

Shock sensor for Robot Welding Torch for Robot Coaxial Power Cable for Robot



For CO₂/MAG



RTWH5000H

Instruction Manual

= Safety and Operation =

Instruction Manual No.
1L11402-E-3

Thoroughly read this instruction manual to operate the units correctly.

- Installation, maintenance, and repair of this welding torch shall be made by qualified persons or persons who fully understand welding machines to secure the safety.
- To secure the safety, operation of this welding torch shall be made by persons who have knowledge and technical skill to fully understand the contents of this manual and handle the machine.
- Regarding safety education, utilize courses and classes held by head/branch offices of the Welding Society /Association and the related societies/associations, and qualifying examinations for welding experts/consultant engineers.
- After thoroughly reading this manual, be sure to retain it with the warranty in the place where the persons concerned can read any time. Read it again as occasion demands.
- If incomprehensible, contact our offices. For servicing, contact our local distributor or sales representatives in your country.
Our addresses and telephone numbers are listed in the back cover of this Instruction Manual.




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NOTES ON SAFETY

1. Notes on Safety


- Before operating this product, thoroughly read this instruction manual first to operate the product correctly.
- Cautions described in this instruction manual are to prevent you and other people from being injured or damaged by having the product operated correctly and safely.
- Although this product is designed and manufactured in due consideration of safety, carefully follow the notes and cautions described in this manual. Otherwise, there may occur an accident causing serious injury or death.
- Various ranks of accidents resulting in injury, damage, or death may occur if mishandling the product. The caution alert symbols and signals are classified into three ranks as below, used throughout these instruction manual as well as warning labels put on each unit and device.

Symbol	Signal	Description
	DANGER	Mishandling may cause seriously dangerous situation that could result in serious injury or death to personnel. Limited situation of great urgency.
	WARNING	Mishandling may cause a dangerous situation that could cause serious injury or death to personnel.
	CAUTION	Mishandling may cause a dangerous situation that could cause medium or slight injury to personnel, or material damage.

Hazards and special instructions described by  **CAUTION** are very important as well. Neglect of them may occasionally cause serious injury or death to personnel. Therefore, be sure to follow the instructions described by all three safety alert symbols and signal words.

The meanings of "serious injury", "medium or slight injury", and "material damage" are as follows.

- Serious injury : Injury with a sequela due to a loss of eyesight, injury, burn (high temperature and low temperature), electric shock, a bone fracture, poisoning and so on as well as injury that requires hospital treatment or long treatment as an outpatient.
- Medium or slight injury : Injury, burn, electric shock and so on that require no hospital treatment nor long treatment as an outpatient.
- Material damage : Damage to property, and direct and incidental / consequential damage due to the damage to devices.

Ref.:  **IMPORTANT** : The sign "IMPORTANT" indicates special instructions necessary for the most efficient operation.

IMPORTANT SAFEGUARD

2. Important Safeguard

2.1 Read, understand, and comply with all safety rules described at the beginning of each instruction manual in addition to the following ones before starting Arc welding operation.



WARNING

- Observe the following notices to prevent a serious accident that results in serious injury or death.

- 1) This torch is designed and manufactured in due consideration of safety, but you must follow the handling precautions described in this instruction manual. If you fail to do so, there may occur an accident resulting in serious injury or death.
- 2) Related laws, regulations, and your company's standards should be observed in constructing input power source, selecting an installation area, handling/storing/piping high pressure gas, storing welded products, and disposing wastes.
- 3) Keep out of the robot operating zone and the welding area.
- 4) A person with pacemaker should not approach the operating welding machine and the welding area unless his or her doctor permits. A welding machine generates a magnetic field around it during powered, which will have a bad effect on the pacemaker.
- 5) Installation, maintenance, and repair of this torch should be performed by qualified personnel or those who fully understand a welding torch for further safety.
- 6) Operation of this torch should be done by personnel who have knowledge and technical skill to fully understand the contents of this manual and to handle the torch safely.
- 7) This torch must not be used for purposes other than welding.

2.2 Observe the following to prevent electric shock.



WARNING

- Do not touch live electrical parts.


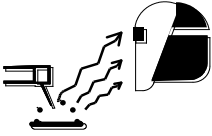


- Touching live electrical parts can cause fatal shock or severe burns.

- 1) Only qualified personnel should perform grounding work of the welding power supply and workpiece, or a workpiece and powered peripheral jigs while abiding by domestic regulations.
- 2) Do not touch live electrical parts.
- 3) Always wear dry insulating gloves and other body protection. Do not wear torn or wet gloves/work clothes.
- 4) Before doing the installation, inspection, maintenance, etc. of this product be sure to turn off all the input power sources and check, several minutes later, that there is no charging voltage since the condenser and the like may have been recharged.
- 5) Do not use cables with insufficient capacity, with damage, or with naked conductors.
- 6) Be sure to tighten the connections of cables and insulate them in order to prevent personnel from touching those parts easily.
- 7) DO NOT use a welding machine with its case or cover removed.
- 8) Secure a firm foothold before initiating work. DO NOT perform work with an unstable foothold or with a foothold at a height of two meters or above.
- 9) Make periodic inspection and maintenance. Damaged parts should be repaired before use.
- 10) Turn off POWER switch when not in use.



IMPORTANT SAFEGUARD (continued)

- 2.3 All the personnel in and around the working area including an operator should wear appropriate protection to protect themselves from arc rays, spatters, slag, and noise produced by welding.

 WARNING	<ul style="list-style-type: none"> • Install a lightproof wall where arc is generated. • Wear appropriate eye, ear, and body protection.
	<ul style="list-style-type: none"> • Arc rays may cause inflammation of eyes and burns on skin • Spatter s and slag may cause eye troubles and burns. • Noise may cause hearing problems.

- 1) Wear lightproof glasses or a welder's shield helmet with a proper shade of filter when welding or watching a welder work.
- 2) **INSTALL ARC PROTECTIVE CURTAINS** in between an operator and arc rays.
- 3) **WEAR PROPER SAFETY GLASSES** in work area at all times.
- 4) **WEAR PROPER EAR PROTECTION.**
- 5) **WEAR PROPER BODY PROTECTION** including woolen clothing, flameproof apron and gloves, leather leggings, high boots and leather arm and shoulder gauntlets.
- 6) **WEAR PROPER SAFETY GLASSES** to protect eyes and skin from spatters and slag.


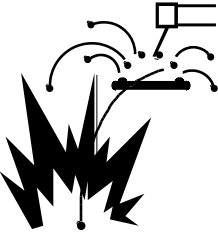
- 2.4 All the personnel in and around the working area including an operator should wear appropriate protection to protect themselves from fumes and gases produced by welding.

 WARNING	<ul style="list-style-type: none"> • DO NOT inhale fumes and gases generated by welding. • Ventilate the area sufficiently and wear a welder's shield mask if necessary.
	<ul style="list-style-type: none"> • Fumes and gases generated by welding have a harmful effect on human body. • Welding in a small area may cause suffocation due to the lack of air.

- 1) **KEEP YOUR HEAD** out of fumes and **DO NOT** inhale any.
- 2) **USE FORCED EXHAUST VENTILATION** at the arc.
- 3) **VENTILATE** the area to prevent build-up of fumes and gases.
- 4) If ventilation is insufficient, **USE APPROVED BREATHING DEVICES.**
- 5) **READ AND FOLLOW WARNING LABELS** on all containers of welding materials.
- 6) Before use, **READ AND UNDERSTAND** the manufacture's instructions, Material Safety Data Sheets (MSDSs), and follow your employer's safety practices.
- 7) To prevent gas poisoning and suffocation, use a local ventilator or a respirator specified by your country's domestic laws.
- 8) Be sure to ventilate the area or wear a respirator by welding in a small place. A well-trained watchman should observe the work.
- 9) Do not weld near the place where degreasing, cleaning or spraying is carried out. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases. If welding is carried out there, harmful gases may be produced.
- 10) Toxic fumes and gases are produced when coated steel is welded. Be sure to ventilate the area sufficiently or use a respirator.


IMPORTANT SAFEGUARD (continued)

2.5 Prevent fire, explosion, burns and injury caused by heated workpiece, spatters, slag, and arc sparks right after welding as described below.

 WARNING	<ul style="list-style-type: none"> • Do not weld near flammable materials. • Watch for fire: keep a fire extinguisher nearby. • NEVER do welding on inflammables such as a piece of wood or cloth. • Do not weld on closed containers.
	<ul style="list-style-type: none"> • Heated workpiece, spatters, slag and arc sparks right after welding may cause fire. • Incomplete cable connections, incomplete contacts in the current circuit of the workpiece such as steel frames may cause a fire due to the heat generated when powered. • Arc generated on containers of inflammables such as gasoline may cause an explosion. • Welding of airtight tanks and pipes may cause a bursting. • Touching a heated workpiece, spatters, slag or arc sparks will cause a serious burn.

- 1) KEEP FLAMMMLE MATERIALES out of the robotic cell.
- 2) Welders should wear appropriate protection such as flameproof leather gloves, work clothes with long sleeves, a leg cover, a flameproof leather apron in order to prevent burns caused by touching heated workpiece, spatters, slag and arc sparks right after welding.
- 3) WATCH for fire.
- 4) Have a fire extinguisher nearby Operators should know how to use it.
- 5) DO NOT touch heated workpiece and peripheral jigs with inflammables such as a piece of wood or cloth. Doing so might cause not only a fire but also burns.
- 6) DO NOT put heated workpiece close to inflammables right after welding.
- 7) Remove inflammables from the place where welding is carried out so that spatters and slag will not strike them.
- 8) Do not use inflammable gases near the welding sight.
- 9) Tighten and insulate the cable connections completely.
- 10) Connect the cables on the workpiece side as close to the welding area as possible to prevent the welding current from traveling along unknown paths and causing electric shock and fire hazards.
- 11) A gas pipe with gas sealed in, an airtight tank and a pipe must not be welded because they might explode.
- 12) NEVER do welding on inflammables such as a piece of wood or cloth.
- 13) When welding a large-size structure such as a ceiling, floor, wall, etc., remove any inflammables hidden behind a workpiece.

2.6 Directions

 DANGER	<ul style="list-style-type: none"> • Do not alter or remodel our products. • You may get injured or have your equipment damaged because of fire, failure or malfunction caused by altering or remodeling the product. • The warranty does not cover any altered or remodeled products.
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IMPORTANT SAFEGUARD (continued)

For reference

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office.

Recommended Practices for Plasma Arc Cutting, American Welding Society Standard AWS C5.2, from American Welding Society.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales.


Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association.

NOTES ON USE

3. Notes on Use

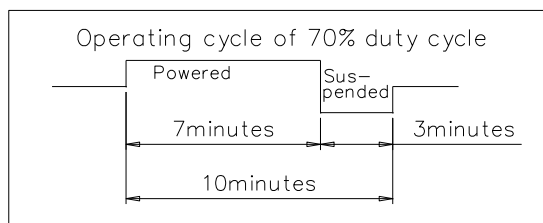
3.1 Duty cycle

 CAUTION	<ul style="list-style-type: none"> • Use the torch with the specified rated duty cycle or under. Otherwise, the welding torch may be deteriorated or burned out.
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Welding torch	Rated duty cycle
RTWH-5000H	500A 100% (CO ₂) 400A 100% (MAG)

- The rated duty cycle of 80% indicates that the torch shall be used at the rated welding current for 8 minutes and then suspended for 2 minutes out of 10 minutes.
- The rated duty cycle of 50% indicates that the torch shall be used at the rated welding current for 5 minutes and then suspended for 5 minutes out of 10 minutes.
- Use of the welding torch with the excess rated duty cycle may lead to the temperature rise exceeding the allowable value, resulting in damage or burn.
- When using RTWH5000H is sure that DAIHEN genuine coolant is being supplied with the water tank (PU-301).

Otherwise, the temperature of welding torch may rise to over the allowable value, leading to damage or burn.



3.2 Inching

 WARNING	<ul style="list-style-type: none"> • Do not look into the tip hole in inching to cheek. • In inching, the welding torch tip must not be put near to your face, eye, and body.
	<ul style="list-style-type: none"> • Do not look into the tip hole in inching to check if the wire is fed. The wire may spring out and stick into your face, eyes, and body. It is very dangerous. • In inching, the welding torch tip must not be put near to your face, eyes, and body. The wire may spring out and stick into your face, eyes, and body to injure.

Set the welding torch straight, feed the wire with pressing the INCH button, and then release the button when the wire is protruded by 10mm from the tip of torch.

3.3 Replacement of Parts



CAUTION

- To prevent burns, comply with the following cautions.

- Do not directly touch the high-temperature parts of a nozzle, an electrode and so on.
- When welding, wear suitable protection such as leather gloves for welding.
- Do not replace torch tip elements before they cool off.



CAUTION

- If any parts are damaged, replace them with new ones for further safety and better quality.

- Be sure to place an order for replacement parts at our sales office or our agency.



CAUTION

- Do not disassemble the shock sensor. If disassembled, gas leak and malfunction may be caused.

3.4 Coolant



CAUTION

- Be sure to run the DAIHEN genuine coolant for the liquid-cooled torch. Insufficient amount of running coolant may lead to damage of torch.

3.5 Cable hose



CAUTION

- Never let cable hoses neither touch any heated part of the welded, put something heavy on top nor bend them excessively because the welding torch might become damaged.

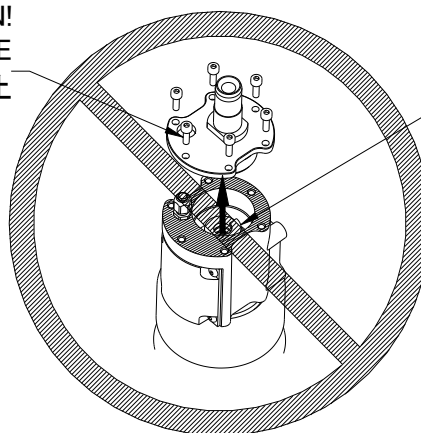
3.6 Shock sensor



CAUTION

- In the main body of shock sensor inside, a powerful coil spring is had built-in. Because there is a threat that a coil spring protrudes, please do not dismantle a shock sensor.

CAUTION!
DO NOT DISASSEMBLE
分解禁止



SPRING
コイルバネ



CAUTION

- The shock sensor absorbs damage at the speed of the manual operation (or equal with the manual operation). The shock sensor is damaged at the speed faster than manual operation.

Thank you for purchasing DAIHEN CO₂ /MAG welding torch.
Before use, read this instruction manual thoroughly to use the product correctly.

- [Note]
1. The contents in this instruction manual are subject to change without prior notice.
 2. We have carefully written the instruction manual to eliminate as many errors as possible. Even if any errors are found in the contents, we are not responsible for any damage resulting from those errors.
 3. No part of this instruction manual may be reproduced or stored in any form without the express written permission.

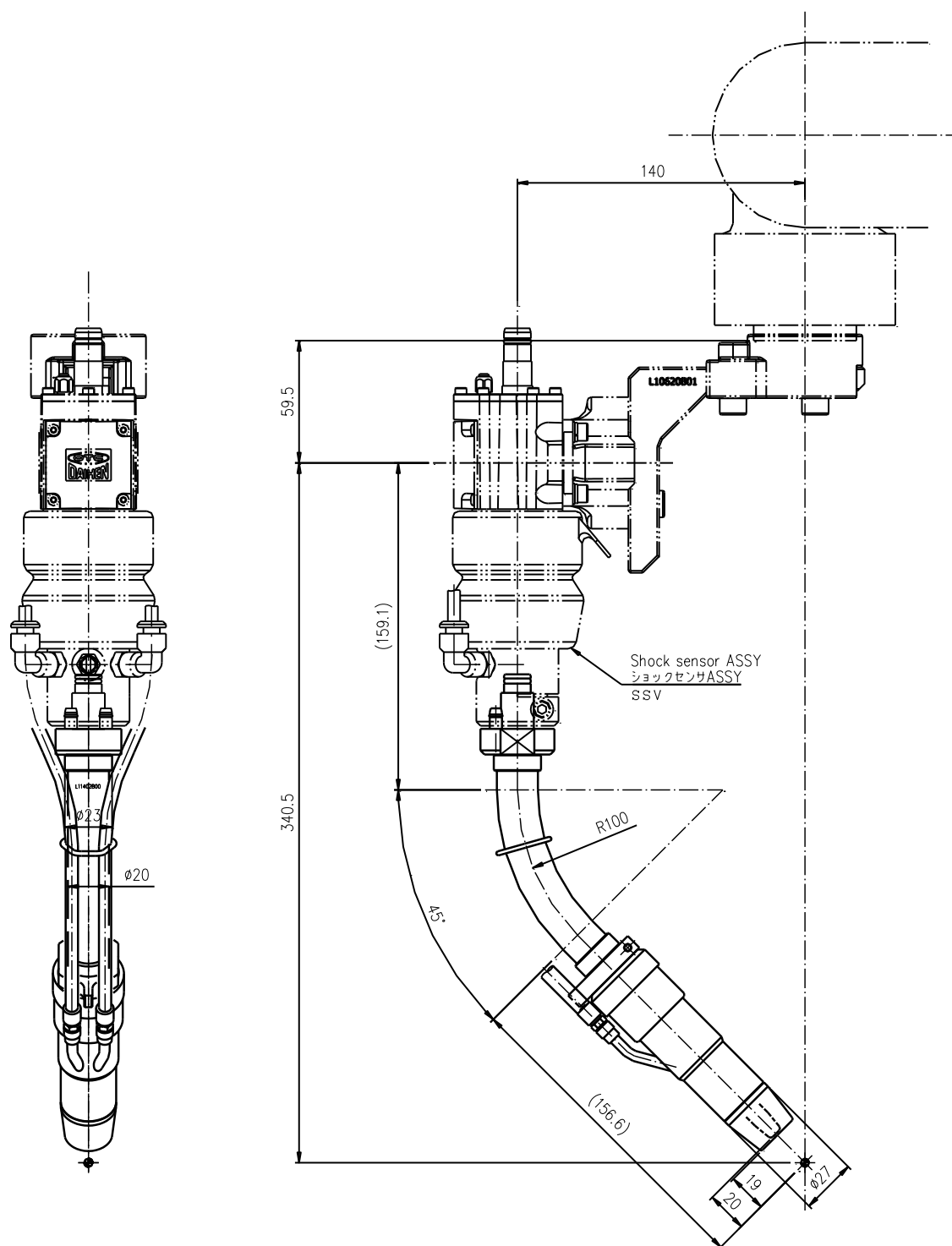
1 . Specifications

This is the “CO₂ /MAG welding torch” to be used for CO₂/MAG welding.
Use the welding torch in combination with the shock sensor SSV - RZKB dedicated to NB15 manipulator.
The specifications are shown in Table 1.1. (Refer to Fig.1.1 ,1.2 for the outline drawing.)

