MPa	5	46 kHz
PGM-100KE	10 MPa	5	60 kHz
PGM-200KE	20 MPa	4	73 kHz
PGM-500KE	50 MPa	3	80 kHz

Dimensions

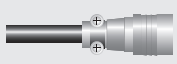


PGM-10 to 20KE



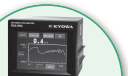
PGM-50 to 500KE

Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGM-E Recommended products for combination

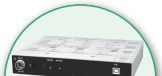

Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

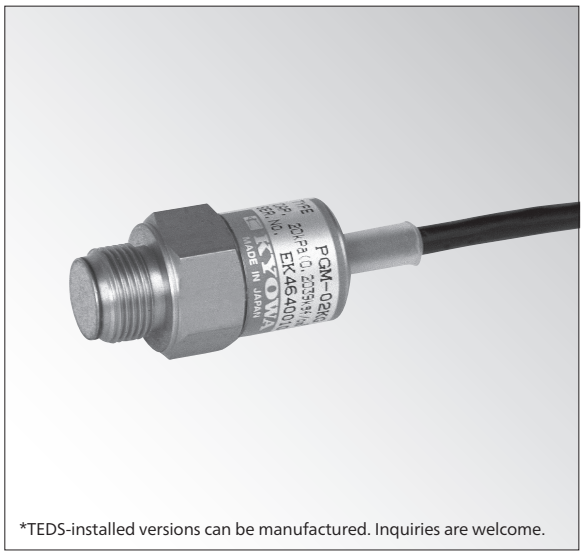

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGM-G

Low Pressure Transducer

●Low Pressure Measurement with High Accuracy
●20 to 100 kPa



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Enable Highly Accurate and Stable Measurement of Low Pressures

PGM-G series pressure transducers come with the cable in a conduit pipe for back-pressure compensation. Thus, they are easy to handle and enable highly accurate and stable measurement of low pressures.

Specifications

Performance

Rated Capacity	See table below.	
Nonlinearity	Within ±0.5% RO	
Hysteresis	Within ±0.3% RO	
Rated Output	PGM-02KG	0.75 mV/V (1500 μm/m) or more
	PGM-05KG	1.25 mV/V (2500 μm/m) or more
	PGM-1KG	1.4 mV/V (2800 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	350 Ω±10%
Output Resistance	350 Ω±10%
Cable	4-conductor (0.08 mm²) horizontal vinyl shielded cable in fluoroplastic tube, 4.2 mm diameter by 3 m long, terminated with connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: SUS metallic finish
	Liquid-contacting part: SUS 304
Weight	Approx. 40 g (Excluding cable)
Degree of Protection	IP54 (IEC 60529)
Mounting Screw	M14 P=1, male

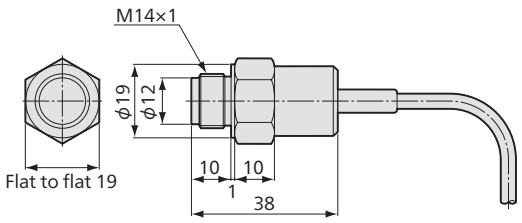
Standard Accessories O-ring (JIS B 2401-P14)

Models	Rated Capacity	Natural Frequencies (Approx.)
PGM-02KG	20 kPa	2 kHz
PGM-05KG	50 kPa	3 kHz
PGM-1KG	100 kPa	4 kHz

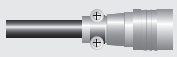
To Ensure Safe Usage

Neither bend nor vibrate the cable, otherwise, the output may be affected.
So, please fasten the cable when using.

Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGM-G Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGMC-A

Small-sized Pressure Transducer

- Sensing surface of 5.5 mm diameter
- 200 kPa to 1 MPa

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & lightweight
High frequency response
Flush diaphragm type

PGMC-A series pressure transducers adopt a flush diaphragm with the sensing surface of 5.5-mm diameter. Since a high frequency response to low pressure is ensured, they are suitable for pressure measurement requiring quick response or for a complicated piping system where the attaching space is limited.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1.5% RO
Hysteresis	Within ±1.5% RO
Rated Output	0.6 mV/V (1200 μm/m) or more(PGMC-A-200KP)
	1 mV/V (2000 μm/m)±20%(PGMC-A-500KP & 1MP)

Environmental Characteristics

Safe Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.3% RO/°C (PGMC-A-200KP)
	Within ±0.2% RO/°C (PGMC-A-500KP & 1MP)
Temperature Effect on Output	Within ±0.3%/°C (PGMC-A-200KP)
	Within ±0.2%/°C (PGMC-A-500KP & 1MP)

Electrical Characteristics

Safe Excitation Voltage	3 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±10%
Output Resistance	350 Ω±10%
Cable	4-conductor (0.065 mm²) vinyl shielded cable, 4 mm diameter by 3 m long, terminated with connector plug (Shield wire is connected to mainframe.)

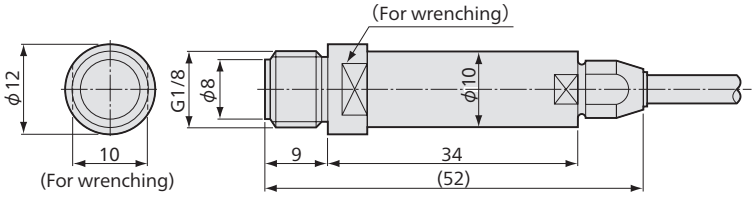
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Liquid-contacting part: C1720
	Screw: SUS 303
Weight	Approx. 20 g (Excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G1/8, male

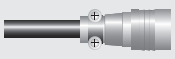
Standard Accessories Fluoroplastic sealing tape

Models	Rated Capacity	Natural Frequencies (Approx.)
PGMC-A-200KP	200 kPa	24 kHz
PGMC-A-500KP	500 kPa	34 kHz
PGMC-A-1MP	1 MPa	40 kHz

Dimensions



Connector plug



- Physical quantity indication
- Static measurement
- Dynamic measurement

PGMC-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

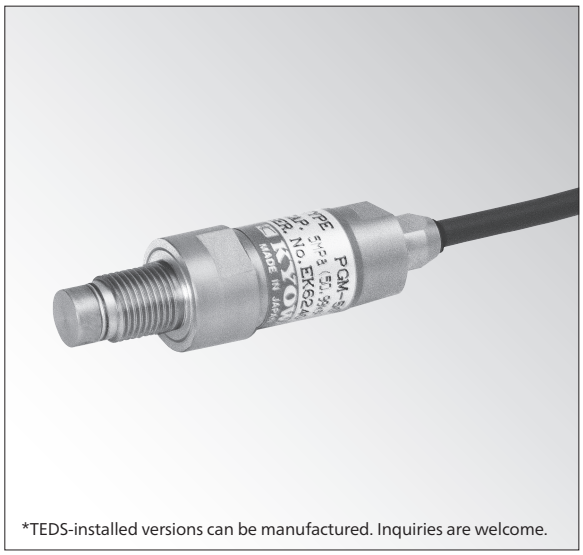

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGM-D

●High Frequency Response ●5 to 50 MPa

Small-sized Pressure Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Rated Output	1.5 mV/V (3000 μm/m) ±20%

Environmental Characteristics

Safe Temperature Range	-10 to 70°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.1% RO/°C
Temperature Effect on Output	Within ±0.1%/°C

Electrical Characteristics

Safe Excitation Voltage	3 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	120 Ω±2%
Output Resistance	120 Ω±2%
Cable	4-conductor (0.065 mm²) vinyl shielded cable, 4 mm diameter by 3 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Case: SUS metallic finish Liquid-contacting part: SUS 630
Weight	Approx. 40 g (Excluding cable)
Mounting Screw	G1/8, male

Standard Accessories Gasket (Mild copper)

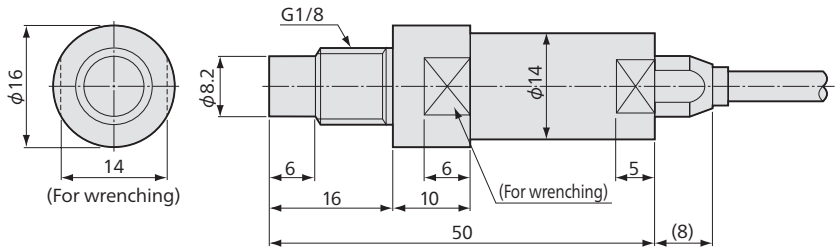
*We can also manufacture PGM-10KD M156 with the rated capacity of 1 MPa and PGM-20KD M156 with the rated capacity of 2 MPa.

Models	Rated Capacity	Natural Frequencies (Approx.)
PGM-50KD	5 MPa	83 kHz
PGM-100KD	10 MPa	113 kHz
PGM-200KD	20 MPa	150 kHz
PGM-500KD	50 MPa	250 Hz

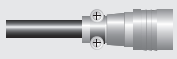
High Frequency Response and Highly Accurate Flush Diaphragm Type with Small Pressure Sensing Surface

●Small pressure sensing surface
●Flush diaphragm type
●High frequency response
●High accuracy

Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGM-D Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

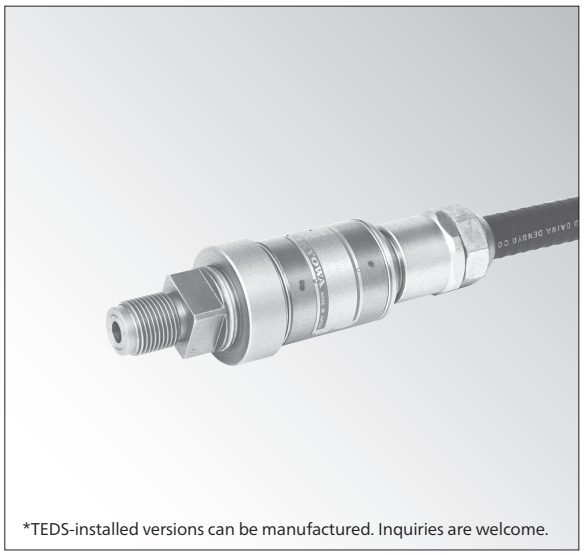

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGR-A

●Critical Overload: 117.7 MPa(1200 kgf/cm²)
●1 to 20 MPa

High-pressure-resistant Pressure Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

High Temperatures up to 100°C High Pressure Withstanding Highly Accurate

●High temperatures up to 100°C
●High pressure withstanding
●High accuracy

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.1% RO
Rated Output	1.5 mV/V (3000 μm/m) ±5%

Environmental Characteristics

Safe Temperature Range	-30 to 110°C
Compensated Temperature Range	-10 to 100°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 8 V AC or DC
Input Resistance	350 Ω±1.4%
Output Resistance	350 Ω±1.4%
Cable	4-conductor (0.75 mm²) fluonlex shielded cable, 8 mm diameter by 5 m long, bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

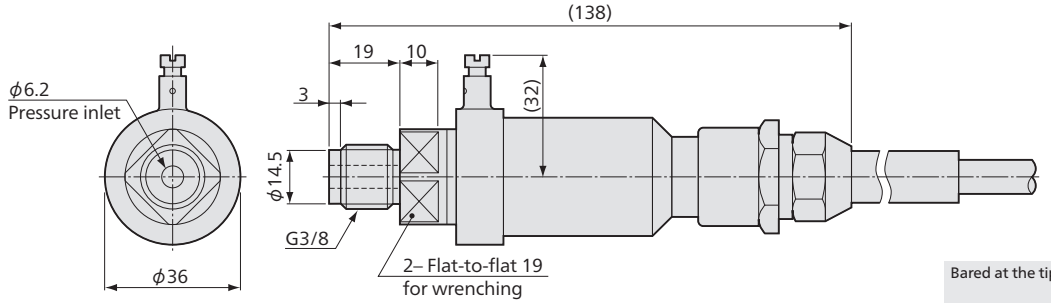
Safe Overload Rating(*1)	300%
Critical Overload(*2)	117.7 MPa (PGR-10 to 50KA)
	196.1 MPa (PGR-100 & 200KA)
Natural Frequencies	See table below.
Material	Case: SUS metallic finish
	Liquid-contacting part: SUS 630
Weight	Approx. 400 g (Excluding cable)
Mounting Screw	G3/8, male

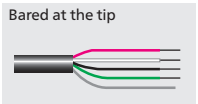
Standard Accessories: Gasket (Mild copper)

Models	Rated Capacity	Natural Frequencies (Approx.)
PGR-10KA	1 MPa	12 kHz
PGR-20KA	2 MPa	17 kHz
PGR-50KA	5 MPa	29 kHz
PGR-100KA	10 MPa	42 kHz
PGR-200KA	20 MPa	60 kHz

*1. Maximum overload which can be applied without causing any permanent change in specified characteristics
*2. Maximum overload which can be applied without causing any structural damage.

Dimensions





●Physical quantity indication ●Static measurement ●Dynamic measurement

PGR-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25

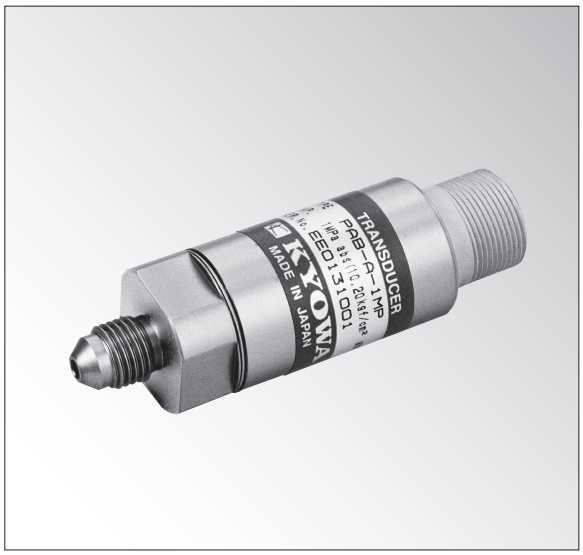

Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63

PAB-A

Absolute Pressure Transducer

●Measurement from Absolute Pressure Zero (Vacuum)
●200 kPa$_{abs.}$ to 2 MPa$_{abs.}$



Compact & Lightweight, Highly Stable

●Possible to measure absolute pressure
●Highly reliable (conforming to MIL-STD-810C)

PAB-A series pressure transducers can measure absolute pressures from zero to 2 MPa abs for long-term. Developed for pressure measurement on airplanes and flying objects, these transducers pass high-temperature and vibration tests in conformity to MIL-STD-810C and can widely be used in various industrial and engineering fields.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.1% RO
Rated Output	2 mV/V (4000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-30 to 80°C
Compensated Temperature Range	-20 to 70°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	8 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	367 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm^2) chloroprene shielded cable, 7.6 mm diameter by 3 m long, bared at the tip (Shield wire is connected to mainframe.)

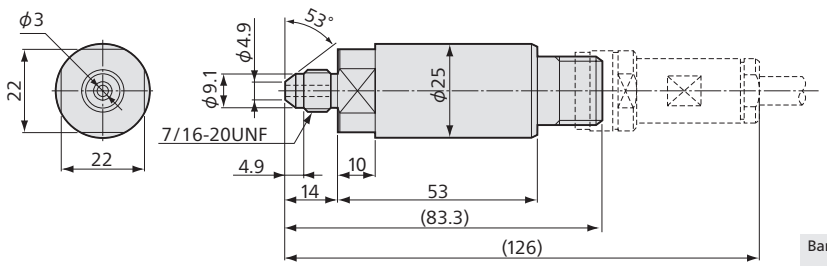
Mechanical Properties

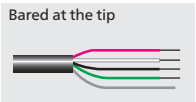
Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	SUS 630 (Liquid-contacting part)
Weight	Approx. 130 g (Excluding cable)
Mounting Screw	7/16-20UNF male

Standard Accessories: O-ring (JIS B 2401-P15)

Models	Rated Capacity	Natural Frequencies (Approx.)
PAB-A-200KP	200 kPa$_{abs.}$	5 kHz
PAB-A-500KP	500 kPa$_{abs.}$	8 kHz
PAB-A-1MP	1 MPa$_{abs.}$	10 kHz
PAB-A-2MP	2 MPa$_{abs.}$	12 kHz

■Dimensions





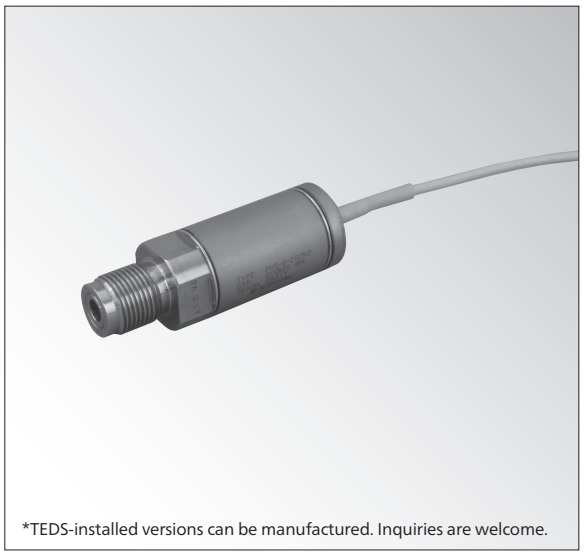
●Dynamic measurement

PAB-A Recommended products for combination

PHS-B

Highly Reliable Pressure Transducer(Sputter Gage Method)

●Long-Term Stability at 200˚C
●200 $kPa_{abs.}$ to 20 $MPa_{abs.}$



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.2% RO
Rated Output	1.5 mV/V (3000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-196 to 230°C
Compensated Temperature Range	-30 to 200°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.015%/°C

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	900 Ω $^{100}_{-150}$ Ω
Output Resistance	900 Ω $^{100}_{-150}$ Ω
Cable	4-conductor (0.09 mm^2) fluoroplastic shielded cable, 5 m long, 3.1 mm diameter, bared at the tip (Shield wire is not connected to mainframe)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Materials	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 130 g (Excluding cable)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

Models	Rated Capacity	Natural Frequencies (Approx.)
PHS-B-200KP	200 $kPa_{abs.}$	5 kHz
PHS-B-500KP	500 $kPa_{abs.}$	7 kHz
PHS-B-1MP	1 $MPa_{abs.}$	20 kHz
PHS-B-2MP	2 $MPa_{abs.}$	30 kHz
PHS-B-5MP	5 $MPa_{abs.}$	50 kHz
PHS-B-10MP	10 $MPa_{abs.}$	70 kHz
PHS--B20MP	20 $MPa_{abs.}$	100 kHz

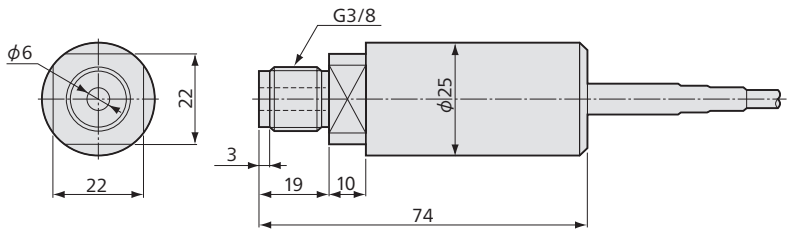
Both High and Low Temperatures Possible to Measure Absolute Pressure Excellent High-temperature

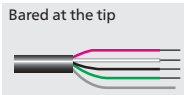
PHS-A series pressure transducers have the thin-film strain gage and temperature-compensating resistive membrane formed directly on the diaphragm by sputtering and photo-lithography, thereby enabling accurate temperature compensation even at high temperatures.

To Ensure Safe Usage

High-carrier-based dynamic strain amplifier DPM-912, 913 or 952 may not satisfy the specified rated output in some rare case. Request us to calibrate the transducer in combination with the strain amplifier. Or, if possible, use dynamic strain amplifier DPM-911 or 951 or signal conditioner CDV-900A.

Dimensions





●Physical quantity indication ●Dynamic measurement

PHS-B Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9

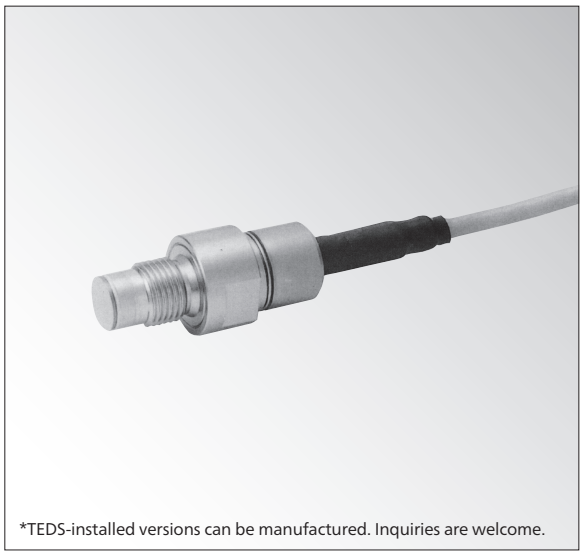

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

PHC-B

●Excellent Heat Resistance ●2 to 20 MPa

Flush Diaphragm Type High-temperature Pressure Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Heat-resistant Sputter Gages Achieve Pressure Measurement at High-Temperature

●Safe temperature range from -30 to 240˚C
●Flush diaphragm ensuring high frequency response
●Compact, flexible, and heat-resistant cable ensuring ease of use

To enable pressure measurement at high temperature, PHC-B series pressure transducers adopt thin-film strain gage formed by sputtering.
The sensor part is a flush, diaphragm detecting pressure directly on a flat surface without pressure medium, thus enabling pressure measurement without missing momentary pressure changes. In addition, the flush diaphragm makes these transducers suitable for measuring not only liquid or gas pressure but also pressure of highly viscous medium.
The small-sized design and flexible cable make them easy to use even in limited space.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.3% RO
Repeatability	0.2% RO or less
Rated Output	0.6 mV/V (1200 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-30 to 240°C (200°C with cable, -25 to 80°C with connector plug)
Compensated Temperature Range	23 to 230°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	380 to 650 Ω
Output Resistance	380 to 650 Ω
Cable	4-conductor (0.09 mm²) fluoroplastic shielded cable, 3.1 mm diameter by 3 m long, terminated with connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Materia	Case: SUS metallic finish
	Liquid-contacting part: SUS 630
Weight	Approx. 70 g (Excluding cable)
Degree of Protection	IP62 (IEC 60529)
Mounting Screw	G1/8, male

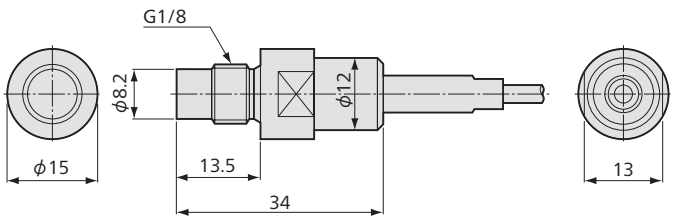
Standard Accessories Gasket (Mild copper)

Models	Rated Capacity	Natural Frequencies (Approx.)
PHC-B-2MP	2 MPa	45 kHz
PHC-B-5MP	5 MPa	75 kHz
PHC-B-10MP	10 MPa	85 kHz
PHC-B-20MP	20 MPa	85 kHz

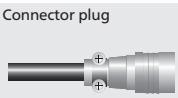
To Ensure Safe Usage

High-carrier-based dynamic strain amplifier DPM-912, 913 or 952 may not satisfy the specified rated output in some rare case. Request us to calibrate the transducer in combination with the strain amplifier. Or, if possible, use dynamic strain amplifier DPM-911 or 951or signal conditioner CDV-900A.

■Dimensions



Connector plug



●Physical quantity indication ●Dynamic measurement

PHC-B Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9

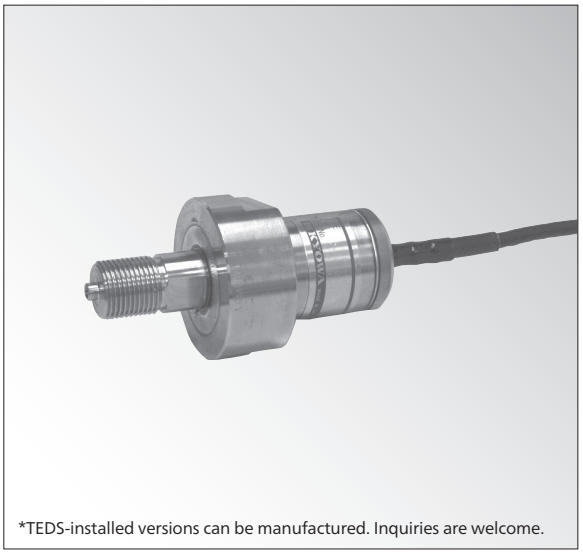

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

PHB-A

●-196 to 200°C ●1 to 50 MPa

High/Low-temperature Pressure Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Suitable for Pressure Measurement of LPG/LNG Tanks and Gas or Steam Turbines

●Usable at both high and low temperatures
●Corrosion resistant
●Hermetically-sealed structure with inert gas filled in
●Highly reliable

PHB-A series is designed for pressure measurement from low to high temperatures. The sensor surface is made by stainless steel diaphragm and inert gas is filled in to increase reliability.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.4% RO
Hysteresis	Within ±0.4% RO
Rated Output	2.2 mV/V (4400 μm/m)±15%

Environmental Characteristics

Safe Temperature Range	-196 to 210°C
	(connector plug: -25 to 80°C)
Compensated Temperature Range	-196 to 200°C
	(connector plug: -25 to 80°C)
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.035%/°C (PHB-A-1MP)
	Within ±0.03%/°C (PHB-A-2 to 50MP)

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm²) fluoroplastic shielded cable,
	5 mm diameter by 3 m long, terminated with connector plug
	(Shield wire is connected to mainframe.)

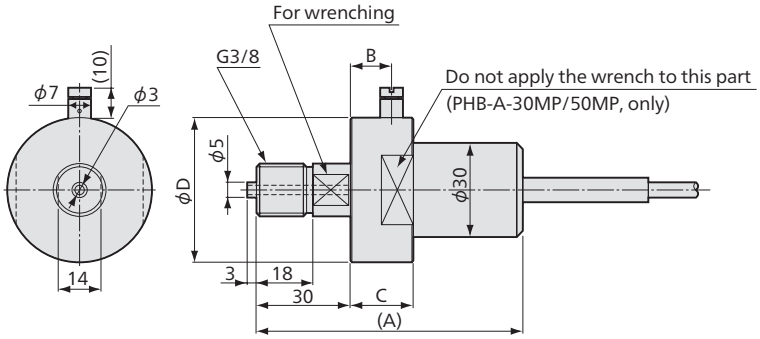
Mechanical Properties

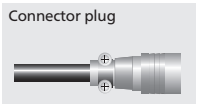
Safe Overload Rating	120%
Natural Frequencies	See table below.
Material	Case: SUS metallic finish
	Liquid-contacting part: SUS 630
Weight	See table below.
Degree of Protection	IP51 (IEC 60529)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

*Do not use PHB-A-20MP to PHB-A-50MP for endurace/fatigue tests.
*Avoid using for a long-term measurement of gas pressure if much importance is attached to the stability of output in a minute range. For such application, we can manufacture models with no air vent.

■Dimensions





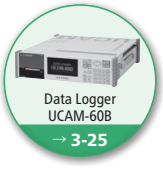
Models	Rated Capacity	A	B	C	ϕD	Natural Frequencies (Approx.)	Weight (Approx.)*
PHB-A-1MP	1 MPa	80	10	16	36	8 kHz	203 g
PHB-A-2MP	2 MPa					13 kHz	
PHB-A-5MP	5 MPa	84	13	20	36	21 kHz	270 g
PHB-A-10MP	10 MPa					29 kHz	
PHB-A-20MP	20 MPa					40 kHz	
PHB-A-30MP	30 MPa	84	13	20	46	45 kHz	360 g
PHB-A-50MP	50 MPa					50 kHz	

*Excluding cable

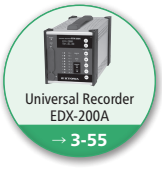
●Physical quantity indication ●Static measurement ●Dynamic measurement

PHB-A Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

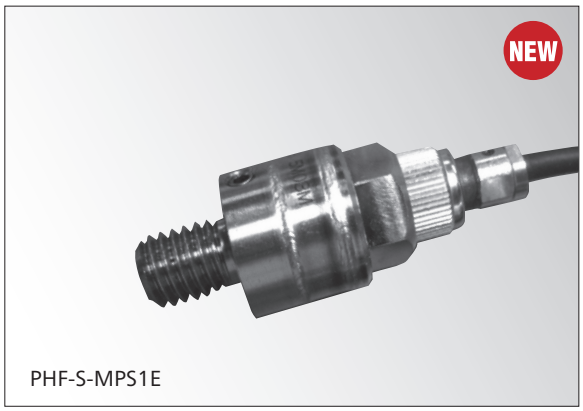

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PHF-S-S1 Series

Small-sized High-temperature Pressure Transducer

●-40 to 150°C
●2 to 20 MPa



PHF-S-MPS1E

Excellent in environmental performance

●Enable to reduce weight effect on measuring objects
●After removing the connector, enables to install in a limited space by a socket wrench

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.2%RO
Rated Output	Approx. 1.75 mV/V

Environmental Characteristics

Safe Temperature Range	-40 to 160°C
Compensated Temperature Range	-40 to 150°C
Temperature Effect on Zero	Within ±0.008% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±5%
Output Resistance	350 Ω±5%
Cable	4-conductor (0.08 mm²) silicon cable by 4 m long, terminated with connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Liquid-contact part: SUS 630
Weight	Approx. 20 g
Degree of Protection	IP45 (IEC 60529)
Mounting Screw	See table below.

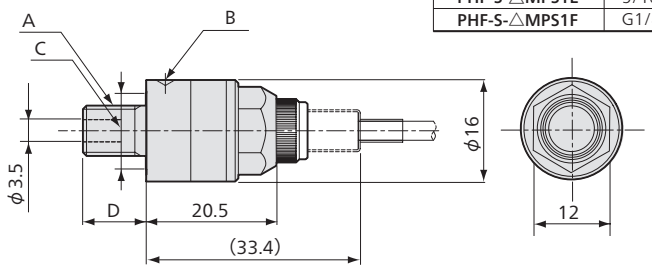
Models	Rated Capacity	Natural frequencies (Approx.)
PHF-S- 2MPS1□	2 MPa	45 kHz
PHF-S- 5MPS1□	5 MPa	60 kHz
PHF-S- 10MPS1□	10 MPa	70 kHz
PHF-S-20MPS1□	20 MPa	85 kHz

The suffix comes from A to F stands different screws and cable length.

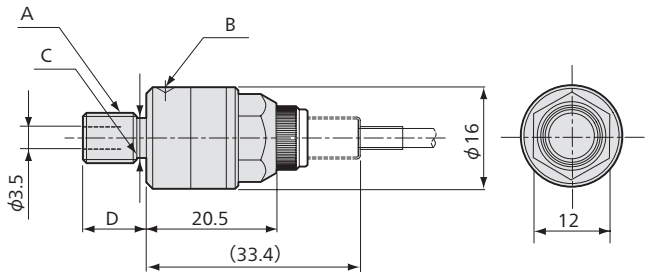
Dimensions

Models	A	B	C	D	Cable Length
PHF-S-△MPS1A	R1/8	Air-vent screw	–	7.5	4 m
PHF-S-△MPS1B	M8×1.25	Air-vent screw	ϕ12	10	4 m
PHF-S-△MPS1C	M10×1.25	Air-vent screw	ϕ14	12	4 m
PHF-S-△MPS1D	M10×1.0	Air-vent screw	ϕ8.2	10	5 m
PHF-S-△MPS1E	5/16-24UNF	–	ϕ6.3	10	4.5 m
PHF-S-△MPS1F	G1/8	Air-vent screw	–	9	4 m

*△ means capacity of each model

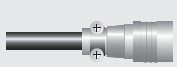


PHF-S-MPS1A/B/C/F



PHF-S-MPS1D/E

Connector plug



Note:
UNF and G type screws are available from size 8 to 12 mm.

●Physical quantity indication ●Static measurement ●Dynamic measurement

PHF-S-S1 Series Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PHF-S-SA2

●Vibration Resistance: 490.3 m/s²
●2 to 20 MPa

Small-sized High-temperature Pressure Transducer

Compact & Lightweight, Usable at up to 150°C

●High vibration resistance: 490.3 m/s² (50 G)
●Highly stable

PHF-S-SA2 series are small-sized strain-gage type pressure transducers which are usable in 150°C environment.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.4% RO (PHF-S-2MPSA2)
	Within ±0.3% RO (PHF-S-5 to 20MSA2)
Hysteresis	Within ±0.2% RO
Rated Output	2 mV/V (4000 μm/m)

Environmental Characteristics

Safe Temperature Range	-40 to 170°C
	(connector plug: -25 to 80°C)
Compensated Temperature Range	-40 to 150°C
	(connector plug: -25 to 80°C)
Temperature Effect on Zero Balance	Within ±0.008% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.09 mm²) fluoroplastic shielded cable, 3.1 mm diameter by 4 m long, terminated with connector plug

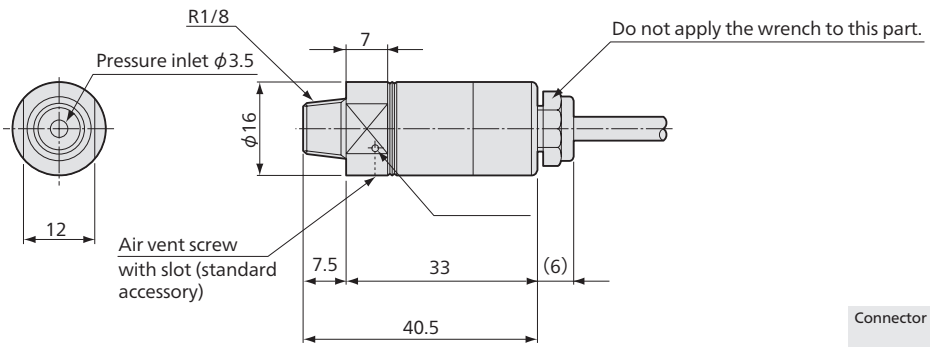
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Liquid-contacting part: SUS 630
Weight	Approx. 50g (Excluding cable)
Mounting Screw	R1/8, male
RoHS Directive	EN50581

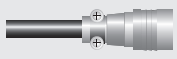
Standard Accessories: Hexagon wrench for air vent screw (M3)

Models	Rated Capacity	Natural Frequencies (Approx.)
PHF-S-2MPSA2	2 MPa	25 kHz
PHF-S-5MPSA2	5 MPa	50 kHz
PHF-S-10MPSA2	10 MPa	70 kHz
PHF-S-20MPSA2	20 MPa	100 kHz

■Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PHF-S-SA2 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PHF-S-SA4

●-40 to 150°C ●2 to 10 MPa

Small-sized High-temperature Pressure Transducer

Compact & Lightweight Usable at up to 150°C

As an upgraded version of PHF-S-SA2 series, PHF-S-SA4 series is designed to be more compact and lightweight and applicable up to150°C.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.2% RO
Rated Output	Approx. 0.5 mV/V (1000 μm/m)

Environmental Characteristics

Safe Temperature Range	-40 to 170°C (excl. connector)
Compensated Temperature Range	-40 to 150°C (excl. connector)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±5%
Output Resistance	350 Ω±5%
Cable	4-conductor (0.09 mm²) fluoroplastic shielded cable, 3.1 mm diameter by 50 cm long, terminated with R04-P5M connector plug (Shield wire is not connected to mainframe.)

