

# *Alcoa Assembly Tools For Frangible Collars*

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- **Hand Installation Tools**
- **Removal Tools**
- **Pneumatic Power Tools**

Updated: 31-Jul-2014

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**Alcoa  
Fastening  
Systems**



**Assembly Tool Systems Division**  
801 S. Placentia Avenue  
Fullerton, CA USA 92831  
714-278-8908 Telephone  
714-871-4821 FAX

# How to Select a Frangible Collar Tool

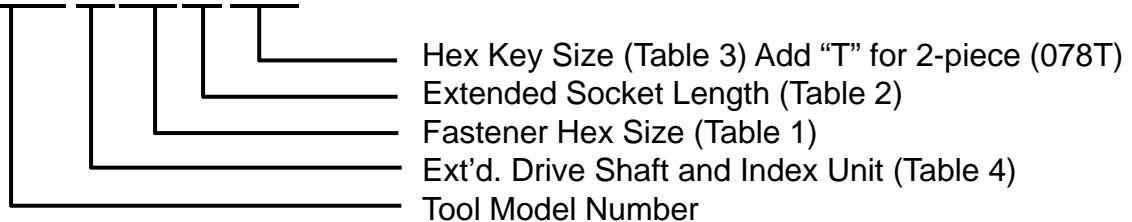
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## How to Specify Your Tool Selection:

1. Identify the fastener type and diameter by part number.
2. Identify the installed torque range of the fastener.
3. What is the hex size of the collar? Example: 1/4" = 250
4. Does a pistol grip tool or a straight motor fit the application best?
5. Most tools can be equipped with a 360° index unit that will help with application accessibility.
6. Would the tool fit best with an extended socket or a flush socket?
7. Are the threaded pins interference fit or loose? If they are loose a hex key would be required.
8. Don't see the tool you need? We have 100's of tool models not listed in this catalog.
9. Need Additional Help? Please call us for assistance.

## Example of Complete Tool Model Number:

CTL1429 C 343 D 078



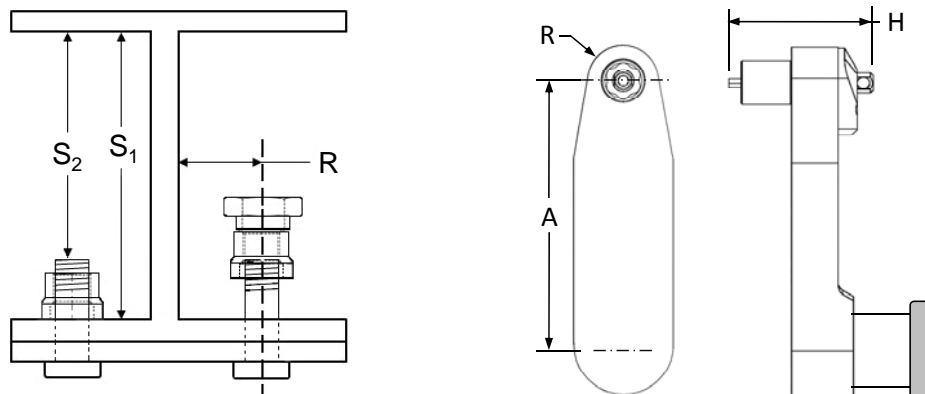
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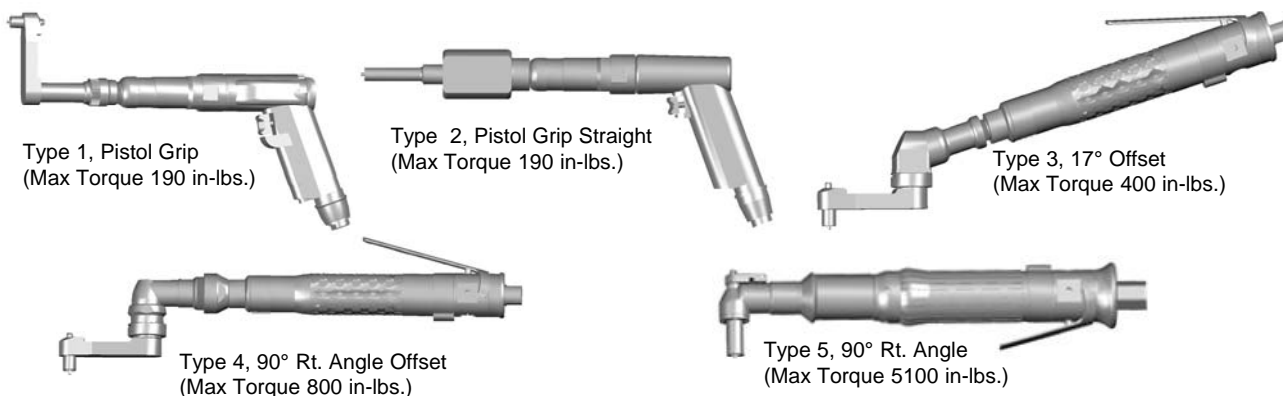


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**New Tool Application Form**



1. Nut or frangible collar part number \_\_\_\_\_
2. Hex size of the Nut or frangible collar \_\_\_\_\_ inches \_\_\_\_\_ mm
3. What is the final torque requirement of the fastener \_\_\_\_\_ in-lbs., \_\_\_\_\_ (Nm)
4. "R" Edge distance between centerline of fastener to nearest structure \_\_\_\_\_ (in) \_\_\_\_\_ (mm)
5. "S<sub>1</sub>" Total working space \_\_\_\_\_ (in), \_\_\_\_\_ (mm)
6. "S<sub>2</sub>" Minimum clearance over Pin \_\_\_\_\_ (in) \_\_\_\_\_ (mm)
7. Will a hex key be required? YES or NO (circle one), if yes, hex key size \_\_\_\_\_
8. "A" Offset required, Min \_\_\_\_\_ Max \_\_\_\_\_ (inch or mm)
9. Is an extended socket required? Yes or No, Length of socket \_\_\_\_\_ (inch or mm)
10. "H" Maximum height of the gear head, Including socket \_\_\_\_\_ (inch or mm)



11. Determine type of tool: Type 1 \_\_\_\_\_, Type 2 \_\_\_\_\_, Type 3 \_\_\_\_\_, Type 4 \_\_\_\_\_, Type 5 \_\_\_\_\_
12. Make and model number of preferred nutrunner \_\_\_\_\_

Company Name \_\_\_\_\_

Contact \_\_\_\_\_

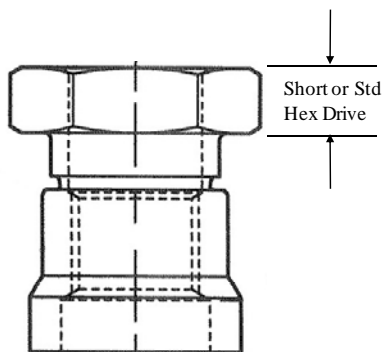
Phone \_\_\_\_\_ FAX \_\_\_\_\_

Return by FAX: (714) 871-4821 (attn: Product Management)

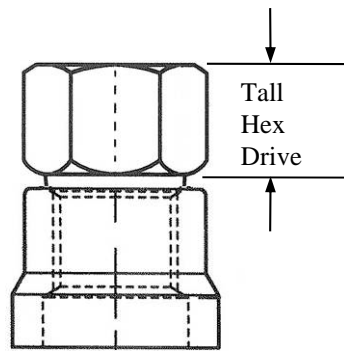
# Standard & Taller Hex Frangible Collars

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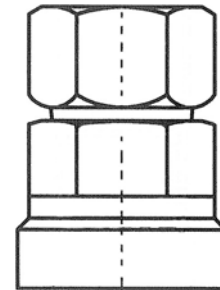
**Standard “HL”  
Frangible Collar**



**“HST” (Tall Hex)  
Frangible Collar**



**“Bi-Hex Nut”  
(Airbus)**



Our socket and hex key systems are designed to install all (3) types of fasteners using the same sockets and hex key systems.

Below is an example of a tool ordering number:

CTL1429C343D078T

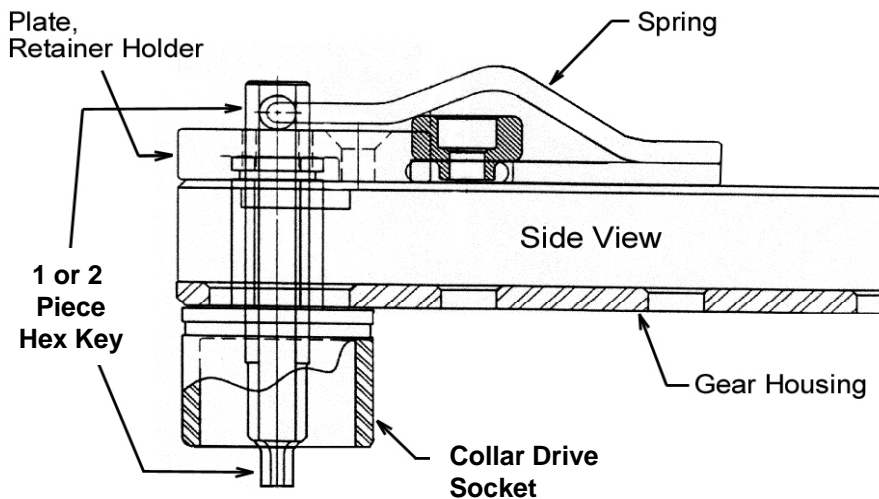
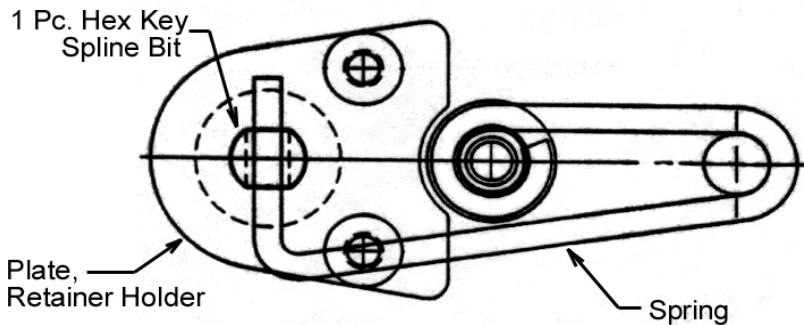
CTL3429A343D078T

# **“ERGO” HEX KEY SYSTEM FOR IMPROVED PERFORMANCE & SAFETY**



This unique hex key design keeps it from turning and twisting the return spring during the fastener installation cycle. It also eliminates torsional friction that can build up during installation cycle improving the spring durability and making it easier to remove the tool and move to the next fastener.

Top View



# **“NEW” HIGH STRENGTH HEX KEY SYSTEM**

## **For Alcoa Power Tools**

The purpose of the hex key is to hold the screw or bolt (pin) from turning while the nut is being installed, this is particularly important in non-interference fit holes. It works as a “hold & drive” from the nut side of the application and is affixed to the back of the attached gear housing.

### **Improved Strength, Solid 1-Piece Hex Key**

*Solid 1-Pc Hex Key* →



### **1-Piece Hex Key**

- Very strong-forged Hex Key
- Available in socket lengths up to 3.0” (76.2mm)
- Hex Keys last longer
- Less downtime
- Improved production
- Easy to change or replace (Does not require tools)
- Lowers fastener install costs
- Available in hex sizes: .062 (1/16”), .078 (5/64), .094 (3/32”)

**1-Piece Hex Key System**



**2-Piece Hex Key System**



Hex Key



Hex Key Holder with Set Screw

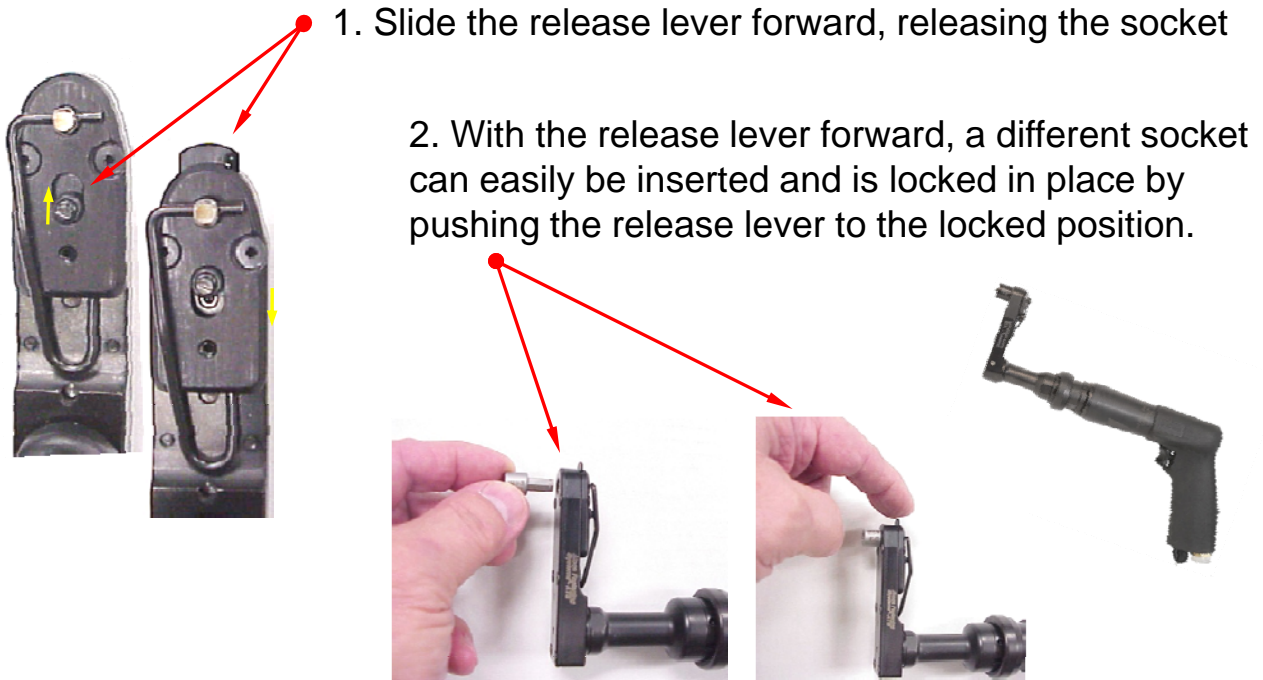
Note: 1-pc and 2-pc hex keys systems are interchangeable

# Socket Options

## “Quick Change Socket System”

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*The Alcoa tool can be equipped with the “Quick Change” socket feature allowing the operator to easily change the socket and hex key size to install a range of fasteners. Usually one tool has the torque capability to install two or more diameters of collars.*



**Standard Alcoa 1-Piece Hex Keys**  
(worn or broken keys are easily changed without special tooling)



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# *Frangible Collars Assembly Tools*

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Collar Removal Tools . . . . .	Section 6

### **Sales & Service:**

Alcoa Fastening Systems  
Assembly Tool Systems Division  
801 S. Placentia Avenue  
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714-278-8908 Customer Service  
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# *Frangible Collars Assembly Tools*

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# Pistol Grip Power Tools

## SECTION 1



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# Frangible Collars Assembly Tools

## Pistol Grip Extended Drive Shaft Options

**Table 4**  
Drive Shaft Extended Length

Code	Extended Shaft Length	Index Unit
A	-	With
B	-	Without
C	2.0" (50.8mm)	With
D	2.0" (50.8mm)	Without
G	6.0" (152.4mm)	With
H	6.0" (152.4mm)	Without



CTL1439**B**343G078  
Short with no index unit



CTL1439**A**343G078  
Short with Index Unit



CTL1439**C**343G078  
2 in. Ext'd with Index Unit

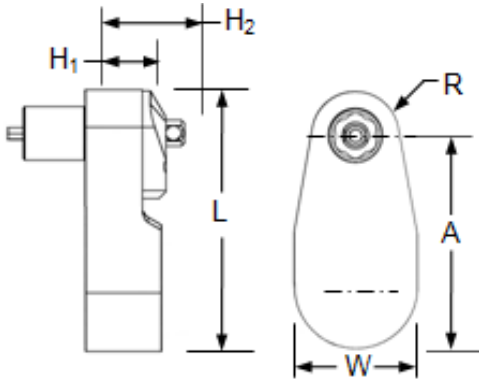
360° Index Unit



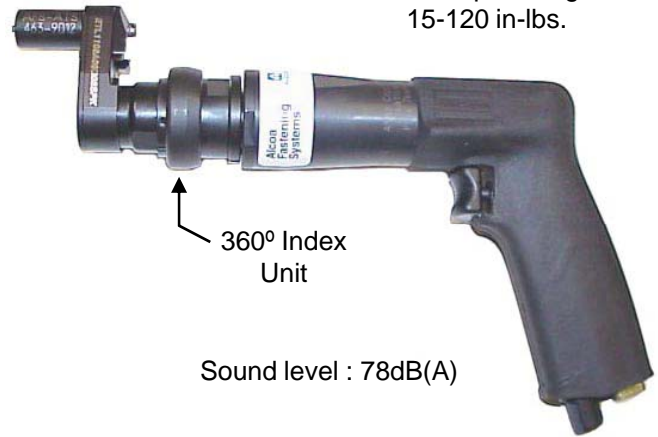
CTL1439**G**343G078  
6 in. Ext'd with Index Unit

Index units are highly recommended, this feature allows the gear head to rotate and lock into place every 45° increasing the utility in various locations.

# Offset Pistol Grip Tools For Frangible Collar Applications



Tool Torque Range:  
15-120 in-lbs.



Sound level : 78dB(A)

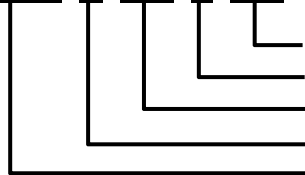
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
CTL1428	3	1.25" [31.8mm]	.47" [11.9mm]	.81" [20.5mm]	2.11" [53.5mm]	1.0" [25.4mm]	.35" [8.9mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Extended Socket Length		Table 3a Key Hex Size		Table 3b Aster Key		Table 4 Drive Shaft Length with 360° Index Capability		
Code	Hex Size	Code	Extension	Code	Hex Size	Code	Dia.	Code	Length	Index Unit
219	7/32"	A	Flush	062	1/16"	000	No Key	A	-	With
250	1/4"	C	3/8"	078	5/64"	AK2	-2	C	2.0"	With
312	5/16"	D	1/2"	094	3/32"	AK3	-3	G	6.0"	With
343	11/32"	E	5/8"			AK3A	-3A			
437	7/16"	F	3/4"			AK4	-4			
		G	1.0"							
		J	2.0"							

Largest flush socket size is (.312) 5/16" A/F

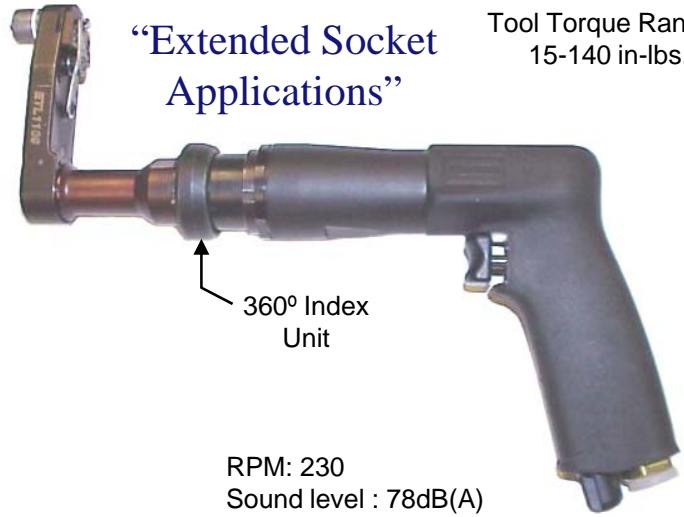
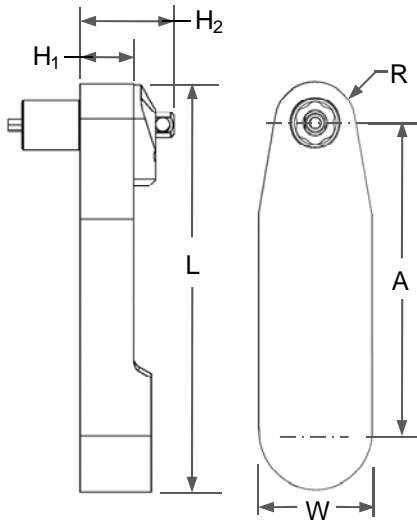
Example of Complete Tool Model Number:

**CTL1428 C 312 E 078**



Hex Key Size (Table 3a) or Aster Key Size (Table 3b)  
Extended Socket Length (Table 2)  
Fastener Hex Size (Table 1)  
Ext'd. Drive Shaft (Table 4)  
Tool Model Number

# Offset Pistol Grip Tools For Frangible Collar Applications



Tool Torque Range:  
15-140 in-lbs.

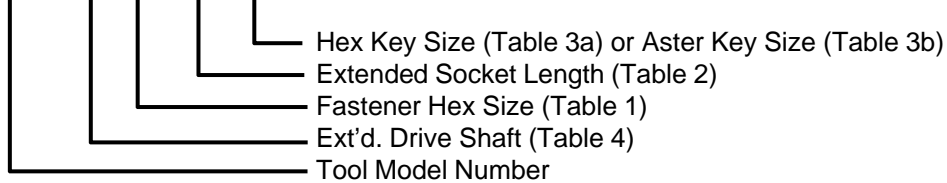
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL1429</b>	5	2.68 [68.1mm]	.47 [11.9mm]	.81 [20.5mm]	3.53 [89.7mm]	1.0 [25.4mm]	.35 [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)	Table 2 Extended Socket Length	Table 3a Key Hex Size	Table 3b Aster Key	Table 4 Drive Shaft Length with 360° Index Capability																																																												
<table border="1"> <thead> <tr> <th>Code</th> <th>Hex Size</th> </tr> </thead> <tbody> <tr> <td>219</td> <td>7/32"</td> </tr> <tr> <td>250</td> <td>1/4"</td> </tr> <tr> <td>312</td> <td>5/16"</td> </tr> <tr> <td>343</td> <td>11/32"</td> </tr> <tr> <td>437</td> <td>7/16"</td> </tr> </tbody> </table>	Code	Hex Size	219	7/32"	250	1/4"	312	5/16"	343	11/32"	437	7/16"	<table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Flush</td> </tr> <tr> <td>C</td> <td>3/8"</td> </tr> <tr> <td>D</td> <td>1/2"</td> </tr> <tr> <td>E</td> <td>5/8"</td> </tr> <tr> <td>F</td> <td>3/4"</td> </tr> <tr> <td>G</td> <td>1.0"</td> </tr> <tr> <td>J</td> <td>2.0"</td> </tr> </tbody> </table>	Code	Extension	A	Flush	C	3/8"	D	1/2"	E	5/8"	F	3/4"	G	1.0"	J	2.0"	<table border="1"> <thead> <tr> <th>Code</th> <th>Hex Size</th> </tr> </thead> <tbody> <tr> <td>062</td> <td>1/16"</td> </tr> <tr> <td>078</td> <td>5/64"</td> </tr> <tr> <td>094</td> <td>3/32"</td> </tr> </tbody> </table>	Code	Hex Size	062	1/16"	078	5/64"	094	3/32"	<table border="1"> <thead> <tr> <th>Code</th> <th>Dia.</th> </tr> </thead> <tbody> <tr> <td>000</td> <td>No Key</td> </tr> <tr> <td>AK2</td> <td>-2</td> </tr> <tr> <td>AK3</td> <td>-3</td> </tr> <tr> <td>AK3A</td> <td>-3A</td> </tr> <tr> <td>AK4</td> <td>-4</td> </tr> </tbody> </table>	Code	Dia.	000	No Key	AK2	-2	AK3	-3	AK3A	-3A	AK4	-4	<table border="1"> <thead> <tr> <th>Code</th> <th>Length</th> <th>Index Unit</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>-</td> <td>With</td> </tr> <tr> <td>C</td> <td>2.0"</td> <td>With</td> </tr> <tr> <td>G</td> <td>6.0"</td> <td>With</td> </tr> </tbody> </table>	Code	Length	Index Unit	A	-	With	C	2.0"	With	G	6.0"	With
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A	-	With																																																														
C	2.0"	With																																																														
G	6.0"	With																																																														

Maximum Flush Socket is 5/16" (.312) Hex

Example of Complete Tool Model Number:

**CTL1429 C 312 E 078**



**Alcoa  
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Systems**

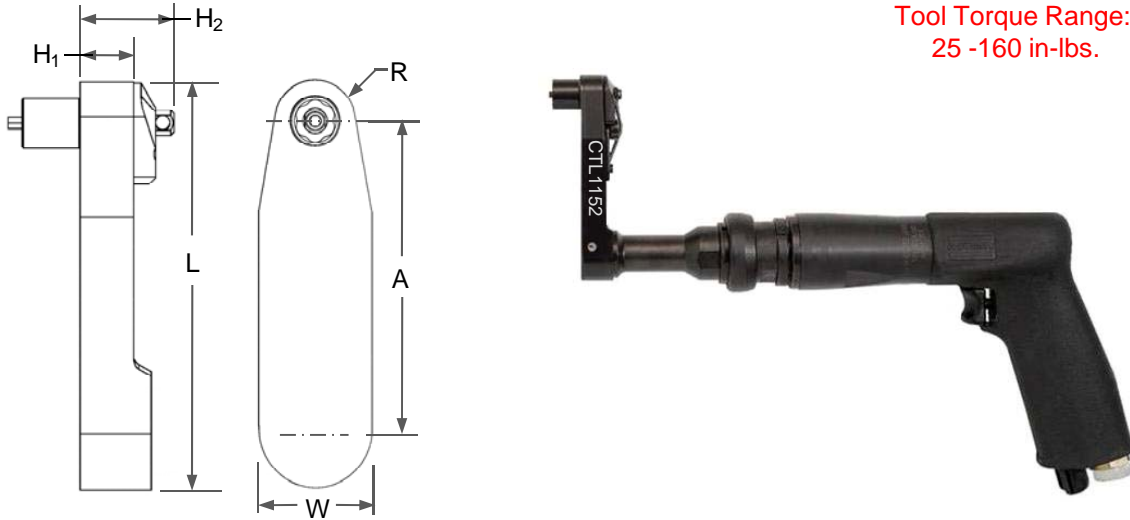


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# Offset Pistol Grip Tools For Frangible Collar Applications

Tool Torque Range:  
25 -160 in-lbs.



