

**PRESSURE FOLLOW-UP MECHANISMS**

**VP-SS**

# **OPERATION MANUAL**



Thank you for purchasing our Pressure Follow-Up Mechanisms **VP-SS**.  
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.

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# 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.

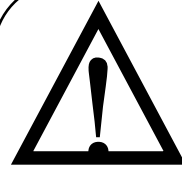
- These precautions are shown for safe use of our products and for prevention of damage or injury to operators or others. Be sure to read each of them, since all of them are important for safety.
- The meaning of the words and symbols is as follows.



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



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# CAUTION

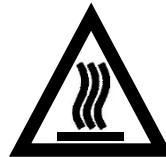
Denotes operations and practices that may result in personal injury or damage to the equipment if not correctly followed.



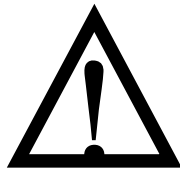
These symbols denote "prohibition". They are warnings about actions out of the scope of the warranty of the product.



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.



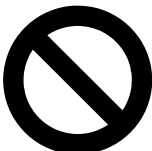
**Apply the specified power supply.**

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.



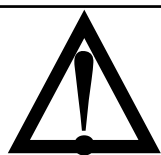
**Persons with pacemakers must stay clear of the welding machine.**

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.



## 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.



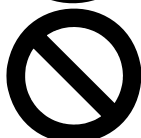
**Connect the specified cables securely.**

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**

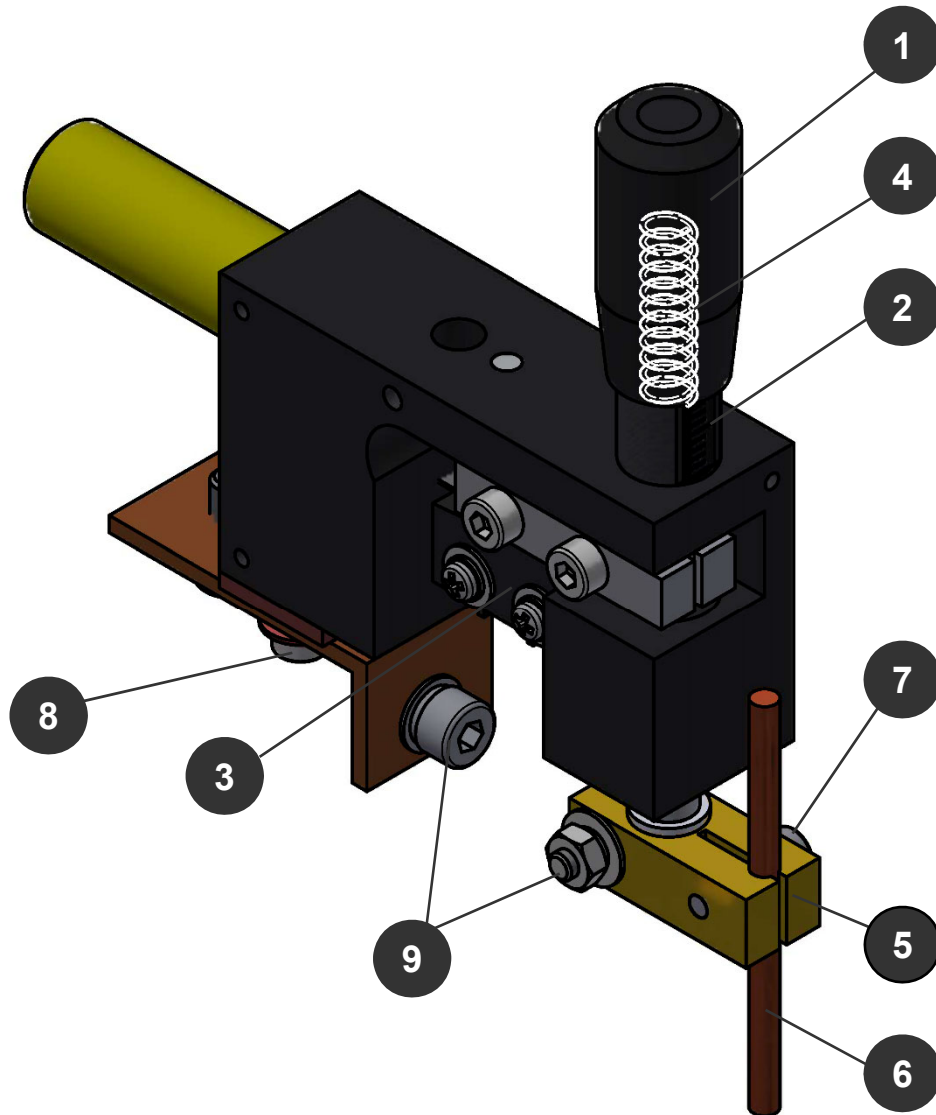
- In this machine, the linear guide (linear bushing) is used vertically. Accordingly, grease or oil may drip, but this is not an accident. In particular, when a new machine is used, lots of grease or oil will drip. In this case, wipe it off properly during machine operation. If grease or oil sticks on the weldment, this may cause a defect.
- Do not install this product in the following:
  - Damp places where humidity is 90% or higher,
  - 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**

