

Stroke sensor HS series



Stroke sensors are wire pull-out type length meters that are used for construction vehicles and industrial machinery. They have a proven results in the accurate measurement control of outriggers, booms, etc. They support many and varied strokes using two types of housing—one for short strokes (up to 3.1 meters) and one for long strokes (up to 10 meters)—and, with either type, the output resistance levels vary depending on the amount of wire pulled out.

Features

1. These sensors are lightweight and compact because their casings and covers are made of resin.
2. Nylon-coated wires are used to achieve a structure that is highly resistant to dirt.
3. The sensors have a top-notch durability that makes them capable of withstanding long-term continuous use.
4. The water-proof structure makes the sensors extremely resistant to environmental conditions.
5. The strokes and output resistance values can be changed. (optional)

Model Code

HS-170-110-2-21

1 2 3 4 5 6 7

- 1 Stroke sensor series symbol
- 2 Stroke (indicated in cm units)
- 3 Wire pull-out direction (see Fig. 1)
 - 1: Wire pulled out toward the right
 - 2: Wire pulled out toward the left
- 4 Connector symbol (see Fig. 2)
 - 1: Standard (connector made by Sumitomo Wiring Systems Ltd. provided)
 - N: No connector provided
- 5 Cord pull-out direction (see Fig. 3)
 - 0: Cord pulled out downward
 - 1: Cord pulled out toward the left
 - 2: Cord pulled out upward
 - 3: Cord pulled out toward the right
- 6 Drain hole positions (see Fig. 4)
 - 0: At the bottom and 30° to the left
 - 1: At the left and 30° above
 - 2: At the top and 30° to the right
 - 3: At the right and 30° below
- 7 Design no.

Fig. 1 Wire pull-out direction

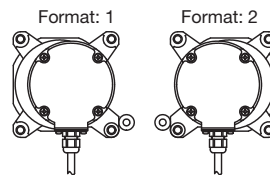


Fig. 2 Connector symbol

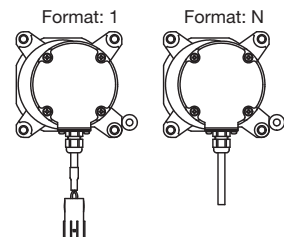


Fig. 3 Cord pull-out direction

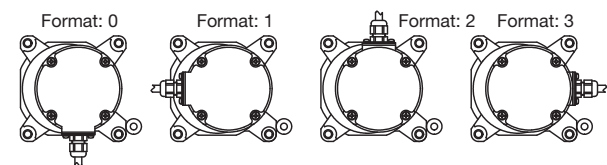
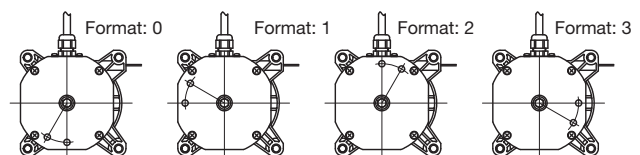


Fig. 4 Drain positions



Specifications

HS-170-110-2-21

Detection system	Wire drum wind-up type
Stroke	1700 mm
Wire	Outside diameter: 1.10 mm (thickness of nylon coating included) Cable diameter: 0.88 mm Material: Stainless steel
Potentiometer	Total resistance value: 5 k Ω \pm 20% Independent linearity: \pm 0.25% Rated power: 2 W Resistance wire temperature coefficient: \pm 50 ppm/ $^{\circ}$ C
Output reproducibility	Less than \pm 10 mm (reference value)
Water resistance	JIS D 0203-1994 S1
Vibration resistance	JIS D 1601-1990 Class 3A Vibration frequency range category 100 Vibration acceleration grade category 4
Impact resistance	196 m/s ² (up/down, left/right and front/back directions) Time: 0.01 to 0.02 sec.
Working temperature range	-20 $^{\circ}$ C ~ +70 $^{\circ}$ C
Shelf temperature range	-30 $^{\circ}$ C ~ +70 $^{\circ}$ C
Relative humidity	30 % ~ 95 %
Durability	More than 30000 returns at 700 mm/sec. between a stroke of 100 and 1600 mm
Weight	Approx. 500 g