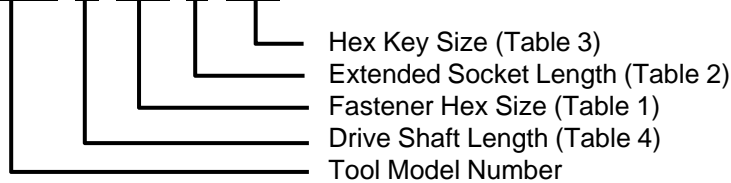
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> Ref.	L	W	R
<b>CTL1452A</b>	5	2.72" [69.0mm]	.38" [9.5mm]	.72" [18.5mm]	3.7" [94.7mm]	1.0" [25.4mm]	.39" [10.0mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Hex Size	Code	Length
219	7/32"	A	Flush	000	No Key	A	-
250	1/4"	C	3/8"	078	5/64"	C	2.0"
312	5/16"	D	1/2"	094	3/32"	G	6.0"
343	11/32"	E	5/8"	125T	1/8"		
375	3/8"	G	1.0"				
437	7/16"	J	2.0"				

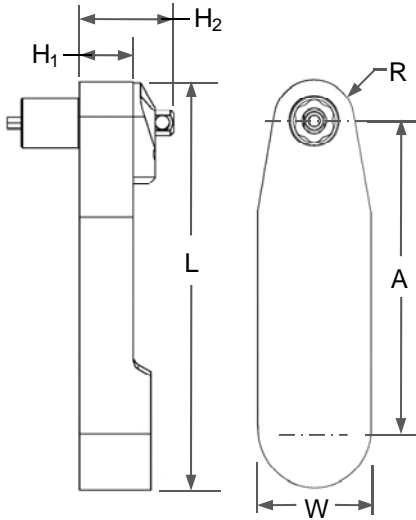
Max flush socket size is .343 (11/32")

Example of Complete Tool Model Number:

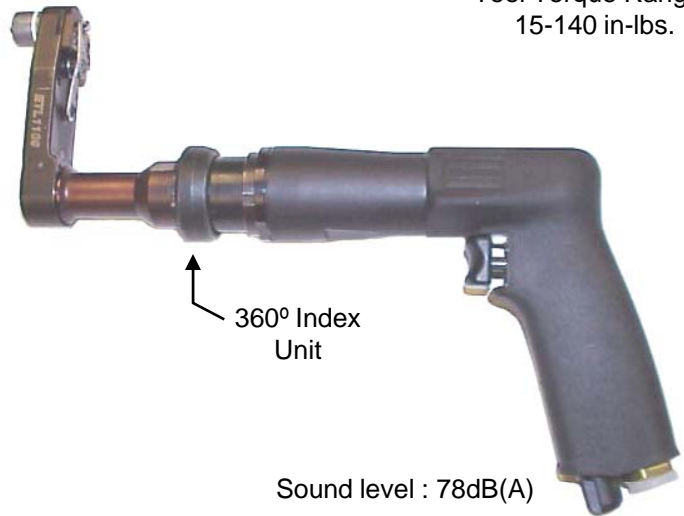
**CTL1452 C 343 A 078**



# Offset Pistol Grip Tools For Frangible Collar Applications



Tool Torque Range:  
15-140 in-lbs.



Sound level : 78dB(A)

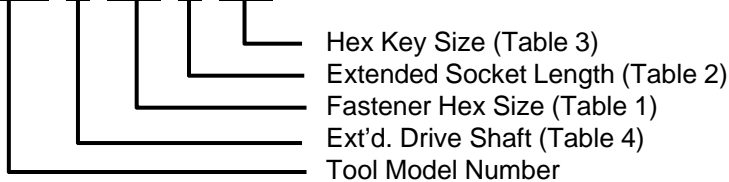
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL1438</b>	7	4.13" [104.9mm]	.47" [11.9mm]	.81" [20.5mm]	4.98" [126.5mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Size	Code	Length
219	7/32"	C	0.375"	062	1/16" Hex Key	A	-
250	1/4"	D	0.500"	078	5/64" Hex Key	C	2.0"
312	5/16"	E	0.625"	094	3/32" Hex Key	G	6.0"
343	11/32"	G	1.0"				
375	3/8"	J	2.0"				
437	7/16"						

Largest flush socket size is 5/16" A/F

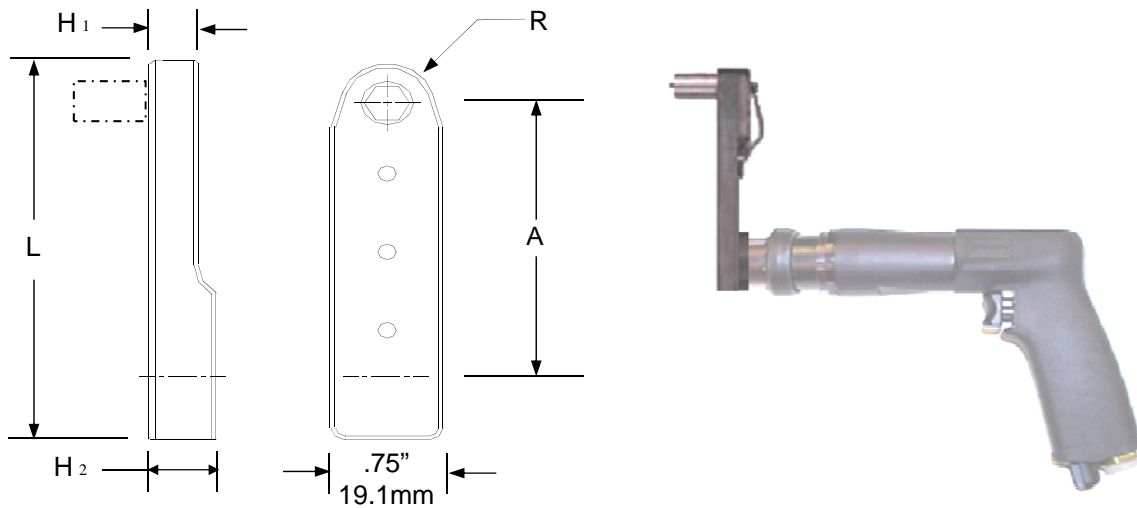
Example of Complete Tool Model Number:

**CTL1438 C 343 D 078**



# Offset Pistol Grip Tools For Frangible Collar Applications

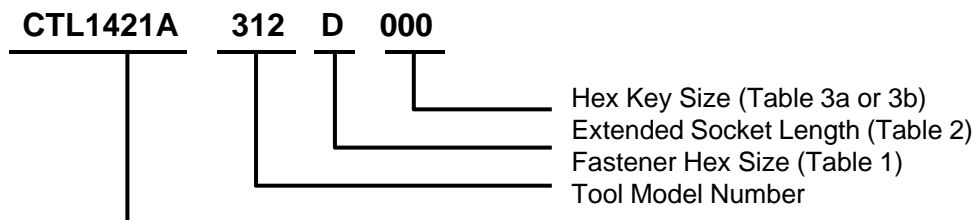
Max Torque 80 in\_lbs



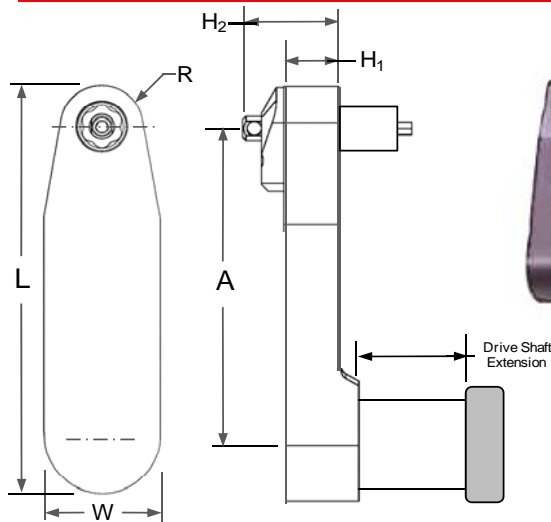
Model Number	No. of Gears	A	H1	H2	L	R
CTL1421	5	2.38	.34 [8.6mm]	.46	4.18 [106.1mm]	.31 [7.9mm]

Table 1 Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3a Key Hex Size		Table 3b Aster® Key	
Code	Hex Size	Code	Extension	Code	Size	Code	Dia.
219	7/32"	A	Flush	000	No Key	000	No Key
250	1/4"	B	1/4"	062	1/16"	AK2	-2
		C	3/8"	078	5/64"	AK3	-3
		D	1/2"			AK3A	-3A

Example of Complete Tool Model Number:



# Offset Pistol Grip Tools For Frangible Collar Applications



Tool Torque Range:  
15-130 in-lbs.



## Back Drive Socket Position

RPM: 275  
Sound level : 78dB(A)

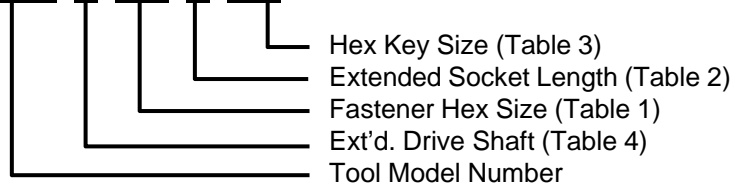
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R
<b>CTL1449</b>	4	1.96 [49.8mm]	.47 [11.8mm]	.81 [20.5mm]	2.81 [71.4mm]	.35 [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Size	Code	Length
219	7/32"	C	0.375"	062	1/16" Hex Key	A	-
250	1/4"	D	0.500"	078	5/64" Hex Key	C	2.0"
312	5/16"	E	0.625"	094	3/32" Hex Key	G	6.0"
343	11/32"	G	1.0"				
375	3/8"	J	2.0"				
437	7/16"						

Largest flush socket gear size is 5/16" A/F

Example of Complete Tool Model Number:

**CTL1449 C 343 D 078**



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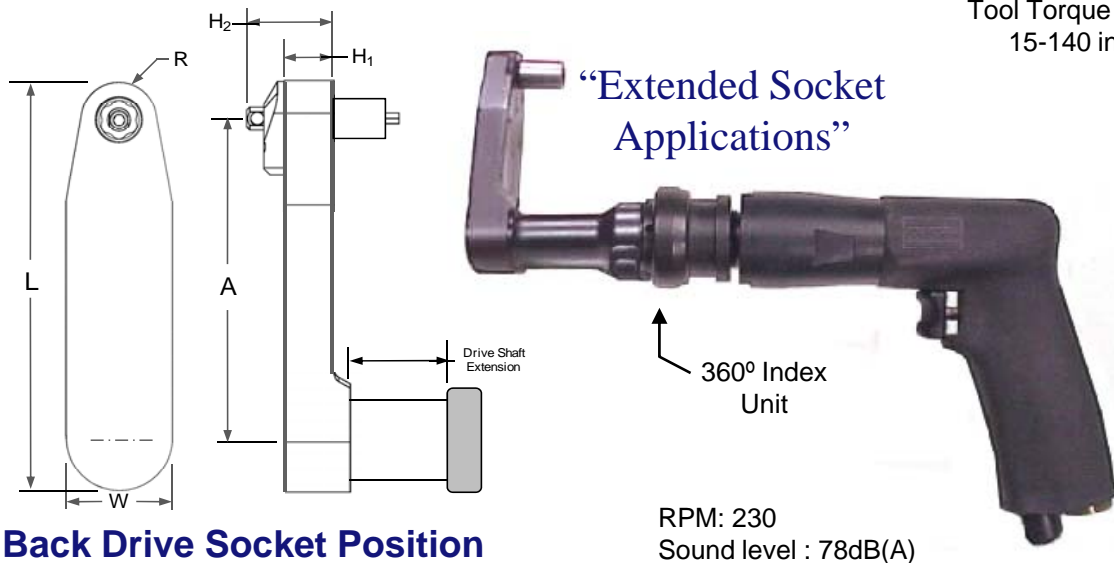
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# Offset Pistol Grip Tools For Frangible Collar Applications

Tool Torque Range:  
15-140 in-lbs.



**Back Drive Socket Position**

RPM: 230  
Sound level : 78dB(A)

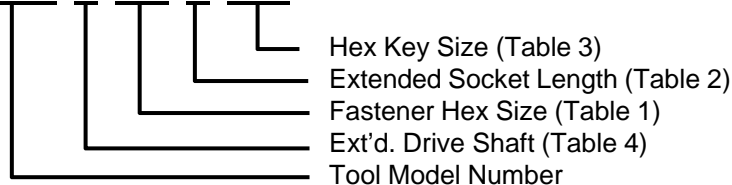
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R
<b>CTL1434</b>	6	3.47 [88.1mm]	.47 [11.9mm]	.81 [20.5mm]	4.39 [111.7mm]	.43 [10.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Size	Code	Length
219	7/32"	C	0.375"	062	1/16" Hex Key	A	-
250	1/4"	D	0.500"	078	5/64" Hex Key	C	2.0"
312	5/16"	E	0.625"	094	3/32" Hex Key	G	6.0"
343	11/32"	G	1.0"				
375	3/8"	J	2.0"				

Largest flush socket gear size is 5/16" A/F

Example of Complete Tool Model Number:

**CTL1434 C 343 D 078**

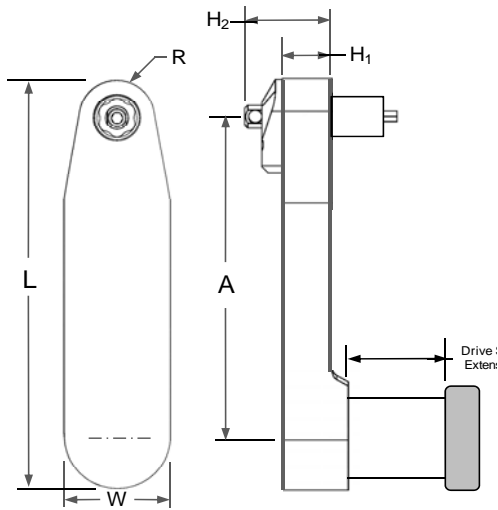


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Fullerton, CA USA 92831  
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# Offset Pistol Grip Tools For Frangible Collar Applications



**Back Drive Socket Position**

Tool Torque Range:  
15-140 in-lbs.

“Extended Socket Applications”



RPM: 230  
Sound level : 78dB(A)

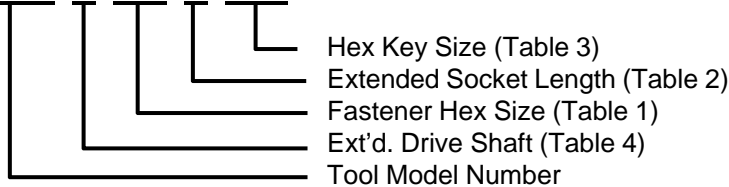
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R
<b>CTL1715</b>	6	3.38 [85.9mm]	.47 [11.9mm]	.66 [16.7mm]	4.20 [106.7mm]	.33 [8.3mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Size	Code	Length
219	7/32"	C	0.375"	062	1/16" Hex Key	A	-
250	1/4"	D	0.500"	078	5/64" Hex Key	C	2.0"
312	5/16"	E	0.625"	094	3/32" Hex Key	G	6.0"
		G	1.0"				
		J	2.0"				

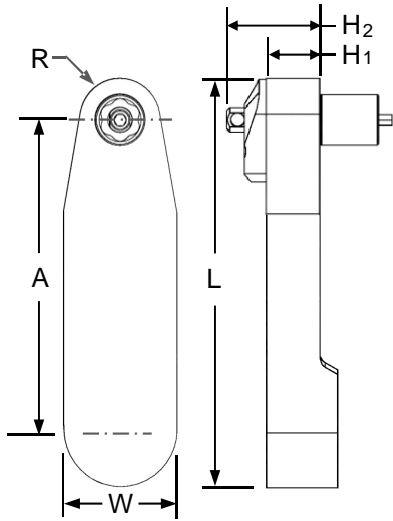
Largest flush socket gear size is 5/16" A/F

Example of Complete Tool Model Number:

**CTL1715 C 312 D 078**



# Offset Pistol Grip Tools For Frangible Collar Applications



**Back Drive Socket Position**



Tool Torque Range:  
15-90 in-lbs.

RPM: 275  
Sound level : 78dB(A)

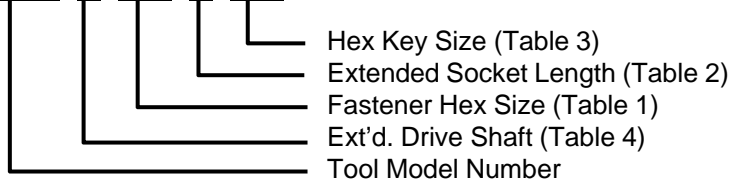
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL1424</b>	6	3.38" [85.8mm]	.47" [11.9mm]	.81" [20.5mm]	4.05" [102.9mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Length with 360° Index Unit	
Code	Hex Size	Code	Extension	Code	Hex Size	Code	Length
219	7/32"	A	Flush	062	1/16"	A	-
250	1/4"	C	0.375"	078	5/64"	C	2.0"
312	5/16"	D	0.500"	094	3/32"	G	6.0"
343	11/32"	E	0.625"				
375	3/8"	G	1.0"				
437	7/16"	J	2.0"				

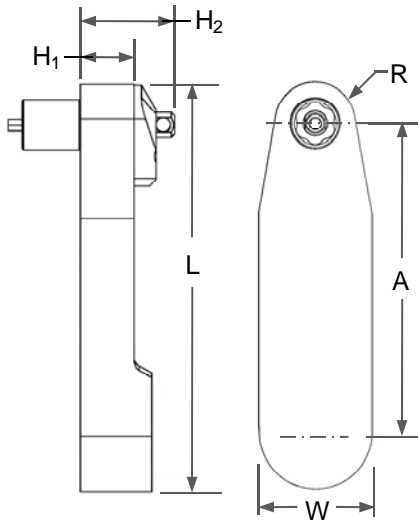
Largest flush socket gear size is 5/16" A/F

Example of Complete Tool Model Number:

**CTL1424 C 312 D 094**



# Offset Pistol Grip Tools For Frangible Collar Applications



Tool Torque Range:  
15-140 in-lbs.

“Flush or Extended  
Socket Applications”



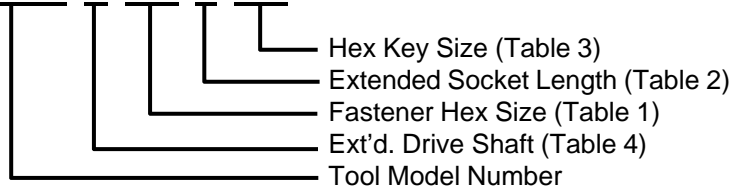
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> Ref.	L	W	R
<b>CTL1461</b>	5	2.75" [69.9mm]	.47" [11.9mm]	.81" [20.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
219	7/32"	A	Flush	062	1/16" Hex Key	A	-	With
250	1/4"	C	0.375"	078	5/64" Hex Key	B	-	Without
312	5/16"	D	0.500"	094	3/32" Hex Key	C	2.0"	With
343	11/32"	E	0.625"	125T	1/8" Hex Key	D	2.0"	Without
375	3/8"	G	1.0"			G	6.0"	With
437	7/16"	J	2.0"			H	6.0"	Without

24P

Example of Complete Tool Model Number:

**CTL1461 C 343 A 078**



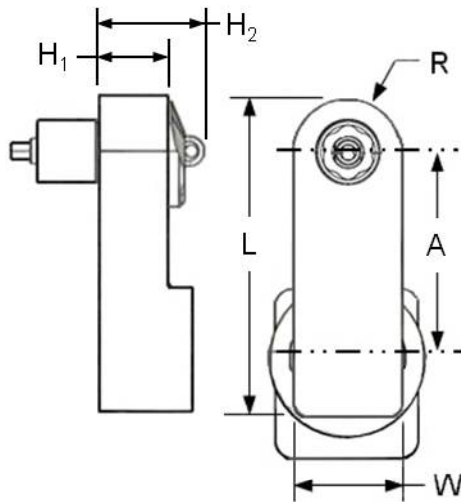
**Alcoa  
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# Offset Pistol Grip Tools For Frangible Collar Applications



Torque Max: 170 in-lbs



RPM: 220  
Sound level : 78dB(A)

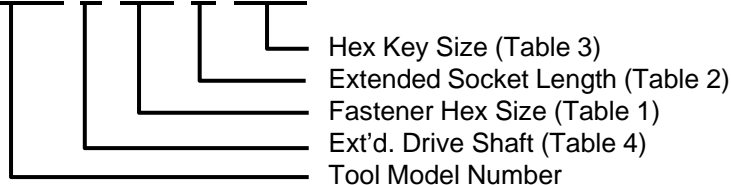
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL1415</b>	3	1.62" [41.1mm]	.68" [17.3mm]	1.0" [25.2mm]	2.69" [68.3mm]	1.0" (25.4mm)	.50" (12.2mm)

The above tool model is designed for use with a flush socket gear or extended sockets.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. Hex Key	B	-	Without
500	1/2"	E	0.625"	156T	5/32" Dia. Hex Key	C	2.0"	With
562	9/16"	G	1.0"	187T	3/16" Dia. Hex Key	D	2.0"	Without
		J	2.0"					

Example of Complete Tool Model Number:

**CTL1415 A 500 G 156T**



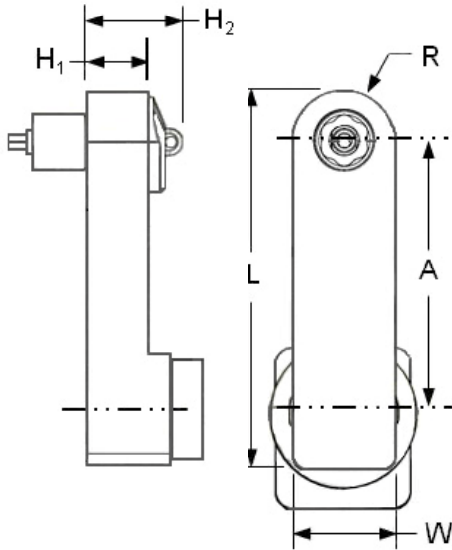
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# Offset Pistol Grip Tools For Frangible Collar Applications



Torque Max: 170 in-lbs



RPM: 220  
Sound level : 78dB(A)

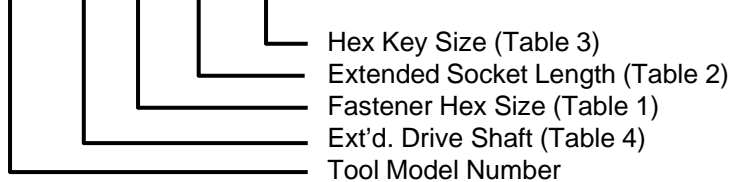
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (With Hex Key)	L	W	R
<b>CTL1420</b>	5	3.38" [85.9mm]	.68" [17.3mm]	1.0" [25.4mm]	4.44" [112.7mm]	1.0" (25.4mm)	.50" (12.2mm)

The above tool model is designed for use with a flush socket gear or extended sockets.

