MANUAL NO: 80A Torch

DAIHEN Corporation

OWNER'S MANUAL

FOR

PLASMA CUTTING TORCH

MODEL: CT(P•Z)W(M•L)-0802

DO NOT DESTROY

IMPORTANT: Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This equipment and this manual are for use only by persons trained and experienced in the safety operation of cutting equipment. Do not allow untrained persons to install, operate or maintain this equipment. Contact your distributor if you do not fully understand this manual.

OTC DAIHEN Inc. WELDING & MECHATRONICS DIVISION

Last Modified: December, 2006

CONTENTS

1. SAFETY INFORMATION

The following safety alert symbols and signal words are used throughout this manual to identify various hazards and special instructions.

⚠ WARNING	WARNING gives information regarding possible personal injury or loss of life.

⚠ CAUTION	CAUTION refers to minor personal injury or possible equipment damage.

2. PLASMA ARC CUTTING SAFETY PRECAUTIONS

⚠ WARNING
PLASMA ARC CUTTING can be hazardous.
◆ PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. Be sure to: ・Keep children away. ・Keep pacemaker wearers away until consulting a doctor. ◆ Read and understand the summarized safety information given below and the original principal information that will be found in the PRINCIPAL SAFETY STANDARDS. ◆ Have only trained and experienced persons perform installation, operation, and maintenance of this equipment. ◆ Use only well maintained equipment. Repair or replace damaged parts at once.
PLASMA ARC CUTTING is safe when precautions are taken.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuits are electrically live whenever the output is on. The power line and internal circuits of this equipment are also live when the line disconnect switch is on. When plasma cutting all metal components in the torch and work circuits are electrically live.

1. Do not touch live electrical parts.
2. Wear dry insulating gloves and other body protection that are free of holes.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Be sure to turn off the line disconnect switch before installing, changing torch parts or maintaining this equipment.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Keep all panels and covers of this equipment securely in place.
7. Do not use worn, damaged, undersized, or poorly spliced cables.
8. Do not touch electrode and any metal object if POWER switch is ON.
9. Do not wrap cables around your body.
10. Turn off POWER switch when not in use.
11. Keep away from torch tip and pilot arc when trigger is pressed.

ARC RAYS can burn eyes and skin.
NOISE can damage hearing.

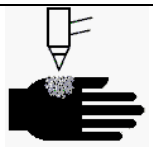
Arc rays from the cutting process produce intense heat and strong ultraviolet rays that can burn eyes and skin.
Noise from some plasma arc cutting applications can damage hearing.

1. Wear face shield with a proper shade of filter (See ANSI Z 49.1 listed in PRINCIPAL SAFETY STANDARDS) to protect your face and eyes when cutting or watching a cutter work.
2. Wear approved safety goggles. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare: warn others not to look at the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved earplugs or earmuffs if noise level is high.

	FUMES AND GASES can be hazardous to your health.

Cutting produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. Ventilate the area and / or use exhaust at the arc to remove cutting fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDS) and the manufacturer ’s instructions on metals to be cut, consumables, coatings, and cleaners.
5. Do not cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to from highly toxic and irritating gases.

	PLASMA ARC can cause injury

1. Keep away from the torch tip.
2. Do not grip material near the cutting path.
3. The pilot arc can cause burns. Keep away from tip when trigger is pressed.
4. Wear proper flame-retardant clothing covering all exposed body areas.
5. Point torch away from your body and toward work when pressing the torch trigger.
6. Turn off the line disconnect switch and POWER switch on the front panel before disassembling torch or changing torch parts.
7. Use only torch (‘s) specified in the Owner’s Manual.

	FLYING SPARKS AND HOT METAL can cause injury.

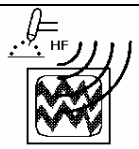
Chipping and grinding can cause flying metal.

1. Wear approved face shield or safety goggles with side shields.
2. Wear proper body protection to protect skin.
3. Wear flame-resistant earplugs or earmuffs to prevent sparks from entering ears.

CYLINDER can explode if damaged.

A shielding gas cylinder contains high-pressure gas. If damaged, a cylinder can explode.
Since gas cylinders are normally part of the cutting process, be sure to treat them carefully.

1. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them in good condition.
2. Protect compressed gas cylinders from excessive heat, mechanical shock, and arcs.
3. Keep the cylinder upright and securely chained to a stationary support or a rack to prevent falling or tipping.
4. Keep cylinders away from any cutting or other electrical circuit.
5. Never touch cylinder with cutting electrode.
6. Read and follow instructions on compressed gas cylinders, associated equipment, and the CGA publication P-1 listed in PRINCIPAL SAFETY STANDARDS.
7. Turn face away from valve outlet when opening cylinder valve.
8. Keep protective cap in place over valve except when gas cylinder is in use or connected for use.



This equipment uses high frequency for arc starting.

High-frequency may enter nearby units as shown below, causing electromagnetic trouble.

* Input cables, signal cables, telephone cables
* Radio sets, TV sets
* Computers and other control equipment
* Industrial detectors and safety units
* Pacemakers, hearing-aid sets

For preventing electromagnetic trouble,

1. Make the cable as shortest as possible.
2. Install cables along the floor or the ground as close as possible.
3. Put the base metal side cable together with the torch side cable.
4. Do not use a common base metal ground with other machines.
5. Tightly close all of the doors and covers of this equipment, and secure them.
6. Do not press the torch switch other than when ready to start the arc.
7. When electromagnetic trouble occurs, take the measures shown in this instruction manual until trouble is corrected.
   Please contact OTC-DAIHEN , when necessary.
8. Pacemaker wearers must not come near this equipment during operation until consulting your doctor.
   Operation of the pacemakers will be affected badly by high frequency.

	Rotating parts may cause injuries. Be sure to observe the following.

If hands, fingers, hair or clothes are put near the fan's rotating parts, injuries may occur.

1. Do not use this equipment if the case and the cover are removed.
2. When the case is removed for maintenance/inspection and repair, certified or experienced operators must perform the work. Erect a fence, etc. around the cutting machine to keep others away from it.
3. Do not put hands, fingers, hair or clothes near the rotating fans.

PLASMA ARC CUTTING work areas are potentially hazardous.

FALLING or MOVING machine can cause serious injury.

- ◆ Use both eyebolts, if installed, to lift the cutting power source.
- ◆ Put this equipment solidly on a flat surface.
- ◆ Do not pull this equipment across a floor laid with cables and hoses.

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.

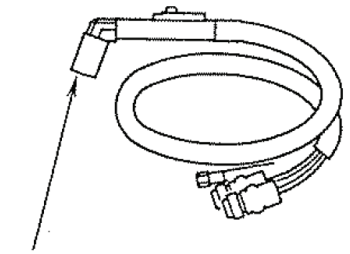
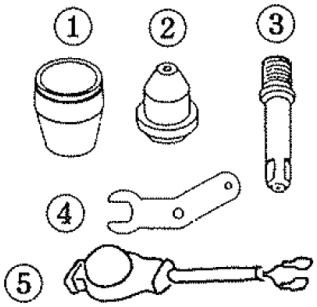
Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales.