HS-270-210-2-21

Detection system	Wire drum wind-up type
Stroke	2700 mm
Wire	Outside diameter: 1.10 mm (thickness of nylon coating included) Cable diameter: 0.88 mm Material: Stainless steel
Potentiometer	Total resistance value: 5 k Ω \pm 20% Independent linearity: \pm 0.25% Rated power: 2 W Resistance wire temperature coefficient: \pm 50 ppm/ $^{\circ}$ C
Output reproducibility	Less than \pm 10 mm (reference value)
Water resistance	JIS D 0203-1994 S1
Vibration resistance	JIS D 1601-1990 Class 3A Vibration frequency range category 100 Vibration acceleration grade category 4
Impact resistance	196 m/s ² (up/down, left/right and front/back directions) Time: 0.01 to 0.02 sec.
Working temperature range	-20 $^{\circ}$ C ~ +70 $^{\circ}$ C
Shelf temperature range	-30 $^{\circ}$ C ~ +70 $^{\circ}$ C
Relative humidity	30 % ~ 95 %
Durability	More than 20000 returns at 200 mm/sec. between a stroke of 100 and 2600 mm
Weight	Approx. 500 g

HS-800-110-2-21

Detection system	Wire drum wind-up type
Stroke	8000 mm
Wire	Outside diameter: 1.5 mm (thickness of nylon coating included) Cable diameter: 1.21 mm Material: Stainless steel
Potentiometer	Total resistance value: 5 k Ω \pm 5 % Independent linearity: \pm 0.25% Rated power: 2 W Resistance wire temperature coefficient: \pm 50 ppm/ $^{\circ}$ C
Accuracy	Linearity: Less than \pm 100 mm Output reproducibility: Less than \pm 50 mm
Water resistance	JIS D 0203-1994 S1
Vibration resistance	JIS D 1601-1995 Class 3B Vibration frequency range category 100 Vibration acceleration grade category 70
Impact resistance	196 m/s ² (up/down, left/right and front/back directions) Time: 0.01 to 0.02 sec.
Working temperature range	-20 $^{\circ}$ C ~ +70 $^{\circ}$ C
Shelf temperature range	-30 $^{\circ}$ C ~ +70 $^{\circ}$ C
Relative humidity	30 % ~ 95 %
Durability	More than 33000 returns at 200 mm/sec. between a stroke of 0 and 8000 mm
Weight	Approx. 1500 g

