Advance Instrument Inc.

Strain Gage Instrumentation

Mechanics Measuring

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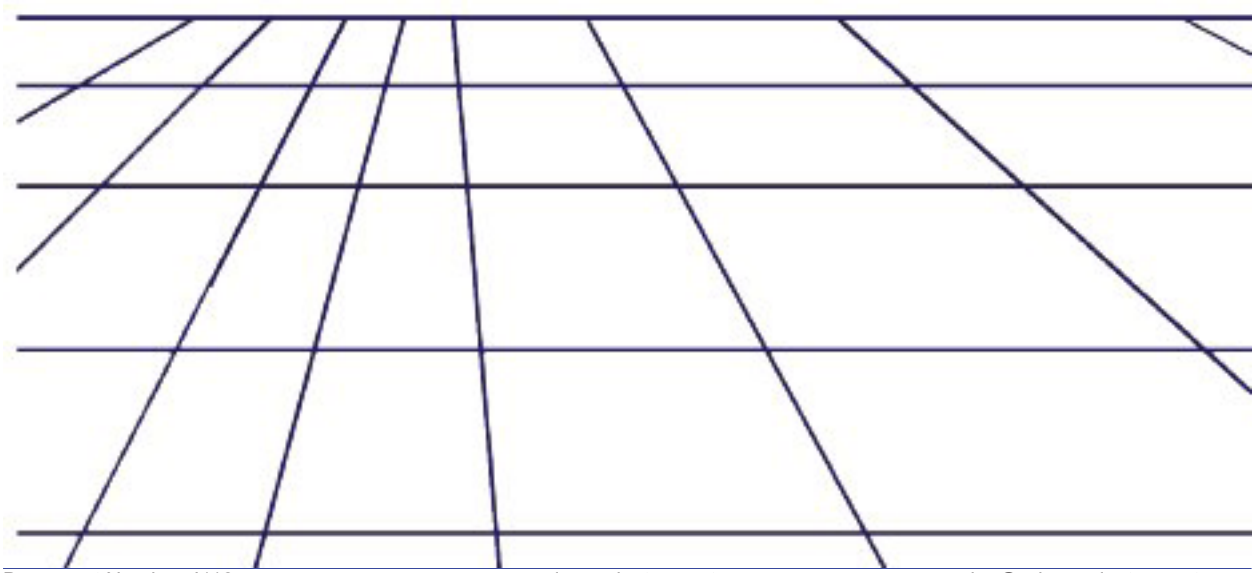
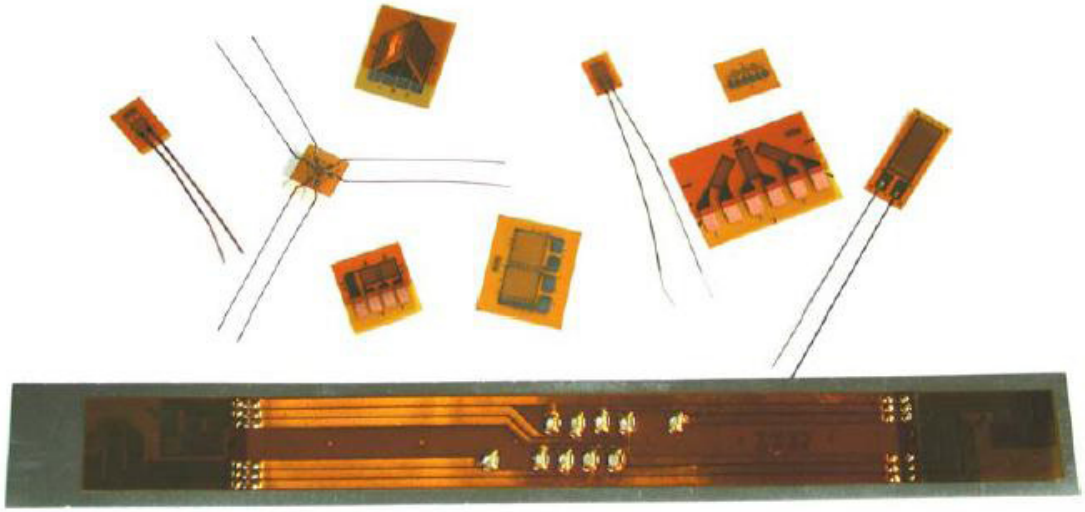
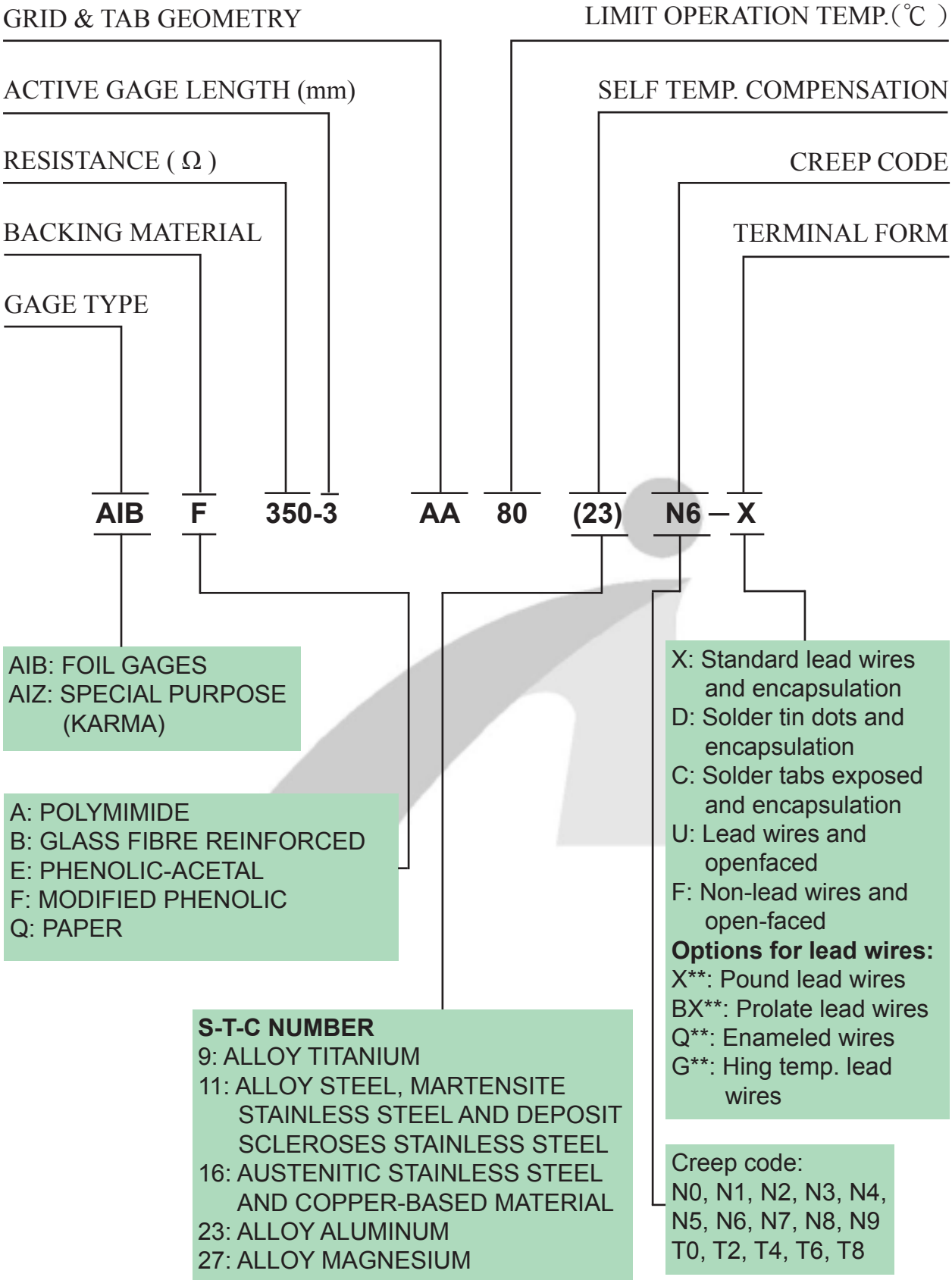


Strain Gage and Accessories



Resistance Strain Gage Designation System



Self-Temperature Compensation Strain Gages

Introduction:

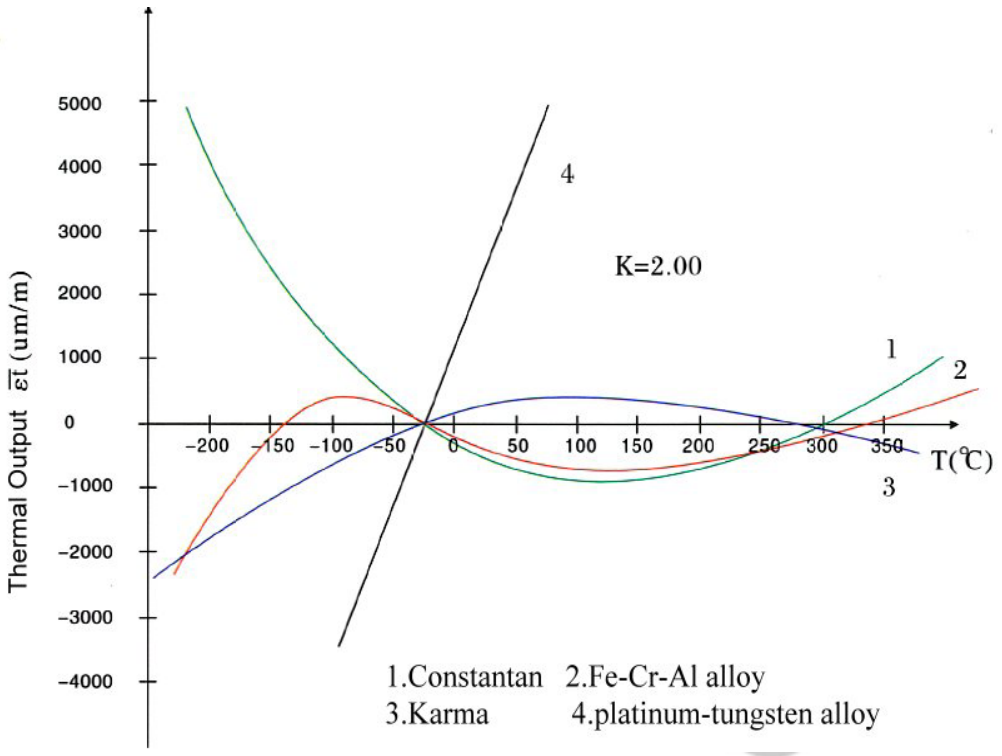
The strain gages that are installed on surface of a tested object without any outside force, when environmental temperature changes, the resistance value will be changed accordingly. This phenomenon is called strain gages thermal output. It is result from interactions and cumulation of resistance temperature coefficient of grid materials, sensitive grid materials and linear dilatability coefficient of the tested objects. It is shown as the formula below:

$$\varepsilon t=[(\alpha g/K)*(\beta S-\beta g)]\triangle t$$

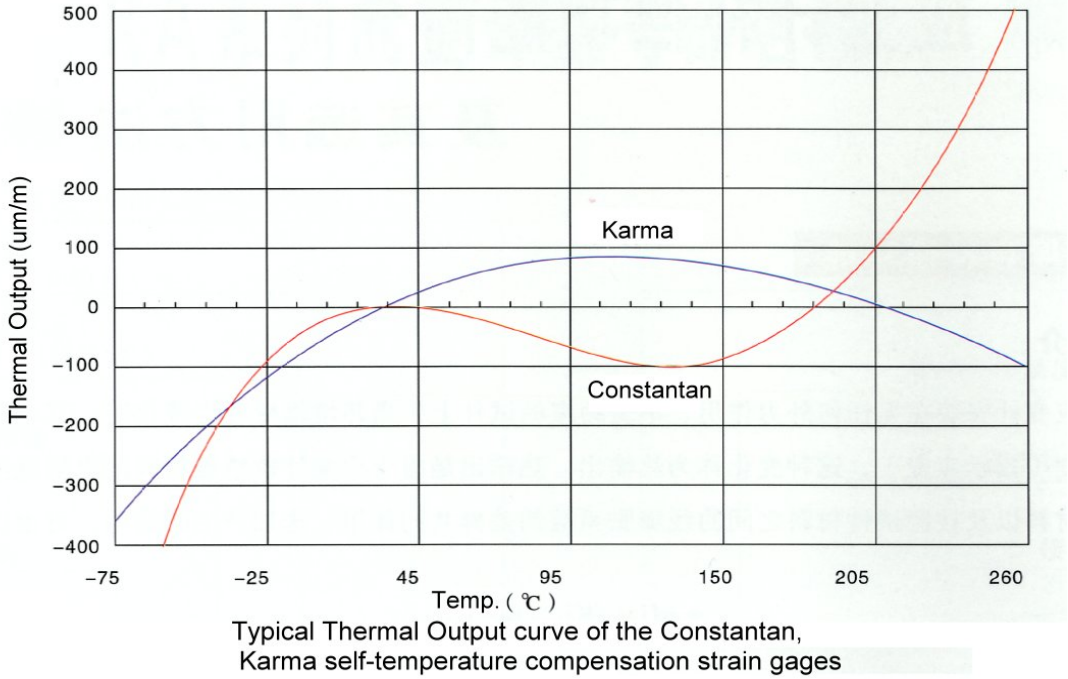
In the above formula, αg and βg refer to resistance temperature coefficient of the grid materials and linear dilatability of strain gages respectively; K refers to gage factor; βS refers to linear dilatability. coefficient of the tested object; △t refers to relative temperature changes of reference departure temperature.

Thermal output is the largest error resource of strain measurement in static state as shown in picture 1 . With increasing of the temperature effect, the decentralization of thermal output will also be increased. If there are temperature grads or instant changes during test, the difference will become larger. Therefore, the ideal circumstance is that strain gages thermal output value is close to zero. The strain gages that fulfill this requirement are called self-temperature compensation strain gages.

By adjusting alloy elements' ratio of the strain gages grid material or changing foil's cold rolled reduction and proper heat treatment, the crystal configuration of the sensitive grid would be recombined and its temperature coefficient of the resistance would be changed. In order to make strain gages' thermal output close to zero and to realize self-temperature compensation for spring element or tested object materials, to meet the requirement of the high precision strain analysis and transducer production. Picture 2 is the typical thermal output curve of the Constantan, Karma self-temperature compensation strain gages. In the range of +20~~+250℃ , their thermal output value is very small.



Picture 1: Thermal output curve of the strain gages



Picture 2: Thermal output curve of the Constantan and Karma self temperature compensation strain gages

Notes for using STC gages:

(1) At present, A.I. offers self-temperature compensation strain gages with codes of: 9，11，16，23，27，Among them, " 9"is used for alloy titanium materials (the typical value of the linear coefficient expansion is 8.8×10(-6) /℃)；"11"used for alloy steel, Martensite stainless steel and deposit scleroses stainless steel materials(the typical value is 16×10(-6) /℃); "23" used for alloy aluminum materials (the typical value is 23.2×10(-6) /℃);"27"used for alloy magnesium materials (the typical value is 26.1×10(-6) /℃).

(2) When the self-temperature compensation gages matches the material of tested object, it is not necessary to compensate thermal output within the range of compensation temperature.

(3) In case that the material of the tested object required by self-temperature compensation gages do not match the material of the tested object that is used, we should utilize two or four gages to form a half bridge or full bridge to minimize the temperature effect.

(4) When measuring with Quarter Bridge, we should install a strain gage on "compensated object" which is the same material as the tested object. The strain gage should be from the same lot as the one installed on the tested object. The two gages should be under the same temperature environment and located next to each other in the Wheatstone bridge.

Self-Creep Compensation Strain Gages

Introduction:

The creep characteristics exist in spring element because of an elasticity of its materials, which makes the transducer output increasing with the addition of time (positive creep), and depends on several variables such as spring element material, structure, strain field, span, heat treatment and test temperature, etc.

The backing of gages and adhesive for bonding have high viscoelasticity, results in the output decreasing with the addition of time; but grid material of gages has an elasticity which makes the output increasing with the addition of time.

The result of accumulation is that the strain gages have positive or negative creep under fixed load; its direction and value could be adjusted by modifying the design of grid structure, backing material ratio and key technology parameter. For example, changing the dimension of the end grid and fixing the other parameters, we can get the curve of creep characteristic After selecting materials of spring element, if gage creep is equal to spring element creep in value but the direction is opposite, then we can compensate the creep of spring element.

In the same way, during making transducers, the creep error caused by other factors could be adjusted this way, and the combined creep value could be limited in minimum range (as shown in picture 3). AI. offers many models of gages which standard creep grads to be selected by transducer manufacturers. (The N※, T※ in strain gages designation refer to creep code, different codes represent different creep value. The rule is: creep difference between any two-neighbor codes is 0.01-0.015%FS/ 30min)

Sketch map of the creep:

N9 > N7 > N5 > N3 > N1 > N0 > N8 > N6 > N4 > N2 > T0 > T2 > T4 > T6 > T8

\+ <---------- creep ----------> -

Notes for using self-Creep Compensation strain gages:

(1) For the first time using, please select one or two models of gages which have great different creep values (different creep codes) and bond them onto the spring element. The matched creep codes will be determined according to actual test value of comprehensive creep and direction.

(2) For transducers with the same spring materials and structure, the smaller the capacity is, the more positive creep it would be, therefore a more negative creep code should be selected.

(3) Different element material exhibits different creep characteristics. Therefore, different creep code should be selected for steel and aluminum transducers with the same capacity and structure.

(4) Transducer creep depends on many variables such as spring elements, strain gages, adhesive as well as the sealing form, protective coating, technique parameters, etc. The direction and magnitude of such error can be predicted, and shall be considered when selecting creep code.

Selection of Strain Gages

In practice, we should first follow the experiment or application conditions (i.e. application accuracy, environmental conditions including temperature, humidity, abominable environment, all kinds of interference and tested object dimensions, bonding area, radius of curvature and installation conditions, etc.). Second, we should conform to the materials of tested objects or spring elements (material linear coefficient of expansion, elastic modulus, structure, approximate force load or stress distributing status, etc.). Taking advantages of the above-mentioned principles, we can choose gages with the best performance-price ratio to match above conditions.

