MANUAL NO:U3500-8

DAIHEN Corporation

OWNER'S MANUAL

FOR

WIRE FEEDER

MODEL: CMR-231 U3500

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 welding equipment. Do not allow untrained persons to install, operate or maintain this equipment. Contact your distributor if you do not fully understand this manual.

DAIHEN Corporation WELDING PRODUCTS DIVISION

November 15, 2002

Upon contact, advise MODEL and MANUAL NO.

Notice : Machine export to Europe

This product does not meet the requirements specified in the EC Directives which are the EU safety ordinance that was enforced starting on January 1, 1995. Please make sure that this product is not allowed to bring into the EU after January 1, 1995 as it is.
The same restriction is also applied to any country which has signed the EEA accord.

Please ask us before attempting to relocate or resell this product to or in any EU member country or any other country which has signed the EEA accord.

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. ARC WELDING SAFETY PRECAUTIONS

⚠ WARNING
ARC WELDING 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.
ARC WELDING is safe when precautions are taken.

ELECTRIC SHOCK can kill.

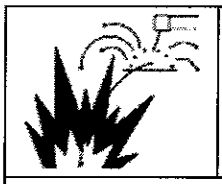
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuits are electrically live whenever the output is on. The power line and internal circuits of this equipment are also live when the line disconnect switch is on. When arc welding all metal components in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

ARC RAYS can burn eyes and skin: FLYING SPARKS AND HOT METAL can cause injury. NOISE can damage hearing.

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

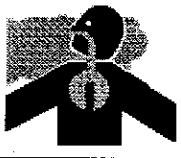
1. Wear face shield with a proper shade of filter (See ANSI Z 49.1 listed in PRINCIPAL SAFETY STANDARDS) to protect your face and eyes when welding or watching a welder work.
2. Wear approved safety goggles. Side shields recommended.
3. Use protective screens or barriers to protect others from flash 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.
   Chipping and grinding can cause flying metal. As welds cool, they can throw off slag.
6. Wear approved face shield or safety goggles. Side shields recommended.
7. Wear proper body protection to protect skin



WELDING can cause fire and explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, spatter, hot base metal, and hot equipment can cause fire and explosion. Accidental contact of electrode or welding wire to metal object can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metals.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 10m (33ft.) of the welding arc. If this is not possible, tightly, cover them with approved covers.
4. Be alert that welding sparks and hot metals from welding can easily pass through cracks and openings into adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can ignite a hidden fire.
7. Do not weld on closed containers such as tanks or drums.
8. Connect base metal side cable 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.
9. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
10. Do not use the welding power source for other than arc welding.
11. Wear oil-free protective garments such as leather gloves, a heavy shirt, cuffless trousers, boots, and a cap.
12. A loose cable connection can cause sparks and excessive heating.
13. Tighten all cable connections.



FUMES AND GASES can be hazardous to your health.

Arc welding produce 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 welding 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, consumables, coatings, and cleaners.
5. Do not weld or cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
6. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.

	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 welding 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 welding or other electrical circuit.
5. Never touch cylinder with welding 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.

	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 or wire feeder's feed roll, 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 this equipment to keep others away from it.
3. Do not put hands, fingers, hair or clothes near the rotating fans or wire feed roll.

ARC WELDING work areas are potentially hazardous.
FALLING or MOVING machine can cause serious injury. ◆ Use both eyebolts, if installed, to lift the welding power source. ◆ Put the welding power source and wire feeder solidly on a flat surface. ◆ Do not pull the welding power source across a floor laid with cables and hoses. ◆ Do not put wire feeder on the welding power source. ◆ Do not put the welding power source and wire feeder where they will pit or fall. WELDING WIRE can cause puncture wounds. ◆ Do not press gun trigger until instructed to do so. ◆ Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

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.

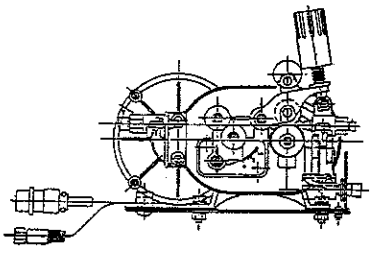
Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute.

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

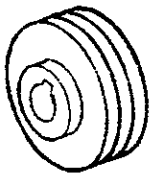
3. CHECKING PACKAGE CONTENTS

・Check quantity at opening the package.