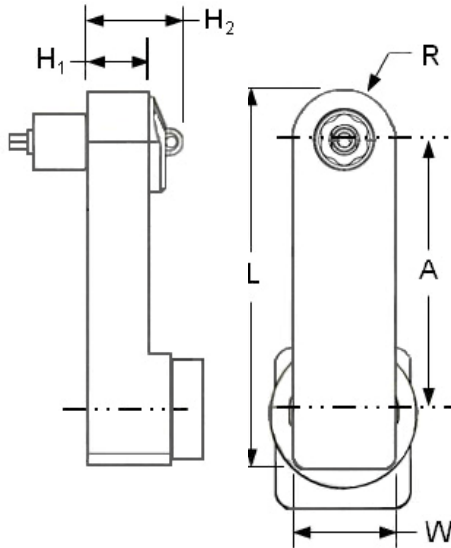
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. Hex Key	B	-	Without
500	1/2"	E	0.625"	156T	5/32" Dia. Hex Key	C	2.0"	With
562	9/16"	G	1.0"	187T	3/16" Dia. Hex Key	D	2.0"	Without
		J	2.0"					

Example of Complete Tool Model Number:

**CTL1420 A 500 G 156T**



# Offset Pistol Grip Tools For Frangible Collar Applications



Torque Max: 210 in-lbs



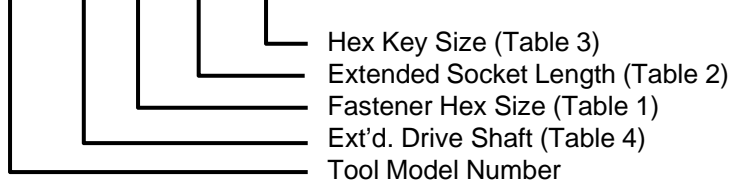
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (With Hex Key)	L	W	R
<b>CTL1436</b>	7	5.13" [130.3mm]	.68" [17.3mm]	1.0" [25.4mm]	6.19" [157.3mm]	1.0" (25.4mm)	.50" (12.2mm)

The above tool model is designed for use with a flush socket gear or extended sockets.

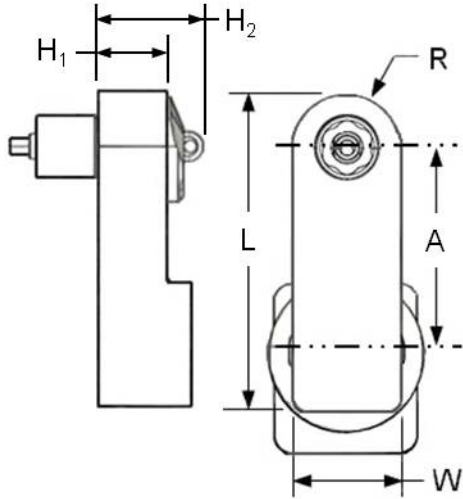
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. Hex Key	B	-	Without
500	1/2"	E	0.625"	156T	5/32" Dia. Hex Key	C	2.0"	With
562	9/16"	G	1.0"	187T	3/16" Dia. Hex Key	D	2.0"	Without
		J	2.0"					

Example of Complete Tool Model Number:

**CTL1436 A 500 G 156T**



# Offset Pistol Grip Tools For Frangible Collar Applications



Torque Max: 210 in-lbs



Ref: LUM21HR01-K

RPM: 110  
Sound level : 78dB(A)

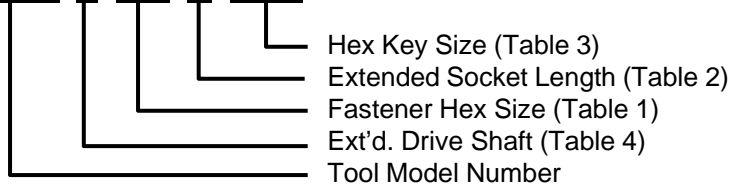
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTH1415</b>	3	1.62" [41.1mm]	.68" [17.3mm]	1.0" [25.4mm]	2.69" [68.3mm]	1.0" (25.4mm)	.50" (12.2mm)

The above tool model is designed for use with a flush socket gear or extended sockets.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. Hex Key	B	-	Without
500	1/2"	E	0.625"	156T	5/32" Dia. Hex Key	C	2.0"	With
562	9/16"	G	1.0"	187T	3/16" Dia. Hex Key	D	2.0"	Without
		J	2.0"					

Example of Complete Tool Model Number:

**CTH1415 A 500 G 156T**



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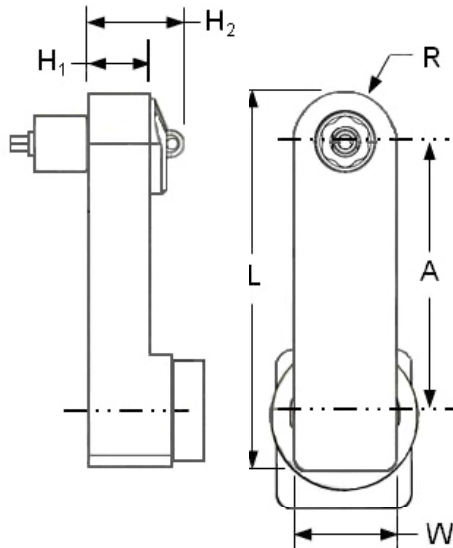


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# Offset Pistol Grip Tools For Frangible Collar Applications



Torque Max: 210 in-lbs



Ref: LUM21HR01-K

RPM: 110  
Sound level : 78dB(A)

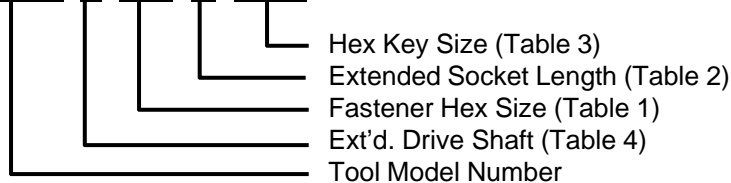
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (With Hex Key)	L	R
<b>CTH1420</b>	5	3.38 [85.9mm]	.68 [17.3mm]	1.0" [25.4mm]	4.44 [113.0mm]	.50 [12.7mm]

The above tool model is designed for use with a flush socket gear or extended sockets.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. Hex Key	B	-	Without
500	1/2"	E	0.625"	156T	5/32" Dia. Hex Key	C	2.0"	With
562	9/16"	G	1.0"	187T	3/16" Dia. Hex Key	D	2.0"	Without
		J	2.0"					

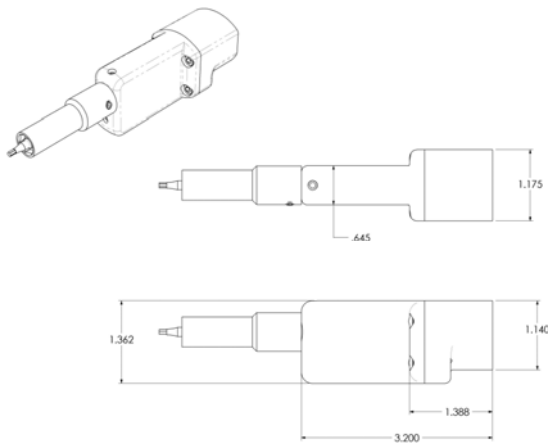
Example of Complete Tool Model Number:

**CTH1420 A 500 G 156T**



# Straight Pistol Grip Tools For Frangible Collar Applications

Torque Max: 135 in-lbs



RPM at Socket: 290

### Tool Data:

Torque Capability: Up to 135 in. lbs. maximum

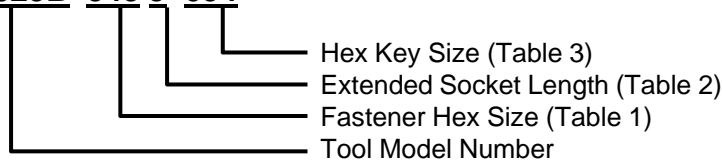
Total Tool Length:

Total Wt:

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 3 Aster Key	
Code	Hex Size	Code	Extension	Code	Size	Code	Dia.
219	7/32"	J	2.0"	062	1/16" Hex Key	000	No Key
250	1/4"	L	3.0"	078	5/64" Hex Key	AK2	-2
282	9/32"	P	4.0"	094	3/32" Hex Key	AK3	-3
312	5/16"					AK3A	-3A
343	11/32"					AK4	-4
375	3/8"						
437	7/16"						

Example of Complete Tool Model Number:

**CTL2023B 343 J 094**



# Straight Pistol Grip Tools For Frangible Collar Applications

Torque Max: 215 in-lbs



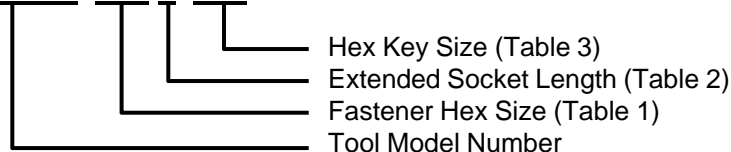
## Tool Data:

Torque Capability: Up to 215 in. lbs. Maximum  
 Total Tool Length: 14.2" [ 360mm] without Socket  
 Total Wt: 3.62 lbs [ 1.64 kg ]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	J	2.0"	094	3/32" Hex Key
437	7/16"	L	3.0"	125	1/8" Hex Key
500	1/2"	P	4.0"	156	5/32" Hex Key
562	9/16"			187	3/16" Hex Key
625	5/8"				
750	3/4"				

Example of Complete Tool Model Number:

**CTH2000B 437 J 156**



# *Frangible Collars Assembly Tools*

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## 17° Offset Power Tools

### SECTION 2



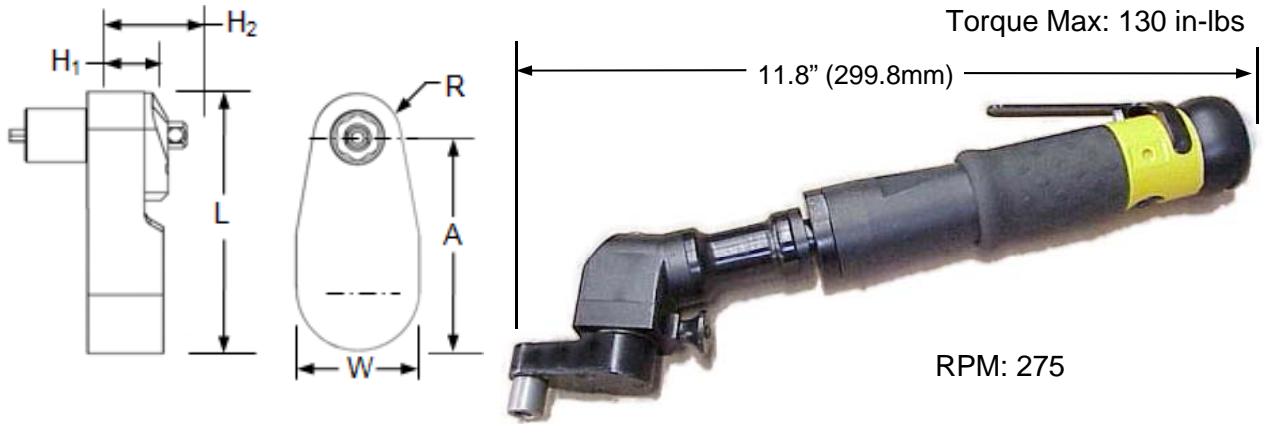
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# 17° Offset For Frangible Collars



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
CTL3428	3	1.25" [31.8mm]	.47" [11.9mm]	.81" [20.5mm]	2.11" [53.5mm]	1.0" [25.4mm]	.35" [8.9mm]

The above model tools are designed for use with extended sockets.

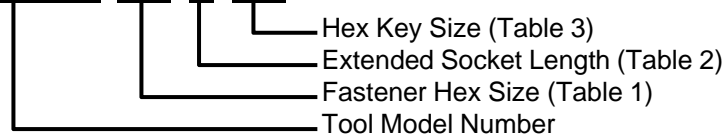
Table 1 Frangible Collar Hex Size (Across Flats)	Table 2 Ext'd.Socket Length	Table 3 Key Hex Size																																						
<table border="1"> <thead> <tr> <th>Code</th> <th>Hex Size</th> </tr> </thead> <tr> <td>219</td> <td>7/32"</td> </tr> <tr> <td>250</td> <td>1/4"</td> </tr> <tr> <td>312</td> <td>5/16"</td> </tr> <tr> <td>343</td> <td>11/32"</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>	Code	Hex Size	219	7/32"	250	1/4"	312	5/16"	343	11/32"					<table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tr> <td>A</td> <td>Flush</td> </tr> <tr> <td>C</td> <td>0.375"</td> </tr> <tr> <td>D</td> <td>0.500"</td> </tr> <tr> <td>E</td> <td>0.625"</td> </tr> <tr> <td>G</td> <td>1.0"</td> </tr> <tr> <td>J</td> <td>2.0"</td> </tr> </table>	Code	Extension	A	Flush	C	0.375"	D	0.500"	E	0.625"	G	1.0"	J	2.0"	<table border="1"> <thead> <tr> <th>Code</th> <th>Size</th> </tr> </thead> <tr> <td>062</td> <td>1/16" Hex Key</td> </tr> <tr> <td>078</td> <td>5/64" Hex Key</td> </tr> <tr> <td>094</td> <td>3/32" Hex Key</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Code	Size	062	1/16" Hex Key	078	5/64" Hex Key	094	3/32" Hex Key		
Code	Hex Size																																							
219	7/32"																																							
250	1/4"																																							
312	5/16"																																							
343	11/32"																																							
Code	Extension																																							
A	Flush																																							
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D	0.500"																																							
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G	1.0"																																							
J	2.0"																																							
Code	Size																																							
062	1/16" Hex Key																																							
078	5/64" Hex Key																																							
094	3/32" Hex Key																																							

\* Flush sockets only available in (.219, .250) hex sizes

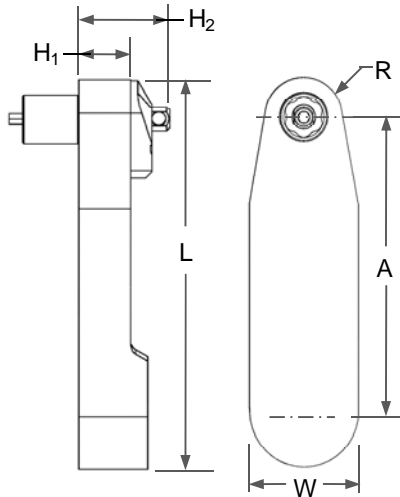
24P

Example of Complete Tool Model Number:

**CTL3428A 343 G 078**



# 17° Offset For Frangible Collars



Torque Max: 150 in-lbs  
RPM at Socket: 270

“Flush or Extended Socket Applications”

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3402A</b>	5	2.75" [69.9mm]	.38" [9.71mm]	.73" [18.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

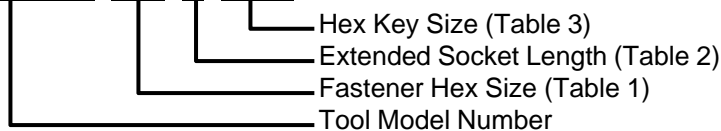
The above model tools are designed for use with a flush socket gear or extended sockets.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A	Flush	078T	5/64" Hex Key
250	1/4"	C	0.375"	094T	3/32" Hex Key
312	5/16"	D	0.500"	125T	1/8" Hex Key
343	11/32"	E	0.625"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

1/8" Hex key available on Models CT3110 and CT3111

Example of Complete Tool Model Number:

**CTL3402A 343 A 078T**



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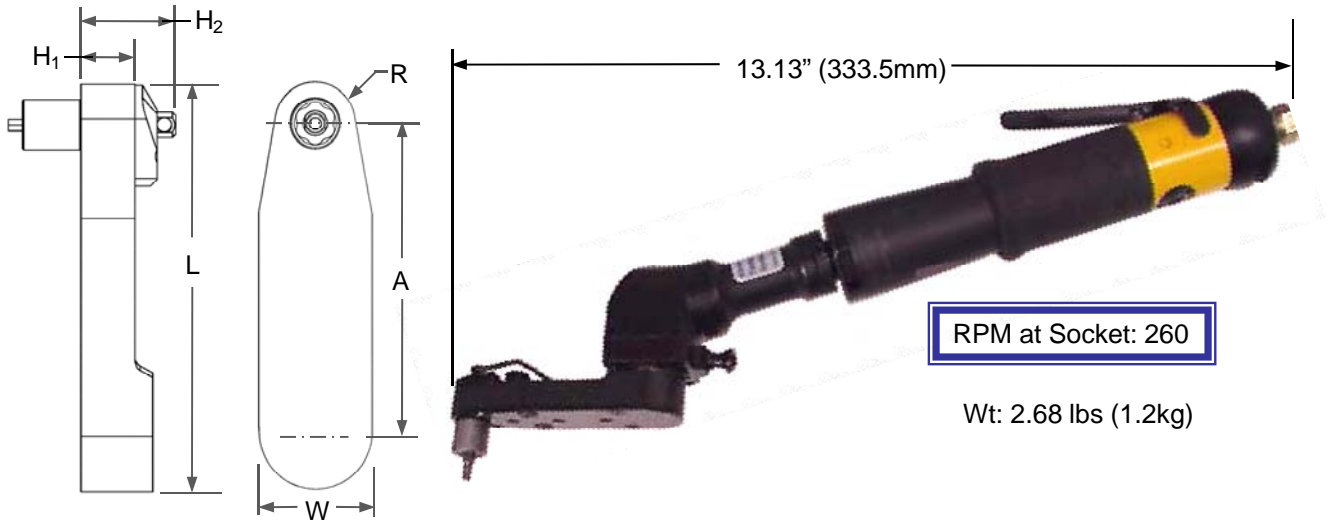


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# 17° Offset For Frangible Collars

Torque Max: 145 in-lbs



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3429A</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

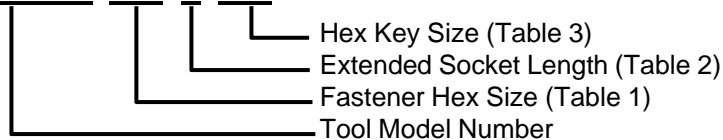
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
312	5/16"	D	0.500"	094	3/32" Hex Key
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"	G	1.0"		
		J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

24P

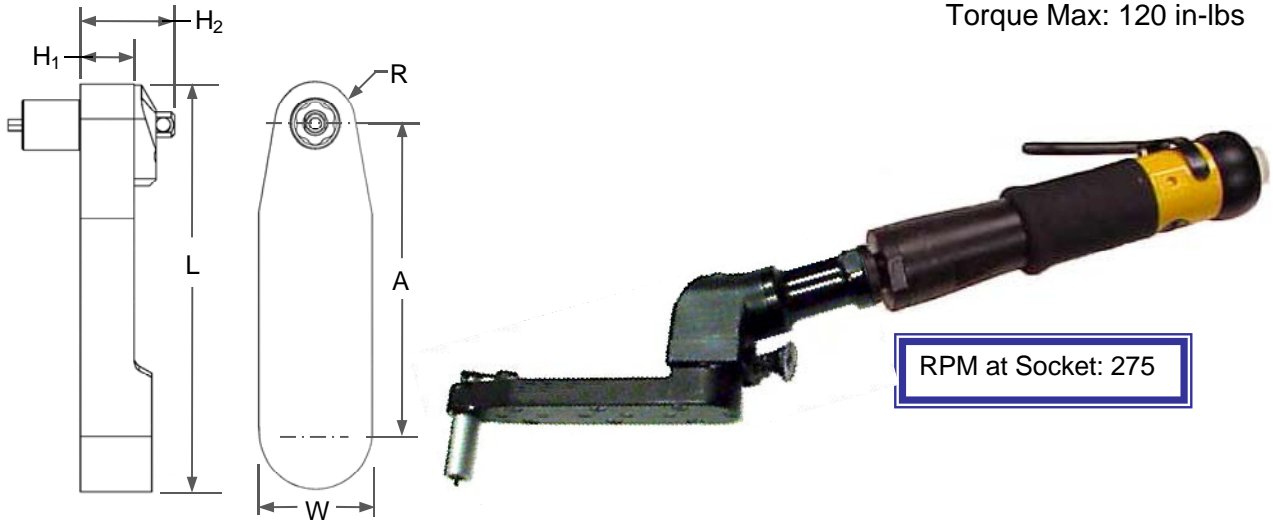
Example of Complete Tool Model Number:

**CTL3429A 343 F 078**



# 17° Offset For Frangible Collars

Torque Max: 120 in-lbs



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3438</b>	7	4.13" [104.9mm]	.47" [11.9mm]	.81" [20.5mm]	4.98" [126.5mm]	1.0" [25.4mm]	.35" [8.8mm]

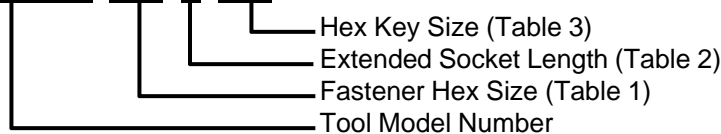
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" HexKey
250	1/4"	C	0.375"	078	5/64" HexKey
312	5/16"	D	0.500"	094	3/32" HexKey
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"	G	1.0"		
		J	2.0"		

\* Flush sockets available in (.250, .282 & .312) hex sizes

32P

Example of Complete Tool Model Number:

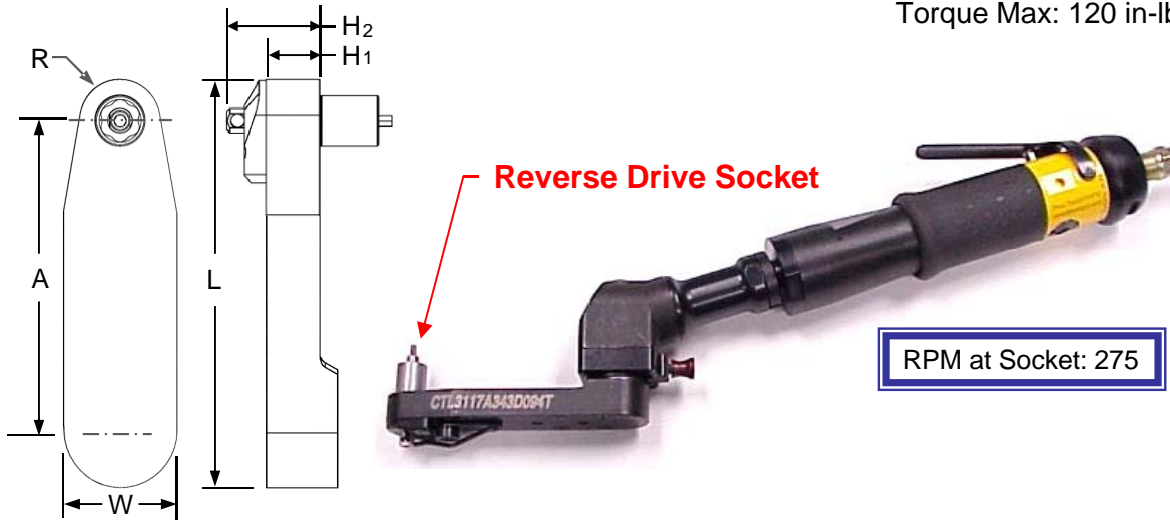
**CTL3438A 343 F 078**





# 17° Offset For Frangible Collars

Torque Max: 120 in-lbs



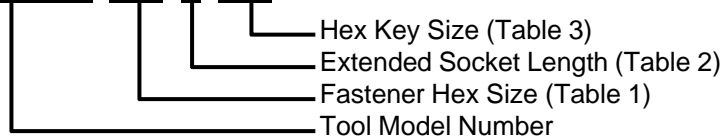
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3424A</b>	6	3.38" [85.8mm]	.47" [11.9mm]	.81" [20.5mm]	4.05" [102.9mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Hex Size
219	7/32"	A*	Flush	062	1/16"
250	1/4"	C	0.375"	078	5/64"
312	5/16"	D	0.500"	094	3/32"
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"	G	1.0"		
		J	2.0"		