I. Steps

1. First, choose strain gage series according to application accuracy and environmental circumstance.

2. Choose grid length according to the tested object dimensions, bonding areas, radius of the curvature, installation conditions and strain grads.

3. Choose grid pattern according to strain grads, stress type, heat dispersing conditions, installation space and gages resistance.

4. Choose standard resistance according to application conditions, power consumption and the maximum voltage allowed.

5. Choose self-temperature compensation or self-elastic modulus compensation codes according to types of tested object material, working temperature range and application accuracy.

6. Choose creep compensation code according to proper creep characteristic of spring element, actual measured accuracy, workmanship and process technology, protection adhesive type and encapsulation form and so on.

7. Choose lead wire according to actual requirement.

Selection of Strain Gages

II. How to choose strain gages

1. Choose grid length:

   The output of strain gages under loading come from the average strain of its grid area. In order to get actual measured value, the grid length of strain gages should not be longer than 1/5 ～ 1/10 radial of the measuring area. Strain gages with longer grid length are easy for bonding, wiring and thermolysis, which can improve the performance of gages. However, we should choose it according to actual requirement. For common transducers and relative even stress field, gages with 3~6mm grid are recommended.

   For heterogeneous materials, such as concrete, cast iron and cast steel, gages with grid length no less than the grain dimension of the heterogeneous materials are recommended, so that the average strain of the inner structure can be measured exactly. For the stress measurement of higher strain-grads, we had better choose gages with short grid length.

2. Choose grid and backing materials:

   If environmental temperature is less than 60℃ , and the maximum strain is less than 1000μm/m for a long time, Constantan foil or Karma foil strain gages with modified phenolic backing or polyimide backing or thin polyimide flin (AIBF, AIZF, AIBA, AIBHB, AIBAM series and strain gages used for daily used transducers) should be recommended. If environmental temperature goes higher up to 150℃ , Constantan or Karma foil gages with polyimide backing (AIBA series) should be recommended. If used for high precision transducers under environmental temperature less than 60℃ , either Constantan or Karma foil gages with modified phenolic backing (before AIZF, AIBHB, AIBAM series) could be used.

3. Choose grid pattern:

   Measuring the principal stress of unknown direction or shear stress, we should choose multi-axis strain gages. The former one can use strain gages of three axis with 45°or 60°or 120°angle(Rosette gages). The latter one can use strain gages of two axis with 90°angle(Shear gages). Single-axis strain gages can measure principal stress of known direction. Pressure transducers can use diaphragm strain gages with multi-axis.

   Measuring strain distribution, 5 to 10 grids in parallel or chain should be selected.

Selection of Strain Gages

4. Choose central distance between two grids:
   The central distance between two grids of double axis gages produced by us are L6, 6.0mm, L68=6.8mm, L7=7.0mm, L8=8.0mm, L0=10.0mm, L2=12.0mm, L4=14.0mm and so on. The customers can choose strain gages with proper central distance according to their requirement.

5. Choose gages resistance:
   Usually we choose gages resistance according to heat dispersing areas, the effect of cable wire resistance, signal-noise ratio and power consumption. As for transducers we often recommend strain gages with resistance of 350Ω and 1000Ω. As for test of stress distribution, strain and stress measuring in static status, customer should choose the resistance which are close to the matched instrument. Generally we recommend strain gages with resistance of 120Ω and 350Ω.

6. Choose ultimate temperature:
   This temperature means ultimate working temperature. If ultimate working temperature is lower than 60℃ , this component (Temp. Number) will often be omitted in our designation.

7. Choose self-temperature compensation or self-elastic modulus compensation code
   Choosing self-temperature compensation or self-elastic modulus compensation code, we should conform to the functions of self-temperature compensation or self-elastic modulus compensation described in above paragraph.

8. Choose creep code:
   Customers can choose creep code according to the methods described in the function of creep self-compensation.

9. Choose lead wire form.

Selection of Strain Gages

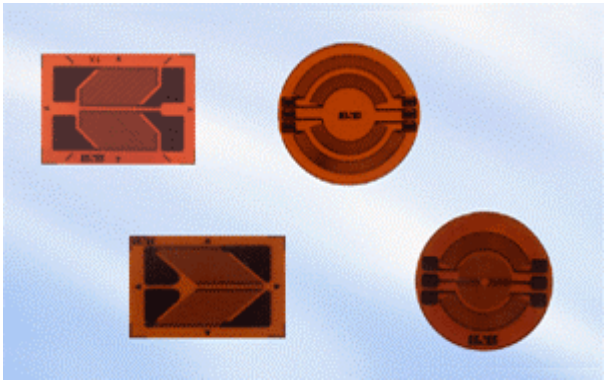
A.I. strain gages have diversiform lead wire forms:

1. Standard lead wire form, AIBQ, AIBA, AIBB, AIZF, AIZCF, AIZFF series and AIKA, AIBA, AICA, AIBC, AICB, AICC, AIFD, AIAA-W, AIHA-W pattern strain gages adopt column lead wire. AIBE, AIBF, AIBCF, AIBFF, AIRNF, AIRBF series stain gages adopt belt lead wire. The length of lead wire is 30±3mm except that AIHA series belt lead wire is 25±2mm.

2. Belt lead wire form, when AIHA series lead wire length is 25mm and other stain gages lead wire length is 30mm, it is no need to show in model name. Otherwise, the lead wire length must be notified.

3. Other lead wire form, like varnish wrapped wire, high temperature wire, etc.

Standard Strain Gages

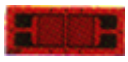


Specification:

AIBE Series	AIBA Series	AIBQ Series
Fully encapsulated Constantan foil gages, phenolic-acetal backing and self-temperature compensation. With good flexibility, stable performance and easy bonding, are suitable for general transducers (Class 0.05) and stress analysis.	Fully encapsulated Constantan foil gages, polyimide backing and self-temperature compensation. With high elongation, excellent heat-resistance and wide temperature range, are mainly used for precise stress analysis and normal accuracy transducers with temperature up to 150℃ .	Constantan foil gages with thin and flexible paper-based acetal backing, without self-temperature compensation, are easy bonding and handling. It is widely used for general stress analysis, especially for composite material sand cement structures.

Specifications	AIBE Series	AIBA Series	AIBQ Series
Resistance	60,120,350,650	120,350	120
Resistance Tolerance	≤±0.1%		
Gage Factor	2.00~2.20	1.86~2.20	2.00~2.20
Dispersion of Gage Factor	≤±1%		
Strain Limit	2.0%		
Fatigue Life	≥1M		
STC Code	9,11,16,23,27		
Temp.Range	-30~+80	-30~+80,-80~+150	-30~+80
Lead Wire Form	X(Omissible),C,D,F,U,X**, BX**,Q**,G**		C(Omissible),X,D,F,U, X**,BX**,Q**,G**
Standard Lead Wire Form	1. AIBA, AIBQ and AIZF Series strain gages with pattern of AIKA, AIBA, AICA, AIBC, AICB, AICC , AIFD, AIAA-W and AIHA-W are soldered with column lead wires 30±3mm long. 2. AIBE, AIBF, AIRNF and AIRBF Series strain gages are soldered with belt lead wires. Eexcept AIHA patterned gages is with 25±2mm lead wire,the others are all with 30±3mm wire. 3. Please define your special demand of lead wires in your order per our Desingnation System.		

Standard Strain Gages

Pattern	Model	Grid size(LXW)	Backing dimension(LXW)
		mm	mm
	AIBE(AIBA)120-2BB(**)	2.0X2.4	5.6X7.2
	AIBE(AIBA)120-3BB(**)	2.8X3.3	6.5X8.5
	AIBE(AIBA)120-4BB(**)	4.0X4.5	8.0X11.0
	AIBE(AIBA)350-2BB(**)	2.2X3.3	6.0X7.5
	AIBE(AIBA)350-3BB(**)	3.1X3.7	6.6X8.9
	AIBE(AIBA)350-4BB(**)	4.0X4.0	7.8X10.0
	AIBE350-6BB(**)	6.1X6.0	10.0X14.4
	AIBE(AIBA)120-2BB-A(**)	1.9X2.3	5.6X6.6
	AIBE(AIBA)120-3BB-A(**)	3.0X2.8	8.8X6.6
	AIBE(AIBA)120-4BB-A(**)	4.0X4.0	10.0X7.6
	AIBE(AIBA)350-2BB-A(**)	2.2X3.3	7.8X6.2
	AIBE(AIBA)350-3BB-A(**)	3.0X3.4	9.8X6.8
	AIBE(AIBA)350-4BB-A(**)	4.0X4.2	10.0X7.8
	AIBE350-6BB-A(**)	6.0X6.1	14.0X10.0
	AIBE(AIBA,BQ)120-2BA(**)	2.0X1.5	9.3X9.3
	AIBE(AIBA, AIBQ)120-3BA(**)	3.1X1.8	11.1X11.1
	AIBE(AIBA, AIBQ)120-4BA(**)	3.8X1.7	11.6X11.6
	AIBE(AIBQ)120-6BA(**)	5.9X3.1	15.4X15.4
	AIBE(AIBA, AIBQ)120-2CA(**)	2.0X1.5	9.3X9.3
	AIBE(AIBA, AIBQ)120-3CA(**)	3.1X1.8	11.1X11.1
	AIBE(AIBA, AIBQ)120-4CA(**)	3.8X1.7	11.6X11.6
	AIBE120-2BC(**)	2.0X2.0	7.8X7.8
	AIBE120-3BC(**)	2.8X1.7	7.7X7.7
	AIBE120-4BC(**)	4.1X1.8	9.4X9.4
	AIBE120-2CB(**)	2.0X2.0	7.8X7.8
	AIBE120-3CB(**)	2.8X1.7	7.7X7.7
	AIBE120-4CB(**)	4.1X1.8	9.4X9.4
	AIBE120-2GB(**)	2.1X3.0	10.8X4.4
	AIBE120-3GB(**)	3.1X3.0	12.6X4.4
	AIBE120-4GB(**)	4.0X3.7	16.0X5.8
	AIBE350-2GB-A(**)	2.0X3.0	10.8X4.4
	AIBE120-2CE(**)	2.0X2.4	8.8X8.0
	AIBE120-3CE(**)	3.0X3.4	11.0X11.0

