



**HOWMET
AEROSPACE**

Frangible Collar Assembly Tools



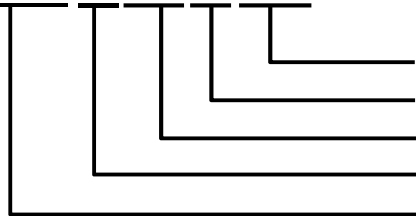
Tool Selection

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, 714-278-8908

Example of Complete Tool Model Number:

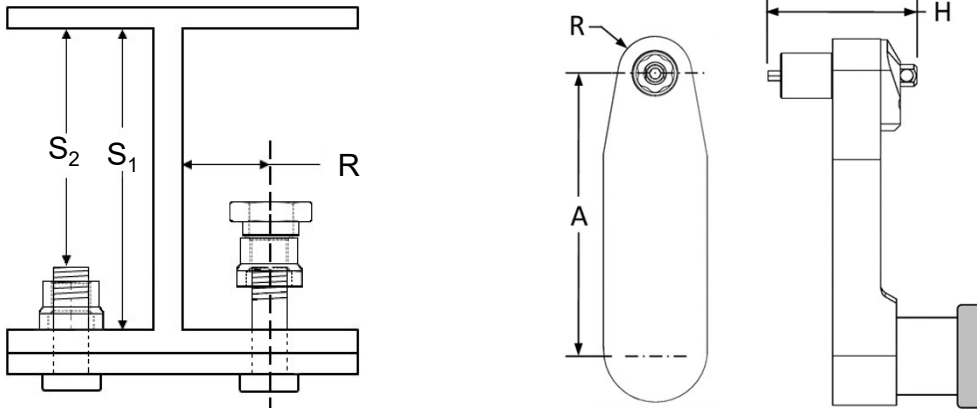
CTL1429 C 343 D 078



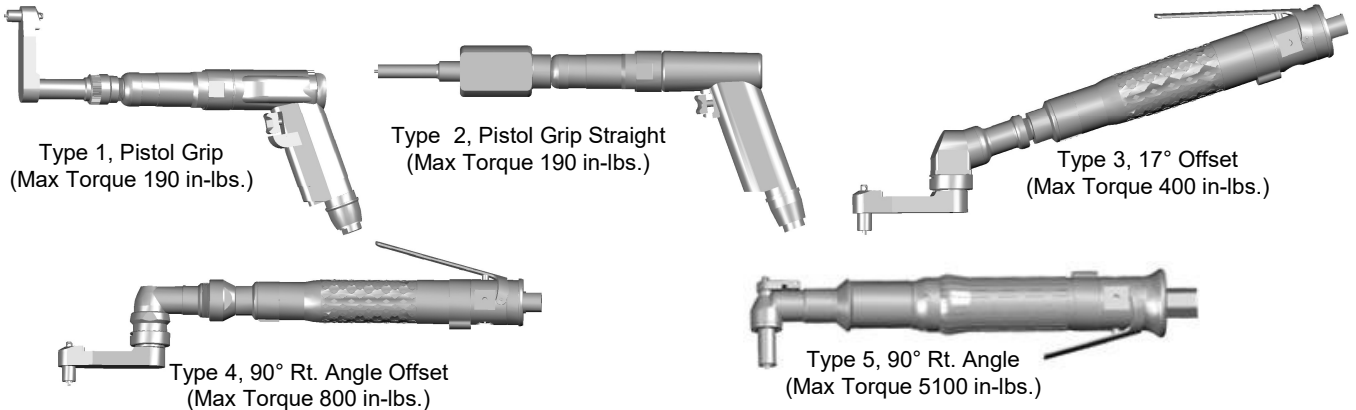
Hex Key Size (Table 3) Add "T" for 2-piece (078T)
Extended Socket Length (Table 2)
Fastener Hex Size (Table 1)
Ext'd. Drive Shaft and Index Unit (Table 4)
Tool Model Number



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. "S₁" Total working space _____ (in), _____ (mm)
6. "S₂" 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 _____

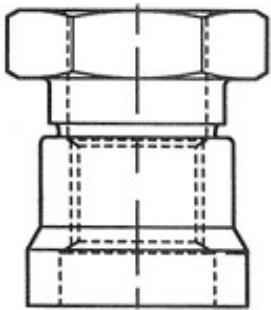
Contact _____

Phone _____ FAX _____

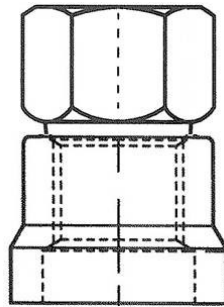
Return by FAX: (714) 871-4821 or E-mail glenn.anderson@Howmet.com

Standard & Tall Hex Frangible Collars

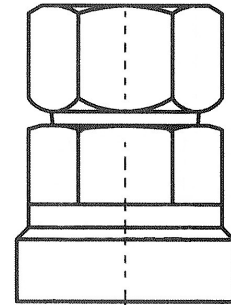
**Standard "HL"
Frangible Collar**



**"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:

CTL1429C343D078

CTL3429A343D078

Bi-Hex Nuts

Example of Fastener Part Numbers:

ASNA2528-(*)

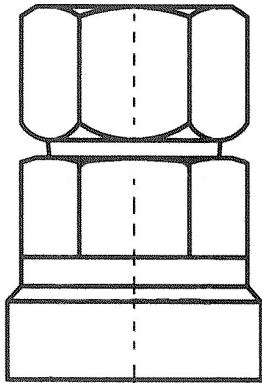
ASNA2536-(*)

ASNA2537-(*)

ASNA2538-(*)

This fastener can be installed as a “frangible collar” using non-torque controlled tools or as a nut installed with torque controlled tools in a pre-torque or final torque condition.

“Bi-Hex Nut”



“Bi-Hex” Nuts have (2) wrenchable hex features. The top hex can be used if you are using a non-torque controlled installation tool. The top hex will “break-off” when the proper seating torque has been reached.

If “Pre-Torquing” the nut is important, tightening the nut without breaking the collar, a deep hex recess socket can be used with a torque controlled tool. The socket reaches over both hex features and the top hex is not removed. This requires a secondary operation to break off the top hex after a period of time.

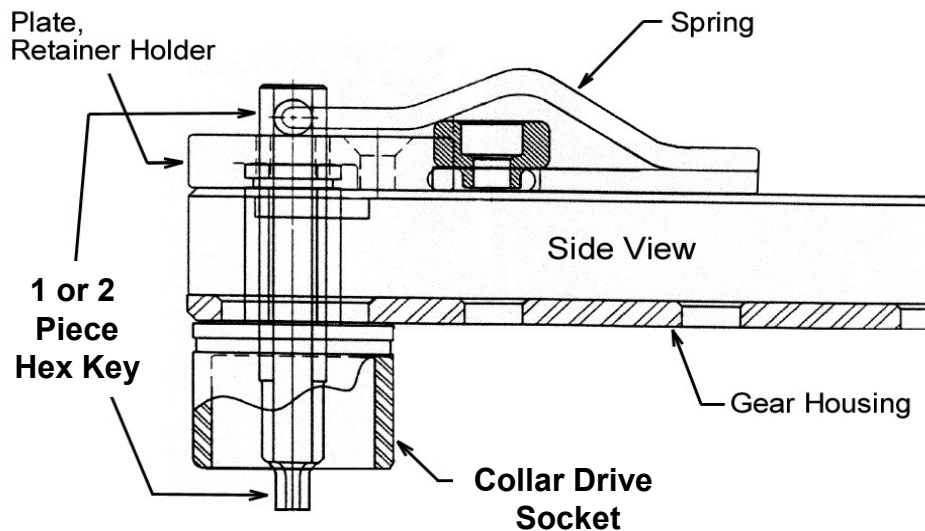
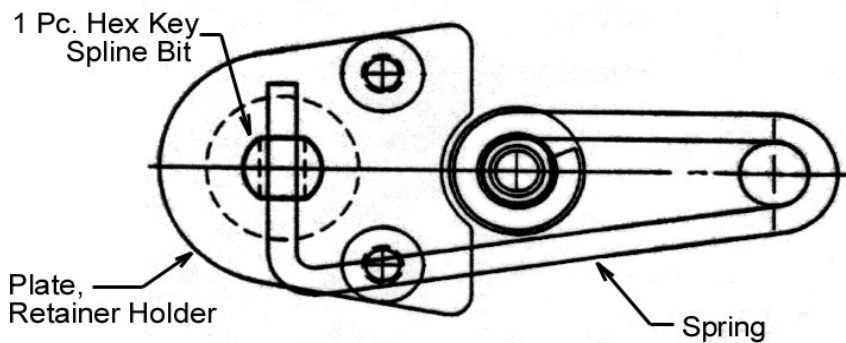
**Note: “CTL” Frangible collar tool for final installation
“KTLP” indicates a pre-torque tool**

ERGO 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



High Strength Hex Key System

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



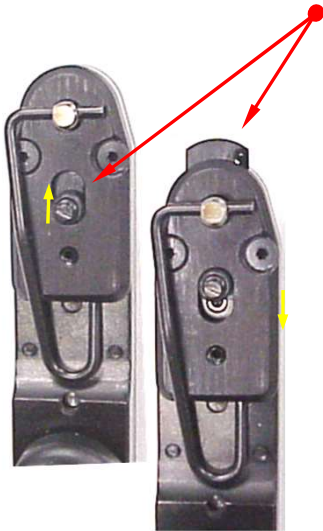
Hex Key Holder with Set Screw

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

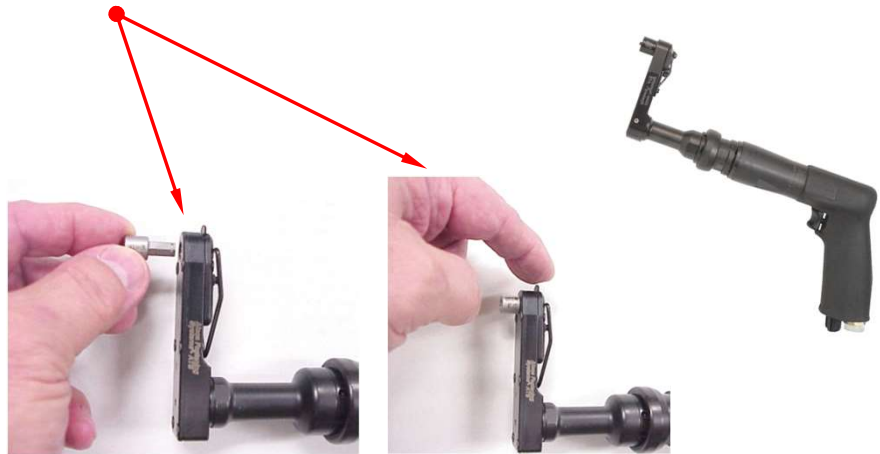
Optional "Quick Change Socket System"

The Howmet 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.

1. Slide the release lever forward, releasing the socket



2. With the release lever forward, a different socket can easily be inserted and is locked in place by pushing the release lever to the locked position.



Standard Howmet 1-Piece Hex Keys

(worn or broken keys are easily changed without special tooling)



Frangible Collar Assembly Tools

Table of Contents

Pistol Grip Power Tools	Section 1
17° Offset Power Tools	Section 2
90° Offset Power Tools	Section 3
90° Right Angle Tools	Section 4
Hand Installation Tools & Hex Key Accessories	Section 5
Collar Removal Tools	Section 6

Sales & Service:

Howmet Fastening Systems
Assembly Tool Systems Division
801 S. Placentia Avenue
Fullerton, CA 92831 USA

714-278-8908 Customer Service
714-871-4821 FAX

Frangible Collar Assembly Tools

Pistol Grip Power Tools

SECTION 1



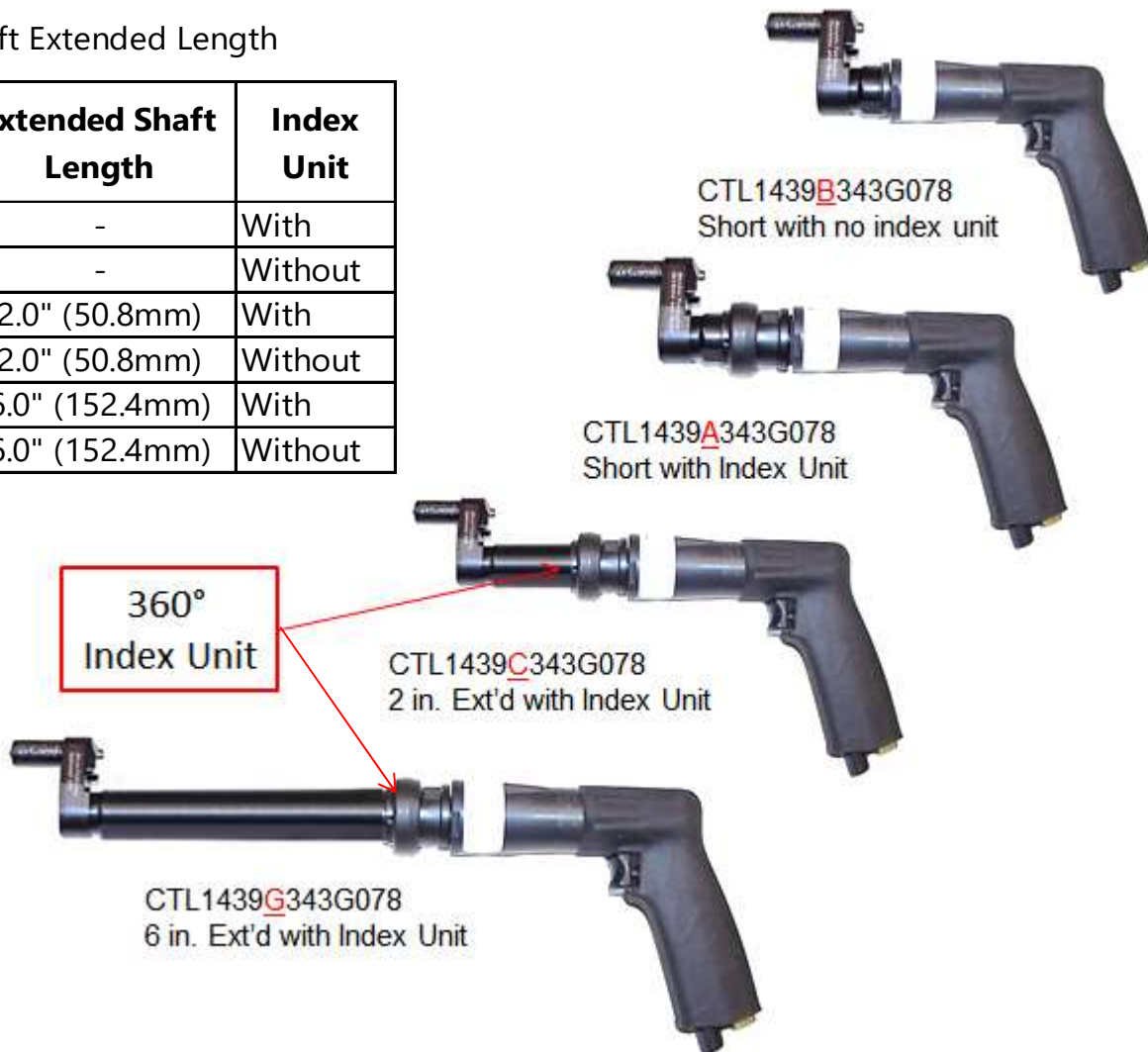
Frangible Collar Assembly Tools

Pistol Grip Extended Drive Shaft Options

Table 4

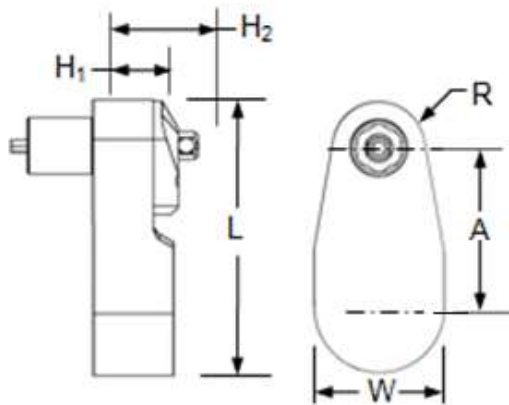
Drive Shaft Extended Length

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



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



Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1428	3	1.27" [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:

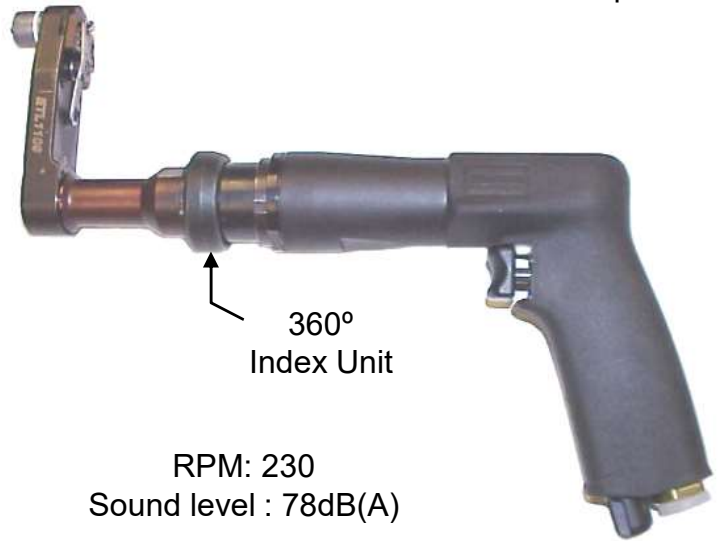
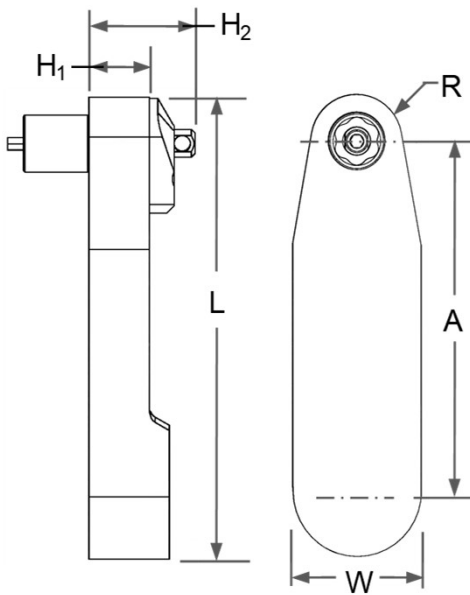
CTL1428 C 312 E 078



- 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

Max Torque 140 In-Lbs



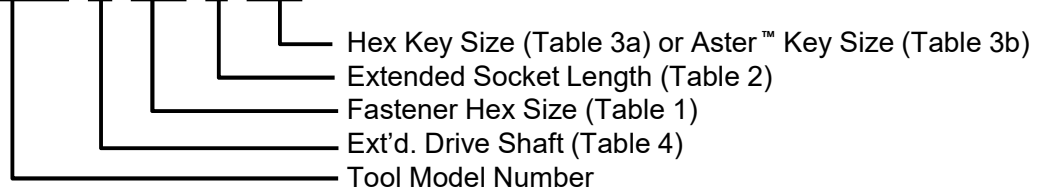
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1439	5	2.68" [68.1mm]	.38" [9.5mm]	.69" [17.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 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
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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"							

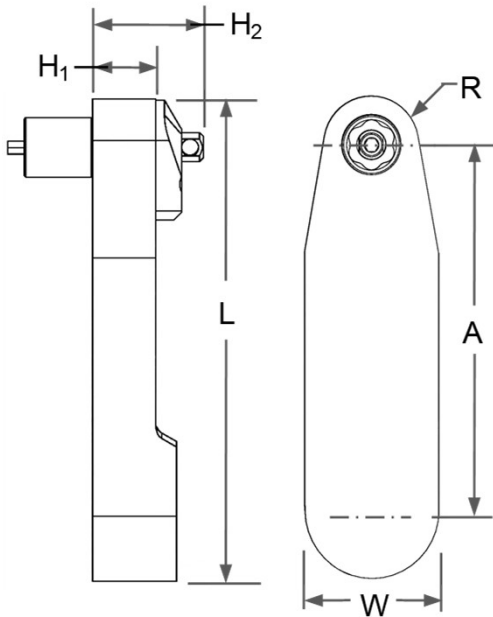
Maximum Flush Socket is 5/16" (.312) Hex

Example of Complete Tool Model Number:

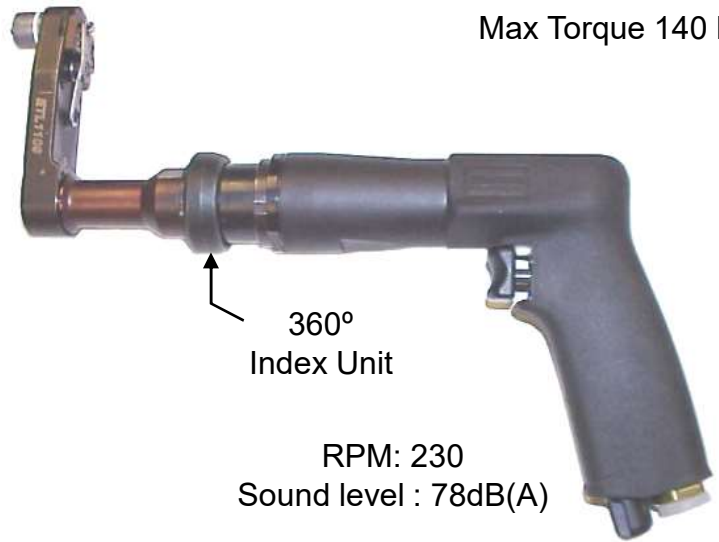
CTL1439 C 312 E 078



Offset Pistol Grip Tools



Max Torque 140 In-Lb.



