



Guide to the choice

- **Air screwdrivers and nutrunners**
- **Electric screwdrivers**
- **Computerised electric screwdrivers**
- **Air nutrunner motors**
- **Computerised electric nutrunner motors**
- **Automatic systems for fastening**



Tightening with Fiam:

Why tighten

The use of screws (nuts, bolts, etc.) in industrial assembly processes is still very popular, especially because the tightening process is reversible; it is always possible to disassemble and reassemble components without damaging them.

The tightening process is based on the synergy among three factors; **screw, joint and screwdriver**. The overall quality of the tightening process is therefore closely linked to the right choice of best type of screw for the application, the material with which the components of the joint are made of and the air or electric screwdriver.

The same considerations also apply to air or electric nutrunner motors. Those who wish to have more information concerning the following are kindly asked to contact Fiam's Technical Assistance Service.

The screws

Nowadays, specific screws are available depending on the kind of materials and the various applications; this offers quicker, safer and less expensive assembly work. The main screws on sale are:



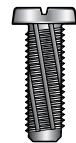
METRIC

Generally used with nuts and threaded holes.



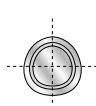
SELF-THREADING

These form the thread and tighten at the same time. The thread is created by the deformation of the material, making this kind of screw particularly suitable for plastic, wood and other lightweight materials.



SELF-TAPPING

These are metric screws with special grooves on their threaded shanks which allow the shavings created during tightening to be removed.



THREE-LOBE

These are metric screws that tap through the special lobe shape of the shank, thereby deforming the material rather than removing it.



SELF-DRILLING

These are self-threading screws with a special "drill" tip that makes the hole during drilling.

The type of imprint may be...



SLOTTED

Mainly used in the wood, eye-glasses, electronics sectors, etc; low priced and often of poor quality.



CROSS-SLOTTED (PHILIPS-POZIDRIVE)

Used on plastic, sheet metal and wood; the cross-slot improves the connection between screw and screwdriver.



TORX

This transmits higher torque levels with lower axial thrust. The imprint offers a larger surface contact and effective connection with minimum clearance.



HEX SOCKET SCREW (Allen screw)

Normally with metric pitch, it can be used in small spaces.



HEX HEAD

Used in many sectors, both in the metric and in the self-threading and self-drilling versions etc.. Particularly effective for high tightening torque levels.

The screws can be fitted with:



BUILT-IN FLAT WASHER

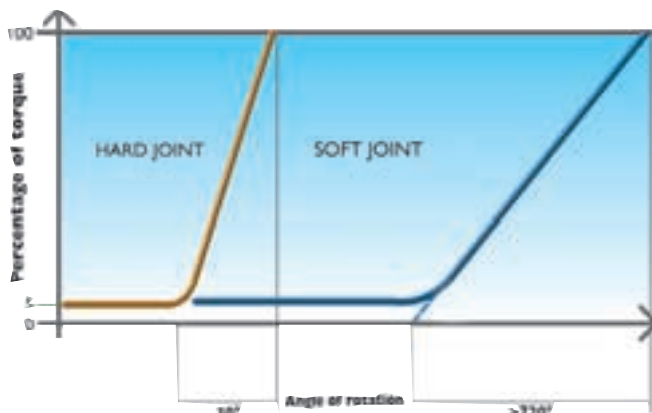
This improves the quality of tightening and makes tightening cycle times quicker.



KNURLED WASHER UNDER THE HEAD

Fixed or mobile, it reduces the chances of the screw from accidentally loosening.

The joint



Steel, aluminium, plastic and wood, etc. create different joints and therefore they can support different tightening forces. **It's important to know what material the joint is made of when choosing the screw and the screwdriver.** Joints can be hard or soft.

