



Tightening automation.
Only excellent solutions.

MCA

**Tightening module to be integrated
into automatic production systems**

Fiam®

PEOPLE AND SOLUTIONS



MCA: tightening module with automation

Effective, fast and safe

Concentrated innovation for a faster, more reliable production process: these are the MCA tightening modules. 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 emergency button, pedal, etc.).

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).

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 on anthropomorphic arm



MCA for automatic lines with pallet transfer



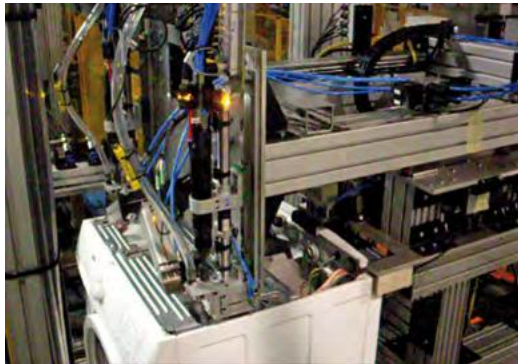
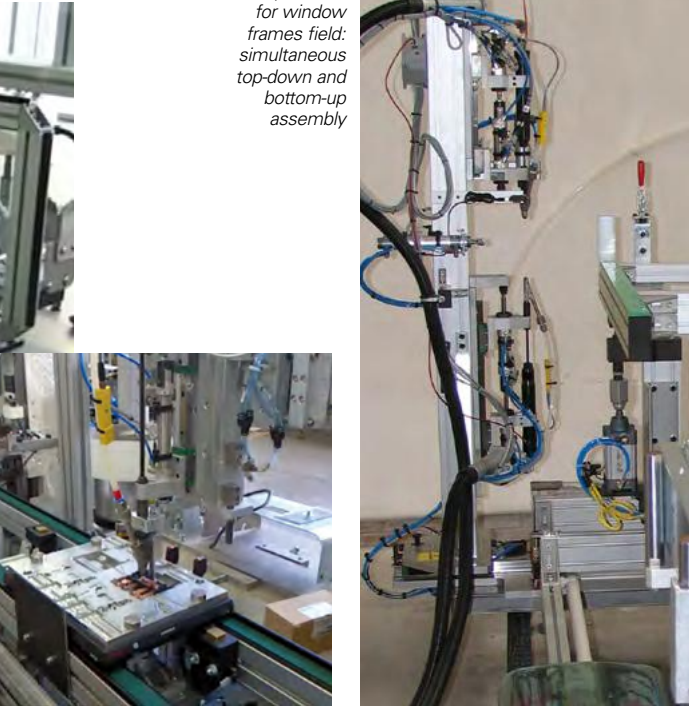
MCA on Cartesian X-Y axes



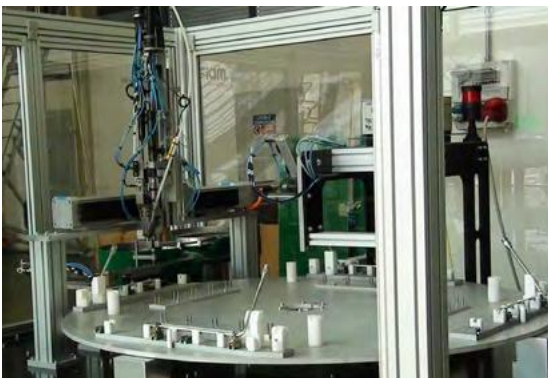
MCA with collaborative robot

Automatic screw feeding production cycles

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



Multiple MCA application on washing machines



MCA on turntable

For all types of screws

metric, self-threading, self-tapping,
self-drilling, three-lobe, with knurled
washer under the head etc.

Perfect integration

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

Installation on X, Y and Z axis

in order to tighten at different working heights

Can be installed

on anthropomorphic scara robots and Cobots

for versatile solutions that can always be
reconverted

Multiple levels of accuracy

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

Assures multiple tightening

even with very short centre-to-centre
distances

1

EasyDriver screw feeding

They manage the entire working cycle with great flexibility because they manage the tightening sequences quickly and easily, customising them to the specific applications. The **INTEGRATED PLC** manages all machine parameters according to the tightening needs.

Find out all about them on page 6



EasyDriver



EasyDriver 1|1



Ea

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** since all screws are tightened with great precision. Made from aluminium alloy, they are light and compact (only 40 mm in width) and can be **used on manipulators, electric axes or robots**. They can also withstand substantial axial thrust (e.g. assembly with self-drilling screws).