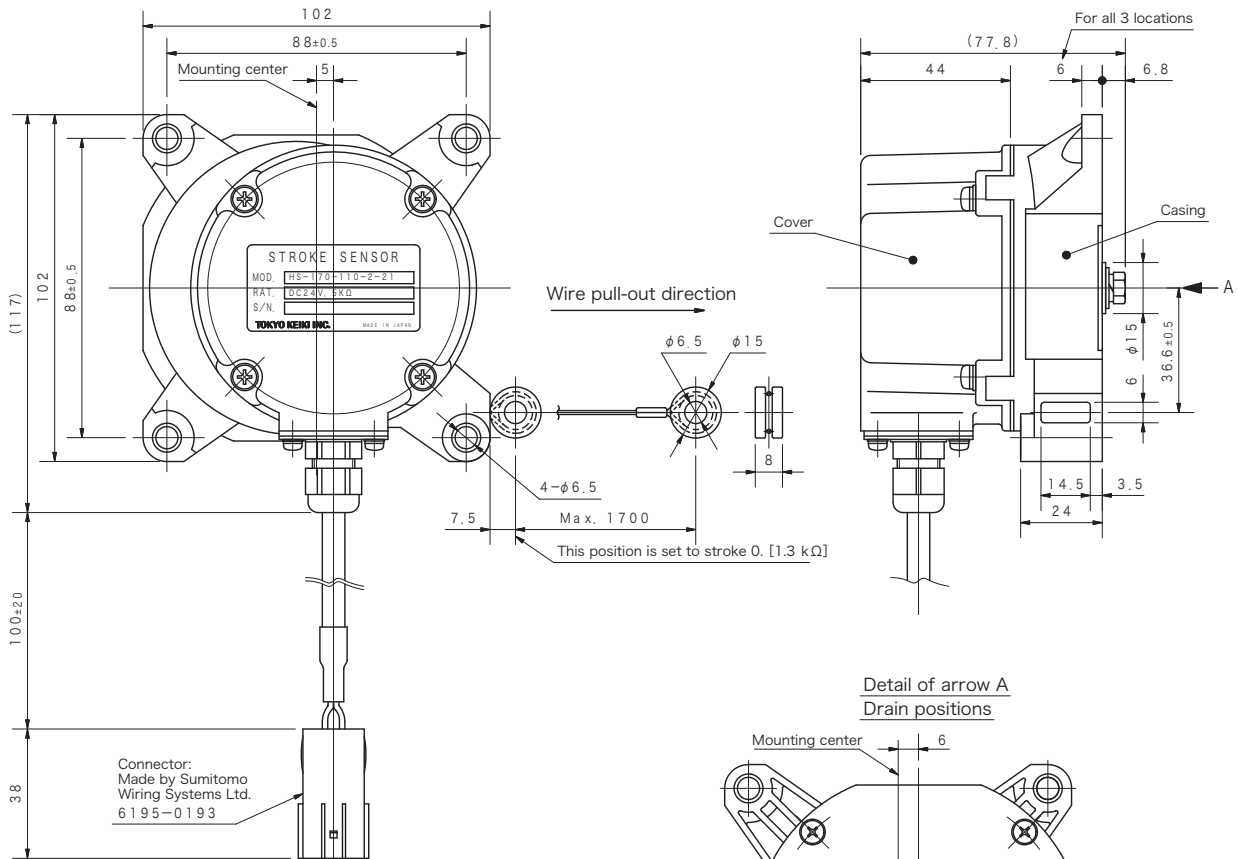
Notes on operation

It may not be possible to achieve the characteristics of the specifications values if the stroke sensor has been used against the following precautions.

- 1) The stroke sensor must be installed on a flat surface. The flatness must be set to less than 0.5 mm when the stroke sensor is tightened using the four bolts.
- 2) If the stroke sensor is used in an environment where it will be exposed to rain or other forms of water, it must be installed with the drain holes positioned in such a way that the water will drain off easily.
- 3) The stroke sensor must be installed in such a way that when the wire has been pulled out to the maximum extent of the usage range, the wire and the mounting surface are made parallel and the fleet angle is set to 0 $^{\circ}$ or more but less than 1.5 $^{\circ}$ or 4.5 $^{\circ}$. For further details, refer to the "Dimensions" of the products.
- 4) If the stroke sensor wire is susceptible to the effects of vibration, wind, etc., a guide roller or other such part must be placed near the pull-out opening to minimize these effects. However, the wire height and fleet angle must be in strict accordance with the specifications.
- 5) When the wire has been pulled out and then is released, it will be wound back up in an instant. This may result in equipment damage or physical danger so measures must be taken to prevent this sudden wind-up.
- 6) The stroke sensor must not be cleaned using water under high pressure. Some of the water may find the way inside the sensor area.
- 7) The stroke sensor must not be exposed to freezing conditions. If the inside becomes frozen, it may no longer function, and if it is forcibly used, it may be damaged.
- 8) The stroke sensor must not be disassembled. Disassembly is dangerous as the inside drum may rotate suddenly or the spiral spring may recoil.

Dimensions

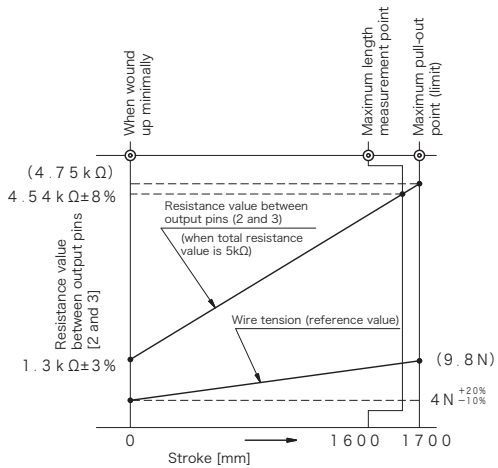
● Stroke sensor HS-170-110-2-21



Connector number

- ① Red: +
- ② Black: -
- ③ White: Signal
- ④ No connection

[Fig. 2 Internal circuit]

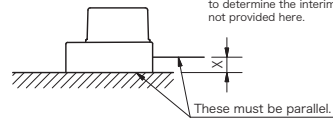


[Fig. 1 Output resistance characteristics and wire tension]

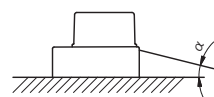
[Wire height]

Stroke	Unit [mm]
0	Height: X 1.2.5±1
1700	6.0±1

Note: Use the rule-of-three calculation to determine the interim strokes not provided here.