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- ◇ **Suitable unit for high precision high quality welding and for automatic machine**
- ◇ **High performance mechanism reducing to the utmost capability the friction and mass of the follow-up unit**

### 3. Name and Functions of Each Section



3. Name and Functions of Each Section



### (1) Pressure adjusting knob

This knob is used to adjust the pressure at welding. Turn the pressure knob to set the required pressure.

### (2) Pressure scale

This scale is used to read the pressure at welding. For the relation of pressure between "Pressure scale" and "Pressure spring specification", refer to the pressure diagram (page 13).



**CAUTION** The pressure diagram represents theoretical values. To measure actual pressure, use a pressure gauge or spring balance.

### (3) Pressure sensor

The pressure sensor is used to make sure that pressure is applied to the weldment at welding. This sensor outputs a signal when the electrode makes contact with the weldment and the detecting dog is raised 1.5 mm.



**CAUTION** The pressure allowance should be  $2.5 \pm 0.5$  mm. If the machine is operated when the pressure allowance exceeds 4 mm, its internal mechanism will be damaged, resulting in a serious failure.

### (4) Pressure spring

This pressure spring gives the pressure required for welding to the weldment. Pressure spring specification (SS series): Maximum pressure 4/7 (N)

### (5) Electrode holder

This part is used to give a welding current to the welding electrodes and fix the electrodes.

### (6) Welding electrode

This is an electrode rod for welding. Select a material and an end shape suitable for your use. We prepare welding electrodes for various uses.

### (7) Welding electrode fixing screw

This screw is used to remove or mount the welding electrode.

### (8) Screw to supply power (from the transformer or power supply side)

Connect the welding cable from the welding transformer or welding power supply.

### (9) Jumper line (secondary conductor) connecting screws

Item name: VP(T)-SS jumper line (0.5sq-100L)