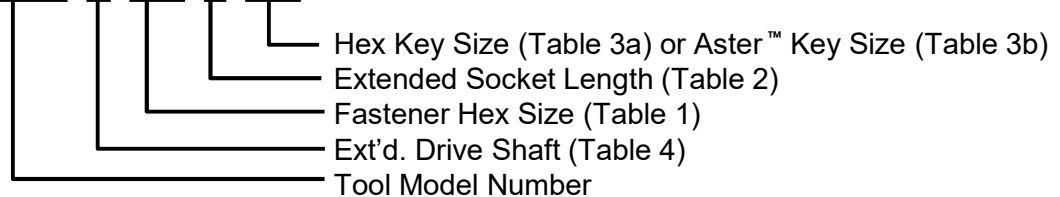
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1429	5	2.68 [68.1mm]	.47 [11.9mm]	.81 [20.5mm]	3.53 [89.7mm]	1.0 [25.4mm]	.35 [8.8mm]

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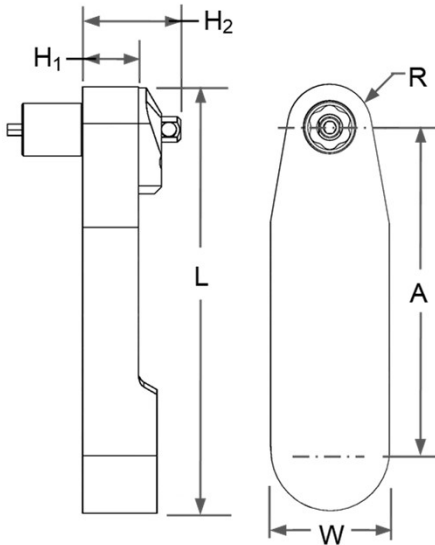
Maximum Flush Socket is 5/16" (.312) Hex

Example of Complete Tool Model Number:

CTL1429 C 312 E 078



Offset Pistol Grip Tools



Max Torque 160 in-lbs.



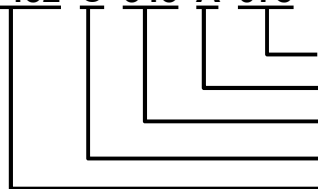
Model Number	No. of Gears	A	H ₁	H ₂ Ref.	L	W	R
CTL1452A	5	2.72" [69.0mm]	.38" [9.5mm]	.72" [18.5mm]	3.7" [94.7mm]	1.0" [25.4mm]	.39" [10.0mm]

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

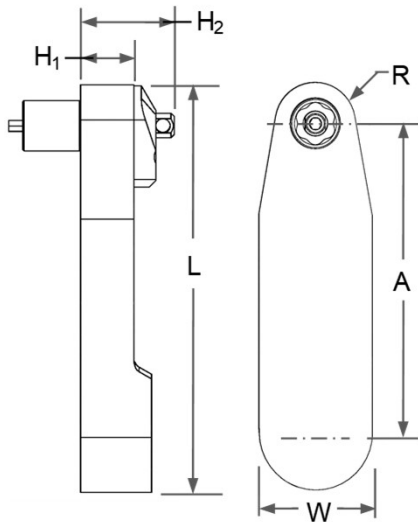
Example of Complete Tool Model Number:

CTL1452 C 343 A 078



Hex Key Size (Table 3)
 Extended Socket Length (Table 2)
 Fastener Hex Size (Table 1)
 Drive Shaft Length (Table 4)
 Tool Model Number

Offset Pistol Grip Tools



Tool Torque Range:
15-100 in-lbs.



Sound level : 78dB(A)

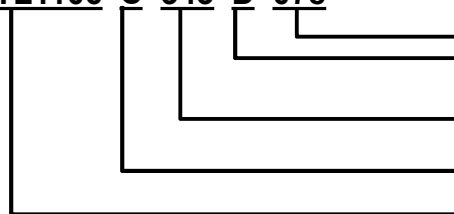
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1106	7	4.08" [103.6mm]	.47" [11.9mm]	.78" [19.8mm]	4.9" [124.5mm]	1.0" [25.4mm]	.32" [8.2mm]

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

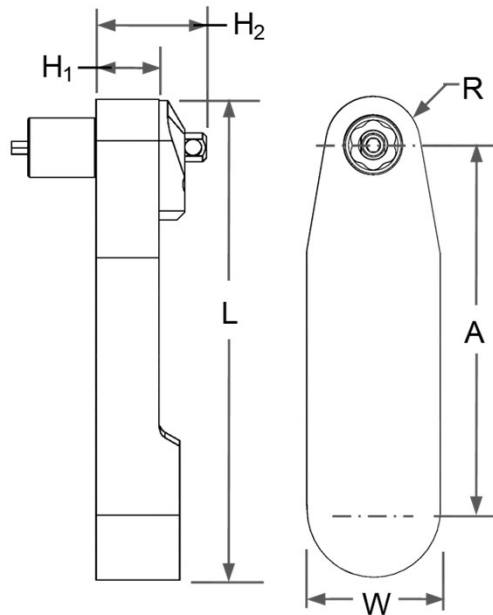
Example of Complete Tool Model Number:

CTL1106 C 343 D 078



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

Offset Pistol Grip Tools



Max Torque 140 in-lbs.



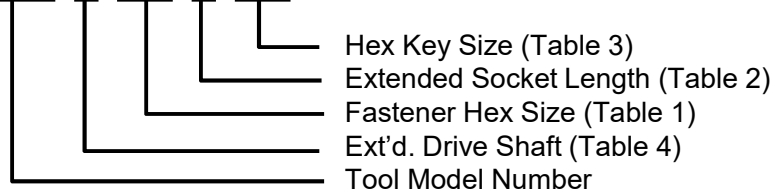
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1438	7	4.13" [104.9mm]	.47" [11.9mm]	.81" [20.5mm]	4.98" [126.5mm]	1.0" [25.4mm]	.35" [8.8mm]

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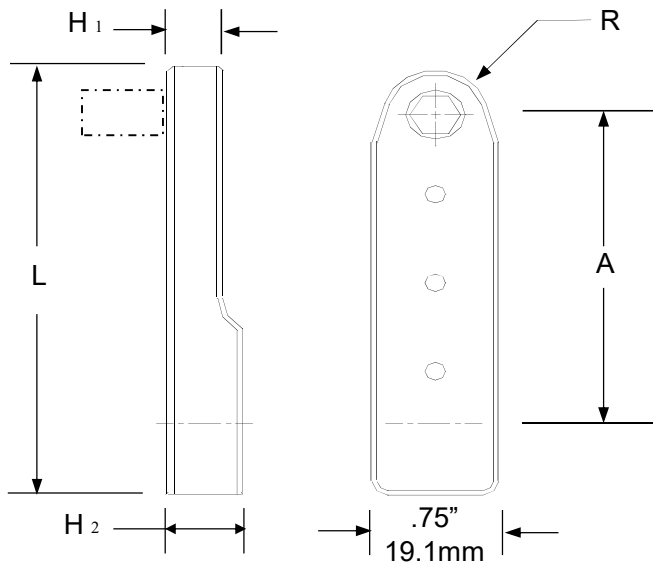
Largest flush socket size is 5/16" A/F

Example of Complete Tool Model Number:

CTL1438 C 343 D 078



Offset Pistol Grip Tools



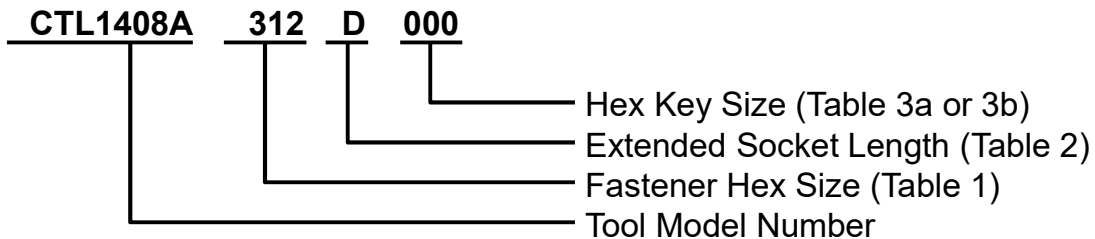
Max Torque 80 in_lbs



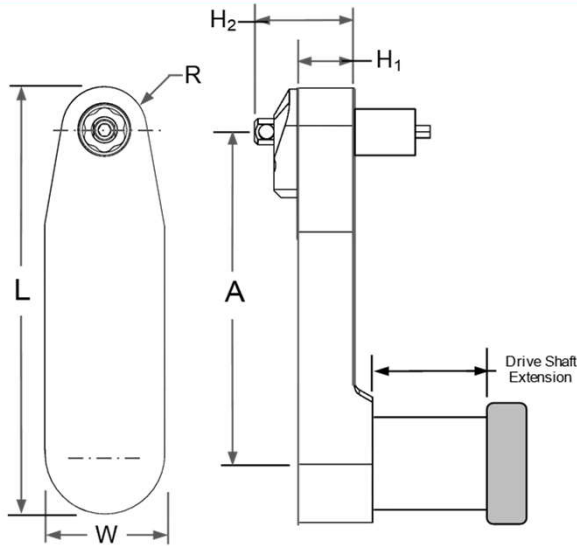
Model Number	No. of Gears	A	H1	H2	L	R
CTL1408	5	2.38	.34 [8.6mm]	.46	4.18 [106.1mm]	.31 [7.9mm]

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



Max Torque 130 in-lbs.



RPM: 275
Sound level : 78dB

Back Drive Socket Position

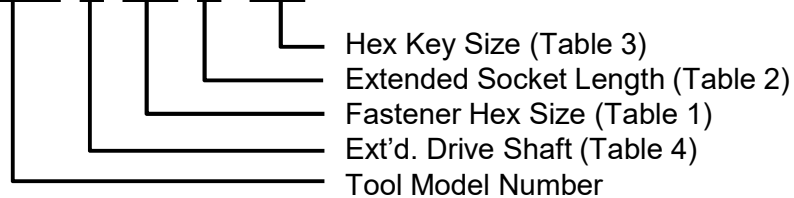
Model Number	No. of Gears	A	H ₁	H ₂	L	R
CTL1449	4	1.96 [49.8mm]	.47 [11.8mm]	.81 [20.5mm]	2.81 [71.4mm]	.35 [8.8mm]

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

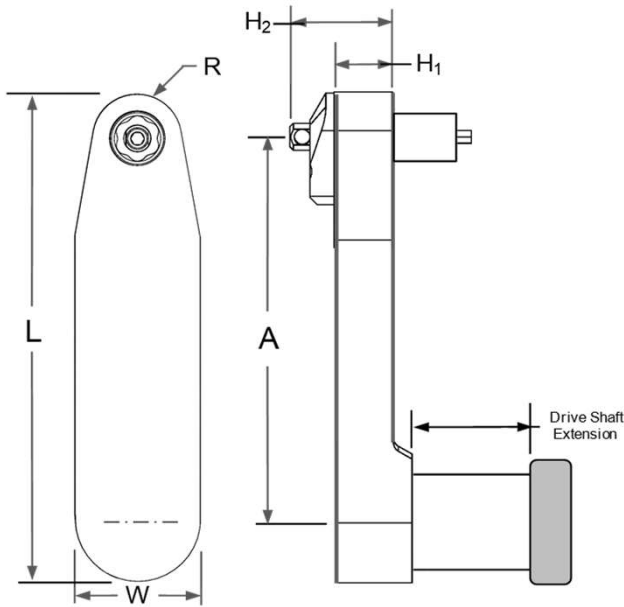
Example of Complete Tool Model Number:

CTL1449 C 343 D 078



Offset Pistol Grip Tools

Max Torque 140 in-lbs.



Back Drive Socket Position

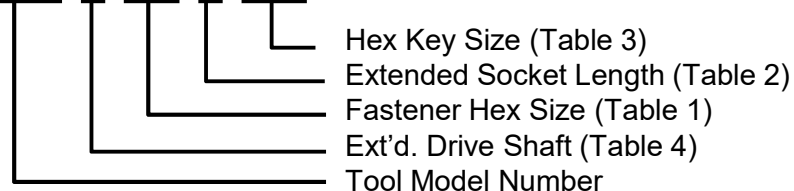
Model Number	No. of Gears	A	H ₁	H ₂	L	R
CTL1434	6	3.47 [88.1mm]	.47 [11.9mm]	.81 [20.5mm]	4.39 [111.7mm]	.43 [10.8mm]

<p>Table 1 Frangible Collar Hex Size (Across Flats)</p> <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>375</td> <td>3/8"</td> </tr> </tbody> </table>	Code	Hex Size	219	7/32"	250	1/4"	312	5/16"	343	11/32"	375	3/8"	<p>Table 2 Ext'd.Socket Length</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tbody> <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> </tbody> </table>	Code	Extension	C	0.375"	D	0.500"	E	0.625"	G	1.0"	J	2.0"	<p>Table 3 Key Hex Size</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Size</th> </tr> </thead> <tbody> <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> </tbody> </table>	Code	Size	062	1/16" Hex Key	078	5/64" Hex Key	094	3/32" Hex Key	<p>Table 4 Drive Shaft Length with 360° Index Unit</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Length</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>-</td> </tr> <tr> <td>C</td> <td>2.0"</td> </tr> <tr> <td>G</td> <td>6.0"</td> </tr> </tbody> </table>	Code	Length	A	-	C	2.0"	G	6.0"
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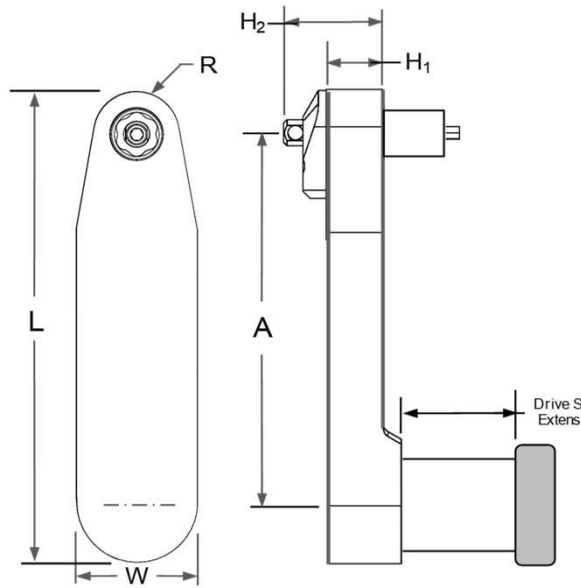
Largest flush socket gear size is 5/16" A/F

Example of Complete Tool Model Number:

CTL1434 C 343 D 078



Offset Pistol Grip Tools



Max Torque 140 in-lbs.



RPM: 230
Sound level : 78dB(A)

Back Drive Socket Position

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

Code	Hex Size
219	7/32"
250	1/4"
312	5/16"

Table 1
Frangible Collar
Hex Size (Across Flats)

Code	Extension
C	0.375"
D	0.500"
E	0.625"
G	1.0"
J	2.0"

Table 2
Ext'd.Socket Length

Code	Size
062	1/16" Hex Key
078	5/64" Hex Key
094	3/32" Hex Key

Table 3
Key Hex Size

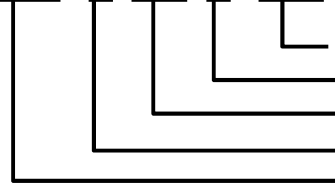
Code	Length
A	-
C	2.0"
G	6.0"

Table 4
Drive Shaft Length
with 360° Index Unit

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

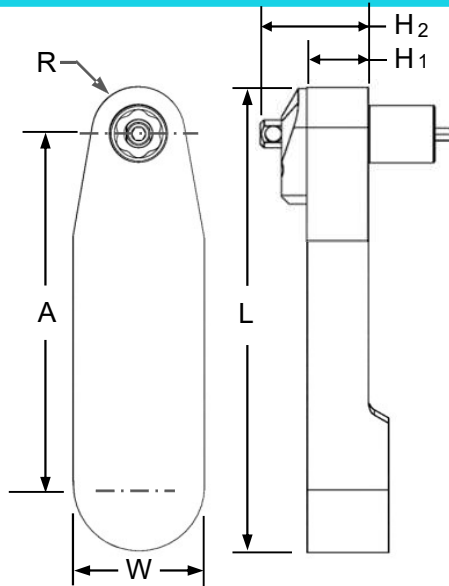
Example of Complete Tool Model Number:

CTL1715 C 312 D 078



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

Offset Pistol Grip Tools



Max Torque 90 in-lbs.



Shown without Index Unit

RPM: 275
Sound level : 78dB(A)

Back Drive Socket Position

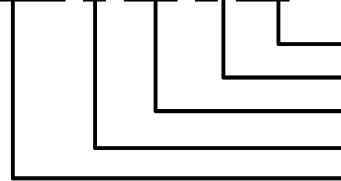
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1424	6	3.38" [85.8mm]	.47" [11.9mm]	.81" [20.5mm]	4.05" [102.9mm]	1.0" [25.4mm]	.35" [8.8mm]

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

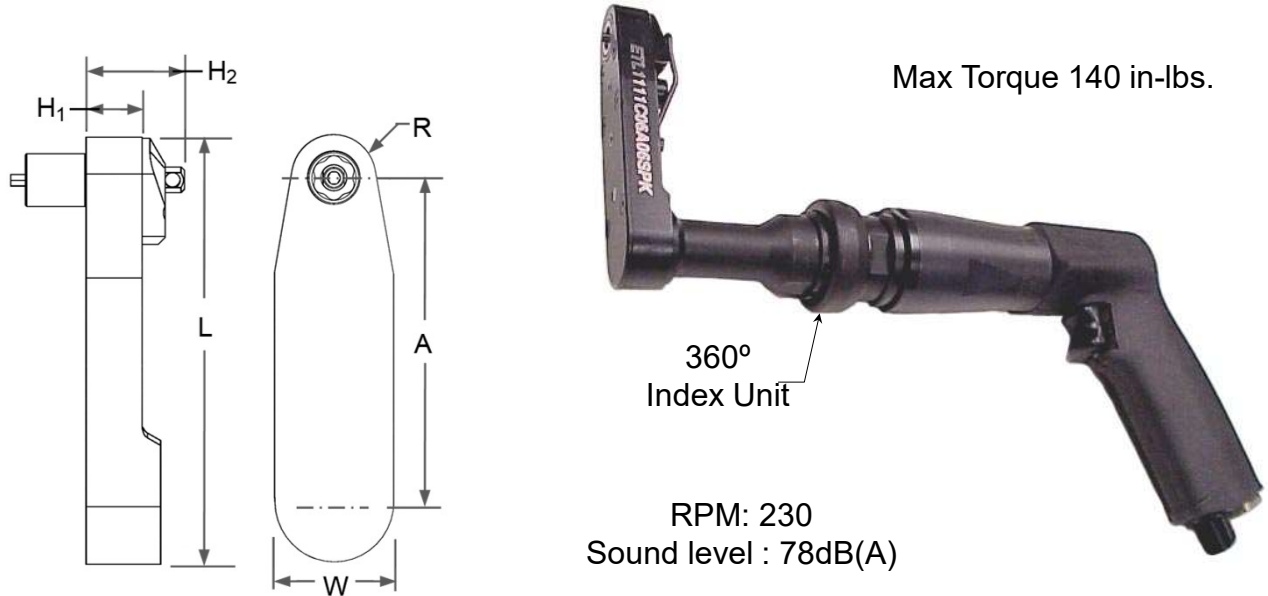
Example of Complete Tool Model Number:

CTL1424 C 312 D 094



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

Offset Pistol Grip Tools



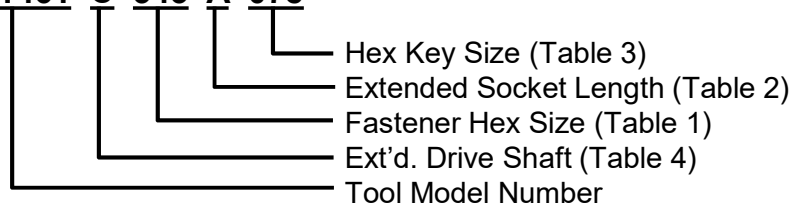
Model Number	No. of Gears	A	H ₁	H ₂ Ref.	L	W	R
CTL1461	5	2.75" [69.9mm]	.47" [11.9mm]	.81" [20.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

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

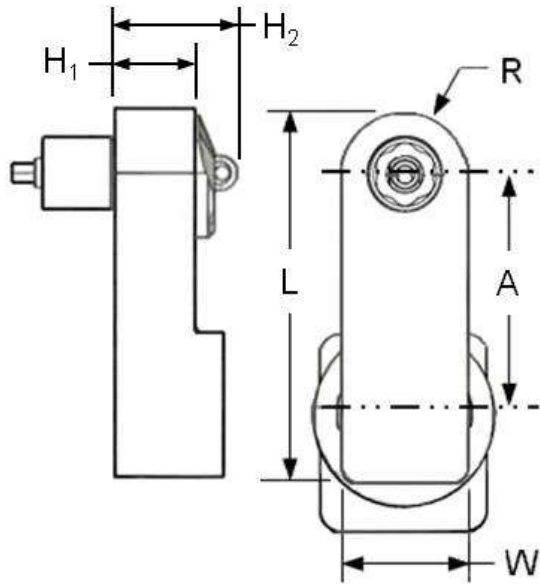
24P

Example of Complete Tool Model Number:

CTL1461 C 343 A 078



Offset Pistol Grip Tools



Torque Max: 170 in-lbs



RPM: 220
Sound level : 78dB(A)

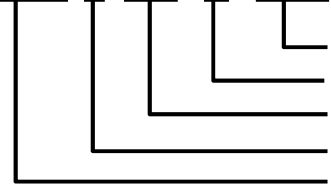
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL1415	3	1.62" [41.1mm]	.68" [17.3mm]	1.0" [25.2mm]	2.69" [68.3mm]	1.0" (25.4mm)	.50" (12.2mm)

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:

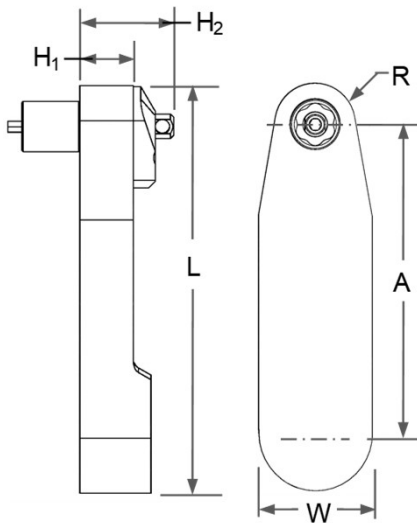
CTL1415 A 500 G 156T



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

Offset Pistol Grip Tools

Tool Torque Range:
15-140 in-lbs.



