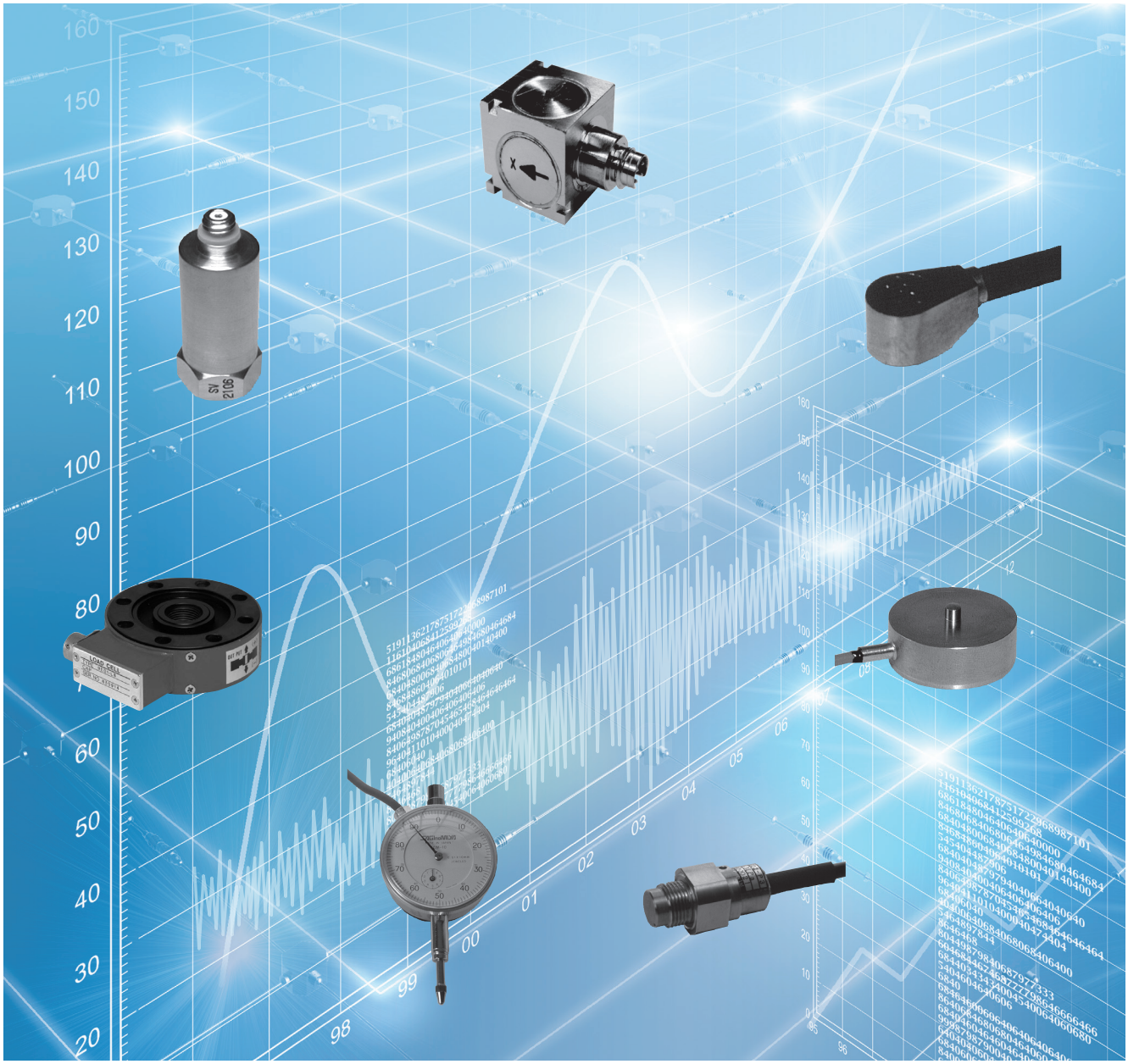
TRANSDUCERS

Load Cells
Pressure Transducers
Displacement Transducers
Torque Transducers
Acceleration Transducers (Strain gauge type)
Acceleration Transducers (Piezoelectric type)



A&D Company, Ltd.

Discover Precision

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"The transducer is the basis for measurement."

Transducers that convert the mechanical, electromagnetic, and thermal properties of artificial objects and natural phenomena into signals that are easy for humans and computers to handle are widely used in various industries, such as for daily use transportation like automobiles and railways, and in the rational designing of structures, such as bridges and factories, to ensure a high level of safety.

There are a wide variety of transducers depending on the physical information, detection principle, and the form of transducer for the intended goal. Therefore, it is necessary to carefully consider the properties of the measurement target and transducers in order to select the optimal transducer for the measurement conditions.

A&D offers a variety of transducers to meet the requirements for a wide range of fields.

Terminology and definitions

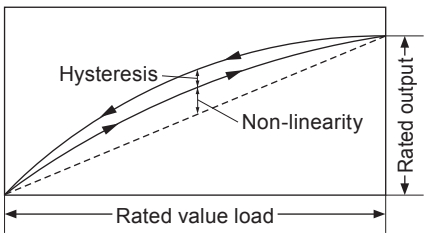
- Rated capacity
  The maximum load of load cell which can measure while maintaining its specifications. (Figure 1)
- Rated output
  The value obtained by subtracting the non-load output from the rated output. It is usually expressed with an output (mV/V) per excitation voltage(1V). (Figure 1)
- Output voltage 'e' from Wheatstone bridge circuit in 1 gauge method is a relation as follows.

$$e = \frac{1}{4} \cdot K \cdot \varepsilon \cdot E$$

K : gauge factor
ε : Strain value
E : Bridge voltage

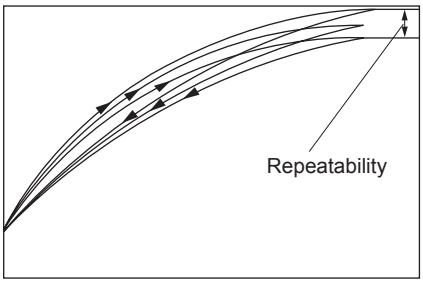
In case of transducer with a rated output of 1 mV/V, the strain amount is converted from the above equation, the strain $\varepsilon = 2{,}000 \times 10^{-6}$, so, 1 mV/V = $2{,}000 \times 10^{-6}$ strain,

- Zero balance
  Output voltage of the transducer when there is no load, usually expressed as a percentage of rated output.
- Allowable overload
  Load exceeding the specifications that can be applied without causing a permanent change in the characteristics. It is expressed as a percentage of the rated load.
- Maximum allowable overload
  Maximum load exceeding the specifications that can be applied without causing destructive damage mechanically. It is expressed as a percentage of the rated load.
- Non-linearity
  From the calibration curve, the largest deviation from a straight line drawn from the no-load point and the rated load point, measured only when the load is increased. It is expressed as a percentage of the rated output. (Figure 1)
- Hysteresis
  Maximum difference between the transducer outputs while the load is increasing and decreasing from no load to the rated load. It is expressed as a percentage of the rated output. (Figure 1)



(Figure 1)

- Repeatability
  Maximum difference in output when the same rated load is measured repeatedly under identical load and environmental conditions. It is expressed as a percentage of rated output. (Figure 2)



(Figure 2)

- Compensated temperature range
  The temperature range at which the rated output and zero-balance are compensated not to exceed the specifications.
- Allowable temperature range
  Temperature range that can be applied continuously without causing permanent destructive change to the transducer.
- Temperature effect of zero point
  The change in zero-balance caused by ambient temperature change. It is expressed as percentage of the rated output per 1°C of ambient temperature change.
- Temperature effect on output
  The change in output caused by ambient temperature changes. This is expressed as a percentage of the output per 1°C of ambient temperature change.
- Insulation resistance
  Resistance of electrical insulation between the circuitry and main unit of the transducer. Normally, It is measured under standard environmental conditions using DC50V.
- Remote sensing
  Means not to be affected in output voltage by cable length when it is long.

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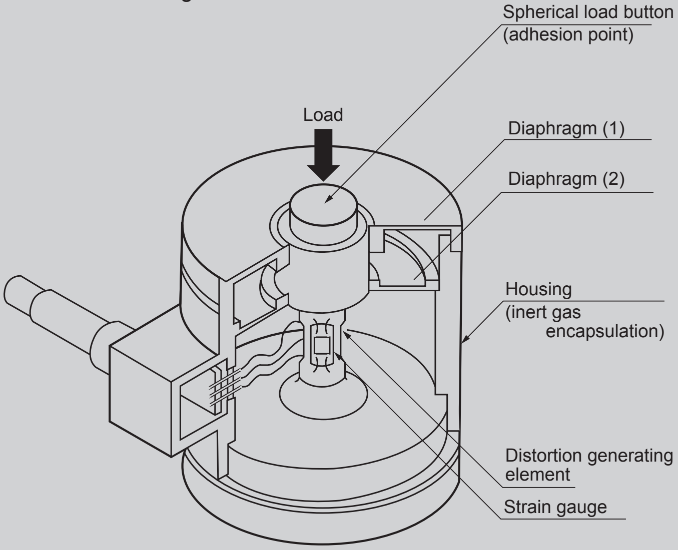
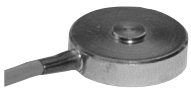
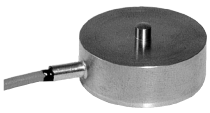
Load Cell

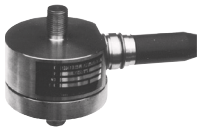
Structural drawing

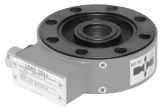


The strain gauge type load cell is a sensor that converts the magnitude and force of a load into an electric quantity by adhering a strain gauge to an elastic deformation sensing element (distortion generating element).
The material of the sensing element is a special steel that makes hysteresis and creep fatigue extremely low, so it can be used semi-permanently unless it is used with a destructive load.
There are types available for compression load only, tensile load only, and tensile and compression load.
The strain gauge attached to the sensing element is self-temperature compensating and uses elements that are excellent for linearity, long-term stability, and fatigue resistance.
In addition, an inert gas is enclosed inside the load cell to prevent deterioration of the insulation of the internal elements, thereby ensuring long-term stabilization of its characteristics.
By connecting to various measuring instruments, it can be applied to analog recording of loads and forces, digital display, system automation by computer, and force control of FA equipment, robots, etc.

Type	Ultra-compact				Compact				General use							High precision							Special type		
	Compression			Tension	Compression		Tension		Compression		Tension	Compression and Tension				Compression	Tension		Compression and Tension				Compression		Compression and Tension
Model 9E01-	L2	L42	L43	L44	L18	L18WA	L19	L19WA	L1	L3	L5	L4	L8	L23	L23WA	L11A	L15A	L33	L21	L22A	L31	L35	L9	L14	L23H
Rated capacity range (Unit: N)	5 – 100	200 – 1k	10 – 1k	50 – 2k	500 – 200k	500 – 200k	500 – 20k	500 – 20k	10k – 1M	50 – 5k	50 – 5k	10k – 1M	1k – 200k	5k – 1M	5k – 200k	10k – 200k	10k – 200k	200 – 20k	500 – 5k	10k – 1M	50 – 2k	20 – 2k	10k – 1M	1M – 5M	5k – 200k
Structure	Beam type	Diaphragm type			Coaxial beam, gas encapsulated type	Coaxial beam, waterproof, gas encapsulated type	Coaxial beam, gas encapsulated type	Coaxial beam, waterproof, gas encapsulated type	Rod type	Dust-proof structure, beam type		Rod type	Low profile, airtight structure		Waterproof, gas encapsulated type	Gas encapsulated type		Double beam type	Double beam, Gas encapsulated type		Rod beam type		Center hole type	Washer type	Low and high temperature type
Rated output (mV/V)	1				2				1.5					2		3			2		3	2	1.5	1	2
Non-linearity (%RO)	1	2	1		0.15 / 0.1				0.2	0.15		0.2	0.15	0.05 / 0.15		0.03		0.02		0.03	0.05	0.015	0.2	1	0.2
Allowable overload (%)	120		150	120	150		150 / 120		150							150							150		

	Ultra-compact types				Compact types
Model	**9E01-L2**	**9E01-L42**	**9E01-L43**	**9E01-L44**	**9E01-L18**
Rated capacity	5 to 100N	200, 500N, 1kN	10 to 1kN	50 to 2kN	500 to 200kN
Type	Compression			Tension	Compression
Structure	Beam type	Diaphragm type			Coaxial beam type
Features	• Button type load cell with a wide load area (Φ10) • Optimal for measurement of finger pressure sensation	• Φ14 Outside diameter/4 mm thickness, all-stainless steel construction, ultra-compact and high-capacity • Load sensing is available on Φ4 flat surface. • Applications: Occlusal force measurement, press pressure control, embedding in industrial machines	• Button-type, ultra-compact load cell • Applications: Press pressure control, embedding in industrial machinery	• Ultra-compact load cell	• All-stainless steel construction (SUS630) • Inert gas encapsulated, airtight structure
Appearance					
Allowable overload	120 %RC	120 %RC	150 %RC	120 %RC	150 %RC
Rated output	1 mV/V±20 %	1 mV/V±20 %	1 mV/V±20 %	1 mV/V±20 %	2 mV/V±1 %
Non-linearity	±1 %RO	±2 %RO	±1 %RO	±1 %RO	±0.15 %RO (500 N to 20 kN) ±0.10 %RO (50 kN to 200 kN)
Hysteresis	±1 %RO	±2 %RO	±1 %RO	±1 %RO	±0.15 %RO
Repeatability	±0.5 %RO	±1 %RO	±0.5 %RO	±0.5 %RO	±0.1 %RO
Excitation V.	Within 2 V	Within 2 V	Within 4 V	Within 4 V	Within 12V
Allowable excitation V.	3 V	3 V	6 V	6 V	20 V
Input resistance	120 Ω ±50 Ω	120 Ω	350 Ω	350 Ω	425 Ω ±50 Ω
Output resistance	120 Ω	120 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	20 to 60 °C	0 to 60 °C	0 to 60 °C	0 to 60 °C	−10 to 60 °C
Allowable Temp. range	0 to 80 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−30 to 80 °C
Temp. effect of zero point	±0.03 %RO/°C	±0.2 %RO/°C	±0.2 %RO/°C	±0.2 %RO/°C	±0.01 %RO/°C
Temp. effect on output	±0.03 %/°C	±0.03 %/°C	±0.1 %/°C	±0.1 %/°C	±0.01 %/°C
Supplied cables	Φ3 mm-4 core shielded cable 2 m, stripped end	Φ2 mm-4 core shielded cable 2 m, stripped end	Φ2 mm-4 core shielded cable 3 m, stripped end (10 N to 50 N) Φ2. 8 mm-4-core shielded cable 3 m, stripped end (100 N to 1 kN)	Φ2 mm-4 core shielded 3 m, stripped end (50 N) Φ2. 4 mm-4-conductor shielded 3 m, stripped end (100 N to 2 kN)	Φ6 mm 4 core shielded cable 5 m, stripped end (500 N to 20 kN) Φ8 mm 4 core shielded cable 5 m, stripped end (50 kN to 200 kN)
Conformity Directive (RoHS2 Directive)	YES	YES	YES	YES	YES
Connector	An NDIS connector can be attached to the end of the cable as optional.				

	Compact types			General use
Model	**9E01-L18WA**	**9E01-L19**	**9E01-L19WA**	**9E01-L1**
Rated capacity	500 to 200kN	500 to 20kN	500 to 20kN	10k to 1MN
Type	Compression			Compression
Structure	Coaxial-beam type, completely waterproof	Coaxial beam type	Coaxial-beam type, completely waterproof	Column type with spherical support
Features	• Completely waterproof compliant (JIS C 0920 7 class/waterproof, usable underwater) • All-stainless steel construction (SUS630)	• All-stainless steel construction (SUS630) • Inert gas encapsulated, airtight structure • Main Applications: Testers/industrial equipment	• Completely waterproof compliant (JIS C 0920 7 class/waterproof, usable underwater) • All-stainless steel construction (SUS630) • Inert gas encapsulated, airtight structure	• High reliability • Abundant of delivery achievements and low cost • Spherical support (with gap cap)
Appearance				
Allowable overload	150 %RC	150 %RC (500 N to 10 kN) 120 %RC (20 kN)	150 %RC (500 N to 10 kN) 120 %RC (20 kN)	150 %RC
Rated output	2 mV/V±1 %	2 mV/V±1 %	2 mV/V±1 %	1.5 mV/V±1 %
Non-linearity	±0.15 %RO (500 N to 20 kN) ±0.10 %RO (50 kN to 200 kN)	±0.15 %RO	±0.15 %RO	±0.2 %RO
Hysteresis	±0.15 %RO	±0.15 %RO	±0.15 %RO	±0.2 %RO
Repeatability	±0.1 %RO	±0.1 %RO	±0.1 %RO	±0.1 %RO
Excitation V.	Within 12 V	Within 12 V	Within 12 V	Within 12 V
Allowable excitation V.	20 V	20 V	20 V	20 V
Input resistance	425 Ω ±50 Ω	425 Ω ±50 Ω	425 Ω ±50 Ω	350 Ω
Output resistance	350 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 ºC	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−30 to 80 ºC	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C
Temp. effect of zero point	±0.01 %RO/ºC	±0.01 %RO/°C	±0.01 %RO/°C	±0.01 %RO/°C
Temp. effect on output	±0.01 %/ºC	±0.01 %/°C	±0.01 %/°C	±0.01 %/°C
Supplied cables	Φ9. 4 mm 4-conductor shielded cable 5 m, stripped end	Φ6 mm-4 core shielded cable 5 m, stripped end	Φ9. 4 mm-4-core shielded cable 5 m, stripped end	Main unit connector: Receptacle (PRC03-21A10-7F) relay cable L-A-5 included
Conformity Directive (RoHS2 Directive)	N/A	YES	N/A	YES
Connector	An NDIS connector can be attached to the end of the cable as optional.			—

