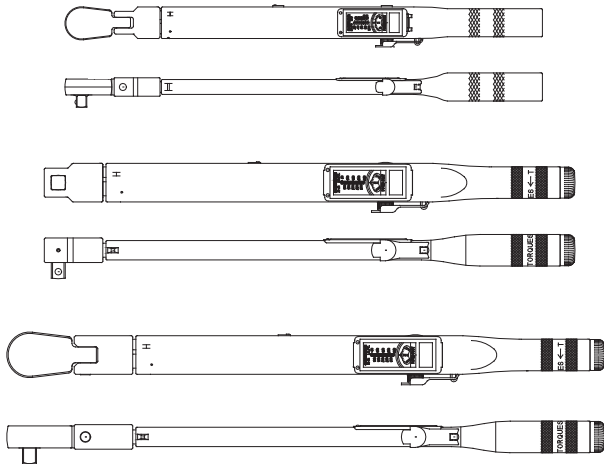


**Split Beam Type Torque Wrench**

# User Manual



Accurate within **4%** of the setting from 20% of full scale to full scale

**Specifications**

Drive	Stock No.	Range	Torque	Increments	Length	Weight
<b>Flex ratchet models</b>						
3/8"	C2FR600H*	100-600 lb. in.	10 lb. in.	17-5/8"	1 lb	8 oz
3/8"	C2FR100F*	20-100 lb. ft.	2 lb. ft.	17-5/8"	1 lb	8 oz
1/2"	C3FR250F*	40-250 lb. ft.	5 lb. ft.	22-1/8"	3 lbs	6 oz
<b>Metric reading</b>						
3/8"	C2FR14M*	2.2-14 kg•m	0.2 kg•m	17-5/8"	1 lb	8 oz
1/2"	C3FR34M*	5-34 kg•m	1 kg•m	22-1/8"	3 lbs	6 oz
<b>Newton meter reading</b>						
3/8"	C2FR68N*	14-68 N•m	2 N•m	17-5/8"	1 lb	8 oz
3/8"	C2FR130N*	25-135 N•m	5 N•m	17-5/8"	1 lb	8 oz
1/2"	C3FR350N*	60-350 N•m	5 N•m	22-1/8"	3 lbs	6 oz
<b>Fixed ratchet models</b>						
3/8"	C2R100F*	20-100 lb. ft.	2 lb. ft.	17-5/8"	1 lb	8 oz
3/8"	C2R100FB**	16-100 lb. ft.	2 lb. ft.	17-1/8"	1 lb	8 oz
1/2"	C3R250F*	40-250 lb. ft.	5 lb. ft.	22-1/8"	3 lbs	6 oz
1/2"	C3R250FB**	40-250 lb. ft.	5 lb. ft.	22-1/8"	3 lbs	6 oz
<b>Fixed head models</b>						
1/2"	C3F250F	50-250 lb. ft.	5 lb. ft.	18-1/2"	2 lbs	11 oz
<b>Metric reading</b>						
1/2"	C3F34M	7-34 kg•m	1 kg•m	18-1/2"	2 lbs	11 oz

\* Non-Reversible Ratchet

\*\* Black Oxide Finish

**Safety warnings and cautions**

**CAUTION: Torque Wrenches**  
Overtorquing can cause breakage. Do not exceed rated torque.

Wear safety goggles. (Users and bystanders)  
Wrench can break while breaking fasteners loose. Do not use a torque wrench to break fasteners loose. Using force against flex stops on flex head torque wrenches can cause head breakage. Do not force head of flex head torque wrenches against stops. A torque wrench that is out of calibration can cause part or tool breakage.

Calibrate periodically to maintain accuracy. *Broken tools and parts can cause injury*

**CAUTION: Torque Wrenches**  
A wrench that is slipping can cause accidents.  
On detachable wrenches, make sure the spring-loaded locking pins that secure sections of the wrench are fully engaged in their locking pin holes.

Make sure that the socket is properly seated on the nut or bolt. Always pull (do not push) on the wrench handle and adjust your stance accordingly.

\* *Slipping wrench can cause injury*

**WARNING: Ratchets**  
Ratchet mechanism may slip or break if dirty. Mismatched or partially worn parts can cause ratchet to slip or break.

Do not immerse sealed ratchet in fluids.  
Do not replace worn parts individually, use entire contents of the service kit.

Ratchets that slip or break can cause injury.

