











# TABLE OF CONTENTS

## TUBE WORKING TOOLS

<b>TUBE CUTTERS</b>	1-4		51-55	
<b>TUBE BENDERS</b>	4-10		56	
<b>FLARING &amp; SWAGING</b>	11-18		57-59	
<b>TUBING TOOL KITS</b>	19-20		60	
<b>TUBING TOOL SELECTOR</b>	21		61-62	
<b>ACCESSORIES &amp; WRENCHES</b>	22-24		63	
	25-29		64	
	30-34		65-68	
	35		69	
	36		70-73	
	37-38		74	
	39-40		75-77	
	41-45		78-79	
	45		79	
	46		80	
	47		<b>ALPHA-INDEX</b>	
	48		81-84	
	49-50			

For hard or soft copper, aluminum, brass, thin wall steel, stainless steel, monel, titanium and other tubing.

## METAL TUBING

### HI-DUTY® TUBE CUTTERS

For 1/8" to 1-1/8" and 1/4" to 1-5/8" O.D. tubing.

- Enclosed hardened steel, thrust bearing feed mechanism for smoothest cutting action and trouble free operation.
- Unique design eliminates spiraling for clean right angle cuts. Our high precision machining and construction method permits one-piece screw-type axle for easy access to cutter wheel – no clip to lose or replace.
- Rugged aluminum alloy body designed for handling ease. Body is hand buffed and nickel chrome plated to a high-luster finish.
- Foldaway hardened steel reamer with turned cutting edge removes inside burrs cleanly. Filing surface removes outside burrs.
- Rollers feature flare cut-off groove to reduce tube loss when damaged flare is removed.
- Imperial® cutter wheels are made of the highest quality wear and abrasion-resistant chromium steel and precision machined to exacting specifications for accurate cutting and long life. Each tool is supplied with a spare cutter wheel.
- All Imperial tube cutters are 100% factory tested to ensure accurate spiral-free cutting.



TC-1000

**TC-1000** For 1/8" to 1-1/8" (4 mm to 28 mm) O.D. tubing. Includes (2) S75015 general purpose cutter wheels. Length 5". Wt. 8.8 oz.

**TC-1010** For 1/8" to 1-1/8" (4 mm to 28 mm) O.D. tubing. Includes (2) S75046 cutter wheels for continuous cutting of stainless steel, monel and other hard-temper tubing. Length 5". Wt. 8.8 oz.

**TC-1020** Combination tube constrictor & tube cutter. For 1/8" to 1-1/8" (4 mm to 28 mm) O.D. tubing. Includes S76637 constrictor wheel and S75015 general purpose cutter wheel. Length 5-1/2". Wt. 8.8 oz.

**312-FC** For 1/4" to 1-5/8" (7 mm to 41 mm) O.D. tubing. Includes (2) S75015 general purpose cutter wheels. Length 5-1/2". Wt. 10.4 oz.

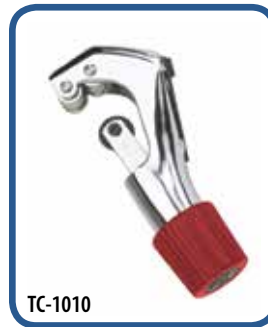
Conforms to Federal Specification GGG-C-771d, Type II, Class I.

**S75015** General purpose cutter wheel.

**S75046** Wheel for continuous cutting of stainless steel, monel and other hard temper tubing. For cutters TC-1000, TC-1010, TC-1550, TC-1560, 312-FC, 174-F, TC-2050 and TC-3050.

**S16003162** Replacement cutter wheel for soft copper & aluminum tubing is extra sharp to minimize burr buildup.

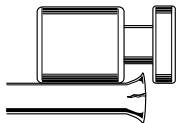
**S76637** Constrictor wheel for producing sweat joints.



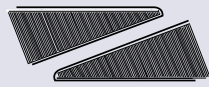
TC-1010



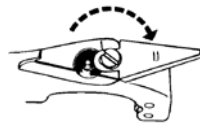
312-FC



**FLARE CUT-OFF GROOVE**  
Groove in rollers reduces tube loss when cracked flare is removed.

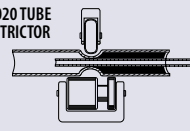


**FOLDAWAY REAMER**  
Hardened steel reamer with turned cutting edge removes inside burrs cleanly. Filing surface removes outside burrs.



**SPARE CUTTING WHEEL**  
Spare cutter wheel carried under foldaway locking reamer.

**TC-1020 TUBE CONSTRICTOR**



**FILL WITH SOLDER**  
Joint is ready for sweating when constricted tube contacts smaller tube. Can be used for crimping applications.

### JUNIOR TUBE CUTTER

For 1/8" to 3/4" (4 mm to 19 mm) O.D. tubing.

**227-FA** Includes S32633 general purpose cutter wheel. Swing radius 2". Length 3-1/2". Wt. 5.0 oz.



227-FA

## METAL TUBING

### "IMP"<sup>®</sup> MINI TUBE CUTTERS

For 1/8" to 5/8", 3/16" to 7/8" and 1/8" to 1-1/8" O.D. tubing.

- Big capacity, small size tube cutters designed for use in tight quarters where other cutters won't fit.
- Enclosed feed screw minimizes contamination assuring continued smooth operation.
- Corrosion-resistant steel rollers positioned at bottom of cutter allow for easier cutter engagement on tubing and smoother cutting action.
- All Imperial<sup>®</sup> tube cutters are 100% factory tested to ensure accurate spiral-free cutting.

**TC-1050** For 1/8" to 5/8" (4 mm to 15 mm) O.D. tubing. Includes (1) S32633 general purpose cutter wheel. Swing radius 1-1/4" (1-3/8" swing radius with 5/8" tube). Length 1-3/4". Wt. 2.5 oz.

**S32633** General purpose cutter wheel for TC-1050.

**S26883** Screw for TC-1050 cutter wheel.

**TC-2050** For 3/16" to 7/8" (5 mm to 22 mm) O.D. tubing. Includes (1) S75015 general purpose cutter wheel. Swing radius 1-11/16". Length 2-1/4". Wt. 4.0 oz.

**TC-3050** For 1/8" to 1-1/8" (4 mm to 28 mm) O.D. tubing. Includes (1) S75015 general purpose cutter wheel. Swing radius 2-1/2" (2-1/16" swing radius with 1-1/8" tube). Length 3". Wt. 7.0 oz.

**S75015** General purpose cutter wheel.

**S74762** Screw for TC-3050 cutter wheel.

### RATCHETING TUBE CUTTERS

For 1/8" to 5/8" and 1/8" to 1-1/8" O.D. tubing.

- Easily completes a full revolution, maximizing leverage.
- Cutter can easily be removed from the handle.
- Ergonomic handle with non-slip grip.
- Six independent drive pawls provide 15° arc-swing.
- Includes (1) general purpose cutter wheel.

**TC-1050RH** For 1/8" to 5/8" (4 mm to 15 mm) O.D. tubing. 2-Pc. set includes TC-1050 "IMP"<sup>®</sup> mini tube cutter and ratcheting handle in clamshell packaging. Length 5". Wt. 6.0 oz.

**TC-1051** Ratcheting handle only. Length 5". Wt. 1.5 oz.

**TC-3050RH** For 1/8" to 1-1/8" (4 mm to 28 mm) O.D. tubing. 3-Pc. set includes TC-3050 "IMP"<sup>®</sup> tube cutter, removable deburr tool and ratcheting handle in clamshell packaging. Length 7". Wt. 11.5 oz.

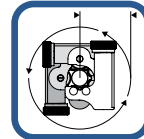
**TC-3051** Ratcheting handle and deburr tool. Length 7". Wt. 4.0 oz.



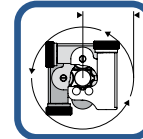
TC-1050

TC-2050

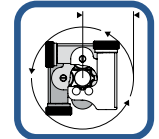
TC-3050



Swing Radius  
1-1/4"



Swing Radius  
1-11/16"



Swing Radius  
2-1/2"

Use cutter with or without patented ratcheting handle - snaps into place in seconds

TC-3050RH includes a removable deburr tool



TC-3050RH



Removable Deburr Tool  
(TC-3050RH and TC-3051)

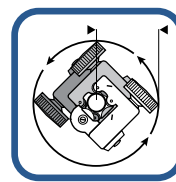
Six independent drive pawls give small, 15° arc-swing



### BIG "IMP"<sup>®</sup> TUBE CUTTER - "Big capacity in small size"

For 3/8" to 1-1/8" (10 mm to 28 mm) O.D. tubing.

**174-F** Includes (2) S75015 general purpose cutter wheels. Swing radius 1-15/16" (2-1/4" swing radius with 1-1/8" tube). Length 2-11/16". Wt. 5.0 oz.



Swing Radius  
1-15/16"

174-F



S75015 - Spare cutting wheel

# METAL TUBING

## ADJUST-O-MATIC™ TUBE CUTTERS

For 3/8" to 2-5/8" and 2" to 4-1/8" O.D. tubing.

- Ratchet feed mechanism speeds up cutting operation.
- Extra wide rollers with flare cut-off groove stabilize tubing.
- Spare cutting wheel included under handle cap.
- Enclosed screw-type feed mechanism; lightweight aluminum alloy body.

**206-FB** For 3/8" to 2-5/8" (10 mm to 66 mm) O.D. tubing. Includes (2) S74761 general purpose cutter wheels. Length closed 7-3/4". Wt. 2.0 lbs.

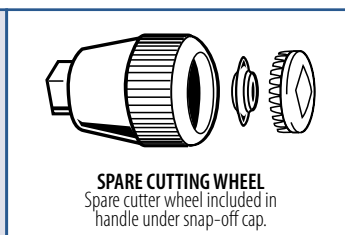
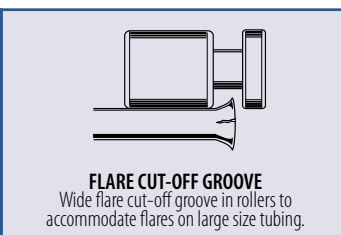
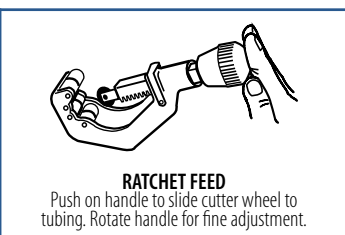
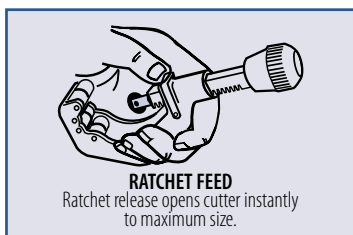
**406-FA** For 2" to 4-1/8" (51 mm to 104 mm) O.D. tubing. Includes (2) S74833 general purpose cutter wheels. Length closed 11-1/4". Wt. 3.5 lbs.

Conforms to Federal Specification GGG-C-771d, Type II, Class I.



406-FA

206-FB



## 144-F IMPERIAL® TUBE CUTTER SERVICE CENTER

For 1/8" to 4-1/8" O.D. tubing.

Selling Imperial® replacement cutter wheels, reamer blades and fasteners is easy. Our Service Center organizes a popular selection of replacement parts for Imperial cutters. Display on the counter or bring it with you when making sales calls.

- 15 most common replacement parts stocked in one handy container.
- Includes a visual replacement chart for quick and easy identification.



144-F

### 144-F SERVICE CENTER INCLUDES:

PART NO.	QUANTITY	DESCRIPTION	CUTTER
S75015	10	General Purpose Cutter Wheel	TC-1000, TC-1010, 312-FC, 174-F, TC-2050, TC-3050
S75046	5	Cutter Wheel for Stainless Steel	TC-1000, TC-1010, 312-FC, 174-F, TC-2050, TC-3050
S32633	10	Cutter Wheel	TC-1050, 227-FA
S74761	5	Cutter Wheel	206-FB, 206-FBP
S74762	5	Cutter Wheel Retaining Screw	TC-1000, TC-1010, 312-FC, 174-F, TC-2050, TC-3050
S74833	3	Cutter Wheel	406-FA
S26883	3	Cutter Wheel Retaining Screw	TC-1050
S77511	3	Cutter Wheel Retaining Screw	206-FB, 206-FBP
S74834	3	Cutter Wheel Retaining Screw	406-FA
S76637	3	Constrictor Roller Wheel	TC-1000, TC-1010, TC-1020, 312-FC
S16003162	5	Cutter Wheel for Soft Copper Only	TC-1000, TC-1010, 312-FC, 174-F, TC-2050, TC-3050
S10000770	3	Cutter Wheel for PVC	206-FB, 206-FBP
S7931801	3	Reamer Blade	TC-1000, TC-1010, 312-FC
S8201501	3	Retaining Screw for Reamer Blade	TC-1000, TC-1010, 312-FC
S74197	3	Spring Washer for Reamer Blade	TC-1000, TC-1010, 312-FC
144-FB	1	Container only	

# PVC, PLASTIC AND NON-METAL REINFORCED TUBING

## PLASTIC TUBE AND HOSE SHEARS

For 1/16" to 13/16" (1 mm to 20 mm) O.D. hose\* or tubing.

