DAIHEN Corporation

CO_2/ MAG/ MIG Wire feeding unit

AF－4012
AFA－4012

Instruction Manual

= Safety and Handling Operation =

Instruction Manual No.

Wire feeding unit [AF-4012/AFA-4012]･･･1L11236-E-2

First, read this instruction manual thoroughly, and operate the unit correctly.

- To ensure the safety, only the qualified personnel or the personnel who has fully understood the welding robot must perform maintenance, inspection and repair work of this unit.
- To ensure the safety, only the personnel who has fully understood this instruction manual and acquired sufficient knowledge and skill must perform the operation work of this unit.
- Regarding the safety education, take courses and classes held by the head/branch offices of Welding Society/Association or related societies/associations.
  Also, utilize the qualifying examination for welding experts/consultant engineers.
- After reading this instruction manual, place it together with a warranty so that the personnel concerned can review anytime as needed.
- If you find anything unclear, or about servicing, contact our local distributor or sales representatives in your country.

The addresses and telephone numbers for you to contact are listed in the back cover of this instruction manual.

Contents

Note on Safety

1. Note on Safety

- Before operating, thoroughly read this instruction manual, and operate this unit correctly.
- Caution note mentioned in this manual is to use the equipment safely and prevent danger and damage from occurring.
- This wire feeding unit is designed and manufactured upon due consideration of safety. However, be sure to follow the instructions and cautions described in this manual when using it. Otherwise, there may occur an accident resulting in death or a serious injury.
- Mishandling of equipment may cause various levels of accidents and damage. In order to draw attention to mishandling, three levels of safety alert symbols; “DANGER”, “WARNING” and “CAUTION” are adopted throughout this manual. See below for the details.

DANGER	Mishandling may cause death or a serious injury to an operator. Also, the level of urgency to alert is high when a danger occurs. Limited situation of great urgency.
WARNING	Mishandling may cause death or a serious injury to an operator.
CAUTION	Mishandling may cause a medium or slight injury to an operator or property damage.

Even if the matters mentioned in **CAUTION** may occasionally cause a serious injury depending on a condition. Be sure to comply with the notes and instructions.

”Serious injury”, “Medium or slight injury” and “Property damage” mentioned above give the meanings as follows.

Serious injury	:	Injury that leaves sequelae caused by a loss of eyesight, injury, burn (high/low temperature), electric shock, bone fracture, poisoning etc,. Or, injury that requires hospitalization or long-term treatment as an outpatient.
Medium or slight injury	:	Damage including injury, burn (high/low temperature), electric shock and others that does not require either hospitalization or long-term treatment.
Property damage	:	Damage to property and direct/indirect damage to equipment.

Caution Note on Safety

2. Requirements on Safety

2.1 Before starting welding operation, thoroughly read and understand the related safety rules and caution note below in addition to the instruction manual for welding power supply.
Be sure to follow the instructions.

⚠ **WARNING**	● To avoid a fatal physical accident, follow the notes below.

1) This wire feeding unit is designed and manufactured upon due consideration of safety, however be sure to follow the notes described in this instruction manual. If operating this unit without following the instructions, a fatal accident such as death or a serious injury may occur.
2) For selecting the installation area, handling/storing/piping high pressure gas, storing the welded manufactures and disposal of waste, comply with rules and regulations in your company.
3) Keep away from the welding power supply and the welding operation area.
4) A person with a pacemaker must not approach the welding power supply turned ON and the welding operation area without getting the permission by his/her doctor. The welding power supply turned ON generates the magnetic field, which adversely affects on a pacemaker.
5) To ensure safety, only the qualified personnel or those who fully understand this wire feeding unit must perform the maintenance and repair work of the unit. (※1)
6) To ensure safety, only the personnel who fully understand this instruction manual and have sufficient knowledge and skill must operate this wire feeding unit. (※1)
7) Do not use this wire feeding unit for other than welding.

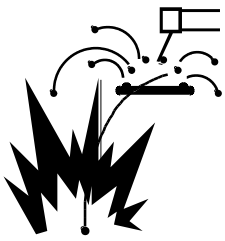
2.2 To avoid the electric shock hazard, follow the note below.

⚠ **WARNING**	● Do not touch the live electric parts.
	Touching live electric parts may cause a fatal shock or a severe burn.

1) Only the qualified personnel must perform the grounding work for the welding power supply, workpiece and jigs electrically connected with workpiece according to the regulations (Technical Standard of Electrical Facilities).
2) Do not touch live electric parts.
3) Be sure to always wear a dry pair of insulating gloves and fatigue uniform. Never wear torn or wet gloves and fatigue uniform.
4) Before performing installation, inspection, maintenance and other works, be sure to turn off all the input-side power. Even if the input-side power is OFF, a capacitor and other components may be still electrically charged. To start operating, therefore, wait for a few minutes after the power was turned OFF until no charged voltage is detected.
5) Do not use connection cables with insufficient capacity, with damage or with naked conductors.
6) Be sure to secure the cable connection and insulate them to prevent personnel from easily touching those parts.
7) Do not use the welding power supply without its case or cover.
8) Before starting operation, secure a firm footing. Also, do not perform operation at unstable footing or at higher place (2m or higher).
9) Carry out maintenance and inspection periodically, and repair the damaged parts before using the equipment.
10) Be sure to turn off the input-side power of equipment if not in use.

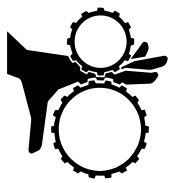
Caution Notes on Safety (continued)

2.3 To avoid a fire and explosion caused by the heated workpiece right after welding, spatter, slag or arc spark, and to avoid injury, follow the notes below.

⚠ **WARNING**	● Do not perform welding near inflammables or combustibles. ● Watch out for a fire and know where a fire extinguisher is placed. ● Never perform welding on flammable materials such as wood or cloth. ● Do not perform welding on workpiece that makes it an airproof container.
	● Heated workpiece right after welding, spatter, slag and arc spark cause a fire. ● Improper cable connection or improper contact in the workpiece-side current circuit such as steel frames may cause an exothermic fire. ● An explosion may occur if generating arc on the container for flammables or combustibles such as gasoline. ● If welding on an airproof tank or pipe, they may burst. ● Heated workpiece right after welding, spatter, slag and arc spark cause a serious burn.

1) Do not perform welding near inflammables or combustibles.
2) To avoid getting a burn by the heated workpiece right after welding, spatter, slag and arc spark, an operator must wear a pair of flameproof leather gloves, a long-sleeve fatigue uniform, a leg cover, a flameproof leather apron and other protective clothes.
3) Always watch out for a fire and other danger.
4) Place a fire extinguisher near the welding work area. Also, each operator must fully know how to use.
5) Do not bring the heated workpiece or the jigs into contact with flammable materials such as wood or cloth. Otherwise, not only a fire may occur but you may also get a burn.
6) Do not bring the heated workpiece right after welding into contact with combustibles.
7) Keep inflammables and combustibles away from the welding work area to avoid spatters.
8) Never use inflammable gas near the welding work area.
9) Firmly secure the cable connection, and insulate them.
10) Connect the workpiece-side cable as nearer to the welding spot as possible.
11) Do not perform welding on gas-filled pipes, airproof tanks and pipes etc. because they may burst.
12) Do not perform welding on flammable materials such as wood or cloth.
13) To perform welding on ceiling, floor, wall etc., be sure to carefully check behind and clear away the combustibles and inflammables.

2.4 If you carelessly touch the rotating part, you may get entangled and injured. Be sure to follow the notes below.

⚠ **WARNING**	● Do not bring your hands, fingers, hair, clothes etc. close to the rotating part.
	● Keep your hands, fingers, hair, clothes etc. away from the rotating part of wire feeding unit such as a feeding roll. You may get entangled and injured. ● Be sure to turn off the welding power supply and assist feeder or input the emergency stop signal of the robot (Teach pendant, Operation box, External controller etc.) before connecting the torch or replacing the wire and other consumable parts such as the feeding roll.

1) When using a welding power supply, be sure that its case and cover are fixed on.
2) When required to unfix the cover of welding power supply for maintenance, inspection and repair work, only the personnel who has taken the specified course and fully understands the welding power supply must perform the operation. During the operation, keep other people away from the work area by enclosing it.
3) Keep your hands, fingers, hair, clothes etc. away from the feeding roll on rotating.

Reference

< PRINCIPAL SAFETY STANDARDS >

Arc welding equipment ? Installation and use, Technical Specification
IEC 62081, from International Electrotechnical Commission

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.

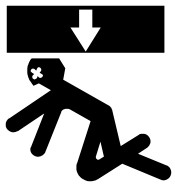
Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute.

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

3. Transport and Installation

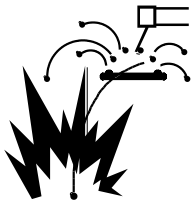
3.1 Transportation

To avoid an accident and damage to the wire feeding unit in transportation, observe the followings.

⚠ **WARNING**	● Do not touch live electrical parts.
	● Before transporting and transferring the wire feeding unit, be sure to turn off the input power by switching in the switch box.
⚠ **WARNING**	● For transporting and hanging of this unit, follow the specified procedures. ● To fix the unit and other peripheral equipment, use the prescribed tightening torque.
	● Falling objects harm personnel and equipment. ● Use the prescribed tightening torque when fixing the unit. Otherwise, a fatal physical injury may be caused because of turnover of the unit, flying or falling of the tool and some other reasons. ● For transporting the wire feeding unit by craning to high, be sure to unset the wire from the unit.

3.2 Installation

For installing the wire feeding unit, observe the following notes to protect operator's health from a fire, an explosion, fumes and gas caused or produced by welding performance.

⚠ **WARNING**	● Do not place the unit near inflammables. ● Watch out for a fire and know where a fire extinguisher is placed.
	● Do not install the welding power supply near inflammables or flammable gas. ● Keep inflammables away from the welding area so that they will not be exposed to spatter. If not possible, cover them with the fireproof cover.
⚠ **WARNING**	● Do not breathe in fumes. ● Ventilate the area enough and wear a protection face guard and other protective equipment as needed.
	● To avoid gas poisoning or asphyxia, use a respirator or adopt a ventilation system prescribed by the laws in your country. ● When performing welding in a tight space, be sure to ventilate the area enough or wear a respirator, and operate in control of the trained observer.

< Installation location >

● Install the wire feeding unit in a place meeting the following conditions.

- Indoor place in which no direct sunlight, wind and weather is exposed, and with little moisture and dust
- The ambient temperature is within the range of -10～40℃.
- No wind is blown to the arc part.

(Wind may cause a welding failure. Avoid a wind with a windshield or other items.)

Caution Notes on Safety (continued)

4. Connection

⚠ **WARNING**	● To avoid electric shock ,be sure to turn off all the input powers by switching in the switch box before performing the connection work.