Find out all about them on page 10



SINGLE-STROKE FASTENING SLIDE

SL15 model
• Min. centre-to-centre distance 41 mm

SL20 model
• Min. centre-to-centre distance 51 mm



DUAL FASTENING SLIDE

SL15 model
• Min. centre-to-centre distance 41 mm

Devices for Cobots

Fiam tightening modules are designed to be used with collaborative robots, too, by using a **special (patented) auto-advance device** that performs the tightening strokes.

Find out all about them on page 24

3

Nutrunner motors: air, electric or DC-driven

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 control systems are available for different applications and types of joint and screw.

Find out all about them on page 18



AIR NUTRUNNER MOTORE

0,4 ÷ 40 Nm

- they ensure high performance even at low air feed pressure
- air-shut off models

4 MCA: high flexibility



EasyDriver Maxi 1|1



EasyDriver 2|1



EasyDriver 1|2



EasyDriver Maxi 1|2



AL-STROKE
FASTENING SLIDE

SL20 model
• Min. centre-to-
centre distance
51 mm



TRIPLE-STROKE
FASTENING SLIDE

SL15 model
• Min. centre-to-
centre distance
41 mm



TIGHTENING MODULE
FOR COBOTS

0,1 ÷ 5, 6 Nm

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



ELECTRIC NUTRUNNER MOTOR

0,3 ÷ 4,5 Nm



DC DRIVEN NUTRUNNER MOTOR

up to 50 Nm

- for the control, monitoring and systematic checking of the whole assembly process and data logging and statistics

- models with:
INDIRECT CONTROL
(based on current absorption)
or
DIRECT CONTROL
of the tightening torque/angle



TOD



TOC



TCS - B E



CT2500A

High capacity vibrating bowl

for improved working autonomy;
coated with anti-wear material



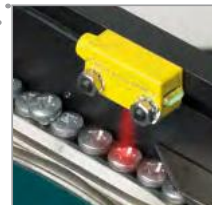
High frequency screw selector

customized on specific screw sample, guaranteeing
high selection reliability at tight cycle time



"Overload" photocell

it makes sure no screw
gets stuck in the selection
duct guaranteeing high and
uninterrupted production



Soundproof transparent cover

for a better view of the
inside without having to
open the machine

INTEGRATED PLC

It manages input
signals - tightening
start, fault reset,
emergencies.
It provides output
signals - fault,
tightening result.
It interfaces with
indicator and
monitoring devices
(LED, workpiece
counters, light
towers) in order to
immediately monitor
and diagnose the
production cycle.

LED lights

to monitor the
various phases of
the working cycle



Screw shooting in a closed chamber

it increases the speed of
the screw along its
path and consequently
the productive process
optimizing the use of
compressed air



Functional keypad

it adjusts easily and
directly the machine
parameters



Filter, regulator and lubrication group

with air pressure
gauge. It filters the
inlet air and assures
constant machine feed,
while guaranteeing
suitable tool lubrication



Tightening mode selection

- torque and depth control, or
- depth control

Stainless steel structure

it guarantees long lifetime



External structure

of small dimensions,
which can be
dismounted easily for
maintenance



EasyDriver Screw feeding system

Standard version, feeds the screws optimally and without jamming.

| | |
|----------------|---|
| Bowl: | Circular, 240 mm in Ø |
| Screws: | For screws between 10 and 35 mm in length |
| Key: | standard version, 1 x 240mm Ø bowl feeds a slide/spindle |

Upon request: **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. Can be combined with the 5 or 10 Lt **hopper module** to be joined to the structure that must be equipped in this case of fixed feet.



EasyDriver 1|1 Screw feeding system

Used when the job calls for powerful air nutrunner motors that entail the use of larger FRL units.

| | |
|----------------|---|
| Bowl: | Circular, 240 mm in Ø |
| Screws: | For screws between 10 and 35 mm in length |
| Key: | 1 1 = 1 240mm Ø bowl feeds 1 slide/spindle |

Upon request: **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. Can be combined with the 5 or 10 Lt **hopper module** to be joined to the structure that must be equipped in this case of fixed feet.



