Tightening automation.

Putting the innovation into
productivity, increasing reliability.

MCA.

**Tightening module
with automatic screw feeding to be integrated
into automatic production systems**

Fiam®
PEOPLE AND SOLUTIONS

TIGHTENING MODULE WITH AUTOMATIC SCREW FEEDING

Effective, fast and safe production cycles.

Concentrated innovation for a faster, more reliable production process: these are the MCA tightening module.
Suitable for **large batches of the same screws.** They **can be integrated** into existing production systems such as **assembly lines, manipulators, electric Cartesian axes and collaborative robots,** in order to obtain complete and independent tightening cycles using a simple external start (from PLC, dual command, start button, pedal, etc.).

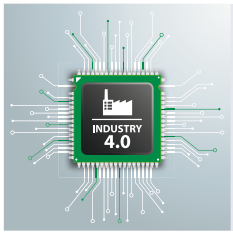
MCA on Cartesian X-Y axes

They offer concrete productivity benefits because:

- **screws are sent continuously and quickly** from the bowl feeder to the screw-retaining head (nose piece)
- the **approach** and subsequent **tightening** of the screw on the component is automatic and accurate
- the whole tightening cycle is **controlled and monitored by an integrated PLC** that interfaces with the automated production systems (Industry 4.0)
- **uninterrupted working continuity:** the several feeders innovations are designed to eliminate any possible machine downtime..

MCA is suitable for all torque requirements, even when used in heavy duty conditions.
A solution designed and manufactured entirely by Fiam for industrial assembly. The ultimate in innovation and reliability packed into a single solution.

MCA for collaborative robot

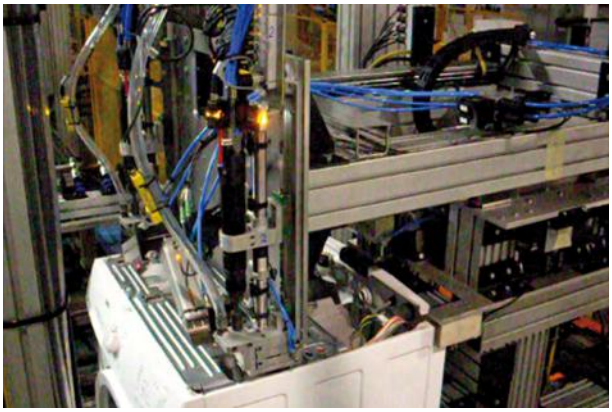


INDUSTRY 4.0 SOLUTIONS

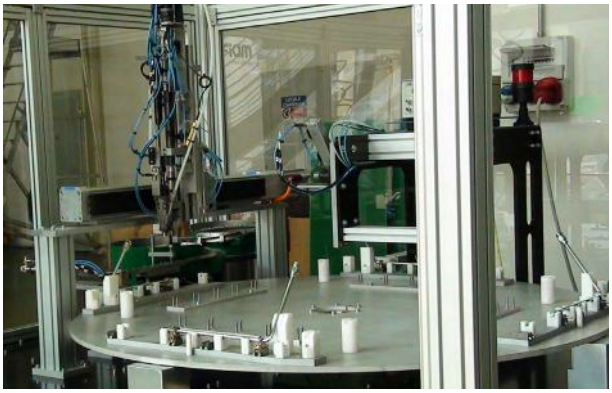
MCA tightening solutions are entirely designed and manufactured by Fiam to **integrate with plant management systems (INDUSTRY 4.0)** and may be eligible for the tax incentives available under current regulations.

MCA on anthropomorphic arm

MCA for automatic lines with pallet transfer



Multiple MCA application on washing machines



MCA su tavola rotante

For all type of screws

metric, self-threading, self-tapping, self-drilling, three-lobe, etc.

Perfect integration

on any production line: single workstations, turntables, automatic pallet lines

Installation on X,Y and Z axes

in order to tighten at different working heights

Can be installed on anthropomorphic scararobots and Cobots

to obtain versatile solutions, that can always be reconverted and that work safely side by side of operators

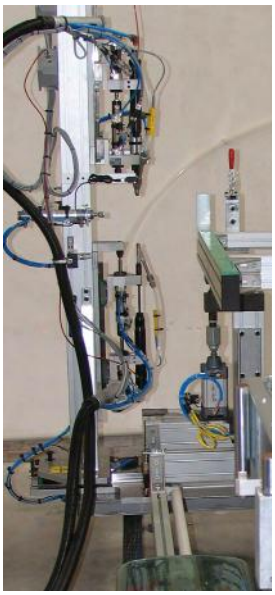
Multiple levels of accuracy

offered by: air shut-off or DC-driven nutrunner motors, which can be networked with factory's control systems (Industry 4.0)

Assures multiple tightening

and accelerate the productivity of cycles assembly

MCA for window frames field: simultaneous top-down and bottom-up assembly



1

Screw feeders
EasyDriver

They manage the entire working cycle with great flexibility: they manage tightening sequences quickly and easily, customizing them to the different applications.
The **INTEGRATED PLC** governs all machine parameters according to the assembly needs.

Page 6

EasyDriver ED B

EasyDriver ED B 1|1

Easy

2

Fastening slides

They ensure a **precise approach stroke of the nutrunner motor/ screw-retaining head to the component**, guaranteeing **high reliability of the assembled product.** Can be **used on manipulators, electric axes or robots** and they withstand important axial thrust

Devices for Cobots

Designed to be used with collaborative robots with automatic forward bit stroke device **(patented)** that performs tightening strokes in full security.

Page 12

SINGLE STROKE FASTENING SLIDE

SM15 model
• Min centre-to-centre distance 41 mm

SM20 model
• Min centre-to-centre distance 51 mm

Available also with "screw at sight" function (SW models)

DUAL STRO FASTENING S

DM15 model
• Min centre-to-centre distance 51 mm

Available also with "sc function (DW mo

3

Air or electric nutrunner motors

Specifically designed and manufactured for **industrial automation, they meet every need in terms of tightening accuracy.**
Extremely sturdy, Fiam nutrunner motors guarantee constant performance for all torque requirements, even when used in heavy duty conditions.
Different torque and torque/angle control systems are available for different applications and types of joint and screw.

Page. 20

0,4 ÷ 10 Nm

AIR NUTRUNNER MOTORS
WITH MECHANICAL CLUTCH AND AUTOMATIC SHUT OFF

• they ensure high performance **even at low air feed pressure**

Driver ED B M 1|1

EasyDriver ED B 2|1

EasyDriver ED B 1|2

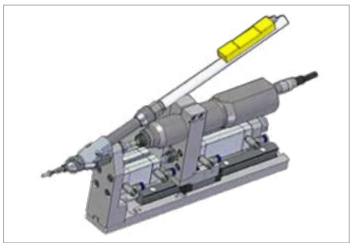
EasyDriver ED B M 1|2

Fastening slides with OFF-SET device

OKE SLIDE

DM20 model
- Min centre-to-centre distance 51 mm

rew at sight" odels)



COMPACT FASTENING SLIDE FOR SMALL SPACES OR TO TIGHTEN FROM THE BOTTOM TO THE TOP

Available also with "screw at sight" function (SW models)

TIGHTENING DEVICES FOR COBOT

0,1 ÷ 7 Nm

- The device is designed to be fixed to the Cobot's wrist with a bracket and can communicate with network PLC

0,3 ÷ 4,5 Nm

ELECTRIC NUTRUNNER MOTORS
WITH MECHANICAL CLUTCH AND AUTOMATIC SHUT OFF

+

TPU 2
POWER SUPPLY UNIT

TPU-M1
MONITORING UNIT

0,3 ÷ 7 Nm

ELECTRIC NUTRUNNER MOTORS
WITH TORQUE/ANGLE CURRENT CONTROL

+

TPU-C1
CONTROL UNIT

TPU-C3
CONTROL UNIT

0,1 ÷ 50 Nm

ELECTRIC NUTRUNNER MOTORS
WITH TORQUE/ANGLE CONTROL BY:
- CURRENT CONTROL
- BUILT-IN TRANSDUCER AND RESOLVER

+

TCS-B
CONTROL UNIT

+

CT 2500 A
CONTROL UNIT

EasyDriver Screw feeders

High working autonomy

The vibrating bowl of models available, ensure different working autonomies and the vibrator timed system, managed by the PLC, automatically stops screw feeding when not needed thereby reducing the consumption of electricity

Selector

The high selection speed allows to reach high screw feeding frequencies;t he screw shooting in a closed chamber ensures a low noise level and there are no compressed air dissipations and any screw jam is eliminated

Screw passage sensors

There are two screw passage sensors which, respectively positioned under the selector and on the tightening head, detect the screw passage (one after selection and one after screw shooting)

No jamming

The 'overload' photocell makes sure no screws get jammed in the selection duct by emitting a jet of air to eliminate excess screws

INTEGRATED Siemens LOGO! PLC to manage all machine parameters

EDMI *EasyDriver Machine Interface* to connect remotely

"Poka yoke" connections

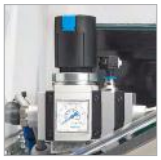
For quick and error-free installations

All clearly visible

Large transparent cover for a good internal view without having to open the machine

External keypad for immediate adjustments

Conveniently positioned: the operator does not have to open the machine to adjust parameters



Pressure under control

The air treatment unit eliminates condensation and dust present in the compressed air supply. It also regulates max supply pressure. Lubricator is also present in case of use of air nutrunner motors

Analogic line pressure switch

Controls the incoming air pressure to ensure the proper functioning of all system functions

For any type of screws

For metric, self-tapping, self-drilling, trilobate screws, with double thread etc ...

Pressure under control

The air treatment unit eliminates condensation and dust present in the compressed air supply.

It also regulates max supply pressure. Lubricator is also present in case of use of air nutrunner motors

EasyDriver ED B screw feeder

Feeds the screws optimally and without jamming.

Bowl:	**Circular, 240 mm in Ø**
Screws:	**For screws between 10 and 35 mm in lenght**
	1 x 240mm Ø bowl feeds an air/electric slide/spindle

Upon request:

- **Low level sensor:** device for the bowl feeder indicates when the bowl needs screw reloading. The signal can be managed by the PLC of the tightening system or by external PLC.
- **Basic structure to support the feeder,** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing or with wheels.
- **Module complete with hopper** with 5 or 10 Lt capacity and to be joined to the basic structure that must be equipped in this case of fixed feet.

For details see p. 34

EasyDriver ED B 1|1 screw feeder

It is used when it is necessary to use powerful air nutrunner motors that require larger FRL units and when better sound proofing is required in the work environment.

Bowl:	**Circular, 240 mm in Ø**
Screws:	**For screws between 10 and 35 mm in lenght**
Key:	**1|1 = 1 x 240 mm Ø bowl feeds an air/electric slide/spindle**

Upon request:

- **Low level sensor:** device for the bowl feeder indicates when the bowl needs screw reloading. The signal can be managed by the PLC of the tightening system or by external PLC.
- **Basic structure to support the feeder,** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing or with wheels.
- **Module complete with hopper** with 5 or 10 Lt capacity and to be joined to the basic structure that must be equipped in this case of fixed feet.

For details see p. 34

EasyDriver ED B M 1|1 screw feeder

Used when the job involves large screws and also in the event of high production rates to allow the system to run unaided for longer.

Bowl:	**Circular, 420 mm in Ø**
Screws:	**For screws between 35 and 60 mm in lenght**
Key:	**MAXI 1|1 = 1 x 420 mm Ø bowl feeds an air/electric slide/spindle**

Upon request

- **Low level sensor:** device for the bowl feeder indicates when the bowl needs screw reloading. The signal can be managed by the PLC of the tightening system or by external PLC.
- **MAXI structure to support the feeder,** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing
- **Module complete with hopper** with 10 or 50 Lt capacity and to be joined to the MAXI structure.

For details see p. 34

EasyDriver ED B 2|1 screw feeder

With its dual circular bowls, it can process **2 geometrically similar screws**, for example differing in length or made from different materials (e.g. stainless steel / browned steel) to feed a slide (one way).
Screw choice is managed by the feeder's PLC through a selector or by an external signal.

Bowl:	**2 circular bowls with 240 mm in Ø**
Screws:	**For screws between 10 and 35 mm in lenght**
Key:	**2|1 = 2 x 240 mm Ø bowls feed an air/electric slide/spindle**

Upon request:
- **Low level sensor:** device for bowl feeder indicates when the bowl needs screw reloading. For this model: external signal not integrated into I / O (management by the customer).
- **Structure to support the feeder** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing.

For details see p. 34

EasyDriver ED B 1|2 screw feeder

Designed to feed two single- or dual-stroke slides. The work cycle involves selecting and shooting 2 screws at the same time.

Bowl:	**Circular bowl with 240 mm in Ø**
Screws:	**For screws between 10 and 35 mm in lenght**
Key:	**1|2 = 1 240 mm Ø bowl feeds 2 air/electric slides/spindles**

Upon request:
- **Low level sensor:** device for bowl feeder indicates when the bowl needs screw reloading. For this model: external signal not integrated into I / O (management by the customer).
- **Basic structure to support the feede,** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing or with wheels.
- **Module complete with hopper** with 5 or 10 Lt capacity and to be joined to the basic structure that must be equipped in this case of fixed feet.

For details see p. 34

EasyDriver ED B MAXI 1|2 screw feeder

Used when the job involves large screws and there is the need to feed two single-or dual-stroke slides. The work cycle involves selecting and shooting 2 screws at the same time.

Bowl:	**Circular, 420 mm in Ø**
Screws:	**For screws between 35 and 60 mm in lengh**
Key:	**MAXI 1|2 = 1 x 420 mm Ø bowl feeds 2 air/electric slides/spindles**

Upon request:
- **Low level sensor:** device for the bowl feeder indicates when the bowl needs screw reloading. For this model: external signal not integrated into I / O (management by the customer).
- **MAXI structure to support the feeder,** equipped with aluminum base plate already prepared with the holes that allow to fix the suitable feeder on it. With aluminum profiles with channels for cables and tube bundles inside the slots positioned under the support surface, is available with support adjustable feet in height even for floor fixing.
- **Module complete with hopper** with 10 or 50 Lt capacity and to be joined to the MAXI structure.

