DAIHEN TIG Welding Torch (MWP-18)

Instruction Manual
= Safety and Operation =

Instruction Manual No.
1K2874-E-1

First thoroughly read this manual to operate the machine correctly.

- Installation, maintenance, and repair of this welding machine should be made by qualified persons or persons who fully understand welding machines for extra safety.
- Operation of this welding machine should be made by persons who have knowledge and technical skill to understand the contents of this manual well and handle the machine safely for extra safety.
- 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 first, store it with the warranty in the place where the persons concerned can read at 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.

Contents

NOTES ON SAFETY

1. Notes on Safety

- Before operating this product, you should first thoroughly read this Instruction Manual to operate the product correctly.
- Precautions in this Instruction Manual are described to prevent you and others from being injured and suffering loss in your property by having the product operated correctly and safely.
- This welding machine is designed and manufactured in due consideration of safety, but you should observe 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.
- Various ranks of accidents resulting in injury, death or damage may be caused by the mishandling of devices. The following safety alert symbols and signal words are used throughout this manual to identify various hazards and special instructions.

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

Hazards and special instructions identified by CAUTION are very important as well because neglecting them may occasionally cause serious injury or death to personnel. Do follow the instructions identified by all three safety alert symbols and signal words because they are all very important.

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 : IMPORTANT statements identify special instructions necessary for the most efficient operation.

IMPORTANT SAFEGUARD

2. Precautions for Safety

2.1 Read, understand, and comply with all safety rules described at the beginning of the welding power source manual in addition to the following before initiating arc welding operations.

⚠ WARNING	● Observe the following to prevent a serious accident that results in a serious injury or a death

1) This welding torch is designed and manufactured in due consideration of safety, but you should observe the handling precautions described in this Instruction Manual. If you fail to do so, there may occur an accident resulting in a serious injury or a death.
2) Related laws and 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 moving zone of a welding machine and the welding area.
4) A person with a pacemaker should not go near 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, and that will have a bad effect on the pacemaker.
5) Installation, maintenance and repair of this welding torch should be done by qualified personnel or those who fully understand a welding torch for further safety.
6) Operation of this welding torch should be done by personnel who have knowledge and technical skill to be able to understand the contents of this manual well and to handle the torch safely.
7) This welding torch must not be used for purposes other than welding.

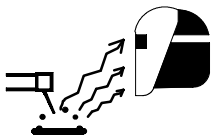
2.2 Observe the following to prevent an electric shock.

⚠ WARNING	● Do not touch live electrical parts .
	● Touching live electrical parts can cause fatal shock or severe burns.

1) Only qualified personnel should do the grounding work of the welding power source and a 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 and 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.

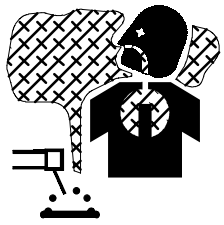
IMPORTANT SAFEGUARD (continued)

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	● Install a lightproof wall where arc is generated. ● Wear appropriate eye, ear, and body protection.
	● 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.

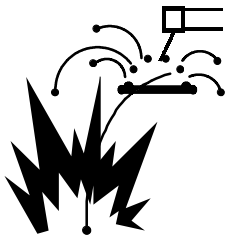
2.4 All the personnel in and around the working area including an operator should wear appropriate protection to protect themselves from fumes and gases produced by welding.

⚠ WARNING	● DO NOT inhale fumes and gases generated by welding. ● Ventilate the area sufficiently and wear a welder's shield mask if necessary.
	● 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	● 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.
	● 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 FLAMMBLE 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.

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.

HANDLING PRECAUTIONS

3. Handling Precautions

3.1 Coolant

⚠ CAUTION	● Be sure to keep the flow of coolant at more than 1 liter per minute. (Water pressure of more than 0.1 to 0.3 MPa is required at a torch inlet). Insufficient flow of coolant may damage a welding torch.

- NEVER apply air-cooling.
- NEVER use a welding torch that had a water leak because doing so might cause an electric shock.