☐Wire feeder

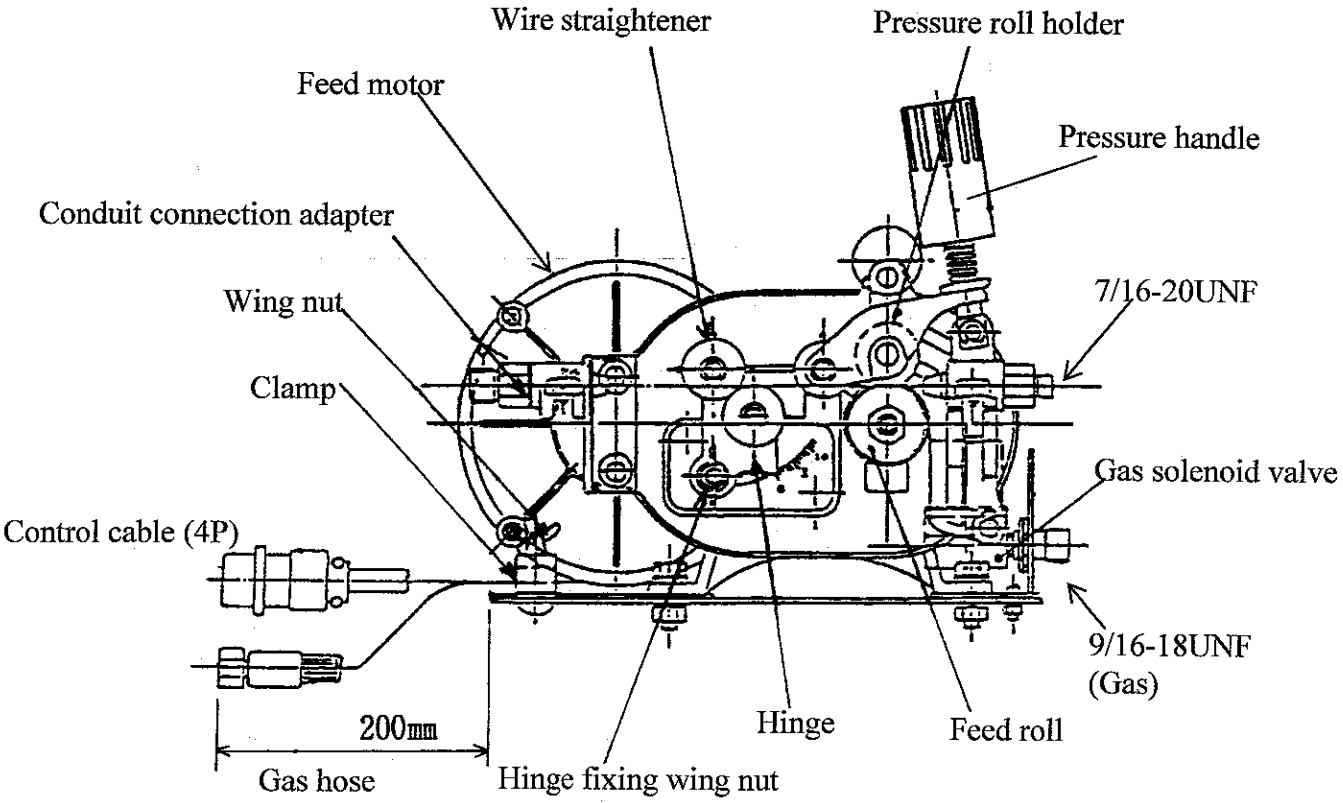


・Standard accessories



Parts name	Q'ty	Remarks
Feed roll (for 1.0 and 1.2 ϕ)	(1)	Built in body

4. EACH DESIGNATION AND OPERATION



5. TRANSPORTATION AND INSTALLATION

5.1 Transportation

⚠ WARNING	
Observe the following to prevent troubles in running and breakage of the welding machine.	
	●When carrying or transferring the wire feeder, be sure to turn OFF input power supply by the line disconnect switch.
	●When carrying the wire feeder to height, remove the wire from wire feeder.

5.2 Installation

⚠ CAUTION	
In installing the welding machine, observe the following to prevent occurrence of fires by welding and physical damage by fume gas.	
	●Do not install the welding machine near combustible materials and inflammable gas. ●Remove combustible materials not to attach the spatter to them. If not removed, cover combustible materials with the noncombustible cover.
	●For preventing gas-poisoning at choking, use local exhaust equipment or use protectors for respiration. ●In welding at narrow space, ventilate the place sufficiently or wear the protectors for respiration, and work under supervision by a trained supervisor.

