# SERIES 40 WELD HEAD

Swagelok series 40 welding system components deliver consistent, precise welds for outside diameters from 1 1/2 to 4 in. (38,1 to 101,6 mm).

A dc motor in the weld head drives a rotor, which revolves the tungsten electrode around the weld joint. Optical circuitry in the weld head sends precise feedback to the power supply to control the speed of the rotor.

All moving parts in the weld head are mounted in low-friction devices to provide smooth, consistent operation.

A spring-loaded, floating brush maintains contact with approximately two-thirds of the circumference of the rotor. This configuration ensures consistent, uniform electrical conductance to the rotor and electrode.

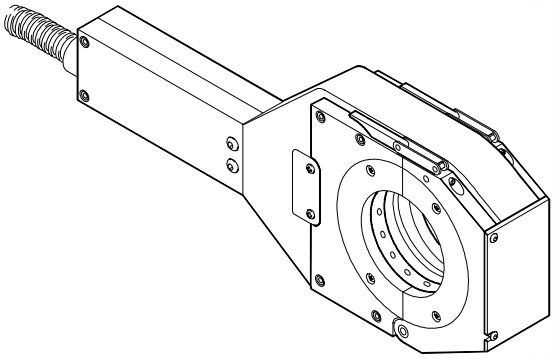

*Figure 1 Series 40 Weld Head*

# Unpacking the Weld Head Components

The weld head assembly and tool package are packaged in a foam-lined shipping container. Perform the following steps when your Swagelok series 40 weld head arrives.

1. Inspect the container for damage.
2. Remove the components from the container.
3. Check the items for any damage.
4. Verify that the weld head serial number matches the serial number on the shipping container.
5. Record the model and serial numbers, and the delivery dates on page 7 of the *Regulatory* Module.

# Installing the Weld Head

The weld head assembly has four connectors that plug into the power supply. See Figure 2.

The four connectors on the cable are:

- fixture
- electrode (red)
- work (green)
- weld head shielding gas.

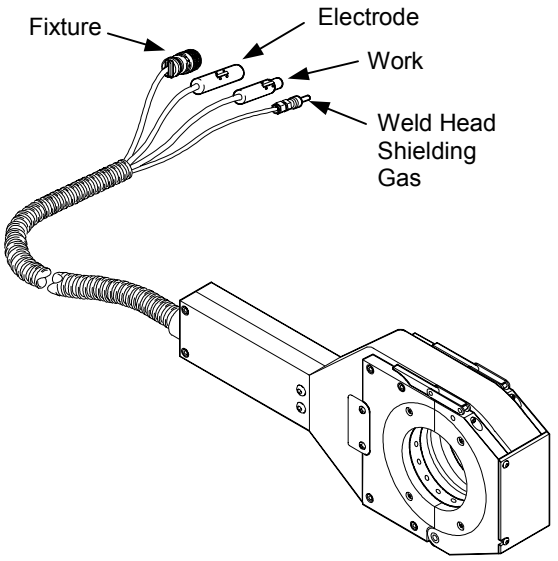


*Figure 2 Weld Head Assembly*

Connect the four connectors to the rear panel of the power supply by performing the following steps (see Figure 3):

1. Locate the weld head assembly.
2. Align the notch on the multi-pin connector with the small tab in the mating socket on the rear panel labeled FIXTURE. Insert the connector in the socket. Turn the connector sleeve clockwise by hand until it is tight. This connection provides the control signals to drive the weld head.
3. Insert and fully seat the red connector into the socket on the rear panel labeled ELECTRODE. Twist the connector 1/4-turn clockwise to lock it into place. This connection is the negative (-) terminal of the weld head.
4. Insert the green connector into the socket on the rear panel labeled WORK. Twist the connector 1/4-turn clockwise to lock it into place. This connection is the positive (+) terminal of the weld head.
5. Insert the weld head shielding gas connector into the Swagelok Quick-Connect stem labeled TO WELD HEAD. Ensure that the connector is firmly attached. This connection provides shielding gas to the weld head through a solenoid valve in the power supply.

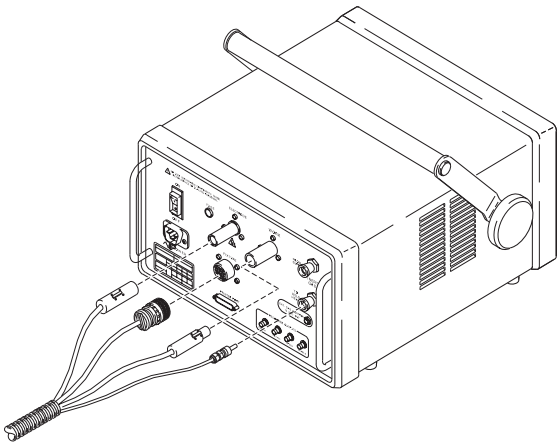

*Figure 3 Weld Head Connectors*

**Caution!**
**Ensure that the fixture connector is fully seated in the mating socket and the threaded sleeve is tight.**

***Note:*** *The weld head shielding gas connector must be a single-end shut-off (SESO) Swagelok Quick-Connect stem (SS-QC4-S-400).*

# Selecting the Electrode

Electrode length depends on the desired arc gap and outside diameter of the work piece being welded. To select the correct electrode use the Calculating Tungsten Electrode Length formula. Once you have the correct length calculated either select an electrode from stock using the Electrode Selection Table or place a special order.

## Tungsten Electrode Length Calculation

To determine the tungsten electrode length for a specific arc gap, use the formula below:

(Rotor OD ÷ 2) – (Tube OD ÷ 2) – Arc Gap = Electrode Length

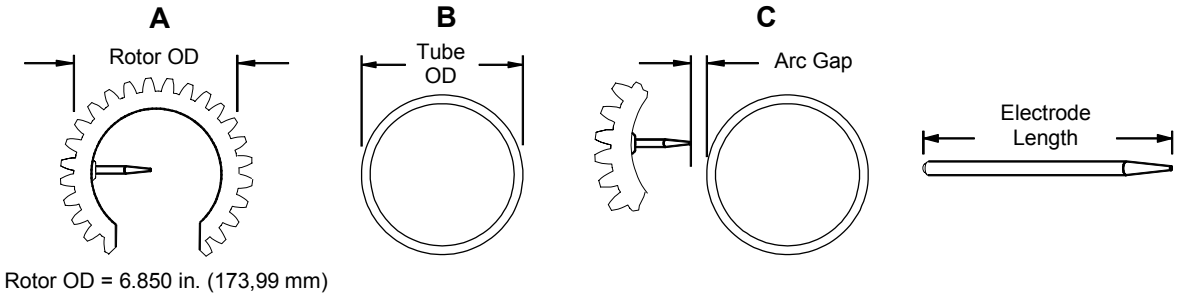


*Figure 4 Electrode Length Calculation Parameters*

**Example No. 1:** (1.5 in. to 1.5 in. tube butt weld)

| | |
|---|---|
| Rotor OD | A= 6.850 in. |
| Tube outside diameter | B= 1.500 in. |
| Desired arc gap | C= 0.060 in. |

(6.850 ÷ 2) – (1.500 ÷ 2) – 0.060 in. = 2.615 in.

**Example No. 2:** (38,1 mm to 38,1 mm tube butt weld)

| | |
|---|---|
| Rotor OD | A = 173,99 mm |
| Tube outside diameter | B = 38,10 mm |
| Desired arc gap | C = 1,52 mm |

(173,99 ÷ 2) – (38,10 ÷ 2) – 1,52 mm = 66,425 mm

*Table 1 Electrode Selection for 0.060 in. Arc Gap*

| Electrode Part No. | Component OD | Electrode Length (L) | Electrode Diameter (D) |
|---|---|---|---|
| SWS-C.094-2.615-P | 1.5 in. | 2.615 in. (66,40 mm) | 0.094 in. (2,39 mm) |
| SWS-C.094-2.365-P | 2.0 in. | 2.365 in. (60,07 mm) | 0.094 in. (2,39 mm) |
| SWS-C.094-2.115-P | 2.5 in. | 2.115 in. (53,72 mm) | 0.094 in. (2,39 mm) |
| SWS-C.094-1.865-P | 3.0 in. | 1.865 in. (47,37 mm) | 0.094 in. (2,39 mm) |
| SWS-C.094-1.615-P | 3.5 in. | 1.615 in (41,02 mm) | 0.094 in. (2,39 mm) |
| SWS-C.094-1.365-P | 4.0 in. | 1.365 in (34,67 mm) | 0.094 in. (2,39 mm) |

***Note:*** *Auto generated programs are exact lengths. You may substitute another length that is within 0.005 in.*

## Electrode Geometry

This illustration shows the electrode shape Swagelok suggests. Properly ground electrodes provide consistent, repeatable welds. Pre-ground electrodes are available from your Swagelok representative. See your parts list for ordering information.