3.2 Cable Hose

⚠ CAUTION	● Never let cable hoses touch any heated part of the welded, put something heavy on top nor bend them excessively because the welding torch might become damaged.

3.3 Replacement of Parts

⚠ CAUTION	● To prevent burns, observe the following.

- 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 at our sales office or our agency.

⚠ CAUTION	● Wear protective glasses for eye protection when grinding an electrode.

- Follow safety instructions of a grinder or an electrode grinder when grinding an electrode.

This instruction manual describes the operation and maintenance of TIG Welding Torch MWP-18. Read and understand the entire contents of this manual before use to be able to handle the torch properly. Before operating the torch, be sure to read OPERATION.

Note 1: The contents of this instruction manual are subject to change without prior notice.
2: We do our best not to have any misprint or error in this manual. However, when we do have them, we are not responsible for any problems or consequences arisen from them.
3: We prohibit whole or a part of this manual to be copied without permission.

Operation

1. Specifications

Torch MWP-18 is for automatic TIG welding, thus used for welding with AC (a high-frequency superimposition) or DC (Mainly a negative electrode).
Specifications are described in Table 1.

Table 1 Specifications (See Figure 1)

Type		MWP-18
Welding method		TIG welding
Max. applicable current	DC (positive electrode)	300A
	AC	260A
Rated duty cycle		100%
Electrode in use		(ϕ1.0) (ϕ1.6) (ϕ2.4) ϕ3.2
Materials of electrode		Ceriated tungsten (Thoriated tungsten, pure tungsten)
Cooling method		Water cooling
Torch shape		Pencil shape
Cable length		6 m

Note: Options need to be purchased for the electrode sizes in parenthesis.