⚠ **CAUTION**	● Secure the cable connection firmly.

5. Directions

⚠ **DANGER**	● 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.

Thank you very much for purchasing our wire feeding unit AF-4012 and AFA-4012 for CO_2/ MAG/ MIG welding. Read this instruction manual thoroughly before using this product, and use the product properly.

[Note] 1. The contents in this manual are subject to change without notice.
2. We have carefully compiled this instruction manual so that we will not make any errors in the content. Even if there errors are found, we are not responsible for any damage caused by the error.
3. No part of this instruction manual may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means.

⚠ **DANGER**	● 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.

1. Specifications

1.1 AF-4012

AF-4012 is the robot dedicated wire feeding unit used for CO_2 / MAG welding.
The specifications are shown in Table 1.1 below.
See Fig. 1.1 for the external diagram.

Table 1.1 Specifications of AF-4012

Model	AF-4012
Welding method	CO_2 / MAG welding
Rolling system	4-roll system
Applicable wire diameter	Mild steel/ Stainless (φ0.8), φ0.9, φ1.0, φ1.2, (φ1.4), (φ1.6)
Wire feed rate	1.5 to 22m/min
Mass (Weight)	Approx. 4.2Kg
Applicable power supply	WB series welding power supply

Note) The standard is that this wire feeding unit builds in the components that support steel wires (φ0.9, φ1.0, and φ1.2). The applicable wire diameter indicated in ( ) is an option.

1.2 AFA-4012

AFA-4012 is the robot dedicated wire feeding unit used for MIG welding.
The specifications are shown in Table 1.2 below.
See Fig. 1.2 for the external diagram.

Table 1.2 Specifications of AFA-4012

Model	AFA-4012
Welding method	MIG welding
Rolling system	4-roll system
Applicable wire diameter	Aluminum： φ1.0, φ1.2, (φ1.6)
Wire feed rate	1.5 to 22m/min
Mass (Weight)	Approx. 4.4Kg
Standard assembly	Wire straightener
Applicable power supply	WB series welding power supply

Note) The standard is that this wire feeding unit builds in the components that support aluminum wires (both φ1.0 and φ1.2). The applicable wire diameter indicated in ( ) is an option.

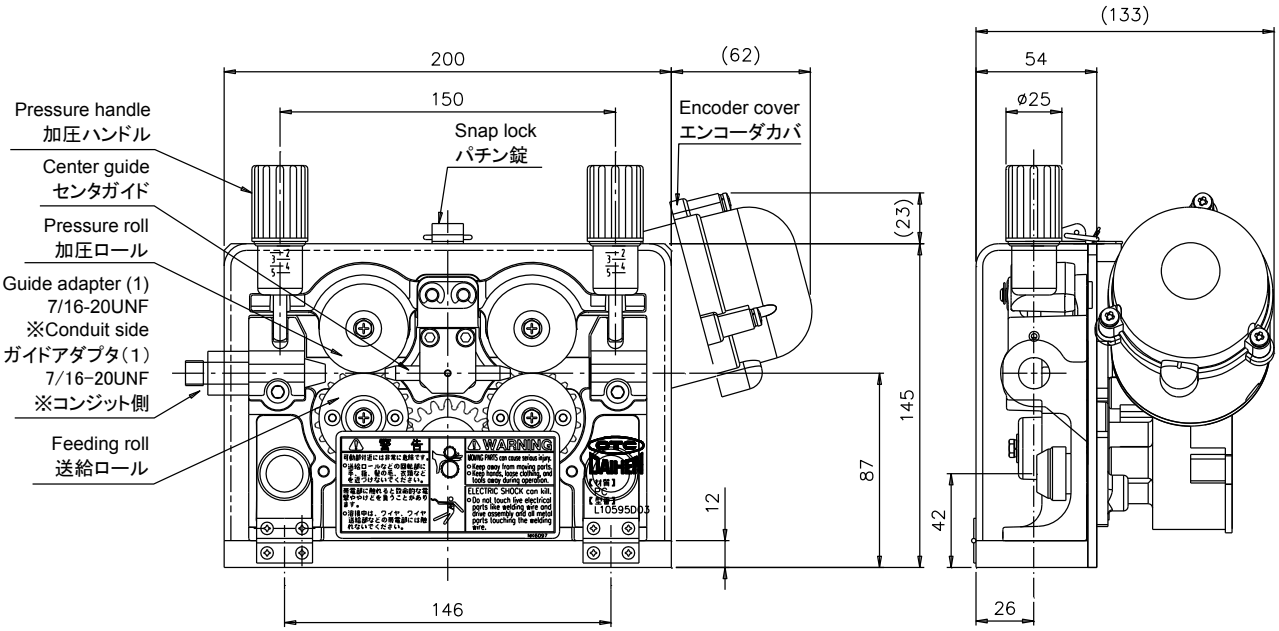


Fig. 1.1 External diagram of wire feeding unit :AF-4012(for CO_2 / MAG) (Unit : mm)

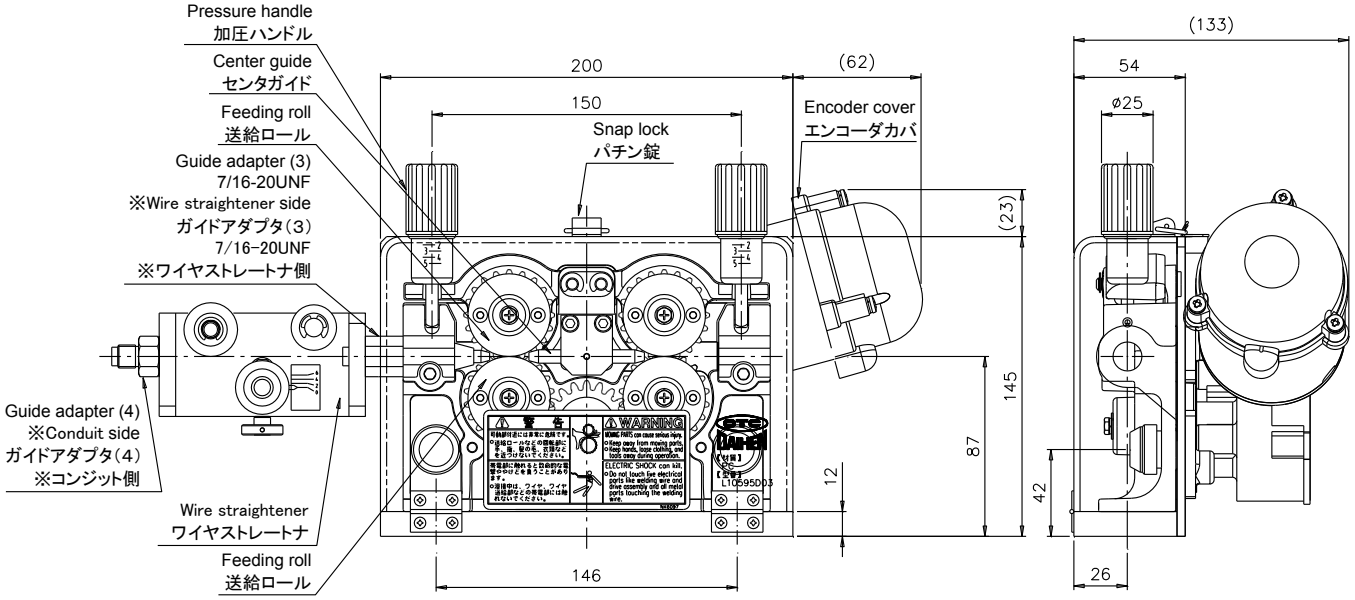


Fig. 1.2 External diagram of wire feeding unit :AFA-4012(for MIG) (Unit : mm)

2. Mounting to Manipulator (*Almega A II／FD series)*

2.1 Notes of connecting the cable of wire feeder to each manipulator

Work accordingly to the following precautions when connecting the motor cable, encoder cable and the cable for the solenoid valve, of the wire feeder, to each manipulator.

・The PE bag covered the connector in the manipulator shoulder is used to protect the connector.

・Detach the PE bag for the connector protection once when you connect.

・Do not throw away the PE bag because it uses it again after wiring ends.

2.2 Mounting to Almega A II-V6／FD-V6 series

Follow the procedures below to mount this wire feeding unit on the shoulder part of manipulator.

The following fixing brackets (for the AII-V6 series) are separately required for mounting. Be sure to use them

.

・Fixing bracket for AF-4012, AFA-4012 ：L10677A

(1) Referring to Fig. 2.1 and 2.2, mount the fixing bracket to the wire feeding unit.
For mounting, use the hexagon head bolts and washers and nuts provided with the feeding unit.
After mounting them, be sure to mount the insulating cover to each fixing bolt.

(2) Referring to Fig. 2.1 and 2.2, mount the fixing bracket onto the shoulder part of manipulator .
Fix it in a position where the coaxial power cable bends as gently as possible. The fixing bracket is adjustable back and forth.

(3) After mounting it onto the shoulder part, remove the shoulder cover.

(4) Draw out wiring in the shoulder. And, detach the PE bag that protects the connector once.

【Note】Do not throw away the PE bag because it uses it again after wiring ends.

(5) Connect the motor cable, the encoder cable and the voltage detection cable of wire feeding unit with the in-manipulator cables. For cable connection, see Section 9 “Electrical connection diagram”.

(6) After connecting cables, put the connector in the PE bag as before. And, bind the opening of the PE bag in the binder.

(7) Return the shoulder cover to its original position.

【Note】A shock sensor connector is included in the manipulator.