	General use			
Model	**9E01-L3**	**9E01-L5**	**9E01-L4**	**9E01-L8**
Rated capacity	50 to 5kN	50 to 5kN	10k to 1MN	1k to 200kN
Type	Compression	Tension	Tension and compression	
Structure	Coaxial beam type		Pipe/rod type	Shear type, low profile, airtight structure
Features	• High reliability type • Optimal for materials testing machines • Low cost • Includes compression load button	• High reliability type • Optimal for materials testing machines • Low cost • Includes rod end for tension	• High reliability type • Compact and lightweight for easy handling • Attached tension and compression bidirectional test data (excluding some ratings) • Optimized for measuring the hauling power of construction and farming machines	• Attached tension and compression bidirectional test data (traceability certification available / some models are excluded) • High level of mounting flexibility (screw / flange fixing) • Excellent eccentricity resistance and fatigue resistance.
Appearance				
Allowable overload	150 %RC	150 %RC	150 %RC	150 %RC
Rated output	1.5 mV/V±1 %	1.5 mV/V±1 %	1.5 mV/V±1 %	0.75 mV/V±1 % (1 kN) 1.0 mV/V±1 % (2 kN) 1.5 mV/V±1 % (5 kN to 200 kN)
Non-linearity	±0.15 %RO	±0.15 %RO	±0.2 %RO	±0.15 %RO
Hysteresis	±0.15 %RO	±0.15 %RO	±0.2 %RO	±0.15 %RO
Repeatability	±0.1 %RO	±0.1 %RO	±0.1 %RO	±0.1 %RO
Excitation V.	Within 10 V	Within 10 V	Within 12 V	Within 12 V
Allowable excitation V.	15 V	15 V	20 V	20 V
Input resistance	350 Ω	350 Ω	350 Ω	350 Ω
Output resistance	350 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C
Temp. effect of zero point	±0.01 %RO/°C	±0.01 %RO/°C	±0.01 %RO/°C	±0.01 %RO/°C (1 kN, 2 kN) ±0.005 %RO/°C (5 kN to 200 kN)
Temp. effect on output	±0.01 %/°C	±0.01 %/°C	±0.01 %/°C	±0.01 %/°C
Conformity Directive (RoHS2 Directive)	YES	YES	YES	YES
Supplied cables	Main unit connector: Receptacle (PRC03-21A10-7F) and relay cable L-A-5 included			

	General use		High-precision type	
Model	**9E01-L23**	**9E01-L23WA**	**9E01-L11A**	**9E01-L15A**
Rated capacity	5k to 1MN	5k to 200kN	10k to 200kN	10k to 200kN
Type	Tension and compression		Compression	Tension
Structure	Shear type, low profile, airtight structure	Shearing type, completely waterproof	Coaxial beam type, inert gas encapsulated	
Features	• Attached tension and compression bidirectional test data • Easy to use with a high level of mounting freedom • Excellent resistance to eccentricity and fatigue • Widely used in fatigue testing machines and industrial machineries.	• Completely waterproof compliant (JIS C 0920 7 class / waterproof, usable underwater) • All-stainless steel construction (SUS630) • Attached tension and compression bidirectional test data • Easy to use with a high level of mounting freedom • Excellent resistance to eccentricity and fatigue	• High precision, high stability, and inert gas encapsulated • Hermetically sealed structure with excellent environmental resistance • Support for high compression capacity • Support for remote sensing • Applications: Weighing and industrial machines	• High precision, high stability, and inert gas encapsulated • Hermetically sealed structure with excellent environmental resistance • Support for high compression capacity • Support for remote sensing • Applications: Weighing and industrial machines
Appearance				
Allowable overload	150 %RC	150 %RC	150 %RC	150 %RC
Rated output	2 mV/V±1 %	2 mV/V±1 %	3 mV/V±1 %	3 mV/V±1 %
Non-linearity	±0.05 %RO (5 kN to 200 kN) ±0.15 %RO (500 kN, 1 MN)	±0.05 %RO	±0.03 %RO	±0.03 %RO
Hysteresis	±0.1 %RO (5 kN to 200 kN) ±0.15 %RO (500 kN, 1 MN)	±0.1 %RO	±0.03 %RO	±0.03 %RO
Repeatability	±0.03 %RO (5 kN to 200 kN) ±0.1%RO (500kN, 1MN)	±0.05 %RO	±0.02 %RO	±0.02 %RO
Excitation V.	Within 12 V	Within 12 V	Within 12 V	Within 12 V
Allowable excitation V.	20 V	20 V	20 V	20 V
Input resistance	350 Ω	350 Ω	350 Ω	350 Ω
Output resistance	350 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C
Temp. effect of zero point	±0.005 %RO/°C	±0.005 %RO/°C	±0.002 %RO/°C	±0.002 %RO/°C
Temp. effect on output	±0.01 %/°C	±0.01 %/°C	±0.002 %/°C	±0.002 %/°C
Supplied cables	Φ8 mm-4 core shielded cable 5 m, with terminal NDIS connector	Φ8. 5 mm-4-core shielded cable 5 m, stripped end	Φ8. 5 mm 6-core shielded cable 5 m, stripped end	Φ8. 5 mm-6-core shielded cable 5 m, stripped end
Conformity Directive (RoHS2 Directive)	YES	N/A	YES	YES
Connector	—	An NDIS connector can be attached to the end of the cable as optional.		

	High-precision type			
Model	**9E01-L33**	**9E01-L21**	**9E01-L22A**	**9E01-L31**
Rated capacity	200 to 20kN	500 to 5kN	10k to 1MN	50 to 2kN
Type	Tension	Tension and compression		
Structure	Double beam type	Coaxial beam type, inert gas encapsulated	Shearing type/Inert gas encapsulation	Cantilever beam type
Features	• High-precision, high-output, general purpose type • Compact, lightweight, and low cost • Special moisture-proof process ensures high stability • Applications: Hopper & packer weighing instruments, testing machines, industrial machinery	• High precision, inert gas encapsulated • Internal mechanism not affected by atmospheric pressure • Support for remote sensing • Available as a load cell for standard devices • Attached tension and compression bidirectional test data	• High-precision tensile and compression type • Inert gas encapsulation, completely airtight welded structure • Support for remote sensing • Excellent resistance to eccentricity and fatigue • Fatigue testing machine, widely used in industrial machinery	• High precision, high output, and low cost • Compact, lightweight, and easy to install • Attached tension and compression bidirectional test data • Applications: Industrial scale, testing machines, and industrial equipment
Appearance				
Allowable overload	150 %RC	150 %RC	150 %RC	150 %RC
Rated output	3 mV/V±1 %	2 mV/V±1%	2 mV/V±1 %	3 mV/V±1 %
Non-linearity	±0.02 %RO	±0.02 %RO	±0.03 %RO	±0.05 %RO
Hysteresis	±0.02 %RO	±0.02 %RO	±0.03 %RO	±0.05 %RO
Repeatability	±0.01 %RO	±0.01 %RO	±0.02 %RO	±0.03 %RO
Excitation V.	Within 12 V	Within 12 V	Within 12 V	Within 12 V
Allowable excitation V.	20 V	20 V	20 V	20 V
Input resistance	350 Ω	350 Ω	350 Ω	350 Ω
Output resistance	350 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C
Temp. effect of zero point	±0.002 %RO/°C	±0.002 %RO/°C	±0.002 %RO/°C	±0.005 %RO/°C
Temp. effect on output	±0.002 %/°C	±0.002 %/°C	±0.002 %/°C	±0.005 %/°C
Supplied cables	Φ6 mm-4 core shielded cable 5 m, stripped end	Φ8 mm-6 core shielded cable 5 m, stripped end	Φ9. 6 mm-6-core shielded cable 5 m, stripped end	Φ6 mm-4 core shielded cable 3 m, stripped end
Conformity Directive (RoHS2 Directive)	YES	YES	YES	YES
Connector	An NDIS connector can be attached to the end of the cable as optional.			

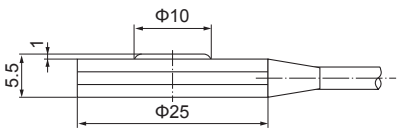
	High-precision type	Unique type		
Model	**9E01-L35**	**9E01-L9**	**9E01-L14**	**9E01-L23H**
Rated capacity	20 to 2kN	10k to 1MN	1M to 5MN	5k to 200kN
Type	Tension and compression	Compression		Tension and compression
Structure	Cantilever beam type, metal bellows	Center hole type	Washer type	Supports shearing and high/low temperatures
Features	• High precision and general purpose • Inert gas encapsulated, completely airtight structure • Equipped with a metal bellows with excellent environmental resistance • Support for low capacity • Attached tension and compression bidirectional test data	• High-capacity, general-purpose, center hole load cell • Optimal for measurement of tensile strength of bolts, wire ropes, etc. • Compact and low cost	• Custom designed production to meet capacity and dimensions • Welded structure or hermetically sealed depending on the installation environment • Applications: Large rolling mills and forging presses	• Supports high and low temperatures (−40 to 150 °C) • All-stainless steel construction (SUS630) • Attachment of tensile and compression bidirectional test data • Easy to use with a high level of mounting freedom • Excellent resistance to eccentricity and fatigue
Appearance				
Allowable overload	150 %RC	150 %RC	150 %RC	150 %RC
Rated output	2 mV/V±1 %	1.5 mV/V±1%	1 mV/V±1%	2 mV/V±10 %
Non-linearity	±0.015 %RO	±0.2 %RO	±1 %RO	±0.2 %RO
Hysteresis	±0.015 %RO	±0.2 %RO	±1 %RO	±0.2 %RO
Repeatability	±0.01 %RO	±0.1 %RO	±0.3 %RO	±0.1 %RO
Excitation V.	Within 12 V	Within 12 V	Within 12 V	Within 10 V
Allowable excitation V.	20 V	20 V	20 V	15 V
Input resistance	350 Ω	350 Ω	350 Ω	350 Ω
Output resistance	350 Ω	350 Ω	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−40 to 150 °C
Allowable Temp. range	−30 to 80 °C	−30 to 80 °C	−30 to 80 °C	−40 to 180 °C
Temp. effect of zero point	±0.002 %RO/°C	±0.01 %RO/°C	±0.01 %RO/°C	±0.02 %RO/°C (20 to 150 °C) ±0.05 %RO/°C (−40 to 20 °C)
Temp. effect on output	±0.0015 %/°C	±0.01 %/°C	±0.01 %/°C	±0.05 %/°C
supplied cables	Φ6 mm-4 core shielded cable 5 m, stripped end	Main unit connector: Receptacle (PRC03-21A10-7F) and relay cable L-A-5 included	Φ8 mm-4 core shielded cable 10 m, stripped end	Φ6 mm-4 core shielded cable 5 m, stripped end
Conformity Directive (RoHS2 Directive)	YES	YES	N/A	N/A
Connector	An NDIS connector can be attached to the end of the cable as optional.	—	An NDIS connector can be attached to the end of the cable as optional.	

External dimensions

Unit: mm *weight does not include cable.

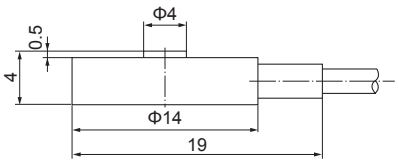
Ultra compact type

9E01-L2



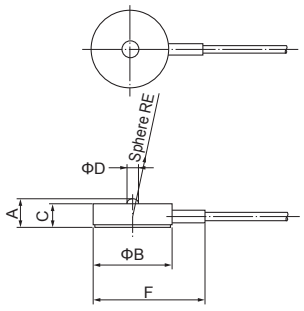
Model	Rated capacity	Weight (g)	Natural frequency (kHz)
9E01-L2-5N	5N	10	1.6
9E01-L2-10N	10N		2.5
9E01-L2-20N	20N		4.1
9E01-L2-50N	50N		6.6
9E01-L2-100N	100N		9.5

9E01-L42



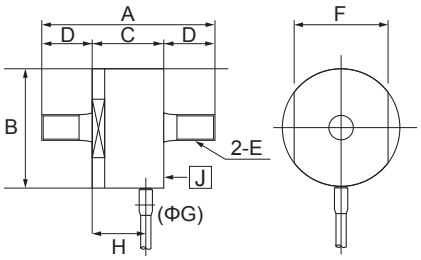
Model	Rated capacity	Weight (g)	Natural frequency (kHz)
9E01-L42-200N	200N	3	41
9E01-L42-500N	500N		66
9E01-L42-1KN	1kN		101

9E01-L43



Model	Rated capacity	A	B	C	D	E	F	Weight (g)	Natural frequency (kHz)
9E01-L43-10N	10N	4	12	3.3	1.8	2	17	2.8	17
9E01-L43-20N	20N								21
9E01-L43-50N	50N								35
9E01-L43-100N	100N	9.5	20	7.5	2.5	4	25	5.2	21
9E01-L43-200N	200N								25
9E01-L43-500N	500N								41
9E01-L43-1KN	1kN								59

9E01-L44

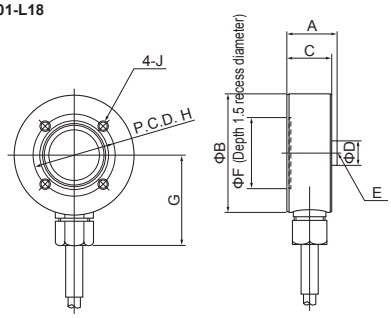


Model	Rated capacity	A	B	C	D	E	F	G	H	Weight (g)	Natural frequency (kHz)
9E01-L44-50N	50N	24	Φ15	10	7	M3 × 0.5	12	2.4	8	11	17
9E01-L44-100N	100N	31	Φ20	15	8	M4 × 0.7	17	3	11.3	30	21
9E01-L44-200N	200N										35
9E01-L44-500N	500N										21
9E01-L44-1KN	1kN										25
9E01-L44-2KN	2kN	41	Φ28	17	12	M6 × 1	24	3	12	74	41

*Be careful that the surface of an item that faces the converter, such as a jig, does not touch the surface J of the converter main unit.

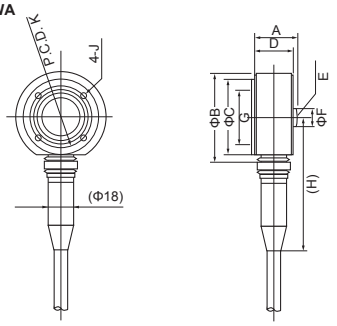
Compact type

9E01-L18



Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
9E01-L18-500N	500N	25	60	22	12	sphere R50	36	45	42	M5 × depth 6	0.7	3.6
9E01-L18-1KN	1kN											5.4
9E01-L18-2KN	2kN											7.8
9E01-L18-5KN	5kN											13
9E01-L18-10KN	10kN										0.8	16
9E01-L18-20KN	20kN											23
9E01-L18-50KN	50kN	40	100	35	24	sphere R70	65	80	80	M8 × depth 15	1.8	7.7
9E01-L18-100KN	100kN											11
9E01-L18-200KN	200kN	45	120	40	33	sphere R100	73	90	90		3.1	5

9E01-L18WA



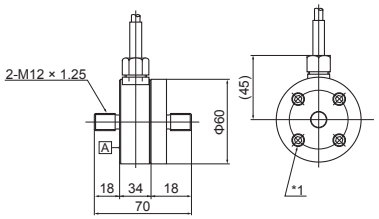
	Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	Weight (kg)	Natural frequency (kHz)
★	9E01-L18WA-500N	500N	30	60	50	27	sphere R50	12	36	88	M5 × depth 6	42	0.5	3.6
★	9E01-L18WA-1KN	1kN												5.4
★	9E01-L18WA-2KN	2kN												7.8
★	9E01-L18WA-5KN	5kN												13
★	9E01-L18WA-10KN	10kN												16
★	9E01-L18WA-20KN	20kN											0.6	23
★	9E01-L18WA-50KN	50kN	40	98	88	35	sphere R70	24	65	98	M6 × depth 12	76	1.6	7.7
★	9E01-L18WA-100KN	100kN												11
★	9E01-L18WA-200KN	200kN	45	116	106	40	sphere R100	33	73	107	M8 × depth 15	90	2.9	5

★ mark indicates a build-to-order product.

External dimensions

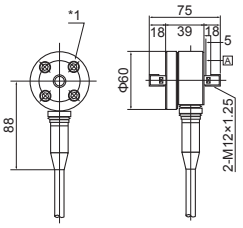
Unit: mm *weight does not include cable.

9E01-L19



Model	Rated capacity	Weight (kg)	Natural frequency (kHz)
9E01-L19-500N	500N	1	3.6
9E01-L19-1KN	1kN		5.4
9E01-L19-2KN	2kN		7.8
9E01-L19-5KN	5kN		13
9E01-L19-10KN	10kN	1.1	16
9E01-L19-20KN	20kN		23

9E01-L19WA



Model	Rated capacity	Weight (kg)	Natural frequency (kHz)
★ 9E01-L19WA-500N	500N	0.8	3.6
★ 9E01-L19WA-1KN	1kN		5.4
★ 9E01-L19WA-2KN	2kN		7.8
★ 9E01-L19WA-5KN	5kN		13
★ 9E01-L19WA-10KN	10kN	0.9	16
★ 9E01-L19WA-20KN	20kN		23

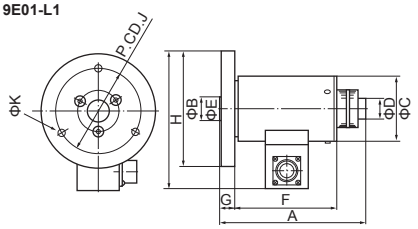
*1 8 adapter mounting screws are tightened at 10kN and 20kN.

★ mark indicates a build-to-order product.

*2 Be careful that the surface facing the transducer, such as a jig, does not touch with the surface A of the transducer main unit.

Diffusion type

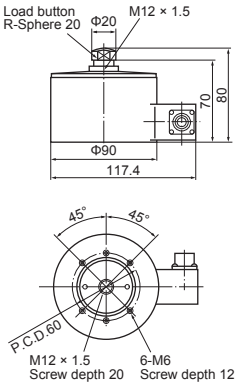
9E01-L1



Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	Weight (kg)	Natural frequency (kHz)
9E01-L1-10KN	10kN	102	80	45	14	18	87	10	94.5	60	3-Φ5.5	1.4	1.3
9E01-L1-20KN	20kN	102	80	45	14	18	87	10	94.5	60	3-Φ5.5		5.4
9E01-L1-50KN	50kN	110	80	40	20	15	95	10	93	65	4-Φ6.5	1.6	9
9E01-L1-100KN	100KN	120	100	50	30	21	105	10	108	80	4-Φ8.5	2	8.3
9E01-L1-200KN	200kN	150	120	66	40	30	134	11	126	100	4-Φ8.5	3.2	8.1
★ 9E01-L1-500KN	500kN	210	150	98	60	48	185	20	157	125	4-Φ10.5	13	4.8
★ 9E01-L1-1MN	1MN	276	250	143	100	68	245	21	225	190	4-Φ13	30	3.7

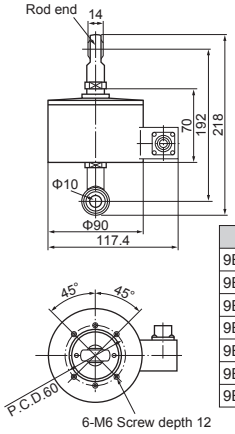
★ mark indicates a build-to-order product.