• **The joint is soft** when tightening torque is reached with a rotation of at least 720° (about 2 rotations);

• **The joint is hard** when tightening torque is reached with a maximum rotation of 30°.

the quality solution

The tightening force of the screw

The tightening force is obtained by applying a torque to the screw and allows two elements to be kept firmly together. Only about 10% of the torque is transformed into tightening force, the remaining 90% is dissipated in various types of frictions.

10% is transformed into tightening force which guarantees the hold or the tightening of the joint;

about 50% of the torque is dissipated to overcome the frictions of the under head of the screw;

40% is dissipated to overcome the frictions between the threads.



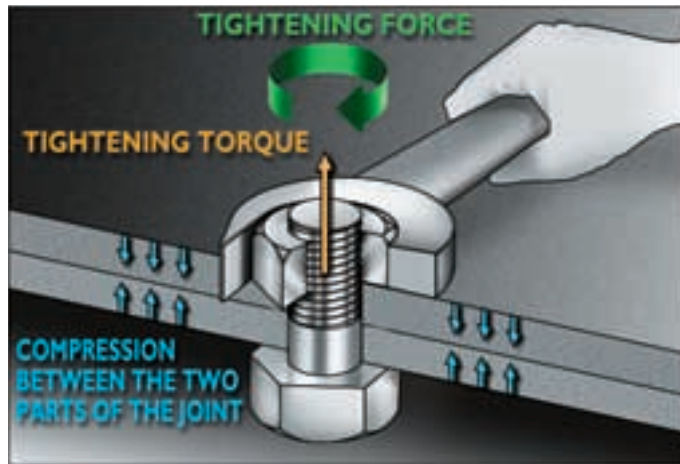
How the torque applied to the joint is distributed

Frictions make the tightening force applied to the screw (and therefore to the effective hold of the joint) extremely variable. As a result, the values of tightening torque to apply to the screw, shown in the table here beside, are purely indicative.

Electronic instruments such as digital torque readers and analysers, static and dynamic transducers, dynamometric wrenches and screwdrivers are used to **measure, check,** visualise, print and process **tightening force values** (see Fiam catalogues nos. 39, 42, 35). These instruments permit to:

- Ensure the required quality standards are respected
- Certify correct assembly
- Guarantee higher finished product quality
- Reduce the risks of "product responsibility".

And they have also become of fundamental importance when each single tightening operation must be certified, especially when working according to **ISO 9000** standards.



The torque applied transforms into tightening force in the screw

The table shows approximate recommended torque values (in Nm) for wide pitch metric screws featuring various degrees of resistance (ref. UNI EN 20898/1).

Pitch and screw Ø mm	SCREW STRENGTH CLASS (DIN)								
	Normal screws					High strength screws			
	3,6	4,6	4,8	5,8	6,8	8,8	10,9	12,9	
M 1	0,0107	0,0143	0,0190	0,0239	0,0287	0,0382	0,0539	0,0646	
M 1,2	0,0206	0,0273	0,0364	0,0456	0,0547	0,0732	0,103	0,123	
M 1,4	0,033	0,044	0,059	0,074	0,088	0,118	0,166	0,199	
M 1,6	0,048	0,064	0,085	0,106	0,128	0,170	0,238	0,288	
M 1,8	0,075	0,099	0,132	0,166	0,2	0,265	0,373	0,45	
M 2	0,099	0,132	0,176	0,220	0,264	0,35	0,50	0,595	
M 2,5	0,203	0,27	0,36	0,444	0,540	0,72	1,02	1,21	
M 3	0,351	0,467	0,62	0,78	0,935	1,24	1,75	2,10	
M 4	0,802	1,070	1,4	1,78	2,14	2,9	4,0	4,8	
M 5	1,57	2,10	2,8	3,50	4,21	5,5	8	9,4	
M 6	2,71	3,61	4,8	6,02	7,22	9,7	13,6	16,2	
M 8	6,57	8,70	11,6	14,6	17,5	23	33	39	
M 10	13	17,5	23	29	35	47	65	78	
M 12	22,6	30	40	50	60	80	113	135	
M 14	36	48	65	79	95	130	180	215	
M 16	55	73	98	122	147	196	275	330	
M 18	75	101	135	168	202	270	380	450	
M 20	107	143	190	238	286	385	540	635	
M 22	145	190	255	320	385	510	715	855	
M 24	185	245	325	410	490	650	910	1100	
M 27	275	365	480	605	725	960	1345	1615	
M 30	370	495	650	820	990	1300	1830	2200	
M 33	500	670	885	1110	1340	1770	2480	2980	
M 36	645	860	1130	1430	1720	2260	3170	3810	