**307-FP** **Snimp™** Compact shear for 1/16" to 1/2" (1 mm to 13 mm) O.D. plastic tubing and non-metal reinforced hose. Spring loaded for safety - closes automatically. Includes S8115601 replaceable hardened steel blade. Length 2-7/8". Wt. 1.0 oz. each. Comes in 12-pc. pop-up counter display. 9"D x 12"W x 12"H.



307-FP

**327-FP** For 1/8" to 13/16" (4 mm to 20 mm) O.D. plastic tubing and non-metal reinforced hose. Can be wall- or bench-mounted for production, or carried in a toolbox. Includes S77615 replaceable hardened steel blade. Length 9-3/4". Wt. 1.0 lb.

\* Not for use with metal reinforced hose.



327-FP



307-FP POP-UP DISPLAY

## TUBE BENDERS

For soft copper and aluminum tubing.

# TUBE BENDERS

## SPRING TYPE TUBE BENDERS

For soft copper and aluminum tubing.

For 1/4" to 7/8" O.D. tubing.

Tools allow hand bending of soft tubing to any shape without collapsing walls. Special spring steel, zinc finish. End belled for quick tube removal.

- 201-F** Set of 8 benders for 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" and 7/8" O.D. tubing.
- 101-F** Set of 6 benders for 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" O.D. tubing.
- 163-F** Set of 4 benders for 1/4", 3/8", 1/2" and 5/8" O.D. tubing.
- 112-F** Set of 3 benders for 1/4", 5/16" and 3/8" O.D. tubing.



102-F-08

PART NO.	TUBE O.D. (in.)	LENGTH (in.)	WEIGHT EACH (OZ.)
102-F-04	1/4	10	3
102-F-05	5/16	10	3
102-F-06	3/8	10	4
102-F-07	7/16	12	6.25
102-F-08	1/2	12	6.5
102-F-10	5/8	12	8
102-F-12	3/4	12	10
102-F-14	7/8	12	10

Each tool bends only one size.



# TRIPLE HEAD LEVER TYPE

## 470-FH TRIPLE HEAD 180° TUBE BENDER WITH ROTO-LOK™ INDEXING HANDLE

- Bends 3/16", 1/4", 5/16" and 3/8" O.D. tubing.
- Patented, quick-action indexing lever repositions two-stage handle midway through bend when both handles begin to meet. This feature allows easy fabrication of bends up to 180° with reduced effort, better control and no crossing of handles!
- Optimum bending radius – for each tubing size.
- Calibrated markings – for making accurate left-hand, right-hand and offset bends.
- Compact design for working in tight spaces.
- Cushion grips – for comfort and stability.
- Made of lightweight, die-cast aluminum.

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)
3/16	9/16
1/4	9/16
5/16	11/16
3/8	15/16



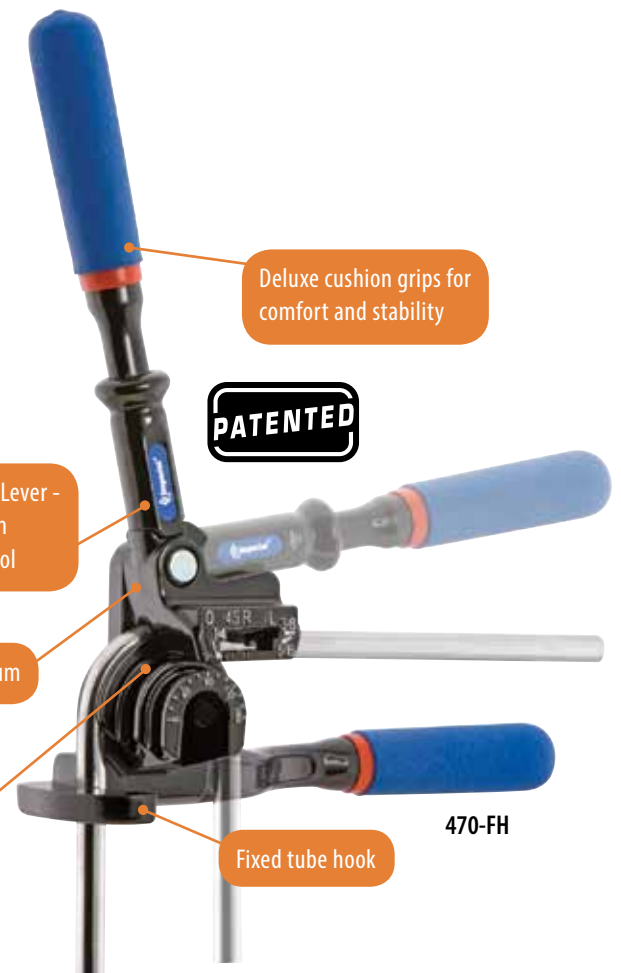
Patented Roto-Lok™ Indexing Lever - Smooth, tight 180° bends with less effort and improved control

Lightweight die-cast aluminum

Bends 3/16", 1/4", 5/16" and 3/8" O.D. tubing

Deluxe cushion grips for comfort and stability

**PATENTED**



470-FH

Fixed tube hook

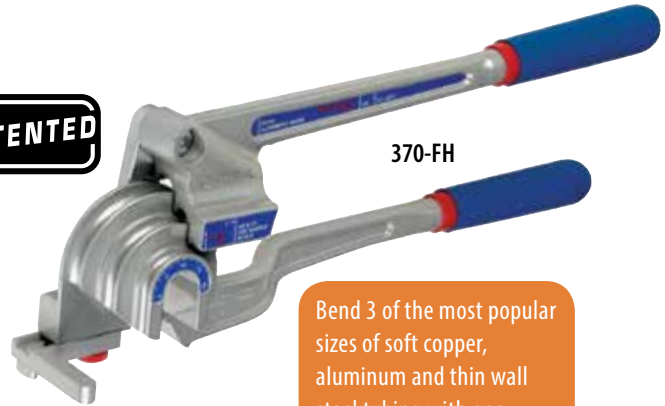


# TRIPLE HEAD LEVER TYPE

## 370-FH TRIPLE HEAD 180° TUBE BENDER

- Bends 3/16", 1/4", 3/8" and 1/2" tubing.
- Makes smooth, tight-radius 180° bends.
- Calibrated markings - for making accurate left-hand, right-hand and offset bends.
- Adjustable hook.
- Optimum bending radius - for each tubing size.
- Cushion grips - for extreme comfort.
- Made of lightweight die-cast aluminum.

**PATENTED**



370-FH

Bend 3 of the most popular sizes of soft copper, aluminum and thin wall steel tubing with one rugged, precise tool!

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)
3/16	11/16
1/4	11/16
3/8	1-1/8
1/2	1-1/2



Easy 180° bends in one swift motion



## IMP™ TRIPLE HEAD BENDERS

- Bends soft copper, aluminum and thin wall steel tubing.
- Bends 1/8", 3/16", 1/4", 5/16", and 3/8" tubing.
- Makes smooth, tight-radius 90° bends.
- Calibrated markings - for making accurate left-hand, right-hand and offset bends.
- 90° start requires less effort – making bending fast and easy.
- Made of lightweight die-cast aluminum.

**367-FH** For 1/8", 3/16" and 1/4" (3 mm, 4 mm and 6 mm) O.D. tubing. Wt. 0.5 lbs.

**368-FH** For 3/16", 1/4", 5/16" and 3/8" (6 mm and 8 mm) O.D. tubing. Wt. 1.0 lbs.



367-FH

368-FH

**367-FH**

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE	
	(in.)	(mm)
1/8	5/8	16
3/16	19/32	15
1/4	9/16	14

**368-FH**

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE	
	(in.)	(mm)
3/16	1-1/64	26
1/4	1-1/64	26
5/16	1	25
3/8	15/16	24

## LEVER TYPE

### 364-FHA LEVER TYPE TUBE BENDERS

For 1/8" to 1" and 6 mm to 12 mm O.D. tubing.

Each tool bends one size. Open-side type which slips over tube at any point. Makes smooth, tight radius bends up to 180° with minimum effort. No scoring or flattening of tubing. Calibrated to show angle of bend. Wide hook grips tubing securely.

#### 364-FHA-14

Features telescopic handles for increased leverage. Expandable style furnished for 7/8" and 1" O.D. tubing.

PART NO.	TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)		WEIGHT EACH (lbs.)	
		(mm)	(inches)	(kg.)	(lbs.)
364-FH-02	1/8	3/8		0.5	
364-FH-03	3/16	7/16		0.5	
364-FHA-04	1/4	9/16		1.0	
364-FHA-05	5/16	11/16		1.0	
364-FHA-06	3/8	15/16		1.75	
364-FHA-08	1/2	1-1/2		3.5	
364-FHA-10*	5/8	2-1/4		5.5	
364-FHA-12*	3/4	3		7.0	
364-FHA-14*	7/8	3		10.5	
364-FHA-16*	1	3-1/2		10.5	

Each tool bends only one size.

Conforms to Federal Specification GGG-B-191a Type III, Class 2.

\* For bending annealed copper and aluminum tubing only.



#### 364-FHA-06

Style for 1/4" through 1/2" and 6 mm to 12 mm O.D. tubing.

### METRIC SIZE BENDING TOOLS

PART NO.	TUBE O.D. (mm)	RADIUS TO CENTER OF TUBE		WEIGHT EACH	
		(mm)	(inches)	(kg.)	(lbs.)
364-FHAM-6MM	6	14.2	9/16	0.45	1.0
364-FHAM-10MM	10	24.0	15/16	0.79	1.75
364-FHAM-12MM	12	38.1	1-1/2	1.6	3.5

Each tool bends only one size.



#### 364-FH-02

Style for 1/8" and 3/16" O.D. tubing.

#### 364-FHA-10

Style for 5/8" and 3/4" O.D. tubing.

### 364-FHB SWIVEL HANDLE TUBE BENDERS

For 1/4" to 1/2" and 6 mm to 12 mm O.D. tubing.

The 364-FHB series has a swivel handle that can be repositioned midway through a bend when both handles begin to meet. This simple feature allows easy fabrication of bends up to 180° with reduced effort, better control and without the crossing of handles, typical of most other lever type benders.

PART NO.	TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)		WEIGHT EACH (lbs.)	
		(mm)	(inches)	(kg.)	(lbs.)
364-FHB-04	1/4	9/16		1.0	
364-FHB-05	5/16	11/16		1.0	
364-FHB-06	3/8	15/16		1.75	
364-FHB-07	7/16	1-1/2		3.5	
364-FHB-08	1/2	1-1/2		3.5	

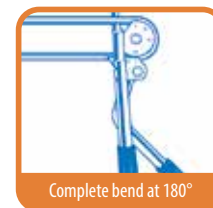
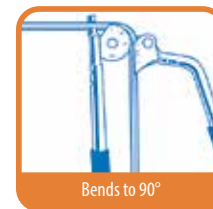
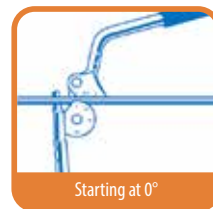
Each tool bends only one size.

Conforms to Federal Specification GGG-B-191a Type III, Class 2.



#### 364-FHB-06

Style for 1/4" through 1/2" and 6 mm to 12 mm O.D. tubing.



### METRIC SIZE BENDING TOOLS

PART NO.	TUBE O.D. (mm)	RADIUS TO CENTER OF TUBE		WEIGHT EACH	
		(mm)	(inches)	(kg.)	(lbs.)
364-FHBM-6MM	6	14.2	9/16	0.45	1.0
364-FHBM-8MM	8	17.5	11/16	0.45	1.0
364-FHBM-12MM	12	38.1	1-1/2	1.6	3.5

Each tool bends only one size.