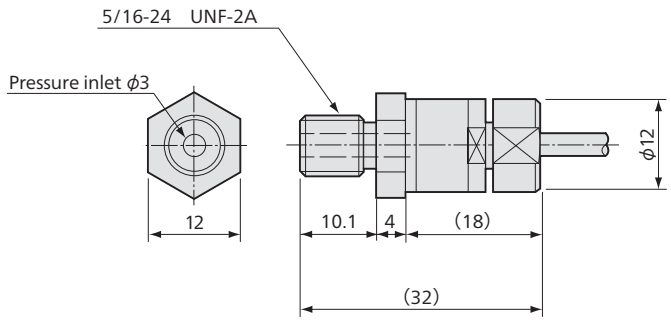
Mechanical Properties

Safe Overload Rating	150%
Natural Frequencies	See table below.
Material	Metallic finish
Degree of Protection	IP63 (IEC 60529)
Weight	Approx. 20 g (excluding cable)
Mounting Screw	5/16-24UNF, male
RoHS Directive	EN50581

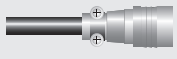
Standard Accessories Extension cable (4-conductor (0.09 mm²) fluoroplastic shielded cable, 3 mm diameter by 4 m long, terminated with R04-J5F to the sensor and PRC03-12A10-7M to measuring instruments.)
O-ring (AS568 010)

Models	Rated Capacity	Natural Frequencies (Approx.)
PHF-S-2MPSA4	2 MPa	110 kHz
PHF-S-5MPSA4	5 MPa	120 kHz
PHF-S-10MPSA4	10 MPa	170 kHz

Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PHF-S-SA4 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PGH-S-100MPSA17

Large-capacity Pressure Transducer

●Small-sized Large capacity
●Usable at High-temperature
●100 MPa

Specifications

Performance

Rated Capacity	100MPa
Nonlinearity	±0.3% RO
Hysteresis	±0.2% RO
Rated Output	Approx. 1 mV/V (2000 μm/m)

Environmental Characteristics

Safe Temperature Range	-20 to 150°C
Compensated Temperature Range	-40 to 150°C
Temperature Effect on Zero Balance	±0.03% RO/°C
Temperature Effect on Output	±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	2 to 5 V AC or DC
Input Resistance	550 Ω±150Ω
Output Resistance	450 Ω±100Ω
Cable	4 m chloroprene shield cable
	Measuring instrument side: Connector plug

Mechanical Properties

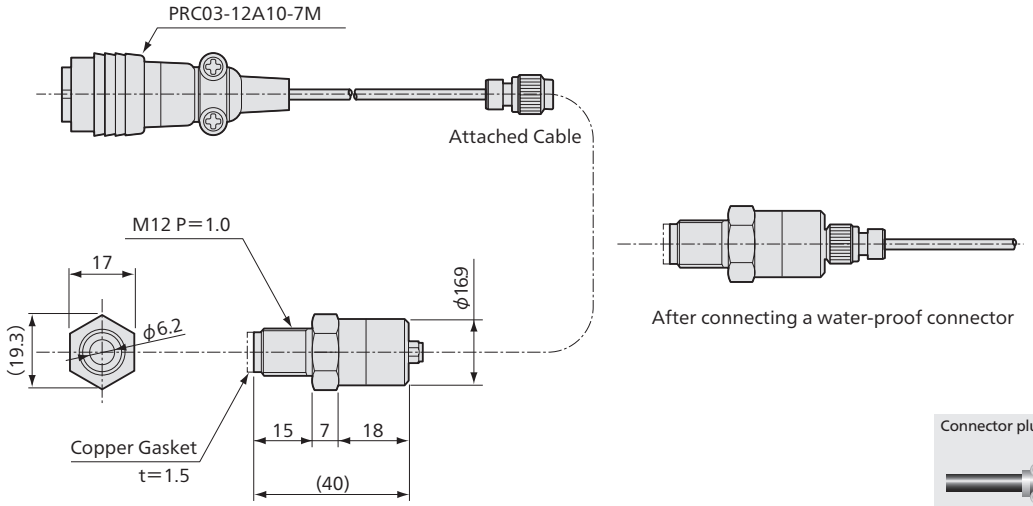
Material	Metallic finish
Mounting Screw	M12, P=1
Degree of Protection	IP64(IEC 60529)

Standard Accessories: Gasket (Mild copper)

Small-sized Large-capacity Transducer Usable at High temperature

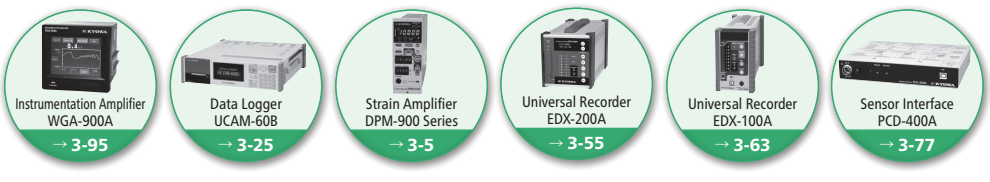
●Small Φ20x40 (Including 15 long screw portion)
●Large capacity 100 MPa
●Usable at high temperature 150˚C
●Safe design with just one SUS body without welded part.
●Removable cable
●Degree of protection IP64 (After connecting connector)
●Mounting screw M12, P=1

■Dimensions



●Physical quantity indication ●Static measurement ●Dynamic measurement

PGH-S-100MPSA17 Recommended products for combination



PGH-S-300MPSA19

Large-capacity Pressure Transducer

- Large capacity
- 300 MPa

Specifications

Performance

Rated Capacity	300MPa
Nonlinearity	±1.0% RO
Hysteresis	±1.0% RO
Rated Output	Approx. 0.5 mV/V (1000 μm/m)

Environmental Characteristics

Safe Temperature Range	-0 to 60°C
Compensated Temperature Range	-10 to 70°C
Temperature Effect on Zero Balance	±0.05% RO/°C
Temperature Effect on Output	±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	2 to 5 V AC or DC
Input Resistance	550 Ω±150Ω
Output Resistance	450 Ω±100Ω
Cable	5 m fluoroplastic cable
	Measuring instrument side: Connector plug

Mechanical Properties

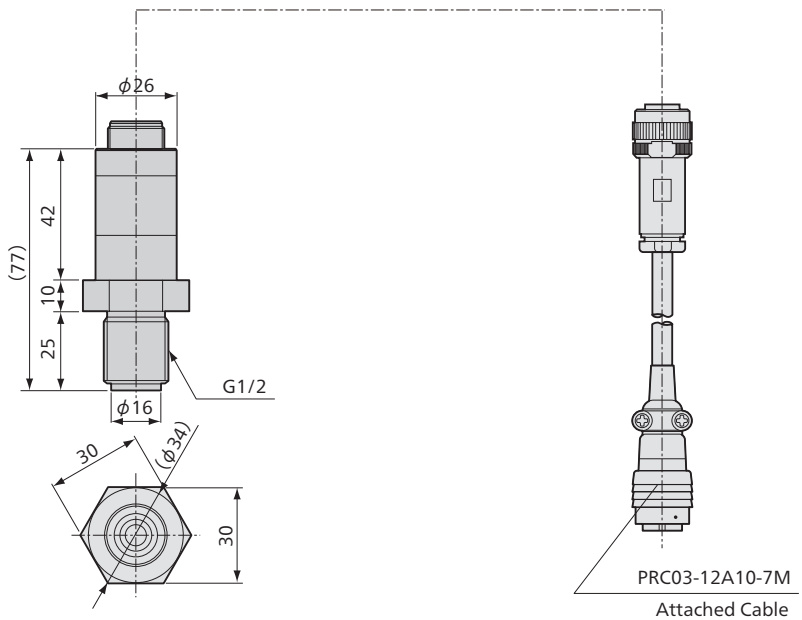
Material	Metallic finish
Mounting Screw	G1/2

Standard Accessories: Gasket (Mild copper)

Large-capacity Pressure Transducer

- High pressure 300 MPa measurement
- Safe design with just one SUS body without welded part.
- Removable cable
- Mounting screw G1/2

Dimensions



- Physical quantity indication
- Static measurement
- Dynamic measurement

PGH-S-300MPSA19 Recommended products for combination


Instrumentation Amplifier WGA-900A → 3-95


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

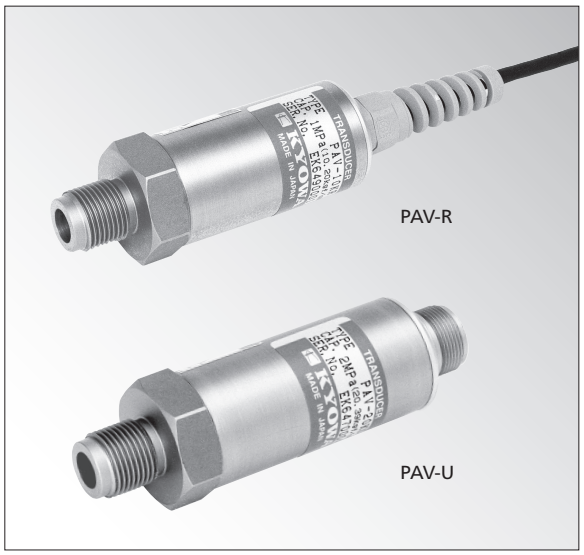

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

PAV-R/U

●Highly Resistant against Noise during Transmission
●1 to 50 MPa

Voltage-output Pressure Transducer



Suitable for Pressure Measurements of Industrial Equipments and Distant Pressure Measurement by Cable Extension

- Voltage output in a range of 0 to 5 V
- Noise resistant
- High safe overload rating of 200%
- Suitable for industrial equipment/pressure control system
- Wide range of rated capacities

PAV-R/U pressure transducers have dedicated built-in amplifier and output voltage signals from 0 to 5V. There is no connection by welding in pressure sensor section. The built-in amplifier adopts unique hybrid IC to reduce numbers of components resulting in increasing reliability. Because built-in amplifier amplifies detected slight voltage in transmission, amplified voltage signals have high resistance against noises, such as inductive interference, and ensure high accuracy.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.2% RO
Rated Output	0 to 5 V

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-20 to 70°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.02%/°C

Electrical Characteristics

SN Ratio	50 dB or more
Load Resistance	1 kΩ or more
Frequency Response (Built-in Amplifier)	DC to 1 kHz
Power Supply	12 VDC (10.5 to 15 V), 30 mA
Cable	PAV-R: 4-conductor (0.18 mm²) vinyl shielded cable, 4.6 mm diameter by 3 m long, bared at the tip
	PAV-U: 4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 3 m long, bared at the tip
	(Shield wire is not connected to mainframe.)

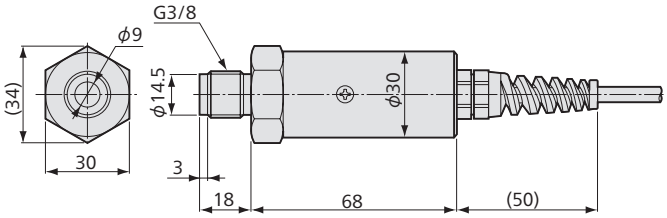
Mechanical Properties

Safe Overload Rating	200%
Materials	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 200 g (Excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G3/8, male

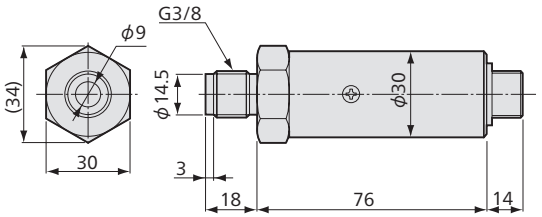
Standard Accessories Gasket (Mild copper)

Cable-integrated	Connector-equipped	Rated Capacity
PAV-10KR	PAV-10KU	1 MPa
——	PAV-50KU	5 MPa
——	PAV-100KU	10 MPa
——	PAV-200KU	20 MPa
PAV-300KR	PAV-300KU	30 MPa
——	PAV-500KU	50 MPa

Dimensions

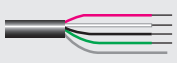


PAV-R



PAV-U

Bared at the tip



●Dynamic measurement

PAV-R/U Recommended products for combination


Universal Recorder EDX-200A
→ 3-55

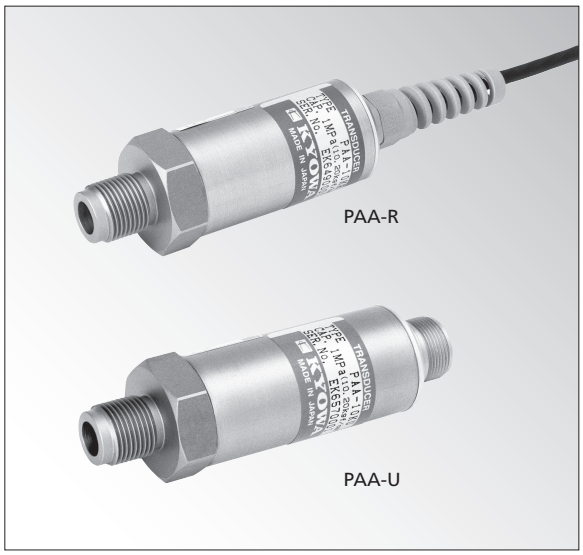

Universal Recorder EDX-100A
→ 3-63


Memory Recorder/Analyzer EDX-3000B
→ 3-69

PAA-R/U

●Highly Resistant against Noise during Transmission
●500 kPa to 50 MPa

Current-output Pressure Transducer



Suitable for Pressure Measurements of Industrial Equipments and Distant Pressure Measurement by Cable Extension

●Current output in a range of 4 to 20 mA
●Noise resistant
●High safe overload rating of 200%
●Suitable for industrial equipment/pressure control system
●Wide range of rated capacities

PAA-R/U pressure transducers have dedicated built-in amplifier and output current signals from 4 to 20 mA. There is no connection by welding in pressure sensor section. The built-in amplifier adopts unique hybrid IC to reduce numbers of components resulting in increasing reliability. Because built-in amplifier amplifies detected slight voltage in transmission, amplified signals have high resistance against noises, such as inductive interference, and ensure high accuracy.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.2% RO
Rated Output	4 to 20 mA

Environmental Characteristics

Safe Temperature Range	-20 to 80°C
Compensated Temperature Range	-20 to 70°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.02%/°C

Electrical Characteristics

SN Ratio	50 dB or more
Load Resistance	0 to 500 Ω
Frequency Response (Built-in Amplifier)	DC to 1 kHz
Power Supply	24 VDC (21 to 30 V), 30 mA
Cable	PAA-R: 4-conductor (0.18 mm²) vinyl shielded cable, 4.6 mm diameter by 3 m long, bared at the tip
	PAA-U: 4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 3 m long, bared at the tip
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	200%
Materials	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 200 g (Excluding cable)
Degree of Protection	IP64 (IEC 60529)
Mounting Screw	G3/8, male

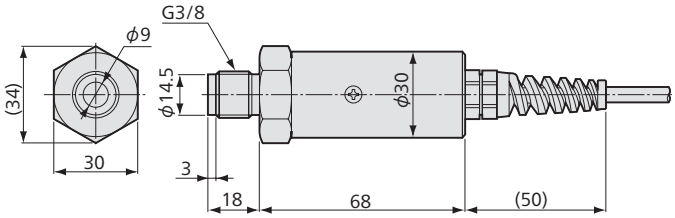
Standard Accessories: Gasket (Mild copper)

Cable-integrated	Connector-equipped	Rated Capacity
PAA-5KR	——	500 kPa
PAA-10KR	PAA-10KU	1 MPa
PAA-20KR	PAA-20KU	2 MPa
——	PAA-50KU	5 MPa
PAA-100KR	PAA-100KU	10 MPa
PAA-200KR	PAA-200KU	20 MPa
PAA-300KR	PAA-300KU	30 MPa
PAA-500KR	PAA-500KU	50 MPa

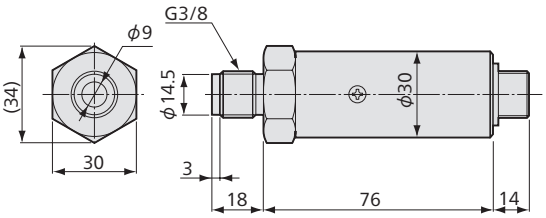
To Ensure Safe Usage

When measuring using voltage mode such as UCAM-60B, use a 250 Ω resistor to convert to voltage.

Dimensions

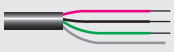


PAA-R



PAA-U

Bared at the tip



●Dynamic measurement

PAA-R/U Recommended products for combination


Universal Recorder EDX-200A
→ 3-55

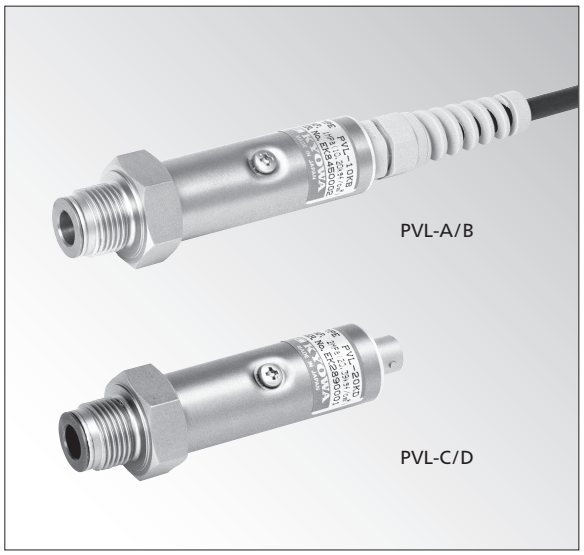

Universal Recorder EDX-100A
→ 3-63


Memory Recorder/Analyzer EDX-3000B
→ 3-69

PVL

●Output 0 to 5 V, 1 to 5 V ●500 kPa to 50 MPa

Voltage-output Pressure Transducer



Excellent Noise Resistance Type with a Built-in Amplifier

- ●Voltage output in a range of 0 to 5 V or 1 to 5 V
- ●High frequency response
- ●Compact and lightweight
- ●Applicable to highly viscous pressure medium
- ●Wide range of rated capacities
- ●Built-in negative power supply achieves to indicate 0V output as true 0V (PVL-B/D)

PVL series pressure transducers detect pressures by strain gage and then amplify these slight voltage signals by a built-in amplifier. The pressure sensor part is simply integrated structure and has high reliability. Also, the amplifier is fully tuned. Therefore, PVL series not only provide high vibration resistance, environmental resistance and stability but also without adjustment.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO(PVL-5 to 20 K)
	Within ±0.3% RO(PVL-30 to 500 K)
Hysteresis	Within ±0.5% RO(PVL-5 to 20 K)
	Within ±0.3% RO(PVL-30 to 500 K)
Rated Output	PVL-A/C: 1 to 5 V
	PVL-B/D: 0 to 5 V

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C(PVL-5 to 20 K)
	Within ±0.03% RO/°C(PVL-30 to 500 K)
Temperature Effect on Output	Within ±0.05%/°C (PVL-5 to 20 K)
	Within ±0.03%/°C(PVL-30 to 500 K)

Electrical Characteristics

Output	See table above.
SN Ratio	50 dB or more
Load Resistance	1 kΩ or more
Frequency Response (Built-in Amplifier)	DC to 1 kHz
Power Supply	12 VDC(10.5 to 15 V), 30 mA or less
Cable	PAL-A/B: 4-conductor (0.14 mm²)chloroprene shielded cable
	6 mm diameter by 30 cm long, bared at the tip
	PAL-C/D: 4-conductor (0.18 mm²)vinyl shielded cable,
	4.6 mm diameter by 3 m long, bared at the tip
	(Shield wire is not connected to mainframe.)

Mechanical Properties

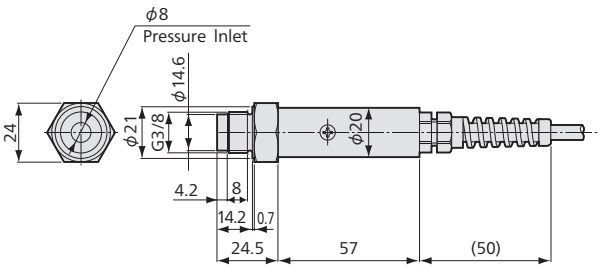
Safe Overload Rating	150%
Material	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 85 g (Excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

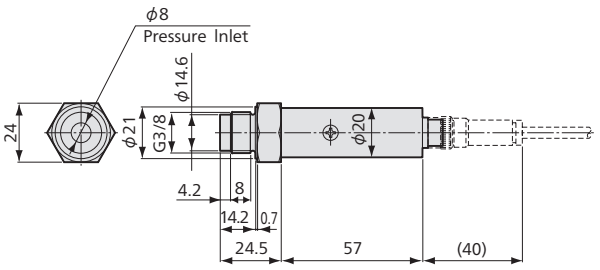
For every rated capacity, mechanical natural frequency is the same as PGM-H(2-88).

Models				Rated Capacity
Cable-integrated		Connector-equipped		
1 to 5V output	0 to 5V output	1 to 5V output	0 to 5V output	
——	PVL-5KB	PVL-5KC	PVL-5KD	500 kPa
——	PVL-10KB	PVL-10KC	PVL-10KD	1 MPa
——	PVL-20KB	PVL-20KC	PVL-20KD	2 MPa
——	PVL-50KB	PVL-50KC	PVL-50KD	5 MPa
——	PVL-100KB	PVL-100KC	PVL-100KD	10 MPa
PVL-200KA	PVL-200KB	PVL-200KC	PVL-200KD	20 MPa
——	PVL-300KB	——	PVL-300KD	30 MPa
——	PVL-500KB	PVL-500KC	PVL-500KD	50 MPa

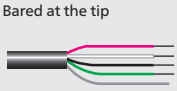
Dimensions



PVL-A/B



PVL-C/D



●Dynamic measurement

PVL Recommended products for combination


Universal Recorder EDX-200A → 3-55

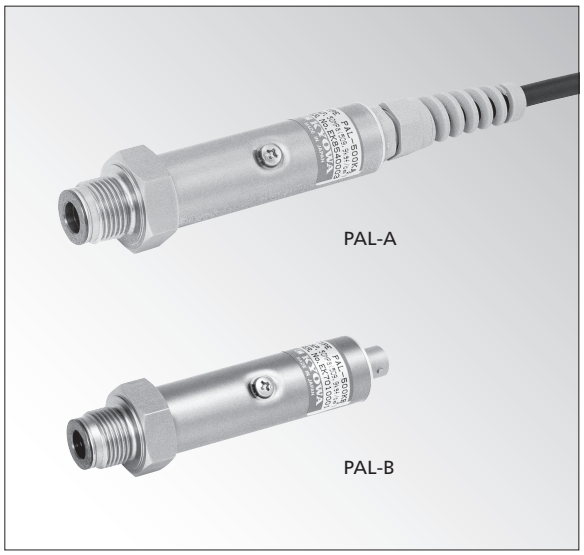

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

PAL

●Output 4 to 20 mA ●500 kPa to 50 MPa

Current-output Pressure Transducer



Excellent Noise Resistance Type with a Built-in Amplifier

- ●Current output in a range from 4 to 20 mA
- ●High frequency response
- ●Small-sized and lightweight
- ●Applicable to highly viscous pressure medium
- ●Various capacity ranges

PAL series pressure transducers amplify detected slight signals by a built-in amplifier and then transmit amplified signals in current. The pressure sensor part is simply integrated structure and has high reliability. Also, the amplifier is fully tuned. Therefore, PAL series not only provide high vibration resistance, environmental resistance and stability but also measure without adjustment.

To Ensure Safe Usage

When measuring using voltage mode such as UCAM-60B, use a 250Ω resistor to convert to voltage.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5%RO(PVL-5 to 20 K)
	Within ±0.3%RO(PVL-30 to 500 K)
Hysteresis	Within ±0.5%RO(PVL-5 to 20 K)
	Within ±0.3%RO(PVL-30 to 500 K)
Rated Output	4 to 20 mA

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	-10 to 60°C
Temperature Effect on Zero Balance	Within ±0.05%RO/°C (PVL-5 to 20 KA)
	Within ±0.03%RO/°C (PVL-30 to 500 KA)
Temperature Effect on Output	Within ±0.05%/°C (PVL-5 to 20 KA)
	Within ±0.03%/°C (PVL-30 to 500 KA)

Electrical Characteristics

SN Ratio	50 dB or more
Load Resistance	0 to 500 Ω
Frequency Response (Built-in Amplifier)	DC to 1 kHz
Power Supply	24 VDC (21 to 30 V), 30 mA or less
Cable	PAL-A: 4-conductor (0.14 mm²) chloroprene shielded cable,
	6 mm diameter by 30 cm long, bared at the tip
	PAL-B: 4-conductor (0.18 mm²) vinyl shielded cable,
	4.6 mm diameter by 3 m long, bared at the tip
	(Shield wire Is not connected to mainframe)

Mechanical Properties

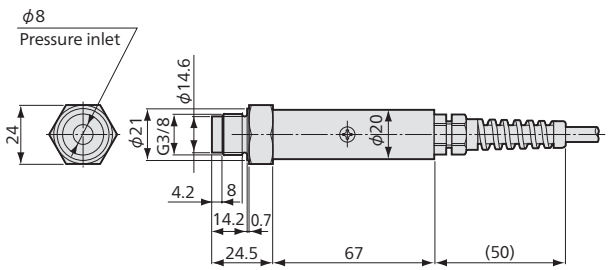
Safe Overload Rating	150%
Material	Case: SUS (Metallic finish)
	Liquid-contacting part: SUS 630
Weight	Approx. 85 g (excluding cable)
Degree of Protection	IP52 (IEC 60529)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

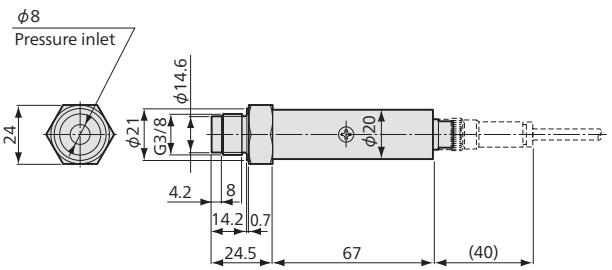
For every rated capacity, mechanical natural frequency is the same as PGM-H(2-88).

Models		Rated Capacity
Cable-integrated	Connector-equipped	
PAL-5KA	**PAL-5KB**	500 kPa
PAL-10KA	**PAL-10KB**	1 MPa
PAL-20KA	**PAL-20KB**	2 MPa
PAL-50KA	**PAL-50KB**	5 MPa
PAL-100KA	**PAL-100KB**	10 MPa
PAL-200KA	**PAL-200KB**	20 MPa
PAL-300KA	**PAL-300KB**	30 MPa
PAL-500KA	**PAL-500KB**	50 MPa

Dimensions



PAL-A



PAL-B

Bared at the tip

●Dynamic measurement

PAL Recommended products for combination


Universal Recorder EDX-200A → 3-55

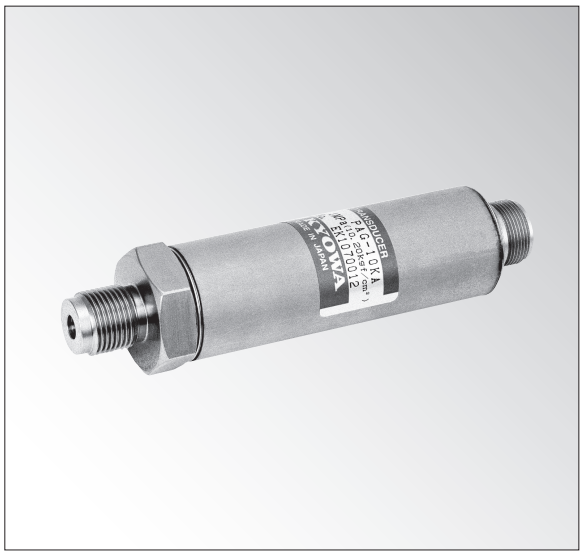

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

PAG-2KA

●Excellent in Reliability & Stability
●200 kPa

Highly Stable Current-output Pressure Transducer



Excellent Reliability & Stability Fine Resolution

●Current output in a range from 4 to 20 mA
●Noise resistant

PAG-A series pressure transducers are stable and their sensor part is designed to be highly stable. Also, inert gas is sealed hermetically in sensor part, ensuring excellent reliability and stability for long-term. The built-in amplifier is composed of highly-selected reliable components and be fully tuned to provide high-frequency radio noise resistance. Therefore, PAG-A series achieves reliable, stable, and high noise resistant measurements.

Specifications

Performance

Rated Capacity	200 kPa
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.2% RO
Rated Output	4 to 20 mA

Environmental Characteristics

Safe Temperature Range	-20 to 75°C
Compensated Temperature Range	-20 to 70°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.01%/°C
Zero Stability	±0.5% RO/year

Electrical Characteristics

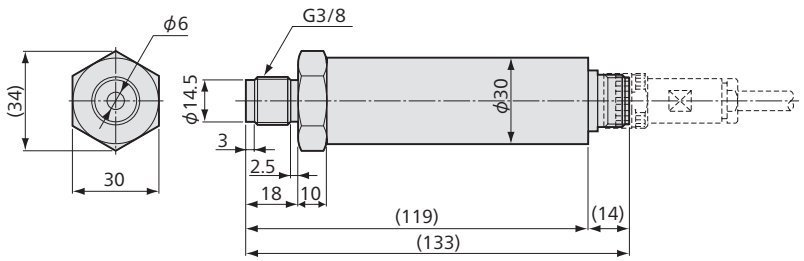
SN Ratio	60 dB or more
Load Resistance	0 to 500 Ω
Frequency Response (Built-in Amplifier)	DC to 400 Hz +0.5, -3 dB
Power Supply	24 V DC (21 to 30 V), 30 mA or less
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 7.6 mm diameter by 5 m long, bared at the tip (3-wire) (Shield wire is not connected to mainframe.)

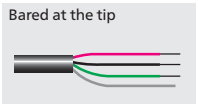
Mechanical Properties

Safe Overload Rating	150%
Material	Case: SUS (Metallic finish), SUS 630
Weight	Approx. 270 g (Excluding cable)
Degree of Protection	IP62 (IEC 60529)
Mounting Screw	G3/8, male

Standard Accessories Gasket (Mild copper)

Dimensions





●Dynamic measurement

PAG-2KA Recommended products for combination


Universal Recorder EDX-200A → 3-55

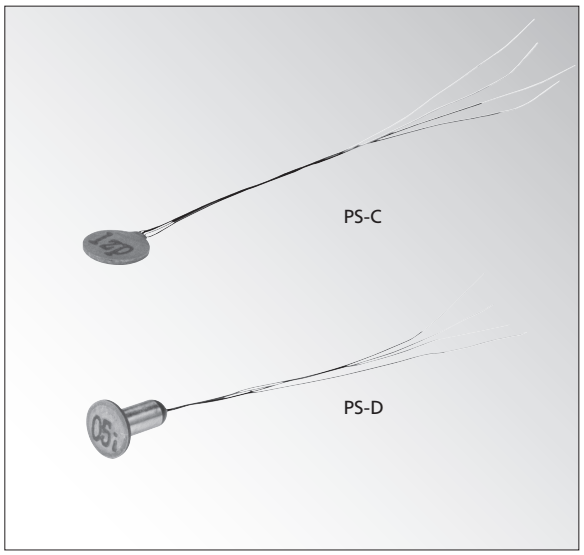

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

PS

Miniature Pressure Sensor

●For Distributed Pressure Measurement
●50 kPa to 7 MPa



Ultra-thin & Compact Design Wide Range of Rated Capacity

PS series pressure transducers have a bridge of strain gages inside, achieving ultra-thin compact structure. They are installed by adhesives. They are suitable for distributed pressure measurement by using multiple units.

Note
(1) Copper alloy is used for sensing element. Avoid measuring corrosive liquid or gas.
(2) Epoxy adhesive has been used to assemble the liquid contacting section. Measuring liquids of PS-20 to 70KC/D M2 are limited to oil.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.25 mV/V (500 μm/m) or more (PS-05KC/D)
	0.5 mV/V (1000 μm/m) or more (PS-1KC/D)
	0.85 mV/V (1700 μm/m)±30% (PS-2KC/D)
	1 mV/V (2000 μm/m)±20% (PS-5 to 70KC/D)
Note: Rated output is sorted to one of the classes divided by every 2% difference in output value. Since the rated output stated in the Test Data Sheet is the center value of the class, it may have a maximum error of ±1%.	

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.8% RO/°C (PS-05KC/D)
	Within ±0.4% RO/°C (PS-1KC/D)
	Within ±0.3% RO/°C (PS-2KC/D)
	Within ±0.2% RO/°C (PS-5 to 70KC/D)
Temperature Effect on Output	Within ±0.3%/°C (PS-05 to 2KC/D)
	Within ±0.2%/°C (PS-5to 70KC/D)

Electrical Characteristics

Safe Excitation Voltage	3 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 Ω±10%
Output Resistance	350 Ω±10%
Cable	Polyurethane coated copper wires, 0.1 mm diameter (0.08 mm diameter with PS-05KD & 1KD) by 5 cm long, soldering finish at each tip (Shield wire is not connected to mainframe.)

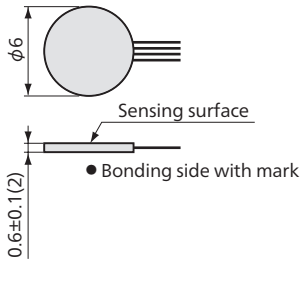
Mechanical Properties

Safe Overload Rating	150% (100% with PS-70KC/D M2)
Materials	Metallic finish
Weight	Approx. 0.5 g±20% (Including cable)

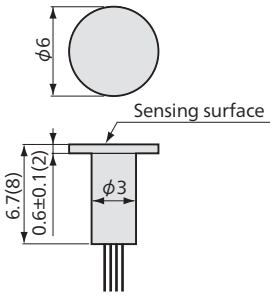
Models		Rated Capacity	Natural Frequencies (Approx.)
Cable Direction to Sensing Surface			
Horizontal	Vertical		
PS-05KC	**PS-05KD**	50 kPa	10 kHz
PS-1KC	**PS-1KD**	100 kPa	10 kHz
PS-2KC	**PS-2KD**	200 kPa	14 kHz
PS-5KC	**PS-5KD**	500 kPa	20 kHz
PS-10KC	**PS-10KD**	1 MPa	37 kHz
PS-20KC M2	**PS-20KD M2**	2 MPa	46 kHz
—	**PS-30KD M2**	3 MPa	58 kHz
PS-50KC M2	**PS-50KD M2**	5 MPa	71 kHz
PS-70KC M2	**PS-70KD M2**	7 MPa	86 kHz

Measuring liquids of PS-20 to 70KC/D M2 are limited to oils.

■Dimensions



PS-C



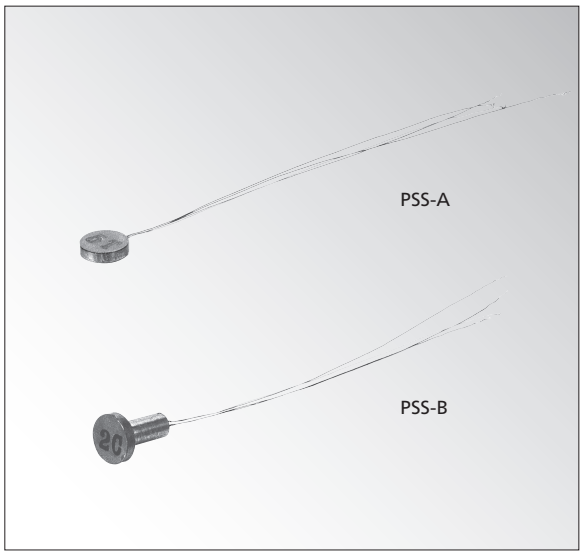
PS-D

Figures in parentheses are for 2 to 7MPa.

PSS

Miniature Pressure Sensor

●For Distributed Pressure Measurement
●20 to 100 kPa



Ultra-Small and Lightweight Design with Small Rated Capacities and Suitable for Gas Pressure Measurement

PSS series pressure transducers have a bridge of strain gages inside, achieving ultra-thin compact structure. A thin-film strain gage is directly formed on a diaphragm by sputtering and photo lithography. PSS transducers are installed by adhesives and developed mainly for gas pressure measurement.

Note
(1) Copper alloy is used for sensing element. Avoid measuring corrosive liquid or gas.
(2) An epoxy adhesive is used to assemble the sensing element. Therefore, avoid using the sensor to measure organic solvents (toluene, ketone, etc.)
(3) It should not be used under high temperature and high humidity environments for a long time.
(4) It should not be used under water.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±3% RO(02K), Within ±1% RO(05K, 1K)
Hysteresis	Within ±3% RO(02K), Within ±1% RO(05K, 1K)
Rated Output	1 mV/V (2000 μm/m) or more
	0.75 mV/V (1500 μm/m) or more (PSS-02KAF/BF)
Note: Rated output is sorted to one of the classes divided by every 2% difference in output value. Since the rated output stated in the Test Data Sheet is the center value of the class, it may have a maximum error of ±1%.	

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	0 to 50°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.8% RO/°C (PSS-05 & 1KAE/BE)
	Within ±0.6% RO/°C (PSS-02KAF/BF)
Temperature Effect on Output	Within ±0.3%/°C
	Within ±0.5%/°C (PSS-02KAF/BF)

Electrical Characteristics

Safe Excitation Voltage	4 V AC or DC
Recommended Excitation Voltage	1 to 2 V AC or DC
Input Resistance	350 to 1000 Ω
Output Resistance	350 to 1000 Ω
Cable	Polyurethane coated copper wires, 0.08 mm diameter by 5 cm long, soldering finish at each tip (Shield wire is not connected to mainframe.)

Mechanical Properties

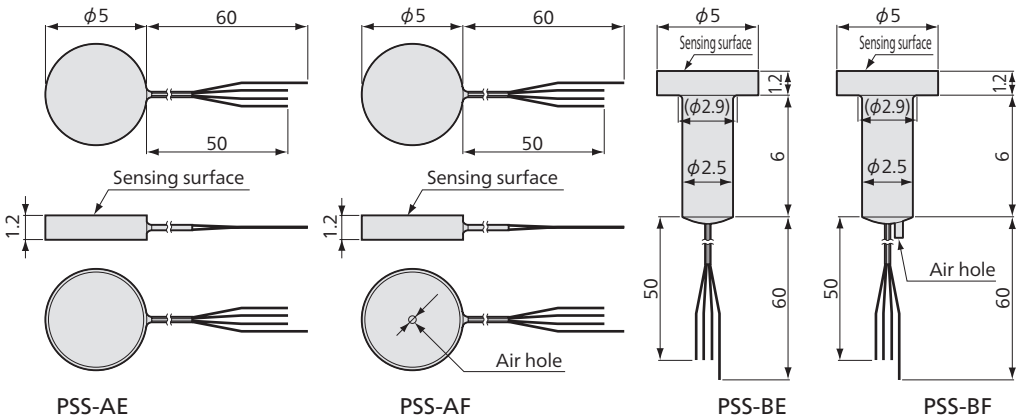
Safe Overload Rating	150%
Weight	PSS-A: Approx. 0.15 g
	PSS-B: Approx. 0.3 g

Models		Rated Capacity	Natural Frequencies (Approx.)	Remarks
Cable Direction to Sensing Surface				
Horizontal	Vertical			
PSS-05KAE	**PSS-05KBE**	50 kPa	18 kHz	Sealed type
PSS-1KAE	——	100 kPa	31 kHz	
PSS-02KAF	**PSS-02KBF**	20 kPa	6 kHz	Atmospheric

To Ensure Safe Usage

High-carrier-based dynamic strain amplifier DPM-912, 913 or 952 may not satisfy the specified rated output in some rare case. Request us to calibrate the transducer in combination with the strain amplifier. Or, if possible, use dynamic strain amplifier DPM-911 or 951 or signal conditioner CDV-900A.

