WELDING HEAD

AH Series

OPERATION MANUAL

AMADA®

Z07M0875E-07

Thank you for purchasing our Welding Head **AH Series**.
This operation manual describes its method of operation and precautions for use.
Read this operation manual carefully prior to use. Store appropriately for ready reference.

Contents

1. Special Precautions

(1) Safety Precautions

Before using, be sure to read this operation manual to operate this machine correctly. This operation manual may include some items that do not correspond to your use. However, you are kindly requested to read only the items related to your use.

- These precautions are shown for safe use of our products and for prevention of damage or injury to operators or others. Be sure to read each of them, since all of them are important for safety.
- The meaning of the words and symbols is as follows.

DANGER

Denotes operations and practices that may imminently result in serious injury or loss of life if not correctly followed.

WARNING

Denotes operations and practices that may result in serious injury or loss of life if not correctly followed.

CAUTION

Denotes operations and practices that may result in personal injury or damage to the equipment if not correctly followed.

These symbols denote “prohibition”.
They are warnings about actions out of the scope of the warranty of the product.

These symbols denote actions which operators must take.

Each symbol represents the contents that give notice of DANGER, WARNING, or CAUTION to the operator.

DANGER

Do not disassemble, repair, or modify this machine in any case.

Otherwise, an electric shock or injury will occur. When internal inspection or repair is required, make contact with us.

WARNING

Do not put your hands between the electrodes.

When welding, keep your fingers and hands away from the electrodes.

Do not touch any welded part or electrodes during welding and just after welding finished.

The welded part of a workpiece, electrodes and electrode holder are very hot. Do not touch them; otherwise you may be burnt.

Apply the specified power supply.

Application of a voltage out of the specified range can cause fire and electric shock.

Stop the operation if any trouble occurs.

Continuous operation after occurrence of a trouble such as burning smell, abnormal sound, abnormal heat, smoke, etc. can cause electric shock and fire. If such a trouble occurs, immediately consult us or your distributor.

Persons with pacemakers must stay clear of the welding machine.

The welding machine generates a magnetic field and has effects on the operation of the pacemaker while it is turned on. A person who uses a pacemaker must not approach the welding machine or walk around the welding shop while the welding machine is in operation, without being permitted by his/her doctor.

Wear protective glasses.

If you look at the surface flash and expulsion directly during welding, your eyes may be damaged.

1. Special Precautions

CAUTION

Do not splash water on the product.

Water splashed over the electric parts can cause electric shock and short circuits.

Do not give excessive force to connecting cables.

Do not bend, pull, or pinch any cable forcibly. If the cable is damaged, it will cause an electric shock, short circuit, or firing.

Connect the specified cables securely.

Cables of insufficient current-carrying capacities and loose connections can cause fire and electric shock.
If the welding cable is not connected completely, a spark will occur.

Install the product on firm, level surface.

If the product falls or drops, injury may result.

Keep combustible matter away from the welding machine.

Do not put any combustible material around the welder. Surface flash and expulsion can ignite combustible matter.

Do not cover the product with a blanket, cloth, etc.

If such a cover is used, it may be overheated and burn.

Keep a fire extinguisher nearby.

Keep a fire extinguisher in the welding shop in case of fire.

Maintain and inspect the product periodically.

Maintain and inspect the product periodically, and repair any damage near by before starting operation. Tighten the welding cable connecting section periodically.

Protective gear must be worn.

Put on protective gear such as protective gloves, long-sleeve jacket, leather apron, etc. Surface flash and expulsion can burn the skin if they touch the skin.

Do not use this product for purposes other than welding.

Use of this product in a manner other than specified can cause electric shock and fire.

When outage occurs, be sure to turn off the power supply.

After a recovery from the outage, the machine may be started or powered suddenly, resulting in an injury.

(2) Precautions for Handling

- Set the cylinder cover on when operating the cylinder to avoid fingers to be caught in the cylinder stopper.

- In this machine, the linear guide (linear bushing) is used vertically. Accordingly, grease or oil may drip, but this is not an accident. In particular, when a new machine is used, lots of grease of oil will drip. In this case, wipe it off properly during machine operation. If grease or oil sticks on the weldment, this may cause a defect.

