

 **PATENTED RIVETING MACHINE**
YOSHIKAWA IRON WORKS

Riveting Machine

US-66

Handling manual






- ◆ Be sure to read this manual carefully before using the product and use it correctly. Improper operation may cause accidents, shorten the life of the product, and degrade its performance.
- ◆ Keep this manual in a safe place so that it can be used at any time.









"Safety Precautions"

The precautions shown here are intended to ensure that you use the product correctly and to prevent injury or damage to you or others. In addition, in order to clarify the magnitude and degree of urgency of danger and damage, precautions should be classified as "DANGER," "WARNING," and "CAUTION." Be sure to follow all of these important safety instructions.

	DANGER Failure to observe these instructions results in an imminent likelihood of death or serious personal injury.
	WARNING Failure to observe these instructions results in the possibility of death or serious personal injury.
	CAUTION Failure to observe these instructions results in the possibility of personal injury or material damage.

About the symbols

The symbols shown below are used to classify and explain the types of items to be observed. Please read the contents carefully.

	The  symbol indicates a "DANGER," "WARNING," or "CAUTION" .
	The  symbol indicates a "prohibited" action that must not be performed.
	The  symbol indicates a "compulsory" action that must be performed.



DANGER

	<p>◆ Be sure to conduct a risk assessment under actual usage conditions of the product after it is delivered, it is moved to a different place, new workers begin to use it, there is a change in products being made, there is a change in the surroundings or layout, etc. Otherwise, fires, electric shocks, death or injury, and equipment damage may result.</p>
	<p>◆ Do not put your hands or fingers under the head of the machine as you may be seriously injured. Be very careful while operating the machine.</p>
	<p>◆ Do not open the control box door. There is a risk of electric shock. If you must open the control box door, first turn off the power and unplug the power cord, before opening the door.</p>



WARNING

	<p>◆ Secure the machine housing to the floor or to a workbench. If it is not truly secured, the machine may accidentally fall over and injure someone. We cannot guarantee against product damage or personal injury in the event of an accident.</p>
	<p>◆ Do not use any power supply or voltage other than that which is specified. Using a different power supply may cause product failure or start a fire.</p>
	<p>◆ Do not damage the wiring. If a damaged wire causes a short circuit, the cord will melt and may start a fire.</p>
	<p>◆ Do not splash water on the product. Doing so may damage the product, give someone an electric shock or start a fire.</p>
	<p>◆ Never attempt to disassemble or repair this product unless you are a repair technician. Doing so may start a fire or cause a malfunction resulting in personal injury. In case the machine needs repair or fails to work correctly, please contact our sales office nearest to you.</p>
	<p>◆ Do not touch the switches with wet hands. Doing so may give you an electric shock or cause a malfunction.</p>



CAUTION

	<ul style="list-style-type: none">◆ Turn off the power before replacing the head, the insert, or a jig. Doing so while operating the machine may result in injury due to incorrect operation.
	<ul style="list-style-type: none">◆ After installing or relocating the machine, be sure to remove the head from the machine and check the direction of the motor's rotation when performing a test run. If it rotates in the wrong direction, the head may come off and cause damage or a personal injury.
	<ul style="list-style-type: none">◆ Do not put your fingers or other objects into the rotating parts during operation. Doing so may cause a personal injury or a machine malfunction.
	<ul style="list-style-type: none">◆ Since the source pressure of the riveter is already set for each model, do not change it without knowing what you are doing. If you use the machine at a pressure above the existing setting, it may damage the machine or cause it to malfunction.
	<ul style="list-style-type: none">◆ Be sure to connect all wires and terminals securely. If you don't, it may result in a poor contact, damage the machine or cause it to malfunction.
	<ul style="list-style-type: none">◆ Please use only genuine items purchased from us, for use as consumables and replacement parts. If you don't, it may damage the machine or cause it to malfunction. When disposing of the machine and/or any parts, treat them as industrial waste.
	<ul style="list-style-type: none">◆ In the event of an accident or machine damage or failure, immediately turn off the power and stop operation. If repair is required, please contact our nearest sales office.
	<ul style="list-style-type: none">◆ If the power is turned off for a long time, the cylinder will drop. If there is any interference (contact) with jigs, or other items nearby, it may damage the machine.
	<ul style="list-style-type: none">◆ Do not allow any mechanical shocks (impacts) when installing the machine. They may cause a machine failure.

Disclaimer

“Exclusions from warranty coverage”

In the unlikely event that a problem occurs with this product, we will deal with it based on the following exclusions and disclaimer.

- Defects caused by not following the precautions described in this instruction manual.
- Defects due to design and installation that violate the descriptions in this operation manual
- Defects due to any use other than the intended purpose described in this operation manual
- Defects caused by the installation and handling of the machine due to user instructions given to the designers and installers, that are not part of the standard specifications, are not covered.
- Modified machine specifications or performance after delivery and any defects caused by that.
- Defects caused by use, storage, transportation, etc., outside of the range of environmental conditions normally expected at the time of development, manufacturing, and sales
- Defects caused by force majeure (natural disasters, landslides, ground subsidence, fires, explosions, riots, etc.)
- If any defect is not reported promptly after being discovered

"Precautions for safe use"

1. Operating conditions and ambient environment

- Please check the operating conditions where the machine will be used and its environment, including: the operating hours and machine settings, the resulting finished products, the waste generated during production, the temperature, humidity, altitude, and atmosphere, such as dust or gas in air at the place where the machine will be used
- If the customer moves or exports the product overseas, they should check the power supply, installation environment, surrounding environment, etc. of the country or region where it will be used.

2. Necessity to confirm the place of use (regulations of municipalities, etc.)

- Check the local ordinances where the machine will actually be used.
- If the customer moves or exports the product overseas, they should check the laws, regulations, and ordinances of the country or region where the product will be used.

3. Necessity for worker education

- The machine may only be installed by a trained person, such as a professional contractor or a specialized person.
- In the case of special work stipulated by laws and ordinances, only a qualified person, or a person who has undergone the necessary training, should perform the work.
- Only persons who have had safety training should perform any work using the machine.
- Work using the machine should only be performed by trained personnel.
- Maintenance work must be performed by engineers or technicians with the necessary mechanical and electrical expertise.
- In the case of special work stipulated by laws and ordinances, only a qualified person, or a person who has undergone the necessary training, should perform the work.

4. Necessity of risk assessment

- Perform a risk assessment under the actual conditions of use, such as the environment, location, and qualifications of workers at the place where the machine will actually be used.
 - Various safety devices are available as options, so please contact our sales office.
-



"Precautions for safe use"

5. Need for primary power protection

- If power supply circuit protection is required as the result of the risk assessment, take the appropriate protective measures.
- Various protective devices are available as options, so please contact our sales office.
- If electrical noise countermeasures are required for the machine power supply line, etc., please contact our sales office.

6. The need to identify the person involved, including repair work

- To use this machine, we recommend that the customer clarify the work details and scope of responsibility as shown below. Please check each item before starting operation.

① Transportation and Installation: Transporter, machine transportation, and installation manager

② Electrical work/wiring: Electric worker, electric engineer

③ Production: Workers who have had safety training and received explanations of working conditions

④ Setup changes, new model addition: Only performed by workers and managers who have had safety training and received explanations of the working conditions,

⑤ Maintenance and inspection: Mechanical and electrical maintenance engineers

⑥ Repair (mechanical system): Mechanical maintenance engineer (limited to the scope specified in the manual)

⑦ Repair (electrical system): Electrical maintenance engineer (limited to the scope specified in the manual)

⑧ Other repairs: Manufacturer

⑨ Disposal: Disposal contractor, person in charge of the disposal business

- * If ①, ②, ⑤, ⑥, or ⑦ above are special work specified by law, the work should only be done by a qualified person or a person who has received the necessary training.

7. About disposal

- When disposing of the machine, check the requirements of the municipality where it will be disposed.
- When disposing of the product overseas, check the laws, rules and regulations of the country or region where the product will be disposed.

In the event of a failure or malfunction, please contact our sales office.

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■ Foreword

Thank you for choosing Yoshikawa's "US-66" riveting machine

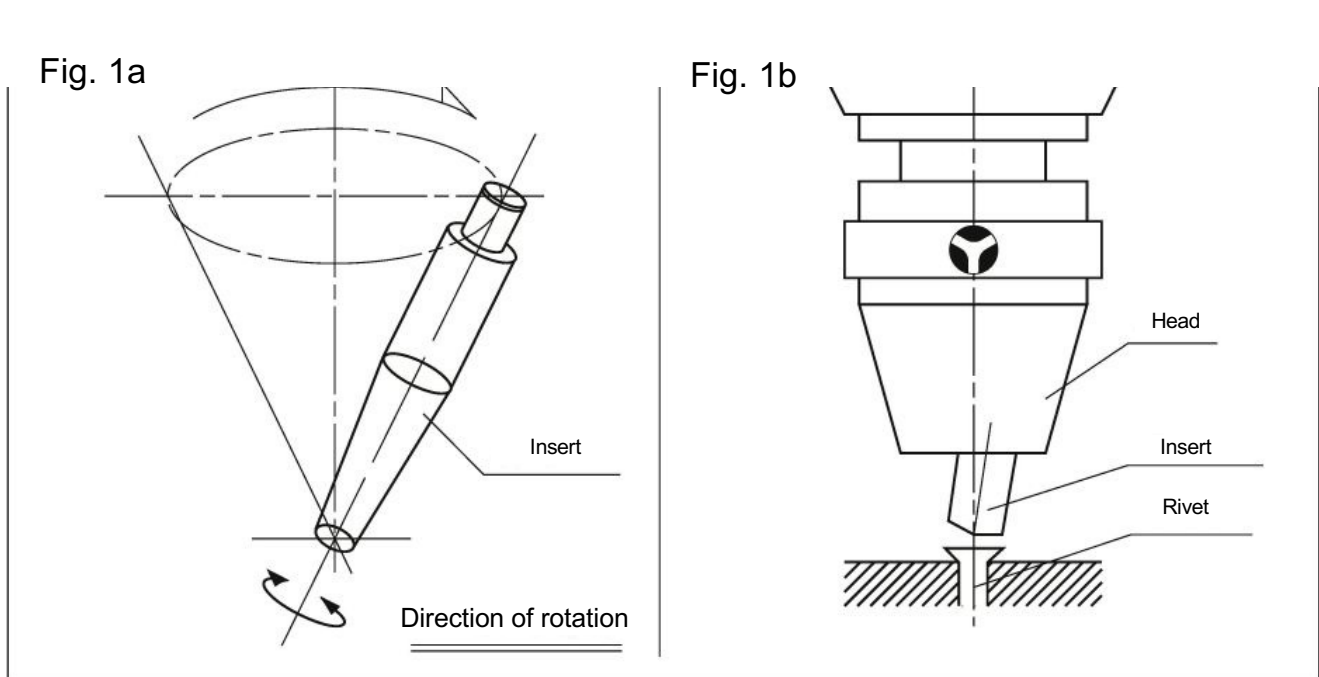
This is an excellent machine that is the result of many years of our experience and research as a professional manufacturer of riveting machines.

This manual describes how to handle it and points to take note of when using the US-66. Improper handling may cause accidents or malfunctions. Therefore, please make sure to read this manual thoroughly before using the riveter and then use the machine as directed.

Please make sure that this manual is handed to and read by anyone who will be using the riveter. Keep the manual handy for easy reference by anyone operating the riveter.

Method of operation

This riveting system has a head with a spindle that rotates at the tip of a special hydraulic cylinder. There is also an insert that can be rotated at an angle with respect to the rotation axis of the head. The insert itself can also rotate freely. So, even if the head continues rotating, the insert can stop regardless of the rotation of the head. See Fig.1b.



Normally, the insert rotates together with the head of the rivet machine. Then, when the insert touches the top edge of a rivet, the insert itself stops rotating and instead it moves around the top surface of the rivet as described next. See Fig. 1a.