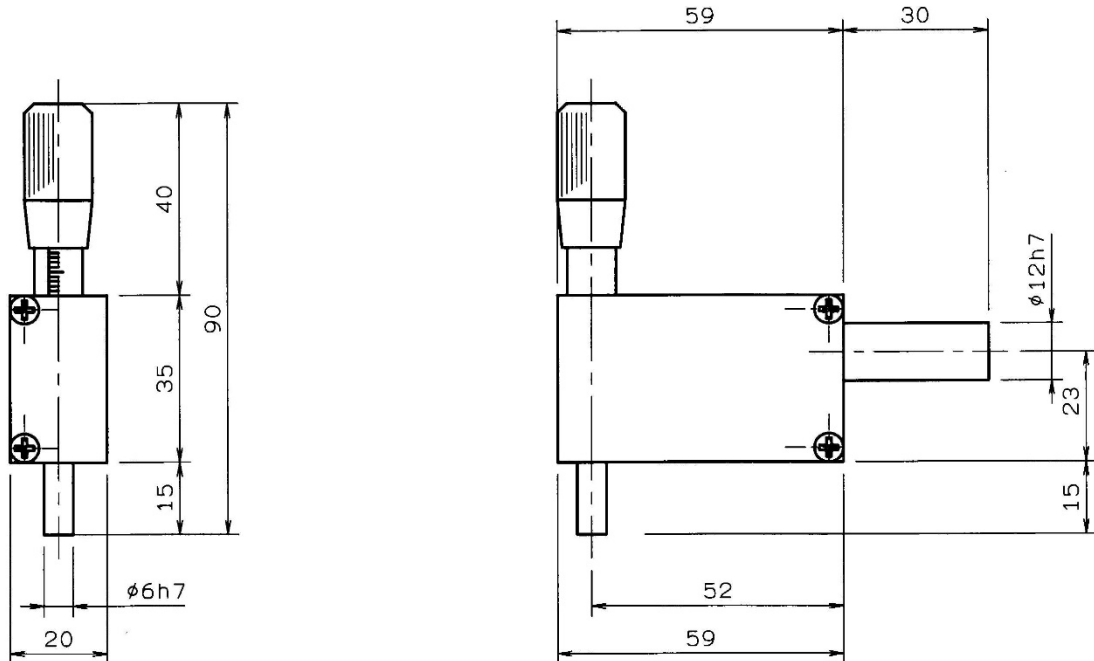
Part number: 1042724

Model number: 10273-201-1

## 4. Installation and Connection

### (1) Installation

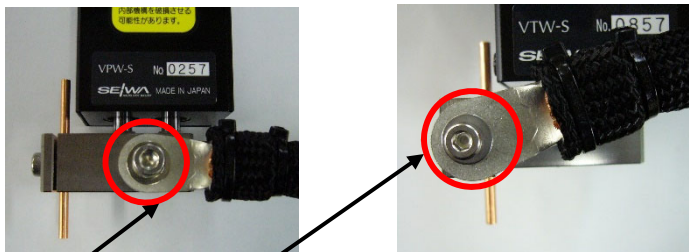
When fixing the pressure follow-up mechanism, perform drilling by referring to the drawing.



**CAUTION** Fix this machine on a high-rigidity driving section for use. If the rigidity is not enough, the welding quality may be lowered by flapping.

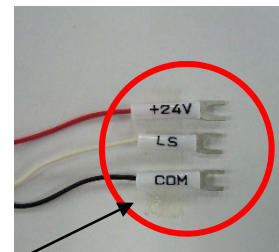
### (2) Connection

Secondary-side welding cable wiring



Connect the welding cable.

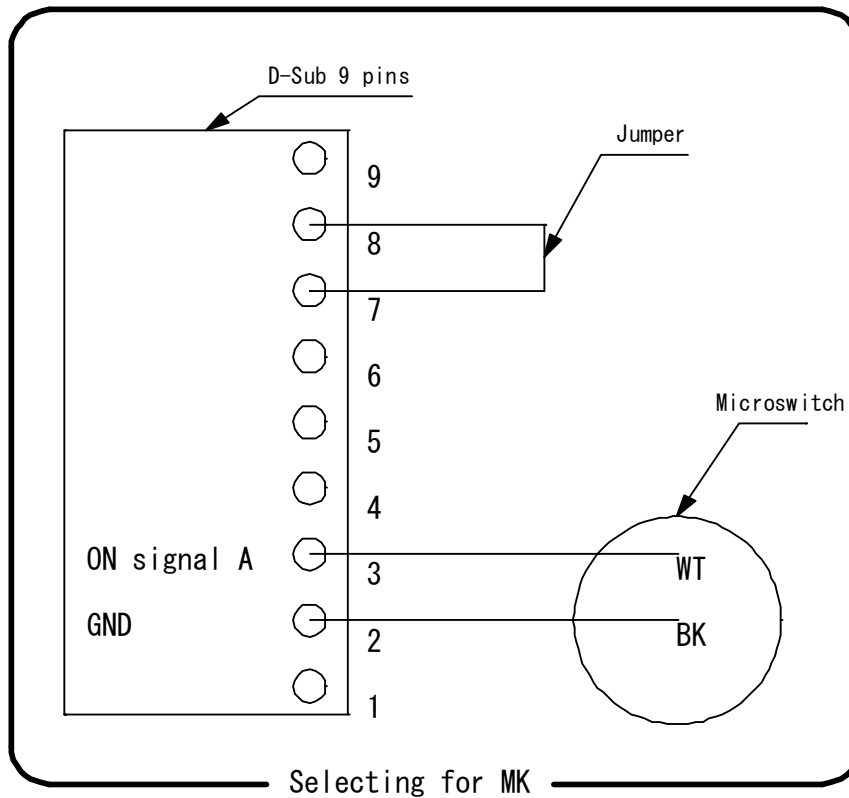
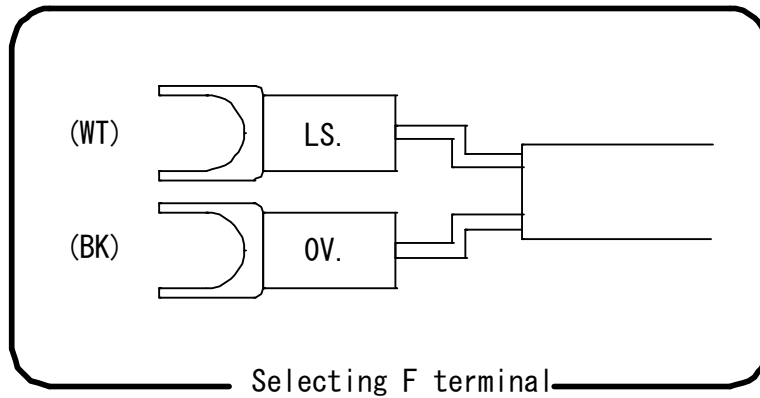
Signal line wiring