\* Flush sockets available in (.220, .250, .282 & .312) hex sizes

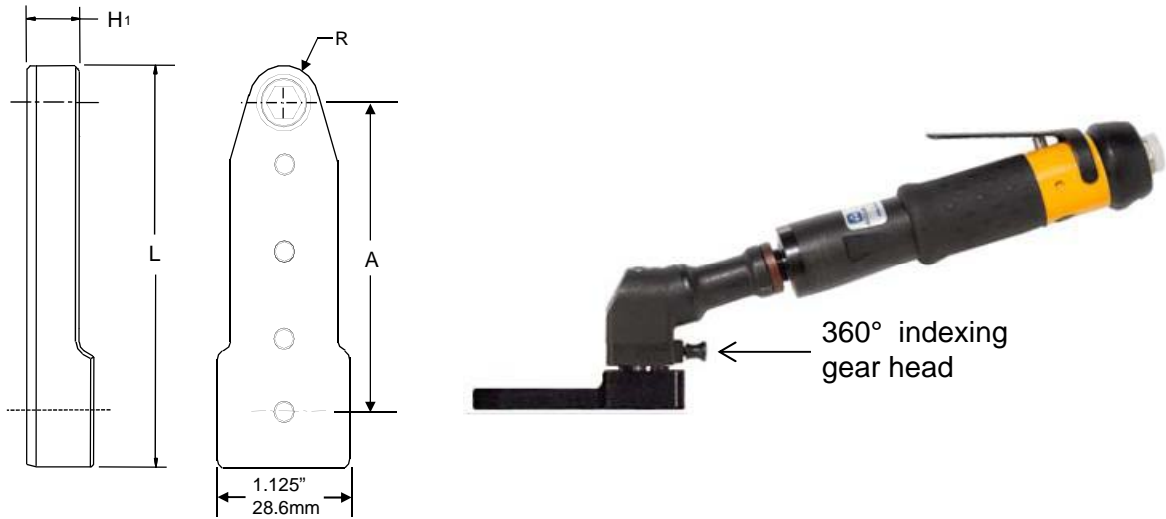
Example of Complete Tool Model Number:

**CTL3424A 343 F 078**



# 17° Offset For Frangible Collars

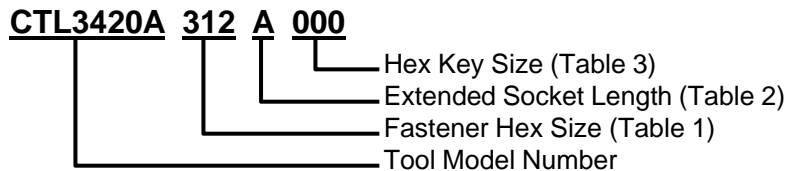
Torque Max: 90 in-lbs



Model Number	No. of Gears	A	H <sub>1</sub>	L	R
<b>CTL3420A</b>	5	2.41 [61.1mm]	.31 [7.8mm]	3.39 [86.1mm]	.36 [9.1mm]

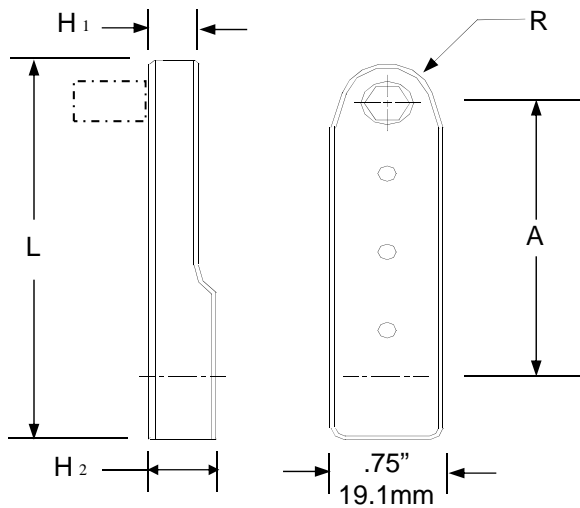
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Hex Size
219	7/32"	A	Flush	000	NA
250	1/4"	C	0.375"	062	1/16"
312	5/16"	D	0.500"	078	5/64"
343	11/32"	E	0.625"		
375	3/8"	G	1.0"		

Example of Complete Tool Model Number:



# 17° Offset For Frangible Collars

Torque Max: 80 in-lbs

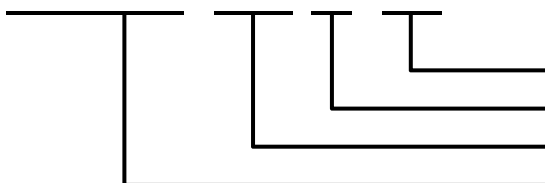


Model Number	No. of Gears	A	H1	H2	L	R
CTL3421	5	2.38	.34 [8.6mm]	.46	4.18 [106.1mm]	.31 [7.9mm]

Table 1 Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3a Key Hex Size		Table 3b Aster® Key	
Code	Hex Size	Code	Extension	Code	Size	Code	Dia.
219	7/32"	A	Flush	000	No Key	000	No Key
250	1/4"	B	1/4"	062	1/16"	AK2	-2
		C	3/8"	078	5/64"	AK3	-3
		D	1/2"			AK3A	-3A

Example of Complete Tool Model Number:

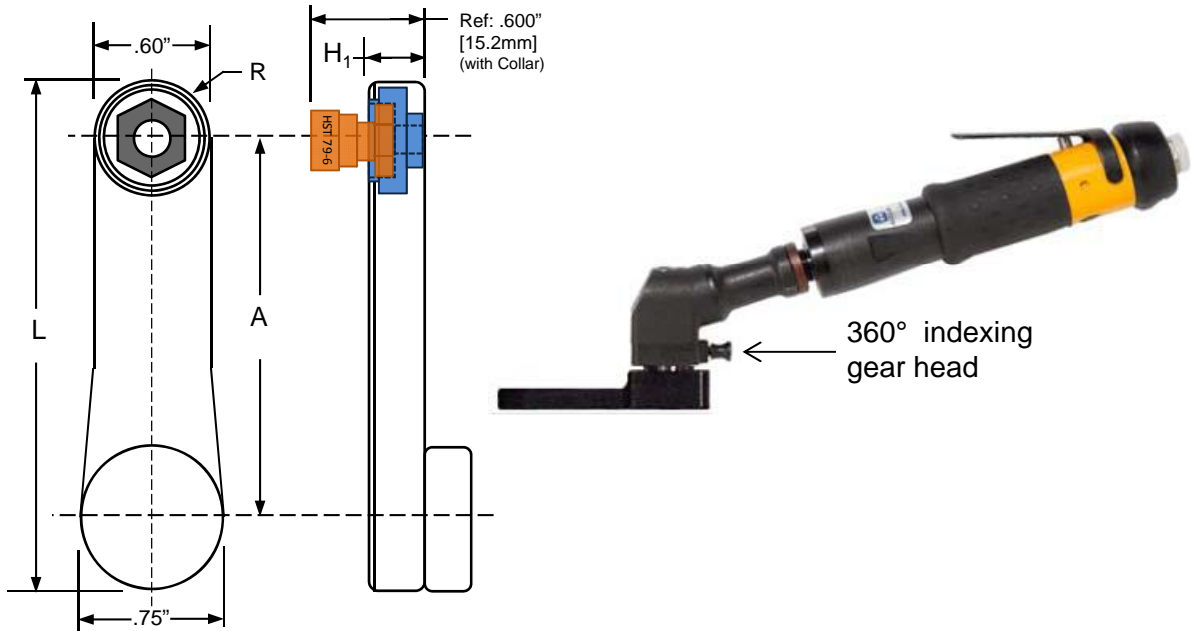
**CTL3421A 312 D 000**



Hex Key Size (Table 3a or 3b)  
Extended Socket Length (Table 2)  
Fastener Hex Size (Table 1)  
Tool Model Number

# 17° Offset For Frangible Collars

Torque Max: 90 in-lbs



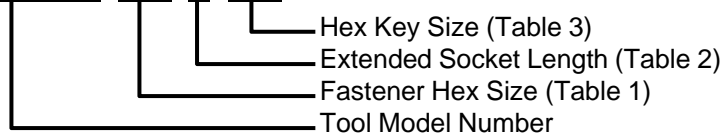
Model Number	No. of Gears	A	H <sub>1</sub>	L	R
CTL3707A	5	1.97" [50.0mm]	.285" [7.2mm]	2.65" [67.3mm]	.30" [7.6mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
<b>Code</b>	<b>Hex Size</b>	<b>Code</b>	<b>Extension</b>	<b>Code</b>	<b>Hex Size</b>
219	7/32"	A	Flush Sockets Only	000	NA
250	1/4"			062	1/16"
312	5/16"			078	5/64"
343	11/32"				

This tool model is not recommended for use with extended sockets, please select another model.

Example of Complete Tool Model Number:

**CTL3707A 343 A 078**



# 17° Offset For Frangible Collars

Torque Max: 145 in-lbs



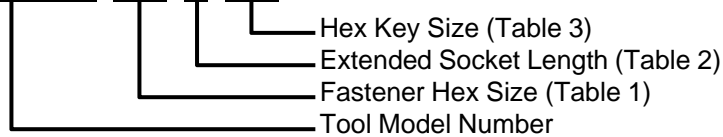
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3439A</b>	5	2.68" [68.1mm]	.38" [9.5mm]	.69" [17.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
312	5/16"	D	0.500"	094	3/32" Hex Key
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"	G	1.0"		
		J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312 ) hex sizes

Example of Complete Tool Model Number:

**CTL3439A 437 D 094**



# 17° Offset For Frangible Collars

Torque Max: 145 in-lbs



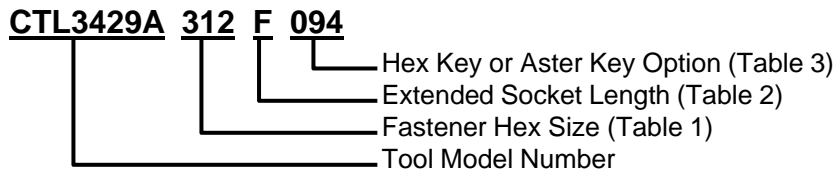
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3429A</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1		Table 2		Table 3		Table 3	
Collar Hex Size		Ext'd.Socket Length		Key Hex Size		Aster Key	
Code	Dia.	Code	Extension	Code	Size	Code	Dia.
219	-2	A *	Flush	062	1/16" Hex Key	000	No Key
250	-3	C	0.375"	078	5/64" Hex Key	AK2	-2
282	-3A	D	0.500"	094	3/32" Hex Key	AK3	-3
312	-4	E	0.625"			AK3A	-3A
		F	0.750"			AK4	-4
		G	1.0"				
		J	2.0"				

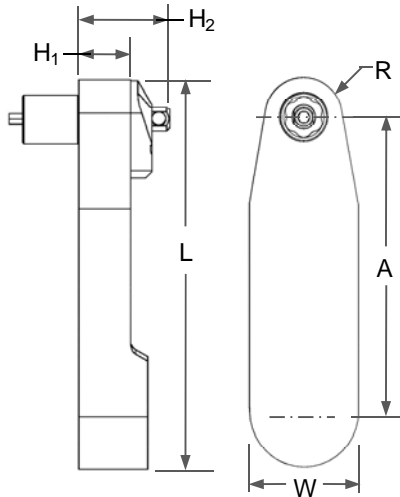
\* Flush sockets only available in (.219, .250, .223, .312) hex sizes

24P

Example of Complete Tool Model Number:



# 17° Offset For Frangible Collars



Torque Max: 150 in-lbs  
RPM at Socket: 270

“Flush or Extended  
Socket Applications”

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL3461A</b>	5	2.75" [69.9mm]	.47" [11.9mm]	.81" [20.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

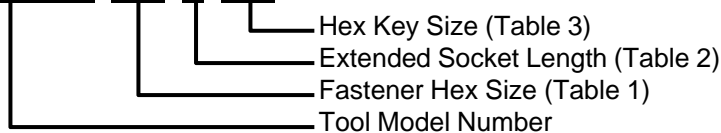
The above model tools are designed for use with a flush socket gear or extended sockets.

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A	Flush	078	5/64" Hex Key
250	1/4"	C	0.375"	094	3/32" Hex Key
312	5/16"	D	0.500"	125T	1/8" Hex Key
343	11/32"	E	0.625"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

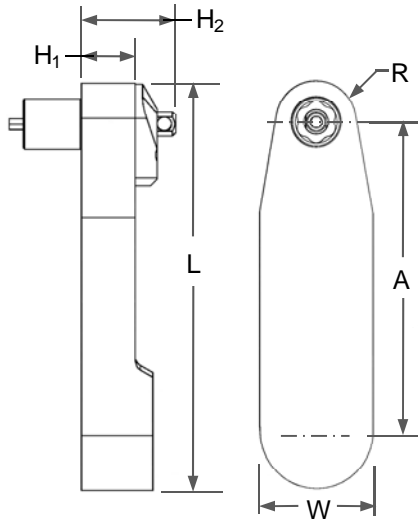
1/8" Hex key available on Models CT3110 and CT3111

Example of Complete Tool Model Number:

**CTL3461A 343 A 078**



# 17° Offset For Frangible Collars



Torque Max: 230 in-lbs



Wt: 2.9 lbs (1.3kg)  
RPM: 220 at socket  
Motor: LBB16S005 Mod.

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CTL3498A</b>	5	3.19 [81.0mm]	.50 [11.4mm]	.84 [21.5mm]	4.5 [114.3mm]	1.12 [28.4mm]	.43 [10.8mm]

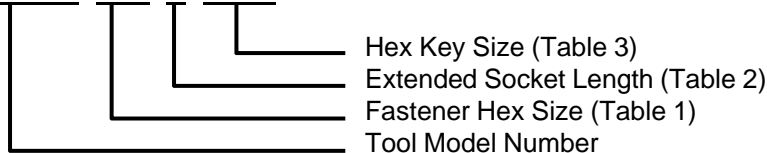
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)	<b>Table 2</b> Ext'd.Socket Length	<b>Table 3</b> Key Hex Size																														
<table border="1"> <thead> <tr> <th>Code</th> <th>Hex Size</th> </tr> </thead> <tbody> <tr> <td>375</td> <td>3/8"</td> </tr> <tr> <td>437</td> <td>7/16"</td> </tr> <tr> <td>500</td> <td>1/2"</td> </tr> <tr> <td>562</td> <td>9/16"</td> </tr> </tbody> </table>	Code	Hex Size	375	3/8"	437	7/16"	500	1/2"	562	9/16"	<table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Flush</td> </tr> <tr> <td>D</td> <td>0.500"</td> </tr> <tr> <td>E</td> <td>0.625"</td> </tr> <tr> <td>F</td> <td>0.750"</td> </tr> <tr> <td>G</td> <td>1.0"</td> </tr> </tbody> </table>	Code	Extension	A	Flush	D	0.500"	E	0.625"	F	0.750"	G	1.0"	<table border="1"> <thead> <tr> <th>Code</th> <th>Size</th> </tr> </thead> <tbody> <tr> <td>094</td> <td>3/32" Hex Key</td> </tr> <tr> <td>125T</td> <td>1/8" Hex Key</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Code	Size	094	3/32" Hex Key	125T	1/8" Hex Key		
Code	Hex Size																															
375	3/8"																															
437	7/16"																															
500	1/2"																															
562	9/16"																															
Code	Extension																															
A	Flush																															
D	0.500"																															
E	0.625"																															
F	0.750"																															
G	1.0"																															
Code	Size																															
094	3/32" Hex Key																															
125T	1/8" Hex Key																															
Max flush hex size is 1/2" A/F																																

Example of Complete Tool Model Number:

**CTL3498A 437 A 125T**



**Alcoa  
Fastening  
Systems**

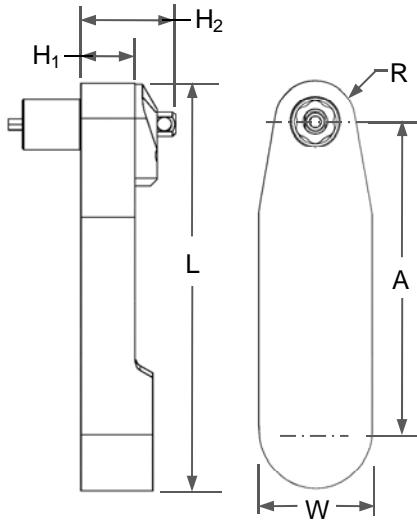


**Assembly Tool Systems Division**

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# 17° Offset For Frangible Collars



Torque Max: 270 in-lbs



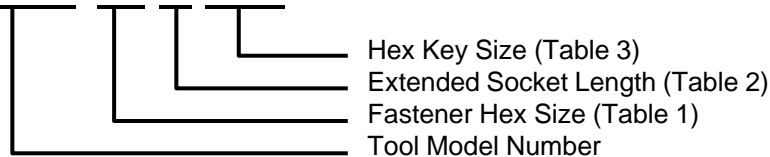
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CT3498A</b>	5	3.19 [81.0mm]	.50 [11.4mm]	.84 [21.5mm]	4.5 [114.3mm]	1.12 [28.4mm]	.43 [10.8mm]

This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Hex Size
375	3/8"	A	Flush	094	3/32"
437	7/16"	D	1/2"	125T	1/8"
500	1/2"	E	5/8"	156T	5/32"
562	9/16"	F	3/4"		
625	5/8"	G	1.0"		

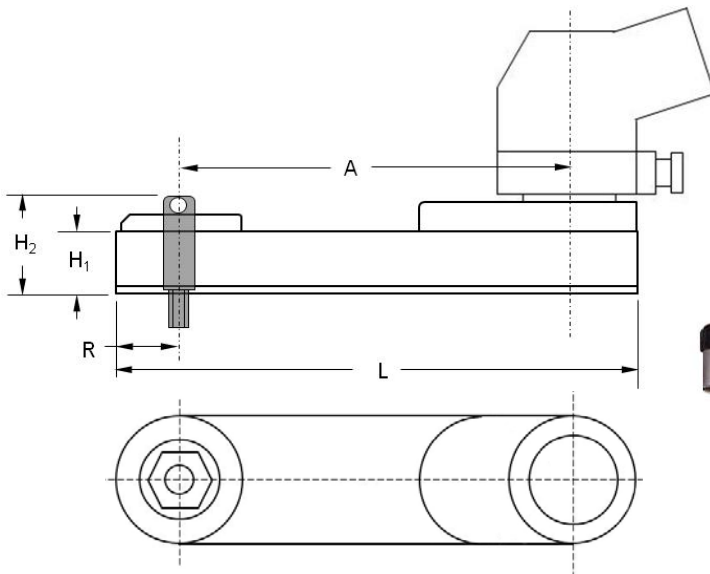
Example of Complete Tool Model Number:

CT3498A 437 A 125T



# 17° Offset For Frangible Collars

Torque Max: 310 in-lbs



Ref: LTV28N30-10 Mod.

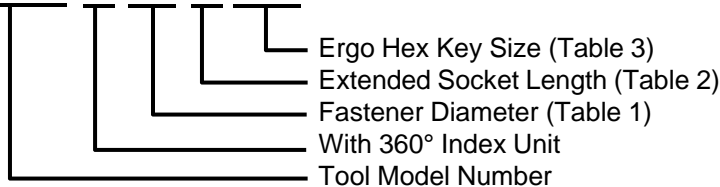
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R	W
<b>CT3475A</b>	5	3.23" [82.0mm]	.50" [12.7mm]	.84" [21.5mm]	4.3" [109.2mm]	.50" [12.7mm]	1.0" [25.4mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
		J	2.0"		

.500 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

CT3475 A 375 A 125T



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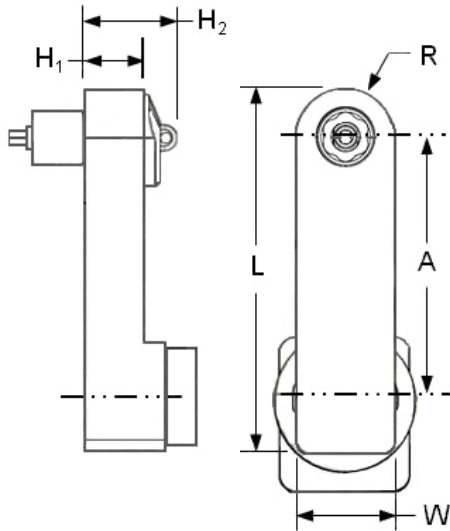


**Assembly Tool Systems Division**

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# 17° Offset For Frangible Collars

Torque Max: 320 in-lbs



RPM at Socket: 175

Wt: 5.6 lbs (2.55kg)



Ref: LTV28N30-10 Mod.

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R	W
<b>CTL3472A</b>	5	3.0" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.2" [106.4mm]	.56" [14.2mm]	1.12" [28.4mm]

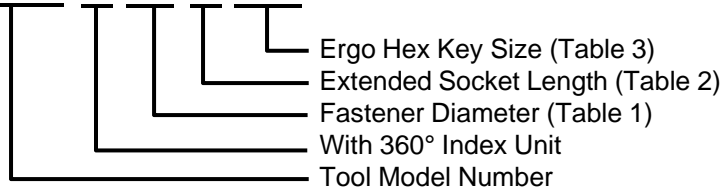
Model CTL3172A is designed for use with a flush socket gear or extended sockets

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	000	NA
437	7/16"	E	5/8"	125T	1/8"
500	1/2"	G	1.0"	156T	5/32"
562	9/16"	J	2.0"	187T	3/16"
625	5/8"			219T	7/32"
687	11/16"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

**CTL3472 A 625 D 156T**



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Systems**

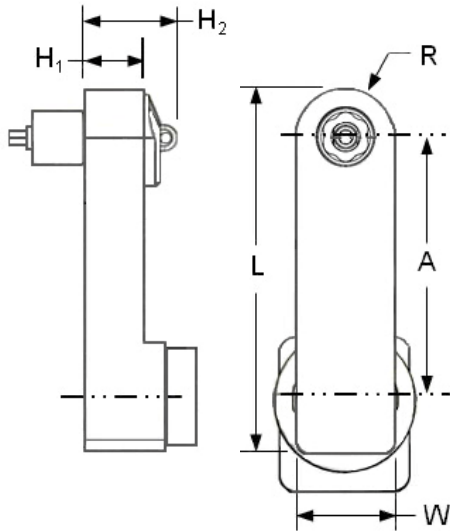


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714-871-4821 FAX

# 17° Offset For Frangible Collars

Torque Max: 500 in-lbs



Ref: LTV38N68-13 Mod.