360°
Index
Unit

RPM: 230

Sound level : 78dB(A)

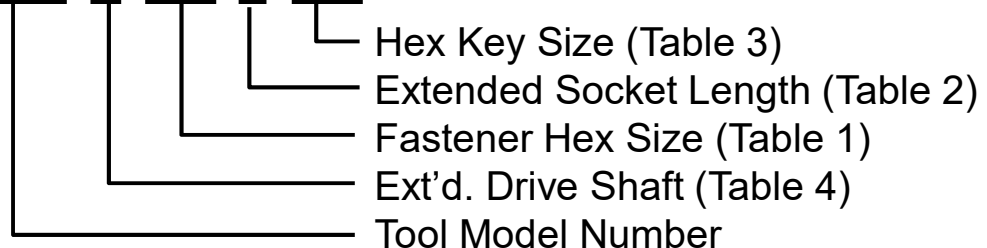
Model Number	No. of Gears	A	H ₁	H ₂ Ref.	L	W	R
CTL1111	5	2.75" [69.9mm]	.47" [11.9mm]	.72" [18.4mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

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

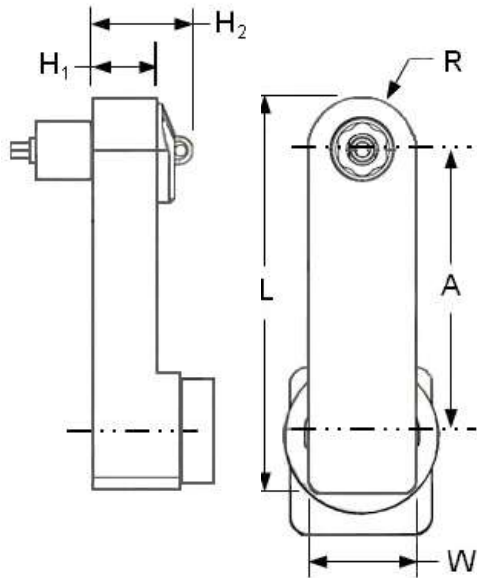
24P

Example of Complete Tool Model Number:

CTL1111 C 343 A 078



Offset Pistol Grip Tools



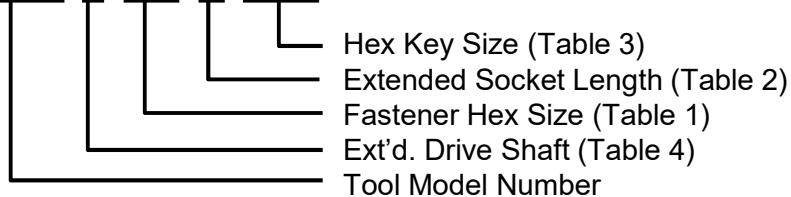
Model Number	No. of Gears	A	H ₁	H ₂ (With Hex Key)	L	W	R
CTL1420	5	3.38" [85.9mm]	.68" [17.3mm]	1.0" [25.4mm]	4.44" [112.7mm]	1.0" (25.4mm)	.50" (12.2mm)

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

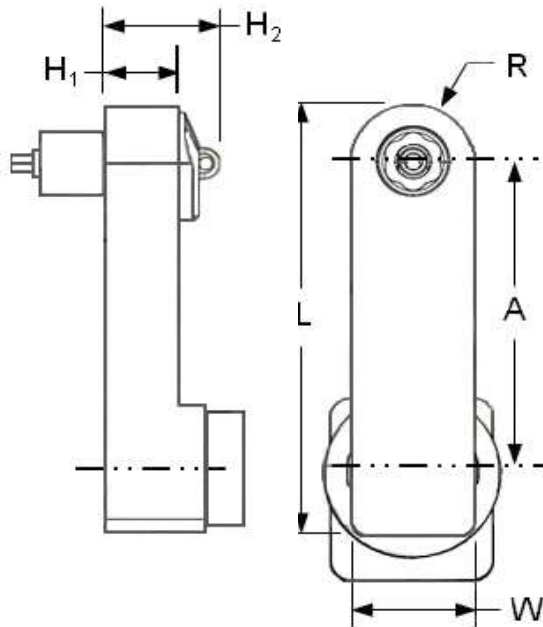
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. 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



Torque Max: 210 in-lbs



RPM: 220
Sound level : 78dB(A)

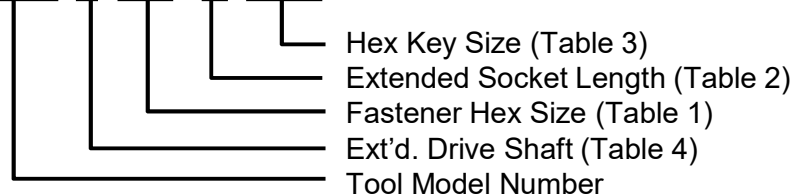
Model Number	No. of Gears	A	H ₁	H ₂ (With Hex Key)	L	W	R
CTL1436	7	5.13" [130.3mm]	.68" [17.3mm]	1.0" [25.4mm]	6.19" [157.3mm]	1.0" (25.4mm)	.50" (12.2mm)

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

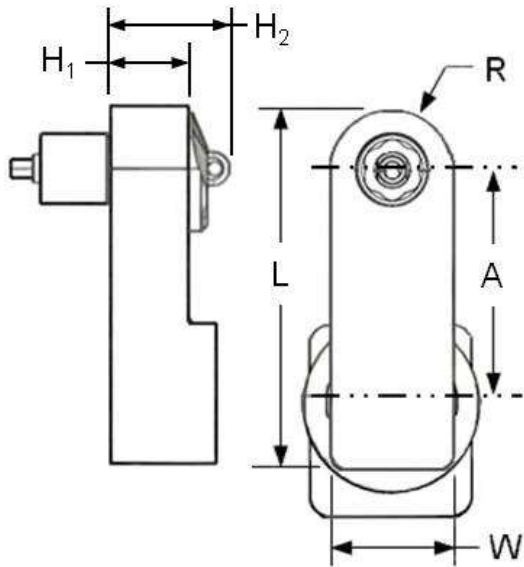
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. 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



Torque Max: 210 in-lbs



Ref: LUM21HR01-K

RPM: 110
Sound level : 78dB(A)

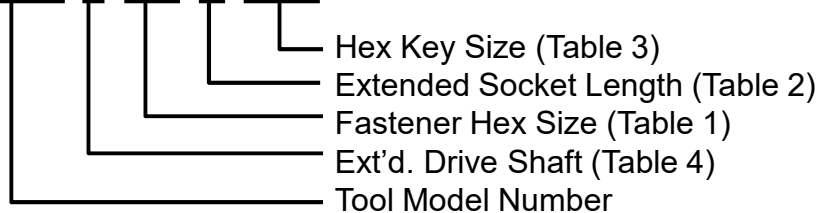
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTH1415	3	1.62" [41.1mm]	.68" [17.3mm]	1.0" [25.4mm]	2.69" [68.3mm]	1.0" (25.4mm)	.50" (12.2mm)

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

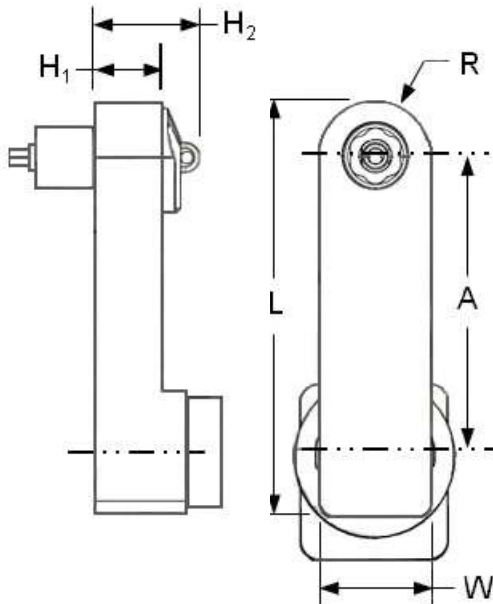
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Hex Keys (See Table 5, Accessories)		Table 4 Drive Shaft Extended Length		
Code	Hex Size	Code	Extension	Code	Size	Code	Length	Index Unit
375	3/8"	C	0.375"	094T	3/32" Hex Key	A	-	With
437	7/16"	D	0.500"	125T	1/8" Dia. 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



Offset Pistol Grip Tools



Torque Max: 210 in-lbs

Ref: LUM21HR01-K

RPM: 110
Sound level : 78dB(A)

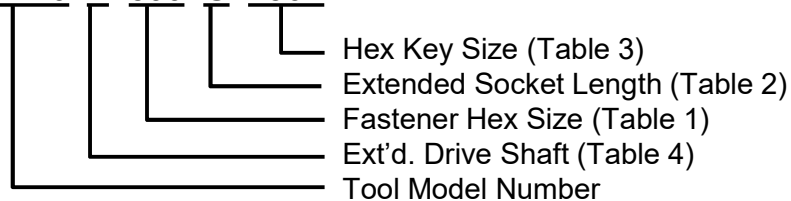
Model Number	No. of Gears	A	H ₁	H ₂ (With Hex Key)	L	R
CTH1420	5	3.38 [85.9mm]	.68 [17.3mm]	1.0" [25.4mm]	4.44 [113.0mm]	.50 [12.7mm]

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"					

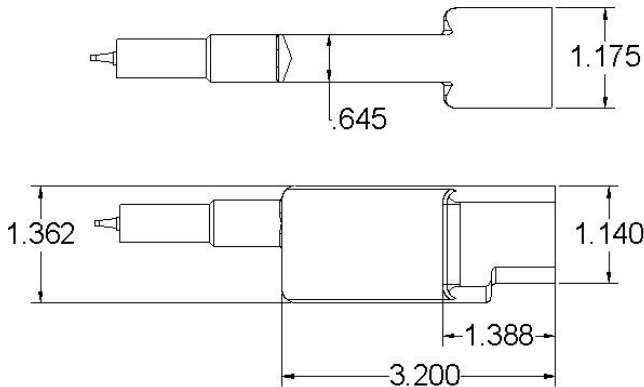
Example of Complete Tool Model Number:

CTH1420 A 500 G 156T



Straight Pistol Grip Tools

Torque Max: 135 in-lbs



RPM at Socket: 290

Table 1

Frangible Collar
Hex Size (Across Flats)

Code	Hex Size
219	7/32"
250	1/4"
282	9/32"
312	5/16"
343	11/32"

Table 2

Ext'd.Socket Length

Code	Extension
J	2.0"
L	3.0"
P	4.0"

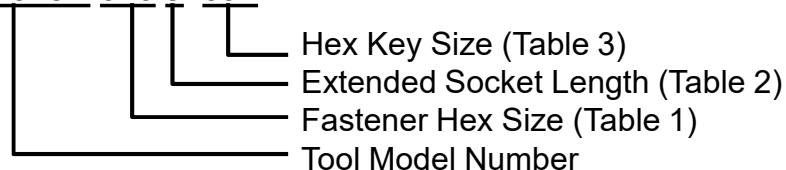
Table 3

Key Hex Size

Code	Size	Part No.
062	1/16"	093-9450-062-CT
078	5/64"	093-9450-078-CT
094	3/32"	093-9450-094-CT

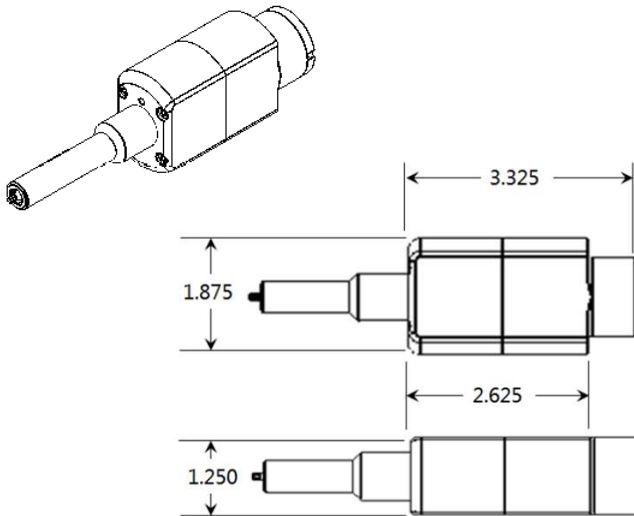
Example of Complete Tool Model Number:

CTL2028B 343 J 094



Straight Pistol Grip Tools

Torque Max: 160 in-lbs

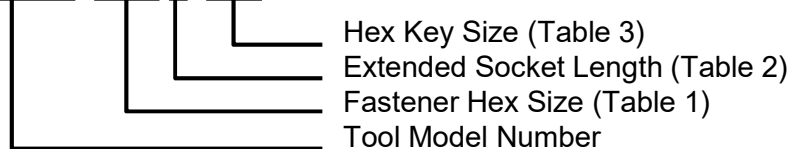


RPM at Socket: 290

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"	J	2.0"	062	1/16" HexKey
250	1/4"	L	3.0"	078	5/64" HexKey
282	9/32"	P	4.0"	094	3/32" HexKey
312	5/16"				
343	11/32"				
375	3/8"				
437	7/16"				

Example of Complete Tool Model Number:

CT2005B 437 J 094



Straight Pistol Grip Tools

Torque Max: 215 in-lbs



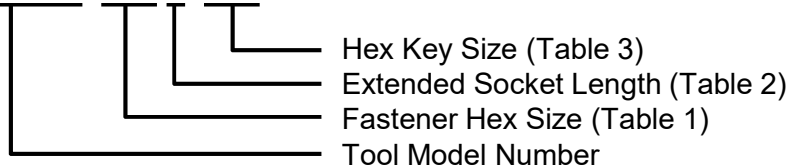
Tool Data:

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:

CTH2005B 437 J 156



Frangible Collar Assembly Tools

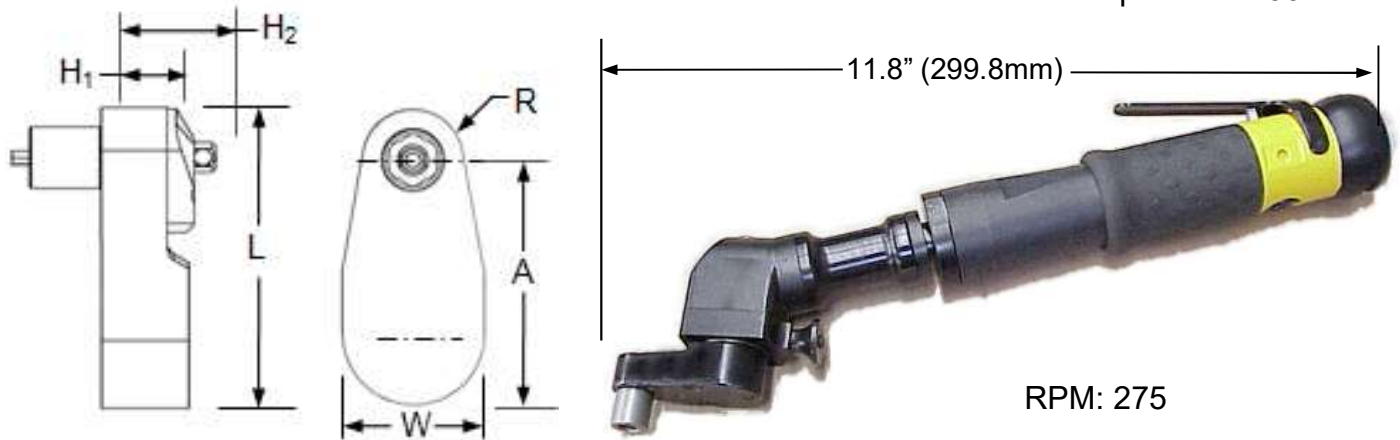
17° Offset Power Tools

SECTION 2



17° Offset Lever Tools

Torque Max: 130 in-lbs



Model Number	No. of Gears	A	H ₁	H ₂	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]

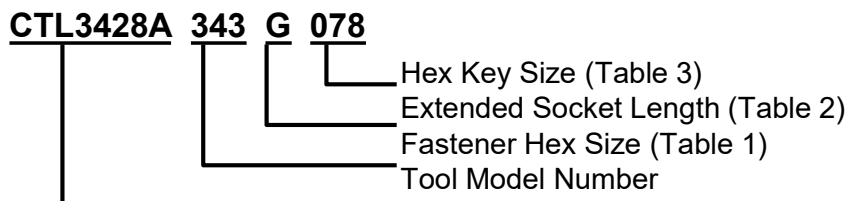
The above model tools are designed for use with extended sockets.

Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
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"		
		G	1.0"		
		J	2.0"		

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

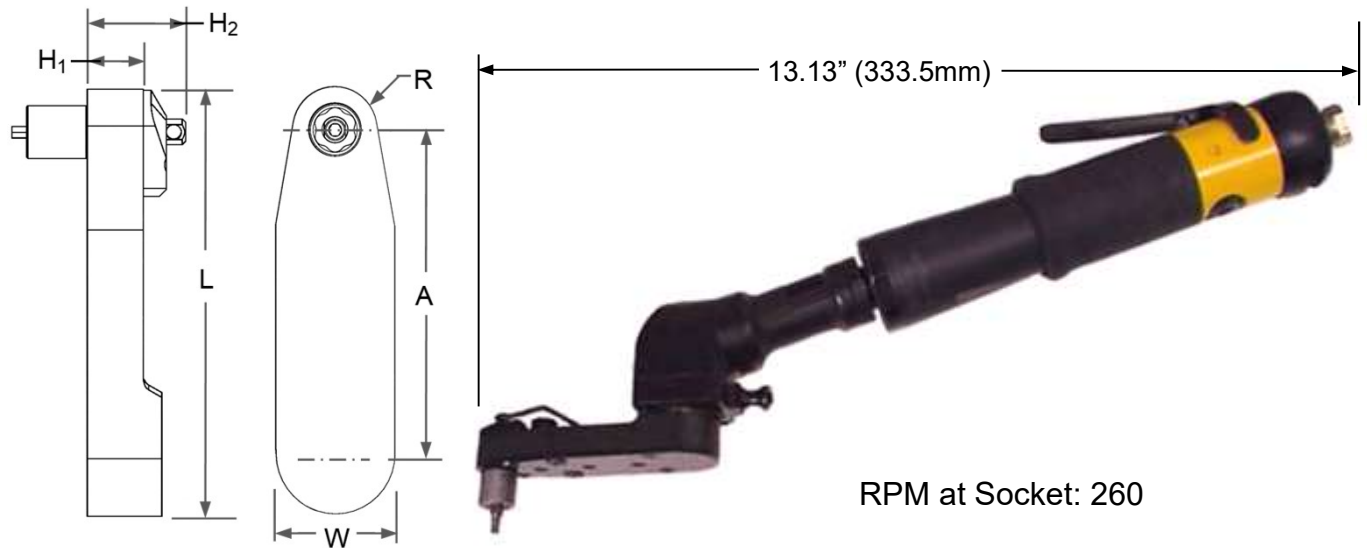
24P

Example of Complete Tool Model Number:



17° Offset Lever Tools

Torque Max: 145 in-lbs

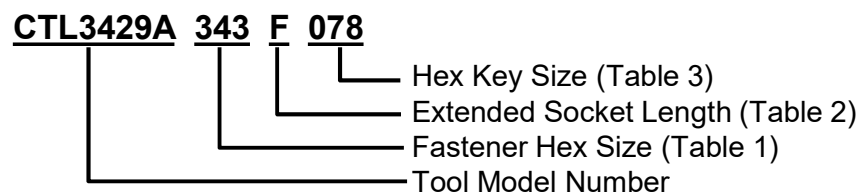


Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3429A	5	2.68" [68.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

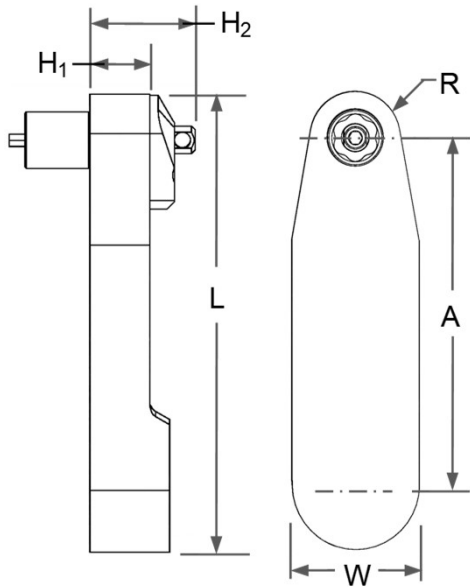
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
312	5/16"	D	0.500"	094	3/32" Hex Key
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"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

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

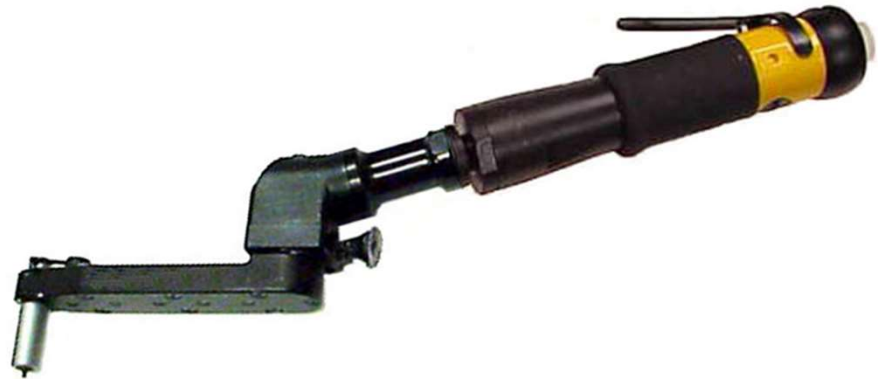
Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 120 in-lbs



RPM at Socket: 275

Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3438	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)

Code	Hex Size
219	7/32"
250	1/4"
312	5/16"
343	11/32"
375	3/8"
437	7/16"

Table 2

Ext'd.Socket Length

Code	Extension
A*	Flush
C	0.375"
D	0.500"
E	0.625"
F	0.750"
G	1.0"
J	2.0"

Table 3

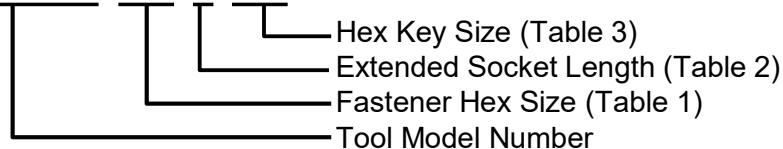
Key Hex Size

Code	Size
062	1/16" Hex Key
078	5/64" Hex Key
094	3/32" Hex Key

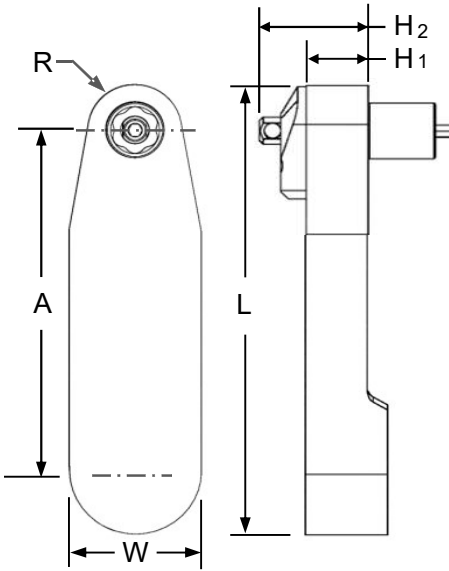
* Flush sockets available in (.250, .282 & .312) hex sizes

Example of Complete Tool Model Number:

CTL3438A 343 F 078



17° Offset Lever Tools



Torque Max: 120 in-lbs



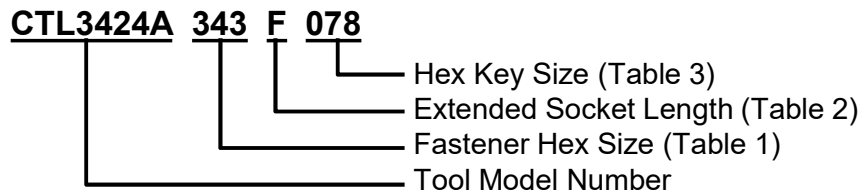
RPM at Socket: 275

Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3424A	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"		

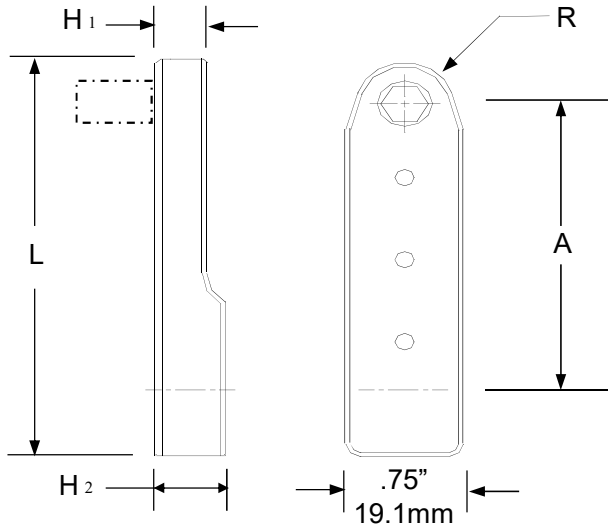
* Flush sockets available in (.220, .250, .282 & .312) hex sizes

Example of Complete Tool Model Number:



17° Offset Lever Tools

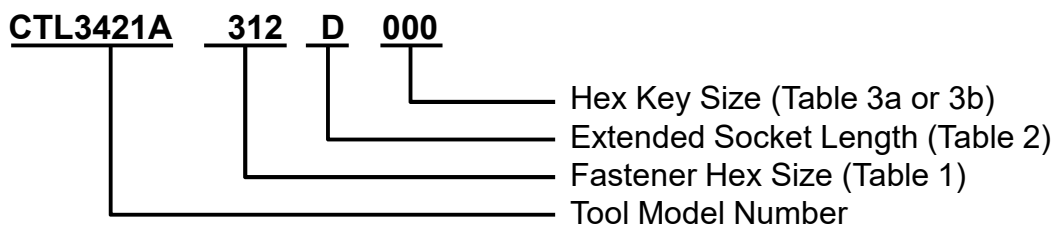
Torque Max: 80 in-lbs



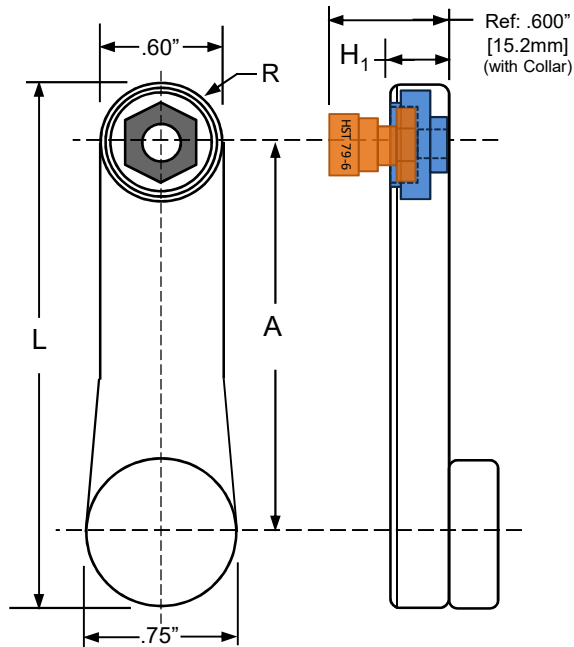
Model Number	No. of Gears	A	H1	H2	L	R
CTL3421	5	2.38	.34 [8.6mm]	.46	4.18 [106.1mm]	.31 [7.9mm]

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:



17° Offset Lever Tools



Ref: .600"
[15.2mm]
(with Collar)

Torque Max: 90 in-lbs



360° indexing gear head

Model Number	No. of Gears	A	H ₁	L	R
CTL3707A	5	1.97" [50.0mm]	.285" [7.2mm]	2.65" [67.3mm]	.30" [7.6mm]
CTL3777A	7	2.97" [75.4mm]	.285" [7.2mm]	3.81" [96.8mm]	.30" [7.6mm]

Table 1

Frangible Collar
Hex Size (Across Flats)

Code	Hex Size
219	7/32"
250	1/4"
312	5/16"
343	11/32"

Table 2

Ext'd.Socket
Length

Code	Extension
A	Flush Sockets Only

Table 3

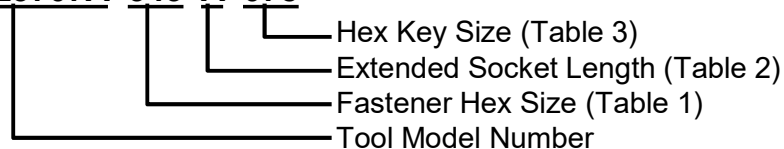
Key Hex Size

Code	Hex Size
000	NA
062	1/16"
078	5/64"

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

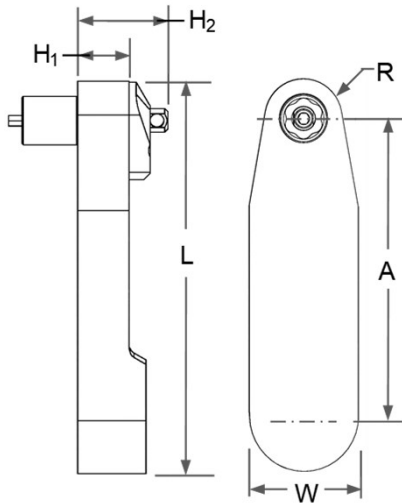
Example of Complete Tool Model Number:

CTL3707A 343 A 078



17° Offset Lever Tools

Torque Max: 145 in-lbs



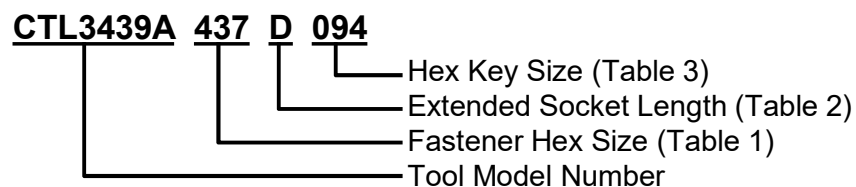
RPM at Socket: 260

Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3439A	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"		

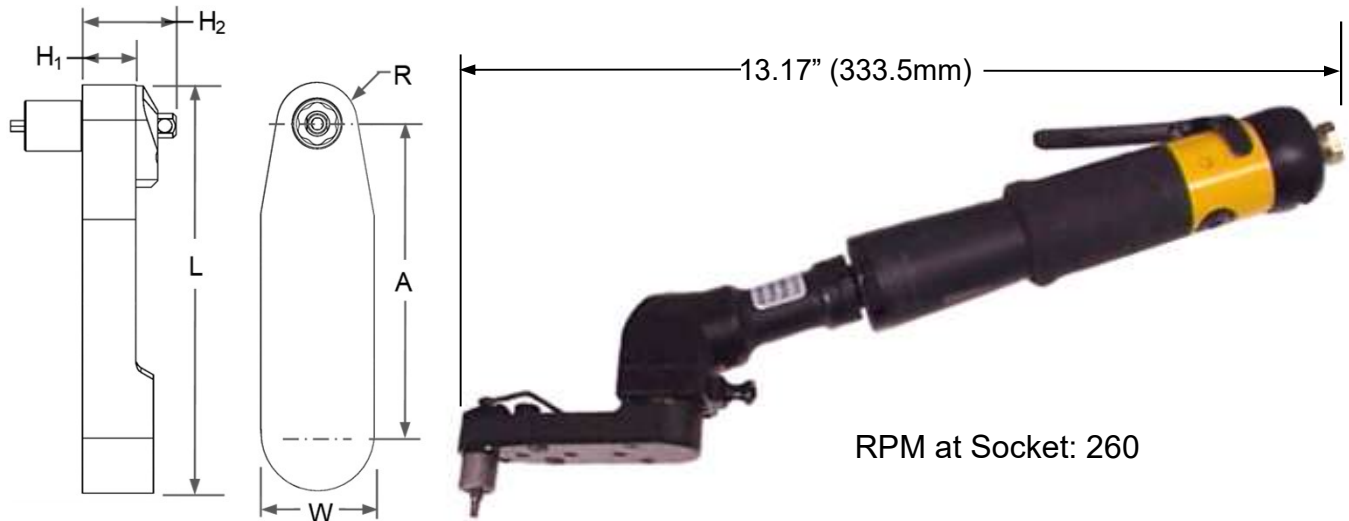
* Flush sockets only available in (.219, .250, .282, .312) hex sizes

Example of Complete Tool Model Number:



17° Offset Lever Tools

Torque Max: 145 in-lbs



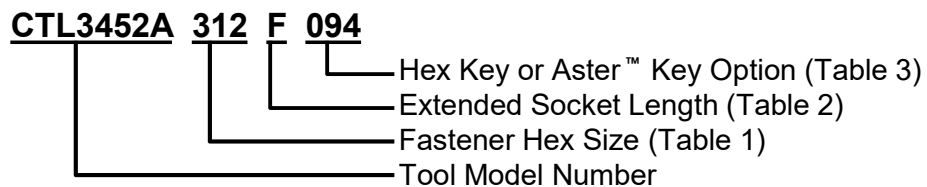
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3452A	5	2.72" [69.1mm]	.47" [11.9mm]	.81" [20.5mm]	3.70" [94.0mm]	1.0" [25.4mm]	.39" [9.7mm]

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"				

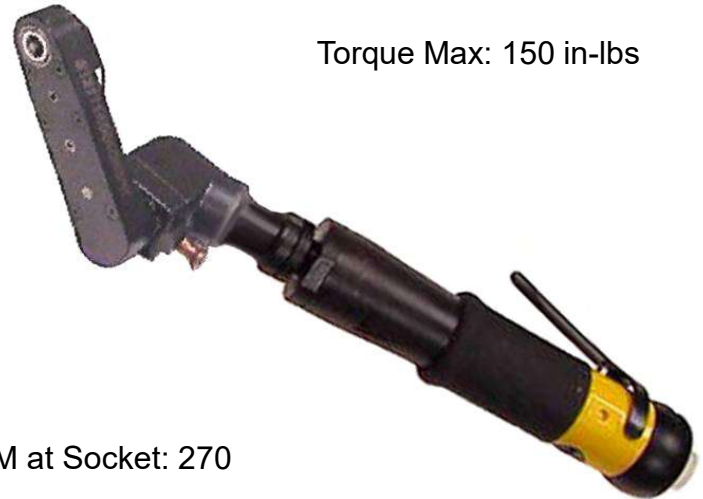
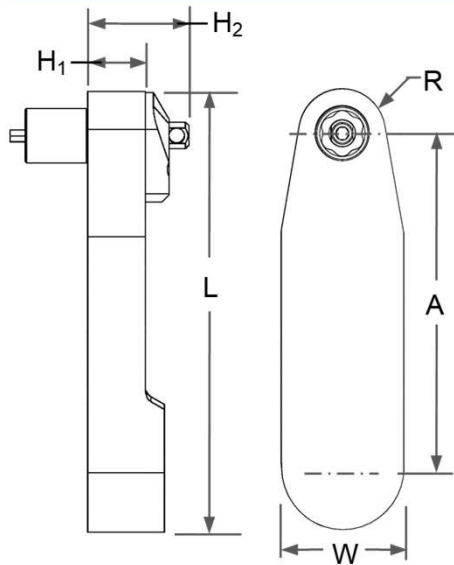
* Flush sockets only available in (.219, .250, .223, .312) hex sizes

24P

Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 150 in-lbs

RPM at Socket: 270

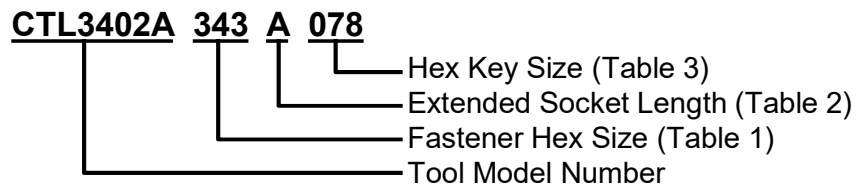
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3402A	5	2.75" [69.9mm]	.38" [9.71mm]	.73" [18.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

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

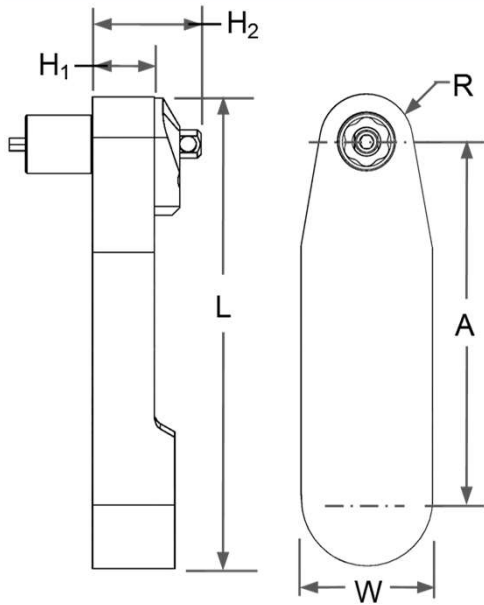
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A	Flush	078	5/64" Hex Key
250	1/4"	C	0.375"	094	3/32" Hex Key
312	5/16"	D	0.500"	125T	1/8" Hex Key
343	11/32"	E	0.625"		
375	3/8"	G	1.0"		
437	7/16"	J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

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

Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 150 in-lbs

RPM at Socket: 270

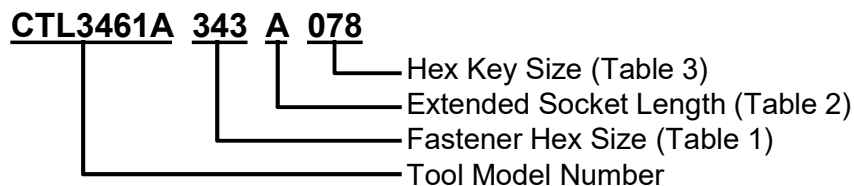
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3461A	5	2.75" [69.9mm]	.47" [11.9mm]	.81" [20.5mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

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

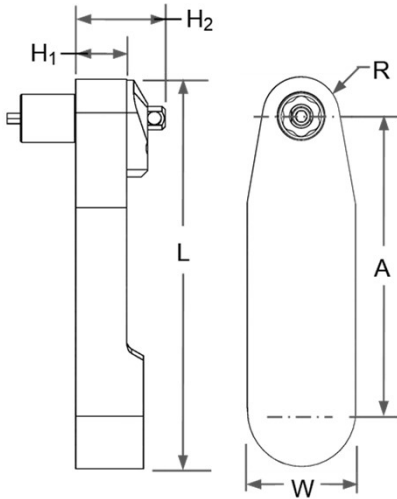
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A	Flush	078	5/64" Hex Key
250	1/4"	C	0.375"	094	3/32" Hex Key
312	5/16"	D	0.500"	125T	1/8" Hex Key
343	11/32"	E	0.625"		
375	3/8"	G	1.0"		
437	7/16"	J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

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

Example of Complete Tool Model Number:



17° Offset Lever Tools



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



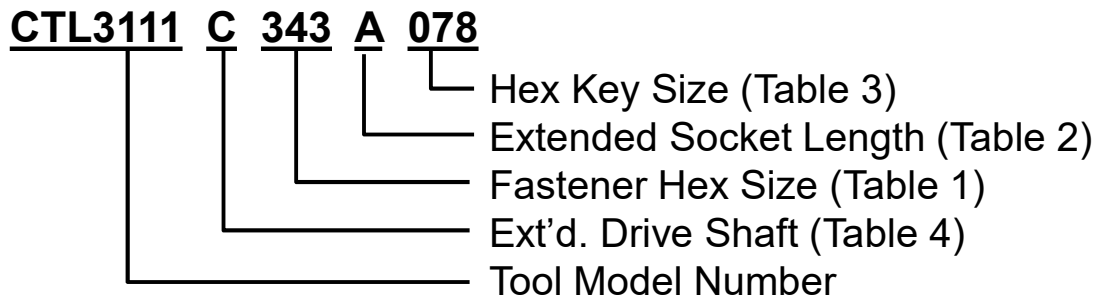
“Flush or Extended Socket Applications”

Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL3111A	5	2.75" [69.9mm]	.47" [11.9mm]	.78" [19.8mm]	3.68" [93.3mm]	1.0" [25.4mm]	.43" [10.8mm]

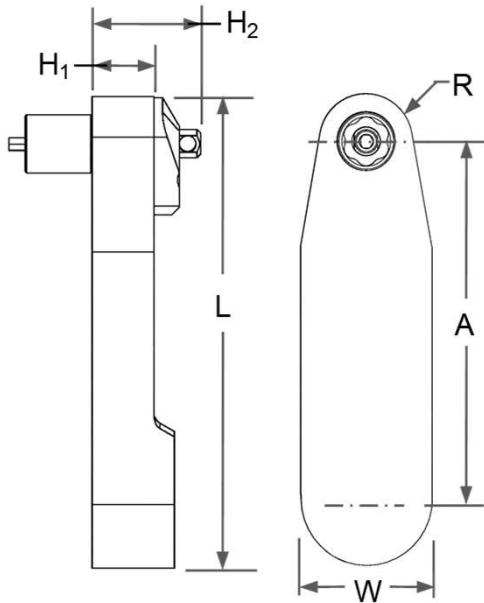
The above model tools are designed for use with a flush socket gear or extended sockets.

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"		

Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 230 in-lbs

Motor: LBB16S005 Mod.



RPM: 220 at socket

Model Number	No. of Gears	A	H ₁	H ₂ (Ref)	L	W	R
CTL3498A	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.

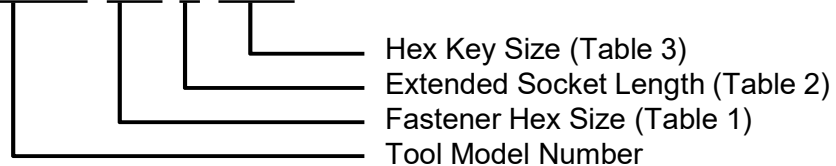
This gear head has 360° indexing capability.

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"	E	0.625"	125T	1/8" Hex Key
500	1/2"	F	0.750"		
562	9/16"	G	1.0"		

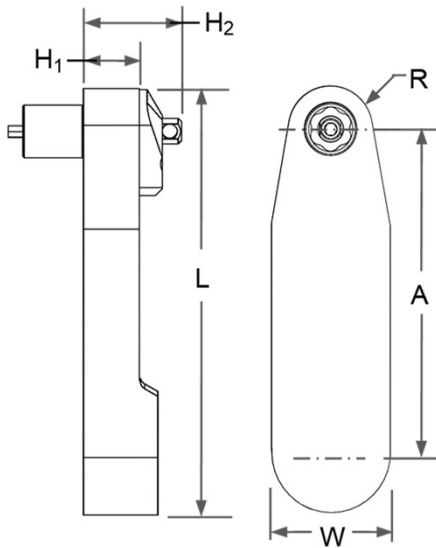
Max flush hex size is 1/2" A/F

Example of Complete Tool Model Number:

CTL3498A 437 A 125T



17° Offset Lever Tools



Torque Max: 270 in-lbs



Ref: LTV28N30-10

RPM at Socket: 290

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

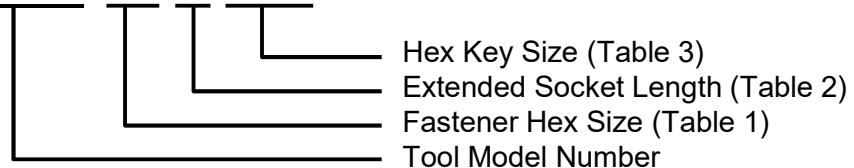
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

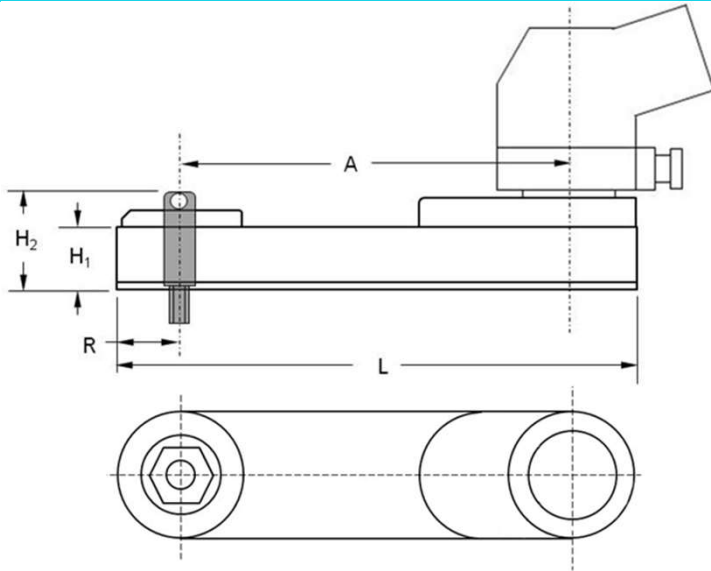
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Hex Size
375	3/8"	A	Flush	094	3/32"
437	7/16"	D	1/2"	125T	1/8"
500	1/2"	E	5/8"	156T	5/32"
562	9/16"	F	3/4"		
625	5/8"	G	1.0"		

Example of Complete Tool Model Number:

CT3498A 437 A 125T



17° Offset Lever Tools



Torque Max: 310 in-lbs



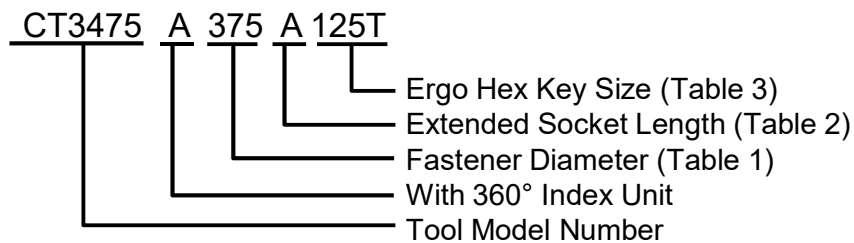
Ref: LTV28N30-10 Mod.