Table 1.1 Specifications of welding torch

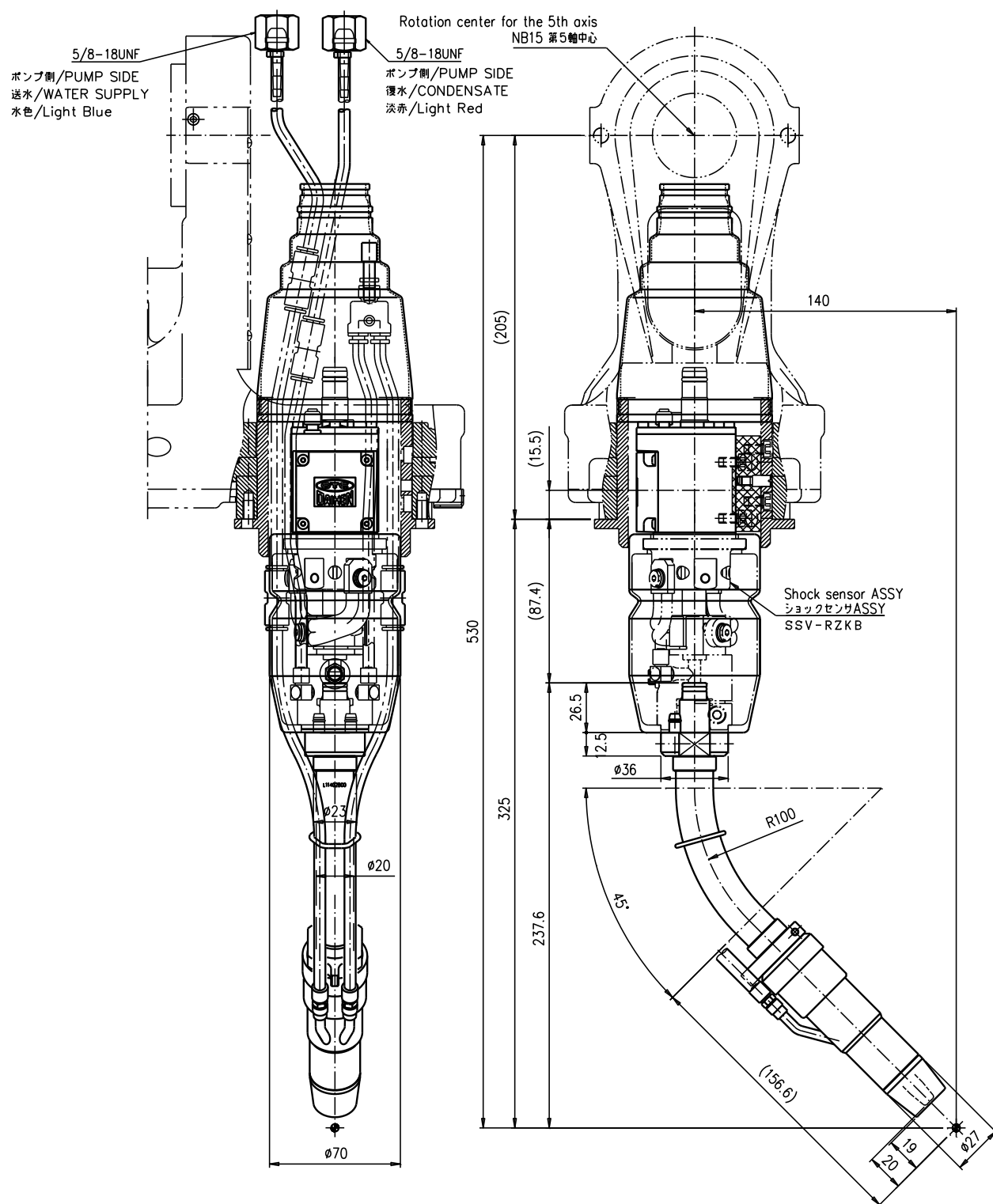
Category	Liquid-cooled 500A torch (High rated duty cycle type)
Model	RTWH5000H
Torch type	Curved (45°)
Welding process	CO ₂ (MAG)
Max. operating current	500A(500A)
Rated duty cycle	100% (80%)
Wire type	Solid wire, Flux cored wire
Applicable wire	(ϕ 1.2) (ϕ 1.4) ϕ 1.6
Cooling system	Liquid cooling
Shock sensor	SSV-RZKB

- Note)
1. While using RTWH5000 series is sure that DAIHEN genuine coolant is being supplied with the water tank (PU-301).
 2. The maximum operating current and rated duty cycle are different between CO₂ and MAG welding process.
 3. Shock sensor function
Arc welding robots may cause the welding torch to come into contact with workpiece or jig, thus resulting in the deformation of the welding torch or damage to the robot itself. To prevent such problem, this welding torch incorporates the shock sensor function that outputs an external force detection signal the instant when the nozzle portion gets displaced to immediately stop the robot if external force larger than that specified is applied to the torch tip portion (nozzle portion). This function is incorporated on the assumption that the welding torch comes into contact with workpiece or jig during robot teaching. Contact of the welding torch with it while in automatic operation may cause damage to the robot or the torch.
The shock sensor function does not provide any guarantees against the accuracy of aiming point of the torch tip portion. After the shock sensor gets activated, ensure the aiming point. (For detail, refer to information in Section 5.2.)
 4. Use of the air-blow function requires the air-blow unit and the air-blow kit separately. Refer to the instruction manual for the air-blow unit (1L10686-E-*).
 5. The shock sensor and the welding torch are distinct products.



Weight 2.6 [kg] 5.73 [lb]
 Liquid-cooled 500A CO₂/MAG curved torch
 RTWH5000H with shock sensor "SSV"

Fig.1.1 Outline drawing of Liquid-cooled 500A torch Unit (mm)



Weight 2.1 [kg] 4.62 [lb]
 Liquid-cooled 500A CO₂/MAG curved torch
 RTWH5000H with shock sensor "SSV-RZKB"

Fig.1.2 Outline drawing of Liquid-cooled 500A torch Unit (mm)

2. Checking the Contents

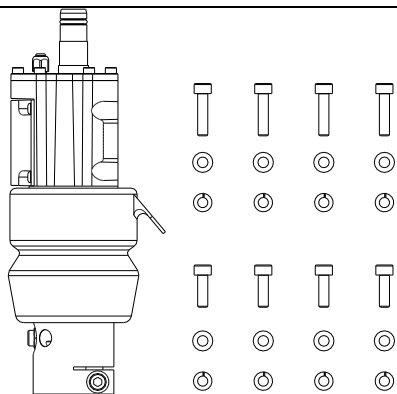
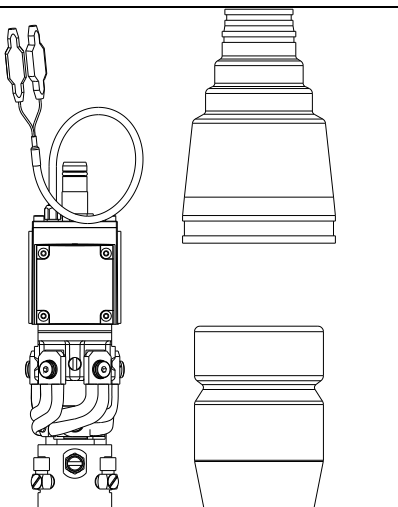
SSV	SSV – RZKB
 <p> Shock sensor unit..... 1 piece Mounting bolt (M5×15) 4 pieces Mounting bolt (M5×20) 4 pieces Spring washer (M5) 8 pieces Washer (M5) 8 pieces </p>	 <p> Shock sensor unit..... 1 piece Hood..... 1 piece cable cover..... 1 piece </p>

Fig. 2.1 Checking the contents of package

Note)1. The bolts used to fix the tool pod built in the manipulator wrist to the shock sensor insulating bracket are accessories to the tool pod.

2. The cable tie to fix the cable cover to the coaxial power cable is an accessory to the torch.

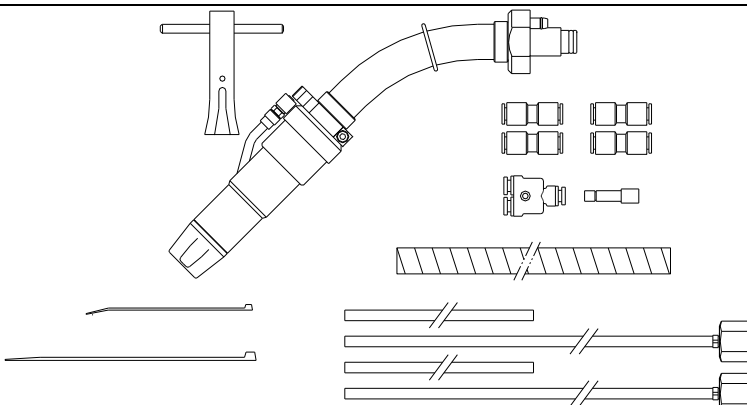
RTWH5000H	
<p> Welding torch main body 1 piece Wrench 1 piece Cooling water hose(6m) 2 pieces Spatter tube (2m) 2 pieces Coolant piping joint (straight type).... 4 pieces Coolant piping joint (U-shape type).... 1 piece plug 1 piece spiral tube 1 pieces cable tie(large)..... 2 pieces cable tie(small) 4 pieces </p>	

Fig. 2.2 Checking the contents of package

Note) 1. Use of the RTWH5000H Liquid-cooled torch requires a water tank in addition to this torch. Purchase the water tank (PU-301) separately.

2. Use the wrench that comes with the Liquid-cooled torch to dismount the contact tip.

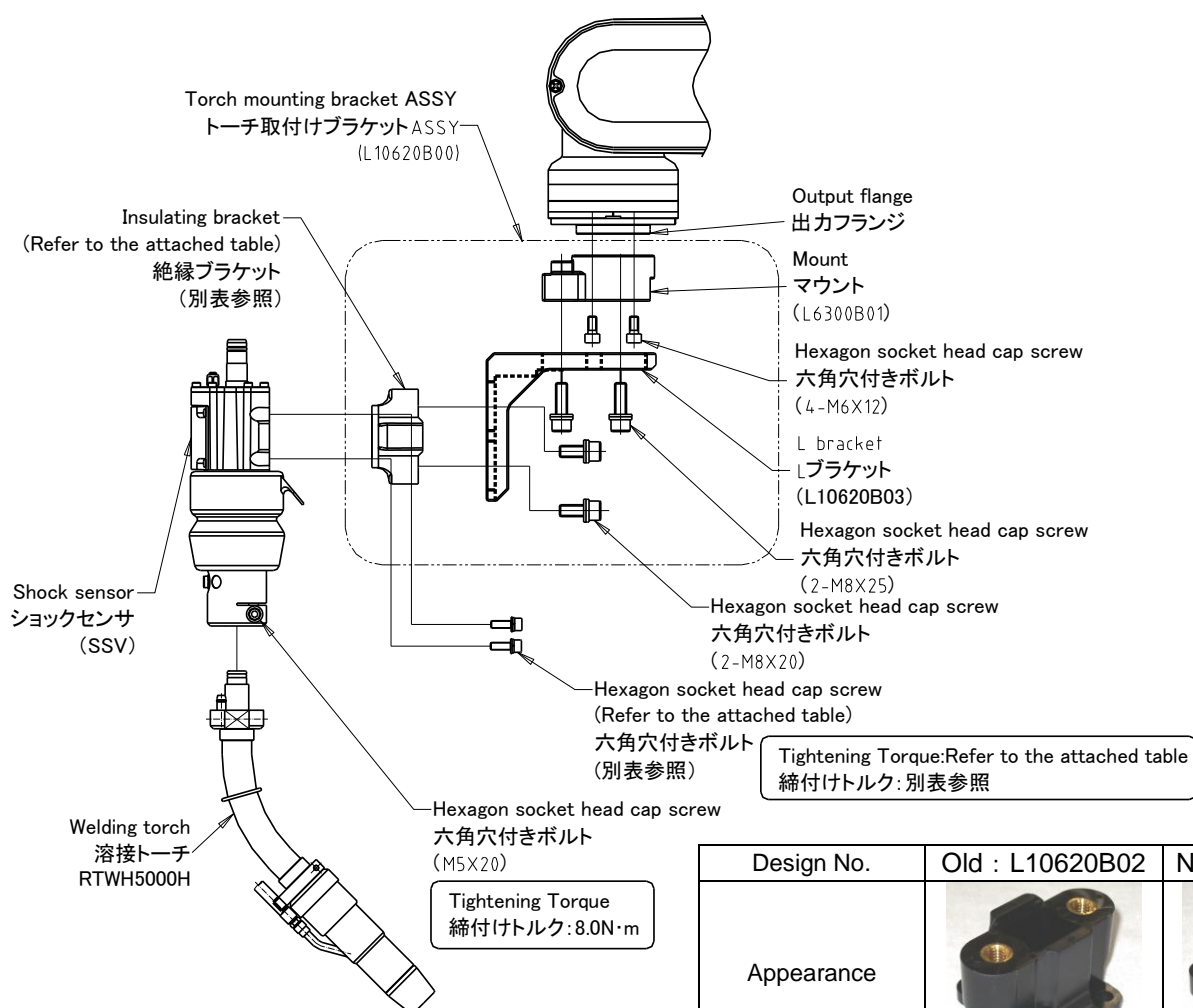
3. When mounted on the V type manipulator, coolant piping joints (straight type) is used only two.

4. When mounted on the V type manipulator, cable tie (large) (small) is not used.

3. Installing and Adjusting Procedure of Welding Torch

3.1 Mounting of Welding Torch on V Type Manipulator

3.1.1 Mounting of shock sensor and mounting bracket



Design No.	Old : L10620B02	New : L10620B04
Appearance		
Bolt	M5X15	M5X20
Tightening Torque	5.0N・m	7.0N・m

(Note: Purchase the torch mounting bracket ASSY separately.)

Fig. 3.1 Mounting of torch and shock sensor (for 45° curved / straight torch)

- Assemble the mount (L6300B01) onto the output flange of manipulator using 4 pieces of hexagon socket head cap screws (M6×12).
- Mount the L-bracket (L10620B03) to the mount that has assembled in the procedure (1) with 2 pieces of hexagon socket head cap screws (M8×25).
- Mount the insulating bracket (Refer to the attached table) to the L-bracket that has mounted in the procedure (2) with 2 pieces of hexagon socket head cap screws (M8×20).
- Mount the shock sensor onto the insulating bracket with 4 pieces of hexagon socket head cap screws (Refer to the attached table).
- Loosen the hexagon socket head cap screw (M5×20) of shock sensor to insert the torch. Fix it by tightening the screw.

Important point about bolt used when insulating bracket is mounted

With the shape change of the insulating bracket, bundle two kinds of bolts for insulating bracket mount (M5x15, M5x20).

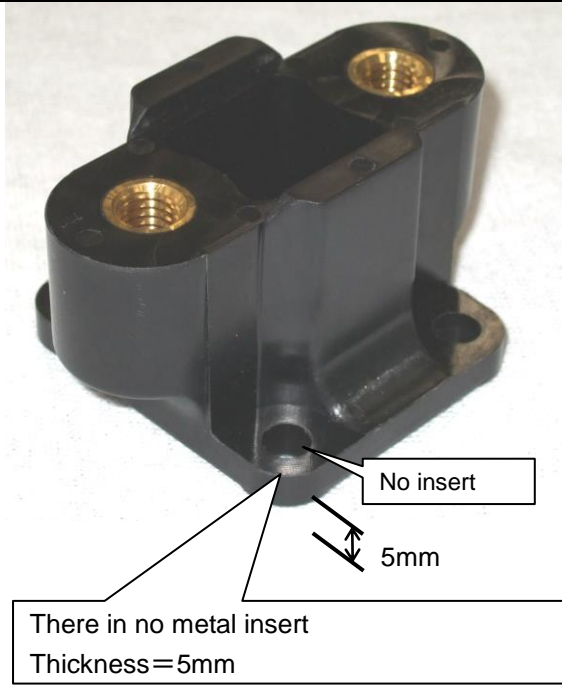
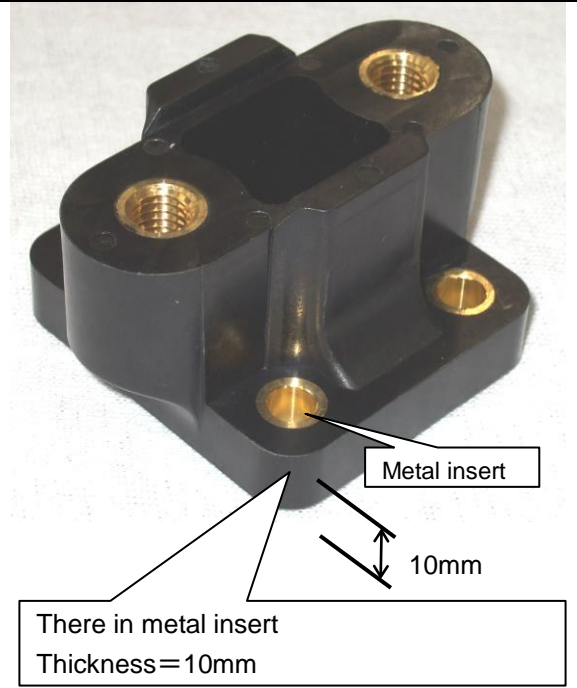
When you mount **old** insulating bracket, please use a bolt of **M5X15**.

When you mount **new** insulating bracket, please use a bolt of **M5X20**.

If you use a different bolt, you cannot fix certainly because the length of bolt is different.

In addition, when you mount insulating bracket, **please use a washer and spring washer by all means.**

Insulating bracket-bolt Correspondence list

	<u>Old</u> insulating bracket L10620B02	<u>New</u> insulating bracket L10620B04
Appearance	 <p>No insert 5mm</p> <p>There in no metal insert Thickness=5mm</p>	 <p>Metal insert 10mm</p> <p>There in metal insert Thickness=10mm</p>
Bolt	<u>M5X15</u>	<u>M5X20</u>

3.1.2 Mounting the torch gauge

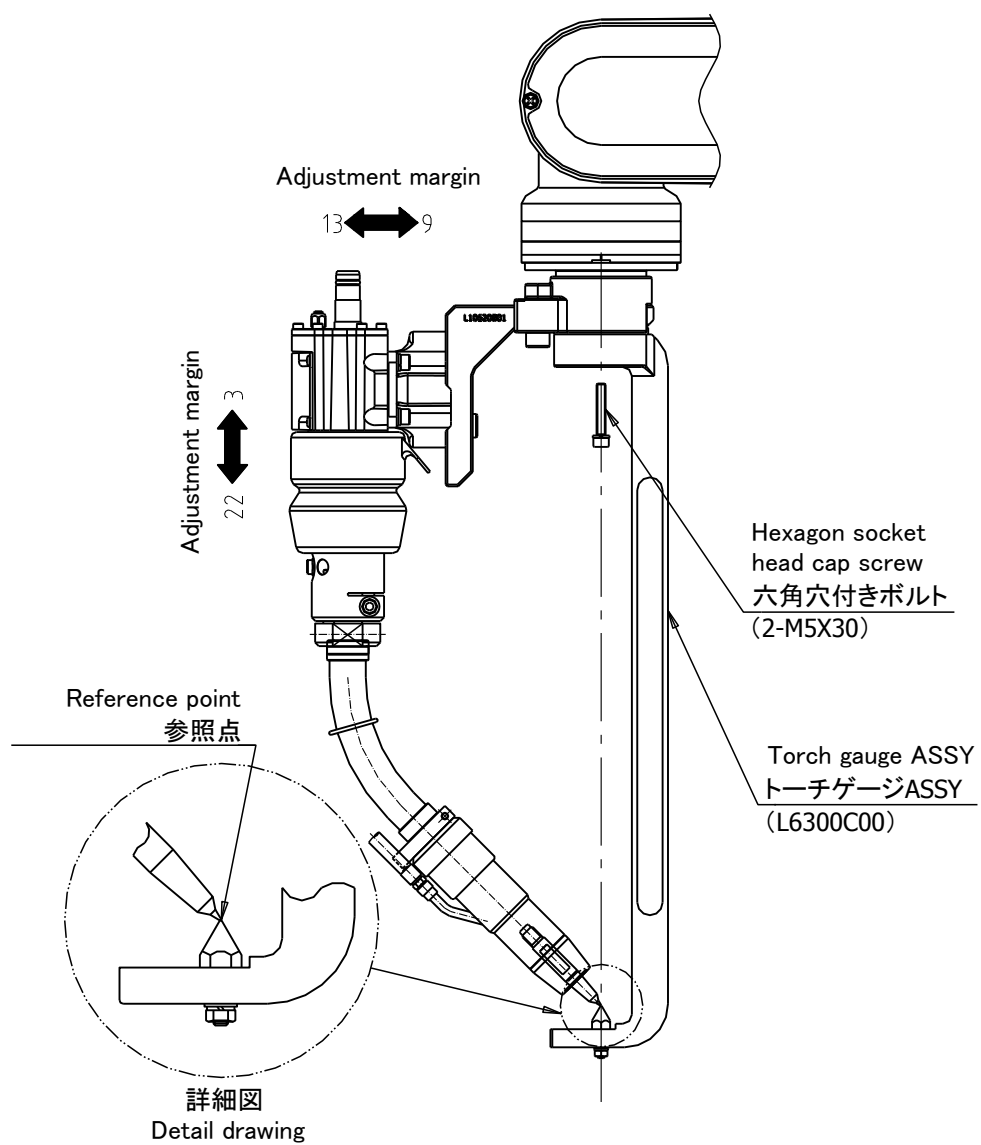


Fig. 3.2 Mounting the torch gauge (for 45° curved torch)

(Note: Purchase the torch gauge ASSY separately.)