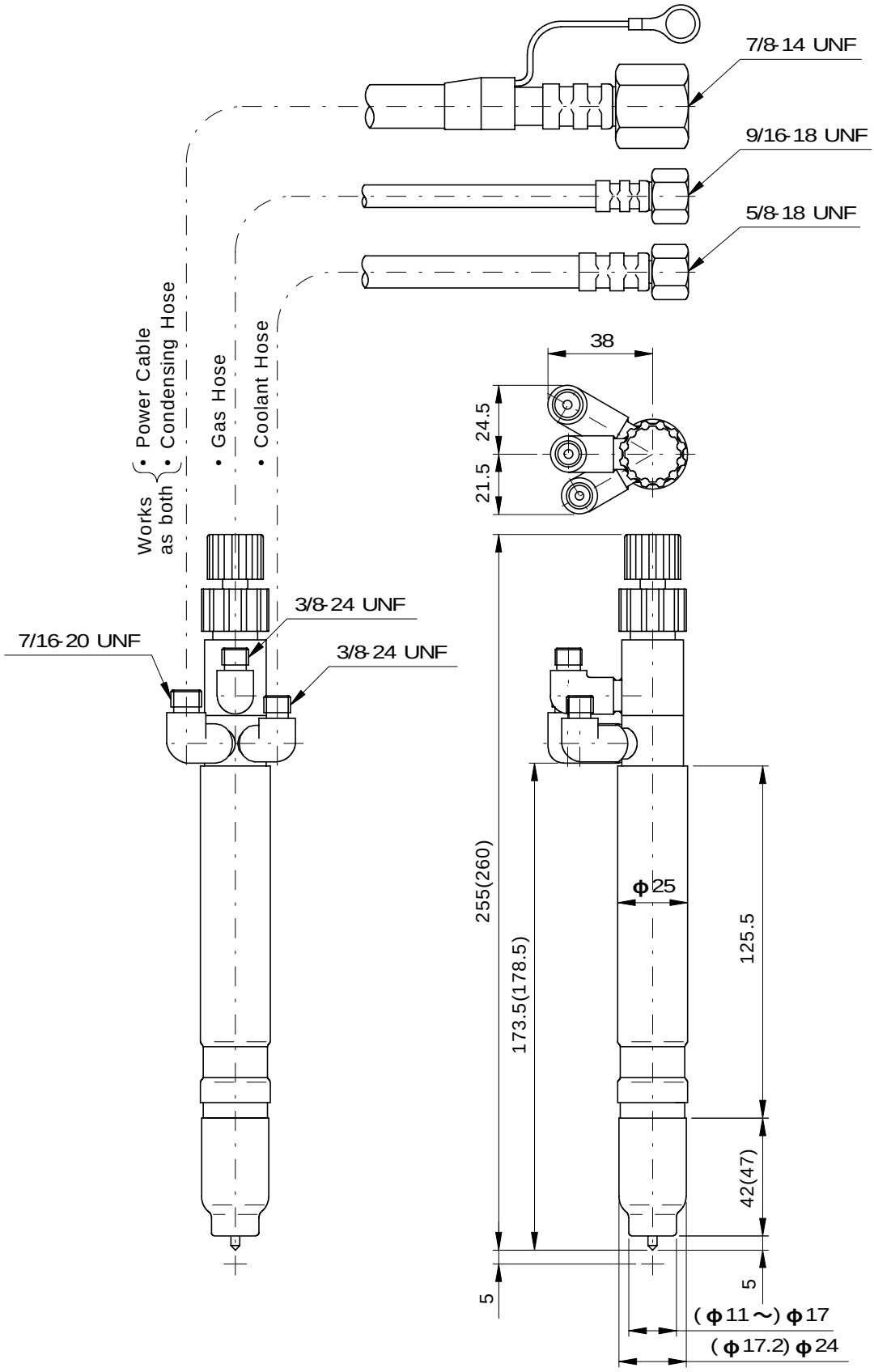


Fig. 1 Outline drawing of MWP-18 TIG Welding Torch

2. Standard Incorporated Parts

Make sure that the following are incorporated when unpacked.

Table 2 Standard Incorporated Parts

Name	Part No.	Quantity	Remarks
Collet (3.2)	H21B17	1	
Insulator	H21B60	1	For gas lens
Lea collet (3.2)	H561C05	1	
"O" ring (P.12)	3572-012	1	JISB2401P12 (Silicon rubber)
Nozzle (No.8)	H21B44	1	
Ceriated tungsten electrode	0870-032	1	$\phi 3.2 \times 150$mm

Note: The above are standard specifications. We have a wide selection of optional parts so that you can do a wide range of welding by replacing the replaceable part with a respective option.
For more details, see PARTS LIST on pp.8.

3. Functions of the Main Parts

3.1 Tungsten Electrode

Ceriated tungsten electrode (2% cerium contained, $\phi 3.2 \times 150$mm) is incorporated for standard specifications. See pp.8 for tungsten electrode with other diameter.

3.1.1 Selection of Electrode

Ceriated tungsten (2% cerium contained, gray mark), thoriated tungsten (2 % thorium contained, red mark) and pure tungsten (white mark) are commonly used as tungsten electrode.

Table 3 Selection of Electrode

Welding method (power source)	Materials of electrode	Materials of wokpiece
DC TIG welding	Ceriated tungsten (2% cerium contained) Thoriated tungsten (2% thorium contained)	Stainless steel, mild steel, brass, high carbon steel, cast iron, copper, titanium, silver
AC TIG welding	Ceriated tungsten (2% cerium contained) Pure tungsten Thoriated tungsten (2% thorium contained)	Aluminum, aluminum casting, magnesium, magnesium casting

Note: The table above lists only typical electrode and workpiece materials.

3.1.2 Selection of Electrode Diameter

Apply welding current within the range specified in Table 4 according to electrode diameter

Table 4 Relationship between Electrode Diameter and Welding Current

Electrode diameter mm ϕ	Welding current (A)				
	DC TIG welding (negative electrode)		AC TIG welding		
	Ceriated tungsten	Thoriated tungsten	Ceriated tungsten	Pure tungsten	Thoriated tungsten
1.0	–	1 – 80	–	10 – 60	20 – 80
1.6	5 – 150	5 – 150	40 – 130	20 – 100	40 – 130
2.4	20 – 250	20 – 250	70 – 220	50 – 160	70 – 220
3.2	50 – 400	50 – 400	110 – 290	100 – 210	110 – 290

Note: This table describes the standard ranges of welding current that differ according to electrode diameter.