# HEAVY DUTY LEVER TYPE

## 664-FH HEAVY-DUTY 180° TUBE BENDER WITH ROTO-LOK™ INDEXING HANDLE FOR TIGHT RADIUS BENDS

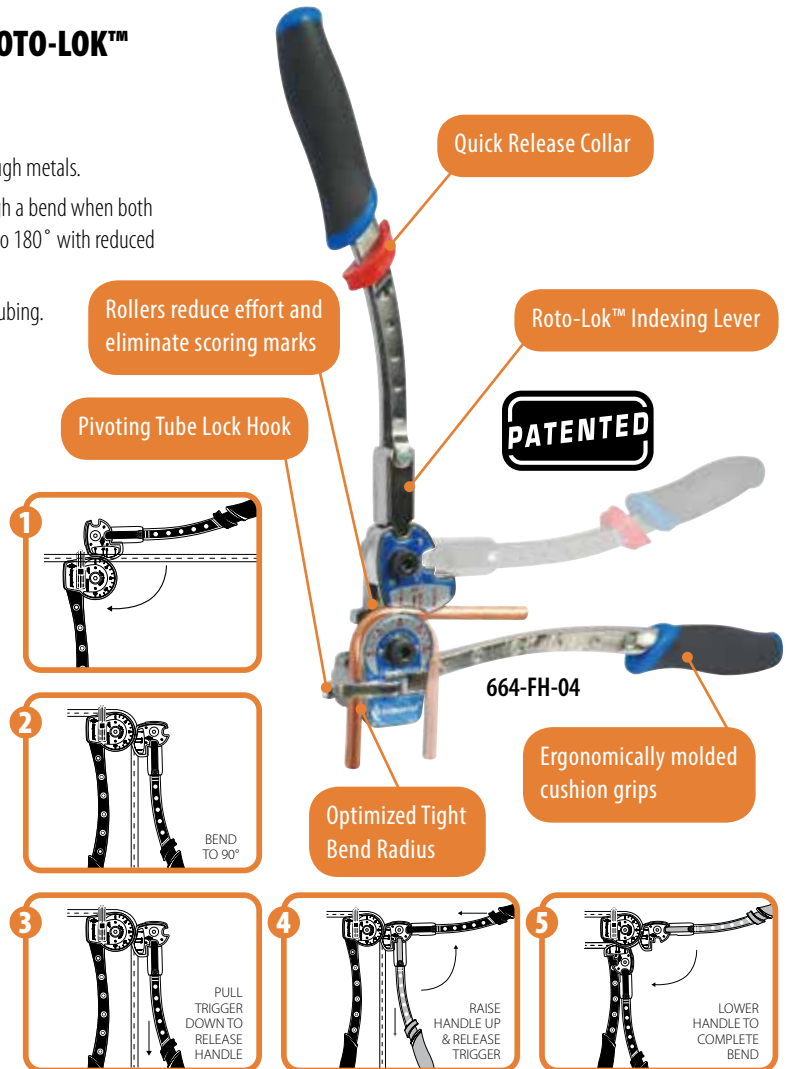
For 1/4" to 1/2" and 6 mm to 12 mm O.D. tubing.

- New design for accurate and tight bends up to 180° in stainless steel and other tough metals.
- Patented, quick action trigger release repositions two-stage handle midway through a bend when both handles begin to meet. This feature allows easy fabrication of optimized bends up to 180° with reduced effort, better control and no crossing of handles!
- Rollers in bending handle reduce friction and bending effort; eliminate scoring of tubing.
- Patented ergonomic grips.
- Durable nickel finish.
- Vise lug for mounting in vise.

PART NO.	TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)	WEIGHT EACH (lbs.)
664-FH-04	1/4	9/16	1.2
664-FH-06	3/8	15/16	3.7
664-FH-08	1/2	1-1/2	7.6

PART NO.	TUBE O.D. (mm)	RADIUS TO CENTER OF TUBE (mm)	WEIGHT EACH (lbs.)
664-FH-6MM	6	15	1.2
664-FH-8MM	8	24	3.7
664-FH-10MM	10	24	3.7
664-FH-12MM	12	38	7.6



## 564-FH LEVER TYPE HEAVY-DUTY TUBE BENDER

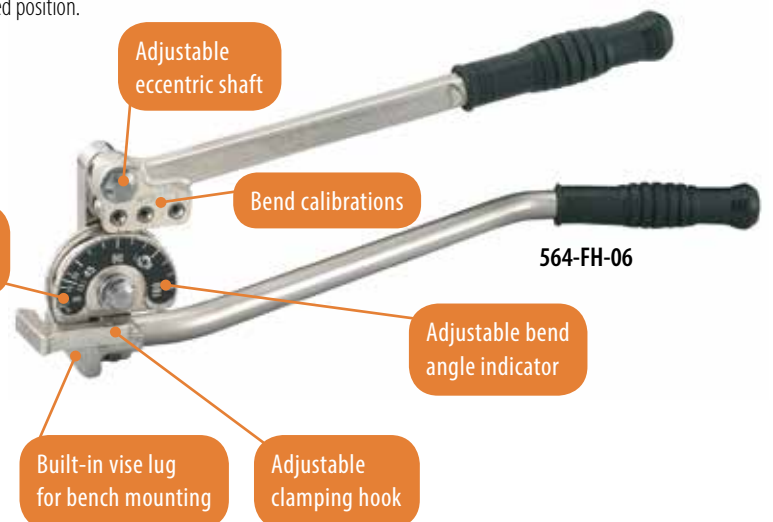
For 3/8" and 1/2" O.D. tubing.

This heavy-duty tube bender features high-strength tool steel construction on all components subjected to stress during the bending process – including forming rollers, form wheel, stop pins, hook and cam adjustment shaft. Unique offset handle design assures maximum power transfer between worker and bender. Bender will not “gyrate” as handles are brought to closed position.

- Meets ANSI B31.1/ASME Sec. 3 Boiler/Power requirements.
- Vise mountable.
- Prevents slippage and flattening.
- Fully adjustable to compensate for variances in tube tolerance.
- Starts with handles at 90° angle.
- Built for rugged day-in and day-out use.
- Precise bends!
- Self-aligning rollers eliminate scoring and reduce bending effort.

PART NO.	TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)	WEIGHT EACH (lbs.)
564-FH-06	3/8	1-1/8	5.5
564-FH-08	1/2	1-1/2	7.0

Each tool bends only one size.



## LEVER TYPE KITS

### WIDE RANGE TUBE BENDER KITS

For 1/4" to 7/8" O.D. tubing.

Each tool quickly adapts to all sizes in its range by changing forming wheel and block. Telescopic handles reposition during bend for best leverage. Calibrations show precise bend angle. One-piece benders furnished for 1/4" and 5/16" O.D. sizes. Includes metal tool case with space for other tools needed on the job.

Conforms to Federal Specification GGG-B-191a Type III, Class 1.

**260-FHA for 7 sizes. Wt. 23 lbs.**

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)
1/4	9/16
5/16	11/16
3/8*	1-5/8
1/2*	1-5/8
5/8*	2-1/4
3/4*	3
7/8*	3

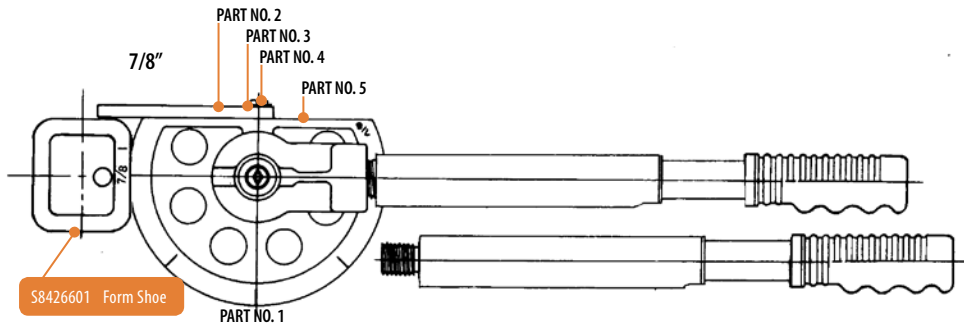
All wide range benders furnished in tool case with space for other tools.



260-FHA

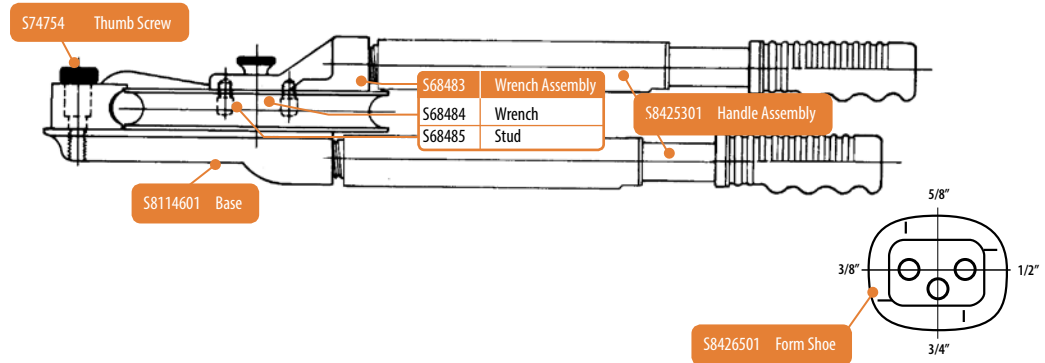
**350-FHA for 6 sizes. Wt. 20 lbs.**

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)
1/4	9/16
5/16	11/16
3/8*	1-5/8
1/2*	1-5/8
5/8*	2-1/4
3/4*	3



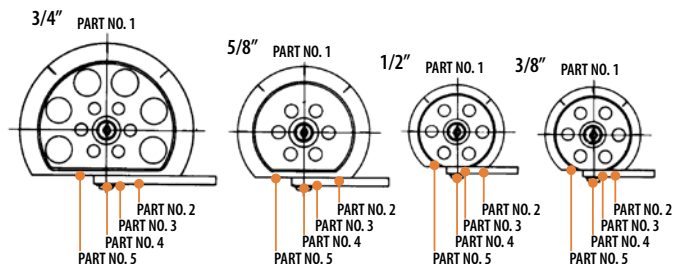
**360-FHA for 4 sizes. Wt. 20 lbs.**

TUBE O.D. (in.)	RADIUS TO CENTER OF TUBE (in.)
3/8*	1-5/8
1/2*	1-5/8
5/8*	2-1/4
3/4*	3



\* Recommended for bending annealed copper and aluminum tubing only.

Size (in.)	PART NO. 1 (Wheel Assembly)	PART NO. 2 (Hook)	PART NO. 3 (Spring Washer)	PART NO. 4 (Hook Screw)	PART NO. 5 (Form Wheel)
3/8	-	S68480	S68481	S66914	S68479
1/2	S68492	S62156	S68481	S66914	S68493
5/8	S68496	S8058801	S68481	S66914	S68497
3/4	S8487001	S8058901	S68481	S66914	S8442401
7/8	S8485201	S68502	S68481	S66914	-



## GEAR TYPE

### 270-F GEAR TYPE TUBE BENDER

For 3/4" to 1-1/8" O.D. tubing.

For all bending work. Spur-gear type with 10-to-1 ratio for easy bending of tempered tubing. Floating shoe aligns tube perfectly on calibrated forming wheel. Pull-pin on wheel speeds repositioning for bends over 90°. Portable. Can be hand held, clamped in vise or bolted to bench. Adapts to pipe vise with handle 271-F.



Each tool bends only one size.