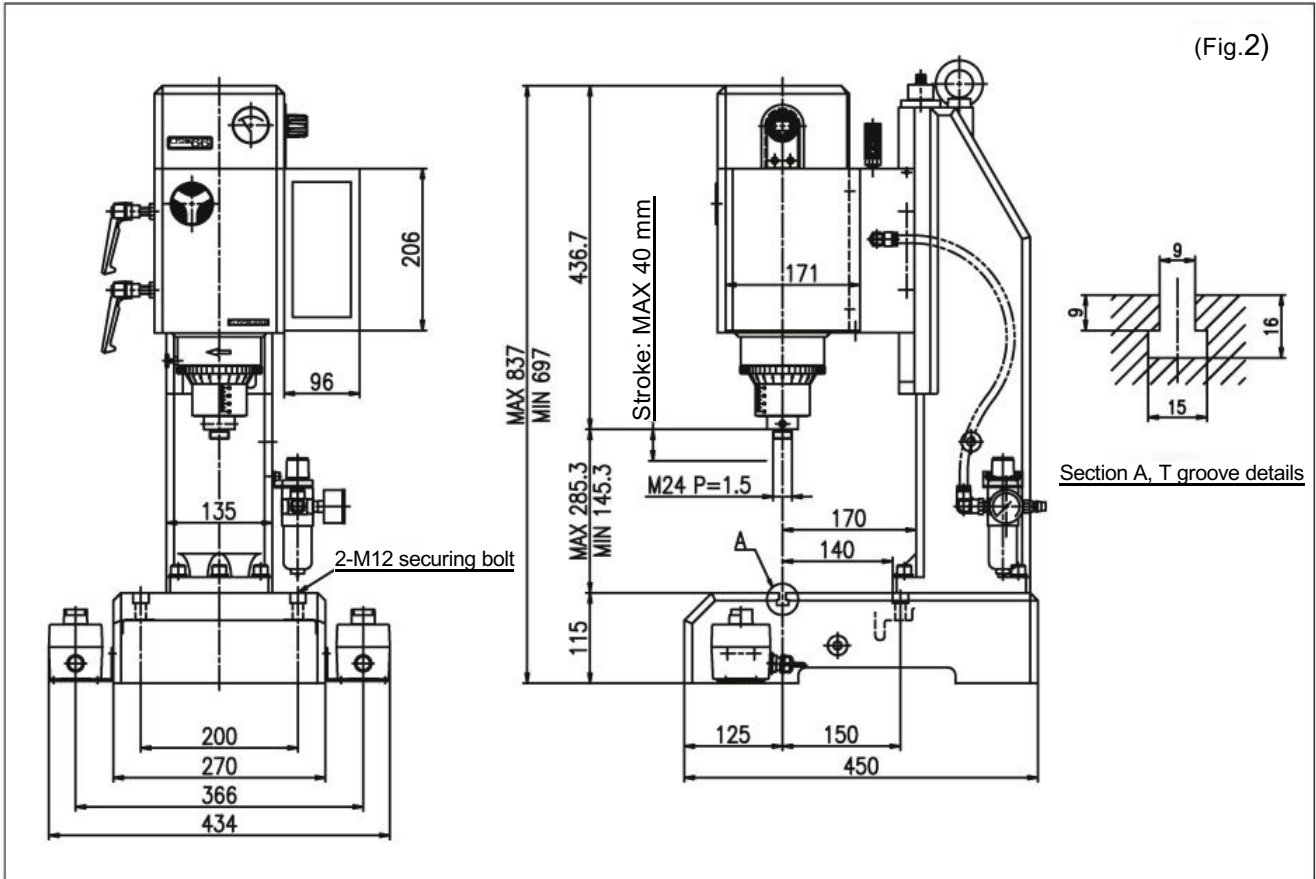
The tip of the insert first contacts a rivet at a point on the outer edge of the top surface of the rivet. Then, its movement describes a circular line as the cylinder descends. Finally, it moves with a length equal to the radius of the rivet head. Based on the principle that the contacting point of the insert tip on the rivet head will move from the edge of the head to the center, the surface can be shaped as desired. The surface shape formed can be flat, cone, pan-shaped, etc., depending on the shape of this contact line.

The deformation of the rivet follows the movement of the contact line between the rivet and the insert, and the rivet head shape will change in microscopic amounts, while simultaneously completing the riveting operation .

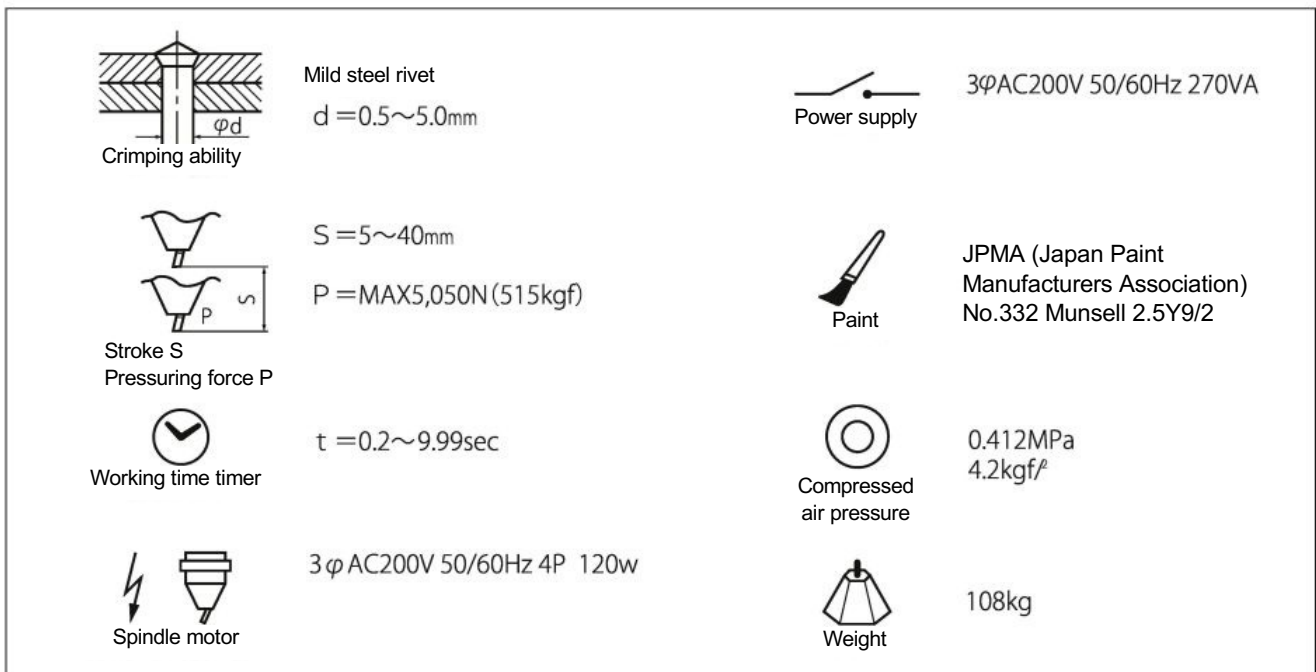


■ Specifications

US-66 outline drawings



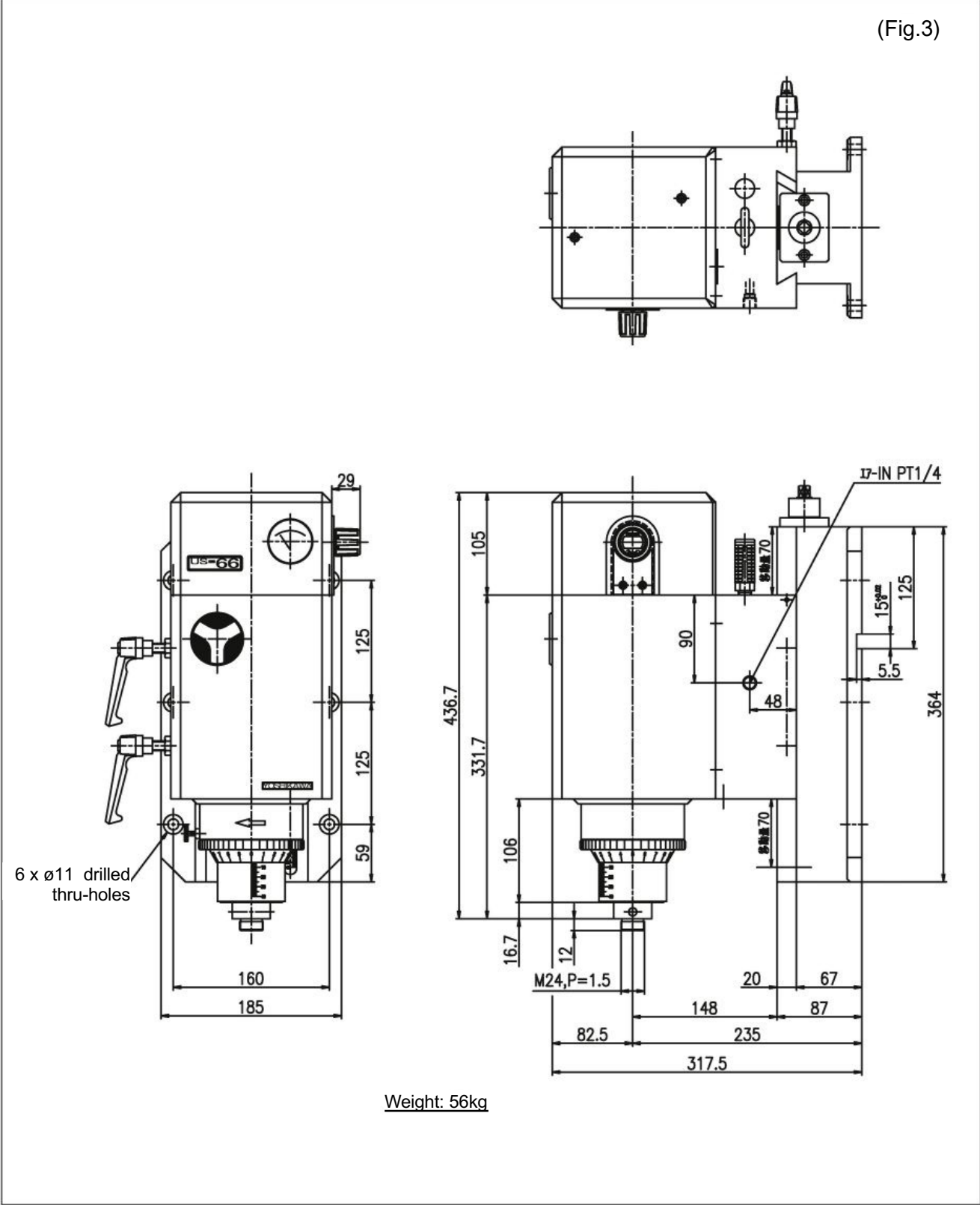
Specifications



◆ The design, dimensions, etc. are subject to change without notice.

■ Specifications

US-66E outline drawings





1. Machine installation and environment

Fig.4.1

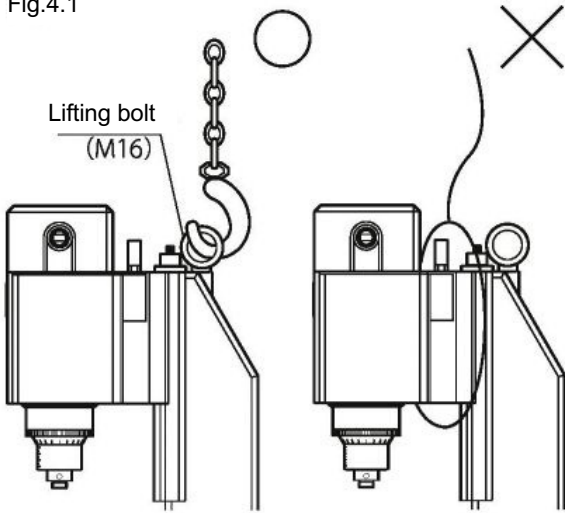


Fig.4.2

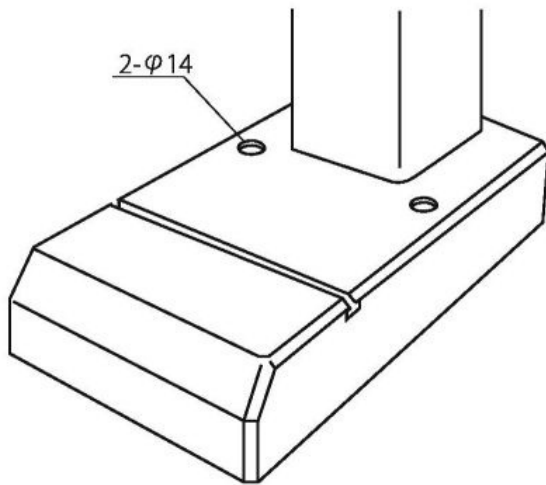
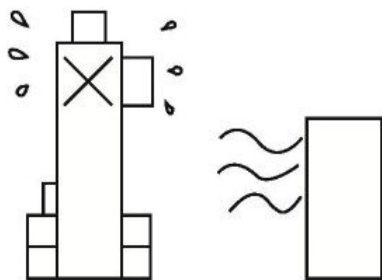


Fig.5



1-1 Mounting and installation

1) Transportation and movement (Fig.4.1)

When transporting or moving the machine, use the lifting bolts (M16) on the machine column, and lift the machine using a lifting equipment having 300kg or more lifting capacity.

US-66 = 108kg, US-66E = 57kg

! DANGER!