9E01-L3



Model	Rated capacity	Weight (kg)	Natural frequency (kHz)
9E01-L3-50N	50N	2	0.3
9E01-L3-100N	100N	2.1	0.6
9E01-L3-200N	200N		0.9
9E01-L3-500N	500N		1.3
9E01-L3-1KN	1kN		1.9
9E01-L3-2KN	2kN	2.3	2.5
9E01-L3-5KN	5kN		4.7

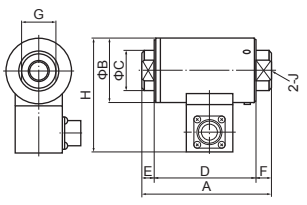
9E01-L5



Model	Rated capacity	Weight (kg)	Natural frequency (kHz)
9E01-L5-50N	50N	2.2	0.01
9E01-L5-100N	100N	2.3	0.02
9E01-L5-200N	200N		0.03
9E01-L5-500N	500N		0.04
9E01-L5-1KN	1kN		0.06
9E01-L5-2KN	2kN	2.5	0.08
9E01-L5-5KN	5kN		0.15

Diffusion type

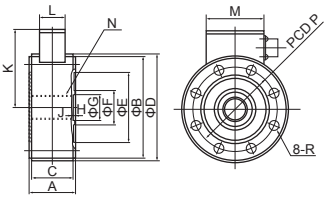
9E01-L4



Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
9E01-L4-10KN	10kN	83	41	24	65	8	10	22	74	M14 × 1.5 depth 15	0.7	7.4
9E01-L4-20KN	20kN	98	50	29.5	73	11	14	26	83	M18 × 1.5 depth 22	1.1	6
9E01-L4-50KN	50kN	152	52	44.5	85	36	31	41	85	M18 × 1.5 depth 34	1.6	6.3
9E01-L4-100KN	100kN	200	70	59	110	47	43	4-Φ8*	103	M28 × 1.5 depth 45	2.6	6.1
9E01-L4-200KN	200kN	270	96	84	145	65	60	4-Φ10*	129	M54 × 2 depth 65	8.5	3.9
★ 9E01-L4-500KN	500kN	420	146	129	220	102	98	4-Φ15*	175	M84 × 2.5 depth 100	22	4.3
★ 9E01-L4-1MN	1MN	560	195	174	290	140	130	4-Φ20*	225	M110 × 3.0 depth 130	70	2.5

*There are holes for hooking wrench for 100 kN or more. ★ mark indicates a build-to-order product.

9E01-L8



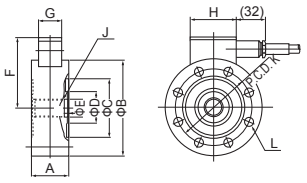
Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	Weight (kg)	Natural frequency (kHz)
9E01-L8-1KN	1kN	25	65	22	70	41	18	14	0.5	2	55	22	50	M12 × 1	52	6.5	0.6	6.5
9E01-L8-2KN	2kN																	8
9E01-L8-5KN	5kN																	11
9E01-L8-10KN	10kN																	16
9E01-L8-20KN	20kN	30															0.7	21
9E01-L8-50KN	50kN		88	27	92	60	30	22	1		67			M20 × 1.5	74	9	1.1	18
9E01-L8-100KN	100kN	34	117	31	121	82	46	34	1		81			M32 × 2	100	11	2.2	16
9E01-L8-200KN	200kN	50	166	—	—	116	60	44	1		117	40	70	M40 × 2	142	17	6	12

*The dimensional tolerance of G is "H7". *There is no cover for 200KN. (The main unit has a relay box.)

External dimensions

Unit: mm *weight does not include cable.

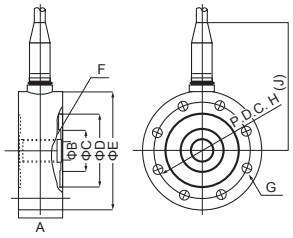
9E01-L23



Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	L	Weight (kg)	Natural frequency (kHz)
9E01-L23-5KN	5kN	40	105	65	35	20	77	25	50	M18 × 1.5	85	8-Φ9	2.2	3.5
9E01-L23-10KN	10kN													5
9E01-L23-20KN	20kN													7.6
9E01-L23-50KN	50kN	50	120	74	40	26	86			M24 × 1.5	95	8-Φ11	3.7	8.8
9E01-L23-100KN	100kN	65	160	100	60	40	108.5	30	55	M36 × 2	130	8-Φ18	8.5	7
9E01-L23-200KN	200kN	80	220	140	80	55	140.5			M50 × 2	180	8-Φ26	20	5.6
★ 9E01-L23-500KN	500kN	100	330	200	135	90	203.5	40	70	M85 × 2	265	8-Φ33	54	5.9
★ 9E01-L23-1MN	1MN	140	460	280	190	115	270			M110 × 3	370	16-Φ33	150	3.3

*The dimensional tolerance of E is "H7". ★ mark indicates a build-to-order product.

9E01-L23WA

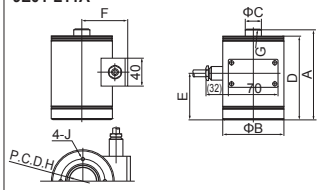


Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
★ 9E01-L23WA-5KN	5kN	40	20	35	65	105	M18 × 1.5	8-Φ9	85	115	2	3.5
★ 9E01-L23WA-10KN	10kN											5
★ 9E01-L23WA-20KN	20kN											7.6
★ 9E01-L23WA-50KN	50kN	50	26	40	74	120	M24 × 1.5	8-Φ11	95	122	3.5	8.8
★ 9E01-L23WA-100KN	100kN	65	40	60	100	160	M36 × 2	8-Φ18	130	142	8.3	7
★ 9E01-L23WA-200KN	200kN	80	55	80	140	220	M50 × 2	8-Φ26	180	172	18	5.6

*The dimensional tolerance of B is "H7". ★ mark indicates a build-to-order product.

High-precision type

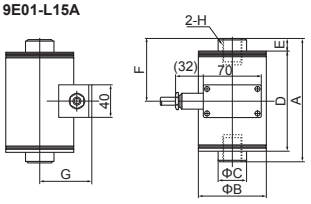
9E01-L11A



Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
9E01-L11A-10KN	10kN	110	88	16	102	55	69	sphere R70	60	M6 depth 10	3	3
9E01-L11A-20KN	20kN	130		24	120	67		sphere R100			4.2	2.3
9E01-L11A-50KN	50kN	130										2.6
9E01-L11A-100KN	100kN	190	127	28	180	90	95		80	M6 depth 15	11	2.1
★ 9E01-L11A-200KN	200kN	280	166	33	268	135	117		90		27	1.7

★ mark indicates a build-to-order product.

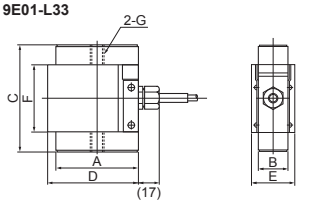
9E01-L15A



Model	Rated capacity	A	B	C	D	E	F	G	H	Weight (kg)	Natural frequency (kHz)
★ 9E01-L15A-10KN	10kN	115	85	18	93	12	60	66.5	M12 × 1.75 depth 14	2.9	3.3
★ 9E01-L15A-20KN	20kN	148.5		35	119.5	16	75.5		M24 × 2 depth 32	3.4	2.5
★ 9E01-L15A-50KN	50kN										2.9
★ 9E01-L15A-100KN	100kN	213	127	48	160	30	110	95.5	M36 × 2 depth 45	7.4	2.3
★ 9E01-L15A-200KN	200kN	290	166	70	210	40	140	118	M48 × 3 depth 60	18	1.9

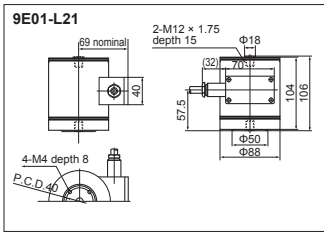
★ mark indicates a build-to-order product.

9E01-L33



Model	Rated capacity	A	B	C	D	E	F	G	Weight (kg)	Natural frequency (kHz)
9E01-L33-200N	200N	70	25	90	77	37	58	M12 × 1.75 depth 18	0.4	0.39
9E01-L33-500N	500N									0.37
9E01-L33-1KN	1kN									0.49
9E01-L33-2KN	2kN								1	0.91
9E01-L33-5KN	5kN									1.5
9E01-L33-10KN	10kN	80	30	108	87	42	71	M16 × 2 depth 20	1.6	1.9
9E01-L33-20KN	20kN									3.3

9E01-L21



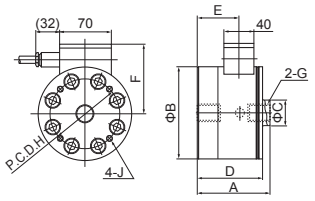
Model	Rated capacity	Weight (kg)	Natural frequency (kHz)
★ 9E01-L21-500N	500N	3	0.75
★ 9E01-L21-1KN	1kN		0.77
★ 9E01-L21-2KN	2kN		1.6
★ 9E01-L21-5KN	5kN		2

★ mark indicates a build-to-order product.

External dimensions

Unit: mm *weight does not include cable.

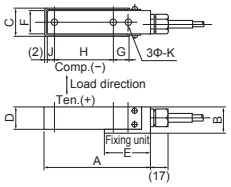
9E01-L22A



	Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
★	9E01-L22A-10KN	10kN	80	100	22	72	42	78	M12 × 1.75 depth 20	80	M8 × depth 12	3.2	6
★	9E01-L22A-20KN	20kN							M16 × 2 depth 20				8.6
★	9E01-L22A-50KN	50kN	95	125	34	85	52	94	M24 × 2 depth 30	95	M8 × depth 15	6.8	6.4
★	9E01-L22A-100KN	100kN	135	160	48	120	75	114	M36 × 2 depth 45	120		16	5.9
★	9E01-L22A-200KN	200kN	175	200	65	155	100	136	M48 × 3 depth 60	160		34	4.9
★	9E01-L22A-500KN	500kN	270	310	105	250	165	192	M80 × 3 depth 90	230	M16 × depth 30	135	4
★	9E01-L22A-1MN	1MN	330	400	150	310	210	239	M110 × 4 depth 110	300	M16 × depth 40	280	3.5

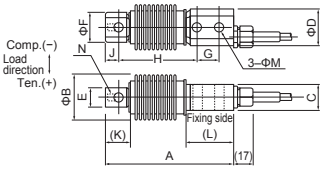
★ mark indicates a build-to-order product.

9E01-L31



Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	Weight (g)	Natural frequency (kHz)
9E01-L31-50N	50N	107	25	29	23	48	25	15	60	8	6.5	0.3	0.3
9E01-L31-100N	100N												0.46
9E01-L31-200N	200N												0.7
9E01-L31-500N	500N												2.2
9E01-L31-1KN	1kN												3.4
9E01-L31-2KN	2kN	167	35	39	33	82	35	45	83	15	13	0.7	4.6

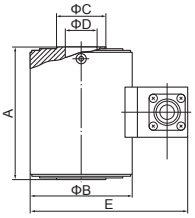
9E01-L35



Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	L	M	N	Weight (kg)	Natural frequency (kHz)
9E01-L35-20N	20N	118	43	24	32	20	27	20	72	12	22	44	8.5	M8	0.25	0.2
9E01-L35-50N	50N															0.3
9E01-L35-100N	100N															0.5
9E01-L35-200N	200N															0.8
9E01-L35-500N	500N															1.4
9E01-L35-1KN	1kN															2.6
9E01-L35-2KN	2kN	155	53	28	42.5	25	36	30	90	17.5	32.5	62.5	13	M10	0.48	2.2

Unique type

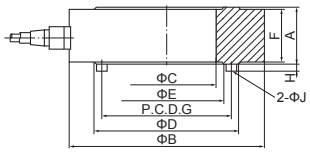
9E01-L9



	Model	Rated capacity	A	B	C	D	E	Weight (kg)	Natural frequency (kHz)
★	9E01-L9-10KN	10kN	65	40	14	10	73	0.8	4.4
★	9E01-L9-20KN	20kN	75	50	20	15	83	0.8	6.3
★	9E01-L9-50KN	50kN	80	60	28	20	93	1.1	8.2
★	9E01-L9-100KN	100kN	100	65	38	25	98	1.6	8.3
★	9E01-L9-200KN	200kN	130	80	52	35	113	3	7
★	9E01-L9-500KN	500kN	180	120	86	60	153	10	8.1
★	9E01-L9-1MN	1MN	240	150	118	80	183	18	5.2

*The dimensional tolerance of D is "H7". ★ mark indicates a build-to-order product.

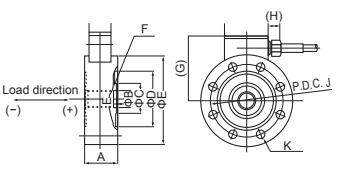
9E01-L14



	Model	Rated capacity	A	B	C	D	E	F	G	H	J	Weight (kg)	Natural frequency (kHz)
★	9E01-L14-1MN	1MN	64	241	152	188.6	164.6	62	177	10	10	8	21.9
★	9E01-L14-2MN	2MN	70	355	230	295	265	68	280			24	19
★	9E01-L14-5MN	5MN				316	240				20		27.3

★ mark indicates a build-to-order product.

9E01-L23H



	Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	Weight (kg)	Natural frequency (kHz)
★	9E01-L23H-5KN	5kN	40	20	35	65	105	M18 × 1.5	77	17	85	8-Φ9	2.2	3.5
★	9E01-L23H-10KN	10kN												5
★	9E01-L23H-20KN	20kN												7.6
★	9E01-L23H-50KN	50kN	50	26	40	74	120	M24 × 1.5	86		95	8-Φ11	3.7	8.8
★	9E01-L23H-100KN	100kN	65	40	60	100	160	M36 × 2	108.5		130	8-Φ18	8.5	7
★	9E01-L23H-200KN	200kN	80	55	80	140	220	M50 × 2	140.5		180	8-Φ26	20	5.6

*The dimensional tolerance of B is "H7". ★ mark indicates a build-to-order product.

Accessories for load cell

Mounting pedestal	Rod end	Rotation attachment	Load button
 **TC**	 **TEA**	 **TGA/TGB**	 **TBA·TBB**

Ring hook	Load bearing plate	Free metal fitting
 **TDC·TDD**	 **TKA**	 **THA**

	Model	Load button	Mounting pedestal	Free metal fitting	Load bearing plate	Ring hook	Rotation attachment	Rod end *1 When a mounting pedestal is used *2 When a rotation attachment is used
Compression	9E01—L3 — 50N to 5KN	TBB—12	TCA—60	THA—1	TKA—2	—	—	—
Tension and compression	9E01—L4 — 10KN	TBB—14	TCG—24	THA—1	TKA—2	TDD—14	TGB—14	TEB—14 TEA—12 *2
	9E01—L4 — 20KN	TBB—18	TCG—30	THA—2	TKA—2	TDD—18	TGC—18	TEB—18 TEA—16 *2
	9E01—L4 — 50KN	TBB—28	TCG—45	THA—5	TKA—5	TDD—28	TGB—28	TEB—28 TEA—24 *2
	9E01—L4 — 100KN	TBB—40	TCG—60	THA—10	TKA—10	TDD—40	TGB—40	TEC—40 TEA—39 *2
	9E01—L4 — 200KN	TBB—54	TCG—85	THA—20	TKA—20	TDD—54	TGB—54	TEC—54 TEA—50 *2
	9E01—L4 — 500KN	—	—	—	—	—	—	—
	9E01—L4 — 1MN	—	—	—	—	—	—	—
Tension	9E01—L5 — 50N to 5KN	—	—	—	—	—	TGG—12	TEB—12
Tension and compression	9E01—L8 — 1KN to 10KN	TBC—12	TCE—65	THA—1	TKA—2	—	TGC—12	TEC—12 *1 TEA—12 *2
	9E01—L8 — 20KN	TBC—12	TCE—65	THA—2	TKA—2	—	TGD—12	TEC—12 *1 TEA—16 *2
	9E01—L8 — 50KN	TBC—20	TCE—88	THA—5	TKA—5	—	TGC—20	TEB—20 *1 TEA—24 *2
	9E01—L8 — 100KN	TBC—32	TCE—117	THA—10	TKA—10	—	TGC—32	TEB—32 *1 TEA—39 *2
	9E01—L8 — 200KN	TBC—40	TCE—166	THA—20	TKA—20	—	TGA—40	TEE—40 *1 TEA—50 *2
Compression	9E01—L11A — 10KN	—	TCA—60	THA—1	TKA—2	—	—	—
	9E01—L11A — 20KN	—	TCA—60	THA—2	TKA—2	—	—	—
	9E01—L11A — 50KN	—	TCA—60	THA—5	TKA—5	—	—	—
	9E01—L11A — 100KN	—	TCB—80	THA—10	TKA—10	—	—	—
	9E01—L11A — 200KN	—	TCB—90	THA—20	TKA—20	—	—	—
Tension	9E01—L15A — 10KN	—	—	—	—	TDD—12	TGA—12	TEA—12
	9E01—L15A — 20KN, 50KN	—	—	—	—	TDD—24	TGA—24	TEA—24
	9E01—L15A — 100KN	—	—	—	—	TDD—36	TGA—36	TEB—36 TEA—39 *2
	9E01—L15A — 200KN	—	—	—	—	TDD—48	TGA—48	TEC—48 TEA—50 *2
Compression	9E01—L18 — 500N to 10KN	—	TCA—42	THA—1	TKA—2	—	—	—
	9E01—L18 — 20KN	—	TCA—42	THA—2	TKA—2	—	—	—
	9E01—L18 — 50KN	—	TCA—80	THA—5	TKA—5	—	—	—
	9E01—L18 — 100KN	—	TCA—80	THA—10	TKA—10	—	—	—
	9E01—L18 — 200KN	—	TCA—90	THA—20	TKA—20	—	—	—
Compression	9E01—L18WA — 500N to 20KN	—	TCH—42	—	—	—	—	—
	9E01—L18WA — 50KN, 100KN	—	TCH—76	—	—	—	—	—
	9E01—L18WA — 200KN	—	TCH—90	—	—	—	—	—
Tension	9E01—L19 — 500N to 10KN	—	—	—	—	—	TGE—12	TEF—12
	9E01—L19 — 20KN	—	—	—	—	—	TGF—12	TEF—12
Tension and compression	9E01—L21 — 500N to 5KN	TBA—12	TCB—40	—	TKA—2	—	TGA—12	TEA—12
Tension and compression	9E01—L22A — 10KN	TBA—12	TCA—80	THA—1	TKA—2	—	TGA—12	TEA—12
	9E01—L22A — 20KN	TBA—16	TCA—80	THA—2	TKA—2	—	TGA—16	TEA—16
	9E01—L22A — 50KN	TBA—24	TCA—95	THA—5	TKA—5	—	TGA—24	TEA—24
	9E01—L22A — 100KN	TBA—36	TCA—120	THA—10	TKA—10	—	TGA—36	TEB—36 TEA—39 *2
	9E01—L22A — 200KN	TBA—48	TCA—160	THA—20	TKA—20	—	TGA—48	TEC—48 TEA—50 *2
	9E01—L22A — 500KN	—	—	—	—	—	—	—
	9E01—L22A — 1MN	—	—	—	—	—	—	—
Tension and compression	9E01—L23 — 5KN, 10KN	TBB—18	TCF—105	THA—1	TKA—2	—	TGB—18	TEC—18 TEA—16 *2
	9E01—L23 — 20KN	TBB—18	TCF—105	THA—2	TKA—2	—	TGB—18	TEC—18 TEA—16 *2
	9E01—L23 — 50KN	TBB—24	TCF—120	THA—5	TKA—5	—	TGB—24	TEB—24 TEA—24 *2
	9E01—L23 — 100KN	TBA—36	TCF—160	THA—10	TKA—10	—	TGB—36	TEC—36 TEA—39 *2
	9E01—L23 — 200KN	TBB—50	TCF—220	THA—20	TKA—20	—	TGB—50	TEA—50
	9E01—L23 — 500KN	—	—	—	—	—	—	—
	9E01—L23 — 1MN	—	—	—	—	—	—	—
Tension	9E01—L33 — 200N to 5KN	—	—	—	—	—	TGA—12	TEA—12
	9E01—L33 — 10KN, 20KN	—	—	—	—	—	TGA—16	TEA—16
Tension	9E01—L44 — 50N	—	—	—	—	TDC—3	—	—
	9E01—L44 — 100N to 1KN	—	—	—	—	TDC—4	—	—
	9E01—L44 — 2KN	—	—	—	—	TDC—6	—	—

Load Cell

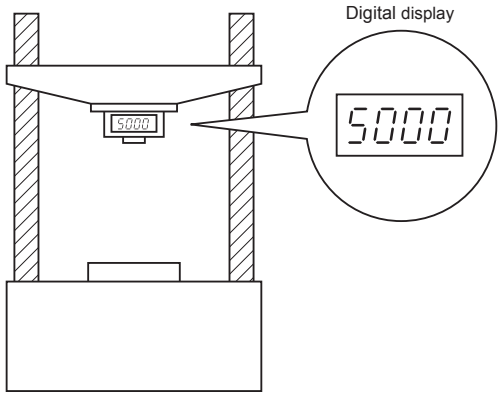
Compression Load Cell with Digital Display

9H01 1k to 1000kN

- Compression
- Digital display is attached
- Analog output
- Traceability certification (optional)

To control the accuracy of load cell in-house, a load cell calibration system that complies with the national weighing standards is required.