Standard Strain Gages

Pattern	Model	Grid size(LXW)	Backing dimension(LXW)
		mm	mm
	AIBE(AIBA)120-4FD(**)	3.8X1.5	8.0X11.2
	AIBE(AIBA)120-2GD(**)	2.0X2.2	15.3X6.2
	AIBE350--2GD(**)	2.0X3.8	20.0X5.0
	AIBE120-1CC(**)	1.0X1.0	6.7X6.7
	AIBE120-2CC(**)	2.0X1.4	7.0X7.0
	AIBE120-4CC(**)	4.0X1.8	11.4X11.4
	AIBE120-(10)KA(**)	¢ 9.0	¢ 10.0
	AIBE(AIBA)350-(10)KA(**)	¢ 9.0	¢ 10.0
	AIBE(AIBA)350-(15)KA(**)	¢ 14.0	¢ 15.0
	AIBE(AIBA)350-(20)KA(**)	¢ 18.5	¢ 20.2

Note:

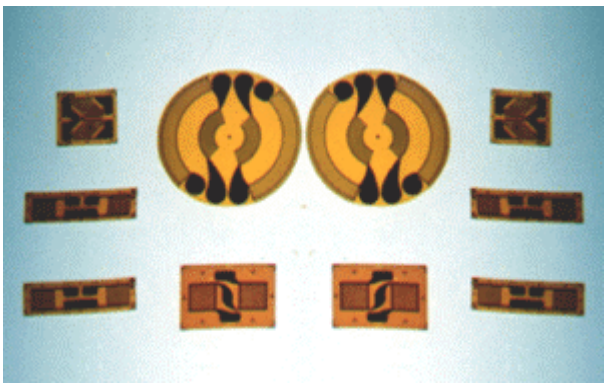
1. AIBA Series strain gages are classified into two-temperature groupes at normal temperature (within 80℃) and moderate temperature (within150℃). It should be mentioned in your order. For example, AIBA350-3HA (11) is in normal temperature, AI BA350-3HA (11) 150 is in moderate temperature.

2. Both AIBE and AIBQ series are classfied into gages with temperature self-compensation and gages without temperature self-compensation. For example, AIBE120-3AA (11) is temperature self-compensated and AIBE120-3AA is non-temperature selfcompensated.

3. For encapsulated gages with grid pattern AIHA-D and AIHA-E, we only offer gages with lead wire forms.

4. Except for the models listed in above table, we also can produce hight precision transducers that use strain ages with any shape and size according to samples or drawings supplied by customers.

Standard Strain Gages



Specification:

AIBE Series	AIBA Series	AIBQ Series
Fully encapsulated Constantan foil gages, phenolic-acetal backing and self-temperature compensation. With good flexibility, stable performance and easy bonding, are suitable for general transducers (Class 0.05) and stress analysis.	Fully encapsulated Constantan foil gages, polyimide backing and self-temperature compensation. With high elongation, excellent heat-resistance and wide temperature range, are mainly used for precise stress analysis and normal accuracy transducers with temperature up to 150℃ .	Constantan foil gages with thin and flexible paper-based acetal backing, without self-temperature compensation, are easy bonding and handling. It is widely used for general stress analysis, especially for composite material sand cement structures.

Specifications	AIBE Series	AIBA Series	AIBQ Series
Resistance	60,120,350,650	120,350	120
Resistance Tolerance	≤±0.1%		
Gage Factor	2.00~2.20	1.86~2.20	2.00~2.20
Dispersion of Gage Factor	≤±1%		
Strain Limit	2.0%		
Fatigue Life	≥1M		
STC Code	9,11,16,23,27		
Temp.Range	-30~+80	-30~+80,-80~+150	-30~+80
Lead Wire Form	X(Omissible),C,D,F,U,X**, BX**,Q**,G**		C(Omissible),X,D,F,U, X**,BX**,Q**,G**
Standard Lead Wire Form	1. AIBA, AIBQ and AIZF Series strain gages with pattern of AIKA, AIBA, AICA, AIBC, AICB, AICC , AIFD, AIAA-W and AIHA-W are soldered with column lead wires 30±3mm long. 2. AIBE, AIBF, AIRNF and AIRBF Series strain gages are soldered with belt lead wires. Eexcept AIHA patterned gages is with 25±2mm lead wire,the others are all with 30±3mm wire. 3. Please define your special demand of lead wires in your order per our Desingnation System.		

Standard Strain Gages

Pattern	Model	Grid size(LXW)	Dimension (LXW)
		mm	mm
	AIBE(AIBA)60-02AA(**)	0.2X1.1	3.6X3.0
	AIBE(AIBA)120-02AA(**)	0.2X2.0	4.0X3.6
	AIBE(AIBA)120-1AA(**)	1.0X2.0	4.3X3.5
	AIBE60-03AA(**)	0.3X1.0	3.6X3.0
	AIBE60-05AA(**)	0.5X0.5	3.6X3.0
	AIBE120-03AA(**)	0.3X1.8	2.7X2.7
	AIBE120-05AA(**)	0.5X1.2	3.0X2.6
	AIBE(AIBA, AIBQ)120-2AA(**)	2.0X1.7	5.4X3.2
	AIZF350-1AA(11)-W-X	1.0X2.0	3.0X2.0
	AIZF350-2AA(11)-W-X	2.0X1.0	3.8X2.0
	AIZF350-1HA(11)-W-X	1.0X1.0	2.8X2.0
	AIBE(AIBA)120-2AA-A(**)	1.9X2.2	6.2X3.4
	AIBE(AIBA, AIBQ)120-3AA(**)	2.8X2.0	6.4X3.5
	AIBE(AIBA, AIBQ)120-4AA(**)	4.2X1.9	8.2X3.6
	AIBE(AIBA, AIBQ)120-5AA(**)	5.0X2.0	10.0X4.0
	AIBE(AIBA, AIBQ)120-6AA(**)	5.8X2.7	9.7X4.2
	AIBE(AIBA, AIBQ)120-8AA(**)	7.8X2.6	12.2X4.3
	AIBE(AIBA, AIBQ)120-10AA(**)	9.8X3.0	15.5X5.0
	AIBQ120-20AA(**)	20.0X3.0	28.9X7.2
	AIBQ120-40AA(**)	42.0X2.4	52.0X7.2
	AIBQ120-60AA(**)	60.0X2.2	68.0X6.8
	AIBQ120-80AA(**)	80.0X2.5	90.0X7.0
	AIBQ120-100AA(**)	100x3.6	110.0x7.0
	AIBE(AIBA)200-4AA(**)	4.0X2.2	9.0X4.0
	AIBE(AIBA)200-6AA(**)	6.0X2.3	10.7X4.8
	AIBE200-8AA(**)	7.8X3.0	11.0X6.0
	AIBE(AIBA)350-2AA(**)	2.4X3.3	6.4X4.7
	AIBE350-2AA-A(**)	2.2X3.0	4.5X4.0
	AIBE(AIBA)350-3AA(**)	3.1X3.5	7.4X4.9
	AIBE(AIBA)350-4AA(**)	4.0X2.8	8.2X4.6
	AIBE(AIBA)350-5AA(**)	4.8X3.4	9.4X5.0
	AIBE(AIBA)350-6AA(**)	6.4X3.8	11.0X5.4
	AIBE350-8AA(**)	7.5X5.4	11.2X7.4
	AIBE350-10AA(**)	10.0X4.8	13.8X6.6
	AIBE500-4AA(**)	4.0X3.3	7.9X4.6
	AIBE500-6AA(**)	6.0X3.3	11.6X5.3
	AIBE650-4AA(**)	4.2X4.5	8.9X5.9
	AIBE650-5AA(**)	5.0X3.9	9.0X5.6
	AIBE650-6AA(**)	6.2X4.2	10.6X5.7
	AIBE1000-3AA(**)	3.2X4.8	7.4X7.4
	AIBE1000-6AA(**)	6.0X5.0	10.0X6.3