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 Confirming Torch Package Contents

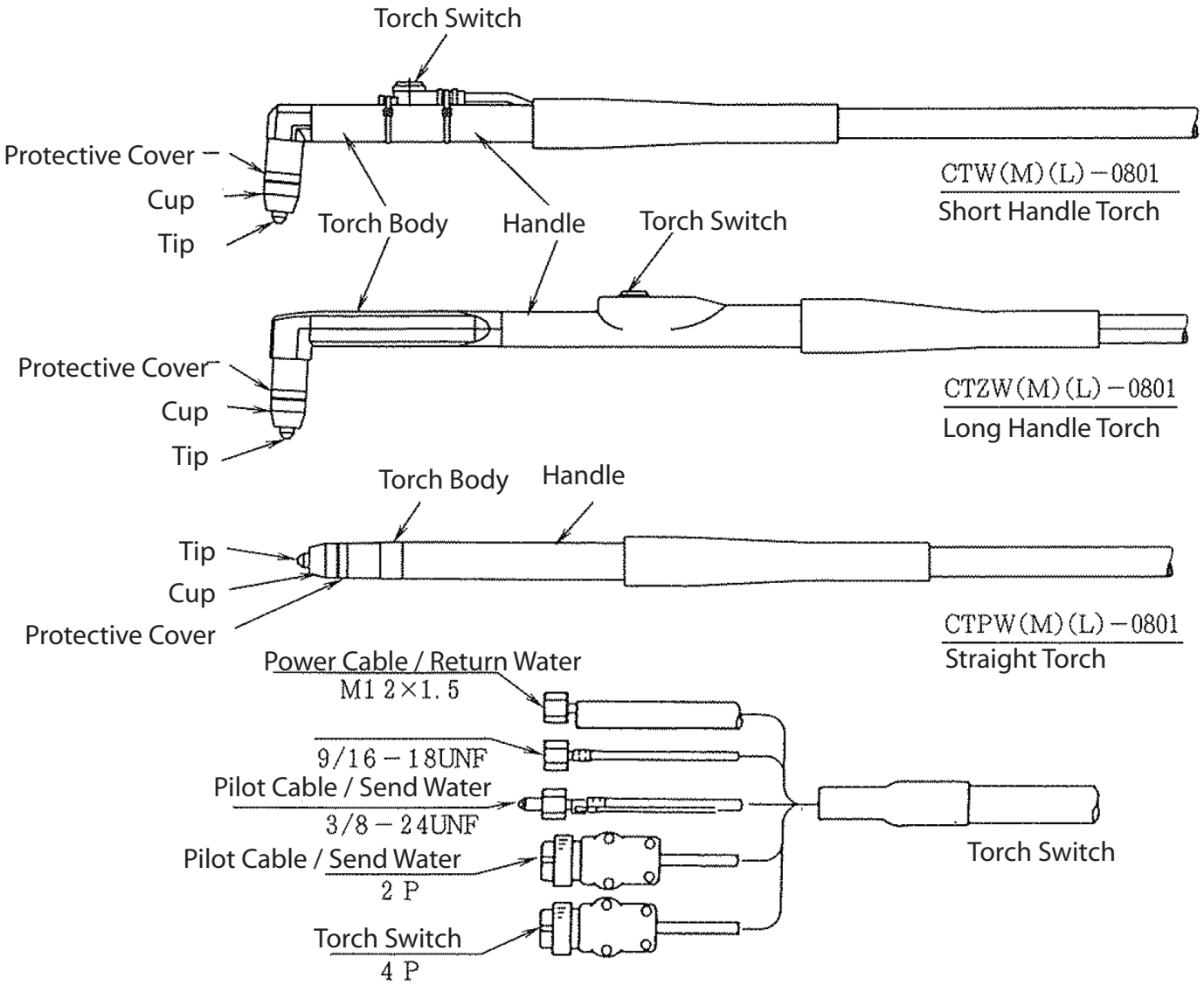
Please confirm the following components were shipped with your torch package

Plasma Cutting Torch	Included Items
 Vinyl Cap (Remove before using)	

① Cup	1
② Tip	4
③ Electrode	4
④ Wrench	1
⑤ Torch Switch	1※

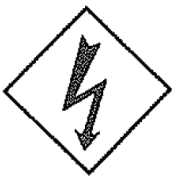
※ Only included with CTPW(M)(L)-0801

④ Part Names



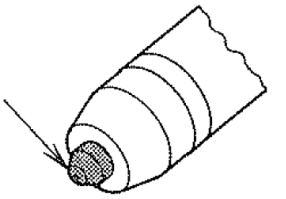
⑤ Operation Precaution

CAUTION Observe the followings to prevent the electrical shock.

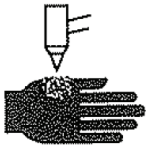


- Do not touch live electrical parts.
- When power source is on, do not touch the tip.

If you push the torch switch, the voltage increases, which may lead to electrical shock.



CAUTION If you touch plasma arc or pilot arc, you will be burned.



- Do not point the tip of the torch in direction of personnel.
- During cutting operations, when placing the torch down, do not leave torch switch on ore place in an unstable place.

5. 1 Precautions during cutting operations

CAUTION Please observe the following during cutting operations.
* Avoiding the following precautions will shorten the life of consumable items and can cause damage to the torch.

(1) Cutting Start

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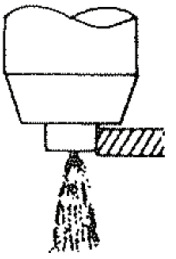

- During the start of the arc, do not touch the side of the tip to the edge of the base material.
- This will cause a large arc to generate, and may create a larger hole in the tip.

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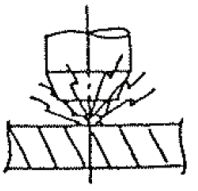
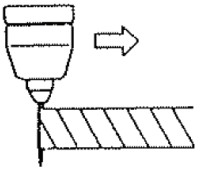


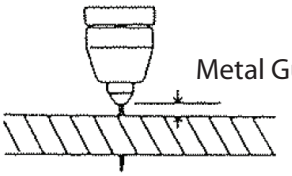
- Do not start with the tip vertically on top of the base material.
- This may create and arc inside the tip, and may burn up the tip.