INSTALLATION PLACE

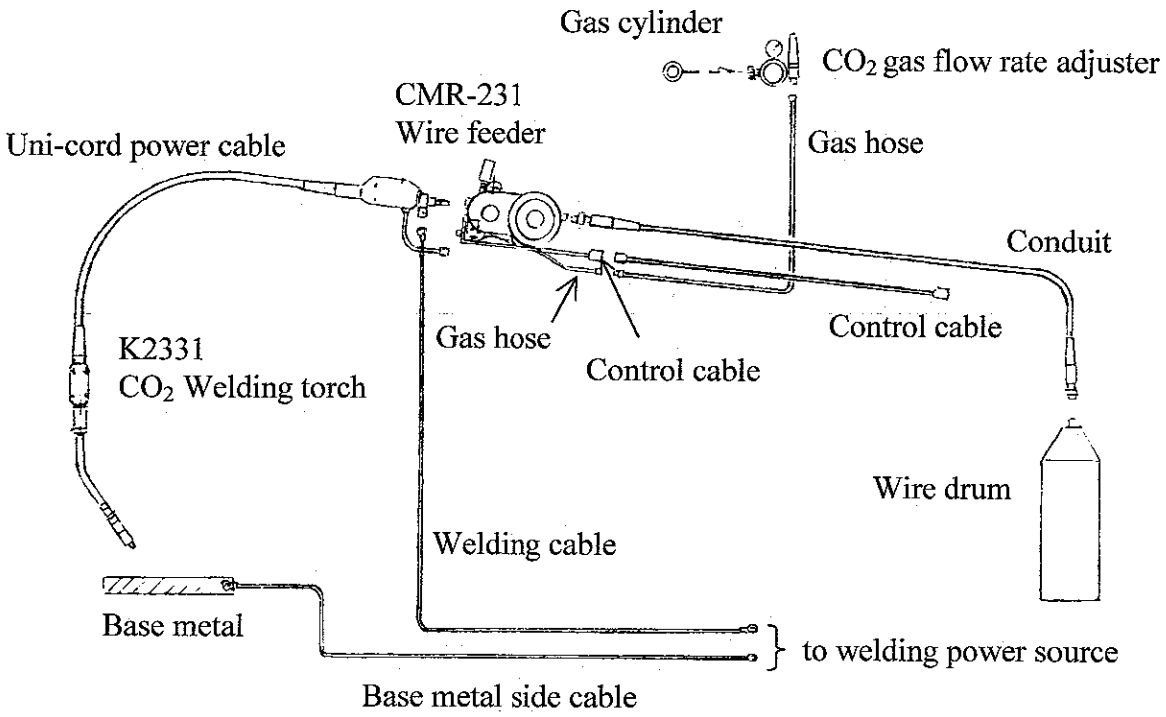
●Observe the following when selecting a installation place.

- Less humidity, dirt and dust. And do not expose welding machine to direct sun light, wind and rain.
- Ambient temperature is −10～40℃.
- There are no windows.
  (Use a wind shield to protect arc from wind, otherwise blow hole may be caused.)

6. CONNECTION

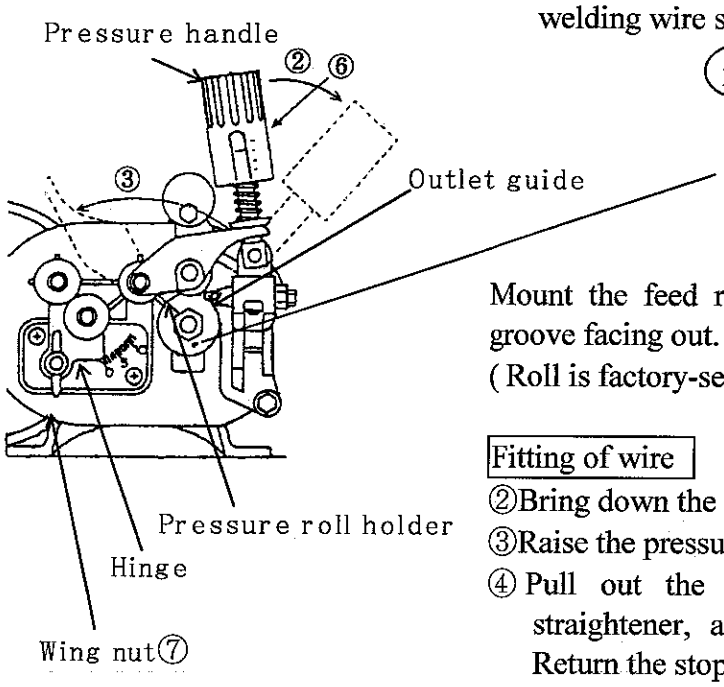
⚠ WARNING
●Be sure to turn OFF the line disconnect switch before connection.

⚠ CAUTION
●Securely tighten connection parts of cables.



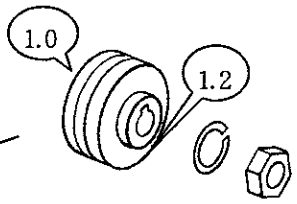
7. WELDING PREPARATION

7.1 Fitting of wire



Checking wire size of the feed roll

① Check the groove of the feed roll matches welding wire size.