For details see p. 34

TECHNICAL FEATURES		EASYDRIVER SCREW FEEDERS					
		ED B	ED B 1|1	ED B M 1|1	ED B 2|1	ED B 1|2	ED B M 1|2
							
Aluminium bowl (qty.)	Ø 240mm (Capacity 1 liter)	1	1	✘	2	1	✘
	Ø 420mm (Capacity 3 liters)	✘	✘	1	✘	✘	1
Air - Electric system	FESTO components	✔	✔	✔	✔	✔	✔
Enclosure	Stainless steel with plastic top cover	✔	✘	✘	✘	✘	✘
	Painted steel / aluminum and plastic upper cover	✘	✔	✔	✔	✔	✔
	Sound absorbing	✘	✔	✔	✔	✔	✔
Dimensions	Length [mm]	510	600	800	900	600	800
	Width [mm]	370	530	700	600	530	700
	Height [mm]	340	430	530	430	430	530
	Weight [Kg]	36	75	110	105	75	110
Tube carrying hoses and cables	Lenght 5 [m]	✔	✔	✔	✔	✔	✔
Filter-Regulator-Lubricator unit complete with built-in pressure gauge	G3/8 (flow rate 20 l/s)	✔	✘	✘	✘	✘	✘
	G1/2 (flow rate 40 l/s)	✘	✔	✔	✔	✔	✔
Air consumption [l/s]	Min.	2	2	2	2	4	4
	Max.	16	16	16	16	32	32
Electricity consumption, apparent power [VA] 230V/50Hz 230V/60Hz 110V/60Hz	With air nutrunner motor	180	180	320	360	180	317
	With eTensil electric nutrunner motor	255	255	400	400	355	477
	With 15 MCB electric nutrunner motor	780	780	920	1560	1375	1517
	With 25 MCB electric nutrunner motor	780	780	920	1560	4174	4316
	With X-Paq electric nutrunner motor	780	780	920	1560	1375	1517
PLC Siemens LOGO! For the flexible and detailed management of the individual features of screw feeder	The machine is supplied with the parameters already set according to the cycle of customized tightening and the integrated PLC allows • Setting of the different functions of the combined nutrunner motor • Protection of the various "key" functions with 4 passwords • System configuration • Absolute counts of OK and NOK tightenings • Setting of the minimum threshold of the operating pressure through line pressure switch (minimum	✔	✔	✔	✔	✔	✔
Micro SD	Present in the Siemens LOGO! PLC allows to record the main tightening data which are stored at each tightening cycle or at each fault status	✔	✔	✔	✘	✘	✘
LOG DATI By means of a PC-readable SD card	Examples of stored **data values**: • I/O status • Internal memories • Screw shot time • Fastening time • Machine cycle time • Line pressure • Insufficient line pressure (machine stopped), • Insufficient line pressure (machine in work: tightening)	✔	✔	✔	✔	✔	✔
Test method	To carry out empty tightening cycles that can be set without the need for an external PLC. Useful for machine installation, setting and troubleshooting	✔	✔	✔	✔	✔	✔
It features a Modbus TCP/IP connection to communicate with the Factory management System (Industry 4.0)	Parameter control of: • Screw shooting time • Cycle time • Tightening time • Line pressure Using Network I/O: • Sending input signals: Start / Reset / Screw Recall / • Reception, in output, of all the foreseen signals (eg details of anomalies and types of NOK verified) Remote modification of machine operating parameters instead of intervening on-board PLC display	✔	✔	✔	✔	✔	✔
Analogic line pressure switch	For feedback on the inlet air pressure and the definition of the minimum operating pressure Useful for the correct functioning of the following features: • blows from screw overturning and overflow on vibrating bowl • power supply of the connected air tool • forward bit stroke device • screw shooting • preventing the start machine if air feeding conditions are not aligned with those set	✔	✔	✔	✔	✔	✔
EDMI: Web Server Interface ***(EasyDriver Machine Interface)***	• Login password • Remote connections with the main functions of machine PLC with access from PC / Mobile / Tablet • Real-time functionality: - Values Display: Screw shooting time | Cycle time | Tightening time The maximum, minimum and average time values can be displayed for them. - Monitoring of exchange I / O signals - Access to diagnostics - Line pressure display - Access to system statistics / counters regarding anomalies and cycles performed - Flowchart showing current activities and main features • Interface language: English	✔	✔	✔	✔	✔	✔

Interconnectivity: a key element for Industry 4.0

Not just tightening reliability, in-process checks and planning for any possible operating situation, but above all **interaction with the plant management systems.**

MCA tightening modules can be managed remotely just using freely programmable I/O signals or via the Modbus TCP/IP protocol; they can also **interface with line PLCs and various devices,** interacting for example with:

- Bar Code reader
- Conveyor belt
- Workpiece clamping jig activation/ deactivation systems
- Signalling and monitoring mechanisms such as LEDs, part counters, light towers.

Analysis and monitoring KPIs

In addition to checking the production cycle in real time, **data storage** can **provide statistics** to monitor the machine operating cycle, and therefore productivity, and convert this data into analysis KPIs (key performance indicators) to **optimise the tightening process cycle time.**

Built-in PLC

Included in all EasyDriver screw feeders, it manages the numerous available machine parameters and drives the coupled nutrunner motor.

The **integrated Modbus TCP/IP protocol** provides interconnectivity with the factory system to monitor, for example:

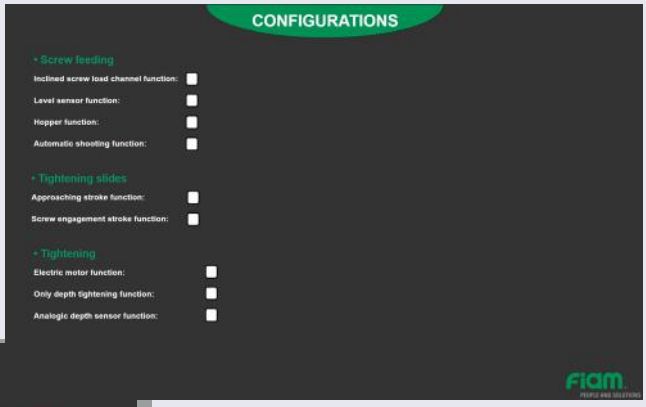
- the tightening results
- the screw count/work cycles for triggering maintenance or automatic screw feeder reloading
- OK sequences, i.e. the correct pre-set tightening sequence
- in-process management of process faults, e.g. stripped threads, emergencies, fault reset.

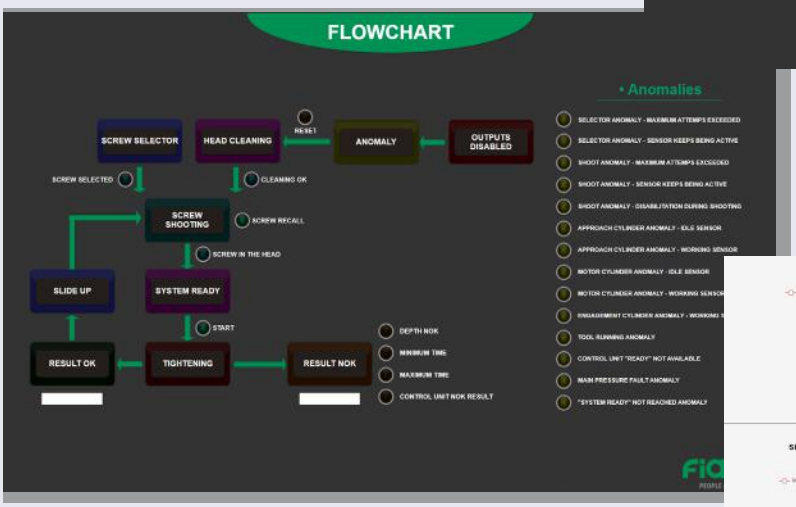
The Modbus protocol also offers a "real time" connection with the machine, and consequently remote management of the various feeder parameters.

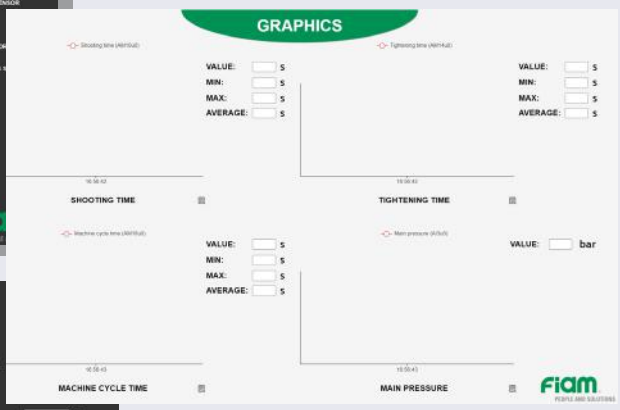
WITH EDMI SERVICE IS IN REAL TIME

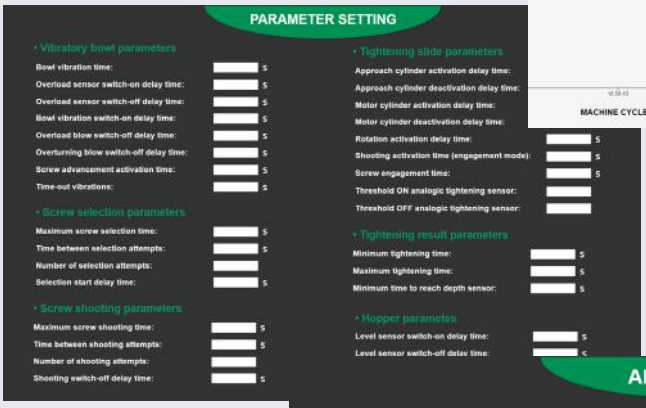
The *EDMI WebServer interface* is user-friendly and effective, allowing you to connect your MCA tightening system to a PC, mobile or tablet. With access to the main functions of the machine PLC software, you can view the machine performance and monitor its main functions; and service is made easier because the tightening system behaviour can be checked in real time.

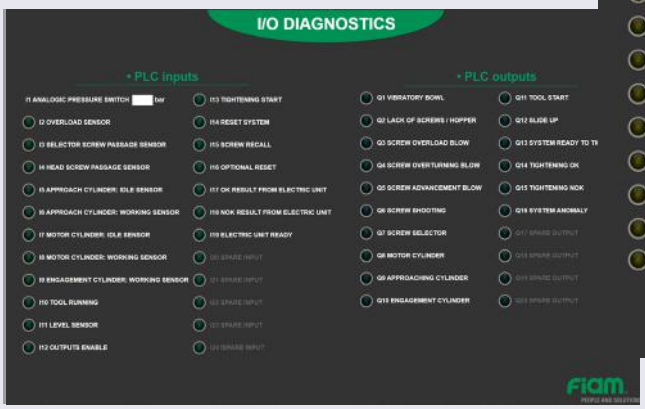

PEOPLE AND SOLUTIONS
Name
Password
Log on
WEB SITE
FIAM CLOUD


CONFIGURATIONS
• Screw feeding
Inclined screw load channel function:
Level sensor function:
Hopper function:
Automatic shooting function:
• Tightening slides
Approaching stroke function:
Screw engagement stroke function:
• Tightening
Electric motor function:
Only depth tightening function:
Analogic depth sensor function:


FLOWCHART
SCREW SELECTOR
HEAD CLEANING
RESET
ANOMALY
OUTPUTS DISABLED
SCREW SELECTED
CLEANING OK
SCREW SHOOTING
SCREW RECALL
SCREW IN THE HEAD
SLIDE UP
SYSTEM READY
START
RESULT OK
TIGHTENING
RESULT NOK
DEPTH NOK
MINIMUM TIME
MAXIMUM TIME
CONTROL UNIT NOK RESULT
• Anomalies
SELECTOR ANOMALY - MAXIMUM ATTEMPS EXCEEDED
SELECTOR ANOMALY - SENSOR KEEPS BEING ACTIVE
SHOOT ANOMALY - MAXIMUM ATTEMPS EXCEEDED
SHOOT ANOMALY - SENSOR KEEPS BEING ACTIVE
SHOOT ANOMALY - DISABILITATION DURING SHOOTING
APPROACH CYLINDER ANOMALY - IDLE SENSOR
APPROACH CYLINDER ANOMALY - WORKING SENSOR
MOTOR CYLINDER ANOMALY - IDLE SENSOR
MOTOR CYLINDER ANOMALY - WORKING SENSOR
ENGAGEMENT CYLINDER ANOMALY - WORKING SENSOR
TOOL RUNNING ANOMALY
CONTROL UNIT "READY" NOT AVAILABLE
MAIN PRESSURE FAULT ANOMALY
"SYSTEM READY" NOT REACHED ANOMALY


GRAPHICS
VALUE:
MIN:
MAX:
AVERAGE:
SHOOTING TIME
TIGHTENING TIME
MACHINE CYCLE TIME
MAIN PRESSURE
bar


PARAMETER SETTING
• Vibratory bowl parameters
Bowl vibration time:
Overload sensor switch-on delay time:
Overload sensor switch-off delay time:
Bowl vibration switch-on delay time:
Overload blow switch-off delay time:
Overturning blow switch-off delay time:
Screw advancement activation time:
Time-out vibrations:
• Screw selection parameters
Maximum screw selection time:
Time between selection attempts:
Number of selection attempts:
Selection start delay time:
• Screw shooting parameters
Maximum screw shooting time:
Time between shooting attempts:
Number of shooting attempts:
Shooting switch-off delay time:
• Tightening slide parameters
Approach cylinder activation delay time:
Approach cylinder deactivation delay time:
Motor cylinder activation delay time:
Motor cylinder deactivation delay time:
Rotation activation delay time:
Shooting activation time (engagement mode):
Screw engagement time:
Threshold ON analogic tightening sensor:
Threshold OFF analogic tightening sensor:
• Tightening result parameters
Minimum tightening time:
Maximum tightening time:
Minimum time to reach depth sensor:
• Hopper parametes
Level sensor switch-on delay time:
Level sensor switch-off delay time:


I/O DIAGNOSTICS
• PLC inputs
I1 ANALOGIC PRESSURE SWITCH
I2 OVERLOAD SENSOR
I3 SELECTOR SCREW PASSAGE SENSOR
I4 HEAD SCREW PASSAGE SENSOR
I5 APPROACH CYLINDER: IDLE SENSOR
I6 APPROACH CYLINDER: WORKING SENSOR
I7 MOTOR CYLINDER: IDLE SENSOR
I8 MOTOR CYLINDER: WORKING SENSOR
I9 ENGAGEMENT CYLINDER: WORKING SENSOR
I10 TOOL RUNNING
I11 LEVEL SENSOR
I12 OUTPUTS ENABLE
I13 TIGHTENING START
I14 RESET SYSTEM
I15 SCREW RECALL
I16 OPTIONAL RESET
I17 OK RESULT FROM ELECTRIC UNIT
I18 NOK RESULT FROM ELECTRIC UNIT
I19 ELECTRIC UNIT READY
• PLC outputs
Q1 VIBRATORY BOWL
Q2 LACK OF SCREWS / HOPPER
Q3 SCREW OVERLOAD BLOW
Q4 SCREW OVERTURNING BLOW
Q5 SCREW ADVANCEMENT BLOW
Q6 SCREW SHOOTING
Q7 SCREW SELECTOR
Q8 MOTOR CYLINDER
Q9 APPROACHING CYLINDER
Q10 ENGAGEMENT CYLINDER
Q11 TOOL START
Q12 SLIDE UP
Q13 SYSTEM READY TO TI
Q14 TIGHTENING OK
Q15 TIGHTENING NOK
Q16 SYSTEM ANOMALY


ANOMALIES
SELECTOR ANOMALY - MAXIMUM ATTEMPS EXCEEDED
SELECTOR ANOMALY - SENSOR KEEPS BEING ACTIVE
SHOOT ANOMALY - MAXIMUM ATTEMPS EXCEEDED
SHOOT ANOMALY - SENSOR KEEPS BEING ACTIVE
SHOOT ANOMALY - DISABILITATION DURING SHOOTING
APPROACH CYLINDER ANOMALY - IDLE SENSOR
APPROACH CYLINDER ANOMALY - WORKING SENSOR
MOTOR CYLINDER ANOMALY - IDLE SENSOR
MOTOR CYLINDER ANOMALY - WORKING SENSOR
ENGAGEMENT CYLINDER ANOMALY - WORKING SENSOR
TOOL RUNNING ANOMALY
CONTROL UNIT "READY" NOT AVAILABLE
NOK TIGHTENING - MINIMUM TIME
NOK TIGHTENING - MAXIMUM TIME
NOK TIGHTENING - DEPTH TIGHTENING NOT ACHIEVED
NOK TIGHTENING - NOK RESULT FROM CONTROL UNIT
MAIN PRESSURE FAULT ANOMALY
MAIN PRESSURE FAULT DURING TIGHTENING
"SYSTEM READY" NOT REACHED ANOMALY
PLC OUTPUTS DISABLED

2 Fastening slides

COMPACT AND VERSATILE. IDEAL FOR EVERY APPLICATION.

Fastening slides are **entirely designed** and manufactured by Fiam with high quality materials, guaranteeing very high reliability and long life time, also in presence of high production rates.
Their movement ensures a **perfect approach stroke of the nutrunner motor/screw-retaining head** to the part being assembled.
Also suitable for applications with **several tightening points with very close centre-to-centre distances** (min. 41 mm for SM15 models. min. 51 mm for SM 20 models).
On request, **offset devices** are available that can reach tightening points having a centre-to-centre distance of approx. 20 mm. Due to their compact dimensions and extremely low weight, fastening slides are extremely versatile and **can be used on manipulators, electric axes and robots** with air or electric nutrunner motors.
Numerous available models allow the **installation of nutrunner motors of different sizes and are suitable for applications where high axial thrust is required (e.g. in assemblies with self-tapping screws)** or where the overall dimensions involve tightening from bottom to top or where it is necessary to favor screw engagement.

Running on ball recirculating runners:	wih dovetail size 15/20 mm
Pneumatic cylinders:	with bores of suitable diameter for the type of slide to use
Limit switch position sensors:	✓
Air flow governors:	✓
Max possible nutrunner motor diameter:	42,5 mm
Function "screw at sight":	upon request
Fastening slides to tighten from the bottom to the top:	upon request
Off-set device:	upon request
Analogic sensor for depth control:	upon request
Weight (slide only):	1,8 ÷ 2,2 Kg

On request, fastening slides with OFFSET device for extremely short centre-to-centre distances.

Shielded screw transit sensor
Also check very small screws

Practical and rational hose
That includes the air and electric cables between slide and screw feeder

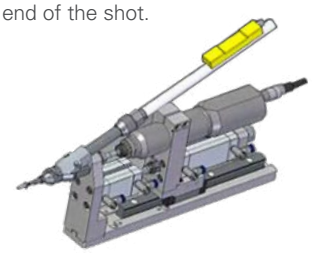
Pneumatic cylinders
Equipped with built-in pneumatic decelerators

"Screw at sight" function
Fastening slide can be supplied with this funcion: the screw is held firmly inside the screw-retaining head and screw engagement movement is achieved by means of an additional cylinder. Once the screw has reached the screw-retaining head, the imprint is engaged and then further steps of approach and subsequent tightening can be completed.

Fastening slide with air nutrunner motor.

Compact fastening slide
Compact configuration ideal to working from the bottom to the top and/or for layouts with reduced encumbrements.

The configuration also includes the "screw at sight" function which, in addition to allowing greater ease of centering on the tightening point, if used from the bottom up, prevents the screw from falling back to the end of the shot.



Fastening slide with electric nutrunner motor eTensil.

SINGLE STROKE FASTENING SLIDES

SM 15 model

The single stroke fastening slide stands out for the single stroke performed by its motor to reach the tightening point and then tighten. Considering compact dimensions and weight, single stroke fastening slides are particularly suitable in situations where the approach movement is made by a robot arm or a manipulator with Z axis. Rail track size: 15 mm.

Recommended for:

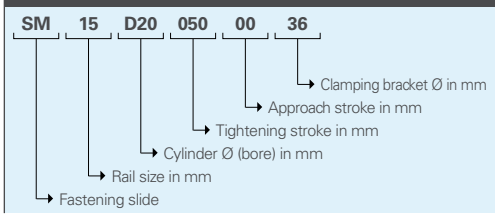
- **tightening torque up to 10 Nm**
- **nutrunner motors with ø max 36 mm**

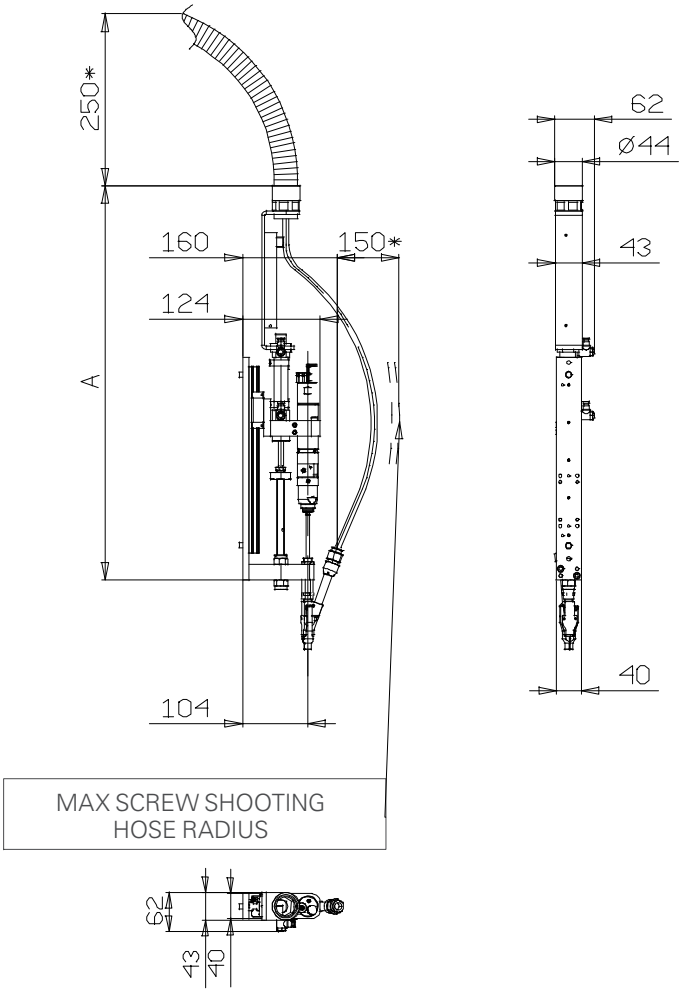
SW MODELS: WITH SCREW AT SIGHT

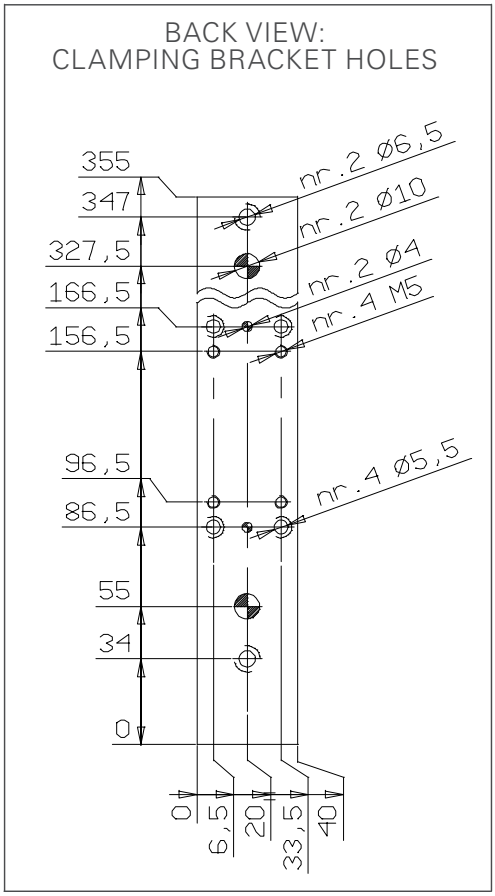
Single-stroke fastening slides, can be supplied wih "visible screw" function: the screw is held firmly inside the screw-retaining head and screw engagement movement is achieved by means of an additional cylinder. Once the screw has reached the screw-retaining head, the imprint is engaged and then further steps of approach and subsequent tightening can be completed.

Single-stroke fastening slide	Size (rail track size)	Tightening stroke	Cylinder Ø (bore)
	mm	mm	mm
SM 15D20 050-00 36	15	50	20
SM 15D20 050-00 32	15	50	20
SM 15D20 080-00 36	15	80	20
SM 15D20 080-00 32	15	80	20
SM 15D25 050-00 36	15	50	25
SM 15D25 050-00 32	15	50	25
SM 15D25 080-00 36	15	80	25
SM 15D25 080-00 32	15	80	25

How to read model names







The dimensional drawings are available in different formats on our Fiam reserved area (www.fiamgroup.com)

SINGLE STROKE FASTENING SLIDES

SM 20 model

SM 20 single stroke fastening slides, are characterized from the different rail track size: 20 mm.

Recommended for:

- **tightening torque up to 10 Nm**
- **nutrunner motors with ø max 42,5 m**

SW MODELS: WITH SCREW AT SIGHT

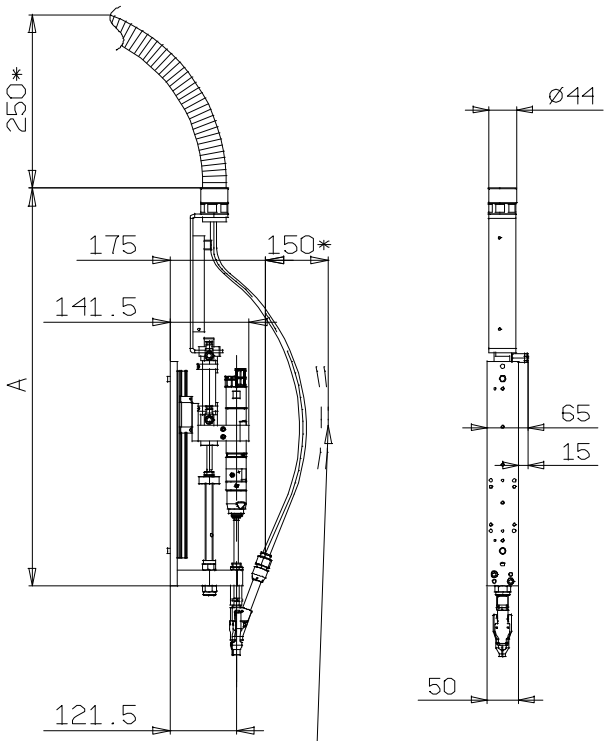
Single-stroke fastening slides, can be supplied wih "visible screw" function: the screw is held firmly inside the screw-retaining head and screw engagement movement is achieved by means of an additional cylinder. Once the screw has reached the screw-retaining head, the imprint is engaged and then further steps of approach and subsequent tightening can be completed.

Single-stroke fastening slide	Size (rail track size)	Tightening stroke	Cylinder Ø (bore)
	mm	mm	mm
SM 20D25 050-00 42,5	20	50	25
SM 20D25 080-00 42,5	20	80	25

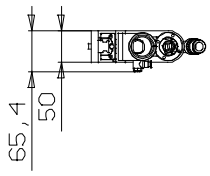
How to read model names

SM 20 D25 050 00 42,5

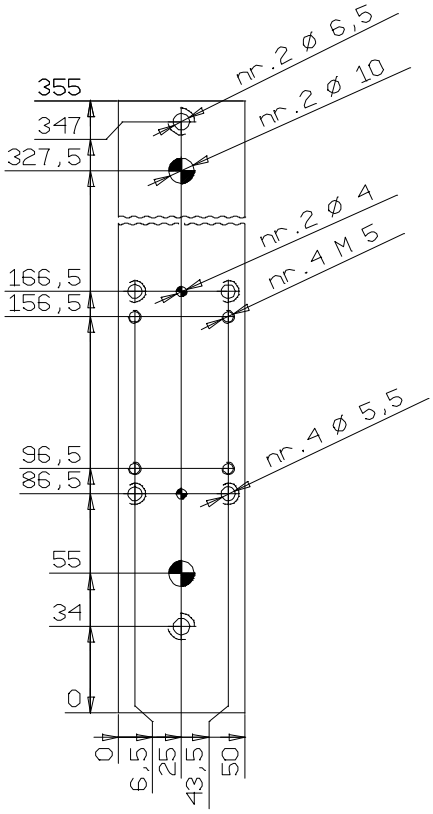
- SM → Fastening slide
- 20 → Rail size in mm
- D25 → Cylinder Ø (bore) in mm
- 050 → Tightening stroke in mm
- 00 → Approach stroke in mm
- 42,5 → Clamping bracket Ø in mm



MAX SCREW SHOOTING HOSE RADIUS



BACK VIEW: CLAMPING BRACKET HOLES



The dimensional drawings are available in different formats on our Fiam reserved area (www.fiamgroup.com)

DUAL STROKE FASTENING SLIDES

DM 15 model

In addition to the stroke performed by the motor for the purpose of tightening, they feature an additional approach stroke to bring the head down to the component. In the slide description the first number indicates the nutrunner motor stroke, while the second identifies the head approach stroke (in mm). Rail track size: 15 mm.