3.2 Selection of Collet, Collet Body

A collet and a collet body are for feeding and holding electrode. They are divided into two kinds depending on whether they have gas lenses. (Ones for gas lenses are incorporated as standards.) Moreover, they are divided into four kinds depending on the electrode diameter to be used with, thus use a right collet and a collet body according to electrode diameter.

3.3 Selection of Nozzle

In order to have a sufficient shielding effect of argon gas, see Table 5 and use a right nozzle according to welding current.

Nozzles have good electric insulation, and they especially have excellent shock-resistance and heat-resistance.

The relationship between welding current and nozzle diameter is described in Table 5, and the relationship between nozzle No. and inside diameter in Table 6.

Table 5 The Relationship between Welding Current and Nozzle Diameter

Welding current (A)	DC welding		AC welding	
	Nozzle No.	Gas flow rate	Nozzle No.	Gas flow rate
10 – 100	4, 5, 6	4 – 5 liter / min	5, 6	6 – 8 liter / min
101 – 150	4, 5, 6	5 – 7 liter / min	6, 7	7 – 10 liter / min
151 – 200	4, 5, 6, 7, 8	6 – 8 liter / min	7, 8	7 – 10 liter / min
201 – 300	5, 6, 7, 8	8 – 9 liter / min	8, 10, 12	8 – 15 liter / min

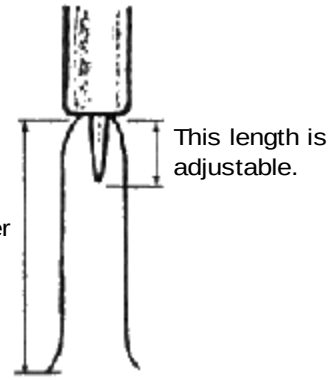
Table 6 The Relationship between Nozzle No. and Inside Diameter

Nozzle No.	4	5	6	7	8	10	12
Inside diameter (mm)	6.5	8	9.5	11	12.7	16	19

3.4 Nozzle for Gas Lens

When a fluid flows inside a tube, the bigger the value of L/D is, the easier it is to obtain the streamline flow.
(L: length of a tube, D: diameter of a tube)
Gas lens has this logic applied.

Gas lens controls the flow of shield gas at a uniform pace.
Gas lens has the following advantages.



- As gas is spouted from a nozzle in a streamline flow, it has good shield effect.
- Even a small gas flow rate brings about sufficient shield effect.
- As the length of the tip of tungsten is adjustable, more space between a nozzle and a workpiece can be obtained. That makes it easier for personnel to observe arc and the working area well. Moreover, welding in a narrow area will be feasible.
- The productivity will rise and the damage to a nozzle will be far reduced. Therefore, a gas nozzle is very useful in high-quality or complicated welding.

＊When you do not use a nozzle for a gas lens, you do not need No. 3: Insulator (H21B60) in the Parts List on pp.8.

4. Changing Tungsten Electrode

(From ϕ3.2 to ϕ1.6)

4.1 Parts Necessary for ϕ1.6

- Tungsten electrode (ϕ1.6 – 150 mm)
- Collet body (for ϕ1.6)
- Collet (for ϕ1.6)
- Lea collet (for ϕ1.6)

One set each

4.2 How to Change

- Remove a set screw and take out a lea collet.
- Loosen a lea collet body by turning its head and remove a nozzle, a collet body, a tungsten electrode and a collet.
- Insert a tungsten electrode (ϕ1.6) into a collet (for ϕ1.6) prepared, and then screw that into a collet body (for ϕ1.6).
  DO NOT forget to change an insulator as well when changing a collet body from ϕ3.2 to ϕ1.6.
- Screw a nozzle into a collet body.
- Insert a lea collet (for ϕ1.6) into a lea collet body.
- Adjust the length of the part of a tungsten electrode that is sticking out according to the shape of the welded and the location to be welded.
- As soon as the length to be stuck out is decided, tighten the head of a lea collet body and mount a set screw.