Compression load testing machine

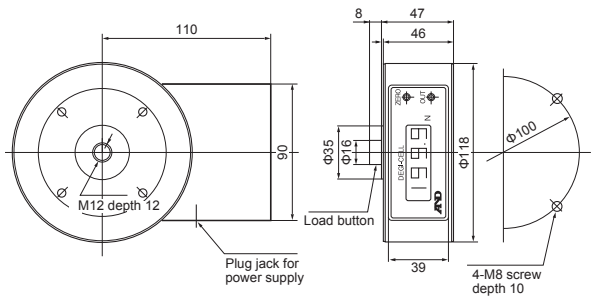


A compression load cell combined with a strain amplifier digital display that allows a load to be directly read as numeric value.
Mounting in vertically, horizontally, or tilted is available.
It can be installed in locations with little mounting space because of low-profile design.
It can be used in load measurement when using a loop type force gauge or jack up, or calibration of a tester.

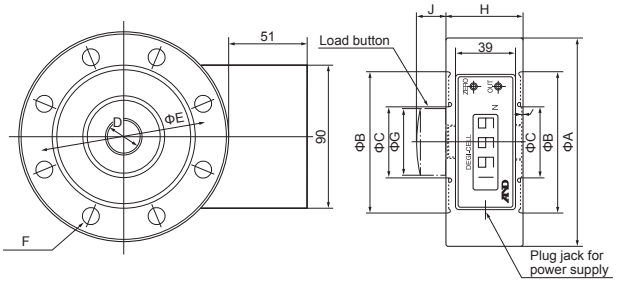
- Values can be read directly via the large 4-digit digital display
- Capacity from 1kN to 1MN
- It can be installed even in narrow space
- Analog output (1V/FS) is available because of low-profile design.

■ External dimensions

• 1kN to 5kN



• 10kN to 1000kN



Model	Rated capacity	A	B	C	D	E	F	G	H	J
9H01-10KN	10kN	118	82	36	M18P1.5	100	8-Φ 9	34	46	13
9H01-20KN	20kN	118	82	36	M18P1.5	100	8-Φ 9	34	46	13
9H01-50KN	50kN	118	82	36	M18P1.5	100	8-Φ 9	34	46	13
9H01-100KN	100kN	138	94	48	M24P2	116	8-Φ11	44	50	20
9H01-200KN	200kN	182	126	76	M39P2	154	8-Φ14	72	60	35
9H01-300KN	300kN	196	130	82	M39P2	162	8-Φ14	72	70	35
9H01-500KN	500kN	226	153	92	M50P2	190	12-Φ18	88	90	45
9H01-1000KN	1000kN	310	200	138	M76P3	256	8-Φ26	118	110	65

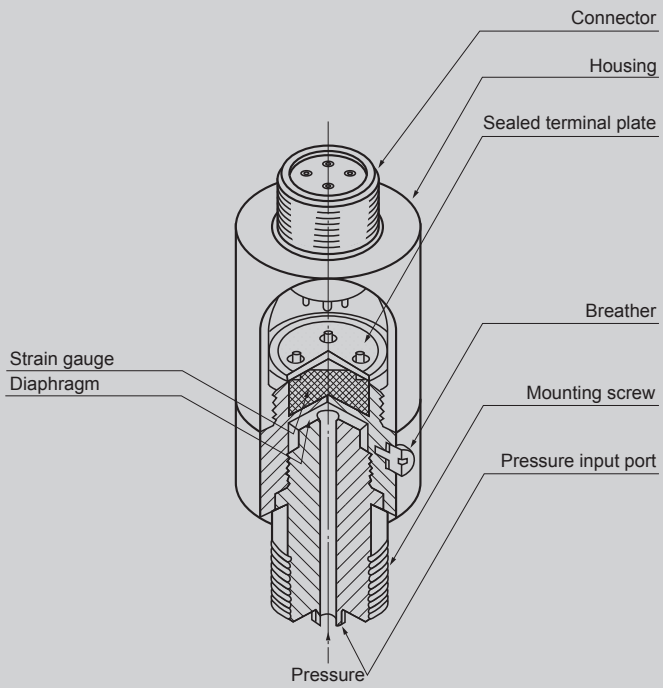
■ Specifications

Rated capacity	1kN to 1000kN
Allowable overload	120% RC (1k to 5kN) 150% RC (10k to 1000kN)
Accuracy	0.2% FS ±1dig (1k to 5kN) 0.1% FS ±1dig (10k to 1000kN)
Operating Temp.	0 to 50°C
Operating humidity	90% RH or less (no condensation)
Temp. drift	±0.05%RO/°C
Display	5000 (7-segment LED, H = 15mm)
Sample time	2.5 times/sec
Analog output	1V (Output resistance 1kΩ
Power Supply	AC100V (with dedicated AC100V adapter)
Current consumption	0.1A (DC12V)
Accessory	Dedicated AC adapter, output cable, instruction manual, warranty card

Model	Rated capacity	Weight (kg)
9H01-1KN	1kN	3.0
9H01-2KN	2kN	3.0
9H01-5KN	5kN	3.0
9H01-10KN	10kN	3.5
9H01-20KN	20kN	3.5
9H01-50KN	50kN	3.5
9H01-100KN	100kN	5.5
9H01-200KN	200kN	11.0
9H01-300KN	300kN	15.0
9H01-500KN	500kN	24.0
9H01-1000KN	1000kN	60.0

Pressure Transducer

Structural drawing



There are two methods of measuring pressure as a physical quantity: relative pressure based on atmospheric pressure,and absolute pressure based on a vacuum.
The strain gauge type pressure transducer uses a strain gauge for the element that converts pressure into an electrical quantity, so there are no malfunctions, and it can perform pressure measurement stably for a long period of time with high accuracy.
Applications of these pressure transducers are increasing in broad range, not only in the field of industrial measurement, but also as pressure transducers to control pressure.

Type			General-purpose				High-pressure	High-temperature	
Model 9E02-			P2	P11	P13A☆	P3	P4	P6	P6G
Rated capacity	Unit (Pa)	2k							
		5k							
		10k							
		50k							
		100k							
		200k							
		500k							
		1M							
		2M							
		5M							
		10M							
		20M							
		50M							
		100M							
		200M							
Structure			Pressure input type			Flash diaphragm type	Pressure input type	Pressure input type	
Rated output (mV/V)			1.0 (1.5)	1.5 (2.0)	0.5 (0.75)	1.0 (1.5)	0.5	1.0 (1.5)	1.0 (1.5)
Non-linearity (%RO)			0.3 (0.15)	0.5 (0.3)	0.2	0.5	0.3	0.5	

☆: The minimum order quantity is 10 pieces.

Pressure Transducer

	General purpose			
Model	**9E02-P2**	**9E02-P11**	**9E02-P13A☆**	**9E02-P3**
Rated capacity	500k, 1M, 2M to 50MPa	1M, 2M, 5M, 10M, 20M, 50MPa	200k, 500kPa	1M, 2M, 5M, 10M, 20M, 50MPa
Structure and application	Pressure introduction type, high-precision, high-stability, general purpose	Pressure introduction type, high stability, general purpose	Pressure introduction type for low pressure	Flash diaphragm type, high response, general purpose
Features	• High-precision, high-stability • Pressure introduction type, hermetically sealed structure • All-stainless steel construction • Optimal for testing machines for high-precision hydraulic pressure detection	• General purpose, high stability type • Pressure introduction type, hermetically sealed structure • All-stainless steel construction • Direct-out cable as standard	• All-stainless steel construction	• General-purpose flash diaphragm type • Optimal for high response and impact pressure measurement • Support for high viscosity pressure media • All-stainless steel construction
Appearance				
Allowable overload	120 %RC	120 %RC	150 %RC	120 %RC
Rated output	1.0 mV/V±1 % (500 kPa,1 MPa) 1.5 mV/V±1 % (2 MPa to 50 MPa)	1.5 mV/V±1 % (1 MPa) 2.0 mV/V±1 % (2 MPa to 50 MPa)	0.5 mV/V±1 % (200 kPa) 0.75 mV/V±1 % (500 kPa)	1.0 mV/V±20 % (1 MPa) 1.5 mV/V±20 % (2 MPa to 50 MPa)
Non-linearity	±0.3 %RO (500 kPa,1 MPa) ±0.15 %RO (2 MPa to 50 MPa)	±0.5 %RO (1 MPa) ±0.3 %RO (2 MPa to 50 MPa)	±0.2 %RO	±0.5 %RO
Hysteresis	± 0.3 %RO (500 kPa,1 MPa) ± 0.15 %RO (2 MPa to 50 MPa)	±0.5 %RO (1 MPa) ±0.3 %RO (2 MPa to 50 MPa)	±0.2 %RO	±0.5 %RO
Repeatability	±0.2 %RO (500 kPa,1 MPa) ±0.1 %RO (2 MPa to 50 MPa)	±0.3 %RO (1 MPa) ±0.2 %RO (2 MPa to 50 MPa)	—	±0.3 %RO
Excitation V.	Within 10 V	Within 10 V	Within 10 V	Within 4 V
Allowable excitation V.	15 V	15 V	15 V	6 V
Input/output resistance	350 Ω±1 %	350 Ω±1 %	Input impedance: 370 Ω±1 % Output resistance: 350 Ω±1 %	350 Ω±1 %
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−20 to 80 °C	−20 to 80 °C	−20 to 80 °C	−20 to 80 °C
Temp. effect of zero point	±0.01 %RO/°C (500 kPa,1 MPa) ±0.005 %RO/°C (2 MPa to 50 MPa)	±0.03 %RO/°C (1 MPa) ±0.02 %RO/°C (2 MPa to 50 MPa)	±0.02 %RO/°C	±0.08 %RO/°C
Temp. effect on output	±0.01 %/°C	±0.05 %/°C	±0.02 %/°C	±0.05 %/°C
Weight	800g	250g	260g	80g
Supplied cables	Main unit connector: Receptacle (PRC 03-21A10-7F) Relay cable L-A-5 (5m, 1 pc.)	Φ6 mm 4 core shielded 0.3 m, includes terminal connector (jack/ PRC03-32A10-7F) Relay cable L-A-5 (5m, 1 pc.)	Main unit connector: Receptacle (PRC 03-21A10-7F) Relay cable L-A-5 (5m, 1 pc.)	Φ6 mm 4 core shielded 0.3 m, includes terminal connector (jack/ PRC03-32A10-7F) Relay cable L-A-5 (5m, 1 pc.)
Conformity Directive (RoHS2 Directive)	YES	YES	N/A	YES

	High pressure	High temperature	
Model	**9E02-P4**	**9E02-P6**	**9E02-P6G**
Rated capacity	50M, 100M, 200MPa	1M, 2M, 5M, 10M, 20M, 50MPa	1M, 2M, 5M, 10MPa
Structure and application	Pressure introduction type, high pressure measurement, general purpose	Pressure introduction type, compact, lightweight, high-temperature compatible, general purpose	Pressure introduction type, compact, lightweight, high-temperature compatible, vibration resistant
Features	• High pressure measurement • Compact and lightweight (260g) • Pressure introduction type, hermetically sealed structure • All-stainless steel construction	• Compact and lightweight 40g (excluding/cable) • High-temperature compatible (150 °C) • Excellent corrosion resistance using the stainless-steel for pressure-receiving unit (SUS630)	• Compact and lightweight 40g (excluding/cable) • Anti-vibration construction (300 m/s²) • High-temperature compatible (150 °C) • Excellent corrosion resistance using the stainless -steel for pressure-receiving unit (SUS630)
Appearance			
Allowable overload	120 %RC	120 %RC	120 %RC
Rated output	0.5 mV/V±1 %	1.0 mV/V±20 % (1 MPa) 1.5 mV/V±20 % (2 MPa to 50 MPa)	1.0 mV/V±20 % (1 MPa) 1.5 mV/V±20 % (2 MPa to 10 MPa)
Non-linearity	±0.3 %RO	±0.5 %RO	±0.5 %RO
Hysteresis	±0.3 %RO	±0.5 %RO	±0.5 %RO
Repeatability	±0.2 %RO	±0.3 %RO	±0.3 %RO
Excitation V.	Within 10 V	Within 4 V	Within 4 V
Allowable excitation V.	15 V	6 V	6 V
Input resistance	350 Ω±1 %	370 Ω	370 Ω
Output resistance	350 Ω±1 %	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 150 °C	−10 to 150 °C
Allowable Temp. range	−20 to 80 °C	−20 to 165 °C	−20 to 165 °C
Temp. effect of zero point	±0.02 %RO/°C	±0.008 %RO/°C	±0.008 %RO/°C
Temp. effect on output	±0.01 %/°C	±0.01 %/°C	±0.01 %/°C
Weight	260g	40g (1 MPa to 10 MPa) 110g (20 MPa,50 MPa)	40g
Supplied cables	Main unit connector: Receptacle (PRC03-21A10-7F) Relay cable L-A-5 (5m, 1 pc.)	Φ4 mm, 4-core shielded heat resistant cable 5 m with terminal connector (plug/ PRC03-12A10-7M)	Φ4 mm, 4-core shielded heat resistant cable 5 m with terminal connector (plug/ PRC03-12A10-7M)
Conformity Directive (RoHS2 Directive)	YES	N/A	N/A

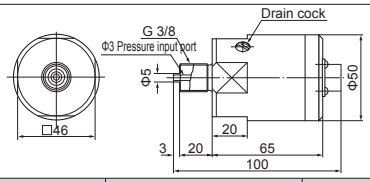
☆: The minimum order quantity is 10 pieces.:

External dimensions

Unit: mm

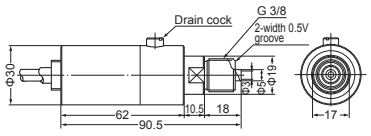
Diffusion type

9E02-P2



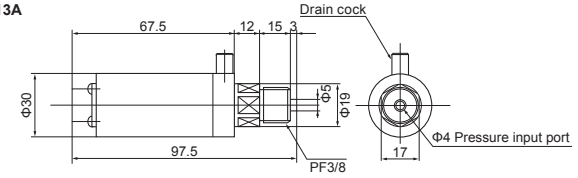
Model	Rated capacity	Natural frequency (kHz)
9E02-P2-500KPA	500 kPa	10
9E02-P2-1MPA	1 MPa	16
9E02-P2-2MPA	2 MPa	20
9E02-P2-5MPA	5 MPa	34
9E02-P2-10MPA	10 MPa	44
9E02-P2-20MPA	20 MPa	68
9E02-P2-50MPA	50 MPa	92

9E02-P11



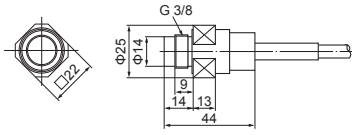
Model	Rated capacity	Natural frequency (kHz)
9E02-P11-1MPA	1 MPa	16
9E02-P11-2MPA	2 MPa	17
9E02-P11-5MPA	5 MPa	40
9E02-P11-10MPA	10 MPa	65
9E02-P11-20MPA	20 MPa	60
9E02-P11-50MPA	50 MPa	94

9E02-P13A



Model	Rated capacity	Natural frequency (kHz)
9E02-P13A-200KPA	200 kPa	0.3
9E02-P13A-500KPA	500 kPa	0.6

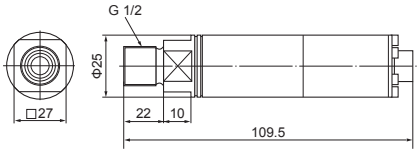
9E02-P3



Model	Rated capacity	Natural frequency (kHz)
9E02-P3-1MPA	1 MPa	36
9E02-P3-2MPA	2 MPa	43
9E02-P3-5MPA	5 MPa	62
9E02-P3-10MPA	10 MPa	84
9E02-P3-20MPA	20 MPa	120
9E02-P3-50MPA	50 MPa	180

High pressure

9E02-P4

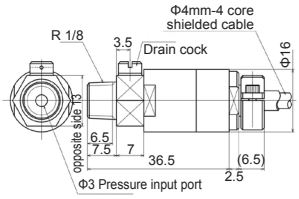


Model	Rated capacity	Natural frequency (kHz)
9E02-P4-50MPA	50 MPa	14
9E02-P4-100MPA	100 MPa	
9E02-P4-200MPA	200 MPa	

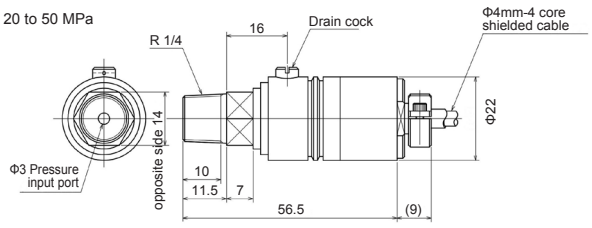
High temperature

9E02-P6

1 to 10 MPa

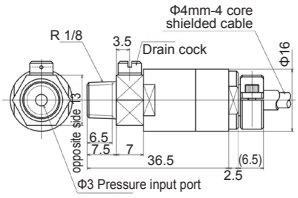


20 to 50 MPa



Model	Rated capacity	Natural frequency (kHz)
9E02-P6-1MPA	1 MPa	38
9E02-P6-2MPA	2 MPa	60
9E02-P6-5MPA	5 MPa	95
9E02-P6-10MPA	10 MPa	165
9E02-P6-20MPA	20 MPa	150
9E02-P6-50MPA	50 MPa	240

9E02-P6G



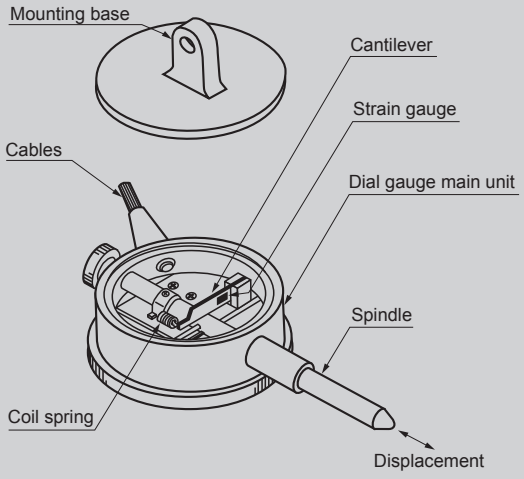
	Model	Rated capacity	Natural frequency (kHz)
★	9E02-P6G-1MPA	1 MPa	38
★	9E02-P6G-2MPA	2 MPa	60
★	9E02-P6G-5MPA	5 MPa	95
★	9E02-P6G-10MPA	10 MPa	165

The ★ mark indicates a build-to-order product.