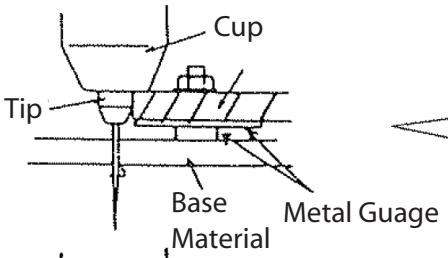
- When cutting plate thicknesses greater than 16mm, make sure the arc has completely cut to the bottom side before moving the torch

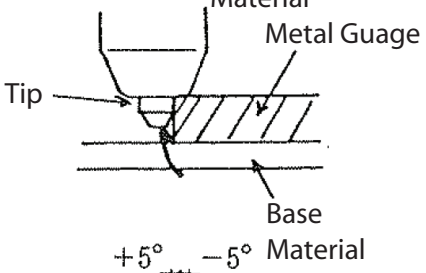
⑤ Operation Precaution (cont'd)

(2) During Cutting



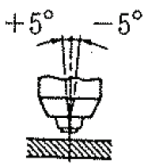
• The best distance from tip to the base material is 4mm; the maximum distance should not exceed 5mm.

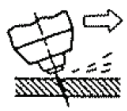




• When using for gas cutting and using a metal type gauge, the guage use insulator (Part No. H775L00) is used to insulate between the base material and guage.

• Do not use a guage without an insulator. The arc will travel to the metal gauage, causing damage to the tip, resulting cutting faults.



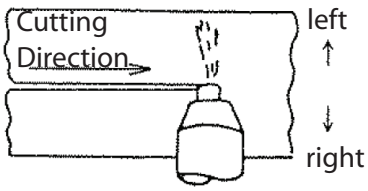


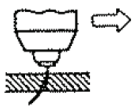
• The proper torch angle to base metal should be within ±5° .

• If forward angle is too large, upwash occurs forward of cutting direction.

• If torch leans to the right against cutting direction, it spatters to the left, and spatters to the right, if torch leans to the left against cutting direction.

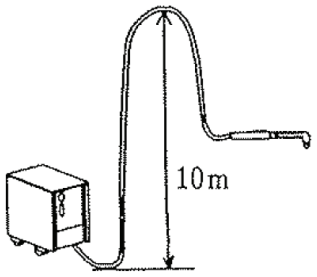
• Keep the proper torch angle to prevent flying spatter.





• Plasma arc flows slightly backward with correct cutting speed, so dross can be easily taken off from base metal.

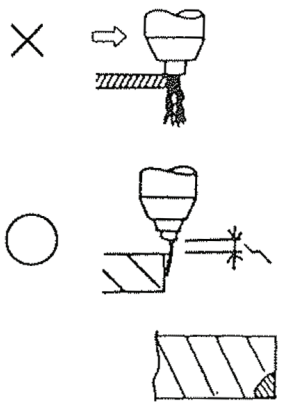
• If it is too fast, upwash occurs forward of cutting direction.



• Do not lift the torch cable in excess of 10m. (Doing so will cause the coolant water to not reach the torch tip and this may burn up the torch)

⑤ Precautions for Cutting Operation (Continued)

(3) End of Cutting

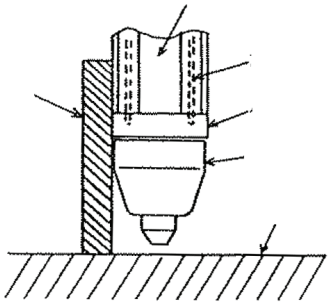


Do not cut down with touching tip to base metal. Strong arc generates, and the hole of tip can be deformed.

At cutting terminal, keep tip away from base metal for 1～3mm, then cut it down.

Thickness greater than 16mm will sometimes leave a small area.

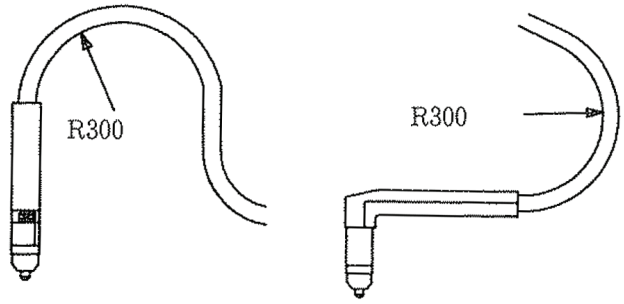
5.2 About the Insulating Cover

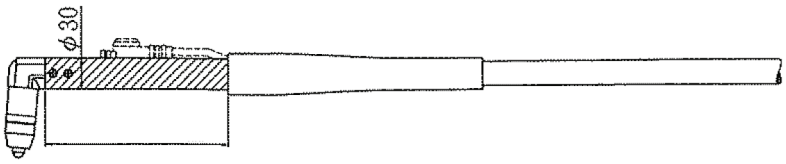


The insulating cover serves to protect the detective pin. Careless handling of the torch body may cause damage to the insulating cover. If the insulating cover has been removed, high frequency is emitted from the detective pin and may cause damage to the torch body. If the insulating cover is damaged, replace it.

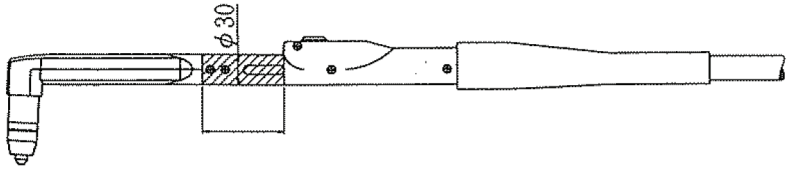
5.3 Hose Cable Bend Radius

Do not bend the cable less than 300 mm in radius. In particular, when using the torch in automated systems, causing the cable to bend less than 300mm in radius will cause the cable to break sooner than the expected lifespan.

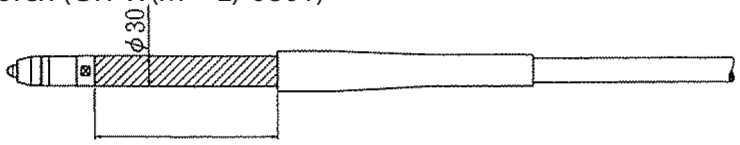




(2) Long Handle Torch (CTZW(M・L)-0801)

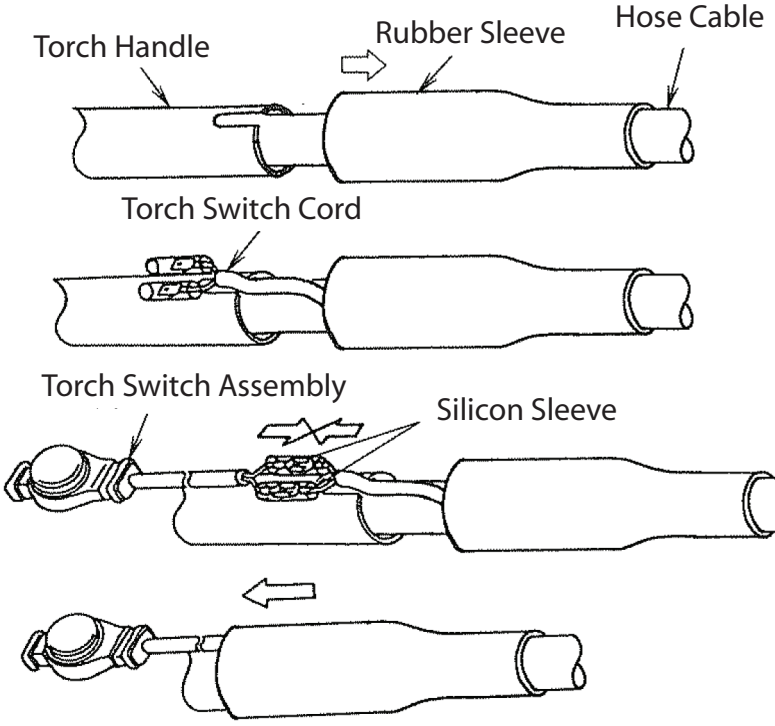


(3) Straight Torch (CTPW(M・L)-0801)



5.5 Attaching the Torch Switch for CTPW(M)(L)-0801 Straight Torch

When using the attached torch switch assembly (part number K2433A00), please follow the guidelines below.