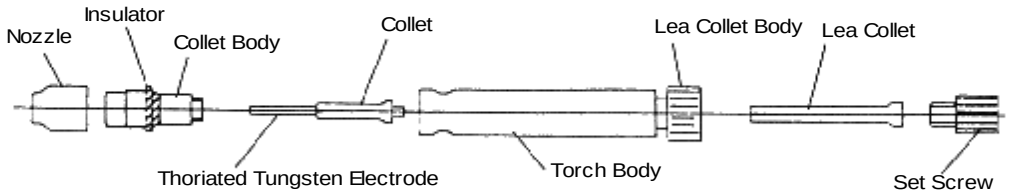


Fig. 2

⚠ CAUTION	● Make sure to tighten a collet body and a torch body firmly. If either of them is loose even slightly, a collet might be burned and seized up or an operator might get burn due to the heat-up.

⚠ CAUTION	● Stick out an electrode 5 to 10 mm from the tip of a nozzle. If the tip of the electrode is located inside the nozzle, the nozzle might become damaged due to the arc heat-up.

5. Connection to Welding Power Source

⚠ CAUTION	● Tighten each connection firmly. If there is any loosened part, fire or burn might be caused due to the heat-up.

- Refer to an instruction manual for each welding power source, and connect a torch properly.

6. Requirements

6.1 When mounting this torch onto a robot, connect a lead cable bundled with a power cable to the connection part of the workpiece-side welding cable on the welding power source.

6.2 If there is any loosened part in every connection of a torch, heating, a water leak or a gas leak might occur. Make sure to tighten the connections sufficiently.

6.3 Keep a gas flow rate at 7 – 8 liter / min for AC and 5 – 6 liter / min for DC for normal operations. When a gas lens is in use, sufficient shield effect will be obtained at a lower rate. When it is windy, or a workpiece and a torch need to be moved farther away from each other, raise the flow rate at the appropriate times.

6.4 Keep the flow rate of coolant at more than 1.2 liter / min. 1.2 – 1.5 kg / cm^2 is appropriate for water pressure. DO NOT use with water pressure of more than 3 kg / cm^2. Lower than 25ºC is desirable for the temperature at the inlet.

6.5 Although a cable hose, a gas hose and a coolant hose are all protected by hose sheaths, DO NOT put anything heavy on top, let them touch heated parts of the welded, nor bent them by force.

6.6 Always keep a tungsten electrode clean.

1) When spatters stick to an electrode:
   Generate arc on other steel plate, and it will be cleaned.
2) When the tip of an electrode makes a tiny spherical shape:
   Sharpen the tip by a grinder and so on to form acute angles.
3) When an electrode sticks into the molted pool:
   Turn off POWER, take out the electrode and break it at the lowermost part of the tip. Then, fix the tip of the electrode with a grinder and so on.

6.7 Keep a nozzle clean as well. Remove its cap occasionally and check whether there is any abnormality.

6.8 Even when an abnormality cannot be observed from outside, doing periodic inspection to check out the wearing out of parts is desirable for maintaining a touch in a good shape and obtaining fine results of welding.

7. What if the Following Occur

Trouble	Probable causes
No arc generated	1. The connections of welding cable of a torch and a workpiece are incomplete.
	2. The fuse of a control unit has blown.
	3. Electromagnetic contactor does not work.
	4. Argon gas has not flowed.
	5. A high frequency has not been generated.
Electrode damaged	1. The length of an arc is too short.
	2. The flow rate of an argon gas is not enough.
Electrode melted	1. The welding current is too large in proportion to the diameter of an electrode.
	2. The polarity of an electrode is wrong.
Torch body heated	1. Coolant has not flowed enough.
	2. The tightened parts became loose.

8. Parts List

When parts of a torch are worn out or damaged, refer to Figure 3 and Table 6 and place an order for replacement at our sales office or our agency. Be sure to leave the name and part No. or specification when placing an order.