*Mass does not include cabling.
*Natural frequency is a calculation of a single unit of an elastic body. The pressure response is dependent on the pressure medium.

Displacement Transducer

Structural drawing



This transducer converts the amount of displacement of an object into an electric signal and measures the displacement. There are many models, including cantilever type, sliding resistance wire type, and inductance type. The cantilever type is suitable for systems that connect to computers, etc., because it produces no noise at all. In addition, there are many small and lightweight box types that can be used even when the measurement location is narrow and multiple points are required, a large stroke type when measuring large displacements, and an inductance type when fast responsiveness is required. It is ideal for measuring the amount of displacement of structures and the amount of movement of moving objects, and there are transducers with a measurement range of 5 mm to 300 mm, so you can select the model according to your application.

Structure	Model 9E08-	Rated capacity Unit: mm												Rated output (mV/V)	Non-linearity (%RO)
		2.5	5	10	20	30	50	100	200	300	500	1000	2000		
Cantilever type	D1A		■	■	■	■	■							1.5	0.5
Sliding resistance wire type	D3A					■	■	■	■	■	■				0.2
Cantilever type	D4		■	■	■	■									0.5
Inductance type	D6		■	■	■		■	■	■						0.3

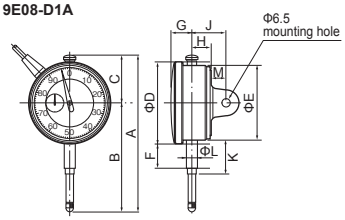
Displacement Transducer

Model	9E08-D1A	9E08-D3A	9E08-D4	9E08-D6
Rated capacity	5, 10, 20, 30mm	30, 50,100, 200, 300mm	5, 10, 20, 30, 50mm	±5, 10, 20, 50, 100mm
Structure and application	Cantilever type, dial gauge type	Sliding resistance wire type with scale	Cantilever type, compact, lightweight, low cost	Inductance type, supports dynamic measurement For use with dynamic strain measuring instruments (carrier wave 5kHz)
Appearance				
Rated output	1.5 mV/V±1 %	1.5 mV/V±1 %	1.5 mV/V±1 %	1.5 mV/V±10 %
Non-linearity	±0.5 %RO	±0.2 %RO	±0.5 %RO	±0.3 %RO
Hysteresis	±0.5 %RO	±0.2 %RO	±0.5 %RO	±0.3 %RO
Repeatability	±0.3 %RO	±0.1 %RO	±0.3 %RO	±0.2 %RO
Excitation V.	Within 3 V	Within 10 V	Within 3 V	AC 2 V
Allowable excitation V.	4 V	12 V	4 V	*Only supported by dynamic strain measuring instruments with a 5kHz sine-wave
Input resistance	350 Ω	350 Ω	120 Ω	160 Ω
Output resistance	350 Ω	350 Ω	120 Ω	120 Ω
Compensated Temp. range	5 to 40 °C	0 to 50 °C	0 to 50 °C	0 to 50 °C
Temp. effect of zero point	5 to 50 °C	0 to 60 °C	0 to 60 °C	0 to 60 °C
Allowable Temp. range	±0.02 %RO/°C	±0.02 %RO/°C	±0.05 %RO/°C	±0.02 %RO/°C
Temp. effect on output	±0.02 %/°C	±0.01 %/°C	±0.08 %/°C	—
Supplied cables	Φ4 mm-4 core shielded 0.3 m cable with terminal connector (jack/ PRC 03-32A10-7F) Relay cable is optional	Φ4 mm-4 core shielded 0.3 m cable with terminal connector (30 to 100mm) Φ6 mm-4 core shielded 0.3 m, with terminal connector (200 to 300mm) (jack/ PRC03-32A10-7F) Relay cable is optional	Φ4 mm-4 core shielded 0.3m cable with terminal connector (jack/ PRC 03-32A10-7F) Relay cable is optional	Φ3 mm-4 core shielded 5 m, with terminal connector (jack/ PRC03-12 A10-7M) Extension cable is optional
Conformity Directive (RoHS2 Directive)	N/A	YES	YES	N/A

External dimensions

Unit: mm

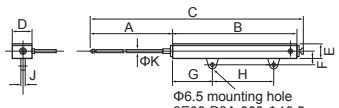
9E08-D1A



*The probe screw is M2.5, P0.45, depth 5.

Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	L	M	Starting force	Endpoint reaction force	Weight (g)	Response frequency (Hz)
9E08-D1A-5	5 mm	106.5	65	41.5	52.8	49	14.1	14.5	11.5	25	20.5	8	11	0.5N	1.6N	155	5
9E08-D1A-10	10 mm	106.5	65	41.5	52.8	49	14.1	14.5	11.5	25	20.5	8	11	0.5N	1.8N	155	5
9E08-D1A-20	20 mm	129.5	88.5	41	66.5	62.5	20	14.5	12	24	27	8	10.5	0.6N	2.0N	170	4
9E08-D1A-30	30 mm	146.5	100.5	46	77.5	72.5	17.3	17.5	11	24	24.3	8	11	0.6N	2.2N	220	3

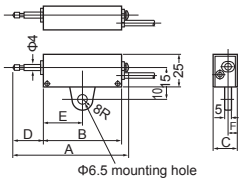
9E08-D3A



*The probe screw is M2.5, P0.45, depth 5.

Model	Rated capacity	A	B	C	D	E	F	G	H	J	K	Starting force	Endpoint reaction force	Weight (g)	Response frequency (Hz)
9E08-D3A-30	30 mm	47	76	129	32	27	27	35	—	6	5	1.8N	3.5N	250	15
9E08-D3A-50	50 mm	67	96	169	32	27	27	40	—	6	5	1.9N	3.5N	280	12
9E08-D3A-100	100 mm	117	153	276	32	27	27	70	—	6	5	1.9N	3.2N	330	5
9E08-D3A-200	200 mm	235	265	505	40	30	28	80	120	6	6	3.5N	8.0N	630	2
9E08-D3A-300	300 mm	361	409	809	70	45	47	75	254	10	10	9.5N	13.0N	2.5 kg	1.5

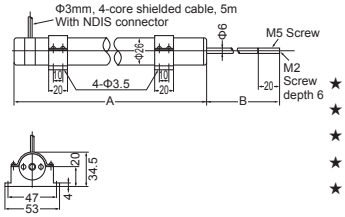
9E08-D4



*The probe screw is M2.5, P0.45, depth 5.

Model	Rated capacity	A	B	C	D	E	F	Starting force	Endpoint reaction force	Weight (g)	Response frequency (Hz)
9E08-D4-5	5 mm	67	45	22	18	20	11	2.0N	5.0N	150	5
9E08-D4-10	10 mm	91	60	18	25	30	7	2.0N	5.0N	200	5
9E08-D4-20	20 mm	101	60	18	35	30	7	1.5N	4.5N	250	4
9E08-D4-30	30 mm	131	80	18	45	40	7	1.0N	4.0N	300	3
9E08-D4-50	50 mm	171	100	18	65	50	7	1.0N	4.0N	400	2.5

9E08-D6

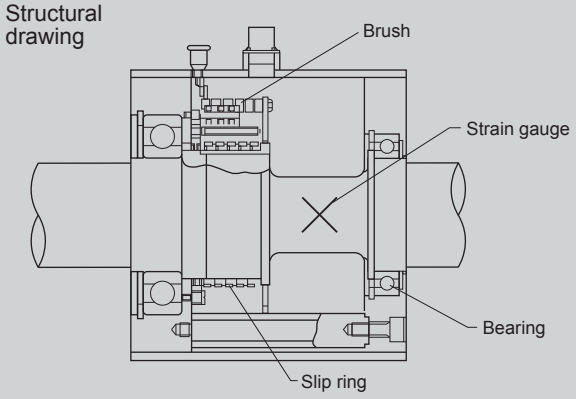


Model	Rated capacity	A	B	Weight (kg)	Response frequency (Hz)
★ 9E08-D6-5	± 5mm	152	60	0.6	2k
★ 9E08-D6-10	± 10mm	172	60	0.7	2k
★ 9E08-D6-20	± 20mm	232	70	0.9	2k
★ 9E08-D6-50	± 50mm	352	100	1.3	2k
★ 9E08-D6-100	±100mm	572	150	2.1	2k

★ mark indicates a build-to-order product.

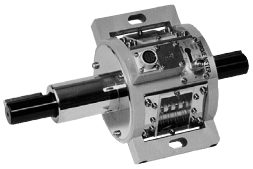
Torque Transducer

Structural drawing

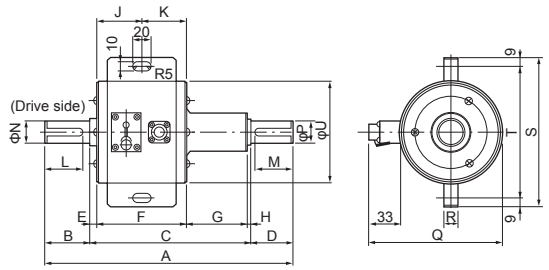


This transducer is installed between the rotating shafts of rotating equipment to measure the transmitted torque. The torsional strain of the rotating shaft is converted into an electric quantity by a strain gauge, and the electric quantity is transmitted from the rotating shaft to the stationary side via the built-in slip ring. It is used for torque measurement in the research and testing and inspection departments of rotating equipment. When selecting a torque transducer, consider the measured torque, the rotation speed, the mounting space and the measurement time, etc.

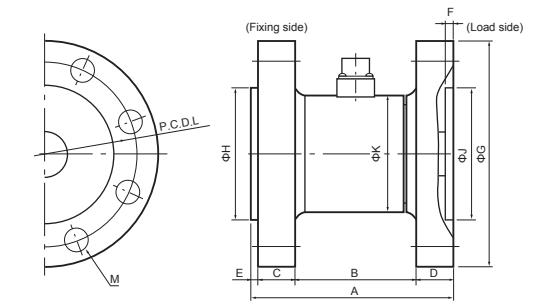
Torque Transducer

Model	9E05-B1	9E05-T1
Rated capacity	5N•m to 20kN•m	50N•m to 20kN•m
Structure and application	Rotation type (slip ring type) /general purpose	Non-rotating, high rigidity, flanged at both ends, general purpose
Features	• Capable of measuring dynamic torque from a static state • High-precision measurement with minimal effect from bending or thrust • Easy cleaning and inspection for slip-ring wear	• Capable of measuring dynamic torque from a static state • Small mechanical twist angle (approximately 0.1°, approximately 0.2 °/5 kN•m or more),High accuracy • Applications: Materials testing machine, testing equipment, etc.
Appearance		
Allowable overload	120 %RC	150 %RC
Rated output	0.5 mV/V±1 % (5 N•m to 20 N•m) 1 mV/V±1 % (50 N•m) 1.5 mV/V±1 % (100 N•m to 20 kN•m)	1.0 mV/V±1 %
Non-linearity	±0.3 %RO	±0.2 %RO
Hysteresis	±0.2 %RO	±0.2 %RO
Repeatability	±0.2 %RO	±0.1 %RO
Excitation V.	Within 8 V	Within 12 V
Allowable excitation V.	10 V	20 V
Input resistance	350 Ω	350 Ω
Output resistance	350 Ω	350 Ω
Compensated Temp. range	−10 to 60 °C	−10 to 60 °C
Allowable Temp. range	−15 to 75 °C	−30 to 80 °C
Temp. effect of zero point	±0.01 %RO/°C	±0.01 %RO/°C
Temp. effect on output	±0.01 %RO/°C	±0.01 %RO/°C
supplied cables	Main unit connector: Receptacle Relay-cable L-A-5 included	Main unit connector: Receptacle Relay-cable L-A-5 included
Conformity Directive (RoHS2 Directive)	YES	YES

9E05-B1



9E05-T1

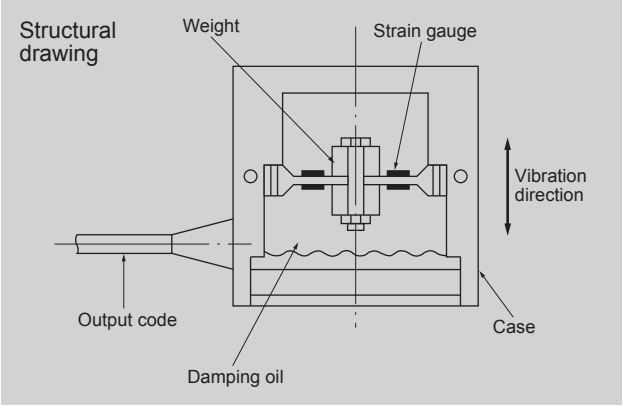


	Model	Rated Torque N•m	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	Max. rotation speed (rpm)	Torsional natural frequency (Hz)	Weight (kg)
★	9E05-B1-5N	5	268	47	173	48	7	95	63	8	47	48	35	35	20	20	140	15	157	139	107	7500	4	2.9
★	9E05-B1-10N	10																						
★	9E05-B1-20N	20																						
★	9E05-B1-50N	50	260	48	167	45				2			40	40	23	23							4	3
★	9E05-B1-100N	100																					4.8	
★	9E05-B1-200N	200	300	65	175	60		105	63	–	52	53	50	50	38	38						5500	2.5	5
★	9E05-B1-500N	500																					4.7	
★	9E05-B1-1KN	1k	385	97	191	97	3	114	74		56	58	80	80	63	63	168		179	161	135	3500	2.1	14
★	9E05-B1-2KN	2k																					3.3	
★	9E05-B1-5KN	5k	500	140	219	141	4	129	86		64	65	115	115	90	90	205		216	198	172	2500	2.3	36
★	9E05-B1-10KN	10k																					3.6	
★	9E05-B1-20KN	20k	680	190	254	236	10	139	109		67.5	67.5	160	160	115	115	243		251	233	210	2000	2.1	

	Model	Rated Torque N•m	A	B	C	D	E	F	ΦG	ΦH	ΦJ	ΦK	L	M	Weight (kg)
	9E05-T1-50N	50	99	65	15	15	4	5	110	60	60	65	90	8-Φ9	2.9
	9E05-T1-100N	100													
	9E05-T1-200N	200													
	9E05-T1-500N	500	119	70	22.5	22.5			135	80	80	70	110	8-Φ14	6.2
	9E05-T1-1KN	1k													
★	9E05-T1-2KN	2k	154	95	27.5	27.5			185	110	110	89	155	8-Φ18	13
★	9E05-T1-5KN	5k	199	125	35	35			215	125	125	101	180	12-Φ18	25
★	9E05-T1-10KN	10k	239	155	40	40			270	160	160	114	230	12-Φ22	45
★	9E05-T1-20KN	20k	339	225	55	55			340	210	210	160	280	12-Φ33	97

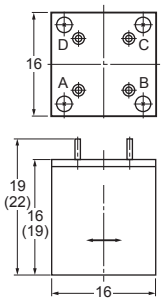
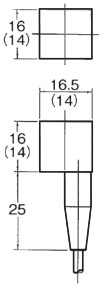
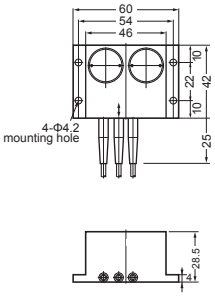
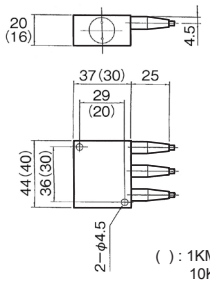
★ mark indicates a build-to-order product.

Acceleration Transducer (The strain gauge type)



This transducer measures how much acceleration is acting on the object. It is used for measurements such as impact acceleration when a collision occurs, vehicle acceleration, and structure vibration.
The strain gauge type transducer is compact, lightweight, and has excellent stability, enabling absolute value measurement of acceleration that cannot be obtained with piezoelectric acceleration transducers.
There are single-axis transducers and three-axis type transducers capable of measuring the X, Y, and Z directions at the same time. A wide range of capacities from 20 to 10km/s2 allows to be selected in accordance with the use.

