Tightening automation. Only excellent solutions.



High technology brushless electric nutrunner motors



High technology tightening solutions

Quality guarantee with a precise tightening

Assembly operations, and most of all the ones foreseeing the use of screws (nuts, bolts, etc.) are of utmost importance to guarantee the final quality of a product.

This is particularly true as much as the fastening operation is a "critical" one as it is the case when there is the need to guarantee the **safety of the working cycle** (brake

TCS.B

systems for motor vehicles for example), **service life and performance** (head fixing of explosion engines for example), according to international norms and extreme precision in assembly operations.

Under these conditions the fastening cycle is of the utmost importance and has to be carried out by using the suitable technics and instruments.

Solutions to meet any production requirement

- For any threaded element
- Semi-automatic solutions: a valuable help for operators
- Multi-spindle tightening units: winning productivity
- Anthropomorphic robot, versatile and always convertible
- Electric axis to ease assembly on different surface





Control strategies of the tightening pro

In the industrial tightening process we different tightening requirements needing different control modalities are found. For example, the **torque control with the angle monitoring, the angle control with the torque monitoring, only torque control** and other types of control. Fiam control units are equipped with a software to manage 4 basic strategies. The tightening torque control

The main parameter to be controlled is the tightening torque applied to the screw. The motor stops automatically when the pre-set torque value (CP) has been reached. If the torque and time values found by the system are within the programmed limits, the warning of OK cycle (green led turned on) is given.



Advantages

Accurate control of torque values in the soft joints

The angle/ torque control

The main parameters to be controlled are the tightening torque applied to the screw and the rotation angle of the screw, with priority to the angle value.

The motor stops automatically when the pre-set angle value (AP) has been reached. If the torque and angle values found by the system are within the programmed limits, the motor stops automatically and the warning of OK cycle (green led turned on) is given.



Connecting rods of

motors, motor head, etc.

Advantages

Accurate control of the quality of the assembled product through the angle and torque values with tightenings at yield point; it is possible to assemble bolts, with lower weight, dimensions and diameter, obtaining a lighter assembled product

Untightening control

he main parameter to be controlled is **the** left rotation angle of the screw. The motor stops automatically when the pre-set angle value (AP) has been reached. If the angle values found by system are within the programmed limits, the motor stops automatically and the warning of OK cycle (green led turned on) is given.



Resumption of the after the adjustmen materials

DCess



Applications

the very Tightening between sheet metal and sheet metal (motor vehicle and household appliance fields) and tightening with the use of rubber joints (or similar)

The torque/ angle control

The main parameters to be controlled are the **fightening torque** applied to the screw and the rotation angle of the screw, with priority to the torque value. The motor stops automatically when the

automatically when the pre-set torque value (CP) has been reached. If the torque and angle values found by the system are within the programmed limits, the motor stops automatically and the warning of OK cycle (green led turned on) is given.



Advantages

Maximum control of the torque and certainty of a perfect joint through the angle surveys

Applications

Fixing seat belts, connecting rods of motors, drive shafts, brakes, wheels etc.



Applications

tightening t of the <u>Everywhere it is necessary</u>

to untighten workpieces

Engagement

Slow rotation used at the beginning of the tightening cycle to allow correct insertion of the bit into screw imprint and to verify that the screw has not been already tightened. The main parameter to be controlled is the rotation angle. If during the engagement stage, torque does not exceed the maximum set torque, the system completes the strategy correctly and carries on real tightening phases.



Advantage

Initial check to enable correct alignment between motor bit and screw head and to avoid tightenings on screws already inserted or offset respect to hole

Applications

Everywhere it is necessary to verify the initial state of screws and joint before proceeding with tightening phases

High technology tightening solutions: mar

CURRENT CONTROL electric nutrunner motors

The torque/angle parameters are achieved by measuring the current absorbed by the brushless motor and by appropriate sensors.





Electric nutrunner motors with TORQUE AND ANGLE CONTROL

Equipped with an **electronic transducer** to read the torque applied to the screw; **while the angle is read directly** by appropriate sensors.



ny configurations for evey need



Controller and feeding unit TCS-B

Connecting cables







Driver TOD...



Control unit TOC...



Be demanding

Brushless solutios for every need.

Wide range of brushless electric nutrunner motors

with current control or torque/angle control; thanks to their modularity and versatility, they are used in multispindle units for fastening operations where more threaded elements are fastened simultaneously.

These motors together with the feed and control units guarantee extreme precision and accuracy and **maximum quality of the tightening process and of the assembled product**.



