

Cleco® DC Electric Assembly Tools

SP-1020-EN 0909 7.5M

**COOPER** Tools



ISO 9001

Cooper Tools Division has attained ISO 9001 Quality System Certification for seven of our facilities. The driving force behind the implementation of the Quality System is the commitment "to provide our customers with the **best value delivered** by offering only products and services **that meet or exceed their expectations**".



Lexington, South Carolina



Dayton, Ohio



Hicksville, Ohio



Springfield, Ohio



Braunschweig, Germany



Westhausen, Germany



Ozoir-la-Ferrière, France

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Warranty

Cooper warrants products and parts sold by it, insofar as they are of its own manufacture, against defects of material and workmanship, under normal use and service in accordance with its written instructions, recommendations, and ratings for installation, operation, maintenance, and service of products, for a period of **ONE YEAR FROM THE DATE OF INITIAL USE, BUT IN NO EVENT SHALL THE WARRANTY EXCEED 24 MONTHS FROM DATE OF DELIVERY TO DISTRIBUTOR.** Proof of Purchase with shipment date must be furnished by the user to validate the warranty. This warranty applies only to products manufactured by Cooper and specifically excludes products manufactured by others. Products not manufactured by Cooper are warranted only to the extent and in the manner warranted to Cooper by the manufacturer

and then only to the extent Cooper is able to enforce such warranty. Cooper's warranty with respect to products manufactured by it is limited to the repair or replacement, as Cooper may elect, of any defective part regarding which the Distributor has given 5 days written notice from the discovery of such defect. Installation and transportation costs are not included. Cooper shall have the option of requiring the return to it of the defective material, transportation prepaid, for inspection. No allowance will be made for repairs without Cooper's approval. **COOPER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, AND HEREBY DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Lubrication Products

Cooper Tools' products are classified as non-hazardous manufactured items, defined in the OSHA 1910.1200 Hazard Communication Standard as "Articles". These products, under conditions of normal use, do not release or cause exposure to a hazardous chemical.

Under normal conditions of use, lubrication products sold separately for or used within these tools should not cause an exposure hazard. Refer to the Material Safety Data Sheet (M.S.D.S.) for Safety and Disposal Information. M.S.D.S. sheets are available upon request from Cooper Tools.

Cooper is also aware of, and complies with, the provisions of section 611 amendments to the Clean Air Act of 1990. No ozone depleting chemicals have been used in the manufacture of our products.

If you resell or distribute these products, you have the responsibility for ensuring that the Material Safety Data Sheets are provided to the purchaser.

Proper lubrication is essential to the economical operation of pneumatic and electric tools. Cooper Tools perform better and their life is extended by using the recommended lubricants. All lubricants that are listed in the accessory section of this catalog have undergone extensive testing and are recommended for use with Cooper Tools products.

Fastener Selection

The suggested fasteners listed in this catalog are determined by matching a tool's maximum rated load to Society of Automotive Engineers (SAE) Grade 5 and International Organization of Standardization (ISO) Grade 9.8 fasteners. The torque capabilities for SAE Grade 5 fasteners are from SAE Manual, SAE J429 (Mechanical and Material Requirement for Externally Threaded Fasteners). The torque capabilities for ISO Grade 9.8 fasteners are from ISO 898-1 (Mechanical Properties of Fasteners). All values selected are based on lubricated fasteners.

The suggested fasteners listed in this catalog are advisory only, and Cooper Tools recommends that you further consult other technical references before final tool selection. Reliance on the accuracy of this catalog data for any purpose by anyone is at the sole risk of that person. Cooper Tools is not responsible for any loss, claim, or damage arising from improper tool selection.

The torque values listed under the headings "TORQUE" are tested on an ISO 5393 soft joint rate test fixture unless otherwise stated by a special note.

17 & 47 Cross Reference To 18 & 48

Old Part No.	Replaced By Part No.
17EA08AL2	18EA08AL2
17EA15AM3	18EA15AM3
17EA15AM3B	18EA15AM3B
17EA16F1MB00	18EA16F1MB00*
17EA16F1MD00	18EA16F1MD00*
17EA16S131	18EA16S131
17EA22AM3	18EA22AM3
17EA22AM3B	18EA22AM3B
17EA23S131	18EA23S131
17EA28AM3	18EA28AM3
17EA28AM3B	18EA28AM3B
17EA30F1MG20	18EA30F1MG20*
17EA30S131	18EA30S131
17EP06D2	18EP06D2
17EP06Q	18EP06Q
17EP12D3	18EP12D3
17EP12Q	18EP12Q
17EP17D3	17EP17D3
17EP17Q	18EP17Q
17EP22D3	18EP22D3
17EP31D3	18EP31D3
17ES06D2	18ES06D2
17ES06Q	18ES06Q
17ES06ZA	18ES06ZA
17ES12D3	18ES12D3
17ES12Q	18ES12Q
17ES12ZA	18ES12ZA
17ES17D3	18ES17D3
17ES17Q	18ES17Q
17ES17ZA	18ES17ZA
17ES22D3	18ES22D3
17ES31D3	18ES31D3
47EA105AH4	48EA105AH4
47EA105AH4B	48EA105AH4B
47EA110F3MF00	48EA110F3MF00*
47EA110F3MJ00	48EA110F3MJ00*
47EA110H3MIOM6B	48EA110H3MIOM6B*
47EA110H3MJT30	48EA110H3MJT30*
47EA110H3MLFMB	48EA110H3MLFMB*
47EA110H3MLMM5	48EA110H3MLMM5*
47EA110H3MLMM6	48EA110H3MLMM6*
47EA110H3MMFMB	48EA110H3MMFMB*
47EA110H3MRMM6	48EA110H3MRMM6*
47EA110H4MPMM6	48EA110H4MPMM6*
47EA110H5MIOM6B	48EA110H5MIOM6B*
47EA110H5MLOMBD	48EA110H5MLOMBD*
47EA110H5MOFMD	48EA110H5MOFMD*
47EA110S341	48EA110S341
47EA135F4MM10	48EA135F4MM10*
47EA135H3MLFMB	48EA135H3MLFMB*
47EA135H3MLFMC	48EA135H3MLFMC*
47EA135H3MLMM6	48EA135H3MLMM6*
47EA135H3MLT40	48EA135H3MLT40*
47EA135H3MMMM6	48EA135H3MMMM6*
47EA135H3MOFMD	48EA135H3MOFMD*
47EA135H3MOT45	48EA135H3MOT45*
47EA135H3MRMMB	48EA135H3MRMMB*

Old Part No.	Replaced By Part No.
47EA135H4MKMM6	48EA135H4MKMM6*
47EA135H4MLMM6	48EA135H4MLMM6*
47EA135H4MOFMD	48EA135H4MOFMD*
47EA135H5MLMM6	48EA135H5MLMM6*
47EA135H5MOFMB	48EA135H5MOFMB*
47EA135H5MOFMD	48EA135H5MOFMD*
47EA135H5MOMM6	48EA135H5MOMM6*
47EA135H5MOT45	48EA135H5MOT45*
47EA135H6MOFMD	48EA135H6MOFMD*
47EA135H9MOFMD	48EA135H9MOFMD*
47EA135H9MOMM6	48EA135H9MOMM6*
47EA135MH4	48EA135MH4
47EA135MH4B	48EA135MH4B
47EA135S461	48EA135S461
47EA15AL3	48EA15AL3
47EA15AL3B	48EA15AL3B
47EA175AX5	48EA175AX6
47EA175AX5B	48EA175AX6B
47EA230AX5	48EA230AX5
47EA230AX5B	48EA230AX5B
47EA230AX6	48EA230AX6
47EA230AX6B	48EA230AX6B
47EA230F4MM00	48EA230F4MM00*
47EA230F4MM80	48EA230F4MM80*
47EA230F4MO00	48EA230F4MO00*
47EA230H3MKT30	48EA230H3MKT30*
47EA230H3MKT40	48EA230H3MKT40*
47EA230H3MOFMD	48EA230H3MOFMD*
47EA230H3MOMM6	48EA230H3MOMM6*
47EA230H3MOT40	48EA230H3MOT40*
47EA230H3MRFMD	48EA230H3MRFMD*
47EA230H6MOT45	48EA230H6MOT45*
47EA230H9MRFMF	48EA230H9MRFMF*
47EA230S461	48EA230S461
47EA30S231	48EA30S231
47EA33AM3	48EA33AM3
47EA39S231	48EA39S231
47EA39S232	48EA39S231
47EA39S235	48EA39S231
47EA43AM3	48EA58AM3
47EA43AM3B	48EA58AM3B
47EA43F3MG00	48EA37F3MG00*
47EA43F3MI00	48EA37F3MI00*
47EA43H3MIFMD	48EA37H3MIFMD*
47EA43H3MIMM5	48EA37H3MIMM5*
47EA43H3MLMM5	48EA37H3MLMM5*
47EA43S341	48EA37S341
47EA55F2MG20	48EA52F2MG20*
47EA55S231	48EA55S231
47EA56F3MI40	48EA53F3MI40*
47EA56H3MHMM5	48EA53H3MHMM5*
47EA56H3MIFMA	48EA53H3MIFMA*
47EA56H3MJOM5B	48EA53H3MJOM5B*
47EA56H4MIOM6B	48EA53H4MIOM6B*
47EA56H4MLMMB	48EA53H4MLMMB*
47EA60AM3	48EA58AM3
47EA60AM3B	48EA58AM3B

Old Part No.	Replaced By Part No.
47EA60AM4	48EA58AM4
47EA60AM4B	48EA58AM4B
47EA80F3MJ00	48EA75F3MJ00
47EA80F3ML00	48EA75F3ML00
47EA80F3MM20	48EA75F3MM20
47EA80H3MIFMA	48EA75H3MIFMA
47EA80H3MIMM5	48EA75H3MIMM5
47EA80H3MIT30	48EA75H3MIT30
47EA80H3MLMM5	48EA75H3MLMM5
47EA80H3MOMMB	48EA75H3MOMMB
47EA80H3MPMM6	48EA75H3MPMM6
47EA80H4MHMM5	48EA75H4MHMM5
47EA80H4MIFMA	48EA75H4MIFMA
47EA80H4MJMMD	48EA75H4MJMMD
47EA80S341	48EA75S341
47EA90AH4	48EA90AH4
47EA90AH4B	48EA90AH4B
47EC30D1	48EC30D1
47EC30D3	48EC30D3
47EP125D4	48EP125D4
47EP125D4B	48EP125D4B
47EP12Q	48EP12Q
47EP150D4	48EP150D4
47EP25D3	48EP25D3
47EP36D3	48EP36D3
47EP48D3	48EP48D3
47EP65D4	48EP65D4
47EP65D4B	48EP65D4B
47EP90D4	48EP90D4
47EP90D4B	48EP90D4B
47ES1152ZA	48ES1152ZA
47ES125D4	48ES125D4
47ES125D4B	48ES125D4B
47ES12Q	48ES12Q
47ES12ZA	48ES12ZA
47ES1502ZA	48ES1502ZB
47ES150D4	48ES150D4
47ES1653ZA	48ES1653ZB
47ES221ZA	48ES271ZB
47ES2503ZA	48ES2503ZB
47ES25D3	48ES25D3
47ES281ZA	48ES271ZB
47ES36D3	48ES36D3
47ES401ZA	48ES602ZB
47ES48D3	48ES48D3
47ES602ZA	48ES602ZB
47ES65D4	48ES65D4
47ES65D4B	48ES65D4B
47ES702ZA	48ES702ZB
47ES802ZA	48ES802ZB
47ES90D4	48ES90D4
47ES90D4B	48ES90D4B
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*Tool nomenclature/ordering process changed. See catalog page for details.

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48ES12Q.....	24	67ES135BZ4.....	29,71	EMT400-10R6-3/4"-APM72		PBA-24-AH.....	58	TME-221-30-* -U.....	37
48ES12ZA.....	28,71	67ES135D4.....	25	EMT400-3-OS400-3/4"-		PBA-30-AH.....	58	TME-221-30-* -ED.....	37
48ES1502ZB.....	28,71	67ES1670D8.....	25	APM.....	73	S308434.....	75	TME-221-30-* -EP.....	37
48ES150D4.....	24	67ES1670Z8.....	29,71	EMT400-3R6-3/4"-APM	72	S308435.....	75	TME-221-30-* -EP.....	37
48ES1653ZB.....	28,71	67ES190D6.....	25	EMT-400-3V-APM.....	74	S308436.....	75	TMEB-COM-V2.03.....	19
48ES2503ZB.....	28,71	67ES190Z6.....	29,71	EMT-400-3X-APM.....	74	S308437.....	75	TMEC-220-15-*.....	18
48ES25D3.....	24	67ES2060D8.....	25	EMT400-4-OS400-3/4"-		S308438.....	75	TMEC-220-30-*.....	18
48ES271ZB.....	28,71	67ES2060Z8.....	29,71	APM.....	73	S308439.....	75	TMEI-114-15-* -D-EP.....	56
48ES361ZB.....	34,71	67ES285D6.....	25	EMT400-4R6-3/4"-APM	72	S308440.....	75	TMEI-114-15-*.....	56
48ES36D3.....	24	67ES285Z6.....	29,71	EMT400-5-OS400-3/4"-		S308441.....	75	TMEI-114-15-* -D.....	56
48ES48D3.....	24	67ES385D6.....	25	APM.....	73	S308450.....	75	TMEI-114-30-*.....	56
48ES602ZB.....	28,71	67ES385Z6.....	29,71	EMT400-5R6-3/4"-APM	72	S308474.....	75	TMEI-114-30-* -D.....	56
48ES65D4.....	24	67ES4050D12.....	25	EMT400-8R6-3/4"-APM	72	S308475.....	75	TMEI-114-30-* -D-EP.....	56
48ES702ZB.....	34,71	67ES475D6.....	25	EMT600-2-OS600-1"-APM		S976956.....	75	TMEI-114-30-* -EP.....	56
48ES802ZB.....	34,71	67ES475Z6.....	29,71	73		SBA-12.....	58	TMEM-114-15-*.....	38
48ES90D4.....	24	67ES610D6.....	25	EMT600-2R6-1"-APM....	72	SBA-12-AH.....	58	TMEM-114-15-* -EP.....	38
48ET20T2.....	32	67ES610Z6.....	29,71	EMT600-3-OS600-1"-APM		SBA-18.....	58	TMEM-114-15-* -IO.....	38
48ET30T3.....	32	67ES65BZ4.....	29,71	73		SBA-18-AH.....	58	TMEM-114-30-*.....	38
48ET40T4.....	32	67ES65D4.....	25	EMT600-3R6-1"-APM....	72	SBA-24-AH.....	58	TMEM-114-30-* -EP.....	38
4BB-4B360A-4K1M-		67ES850D8.....	25	EMT800-2-OS800-1"-APM		SBA-30-AH.....	58	TMEM-114-30-* -IO.....	38
4Z1250A.....	71	67ES850Z8.....	29,71	73		SBA-30-WM.....	58		
4BB-4B360A-4K1M-4ZA71		CPBA-12-AH.....	58	EMT800-2R6-1"-APM....	72	T3M-50-N-11-U-DLW....	18		
4BB-4B360A-4VK1M....	72	CPBA-18.....	58	EMT80-10-OS75-3/8"-APM		T3M-51-M-15-U.....	78		
4BB-4B360A-4WK1M....	74	CPBA-18-AH.....	58	73		T3M-51-M-15-U-D.....	78		
4BB-4B460A-4K2M-		CPBA-30.....	58	EMT80-10P-APM.....	74	T3M-51-M-15-U-I.....	78		
4Z1600A.....	71	CPBA-30-AH.....	58	EMT80-10R6-3/8"-APM	72	T3M-51-M-15-U-P.....	78		
4BB-4B460A-4K2M-4ZA71		CPBA-30-WM.....	58	EMT80-10T-APM.....	74	T3M-51-M-30-U.....	78		
4BB-4B460A-4VK2M....	72	CSBA-12-AH.....	58	EMT80-2R6-1/2"-APM... 72		T3M-51-M-30-U-D.....	78		
4BB-4B460A-4WK2M... 74		CSBA18.....	58	EMT80-3-OS75-1/2"-APM.		T3M-51-M-30-U-I.....	78		
4BB-4B630A-4K2M-4ZA71		CSBA-18-AH.....	58	73		T3M-51-M-30-U-P.....	78		
4BB-4B630A-4VK3M.... 72		CSBA-24.....	58	EMT80-3P-APM.....	74	T3M-52-A-30-U.....	78		
4BB-4B630A-4VK4MS.. 72		CSBA-30.....	58	EMT80-3R6-1/2"-APM.. 72		T3M-52-A-30-U-D.....	78		
4BB-4B630A-4WK3M... 74		CSBA-30-AH.....	58	EMT80-3T-APM.....	74	T3M-52-A-30-U-I.....	78		
541715-2.....	19	EMT1200-2R8-1"-APM.. 72		EMT80-4-OS75-1/2"-APM.		T3M-52-A-30-U-P.....	78		
572689-1.....	82	EMT200-10-OS150-1/2"-		73		T3M-53-A-33-U.....	78		

The Total Solution For Quality & Critical Fastening Operations

Any number of companies can offer you power hand tools. Only Cooper Tools can offer you the innovative concept of Tightening Management.

It is an idea born of necessity, because Cooper Tools' fastening technology is used globally and across all industries. This technology is used to assemble circuit boards in the electronics industry and a great multitude of applications within general industry where "quality critical" requirements are the rule. In motor vehicle environments across the globe, Cooper Tools' complete line of transducerized electric tools are used in "safety critical" applications where spot-on precision and traceability are required. And finally, in one of the most demanding environments, our line of DC electric tools are used in aircraft assembly where "good enough" will never be acceptable.

As a result, the Cooper concept of Tightening Management has been forged on a foundation of dedication to technical concepts, creative thinking, diligent scientific inquiry, and the continuous pursuit of perfection. Nothing is left to chance. Nothing is forgotten.

Because of our drive for perfection, you can excel in your job. Indeed, due to our uncommon focus on total fastening solutions instead of just products, our customers look upon us not merely as vendors, but as strategic allies. And at Cooper Tools, we welcome the challenge of leadership this imposes.

The Systems

Cooper Tools' state of the art Cleco Tightening Manager System delivers unprecedented performance,



productivity and accountability in both “quality critical” and “safety critical” assembly applications.

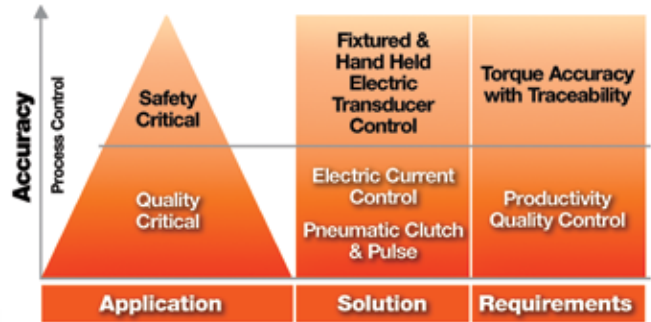
Durability, speed, and ergonomics are achieved using the corded Cleco DC electric tools with a complete line of tool configurations and an assortment of controller options to choose from.

The Cleco LiveWire™ system provides the most cost-effective safety critical fastening solution available in the world today. By marrying cordless tools and WiFi communications, the operators gain the mobility and flexibility they need to increase productivity and reduce in-system damage costs. One line controller managing up to 10 cordless tools while utilizing the most up-to-date wireless encryption technology provides a cost savings unparalleled in industry today.

When considering the cumulative impact of all these components – the tools, the controllers, the software,

the flexibility, the accessories and the support – it becomes easy to see why the Cleco Tightening Manager System is the benchmark for all DC electric tool systems.

Application Segment



Cleco®

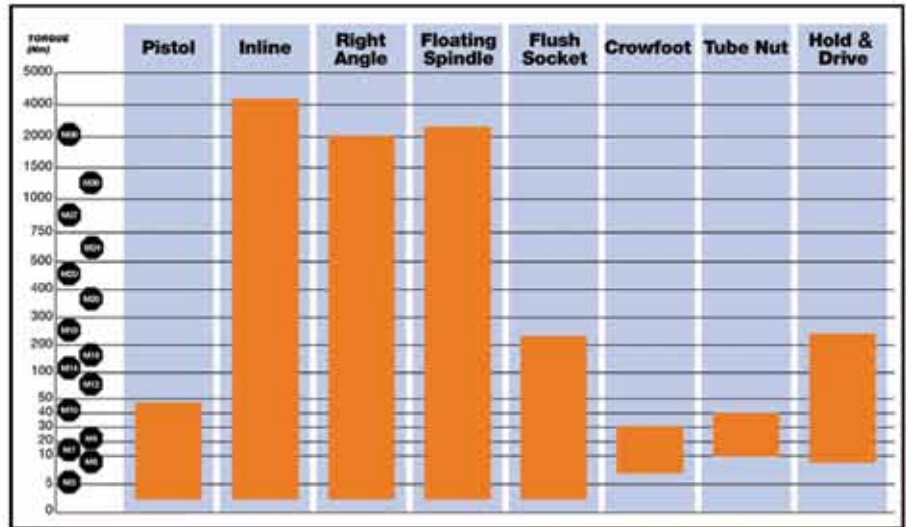


The Tools & Serviceability

Industrial Tools

Cooper Tools' line of Cleco DC electric tools are engineered to provide greater torque repeatability, minimal torque loss, increased speed control and ease of maintenance.

Our tools are available in right-angle, inline, and pistol grip configurations, in addition to specialty nutrunners such as flush socket, floating spindle, tube nut, crowfoot, and hold & drive tools covering 2 to 4000 Nm. Cleco DC tools incorporate a technically sophisticated engineering design, resulting in an ergonomic tool with durability that is second to none.



- **Brushless precision**
- **Resolver control**
- **Transducer accuracy**
- **Memory intelligence**

Cleco®



Serviceability

Cleco DC electric tools are simply the most serviceable tools in the world.

- Full maintainability with no restrictions
- Modular construction
- Ease of maintenance
- Tool memory tracks cycles/PM



Simple and modular start/forward/reverse switch assembly

Modular motor and connector assembly provides unmatched power precision.

Quick-disconnect connectors for ease of assembly/repair.

Resolver technology for full range speed control.

So simple, only four standard tools are required for assembly/disassembly!



The Most Cost-Effective Safe

Up To 50% Savings Over Traditional Systems!

Mobility is a major advantage with wireless communications. Cleco LiveWire™ marries the freedom and flexibility of cordless tools with real-time wireless error proofing. Utilizing an industry standard 2.4GHz WLAN (Wireless Local Area Network) interface in conjunction with the highest security encryption and authentication levels, plus a 512-cycle tool memory buffer, LiveWire™ ensures you will never compromise safety critical data transmissions.



***10 Tools.
1 Line
Controller.***



Safety Critical Solution Available.

New! Tethered Productivity!

Cleco LiveWire™ tools are now available with Vmax™, a tethered solution that drives continuous tool power and speed increases up to 83% without losing accuracy or durability. This leading innovation utilizes the same 10 tools to one line controller hardware solution with up to 33% cost savings over traditional systems. New Vmax™ technology auto-senses the applied power source and adjusts the maximum tool speed capability on the fly. LiveWire™ with Vmax™ combines the power you need with the most versatile wireless system available today.



Wireless Security

- WEP (Wired Equivalent Privacy)
 - 64/128 Bit Encryption HEX (RC4)
- WPA (Wireless Protected Access)/WPA2/802.11
 - 128 Bit TKIP/CCMP Encryption
 - 802.1x EAP Authentication
 - LEAP, PEAP, TTLS
 - GTC, MD5, OTP, PAP, CHAP, MSCHAP, MSCHAPv2, TTLS MSCHAPv2

Cordless Freedom or Tethered Speed...The Choice Is Yours.



V-max tether is 59% lighter and 46% smaller diameter than traditional cables.

All The Brains. All The Power.

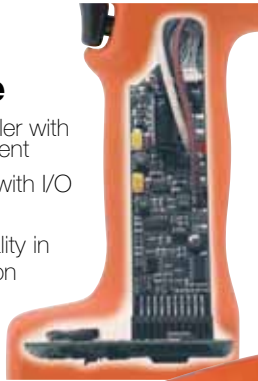
LiveWire™ offers precision torque, angle and speed control features for safety critical fastening in a lightweight, wireless design.

With up to 1,000 tightening operations per battery charge and quick charge cycles, your safety critical applications are assured to never run out of power.

LiveWire™ has been designed and tested to provide wireless connectivity across the harshest of machine-to-machine environments.

Electronic Intelligence

- On-board controller with power management
- Integrated servo with I/O signal handling
- Corded functionality in a cordless solution



Low vibration soft grip handle



High Resolution Resolver

- Rotor position detection
- Angle control and monitoring for Quality Assurance
- Full range speed control for operator ergonomics



Operator Status Display

- Configurable real-time 3 line display
- Green/Red/Yellow LCD for status
- 2 configurable application buttons
- Multiple LED status indicators

Low compression trigger

Battery Technology

- 26V, 1.6 Ah Li-Ion rechargeable battery
- High power-to-weight technology
- Up to 1,000 cycles per charge (hard joint)
- >900 charging cycles
- Fully charged in 1 hour



Power. And It's Wireless.

Solid metal construction for maximum durability

Integrated Bar Code Scanner (optional)

- Enables real-time bar code data collection
- Programmable bit for Auto Parameter Select
- Tool enable and disable configurability

Precision Gearing

Configurable LED Illumination



Reaction Transducer

- Accurate detection of torque via Strain Gage Bridge
- Torque traceability of safety critical joints

Brushless Motor

- Superior performance with full range speed control
- Low rotor inertia for high torque accuracy



Digital Audio Interface

- Operator audible alarm
- Programmable sound duration



Electric Nutrunners – Cordless Transducer Control

Right Angle Tools

Cleco®

Right Angle Series

Torque Range
5.5 - 70 Nm
4.1 - 51.6 Ft. Lbs.

Bolt Size
M5 - M10
#10 - 7/16"

- Brushless precision
- Resolver control
- Transducer accuracy
- On-board controller with power management
- Integrated servo with I/O signal handling

47BAXSB50AM3



Cordless Tools Nomenclature

47	B	A	X	X	X	XX	XXX	X
Motor 47	Power B-Battery				Voltage B – 26V/48V		Output Drive AM3 – 3/8" Sq.Dr. – Pin Retainer AH4 – 1/2" Sq.Dr. B Ball Retainer	Retainer
Tool Style A – Angle			Peripherals S – Barcode Scanner – – None			Max Torque (Nm) Under 60Nm, rounded up to the nearest 1Nm. Over 60Nm, rounded to the nearest 5Nm.		
Data Transmission – – None X – WLAN: WEP, WPA, WPA2, 802.1x								

Right Angle Model Number	Torque Range		Free Speed (RPM)		Weight* Less Battery		Output Drive Size	Length With Battery		Anglehead			
	Ft.Lbs.	Nm	26V	48V	lbs.	kg		in.	mm	Side to Center		Height	
										in.	mm	in.	mm
47BAXSB15AM3	4.1-11.1	5.5-15	538	983	4.3	1.95	3/8" SQ	21.79	553.5	0.6	15	1.6	40
47BAXSB21AM3	5.9-15.5	8-21	411	751	4.3	1.95	3/8" SQ	21.79	553.5	0.6	15	1.6	40
47BAXSB28AM3	7.4-20.7	10-28	291	532	4.3	1.95	3/8" SQ	21.79	553.5	0.6	15	1.6	40
47BAXSB35AM3	9.6-25.8	13-35	244	447	4.9	2.22	3/8" SQ	23.05	585.5	0.75	19	1.8	45
47BAXSB50AM3	13.3-36.9	18-50	182	293	5.0	2.27	3/8" SQ	23.39	594.0	0.75	19	1.8	45
47BAXSB70AH4	17.7-51.6	24-70	123	215	8.4	3.79	1/2" SQ	26.7	678.0	0.83	21	1.9	49

*Weight of 26V Li-Ion battery (1.04lbs./0.47kg).

General: All tools must be used with a approved Cooper Tools line controller.

Standard Equipment: Integrated infrared communications. Ball retainer optional.

Extra Equipment: See pages 18-19 for optional accessories.



17BPXSB13Q

Cleco®

Pistol Grip Series

Torque Range	Bolt Size
3.0 - 13 Nm	M5 - M6
2.2 - 9.6 Ft. Lbs.	#10 - 1/4"

- Brushless precision
- Resolver control
- Transducer accuracy
- On-board controller with power management
- Integrated servo with I/O signal handling



Cordless Tools Nomenclature

17	B	P	X	X	X	XX	Q
Motor 17	Power B-Battery				Voltage B – 26V/48V		Output Drive Q – Quick change
Tool Style P – Pistol		Peripherals S – Barcode Scanner - - None			Max Torque (Nm) Under 60Nm, rounded up to the nearest 1Nm.		
Data Transmission - – None X – WLAN: WEP, WPA, WPA2, 802.1x							

Pistol Grip Model Number	Torque Range		Free Speed (RPM)		Weight* Less Battery		Output Drive Size	Length With Battery		Side to Center	
	Ft.Lbs.	Nm	26V	48V	lbs.	kg		in.	mm	in.	mm
17BPXSB05Q	2.2-3.7	3-5	1639	2428	2.8	1.29	1/4" Hex	8.44	214.5	0.71	18
17BPXSB07Q	2.2-5.2	3-7	1161	1721	2.8	1.29	1/4" Hex	8.44	214.5	0.71	18
17BPXSB09Q	2.2-6.6	3-9	887	1314	2.8	1.29	1/4" Hex	8.44	214.5	0.71	18
17BPXSB13Q	2.2-9.6	3-13	629	931	2.8	1.29	1/4" Hex	8.44	214.5	0.71	18

*Weight of 26V Li-Ion battery (1.04lbs./0.47kg).

General: All tools must be used with a approved Cooper Tools line controller.

Standard Equipment: Integrated infrared communications.

Extra Equipment: See pages 18-19 for optional accessories.

Electric Nutrunners – Cordless Transducer Control

Tube Nut Tools

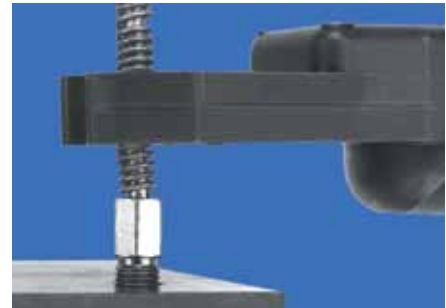
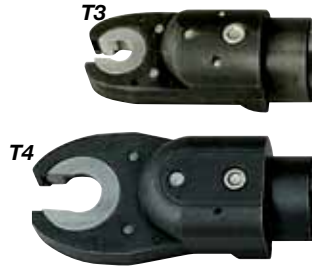
Cleco®

Tube Nut Series

Torque Range
10 - 40 Nm
7.4 - 29.5 Ft. Lbs.

Bolt Size
M6 - M10
1/4" - 3/8"

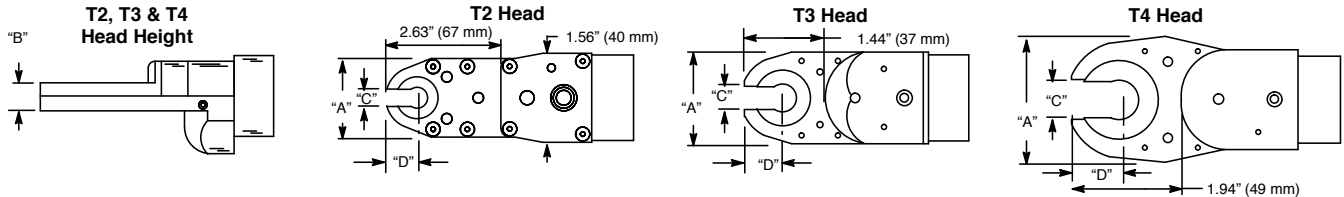
- Brushless precision
- Resolver control
- Transducer accuracy
- On-board controller with power management
- Integrated servo with I/O signal handling



The 47BT tube nut wrench alternates the direction of rotation each time the lever is actuated. When rotating in reverse, the socket will stop at the open position.



47BTXSB20T2



Tube Nut Tool Nomenclature

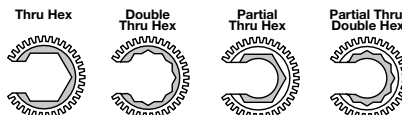
47	B	T	X	X	X	XX
Series 47	Power B-Battery					Battery B-26V-48V
Tool Style T - Tube Nut						Peripherals S - Barcode Scanner - - None
Data Transmission - - None X - WLAN: WEP, WPA, WPA2, 802.1x						Head Type T2 - 20 Nm T3 - 30 Nm T4 - 40 Nm

Socket Nomenclature

KSX	XX	XX	X
Head Type KS2 - T2 KS3 - T3 KS4 - T4			Output Type 0 - Partial Thru Hex 1 - Thru Hex 2 - Double Thru Hex 3 - Partial Thru Double Hex
			Extension Length 0 - Flush 2 - 1/4" 4 - 1/2" 6 - 3/4"
			Maximum Hex Socket Size MG, EE T2 Head Type MM, 3/4" T3 Head Type MU, 1 1/16" T4 Head Type 00, ## (Specials) All Head Types

Socket Sizes

EA - 1/4"	M5 - 5mm	MH - 14mm	MP - 22mm
EC - 3/8	M6 - 6mm	MI - 15mm	MQ - 23mm
EE - 1/2	MA - 7mm	MJ - 16mm (5/8")	MR - 24mm (15/16")
EF - 9/16	MB - 8mm (5/16)	MK - 17mm	MS - 25mm
EH - 11/16	MD - 10mm	ML - 18mm	MT - 26mm
EJ - 13/16	ME - 11mm (7/16)	MM - 19mm (3/4")	MU - 27mm (1 1/16")
EK - 7/8	MF - 12mm	MN - 20mm	
EM - 1	MG - 13mm	MO - 21mm	



Tube Nut	Torque Range		Free Speed (RPM)		Weight* Less Battery		Max. Drive Size	Length w/Battery	Head			
	Ft.Lbs.	Nm	26V	48V	lbs.	kg			A Width	B Blade Ht.	C Opening	D End/Cntr.
47BTXSB20T2	7.4-14.6	10-20	260	455	5.4	2.4	1/2"	23.6 600	1.42 36	0.55 14	0.28 7	0.53 13
47BTXSB30T3	11.1-22.1	15-30	188	329	5.5	2.5	3/4"	23.3 592	1.65 42	0.59 15	0.475 12	0.73 19
47BTXSB40T4	14.8-29.5	20-40	141	247	6.3	2.8	1 1/16"	22.6 575	2.36 60	0.59 15	0.675 17	0.93 24

*Weight of 26V Li-Ion battery (1.04lbs./0.47kg).

General: All tools must be used with a approved Cooper Tools line controller.

Standard Equipment: Integrated infrared communications.

Extra Equipment: See pages 18-19 for optional accessories.

To order individual sockets, use a "KS" prefix. (i.e. KS2EA01 for a T2, 1/4", flush, thru hex socket.)

Cleco®

Crowfoot Series

Torque Range
10.5 - 30 Nm
7.7 - 22.1 Ft. Lbs.

Bolt Size
M6 - M10
1/4" - 3/8"

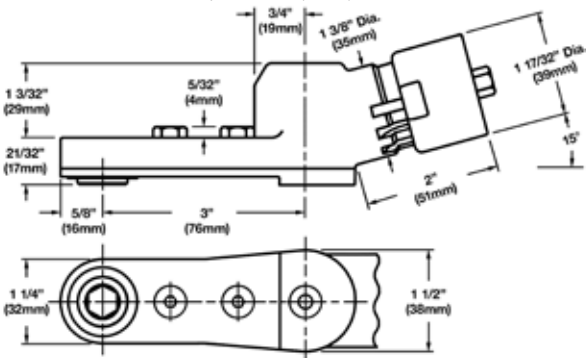
- Brushless precision
- Resolver control
- Transducer accuracy
- On-board controller with power management
- Integrated servo with I/O signal handling



47BCXSB30C1

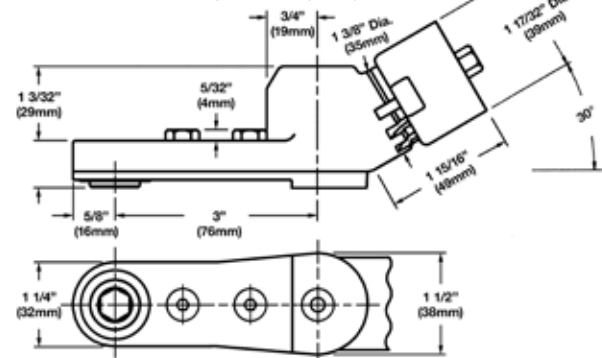
C1 – 15° Head (Part No. 301071)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



C3 – 30° Head (Part No. 301072)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



Crowfoot Tool Nomenclature

47 B C X X B XX CS XX X X

Series
47

Battery
B – 26V-48V

Tool Style
C – Crowfoot

Peripherals
-- None
S – Barcode scanner

Head Type
C1 – 15°
C3 – 30°

Socket Nomenclature

Socket Type
CS – Crowfoot

Output Type
1 – Thru Hex

Extension Length
0 – Flush 4 – 1/2" 6 – 3/4"

Socket Size

EA – 1/4" MA – 7mm MF – 12mm
EC – 3/8 MB – 8mm (5/16) MG – 13mm
EE – 1/2 MC – 9mm MH – 14mm
EF – 9/16 MD – 10mm MI – 15mm
ME – 11mm (7/16)

Data Transmission

-- None
X – WLAN: WEP, WPA, WPA2, 802.1x

Crowfoot	Torque Range		Free Speed (RPM)		Weight* Less Battery		Max. Drive Size	Length w/Battery	
	Model Number	ft. lbs.	Nm	26V	48V	lbs.		kg	in.
47BCXSB30C1	7.7-22.1	10.5-30	186	326	7.0	3.2	1/2"	26.26	667
47BCXSB30C3	7.7-22.1	10.5-30	186	326	7.0	3.2	3/4"	25.98	660

*Weight of 26V Li-Ion battery (1.04lbs./0.47kg).