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

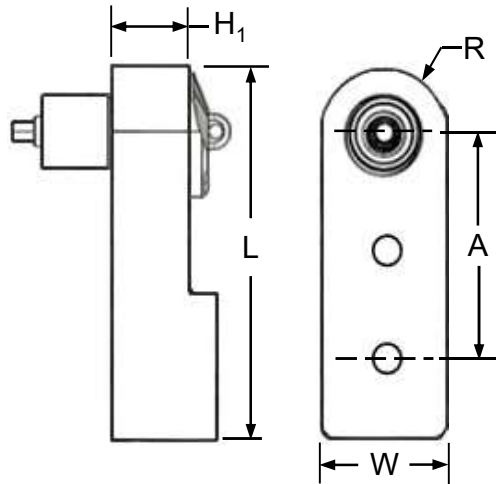
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd. Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
		J	2.0"		

.500 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 320 in-lbs

LTV28N30-10



360° Index Unit

Free Speed RPM: 170

Model Number	No. of Gears	A	H ₁	H ₂ (Ref)	L	W	R
CTL3493A	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.

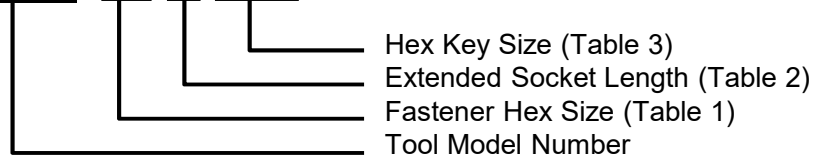
This gear head has 360° indexing capability.

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"	219T	7/32"
687	11/16"			250T	1/4"
750	3/4"				

.687 Max A/F Flush Socket Gear

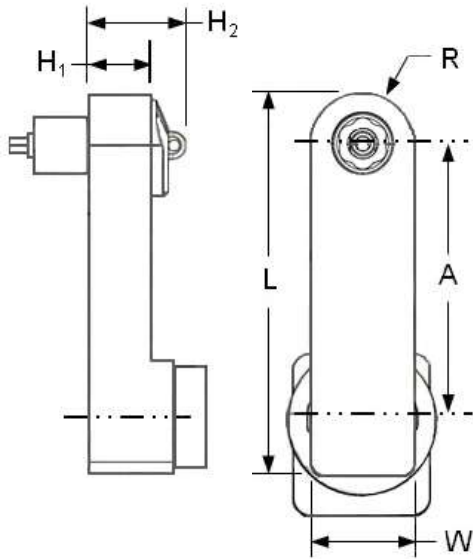
Example of Complete Tool Model Number:

CTL3493A 500 G 156T



17° Offset Lever Tools

Torque Max: 320 in-lbs



Ref: LTV28N30-10 Mod.

RPM at Socket: 175

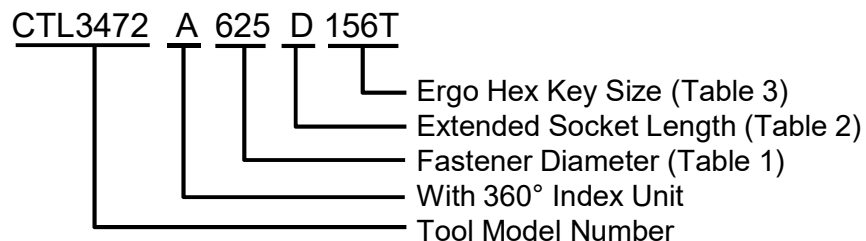
Model Number	No. of Gears	A	H ₁	H ₂	L	R	W
CTL3472A	5	3.0" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.2" [106.4mm]	.56" [14.2mm]	1.12" [28.4mm]

Model CTL3472A 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 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"

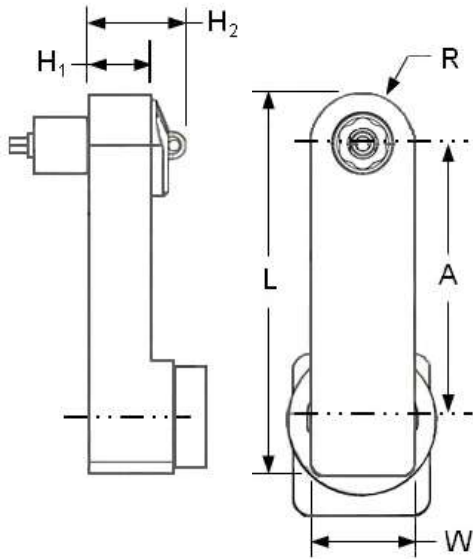
.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



17° Offset Lever Tools

Torque Max: 320 in-lbs



Ref: LTV28N30-10 Mod.

RPM at Socket: 175

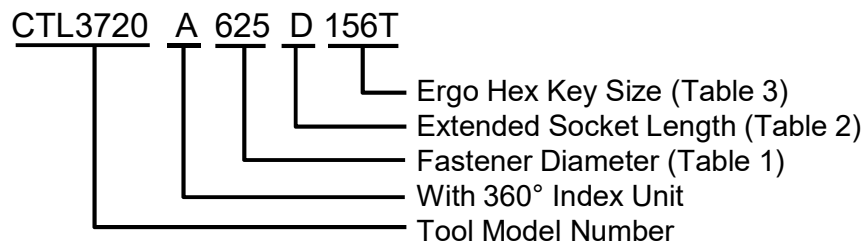
Model Number	No. of Gears	A	H ₁	H ₂	L	R	W
CTL3720A	5	3.0" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.2" [106.4mm]	.56" [14.2mm]	1.12" [28.4mm]

Model CTL3720A is designed for use with a flush socket gear or extended sockets

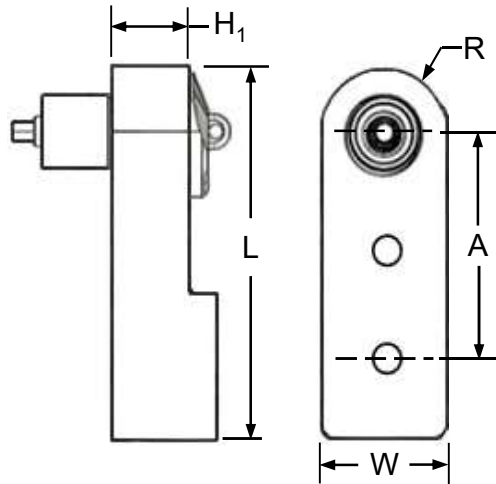
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	000	NA
437	7/16"	E	5/8"	125T	1/8"
500	1/2"	G	1.0"	156T	5/32"
562	9/16"	J	2.0"	187T	3/16"
625	5/8"			219T	7/32"
687	11/16"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

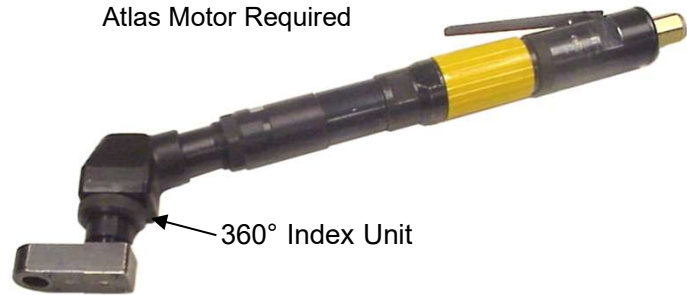


17° Offset Lever Tools



Torque Max: 500 in-lbs

LTV38N68-13
Atlas Motor Required



360° Index Unit

Free Speed RPM: 170

Model Number	No. of Gears	A	H ₁	H ₂ (Ref)	L	W	R
CT3493A	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.

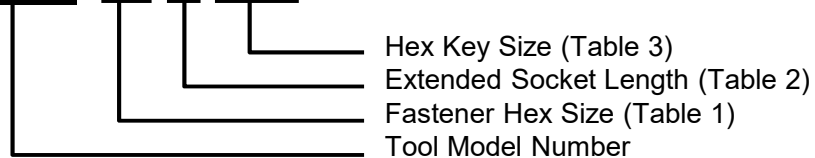
This gear head has 360° indexing capability.

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"	219T	7/32"
687	11/16"			250T	1/4"
750	3/4"				

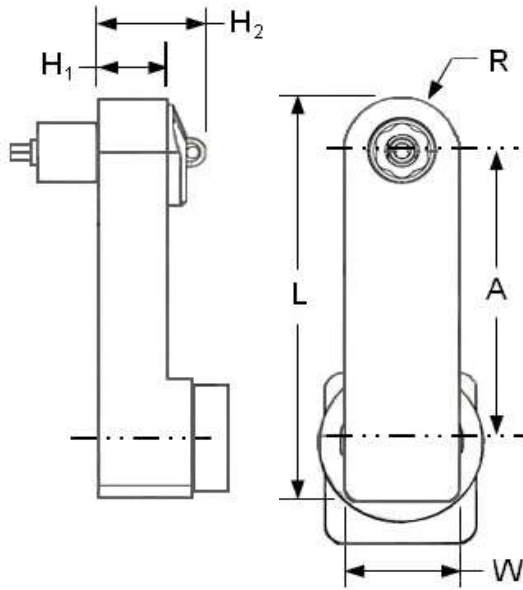
.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

CT3493A 500 G 156T



17° Offset Lever Tools



Torque Max: 520 in-lbs



Ref: LTV38N68-13 Mod.

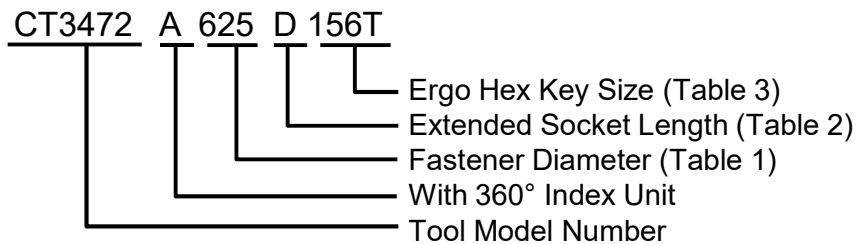
RPM at Socket: 100

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

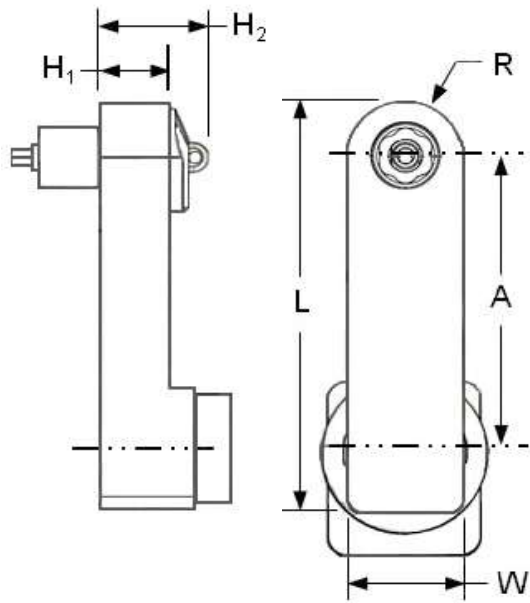
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
437	7/16"	A	Flush	000	NA
500	1/2"	E	5/8"	125T	1/8"
562	9/16"	G	1.0"	156T	5/32"
625	5/8"	J	2.0"	187T	3/16"
687	11/16"			219T	7/32"
750	3/4"			250T	1/4"

.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



17° Offset Lever Tools



Torque Max: 400 in-lbs



RPM at Socket: 100

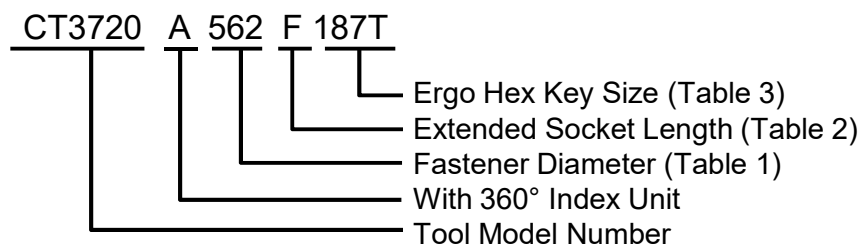
Model Number	No. of Gears	A	H ₁	H ₂ (Ref)	L	W	R
CT3720A	7	3.69" [93.6mm]	.69" [17.5mm]	1.0" [25.4mm]	4.88" [124.0mm]	1.12" [28.4mm]	.59" [15.0mm]

Model CT3720A 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 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:



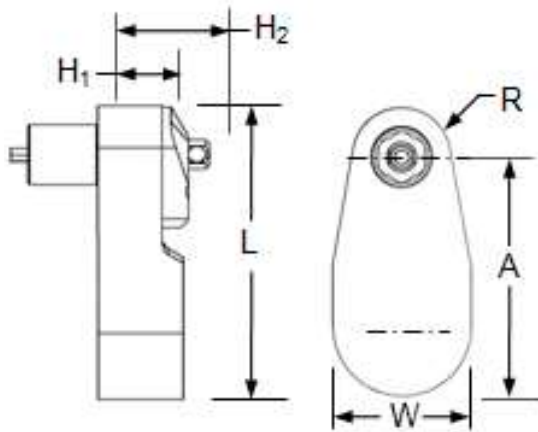
Frangible Collars Assembly Tools

90° Offset Power Tools

SECTION 3



90° Offset Lever Tools



Torque Max: 140 in-lbs



250 RPM at Socket

Model Number	No. of Gears	A	H ₁	H ₂	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.

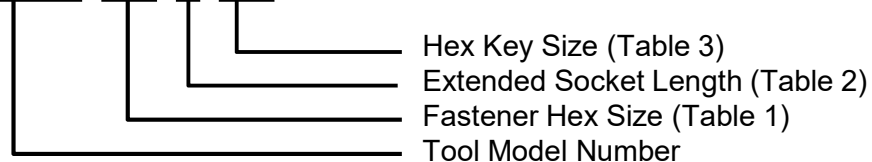
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size		
Code	Hex Size	Code	Extension	Code	Size	Hex Key P/N
219	7/32"	A*	Flush	062T	1/16" 2-Pc Hex Key	093-9337
250	1/4"	C	0.375"	078T	5/64" 2-Pc Hex Key	093-9334
282	9/32"	D	0.500"	094T	3/32" 2-Pc Hex Key	093-9333
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

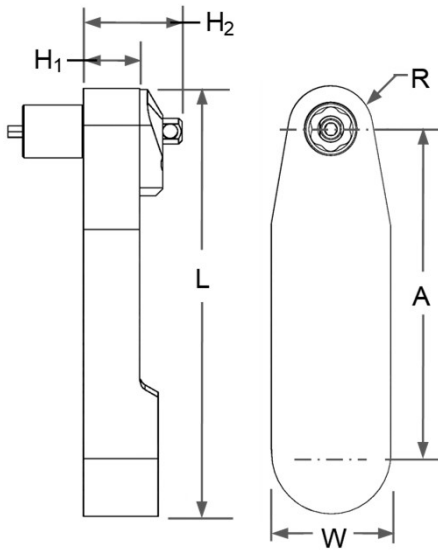
Example of Complete Tool Model Number:

CTL5428A 250 C 078



90° Offset Lever Tools

Torque Max: 145 in-lbs



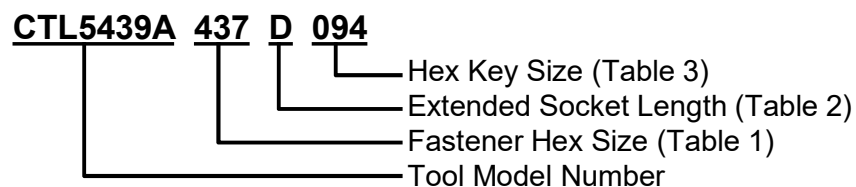
RPM at Socket: 260

Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL5439A	5	2.68" [68.1mm]	.38" [9.5mm]	.69" [17.5mm]	3.53" [89.7mm]	1.0" [25.4mm]	.35" [8.8mm]

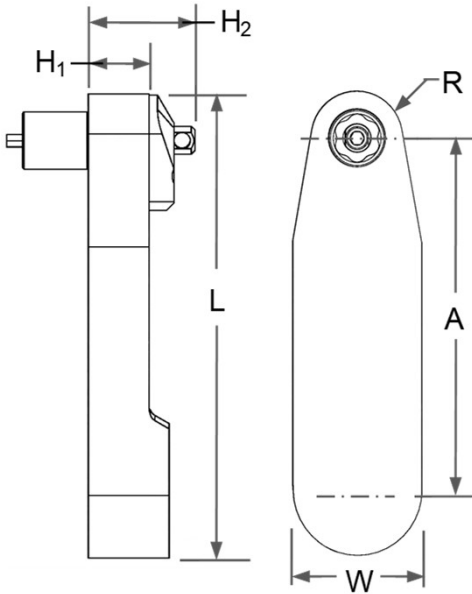
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
312	5/16"	D	0.500"	094	3/32" Hex Key
343	11/32"	E	0.625"		
375	3/8"	F	0.750"		
437	7/16"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

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

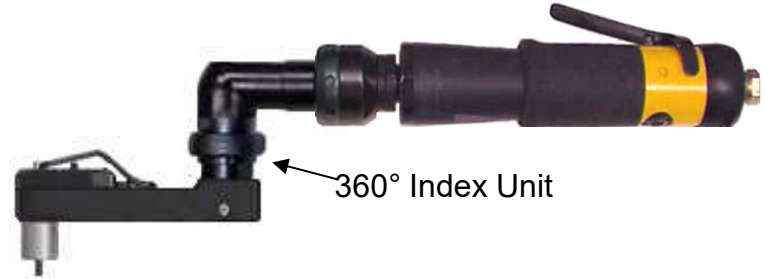
Example of Complete Tool Model Number:



90° Offset Lever Tools



Torque Max: 140 in-lbs



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

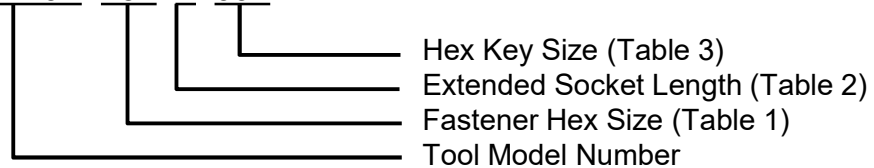
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
282	9/32"	D	0.500"	094	3/32" Hex Key
312	5/16"	E	0.625"		
343	11/32"	F	0.750"		
375	3/8"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

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

24P

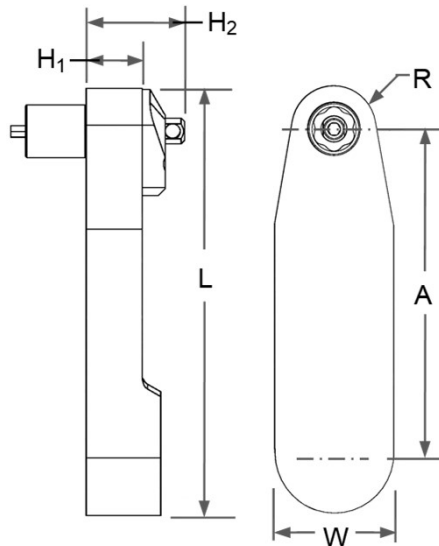
Example of Complete Tool Model Number:

CTL5429A 437 F 094



90° Offset Lever Tools

150 in lbs Max.



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

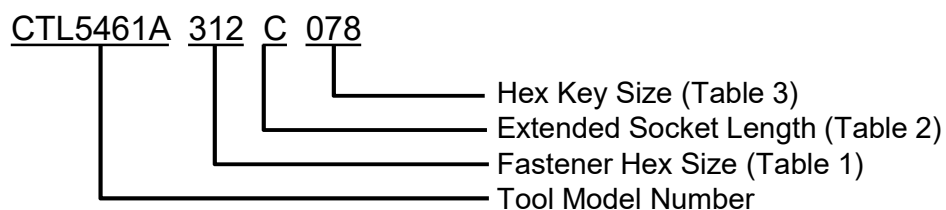
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

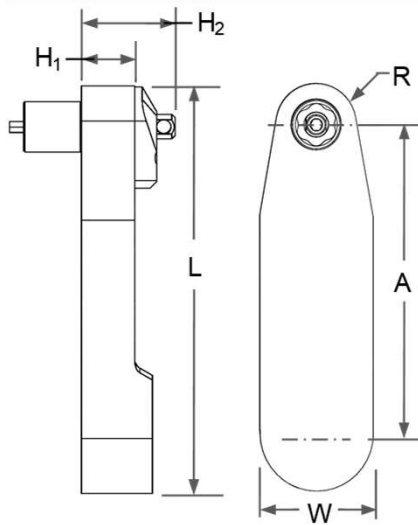
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
219	7/32"	A*	Flush	062	1/16" Hex Key
250	1/4"	C	0.375"	078	5/64" Hex Key
282	9/32"	D	0.500"	094	3/32" Hex Key
312	5/16"	E	0.625"	125T	1/8" Hex Key
343	11/32"	F	0.750"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



90° Offset Lever Tools



150 in lbs Max.



Model Number	No. of Gears	A	H ₁	H ₂	L	R
CTL5111A	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.

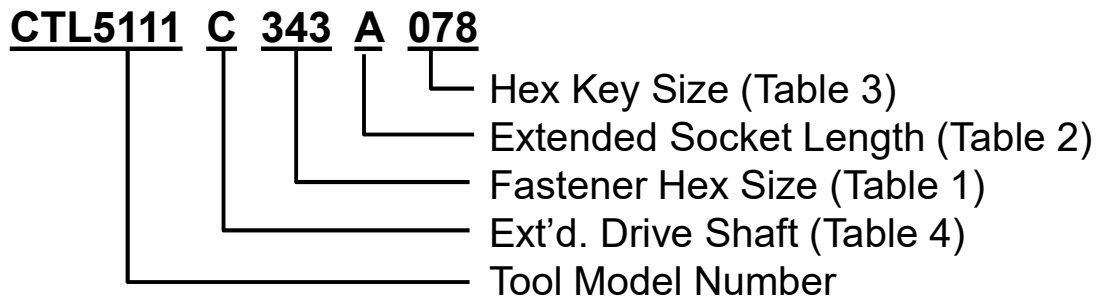
This gear head has 360° indexing capability.