Standard Strain Gages

Pattern	Model	Grid size(LXW) mm	Dimension (LXW) mm
	AIBE(AIBA)350-3AB(**)	4.5X3.7	8.2X5.9
	AIBE(AIBA)350-4AB(**)	5.5X4.8	10.0X7.0
	AIBE(AIBA)350-6AB(**)	8.5X6.8	12.1X10.0
	AIBE(AIBA)350-8AB(**)	11.2X8.8	15.0X11.0
	AIBE(AIBA)120-2FB(**)	2.0X2.0	5.2X5.6
	AIBE(AIBA)120-3FB(**)	2.7X1.7	6.5X6.0
	AIBE(AIBA)120-4FB(**)	4.0X2.2	8.2X6.4
	AIBE(AIBA)350-2FB(**)	2.0X2.8	6.4X7.6
	AIBE(AIBA)350-3FB(**)	3.1X3.0	7.4X7.6
	AIBE(AIBA)350-4FB(**)	4.0X2.4	8.2X6.8
	AIBE350-6FB(**)	5.9X2.8	9.8X7.3
	AIBE(AIBA)120-2HA-D(**)	2.0X3.8	5.8X7.0
	AIBE(AIBA)350-2HA-D(**)	2.0X3.8	8.8X5.6
	AIBE(AIBA)350-3HA-D(**)	3.0X5.2	8.8X6.6
	AIBE(AIBA)350-4HA-D(**)	4.2X6.9	8.2X8.2
	AIBE350-6HA-D(**)	6.0X10.0	11.0X10.5
	AIBE(AIBA)120-2HA-E(**)	2.0X3.8	5.8X7.0
	AIBE(AIBA)350-2HA-E(**)	2.0X3.8	8.8X5.6
	AIBE(AIBA)350-3HA-E(**)	3.0X5.2	8.8X6.8
	AIBE(AIBA)350-4HA-E(**)	4.2X6.9	8.2X8.2
	AIBE(AIBA)350-6HA-E(**)	6.0X10.0	11.0X10.5

Note:

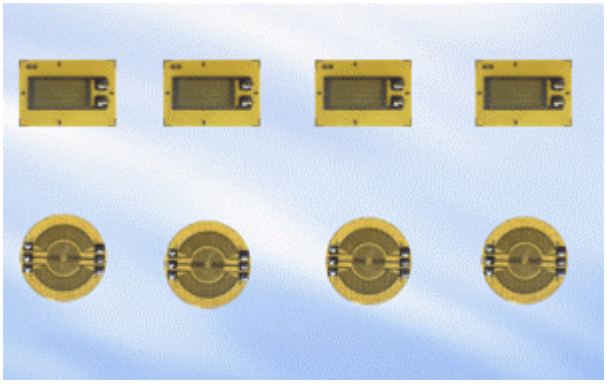
1. AIBA Series strain gages are classified into two-temperature groupes at normal temperature (within 80℃) and moderate temperature (within150℃). It should be mentioned in your order. For example, AIBA350-3HA (11) is in normal temperature, AIBA350-3HA (11) 150 is in moderate temperature.

2. Both AIBE and AIBQ series are classfied into gages with temperature self-compensation and gages without temperature self-compensation. For example, AIBE120-3AA (11) is temperature self-compensated and AIBE120-3AA is non-temperature self-compensated.

3. For encapsulated gages with grid pattern AIHA-D and AIHA-E, we only offer gages with lead wire forms.

4. Except for the models listed in above table, we also can produce high precision transducers that use strain gages with any shape and size according to samples or drawings supplied by customers.

Strain gages for Special Purpose



Specification:

AIBAB Series Mid-Temp.Strain gages up to 250℃
Karma foil gages, glass-fibred-reinforced polyamide backing, with excellent heat-resistance, good ability on insulation and higher applicable temperature, especially suitable for stress analysis and transducers.

AIBE Series Residual Stress Gages
Gages for residual stress can measure the uneven plastic deformation, which are caused by the effect of external force or temperature.

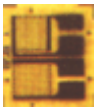
AITJ Series Waterproof Foil Strain Gages
Adopting special adhesive with features of waterproof and mildew resistance, and the gages employ the fully encapsulated form. Waterproof gages are specially designed for stress measurement in the static pressure field under water within 5Mpa. They can successfully be used in the test of hermetic of the air plane cockpit, the stress analysis for internal wall of pressure container and the strength test and crustal stress test of dam and highway.

AITA Series High-elongation Strain Gages
Adopting special grid and backing materials and are most commonly used for high-elongation or post-yield stress analysis of many materials and structures.

Strain gages for Special Purpose

Speciafications	AIBAB 250℃ Series	AITJ Series	(AIBE)Series for Residual Stress Determination	AITA Series
Backing Material	Glass-fibre-reinforce polyimide	Polyurethane	Phenolic-Aceta	Polyimide
Grid Materials	Karma Foil	Constantant Foil		Annealed Constantan Foil
Resistance(Ω)	120,350	120,350	120	120,350
Resistance Tolerance	≤±0.15%			≤3%
Gage Factor	1.86~1.98	2.00~2.20		
Dispersion of Gage Factor	≤±1%			
Strain Limit	1.5%	2.0%		5%,10%,15%,20%
Fatigue Life	10~7	10~6	10~7	
Temp.Range(℃)	-269~+250	-30~+60		-30~+150
STC Code	9,11,16,23,27			
Compenation Class	1.0μm/m/℃			
Insulation Resistance(MΩ)	10000	50(under water)	10000	
Adhesive	AIF-601, AIH-600	AIAZ-709	AIH-610, AIH-600 AIX-602, AI502	AIA-713, AI502
Lead Wire Form	Soldered with column lead wire with length of 30mm	Soldered with wires with length of 1 meter	Soldered with column lead wire with length of 30mm	C

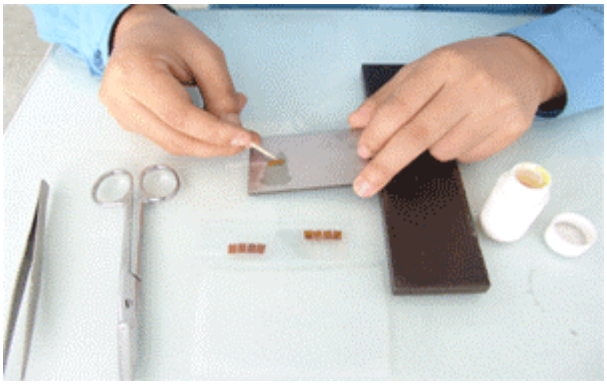
Strain gages for Special Purpose

PATTERN		MODEL	GRID SIZE LXW(mm)	BACKING DIMENSION LXW(mm)
AIBAB Series foil strain gages with temperature up to 250℃		AIBAB120-4AA250(**)	3.9X2.6	8.0X4.4
		AIBAB350-5AA250(**)	5.0X4.1	9.4X5.7
		AIBAB350-3BB250(**)	3.0X3.4	8.8X6.8
		AIBAB350-4BB250(**)	4.0X4.3	10.0X7.8
		AIBAB350-(10)KA250(**)	¢ 9.0	¢ 10.0
		AIBAB350-(15)KA250(**)	¢ 14.0	¢ 15.0
		AIBAB350-(20)KA250(**)	¢ 19.0	¢ 20.0
		AIBAB1000-(20)KA250(**)	¢ 19.0	¢ 20.0
		AIBAB350-4HA-D250(**)	4.0X3.2	8.2X8.2
Strain geges for residual stress determination		AIBE120-2CA-K	2.0X1.2	9.0X9.0
		AIBE120-2CD-K	2.0X1.5	14.0X14.0
		AIBE120-3CD-K	3.1X1.8	16.0X16.0
AITA Series high elongation foil strain gages		AITA120-6AA(**)	6.0X3.2	12.0X8.0
		AITA120-6AA(**%)	60.0X3.2	68.0X6.0
		AITA350-5AA(**%)	5.0X4.9	10.3X7.8
		AITA120-5AA(**%)-C	6.3X3.7	15.0X7.0
		AITA350-5AA(**%)-C	5.0X4.9	12.9X7.8
		AIDCA3·G1		6.0X6.0
		AIDCA6·G1		8.0X8.0
AITJ Series water-proofed foil strain gages		TJ120-4AA(**)	4.0X2.3	29.0X10.0
		AITJ350-5AA(**)	5.0X2.8	29.0X12.0

Note:

1. ※※% is variable of 10%,15% ,20% respectivity. You can fill a specific variable into it according to your requirement.
2. AITA Series strain gages are terminal AIDCA series tabs matched for high elongation strain gages.
3. The length of the lead wire of AITJ series waterproofed foil strain gages is generally 1m, and also can be changed according to customer's requirements.

Terminal Tabs



Introduction:

Terminal tabs adopt imported copper foil, with polyimide or glass fiber reinforced epoxy colophony backing. It has better electronic performance and bigger flexibility that is easy for installation. Before soldering, polishing is required to erase the protective film. It is the same way as strain gates installation.

Specification:

AIDTA Series Polyimide backing and pure copper foil , good flexible, insulation, and humidity and heat resistance, stable chemical performance, high security and reliability. It can be used in relatively scurviness conditions.	**AIDTB Series** Glass fibre reinforced epoxy backing and pure copper foil, high intensity, with good bonding performance.