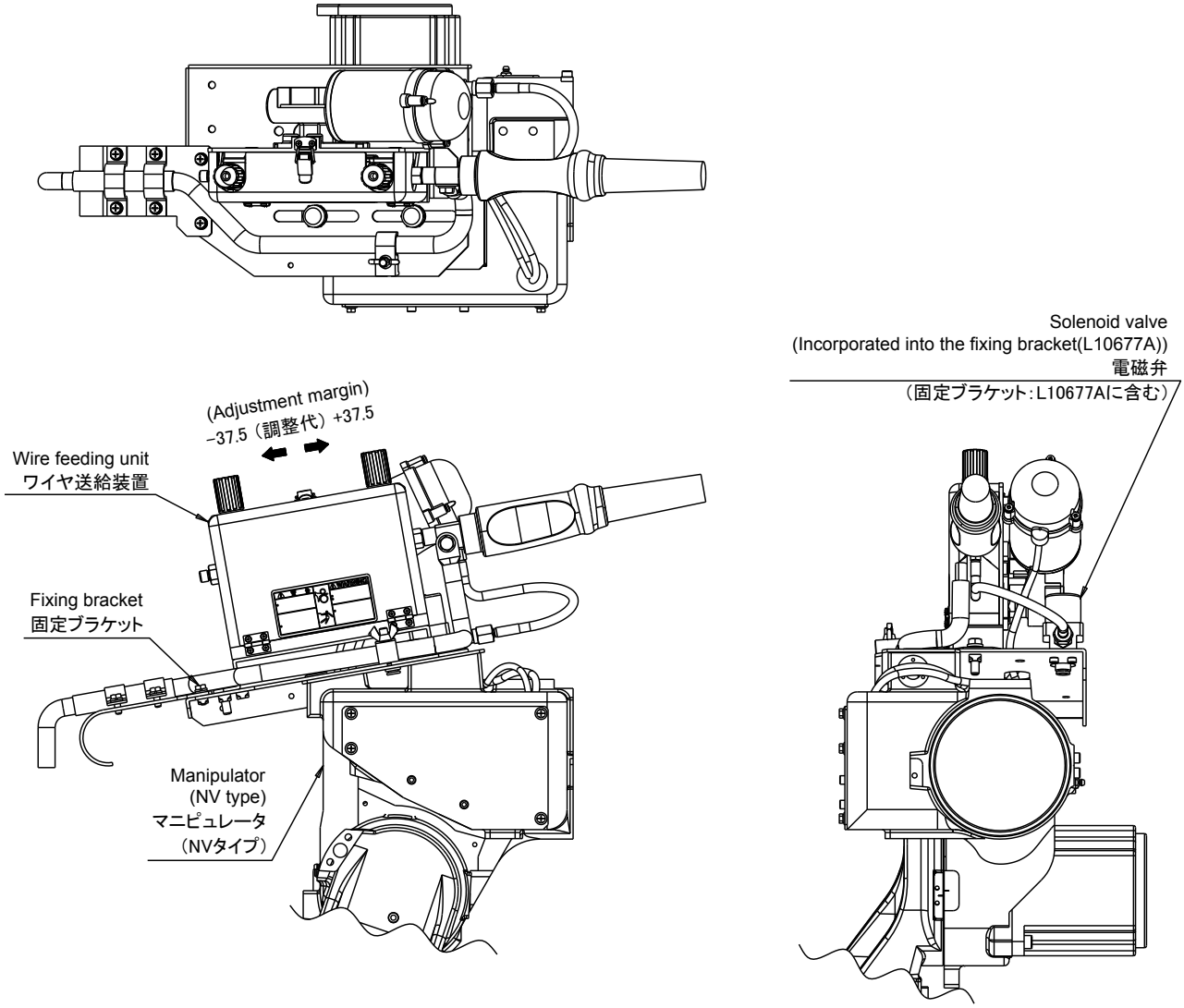


Fig. 2.1　Mounting to AⅡ-V6／FD-V6　series manipulator (Procedure (1))

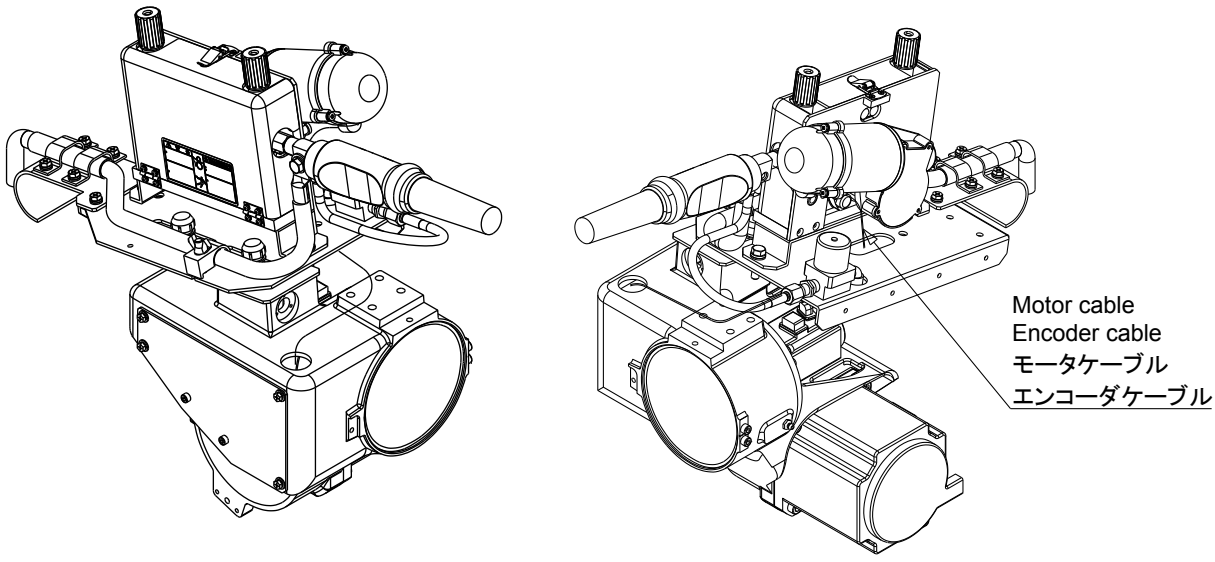


Fig. 2.2　Mounting of wire feeding unit and fixing bracket (Procedure (2))

2.3 Mounting to Almega A II-B4／FD-B4 series

Follow the procedures below to mount this wire feeding unit on the shoulder part of manipulator.
The fixing bracket (L10680A: for A II-B4) is separately required for mounting.
For the configuration of parts for mounting the wire feeding unit and the fixing bracket, refer to Fig. 2.4.

(1) Referring to Fig. 2.3, dismount the mounting bracket and fixing plate from the fixing bracket once.
(2) Referring to Fig. 2.4, mount the fixing plate and insulating plate (2) to the wire feeding unit.
After mounting them, be sure to mount the insulating cover to each fixing bolt.
For mounting, use the hexagon head bolts provided with the feeding unit. However, mounting to the AII-B4 series requires no washers and nuts provided (2 pieces each).
(3) Referring to Fig. 2.4, mount the mounting bracket and insulating plate (1) to the manipulator.
Be sure to mount the insulating plate (1) in such a way that it is sandwiched between the manipulator and the mounting bracket. In addition, mount the insulating bush to each fixing bolt.
After mounting the bushes, be sure to mount the insulating cover to each fixing bolt.
(4) Fix the fixing plate and the mounting bracket with the provided bolts, and then mount the wire feeding unit to the manipulator. At this time, the mounting position can be adjusted in the forward and backward directions. For adjustment, unfasten the hexagon head bolts so that the unit can slide.
(5) Connect the coaxial power cable to the wire feeding unit. Subsequently, referring to Fig. 2.5, move the 5th and 6th axes to the following position (posture), respectively.
5th axis: To the maximum extent to the manipulator's inward side (software limit)
6th axis: To the maximum extent (software limit) (either to the "+" or "−" side)
(6) Referring to Fig. 2.5, adjust and fix the position of the slide plate to the extent that the coaxial power cable does not hit against the cover in the posture described in Step (5) above.
(7) Referring to Fig. 2.6, conduct curing for the connection of gas hoses from the solenoid valve and spiral tubes.
(8) Dismount the side cover from the robot shoulder.
(9) Draw out wiring in the shoulder. And, detach the PE bag that protects the connector once.
【Note】Do not throw away the PE bag because it uses it again after wiring ends.
(10) Referring to Fig. 2.7, pull in motor cables, encoder cables, and voltage detection cables through a hole in the blind cover, and then connect them to the robot cables. For detail of cable connections, refer to the Electrical Wiring Diagram shown in Section 9.
(11) After connecting cables, put the connector in the PE bag as before. And, bind the opening of the PE bag in the binder.
(12) Return the side cover to its original position.
【Note】The shock sensor connector is incorporated in the manipulator.
The solenoid valve is incorporated in the fixing bracket.
*1: Currently, the AII-B4 series are not available for TIG welding.

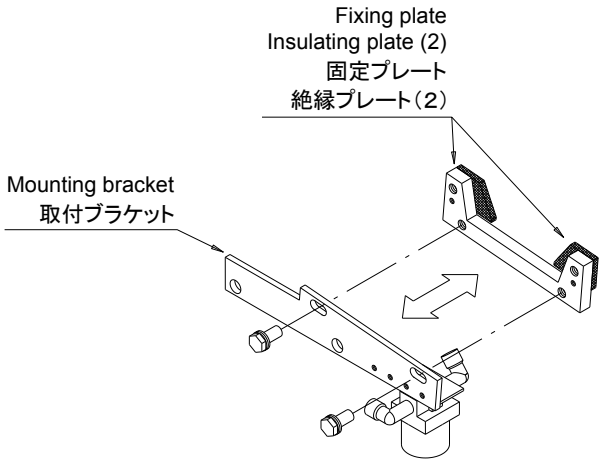


Fig. 2.3　Preparation for mounting of fixing bracket (Procedure (1))

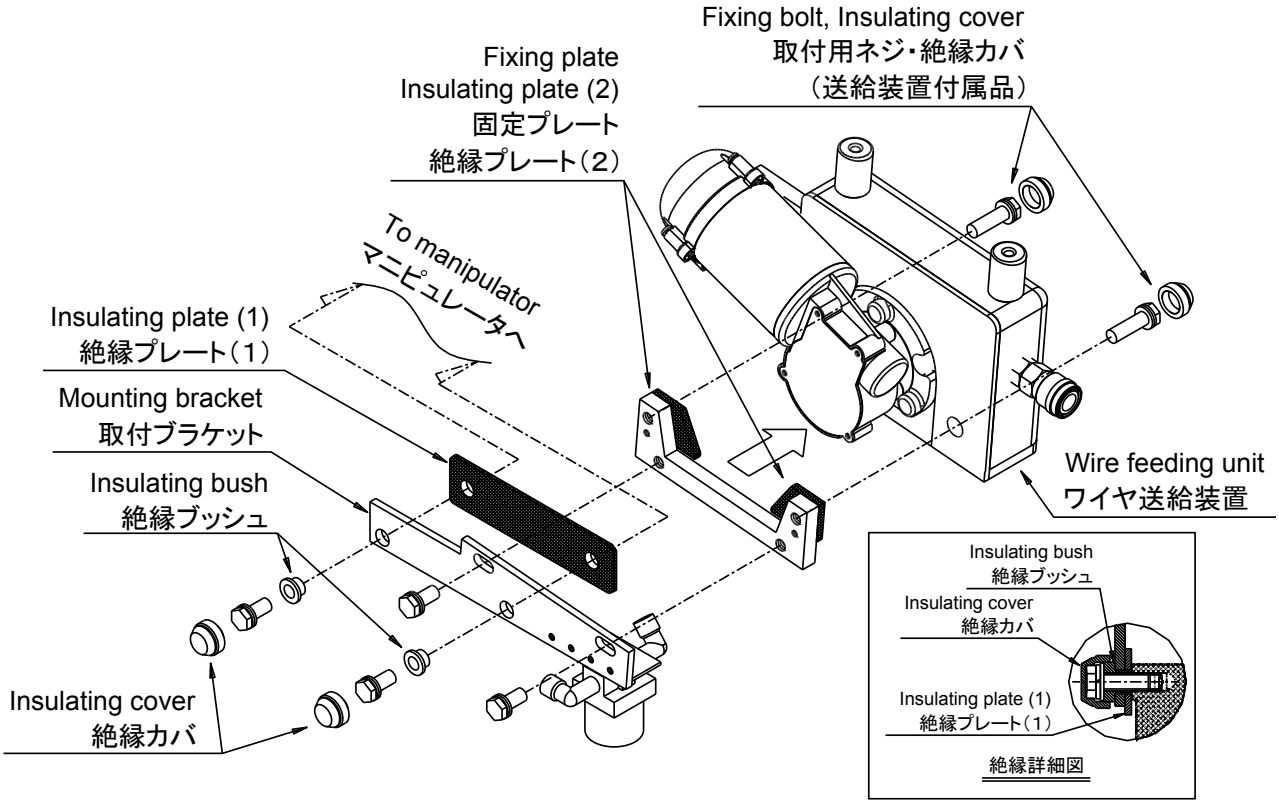


Fig. 2.4　Mounting of manipulator fixing bracket and wire feeding unit (Procedure (2) and (3))