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	062T	1/16" Hex Key
250	1/4"	C	0.375"	078T	5/64" Hex Key
282	9/32"	D	0.500"	094T	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"		

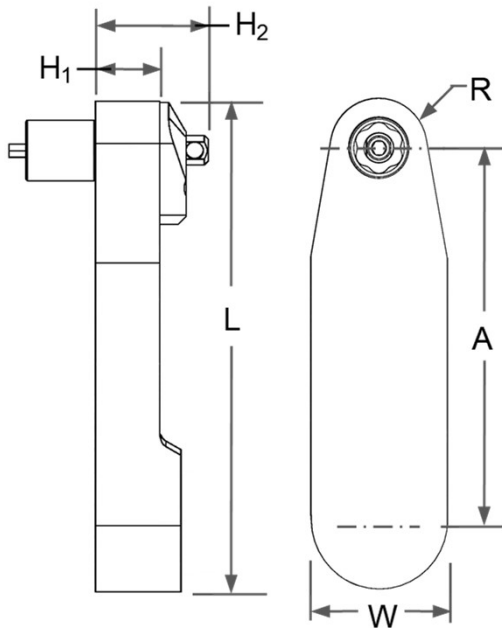
* Flush sockets only available in (.219, .250, .282, .312) hex sizes

24P

Example of Complete Tool Model Number:



90° Offset Lever Tools



Torque Max: 140 in-lbs



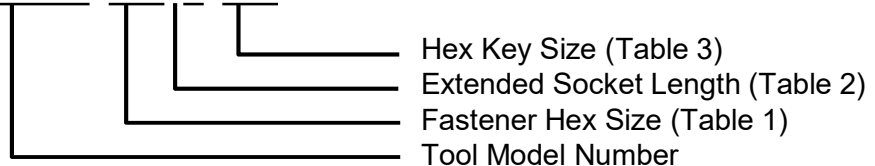
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL5438	7	4.13" [104.9mm]	.47" [11.9mm]	.81" [20.5mm]	4.98" [126.5mm]	1.0" [25.4mm]	.35" [8.8mm]

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"		

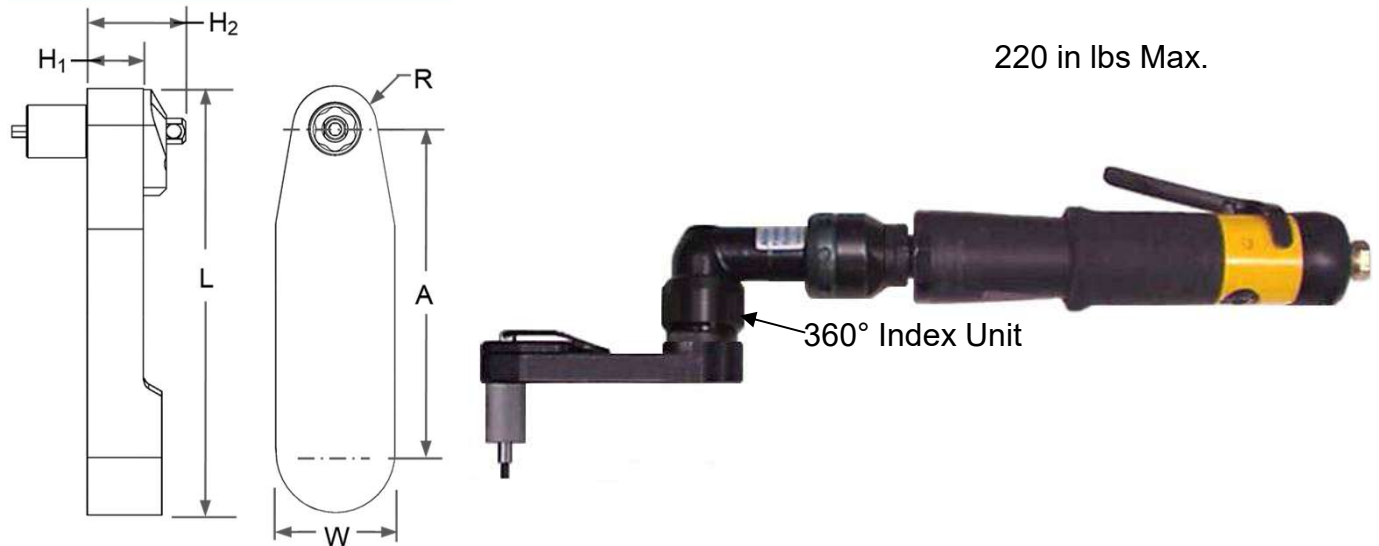
* Flush sockets only available in (.219, .250, .282, .312) hex sizes

Example of Complete Tool Model Number:

CTL5438A 437 F 094



90° Offset Lever Tools



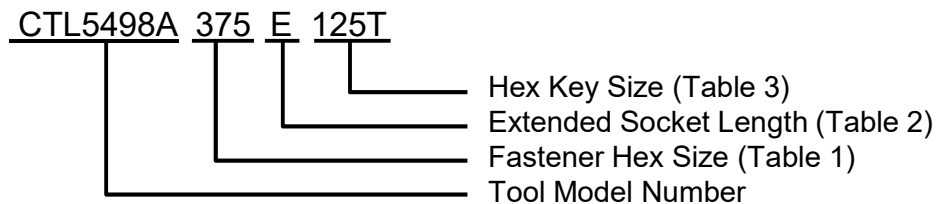
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CTL5498A	5	3.19" [81.0mm]	.50" [12.7mm]	.84" [21.5mm]	4.5" [114.3mm]	1.12" [28.4mm]	.43" [10.8mm]

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.

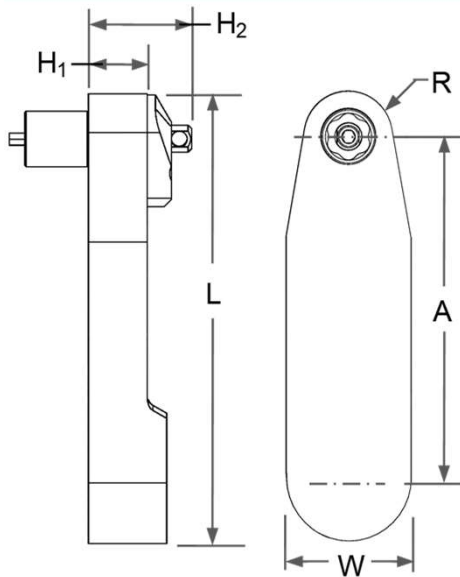
This gear head has 360° indexing capability.

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:



90° Offset Lever Tools



260 in lbs Max.



Ref: LTV28N30 Series

Model Number	No. of Gears	A	H1	H2 (Ref)	L	W	R
CT5498A	5	3.19 [81.0mm]	.50 [12.7mm]	.84" [21.5mm]	4.5 [114.3mm]	1.12 [28.4mm]	.43 [10.8mm]

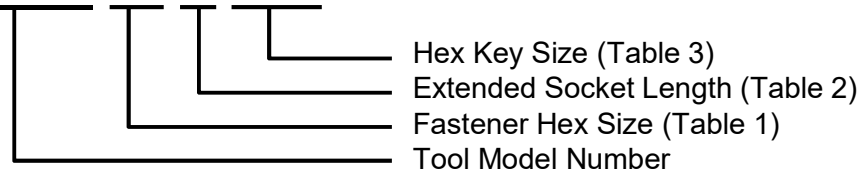
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

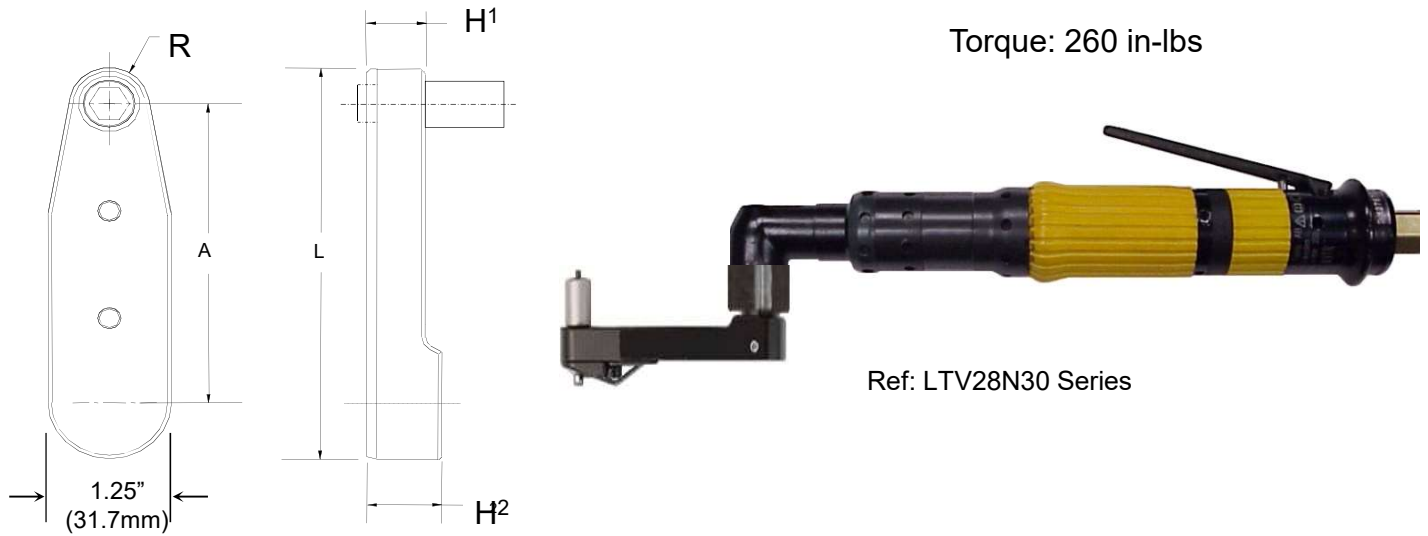
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	094	3/32" Hex Key
437	7/16"	D	0.500"	125T	1/8" Hex Key
500	1/2"	E	0.625"	156T	5/32" Hex Key
562	9/16"	F	0.750"		
		G	1.0"		

Example of Complete Tool Model Number:

CT5498A 475 G 125T



90° Offset Lever Tools



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

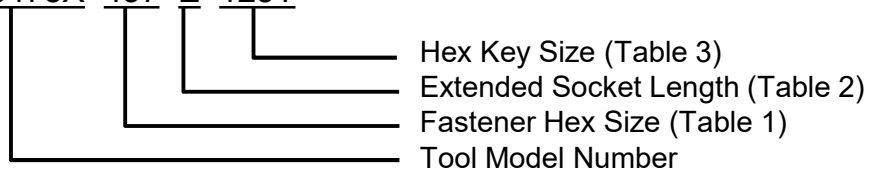
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

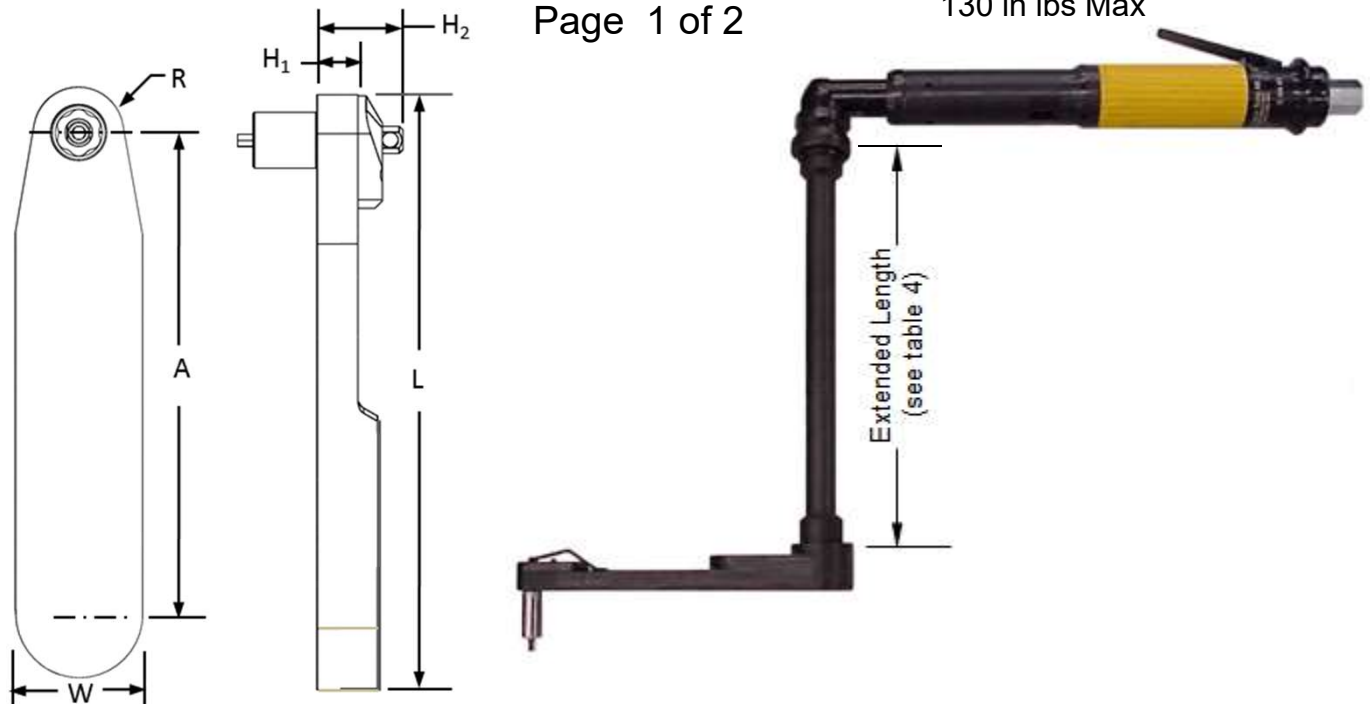
Table 1 Frangible Collar Hex Size (Across Flats)		Table 2 Ext'd.Socket Length		Table 3 Key Hex Size	
Code	Hex Size	Code	Extension	Code	Size
375	3/8"	A	Flush	094	3/32" Hex Key
437	7/16"	D	0.500"	125T	1/8" Hex Key
500	1/2"	E	0.625"	156T	5/32" Hex Key
562	9/16"	F	0.750"		
		G	1.0"		

Example of Complete Tool Model Number:

CT5478X 437 E 125T



90° Offset Lever Tools

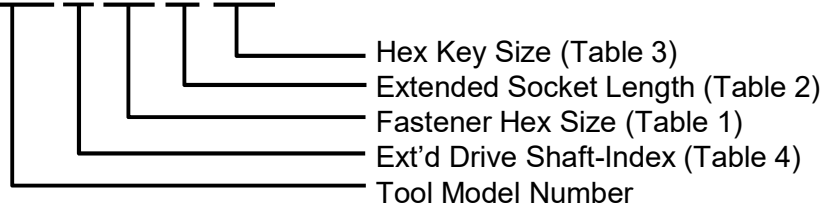


Model Number	No. of Gears	A	H ₁	H ₂	L	R	W (Front)
CT5705	9	6.59" [167.4mm]	.43" [10.9mm]	.73" [18.5mm]	7.6" [193mm]	.35" [8.9mm]	1.0" [25.4mm]

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																																												
<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>375</td><td>3/8"</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"	375	3/8"	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>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"	G	1.0"	J	2.0"	<table border="1"> <thead> <tr> <th>Code</th> <th>Size</th> </tr> </thead> <tbody> <tr><td>078</td><td>5/64" Hex Key</td></tr> <tr><td>094</td><td>3/32" Hex Key</td></tr> </tbody> </table>	Code	Size	078	5/64" Hex Key	094	3/32" Hex Key	<table border="1"> <thead> <tr> <th>Code</th> <th>Extension</th> </tr> </thead> <tbody> <tr><td>A</td><td>1-1/2"</td></tr> <tr><td>E</td><td>4.0"</td></tr> <tr><td>G</td><td>6.0"</td></tr> <tr><td>K</td><td>12.0"</td></tr> </tbody> </table>	Code	Extension	A	1-1/2"	E	4.0"	G	6.0"	K	12.0"
Code	Hex Size																																														
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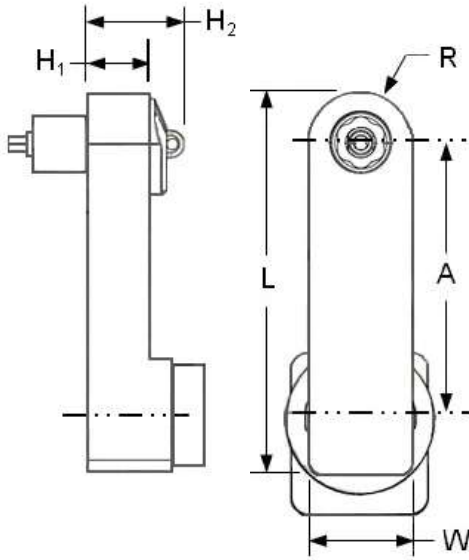
Example of Complete Tool Model Number:

CT5705 G 437 F 094



90° Offset Lever Tools

300 in-lbs



RPM at Socket: 270

Model Number	No. of Gears	A	H ₁	H ₂	L	R	W
CTL5472A	5	3.0" [76.2mm]	.69" [17.5mm]	1.0" [25.4mm]	4.19" [106.4mm]	.56" [14.2mm]	1.12" [28.4mm]

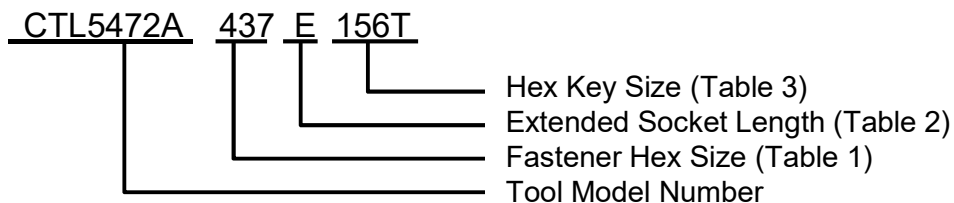
This is a very durable tool design for general purpose applications and is designed for Use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

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	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"

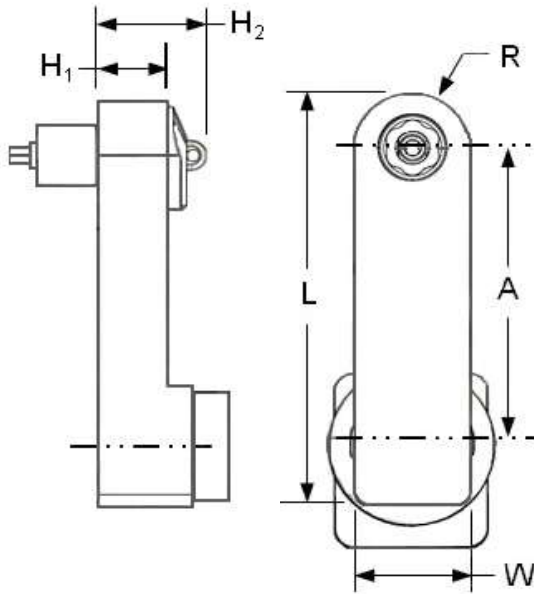
.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



90° Offset Lever Tools

520 in-lbs



Ref: LTV38N68-13

RPM at Socket: 270

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

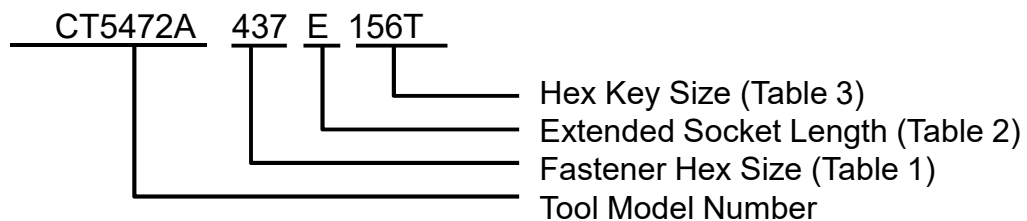
This is a very durable tool design for general purpose applications and is designed for Use in a flush condition or with extended sockets and hex keys when required.

This gear head has 360° indexing capability.

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	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"

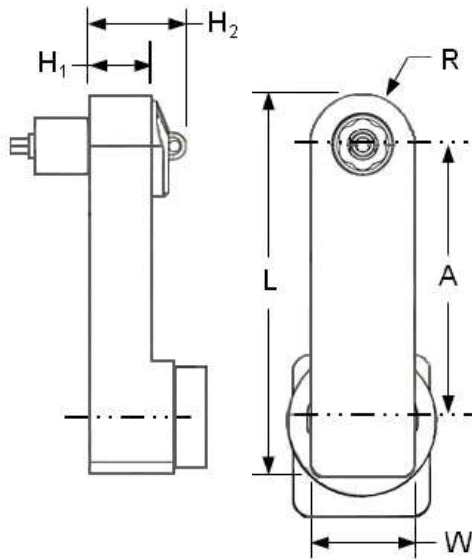
.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



90° Offset Lever Tools

450 in-lbs



Ref: LTV38N68-13

RPM at Socket: 290

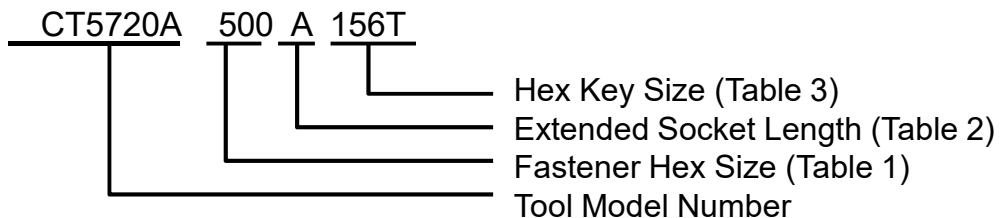
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CT5720A	7	3.69" [93.6mm]	.69" [17.5mm]	1.0" [25.4mm]	4.88" [124.0mm]	1.12" [28.4mm]	.56" [14.2mm]

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"		

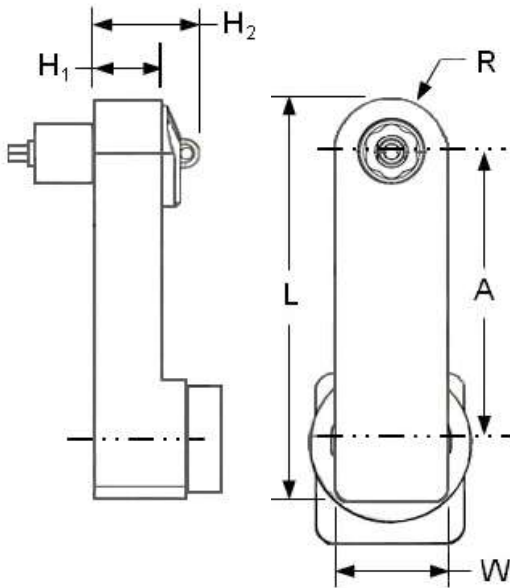
.625 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



90° Offset Lever Tools

600 in-lbs



RPM at Socket: 240

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

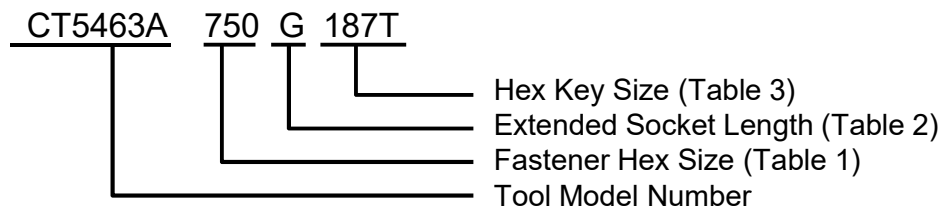
This is a very durable tool design for general purpose applications and is designed for use in a flush condition or with extended sockets and hex keys when required.