Terminal Tabs

Pattern	Model	Grid size (L)X(W) (mm)	Backing dimension (L)X(W) (mm)
	AIDTA(B)2.G1	3.0X1.0	5.0X4.0
	AIDTA(B)3.G1	5.0X2.0	6.0X6.0
	AIDTA(B)6.G1	6.4X2.6	8.0X8.0
	AIDTA(B)10.G1	10.0X4.0	12.0X12.0
	AIDTA(B)3.G3	5.0X2.0	6.0X6.0
	AIDTA(B)6.G3	6.4X2.6	8.0X8.0
	AIDTA(B)10.G3	10.0X3.0	12.0X12.0
	AIDTA(B)3.G5	5.0X2.0	6.0X6.0
	AIDTA(B)6.G5	6.0X2.5	8.0X8.0
	AIDTA(B)10.G5	10.0X3.0	13.0X12.0
	AIDTA(B)3.G2	5.0X1.4	7.0X6.0
	AIDTA(B)4.G2	4.0X1.5	7.5X4.4
	AIDTA(B)5.G2	5.0X1.0	6.0X5.0
	AIDTA(B)6.G2	7.0X1.6	8.0X8.0
	AIDTA(B)10.G2	9.7X3.0	13.0X12.0
	AIDTA(B)3.G4	5.0X1.4	7.0X6.0
	AIDTA(B)6.G4	6.5X1.6	8.0X8.0
	AIDTA(B)10.G4	10.0X4.0	12.0X14.0
	AIDTA(B)3.G6	3.0X1.0	5.0X3.0
	AIDTA(B)6.G6	6.0X2.0	8.0X4.0
	AIDTA(B)10.G6	10.0X4.0	12.0X6.0

Notes:

In the above list, AIDAT(B)6.G6 represents two models--AIDTA6.G6 and AIDTB6.G6 respectively. Please specify the appropriate models on your purchase order.

Accessories and Strain gages adhesive

Accessories:

Name	Model	Applications	Specifications
Lead Solder	AISD-704	Strain gages soldering	φ 1.0,normal melting temperature 183℃
	AISD-705		φ 2.0,high temperature melting tem.267℃
Soldering Flux	AIS-620	Strain gages soldering	25 grams
Silver-plated Copper Wire	AIL-706	Connecting wires	φ0.15, 75 grams/roll
4-Wire Lead Wires	AICL-707		φ1.2, 0.42 grams/meter
High Temp. Lead Wire	AIGL-708	Connecting, Bridging Application Tem. range:0-260	φ1.2, 200 meters/roll
Varnish Wrapped Wire	AIQL-717	Strain gages soldering	φ0.15
Silicon Rubber	AISL-710	Cure	Thickness:3mm,5mm(300x300mm)
Polishing Materials for Adjusting Resistance	AIT-711	Adjust resistance	Dia.1 micron
Tyflon Film	AIPTFE	Bonding ,Cure	Width:90mm,thickness:0.05mm
Tweezers	AIZN-712	Bonding, holding strain gages	Round header, length 100mm
Brand Iron Header	AIB-622	Soldering strain gages	
Cotton yarn	AIM-713	Cleaning strain gages	
Brush	AIM-714	Cleaning and boarding strain gages	
Sand Paper	AISP-715	Polishing to remove the oxide of the tested object	220#-400#
Polyimide Tape	AIPT-716	Fixing strain gages	Width 8mm,5 meter/roll

Accessories and Strain gages adhesive

Strain gages adhesive:

AIH-600 High Performance Epoxy Features: Fast drying, low viscosity, minimum creep and hysteresis, excellent repeatability and stability, high insulation over a wide temperature range: Short term : -269 ~ +370℃ ; Long term : -269 ~ +288℃ . **Applications:** It is used to replace AIH-610. Excellent for bonding of all gages and compensation resistors made by our company. Specially recommended for high precise transducers. **Curing Condition:** Used within 150℃ : 1 ~ 0.3Mpa, +135℃ /2hours ; Poster-cure : +165℃ /2 hours Used within 250℃ : 0.1 ~ 0.3Mpa , +150℃ /2hours ; Poster-cure : +175℃ /2hours **Stock Period:** 6 months at 24℃ or 12 months at +2℃ in a single composition.	**AIH-610 High Performance Epoxy Features:** Fast drying, low viscosity, minimum creep and hysteresis, excellent repeatability and stability, high insulation over a wide temperature range: Short term : -269 ~ +370℃ ; Long term : -269 ~ +288℃ **Applications:** Excellent for the bonding of all gages and compensation resistors made by our company. Specially recommended for the high precision transducers. **Curing Condition:** Used within 150℃ : 0.1 ~ 0.3Mpa. 2 hours at +135℃ , Poster-cure 2 hours at +165℃ **Stock Period:** 6 months at 24℃ or 12 months at +2℃ in a single composition.
AIX-602 Modified Phenolic-acetal Features: Having a moderate viscosity, small creep and hysteresis. Good repeatability and stability. Operating temp. range: -30 ~ +60℃ **Applications:** Special recommended for the bonding of AIBE, AIR series strain gages or compensation resistors. It's possible to cure without pressure. **Curing Condition:** 1 ~ 0.3Mpa. 2 hours at +120℃ Poster-cure 2 hours at +180℃ . **Stock Period:** Months at room temperature.	**AIAZ-709 Polypro Thane Features:** Having so excellent properties as waterproof, moisture proof, resistant and high insulation. Dry at room temperature. Operating temp. range -30 ~ +60℃ **Applications:** Recommended for the bonding of waterproof gages. It may be also used for protective coating for transducers and gages. **Curing Condition:** Cure 24 hours at room temperature also can cure rapidly at elevated temp. for 4 hours at +80℃ **Stock Period:** months at room temperature in a single composition.

Accessories and Strain gages adhesive

Strain gages adhesive:

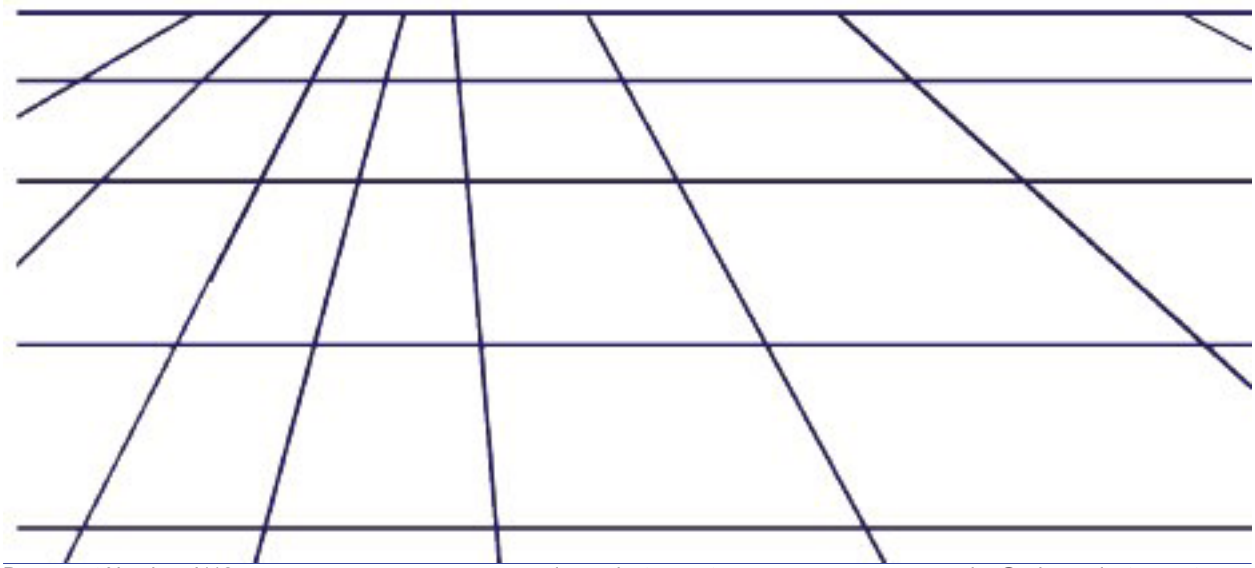
AIH-611 Special Epoxy Features: Double composition. No solvent. Cure at normal temperature and pressure. Operating temperature range:-30 ~ +60℃ . **Applications:** Special recommended for bonding of compensation resistors. Tabs gages and stress analysis at normal temperature and pressure. **Curing Condition:** 24 hours at room temperature. **Stock Period:** 10 months at room temperature in a single composition.	**AIA-713 Polyimide Features:** With a stable performance, small creep and hysteresis. Operating temperature range:-30 ~ +280℃ **Applications:** Recommended for the bonding of high elongation gages for measuring at middle temperature. **Curing Condition:** 1 ~ 0.2Mpa for 1 hours at +120℃ ; 3 hours at +180℃ **Stock Period:** 12 months at +2℃
AIF-601 Phenolic-acetal Epoxy Features: With high viscosity, good stability and wide operating temperature range. Operating temperature range:-60 ~ +250℃ **Applications:** Recommended for the bonding of AIBB, AIBA series strain gages. Used at moderate temperature. **Curing Condition:** 1 ~ 0.3Mpa used within 150℃ : 1 hours at +100℃ ; 3 hours at +150℃ . Poster-cure 2 hours at +170℃ ; For AIBB series strain gages with temperature up to 250℃ : **Stock Period:** 10 months at +10℃	**AIG-704/AIG-D04 Room temperature sulfide silicon rubber Features:** Having so excellent properties as waterproof, moisture-proof, meld resistant and high insulation. Operating temperature range: -30 ~ +100℃ **Applications:** Recommended for the protective coating of transducers and strain gages for stress analysis. **Curing Condition:** 16~24 hours at normal temperature and pressure. **Stock Period:** 12 months at room temperature in single composition.