Mount the feed roll to the wire feeder, with proper groove facing out.
(Roll is factory-set to 1.2 ϕ .)

Fitting of wire

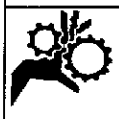
②Bring down the pressure handle.
③Raise the pressure roll holder.
④ Pull out the wire to let it through the wire straightener, and insert it into the outlet guide. Return the stopper to original position.
⑤Turn the pressure roll holder and the pressure handle back.

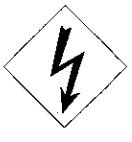
Adjusting of pressure and straightener

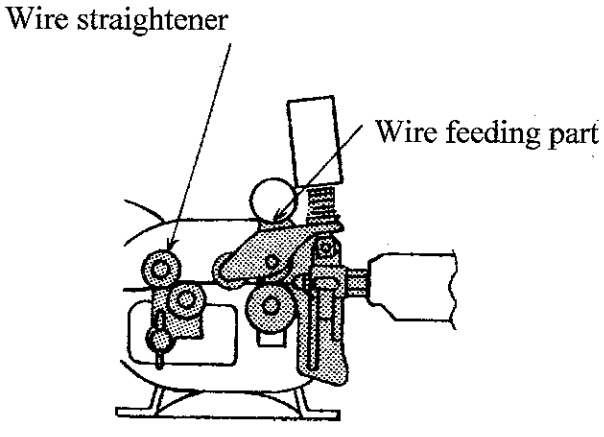
⑥ Adjust the pressure handle to set pressure force matching the wire size.
⑦ Loosen the wing nut, adjust the hinge and fix it at an appropriate position.

Wire size	Wire pressure adjusting		Wire straightener adjusting
	Pressure handle scale		Straight hinge adjusting scale
	Solid wire	Flux cored wire	
ϕ 1.6	5～6	4～5	0～2
ϕ 1.2, 1.4	5～6	3～4	1～3
ϕ 1.0, 0.9	3～4	—	2～4
ϕ 0.8	2～3	—	3～5

7.2 Wire feeding by inching operation

⚠ WARNING
 ●Do not look into the tip hole to check on feeding of the wire while inching.
⚠ CAUTION
 ●Do not put your hands, fingers, hair or clothes near the rotating parts of the feed roll, etc. while inching. Biting may occur, causing injuries.

⚠ WARNING
※Touching the electrification parts may cause fatal electric shook and burn.
 ● Never touch electrically hot parts of wire and wire feeder. ▒▒ part indicates electrically hot part when welding.

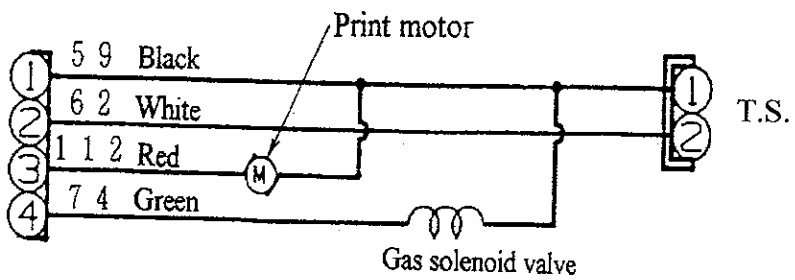


8. MAINTENANCE AND TROUBLESHOOTING

8.1 Inspection in working

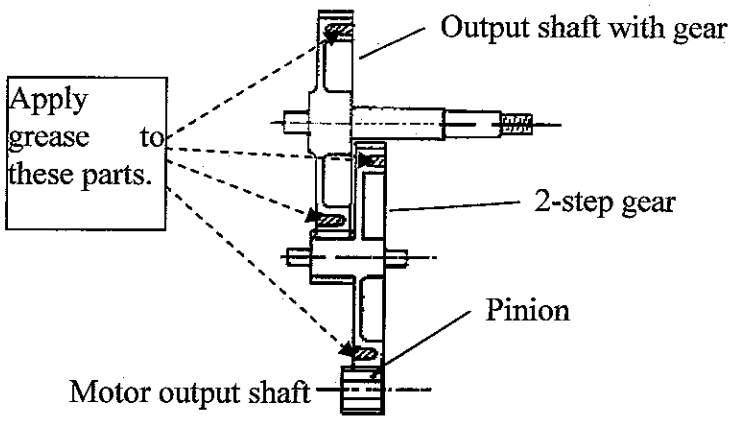
Parts	Inspection point	Trouble	Measures
Pressure scale	●Is pressure force matching with the wire size?	Pressure force is too weak or too strong.	Match pressure force with the value of wire pressure adjustment recommended in item 7.2.
Outlet guide	●Are not full of chips and dusts left around the inlet of the outlet guide and the feed roll?	Chips and dusts are left.	Remove chips and dusts.
Feed roll	●Are the wire size and the marking of the feed roll matching?	Wire size and the marking do not match.	Change to the feed roll matching with the wire size.
	●Wire touching surface condition.	The surface is worn.	Replace with new one.
Pressure roll	●Does the roll rotate smoothly?	The roll does not rotate smoothly.	Replace with new one
Wire straightener	●Are not full of chips and dusts left?	Chips and dusts are left.	Remove chips and dusts.
	●Does the roll rotate smoothly?	The roll does not smoothly.	Remove chips and dusts, or replace with new one.
Cable	●Is not the cable coating broken, or is not the cable liable to be disconnected?	The coating is broken or the cable is likely to be disconnected.	Replace with new one.
	●Is not the connecting part loosened?	The connection part is loosened.	Firmly tighten.
Gas hose	●Is not crazing formed?	Crazing is formed.	Replace with new one.