- Do not install this product in the following:
  - Damp places where humidity is higher than 90%,
  - Dusty places,
  - Places where chemicals are handled,
  - Places where corrosive gas is generated,
  - Places near a high noise source,
  - Hot or cold places where temperatures are above 40°C or below 5°C, and
  - Areas where water will be condensed.

- Clean the outside of the product with a soft, dry cloth or one wet with a little water. If it is very dirty, use diluted neutral detergent or alcohol. Do not use paint thinner, benzine, etc., since they can discolor or deform the product.

- Between electrodes, do not put such a material other than the weldment as tool and screw. Otherwise, the welding electrode will be damaged or a spark will occur. When performing maintenance for this machine as a result of replacement of electrodes, turn off the power supplies of the welder and control device in advance.

- Do not put a screw, a coin, etc., in the product, since they can cause a malfunction.

- Be sure to install the screws, which were removed for maintenance of this machine, in their original positions. If they are installed in different positions, this machine will be damaged or go wrong.

- Operate the product according to the method described in this operation manual.

2. Features

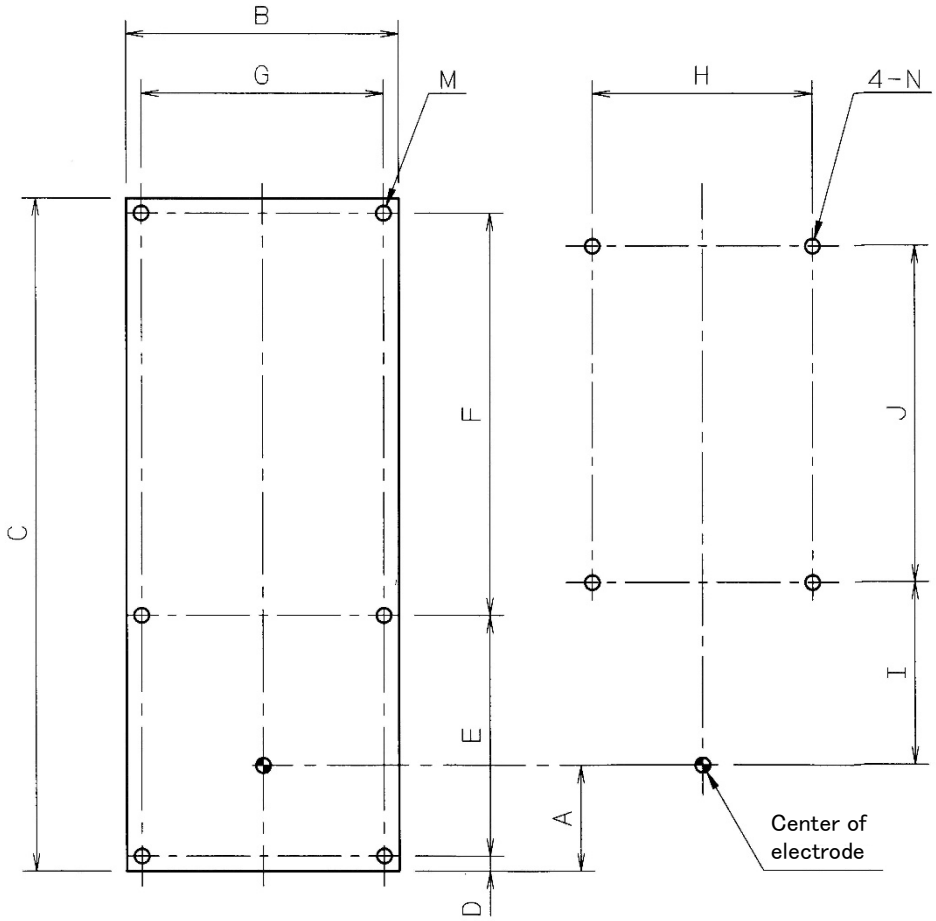
In AH series welding heads, the air cylinder and the pressure follow-up mechanisms are integrated into signal housing for compact design.