Acceleration Transducer

Model	**9E07-A1**	**9E07-A2**	**9E07-A3**	**9E07-A4**
Rated capacity	20, 50, 100, 200m/s²	100, 200, 500, 1k, 2k, 5k, 10k m/s²	20, 50, 100, 200m/s²	100, 200, 500, 1k, 2k, 5k, 10k m/s²
Structure and application	Single-axis, high output	Single-axis, high response	3-axis, high output	3-axis, high response
Features	• Compact and high output type • Capable of static, dynamic, and impact acceleration measurement	• Compact and high output type • Capable of static, dynamic, and impact acceleration measurement	• Compact , 3-axis, high-output type • Capable of static, dynamic, and impact acceleration measurement	• Compact , 3-axis, high-respons type • Capable of static, dynamic, and impact acceleration measurement
Appearance				
Allowable overload	130 %RC	200 %RC	130 %RC	120 %RC
Rated output	1.1 mV/V±30 %	0.55 mV/V±30 %	1.0 mV/V±30 %	0.5 mV/V±30 %
Non-linearity	±1 %RO	±1 %RO	±1 %RO	±1 %RO
Hysteresis	±1 %RO	±1 %RO	±1 %RO	±1 %RO
Horizontal sensitivity	±3 %RO	±2 %RO	±2 %RO	±2 %RO
Damping ratio	Approx. 0.7 (at 25 °C)	Approx. 0.7 (at 25 °C)	Approx. 0.7 (at 25 °C)	Approx. 0.7 (at 25 °C)
Excitation V.	Within 3 V	Within 3 V	Within 3 V	Within 3 V
Allowable excitation V.	4 V	4 V	4 V	4 V
Input resistance	120 Ω	120 Ω	120 Ω	120 Ω
Output resistance	120 Ω	120 Ω	120 Ω	120 Ω
Allowable Temp. range	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C	−10 to 60 °C
Temp. effect of zero point	±0.1 %RO/°C	±0.1%RO/°C	±0.1 %RO/°C	±0.1 %RO/°C
supplied cables	4-core parallel plastic cable 0.6 m, exposed tip*1	Φ3 mm-4 core shielded 5 m, stripped end *1	Φ3 mm-4 core shielded 5m, stripped end *1	Φ3 mm-4 core shielded 5 m, stripped end *1
Conformity Directive (RoHS2 Directive)	N/A	N/A	N/A	N/A
External dimensions (mm)	 ( ) : 20MS	 ( ) : 1KMS to 10KMS		 ( ) : 1KMS to 10KMS

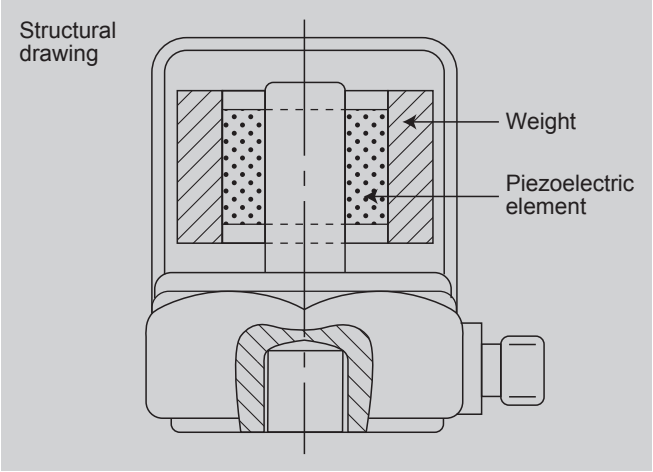
*1 An NDIS connector can be attached to the end of the cable as optional.

Type			Single-axis		3-axis	
Model 9E07-			A1	A2	A3	A4
Rated capacity	Unit: m/s²	20				
		50				
		100				
		200				
		500				
		1k				
		2k				
		5k				
		10k				
Rated output (mV/V)			1.1	0.55	1.1	0.55
Non-linearity (%RO)			1.0			

Model	Rated capacity (m/s²)	Natural frequency (Hz)	Frequency response (Hz)	Weight (g)
9E07-A1-20MS	20	50	DC to 36	20
9E07-A1-50MS	50	105	DC to 80	17
9E07-A1-100MS	100	155	DC to 135	
9E07-A1-200MS	200	215	DC to 180	
9E07-A2-100MS	100	500	DC to 340	12
9E07-A2-200MS	200	750	DC to 450	
9E07-A2-500MS	500	1.4k	DC to 900	
9E07-A2-1KMS	1k	1.9k	DC to 1.1k	8
9E07-A2-2KMS	2k	3k	DC to 2k	
9E07-A2-5KMS	5k	5.2k	DC to 3k	
9E07-A2-10KMS	10k	8k	DC to 5k	

Model	Rated capacity (m/s²)	Natural frequency (Hz)	Frequency response (Hz)	Weight (g)
9E07-A3-20MS	20	48	DC to 30	160
9E07-A3-50MS	50	95	DC to 60	
9E07-A3-100MS	100	132	DC to 85	
9E07-A3-200MS	200	215	DC to 140	
9E07-A4-100MS	100	500	DC to 340	90
9E07-A4-200MS	200	750	DC to 450	
9E07-A4-500MS	500	1.4k	DC to 900	
9E07-A4-1KMS	1k	1.9k	DC to 1.1k	50
9E07-A4-2KMS	2k	3k	DC to 2k	
9E07-A4-5KMS	5k	5.2k	DC to 3k	
9E07-A4-10KMS	10k	8k	DC to 5k	

Piezoelectric Acceleration Transducer

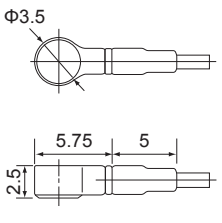
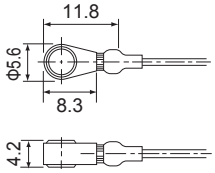
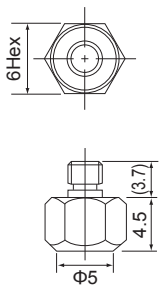
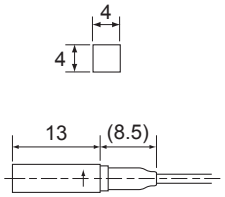


Vibration measurement is to "understand the time course of a vibrating object", and there are methods to measure displacement, velocity, and acceleration. In recent years, many methods have been adopted for vibration measurement to obtain "vibration acceleration" using a piezoelectric acceleration transducer.
When comparing the piezoelectric acceleration transducer to the strain gauge type acceleration transducer, the piezoelectric acceleration transducer has the following characteristics, and is used for mechanical vibration measurement in conjunction with a charge amplifier.

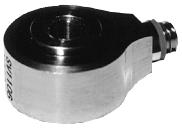
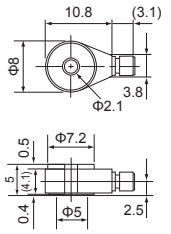
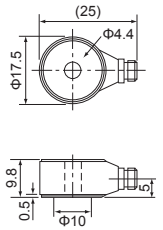
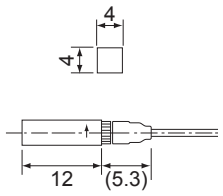
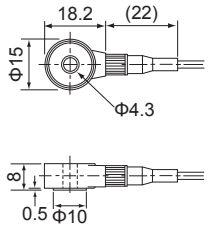
- High bandwidth and high-sensitivity
- Good environmental resistance (temperature, pressure, environmental magnetic fields, high humidity)
- No phase distortion of waveforms
- Compact and lightweight

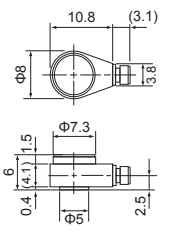
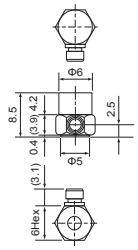
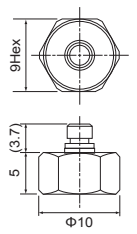
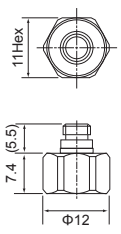
Piezoelectric acceleration transducers are physical characteristic transducers using elements that have a piezoelectric effect. Inside, a spring mass system is used to apply a force proportional to the external force (acceleration) to the piezoelectric element to generate an electric charge on the terminal of the element. The advantage of using a piezoelectric element is that it does not require an external power supply because it can generate electric charges by itself.
Quartz is a natural piezoelectric element, but its sensitivity is low, so ferroelectrics are used in piezoelectric acceleration transducers.
Ferroelectrics are artificial ceramics, and the characteristics of a piezoelectric element can be obtained by artificially imparting polarity. In addition to such ceramic molding technology, the latest sensor structure design technology has been incorporated to enable higher charge sensitivity and acceleration measurement under high and low temperatures and in special environments.

Piezoelectric Acceleration Transducer SV1000 series

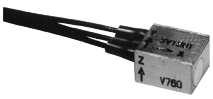
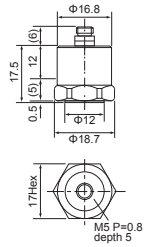
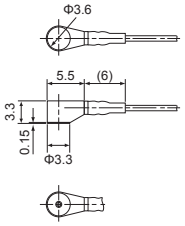
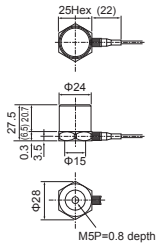
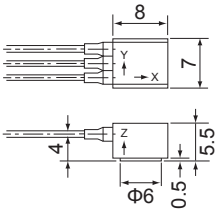
Model	SV1101	SV1102	SV1103	SV1104
Features	Ultra-compact and lightweight, for use in measuring the vibration of lightweight materials		Compact and lightweight	Compact, lightweight, high sensitivity
Appearance				
Sensitivity pc/m/s²	0.035	0.061	0.061	1.84
Capacity pF	580	370	650	1,900
Max. use acceleration m/s²	100,000	10,000	5,000	5,000
Max. allowable acceleration m/s²	–	50,000	10,000	10,000
Frequency range Hz	0.5 to 20k (±3dB)	0.5 to 5k (±1dB)	0.5 to 10k (±1dB) to 20k (±3dB)	0.5 to 1.3k (±1dB)
Frequency response Hz	60k	60k	60k	5k
Structure	Shear type	Shear type	Shear type	Bending mold
Temp. range (°C)	−50 to 160	−50 to 160	−50 to 160	−20 to 120
Case mounting surface	Ground	Ground	Ground	Ground
Case material	Titanium (TB340H)	Titanium (Ti-64L-4V)	Titanium (TB340H)	Stainless steel (SUS-303)
External Dimensions (mm)	Φ3.5 × 2.5	Φ5.6 × 4.2	6Hex × 4.5	13 × 4× 4
Mounting	Gluing	Gluing	Gluing	Gluing
Connector	Side/Φ0.8 cable Direct out 3m (miniature male)	Side cable Direct output 30cm (mini female)	Top (micro male)	Side/Φ1.0 cable Direct out 3m (mini male)
Accessory	gluing stud × 1 removal jig × 1	Removal jig (micro screwdriver) × 1	Removal jig (wrench) × 1	gluing stud × 1 removal jig × 1
Weight (g)	0.2	0.7	0.7	1.3
External dimensions (mm)				

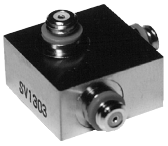
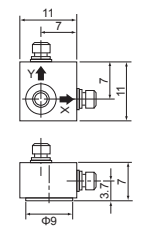
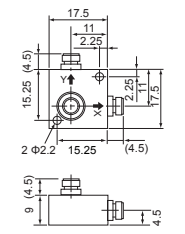
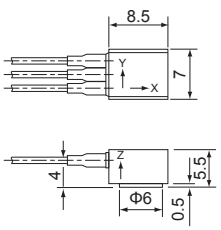
Piezoelectric Acceleration Transducer SV1000 series

Model	SV1105	SV1106	SV1107WA	SV1108W
Features	Compact and lightweight	Measurement of mechanical vibration	Compact, lightweight, waterproof, high sensitivity	Waterproof
Appearance			 JIS C 0920 IPx8, Pressure resistant 0.59Pa	 JIS C 0920 IPx8, Pressure resistant 0.59Pa
Sensitivity pc/m/s²	0.2	3.67	1.84	1.33
Capacity pF	1,200	1,900	1,900	2,300
Max. use acceleration m/s²	5,000	5,000	5,000	5,000
Max. allowable acceleration m/s²	10,000	15,000	10,000	10,000
Frequency range Hz	0.5 to 10k (±1dB) to 20k (±3dB)	0.5 to 7k (±1dB)	0.5 to 1.3k (±1dB)	0.5 to 8k (±1dB)
Frequency response Hz	60k	38k	5k	26k
Structure	Shear type	Shear type	Bending mold	Shear type
Temp. range (°C)	−50 to 160	−50 to 160	−20 to 120	−20 to 120
Case mounting surface	Ground	Ground	Ground	Ground
Case material	Stainless steel (SUS-304)	Titanium (Ti-64L-4V)	Stainless steel (SUS-304)	Stainless steel (SUS-303)
External Dimensions (mm)	Φ8 × 5	Φ17.5 × 9.8	12 × 4 × 4	Φ15 × 8
Mounting	Center hole (Φ2.1)	Center hole (Φ4.4)	Gluing	Center hole (Φ4.3)
Connector	Side (micro female)	Side (mini female)	Side/Φ1.0 cable direct out 3m (mini male)	Side/Φ2.0 cable direct out 15m (mini male)
Accessory	Gluing stud × 1, removal jig (M2 hexagonal wrench) × 1, hexagon socket head bolt (M2 × 8) × 1	Gluing stud × 1, removal jig (M4 hexagonal wrench) × 1, hexagon socket head bolt (M4 × 15) × 1	gluing stud × 1, removal jig × 1	Gluing stud × 1, removal jig (M4 hexagonal wrench) × 1, hexagon socket head bolt (M4 × 12) × 1
Weight (g)	1.9	13.5	1.5	11
External dimensions (mm)				

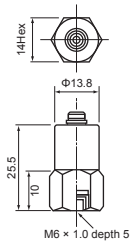
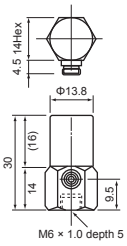
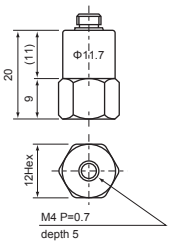
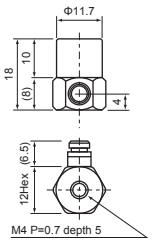
Model	SV1109	SV1110	SV1111	SV1112
Features	Compact, lightweight, and high frequency measurement	Compact, lightweight, and high frequency measurement	Compact and lightweight for measuring the vibration of lightweight materials	Compact and lightweight for measuring the vibration of lightweight materials
Appearance				
Sensitivity pc/m/s²	0.4	0.122	0.306	0.632
Capacity pF	1,500	900	600	1,180
Max. use acceleration m/s²	10,000	10,000	10,000	10,000
Max. allowable acceleration m/s²	30,000	30,000	30,000	30,000
Frequency range Hz	0.5 to 16k (±1dB)	0.5 to 10k (±1dB)	0.5 to 10k (±1dB)	0.5 to 8k (±1dB)
Frequency response Hz	50k	60k	30k	25k
Structure	Shear type	Shear type	Shear type	Shear type
Temp. range (°C)	−50 to 160	−50 to 160	−50 to 160	−50 to 160
Case mounting surface	Ground	Ground	Ground	Ground
Case material	Titanium (Ti-6AL-4V)	Titanium (Ti-6AL-4V)	Titanium (Ti-6AL-4V)	Titanium (Ti-6AL-4V)
External Dimensions (mm)	Φ8 × 6	6Hex × 8.5	9Hex × 8.7	11Hex × 12.9
Mounting	Gluing	Gluing	Gluing	Gluing
Connector	Side (micro female)	Side (micro female)	Top (micro male)	Top (mini female)
Accessory	Gluing stud × 1, removal jig (micro screwdriver) × 1	Removal jig (wrench) × 1	Removal jig (wrench) × 1	Removal jig (wrench) × 1
Weight (g)	1.7	1	1.6	4
External dimensions (mm)				

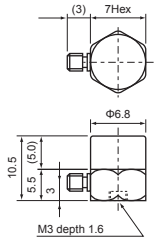
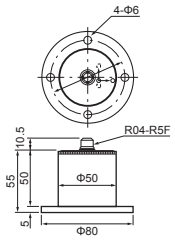
Piezoelectric Acceleration Transducer SV1000 Series / 9F Series

Model	SV1113	SV1114W	SV1115W	SV1301
Features	General-purpose, high sensitivity, water resistant	Compact, lightweight, waterproof, vibration measurement for lightweight materials	General purpose, waterproof, high sensitivity	3-axis, compact, lightweight
Appearance		 JIS C 0920 IPx8, Pressure resistant 0.59Pa	 JIS C 0920 IPx8, Pressure resistant 0.59Pa	
Sensitivity pc/m/s²	5.1	0.0459	81.6	0.04
Capacity pF	1,080	580	30,000	250
Max. use acceleration m/s²	10,000	10,000	10,000	25,000
Max. allowable acceleration m/s²	30,000	50,000	30,000	50,000
Frequency range Hz	0.5 to 7k (±1dB)	0.5 to 10k (±1dB) to 20k (±3dB)	0.5 to 2k (±1dB)	0.5 to 20k (±3dB)
Frequency response Hz	30k	60k	18k	60k
Structure	Shear type	Shear type	Shear type	Shear type
Temp. range (°C)	−50 to 160	−50 to 160	−50 to 160	−50 to 160
Case mounting surface	Ground	Ground	Ground	Ground
Case material	Stainless steel (SUS-303)	Titanium (Ti-6AL-4V)	Stainless steel (SUS-303)	Titanium (TB340H)
External Dimensions (mm)	17 Hex × 17.5	Φ3.6 × 3.3	25Hex × 27.5	8 × 7 × 5.5
Mounting	Bolt lock (M5 × 5, P = 0.8)	Gluing	Bolt lock (M5 × 5, P = 0.8)	Gluing
Connector cable	Top (mini female)	Side/Φ0.8 cable direct out 3m (mini male)	Side/Φ2.0 cable direct out 3m (mini male)	Side cable direct out 30cm (mini female)
Accessory	Gluing stud x 1, Bolt (M5 ×10, P = 0.8) ×1	gluing stud x 1, removal jig x 1	Bolt (M5 × 10, P = 0.8) × 1	Gluing stud × 1, removal jig (wrench) × 1
Weight (g)	29	0.2	90	1.2
External dimensions (mm)				

Model	SV1302	SV1303	SV1304W
Features	3-axis, compact	3-axis, general purpose	3-axis, compact, lightweight, waterproof
Appearance			 JIS C 0920 IPx8, Pressure resistant 0.59Pa
Sensitivity pc/m/s²	0.061	0.347	0.04
Capacity pF	650	750	574
Max. use acceleration m/s²	5,000	5,000	25,000
Max. allowable acceleration m/s²	10,000	10,000	50,000
Frequency range Hz	0.5 to 10k (±1dB) to 12k (±3dB)	0.5 to 8k (±1dB)	0.5 to 20k (±3dB)
Frequency response Hz	35k	25k	60k
Structure	Shear type	Shear type	Shear type
Temp. range (°C)	−50 to 160	−50 to 160	−50 to 160
Case mounting surface	Ground	Ground	Ground
Case material	Titanium (TB340H)	Titanium (TB340H)	Titanium (Ti-6AL-4V)
External Dimensions (mm)	11 × 11 × 7	17.5 × 17.5 × 9	8.5 × 7 × 5.5
Mounting	Gluing	Bolt (M2 holes × 2 locations)	Gluing
Connector cable	3-axis directional (micro female) cable sold separately	3-axis directional (mini female) cable sold separately	Side/Φ0.8 cable direct out 3m (mini male)
Accessory	Gluing stud × 1, removal jig (wrench) × 1	Removal jig (M2 hexagonal wrench) × 1, hexagon socket head bolt (M2 × 12) × 2	Gluing stud × 1, removal jig (wrench) × 1
Weight (g)	3.7	14	1.3
External dimensions (mm)			

