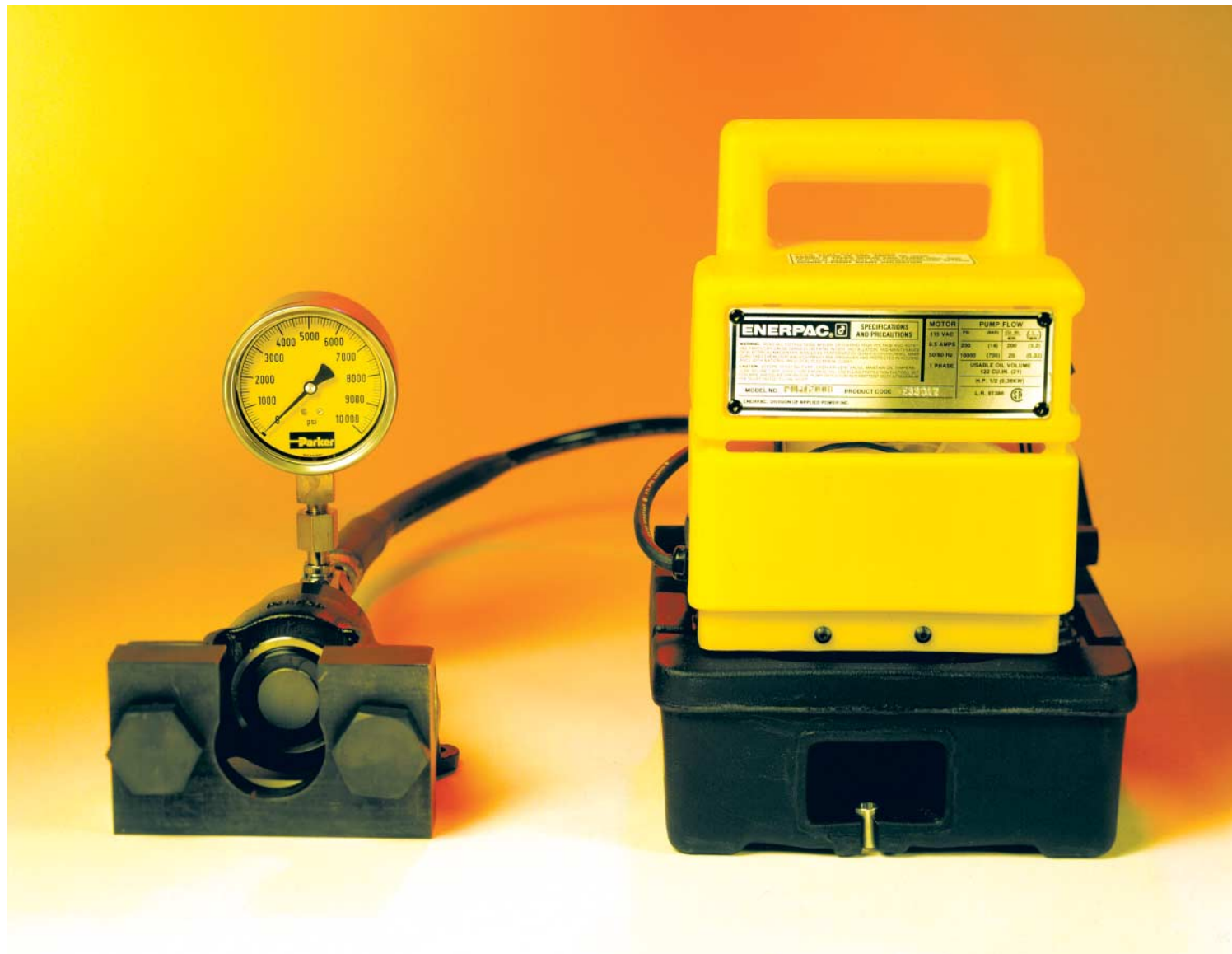




Bulletin 4393-B1  
June 2003

## Parker Hyferset Hydraulic Presetting Tool



***The Fitting Authority***



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**Parker Hannifin Corporation**  
Tube Fittings Division  
Columbus, OH

# Hyferset Portable Presetting Tool



## Easy to Operate

The Hyferset is an efficient, dependable device for presetting Ferulok and EO/EO-2 fittings. The tool is capable of presetting on tubing of steel, stainless steel and Monel material. Complete the task with ease by selecting the correct components and using a hydraulic hand or electric pump.



## Portable

The lightweight Hyferset (35 lb. base unit) can be easily moved around the workplace. A wooden carrying case is available to aid portability.



## Presetting

The Hyferset is capable of presetting Ferulok ferrules for tube sizes 1/4" through 2" and EO/EO-2 cutting rings and functional nuts for tube sizes 6mm through 28mm.



## Hydraulic Pump

The Hyferset can be used with an electric-hydraulic or hand-hydraulic pump to give the user choices of power.

## Set-Up Instructions

### Step 1 Hyferset Adapter

Install the straight adapter (part number 6 FLO-S) into the NPTF pipe thread port in the rear of the Hyferset with a pipe sealant. **Note:** If you are **NOT** installing the pressure gauge, proceed to Step 4.

### Step 2 Swivel Tee

Install the swivel end of the “T” fitting (part number 6 R6LO-S) on the Hyferset adapter. Make sure the branch end of the “T” is oriented in the upward direction.

### Step 3 Pressure Gauge

Install the conversion adapter (part number 6 G6L-S) to the pressure gauge (part number 900044). Install the adapter/gauge assembly to branch end of the “T” fitting.