Dimensions



●Static measurement ●Dynamic measurement

PSS Recommended products for combination


Fast Data Logger UCAM-550A → 3-31


Signal Conditioner CDV-900A → 3-9

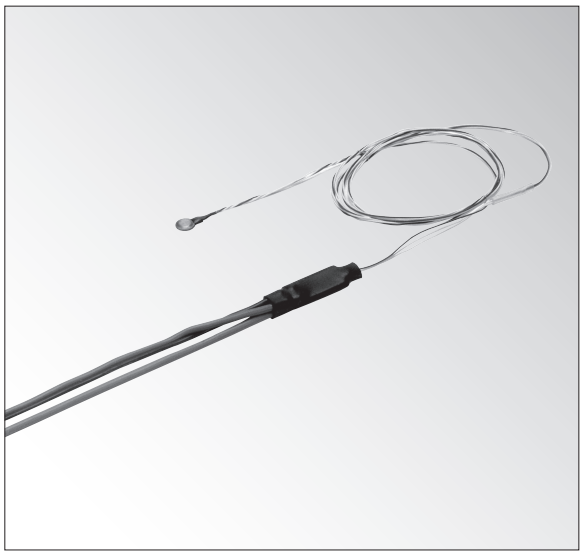

Medium Speed Network Terminal Box NTB-500A → 3-35


Universal Recorder EDX-200A → 3-55

PSM-AB

Miniature Pressure Sensor

●Kyowa's Smallest Pressure Sensors
●100 & 200 kPa



Ultra-small Sized Pressure Transducers with Strong Fluorocarbon Resin Cable

●Bridge adapter Standard Accessories

PSM-AB series are the smallest pressure sensors in Kyowa's products designed based on integration of sensor element and diaphragm. This sensor adopts 1-gage 3-wire system and configures a full bridge in a bridge adapter. In addition, this sensor is installed by adhesives. Developed mainly for gas pressure measurement, PSM-AB series can measure denser points than conventional transducers.

Note
(1) Copper alloy is used for sensing element. Avoid measuring corrosive liquid or gas.
(2) The mainframe has been assembled using an epoxy adhesive. Do not therefore use the transducer to measure organic solvent. (e.g. Toluene, ketone and others)

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.275 mV/V (550 μm/m) ±25% (PSM-1KAB)
	0.38 mV/V (760 μm/m) ±25% (PSM-2KAB)
Note: Rated output is sorted to one of the classes divided by every 0.007 mV/V difference in output value. Since the rated output stated in the Test Data Sheet is the center value of the class, it may have a maximum error of ±0.0035 mV/V.	

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±1% RO/°C (PSM-1KAB)
	Within ±0.5% RO/°C (PSM-2KAB)
Temperature Effect on Output	Within ±0.3%/°C

Electrical Characteristics

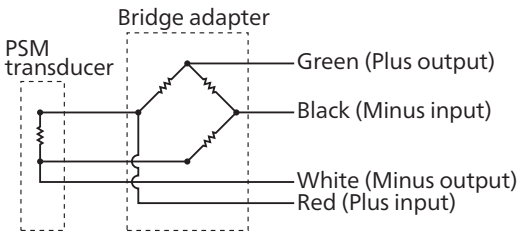
Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	2 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	Transducer: 3-conductor fluoroplastic coated cable, 0.3 mm diameter by 50 cm long
	Bridge adapter: 4-conductor vinyl coated cable, 1.3 mm diameter by 15 cm long, bared at the tip
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	150%
Weight	Approx. 0.5 g (Including cable but not bridge adapter)
Degree of Protection	IP61 (IEC 60529) (Excluding bridge adapters)

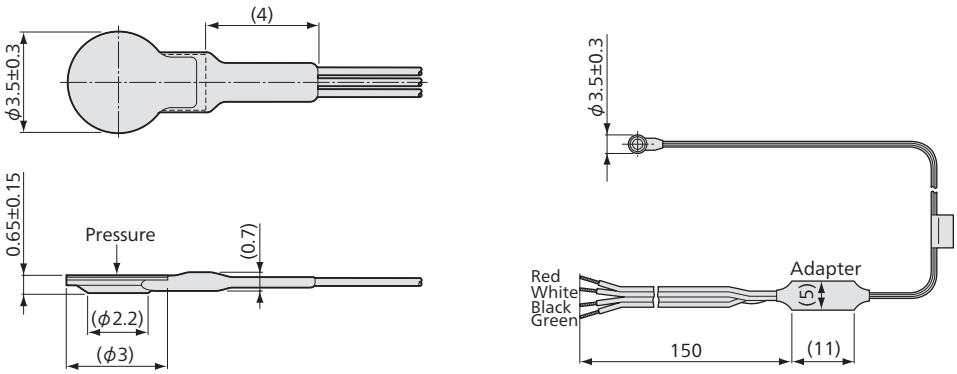
Models	Rated Capacity	Natural Frequencies(Approx.)	Remarks
PSM-1KAB	100 kPa	3 kHz	Bridge adapter Attached standard
PSM-2KAB	200 kPa	3 kHz	

Circuit Diagram



PSM-AB (Full bridge system)

Dimensions



●Physical quantity indication ●Static measurement ●Dynamic measurement

PSM-AB Recommended products for combination


Instrumentation Amplifier WGI-400A →3-103


Fast Data Logger UCAM-550A →3-31


Strain Amplifier DPM-900 Series →3-5


Medium Speed Network Terminal Box NTB-500A →3-35


Universal Recorder EDX-200A →3-55


Sensor Interface PCD-400A →3-77

PDS-A

●For Wind Pressure Measurement ●1 to 7 kPa

Minute Differential Pressure Transducer

*TEDS installation not possible.

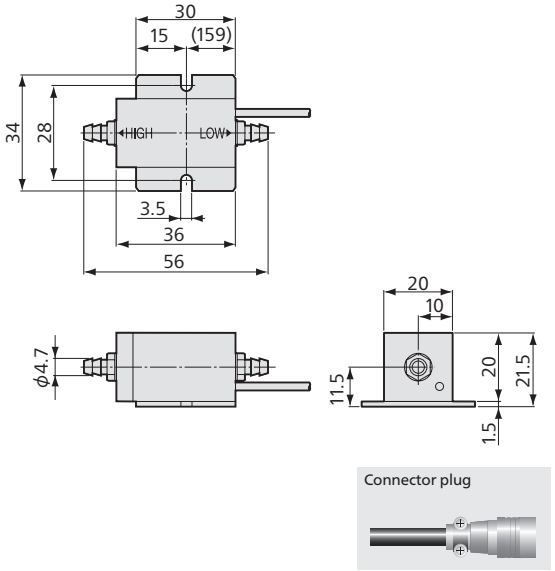
For Wind Pressure Measurement

●High frequency response
●Highly accurate
●High sensitivity
●Noise resistant
●Compact and lightweight

PDS-A series pressure transducers have diffusional semiconductor strain gages on a silicon diaphragm. PDS-A transducers detect pressures as resistance variation and then convert this variation to electrical signals. These signals are indicated by Kyowa's signal conditioners.

Note
(1) Use the transducer with general air
(2) If water or any other liquid enters the low side, the transducer gets out of order.

■Dimensions



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (Within ±0.7% with 25GA)
Hysteresis	Within ±0.3% RO
Rated Output	±7 to 23 mV (PDS-10GA)
	±13 to 23 mV (PDS-25 to 70GA)
Rated Output Accuracy	±1.0% RO (PDS-10 & 25GA)
	±1.5% RO (PDS-50GA), ±2.0% RO (PDS-70GA)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Safe Humidity Range	20 to 85% RH (at 0 to 50°C)
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.1% RO/°C (PDS-10GA)
	Within ±0.08% RO/°C (PDS-25 to 70GA)
Temperature Effect on Output	Within ±0.1%/°C (PDS-10GA)
	Within ±0.08%/°C (PDS-25 to 70GA)
Pressure Medium	General air (Non-corrosive gas)

Electrical Characteristics

Initial Unbalance	Within ±10 mV
Bridge Output Resistance	2 to 6 kΩ
Recommended Excitation Voltage	10 VDC (9.5 to 15 V), 5 mA or less
	(Bridge power supply of signal conditioner can be used.)
Cable	PDS-A: 4-conductor (0.05 mm^2) chloroprene shielded cable,
	3 mm diameter by 3 m long, terminated with connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	300% (600% with PDS-10GA)
Maximum Line Pressure	100 kPa
Natural Frequencies	Approx. 1.7 kHz
Weight	Approx. 40 g (Excluding cable)
Posture Effect	Zero drift within ±0.3%(±0.8% with 10GA) when inclined
	by 90° referring to horizontal condition
Internal Volume	High side: Approx. 0.2 x 10^{-6} m^3 (0.2 ml)
	Low side: Approx. 1 x 10^{-6} m^3 (1 ml)
Pressure Connection	4.7 mm diameter barb fitting

Models	Rated Capacity
PDS-10GA	1 kPa
PDS-25GA	2.5 kPa
PDS-50GA	5 kPa
PDS-70GA	7 kPa

To Ensure Safe Usage

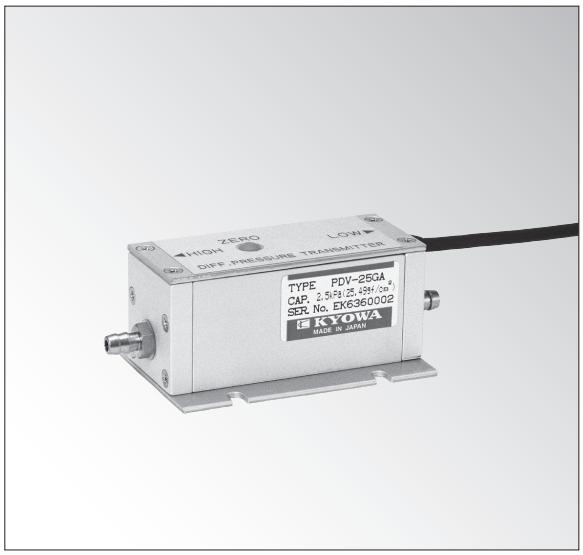
●Avoid dew condensation or freeze, because these transducers are designed for general indoor use.
●If using as a gage pressure meter, apply pressure to the HIGH side, and open the LOW side to the atmosphere.
●For atmospheric observation, prepare piping to prevent rainwater from entering the pressure inlet.
●Signal conditioners CDV-900A and instrumentation amplifiers WGA-900A,650B/710C with built-in bridge power supply of 10V DC are available for PDS-A series. In the case of WGA-650B or 710C, connection cable N-70 is required.
●Use a series type power supply.
*If dimensions of the pressure connection are desired to change, contact us.

●Dynamic measurement
PDS-A Recommended products for combination
Signal Conditioner CDV/CDA-900A
→3-9

PDV-A

●For Wind Pressure Measurement
●1 to 7 kPa

Minute Differential Pressure Transducer



Corrosion Resistance with Built-in Variable Damping Mechanism

- ●High frequency response
- ●Highly accurate
- ●High sensitivity
- ●Noise resistant
- ●Voltage output of 5 V
- ●Compact and lightweight

PDV-A series pressure transducers have diffusional semiconductor strain gages on a silicon diaphragm. PDV-A transducers detect pressures as resistance variation and then amplify this signal by built-in amplifier.

Note
(1) Use the transducer with general air.
(2) If water or any other liquid enters the low-pressure line the transducer gets out of order.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO (Within ±0.7% with 25GA)
Hysteresis	Within ±0.3% RO
Rated Output	±5 V
Rated Output Accuracy	±1.0% RO (PDV-10 & 25GA)
	±1.5% RO (PDV-50GA)
	±2.0% RO (PDV-70GA)

Environmental Characteristics

Safe Temperature Range	-20 to 70°C
Safe Humidity Range	20 to 85% RH (0 to 50°C)
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.1% RO/°C (PDV-10GA)
	Within ±0.08% RO/°C (PDV-25 to 70GA)
Temperature Effect on Output	Within ±0.1%/°C (PDV-10GA)
	Within ±0.08%/°C (PDV-25 to 70GA)
Pressure Medium	General air (Non-corrosive gas)

Electrical Characteristics

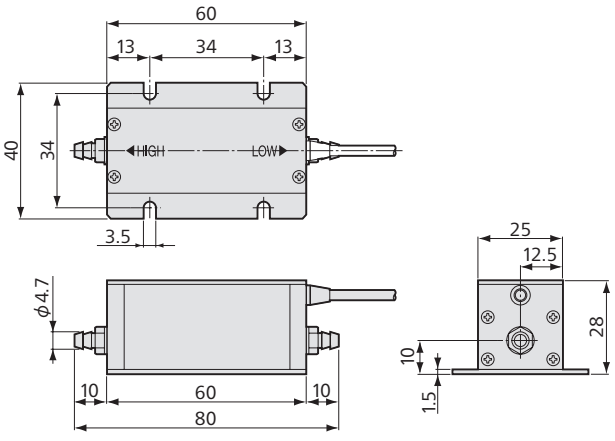
Load Resistance	5 kΩ or more
Bridge Output Resistance	2 to 6 kΩ
Power Supply	12 VDC (11 to 15 V), 30 mA or less
Cable	PDV-A: 4-conductor (0.05 mm²) chloroprene shielded cable, 3 mm diameter by 3 m long, bared at the tip

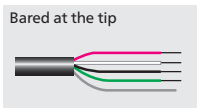
Mechanical Properties

Safe Overload Rating	300% (600% with PDV-10GA)
Maximum Line Pressure	100 kPa
Natural Frequency	Approx. 1.7 kHz
Weight	Approx. 100 g (Excluding cable)
Posture Effect	Zero drift within ±0.3%(±0.8% with 10GA) when inclined by 90°referring to horizontal
Internal Volume High side	Approx. 0.2 x 10^{-6} m^3 (0.2 ml)
Low side	Approx. 1 x 10^{-6} m^3 (1 ml)
Pressure Connection	4.7 mm diameter barb fitting

Models	Rated Capacity
PDV-10GA	1 kPa
PDV-25GA	2.5 kPa
PDV-50GA	5 kPa
PDV-70GA	7 kPa

■Dimensions





To Ensure Safe Usage

- ●Avoid dew condensation or freeze, because these transducers are designed for general indoor use.
- ●When using for a pressure meter, apply pressure to the high side and open the low side to the atmosphere.
- ●For atmospheric observation, prepare piping to prevent rainwater from entering the pressure inlet.

*If dimensions of the pressure connection are desired to change, contact us.

PDV-A Recommended products for combination

●Static measurement
Data Logger UCAM-60B
→ 3-25

●Dynamic measurement
Sensor Interface PCD-430A
→ 3-77

PD-A

Differential Pressure Transducer

●Usable at Max. Line Pressure of 2.94 MPa
●10 to 200 kPa

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Wide Line Pressure Margin and Highly Accurate

PD-A series pressure transducers can measure slight differential pressures highly accuracy. They are suitable for long-term measurements and measurements requiring high accuracy. Furthermore, they can be used for not only differential pressure measurement but also indication and control of automation systems based on characteristics of differential pressure sensor like flow rate measurement.

Note: Copper alloy is used for sensing element. Avoid measuring corrosive liquid or gas.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.2% RO
Rated Output	1.5 mV/V (3000 μm/m) ±1%

Environmental Characteristics

Safe Temperature Range	-10 to 70°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C (PD-100GA)
	Within ±0.01% RO/°C (PD-200GA to 2KA)
Temperature Effect on Output	Within ±0.5%/°C (PD-100GA)
	Within ±0.03%/°C (PD-200GA to 2KA)

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 5 m long, terminated with connector plug
	(Shield wire is connected to mainframe.)

Mechanical Properties

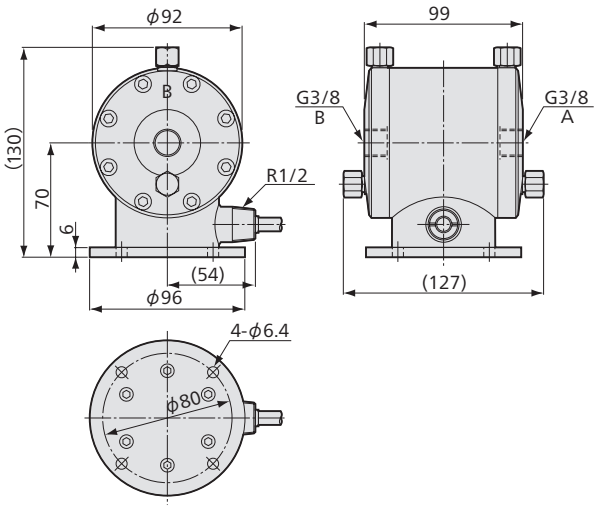
Safe Overload Rating	Differential Pressure 200% (PD-100 & 200GA)
	150% (PD-500GA & 1KA)
	125% (PD-2KA)
Maximum Line Pressure	2.94 MPa
Natural Frequencies	See table below.
Weight	Approx. 5 kg (Excluding cable)

*To use for gas, contact us.

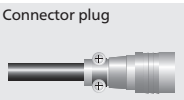
When A side is a high pressure plus output
B side is a high pressure minus output.
(Refer to A, B Dimensions)

Models	Rated Capacity	Natural Frequencies (Approx.)
PD-100GA	10 kPa	60 Hz
PD-200GA	20 kPa	110 Hz
PD-500GA	50 kPa	230 Hz
PD-1KA	100 kPa	400 Hz
PD-2KA	200 kPa	700 Hz

■Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PD-A Recommended products for combination


Instrumentation Amplifier WGA-680A
→3-97


Instrumentation Amplifier WGA-710C
→3-100


Data Logger UCAM-60B
→3-25


Strain Amplifier DPM-900 Series
→3-5


Universal Recorder EDX-100A
→3-63


Sensor Interface PCD-430A
→3-51

PDU-A

●Usable at Max. Line Pressure of 30 MPa
●50 kPa to 2 MPa

Stainless Steel Differential Pressure Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Corrosion Resistant Built-in Variable Damping Mechanism

●Overload protection mechanism

Note: Copper alloy is used for sensing element. Avoid measuring corrosive liquid or gas.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO (PDU-A-50 to 500KP)
	Within ±0.25% RO (PDU-A-1 & 2MP)
Hysteresis	Within ±0.2% RO (PDU-A-50 to 500KP)
	Within ±0.25% RO (PDU-A-1 & 2MP)
Repeatability	0.1% RO or less
Rated Output	1.5 mV/V (3000 μm/m) ±0.5%

Environmental Characteristics

Safe Temperature Range	-30 to 90°C
Compensated Temperature Range	-20 to 80°C
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
	(50KP, 100KP: Within ±0.02%RO/°C)
Temperature Effect onOutput	Within±0.01%/°C
	(50KP, 100KP: Within ±0.02%/°C)

Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable,
	7.6 mm diameter by 5 m long, terminated with connector plug
	(Shield wire is connected to mainframe.)

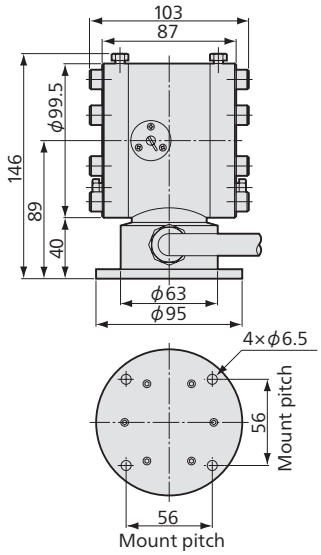
Mechanical Properties

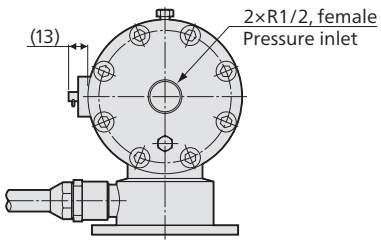
Safe Overload Rating	150% (if an overload of 30 MPa is applied to either high or low pressure side, the transducer is not damaged.)
Frequency Response Range	DC to 30 Hz
Maximum Line Pressure	30 MPa
Weight	Approx. 6 kg (Excluding cable)

*To use for gases, contact us.

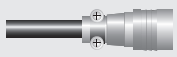
Models	Rated Capacity
PDU-A-50KP	50 kPa
PDU-A-100KP	100 kPa
PDU-A-200KP	200 kPa
PDU-A-500KP	500 kPa
PDU-A-1MP	1 MPa
PDU-A-2MP	2 MPa

■Dimensions





Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

PDU-A Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Instrumentation Amplifier WGA-710C → 3-100


Data Logger UCAM-60B → 3-25


Strain Amplifier DPM-900 Series → 3-5

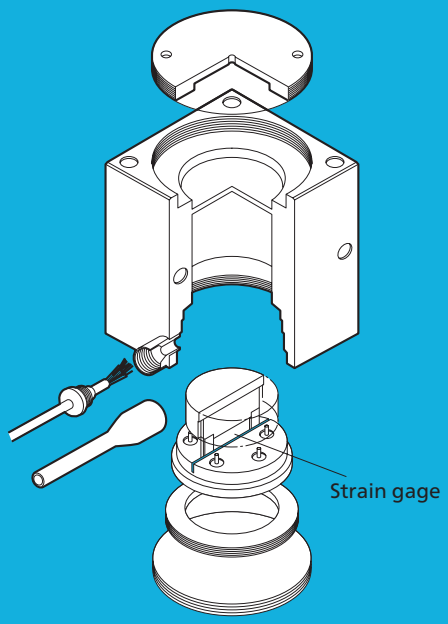

Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-430A → 3-51

Acceleration Transducers

Kyowa's strain gage acceleration transducers convert the acceleration of running vehicle or the vibration of car body or machinery into minute voltage to enable accurate measurement of acceleration or vibration with various measuring instruments. Each model is compact and lightweight, and ensures superior static and dynamic characteristics. Various rated capacity models cover a wide scope of applications. In addition, triaxial models are available for simultaneous detection of accelerations in three directions: X, Y and Z.

■Acceleration Transducers

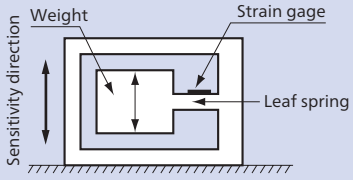


Features

- Compact and lightweight design results in minimal effects on the vibration mode of the measuring objects to which the transducer is mounted.
- Wide frequency response range enables faithful detection of impact-initiated acceleration.
- Fatigue life is 10 million times or more.

■Principle of Acceleration Transducers

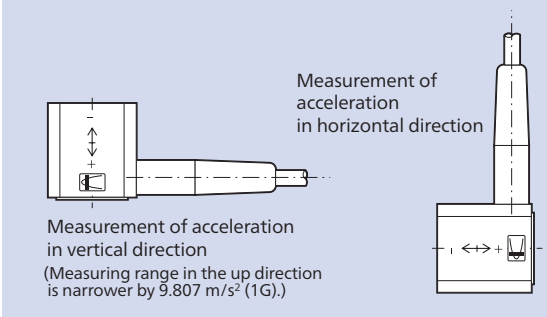
With the basic configuration shown below, acceleration initiates inertia force to the weight and deforms the leaf spring. The strain gage adhered to the leaf spring detects the displacement of the leaf spring as a strain quantity proportional to the acceleration. The strain gage signal is amplified to enable acceleration measurement. An advantageous feature of this configuration is to enable the transducer to respond to static acceleration at DC.



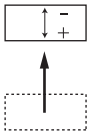
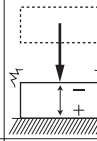
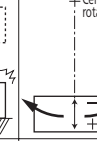
Basic Configuration of Strain Gage Acceleration Transducer

■Installation and Removal

Install the acceleration transducer aligning the sensitive axis ("+ ← →-" marked on the transducer) with the acceleration measuring direction.



●There are 2 marks which indicates the sensitivity axis of acceleration.
(1) When the arrow which indicates the sensitivity axis is "+← → -" ; In case a acceleration transducers is set as "+" points the earth's center (direction for Acceleration of Gravity),+1G is output when any load is not added. As the output is based on Acceleration of Gravity, the relationship between input condition and output of acceleration is shown on the following table.

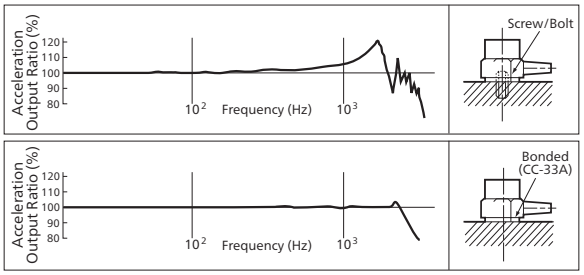
	Acceleration	Impact	Rotation	
Acceleration conditions				It agrees with a motion of a plumb bob and outputs 1G at the time of stillness. Gravitational acceleration is to be basic 
Polarity of output	(+)	(+)	(+)	

(2) When the arrow which indicates the sensitivity axis is " ↑ ";

Arrows on mainframe " ↑"

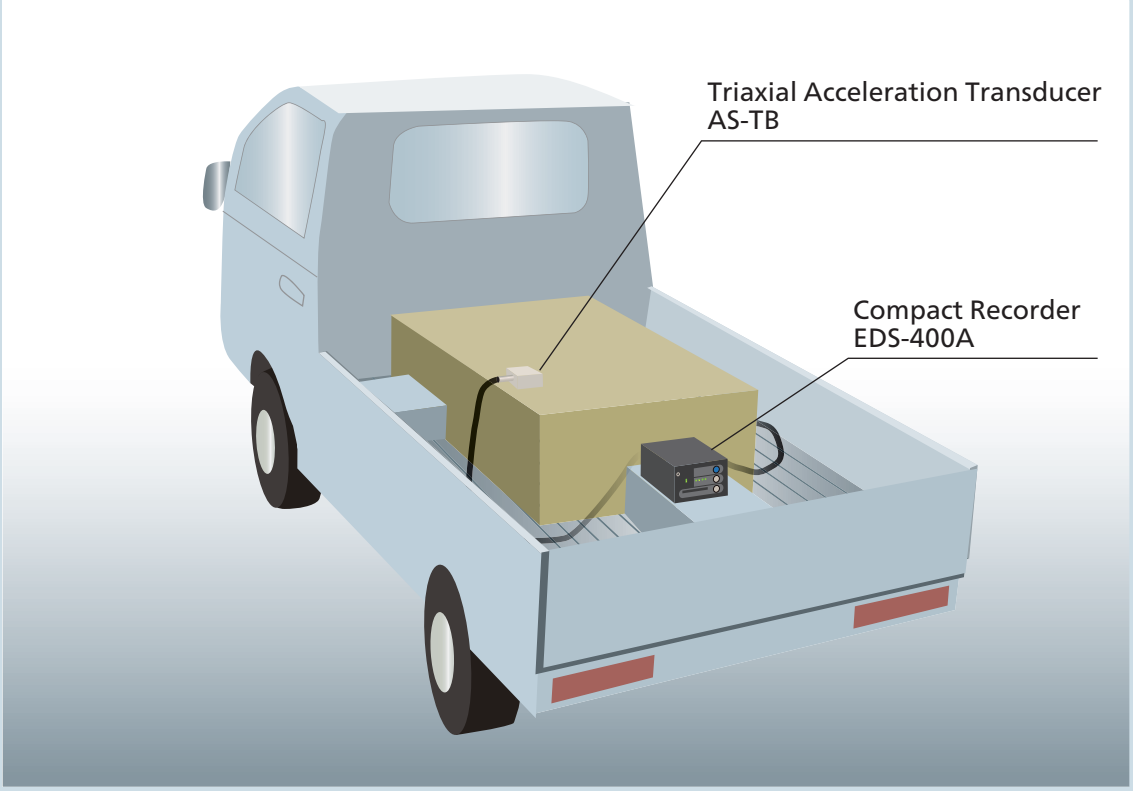
	Acceleration	Impact	Rotation	
Acceleration conditions				The arrow on the mainframe is in accordance with the direction of acceleration.
Polarities of output	(+)	(+)	(+)	

Note) Please check instruction Acceleration transducers are installed to objects by adhesives like CC-33A, bolts, or mount bases. To measure correctly, mount acceleration transducers following instruction manual. When removing acceleration transducers, take sufficiently care to avoid excessive impact or force resulting in damaging transducers.



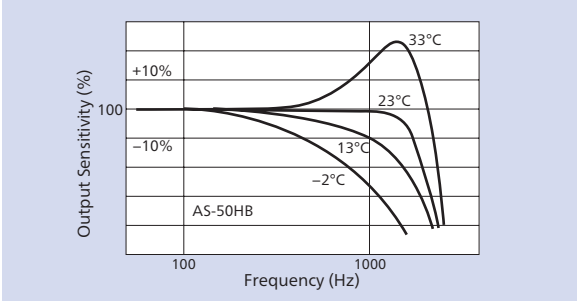
Acceleration Transducers Measurement Examples

●Vibration tests of goods during truck transportation



■Temperature Effect

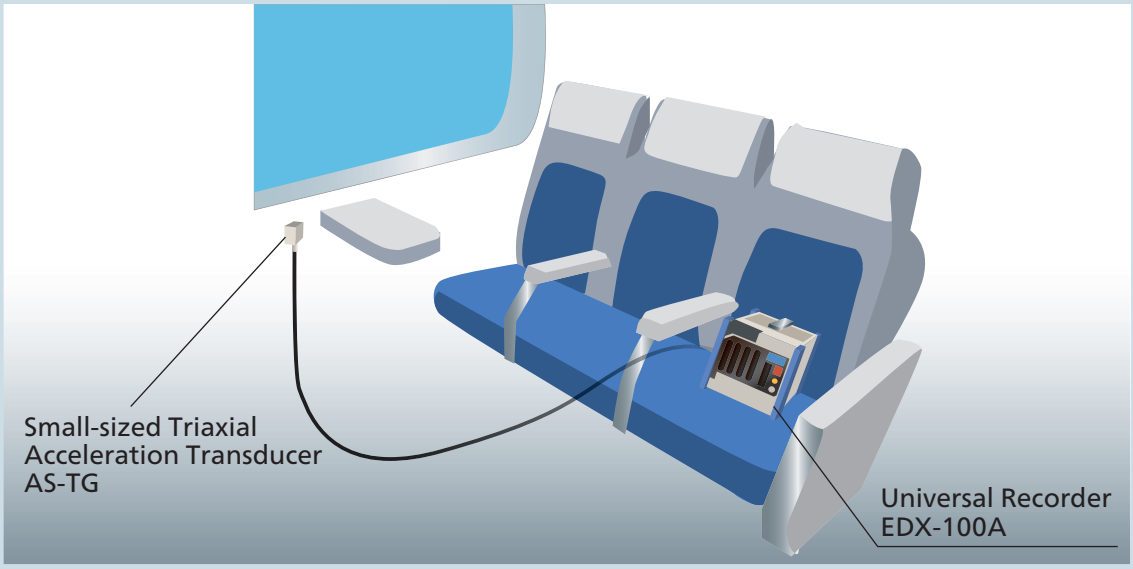
To ensure flat frequency response characteristics, some models of acceleration transducers have oil sealed inside. The viscosity of the oil is adjusted to make the frequency response flat at 23˚C. Changes in viscosity due to temperature changes affect the frequency response and phase characteristics. Though a silicone oil which the viscosity hardly changes is adopted, the frequency response characteristics of the transducer are affected by temperatures as shown in the figure below. Thus, for accurate measurement in a frequency zone exceeding one-tenth the stated frequency response range, the temperature of the transducer should be kept around 23˚C.



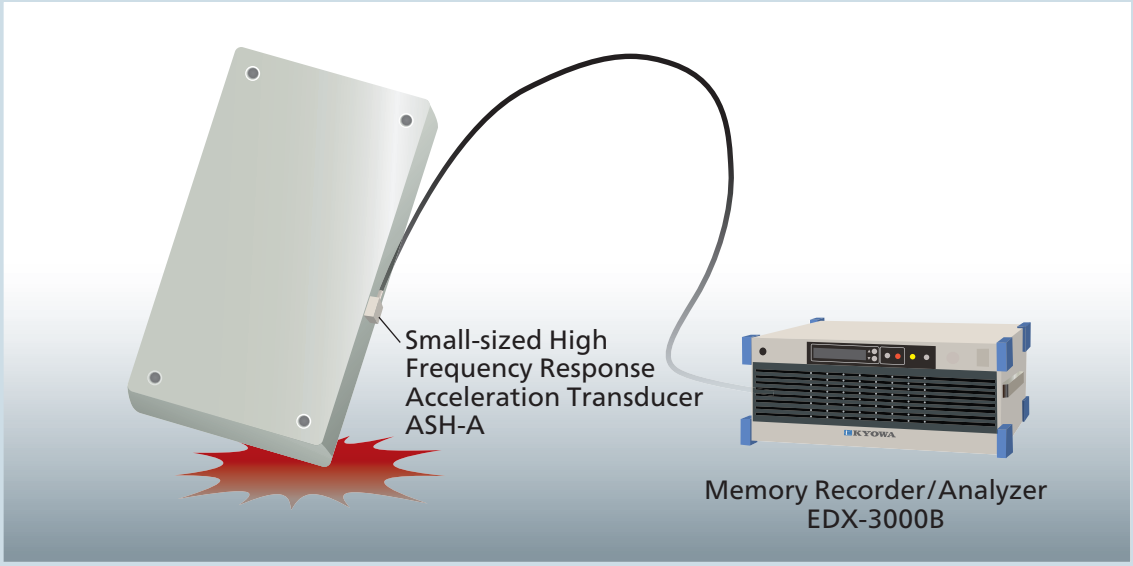
■Overload Considerations

Generally, the magnitude of acceleration is difficult to be grasped by human perception. If the transducer is dropped on the floor, it may easily sense acceleration exceeding 9807 m/s^2 (1000 G) depending on the material of the floor. If a small-capacity acceleration transducer receives an acceleration 10 times larger than the rated capacity, the initial voltage unbalance changes outstandingly, thereby making the transducer unusable due to disconnection of the gage, etc. Thus, the acceleration transducer must be handled carefully

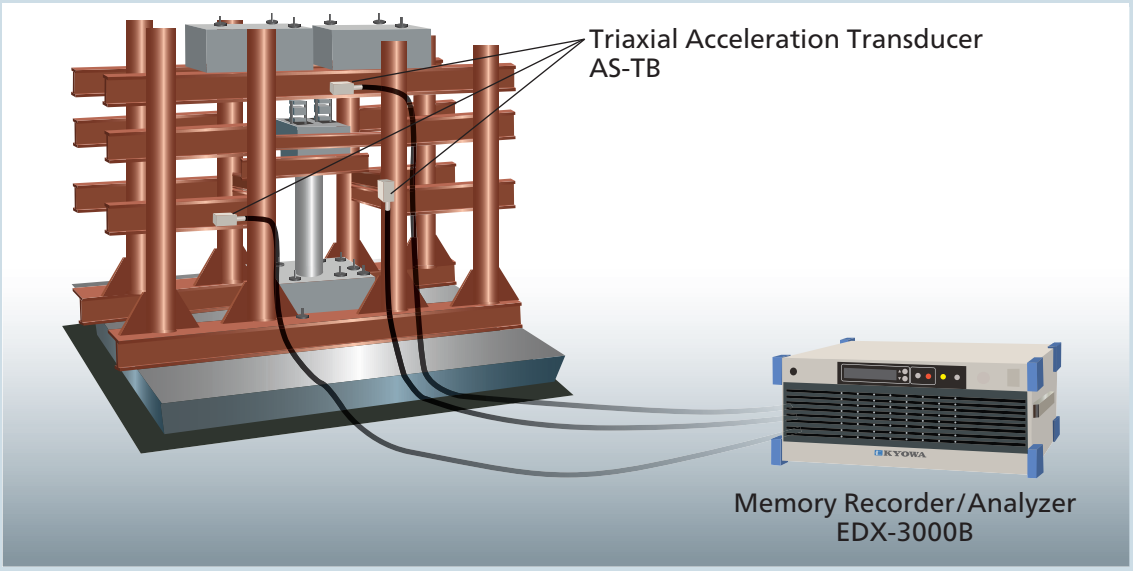
●Vibration tests on railway vehicle and truck



●Drop impact tests of fuel cell container and lithium-ion battery



●Vibration tests on various structures such as piers



Acceleration Transducer Selection Chart

Models		Rated Capacity (±m/s²)										Pages
		9.807	19.61	49.03	98.07	196.1	490.3	980.7	1961	4903	9807	
Small-sized Small Capacity	Small-sized Small/ Medium Capacity **AS-GA**	Yes	Yes	Yes	Yes	Yes						2-119
	Small-sized Small/ Medium Capacity **AS-GB**	Yes	Yes	Yes	Yes	Yes						2-119
Small-sized Triaxial	Small-sized Small/ Medium Capacity **AS-TG**	Yes	Yes	Yes	Yes	Yes						2-123
Water Proof	Small-sized Small/ Medium Capacity **ASW-A**	Yes	Yes	Yes	Yes	Yes						2-126
Servo Type	Small-sized Small, Output ±5 V FS **ASQ-D**	Yes	Yes	Yes								2-127
Small-sized	Small-sized Small Capacity **AS-B**				Yes	Yes	Yes					2-120
High Frequency Response	Medium Capacity **AS-HB**				Yes	Yes	Yes					2-121
Triaxial	Medium Capacity **AS-TB**				Yes	Yes	Yes					2-124
High Frequency Response	Large Capacity **ASH-A**							Yes	Yes	Yes	Yes	2-122
Triaxial	Large Capacity **ASHT-A**							Yes	Yes	Yes	Yes	2-125
Small-sized Triaxial	Small-sized Small/ Medium Capacity **AMA-A** NEW		Yes	Yes	Yes		Yes					2-131

Models		Rated Capacity (±m/s²)					Pages
		360	400	2200	3600	4000	
Piezoelectric type	Large Capacity **ASPA-A**			Yes			2-129
	Large Capacity **ASPB-A**			Yes			2-129
	3 Axis Type **ASPC-A(-ID)**	Yes	Yes		Yes	Yes	2-129

Model	Rated Capacity (±deg/s)	Pages
	900	
Three Axis Angular Rate Gyro **GSAT-A** NEW	Yes	2-133

Acceleration Transducers for Crash Test

Models	Pages
ASD-B	5-23
ASDH-A	5-24
ASE-A	5-25

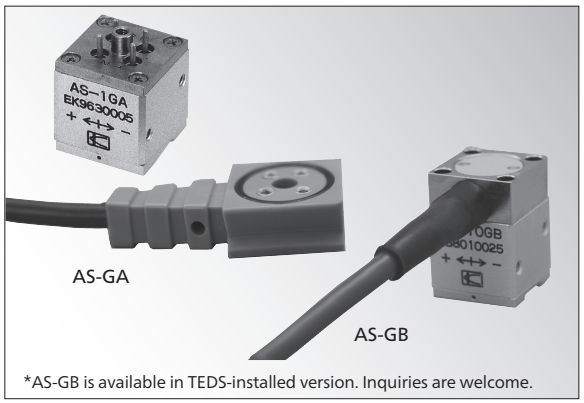
Models	Pages
ASER-A	5-26
ASDE-A	5-27
ASDR-A-1K NEW	5-28

Models	Pages
ASM-200BA	5-29
ASM-1KBCV/BCH M3 (ASM-1KBCV M3, ASM-1KBCH M3)	5-30
ASM-1KCBV	5-31

AS-GA/GB

●9.807 to 196.1 m/s²

Small-sized Small-capacity Acceleration Transducer



*AS-GB is available in TEDS-installed version. Inquiries are welcome.