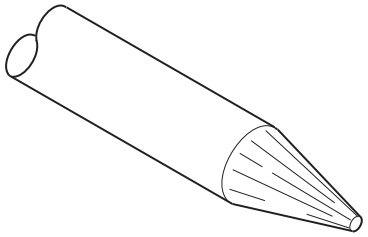

*Figure 5 Tungsten Electrode*

The electrode part numbers are assigned as follows:

**SWS – X.### - #.### - ### - P**

- **X.###** — Material Designator: C = Ceriated, T = Thoriated; Electrode Diameter
- **#.###** — Electrode Length
- **###** — Tip Diameter
- **P** — Package Designator

The ceriated electrode material type is a mixture of 98 % tungsten and 2 % cerium and is commonly referred to as “2 % ceriated.” This electrode type has demonstrated improved arc starting performance over the 2 % thoriated type, particularly when using purified shielding gas.

# Installing the Electrode

1. With the weld head in the open position, press JOG on the operator panel until the tungsten electrode is in the position shown in Figure 6.
2. Loosen the electrode set screw. Remove the electrode if you are replacing it.
3. Insert the new electrode until it is flush with the outside edge of the rotor.
4. Tighten the electrode set screw to secure the electrode.
5. Press HOME on the operator front panel to return rotor to the home position.

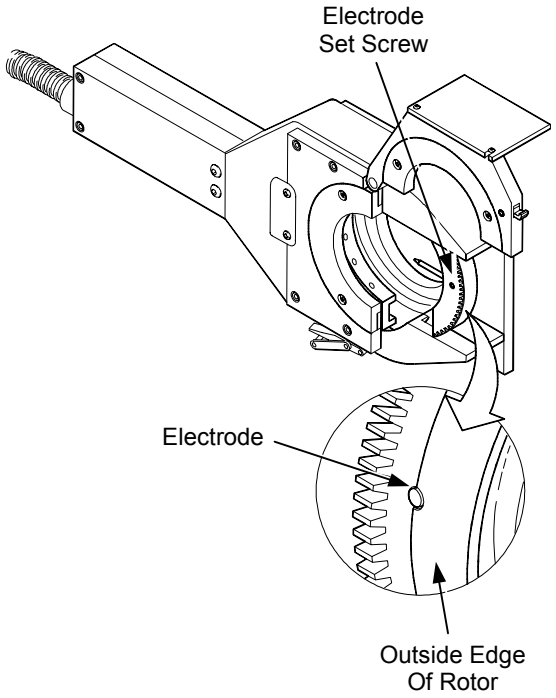


*Figure 6 Electrode Installation*

**Caution!**

**Do not jog or move the rotor unless the electrode is clamped in place.**

# Preparing the Work

It is important to prepare the tube pieces properly before welding. Refer to Figure 7.

Tubing must be square and burr-free to ensure repeatable, high-quality autogenous fusion welds.
Cut the tubing to length with a hacksaw or tube cutter. Face the tube ends with a lathe or a portable facing tool. Deburr the ends, making sure that both the inside and outside diameters are square and burr-free. Clean the tube ends using an appropriate solvent.

Minimize the chance of a poor quality weld by following these guidelines:

- Tube ends must be square.
- Tube ends must not have a wall thickness variation exceeding ± 15 % of nominal.
- Tube ends must be burr-free.
- Tube ends must be free of any rust, grease, oil, paint, or other surface contaminates.

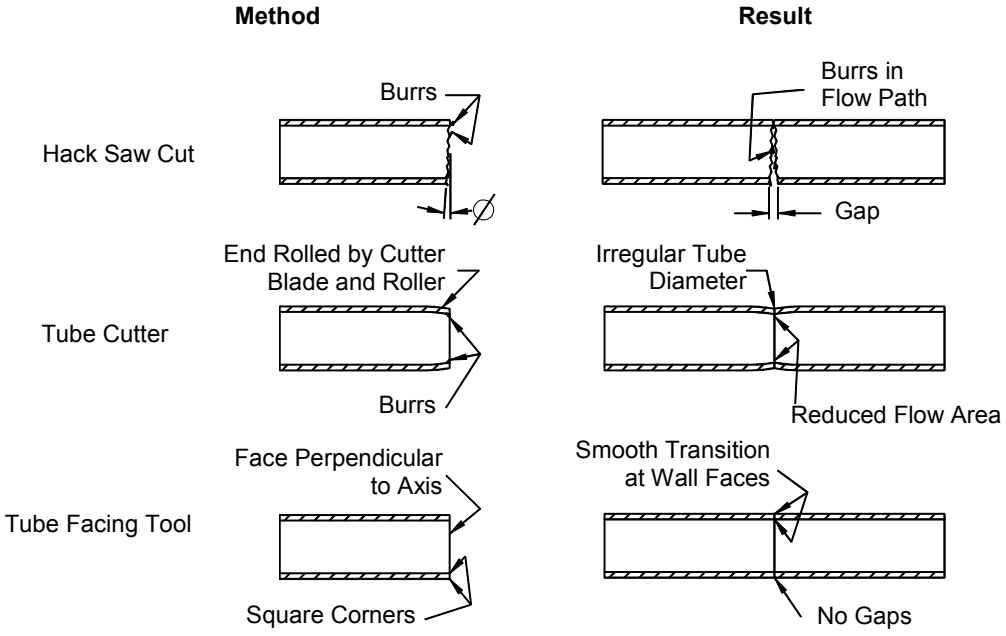


*Figure 7 Tube Preparation*

# Operating the Weld Head

Operate the weld head using the following parameters:

## Series 40

| | |
|---|---|
| **Shield gas flow rate std ft$^3$/hr (std L/min)** | 30 to 50[1] (14 to 23) |
| **Prepurge and Postpurge minimum time in seconds** | 45[2] |
| **Start Power** | Normal |
| **Maximum Recommended Average Amps** | 100 A |

[1] Set flow to higher rates when welding at high current rates.

[2] Flow should be continuous for cooling when welding at high current rates.

## Collet Installation

1. Select the appropriate set of collets according to the tube OD of the tubing to be welded.
2. Remove the four screws holding the collets on each side of the weld head.
3. Install the selected collet.
4. Reinstall the screws.

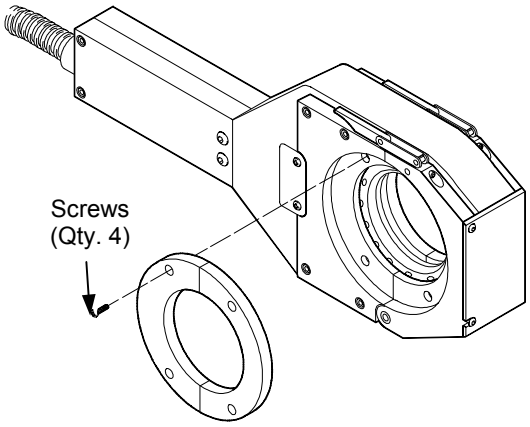


*Figure 8 Installing the Collet*

## Work Piece Alignment

1. Open the window cover.
2. Open one of the fixture side plates.
3. Insert the first work piece aligning it with the tungsten electrode.
4. Close and latch the fixture side plate.
5. Open the other fixture side plate.
6. Insert the second work piece and butt the weld ends together.
7. Close and latch the fixture side plate.
8. Inspect the alignment by looking through the window cover to verify that the two work pieces are centered on the tungsten electrode.

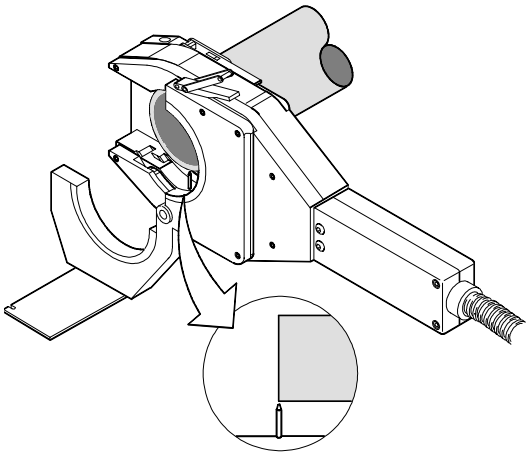

*Figure 9 Aligning the Work Piece with the Electrode*

## Latch Tension Adjustment

1. Adjust the latch adjustment screws so that the latch is in position to exert appropriate tension on the tube.

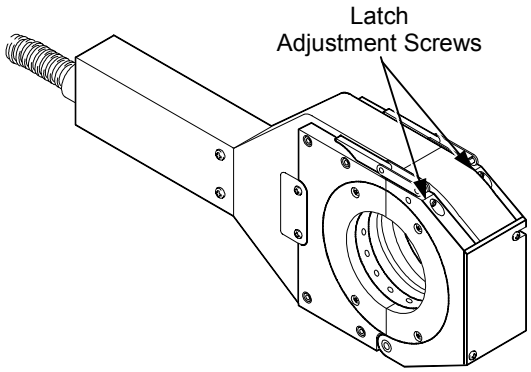


*Figure 10 Adjusting the Latch Tension*

## Weld Head Mounting

1. Bolt the mounting bracket to the top of the bench.
2. Thread the power cord through the opening of the mounting bracket and seat the weld head in the position shown in Figure 11.