General: All tools must be used with a approved Cooper Tools line controller.

Standard Equipment: One 26V Li-Ion battery. Integrated infrared communications.

Extra Equipment: See pages 18-19 for optional accessories.

To order individual sockets, use a "CS" prefix before the required socket. (i.e. CSEE01 for a 1/2", flush, thru hex socket.)

Cordless Tool Controllers & Power Module

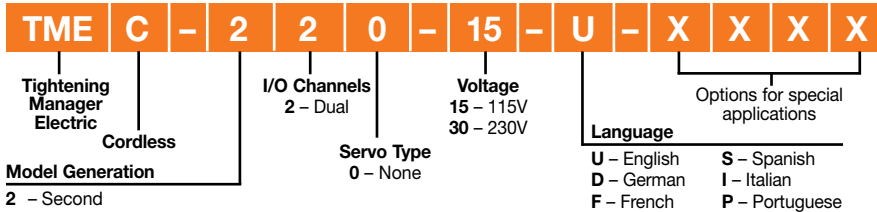
TMEC & Power Module

TMEC Series Tightening Manager Controller

- Multiple channel configurations
- Configurable 24V I/O
- Ethernet TCP/IP standard
- Serial & USB ports standard
- Local storage 50,000 cycles
- High resolution color LCD
- Full programming keypad



TMEC Nomenclature



Controllers

Model Number*		Features	Weight		Width		Height		Depth	
115VAC	230VAC		lbs.	kg	in.	mm	in.	mm	in.	mm
TMEC-220-15-*	TMEC-220-30-*	1-10 channel controller, Ethernet, I/O	13	5.9	11	279.9	17	431.8	5	12.7
T3M-50-N-11-U-DLW		1-10 channel controller, Ethernet, Devicenet, I/O	45	20.4	19	482.6	15	381.0	13	330.2

*Languages offered: D-German, P-Portuguese, S-Spanish, U-English, F-French, I-Italian.
Note: See page 78 for T3M specifications.

LiveWire Power Module

- Up to 83% faster!
- Auto sensing input - (85-275 VAC)
- Power & status LEDs
- Electronic circuit protection
- Durable metal housing
- Light weight - 6.8lbs. (3.1kg)



Power Module

Model No.	Weight		Width		Length		Depth	
	lbs.	kg	in.	mm	in.	mm	in.	mm
961350	1.5	6.8	9.4	240	4.7	120	5.9	150

2M power cable included.

Speed Improvement Comparison

Series	Model Number	Free Speed (RPM)		% Increase
		26V Battery	48V Power Module	
Pistol	17BPXSB05Q	1639	2428	48%
	17BPXSB07Q	1161	1721	48%
	17BPXSB09Q	887	1314	48%
	17BPXSB13Q	629	931	48%
Right Angle	47BAXSB15AM3	538	983	83%
	47BAXSB21AM3	411	751	83%
	47BAXSB28AM3	291	532	83%
	47BAXSB35AM3	244	447	83%
	47BAXSB50AM3	182	293	75%
	47BAXSB70AH4	123	215	75%



Cordless Tools & Controllers

Accessories



Vmax Tethers

Part Number	
Tool	Extension
961341-***	961342-***

***Length: 030=3m, 060=6m, 080=8m, 100=10m
Note: Maximum 20M length



TMEB-COM Software

Part Number	Description
TMEB-COM-V2.03	Programming software

115VAC Ethernet Switches

Part No.	Ports			Approx. Dimensions		Approx. Wt.	
	Total	In	Out	in.	mm	lbs.	kg
543444-8	8	1	7	6.5x4.5x1.5	160x110x35	0.6	0.3
543444-16	16	1	15	7x6x2.5	185x150x65	1.1	0.5
543444-24	24	1	23	10.5x7x2	270x170x50	3.0	1.3

Ethernet Cables

Part Number	Description	Length	
		Feet	Meters
543446-7	Ethernet Crossover Cable	7	2
543445-7	Ethernet Patch Cable	7	2
543445-50	Ethernet Patch Cable	50	15
543445-100	Ethernet Patch Cable	100	30

Tool Holders

Part No.	Description
935144	Pistol tool holder w/infrared interface
935396	Pistol tool holder
935290	Angle tool holder w/infrared interface
935395	Angle tool holder
935170	Infrared interface cable
935998	70 Nm RA, Crowfoot & Tubenut tool holder
935999	70 Nm RA, Crowfoot & Tubenut tool holder w/infrared interface



Tool Holder Extension Cables

Part No.	Description
935154	9' (3m) extension cable
935155	19.5' (6m) extension cable
935157	33' (10m) extension cable

Phoenix Connectors

Part No.	Description
542892	Input Phoenix connector
542893	Output Phoenix connector
939348	Hood/strain TME I/O cable relief

Accessory Cables

Part No.	Description	Length	
		ft.	m
542985-3	Controller to input acc.	3	1
542985-9	Controller to input acc.	9	3
542985-25	Controller to input acc.	25	7.5
542985-50	Controller to input acc.	50	15



WLAN Access Point

2.4 GHZ NA No.	Description
543995	WLAN Access Point

Radio Range: 30-50 meters
IEEE 802.11b/g
Max. Tools: 10



Torque Selector Switches

Part No.	Description
542977-8	8 Select
542977-16	16 Select
542977-32	32 Select
542977-64	64 Select



Socket Trays

Part No.	Description
960645	Four position w/10m cable
960646	Eight position w/10m cable

Maximum socket diameter 1.125".



Replacement Inserts

Part Number
S970716

For use with 960645 & 960646 socket trays.

Socket Trays

Part No.	Description
542978-4	Four position
542978-8	Eight position

Notes: Up to 16 linked 4 position trays maximum.
Minimum socket O.D. 1".
Maximum O.D. 2.25".



Socket Posts

For use with 542978-4 & 542978-8 socket trays.

Part Number	Socket Post Size
99249181	.550/.540
99249169	1.062/1.052
99249165	.590/.580
99249164	.945/.935
99249163	.827/.817
99249162	.709/.699
99249161	.625/.615
99249160	.437/.432
99249159	.812/.802
99249158	.687/.677
99249157	.875/.865
99249156	1.000/.990
99249148	1.125/1.115
99249147	.938/.928
99249104	.750/.740
99249103	.669/.659
99249102	.562/.552
99249101	.500/.490

Note: Select socket post size within tolerance of socket used.

Lockout Washer

For use with 542978-4 & 542978-8 socket trays.

Part Number	Note
99248150	Vacant position lockout washer

Battery

Part No.	Description
935377	26V Li-Ion battery

(1.04lbs./0.47kg)



Battery Charger

115V/220V Part No.	Description
935391	26V battery charger

- Charge time: 1 hr.
- 26V Li-Ion only
- Power/Charge/Error LED indicators

Pistol Dead Handle

Part No.	Description
301837	Reversible handle mount



Tool Suspension Bail

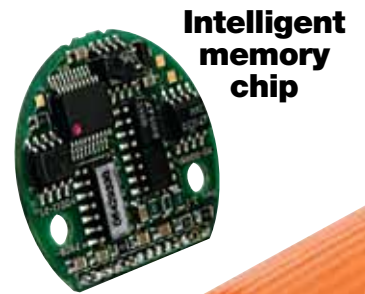
Part No.	Description
541715-2	Angle tool swivel



Durability. Speed.

Cleco 18-48 series tools are driven by a new maintenance-free brushless motor with up to 50% more speed and productivity. This new motor technology coupled with our high-resolution resolver offers full range control for safety critical joints. The 18-48 series tools with industry proven gear trains create outstanding durable production performance.

The Cleco 18-48 series electric tools provide a unique modular assembly design for ease of repair. The on-board intelligent memory chip records tool set-up values and counts cycles for maintenance scheduling to prevent costly production downtime.



Intelligent memory chip

Highly visible operator feedback LEDs

Error free connector



Matrix

New low compression switch



New handle for operator comfort



Resolver technology for full range speed control

Ergonomics.

Optimal tool weight and balance

Durable industry proven gear train

Reaction transducer for consistent torque repeatability

Adjustable angle head allows flexible orientation

New low inertia brushless motor for superior fastening control

Standard tools required for service



Cleco®

Electric Nutrunners – Corded Transducer Control

Right Angle Tools

Cleco®

Right Angle Series

Torque Range
2 - 230 Nm
1.5 - 169.6 Ft. Lbs.

Bolt Size
M5 - M16
#10 - 5/8"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



XX	E	A	XXX	XXX	X
Motor 18, 48	Power E-Electric				Retainer - Pin retainer B Ball retainer
Tool Style A - Right Angle			Output Drive		
Max Output Torque (Nm) Under 60 Nm, rounded up to the nearest 1 Nm. Over 60 Nm, rounded to the nearest 5 Nm.			AL2 - 1/4" Sq.Dr. AM4 - 1/2" Sq.Dr. AL3 - 3/8" Sq.Dr. AH4 - 1/2" Sq.Dr. AM3 - 3/8" Sq.Dr. MH4 - 1/2" Sq.Dr. AX6 - 3/4" Sq.Dr.		

Right Angle Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Anglehead			
	ft. lbs.	Nm		lbs.	kg		in.	mm	Side to Center		Height	
									in.	mm	in.	mm
18EA08AL2	1.5-5.9	2-8	3000	2.9	1.3	1/4"	13.6	345	0.51	13	1.4	36
18EA15AM3	3.0-11.1	4-15	1300	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41
18EA22AM3	3.7-16.2	5-22	920	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41
18EA28AM3	4.4-20.7	6-28	700	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41
48EA15AL3	2.2-11.1	3-15	2855	3.8	1.7	3/8"	15.7	398	0.59	15	1.6	41
48EA28AL3	4.4-20.7	6-28	1300	4.1	1.9	3/8"	16.2	410	0.59	15	1.6	41
48EA41AM3	6.6-30.2	9-41	1090	4.3	2.0	3/8"	17.3	440	0.75	19	1.9	48
48EA58AM3	8.9-42.8	12-58	770	4.3	2.0	3/8"	17.3	440	0.75	19	1.9	48
48EA58AM4	8.9-42.8	12-58	770	4.3	2.0	1/2"	17.3	440	0.75	19	1.9	48
48EA90AH4	13.3-64.2	18-87	515	6.6	3.0	1/2"	18.5	470	0.81	21	2.3	58
48EA105AH4	15.5-76.7	21-104	340	6.6	3.0	1/2"	18.5	470	0.81	21	2.3	58
48EA135MH4	19.9-98.1	27-133	265	7.3	3.3	1/2"	19.1	485	0.94	24	2.4	61
48EA175AX6	26.6-129.8	36-176	190	10.2	4.6	3/4"	21.6	549	1.06	27	2.7	69
48EA230AX6	33.9-169.6	46-230	145	10.2	4.6	3/4"	21.6	549	1.06	27	2.7	69

*Weights are without tool cable and reaction bar.

†Note: Limited anglehead durability at rated torque.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector. Ball retainer optional.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX,

Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)



67EA235AL6

Cleco®

Right Angle Series

Torque Range
46 - 2000 Nm
34 - 147.5 Ft. Lbs.

Bolt Size
M18 - M36
3/4" - 1 1/2"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence

XX	E	A	XXXX	XXX	X
Motor 67	Power E-Electric				Retainer - Pin retainer B Ball retainer
Tool Style A - Right Angle			Output Drive AL6 - 3/4" Sq.Dr. AM6 - 3/4" Sq.Dr. ML6 - 3/4" Sq.Dr. AH8 - 1" Sq.Dr.		
Max Output Torque (Nm) Under 60 Nm, rounded up to the nearest 1 Nm. Over 60 Nm, rounded to the nearest 5 Nm.					

Right Angle Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Anglehead			
	ft. lbs.	Nm		lbs.	kg		in.	mm	Side to Center		Height	
									in.	mm	in.	mm
67EA235AL6	33.9-169.6	46-230	135	12.9	5.9	3/4"	25.8	655	1.03	26	2.3	58
67EA255AL6	40.6-188.1	55-255	115	12.9	5.9	3/4"	25.8	655	1.03	26	2.3	58
67EA310ML6	44-229	60-310	100	20.2	9.2	3/4"	29.1	739	1.06	27	2.55	65
67EA340AM6	51.6-247.1	70-335	90	21.0	9.5	3/4"	31.6	803	1.38	35	3.1	79
67EA460AM6	70.1-339.3	95-460	66	21.0	9.5	3/4"	31.6	803	1.38	35	3.1	79
67EA570AM6 [‡]	84.8-420.4	115-570	53	21.0	9.5	3/4"	31.6	803	1.38	35	3.1	79
67EA730AM6 [‡]	110.6-538.4	150-730	46	21.0	9.5	3/4"	31.6	803	1.38	35	3.1	79
67EA860AH8	129.1-634.3	175-860	33	22.7	10.3	1"	25.3	643	1.50	38	9.32	237
67EA1035AH8	154.9-763.3	210-1035	25	23.0	10.5	1"	26.3	668	1.50	38	9.32	237
67EA1340AH8	199.1-988.3	270-1340	20	23.0	10.5	1"	26.3	668	1.50	38	9.32	237
67EA1700AH8	250.8-1253.8	340-1700	16	23.0	10.5	1"	26.3	668	1.50	38	9.32	237
67EA2010AH8	295.0-1475.0	400-2000	13	23.0	10.5	1"	26.3	668	1.50	38	9.32	237

*Weights are without tool cable and reaction bar.

[‡]Note: Limited anglehead durability at rated torque.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX,

Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)

Electric Nutrunners – Coded Transducer Control

Inline Non-Floating Spindle Tools

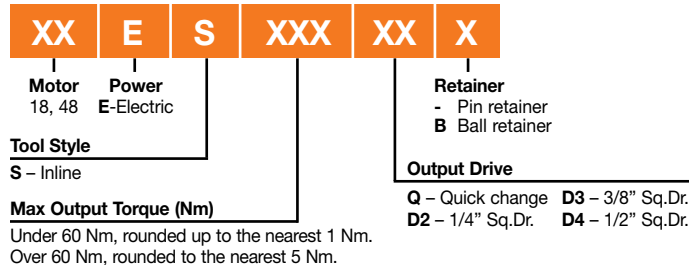
Cleco®

Inline Non-Floating Series

Torque Range
2 - 150 Nm
1.5 - 113 Ft. Lbs.

Bolt Size
M5 - M14
#10 - 5/8"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



Inline Non-Floating Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18ES06Q	1.5-4.4	2-6	4000	2.5	1.1	1/4" Hex	12.3	312	0.91	23
18ES06D2	1.5-4.4	2-6	4000	2.5	1.1	1/4"	11.8	300	0.91	23
18ES12Q	2.2-8.9	3-12	1820	2.7	1.2	1/4" Hex	13.0	330	0.91	23
18ES12D3	2.2-8.9	3-12	1820	2.7	1.2	3/8"	12.4	315	0.91	23
18ES17Q	3.0-12.5	4-17	1290	2.7	1.2	1/4" Hex	13.0	330	0.91	23
18ES17D3	3.0-12.5	4-17	1290	2.7	1.2	3/8"	12.4	315	0.91	23
18ES22D3	3.7-16.2	5-22	985	2.7	1.2	3/8"	12.4	315	0.91	23
18ES31D3	5.2-22.9	7-31	695	2.7	1.2	3/8"	12.4	315	0.91	23
48ES12Q	2.2-8.9	3-12	4000	3.0	1.4	1/4" Hex	13.5	343	0.91	23
48ES12D2	2.2-8.9	3-12	4000	3.0	1.4	1/4"	13.0	330	0.91	23
48ES25D3	4.4-18.4	6-25	1820	3.2	1.5	3/8"	13.6	345	0.91	23
48ES36D3	5.9-26.6	8-36	1290	3.2	1.5	3/8"	13.6	345	0.91	23
48ES48D3	7.4-35.4	10-48	985	3.3	1.5	3/8"	13.8	351	0.91	23
48ES65D4	9.6-47.9	13-65	750	5.3	2.4	1/2"	16.6	420	1.13	29
48ES90D4	14.0-66.4	19-90	510	5.6	2.5	1/2"	17.1	435	1.13	29
48ES125D4	19.2-92.2	26-125	360	5.6	2.5	1/2"	17.1	435	1.13	29
48ES150D4	22.9-110.6	31-150	240	5.6	2.5	1/2"	17.1	435	1.13	29

*Weights are without tool cable.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector; Dead Handle is included with 18ES12Q and 18ES12D3. Ball retainer optional.

Reaction bar is included with inline tools with output torques of 17-150 NM.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.

Mounting Plates: 543231 - (all with exception of listed below)

543235 - 18ES06Q, 48ES12Q

49087108 - 48ES65D4, 48ES90D4, 48ES125D4, & 48ES150D4.

See page 41 for mounting plate dimensions.

Additional Accessories: (Pages 39-41)

Electric Nutrunners – Coded Transducer Control

Inline Non-Floating Spindle Tools



Cleco®

Inline Non-Floating Series

Torque Range
13 - 4050 Nm
10 - 2985 Ft. Lbs.

Bolt Size
M10 - M42
7/16" - 1 3/4"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



67ES135D4

XX	E	S	XXXX	XXX	X
Motor 67	Power E-Electric				Retainer - Pin retainer B Ball retainer
Tool Style S - Inline			Output Drive D4 - 1/2" Sq.Dr. D8 - 1" Sq.Dr. D6 - 3/4" Sq.Dr. D12 - 1 1/2" Sq.Dr.		
Max Output Torque (Nm) Under 60 Nm, rounded up to the nearest 1 Nm. Over 60 Nm, rounded to the nearest 5 Nm.					

Inline Non-Floating Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
67ES65D4	10-47	13-64	535	10.3	4.7	1/2"	21.0	533	1.31	33
67ES105D4	15-77	21-104	330	10.3	4.7	1/2"	21.0	533	1.31	33
67ES135D4	20-100	27-135	245	10.3	4.7	1/2"	21.0	533	1.31	33
67ES190D6	28-140	38-190	165	11.6	5.3	3/4"	20.5	521	1.31	33
67ES285D6	42-210	57-285	115	11.6	5.3	3/4"	20.5	521	1.31	33
67ES385D6	57-285	77-386	83	11.6	5.3	3/4"	20.5	521	1.31	33
67ES475D6	70-350	95-475	67	12.0	5.4	3/4"	20.9	531	1.31	33
67ES610D6	90-450	122-610	50	12.0	5.4	3/4"	20.9	531	1.31	33
67ES850D8	125-625	170-848	33	17.0	7.7	1"	23.8	605	1.50	38
67ES1050D8	155-775	210-1050	27	17.0	7.7	1"	23.8	605	1.50	38
67ES1670D8	246-1230	334-1668	17	17.0	7.7	1"	23.8	605	1.50	38
67ES2060D8	304-1520	412-2060	14	17.0	7.7	1"	23.8	605	1.50	38
67ES4050D12	597-2985	810-4050	6	45.2	20.5	1 1/2"	24.5	622	2.35	60

*Weights are without tool cable or reaction bar if so equipped.
General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector; Reaction bar; Slave drive reaction bar on 67ES4050D2.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.
Additional Accessories: (Pages 39-41)

Electric Nutrunners – Coded Transducer Control

Pistol Grip Tools

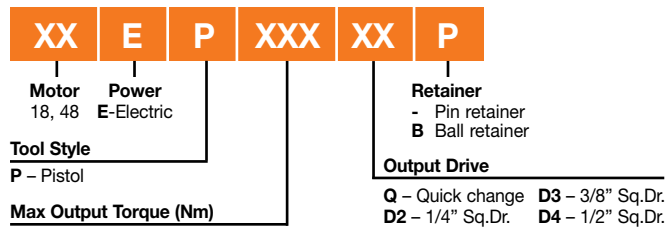
Cleco®

Pistol Grip Series

Torque Range
2 - 150 Nm
1.5 - 113 Ft. Lbs.

Bolt Size
M5 - M14
#10 - 5/8"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



Under 60 Nm, rounded up to the nearest 1 Nm.
Over 60 Nm, rounded to the nearest 5 Nm.

Pistol Grip Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18EP06Q	1.5-4.4	2-6	4000	2.2	1.0	1/4" Hex	7.0	178	0.84	21
18EP06D2	1.5-4.4	2-6	4000	2.2	1.0	1/4"	6.5	165	0.84	21
18EP12Q	2.2-8.9	3-12	1820	2.4	1.1	1/4" Hex	7.7	196	0.84	21
18EP12D3	2.2-8.9	3-12	1820	2.4	1.1	3/8"	7.2	183	0.84	21
18EP17Q	3.0-12.5	4-17	1290	2.4	1.1	1/4" Hex	7.7	196	0.84	21
18EP17D3	3.0-12.5	4-17	1290	2.4	1.1	3/8"	7.2	183	0.84	21
18EP22D3	3.7-16.2	5-22	985	2.4	1.1	3/8"	7.2	183	0.84	21
18EP31D3	5.2-22.9	7-31	695	2.4	1.1	3/8"	7.2	183	0.84	21
48EP12Q	2.2-8.9	3-12	4000	2.7	1.2	1/4" Hex	8.2	208	0.84	21
48EP12D2	2.2-8.9	3-12	4000	2.7	1.2	1/4"	7.7	196	0.84	21
48EP25D3	3.7-18.4	5-25	1820	2.9	1.3	3/8"	8.4	213	0.84	21
48EP36D3	5.9-26.6	8-36	1290	2.9	1.3	3/8"	8.4	213	0.84	21
48EP48D3	7.4-35.4	10-48	985	3.0	1.4	3/8"	8.6	218	0.84	21
48EP65D4	9.6-47.9	13-65	750	5.0	2.3	1/2"	11.4	290	1.1	28
48EP90D4	14.0-66.4	19-90	510	5.3	2.4	1/2"	12.0	305	1.1	28
48EP125D4	19.2-92.2	26-125	360	5.3	2.4	1/2"	12.0	305	1.1	28
48EP150D4	22.9-110.6	31-150	240	5.3	2.4	1/2"	12.0	305	0.9	23

*Weights are without tool cable or suspension bail.

General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector; Suspension Bail; Dead Handle is included with 18EP12Q & 18EP12D3. Reaction bar is included with pistol tools with output torques of 17-150 Nm. Ball retainer optional.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.
Additional Accessories: (Pages 39-41)

Electric Nutrunners – Corded Transducer Control

Push-to-Start Pistol Grip/Inline Tools



18EP06QP

Cleco®

Push-to-Start Series

Torque Range
2 - 12 Nm
1.5 - 8.9 Ft. Lbs.

Bolt Size
M5 - M6
#10 - 1/4"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



18ES06QP

XX	E	X	XX	XX	P
Motor 18	Power E-Electric				Push-to-Start
Tool Style					Output Drive
P - Pistol S - Inline					Q - Quick change D3 - 3/8" Sq.Dr.
Max Output Torque (Nm)					
Under 60 Nm, rounded up to the nearest 1 Nm.					

Push-to-Start Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18EP06QP	1.5-4.4	2-6	4000	2.66	1.19	1/4" Hex	9.35	238	0.84	21
18EP06D3P	2.2-8.9	3-12	4000	2.66	1.19	3/8"	8.8	224	0.84	21
18EP12QP	2.2-8.9	3-12	1820	2.83	1.27	1/4" Hex	9.35	196	0.84	21
18EP12D3P	2.2-8.9	3-12	1820	2.83	1.27	3/8"	8.8	224	0.84	21
18ES06QP	1.5-4.4	2-6	4000	2.93	1.31	1/4" Hex	14.75	375	0.91	23
18ES06D3P	2.2-8.9	3-12	4000	2.93	1.31	3/8"	14.20	360	0.91	23
18ES12QP	2.2-8.9	3-12	1820	3.10	1.40	1/4" Hex	14.75	375	0.91	23
18ES12D3P	2.2-8.9	3-12	1820	3.10	1.40	3/8"	14.20	360	0.91	23

*Weights are without tool cable or suspension bail.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector; Suspension Bail (pistol only); Dead Handle (301857) is included with 18CPE12Q & 18CPE12D3.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)

Electric Nutrunners – Coded Transducer Control

Inline Floating Spindle Tools

Cleco®

Inline Floating Spindle Series

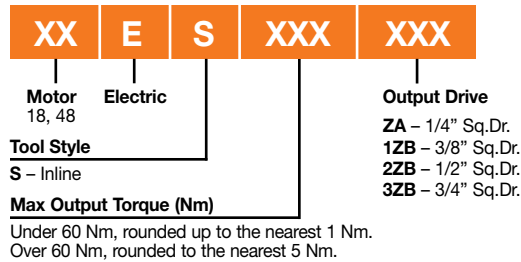
Torque Range
2 - 248 Nm
1.5 - 182.9 Ft. Lbs.

Bolt Size
M5 - M16
#10 - 5/8"

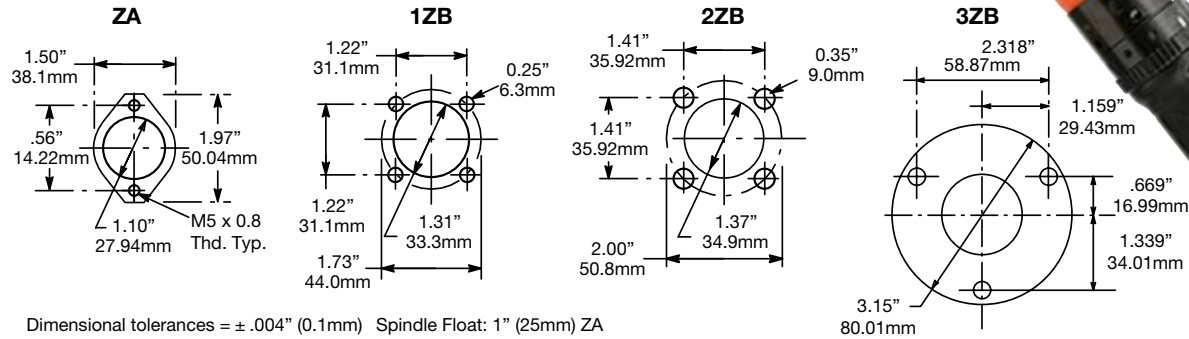
- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



48ES12ZA



Base Plate Mounting Dimensions



Inline Floating Spindle Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18ES06ZA	1.5-4.4	2-6	4000	3.0	1.4	1/4	15.5	394	0.91	23
18ES12ZA	2.2-8.9	3-12	1820	3.2	1.5	1/4	16.0	406	0.91	23
18ES17ZA	3.0-12.5	4-17	1290	3.2	1.5	1/4	16.0	406	0.91	23
48ES12ZA	2.2-8.9	3-12	4000	3.4	1.5	1/4	16.7	425	0.91	23
48ES271ZB	5.9-19.9	8-27	1820	5.8	2.6	3/8	22.0	559	0.92	23
48ES361ZB	5.2-26.6	7-36	1290	5.8	2.6	3/8	22.0	559	0.92	23
48ES602ZB	8.1-42.0	11-57	855	8.4	3.8	1/2	24.4	620	1.10	28
48ES702ZB	10.3-50.2	14-68	570	8.4	3.8	1/2	24.4	620	1.10	28
48ES802ZB	12.5-60.5	17-82	450	9.6	4.4	1/2	26.7	678	1.10	31
48ES1152ZB	18.4-84.8	25-115	320	9.6	4.4	1/2	26.7	678	1.10	31
48ES1502ZB	22.9-110.6	31-150	245	9.6	4.4	1/2	26.7	678	1.10	31
48ES1653ZB	24.3-121.7	33-165	220	14.6	6.6	3/4	28.6	726	1.57	40
48ES2503ZB	36.8-182.9	50-248	145	14.6	6.6	3/4	28.6	726	1.57	40

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector. Tools have thru hole output.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)

Cleco®

Inline Floating Spindle Series

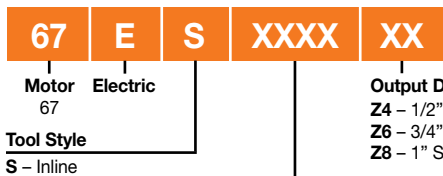
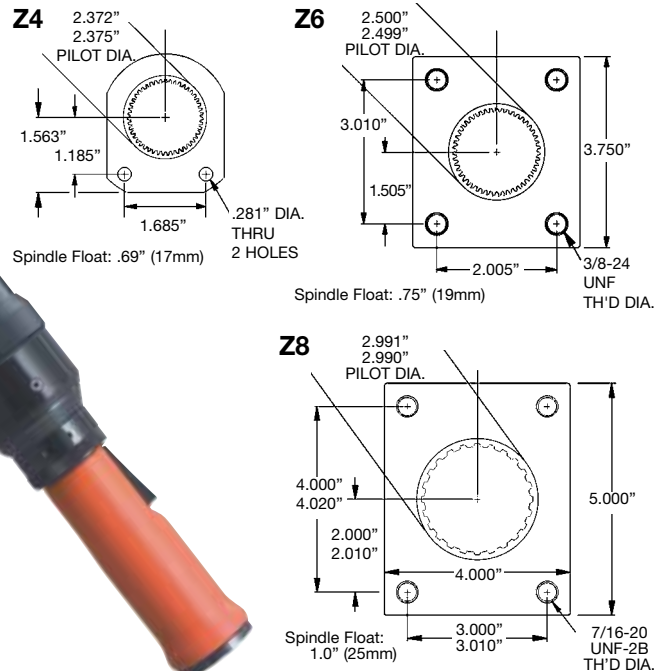
Torque Range	Bolt Size
13 - 2060 Nm	M6 - M36
10 - 1520 Ft. Lbs.	1/4" - 1 1/2"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



67ES2060Z8

67ES Base Plate Mounting Dimensions



Max Output Torque (Nm)

Under 60 Nm, rounded up to the nearest 1 Nm.
 Over 60 Nm, rounded to the nearest 5 Nm.

Inline Floating Spindle	Torque Range		Max. Speed	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
67ES65BZ4	10-47	13-64	535	10.8	4.9	1/2	21.0	533	1.31	33
67ES105BZ4	15-77	21-104	330	10.8	4.9	1/2	21.0	533	1.31	33
67ES135BZ4	20-100	27-135	245	10.8	4.9	1/2	21.0	533	1.31	33
67ES190Z6	28-140	38-190	165	15.6	7.1	3/4	22.0	559	1.31	33
67ES285Z6	42-210	57-285	115	15.6	7.1	3/4	22.0	559	1.31	33
67ES385Z6	57-285	77-386	83	15.6	7.1	3/4	22.0	559	1.31	33
67ES475Z6	70-350	95-475	67	16.0	7.3	3/4	22.4	569	1.31	33
67ES610Z6	90-450	122-610	50	16.0	7.3	3/4	22.4	569	1.31	33
67ES850Z8	125-625	170-848	33	20.0	9.1	1	23.8	605	1.50	38
67ES1050Z8	155-775	210-1050	27	20.0	9.1	1	23.8	605	1.50	38
67ES1670Z8	246-1230	334-1668	17	20.0	9.1	1	23.8	605	1.50	38
67ES2060Z8	304-1520	412-2060	14	20.0	9.1	1	23.8	605	1.50	38

*Weights are without tool cable or reaction bar if so equipped.
General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector; 67ES series – Mounting plate.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.
Additional Accessories: (Pages 39-41)

Electric Nutrunners – Corded Transducer Control

Hold & Drive Tools

Cleco®

Hold & Drive Series

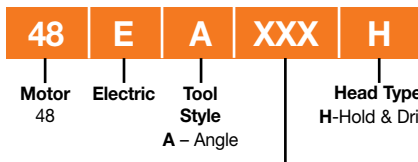
Torque Range
 11 - 227 Nm
 8.1 - 167.4 Ft. Lbs.

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



48EA115H

Hold & Drive Tool Nomenclature

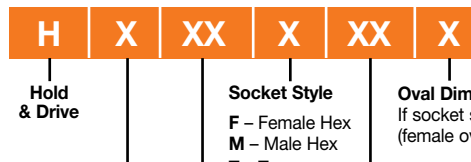


Max Output Torque
 <60 Nm, rounded up to the nearest 1 Nm.
 >60 Nm, rounded to the nearest 5 Nm.

Drive Socket Sizes (surface drive)

EH - 11/16	MG - 13mm	MM - 19mm (3/4")	MS - 25mm
EJ - 13/16	MH - 14mm	MN - 20mm	MT - 26mm
EK - 7/8	MI - 15mm	MO - 21mm	MU - 27mm (1 1/16")
EM - 1	MJ - 16mm (5/8")	MP - 22mm	MX - 30mm (1 3/16")
EO - 1 1/8	MK - 17mm	MQ - 23mm	MZ - 32mm (1 1/4")
	ML - 18mm	MR - 24mm (15/16")	

Socket Nomenclature



Retainer Shaft

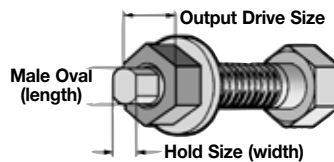
- 3 - 3 1/2"
- 4 - 4"
- 5 - 5 3/8"
- 6 - 5 7/8"
- 9 - 9 1/2"

- Socket Style**
 F - Female Hex
 M - Male Hex
 T - Torx
 O - Female Oval

Oval Dim. (length)
 If socket style = 0 (female oval)

Hold Socket (width across flats)

- | | |
|-------------------------|--------------------------|
| EA - 1/4 | ME - 11mm (7/16") |
| EC - 3/8 | MF - 12mm |
| M5 - 5mm | 15 - T15 |
| M6 - 6mm | 20 - T20 |
| MA - 7mm | 25 - T25 |
| MB - 8mm (5/16") | 30 - T30 |
| MC - 9mm | 40 - T40 |
| MD - 10mm | 45 - T45 |
| | 50 - T50 |



Hold & Drive Model Number	Torque Range		Free Speed RPM	Length		Weight*		Head Height		Side to Center	
	Ft.Lbs.	Nm		in.	mm	lbs.	kg	in.	mm	in.	mm
48EA53H	8.1 - 39.1	11 - 53	850	20.2	512	7.9	3.60	2.40	61	1.06	27
48EA75H	11.1 - 54.6	15 - 74	600	20.2	512	7.9	4.03	2.40	61	1.06	27
48EA110H	17.0 - 82.6	23 - 112	400	20.2	512	8.9	4.03	2.40	61	1.06	27
48EA135H	20.7 - 98.8	28 - 134	270	20.6	522	8.9	4.03	2.40	61	1.06	27
48EA230H	34.7 - 167.4	47 - 227	150	22.2	563	10.6	4.79	2.40	61	1.06	27

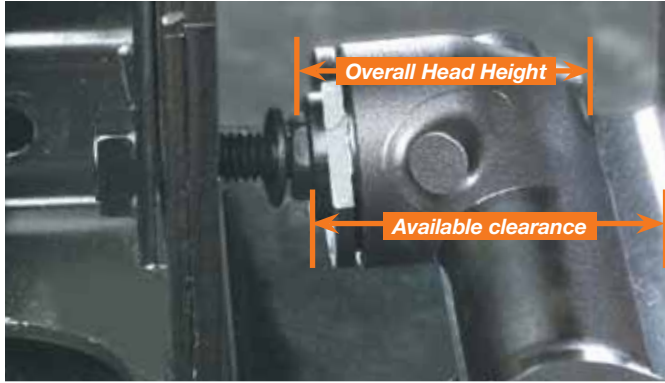
*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector. Retraction 1" standard for hold bit.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)



Flush socket tools have plenty of clearance to fit low clearance applications. Electric flush socket tools tighten with much higher accuracy than tools with crowfoot attachment.

Cleco®

Flush Socket Series

Torque Range
4.9 - 230 Nm
3.6 - 169.6 Ft. Lbs.

Bolt Size
M8 - M21
1/2" - 1 3/16"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



Flush Socket Tool Nomenclature

XX **E** **A** **XXX** **F**

Motor
18
48

Electric

Tool Style
A - Right Angle

Flush Socket

Max Output Torque

F1 16, 23, 30 Nm **F3** 53, 75, 110 Nm
F2 37, 52 Nm **F4** 135, 230 Nm
<60 Nm, rounded up to the nearest 1 Nm. >60 Nm, rounded to the nearest 5 Nm.