Compact & Lightweight Easy to Use Suitable for Measurement of Vibration of Model Structures and in the Field of Human Engineering.

Using a strain gage as the sensing element, AS-GA and AS-GB series acceleration transducers are designed to measure small levels of acceleration. The compact & lightweight design makes them widely used for measurement of vibration in small structures or scale models as well as in the field of human engineering. AS-GA series comes with hermetic terminal and AS-GB series are integrated with cable. A convenient mount base to facilitate installation.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-15 to 65°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	121 Ω±1.7%
Output Resistance	121 Ω±1.7%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug; and with dedicated removable connector at the other end (AS-GA) (AS-GA: Shield wire is not connected to mainframe.) (AS-GB: Shield wire is connected to mainframe.)

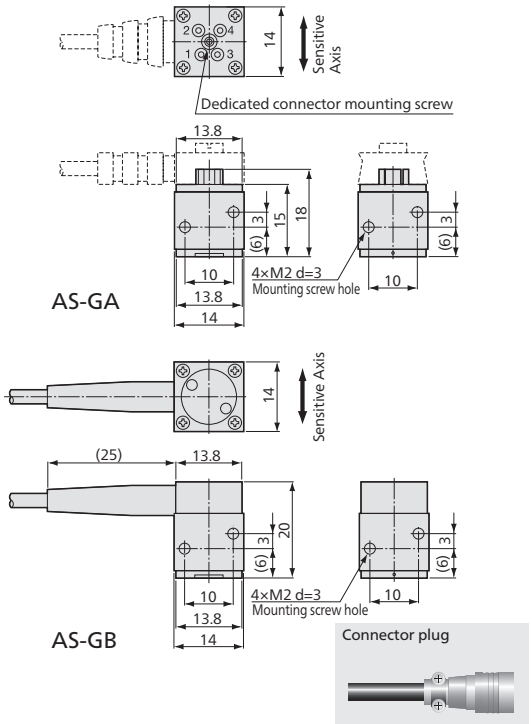
Mechanical Properties

Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	±4%
Weight	Approx. 15 g (GA) (Excluding cable) Approx. 25 g (GB) (Excluding cable)

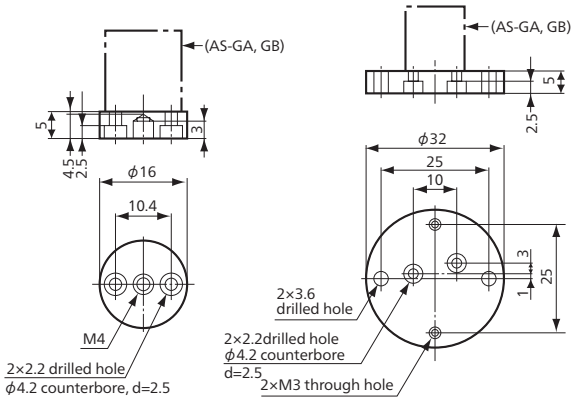
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
AS-1GA, GB	±9.807 m/s²(±1 G)	DC to 40 Hz ±5%
AS-2GA, GB	±19.61 m/s²(±2 G)	DC to 60 Hz ±5%
AS-5GA, GB	±49.03 m/s²(±5 G)	DC to 100 Hz ±5%
AS-10GA, GB	±98.07 m/s²(±10 G)	DC to 150 Hz ±5%
AS-20GA, GB	±196.1 m/s²(±20 G)	DC to 250 Hz ±5%

Note: To install AS-GB, use CC-33A adhesive or optional mount base (see figures below).
The acceleration transducer is subject to a constant acceleration in the direction of gravity, therefore measurement is restricted, taking into account this vertical movement (9.807m/s²).
For the AS-1GA/1GB, if sensitivity is set in line with the direction of gravity, then the rated capacity will be exceeded. As long as the safe overload rating is not exceeded, there will be no damage, but characteristics will be outside the guaranteed range.

■Dimensions



■Mount Base



DK-1A
Weight: Approx. 2.5 g, aluminum

DK-1B
Weight: Approx. 10 g, aluminum

●Dynamic measurement

AS-GA/GB Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9


Compact Recording System EDX-10 series → 3-49


Sensor Interface PCD-400A → 3-77

AS-B

●Compact & Lightweight ●98.07 to 490.3 m/s²

Small-sized Acceleration Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000 μm/m) ±20%(±25% with AS-10B)

Environmental Characteristics

Safe Temperature Range	-10 to 60°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	120 Ω±5%
Output Resistance	120 Ω±5%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	±2%
Weight	Approx. 13 g (Excluding cable)

The Small and Lightweight Design Barely Disturbs the Vibration Mode of the Object under Measurement.

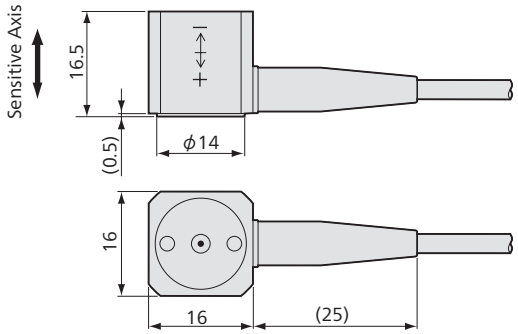
●10 million times repetitive measurement possible

The small and lightweight design barely disturbs the vibration mode of the object under measurement. Easy installation is ensured using CC-33A adhesive.

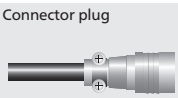
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
AS-10B	±98.07 m/s²(±10 G)	DC to 350 Hz ±5%
AS-20B	±196.1 m/s²(±20 G)	DC to 500 Hz ±5%
AS-50B	±490.3 m/s²(±50 G)	DC to 1 kHz ±5%

Notes: 1. Percentage in frequency response column is sensitivity deviation.
2. Resonance frequency measured by mounting to a shaker.

■Dimensions



Connector plug



●Dynamic measurement

AS-B Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9


Compact Recording System EDX-10 series → 3-49


Sensor Interface PCD-400A → 3-77

AS-HB

●High Frequency Response ●98.07 to 490.3 m/s²

Small-sized High Frequency Response Acceleration Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000 μm/m) ±20%(±25% with AS-10HB)

Environmental Characteristics

Safe Temperature Range	-15 to 65°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	120 Ω±8.3%
Output Resistance	140 Ω±7.1%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

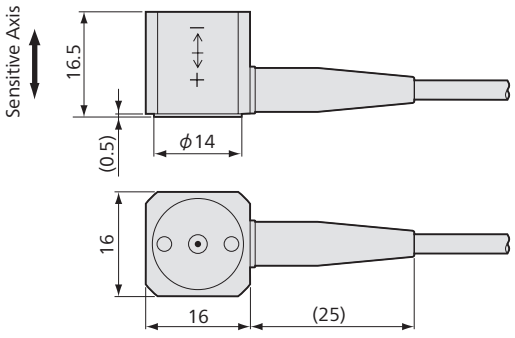
Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	±2%
Weight	Approx. 13 g (Excluding cable)

Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
AS-10HB	±98.07 m/s²(±10 G)	DC to 500 Hz ±5%
AS-20HB	±196.1 m/s²(±20 G)	DC to 650 Hz ±5%
AS-50HB	±490.3 m/s²(±50 G)	DC to 1.5 kHz ±5%

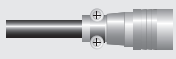
Highly Accurate and Reliable Transducers with Wide Frequency Response Ranges

AS-HB series acceleration transducers provide twice wider frequency response range than AS-B series at maximum. Therefore, AS-HB series ensure more accurate acceleration measurements. It is easy to install AS-HB by using the adhesive CC-33A.

■Dimensions



Connector plug



●Dynamic measurement

AS-HB Recommended products for combination


Strain Amplifier DPM-900 Series
→3-5


Signal Conditioner CDV-900A
→3-9


Compact Recording System EDX-10 series
→3-49


Universal Recorder EDX-100A
→3-63

ASH-A

●High Frequency Response ●980.7 to 9807 m/s²

Small-sized High Frequency Response Acceleration Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000μ m/m) ±20%

Environmental Characteristics

Safe Temperature Range	-15 to 65°C
Compensated Temperature Range	5 to 40°C
Temperature Effect on Zero Balance	Within ±1% RO/°C
Temperature Effect on Output	Within ±1%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	120 Ω±8.3%
Output Resistance	120 Ω±8.3%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug (Shield wire is not connected to mainframe.)

Mechanical Properties

Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	Less than ±2%
Weight	Approx. 6.5 g (Excluding cable)

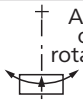
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
ASH-A-100	±980.7 m/s² (±100 G)	DC to 2 kHz ±5%
ASH-A-200	±1961 m/s² (±200 G)	DC to 3.5 kHz ±5%
ASH-A-500	±4903 m/s² (±500 G)	DC to 5 kHz ±10%
ASH-A-1K	±9807 m/s² (±1000 G)	DC to 7 kHz ±10%

Compact and Lightweight Design Resulting in Slight Effects on Vibration Mode

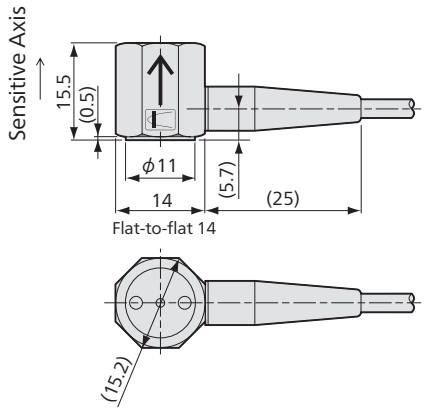
Compact and lightweight design of ASH-A series acceleration transducers do not disturb vibration mode of objects by installing these transducers. In addition, it is easy to install ASH-A acceleration transducers by adhesives like CC-33A.

■Acceleration Directions

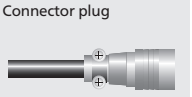
[↑] (Arrow head to one side direction mark of mainframe)

	Acceleration	impact	rotation	
Acceleration conditions				The mark of mainframe corresponds to the direction of acceleration
Polarities of output	(+)	(+)	(+)	

■Dimensions



Connector plug



●Dynamic measurement

ASH-A Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Compact Recording System EDX-10 series → 3-49


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-2000B → 3-67


Memory Recorder/Analyzer EDX-3000B → 3-69

AS-TG

Small-sized Triaxial Acceleration Transducer

- 9.807 to 196.1 m/s²
- Simultaneous Measurement of Acceleration in X, Y and Z Directions

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Able to Withstand against 10 Times Larger Overload than Rated Capacity by the Built-in Overload Stopper

AS-TG series acceleration transducers have 3 incorporated miniature acceleration transducers to measure simultaneously 3 axial accelerations (X, Y, and Z). Not only are interferences of AS-TG series among each axes little, but also AS-TG series can withstand against 10 times larger overload than rated capacity. Moreover, it can be used also to 10 million times of repetition loads.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-10 to 60°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	121 Ω±1.7%
Output Resistance	121 Ω±1.7%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug (Shield wire is not connected to mainframe.)

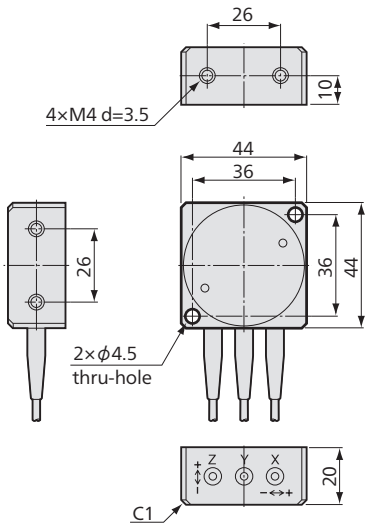
Mechanical Properties

Safe Overload Rating	1000% (With a stopper)
Frequency Response Range	See table below.
Transverse Sensitivity	±4%
Weight	Approx. 110 g (Excluding cable)

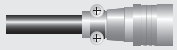
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
AS- 1TG	±9.807 m/s² (±1 G)	DC to 40 Hz ±5%
AS- 2TG	±19.61 m/s² (±2 G)	DC to 60 Hz ±5%
AS- 5TG	±49.03 m/s² (±5 G)	DC to 100 Hz ±5%
AS-10TG	±98.07 m/s² (±10 G)	DC to 150 Hz ±5%
AS-20TG	±196.1 m/s² (±20 G)	DC to 250 Hz ±5%

Notes: Measurement range of up-down direction is narrowed by 1G (9.807 m/s²) because gravity acceleration is always applied to acceleration transducers. In terms of AS-1TG, detected value exceeds rated capacity in positive side toward gravity direction. Although AS-TG acceleration transducers are not broken under safe overload rating, characteristics are out of warranty.

Dimensions



Connector plug



●Dynamic measurement

AS-TG Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9


Compact Recording System EDX-10 series → 3-49


Universal Recorder EDX-100A → 3-63

AS-TB

Triaxial Acceleration Transducer

- Simultaneous Measurement of Acceleration in X, Y and Z Directions
- 98.07 to 490.3 m/s²

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	±0.5 mV/V (1000 μm/m) ±20% (AS-TB) (±25% with AS-10TB)

Environmental Characteristics

Safe Temperature Range	-15 to 65°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	120 Ω±5%
Output Resistance	120 Ω±5%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 5 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

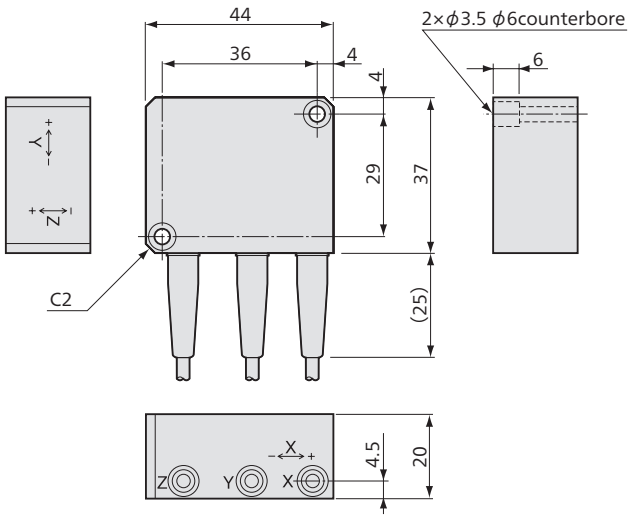
Safe Overload Rating	300% (Each axis)
Frequency Response Range	See table below.
Transverse Sensitivity	±2%
Weight	Approx. 95 g (Excluding cable)

Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
AS-10TB	±98.07 m/s² (±10 G)	DC to 350 Hz ±5%
AS-20TB	±196.1 m/s² (±20 G)	DC to 500 Hz ±5%
AS-50TB	±490.3 m/s² (±50 G)	DC to 1 kHz ±5%

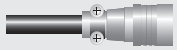
Compact and Lightweight Design and Simultaneous Measurement of Accelerations in X, Y, and Z Directions

AS-TB series acceleration transducers have 3 incorporated acceleration transducers to measure simultaneously 3 axial accelerations (X, Y and Z). Because of little interference among each axes, these series acceleration transducers enable accurate measurement and be applied to acceleration analysis of complex vibration phenomena.

■Dimensions



Connector plug



●Dynamic measurement

AS-TB Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Signal Conditioner CDV-900A → 3-9


Compact Recording System EDX-10 series → 3-49


Universal Recorder EDX-100A → 3-63

ASHT-A

Triaxial Acceleration Transducer

- Measures 3 X, Y, and Z axes simultaneously
- 980.7 to 9807 m/s²

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact and lightweight measure 3 axes acceleration simultaneously.

- Measurement from DC is possible
- 3 acceleration transducers are within the same case, enabling measurement in X, Y, and Z axes.
- Minimal mutual interference between each axis, enabling high-accuracy measurement.
- Applicable to the analysis of acceleration in complex vibration phenomena
- Compact and lightweight

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.5 mV/V (1000 μm/m) ±20%

Environmental Characteristics

Compensated Temperature Range	5 to 40°C
Safe Temperature Range	-15 to 65°C
Temperature Effect on Zero Balance	Within ±1% RO/°C
Temperature Effect on Output	Within ±1% RO/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	2 V AC or DC
Input Resistance	120 Ω±8.3%
Output Resistance	120 Ω±8.3%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 5m long, 3.2 mm diameter, end connector plug (PRC03-12A 10-7M 10.5) ×3 (Shield wire is not connected to mainframe.)

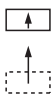
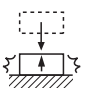
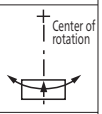
Mechanical Properties

Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	2% or less
Weight	Approx. 45 g (With cable, 420 g)
Dimensions	30×38×16 mm

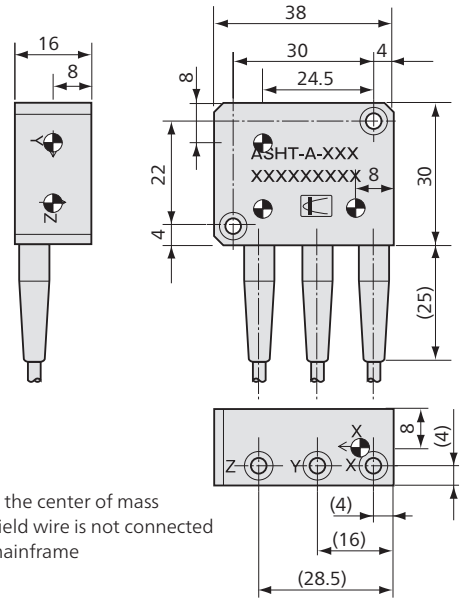
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
ASHT-A-100	±980.7 m/s² (±100 G)	DC to 1.2 kHz ±5%
ASHT-A-200	±1961 m/s² (±200 G)	DC to 2.1 kHz ±5%
ASHT-A-500	±4903 m/s² (±500 G)	DC to 3 kHz ±10%
ASHT-A-1K	±9807 m/s² (±1000 G)	DC to 5 kHz ±10%

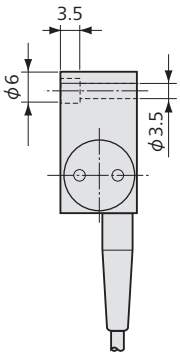
Acceleration Directions

Arrows on mainframe " ↑"

Acceleration conditions	Acceleration	Impact	Rotation	The arrow on the mainframe is in accordance with the direction of acceleration.
				
Polarities of output	(+)	(+)	(+)	

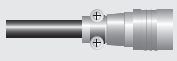
Dimensions





◔ indicates the center of mass
Note) Shield wire is not connected to mainframe

Connector plug



● Dynamic measurement

ASHT-A Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Compact Recording System EDX-10 series → 3-49


Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-2000B → 3-67


Memory Recorder/Analyzer EDX-3000B → 3-69

ASW-A

Waterproof Acceleration Transducer

●Usable Underwater or underground
●9.807 to 196.1 m/s²

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Waterproof Structure to Withstand against Water Pressures up to 490kPa. Corrosion-Resistant Model with Stainless Steel

ASW -A series are waterproof acceleration transducers to withstand against water pressures up to 490kPa. Even small-sized these acceleration transducers ensure reliable measurements under harsh operating environments. In addition, corrosion-resistant version with stainless steel case is also available.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	±0.5 mV/V (1000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	-15 to 65°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 3 V AC or DC
Input Resistance	122 Ω±1.6%
Output Resistance	122 Ω±1.6%
Cable	4-conductor (0.08 mm²) chloroprene shielded cable,
	4 mm diameter by 5 m long, terminated with connector plug
	Underwater application possible by using Kyowa's cable
	connection kit JB-200A
	(Shield wire is connected to mainframe.)

Mechanical Properties

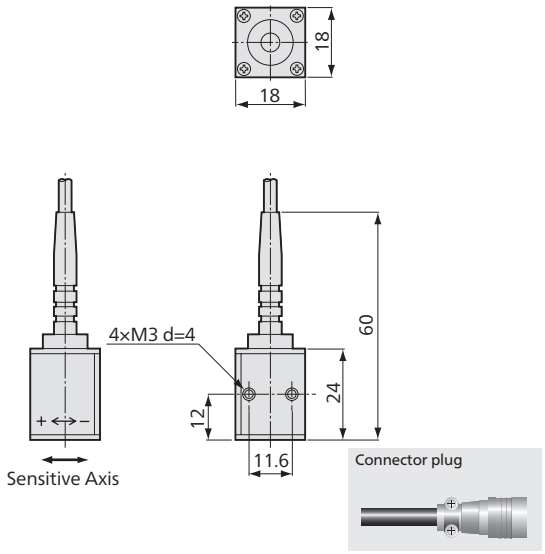
Safe Overload Rating	300%
Frequency Response Range	See table below.
Transverse Sensitivity	±4%
Withstand Water Pressure	490.3 kPa
Material	Case: Corrosion-resistant aluminum,
	anodic acid coating
Weight	Approx. 40 g (Excluding cable)

*For installation, use CC-33A adhesive or optional mount base (shown below).

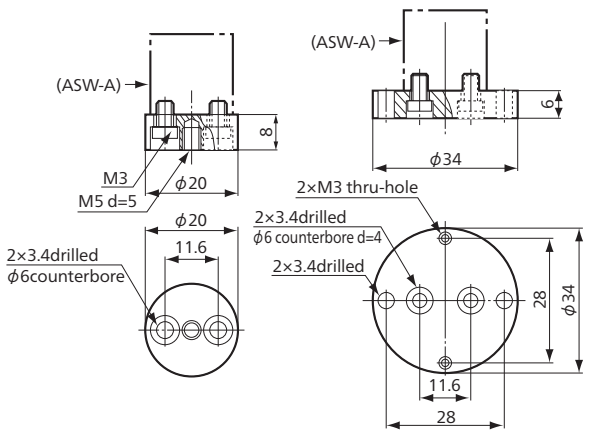
Models	Rated Capacity (Reference Value)	Frequency Response (at 23°C)
ASW- 1A	±9.807 m/s²(±1 G)	DC to 40 Hz ±5%
ASW- 2A	±19.61 m/s²(±2 G)	DC to 60 Hz ±5%
ASW- 5A	±49.03 m/s²(±5 G)	DC to 100 Hz ±5%
ASW-10A	±98.07 m/s²(±10 G)	DC to 150 Hz ±5%
ASW-20A	±196.1 m/s²(±20 G)	DC to 250 Hz ±5%

Note) The acceleration transducer is subject to a constant acceleration in the direction of gravity, therefore measurement is restricted, taking into account this vertical movement (9.807 m/s²).
For the ASW-1A, if sensitivity for vertical acceleration is set in line with the direction of gravity, then the rated capacity will be exceeded in the + direction. As long as the safe overload rating is not exceeded, there will be no damage, but characteristics will be outside the guaranteed range.

■Dimensions



■Mount Base



DK-1C
Weight: Approx. 5.3 g
Aluminum

DK-1D
Weight: Approx. 13 g
Aluminum

●Dynamic measurement

ASW-A Recommended products for combination

Strain Amplifier DPM-900 Series → 3-5

Signal Conditioner CDV-900A → 3-9

Compact Recording System EDX-10 series → 3-49

Sensor Interface PCD-400A → 3-77

ASQ®-D

Servo Type Acceleration Transducer

- 9.807 to 49.03 m/s²
- Measurement of minute vibrations
- IP67

Highly sensitive measurement of minute vibration Most suitable for vibration measurement of vehicles, structures and the ground

- Acceleration measurement in a range of DC to 100 Hz is possible. (If desired, a model covering a range of DC to 300 Hz can be manufactured.)
- Compact and lightweight while ensuring high accuracy and high output

Unlike conventional strain-gage type acceleration transducers, the ASQ series acceleration transducers have a servomechanism that ensures accurate, stable and reliable measurement of minute vibration with high sensitivity. A dedicated VAQ signal conditioner is available as the mating instrument.
Measuring targets include vibration generated by running vehicles, earthquake or wind in structures and the ground as well as general low-frequency vibration.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.03% RO
Hysteresis	Within ±0.05% RO
Rated Output	±5 V(10 V)±5%

Environmental Characteristics

Compensated Temperature Range	-10 to 60°C
Safe Temperature Range	-20 to 80°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05% RO/°C

Electrical Characteristics

Power Supply	±11 to ±16 VDC, 40 mA or less (±12 V recommended)
	Supplied from dedicated signal conditioner VAQ-700A, if used.
Cable	N-41: 6-conductor (0.2 mm²) vinyl shielded dedicated cable
	(For connection to VAQ-700A), 5.8 mm diameter by 50 m long (optional)
	N-45: 6-conductor (0.2 mm²) vinyl-shielded 1-G cancel cable, 5.8 mm diameter by 40 cm long
	Applicable connector 272FCW-12P (optional) (WITCO OF JUPITER DENTSU Co., Ltd.)

Mechanical Properties

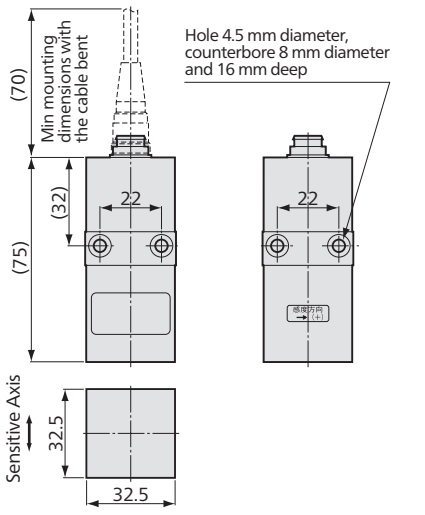
Frequency Response Range	DC to 100 Hz (sensitivity deviation ±10%); DC to 300 Hz available on request
Transverse Sensitivity	Within ±0.3%
Degree of Protection	IP67 (IEC 60529)
Weight	Approx. 220 g (Excluding cable)

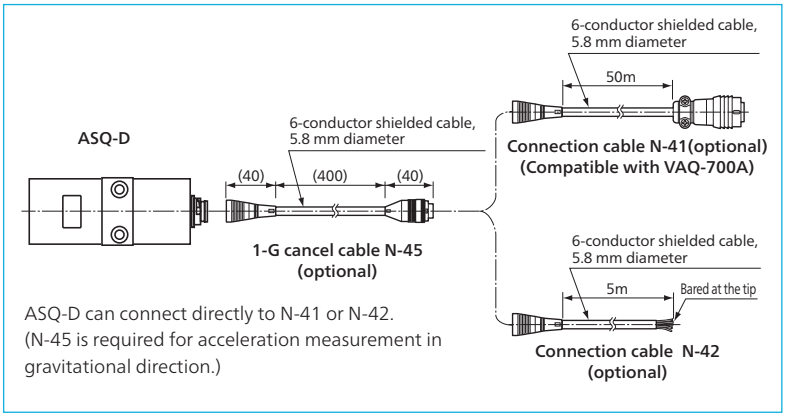
Standard Accessories Hexagon socket head bolts (2–M4 x 25)
Instruction Manual

Optional Accessories Connection cables N-41 50 m long & N-42 5 m long
1-G cancel cable N-45 40 cm long

Models	Rated Capacity
ASQ-D-1	±9.807 m/s² (±1 G)
ASQ-D-2	±19.61 m/s² (±2 G)
ASQ-D-5	±49.03 m/s² (±5 G)

Dimensions

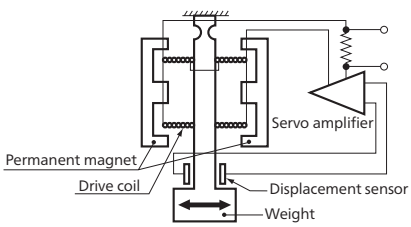




ASQ-D can connect directly to N-41 or N-42.
(N-45 is required for acceleration measurement in gravitational direction.)

Example of basic structure of servo type acceleration transducer

With the basic structure shown, an applied acceleration displaces the weight from the neutral position. The displacement sensor detects the displacement quantity and sends via the servo amplifier the signal to the drive coil that is fixed to the weight support. When the signal current flows to the drive coil placed in a magnetic field generated by the permanent magnet, the electromagnetic force returns the weight to the original position. Since the current is proportional to the applied acceleration, a proportional voltage to the acceleration is output from both ends of the resistor inserted in the current loop.



- Static measurement / Dynamic measurement

ASQ®-D Recommended products for combination

VAQ®-700A
→2-128

VAQ®-700A

ASQ dedicated conditioner

●Simultaneous measurement of acceleration, velocity and displacement

Signal conditioner that can simultaneously measure acceleration, velocity and displacement

●Easy-to-read LED indicator
●Single channel type. Multiple units can be accommodated in a portable housing case for multi-channel measurement.

The 1-channel signal conditioner enables simultaneous measurement of acceleration, velocity by 1-time integration and displacement by 2-time integration. For multi-channel measurement, a portable housing case is available to accommodate multiple units.

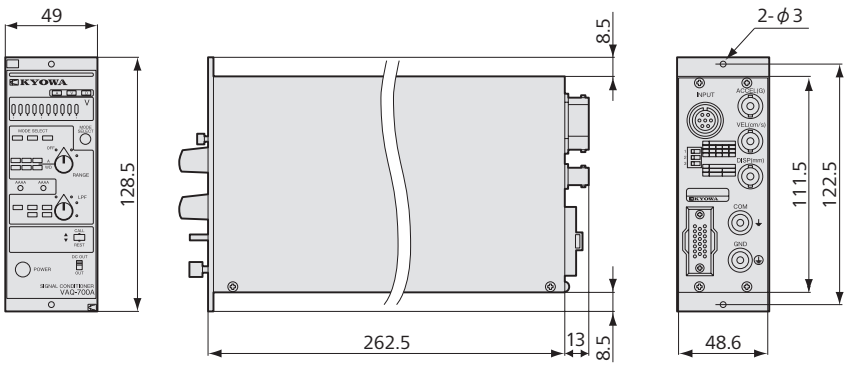
Specifications

Applicable Transducers		ASQ-D-1	ASQ-D-2	ASQ-D-5
Number of Measuring Channels		1		
Measuring Modes		Simultaneous measurement and output of acceleration, velocity and displacement		
Acceleration	Measuring Range	±9.807 m/s²(±1G)	±19.61 m/s²(±2 G)	±49.03 m/s²(±5 G)
	Range Select (G≒9.807 m/s²)	0.01, 0.1, 1G, OFF	0.02, 0.2, 2G, OFF	0.05, 0.5, 5G, OFF
	Calibration	Linked with selected range x 1.02		
	Accuracy	±0.5% to reading with both measuring range and calibration		
	Frequency Response Range	DC to 300 Hz (±5%) in DC acceleration mode, 0.1 to 100 Hz (±5%) in AC acceleration mode		
Velocity	Measuring Range	±100 cm/s	±200 cm/s	±500 cm/s
	Range Select	1,10,100 cm/s, OFF	2,20,200 cm/s, OFF	5, 50, 500 cm/s, OFF
	Calibration	Linked with selected range		
	Accuracy	±1% to reading with both measuring range and calibration		
	Frequency Response Range	0.1 to 100 Hz(±5%)		
Displacement	Measuring Range	±100 mm	±200 mm	±500 mm
	Range Select (G≒9.807 m/s²)	1, 10, 100 mm, OFF	2, 20, 200 mm, OFF	5, 50, 500 mm, OFF
	Calibration	Linked with selected range		
	Accuracy	±1% to reading with both measuring range and calibration		
	Frequency Response Range	0.1 to 60 Hz (±5%) (1 to 60 Hz with a maximum sensitivity selected for the measuring range)		
Output		±10 V (load 5 kΩ or more)		
Operating Temperature Range		–10 to 50°C		
Power Supply		AC line or 12 VDC		
Dimensions & Weight		49(W)×128.5(H)×262.5(D) mm, approx.1.4 kg		

Standard Accessories: AC power cable P-16 (With a conversion adapter CM-39), output cable U-58 (3 PC.), fuse, miniature screwdriver, Instruction Manual

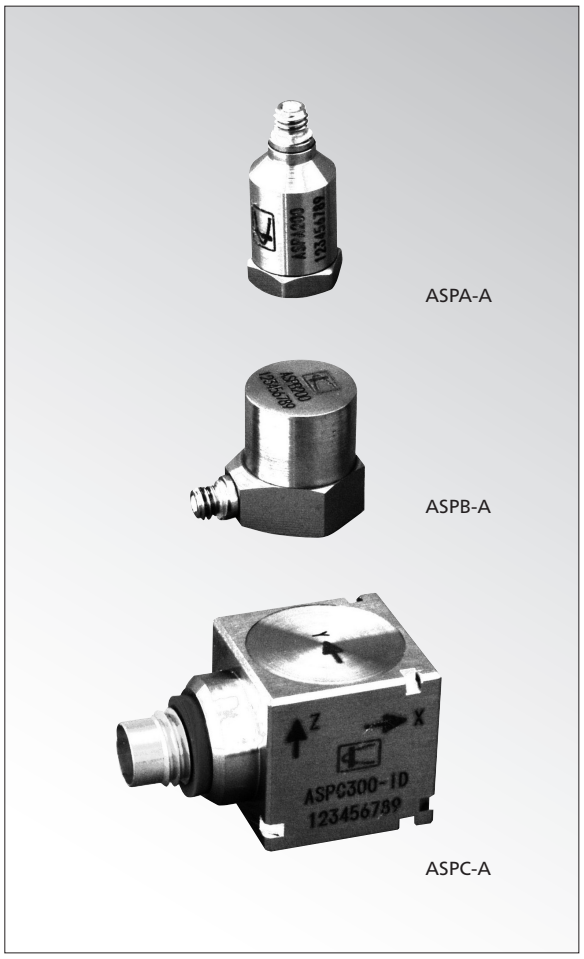
Optional Accessories: YC-A is a portable housing case that can accommodate multiple units of VAQ-700A. For the YC-A, refer to page 3-18.

