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OPERATING INSTRUCTIONS

Operating Manual for Closed Weld Head Series
TPWH-C- 1”, 1.5”, 3”, 4” & 6”

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Serial #:

ATTENTION – IMPORTANT WARRANTY INFO:

**TO VALIDATE YOUR WARRANTY, PLEASE VISIT OUR WEBSITE WWW.OTTOARC.COM
TO COMPLETE AND SUBMIT OUR DIGITAL WARRANTY FORM.
THANK YOU FOR YOUR COOPORATION.**

Operating Manual for Closed Weld Head Series
TPWH-C- 1”, 1.5”, 3”, 4” & 6”

- **The operating instructions must be read before utilizing this equipment.**
- **Failure to do so can lead to equipment damage and may be dangerous.**
- **Machines may only be operated by personnel familiar with the appropriate safety regulations.**

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Safety Instructions

Warning: Observe accident prevention regulations. Ignoring the following safety procedures can be fatal. Before performing welding tasks ensure you are wearing appropriate dry oil free clothing, approved personal protective equipment such as flame retardant outerwear, hole free gloves, boots, etc. Protect eyes and face with approved safety glasses, welding hood and proper shade welding filter plate.

Electric shock can kill. The machine must be connected to earth grounded power outlets. Only operate with an approved and serviceable main power cable and electrical power connection plug. Do not use an improperly repaired plug or damaged main power cable. Damaged and missing insulation can cause electric shock. Replace damaged cables immediately before proceeding. Only qualified and authorized personnel may open the welding power supply and associated components and tooling. Before opening the machine remove the main power plug from the power source. Switching off the power alone is not sufficient. DC voltage can be present in the power supply after the unit is disconnected. Wait at least 2 minutes until capacitors are discharged before opening and servicing the machine. Always put the weld head down so it is insulated from workpiece contact.

Touching low voltages can cause you to jump or fall and lead to accidents Safeguard yourself against shock and resulting falls especially when working heights, or when working from a platform or scaffolding. When welding, handle and operate work clamps, weld heads/torches, and workpiece materials properly, and not in ways for which they are not intended. Do not touch electrically energized parts with bare skin. Never use welding leads, work clamps, torches or ground cables with damaged insulation, worn or undersize components, or with poorly made electrical connections.

Fumes and gases can be dangerous to your health. Do not breathe in fumes and gases. Keep your head out of the welding fumes. Ensure that there is sufficient fresh air and proper ventilation in the work area.
Keep solvent vapors away from the arc radiation area. Chlorinated hydrocarbon fumes can be converted into poisonous phosgene by ultraviolet radiation.

Workpiece, flying sparks and molten droplets are hot. Keep children and animals well away from the working area. Their behavior is unpredictable. Remove all flammables, including closed containers with flammable or explosive liquids well away from the work area. There is always a danger of fire and explosion when welding. Always watch for fire and keep fire extinguishers close by. Never heat explosive liquids, dusts or gases by welding or cutting. There is also a danger of explosion if apparently harmless substances in closed containers are able to build up excess pressure when they are heated.

Take care to avoid fire hazards. All fire hazards must be avoided. Flames can form when sparks are flying, when parts are glowing red hot, or when hot slag is present. A constant check must be kept on whether fire hazards have been created in the working area. Highly flammable objects such as matches and cigarette lighters must not be carried on your person while welding. You must ensure that proper fire extinguishing equipment (appropriate to the welding process) is available and close to the welding work area and that it is easy to access. Containers in which fuels or lubricants have been present must be thoroughly cleaned before welding begins. It is not sufficient simply for the receptacle to be empty. After a workpiece has been welded, it must only be touched or brought into contact with flammable material when it has cooled down sufficiently.

Loose welding connections can destroy protective conductor systems of interior installations and cause fires. Before beginning welding work ensure that the ground clamp is properly connected to the workpiece or welding bench, and that there is a direct electrical connection from the workpiece to the power supply.

Noise exceeding 70 dBA can cause permanent hearing damage. Wear suitable hearing protection such as ear muffs or ear plugs. Ensure that other people who are in the work area also wearing proper hearing protection and other required personal protective equipment.

Secure gas cylinder. Place shielding gas cylinders in the holders provided for them and secure with safety chains. Take proper care when handling gas cylinders. Only transport with gauges removed and safety caps securely in place. Do not drop, throw, or heat cylinders, and guard against them falling over at all times. When moving the power supply by crane remove the gas cylinder and any other equipment or tooling from the welding machine.

Caution: Electromagnetic energy fields and high frequency (HF) generated by welding equipment can interfere with other electronic equipment such as computers, computer controllers, radios, and other communication equipment.

As noted in Electromagnetic Compatibility Standard EN 50199, the machines are intended for use in industrial areas. If they are operated in residential environments problems can occur in ensuring electromagnetic compatibility.

The functioning of heart pacemakers can be adversely affected when you are standing near the welding machine. Malfunctioning of electronic equipment in the vicinity of the welding location is possible.
Other main power supply cables, safety equipment leads, signal and telecommunications leads above, under and near the welding device may be subject to interference. Ensure all systems are properly grounded and that cables do not touch and are not run on top of each other.

Warning: Electromagnetic interference must be reduced to such a level that it no longer constitutes interference. Possible reduction measures: Welding machines should be regularly maintained and properly grounded. Welding leads should be as short as possible and run with separation (not touching) on or near to the ground. Selective shielding of other leads and equipment in the environment can reduce radiation.

Caution: Repairs and modifications may only be carried out by authorized and qualified personnel. The warranty becomes null and void in the event of unauthorized repairs or modifications.

Our operating instructions will provide you with an introduction to the safe use of the machine.
Please read them closely and only start with when you are familiar with them.

For additional welding safety information read:
American National Standard Z49.1 “Safety in Welding and Cutting” published by the American Welding Society, Miami, Florida; OSHA Safety and Health Standards, 29 CFR 1910, available from U.S. Government Printing Office, Washington DC.

Transportation and Installation

The following conditions must be observed during operation:

Ambient temperature operating range
During welding: 14°F to 104°F (-10°C to +40°C)
For transport and storage: -13°F to 131°F (-25°C to +55°C)
Use the appropriate coolant mixture depending on temperature

Relative air humidity
Up to 50% at 104°F (40°C)
Up to 90% at 68°F (20°C)

Operate in conditions that are free of excessive amounts of dust, acid vapors, corrosive gases, etc.

Equipment Description

The closed weld head series is specially designed for automatic orbital tube-to-tube Gas Tungsten Arc Welding (GTAW) without the addition of filler metal. It is suitable for ferrous and non-ferrous alloy tubing and pipe using a closed-butt joint design. The weld joint is surrounded by shielding gas inside the closed chamber of the welding head to ensure proper gas coverage and provide quality welds. The weld head is water cooled for long life and high duty cycle operation. Both standard and custom tube clamping collets are available for a wide variety of applications and materials. Tube clamping collets are designed for accurate tube-end alignment and long life.

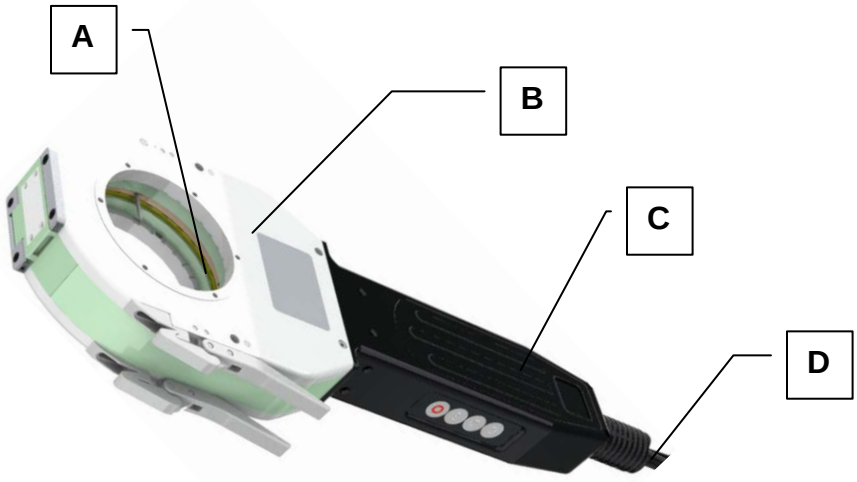
The weld head is connected to the power supply by 33 foot (10m) cables which supply weld current, control signals, cooling water and gas. These cables are contained in a protective flexible housing. The cables can be extended according to customer requirements.

When paired with the OW-ARC-180 Orbital Welding Power Supply, these weld heads form a complete TIG tube/tube orbital system providing welds of the highest quality, productivity, and repeatability.

Industry Applications

- Power Generation
- Biotech & Pharmaceutical
- Semiconductor
- Petrochemical
- Food & Beverage
- Heat & Air conditioning
- Aerospace
- Manufacturing

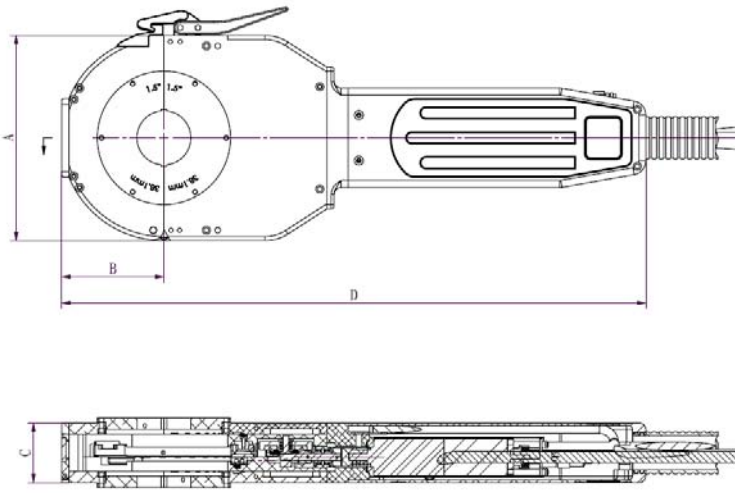
Main Structure



The TPWH-C Series is made up of 4 main units:

A: Drive unit
B: Clamping unit
C: Handle
D: Water, electricity, gas cable hose assembly

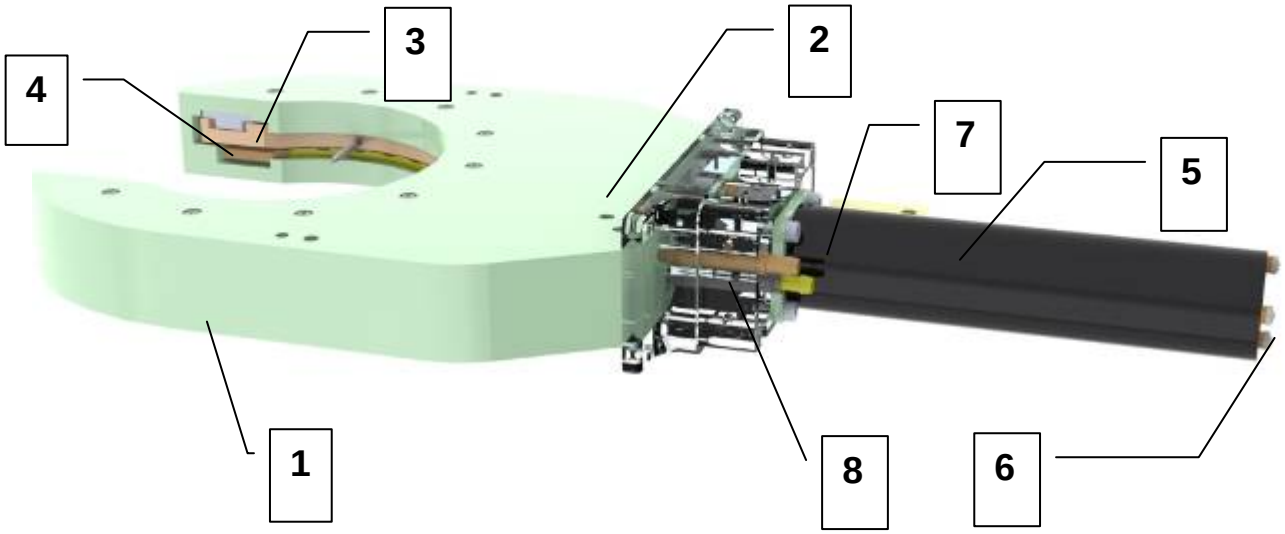
Appearance and Dimensions



Weld Head Specifications:

Weld Head >	1”	1.5”	3”	4”	6”
Dimension A	80	98	145	195	295
Dimension B	40	47	72	97	150
Dimension C	40	41	43	57	61
Dimension D	340	360	412	497	630
Weight (lbs)- w/o cable	4.4	4.4	6.6	13.2	23.2
Dimension summary (in)	340X80X40	360X120X41	412×165×43	497×230×57	630×330×61
Material Applications	Carbon steel, Stainless steel, Titanium alloy	Carbon steel, Stainless steel, Titanium alloy	Carbon steel, Stainless steel, Titanium alloy	Carbon steel, Stainless steel, Titanium alloy	Carbon steel, Stainless steel, Titanium alloy
Tube OD	1/4″ to 1” (6 to 25.4 mm)	1/4″ to 1 1/2″ (6 to 38.1 mm)	3/4″ ~ 3″ (19.05 to 76. mm)	1 1/2″ to 4 1/2″ (38.1 to 114.3 mm)	2″ to 6 5/8″ (50.8 to 168.3 mm)
Rotation speed (rpm)	0.6 ~ 12	0.3 ~ 6	0.2 ~ 4	0.095 ~ 1.9	0.06 ~ 1.2
Electrode OD	0.039”, 0.062” (1.0, 1.6 mm)	0.095” (2.4 mm)	0.062”,0.095” (1.6 , 2.4 mm)	0.062”,0.095” (1.6 , 2.4 mm)	0.095”,0.125” (2.4 , 3.2 mm)
Protective gas	Argon	Argon	Argon	Argon	Argon
Cooling	Water	Water	Water	Water	Water
Coolant flow	≥0.6 quart/min (600 ml/min)	≥0.6 quart/min (600 ml/min)	≥0.6 quart/min (600 ml/min)	≥0.6 quart/min (600 ml/min)	≥0.6 quart/min (600 ml/min)
Current	60A duty cycle 60%	65A duty cycle 60%	75A duty cycle 60%	100A duty cycle 60%	100A duty cycle 60%

Drive Unit



The Drive Unit includes rotation parts and the motor:

Rotation parts include:

1. groove board
2. cover
3. gear ring
4. conductive ring

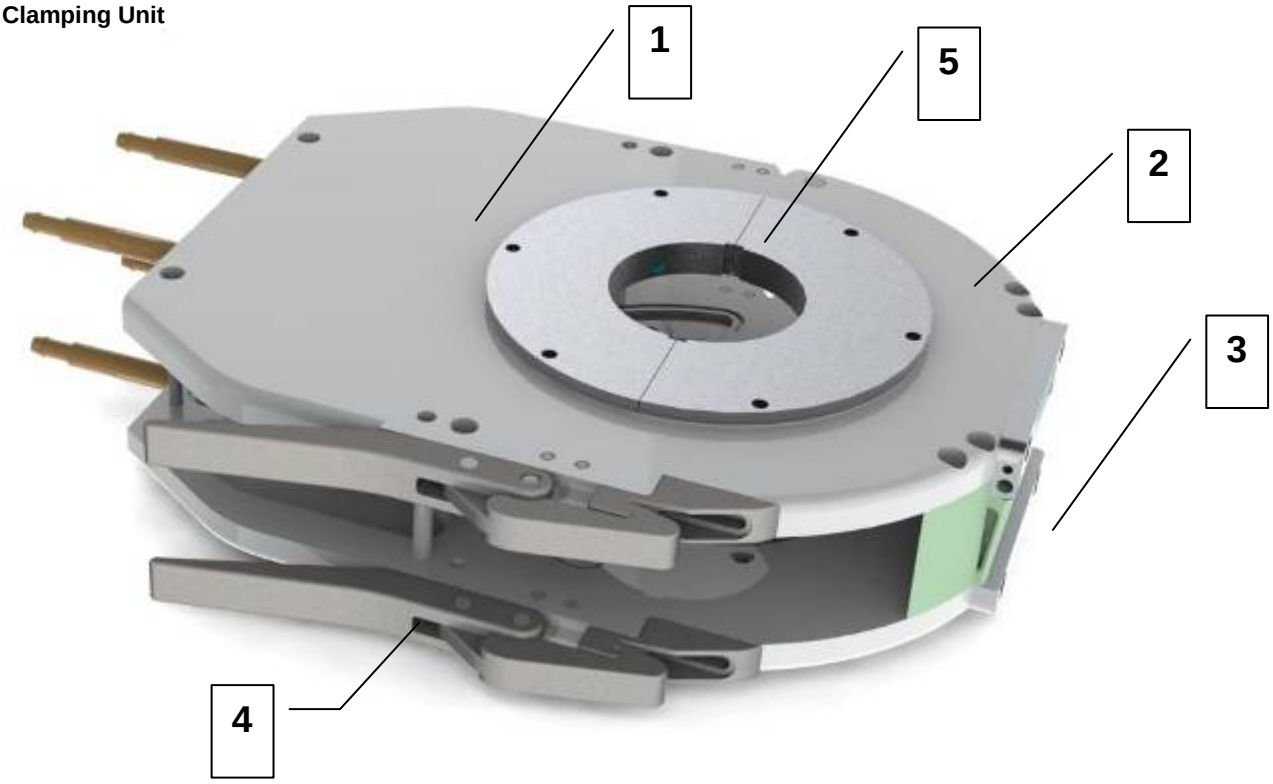
The groove board and the gear cover are made from electrically insulating material to ensure both side clamps are insulated. There is an "O" ring in the groove board to exclude atmosphere and provide a sealed chamber for high purity welding. The electrode is installed on the gear ring and is driven by a DC motor with encoder feedback for precise speed and position control during the welding cycle. A water-cooling circuit in the conductive ring cools the gear ring during the welding process. A groove on the gear ring provides even shielding gas distribution.

