

FITOK

Instruction Manual for Medium & High Pressure Tools

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Introduction

FITOK manual coning and threading tools are designed and manufactured for precise and optimum performance with tubing ends for the medium and high pressure connections. The manual reseating tools are used for repairing the worn cone seat of medium and high pressure fittings or valves. Please read the instructions carefully before using the tools.

Manual Coning Tools

Applied in medium and high pressure tubing for concentric cone processing. All the manual coning tools use the same basic tools on which the cutter heads and the collets of different sizes can be replaced. A complete ordering number shall include that of the basic tool, collet and cutter head. The collet and the cutter head can be ordered individually.



Manual Threading Tools

Applied in medium and high pressure tubing for thread processing. All the manual threading tools use the same basic tools to process threads by replacing threading dies and guide bushings of different sizes. A complete ordering number shall include that of the basic tool, threading die and guide bushing. The threading die and the guide bushing can be ordered individually.



Manual Reseating Tools

Used for repairing the worn cone seat of medium and high pressure fittings or valves. A complete ordering number shall include that of the cutter, antifriction gasket, orientation nut and handle. The cutter, antifriction gasket, orientation nut and handle can be ordered individually.



Operating Instructions

Manual Coning Tools

1. Cut tubing to the desired length. (Fig. 1-1)

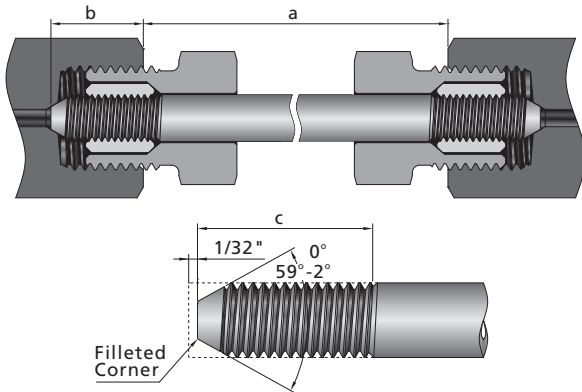


Fig.1-1

$$L = a + 2b + 2 \times 1/32 \text{ "}$$

L: Tubing length

a: Component distance

b: Tubing engagement Table 1-1

c: Thread length

1/32": Standard face distance per tubing

Table 1-1

Connection	Tube O.D. x I.D. in.	b in. (mm)
2FH4	1/4 x 0.109	0.55 (14.0)
2FH6	3/8 x 0.203	0.69 (17.6)
2FH9	9/16 x 0.312	0.84 (21.4)
6FH4	1/4 x 0.083	0.50 (12.7)
6FH6	3/8 x 0.125	0.70 (17.7)
6FH9	9/16 x 0.188	0.87 (22.1)

2. Rotate the feed nut and remove the cutter support from the coning tool housing when replacing the cutter head. (Fig.1-2)



Fig.1-2

3. Loosen the set screw and remove the cutter head from the cutter support. (Fig.1-3)

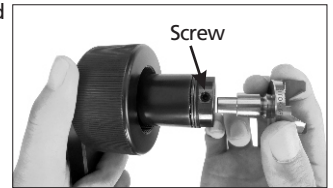


Fig.1-3

4. Replace with a suitable cutter head. Tighten the screw to fix the cutter head firmly. (Fig. 1-4)



Fig.1-4

5. Rotate the nut to remove the nut and the collet from the coning tool housing when replacing the collet. (Fig.1-5)

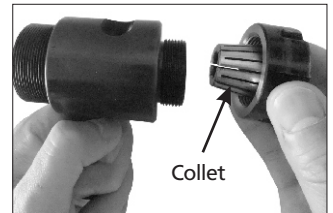


Fig.1-5

6. Remove the collet from the nut and replace with the required one. The groove of collet should be completely placed into the convex shoulder of the nut. (Fig.1-6)



Fig.1-6

7. Lubricate the tool housing thread. Install the cutter support and the nut/collet assembly into the tool housing. (Fig.1-7)

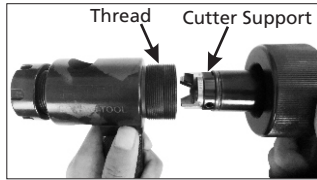


Fig.1-7

8. Clamp the coning tool in a jaw vise and slope down the collet slightly. (Fig.1-8)

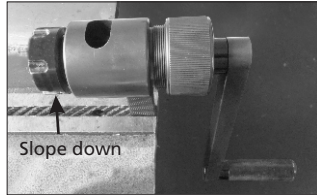


Fig.1-8

9. Rotate the feed nut to make the end face of the cutter support align with the back-end face of the window or into the tool housing. (Fig.1-9)