(1) Remove the rubber sleeve from the cable side of the torch handle

↓

(2) Expose the torch switch cord from the torch handle

↓

(3) Connect the torch switch terminals.
NOTE: Make sure to connect the terminals in the silicon tubes

↓

(4) Slide rubber sleeve back to original place

6. MAINTENANCE AND TROUBLESHOOTING

⚠ WARNING

Observe followings to prevent electrical shock.

- Do not touch live electrical parts.
- Do not touch tip, when power source is on.
- Be sure to turn off the line disconnection switch before checking torch and exchanging parts.
- Operate the maintenance check periodically, and be sure to troubleshoot and repair immediately.
- This cutting torch must be operated by persons who understand contents of this owner's manual and have knowledge and skills for cutting torch safety.

⚠ CAUTION

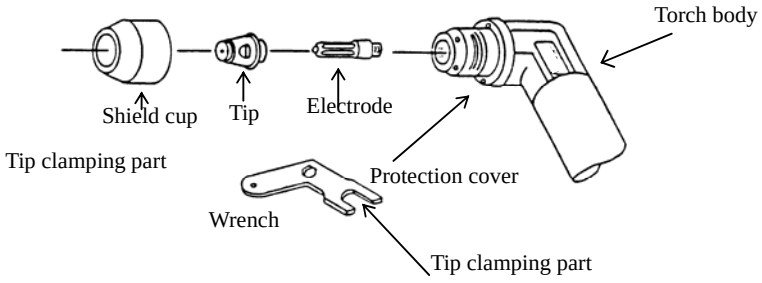
Observe the followings to prevent burning.

- When operating, do not touch high temperature parts (tip, shield cup, and base metal just after the operation).
- Use protectors (leather gloves, etc.) when operating.
- Exchanging torch tip parts must be done after cooling down.

⚠ CAUTION

- If parts are damaged, replace with new ones for safety and quality assurance.
- Only use OTC's genuine parts for replacing.

6.1 Replacing of shield cup, tip, and electrode

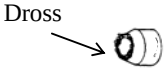


For assembling and disassembling of tip and electrode, use a wrench (accessory).

(1) Installation of shield cup

Before installing shield cup to torch body, wipe dusts out by a peace of dry cloth.

Turn cup tightly.

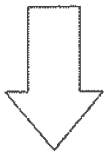


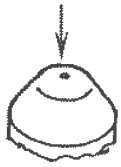
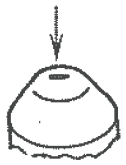
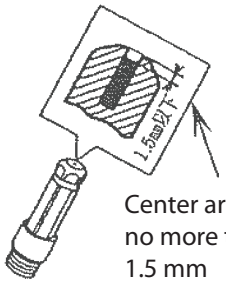
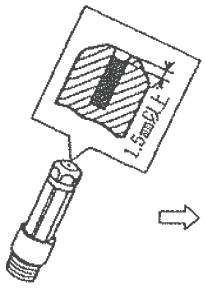
If dross sticks to shield cup, wipe them out as soon as possible, it can cause damage to it.

(ii) After performing a number of cuts, you will begin to notice some of the effects below during cutting. When this happens, inspect the tip and electrode, and if any of the consumable parts are in need of change, please change them.

- Please do not attempt to grind the tip or electrode

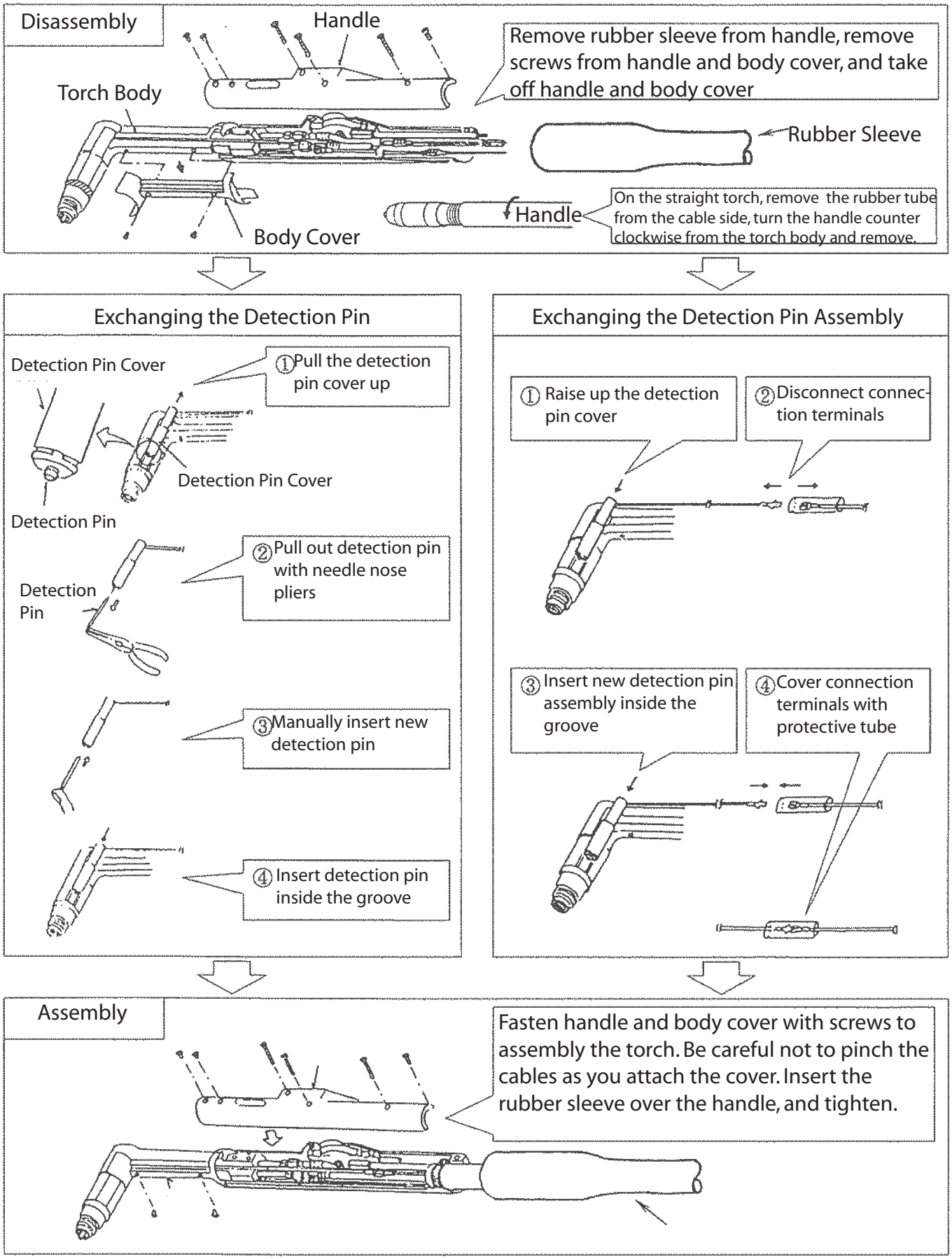
Phenomena While Cutting	Detection Area
• Pilot arc does not easily ignite, and bad starts occur	Tip, Electrode
• During the start, a loud "BAAHHHH" sound can be heard	Electrode
• Even after exchanging the tip, weird shape holes occur	Electrode
• The cutting area begins to bend aways from terminal	Tip
• The tip sticks to the base material	Tip