3.2 Mounting of Welding Torch on NB15 Manipulator

3.2.1 Mounting of curved torch

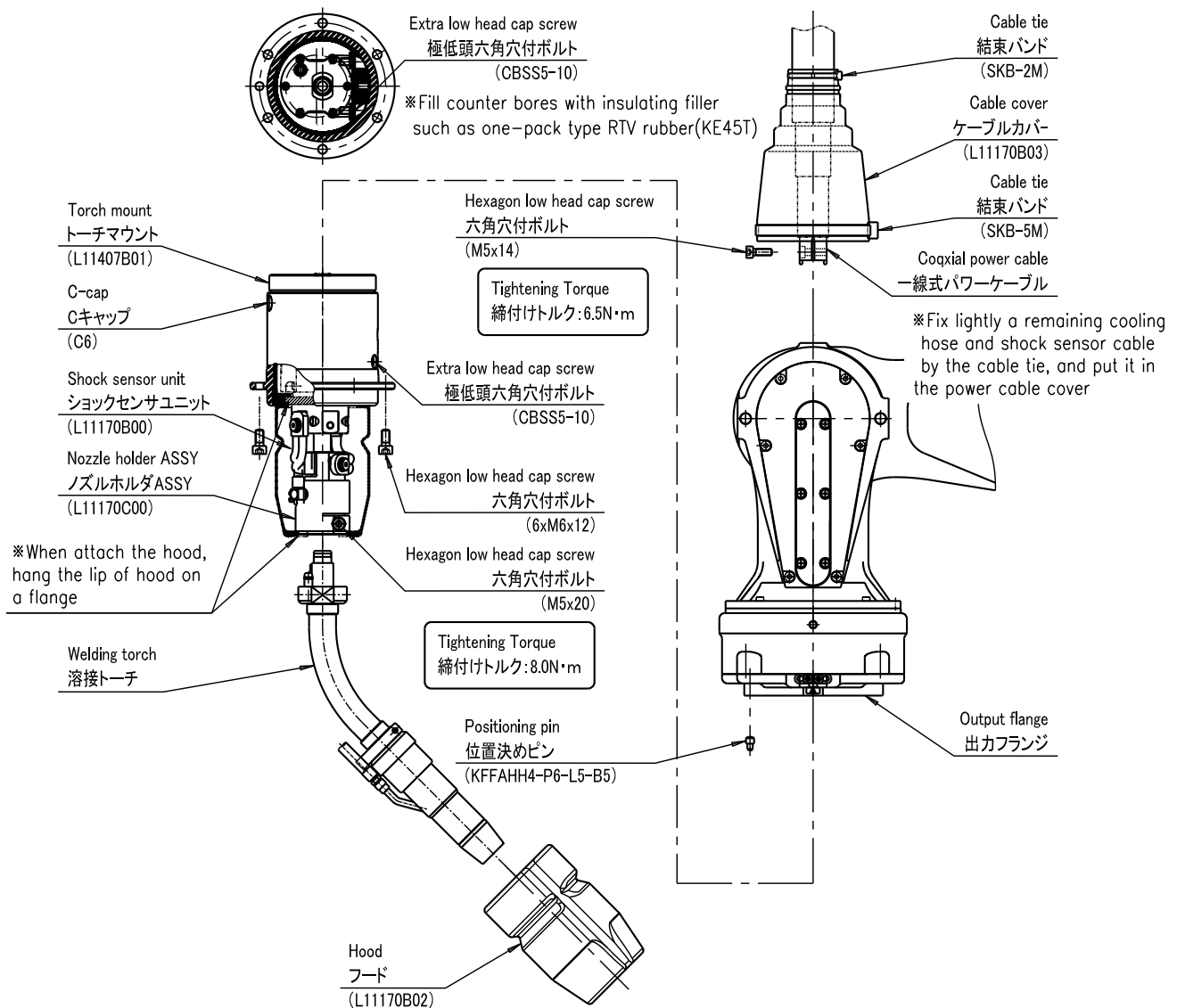


Fig. 3.3 Mounting of torch and shock sensor

- (1) Drive the two insulating dowel pins onto the output flange of manipulator from underneath. (The pins are attached to the torch mounting bracket (L11407B00).)
The locating pin is stepped. The side of larger diameter is faced to the output flange. The side of the output flange has two pin mounting holes. In the robot home position, use the pin mounting hole in front of the robot.
- (2) Attach the insulating bracket (L11170F02) to the shock sensor unit (L11170B00) using 4 pieces extra low head cap screw (CBSS5-10), and **fill counter bores with insulating filler such as one-pack type RTV rubber over the bolts for secure insulation.**
- (3) Attach the torch mount to the shock sensor unit assembled in (2) using 4 pieces of extra low head cap screws (CBSS5-10). (This does not need to be insulated.)

- (4) In advance, pass the cable cover (L11170B03) through the coaxial power cable. Pass the coaxial power cable through the 6th axis hollow and then attach the cable to the shock sensor unit. To secure the cable, insert a tool from the hole on the side of the torch mount and secure the bolts. Cap the hole through which the tool is passed using C cap (C6). Connect the shock sensor cable.
- (5) Insert the shock sensor unit assembled in (4) into the manipulator output flange from the bottom and secure it using 6 pieces of hexagon socket head cap screws (M6x12). Then, align the torch mount pin hole to the positioning pin.
- (6) Unfasten the hexagon socket head bolt (M5x20) that fixes the shock sensor, and then insert and fix the welding torch.
- (7) Attach the cable cover and then attach the hood (L11170B02) from the bottom. (Refer to the top view in fig.3.3 for the installation direction.) To fix the power cable cover, use the cable ties that come with the shock sensor. (Fix the cover at the top and bottom.)



Note) Adjust the phase of the shock sensor to those of the coaxial power cable as shown Fig. 3.3.

3.2.2 Reference point teaching procedure (Creation of home position confirmation program)

- (1) Dismount the nozzle and the contact tip from the torch of the RT series.
- (2) Mount the tip gauge firmly to the torch
- (3) To set a reference point, prepare a sharp-pointed object fixed to the ground (e.g. tip gauge) (hereinafter referred to as the “reference gauge”).

Align the point of the tip gauge on tip of the reference gauge, and then teach such point as the reference point (2) (point teaching). Use this reference point (2) to confirm the mechanical deviation of the torch.

Table 3.1 Type of Tip gauge

L10319H	L317Z
エクステンション20mm Extension 20mm	エクステンション20mm Extension 20mm
	
M8 ネジ用 for M8 screw	M6 ネジ用 for M6 screw

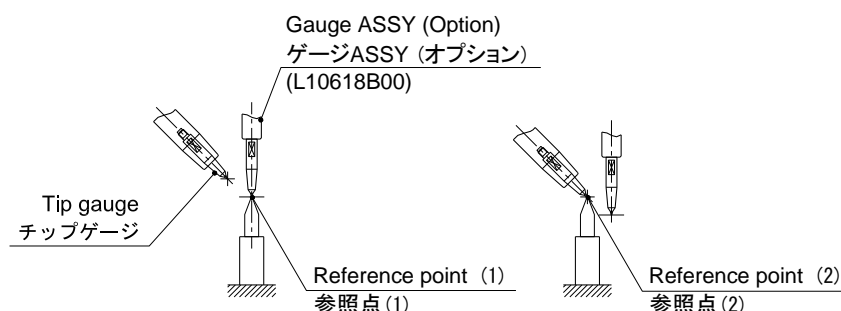


Fig.3.4 Teaching of reference point

(Note: To use a M6 chip, you should purchase a tip nut [L10411D04] separately.)

3.2.3 Daily check of reference point

In the daily check, see if no deviation has occurred in the reference point (2) taught by the origin-position check program. If any deviation has occurred caused by the torch collision etc., correct it by the procedure Fig.3.5.

If a deviation has occurred in the reference point (1) taught by the origin-position check program, provided with the gauge ASSY (option), that deviation shall be attributed to the manipulator. Contact our sales department.

If no deviation has occurred in the reference point (1), that deviation shall be attributed to the torch. In this case, correct it by the following procedure.

Note that when checking the reference point (1) first taught, be sure to use the gauge applied in the first. If using a wrong gauge, the precise position accuracy cannot be obtained.

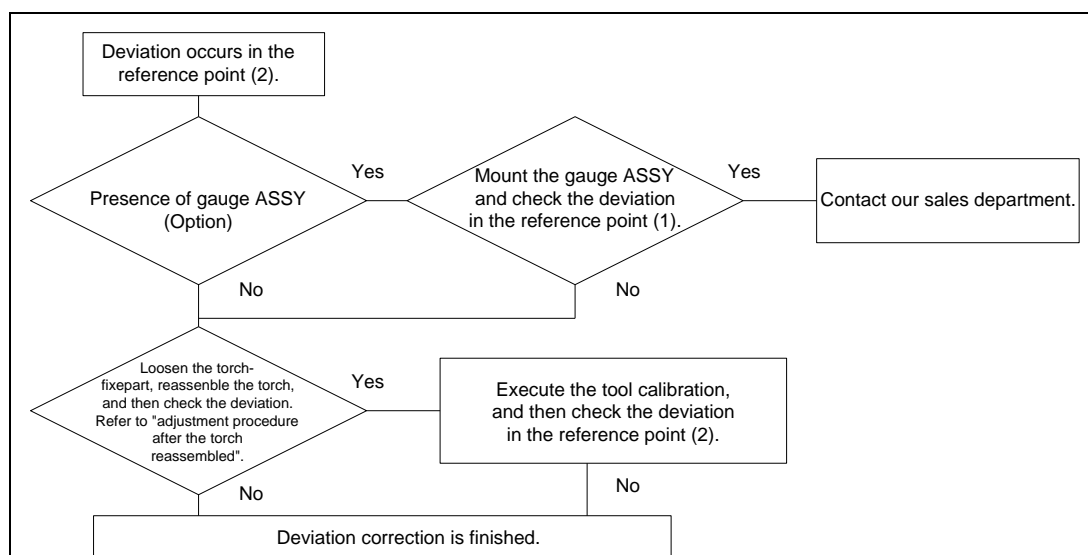


Fig.3.5 Checking procedure when the torch deviated

3.2.4 Adjustment procedure with the tool length automatic setting

- (1) Copy the existing origin position check program (Program A for example), and newly create the program B. Running this program B, align the tip of reference gauge and the point of tip gauge fixed on the torch tip by performing the **rectangular manual operation holding the torch posture** from the position of program A to perform teaching (point-teaching).

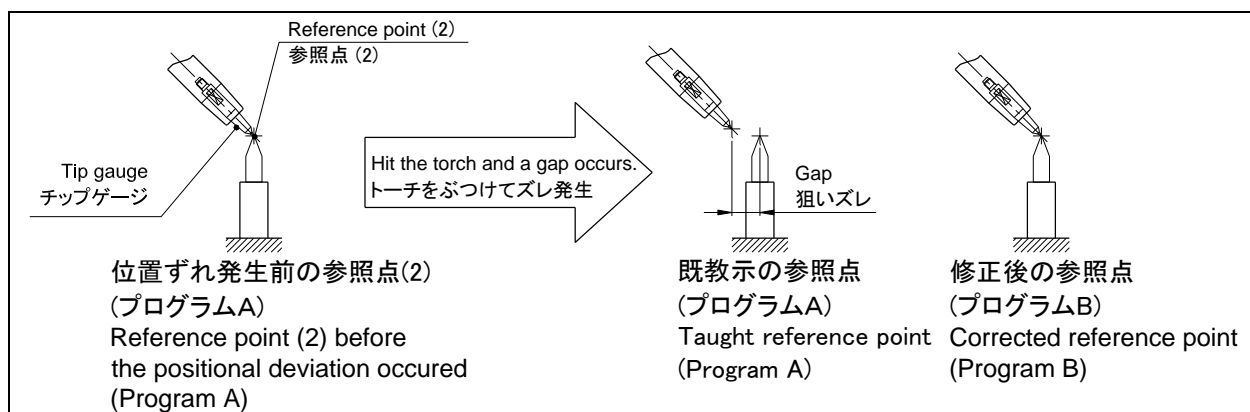


Fig.3.6 Checking the reference point

- (2) Perform the 2-point tool length setting. With this setting, the amount of torch (tool) deviation can be automatically reflected to the program. For details of the operation procedure, see the Instruction Manual.
- (3) As the tool conversion function is automatically executed, follow the instruction and convert the program that you would like to perform the tool conversion. For details of the operation procedure, see the instruction manual.
- (4) Call the program A and check that the deviation in the reference point (2) has been corrected, having a proper reference point.

In addition, do not execute the tool conversion function in the program where the reference point (1) has been taught with the optional gauge ASSY provided.

If executing the tool conversion function in all the programs, teach the reference point (1) again.

Table 3.2 Reference instruction manual

Type	Reference instruction manual	
FD manipulator	Chapter 4, SETUP (1L21700B-E-*)	4.5.2
		4.5.8

3.3 Connecting the Liquid-cooled Hose

3.3.1 Mounting on V type manipulator

- (1) Two meter of spatter tubes (light blue: FS-4-6X4-BU, light red: FS-4-6X4-RE) are attached as the assembly component of the cooling water hose provided with RWH5000H. Cut these hoses into the following length.

- spatter tubes (light blue: FS-4-6X4-BU) : 560mm x 2 piece
- spatter tubes (light red: FS-4-6X4-RE) : 330mm x 2 piece

Note) Cut the cooling water hose perpendicularly, being careful not to damage the outside surface.

Use special tube cutter when you cut the cooling water hose. Do not cut the cooling water hose with pliers, nippers, scissors, etc., otherwise, the cooling water hose will be deformed and trouble may result.

- (2) Create the assembly as shown in Figure 3.7, using the tube created in (1), coolant piping joints (straight type, U-shape type) and plugs.

Note) To mount the cooling water hose, grasp the cooling water hose, slowly push it into the one-touch fitting until it comes to a stop. Pull the cooling water hose back gently to make sure it has a positive seal. Insufficient installation may cause water to leak or the cooling water hose to release.

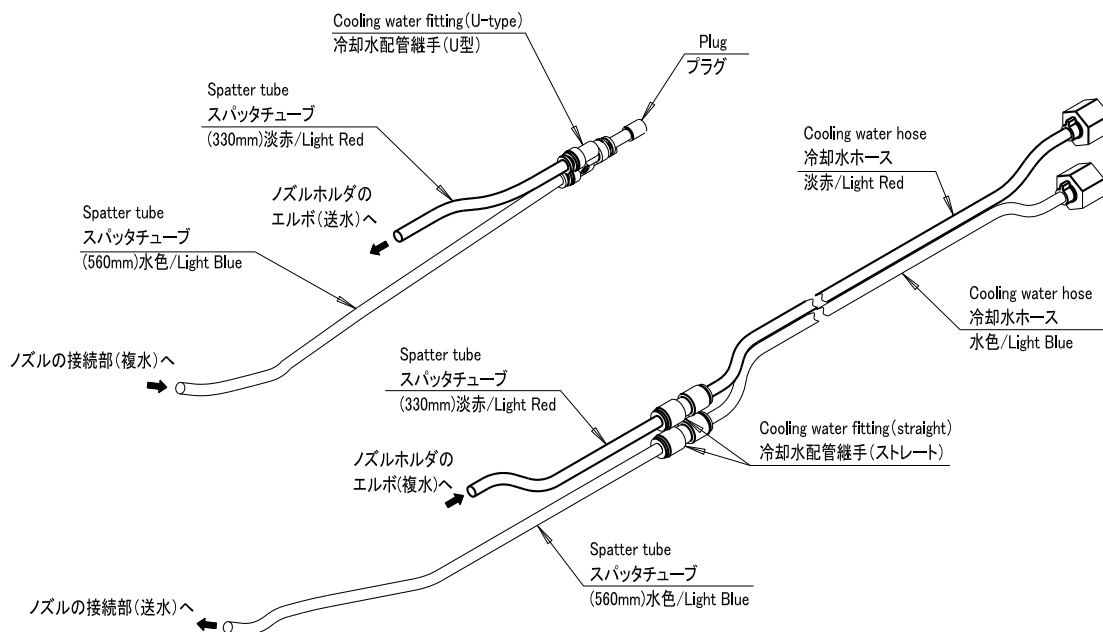


Fig.3.7 Connection of hose (1)

- (3) An assembly made with ② Connect to each elbow. Please covered with a protective cap to elbow side joint.

Note) Run the spatter tube, which is to be directly connected to the nozzle, please connect out through the O ring accessory to torch body.

Note) There are supply water and return water. Connect the assembly correctly as shown in **Figures 3.8.**

- (4) Bind up the cooling water hose and coaxial power cable with a spiral tube.
(5) Run the cooling water hoses along the coaxial power cable to connect them to the water tank (PU-301).