Head Type

F1 Head 8-15mm socket capacity
F2 Head 10-15mm socket capacity
F3 Head 13-21mm socket capacity
F4 Head 13-21mm socket capacity

Socket Nomenclature

FX **XX** **X** **X**

Output Type
0-Standard 1-Fast Lead 2-Magnetic

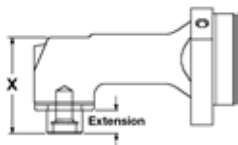
Extension Length

0 - Flush 4 - 1/2" 8 - 1"
2 - 1/4" 6 - 3/4"

Socket Size

EC - 3/8 **MB** - 8mm (5/16) **MJ** - 16mm (5/8")
EE - 1/2 **MD** - 10mm **MK** - 17mm
EF - 9/16 **ME** - 11mm (7/16) **ML** - 18mm
EH - 11/16 **MF** - 12mm **MM** - 19mm (3/4")
EJ - 13/16 **MG** - 13mm **MN** - 20mm
MH - 14mm **MO** - 21mm
MI - 15mm

X Dimension For Flush Socket



Head	in.	mm	Socket Size Range
F1	1.54	39	8-15mm
F2	1.69	43	10-15mm
F3	2.32	59	13-21mm
F4	2.4	61	17-21mm

Flush Socket Model Number	Head Type	Torque Range		Free Speed RPM	Weight*		Length		Anglehead			
		ft. lbs.	Nm		lbs.	kg	in.	mm	Side to Center		Height	
									in.	mm	in.	mm
18EA16F	F1	3.6-11.8	4.9-16	1225	4.4	2.00	16.0	406	0.55	14	1.54	39
18EA23F	F1	3.4-17.0	4.6-23	860	4.4	2.00	16.0	406	0.55	14	1.54	39
18EA30F	F1	4.4-22.1	6.0-30	655	4.4	2.00	16.0	406	0.55	14	1.54	39
48EA37F	F2	5.9-27.3	8.0-37	1225	5.4	2.43	18.7	474	0.67	17	1.69	43
48EA52F	F2	8.1-38.3	11-52	860	5.4	2.43	18.7	474	0.67	17	1.69	43
48EA53F	F3	8.1-39.0	11-53	850	6.0	2.74	20.0	509	0.87	22	2.32	59
48EA75F	F3	11.1-55.3	15-75	600	6.0	2.74	20.0	509	0.87	22	2.32	59
48EA110F	F3	17.0-81.1	23-110	400	7.4	3.38	20.5	521	0.87	22	2.32	59
48EA135F	F4	19.9-99.5	27-135	270	8.9	4.03	20.6	522	1.06	27	2.40	61
48EA230F	F4	34.7-169.6	47-230	150	10.6	4.79	22.2	563	1.06	27	2.40	61

*Weights are without tool cable or reaction bar if so equipped.
General: All tools must be used with an approved Cooper Tools cable and controller.
Standard Equipment: Air-LB Connector.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 301877-XX.
Additional Accessories: (Pages 39-41)

Electric Nutrunners – Corded Transducer Control

Tube Nut Tools

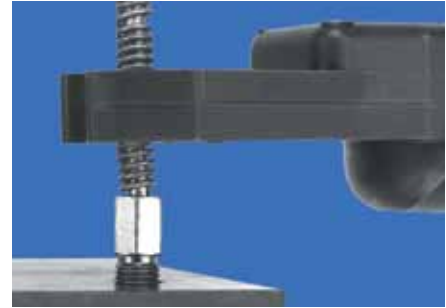
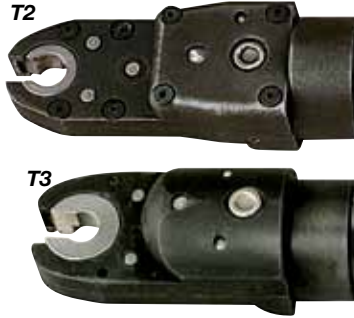


Tube Nut Series

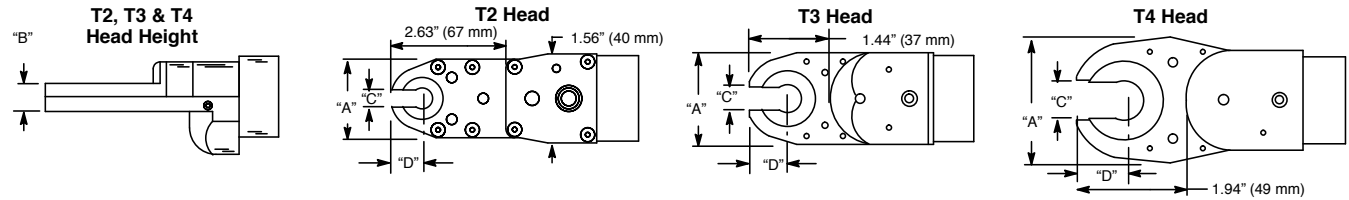
Torque Range
10 - 40 Nm
7.4 - 29.5 Ft. Lbs.

Bolt Size
M6 - M10
1/4" - 3/8"

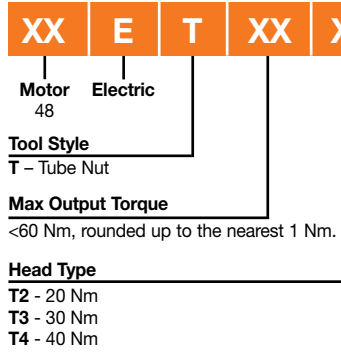
- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



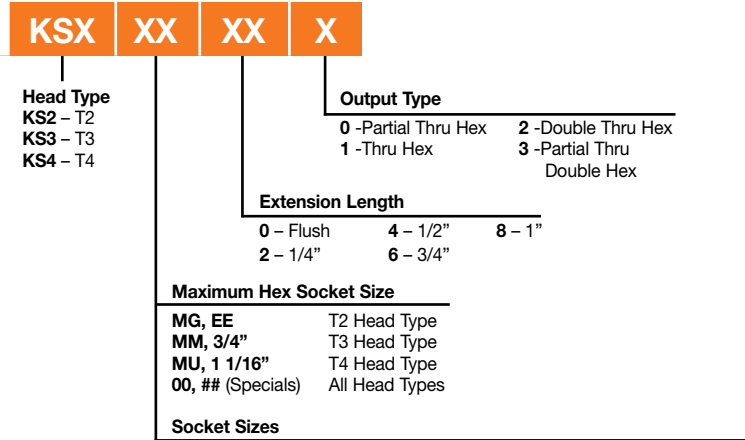
The 48ET tube nut wrench alternates the direction of rotation each time the lever is actuated. When rotating in reverse, the socket will stop at the open position.



Tube Nut Tool Nomenclature

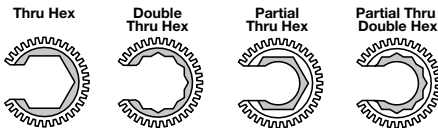


Socket Nomenclature



Socket Sizes

EA - 1/4"	M5 - 5mm	MH - 14mm	MP - 22mm
EC - 3/8"	M6 - 6mm	MI - 15mm	MQ - 23mm
EE - 1/2"	MA - 7mm	MJ - 16mm (5/8)	MR - 24mm (15/16)
EF - 9/16"	MB - 8mm (5/16)	MK - 17mm	MS - 25mm
EJ - 11/16"	MD - 10mm	ML - 18mm	MT - 26mm
EK - 13/16"	ME - 11mm (7/16)	MM - 19mm (3/4)	MU - 27mm (1 1/16)
EM - 1"	MF - 12mm	MN - 20mm	
	MG - 13mm	MO - 21mm	



Note: To order individual sockets, use a "KS" prefix (i.e. KS2EA01 for a T2 1/4", Flush, Thru Hex socket.)

Tube Nut	Max. Drive Size	Torque Range		Free Speed	Weight*	Length		Head									
		Ft.Lbs.	Nm			RPM	lbs.	kg	in.	mm	A Width		B Blade Ht.		C Opening		D End/Cntr.
Model Number								in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
48ET20T2	1/2"	7.4-14.8	10-20	1425	4.4	2.0	16.9	430	1.42	36	0.55	14	0.28	7	0.53	13	
48ET30T3	3/4"	11.1-22.1	15-30	1030	4.5	2.0	16.6	422	1.65	42	0.59	15	0.475	13	0.73	19	
48ET40T4	1 1/16"	14.8-29.5	20-40	770	5.3	2.3	17.9	454	2.36	60	0.59	15	0.675	18	0.93	24	

*Weights are without tool cable and reaction bar.

General: All tools must be used with an approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.
Additional Accessories: (Pages 39-41)

Cleco®

Crowfoot Series

Torque Range
7 - 30 Nm
5 - 22 Ft. Lbs.

Bolt Size
M6 - M8
#10 - 3/8"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



Crowfoot Tool Nomenclature

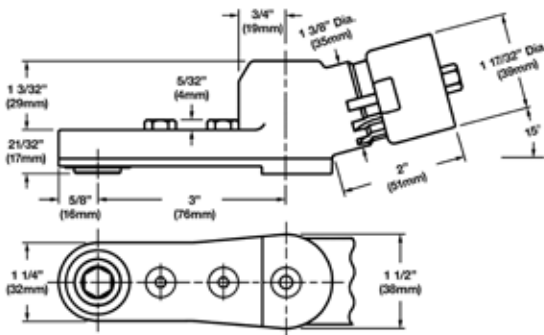
48	E	C	XX	XX
Motor 48	Electric			
Tool Style C - Crowfoot				
Max Output Torque <60 Nm, rounded up to the nearest 1 Nm.				
Head Type C1 - 15° Crowfoot C3 - 30° Crowfoot				

Socket Nomenclature

CS	XX	XX	X
Socket Type CS - Crowfoot			
	Output Style 1 - Thru Hex		
	Extension Length 0 - Flush 4 - 1/2" 6 - 3/4"		
Socket Size			
EA - 1/4"	MC - 9mm		
EC - 3/8"	MD - 10mm		
EE - 1/2"	ME - 11mm (7/16)		
EF - 9/16"	MF - 12mm		
MA - 7mm	MG - 13mm		
MB - 8mm (5/16)	MH - 14mm		
	MI - 15mm		

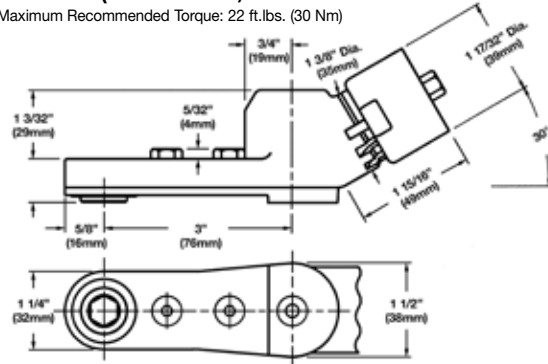
15° Head (Part No. 301071)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



30° Head (Part No. 301072)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



Crowfoot		Torque Range		Free Speed	Weight*		Length	
Model Number		ft. lbs.	Nm	RPM	lbs.	kg	in.	mm
15° Head	30° Head							
48EC30C1	48EC30C3	5.2-22.1	10.5-30	860	5.5	2.3	20.5	521

*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector.

Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.
Additional Accessories: (Pages 39-41)

To order individual sockets, use "CS" prefix before the required socket. (i.e. CSEA01 for a 1/4", flush, thru hex socket.)

Electric Nutrunners – Coded Transducer Control

Right Angle Floating Spindle Tools



Right Angle Floating Spindle Series

Torque Range
5.1 - 255 Nm
3.7 - 188.1 Ft. Lbs.

Bolt Size
M7 - M18
1/4" - 3/4"

- Brushless precision
- Resolver control
- Transducer accuracy
- Memory intelligence



Right Angle Floating Spindle Tool Nomenclature

XX	E	A	XXX	XX	X	X
Motor 18 48 67	Electric	Tool Style A - Right Angle	Square Drive 3 - 3/8" (S1, S2) 4 - 1/2" (S3, S4) 6 - 3/4" (S4)	Extension Length 1 - 1.13" (S1), 1.00" (S2 & S3), 1.25" (S4) 2 - 2.13" (S1), 3.00" (S2), 2.5" (S4 1/2" Dr.) 5 - 5.13" (S2), 4.25" (S4) 6 - 6.0" (S4 1/2" Dr.), 7.0" (S4 3/4" Dr.) 11 - 11.0" (S4 3/4" Dr.)		
Max Output Torque S1 Head - 16, 23, or 30 Nm S2 Head - 37 or 52 Nm S3 Head - 53, 75, 95, or 110 Nm S4 Head - 135 or 230 Nm (48 series) S4 Head - 150, 185, 210, 235 or 255 Nm (67 series)			Tool Termination S1 Sliding (Floating) Spindle S2 Sliding (Floating) Spindle S3 Sliding (Floating) Spindle S4 Sliding (Floating) Spindle			

Right Angle Floating Spindle Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18EA16S131	3.7-11.8	5.1-16	1225	4.4	2.00	3/8"	16.0	406	0.55	14
18EA23S131	5.3-16.9	7.2-23	860	4.4	2.00	3/8"	16.0	406	0.55	14
18EA30S131	4.4-22.1	6.0-30	655	4.4	2.00	3/8"	16.0	406	0.55	14
48EA37S231	5.9-27.2	8.0-37	1225	5.4	2.43	3/8"	18.7	474	0.67	17
48EA52S231	8.1-38.3	11-52	860	5.4	2.43	3/8"	18.7	474	0.67	17
48EA53S341	8.1-39.1	11-53	850	6.0	2.74	1/2"	20.0	509	0.87	22
48EA75S341	11.0-55.3	15-75	600	6.0	2.74	1/2"	20.0	509	0.87	22
48EA95S341	14.7-70.0	20-95	460	7.4	3.38	1/2"	20.5	521	0.87	22
48EA110S341	16.9-81.1	23-110	400	7.4	3.38	1/2"	20.5	521	0.87	22
48EA135S461	20.6-99.5	28-135	270	8.9	4.03	3/4"	20.6	522	1.06	27
48EA230S461	34.6-169.6	47-230	150	10.6	4.79	3/4"	22.2	563	1.06	27
67EA150S461	22.1-110.6	30-150	210	12.9	5.90	3/4"	25.8	655	1.03	26
67EA185S461	27.3-136.3	37-185	170	12.9	5.90	3/4"	25.8	655	1.03	26
67EA210S461	31.0-154.8	42-210	155	12.9	5.90	3/4"	25.8	655	1.03	26
67EA235S461	33.9-169.6	46-230	135	12.9	5.90	3/4"	25.8	655	1.03	26
67EA255S461	40.6-188.1	55-255	115	12.9	5.90	3/4"	25.8	655	1.03	26

*Weights are without tool cable and mounting plate.

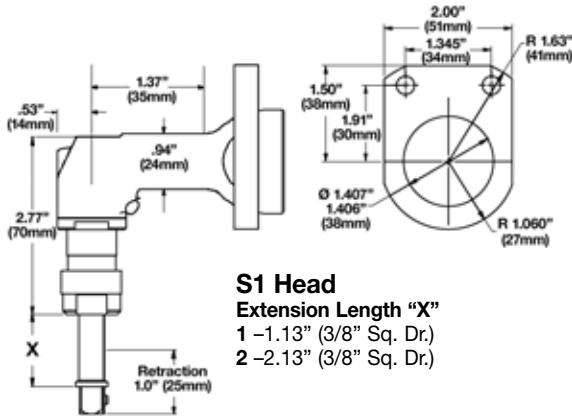
General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector; Mounting plate.

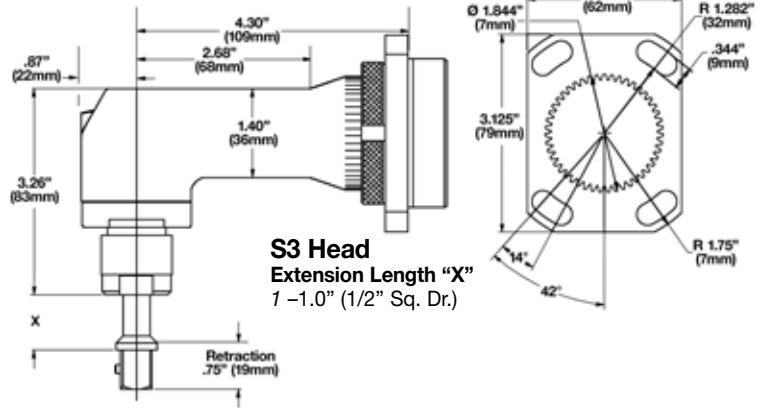
Extra Equipment: Std. tool cable 542778-XX, RA swivel cable 544055-XX, Inline swivel cable 544056-XX, Extension cable 542779-XX.

Additional Accessories: (Pages 39-41)

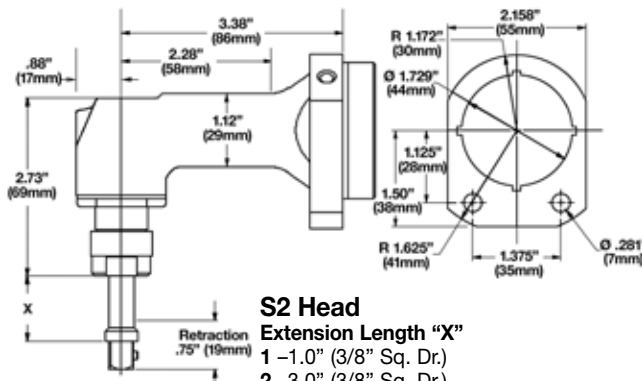
18EA, 48EA & 67EA Floating Spindle Angle Heads



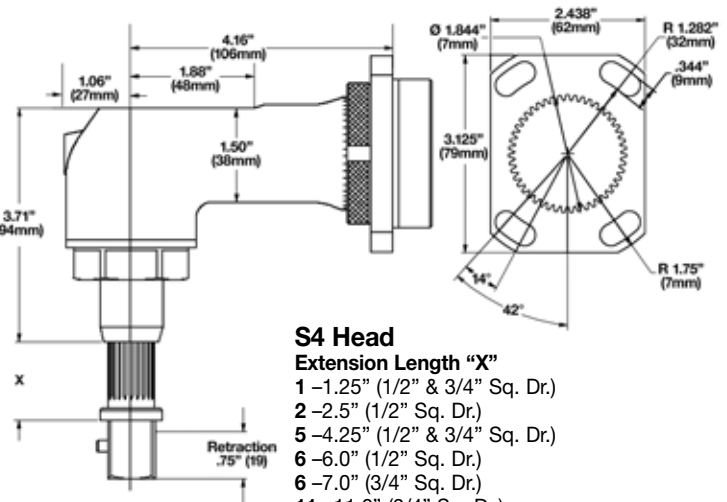
S1 Head
 Extension Length "X"
 1 -1.13" (3/8" Sq. Dr.)
 2 -2.13" (3/8" Sq. Dr.)



S3 Head
 Extension Length "X"
 1 -1.0" (1/2" Sq. Dr.)



S2 Head
 Extension Length "X"
 1 -1.0" (3/8" Sq. Dr.)
 2 -3.0" (3/8" Sq. Dr.)
 5 -5.13" (3/8" Sq. Dr.)



S4 Head
 Extension Length "X"
 1 -1.25" (1/2" & 3/4" Sq. Dr.)
 2 -2.5" (1/2" Sq. Dr.)
 5 -4.25" (1/2" & 3/4" Sq. Dr.)
 6 -6.0" (1/2" Sq. Dr.)
 6 -7.0" (3/4" Sq. Dr.)
 11 -11.0" (3/4" Sq. Dr.)

Tightening Manager™ Controllers

The Controllers

The heart of the system is the Cleco Tightening Manager Controller. These controllers use technology that is both user-friendly and technically advanced.

Cleco Tightening Manager Controllers are available in three configurations – single-channel TME, 2-channel TME, and the TMEM controller, also known as the "Mini" TME.

Cleco Tightening Manager Controllers are capable of handling a broad array of tools ranging in torque from 2 to 4000 Nm, and include 9 different tool configurations. The controllers incorporate the most intuitive user interface available today – everything you need to operate the controller is right on the screen.

Common tool cables and I/O connections further simplify the product offering, interface, and error-proofing capabilities.

The Cleco TMEM is a less expensive, streamlined version of the larger TME controller. Programming access is done locally, or through a remote network connection.

Cleco Tightening Manager controllers allow for monitoring and evaluation of the production process

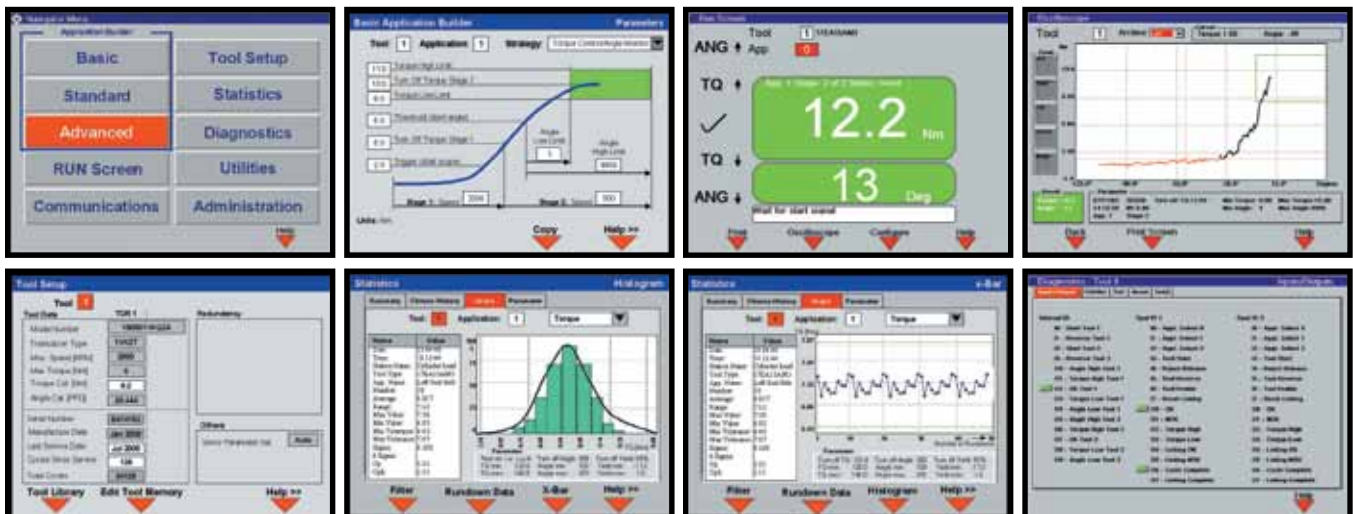


Shown above are the Cleco TME and the TMEM "Mini" Tightening Manager Controllers.

through the use of unique graphic displays. The on-board oscilloscope allows a thorough analysis of the torque and rotation relationship for every rundown.

All of the controllers offer fully configurable inputs and outputs to ensure compatibility with in-plant error proofing systems.

Workcell is an ingenious way to program one controller from another. This functionality comes standard in all TME and TMEM controllers with an Ethernet connector. Up to 20 controllers can be configured in a workcell, giving the programmer remote access without a PC or laptop through the LAN (local area network).



Cleco Tightening Manager Controllers incorporate the most intuitive graphic user interface available today. As shown on the typical screens above, everything you need to operate the controller is right on the screen.



Up to 20 Cleco Tightening Manager Controllers with an Ethernet connector can be configured in a workcell.



Cleco®

TM-200 Series Tightening Manager Controller

- Single or 2-channel
- Graphics interface
- Fully programmable
- Local storage of 5,000 cycles
- LAN capable
- Fieldbus options available



TME	2	X	X	XX	X	X
Tightening Manager Electric	Series 2 - 200	Servo 1 - TMH		Special configuration		
Number of channels		Input voltage		Language		
1 - Single channel 2 - 2 channel		15 - 115 VAC 30 - 230 VAC		ED - DeviceNet EP - Profibus U - English D - German S - Spanish P - Portuguese		

Model Number		Features	Weight		Width		Height		Depth	
115VAC	230VAC		lbs.	kg	ins.	mm	ins.	mm	ins.	mm
TME Single Channel										
TME-211-15-*	TME-211-30-*	Ethernet	87	39.5	16.5	419.1	17.5	444.5	12.3	312.4
TME-211-15- *-ED	TME-211-30- *-ED	Ethernet & DeviceNet	87	39.5	16.5	419.1	17.5	444.5	12.3	312.4
TME-211-15- *-EP	TME-211-30- *-EP	Ethernet & Profibus	87	39.5	16.5	419.1	17.5	444.5	12.3	312.4
TME 2-Channel										
TME-221-15-*	TME-221-30-*	Ethernet	103	46.8	16.5	419.1	17.5	444.5	14.1	358.1
TME-221-15- *-ED	TME-221-30- *-ED	Ethernet & DeviceNet	103	46.8	16.5	419.1	17.5	444.5	14.1	358.1
TME-221-15- *-EP	TME-221-30- *-EP	Ethernet & Profibus	103	46.8	16.5	419.1	17.5	444.5	14.1	358.1

*Languages offered: D-German, P-Portuguese, S-Spanish, U-English

Standard Equipment: 3.5" floppy drive, 24 volt I/O, Ethernet, 2 USB connectors, 2 serial connectors, printer connector, PS2 keyboard connector.
TM-COM1M software included.

Tightening Manager™ Controllers

TMEM “Mini” Series



TMEM “Mini” Series Tightening Manager Controller

- Single channel
- Economical
- Remote programming
- Local storage of 5,000 cycles
- LAN capable
- Fieldbus options available



TME	M	1	X	X	XX	X	X
Tightening Manager Electric	“Mini” Series 1 – 100	Number of channels 1 – Single channel	Servo 4 – STMHE Input voltage 15 – 115 VAC 30 – 230 VAC	Language U – English D – German S – Spanish P – Portuguese	Special configuration IO – Ethernet EP – Profibus		



Model Number		Features	Weight		Width		Height		Depth		
115VAC	230VAC		lbs.	kg	ins.	mm	ins.	mm	ins.	mm	
TMEM “Mini”											
TMEM-114-15- *	TMEM-114-30- *	-	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6	
TMEM-114-15- * -IO	TMEM-114-30- * -IO	Ethernet IO	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6	
TMEM-114-15- * -EP	TMEM-114-30- * -EP	Ethernet & Profibus	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6	

*Languages offered: D-German, P-Portuguese, S-Spanish, U-English
Standard Equipment: 24 volt I/O, Ethernet, 2 serial connectors. TM-COM1M software included.

Tool Cables

Model Number		Swivel		Length	
Tool	Extension	Right Angle	Inline	Feet	Meters
542778-1M*	542779-1M	544055-1M*	544056-1M*	3	1
542778-2M*	542779-2M	544055-2M*	544056-2M*	6	2
542778-3M	542779-3M	544055-3M	544056-3M	9	3
542778-6M	542779-6M	544055-6M	544056-6M	19.5	6
542778-8M	542779-8M	544055-8M	544056-8M	26	8
542778-10M	542779-10M	544055-10M	544056-10M	33	10
542778-15M	542779-15M	544055-15M	544056-15M	49	15
	542779-20M			66	20
	542779-25M			82	25
	542779-30M			96	30
	542779-40M			131	40
542778-50M	542779-50M	544055-50M	544056-50M	164	50

Maximum cable length 100M 115VAC/20M 230VAC.
Overall minimum cable length 3M.
*Must be used with 542779 extension cable.



8 Position Remote Parameter Switch

Description	Part Number
Remote Parameter Switch (with 25' integrated cable)	542979
Remote Parameter Switch (with 50' integrated cable)	542979-50

Direct Connect Cables

Connects controller direct to PC

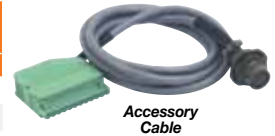
Part No.	Description	Length	
		ft.	m
543446-7	Ethernet crossover cable	7	2
543490-10	Serial cable null modem	10	3

Phoenix Connectors

Part No.	Description
542892	Input Phoenix connector
542893	Output Phoenix connector
939348	Hood/strain TME I/O cable relief

Accessory Cables

Controller to Input Accessory	Input Acc. to Input Acc.	Controller to Synch Box	Controller to 1 Spindle Annunciator	Controller to 2 Spindle Annunciator	Synch Box to Input Accessory	Synch Box to Annunciators (2/more spindles)	Length	
							ft.	m
542985-3	542986-3	576058-3	542989-3	543451-3	542987-3	542988-3	3	1
542985-9	542986-9	576058-9	542989-9	543451-9	542987-9	542988-9	9	3
542985-25	542986-25	576058-25	542989-25	543451-25	542987-25	542988-25	25	7.5
542985-50	542986-50	576058-50	542989-50	543451-50	542987-50	542988-50	50	15



Tightening Manager Upgrade Kits

Part Number	Description
543481	Upgrades a Standard TMEM to a TMEM I/O
543334-EN	Upgrades a Standard TME with a 6 character serial number to an Ethernet TME
543334J-EN	Upgrades a Standard TME with a serial number having a J as the seventh character to an Ethernet TME
543335-ED	Upgrades a Standard TME with a 6 character serial number to a DeviceNet TME
543335J-ED	Upgrades a Standard TME with a serial number having a J as the seventh character to a DeviceNet TME
543941	Upgrades a Standard TME 200-U to -EP (Ethernet & Profibus TME)
543942	Upgrades a Standard TME 200-U to -ED (Ethernet & DeviceNet TME)

Special Adapter Cable



Part No.	Description
542916-1	Adapter cable for Rotor resolver tools

Tool & Cable Tester

Part No.	Description
961024	Tool & cable tester tool memory programming
542991	Tool & cable tester



Lever Extension Kits

Description	Part No.
Lever Extension Kit (non-swivel)	541757
Lever Extension Kit (swivel)	543414

Note: Models for standard tool cable (non-swivel) and swivel cable.



Suspension Bail

Description	Part No.
Tool suspension bail	1110909



Test Fixture

Part Number
536185

Medium to Hard Torque
Belleville Washer Test Fixture is clamped in a vise and used to test tools (10 In. Lbs. – 100 Ft. Lbs., 1.13Nm – 135.6Nm). Washers can be rearranged to simulate “hard” or “soft” joints.



Electric Controller

Accessories

Input Accessories

Torque Selector Switches

Torque Selector	Part Number
8 Select	542977-8
16 Select	542977-16
32 Select	542977-32
64 Select	542977-64



Annunciators

Spindles	Part Number
1	542976-1
2	542976-2
3	542976-3
4	542976-4
5	542976-5
6	542976-6



Start/Stop Switches

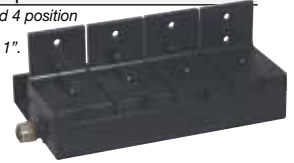
Description	Part No.
Start Box	542972
Stop Box	542973
Start/Stop Box	542974
Start/Stop/Reverse	542975



Socket Trays

Part No.	Description
542978-4	Four position
542978-8	Eight position

Notes: Up to 16 linked 4 position trays maximum.
Minimum socket O.D. 1".
Maximum O.D. 2.25".



Patch Cables

Connects Ethernet switches to controller or PC

Part Number	Length	
	Feet	Meters
543445-7	7	2
543445-50	50	15
543445-100	100	30

Synch Boxes

Spindles	Part No.
2	576060-2
3	576060-3
4	576060-4
5	576060-5
6	576060-6



115VAC Ethernet Switches

Part Number	Ports			Approx. Dimensions		Approx. Weight	
	Total	In	Out	Inches	mm	lbs.	kg
543444-8	8	1	7	6.5x4.5x1.5	160x110x35	0.6	0.3
543444-16	16	1	15	7x6x2.5	185x150x65	1.1	0.5
543444-24	24	1	23	10.5x7x2	270x170x50	3.0	1.3

Socket Trays

Part No.	Description
960645	Four position w/10m cable
960646	Eight position w/10m cable

Maximum socket diameter 1.125".



Replacement Inserts

Part Number
S970716

For use with 960645 & 960646 socket trays.



Socket Posts

For use with 542978-4 & 542978-8 socket trays.

Part Number	Socket Post Size
99249181	.550/.540
99249169	1.062/1.052
99249165	.590/.580
99249164	.945/.935
99249163	.827/.817
99249162	.709/.699
99249161	.625/.615
99249160	.437/.432
99249159	.812/.802
99249158	.687/.677
99249157	.875/.865
99249156	1.000/.990
99249148	1.125/1.115
99249147	.938/.928
99249104	.750/.740
99249103	.669/.659
99249102	.562/.552
99249101	.500/.490

Note: Select socket post size within tolerance of socket used.

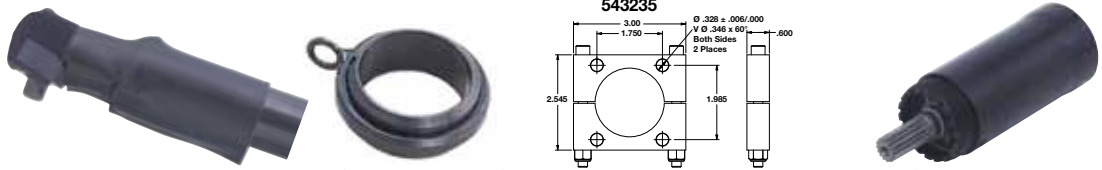
Lockout Washer

For use with 542978-4 & 542978-8 socket trays.

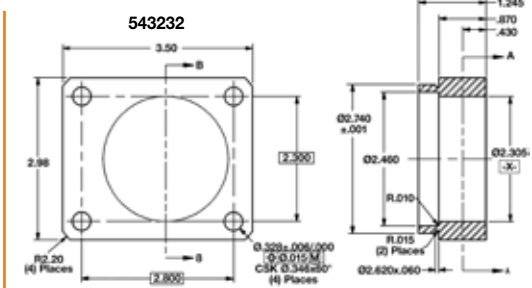
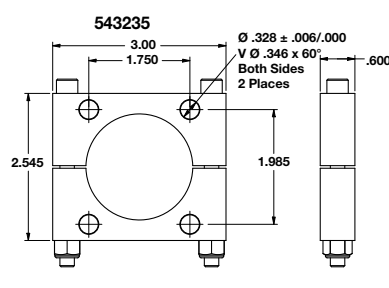
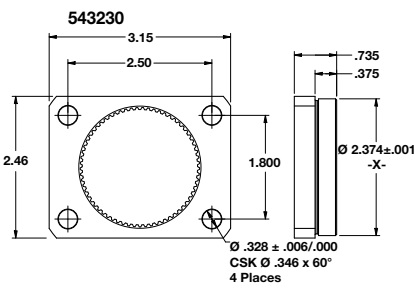
Part Number	Note
99248150	Vacant position lockout washer

Electric Nutrunner

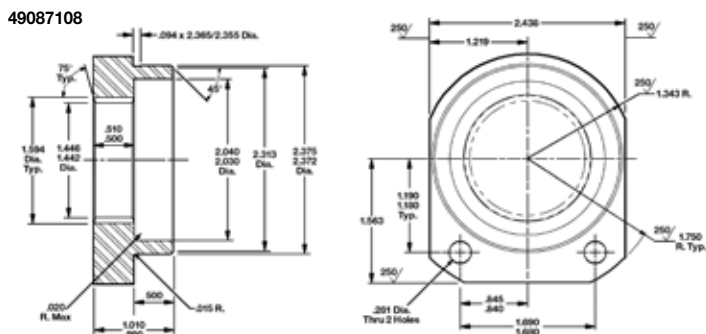
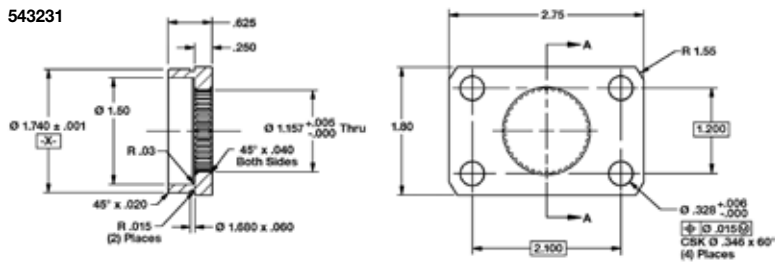
Accessories



Tool Type	Model Number	Cover	Swivel Bail	Mounting Plate	Extension
Right Angle	17/18EA...AL2	205832	541715-2	-----	-----
	17/18EA...AM3	205834	541715-2	-----	-----
	47EA...AM3/4	543070	541715-2	543235	542428
	47/48EA...AH4	543070	541715	543230	535833
	47/48EA135MH4	543071	541715	543230	535833
	47/48EA...AX6	205838	541715	543232	541860
	67EA...AL6	205838	35007004	49097101 (included with tool)	48316033
67EA...AM6	-----	-----	48A17006	45017152 (included with tool)	-----
Flush Socket	17/18EA...F1...	-----	541715-2	57217101 (requires 57218103 screw)	-----
	47/48EA...F2...	-----	541715-2	43287131	-----
	47/48EA...F3...	-----	541715-2	49097101 (requires 49098103 locknut)	-----
	47/48EA...F4...	205838	541715	49097101 (requires 49098103 locknut)	48316033
Hold-N-Drive	47/48EA ...H...over 100NM	205838	541715	49097101 (requires 49098103 locknut)	48316033
	47/48EA ...H...under 100NM	205838	541715-2	49097101 (requires 49098103 locknut)	48316033



Inline Tools Mounting Plates



Durability. Speed

Cost Effective Solution for Quality Critical Applications.