	Check Item	Correct	Exchange Signs
Tip	Has the hole at the end of the tip changed size?  Hole	● The hole is perfectly round Perfect Circle 	● The hole has started to enlarge and becomes oval shaped. Oval Shape  Cutting in this condition will result in less focused cuts of poorer quality.
Electrode	Has the tip of the electrode started to wear out? 	● The center area of the electrode is less than 1.5mm.  Center area is no more than 1.5 mm	● The center area of the electrode is greater than 1.5mm.  If the depth of the electrode consumable area goes beyond 1.5 mm in depth, there becomes the risk of burn damage to the torch.

6. 2 Exchanging the Detection Pin Area

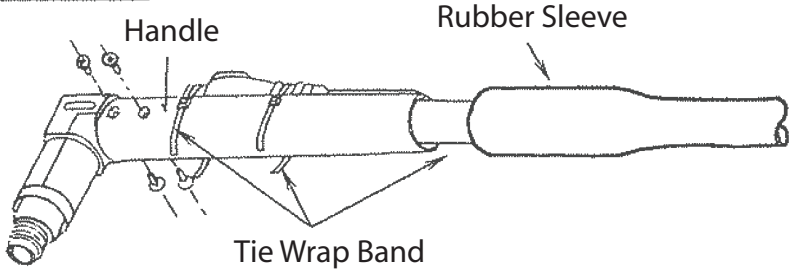
(1) (1) CTZW(M)(L)-0801 (Long Handle Torch and CTPW(M)(L)-0801 (Straight Torch) Exchange Method



6. 2 Exchanging the Detection Pin Area

(2) Replacement Method for CTW(M)(L)-0801 (Short Handle Torch)

Disassembly

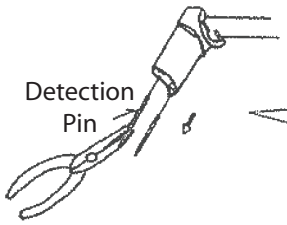


Slide back rubber sleeve towards cable side, cut the tie wraps and carefully remove the torch switch.

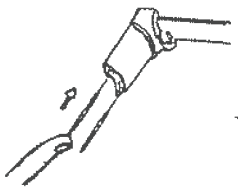
Remove screws from the handle, and and slide back handle towards the cable side.

Exchanging the Detection Pin

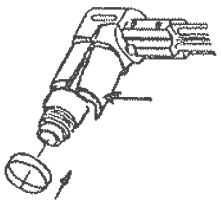
① Remove the protective cover and pop off cover to detection pin by using a small flat-head screw driver



② Remove detection pin by using needle-nose pliers.



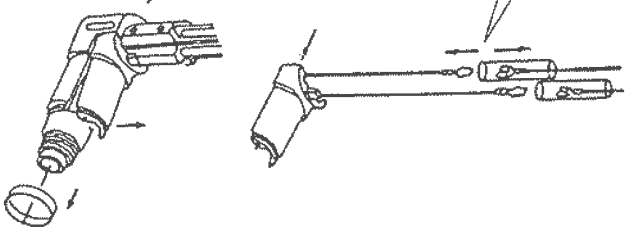
③ Manual insert new detection pin



④ Snap detection pin cover back into place, and slide protective cover back on.

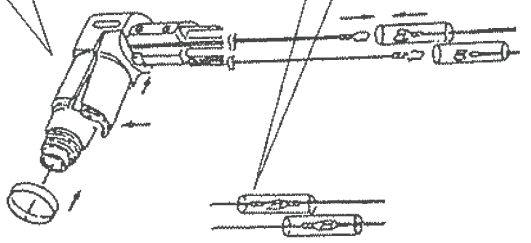
① Remove the protective cover and pop off cover to detection pin by using a small flat-head screw driver

② Pull down detection pin cover and disconnect terminal connectors.

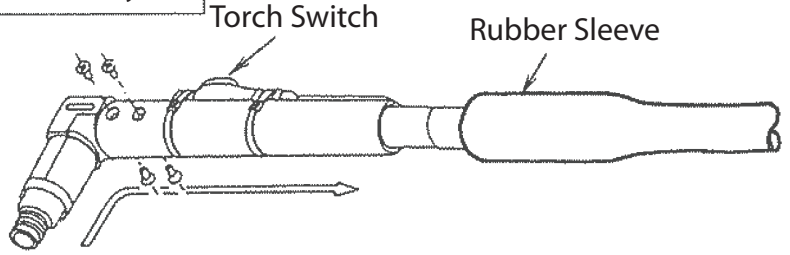


③ Insert new detection pin assembly, snap in place, and slide protective cover back in place.

④ Reconnect connection terminals and cover with protective tube.



Assembly

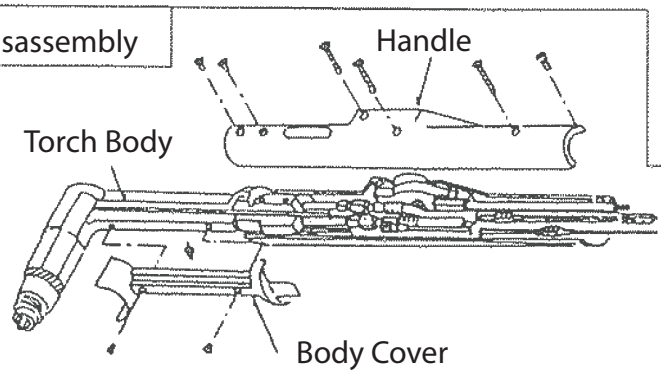


Insert handle into torch body, tighten screws back in place, and affix the torch switch.