**Introduction**

**CAUTION:** Do not use a torque wrench to break tight fasteners loose. This can damage the tool and result in inaccurate settings.

Precision Instruments Split-beam series torque wrenches are precision measurement tools, designed to torque in the clockwise direction and guaranteed accurate within 4% of the setting from 20% of full scale to full scale.

An innovative "split beam" torque measuring mechanism provides consistent accuracy throughout the torque setting range. Because no coil spring is used, there is no need to "work-in" a Split-beam series torque wrench before using it the first time during a work period. Nor is it necessary to adjust to the lowest torque setting after use.

In use, the wrench clicks and provides a few degrees of free movement when the desired torque is reached. When pressure on the wrench is completely released, the wrench automatically resets for the next application.

- Setting torque on adjustable wrenches is fast and easy because there is no spring tension on the set knob.
- Torque setting is lockable on adjustable wrenches for repetitive applications.
- Hand-hold position on pre-set wrenches is less critical than with other click-type torque wrenches.
- The wrench length is designed to provide the leverage required for maximum torque applications. The length also provides the needed reach for those-hard-to-get-at places.
- Adjustable models have a convenient conversion scale located just above the scale window.
- The torque wrenches are chrome plated for appearance and easy cleanup, and knurled handles help to provide a slip resistant grip.

**Instructions**

**Setting the torque wrench**

*For adjustable models with set knob:*  
Pull back on the lock lever to unlock the set knob. With the set knob turned to the lowest value, turn the knob clockwise to the desired value indicated at the set mark, located at the top center of the scale window. If the value is exceeded, back off and approach the proper setting from the low side. Close the lock lever to lock the set knob at the torque setting.

**Torquing fasteners**

Apply torque to fasteners by pulling the wrench smoothly. When the torque setting is reached, a click will be heard as the wrench releases. When you completely release the pressure, the wrench automatically resets for the next torque application.

**Calibration**

Periodic calibration is necessary with normal use. This helps assure accurate readings and properly applied torque. For additional information, check with your Precision Instruments representative.

**Ratchet maintenance**

Ratchet service kits are available for maintaining the wrenches at optimum operating efficiency. Check with your Precision Instruments representative for the proper service kit.

**Torque wrench head styles**

Split-beam series torque wrenches are manufactured in three different head styles: flex ratchet (FR-models), fixed ratchet (R-models) and fixed head (F-models). Preset models (CP) are available in a fixed ratchet and fixed head style.

Flex ratchet models provide a smooth ratcheting action for efficiency and reduced operator fatigue. They flex 15° up and down for additional knuckle clearance and the ability to work around obstructions.

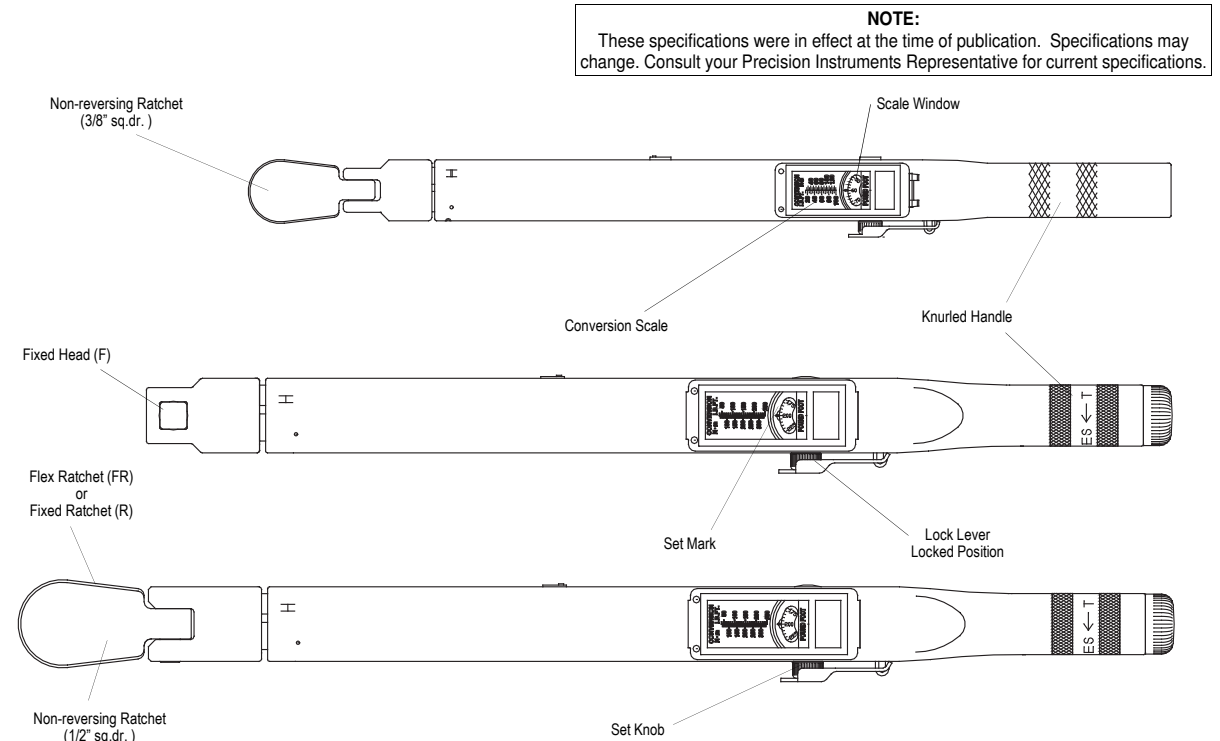
Fixed ratchet models have the same ratcheting action as the flex ratchet head torque wrenches. They differ in the pin that secures the ratchet head to the torque body. The pin on fixed ratchet models eliminates up and down movement and secures the head rigidly in line with the torque body.