### Step 4 Hose / Pump Assembly

Install the male pipe thread end of the hose assembly (part number 900004) to the female pipe thread port of either the electric-hydraulic or hand-hydraulic pump.

### Step 5 Hose / Hyferset Assembly

If you are using a pressure gauge, install the swivel end of the hose to the remaining end of the “T” fitting. If you are **NOT** using a pressure gauge, install the hose end to the male end of 6 FLO-S.

### Step 6 Check for Leaks

Operate the hydraulic pump and check for leaks at the connections.

**Note:** If you order the Hyferset Kit, please note the pressure gauge is not included.

**Caution:** A pressure gauge is required with metric presets (EO/EO-2) and is optional on inch presets with positive stop dies.

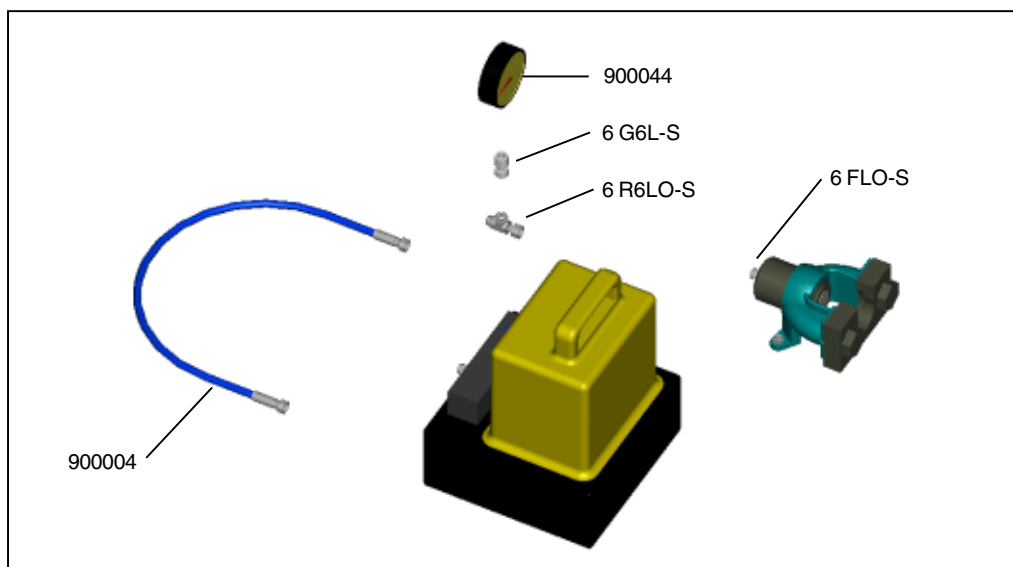


Fig. 1 — Set-up

## For Your Safety

When using this machine on a bench, be sure that the hose assembly does not extend over the edge of the bench where it can be struck by plant equipment.

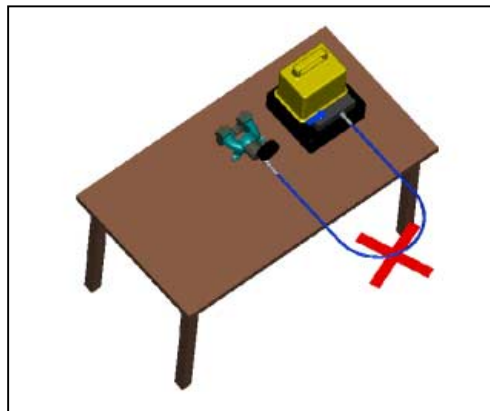


Fig. 2 — Incorrect Method

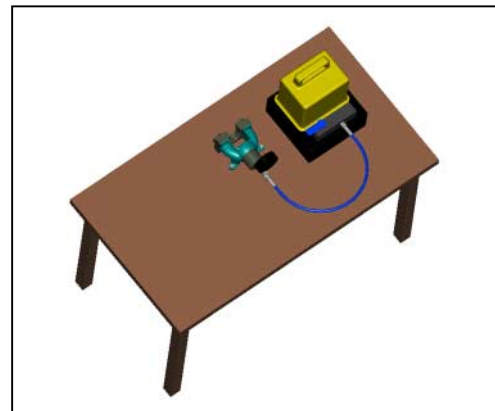


Fig. 3 — Correct Method

## Tube-End Preparation

### Tube-End Preparation

Tube-end preparation is one of the most critical processes in obtaining an optimum seal of a preset tube end connection. Regardless of the tube material, similar guidelines for tube cut-off, deburring and cleanliness can help assure the tube-to-fitting connection remains leak free.

#### Tube Cutting

- It is critical that the tube be cut squarely within  $\pm 1^\circ$  in order to assure the proper tube-to-fitting connection. If the tube is not cut squarely, it will result in the tube not resting properly in fitting body during presetting.
- When cutting tube in preparation for presetting, a saw which uses a toothed blade is recommended. This type of tool will assure that the tube end is not hardened from excessive heat or working of material.