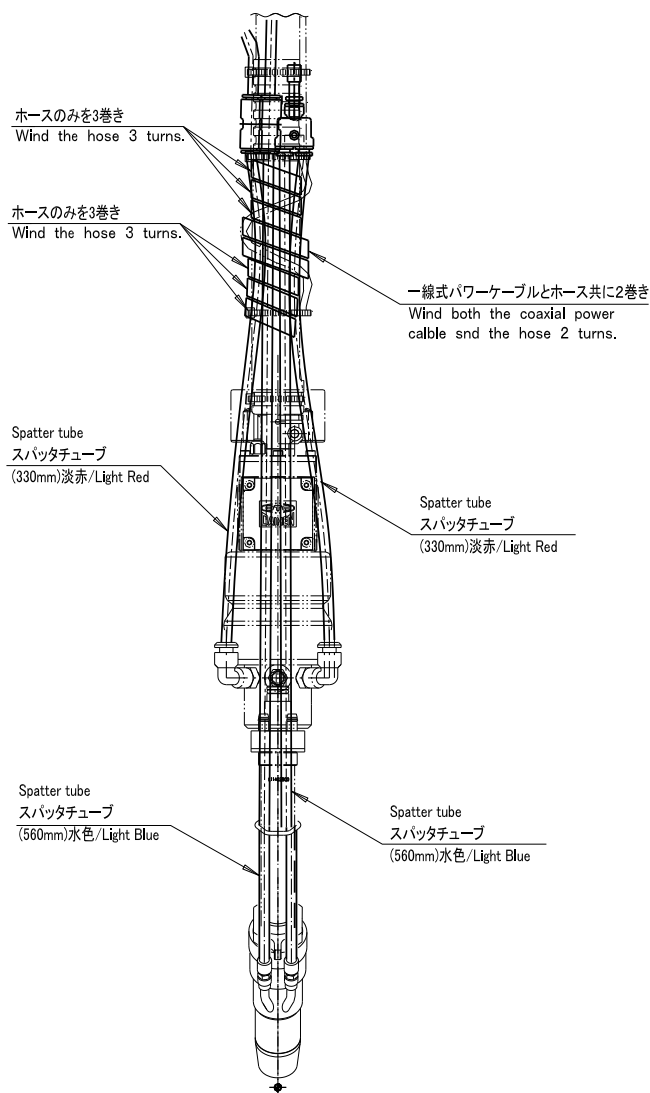


Fig.3.8 Connection of hose (2)(For V type Manipulator)

3.3.2 Mounting on NB15 manipulator

- (1) One meter of spatter tubes (light blue: FS-4-6X4-BU, light red: FS-4-6X4-RE) are attached as the assembly component of the cooling water hose provided with RWH5000H. Cut these hoses into the following length.

- spatter tubes (light blue: FS-4-6X4-BU) : 170mm x 1 piece, 220mm x 2 pieces
- spatter tubes (light red: FS-4-6X4-RE) : 150mm x 1 piece, 180mm x 1 piece
200mm x 1 piece

Note) Cut the cooling water hose perpendicularly, being careful not to damage the outside surface.

Use special tube cutter when you cut the cooling water hose. Do not cut the cooling water hose with pliers, nippers, scissors, etc., otherwise, the cooling water hose will be deformed and trouble may result.

- (2) Create the assembly as shown in Figure 3.9, using the tube created in (1), coolant piping joints (straight type, U-shape type) and plugs.

Note) To mount the cooling water hose, grasp the cooling water hose, slowly push it into the one-touch fitting until it comes to a stop. Pull the cooling water hose back gently to make sure it has a positive seal. Insufficient installation may cause water to leak or the cooling water hose to release.

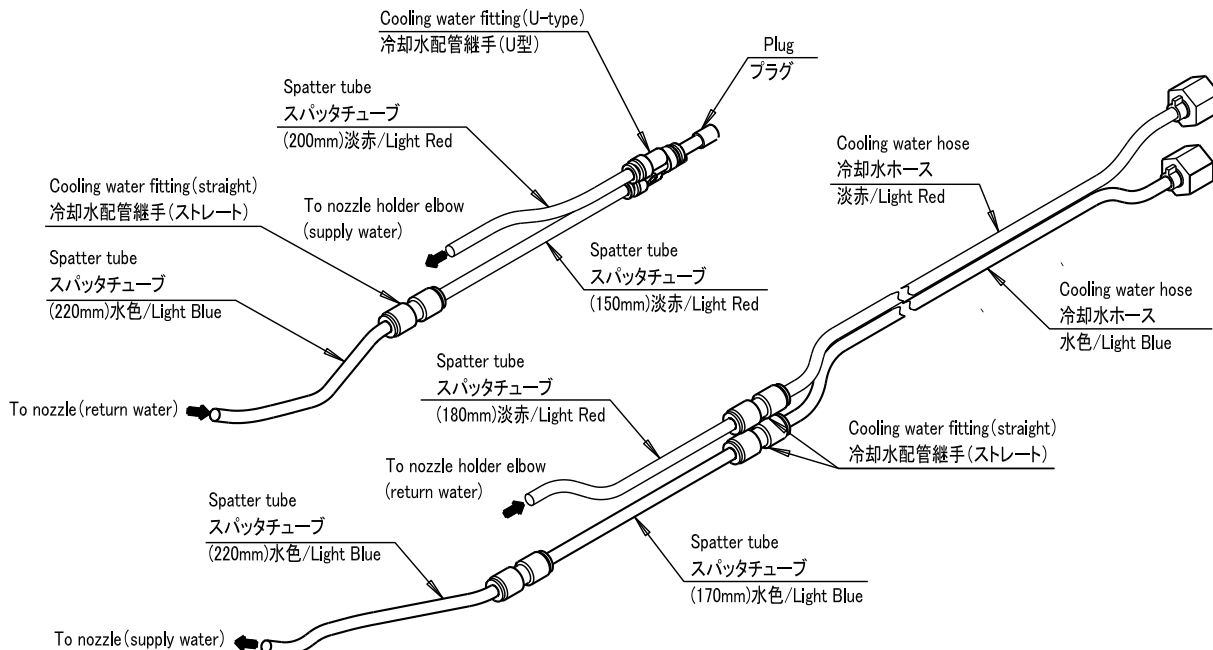


Fig.3.9 Connection of hose (3)

- (3) Remove the hood from the shock sensor.
- (4) Lift the cable cover along the coaxial power cable. Insert the assembly created in (2) in the cable cover. Then, pass the assembly through the 6th axis hollow and connect it to the nozzle holder elbow.

Note) There are supply water and return water. Connect the assembly correctly as shown in Figures 3.9, 3.10 and 3.11 (detailed view of C). In this step, do not connect it to the nozzle. Do the connection later in (8). (See the drawing at left in Figure 3.9.)

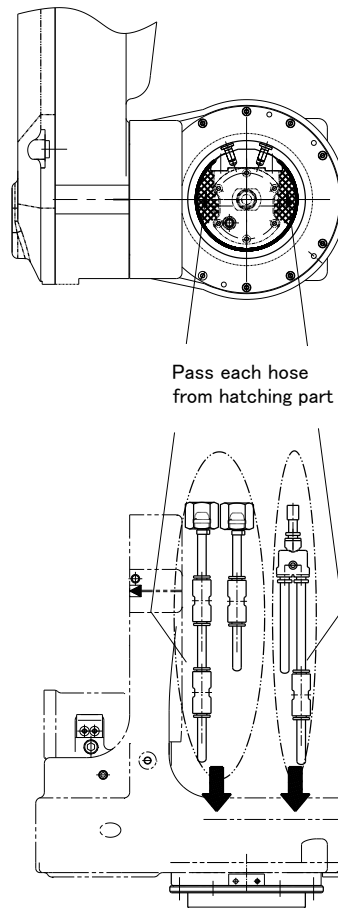
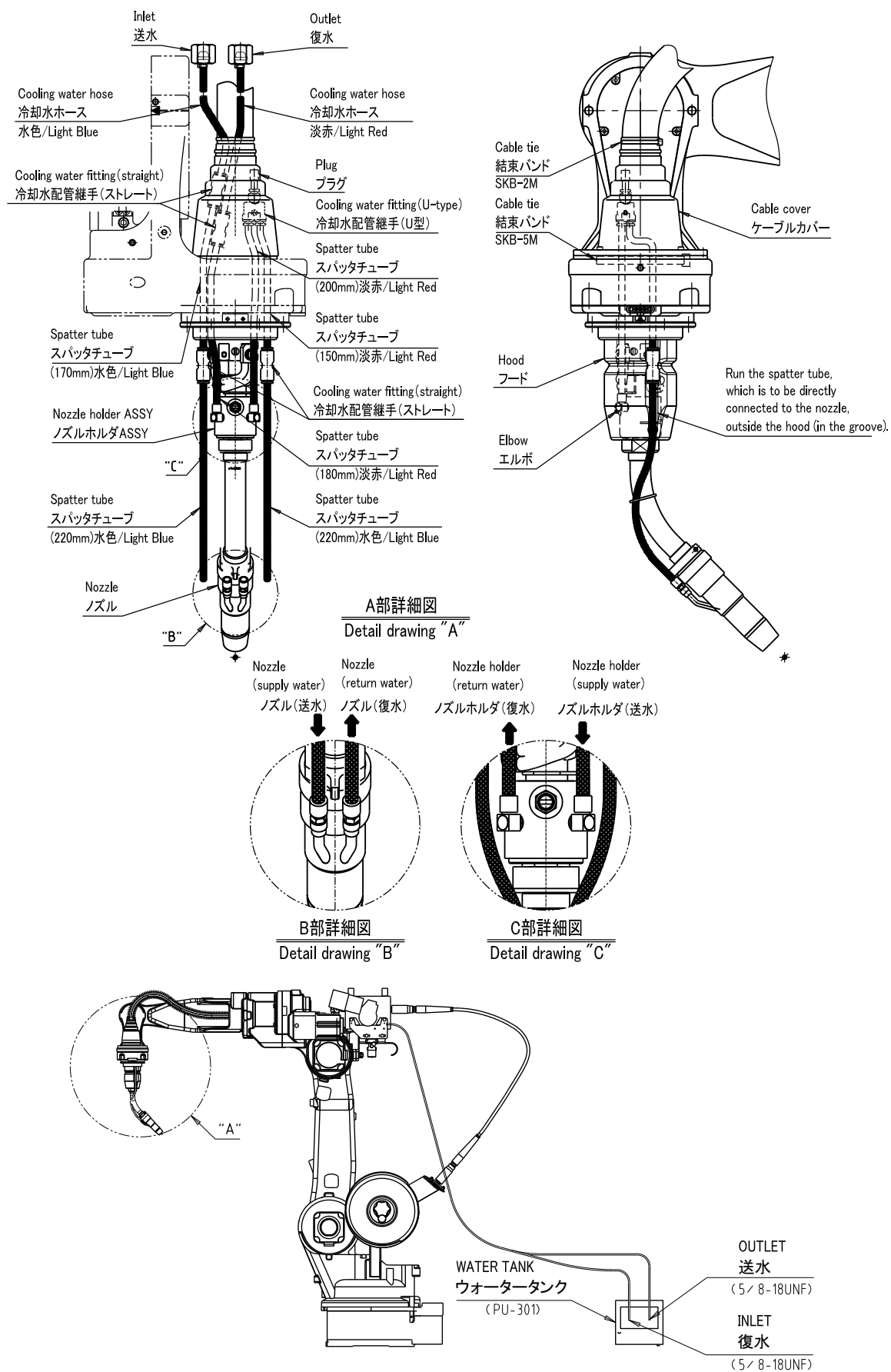


Fig.3.10 Connection of hose (4) (For NB15 Manipulator)

- (5) Attach the cable cover and fix the upper and lower ends using the cable tie (upper: SKB-2M, lower: SK-5M).
- (6) Mount the hood. Run the spatter tube, which is to be directly connected to the nozzle, outside the hood (in the groove). Note that you cannot attach the hood in the wrong order. (See the drawing at right in Figure 3.11.)
- (7) Connect the liquid-cooled torch to the nozzle holder.
- (8) Attach 2 spatter tubes to the nozzle.

Note) Run the spatter tube, which is to be directly connected to the nozzle, please connect out through the O ring accessory to torch body.

Note) There are supply water and return water. Connect the assembly correctly as shown in Figures 3.9, 3.10 and 3.11 (detailed view of B).



(Note: you should purchase aPU-301 separately.)

Fig.3.11 Connection of hose (5) (For NB15 Manipulator)

- (9) Connect the cooling water hose to the torch along with the coaxial power cable.
- (10) Bind up the cooling water hose and coaxial power cable with a spiral tube.
Connect spiral tubes to the W/F side as shown with *1 to *3.
[Caution] Slacken off the portions marked with "*" in Fig.3.12.
- (11) Adjust the slack in the cooling water hose.
 - ① Make the robot posture upright and horizontal.
 - ② Rotate the 6th axis to in the maximum (soft limit), and check that no stress is applied to the cooling water hose. [Both +/- side]
 - ③ Rotate the 6th axis to in the maximum (soft limit) in either + or – side, and 4th axis in the other side of the 6th axis to the maximum (soft limit), and then check that no stress is applied the cooling water hose.
 - ④ Rotate both the 4th and 6th axis to the maximum (soft limit) respectively in the other side of the above operation (3), and check that no stress is applied to the cooling water hose.
- (12) Check the slack of cooling water hose, and secure the spiral tube at its end with a cable tie.
- (13) Bind the cooling water hose and coaxial power cable on the W/F side with a cable tie.
- (14) Use cable ties that come with the shock sensor to fix the top end of the power cable cover together with the coaxial power cable, shock sensor cable and cooling water hose.

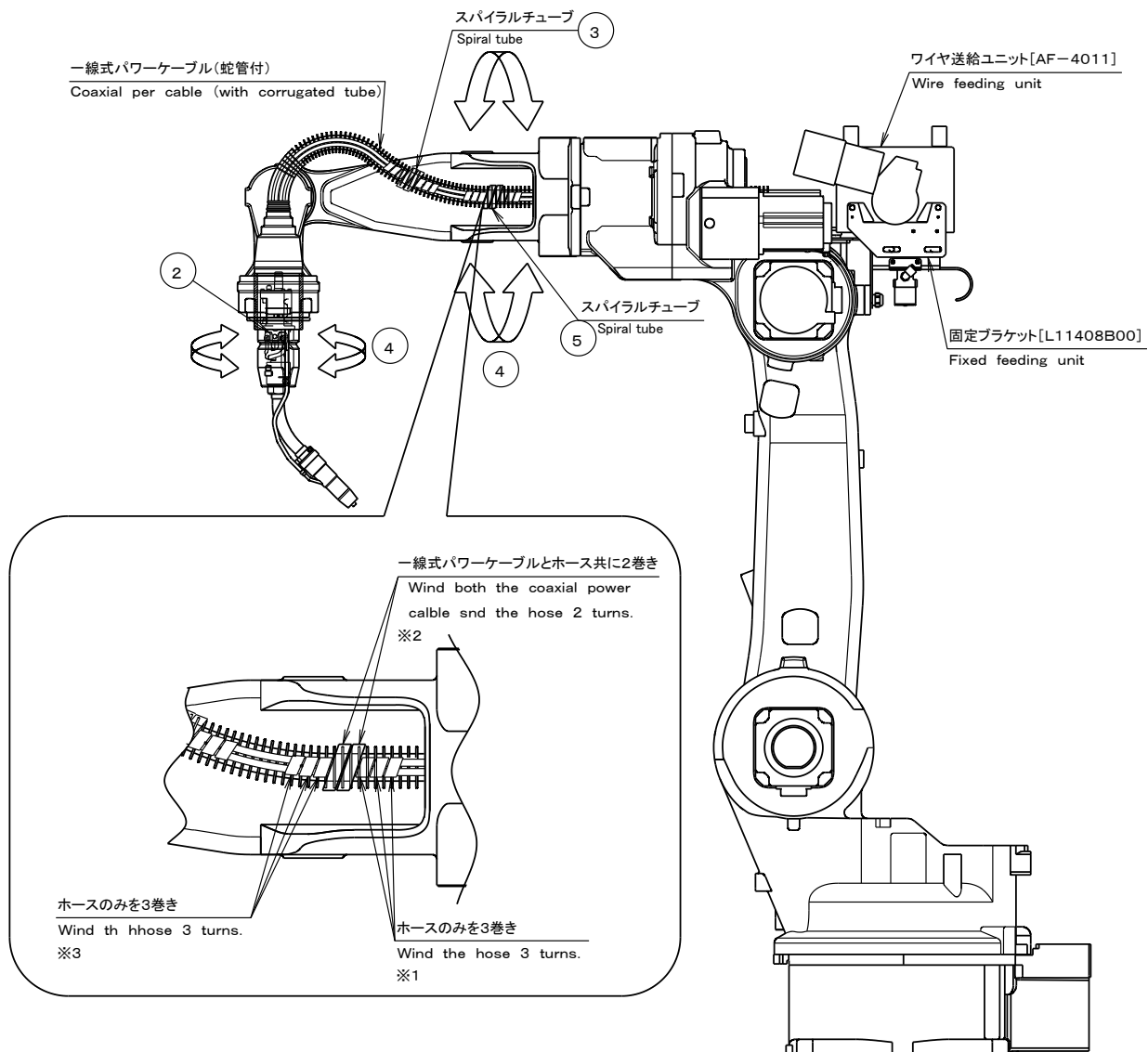


Fig.3.12 Connection of cooling water hose (For NB15 manipulator)

3.4 Handling Instructions for RTWH5000H Torch

- (1) Be sure to install an orifice. Installation of the orifice is essential, which prevents the short circuit likely to happen between the nozzle and torch body, and also avoids turbulence of the shield gas.
- (2) Remove the spatter adhered to the nozzle and contact tip before it gets deposited.
- (3) Be sure to use the DAIHEN genuine tip. Use of a worn-out tip with an enlarged diameter causes conduction defect and wire deflection, which results in unstable Arc and aiming deviation. Therefore, replace the tip accordingly before it gets used up.
- (4) Gas flow shall be 15 l/min or more.
- (5) Clean up the inside of liner (included in the coaxial power cable) and of outlet guide with compressed air or others once in 10 days. Otherwise, deposit of sludge and dust will cause defective wire feeding, which leads to poor welding performance.
- (6) When the wire is stuck at the tip end, the wire will buckle in the liner or be cut in the feed roll. If keeping wire feed performance under such a condition, feeding failure or Arc shortage may occur. To prevent this, remove the wire between the feed roll and tip end first, and then insert a new wire.
- (7) For the teaching program that lets the torch evacuated from the workpiece after welding performance, teach it to pull up the torch obliquely upward so that the shock sensor can work even if the wire sticks on the workpiece.