Slide the rubber sleeve back in place make sure that everything fits nicely.

6.3 Replacing the Torch Body

Disassembly

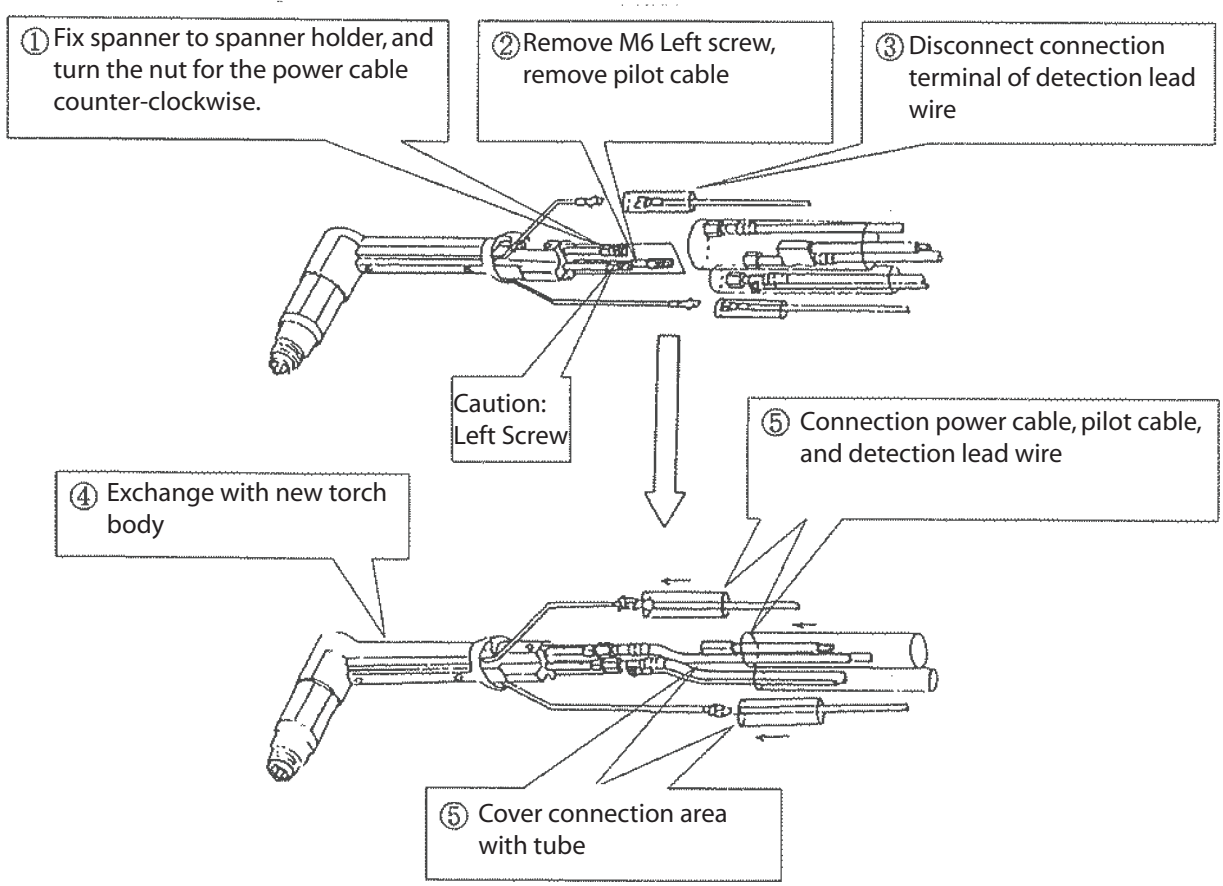


● Please refer to the assembly & disassembly figures in 6.2 for the CTW(M)(L)-0801 Short Handle Torch and CTPW(M)(L)-0801 Straight Torch.

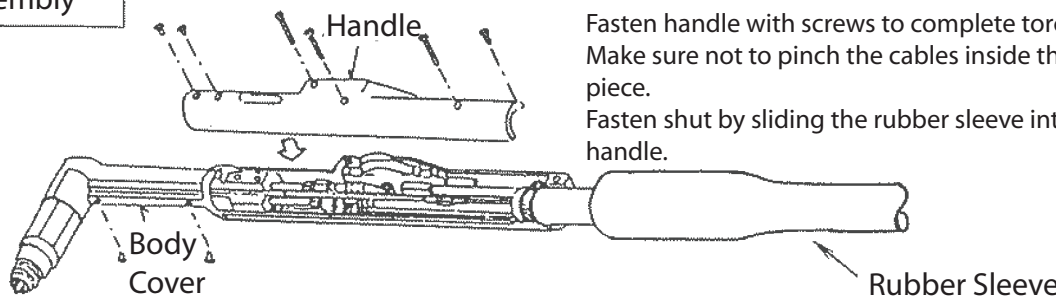
Remove the rubber sleeve from the handle, remove screws from the handle and disassemble.

Exchanging

WARNING: The pilot cable connection opening (yellow hose) is held only by the left screw. If you overtwist the the right screw, you risk damaging the connection opening.



Assembly



Fasten handle with screws to complete torch assembly.
Make sure not to pinch the cables inside the handle piece.
Fasten shut by sliding the rubber sleeve into the the handle.

⑦ Parts List

• Please use the following as a reference for purchasing replacement parts from either your distributor or one of our service centers.

• Regarding Part Replacement Duration
The usual minimum for part supply duration is generally 7 years after the product goes out of production. However, parts may still be purchased through an external part vendor.