〈Schematic diagram〉



8.2 Yearly inspection

(1) Grease replacement of reduction gear



After wiping out grease, apply grease again to the surface and sides of reduction gear as shown in the figure above. Be sure to use Sunlight Grease 1 produced by Showa Shell Sekiyu K.K. If Sunlight Grease 1 is not available, use lithium type of Grease 1.

⚠ CAUTION
Never fill the gear box with grease. This may result in burnout of the wire feeder.

(2) Replacement of feed motor

⚠ CAUTION
• Never attempt to disassemble the feed motor. This may damage the wire feeder. • Never check how much the brush is worn out or replace the brush.

Service life of the brush is normally about 4,000 hours (if it is used for 6 hours a day, its service life will be about 2 years.). Periodical replacement of the feed motor is recommended.

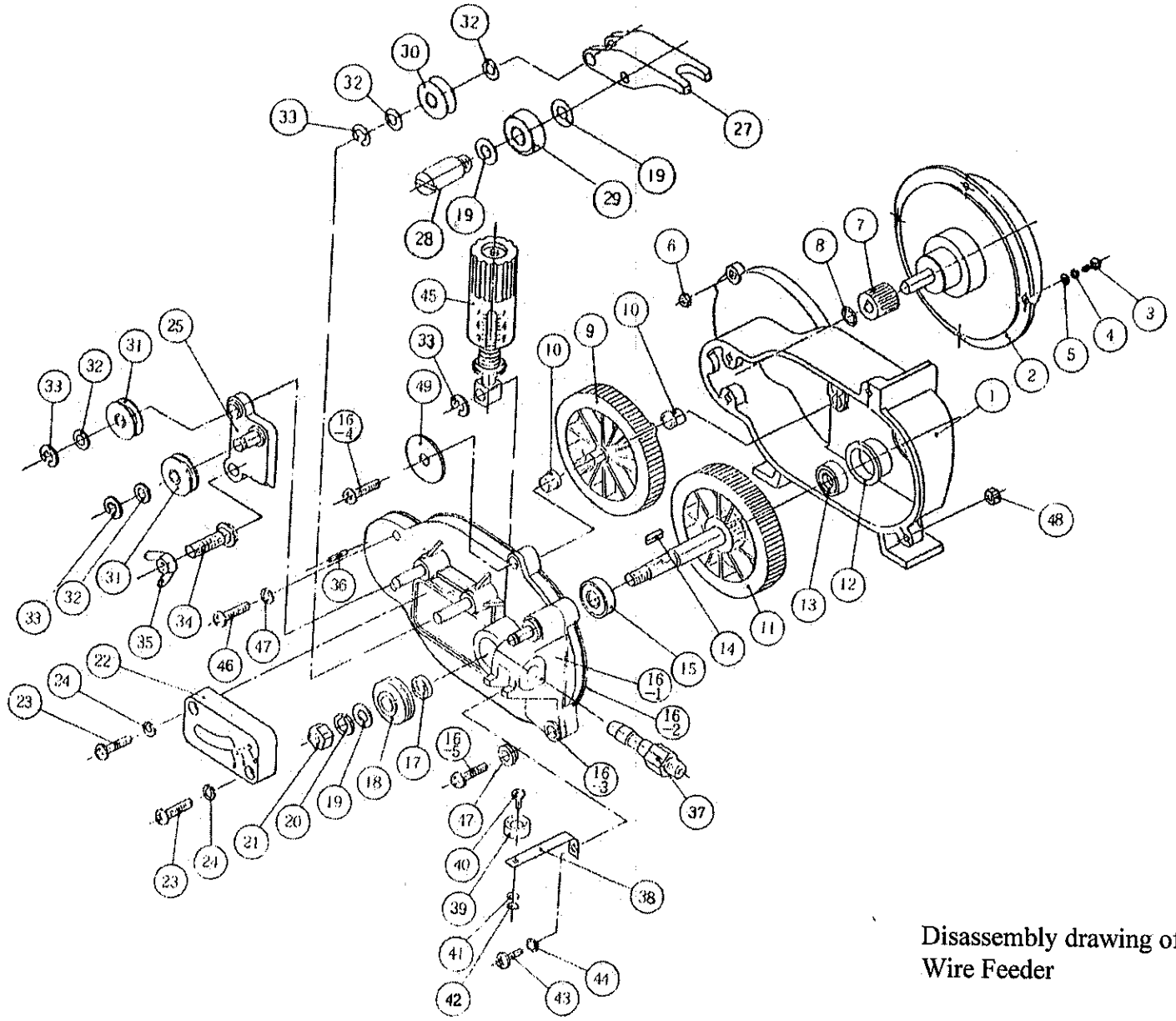
9. PARTS LIST

Please order parts necessary for repair from OTC or its agents, indicating parts name, reference No. and Part No.