Fixed head torque wrenches do not have flex or ratcheting features. The square drive is fixed. This model is ideal for many assembly line operations.

**If Your Torque Wrench Needs Repair**

1. Send it to an authorized Precision Instruments Service Center, or give it to your Precision Sales representative. Do not attempt to repair it yourself.
2. If the warranty is no longer in effect, your Precision Instruments Customer Service Representative will contact you with repair charges for your approval before being repaired.
3. A series of testers are available from Precision Sales for checking the accuracy of your Torque Wrench. See your Precision Sales representative for more information.

**Split-Beam Series torque wrenches are designed to measure torque in the clockwise direction only.**



**NOTE:**  
These specifications were in effect at the time of publication. Specifications may change. Consult your Precision Instruments Representative for current specifications.

Precision Instruments, Inc. Sales (toll free): 866-TWRENCH  
 1846 Miner Street (866-897-3624)  
 P.O. Box 1367  
 Des Plaines, IL. 60017 Fax: 847-824-7629

E-mail us at: sales@torqwrench.com

Visit us at: [www.torqwrench.com](http://www.torqwrench.com)

**TORQUE PRODUCTS FULL WARRANTY**

**PRECISION INSTRUMENTS WARRANTS THAT PRECISION TORQUE PRODUCTS ARE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS.** Precision Instruments will repair or replace these tools which fail to give satisfactory service due to defective workmanship or materials.

This warranty for Precision Instruments torque products is for ONE YEAR from the date of the original purchase. Repair or replacement shall be at the election and expense of Precision Instruments. Except where unreasonable, the product must be returned to Precision Instruments prepaid for warranty service. Precision Instruments does not provide any warranty for any product, or its calibration, subjected to abnormal use. Abnormal use includes misuse, modification, unreasonable use, neglect, lack of maintenance, lack of periodic calibration, or use after the tool is significantly worn.

**PRECISION INSTRUMENTS SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL COSTS OR DAMAGES INCURRED BY THE PURCHASER OR OTHER** including, without limitations, lost profits, revenues, anticipated sales, business opportunities, goodwill, or interruption of business and any other injury of damage. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty is your exclusive remedy and is in place of all other rights and remedies. You may have other rights which vary from state to state or country.

Precision Instruments, Inc.  
 Warranty Information  
 P. O. Box 1306  
 Des Plaines, IL 60017

Rev 01/03

**GENERAL TORQUE SPECIFICATION CHART FOR I.F.I.\* METRIC FASTENERS\*\* ( when SAE10 oil is used as a lubricant )**

Minimum Tensile *** Strength Mpa	400	420	520	830	900	1040	1220
Proof Load MPa	225	310	380	600	650	830	970
Property Class	4.6	4.8	5.8	8.8	9.8	10.9	12.9
Bolt Diameter	Torque: Newton Metre						
metric	inch						
5mm	0.197	2.9	4	5	-	8	11
6mm	0.236	5	7	8	-	14	18
7mm	0.276	8	11	14	-	24	30
8mm	0.315	12	16	20	-	34	44
10mm	0.394	23	32	40	-	70	85
12mm	0.472	40	56	70	-	120	150
14mm	0.551	65	90	110	-	190	240
16mm	0.63	100	140	170	270	290	380
20mm	0.787	200	-	330	520	-	740
24mm	0.945	340	-	580	920	1260	1480
30mm	1.181	680	-	-	1820	-	2520