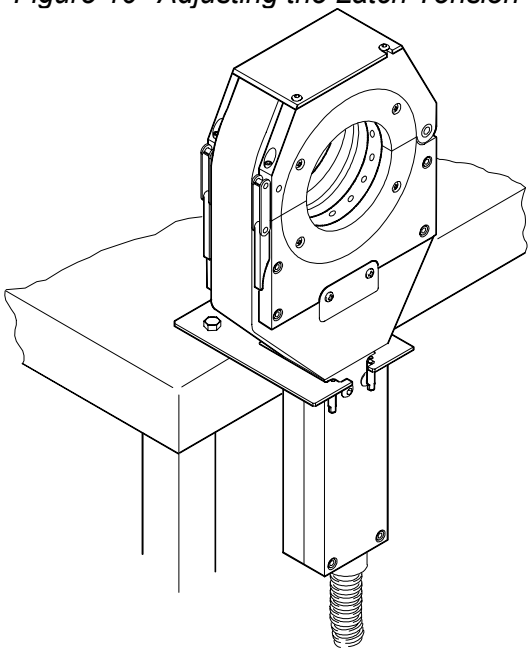

*Figure 11 Mounting the Weld Head*

***Note:*** *The weld head may be mounted as illustrated or turned 90°.*

# Performing Daily Maintenance

To keep your Swagelok welding system (SWS) equipment in proper working order, you must perform daily maintenance on the system components.

Store the weld head in a clean, dry place.

At the start of each workday remove dirt, carbon, and vapor deposits from the weld head rotor area with a clean, soft cloth and a solvent such as isopropyl alcohol.

***Note:*** *If you experience problems while performing the procedures in this section, refer to Troubleshooting or contact your Swagelok representative.*

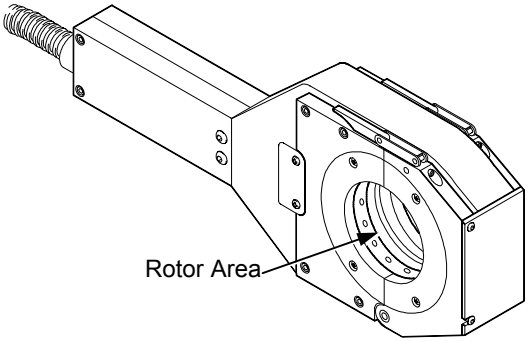


*Figure 12 Inspect Exposed Surfaces of the Weld Head*

**WARNING!**

**DISCONNECT THE WELD HEAD FROM THE POWER SUPPLY BEFORE PERFORMING MAINTENANCE.**

# Performing Periodic Maintenance

This section describes the procedures necessary for maintaining the weld head after every 400 to 500 welds.

Parts that are found to be defective during this procedure should be replaced. For detailed part drawings and ordering information, refer to the **Part Drawings** beginning at the end of this manual. Spare parts are available through your Swagelok representative.

**Caution!**

**Do not use lubricants inside the weld head.**

## Weld Head Timing Check Program

1. Select PROG/CREATE.
2. Select MANUAL ENTRY, then press **ENTER**.
3. Select LEVELS ONLY, then press **ENTER**.
4. Enter 2 levels, then press **ENTER**.
5. Enter a programmer name. Typically it would be your name.
6. Enter the Side 1 Tube Diameter (40), then press **ENTER**.
7. Select 40H from the Weld Head pick list.
8. Using Table 2, enter the following parameters.

*Table 2 Parameters*

| Parameter | Entry |
|---|---|
| Start Power | Normal |
| Start Current | 20 |
| Rotor Delay | 0 |
| Prepurge | 5 |
| Postpurge | 5 |
| Downslope | 0 |

9. Using Table 3, enter the following parameters for level 1 and level 2.

*Table 3 Level 1 and Level 2 Parameters*

| Parameter | Level 1 Setting | Level 2 Setting |
|---|---|---|
| Impulse | 2.0 | 2.0 |
| Maintenance | 2.0 | 2.0 |
| Weld Time | 60 | 15 |
| Ramp | 0 | 0 |
| Pulse Rate | 1 | 1 |
| Pulse Width | 50 | 50 |
| Speed Hi | 2.00 | 0.00 |
| Speed Lo | 2.00 | 0.00 |

10. Press **WELD**.
11. Select SAVE TO MEMORY, then press **ENTER**.
12. Enter the procedure name (Timing Test), then press **ENTER**.

## Weld Head Timing Test

1. Select WELD/TEST.
2. Press **START**.
3. After verifying the screen displays “WELD HEAD IS CLEAR TO ROTATE”, press **ENTER**.
4. Verify the rotor completes two revolutions then check that no part of the rotor is exposed after it stops. See Figure 13.
5. If the rotor does not complete the revolutions and stop correctly, contact your Swagelok representative.

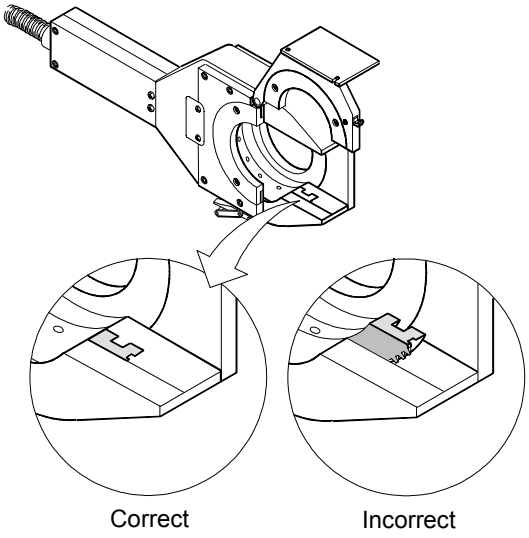


*Figure 13 Rotor Position*

**WARNING!**

**THE ROTOR WILL ROTATE ONE REVOLUTION TO HOME POSITION 15 SECONDS AFTER COMPLETING THE TWO REVOLUTIONS**

## Weld Head Cleaning and Inspection

This section describes how to disassemble the weld head and rotor.

### Weld Head

To disassemble the weld head, follow these steps:

1. Blow any loose material from the weld head assembly with clean, low-pressure air.
2. Remove the four screws from the left side plate. See Figure 14.
3. Using a flat-bladed screwdriver, evenly pry the left fixture side plate off of the weld housing being careful not to damage ends of threaded alignment studs.
4. Remove the long motor cover screws and the motor cover end screws. See Figure 15.
5. Remove the four weld head housing screws from the housing. Using a flat blade screwdriver, carefully separate the brush side from the gear side. See Figure 16.
6. Carefully separate the weld head housing halves so that internal components, such as the ground pin insulators and fixture pin insulator are not damaged. See Figure 16.