As regards self-threading screws, self-locking nuts, stainless steel screws, etc., due to the considerable complexity of the variables that affect torque levels (type of material, frictions...) the correct torque value to apply should be analysed case by case.

INDICATIVE TIGHTENING TORQUE (Nm) FOR SELF-THREADING SCREWS

Ø screw (mm)	2,2	2,9	3,5	3,9	4,2	4,8	5,5	6,3
Recommended torque (Nm)	0,3	1	1,8	2,5	3	4,2	6,7	9

The tightening torque control system

In order to choose the best screwdriver, it is important to know the principles lying behind each family of screwdrivers, that is, the tightening torque control system. Generally speaking, the following considerations also apply to air nutrunner motors: for these products please contact the **Fiam Technical Assistance Service**.

Air screwdrivers and nutrunners with clutch

The clutch is a mechanical torque control device and can be of various types

JB, JM2 TRACS

IMMEDIATE AND AUTOMATIC AIR SHUT-OFF CLUTCH (Jointech Plus, Joint Master 2, Tracs)

When the pre-set torque value is reached, the clutch automatically stops the air feed and the air motor. It guarantees **high torque repeatability and generates minimum reaction on the hand of the operator**.

The sophisticated design concept and machining precision of the clutch guarantee quality tightening regardless of the action of the operator and the variable softness of the joint.

JP-TC

IMMEDIATE AND AUTOMATIC AIR SHUT-OFF CLUTCH AND TORQUE TRANSDUCER (Jointech Plus-TC)

Besides the characteristics of the automatic shut-off clutch, the built-in torque transducer of the screwdriver (and connected to an electronic reader) constantly monitors the functionality of the tool and applied torque **repeatability**.

D

INCREMENTAL IMMEDIATE AND AUTOMATIC AIR SHUT-OFF CLUTCH (Delta)

This is used with applications in which the final tightening torque is lower than the torque developed during tightening, for example, when creating a thread with self-threading or self-shaping screws. It is based on the principle of **inhibiting** the clutch during the **initial tightening phase** (thread formation phase) and only **activating** it during the **final part** of the cycle.

UJ

SLIP CLUTCH (Uni Jointech)

When the pre-set torque is reached, two ratchets begin to slip. The clutch does not stop the air motor and therefore it is up to the operator to decide when to stop the tightening process. It is certainly one of the most versatile clutches and most popular in the past, as the skill and experience of the operator determine the applied torque depending on the situation and the type of joint. However, the slip clutch generates high levels of noise and vibrations which makes it unsuitable from the ergonomic point of view. Moreover the premature wear of the ratchets does not guarantee torque repeatability over time.

Air screwdrivers and nutrunners without clutch

SF

DIRECT DRIVE - WITHOUT CLUTCH (OR STALL TYPE) (SF)

This is the simplest tightening solution: the air motor is directly connected by means of adapters to the accessory (bit, socket, etc.) working on the screw. The torque applied can be adjusted by regulating the air feed pressure. It is a **low-priced alternative compared with the slip clutch** with the advantage that it **does not generate vibrations**. It is also very versatile as it can tighten screws with different diameters on different joints.

Mechanic impact air wrenches

IM

Mechanic impact air wrenches, popular in the past, are not currently used much at industrial level due to their elevated noise and vibration levels.