\*\*\* Megapascal  
 \*\* Note: Use only when manufacturers specifications are not available, these values are for stiff metal-to-metal joints and are based on 90% of proof load. DO NOT USE for gaskets joints or joints of soft materials.  
 \* I.F.I. = Industrial fasteners Institute.

**CONVERSION OF VARIOUS UNITS OF TORQUE**

Convert			Convert		
From	To	Multiply	From	To	Multiply
lb.in.	oz.in.	16	oz.in.	lb.in.	.0625
lb.in.	lb.ft.	.08333	lb.ft.	lb.in.	12
lb.in.	kg.cm.	1.1519	kg.cm.	lb.in.	.8681
lb.in.	kg.m.	.011519	kg.m.	lb.in.	86.81
lb.in.	N*m	.133	N*m	lb.in.	8.85
lb.in.	dN*m	1.13	dN*m	lb.in.	.885
lb.ft.	kg.m.	.1382	kg.m.	lb.ft.	7.236
lb.ft.	N*m	1.356	N*m	lb.ft.	.7376
N*m	dN*m	10	dN*m	N*m	.10
N*m	kg.cm.	10.2	kg.cm.	N*m	.09807
N*m	kg.m.	.102	kg.m.	N*m	9.807

**GENERAL TORQUE SPECIFICATION CHART FOR I.S.O.\*\* METERIC FASTENERS\*\*\* ( when SAE 10 oil is used as a lubricant )**

Minimum Tensile Strength	kg/mm2 P.S.I.	40		50		60		80	100	120	
Proof Load	kg/mm2 P.S.I.	56900	29.1	28.2	36.4	33.9	43.7	47.5	58.2	79.2	
		32150	41390	40110	51770	48220	62160	67560	82780	112650	
Property Class		4.6	4.8	5.6	5.8	6.6	6.8	6.9	8.8	10.9	
Bolt Diameter		Figures are KILOGRAM METER except those that are <b>bolded</b> which are KILOGRAM CENTEMETER									
Metric	Inch										
6 mm	0.236	<b>49</b>	<b>63</b>	<b>61</b>	<b>79</b>	<b>74</b>	<b>95</b>	<b>103</b>	<b>126</b>	<b>172</b>	
8 mm	0.315	<b>119</b>	<b>153</b>	<b>148</b>	<b>191</b>	<b>178</b>	<b>230</b>	<b>250</b>	<b>306</b>	<b>417</b>	
10 mm	0.394	<b>235</b>	<b>303</b>	<b>294</b>	<b>379</b>	<b>353</b>	<b>455</b>	<b>495</b>	<b>606</b>	<b>82</b>	
12 mm	0.472	<b>411</b>	<b>529</b>	<b>427</b>	<b>662</b>	<b>616</b>	7.9	8.6	10.5	14	
14 mm	0.551	<b>654</b>	8.4	8.2	10.5	10	12	13	17	23	
16 mm	0.63	10	13	12	16	15	20	21	26	36	
18 mm	0.709	14	18	17	23	21	27	30	36	49	
22 mm	0.866	27	35	34	44	41	52	57	70	95	

\*\*\* NOTE: Use only when manufacturers specifications are not available, these values are for stiff metal-to-metal joints and are based on 90% of proof load. DO NOT USE for gasket joints or joints of soft materials  
 \*\* I.S.O.= International Standardization Organization.