##### Recommended:

Hacksaw, Low-Speed Circular Saw

##### Not Recommended:

Tube Cutter, Abrasive Saw

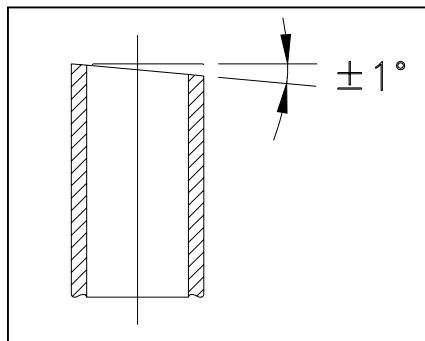


Fig. 4 — Tube Cut Angle

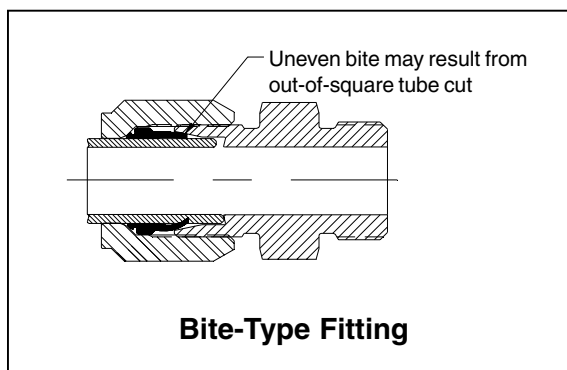


Fig. 5 — Cutaway Bite-Type Fitting

#### Tube Deburring

- Deburring the inside and outside diameter of the tube end is necessary to assure the tube fits properly inside the ferrule and fitting body. Proper deburring of the tube end is also necessary to help the tubing fit properly in the body die.

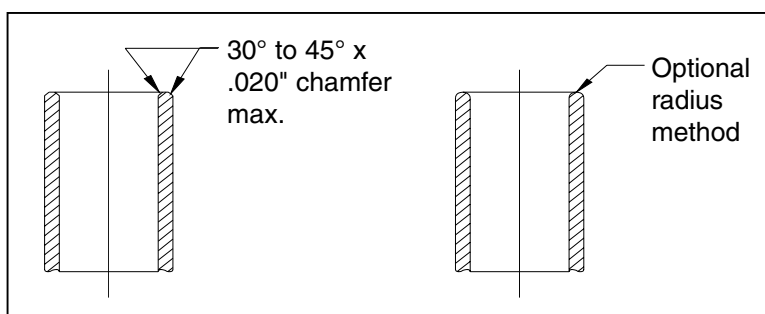


Fig. 6 — Tube Deburring

**Presetting Metric Fittings (EO/EO-2)****Operating Information for Presetting Metric Fittings (EO/EO-2)****Components Required****Sizes 6mm through 28mm**Description

Nut Die

Body Die

Part Number

See Table 1

See Table 1



Fig. 7 — Nut Die



Fig. 8 — Body Die

**Step 1 Select Tooling**

Select the necessary tooling from Table 1 based on the size of the tube/fitting to be preset.

Tube O.D. Size (mm)	Part No.		
	Nut Die	Body Die L-Series	Body Die S-Series
6	910291-6 mm	910290-6L	910289-6S
8	910291-8 mm	910290-8L	910289-8S
10	910291-10 mm	910290-10L	910289-10S
12	910291-12 mm	910290-12L	910289-12S
14	910291-14 mm		910289-14S
15	910291-15 mm	910290-15L	
16	910291-16 mm		910289-16S
18	910291-18 mm	910290-18L	
20	910291-20 mm		910289-20S
22	910291-22 mm	910290-22L	
25	910291-25 mm		910289-25S
28	910291-28 mm	910290-28L	

Table 1 — Body Dies and Nut Dies for EO and EO-2 Fittings

**Hyferset Presetting Pressures for Metric Fittings (EO/EO-2)**

Pre-Setting Pressures (psi) for Steel EO Fittings <sup>1), 2)</sup>					
Tube Size (mm)	Wall Thickness (mm)				
	1.0	1.5	2.0	2.5	3.0
6-L	650	650			
6-S	650	650			
8-L	900	900			
8-S	900	900			
10-L	1,350	1,350	1,550		
10-S	1,350	1,350	1,550		
12-L	1,750	1,750	1,750	1,750	
12-S	1,750	1,750	1,750	1,750	
14-S		2,000	2,000	2,200	2,200
15-L	1,800	1,800			
16-S		2,200	1,450	1,450	
18-L	2,000	2,000	2,000		
20-S			3,300	3,500	
22-L		3,100	3,100		
25-S				4,000	4,000
28-L		3,500	3,500		

Table 2 — Presetting Pressures for Steel EO Fittings<sup>1,2</sup>

Pre-Setting Pressures (psi) for Stainless Steel EO Fittings <sup>1), 2)</sup>					
Tube Size (mm)	Wall Thickness (mm)				
	1.0	1.5	2.0	2.5	3.0
6-L					
6-S					
8-L					
8-S					
10-L					
10-S					
12-L		1,900			
12-S		1,900			
14-S					
15-L		2,200			
16-S			2,600		
18-L		2,500			
20-S			4,000		
22-L					
25-S			4,300	4,500	4,500
28-L			4,300		

Table 3 — Presetting Pressures for Stainless Steel EO Fittings<sup>1,2</sup>

Hyferset Pre-Setting Pressures (psi) for EO-2 Fittings <sup>1), 2)</sup>		
Size	Series	Any wall
6	L	1,150
6	S	1,150
8	L	1,450
8	S	1,450
10	L	2,450
10	S	2,450
12	L	2,800
12	S	2,800
14	S	3,500
15	L	2,800
16	S	3,900
18	L	3,200
20	S	5,600
22	L	4,950
25	S	6,400
28	L	5,600

Table 4 — Presetting Pressures for Steel and Stainless Steel EO-2 Fittings<sup>1,2</sup>

- CAUTION:** EO and EO-2 presetting dies are not positive stop style. Presetting must be done using pressures given in Tables 2 through 4.
- The values provided in Table 2 through 4 are provided as a guide only and normally will produce a satisfactory bite when using the Parker Hyferset.