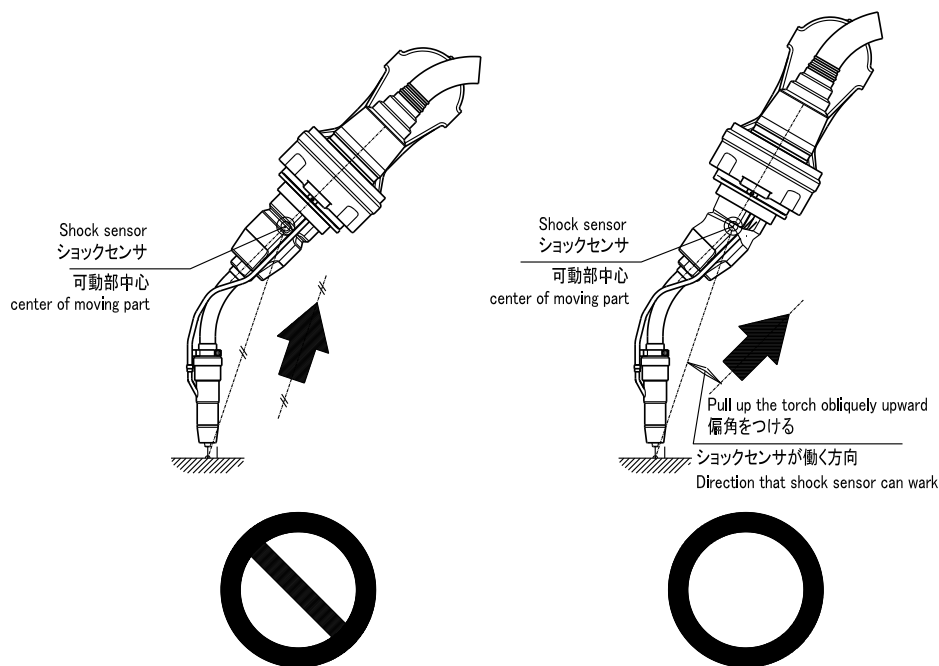


Fig.3.13 Evacuating direction

- (8) The shock sensor is the mechanism to protect the torch and manipulator in the case of collision between the torch and workpiece, but does not guarantee the accuracy of the torch tip teaching point (torch aiming point) afterward. After the shock sensor has worked, check the aiming point of torch again with the torch gauge.
In addition, when the torch is returned slowly to release the operation of shock sensor, target point tends to shift. In such a case, move the shock sensor quickly again and the target point returns to the original target point. The shock sensor absorbs the shock caused by the torch colliding at less than a speed of manual operation mode. When the torch collides at a speed of automatic operation mode (at higher than a speed of manual operation mode), the torch may be damaged.
- (9) When the screws (M5×20) fixing the torch are loose, the torch tip position will be off. Tighten the screws using the proper torque value.

3.5 Attaching and Removing the Nozzle

Since the torch nozzle uses the coupler system, it can be attached and removed in a single operation. To attach/remove the nozzle, follow the procedure below:

3.5.1 Attaching the nozzle

- (1) Insert the nozzle into the torch body.
- (2) Push the nozzle until the pin reaches the end of the cover vertical groove.
To insert the O ring, push the nozzle by gently rotating it.
- (3) Turn the cover counterclockwise to lock the nozzle.

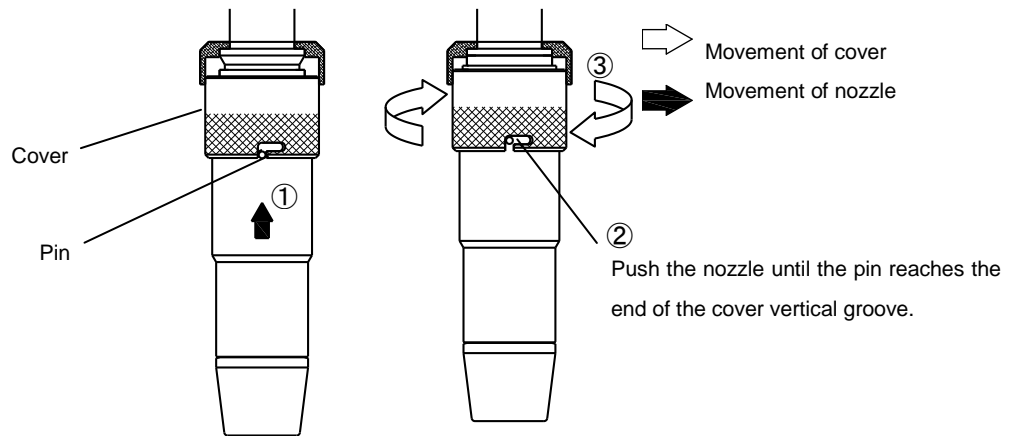


Fig.3.14 Attaching the nozzle

3.5.2 Removing the nozzle

- (1) Turn the cover clockwise to unlock the nozzle.
 - (2) Lift up the cover.
 - (3) While keeping the cover upward, remove the nozzle from the torch.
- (Note 1: Do not remove the nozzle while the cover is kept flat.)
(Note 2: After removing the nozzle, be sure to stop the water tank and then remove the coolant hose, if required.)

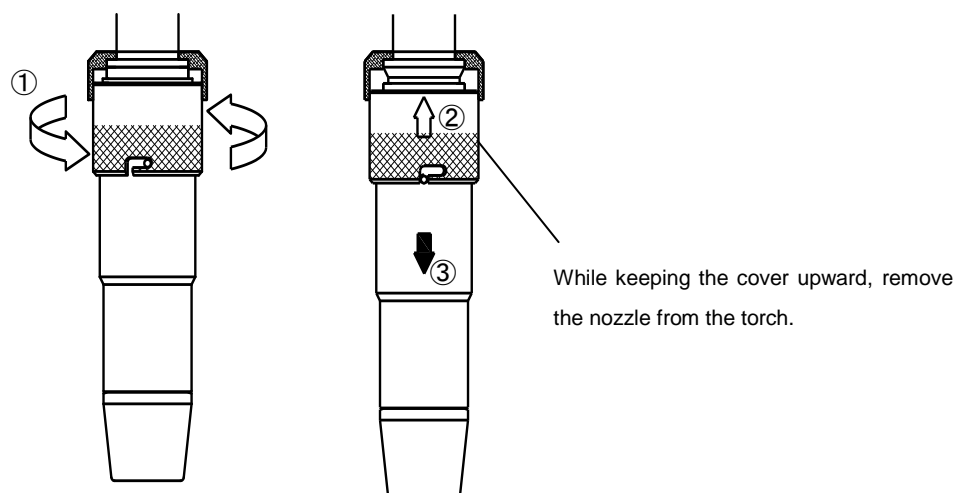


Fig.3.15 Removing the nozzle

4. Coaxial Power Cable for Robot

4.1 Type of Coaxial Power Cables

The coaxial power cable is to lead the wire and shield gas from the wire feeding unit, shock sensor cable, and voltage detection cable (when DL W.P.S used) to the torch. Refer to the table below to choose the coaxial power cable according to the manipulator that you use.

Table 4.1 Type of coaxial power cables

Type	Nominal cable length	Applicable manipulator	Remarks
L-11641	1.1m	NV6,NV20	●
L-11642	1.2m	-	△
L-11643	1.3m	-	△
L-11644	1.4m	NV6L	●
L-11645	1.5m	-	△
L-11646	1.6m	-	△
L-11647	1.7m	-	△
L-11648	1.8m	-	△
L-11649	1.9m	-	△
L-11650	2.0m	-	△
L-11651	2.1m	-	△
L-11655	2.5m	NS3,NH5	△
L-11405	1.0 m	NB15	●

●: Standard, △: Build-to-order

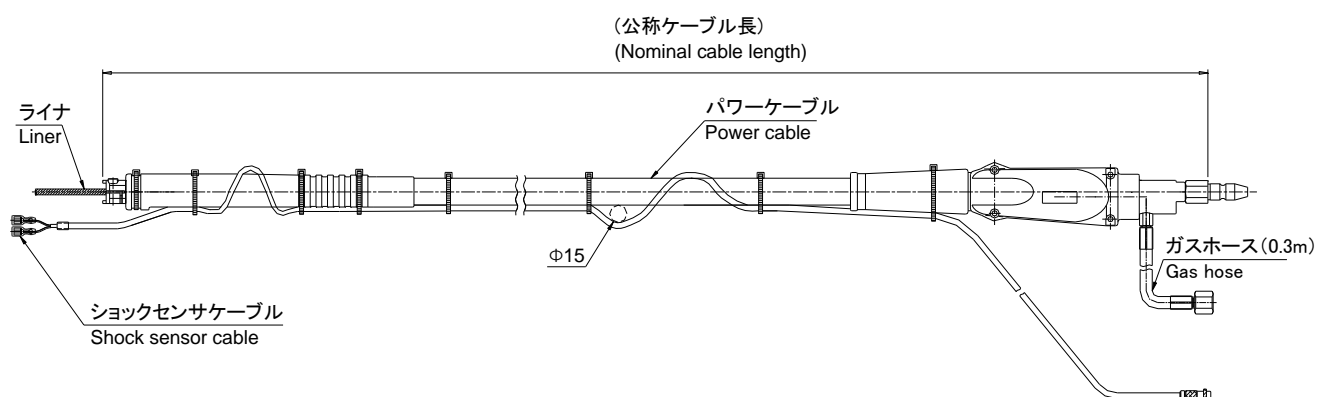


Fig.4.1 Outline drawing of the coaxial power cable(L-11641~L-11655)

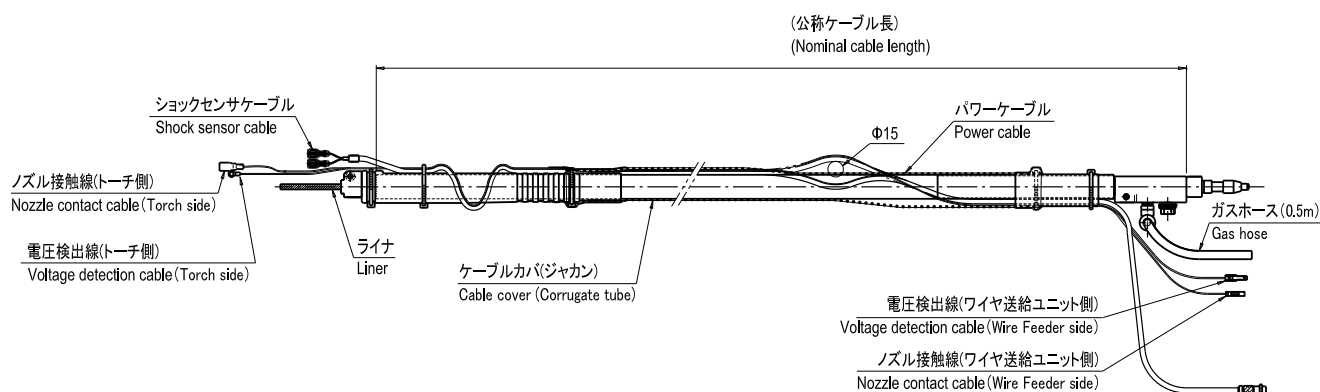


Fig.4.2 Outline drawing of the coaxial power cable(L-11405)

4.2 Connecting the Voltage Detection Cable to the Shock Sensor

Connect a voltage detection wire to the shock sensor as shown in the figure below. To connect a voltage detection wire to SSV-ZRKB, bundle the excess portion of the voltage detection wire together with the shock sensor cable and nozzle contact cable, and then put it in the power cable cover. After that, fix the cover with cable ties.

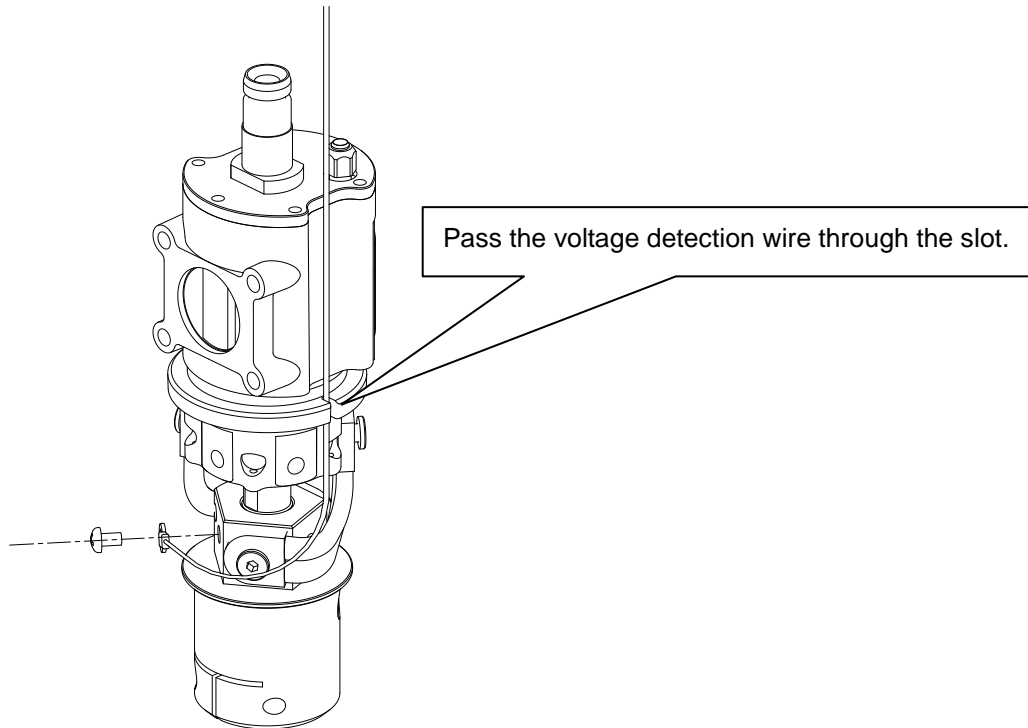


Fig.4.3 Connection the voltage detection cable to the SSV

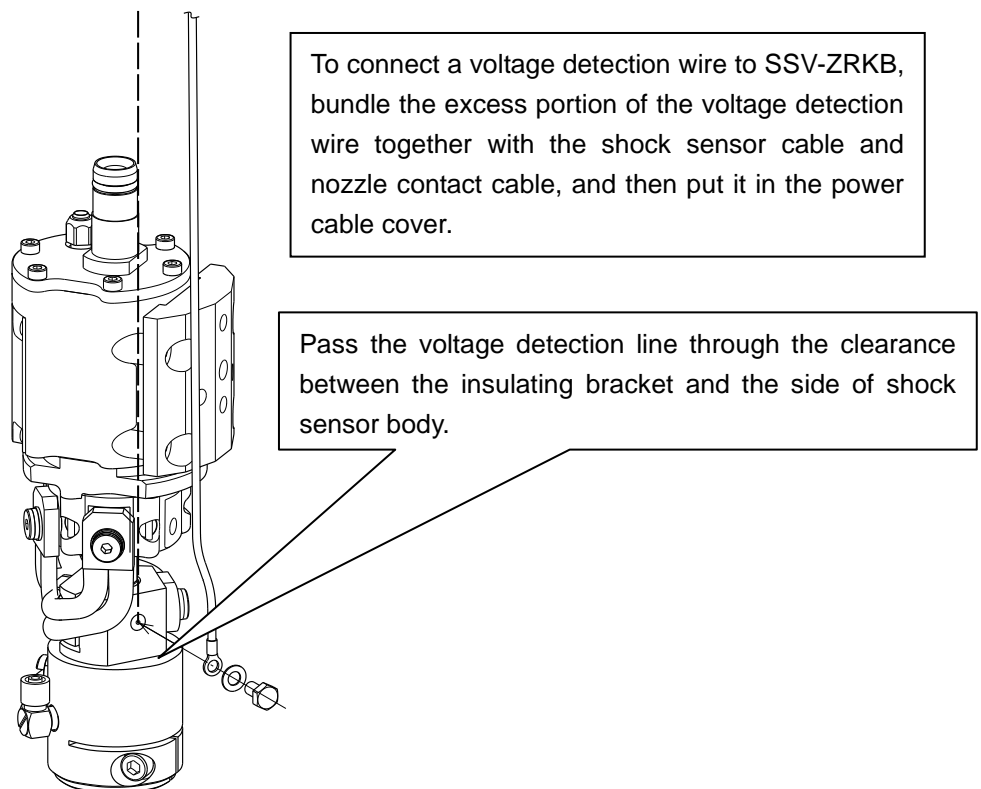


Fig.4.4 Connection the voltage detection cable to the SSV-RZKB

*Use the nozzle contact line together with the detection function. The detection function is being prepared (as option)

4.3 Connection of Coaxial Power Cable

4.3.1 For V type manipulator

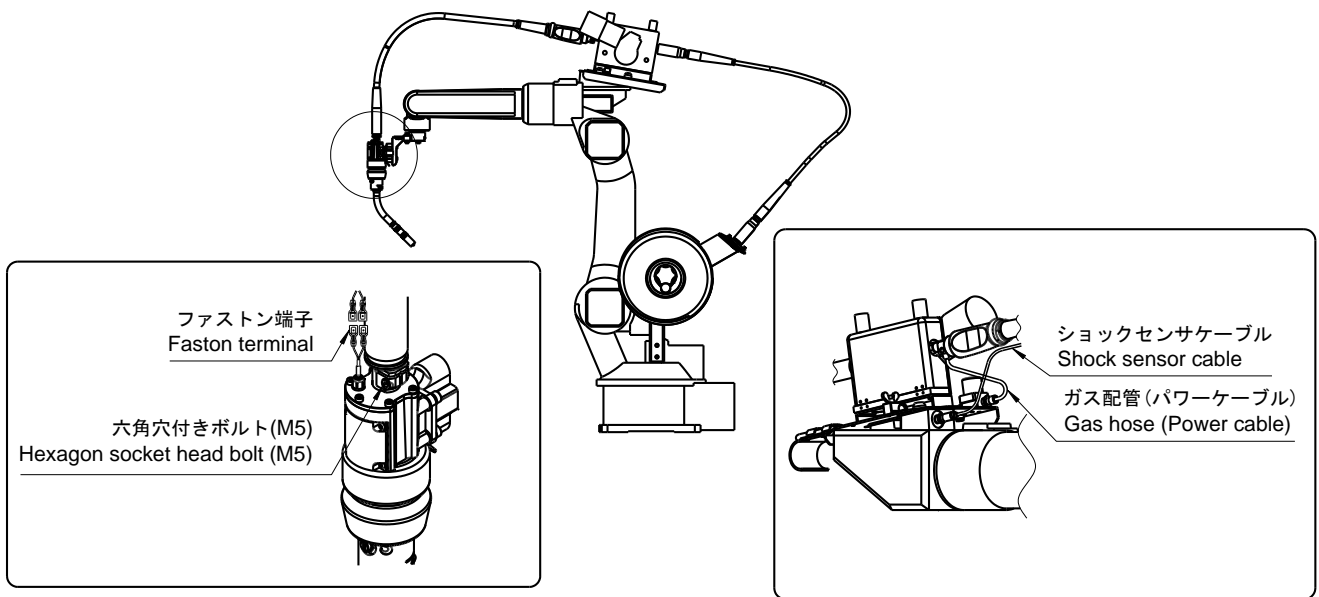


Fig.4.5 Connection of the coaxial power cable (For V type manipulator)

Protect the FASTON terminal of the shock sensor cable with the silicon tube that comes with the coaxial power cable, and then secure it to the coaxial power cable with the cable tie.

Adjust the phases of the shock sensor unit to those of the coaxial power cable as shown Fig. 4.5.