**THREADED FASTENER TENSION GUIDE ( Figures Represent Pounds of Clamping Force )**

Stress Area	0.0091	0.0141	0.0175	0.0318	0.0524	0.0775	0.1063	0.1419	0.1819	0.226	0.3344	0.4617	0.6057	0.7632	0.9691	1.4052	1.8993
Outside Diameter	No.6	No.8	No.10	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"	1-1/2"	1-3/4"
Threads Per Inch	32	32	24	20	18	16	14	13	12	11	10	9	8	7	7	6	5
Torque:	5 lb.in.	205	157														
	10 lb.in.	410	316	315													
	20 lb.in.	820	632	630	337												
	40 lb.in.		1264	1264	674	541											
	80 lb.in.				1348	1082	987										
	10 lb.ft.				2043	1625	1482	1224									
	20 lb.ft.				4092	3250	2964	2143									
	40 lb.ft.					6503	5928	4896	4286	3899							
	80 lb.ft.						11857	9796	8572	7799	7065						
	100 lb.ft.							12245	10716	9749	8832	7915					
	125 lb.ft.								13395	12186	11049	9894					
	150 lb.ft.								16091	14623	13261	11872					
	175 lb.ft.									17061	15462	13851	12117				
	200 lb.ft.									19498	17664	15830	13836	12113			
	250 lb.ft.									24373	22100	19788	17296	15142	11985		
	300 lb.ft.										26523	23745	20776	18170	14382	13247	
	400 lb.ft.											31660	27700	24227	19176	17663	
	500 lb.ft.												39576	34592	30284	23971	22079
	750 lb.ft.													51941	45426	35956	33118
															29631	22678	

In some cases it may be desirable to know the total clamping force obtained for a given torque. Values are approximate. SAE 30 engine oil was used as lubricant. Use of high stress lube may increase value 20% or more. Highest values for a given size may only be obtained with heat treated bolts having minimum tensile strengths of 150,000 P.S.I. or more.

\* Stress area is calculated as the area of the circle whose diameter is the mean between the root and pitch diameters. This closely approximates the actual stress condition. Maximum theoretical clamping force cannot be obtained from threaded fasteners. Additional stresses to the fastener are caused by the torsional forces of tightening.

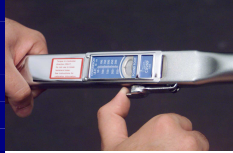
**Caution**

Always use manufacturers specifications when available. These specifications are approximate and may not be appropriate for some applications. No liability is assumed for errors which may result from the use of any of these specifications.

Fastener	Type	Minimum Tensile Strength	Material	PRODUCTION TORQUE GUIDE																						
				Body size of Outside Diameter																						
				2	3	4	5	6	8	10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2		
	S.A.E 2 Steel	74000 P.S.I	Low Carbon										6	12	20	32	47	69	96	155	206	310	480	675	900	1100
	S.A.E. 5 Steel	120000 P.S.I	Medium Carbon Heat Treat										10	19	33	54	78	114	154	257	382	587	794	1105	1500	1775
	S.A.E. 7 Steel	133000 P.S.I.	Medium Carbon Alloy										13	25	44	71	110	154	215	360	570	840	1325	1825	2500	3000
	S.A.E. 8 Steel	150000 P.S.I.	Medium Carbon Alloy										14	29	47	78	119	169	230	380	600	900	1430	1975	2650	3200
	Socket Head Cap Screw	160000 P.S.I.	High Carbon Quenched Tempered										16	33	54	84	125	180	250	400	640	970	1520	2130	2850	3450
	Socket Set Screw	212000 P.S.I.	High Carbon Quenched Tempered																							
	Machine Screw Stainless		18-8	2.6*	4*	5.5*	8*	10*	20*	23*	75*	132*	20	31	43	58	95	130	194	260	400	500				725
	Machine Screw Stainless		316	2.7*	4*	5.7*	8*	10*	22*	25*	80*	140*	22	34	46	60	100	135	210	280	425	515				750
	Machine Screw Yellow Brass	60000 P.S.I.	CU 63 ZN 37	2*	3.3*	4.4*	6.4*	8*	16*	20*	65*	110*	17	27	37	49	78	104	160	215	325	400				595
	Silicone Bronze Type "B"	70000 P.S.I.	CU 96 ZNI-5 Min.	2.3*	3.7*	4.9*	7.2*	10*	19*	22*	70*	125*	20	30	41	53	88	117	180	250	365	450				655
	Machine Screw Aluminum	55000 P.S.I.	CU 3.8-4.9 1.2-1.8 MN 3-9	1.4*	2.1*	2.9*	4.3*	5.4*	12*	15*	46*	82*	13	20	27	36	62	83	128	170	255	315				460
	Machine Screw Monel	82000 P.S.I.	NI 67 CU 30 FE 1.4	2.5*	4*	5.5*	8*	11*	21*	27*	87*	155*	23	36	50	67	115	155	235	315	475	585				850
	Sems Heat Treated Steel	120000 P.S.I.	1018 1022	4*	5*	7*	11*	15*	27*	37*	90*	200*	330*													
	Studs	Use SAE 2.5 and 8 values when grade is known, with nut of sufficient strength.												All figures are POUND FEET except those marked with an <b>ASTERISK ( * )</b> which are POUND INCHES. These values are for lubricated fasteners.												
	Tapping Screw	Set up joint as it will be in production use 70% of over-torque failure as production specifications.																								