**Presetting Metric Fittings (EO/EO-2)****Step 2 Install the Nut Die**

Insert the nut die in the back-up plate opening from the inside so that the nut support shoulder seats squarely in the counterbore of the back-up plate. The spring loaded ball plunger will secure the nut support in the proper position.

**Step 3 Install the Nut and Progressive Ring onto the Tube**

Slide the nut and progressive ring onto the tube. For EO, the straight pilot section (bite edge) points toward the end of the tube on which it is to be preset, and the raised portion of the progressive ring points toward the nut. For EO-2, slide the functional nut assembly onto the tube with the threaded end of the nut facing the end of the tube to be preset.

**Step 4 Lubricate the Progressive Ring (EO Only)**

Lubricate the leading outer (bite) edge of the ferrule with lubricant, comparable to the viscosity of STP®. This reduces wear on the die and lowers friction, ensuring that all the force is available to preset the progressive ring.

**Step 5 Install the Body Die**

Lubricate the inside of the body die with lubricant (EO only), comparable to the viscosity of STP®. Install the body die over the tube end until the tube bottoms on the die shoulder. Push the nut and progressive ring forward to place the parts in correct position for presetting. The body die will enter the bore of the nut, and the parts will be in the correct position for presetting.

**Presetting Metric Fittings (EO/EO-2)****Step 6 Position the Assembly for Presetting**

Place the tube within the slot in the nut support.

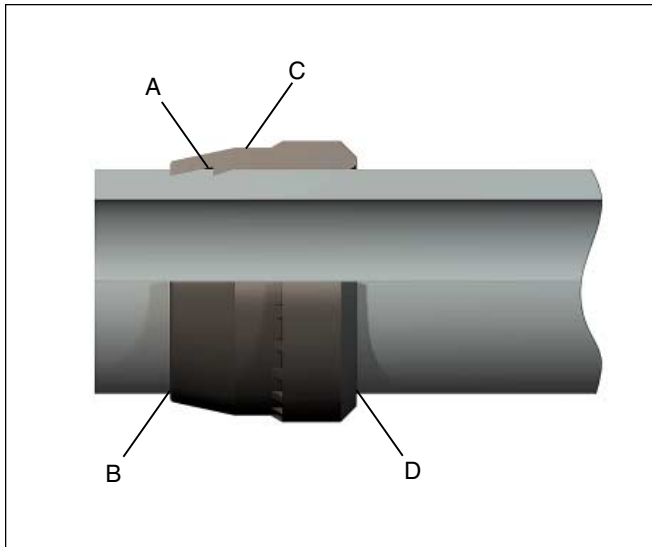
**Step 7 Preset the Ferrule**

Determine the required preset pressure based on the tube size from the table on page 4. Apply hydraulic pressure with a hand or electric pump to advance the piston of the Hyferset. Continue the operation until the predetermined pressure is reached. De-energize the hydraulic power supply or release the valve on the hand pump. The Hyferset piston will retract.

**Step 8 Remove the Tube**

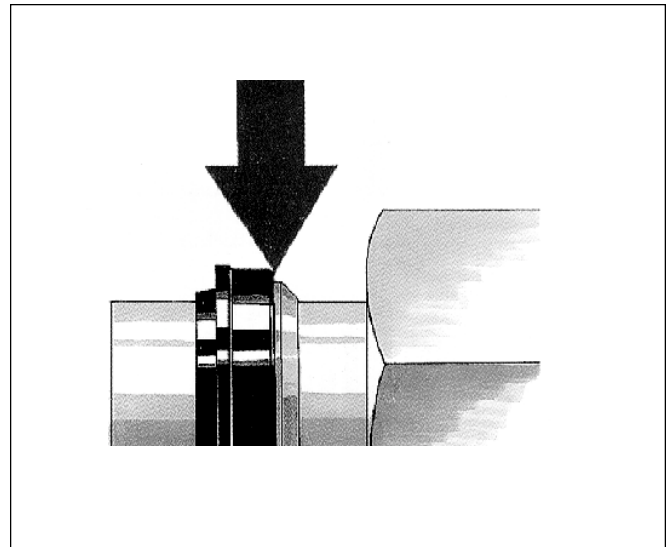
Lift out the tube with preset progressive ring and inspect it according to the procedures shown on the following page.



**Presetting Metric Fittings (EO/EO-2)****Fig. 9 — EO Bite Preset Inspection****EO Bite Preset Inspection**

The following detailed inspection must be followed after the ferrule has been preset to the tube.

1. A ridge of metal (A) should be raised above the tube surface to a height of at least 50% of the thickness of the progressive ring/cutting ring's leading edge, all the way around the tube.
2. The leading edge of the progressive ring/cutting ring should be coined flat (B).
3. There must be a bow in the pilot section of the ferrule (C).
4. The tail or back end of the progressive ring/cutting ring should be snug against the tube (D).

**Fig. 10 — EO-2 Bite Preset Inspection****EO-2 Bite Preset Inspection**

The following inspection must be followed after the ferrule (DOS) has been preset to the tube.

