# Multihead Hydraulic Swaging Unit (MHSU)—16FK

## Operating Instructions

1 in. medium-pressure 16FK MHSU with base
for use with 1 in. medium-pressure tube fittings

**READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE USING THE MHSU.**

### Definitions

Statements and symbols are used in this document to identify safety concerns. Read the definitions below before setting up and operating the MHSU.

**WARNING**
**Statements that identify conditions or practices that could result in personal injury or loss of life.**

**CAUTION**
**Statements that identify conditions or practices that could result in damage to the equipment or other property.**

### Safety Precautions

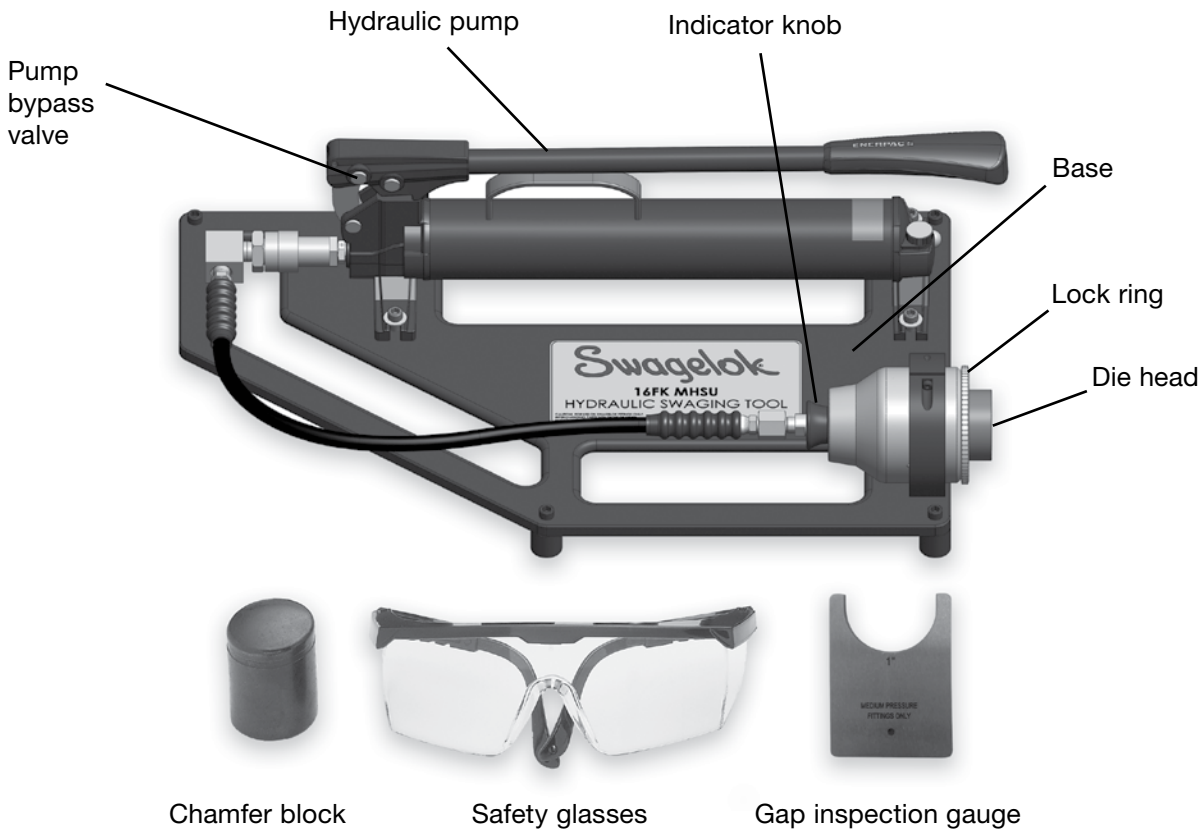
**WARNING, EYE PROTECTION**
**Safety glasses must be worn when setting up and operating the MHSU. Failure to wear safety glasses may result in serious personal injury.**

**CAUTION**
**Do not tamper with or alter any components of the MHSU. Tampering with or altering components of the MHSU may cause equipment failure and/or affect fitting performance.**

**WARNING**
**If a malfunction or any sign of excess leakage occurs, do not use the MHSU. Return it to your authorized Swagelok representative for assistance. Continued use may result in serious personal injury, cause equipment failure, and/or affect fitting performance.**