The AH series welding heads offer great quality of welding by improving the accuracy and reliability, and ease of mounting onto the automatic welding machine.

3. Installation and Connection

(1) Installation

Drill some holes to mount the welding head on the mounting surface of your existing desk, shelf, or bench as shown below.



Mounting Base Mounting Frame

A	B	C	D	E	F	G	H	I	J	M	N
70	180	450	10	160	270	160	145	122	226	For 6-M10	For M10

Note: For installation without a base, the mounting surface must have an enough structural strength.

(2) Connection

(1) Air Piping

The speed controller with one-touch joint is mounted at the main unit of cylinder. The outer diameter of urethane tube is φ10.

(2) Connection of the Welding Cable

Connect the bus bar on the rear of the welding head to the welding transformer with a welding cable of adequate square millimeter.

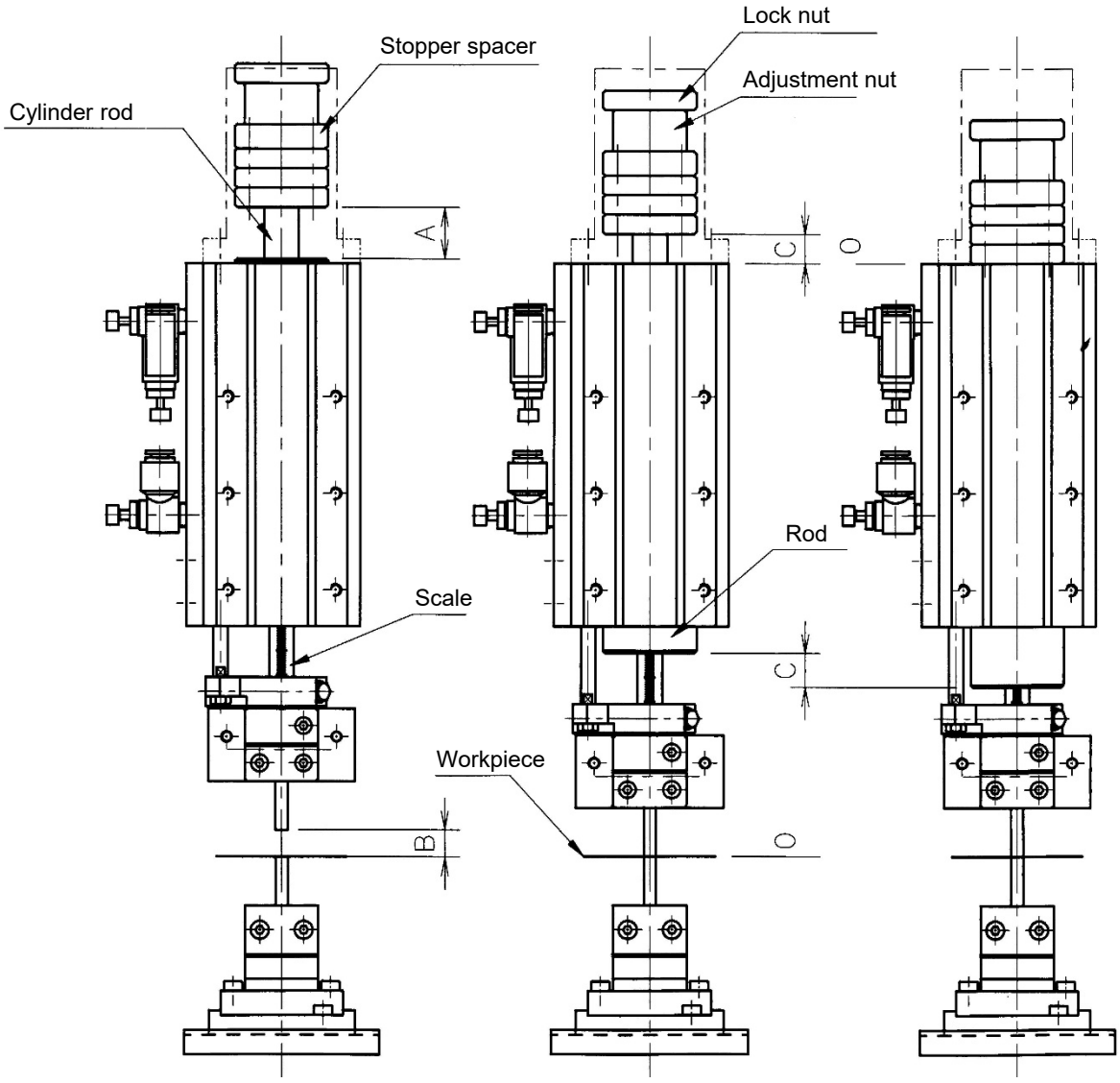
(3) Connection of the Pressure Signal Cable