1. Push back the nut past the seal ring (DOZ) and ferrule (DOS). Check that the gap between the seal ring (DOZ) and the ferrule (DOS) is almost closed or fully closed. A slight gap (up to 0.2mm) due to spring back is acceptable. The gap will be uniform around the tube if not preset correctly.

**Presetting Inch Fittings (Ferulok)****Operating Information for Presetting Inch Fittings (Ferulok)****Components Required****Sizes 1/4" through 2"**Description

Nut Die

Body Die

Part Number

See Table 5

See Table 5

**Fig. 11 — Nut Die****Fig. 12 — Body Die****Step 1 Select Tooling**

Select the necessary tooling from Table 5 based on the size of the tube/fitting to be preset.

Size	Tube O.D. (in.)	Nut Die Part No.	Body Die Part No.
4	1/4	680370-4	720105-4
6	3/8	680370-6	720105-6
8	1/2	680370-8	720105-8
10	5/8	680370-10	720105-10
12	3/4	680370-12	720105-12
14	7/8	680370-14	720105-14
16	1	680370-16	720105-16
20	1 1/4	680370-20	720105-20
24	1 1/2	680370-24	720105-24
32	2	680370-32	720105-32

**Table 5 — Body Dies and Nut Dies for Ferulok****Hyferset Presetting Pressures for Inch Fittings (Ferulok)<sup>1), 2), 3)</sup>**

Tube Size	Wall Thickness — Steel							Wall Thickness — Stainless Steel						
	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.035	0.049	0.065	0.083	0.095	0.109	0.120
4	800	900	1,400	1,800	1,800	1,800		900	1,000	1,500	2,000	2,000	2,000	
6	900	1,400	800	2,000	2,000	2,000	2,200	1,000	1,500	2,000	2,000	2,000	2,000	2,500
8		1,600	2,000	2,500	2,700	3,000	3,200		1,800	2,200	3,000	3,000	3,500	3,500
10			2,200	2,700	3,000	3,500	3,500			2,500	3,000	3,500	4,000	4,000
12			2,700	3,000	3,500	3,500	4,000			3,000	3,500	4,000	4,000	4,500
14			3,000	3,500	3,500	4,000	4,500			3,000	4,000	4,000	4,500	5,000
16				3,500	4,000	4,500	5,000				4,500	4,500	5,000	5,000
18				4,000	4,500	4,500	5,000				4,500	5,000	5,000	5,500
20					4,500	5,000	5,500					5,000	6,000	6,000
24					5,500	6,000	7,000					6,500	7,000	7,000
28					7,000	7,500	8,000					7,500	8,000	8,500
32					8,500	9,000	10,000					9,500	10,000	10,000

**Table 6 — Presetting Pressures for Steel and Stainless Steel Ferulok Fittings<sup>1), 2), 3)</sup>**

1. Ferulok presetting dies are positive stop dies. Use of the pressures shown above is optional.
2. The values provided in the table are provided as a guide only and normally will produce a satisfactory bite when using the Parker Hyferset.
3. For wall thicknesses greater than those listed, contact the Tube Fittings Division.

**Presetting Inch Fittings (Ferulok)****Step 2 Install the Nut Die**

Insert the nut die in the back-up plate opening from the inside so that the nut support shoulder seats squarely in the counterbore of the back-up plate. The spring loaded ball plunger will secure the nut support in the proper position.

**Step 3 Presetting Pressure (optional for inch sizes)**

Based on the tube outside diameter and wall thickness, determine the presetting pressure from Table 6 on the previous page.

**Step 4 Assemble the Nut and Ferrule to the Tube**

Slide the nut and ferrule onto the tube. The straight pilot section (bite edge) points toward the end of the tube on which it is to be preset, and the raised portion of the ferrule points toward the nut.

**Step 5 Lubricate the Ferrule**

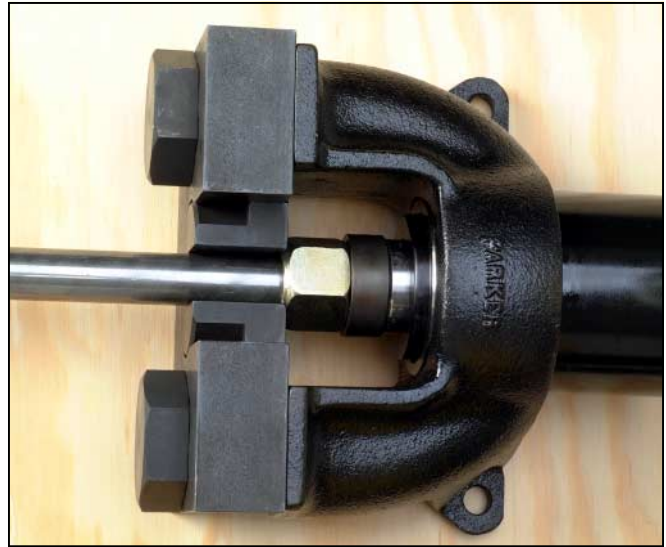
Lubricate the leading outer (bite) edge of the ferrule with lubricant, comparable to the viscosity of STP®. This reduces wear on the die and lowers friction, ensuring that all the force is available to preset the ferrule.

**Step 6 Install the Body Die**

Lubricate the inside of the body die with lubricant, comparable to the viscosity of STP®. Install the body die over the tube end until the tube bottoms on the die shoulder. Push the nut and ferrule forward to place the parts in correct position for presetting. The body die will enter the bore of the nut, and the parts will be in the correct position for presetting.