Connect signal cables.  
(Refer to page 9.)

### (3) Pressure Signal Cable

[Pressure signal cable terminal]



## 5. Operating Method

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### (1) Introduction

We recommend you to use this machine (VP-SS) in combination with our pressure follow-up mechanism driving unit as a set.

To obtain the performance of the pressure follow-up mechanism driving unit fully, read the "Operation manual for the pressure follow-up mechanism driving unit" attached to the pressure follow-up mechanism driving unit together with this operation manual.



#### CAUTION

- (1) Operate the machine in the pressure allowance range of  $2.5 \pm 0.5$  mm.  
(Refer to page 12.)
  - When the pressure allowance goes below 2.0 mm, a stable pressure signal may not be obtained or pressure shortage may occur.
  - When the pressure allowance exceeds 5.0 mm, the internal mechanism of the pressure follow-up mechanism may be damaged. Operate the machine at 4.0 mm or less.
- (2) Select a welding cable to be installed on the electrode holder so that the weight or tension of the cable itself may not be applied, and then install the welding cable.
- (3) Do not apply any horizontal load to the electrode and spindle in any case.
- (4) When the operating condition corresponds to any of the following 3 items, the weldability may be adversely affected if the standard specification is adopted. In this case, consult with our business staff.
  - The machine is used for welding at a large current or at short tact time.
  - The machine is used when the spindle and the electrode are put in an eccentric form or the eccentric size exceeds the standard size.
  - The machine is used when the eccentricity between the spindle and electrode is in the transverse direction to the front of the follow-up section.
- (5) Do not use this unit in a horizontal direction, otherwise the microswitch may malfunction.

## (2) Operating Method

### (1) Setting the pressure

Turn the pressure adjusting knob to set the pressure.

For the relation between the scale and pressure, refer to the pressure diagram (page 13).

### (2) Installing the welding electrode

Install the welding electrode on the electrode holder.

At this time, we recommend you to measure the projection allowance of the electrode in advance.

\* At replacement of electrode, keep the projection allowance on a certain level.  
(Refer to page 12.)

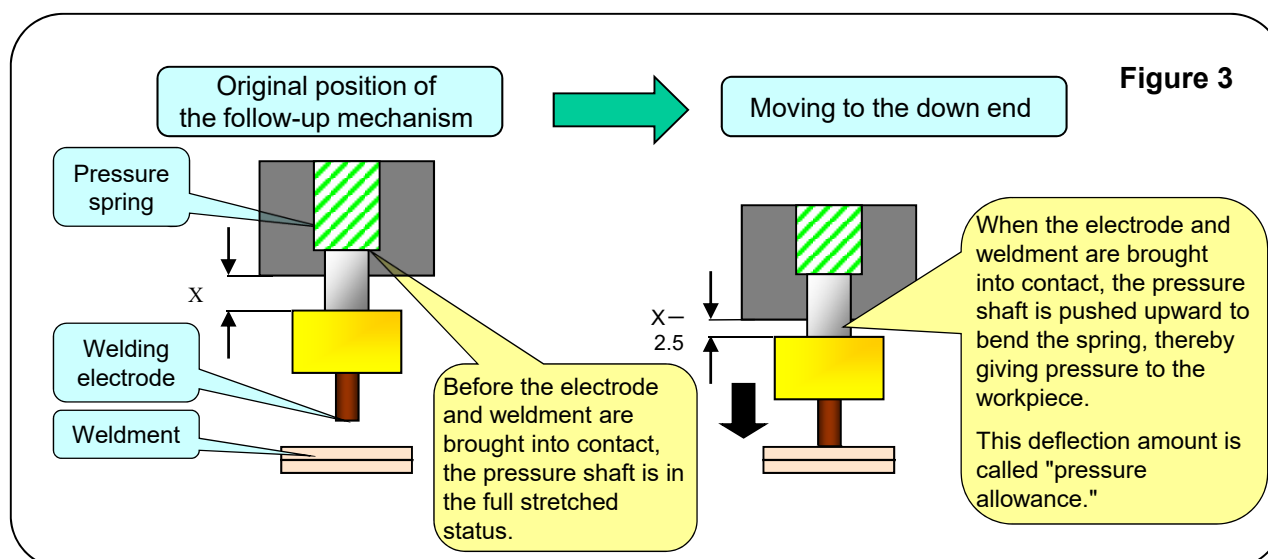
### (3) Adjusting the driving stroke of the follow-up section