RPM at Socket: 100

Wt: 5.9 lbs (2.7kg)

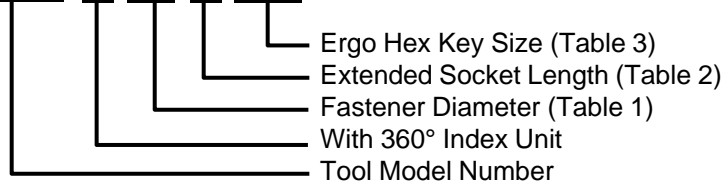
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CT3472A</b>	5	3.00" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.2" [106.4mm]	1.12" [28.4mm]	.56" [14.2mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
625	5/8"	J	2.0"	187T	3/16"
687	11/16"			219T	7/32"
750	3/4"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

**CT3472 A 625 D 156T**



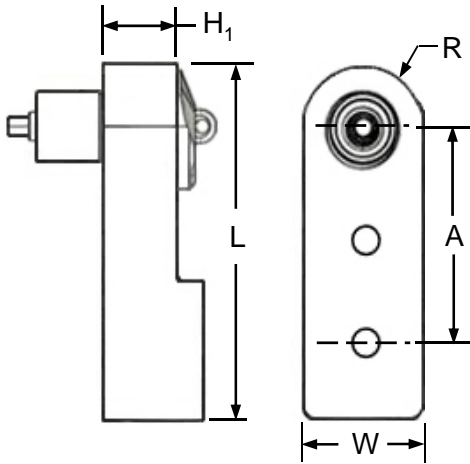
**Alcoa  
Fastening  
Systems**



**Assembly Tool Systems Division**

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# 17° Offset For Frangible Collars



**3-Gear**

Torque Max: 500 in-lbs



LTV38R57-13  
Atlas Motor Required

Wt: 3.3Kg Free Speed RPM: 170

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CT3493A</b>	3	1.78" [45.2mm]	.69" [17.5mm]	1.0" [25.4mm]	2.97" [70.9mm]	1.12" [28.6mm]	.59" [15.0mm]

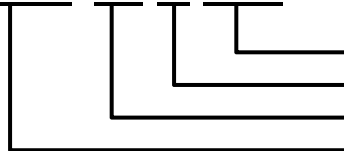
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	156T	5/32"
562	9/16"	G	1.0"	187T	3/16"
625	5/8"	J	2.0"	219T	7/32"
687	11/16"			250T	1/4"
750	3/4"				

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

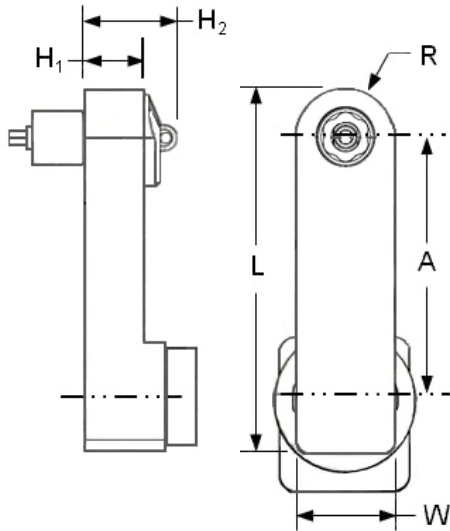
CT3493A 500 G 156T



Hex Key Size (Table 3)  
Extended Socket Length (Table 2)  
Fastener Hex Size (Table 1)  
Tool Model Number

# 17° Offset For Frangible Collars

Torque Max: 400 in-lbs



RPM at Socket: 100

Wt: 5.9 lbs (2.7kg)

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CT3720A</b>	7	3.69" [93.6mm]	.69" [17.5mm]	1.0" [25.4mm]	4.88" [124.0mm]	1.12" [28.4mm]	.56" [14.2mm]

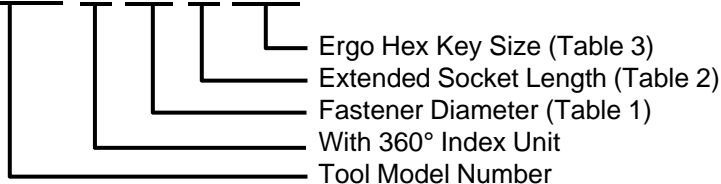
Model CT3720A is designed for use with a flush socket gear or extended sockets

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
625	5/8"	J	2.0"	187T	3/16"
687	11/16"			219T	7/32"
750	3/4"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

CT3720 A 562 F 187T



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**Assembly Tool Systems Division**

801 S. Placentia Avenue  
Fullerton, CA USA 92831  
714-278-8908 Telephone  
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# *Frangible Collars Assembly Tools*

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## 90° Offset Power Tools

### SECTION 3



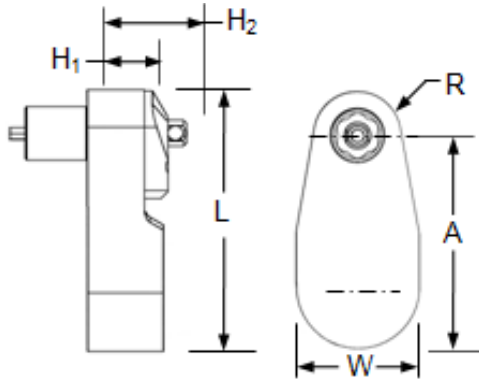
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801 S. Placentia Avenue  
Fullerton, CA USA 92831  
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714-871-4821 FAX

# 90° Offset For Frangible Collars



Torque Max: 140 in-lbs  
250 RPM at Socket



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
CTL5428A	3	1.25" [31.8mm]	.47" [11.9mm]	.81" [20.5mm]	2.1" [53.3mm]	1.0" [25.4mm]	.35" [8.8mm]

This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

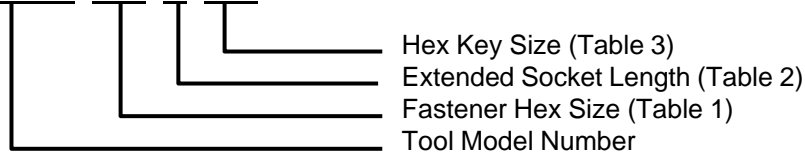
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		
Code	Hex Size	Code	Extension	Code	Size	Hex Key P/N
219	7/32"	A *	Flush	062T	1/16" 2-Pc Hex Key	093-9337
250	1/4"	C	0.375"	078T	5/64" 2-Pc Hex Key	093-9334
282	9/32"	D	0.500"	094T	3/32" 2-Pc Hex Key	093-9333
312	5/16"	E	0.625"	062	1/16" 1-Pc Hex Key	Depends on socket length
343	11/32"	F	0.750"	078	5/64" 1-Pc Hex Key	
375	3/8"	G	1.0"	094	3/32" 1-Pc Hex Key	
437	7/16"	J	2.0"			

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

24P

Example of Complete Tool Model Number:

CTL5428A 250 C 078



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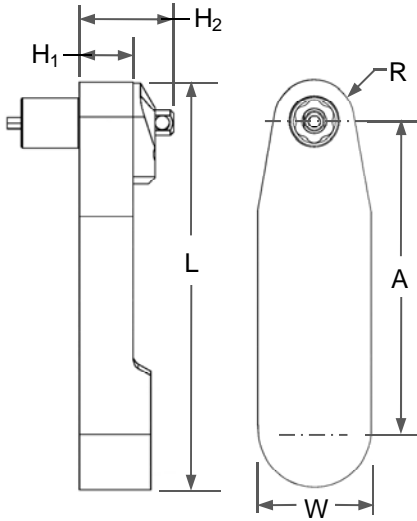
**Assembly Tool Systems Division**

801 S. Placentia Avenue  
Fullerton, CA USA 92831  
714-278-8908 Telephone  
714-871-4821 FAX



# 90° Offset For Frangible Collars

Torque Max: 140 in-lbs



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL5429A</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

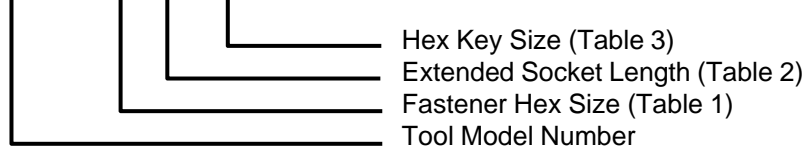
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
282	9/32"	D	0.500"	094	3/32" Hex Key
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

24P

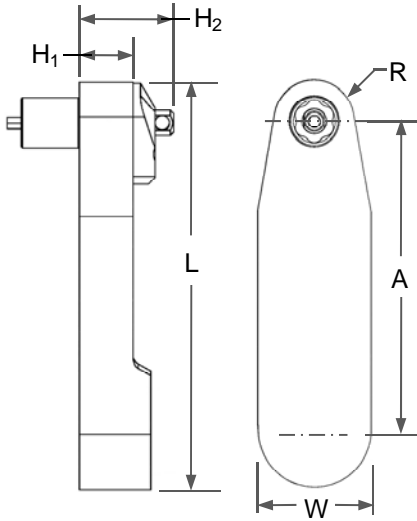
Example of Complete Tool Model Number:

CTL5429A 437 F 094



# 90° Offset For Frangible Collars

Torque Max: 140 in-lbs



Non Indexing Gear Head

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL5429B</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

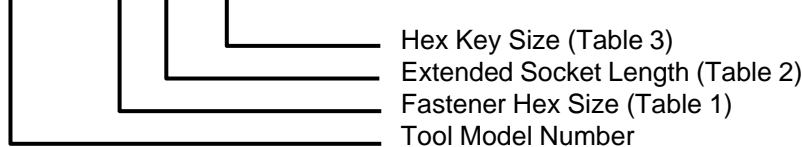
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" HexKey
250	1/4"	C	0.375"	078	5/64" HexKey
282	9/32"	D	0.500"	094	3/32" HexKey
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

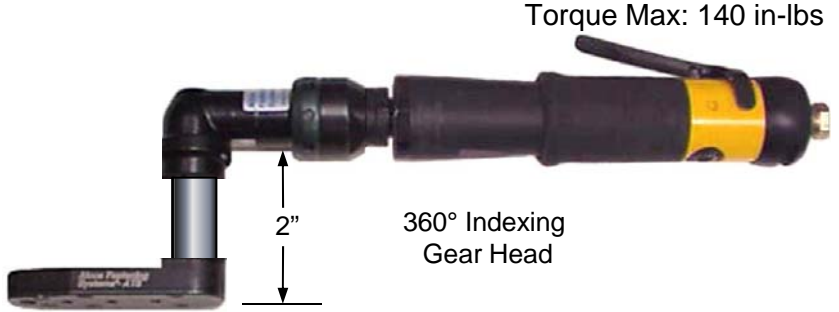
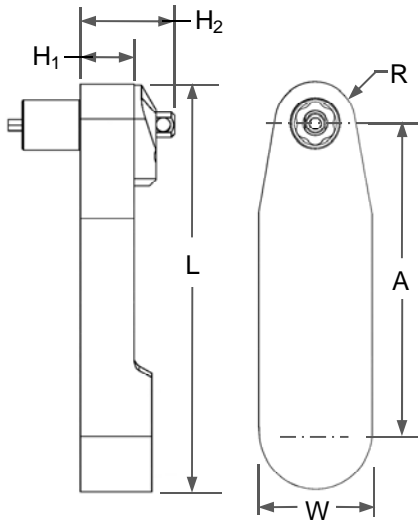
24P

Example of Complete Tool Model Number:

CTL5429B 437 F 094



# 90° Offset For Frangible Collars



Model Number	No. of Gears	A	H1	H2	L	W	R
<b>CTL5429J</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

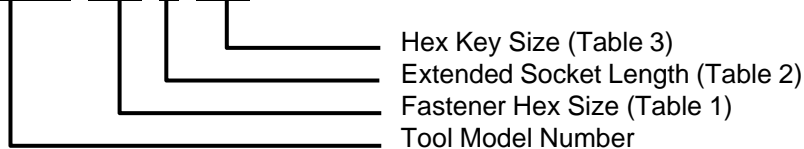
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" HexKey
250	1/4"	C	0.375"	078	5/64" HexKey
282	9/32"	D	0.500"	094	3/32" HexKey
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

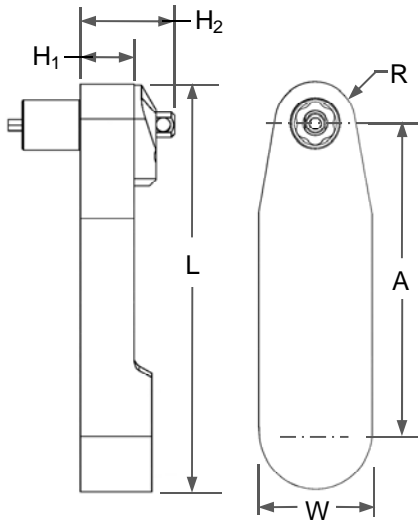
24P

Example of Complete Tool Model Number:

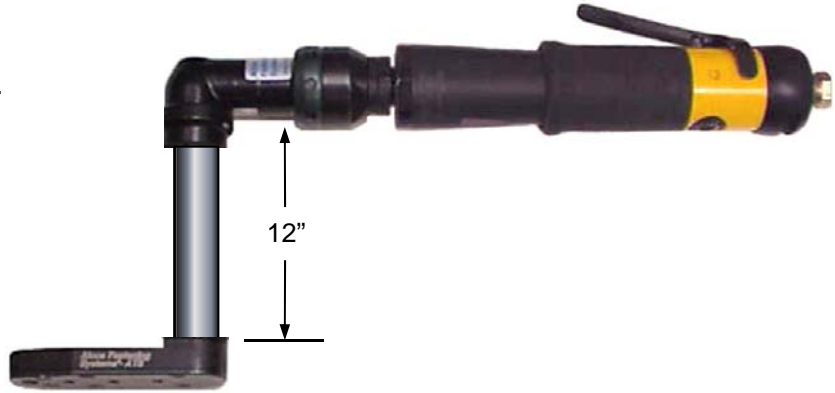
CTL5429J 437 F 094



# 90° Offset For Frangible Collars



Torque Max: 140 in-lbs



Model Number	No. of Gears	A	H1	H2	L	W	R
<b>CTL5429T</b>	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

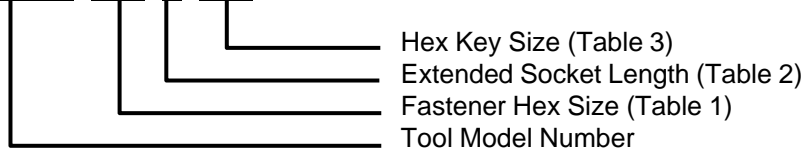
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" HexKey
250	1/4"	C	0.375"	078	5/64" HexKey
282	9/32"	D	0.500"	094	3/32" HexKey
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

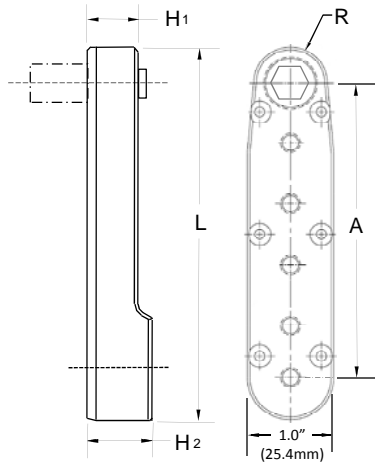
24P

Example of Complete Tool Model Number:

CTL5429T 437 F 094



# 90° Offset For Frangible Collars



*150 in lbs Max.*



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R
<b>CTL5461A</b>	5	2.75 [69.9mm]	.47 [11.9mm]	.61 [15.4mm]	3.68 [93.3mm]	.43 [10.8mm]

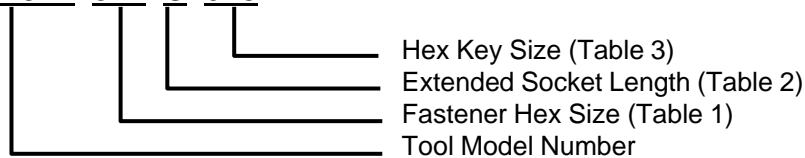
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
282	9/32"	D	0.500"	094	3/32" Hex Key
312	5/16"	E	0.625"	125T	1/8" Hex Key
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

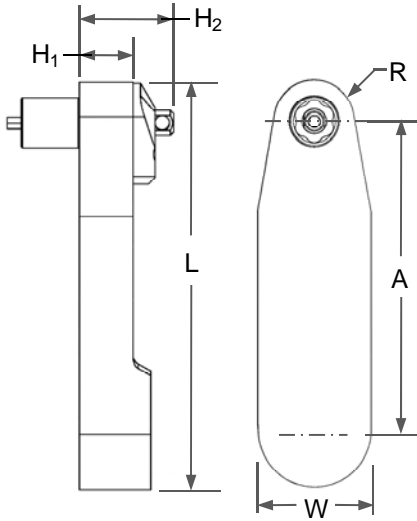
Example of Complete Tool Model Number:

CTL5461A 312 C 078



# 90° Offset For Frangible Collars

Torque Max: 140 in-lbs



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL5438</b>	7	4.13" [104.9mm]	.47" [11.9mm]	.81" [20.5mm]	4.98" [126.5mm]	1.0" [25.4mm]	.35" [8.8mm]

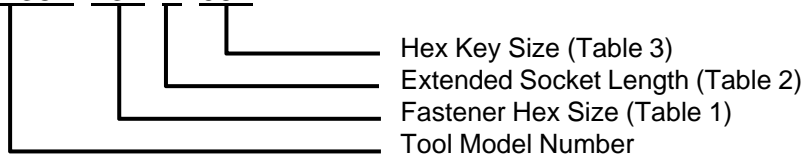
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A *	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
282	9/32"	D	0.500"	094	3/32" Hex Key
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"	G	1.0"		
437	7/16"	J	2.0"		

\* Flush sockets only available in (.219, .250, .282, .312) hex sizes

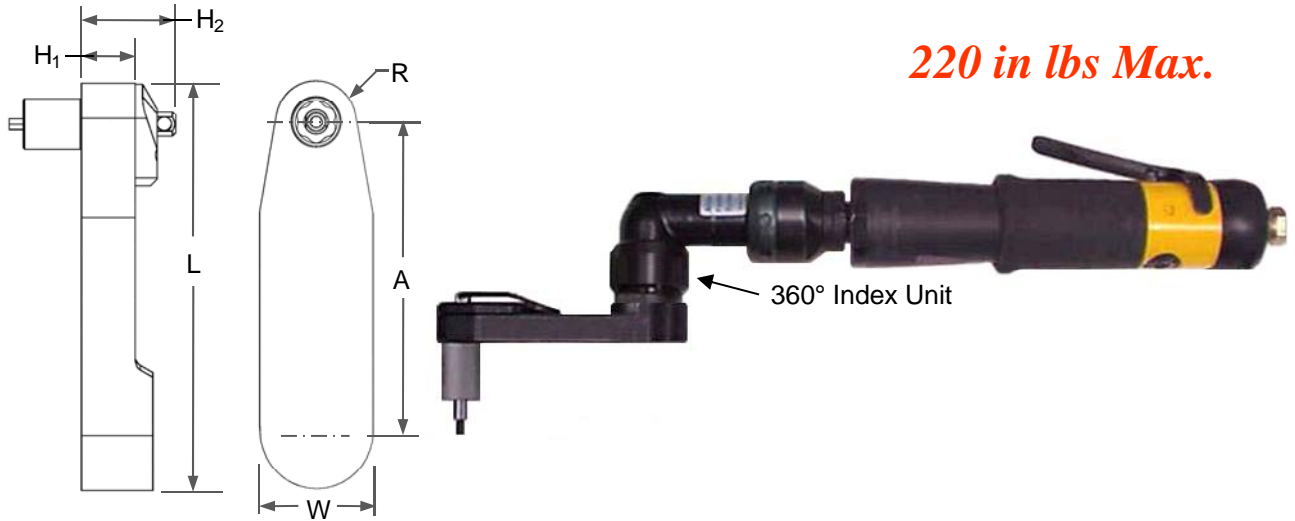
24P

Example of Complete Tool Model Number:

CTL5438A 437 F 094



# 90° Offset For Frangible Collars



**220 in lbs Max.**

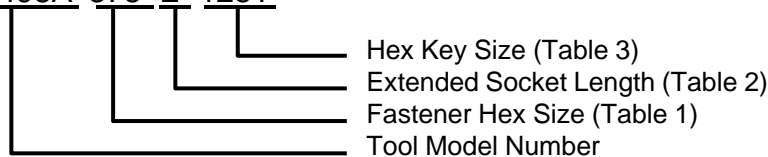
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CTL5498A</b>	5	3.19" [81.0mm]	.50" [12.7mm]	.84" [21.5mm]	4.5" [114.3mm]	1.12" [28.4mm]	.43" [10.8mm]

This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

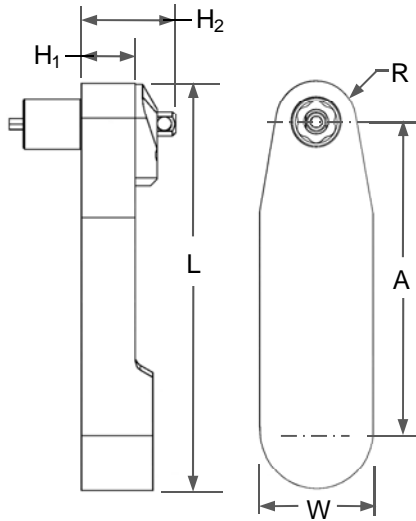
<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	094	3/32" Hex Key
437	7/16"	D	0.500"	125T	1/8" Hex Key
500	1/2"	E	0.625"	156T	5/32" Hex Key
562	9/16"	F	0.750"		
		G	1.0"		

Example of Complete Tool Model Number:

CTL5498A 375 E 125T



# 90° Offset For Frangible Collars



**260 in lbs Max.**



Ref: LTV28N30 Series

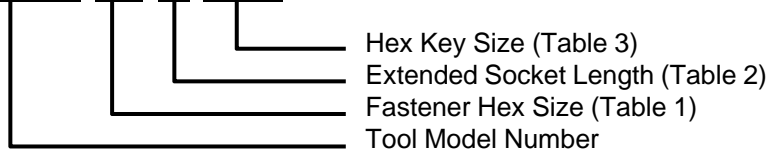
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	L	W	R
<b>CT5498A</b>	5	3.19 [81.0mm]	.50 [12.7mm]	.84" [21.5mm]	4.5 [114.3mm]	1.12 [28.4mm]	.43 [10.8mm]

This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	094	3/32" Hex Key
437	7/16"	D	0.500"	125T	1/8" Hex Key
500	1/2"	E	0.625"	156T	5/32" Hex Key
562	9/16"	F	0.750"		
		G	1.0"		

Example of Complete Tool Model Number:

CT5498A 475 G 125T



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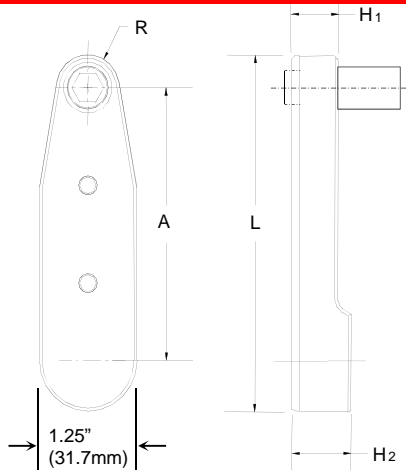


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# 90° Offset, Reverse Socket For Frangible Collars



Max: 260 in-lbs



Ref: LTV28N30 Series

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R
<b>CT5478</b>	4	2.35 [59.6mm]	.50 [12.7mm]	.65 [16.7mm]	3.7 [92.8mm]	.437 [11.1mm]