Cleco **CurrentControl** electric assembly tools provide an up-sell solution to quality critical applications presently specifying a pneumatic clutch tool and verifier combination. Cleco proprietary **CurrentControl** systems up-sell on superior productivity, error proofing and process flexibility.

Our Cleco controller systems are recognized globally for “best in class” software interface. This is accomplished through simple navigation, basic programming screens, visual programming graphics and real-time process feedback. Our latest innovation “Auto Program” takes the guesswork out of programming. Simply enter the application torque target and the software automatically compiles the program for production use.



Unrestricted Speed Control



Adjustable angle head allows flexible orientation



New Cleco TMEI Controller



Cleco®

ed. Ergonomics.

Why **CurrentControl** vs. Pneumatic Clutch?

Superior Productivity

- Up to 2–3X faster
- Unrestricted speed control
- Up to 25% less noise
- Cleaner operating environment
- Auto torque sequencing
- Proven production durability

Superior Error Proofing

- 96 position fastener count
- 9 tool LED operator feedback
- 8 configurable I/O
- Fieldbus ready
- 5,000 tightening cycle storage
- Advanced system diagnostics
- Barcode application select

Superior Process Flexibility

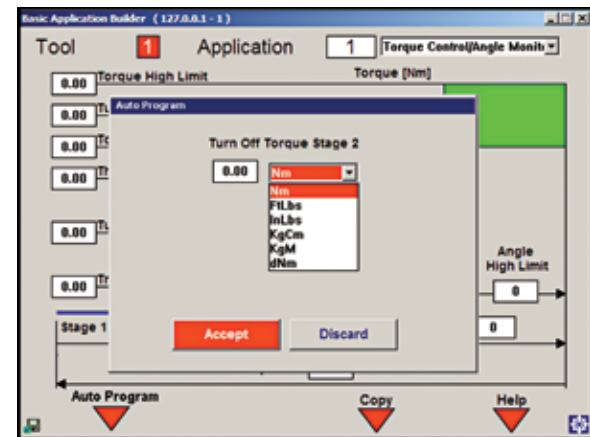
- 255 programmable tightening strategies
- 6 configurable stages per strategy
- Angle process control/monitoring
- Counter-clockwise process control/monitoring
- Less parts to maintain – no clutch
- 100M field cable lengths

Easy Setup 1-2-3-Go!

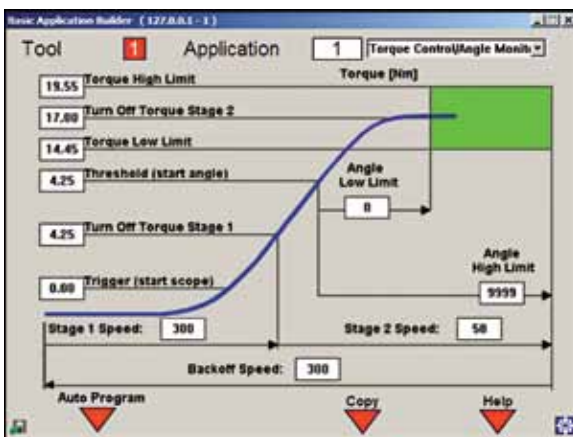
1. Select “Basic” from menu.



2. Enter final torque value.



3. Tool automatically programmed.



Go! Production ready.



Electric Nutrunners – Corded Current Control

Right Angle Tools

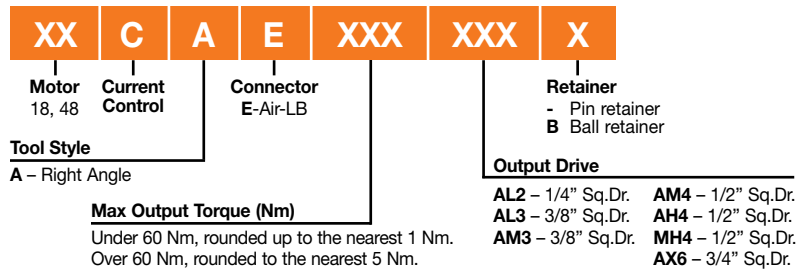
Cleco®

Right Angle Series

Torque Range
2 - 230 Nm
1.5 - 170 Ft. Lbs.

Bolt Size
M5 - M16
#10 - 5/8"

- Brushless precision
- Resolver control
- Memory intelligence



Right Angle Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Anglehead					
	ft. lbs.	Nm		lbs.	kg		in.	mm	Side to Center		Height			
									in.	mm	in.	mm	in.	mm
18CAE08AL2	1.5-5.9	2-8	3000	2.9	1.3	1/4"	13.6	345	0.51	13	1.4	36		
18CAE15AM3	3.0-11.1	4-15	1300	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41		
18CAE22AM3	3.7-16.2	5-22	920	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41		
18CAE28AM3	4.4-20.7	6-28	700	3.3	1.5	3/8"	14.8	376	0.59	15	1.6	41		
48CAE15AL3	2.2-11.1	3-15	2855	3.8	1.7	3/8"	15.7	398	0.59	15	1.6	41		
48CAE28AL3	4.4-20.7	6-28	1300	4.1	1.9	3/8"	16.2	410	0.59	15	1.6	41		
48CAE41AM3	6.6-30.2	9-41	1090	4.3	2.0	3/8"	17.3	440	0.75	19	1.9	48		
48CAE58AM3	8.9-42.8	12-58	770	4.3	2.0	3/8"	17.3	440	0.75	19	1.9	48		
48CAE58AM4	8.9-42.8	12-58	770	4.3	2.0	1/2"	17.3	440	0.75	19	1.9	48		
48CAE90AH4	13.3-64.2	18-87	515	6.6	3.0	1/2"	18.5	470	0.81	21	2.3	58		
48CAE105AH4	15.5-76.7	21-104	340	6.6	3.0	1/2"	18.5	470	0.81	21	2.3	58		
48CAE135MH4	19.9-98.1	27-133	265	7.3	3.3	1/2"	19.1	485	0.94	24	2.4	61		
48CAE175AX6	26.6-129.8	36-176	190	10.2	4.6	3/4"	21.6	549	1.06	27	2.7	69		
48CAE230AX6	33.9-169.6	46-230	145	10.2	4.6	3/4"	21.6	549	1.06	27	2.7	69		

*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Air-LB Connector. Ball retainer optional.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Inline Non-Floating Spindle Tools



Cleco®

Inline Non-Floating Series

Torque Range
2 - 150 Nm
1.5 - 113 Ft. Lbs.

Bolt Size
M5 - M14
#10 - 5/8"

- Brushless precision
- Resolver control
- Memory intelligence



XX	C	S	E	XXX	XX	X
Motor 18, 48	Current Control	Connector E – Air-LB		Output Drive		Retainer - Pin retainer B Ball retainer
Tool Style S – Inline			Max Output Torque (Nm) Under 60 Nm, rounded up to the nearest 1 Nm. Over 60 Nm, rounded to the nearest 5 Nm.			
			Q – Quick change D3 – 3/8" Sq.Dr. D2 – 1/4" Sq.Dr. D4 – 1/2" Sq.Dr.			

Inline Non-Floating Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18CSE06Q	1.5-4.4	2-6	4000	2.5	1.1	1/4" Hex	12.3	312	0.91	23
18CSE06D2	1.5-4.4	2-6	4000	2.5	1.1	1/4"	11.8	300	0.91	23
18CSE12Q	2.2-8.9	3-12	1820	2.7	1.2	1/4" Hex	13.0	330	0.91	23
18CSE12D3	2.2-8.9	3-12	1820	2.7	1.2	3/8"	12.4	315	0.91	23
18CSE17Q	3.0-12.5	4-17	1290	2.7	1.2	1/4" Hex	13.0	330	0.91	23
18CSE17D3	3.0-12.5	4-17	1290	2.7	1.2	3/8"	12.4	315	0.91	23
18CSE22D3	3.7-16.2	5-22	985	2.7	1.2	3/8"	12.4	315	0.91	23
18CSE31D3	5.2-22.9	7-31	695	2.7	1.2	3/8"	12.4	315	0.91	23
48CSE12Q	2.2-8.9	3-12	4000	3.0	1.4	1/4" Hex	13.5	343	0.91	23
48CSE12D2	2.2-8.9	3-12	4000	3.0	1.4	1/4"	13.0	330	0.91	23
48CSE25D3	4.4-18.4	6-25	1820	3.2	1.5	3/8"	13.6	345	0.91	23
48CSE36D3	5.9-26.6	8-36	1290	3.2	1.5	3/8"	13.6	345	0.91	23
48CSE48D3	7.4-35.4	10-48	985	3.3	1.5	3/8"	13.8	351	0.91	23
48CSE65D4	9.6-47.9	13-65	750	5.3	2.4	1/2"	16.6	420	1.13	29
48CSE90D4	14.0-66.4	19-90	510	5.6	2.5	1/2"	17.1	435	1.13	29
48CSE125D4	19.2-92.2	26-125	360	5.6	2.5	1/2"	17.1	435	1.13	29
48CSE150D4	22.9-110.6	31-150	240	5.6	2.5	1/2"	17.1	435	1.13	29

*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Air-LB Connector; Dead Handle is included with 18CSE12Q and 18CSE12D3. Reaction bar is included with inline tools with output torques of 17-150 Nm. Ball retainer optional.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. Mounting Plates: 543231 - (all with exception of listed below) 543235 - 18ES06Q, 48ES12Q 49087108 - 48ES65D4, 48ES90D4, 48ES125D4, & 48ES150D4. See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Pistol Grip Tools

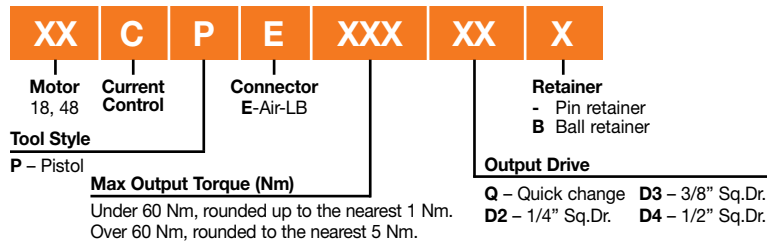
Cleco®

Pistol Grip Series

Torque Range
2 - 150 Nm
1.5 - 113 Ft. Lbs.

Bolt Size
M5 - M14
#10 - 5/8"

- Brushless precision
- Resolver control
- Memory intelligence



Pistol Grip Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18CPE06Q	1.5-4.4	2-6	4000	2.2	1.0	1/4" Hex	7.0	178	0.84	21
18CPE06D2	1.5-4.4	2-6	4000	2.2	1.0	1/4"	6.5	165	0.84	21
18CPE12Q	2.2-8.9	3-12	1820	2.4	1.1	1/4" Hex	7.7	196	0.84	21
18CPE12D3	2.2-8.9	3-12	1820	2.4	1.1	3/8"	7.2	183	0.84	21
18CPE17Q	3.0-12.5	4-17	1290	2.4	1.1	1/4" Hex	7.7	196	0.84	21
18CPE17D3	3.0-12.5	4-17	1290	2.4	1.1	3/8"	7.2	183	0.84	21
18CPE22D3	3.7-16.2	5-22	985	2.4	1.1	3/8"	7.2	183	0.84	21
18CPE31D3	5.2-22.9	7-31	695	2.4	1.1	3/8"	7.2	183	0.84	21
48CPE12Q	2.2-8.9	3-12	4000	2.7	1.2	1/4" Hex	8.3	211	0.84	21
48CPE12D2	2.2-8.9	3-12	4000	2.7	1.2	1/4"	7.7	196	0.84	21
48CPE25D3	4.4-18.4	6-25	1820	2.9	1.3	3/8"	8.4	213	0.84	21
48CPE36D3	5.9-26.6	8-36	1290	2.9	1.3	3/8"	8.4	213	0.84	21
48CPE48D3	7.4-35.4	10-48	985	3.0	1.4	3/8"	8.6	218	0.84	21
48CPE65D4	9.6-47.9	13-65	750	5.0	2.3	1/2"	10.8	274	1.1	28
48CPE90D4	14.0-66.4	19-90	510	5.3	2.4	1/2"	11.3	287	1.1	28
48CPE125D4	19.2-92.2	26-125	360	5.3	2.4	1/2"	11.3	287	1.1	28
48CPE150D4	22.9-110.6	31-150	240	5.3	2.4	1/2"	11.3	287	0.9	23

*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Air-LB Connector; Suspension Bail; Dead Handle is included with 18CPE12Q & 18CPE12D3. Reaction bar is included with pistol tools with output torques of 17-150 Nm. Ball retainer optional.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX.
 See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Push-to-Start Pistol Grip/Inline Tools



18CPE06QP



18CSE06QP

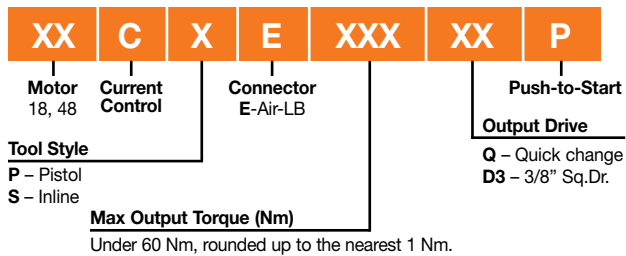
Cleco®

Push-to-Start Series

Torque Range
2 - 12 Nm
1.5 - 8.9 Ft. Lbs.

Bolt Size
M5 - M6
#10 - 1/4"

- Brushless precision
- Resolver control
- Memory intelligence



Push-to-Start Model Number	Torque Range		Max. Speed RPM	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm		lbs.	kg		in.	mm	in.	mm
18CPE06QP	1.5-4.4	2-6	4000	2.66	1.19	1/4" Hex	9.35	238	0.84	21
18CPE06D3P	2.2-8.9	3-12	4000	2.66	1.19	3/8"	8.8	224	0.84	21
18CPE12QP	2.2-8.9	3-12	1820	2.83	1.27	1/4" Hex	9.35	196	0.84	21
18CPE12D3P	2.2-8.9	3-12	1820	2.83	1.27	3/8"	8.8	224	0.84	21
18CSE06QP	1.5-4.4	2-6	4000	2.93	1.31	1/4" Hex	14.75	375	0.91	23
18CSE06D3P	2.2-8.9	3-12	4000	2.93	1.31	3/8"	14.20	360	0.91	23
18CSE12QP	2.2-8.9	3-12	1820	3.10	1.40	1/4" Hex	14.75	375	0.91	23
18CSE12D3P	2.2-8.9	3-12	1820	3.10	1.40	3/8"	14.20	360	0.91	23

*Weights are without tool cable and reaction bar.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Air-LB Connector; Suspension Bail on pistol models; Dead Handle (301857) is included with 18CPE12Q & 18CPE12D3.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Inline Floating Spindle Tools

Cleco®

Inline Floating Spindle Series

Torque Range
2 - 248 Nm
1.5 - 182.9 Ft. Lbs.

Bolt Size
M5 - M16
#10 - 5/8"

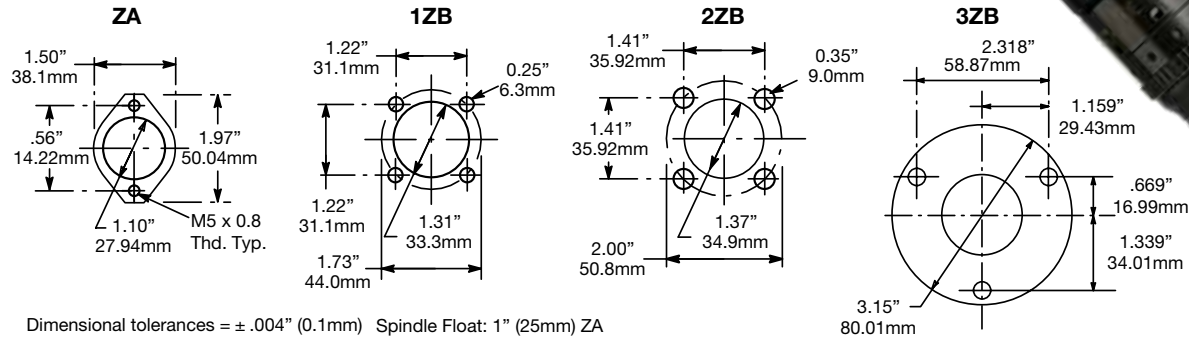
- Brushless precision
- Resolver control
- Memory intelligence



18CSE12ZA

XX	C	S	E	XXX	XXX
Motor 18, 48	Current Control	Connector E-Air-LB		Output Drive ZA – 1/4" Sq.Dr. 1ZB – 3/8" Sq.Dr. 2ZB – 1/2" Sq.Dr. 3ZB – 3/4" Sq.Dr.	
Tool Style S – Inline			Max Output Torque (Nm) Under 60 Nm, rounded up to the nearest 1 Nm. Over 60 Nm, rounded to the nearest 5 Nm.		

Base Plate Mounting Dimensions



Inline Floating Spindle Model Number	Torque Range		Max. Speed	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm	RPM	lbs.	kg		in.	mm	in.	mm
18CSE06ZA	1.5-4.4	2-6	4000	3.0	1.4	1/4	15.5	394	0.91	23
18CSE12ZA	2.2-8.9	3-12	1820	3.2	1.5	1/4	16.0	406	0.91	23
18CSE17ZA	3.0-12.5	4-17	1290	3.2	1.5	1/4	16.0	406	0.91	23
48CSE12ZA	2.2-8.9	3-12	4000	3.4	1.5	1/4	16.7	425	0.91	23
48CSE271ZB	5.9-19.9	8-27	1820	5.8	2.6	3/8	22.0	559	0.92	23
48CSE361ZB	5.2-26.6	7-36	1290	5.8	2.6	3/8	22.0	559	0.92	23
48CSE602ZB	8.1-42.0	11-57	855	8.4	3.8	1/2	24.4	620	1.10	28
48CSE702ZB	10.3-50.2	14-68	570	8.4	3.8	1/2	24.4	620	1.10	28
48CSE802ZB	12.5-60.5	17-82	450	9.6	4.4	1/2	26.7	678	1.10	31
48CSE1152ZB	18.4-84.8	25-115	320	9.6	4.4	1/2	26.7	678	1.10	31
48CSE1502ZB	22.9-110.6	31-150	245	9.6	4.4	1/2	26.7	678	1.10	31
48CSE1653ZB	24.3-121.7	33-165	220	14.6	6.6	3/4	28.6	726	1.57	40
48CSE2503ZB	36.8-182.9	50-248	145	14.6	6.6	3/4	28.6	726	1.57	40

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Air-LB Connector.

Tools have thru hole output.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Hold & Drive Tools



Cleco®

Hold & Drive Series

Torque Range
 11 - 227 Nm
 8.1 - 167.4 Ft. Lbs.

- Brushless precision
- Resolver control
- Memory intelligence

Hold & Drive Tool Nomenclature

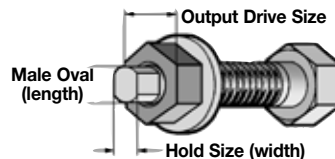
48	C	A	E	XXX	H
Motor 48	Current Control	Connector E – Air-LB	Head Type H-Hold & Drive	Hold & Drive	
Tool Style					
A – Right Angle					
Max Output Torque					
<60 Nm, rounded up to the nearest 1 Nm.					
>60 Nm, rounded to the nearest 5 Nm.					

Socket Nomenclature

H	X	XX	X	XX	X
Retainer Shaft	Socket Style	Oval Dim. (length)			
3 - 3 1/2"	F – Female Hex	If socket style =0 (female oval)			
4 - 4"	M – Male Hex				
5 - 5 3/8"	T – Torx				
6 - 5 7/8"	O – Female Oval	Hold Socket (width across flats)			
9 - 9 1/2"		EA - 1/4	15 - T15		
		EC - 3/8	20 - T20		
		M5 - 5mm	25 - T25		
		M6 - 6mm	30 - T30		
		MA - 7mm	40 - T40		
		MB - 8mm (5/16")	50 - T50		
		MC - 9mm			
		MD - 10mm			
		ME - 11mm (7/16")			
		MF - 12mm			

Drive Socket Sizes (surface drive)

EH - 11/16	MH - 14mm	MN - 20mm	MS - 25mm
EJ - 13/16	MI - 15mm	MO - 21mm	MT - 26mm
EK - 7/8	MJ - 16mm (5/8")	MP - 22mm	MU - 27mm (1 1/16")
EM - 1	MK - 17mm	MQ - 23mm	MX - 30mm (1 3/16")
EO - 1 1/8	ML - 18mm	MR - 24mm (15/16")	MZ - 32mm (1 1/4")
MG - 13mm	MM - 19mm (3/4")		



Hold & Drive Model Number	Torque Range		Free Speed RPM	Length		Weight*		Head Height		Side to Center	
	Ft.Lbs.	Nm		in.	mm	lbs.	kg	in.	mm	in.	mm
48CAE53H	8.1 – 39.8	11 – 54	850	20.2	512	7.9	3.60	2.40	61	1.06	27
48CAE75H	11.1 – 56.8	15 – 77	600	20.2	512	7.9	4.03	2.40	61	1.06	27
48CAE110H	17.0 – 85.6	23 – 115	400	20.2	512	8.9	4.03	2.40	61	1.06	27
48CAE135H	20.7 – 101.8	28 – 135	270	20.6	522	8.9	4.03	2.40	61	1.06	27
48CAE230H	34.7 – 169.6	47 – 230	150	22.2	563	10.6	4.79	2.40	61	1.06	27

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with a approved Cooper Tools cable and controller.
Standard Equipment: Air-LB Connector. Retraction 1" standard for hold bit.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX.
 See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Flush Socket Tools



Flush Socket Series

Torque Range
4.9 - 234 Nm
3.6 - 172.6 Ft. Lbs.

Bolt Size
M8 - M21
1/2" - 1 3/16"

- Brushless precision
- Resolver control
- Memory intelligence

18CAE30F1

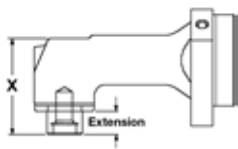


Flush Socket Tool Nomenclature

XX	C	A	E	XXX	F
Motor 18, 48	Current Control	Connector E - Air-LB	Flush Socket		
Tool Style A - Right Angle					
Max Output Torque					
F1 16,23, 30 Nm	F3 53, 75, 110 Nm	F2 37, 52 Nm	F4 135, 230 Nm		
<60 Nm, rounded up to the nearest 1 Nm. >60 Nm, rounded to the nearest 5 Nm.					
Head Type					
F1 Head 8-15mm socket capacity					
F2 Head 10-15mm socket capacity					
F3 Head 13-21mm socket capacity					
F4 Head 13-21mm socket capacity					

Socket Nomenclature

FX	XX	X	X
		Output Type 0-Standard 1-Fast Lead 2-Magnetic	
Extension Length			
0 - Flush	4 - 1/2"	8 - 1"	
2 - 1/4"	6 - 3/4"		
Socket Size			
EC - 3/8	MB - 8mm (5/16")	MJ - 16mm (5/8")	
ED - 7/16	MD - 10mm	MK - 17mm	
EE - 1/2	ME - 11mm (7/16")	ML - 18mm	
EF - 9/16	MF - 12mm	MM - 19mm (3/4")	
EH - 11/16	MG - 13mm	MN - 20mm	
EJ - 13/16	MH - 14mm	MO - 21mm	
	MI - 15mm		



X Dimension For Flush Socket

Head	in.	mm	Socket Size Range
F1	1.54	39	8-15mm
F2	1.69	43	10-15mm
F3	2.32	59	13-21mm
F4	2.4	61	17-21mm

Flush Socket	Head Type	Torque Range		Free Speed	Weight*		Length		Anglehead				
		ft. lbs.	Nm		RPM	lbs.	kg	in.	mm	Side to Center		Height	
Model Number										in.	mm	in.	mm
18CAE16F	F1	3.6-11.8	4.9-16	1225	4.4	2.00	16.0	406	0.55	14	1.54	39	
18CAE23F	F1	3.4-17.0	4.6-23	860	4.4	2.00	16.0	406	0.55	14	1.54	39	
18CAE30F	F1	4.4-22.1	6.0-30	655	4.4	2.00	16.0	406	0.55	14	1.54	39	
48CAE37F	F2	5.9-27.3	8.0-37	1225	5.4	2.43	18.7	474	0.67	17	1.69	43	
48CAE52F	F2	8.1-38.3	11-52	860	5.4	2.43	18.7	474	0.67	17	1.69	43	
48CAE53F	F3	8.1-39.0	11-53	850	6.0	2.74	20.0	509	0.87	22	2.32	59	
48CAE75F	F3	11.1-55.3	15-75	600	6.0	2.74	20.0	509	0.87	22	2.32	59	
48CAE110F	F3	17.0-81.1	23-110	400	7.4	3.38	20.5	521	0.87	22	2.32	59	
48CAE135F	F4	19.9-99.5	27-135	270	8.9	4.03	20.6	522	1.06	27	2.40	61	
48CAE230F	F4	34.7-172.6	47-230	150	10.6	4.79	22.2	563	1.06	27	2.40	61	

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with a approved Cooper Tools cable and controller.

Standard Equipment: Air-LB Connector.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Tube Nut Tools



Cleco®

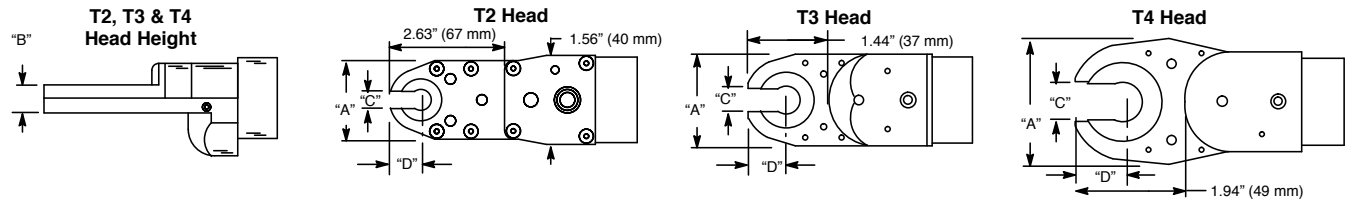
Tube Nut Series

Torque Range
10 - 40 Nm
7.4 - 29.5 Ft. Lbs.

Bolt Size
M6 - M10
1/4" - 3/8"

- Brushless precision
- Resolver control
- Memory intelligence

The 48ET tube nut wrench alternates the direction of rotation each time the lever is actuated. When rotating in reverse, the socket will stop at the open position.

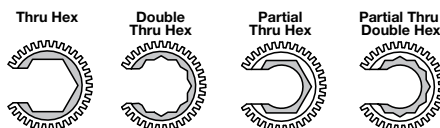


Tube Nut Tool Nomenclature

XX	C	T	E	XX	XX
Motor 48	Current Control	Connector E - Air-LB			
Tool Style T - Tube Nut					
Max Output Torque <60 Nm, rounded up to the nearest 1 Nm.					
Head Type T2 - 20 Nm T3 - 30 Nm T4 - 40 Nm					

Socket Nomenclature

KSX	XX	XX	X
Head Type KS2 - T2 KS3 - T3 KS4 - T4	Output Type 0 - Partial Thru Hex 2 - Double Thru Hex 1 - Thru Hex 3 - Partial Thru Double Hex		
Extension Length 0 - Flush 4 - 1/2" 8 - 1" 2 - 1/4" 6 - 3/4"			
Maximum Hex Socket Size			
MG, EE	T2 Head Type		
MM, 3/4"	T3 Head Type		
MU, 1 1/16"	T4 Head Type		
00, ## (Specials)	All Head Types		
Socket Sizes			
EA - 1/4"	M5 - 5mm	MH - 14mm	MP - 22mm
EC - 3/8	M6 - 6mm	MI - 15mm	MQ - 23mm
EE - 1/2	MA - 7mm	MJ - 16mm (5/8)	MR - 24mm (15/16)
EF - 9/16	MB - 8mm (5/16)	MK - 17mm	MS - 25mm
EH - 11/16	MD - 10mm	ML - 18mm	MT - 26mm
EJ - 13/16	ME - 11mm (7/16)	MM - 19mm (3/4)	MU - 27mm (1 1/16)
EK - 7/8	MF - 12mm	MN - 20mm	
EM - 1	MG - 13mm	MO - 21mm	



Note: To order individual sockets, use a "KS" prefix (i.e. KS2EA01 for a T2 1/4", Flush, Thru Hex socket.)

Tube Nut	Max. Drive Size	Torque Range		Free Speed	Weight*	Length		Head								
		Ft.Lbs.	Nm			RPM	lbs.	kg	A Width		B Blade Ht.		C Opening		D End/Cntr.	
									in.	mm	in.	mm	in.	mm	in.	mm
48CTE20T2	1/2"	7.4-14.8	10-20	1425	4.4	2.0	16.9	430	1.42	36	0.55	14	0.28	7	0.53	13
48CTE30T3	3/4"	11.1-22.1	15-30	1030	4.5	2.0	16.6	422	1.65	42	0.59	15	0.475	13	0.73	19
48CTE40T4	1 1/16"	14.8-29.5	20-40	770	5.3	2.3	17.9	454	2.36	60	0.59	15	0.675	18	0.93	24

*Weights are without tool cable and reaction bar.

General: All tools must be used with an approved Cooper Tools cable and controller.
Standard Equipment: Matrix Connector.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX.
See page 57 for additional cables and accessories.

Electric Nutrunners – Corded Current Control

Crowfoot Tools

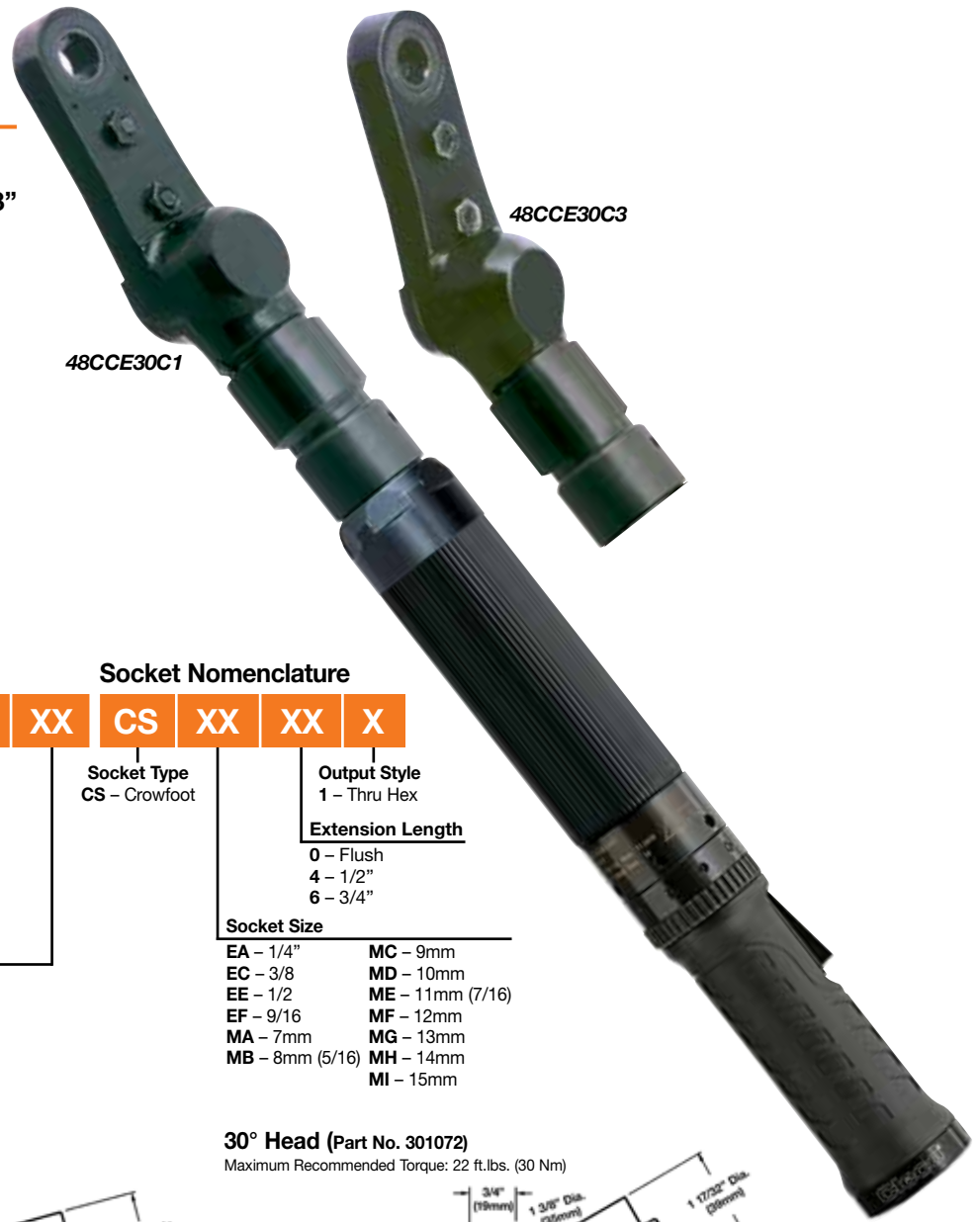


Crowfoot Series

Torque Range
7 - 30 Nm
5 - 22 Ft. Lbs.

Bolt Size
M6 - M8
#10 - 3/8"

- Brushless precision
- Resolver control
- Memory intelligence



Crowfoot Tool Nomenclature

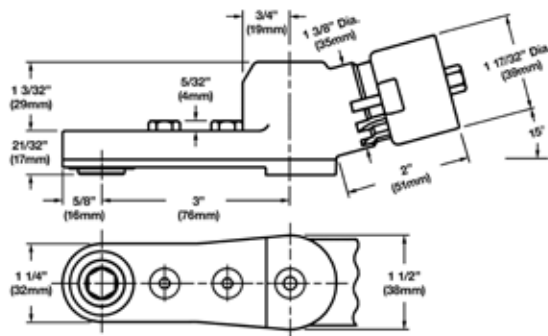
48	C	C	E	XX	XX
Motor 48	Current Control	Connector E – Air-LB			
Tool Style C – Crowfoot					
Max Output Torque <60 Nm, rounded up to the nearest 1 Nm.					
Head Type C1 – 15° Crowfoot C3 – 30° Crowfoot					

Socket Nomenclature

CS	XX	XX	X
Socket Type CS – Crowfoot	Output Style 1 – Thru Hex		
Extension Length 0 – Flush 4 – 1/2" 6 – 3/4"			
Socket Size			
EA – 1/4"	MC – 9mm		
EC – 3/8	MD – 10mm		
EE – 1/2	ME – 11mm (7/16)		
EF – 9/16	MF – 12mm		
MA – 7mm	MG – 13mm		
MB – 8mm (5/16)	MH – 14mm		
	MI – 15mm		

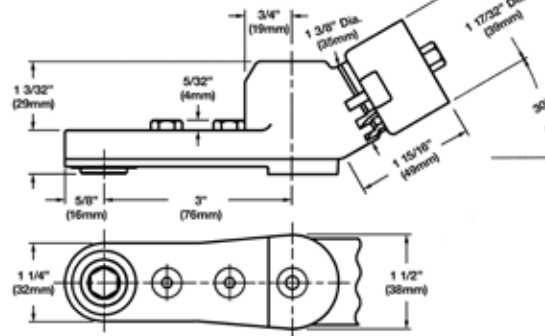
15° Head (Part No. 301071)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



30° Head (Part No. 301072)

Maximum Recommended Torque: 22 ft.lbs. (30 Nm)



Crowfoot		Torque Range		Free Speed	Weight*		Length	
Model Number		ft. lbs.	Nm	RPM	lbs.	kg	in.	mm
15° Head	30° Head							
48CCE30C1	48CCE30C3	7.7-22.1	10.5-30	860	5.5	2.3	20.5	521

*Weights are without tool cable and reaction bar.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX,

Inline swivel cable 301904-XX, Extension cable 301877-XX.

See page 57 for additional cables and accessories.

To order individual sockets, use a "CS" prefix before the required socket. (i.e. CSEA01 for a, 1/4", flush, thru hex socket.)

Electric Nutrunners – Corded Current Control

Right Angle Floating Spindle Tools



Right Angle Floating Spindle Series

Torque Range
5.1 - 230 Nm
3.7 - 169.6 Ft. Lbs.