■Dimensions



ASPA-A/ASPB-A/ASPC-A

Piezoelectric acceleration transducer (built-in amplifier)



Specifications

■ASPA-A-200	
Used Acceleration	±2200 m/s²
Voltage Sensitivity	1.0 mV per m/s² ±10%
Resonant Frequency	Approx. 45 kHz
Frequency Range (±1 dB)	3 Hz to 12 kHz
Frequency Range (±3 dB)	1.5 Hz to 16 kHz
Impact Resistance	10000 m/s²
Usable Temperature Range	-30 to 100°C
Lateral Sensitivity	5% or less
Output Impedance	100 Ω or less
Weight	Approx. 2 g
External Case Material	Titanium
Mounting Screws	Female screw (M3×0.5 depth 2)
Power Source	15 to 25 VDC, 0.5 to 5.0 mA
Cable	Dedicated cable (Y01D0995) length approx. 2 m
	Tip connector
	·Transducer side - C29-104P
	·Measuring instrument side – miniature connector
	(Shield wire is connected to mainframe.)
Standard Accessories	Miniature BNC conversion connector

*Acceleration (m/s²)
= Output voltage from sensor (mV) ÷ Voltage sensitivity (mV per m/s²)

■ASPB-A-200	
Used Acceleration	±2200 m/s²
Voltage Sensitivity	1.0 mV per m/s² ±10%
Resonant Frequency	Approx. 45 kHz
Frequency Range (±1 dB)	3 Hz to 12 kHz
Frequency Range (±3 dB)	1.5 Hz to 16 kHz
Impact Resistance	10000 m/s²
Usable Temperature Range	-30 to 100°C
Lateral Sensitivity	5% or less
Output Impedance	100 Ω or less
Weight	Approx. 3 g
External Case Material	Titanium
Mounting Screws	Female screw (M3×0.5 depth 2)
Power Source	15 to 25 VDC, 0.5 to 5.0 mA
Cable	Dedicated cable (Y01D0995) length approx. 2 m
	Tip connector
	·Transducer side - C29-104P
	·Measuring instrument side – miniature connector
	Shield wire is connected to mainframe
Standard Accessories	Miniature BNC conversion connector

*Acceleration (m/s²)
= Output voltage from sensor (mV) ÷ Voltage sensitivity (mV per m/s²)

Wide measurement range, capable of measuring slight through to high accelerations.

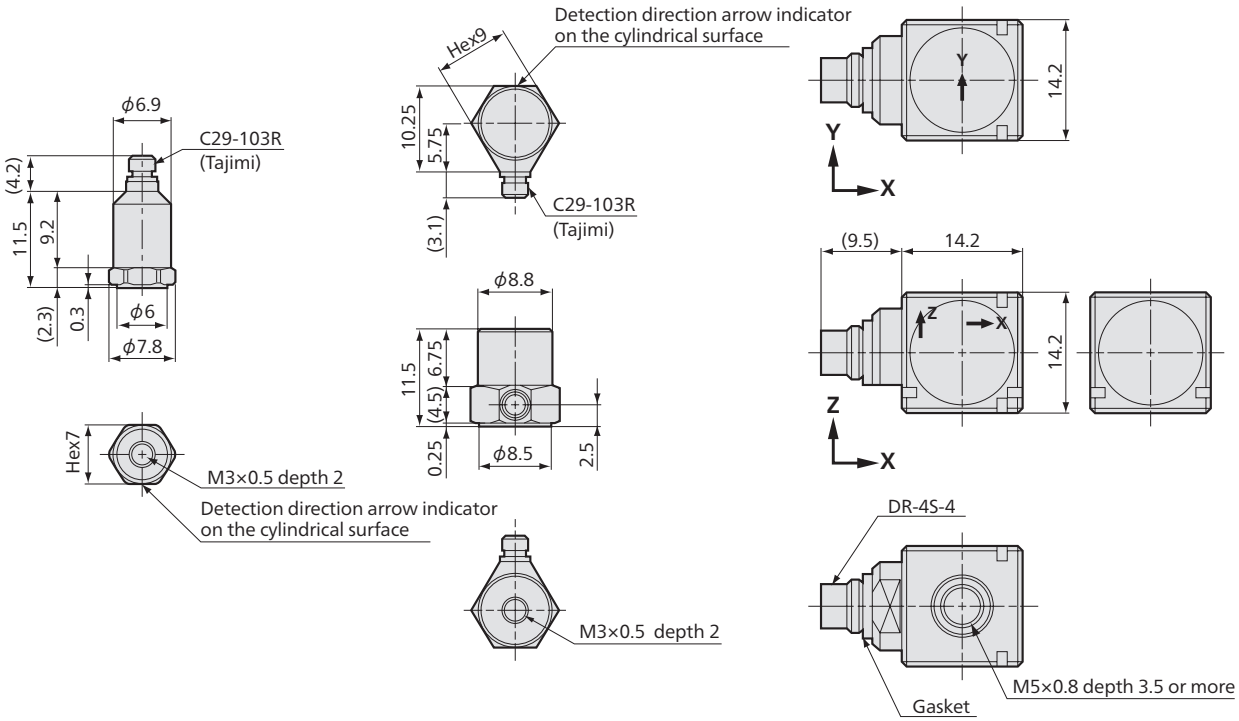
- ●High sensitivity, small size
- ●Capable of measurement of wide band, low to high frequencies
- ●Provides a wide measurement range, capable of measuring slight to high accelerations
- ●High mechanical strength
- ●Environmentally-resistant

■ASPC-A-30/ASPC-A-300/ASPC-A-30-ID/ASPC-A-300-ID	
Used Acceleration	ASPC-A-30: ±400 m/s²
	ASPC-A-300: ±4000 m/s²
	ASPC-A-30-ID: ±360 m/s²
	ASPC-A-300-ID: ±3600 m/s²
Voltage Sensitivity	ASPC-A-30: 10 mV per m/s² ±10%
	ASPC-A-300: 1.0 mV per m/s² ±10%
	ASPC-A-30-ID: 10 mV per m/s² ±10%
	ASPC-A-300-ID: 1.0 mV per m/s² ±10%
Resonant Frequency	Approx. 35 kHz
Frequency Range (±1 dB)	1 Hz to 5 kHz
Frequency Range (±3 dB)	1 Hz to 8 kHz
Impact Resistance	30000 m/s²
Usable Temperature Range	
ASPC-A-30 / ASPC-A-300	
-50 to 110°C (With operating power supply 0.5 mA to 5 mA)	
-50 to 70°C (With operating power supply 0.5 mA to 10 mA)	
However, the measurement side connector is -20°C to 60°C	
ASPC-A-30-ID / ASPC-A-300-ID	
–40 to 85°C (With operating power supply 0.5 mA to 5 mA)	
–40 to 70°C (With operating power supply 0.5 mA to 10 mA)	
However, the measurement side connector is -20°C to 60°C	

Lateral Sensitivity	5% or less
Output Impedance	1000 Ω or less
Weight	Approx. 11 g
External Case Material	Titanium
Mounting Screws	Female screw (M5×0.8 depth 3.5)
Power Supply	21 to 24 VDC, 0.5 to 10 mA
Cable	Dedicated cable (Y01D0898) length approx. 3.3 m
	Tip connector transducer side DR-4S-1
	Measurement side BNC connector (BNC163)
	Shield wire is connected to mainframe.
Sensor ID	TEDS (IEEE1451.4)
	(ASPC-A-30 -ID / ASPC-A-300 –ID only)
Other	For 3 axis (X, Y, Z)

*Acceleration (m/s²)
= Output voltage from sensor (mV) ÷ Voltage sensitivity (mV per m/s²)

■Dimensions



●Dynamic measurement

ASPA/ASPB/ASPC Recommended products for combination

Conditioner card CVM-41A → 3-74

+

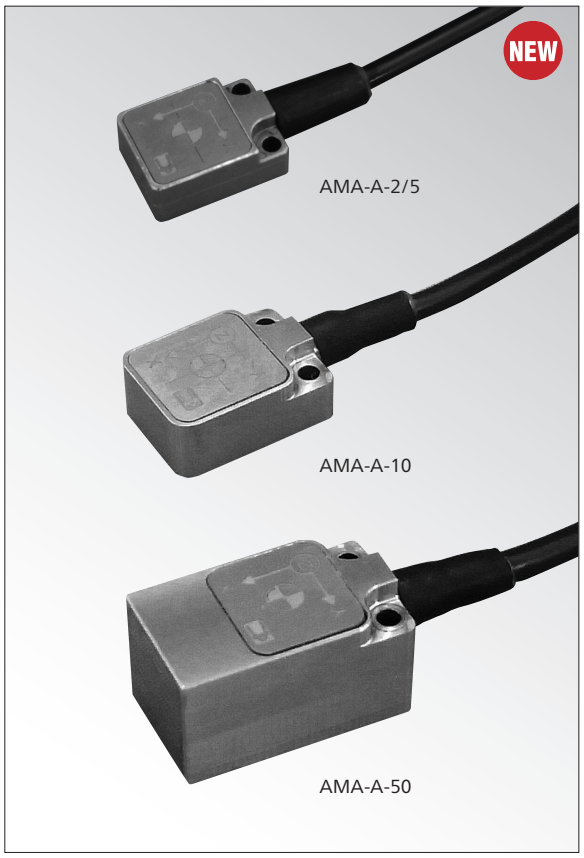
Universal Recorder EDX-200A → 3-55

Universal Recorder EDX-100A → 3-63

Memory Recorder/Analyzer EDX-3000B → 3-69

AMA-A

Small-sized Triaxial Accelerometer



●Lightweight ●19.61 to 490.3 m/s²

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	± 2 V ± 0.2 V

Environmental Characteristics

Compensated Temperature Range	-10 to 60°C (Non-condensing)
Safe Temperature Range	-20 to 80°C (Non-condensing)
Temperature Effect on Zero Balance	Within ± 0.5% RO / °C (Ideal value)
Temperature Effect on Output	Within ±1% /°C
Electrostatic withstand voltage	4 kV

Electrical Characteristics

Safe Excitation Voltage	Dual supply: ± 7 VDC
	Single supply: 14 V
Recommended Excitation Voltage	Dual supply: ± 2.5 VDC to ± 6 VDC
	Single supply: 5 to 12 VDC
Consumption Current	AMA-A-2 to 5: 10 mA or less (5 VDC)
	AMA-A-10 to 50: 20 mA or less (5 VDC)
Cables	Sensor to Relay: D* mm diameter by 5 m long
	6-conductor (0.04 mm²) chloroprene shielded cable.
	(Shield wire is not connected to mainframe.)
	*D:2.5 for AMA-A-2 to 5; 2.9 for AMA-A-10 to 50

Mechanical Properties

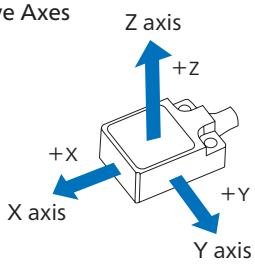
Safe Overload	See table below.
Frequency Response Range	See table below.
Transverse Sensitivity	Within ±4%
Weight	Sensor: See table below.
	Relay: Approx. 5 g (Excluding cable)
Dimensions	See table below.

Note) The acceleration transducer is subject to a constant acceleration in the direction of gravity, therefore measurement is restricted, taking into account this vertical movement (9.807 m/s²).

Compact & lightweight acceleration transducer enduring large overloads

- ●Compact and Triaxial
- ●High frequency response (AMA-A-2 to 5: Up to 500 Hz, AMA-A-10 to 50: Up to 200 Hz)
- ●Durable
- ●No external power supply unit is necessary. (Using EDX's conditioner card CVM-41A or AD-40AS)
- ●Fault diagnosis function is available
- ●Also available battery box for AMA as an optional accessory

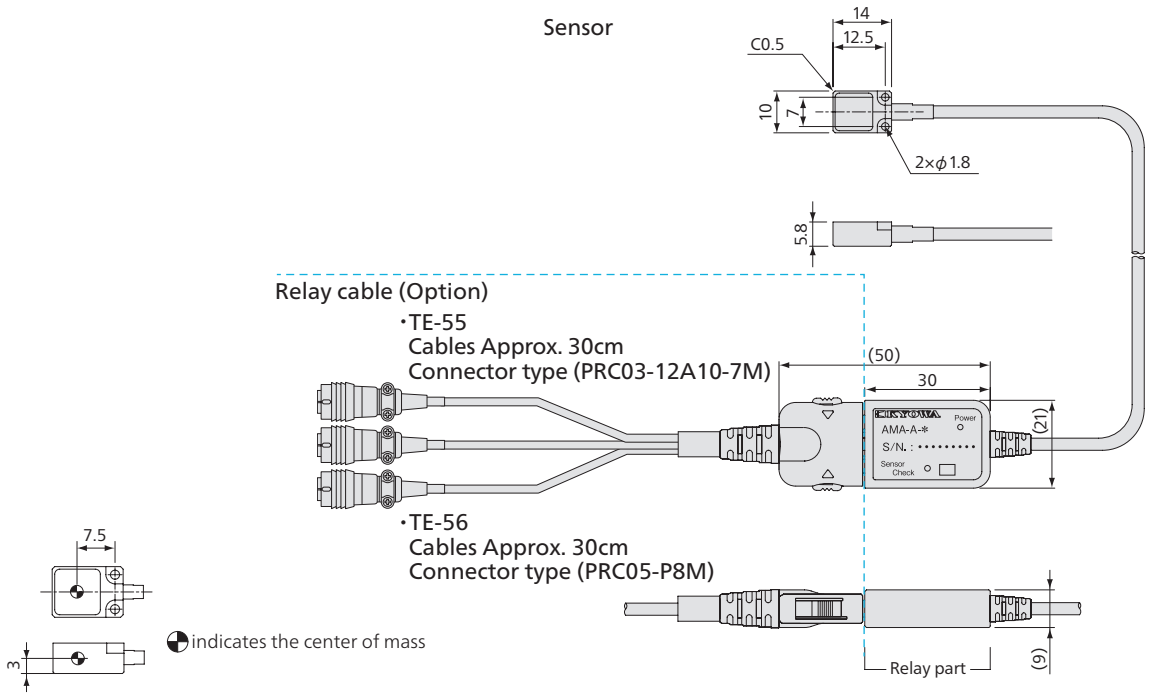
Directions of Sensitive Axes



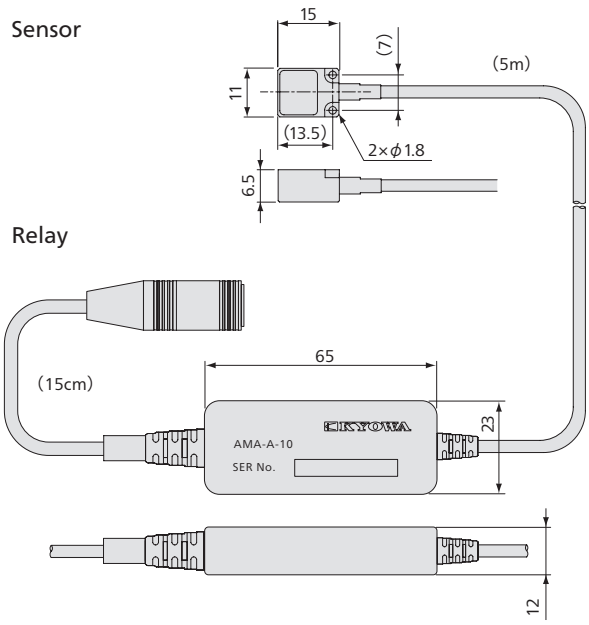
Models	Rated Capacity	Safe overload	Frequency response	Weight (Sensor)	Dimensions	
					Sensor	Relay
AMA-A-2	±19.61 m/s² (±2G)	±19,613 m/s² (±2000 G)	DC to 500 Hz	3 g	14(W)×10(D)×5.8(H)	30(W)×21(D)×9(H)
AMA-A-5	±49.03 m/s² (±5G)					
AMA-A-10	±98.07 m/s² (±10G)	±9,807 m/s² (±1000 G)	DC to 200 Hz	7 g	15(W)×11(D)×6.5(H)	65(W)×23(D)×12(H)
AMA-A-50	±490.3 m/s² (±50G)			13.5 g	19.3(W)×11(D)×11(H)	65(W)×23(D)×12(H)

■Dimensions

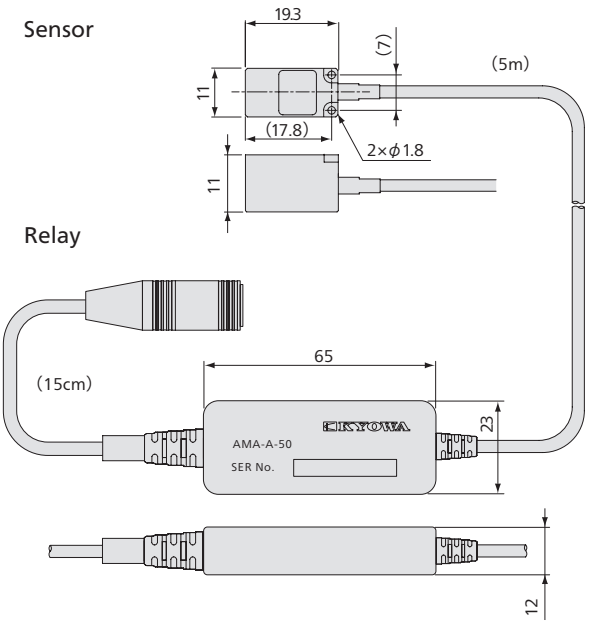
AMA-A-2, 5



AMA-A-10



AMA-A-50



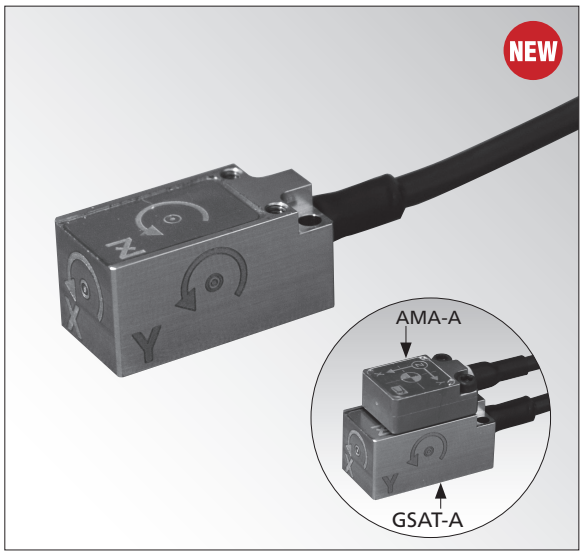
* Relay cable is an optional accessory.

●Dynamic measurement

AMA-A Recommended products for combination
Conditioner card CVM-41A → 3-74
AD Converter Card AD-40AS → 3-76
+
Universal Recorder EDX-200A → 3-55
Universal Recorder EDX-100A → 3-63
Memory Recorder/Analyzer EDX-3000B → 3-69

GSAT-A-900

Three Axis Angular Rate Gyro



Compact and lightweight while enabling simultaneous measurement of angular velocities in 3 directions

- Compact and triaxial
- High shock resistance 9807 m/s² (1000G)
- Most suitable for posture measurement
- AMA-A* can be mounted on the top

Note: * AMA-A: Compact triaxial acceleration transducers

Specifications

Performance

Rated Capacity	±900 deg./s (±15.708 rad/s)
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±.05% RO
Rated Output	Approx. ±2.0 V

Environmental Characteristics

Compensated Temperature Range	5°C to 40°C
Safe Temperature Range	–10°C to 60°C
Temperature Effect on Zero Balance	Within ±1.0% RO / °C

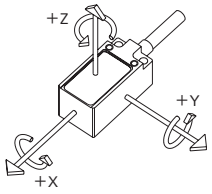
Electrical Characteristics

Safe Excitation Voltage	±6.0 VDC with dual supply
	12 VDC with single supply
Recommended Excitation Voltage	±2.5 VDC to ±5.0 VDC with dual supply
	With single supply, refer to the instruction manual.
No-load Output	Within ±10% RO
Cables	Sensor: 9-conductor (0.04 mm²) vinyl shielded cable, 2.7 mm diameter by approx. 7 m long
	Relay: 4-conductor (0.05 mm²) vinyl shielded cables, 2.6 mm diameter by approx. 1 m long, terminated with connector plugs
	(Shield wire is not connected to mainframe.)

Mechanical Properties

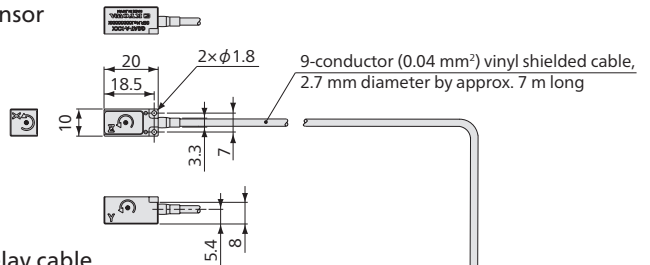
Safe Overload Rating	1000%
Safe Shock Resistance	9807 m/s² (1000G)
Transverse Sensitivity	Within ±10% RO
Weight	Approx. 10 g (Excluding cables)

Directions of Sensitive Axes

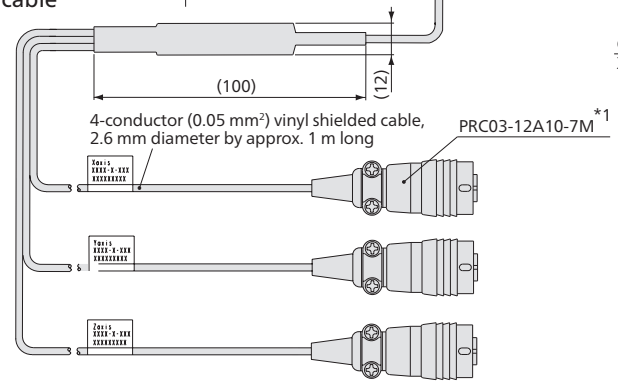


Dimensions

Sensor

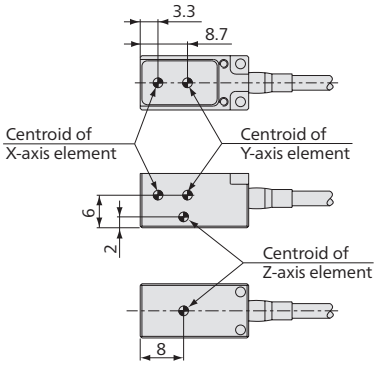


Relay cable



*1 For rectangular connectors' type Its model is GSAT-A-J

Centroid positions



Weight: Approx. 10 g (Excluding cables)
Cable full length: Approx. 8 m long

◓ indicates the centroid of element.

●Dynamic measurement

GSAT-A Recommended products for combination

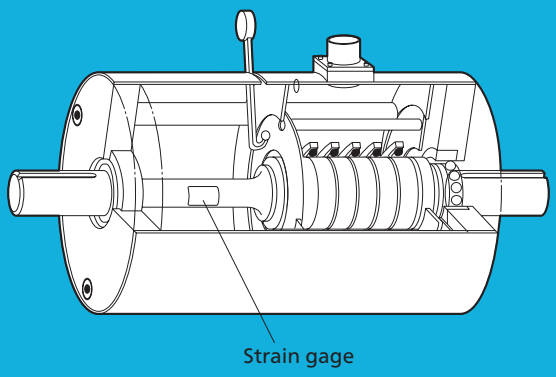

DIS-5010A
→ 5-39


DIS-5210A
→ 5-46

Torque Transducers

Kyowa's torque transducers convert torsion (surface shearing stress) corresponding to a torque of the shaft to an electric quantity (voltage), and then output signals through slip ring, brush, rotary transformer and photo transmittance. They ensure accurate and easy measurement of the torque transmitted from the target object under conditions of standstill to high-speed rotation.
Since all these transducers use strain gages for the sensing element, precise and stable measurement is assured even for long-term operation under severe conditions. Thus, they can widely be used not only for experiments and research but also for industrial measurement.
Kyowa's torque transducers are designed for use in combination with strain amplifiers. Kyowa's recorder/ analyzer enables simultaneous measurement of torque and other variables such as temperature.

■Torque Transducers



Features

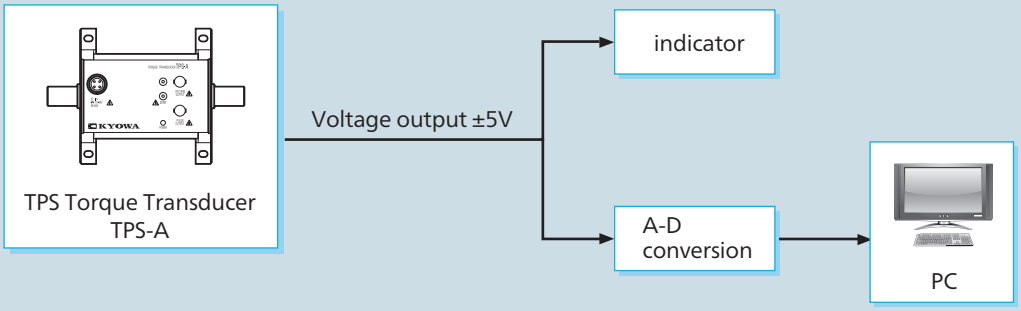
- Stable torque measurement under various conditions from stop to high-speed rotation
- Highly accurate torque measurement with minimal effect of bending or thrust of the shaft
- Little impact from shaft bending or sliding, enabling high accuracy torque measurements

To Ensure Safe Usage

Kyowa's torque transducers are designed to detect torsional deformation of a metal shaft by using a strain gage. Torque is measured on a shaft placed between a motor and a load. If torque exceeding the rated capacity is applied to the torque transducer, a shaft will be deformed plastically and then be destructed. Also, if overload torque continues to be applied, this results in fatigue destruction of shaft.
In TP series, shafts are covered with metal case which prevents scattering broken pieces by destruction, but make sure to take countermeasures.

(1) Kyowa's torque transducers are designed to transmit torsional torque. Make sure that the end of the shaft does not receive any radial or thrust load. Loads except torsional load may cause destruction of a shaft by applying excessive stress.
(2) For TP series torque transducers, use a flexible coupling. Rigid flange coupling causes a shaft excessive stress leading to worsen performance and destruction.
(3) If the load has a high inertia and the motor rotation rises up quickly, the transducer may momentarily be loaded with a large torque. Make sure to choose a suitable torque transducer which has enough rated capacity.
(4) In dynamic torque measurement, pay attention to a natural frequency of a torsion which depends on relationships among both inertias of a motor and a load and a torsional rigidity of a torque transducer. Also, avoid rotating a shaft at a speed (rpm) approaching a natural frequency of a measurement system.

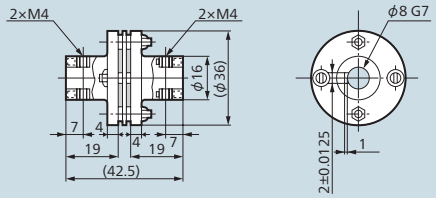
Block Diagram of Measurement System of TPS Torque Transducers



Flexible Couplings Dedicated to TP-D/E/M

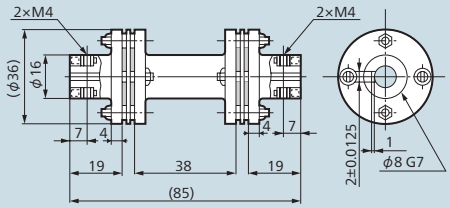
- FC-1B, Single Type
  (For use where there is no eccentricity but only declination)
- FC-2B, Double Type
  (For use where there are both eccentricity and declination)

FC-1B



Max. Angular Deviation: 0.8°
Torsion Spring Constant: Approx. 800 N·m/rad
Weight: Approx. 40 g

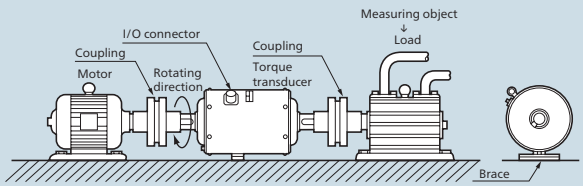
FC-2B



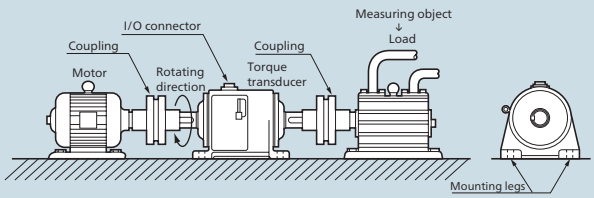
Max. Eccentricity: 0.5 mm
Max. Angular Deviation: 0.8°
Torsion Spring Constant: Approx. 800 N·m/rad
Weight: Approx. 80 g

Method how to install TP Torque Transducer (Check the I/O connector position and measuring object when installing.)

To measure load torque

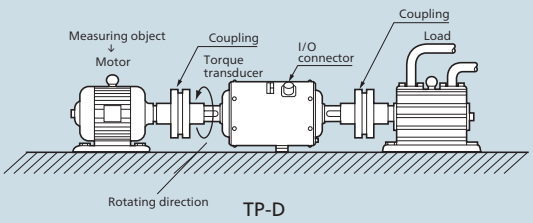


TP-D

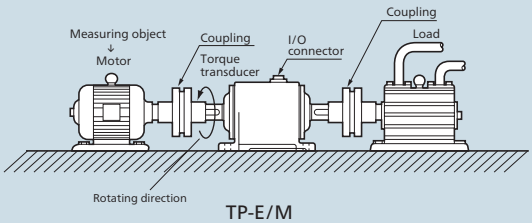


TP-E/M

To measure motor torque



TP-D

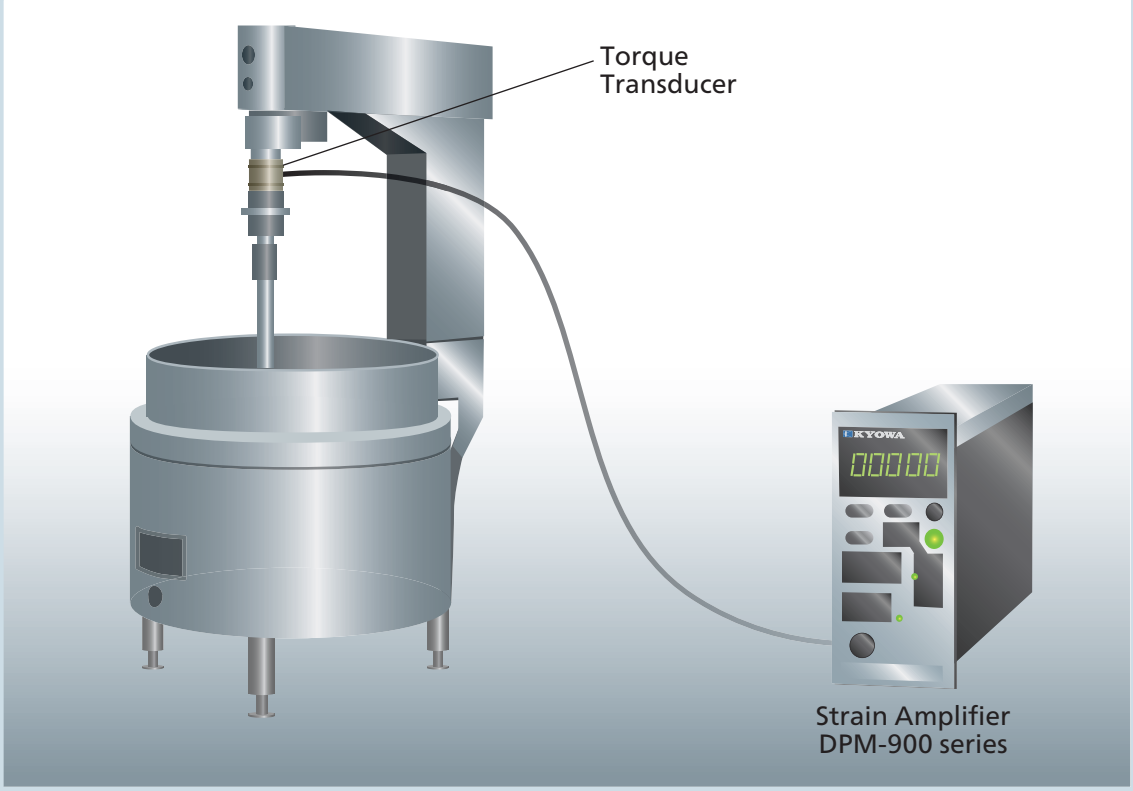


TP-E/M

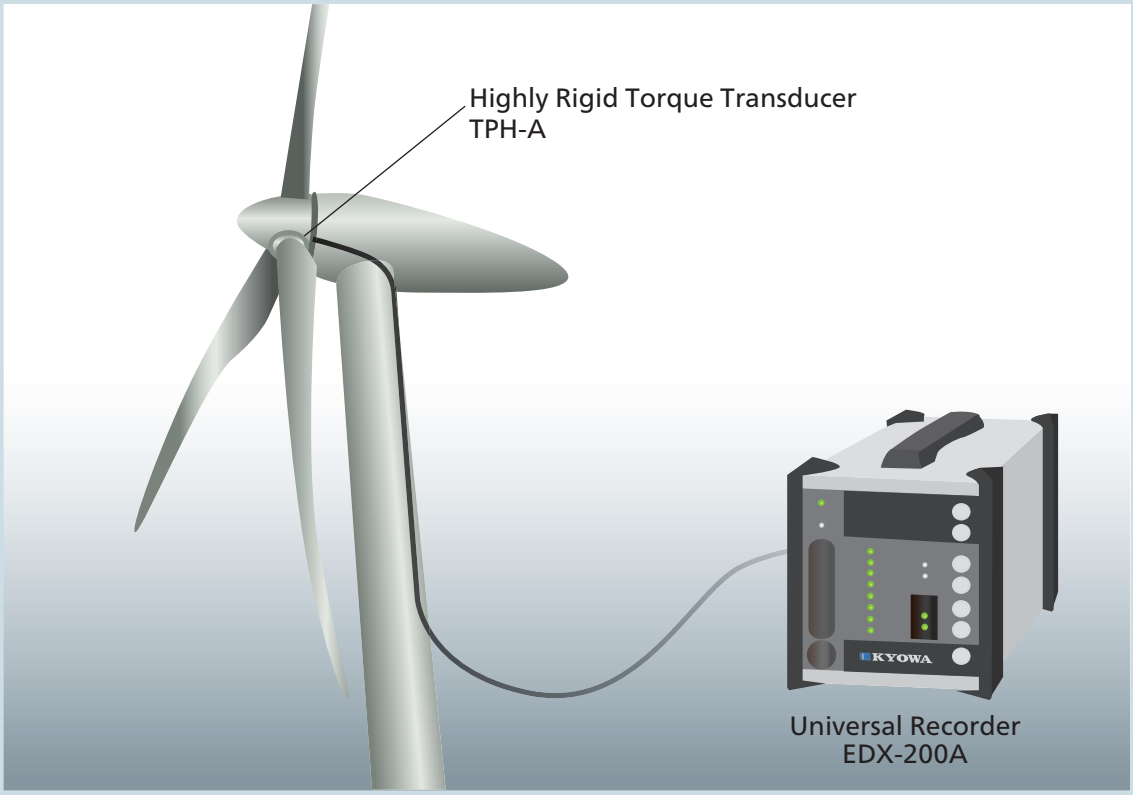
Mounting bolts are not included in accessories to the transducer.