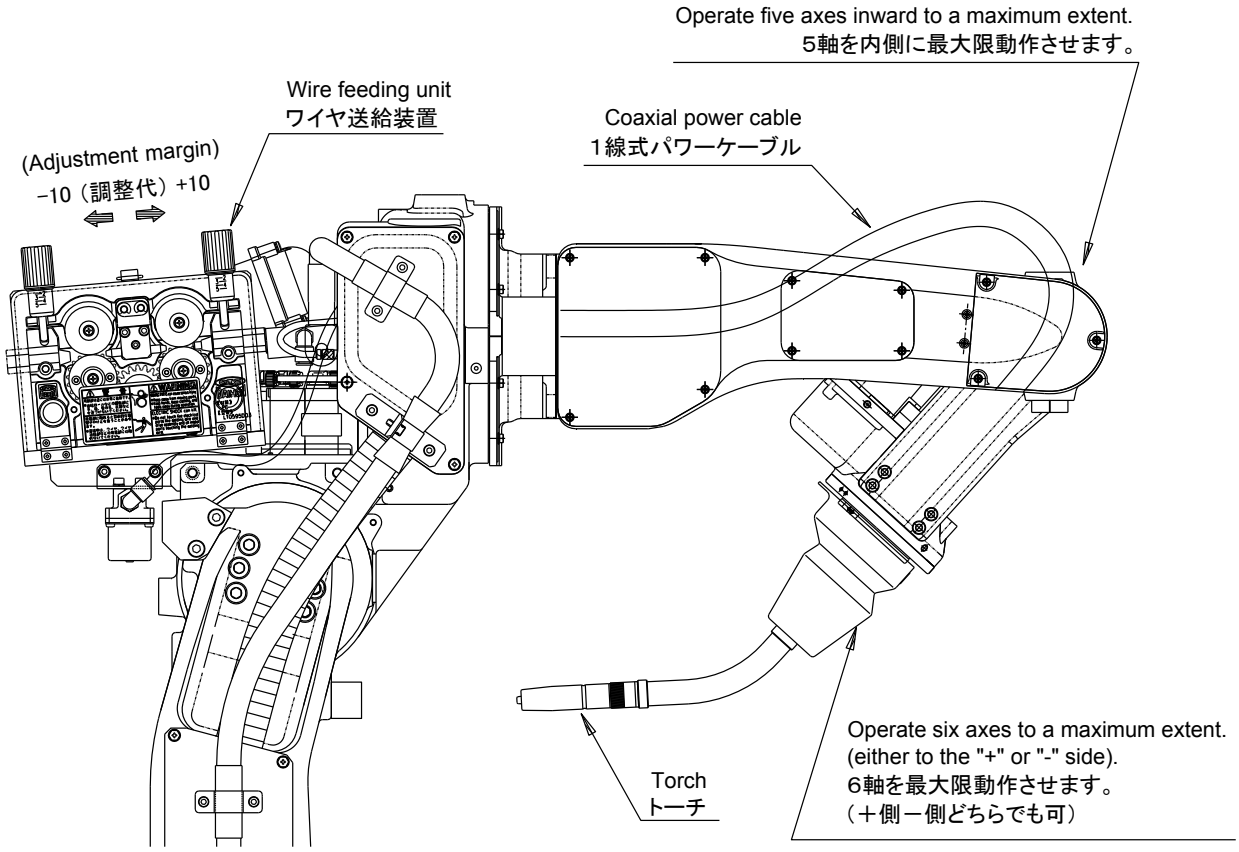


Fig. 2.5　Mounting of manipulator fixing bracket and wire feeding unit (Procedure (5))

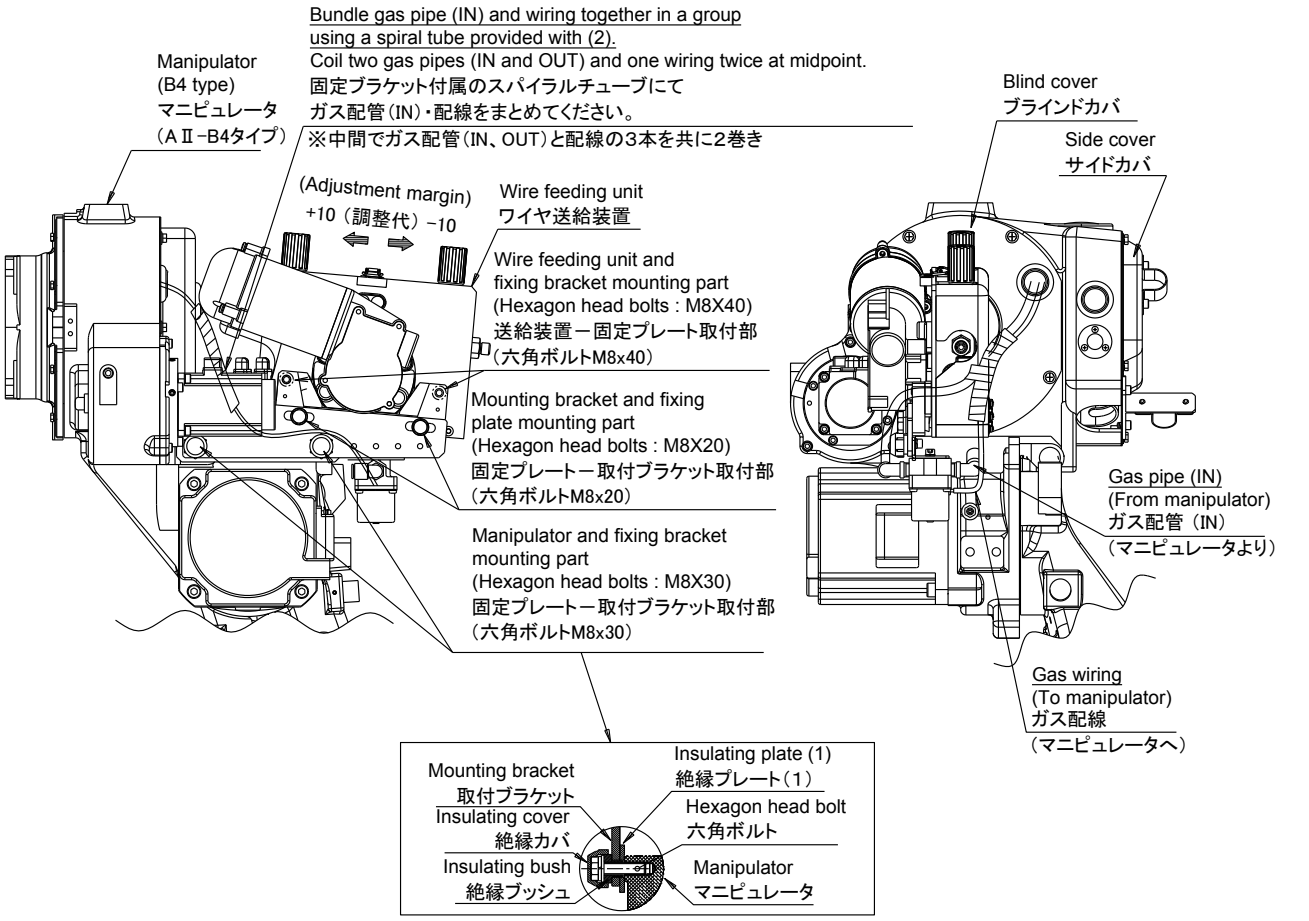


Fig. 2.6　Mounting of manipulator fixing bracket and wire feeding unit (Procedure (7))

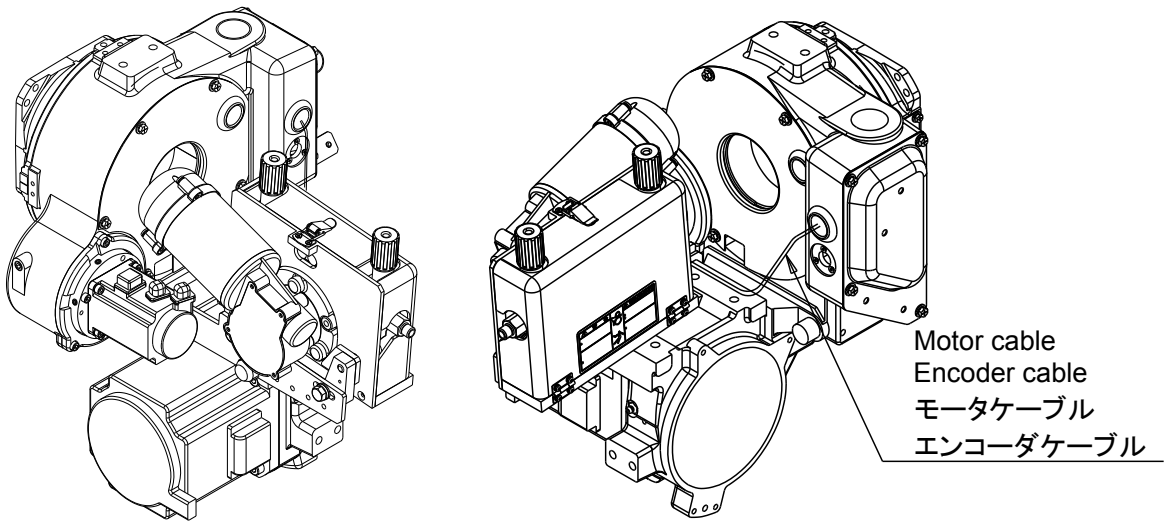
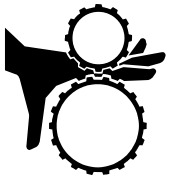


Fig. 2.7　Mounting of manipulator fixing bracket and wire feeding unit (Procedure (9))

3. Welding Preparation

⚠ **WARNING**	●If you carelessly touch the rotating part, you may get entangled and injured. Be sure to follow the note below.
	●Keep your hands, fingers, hair, clothes etc. away from a rotating part such as the feeding roll of wire feeding unit or assist feeder. Otherwise, you may get entangled and injured. ●Do not use the wire feeding unit and assist feeder with their case or cover opened. ●When required to unfix the cover of welding power supply for maintenance, inspection, or repair work, only the personnel who has taken the specified course and fully understands the welding power supply must perform the operation. Also, during the operation, keep other people away from the work area by enclosing it. ●Be sure to turn off the welding power supply and assist feeder or input the emergency stop signal of the robot (Teach pendant, Operation box, External controller etc.) before connecting the torch or replacing the wire and other consumable parts such as the feeding roll.