Connect the terminal or connector of the pressure signal cable to the welding power supply.

Note: See also the operation manual for the welding power supply.

4. Operating Method

(1) Stroke and Welding Force Adjustments



Home (Released) Touch Press

A = B + C

Full stroke Stroke to touch Stroke to press

Referring to the Pressure Diagram, adjust the upper adjustment nut until the desired press force can be obtained. Depending upon the thickness of the workpiece to be welded, if it is impossible to have an enough stroke for the head to press the workpiece, adjust the thickness of the stopper spacer. (The stopper spacer can be disassembled.)

Four stopper spacers are assembled by default.
To add the stopper spacer, purchase the required number of following item (1 piece) separately.

Item No.	Model No.
1035809	0007302

When changing the thickness of stopper spacer, refer to the table below to change the fixing bolt.

Number of stopper spacers	1	2	3	4	5	6	7	8
Hexagon bolt	M4-10	M4-20	M4-30	M4-35	M4-45	M4-50	M4-60	M4-70

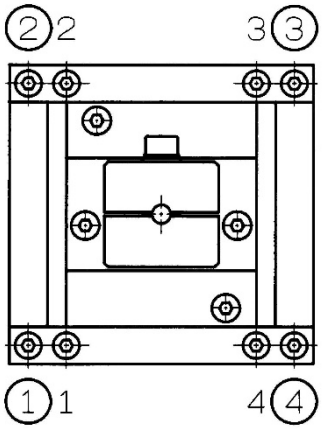
* M4-35 for the standard 4 pieces is already assembled.

(2) Adjustment of Cylinder Descending Speed

The cylinder descending speed is adjusted by two speed controllers on the side of cylinder. The speed becomes slow whichever speed controller you turn. The cylinder ascending speed is adjusted by the upper speed controller.

(3) Lower Electrode Alignment

The lower electrode holder base can be adjusted horizontally, from front to back and from side to side.



■ Centering Adjustment

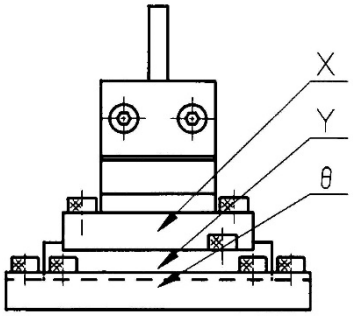
Loosen the fixing screws for the X and Y stages.
While applying a pressure, adjust the upper and lower electrodes for centering.

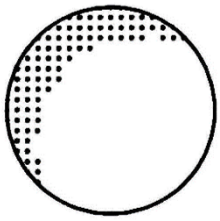
①~④ Fixing Screws

1~4 Jack Screws

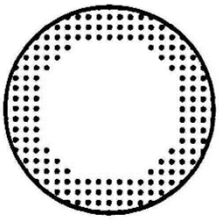
■ Parallel Alignment

Set the press force to “1” on the stroke scale. Visually center the upper and lower electrodes and tighten the screws for the X, Y and θ stages. Next, prepare a sheet of white paper and copy carbon paper. Place them on the lower electrode, and give a press with the upper electrode. Perform a parallel adjustment with the jack screws until a satisfactory uniform stamp is obtained.