Fig.1-9

10. Insert the tubing through the collet until the end of the tubing reaches the 3/4 position of the housing window. (1/2 position for tubing of 1/4" O.D.) (Fig.1-10)



Fig.1-10

11. Tighten the collet nut with a wrench to clamp the tubing. (Fig.1-11)



Fig.1-11

12. Rotate the feed nut to push forward the cutter support until the blades just touch the tubing. (Fig.1-12)

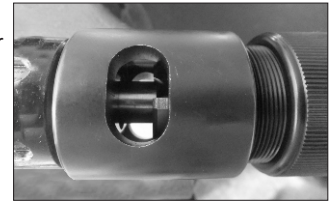


Fig.1-12

13. Apply cutting oil^① onto the cutting blades through the housing window, keeping the blades thoroughly lubricated, which helps to make cutting smoother and extend the life of the cutter head. (Fig.1-13)

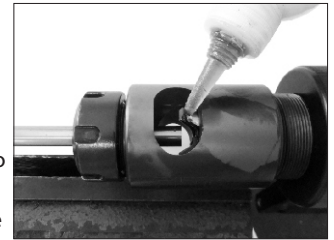


Fig.1-13

14. Rotate the handle clockwise while slowly rotating the feed nut to push forward the cutter head and begin to count the number of turns of the feed nut. When the number of turns reaches the number specified in Table 1-2, stop rotating the feed nut, while keeping rotating the handle until the cutter ceases to cut the tubing. The coning is thus completed. (Fig.1-14)

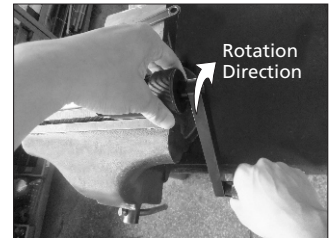


Fig.1-14

Table 1-2

Connection	2FH4	2FH6	2FH9	6FH4	6FH6	6FH9
Number of Turns	2-1/2	3	3-1/2	3	3-1/2	5-1/2

① Cutting oil is required for the operation of manual coning tools, manual threading tools and manual reseating tools. Quality cutting oil serves to reduce the heat and friction between the cutter and the metal, optimize the surface finish, and extend the life of the cutter.

15. Rotate the feed nut counterclockwise to remove the blades away from the tubing. Loosen the collet nut with a wrench. Remove the tubing. (Fig.1-15)

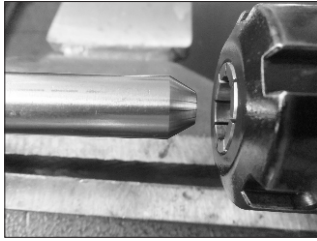


Fig. 1-15

Note: Do not rotate the handle counterclockwise at any time.

16. Visually inspect to check whether the end face of the tubing is smooth, the filleted corner is formed or not. If not, repeat the coning process until a smooth filleted corner is achieved. Replace the cutter head if necessary. (Fig.1-16)

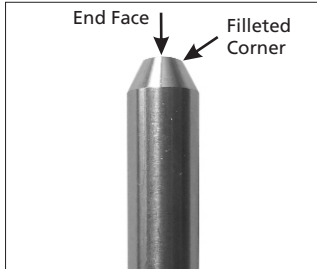


Fig. 1-16

Note: Remember to clean the chips from the cutter head and body of the tool before coning the next tubing.

Manual Threading Tools

1. Screw the handles into the housing of the manual threading tool. (Fig.2-1)

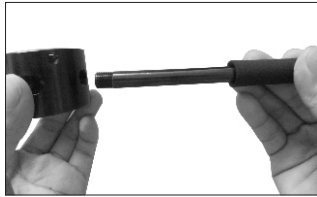


Fig.2-1

2. Take out the threading die by loosening the set screws. Align the mounting holes when installing the required die. (Fig.2-2)