3.1 Pressure releasing operation

To pass the wire through into this wire feeding unit or to replace the feeding roll, see Fig. 3.1 and follow the procedures below.

(1) Release the snap lock and pull the clear cover toward.
(2) Pull the pressure handle toward and lift up the pressure holder.
(3) Pass through a wire into the conduit-side adaptor, the center guide and the adaptor on coaxial power cable side in this order.
(4) To replace the feeding roll, see the following section.
(5) Return the pressure holder and the pressure handle to their original position.

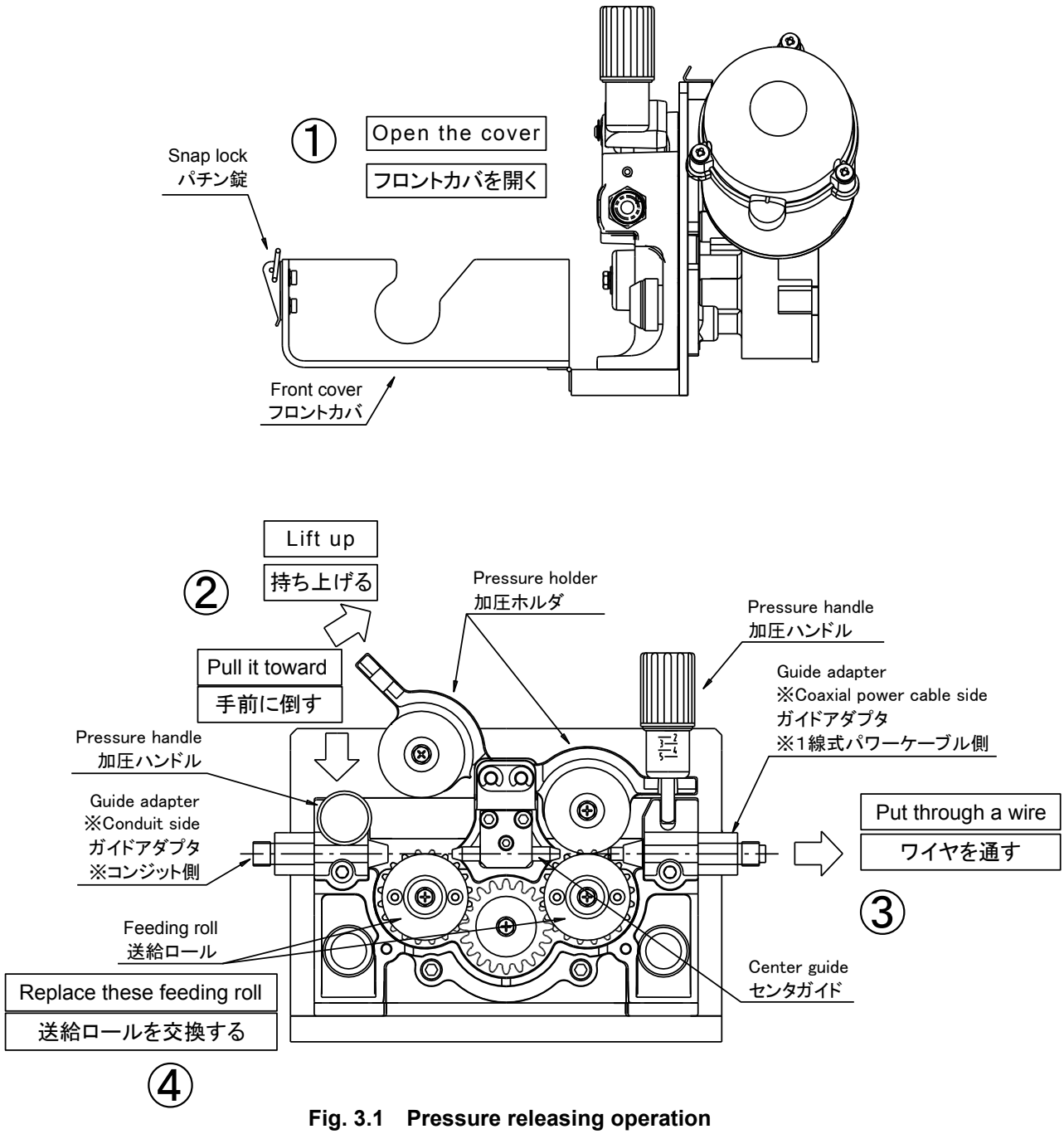


Fig. 3.1　Pressure releasing operation

3.2 Mounting of feeding roll

For shipment, the feeding roll as per the specification under Chapter 1 is incorporated as the standard equipment. However, to use any wire of different diameter, replace with a feeding roll corresponding to such diameter.

To replace the feeding roll, see Fig. 3.2 and follow the procedures below.

(1) Release the pressure. (Refer to the section 3.1.)
(2) Remove two pieces of setscrew that fix the feeding roll.
(3) Pull out the feeding roll toward.
(4) Replace the feeding roll so that the same stamp as that of the wire diameter to use can be seen.

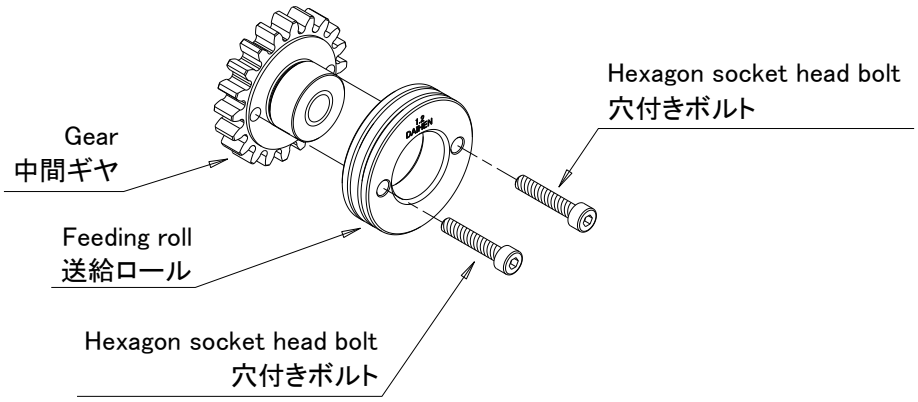


Fig. 3.2 Mounting of feeding roll

[Note]
If applying an aluminum wire (for AFA-4011, AFU-4211), four feeding rolls and middle gears are required. Replace with feeding rolls suitable for each type. For the types of feeding rolls, refer to the Parts List.

3.3 Pressure adjustment

Referring to Fig. 3.3 on the following section, turn the pressure handle and set the pressure according to each wire diameter. The rough standard of set value is as shown in Table 3.1 below.

Table 3.1 Rough standard of pressure

Wire diameter	Solid wire Flux-cored wire	Hard aluminum	Soft aluminum
φ1.6	3 to 4	2 to 3	2 to 3
φ1.4			
φ1.2	2 to 3	1 to 2	1 to 2
φ1.0			
φ0.9			
φ0.8	1 to 2		

[Note] 1. The values in the table above are just rough standards. They may differ depending on the welding conditions and the wire type.
2. Set the pressure handle to the same scale for the right and left sides.

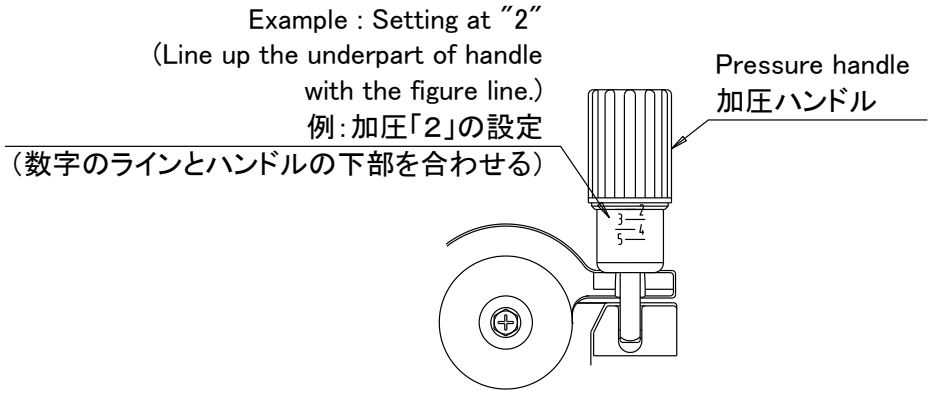


Fig. 3.3　Pressure adjustment

3.4 Pressure adjustment for straightener

A straightener is the component to correct wire distortion that is standardized in AFA-4012. The model AFA-4012 needs not only the pressure adjustment shown in the previous section but also the pressure adjustment for straightener.

See the following Table 3.2 and Fig. 3.4 to set the appropriate pressure value.

Table 3.2　Rough pressure standard for straightener

Wire diameter	Solid wire Flux-cored wire	Hard aluminum	Soft aluminum
φ1.6	2 to 3	2 to 3	2 to 3
φ1.4	3 to 4		
φ1.2		3 to 4	4 to 5
φ1.0	4 to 5	4 to 5	
φ0.9			
φ0.8			

[Note]　The values in the table above are just rough standards. They may differ depending on the welding conditions and the wire type.

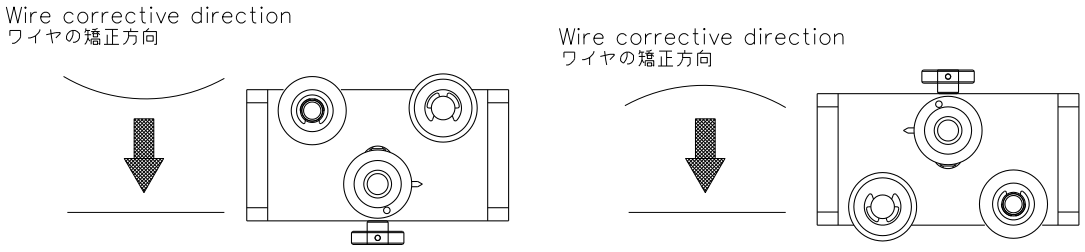


Fig. 3.4　Pressure adjustment for straightener

[Note]　As shown in the figure above, there are cases where it is recommended to mount the strainer the other way around depending on the direction in which wire tends to bend.