4.3.2 For NB15 manipulator

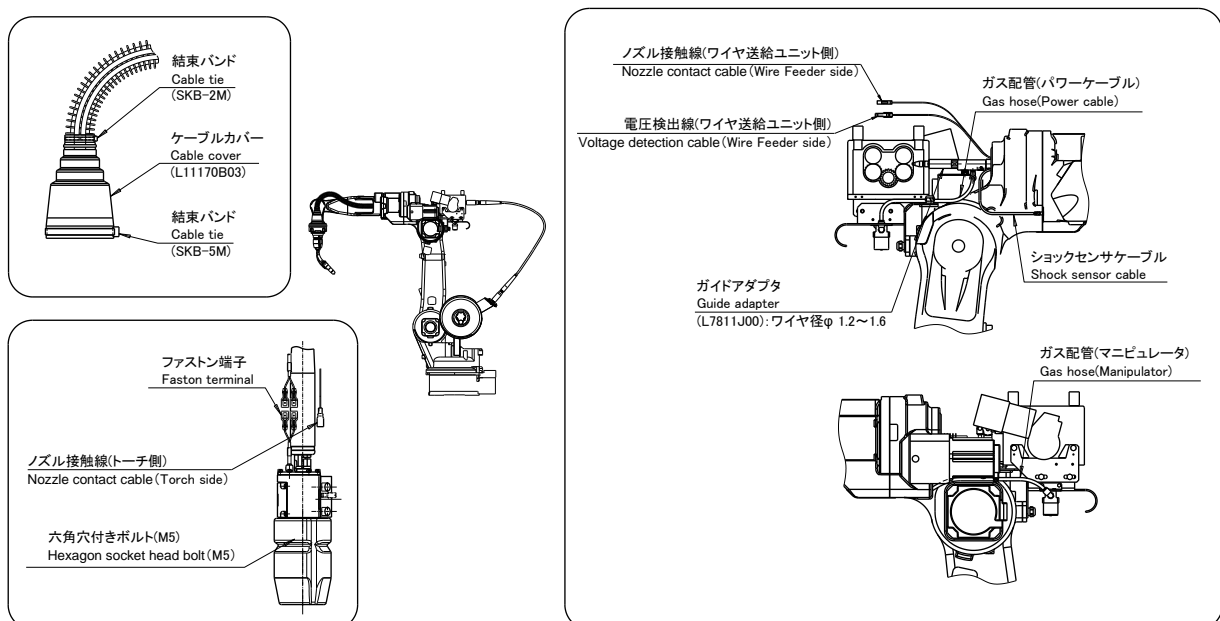


Fig.4.6 Connection of the coaxial power cable (For NB15 manipulator)

After connecting the shock sensor cable and voltage detection line, gather the remaining parts and nozzle contact line (to the torch), put all of them in the cable cover and fix the cover to the coaxial power cable using the cable tie. Also fix the nozzle detection line to the wire supply unit to the coaxial power cable using the cable tie so that it will not prevent the robot from operating smoothly.

Remove the accessory guide adaptor from the coaxial power cable and replace it with the wire guide as shown in Figure 4.6 according to the wire diameter.

4.3.3 Adjustment of the coaxial power cable

- (1) Mount a torch, wire feeding unit (fixing bracket), and coaxial power cable.
- (2) Operate the 5th axis to the maximum (soft limit) toward the manipulator's inner side as shown in Fig.4.7.
- (3) Operate the 6th axis to the maximum (soft limit). (Either in the + or – side.)
- (4) Adjust the fixing bracket in the above posture so that the coaxial power cable does not collide with the cover (see Fig.4.7).

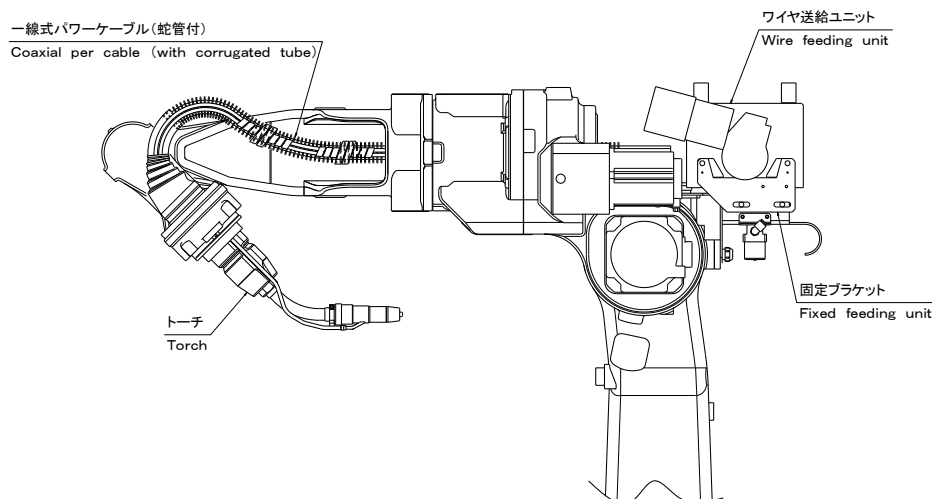


Fig.4.7 Adjustment of the coaxial power cable

4.4 Cutting the Liner

Cut the liner according to the length of each torch, referring to Fig. 4.8 and Table 4.2, Fig.4.9 and Table 4.3. Rasp the edge of the liner's cut section to eliminate burrs.

Also, take enough care not to bend a liner or burr the hole when cutting.

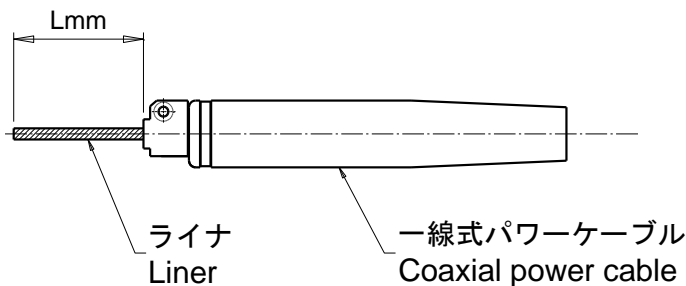


Fig.4.8 Cutting the liner from the coaxial power cable

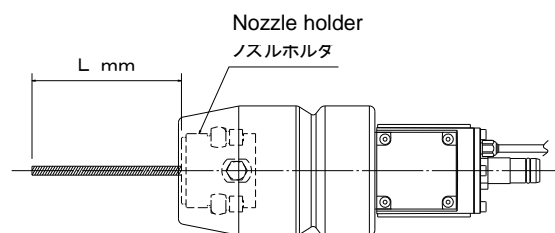


Fig.4.9 Cutting the liner from the coaxial power cable

Table 4.2 Length of liner from coaxial power cable
(Rough measure)

Torch model	L (mm)
RTWH5000H	366

Table 4.3 Length of liner from nozzle holder
(Rough measure)

Torch model	L (mm)
RTWH 5000H	199

4.5 Liner Clamp Function

A liner clamp function is equipped with the nozzle holder of each shock sensor.

During welding, weld wire may sway to cause unstable wire feeding due to clearance between the sensor and the liner in the coaxial power cable. This problem will result in faulty weld arc start or fluctuations in the protrusion length of weld wire.

The liner clamp unit has the effect of reducing the behavior of weld wire by binding the coil liner.

- (1) Unfasten the lock nut, and then thoroughly pull out the clamp screw.
- (2) Insert the coaxial power cable.
- (3) Gradually turn the clamp screw until it hits against the liner, and then make it 1/4 turns.
- (4) Clamp the liner with the lock nut.

Note) Turning the clamp screw excessively will crush the liner to disable weld wire feeding.

Note) To dismount the coaxial power cable or the liner, unclamp the liner clamp first.

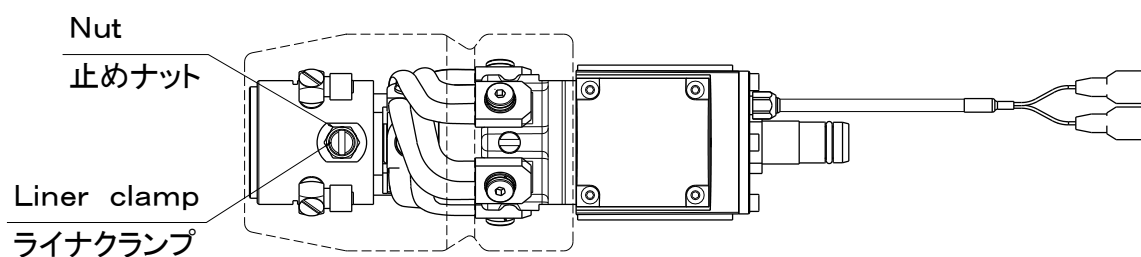


Fig.4.10 Liner clamp

5. Attaching to NB15 manipulator

5.1 Cautions on Wiring to the Manipulator of the Wire Supply Unit

When connecting the motor lines, encoder lines and solenoid valves of the wire supply unit, observe the following cautions on operation.

- The PE bag covering the wiring in the manipulator shoulder is provided to protect the connector.
- When wiring, once remove the PE bag for connector protection.
- Keep the removed PE bag at hand because it is reused after completion of wiring.

5.2 Attaching to V type Manipulator

For the attaching to V type Manipulator, see the instruction manual (L-10595-E-*) for wire feeding unit.

5.3 Attaching to NB15 Manipulator

Attach the wire supply unit to the manipulator shoulder using the following procedure.

A W/F lock bracket (L11408A00: for NB15) is required separately. Be sure to prepare it in advance.

For the configuration of the wire supply unit and the lock bracket, see Figure 5.1.

- (1) Attach the bracket and insulating plate 2 to the wire supply unit as shown in Figure 5.1.
Use the hexagon head bolt provided with the wire supply unit. However, when attaching them to NB15, two washers and nuts (accessories) are not required. Be sure to put the insulating cover over the hexagon head bolt after attachment.
- (2) Attach the lock bracket, insulation plate 1 (using hexagon head bolt: M8x30 x 1) and insulating plate 2 (using hexagon head bolt; M8x35 x 2) to the manipulator as shown in Figure 5.1. Be sure to attach insulating plates 1 and 2 by sandwiching them between the manipulator and the mounting bracket. Also be sure to attach the insulating bush to the hexagon head bolts. After completion of attachment, attach the insulating cover to the hexagon head bolts.
- (3) Fix the mounting bracket and lock bracket using 2 hexagon head bolt (M8x20) and attach the wire supply unit to the manipulator. You can adjust the attachment position in the front-back direction. To do this, loosen the hexagon head bolt to enable the unit to slide.
- (4) Attach the coaxial power cable to the wire supply unit. Remove the guide adaptor from the coaxial power cable and reattach the guide adaptor (3) (ϕ 1.2~ ϕ 1.6) provided with the W/F lock bracket.
- (5) Attach the coaxial power cable to the wire supply unit. Remove the guide adaptor from the coaxial power cable and After attaching the coaxial power cable to the wire supply unit, operate the manipulator to the following position as shown in Figure 5.2:attach the guide adaptor (3) (ϕ 1.2~ ϕ 1.6) provided with the W/F lock bracket.
5th axis: To the MAX position of the minus (-) direction (inside) on the manipulator (soft limit)
6th axis: To the MAX position (soft limit, either plus (+) or minus (-) direction will be OK.)
- (6) As shown in Figure 5.2, adjust the slide plate position so that the coaxial power cable does not hit the robot arm in the position of (4), and then fix the slide plate.
- (7) As shown in Figure 5.3, plumb the gas hose to the solenoid valve. Run gas piping IN along the upper portion of the 3rd axis motor. Pass gas piping OUT through the clearance between the wire supply unit and the lock bracket.
- (8) Remove the 4th axis lower cover from the entire 4th axis cover of the robot. (See Figure 5.4.)
- (9) Pull the wire from the 4th axis cover. Remove the PE bag once, which protects the connector.
Note) Keep the removed PE bag at hand because it is reused after completion of wiring.
- (10) As shown in Figure 5.4, pull the motor line, encoder line and voltage detection line from the hole where the 4th axis lower cover has been removed.

- (11) Connect the wire supply unit to the main unit cable. For further information on cable connection, see the electrical circuit diagram in Section 10.
- (12) After completion of connection, insert the connector in the PE bag removed in (9), tighten the opening of bag using a cable tie and store it inside the 4th axis cover. Then, reattach the 4th axis lower cover to the original position.

Note) The shock sensor connector is incorporated into the manipulator. The solenoid valve is incorporated into the lock bracket.

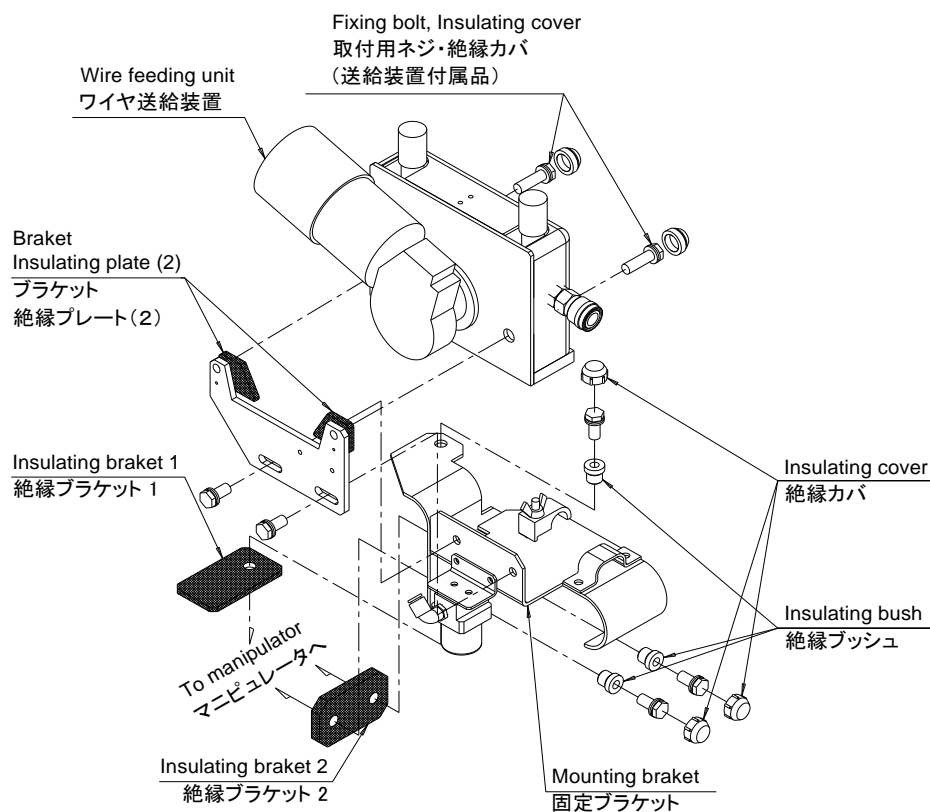


Fig.5.1 Attaching to NB15 manipulator (procedure(1)~(3))

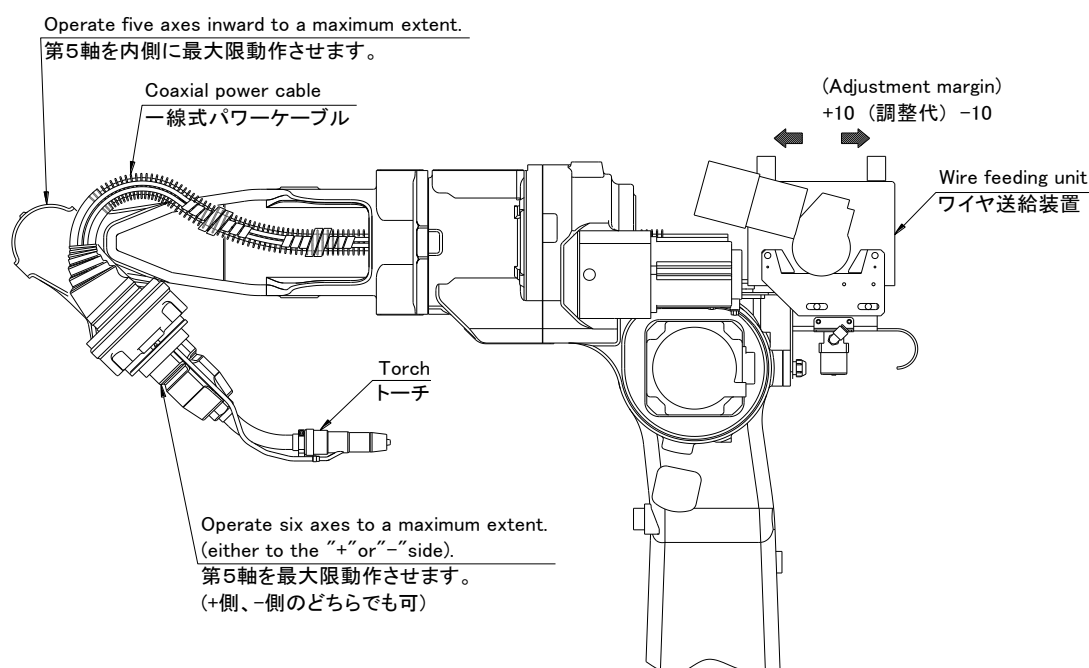


Fig.5.2 Attaching to NB15 manipulator (procedure (4)~(6))

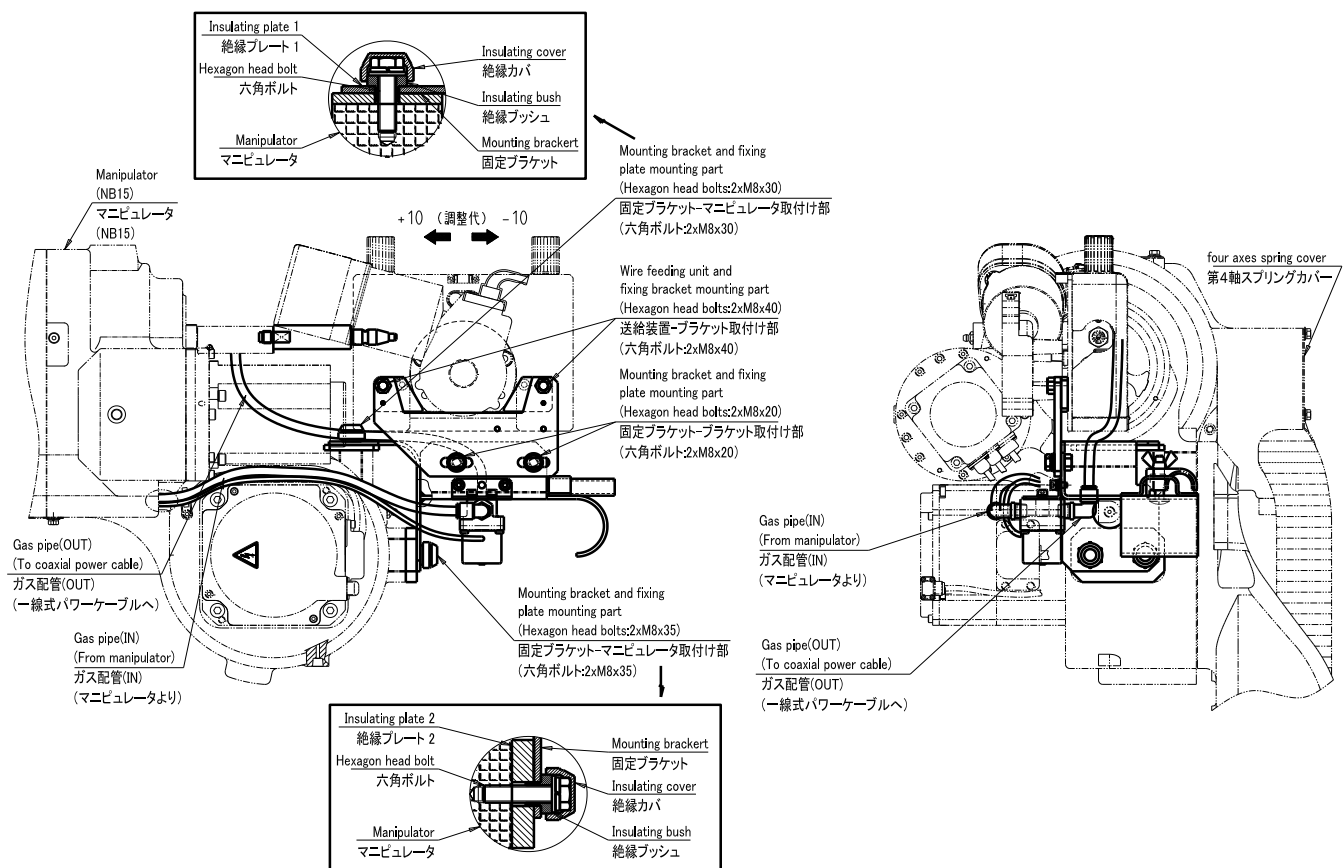


Fig.5.3 Attaching to NB15 manipulator (procedure (7))