Torque Transducers measurement examples

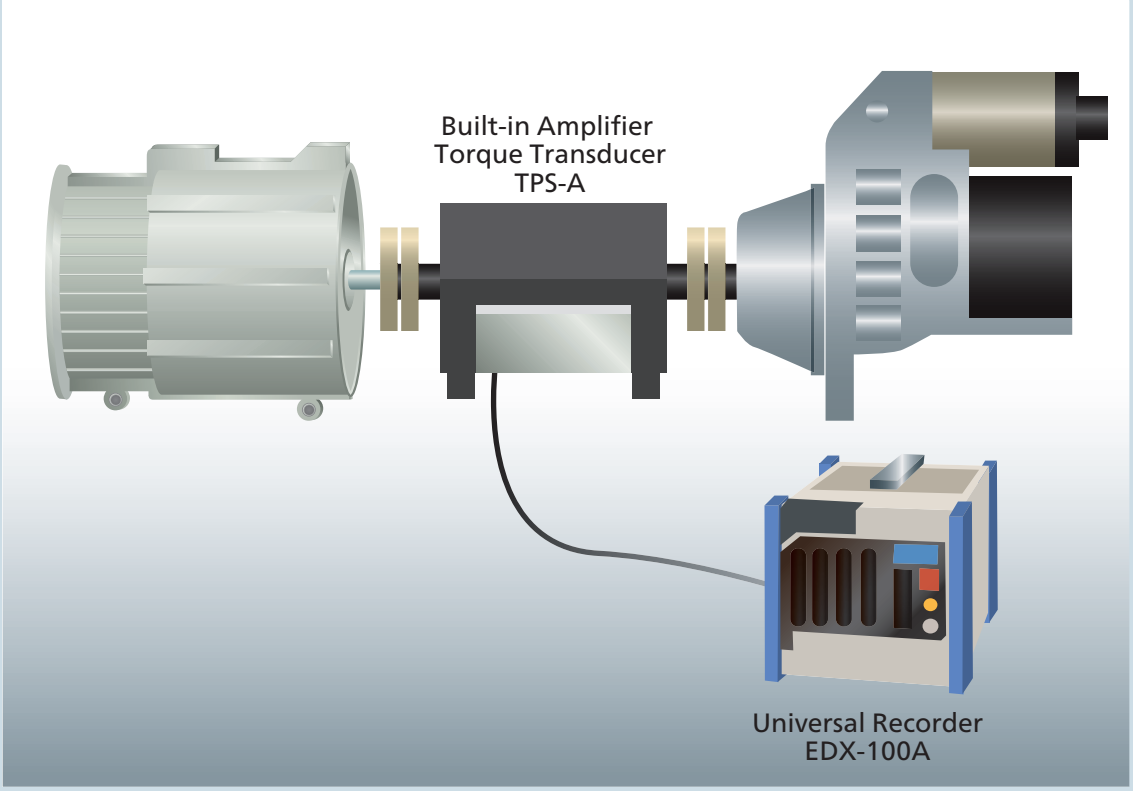
●Torque measurement and control of a stir machine when food is stirred



●Torque measurement of wind power generators and dynamos



● Torque evaluation of motors



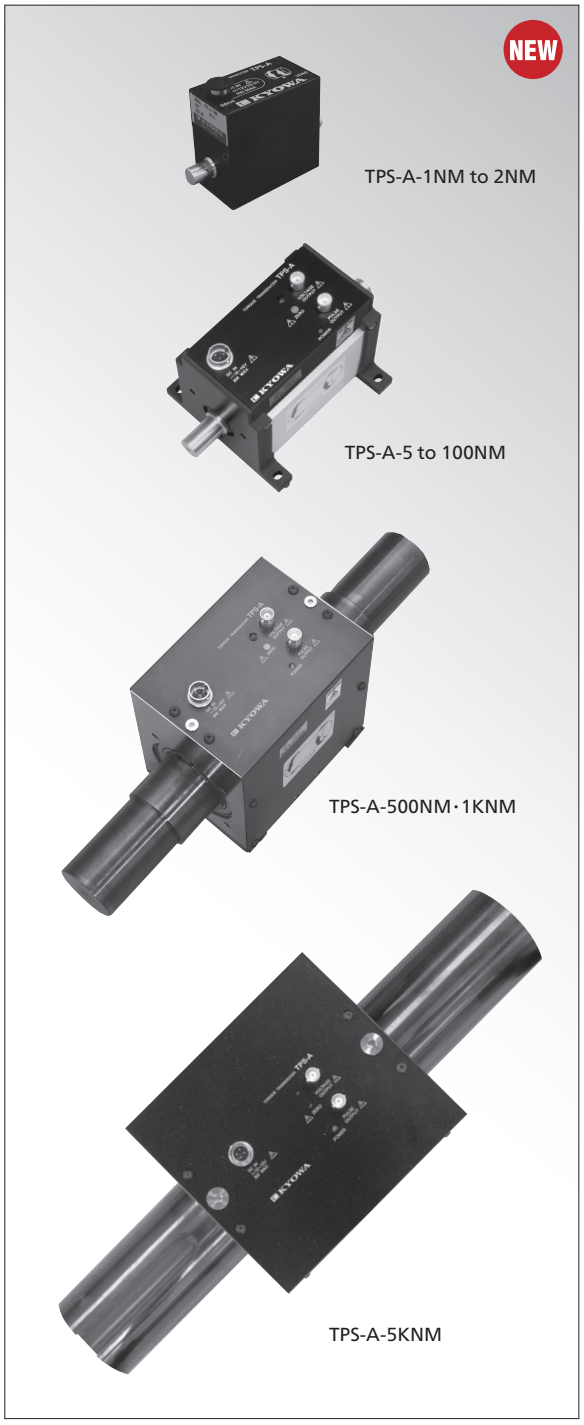
Torque Transducer Selection Chart

Models		Rated capacity N·m 0.2	0.5	1	2	5	10	50	100	200	500	Rated capacity kN·m 1	2	5	10	20	40	50	Pages
Compact	Compact, small capacity **TP-D**	Yes	Yes	Yes	Yes														2-144
	Compact, small capacity **TP-E**	Yes	Yes	Yes	Yes														2-144
For High Speed	Rotation Speed 3000 to 15000 rpm **TP-M**	Yes	Yes	Yes	Yes	Yes													2-145
Built-in Amplifier	Compact lightweight **TPS-A** NEW			Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes					2-139
Highly Rigid	Noncontact, Optical Transmission **TPH-A**										Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-141
Non-revolving type	Compact, High capacity NEW **TPR-S-10KNMSA48**														Yes				2-147

TPS-A

●Compact & Lightweight ●±1 N·m to ±5 kN·m

Built-in Amplifier Torque Transducer



Specifications

Performance

Rated Capacity	See table below.
Rated Output	±(5+0.2 V) (load resistance 5 kΩ or more)
Nonlinearity	Within ±0.1% RO(TPS-A-1NM to 2NM)
	Within ±0.3% RO(TPS-A-5NM to 5KNM)
Hysteresis	Within ±0.1% RO(TPS-A-1NM to 2NM)
	Within ±0.3% RO(TPS-A-5NM to 5KNM)

Environmental Characteristics

Safe Temperature Range	-10°to 70°C (Non-condensing)
Compensated Temperature Range	-10°to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.1% RO/°C (1NM to 5NM)
	Within ±0.05% RO/°C (10NM to 50NM)

Electrical Characteristics

Frequency Response Range (Amplifier)	See table below.
SN Ratio	45 dB or more
Power Supply	12±0.5 VDC (TPS-A-1NM to 2NM)
	10 to 16 VDC (TPS-A-5NM to 5kNM)
Current Consumption	See table below.

Mechanical Properties

Safe Overload Rating	See table below.
Maximum Rotation Speed	See table below.
Safe Bending Moment	See table below.
Safe Load at Shaft End	See table below.
Moment of Inertia	See table below.
Weight	See table below.
Degree of Protection	IP40 (IEC 60529)

Optional Accessories
AC adapter (SA-10A-EDS)
DC power cable (P-76)
BNC cables (U-58, U-59, U-15)
Cables for TPS-A (TE-57R, TE-58R)

Keyless coupling

SFC-025SA2-T011-K-8B-□B (For 1NM, 2NM)
SFC-040SA2-K-16B-□B (For 5NM)
SFC-060SA2-K-16B-□B (For 10NM, 50NM)
SFF-080SS-K-19B-□B○-100N (For 500NM)
SFF-140SS-K-45K-□ K○ (For 500NM)
SFH-190S-T010-K-45K-□ K○ (For 1KNM)

Coupling with a key

SFH-260S-T004-4-K-75H-□○ (For 5KNM)

□ is the other part of shaft, ○ is the tolerance on the hole.
(blank: h7, K: k6, M: m6, J: j6, S: 35+0.010-0)
As for 5KNM, H: New JIS; N: New regulated motors; None: Old JIS

Noncontact Measurement Design to Shaft Ensures Easy Maintenance.

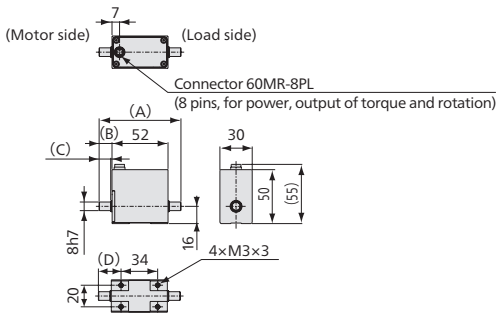
●Easy maintenance.
●Built-in Amplifier with ±5 V output.
●Rotation Speed Output: 4 pulses per rotation
●Applicable to a friction-joint coupling (Excluding 5KNM)

Models	Rated Capacity	Current Consumption (Approx.) *1	Safe Overload Rating	Frequency Response Range	Max Rotary Speed	Safe Bending Moments *2	Safe Loads at the Shaft End	Moments of Inertia(kg·m²)	Weight (Approx.)
TPS-A-1NM	±1 N·m	Within 0.4 A	200%	DC to 200 Hz (-3dB±2dB)	15000 rpm	1.2 N·m	300 N	1.5×10^{-6}	150 g
TPS-A-2NM	±2 N·m							1.5×10^{-6}	
TPS-A-5NM	±5 N·m	Within 0.5 A	150%		5000 rpm	1.5 N·m		2.5×10^{-4}	1.5 kg
TPS-A-10NM	±10 N·m					3 N·m		2.6×10^{-4}	1.8 kg
TPS-A-50NM	±50 N·m		120%			15 N·m		2.6×10^{-4}	
TPS-A-100NM	±100 N·m		150%				600 N	2.7×10^{-4}	
TPS-A-500NM	±500 N·m			DC to 500 Hz (-3dB±2dB)		150 N·m	800 N	2.3×10^{-3}	9 kg
TPS-A-1KNM	±1 kN·m				4000 rpm			2.6×10^{-3}	10 kg
TPS-A-5KNM	±5 kN·m	Within 0.4 A			3000 rpm	500 N·m	1 KN	1.8×10^{-2}	30 kg

*1 Power supply: 12 VDC
*2 Torque transducer only

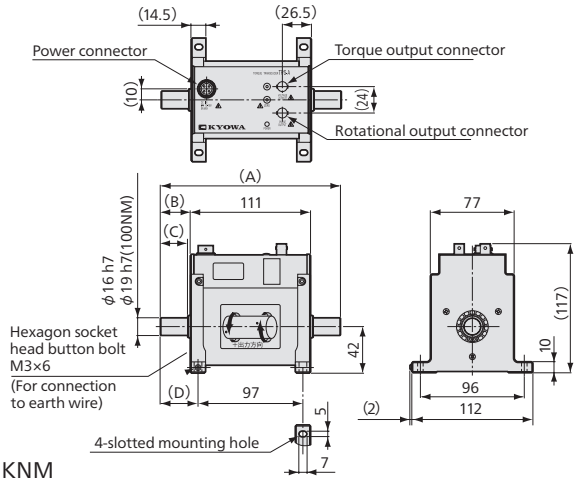
Dimensions

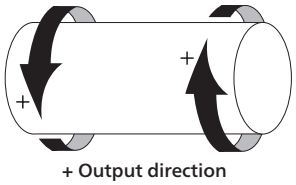
TPS-A-1NM to 2NM



Models	A(mm)	B(mm)	C(mm)	D(mm)
TPS-A-1NM	76	12	10.75	21
TPS-A-2NM				
TPS-A-5NM	144	16.5	14	23.5
TPS-A-10NM	166	27.5	25	34.5
TPS-A-50NM				
TPS-A-100NM	176	32.5	30	39.5
TPS-A-500NM	283	75	36.5	
TPS-A-1KNM	350	108	70	
TPS-A-5KNM	435	134	130	

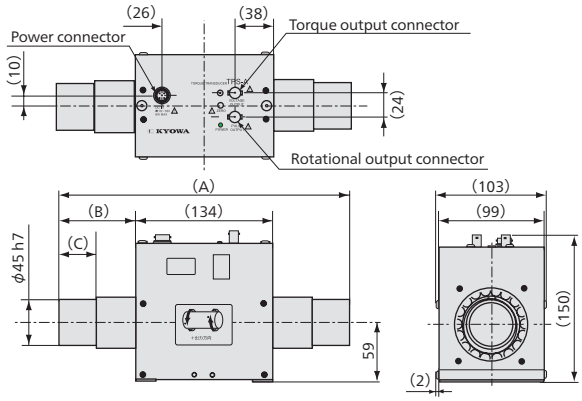
TPS-A-5NM to100NM



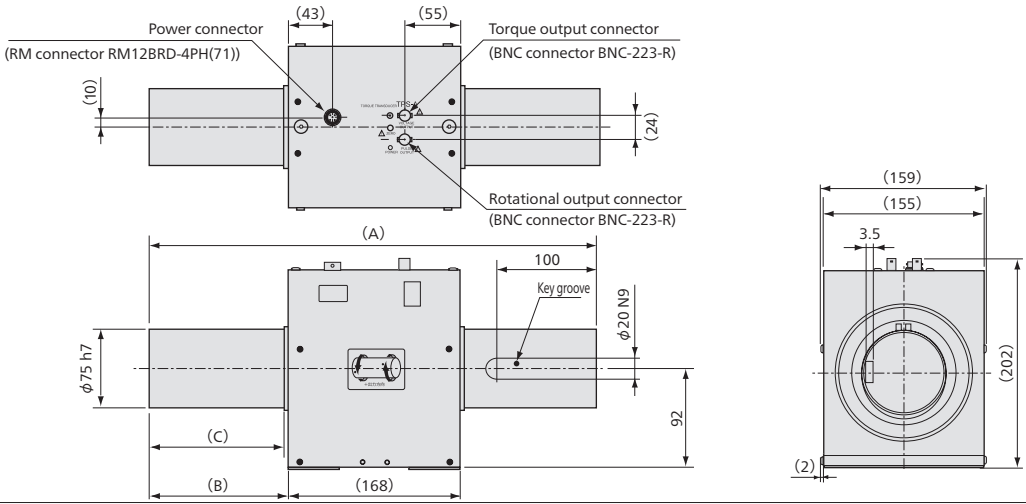


+ Output direction

TPS-A-500NM, 1KNM



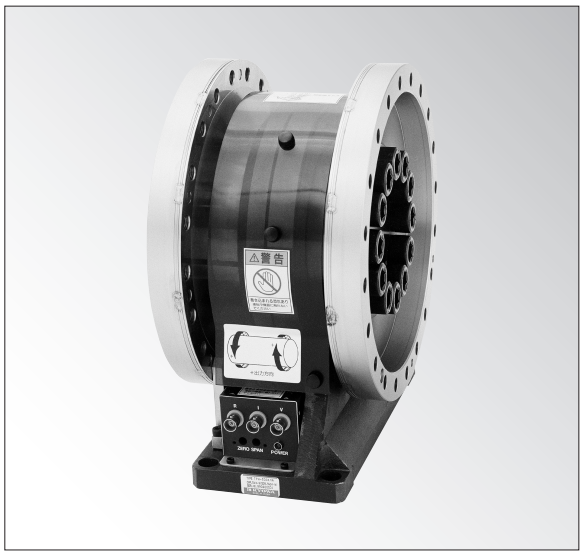
TPS-A-5KNM



TPH-A

Highly Rigid Torque Transducer

●500 N·m to 50 kN·m ●Noncontact Design
●No Bearing ●High Frequency Response



Noncontact Design to Shaft, High Frequency Response, High Accuracy

TPH-A torque transducers can measure torque up to 10000 rpm. The main feature of these transducers is high rigidity and an equipped flexible coupling. The unique design with no contact parts such as slip rings, ensures safe use even for long-term measurement of an object rotating at high speeds.
In addition, a built-in amplifier outputs voltage and current signals simultaneously and directly to recorder or indicator and A-D converter helps data acquisition by personal computer.
TPH-A torque transducers can simultaneously measure torque and revolution speed.

- ●High torsional stiffness.
- ●Noncontact design without slip rings or bearing enables easy maintenance and accurate measurement in high speed.
- ●No temperature rise due to rolling friction, ensuring stable performance.
- ●No interference to signal transmission and few noises by rotary transformer power supply method and optical signal transmission method.
- ●Diaphragm-type flexible coupling provided standard.
- ●Dedicated built-in amplifier gives voltage (±10V), current (12±8mA) output.
- ●Tachometer output (open collector output) enables measurement on a digital revolution counter (1 pulse/rev.).

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO (TPH-50K to 500KMA)
	Within ±0.5% RO (TPH-1T to 5TMA)
Hysteresis	Within ±0.2% RO (TPH-50 to 500KMA)
	Within ±0.5% RO (TPH-1T to 5TMA)
Repeatability	Within ±0.1% RO (TPH-50 to 500KMA)
	Within ±0.5% RO (TPH-1T to 5TMA)
Rated Output	±10 V ±0.02 V (±0.05 V with TPH-1T to 5TMA)
	(load resistance 10 kΩ or more)
	±8 mA ±0.04 mA (±0.1 mA wih TPH-1T to 5TMA)
	(load resistance 500 Ω or less)
	[minus rated capacity (4 mA) to zero (12 mA) to plus
	rated capacity (20 mA)]

Environmental Characteristics

Safe Temperature Range	-10 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Frequency Response Range (Amplifier)	DC to 1 kHz, deviation +1, -3 dB
SN Ratio	50 dB p-p or more (Noise 60 mV_{p-p} or less)
Power Supply	90 to 240 VAC

Mechanical Properties

Safe Overload Rating	150% (TPH-50 Kto 500KMA)
	120% (TPH-1T to 5TMA)
	Output is saturated at approx. 110% the
	rated capacity.
	Max. Speed, Resonance Frequencies,
	Torsion Spring Constants, Spring Constants in
	Axial Direction, Moments of Inertia and Weight:
	See table below.

Standard Accessories Power cable, 2 m long
Dedicated bolts and nuts (42 sets including 2 spare sets)
Flange is not included. Prepare it separately.

To Ensure Safe Usage

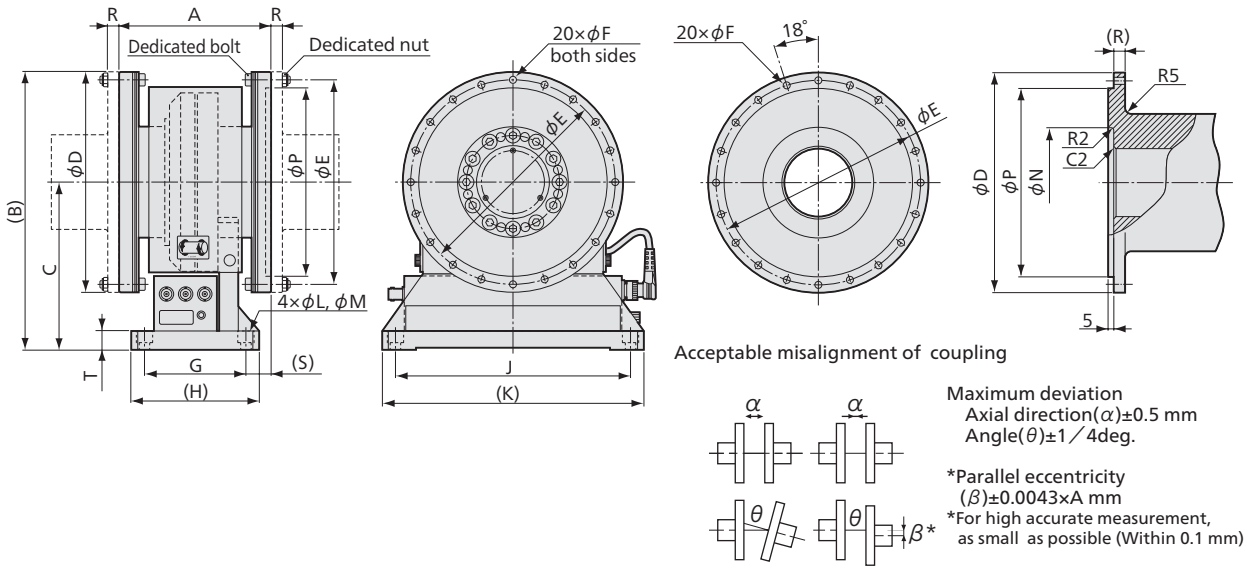
TPH-A series torque transducers are not cased, and thus, the rotating part and couplings are exposed. Considering fatigue failures of these parts, the user should consider installation of a safety steel cover, etc.
Specially designed diaphragm couplings are incorporated into all transducers. The instruction manual describes the maximum safe misalignment from the shaft. For stable torque measurement, set the couplings to minimize misalignment.
For other general safety precautions, refer to page 2-135.

Models	Rated Capacity	Resonance Frequencies *1 (Approx.)	Maximum Speed(rpm)	Torsion Spring Constant	Improvement Ratio (times)	Spring Constant in Axial Direction (N/mm)	Moments of Inertia Approx.(kg.m²)	Weight (Approx.)
TPH-50KMA	±500 N·m	1.0 kHz	10000	6.37×10^5 N·m/rad	21.0	3.1×10^3	0.032	10.7 kg
TPH-100KMA	±1 kN·m	1.0 kHz		1.67×10^6 N·m/rad	20.5	3.2×10^3	0.070	15.9 kg
TPH-200KMA	±2 kN·m	1.4 kHz		3.04×10^6 N·m/rad	18.2			
TPH-500KMA	±5 kN·m	1.5 kHz		2.25×10^6 N·m/rad	6.4	2.6×10^3	0.120	18.4 kg
TPH-1TMA	±10 kN·m	1.6 kHz	5000	7.35×10^6 N·m/rad	10.6	2.1×10^3	0.650	40 kg
TPH-2TMA	±20 kN·m	1.7 kHz	3000	1.47×10^7 N·m/rad	12.5	2.5×10^3	0.810	53 kg
TPH-4TMA	±40 kN·m	2.3 kHz		2.94×10^7 N·m/rad	——	2.0×10^3	1.580	83 kg
TPH-5TMA	±50 kN·m	2.4 kHz		4.90×10^7 N·m/rad	——	2.0×10^3	1.700	100 kg

*1. The stated resonance frequency applies to the torque transducer including the coupling.
*2. The stated torsion spring constants of earlier Kyowa's models are with the mainframe only and excluding the coupling.

Dimensions

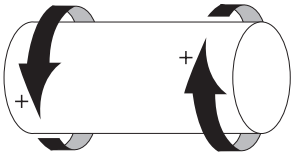
Coupling flange diagram is available on request.



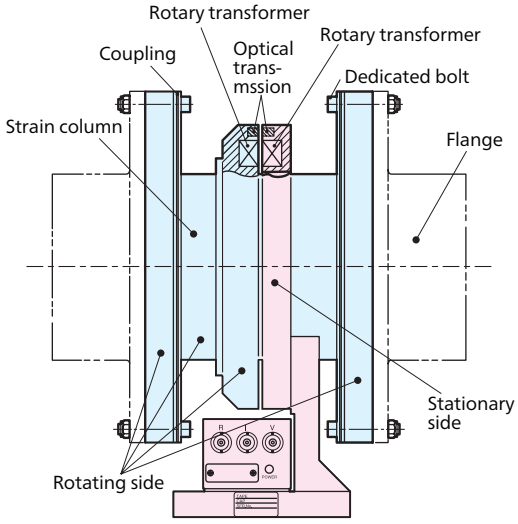
Models	A	(B)	C	ϕD	ϕE	ϕF	G	(H)	J	(K)	ϕL	ϕM	ϕN	ϕP	R	(S)	T
TPH-50KMA	134	241.5	145.5	192	178	6	90	112	208	230	9	14 d=10	96	163	10	22	16
TPH-100KMA TPH-200KMA	146	272	160	224	207	6	90	112	208	230	9	14 d=10	120	191	10	28	
TPH-500KMA	150	281	160	242	220	10	90	112	208	230	9	14 d=10	125	201	12	30	
TPH-1TMA	200	362	197	330	308	10	90	112	208	230	10	15 d=10	188	283	12	65.3	25
TPH-2TMA	200	405	220	370	348	13	120	150	310	340	11	18 d=12	222	325	16	42.3	
TPH-4TMA	200	470	250	440	408	16	150	180	372	400	13	19 d=12	260	376	20	24.3	
TPH-5TMA	260	470	250	440	408	16	150	180	372	400	13	19 d=12	260	376	20	54.3	

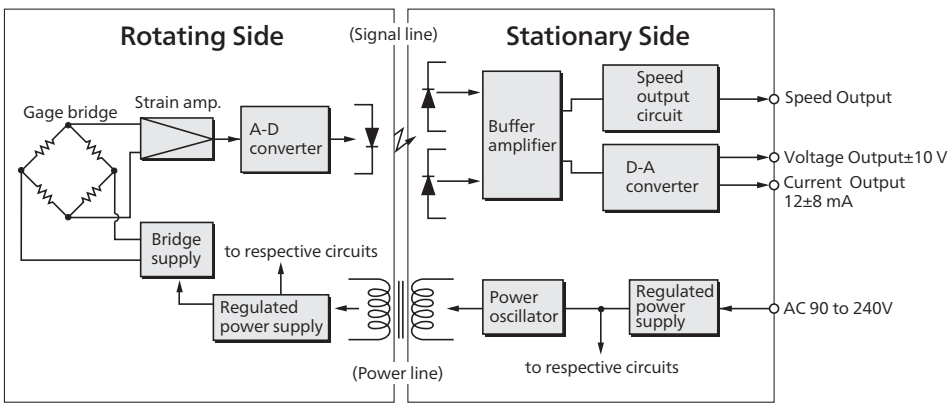
Power and Signal Transmission in TPH Series

Using a strain gage, TPH-A- torque transducers detect torsion corresponding to torque and convert it to voltage. After amplified, the voltage is digitized and then transferred as an optical signal to the stationary side via light-emitting diode. The transferred digital signal is converted to an analog signal for torque measurement. The rotating speed is optically transferred, too enabling simultaneous measurement of torque and rotating speed. The rotating side is powered through the rotary transformer.



+ Output direction





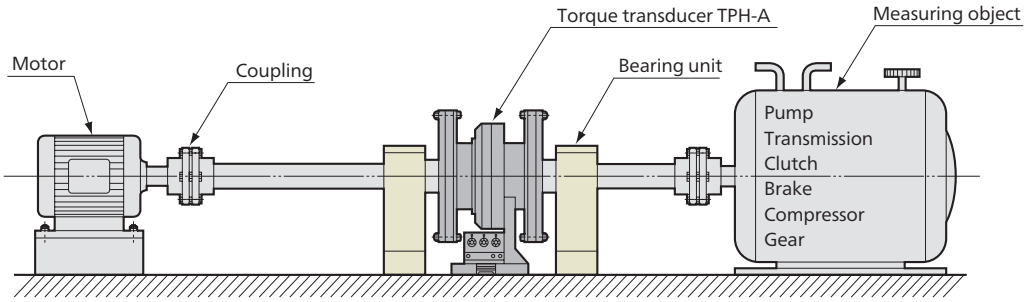
Rotating side
Stationary side

Applications for Torque Measurement

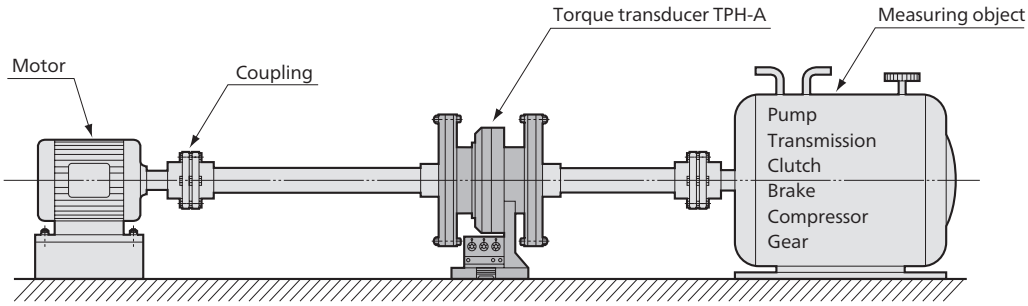
1. Application where the distance between motor and measuring object is long and the rotation speed is high

● It is recommended to install a bearing unit.

Recommended Example



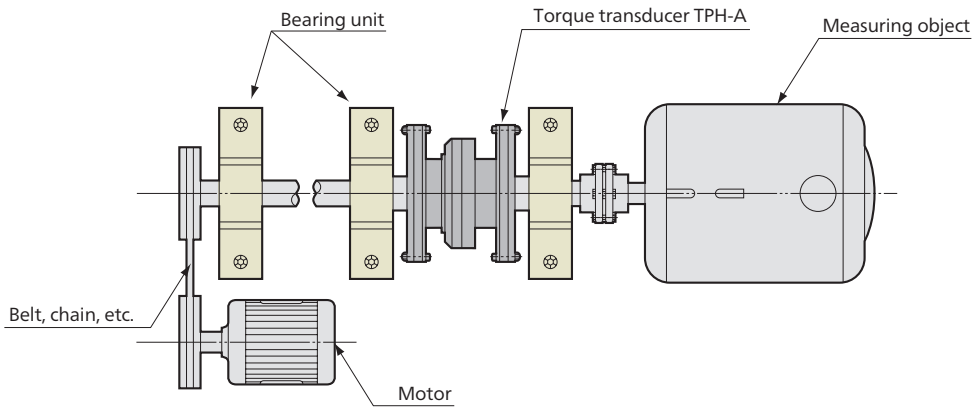
Wrong Example



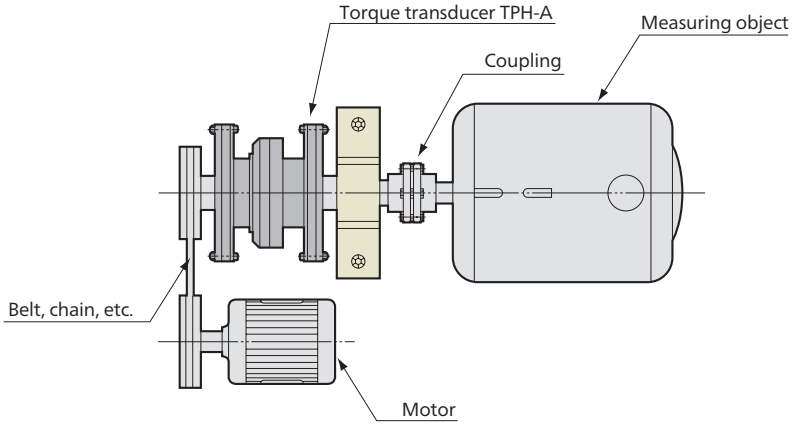
2. If connected using belt or chain, etc.

● It is recommended to install bearing units.

Recommended Example

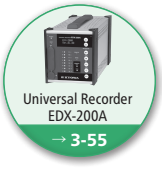


Prohibited Example



● Dynamic measurement

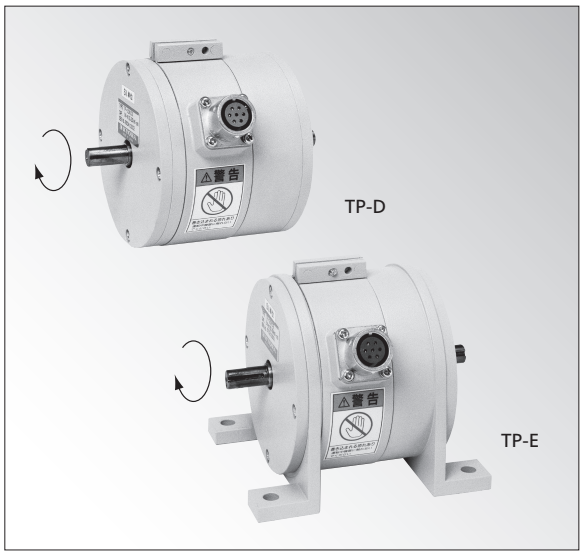
TPH-A Recommended products for combination



TP-D/E

Small-sized Torque Transducer

●For Small Torque Measurement ●0.2 to 2 N·m
●Slip Ring Type



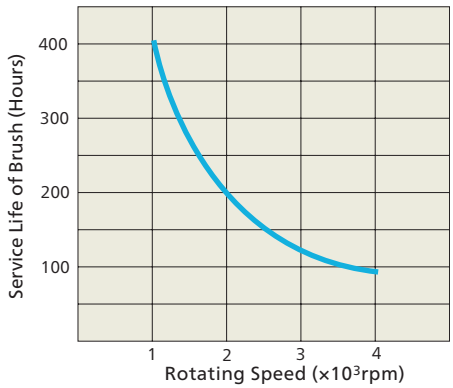
Large Voltage Enables to Measure Small Torque

●Two types are available: simple installation and stationary.

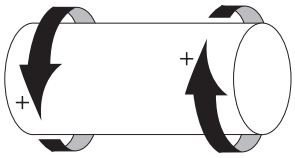
TP-M series high-speed torque transducers can measure torque at a maximum 15000 rpm, and are available with a rated capacity ranging from 0.2 to 5 N·m. An overload prevention stopper avoids large torque generated in motor startup, etc. While all models are the stationary type with mounting legs, these legs can be easily removed. About measurement instruments, carrier-type strain amplifiers, DPM series, are recommended.

*For DPM series, refer to page 3-5.

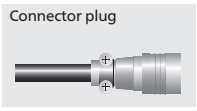
■Service Life of Brush



Note: Worn brushes can be replaced for value. Contact us.



+ Output direction



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±1% RO
Hysteresis	Within ±1% RO
Rated Output	0.75 to 1.5 mV/V (1500 to 3000 μm/m)

Environmental Characteristics

Safe Temperature Range	0 to 60°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Rotation-Induced Noise	12 μm/$m_{p\text{-}p}$ or less
Cable	4-conductor (0.3 mm^2) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with connector plug at both ends (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	120%
Max. Speed	4000 rpm
Angle of Torsion	See table below.
Torsion Spring Constant	See table below.
Moments of Inertia	Approx. 0.081 x10^{-4} kg·m^2
Weight	Approx. 560 g (TP-D), approx. 610 g (TP-E)

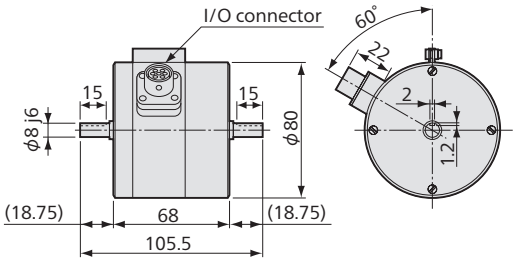
Optional Accessories: Dedicated flexible couplings FC-1B/FC-2B

Models	Rated Capacity	Rated Torsion Angle, Approx.(rad)	Torsion Spring Constant (Approx.)
TP-2KCD,E	0.2 N·m	0.027 rad	7.4 N·m/rad
TP-5KCD,E	0.5 N·m	0.017rad	29.4 N·m/rad
TP-10KCD,E	1 N·m	0.015 rad	66.7 N·m/rad
TP-20KCD,E	2 N·m	0.013 rad	153.8 N·m/rad

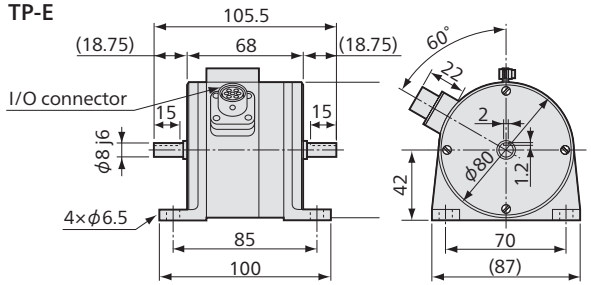
Note: Starting torque: Approx. 0.02 N·m (reference value)
*For the optional dedicated flexible coupling, refer to page 2-136.
For connection of the torque transducer with motor and loaded equipment, refer to page 2-136.

■Dimensions

TP-D



TP-E



*A tolerance of a height to a shaft conforms to JIS B0405m class and that of key dimensions complies with JIS.
For details of the tolerance contact us.

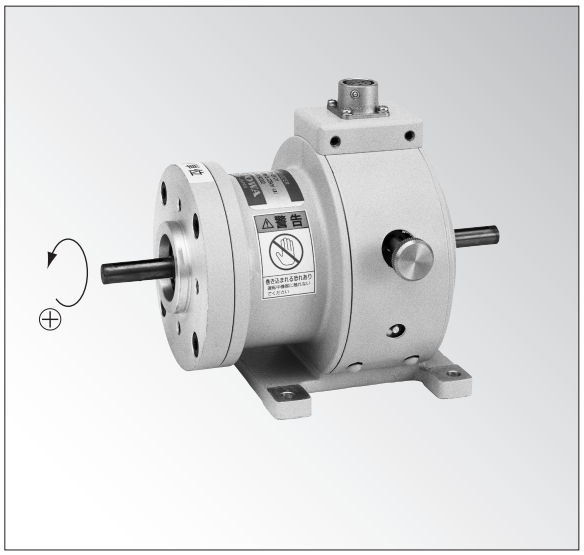
●Dynamic measurement

TP-D/E Recommended products for combination

TP-M

●For Small Torque Measurement ●0.2 to 5 N·m
●Slip Ring Type

High-speed Torque Transducer



Possible to Measure 0.2 N·m Torque by 15,000 rpm at Maximum.

●Overload prevention stopper is provided.
●Mounting legs can be removed as required

TP-M series high-speed torque transducers can measure torque at a maximum 15000 rpm, and are available with a rated capacity ranging from 0.2 to 5 N·m. An overload prevention stopper avoids large torque generated in motor startup, etc. While all models are the stationary type with mounting legs, these legs can be easily removed. About measurement instruments, carrier-type strain amplifiers, DPM series, are recommended.