Recommended for:

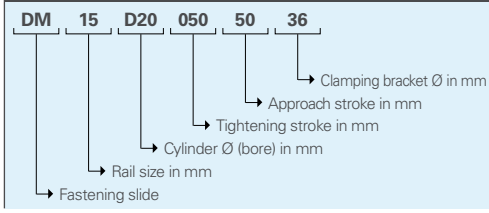
- **tightening torque up to 10 Nm**
- **nutrunner motors with ø max 36 mm**

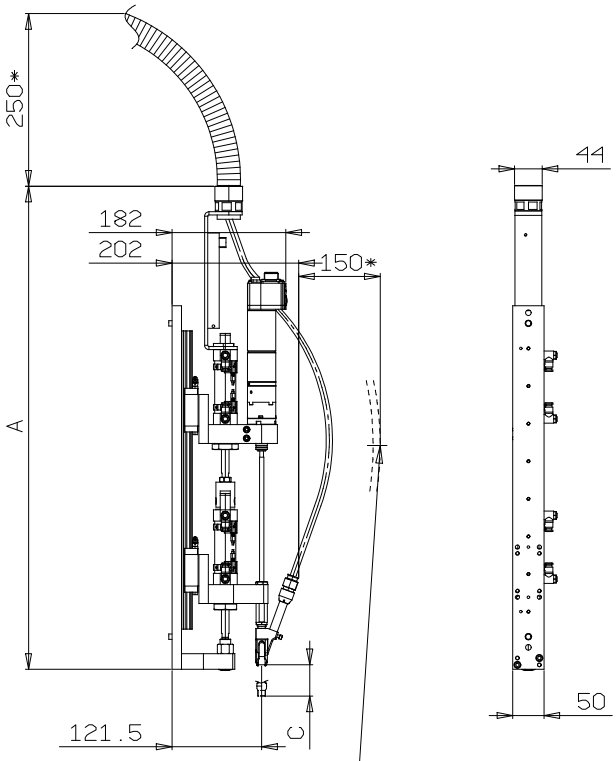
DM MODELS: WITH SCREW AT SIGHT

Dual-stroke fastening slides, can be supplied wih "visible screw" function: the screw is held firmly inside the screw-retaining head and screw engagement movement is achieved by means of an additional cylinder. Once the screw has reached the screw-retaining head, the imprint is engaged and then further steps of approach and subsequent tightening can be completed.

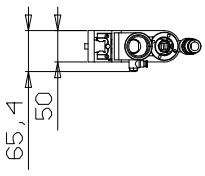
Dual-stroke fastening slide	Size (rail track size)	Tightening and approach strokes	Cylinder Ø (bore)	C distance	A distance
	mm	mm	mm	mm	mm
DM 15D20 050-50 36	15	50-50	20	50	710
DM 15D20 050-50 32	15	50-50	20	50	710
DM 15D20 050-80 36	15	50-80	20	80	770
DM 15D20 050-80 32	15	50-80	20	80	770
DM 15D20 080-50 36	15	80-50	20	50	770
DM 15D20 080-50 32	15	80-50	20	50	770
DM 15D20 080-80 36	15	80-80	20	80	830
DM 15D20 080-80 32	15	80-80	20	80	830
DM 15D25 050-50 36	15	50-50	25	50	710
DM 15D25 050-50 32	15	50-50	25	50	710
DM 15D25 050-80 36	15	50-80	25	80	770
DM 15D25 050-80 32	15	50-80	25	80	770
DM 15D25 080-50 36	15	80-50	25	50	770
DM 15D25 080-50 32	15	80-50	25	50	770
DM 15D25 080-80 36	15	80-80	25	80	830
DM 15D25 080-80 32	15	80-80	25	80	830

How to read model names

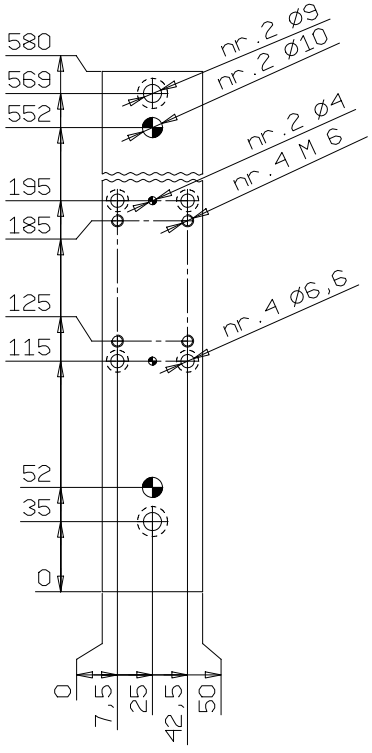




MAX SCREW SHOOTING HOSE RADIUS



BACK VIEW: CLAMPING BRACKET HOLES



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DUAL STROKE FASTENING SLIDES

DM 20 model

DM 20 dual stroke fastening slides, are characterized from the different rail track size : 20 mm.

Recommended for:

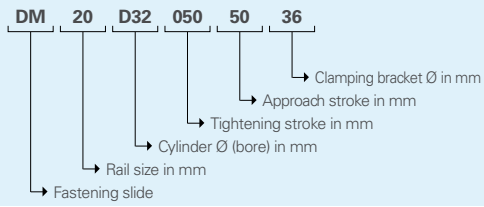
- **tightening torque up to 10 Nm**
- **nutrunner motors with ø max 42,5 mm**

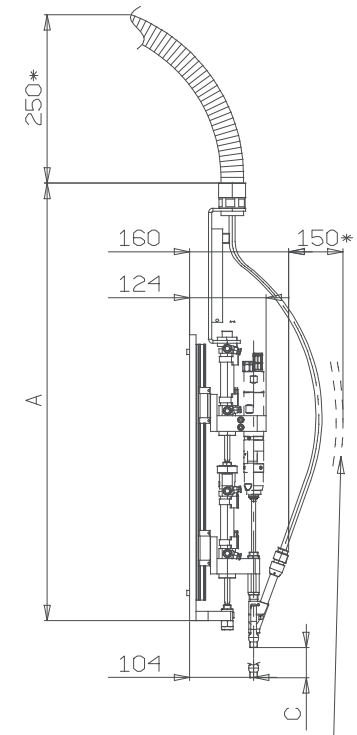
DM MODELS: WITH SCREW AT SIGHT

Dual-stroke fastening slides, can be supplied wih "visible screw" function: the screw is held firmly inside the screw-retaining head and screw engagement movement is achieved by means of an additional cylinder. Once the screw has reached the screw-retaining head, the imprint is engaged and then further steps of approach and subsequent tightening can be completed.

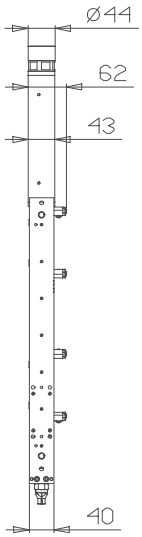
Dual-stroke fastening slide	Size (rail track size)	Tightening and approach strokes	Cylinder Ø (bore)	C distance	A distance
	mm	mm	mm	mm	mm
DM 20D32 050-50 36	20	50-50	32	50	740
DM 20D32 050-50 42,5	20	50-50	32	50	740
DM 20D32 080-50 36	20	80-50	32	50	810
DM 20D32 080-50 42,5	20	80-50	32	50	810
DM 20D32 050-80 36	20	50-80	32	80	810
DM 20D32 050-80 42,5	20	50-80	32	80	810
DM 20D32 080-80 36	20	80-80	32	80	860
DM 20D32 080-80 42,5	20	80-80	32	80	860
DM 20D40 050-50 36	20	50-50	40	50	740
DM 20D40 050-50 42,5	20	50-50	40	50	740
DM 20D40 080-50 36	20	80-50	40	50	810
DM 20D40 080-50 42,5	20	80-50	40	50	810
DM 20D40 050-80 36	20	50-80	40	80	810
DM 20D40 050-80 42,5	20	50-80	40	80	810
DM 20D40 080-80 36	20	80-80	40	80	860
DM 20D40 080-80 42,5	20	80-80	40	80	860

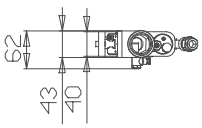
How to read model names



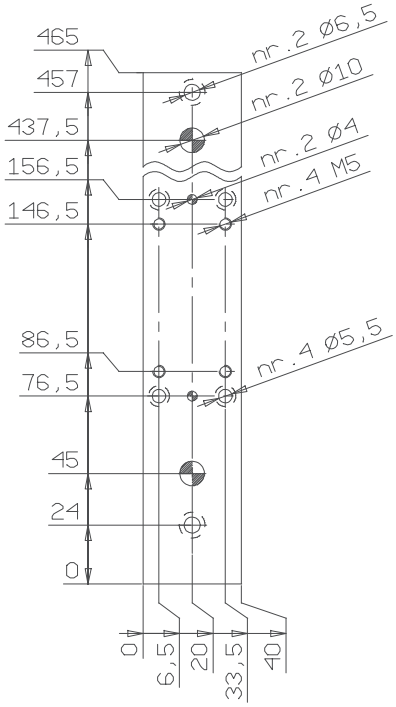


MAX SCREW SHOOTING HOSE RADIUS





BACK VIEW:
CLAMPING BRACKET HOLES



The dimensional drawings are available in different formats on our Fiam reserved area (www.fiamgroup.com)

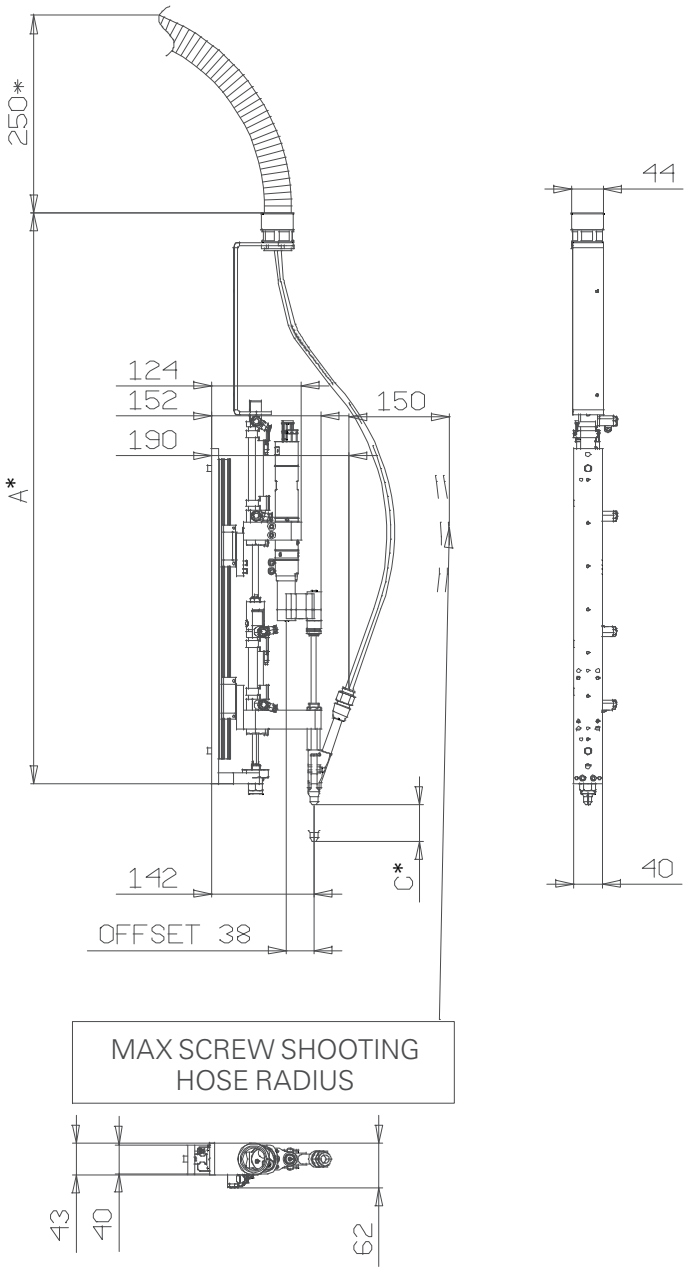
DUAL STROKE FASTENING SLIDES WITH OFFSET DEVICE

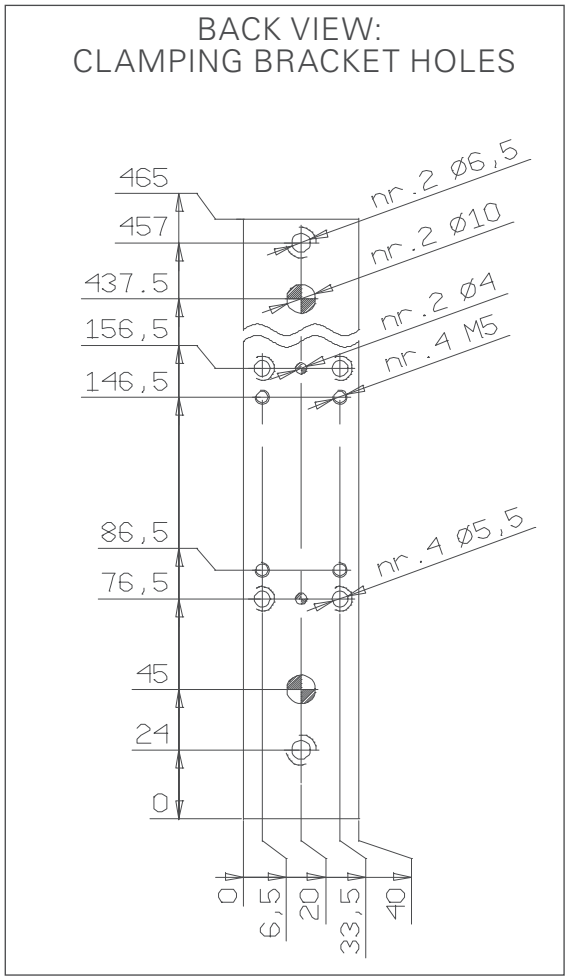
DM 15 model

In addition to the stroke performed by the motor for the purpose of tightening, these slides feature an additional approach stroke to bring the head down to the component, as well as the offset device, which allows you to reach tightening points with center distances close to 20 mm.