Reliability

Long lifetime of the components thanks to careful design and to quality of the productive process which results in less maintenance and repair costs

For ISO 9000 environments, these motors are powered by a driver and computerised control unit, which are programmable according to customer's needs, ensuring control of the fastening parameters (torque, angle, speed), and it is possible to view, print, store and collect statistical data

Some moldels are equipped with a **builtin angle transducer (resolver)** that guarantees an elevated resolution in the angle measurement and the therefore it assures an **excellent tightening process control**

These motors ensure **consistent fastening accuracy** by a suitable programming of the control unit which allows a high torque repeatability and reduced torque scattering

CURRENT CONTROL MODELS

They offer **superior quality standards** with reduced operating costs thanks to their simple manufacturing concept when compared to the matching models with torque/angle built-in transducer (with torque and angle control)

MODELS WITH TORQUE AND ANGLE CONTROL

The electronic transducer integrated in the static brushless motor is of **limitless** duration

They are performing even if the joint features change from one piece to another: these motors are not affected by these changes which are considered normal in the tightening operations and they guarantee the achievement of the programmed parameters

Electric nutrunner motors

Don't be satisfied with the maximum

Perfection for your solutions

Naturally innovative

Productivity Ergonomics Ecology

Considerable increase of the efficiency, of the tightening cycle thanks to innovative design concept

They are mainly used in multispindle units for fastening operations with one or more spindles. These motors ensure a combination of high quality and increased productivity in the fastening process, since more screws are **fastened simultaneously under the same timecycle conditions**

Considerable reduction of the productive times: there is no need of post-process controls as extremely precise fastening is guaranteed

Compact design, reduced dimensions and weights: this facilitates their use on manipulators used in robotic assembly Optimization of performances in regard to ergonomics and operator safety in working environments

They meet the most important ergonomic requirements such as **low noise level** and **maximum safety** (thanks to the low electric voltage); so they guarantee comfortable working environments to the operators

Their use on robot or semi-automatic tightening machines avoids the operators to carry out difficult tightening operations and/or components manipulation Innovative systems designed paying even more attention with respect to environment and its safeguard

They **safeguard** the working environment from the presence of **environmental** pollution caused by the oil exhaust of the compressed air

More healthy and breathable working environments thanks to **absence of coal and copper dust** (motor without brushes)

Greater output of the motors guarantees less electric energy consumptions

They are made with **recyclable materials**; all the parts may therefore be easily disposed of and do not represent a hazard for environmental pollution or personal safety

All Fiam products are supplied **eco-friendly packaging**

Eco-contribution WEEE acquitted: Fiam carries out its obligations of producer, with full respect for the environment, and without any extra charge for the customer

Nutrunner motors with torque and angle control 15MCB20A1

> Nutrunner motors with torque and angle control 15MCB20A2

Nutrunner motors with torque and angle control 17MCB...A1

CURRENT CONTROL

Brushless electric nutrunner motors from 1 to 90 Nm

15 MCB...C1/C2 25 MCB...C1/C2 50 MCB...C1/C2



• Controller and feeding unit, basic version TCS-B...

Connecting cables



Tree of brushess ectric motor		Recommended tightening to que		tole speed	Reversibility	Meight		Accessionies	Ariai compensation strokenoed	Comtroller and teeding and to use unit loage tq
Model	Code	Nm	in Ib	rpm	Туре	Kg	lb	Drive	mm/N	Model
15MCB05C1	111618201	1 ÷ 5	8.85 ÷ 44.25	1700	U	1,7	3.74	3/8"	-	TCS-B 15
15MCB05C2	111618206	1 ÷ 5	8.85 ÷ 44.25	1700	U	2	4.4	3/8"	20/35	TCS-B 15
15MCB10C1	111618231	2 ÷ 10	17.7 ÷ 88.5	700	U	1,8	3.96	3/8"	-	TCS-B 15
15MCB10C2	111618236	2 ÷ 10	17.7 ÷ 88.5	700	U	2,1	4.62	3/8"	20/35	TCS-B 15
15MCB20C1	111618261	4 ÷ 20	35.4 ÷ 177	350	U	1,8	3.96	3/8"	-	TCS-B 15
15MCB20C2	111618266	4 ÷ 20	35.4 ÷ 177	350	U	2,1	4.62	3/8"	20/35	TCS-B 15
25MCB30C1 *	111618291	6 ÷ 30	53.1 ÷ 265.5	600	U	2,6	5.72	3/8"	-	TCS-B 25
25MCB30C2 *	111618296	6 ÷ 30	53.1 ÷ 265.5	600	U	2,9	6.38	3/8"	25/35	TCS-B 25
25MCB20C1 *	111618371	4 ÷ 20	35.4 ÷ 177	1500	${\bf O}$	4,7	10.34	3/8"	-	TCS-B 25
25MCB20C2 *	111618376	4 ÷ 20	35.4 ÷ 177	1500	\heartsuit	5	11	3/8"	50/65	TCS-B 25
25MCB35C1 *	111618381	7 ÷ 35	61.95 ÷ 309.75	700	U	4,7	10.34	1/2"	-	TCS-B 25
25MCB35C2 *	111618386	7 ÷ 35	61.95 ÷ 309.75	700	U	5	11	1/2"	50/65	TCS-B 25
25MCB50C1 *	111618391	10 ÷ 50	88.5 ÷ 442.5	500	U	5,2	11.44	<u> </u>	-	TCS-B 25
25MCB50C2 *	111618396	10 ÷ 50	88.5 ÷ 442.5	500	U	5,5	12.1	1/2"	50/65	TCS-B 25
50MCB45C1 *	111618401	10 ÷ 45	88.5 ÷ 398.25	1250	${\bf O}$	7	15.4	1/2"	-	TCS-B 50
50MCB45C2 *	111618406	10 ÷ 45	88.5 ÷ 398.25	1250	U	7,3	16.06	1/2"	50/65	TCS-B 50
50MCB65C1 *	111618411	14 ÷ 65	123.9 ÷ 575.25	600	U	7	15.4	<u> </u>	-	TCS-B 50
50MCB65C2 *	111618416	14 ÷ 65	123.9 ÷ 575.25	600	U	7,3	16.06	1/2"	50/65	TCS-B 50
50MCB90C1 *	111618421	18 ÷ 90	159.3 ÷ 796.5	420	U	7	15.4	1/2"	-	TCS-B 50
50MCB90C2 *	111618426	18 ÷ 90	159.3 ÷ 796.5	420	U	7,3	16.06	1/2"	50/65	TCS-B 50