Hydraulic pulse air wrenches

FPW

Hydraulic pulse air wrenches are a satisfactory solution to tighten at medium-to-high torque levels: the hydraulic unit generates torque pulses with elevated frequencies, allowing rapid tightening with modest torque reaction on the hand.

FPT

In addition to the advantages offered by the FPW range, the hydraulic pulse air wrenches with automatic air shut-off offer greater torque repeatability.

Direct current electric screwdrivers

AE

These screwdrivers feature clutches with automatic shut-off of the electric feed.

Computer controlled direct current electric screwdrivers

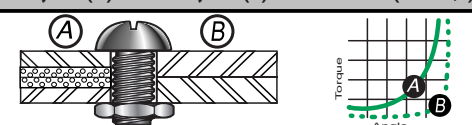
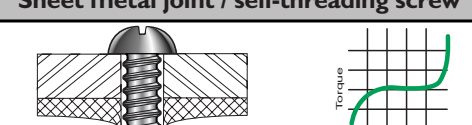
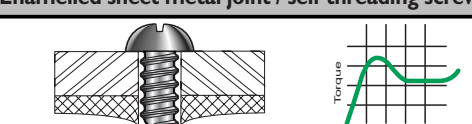
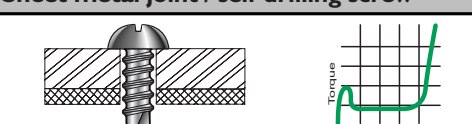
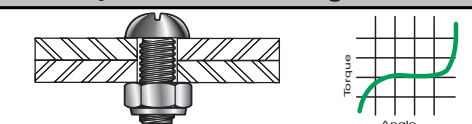
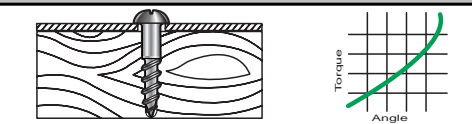
AEC

The computerised control unit, together with the excellent flexibility and possibility of control of the brushless electric motor, allows **extremely effective tightening strategies** to be set up, both for manually held electric screwdrivers and for electric nutrunner motors mounted on complex assembly systems. The tightening process is controlled by the torque/angle transducers integrated into the screwdriver/nutrunners which allow the system to monitor these two parameters in real time and to interactively and immediately make the required corrections to the tightening process.

the quality solution

Types of joint and choice of torque control system

A list of examples of joints follows together with the most suitable torque control system for most applications. The wide variety of assembly solutions leads us to recommend an adequate "on-site" assessment in cooperation with the **Fiam Technical Assistance Service**.