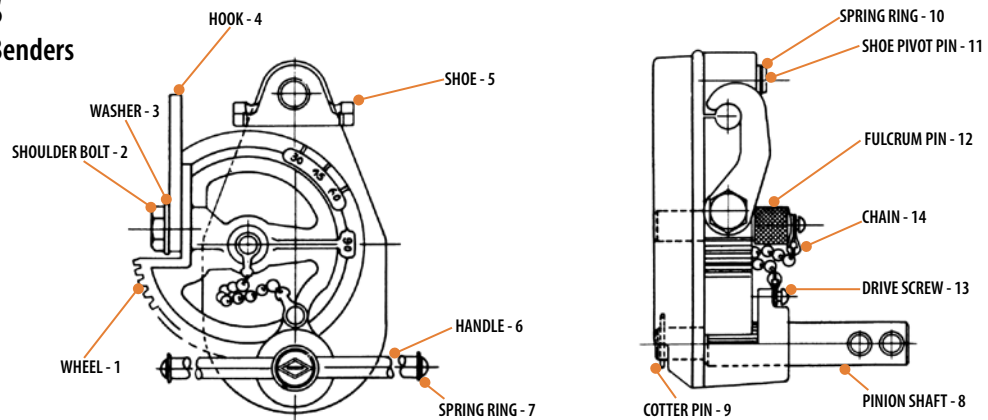
PART NO.	TUBE O.D. (in.)	RADIUS FROM CTR. TO CENTER OF TUBE (in.)	MIN. RETURN FROM CENTER TO CENTER OF TUBE (in.)	WEIGHT EACH (lbs.)	WALL THICKNESS (in.)
270-F-12	3/4	4	9-1/2	15	.042 to .083
270-F-14	7/8	4	9-1/2	14.75	.045 to .083
270-F-16	1	4	9-1/2	14.75	.065 to .095*
270-F-18	1-1/8	4	9-1/2	14.25	.065 to .095*

271-F Pipe Vise Extension. Fits all 270-F benders. Wt. 1.75 lbs.

\* Not recommended for Type L Hard and Type M copper tubing with wall thickness over .065".

### REPLACEMENT PARTS

For 270-F Gear Type Tube Benders



TUBE BENDER	Size (in.)	PART NO. 1	PART NO. 2	PART NO. 3	PART NO. 4	PART NO. 5	PART NO. 6	PART NO. 7	PART NO. 8	PART NO. 9	PART NO. 10	PART NO. 11	PART NO. 12	PART NO. 13	PART NO. 14
270-F-12	3/4	S62305	S62294	S62298	S62307	S62306	S62292	S62297	S62291	S62255	S62296	S62295	S62835	S62836	S62837
270-F-14	7/8	S62302	S62294	S62298	S62304	S62303	S62292	S62297	S62291	S62255	S62296	S62295	S62835	S62836	S62837
270-F-16	1	S62299	S62294	S62298	S62301	S62300	S62292	S62297	S62291	S62255	S62296	S62295	S62835	S62836	S62837
270-F-18	1-1/8	S62287	S62294	S62298	S62290	S62289	S62292	S62297	S62291	S62255	S62296	S62295	S62835	S62836	S62837

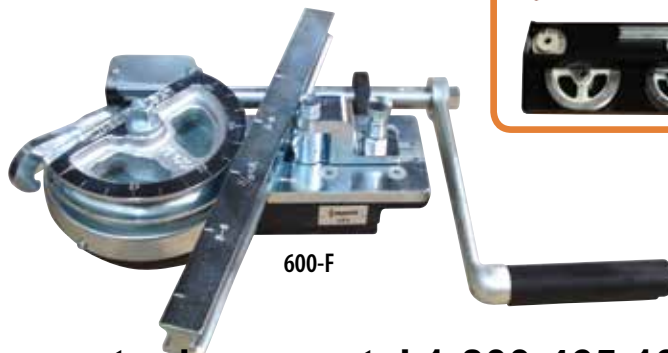
### WORM GEAR TUBE BENDER

For 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.

**600-F** Precision tool for highest quality work. 50-to-1 gear ratio and crank with revolving hand grip keeps effort at a minimum. Follow bar eliminates drawing action and keeps tube in virtually perfect round. Adjustable pressure roller positions quickly in index holes. Enclosed gears. Includes metal tool case. Can be clamped in vise or bolted to bench or tripod. Size of kit: 14" x 9" x 6". Wt. 35.0 lbs.

Tube Wall Thickness and Bend Radius

TUBE O.D. (in.)	WALL THICKNESS (in.)	RADIUS TO CENTER OF TUBE (in.)
1/4	.016 to .049	3/4
5/16	.020 to .065	1
3/8	.028 to .083	1-1/4
1/2	.035 to .083	2
5/8	.042 to .083	2-1/2
3/4	.049 to .083	3



Conforms to Federal Specification GGG-B-191b, Type I, Class 2.  
Meets ANSI Specification (B31.1) and ASME Section III Nuclear Code.

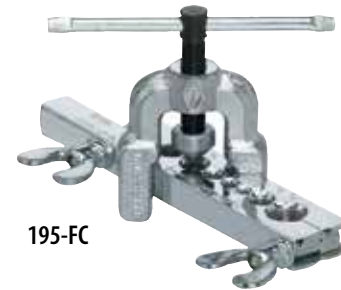
## 45° FLARING TOOLS

### 45° FLARING TOOL

For 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" O.D. tubing.

**195-FC** Flares 7 sizes of tubing. Rugged forged steel slip-on yoke and hardened flaring bar. Positive clamping action of bars prevents tube slippage. Self-centering yoke with swivel-type, hardened steel, chrome finished flaring cone forms better flares with less effort. Design of yoke permits flaring where there is little space between nut and tube end. Satin finish nickel chrome plated. Wt. 2.0 lbs.

Outside Tube Diameter (in.)	3/16	1/4	5/16	3/8	7/16	1/2	5/8
Wall Thickness (in.)	.028	.035	.035	.035	.035	.035	.035



195-FC

### 45° LARGE SIZE FLARING TOOLS

Flares larger tube sizes. Quick slip-on yoke with hardened steel, chrome finished swivel flaring cone reduces effort. Positive clamping action of flaring bar eliminates tube movement. Nickel chrome finish.

Conforms to Federal Specification GGG-F-451a Type 1, Class 2, Style A.

**103-FS** For sizes 3/4", 7/8" and 1" O.D. tubing. Wt. 3.75 lbs.

**203-FA** For sizes 5/8", 3/4", 7/8" and 1-1/8" O.D. tubing. Wt. 3.75 lbs.

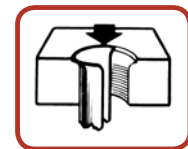
**375-FS** For sizes 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing. Includes tool case. Wt. 3.75 lbs.



103-FS



**SELF GAUGING** - Just insert tube flush with top of die for accurate flare size.



**FORMS STRONGER FLARES**- Stronger flares assured by smooth, even radius formed at base of every flare by engineered chamfer.

Outside Tube Diameter (in.)	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1-1/8
Wall Thickness (in.)	.025	.028	.035	.035	.035	.035	.035	.049	.049	.049	.058	.058

### HI-DUTY® 45° FLARING TOOL

For 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.

**300-FB** Hardened steel, chrome finished cone makes exceptionally smooth, high strength flares with a radius at base of flare - instead of the sharp angle formed by ordinary tools. Slip-on yoke permits use in tight quarters, allows flaring where there is little space between nut and tube end. New feed screw design provides smoother, easier operation. Positive gripping and self-gauging of tube for exact flare size. Sliding die blocks lock in place by lever clamp action to ensure even dispersal of force around full diameter of tube for superior grip. Wt. 1.6 lbs.

Outside Tube Diameter (in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness (in.)	.028	.035	.035	.035	.035	.035



300-FB

## 45° ROL-AIR™ FLARING TOOLS

### 45° ROL-AIR™ FLARING TOOL

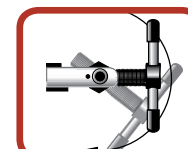
Flares and burnishes 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.

**500-FC** Faceted, hardened steel, chrome finished cone rolls out perfect 45° flares above die block, and automatically burnishes flare face reducing the need for deburring. Original wall thickness is maintained at base of flare. Slip-on yoke permits use in tight quarters, where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies grip tubing without scoring. Satin chrome and black finish. Wt. 1.5 lbs.

Outside Tube Diameter (in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness (in.)	.028	.035	.035	.035	.035	.035



Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.



Unique detention mechanism for rapid engagement and release of die blocks.



500-FC

WORKS WITH R-410A



# 45° ROL-AIR™ FLARING TOOLS

## “GRABBER”™ ROL-AIR™ 45° FLARING TOOL

Universal application. Adjustable opening holds all sizes.

Flares and burnishes 3/16" to 5/8" (4.75 mm to 16 mm) O.D. tubing.

**525-F** Unique, self-adjusting, tube holding mechanism permits flaring any size tubing within the range of 3/16" to 5/8" (4.75 mm to 16 mm) O.D. Innovative, single-opening design is more compact and easier to use than conventional multi-opening flaring bars. Faceted, hardened steel, chrome finished cone rolls out and burnishes perfect 45° flare above the tube-holding mechanism reducing need for deburring. Original wall thickness is maintained at base of flare. Slip-on self-centering yoke permits use in tight quarters. Large handle, with better leverage, and precision threads on feed screw make flaring effortless. High quality construction with satin chrome and black finish. Wt. 1.75 lbs.

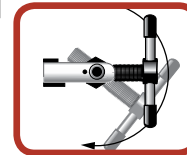


Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.028	.035	.035	.035	.035	.035

Outside Tube Diameter	(mm)	4.75	6	8	10	12	15	16
Wall Thickness	(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0

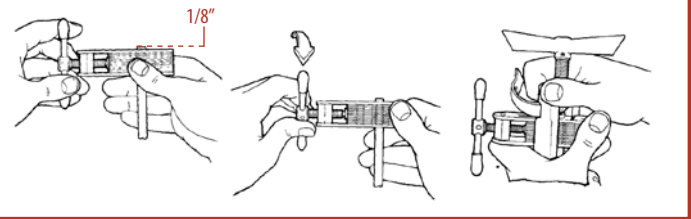


Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.



Unique detention mechanism for rapid engagement and release of die blocks.

- (1) Insert tubing into adjustable opening of tube-holding assembly. Position end of tubing approximately 1/8" above the surface of holder.
- (2) Tighten clamp screw approximately 1/2 to 3/4 of a turn beyond free travel position to secure tubing.
- (3) Be certain flaring cone surface is oiled. Slip yoke over tube-holding assembly centering on tubing. Twist yoke clockwise to lock in position. Turn yoke handle clockwise to flare.

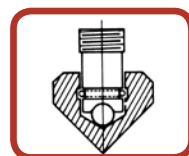


# 45° DOUBLE FLARING TOOLS

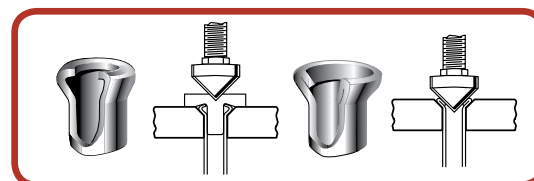
## 45° DOUBLE FLARING TOOL

For 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. tubing.

**93-FB** Recommended for Bundy and other annealed soft steel tubing (wall thickness to .035"). Also makes single or double flares in soft copper or aluminum tubing. Small, lightweight, easy to handle. Steel yoke; swivel-type hardened steel, chrome finished flaring cone. Bar provides positive grip of tubing. Includes tool case. Wt. 3.0 lbs. Conforms to Federal Specification GGG-F-451a, Type 1, Class 2, Style A.



**SWIVEL-TYPE BALL BEARING CONE** - Ball thrust bearing in flaring cone minimizes friction, makes operation easier.



**DOUBLE FLARING ADAPTERS-** Screw down flaring cone with proper size adapter in tube. Retract cone, remove adapter, complete flare.



## 37° FLARING TOOLS

### 37° FLARING TOOL

For 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.

**437-FB** For use with soft copper, aluminum and brass tubing. Hardened steel, chrome finished cone makes exceptionally smooth, high-strength flares with a radius at base of flare - instead of the sharp angle formed by ordinary tools. Slip-on yoke permits use in tight quarters, allows flaring where there is little space between nut and tube end. New feed screw design provides smooth, easier operation. Positive gripping and self-gauging of tube for exact flare size. Sliding die blocks lock in place by clamp action. Satin chrome and black finish. Wt. 1.75 lbs.

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.032	.032	.032	.032	.035	.035



437-FB

**SELF GAUGING-** Just insert tube flush with top of die for accurate flare size.



**FORMS STRONGER FLARES-** Stronger flares assured by smooth, even radius formed at base of every flare by engineered chamfer.



### 37° ROL-AIR™ FLARING TOOL

For 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.

**507-FB** For use with soft copper, aluminum and brass tubing. Faceted, hardened steel chrome finished cone rolls out perfect 37° flares above die block - then automatically burnishes flare face. Original wall thickness is maintained at base of flare. Slip-on yoke permits use in tight quarters where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies firmly grip tubing. Satin chrome and black finish. Wt. 1.75 lbs.