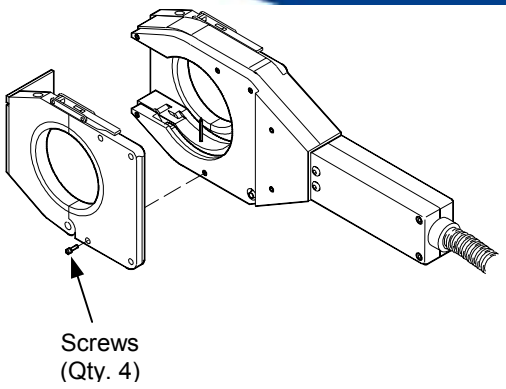


*Figure 14 Removing the Left Side Plate*

***Note:*** *As you remove the screws from the weld head organize them so that you can reinstall them in their original holes upon reassembly.*

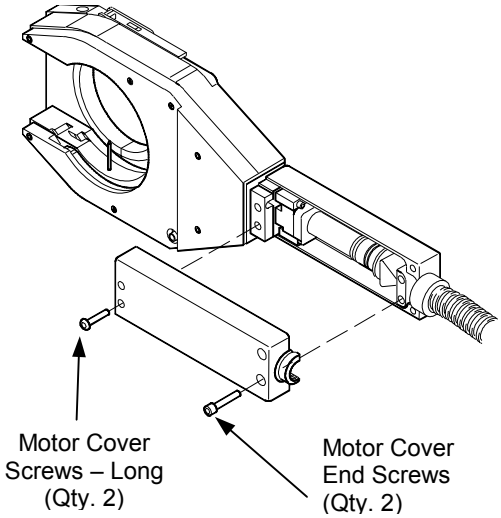


*Figure 15 Removing the Motor Cover*

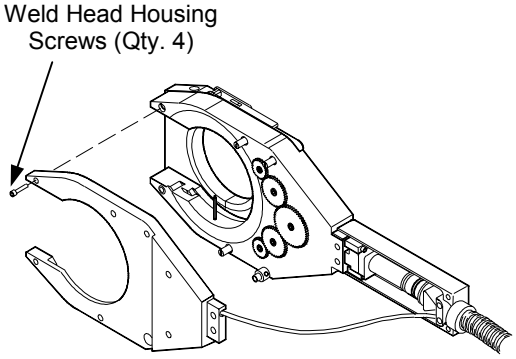


*Figure 16 Disassembling the Weld Head Housing*

## Brush

1. Remove the three brush screws and the two clamping plate screws.
2. Remove the brush from the brush side of the housing assembly. See Figure 17.
3. Inspect and clean the brush using the following steps:
   - Check the brush for excessive wear. Replace if necessary.
   - Remove any oxidation from the brush surface and brush clamp plate with a nylon abrasive pad.
   - Turn the brush over and remove any oxidation from the area that contacts the brush clamp plate with a nylon abrasive pad.
   - Remove the residue left by the abrasive pad using isopropyl alcohol and a lint-free pad.
   - Remove residue from the brush groove with isopropyl alcohol and a lint-free pad.
4. Reinstall the brush making sure the springs are fully seated in the brush housing.
5. Screw the two short screws into the brush clamp plate.
6. Screw the three long screws into the brush housing.

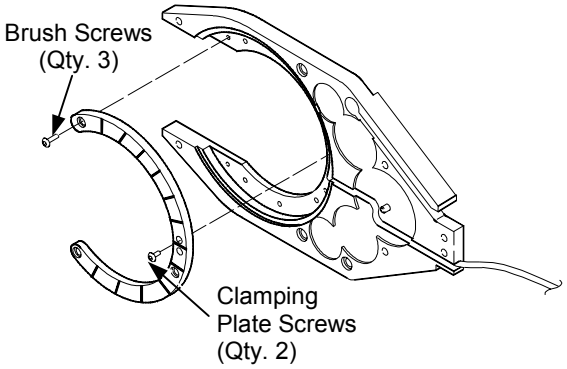


*Figure 17 Removing the Brush*

***Note:*** *The brush clamp plate is attached with two Torx Plus IP-8 screws. Use a Torx Plus T8 wrench to remove.*

**Caution!**

**Be careful not to strip the heads or screw threads.**

***Note:*** *The brush should demonstrate a spring action if installed properly.*

## Rotor

1. Inspect the gears for wear and replace if damaged by referring to the Gear Side Assembly drawing on page 22.
2. Remove the rotor from the gear side of the housing assembly. See Figure 18.
3. Place the rotor on a clean, dry surface.
4. Inspect the rotor bearing assemblies for wear and damage. Contact your Swagelok representative if replacement is necessary.
5. If the rotor bearing assemblies are dirty, clean them with isopropyl alcohol.
6. Inspect the rotor for dirt and other deposits. Remove dirt or other deposits with a nylon abrasive pad.
7. Remove residue from the rotor track with isopropyl alcohol and a lint-free pad.
8. Remove the actuator tab. Inspect it for excessive wear. Replace if necessary.
9. Remove dirt or other deposits from the actuator tab with a nylon abrasive pad.
10. Remove residue left by the nylon abrasive pad from the actuator tab with isopropyl alcohol and a lint-free pad.
11. Reinstall the actuator tab.
12. Reinstall the rotor onto the rotor track making sure that it is centered.

***Note:*** *Make any necessary gear replacements before reinstalling the rotor.*

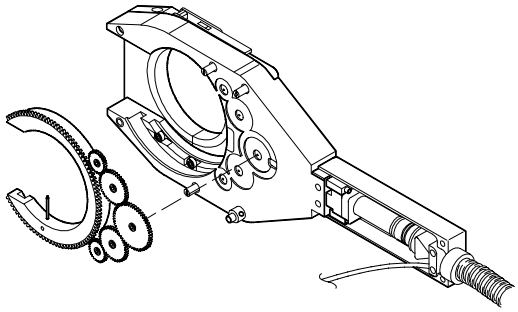

*Figure 18 Removing the Rotor*

## Weld Head Reassembly

1. Reinstall the brush side assembly onto the gear side assembly.
2. Replace the left side of the motor cover making sure the cable cover is seated in the stress reliever.
3. Replace the left side fixture plate.

***Note:*** *If the fixture side plate screws thread into the alignment studs and cause both to rotate without tightening, insert an Allen wrench into the alignment stud to keep it in place while you finish tightening the fixture side plate screws.*

## Home Sensor Adjustment

Test the home sensor assembly for proper operation by pressing **HOME** on the power supply.

If the rotor rotates continuously you will need to adjust or replace the home sensor actuator.

1. Remove the actuator cover. See Figure 19.
2. Slightly loosen the actuator plate screws.
3. Slowly rotate the home actuator switch adjustment cam clockwise until the rotor finds the home position.
4. Rotate the home actuator switch adjustment cam an additional 5°.
5. Tighten the actuator plate screws.
6. Press **HOME** on the power supply to verify the adjustment.
7. Reinstall the actuator cover.

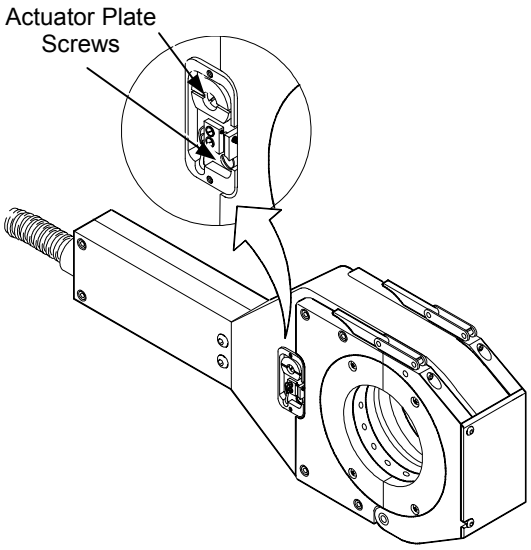


*Figure 19 Adjusting the Home Sensor*

**Caution!**

**Over-adjustment of the cam will cause the home sensor to fail prematurely due to excessive pressure. Adjust the cam just past the point where the home sensor "clicks" when actuated.**

### Actuator Replacement

If adjusting the home sensor assembly does not activate the home sensor assembly, you will need to replace the actuator.

1. Remove the right fixture side plate. See Figure 20.
2. Remove and replace the home sensor actuator.
3. Repeat steps 1 to 7 of **Home Sensor Adjustment**.
4. Reinstall the right fixture side plate.