<p>1</p> <p>The initial torque required is very low and grows gradually (soft joint A) or rapidly (hard joint B) when the screw head begins to slip on the joint.</p>	<p>Soft joint (A) and hard joint (B) / metal screw (class 8,8)</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●●●</td> <td>●●●</td> <td>—</td> <td>●</td> <td>●</td> <td>●</td> <td>●●</td> <td>●●●</td> <td>●●●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●●●	●●●	—	●	●	●	●●	●●●	●●●
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<p>2</p> <p>The initial torque for forming the thread is lower than the final tightening torque.</p>	<p>Sheet metal joint / self-threading screw</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●●●</td> <td>●●●</td> <td>●</td> <td>●●</td> <td>●</td> <td>●</td> <td>●●</td> <td>●●●</td> <td>●●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●●●	●●●	●	●●	●	●	●●	●●●	●●
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<p>3</p> <p>The initial torque for forming the thread is higher than the final tightening torque.</p>	<p>Enamelled sheet metal joint / self-threading screw</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●</td> <td>●</td> <td>●●●</td> <td>●●●</td> <td>●</td> <td>—</td> <td>—</td> <td>●</td> <td>●●●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●	●	●●●	●●●	●	—	—	●	●●●
JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC												
●	●	●●●	●●●	●	—	—	●	●●●												
<p>4</p> <p>The initial torque for making the hole and forming the thread tends to increase rapidly when the screw head slips on the joint.</p>	<p>Sheet metal joint / self-drilling screw</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●●●</td> <td>●●●</td> <td>●●</td> <td>●</td> <td>●</td> <td>●</td> <td>●</td> <td>●●●</td> <td>●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●●●	●●●	●●	●	●	●	●	●●●	●
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<p>5</p> <p>The initial torque required to overcome the friction generated by the plastic insert in the nut tends to increase rapidly when the screw head slips on the joint.</p>	<p>Joint with self-locking nut</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●●●</td> <td>●●●</td> <td>—</td> <td>●</td> <td>●</td> <td>●</td> <td>●●</td> <td>●●●</td> <td>●●●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●●●	●●●	—	●	●	●	●●	●●●	●●●
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<p>6</p> <p>The torque level increases gradually and constantly until the final peak when the screw slips on the joint.</p>	<p>Joint for wood/plastic screw</p> 	<p>RECOMMENDED TORQUE CONTROL SYSTEM</p> <table border="1"> <thead> <tr> <th>JP, JM2 TRACS</th> <th>JP-TC</th> <th>D</th> <th>UJ</th> <th>SF</th> <th>IM</th> <th>FPW FPT</th> <th>AE</th> <th>AEC</th> </tr> </thead> <tbody> <tr> <td>●●●</td> <td>●●●</td> <td>—</td> <td>●●</td> <td>●●</td> <td>—</td> <td>—</td> <td>●●●</td> <td>●</td> </tr> </tbody> </table>	JP, JM2 TRACS	JP-TC	D	UJ	SF	IM	FPW FPT	AE	AEC	●●●	●●●	—	●●	●●	—	—	●●●	●
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●●● Recommended ●● Acceptable ● Slightly recommended

KEY

Type of torque control system

JP, JM2 TRACS	Immediate and automatic air shut-off	UJ	Slip clutch	FPT	Hydraulic pulse with automatic air shut-off
JP-TC	Immediate and automatic air shut-off and torque transducer	SF	Direct drive without clutch (or stall type)	AE	Automatic shut-off of the electric feed
D	Incremental immediate and automatic air shut-off	IM	Mechanic impact	AEC	Computerised shut-off of the electric feed
		FPW	Hydraulic pulse		

Tightening with Fiam:

Solutions by Fiam




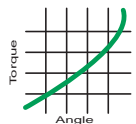





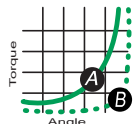











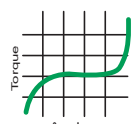





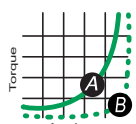


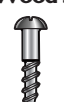


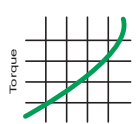


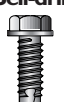


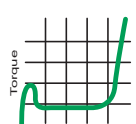





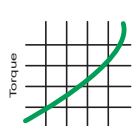


After choosing the type of screw and identifying the joint and torque control system, the most suitable Fiam tool must be identified:

CONTROL SYSTEM		FIAM TOOL		
JP, JM2 TRACS	AIR SCREWDRIVERS AND NUTRUNNERS	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Jointech-Plus • Joint Master 2 • Tracs 	<ul style="list-style-type: none"> • CZE...A • CSEZ...A • CSE...A • CY...A • CZE...AS • AZ, AS, AD, AG 	<ul style="list-style-type: none"> 0,5÷5 0,7÷4,3 2,5÷10 7÷24 0,5÷4 0,8÷60 	<ul style="list-style-type: none"> 13 11 23 24 13 26
	AIR NUTRUNNER MOTORS			
	<ul style="list-style-type: none"> • Jointech-Plus 	<ul style="list-style-type: none"> • MCZ...A, MCS...A • MCY...A 	<ul style="list-style-type: none"> 0,7÷35 	<ul style="list-style-type: none"> 27
JP-TC	AIR SCREWDRIVERS AND NUTRUNNERS	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Jointech-Plus and torque transducer 	<ul style="list-style-type: none"> • CZE, CSE...-TC • AD, AG...-TC 	<ul style="list-style-type: none"> 0,7÷14 7÷60 	<ul style="list-style-type: none"> 18 14
D	AIR SCREWDRIVERS	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Delta 	<ul style="list-style-type: none"> • CSE...A 	<ul style="list-style-type: none"> 0,8÷5 	<ul style="list-style-type: none"> 37
UJ	AIR SCREWDRIVERS AND NUTRUNNERS	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Uni-Jointech 	<ul style="list-style-type: none"> • CSE • CZ • CY • AZ, AS • RSE 	<ul style="list-style-type: none"> 1÷10 0,6÷4,7 4,5÷25 0,8÷19 1,5÷8 	<ul style="list-style-type: none"> 15 22 21 25 31
	AIR NUTRUNNER MOTORS			
	<ul style="list-style-type: none"> • Uni-Jointech 	<ul style="list-style-type: none"> • MCZ, MSCZ, MCS, MSCS, MCY 	<ul style="list-style-type: none"> 0,6÷25 	<ul style="list-style-type: none"> 28
SF	AIR SCREWDRIVERS	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Direct drive without clutch (stall type) 	<ul style="list-style-type: none"> • AS, AN, AY • CD...SF 	<ul style="list-style-type: none"> 11÷110 6÷16 	<ul style="list-style-type: none"> 9 2
IM	AIR WRENCHES	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Mechanic impact 	<ul style="list-style-type: none"> • CSI..., FW... 	<ul style="list-style-type: none"> 15÷4000 	<ul style="list-style-type: none"> 16
FPW FPT	AIR WRENCHES	Models	Torque Range Nm	Catalogue*
	<ul style="list-style-type: none"> • Hydraulic pulse 	<ul style="list-style-type: none"> • FPW 	<ul style="list-style-type: none"> 15÷200 	<ul style="list-style-type: none"> 17
	<ul style="list-style-type: none"> • Hydraulic pulse with automatic air shut-off 	<ul style="list-style-type: none"> • FPT 	<ul style="list-style-type: none"> 12÷130 	<ul style="list-style-type: none"> 45
AE	ELECTRIC SCREWDRIVERS	Models	Torque Range Nm	Catalogue*
		<ul style="list-style-type: none"> • CL, α • F 	<ul style="list-style-type: none"> 0,02÷3,5 0,7÷8 	<ul style="list-style-type: none"> 5 4
AEC	COMPUTERISED ELECTRIC SCREWDRIVERS AND NUTRUNNERS	Models	Torque Range Nm	Catalogue*
		<ul style="list-style-type: none"> • HCS, PCS, HCSK, HCA 	<ul style="list-style-type: none"> 1,3÷160 	<ul style="list-style-type: none"> 7

* Catalogue numbers are shown on their back covers next to the date of printing.
The products herewith reported could be not available for some countries.

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EXAMPLES

TYPE OF SCREW	Type of material (joint)	Behaviour of joint	Required tightening torque	Chosen control system	FIAM MODEL
Self-threading  ø 3,5 mm L=19 mm	 PLASTIC 		1,3 Nm		
Metric  M5 L=20 mm	 STEEL 		4 Nm		
Self-threading  ø 3,9 mm L=15 mm	 ENAMELLED SHEET METAL 		2 Nm		
Self-locking nut  M4	 STEEL 		2 Nm		
Metric  M1,8 L=5 mm	 BRASS 		0,2 Nm		
Wood screw  ø 6 mm L=50 mm	 WOOD 		max 16 Nm <small>according to the type of wood</small>		
Self-drilling  ø 6,3 mm L=40 mm	 STEEL 		10 Nm		
Self-threading  ø 6,3 mm L=60 mm	 PLASTIC 		12 Nm		

As regards air nutrunner motors, please contact the **Fiam Technical Assistance Service** or your local distributor.