Recommended for:

- **tightening torque up to 10 Nm**
- **nutrunner motors with ø max 36 mm**





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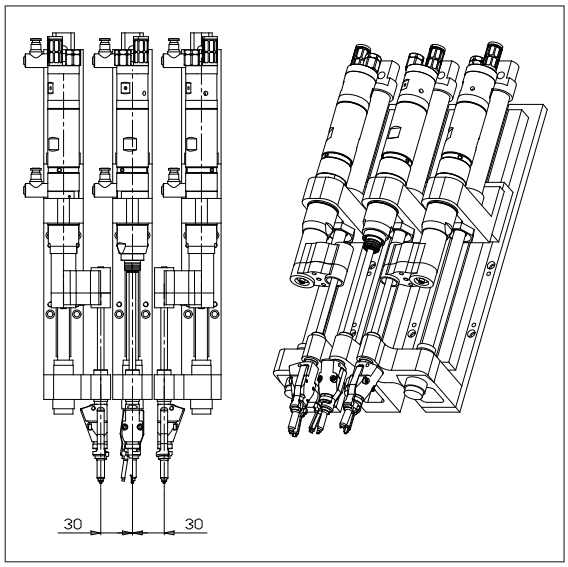


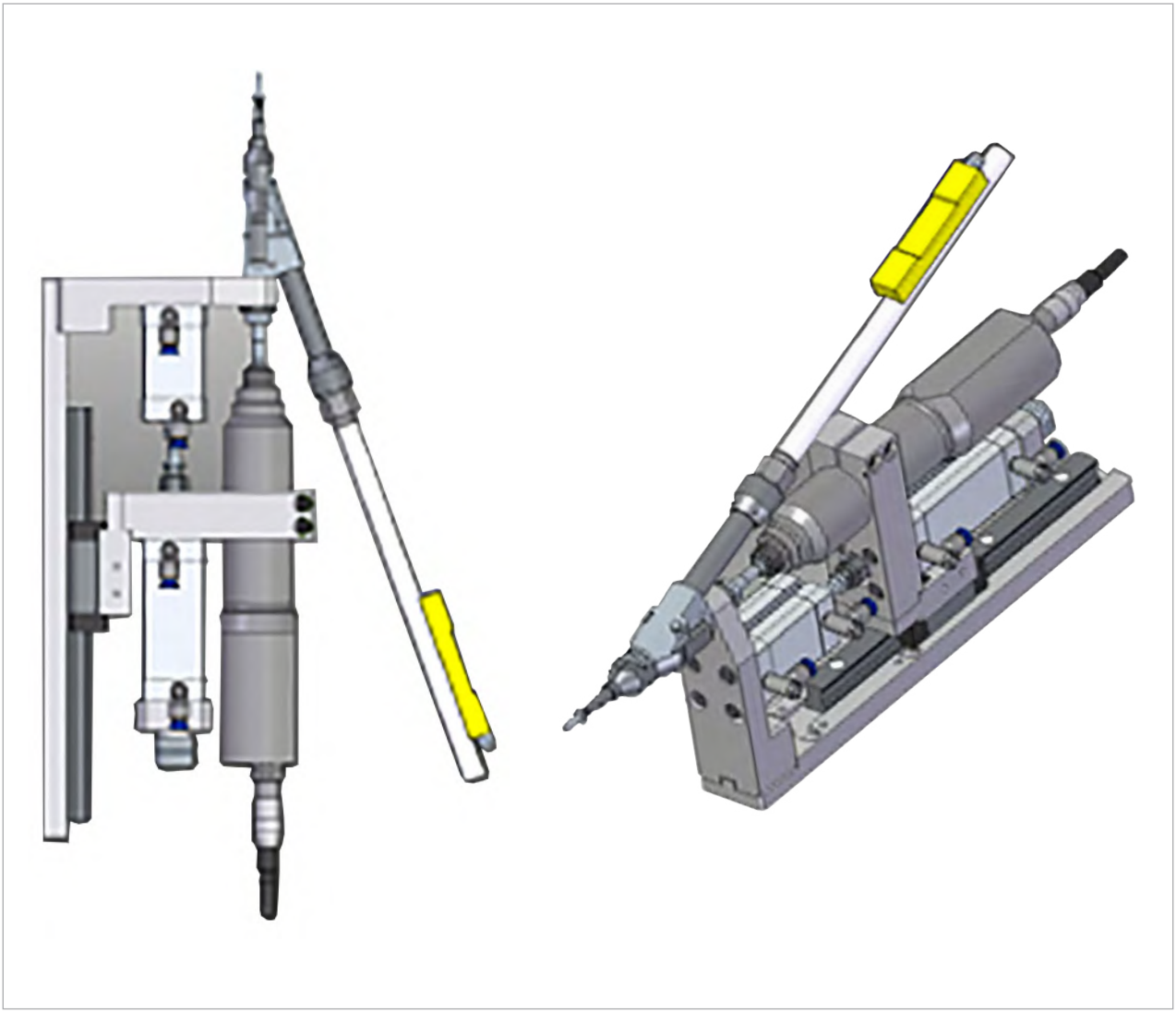
Application example of 2 fastening slides with head OFFSET device, in order to fasten screws with short distance to centre.

* for measurements of dimensions A and C, refer to the table on page 16

COMPACT FASTENING SLIDES

Single or dual stroke slides can be supplied in the compact configuration: ideal for working the bottom to the top and / or for layouts with reduced spaces.

The configuration also includes the "screw at sight" function which, in addition to allowing greater ease of centering on the tightening point, if used from the bottom up, prevents the screw from falling back to the end of the shot.



Nutrunner motors available

The motorization technologies that can be used with MCA tightening modules are several and to be chosen according to the application, the type of joint and screw, the production layout and the type of production rates required and also the level of monitoring and control you need on the production cycle.

Those available are:

• **Air nutrunner motors:**	**torque control by mechanical clutch**
• **eTensil electric nutrunner motors**	**torque control by mechanical clutch**
• **eTensil electric nutrunner motors**	**torque/angle by current control**
• **MCB electric nutrunner motors**	**torque/angle control by:** **- current control** **- built-in transducer and resolver**
• **X-PAQ electric nutrunner motors**	**torque/angle control by built-in transducer and resolver**

AIR NUTRUNNER MOTORS

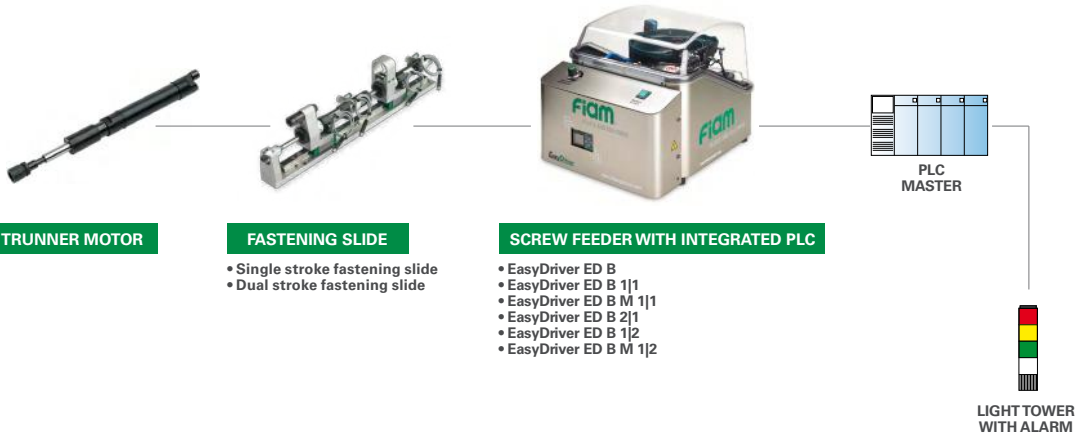
They are able to tighten correctly at every level of need and their sturdiness ensures constant performance over time, for torques up to 10 Nm even in heavy duty conditions and at low supply pressures.

Air nutrunner motors have a **mechanical clutch for torque control** which automatically and instantly stops the supply air and guarantees **high torque repeatability** and **low Mean Shift, even when joint elasticity changes**.

This system makes it possible to keep torque values unaltered for hundreds of thousands of cycles.
Ideal to assemble components manufactured with high quality materials.

To learn more about all air nutrunner motors features, consult the online catalog here.

MCA TIGHTENING MODULE CONFIGURATION WITH AIR NUTRUNNER MOTORS



eTensil ELECTRIC NUTRUNNER MOTORS WITH MECHANICAL CLUTCH

The innovative electric nutrunner motors eTensil ensure **high levels of performance and reliability with maximum safety** given their low voltage operation and perfect thermal insulation.

They stand out for:

- **Torque control with mechanichal clutch and automatich shut off.** This ensures **high repeatability** – in other words a low Mean Shift value – **even when faced with a variable joint softness level**
- Brushless motors are the avant-garde in efficient and consistent performance, due to their **high-precision mechanics**
- The absence of brushes ensure **limited maintenance and absence of dust** in the workplace
- **Strong thrust bearings:** to withstand the thrust of the sort of slides found in automated production cycles that move in rapid, non-stop strokes
- **Practical machine mounting** along the full length of the aluminium outer body
- **Centring system** designed to achieve unbeatable reliability along both the vertical and horizontal axis
- High silence and safety.

As with air nutrunner motors, **clutch adjustment is quick and easy** and takes place from the outside through an access slot protected by a band spring.

eTensil nutrunner motors and control units, are covered by an extended warranty of 24 months or 1.000.000 cycles (first goal achieved).

Units features

It is possible to combine TPU 2 power supply unit or TPU-M1 monitoring unit which is able not only to supply the tools with the correct power supply but also to **monitor and manage all tool functions thanks to the large number of functions available** and programmable, such as detecting process anomalies such as threads or screws already tightened.

TPU-2 - POWER SUPPLY UNIT

- 5 "opto-isolated" signals in input and 5 in output
- Correct functioning LED
- Clutch shut off LED
- Anomalies / emergencies LED
- Two rotation speeds: LOW / HIGH

The features shown **are those expressed by the unit when matched with MCA tightening module**. For more information, Fiam Technical Assistance Service is at your disposal.

For an in-depth study of the different features offered by the units and nutrunner motors, consult the online catalog 105.

TPU-M1- MONITORING UNIT

- 8 programs to control tightening process
- 1 programmable sequence up to a max of 8 steps
- Screw counter - Poka Yoke system
- OK / NOK: tightening result displayed
- Min / Max tightening time control - Poka Yoke system
- Serial communication (RS232)
- Language selection (IT, EN, DE, FR, ES)
- Log of the last 99 tightenings
- Programmable I/O
- Selection of programs from I / 0 (remotely)
- Min / Max tightening angle control - Poka Yoke system

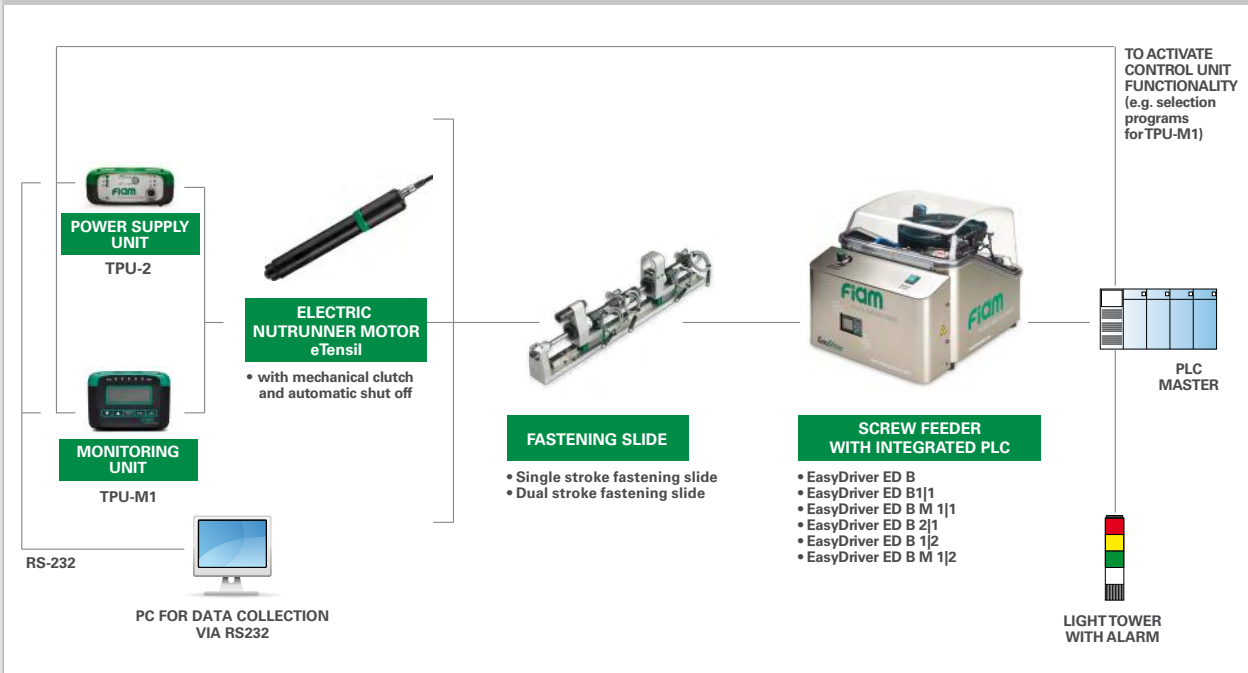
SMART PRO EVO PROGRAMMING

- Soft Start - acceleration ramp
- Settable rotation speed

TIGHTENING STRATEGIES

- Torque control with mechanical clutch
- Torque control with mechanical clutch and tightening time monitoring
- Time control (Stop-by-time tightening)
- Angle control and tightening time monitoring

MCA TIGHTENING MODULE CONFIGURATION WITH eTensil ELECTRIC NUTRUNNER MOTORS WITH MECHANICAL CLUTCH



eTensil ELECTRIC NUTRUNNER MOTORS WITH TORQUE/ANGLE CURRENT CONTROL

The innovative control system that distinguishes these brushless electric nutrunner motors is in great demand in assembly lines where components to be assembled include several variants are processed which imply, with the different geometries and different types of screws, extreme operational flexibility.