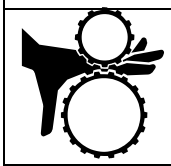
3.5 Wire feeding by inching

To feed a wire, thoroughly read the following caution notes and perform the operation carefully.

⚠ WARNING

●While in inching, do not bring the welding torch tip to face, eye, or body. Doing so may cause wire to get stuck in face, eye, or body when it comes out, resulting in injury.

⚠ CAUTION

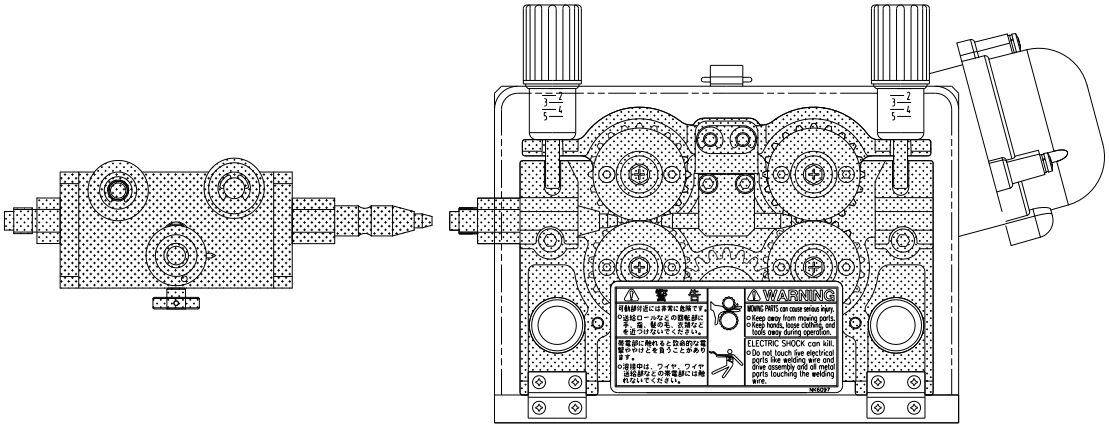


●While in inching, do not bring the feeding roll part to hands, fingers, hair, clothes, etc.. If doing so, you may be entangled and get injured.

⚠ WARNING

* You may get a fatal electric shock or a severe burn if touching the live electric parts.

Do not touch the live electric parts such as a wire or a wire feeding part during welding performance. The shadowed part ▒▒▒▒▒ is electrified during welding performance. (Inside the clear cover)



4. Inspection and Maintenance

4.1 Inspection

Carry out inspection on the following points.

Part	Inspection point	Possible trouble	Measures
Pressure scale	●Is the welding pressure appropriate for the wire diameter?	Wire distortion or feeding failure.	Refer to Chapter 3.3 “Pressure adjustment” and adjust the welding pressure.
Guide adaptor Center guide	●Is there no dust or wire chips stuck in the guide adaptor or the center guide?	Wire feeding failure.	Remove dust and wire chips.
Feeding roll	●Does the stamp on feeding roll match the actual wire diameter?	Wire distortion or feeding failure.	Use the appropriate feeding roll in accordance with the wire diameter.
	●Is the groove not worn out?		Replace the feeding roll with new one.
Pressure roll	●Does it smoothly rotate?	Wire feeding failure or strange noise.	Replace the pressure roll with new one.
Encoder cable	●Is the cable going to be disconnected or its cover broken?	Wire feeding failure or feeding impossibility.	Replace the encoder cable with new one.
	●Is not the connector cap off?		Remove dust at the connector part and put the connector cap.
Motor cable	●Is the cable going to be disconnected or its cover broken?	Wire feeding failure or feeding impossibility.	Replace the motor cable with new one.
Voltage detection cable	●Is the cable going to be disconnected or its cover broken?	Wire feeding failure or feeding impossibility.	Replace the voltage detection cable with new one.
Motor	●Is the motor replaced periodically due to the life of the brush?	Wire feeding impossibility.	Replace the motor. Life duration is approx. 4000 hours (approx. 2yrs).
Wire feeding unit (lower part)	●Are wire chips not stuck?	Wire feeding failure or damage to gears.	Clean the unit periodically.

4.2 Replacement of feeding motor

⚠ CAUTION

- **Never attempt to disassemble the feed motor. This may result in damage to the wire feeder.**
- **Feed motor is built with dustproof structure, in which a rotary encoder is installed. If the feed motor is disassembled, its dustproof function will be lost or the rotary encoder damaged, resulting in failure.**
- **It is unable to clean the inside of the motor nor replace the brush.**

*Target for life and replacement of feed motor

The life of the feeding motor is approximately 3,000 to 4,000 hours.

In addition, the life varies with the load conditions and ambient temperature.

*When the life of the feeding motor expires, the following phenomena occur.

It is recommended that the feeding motor be replaced in advance by referring to the lifetime.

When the motor does not operate, the following warning and abnormal status of the welding machine will be displayed.

Example)

[E-800] Abnormal encoder of feeding motor

[E-820] Motor overcurrent (warning)

[E-830] Motor overcurrent (abnormal status)

5. Parts List for AF-4012(for CO_2 / MAG)

●If the components get worn out or damaged while using this wire feeding unit, refer to Fig. 5.1 to 5.4 and Table 5.1 to 5.5 and contact our local distributor or sales agent.
When ordering, be sure to give both the item name and the part number.
The items followed by ( ) in the Q'ty column are optional.

5.1 Parts list for wire feeding unit (AF-4012)

Table 5.1 Parts list for wire feeding unit (AF-4012)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	L11236B00	Feeding frame	1set	For details, refer to Chapter 5.2.
2	L10595C00	Assembly parts	1set	For details, refer to Chapter 5.3.
3	L10595D00	Wire feeder cover	1set	For details, refer to Chapter 5.4.
4	L7810G	Feeding roll	1set	For details, refer to Chapter 5.5.
5	L7437D00	Voltage detection cable	1	For the electrical wiring, see Chapter 9.1 on the following page.

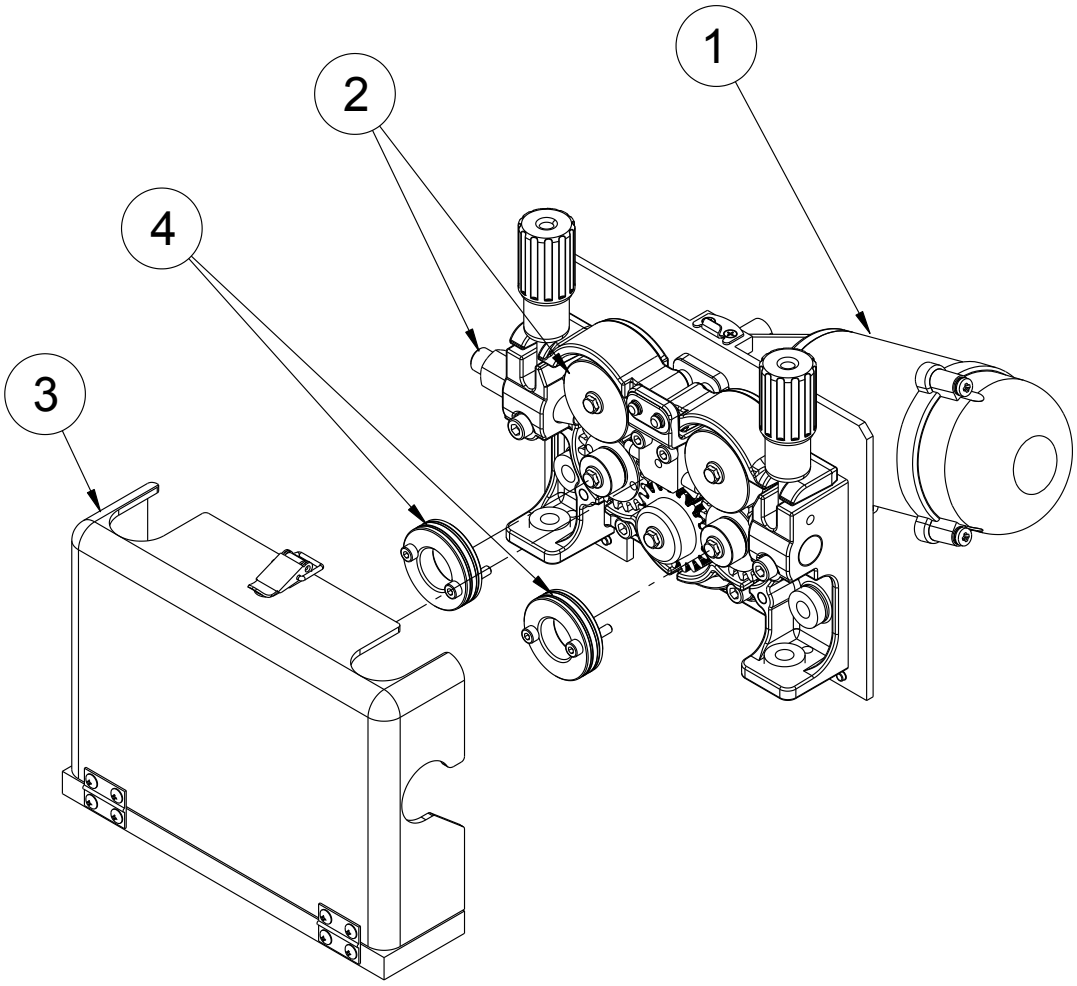


Fig. 5.1 Exploded diagram of wire feeding unit (AF-4012)

5.2 Parts list for wire feeding unit (L11236B00)

Table 5.2 Parts list for feeding frame (L11236B00)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	L11236B01	Bracket	1	
1-1		Hexagon socket head cap screw	2	M6x35
2	L10595B04	Coil spring	1	
3	L10595B02	Pressure holder pin	2	
4	U30023T00	Pressure holder (L)	1	Assembly part
5	U30023W00	Pressure holder (R)	1	Assembly part
6	L10595B03	Driving roll axis	2	
7	L10595P00	Middle gear	2	Assembly part
7-1		P socket head setscrew	2	M4x10
8	W-W03729	Feeding motor	1	
8-1		Setscrew	3	M6x18
9	L10595Q00	Drive gear	1	
9-1		P socket head setscrew	1	M4x14
10	L10595B05	Pressure spring holder	2	
11	L10595B08	Compression spring	2	
12	L10595B06	Pressure handle	2	
13	L10595B07	Pressure bolt	2	
13-1	4739-043	Spring pin	2	2.5x14
14		P flat head screw	2	M5x20
15	L10595B09	Insulating bush	4	
15-1		Hexagon head bolt	2	M8x40
16	U5185B15	Insulating cover	2	
17	L11236L01	Motor mount	1	