Table 7 Parts List

No	PART No	Description	Q'ty	Remarks
1	K2874B	Torch body	1	
2	H561E	Lea collet body	1	
3	H21B60	Insulator	1	For gas lens
4	H21B17	Collet (3.2)	1	
5	H21B14	Collet (1.0)	(1)	Optional
6	H21B15	Collet (1.6)	(1)	Optional
7	H21B16	Collet (2.4)	(1)	Optional
8	H21B54	Collet body (3.2)	1	
9	H21B51	Collet body (1.0)	(1)	Optional
10	H21B52	Collet body (1.6)	(1)	Optional
11	H21B53	Collet body (2.4)	(1)	Optional
12	H21B09	Collet body (1.0)	(1)	Optional
13	H21B10	Collet body (1.6)	(1)	Optional
14	H21B11	Collet body (2.4)	(1)	Optional
15	H21B12	Collet body (3.2)	(1)	Optional
16	H561C05	Lea collet (3.2)	1	
17	H561C02	Lea collet (1.0)	(1)	Optional
18	H561C03	Lea collet (1.6)	(1)	Optional
19	H561C04	Lea collet (2.4)	(1)	Optional
20	0870 – 032	Ceriated tungsten electrode	1	ϕ3.2 × 150mm
22	0870 – 016	Ceriated tungsten electrode	(1)	ϕ1.6 × 150mm
23	0870 – 024	Ceriated tungsten electrode	(1)	ϕ2.4 × 150mm
24	H21B44	Nozzle (No.8)	1	
25	H21B40	Nozzle (No.4)	(1)	Optional
26	H21B41	Nozzle (No.5)	(1)	Optional
27	H21B42	Nozzle (No.6)	(1)	Optional
28	H21B43	Nozzle (No.7)	(1)	Optional
29	H21B19	Nozzle (No.4)	(1)	Optional
30	H21B20	Nozzle (No.5)	(1)	Optional
31	H21B21	Nozzle (No.6)	(1)	Optional
32	H21B22	Nozzle (No.7)	(1)	Optional
33	H21B23	Nozzle (No.8)	(1)	Optional
34	H21B24	Nozzle (No.10)	(1)	Optional
35	H21B25	Nozzle (No.12)	(1)	Optional
36	3572 – 012	"O" ring (P12)	1	JIS B 2401 P12 (silicon rubber)
37	H472E04	Set screw	1	
38	H662C	Gas hose assy	1	
39	H662D	Coolant hose assy	1	

Table 7　Parts List (Continued)

No	PART No	Description	Q'ty	Remarks
40	H662B	Power cable hose assy	1	
41	H662E	Hose sheath	1	
42	0831-010	Thoriated tungsten electrode	(1)	ϕ1.0×150mm ground　optional
43	0831-016	Thoriated tungsten electrode	(1)	ϕ1.6×150mm ground　optional
44	0831-024	Thoriated tungsten electrode	(1)	ϕ2.4×150mm ground　optional
45	0831-032	Thoriated tungsten electrode	(1)	ϕ3.2×150mm ground　optional
46	0831-010	Pure tungsten electrode	(1)	ϕ1.0×150mm ground　optional
47	0831-016	Pure tungsten electrode	(1)	ϕ1.6×150mm ground　optional
48	0831-024	Pure tungsten electrode	(1)	ϕ2.4×150mm ground　optional
49	0831-032	Pure tungsten electrode	(1)	ϕ3.2×150mm ground　optional