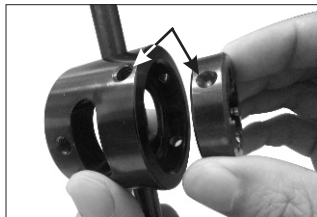


Fig.2-2

3. Tighten the screws to fix the die firmly. (Fig.2-3)

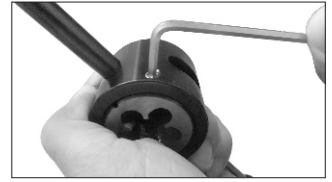


Fig.2-3

4. When change of guide bushing is needed, loosen the set screws to install a new one into the housing of the tool. (Fig.2-4)

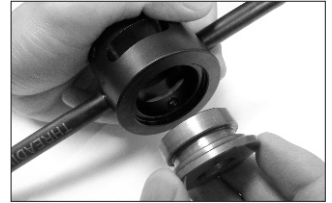


Fig.2-4

5. Tighten the screws to fix the guide bushing. (Fig.2-5)



Fig.2-5

6. Clamp the tubing in a jaw vise, keeping the end to be threaded upwards and leaving enough length. (Fig. 2-6)

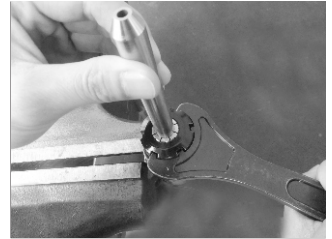


Fig.2-6

Note: It is suggested to clamp the tubing with FITOK coning tool body as shown to protect the tubing from damage.

7. Place the threading tool onto the tubing through the guide bushing. Lubricate the cutting edge with cutting oil. (Fig. 2-7)

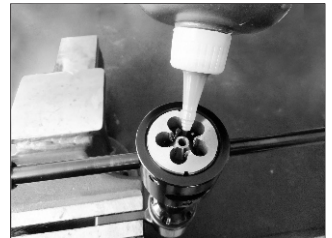


Fig.2-7

8. Press the threading tool and rotate the handles counterclockwise at the same time to make the threading die bite and cut into the tubing wall. Continue to rotate the handles to thread the tubing until the number of turns reaches the number

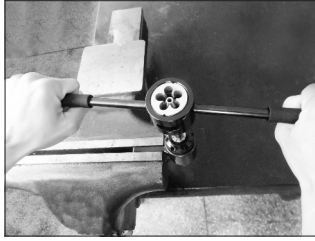


Fig.2-8

specified in Table 2-1. Rotate the handles clockwise to break the chips and quit the threading tool. (Fig. 2-8)

Notes:

1. Remember to rotate the handles periodically to break and discharge metal chips.
2. Remember to clean the chips from the die and body of the tool before threading the next tubing.
3. Lubricate the threading die to make sure there is enough cutting oil during the threading process.

Table 2-1

Connection	Thread Length (c) ^① in. (mm)	Number ^② of Turns
2FH4	0.34 (8.7)	6-1/2
2FH6	0.44 (11.1)	7-1/2
2FH9	0.50 (12.7)	6
6FH4	0.56 (14.3)	12
6FH6	0.75 (19.1)	14
6FH9	0.94 (23.8)	12

① See Fig.1-1.

② Start to count the number of turns when threading die bites the tubing.

9. Deburr the edge of inner hole and clean the tubing. (Fig. 2-9)

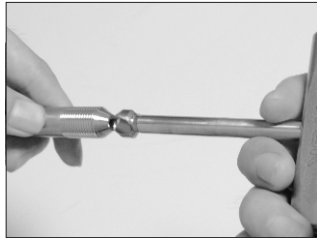


Fig.2-9

Manual Reseating Tools

1. Clamp the workpiece to be processed in a jaw vise. Make sure the end face of the workpiece is paralleled with the jaw vise table top. (Fig. 3-1)



Fig. 3-1

2. Apply a moderate amount of cutting oil on the cutting edge of the tool and the cone of the workpiece. (Fig.3-2)

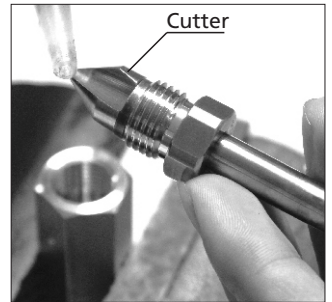


Fig.3-2

3. Insert the reseating tool into the thread hole of the workpiece. Finger tight the orientation nut. (Fig.3-3)



Fig.3-3

4. Rotate the handle until the baseline on the tool coincides with the Zero Line on the orientation nut. (Fig.3-4)

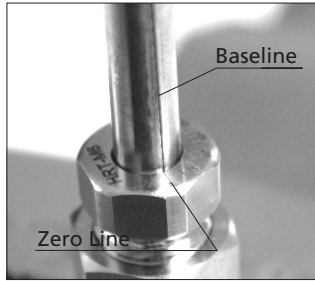


Fig.3-4

5. Tighten the orientation nut clockwise to Angel A as shown in Table 3-1 while keeping the handle still. (Fig. 3-5)



Fig.3-5

6. Rotate the handle clockwise for 10 full circles. Tighten the orientation nut to the 5° mark and then rotate the handle clockwise for 25 full circles. (Fig. 3-6)