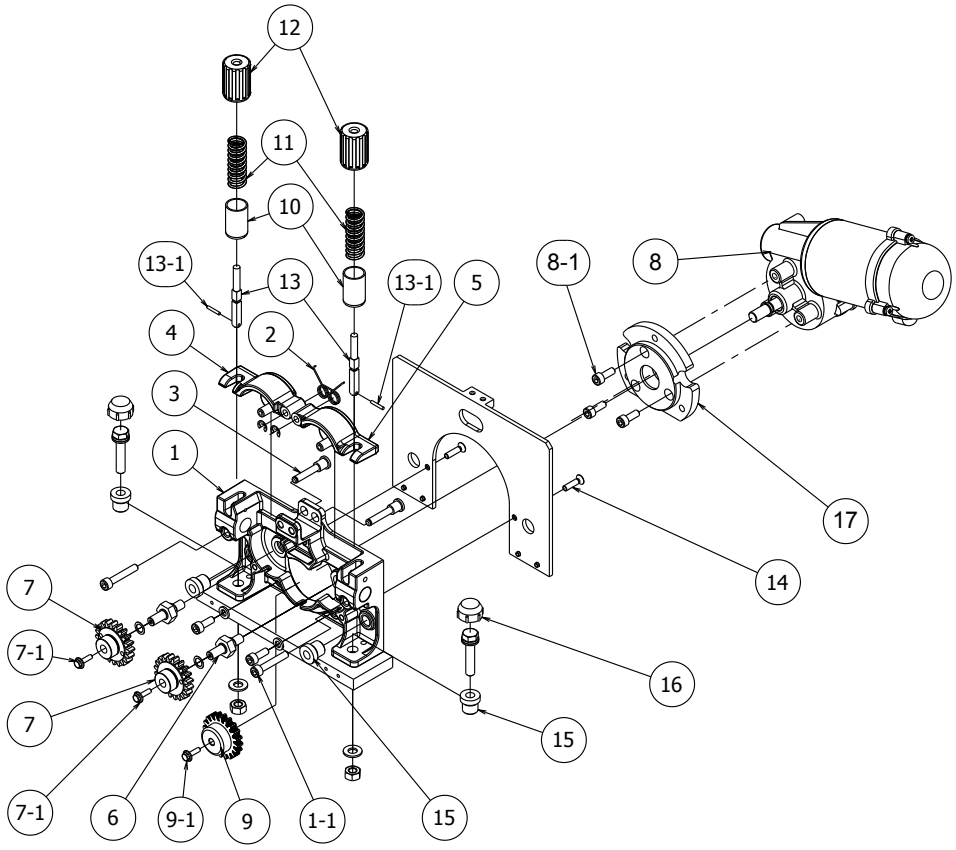


Fig. 5.2 Exploded diagram of feeding frame (L11236B00)

5.3 List of assembly parts (L11236C00)

Table 5.3 List of assembly parts (L11236C00)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	K5439C00	Pressure roll	2	
1-1		Hexagon head bolt		M 4 × 10
2	L7810D04	Guide adapter (1)	1	Conduit side
3	L10595C01	Center guide	1	
4	L10595C02	Guide block	1	
4-1		Hexagon head bolt	2	M5 × 20

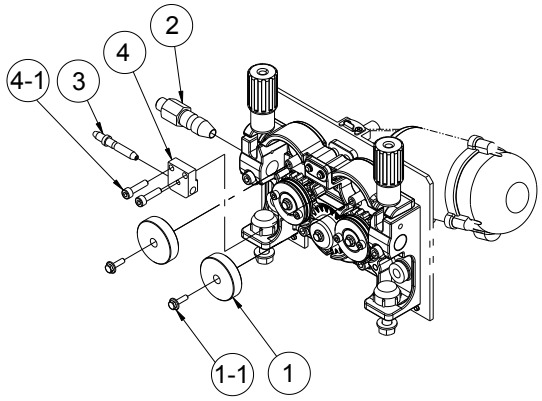


Fig. 5.3 Exploded diagram of assembly parts (L11236C00)

5.4 Parts list for wire feeder cover (L11236D00)

Table 5.4 Parts list for wire feeder cover (L10595D00)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1-1		Rear plate	(1)	L 10595 D 01
1-2		P-flat head screw	(4)	M4x12
1-3		Base plate	(1)	L 10595 D 02
1-4		P-flat head screw	(4)	M5x10
1-5		Front cover	(1)	K 5737 D 01
1-6		Semi snap lock	(1)	C-23-1
1-7		P-flat head screw, Nut	(4)	M3x8
1-8		Flat hinge	(2)	B-1100-1
1-9		P-round screw, Nut	(8)	M3x8

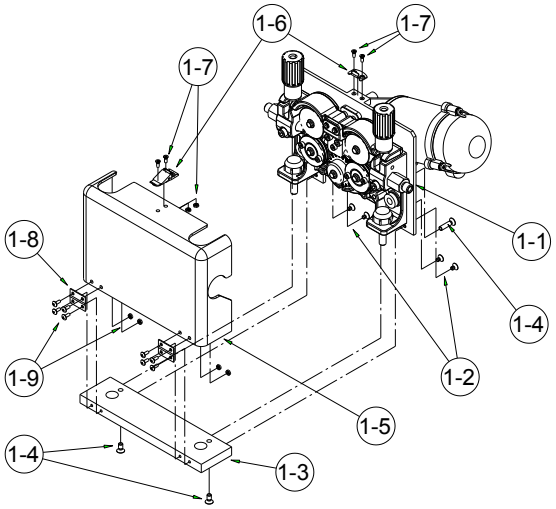


Fig. 5.4 Exploded diagram of wire feeder cover (L11236D00)

5.5 Parts list for feeding roll (L7810G)

Table 5.3 Parts list for feeding roll (L7810G)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	K5439B01	Feeding roll (1.4/1.6)	(2)	Option
2	K5439B12	Feeding roll (0.9-1.0/1.2)	2	Standard assembly
3	K5439B13	Feeding roll (0.8/0.9-1.0)	(2)	Option
4	K5439B04	Feeding roll (1.2/1.4)	(2)	Option
5	K5439B05	Feeding roll (1.2/1.2)	(2)	Option
6	K5439B06	Feeding roll (1.4/1.4)	(2)	Option
7	K5439B07	Feeding roll (1.6/1.6)	(2)	Option
8	K5439B09	Feeding roll (0.6/0.8)	(2)	Option
9	K5439B11	Feeding roll (1.2/1.6)	(2)	Option
10		Setscrew	4	M4x16

Table 5.4 Combination by wire diameter

Wire diameter	Feeding roll	Outlet guide (Included in coaxial power cable)
φ0.8	K5439B13 K5439B09	U2770K01
φ0.9-1.0	K5439B12 K5439B13	U69B34
φ1.2	K5439B12 K5439B04 K5439B05 K5439B11	U69B34 U69B35
φ1.4	K5439B01 K5439B04 K5439B06	U69B35
φ1.6	K5439B01 K5439B07 K5439B11	

6. Parts List for AFA-4012

●If the components get worn out or damaged while using this wire feeding unit, refer to Fig. 6.1 to 6.2 and Table 6.1 to 6.4 and contact our local distributor or sales agent.
When ordering, be sure to give both the item name and the part number.
The items followed by ( ) in the Q'ty column are optional.

6.1 Parts list for wire feeding unit (AFA-4012)

Table 6.5 Parts list for wire feeding unit (AFA-4012)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	L11236B00	Feeding frame	1set	For details, refer to Chapter 5.2.
2	L10596C00	Assembly parts (AL)	1set	For details, refer to Chapter 6.2.
3	L10595D00	Wire feeder cover	1set	For details, refer to Chapter 5.4.
4	L10596G	Feeding roll	1set	For details, refer to Chapter 6.3.
5	L7437D00	Voltage detection cable	1	For the electrical wiring, see Chapter 9.1 in the following page.
6	L7812D	Wire straightener	1set	

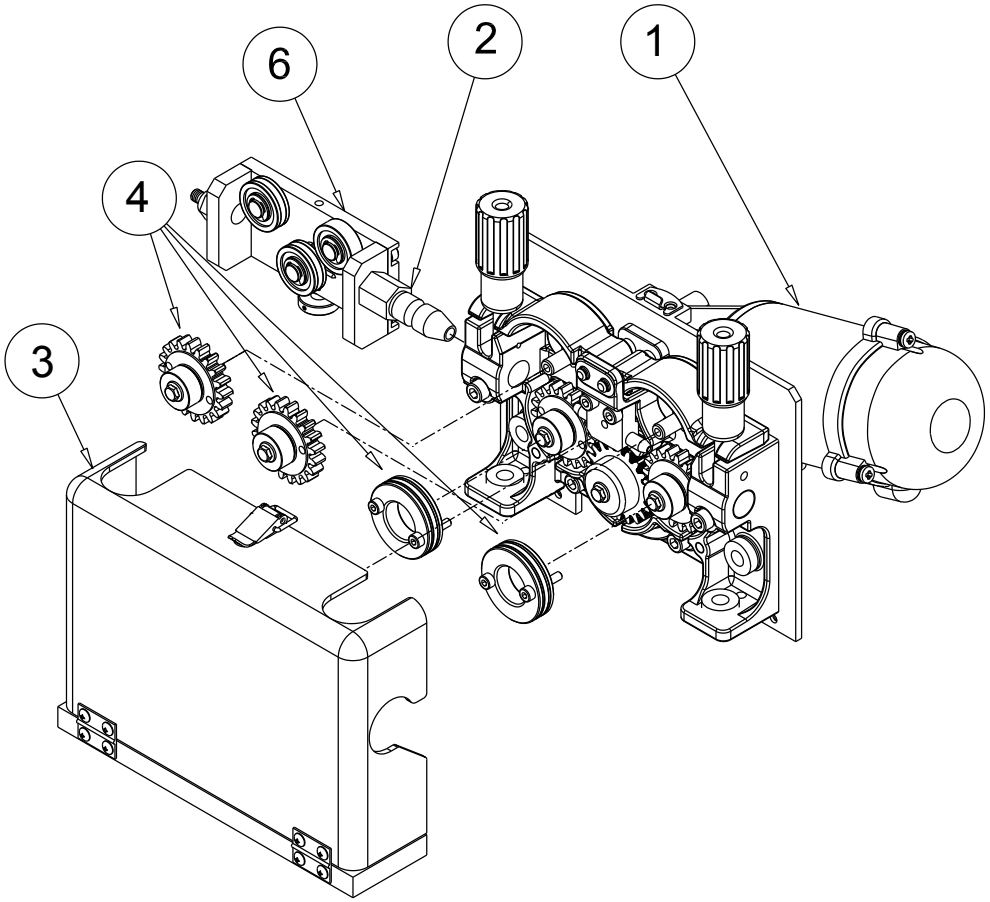


Fig. 6.1 Exploded diagram of wire feeding unit (AFA-4012)