The motor drive unit includes:

5. motor
6. encoder
7. base
8. Bakelite shaft

The DC motor drives the large spur and gear ring through a bevel gear. This drives the electrode around the tube for welding. There is an optical encoder mounted on the back of the motor to ensure accurate rotation speed.

Clamping Unit



The Clamping Unit includes:

1. clamp plate
2. clamp
3. window
4. locking clamp
5. collet.

Two sets of tube clamping collets are installed, one set on each side of the weld head. The window can be opened to watch the electrode and motion of the gear. The aluminum alloy clamping collets are available in standard and custom sizes. Tube clamping collets are easy to install and are designed to provide a tightly sealed inert gas welding atmosphere. The locking clamps are adjustable to ensure proper alignment and clamping pressure.

A list of standard collets is included on the next page. If the application requires a collet which is not covered in this table, please contact Otto Arc; a wide variety of custom collets is available to fit any application.

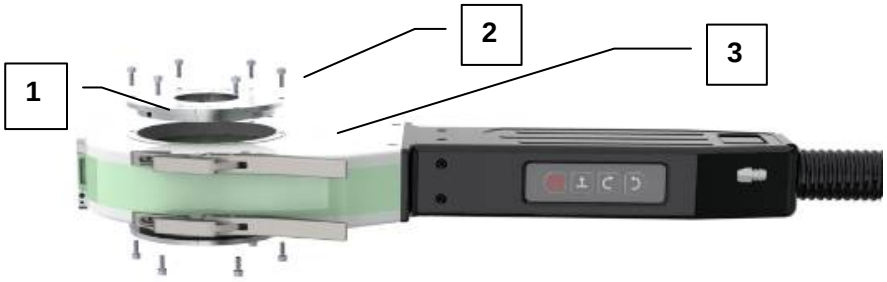
TPWH-C Collet Sizes

TPWH-C-1 (1" Closed Chamber)	
C-1-.25	.25" Collet
C-1-.375	.375" Collet
C-1-.5	.5" Collet
C-1-.5P	.5P" Collet
C-1-.625	.625" Collet
C-1-.75	.75" Collet
C-1-.75P	.75P" Collet
C-1-1	1" Collet
TPWH-C-1.5 (1.5" Closed Chamber)	
C-1.5-.25	.25" Collet
C-1.5-.375	.375" Collet
C-1.5-.5	.5" Collet
C-1.5-.5P	.5P" Collet
C-1.5-.625	.625" Collet
C-1.5-75	.75" Collet
C-1.5-.75P	.75P" Collet
C-1.5-1	1" Collet
C-1.5-1P	1P" Collet
C-1.5-1.5	1.5" Collet
	0.75" Flange Collet
	1.0" Flange Collet
	1.25" Flange Collet
	1.5" Flange Collet
TPWH-C-3 (3" Closed Chamber)	
C-3-75	3/4" Collet
C-3-75P	3/4P" Collet
C-3-1	1" Collet
C-3-1P	1"P Collet
C-3-1.5	1.5" Collet
C-3-1.5P	3/4P" Collet
C-3-2	2" Collet
C-3-2P	2P" Collet
C-3-2.5	2.5" Collet
C-3-2.5P	2.5P Collet
C-3-3	3" Collet
C-3A	Adapter 2503 for TPWH-C-3

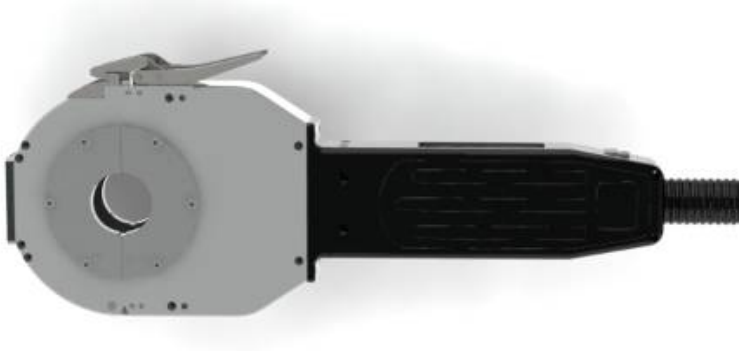
TPWH-C-4 (4" Closed Chamber)	
C-4-1.5	1.5" Collet
C-4-1.5P	1.5P" Collet
C-4-2	2" Collet
C-4-2P	2P" Collet
C-4-2.5	2.5" Collet
C-4-2.5P	2.5P" Collet
C-4-3	3" Collet
C-4-3.5	3.5" Collet (3" Pipe)
C-4-4	4P" Collet (3.5" Pipe)
C-4.5A	Adapter 3503
	0.75" Flange Collet
	0.988" Flange Collet
	1.25" Flange Collet
	1.5" Flange Collet
	2.012" Flange Collet
TPWH-C-6 (6" Closed Chamber)	
C-6-2	2" Collet
C-6-2P	2" Collet
C-6-2.5	2.5" Collet
C-6-2.5P	2.5P" Collet
C-6-3	3" Collet
C-6-3.5	3.5" Collet (3" Pipe)
C-6-4	4" Collet (3.5" Pipe)
C-6-4.5	4.5" Collet (4" Pipe)
C-6-6	6" Collet
C-6-6P	6P" Collet
C-6A	Adapter 4503 for TPWH-C-6

COLLET Installation

Assemble collet into the weld head, tighten the M3 screws.



1. Collet 2. M3 screw 3. Custom clamp (weld head)



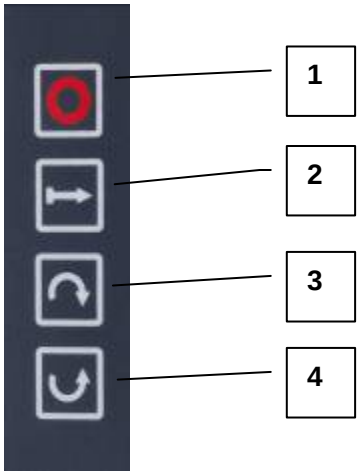
Appearance after installation

Handle

The handle unit includes:

1. Connecting base: connects the rotation unit and the cover
2. Cover: shields the electrical conductors, gas and water hose
3. Button: controls the weld head
4. Fastener: attaches hoses to the head

Pendant button functions:

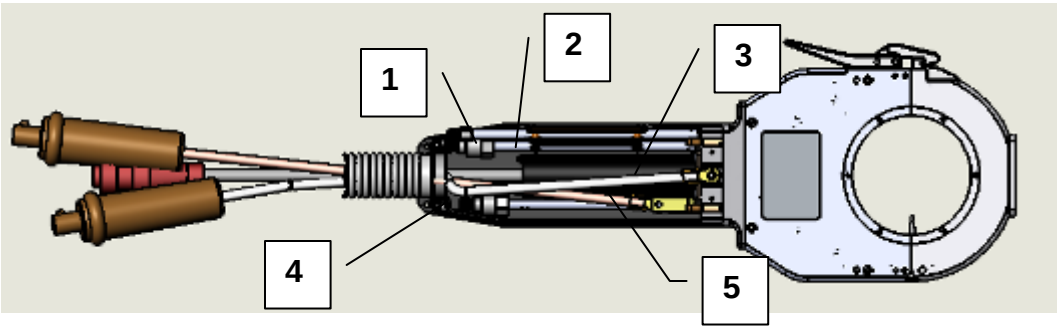


1. Emergency stop: stops all functions
2. Start: starts welding sequence (or starts simulation)
3. CW (clockwise) rotation
4. CCW (counter clockwise) rotation

NOTE: ***Briefly pressing a rotation button in idle mode causes a slow move. Pressing and holding a rotation button causes a high speed move.***

During welding, pressing a rotation button increases or decreases the rotation speed by the amount programmed (See "Rotation Delta" in OW-180 manual).

Water, Electricity and Gas Assembly



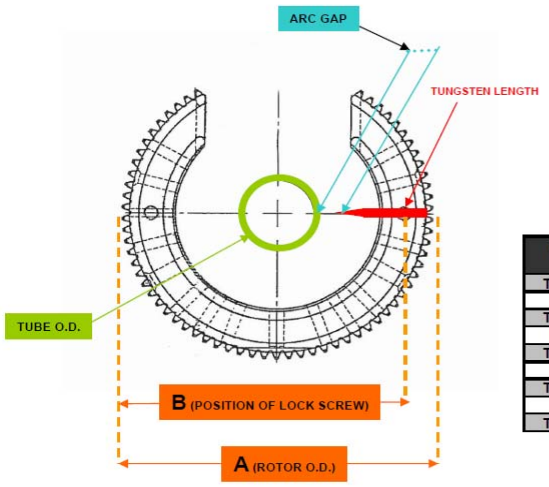
The water, electricity and gas hoses are connected to the power supply and water cooler.

1. Water inlet hose: provides coolant to the weld head
2. Protective gas hose: provides protective gas to the weld head
3. Electrode cable: current conduction
4. Water outlet hose: coolant flow out of the weld head
5. Ground cable: welding ground

Electrode selection:
NOTE: Otto Arc recommends using pre-ground, cut to length electrodes. Electrode dimensions including tip angle, tip blunt diameter, arc gap, and grind method are critical variables which must be specified and controlled to attain optimum, repeatable results. Contact Otto Arc for help selecting the proper electrode.

The following information will assist with selecting the proper length electrode:

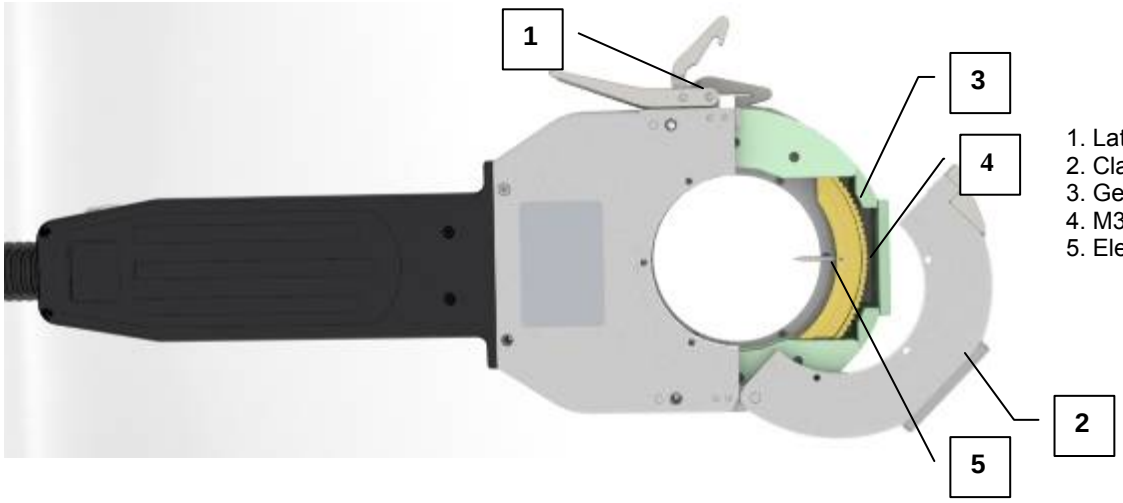
1. Locate the weld head model.
2. Find the corresponding “A” and “B” dimensions (rotor O.D. and set screw location)
3. Determine the arc gap that will be used.
4. Calculate the electrode length from the formula given below.



MODEL	A	B
TPWH-C-1	60.4mm / 2.37"	56.2mm / 2.21"
TPWH-C-2	73.2mm / 2.88"	65.6mm / 2.58"
TPWH-C-3	123.5mm / 4.86"	111.8mm / 4.40"
TPWH-C-4	167.5mm / 6.59"	153.8mm / 6.05"
TPWH-C-6	257.5mm / 10.14	238.8mm / 9.40"

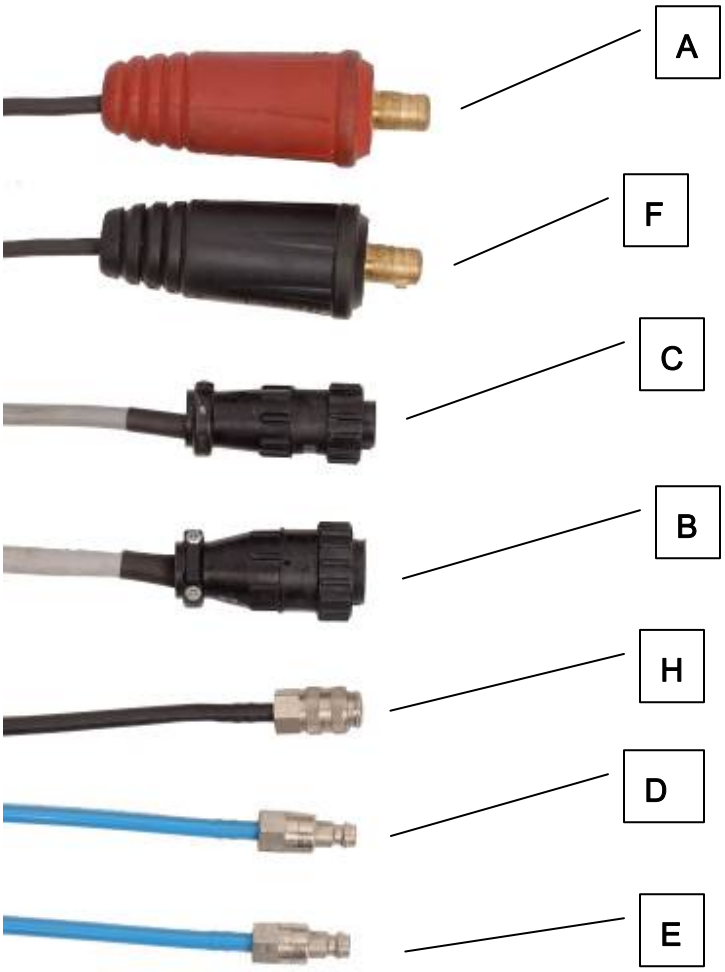
$$\text{FORMULA: } \frac{\text{ROTOR OD} - \text{TUBE OD}}{2} - \text{ARC GAP} = \text{TUNGSTEN LENGTH}$$

Electrode Replacement
Step 1: Loosen the latch
(1) from the clamp
(2) rotate the gear ring
(3) to the top and loosen the screws
(4) remove the electrode and replace with a new one.



1. Latch
2. Clamp
3. Gear Ring
4. M3 Screw
5. Electrode

Components and Connections



Electric cables:

A. Anode connector

B. 9 core adapter (welding control)

C. 7 core adapter (rotation control)

D. Water inlet connector (blue)

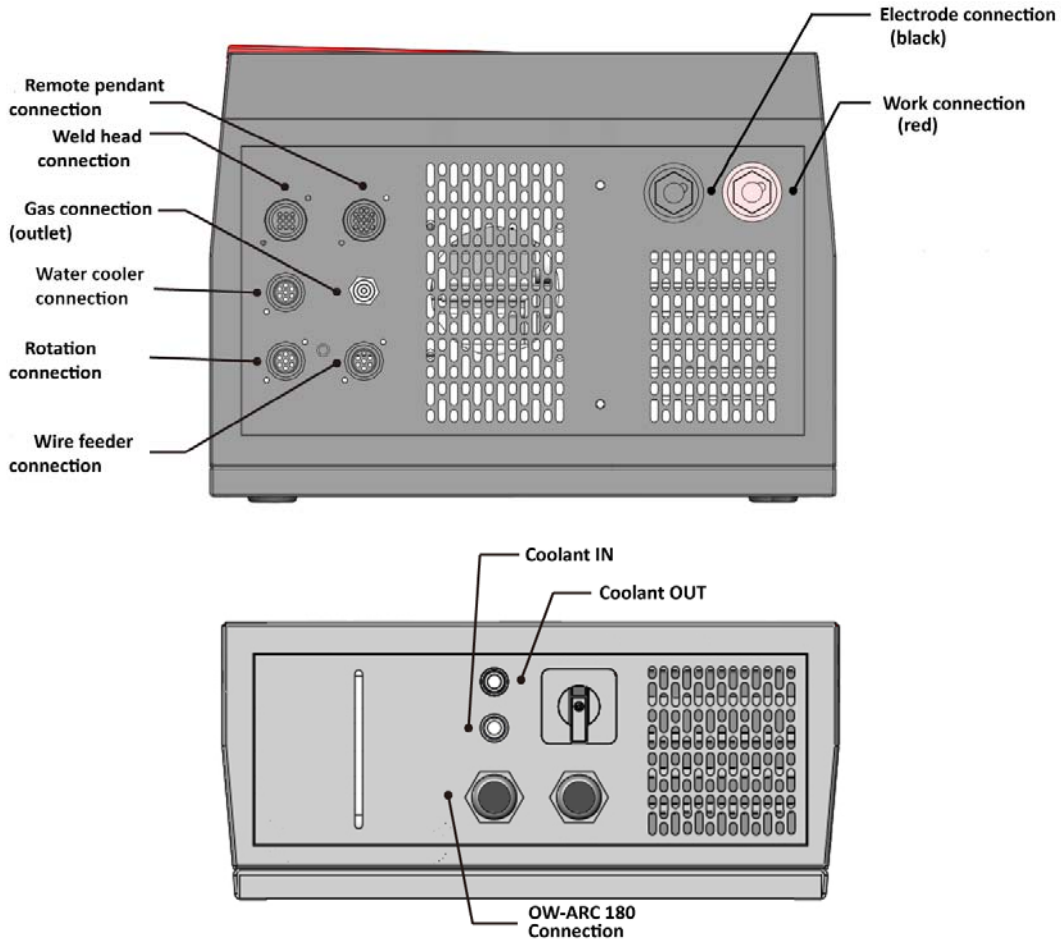
E. Water return connector (blue)

F. Cathode connector

H. Protective gas connector (black)

Step 2: Know the function of the terminals on the power source.