- Do not lift the machine using any positions other than those shown.
- If you do not have the necessary equipment and/or facility for transporting or moving the machine, please hire a specialized contractor, or consult us. Never do it the "easy" way. The lifting bolt of the US-66E has allowable load to endure the weight of one cylinder. Do not use this lifting bolt for other purposes after installing the cylinder.

2) Installation (Fig.4.2)

a) Preparation

When installing the machine, prepare the optional dedicated machine stand or the like.

b) Securing

Secure the machine using bolts or the like by put through two anchor holes (Φ12) at the bottom of the machine.

! DANGER!

- If the installation location is uneven or unstable, the machine may topple over due to an earthquake, or other such event.

1-2 Environment (Fig.5)

When using or storing this machine, please make sure the following environmental conditions are met.

Environmental items	Conditions
Ambient temperature	0°C to +50°C
Ambient humidity	90% RH or below (non-condensing)
Storage temperature	-10°C to +50°C
Storage humidity	90% RH or below (non-condensing)
Ambient atmosphere	Indoors (not exposed to direct sunlight) There should be no corrosive or flammable gas present, and very little oil mist or dust in the environment.

! DANGER!

- Never install the machine near an open fire. Doing so may cause a fire in the machine.

Riveting Machine (US-66)

■ Accessories

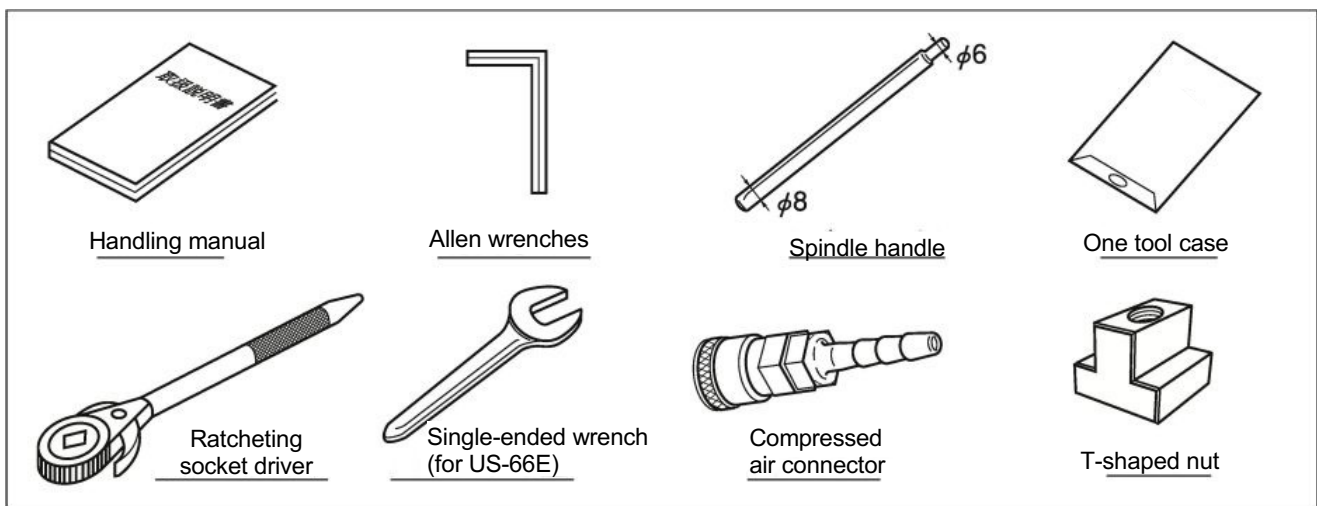
The following tools and equipment are included with this machine. Please check that they were supplied.

◆ If anything is missing, please contact our sales office nearest you.

Accessories for US-66,66E

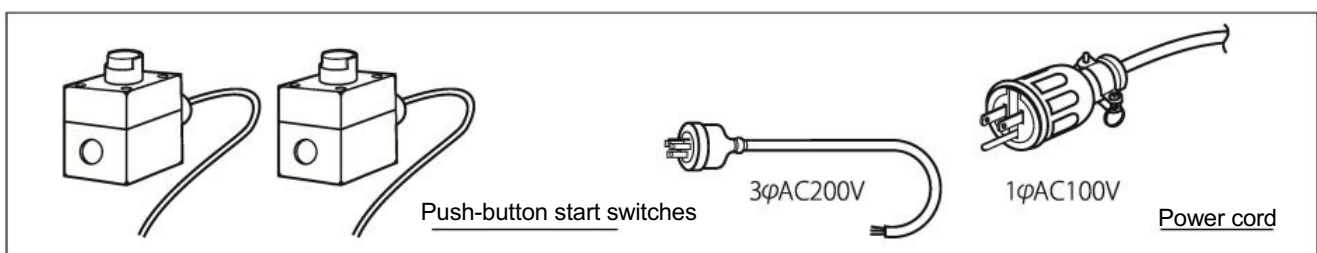
◆ Items stored in the packing case

Handling manual (this book)	1
Allen wrench 3mm	1 each
One spindle handle, $\Phi 8 \times 195\text{mm}$	1
One tool case	1
Single-ended wrench 17 (for US-66E)	1
One ratcheting socket driver, square 10mm connector 171B (66E-type machine only)	1
Coupler plug 20SH	1
T-shaped nut M6	2 pieces (not attached to US-66E)



◆ Items already installed on the machine

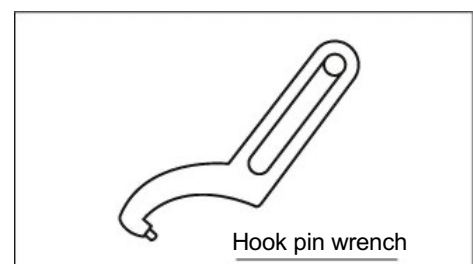
Double push-button switch (with mounting bracket)	2 sets
Power cord	1 set



◆ Accessories for the head

The following accessories are included when you purchase the optional head and insert together with the machine.

Hook pin wrench 1

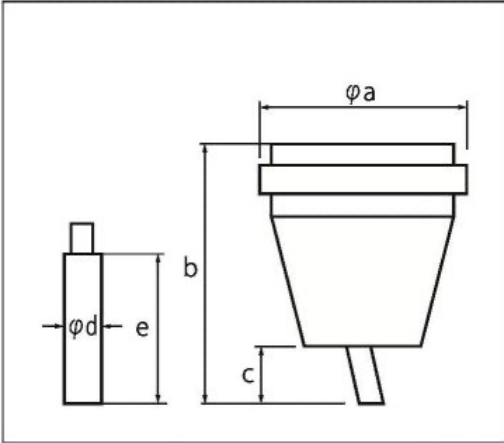




■ Standard head and optional insert

Standard head

Standard head and inserts compatible with US-66 riveter are listed below.



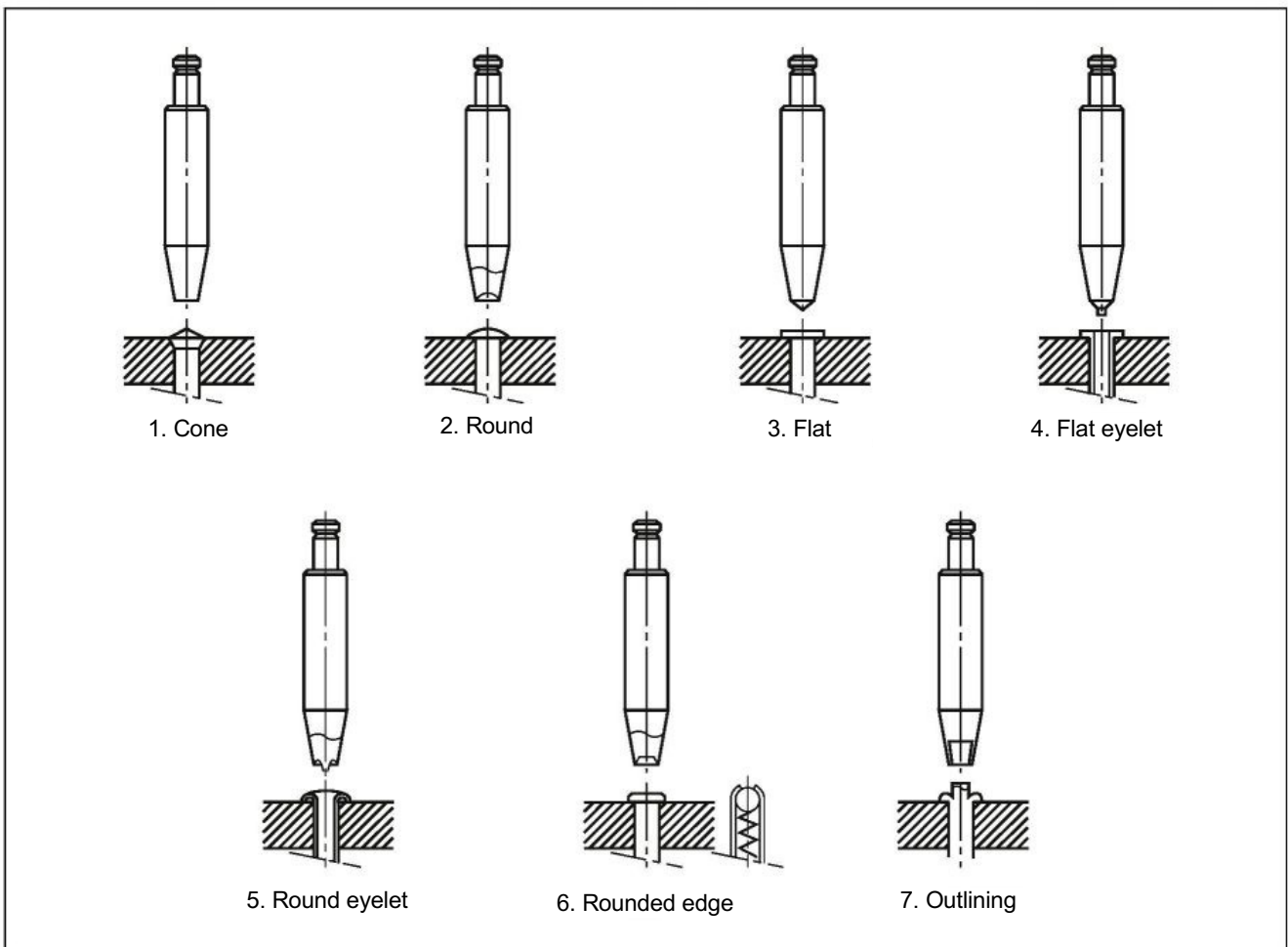
◆ List of standard heads

Head type	ϕa	b	c	ϕd	e
U-8	45	77	20	8	45
U-84	45	92	35	8	59
U-715	56	81	15	15	43
U-725	56	104	38	15	66
U-735	68	138	58	15	101

◆ In addition to the standard heads, we have a variety of heads for different applications, so please contact us.

Insert

The shape of the rivet tips can be broadly divided into the following 7 types. Basic dimensions such as the insert diameter and length are determined by the head. The rivet molding dimensions and materials must be specified in advance.



■ Jigs, tools and operation switches (optional)

In addition to the standard accessories, the riveter US-66 is available with optional accessories depending on your application.

Jigs and tools

Name	Model names and specifications	Quantity
Anvil	∅25x30	1
Anvil base	Only for the US-66 (with M8 washer)	1
T-shaped nut	M8X35, M8 cap nut	2 each
T-shaped nut	Exclusive to US-66 (M8)	2
Grease gun	With M6 mouthpiece, grease pre-filled	1
Working bench A	Model 20301, W800xD580xH700	1
Working bench B	Model 20302, W800xD580xH700 with brake casters	1

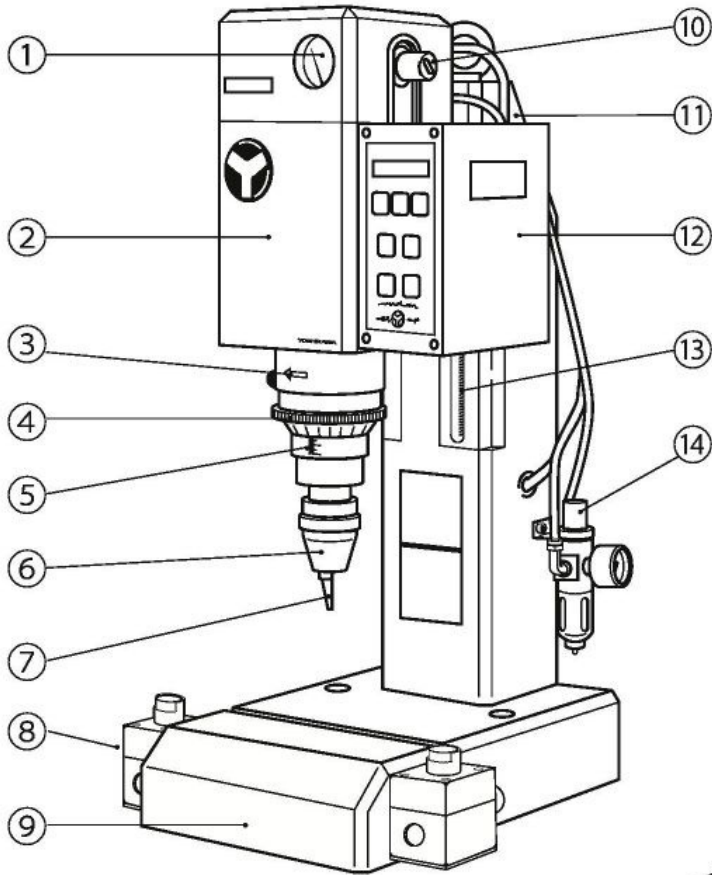
Operation switches

Name	Model names and specifications	Quantity
Emergency stop button	∅30 mushroom push-return type	1
Foot switch *1	With a cover	1

*1: Riveting work controlled by using a foot switch is very dangerous if operated incorrectly. Therefore, at the time of purchase, you need to fill in our request form to make sure you understand the need to instruct the user about secure environmental and work conditions that allow the machine to be used safely.