Legend

15 = Power of the motor/10 • MC = Nutrunner motor • B = Electric brushless • 05 = Maximum torque in Nm • C = Current absorption control • 1 = Output with square drive without axial compensator \bullet 2 = Output with square drive with axial compensator

Legend **Reversibility:** All models are suitable for tightening and untightening operation 5

 Noise level has been measured in accordance with ISO 3744 and ISO 15744 standards.

Accessory drive: male square drive in accordance with ISO 1174-1.
 The code number must be used when ordering.

Data shown in the table are indicative and can be changed without prior notice. Torque values are purely indicative and may be influenced by the softness of the type of joint, by the type and length of the screw, and by the type of accessory used. For all further details, please apply to Fiam Technical Consultancy Service.

* The 25 and 50 MCB models are equipped with a built-in angle transducer (resolver) that guarantees an elevated resolution in the angle measurement and therefore it assures an excellent tightening process control.

CURRENT CONTROL

• Brushless electric nutrunner motors from 1 to 90 Nm

15 MCB...C1/C2 17 MCB...C1/C2 47 MCB...C1/C2





• Driver TOD...

- Control unit TOC 1/2CH
- Connecting cable

The of th		Recommended Vommended Vorque		tolle stoeed	Reversibility	Mejoh		Accessonics	Avial compensator strokensator bit	Driver to Use 10800 15,060	Control unit to use unit (1996 b)
Model	Code	Nm	in Ib	rpm	Туре	Kg	lb	Drive	mm/N	Model	Model
15MCB05C1	111618201	1 ÷ 5	8.85 ÷ 44.25	1700	U	1,7	3.74	3/8"	-	TOD - L	TOC 1/2/CH
15MCB05C2	111618206	1 ÷ 5	8.85 ÷ 44.25	1700	U	2	4.4	3/8"	20/35	TOD - L	TOC 1/2/CH
15MCB10C1	111618231	2 ÷ 10	17.7 ÷ 88.5	700	U	1,8	3.96	3/8"	-	TOD - L	TOC 1/2/CH
15MCB10C2	111618236	2 ÷ 10	17.7 ÷ 88.5	700	U	2,1	4.62	3/8"	20/35	TOD - L	TOC 1/2/CH
15MCB20C1	111618261	4 ÷ 20	35.4 ÷ 177	350	U	1,8	3.96	3/8"	-	TOD - L	TOC 1/2/CH
15MCB20C2	111618266	4 ÷ 20	35.4 ÷ 177	350	U	2,1	4.62	3/8"	20/35	TOD - L	TOC 1/2/CH
17MCB30C1 *	111618290	6 ÷ 30	53.1 ÷ 265.5	600	U	2,6	5.72	3/8"	-	TOD - H1	TOC 1/2/CH
17MCB30C2*	111618295	6 ÷ 30	53.1 ÷ 265.5	600	U	2,9	6.38	3/8"	25/35	TOD - H1	TOC 1/2/CH
17MCB20C1 *	111618370	4 ÷ 20	35.4 ÷ 177	1500	U	4,7	10.34	3/8"	-	TOD - H2	TOC 1/2/CH
17MCB20C2*	111618375	4 ÷ 20	35.4 ÷ 177	1500	U	5	11	3/8"	50/65	TOD - H2	TOC 1/2/CH
17MCB35C1 *	111618380	7 ÷ 35	61.95 ÷ 309.75	700	U	4,7	10.34	1/2"	-	TOD - H2	TOC 1/2/CH
17MCB35C2 *	111618385	7 ÷ 35	61.95 ÷ 309.75	700	U	5	11	1/2"	50/65	TOD - H2	TOC 1/2/CH
17MCB50C1 *	111618390	10 ÷ 50	88.5 ÷ 442.5	500	U	5,2	11.44	1/2"	-	TOD - H2	TOC 1/2/CH
17MCB50C2*	111618395	10 ÷ 50	88.5 ÷ 442.5	500	U	5,5	12.1	1/2"	50/65	TOD - H2	TOC 1/2/CH
47MCB45C1 *	111618400	10 ÷ 45	88.5 ÷ 398.25	1250	U	7	15.4	1/2"	-	TOD - H3	TOC 1/2/CH
47MCB45C2*	111618405	10 ÷ 45	88.5 ÷ 398.25	1250	U	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2/CH
47MCB65C1 *	111618410	14 ÷ 65	123.9 ÷ 575.25	600	U	7	15.4	1/2"	-	TOD - H3	TOC 1/2/CH
47MCB65C2*	111618415	14 ÷ 65	123.9 ÷ 575.25	600	U	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2/CH
47MCB90C1 *	111618420	18 ÷ 90	159.3 ÷ 796.5	420	U	7	15.4	1/2"	-	TOD - H3	TOC 1/2/CH
47MCB90C2*	111618425	18 ÷ 90	159.3 v 796.5	420	U	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2/CH

Legend

15 = Power of the motor/10 • MC = Nutrunner motor • B = Electric brushless • 05 = Maximum torque in Nm • C = Current absorption control • 1 = Output with square drive without axial compensator \bullet 2 = Output with square drive with axial compensator

Legend

- **Reversibility:** All models are suitable for tightening and untightening operation 5
- Noise level has been measured in accordance with ISO 3744 and ISO 15744 standards.
- Accessory drive: male square drive in accordance with ISO 1174-1.
 The code number must be used when ordering.