OW-ARC 180 Power Source



NOTE: Water cooler connections are interchangeable with respect to "IN" and "OUT".

3. Connections:

NOTE: Electrical control cables each have unique connectors that can only be assembled to the matching (correct) connector, making assembly easy and mistake-proof. Welding cable connectors are color coded. Blue water lines from the weld head are interchangeable and can be inserted into either connector on the water cooler.

1. Place the welder on top of the cooler so that both have the end connection panels on the right as you face the welder's touch screen.
2. Connect the weld head torch cables; ensure the cables are connected black-to-black and red-to-red. Connect by aligning keyway, pushing in and rotating ¼ turn to the right. Ensure connectors are tightened snugly at all times to avoid arcing.

3. Connect Weld Head and Rotation cables to their respective connectors; locate keyway on male connector, align it with the mating receptacle, push in and tighten the thread ring.

4. Connect blue water lines to the water cooler; pull back the snap ring on the fitting, push the male end into the fitting and release the snap ring. Lines can be inserted into either fitting on the cooler.

Preparation before Welding

1. Necessary tools

A set of Allen wrenches (1.5mm-6mm),

2. Prepare and install the following parts

A. Install collets.

B. Install electrode.

3. Prepare other welding material

A. Connect Argon gas source.

B. Fill water tank with 1.5 gal (5.5L) coolant (distilled water).

Caution: Do not use deionized water. Add antifreeze to the water to avoid damage to the weld head or water tank in cold weather. Use 50% distilled water mixed with 50% ethylene glycol.

4. Prepare cable connection

A. Connect weld head cables.

B. Connect remote pendant.

5. Turn on power supply

A. Check weld head functions such as rotation.

B. Make sure water cooler switch is set to “ON.”

Caution: When using a water cooled weld head, the water cooler must be set up in the “CONFIG” screen**.** Refer to OW-180 manual.

C. Set “HOME” position, if desired. Refer to OW-180 manual.

D. Purge water lines by pressing “WATER” button on touch screen or pendant. Adequate purging may take up to 1 minute.

6. Adjustments

A. Adjust length of the electrode.

B. Adjust Argon flow.

7. Input welding parameters into the power supply

(Refer to OW-180 manual)

8. Simulation check

Set the “WELD/TEST” button to “TEST” and press start to test all functions except amperage.

9. Start welding

Set the “WELD/TEST” button to “WELD”. Make sure rotor is in HOME position, tube is properly positioned under electrode, and latches are secure. Press “START”.

10. Weld termination

Press “DOWN SLOPE” to stop welding or press “STOP” for emergency stop.

11. Welding finish

Return the rotor to the home position if necessary; unlock latches and carefully remove the weld head.

12. After welding

Turn off the power supply and Argon source when finished welding.

Service and Maintenance

Under normal operating conditions these weld machines require only a minimum amount of maintenance and preventative care. However, when operating in areas with extreme environmental conditions such as high temperature, high dust levels, and during high duty cycle usage there are some points that should be observed to ensure error free operation. These include regular cleaning and inspection as described below.

Only qualified personnel should perform machine cleaning, testing, service and repair. If any failure occurs due to non-compliance with the following instructions do not use the machine again until the fault has been rectified.

Cleaning

Before cleaning disconnect the power supply from the main power source.

Switching off or removing the fuse is not adequate isolation.

REMOVE THE POWER SUPPLY PLUG FROM THE POWER SOURCE!

The weld head should be handled as follows:

- Use dry compressed air to clean the weld head after 1 to 2 months of use.
- Use clean dry lint free cloth to clean the weld head surfaces.

Maintenance

Cooling System

Check the cooling system circuit regularly to ensure there are no leaks under pressure. Check water flow once per month to ensure not lower than 0.6 quart/min. (600ml/min). Change coolant quarterly with approved torch coolant. Typically 50% distilled water mixed with 50% ethylene glycol. **Do not use tap water or automotive antifreeze as these can cause clogging, damage coolant pumps, block coolant passages and result in damaging the weld head.**

Rotation System

The rotation system should run smoothly without any roughness, jerky motions or abnormal sounds. Periodically clean and lubricate the two bearings and gears with a molybdenum bearing lubricant once a year.

Service

Service and repairs should be conducted by qualified personnel.

Your authorized supplier can provide service and repair for all systems.

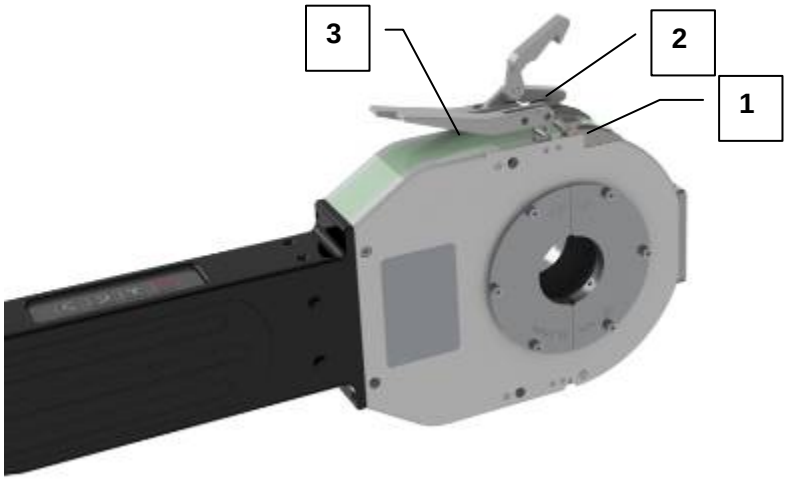
Use original spare parts for all necessary parts replacements. Spare parts may be ordered according to the following parts list. Be sure to list the product model number and serial number. List item descriptions, part numbers and quantities clearly when ordering spare parts. If the part number is not clear describe the part as fully as possible.

Repairs or services performed on this machine by unqualified personnel may void any warranty claims.

Replacement of Consumable Parts

Latch

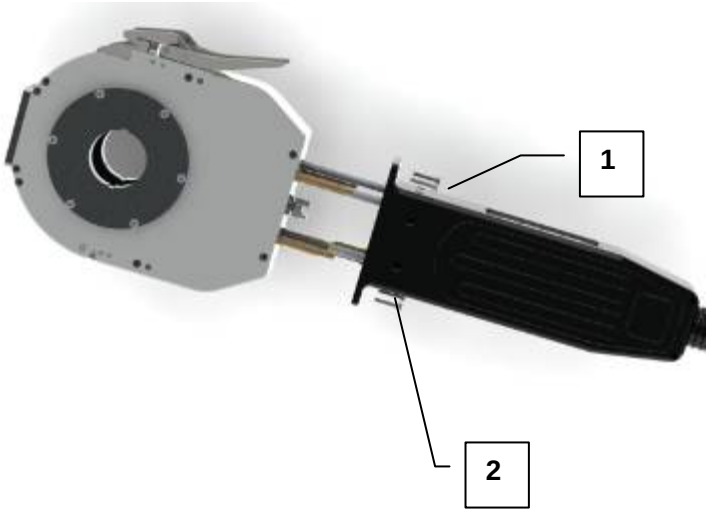
Step 1: Remove the A4 pin (1) take out the clamp and latch for replacement.



1. A4 Pin 2. Clamp 3. Latch

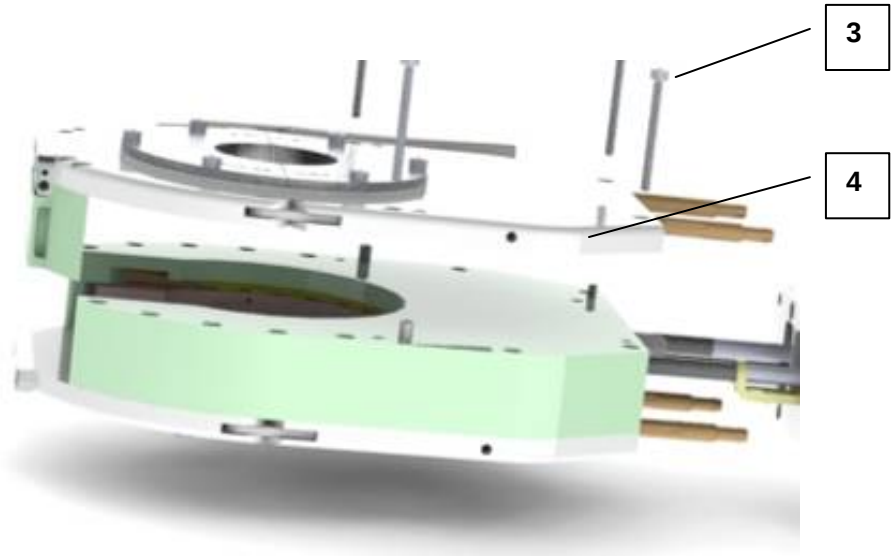
Conductive ring

Step 1: Loosen M3 screws (1) and separate base from clamping unit.



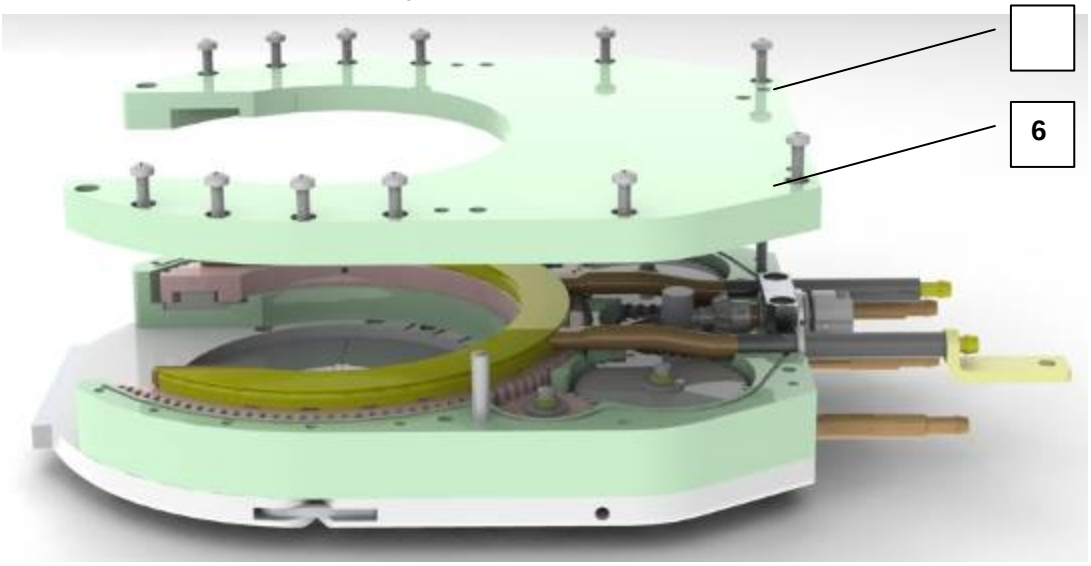
1. M3 screw 2. Base

Step 2: loosen M3 screws (3) and remove the clamp board.



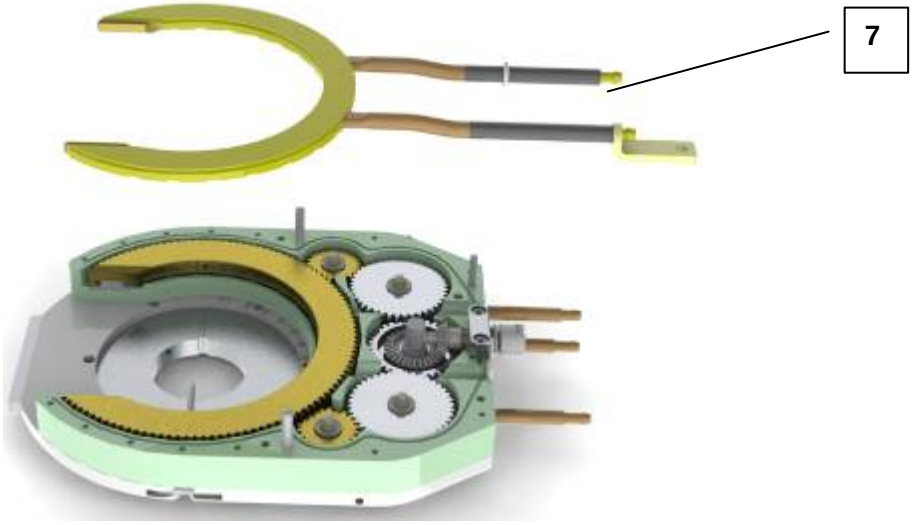
3. M3 screw 4. Clamp Board

Step 3: Loosen M3 screws (5) and remove gear cover (6).

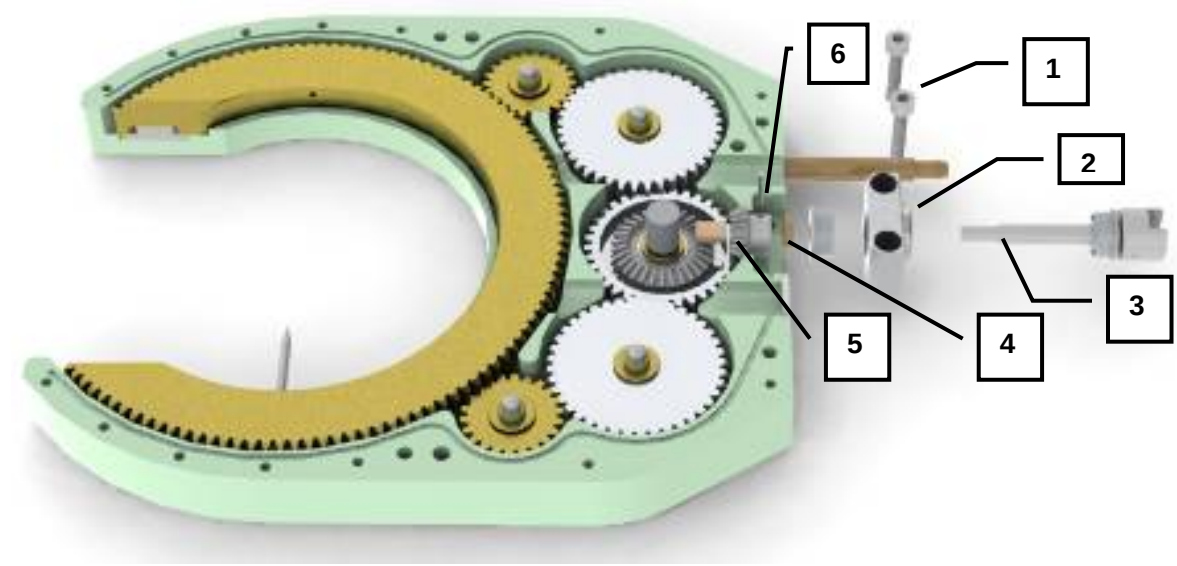


5. M3 screw 6. Gear cover

Step 4: take out conductive ring for replacement.



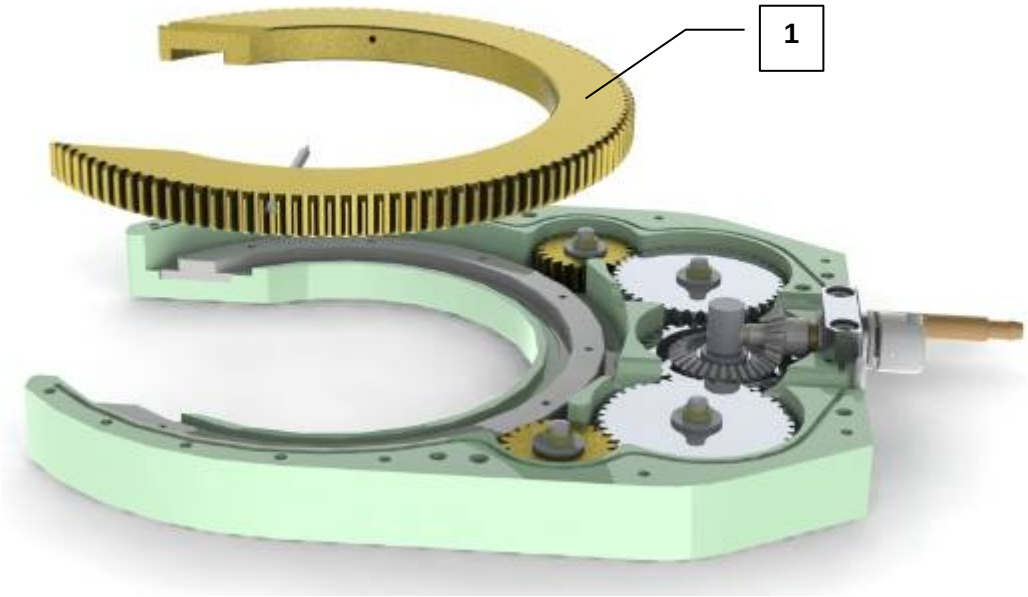
Connection seat, connection shaft, cushion, small bevel gear
Loosen M3 screw (1), remove the shear pin (6), take out connection seat (2), connection shaft (3), cushion (4), small bevel gear (6).