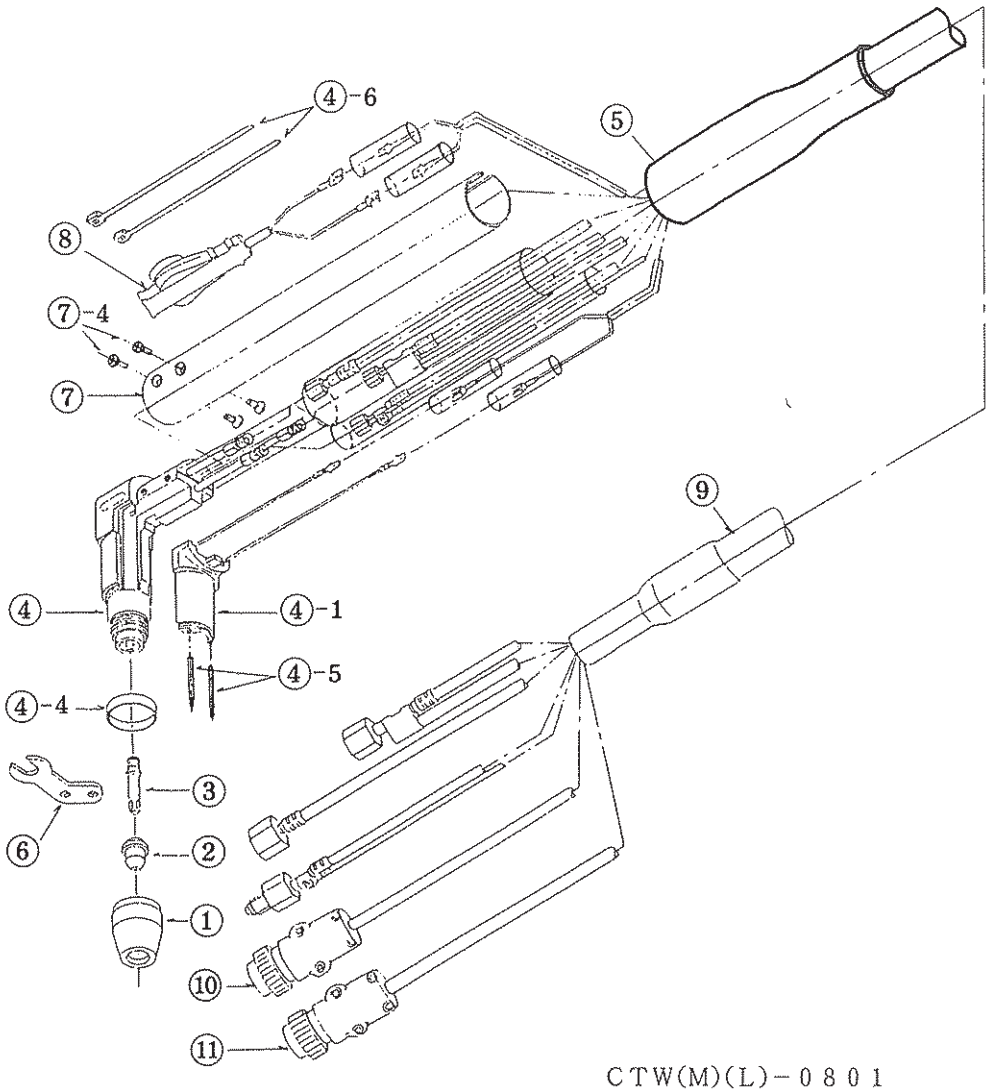
(1) Standard Parts List

No.	Part No. Short	Long	Straight	Name	Quantity	Included	Remarks
1	H767J00			Cap	1	1	
2	H767F01			Tip (80A)	1	4	
3	H777G00			Electrode	1	4	
4	H813G00	H758B00	H760B00	Torch Body	1		Includes 4-1~4-8
4−1	H813H00	−	−	Detection Pin Assembly	(1)		Includes 4-1~4-8
4−2	−	H758R00	H760F00	Detection Pin Assembly (1)	(1)		Includes 4-5
4−3	−	H758S00	H760G00	Detection Pin Assembly (2)	(1)		Includes 4-5
4−4	H758B03			Protective Cover	(1)		
4−5	H758R03			Detection Pin (Contact Plug)	(2)		
4−6	4739−189	−	−	Tie-wrap Band (Black)	(2)		
4−7	−	H758B01	−	Body Cover	(1)		
4−8	−	4739−172	−	M3x5 Small Black Bolt	(2)		
5	H781B01			Rubber Sleeve	1		
6	H758H01			Wrench		1	
7	H813F01	H777F00	H781E00	Handle	1		10m usage
		H778F00	H782E00				20m usage
		H773F00	H774E00				30m usage
7−1	−	4739−176	−	M4 Black Hex Cap	(4)		
7−2	−	4739−174	−	M4x25 Black Round Bolt	(3)		
7−3	−	4739−175	−	M4x10 Black Round Bolt	(1)		
7−4	4739−173		−	M4x6 Black Round Bolt	(4)		
8	K2530A00	K2432A00	K2433A00	Torch Switch Assembly	1	(1)	
9	H777B00			Hose Cable Assembly	1		10m usage, Includes 10,11
	H778B00						20m usage, Includes 10,11
	H773B00						30m usage, Includes 10,11
10	4730−001			Electrical Plug (2P)	(1)		
11	4730−052			Electrical Plug (4P)	(1)		W-W00294

(2) Optional Parts List

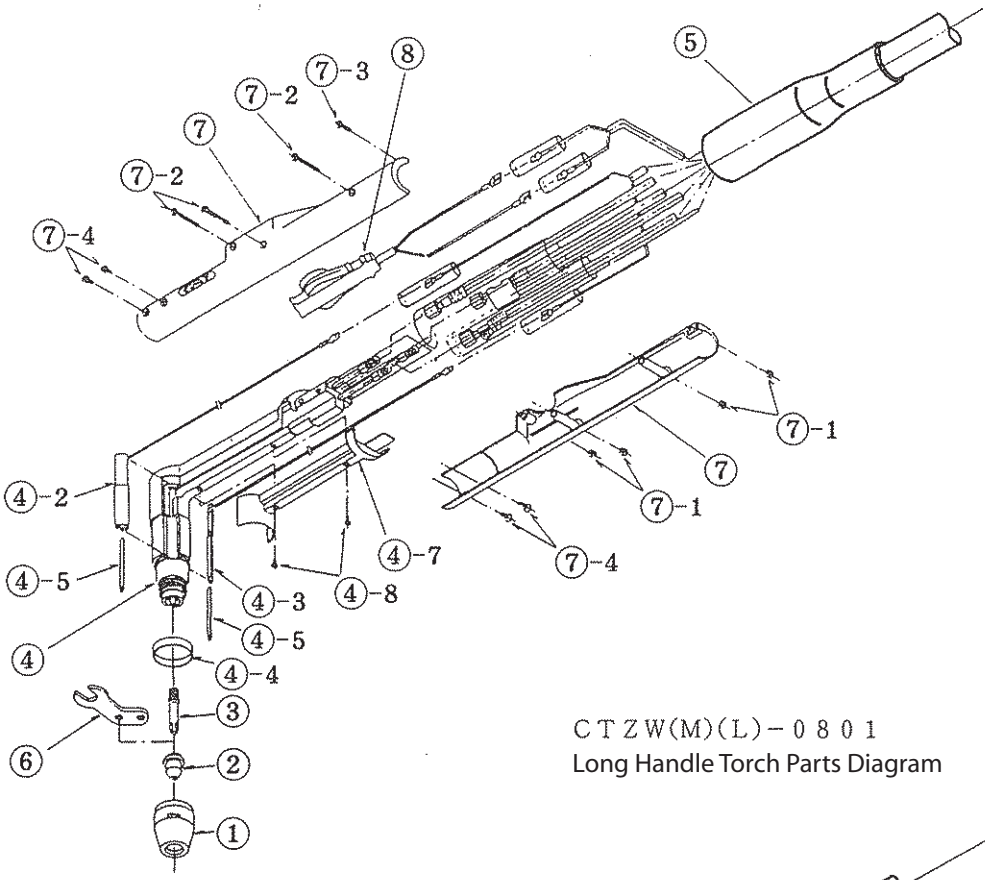
No.	Part No.	Name	Quantity	Remark
	H767F03	Tip (30A)	1	For use on thin plate less than 1.6mm
	H767F02	Tip (50A)	1	For use on thin plate less than 4.5mm