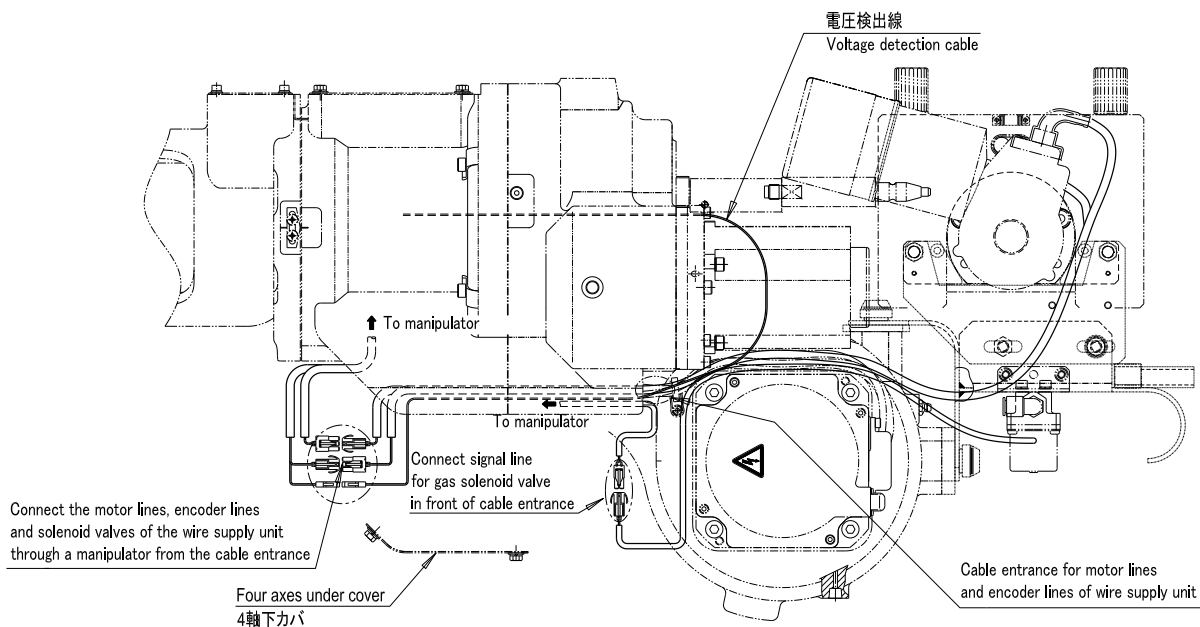


Fig.5.4 Attaching to NB15 manipulator (procedure (8)~(12))

6. Setting the Robot Controller

6.1 Checking the Tool Parameter

On delivery of the robot, the data of the welding torch (tool parameter) in use are not set.

Then, specify the tool parameter depending on the type of robot and torch as described below.

For the installation posture of torch, see Fig. 6.1.

Table 6.1 Tool constants of RTWH5000H torch

V Type	Length			Angle			Center of G			Weight	Moment of inertia			Radius	Reference drawing
	X [mm]	Y [mm]	Z [mm]	Rx [deg]	Ry [deg]	Rz [deg]	Gx [mm]	Gy [mm]	Gz [mm]	Mass [kg]	Ix kgm ²	Iy kgm ²	Iz kgm ²	r mm	
RTWH5000H	0	0	400	180	-45	0	104	0	151	2.6	0.180	0.210	0.030	0.0	Fig.6.1(left)

NB15	Length			Angle			Center of G			Weight	Moment of inertia			Radius	Reference drawing
	X [mm]	Y [mm]	Z [mm]	Rx [deg]	Ry [deg]	Rz [deg]	Gx [mm]	Gy [mm]	Gz [mm]	Mass [kg]	Ix kgm ²	Iy kgm ²	Iz kgm ²	r mm	
RTWH5000H	-140	0	325	180	-45	0	-16.0	0	96.0	2.0	0.043	0.045	0.003	0.0	Fig.6.1(right)

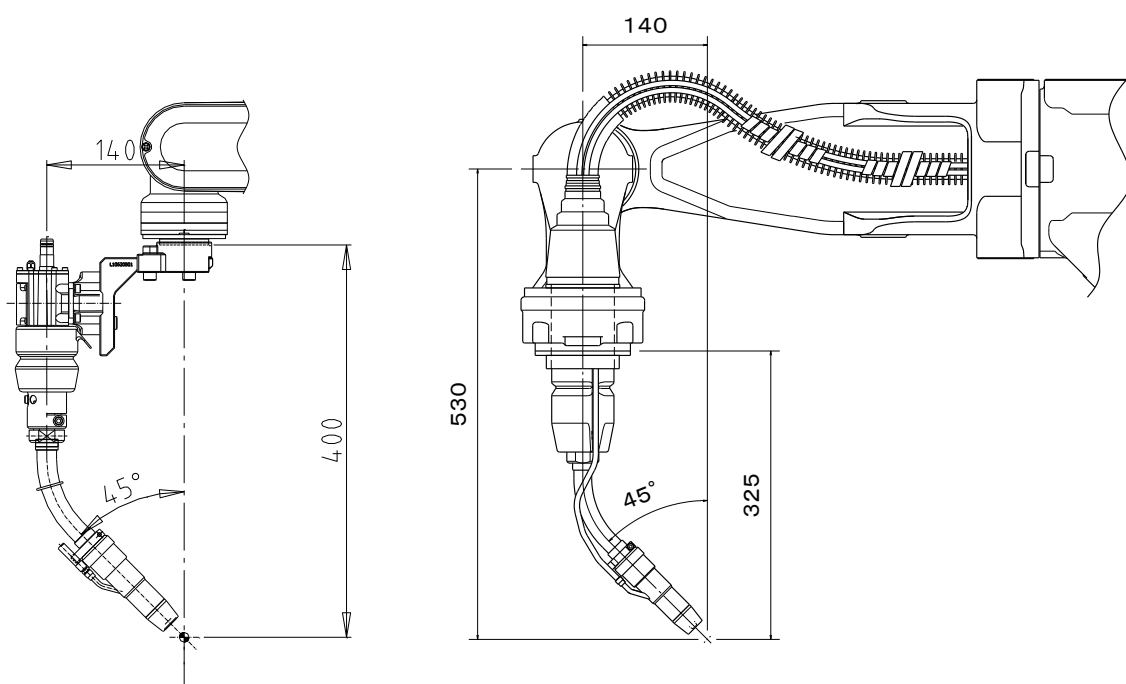


Fig.6.1 Installation form of torch (left :For V type manipulator , right :For NB15 manipulator)

Refer to the instruction manual for each manipulator if the data in Table 6.2 have not been set.

Table 6.2 Reference instruction manual

Type	Reference instruction manual
FD manipulator	Chapter 4, SETUP (1L21700B-E-*)

6.2 Checking the Shock Sensor Operation

6.2.1 External force for actuating the shock sensor

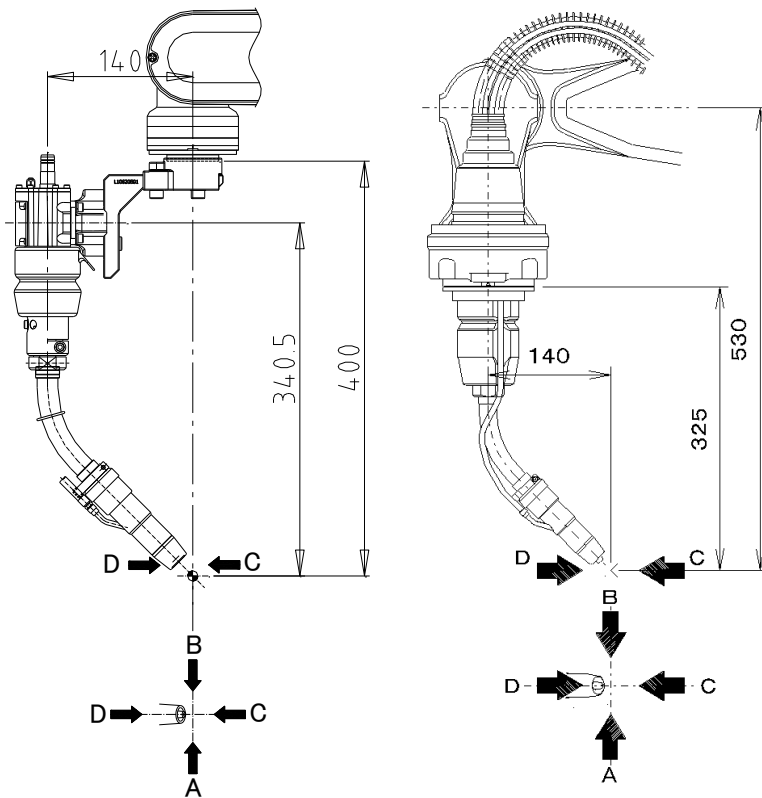


Table 6.3 External force

Shock Sensor	SSV	SSV-RZKB
Direction	External force (kg)	
A	3.0	5.0
B	3.0	5.0
C	3.0	5.0
D	3.0	5.0

The table 6.3 shows the rough standard load to actuate the shock sensor when the external force is applied on the torch tip. These values depend on the shape and length of the torch.

Fig.6.2 Direction of the external force (left : SSV , right : SSV-RZKB)

6.2.2 Checking the shock sensor operation

○ FD controller

Press the torch tip in by hand and check that the following message appears on

[2] The failure monitor screen (See Fig.6.3).

Error category : Emergency stop failure

Error code : A4920

The message will disappear by unhanding the torch.

If no message is displayed, the shock sensor cable might cause a short circuit. In contrast, if any message remains displayed, the shock sensor cable might not be connected or might have breaks.

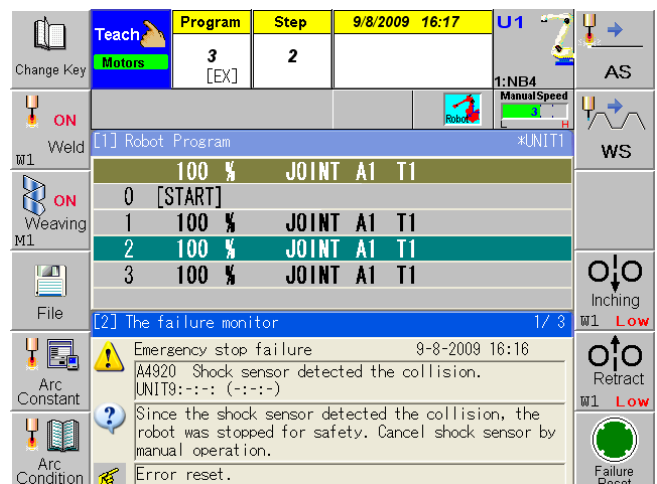


Fig. 6.3 TP screen (FD manipulator)

* For details of the failure monitor screen, refer to Chapter in the Instruction Manual for Manipulator "CONTROL AND MAINTENANCE FUNCTION" (1L21700L-E-*) in FD controller.

7. Troubleshooting

Phenomena	Possible cause
No arc generation	<ul style="list-style-type: none"> ▪ Contact failure or breaking of welding cable.
No smooth wire feeding Unstable welding performance	<ul style="list-style-type: none"> ▪ Shortage of wire pressure in the feed roll. ▪ Tip wear. ▪ Outlet guide wear. ▪ Wire waste powder has deposited in a wire feeding path.
Wire contact on tip	<ul style="list-style-type: none"> ▪ No smooth wire feeding. ▪ The hole on the tip became larger. ▪ The distance between tip and workpiece is too short.
Shock sensor cannot be released.	<ul style="list-style-type: none"> ▪ Contact failure or breaking of shock sensor cable. ▪ Nozzle is bent. <p>* When a contact accident occurs and the robot operation stops by the shock sensor's detection signal, first investigate the cause of the accident. Pay close attention while operating the robot or restoring the power without known cause. It may be hazardous. To release the contact, see the Instruction Manual for robot controller "CONTROL AND MAINTENANCE FUNCTION"</p>
Aim deviation	<ul style="list-style-type: none"> ▪ Orifice is not mounted. <p>* If an orifice is not mounted, spatter will be deposited inside to lead conduction between the nozzle and tip body. This will result in anomalous arc discharge and bending in the tip body.</p> <ul style="list-style-type: none"> ▪ The torch fixing screws (M6 × 12) are loose. ▪ The shock sensor has worked because of hitting the torch. <p>* Move back the torch quickly so that the aiming point will be coincident with the original point.</p>
Poor shielding	<ul style="list-style-type: none"> ▪ Specified tip and nozzle are not mounted. ▪ Breaking in the hose (the air-blow torch).

8. Replacement Parts for Various Wire Diameters

8.1 Replacement Parts for Various Wire Diameters of Torch

Following parts shall be changed depending on the wire diameter in use.

【Torch related】

(1) Tip

【Coaxial power cable】

(2) Coil liner

(3) Outlet guide

(4) Guide adapt

【Wire feeding unit】

(5) Feeding roll

(6) Inlet guide

Use the parts suitable for each wire diameter when changing the welding wire.

The parts are listed as follows.

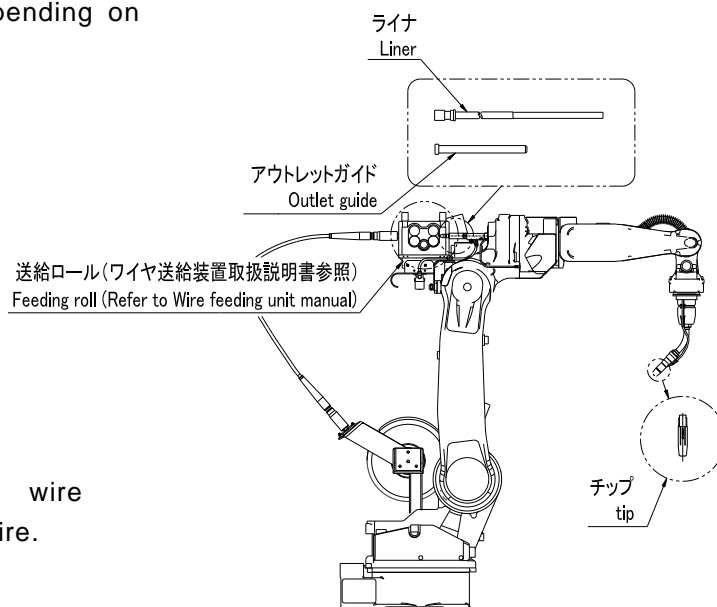


Fig.8.1 Replacement parts for various wire diameters

Note) For the feeding roll, see the instruction manual for wire feeding unit.

Note) Use the outlet guide with wire diameter $\phi 1.2 - 1.6$: L7811J00, not the one provided with the coaxial power cable.

Table 8.1 Combination of tip

● Standard
△ Option

Wire dia.	$\phi 1.2$	$\phi 1.4$	$\phi 1.6$	Tip nut
Torch model				
Part No.	L10361B04	L10361B05	L10361B06	L 10411D02
	△	△	●	●
Outline drawing	Marking of wire diameter ワイヤ径刻印 			
Part No.	L7250B04	L7250B05	L7250B06	L 10411D04
	△	△	△	△
Outline drawing	Marking of wire diameter ワイヤ径刻印 			

Note) To use a M6 chip, you should purchase a tip nut [L10411D04] separately.

9. Parts List

If the components are worn out or damaged while using this torch, see the following table and contact our sales agent. When ordering, be sure to provide the item name and part No. (or the specification).

i important

- Time limitation for parts supply

The minimum time limitation for the product parts is set to the 7th year from the end of production.

Table 9.1 Parts list for RTWH5000H.