Accessories and Strain gages adhesive

Strain gages adhesive:

AIX-714 Acetyl Features: Moderate viscosity, easy to dilute, fast drying. Small hysteresis, good repeatability and stability are this kind of adhesive's characteristics. Operating temperature range:30 ~ +150℃ **Applications:** Recommended for the bonding of AIBQ series strain gages. **Curing Condition:** 1 ~ 0.2Mpa for half an hour at +80℃ , 2 hours at +160℃ **Stock Period:** 6 months at room temperature.	**AIB-702 Cyanogens acryl ate Features:** Having good bonding, small creep and hysteresis. And it can be used easily. But elevated temperature and moisture will deteriorate its performance **Applications:** Recommended for the bonding of common strain gages and for short term stress analysis. **Curing Condition:** Press with finger, Cure 3 hours at room temperature. **Stock Period:** 3 months at +2℃ without direct light and moisture resistant.
AIGD-711 Modified epoxy Features: Double composition with good bonding and can be used easily. It also has high insulation. Operating temperature:-60 ~ +260℃ **Applications:** Used to fix the lead wire of the strain gages. **Curing Condition:** Cure 3 hour at +60 ~ +80℃ or 3 days at room temperature. **Stock Period:** 9 months at +2℃ for single composition 1 hour after mixed.	

New Production Sensors



Load Cells

Description: ABM14D

ABM14D

Model	ABM14D			
Load range	10/20/25/30/40/50/100 tons			
Load range	10/20/25/30/40/50/100 tons			
Error %FS	≤±0.030	≤±0.020	≤±0.018	≤±0.026
Creep %FS/30min	≤±0.024	≤±0.016	≤±0.012	≤±0.017
Temperature Effect-Span(Max) %FS/10℃	≤±0.017	≤±0.011	≤±0.009	≤±0.013
Temperature Effect-Zero %FS/10℃	≤±0.023	≤±0.015	≤±0.010	≤±0.014
Output Sensitivity mV/V	1.5±0.003			
Input Resistance Ω	700±7			
Output Resistance Ω	703±4			
Insulation Resistance MΩ	≥5000(50VDC)			
Zero Output	1.0			
Temperature, Compensate ℃	-10 ～ +40			
Temperature, Operating ℃	-35 ～ +70			
Recommend Excitation V	5 ～ 12(DC)			
Max Excitation V	18(DC)			
Safety Over Load %FS	150			
Limitary Over Load %FS	300			

Load Cells

Description: ABM14D

ABM14D

Model	AHM11					
Load range	5/10/20/30/50/100/200/250/300/350/500 kgs					
Error %FS	≤±0.030	≤±0.020	≤±0.018	≤±0.026	≤±0.035	≤±0.050
Creep %FS/30min	≤±0.024	≤±0.016	≤±0.012	≤±0.017	≤±0.030	≤±0.040
Temperature Effect-Span(Max) %FS/10℃	≤±0.017	≤±0.011	≤±0.009	≤±0.013	≤±0.030	≤±0.040
Temperature Effect-Zero %FS/10℃	≤±0.023	≤±0.015	≤±0.010	≤±0.014	≤±0.030	≤±0.020
Output Sensitivity mV/V	2.0±0.02					
Input Resistance Ω	460±50					
Output Resistance Ω	351±2					
Insulation Resistance MΩ	≥5000(50VDC)					
Zero Output	1.0					
Temperature, Compensate ℃	-10 ～ +40					
Temperature, Operating ℃	-35 ～ +70					
Recommend Excitation V	5 ～ 12(DC)					
Max Excitation V	18(DC)					
Safety Over Load %FS	150					
Limitary Over Load %FS	300					

Load Cells

Description: ABM1

ABM1

Model	ABM1					
Load range	5/10/20/30/50/100/200/250/300/350/500 kgs					
Error %FS	≤±0.030	≤±0.020	≤±0.018	≤±0.026	≤±0.035	≤±0.050
Creep %FS/30min	≤±0.024	≤±0.016	≤±0.012	≤±0.017	≤±0.030	≤±0.040
Temperature Effect-Span(Max) %FS/10℃	≤±0.017	≤±0.011	≤±0.009	≤±0.013	≤±0.030	≤±0.040
Temperature Effect-Zero %FS/10℃	≤±0.023	≤±0.015	≤±0.010	≤±0.014	≤±0.030	≤±0.020
Output Sensitivity mV/V	2.0±0.02					
Input Resistance Ω	460±50					
Output Resistance Ω	351±2					
Insulation Resistance MΩ	≥5000(50VDC)					
Zero Output	1.5					
Temperature, Compensate ℃	-10 ～ +40					
Temperature, Operating ℃	-35 ～ +70					
Recommend Excitation V	5 ～ 12(DC)					
Max Excitation V	18(DC)					
Safety Over Load %FS	150					
Limitary Over Load %FS	300					

Load Cells

Description: AH3

AH3

Model	AH3						
Load range	0.025/0.05/0.1/0.15/0.2/0.25/0.3/0.5/0.6/0.75/1/1.5/2/2.5/3/5/7.5/10/15/20/30 tons						
Error %FS	≤±0.030	≤±0.020	≤±0.018	≤±0.018	≤±0.026	≤±0.035	≤±0.050
Creep %FS/30min	≤±0.024	≤±0.016	≤±0.012	≤±0.012	≤±0.017	≤±0.030	≤±0.040
Temperature Effect-Span(Max) %FS/10℃	≤±0.017	≤±0.011	≤±0.009	≤±0.009	≤±0.013	≤±0.030	≤±0.040
Temperature Effect-Zero %FS/10℃	≤±0.023	≤±0.015	≤±0.010	≤±0.010	≤±0.014	≤±0.030	≤±0.020
Output Sensitivity mV/V	2.0±0.004						
Input Resistance Ω	350±3.5						
Output Resistance Ω	351±2.0						
Insulation Resistance MΩ	≥5000(50VDC)						
Zero Output	1.5						
Temperature, Compensate ℃	-10 ～ +40						
Temperature, Operating ℃	-35 ～ +70						
Recommend Excitation V	5 ～ 12(DC)						
Max Excitation V	18(DC)						
Safety Over Load %FS	150						
Limitary Over Load %FS	300						

Load Cells

Description: AH2F & AHM2D4

AH2F	AHM2D4
	

Model	AH2F			AHM2D4			
Load range	1/2/3/5/10/15/20/30/50 tons			0.5/1/2/5/10/20 tons			
Error %FS	≤±0.050	≤±0.030	≤±0.020	⩽ ±0.030	⩽ ±0.020	⩽ ±0.018	⩽ ±0.026
Creep %FS/30min	≤±0.038	≤±0.023	≤±0.016	⩽ ±0.024	⩽ ±0.016	⩽ ±0.012	⩽ ±0.017
Temperature Effect-Span(Max) %FS/10℃	≤±0.028	≤±0.017	≤±0.011	⩽ ±0.017	⩽ ±0.011	⩽ ±0.009	⩽ ±0.013
Temperature Effect-Zero %FS/10℃	≤±0.047	≤±0.029	≤±0.019	⩽ ±0.023	⩽ ±0.015	⩽ ±0.010	⩽ ±0.014
Output Sensitivity mV/V	2.0±0.01			2.0±0.002			
Input Resistance Ω	770±30			350±3			
Output Resistance Ω	700±5			351±2			
Insulation Resistance MΩ	≥ 5000(50VDC)			⩾ 5000(50VDC)			
Zero Output	1.5			1.0			
Temperature, Compensate ℃	-10 ～ +40			-10 ～ +40			
Temperature, Operating ℃	-35 ～ +70			-35 ～ +65			
Recommend Excitation V	5 ～ 12(DC)			5 ～ 12(DC)			
Max Excitation V	18(DC)			18(DC)			
Safety Over Load %FS	150			150			
Limitary Over Load %FS	300			300			

Load Cells

Description: AH2D & AH2A

AH2D	AH2A
	

Model	AH2D			AH2A		
Load range	5/10/20 tons			1/2/3/4/5 Mega-N		
Error %FS	≤±0.050	≤±0.030	≤±0.020	0.1%	0.2%	0.3%
Creep %FS/30min	≤±0.038	≤±0.023	≤±0.016	0.05%	0.05%	0.05%
Temperature Effect-Span(Max) %FS/10℃	≤±0.028	≤±0.017	≤±0.011	0.05%	0.1%	0.2%
Temperature Effect-Zero %FS/10℃	≤±0.047	≤±0.029	≤±0.019	0.05%	0.1%	0.2%
Output Sensitivity mV/V	2.0±0.008			≥2.0		
Input Resistance Ω	750±10			1072±5		
Output Resistance Ω	700±5			1050±5		
Insulation Resistance MΩ	≥ 5000(50VDC)			≥5000(50VDC)		
Zero Output	1.0			1.0		
Temperature, Compensate ℃	-10 ～ +40			-10 ～ +40		
Temperature, Operating ℃	-35 ～ +70			-35 ～ +70		
Recommend Excitation V	5 ～ 12(DC)			5 ～ 12(DC)		
Max Excitation V	18(DC)			18(DC)		
Safety Over Load %FS	150			150		
Limitary Over Load %FS	300			300		