**Presetting Inch Fittings (Ferulok)**

**Step 7 Position the Assembly for Presetting**  
Place the tube in the slot of the nut support.



**Step 8 Method 1: Using Pressure Gauge**  
Apply hydraulic pressure to advance the piston of the Hyferset. Continue the operation until the predetermined pressure is reached. De-energize the hydraulic power supply. The Hyferset piston will retract.

**Method 2: Using Positive Stop**

Follow steps 1-7, skipping step 3, then watch the nut make positive contact (bottom out) on the shoulder of the body die. After contact is made, de-energize the hydraulic power supply allowing the Hyferset to retract.

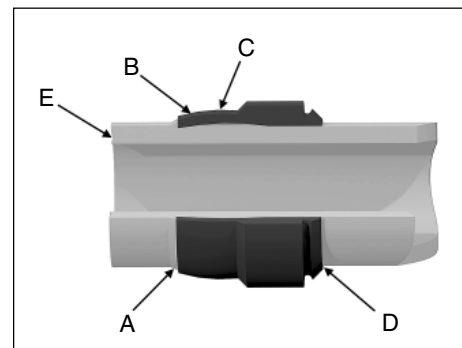


**Step 9 Remove the Tube**  
Lift out the tube with preset ferrule and inspect it according to the procedures shown to the right.

**Ferrule Bite Preset Inspection**

The following detailed inspection must be followed after the ferrule has been preset to the tube.

1. A ridge of metal (A) should be raised above the tube surface to a height of at least 50% of the thickness of the ferrule's leading edge, all the way around the tube.
2. The leading edge of the ferrule should be coined flat (B).
3. There must be a bow in the pilot section of the ferrule (C).
4. The tail or back end of the ferrule should be snug against the tube (D).
5. The end of the tube (E) indicates the tube was bottomed in the tool or fitting during presetting.



**Fig. 13 – Ferrule Bite Preset Inspection**

## Unit Maintenance and Troubleshooting

### Maintenance of Hyferset Unit and Components

- All moving parts should be kept clean.
- All tooling should be handled carefully to avoid damaging smooth surfaces. Presence of nick, burrs, pieces of dirt or chips may mar the surfaces of the tube.
- Lubrication is a necessity when presetting. A lubricant with a similar viscosity to STP® should be used.

### EO Troubleshooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty pre-set/assembly procedure.

Problem / Probable Cause	Remedy
Tube not bottomed	Check for a visible mark on the tube end with EO fitting. (Fig. 14)
Shallow bite	Inspect for turned up ridge of material (collar). A failure to achieve this ridge can be traced either to the nut not being tightened enough or the tube not being bottomed against the stop which allowed the tube to travel forward with the progressive ring. In some instances this assembly may be re-worked. (Fig. 15)
Over-set progressive ring	Too much pressure or more than recommended turns from finger tight were used to pre-set progressive ring, or the nut was severely over-tightened in final assembly. This assembly should be scrapped. (Fig. 16)
Progressive ring cocked on tube	The progressive ring may become cocked on the tube when the tube end is not properly lined up with the body. Generally, this condition is caused by faulty tube bending. All bent tube assemblies should drop into the fitting body prior to make up. This assembly should be scrapped. (Fig. 17)
No bite	If all of the prior checks have been made and the progressive ring still shows no sign of biting the tube, it may be that the tube is too hard. This assembly should be scrapped. (Fig. 18)