Non-parallel



Parallel

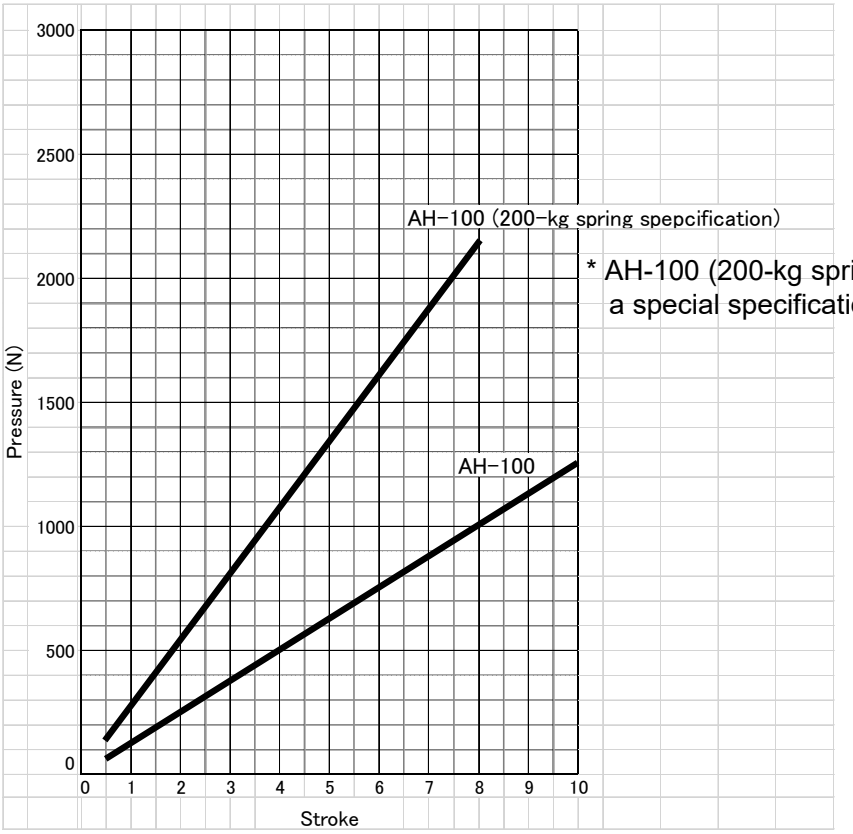
(4) Adjustment of the Timing to Start a Welding Current Flow

The timing to start a welding current flow is adjusted by the position of cylinder sensor. Normally, set the sensor so as to be ON when the stopper spacer reaches the bottom (constant welding force application types).

Also, tangential welding force application type, which is the welding force is increased while a welding current flows, can be set by accelerating the timing of sensor ON.

* When using a non-contact two-wire sensor, adjust the position of sensor ON/OFF with a tester.

(5) Pressure Diagram



* AH-100 (200-kg spring specification) is a special specification.

⚠ CAUTION The pressure diagram is provided as a rough guide. For an accurate pressure measurement, use a pressure gauge.

Cylinder thrust: 1814 [N] at 0.4 MPa of air pressure, 2268 [N] at 0.5 MPa

(6) Maintenance Management

This product cannot be disassembled by customers. If abnormal noise is generated during an up-and-down motion of cylinder or the movement becomes non-smooth, consult us. For preventing dew condensation in the cylinder, use dry air as much as possible.

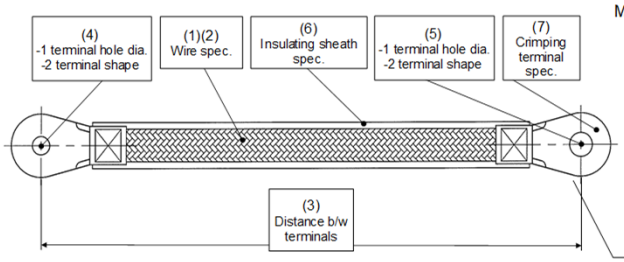
5. Product Specifications

(1) Specifications

1	Electrode Diameter	φ20
2	Welding Force	1250 N max., 2150 N max. (200-kg spring specification)
3	Max. Stroke	80 mm
4	Welding Force Stroke	30 mm max.
5	Factor of Spring	41.8 N, 88.2 N max. (200-kg spring specification)
6	Throat Depth	120 mm
7	Solenoid Valve (24V)	Koganei; 300-4LE1-SR-DC24V
8	Air Regulator	Koganei; FR-300-02
9	C.S (non-contact three-wire type)	ZE155B-CDAS
10	Weight	55 kg