Pressure Sensors

Description: Internal Amplifier

AFYB26				AFYB26	
					
Model	AFYB26			AFYB25	
Range	1,1.5,2,3,3.5,4.5,5,5.5, 6,8,10,12,15,20,25,30,35 MPa			5,6,10,12,15,20,25, 30,35,40,45,50,60 MPa	
Output V	5.0+0.02			3.68+0.02 或 5.0+0.02	
Non-Linearity % FS	0.1	0.2	0.3	0.2	0.3
Non-Repeatability % FS	0.1	0.2	0.3	0.2	0.3
Hysteresis % FS	0.1	0.2	0.3	0.2	0.3
Temperature Effect-Zero %FS/10℃	0.1	0.2	0.3	0.2	0.3
Temperature Effect-Span(Max) %FS/10℃	0.1	0.2	0.3	0.2	0.3
Supply Voltage	+9（VDC）			+5 or +9(VDC)	
Temperature, Compensate ℃	-20-+50			-40--+50	
Temperature, Operating ℃	-20-+65			-40--+65	
Safety Over Load %FS	120			120	
Limitary Over Load %FS	150			150	

Pressure Sensors

Description: High Pressure

AYB15		AYB6		
 		 		
Model	AYB15	AYB6		
Range	20,25,30,35,40,45, 50,60,70,80,100 MPa	20,25,30,35,40,45,50,60 MPa		
Output Sensitivity mV/V	1.5+0.2	2.0+0.1		
Non-Linearity % FS	0.1	0.1	0.2	0.3
Non-Repeatability % FS	0.1	0.1	0.2	0.3
Hysteresis % FS	0.1	0.1	0.2	0.3
Temperature Effect-Zero %FS/10℃	0.1	0.1	0.2	0.3
Temperature Effect-Span(Max) %FS/10℃	0.1	0.1	0.2	0.3
Zero Output mV	≤±1	≤±1		
Output Resistance Ω	700+7	350+7		
Insulation Resistance MΩ	1000 (100VDC)	1000 (100VDC)		
Recommend Excitation V	9-12 (DC/AC)	9-12 (DC/AC)		
Max Excitation V	6-18 (DC/AC)	6-18 (DC/AC)		
Temperature, Compensate ℃	-10--+50	-10-+50		
Temperature, Operating ℃	-20--+65	-20-+65		
Safety Over Load %FS	120	120		
Limitary Over Load %FS	150	150		

Pressure Sensors

Description: Low Pressure

AYB14C	AYB9
	

Model	AYB14C		AYB9	
Range	1,2,3,4 MPa		0.05,0.1,0.15,0.2,0.3,1 MPa	
Output Sensitivity mV/V	1.0+0.1		1.5+0.1	
Non-Linearity % FS	0.1	0.2	0.2	0.3
Non-Repeatability % FS	0.1	0.2	0.2	0.3
Hysteresis % FS	0.1	0.2	0.2	0.3
Temperature Effect-Zero %FS/10℃	0.1	0.2	0.2	0.3
Temperature Effect-Span(Max) %FS/10℃	0.1	0.2	0.2	0.3
Zero Output mV	≤±1		≤±1	
Output Resistance Ω	950--1100		350+3	
Insulation Resistance MΩ	1000 (100VDC)		1000 (100VDC)	
Recommend Excitation V	9-12 (DC/AC)		9-12 (DC/AC)	
Max Excitation V	6-18 (DC/AC)		6-18 (DC/AC)	
Temperature, Compensate ℃	+20--+50		-10-+50	
Temperature, Operating ℃	-10--+80		-20-+65	
Safety Over Load %FS	120		120	
Limitary Over Load %FS	150		150	

Pressure Sensors

Description: Medial Pressure

AYB6A	AYB1
	

Model	AYB6A	AYB1	
Range	3,4,5,6,7,8,10,12,15,20,25 MPa	1,1.5,2,3,3.5,4,5,6,8,10,12,15,20 MPa	
Output Sensitivity mV/V	1.0+0.1	1.0+0.1	
Non-Linearity % FS	0.1	0.1	0.2
Non-Repeatability % FS	0.1	0.1	0.2
Hysteresis % FS	0.1	0.1	0.2
Temperature Effect-Zero %FS/10℃	0.2	0.1	0.2
Temperature Effect-Span(Max) %FS/10℃	0.5	0.1	0.2
Zero Output mV	≤±0.5	≤±1	
Output Resistance Ω	350+7	≥1000(100VDC)	
Insulation Resistance MΩ	1000 (100VDC)	9-12(DC/AC)	
Recommend Excitation V	9-12(DC/AC)	6-18(DC/AC)	
Max Excitation V	6-18(DC/AC)	350+3	
Temperature, Compensate ℃	+20--+70	-10-+50	
Temperature, Operating ℃	0--+80	-20-+65	
Safety Over Load %FS	120	120	
Limitary Over Load %FS	150	150	

Force Sensors

Description: H9Z

AH9Z

Model	AH9Z1	AH9Z2	AH9Z
Load range	0.5,1,1.5,2.5,5tons	0.5,1,1.5,2.5,5 tons	1,2,3,5,10 tons
Error %FS	⩽ ±0.5	⩽ ±0.5	⩽ ±0.5
Creep %FS/30min	⩽ ±0.1	⩽ ±0.1	⩽ ±0.1
Temperature Effect-Span(Max) %FS/10℃	⩽ ±0.1	⩽ ±0.1	⩽ ±0.1
Temperature Effect-Zero %FS/10℃	⩽ ±0.1	⩽ ±0.1	⩽ ±0.1
Output Sensitivity mV/V	0.8±0.02	0.8±0.02	0.6±0.1
Input Resistance Ω	375±10	375±10	750±10
Output Resistance Ω	350±3	350±3	700±7
Insulation Resistance MΩ	⩾ 5000(50VDC)		
Zero Output	1.0		
Temperature, Compensate ℃	-10 ~ +40		
Temperature, Operating ℃	-35 ~ +70		
Recommend Excitation V	5 ~ 12(DC)		
Max Excitation V	18(DC)		
Safety Over Load %FS	150		
Limitary Over Load %FS	200		

Force Sensors

Description: AB10B & AB3L1

AH10B	AB3L1
	

Model	AH10B	AB3L1
Load range	2.5，4，5，7.5，10，15，20 tons	5，15，30 tons
Error %FS	⩽ ±0.5	⩽ ±0.03
Creep %FS/30min	⩽ ±0.1	⩽ ±0.025
Temperature Effect-Span(Max) %FS/10℃	⩽ ±0.05	⩽ ±0.02
Temperature Effect-Zero %FS/10℃	⩽ ±0.05	⩽ ±0.03
Output Sensitivity mV/V	1.5±0.015	1.5±0.02
Input Resistance Ω	780±20	350±3.5
Output Resistance Ω	700±2	350±3.5
Insulation Resistance MΩ	⩾ 5000(50VDC)	⩾ 5000(50VDC)
Zero Output	1.0	1.0
Temperature, Compensate ℃	-10 ～ +40	-10 ～ +40
Temperature, Operating ℃	-35 ～ +70	-30 ～ +70
Recommend Excitation V	5 ～ 12(DC)	5 ～ 12(DC)
Max Excitation V	18(DC)	18(DC)
Safety Over Load %FS	150	150
Limitary Over Load %FS	300	200

Force Sensors

Description: H9X

AH9X

Model	AH9X1	AH9X2	AH9X3
Load range	10，20 tons	2，3，4，5 tons	3 tons
Error %FS	≤ ±0.5		
Creep %FS/30min	≤ ±0.1		
Temperature Effect-Span(Max) %FS/10℃	≤ ±0.1		
Temperature Effect-Zero %FS/10℃	≤ ±0.1		
Output Sensitivity mV/V	1±0.02		
Input Resistance Ω	750±10		
Output Resistance Ω	700±7		
Insulation Resistance MΩ	⩾ 5000(50VDC)		
Zero Output	1.0		
Temperature, Compensate ℃	-10 ～ +40		
Temperature, Operating ℃	-35 ～ +70		
Recommend Excitation V	5 ～ 12(DC)		
Max Excitation V	18(DC)		
Safety Over Load %FS	150		
Limitary Over Load %FS	200		

Force Sensors

Description: AHM9L

AHM9L

Model	AHM9L
Load range	10，15，20，30，40，50，60 tons
tonsTemperature Effect-Span(Max) %FS/10℃	≤ ±0.05
Temperature Effect-Zero %FS/10℃	≤ ±0.05
Output Sensitivity mV/V	1.5±0.02
Input Resistance Ω	750±10
Output Resistance Ω	700±7
Insulation Resistance MΩ	≥ 5000(50VDC)
Zero Output	1.0
Temperature, Compensate ℃	-10 ～ +40
Temperature, Operating ℃	-30 ～ +70
Recommend Excitation V	5 ～ 12(DC)
Max Excitation V	18(DC)
Safety Over Load %FS	150
Limitary Over Load %FS	300

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