Adjust the stroke of the driving section (the mechanism to drive the follow-up mechanism) so that the pressure allowance may be in the range of  $2.5 \pm 0.5$  mm.

<Adjustment example>

Make a stroke adjustment so that the weldment and welding electrode may be brought into contact at the stroke down end (moving end) of the driving section and the spindle of the follow-up mechanism may dive 2.5 mm under the main unit.

\* Remove the cover of the follow-up mechanism to facilitate this adjustment.



### (4) Welding operations

After making sure that each section is surely connected, start welding operations.

Refer to the operation manuals for the welder and attached devices, too.

### (3) Electrode Projection Allowance, Stroke, and Pressure Allowance

#### ● Electrode projection allowance

Determine the electrode projection allowance out of the electrode holder by taking interference with the workpiece, operational convenience, etc. into consideration.

<Example of general electrode projection allowance>

When using a copper type electrode with an electrode diameter of  $\phi 5 \rightarrow 5$  to 30 mm



#### CAUTION

When a high-resistance electrode of tungsten or molybdenum type is used, the heat generation amount at the end is changed by electrode projection allowance. Be careful about projection allowance management at replacement of electrode.

#### ● Head stroke

Determine the head up/down stroke according to the pressure allowance of the pressure follow-up mechanism. (Refer to page 11.)



#### CAUTION

Make sure that the head stroke does not cause interference with the workpiece (that the workpiece can be taken out) when the head goes up.

#### ● Pressure allowance

The deflection amount of the pressure spring in our follow-up mechanism (V-type series) is called "pressure allowance."

Our follow-up mechanism is designed so as to obtain proper pressure when the spring is bent 2.5 mm. (Refer to Figure 3 on page 11.)

Operate the machine in the pressure allowance range of  $2.5 \pm 0.5$  mm.



#### CAUTION

When the pressure allowance goes below 2.0 mm, a stable pressure signal may not be obtained or pressure shortage may occur.