*For DPM series, refer to page 3-5.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.2% RO
Hysteresis	Within ±0.2% RO
Rated Output	0.75 mV/V (1500 μm/m) ±1% (TP-2 & 5KCM)
	1 mV/V (2000 μm/m) ±1% (TP-10KCM)
	1.5 mV/V (3000 μm/m) ±1% (TP-20 & 50KCM)

Environmental Characteristics

Safe Temperature Range	0 to 60°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	Within ±0.02% RO/°C (TP-2 to 10KCM)
	Within ±0.01% RO/°C (TP-20 & 50KCM)
Temperature Effect on Output	Within ±0.02%/°C (TP-2 to 10KCM)
	Within ±0.01%/°C (TP-20 & 50KCM)

Electrical Characteristics

Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	350 Ω±0.5%
Output Resistance	350 Ω±0.5%
Rotation-Induced Noise	12 $\mu m/m_{p\text{-}p}$ or less
Cable	4-conductor (0.3 mm^2) chloroprene shielded cable, 7.6 mm diameter by 5 m long, terminated with connector plug at both ends (Shield wire is not connected to mainframe)

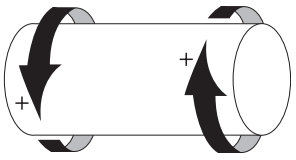
Mechanical Properties

Safe Overload Rating	150% (stopper activates at 150%, critical torque with stopper 150% + 2 N·m)
Operating Speed	3000 to 15000 rpm
Angle of Torsion	See table below.
Torsion Spring Constant	See table below.
Moments of Inertia	Approx.0.35×10^{-4} kg·m^2
Weight	Approx.1.1 kg

Optional Accessories Dedicated flexible couplings FC-1B/FC-2B

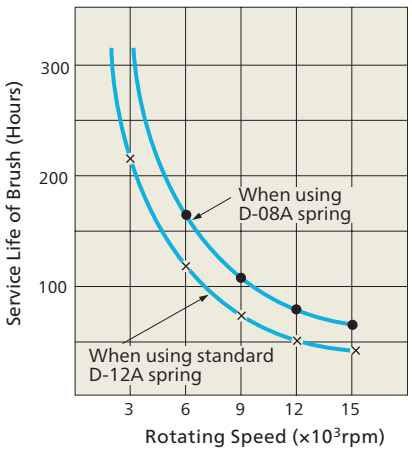
Models	Rated Capacity	Rated Torsion Angle, approx.(rad)	Torsion Spring Constant (Approx.)
TP-2KCM	0.2 N·m	0.0098 rad	20.4 N·m/rad
TP-5KCM	0.5 N·m	0.012 rad	41.7 N·m/rad
TP-10KCM	1 N·m	0.016 rad	62.5 N·m/rad
TP-20KCM	2 N·m	0.016 rad	125 N·m/rad
TP-50KCM	5 N·m	0.015 rad	333 N·m/rad

*For the optional dedicated flexible coupling, refer to page 2-136.
For connection of the torque transducer with motor and loaded equipment, refer to page 2-136.



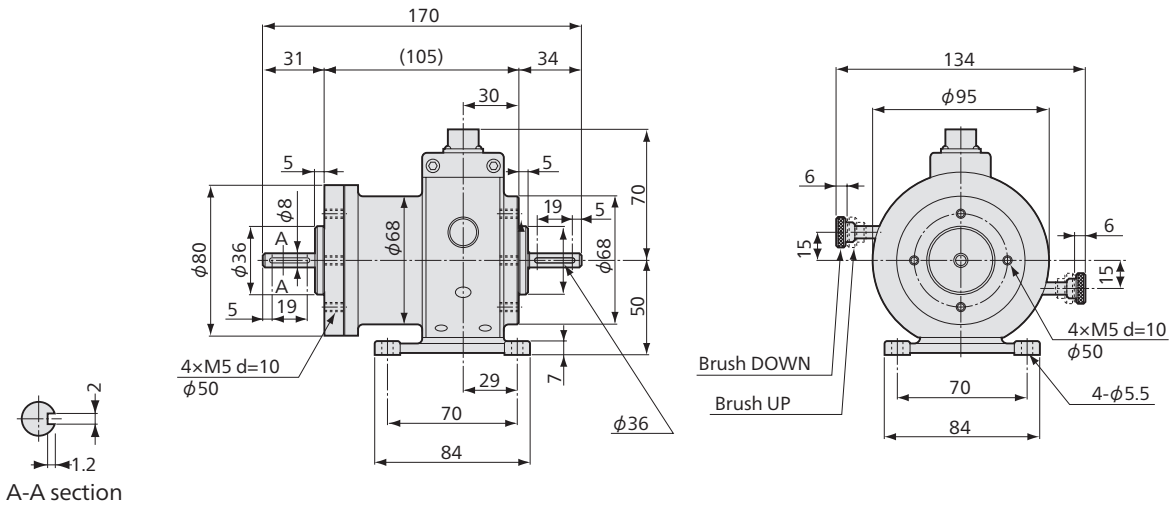
+ Output direction

Service Life of Brush



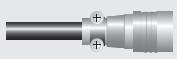
Note: Worn brushes can be replaced for value. Contact us.

Dimensions



*A tolerance of a height to a shaft conforms to JIS B0405m class and that of key dimensions complies with JIS.
For details of the tolerance contact us.

Connector plug



●Dynamic measurement

TP-M Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5

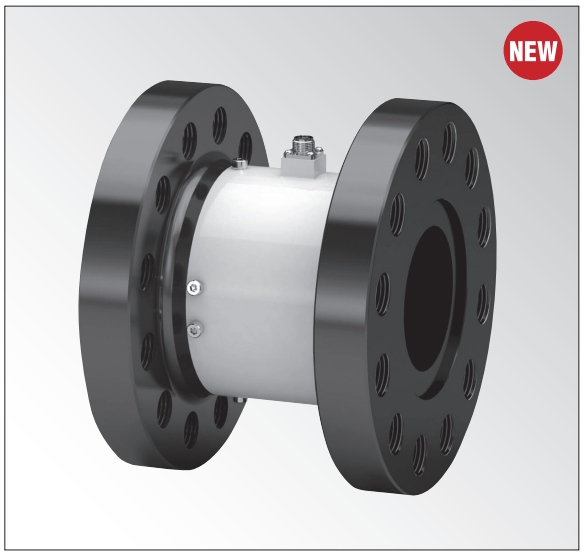

Universal Recorder EDX-200A → 3-55


Universal Recorder EDX-100A → 3-63


Sensor Interface PCD-400A → 3-77

TPR-S-10KNMSA48

Non-rotary Type Torque Transducer



●Large Capacity ●Compact & lightweight
●10 kN·m

●Small-sized large capacity ±10 kN·m
●Being hollowed structure, lightweight approx. 10 kg
●Easily install with bolts on the flange.

Specifications

Performance

Rated Capacity	±10 kN·m
Nonlinearity	±0.3%RO
Hysteresis	±0.3%RO
Rated Output	Approx. 1.5 mV/V(3000 μm/m)

Environmental Characteristics

Safe Temperature Range	0 to 60°C
Compensated Temperature Range	0 to 60°C
Temperature Effect on Zero Balance	±0.05%RO/°C
Temperature Effect on Output	±0.05%/°C

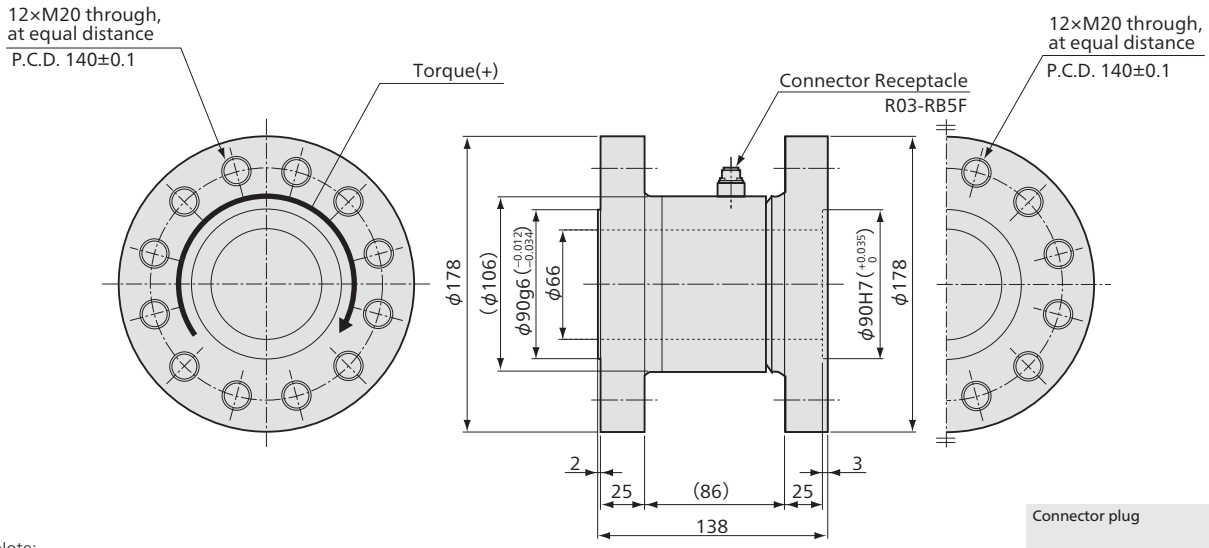
Electrical Characteristics

Safe Excitation Voltage	15 V AC or DC
Recommended Excitation Voltage	1 to 10 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.3 mm²) chloroprene shielded cable, 6 mm diameter by 10 m long, terminated with connector plug at both ends (Shield wire is not connected to mainframe)

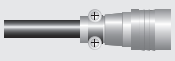
Mechanical Properties

Safe Overload Rating	120%
Weight	Approx. 10.5 kg (Excluding cable)
Material	Main body: Alloy steel Case: Common steel

■Dimensions



Connector plug



Note:
It's a Non-waterproof model, don't cover it with water.
Being non-rotary type, cannot be used for measurement of rotary torque.

●Dynamic measurement

TPR-S-10KNMSA48 Recommended products for combination


Strain Amplifier DPM-900 Series → 3-5


Universal Recorder EDX-200A → 3-55

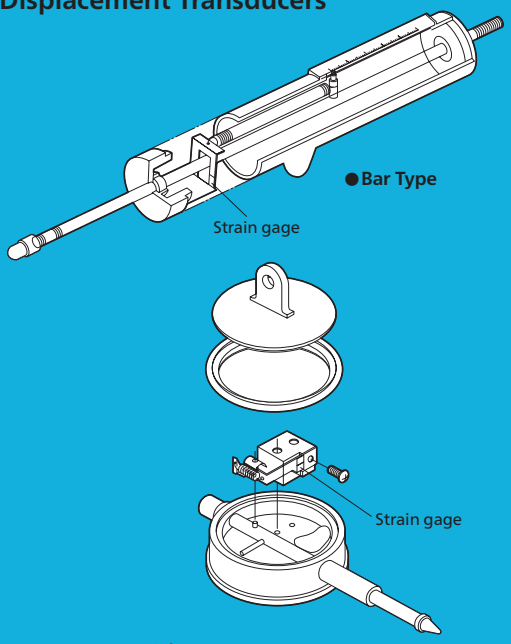

Universal Recorder EDX-100A → 3-63


Memory Recorder/Analyzer EDX-3000B → 3-69

Displacement Transducers

Kyowa's displacement transducers are designed to measure relative displacement and/or absolute displacement from a steady point of structures by converting detected displacement to voltage. They are available in rated capacities ranging from 2 mm to 5 m and in different conversion systems.
DTK-A series adopt strain gages as the transducer elements and receive minimal aging effect, thereby
enabling long-term stable measurement.
DTH-A series has high output of 5 mV/V (10000 μm/m) and nonlinearity of ±0.1%RO. thus ensues highly accurate measurement.
DTP and DTPA-A displacement transducers adopt a potentiometer to convert expansion/contraction of wire to voltage output and very user friendly. Rated capacity of DTP series is prepared from 0.5 to 5 m.

■Displacement Transducers



●Bar Type

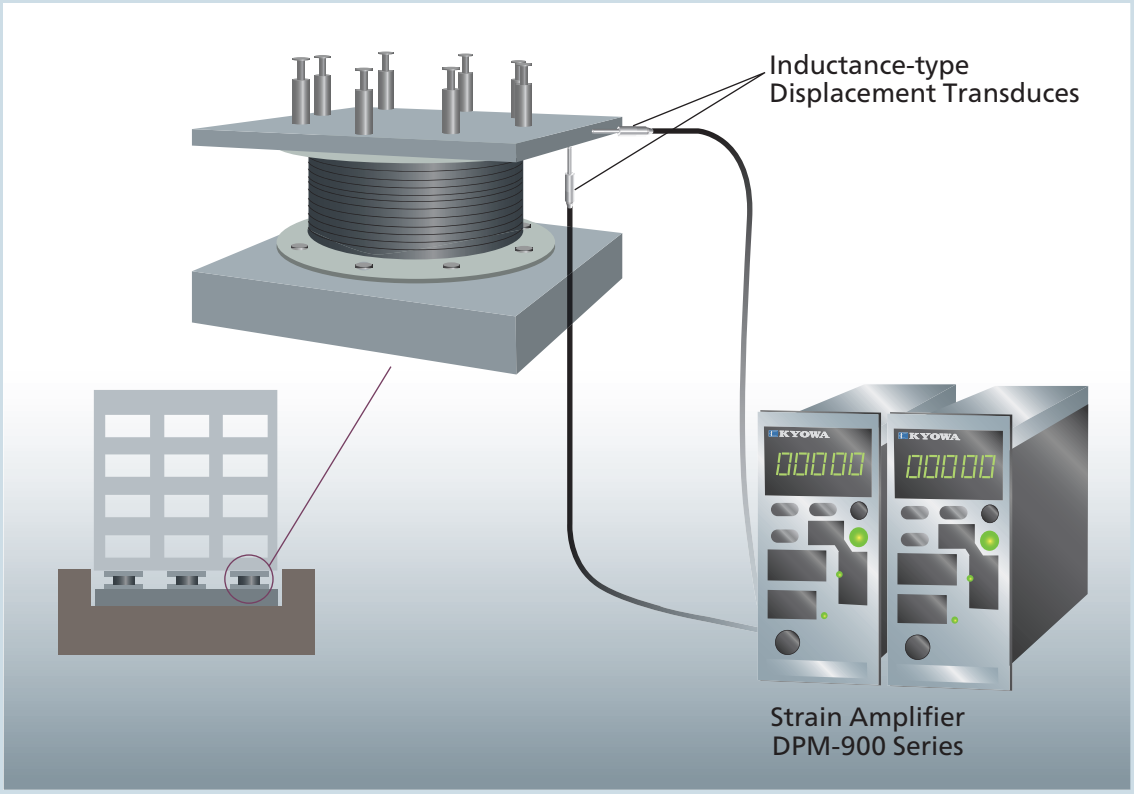
●Dial Gage Type

Features

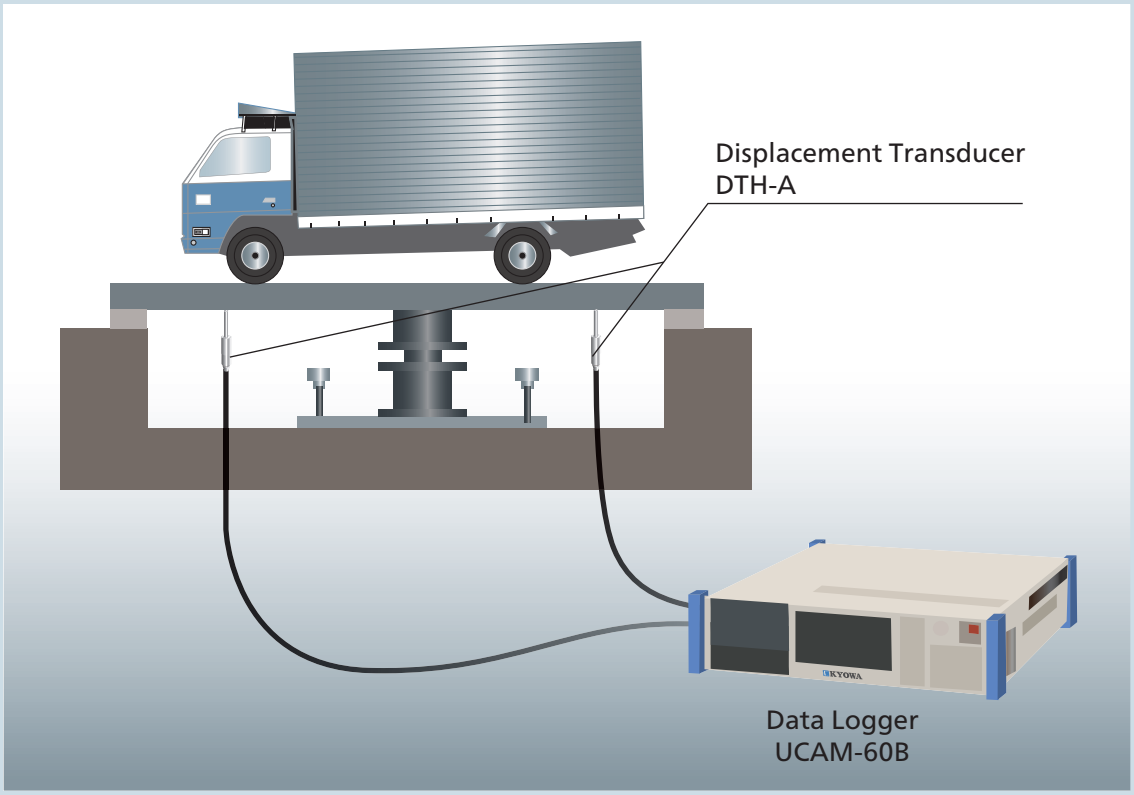
- Various models are available to meet desired measuring displacement from 2 mm to 5m.
- Models for measuring large displacement are prepared
- Excellent nonlinearity and high resolution

Displacement Transducers Measurement Examples

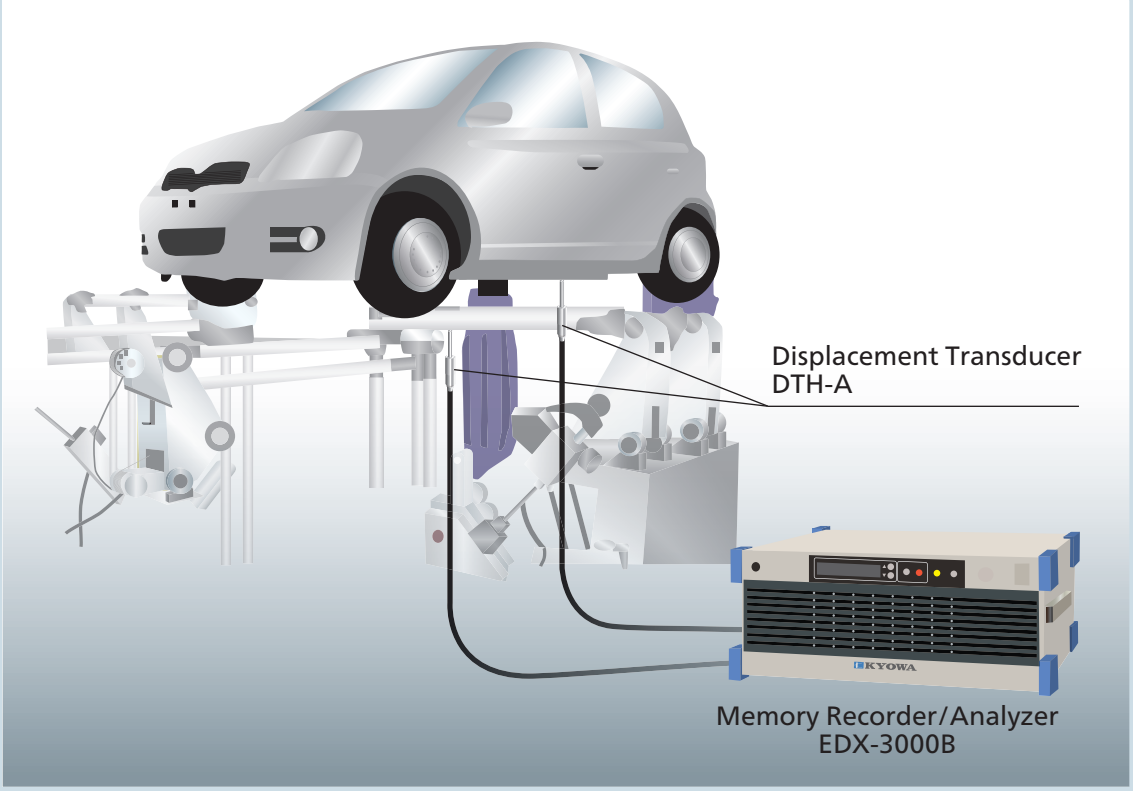
●Displacement measurement of aseismic rubber used for seismically isolated structure in vibration test



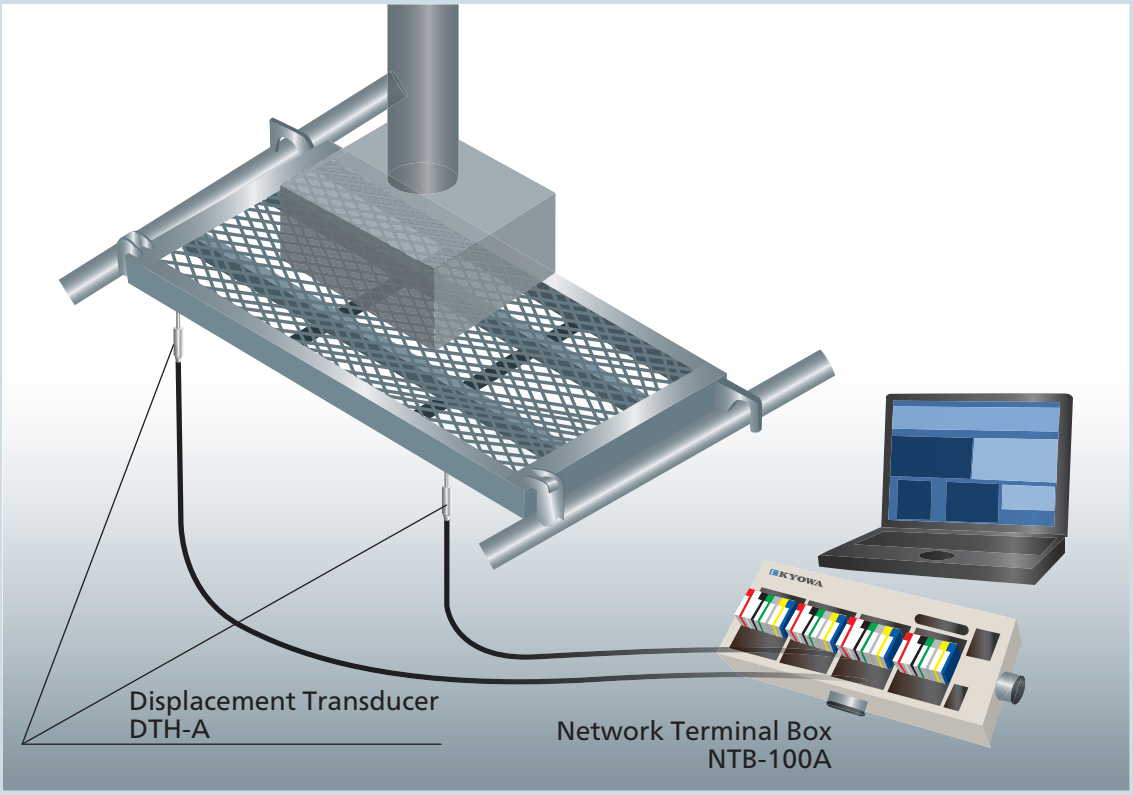
●Displacement measurement of plate load test



●Deflection measurement in auto body strength test



●Deflection and displacement measurement of strength test of scaffold frames



Displacement Transducer Selection Chart

Models		Rated Capacity (mm)													Pages
		2	5	10	20	30	50	100	150	200	300	500	1000	2000	5000	
Clip Type	For Materials Tests **DTC-A** 	Yes	Yes													2-163
Small-sized Type	High Output High Accuracy **DTH-A** 		Yes	Yes	Yes	Yes	Yes	Yes								2-155
Small-sized Type	Both tensile and compression **DTK-A**  NEW					Yes	Yes									2-153
Potentiometer Type	Both tensile and compression **DTT-A**  NEW							Yes								2-154
Strain gage type	Both tensile and compression **DTS-A**  NEW							Yes								2-154
Inductance-Type	Less friction and small measuring force **DLT-AS/BS** 		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			2-162
Dial Gage Type	With Dial Gage **DT-D** 			Yes	Yes	Yes	Yes									2-158
Displacement Transducer	With scale, for both tension and compression **DT-A** 						Yes	Yes								2-157
Displacement Transducer	Capacity 200 mm, both tension and compression **DTJ-A-200** 									Yes						2-156
Potentiometer Type	For Large Displacement Measurement **DTPA-A**  NEW											Yes	Yes			2-160
Potentiometer Type	For Large Displacement Measurement **DTP-D-S** 													Yes	Yes	2-161

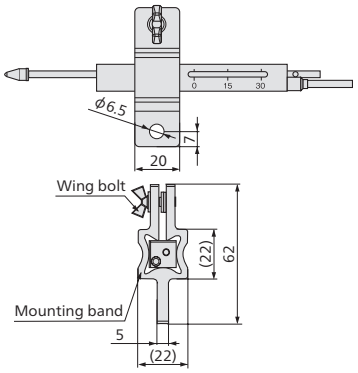
DTK-A

Displacement Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

- Small and angular, easy installation
- Both tension and compression
- Measuring scale is provided

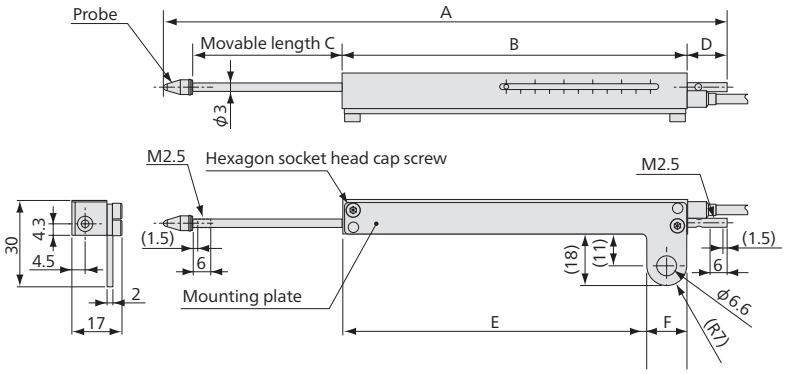
●Mounting band FXB-30B



■Dimensions

Models	A	B	C	D	E	F
DTK-A-30	140	85	31	14 to 45	71	14
DTK-A-50	196	120	51	14 to 65	106	14

Unit: mm



Specifications

Performance

Rated Capacity	DTK-A-30: 30 mm, DTK-A-50: 50 mm
Nonlinearity	Within±0.3% RO
Hysteresis	Within±0.3% RO
Repeatability	0.3% RO or less
Rated Output	2.5 mV/V (5000 μm/m) or more

Environmental Characteristics

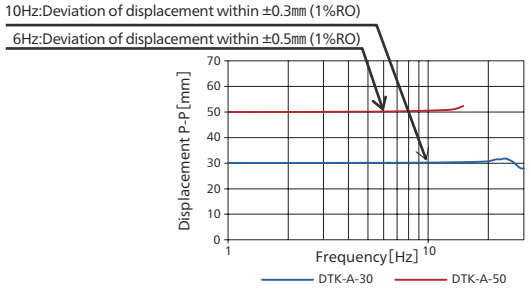
Safe Temperature Range	-10 to 70°C (Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±3%
Output Resistance	350 Ω±3%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 3 m long, terminated with connector plug (Shield wire is not connected to mainframe)

Mechanical Properties

Frequency Response Range DTK-A-30: DC to approx. 10 Hz
DTK-A-50: DC to approx. 6 Hz



Measuring Force	Approx. 2 N
Weight	DTK-A-30: Approx. 25 g, DTK-A-50: Approx. 34 g (Excluding cable)

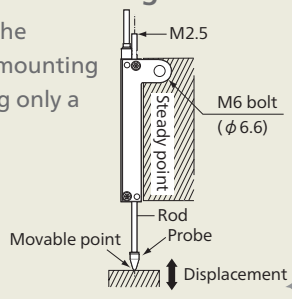
Standard Accessories
Mounting plate : 1
Hexagon socket head bolt (M3×6) : 2
Pin (ϕ2×20) : 1

Optional Accessories (For details, refer to page 2-159.)
Extension rod EB-50, 100
Replacement probes X, XS, SH
Magnet base MB-B

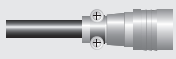
Note:
1. Avoid usage in vibration.
2. If large displacement is applied momentarily, it takes some time that output is settled.
3. Do not apply any displacement in other than expansion/contraction direction of the rod.

To Ensure Safe Usage

Fix using the provided mounting plate using only a M6 bolt



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

DTK-A Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35


Universal Recorder EDX-200A → 3-55


Sensor Interface PCD-400A → 3-77

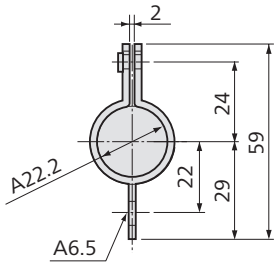
DTT-A/DTS-A

Displacement Transducer

DTT-A: Potentiometer Type
DTS-A: Strain gage type

- Reduce creep
- Both tension and compression
- Fast response (DC to 50 Hz when the tip is fixed)

●Mounting Band FXBP-100A



Specifications

Performance

Rated Capacity	100 mm
Nonlinearity	See table below.
Hysteresis	See table below.
Repeatability	0.1% RO or less
Rated Output	See table below.

Environmental Characteristics

Safe Temperature Range	-10 to 70°C ((Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05%RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	See table below.
Recommended Excitation Voltage	See table below.
I/O Resistance	See table below.
Cable	4-conductor (0.08 mm²) vinyl shielded cable,
	3.2 mm diameter by 1 m long, terminated with NISD connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Frequency Response Range	DC to approx. 6Hz(When the tip is
	touching to the testing machine,
	displacement: 100 mm)
	(Reference: DC to approx. 50 Hz)
	(When the tip is fixed, displacement: 30 mm)
Measuring Force	Approx. 5N
Weight	Approx. 110g (Excluding cable)
Degree of protection	IP40 (IEC 60529)

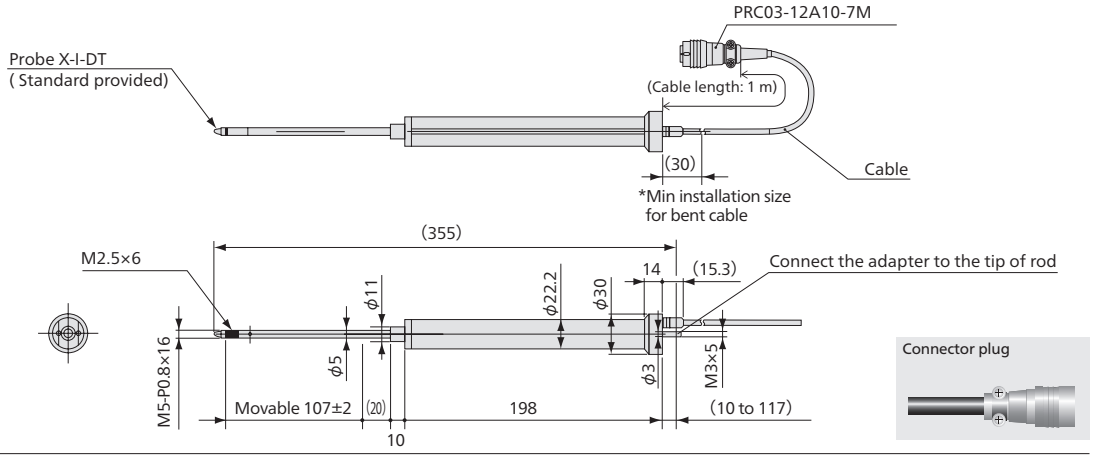
Standard Accessories: Mounting Band FXBP-100A 2 PC.
Adapter 1 PC.

Optional Accessories: (For details, please refer Page 2-159.)
Extension Rods: EB-50, 100, 200, and 300
Replacement Probes: XS-5-DT, H-1-DT, SH-2-DT, XS-105-DT, XS-2-DT, and XS-6-DT

Note: Do not apply any displacement in other than expansion/contraction direction of the rod.

Models	Nonlinearity	Hysteresis	Rated Output	Safe Excitation Voltage	Recommended Excitation Voltage	Resistance
DTT-A-100	Within ±0.2%RO	Within ±0.2%RO	0.9V/V±10%(Voltage output)	36 VDC at 23°C	2 to 10 VDC	1 kΩ±20%
DTS-A-100	Within ±0.3%RO	Within ±0.3%RO	2.5 mV/V(5000 μm/m)±10%	10 V AC or DC	1 to 5 V AC or DC	In: 350 Ω±3% Out: 255 Ω±10%

■Dimensions



●Static measurement ●Dynamic measurement

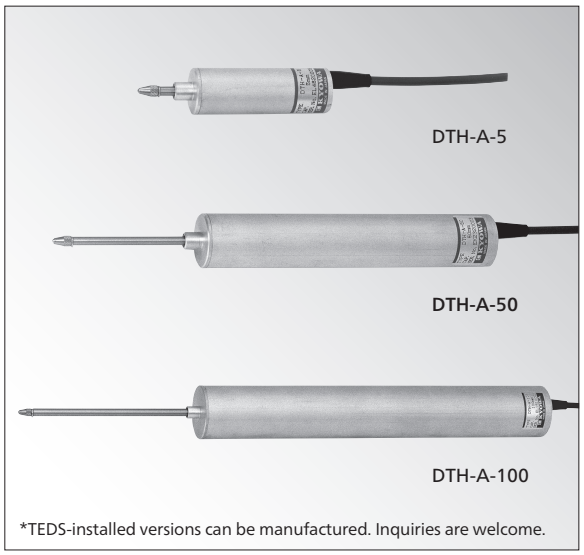
DTT-A/DTS-A Recommended products for combination

- Data Logger UCAM-60B → 3-25
- Fast Data Logger UCAM-550A → 3-31
- Universal Recorder EDX-200A → 3-55
- Universal Recorder EDX-100A → 3-63
- Memory Recorder/Analyzer EDX-3000B → 3-69

DTH-A

Displacement Transducer

●Large Output·Small Measuring Force
●5 to 100 mm



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Compact & Lightweight
Excellent Temperature Characteristics
Highly Accurate with Nonlinearity ±0.1% RO

- Large output of 5 mV/V (10000 μm/m)
- Small measuring force of approx. 1.5 to 4 N

DTH-A series displacement transducers adopt a strain gages for the sensing elements to ensure long-term stable measurement. They can widely be used for measurement of structural relative displacement or absolute displacement from a steady point.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.1% RO
Hysteresis	Within ±0.1% RO
Repeatability	0.1% RO or less
Rated Output	5 mV/V (10000 μm/m) ±0.1%
	±0.15%(DTH-A-5)

Environmental Characteristics

Safe Temperature Range	-10 to 70°C (Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.065 mm²) vinyl shielded cable,
	4 mm diameter by 2 m long, terminated with connector plug
	(Shield wire is not connected to mainframe.)

Mechanical Properties

Frequency Response Range	DC to approx. 2 Hz
Measuring Force	See table below.
Weight	See table below (Excluding cable).

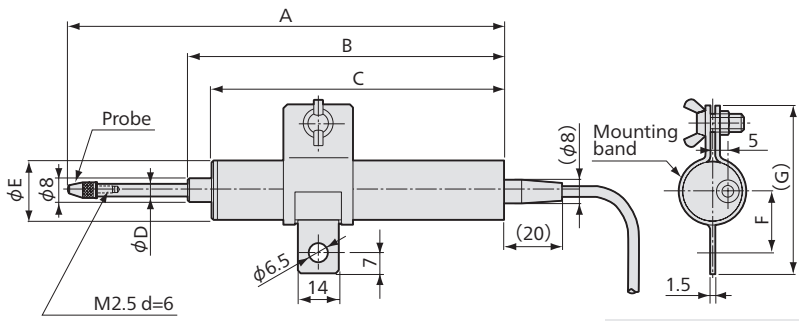
Standard Accessories Mounting band: 1 for DTH-A-5 to 30
2 for DTH-A-50 and 100

Optional Accessories (For details, refer to page 2-159.)

Extension rods EB-50/100/200
Replacement probes X/XS/SH
Magnet base MB-B

Notes:
1. Initial unbalance with the rod fully extended is approximately -5000 to -6000 μm/m.
2. Do not apply any displacement in other than expansion/contraction direction of the rod.

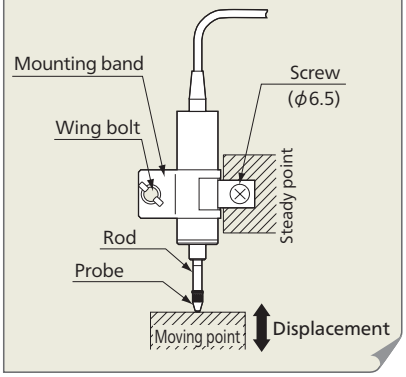
Dimensions



Two mounting bands are provided standard for DTH-A-50 and 100.

To Ensure Safe Usage

Fix the transducer to the steady point, using accessory mounting band, screw and washer.



Models	Rated Capacity	Measuring Force (Approx.)	A		B	C	ϕD	ϕE	F	(G)	Weight (Approx.)
			MAX	MIN							
DTH-A-5	5 mm	1.5 N	84.4	78.4	68	60	4	20	21	57	30 g
DTH-A-10	10 mm	2.2 N	96.4	85.4	75	67					35 g
DTH-A-20	20 mm	2.2 N	122.4	101.4	91	83					
DTH-A-30	30 mm	2.2 N	149.4	118.4	108	100					40 g
DTH-A-50	50 mm	3 N	209.5	158.5	148	140	4	25	23.5	62	75 g
DTH-A-100	100 mm	4 N	359.5	258.5	248	240	5	35	28.5	72	200 g

●Physical quantity indication ●Static measurement ●Dynamic measurement

DTH-A Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35

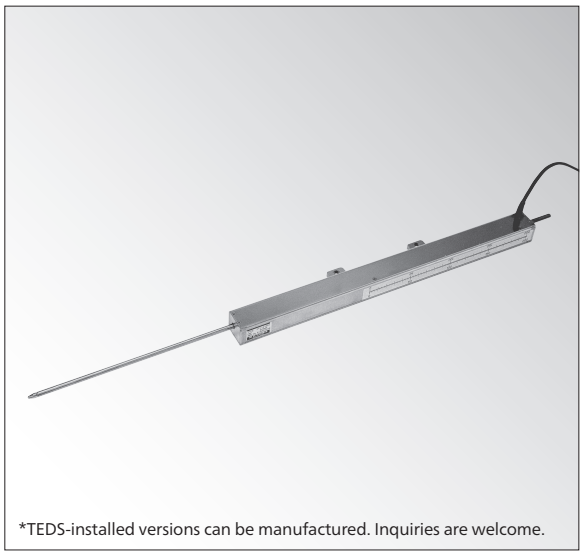

Universal Recorder EDX-200A → 3-55


Sensor Interface PCD-400A → 3-77

DTJ-A-200

Displacement Transducer

●Large Output 5 mV/V ●200 mm



*TEDS-installed versions can be manufactured. Inquiries are welcome.