No	Part No.	Item	Qt.	Remarks	No	Part No.	Item	Qt.	Remarks
1	L11402B00	Torch body Assy	1		16	L10402F00	Cooling water hose(4)	1	6m,red
2	L10411C00	Nozzle body Assy	1		17	L10402G00	Cooling water hose(5)	(1)	8m,option,red
3	L10411D01	Insulator	1		18	L10402H00	Cooling water hose(6)	(1)	10m,option,red
4	L10411D02	Tip nut	1		19	L11402J00	Plumbing fittings ASSY	1	
5	U5685M02	Orifice	1		20	L11407B00	Torch mounting buracket	1	
6	4D-P14	"O"ring	1	P14 (Viton)	Option				
7	L10411J00	Hose guide	1		21	L10411D04	Tip Nut (M6)	(1)	For M6 tip
8	L10411D03	Spatter cover	1	Option	22	L7250B04	Tip (1.2)	(1)	M6 tip
9	L10361B04	Tip (1.2R)	(1)	Option	23	L7250B05	Tip (1.4)	(1)	M6 tip
10	L10361B05	Tip (1.4R)	(1)	Option	24	L7250B06	Tip (1.6)	(1)	M6 tip
11	L10361B06	Tip (1.6R)	(1)	Option					
12	U2559P05	Wrench	1						
13	L10402C00	Cooling water hose(1)	1	6m, blue					
14	L10402D00	Cooling water hose(2)	(1)	8m,option,blue					
15	L10402E00	Cooling water hose(3)	(1)	10m,option,blue					

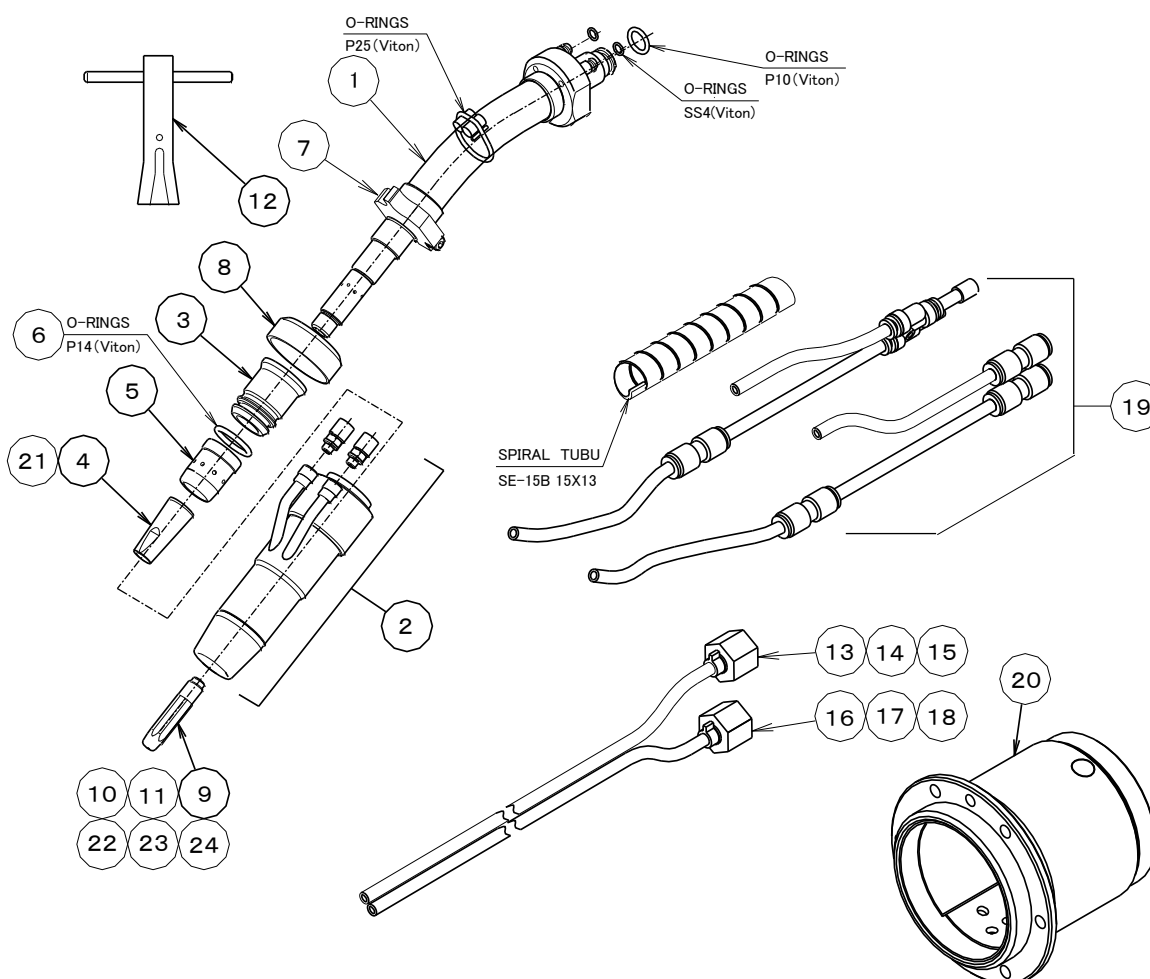


Fig.9.1 Exploded diagram for RTWH5000H

Table 9.2 Parts list for SSV

No	Part No.	Item	Qt.	R e m a r k s
1	L10601D	Power-feeding cable ASSY	2	
2	L10602C	Nozzle holder ASSY	1	
3	L10602B02	Hood	1	
4	3574-017	"O"-ring	1	
5	L10602B00	Shock sensor unit	1	
6	L10772B00	Shock sensor unit	(1)	Reinforced spring type

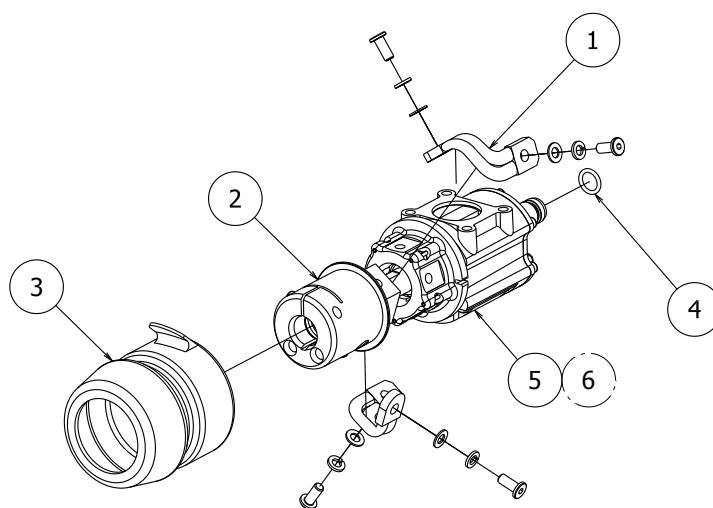


Fig.9.2 Exploded diagram for SSV

Table 9.3 Parts list for SSV-RZKB

No	Part No.	Item	Qt.	R e m a r k s
1	L11170B00	Shock sensor unit	1	
2	L11170F02	Nozzle holder ASSY	1	
3	L10411K00	Hood	1	
4	L11170B02	"O"-ring	1	
5	L11170B03	Shock sensor unit	1	
6	L11170C00	Shock sensor unit	1	
7	M T C S B 4	Cap	4	MISUMI

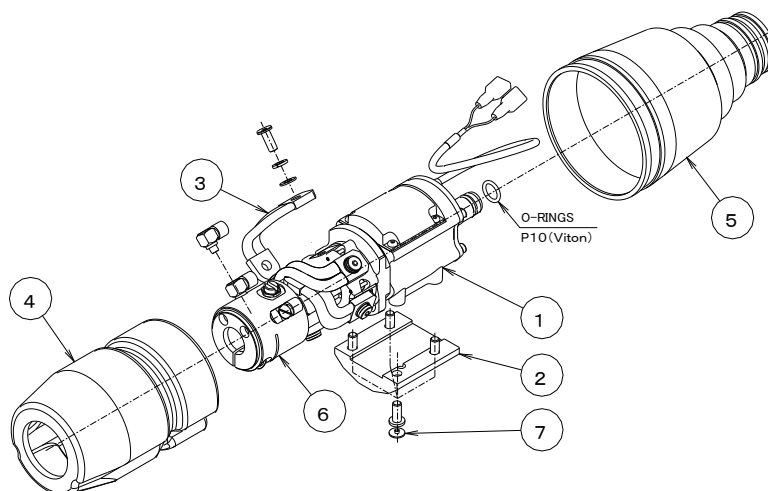


Fig.9.3 Exploded diagram for SSV

Table 9.4 Parts list for the coaxial power cable (For V type manipulator)

No	Part No.	Item	Qt.	Remarks	No	Part No.	Item	Qt.	Remarks
1	See Table. below.	Power cable ASSY	1st		【List of Power cable ASSY】				
2	See Table. below.	Shock sensor cable	1st		1	L 11641B00	Power cable ASSY (1.1M)	1st	For L-11641
3	L 6611B00	Gas hose ASSY	1st			L 11641D00	Power cable ASSY (1.2M)	1st	For L-11642
4	L11641C01	Power adaptor	1			L 11641E00	Power cable ASSY (1.3M)	1st	For L-11643
5	U 5035K00	Cable clamp	1st			L 11641F00	Power cable ASSY (1.4M)	1st	For L-11644
6	L 7810D05	Guide adaptor	1			L 11641G00	Power cable ASSY (1.5M)	1st	For L-11645
7	U 69B35	Outlet guide (1.2~1.6)	1			L 11641H00	Power cable ASSY (1.6M)	1st	For L-11646
8	U 69B34	Outlet guide (0.9~1.2)	(1)	Option		L 11641K00	Power cable ASSY (1.8M)	1st	For L-11648
9	L 6611D01	Liner (1.2~1.6)	1	For L-11641~L-11643		L 11641N00	Power cable ASSY (2.1M)	1st	For L-11651
10	U 4173G04	Liner (1.2~1.6)	1	For L-11644~L-11655		L 11641S00	Power cable ASSY (2.5M)	1st	For L-11655
11	L 6611D02	Liner (0.9~1.2)	(1)	For L-11641~L-11643	【List of Shock sensor cable】				
12	U 4170H02	Liner (0.9~1.2)	(1)	For L-11644~L-11655	2	L 10666J00	Shock sensor cable (8)	1st	For L-10621
						L 10666K00	Shock sensor cable (9)	1st	For L-11642
						L 10666L00	Shock sensor cable (10)	1st	For L-11643
						L 10666M00	Shock sensor cable (11)	1st	For L-11644
						L 10666N00	Shock sensor cable (12)	1st	For L-11645
						L 10666P00	Shock sensor cable (13)	1st	For L-11646
						L 10666R00	Shock sensor cable (15)	1st	For L-11648
						L 10666U00	Shock sensor cable (18)	1st	For L-11651
						L 10666Y00	Shock sensor cable (22)	1st	For L-11655

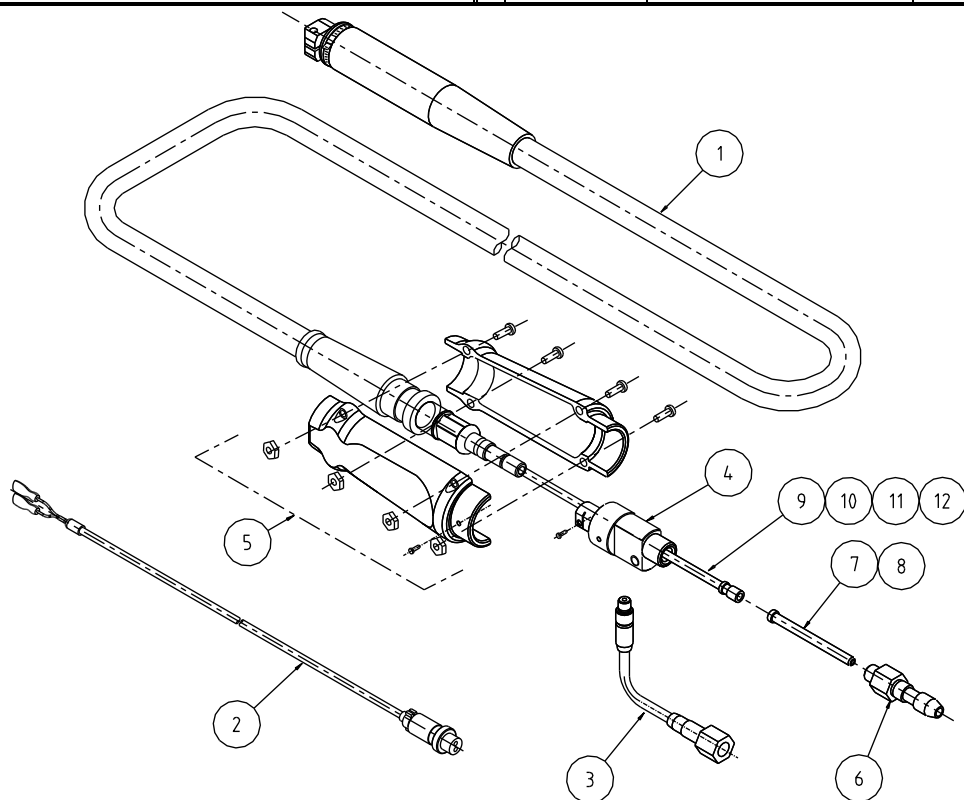


Fig.9.4 Exploded diagram for the coaxial power cable (For V type manipulator)

Table 9.5 Parts list for the coaxial power cable (For NB15 manipulator)

No	Part No.	Item	Qt.	Remarks	No	Part No.	Item	Qt.	Remarks
1	L 11175 B 0 0	Power cable ASSY	1 st		【List of sensor cable】				
2	L 10110 C 0 0	Connection ASSY	1 st		9	L 10666 K 0 0	Shock sensor cable	1 st	
2-1	L 10110 C 0 1	Connection	(1)		10	L 10140 C 0 0	Voltage detection cable	1 st	
3	L 11175 D 0 0	Cable cover ASSY	1 st		11	L 11405 J 0 0	Line nozzle detection	1 st	
4	U 7 8 5 C 1 3	Guide adaptor	1 st		12	L 11175 L 0 0	Nozzle contact detection cable	1 st	
5	U 6 9 B 3 4	Outlet guide (0.9~1.2)	(1)	Option					
6	U 6 9 B 3 5	Outlet guide (1.2~1.6)	1 st						
7	L 6 6 1 1 D 0 2	Liner (0.9~1.2)	(1)	Option					
8	L 6 6 1 1 D 0 1	Liner (1.2~1.6)	1 st						

Note) Use the Line nozzle detection and Nozzle contact detection cable together with the detection function.
The detection function is being prepared (as option)

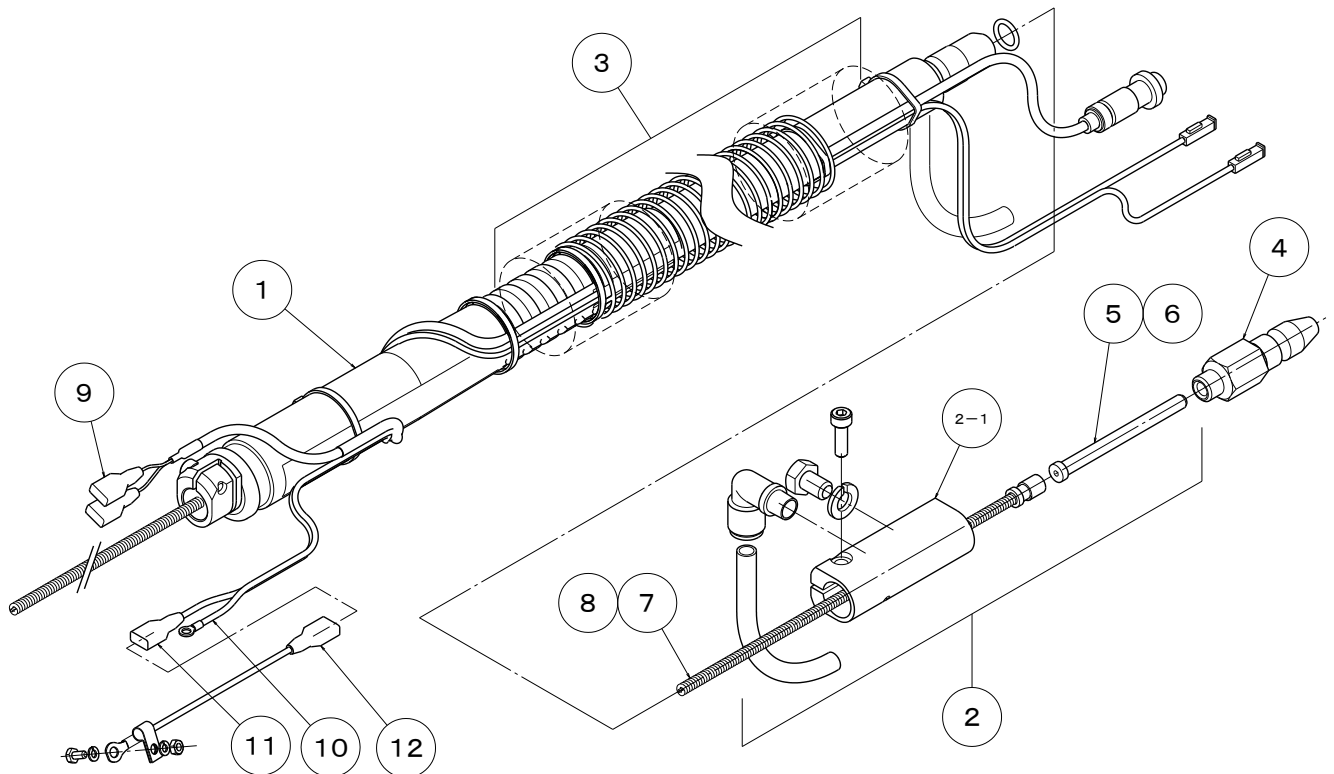
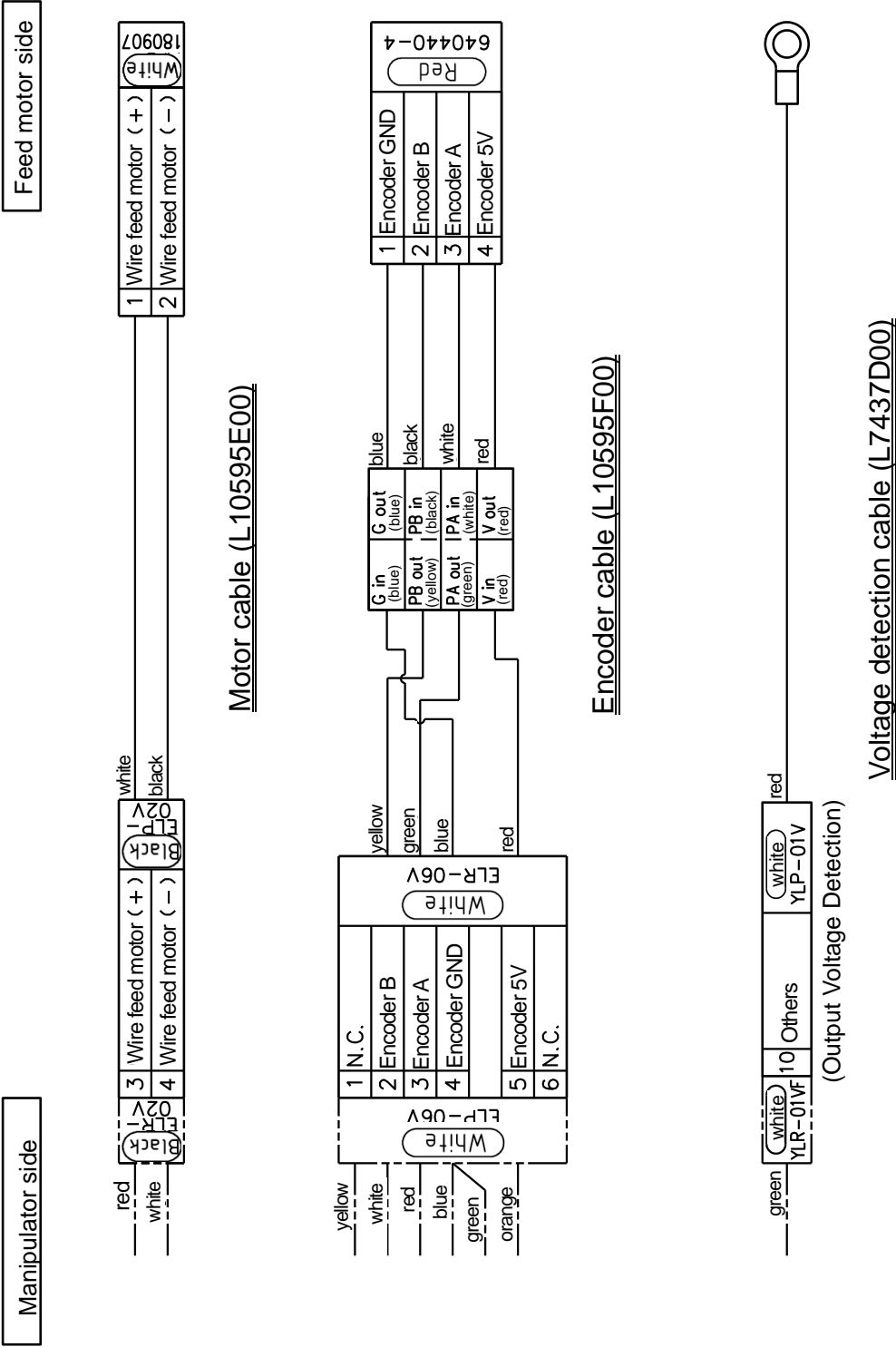


Fig.9.5 Exploded diagram for the coaxial power cable (For NB15 manipulator)

10. Electrical circuit diagram

10.1 Electrical Circuit Diagram (L10595E00,L10595F00,L7437D00)



Instruction Manual for CO₂/MAG Welding Torch
RTWH5000H

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