Bolt Size
M7 - M18
1/4" - 3/4"

- Brushless precision
- Resolver control
- Memory intelligence



Right Angle Floating Spindle Tool Nomenclature

XX	C	A	E	XXX	XX	X	X
Motor 18 48	Current Control	Tool Style A – Right Angle	Connector E – Air-LB		Square Drive 3 - 3/8" (S1,S2) 4 - 1/2" (S3,S4) 6 - 3/4" (S4)	Extension Length 1 -1.13" (S1), 1.00" (S2 & S3), 1.25" (S4) 2 -2.13" (S1), 3.00" (S2), 2.5" (S4 1/2" Dr.) 5 -5.13" (S2), 4.25" (S4) 6 -6.0" (S4 1/2" Dr.), 7.0" (S4 3/4" Dr.) 11 -11.0" (S4 3/4" Dr.)	
Max Output Torque				Tool Termination			
S1 Head – 16, 23, or 30 Nm S2 Head – 37 or 52 Nm S3 Head – 53, 75, 95, or 110 Nm S4 Head – 135 or 230 Nm (48 series)				S1 Sliding (Floating) Spindle S3 Sliding (Floating) Spindle S2 Sliding (Floating) Spindle S4 Sliding (Floating) Spindle			

Right Angle Floating Spindle Model Number	Torque Range		Max. Speed	Weight*		Output Drive Size	Length		Side to Center	
	ft. lbs.	Nm	RPM	lbs.	kg		in.	mm	in.	mm
18CAE16S131	3.7-11.8	5.1-16	1225	4.4	2.00	3/8"	16.0	406	0.55	14
18CAE23S131	5.3-16.9	7.2-23	860	4.4	2.00	3/8"	16.0	406	0.55	14
18CAE30S131	4.4-22.1	6.0-30	655	4.4	2.00	3/8"	16.0	406	0.55	14
48CAE37S231	5.9-27.2	8.0-37	1225	5.4	2.43	3/8"	18.7	474	0.67	17
48CAE52S231	8.1-38.3	11-52	860	5.4	2.43	3/8"	18.7	474	0.67	17
48CAE53S341	8.1-39.1	11-53	850	6.0	2.74	1/2"	20.0	509	0.87	22
48CAE75S341	11.0-55.3	15-75	600	6.0	2.74	1/2"	20.0	509	0.87	22
48CAE95S341	14.7-70.0	20-95	460	7.4	3.38	1/2"	20.5	521	0.87	22
48CAE110S341	16.9-81.1	23-110	400	7.4	3.38	1/2"	20.5	521	0.87	22
48CAE135S461	20.6-99.5	28-135	270	8.9	4.03	3/4"	20.6	522	1.06	27
48CAE230S461	34.6-169.6	47-230	150	10.6	4.79	3/4"	22.2	563	1.06	27

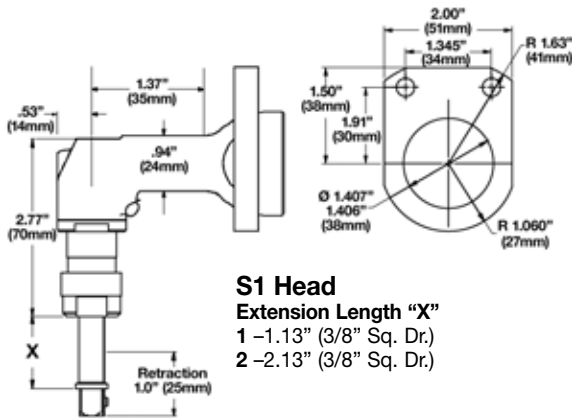
*Weights are without tool cable and mounting plate.

General: All tools must be used with an approved Cooper Tools cable and controller.

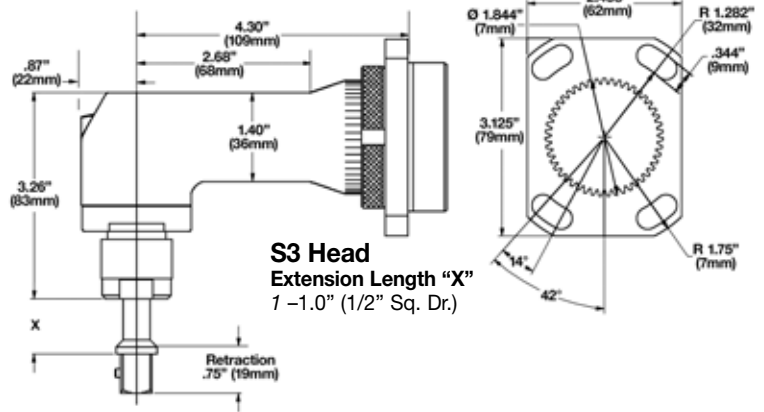
Standard Equipment: Matrix Connector; Mounting plate.

Extra Equipment: Std. tool cable 301866-XX, RA swivel cable 301903-XX, Inline swivel cable 301904-XX, Extension cable 301877-XX. See page 57 for additional cables and accessories.

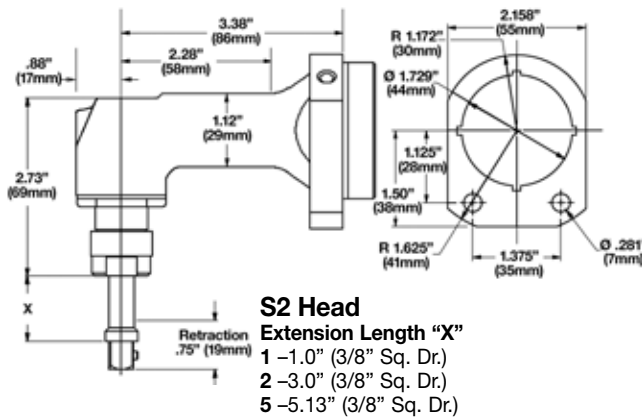
18CAE & 48CAE Floating Spindle Angle Heads



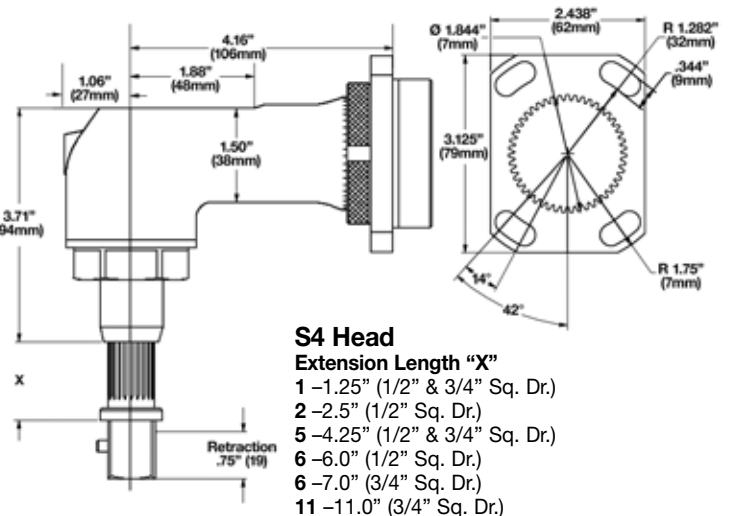
S1 Head
 Extension Length "X"
 1 -1.13" (3/8" Sq. Dr.)
 2 -2.13" (3/8" Sq. Dr.)



S3 Head
 Extension Length "X"
 1 -1.0" (1/2" Sq. Dr.)



S2 Head
 Extension Length "X"
 1 -1.0" (3/8" Sq. Dr.)
 2 -3.0" (3/8" Sq. Dr.)
 5 -5.13" (3/8" Sq. Dr.)



S4 Head
 Extension Length "X"
 1 -1.25" (1/2" & 3/4" Sq. Dr.)
 2 -2.5" (1/2" Sq. Dr.)
 5 -4.25" (1/2" & 3/4" Sq. Dr.)
 6 -6.0" (1/2" Sq. Dr.)
 6 -7.0" (3/4" Sq. Dr.)
 11 -11.0" (3/4" Sq. Dr.)

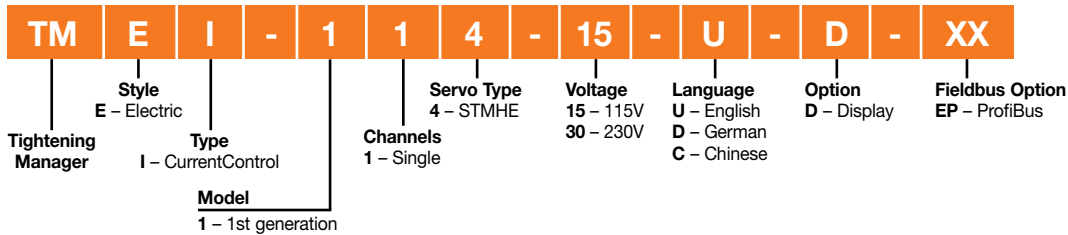
Tightening Manager Controller – Current Control

TMEI “Mini” Series



TMEI

- **Input Voltage:** 115/230VAC
- **Connections:** (1) Serial, (1) TM-COM, (1) Ethernet
- **Inputs/Outputs:** (8) 24V Inputs, (8) 24V Outputs
- **Fieldbus Option:** ProfiBus



Model Number		Features	Weight		Width		Height		Depth	
115VAC	230VAC		lbs.	kg	ins.	mm	ins.	mm	ins.	mm

TMEI “Mini”

TMEI-114-15- *	TMEI-114-30- *	Ethernet - IO	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6
TMEI-114-15- * -EP	TMEI-114-30- * -EP	Ethernet - IO - Profibus	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6
TMEI-114-15- * -D	TMEI-114-30- * -D	Ethernet - IO - Display	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6
TMEI-114-15- * -D-EP	TMEI-114-30- * -D-EP	Ethernet - IO - Profibus, Display	42	19.1	7.9	200.7	16.2	411.5	12.7	322.6

Connectivity: (1) Serial, (1) TM-COM, (1) Ethernet, (8) 24V Inputs, (8) 24V Outputs.

*Languages offered: C-Chinese, D-German, U-English.
TM-COM1M included.

NOTE: 48 series tools require TMEI 230VAC.

See page 63 for available programming languages.

Electric Nutrunner & Controller – Current Control

Accessories



Tool Cables

Model Number		Swivel		Length	
Tool	Extension	Right Angle	Inline	Feet	Meters
301866-1M*	301877-1M	301903-1M*	301904-1M*	3	1
301866-2M*	301877-2M	301903-2M*	301904-2M*	6	2
301866-3M	301877-3M	301903-3M	301904-3M	9	3
301866-6M	301877-6M	301903-6M	301904-6M	19.5	6
301866-8M	301877-8M	301903-8M	301904-8M	26	8
301866-10M	301877-10M	301903-10M	301904-10M	33	10
301866-15M	301877-15M	301903-15M	301904-15M	49	15
	301877-20M			66	20
	301877-25M			82	25
	301877-30M			96	30
	301877-40M			131	40
301866-50M	301877-50M	301903-50M	301904-50M	164	50

Maximum cable length 100M 115VAC/20M 230VAC.

Overall minimum cable length 3M.

*Must be used with 301877 extension cable.



Swivel cable rotates 330° to absorb constant twisting and turning.



Swivel Cable

8 Position Remote Parameter Switch



Description	Part Number
Remote Parameter Switch (with 25' integrated cable)	542979
Remote Parameter Switch (with 50' integrated cable)	542979-50

Direct Connect Cables

Connects controller direct to PC

Part No.	Description	Length	
		ft.	m
543446-7	Ethernet crossover cable	7	2
543490-10	Serial cable null modem	10	3

Phoenix Connectors

Part No.	Description
542892	Input Phoenix connector
542893	Output Phoenix connector
939348	Hood/strain TME I/O cable relief



ACCESSORY CABLE

Accessory Cables

Controller to Input Accessory	Input Acc. to Input Acc.	Controller to Synch Box	Controller to 1 Spindle Annunciator	Controller to 2 Spindle Annunciator	Synch Box to Input Accessory	Synch Box to Annunciators (2/more spindles)	Length	
							ft.	m
542985-3	542986-3	576058-3	542989-3	543451-3	542987-3	542988-3	3	1
542985-9	542986-9	576058-9	542989-9	543451-9	542987-9	542988-9	9	3
542985-25	542986-25	576058-25	542989-25	543451-25	542987-25	542988-25	25	7.5
542985-50	542986-50	576058-50	542989-50	543451-50	542987-50	542988-50	50	15

Input Accessories

Torque Selector Switches

Torque Selector	Part Number
8 Select	542977-8
16 Select	542977-16
32 Select	542977-32
64 Select	542977-64



Annunciators

Spindles	Part Number
1	542976-1
2	542976-2
3	542976-3
4	542976-4
5	542976-5
6	542976-6



Start/Stop Switches

Description	Part No.
Start Box	542972
Stop Box	542973
Start/Stop Box	542974
Start/Stop/Reverse	542975



Socket Trays

Part No.	Description
542978-4	Four position
542978-8	Eight position

Notes: Up to 16 linked 4 position trays maximum.
Minimum socket O.D. 1".
Maximum O.D. 2.25".



Patch Cables

Connects Ethernet Switches to controller or PC

Part Number	Length	
	Feet	Meters
543445-7	7	2
543445-50	50	15
543445-100	100	30

Synch Boxes

Spindles	Part No.
2	576060-2
3	576060-3
4	576060-4
5	576060-5
6	576060-6



115VAC Ethernet Switches

Part Number	Ports			Approx. Dimensions		Approx. Weight	
	Total	In	Out	Inches	mm	lbs.	kg
543444-8	8	1	7	6.5x4.5x1.5	160x110x35	0.6	0.3
543444-16	16	1	15	7x6x2.5	185x150x65	1.1	0.5
543444-24	24	1	23	10.5x7x2	270x170x50	3.0	1.3

Socket Trays

Part No.	Description
960645	Four position w/10m cable
960646	Eight position w/10m cable

Maximum socket diameter 1.125".



Replacement Inserts

Part Number
S970716

For use with 960645 & 960646 socket trays.



Socket Posts

For use with 542978-4 & 542978-8 socket trays.

Part Number	Socket Post Size
99249181	.550/.540
99249169	1.062/1.052
99249165	.590/.580
99249164	.945/.935
99249163	.827/.817
99249162	.709/.699
99249161	.625/.615
99249160	.437/.432
99249159	.812/.802
99249158	.687/.677
99249157	.875/.865
99249156	1.000/.990
99249148	1.125/1.115
99249147	.938/.928
99249104	.750/.740
99249103	.669/.659
99249102	.562/.552
99249101	.500/.490

Note: Select socket post size within tolerance of socket used.

Lockout Washer

For use with 542978-4 & 542978-8 socket trays.

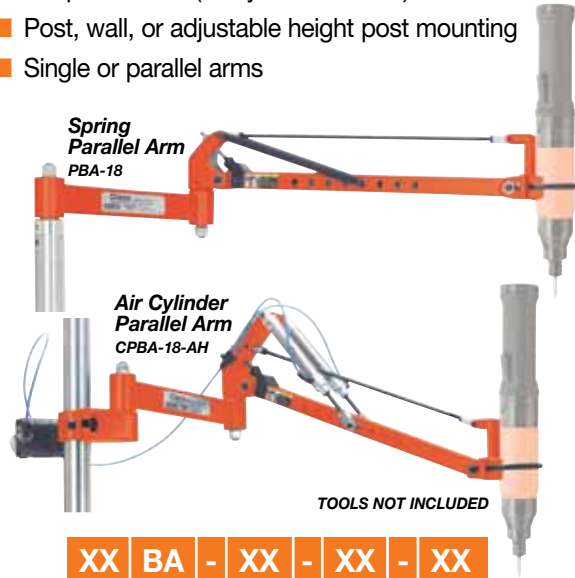
Part Number	Note
99248150	Vacant position lockout washer

Electric Nutrunner Accessories

Balance Arms



- Ball bearing construction
- Supports tools weighing up to 5 lbs. (spring models) or up to 10 lbs. (air cylinder models).
- Post, wall, or adjustable height post mounting
- Single or parallel arms



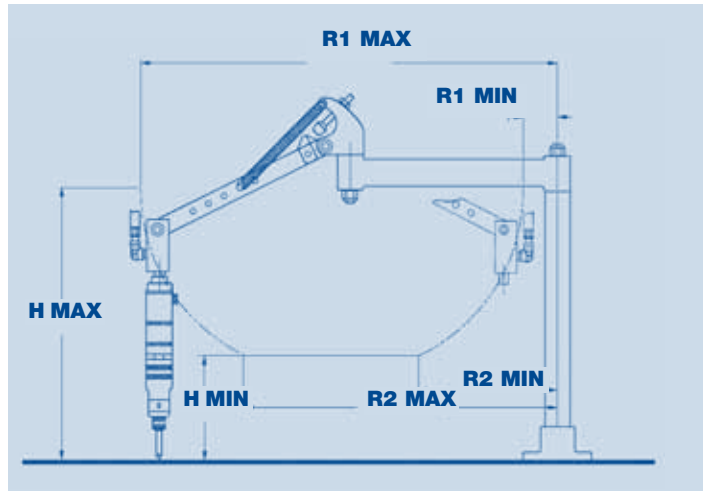
TOOLS NOT INCLUDED

XX BA - XX - XX - XX

Series	Arm Extension	Mount	Adjustable Arm Extension
CS - Air cylinder, single arm	12" 24"	- Post	12" 24"
S - Spring, single arm	18" 30"	AH - Adjustable Height	18" 30"
CP - Air cylinder, parallel arm	(12" unless specified)	WM - Wall Mount	
P - Spring, parallel arm			
Tool Type			
BA - Balance Arm			

Balance Arm Operating Envelope

MODEL	R1 MAX		R1 MIN		R2 MAX		R2 MIN		H MAX		H MIN	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
SBA-12	24	610	2	51	18	457	8	203	15	381	6	152
SBA-18	30	762	6	152	20	508	7	178	15	381	0	0
PBA-12	26	660	3	76	20	508	7	178	17	432	8	203
PBA-18	32	813	8	203	22	559	6	152	17	432	2	51

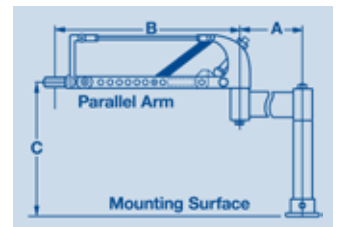
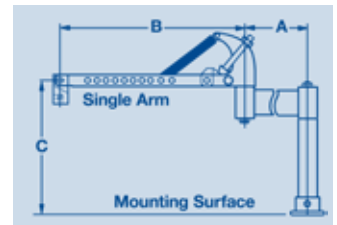


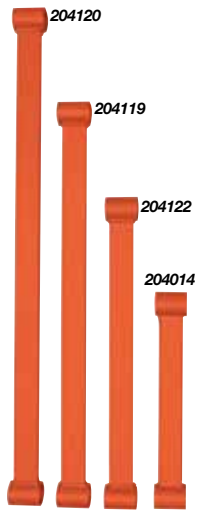
Single Arms		Parallel Arms		Dimensions							
Model No.	Code No.	Model No.	Code No.	A		B		C		D	
				in.	mm	in.	mm	in.	mm	in.	mm
Air Cylinder Models											
CSBA18	520160	CPBA-18	520170	12	305	18	457	18	457	-	-
CSBA-24	520200			12	305	24	610	18	457	-	-
CSBA-30	520201	CPBA-30	520203	12	305	30	762	18	457	-	-
CSBA-12-AH	520165	CPBA-12-AH	520178	12	305	12	305	-	-	30	762
CSBA-18-AH	520162	CPBA-18-AH	520172	12	305	18	457	-	-	30	762
CSBA-30-AH	520167	CPBA-30-AH	520215	12	305	30	762	-	-	30	762
		CPBA-30-WM	520207	12	305	30	762	-	-	-	-
Spring Models											
SBA-12	520001	PBA-12	520007	12	305	12	305	18	457	-	-
SBA-18	520004	PBA-18	520010	12	305	18	457	18	457	-	-
		PBA-24	520045	12	305	24	610	18	457	-	-
SBA-12-AH	520003	PBA-12-AH	520009	12	305	12	305	-	-	30	762
SBA-18-AH	520006	PBA-18-AH	520012	12	305	18	457	-	-	30	762
SBA-24-AH	520110	PBA-24-AH	520047	12	305	24	610	-	-	30	762
SBA-30-AH	520044	PBA-30-AH	520050	12	305	30	762	-	-	30	762
		PBA-18-18-AH	520036	18	457	18	305	-	-	30	762
		PBA-12-WM	520008	12	305	12	305	-	-	-	-
SBA-30-WM	520043			12	305	30	762	-	-	-	-

AH = Adjustable Height WM = Wall Mounted
 Tool weight capacity: 10 lbs. (4.6 kg) Air Cylinder models
 5 lbs. (2.3 kg) Spring models
 Torque capacity: 10 ft. lbs. (13.5 Nm)

Standard Equipment: Operating Instructions and Service Manual.
 Regulator for Air Cylinders.
 Threaded Nipples for CSBA Models
 1/4 NPT Hex Nipple: 204032 1/4 NPT x 1/8 NPT Hex
 Reducer Nipple: 204137

Optional Equipment: Additional accessories: See page 59.





Articulating Arm Extensions

Part Number	Length (inches)
204014	12
204122	18
204119	24
204120	30

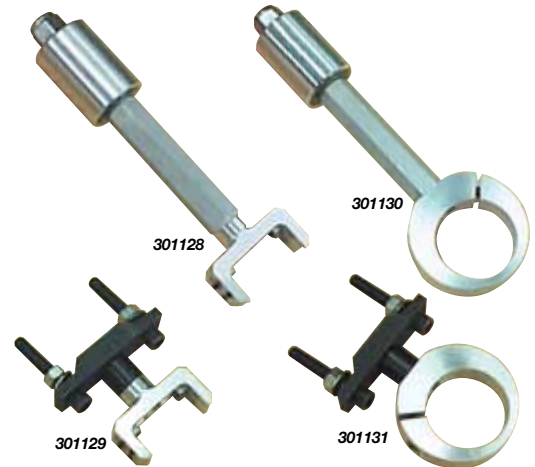
Conversion Kits for Cleco Screwdriver Balance Arms

To Convert Balance Arms		Part No.
From	To	
SBA-12	PBA-12*	521041
SBA-18	PBA-18*	521042
Spring	Cylinder	201606
SBA or PBA Standard Duty	SBA or PBA Heavy Duty**	521060

*Conversion kits for -24 and -30 models are available upon request.
 **Has four springs to support heavier tools or longer arms.

Tool Holders

Part Number	Description
301128	17/47 Pistol-Horiz. Tool Holder
301129	17/47 Pistol- Vert. Tool Holder
301130	17/47 Inline-Horiz. Tool Holder
301131	17/47 Inline-Vert. Tool Holder



Ergonomic Tool Balancers

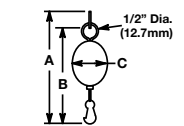
Capacity:
 0.5 – 20.5 kg
 1.0 – 45 Lbs

- External tension Adjustment
- 360° Swivel
- Retracting In-Line Cable

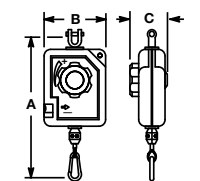


Model No.	Lock Feature	Capacity		"A"		"B"		"C"		Weight	
		lbs.	kg	in.	mm	in.	mm	in.	mm	lbs.	kg
Light Duty – 4.6 ft. (1.4m) Cable Travel											
PL-12A	-	12.0-1.0	5.5-0.5	6.8	171	5.1	130	2.3	58	-	-
Light Duty – 5.0 ft. (1.5m) Cable Travel											
200427	-	2.0-0	.9-0	10.9	277	4.4	112	1.6	41	1.3	0.6
200428	-	4.0-2.0	1.8-9	10.9	277	4.4	112	1.6	41	1.3	0.6
200429	-	5.0-3.0	2.3-1.4	10.9	277	4.4	112	1.6	41	1.3	0.6
Light Duty – 5.2 ft. (1.6m) Cable Travel											
BL-2A	-	2.0-1.0	0.9-0.5	10.4	263	4.0	102	2.2	56	1.1	0.5
BL-4A	-	4.0-2.0	1.8-0.9	10.4	263	4.0	102	2.2	56	1.1	0.5
Light Duty – 6.7 ft. (2.0m) Cable Travel											
BL-6A	-	6.0-4.0	2.7-1.8	12.9	327	5.5	140	3.1	79	3.3	1.5
BLL-6A	Ratchet	6.0-4.0	2.7-1.8	12.9	327	5.5	140	3.1	79	3.3	1.5
BL-8A	-	8.0-6.0	3.6-2.7	12.9	327	5.5	140	3.1	79	3.3	1.5
BLL-8A	Ratchet	8.0-6.0	3.6-2.7	12.9	327	5.5	140	3.1	79	3.3	1.5
Medium Duty – 6.6ft. (2.0m) Cable Travel											
BM-13A	Automatic	13-9.0	5.9-4.1	13.8	350	6.9	175	4.5	114	9.0	4.1
BML-13A	Automatic/Ratchet	13-9.0	5.9-4.1	13.8	350	6.9	175	4.5	114	9.0	4.1
BM-18A	Automatic	18-13	8.2-5.9	13.8	350	6.9	175	4.5	114	9.0	4.1
Medium Duty – 6.0ft. (1.8m) Cable Travel											
BM-25A	Automatic	25-18	11.4-8.2	20.7	527	7.8	197	6.6	169	19	8.6
BM-35A	Automatic	35-25	15.9-11.4	20.7	527	7.8	197	6.6	169	19	8.6
BM-45A	Automatic	45-35	20.5-15.9	20.7	527	7.8	197	6.6	169	19	8.6

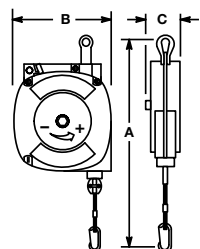
*4.9 ft. cable travel



Light Duty (PL Series)



Light Duty (BL Series)



Medium & Heavy Duty



TM-COM Network Software

Cooper Tools' proprietary TM-COM software delivers ultimate control to the user, empowering them to control the production process remotely through programming that is easy to use and intuitive. Anything that can be programmed locally on the controller can also be done from a remote location using the exact same screens.

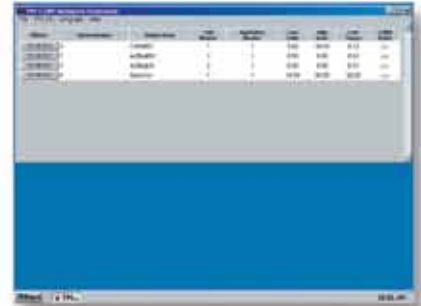
Using TM-COM software to monitor, modify, and/or manage the production line will increase your efficiency and productivity. Centralized management of the tightening process assures quality products.

TM-COM can communicate using either a RS232 serial connection or through an Ethernet TCP/IP connection.



TM-COM Software

Part Number	Description
TM-COM-V2.05	TM-COM network software, USB key



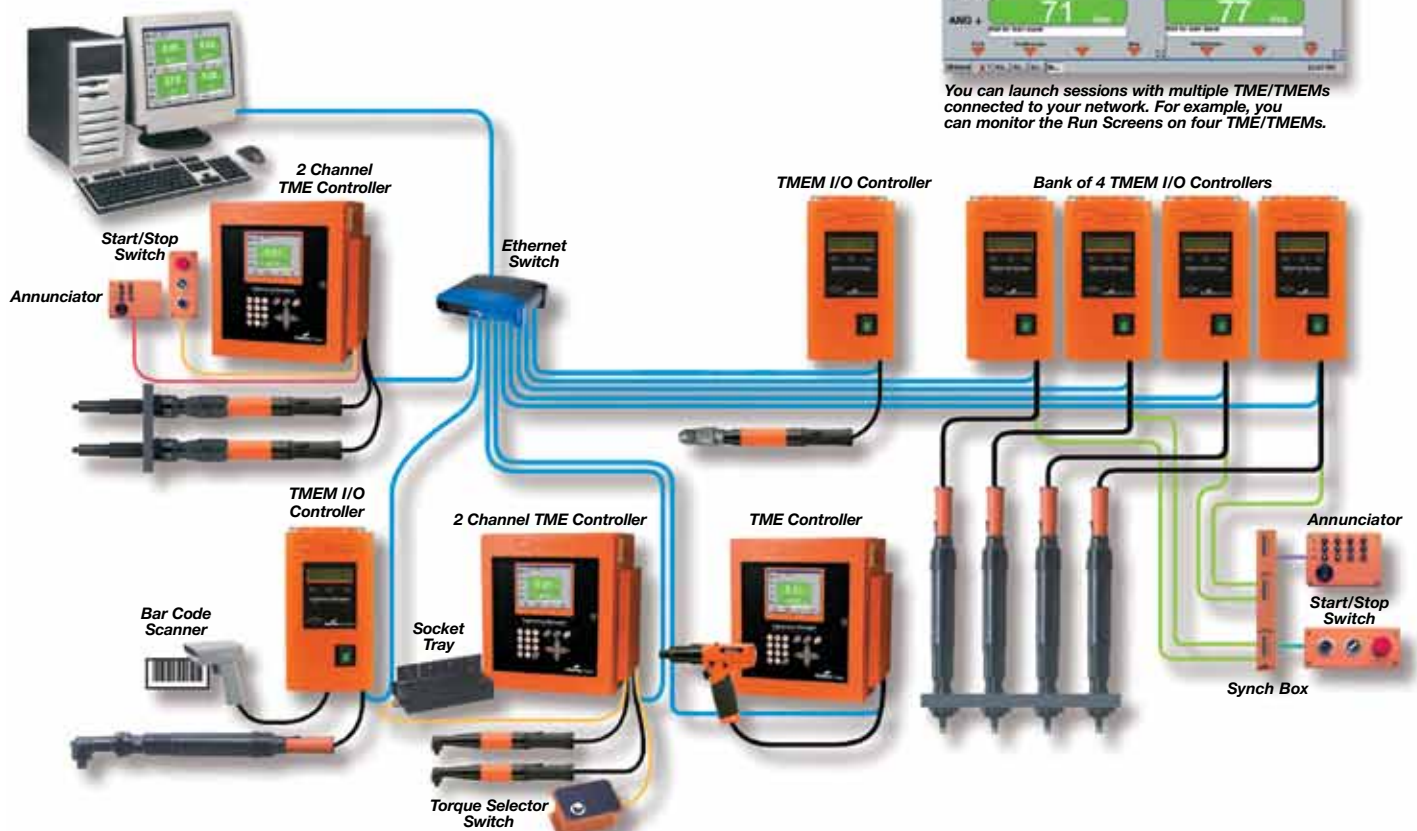
Network Overview Screen lists all Tightening Managers connected to the network.



From the Navigator Screen, you can access all the programming screens available on the TME or TMEM.



You can launch sessions with multiple TME/TMEMs connected to your network. For example, you can monitor the Run Screens on four TME/TMEMs.



Cleco®

TM-COM1 Setup Software

Cooper Tools' TM-COM1 software works just like TM-COM except it will communicate with only one controller at a time.

TM-COM1 can communicate using either a RS232 serial connection or through an Ethernet TCP/IP connection.



When TM-COM1 is first launched, a pop-up menu will be displayed. From this menu, the user will choose the communication method to the TME or TMEM - either RS232 serial or Ethernet.



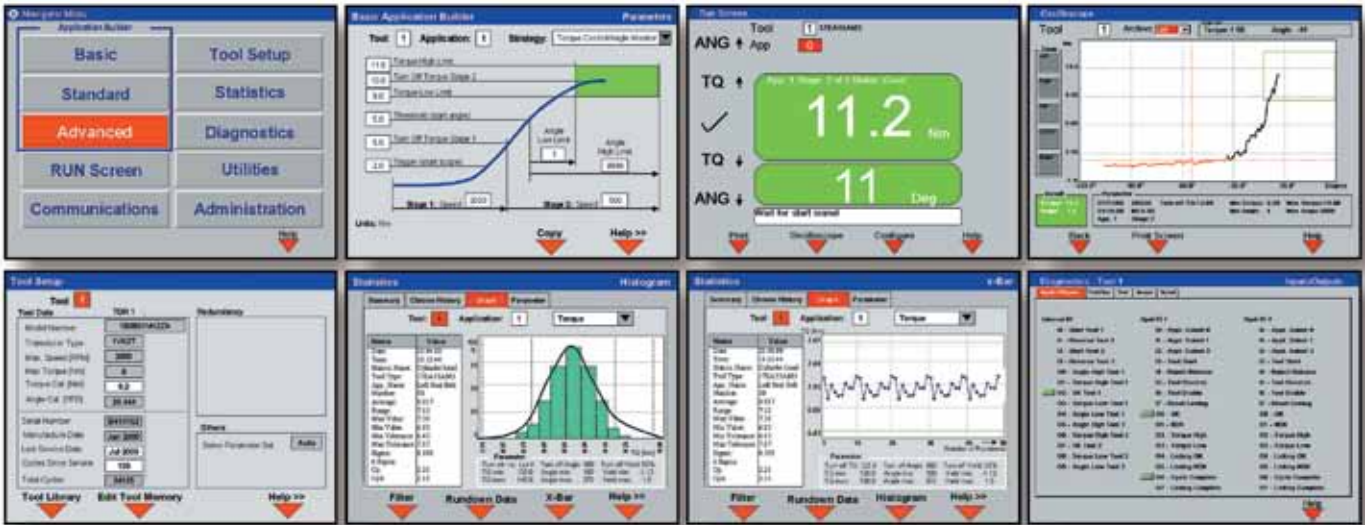
Once the communication method is chosen, another pop-up screen will appear for the user to set up the chosen method. When the user clicks "OK", the familiar Navigator screen appears. From the Navigator screen, the user can access all the programming screens to completely set up the TME or TMEM for normal operation.

TM-COM1 Software

Part Number	Description
TM-COM1-V2.05	TM-COM1 setup software, USB key



All screens available on TME and TM-COM are also available in TM-COM1.



TM-COM1 connected to standard TMEM via RS232 serial.

TM-COM1 connected to TMEM I/O via RS232 serial.

TM-COM1 connected to TME via Ethernet crossover cable.

TM-COM1 connected to TME 2-channel via Ethernet crossover cable.



TM-COM1M “Mini” Software

Cooper Tools’ TM-COM1M is a simplified version of TM-COM1. This software is included free with every Cleco Tightening Manager controller.

The limited screen offering of TM-COM1M still allows the user to program critical fastening strategies, program multi-stage rundowns, and change speeds.

The hardware connection methods are the same as TM-COM1. Communication is either RS232 serial connection or through an Ethernet TCP/IP connection.



TM-COM1M ships FREE with every Cleco Tightening Manager controller!



A limited number of screens are available in TM-COM1M.



TM-COM1M connected to standard TMEM via RS232 serial.

TM-COM1M connected to TMEM I/O via RS232 serial.

TM-COM1M connected to TME via Ethernet crossover cable.

TM-COM1M connected to TME 2-channel via Ethernet crossover cable.

Software

Part Number	Description
TM-COM-V2.05	Network software, 10 installs (Serial cable included)
TM-COM1-V2.05	Setup software, 10 installs (Serial cable included)
543448	Notebook computer loaded with TM-COM (Carrying case included)
543449	Desktop computer loaded with TM-COM (Monitor, keyboard and mouse included)
543488	Notebook computer loaded with TM-COM1 (Carrying case included)

TM-COM Minimum System Requirements

- Operating System:** Windows 2000, NT or XP
- Processor:** Pentium
- Memory:** 256MB
- Free Disk Space:** 10MB per controller
- Other:** MS Office 2000

TM-COM1 & TM-COM1M Minimum System Requirements

- Operating System:** Windows 2000, NT or XP
- Processor:** Pentium
- Memory:** 256MB
- Other:** MS Office 2000
- If connected to:** TMEM Standard – RS232 serial connection
TMEM I/O – RS232 serial or Ethernet connection
TME – RS232 serial or Ethernet connection

115VAC Ethernet Switches

Part No.	Ports			Approx. Dimensions		Weight	
	Total	In	Out	Inches	mm	lbs.	kg
543444-8	8	1	7	6.5x4.5x1.5	160x110x35	0.6	0.3
543444-16	16	1	15	7x6x2.5	185x150x65	1.1	0.5
543444-24	24	1	23	10.5x7x2	270x170x50	3.0	1.3

Direct Connect Cables

Connects TME or TMEM direct to PC

Part No.	Description	Length	
		ft.	m
543446-7	Ethernet crossover cable	7	2
543490-10	Serial cable null modem	10	3

Patch Cables

Connects Ethernet Switches to TME or PC

Part Number	Length	
	Feet	Meters
543445-7	7	2
54 3445-50	50	15
543445-100	100	30

Programming Languages*

All TME, TMEI, and TMEM controllers offer programming in the languages listed below.

All programming software, as well as the user interface on a TME, allows programming in the languages listed below.

- English
- German
- Italian
- Spanish
- Czechoslovakian
- Portuguese
- French
- Polish
- Nederland
- Chinese**

* The languages listed as part of the controller model number refers only to the language of the programming manual shipped with each unit.