1. M3 screw, 2. Connection seat, 3. Connection shaft, 4. Cushion, 5. Small bevel gear, 6. Shear pin

Gear Ring

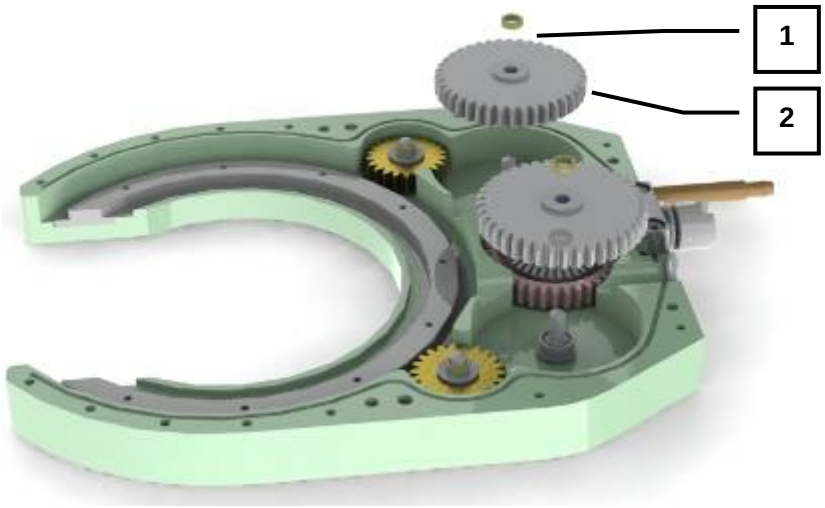
Step 1: take out the gear ring for replacement



1. Gear ring

Gear

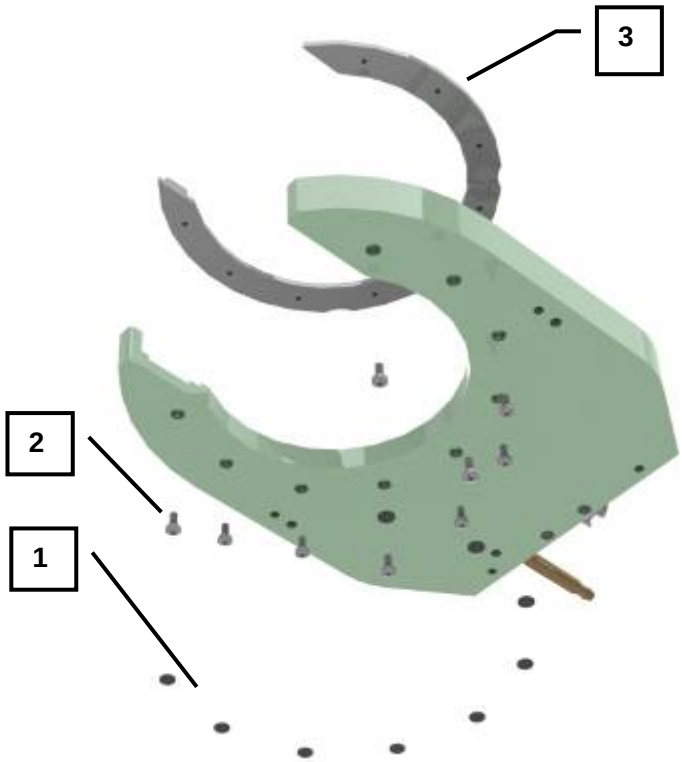
Step 1: Take out cushion (1), and gear (2) for replacement.



1. Cushion 2.Gear

Guide ring

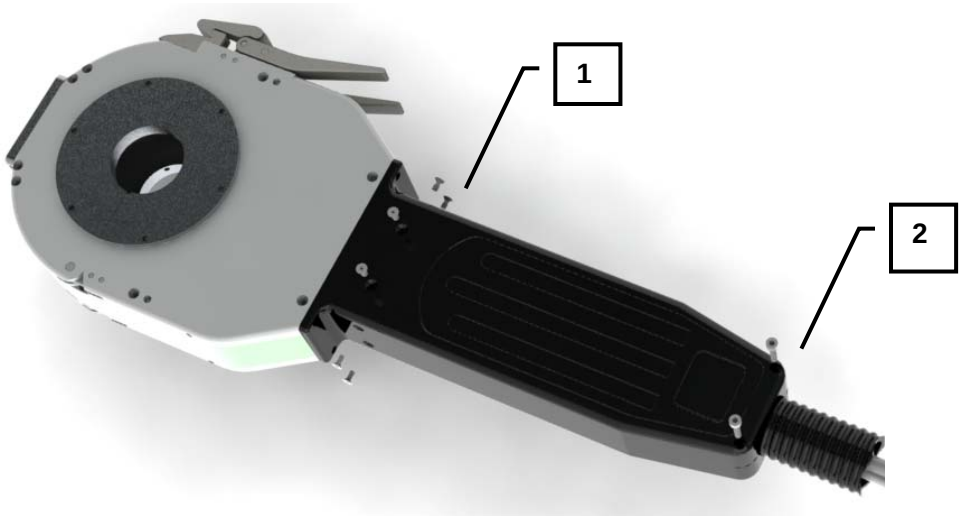
Remove the insulating end cap (1), loosen the M3 screws (2), take out the guide ring (3) for replacement.



1. Insulating end cap 2.M3 screw 3. Guide ring

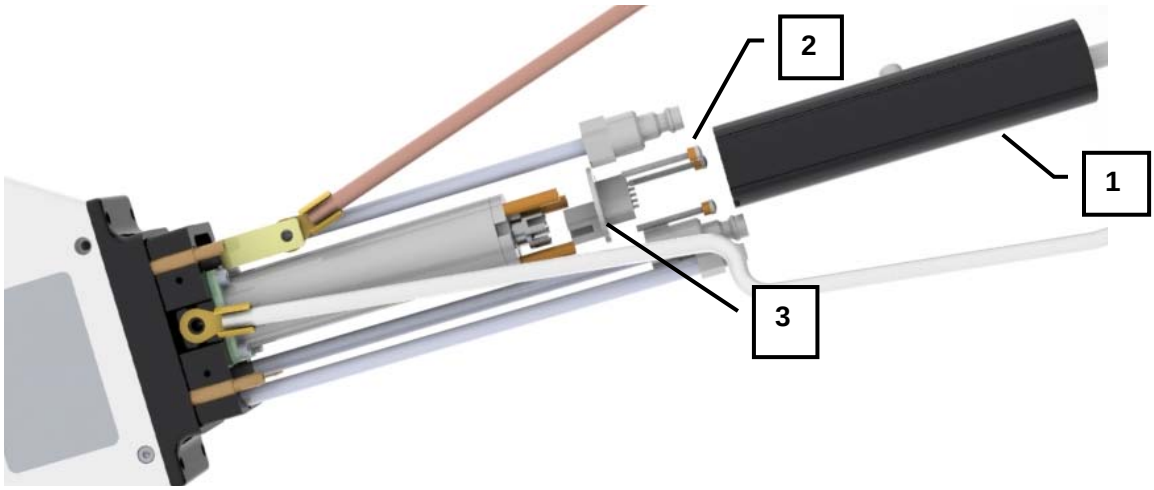
Encoder

Step 1: Remove the 8 pcs of M3 Philips screw (1) and 2 pcs of M3 Allen screw and remove the cover.



1. M3 Philips screw 2. M3 Allen screw

Step 2: Remove the white cap on the encoder, take out the motor cover (1) and loosen the 3 M3 screws (2). Use a soldering iron to remove the solder from encoder wiring and take out the encoder (3) for replacement.



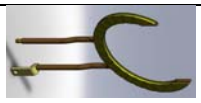
1. Motor cover 2. M3 screw 3. Encoder

TPWH-C Series Consumable Parts List

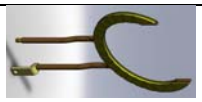
TPWH-C-1

TPWH-C-1 weld head common consumables		
Code	**Description**	**Picture**
050162-0100-0300-00	Guide ring	
050162-0100-0400-00	Gear ring	
050162-0100-0500-00	Gear	
050162-0100-0600-00	Gear	
050162-0100-0700-00	Gear	
050162-0100-0800-00	Big bevel gear	
050162-0100-1000-00	Small bevel gear	
050162-0100-1100-00	Cushion ring	

TPWH-C-1.5

TPWH-C-1.5 weld head common consumables		
Number	**Description**	**Picture**
050152-0100-0300-00	Guide ring	
050152-0100-0400-00	Gear ring	
050152-0100-0500-00	Gear	
050152-0100-0600-00	Gear	
050152-0100-0700-00	Gear	
050152-0100-1200-00	Connection seat	
050152-0100-1400-00	Cushion ring	
050152-0100-1500-00	Sleeve	
050152-0100-1800-00	Connection shaft	
050152-0100-2100-00	Conductive ring	

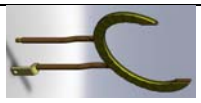
TPWH-C-3

TPWH-C-3 weld head common consumables		
Description	Description	Description
050155-0100-0300-00	Gear ring	
050155-0100-0400-00	Guide ring	
050155-0100-0500-00	Gear	
050155-0100-0600-00	Gear	
050155-0100-0700-00	Gear	
050155-0100-1100-00	Connection seat	
050155-0100-1300-00	Connection shaft	
050155-0100-1400-00	Sleeve	
050155-0100-1700-00	Conductive ring	
050155-0100-2000-00	Big bevel gear	
050155-0100-2100-00	Small bevel gear	
050155-0100-2200-00	Sleeve	

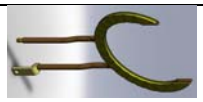
050155-0200-0500-00	Hock	
050155-0200-0600-00	Spanner	
050155-0200-0700-00	Fixed seat	
0002020101244000	(F628/5-2) bearing	
002020101283000	(F628/5-2) bearing	

TPWH-C-4

TPWH-C-4 weld head common consumables		
Description	**Description**	**Description**
050154-0100-0200-00	Gear	
050154-0100-0300-00	Gear	
050154-0100-0400-00	Gear	
050154-0100-0500-00	Big bevel gear	
050154-0100-0800-00	Gear ring	
050154-0100-1100-00	Flange	

050154-0100-1200-00	Sleeve	
050154-0100-1400-00	Small bevel gear	
050154-0100-1600-00	Guide ring	
050154-0100-1800-00	Connection shaft	
050154-0100-1900-00	Conductive ring	
050154-0101-0200-00	Sleeve	
050154-0200-0500-00	Hock	
050154-0200-0600-00	Spanner	
050154-0200-0900-00	Fixed seat	
000202010124400	(F628/5-2) bearing	

TPWH-C-6

TPWH-C-6 weld head common consumables		
Part Number	**Description**	**View**
050160-0100-0300-000	Gear ring	
050160-0100-0400-000	Guide ring	
050160-0100-0500-000	Gear	
50160-0100-0600-000	Gear	
050160-0100-0800-000	Big bevel gear	
050160-0100-0900-000	Small bevel gear	
050160-0100-1200-000	Cushion ring	
050160-0100-1400-000	Fixed seat	
050160-0100-1500-000	Connection shaft	
050160-0100-1700-000	Sleeve	
050160-0100-2100-000	Conductive ring	
050160-0200-0500-00	Hock	
050160-0200-0600-00	Fixed seat	
050160-0200-0700-00	Spanner	
0002020102028000	(F628/5-2) bearing	

Weld Head Troubleshooting

1. No arc and or high frequency when starting weld

- Check the fit of gear ring with groove board and cover; replace if damaged.

2. The rotor does not rotate when welding

- Check rotation motor cable; make sure it is securely connected.
- Use touch screen or pendant to test rotation. Contact repairman if there is no reaction.

3. The gear ring rotates continuously and won't stop, or controller does not count degrees

- Check rotation motor cable; make sure it is securely connected.
- Use touch screen or pendant to test rotation. If there is no reaction call for repairs.
- Check if the degree shown on the display is "0"; replace the encoder or use time as weld unit.

4. Porosity in the weld

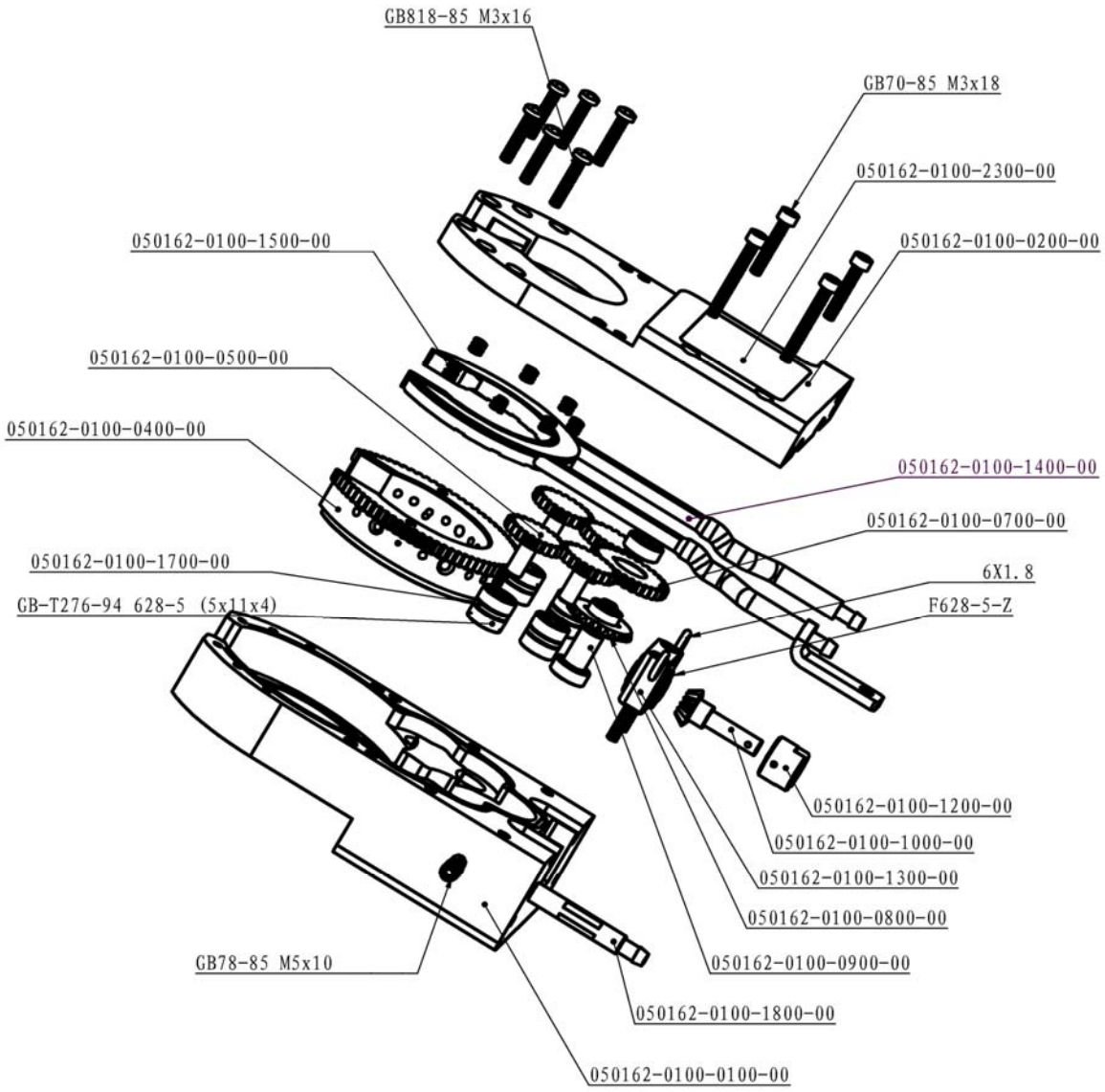
- Recheck Argon connections and flow rate. Check gas hoses for leaks; replace suspect hoses.
- Ensure tubing is cleaned both ID and OD, and free of contaminants and/or plating.