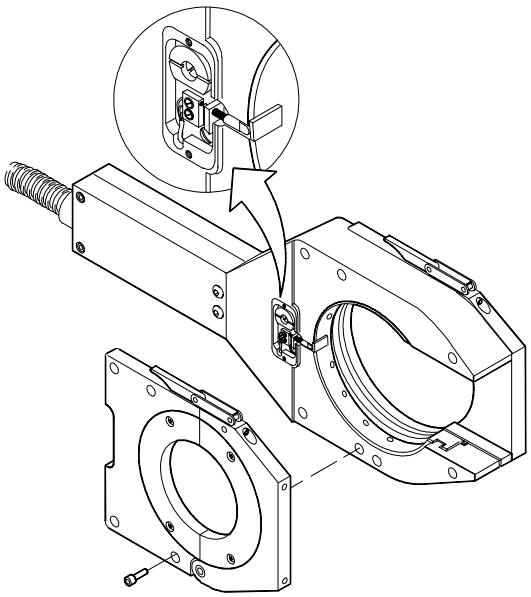

*Figure 20 Replacing the Actuator*

# Specifications

| Component | Dimensions | | Weight |
|---|---|---|---|
| Weld Head | Length | 19.2 in. (48,8 cm) | 12.8 lbs (5,8 kg) |
| | Width | 8.0 in. (20,3 cm) | |
| | Thickness | 2.8 in. (7,1 cm) | |
| Power Cord | Length | 15 ft. (457,2 cm) | 4.5 lbs (2,04 kg) |
| | | 25 ft. (762 cm) | 7.28 lbs (3,3 kg) |
| | | 50 ft. (1524 cm) | 14.5 lbs (6,58 kg) |
| Collets | Tube OD | 2.0 in. set (5,08 cm) | 7.58 lbs (3,44 kg) |
| | | 3.0 in. set (7,62 cm) | 6.24 lbs (2,83 kg) |
| | | 4.0 in. set (10,16 cm) | 4.38 lbs (1,99 kg) |
| Case | Length | 23.25 in. (59,1 cm) | 13 lbs (5,9 kg) |
| | Width | 20.75 in. (52,7 cm) | |
| | Thickness | 9.0 in. (22,86 cm) | |

| Parameter | Specification |
|---|---|
| Max Rotor Speed | 2.5 r/min Maximum |
| E-distance | 1.4 in. (35,56 mm) to the center of the electrode |

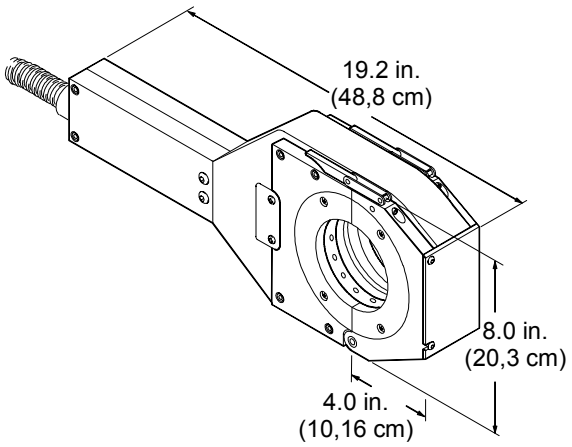


*Figure 21 Specifications*

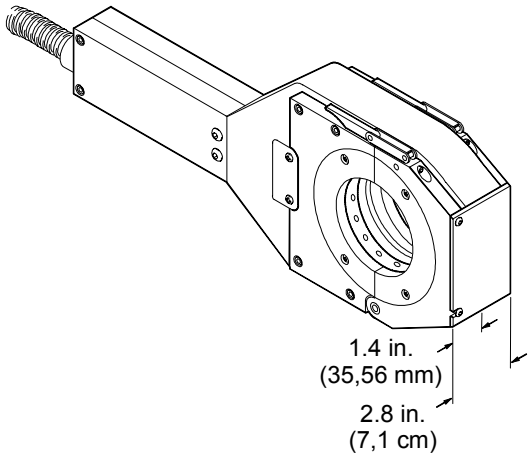


*Figure 22 E-Distance*

# Parts Drawings

This section includes exploded assembly drawings and associated parts lists. These drawings are provided as a guide to identifying part names. For specific part ordering information, contact your Swagelok representative.

The parts identified in this section include:

- SWS-40H Weld Head Assembly
- SWS-40H Gear Side Assembly
- SWS-40H Brush Side Assembly
- SWS-40H Fixture Side Plate Assembly – Left
- SWS-40H Fixture Side Plate Assembly – Right
- SWS-40H Motor Drive Assembly

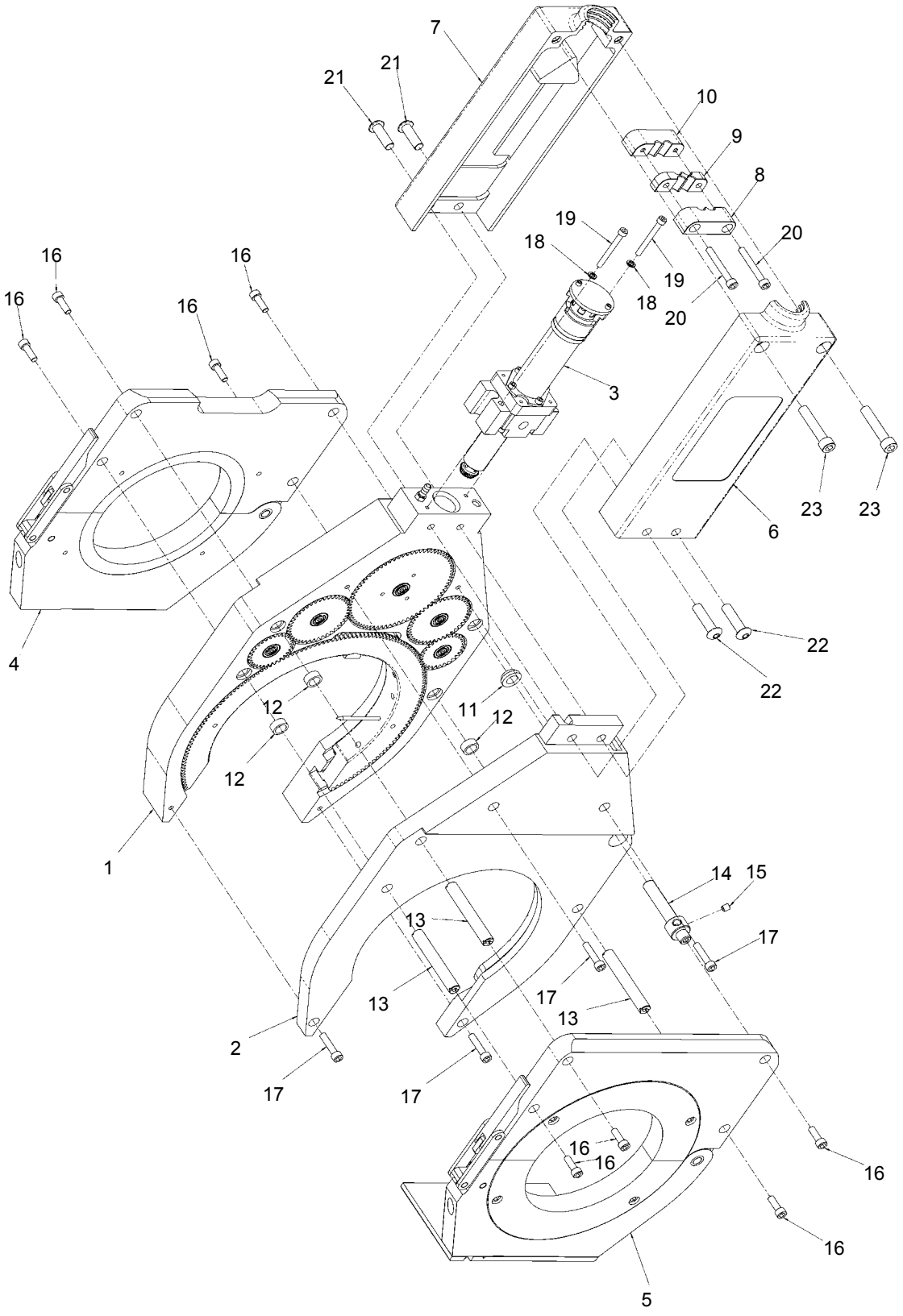


*Figure 23 SWS-40H Weld Head*

*Table 4 SWS-40H Weld Head Parts List*

| Reference No. | Description | Available in Kit No. |
|---|---|---|
| 1 | Housing (Gear Side) Assembly | SWS-40HP-GEARHOUSE |
| 2 | Housing (Brush Side) Assembly | SWS-40HP-BRSHHOUSE |
| 3 | Motor Drive Assembly | * |
| 4 | Fixture Side Plate Assembly Right | SWS-40-FSP1R |
| 5 | Fixture Side Plate Assembly Left | SWS-40FSP1L |
| 6 | Motor Cover (Left) with Swagelok Label | SWS-40HP-MCL |
| 7 | Motor Cover (Right) with Serial Number Label | SWS-40HP-MCR |
| 8 | Cord Strain Relief-Left | SWS-40HP-SR |
| 9 | Cord Strain Relief-Middle | SWS-40HP-SR |
| 10 | Cord Strain Relief-Right | SWS-40HP-SR |
| 11 | Ground Pin Insulator | SWS-40HP-FIXPINS |
| 12 | Fixture Pin Insulator | SWS-40HP-FIXPINS |
| 13 | Fixture Pin | SWS-40HP-FIXPINS |
| 14 | Ground Pin | SWS-40HP-FIXPINS |
| 15 | Ground Pin Set Screw | SWS-40HP-FIXPINS |
| 16 | Fixture Side Plate Mounting Screws | SWS-40HP-FIXPINS |
| 17 | Housing Screws | SWS-40HP-BRSHHOUSE, SWS-40HP-BRSHSCREWS |
| 18 | Motor Drive Assembly Mounting Screw Lock Washers | * |
| 19 | Motor Drive Assembly Mounting Screws | * |
| 20 | Cord Strain Relief Screws | SWS-40HP-SR |
| 21 | Motor Cover (Right) Screws- Short | SWS-40HP-MCR, SWS-40HP-MCSCREWS |
| 22 | Motor Cover (Left) Screws- Long | SWS-40HP-MCL, SWS-40HP-MCSCREWS |
| 23 | Motor Cover (Left) End Screws | SWS-40HP-MCL, SWS-40HP-MCSCREWS |

* Not available as a field replaceable spare part.