**CAUTION**
**Do not use the hand pump after the indicator knob releases. Failure to stop pumping after the indicator knob releases may affect fitting performance.**

## 16FK MHSU with Baseplate




## Shipping Case Contents

The following items ship with each case:

- 16FK MHSU Hydraulic Swaging Unit
- 1 in. Chamfer Block
- 16FK Gap Gage
- Safety Glasses
- 16FK MHSU Operating Instructions

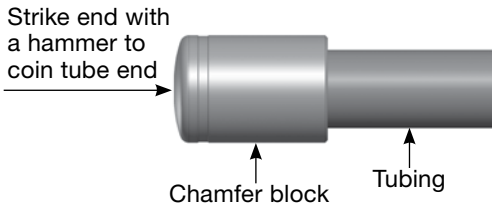
## Operation

1. Open the **pump bypass valve** by turning the handle counterclockwise at least one-half to one turn. It may be necessary to first close the valve completely by turning the handle clockwise until it stops. (If the bypass valve is in the full open position upon receipt of the MHSU unit, it will not be possible to open it an additional one-half to one turn.)
2. Prepare tube ends by deburring or using the Swagelok chamfer block as follows.
   Note: Use the chamfer block when preparing up to and including 1-inch tubing.
   A. Cut tubing squarely. Use of a Swagelok tube saw guide is recommended.
   B. Remove any burrs. Use of a Swagelok tube deburring tool is recommended.

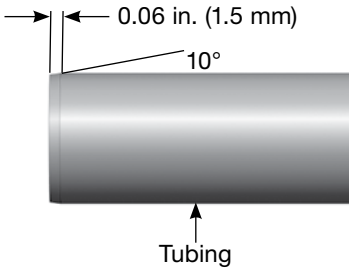
   **⚠ WARNING**

   **Deburr the OD of the tube to ensure that it properly rests against the piston shoulder. If the tube is not resting against the piston shoulder, it could result in inadequate preswaging, which, in turn, could lead to premature tube failure and result in loss of life, injury, or property damage. One of the causes of the tube not seating properly could be because it hasn't been properly deburred.**

   C. For the 16FK MHSU, use the chamfer block provided. Insert the cut end of the tubing into the chamfer block, and while firmly holding the tubing, strike the chamfer block with a hammer to coin the end (as shown below).




   D. If a file is used on the OD, make a 10° x 0.06 in. (1.5 mm) chamfer (as shown below).




3. Insert the arbored nut and ferrule set into the Swagelok medium-pressure die. Thread the nut into the die head to finger-tight. Remove the arbor, leaving the nut and ferrules in the die head. The orientation of the **nut**, **rear ferrule**, and **front ferrule** should be as shown in Fig. 1.

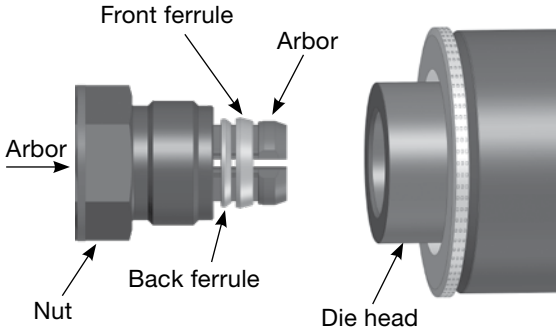



Fig. 1 Nut and Ferrule Orientation

4. Insert the tubing into the die head until it rests firmly against the piston shoulder. Tighten the nut until finger-tight.
5. Push the **indicator knob** forward until it snaps into place. The **knob shoulder** should be flush with the hydraulic housing. See Fig. 2.

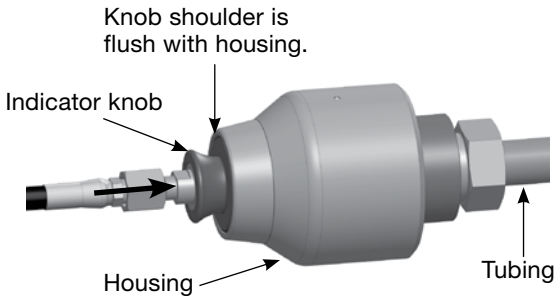



Fig. 2 Indicator Knob in Swaging Position

**CAUTION**

**⚠ If the indicator knob does not snap into place or is not flush with the housing, the piston may not be fully retracted. This problem may be caused by the bypass valve being closed or by the piston binding. Do not proceed until the unit is functioning properly. Contact your authorized Swagelok sales and service representative for further assistance.**

6. Close the pump bypass valve to the finger-tight position by rotating the valve handle clockwise until it stops.

7. While holding the tubing against the piston shoulder, increase the hydraulic pressure by using the hand pump until the indicator knob is released.