Data shown in the table are indicative and can be changed without prior notice. Torque values are purely indicative and may be influenced by the softness of the type of joint, by the type and length of the screw, and by the type of accessory used. For all further details, please apply to Fiam Technical Consultancy Service.

* The 17 and 47 MCB models are equipped with a built-in angle transducer (resolver) that guarantees an elevated resolution in the angle measurement and therefore it assures an excellent tightening process control.

TORQUE AND ANGLE CONTROL

• Brushless electric motors from 0,5 to 65 Nm

15 MCB...A1/A2 17 MCB...A1/A2 50 MCB...C1/C2



• Driver TOD...

Control unit TOC1/2CH

Connecting cable

e of shess ctric ror		ommended tening	9	Speed	ersibility	,		essonies	in Densator bit	er to use	trol unit 80 unit 86 16)
22 8 8		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		101	Age,	No.	_	200	7 8 kg	Deg Degi	10 Q Q
Model	Code	Nm	in lb	rpm	Туре	Kg	lb	Drive	mm/N	Model	Model
15MCB05A1	111618216	0,5 ÷ 5	4.43 ÷ 44.25	1700	U	2,3	5.06	3/8"	-	TOD - L	TOC 1/2CH
15MCB05A2	111618221	0,5 ÷ 5	4.43 ÷ 44.25	1700	U	2,6	5.72	3/8"	20/35	TOD - L	TOC 1/2CH
17MCB05A1 *	111618430	0,5 ÷ 5	4.43 ÷ 44.25	700	${\mathfrak O}$	3,2	7.04	3/8"	-	TOD - H1	TOC 1/2CH
17MCB05A2 *	111618435	0,5 ÷ 5	4.43 ÷ 44.25	700	U	3,5	7.7	3/8"	20/35	TOD - H1	TOC 1/2CH
15MCB10A1	111618246	1 ÷ 10	8.85 ÷ 88.5	700	${\bf O}$	2,4	5.28	3/8"	-	TOD - L	TOC 1/2CH
15MCB10A2	111618251	1 ÷ 10	8.85 ÷ 88.5	700	U	2,7	5.94	3/8"	20/35	TOD - L	TOC 1/2CH
17MCB10A1 *	111618440	1 ÷ 10	8.85 ÷ 88.5	700	${\mathfrak O}$	3,2	7.04	3/8"	-	TOD - H1	TOC 1/2CH
17MCB10A2 *	111618445	1 ÷ 10	8.85 ÷ 88.5	700	U	3,5	7.7	3/8"	20/35	TOD - H1	TOC 1/2CH
15MCB20A1	111618276	2 ÷ 20	17.7 ÷ 177	350	U	2,4	5.28	3/8"	-	TOD - L	TOC 1/2CH
15MCB20A2	111618281	2 ÷ 20	17.7 ÷ 177	350	U	2,7	5.94	3/8"	20/35	TOD - L	TOC 1/2CH
17MCB30A1 *	111618300	3 ÷ 30	26.55 ÷ 265.5	600	U	3,2	7.04	3/8"	-	TOD - H1	TOC 1/2CH
17MCB30A2 *	111618305	3 ÷ 30	26.55 ÷ 265.5	600	U	3,5	7.7	3/8"	20/35	TOD - H1	TOC 1/2CH
17MCB20A1 *	111618310	2 ÷ 20	17.7 ÷ 177	1500	U	4,7	10.34	3/8"	-	TOD - H2	TOC 1/2CH
17MCB20A2 *	111618315	2 ÷ 20	17.7 ÷ 177	1500	U	5	11	3/8"	50/65	TOD - H2	TOC 1/2CH
17MCB35A1 *	111618320	4 ÷ 35	35.4 ÷ 309.75	700	U	4,7	10.34	1/2"	-	TOD - H2	TOC 1/2CH
17MCB35A2 *	111618325	4 ÷ 35	35.4 ÷ 309.75	700	U	5	11	1/2"	50/65	TOD - H2	TOC 1/2CH
17MCB50A1 *	111618330	5 ÷ 50	44.25 ÷ 442.5	500	U	5,2	11.44	1/2"	-	TOD - H2	TOC 1/2CH
17MCB50A2 *	111618335	5 ÷ 50	44.25 ÷ 442.5	500	U	5,5	12.1	1/2"	50/65	TOD - H2	TOC 1/2CH
47MCB45A1 *	111618340	5 ÷ 45	44.25 ÷ 398.25	1250	U	7	15.4	1/2"	-	TOD - H3	TOC 1/2CH
47MCB45A2 *	111618345	5 ÷ 45	44.25 ÷ 398.25	1250	U	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2CH
47MCB65A1 *	111618350	7 ÷ 65	61.95 ÷ 575.25	600	U	7	15.4	1/2"	-	TOD - H3	TOC 1/2CH
47MCB65A2 *	111618355	7 ÷ 65	61.95 ÷ 575.25	600	\mathbf{O}	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2CH
47MCB90A1 *	111618360	9 ÷ 90	79.65 ÷ 796.5	420	${\bf O}$	7	15.4	1/2"	-	TOD - H3	TOC 1/2CH
47MCB90A2*	111618365	9 ÷ 90	79.65 ÷ 796.5	420	U	7,3	16.06	1/2"	50/65	TOD - H3	TOC 1/2CH