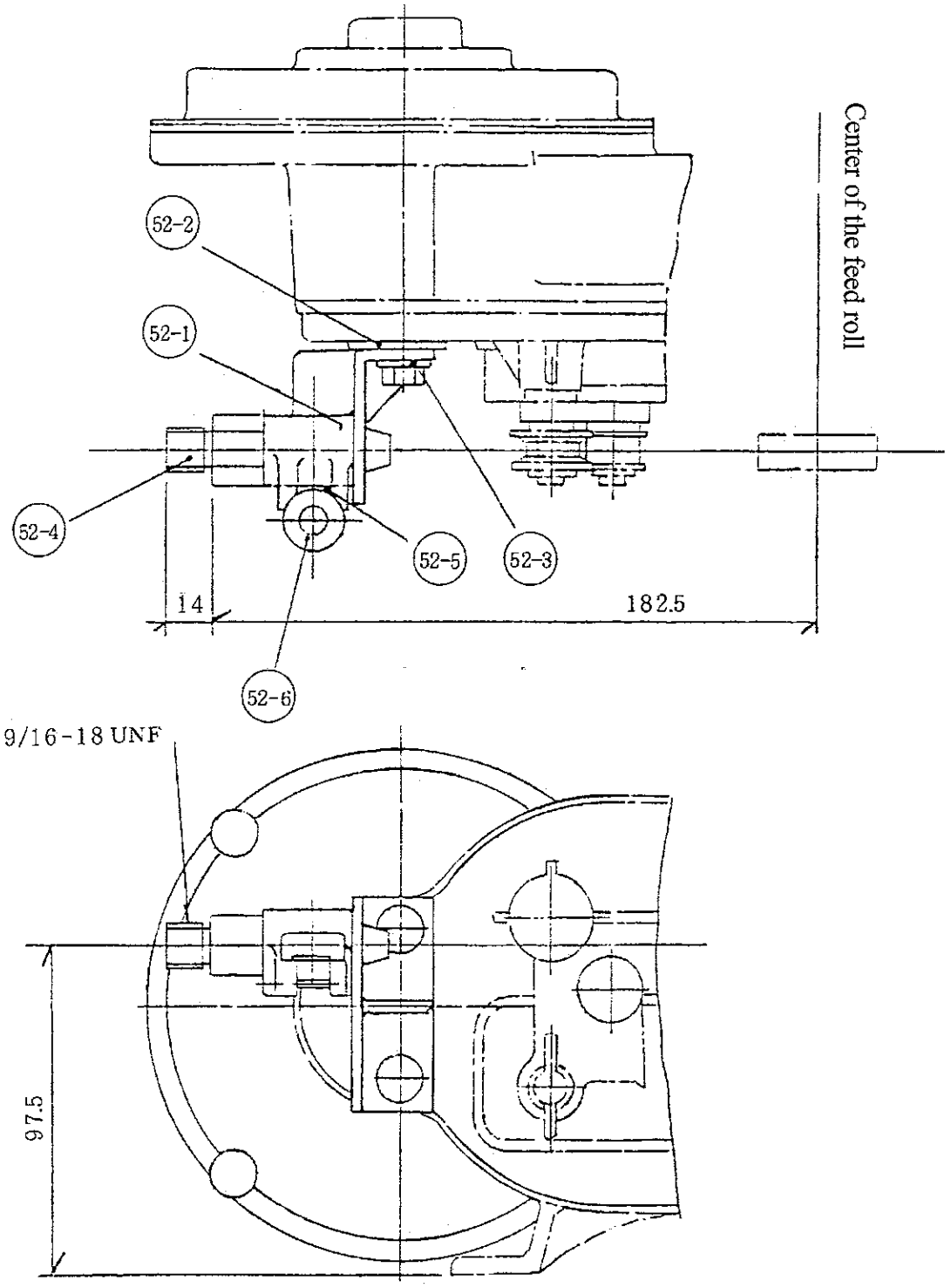
9.1 Wire feeder

Item No.	Part No.	Description	Q'ty	Remarks
1	K1123B01	Gear case	1	
2	4802-006	Print motor	1	
3		Screw	4	M5-20
4		Spring washer	4	M5
5		Washer	4	M5
6		Nut	2	M5
7	K1123B02	Pinion	1	
8	3361-401	Snap ring	3	CSTW-10
9	K1123B03	2-step gear	1	
10	K1123B05	Bush	2	
11	K1123B04	Geared output shaft	1	
12	K1123B06	Insulating spacer	1	
13	3311-029	Radial ball bearing	1	No.6000ZZ
14	3361-206	Key	1	4×4×8
15	3311-008	Radial ball bearing	1	No.6001LL
16	K1200B01	Gear case	1	
16-1	K1200B04	Torch holder	(1)	
16-2	K1200X00	Gear case	(1)	
16-3	U1230B14	Insulating washer	(1)	
16-4		Bolt	(1)	M6-35
16-5		Bolt	(1)	M6-40
17	K1123B07	Spacer	1	
18	U1376H01	Feed roll (1.0, 1.2 ϕ)	1	
19		Washer	3	M10
20		Spring washer	1	M10
21		Nut	1	M10
22	K1200B02	Guide plate	1	
23		Screw	2	M5-20
24		Spring washer	2	M5
25	K1123F00	Hinge assembly	1 set	
26	K1200C00	Pressure roll assembly	1 set	assembled part
27	K1200C01	Pressure roll holder	1	
28	U4345B04	Pressure roll shaft	1	
29	3311-003	Radial ball bearing	1	No.6200LL
30	K1123C06	Roll (1)	1	with bush
31	K1123C07	Roll (2)	2	
32		Thrust washer	4	STW-FT8.0×0.5