**NOTICE**
**Do not continue pumping the hand pump after the indicator knob releases. Failure to stop pumping after the indicator knob releases may affect fitting performance.**

8. Open the pump bypass valve by turning the handle one-half to one turn counterclockwise.
9. Unthread the Swagelok medium-pressure nut and remove the preswaged assembly from the housing.
10. Inspect the tube end for **bottoming marks**. These radial indentations indicate the tubing was properly bottomed in the MHSU. If there are **not four** visible indentations, the preswaged assembly should not be used. See Fig. 3.

    Note: Depending upon the tube end squareness, the marks may be intermittent.

    Note: The MHSU should be used **one time only** to preswage a set of ferrules. If the ferrules were insufficiently preswaged, they should be discarded and the process started again with a new set of ferrules.

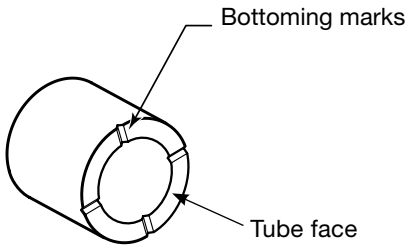



Fig. 3 Tube Bottoming Mark

11. Install the preswaged assembly into the fitting body. Turn the nut onto the fitting body until it is finger-tight. See Fig. 4.

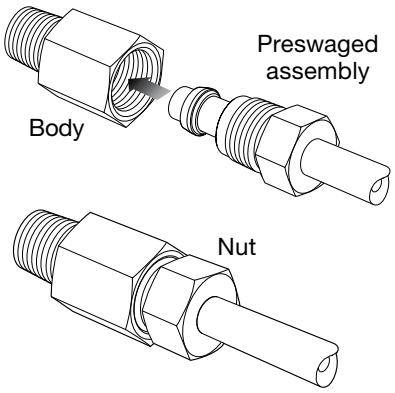



Fig. 4 Installing Preswaged Assembly into Fitting Body

12. Place a mark on the fitting body, inline with one of the hex points of the nut. Hold the fitting body steady and tighten the nut one-third turn or two hex points from the scribed mark. See Fig. 5.

    *Alternatively, hold the fitting body steady and tighten the nut to the specified torque.*

| Tube OD | Required Torque | |
|---|---|---|
| | ft·lb | N·m |
| 1 in. | 350 | 475 |

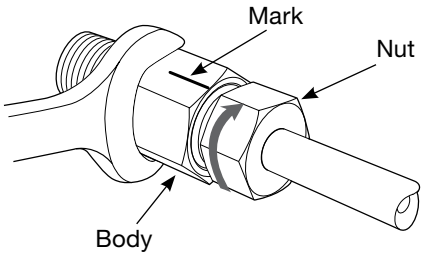



Fig. 5 Tighten Nut with Wrench

**CAUTION**
**Use the Swagelok 16FK gap inspection gauge to ensure the fitting has been sufficiently tightened or system leakage could result.**

## Gauging Instructions

Position the Swagelok 16FK gap inspection gauge adjacent to the gap between the nut and body hex. See Fig. 6.

- If the gauge **will not** enter the gap, **the fitting is sufficiently tightened.**
- If the gauge **will** enter the gap, **additional tightening is required.**

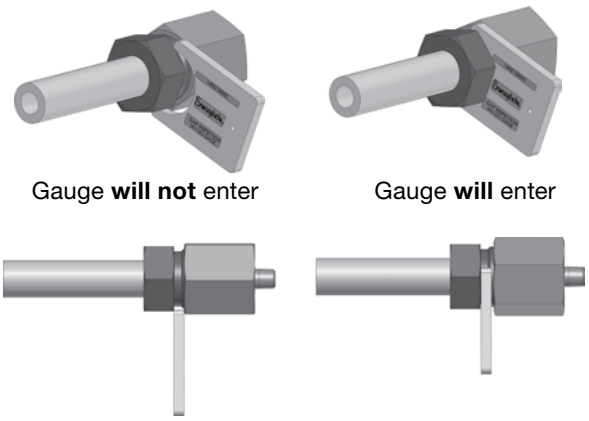



Fig. 6 Using the MHSU Gap Inspection Gauge

## Die Head Replacement

1. Unthread and remove the threaded **lock ring** from the **hydraulic housing**.
2. Remove the previously installed **die head** from the **hydraulic housing**. See Fig. 7.