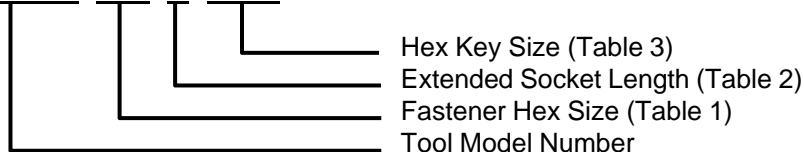
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)	<b>Table 2</b> Ext'd.Socket Length	<b>Table 3</b> Key Hex Size																														
<table border="1"> <thead> <tr> <th>Code</th> <th>Hex Size</th> </tr> </thead> <tbody> <tr> <td>375</td> <td>3/8"</td> </tr> <tr> <td>437</td> <td>7/16"</td> </tr> <tr> <td>500</td> <td>1/2"</td> </tr> <tr> <td>562</td> <td>9/16"</td> </tr> </tbody> </table>	Code	Hex Size	375	3/8"	437	7/16"	500	1/2"	562	9/16"	<table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Flush</td> </tr> <tr> <td>D</td> <td>0.500"</td> </tr> <tr> <td>E</td> <td>0.625"</td> </tr> <tr> <td>F</td> <td>0.750"</td> </tr> <tr> <td>G</td> <td>1.0"</td> </tr> </tbody> </table>	Code	Extension	A	Flush	D	0.500"	E	0.625"	F	0.750"	G	1.0"	<table border="1"> <thead> <tr> <th>Code</th> <th>Size</th> </tr> </thead> <tbody> <tr> <td>094</td> <td>3/32" Hex Key</td> </tr> <tr> <td>125T</td> <td>1/8" Hex Key</td> </tr> <tr> <td>156T</td> <td>5/32" Hex Key</td> </tr> </tbody> </table>	Code	Size	094	3/32" Hex Key	125T	1/8" Hex Key	156T	5/32" Hex Key
Code	Hex Size																															
375	3/8"																															
437	7/16"																															
500	1/2"																															
562	9/16"																															
Code	Extension																															
A	Flush																															
D	0.500"																															
E	0.625"																															
F	0.750"																															
G	1.0"																															
Code	Size																															
094	3/32" Hex Key																															
125T	1/8" Hex Key																															
156T	5/32" Hex Key																															

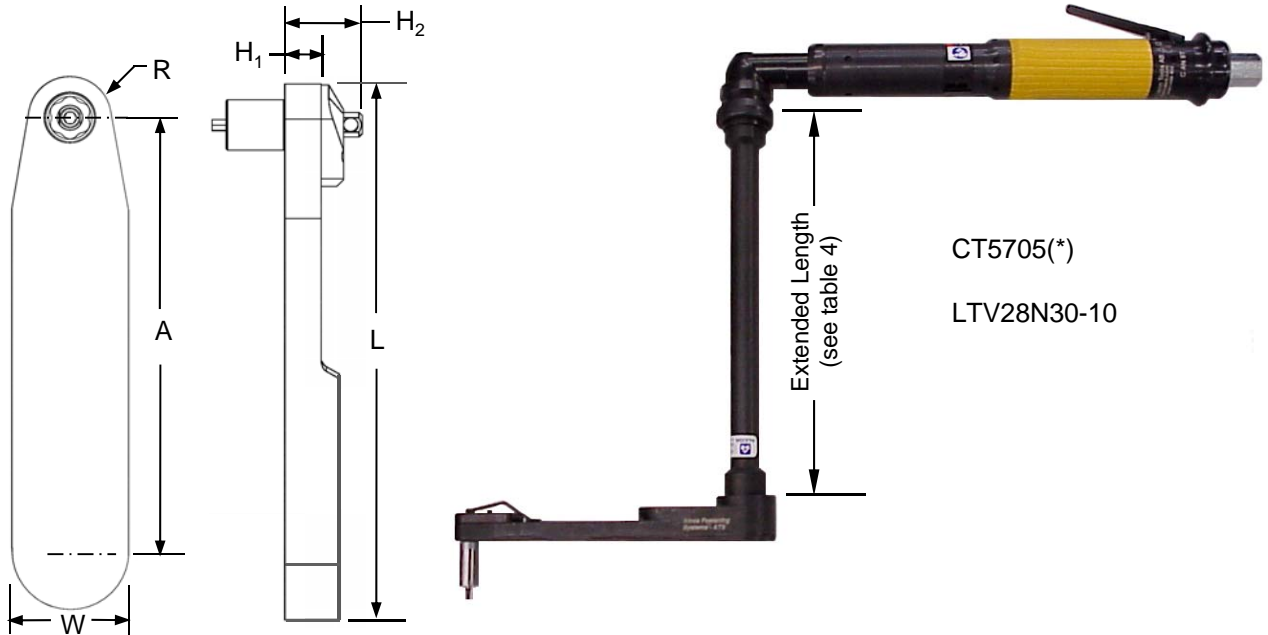
Example of Complete Tool Model Number:

CT5478X 437 E 125T



# 90° Offset For Frangible Collars

*130 in lbs Max.*

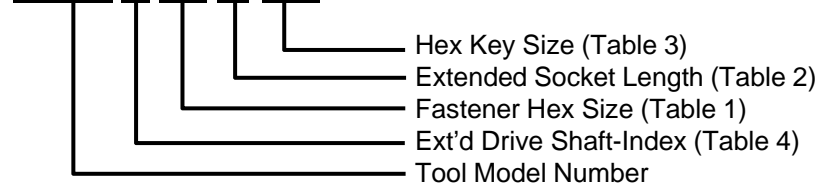


Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R	W (Front)
<b>CT5705</b>	9	6.59" [167.4mm]	.43" [10.9mm]	.73" [18.5mm]	7.6" [193mm]	.35" [8.9mm]	1.0" [25.4mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Extended Drive Shaft with 360° Index Capability	
Code	Hex Size	Code	Extension	Code	Size	Code	Extension
219	7/32"	A	Flush	078	5/64" Hex Key	A	1-1/2"
250	1/4"	C	3/8"	094	3/32" Hex Key	E	4.0"
312	5/16"	D	1/2"			G	6.0"
343	11/32"	E	5/8"			K	12.0"
375	3/8"	G	1.0"				
437	7/16"	J	2.0"				

Example of Complete Tool Model Number:

**CT5705 G 437 F 094**



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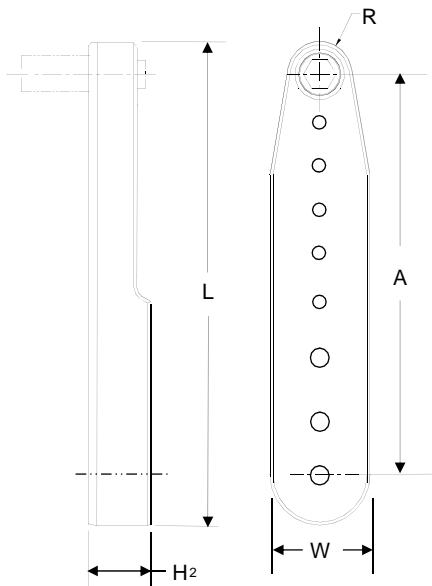


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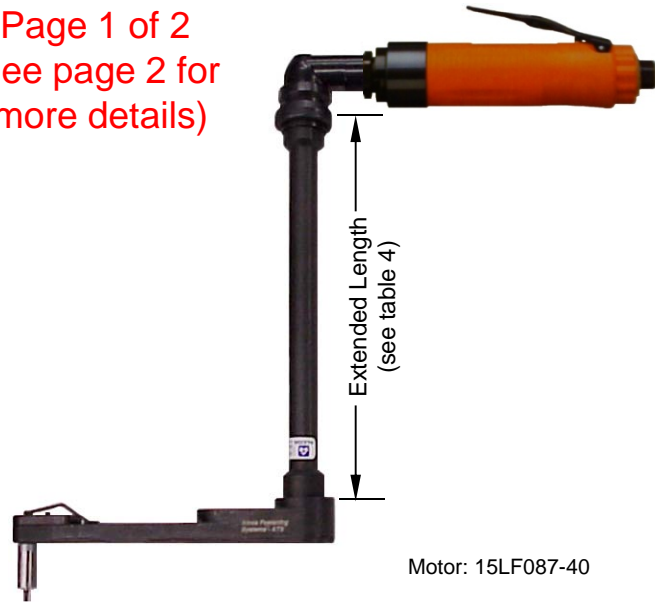
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# 90° Offset For Frangible Collars

60 in lbs Max.



Page 1 of 2  
(see page 2 for more details)



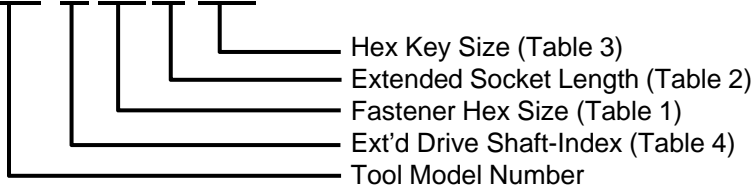
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R	W (Front)
CTC5705	9	6.59" [167.4mm]	.735" [18.7mm]	.73" [18.5mm]	7.6" [193mm]	.35" [8.9mm]	1.0" [25.4mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		Table 4 Extended Drive Shaft with 360° Index Capability	
Code	Hex Size	Code	Extension	Code	Size	Code	Extension
219	7/32"	A	Flush	078	5/64" Hex Key	A	1-1/2"
250	1/4"	C	3/8"			E	4.0"
312	5/16"	D	1/2"			G	6.0"
343	11/32"	E	5/8"				
		G	1.0"				
		J	2.0"				

24P

Example of Complete Tool Model Number:

CTC5705 G 343 A 078



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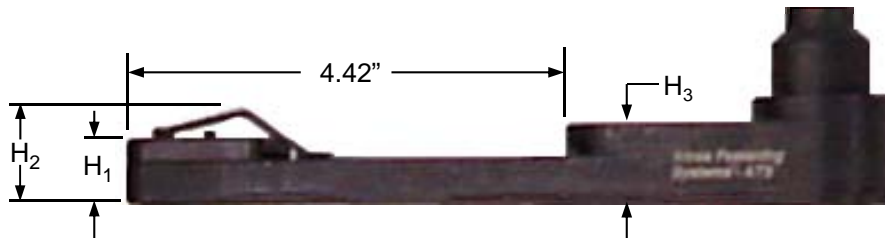
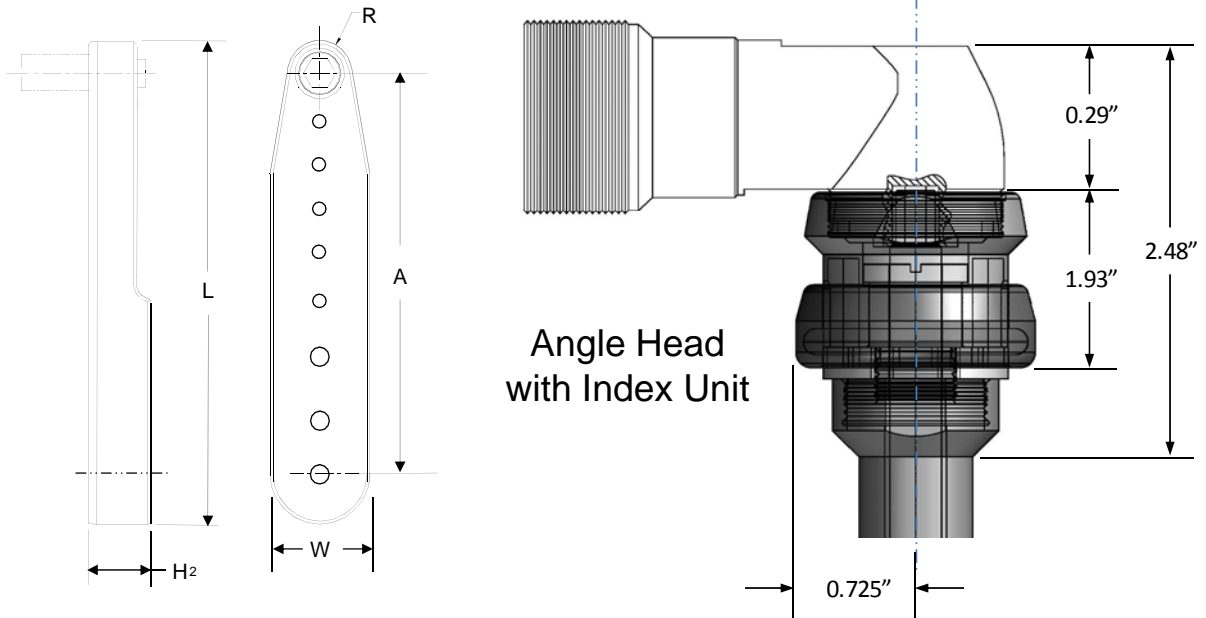
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# 90° Offset For Frangible Collars

60 in lbs Max.

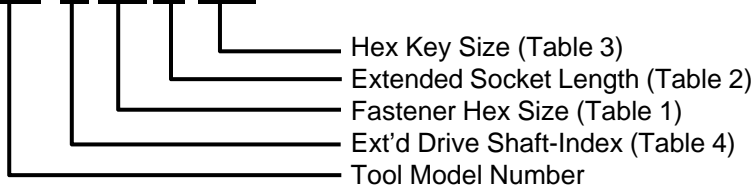
Page 2 of 2



Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub> (Ref)	H <sub>3</sub>	L	R
CTC5705	9	6.59" [167.4mm]	.480" [12.19mm]	.680" [17.3mm]	.730" [18.5mm]	7.6" [193mm]	.35" [8.9mm]

Example of Complete Tool Model Number:

CTC5705 G 343 A 078



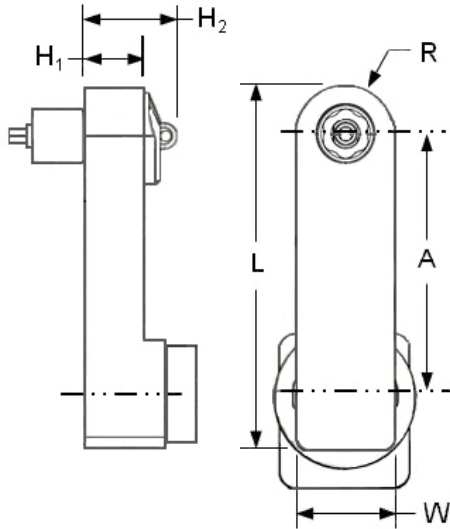
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# 90° Offset For Frangible Collars



RPM at Socket: 270

**270 - 500 in-lbs**



Ref: LTV38N68-13

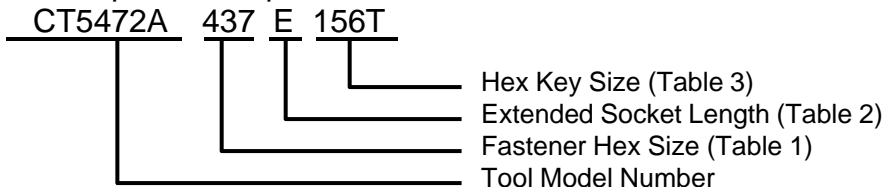
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	R	W
<b>CT5472A</b>	5	3.0" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.19" [106.4mm]	.56" [14.2mm]	1.12" [28.4mm]

This is a very durable tool design for general purpose applications and is designed for Use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

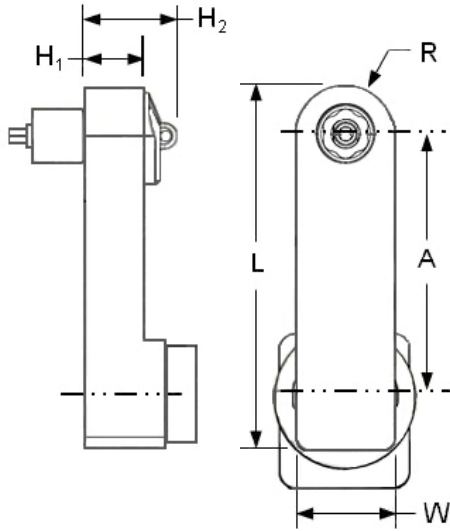
<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	000	NA
437	7/16"	E	5/8"	125T	1/8"
500	1/2"	G	1.0"	156T	5/32"
562	9/16"	J	2.0"	187T	3/16"
625	5/8"			219T	7/32"
687	11/16"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



# 90° Offset For Frangible Collars



RPM at Socket: 290

**300 - 450 in-lbs**



Ref: LTV38N68-13

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CT5720A</b>	7	3.69" [93.6mm]	.69" [17.5mm]	1.0" [25.4mm]	4.88" [124.0mm]	1.12" [28.4mm]	.56" [14.2mm]

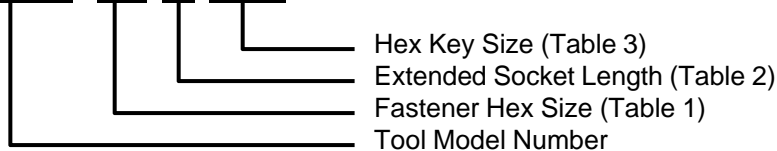
This is a very durable tool design for general purpose applications and is designed for Use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	156T	5/32"
562	9/16"	G	1.0"	187T	3/16"
625	5/8"	J	2.0"		

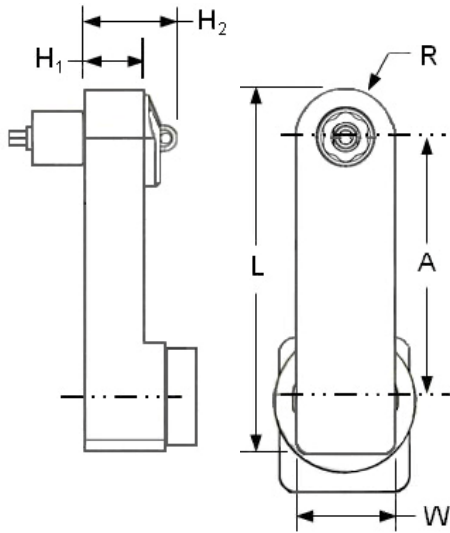
.625 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

CT5720A 500 A 156T



# 90° Offset For Frangible Collars



RPM at Socket: 240

240 - 600 in-lbs



LTV38N68 Atlas Motor Required

Tool Length: 515mm (20.3")  
Wt: 2.8kg (5.9 lbs)

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CT5463A</b>	5	3.19" [81.0mm]	.69" [17.6mm]	1.0" [26.3mm]	4.44" [112.8mm]	1.37" [34.9mm]	.68" [17.3mm]

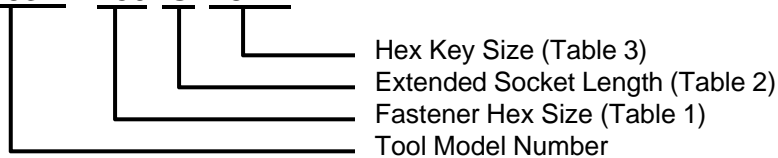
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required. This gear head has 360° indexing capability.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
625	5/8"	J	2.0"	187T	3/16"
687	11/16"			219T	7/32"
750	3/4"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

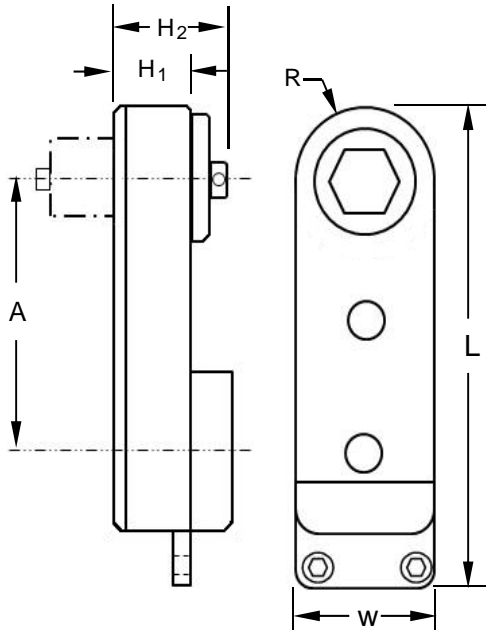
CT5463A 750 G 187T



# 90° Offset For Frangible Collar Applications

## 620 - 840 in lbs

Torque Max: 840 in-lbs



Pictured Tool is a Simulation of actual tool model

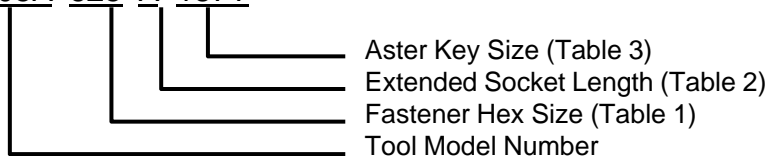
Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CT5605</b>	3	2.18" [55.25mm]	.77" [19.5mm]	1.12" [28.4mm]	4.55" [115.57mm]	1.38" [35.1mm]	.69" [17.5mm]

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
562	9/16"	A	Flush	000	NA
625	5/8"	E	5/8"	156T	5/32"
687	11/16"	G	1.0"	187T	3/16"
750	3/4"	H	1.5"	219T	7/32"
875	7/8"	J	2.0"	250T	1/4"

.626 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

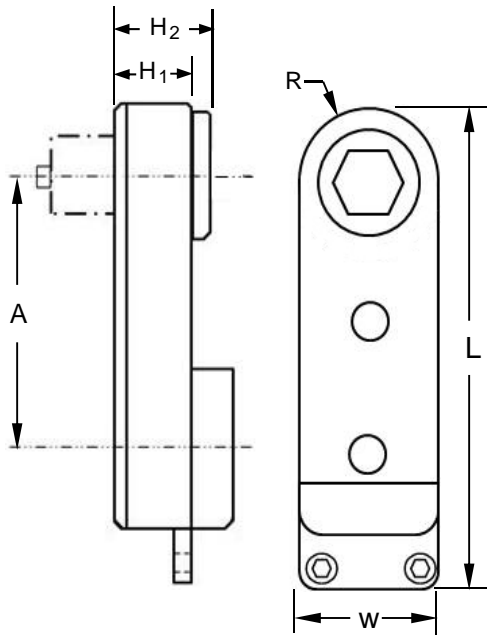
CT(D)5605A 625 A 187T





# 90° Offset For Frangible Collars Applications

Torque Max: 1290 in-lbs



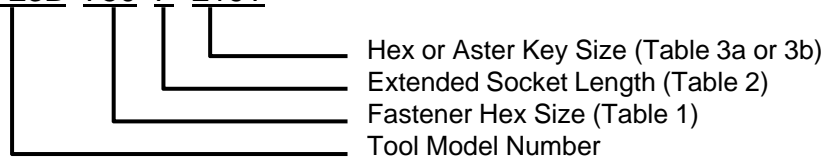
Pictured Tool is a Simulation of actual tool model

Model Number	No. of Gears	A	H <sub>1</sub>	H <sub>2</sub>	L	W	R
<b>CT5723B</b>	3	2.88" [73.2mm]	1.0" [25.4mm]	1.18" [29.9mm]	4.85" [123.2mm]	1.80" [45.7mm]	.90" [22.8mm]

<b>Table 1</b> Frangible Collar Hex Size (Across Flats)		<b>Table 2</b> Ext'd.Socket Length		<b>Table 3</b> Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
750	3/4"	A	Flush	000	NA
875	7/8"	E	5/8"	219T	7/32"
937	15/16"	G	1.0"	250T	1/4"
.626 Max A/F Flush Socket Gear		H	1.5"		
		J	2.0"		

Example of Complete Tool Model Number:

CT5723B 750 F 219T



# *Frangible Collars Assembly Tools*

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## 90° Right Angle Power Tools

### SECTION 4



# 90° Offset Tools For Frangible Collar Applications

RPM at Socket: 275

20 - 230 in-lbs

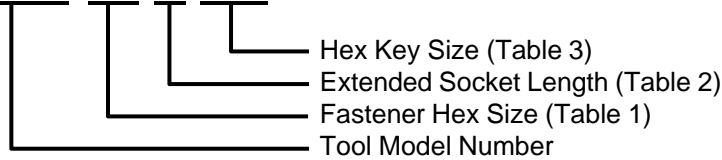


Model Number	L	H	Center to Side Angle Head	Weight
CT310AA	9.6" [243mm]	1.5" [36.6mm]	0.53" [13.5mm]	1.9 lbs [0.88 kg]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	F	0.750"	062T	1/16" HexKey
250	1/4"	G	1.0"	078T	5/64" HexKey
282	9/32"	J	2.0"	094T	3/32" HexKey
312	5/16"	L	3.0"		
343	11/32"				
375	3/8"				
437	7/16"				

Example of Complete Tool Model Number:

CT310AA 312 J 078T



# 90° Angle Head Tools For Frangible Collar Applications



Table 1

Tool Model Number	Max Torque (in-lbs)	Max Torque Nm	RPM	Hex Socket Sizes (A/F)								Hex Key Sizes		
				7/32	1/4	9/32	5/16	11/32				.062	.078	.094
CT310AA	220	15	275	7/32	1/4	9/32	5/16	11/32				.062	.078	.094
CT310AB	265	30	400	5/16	11/32	7/16	1/2	9/16				.094	.125	.156
CT310AE	480	68	370	7/16	1/2	9/16	5/8	11/16	3/4			.125	.156	.187
CT310AF	750	85	300	1/2	9/16	5/8	11/16	3/4	7/8			.156	.187	.219
CT310AG	880	100	250	1/2	9/16	5/8	11/16	3/4	7/8			.156	.187	.219
CT310BJ	1050	120	215	5/8	11/16	3/4	7/8	15/16	1.0	1 1/8	1 1/4	.187	.219	.250
CT310BK	1330	150	170	5/8	11/16	3/4	7/8	15/16	1.0	1 1/8	1 1/4	.219	.250	
CT310AN	1775	200	320	5/8	11/16	3/4	7/8	15/16	1.0	1 1/8	1 1/4	.219	.250	
CT310AP	3100	350	240	5/8	11/16	3/4	7/8	15/16	1.0	1 1/8	1 1/4	.250		
CT310AQ	5100	575	180	5/8	11/16	3/4	7/8	15/16	1.0	1 1/8	1 1/4	.250		

Example of Complete Tool Model Number:

CT310AG 750 G 187T

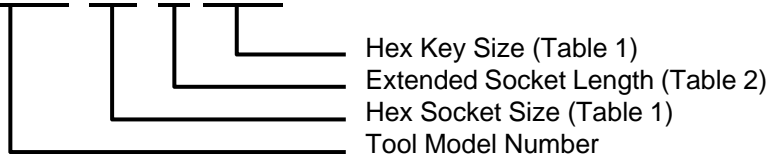


Table 2

Ext'd.Socket Length

Code	Extension
B	.250 "
D	.500 "
E	.625 "
G	1.0"
J	2.0"
L	3.0"

# *Frangible Collars Tools*

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## Installation Hand Tools and Hex Keys Accessories



### SECTION 5

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# Hand Assembly Tools For Frangible Collars

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## Small Roller Wrenches, 40 & 80 in-lbs



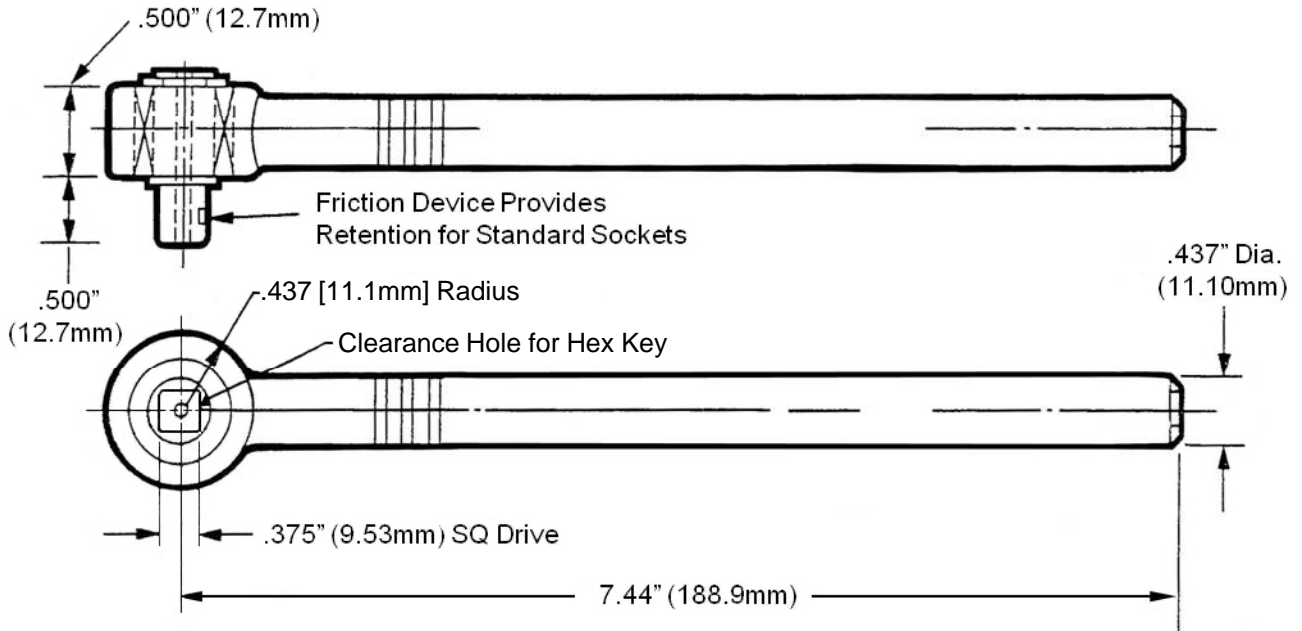
### Roller Wrenches With Square Drive

Part Number	Max Torque	Socket Drive	Hole Thru Dia.
RWB100-40	40 in-lbs	1/4"	.119
RWB100-80	80 in-lbs	1/4"	.119
RWBO100-40	40 in-lbs	1/4"	.119
RWBO100-80	80 in-lbs	1/4"	.119

# Hand Assembly Tools For Frangible Collars

150 in-lbs Max Torque

## Medium Roller Wrench with 3/8" Sq. Drive



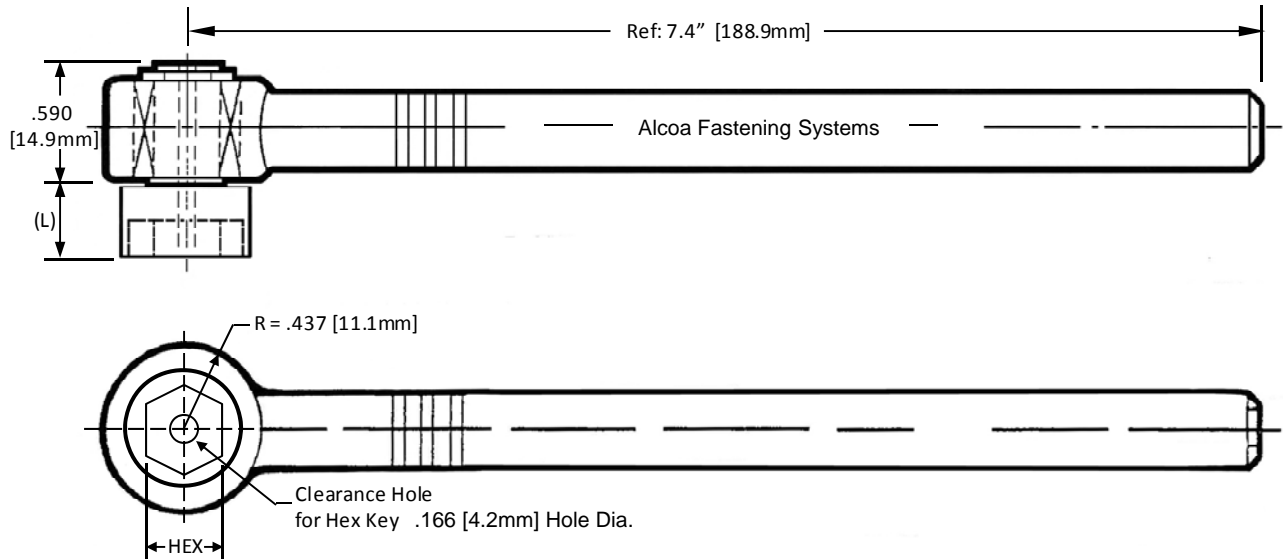
## Roller Wrench With Square Drive

Ordering Number	Max Torque	Socket Sq. Drive	Hole Thru Dia.
RWB100-150-375	150 in-lbs	3/8"	.231 .236

# Hand Assembly Tools For Frangible Collars

150 in-lbs Max Torque

## Medium Roller Wrench with Integrated Sockets



Ordering Number	Hex Size		L	Hole Thru Dia.
RWB130A-31	.312	5/16"	.250	.166
RWB130A-34	.343	11/32"	.270	.166
RWB130A-37	.375	3/8"	.370	.166
RWB130A-43	.437	7/16"	.430	.166

- Designed to fit into limited access applications
- Will install frangible collars requiring 150 in-lbs [17Nm] of applied torque

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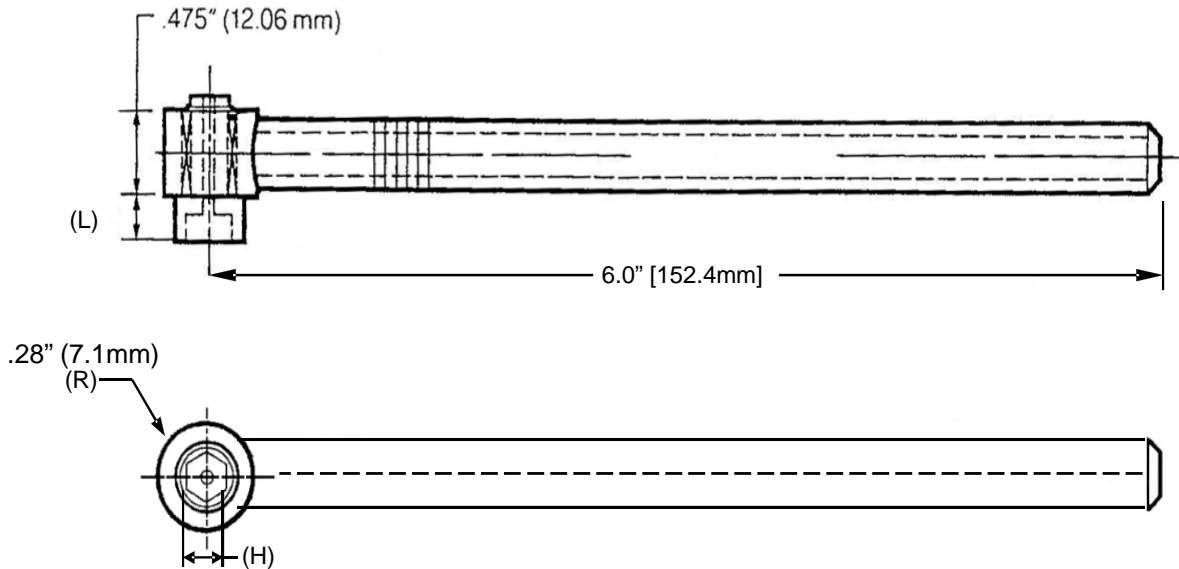
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# Hand Assembly Tools For Frangible Collars

40 in-lbs Max Torque

## Lt. Duty Roller Wrenches with Integrated Sockets



Ordering Number	(H) Hex Size		L	Hole Thru Dia.
RWB40A-21	.219	7/32"	.240	7/32"
RWB40A-25	.250	1/4"	.240	7/32"
RWB40A-28	.281	9/32"	.240	7/32"
RWB40A-31	.312	5/16"	.250	7/32"
RWB40A-34	.343	11/32"	.270	7/32"

- Maximum 40 in-lbs Torque Capability
- Designed to fit into limited access applications
- Do not exceed maximum torque capability of the roller wrench

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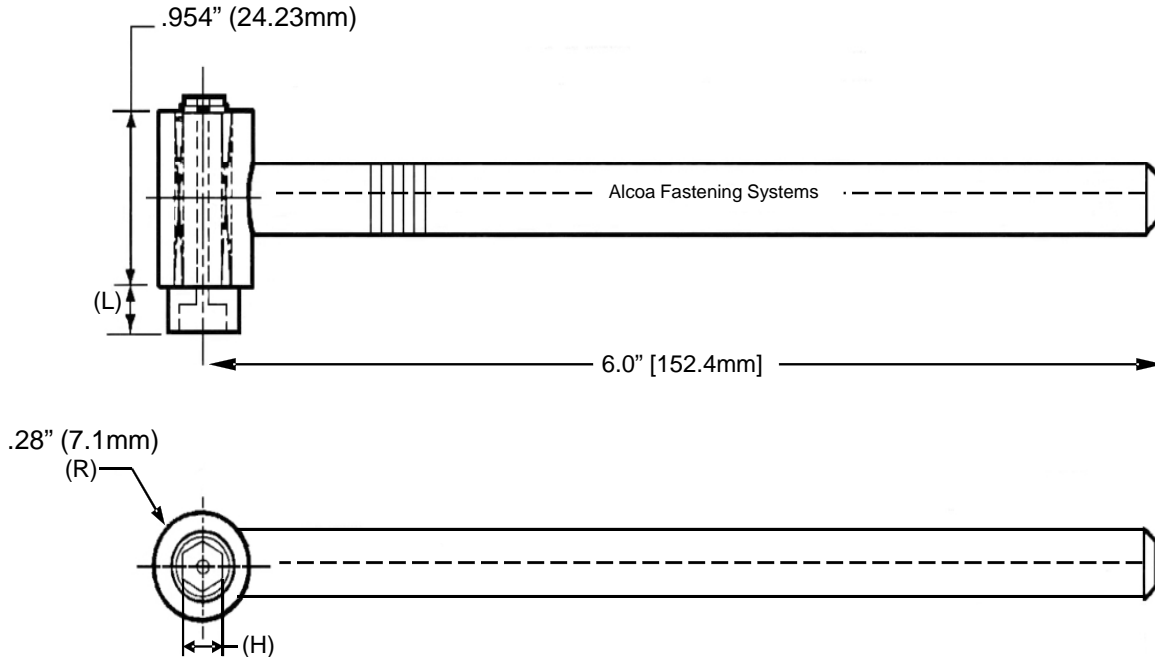
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# Hand Assembly Tools For Frangible Collars

80 in-lbs Max Torque

## Lt. Duty Roller Wrenches with Integrated Sockets



Ordering Number	(H) Hex Size		L	Hole Thru Dia.
RWB80A-21	.219	7/32"	.240	7/32"
RWB80A-25	.250	1/4"	.240	7/32"
RWB80A-28	.281	9/32"	.240	7/32"
RWB80A-31	.312	5/16"	.250	7/32"
RWB80A-34	.343	11/32"	.270	7/32"

- Maximum 80 in-lbs Torque Capability
- Designed to fit into limited access applications
- Do not exceed maximum torque capability of the roller wrench

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# Hand Assembly Tools For Frangible Collars

## Roller Wrench, up to 400 in-lbs



Ordering Number	A Ref.	Handle Length Ref.	C Dia. Ref.	D Max.	Square Drive	Hole Thru Dia.
RWB100-400	2.0	8.0	1.5	.74	3/8"	1/8"

- Notes: 1. Above Roller Wrench requires a square drive 3/8" socket to fit the fastener hex size.  
 2. Sockets are not included with the Roller Wrench  
 3. Hex Key Handle Assembly sold separately

# Hand Assembly Tools For Frangible Collars

## Roller Wrench, up to 400 in-lbs

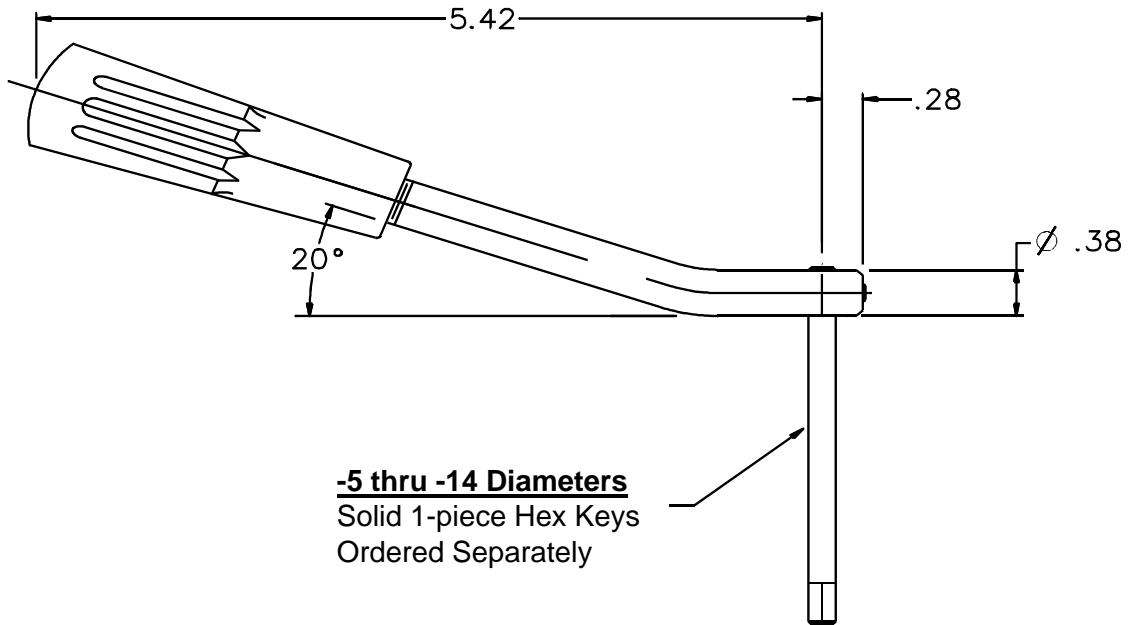


Ordering Number	Hex Size	A Length Ref.	B Height Ref.	C Radius Max.	D Dia. Ref.	Handle Length Ref.	Hole Thru Dia.	Square Drive
RWB100-400-37	.375	1.25	.785	.74	1.5	8.0	1/8"	3/8"
RWB100-400-50	.500	1.25	.785	.74	1.5	8.0	1/8"	3/8"
RWB100-400-56	.562	1.25	.785	.74	1.5	8.0	1/8"	3/8"

- Notes: 1. Above Roller Wrench will have a square drive 3/8" socket to fit the fastener hex size.  
 2. Socket is included with this Roller Wrench  
 3. Hex Key Handle Assembly sold separately

# Special Hex Key Wrenches For Frangible Collars

## SPKH –Special Hex Key Handle



### Hex Keys

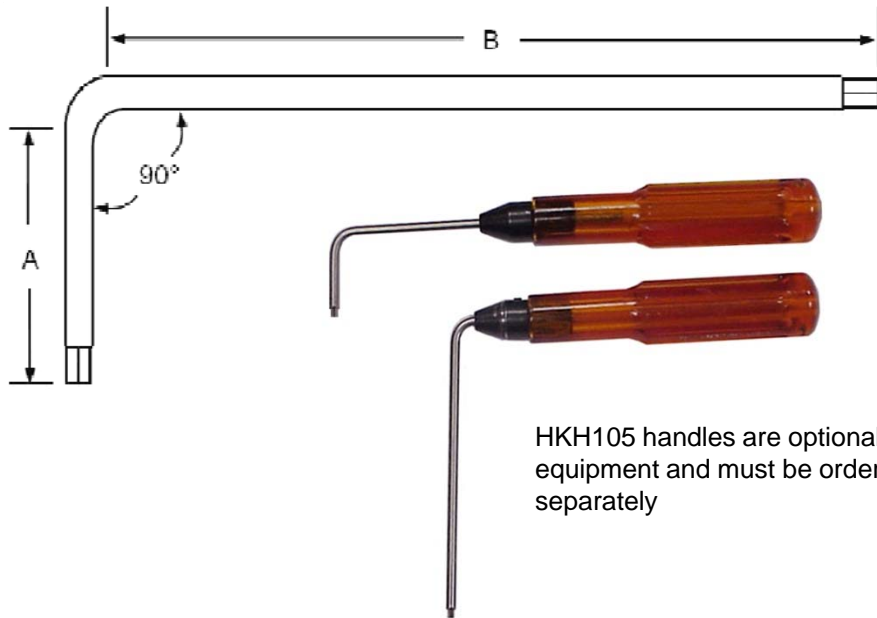
Pin Dia.	Handle (20°)	Handle (Straight)	Hex Key Size	Hex Keys Choices	
				.825 Long	2.5" Long
-5	SPKH-6	SPKH-6S	.078 (5/64")	093-9322	093-9323
-6	SPKH-6	SPKH-6S	.078 (5/64")	093-9322	093-9323
-8	SPKH-8	SPKH-8S	.094 (3/32")	093-9324	093-9325
-10	SPKH-10	SPKH-10S	.125 (1/8")	016-9867	016-9868
-12	SPKH-12	SPKH-12S	.156 (5/32")	016-9869	016-9870
-14	SPKH-14	SPKH-14S	.187 (3/16")	216-9008	216-9009

#### How to Order:

1. Order Handle Assembly Separately: SPKH-(\*)
2. Order Hex Keys Separately

# Hex Key Accessories For Frangible Collars

Extra Strong Hex Keys to be used for manual installation and removal of fasteners



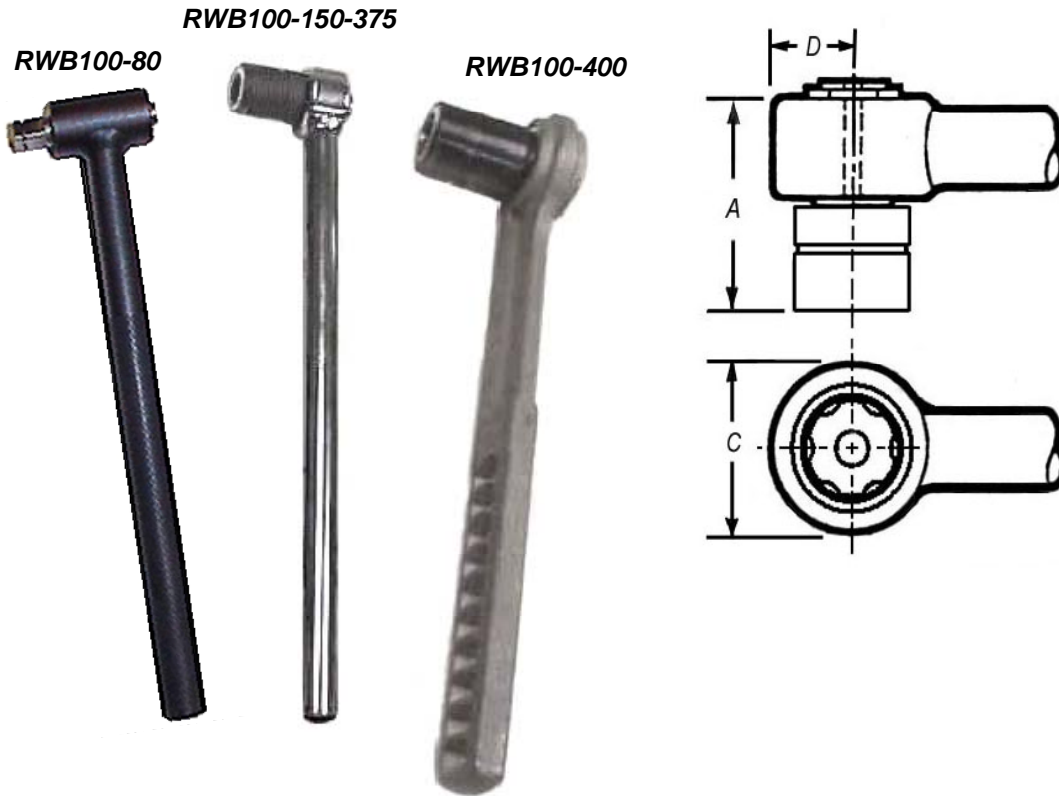
Hex Key Part Number	Handle Part Number (Optional)	Screw Dia.	Hex Size	"A" Reference (inches)	"B" Reference (inches)
HK650-078-1	HKH105-078	-5, -6	5/64" (.078)	0.50	3.20
HK650-078-2	HKH105-078	-5, -6	5/64" (.078)	0.75	3.20
HK650-078-3	HKH105-078	-5, -6	5/64" (.078)	2.09	4.45
HK650-094-1	HKH105-094	-8	3/32" (.094)	0.50	3.50
HK650-094-2	HKH105-094	-8	3/32" (.094)	0.75	3.25
HK650-094-3	HKH105-094	-8	3/32" (.094)	2.09	4.45
HK650-125-4	Not Available	-10	1/8" (.125)	1.25	5.25
HK650-125-3	Not Available	-10	1/8" (.125)	2.40	4.10
HK650-156-3	Not Available	-12	5/32" (.156)	2.40	4.10
HK650-156-4	Not Available	-12	5/32" (.156)	1.25	5.25