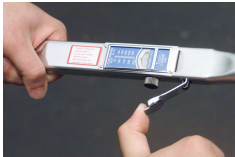


**Setting the  
Precision Instruments  
C-Line Click-Type  
Torque Wrench**



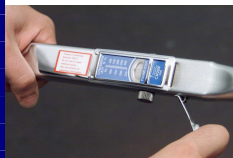
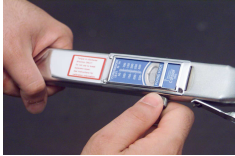
Hold the wrench by the ratchet end in your left hand

Use your thumb to open the lock lever



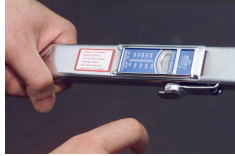
The lock lever will spring open against the handle

Use your right hand to adjust torque setting in the window

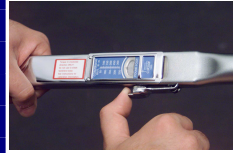


Close lock lever with right index finger

The lock lever will spring closed against the adjustment knob

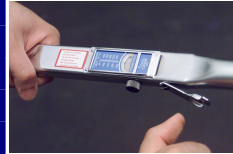


**Setting the  
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Torque Wrench**



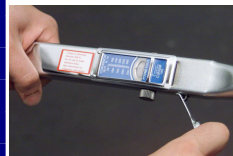
Hold the wrench by the ratchet end in your left hand

Use your thumb to open the lock lever



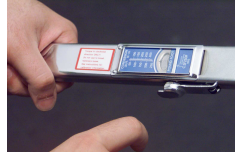
The lock lever will spring open against the handle

Use your right hand to adjust torque setting in the window

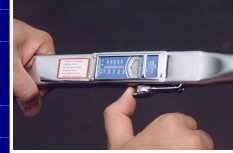


Close lock lever with right index finger

The lock lever will spring closed against the adjustment knob

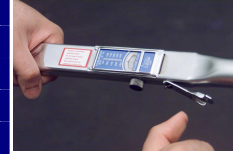


**Setting the  
Precision Instruments  
C-Line Click-Type  
Torque Wrench**



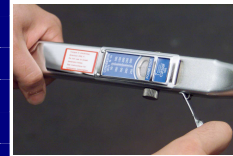
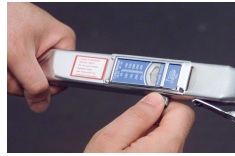
Hold the wrench by the ratchet end in your left hand

Use your thumb to open the lock lever



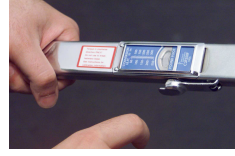
The lock lever will spring open against the handle

Use your right hand to adjust torque setting in the window

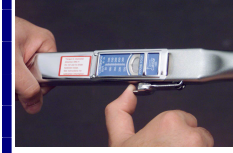


Close lock lever with right index finger

The lock lever will spring closed against the adjustment knob

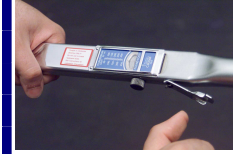
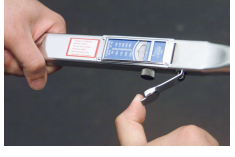


**Setting the  
Precision Instruments  
C-Line Click-Type  
Torque Wrench**



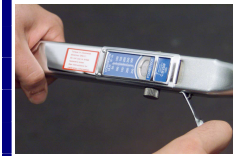
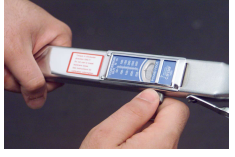
Hold the wrench by the ratchet end in your left hand

Use your thumb to open the lock lever



The lock lever will spring open against the handle

Use your right hand to adjust torque setting in the window



Close lock lever with right index finger

The lock lever will spring closed against the adjustment knob