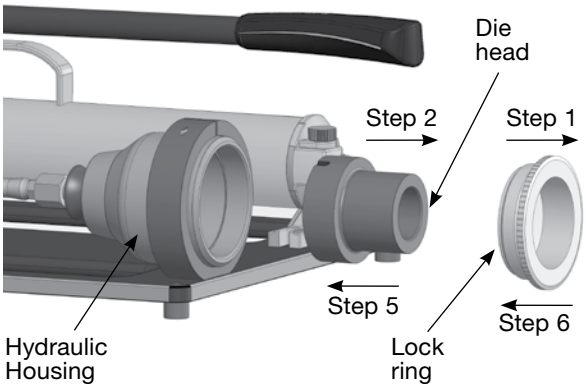



Fig. 7 Body Die Removal / Installation

3. Select the replacement **die head** suitable for the 16FK MHSU.
4. Check the **die head** piston for movement by depressing the piston before inserting the die head into the **hydraulic housing**.
5. Install the selected **die head** into the **hydraulic housing,** and align the two notches on the die head with the two **locating pins** on the hydraulic housing. See Fig. 8.

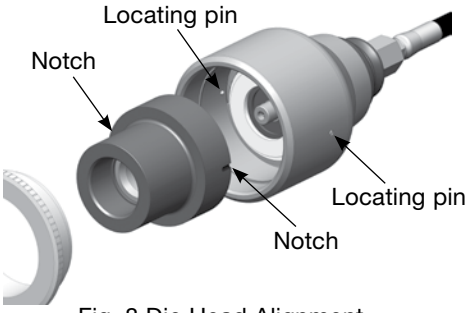



Fig. 8 Die Head Alignment

6. Reinstall the threaded **lock ring** into the **hydraulic housing**.
   Note: Visually verify that the threaded lock ring is threaded until it is bottomed out against the face of the hydraulic housing. See Fig. 9.

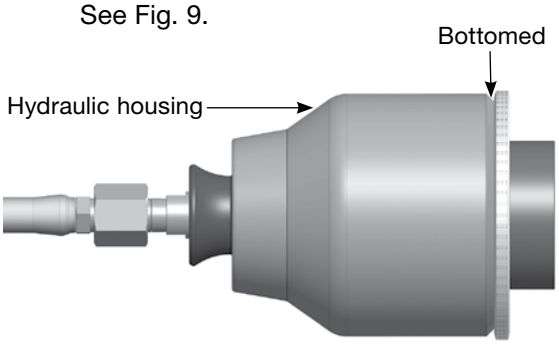



Fig. 9

## Troubleshooting

| Symptom | Cause | Remedy |
|---|---|---|
| Tubing is difficult to remove from the MHSU. | There has been normal tube expansion. | Rock the tubing gently back and forth.<br>**CAUTION**<br>Do not rotate the tubing, or system leakage may result. |
| | Tube wall thickness may be below the recommended level. | Refer to the tubing listed in the **Medium- and High-Pressure Fittings, Tubing, Valves, and Accessories** catalog, MS-02-472, for FK fittings. |
| The indicator knob fails to release. | Oil may need to be added. | Place the unit on a horizontal surface. Check the oil level, and fill to the lowest thread if necessary. Use 10W, AW-46 grade hydraulic oil or equivalent with an antifoaming additive.<br>If the oil reservoir is full and symptom persists, return the unit to your authorized Swagelok representative.<br>Oil level up to lowest thread<br>  <br>Proper Oil Level |
| The die head piston does not return fully after swaging. | The die head piston may be damaged. | Return the unit to your authorized Swagelok representative. |
| The pump is failing to build pressure. | The oil level is incorrect.<br>Too much or too little oil prevents the pump from working properly. | Add or remove oil as necessary with the unit on a horizontal surface. Use 10W, AW-46 grade hydraulic oil or equivalent with an antifoaming additive. |
| There is oil around the pump. | There has been normal wear to the pump components. | A small amount of leakage is acceptable. If oil is continuously dripping or there is a puddle, return the unit to your authorized Swagelok representative. |

### Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.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