(2) Welding Cable

Secondary conductor specification selection table



Model instruction example

K-060 - 1000 - 06 - 08 - N - Blank

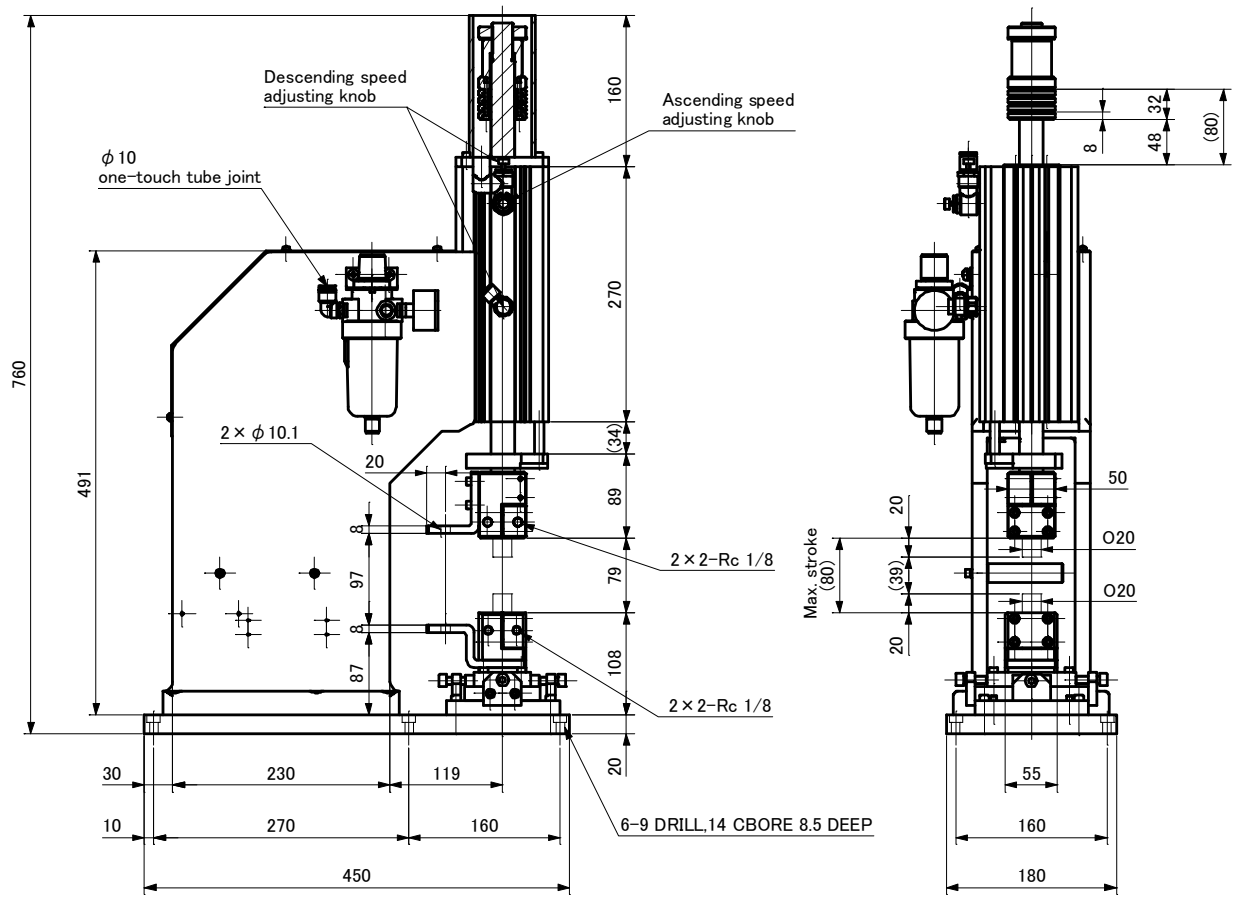
(1)(2) Wire spec.	(3) Distance b/w terminals (mm)	(4) Crimping terminal spec. 1	(5) Crimping terminal spec. 2	(6) Insulating sheath spec.	(7) Crimping terminal direction Blank=0° 180=180°