Fiam puts its experience and technical skill at the service of customers to solve specific problems: Fiam studies and produces **customised tools** to satisfy individual tightening requirements. To make the best choice, please contact the Customer Technical Assistance Service or your local distributor.

The above examples are purely indicative and therefore we recommend to contact the Fiam Technical Assistance Service or your local distributor.



Tightening with Fiam:

Ergonomics and safety

The ergonomic and safety aspects of screwdrivers/nutrunners are further fundamental parameters of choice. Fiam has its own in-house laboratories and specialised staff for analysing and measuring noise, vibrations and other ergonomic parameters. For more information please contact Fiam Technical Assistance Service.



Tools shape

An ergonomic screwdriver/nutrunners must offer various grip positions making use of rounded shapes and no sharp edges. Pistol grips, for example, must offer the following 4 basic grips:

- 1) **“High” grip** for exercising sufficient thrust keeping the tool aligned with the arm. Ensures the arm is not subject to bending force which would fatigue it;
- 2) **“Low” grip** when less thrust and more aim pressure is required;
- 3) **“Forward” grip** to help balance the screwdriver;
- 4) **“Up grip”** for working with an overhead air feed.

The grip of the screwdrivers is specially designed for women’s hands, too, and is shaped so that torque reaction and axial thrust are contrasted by the operator as effectively as possible by means of a safe, no-slip grip.

The screwdrivers with straight grips are covered with soft material and **insulate the operator’s hand from sudden changes of temperature.**

Angle nutrunners are perfect for work in small, inaccessible areas.



Start button pressure

Doing a large number of tightening operations during the day can also fatigue the operator’s fingers due to the effort required to start the tool. This problem is solved by the several, specially designed starting solutions (push, button, etc.) that considerably reduce starting effort with consequent advantages in terms of **reduced fatigue.**



Reaction on the hand

When the pre-set torque is reached, not only does the mechanical clutch close the air feed to the air motor but also immediately disconnects transmission of power between the accessory (bit) and the rotating components of the screwdriver, thereby eliminating all inertia. **This minimises the reaction exercised by the screwdriver on the operator’s hand after reaching the pre-set torque.**



Weight and suspension systems

Heavy and badly-balanced screwdrivers cause operator fatigue.

The ergonomic shape of the grip and the use of light alloys produce lightweight, correctly balanced screwdrivers which offer **greater handiness** at the same torque levels.

Fatigue caused by these factors can **easily be eliminated** by means of **suitable balancers.**



Noise

A technologically advanced air screwdriver must be designed in order to reduce noise levels at source. The use of automatic air shut-off clutches offers considerable noise reductions, compared with those produced by traditional screwdrivers with slip clutches. With automatic air shut-off clutches, the time during which the operator remains exposed to this phenomenon is also reduced. As previously mentioned, in fact, these screwdrivers automatically stop as soon as the pre-set torque is reached. **Exposure time is reduced by about four times** compared with exposure times of traditional slip screwdrivers. As well as adapting the internal mechanisms, the use of **new built-in silencing systems** has considerably reduced the noise caused by the exhaust air of the screwdriver. To further reduce the noise emitted by the screwdrivers, tubes for conveying the exhaust air should also be used. All our screwdrivers are therefore designed in that sense.



Vibrations

Screwdrivers and nutrunners, similarly to most portable machines, are a source of vibrations. This phenomenon is particularly important as vibrations are transmitted directly to the hand and arm of the operator who grips the equipment and can give rise to considerable levels of exposure. The use of a technologically advanced automatic air shut-off clutch reduces the vibration levels to under 1 m/s² (the threshold level under which the risk is considered nil) with respect to traditional slip clutches. As well as generating considerably lower vibration levels, screwdrivers with automatic air shut-off clutches also reduce the **time** in which the operator remains exposed to this phenomenon.