Tools with delivery

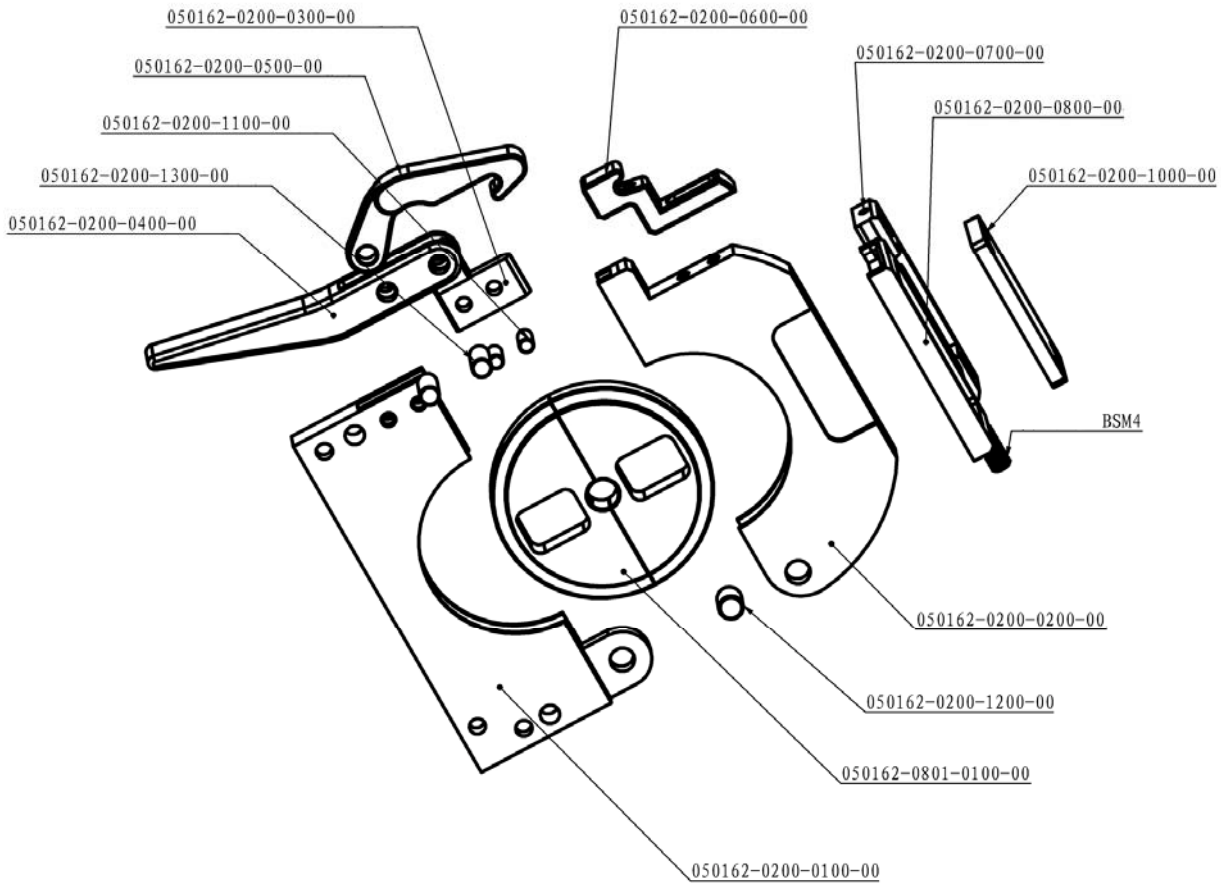
NO.	Code	Description	Qty	Remark
1	0010030401021000	Allen wrench (7 pcs)	1 set	BS-7C
2	0010030601031000	Flat screwdriver	1	150x6.5x1mm
3	0010030601034000	Philips screwdriver	1	#1

TPWH-C Series Exploded Views

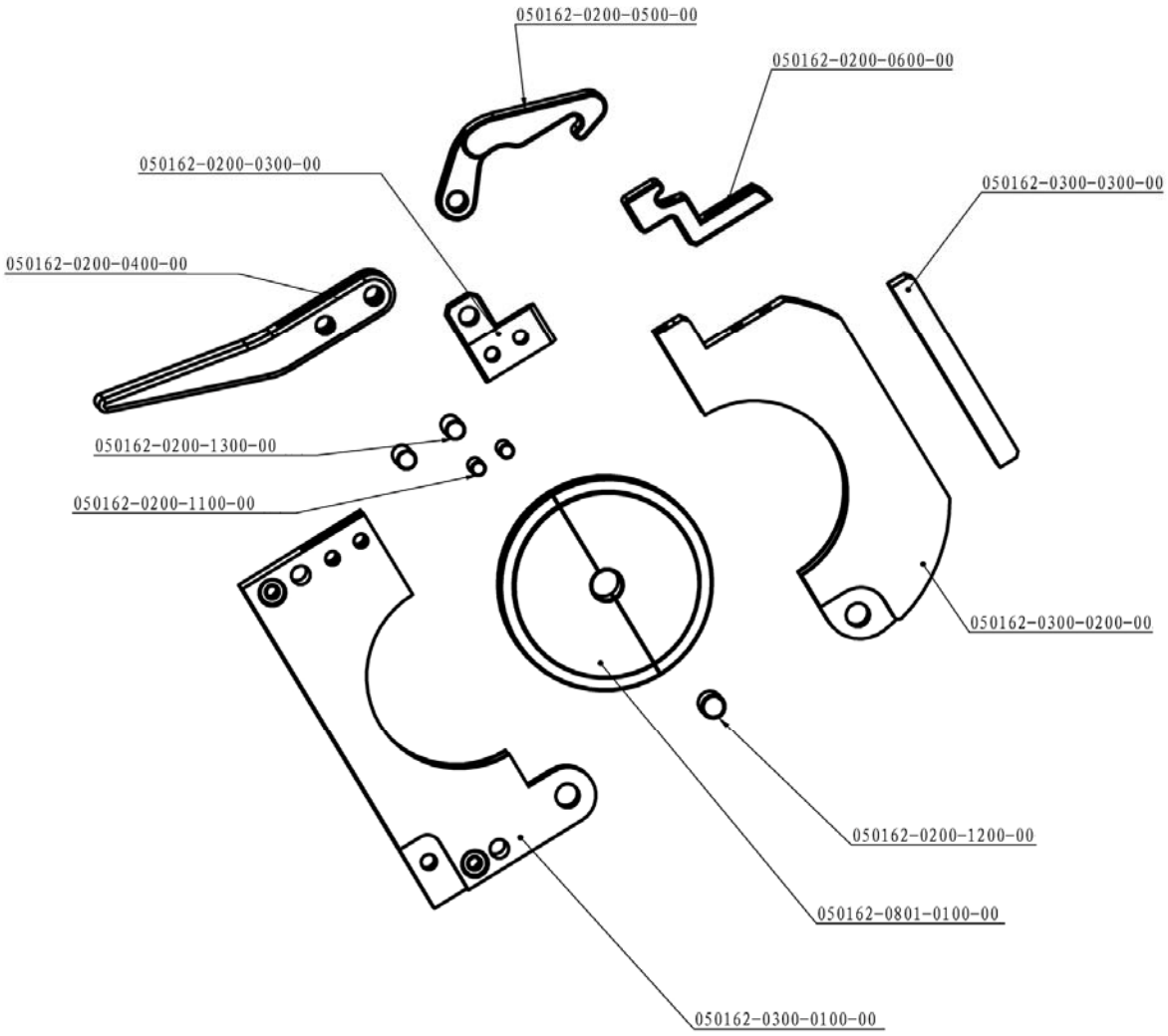
TPWH-C-1 (1” Closed Weld Head)
Exploded View 1



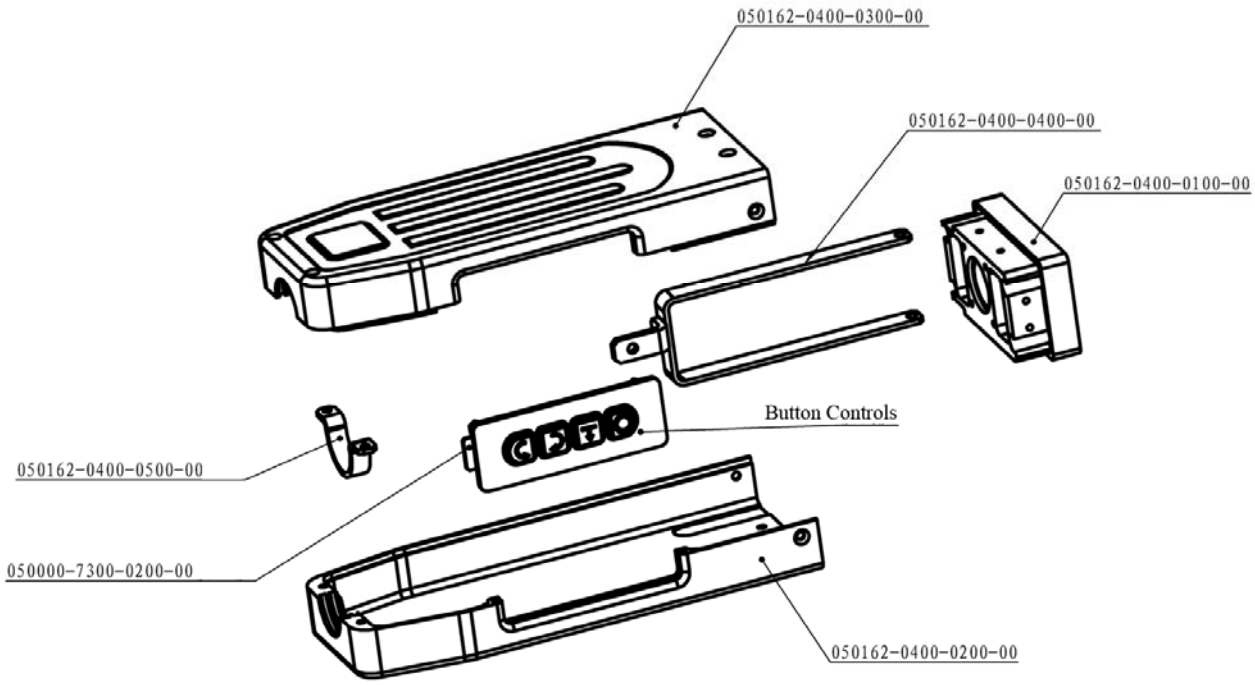
TPWH-C-1 (1" Closed Weld Head)
Exploded View 2



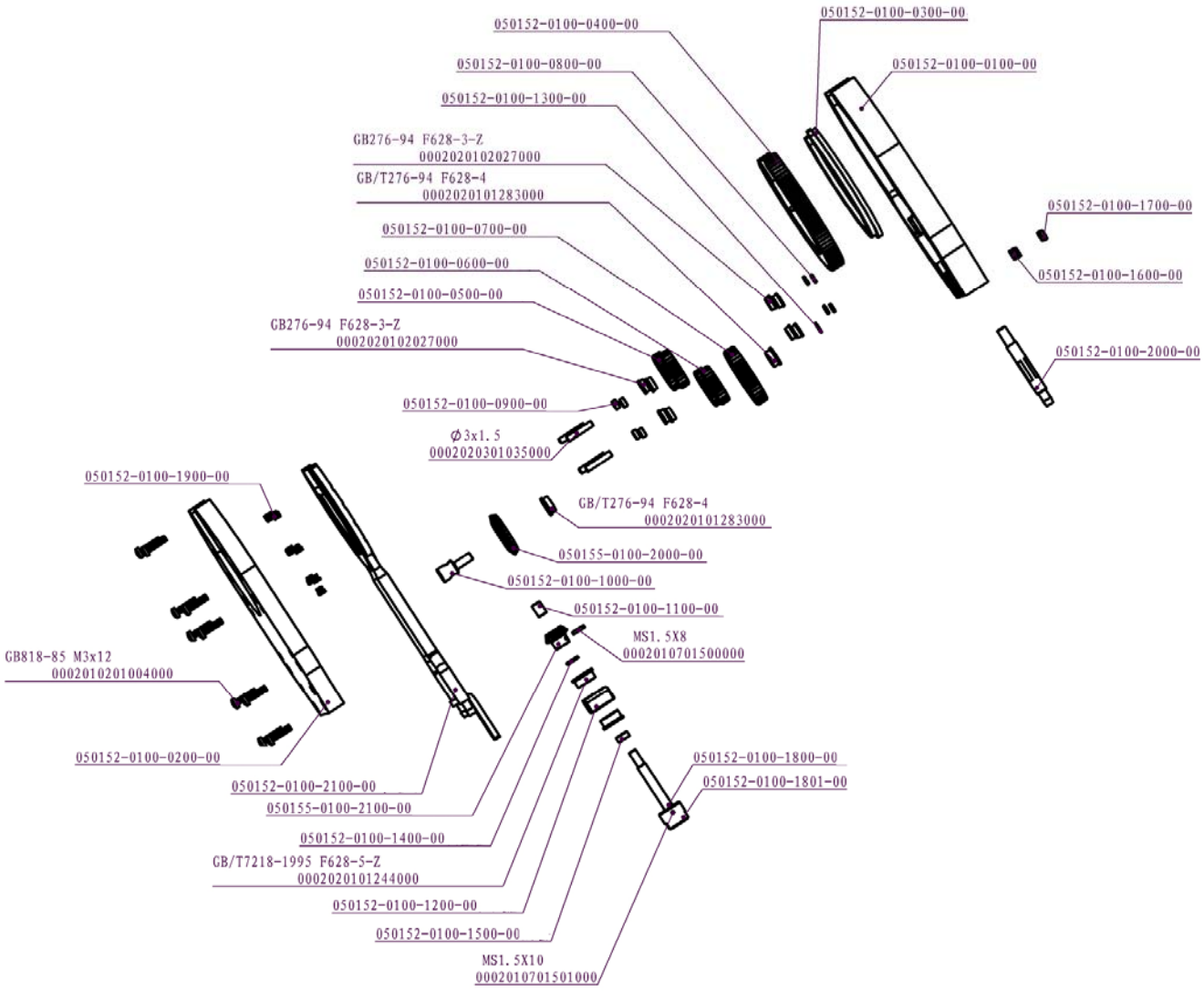
TPWH-C-1 (1” Closed Weld Head)
Exploded View 3



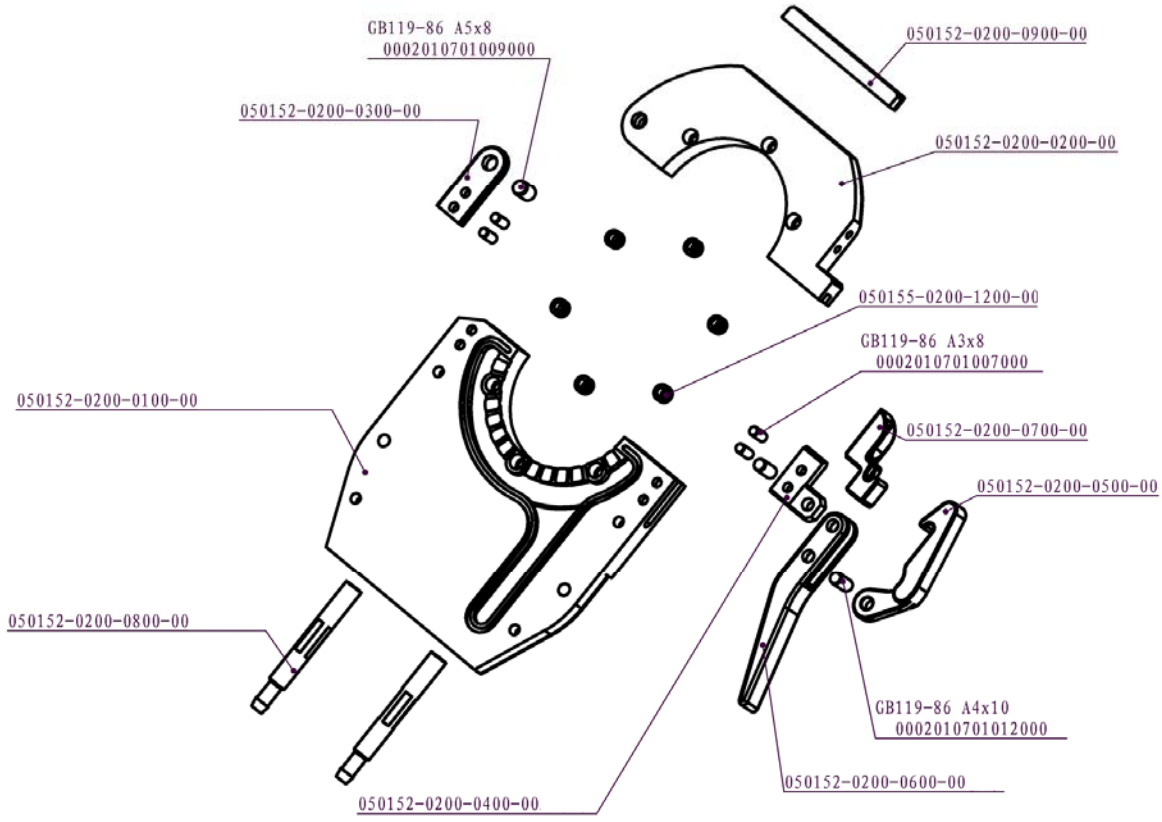
TPWH-C-1 (1” Closed Weld Head)
Exploded View 4