Piezoelectric Acceleration Transducer SV1000 Series/ 9F Series

Model	9F02A	9F03	9F07	9F08
Features	Vibration measurement and monitoring	General purpose vibration measurement and monitoring	General purpose vibration measurement and monitoring	General purpose vibration measurement and monitoring
Appearance				
Sensitivity pc/m/s²	5.0	5.0	0.9	0.9
Capacity pF	1,000	1,000	500	500
Max. use acceleration m/s²	16,000	16,000	50,000	50,000
Frequency range Hz	1 to 8k (±1dB)	1 to 7k (±1dB)	1 to 10k (±1dB)	1 to 10k (±1dB)
Frequency response Hz	40k	30k	60k	60k
Structure	Compression type	Compression type	Compression type	Compression type
Case mounting surface	Ground	Ground	Ground	Ground
Seal	Epoxy	Epoxy	Epoxy	Epoxy
Temp. range (°C)	−40 to +150	−40 to +150	−20 to +140	−20 to +140
External Dimensions (mm)	14Hex × 25.5	14Hex × 30	12Hex × 20	12Hex × 18
Mounting	M6 × 1.0	M6 × 1.0	M4 × 0.7, depth 5	M4 × 0.7, depth 5
Connector cable	Top, cable optional	Side,cable optional	Top, cable optional	Side, cable optional
Accessory	Set screw 1pc.	Set screw 1pc.	Set screw 1pc.	Set screw 1pc.
Weight (g)	25	29	13	13
External dimensions (mm)				

Model	9F11B	9F18
Features	Vibration measurement of lightweight materials and impact acceleration measurement	High sensitivity, 3-axis
Appearance		
Sensitivity pc/m/s²	0.3	400
Capacity pF	680	15,000
Max. use acceleration m/s²	50,000	1,000
Frequency range Hz	5 to 20k (±1dB)	0.5 to 1k (±3dB)
Frequency response Hz	60k	2.3k
Structure	Shear type	Bending type, water-resistant construction (JIS0920 IPx2 compliant)
Case mounting surface	Ground	Ground
Seal	Epoxy	—
Temp. range (°C)	−20 to +150	−10 to +60
External Dimensions (mm)	7Hex × 10.5	Φ80 × 55 (H)
Mounting	M3 × 0.5, depth 1.6	Four Φ6 holes on the flange
Connector cable	Side, cable optional	3-axis, waterproof connector cable (RO4-R5F) optional
Accessory	Set screw 1pc.	—
Weight (g)	2	About 490
External dimensions (mm)		

Piezoelectric Acceleration Transducer 9G Series

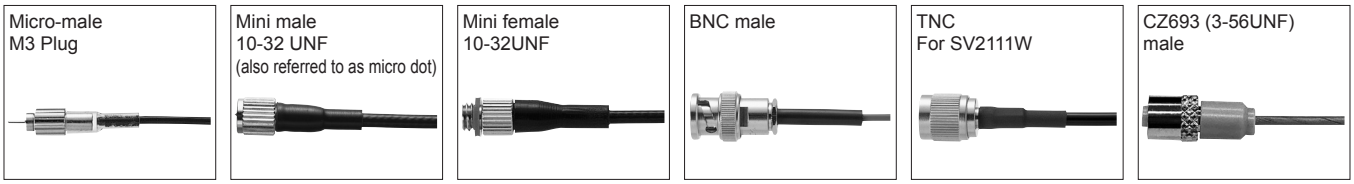
	Model	Features	Sensitivity (pc/m/s²)	Max. use acceleration (m/s²)	Frequency response (Hz)	Operating Temp. (°C)	Dimensions (mm)	Weight (g)
Single axis	9G10S	Vibration measurement of lightweight materials	0.045	10,000	1 to 10k (±5%), 10K to 20k (±10%)	−50 to 160	Φ3.6 × 3	0.16
	9G10SW	Waterproof and vibration measurement of lightweight materials					Φ3.6 × 3.3	0.3
	9G101S	Measurement of lightweight materials	0.06				Φ5.6 × 4.2	0.6
	9G103S	Compact and lightweight					6Hex × 4.5	
	9G110B	High sensitivity vibration measurement	1.8	5,000	1 to 1.3k (±5%)	−50 to 120	4 × 4 × 13	1.3
	9G111BW	Waterproof, compact, and lightweight						
	9G201S	Hole structure	0.2	10,000	1 to 10k (±5%), 10k to 20k (±10%)	−50 to 160	Φ8 × 5.4	1.53
	9G203S	Compact, lightweight, high frequency measurement	0.4		1 to 10k (±5%), 10k to 16k (±10%)		Φ8 × 6	1.7
	9G208S		0.12		1 to 10k (±5%)		6Hex × 8.5	1
	9G210S	Compact, vibration measurement of lightweight materials	0.3				9Hex × 5	1.8
	9G301S	Measurement of mechanical vibration	3.6		1 to 7k (±5%)	−50 to 120	Φ17.5 × 9.8	13
	9G305SW	Waterproof, measurement of mechanical vibration	1.3		1 to 8k (±5%)		Φ15 × 8	15.5
	9G320S	General-purpose, water resistant, high sensitivity	5		1 to 7k (±5%)		19Hex × 19.5	35
	9G1703S	General purpose, high sensitivity	80		1 to 2k (±5%)	−50 to 160	25Hex × 25	90
	9G1703SW	Waterproof, general purpose, high sensitivity					25Hex × 27.5	95
3-axis	9G3102S	Ultra-compact, 3-axis	0.04		1 to 10k (±5%), 10k to 20k (±10%)		7 × 8 × 5.5	1.2
	9G3102SW	Waterproof, ultra-compact, 3-axis					7 × 8.5 × 5.5	1.4
	9G3103S	Compact, lightweight, 3-axis	0.06		1 to 10k (±5%), 10k to 12k (±10%)		11 × 11 × 7	3.6
	9G3201S	General purpose, compact, 3-axis			1 to 8k (±5%)		17.5 × 17.5 × 9	12.6

Optional Cables for the SV1000/9F/9G Series

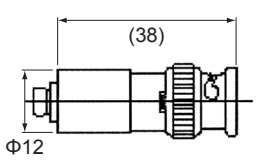
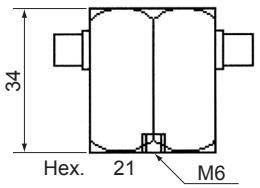
Product name	Model	Specifications	Applicable models
Low noise cable	47589B-□	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Cable Diameter Φ2.3mm, mini male (10-32UNF) to mini male (10-32UNF)	9F02A / 03 / 07 / 08 SV1102 / 1106 / 1112 / 1113 SV1301 / 1303 SV1101 / 1104 / 1107WA extension SV1108W / 1114W / 1115W extension SV1304W extension
	47765B-□	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Cable Diameter Φ1.2mm, mini male (10-32UNF) to mini male (10-32UNF)	
	47686B-□	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Cable diameter Φ1.2mm, micro male (M3) to mini male (10-32 UNF)	9F11B SV1103 / 1105 / 1109 SV1110 / 1111 / 1302
	47686B	Length 2m, cable diameter Φ1.2mm, micro male (M3) to mini male (10-32UNF)	
Low-noise cable for 9F18	LN-023Y-□	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Mini male (10-32UNF) × 3 to waterproof connector (R04-P5M)	9F18
	LN-023Y-10	Length 10m, mini male (10-32UNF) × 3 to waterproof connector (R04-P5M)	
Low-noise cable for 9G	LNA-PS-02RO	Length 2m, cable diameter Φ1.0mm, micro male (M3) to mini male (10-32UNF)	9G103S / 201S / 203S 9G208S / 210S / 3103S
	LNA-PS-05RO	Length 5m, cable diameter Φ1.0mm, micro male (M3) to mini male (10-32UNF)	
	LNA-PS-□□RY	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Cable diameter Φ1.0mm, micro male (M3) to mini male (10-32 UNF)	
Low-noise cable for 9G	LNB-PP-02RO	Length 2m, Cable Diameter: Φ2.0mm, mini male (10-32UNF) to mini male (10-32UNF)	9G10S / 101S / 301S For 9G320S / 1703S / 3102S / 3201S
	LNB-PP-05RO	Length 5m, Cable Diameter: Φ2.0mm, mini male (10-32UNF) to mini male (10-32UNF)	
	LNB-PP-□□RY	□ indicates the total length of the cable (m): 1 to 30 (in units of 1m) Cable Diameter Φ2.0mm, mini male (10-32UNF) to mini male (10-32UNF)	

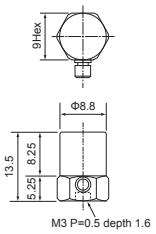
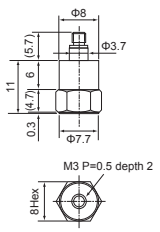
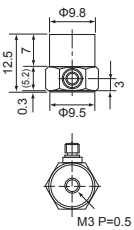
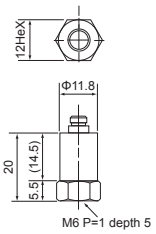
* For SV1000 series and 9F series, please purchase the above applicable cable.
* The cable of standard accessory equipped with the 9G series cannot be changed. Please purchase separately.

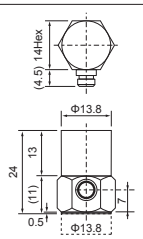
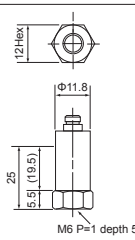
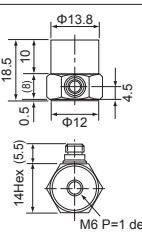
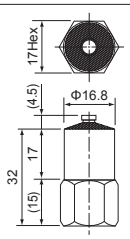
Connector shape



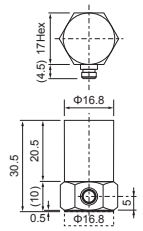
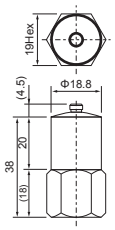
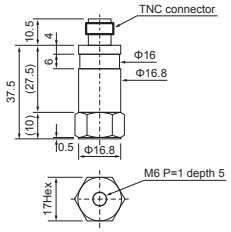
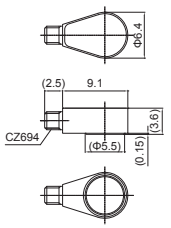
Charge converter

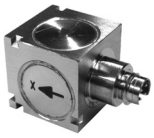
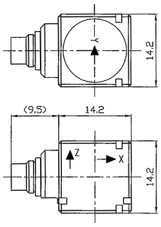
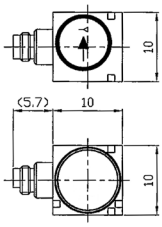
Model	AP11-901	AP11-902	AP11-903
Specifications	Gain 1.0mV/pC, maximum input charge 5,000 pC		Gain 1.0mV/pC, maximum input charge 50,000pC
External dimensions (mm)			

Model	SV2101A	SV2102	SV2103	SV2104
Features	Ultra-compact, single axis			
Appearance				
Sensitivity pc/m/s²	0.3	1	1	1
Max. use acceleration m/s²	5,500	2,200	2,200	2,200
Max. allowable acceleration m/s²	30,000	10,000	10,000	30,000
Frequency range Hz	3 to 30k (±3dB)	0.8 to 16k (±3dB)	0.8 to 16k (±3dB)	3 to 20k (±3dB)
Frequency response Hz	60k	40k	40k	50k
Drive power supply (constant current drive)	15 to 25V, 2mA	15 to 25V, 0.5 to 5mA	15 to 25V, 0.5 to 5mA	15 to 25V, 0.5 to 5mA
Structure	Compression type	Shear type	Shear type	Compression type
Temp. range (°C)	−20 to 110	−30 to 110	−30 to 110	−20 to 110
Case mounting surface	Ground	Ground	Ground	Ground
Case material	Titanium (TB340H)	Titanium (TB340H)	Titanium (TB340H)	Stainless steel (SUS-303)
External Dimensions (mm)	9Hex × 13.5	8Hex × 11	10Hex × 12.5	12Hex × 20
Mounting	Bolt lock (M3 × 1.6, P = 0.5)	Bolt lock (M3 × 2, P = 0.5)	Bolt lock (M3 × 2, P = 0.5)	Bolt lock (M6 × 5, P = 1)
Connector	Side (micro female)	Top (micro male)	Side (micro female)	Top (mini female)
Accessory	Hexagon socket head bolt (M3 × 5, P = 0.5) × 1	Hexagon socket head bolt (M3 × 4, P = 0.5) × 1	Hexagon socket head bolt (M3 × 4, P = 0.5) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1
Weight (g)	3	2.6	3.8	14.5
External dimensions (mm)				

Model	SV2105	SV2106	SV2107	SV2108
Features	Ultra-compact, single axis	Compact, general-purpose, single axis		General-purpose, single axis, insulation type
Appearance				
Sensitivity pc/m/s²	1	10	10	1
Max. use acceleration m/s²	3,500	220	220	3,400
Max. allowable acceleration m/s²	10,000	30,000	49,000	10,000
Frequency range Hz	3 to 15k (±3dB)	3 to 12k (±3dB)	5 to 10k (±3dB)	5 to 7k (±3dB)
Frequency response Hz	50k	32k	40k	35k
Drive power supply (constant current drive)	15 to 25V, 0.5 to 5mA	15 to 25V, 0.5 to 5mA	15 to 36V, 0.5 to 10mA	15 to 25V, 0.5 to 5mA
Structure	Compression type	Compression type	Shear type	Compression type
Temp. range (°C)	−20 to 110	−20 to 110	−50 to 110	−20 to 110
Case mounting surface	Ground	Ground	Ground	Insulation (between case and signal)
Case material	Stainless steel (SUS-303)	Stainless steel (SUS-303)	Titanium (TB340H)	Stainless steel (SUS-303)
External Dimensions (mm)	14Hex × 24	12Hex × 25	14Hex × 18.5	17Hex × 32
Mounting	Bolt lock (M6 × 5, P = 1)	Bolt lock (M6 × 5, P = 1)	Bolt lock (M6 × 5, P = 1)	Bolt lock (M6 × 5, P = 1)
Connector	Side (mini female)	Top (mini female)	Side (mini female)	Top (mini female)
Accessory	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1
Weight (g)	19	19	10	38
External dimensions (mm)				

Piezoelectric Accelerometer with Built-in Amplifier SV2000 Series

Model	SV2109	SV2110	SV2111W	SV2113
Features	General-purpose, single axis	General-purpose, insulation type	Waterproof, single axis	Ultra-compact, single axis
Appearance			 JIS C 0920 IPX7	
Sensitivity pc/m/s²	10	10	5	1
Max. use acceleration m/s²	350	350	700	5,000
Max. allowable acceleration m/s²	10,000	10,000	10,000	30,000
Frequency range Hz	3 to 10k (±3dB)	3 to 7k (±3dB)	3 to 10k (±3dB)	1 to 13k (±3dB)
Frequency response Hz	30k	30k	35k	50k
Drive power supply (constant current drive)	15 to 25V, 0.5 to 5mA	15 to 25V, 0.5 to 5mA	15 to 25V, 0.5 to 5mA	21 to 30V, 2 to 10mA
Structure	Compression type	Compression type	Compression type	Shear type
Temp. range (°C)	−20 to 110	−20 to 110	−20 to 110	−54 to 120
Case mounting surface	Ground	Insulation (between case and signal)	Insulation (between case and signal)	Insulation (between case and signal)
Case material	Stainless steel (SUS-303)	Stainless steel (SUS-303)	Stainless-steel (SUS-303) waterproof connector	Aluminum
External Dimensions (mm)	17Hex × 30.5	19Hex × 38	17Hex × 37.5	Φ6.4 × 3.6
Mounting	Bolt lock (M6 × 5, P = 1)	Bolt lock (M6 × 5, P = 1)	Bolt lock (M6 × 5, P = 1)	Gluing
Connector	Side (mini female)	Top (mini female)	Top (TNC)	Side, CZ694 (3-56UNF) • female
Accessory	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	Hexagon socket head bolt (M6 × 10, P = 1.0) × 1	removal jig x 1
Weight (g)	41	60	49	0.6
External dimensions (mm)				

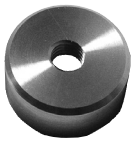
Model	SV2303	SV2304	SV2305
Features	Compact, 3-axis		
Appearance			
Sensitivity pc/m/s²	10	1	1
Max. use acceleration m/s²	400	4,000	5,000
Max. allowable acceleration m/s²	30,000		30,000
Frequency range Hz	1 to 5kHz (X-axis and Y-axis) 1 to 8kHz (Z-axis)		2 to 10kHz (X and Y axes) 2 to 15kHz (Z-axis)
Frequency response Hz	35k		55k
Drive power supply (constant current drive)	21 to 24V, 0.5 to 10mA		21 to 30V, 2 to 10mA
Structure	Shear type		Shear type
Temp. range (°C)	−50 to 110		−50 to 120
Case mounting surface	Ground		Ground
Case material	Titanium (Ti-6AL-4V)		Titanium (Ti-6AL-4V)
External Dimensions (mm)	14.2 × 14.2 × 14.2		10 × 10 × 10
Mounting	Gluing or bolt lock (M5 • D = 3.5)		Gluing or bolt lock (M5 • D = 2)
Connector	Single axis directional (dedicated 4P connector)		Single axis directional (dedicated 4P connector)
Accessory	Mounting screw (M5 × 0.8 × 8) 1pc, SA12ZSC-02 dedicated base 1pc		Mounting screw (M3 × 0.5 × 4) 1pc, SA11ZSCA-02 dedicated base 1pc
Weight (g)	11.1		4.4
External dimensions (mm)			

Options for SV2000

Product name	Model	Specifications	Applicable models
Cable for amplifier with internal converter*	9F-Z-3M	Length 3m, Cable Diameter: Φ2.3, mini male (10-32UNF) to BNC male	SV2104 / 2105 / 2106 / 2107 / 2108 / SV2109 / 2110
	AFRC80-3M	Length 3m, cable diameter Φ4.3, TNC to BNC male, heat resistant 80°C	SV2111W
	AFRC110-3M	Length 3m, cable diameter Φ4.3, TNC to BNC male, heat resistance 110°C	
Cable for amplifier with internal converter	47766B-☐	☐ : 1 to 30 (in units of 1m), cable diameter Φ1.2, black, Micro male to BNC male (low noise cable 47686B + connector 29901-004)	SV2101A / 2102 / 2103
	47767B-☐	☐ : 1 to 30 (in units of 1m), cable diameter Φ1.2, black, Mini male to BNC male (low noise cable 47686B + connector 29901-004)	SV2104 / 2105 / 2106 / 2107 / 2108 / SV2109 / 2110
	SAR11SCG01-3m	Length 3m, cable diameter Φ0.6, CZ693(3-56UNF)male — Mini (10-32UNF) male	SV2113
Cable for amplifier with internal 3-axis converter	SA12ZSC-01B	Dedicated connector BNC, 3.3m	SV2303 / 2304
	SA12ZSC-03-5	Extension cable, 5m	
	SA12ZSC-03-10	Extension cable, 10m	
	SA11ZSCA-01B	Dedicated connector BNC, 3m	SV2305
	SA11ZSCA-01B-5	Dedicated connector BNC, 5m	
	SA11ZSCA-01B-10	Dedicated connector BNC, 10m	
Base	SA12ZSC-02 (5)	5 pcs/pack	SV2303 / 2304
	SA11ZSCA-02 (5)	5 pcs/pack	SV2305

*This cable is not a low noise cable, and therefore cannot be used with a charge output type piezoelectric acceleration converter.