Excellent Temperature Characteristics and Highly Accurate with Nonlinearity ±0.3%RO

●Large output by 5 mV/V (10000 μm/m)
●Both tension and compression
●Graduated

The high rated capacity of 200 mm makes this transducer widely applicable for measurement of structural relative displacement or absolute displacement from a steady point.

Specifications

Performance

Rated Capacity	200 mm
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.3% RO
Repeatability	0.3% RO or less
Rated Output	5 mV/V (10000 μm/m)±0.3%

Environmental Characteristics

Safe Temperature Range	-10 to 70°C (Non-condensing)
Compensated Temperature Range	0 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.02% RO/°C
Temperature Effect on Output	Within ±0.02%/°C

Electrical Characteristics

Safe Excitation Voltage	6 V AC or DC
Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.065 mm²) vinyl shielded cable,
	4 mm diameter by 2 m long, terminated with connector plug
(Shield wire is not connected to mainframe)	

Mechanical Properties

Frequency Response Range	DC to approx. 2 Hz
Measuring Force	Approx. 5.9 N
Weight	Approx. 560 g (Excluding cable)

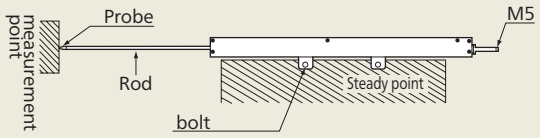
Optional Accessories (For details, refer to page 2-159.)

Extension rod EB-300
Replacement probes X/XS/SH
Magnet base MB-B

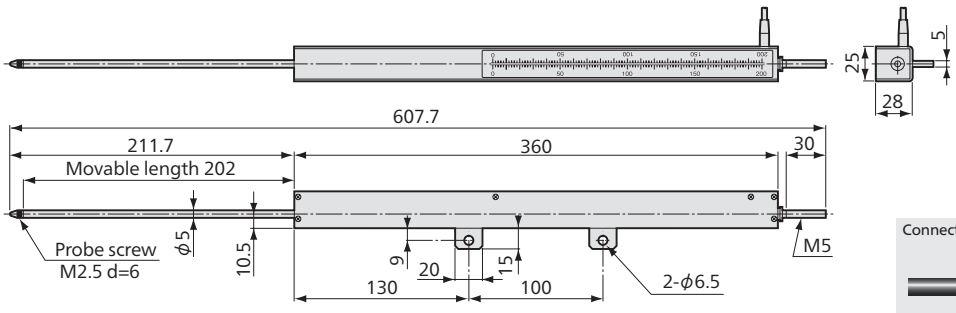
Notes:
1. Initial unbalance with the rod fully extended is approximately -5000 to -6000μm/m.
2. Avoid usage in vibration.
3. If large displacement is applied momentarily, it takes some time that output is settled.
4. Do not apply any displacement in other than expansion/contraction direction of the rod.

To Ensure Safe Usage

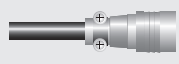
Fix the transducer to the steady point using 2 M6 bolts.



Dimensions



Connector plug



●Physical quantity indication ●Static measurement ●Dynamic measurement

DTJ-A-200 Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35

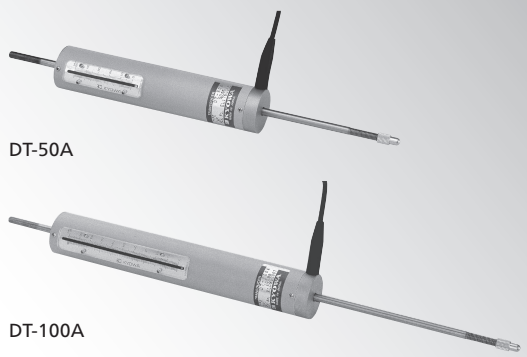

Universal Recorder EDX-200A → 3-55


Sensor Interface PCD-400A → 3-77

DT-A

Displacement Transducer

●Easy Installation, Handling & Maintenance
●50 &100 mm



DT-50A

DT-100A

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Measurement with Direct Reading Scale of Displacement

●Both tension and compression

DT-A displacement transducers adopt strain gages in the sensor part to ensure measurement. Rated capacity is 50 and 100 mm. They can be widely used for measurement of structural relative displacement or absolute displacement from a steady point

Specifications

Performance

Rated Capacity	50 mm (DT-50A), 100 mm (DT-100A)
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Repeatability	0.3% RO or less
Rated Output	1.5 mV/V (3000 μm/m)±20%

Environmental Characteristics

Safe Temperature Range	0 to 60°C (Non-condensing)
Compensated Temperature Range	0 to 50°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	5 V AC or DC
Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	120 Ω±3%
Output Resistance	120 Ω±3%
Cable	4-conductor (0.08 mm²) chloroprene shielded cable, 4 mm diameter by 5 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

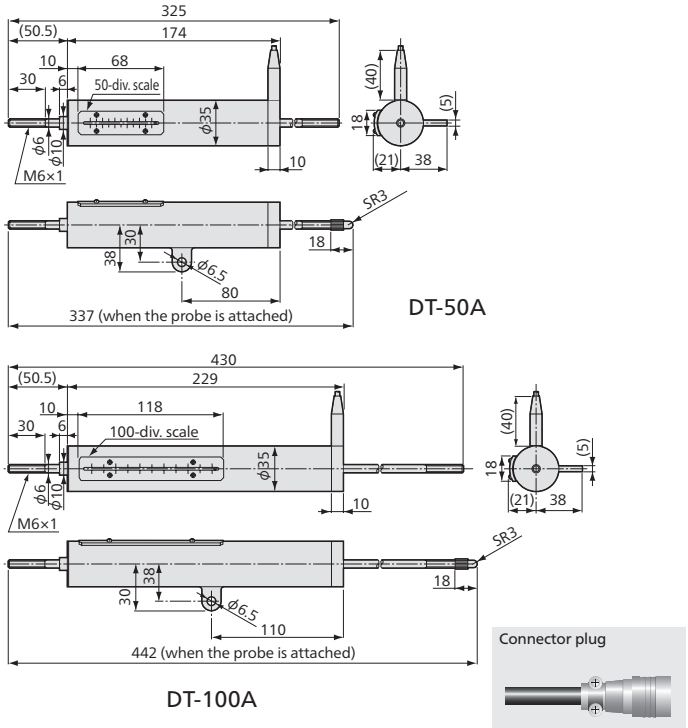
Frequency Response Range	DC to approx. 1.5 Hz
Measuring Force	Approx. 4.4 N
Weight	Approx. 380 g (50A), approx. 450 g (100A) (Excluding cable)

Optional Accessories (For details, refer to page 2-159.)

Magnet base MB-B
Replacement probe X, XS or SH cannot be used.

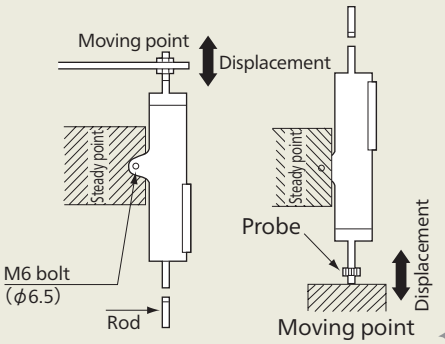
Notes:
1. Avoid usage in vibration.
2. If large displacement is applied momentarily, it takes some time that output is settled.
3. Do not apply any displacement in other than expansion/contraction direction of the rod.

■Dimensions



To Ensure Safe Usage

●Fix the transducer to a steady point by the M6 bolt.
●DT-A series transducers are designed to provide the smallest possible measuring force. Thus, the rod may not move with the displacement when the transducer is mounted upward. In such a case, detach the probe and fix the rod to the steady point using a nut. (See the figure at the left.)



●Physical quantity indication ●Static measurement ●Dynamic measurement

DT-A Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35


Universal Recorder EDX-200A → 3-55


Sensor Interface PCD-400A → 3-77

DT-D

●Easy Installation, Handling & Maintenance
●10 to 50 mm

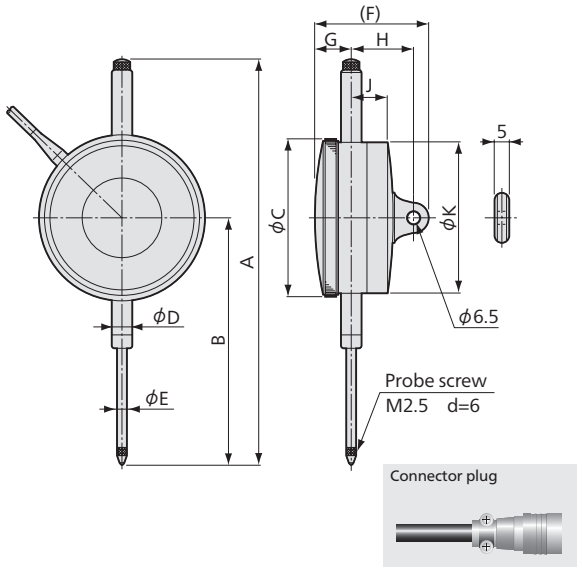
Dial Gage-equipped Displacement Transducer

*TEDS-installed versions can be manufactured. Inquiries are welcome.

Possible to Read Displacement Directly by Scale and Excellent Temperature Characteristics

DT-D displacement transducers adopt strain gages for the sensor part to ensure long-term stable measurement. They can widely be used for measurement of structural relative displacement or absolute displacement from a steady point.

■Dimensions



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Repeatability	0.3% RO or less
Rated Output	1.5 mV/V (3000 μm/m) or more

Environmental Characteristics

Safe Temperature Range	0 to 55°C (Non-condensing)
Compensated Temperature Range	0 to 50°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.03% RO/°C
Temperature Effect on Output	Within ±0.03%/°C

Electrical Characteristics

Safe Excitation Voltage	12 V AC or DC
Recommended Excitation Voltage	1 to 4 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.08 mm²) chloroprene shielded cable, 4 mm diameter by 5 m long, terminated with connector plug (Shield wire is connected to mainframe.)

Mechanical Properties

Safe Overload Rating	100%
Frequency Response Range	DC to approx. 0.8 Hz
Measuring Force	See table below.
Weight	See table below (Excluding cable).

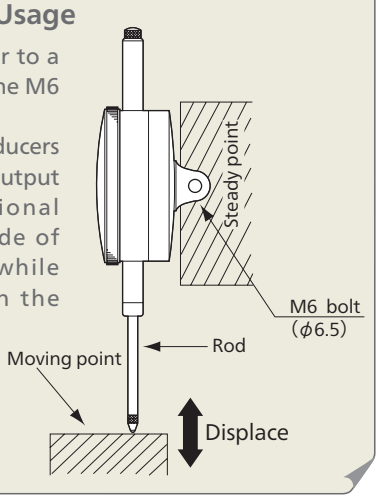
Optional Accessories (For details, refer to page 2-159.)

Replacement probes X/XS/SH
Magnet base MB-B

Notes:
1. Avoid usage in vibration.
2. If large displacement is applied momentarily, it takes some time that output is settled.
3. Do not apply any displacement in other than expansion/contraction direction of the rod.
4. If the DT-50D M150 is used in horizontal position, the rod inclines by approximately 10 mm due to its own weight and may not follow displacement.

To Ensure Safe Usage

●Fix the transducer to a steady point by the M6 bolt.
●DT-D series transducers are designed to output signal proportional to the magnitude of displacement, while indicating it on the dial gage.



Models	Rated Capacity	Measuring Force (Approx.)	A	B	ϕC	ϕD	ϕE	F	G	H	J	ϕK	Weight (Approx.)
DT-10D	10 mm	1.7 N	106.5	65	53	8	4	54	14.5	31	17.5	49	160 g
DT-20D	20 mm	2.1 N	131	90	66.5	8	5	52	14.5	29.5	17	62.5	310 g
DT-30D M150	30 mm	2.2 N	148	102	75.5	8	5	54	17.5	28.5	15.5	72.5	260 g
DT-50D M150	50 mm	2.7 N	209.5	128	81.5	10	5.5	58	17.5	32	19	78.5	300 g

●Physical quantity indication ●Static measurement ●Dynamic measurement

DT-D Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35


Universal Recorder EDX-200A → 3-55

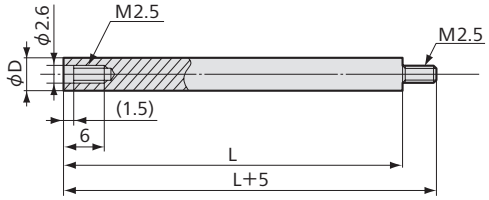

Sensor Interface PCD-400A → 3-77

Optional Accessories for Displacement Transducers

Extension Rods

To extend the displacement detection terminal of DTH,DTJ and DTK series.

Dimensions



Models	ϕD	L	Applicable Transducers	Transducer Mounting Directions
EB-50	4	50	DTH-A	Downward/Sideways*
EB-100	5	100	DTH-A	Downward/Sideways*
EB-200	6	200	DTH-A-100	Downward/Sideways
EB-300	6	300	DTJ-A-200	Sideways (dial gage upward)

Magnet Base

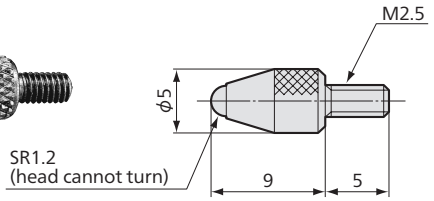
Widely usable for supporting displacement transducers, etc.

MB-B

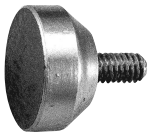
Replacement Probes

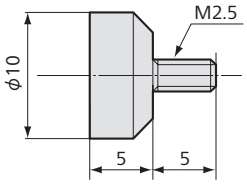
Probes for replacement of DTH, DTJ, DT-D, DTK type standard accessory probes (spherical head probes) that contact the measured surface.

Ballpoint Probe X-1-DT(Standard accessory)

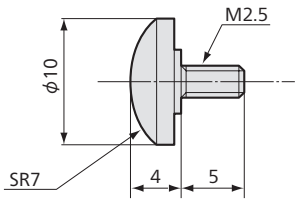


Flat Probe XS-5-DT

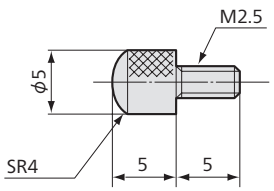




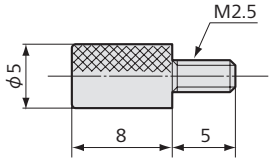
Spheric Probe XS-6-DT



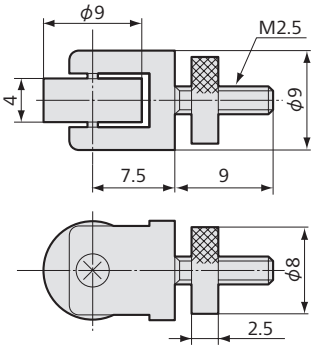
Spheric Probe XS-105-DT



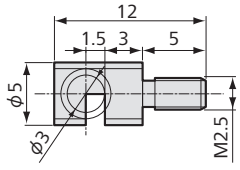
Flat Probe XS-2-DT



Roller-Equipped Probe SH-2-DT

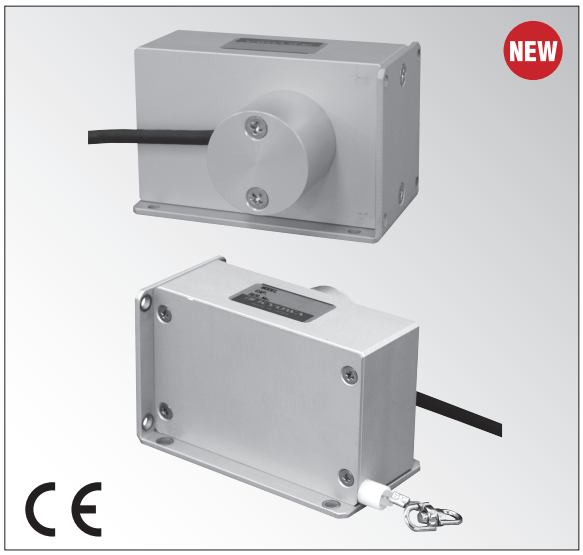


Hook Type Probe H-1-DT



DTPA-A

Potentiometer-type Displacement Transducer



Wire type, therefore long displacement measurement is possible

- Hardly kinking wire
- High response (When the stroke is rated output: 1000 mm/s or equivalent)
- New wire-winding mechanism enables less trouble
- Compact, lightweight, and easy to install
- Constant measuring force
- Measurement possible with strain amplifier

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.3% RO
Repeatability	0.1% RO or less
Rated Output	2.5 mV/V (5000 μm/m) ±10%

Environmental Characteristics

Safe Temperature Range	-10 to 80°C (Non-condensing)
Compensated Temperature Range	0 to 70°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.05% RO/ °C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

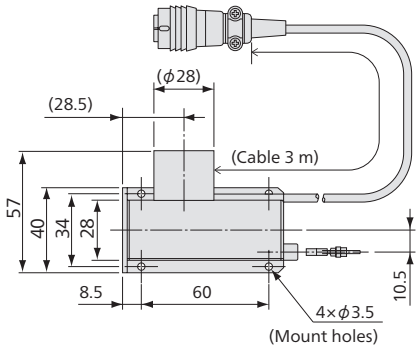
Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	See table below.
Cable	0.08 mm², 4-conductor shielded chloroprene 3 m long, ϕ4 mm, terminated with connector plug. (Shield wire is not connected to the chassis.)

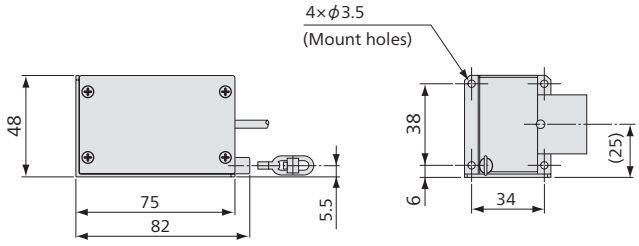
Mechanical Properties

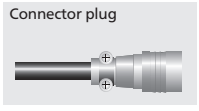
Safe Overload Rating	103% (When fixing the 20-mm wire)
Measuring Force	Approx. 2 N (Max. 2.8 N)
Frequency Response Range	DC to 1.0 Hz (When the stroke is 500 mm: 1000 mm/s or equivalent) (May emit a spike noise when the speed is 10 mm/s or less.)
Wire	Diameter: 0.45 mm, Material: Stainless steel
Weight	Approx. 220g (Excluding cable)
Degree of protection	IP40(IEC 60529)
RoHS Directive	EN50581

Models	Rated Capacity	Output Resistance
DTPA-A-500	500 mm	260 Ω±3%
DTPA-A-1K	1000 mm	205 Ω±3%

Dimensions

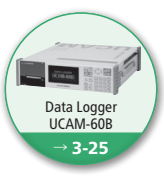






DTPA-A Recommended products for combination

●Static measurement

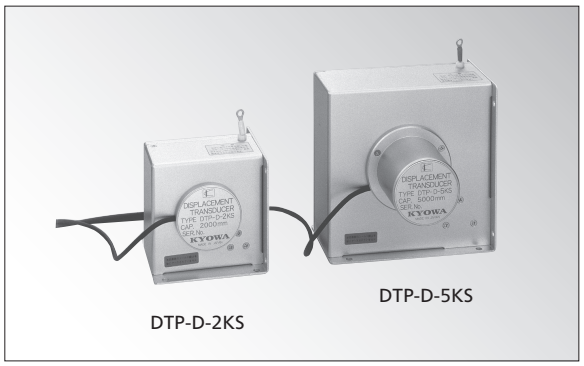


●Dynamic measurement

DTP-D-S

●For Large Displacement Measurement
●2000 to 5000 mm

Potentiometer-type Displacement Transducer

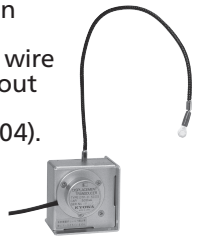


Large Displacement Measurement and High-level Output in Each Capacity

DTP-D-S displacement transducers are designed to measure displacement by converting expansion/contraction of a sensing wire to electric signal by potentiometer. Two models are available with rated capacity 2000 and 5000 mm, all providing a high rated output of 5 mV/V. In addition, measuring force of the wire is constant, thereby making these transducers easy to use.

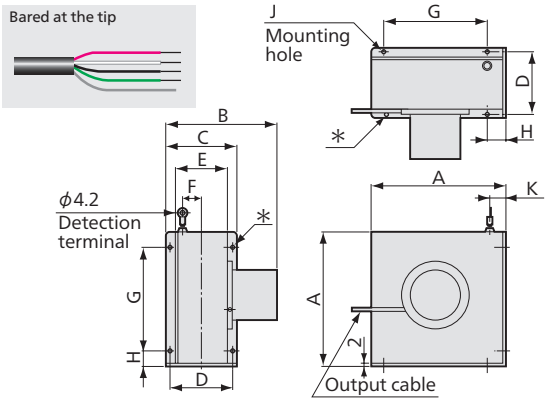
●Compact, lightweight, and easy to install
●Measurement possible with strain amplifier
●Constant measuring force of the wire (With differences between pull-out and pull-in)
●Stainless steel wire is used (SUS 304).

*For cases where the transducer mainframe cannot be mounted to a steady point by attaching the tube to the wire outlet, Kyowa can offer a type which enables displacement measurement by fixing the tip of the tube to a steady point. (Free steady point type)



Free Steady Point Type

Dimensions



Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within ±0.3% RO
Hysteresis	Within ±0.3% RO
Rated Output	5 mV/V (10000 μm/m) ±0.3%
Resolution	1/1850

Environmental Characteristics

Safe Temperature & Humidity Range	-10 to 60°C, 90% RH or less (Non-condensing)
Compensated Temperature & Humidity Range	-10 to 55°C, 90% RH or less (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.1% RO/°C

Electrical Characteristics

Detection Method	Potentiometer
Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	1 to 5 V AC or DC
Input Resistance	350 Ω±1%
Output Resistance	350 Ω±1%
Cable	4-conductor (0.08 mm²) chloroprene shielded cable, 4 mm diameter by 3 m long, bared at the tip (Shield wire is not connected to mainframe.)

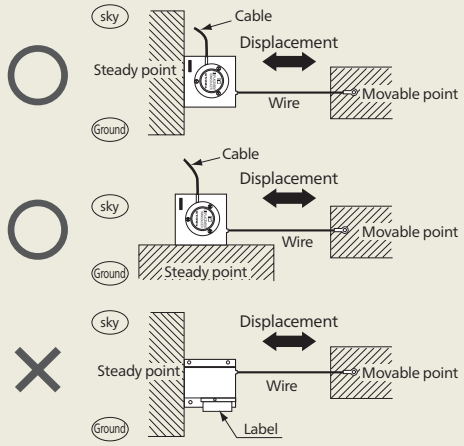
Mechanical Properties

Safe Overload Rating	120%
Measuring Force	See table below.
Maximum Response Speed	See table below.
Service Life	10000 times
Wire	0.5 mm diameter, material SUS304
Weight	See table below.

Notes:
1. DTP-D-A series cannot be used in repetitive tests for fatigue life evaluation
2. Measurement is impossible when speeds of wire extraction/rewind are lower than follows;
   DTP-D-2KS/5KS 20 mm/s or less

To Ensure Safe Usage

Install the transducer with the label coming vertically to the ground. (See figures below.)



●Fix a transducer to a steady point where a wire can be pulled out at right angle. It is required to pull out 5mm or more at least in measurement.
●DTP-A-S series cannot be used for dynamic measurement or measurement of rapidly moving or vibration-accompanied objects.

Models	Rated Capacity	Measuring Force of Wire (Approx.)		Max. Response Speed	A	B	C	D	E	F	G	H	J	K	Weight (Approx.)
		Pull-Out Direction	Pull-In Direction												
DTP-D-2KS	2000 mm	1.57 N	0.98 N	300 mm/s	100	—	90	80	59	14	80	10	8×ϕ5.5	12	550 g
DTP-D-5KS	5000 mm	1.67 N	1.08 N	400 mm/s	153	127	80	70	60	20	120	15	8×ϕ5.5	15	1.4 kg

●Static measurement ●Dynamic measurement

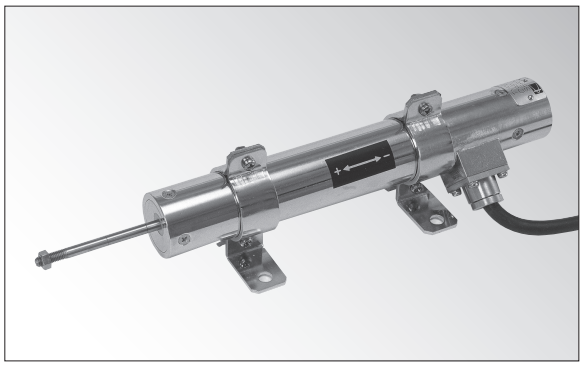
DTP-D-S Recommended products for combination

- Data Logger UCAM-60B → 3-25
- Fast Data Logger UCAM-550A → 3-31
- Universal Recorder EDX-200A → 3-55
- Universal Recorder EDX-100A → 3-63
- Memory Recorder/Analyzer EDX-3000B → 3-69

DLT-AS/BS

●5 to 500 mm

Inductance-type displacement transducer



Less friction and small measuring force Excellent linearity and high resolution

- ●Complete shielding against magnetism makes the transducers hard to receive external electric effects.
- ●Stable against temperature changes
- ●Noncontact design between the core and mainframe ensures durability.
- ●Also available in waterproof type (DLT-BS)

Using a differential transformer for the sensing element, the inductance displacement transducers convert mechanical displacement to an electric quantity (voltage). Since an amplifier excited by 5 kHz carrier is required for measurement, use the transducers in combination with a carrier-type dynamic strain amplifier in DPM series.
The transducers enable measurement of changing length or displacement initiated by unevenness, elongation/contraction or thickness change of an object. Watertight models conforming to IEC 60529 make transducers in this series further suitable for field measurement.

Specifications

Performance

Rated Capacity	See table below. (DLT-BS is watertight model conforming to IEC 60529)
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Rated Output	Approx. ±2 mV/V (4000 μm/m)

Environmental Characteristics

Safe Temperature Range	-15 to 75°C (Non-condensing)
Compensated Temperature Range	-10 to 60°C (Non-condensing)
Temperature Effect on Zero Balance	Within ±0.01% RO/°C
Temperature Effect on Output	Within ±0.01%/°C

Electrical Characteristics

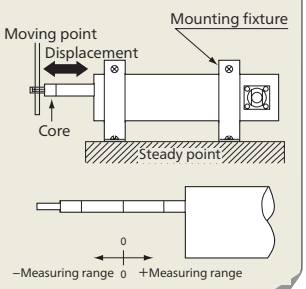
Detection Method	Inductance
Safe Excitation Voltage	5 VAC (Carrier frequency 5 kHz)
Recommended Excitation Voltage	2 VAC (Carrier frequency 5 kHz)
Input Resistance	120 Ω±1%
Output Resistance	120 Ω±1%
Cable	4-conductor (0.3 mm²) vinyl shielded cable, 7.6 mm diameter by 5 m long, terminated with connector plug

Mechanical Properties

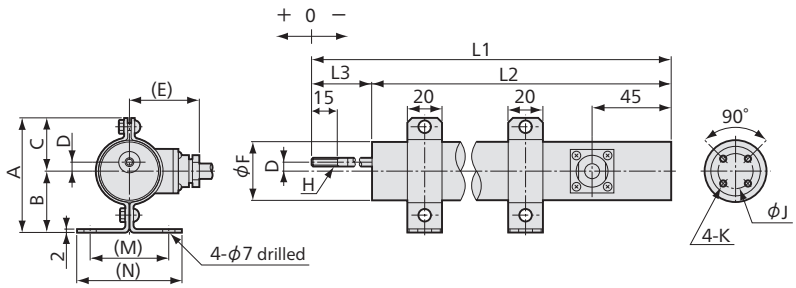
Frequency Response Range	See table below.
Weight	See table below.

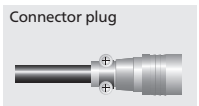
To Ensure Safe Usage

- ●The transducer may be mounted with an accessory mounting fixture or with the screws on the top of case.
- ●The carrier frequency affects the output voltage and characteristics of transducers. Thus, any dynamic strain amplifier with bridge excitation at other than 5 kHz cannot be used. (Also, any amplifier with DC bridge excitation cannot be used.)



Dimensions





Models		Rated Capacity	Frequency Response Range	A	B	C	D	(E)	ϕF	H	ϕJ	K	L1	L2	L3	M	N	Weight (Approx.)
DLT-5AS	DLT-5BS	±5 mm	DC to 200 Hz	65	35	30	5	40	33	M5 P=0.8	20	M4 P=0.7 d=7	210	175	35	45	60	700 g
DLT-10AS	DLT-10BS	±10 mm	DC to 100 Hz															
DLT-20AS	DLT-20BS	±20 mm	DC to 50 Hz	65	35	30	5	40	33	M5 P=0.8	20	M4 P=0.7 d=7	270	215	55	45	60	800 g
DLT-30AS	DLT-30BS	±30 mm	DC to 30 Hz															
DLT-50AS	DLT-50BS	±50 mm	DC to 20 Hz	65	35	30	5	40	33	M5 P=0.8	20	M4 P=0.7 d=7	330	255	75	45	60	900 g
DLT-100AS	DLT-100BS	±100 mm	DC to 15 Hz	65	35	30	5	40	33	M5 P=0.8	20	M4 P=0.7 d=7	520	395	125	45	60	1.2 kg
DLT-150AS	DLT-150BS	±150 mm	DC to 10 Hz	75	40	35	7	45	42	M6 P=1	25	M5 P=0.8 d=10	680	500	180	55	70	2.3 kg
DLT-200AS	DLT-200BS	±200 mm	DC to 9 Hz	75	40	35	7	45	42	M6 P=1	25	M5 P=0.8 d=10	830	600	230	55	70	2.6 kg
DLT-300AS	DLT-300BS	±300 mm	DC to 7 Hz	75	40	35	7	45	42	M6 P=1	25	M5 P=0.8 d=10	1130	800	330	55	70	3.3 kg
DLT-500AS	DLT-500BS	±500 mm	DC to 5 Hz	75	40	35	7	45	42	M6 P=1	25	M5 P=0.8 d=10	1730	1200	530	55	70	5 kg

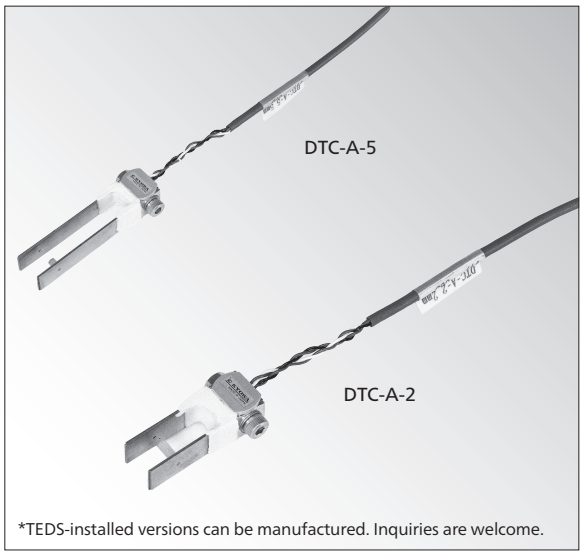
●Dynamic measurement

DLT-AS/BS Recommended products for combination
Strain Amplifier DPM-900 Series → 3-5
Strain Amplifier DPM-951A → 3-7

DTC-A

●2 & 5 mm

Clip-type Displacement Transducer



*TEDS-installed versions can be manufactured. Inquiries are welcome.

For Materials Tests with an Overload Prevention Stopper

●Sensor tip is designed in conformity with ASTM Standard.
●Mounting tips are optionally available.

DTC-A displacement transducers can measure crack opening displacement of materials, complying with ASTM standard, etc. To measure crack opening displacement, bezels at both tips of a clip are hooked to crack edges. If crack edges are too large or bezels are not applicable, mounting tips are optionally available.

Specifications

Performance

Rated Capacity	See table below.
Nonlinearity	Within±1% RO
Hysteresis	Within±1% RO
Repeatability	1% RO or less
Rated Output	2.5 mV/V (5000 μm/m) +20/-10%

Environmental Characteristics

Safe Temperature Range	-10 to 60°C
Compensated Temperature Range	0 to 50°C
Temperature Effect on Zero Balance	Within ±0.05% RO/°C
Temperature Effect on Output	Within ±0.05%/°C

Electrical Characteristics

Safe Excitation Voltage	10 V AC or DC
Recommended Excitation Voltage	2 to 4 V AC or DC
Input Resistance	350 Ω±2%
Output Resistance	350 Ω±2%
Cable	4-conductor (0.08 mm²) vinyl shielded cable, 3.2 mm diameter by 2 m long, bared at the tip (Shield wire is not connected to mainframe.)

Mechanical Properties

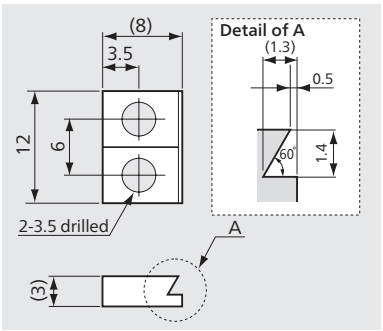
Safe Overload Rating	130% (With a stopper)
Natural Frequencies	See table below.
Measuring Force	See table below.
Weight	Approx. 20 g (Excluding cable)

Models	Rated Capacity(Bezel Distance)	Measuring Force(Approx.)	Natural Frequencies (Approx.)
DTC-A-2	2 mm(8 to 10 mm)	4 to 20 N	580 Hz
DTC-A-5	5 mm(4 to 9 mm)	1 to 10 N	215 Hz

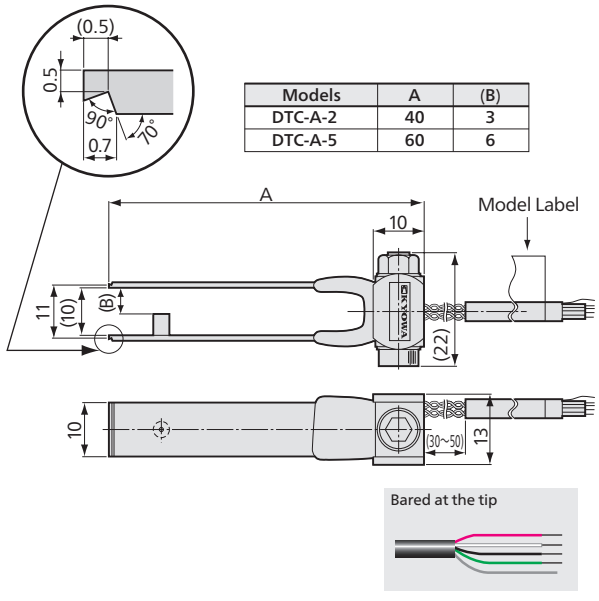
Optional Accessories

Mounting tips TIP-10A

Use the optional mounting tips where a bezel cannot be prepared on the test piece or where the mounting bezel distance is too wide. The tip is available in 2 pieces per set.

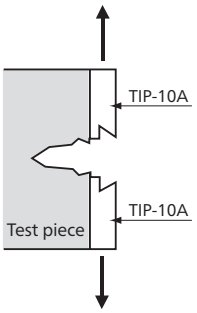


■Dimensions

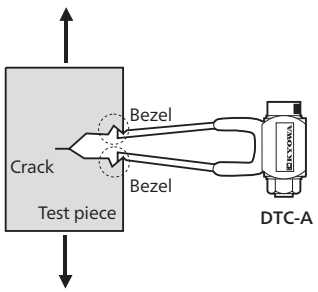


Models	A	(B)
DTC-A-2	40	3
DTC-A-5	60	6

■Application for Mounting tips



■Typical Application (Material testing in conformity with ASTM)



●Prepare two bezels at counter-positions on the crack or fix 2 optional mounting tips TIP-10A using screws or adhesive. Mount the DTC-A to the bezels or to the tips.

●Physical quantity indication ●Static measurement ●Dynamic measurement

DTC-A Recommended products for combination


Instrumentation Amplifier WGA-680A → 3-97


Data Logger UCAM-60B → 3-25


Medium Speed Network Terminal Box NTB-500A → 3-35


Universal Recorder EDX-200A → 3-55


Sensor Interface PCD-400A → 3-77