With these motors **various assemblies are possible with different parameters of torque, speed, etc. and therefore they can be used for different applications:** the same tightening module can tighten the same screw on different joints by simply adapting the programs on the mached unit. A considerable advantage in terms of investment costs.

eTensil
Fiam Electric Tightening Solutions

These are their main features:

- The torque is detected by measuring the current used by the motor while the angle is detected through integrated Hall sensors
- Brushless motors are the avant-garde in efficient and consistent performance, due to their **high-precision mechanics**
- The absence of brushes ensure **limited maintenance and absence of dust** in the workplace
- **Strong thrust bearings:** to withstand the thrust of the sort of slides found in automated production cycles that move in rapid, non-stop strokes
- **Practical machine mounting** along the full length of the aluminium outer body
- **Centring system** designed to achieve unbeatable reliability along both the vertical and horizontal axis
- Combination with control units that allow **controls, monitoring, analysis, diagnostics e real-time scheduling of production process** and **eliminate post-process controls.**

eTensil nutrunner motors and control units, are covered by an extended warranty of 24 months or 1.000.000 cycles (first goal achieved).

Units features

TPU-C1 - CONTROL UNIT

- 1 program to control tightening process
- Automatic recognition of the tool and configuration
- Screw counter - Poka Yoke system
- OK / NOK and torque value display in Nm or other unit of measurement
- "Smart Thread" function
- "Smart Speed" function
- Min / Max tightening time control - Poka Yoke system
- 2 levels password:
  to protect the set parameters or totally block the system
- Unit calibration
- Available measurement units Nm / Lb / In. / Kgf.cm
- Serial communication (RS232)
- Language selection (IT, EN, DE, FR, ES)
- Log of the last 99 tightenings
- Interfacing with working stations
- Programmable I/O

SMART PRO EVO PROGRAMMING

- Soft Start - acceleration ramp
- Settable rotation speed

TIGHTENING STRATEGIES

- Torque control
- Torque control with tightening time monitoring

TPU-C3 - CONTROL UNIT

- 8 programs to control the tightening process
- 1 programmable sequence up to a max of 8 steps
- Automatic recognition of the tool and configuration
- Screw counter - Poka Yoke system
- OK/NOK and torque value display in Nm or other unit of measurement
- "Smart Thread" function and "Smart Speed" function
- Min / Max tightening time control - Poka Yoke system
- 2 levels password: to protect the set parameters or totally block the system
- Unit calibration • Language selection (IT, EN, DE, FR, ES)
- Available measurement units Nm / Lb / In. / Kgf.cm
- Serial communication (RS232)
- Log of the last 99 tightenings
- Interfacing with working stations
- Programmable I/O
- Selection of programs from I / 0 (remotely)
- Min / Max tightening angle control - Poka Yoke system

SMART PRO EVO PROGRAMMING

- Soft Start - acceleration ramp
- Settable rotation speed

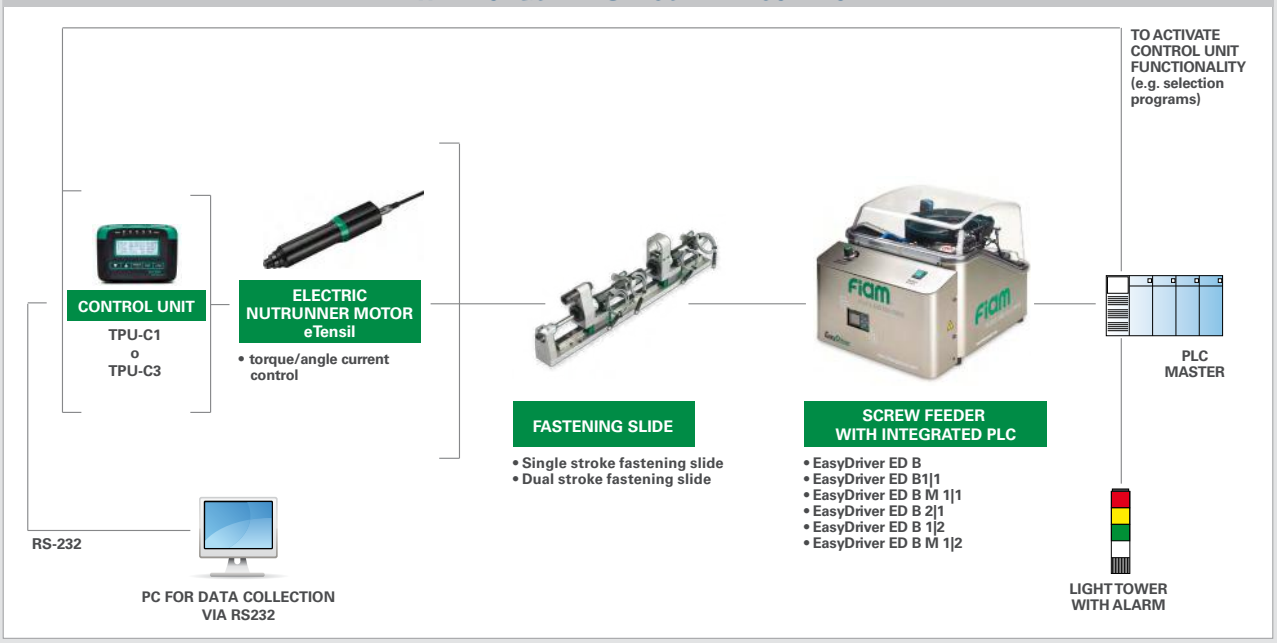
TIGHTENING STRATEGIES

- Torque control
- Torque control with tightening time monitoring
- Torque control with tightening angle monitoring
- Torque control with time and tightening angle monitoring
- Angle control and torque monitoring
- Time control and torque monitoring (Stop-by-time tightening)

The features shown **are those expressed by the unit when matched with MCA tightening module**. For more information, Fiam Technical Assistance Service is at your disposal.

For an in-depth study of the different features offered by the units and nutrunner motors, consult the online catalog 106.

MCA TIGHTENING MODULE CONFIGURATION WITH eTensil ELECTRIC NUTRUNNER MOTORS
WITH TORQUE/ANGLE CURRENT CONTROL



MCB ELECTRIC NUTRUNNER MOTORS
WITH TORQUE/ANGLE CONTROL BY:
- CURRENT CONTROL
- BUILT-IN TRANSDUCER AND RESOLVER

MCB brushless nutrunner motors can be integrate perfectly with the network control systems of the production plant.
They allow **real-time checks, monitoring, analysis, diagnostics and programming of the production process** in each industrial sector and the consequent quality of the products they assemble.
MCA tightening modules with these nutrunner motors boast extremely advanced features: they can **perform different assemblies with different parameters of torque, speed, etc. and therefore be used for different applications** thus guaranteeing a considerable advantage in terms of investment costs.

Electric nutrunner motors MCB, equipped with brushless technology that reduces the maintenance and ensures the absence of dust in the workplace, are paried to a control unit which integrates both power functions (voltage, current...) than those of programming and careful control of each stage of the assembly process.

Available two types of control:

- **Torque/angle current control:** the torque is detected by measuring the current used by the motor while the angle is detected through integrated Hall sensors
- **Torque/angle control by transducer and the resolver integrated:** they perform torque control and angle in direct mode; for a high resolution in the measurement of the values of torque and angle and excellent control of the tightening process.

Units features

TCS-B E - CONTROL UNIT

TIGHTENING STRATEGIES

- Screw engagement, torque, torque/angle, angle/torque,
- OK, NOK and RUN **LEDs**
- **I/O:** 5 inputs and 5 outputs
- RS232 connection for programming, diagnostics and data acquisition
- **Torque/angle/speed adjustment through** pre-set grid
- **Programs storage:** programs can be saved in txt format too, exported and printed
- **Data printout** including main information about last performed tightening strategy

PROGRAMMING

- **Simple, intuitive installation** on a PC with the standard equipment supplied (RS232 cable)
- **System configuration** through the quick guide
- **System calibration:** all parameters are automatically set
- **OFF LINE programming:** it is possible to create, modify and save the tightening programs without connection to TCS-B E system
- **ON LINE programming:** management of tightening programs with PC directly connected to the unit; it is possible to upload and save the tightening data directly to the PC while the tightening program works

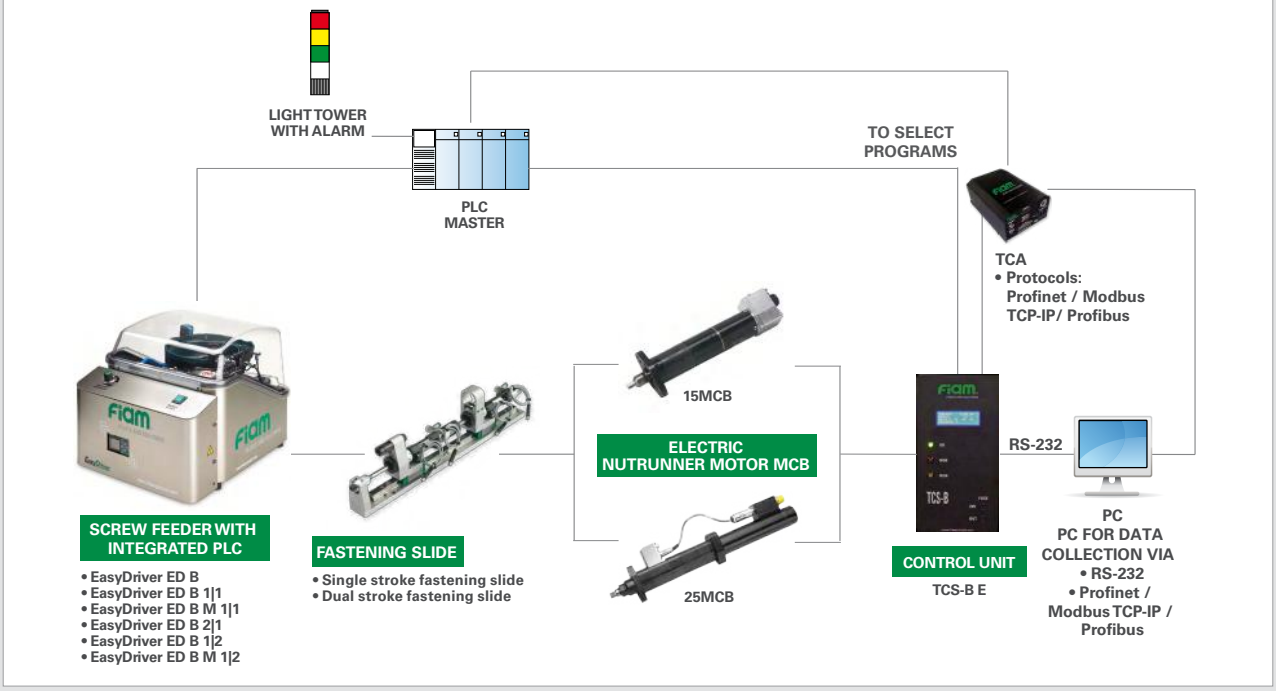
DIAGNOSTIC CHECK

- **Displays the number and type of errors detected** (temperature, feeding tension, diagnostic test, check of motor sensors, resolver, transducer and system)
- **Following checks may be carried out:** motor rotation check, analogic measurement of the supply voltage, motor feedback signals check

The features shown **are those expressed by the unit when matched with MCA tightening module**. For more information, Fiam Technical Assistance Service is at your disposal.

For an in-depth study of the different features offered by the units and nutrunner motors, consult the online catalog 71.

MCA TIGHTENING MODULE CONFIGURATION WITH MCB ELECTRIC NUTRUNNER MOTORS



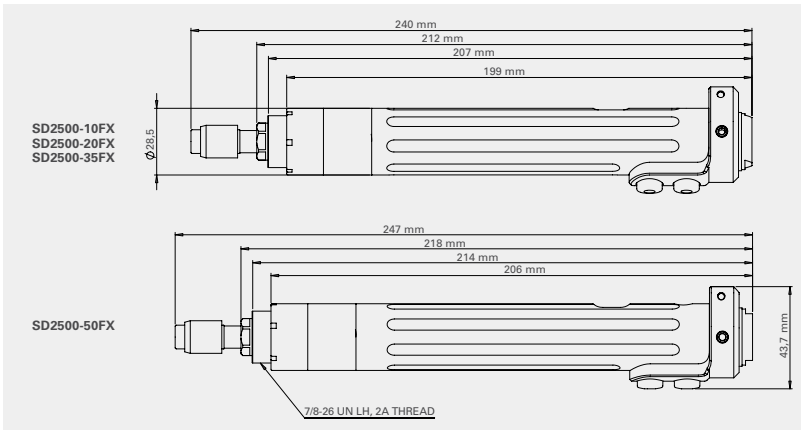
X-PAQ ELECTRIC NUTRUNNER MOTORS WITH TORQUE/ANGLE CONTROL BY BUILT-IN TRANSDUCER AND RESOLVER

The high technology offered by the X-PAQ brushless electric nutrunner motors fulfills every need in terms of accuracy and precision of tightening.
They represent a versatile investment as well as beneficial as each system **can be programmed to perform various assembly operations** with different torque, speed, etc. parameters **so it can be used for several applications.** A conversion which ensures a considerable advantage in terms of investment costs.

Very light and silent, they tighten with perfect control over the tightening process, resulting in high finished product quality.

They are equipped with:

- **Built-in torque transducer and resolver** to ensure high resolution torque/angle parameter measurements
- **Compact design, reduced sizes and above all weights, make them** ideal for installation on single and multiple tightening units and robots
- **Brushless technology:** do not require maintenance and do not pollute the work area as there are no carbon dust residues
- **Innovative control unit** that combines the power supply (voltage, current, etc. parameters) and programming functions, with accurate control of each step of the assembly process and allows **traceability** of all assembly job data.