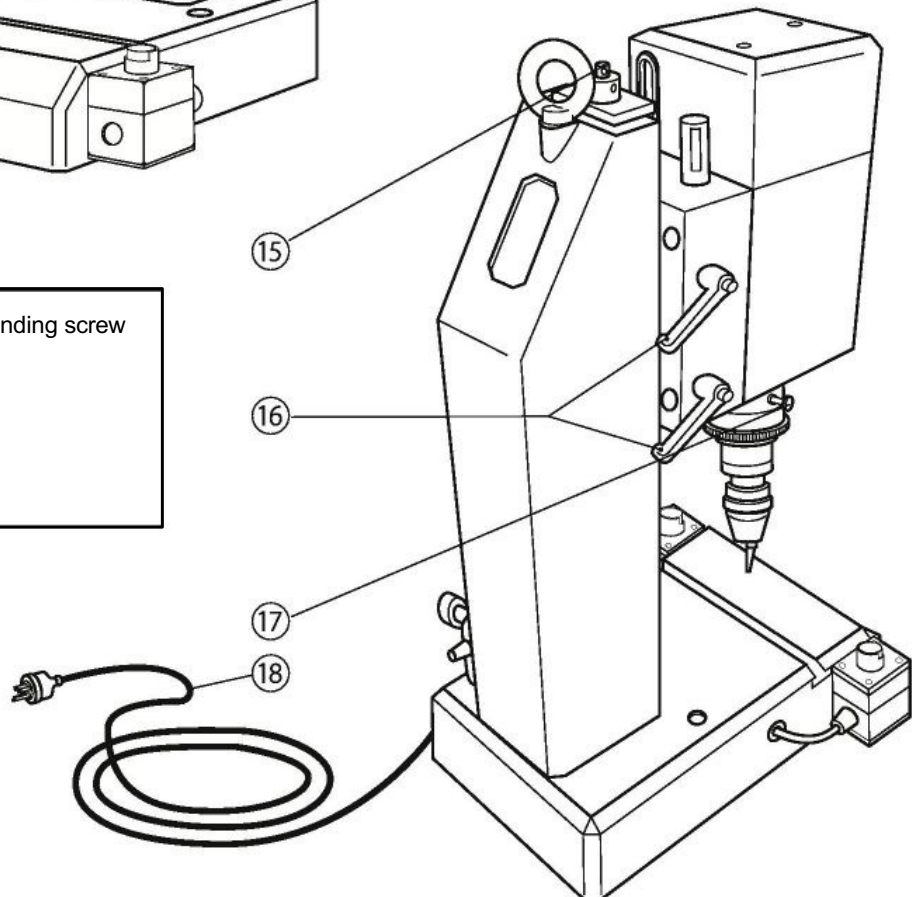


■ Name of each part



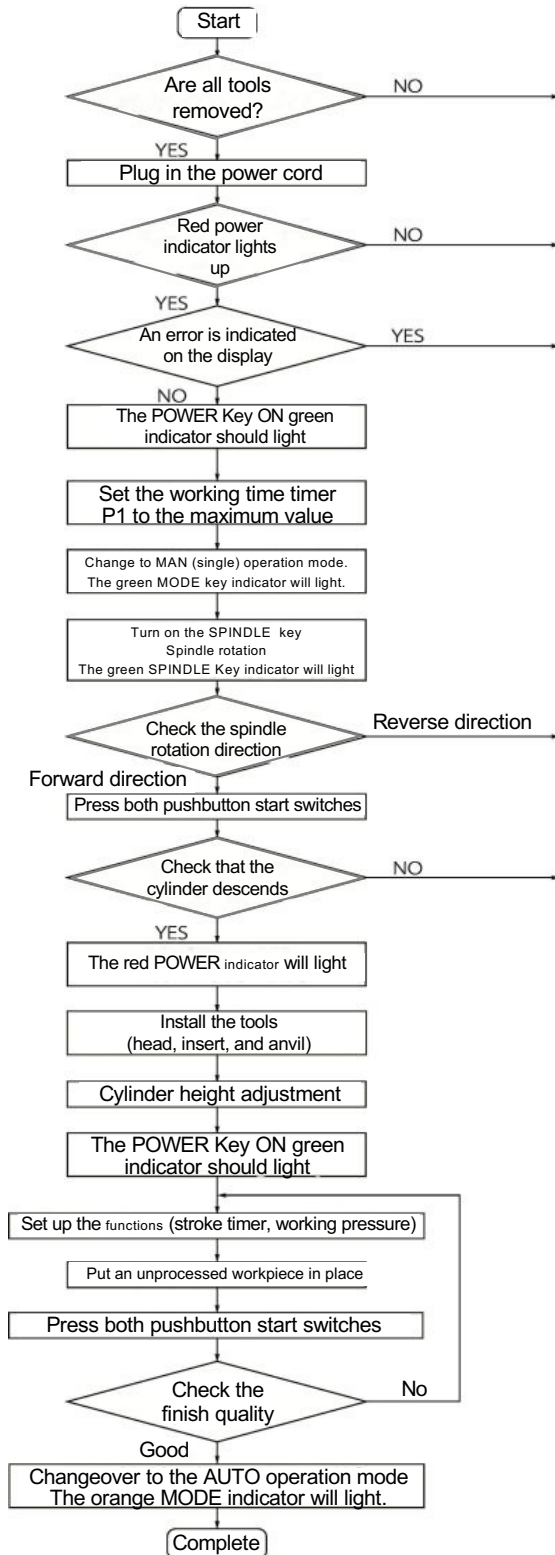
- ① Pressure gauge
- ② Cylinder
- ③ Arrow indication spindle rotation direction
- ④ Stroke adjust ring
- ⑤ Scale (for setting the stroke length)
- ④ Head (optional)
- ⑦ Insert (optional)
- ⑧ Two pushbutton switches
- ⑨ Machine bed
- ⑩ Riveting pressure setting knob
- ⑪ Column
- ⑫ Controller
- ⑬ Cylinder height indicator
- ⑭ Pneumatic assembly consisting of two devices

- ⑮ Cylinder ascending/descending screw
- ⑯ Clamp handle
- ⑰ Stroke adjustment ring
- ⑱ Power cord with plug



2. Preparation for operation

2-1 Work flow




CAUTION!

Make sure that the primary side pneumatic source is connected before starting work.

◆ Remove the tools (head, insert, and anvil) in advance, for safety.

◆ Unplug the power cord and check the primary power supply. Then, plug it in again.

◆ If "Err-***" is displayed, press the  key to initialize the controller.

◆ After turning off the power, pull the power plug out and swap the two phase wires (red and black) in the plug.

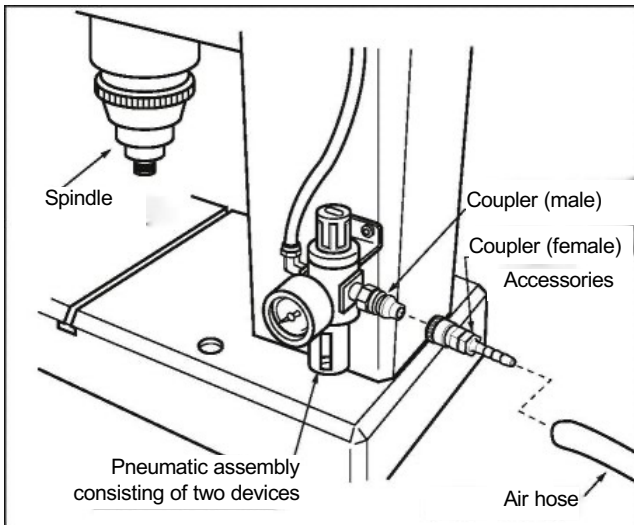
◆ After turning off the power, unplug the power cord and check the start switch connections. Or, check the function settings on the controller.



2-2 Connecting a pneumatic power source

CAUTION!

- Be sure to connect the compressed air line before connecting the power supply.
- Use a dry air supply that does not contain any water (moisture), oil, dust, etc.
The use of inferior quality air may cause a malfunction, hasten deterioration, and damage the machine.



(1) Preparation

The US-66 riveting machine need a stable air source of 0.412Mpa (4.2kgf/cm²). So, install an air hose (ø9 or above) to the installation location of the machine.

(2) Connecting the coupler

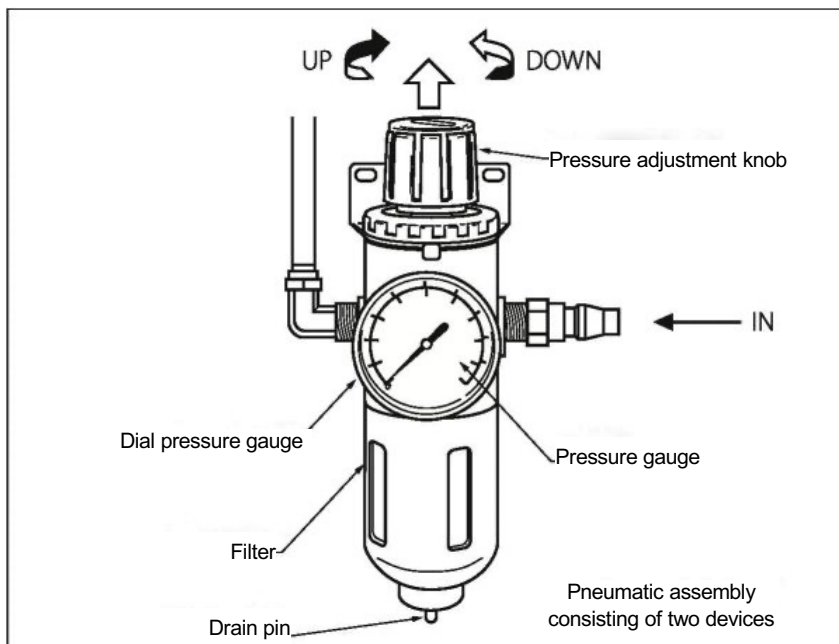
Push the air hose firmly on to the base of the attached connector. Secure it with a metal hose clamp. Then push the air hose connector onto the male connector on the base. Push firmly until it clicks.

(3) Pressure setting (source pressure)

There is no need to readjust the air regulator (reducing valve) as it is already set to 0.412Mpa. But, please check if the indication on the pressure gauge is correct.

If the pressure gauge reads below that value, adjust the pressure reducing valve or check the primary supply pressure.

To adjust the pressure reducing valve, pull up the knob and turn it clockwise to increase the pressure. When the setting is complete, push down the knob to lock it in position.