Environmental factors

Attention to the environment and its safeguard is more important now than ever before. The correct choice of the screwdriver can reduce power consumption, oil fog emissions and noise pollution, as well as making disposal of the screwdriver itself easier. Technological developments have allowed screwdrivers to be produced using **non-lubricated compressed air.** The most significant advantage of this is the elimination of all emissions of oil fog with the exhaust air. This is mainly for the benefit of operator comfort but it also allows them to be used in delicate conditions (electronics, eye-glasses, precision engineering, etc. ...) and eliminates the costs of lubrication systems.

Another factor to consider is the **reduction in the consumption of compressed air.** An automatic air shut-off screwdriver consumes about 30% less than a traditional slip screwdriver.

A further important point is that the best screwdrivers are built using recyclable materials (steel, cast iron, brass, plastic). All the components must be **easy to dispose of and must not be an environmental pollution and/or personal safety hazard.**

Attention towards environmental factors is a fundamental commitment for Fiam which has been developed into an efficient ISO 14001 Certified Environmental Management System.

the quality solution

The productivity of the tightening process

Some strictly manual phases in the tightening process, such as taking the screw and positioning it correctly on the piece, considerably reduce the rhythm and fluidity of assembly operations.

These are productivity problems that FIAM has solved by proposing tightening systems ranging from the simplest type, featuring semi-automatic and automatic screw feed, to completely automated tightening operations, effective solutions for quick and safe tightening.

Semi-automatic tightening systems

These provide a simple and continuous supply of screws and/or nuts and make the work of the operator easy as he no longer has to pick up the screw and/or nut and position it on the screwdriver bit or on the piece.

• Semi-automatic feeders **AM**

for hex nuts from 5.5 to 13 mm (catalogue 32)

• Semi-automatic feeders **SAS**

for magnetisable screws with shank diameters from 1.4 to 5 mm, with PHILLIPS (or POZIDRIVE) cross-slot imprint (catalogue 32)

Automatic tightening systems

Used for large or medium series of identical screws, they feature the following:

- the screw is automatically sent from the feeding bowl to the head of the screwdriver;
- the screw is positioned on the piece at the same time as the screwdriver is operated (manually).

• Autofeed screwdriver **CA**

for various types of screws (catalogue 6)

Multi-spindle units with air or electric drive

Multi-spindle units offer elevated production rhythms given that they perform two or more tightening operations at the same time. Multiple screwdrivers have two or more spindles with fixed or variable distance between the centre and are fitted with manual or automatic feeding devices. They can be powered by air or electricity and there are various systems for programming, controlling and monitoring the production cycle in order to guarantee reliability, accuracy and speed (catalogue 7).

Automatic units with automatic screw feed

These completely automated assembly units increase productivity according to customer requirements and increase the quality of the finished product. They reduce process times and rationalise the work of the operators who also enjoy improved working conditions; production costs are also reduced. The various solutions offer various levels of automation and complexity and are studied together with the customer by means of a specialised and fast consulting service. Bearing in mind these objectives, Fiam has established the “**AUTOVITE**” Division in order to make reliable automatic tightening machines, designed according to real customer requirements.

FIAM Technical Assistance

The Fiam technical assistants provide fast and specialised before and after-sales services.

They are therefore real and proper partners for customers, capable of coming up with the most appropriate solution for their specific requirements and always offering precise and reliable answers. Their close daily contact with the market enables them to identify new product requirements which are passed to the design department to allow them to interpret them correctly and achieve effective design solutions.

Please contact them everytime you need or apply to your local distributor.



FIAM

INDUSTRIAL AIR TOOLS

Fiam Utensili Pneumatici spa
 Viale Crispi, 123 - 36100 Vicenza / Italy
 Tel. +39.0444.562611 - Fax +39.0444.562325
customerservice@fiamairtools.com
www.fiamairtools.com



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