X-PAQ™ PRECISION | ACCURACY | QUALITY

Units features

CT2500A - CONTROL UNIT

- Quick programming on color touch screen
- Fully **displays** the **tightening process**
- **Instantaneously controls** the tightening torque and angle, and indicates the outcome by colouring the whole display
- **32 pre-settable "tasks"** that can be recalled
- **8 programs available for each task,** within which it is possible to set
  he **3 different tightening strategies** available (torque control, torque control-angle, monitoring,
  angle control-torque monitoring) and the other tightening cycle parameters
  (clockwise/counterclockwise - CW/CCW - rotation, minimum/maximum torque, speed reduction during tightening, time limit)
- **Screw counter**
- **Controls tightening sequences**
- **Exports tightening result files /tasks /tightening graphs**
- **Programmable I/O (input/output)** for process control and remote commands
- **DEDICATED INTERFACE DEVICE** designed to communicate with the screw feeder and the exterior (eg with the client PLC Master)
- LEDs for **DIAGNOSTIC checks**

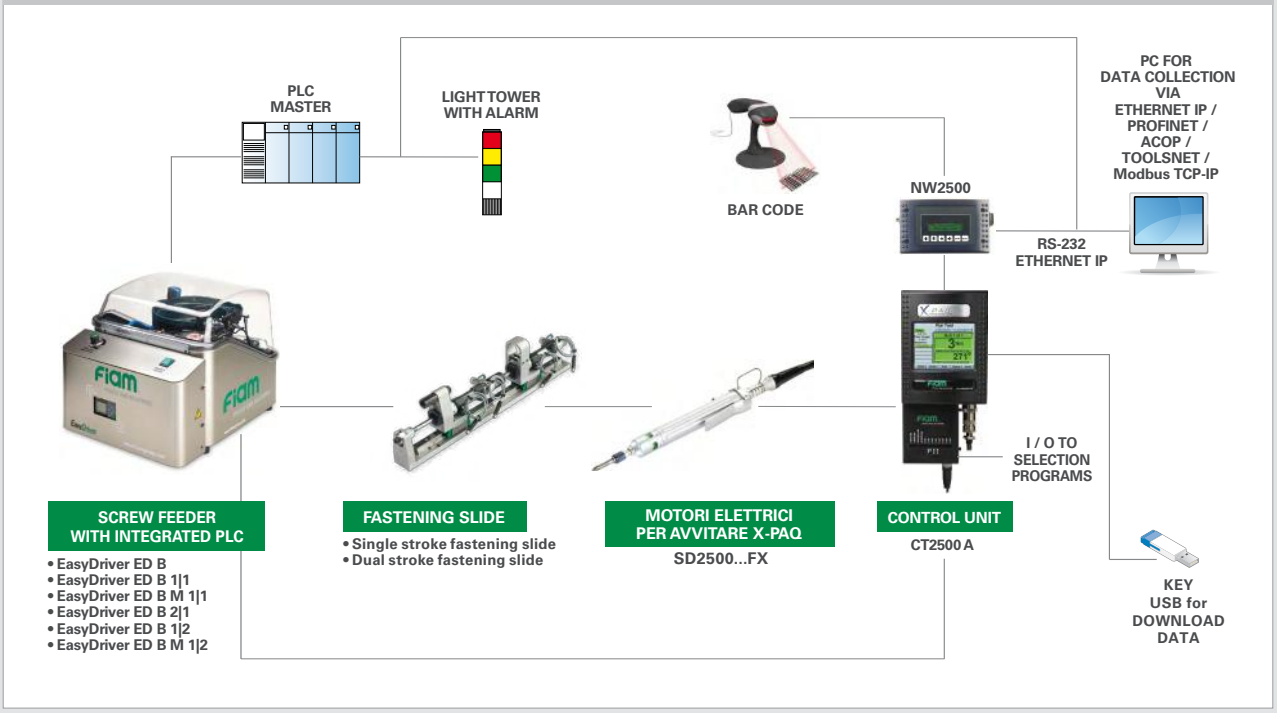
NW2500 - Combinable module (upon request)

- **Module to connect to the CT2500 unit to interface the system with printers, PLCs and PCs via RS232 serial port or Ethernet port with communications protocols ACOP, Ethernet I, ToolsNet and Profinet**
- **Allows the 32 programs available in the CT2500 unit to be recalled in sequence**
- **99 programs/sequence**

For an in-depth study of the different features offered by the units and nutrunner motors, consult the online catalog 104.

The features shown **are those expressed by the unit when matched with MCA tightening module**. For more information, Fiam Technical Assistance Service is at your disposal.

MCA TIGHTENING MODULE CONFIGURATION WITH X-PAQ ELECTRIC NUTRUNNER MOTORS



Heads that make the difference!

The screw retaining heads (nose piece) **hold the screw coming from the feeder and guide it correctly and safely** to allow the bit to go down and tighten on the component.

They are the result of lengthy experience and, being a fundamental element for high quality tightening, are designed and manufactured entirely by Fiam.

The benefits:

- **an excellent screw hold**
- **perfect control of the screw on the tightening point**
- **any depth can be reached**
- **quick and easy assembly and disassembly**

High resistance to breaking and wearing:
they are built with highest quality materials through precise and accurate machining together with the treatments

Safe and reliable screw holding:
heads are equipped with jaws which are opening to release the screw when the bit starts tightening the screw on the component. They can be of different types, depending on the screw or dimensions of the component to be tightened

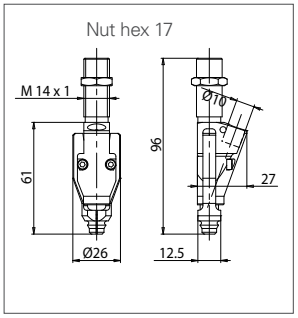
For all types of screw:
the heads have 3 different sizes to take all the various screw types on the market and additionally they can always be customised

Examples of special heads with friction jaws to access to deep tightening points, behind shoulders or for entering very narrow holes.

EVERY SCREW HAS ITS SIZE

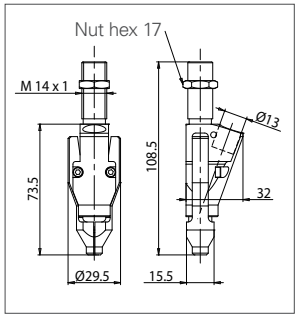
TTV - P

Ø screw head (mm)	L Total length of the screw (mm)
4,5 ÷ 7,0	max 25



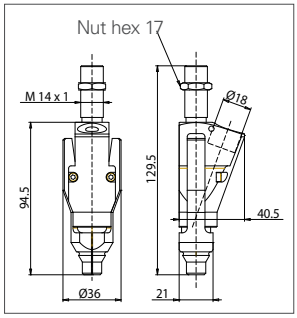
TTV - G

Ø screw head (mm)	L Total length of the screw (mm)
7,1 ÷ 10,0	max 35



TTV - M

Ø screw head (mm)	L Total length of the screw (mm)
10,1 ÷ 13,5	max 35



SOME OF THE MODELS AVAILABLE

WITH ANTI-OVERTURNING DEVICE

when you have screws with screw length / head diameter, between 1.1 (approx) and 1.5, to avoid the screw jamming

WITH FRICTION JAWS

that hold the screw on the head and not on the stem: no opening to allow the head to insert, without further encumbrances, even inside holes and deep tightening points

FOR BIG SCREWS

to tighten screws up to 45 mm length

WITH HOSE

to reach deep tightening points or inside holes

WITH SUPPORTS OR WITH SPECIAL MATERIALS

to facilitate safe and easy positioning. Special materials and geometries are designed not to damage the components during assembly

WITH ELASTIC HOSE AND MECHANICAL SCREW GRIPPING

the hose not only holds the screw perfectly on the head but it rotates together with the screw during tightening. Ideal situation not only for embedded tightening points but also as a substitute for screw suction systems that can become inefficient in the case of assemblies on materials that create dust during tightening

MCA TIGHTENING MODULES WITH FASTENING SLIDES

NUTRUNNER MOTORS Technology	Model	Tightening torque range of nutrunner motor, on soft joint		Idle speed	Type of matched control unit
		Nm	in lb	RPM	
PNEUMATIC SOLUTIONS torque control by mechanical clutch	MCA 20MC S../D… …	0,4÷5	3,5 ÷ 44,2	650÷2700	-
	MCA MCSE S../D… …	0,9÷10	8÷88,5	500÷2500	-
	MCA MCY S.../D… …	7÷10	62÷88,5	550÷800	-
ELECTRIC SOLUTIONS "eTensil" torque control by mechanical clutch	MCA E8MC S.../D… U2/M1 …	0,3÷4,5	2,6÷39,8	2000÷285	TPU2 /TPU-M1
ELECTRIC SOLUTIONS "eTensil" torque/angle by current control	MCA E8MCC S.../D… C1/C3 …	0,3÷7	2,6÷61,9	55÷2000	TPU-C1 /TPU-C3
ELECTRIC SOLUTIONS "X-PAQ" torque/angle control by built-in transducer and resolver	MCA SD2500 S.../D… CT …	0,1÷5,6	1÷50	500÷1700	CT2500A
ELECTRIC SOLUTIONS "MCB" torque/angle by current control	MCA 15MCB C S.../D…T1 …	1÷20	8,8÷177	350÷1700	TCS-B 15 E
	MCA 25MCB C S.../D…T2 …	4÷50	61,9÷796,5	500÷1500	TCS-B 25 E
ELECTRIC SOLUTIONS "MCB" torque/angle control by built-in transducer and resolver	MCA 15MCB A S.../D…T1 …	0,5÷20	4,4÷177	350÷1700	TCS-B 15 E
	MCA 25MCB A S.../D…T2 …	2÷50	17,7÷796,5	500÷1500	TCS-B 25 E

Values to be considered reduced by 20% if used screw feeder EasyDriver ED B

Key:

Tightening module	MCA	
Type of nutrunner motor	20MC	Pneumatic technology
	MCSE	Pneumatic technology
	MCY	Pneumatic technology
	E8MC	Electric technology eTensil
	E8MCC	Electric technology eTensil
	SD2500	Electric technology X-paq
	15MCBC	Electric technology
	25MCBC	Electric technology
	15MCBA	Electric technology
	25MCBA	Electric technology
Type of fastening slide	SM	Single stroke
	SW	Single stroke with screw at sight
	DM	Dual stroke
	DW	Single stroke with screw at sight
Type of control units	U2 =	TPU 2 - Power supply unit eTensil
	M1 =	TPU-M1 - Monitoring unit eTensil
	C1 =	TPU-C1 - Control unit eTensil
	C3 =	TPU-C3 - Control unit eTensil
	CT =	CT2500A - Control unit X-paq
	T1 =	TCS-B 15 E - Control unit
	T2 =	TCS-B 25 E - Control unit
Type of screw feeders	B =	Easy Driver ED B
	B11 =	Easy Driver ED B 1|1
	BM11=	Easy Driver ED B M 1|1
	B21 =	Easy Driver ED B 2|1
	B12 =	Easy Driver ED B 1|2
	BM12 =	Easy Driver ED B M 1|2

Air inlet: 1/4" gas
Recommended air passage: ø 8 mm
Accessories drive: ⬡ ¼

TPU 2 power supply unit: see page 23
TPU-M1 monitoring unit: see page 23

TPU-C1 e TPU-C3 control units: see page 25
CT2500A control unit: see page 29
TCS-B 15 E and TCS-B 25 E control units:see page 27

For eTensil solutions with mechanical clutch, tool speed range varies according to the unit used:
- with **TPU 2**, LOW speed is approximately 80% of the maximum speed specified in the table, and can only be set with the LOW/HIGH button
- with **TPU-M1**, the speed is adjustable and the minimum speed value is equal to 50% of the max speed, as indicated in the table.

For torques and speeds other than those indicated, contact **Fiam Technical Consultancy Service.**

eTensil nutrunner motors with torque/angle current control, are supplied with a working speed equal to 25% of the nominal one to guarantee tightening quality and precision.
In order to obtain the nominal torque and speed range, it is necessary to set parameters following the instructions given in Use and Maintenance Manual.
For any further information, contact the Fiam Technical Service.

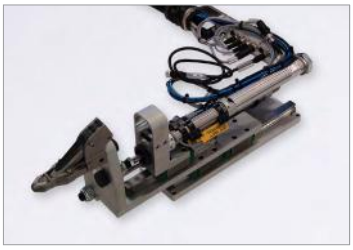
Standard equipment supplied with tightening module

- EasyDriver feeder
- Air or electric nutrunner motor
- Control unit chosen and with connection cable (if used electric nutrunner motor)
- Clutch adjustment key (for nutrunner motors with mechanical clutch)
- 4 tightening bits (1 fitted + 3 spares)
- Ethernet connection cable
- Fastening slide complete with pneumatic fittings and supporting bracket
- Screw-retaining head customized on the customer's screw,completed with bush
- Screw shooting hose
- Two shielded screw transit sensors
- Use and maintenance manual
- Eco-friendly packaging

Models available upon request and Accessories

NUTRUNNER MOTORS

- With **left rotation air motors**
- For **higher torque** range than given above
- With **different speed** and **material**



Slides with cable wiring at 90°

FASTENING SLIDES

- Models with **different approaching strokes**
- Models with analogic sensor for **depth precision control**
- Fastening slides with **protection** in transparent polycarbonate for internal view and greater safety for operators
- Special **fastening slide** for tightening points with a very close **distance to centre (20 mm)**
- **Slides with cable wiring at 90°** for layout with reduced spaces

FOR ALL SOLUTIONS

- Test/checking service of assembly system directly on client's production lines
- Customized support column
- "Level" sensor for bowl feeder to signal when it needs to be reloaded with screws
- Wooden case for shipment: code 683050046 (kg. 11 of case weight)
  Dimensions mm: L 650 x 500 x h 715

LED INDICATOR

Provide 3 types of bright, to be connected to control and monitoring units through 1,5 mt long cable included in supplly. It allows the immediate feedback of the tightening process status. It can be fixed to the workbench.

Model	For units	Code
Led indicator	TPU-C1	686990039
	TPU-C3	686990039
	TPU 2	686990034
	TPU-M1	686990039

LIGHT TOWER WITH ALARM

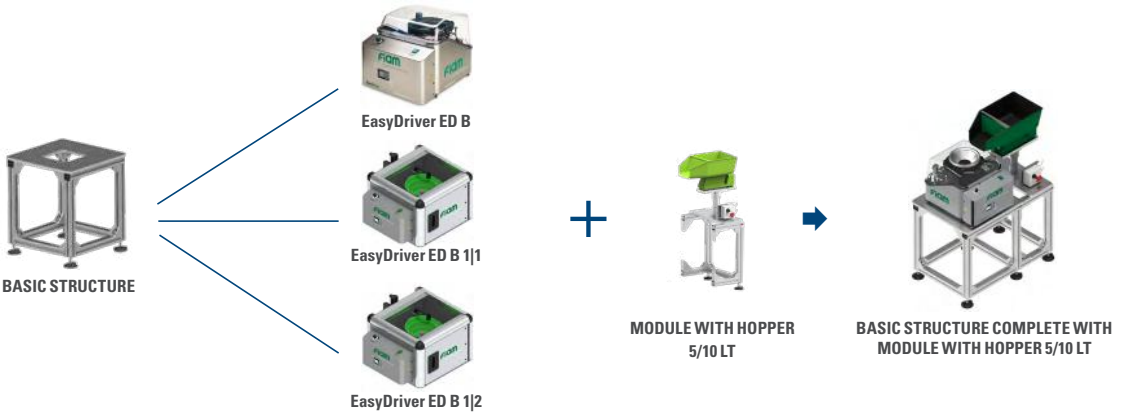
3 colour tower-light equipped with a sound device. To be connected to control unit through the supplied cable 3 meters long. It allows immediate verification of the state of the tightening process. With a diameter of 55 mm, it can be fixed to the workbench.