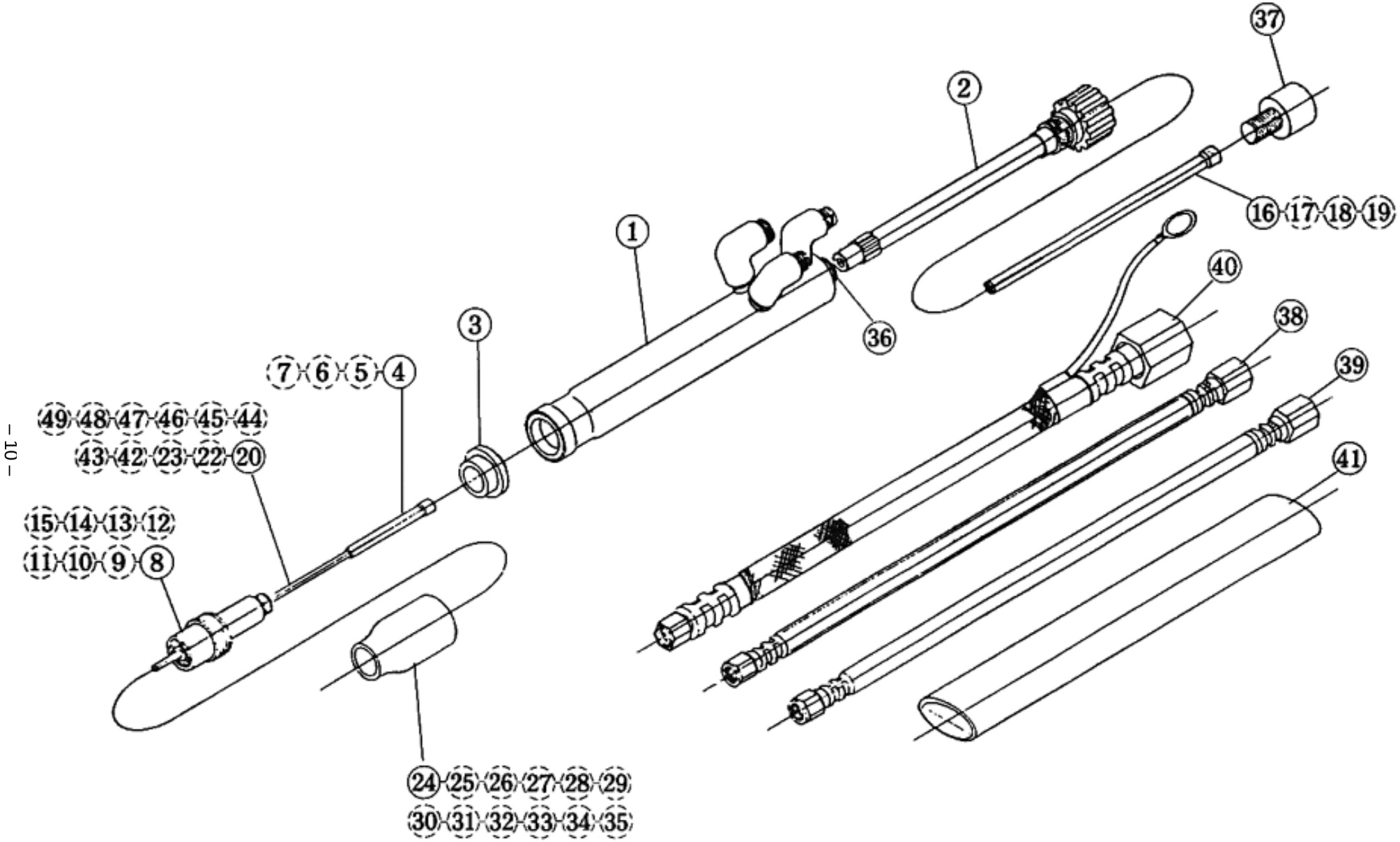


Fig. 3. MWP-18 TIG Welding Torch Parts Layout

Instruction Manual of welding torch

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ITEMS OF MAIN PRODUCTS

ARC WELDING MACHINES

- AC ARC WELDING MACHINES
- DC ARC WELDING MACHINES
- CO_2 GAS-SHIELDED ARC WELDING MACHINES
- MAG ARC WELDING MACHINES
- MIG ARC WELDING MACHINES
- TIG GAS-SHIELDED ARC WELDING MACHINES
- SUBMERGED ARC WELDING MACHINES
- NO-GAS-SHIELDED ARC WELDING MACHINES
- STUD WELDING MACHINES

AIR PLASMA CUTTING MACHINES

ARC WELDING ROBOT

CO_2 LASER EQUIPMENTS

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