** Requires special software to be loaded to the controller.

Software Functionality

	TM-COM	TM-COM1	TM-COM1M
Overview Screen	*		
Network Software	*	*	*
Single point serial connection	•	•	•
Single point Ethernet connection	•	•	•
Navigator	•	•	•
Basic Application Builder	•	•	•
Torque Control/Angle Monitor	•	•	•
Angle Control/Torque Monitor	•	•	•
Standard Application Builder (Seq 11,30,50,41)	•	•	•
High Speed Rundown	•	•	•
Torque Control/Angle Monitor	•	•	•
Angle Control/Torque Monitor	•	•	•
Angle Controlled Backoff	•	•	•
TubeNut	•	•	•
Advanced Application Builder	•	•	•
Setup Matrix	•	•	•
+24V Inputs/Outputs	•	•	•
I/O Mapping	•	•	•
FieldBus	•	•	•
DeviceNet	•	•	•
Profibus	•	•	•
Linking	•	•	•
System Settings	•	•	•
Run Screen	•	•	•
Oscilloscope graphs	•	•	•
Communications	•	•	•
Data Transmission	•	•	•
Part ID (Barcode)	•	•	•
Printer	•	•	•
Tool Setup	•	•	•
Read Tool Memory	•	•	•
Tool Library	•	•	•
Statistics	•	•	•
Chrono History	•	•	•
X-bar, Range, Histogram charts	•	•	•
Export Data	•	•	•
Data Filter	•	•	•
Diagnostics	•	•	•
(I/O, Fieldbus, Arcnet, Tool)	•	•	•
Inputs/Outputs	•	•	•
FieldBus	•	•	•
Tool	•	•	•
Arcnet	•	•	•
Serial	•	•	•
Utilities	•	•	•
Software Upgrade	•	•	•
Administration	•	•	•
Load/Save system setup	•	•	•
Print reports + system setup	•	•	•
Password	•	•	•
Time/Date	•	•	•
Language Selection	•	•	•
Counter	•	•	•

Your Single Source For Custom Automated Systems

Automated Systems provides custom solutions for the automated fastening of threaded joints.

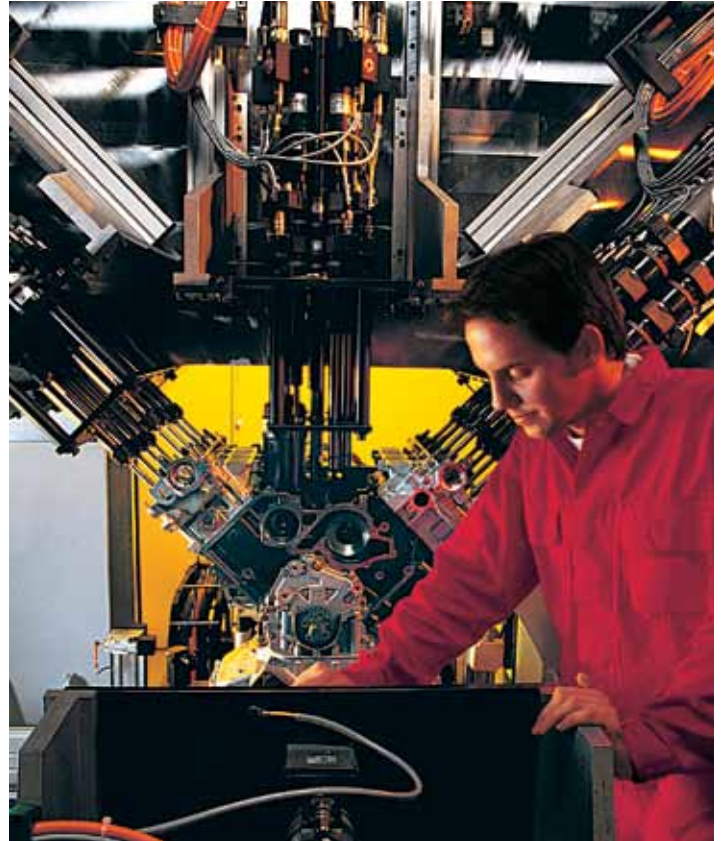
Our global customers span the entire vehicle assembly market, including passenger cars and trucks, power train assembly, off-road vehicles, and agricultural machines. We support machine tool builders in the vehicle and industrial markets with custom fastening system designs based on proven fastening product building modules.

Over many decades, Automated Systems has been providing custom solutions for training, service, and support. From single handheld nutrunners to multiple spindle machines, our custom designed systems are used around the world in an interesting variety of applications.

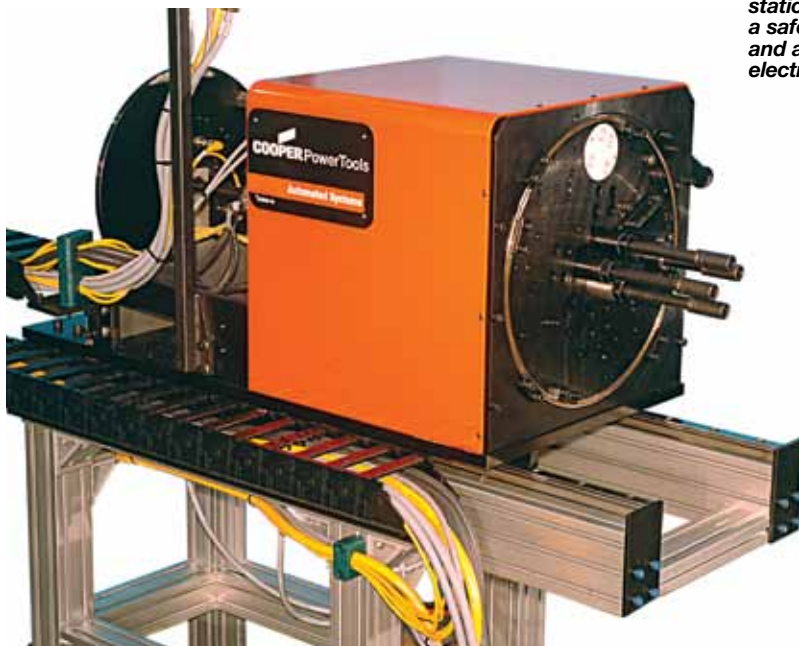
We have a full support staff of Sales Engineers, Mechanical Engineers, Controls Engineers, Project Managers, Field Service Engineers and In house Service Engineers waiting to serve you.

Custom Automated Solutions

The custom designed equipment Automated Systems creates can be configured in either vertical or horizontal orientations depending on the application and customer requirements



An automatic station on an engine assembly line uses two opposing electric power heads, each having 8 spindles, and a center power head of 6 spindles.



Shown above is a manually operated system with a four (4) spindle powerhead that has the capability to manually orientate the spindles radially.

Shown below is a semi-automated water-pump subassembly fastening station. This station design includes a safety light curtain and a 4 spindle fixtured electric tool.

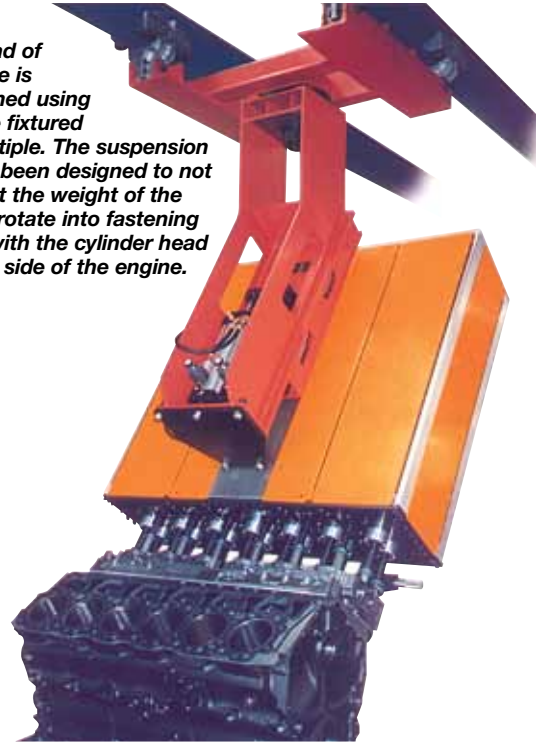


utilizing standard components. Designs may incorporate operator input or be fully automated dependent on the needs of the customer.

Automated Systems' products use high-efficiency electric motors manufactured by Cooper Tools specifically for this application. Available motor torques range from 2 Nm to 4,000 Nm. Motor spindles can be mounted and arranged to match any pattern using standard in-line, special offset, and 90° angle electric motors.

In order to apply our powerhead designs, we also design custom suspension systems along with cable management systems to provide support and movement. In addition to custom built stations fitted with fixtured nutrunner powerheads, Automated System designs, builds, installs and provides service and support from the complete fastening lines.

The left cylinder head of a V12 engine is being fastened using a 26 spindle fixtured electric multiple. The suspension system has been designed to not only support the weight of the tool, but to rotate into fastening alignment with the cylinder head on the right side of the engine.

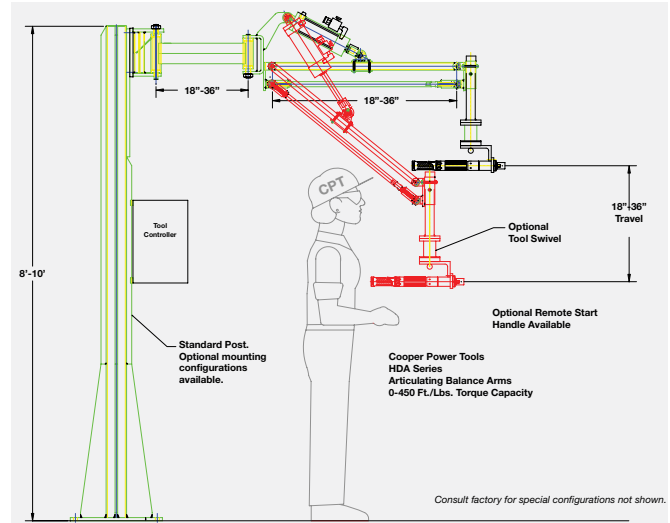


The above manually operated railroad wheel bearing multiple has the capability to tighten three (3) fasteners equally spaced on various centers between 3.50" to 5.85" diameters up to 600 NM torque.

Articulating Support Arms

The basic underlying reason for the use of an articulating arm is to improve productivity through applied ergonomics. A manufacturer cannot ignore the pressure to improve productivity of employees because of the impact productivity has on the bottom line.

Automated Systems offers an articulating arm that can be designed for your suspension application. Articulating arms are also called tool balance arms. Automated Systems' HDA series articulating arms are sized and designed to accommodate different size tools and mounting brackets required for specific applications. The arm can be suspended from an overhead rail,



structural column, ceiling mounted or post. The tool is typically mounted on the end of the arm.

Uses for Articulating Arms

- Stop or AGV stations
- Slow moving conveyor arms
- Work cells
- Side or overhead tool position work

Typical Articulating Arm Features

- Single or parallel arms
- Arm leveling base
- Boom
- Air balancing cylinder
- Mounting end
- Lift arm

Optional Features

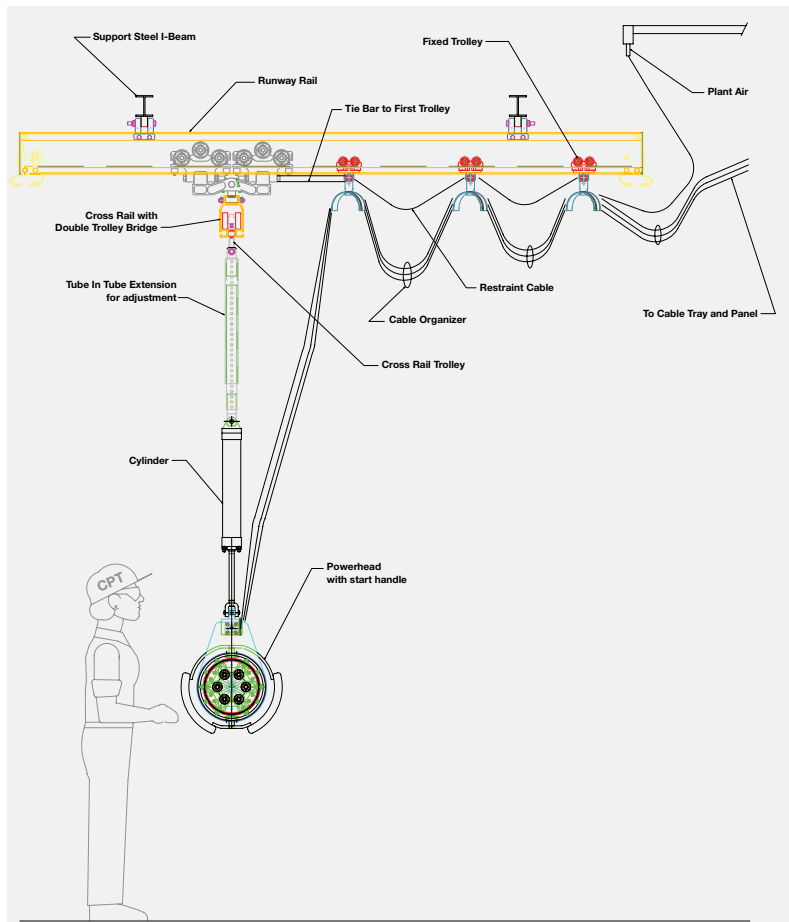
- Pneumatic or electric disc brake

Cable Management

Cooper Tools can provide you with assistance ranging from concept to installation of an efficient cable management solution. Cooper Tools equipment uses cables in conjunction with hand held tools, fixtured hand tools or when nutrunners are provided for incorporation into automated systems.

Cables need to be protected throughout their routing. We protect the cables from machine movement, equipment, chaffing, sharp objects, vibration, heat and liquid.

We have a full support staff of Sales Engineers, Mechanical Engineers, Controls Engineers, Project Managers, Field Service Engineers and In-house Service Engineers waiting to serve you.





Repair bay operator is using a two spindle fixtured tool to fasten components of a wheel hub assembly.



Modular Handling Systems for Handheld Nutrunners & Tightening Spindles

Advantages

- High flexibility/adaptability to your fastening application
- Compact and coordinated system
- Effortless handling
- Can handle DGD and EMT spindles as well as Cleco DC nutrunners
- Modular components means short delivery times

Standard Features

- Dual start/stop handles
- Lightweight aluminum covers & frame
- E-stop
- Ease of service. Easy spindle removal for maintenance or calibration
- Remote spindle indicator lights

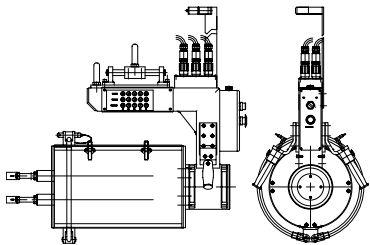
- 2 inch retractable spindle travel
- On-powerhead calibration
- Extended support tubes

Optional Features

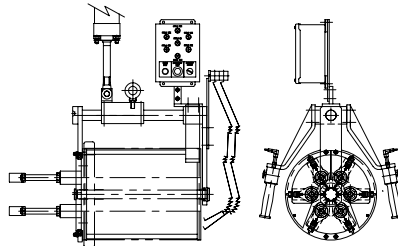
- Powerhead kick-off from wheel
- Remote digital display (MMI)

- Headlights
- Adjustable spindle centers
- Auto spindle retraction for multi-product assembly lines
- Fabricated steel suspension arm
- Part detection

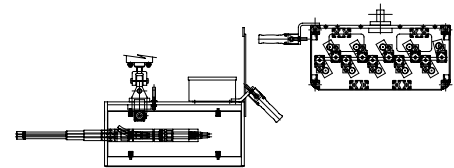
Typical Torque Handling System Configurations



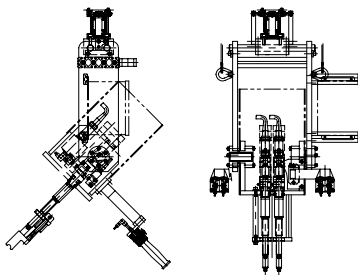
Horizontal Rear Trunion Mount (Wheelnut Application)



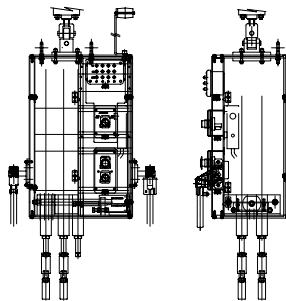
Horizontal Front Trunion Mount (Wheelnut Application)



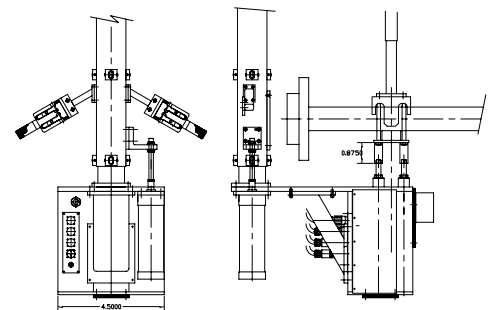
Horizontal Enclosure (Exhaust Manifold Application)



Angled Down Swivel Open Frame (Rocker Application)



Vertical Down Enclosure (U-bolt Application)



Vertical Up Enclosure (U-bolt Application)

Wheelnut Fastening

Cooper Tools is the recognized leader in the design and manufacture of multiple spindle wheelnut assembly systems. We are known across the globe for excellence of innovative engineering design, support, and quality award winning service.

Decades of expertise in the design and manufacturing of multiple spindle fixtured and portable assembly systems have identified Cooper Tools as an experienced, innovative supplier capable of creating custom solutions matched to unique customer assembly requirements.

Cooper Tools makes use of standard system building block components which are used to blend a custom system from a complete line of DC electric spindles, fastening controllers and an extensive listing of twenty-four different fastening strategies which not only include the usual Torque Control, Angle Control and Yield, but also includes the unusual Pulse Torque Recovery makeup torque fastening strategy awarded US Patent number 5,094,301.

Medium Duty Wheelnut Tool For Passenger Vehicles requiring Medium Torque, High Volume

- 100 Nm to 500 Nm

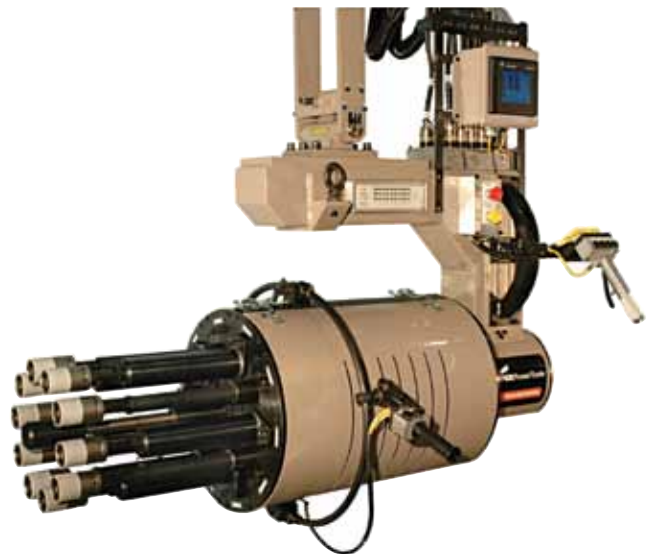
Cooper Tools supplies custom Wheelnut multiple designs using standard major components with proven track records for reliability, lifetime performance, millions of cycles capability and ergonomic solutions which support operator safety, comfort and efficiency.



Heavy Duty Wheelnut Tool For Trucks requiring High Torque, Low Volume

- 700 Nm to 1200 Nm

Cooper Tools Wheelnut multiples use high-efficiency electric motors manufactured specifically for this application. Available motor torques range from 700 Nm to 1200 Nm. Motor spindles can be mounted and arranged to match any bolt circle pattern, using standard in-line motors with or without offset gearing.



Adjustable Wheel Stud Centers

When several similar wheels need to be assembled and the economics of separate powerheads dictates a single powerhead, Cooper has the answer! Adjustable stud centers. The position of the studs can be controlled by an operator manual switch, or auto detection.



Budd Double Wheels

When it comes to fastening inner and outer wheel lug nuts including Budd style stud/nut adapters, a wheelnut powerhead requires long retractable spindles which are designed to prevent side loading. Cooper Tools has the know-how, and the products to supply wheelnut multiples for double wheel truck applications. Our wheel equipment is more rugged than the trucks it assembles.

Suspension System

A properly designed suspension system can not only support the tool and return it to a home position, it can also provide a zero gravity lift and hold. The total weight of the tool is controlled by the operator with very little pressure required to move the tool up or down.



Local Operator Display (Operator Interface)

Each powerhead displays a red, green, and yellow LED on a per spindle basis. The LED display indicates the status of the last tightening as NOK, OK and Low Torque or Angle. An optional local operator interface display can be used to display output, and accept touch screen switch inputs.



Some of the uses of a local operator display include:

- Application selection
- Tool home position jog
- Overall fastening status in green or red
- Part graphics
- Fastening values for torque and angle
- Functional push-button inputs & display outputs

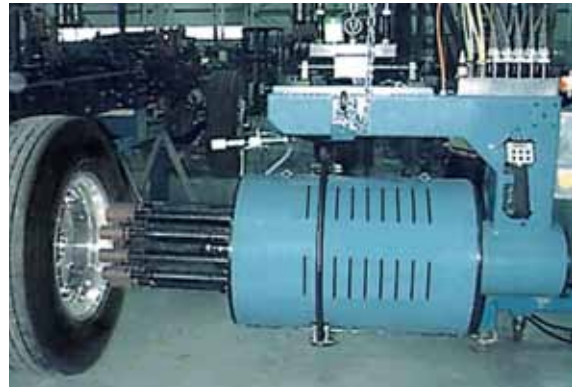


Push-off and Return

On moving transfer lines, the overhead suspension system can be mounted to an overhead track, supporting the multiple. At the conclusion of the fastening rundown by all spindles, the suspension pushes the tool away from the wheel and returns the tool to the home position ready for the next wheel. The vehicle on the assembly transfer line continues to move while the lug nuts are being tightened.

Application Detection of Aluminum and Steel Wheels

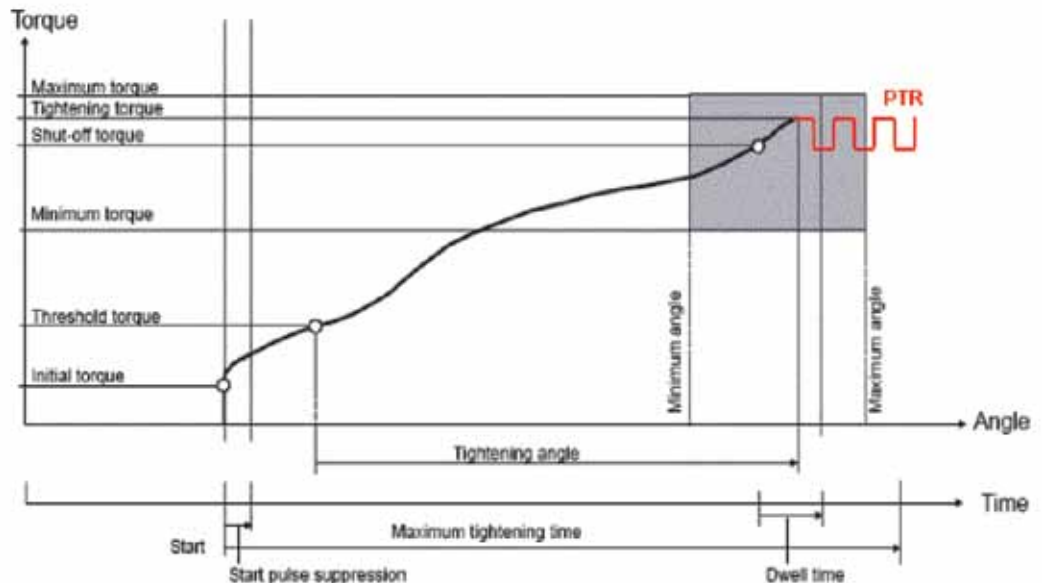
Wheel lug nut tools are distinguished from standard horizontally aligned systems by their cylindrical shape. Rotation of the tool is required for proper alignment with the wheel lugs, and the ability to provide a clear line of sight for the operator. In addition, a 6 spindle tool can be rotated 30 degrees, rundown a second time and tighten the alternate 6 lug nuts on a 12 lug nut wheel. This alternative design is tightening dual truck wheels, and can automatically determine if the wheel is aluminum or steel and change the fastening parameters automatically.



Pulse Torque Recovery (PTR)

Pulse Torque Recovery (PTR) provides a way to program “make-up torque” by pulsing torque at the conclusion of a fastening rundown. PTR is used most successfully on gasket joints, springy sheet metal, or soft metal (aluminum) where a “recovery torque” is required. If a soft joint begins to relax immediately following the rundown, PTR can add a pre-programmed number of pulses following

shutoff target torque to make up the loss of residual torque in the joint. This strategy was awarded U.S. Patent 5,094,301.



Fixtured Electric Nutrunners – Transducer Control

Inline Floating Spindle Tools



Cleco®

18ES, 48ES & 67ES Inline Floating Spindle Series



Torque Range
2 - 2060 Nm
1.5 - 1520 Ft. Lbs.

Bolt Size
M5 - M36
#10 - 1 1/2"

Cleco Inline Floating Spindle	Torque Range		Max. Speed	Float		Output Drive Size	Minimum Center to Center		Weight*		Length	
	Model Number	ft. lbs.		Nm	RPM		in.	mm	in.	mm	lbs.	kg
18ES06ZA	1.5-4.4	2-6	4000	.98	25	1/4	1.81	46	3.0	1.4	15.5	394
18ES12ZA	2.2-8.9	3-12	1820	.98	25	1/4	1.81	46	3.2	1.5	16.0	406
18ES17ZA	3.0-12.5	4-17	1290	.98	25	1/4	1.81	46	3.2	1.5	16.0	406
48ES12ZA	2.2-8.9	3-12	4000	.98	25	1/4	1.81	46	3.4	1.5	16.7	425
48ES271ZB	4.4-19.9	6-27	1820	1.97	50	3/8	1.81	46	5.8	2.6	22.0	559
48ES361ZB	5.9-28.0	8-38	1290	1.97	50	3/8	1.81	46	5.8	2.6	22.0	559
48ES602ZB	8.8-42.0	12-57	855	1.97	50	1/2	2.20	56	8.4	3.8	24.4	620
48ES702ZB	10.3-50.2	14-68	570	1.97	50	1/2	2.20	56	8.4	3.8	24.4	620
48ES802ZB	12.5-60.5	17-82	450	1.97	50	1/2	2.44	62	9.6	4.4	26.7	678
48ES1152ZB	18.4-84.8	25-115	320	1.97	50	1/2	2.44	62	9.6	4.4	26.7	678
48ES1502ZB	22.1-110.6	30-150	245	1.97	50	1/2	2.44	62	9.6	4.4	26.7	678
48ES1653ZB	24.3-121.7	33-165	220	1.97	50	3/4	3.15	80	14.6	6.6	28.6	726
48ES2503ZB	36.1-182.1	49-247	145	1.97	50	3/4	3.15	80	14.6	6.6	28.6	726
67ES65BZ4	10-47	13-64	535	.69	17.6	1/2	1.31	33	10.8	4.9	21.0	533
67ES105BZ4	15-77	21-104	330	.69	17.6	1/2	1.31	33	10.8	4.9	21.0	533
67ES135BZ4	20-100	27-135	245	.69	17.6	1/2	1.31	33	10.8	4.9	21.0	533
67ES190Z6	28-140	38-190	165	.75	19	3/4	1.31	33	15.6	7.1	22.0	559
67ES285Z6	42-210	57-285	115	.75	19	3/4	1.31	33	15.6	7.1	22.0	559
67ES385Z6	57-285	77-386	83	.75	19	3/4	1.31	33	15.6	7.1	22.0	559
67ES475Z6	70-350	95-475	67	.75	19	3/4	1.31	33	16.0	7.3	22.4	569
67ES610Z6	90-450	122-610	50	.75	19	3/4	1.31	33	16.0	7.3	22.4	569
67ES850Z8	125-625	170-848	33	1.0	25	1	1.50	38	20.0	9.1	23.8	605
67ES1050Z8	155-775	210-1050	27	1.0	25	1	1.50	38	20.0	9.1	23.8	605
67ES1670Z8	246-1230	334-1668	17	1.0	25	1	1.50	38	20.0	9.1	23.8	605
67ES2060Z8	304-1520	412-2060	14	1.0	25	1	1.50	38	20.0	9.1	23.8	605

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector; 67ES series – Mounting plate.

All standard 18ES & 48ES tools have thru hole output.

Extra Equipment: Std. Tool Cable 542778-XX, R.A. Swivel Cable 544055-XX, Inline Swivel Cable 544056-XX, Extension Cable 542779-XX.

Additional Accessories: (Pages 41-49, 45-47)

Note: See page 31 for non-floating 67 Series spindles.



DGD

Inline Floating Spindle

Torque Range
2 - 1600 Nm
1.5 - 1180.1 Ft. Lbs.

Bolt Size
M5 - M30
#10 - 1 3/8"

DGD Inline Floating Spindle			Torque Range		Max. Speed	Float		Output Drive Size	Minimum Center to Center		Weight		Length	
Part No.	Model Number	Motor Size	ft. lbs.	Nm		RPM	in.		mm	in.	mm	lbs.	kg	in.
578514	1BB-1B011A-1K3MS-1ZA	1	1.5-8.1	2-11	1222	1.97	50	3/8	1.69	43	3.0	1.4	15.6	396
578500	1BB-1B030A-1K1M-1ZA	1	3.7-23.6	5-32	462	1.97	50	3/8	1.69	43	3.2	1.5	15.6	396
578502	1BB-1B050A-1K2M-1ZA	1	11.0-39.0	15-53	272	1.97	50	3/8	1.69	43	3.2	1.5	15.6	396
578600	2BB-2B100A-2K1M-2ZA	2	18.4-75.2	25-102	329	1.97	50	1/2	2.20	56	3.4	1.5	18.9	481
578602	2BB-2B150A-2K2M-2ZA	2	22.1-112.8	30-153	219	1.97	50	1/2	2.20	56	5.8	2.6	18.9	481
578700	3BB-3B260A-3K2M-3ZA	3	22.1-132.7	30-180	339	1.97	50	3/4	3.18	81	5.8	2.6	21.9	558
578702	3BB-3B180A-3K1M-3ZA	3	36.8-191.7	50-260	220	1.97	50	3/4	3.18	81	8.4	3.8	21.9	558
578800	4BB-4B360A-4K1M-4ZA	4	88.5-265.5	120-360	266	1.97	50	3/4	3.58	91	8.4	3.8	27.1	689
578801	4BB-4B460A-4K2M-4ZA	4	118.0-339.2	160-460	209	1.97	50	3/4	3.58	91	9.6	4.4	27.1	689
578802	4BB-4B630A-4K2M-4ZA	4	162.2-464.6	220-630	141	1.97	50	1	3.58	91	9.6	4.4	27.1	689
578803	4BB-4B360A-4K1M-4Z1250A	4	295.0-921.8	400-1250	78	1.97	50	1	4.76	121	9.6	4.4	29.2	742
578804	4BB-4B460A-4K2M-4Z1600A	4	398.2-1180.1	540-1600	61	1.97	50	1.5	4.76	121	14.6	6.6	29.2	742

Standard Equipment: Air LB Connector

Fixtured Electric Nutrunners – Transducer Control

Inline & Offset Floating Spindle Tools



EMT Inline Floating Spindles Series

Torque Range
19.1 - 1485 Nm
14.1 - 1095 Ft. Lbs.

Bolt Size
M7 - M30
5/16" - 1 3/8"



EMT Inline Floating Spindle			Torque Range		Max Speed	Float		Output drive size	Min center dist		Weight		Length	
Part No.	Motor Size	Model No.	ft. lbs.	Nm	RPM	in.	mm.		in	mm	lbs	kg.	in.	mm
571110	1	EMT80-10R6-3/8"-APM	14.1	19.1	860	2	50.8	0.38	1.81	50	9.5	4.3	19.47	494.5
571111	1	EMT80-6R6-1/2"-APM	26	35	467	2	50.8	0.5	1.81	50	9.5	4.3	19.47	494.5
571105	1	EMT80-4R6-1/2"-APM	35	47	350	2	50.8	0.5	1.81	50	9.5	4.3	19.47	494.5
571104	1	EMT80-3R6-1/2"-APM	51	70	237	2	50.8	0.5	1.81	50	9.5	4.3	19.47	494.5
571100	1	EMT80-2R6-1/2"-APM	68	93	177	2	50.8	0.5	1.81	50	9.5	4.3	19.47	494.5
571222	2	EMT200-10R6-1/2"-APM	40	54	614	2	50.8	0.5	2.38	60.3	15.5	7	21.82	554.2
571211	2	EMT200-5R6-1/2"-APM	73	99	334	2	50.8	0.5	2.38	60.3	15.5	7	21.82	554.2
571221	2	EMT200-4R6-1/2"-APM	97	132	250	2	50.8	0.5	2.38	60.3	15.5	7	21.82	554.2
571205	2	EMT200-3R6-1/2"-APM	144	195	169	2	50.8	0.5	2.38	60.3	15.5	7	21.82	554.2
571220	2	EMT200-2R6-1/2"-APM	192	260	127	2	50.8	0.62	2.38	60.3	15.5	7	21.82	554.2
571308	3	EMT400-10R6-3/4"-APM	50.1	67.9	1155	2	50.8	0.75	6.38	162	29	13.2	23.89	606.8
571307	3	EMT400-8R6-3/4"-APM	69.4	94.1	833	2	50.8	0.75	6.38	162	29	13.2	23.89	606.8
571304	3	EMT400-5R6-3/4"-APM	179	243	310	2	50.8	0.75	6.38	162	29	13.2	23.89	606.8
571303	3	EMT400-4R6-3/4"-APM	208	282	266	2	50.8	0.75	6.38	162	29	13.2	23.89	606.8
571302	3	EMT400-3R6-3/4"-APM	288	391	192	2	50.8	0.75	6.38	162	29	13.2	23.89	606.8
571400	3	EMT600-3R6-1"-APM	396	537	149	2	50.8	1"	7.12	181	35	15.9	24.25	616
571404	3	EMT600-2R6-1"-APM	576	781	102	2	50.8	1"	7.12	181	35	15.9	24.25	616
571500	4	EMT800-2R6-1"-APM	792	1073	102	2	50.8	1"	7.5	190.5	50	22.6	28.44	722.4
571002	4	EMT1200-2R8-1"-APM	1095	1485	74	2	50.8	1"	9.38	238.12	60	27.2	32.91	835.9

*EMT80, EMT200, EMT400 - Optional length spindle drivers available (R8,R10,R12)
 *EMT600, EMT800 - Optional length spindle drivers available (R8,R10,R12,R16)
 *EMT80, EMT200 - Output drive size (Sq. Drive) available in 3/8", 1/2", 5/8"
 *EMT400, EMT600 - Output drive size (Sq. Drive) available in 3/4", 1"
 *EMT Fixtured tools may be configured to meet your requirements.
 Contact Cooper Tools for your configuration.

Standard Equipment: Air LB Connector
Optional Connectors: Contact your nearest CT Sales & Service Center if a motor is required with a VEAM or PTR connector.



Offset Floating Spindle Series

Torque Range
2 - 1600 Nm
1.5 - 1180.1 Ft. Lbs.

Bolt Size
M5 - M24
#10 - 1 1/8"



DGD Offset Floating Spindle			Torque Range		Max. Speed	Float		Output Drive Size	Minimum Center to Center		Weight		Length	
Part No.	Model Number	Motor Size	ft. lbs.	Nm	RPM	in.	mm		in.	mm	lbs.	kg	in.	mm
578515	1BB-1B011A-1VK3M	1	1.5-8.1	2-11	1161	1.97	50	3/8	1.37	35	8.8	4.0	15.1	384
578506	1BB-1B050A-1VK1M	1	3.7-23.6	5-32	439	1.97	50	3/8	1.37	35	8.8	4.0	15.1	384
578505	1BB-1B030A-1VK2B	1	11.0-39.0	15-53	258	1.97	50	3/8	1.37	35	8.8	4.0	15.1	384
578613	2BB-2B100A-2VK1M	2	18.4-75.2	25-102	307	1.97	50	1/2	1.73	44	17.8	8.1	19.8	504
578614	2BB-2B150A-2VK2M	2	22.1-112.8	30-153	204	1.97	50	1/2	1.73	44	17.8	8.1	19.8	504
578709	3BB-3B180A-3VK1M	3	22.1-132.7	30-180	315	1.97	50	3/4	2.32	59	31.3	14.2	21.7	553
578705	3BB-3B260A-3VK2M	3	36.8-191.7	50-260	204	1.97	50	3/4	2.32	59	31.3	14.2	21.7	553
578805	4BB-4B360A-4VK1M	4	88.5-265.5	120-360	249	1.97	50	3/4	2.99	76	47.3	21.5	25.7	655
578806	4BB-4B460A-4VK2M	4	118.0-339.2	160-460	196	1.97	50	3/4	2.99	76	47.3	21.5	25.7	655
578807	4BB-4B630A-4VK3M	4	162.2-464.6	220-630	133	1.97	50	1	2.99	76	47.3	21.5	25.7	655
578808	4BB-4B630A-4VK4MS	4	184.4-590.0	250-800	110	1.97	50	1	2.99	76	48.5	22.0	25.7	655

Standard Equipment: Air LB Connector

Fixtured Electric Nutrunners – Transducer Control

Offset & Right Angle Floating Spindle Tools



Cleco®

EMT Offset Floating Spindles Series

Torque Range
19.1 - 1073 Nm
14.1 - 792 Ft. Lbs.