Legend

15 = Power of the motor/10 • MC = Nutrunner motor • B = Electric brushless • 05 = Maximum torque in Nm • C = Current absorption control • 1 = Output with square drive without axial compensator • 2 = Output with square drive with axial compensator

Legend

Reversibility: All models are suitable for () tightening and untightening operation

Noise level has been measured in accordance with ISO 3744 and ISO 15744 standards.
 Accessory drive: male square drive in accordance with ISO 1174-1.
 The code number must be used when ordering.

Data shown in the table are indicative and can be changed without prior notice. Torque values are purely indicative and may be influenced by the softness of the type of joint, by the type and length of the screw, and by the type of accessory used. For all further details, please apply to Fiam Technical Consultancy Service.

* The models with * are equipped with a built-in angle transducer (resolver) that guarantees an elevated resolution in the angle measurement and therefore it assures an excellent tightening process control.

Electric nutrunner motors

Standard equipment (supplied with motor)

- Axial compensator (where indicated: see chart)
- Flange bracket to fix the motor
- Test certificate
- Use and maintenance manual.
- Eco-friendly packaging.

Accessories/Services available upon request

- · Test/checking service of assembly system at the client's production lines directly
- Quick change chuck for 15/17MCB... only with □ 3/8" (code 654141015)
- Auxiliary grip to allow manual starting
- BITS Fiam supplies different models ideal for different applications. Depending on customer needs, different special bits are available upon request
- BIT HOLDER The bit holder is the accessory used to connect the bit to the nutrunner output shaft. Bit holders are manufactured with high quality materials and treatments that guarantee high resistance to breaking and wear
- SCREW FEED HOSES They convey the screw from the selector to the screw head. Extremely sturdy and with ideal diameter for a quick screw passage, they are available in 2 versions depending on flexibility required by the application: hard models and flexible shape memory models
- SCREW PASSAGE SENSORS It is a device aimed at controlling the screw passage in the feed hose. It is available in with 2 different versions: annular sensor with 100ms delay and embedded annular screw passage sensor, which guarantees a more accurate reading and isn't influenced by other sensors
- FASTENING SLIDES Designed entirely by Fiam, they are manufactured with high quality materials guaranteeing very high reliability and resistance over time, also in presence of high production rates. Suitable for applications with more tightening points close to each other. Their compact dimensions and the extremely low weight make these components extremely versatile and usable with manipulators, electric axis and robots. They are available with 3 different versions:
- Single-stroke fastening slide: the stroke ecompasses approaching fastening point and driving the screw
- Dual-stroke fastening slide: the first stroke brings the nozzle close to the workpiece, the second is used to run the screw
- With **anti-overturning device:** used to handle screws having a ratio total length/head diametre close to 1. This device allows the "movement of the head" avoiding screw incorrect positions during tightening and preventing screws from getting stuck with consequent production stop.
- SCREW HEAD This component is required in order to hold the screw coming from the bowl feeder through the feeding hose and guide it before it is tightened in the workpiece.

The head is equipped with jaws which are opening to release the screw when the bit starts tightening the screw on the component.

Screw heads are extremely reliable as they are built with **highest quality materials** through precise and accurate machining which, together with the treatments, guarantee **high resistance to breaking and wearing**. Available in various models suitable for screw found in the market, these heads are further tailored machined by FIAM basing on design of customer's screw. Moreover they are available also screw head for M8 flat head screws with screw lenght/head diameter ratio at 0,9. These special heads must be combined to slides with anti-overurning device.

• **BUSHES** - The bushes are indispensable accessories for connecting the screw feeding hose to the head for holding screws. Bushes are available in different sizes basing on the type/size of the screw head and are supplied customized basing on the screw and hose types.

For other numerous accessories and components for tightening automation see Fiam Automation catalogues n. 1009 or contact **Fiam Technical Consultancy Service**.