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.032	.032	.032	.032	.035	.035



507-FB



Flares rolled out above die bar by super-smooth faceted cone. Makes stronger, highly polished flares.

### 37° ROL-AIR™ FLARING TOOLS

For 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. Steel and Stainless Steel tubing.

**400-F** Forms 37° flares to government specifications in steel, stainless steel (including MIL-T-6845), titanium and other metal tubing. Positive stop gauge assures correct size of flare. Special burnishing action polishes flare face. Three rollers in flaring cone roll out 37° flare above die block. Roller action cuts effort required; maintains original wall thickness - eliminates stress concentration. Extension on yoke for clamping in vise. Satin chrome and black finish. Includes tool case. Wt. 2.5 lbs.

**401-FA** Reaming yoke for 1/4" to 5/8" O.D. tubing. Recommended for use with steel and stainless steel tubing for proper flaring. Wt. 0.7 lbs.

**402-FA** Flaring and reaming kit. Contains No. 400-F Flaring Tool and No. 401-FA Reaming Yoke for 1/4" to 5/8" O.D. tubing. Includes tool case. Wt. 3.2 lbs. Conforms to Federal Specification GGG-F-451a. Type 1, Class 1, Style A.



400-F



402-FA

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.035	.049	.049	.065	.065	.065



Feed release and burnishing mechanism. Flare control gauge.



3 rollers in flaring cone. Flare formed above die block.



401-FA

Feed screw controls depth of reaming.

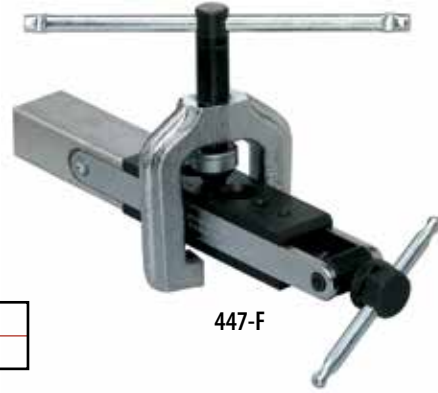
# 37° FLARING TOOLS

## 37° HEAVY-DUTY FLARING TOOL

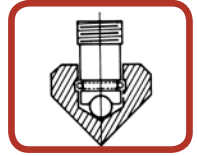
For 1/8", 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. tubing.

**447-F** Forms 37° flares in annealed stainless steel (MIL-T-6345 or AMS5566), cold drawn stainless steel and annealed copper or aluminum tubing. Built to withstand continuous rugged service. Ball thrust bearing mechanism reduces effort required. Hardened tool steel die features non-slip grip of tubing, even after repetitive flaring. Bar has vise extension. Wt. 3.25 lbs.

Outside Tube Diameter	(in.)	1/8	3/16	1/4	5/16	3/8	1/2
Wall Thickness	(in.)	.032	.032	.035	.049	.049	.049



447-F



**SWIVEL-TYPE BALL BEARING CONE** - Ball thrust bearing in flaring cone minimizes friction, makes operation easier.

## LARGE SIZE 37° ROL-AIR™ FLARING TOOLS

For 3/4", 7/8", 1", 1-1/4", 1-1/2" and 2" O.D. tubing.

Three cylinders in flaring cone roll out 37° flare above die block. Flares soft steel, copper, aluminum and fully annealed stainless steel tubing. Roller action reduces effort required; maintains original wall thickness; eliminates stress concentration. Feed release and burnishing action. Vise clamp extension on yoke. Heat treated dies clamp tubing without marking it. Satin chrome and black finish. Includes metal tool case.

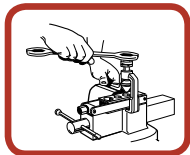
**537-F** Flares and burnishes 3/4", 7/8", 1" and 1-1/4" O.D. tubing. Wt. 13.0 lbs.

**637-F** Flares and burnishes 1-1/4", 1-1/2" and 2" O.D. tubing. Wt. 13.0 lbs.

\* Conforms to Federal Specification GGG-F-451a, Type 1, Class 1, Style B.



537-F



Vise clamp extension.



Flares rolled out above die bar.



Feed release and burnishing mechanism.

Outside Tube Diameter	(in.)	3/4	7/8	1	1-1/4	1-1/2	2
Wall Thickness	(in.)	.065	.065	.065	.083	.083	.083

## FLARING & SWAGING TOOLS

### 45° & 37° PRODUCTION FLARING AND SWAGING TOOL

For 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.

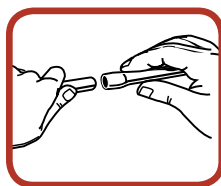
**555-FS** Flares and swages 6 sizes of soft copper, aluminum or brass tubing. Makes both 45° and 37° single flares. Fast cam lever operation. Portable. Can be clamped in vise or bolted to bench. Change sizes quickly. Built in gauge for accurate flare size or swage depth. Unique jaws provide a positive non-slip grip on tubing. Wt. 6.5 lbs.

- Replacement parts:**
- 560-S-03** 3/16" Swaging adapter.
  - 560-S-04** 1/4" Swaging adapter.
  - 560-S-05** 5/16" Swaging adapter.
  - 560-S-06** 3/8" Swaging adapter.
  - 560-S-08** 1/2" Swaging adapter.
  - 560-S-10** 5/8" Swaging adapter.
  - S70348** 45° Flaring cone.
  - S70349** 37° Flaring cone.
  - S8711201** Set of replacement dies.

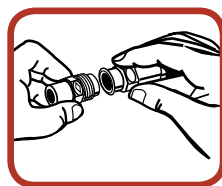


555-FS

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.028	.035	.035	.035	.035	.035



Swages 6 sizes.



Makes 45° & 37° flares.

### METRIC BUBBLE FLARING TOOL

For soft steel or Bundy tubing 4.75 mm (3/16"), 6 mm, 8 mm and 10 mm O.D.

**293-F** Forms international standard bubble flare in one fast operation. Flares metric hydraulic brake lines used on European, Japanese and American automobiles and light trucks. This unique design makes flares on 4 sizes of tubing: 4.75 mm (3/16"), 6 mm, 8 mm and 10 mm O.D. Will flare soft double-wall steel tubing with a wall thickness up to .028". Can also be used with soft copper and aluminum tubing. Includes tool case.

- Replacement parts:**
- S8771801** 4.75 mm (3/16") adapter.
  - S8771701** 6 mm adapter.
  - S8771601** 8 mm adapter.
  - S8771301** 10 mm adapter.
  - S8694401** Wing nut.



293-F



**METRIC BUBBLE FLARING -**  
Just insert tube flush with top of die for accurate flare. With proper adapter size attached, screw down flaring cone until adapter strikes flaring bar surface. Bubble flare is complete.

# FLARING & SWAGING TOOLS

## FLARING (45°) & SWAGING TOOL

For 1/8" to 3/4" O.D. tubing.

**275-FS** Flares and swages. Converts quickly. Screw-type feed. Ideal for use in close quarters. Two bars included cover 9 sizes. Swivel-type swaging adapters and flaring cone are hardened steel, chrome finished for easy operation. Self-centering, slip-on forged steel yoke. Includes tool case. Wt. 3.5 lbs. Flares 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. Includes 5 swage adapters for 7 tube sizes: 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" O.D.

- Replacement parts:** **278-FS-03X04X06** Adapter 3/16", 1/4", 3/8". **278-FS-10** Adapter 5/8".  
**278-FS-05** Adapter 5/16". **278-FS-12** Adapter 3/4".  
**278-FS-08** Adapter 1/2". **S38600** Flaring Cone.



275-FS

Outside Tube Diameter	(in.)	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Wall Thickness	(in.)	.020	.028	.035	.035	.035	.035	.035	.035	.035



275-FS

## 45° FLARING, DOUBLE FLARING & SWAGING TOOL

For 1/8" to 3/4" O.D. tubing.

**275-FSD** Same as 275-FS with the addition of 5 double flaring adapters (3/16", 1/4", 5/16", 3/8", 1/2" O.D.).

## 45° FLARING, SWAGING AND CUTTING KIT

For soft copper, aluminum, steel, stainless steel and brass tubing.

**275-FSC** Kit contains a TC-1000 tube cutter for 1/8" to 1-1/8" O.D. tubing and 275-FS 45° flaring and swaging tool. Includes tool case. Wt. 3.0 lbs.

**Flares:** 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing.

**Swages:** 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.



275-FSC

## 45° DOUBLE FLARING, SWAGING AND CUTTING KIT

**275-FSCD** Kit contains 275-FS, TC-1000, and double flaring adapters for 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. tubing. Includes tool case.



## FLARING & SWAGING TOOLS

### 175-EX XPANDR™ SWAGING/EXPANDING KIT

- Easily expands tube for braze or soldered joints in seconds.
- Floating jaw head design is self-centering for fast, accurate alignment.
- Re-rounds deformed tube ends.
- Accurate joints in seconds without using fittings.
- For soft copper and soft thin wall steel and stainless steel tubing.
- Save 60-70% of time over conventional swaging tools.
- Reduces soldering by 50% over standard fittings.
- Meets ARI tube insertion recommendations.
- Long life with high alloy hardened steel jaw segments.
- XpandR™ Tool comes with non-slip, ergonomically designed grips.
- Includes 5 heads: 3/8", 1/2", 5/8", 3/4" and 7/8".
- Includes metal tool case.

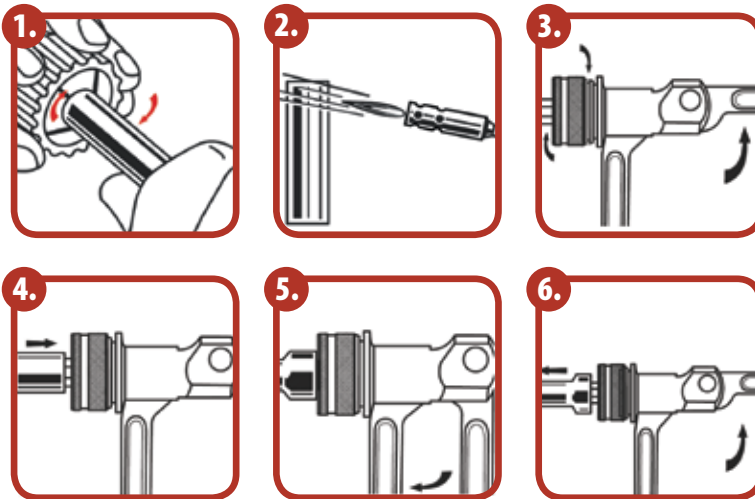


175-EX



### SIX EASY STEPS:

1. Deburr inside of tube.
2. To create perfectly centered capillary sockets for soldering or brazing, you must use soft copper or fully anneal end of tube to be expanded.
3. Pull XpandR™ handle up to 90-degree position. Maintain this position as you screw the appropriate size head over the center-punch and tighten.
4. Insert the end of the tube over the XpandR™ head completely.
5. Pull the lever completely down.
6. Return the lever to the 90-degree position. Remove expanded tube.



### TO RE-ROUND SLIGHTLY DEFORMED TUBE ENDS:

1. Insert deformed tube end to the first groove of head.
2. Pull the lever completely down.
3. Return the lever to the 90-degree position. Remove expanded tube.

#### 175-EX KIT INCLUDES

175EXP	XpandR™ Pliers
175EXC	XpandR™ Case
175EX06	3/8" head
175EX08	1/2" head
175EX10	5/8" head
175EX12	3/4" head
175EX14	7/8" head

You may order kit items separately. Kit wt. 20 lbs.

#### ADDITIONAL HEAD SIZES AVAILABLE:

175EX16	1" head
175EX18	1-1/8" head
175EX22	1-3/8" head
175EX26	1-5/8" head



# SWAGING TOOLS

## PUNCH TYPE SWAGING TOOLS

Use these tools for making tubing connections without fittings. Enlarge end of tube, insert another tube of original O.D. size and solder together like a sweat fitting.