Bolt Size
M7 - M27
5/16" - 1 1/4"

EMT Offset Floating Spindles			Torque Range		Max Speed	Float		Output drive size	Min center dist		Weight		Length	
Part No.	Motor Size	Model No	ft. lbs	Nm	RPM	in.	mm.		in	mm	lbs	kg.	in.	mm
571112	1	EMT80-10-OS75-3/8"-APM	14.1	19.1	860	2	50.8	0.38	1.06	27	11	4.9	21.51	546.3
571113	1	EMT80-6-OS75-3/8"-APM	26	35	467	2	50.8	0.38	1.06	27	11	4.9	21.51	546.3
571114	1	EMT80-4-OS75-1/2"-APM	35	47	350	2	50.8	0.5	1.06	27	11	4.9	21.51	546.3
571115	1	EMT80-3-OS75-1/2"-APM	51	70	237	2	50.8	0.5	1.06	27	11	4.9	21.51	546.3
571223	2	EMT200-10-OS150-1/2"-APM	40	54	614	2	50.8	0.5	1.5	38.1	21	9.5	25.26	641.6
571215	2	EMT200-5-OS150-1/2"-APM	73	99	334	2	50.8	0.5	1.5	38.1	21	9.5	25.26	641.6
571224	2	EMT200-4-OS150-1/2"-APM	97	132	250	2	50.8	0.5	1.5	38.1	21	9.5	25.26	641.6
571225	2	EMT200-3-OS250-1/2"-APM	144	195	169	2	50.8	0.5	1.88	47.6	21	9.5	25.26	641.6
571201	2	EMT200-2-OS250-5/8"-APM	192	260	127	2	50.8	0.62	1.88	47.6	21	9.5	25.26	641.6
571309	3	EMT400-5-OS400-3/4"-APM	179	243	310	2	50.8	0.75	4.75	120.6	39	17.7	30	762
571310	3	EMT400-4-OS400-3/4"-APM	208	282	266	2	50.8	0.75	4.75	120.6	39	17.7	30	762
571311	3	EMT400-3-OS400-3/4"-APM	288	391	192	2	50.8	0.75	4.75	120.6	39	17.7	30	762
571410	3	EMT600-3-OS600-1"-APM	396	537	149	2	50.8	1"	4.75	120.6	45	20.4	30.38	771.6
571413	3	EMT600-2-OS600-1"-APM	576	781	102	2	50.8	1"	4.75	120.6	45	20.4	30.38	771.6
571503	4	EMT800-2-OS800-1"-APM	792	1073	102	2	50.8	1"	5.62	142.7	90	40.8	34.56	877.8

*EMT Fixtured Offset tools may be configured to meet your requirements. Contact CooperTools for your configuration.

Standard Equipment: Air LB Connector.

Optional Connectors: Contact your nearest CT Sales & Service Center if a motor is required with a VEAM or PTR connector.



Cleco®

Right 18EA, 48EA & 67EA Angle Floating Spindle

Torque Range
5.1 - 255 Nm
3.7 - 188.1 Ft. Lbs.

Bolt Size
M7 - M18
1/4" - 3/4"

Cleco Angle Floating Spindle	Torque Range		Max. Speed	Float		Output Drive Size	Minimum Center to Center		Weight*		Length	
	ft. lbs.	Nm	RPM	in.	mm		in.	mm	lbs.	kg	in.	mm
18EA16S131	3.7-12.5	5.1-17	1225	.98	25	3/8	1.10	28	4.4	2.0	16.0	406
18EA23S131	5.3-17.7	7.2-24	860	.98	25	3/8	1.10	28	4.4	2.0	16.0	406
18EA30S131	4.4-22.8	6.0-31	655	.98	25	3/8	1.10	28	4.4	2.0	16.0	406
48EA37S231	5.9-28.0	8.0-38	1225	.74	19	3/8	1.33	34	5.2	2.4	18.6	474
48EA52S231	8.1-39.8	11-54	860	.74	19	3/8	1.33	34	5.2	2.4	18.6	474
48EA53S341	8.1-39.8	11-54	850	.74	19	1/2	1.73	44	5.9	2.7	20.0	509
48EA74S341	11.0-56.8	15-77	600	.74	19	1/2	1.73	44	5.9	2.7	20.0	509
48EA95S341	14.7-72.2	20-98	460	.74	19	1/2	1.73	44	5.9	2.7	20.0	509
48EA110S341	16.9-81.1	23-110	400	.74	19	1/2	1.73	44	7.2	3.3	20.5	521
48EA135S461	20.6-101.7	28-138	270	.74	19	3/4	2.12	54	8.8	4.0	20.5	522
48EA230S461	34.6-172.5	47-234	150	.74	19	3/4	2.12	54	10.3	4.7	22.1	563
67EA150S461	22.1-110.6	30-150	210	.74	19	3/4	2.04	52	13.0	5.9	25.7	655
67EA185S461	27.3-136.3	37-185	170	.74	19	3/4	2.04	52	13.0	5.9	25.7	655
67EA210S461	31.0-154.8	42-210	155	.74	19	3/4	2.04	52	13.0	5.9	25.7	655
67EA235S461	33.9-169.6	46-230	135	.74	19	3/4	2.04	52	13.0	5.9	25.7	655
67EA255S461	40.6-188.1	55-255	115	.74	19	3/4	2.04	52	13.0	5.9	25.7	655

*Weights are without tool cable or reaction bar if so equipped.

General: All tools must be used with an approved Cooper Tools cable and controller.

Standard Equipment: Matrix Connector.

Extra Equipment: Std. Tool Cable 542778-XX, R.A. Swivel Cable 544055-XX, Inline Swivel Cable 544056-XX, Extension Cable 542779-XX.

Additional Accessories: (Pages 41-49)

Fixtured Electric Nutrunners – Transducer Control

Right Angle Non-Floating Spindle Tools



Right Angle Non-Floating Spindle Series

Torque Range
2 - 630 Nm
1.5 - 484.6 Ft. Lbs.

Bolt Size
M5 - M22
#10 - 1"



Angle Non-Floating Spindle			Torque Range		Max. Speed	Float		Output Drive Size	Minimum Center to Center		Weight		Length	
Part No.	Model Number	Motor Size	ft. lbs.	Nm	RPM	in.	mm		in.	mm	lbs.	kg	in.	mm
578516	1BB-1B011A-1WK3M	1	1.5-8.1	2-11	1146	.98	25	3/8	2.04	52	9.7	4.4	16.8	427
578513	1BB-1B030A-1WK1M	1	3.7-23.6	5-32	434	.98	25	3/8	2.04	52	9.7	4.4	16.8	427
578511	1BB-1B050A-1WK2M	1	11.0-39.0	15-53	255	.98	25	3/8	2.04	52	9.7	4.4	16.8	427
578608	2BB-2B100A-2WK1M	2	18.4-75.2	25-102	310	.98	25	1/2	2.32	59	16.7	7.6	19.8	505
578606	2BB-2B150A-2WK2M	2	22.1-112.8	30-153	206	.98	25	1/2	2.32	59	16.7	7.6	19.8	505
578710	3BB-3B180A-3WK1M	3	22.1-132.7	30-180	327	.98	25	3/4	3.18	81	37.0	16.8	23.8	607
578706	3BB-3B260A-3WK2M	3	36.8-191.7	50-260	211	.98	25	3/4	3.18	81	37.0	16.8	23.8	607
578809	4BB-4B360A-4WK1M	4	88.5-265.5	120-360	257	.98	25	3/4	4.40	112	57.5	26.1	25.3	645
578810	4BB-4B460A-4WK2M	4	118.0-339.2	160-460	202	.98	25	3/4	4.40	112	57.5	26.1	25.3	645
578811	4BB-4B630A-4WK3M	4	162.2-464.6	220-630	136	.98	25	1	4.40	112	57.5	26.1	25.3	645

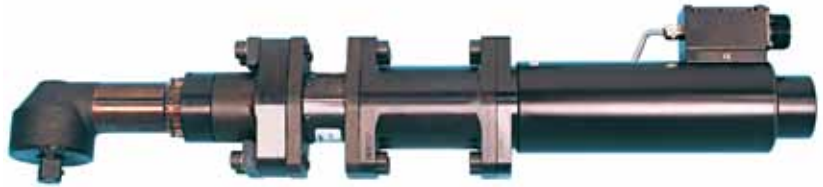
Standard Equipment: Air LB Connector



EMT Right Angle Non-Floating Spindles Series

Torque Range
16 - 830 Nm
12 - 612 Ft. Lbs.

Bolt Size
M7 - M30
5/16" - 1 3/8"



EMT Angle Non-Floating Spindle			Angle Head Type	Torque Range		Max Speed	Output Drive Size	Min Center Dist		Weight		Length **	
Part No.	Model No.	Motor Size		ft. lbs.	Nm	RPM		In	Mm	Lbs.	kg	in	mm
571116	EMT80-10P-APM	1	P	21.8	29.6	552	.38	1.44	36.6	12.5	5.7	16.63	422.4
571117	EMT80-6P-APM	1	P	40.4	54.4	300	.50	1.44	36.6	12.5	5.7	16.63	422.4
571118	EMT80-4P-APM	1	P	54.4	73.1	225	.50	1.44	36.6	12.5	5.7	16.63	422.4
571119	EMT80-3P-APM	1	P*	79.3	108.9	152	.50	1.44	36.6	12.5	5.7	16.63	422.4
571120	EMT80-10T-APM	1	T	26.0	35.0	463	.50	1.75	44.5	13	5.9	16.66	432.1
571121	EMT80-6T-APM	1	T	48.0	65.0	251	.50	1.75	44.5	13	5.9	16.66	432.1
571122	EMT80-4T-APM	1	T	65.0	87.0	188	.50	1.75	44.5	13	5.9	16.66	432.1
571123	EMT80-3T-APM	1	T	94.0	130.0	127	.50	1.75	44.5	13	5.9	16.66	432.1
571124	EMT80-2T-APM	1	T*	126.0	172.0	95	.50	1.75	44.5	13	5.9	16.66	432.1
571127	EMT200-10V-APM	2	V	53.3	72.0	460	.50	2.19	55.6	20	9.0	21.00	533.4
571128	EMT200-5V-APM	2	V	97.3	132.0	250	.625	2.19	55.6	20	9.0	21.00	533.4
571129	EMT200-4V-APM	2	V	129.3	176.0	187	.625	2.19	55.6	20	9.0	21.00	533.4
571230	EMT200-3V-APM	2	V*	192.0	260.0	126	.75	2.19	55.6	20	9.0	21.00	533.4
571231	EMT200-10X-APM	2	X	85.0	114.0	289	.625	2.19	55.6	21	9.5	21.00	533.4
571232	EMT200-5X-APM	2	X	155.0	210.0	157	.75	2.19	55.6	21	9.5	21.00	533.4
571233	EMT200-4X-APM	2	X	206.0	280.0	117	.75	2.19	55.6	21	9.5	21.00	533.4
571234	EMT200-3X-APM	2	X	306.0	414.0	79	.75	2.19	55.6	21	9.5	21.00	533.4
571235	EMT200-2X-APM	2	X*	408.0	552.0	59	.75	2.87	74.0	21	9.5	21.00	533.4
571312	EMT-400-3V-APM	3	V*	384.0	521.0	144	.75	2.19	55.6	36	16.4	25.94	658.8
571313	EMT-400-3X-APM	3	X*	612.0	830.0	90	.75	2.87	74.0	37	16.8	26.32	668.5

*Tool output exceeds angle head capacity – P head: 60 ft- lbs, T head: 100 ft- lbs, V head: 180 ft- lbs and X head: 350 ft lbs.

**Length is measured from center of the square drive to the end of the motor.

Standard Torque reaction bracket

P and T head - #201012 (Optional bracket # 201039)

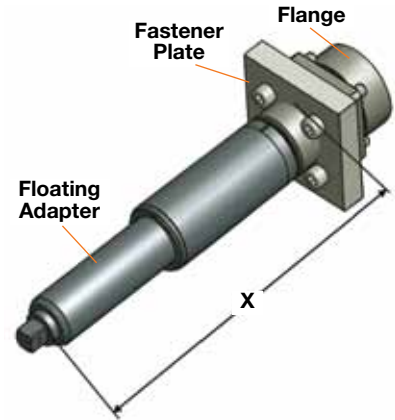
V and X head - # 201034(Optional bracket # 201510)

Standard Equipment: Air LB Connector

Optional Connectors: Contact your nearest CT Sales & Service Center if a motor is required with a VEAM or PTR connector.

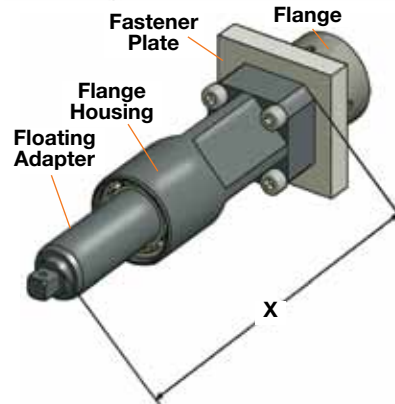
DGD Floating Adapter

Model No.	Motor Size	Maximum Torque		X		Output Drive Size	Drive
		ft. lbs.	Nm	in.	mm		
922325	1	44.25	60	7.08	180	3/8	1ZB 1VK
910609	2	118.00	160	7.08	180	1/2	2ZB 2VK
935552	2	147.51	200	7.08	180	3/4	2ZB 2VK
910613	3	383.63	520	7.28	185	3/4	3ZB 3VK
912106	4	383.63	520	7.48	190	3/4	4VK
912147	4	921.95	1250	7.32	186	1	4VK
S976956	4	921.95	1250	5.31	140	1	4ZA
S308441	4	1180.09	1600	5.31	140	1 1/2	4ZA
916642	4	383.63	520	7.28	185	3/4	4ZA
916643	4	921.95	1250	7.48	190	1	4ZA



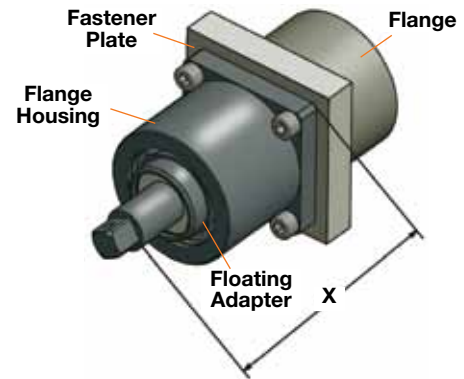
DGD Floating Adapter Including Flange Housing

Model No.	Motor Size	Maximum Torque		X		Output Drive Size	Drive
		ft. lbs.	Nm	in.	mm		
S308434	1	44.25	60	6.61	168	3/8	1ZB
S308435	2	118.00	160	6.77	172	1/2	2ZB
S308450	2	147.51	200	6.77	172	3/4	2ZB
S308436	3	383.63	520	6.92	176	3/4	3ZB
S308437	1	44.25	60	6.61	168	3/4	1VK
S308438	2	81.13	110	6.55	166.5	1	2VK
S308475	2	147.51	200	6.55	166.5	1	2VK
S308439	3	221.26	300	6.73	171	1 1/2	3VK
S308440	4	383.63	520	6.88	175	3/4	4VK
S308474	4	486.79	660	6.73	171	1	4VK



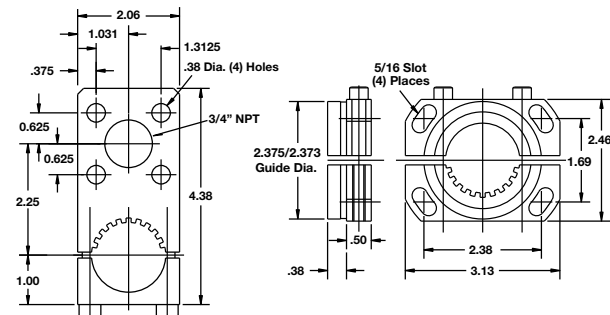
DGD Floating Adapter Including Flange Housing for Right Angle Drive

Model No.	Motor Size	Maximum Torque		X		Output Drive Size
		ft. lbs.	Nm	in.	mm	
929041	1	44.25	60	2.95	75	3/8
929053	2	125.38	170	3.54	90	1/2
929061	2	147.51	200	4.52	115	3/4
929065	3	221.26	300	4.13	105	3/4
929077	4	383.63	520	4.52	115	3/4
929089	4	486.79	660	4.52	115	1



Mounting Brackets for EMT Series Tools

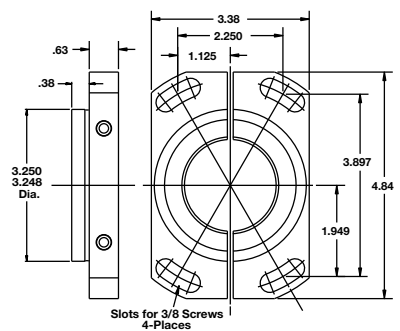
EMT 80 Series



Torque Reaction Bracket
#201012 (Standard)

Torque Reaction Bracket
#201039 (Optional)

EMT 200 & 400 Series



Torque Reaction Bracket
#201034 (Standard)

Torque Reaction Bracket
#201510 (Optional)

Tork-Trak™

(T3M) single channel controller provides extraordinary programming capabilities and interface options for any assembly line. With a wide range of hardware and software options, Tork-Trak can be customized to accommodate your specific fastening requirements and assembly line communication protocols.



The Tork-Trak™ (T3M) is expandable to handle up to four (4) spindles with the use of a Slave Module. Requirements beyond four (4) spindles must be quoted by an application center.

Tork-Trak is capable of handling a broad array of fixtured and portable electric tools ranging in torque from 1 to 4000 Nm, including Cleco, DGD, EMT, and Rotor tools. The controller can control up to ten (10) Cleco LiveWire tools.

The controllers incorporate the most intuitive user interface available today using a menu driven structure, as opposed to the sequential nature of other controllers.

Tork-Trak controllers support the monitoring, evaluation, and editing of any procedure through the use of unique graphic displays. Programming is made easy, data collection and statistics menus are used to monitor the process, and an on-board oscilloscope is available for thorough analysis of torque/angle characteristics of fastening.

Controller Hardware Features

- Industrial PC with PC-104 board set.
- High resolution color TFT digital LCD display with 1024 x 768 pixels – XGA with DVD viewing quality!
- All cables connect through a bulkhead below the front door, allowing several controllers to be mounted side by side.
- Eight front panel indicator lights. High-Low Torque & Angle, Accept & Reject and two user programmable indicator lights.
- 16 user programmable outputs/inputs & mating connector
 - Ethernet port (standard)
 - USB port for memory stick file transfer (standard)
 - Keyboard/mouse ports
 - Keyboard with integrated trackball supplied with each controller
 - Field Bus port
 - 650 MHz Celeron processor, PC-104 CPU
 - 24 VDC, fused, for physical I/O, replaceable from the outside of the enclosure
 - Serial RS-232 port for barcode and serial data.
 - Optional USB/Ethernet ports available

Controller Software Features

- Industrial PC Windows operating system
- Ease of programming
- Same TM Multi-Trak software as used on the Cooper Power Tools Automated Systems multiple spindle panels
- Assures quality fastening on critical assembly processes
- Single or dual transducers to verify torque
- Self diagnostics
- 28 user programmable fastening strategies including Yield and Gradient as well as self-tap and tube-nut
- Network communication capability
 - RS-232 Serial
 - Ethernet TCP/IP
 - Ethernet data & control protocols
 - FieldBus
 - DeviceNet
 - ProfiBus
 - InterBus
 - USB
- Expandable physical I/O (8 in/8 out are standard)
- Expandable spindle support through low-cost Satellites
- FieldBus virtual I/O



Single and double bay control panels shown above have a capacity of up to 32 spindles. This controller is air conditioned, and supports Ether Net and FieldBus communications using Pentium-4 CPU technology. Also pictured above right is a single bay fastening control panel with capacity up to 12 spindles.



The Mid-Six controller is a wall mount design capable of handling up to six spindles and has all of the features as our larger panels.

Automated Systems multi-spindle controllers provide extraordinary capabilities and interface options for any assembly line. These controllers have the capability to house up to 32 spindles with a wide range of hardware and software options. The multi-spindle controller platform is capable of handling a broad array of fixtured and portable electric tools ranging from 1 to 4000 Nm, including Cleco, DGD, EMT, and Rotor tools. In addition, the controller can control up to ten (10) Cleco LiveWire™ tools.

TM Multi-Trak software is at the heart of the system, providing a common programming interface for T3M, Mid-Six, and Multi-spindle controllers. The software can be customized to accommodate your specific fastening requirements and assembly line protocols.

Fastening System Kit (FSK)

The **Fastening System Kit (FSK)** is available to enable the user to handle his own installation and integration. The FSK will be engineered to meet your specific application requirements and will be delivered with documentation for ease of installation. The FSK's can be used in conjunction with new or existing systems.

The Fastening System Kit will consist of the following standard components.



- Servo Modules (Sub plate mountable)
- Fastening Controller with Virtual I/O, Physical I/O and Ethernet or Field bus Ports
- Miscellaneous inter-connect cables and connectors.
- Tools
- Documentation

T3M Nomenclature

T3M	-	5	2	-	A	-	30	-	U	-	X	X	X	X
Tork-Trak™ Controller		Servo Type					Voltage				Options			
Generation		0 – None 1 – TMH 2 – TM12 3 – TM34					11 – 115V (No external transducer) 15 – 115V (note 4) 30 – 230V 1 phase 33 – 230V 3 phase				GM – GM common controller for stack light + public I/O + pendant + Devicenet + 24V PS D – Devicenet C – External serial port P – Profibus F – Factory custom modification I – Interbus U – Public I/O E – Extended I/O (16 in / 21 out) A – Preamp 575210 S1 – Slave module S2 – Slave module S3 – Slave module LW – LiveWire			
		Tool Connector					Language							
		N – None V – Veam A – Air LB M – Matrix					U – English S – Spanish P – Portuguese							

Notes

- Use Air LB connector for DGD tools & EMT tools w/memory. Use Veam connector for EMT tools.
- Use TMH servo for Cleco hand tools. Use TM12 or TM34 for EMT & DGD fixtured tools.
- TMH & TM12 require 230 VAC 1 phase voltage, TM34 requires 230 VAC 3 phase voltage.
- If 115V is required, an external transformer will be supplied. (P/N 572674)
- TM34 is a 3 phase servo only and 115 VAC 1 phase cannot be used.
- Use preamp option for older EMT tools with no built-in preamp.
- S1 supports 1 slave for a total of 2 spindles. S2 supports 2 slaves for a total of 3 spindles. S3 supports 3 tool modules for a total of 4 spindles.

T3MS Tool Module Nomenclature

T3MS	-	1	2	-	A	-	30	-	X	X	X	X
Tork-Trak™ Tool Module		Servo Type					Voltage		Options			
Generation		1 – TMH 2 – TM12 3 – TM34 4 – Wireless					11 – 115V (No external transducer) 15 – 115V (note 4) 30 – 230V 1 phase 33 – 230V 3 phase		A – Preamp 576210 SM – Middle position SE – End position			
		Tool Connector										
		N – None V – Veam A – Air LB M – Matrix										

Notes

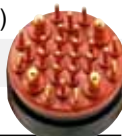
- Use Air LB connector for DGD tools & EMT tools w/memory. Use Veam connector for EMT tools w/o memory. Use Matrix connector for Cleco tools.
- Use TMH servo for Cleco hand tools. Use TM12 or TM34 for EMT & DGD fixtured tools.
- TMH & TM12 require 230 VAC 1 phase voltage, TM34 requires 230 VAC 3 phase voltage.
- If 115V is required, an optional, external transformer is required. Specify transformer input voltage as 440V 3 phase or 230V 3 phase or 115V 1 phase.
- TM34 is a 3 phase servo only. 115 VAC 1 phase cannot be used on the TM34 servo.
- Use preamp option for older EMT tools with no built-in preamp.

T3M & T3MS Controllers for Cleco Tools

Model Number		Servo	Features	Tool Connection
115VAC	230VAC			
T3M Tork-Trak				
T3M-51-M-15-U	T3M-51-M-30-U	TMH	-	Matrix
T3M-51-M-15-U-D	T3M-51-M-30-U-D	TMH	DeviceNet	Matrix
T3M-51-M-15-U-I	T3M-51-M-30-U-I	TMH	Interbus	Matrix
T3M-51-M-15-U-P	T3M-51-M-30-U-P	TMH	Profibus	Matrix
T3MS Tork-Trak Tool Module				
T3MS-11-M-15-SM	T3MS-11-M-30-SM	TMH	Mid. Position	Matrix
T3MS-11-M-15-SE	T3MS-11-M-30-SE	TMH	End Position	Matrix

Cleco Tool Cables

Tool Cable	Extension Cable
542778- XM Standard	542779- XM (optional)
544055- XM Angle Swivel	
544056- XM Inline Swivel	



X = 1**, 2**, 3, 6, 8, 10, 15, 50 (meters) **X** = 1, 2, 3, 6, 8, 10, 15, 50 (meters) **Matrix**

**Must be used with 542779 extension cable.

T3M & T3MS Controllers for Sizes 1 & 2 DGD & EMT Tools

Model Number	Servo	Features	Tool Connection
			230VAC
T3M Tork-Trak			
T3M-52-A-30-U	TM12	-	Air LB
T3M-52-A-30-U-D	TM12	DeviceNet	Air LB
T3M-52-A-30-U-I	TM12	Interbus	Air LB
T3M-52-A-30-U-P	TM12	Profibus	Air LB
T3MS Tork-Trak Tool Module			
T3MS-12-A-30-SM	TM12	Mid. Position	Air LB
T3MS-12-A-30-SE	TM12	End Position	Air LB

Note: Optional fabricated controller stands are available. Contact your local CT representative for details. See sample stand below.

T3M & T3MS Controllers for Sizes 3 & 4 DGD & EMT Tools

Model Number	Servo	Features	Tool Connection
			230VAC
T3M Tork-Trak			
T3M-53-A-33-U	TM34	-	Air LB
T3M-53-A-33-U-D	TM34	DeviceNet	Air LB
T3M-53-A-33-U-I	TM34	Interbus	Air LB
T3M-53-A-33-U-P	TM34	Profibus	Air LB
T3MS Tork-Trak Tool Module			
T3MS-13-A-33-SM	TM34	Mid. Position	Air LB
T3MS-13-A-33-SE	TM34	End Position	Air LB

Note: Optional fabricated controller stands are available. Contact your local CT representative for details. See sample stand below.

DGD & EMT Tool Cables – Low Flex

Tool Cable
577004- XX (standard)
XX = 25, 35, 50, 75, 100 (feet)



DGD & EMT Tool Cables – High Flex

Tool Cable	Extension Cable
577003- XX (standard)	577005- XX (optional)
XX = 15, 25, 35, 50, 75, 100 (feet)	XX = 10, 15, 20, 25, 35, 50 (feet)

Fabricated Aluminum Controller Stand

Part No.	Application
572644	Mid-Six or T3M controllers
572686	Mid-Six or T3M & 3 slave modules

Optional fabricated controller stands are available to meet your custom needs. Contact your local Cooper Tools representative for complete details.



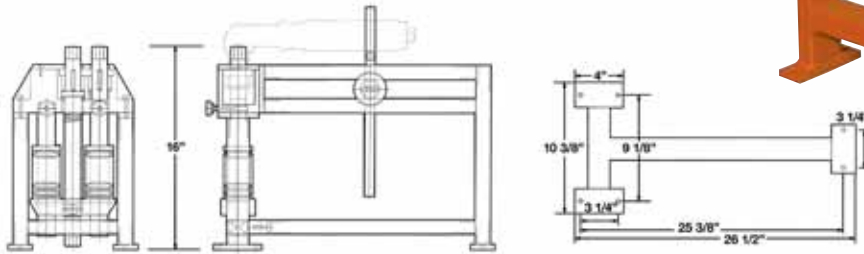
Joint Simulator

Joint simulators are most frequently used to certify the repeatability of nutrunners before being installed on a production line and are also an excellent means of testing nutrunners following repair.

The Joint Simulator can simulate and test the torque output of nutrunners on both hard and soft joints. Each Joint Simulator is supplied with a quantity of spring washers which are used to test tool accuracy. Torque per revolution is varied by stacking the spring washers in different combinations.

Electronic torque testing is accomplished by attaching an external rotary transducer between the tool's square drive and the socket.

Part Number	Torque Range		Width		Height		Length	
	Ft. Lbs.	Nm	in.	mm	in.	mm	in.	mm
550006	12-220	15-300	10.4	264	16	406	26.5	667



Joint Simulator Features

- Easy access, load, set-up and maintenance.
- Heavy-duty and economical.
- Adjustable torque reaction bracket can accommodate virtually any tool.
- For use with reversible/non-reversible tools.



Flexibility. Tracea

The Mobile Assembly Station (MAS) combines accurate transducerized nutrunners, secure database storage and an intuitive user interface making it ideal for repair area assembly, backup of the main assembly line or entire product assembly.

MAS supports an unlimited number of programmable torque applications which are selected via the included industrial PC or by an optional bar code scanner.

MAS can interface with up to three Cleco 18/48 series corded DC electric nutrunners. For the ultimate in flexibility, MAS can also be interfaced with up to five Cleco LiveWire™ tools. That's eight tools in total, covering torque from 2 to 230 NM.

Features

- Interface with up to eight (8) separate tools
 - Up to three (3) Cleco 18/48 DC electric tools
 - Up to five (5) Cleco LiveWire™ tools
- Interface with static torque wrenches
- Interface with barcode scanners
- Integrated industrial PC
 - Keyboard with storage drawer
 - USB user port
- Pre installed torque cart software
- 15" full color LCD display
- Custom-designed industrial grade cart.
- 6" polyurethane casters
- Three (3) external tool storage shelves
- Four lockable internal storage drawers
- Integrated forklift slots



ability. Portability.

Develop

- Assembly parameters programmed via MS Access away from the distractions of the production environment
- Full control over the process including torque, fastening speed and angular rotation

Perform

- MAS guides user step by step through the entire process, prohibiting advancement until the job is done right
- MAS contains entire assembly process allowing repair bay operators to select the job that needs to be done

Analyze

- Data can be analyzed on the MAS or exported using the standard USB interface
- Torque data can be analyzed by either part or process
- Each fastening event stores torque, angle, time/date of event, status, etc.

Flexibility

For ultimate flexibility the MAS can interface with up to (5) LiveWire cordless or LiveWire VMAX tools. Tools can be added as they are needed without any hardware modifications. For a more traditional solution, the MAS can be fitted with up to (3) corded DC electric tools.



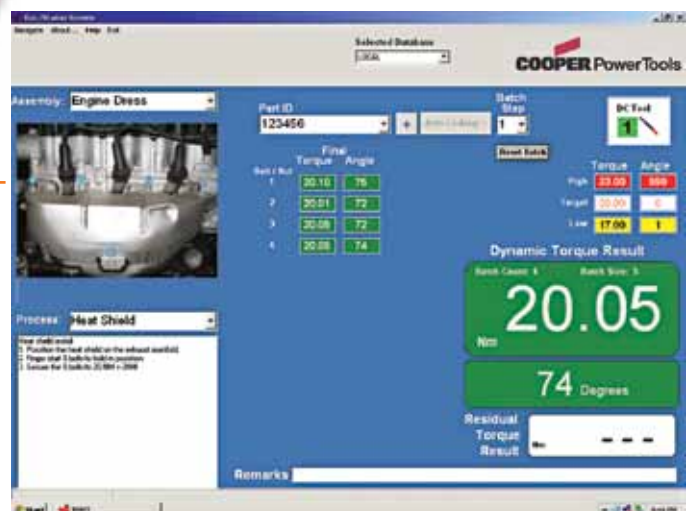
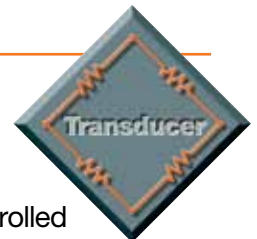
User Interface

User interface software allows for full customization.

- Show a picture of the actual part to eliminate confusion and illustrate proper bolt tightening sequence.
- Add text work instructions to guide operator through the correct assembly process.
- Real time feedback to insure all bolts are tightening within your specifications.

Traceability

When using our LiveWire or 18/48 Series DC electric nutrunners, you can rest assured that the correct torque will be applied and recorded. Both products are controlled by a NIST traceable strain gage torque transducer. The MAS can also be used with optional static torque wrenches which also contain traceable strain gage torque transducers.



Automated Systems

Mobile Assembly Station (MAS)

Mobile Assembly Station (MAS)

Model Number	LiveWire Interface	18/48 Series Interface		
	1 to 5 Tools	1 Tool	2 Tools	3 Tools
FC-20-N-15-U-L	•			
FC-21-M-15-U-E1		•		
FC-21-M-15-U-E2			•	
FC-21-M-15-U-E3				•
FC-21-M-15-U-E1L	•	•		
FC-21-M-15-U-E2L	•		•	
FC-21-M-15-U-E3L	•			•

Standard cart operates on 115VAC. Other options available upon request.
Standard operating language is English. Other languages available upon request.

Optional Equipment

Model Number	Description	Comments
572688	Static Torque Wrench Interface	Supports 1 wrench
572689-1	3/8" drive electronic torque wrench – 7.5-75 in.lbs.	Transducerized wrench with RF communication
572689-2	3/8" drive electronic torque wrench – 7.5-75 ft.lbs.	Transducerized wrench with RF communication
572689-3	1/2" drive electronic torque wrench – 25-250 ft.lbs.	Transducerized wrench with RF communication



Customer & Application Information

Date _____

Customer Name and Address _____

Contact Information _____

Application Description _____

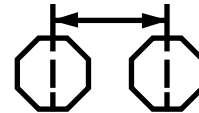
Fastening Strategy

Torque Monitoring Torque Control Torque Control and Angle Monitor Angle Control and Torque Monitor

Other _____ Reject Strategy _____

Center to Center Spacing for Multiple Spindle Applications

To ensure the bolts are not set too close for the tools to reach without interference from the tool body. Attach bolt pattern drawing if necessary.



Controller and Nutrunner System

Controller: Multi-Trak Tork-Trak T3M T3M Slave Module m-Pro 400SE TME TME

Fastening System Kit (FSK) Fabricated stand for controller Mobile Assembly Station (MAS)

Nutrunners: Electric Fixtured: DGD EMT In-line Offset Right Angle Electric Hand Tool: Cleco

Cabling: Standard Special High Flex Field Cable Length: 25' 50' 75' Drop Cable Length: 12' 25'

Customer Supplied Primary Voltage

480 VAC, 3 Phase 220 VAC, 3 Phase 110 VAC, 1 Phase Other

Accept and Reject Signals Light Box OK/ NOK Other HMI None

Communications Requirements

RS232 Ethernet Field Bus: Devicenet Profibus Interbus Ethernet I/P

Server Interfaces: No Yes. If yes what is the Protocol _____

Mechanical Equipment and Support

Multiple Frame: Enclosure Covers Fixed Bolt Pattern Spindle Center Adjustment Manual Automatic

Frame Options: _____

Suspended Multiple Components

Orientation: Vertical Horizontal Rotary (Trunnion) Angular Pivoting Angular Fixed

Suspension: Air Balancer (Cyl) Spring Balancer Torque Tube Articulating Arm Other

Rail Information: _____

Field Service Support

No Yes - at customers facility - Installation Supervision , Start-up & Runoff: Days Required _____

Comments: _____

CPT Representative: _____



Quality Fastener Tools

For more than half a century Apex has maintained the position of world leader in industrial fastening tools. Many power and insert bits, socket combinations and other drivers/adapters pioneered by Apex have today become industry standards, while Apex quality, service and selection give you unsurpassed value.

More Quality For Your Money

Apex quality starts with the selection of raw materials. Only carefully chosen, high grade tool steel is used to make Apex industrial fastener tools. Next, each tool is precision machined from solid bar stock to exacting standards of accuracy. You always get a snug, secure fit – a fit that is not possible from stamped tools.

Finally, each Apex fastener tool is tempered with our exclusive heat treating process. During this step the degree of hardness is determined based upon the application.