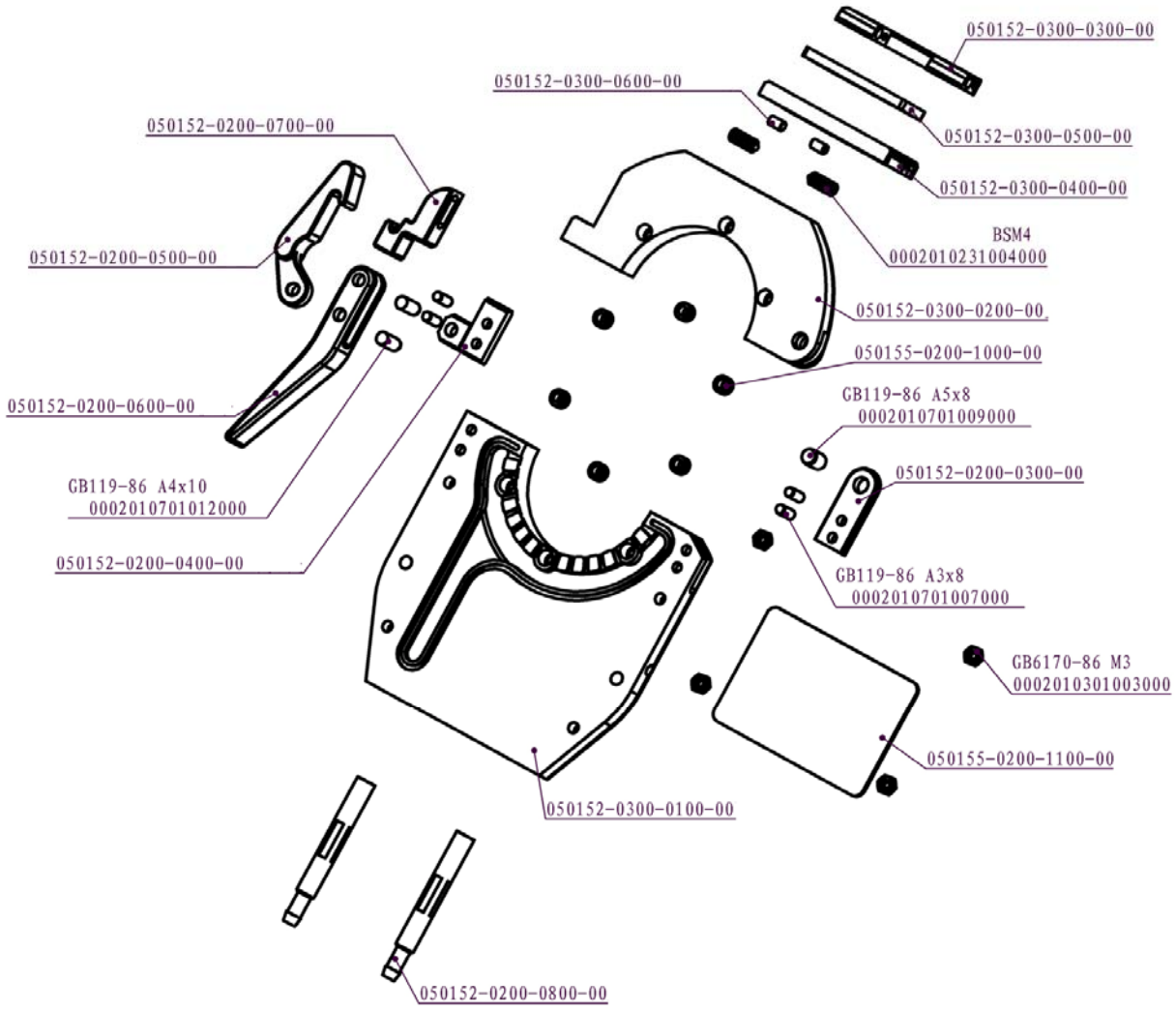
TPWH-C-1.5 (1.5” Closed Weld Head)
Exploded View 1



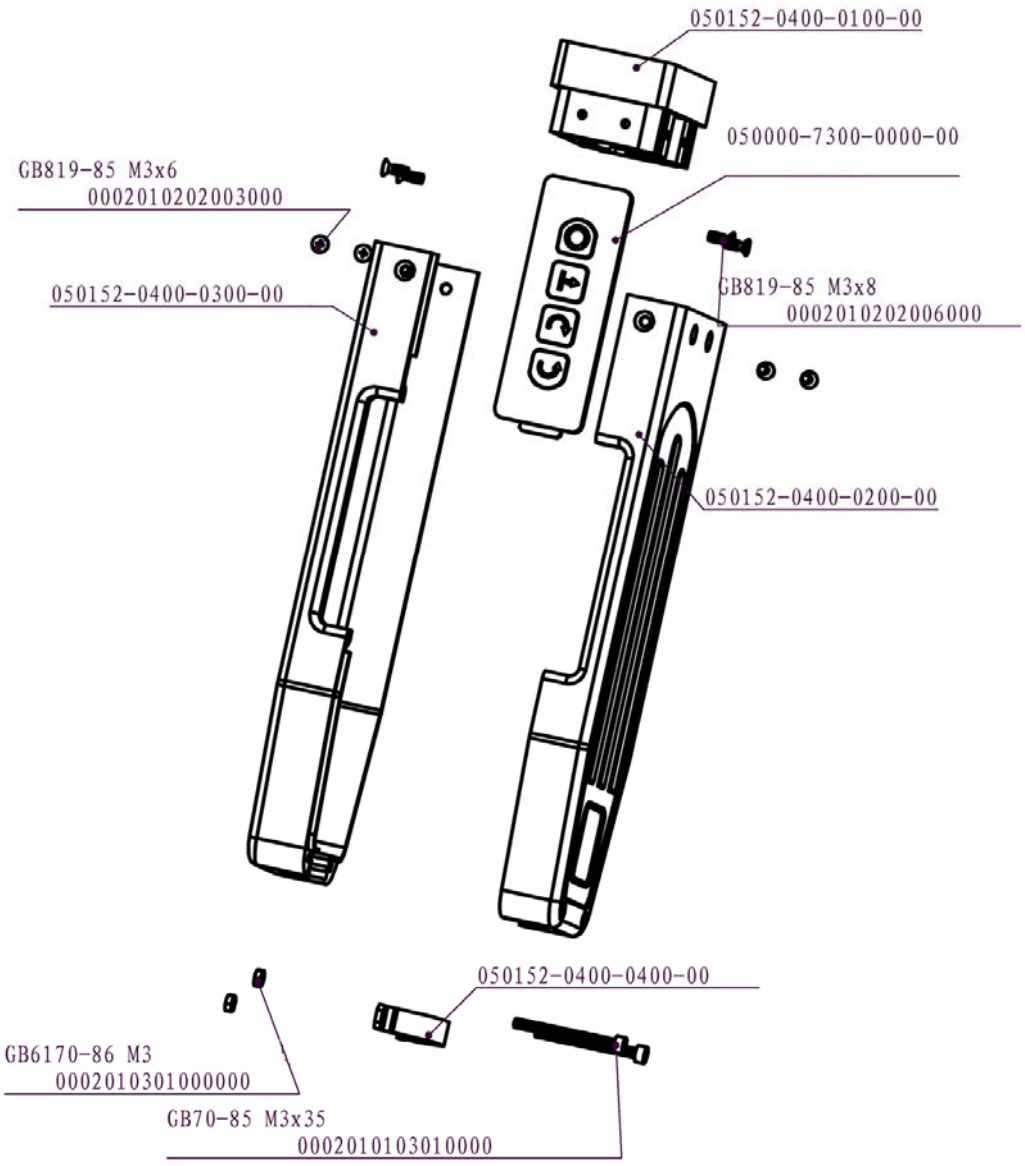
TPWH-C-1.5 (1.5” Closed Weld Head)
Exploded View 2



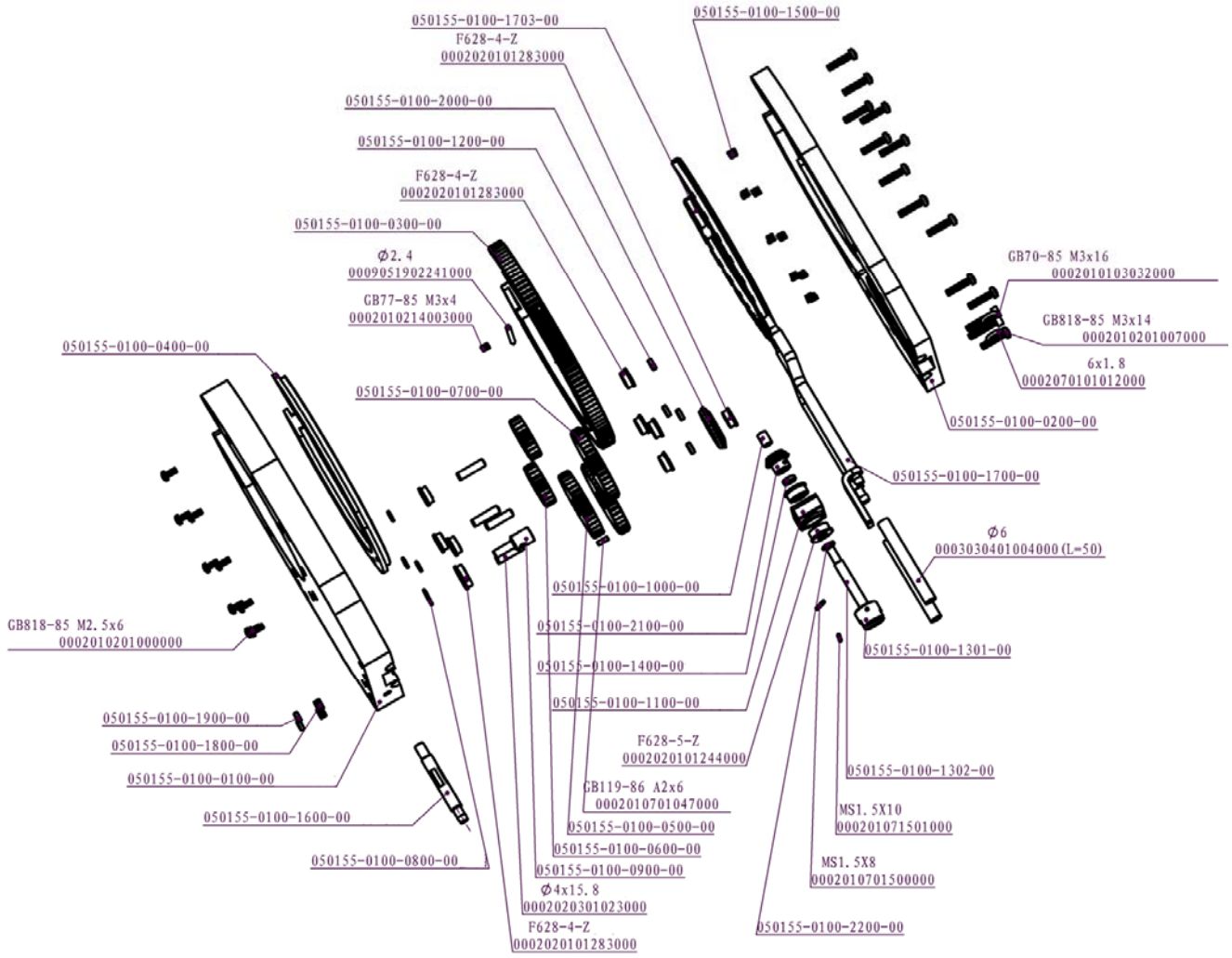
TPWH-C-1.5 (1.5” Closed Weld Head)
Exploded View 3



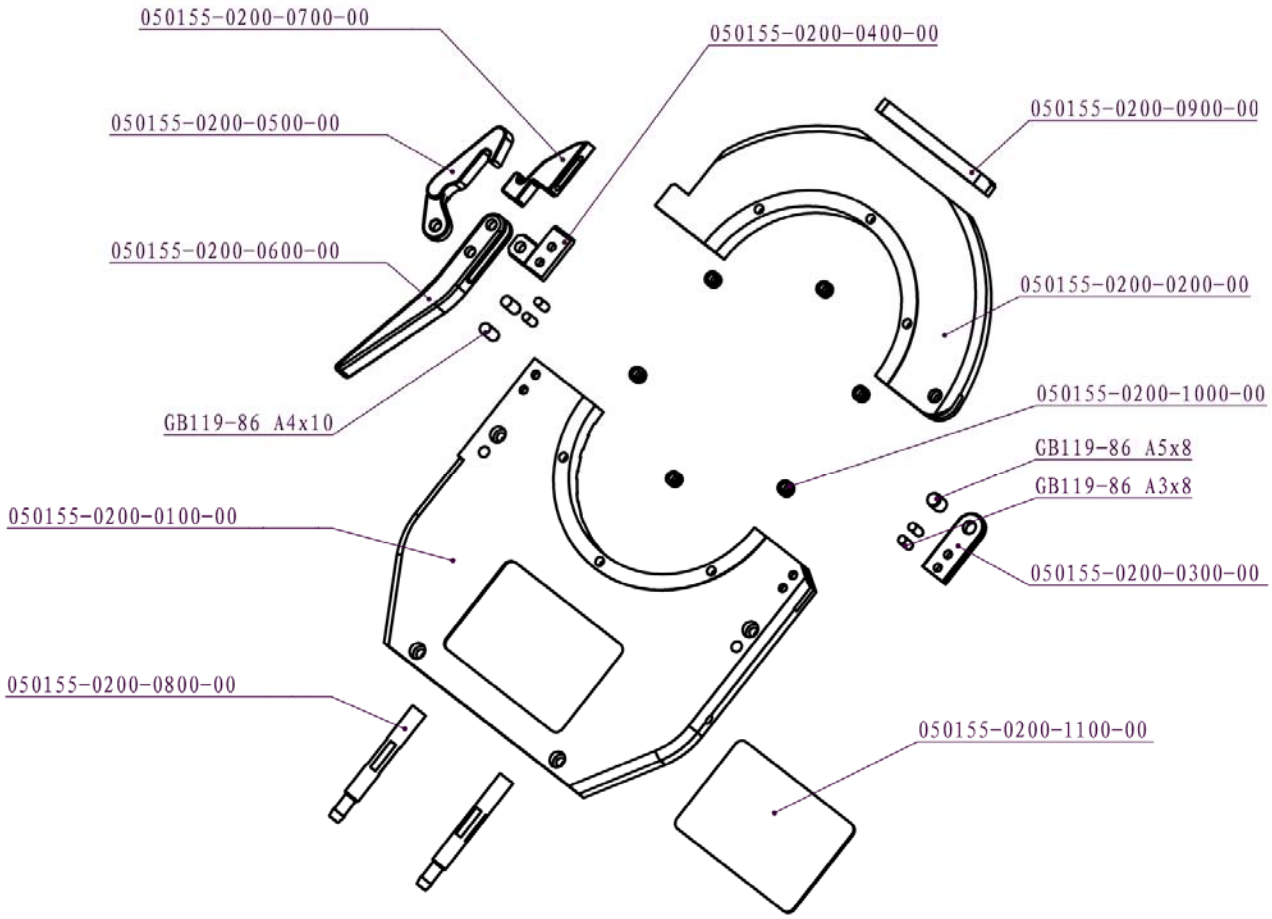
TPWH-C-1.5 (1.5” Closed Weld Head)
Exploded View 4



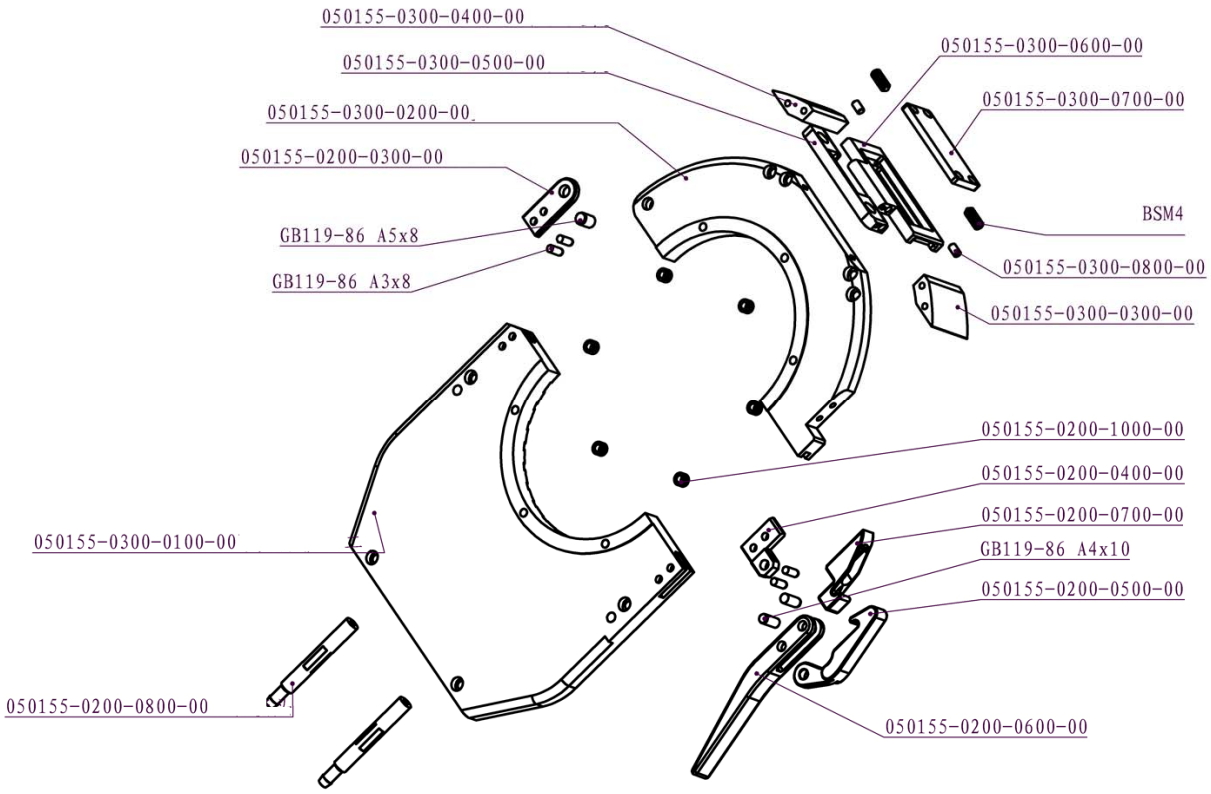
TPWH-C-3 (3” Closed Weld Head)
Exploded View 1