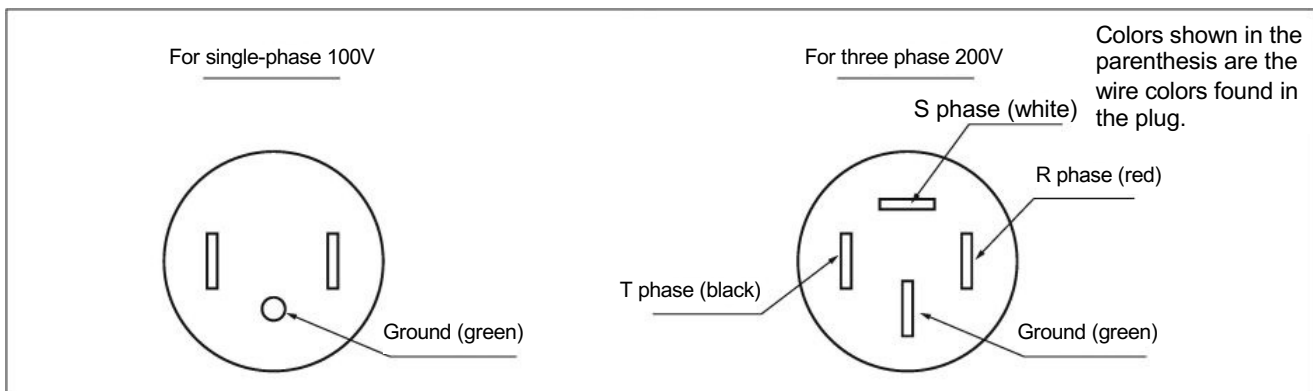


2-3 Power connection


US-66 riveter is equipped a power cord with grounded, 2 pin plug (single-phase 100V) or grounded 4 phase plug (three-phase 200V) according to the power voltage of the machine. Plug the power cord into the main facility power supply where the machine is installed.

 **WARNING!**


 Make sure the power cord plug is securely connected to ground. Otherwise, it may give someone an electric shock or cause a malfunction in the control equipment.



(1) Confirming the power supply

When the primary power is supplied, the  key's OFF red indicator lights up. If it does not light, check the power supply.


(2) Error display

When the power is turned on and [Err-**] appears on the controller display, press the  key. The memory will be initialized and the display will go blank.

The controller cannot be prepared for operation while an error is displayed. Be sure to reset the memory.


2-4 Turning the operation preparation step on and off

(1) Ready for operation

Press the  key on the control panel, the power ON indicator green lights up, and the controller enters the operation preparation. Pressing the same key again, the OFF indicator light will turn on, and the operation preparation will go off.

(2) Confirm the motor rotation direction

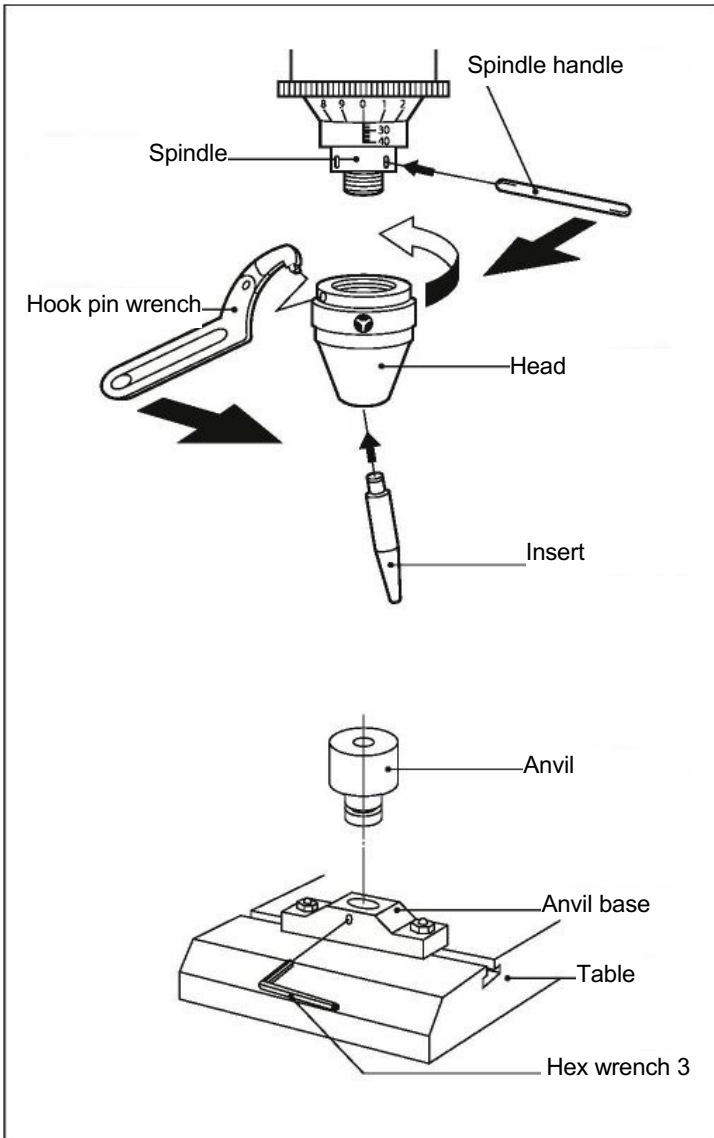
The US-66 spindle motor is wired so that it rotates appropriate direction by inserting the power plugs. However, due to reverse phase of the primary power source of the three phase power source machine, it may rotate reverse direction. In this case, tools and head may be fall off and danger. Be sure to remove the tools and head before turning on the power by firstly inserting the power plug. If they rotate reverse, immediately turn of the preparation operation and unplug the power plug and swap the two-phase wires (red-black) inside the plug.

 **DANGER!**

- When connecting or disconnecting the power cord, hold the plug in your hands. Do not pull on the cord.
Also, never put anything on the cord. It may cause a disconnection or short circuit.



2-5 How to set up the riveting tools



Set up the jigs and tools required for your riveting operation according to the following procedure.

(1) Head

Screw the head onto the threads at the tip of the spindle. Insert the spindle handle into the spindle, as shown in the figure left. Insert the hook pin wrench into the hole on the side of the head and tighten the head with both hands.

(2) Insert

Press the insert into the head, until it clicks into place.

CAUTION!

- Make sure to install the head and inserts securely. If they are not installed correctly, they may fall off during operation.
- The insert may become very hot during riveting work. Therefore, wait for a while after the last operation for it to cool down, before removing the insert. If you touch the hot insert, you may be burned.

(3) Anvil (optional)

Insert an anvil into the anvil base and tighten it by turning the set screws (M6).

Use the optional T-type nuts (M8) to install a dedicated jig.

DANGER!

Be sure to unplug the power cord before attaching jigs or tools to the riveting machine. Installing parts while the power is on is extremely dangerous. You may be seriously injured if the machine starts to operate.

CAUTION!

The anvil and anvil base are optional items, like the head and insert, so you will need to center them the same way as when attaching a dedicated jig. A special tool is required for centering. Please contact our sales office nearest to you if you need one.

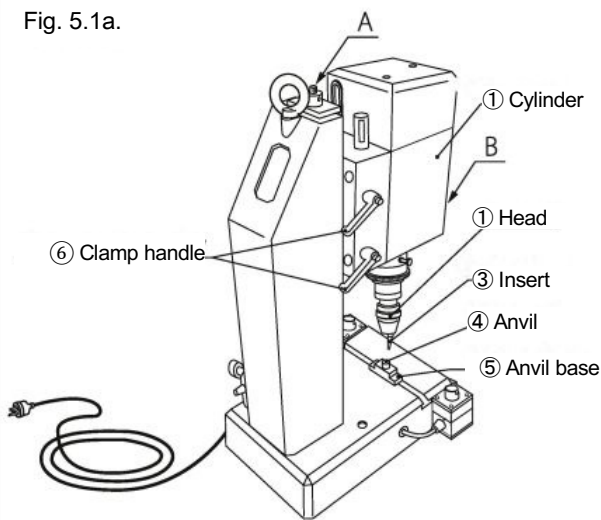
3. Adjustment method

There are three aspects of a riveting operation that have a very large influence on obtaining good results. They are: the Stroke, Pressing force and the Pressing time. Follow the procedure below to adjust each of these elements for proper riveting operation.

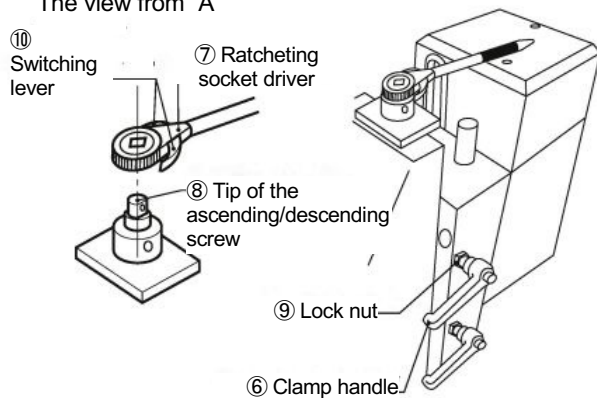
⊘ CAUTION!

Before adjusting the height of the cylinder slide, supply pneumatic air to raise the head, and then turn the controller switch off .

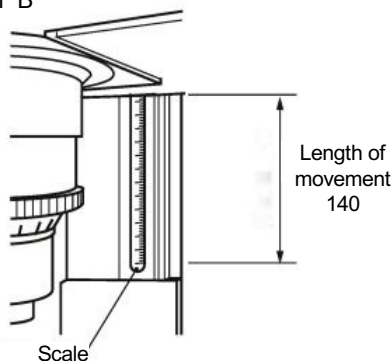
Fig. 5.1a.



The view from "A"



The view from "B"



3-1 Adjusting stroke

(1) Spindle height adjustment (cylinder sliding mechanism)

a. Unclamping the table

First loosen the lock nuts ⑨ on both clamp handles ⑥, and then loosen two clamp handles (upper and lower).

b. Raising/lowering the cylinder

Insert the supplied ratcheting wrench ⑦ to the ascending/descending screw tip ⑧ at the top of the column, turn the wrench clockwise to raise the cylinder, and turn it counterclockwise to lower it. The direction of rotation of the wrench can be changed with the ratchet switching lever ⑩.

c. Adjusting the cylinder height

As a guideline for determining the height, adjust the height of the cylinder between the anvil ④ and the tip of the insert ③, or the tip of the jig and the tip of the insert ③ so that the workpieces to be processed can be easily inserted and removed.

Slide adjusting length = 140mm

However, if the gap is wider than cylinder stroke (40 mm), the riveting process will not be possible.

d. Securing the cylinder slide

Once the cylinder position is determined, tighten both clamp handles ⑥ firmly. Then tighten both lock nuts ⑨ to secure the cylinder.

e. Securing the ascending screw

In order to remove play in the ascending/descending screw, turn the ratchet wrench ⑦ counterclockwise (to the lower side of the cylinder) to lock the screw.

If the machine is used without removing the play, it may cause misalignment due to vibration, etc. Therefore, be sure to remove the free play.

That completes the table height adjustment. However, centering an optional anvil ④ and anvil base ⑤, or a dedicated jig with the head ② and insert ③ must be done before adjusting the cylinder stroke.



(2) Adjusting the cylinder stroke (see Fig.5.1b)

⊘ CAUTION!

- When adjusting the stroke, be sure compressed air is supplied and raise the spindle.

a. Unlocking the adjustment ring

Loosen the set screw ①. Then, you will be able to rotate the adjustment ring.

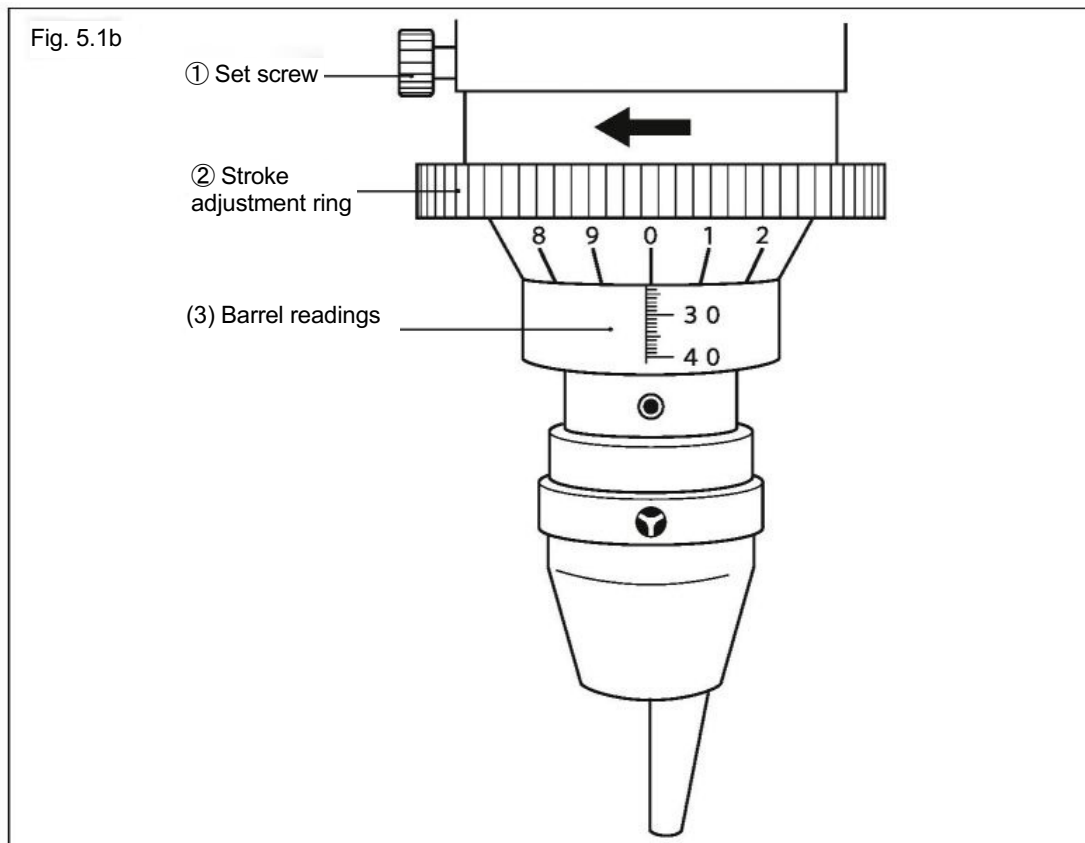
b. Stroke adjustment

Adjust the stroke by turning the stroke adjustment ring ② left and right.