Common Options for the SV2000 and 9F Series

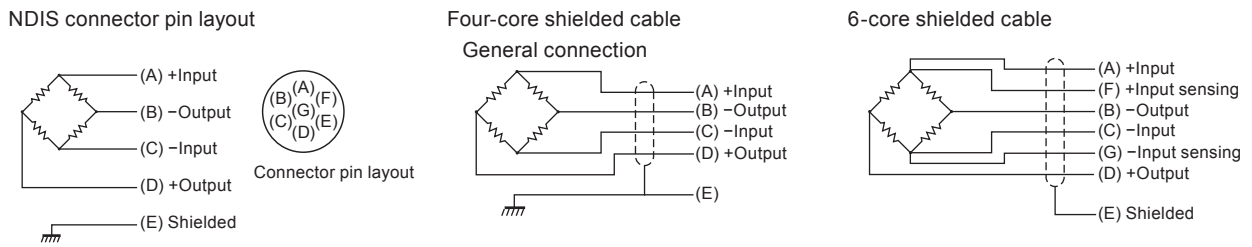
Product name	Stud	Magnet	Magnet	Conversion connector	Relay connector
Model	29901-001	29901-002	29901-003	29901-004	29901-005
					C25A-JJ
Appearance					
Screw	M6 × 1.0	M6 × 1.0	M6 × 1.0	Mini female (10-32UNF) to BNC male	Miniature (10-32UNF)
Specifications	Insulated type	Insulated type	Grounding type	—	Non-grounded type
Applicable model	SV2104 / SV2105 / SV2106 / SV2107 / SV2108 / SV2109 / SV2110 / 9F02A / 9F03			All types of cables with mini connectors	

Connecting Transducer and Connector

■ Connection diagram to the transducer

The connection between the bridge circuit inside the transducer and the cable or connector is as shown in the figure below.
In the 9E series, there are two types of transducers available; one utilizing a 4-core shielded cable, and the other utilizing a 6-core shielded cable.
The 6-core shielded cable is used to compensate the bridge voltage to the converter when there is a long distance from the transducer to the strain amplifier .
NOTE : When using a 6-core shielded cable, the strain amplifier to be used must be a model with the remote sensing function.
Our strain amplifiers (AS1603/1703/1803/1803R/2503/2603) compensate the bridge voltage by using a cable-length compensation function.

1. When connecting to NDIS connector



NOTE : When connecting each cable to the NDIS connector pins, insulate to prevent each pin from short-circuiting. Otherwise the bridge balance can not be performed.

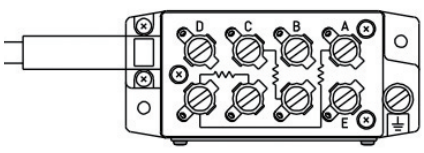
Transducer cable color and function

Pin/Function	Cable color								
(A): +Input (Power)	Red	Red	Red	Red	Red	Red	Red	Red	Red
(B): −Output	Black	Black	White	White	Blue	Blue	Green	Blue	Blue
(C): −Input (Power)	Blue	Blue	Black	Black	White	White	White	White	White
(D): +Output	White	White	Green	Green	Green	Green	Blue	Green	Green
(E): Shield	Shielded	Yellow	Shielded	Shielded	Shielded	Yellow	Yellow	Yellow	Yellow
(F): +Sensing				Yellow				Orange	
(G): - Sensing				Blue				Black	
Ground									Green and yellow
Model	9E01-L2 9E01-L14 9E01-L42 9E01-L43 9E01-L44	9E01-L18 9E01-L19 9E01-L23 9E01-L31 9E01-L33 9E01-L35	9E01-L18WA 9E01-L19WA 9E01-L23WA	9E01-L11A 9E01-L15A 9E01-L21 9E01-L22A	9E07-A1 9E07-A2 9E07-A3 9E07-A4	LCM13 LCM13-M LCB05 LCC07, LCC11 LCC12, LCS15 LBP, LBP-FP1 LCM19 LCM19-M C2F1/C2Z1/ C2X1, LC-1122 LC-1205 LC-1205P LC-1216 LC-1216P LC-2224 LC-4101 to 4 LC-4102R to 4R LC-4221 LC-5206 LC-5206Q LC-5223 LCB03/LCB04 CP, CP-FP, UM CMX/CM, UL ULF X-Y Series	LC-1122 LC-1205 LC-1205P LC-1216 LC-1216P, TP TP-FP, TM	LCB01/02/06	LCM17 LCM17-M

2. When connecting to the bridge box

When using a 4-bridge transducer, this uses a hard-wired 4-gauge technique, eliminating the need for a short circuit for switching the gauge technique of the bridge box.
In addition, the bridge box 120 Ω and 350 Ω are not relevant when connecting to the 9E series.

Bridge box connection diagram

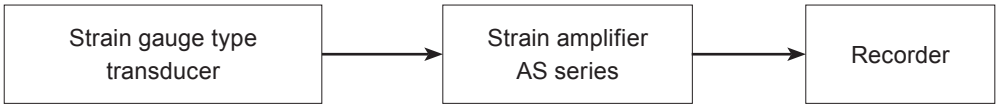


NOTE : The bridge box does not have F and G terminals for remote sensing because it's 4-core shielded.
When connecting a transducer with remote sensing, the transducer's sensing cables (yellow and blue) remain, but the remaining four wires can be used for four-core shielded transducers by connecting them to their respective terminals.
(In this case, the bridge voltage cannot be corrected, so the cable cannot be extended.)

Connecting a Transducer to Measuring Instrument

■ How to read measurement values from a strain gauge type transducer

Sample measurement block diagram (when recording to a recorder)



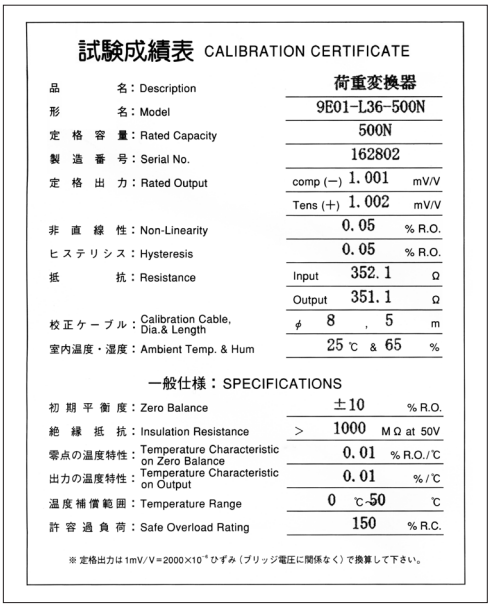
Physical conversion with the transducer calibration value when recorded to a recorder

Strain gauge type transducers always include a calibration certificate, as shown in the figure on the right. (Take care not to lose it.)
Calibration is performed based on the calibration certificate.
Step 1. Connect the strain gauge transducer to the strain amplifier. The strain amplifier input connector is an NDIS female connector. Connect a male NDIS connector to the end of the transducer cable, or connect with a bridge box (5370A:120Ω,5373A:350Ω).
Step 2. Apply a load to the transducer several times to eliminate looseness of jigs and screws. (To prevent zero balance after measurement)
Step 3. Adjust the RANGE (or ATT) of the strain amplifier according to the strain amount to be input. (Described in the instruction manual of the strain amplifier)
The amount of strain to be input refers to the rated output described in the calibration certificate. Calculate the strain amount with the rated capacity as follows:
Ex.) Rated output = 1.001mV/V in the calibration certificate on the right figure.
From the conversion equation of 1.0mV/V =2000×10^{-6} distortion, the value to be input for the strain amplifier CAL (calibration value) is:

$$2000 \times 10^{-6}\ \text{strain} \times \frac{1.001\ (\text{mV/V})}{1.0\ (\text{mV/V})} = 2002 \times 10^{-6}\ \text{strain}$$

Therefore, CAL is set to "2002" when using the AS series strain amplifier.
Step 4. Preform the auto balance. (If RANGE has been changed, auto balance is performed again.)
At this time, make sure that the CAL switch is OFF.
Step 5. Turn ON CAL, and then use FINE (or VAR) to adjust the output voltage of the strain amplifier to a readable voltage.This output voltage is the rated capacity of the transducer.
Step 6. Turn OFF CAL then start measurement.
Step 7. The recorder output waveform (A) is the CAL value (rated capacity).
Physical conversion of measurement data is performed for this amplitude as follows.

$$\text{Measured value at point B} = \frac{\text{b (amplitude at point B)}}{\text{a (amplitude of CAL (calibration value))}} \times \text{rated capacity value}$$



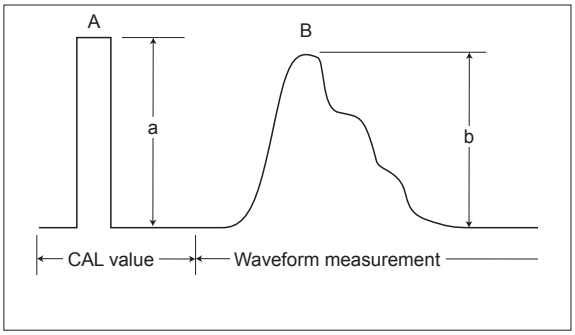
試験成績表 CALIBRATION CERTIFICATE

品名：Description	荷重変換器	
形名：Model	9E01-L36-500N	
定格容量：Rated Capacity	500N	
製造番号：Serial No.	162802	
定格出力：Rated Output	comp (−) 1.001	mV/V
	Tens (+) 1.002	mV/V
非直線性：Non-Linearity	0.05	% R.O.
ヒステリシス：Hysteresis	0.05	% R.O.
抵抗：Resistance	Input 352.1	Ω
	Output 351.1	Ω
校正ケーブル：Calibration Cable, Dia.& Length	φ 8 , 5	m
室内温度・湿度：Ambient Temp. & Hum	25 ℃ & 65	%

一般仕様：SPECIFICATIONS

初期平衡度：Zero Balance	±10	% R.O.
絶縁抵抗：Insulation Resistance	> 1000	MΩ at 50V
零点の温度特性：Temperature Characteristic on Zero Balance	0.01	% R.O./℃
出力の温度特性：Temperature Characteristic on Output	0.01	%/℃
温度補償範囲：Temperature Range	0 ℃-50	℃
許容過負荷：Safe Overload Rating	150	% R.C.

※ 定格出力は 1mV/V=2000×10^{-6} ひずみ（ブリッジ電圧に関係なく）で換算して下さい。



■ Optional cables

Description	Model	Specifications		
Relay cable	47230-5	Φ9.6, 4-core shielded cable, 5m	Conductor resistance: Low type	NDIS Connector Plug — NDIS Connector Plug
	L-A-5	Φ8, 4-core shielded cable, 5m		
	M-A-5	Φ9.6, 6-core shielded cable, 5m	For remote sensing For Load cell 9E01-L11A, L15A, L21, L22A	
	S-A-5	Φ6, 4-core shielded cable, 5m	For Displacement transducer For 9E08-D1A, D3A, D4	
Extension cable	47231-5	Φ9.6, 4-core shielded cable, 5m	Conductor resistance: Low type	NDIS Connector Jack — NDIS Connector Plug
	L-B-5	Φ8, 4-core shielded cable, 5m		
	M-B-5	Φ9.6, 6-core shielded cable, 5m	For remote sensing For Load cell 9E01-L11A, L15A, L21, L22A	
	S-B-5	Φ6, 4-core shielded cable, 5m	For Displacement transducer For 9E08-D1A, D3A, D4	
	T-B-5	Φ3, 4 -core shielded cable, 5m	For Acceleration transducer 9E07-A1, A2, A3, A4 For Displacement transducer 9E08-D6	

Reliable accuracy and quality ! The standard for strain measurement !

AC-Strain Amplifier AS1603, AS1703, AS1803R

■ **Product Overview**

AC strain amplifiers are the representative model of strain amplifiers. They are superior to DC strain amplifiers in terms of SN ratio and sensitivity, and are inferior in terms of linearity and bandwidth. Traditionally, this type of strain amplifier is mostly used for strain and stress measurement.
Another major feature is also resilient to external noise because the frequency of commercial power supplies, which is a large source of noise, is not included in the amplification band of the AC strain amplifier.

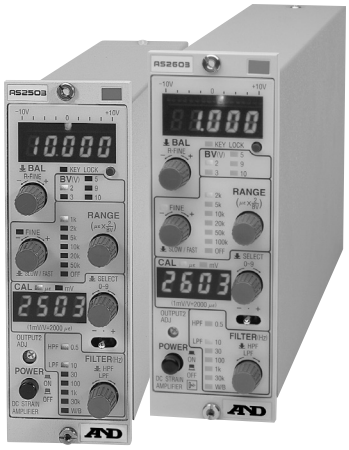
■ **Key Features**

- High sensitivity (AS1603, AS1803R) : 10V output with a sensitivity ±200×10^{-6} strain
- High speed response
  Response characteristics : DC to 10 kHz (AS1703), DC to 2 kHz (AS1603, AS1803R)
- Noise-resistant measurement (AS1803R)
  Our original noise-resistant design is effective to eliminate common mode voltage and control noise in high electromagnetic equipment.
- Excellent safety (AS1603, AS1703, AS1803R)
  Built-in surge-resistant elements in the AC power supply input system.Input and output isolated.
- Equipped with a bridge disconnection check function, which easily avoids measurement problems.

DC Strain Amplifier AS2503, AS2603

■ **Product Overview**

The DC strain amplifier is suitable for high-precision measurement with strain-gauge transducers (load, pressure, torque, acceleration, etc.). The bridge power supply of this device uses a constant-voltage power supply of 2V to 10V,
and has realized a high response frequency DC to 500 kHz (AS2503), so high-speed strain measurement, such as impacts, can be performed.
In addition, the balance circuit is equipped with an auto-balance function, allowing for instant and accurate initial balance adjustment.



■ **Key Features**

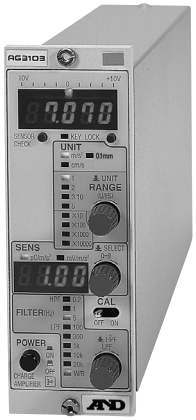
- 2.5 times higher bandwidth than previous models
  Frequency response DC to 500 kHz (AS 2503), DC to 100 kHz (AS2603)
- High input impedance, excellent non-linearity
  Input impedance 10 MΩ, ±0.01%FS (AS2503) non-linearity is ensured.
  High-precision measurement is possible even with gauges with high resistance values.
- Optimal I/O Isolation for system applications (AS2603).
  An isolation circuit is equipped between the input and output.
- Can be used as a DC amplifier
  Can be used as a high-precision voltage amplifier with a max. gain of 10,000 times (AS2503).

High performance Charge Amplifier enables wide band signal input

Charge Amplifier AG3103

■ **Product Overview**

The AG3103 is a charge amplifier that enables wide-band (0.2Hz to 100kHz) signal input. The input from acceleration transducers of both charge output type and voltage output type is available and measuring range is up to 50,000m/s^2, enabling a wide range of vibration measurements, such as impact, rotation vibration, and noise.



■ **Key Features**

- Voltage/charge input (switchable)
  Acceleration transducers input of charge output type (Piezoelectric acceleration mater) and voltage output type (Built in amplifier type) are possible.
- Disconnection check function (charge output type only)
  Automatically determines if there is a cable disconnection. Promoting to reduce measurement preparation time.
- Floating type
  Optimal for system construction considering ground potential difference.
- Built-in integrator
  Speed and displacement can be measured in addition to acceleration.
- Simultaneous AC/DC output
  When connected to a recorder, simultaneous recording and analysis are possible while monitoring input waveform.

Omniace: for high-speed, long-term measurement and storage of all of your data on high capacity storage media

Omniace RA3100

■ **Product Overview**

The RA3100 is a data acquisition system that allows high-speed, long-term recording to a high-capacity storage medium, and high-speed, high-definition recording to a thermal printer.

■ **Key Features**

- Multi-channel input Max. 36ch (analog input), Max. 144 point (logic input)
- High speed sampling Max. 20MS/s
- Long-term recording
  - Memory capacity 4GB (when 18 channels are used, 20MS/s, 5 seconds)
  - SSD capacity 256GB (when 36 channels are used, 1MS/s, approximately 59 minutes)
- Input amplifiers for voltage, temperature, logic
- High-speed chart speed of 100mm/s, and backup to the SSD, even if there is no chart paper.
- Data can be played back during measurement without stopping measurement.
- Y-T and X-Y waveform displays, and FFT analysis can be displayed while measuring.

Omniace RA2300MKⅡ (-S), RA2800A

■ **Product Overview**

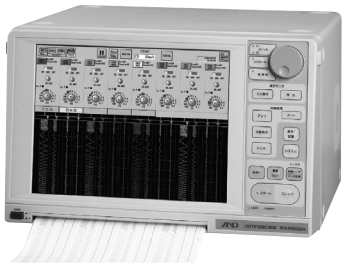
The RA2300MKII and RA2800A are easy-operation data acquisition system that realize pen-writing recording operability, due to visualization of the amplifier setting screen and utilization of a touch panel.

■ **Key Features**

RA2300MKⅡ (internal HDD-320GB, analog input, Max. 16ch)
RA2300MKⅡ-S (internal SSD-256GB, analog input, Max. 16ch)
RA2800A (internal HDD-40GB, analog input, Max 32ch)

- Recording (paper feed) by external synchronization signal and sampling are possible.
- Direct input from transducers
  Support for various types of signals (voltage, strain, temperature, vibration, pressure, rotational pulse, etc.)
  Signals from sensors can be directly input by various types of amplifier units.
- Long-term, high-speed data can be recorded to the built-in HDD or SSD.
- Y-T and X-Y waveform displays can be displayed while measuring.

RA2300MKⅡ (-S)



RA2800A

From R&D to field use, powerful for use under the harshest of conditions.

Omni-Lite Ⅱ RM1102

■ **Product Overview**

The RM1102 is a portable data acquisition device designed with improved environmental resistance, in order to accommodate a variety of measurement conditions.

■ **Key Features**

- Up to 8 channels of voltage and temperature, and 8 logic signals can be input.
- Excellent portability
  Realizes a weight reduction of approximately 1.5kg with full-scale measurement performance.
- Continuous battery operation for long periods of time
- Three different types of measurement modes
  High-speed sampling for memory storage, long-term recording to an SD card, and an optional thermal printer for real-time recording.
- Environmental resistance
  Strong resistant G-body for impacts and drops, and for continuous measurement, such as driving tests.
  Dust-proof and waterproof design for use in any location.
  Due to its temperature resistance, it can be used under severe temperature conditions (low temperature −20°C, high temperature +60°C).

Appearance and/or specifications subject to change for improvement without notice.

A&D Company, Ltd.

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