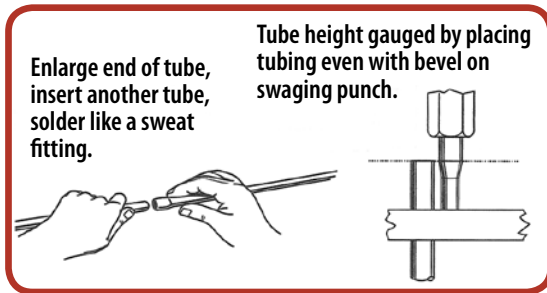
- 94-SSP** 3-in-1 swaging tool for 1/2", 5/8" and 7/8" tubing. Wt. 1.0 lbs.
- 95-S** 6-in-1 swaging tool for 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing. Hi-alloy steel, heat-treated for rugged use. Hex design for ease of extraction. Precision machined surface for ease of forming.
- 193-S** Vinyl case contains 4 swaging punches for 1/4", 3/8", 1/2" and 5/8" O.D. tubing. Wt. 1.0 lbs.
- 195-SA** Vise-mountable flaring bar and 4 swaging punches for 1/4", 3/8", 1/2" and 5/8" O.D. tubing. Includes metal tool case. Wt. 2.0 lbs.
- S75531** Flaring bar only. Wt. 1.0 lb.



94-SSP



193-S



195-SA

### 95-S 6 IN 1 SWAGING TOOL

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8
Wall Thickness	(in.)	.028	.035	.035	.035	.035	.035



95-S

### INDIVIDUAL SWAGING TOOLS

PART NO.	TUBE O.D. (in.)	WALL THICKNESS (in.)	WEIGHT (lbs.)
93-S-04	1/4	.035	.20
93-S-05	5/16	.035	.25
93-S-06	3/8	.035	.25
93-S-08	1/2	.035	.50
93-S-10	5/8	.035	.50
93-S-12	3/4	.035	.75
93-S-14	7/8	.045	1.0

# TUBE WORKING KITS

## CUTTING AND FLARING KITS

Each kit contains a TC-1000 tube cutter for 1/8" to 1-1/8" O.D. tubing and a 45° or 37° flaring tool. Includes tool case.

PART NO.	TUBE CUTTER	FLARING TOOL	RANGE OF FLARING TOOL (in.)	WEIGHT (lbs.)
120-F	TC-1000	375-FS (45°)	1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4 O.D.	2.75
122-FA	TC-1000	437-FB (37°)	3/16, 1/4, 5/16, 3/8, 1/2, 5/8 O.D.	2.75
123-FA	TC-1000	300-FB (45°)	3/16, 1/4, 5/16, 3/8, 1/2, 5/8 O.D.	2.75
124-FA	TC-1000	500-FC (45° Rol-Air™)	3/16, 1/4, 5/16, 3/8, 1/2, 5/8 O.D.	2.75
1226-FA	TC-1000	195-FC (45°)	3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8 O.D.	3.0



# TUBE WORKING KITS

## 45° FLARING, SWAGING AND CUTTING KIT

For soft copper, aluminum, steel, stainless steel and brass tubing.

**275-FSC** Kit contains a TC-1000 tube cutter for 1/8" to 1-1/8" O.D. tubing and 275-FS 45° flaring and swaging tool. Includes tool case. Wt. 3.0 lbs.

**Flares:** 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing.

**Swages:** 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.



275-FSC

## 45° DOUBLE FLARING, SWAGING AND CUTTING KIT

**275-FSD** Kit contains 275-FS, TC-1000, and double flaring adapters for 3/16", 1/4", 5/16", 3/8" and 1/2" O.D. tubing. Includes tool case.

## FLAREPRO™ FOUR-IN-ONE FLARING & SWAGING KIT

For copper, aluminum, steel, stainless steel and other metal tubing.

**2000-FS** Individual size jaw sets are used for positive clamping compactness and operating convenience.

Socket head screws are provided for clamping the jaws to the yoke and feeding the tube forming components. The screws are hand turned for all free travel movement when advancing or retracting.

A hex socket and 3/8" square drive ratchet are furnished for easy operation of the threaded members under load. Tube forming components (flaring cones, double flaring adapters and swaging adapters) are retained on the feed screw by a ball detent mechanism and can be snapped on and off for quick change as required.

The tool is designed to permit hand-held or vise-mounted operation. Includes tool case. Wt. 7.0 lbs.

**Flaring - 37° and 45°:** Flares soft copper, brass, aluminum, steel and stainless steel in nine tube sizes: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing.

**Double Flaring - 45° Only:** Double flares soft copper, aluminum and steel (Bundy or G.M. to .035 wall) in seven tube sizes: 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.

**Swaging:** Swages soft copper, aluminum and brass in seven tube sizes: 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.



2000-FS

### Flaring

Outside Tube Diameter	(in.)	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Wall Thickness	(in.)	.020	.028	.035	.035	.035	.035	.035	.049	.049

### Swaging

Outside Tube Diameter	(in.)	3/16	1/4	5/16	3/8	1/2	5/8	3/4
Wall Thickness	(in.)	.028	.035	.035	.035	.035	.035	.035

# TUBING TOOL SELECTOR

TUBING TOOL SELECTOR				TUBE MATERIAL																
TOOL	PART NO.	PAGE NO.	SIZE RANGE TUBE O.D. (in.)	COPPER										ANNEALED ALUMINUM (SOFT)	ANNEALED BRASS (SOFT)	SAE 1020 STEEL (SOFT)	BRAZED- BUNDY WELD GM STEEL	STAINLESS STEEL ANNEALED (SOFT)	STAINLESS STEEL (1/8 HARD)	TITANIUM
				ANNEALED GENERAL PURPOSE	TYPE K			TYPE L			TYPE M									
					SOFT	BENDING TEMPER-HARD	HARD	SOFT	BENDING TEMPER- HARD	HARD										
Tube Cutters	TC-1000	1	1/8 - 1-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	(1)	(1)
Metal Tubing	TC-1050	2	1/8 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	TC-2050	2	3/16 - 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	(1)	(1)
	TC-3050	2	1/8 - 1-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	(1)	(1)
	174-F	2	3/8 - 1-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	206-FB	3	3/8 - 2-5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	227-FA	1	1/8 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	(1)	(1)
	312-FC	1	1/4 - 1-5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	406-FA	3	2 - 4-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
Thermoplastic	307-FP	4	1/16 - 1/2 (4)																	
Rubber Hose	327-FP	4	1/8 - 13/16 (4)																	
Bending Tools	101-F	4	1/4 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	102-F	4	1/4 - 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	112-F	4	1/4 - 3/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	163-F	4	1/4 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	201-F	4	1/4 - 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	260-FHA	9	1/4 - 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	270-F	10	3/8 - 1-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	350-FHA	9	1/4 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	360-FHA	9	3/8 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	364-FH	7	1/8 - 3/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	364-FHA	7	1/4 - 1 (3)	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	364-FHAM	7	6 - 12 mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	364-FHB	7	1/4 - 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	364-FHBM	7	6 - 12 mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	367-FH	6	1/8, 3/16, 1/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	368-FH	6	3/16, 1/4, 5/16, 3/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	370-FH	6	3/16, 1/4, 3/8, 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	470-FH	5	3/16, 1/4, 5/16, 3/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	564-FH	8	3/8, 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	600-F	10	1/4 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
664-FH	8	1/4, 3/8, 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
664-FH(Metric)	8	6 - 12 mm	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
37° Flaring Tool	400-F	13	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	437-FB	13	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	447-F	14	1/8 - 1/2	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	507-FB	13	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	555-FS	15	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	537-F	14	3/4 - 1-1/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	637-F	14	1-1/4 - 2	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	2000-FS	20	1/8 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
45° Flaring Tool	103-FS	11	3/4 - 1	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	195-FC	11	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	203-FA	11	5/8 - 1-1/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	275-FS	16	1/8 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	275-FSM		4 - 22 mm	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	300-FB	11	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	375-FS	11	1/8 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	376-FS		1/2 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	395-FAM		4 - 16 mm	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	500-FC	11	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	525-F	12	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	555-FS	15	3/16 - 5/8	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
2000-FS	20	1/8 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•	
45° Double Flaring Tools	93-FB	12	3/16 - 1/2	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	195-FB		1/4 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
	2000-FS	20	3/16 - 3/4	•	•	•	•	•	•	•	•	(2)	•	•	•	•	•	•	•	•
Reaming and Deburring Tools	208-F	23	3/16 - 1-1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	208-FSS	23	3/16 - 1-1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	210-F	23		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tube Constrictor	TC-1020	1	1/8 - 1-1/8	•	•	•	•	•	•	•	•	•	•	•	•	•				
Swaging Tools	93-S	18	3/16 - 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	94-SSP	18	1/2, 5/8, 7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	95-S	18	3/16 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	193-S	18	1/4 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	195-SA	18	1/4 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	275-FS	16	3/16 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	555-FS	15	3/16 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	2000-FS	20	3/16 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
	Metric Bubble Flaring Tool	293-F	15	4.75 - 10 mm	•	•	•	•	•	•	•	•	•	•	•	•	•			

(1) Heavy duty cutting wheel No. S75046 is recommended for continuous service with steel, stainless steel, monel, titanium and hard temper copper tubing.  
 (2) Type M tubing should be torch annealed before flaring.  
 (3) No.364-FHA, 5/8" - 1" size should be used only with annealed (softened) non-ferrous tubing.  
 (4) Not to be used with metal reinforced hose.

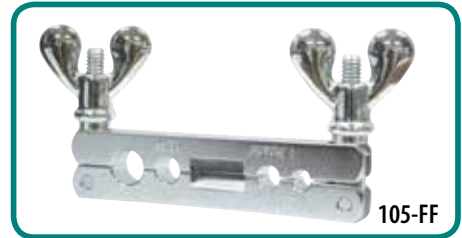
# TESTING AND SERVICE TOOLS

## PINCH-OFF TOOL

For 1/4" to 1/2" O.D. tubing.

Temporarily closes soft copper, aluminum or steel tubing so no liquid or gas passes sealed part. Lets you disconnect line while making repairs without loss of liquid or gas. Forming holes for 1/4", 5/16", 3/8" and 1/2" O.D. tubing.

**105-FF** Pinch-Off Tool for 1/4", 5/16", 3/8" and 1/2" O.D. tubing. Wt. .75 lbs.



105-FF

## TUBING TEST PLUGS

For 1/4" to 1-3/8" O.D. tubing.

For temporary shut-off of tubing without pinching it off or installing a valve. Especially handy for plumbing, heating, refrigeration and instrumentation when troubleshooting for leaks. Lightweight, fast acting, dependable. Insert plug in tube end and tighten wing nut. Expander seals tube and holds pressures to 100 PSI.

**142-F** 3-Pc. test plug kit for 1/2", 5/8" and 7/8" O.D. tubing. Wt. .5 lbs.



140-F-06

### INDIVIDUAL TEST PLUGS

PART NO.	TUBE O.D. (in.)	MIN I.D. DIA. (in.)	MAX I.D. DIA. (in.)	WEIGHT EACH (oz.)	REPLACEMENT SLEEVE
140-F-04	1/4	.171	.190	.5	S62641
140-F-06	3/8	.265	.315	.75	S62648
140-F-08	1/2	.390	.436	1.0	S62655
140-F-10	5/8	.515	.545	1.5	S62661
140-F-12	3/4	.640	.745	2.0	S62666
140-F-14	7/8	.734	.995	3.0	S66434
140-F-18	1-1/8	.984	1.245	4.0	S66435
140-F-22	1-3/8	1.218	1.270	4.0	S71174



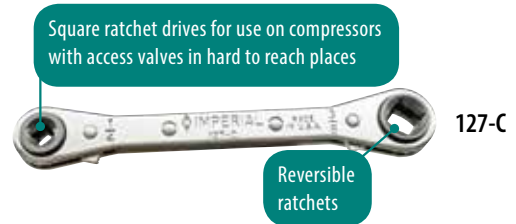
142-F

# WRENCHES

## WRENCHES

For Refrigeration and Air Conditioning Service.

**127-C** Compressor access valve wrench. Chrome plated. Has 1/4", 3/8", 3/16" and 5/16" square drive ratchets and is specially designed for use on compressors with access valves in hard to reach places. Reversible ratchets.



127-C

**127-C0** Same as 127-C except with unique 25° offset that provides additional convenience in hard to reach places.



127-C0

**124-C** Combination wrench with the four sizes most needed for servicing air-conditioning and refrigerator equipment:

- 9/16" hex for dust cap on access valves and plug oil check on compressor.
- 1/2" hex for compressor mounting bolts.
- 1/4" square for valve stem and service valves and old style compressor valves.
- 3/16" square for valve refrigerant charging tanks.



124-C

**126-C** Economy compressor access valve wrench. Chrome plated. Has 1/4", 3/8", 3/16" and 5/16" square drive ratchets and is specially designed for use on compressors with access valves in hard to reach places. Reversible ratchets.