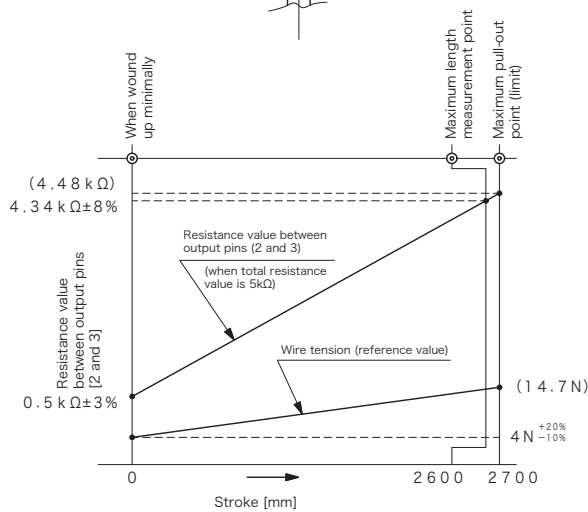
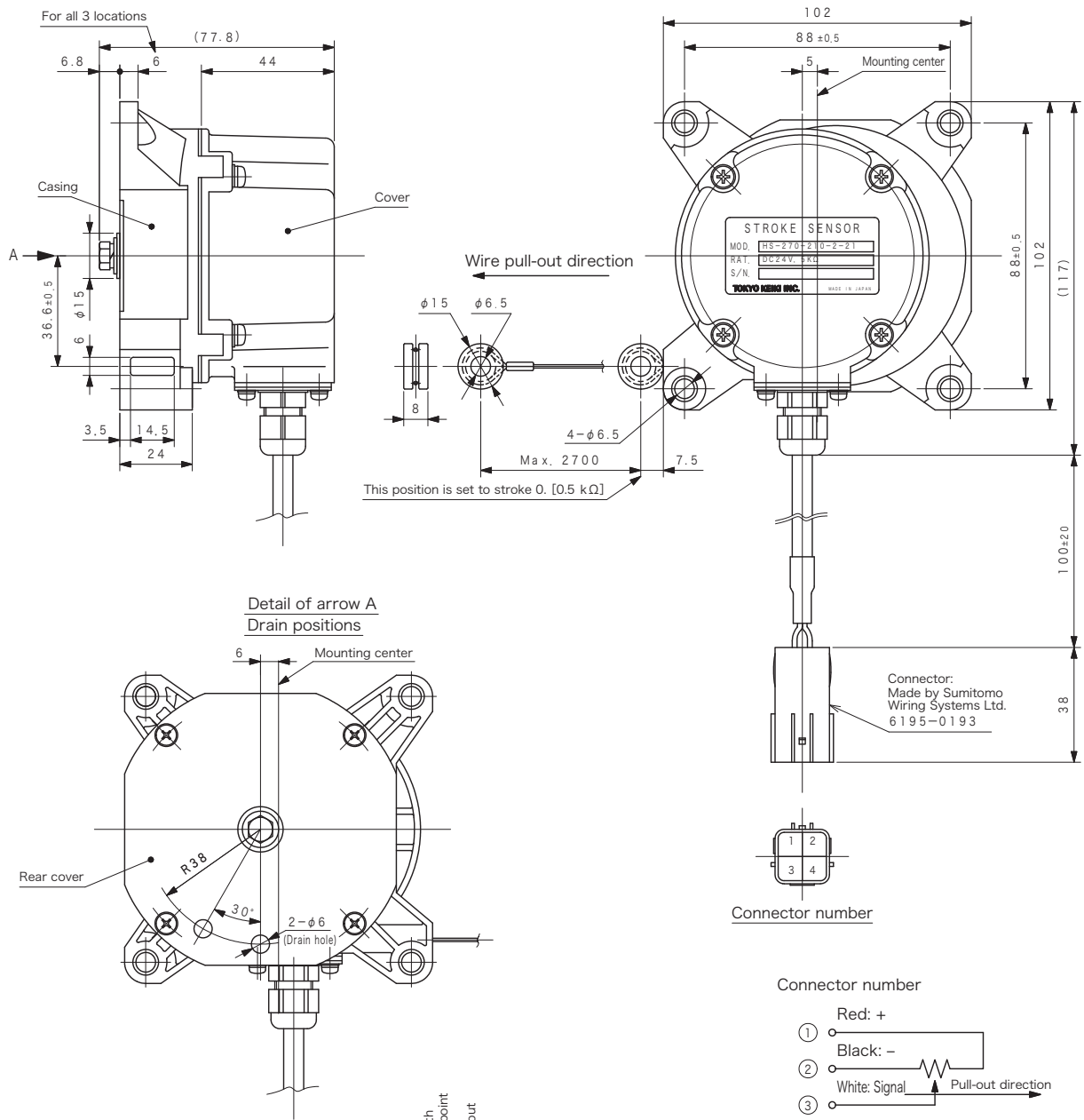
[Fleet angle]