R: Round type　S: Small type　CB: Square type

Secondary conductor specification (Filled items in the following table are recommended.)																				Remarks		
Name	Basic spec. Wire's (1) type (2) cross section		(3) Distance b/w terminals (mm) Unit of 100mm Fixed to 4-digit		Crimping terminal on both sides (4) terminal with smaller hole to (5) bigger hole order													(6) Insulating sheath			(7) Mounting direction of crimping terminal Blank=0° 180=180 °	Available dimension		Mounting crimping terminal nominal
					R4	R5	S5	R6	S6	R8	S8	CB8	R10	S10	CB10	R12		Nylon sleeve	Heat shrinkable tube	Silicone tube		Min. cable length (mm)	Max. cable length (mm)	
					04	05	05K	06	06K	08	08K	08C	10	10K	10C	12		N	G	S				
Carbon wire (round wire)	K-008	-	****	-	○	○	×	○	×	○	×	×	○	×	×	×	-	○	×	○	○	200	3000	8sq
	K-014		****		×	○	×	○	×	○	×	×	○	×	×	×		○	○	○		200		14sq
	K-022		****		×	○	○	○	○	○	×	×	○	×	×	×		○	○	○		200		22sq
	(K-008×3)		****		×	○	○	○	○	○	×	×	○	×	×	×		○	○	○		200		
	(K-008×4)		****		×	○	○	○	○	○	○	×	○	×	×	×		○	○	○		200		38sq
	(K-008×5)		****		×	○	○	○	○	○	○	×	○	×	×	×		○	○	○		200		
	K-038		****		×	○	○	○	○	○	○	×	○	×	×	×		○	○	○		200		
	K-060		****		×	×	×	○	○	○	×	×	○	×	×	○		○	○	○	○	200		60sq
	(K-038×3)		****		×	×	×	○	×	○	×	○	○	×	×	○		○	○	×	Blank= same direction	300		100sq
	(K-038×4)		****		×	×	×	×	×	○	×	○	○	×	○	○		○	○	×		300		150sq
	(K-060×3)		****		×	×	×	×	×	○	×	×	○	○	×	○		○	○	×		300		200sq
Flat braid copper wire (flat wire)	H-022		****		×	○	○	○	○	○	×	×	○	×	×	×		○	○	×	180= reversed direction	200		22sq
	H-030		****		×	○	○	○	○	○	○	×	○	×	×	×		○	○	×		200		38sq
	H-050		****		×	×	×	○	○	○	×	×	○	×	×	○		○	○	×		200		60sq
	H-100		****		×	×	×	○	×	○	×	○	○	×	×	○		○	○	×		300		
	(H-022×4)		****		×	×	×	○	×	○	×	○	○	×	×	○		○	○	×		300		100sq
	(H-030×3)		****		×	×	×	○	×	○	×	○	○	×	×	○		○	○	×		300		
	(H-050×2)		****		×	×	×	○	×	○	×	○	○	×	×	○		○	○	×		300		
	H-150		****		×	×	×	×	×	○	×	○	○	×	○	○		○	○	×		300		150sq
	(H-050×3)		****		×	×	×	×	×	○	×	○	○	×	○	○		○	○	×		300		
	H-200		****		×	×	×	×	×	○	×	×	○	○	×	○		○	○	×		300		200sq
	(H-050×4)		****		×	×	×	×	×	○	×	×	○	○	×	○		○	○	×		300		

6. Outline Drawings

Overall



Note: There are screw holes not shown in the figure above, but do not use them since they are option mounting holes.

Cylinder part