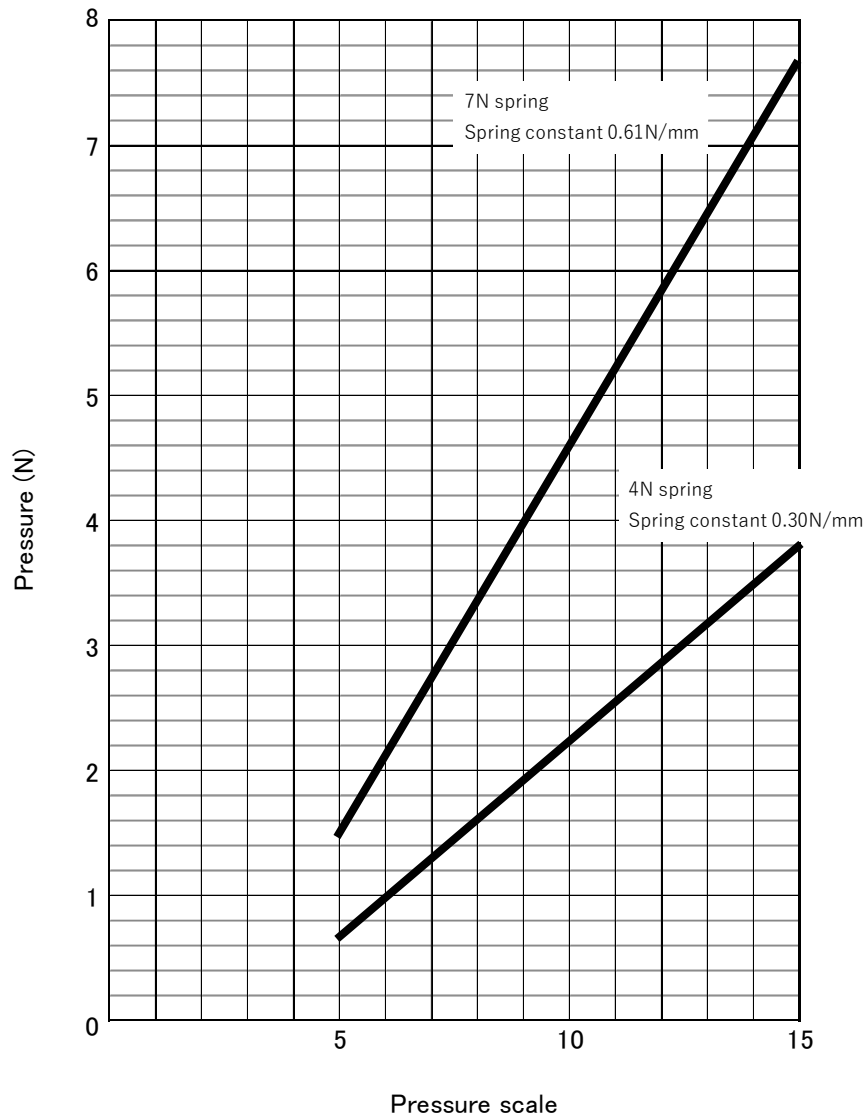
When the pressure allowance exceeds 5.0 mm, the internal mechanism of the pressure following-up mechanism may be damaged. Operate the machine at 4.0 mm or less.

#### ● Electrode projection allowance management

As a management item after a startup of the welder, the item "Electrode projection management" is provided. Electrode projection management permits preventing welding operations from being interrupted due to various faults.

To perform this management accurately, an electrode projection allowance gauge or a removable type holder (preset holder) for the electrode mounting section is used. These methods are very effective.

It is an important point for pressure management to keep the electrode allowance on a certain level at precision stop welding. Accordingly, we recommend you to prepare a work process manual conforming to your management rules.

**(4) Pressure Diagram**

\*1 This is the pressure when Main Shaft is pushed up 2.5 mm.

\*2 The pressure diagram represents theoretical values.

To measure actual pressure, use a pressure gauge or spring balance.

## **(5) Maintenance Management**

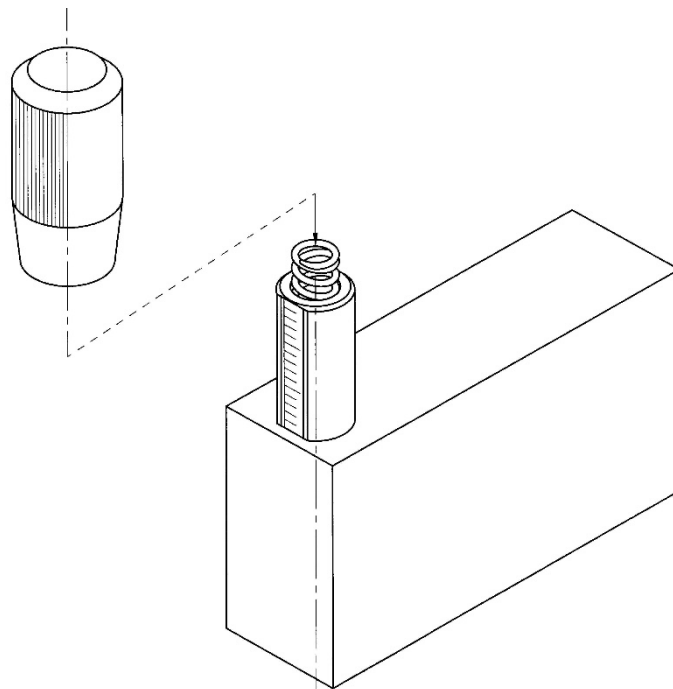
### **(1) Lubrication**

It doesn't need to replace. If the movement become bad, please oil the friction parts a little.

Please use the oil which isn't sticky for the friction parts. Too much lubrication will cause the bad ability.