Turning the ring to the left will make the stroke longer and turning it to the right will shorten the stroke. One turn of the ring makes the stroke 2mm up and down. The stroke can be read on the following two scales: The stroke indicator on the scale barrel ③ displays from 5 to 40mm, 1 tick mark = 1 mm. The scale division around the ring displays fine stroke measurements, 1 tick mark = 0.1 mm.

c. Locking the adjustment ring

After adjusting the stroke, be sure to tighten the adjustment ring set screw, to secure it.



(3) Precautions when adjusting the stroke

- ◆ Adjust the stroke starting from the top of the scale (5mm or around) and then lengthen it gradually. That is because, if a riveting operation is tried in the machine without a workpiece present, and it is set to a long stroke, any insert, anvil, or similar item may be damaged.
- ◆ The US-66 riveter cannot adjust stroke between 0 to 5 mm for its structural reason. Therefore, make sure its minimum stroke is 5 mm.

3-2 Riveting pressure adjustment

The working pressure while riveting has a great effect on the finish of the workpieces to be processed and the processing time for the workpieces. Therefore, adjust the pressure as follows.

⊘ CAUTION!

The supply pressure of the US-66 riveter is max.0.412MPa (4.2kgf/cm²). Properly set the supply pressure with referring to the pneumatic assemble consisting of two devices. Using the machine with an excessively high supply pressure can damage the machine.

(1) Work pressure adjustment

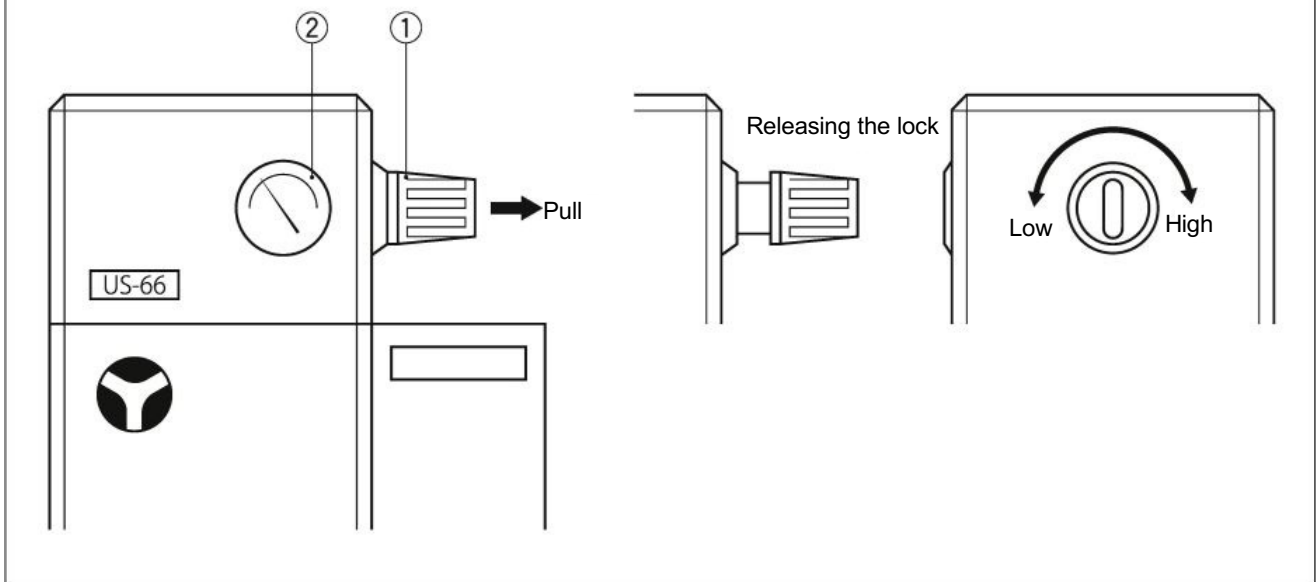
The working pressure refers to pressure used to process workpieces while riveting. It must be adjusted according to workpieces to be processed.

a. How to adjust work pressure

As shown in Fig. 5-2a, pull the pressure adjustment knob ① on the side of the cylinder unlocks the knob and allows adjustment. Turn the knob clockwise to raise working pressure, or counterclockwise to reduce the working pressure. The actual working pressure is indicated on the circular pressure gauge ② on the front.

Even if the working pressure is reduced, the return movement (speed) of the head will not be affected. Also, even if the adjustment knob is turned to the right end (high pressure), the working pressure will not be higher than the pressure set by the pneumatic assembly consisting of two devices.

Fig. 5-2a.



b. Mechanical thrust

In order to find the thrust of the cylinder at the current working pressure setting, refer to the [Thrust - working pressure diagram] described later.



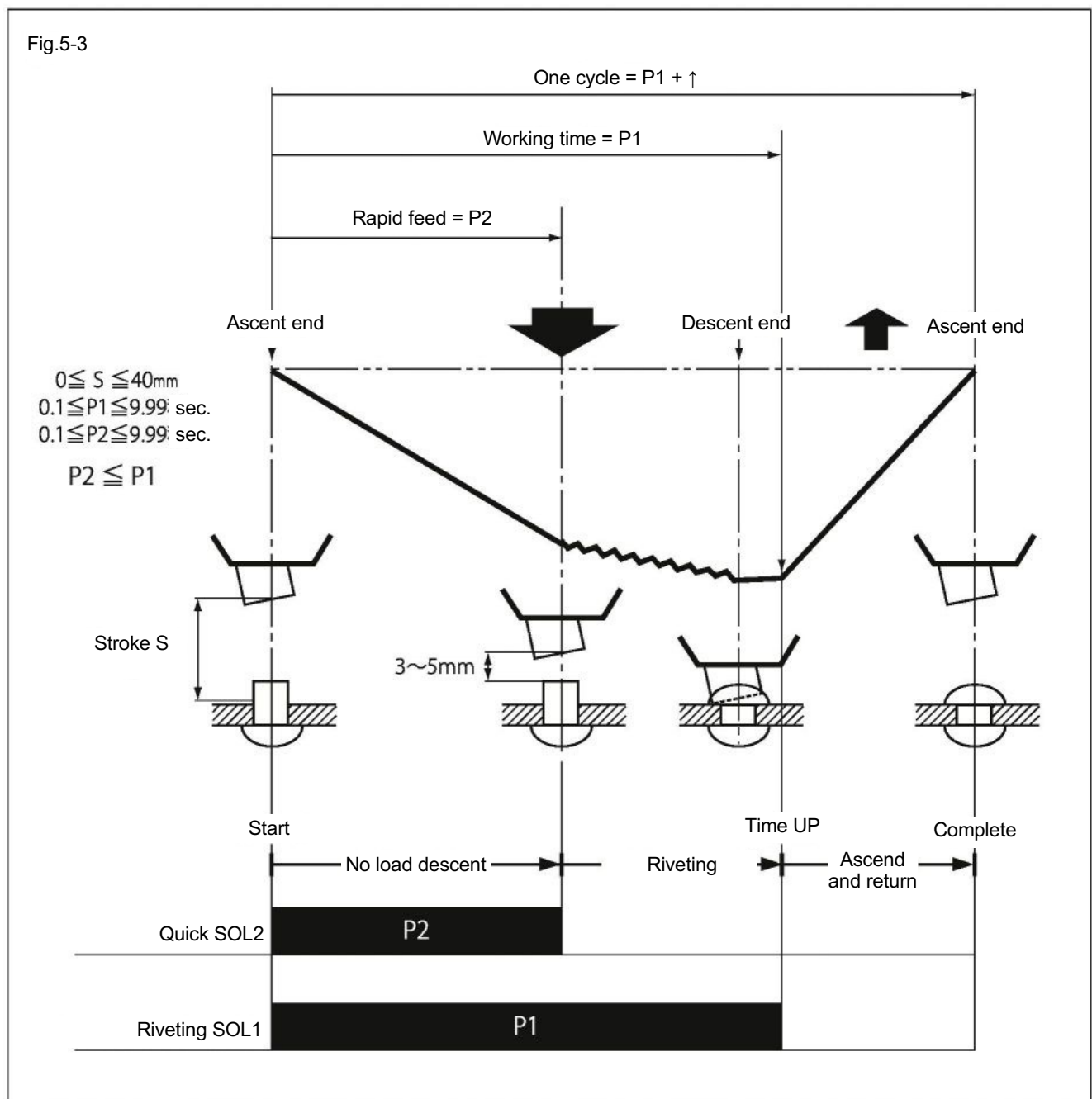
3-3 Riveting timer adjustment

The time required for processing by the riveting machine varies, depending on the material and shape of the rivets (workpieces), the cylinder stroke, and the pressure. Determine an appropriate work time by actually processing some workpieces.

(1) Timer setting

As features of the US-66 riveter, it has quick timer (P2) to set the rapid traverse time from start to contact with the workpiece, and the work timer (P1) that sets the processing time.

The relationship between each timer and riveting process is shown in the Fig. 5-3 below For how to set the timer, see "3-2 Parameter Settings" of the Riveting Controller YC301 Operation Manual.



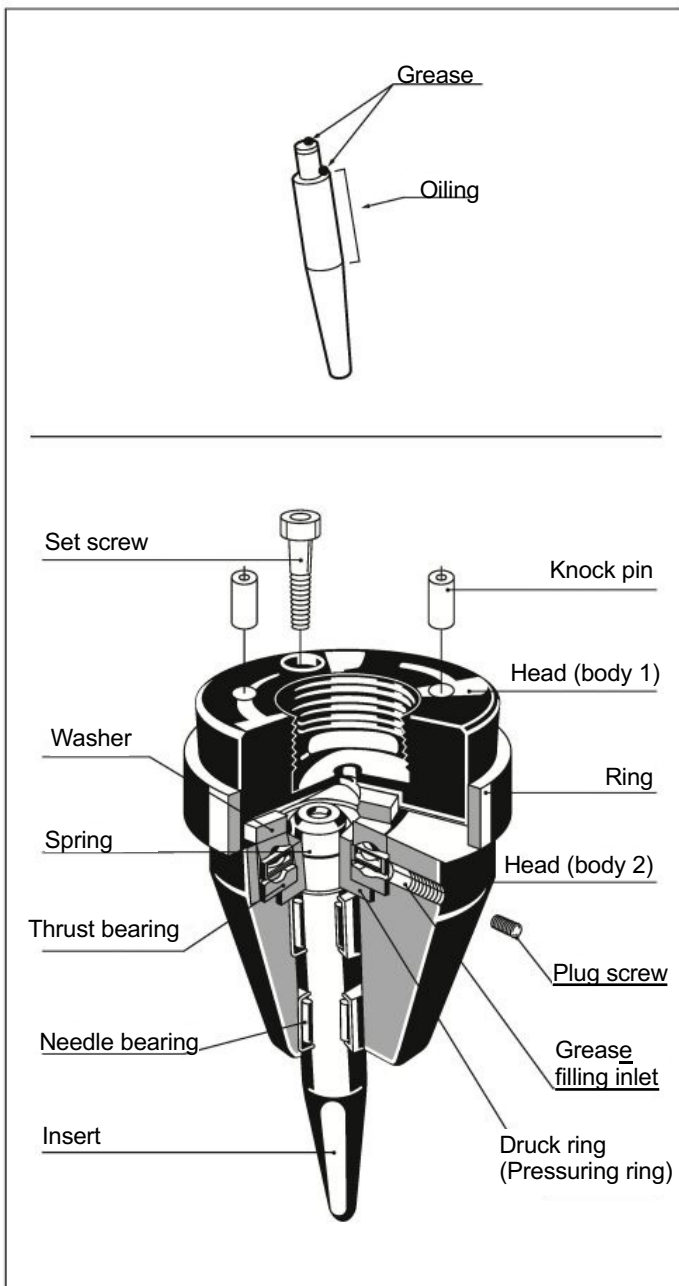
■ Head maintenance tasks

There is a bearing inside the head to receive the insert when it is installed. If the lubricating oil inside the head runs out or if the bearing wears out, the appropriate level of finish cannot be obtained.