Models available upon request

- Models with offset front part (for narrow distances between the axis)
- Models with Offset device
- Models with quick change chuck
- Models with modified flange and/or with customized body design



OFF SET DEVICE







Controller and feeding unit TCS-B

(Tightening Control System-Basic)

- The system **includes** both controller and electrical feeding unit and can be used **only with a single electric nutrunner motors** (1-channel-version)
- The display shows the OK/NOK outcomes and the torque/angle values
- It allows selecting 5 tightening control strategies through 4 programmes (up to 50 instructions for each programme) to be configured by software (supplied with unit): torque, torque/ angle, angle/torque, screw feeding function, untightening
- Equipped with **RS232** serial output for connection to printer or PC
- Equipped with 5 input and 5 output, optocoupled (two can be freely programmed)
- OFF LINE and ON LINE programming only from PC through software pre-installed in the unit
- Alphanumeric display with 4 lines for 20 columns
- English display for the unit. Software in three languages (IT, EN, FR)



Complete and Poler unit leeding			Inconnous	Dimensions Huckooins	Weight		Outour tension	Nominal absorption currention
Model		Code		mm	Kg	lb	Volt	Ampere
TCS-B 15 (wit	n software)	686200305	15MCBC1/C2	390x155x305	10,6	23.3	70	12/36
TCS-B 25 (with	n software)	686200310	25MCBC1/C2	390x155x305	9,5	20.9	300	12/36
TCS-B 50 (wit	n software)	686200315	50MCBC1/C2	390x155x305	9,5	20.9	300	12/36

Legend

TCS-B = Tightening Control System-Basic

Standard equipment (supplied with unit)

- Programming software
- Feed cable
- RS232 serial output
- Eco-friendly packaging
- Use and maintenance manual

Controls through led

- OK
- NOK
- RUN (in cycle)
- Led of functionality of unit

Connections

- Hall connection to sensors of the motor
- Motor power connection to motor
- Power connection to electric feeding
- RS232 connection to PC or printer
 I/O 24 Vdc I/O 24 Vdc connections
- I/O 24 Vdc I/O 24 Vdc con (light columns, PLC...)
- -

Models available upon request

• Unit and software can be customized with other languages

TCS-8 Propr - 2.35 ne i bele - 6 Connect COM 1 STATUS DISCONNECTED Programming Save on PC 14 Open. Export MOTOR 25MCB39C MAX SPEED: 700 um OVE UP ACTORIDUE 25 No MOVE DOWN ALT SEQUENCES DELETE SEQ. DELETE ALL Program size: 28% ON MAGRAGES 100%

Dimensions (mm)

• Voltage: 220-240 Volt, 50 Hz



14 **Controller and feeding unit**

Electric driver TOD

(Tightening Operations Driver)

- Used to feed the motor and supply correct feed parameters (voltage, current, etc...) following data pre-set in the control unit
- Any possible failure is flashed by means of luminous diodes and the system stops immediately.

Available two versions:

- TOD-L: to feed electric motors with tightening torque from 1 to 20 Nm
- TOD-H1, TOD-H2, TOD-H3: to feed electric motors with tightening torque over 20 Nm



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Model	Code			mm	Kg	lb	Volt	Ampere
TOD - L	676120001	15MCBC1/C2 15MCBA1/A2	TOC 1/2CH	400x232x92	8,7	19.14	60	10/20
TOD - H1	676120008	17MCB30C1/C2 17MCB30A1/A2 17MCB05A1/A2 17MCB10A1/A2	TOC 1/2CH	400x232x92	6,8	14.96	300	20/40
TOD - H2	676120009	17MCB20C1/C2 17MCB35C1/C2 17MCB50C1/C2 17MCB20A1/A2 17MCB35A1/A2 17MCB50A1/A2	TOC 1/2CH	400x232x92	6,8	14.96	300	20/40
TOD - H3	676120010	47MCB45C1/C2 47MCB65C1/C2 47MCB90C1/C2 47MCB45A1/A2 47MCB65A1/A2 47MCB90A1/A2	TOC 1/2CH	400x232x92	6,8	14.96	300	20/40

Legend

TOD = driver • L = for motors with tightening torque from 1 to 20 Nm • H1, H2, H3 = for motors with tightening torque over 20 Nm

Standard equipment (supplied with the unit)

- Feed cable.
- Eco-friendly packaging.
- Use and maintenance manual

• Voltage: 220 - 240 Volt 50 Hz

Keyboard operations

• General switch

Connections

- Feedback connection to the transducer/ resolver of the motor
- Motor power connection to motor
 Hall/PC connection to sensors of the
- motor (for TOD-L) and to PC (for TOD-H) • Controller - connection to TOC control unit

Controls through Led

• Generic led of functionality of driver





Control unit TOC

(Tightening Operations Controller)

- They control and monitor the assembly cycle of electric nutrunner motors both direct and indirect torque/angle
- They detect both OK and NOT OK cycles besides the torque/time values which can be easily stored
- Available in 1-channel or 2-channel versions: controlling one motor or two motors, which can be also different, working **synchronously** (ideal for mutispindle units) or asynchronously (independent assembly channels)
- It allows setting up to 30 programmes, each of them with 20 possible instructions
- It allows selecting different tightening control strategies through appropriate instructions: torque, torque/angle, angle/torque, screw engaging function, untightening
- Complete management of the tightening cycle with 10 instructions added to control strategies ones
- Alphanumeric display for a quick cycle reading/monitoring (time curve)
- Built-in membrane key with improved accessibility to programming functions
- Multilingual display (IT, EN, ES)

Connos uni		Tree of noor	The of an	Lingeson traditions	Megon	
Model	Code			mm	Kg	lb
TOC 1 CH	686000398	15MCB 17MCB 47MCB	TOD - L TOD - H1/H2/H3	280x232x143	4,4	9.7
TOC 2 CH	686000399	15MCB 17MCB 47MCB	TOD - L TOD - H1/H2/H3	280x232x143	4,4	9.7