### **(2) Replacing the spring**

Put the cover off and turn left Pressure Adjustment Knob. It can be taken off as shown in the figure and replace Spring.





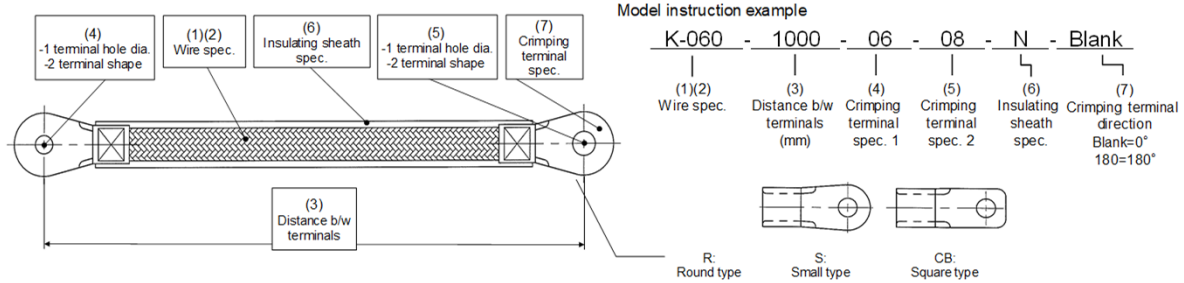
## 6. Product Specifications

### (1) Specifications

1	Pressure range	1 N to 7 N (spring type)
2	Recommended operating thrust	"Operating pressure x 2" as standard
3	Pressure allowance	$2.5 \pm 0.5$ mm
4	Electrode holder	Standard type: $\phi$ 3
5	Pressure signal output	Microswitch specification
6	Weight	0.35 kg

## (2) Welding Cable

Secondary conductor specification selection table



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	Silicon 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	*****	○	○	×	○	×	○	×	×	○	×	×	×	○	×	○	○	Blank= same direction	200	8sq
	K-014	*****	×	○	×	○	×	○	×	×	○	×	×	×	○	○	○			200	14sq
	K-022	*****	×	○	○	○	○	○	×	×	○	×	×	×	○	○	○			200	22sq
	(K-008×3)	*****	×	○	○	○	○	○	×	×	○	×	×	×	○	○	○			200	38sq
	(K-008×4)	*****	×	○	○	○	○	○	×	○	×	×	×	×	○	○	○			200	
	(K-008×5)	*****	×	○	○	○	○	○	×	○	×	×	×	×	○	○	○			200	
	K-038	*****	×	○	○	○	○	○	×	○	×	×	×	×	○	○	○			200	
	K-060	*****	×	×	×	○	○	○	×	×	○	×	×	○	○	○	○			200	60sq
	(K-038×3)	*****	×	×	×	○	×	○	×	○	○	×	×	×	○	○	×			300	100sq
	(K-038×4)	*****	×	×	×	×	×	○	×	○	○	×	○	○	×	○	×			300	150sq
(K-060×3)	*****	×	×	×	×	×	○	×	○	○	×	○	○	×	○	×	300	200sq			
Flat braid copper wire (flat wire)	H-022	*****	×	○	○	○	○	○	×	×	○	×	×	×	○	○	×	180= reversed direction	3000	300	22sq
	H-030	*****	×	○	○	○	○	○	×	×	○	×	×	×	○	○	×			200	38sq
	H-050	*****	×	×	×	○	○	○	×	×	○	×	×	×	○	○	×			200	60sq
	H-100	*****	×	×	×	○	×	○	×	○	○	×	×	×	○	○	×			300	100sq
	(H-022×4)	*****	×	×	×	○	×	○	×	○	○	×	×	×	○	○	×			300	
	(H-030×3)	*****	×	×	×	○	×	○	×	○	○	×	×	×	○	○	×			300	
	(H-050×2)	*****	×	×	×	○	×	○	×	○	○	×	×	×	○	○	×			300	
	H-150	*****	×	×	×	×	×	○	×	○	○	×	×	×	○	○	×			300	150sq
	(H-050×3)	*****	×	×	×	×	×	○	×	○	○	×	○	○	×	○	×			300	200sq
	H-200	*****	×	×	×	×	×	○	×	○	○	×	○	○	×	○	×			300	
(H-050×4)	*****	×	×	×	×	×	○	×	×	○	○	×	○	○	×	○	300				