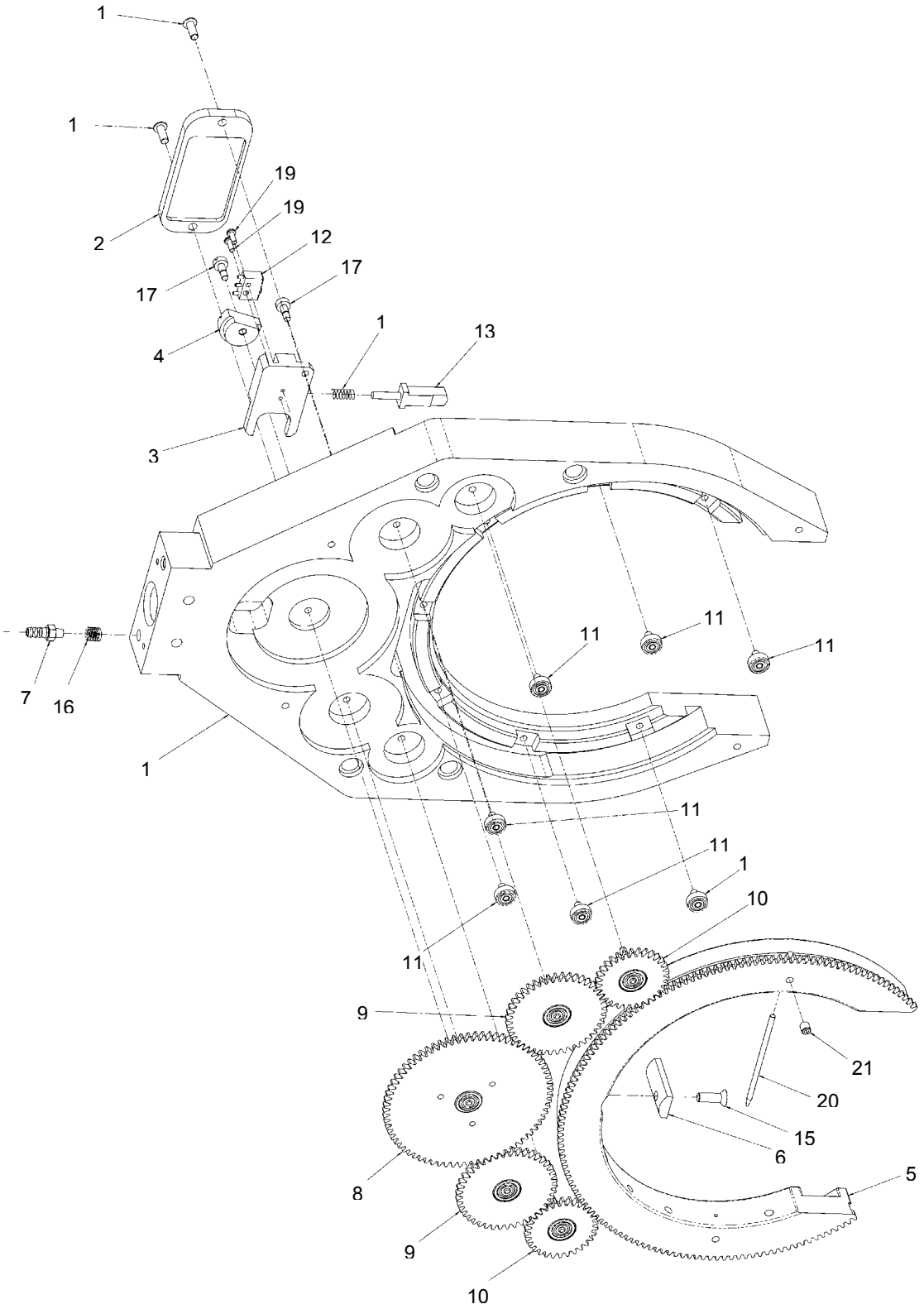


*Figure 24 SWS-40H Gear Side Assembly*

*Table 5 SWS-40H Gear Side Assembly Parts List*

| Reference No. | Description | Available in Kit No. |
|---|---|---|
| 1 | Housing (Gear Side) | SWS-40HP-GEARHOUSE |
| 2 | Actuator Cover | * |
| 3 | Actuator Mounting Plate | * |
| 4 | Actuator Switch Adjustment Cam | * |
| 5 | Rotor | SWS-40HP-ROTOR |
| 6 | Actuator Tab | SWS-40HP-ACTUATOR |
| 7 | Gas Bayonet | SWS-40HP-GEARHOUSE |
| 8 | Drive Gear Assembly | SWS-40HP-DRGEAR |
| 9 | Primary Gear Assembly | SWS-40HP-PRGEAR |
| 10 | Secondary Gear Assembly | SWS-40HP-SEGEAR |
| 11 | Rotor Bearing Assembly | SWS-40HP-GEARHOUSE |
| 12 | Home Sensor Assembly | * |
| 13 | Home Sensor Actuator | SWS-40HP-ACTUATOR |
| 14 | Actuator Spring | SWS-40HP-ACTUATOR |
| 15 | Actuator Tab Screw | SWS-40HP-ACTUATOR, SWS-40HP-GEARSCREWS |
| 16 | Thread Insert | * |
| 17 | Actuator Plate Screws | SWS-40HP-GEARSCREWS |
| 18 | Actuator Cover Screws | SWS-40HP-GEARSCREWS |
| 19 | Home Sensor Screws | SWS-40HP-GEARSCREWS |
| 20 | 2% Ceriated Electrode | SWS-C.094-2.615-P, SWS-C.094-2.365-P, SWS-C.094-2.115-P, SWS-C.094-1.865-P, SWS-C.094-1.615-P, SWS-C.094-1.365-P |
| 21 | Electrode Set Screw | SWS-40HP-ESS, SWS-40HP-ROTOR |

* Not available as a field replaceable spare part.