Legend

TOC = Tightening Operations Controller • 1CH = 1-channel-version (1 motor) • 2CH = 2-channel-version (2 motors)

• Voltage: 220 - 240 Volt, 50 Hz

Models available upon request

- Models with customized software (also with other languages)
- Models for field bus modules
- Models for Ethernet connection (exclusively through TOC-NET R software)

Accessories available upon request

- OK/KO torque signal light column cod. 686000182 (for 1-channel-version, for 2-channel-version).
- 9 pin connection cable for connecting the PC to the printer (5 mt long).
- Programmes manual selector.
- RJ45TOC cable cod. 686000465
- Cable for RS232 cod. 686000879 (serial)
- USB cable cod. 686000464
- Cartesian arms for torques up to 500 Nm

Connections

- CH1/CH2 = connections to TOD electric driver
- MAIN = connection to electric feeding
- INPUT/OUTPUT = I/O 24 Vdc electrical
- RS232 for connection to PC or printer

Standard equiment (supplied with unit)

- Electric feeding cable lenght to 2 mt.
- Use and maintenance manual
- Eco-friendly packaging

Control through Led

- OK/NOK/RUN/ALARM
- Starting the unit

The computerized control unit must be set in accordance with the operating conditions of the motor: please contact our **Technical Consultancy Service.**

Dimensions (mm)





TOC-NET: to manage the control units directly via a Personal Computer

This software can be installed on a Personal Computer running Wndows. It **allows the programming and acquisition of the TOC control unit's data to be managed in real time directly via a Personal Computer instead** of through the unit's keypad. There are two options for performing this operation via a PC:

Local Mode Ideal for production facilities without Ethernet networks	Via TOC-NET-L software installed on PC placed nearby + RS 232 and USB serial ports	Length of cable between PC and TOC unit is a limit
Remote Mode		
For production facilities with Ethernet networks	Via I OC-NE I-R software installed on PC in turn connected to Ethernet network via LAN cable	No distance limitations Ethernet network must be of industrial kind to allow higher transfer rate

Technical features and advantages

- The software can be installed on a PC running Windows XP or later operating system
- Gives **realtime view** of what's happening in the production line
- Programming data, acquired data and those relating to work in progress are all displayed in a single window
- Commands and menus are displayed exactly the same way as they are on the TOC unit: anyone familiar with programming the TOC unit via the keypad will find extremely easy to operate the TOC unit from his own office
- This software can be used to create countless number of programs, i.e. in addition to the 30 that can be loaded on the TOC, others can be created and stored in the PC, ready to be downloaded to the TOC when necessary
- The TOC's current storage limit is exceeded by uploading, i.e. exporting tightening results from the TOC and storing them on the PC. Once exported, they can be deleted from the TOC, which is thus ready for newer results.
- The data exported from the TOC are opened automatically in Excel, ready to be processed
- The software is available in **Italian and English.** On request, it can also be **supplied in different languages**: this would be the case, for example, when dealing with production facilities located abroad and run via Ethernet networks
- Only one TOC control unit at a time can be connected to the PC in "remote" mode.

Description	Model	Code	Standard equipment (supplied with the software)
SOFTWARE TOC-NET L	TOC – NET L	686000461	Use manual HW/USB key for TOC-NET (necessary for
SOFTWARE TOC-NET R	TOC – NET R	686000462	software activation) cod. 686000463

Legend

TOC-NET L = for "local" version • TOC-NET R = for "remote" version

Profibus-DP interface for TOC control unit

It can be used to expand the TOC control unit's connectivity capabilities through connection to the main Fieldbuses found in industrial plants. The advantages are:

- Remote management of control unit (once programmed via keypad)
- Same TOC can be used with different Fieldbuses (it is necessary to simply replace the interface).

Possible operations are as follows:

- Remote selection (i.e. from supervisor PLC) of a program that has been previously set using the relevant keypad built into the TOC (i.e. you program the on-board TOC first, then use the remote PLC, selecting whichever program you want to use);
- STARTING and STOPPING the selected program;
- Acquiring data on torque, angle, OK/NOK result for each tightening operation;
- Acquiring TOC status (ready/not ready).

			/ Dimensions / HxPxL	/ Weight
Interface type	Code	For control unit type	mm	gr
PROFIBUS – DP	686000886	TOC 1CH and TOC 2CH	120 x 75 x 27	145
DEVICE-NET	Upon request	TOC 1CH and TOC 2CH	120 x 75 x 27	145

Standard Equipment (supplied with unit)

• Cable for connection to TOC

• Use and maintenance manual

• Eco-friendly packaging

Models available upon request

- DEVICE-NET interface for TOC control unit
- INTERBUS interface for TOC control unit
- Other Fieldbuses

Accessories available upon request

• 24Vdc power supply unit

Connecting cables

Extremely flexible and safe: the special construction material eliminate any possible interference or *noise* coming from other equipments.

Fiam cables are manufactured to resist to particularly strong dynamic stress: this guarantees a reduction of machine stop, caused by premature breaks of the cables, resulting in saving on maintenance of the tightening system.