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"

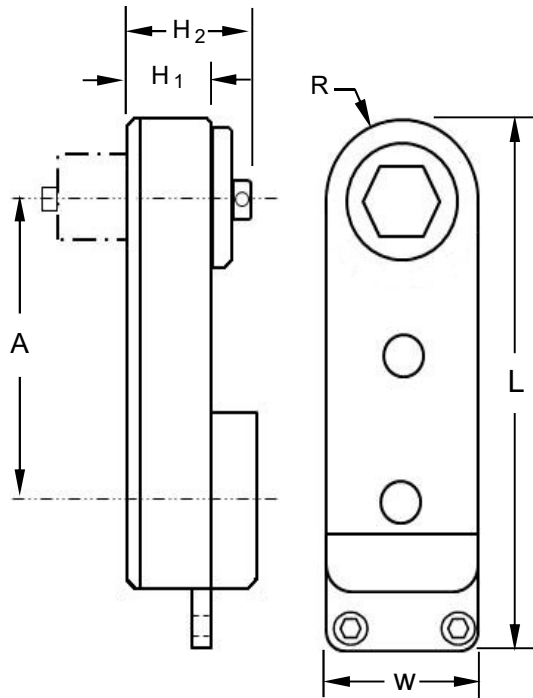
.687 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:



90° Offset Lever Tools

Torque Max: 840 in-lbs



Pictured Tool is a Simulation of actual tool model

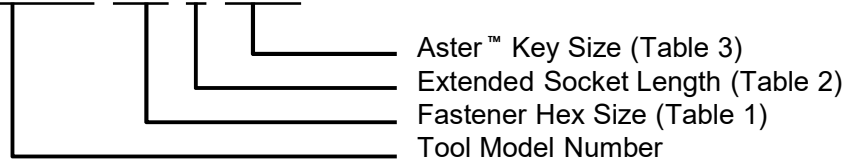
Model Number	No. of Gears	A	H ₁	H ₂	L	W	R
CT5605	3	2.18" [55.25mm]	.77" [19.5mm]	1.12" [28.4mm]	4.55" [115.57mm]	1.38" [35.1mm]	.69" [17.5mm]

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
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

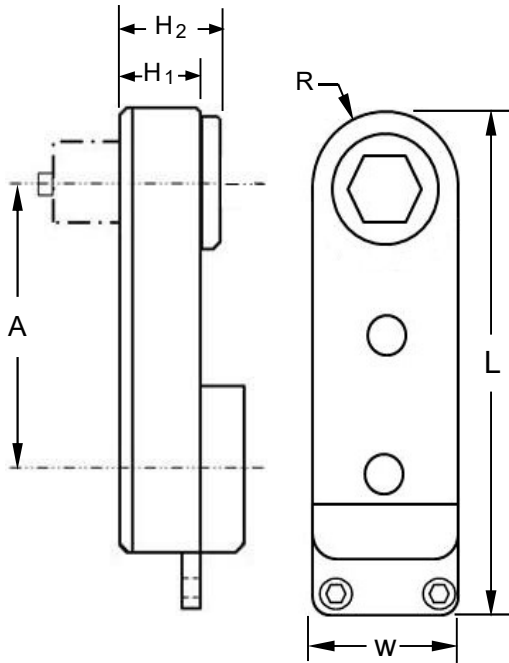
Example of Complete Tool Model Number:

CT(D)5605A 625 A 187T



90° Offset Lever Tools

Torque Max: 1290 in-lbs



Pictured Tool is a Simulation of actual tool model



Head Only

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

Table 1

Frangible Collar
Hex Size (Across Flats)

Code	Hex Size
750	3/4"
875	7/8"
937	15/16"

Table 2

Ext'd.Socket Length

Code	Extension
A	Flush
E	5/8"
G	1.0"
H	1.5"
J	2.0"

Table 3

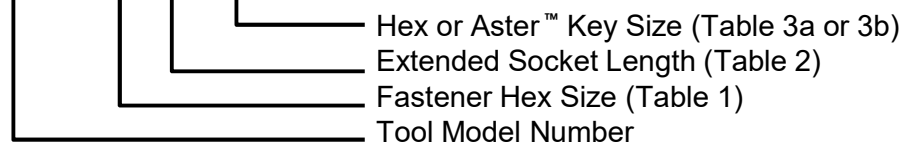
Key Hex Size

Code	Size
000	NA
219T	7/32"
250T	1/4"

.626 Max A/F Flush Socket Gear

Example of Complete Tool Model Number:

CT5723B 750 F 219T



Frangible Collars Assembly Tools

90° Right Angle Power Tools

SECTION 4



90° Angle Head Tools

Max Torque 220 in-lbs

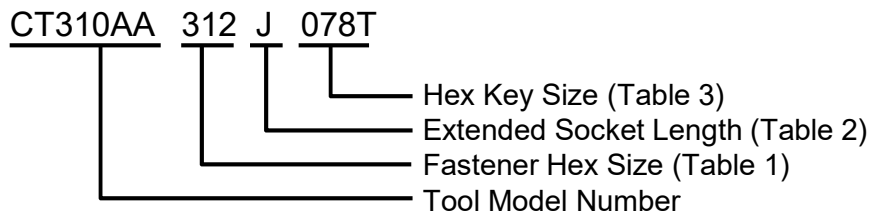


RPM at Socket: 275

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" Hex Key
250	1/4"	G	1.0"	078T	5/64" Hex Key
282	9/32"	J	2.0"	094T	3/32" Hex Key
312	5/16"	L	3.0"		
343	11/32"				
375	3/8"				
437	7/16"				

Example of Complete Tool Model Number:



90° Angle Head Tools

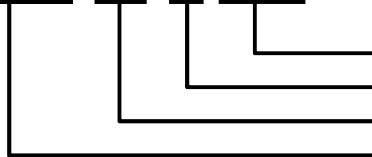


Table 1

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
CT310AD	480	55	370	7/16	1/2	9/16	5/8	11/16	3/4						.125	.156	.187
CT310AE	600	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
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



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

Table 2

Ext'd. Socket Length

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

90° Angle Head Tools

Installation Hand Tools and Hex Keys Accessories

SECTION 5



Hand Assembly Tools For Frangible Collars

Small Roller Wrenches, 40 & 80 in-lbs

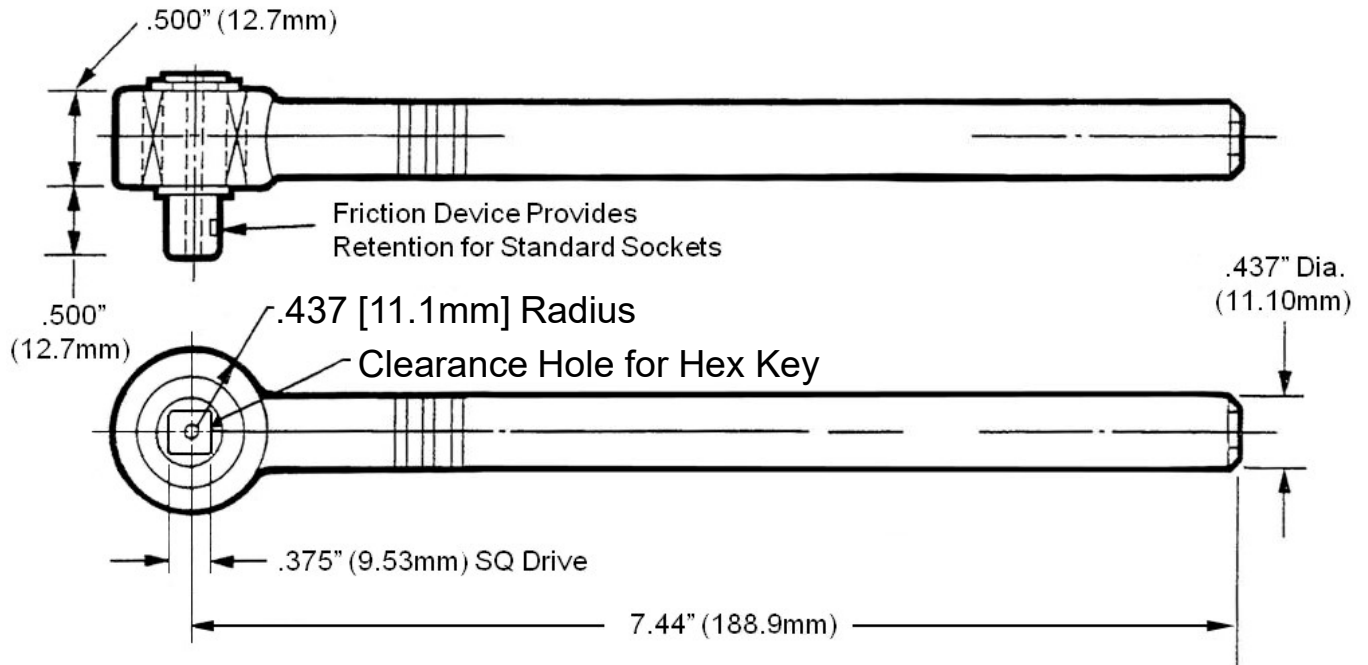


Roller Wrenches With Square Drive

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

Medium Roller Wrench with 3/8" Sq. Drive

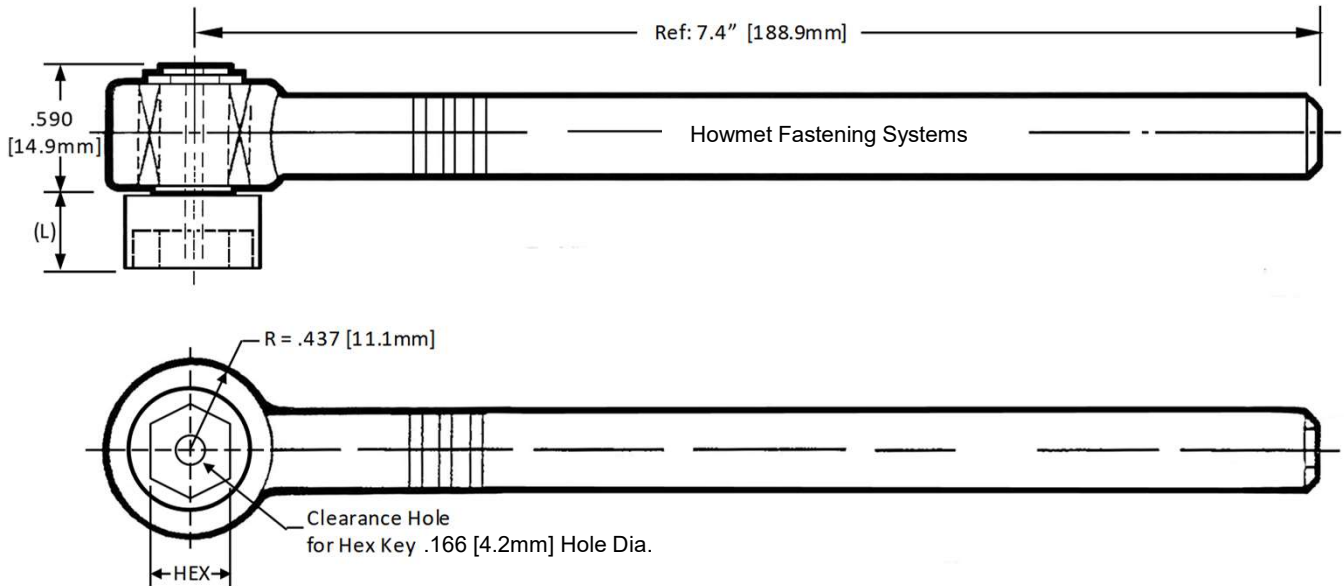


Roller Wrench With Square Drive

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

Medium Roller Wrench with Integrated Sockets

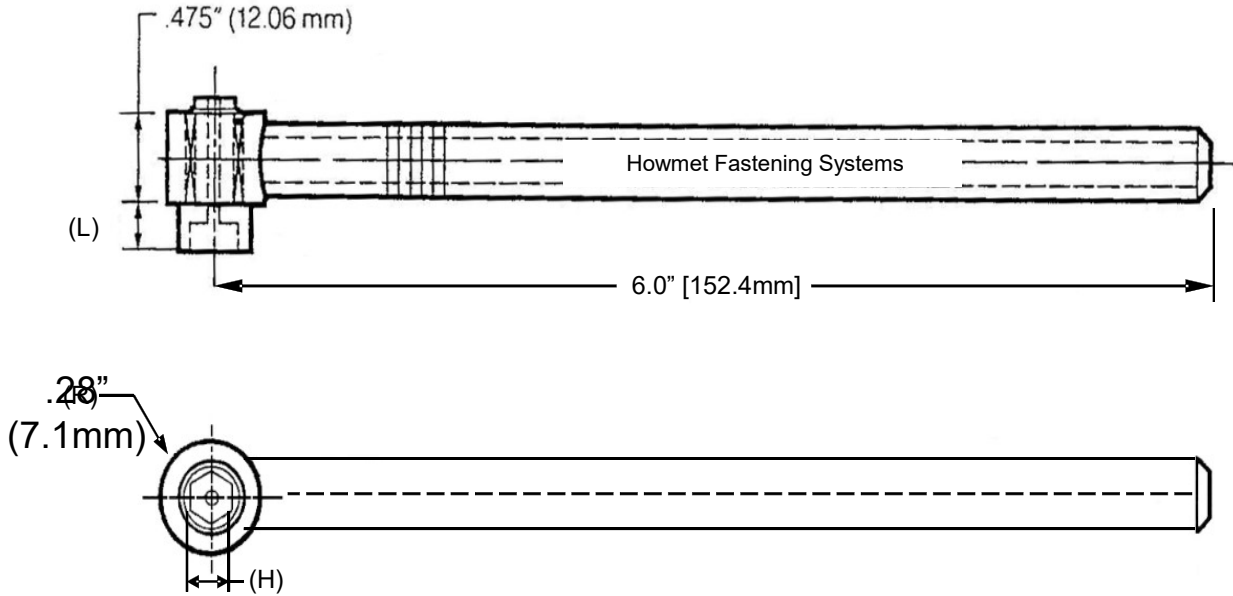


Ordering Number	Hex Size		L	Hole Thru Dia.
RWB130A-31	.312	5/16"	.250	.166
RWB130A-34	.343	11/32"	.270	.166
RWB130A-37	.375	3/8"	.370	.166
RWB130A-43	.437	7/16"	.430	.166

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

Hand Assembly Tools For Frangible Collars

Lt. Duty Roller Wrenches with Integrated Sockets

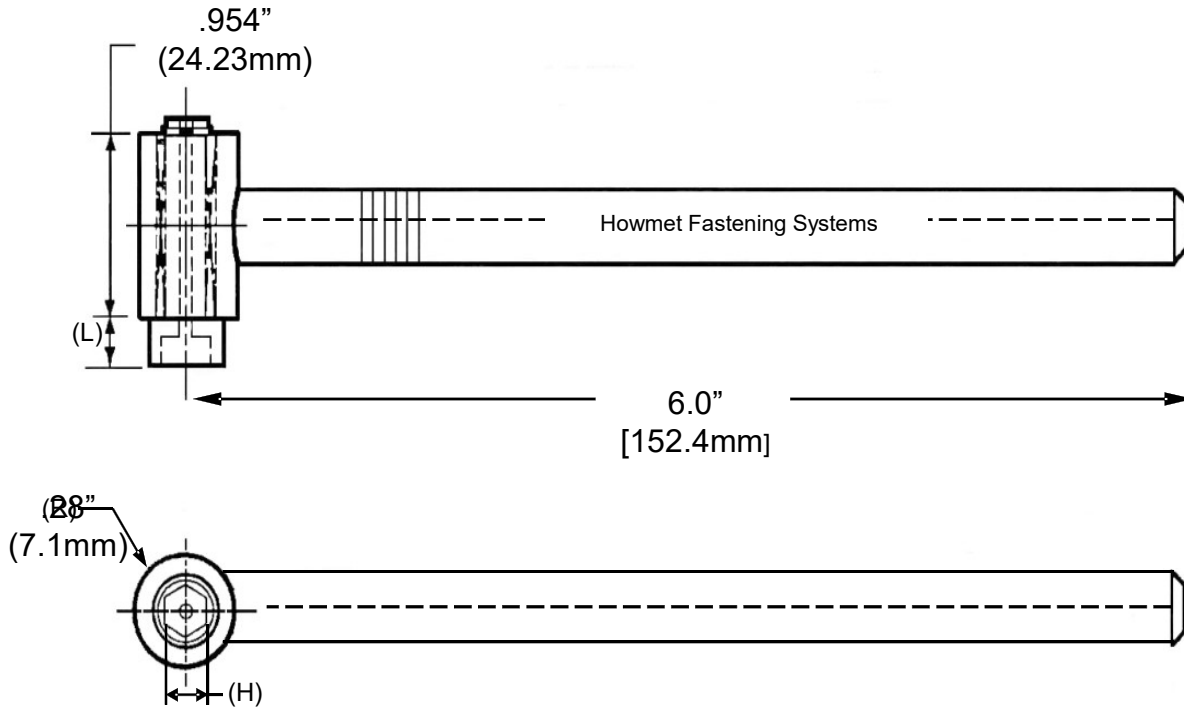


Ordering Number	(H) Hex Size	L	Hole Thru Dia.
RWB40A-21	.219 7/32"	.240	7/32"
RWB40A-25	.250 1/4"	.240	7/32"
RWB40A-28	.281 9/32"	.240	7/32"
RWB40A-31	.312 5/16"	.250	7/32"
RWB40A-34	.343 11/32"	.270	7/32"

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

Hand Assembly Tools For Frangible Collars

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

Hand Assembly Tools For Frangible Collars

Roller Wrench, up to 400 in-lbs



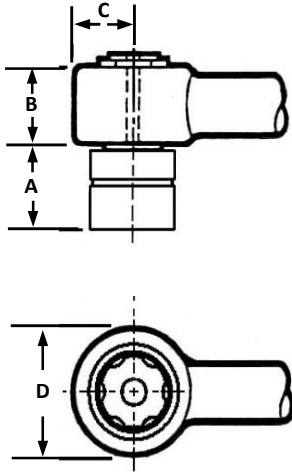
Ordering Number	A Ref.	Handle Length Ref.	C Dia. Ref.	D Max.	Square Drive	Hole Thru Dia.
RWB100-400	2.0	8.0	1.5	.74	3/8"	1/8"

Notes:

1. Sockets are not included with the Roller Wrench
2. Hex Key Handle Assembly sold separately

Hand Assembly Tools For Frangible Collars

Roller Wrench, up to 400 in-lbs



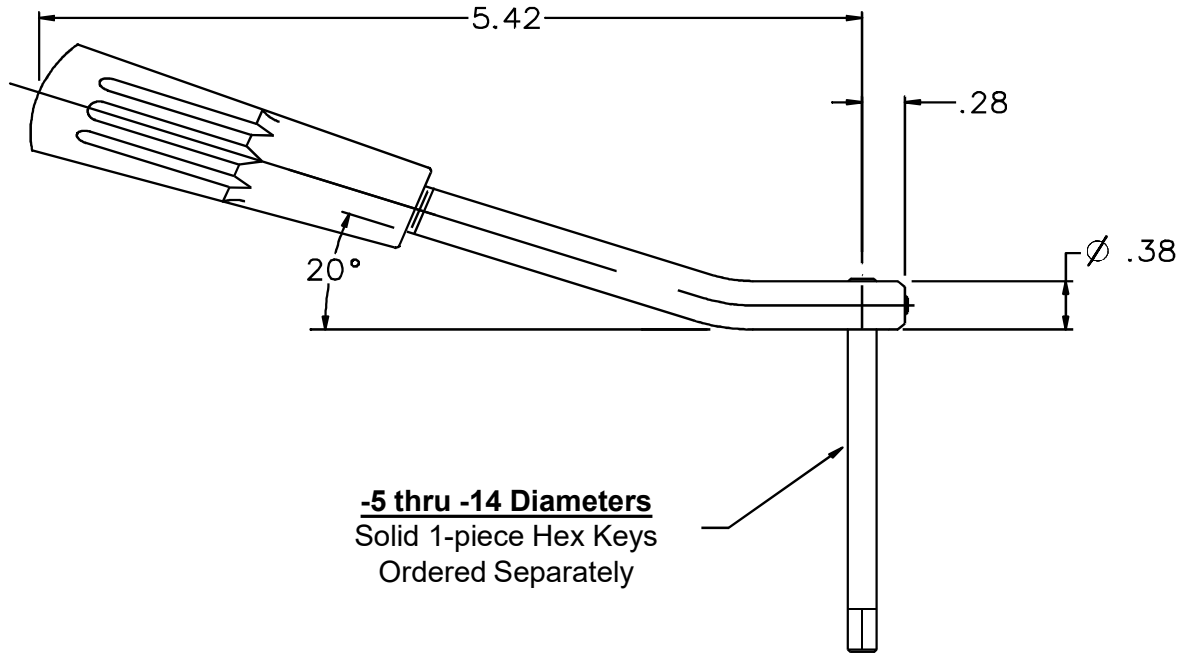
Ordering Number	Hex Size	A Length Ref.	B Height Ref.	C Radius Max.	D Dia. Ref.	Handle Length Ref.	Hole Thru Dia.	Square Drive
RWB100-400-37	.375	1.25	.785	.74	1.5	8.0	1/8"	3/8"
RWB100-400-50	.500	1.25	.785	.74	1.5	8.0	1/8"	3/8"
RWB100-400-56	.562	1.25	.785	.74	1.5	8.0	1/8"	3/8"

Notes:

1. Socket is included with this Roller Wrench
2. Hex Key Handle Assembly sold separately

Hand Assembly Tools For Frangible Collars

SPKH –Special Hex Key Handle



Hex Keys

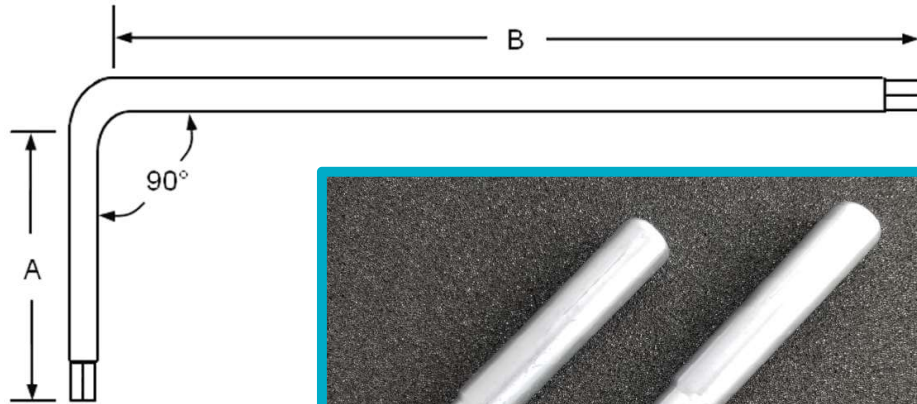
Pin Dia.	Handle (20°)	Handle (Straight)	Hex Key Size	Hex Keys Choices	
				.825 Long	2.5" Long
-5	SPKH-6	SPKH-6S	.078 (5/64")	093-9322	093-9323
-6	SPKH-6	SPKH-6S	.078 (5/64")	093-9322	093-9323
-8	SPKH-8	SPKH-8S	.094 (3/32")	093-9324	093-9325
-10	SPKH-10	SPKH-10S	.125 (1/8")	016-9867	016-9868
-12	SPKH-12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

How to Order:

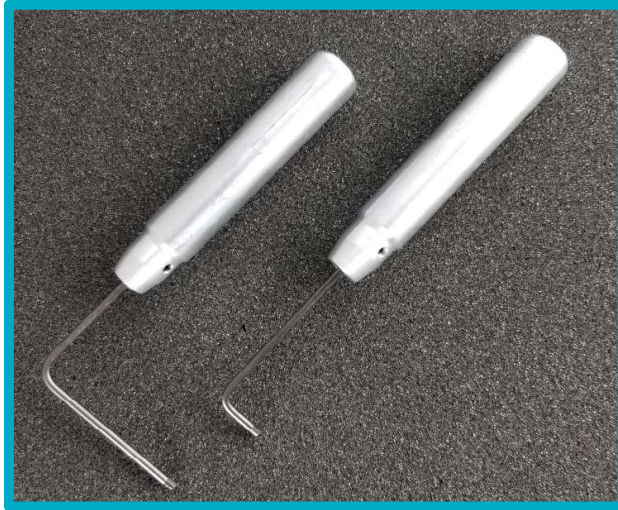
1. Order Handle Assembly Separately: SPKH-(*)
2. Order Hex Keys Separately

Hand Assembly Tools For Frangible Collars

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



HKH105 handles are optional equipment and must be ordered separately



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 Frangible Collars

Roller Wrenches, up to 400 in-lbs



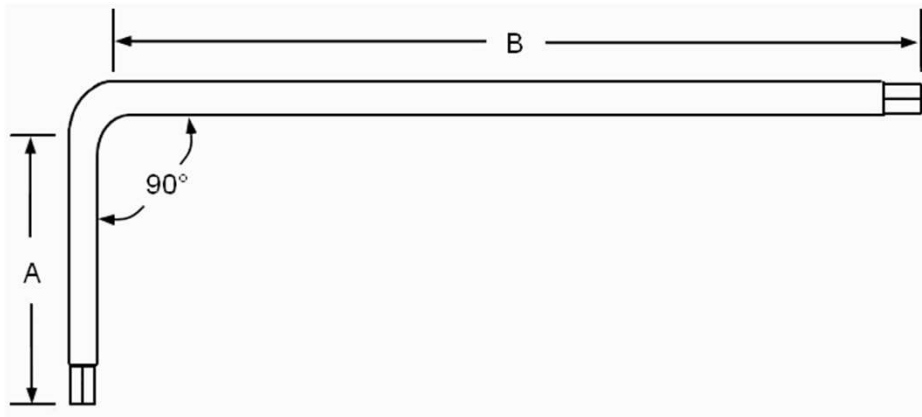
YSA Standard Collars

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

Metric Hex Keys For Frangible Collars

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

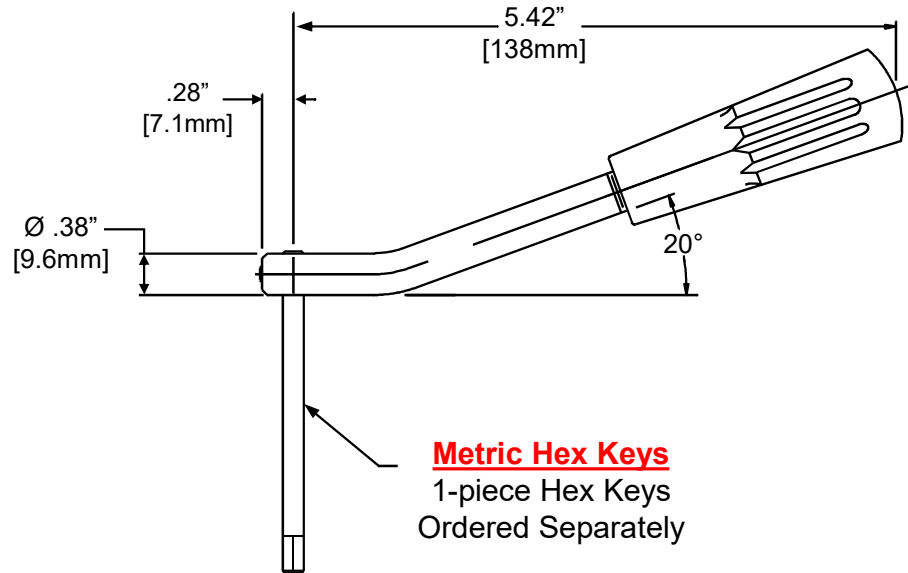


Part Number	Bolt Dia.	Hex Size	"A"		"B"	
			Reference		Reference	
			In	mm	In	mm
HK650-M1.5-1	-4	1.5mm	1.0"	25.4	5.7"	147.3
HK650-M1.5-2	-4	1.5mm	2.5"	63.5	4.3"	109.2
HK650-M1.5-3	-4	1.5mm	3.3"	83.8	3.5"	88.9
HK650-M2-1	-5	2.0mm	1.0"	25.4	5.7"	147.3
HK650-M2-2	-5	2.0mm	2.5"	63.5	4.3"	109.2
HK650-M2-3	-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**

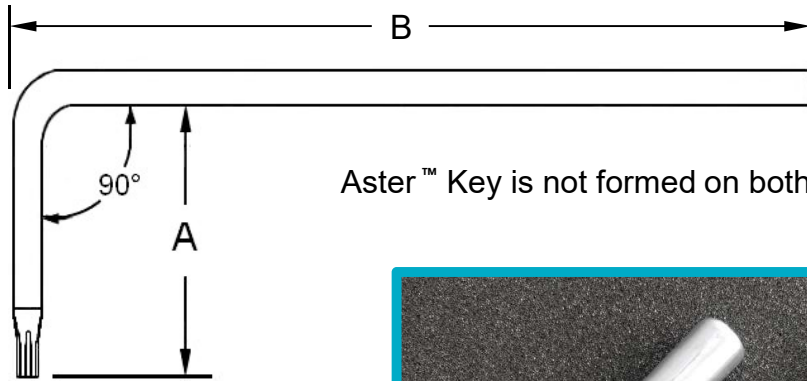
Ordering Numbers	Description	Aster™ Key Length
HKH100	Handle	3.0" (76.2mm)
AK650-2-B	Aster™ Key for -2 Dia. Pin	3.0" (76.2mm)
AK650-3-B	Aster™ Key for -3 Dia. Pin	3.0" (76.2mm)
AK650-3A-B	Aster™ Key for -3A Dia. Pin	3.0" (76.2mm)
AK650-4-B	Aster™ Key for -4 Dia. Pin	3.0" (76.2mm)

Note: Aster™ is a trademark of Blanc Aero Industries

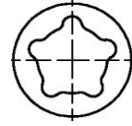
Length of the Aster™ Key can be adjusted to fit application requirements

Aster™ Key Accessories For Nuts and Frangible Collars

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

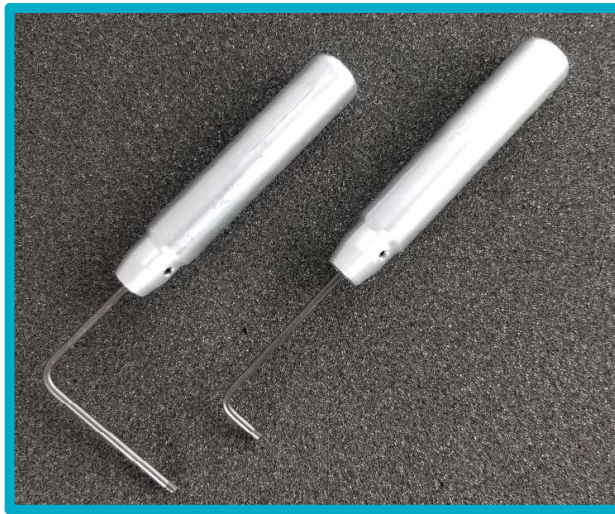


Aster™ Key is not formed on both ends



Aster™
Recess
Shape

AKH105 handles are optional equipment and must be ordered separately



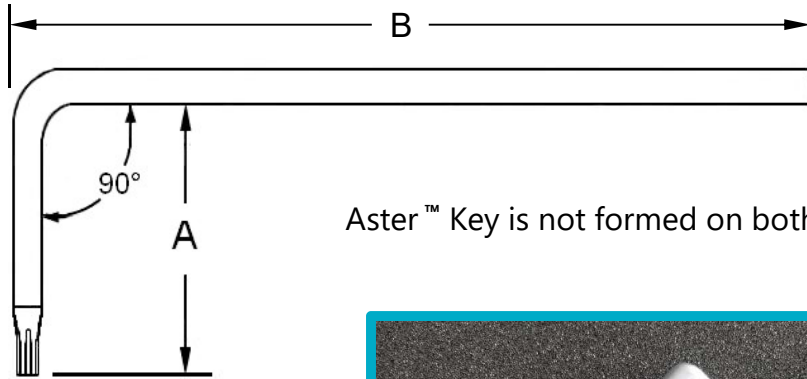
Hex Key Part Number	Handle Part Number (Optional)	Screw Dia.	"A" Reference (mm)	"B" Reference (mm)
AK650-2-16	AKH105-2	-2	16.0	85.0
AK650-3-16	AKH105-3	-3	16.0	85.0
AK650-3A-16	AKH105-3A	-3A	16.0	85.0
AK650-4-17	AKH105-4	-4	17.0	85.0

Material: High Strength Alloy Steel

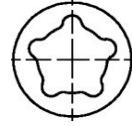
Caution: Do not use this product with a power tool, serious injury can occur.

Aster™ Key Accessories For Nuts and Frangible Collars

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

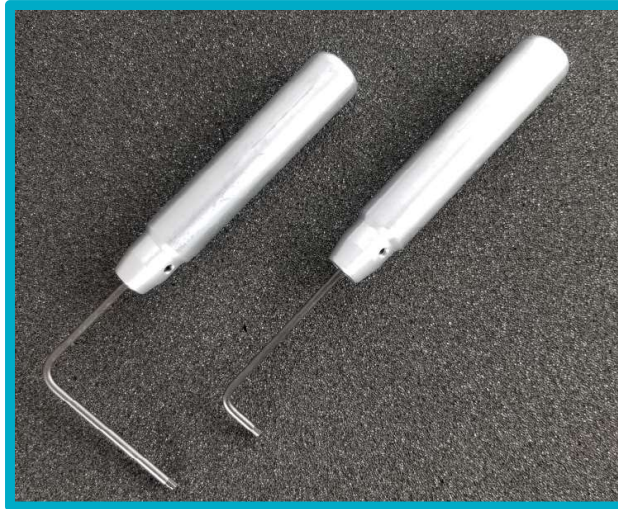


Aster™ Key is not formed on both ends



Aster™
Recess
Shape

AKH105 handles are optional equipment and must be ordered separately



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

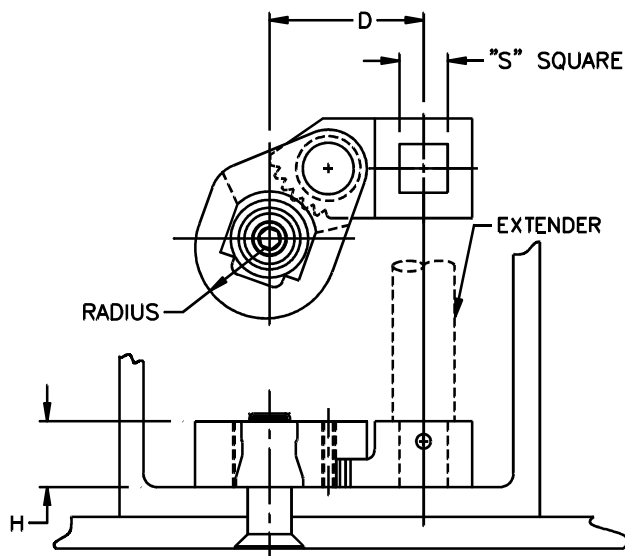
Collar Removal Tools Pneumatic and Hand Tools

SECTION 6



Hand Removal Tool For Frangible Collars

Crow Foot Removal Wrenches

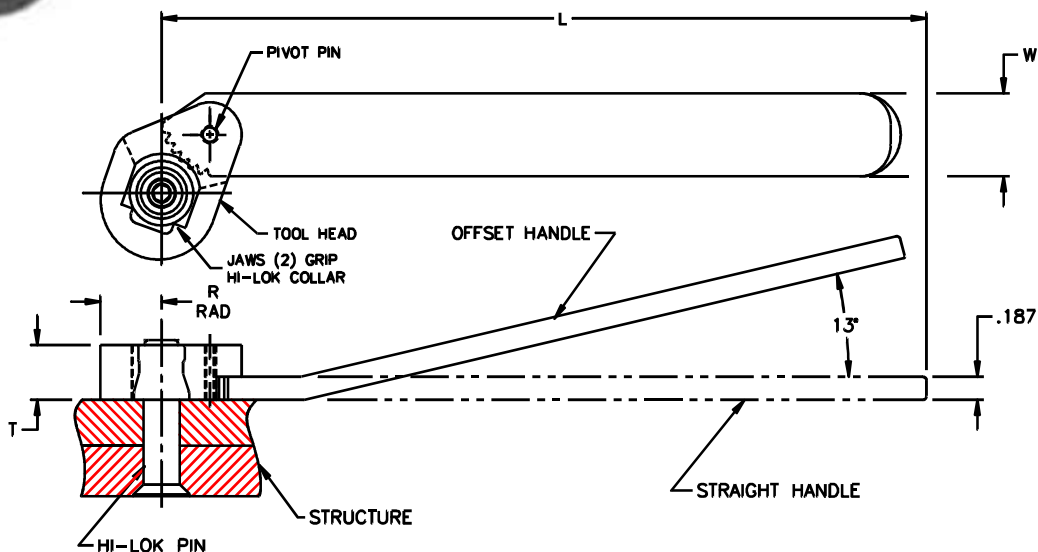


Features:

- 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

Hand Removal Tool For Frangible Collars



FEATURES:

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

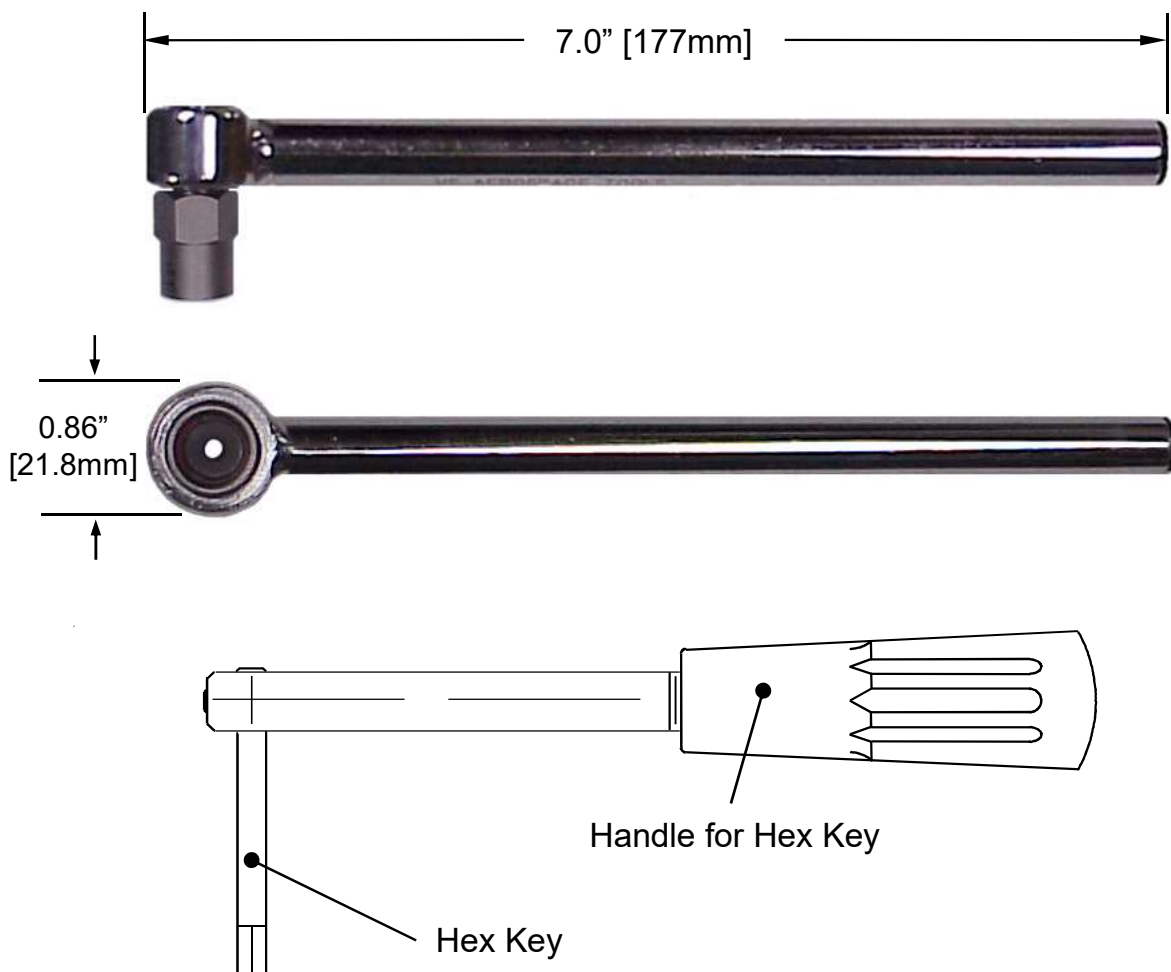
Removal Tool Offset Handle

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

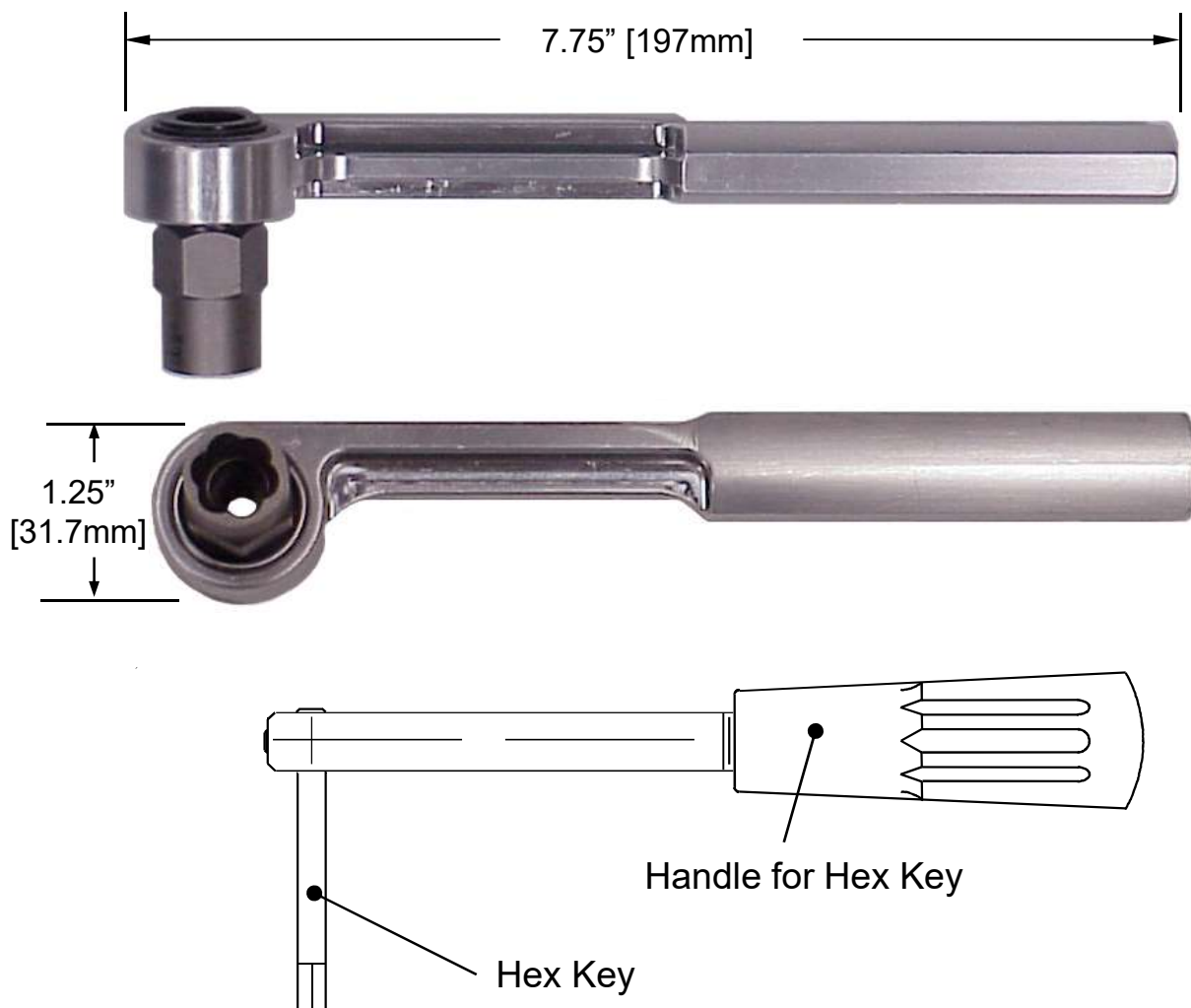
Hand Removal Tool For Frangible Collars



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

Hand Removal Tool For Frangible Collars

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.



Howmet Fastening Systems

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