In order to keep the finish routinely good, make sure to perform maintenance, such as lubricating, regularly.

DANGER!

During maintenance work, it is very dangerous if the machine were to start by mistake. Make sure to unplug the power cord before starting maintenance.



◆ Refilling the lubricating oil

Lubricate the head once a week (approximately 50 hours) as a guideline.

There are two types of oil to apply.

Grease: Lithium grease (Albania 2)

Lubricating oil: Class 3 petroleum lubrication oil

Apply a small amount (0.2cc) of grease to the tip of the insert. If too much is applied, the insert rotation will be poor, and if small diameter rivets (5mm or smaller) are being used, the finish of the workpieces may be adversely affected.

For processing small rivets with diameter 5mm less, apply lubricating oil to the entire part of the insert.

◆ About replacement parts

All parts used in the head are consumables. They should be replaced periodically depending on the head use conditions. In addition, genuine parts and special tools are required to replace parts, so please contact our sales office nearest to you.

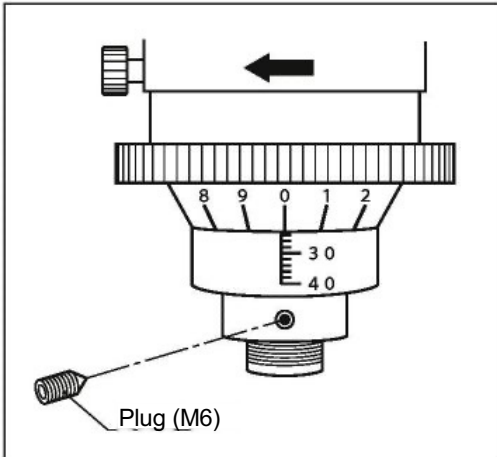


Machine maintenance tasks

In order to maintain good performance of the riveting machine for a long time, be sure to observe the following.

DANGER!

It is very dangerous if the machine starts running by mistake while performing maintenance work on the machine. Make sure to unplug the power cord before starting maintenance.



(1) Spindle lubrication

Depending on how often you use the machine, lubricate the spindle every 6 months (approx. 1,500 hours) as a guideline.

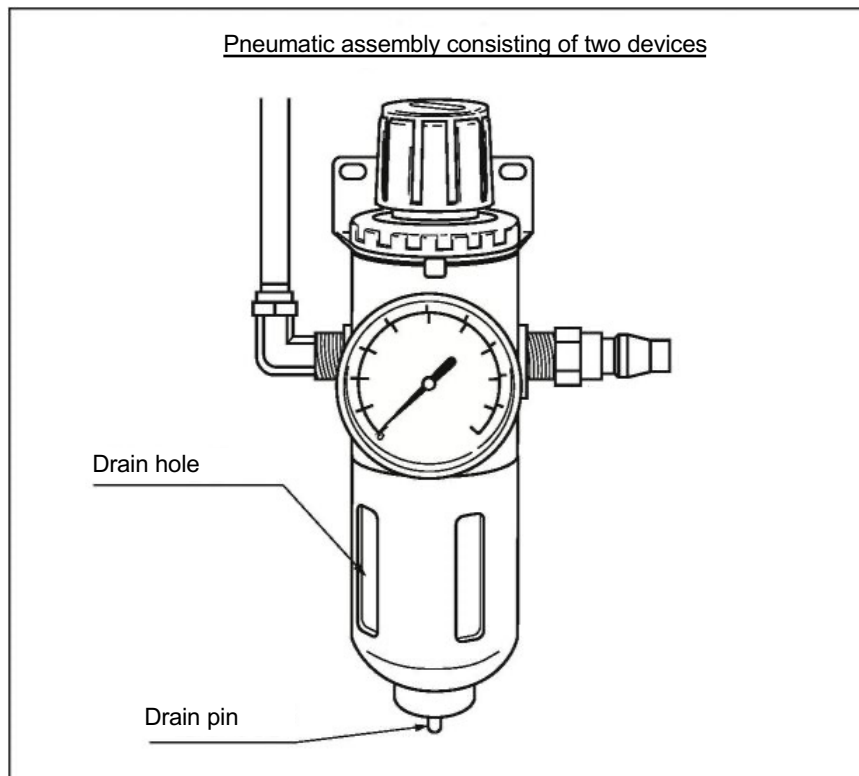
◆ Lubrication procedure

As shown in the figure on the right, there is a lubrication port at the bottom of the spindle. Remove the plug and screw in the tip of the grease gun. The amount of lubrication is appropriate with one stroke of grease gun handle.

Grease: Lithium-based grease (Albania 2)

(2) Air filter cleaning

The air filter of the pneumatic assembly consisting of two devices removes dust from the compressed air supplied and at the same time separates moisture and accumulates in the filter. Pay attention to the water level in the filter. Push the drain pin at the bottom of the filter up with your finger to drain the water.



■ Daily checks

To maintain a good riveting finish and detect machine abnormalities early, make sure to perform the following inspections before starting work each day.

◆ Work to be done before turning on the power		
Section to inspect	Inspection work	Notes:
Head	Rotate the insert with your finger, checking that it rotates smoothly.	If the rotation is difficult or the insert is stuck, clean the inside of the head. The bearing may have reached the end of its life.
Insert	Check that there is no powder from the riveting operations stuck on the tip of the insert.	If it cannot be wiped off with a cloth, etc., it will be necessary to reshape the tip. <u>Never scrape the tip using a file or the like.</u>
Pneumatic assembly consisting of two devices	Check whether the air supply pressure is appropriate by referring to the pressure gauge.	If water accumulates frequently, it is recommended that you install a dryer at the air supply source.
Working pressure	Check the pressure setting displayed on the pressure gauge.	/

■ Troubleshooting page

Machine problem	Causes		Response	
The operation preparation does not turn on.	POWER OFF red LED indicator	Goes off	1. There is no primary power	Check facility's power supply
			2. The power plug is not connected.	Check the power cord
			3. The fuse is blown.	Replace the fuse
	Lights	1. An error appears on the display.	See the attached error display list *2	
2. Malfunction of control equipment		Contact us		
Head does not rotate	1. Spindle switch is off.		Switch it on.	
	2. Operating on a single-phase power supply		Provide a three-phase power supply	
	3. Motor failure or broken joint in the cylinder		Replace or repair	
Cylinder does not rise when the power is turned on	1. Supply air pressure is too low		Adjust the pressure	
	2. Defective solenoid valve		Replace or repair	
	3. Defective quick exhaust valve		Replace or repair	
Riveting cylinder does not descend	1. Working pressure is set too low		Adjust the pressure	
	2. Working timer is set too short		Set the work timer	
	3. Defective solenoid valve		Replace or repair	
	4. Defective reducing valve		Replace or repair	
	5. Defective quick exhaust valve		Replace or repair	
	6. Packing failure in cylinder		Replace or repair	
Head stops rotating when riveting	1. Defective bearing inside the head		Replace or repair	
	2. Defective spindle bearing		Replace or repair	
	3. Operating on a single-phase power supply		Provide a three-phase power supply	
Poor riveting				
Uneven finish quality	1. Looseness of stroke adjustment screw and cylinder clamp		Check the lock screw nut	
	2. The anvil or jig does not match the rivet shape.		Review jigs, etc.	
Burrs are seen	1. Cylinder stroke is too low		Adjust the stroke	
	2. The shape of the insert tip is not appropriate.		Check the insert	
	3. The rivets in the workpieces are not sufficiently tight		Check if the rivets are appropriate for the machine's settings.	
	4. The riveting center is misaligned.		Center all the devices	
The head of the rivet is torn or damaged.	1. There is cut powder on the insert tip.		Clean and/or repair the tip	
	2. Too much grease in the head		Clean and then apply the appropriate amount of grease	
	3. Defective bearing inside the head		Check and replace the bearing if necessary	
Not caulked	1. Low working pressure		Increase the working pressure	
	2. Defective bearing inside the head		Check and replace the bearing if necessary	
	3. Rivet co-rotation		Improve the anvil and/or jig	
	4. Rivet material is too hard		Insufficient machine capacity	

◆ For details about making adjustments, refer to the corresponding item in this manual.

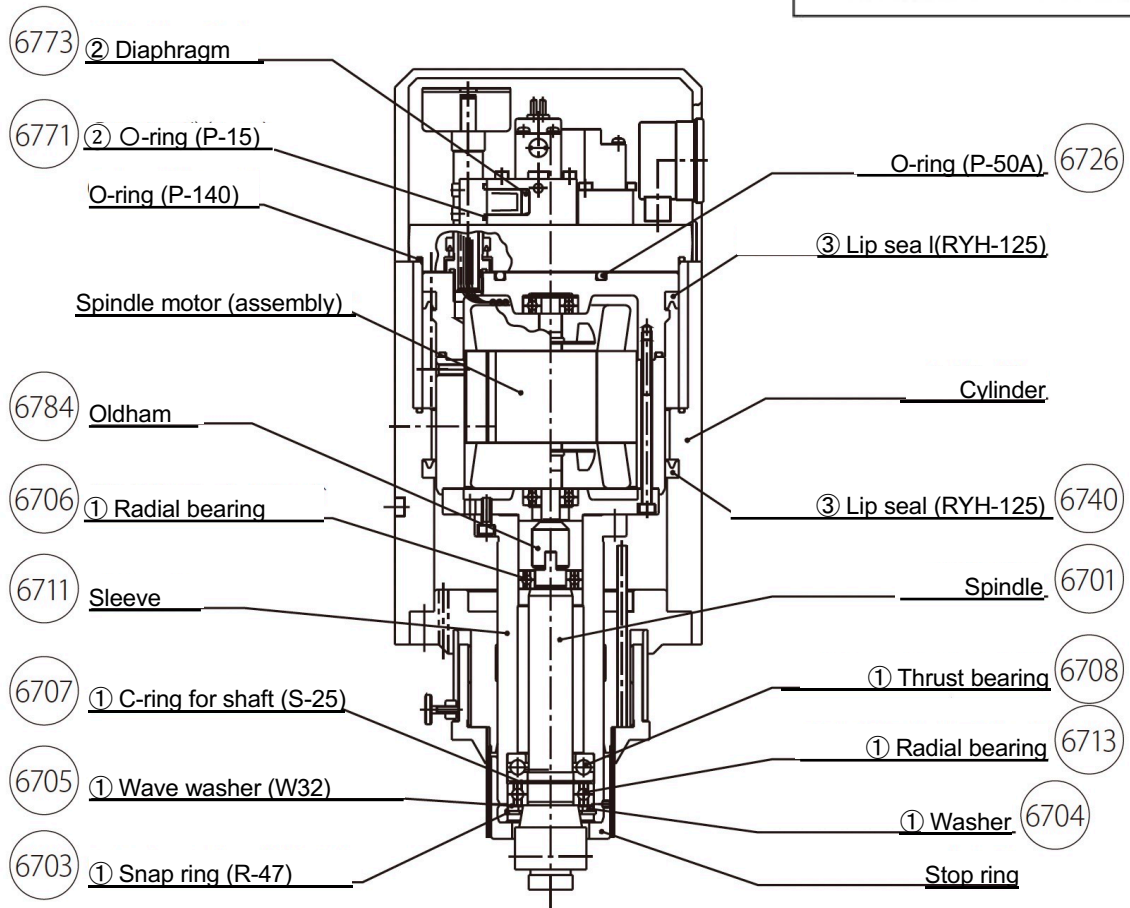
*2: Please check "3-2 Error display list" of "Riveting controller-YC301 operation manual".

■ Cylinder cross-section 1

Part numbers inside a circle are consumables and need to be replaced periodically. For inquiries about replacement work and replacement parts, please contact our sales office nearest you.


CAUTION!

- Do not disassemble or modify the cylinder as it may cause an accident or a malfunction.



* Parts ①, ② and ③ below must be replaced as a set.