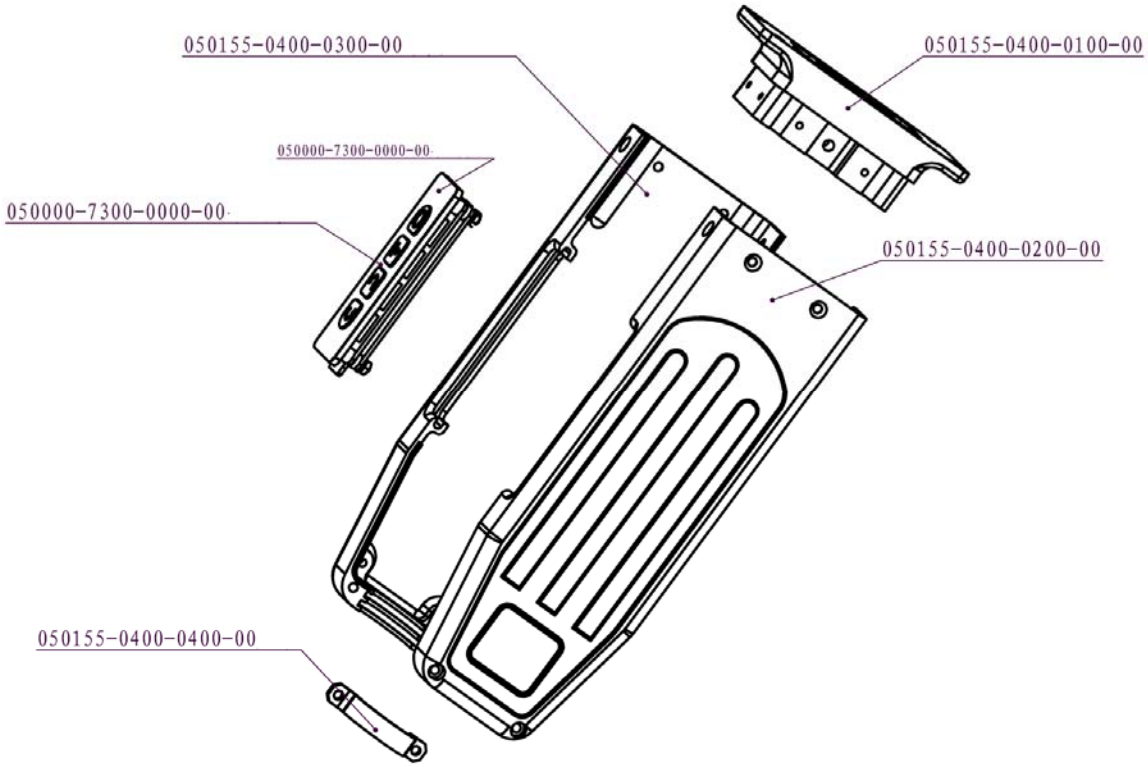
TPWH-C-3 (3” Closed Weld Head)
Exploded View 2



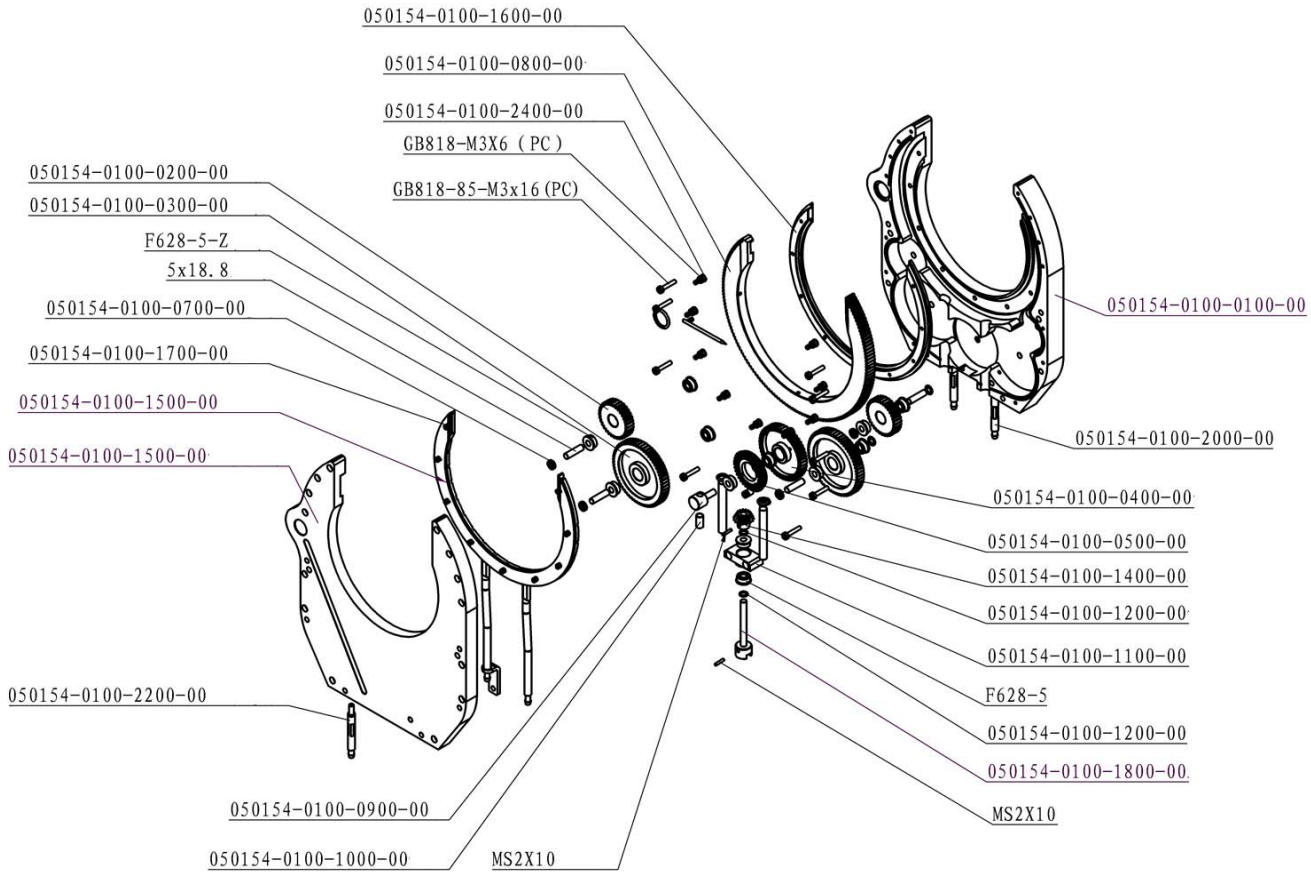
TPWH-C-3 (3” Closed Weld Head)
Exploded View 3



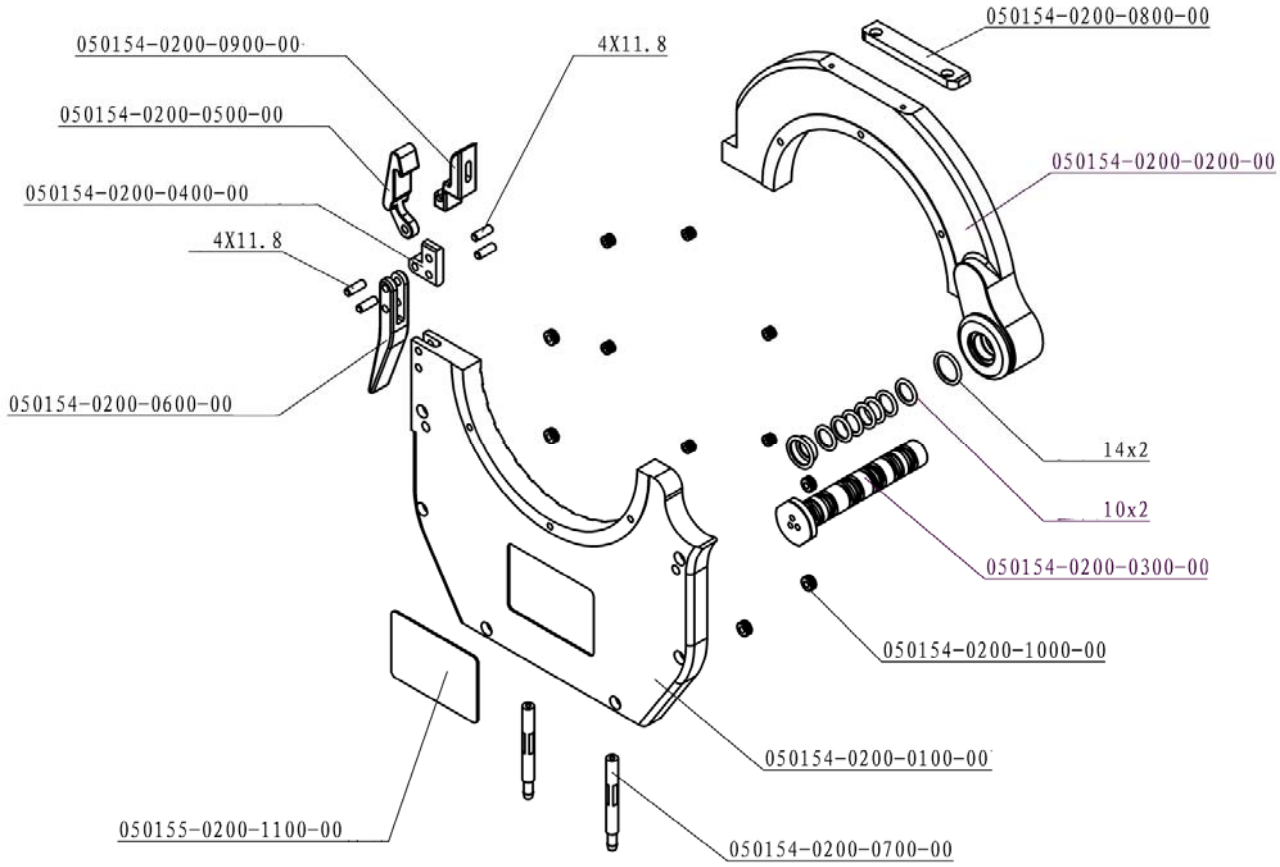
TPWH-C-3 (3” Closed Weld Head)
Exploded View 4



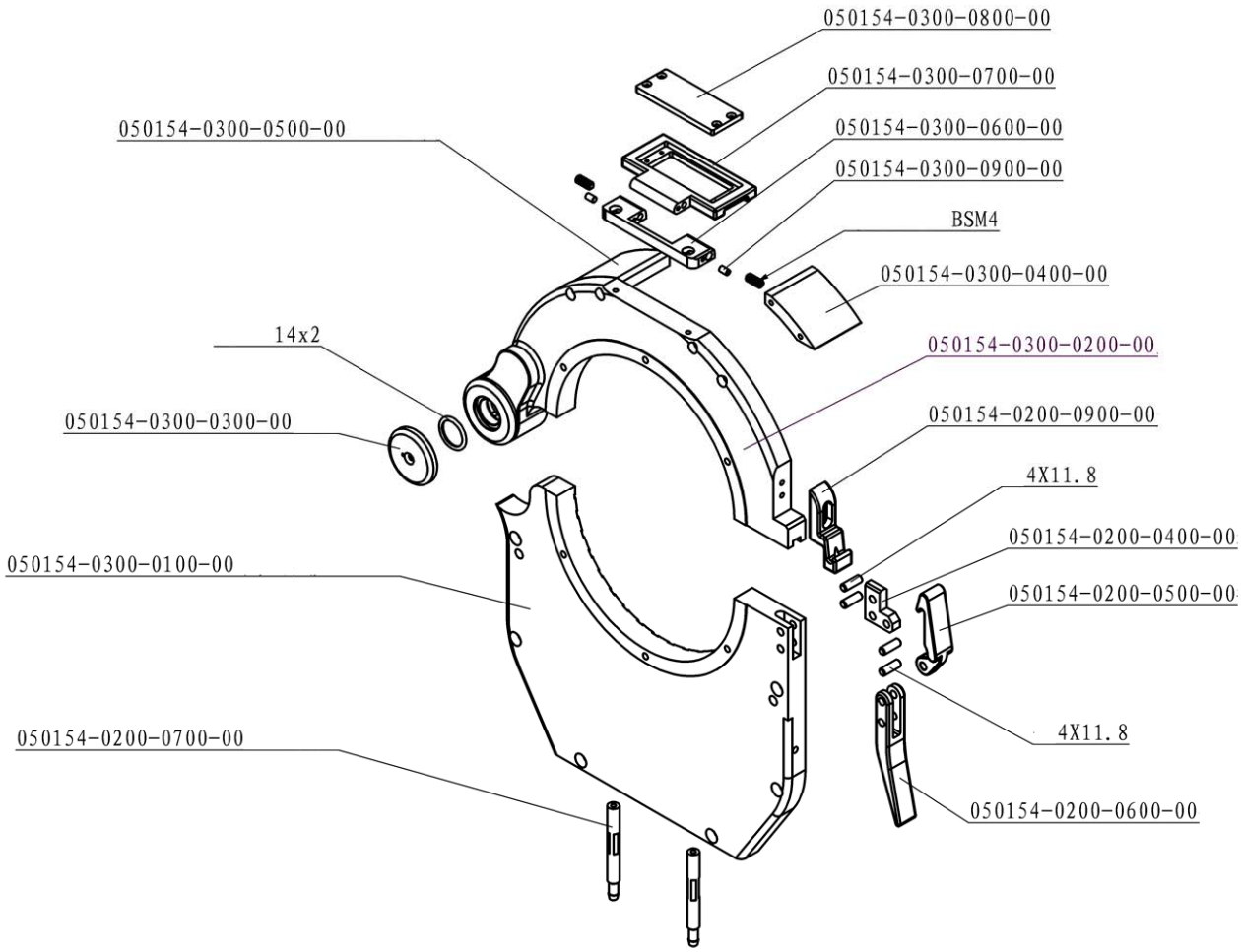
TPWH-C-4 (4” Closed Weld Head)
Exploded View 1



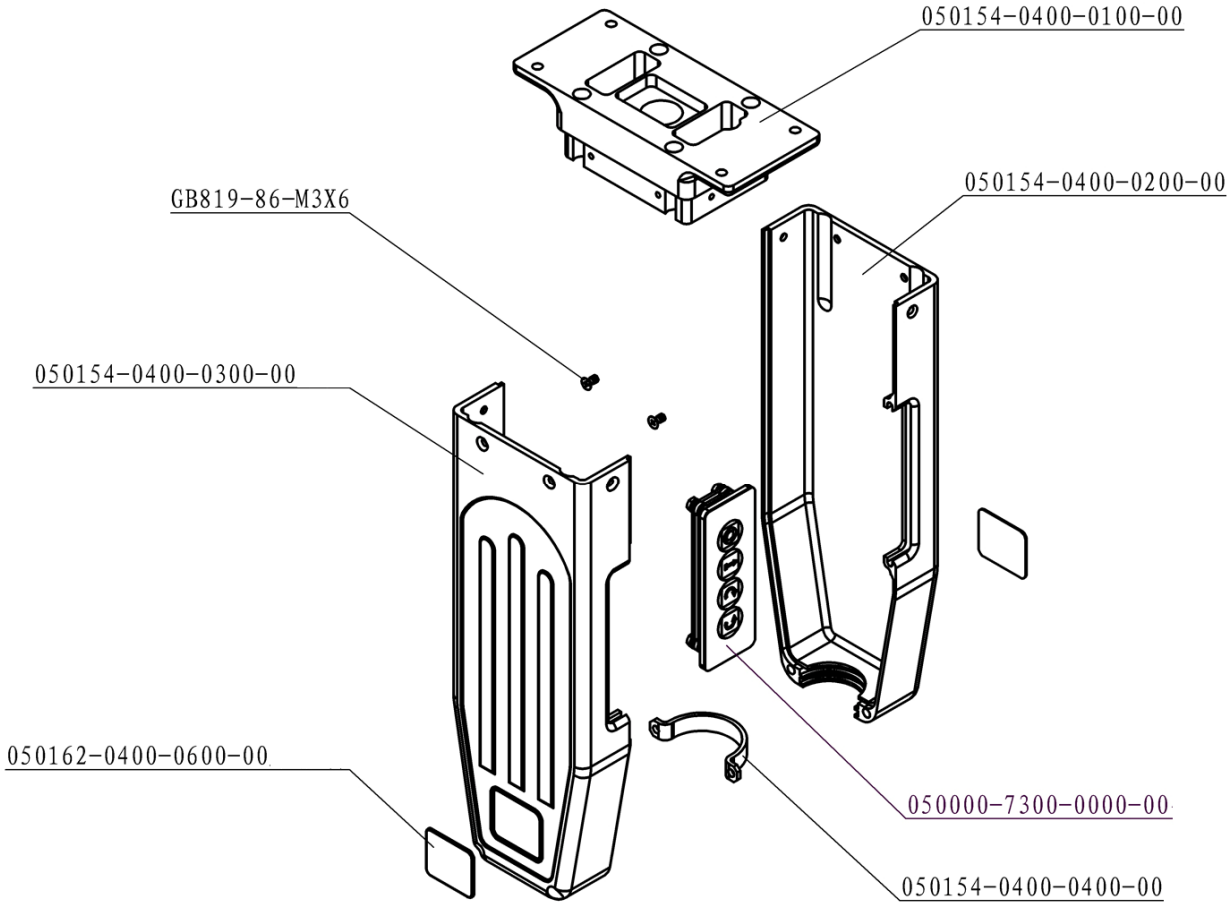
TPWH-C-4 (4” Closed Weld Head)
Exploded View 2