	Kit of cables	Connecting unit	Lenght of the cable mt	Code of the cable
	15MCBC1/C2	TCSB-15	5	686200601
	15MCBC1/C2	TCSB-15	10	686200602
	15MCBC1/C2	TCSB-15	15	686200603
	25MCB30C1/C2	TCSB-25	5	686200604
S	25MCB30C1/C2	TCSB-25	10	686200605
Ū Ū	25MCB30C1/C2	TCSB-25	15	686200606
IO1	25MCBC1/C2 and 50MCBC1/C2	TCSB-50	5	686200607
Σ	25MCBC1/C2 and 50MCBC1/C2	TCSB-50	10	686200608
	25MCBC1/C2 and 50MCBC1/C2	TCSB-50	15	686200609
Z	15MCBC1/C2	TOD +TOC	5	686000872
BU	15MCBC1/C2	TOD +TOC	10	686000873
UT	15MCBC1/C2	TOD +TOC	15	686000874
Ζ	17MCB30C1/C2	TOD +TOC	5	686000869
	17MCB30C1/C2	TOD +TOC	10	686000870
	17MCB30C1/C2	TOD +TOC	15	686000871
	17MCB20/35/50C1/C2 and 47MCBC1/C2	TOD +TOC	5	686000863
	17MCB20/35/50C1/C2 and 47MCBC1/C2	TOD +TOC	10	686000864
	17MCB20/35/50C1/C2 and 47MCBC1/C2	TOD + TOC	15	686000865

FOR CURRENT CONTROL NUTRUNNER MOTORS

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15MCB 5/10/20A1/A2	TOD +TOC	5	686000860
15MCB 5/10/20A1/A2	TOD + TOC	10	686000861
15MCB 5/10/20A1/A2	TOD + TOC	15	686000862
17MCB 5/10/30A1/A2	TOD + TOC	5	686000866
17MCB 5/10/30A1/A2	TOD + TOC	10	686000867
17MCB 5/10/30A1/A2	TOD + TOC	15	686000868
17MCB 20/35/50A1/A2 and 47MCB 45/65/90A1/A2	TOD +TOC	5	686000863
17MCB 20/35/50A1/A2 and 47MCB 45/65/90A1/A2	TOD + TOC	10	686000864
17MCB 20/35/50A1/A2 and 47MCB 45/65/90A1/A2	TOD + TOC	15	686000865

Overall dimensions (mm) of current cont

Electric motors 15MCB... C1/C2

Model	L	Drive
15MCB05C1	232	3/8″
15MCB05C2	244	3/8″
15MCB10C1	256	3/8″
15MCB10C2	267	3/8″
15MCB20C1	256	3/8″
15MCB20C2	267	3/8″



Flange bracket to fix the motor to the support (included)



Electric motors 17MCB30C1/C2 and 25MCB30C1/C2

Model	L	Drive
17/25MCB30C1	325	3/8″
17/25MCB30C2	336	3/8″



Flange bracket to fix the motor to the support (included)



Electric motors 17MCB....C1/C2 and 25MCB...C1/C2

Model	L	Drive
17/25MCB20C1	458	3/8″
17/25MCB20C2	667	3/8″
17/25MCB35C1	508	3/8″
17/25MCB35C2	716	3/8″
17/25MCB50C1	508	1/2″
17/25MCB50C2	716	1/2″



Electric motors 47MCB...C1/C2 and 50MCB...C1/C2

Model	L	Drive
47/50MCB45C1	516	1/2″
47/50MCB45C2	731	1/2″
47/50MCB65C1	561	1/2″
47/50MCB65C2	769	1/2″
47/50MCB90C1	561	1/2″
47/50MCB90C2	769	1/2″





Electric motors 15MCB...A1/A2

Model	L	Drive
15MCB05A1	309	3/8″
15MCB05A2	320	3/8″
15MCB10A1	332	3/8″
15MCB10A2	343	3/8″
15MCB20A1	332	3/8″
15MCB20A2	343	3/8″



AT 45° ONLY

FOR 15MCB...A2



Electric motors 17MCB...A1/A2

Model	L	Drive			
17MCB30A1	401	3/8″			
17MCB30A2	412	3/8″			
17MCB05A1	401	3/8″			
17MCB05A2	412	3/8″			
17MCB10A1	401	3/8″			
17MCB10A2	412	3/8″	AT 45° ONLY FOR 17MCB30A2		56 (17MCB30A2)
$\begin{bmatrix} \mathbf{x}\\ \mathbf{x}\\ \mathbf{x} \end{bmatrix}$	- - - - -	42 M 6			45 (17MCB30A1)
		Flange bra fix the mot support (in	cket to tor to the icluded)		(STROKE 20 IIIII)

otors with torque and angle control

Electric motors 17MCB...A1/A2 M 8 Model L 17MCB20A1 458 3/8″ 17MCB20A2 667 3/8″ VERSION C1 FOR 17MCB AND 25MCB 17MCB35A1 508 3/8″ Ц 17MCB35A2 716 3/8″ đ Ø42 9 17MCB50A1 508 3/8″ ស្ល 17MCB50A2 716 3/8″ VERSION C2 / FOR 17MCB AND 25MCB L FOR MODELS 17MCB...1 - 25MCB...1

Electric motors 47MCB...A1/A2

Model	L	Drive
47MCB45A1	516	1/2″
47MCB45A2	731	1/2″
47MCB65A1	561	1/2″
47MCB65A2	769	1/2″
47MCB90A1	561	1/2″
47MCB90A2	769	1/2″





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