Table 7 — EO Fitting Troubleshooting Guide

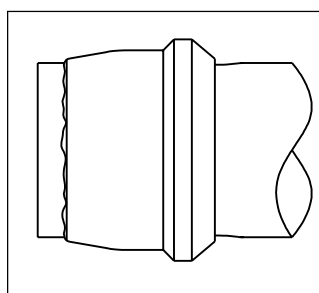


Fig. 14 — Tube not bottomed

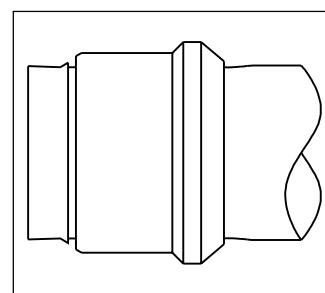


Fig. 15 — Shallow bite

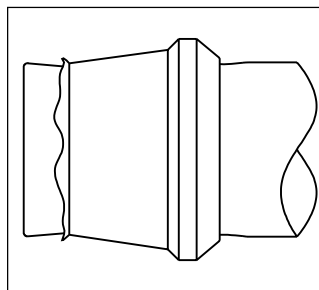


Fig. 16 — Over-set progressive ring cocked on tube

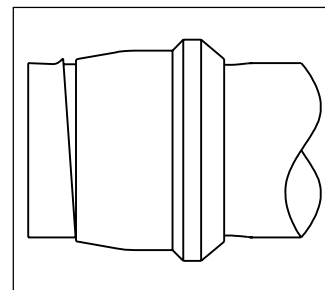


Fig. 17 — Progressive ring ring cocked on tube

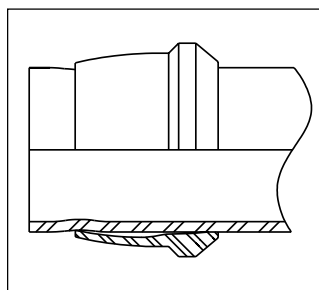


Fig. 18 — No bite



## Unit Maintenance and Troubleshooting

### EO-2 Trouble Shooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty pre-set/assembly procedure.

Problem / Probable Cause	Remedy
Tube not bottomed	The tube end is not in firm contact with the fitting body at assembly. The tubing was not completely inserted into the throat of the fitting body until it bottomed out. Failure to bottom out the tubing against the tube stop of the fitting body during the presetting procedure will allow the tube to travel forward with the functional nut resulting in a shallow bite. This assembly should be scrapped.
Shallow bite	After presetting, inspect to see that the gap between the bite ring and the sealing ring is closed. A failure to achieve a closed gap can be traced to the nut not being tightened enough. This assembly can be reworked by completing the assembly instructions as indicated in the catalog. (Fig. 19)
Damaged seals	Check sealing area for contamination such as chips, zinc particles or other dirt. Also check the inner cone of the fitting body and tubing for damage. Replace DOZ sealing ring if necessary.
Fatigue crack at bite	Ensure proper assembly techniques are utilized. Utilize lubrication and wrench elongation for larger sizes. Check that the gap between the sealing ring and bite ring are closed.
Fatigue crack at rear shoulder of bite ring	Check that the application does not have excessive vibration. Utilize rigid clamping, tension piping or hose assemblies if relative movements are evident.

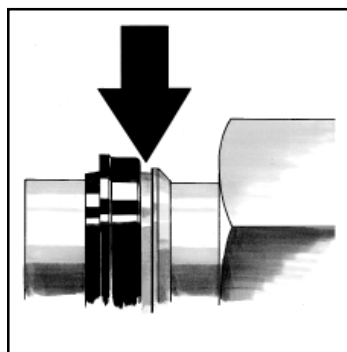


Fig. 19 — Shallow bite

Table 8 — EO-2 Fitting Troubleshooting Guide

## Unit Maintenance and Troubleshooting

### Ferulok Trouble Shooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty Ferulset/assembly procedure.

Problem / Probable Cause	Remedy
Tube not bottomed	Check for the indentation on the tube end or compare the length from the end of the tube to the front end of the ferrule of a known good assembly to that of the assembly in question. This assembly should be scrapped. (Fig. 20)
Shallow bite	Inspect for turned up ridge of material. A failure to achieve this ridge can be traced either to the nut not being tightened enough or the tube not being bottomed against the stop which allowed the tube to travel forward with the ferrule. In some instances this assembly may be re-worked. (Fig. 21)
Over-set ferrule	Too much pressure or more than 1-3/4 turns from finger tight were used to pre-set ferrule, or the nut was severely over-tightened in final assembly. This assembly should be scrapped. (Fig. 22)
Ferrule cocked on tube	The ferrule may become cocked on the tube when the tube end is not properly lined up with the body. Generally, this condition is caused by faulty tube bending. All bent tube assemblies should drop into the fitting body prior to make up. This assembly should be scrapped. (Fig. 23)
No bite	If all of the prior checks have been made and the ferrule still shows no sign of biting the tube, it may be that the tube is too hard. This assembly should be scrapped. (Fig. 24)

Table 9 — Ferulok Fitting Troubleshooting Guide

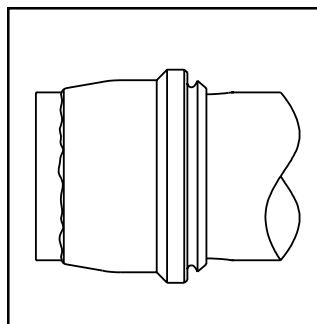


Fig. 20 — Tube not bottomed

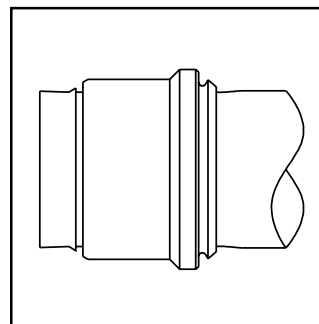


Fig. 21 — Shallow bite

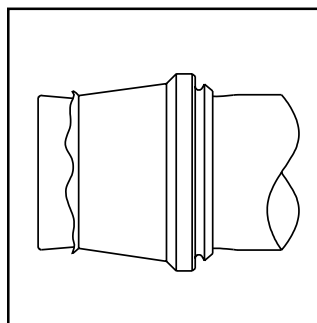


Fig. 22 — Over-set ferrule

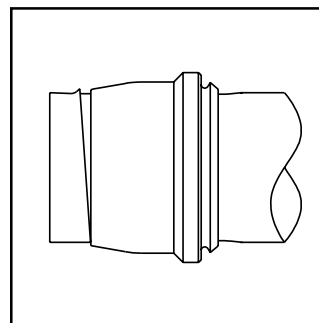


Fig. 23 — Ferrule cocked on tube

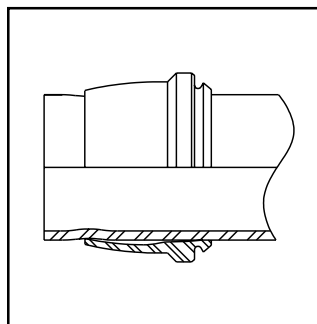


Fig. 24 — No bite

## Unit Maintenance and Troubleshooting

### Hyferset Machine and Components Troubleshooting Guide

Problems with bite type hydraulic fittings are most often traced to faulty Ferulset/assembly procedure.