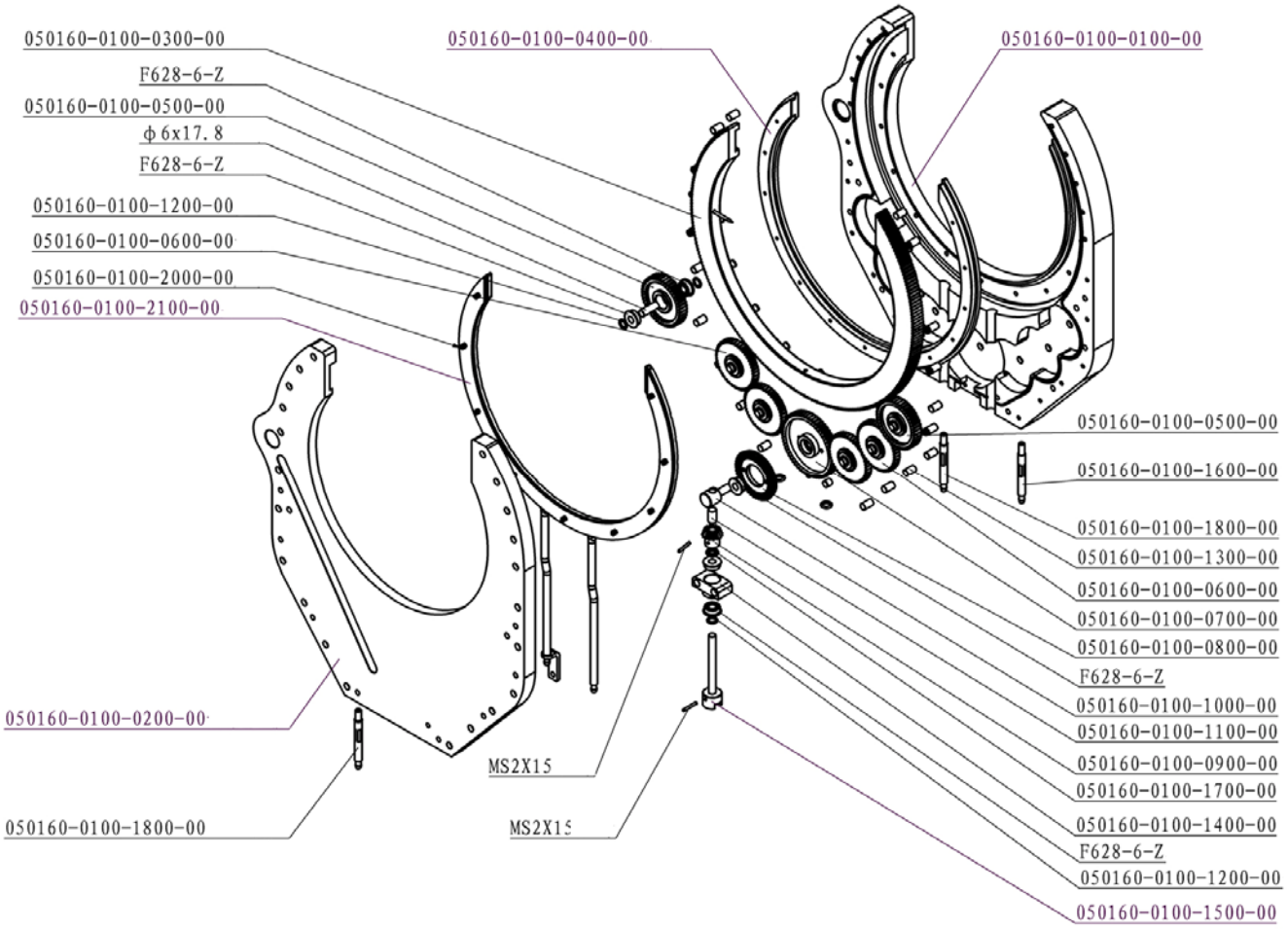
TPWH-C-4 (4” Closed Weld Head)
Exploded View 3



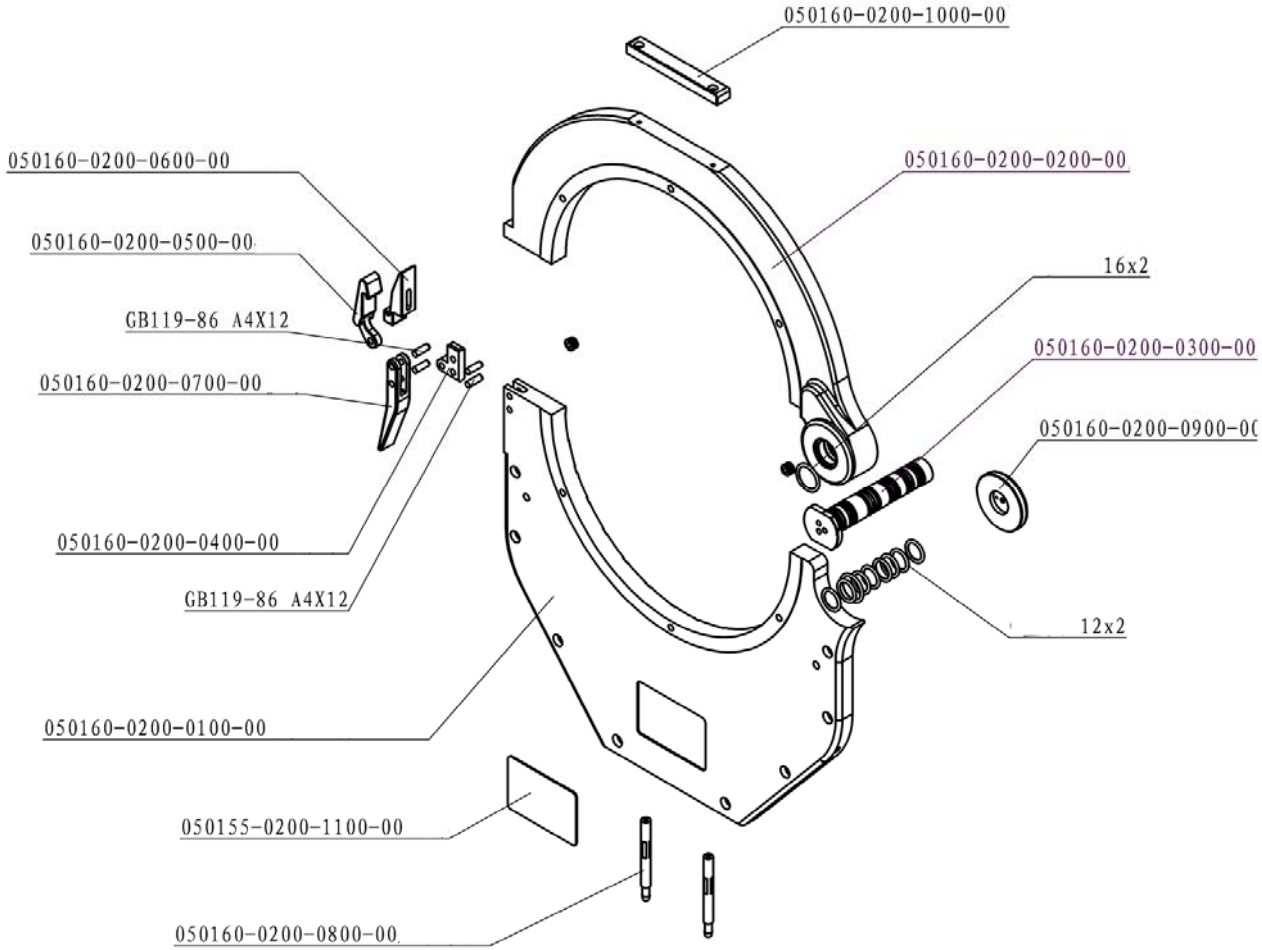
TPWH-C-4 (4” Closed Weld Head)
Exploded View 4



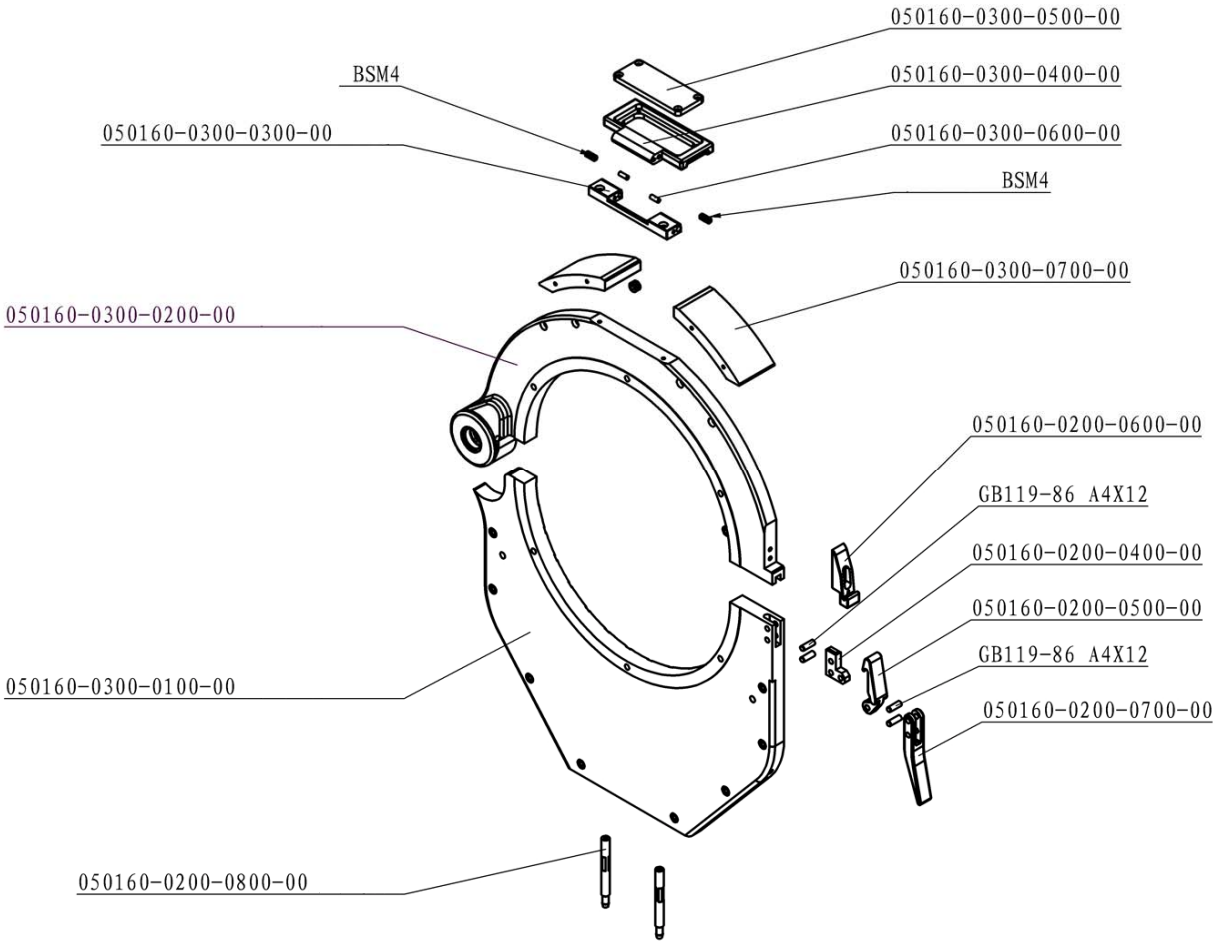
TPWH-C-6 (6” Closed Weld Head)
Exploded View 1



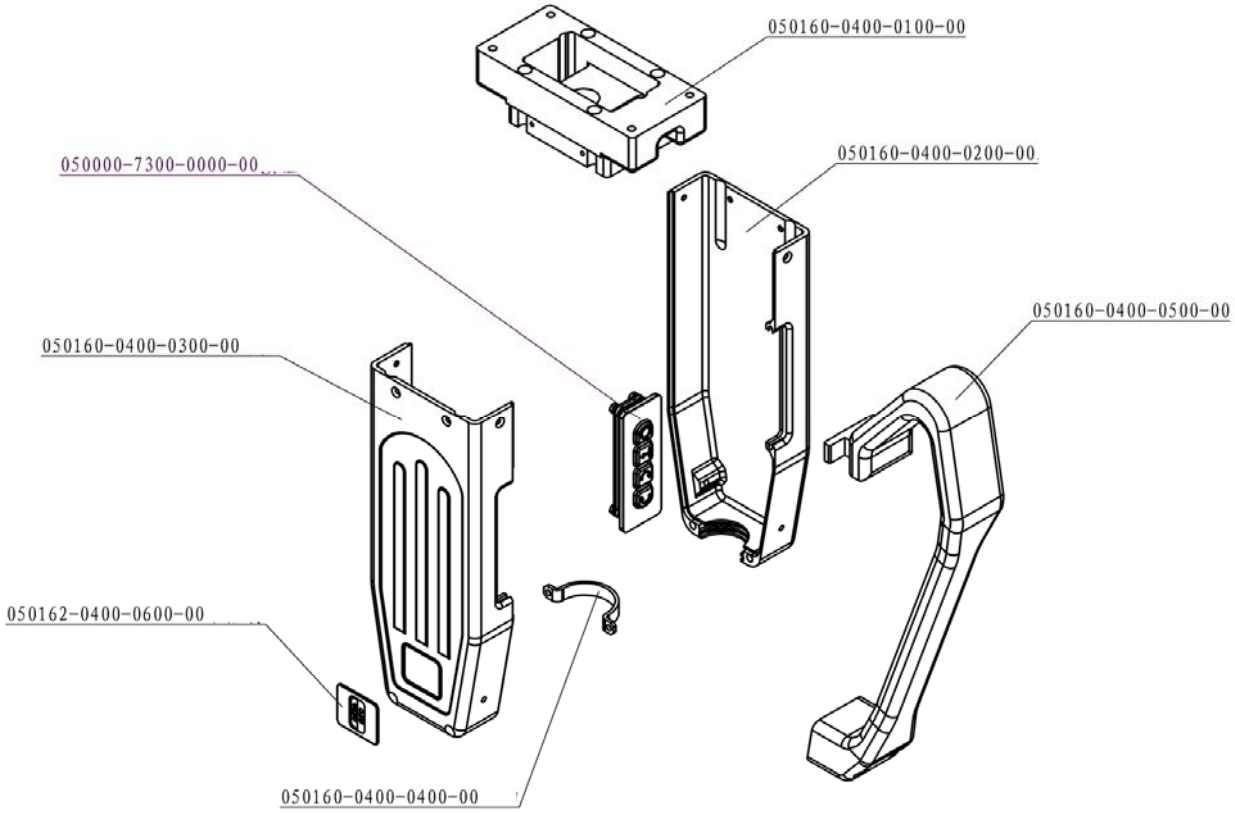
TPWH-C-6 (6” Closed Weld Head)
Exploded View 2



TPWH-C-6 (6” Closed Weld Head)
Exploded View 3



Exploded View 4



Packing List

No.	Description	Qty	Remark
1	TPWH Closed Weld Head (1”, 1.5”, 3”, 4” or 6”)	1pc	
2	Tools	1set	
3	Operation manual	1pc	
4	Certificate	1pc	
5	Packing list	1pc	

Machine Warranty / Repairs

Every Otto Arc product is thoroughly inspected and tested before leaving our warehouse or factory. To have your warranty in forced, you must register your equipment at www.ottoarc.com or send in the self-addressed card that was shipped with the equipment. All products manufactured by Otto Arc Systems, Inc. are warranted to the original purchaser to be free from defects in material and workmanship under normal use, for a period of one year from date of purchase. This does not included tool bits or other consumable items. Should any troubles develop, please call Otto Arc and get a RGA number, and then return the equipment pre-paid to one of Otto Arc Systems location or nearest authorized service centers. If inspection shows the trouble is caused by defective or workmanship, or material, Otto Arc at our option will repair or replace without charge for either parts or labor. The product will be returned to the customer pre-paid. If for some reason the cause of damage is deeming to be done by customers, we will contact the customer and inform them of our results and the cost to fix the equipment. In this case, the repaired equipment will then be returned to the customer with freight pre-paid and billed to the customer.

THIS WARRANTY DOES NOT APPLY WHERE:

A) Repairs or attempted repairs have been made by persons other than Otto Arc Systems, personal, or authorized service repair personal.
B) Repairs are required because of excessive wear or misuse of equipment.
C) The equipment has been abused or involved in an accident.
D) Misuse is evident, such as caused by overloading the equipment beyond it’s rated capacity.
E) The tool has been used after partial failure, or the tool has been used with an improper accessories.

NO OTHER WARRANTY, EITHER WRITTEN OR VERBAL IS AUTHORIZED UNLESS IT IS FROM VICE PRESIDENT OR PRESIDENT OF OTTO ARC SYSTEM, INC.