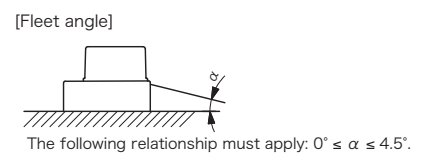
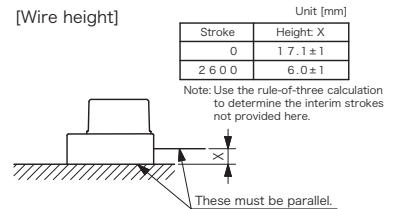
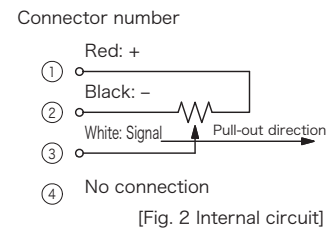
The following relationship must apply: $0^\circ \leq \alpha \leq 1.5^\circ$.

Dimensions

● Stroke sensor HS-270-210-2-21

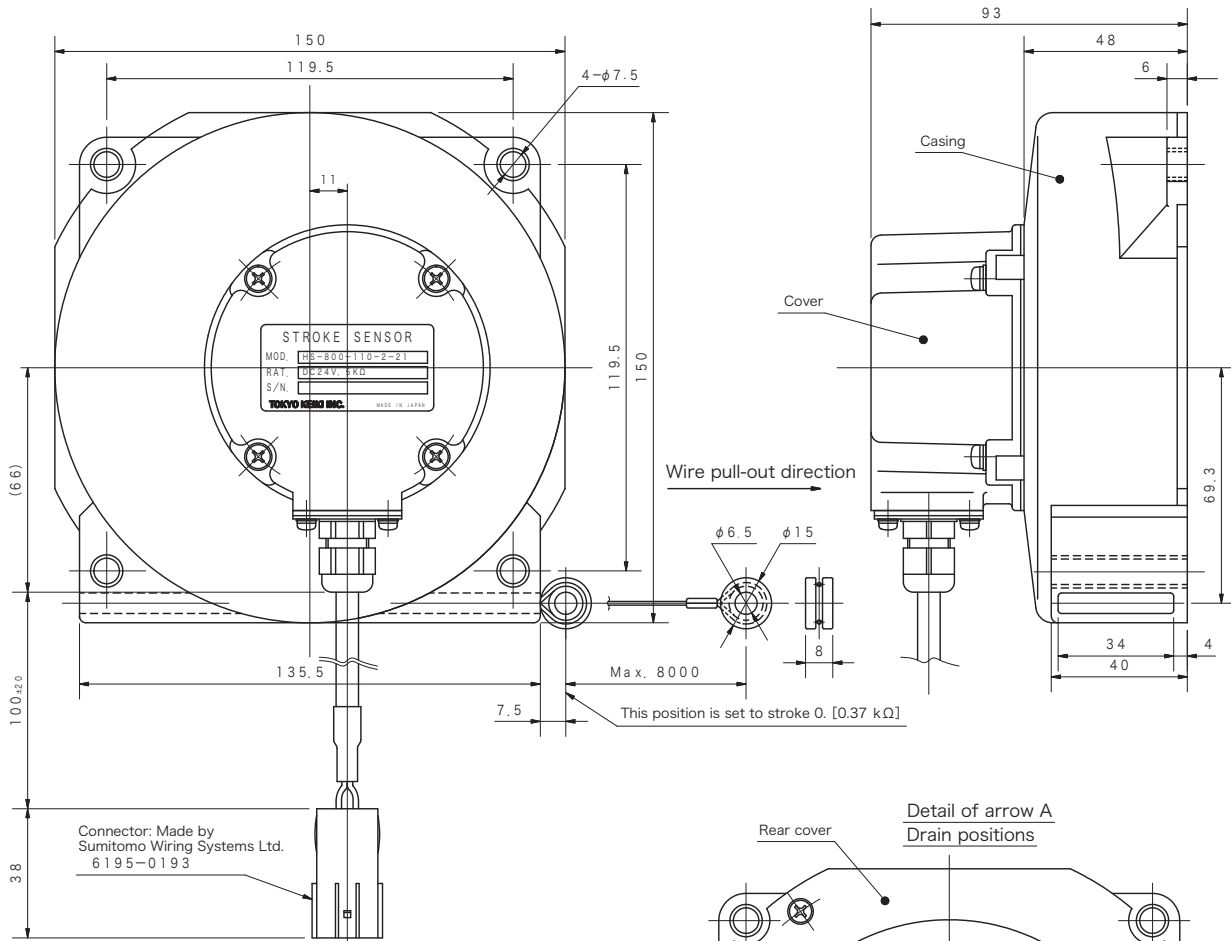


[Fig. 1 Output resistance characteristics and wire tension]



Dimensions

● Stroke sensor HS-800-110-2-21

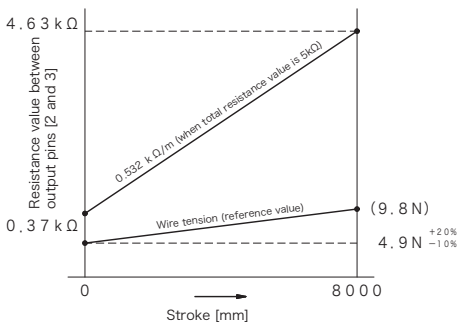
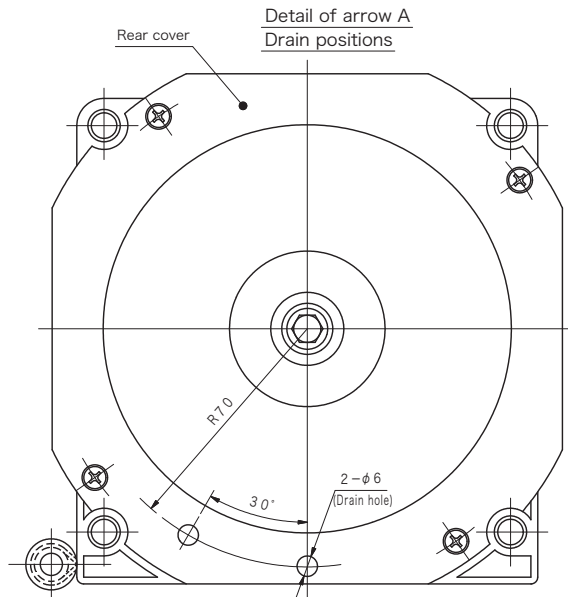


Connector: Made by Sumitomo Wiring Systems Ltd. 6195-0193

Connector number

- ① Red: +
- ② Black: -
- ③ White: Signal
- ④ No connection

[Fig. 2 Internal circuit]

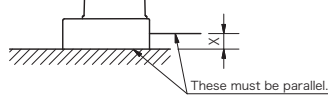


[Fig. 1 Output resistance characteristics and wire tension]

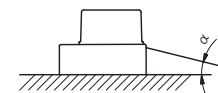
[Wire height]

Unit [mm]	
Stroke	Height: X
0	34.0 ± 1
8000	6.5 ± 1

Note: Use the rule-of-three calculation to determine the interim strokes not provided here.



[Fleet angle]



The following relationship must apply: $0^\circ \leq \alpha \leq 4.5^\circ$.