⑦ Parts List (Continued)

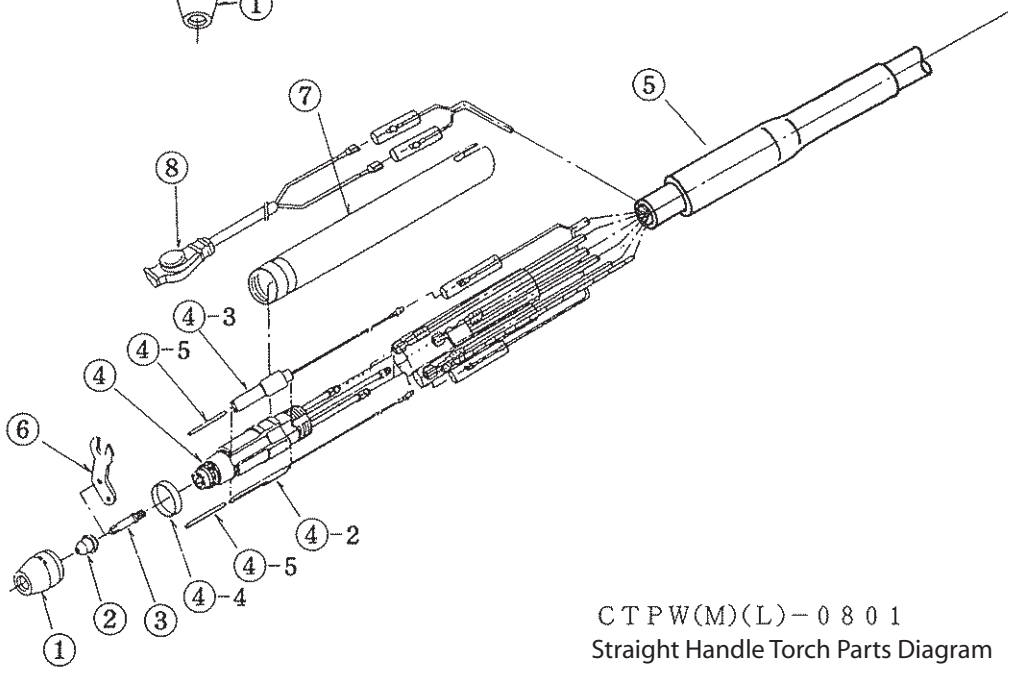


CTW(M)(L)－0801
Short Handle Torch Diagram

⑦ Parts List (Continued)



CTZW(M)(L)－0801
Long Handle Torch Parts Diagram



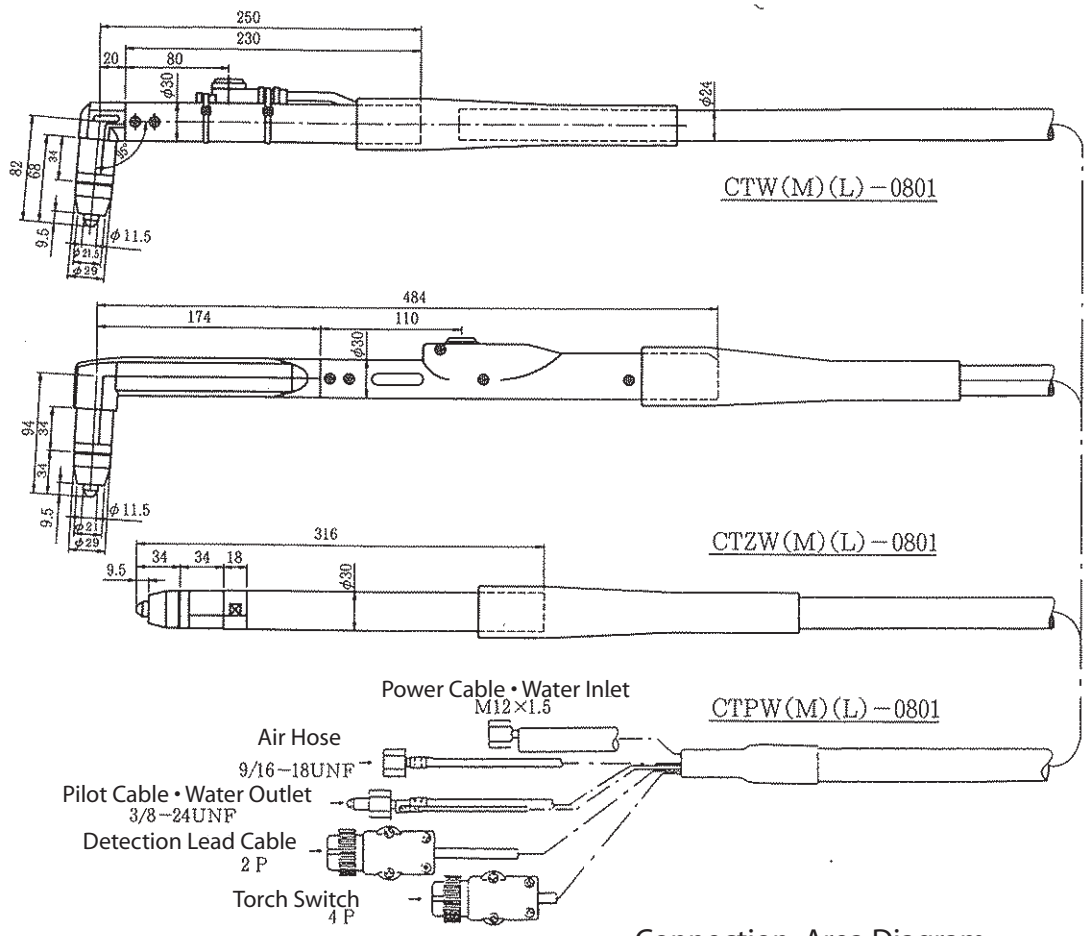
CTPW(M)(L)－0801
Straight Handle Torch Parts Diagram

⑧ Specifications

8.1 Specifications

Cutting Torch	形式	CTW －0801(10m) CTWM－0801(20m) CTWL －0801(30m)	CTZW －0801(10m) CTZWM－0801(20m) CTZWL －0801(30m)	CTPW －0801(10m) CTPWM－0801(20m) CTPWL －0801(30m)
Rated Current	A	80		
Duty Cycle	%	100		
Cooling Method		Forced Cooling (Water Cooled)		
Gas Type		Air		
Weight Torch Only	g	200	350	250
	kg	4.5 (10m)		

8.2 Dimensional Diagrams



Connection Area Diagram
(common for all machine types)