Fast Delivery

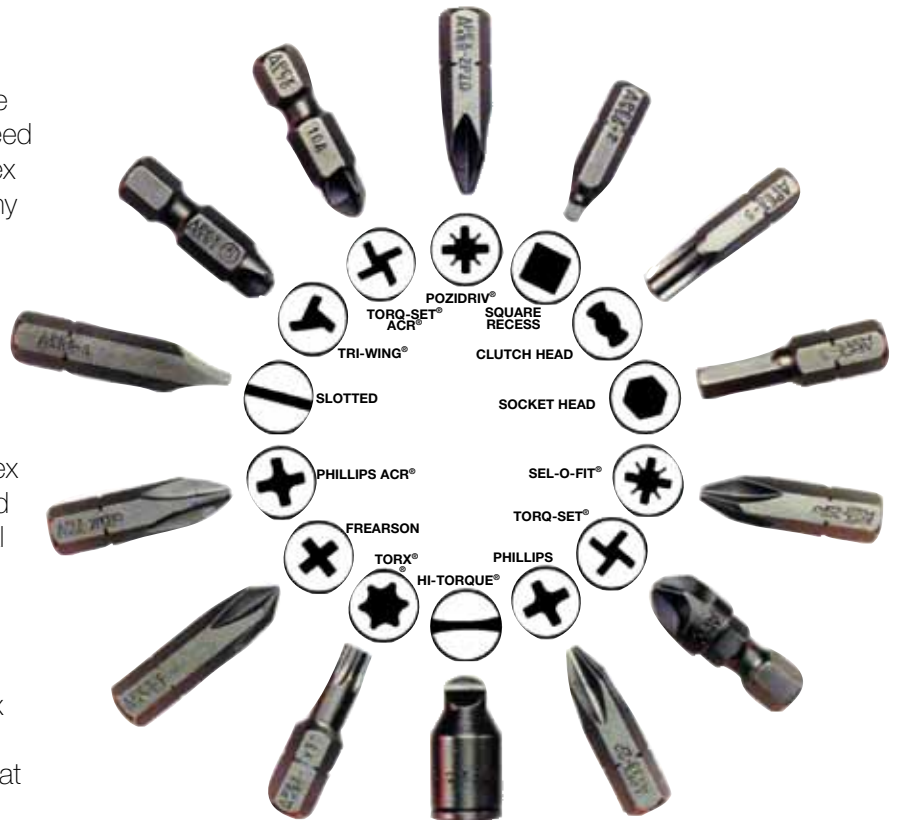
All Apex standard catalog items are available off-the-shelf for immediate delivery. If you need special assistance with your order, your Apex manufacturer's representative can handle any questions you may have.

Special Orders

Apex offers the broadest selection of screw driver and nut runner tools available, from bits, sockets and universal wrenches to extensions, adapters and nut setters. If you have a special application, contact your Apex representative. We may have what you need in stock, or can design and produce special fastener tools for almost any application.

Ordering Information

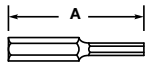
Apex products are distributed world-wide. For a catalog of the complete line of Apex quality fastener tools or to locate your nearest Apex distributor, visit our website at www.coopertools.com or www.apex-tools.com.



Registered Trade Marks: HI-TORQUE, Voi-Shan; TORX, Camcar Division of Textron; ACR, POZIDRIV, TORQ-SET and TRI-WING, Phillips International Co.; SUPADRIV, EIS (Fasteners) LTD.; SEL-O-FIT, FLIP-TIP, and Apex, Cooper Industries, Cooper Tools Division, Apex Operation.

Insert Bits

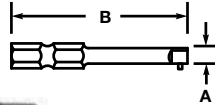
(1/4" hex for socket head cap screws and set screws)



Part Number	Hex Size (in.)	"A"		Cap Screw	Set Screw
		in.	mm		
185-00	1/16	1.00	25.4	1	5.6
185-0	5/64	1.00	25.4	2.3	8
185-1	3/32	1.00	25.4	4.5	10
185-9	7/64	1.00	25.4	6	—
185-2	1/8	1.00	25.4	8	1/4
185-10	9/64	1.00	25.4	8	—
185-3	5/32	1.31	33.3	10	5/16
185-4	3/16	1.31	33.3	1/4	3/8
185-5	7/32	1.31	33.3	—	7/16
185-6	1/4	1.31	33.3	5/16	1/2
185-7	5/16	1.25	31.8	3/8	5/8
185-8	3/8	1.25	31.8	7/16, 1/2	3/4

Square Drive Adapter

(1/4" hex drive sockets) Use with Quick Change and Bit & Finder Models, except as noted.



Part Number	"A" Sq. Drive	"B"		Bushing Number
		in.	mm	
EX250-2	1/4	2.00	50.8	—
EX250-3	1/4	3.00	76.2	847295*
EX250-4	1/4	4.00	101.6	—
EX250-6	1/4	6.00	152.4	—
EX370	3/8	1.63	41.3	—
EX370-3	3/8	3.00	76.2	847295*
EX500-2	1/2	2.00	50.8	—
EX500-3	1/2	3.00	76.2	—

*Note: Required for bit and finder models.

Hex Extensions

Part Number	Hex Drive (in.)	Type of Lock	Overall Length	
			in.	mm

Male Hex Drive with 1/2" Male Square

EX-501-3	7/16	Pin	3	76
EX-501-4	7/16	Pin	4	102
EX-501-6	7/16	Pin	6	152

Male Hex Drive with 3/8" Male Square

EX-371-3	7/16	Pin	3	76
EX-371-4	7/16	Pin	4	102
EX-371-6	7/16	Pin	6	152



Hex Drive Nutsetters

Part Number	Size (in.)	Overall Length (in.)	Socket Nose Diameter (in.)
-------------	------------	----------------------	----------------------------

7/16" 6 Point

6N-1416-3	1/2	3	13/16
6N-1416-4	1/2	4	13/16
6N-1418-3	9/16	3	7/8
6N-1418-4	9/16	4	7/8
6N-1420-3	5/8	3	1
6N-1420-6	5/8	6	1



Insert Bits

Used with Bit Holders
(all bits are 1.0" (25.4 mm) long)



Point Size	Part Number		Wood		Machine & Self-Tapping			
	Phillips	Pozi-Drive	Flat & Oval	Round	Flat, Oval & Pan	Fillister	Truss	Binding
0	446-0	446-1P2D	0.1	0.1	0.1	0.1	0.1	0.1
1	HPL-1	440-1PZD	2-4	2-4	2-4	2-4	2-4	2-4
2	HPI-2	440-2PZD	5-8	5-10	5-10	5-10	6-10	5-10
3	HPI-3	440-3PZD	10-16	12-16	12-16	12-5/16	12-16	12-1/4

6 Point Sockets

Part No.	Hex Opening	Overall Length	Nose End Diameter	Drive End Diameter	Opening Depth
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3/8" Square Drive Sockets, SAE

3112	3/8	1 1/4	19/32	3/4	1/4
3114	7/16	1 1/2	11/16	3/4	9/32
3116	7/16	1/2	1 1/2	13/16	11/32
3118	7/16	9/16	1-1/2	7/8	7/16

1/2" Square Drive Sockets, SAE

5112	3/8	1 1/2	5/8	15/16	1/4
5114	7/16	1 1/2	11/16	15/16	9/32
5116	1/2	1 1/2	13/16	15/16	11/32
5120	5/8	1 1/2	1	1	7/16
5122	11/16	1 1/2	1 1/8	1 1/8	7/16
5124	3/4	1 1/2	1 1/8	1 1/8	15/32

3/4" Square Drive Sockets, SAE

7128	7/8	2	1 1/2	1 1/2	9/16
7132	1	2	1 5/8	1 5/8	5/8
7136	1 1/8	2 1/8	1 3/4	1 3/4	3/4
7140	1 1/4	2 1/8	2	1 3/4	13/16
7144	1 3/8	2 1/8	2 1/8	2 1/8	13/16
7148	1 1/2	2 1/4	2 1/4	2 1/8	1

1" Square Drive Sockets, SAE

8132	1	2 1/8	1 5/8	2	13/16
8140	1 1/4	2 1/8	2 1/8	2 1/8	13/16
8144	1 3/8	2 1/8	2 1/8	2 1/8	13/16
8148	1 1/2	2 1/4	2 1/4	2 1/8	15/16
8156	1 3/4	2 3/8	2 5/8	2 5/8	11/16
8164	2	2 5/8	3	2 5/8	1 3/16

1 1/2" Square Drive Sockets, SAE

9156	1 3/4	2 7/8	2 7/8	3	1 1/8
9160	1 7/8	3	3 1/8	3	1 1/4
9164	2	3 1/8	3 1/4	3 1/4	1 3/8
9172	2 1/4	3 1/4	3 3/8	3 1/4	1 1/2

3/8" Square Drive Sockets, Metric

12mm13	12	38.1	19.1	19.1	7.2
14mm13	14	38.1	22.2	22.2	11.1
16mm13	16	38.1	23.8	23.8	11.1

1/2" Square Drive Sockets, Metric

16mm15	16	38.1	25.4	25.4	11.1
18mm15	18	38.1	28.6	28.6	11.1
20mm15	20	38.1	31.7	31.7	11.9
22mm15	22	38.1	33.3	33.3	14.3

5/8" Square Drive Sockets, Metric

24mm16	24	51	38.1	38.1	15.9
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3/4" Square Drive Sockets, Metric

28mm17	28	54	44.4	44.4	19.1
30mm17	30	54	47.6	44.4	19.1
32mm17	32	54	50.8	44.4	20.6
34mm17	34	54	54.0	54.0	20.6
36mm17	36	57	57.1	54.0	23.8

1" Square Drive Sockets, Metric

32mm18	32	54	54.0	54.0	20.6
34mm18	34	54	54.0	54.0	20.6
36mm18	36	57	57.1	54.0	23.9
38mm18	38	57	57.1	54.0	23.9
42mm18	42	60	63.5	54.0	23.9
46mm18	46	64	69.8	66.7	26.9



APEX® μ -Guard™

Quality Anti-Mar Fastener Tools Begin With Quality Fastener Tools.

Apex μ -Guard™ provides a protective barrier between genuine Apex fastener tools and your finely finished workpiece. The free-spinning patent-pending design provides maximum protection for polished and highly sensitive surfaces.

Apex μ -Guard™ covering is made of a thermo plastic urethane (TPU elastomer) which cushions against costly incidental side impacts. It offers the lowest coefficient of friction for maximum tool efficiency. It is also non-removable for tamper resistance.

With Apex μ -Guard™ you get the proven Apex fastener tool fit and performance plus the best protection available against marring and in-system damage.

μ -Guard™ is your guard against the potential hazards caused by rotational friction.



If it doesn't say Apex on the outside, how can you be sure of what's on the inside?

Prevents Side Impact Damage



Free-Spinning Design



Virtually Damage Free



μ-Guard Sockets

(Includes socket and cover)



Part Number	Socket	Drive End			Socket Length	Fastener End			Assembly Features
		Size	Type	Sex		Size	Type	Sex	
UGS-AB710	10MM21	1/4	Square	F	standard	10 mm	Hex	F	FS
UGS-AB710-01	M-10MM21	1/4	Square	F	standard	10 mm	Hex	F	FS, M
UGS-AB710-02	MB-10MM21	1/4	Square	F	standard	10 mm	Hex	F	FS, M, B
UGS-BA610	10MM13	3/8	Square	F	standard	10 mm	Hex	F	FS
UGS-BA610-01	M-10MM13	3/8	Square	F	standard	10 mm	Hex	F	FS, M
UGS-BB710	10MM23	3/8	Square	F	long	10 mm	Hex	F	FS
UGS-BB710-01	M-10MM23	3/8	Square	F	long	10 mm	Hex	F	FS, M
UGS-BB710-02	MB-10MM23	3/8	Square	F	long	10 mm	Hex	F	FS, M, B
UGS-BB713	13MM23	3/8	Square	F	long	13 mm	Hex	F	FS
UGS-BB713-01	M-13MM23	3/8	Square	F	long	13 mm	Hex	F	FS, M
UGS-BB713-02	MB-13MM23	3/8	Square	F	long	13 mm	Hex	F	FS, M, B
UGS-CB713	13MM25	1/2	Square	F	long	13 mm	Hex	F	FS
UGS-CB713-03	SF-13MM25	1/2	Square	F	long	13 mm	Hex	F	FS, SF
UGS-CB715	15MM25	1/2	Square	F	long	15 mm	Hex	F	FS
UGS-CB715-03	SF-15MM25	1/2	Square	F	long	15 mm	Hex	F	FS, SF
UGS-CB718	18MM25	1/2	Square	F	long	18 mm	Hex	F	FS
UGS-CB718-03	SF-18MM25	1/2	Square	F	long	18 mm	Hex	F	FS, SF

If your tool is not shown in the table of representative products above, please contact your Apex representative.

μ-Guard Extensions

(Includes extension and cover)



Part Number	Extension	Drive End			Extension Length	Socket End			Assembly Features*
		Size	Type	Sex		Size	Type	Sex	
UGE-A2A	EX-250-2	1/4	Hex	M	2	1/4	Square	M	FS
UGE-A4A	EX-250-4	1/4	Hex	M	4	1/4	Square	M	FS
UGE-A6A	EX-250-6	1/4	Hex	M	6	1/4	Square	M	FS
UGE-B2A	EX-370-2	1/4	Hex	M	2	3/8	Square	M	FS
UGE-B4A	EX-370-4	1/4	Hex	M	4	3/8	Square	M	FS
UGE-B6A	EX-370-6	1/4	Hex	M	6	3/8	Square	M	FS
UGE-B3C	EX-376-3	3/8	Square	F	3	3/8	Square	M	FS
UGE-B6C	EX-376-6	3/8	Square	F	6	3/8	Square	M	FS
UGE-B12C	EX-376-12	3/8	Square	F	12	3/8	Square	M	FS
UGE-C4C	EX-508-4	1/2	Square	F	4	1/2	Square	M	FS
UGE-C8C	EX-508-8	1/2	Square	F	8	1/2	Square	M	FS
UGE-C12C	EX-508-12	1/2	Square	F	12	1/2	Square	M	FS

If your tool is not shown in the table of representative products above, please contact your Apex representative.

μ-Guard Bit Holders

(Includes bit holder and cover)



Part Number	Bit Holder	Drive End			Socket Length	Fastener End			Assembly Features
		Size	Type	Sex		Size	Type	Sex	
UGH-1NAA	M-490	1/4	Hex	M	2 31/32	1/4	Hex	F	FS, M, ET
UGH-1AAA	M-490-2	1/4	Hex	M	2	1/4	Hex	F	FS, M, ET
UGH-2NBG	838	3/8	Square	F	1 1/2	1/4	Hex	F	FS, ET
UGH-1NBG	M-838	3/8	Square	F	2 5/8	1/4	Hex	F	FS, M, ET
UGH-2NBC	835	3/8	Square	F	1 1/2	5/16	Hex	F	FS, ET
UGH-1NBC	M-835	3/8	Square	F	2 3/4	5/16	Hex	F	FS, M, ET
UGH-2NBD	855	1/2	Square	F	1 1/2	5/16	Hex	F	FS, ET
UGH-1NBD	M-855	1/2	Square	F	2 3/4	5/16	Hex	F	FS, M, ET
UGH-2NCK	QR-308	3/8	Square	F	1 3/4	1/4	Hex	F	FS, QR
UGH-2NCF	QR-508	1/2	Square	F	2 1/8	1/4	Hex	F	FS, QR
UGH-2NCJ	QR-314	3/8	Square	F	2	7/16	Hex	F	FS, QR
UGH-2NCL	QR-514	1/2	Square	F	2 1/8	7/16	Hex	F	FS, QR

If your tool is not shown in the table of representative products above, please contact your Apex representative.

*Features Abbreviations

- FS** Free Spinning Tool is able to rotate independently of Cover
- M** Magnetic Tool includes magnet to hold the position of the fastener during fastening operation
- B** Bolt Clearance Tool is spring-loaded to allow bolt or nut to retract into the socket body
- SF** Surface Drive Tool has radiused corners to allow easier alignment and engagement of fastener
- ET** Exposed Tip Cover extends beyond end of Bit Holder to shield the majority of a standard 1 inch long Insert Bit.

- QR** Quick Release Tip of Insert Bit will not be covered to allow easier fastener engagement. Tool has tension feature to allow quick & easy change between bits. Cover will not extend beyond end of Bit Holder

Notes: Reported lengths are based on uncovered tool length only for reference. Cover may extend beyond end of tool by 2 mm unless otherwise noted.

Conversion Tables

Millimeter – Decimal – Fraction

mm	Dec.	in.	mm	Dec.	in.	mm	Dec.	in.	mm	Dec.	in.	mm	Dec.	in.
0.100	.0039		5.159	.2031	13/64	10.300	.4055		15.400	.6063		20.400	.8031	
0.200	.0079		5.200	.2047		10.319	.4063	13/32	15.478	.6094	39/64	20.500	.8071	
0.300	.0118		5.300	.2087		10.400	.4094		15.500	.6102		20.600	.8110	
0.397	.0156	1/64	5.400	.2126		10.500	.4134		15.600	.6142		20.638	.8125	13/16
0.400	.0157		5.500	.2165		10.600	.4173		15.700	.6181		20.700	.8150	
0.500	.0197		5.556	.2188	7/32	10.700	.4219		15.800	.6220		20.800	.8189	
0.600	.0236		5.600	.2205		10.716	.4219	27/64	15.875	.6250	5/8	20.900	.8228	
0.700	.0276		5.700	.2244		10.800	.4252		15.900	.6250		21.000	.8268	
0.794	.0313	1/32	5.800	.2283		10.900	.4291		16.000	.6299		21.034	.8182	53/64
0.800	.0315		5.900	.2323		11.000	.4331		16.100	.6339		21.100	.8307	
0.900	.0354		5.953	.2344	15/64	11.100	.4370		16.200	.6378		21.200	.8307	
1.000	.0394		6.000	.2362		11.113	.4375	7/16	16.272	.6406	41/64	21.200	.8346	
1.100	.0433		6.100	.2402		11.200	.4409		16.300	.6417		21.300	.8386	
1.191	.0469	3/64	6.200	.2441		11.300	.4449		16.400	.6457		21.400	.8425	
1.200	.0472		6.300	.2480		11.400	.4488		16.500	.6496		21.431	.8438	27/32
1.300	.0512		6.350	.2500	1/4	11.500	.4528		16.600	.6535		21.500	.8465	
1.400	.0551		6.400	.2520		11.509	.4531	29/64	16.669	.6563	21/32	21.600	.8504	
1.500	.0591		6.500	.2559		11.600	.4567		16.700	.6575		21.700	.8543	
1.588	.0625	1/16	6.600	.2598		11.700	.4606		16.800	.6614		21.800	.8583	
1.600	.0630		6.700	.2638		11.800	.4646		16.900	.6654		21.828	.8594	55/94
1.700	.0669		6.747	.2656	17/64	11.900	.4685		17.000	.6693		21.900	.8622	
1.800	.0709		6.800	.2677		11.906	.4688	15/32	17.066	.6719	43/64	22.000	.8661	
1.900	.0748		6.900	.2717		12.000	.4724		17.100	.6732		22.100	.8701	
1.984	.0781	5/64	7.000	.2756		12.100	.4764		17.200	.6772		22.200	.8740	
2.000	.0878		7.100	.2795		12.200	.4803		17.300	.6811		22.225	.8750	7/8
2.100	.0827		7.144	.2813	9/32	12.300	.4843		17.400	.6850		22.300	.8780	
2.200	.0866		7.200	.2835		12.303	.4844	31/64	17.463	.6875	11/16	22.400	.8819	
2.300	.0906		7.300	.2874		12.400	.4882		17.500	.6890		22.500	.8858	
2.381	.0938	3/32	7.400	.2913		12.500	.4921		17.600	.6929		22.600	.8898	
2.400	.0945		7.500	.2953		12.600	.4961		17.700	.6968		22.622	.8906	57/64
2.500	.0984		7.541	.2969	19/64	12.700	.5000	1/2	17.800	.7008		22.700	.8937	
2.600	.1024		7.600	.2992		12.800	.5039		17.859	.7031	45/64	22.800	.8976	
2.700	.1063		7.700	.3031		12.900	.5079		17.900	.7047		22.900	.9016	
2.778	.1094	7/64	7.800	.3071		13.000	.5118		18.000	.7087		23.000	.9055	
2.800	.1102		7.900	.3110		13.097	.5156	33/64	18.100	.7126		23.019	.9063	29/32
2.900	.1142		7.938	.3125	5/16	13.100	.5157		18.200	.7165		23.100	.9094	
3.000	.1181		8.000	.3150		13.200	.5197		18.256	.7188	23/32	23.200	.9134	
3.100	.1220		8.100	.3189		13.300	.5236		18.300	.7205		23.300	.9173	
3.175	.1250	1/8	8.200	.3228		13.400	.5276		18.400	.7244		23.400	.9213	
3.200	.1260		8.300	.3268		13.494	.5313	17/32	18.500	.7283		23.416	.9219	59/64
3.300	.1299		8.334	.3281	21/64	13.500	.5315		18.600	.7323		23.500	.9252	
3.400	.1339		8.400	.3307		13.600	.5354		18.653	.7344	47/64	23.600	.9291	
3.500	.1378		8.500	.3346		13.700	.5394		18.700	.7362		23.700	.9331	
3.572	.1406	9/64	8.600	.3386		13.800	.5433		18.800	.7402		23.800	.9370	
3.600	.1417		8.700	.3425		13.891	.5469	35/64	18.900	.7441		23.900	.9409	
3.700	.1457		8.731	.3438	11/32	13.900	.5472		19.000	.7480		24.000	.9449	
3.800	.1496		8.800	.3465		14.000	.5512		19.050	.7500	3/4	24.100	.9488	
3.900	.1535		8.900	.3504		14.100	.5551		19.100	.7520		24.200	.9528	
3.969	.1563	5/32	9.000	.3543		14.200	.5591		19.200	.7559		24.209	.9531	61/64
4.000	.1575		9.100	.3583		14.288	.5625	9/16	19.300	.7598		24.300	.9567	
4.100	.1624		9.128	.3594	23/64	14.300	.5630		19.400	.7638		24.400	.9606	
4.200	.1654		9.200	.3622		14.400	.5669		19.447	.7656	49/64	24.500	.9646	
4.300	.1693		9.300	.3661		14.500	.5709		19.500	.7677		24.600	.9685	
4.366	.1719	11/64	9.400	.3701		14.600	.5748		19.600	.7717		24.606	.9688	31/32
4.400	.732		9.500	.3740		14.684	.5781	37/64	19.700	.7756		24.700	.9724	
4.500	.1772		9.525	.3750	3/8	14.700	.5787		19.800	.7795		24.800	.9764	
4.600	.1811		9.700	.3819		14.800	.5827		19.844	.7813	25/32	24.900	.9803	
4.700	.1850		9.800	.3858		14.900	.5866		19.900	.7835		25.000	.9843	
4.763	.1875	3/16	9.900	.3898		15.000	.5906		20.000	.7874		25.003	.9844	63/64
4.800	.1890		9.922	.3902	25/64	15.081	.5938	19/32	20.100	.7913		25.100	.9882	
4.900	.1929		10.000	.3937		15.100	.5945		20.200	.7953		25.200	.9921	
5.000	.1969		10.100	.3976		15.200	.5984		20.241	.7969	51/64	25.300	.9961	
5.100	.2008		10.200	.4016		15.300	.6024		20.300	.7992		25.400	1.000	1

Conversion Tables

Torque – Air Pressure – Miscellaneous



Torque Conversion Factors		
To Convert	Into	Multiply By
Inch Pounds	Foot Pounds	0.0835
Inch Pounds	Newton meters	0.1130
Inch Pounds	Kg-meters	0.0115
Inch Pounds	Kg-Cm	1.1519
Foot Pounds	Inch Pounds	12.000
Foot Pounds	Newton meters	1.3560
Foot Pounds	Kg-meters	0.1382
Foot Pounds	Kg-Cm	13.8240
Newton Meters	Inch Pounds	8.8440
Newton Meters	Foot Pounds	0.7370
Newton Meters	Kg-meters	0.1020
Newton Meters	Kg-Cm	10.2000
Kg meters	Inch Pounds	86.8100
Kg meters	Foot Pounds	7.2340
Kg meters	Newton-meters	9.8040
Kg Cm	Inch Pounds	0.8681
Kg Cm	Foot Pounds	0.0723
Kg Cm	Newton-meters	0.0980

Torque Conversion – In. Lbs. (Nm)					
In. Lbs.	Nm	In. Lbs.	Nm	In. Lbs.	Nm
5	0.6	50	5.7	140	15.8
10	1.1	60	6.8	150	17.0
15	1.7	70	7.9	160	18.1
20	2.3	80	9.0	170	19.2
25	2.8	90	10.2	180	20.3
30	3.4	100	11.3	190	21.5
35	4.0	110	12.4	200	22.6
40	4.5	120	13.6		
45	5.1	130	14.7		

Torque Conversion – Ft. Lbs. (Nm)							
Ft. Lbs.	Nm	Ft. Lbs.	Nm	Ft. Lbs.	Nm	Ft. Lbs.	Nm
1	1.36	33	44.8	65	88.1	97	131.5
2	2.7	34	46.1	66	90.0	98	133.0
3	4.1	35	47.5	67	90.9	99	134.2
4	5.4	36	48.8	68	92.2	100	135.6
5	6.8	37	50.2	69	93.6	110	149.2
6	8.1	38	52.0	70	94.9	115	156.0
7	9.5	39	52.9	71	96.3	120	163.0
8	10.9	40	54.2	72	97.6	125	170.0
9	12.2	41	55.6	73	99.0	130	176.3
10	13.6	42	57.0	74	100.3	135	183.1
11	14.9	43	58.3	75	102.0	140	190.0
12	16.3	44	60.0	76	103.1	145	197.0
13	17.6	45	61.0	77	104.4	150	203.4
14	19.0	46	62.4	78	105.8	155	210.2
15	20.3	47	63.7	79	107.1	160	217.0
16	21.7	48	65.1	80	108.5	165	224.0
17	23.1	49	66.4	81	110.0	170	231.0
18	24.4	50	67.8	82	111.2	175	237.3
19	25.8	51	69.2	83	112.6	180	244.1
20	27.1	52	70.5	84	114.0	185	251.0
21	28.5	53	71.9	85	115.3	190	258.0
22	29.8	54	73.2	86	117.0	195	264.4
23	31.2	55	74.6	87	118.0	200	271.2
24	32.5	56	75.9	88	119.3	225	305.1
25	33.9	57	77.3	89	121.0	250	339.0
26	35.3	58	78.7	90	122.0	275	373.0
27	36.6	59	80.0	91	123.4	300	407.0
28	38.0	60	81.4	92	125.0	350	475.0
29	39.3	61	82.7	93	126.1	400	542.4
30	40.7	62	84.1	94	127.5		
31	42.0	63	85.4	95	129.0		
32	43.4	64	86.8	96	130.2		

Inch Bolt Torque Table

SAE J429 and ASME 574

Steel Grade	SAE 5		SAE 8		Socket Head Cap Screws	
	Torque in Pound Foot or (Pound Inch)					
Nom Dia - Pitch	Dry	Lubed	Dry	Lubed	Dry	Lubed
1/4-20	(101)	(76)	(143)	(107)	(168)	(120)
1/4-28	(116)	(87)	(147)	(123)	(192)	(144)
5/16-18	(209)	(157)	(295)	(221)	(348)	(264)
5/16-24	(231)	(174)	(327)	(245)	(384)	(288)
3/8-16	(372)	(276)	44	33	51	38
3/8-24	(420)	(312)	49	37	58	43
7/16-14	49	37	70	52	81	61
7/16-20	55	41	78	58	91	68
1/2-13	75	57	106	80	124	93
1/2-20	85	64	120	90	140	105
5/8-11	150	113	212	159	238	179
5/8-18	170	127	240	180	270	202
3/4-10	267	200	376	282	423	317
3/4-16	297	223	420	315	472	354
7/8-9	429	322	606	455	682	511
7/8-14	474	355	669	502	752	564
1-8	644	483	909	681	1022	767
1-12	722	542	1020	765	1147	860

Metric Bolt Torque Table

ISO 898

Property Class	8.8		10.9		12.9 Socket Head Cap Screw	
	Torque in Newton Meter - Nm					
Nom Size x Pitch	Dry	Lubed	Dry	Lubed	Dry	Lubed
M5 x 0.80	6.1	4.6	8.8	6.7	10.3	7.7
M6 x 1.00	10.4	7.8	15	11.2	17.6	13.1
M7 x 1.00	17.6	13.1	25.1	18.9	29.4	22
M8 x 1.25	25.4	19.1	37.6	27.3	42.6	32.1
M10 x 1.50	50	38	72	54	84	64
M12 x 1.75	88	66	126	94	146	110
M14 x 2.00	141	106	201	150	235	176
M16 x 2.00	218	164	312	233	365	274
M18 x 2.50	301	226	431	323	504	378
M20 x 2.50	426	319	609	457	712	534
M22 x 2.50	580	435	831	624	971	728
M24 x 3.00	736	552	1052	789	1231	923
M27 x 3.00	1079	809	1544	1158	1805	1353
M30 x 3.50	1463	1097	2092	1570	2446	1834
M33 x 3.50	1990	1493	2849	2137	3328	2497
M36 x 4.00	2557	1918	3659	2744	4276	3208

Lubed means cleaned dry bolts lubricated with a standard medium viscosity machine oil. Lubricate all contact areas of the bolts and washers. Lubricating the bolts is the suggested method.

Miscellaneous Conversion Factors			Air Pressure Conversion		
To Convert	Into	Multiply By	PSI	kPa*	Bar**
Inches	Millimeters	25.4000	85	586	5.9
Millimeters	Inches	0.0394	90	620	6.2
Pounds	Kilograms	0.4536	95	655	6.6
Kilograms	Pounds	2.2050	100	690	6.9
psi	bar	0.069	125	860	8.6
bar	psi	14.5			

*Preferred: Approximate to the nearest 5 kPa.
**Approximate to the nearest 0.5 Bar.

The Total Solution

The total solution from Cooper Tools includes not only a complete line of quality industrial tools and accessories but also a professional engineering and product support staff to help customize each tool to specific application requirements. All are as close as a telephone or e-mail.

Cooper Tools maintains company-owned Service Centers in strategic locations throughout the world, staffed with professional tool repair technicians who use genuine Cooper Tools parts and who are outfitted with the very latest in testing, calibration and inspection equipment. Each tool that is returned to a customer from one of our Service Centers carries with it a warranty that is Cooper Tools' assurance that it will perform just like it did when it was purchased new.



Our support personnel are fully capable of helping to diagnose problems and promptly recommend solutions.

Our complete line of tools are carefully designed and

built from the finest materials available in order to provide years of trouble free service. But, as with any piece of equipment, service problems can occur. All tools are designed to be easy to service ... that is, of course, with properly trained personnel.

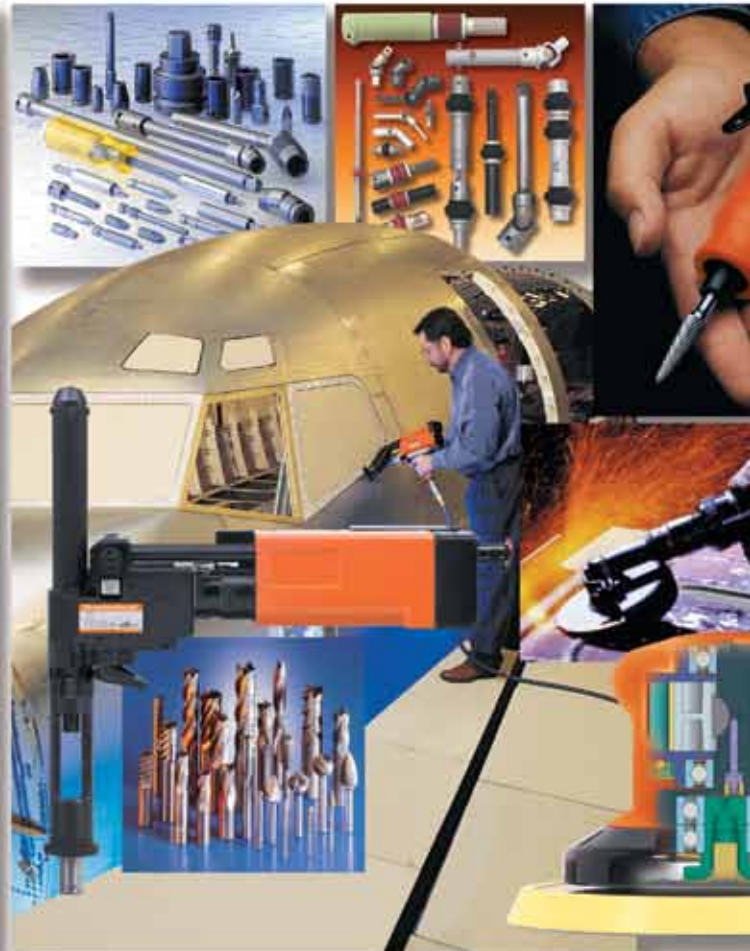
To facilitate quick repairs, and limit downtime ...

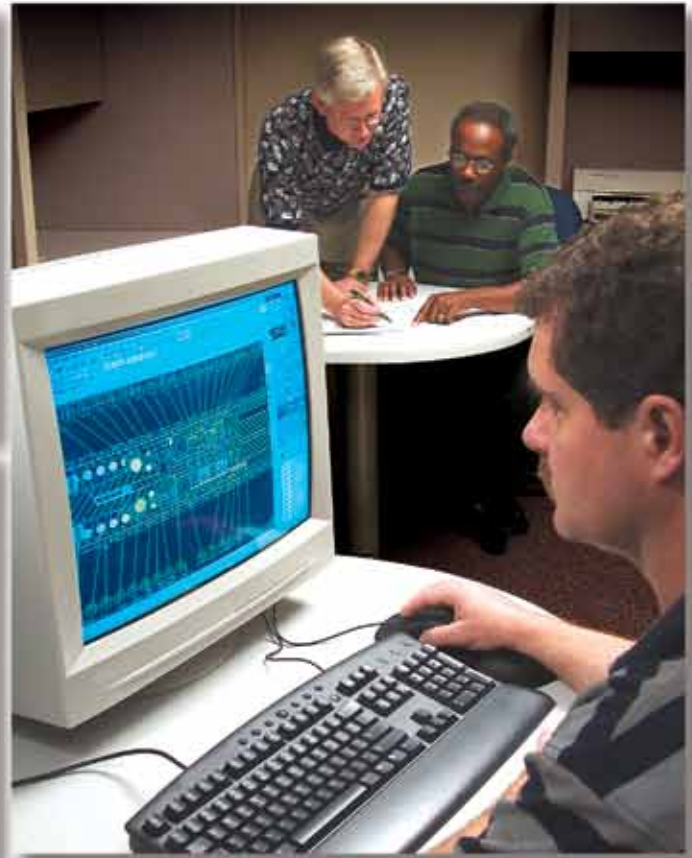
TRAINING

Cooper Tools conducts training seminars covering all aspects of every tool we make.

Introductory training seminars are designed to fully acquaint students with the entire line of tools and their fundamental operation. Advanced training seminars, which are often tailored to individual needs, are designed to hone the skills of the experienced student. Hands-on experience, with an emphasis on troubleshooting and repairing, are the focus of this training.

Service literature, product information, brand catalogs and FAQs are also available around the clock on the web. Just access www.coopertools.com for the latest information available.





Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

Dallas, TX

**Cooper Tools
Sales & Service Center**
1470 Post & Paddock
Grand Prairie, TX 75050
Tel: (972) 641-9563
Fax: (972) 641-9674

Detroit, MI

**Cooper Tools
Sales & Service Center**
2630 Superior Ct.
Auburn Hills, MI 48326
Tel: (248) 391-3700
Fax: (248) 391-6295

Houston, TX

**Cooper Tools
Sales & Service Center**
6550 West Sam Houston
Parkway North, Suite 200
Houston, TX 77041
Tel: (713) 849-2364
Fax: (713) 849-2047

Seattle, WA

**Cooper Tools
Sales & Service Center**
2865 152nd Ave N.E.
Redmond, WA 98052
Tel: (425) 497-0476
Fax: (425) 497-0496

Lexington, SC

Cooper Tools
670 Industrial Drive
Lexington, SC 29072
Tel: (800) 845-5629
Tel: (803) 951-7544
Fax: (803) 358-7681

Los Angeles, CA

**Cooper Tools
Sales & Service Center**
15503 Blackburn Ave
Norwalk, CA 90650
Tel: (562) 926-0810
Fax: (562) 802-1718

York, PA

**Cooper Tools
Sales & Service Center**
York Service Center
3990 E. Market Street
York, PA 17402
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Fax: (717) 757-1659

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Zona Industrial - Iporanga
18087-170 Sorocaba, SP Brazil
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Fax: (011) 55 15 228 3260

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5925 McLaughlin Road
Mississauga, Ont. L5R 1B8
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Fax: (905) 501-4786

China

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955 Sheng Li Road,
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Cooper Tools Is On The Web!

Cooper Tools provides a complete resource for power tools on-line. Our website www.coopertools.com offers product information, service literature, brand catalogs, press releases and more. A dominant source of information, the Cooper Tools website is your source for application solutions on-line.



Making your job easier is our goal!

You can access service literature anytime. Choose a category such as Assembly Tools or Material Removal Tools from the main menu and then click on the brand you're looking for. You'll be on your way to any current service literature you need, whether it's Cleco, Apex, Master Power, or any of our power tool brands.

Up-to-date product catalogs are also available online providing

you with current information on our broad product line. Even Material Safety Data Sheets (M.S.D.S.) for Safety and Disposal Information are available on our website.



It's simple!

Our *Customer Care* section provides you with information such as answers to frequently asked questions or contact phone numbers and addresses for your area of the country. You can browse through the *What's New* information to learn how Cooper Tools continues to be your source for solutions.

For even faster searches, you can go direct to a brand site by simply entering the brand name. Entering www.dotco-tools.com takes you directly to the Dotco brand site.

What is the future of www.coopertools.com? A dynamic site continuing to focus on your need for up-to-date information on the latest Cooper Tools' offerings that you can access anytime you need... twenty-four hours a day, seven days a week!

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