126-C



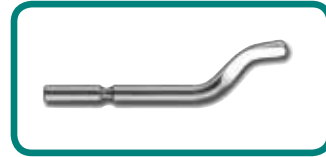
# TUBE DEBURRING

## DEBURRING TOOL

**210-F** The rotary style blade is perfect for removing burrs from holes and edges. Large ergonomic handle reduces user fatigue. Ships complete with two heavy duty blades - extra blade stores inside the handle. For copper, steel, aluminum, zinc, cast iron, brass and plastic tubing. Length 5-3/4". Wt. 1.5 oz.



210-F



S10001087 -Deburr Replacement Blade

## INNER-OUTER REAMING AND DEBURRING TOOLS

For 3/16" to 1-1/2" (5 mm to 38 mm) O.D. tubing.

Reams both inside and outside edges of tube at a 60° included angle with 3 hardened cutting blades. Tough die cast body. Deburs both clockwise and counterclockwise. Fluted body is shaped to fit comfortably in palm.

**208-F** Reamer for copper, aluminum and brass tubing. Hardened steel cutter blades. Blue finish. Wt. .63 lbs.

**208-FSS** Reamer for aircraft grade stainless steel tubing, hard or soft copper, aluminum, brass and steel tubing. Tungsten hardened tool steel cutter blades. Black finish. Wt. .63 lbs.



208-F

# IMPERIAL® TOOL BAG

## 15-POCKET PROFESSIONAL TOOL BAG

**TB-52 Tool Bag**

- 8"W x 16"L x 11"D.
- Double layered ballistic nylon.
- Wide opening mouth.
- Padded handles and 48" shoulder strap.
- Designed to hold tools.
- Tools not included!

TB-52



# RATCHET WRENCHES

## 195-F KWIK-TITE® RATCHET WRENCHES

For 5/16" to 2" and 7 mm to 32 mm hex sizes.

The Kwik-Tite ratchet wrench speeds installation of tube fittings and valves, hex nuts, bolts and fasteners. This unique wrench, with its open jaw design, makes it easy to slip onto fittings and fasteners, even in tight quarters. Flips quickly into tightening position with a sure grip on all hex surfaces.

12-point contact distributes torque pressures evenly on the flats of the hex, not at the corners. Eliminates warping and distorting of fittings and fasteners. Because of the Kwik-Tite ratchet action, tightening jobs are easier and faster.

Kwik-Tite wrenches are constructed for rugged use. Jaws are hardened steel. Handles are made of heavy gauge alloy steel, with a black oxide finish.



Ratcheting of wrench requires only 30° of movement.



**SAE**

PART NO.	HEX SIZE (in.)	OVERALL LENGTH (in.)
195-F 05	5/16	5-1/2
195-F 06	3/8	5-1/2
195-F 07	7/16	5-3/8
195-F 08	1/2	5-1/2
195-F 09	9/16	7-1/4
195-F 10	5/8	7-5/32
195-F 11	11/16	7-1/4
195-F 12	3/4	7-5/16
195-F 13	13/16	9-1/8
195-F 14	7/8	9-3/32
195-F 15	15/16	9-1/4
195-F 16	1	9-9/32
195-F 17	1-1/16	13.59
195-F 18	1-1/8	13.59
195-F 19	1-3/16	13.59
195-F 20	1-1/4	13.59
195-F 22	1-3/8	13.84
195-F 24	1-1/2	13.84
195-F 26	1-5/8	13.84
195-F 28	1-3/4	14.21
195-F 32	2	14.21

- (1) 5/16" - 3/4" sizes have two-tone grips as shown.
- (2) 13/16" - 1" sizes do not have grips.
- (3) 1-1/16" - 2" sizes have foam grips (not shown).



195-F 12



195-F 22 mm

**METRIC**

PART NO.	HEX SIZE (mm)	OVERALL LENGTH (mm)	OVERALL LENGTH (in.)
195-F 07 mm	7	140.72	5.54
195-F 08 mm	8	140.72	5.54
195-F 09 mm	9	140.72	5.54
195-F 10 mm	10	140.72	5.54
195-F 11 mm	11	140.72	5.54
195-F 12 mm	12	140.72	5.54
195-F 13 mm	13	140.72	5.54
195-F 14 mm	14	187.45	7.38
195-F 15 mm	15	187.45	7.38
195-F 16 mm	16	187.45	7.38
195-F 17 mm	17	187.45	7.38
195-F 18 mm	18	187.45	7.38
195-F 19 mm	19	187.45	7.38
195-F 21 mm	21	237.50	9.35
195-F 22 mm	22	237.50	9.35
195-F 24 mm	24	237.50	9.35
195-F 27 mm	27	345.19	13.59
195-F 30 mm	30	345.19	13.59
195-F 32 mm	32	345.19	13.59

- (1) 7 mm - 19 mm sizes have two-tone grips as shown.
- (2) 21 mm - 24 mm sizes do not have grips.
- (3) 27 mm - 32 mm sizes have foam grips (not shown).



195-5STDM KIT



195-7STDS KIT

**KWIK-TITE® RATCHET WRENCH KITS**

PART NO.	DESCRIPTION	WEIGHT (lbs.)
195-4STDS KIT	4-Pc. SAE kit for refrigeration. Contains 5/8", 13/16", 15/16", and 1-1/16" wrenches in pouch. (Not shown).	2.3
195-5STDM KIT	5-Pc. metric kit. Contains 10 mm, 11 mm, 12 mm, 13 mm and 14 mm wrenches in pouch.	2
195-7STDS KIT	7-Pc. SAE kit. Contains 3/8", 7/16", 1/2", 9/16", 5/8", 11/16" and 3/4" wrenches in pouch.	2.5

## ALPHA-NUMERICAL INDEX

PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.
1W	71	93-S-10	18	175EX10	17	195-F 22	24	307-FP	4	398-CKP	32
1W393	70	93-S-12	18	175EX12	17	195-F 22 mm	24	312-FC	1	400-F	13
2W	71	93-S-14	18	175EX14	17	195-F 24	24	323-CR	35	400-RB	32, 35
2W393	70	94-SSP	18	175EX16	17	195-F 24 mm	24	325-CB	35	401-FA	13
3W5	71	95-S	18	175EX18	17	195-F 26	24	327-FP	4	402-FA	13
3W6	70	101-F	4	175EX22	17	195-F 27 mm	24	335-CKP	32	404-CB	35
5W4	70	102-F-04	4	175EX26	17	195-F 28	24	336-CKP	32	404-CR	35
5W6	71	102-F-05	4	175EXC	17	195-F 30 mm	24	350-FHA	9	405-CB	35
6W4	70	102-F-06	4	175EXP	17	195-F 32	24	360-FHA	9	405-CR	35
6W6	71	102-F-07	4	193-S	18	195-F 32 mm	24	364-FH-02	7	405-RH	32, 34
9-C	43	102-F-08	4	195-4STDS	24	195-FC	11	364-FH-03	7	405-RL	32, 34
10SG	32, 34	102-F-10	4	195-5STDM KIT	24	195-SA	18	364-FHA-04	7	406-CB	35
11W	70	102-F-12	4	195-7STDS KIT	24	201-F	4	364-FHA-05	7	406-CR	35
13W	71	102-F-14	4	195-F 05	24	203-FA	11	364-FHA-06	7	406-FA	3
14WA	72	103-FS	11	195-F 06	24	203-MRS	38	364-FHA-08	7	407-CB	35
15WA	72	105-FF	22	195-F 07	24	205-MRS	38	364-FHA-10	7	407-CR	35
16-C	39	105W	72	195-F 07 mm	24	206-FB	3	364-FHA-12	7	408-CB	35
16WA	72	109W	72	195-F 08	24	206-MRS	38	364-FHA-14	7	408-CR	35
17-C	39	112-F	4	195-F 08 mm	24	208-F	23	364-FHA-16	7	415-C	32
17WA	72	120-F	19	195-F 09	24	208-FSS	23	364-FHAM-6MM	7	416-C	32
18-C	39	122-FA	19	195-F 09 mm	24	210-F	23	364-FHAM-10MM	7	417-C	32
18WA	72	123-FA	19	195-F 10	24	213-MRS	38	364-FHAM-12MM	7	417-C-6	32
19WA	72	124-C	22	195-F 10 mm	24	214-MRS	38	364-FHB-04	7	418-CC	32
20-A	29, 39	124-FA	19	195-F 11	24	215-MRS	38	364-FHB-05	7	419-C	32
20WA	72	126-C	22	195-F 11 mm	24	216-MRS	38	364-FHB-06	7	420-BCKP	35
21-H	29	127-C	22	195-F 12	24	227-FA	1	364-FHB-07	7	420-C	32
21-L	29	127-CO	22	195-F 12 mm	24	260-FHA	9	364-FHB-08	7	420-RCKP	35
21WA	72	140-F-04	22	195-F 13	24	270-F-12	10	364-FHBM-6MM	7	421-C	32
24-C	39	140-F-06	22	195-F 13 mm	24	270-F-14	10	364-FHBM-8MM	7	421-CM	32
25-K	39	140-F-08	22	195-F 14	24	270-F-16	10	364-FHBM-12MM	7	422-C	32
25W	69	140-F-10	22	195-F 14 mm	24	270-F-18	10	367-FH	6	422-CB	35
26-C	39	140-F-12	22	195-F 15	24	271-F	10	368-FH	6	422-CR	35
26W	69	140-F-14	22	195-F 15 mm	24	275-FS	16	370-FH	6	423-CAM	35
27-C	39	140-F-18	22	195-F 16	24	275-FSC	16, 20	375-FS	11	423-CAPD	35
30W	71	140-F-22	22	195-F 16 mm	24	275-FSCD	16, 20	395-C	32	423-CK	35
41W	69	142-F	22	195-F 17	24	275-FSD	16	395-CD	32	423-CKP	35
42W	69	144-F	3	195-F 17 mm	24	278-FS-03X04X06	16	395-CKP	32	423-CR	35
45W	69	144-FB	3	195-F 18	24	278-FS-05	16	396-C	32	424-CB	35
93-FB	12	163-F	4	195-F 18 mm	24	278-FS-08	16	396-CD	32	424-CR	35
93-S-04	18	174-F	2	195-F 19	24	278-FS-10	16	396-CKP	32	425-CAM	35
93-S-05	18	175-EX	17	195-F 19 mm	24	278-FS-12	16	397-CD	32	425-CAPD	35
93-S-06	18	175EX06	17	195-F 20	24	293-F	15	398-CC	32	425-CB	35
93-S-08	18	175EX08	17	195-F 21 mm	24	300-FB	11	398-CD	32	425-CK	35