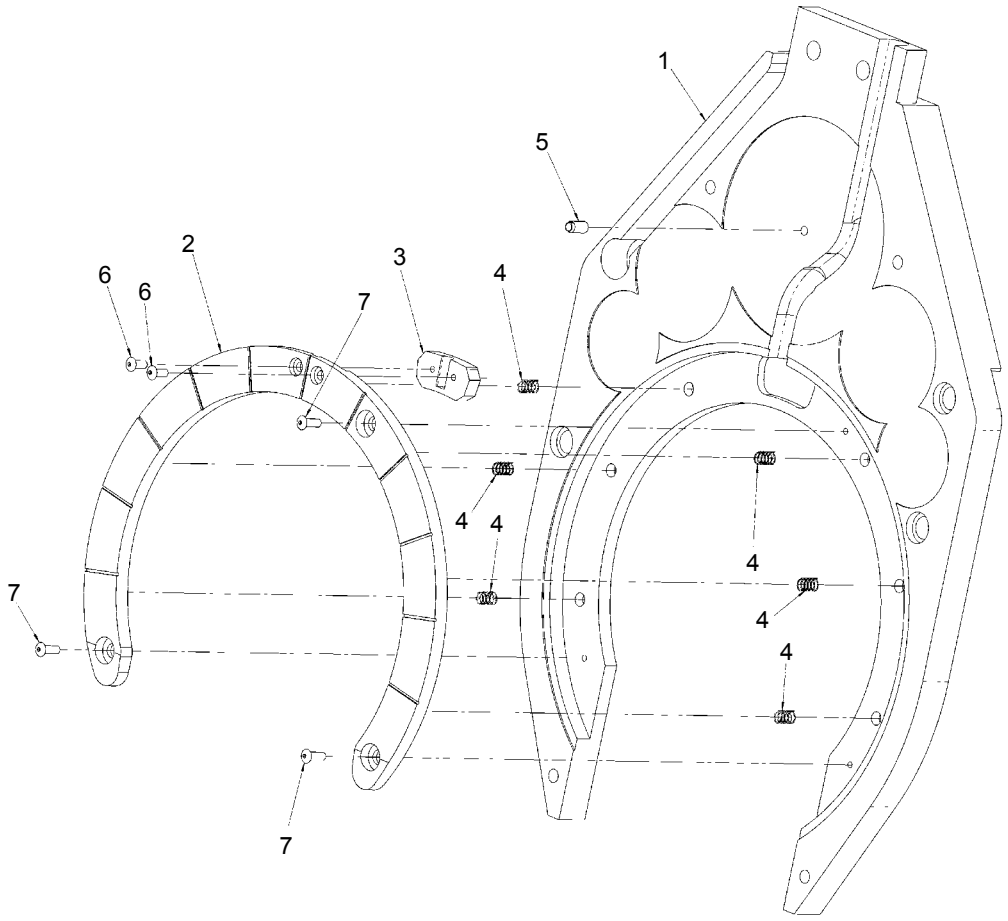


*Figure 25 SWS-40H Housing – Brush Side Assembly*

*Table 6 SWS-40H Housing – Brush Side Assembly Parts List*

| Reference No. | Description | Available in Kit No. |
|---|---|---|
| 1 | Housing (Brush Side) | SWS-40HP-BRSHHOUSE |
| 2 | Brush | SWS-40HP-BRUSH |
| 3 | Brush Clamp Plate | SWS-40HP-BRUSH |
| 4 | Brush Springs | SWS-40HP-BRUSH |
| 5 | Drive Gear Plunger | SWS-40HP-BRSHHOUSE |
| 6 | Brush Clamp Plate Screws | SWS-40HP-BRUSH, SWS-40HP-BRSHSCREWS |
| 7 | Brush Screws | SWS-40HP-BRUSH, SWS-40HP-BRSHSCREWS |

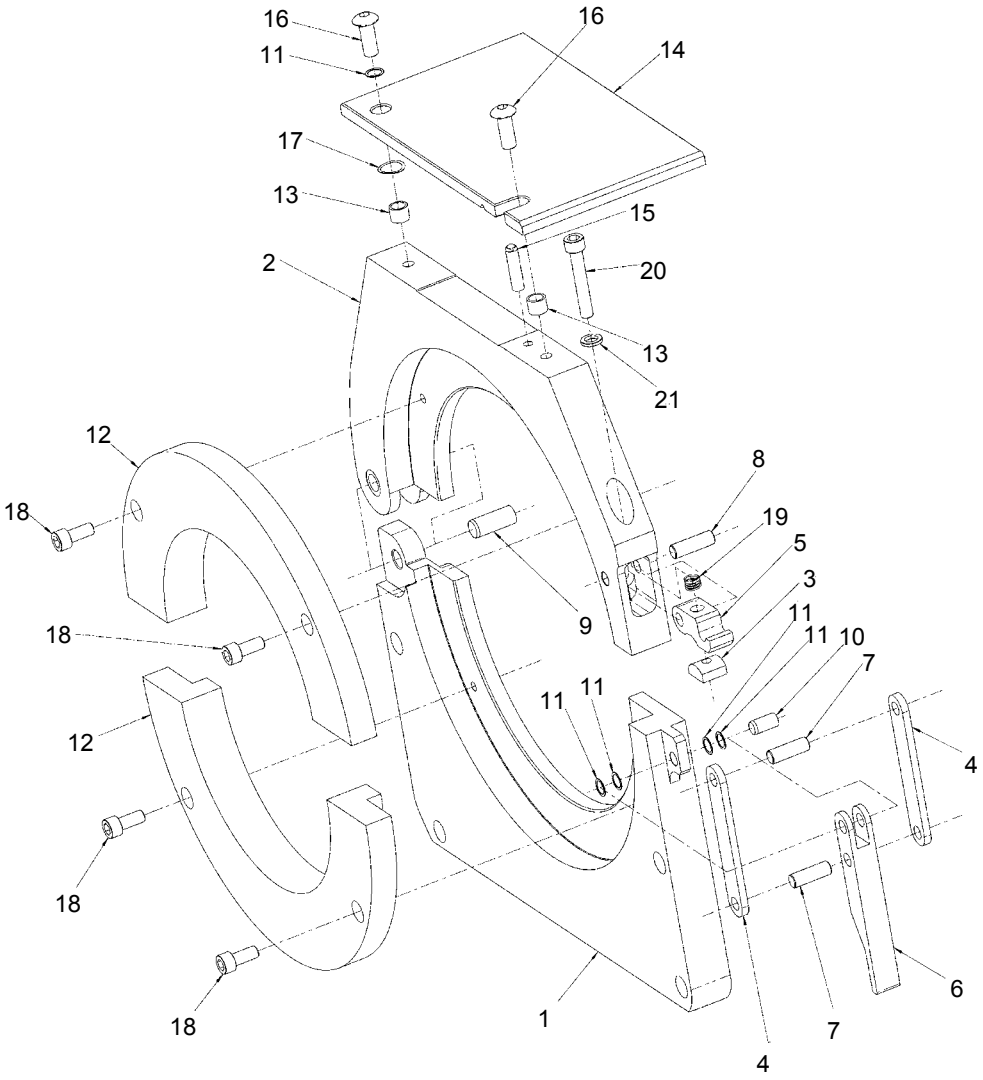


*Figure 26 SWS-40H Fixture Side Plate Assembly – Left*

*Table 7 SWS-40H Fixture Side Plate Assembly – Left Parts List*

| Reference No. | Description | Available in Kit No. |
|---|---|---|
| 1 | Bottom Fixture Plate | SWS-40FSP1L |
| 2 | Top Fixture Plate | SWS-40FSP1L |
| 3 | Latch Hook Cam | SWS-40FSP1L, SWS-40HP-LASCREWS |
| 4 | Latch Arms | SWS-40FSP1L |
| 5 | Latch Hook | SWS-40FSP1L |
| 6 | Latch Lever | SWS-40FSP1L |
| 7 | Latch Arm Pins | SWS-40FSP1L |
| 8 | Latch Hook Pin | SWS-40FSP1L |
| 9 | Hinge Pin | SWS-40FSP1L |
| 10 | Latch Lever Pin | SWS-40FSP1L |
| 11 | Latch Lever Shims | SWS-40FSP1L |
| 12 | SWS-40CI-XX Collets | See Collet Ordering Information |
| 13 | Cover Sleeves | SWS-40FSP1L-CVR, SWS-40HP-CVRSCREWS |
| 14 | Cover | SWS-40FSP1L-CVR |
| 15 | Cover Spring Plunger | SWS-40FSP1L |
| 16 | Cover Screws | SWS-40FSP1L-CVR, SWS-40HP-CVRSCREWS |
| 17 | Wave Washer | SWS-40FSP1L-CVR, SWS-40HP-CVRSCREWS |
| 18 | Collet Screws | SWS-40FSP1L, SWS-40HP-CISCREWS |
| 19 | Latch Hook Spring | SWS-40FSP1L, SWS-40HP-LASCREWS |
| 20 | Latch Adjustment Screw | SWS-40FSP1L, SWS-40HP-LASCREWS |
| 21 | Latch Adjustment Screw Washer | SWS-40FSP1L, SWS-40HP-LASCREWS |