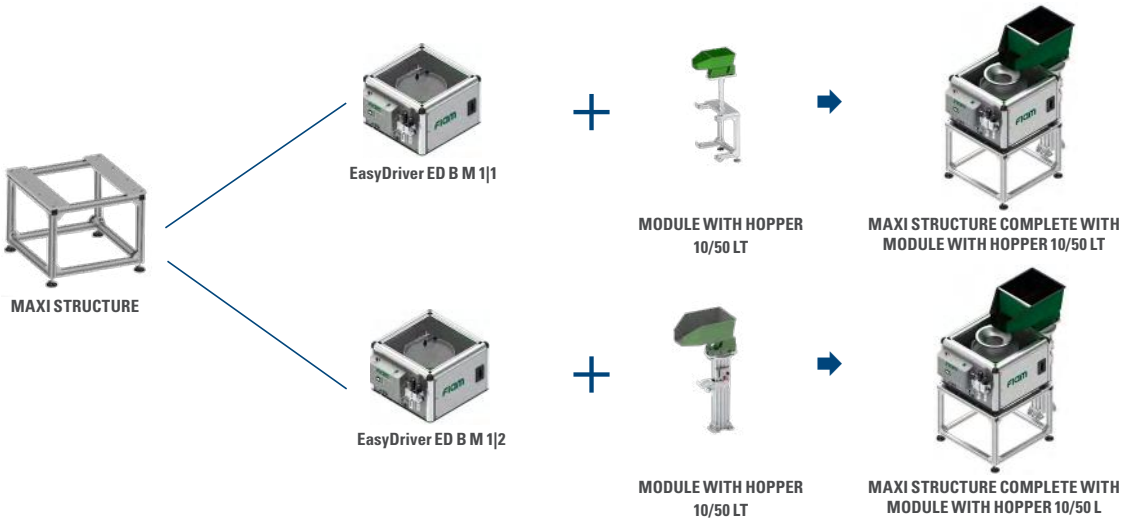
Model	For units	Code
Light tower with alarm	TPU-C1	686990040
	TPU-C3	
	TPU-M1	

SUPPORTING STRUCTURES AND HOPPERS

Entirely designed and manufactured by Fiam, they are useful to support EasyDriver feeders and their hoppers when used to solve needs production at high rates.
They ensure greater cleanliness and functionality of the operational layout thanks to:

- An **aluminum base plate already prepared with the holes** that allow to fix the suitable feeder on it
- **Aluminum profiles with channels for cables and tube bundles inside the slots** positioned under the support surface
- **Support adjustable feet in height** and possibility of having additional brackets for floor fixing through a simple anchoring with supplied squares.





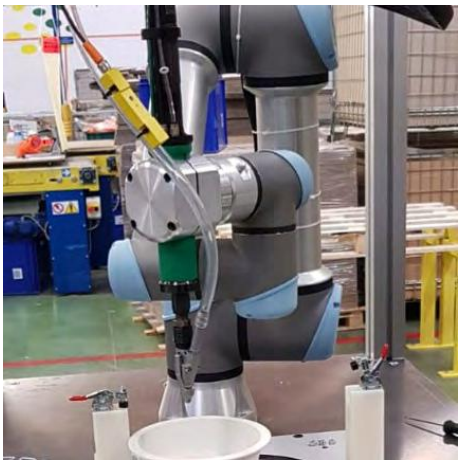
SUPPORTING STRUCTURES AND HOPPERS	EASY DRIVER					
	ED B	ED B 1|1	ED B M 1|1	ED B 2|1	ED B 1|2	ED B M 1|2
						
Basic structure	✔	✔			✔	
Basic structure with wheels (not suitable for the combination with modules for hoppers)	✔	✔			✔	
Double bowl structure (not suitable for the combination with modules for hoppers)				✔		
Module for basic structure with hopper 5 Lt	✔	✔			✔	
Module for basic structure with hopper 10 Lt	✔	✔			✔	
Basic structure complete with module with hopper 5 Lt	✔	✔			✔	
Basic structure complete with module with hopper 10 Lt	✔	✔			✔	
MAXI structure			✔			✔
Module for MAXI structure with hopper 10 Lt			✔			✔
Module for MAXI structure with hopper 50 Lt			✔			✔
MAXI structure complete with module with hopper 10 Lt			✔			✔
MAXI structure complete with module with hopper 50 Lt			✔			✔
Single Hopper 5 Lt	✔	✔			✔	
Single Hopper 10 Lt	✔	✔	✔		✔	✔
Single Hopper 50 Lt	✔	✔	✔		✔	✔
Upon request: Low level sensor (see characteristics pages 7 - 8)	✔	✔	✔	✔	✔	✔

Tighten with Cobots. Humans take a leading role.

There will be a **growing use** of "smart machines", or **collaborative robots**, in production systems. These solutions are not destined to replace humans, but to collaborate with them and **free them from the heavier and more dangerous tasks, allowing them to provide the real added value in their work.**
Operators, or humans, become the ideal means for carrying out complex operations, and their **skills are extended** through a process of *"job enlargement"*, in which they are asked to **perform the more critical tasks** so that their daily work is more motivating and their jobs are more highly qualified.

SCREW FEEDERS EasyDriver

Easy Driver screw feeder, in addition to relating to the line PLC and the control unit (when used), it is equipped with the **Modbus TCP / IP communication protocol.** This fieldbus enables broader and faster communication – via Ethernet connection – of all work-cycle-related information and digital Input and Output signals exchanged with and sent to the Cobot.



JAM-PROOF SCREW SHOOTING

All MCA modules feature two shielded screw transit sensors that, located under screw selector and on the tightening head **(check whether the screw has dropped into the hose properly and readies it for subsequent shooting)**. With this dual system, only once the first sensor located on the tightening head has detected the passage of the screw can a new screw be selected: this avoids screws jamming and building up in the screw shooting hose.

This arrangement results in:

- **improved control of the screw's position** in the hose at each stage of feeding
- **faster screw feeding as screw** selection takes place at the same time as tightening
- **shorter working times** and greater reliability given the continuity of operation.

PATENTED FORWARD BIT STROKE

Device designed to allow the **bit to advance to the tightening point automatically** and not allow it to withdraw. In addition, during the tightening stage, the screwdriver's head does not touch the surfaces of the component, protecting them from any potentially damaging contact.

The forward bit stroke device is designed to be fixed to the Cobot's wrist with a bracket.

NUTRUNNER MOTOR

The nutrunner motors that can be used on Cobots - see range on page 20 for the choice - come in the following versions:

- **AIR** for torque ranges from **1 to 5 Nm**
- **ELECTRIC - ETENSIL RANGE -** for torque tanges from **0,3 to 7 Nm**
- **ELECTRIC - X-PAQ RANGE** for torque ranges from **0.1 to 5.6 Nm**

Safety front and centre

The regulations state that: *"... in the use of collaborative applications, there are two main types of risk to be analysed: **contact and access to the work space.** The objective to be reached – again according to the regulations – is a minimal transfer of energy from the robotic system to the human, and the **systems for minimizing this type of risk** consist in reducing speed and force, reducing the moving masses (i.e. the weight of the robot), adopting a rounded or smooth design, and the use of force/torque control systems."*

Given that collaborative robots already come with sensors that detect contact with objects/humans, the **solution designed and produced by Fiam** for Cobots is **fully compliant with said recommendations** since:

- the devices to be fixed to the cobots with **brackets are extremely light and very small in size**
- screws are **always held inside jaws**
- the screw is only shot out once the s**crewdriver head is positioned** by the cobot **over the tightening point:** this means that the tip of the screw is never exposed during handling and hence cannot hit the operator.

MCA TIGHTENING MODULE FOR COBOT CONFIGURATION

COBOT

MODBUS TCP/IP
or
I/O

SCREW FEEDER WITH INTEGRATED PLC

- EasyDriver ED B
- EasyDriver ED B 1|1
- EasyDriver ED B M 1|1
- EasyDriver ED B 2|1
- EasyDriver ED B 1|2
- EasyDriver ED B M 1|2

AIR NUTRUNNER MOTOR

- with mechanical clutch and automatic shut off

FORWARD BIT STROKE DEVICE

ELECTRIC NUTRUNNER MOTOR eTensil

- with mechanical clutch and automatic shut off

TPU 2

TPU-M1

ELECTRIC NUTRUNNER MOTOR eTensil

- torque/angle current control

TPU-C1

TPU-C3

PC FOR DATA COLLECTION VIA RS 232

ELECTRIC NUTRUNNER MOTOR X-PAQ

- torque/angle control by built-in transducer and resolver

CT2500 A

BAR CODE

NW2500

ETHERNET IP / ACOP / PROFINET / TOOLSNETP

MCA TIGHTENING MODULE FOR COBOT

NUTRUNNER MOTORS Technology	Model	Tightening torque range of nutrunner motor, on soft joint		Idle speed	Type of matched control unit	Forward bit stroke device max stroke
		Nm	in lb	RPM		mm
PNEUMATIC SOLUTIONS torque control by mechanical clutch	MCA 20MC AC ...	0,4÷5	3,5÷44,2	650 ÷ 2700	-	100
ELECTRIC SOLUTIONS "eTensil" torque contro by mechanical clutch	MCA E8MC AC U2/M1 ...	0,3÷4,5	2,6÷39,8	2000÷285	TPU2 /TPU-M1	100
ELECTRIC SOLUTIONS "eTensil" torque/angle by current control	MCA E8MCC AC C1/C3 ...	0,3÷7	2,6÷61,9	55÷2000	TPU-C1 /TPU-C3	100
ELECTRIC SOLUTIONS "X-paq" torque/angle control by built-in transducer and resolver	MCA SD2500 AC CT ...	0,1÷5,6	1÷50	500÷1700	CT2500A	100

Values to be considered reduced by 20% if used screw feeder EasyDriver ED B

Key:

Tightening system	MCA	
Type of nutrunner motor	20MC	Pneumatic technology
	E8MC	Electric technology eTensil
	E8MCC	Electric technology eTensil
	SD2500	Electric technology X-paq
Tightening device	AC	Forward bit stroke for Cobot
Type of control units	U2 =	TPU 2 - Power supply unit eTensil
	M1 =	TPU-M1 - Monitoring unit eTensil
	C1 =	TPU-C1 - Control unit eTensil
	C3 =	TPU-C3 - Control unit eTensil
	CT =	CT2500A - Control unit X-paq
Type of screw feeders	B =	Easy Driver ED B
	B11 =	Easy Driver ED B 1|1
	BM11=	Easy Driver ED B M 1|1
	B21 =	Easy Driver ED B 2|1
	B12 =	Easy Driver ED B 1|2
	BM12 =	Easy Driver ED B M 1|2

Air inlet: 1/4" gas
Recommended air passage: ø 8 mm
Accessories drive: ⎔ ¼

TPU 2 power supply unit: see page 23
TPU-M1 monitoring unit: see page 23

TPU-C1 e TPU-C3 control units: see page 25
CT2500A control unit: see page 29
TCS-B 15 E and TCS-B 25 E control units:see page 27

For eTensil solutions with mechanical clutch, tool speed range varies according to the unit used:
- with **TPU 2**, LOW speed is approximately 80% of the maximum speed specified in the table, and can only be set with the LOW/HIGH button
- with **TPU-M1**, the speed is adjustable and the minimum speed value is equal to 50% of the max speed, as indicated in the table.

For torques and speeds other than those indicated, contact **Fiam Technical Consultancy Service.**

eTensil nutrunner motors with torque/angle current control, are supplied with a working speed equal to 25% of the nominal one to guarantee tightening quality and precision.
In order to obtain the nominal torque and speed range, it is necessary to set parameters following the instructions given in Use and Maintenance Manual.
For any further information, contact the Fiam Technical Service.

Standard equipment supplied with tightening module for Cobot

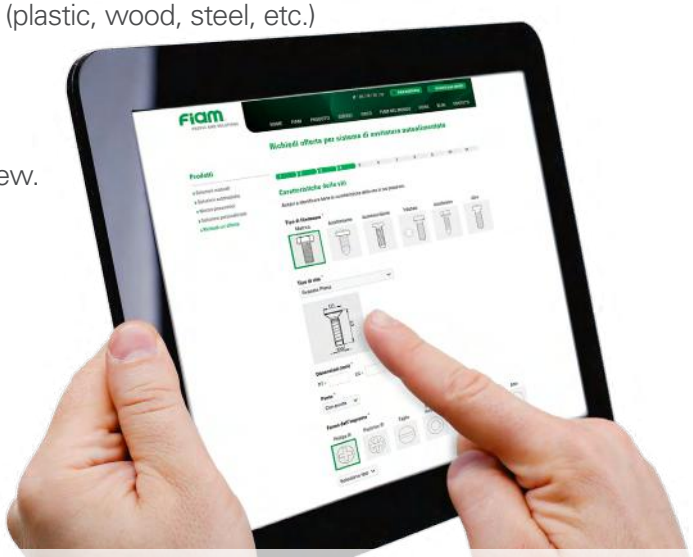
- EasyDriver feeder
- Air or electric nutrunner motor
- Tightening device: forward bit stroke
- Control unit chosen and with connection cable (if used electric nutrunner motor)
- Clutch adjustment key (for nutrunner motors with mechanical clutch)
- 4 tightening bits (1 fitted + 3 spares)
- Fastening slide complete with pneumatic fittings and supporting bracket
- Ethernet connection cable
- Screw shooting hose
- Shielded screw transit sensor
- Use and maintenance manual
- Eco-friendly packaging

NB: the supply does not include the bracket for fixing the forward bit stroke device to the Cobot.

REQUEST A FREE QUOTATION!

When choosing an MCA tightening module with automatic screw feeding, you have to consider:

- **The kind of material to be tightened** (plastic, wood, steel, etc.)
- **Dimensions of the component** to be assembled
- **Tightening torque and speed**, but the most important factor is the screw.



By sending us the details through Data Entry Configurator 4.0, **which you can compile directly on our website**, you will quickly receive a no-obligation "turnkey" solution that will save you time and money!

https://www.fiamgroup.com/en/request-a-quotation/

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Quality Management System Certificate

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