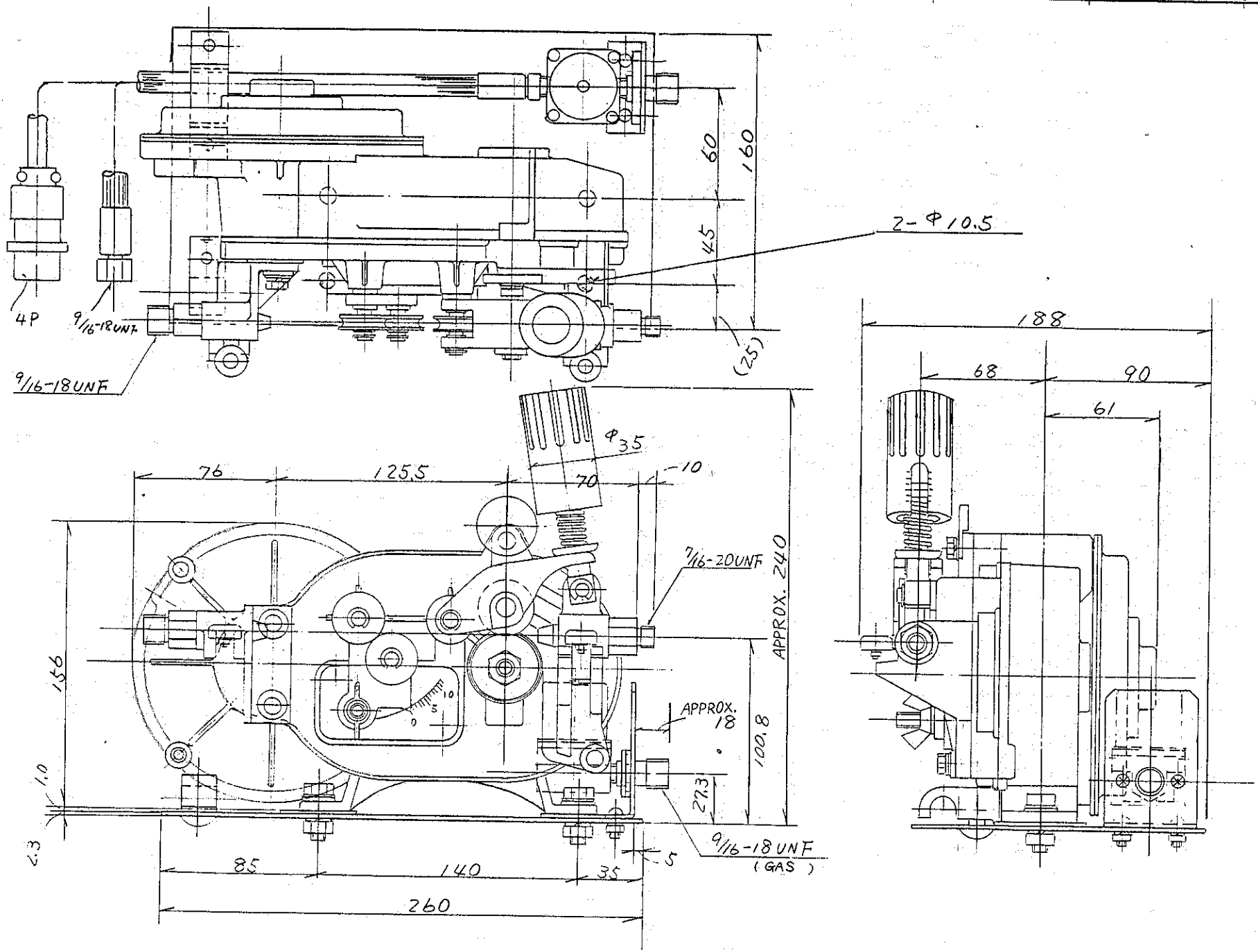
Symbol	Parts No.	Description	Q'ty	Remarks
33	3361-403	Snap ring	4	For 6 ϕ
34	3361-503	Cup square neck bolt	1	B type M8-40
35	3361-505	Wing nut	1	M8
36	3361-208	Spring roll pin	1	3 ϕ -20
37	U785C13	Guide adapter	1	
38	K1200B03	Spring plate	1	
39	U785C11	Protection cover	1	
40		Screw	1	M4-8
41		Spring washer	1	M4
42		Nut	1	M4
43		Screw	1	M5-6
44		Spring washer	1	M5
45	K1123D00	Pressure handle assembly	1 set	
46		Screw	2	M6-25
47		Spring washer	3	M6
48		Nut	1	M6
48-1		Nut	1	M6
49	K1200B06	Remote stopper	1	
9.2 Others				
50	4813-001	Gas solenoid valve	1	W-31156, DC25V
51	U3446B00	Frame small part	1	
51-1	U3446B01	Attachment plate	(1)	
51-2	K1113Z32	Attachment plate	(1)	
51-3	U1997C01	Cable clamp	(1)	
51-4	U1997C02	Hose clamp	(1)	
51-5	U1997C03	Hose cover	(1)	
51-6	U69B35C	Outlet guide	(1)	
51-7	U1997C06	Insulating bush	(2)	
51-8	U2070B01	Insulating sheet	(1)	
52	U1997L00	Conduit connection adapter	1	Refer to P.18
52-1	K1687D02	Conduit connection metal	(1)	
52-2	U1997L02	Insulating plate	(1)	
52-3	U1230B14	Insulating washer	(2)	
		Bolt	(2)	M6-30
		Spring washer	(2)	M6
52-4	U1962D02	Wire guide	(1)	
52-5	U785C09	Spring plate	(1)	
		Screw	(1)	M5 × 0.8-6
		Spring washer	(1)	M5