6.2 list of assembly parts (L10596C00)

Table 6.2 List of assembly parts (L11237C00)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	L10595P00	Middle gear	2	
1-1		Hexagon head bolt	2	M4 x 10
2	L7812B01	Guide adapter (3)	1	For connecting wire straightener
3	L10596C01	Center guide (1.0 to 1.6)	1	
4	L10595C02	Guide block	1	
4-1		Hexagon socket head cap screw	2	M5x20
5	U2586F01	Outlet guide	1	Wire diameter (For 1.0 to 1.2)
6	U2586F02	Outlet guide	(1)	Wire diameter (For 1.6)
7	L7812B02	Guide adapter (4)	1	For connecting conduit
8	L7812B03	Inlet guide	1	

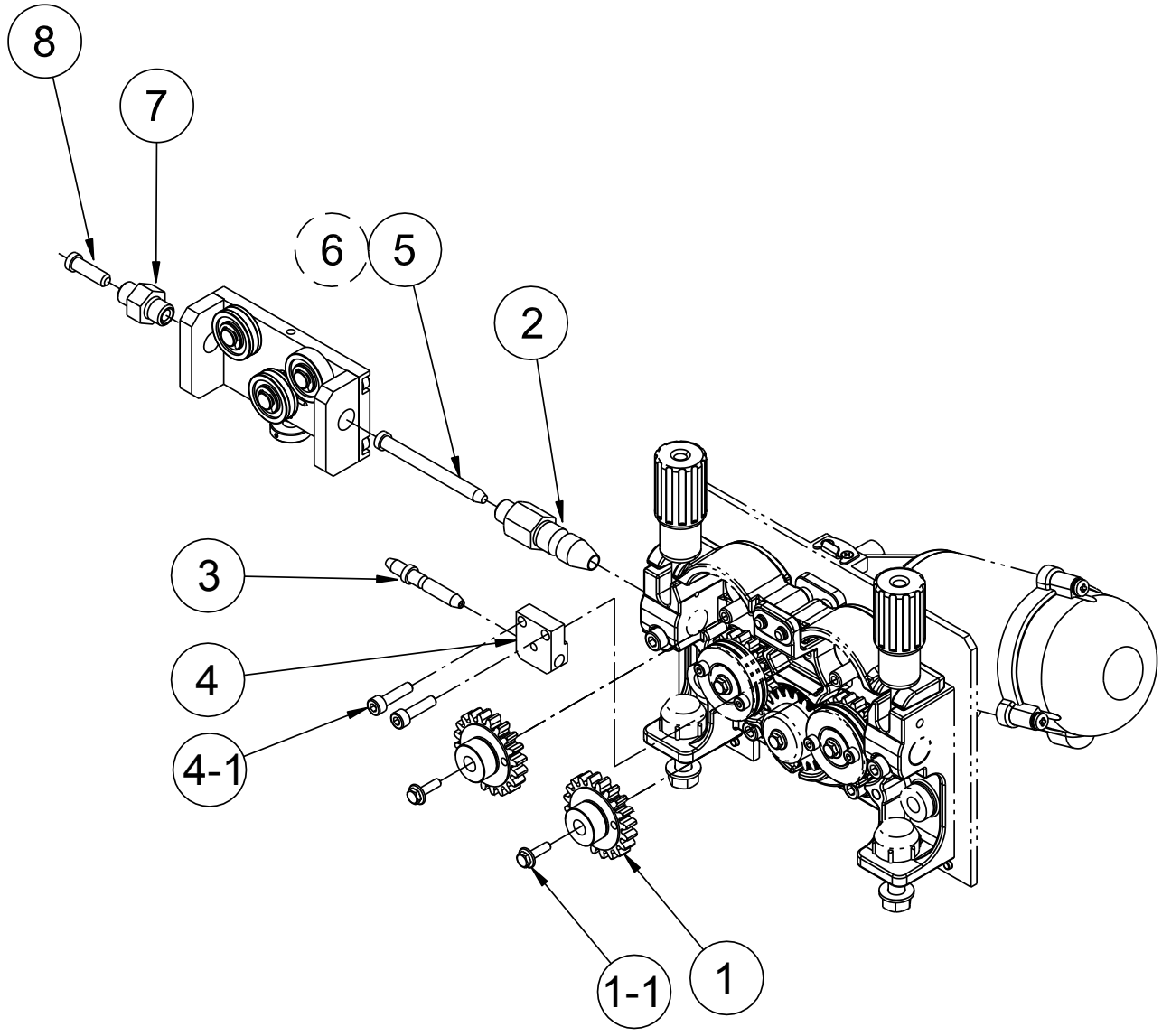


Fig. 6.2 Exploded diagram of assembly parts (L10596C00)

6.3 Parts list for feeding roll (L10596G)

Table 6.1 Parts list for feeding roll (L10596G)

Ref. No.	Parts No.	Item	Q'ty	Remarks
1	K5463R02	Feeding roll (1.0/1.2)	4	Standard assembly (U-shape groove)
2	K5463R03	Feeding roll (1.2/1.6)	(4)	Option (U-shape groove)
3	K5463R06	Feeding roll (0.8/0.9)	(4)	Option (U-shape groove)
4	K5463V02	Feeding roll (1.0/1.2)	(4)	Option (V-shape groove)
5	K5463V03	Feeding roll (1.2/1.6)	(4)	Option (V-shape groove)
6		Setscrew	8	M4x16

Table 6.4 Combination by wire diameter

Wire diameter	**Feeding roll**	**Outlet guide (Coaxial power cable, wire straightener)**
ϕ1.0	K5463R02 (U-shape groove) K5463V02 (V-shape groove)	U2586F01
ϕ1.2	K5463R02 (U-shape groove) K5463R03 (U-shape groove) K5463V02 (V-shape groove) K5463V03 (V-shape groove)	
ϕ1.6	K5463R03 (U-shape groove) K5463V03 (V-shape groove)	U2586F02

[Note]

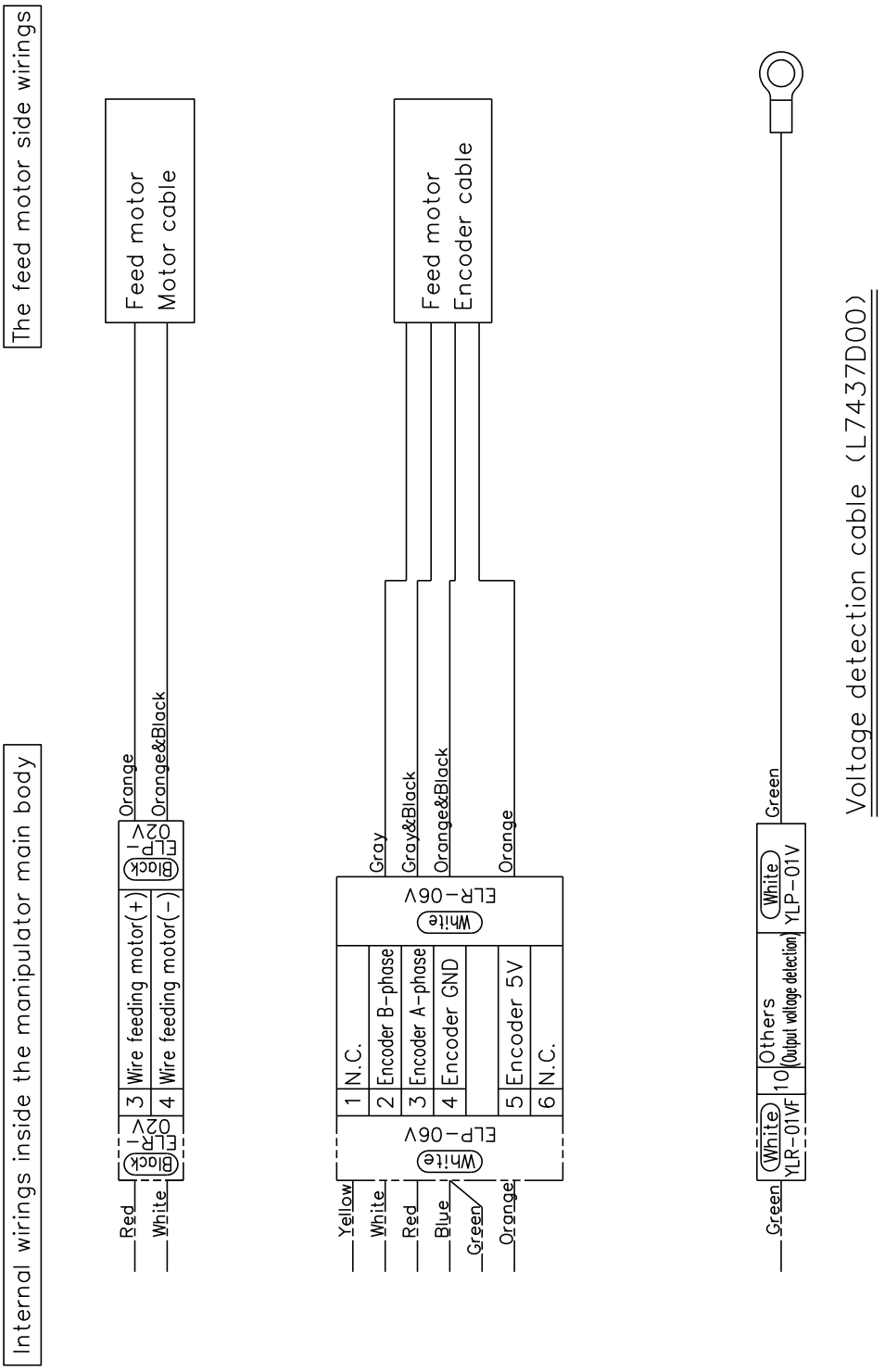
The standard AFA-4011 is designed to use for aluminum.

To use this wire feeding unit for mild steel / stainless steel, use the part listed below to modify the wire feeding unit for mild steel / stainless steel use. Further, the feeding roll needs to be replaced referring to Table 5.6 in the preceding Chapter.

Parts No.	Item	Q'ty	Remarks
L10596J	Assembly parts (Fe)	1set	Parts for the mild steel / stainless specification

9. Electrical Wiring Diagram

9.1 Electrical wiring diagram (L7437D00)



INSTRUCTION MANUAL for CO_2/MAG/MIG wire feeding unit
[AF-4012/AFA-4012]

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