Material: High Strength Alloy Steel

Caution: Do not use these hex keys with power installation tooling

# Hand Assembly Tools For Metric Frangible Collars

## Roller Wrenches, up to 400 in-lbs



### YSA Standard Collars

YSA 351, 352, 353, 361, 362, 363

Collar Dia.	Hex Size (mm)	Socket Part Number	Roller Wrench	Socket Drive	"A" (mm)	"C" (mm)	Socket Length	Hex Key (Metric)	Hex Key Handle, Type 1	Hex Key Handle, Type 2
-4	6	CTSM-6-1	RWB100-80	1/4"	49.8	7.1	22.2mm	HK660-M1.5-1	HKHM-1.5	HKH100
-4	6	CTSM-6-2	RWB100-80	1/4"	76.8	7.1	49.2mm	HK660-M1.5-2	HKHM-1.5	HKH100
-5	7	CTSM-7-1	RWB100-80	1/4"	49.8	7.1	22.2mm	HK660-M2-1	HKHM-2.0	HKH100
-5	7	CTSM-7-2	RWB100-80	1/4"	76.8	7.1	49.2mm	HK660-M2-2	HKHM-2.0	HKH100
-6	8	CTSM-8-1	RWB100-150-375	3/8"	39.0	11.2	25.4mm	HK660-M2.5-1	HKHM-2.5	HKH100
-6	8	CTSM-8-2	RWB100-150-375	3/8"	66.0	11.2	50.8mm	HK660-M2.5-2	HKHM-2.5	HKH100
-8	10	CTSM-10-1	RWB100-400	3/8"	45.3	15.9	25.4mm	HK660-M3-1	HKHM-3.0	HKH100
-8	10	CTSM-10-2	RWB100-400	3/8"	70.7	15.9	50.8mm	HK660-M3-2	HKHM-3.0	HKH100

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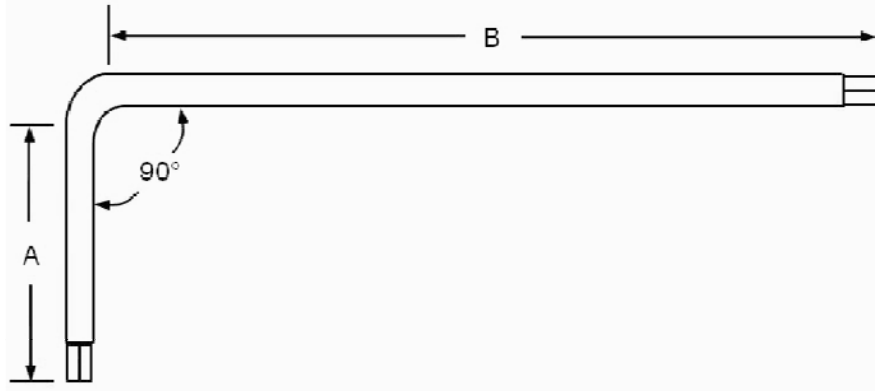


### Assembly Tool Systems Division

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# Metric Hex Key Accessories For Frangible Collars

Extra Strong Metric Keys to be used for manual installation and removal of fasteners



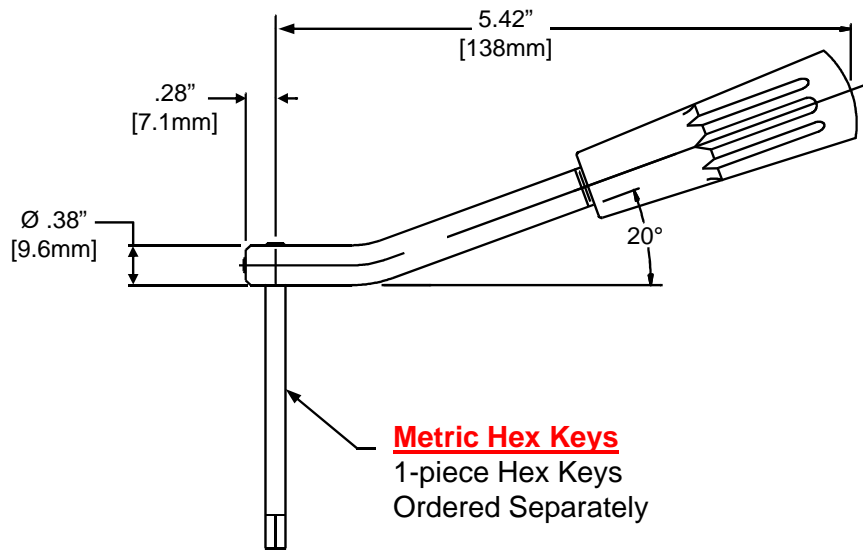
Part Number	Bolt Dia.	Hex Size	"A" Reference		"B" Reference	
			In	mm	In	mm
HK650-M1.5-1	-4	1.5mm	1.0"	25.4	5.7"	147.3
HK650-M1.5-2	-4	1.5mm	2.5"	63.5	4.3"	109.2
HK650-M1.5-3	-4	1.5mm	3.3"	83.8	3.5"	88.9
HK650-M2-1	-5	2.0mm	1.0"	25.4	5.7"	147.3
HK650-M2-2	-5	2.0mm	2.5"	63.5	4.3"	109.2
HK650-M2-3	-5	2.0mm	3.3"	83.8	3.5"	88.9
HK650-M2.5-1	-6	2.5mm	1.0"	25.4	5.8"	147.3
HK650-M2.5-2	-6	2.5mm	2.0"	50.8	4.8"	121.9
HK650-M2.5-3	-6	2.5mm	3.0"	76.2	3.8"	96.5
HK650-M3-1	-8	3.0mm	1.2"	30.5	5.6"	142.0
HK650-M3-2	-8	3.0mm	2.2"	55.8	4.6"	116.8
HK650-M3-3	-8	3.0mm	3.2"	81.3	3.6"	91.4

Material: High Strength Alloy Steel

Caution: Do not use these hex keys with power installation tooling



# Handle for Forged *Metric* Hex Keys



This is an economical handle for holding forged Metric Size Hex Keys. This handle is comfortable to hold and the hex keys are retained by a standard set screw. This handle and key assembly are ideal for manually installed nuts or frangible collars on pins with a metric size hex recess.

The hex keys come in a standard length of 3.0" [76.2mm] and can be shortened for tighter fit applications.

## Type 1 Handle

Handle Part Number	Hex Key Part Number	Description	Collar Dia.	Hex Key Length
HKHM-1.5	HK660-M1.5-1	Hex Key 1.5mm	-4	2.5" [63.5mm]
HKHM-1.5	HK660-M1.5-2	Hex Key 1.5mm	-4	3.3" [85.6mm]
HKHM-2.0	HK660-M2-1	Hex Key 2.0mm	-5	2.5" [63.5mm]
HKHM-2.0	HK660-M2-2	Hex Key 2.0mm	-5	3.3" [85.6mm]
HKHM-2.5	HK660-M2.5-1	Hex Key 2.5mm	-6	2.0" [50.8mm]
HKHM-2.5	HK660-M2.5-2	Hex Key 2.5mm	-6	3.0" [76.2mm]
HKHM-3.0	HK660-M3-1	Hex Key 3.0mm	-8	2.2" [55.9mm]
HKHM-3.0	HK660-M3-2	Hex Key 3.0mm	-8	3.2" [81.3mm]

# Handle for Forged Aster® Keys



This is an economical handle for holding Aster® keys. This handle is comfortable to hold and the keys are retained by a standard set screw. This handle and key assembly are ideal for manually installed nuts or frangible collars on pins with the Aster® recess.

The keys come in a standard length of 3.0" [76.2mm] and can be shortened for tighter fit applications.

Caution: **To avoid injury, do not use this wrench design with power installation tooling**

Ordering Numbers	Description	Aster® Key Length
HKH100	Handle	3.0" (76.2mm)
AK650-2-B	Aster® Key for -2 Dia. Pin	3.0" (76.2mm)
AK650-3-B	Aster® Key for -3 Dia. Pin	3.0" (76.2mm)
AK650-3A-B	Aster® Key for -3A Dia. Pin	3.0" (76.2mm)
AK650-4-B	Aster® Key for -4 Dia. Pin	3.0" (76.2mm)

Note: Aster™ is a trademark of Blanc Aero Industries

Length of the Aster® Key can be adjusted to fit application requirements

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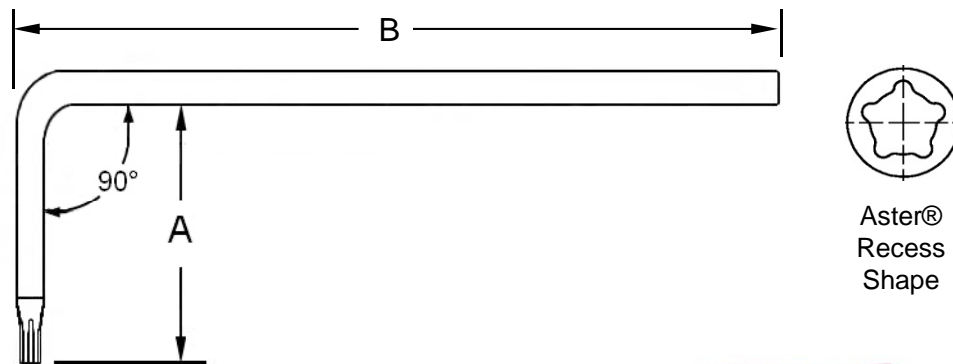


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# Aster® Key Accessories For Nuts and Frangible Collars

## Airbus Applications

Extra Strong Aster® Keys to be used for manual installation and removal of fasteners



AKH105 handles are optional equipment and must be ordered separately

Aster® Key is not formed on both ends

Hex Key Part Number	Handle Part Number (Optional)	Screw Dia.	"A" Reference (mm)	"B" Reference (mm)
AK650-2-16	AKH105-2	-2	16.0	85.0
AK650-3-16	AKH105-3	-3	16.0	85.0
AK650-3A-16	AKH105-3A	-3A	16.0	85.0
AK650-4-17	AKH105-4	-4	17.0	85.0

Material: High Strength Alloy Steel

Caution: Do not use this product with a power tool, serious injury can occur.

# Frangible Collars Tools

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## Collar Removal Tools Pneumatic and Hand Tools



### SECTION 6

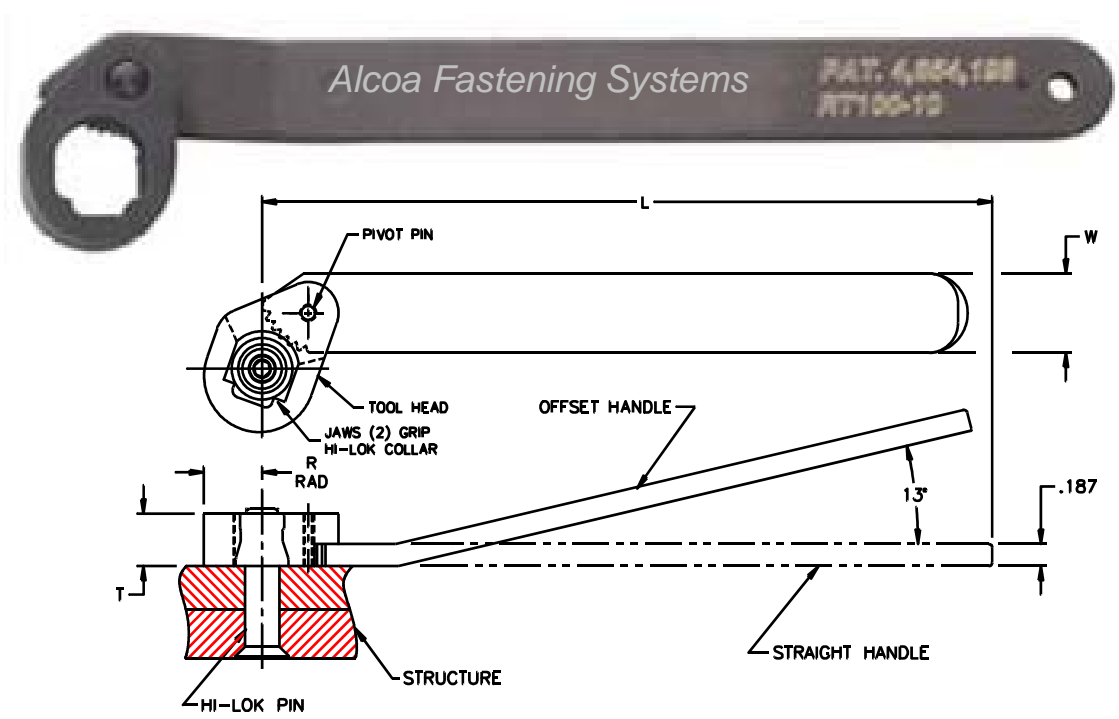
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# Removal Tools For Frangible Collars



**FEATURES:**

- SERRATED REMOVAL TOOL SECURLY GRIPS FRANGILBLE COLLARS FOR EASY REMOVAL
- TOOL IS AVAILABLE WITH AN OFFSET OR STRAIGHT HANDLE

### Removal Tool Offset Handle

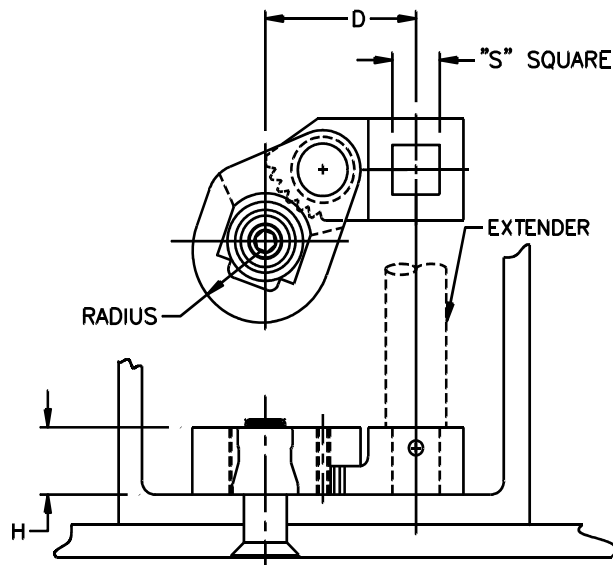
Part Number	Collar Diameter	R	T	L	W
RT100-56	-5, -6	.280	.28	5.6"	.42
RT100-8	-8	.350	.38	5.8"	.55
RT100-10	-10	.430	.47	6.9"	.67
RT100-12	-12	.430	.47	6.9"	.67
RT100-14	-14	.610	.57	9.9"	.95

### Removal Tool Straight Handle

Part Number	Collar Diameter	R	T	L	W
RT100-56S	-5, -6	.280	.28	5.6"	.42
RT100-8S	-8	.350	.38	5.8"	.55
RT100-10S	-10	.430	.47	6.9"	.67
RT100-12S	-12	.430	.47	6.9"	.67
RT100-14S	-14	.610	.57	9.9"	.95

# Removal Tools For Frangible Collars

## Crow Foot Removal Wrenches



### Features:

- Crows foot jaw securely grips frangible collars for their easy removal in restricted areas
- Tool is made of heat treated high grade steel
- Various lengths, user provided, extenders permit tool usage in deep channels

Part Number	Collar Usage	Edge Radius	"S" Square	H	D
RT100-56CF	-5, -6	.280	.25	0.28	1.010
RT100-8CF	-8	.350	.25	0.38	1.170
RT100-10CF	-10	.430	.375	0.47	1.450
RT100-12CF	-12	.430	.375	0.47	1.450
FT100-14CF	-14	.610	.375	0.57	1.800

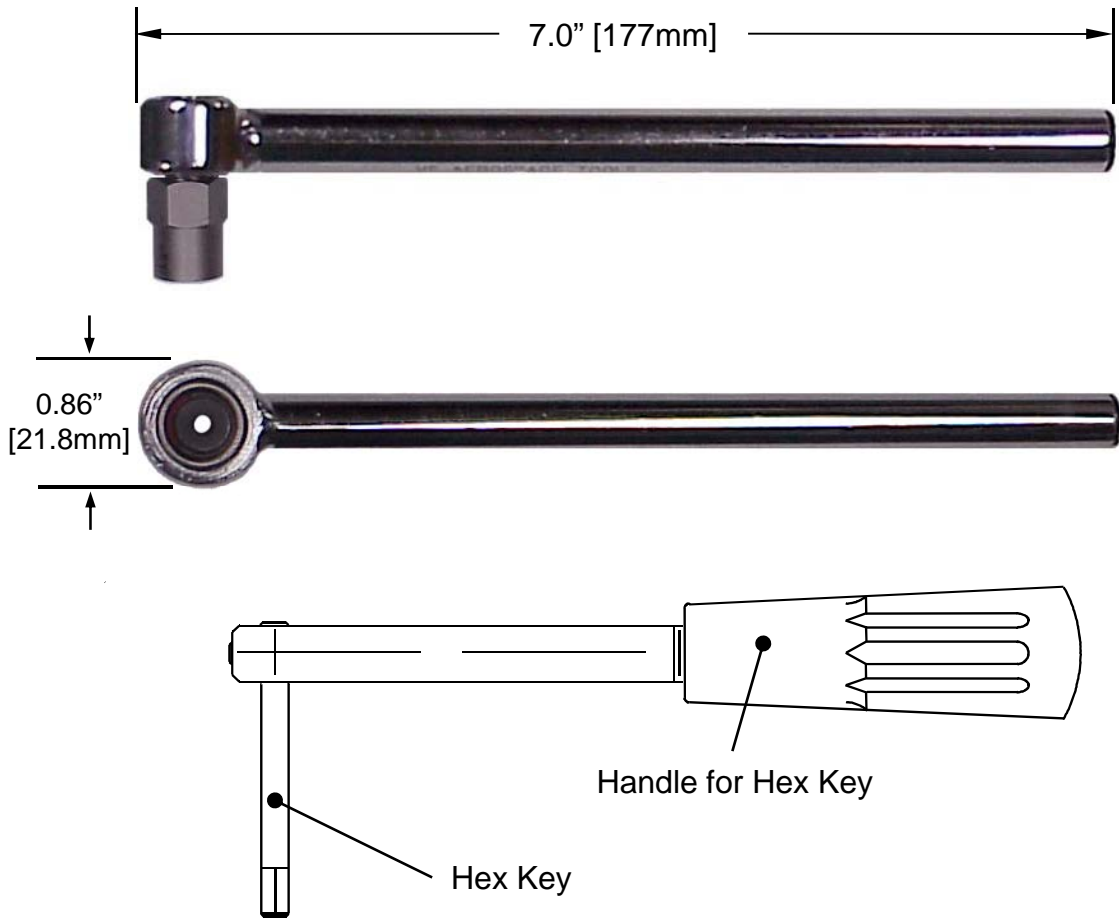
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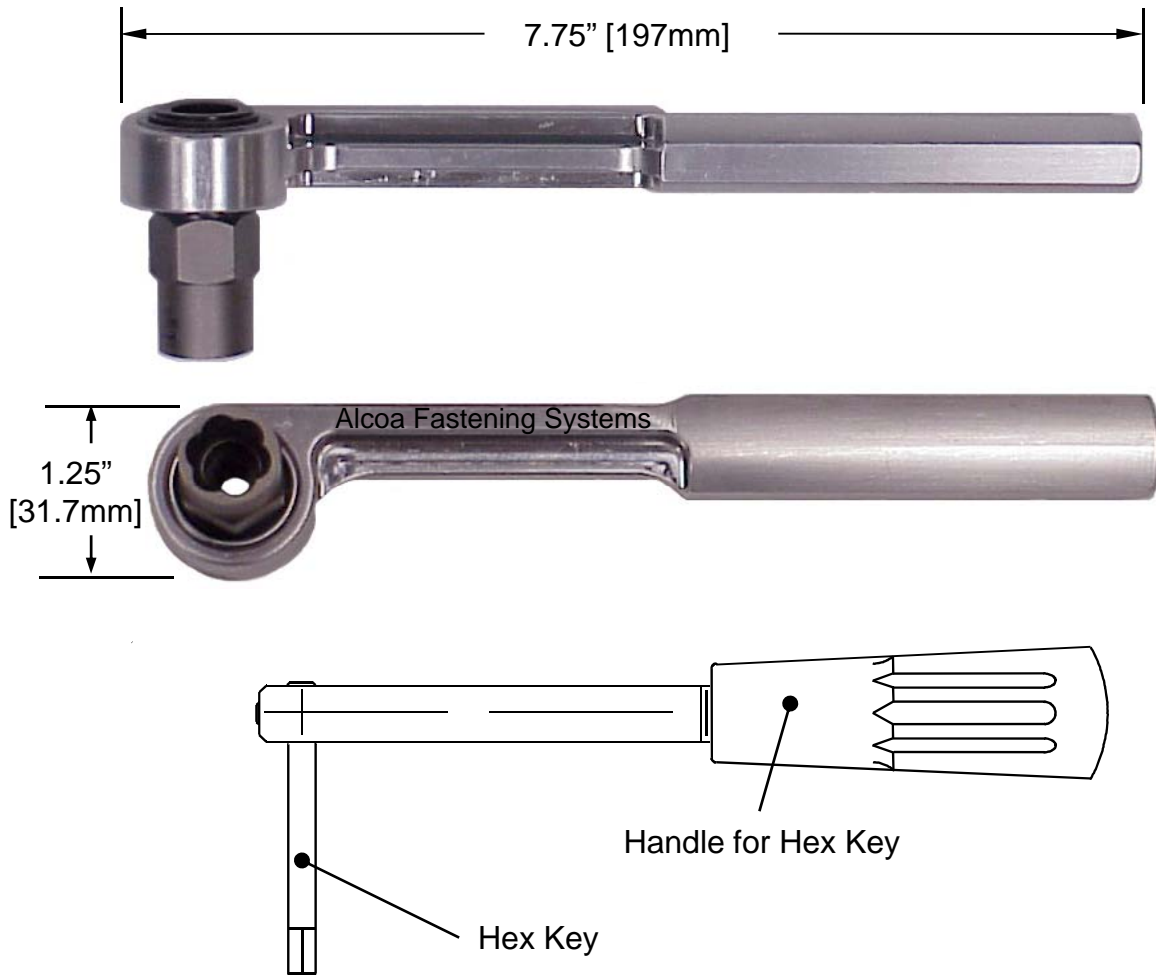
# Hand Removal Tool For Frangible Collars



## Roller Wrench Removal Tools for Frangible Collars

Collar Dia.	Removal Socket	Roller Wrench	Hex Key Size	Hex Key Bit 2.5" Long	Handle for Hex Key Bit
(-5) 5/32"	CRTS9000-5	RT9001-375	.062 (1/16")	TBD	SPKH-5S
(-5) 5/32"	CRTS9000-5	RT9001-375	.078 (5/64")	093-9323	SPKH-6S
(-6) 3/16"	CRTS9000-6	RT9001-375	.078 (5/64")	093-9323	SPKH-6S
(-8) 1/4"	CRTS9000-8	RT9001-375	.094 (3/32")	093-9325	SPKH-8S

# Hand Removal Tool For Frangible Collars



## Roller Wrench Removal Tools for Frangible Collars

Collar Dia.	Removal Socket	Roller Wrench	Hex Key Size	Hex Key Bit 2.5" Long	Handle for Hex Key Bit
(-8) 1/4"	CRTS9000-8	RT9000-375	.094 (3/32")	093-9325	SPKH-8S
(-10) 5/16"	CRTS9000-10	RT9000-375	.125 (1/8")	093-9008	SPKH-10S
(-12) 3/8"	CRTS9000-12	RT9000-375	.156 (5/32")	TBD	SPKH-12S

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# ***Hand Removal Tool For Frangible Collars***

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Procedure for removing frangible collars:

1. Select the correct size removal socket for the fastener that will be removed.
2. Attach the appropriate size removal socket to the ratchet wrench or roller wrench.
3. Place the removal socket over the frangible collar that you want to remove and apply a moderate amount of down pressure. Turn the socket in a counter-clockwise direction to loosen the collar.
4. If the “screw” or “pin” is not tight and turns with the collar when you attempt to loosen it, you will need the appropriate size hex key to hold the “pin” from turning while you rotate the nut. The hex key will fit through the ratchet wrench and socket and fit into the hex recess of the “pin”.
5. Removing the socket from the collar can be difficult. Before the collar is completely removed from the “pin” it is recommended to wiggle the socket which will detach it from the collar. You should be able to remove the collar by hand at this time.

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