Problem / Probable Cause	Remedy
Cylinder does not advance	<ul style="list-style-type: none"> <li>Check the pump to see if the fluid is being provided.</li> <li>Check all connections for leaks.</li> </ul>
Cylinder does not retract	<ul style="list-style-type: none"> <li>Required surfaces are not adequately lubricated with a high-pressure lubricant such as STP®.</li> <li>Valve on hydraulic pump has not been released to allow hydraulic fluid to flow to the pump.</li> </ul>
Underset ferrule	<ul style="list-style-type: none"> <li>Too low of a presetting pressure was used.</li> <li>Positive stop of tube nut to body die was not reached (Ferulok only).</li> <li>Ferrule placed on the tube incorrectly.</li> <li>No lubrication was used on the ferrule and body.</li> </ul>
Overset ferrule	<ul style="list-style-type: none"> <li>Too high of a presetting.</li> </ul>

Table 10 — Hyferset Machine and Components Troubleshooting Guide

### Hyferset Parts Schematic

Item No.	Part Description	Number
—	Hyferset Basic Unit	611011A
—	Hyferset Kit: includes Basic Unit, hand hydraulic pump, one adapter, (6 FLO-S), wooden carrying case, operation manual and video.	611049C
1	Electric - Hydraulic Pump, 10,000 psi	900085
	Hand - Hydraulic Pump, 10,000 psi	900086
2	3' Hose Assembly, 10,000 psi	910004
3	"T" Adapter for Gauge	6 R6LO-S
4	Swivel Adapter for Gauge	6 G6L-S
5	Pressure Gauge	900044
6	Male Connector	6 FLO-S
7	Cylinder Assembly	611023
8	Body (Hyferset Casting)	690078
9	Back-up Plate	680369
10	Bolts (2 required for unit)	680368
11	Body Die for EO/EO-2	See page 4
	Body Die for Ferulok	See page 8
12	Nut Support for EO/EO-2	See page 4
	Nut Support for Ferulok	See page 8

Table 11 — Hyferset Machine and Components Parts Schematic

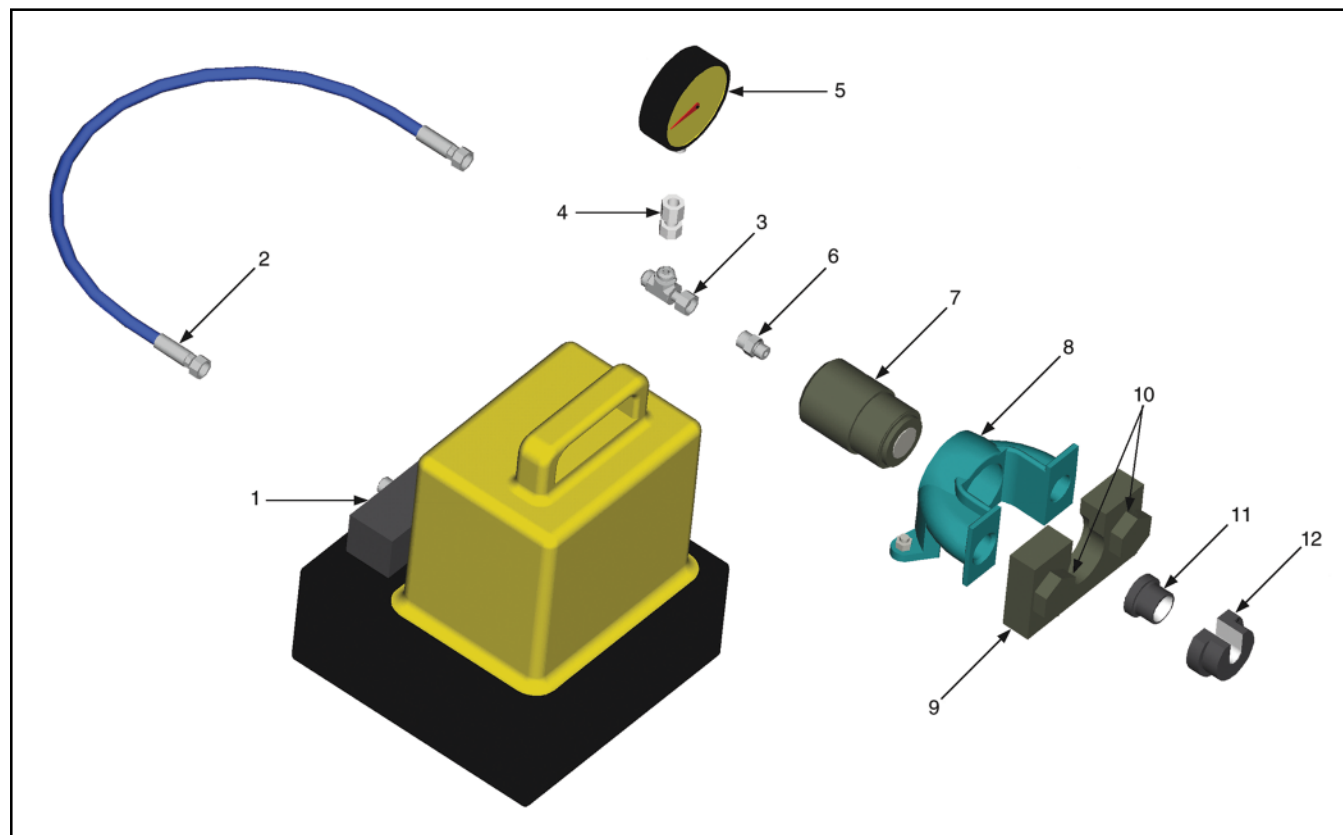


Fig. 25 — Hyferset Parts Schematic