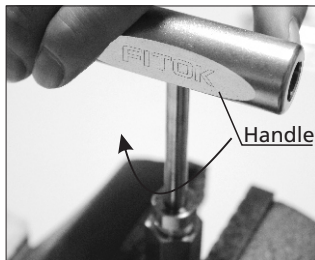


Fig. 3-6

Note: Remain uniform rotation while cutting.

7. Loosen the orientation nut. Take out the reseating tool to see if the worn seat has been completely cut. (Fig. 3-7)



Fig. 3-7

Notes:

1. Repeat Step 1 to Step 7 until the cone has been cut smoothly since the condition of a cone varies from part to part.
2. Remember to clean the workpiece thoroughly to remove all chips and residues.

Table 3-1

Connection	2FH4	2FH6	2FH9	2FH12	2FH16	6FH4	6FH6	6FH9
Tightening Angle (A)	20°	10°	25°	25°	30°	20°	20°	20°

Note: When the cutter gets dull, the tightening angle should be increased to enhance the cutting force.

Ordering Information

Manual Coning Tools			Manual Threading Tools					
Connection	Tube O.D. x I.D. in.	Complete Ordering Number	Ordering Number of Collet	Ordering Number of Cutter Head	Thread Size (Left Hand)	Complete Ordering Number	Ordering Number of Threading Die	Ordering Number of Bushing
2FH4	1/4 x 0.109	HCT-M4	HCT-4-CO	HCT-M4-DT	1/4-28 UNF	HTT-4	HTT-4-D	HTT-4-GS
2FH6	3/8 x 0.203	HCT-M6	HCT-6-CO	HCT-M6-DT	3/8-24 UNF	HTT-6	HTT-6-D	HTT-6-GS
2FH9	9/16 x 0.312	HCT-M9	HCT-9-CO	HCT-M9-DT	9/16-18 UNF	HTT-9	HTT-9-D	HTT-9-GS
6FH4	1/4 x 0.083	HCT-H4	HCT-4-CO	HCT-H4-DT	1/4-28 UNF	HTT-4	HTT-4-D	HTT-4-GS
6FH6	3/8 x 0.125	HCT-H6	HCT-6-CO	HCT-H6-DT	3/8-24 UNF	HTT-6	HTT-6-D	HTT-6-GS
6FH9	9/16 x 0.188	HCT-H9	HCT-9-CO	HCT-H9-DT	9/16-18 UNF	HTT-9	HTT-9-D	HTT-9-GS

FUCHS RENOFORM MZAN 51 is offered by FITOK as cutting oil.
Ordering Number of Cutting Oil: HT-CO

Ordering Information

Manual Reseating Tools					
Connection	Complete Ordering Number	Ordering Number of Cutter	Ordering Number of Antifriction Gasket	Ordering Number of Orientation Nut	Ordering Number of Handle
2FH4	HRT-M4	HRT-4-C	HRT-4-G	HRT-M4-G	HRT-H-1
2FH6	HRT-M6	HRT-6-C	HRT-6-G	HRT-M6-G	HRT-H-2
2FH9	HRT-M9	HRT-9-C	HRT-9-G	HRT-M9-G	HRT-H-3
2FH12	HRT-M12	HRT-12-C	HRT-12-G	HRT-M12-G	HRT-H-4
2FH16	HRT-M16	HRT-16-C	HRT-16-G	HRT-M16-G	HRT-H-4
6FH4	HRT-H4	HRT-4-C	HRT-4-G	HRT-H4-G	HRT-H-1
6FH6	HRT-H6	HRT-4-C	HRT-4-G	HRT-H6-G	HRT-H-1
6FH9	HRT-H9	HRT-9-C	HRT-9-G	HRT-H9-G	HRT-H-3

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Ordering Number of Cutting Oil: HT-CO