52-6	U785C11	Protection cover	(1)	
		Screw	(1)	M3 × 0.5-6
		Nut	(1)	M3 × 0.5
		Spring washer	(1)	M3
		Spring roll pin	(1)	3 ϕ -20



Disassembly drawing of
Wire Feeder



External view of conduit connection adapter
(U1997L00)



External view of model CMR-231 wire feeder

10. SPECIFICATION

10.1 Specification

Model	CMR-231
Applicable wire diameter	(0.8), (0.9), 1.0, 1.2, (1.4), (1.6) mm ϕ
Applicable wire	Solid wire, Flux cored wire
Wire feed speed	Max. 15m / min.
Mass	6 kg

10.2 Combination torch and cable length

Uni-cord power cable / CO_2 welding torch	Cable length		
	1.1m	1.2m	1.4m
Type K2331 (Carved type 350A,70%) Type K2525 (Straight type 350A,70%)	K2434 or K2845C00	K2497 or K2845D00	K2439 or K2845F00

10.3 Standard accessories

Description	Parts name	Q'ty	Remarks
Feed roll (for 1.0 and 1.2 ϕ)	U1376H01	(1)	Built in body

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Phone: +49-2161-69-49710, Fax: +49-2161-69-49711

OTC Industrial (Shanghai) Co.,Ltd.
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OTC (Taiwan) Co.,Ltd.
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OTC DAIHEN Asia Co.,Ltd.
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Upon contact, advise MODEL and MANUAL NO.