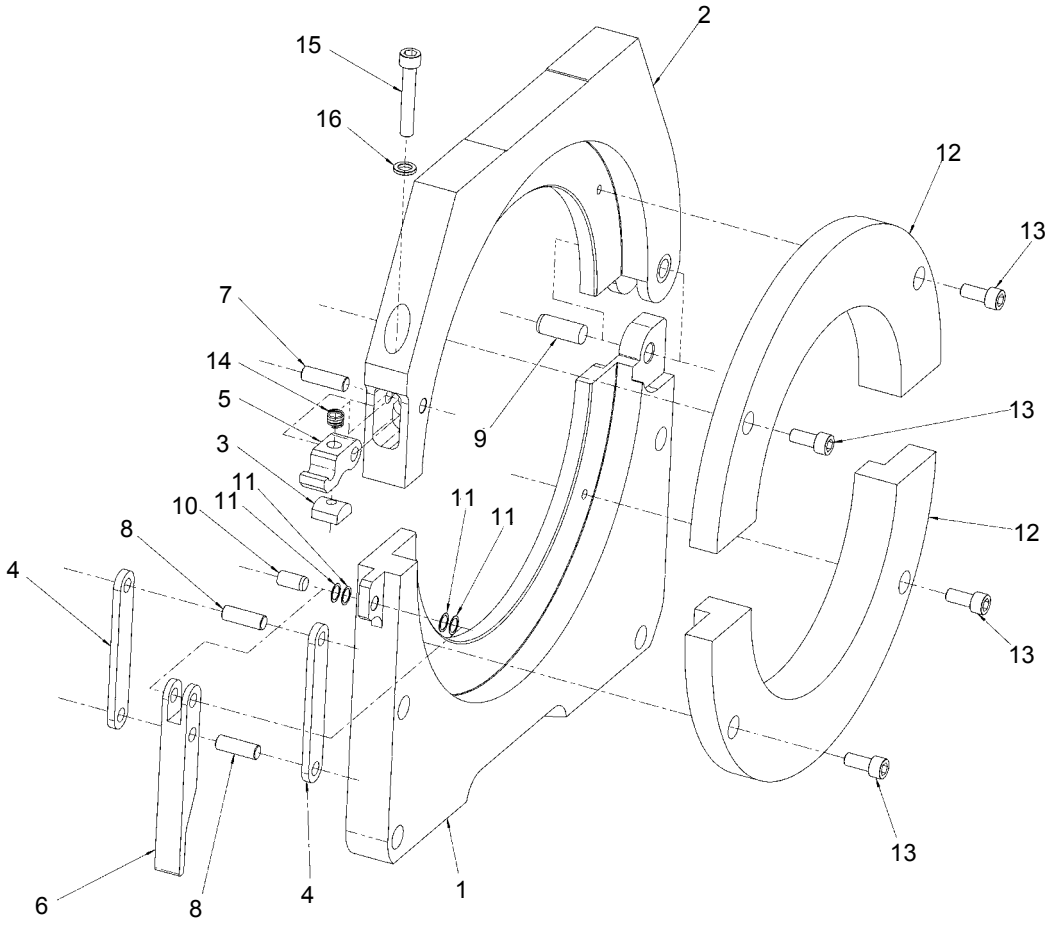


*Figure 27 SWS-40H Fixture Side Plate Assembly – Right*

*Table 8 SWS-40H Fixture Side Plate Assembly – Right Parts List*

| Reference No. | Description | Available in Kit No. |
|---|---|---|
| 1 | Bottom Fixture Plate | SWS-40FSP1R |
| 2 | Top Fixture Plate | SWS-40FSP1R |
| 3 | Latch Hook Cam | SWS-40FSP1R, SWS-40HP-LASCREWS |
| 4 | Latch Arms | SWS-40FSP1R |
| 5 | Latch Hook | SWS-40FSP1R |
| 6 | Latch Lever | SWS-40FSP1R |
| 7 | Latch Hook Pin | SWS-40FSP1R |
| 8 | Latch Arm Pins | SWS-40FSP1R |
| 9 | Hinge Pin | SWS-40FSP1R |
| 10 | Latch Lever Pin | SWS-40FSP1R |
| 11 | Latch Lever Shims | SWS-40FSP1R |
| 12 | SWS-40CI-XX Collets | See Collet Ordering Information |
| 13 | Collet Screws | SWS-40FSP1R, SWS-40HP-CISCREWS |
| 14 | Latch Hook Spring | SWS-40FSP1R, SWS-40HP-LASCREWS |
| 15 | Latch Adjustment Screw | SWS-40FSP1R, SWS-40HP-LASCREWS |
| 16 | Latch Adjustment Screw Washer | SWS-40FSP1R, SWS-40HP-LASCREWS |

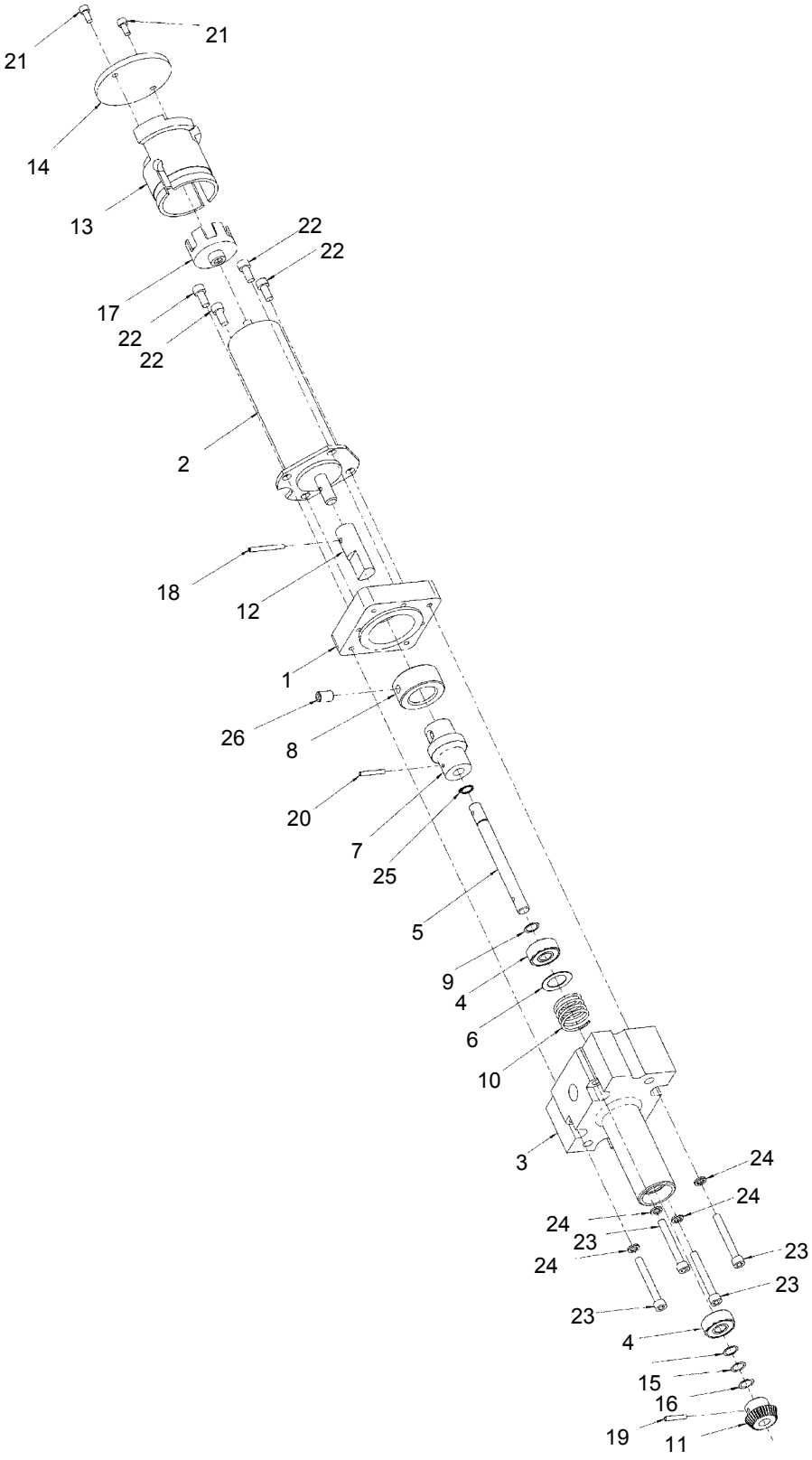


*Figure 28 SWS-40H Motor Drive Assembly*

*Table 9 SWS-40H Motor Drive Assembly Parts List*

| Reference No. | Description | Available in Kit No. † |
|---|---|---|
| 1 | Motor Interface Mount | * |
| 2 | Motor | * |
| 3 | Drive Assembly Housing | * |
| 4 | Drive Assembly Bearings | * |
| 5 | Drive Shaft | * |
| 6 | Pressure Spring Washer | * |
| 7 | Drive Shaft Insulator Coupling | * |
| 8 | Coupling Locking Sleeve | * |
| 9 | Bearing Washer | * |
| 10 | Pressure Spring | * |
| 11 | Drive Pinion Gear | * |
| 12 | Motor Shaft Adapter | * |
| 13 | Encoder Sleeve | * |
| 14 | Encoder Board Assembly | * |
| 15 | Shim | * |
| 16 | Shim | * |
| 17 | Encoder Wheel | * |
| 18 | Motor Drive Coupler Pin | * |
| 19 | Pinion Coupler Pin | * |
| 20 | Drive Shaft Coupler Pin | * |
| 21 | Encoder Board Screws | * |
| 22 | Motor Screws | * |
| 23 | Motor Interface Screws | * |
| 24 | Motor Interface Washers | * |
| 25 | Drive Shaft Clip | * |
| 26 | Coupling Sleeve Set Screw | * |

† For part ordering information, contact your Swagelok representative.
* Not available as a field replaceable spare part.