# ALPHA-NUMERICAL INDEX

PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.
425-CKP	35	482-CKP	32	560-CB	31	637-F	14	800-MBY	38	842-C	30
426-CKP	35	494-C	32	560-FTY	38, 46	640-C	31	800-R	32, 33	843-CS	30
427-CKP	35	495-C	32	560-S-03	15	640-CB	31	803-MRB	37	844-CC	30
428-CKP	35	495-CB	32	560-S-04	15	641-CC	31	803-MRR	37	844-CS	30
429-CKP	35	495-CD	32	560-S-05	15	641-CM	31	803-MRS	37	845-C	30
431-CM	35	495-CKP	32	560-S-06	15	642-C	31	803-MRY	37	846-C	30
432-CM	35	496-C	32	560-S-08	15	644-C	31	804-MRB	37	846-CS	30
434-BKP	35	496-CD	32	560-S-10	15	644-CS	31	804-MRR	37	850-C	30
434-RKP	35	496-CKP	32	564-FH-06	8	645-C	31	804-MRS	37	851-C	30
435-CKP	32	498-C	32	564-FH-08	8	646-C	31	804-MRY	37	852-C	30
436-CKP	32	500-C	32	566-CC	31	650-C	31	805-MRB	37	853-MRB	37
437-FB	13	500-CD	32	570-CKPC	31	651-C	31	805-MRR	37	853-MRR	37
441-CB	35	500-CD-6	32	572-CKPC	31	651-CKPSC	31	805-MRS	37	853-MRS	37
441-CR	35	500-FC	11	572-FTY	38, 46	652-C	31	805-MRY	37	853-MRY	37
443-C	32	500-RH	32, 34	580-CKPSC	31	660-CB	31	806-MRB	37	854-MRB	37
447-F	14	500-RL	32, 34	581-CKPSC	31	664-FH-04	8	806-MRR	37	854-MRR	37
450-C	32	505-C	32	582-CKPC	31	664-FH-06	8	806-MRS	37	854-MRS	37
450-CM	32	507-FB	13	600-F	10	664-FH-6MM	8	806-MRY	37	854-MRY	37
451-C	32	510-C	31	600-R	32, 33, 34	664-FH-08	8	808-MRB	37	855-MRB	37
451-CB	35	510-CM	31	601-RK	32, 33	664-FH-8MM	8	808-MRR	37	855-MRR	37
451-CBM	35	511-C	31	602-RK	32, 33, 34	664-FH-10MM	8	808-MRS	37	855-MRS	37
451-CM	32	511-CM	31	603-MRS	38	664-FH-12MM	8	808-MRY	37	855-MRY	37
451-CR	35	512-C	31	605-MRS	38	680-CKPSC	31	812-MRB	37	856-MRB	37
451-CRM	35	513-C	31	606-MRS	38	681-CKPSC	31	812-MRR	37	856-MRR	37
452-C	32	514-CC	31	612-MRS	38	700-CV	32, 33	812-MRS	37	856-MRS	37
452-C-6	32	515-C	31	620-CC	30	715-CC	30	812-MRY	37	856-MRY	37
452-CB	35	516-CC	31	620-CB	30	717-CC	30	820-C	30	860-CSC	30
452-CR	35	520-C	31	620-CKP	30	718-CC	30	820-CS	30	862-CSC	30
453-C	32	520-CA	31	620-CS	30	720-CC	30	821-C	30	864-CSC	30
453-CB	35	520-CAM	31	621-C	30	721-CC	30	821-CS	30	865-CSC	30
453-CR	35	521-C	31	621-C-6	30	725-CC	30	829-C	30	866-CSC	30
454-C	32	522-CC	31	621-CD	31	726-CC	30	830-CKP	30	870-CSC	30
455-C	32	523-C	31	621-CK	31	740-CBC	30	830-CKPS	30	871-CSC	30
456-C	32	525-CKPC	31	621-CKP	31	741-CBC	30	831-CKP	30	872-CSC	30
458-CB	35	525-F	12	621-CM	31	745-CBC	30	831-CKPS	30	880-CKPSC	30
458-CR	35	535-C	41	621-CS	31	745-CKPC	30	835-CSC	30	903-MRB	37
459-CB	35	536-FTY	38, 46	626-CSC	31	750-CC	30	836-CSC	30	903-MRR	37
459-CR	35	537-F	14	629-C	31	751-CC	30	837-CSC	30	903-MRS	37
460-CB	35	540-CB	31	630-CKP	31	755-CC	30	840-C	30	903-MRY	37
460-CR	35	541-C	42	630-CKPS	31	762-CKPC	30	840-CKPSC	30	905-MRB	37
466-C	28	542-C	42	631-CKP	31	800-MBB	38	841-C	30	905-MRR	37
470-FH	5	548-FTY	38, 46	631-CKP-6	31	800-MBR	38	841-CKPSC	30	905-MRS	37
481-CKPC	32	555-FS	15	631-CKPS	31	800-MBS	38	841-CM	30	905-MRY	37

# ALPHA-NUMERICAL INDEX

PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.
906-MRB	37	2602	48	14571	36	IE-164	53	IR-90HU	60	IR-1150S	60
906-MRR	37	2605	48	7121103	76	IE-165	53	IR-090K	59	IR-1150SU	60
906-MRS	37	3054	45	7121104	76	IE-177	52	IR-90Q	58	IR-2124R	60
906-MRY	37	3054-230V	45	7121105	76	IE-178	52	IR-92	57	IR-2129R	60
953-MRB	37	4014	50	BC-101	79	IE-180	52	IR-92TP	57	IR-2154R	60
953-MRR	37	4014-80Z	50	BC-102	79	IE-182	52	IR-120H	62	IR-2159R	60
953-MRS	37	4014-G	50	BC-103	79	IE-187	55, 77	IR-120S	62	IR-2184R	60
953-MRY	37	4015	50	BS-103	77	IF-5KITC	74	IR-120T	64	IR-2189R	60
955-MRB	37	4015-80Z	50	ET-103	77	IF-101	74	IR-124T	64	IR-2545H	60
955-MRR	37	4015-G	50	ET-104	76	IF-103	74	IR-129T	64	IR-2545HU	60
955-MRS	37	4036	46	ET-107	75	IF-104	74	IR-150H	62	IR-2590H	60
955-MRY	37	4036-Q	46	ET-109	75	IF-6567C	74	IR-150T	64	IR-2590HU	60
956-MRB	37	4501	36	ET-110	75	IF-7476C	74	IR-154T	64	IR-3818C	57
956-MRR	37	4510	36	ET-111	75	IF-7614C	74	IR-159T	64	IR-3845	59
956-MRS	37	4775	36	G6400	43	IF-7693C	74	IR-170S	62	IR-3845H	60
956-MRY	37	4900	45	G6600	43	IF-9315C	74	IR-170T	64	IR-3845HU	60
1003	44	5000	46	GL-1000	48	IR-0015R	60	IR-174T	64	IR-3845Q	58
1003RK	44	5101	44	GT-113	79	IR-0018R	60	IR-179T	64	IR-3845S	60
1011	44	5175	43	GT-114	79	IR-4CK	57	IR-182TK	64	IR-3845SU	60
1012	44	5300	43	GT-116	78	IR-6CK	57	IR-183TK	64	IR-3845T	64
1101	44	7001	47	HP-54	78	IR-6CKCASE	57	IR-184TK	64	IR-3890	59
1102	44	7001GS	47	HP-55	78	IR-6QK	58	IR-230S	60	IR-3890C	57
1201	44	7001RK	47	HP-56	78	IR-8TK	64	IR-250H	60	IR-3890H	60
1226-FA	19	7002	47	IE-106	55	IR-12K	59	IR-250HU	60	IR-3890HU	60
1301	44	7003GS	47	IE-110	54	IR-12QK	58	IR-380H	60	IR-3890Q	58
1702	45	7003RK	47	IE-112	54	IR-15R	63	IR-380HU	60	IR-3890S	60
1703	45	7005	47	IE-114	54	IR-38	59	IR-380S	60	IR-3890SU	60
1705	45	7005GS	47	IE-115	53	IR-38Q	58	IR-380SU	60	IR-3890T	64
1751	45	7005RK	47	IE-116	53	IR-44H	61	IR-380T	64	IR-4715T	64
1751RK	45	7006	47	IE-120	52	IR-44K	61	IR-470H	60	IR-4718C	57
1768	45	7007	47	IE-122	52	IR-44MK	61	IR-470HU	60	IR-4745	59
1770	45	7008	47	IE-123	51	IR-44S	61	IR-470S	60	IR-4745H	60
1813	46	7009	47	IE-125	52	IR-045K	59	IR-470T	64	IR-4745HU	60
1832	46	7009GS	47	IE-130	52	IR-47	59	IR-593T	64	IR-4745Q	58
1833	46	7009RK	47	IE-135	54	IR-47Q	58	IR-601R	63	IR-4745S	60
1834	46	7010	47	IE-136	54	IR-47R	63	IR-602R	63	IR-4745SU	60
1843	46	7013	47	IE-140	55	IR-48R	63	IR-700H	60	IR-4745T	64
2000-FS	20	7020	47	IE-145	55, 77	IR-50H	61	IR-700HU	60	IR-4790	59
2001	48	7024	47	IE-150	55, 77	IR-50K	61	IR-700S	60	IR-4790C	57
2136	48	7025	43	IE-155	51	IR-50S	61	IR-700SU	60	IR-4790HU	60
2423-P	35	7701	42	IE-159	51	IR-70	59	IR-700T	64	IR-4790Q	58
2425-CP	35	7701RK	42	IE-162	53	IR-70Q	58	IR-900H	60	IR-4790S	60
2601	48	9997	50	IE-163	53	IR-90	59	IR-1080T	64	IR-4790SU	60



## ALPHA-NUMERICAL INDEX

PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO.
IR-4790T.....	64	IR-51245T.....	64	S62661.....	22	S8485201.....	9	TM500P.....	80		
IR-5004TK.....	64	IR-51290T.....	64	S62666.....	22	S8487001.....	9	TM500S.....	80		
IR-5108TK.....	64	IR-477045K.....	59	S62835.....	10	S8694401.....	15	U7001.....	47		
IR-5120T.....	64	IR-477090K.....	59	S62836.....	10	S8711201.....	15	U7002.....	47		
IR-5120TK.....	64	IR-LHS.....	63, 64	S62837.....	10	S8771301.....	15	U7005.....	47		
IR-7018C.....	57	IR-LRRL.....	63	S64104.....	33, 34	S8771601.....	15	U7006.....	47		
IR-7045.....	59	IR-LRS.....	63	S64108.....	33, 34	S8771701.....	15	U7009.....	47		
IR-7045H.....	60	KCK-F.....	40	S64870.....	33, 34	S8771801.....	15	U7010.....	47		
IR-7045HU.....	60	KCK-M.....	40	S66434.....	22	S8920071.....	40				
IR-7045Q.....	58	LD-900.....	49	S66435.....	22	S8920072.....	40				
IR-7045S.....	60	LD-910.....	49	S66914.....	9	S8920073.....	40				
IR-7045SU.....	60	LD-920.....	49	S68479.....	9	S8920074.....	40				
IR-7090.....	59	LT100BNR.....	80	S68480.....	9	S8920077.....	40				
IR-7090C.....	57	LT POSTERSET.....	80	S68481.....	9	S8920263.....	40				
IR-7090H.....	60	LTWD1.....	80	S68492.....	9	S8921626.....	38				
IR-7090HU.....	60	PT-109.....	41	S68493.....	9	S10000265.....	38				
IR-7090Q.....	58	S26883.....	2, 3	S68496.....	9	S10000770.....	3				
IR-7090S.....	60	S32633.....	2, 3	S68497.....	9	S16002045.....	41				
IR-7090SU.....	60	S38600.....	16	S68502.....	9	S16003162.....	1, 3				
IR-9045.....	59	S62156.....	9	S69021.....	33, 34	TB-52.....	23, 79				
IR-9045H.....	60	S62255.....	10	S70348.....	15	TC-1000.....	1				
IR-9045Q.....	58	S62287.....	10	S70349.....	15	TC-1010.....	1				
IR-9090.....	59	S62289.....	10	S71174.....	22	TC-1020.....	1				
IR-9090H.....	60	S62290.....	10	S74197.....	3	TC-1050.....	2				
IR-9090HU.....	60	S62291.....	10	S74761.....	3	TC-1050RH.....	2				
IR-9090Q.....	58	S62292.....	10	S74762.....	2, 3	TC-1051.....	2				
IR-9345T.....	64	S62294.....	10	S74833.....	3	TC-2050.....	2				
IR-9390T.....	64	S62295.....	10	S74834.....	3	TC-3050.....	2				
IR-10815T.....	64	S62296.....	10	S75015.....	1, 2, 3	TC-3050RH.....	2				
IR-10845T.....	64	S62297.....	10	S75046.....	1, 3	TC-3051.....	2				
IR-10890T.....	64	S62298.....	10	S75531.....	18	TE-BA01.....	43				
IR-11545SU.....	60	S62299.....	10	S76548.....	33, 34	TE-BA0145.....	43				
IR-11590S.....	60	S62300.....	10	S76637.....	1, 3	TE-BV01-3.....	38				
IR-12045H.....	62	S62301.....	10	S77511.....	3	TE-BV01B.....	38				
IR-12045S.....	62	S62302.....	10	S5951125.....	40	TE-BV01R.....	38				
IR-12090H.....	62	S62303.....	10	S7931801.....	3	TE-BV01Y.....	38				
IR-12090S.....	62	S62304.....	10	S7958301.....	38	TE-BV02-3.....	38				
IR-15045H.....	62	S62305.....	10	S7958302.....	38	TE-BV02B.....	38				
IR-15090H.....	62	S62306.....	10	S8058801.....	9	TE-BV02R.....	38				
IR-17045S.....	62	S62307.....	10	S8058901.....	9	TE-BV02Y.....	38				
IR-17090S.....	62	S62641.....	22	S8201501.....	3	TH-103.....	80				
IR-47700K.....	59	S62648.....	22	S8230301.....	35	TM400P.....	80				
IR-51215T.....	64	S62655.....	22	S8442401.....	9	TM400S.....	80				