① Bearing maintenance kit

Part number	Part names	Model names and specifications	Quantity
6703	Snap ring	R-47	1
6704	Washer		
6705	Wave lock washer	W32	
6706	Radial bearing	6005DDU	
6707	C-ring for shaft	S-25	
6708	Thrust bearing	51205 (Special)	
6713	Radial bearing	6003DDU	

② Quick exhaust valve maintenance set

Part number	Part names	Model names and specifications	Quantity
6758	O-ring	P-9	3
6768	Exhaust side valve seat		1
6769	Quick exhaust valve (body)		1
6771	O-Ring	P-15	1
6773	Diaphragm		1
	Assy's mounting C,B	M4x30	2

③ Cylinder seal maintenance set

Part number	Part names	Model names and specifications	Quantity
6726, 6740	Lip seal	RYH-125	2
6749, 6752	O-ring	G-140	2
6758	O-rRing	P-9	2
6764	Lip seal	GLY-16	1

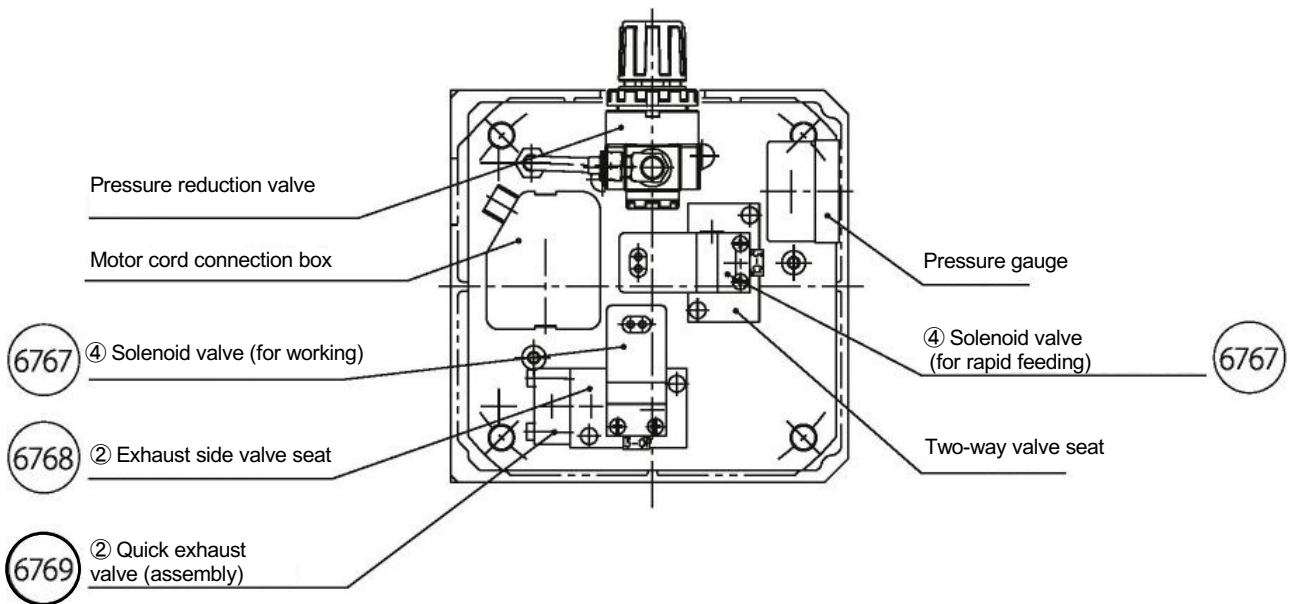


■ Cylinder cross-section 2

Part numbers inside a circle are consumables and need to be replaced periodically. For inquiries about replacement work and replacement parts, please contact our sales office nearest you.

⊘ CAUTION!

- Do not disassemble or modify the cylinder as it may cause an accident or a malfunction.



* Parts below ② and ④ shall be replaced as a kit.

② Quick exhaust valve maintenance set

Part number	Part names	Model names and specifications	Quantity
6758	O-ring	P-9	3
6768	Exhaust side valve seat		1
6769	Quick exhaust valve (body)		1
6771	O-Ring	P-15	1
6773	Diaphragm		1
	Assembly mounting C,B	M4x30	2

④ Valve maintenance set

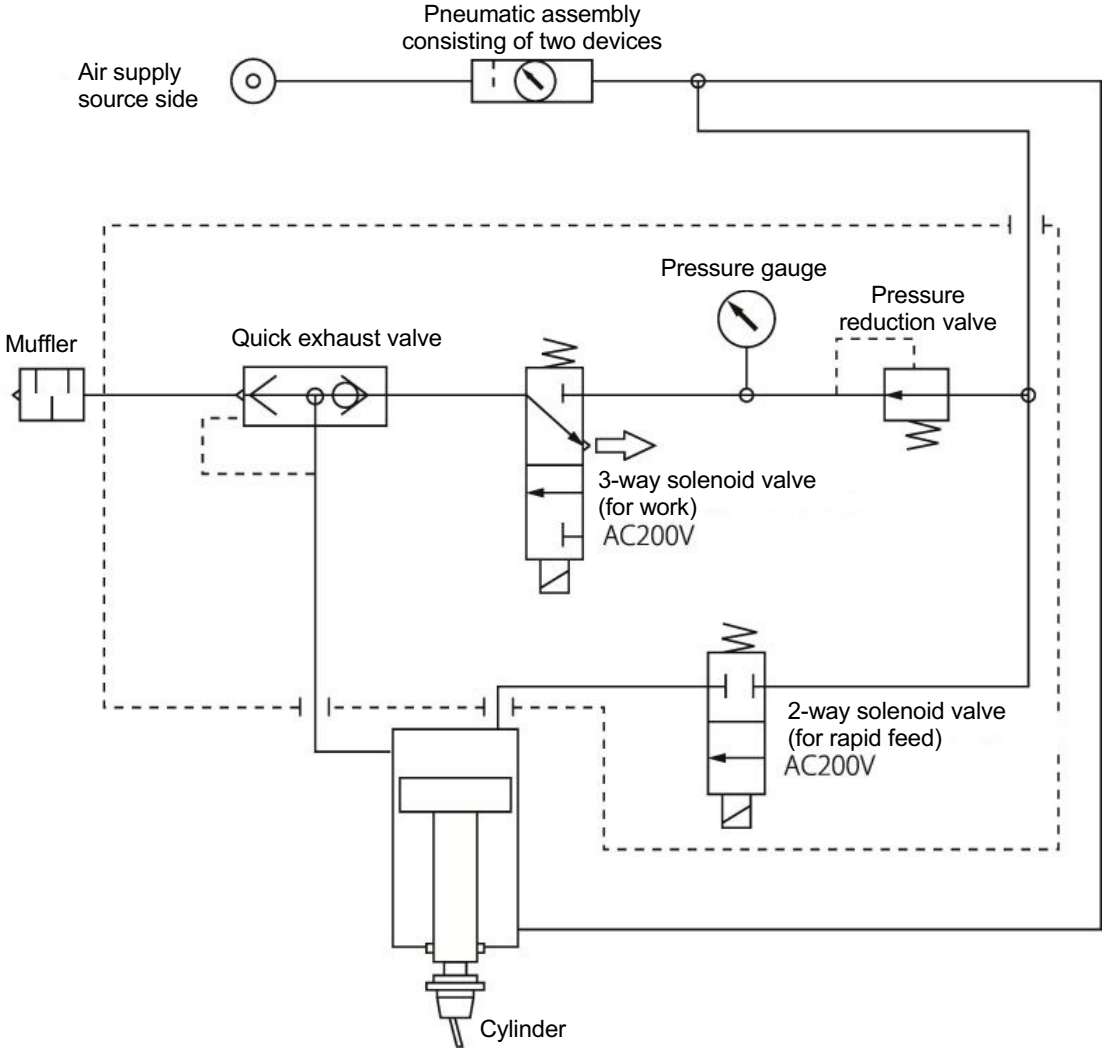
Part number	Part names	Model names and specifications	Quantity
6767	Solenoid valve	For working and rapid feeding	2

■ Hydraulic circuit diagram

Reference: Air consumption when using 0.41Mpa of air pressure

Stroke mm	Number of workpieces per minute	Air consumption NL/minutes
40	10	25.9
30	10	19.4
20	20	25.9
10	20	12.9

US-66 Hydraulic circuit diagram





■ Thrust vs operating pressure curve

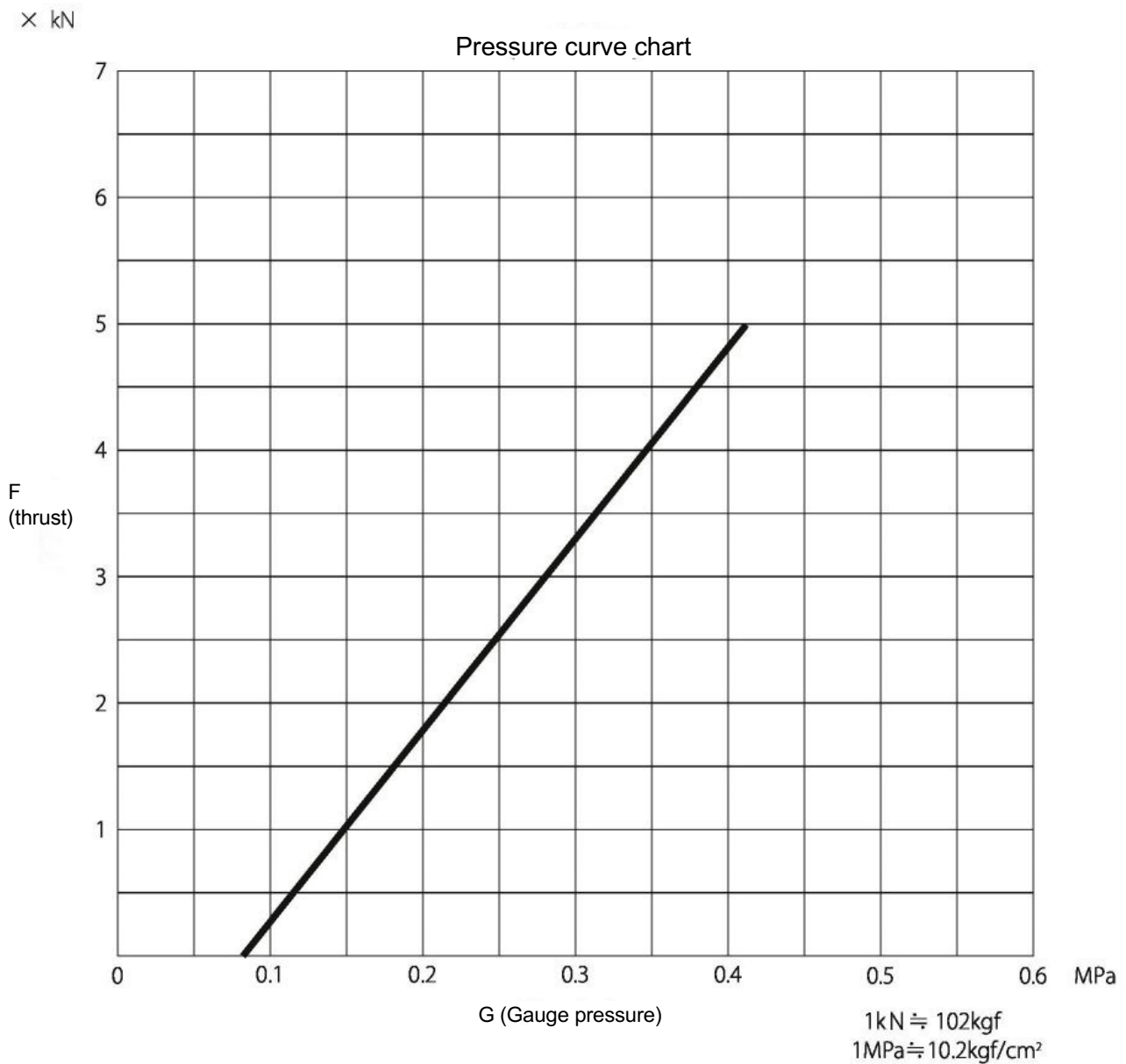


Table of thrust data by rivet material

Unit x kN

Rivet diameter mm	0.5	1.0	2.0	3.0	4.0	5.0	6.0		
Material									
Soft steel	0.8	1.0	2.0	3.0	4.0	5.0	—	—	—
Stainless steel	1.0	2.0	3.0	4.0	5.0	—	—	—	—
Brass	0.7	0.8	1.8	2.5	3.5	4.0	5.0	—	—

Remarks: The above data is for reference with the condition of insert shape = flat type, rivet = solid, caulking margin = rivet diameter x 1/3. The actual working pressure needs to be adjusted each time.

■ Memo



■ Memo





YOSHIKAWA IRON WORKS CO., LTD.

Headquarters & workshop: 3-7, Shitomiya Honmachi, Shijonawate City, Osaka
TEL: (072)876-5151 FAX: 072-878-3329

Tokyo Sales Office: 4-12, 4 Chome, Okudo, Katsushika Ward, Tokyo
TEL: (03)3694-1631 FAX: 03-3696-6090

Nagoya Sales Office: 1806, 1 Chome Takenoyama, Nisshin City, Aichi
TEL: (0561)75-6660~5 FAX: 0561-74-2332