EasyDriver MAXI 1|1 Screw feeding system

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, even when working with small screws.

| | |
|----------------|--|
| Bowl: | Circular, 420 mm in Ø |
| Screws: | For screws between 35 and 60 mm in length |
| Key: | MAXI 1 1 = 1 420mm Ø bowl feeds 1 slide/spindle |

Upon request: **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. Can be combined with the 10 or 50 Lt **hopper module** to be joined to the structure that must be equipped in this case of fixed feet.



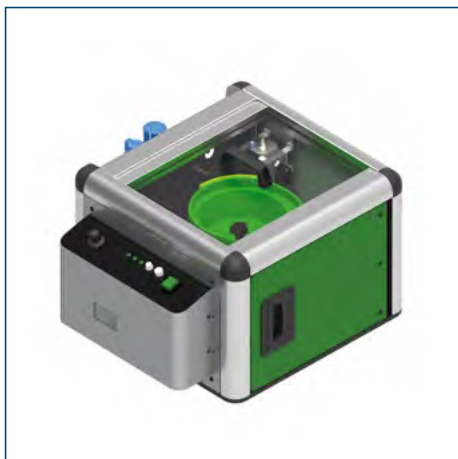


EasyDriver 2|1 Screw feeding system

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, 240 mm in Ø |
| Screws: | For screws between 10 and 35 mm in length |
| Key: | 2 1 = 2 240mm Ø bowls feed 1 slide/spindle |

Upon request: **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.



EasyDriver 1|2 Screw feeding system

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

| | |
|----------------|--|
| Bowl: | Circular, 240 mm in Ø |
| Screws: | For screws between 10 and 35 mm in length |
| Key: | 1 2 = 1 240mm Ø bowl feeds 2 slides/spindles |

Upon request: **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. Can be combined with the 5 or 10 Lt **hopper module** to be joined to the structure that must be equipped in this case of fixed feet.









EasyDriver MAXI 1|2 Screw feeding system

Used when the job involves large screws and there is the need to feed two single- or dual-stroke slides, fitted with air nutrunner motor. Also used in the event of high production rates to allow the system to run unaided for longer, even when working with small screws. 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 length |
| Key: | MAXI 1 2 = 1 420mm Ø bowl feeds 2 slides/spindles |

Upon request: **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. Can be combined with the 10 or 50 Lt **hopper module** to be joined to the structure that must be equipped in this case of fixed feet.



| TECHNICAL FEATURES | | EASY DRIVER | | | | | |
|---|---|---|--|---|---|---|---|
| | | STANDARD | 1 1 | MAXI 1 1 | 2 1 | 1 2 | MAXI1 2 |
| | |  |  |  |  |  |  |
| Aluminium bowl (qty.) | Ø 240mm | 1 | 1 | ✗ | 2 | 1 | ✗ |
| | Ø 420mm | ✗ | ✗ | 1 | ✗ | ✗ | 1 |
| Air - Electric system | Complete with solenoid valves on control board | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | FESTO components | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Siemens PLC [LOGO!] | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enclosure | Stainless steel with plastic top cover | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| | Steel/painted aluminium with plastic top cover | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Sound absorbing | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dimensions | Length [mm] | 450 | 600 | 800 | 900 | 600 | 800 |
| | Width [mm] | 340 | 530 | 700 | 600 | 530 | 700 |
| | Height [mm] | 400 | 430 | 530 | 430 | 430 | 530 |
| | Weight [Kg] | 36 | 75 | 110 | 105 | 75 | 110 |
| Tube carrying hoses and cables | Length 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 | Module with air nutrunner motor | 180 | 180 | 320 | 360 | 180 | 320 |
| | Module with 15 MCB... DC-driven nutrunner motor | 780 | 780 | 920 | 1560 | 780 | 920 |
| | Module with 25 MCB... DC-driven nutrunner motor | 2170 | 2170 | 2320 | 4340 | 2170 | 2320 |
| | Module with SD 2500 DC-driven nutrunner motor | 780 | 780 | 920 | 1560 | 780 | 920 |
| Integrated PLC | Operator panel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Diagnostic software for immediate, intuitive monitoring of any anomalies: - 24 diagnostic messages - suggestions as to possible main causes of inefficiency - real-time monitoring of the signal generating the issue - display colour mirrors machine status | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Interfacing with external devices | Input signals: START, RESET | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Output signals: IDLE POSITION, READY, OK, NOK, ANOMALY | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | For Cobot version: ModbusTC/IP protocol (see page 24) | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ |

FASTENING SLIDES

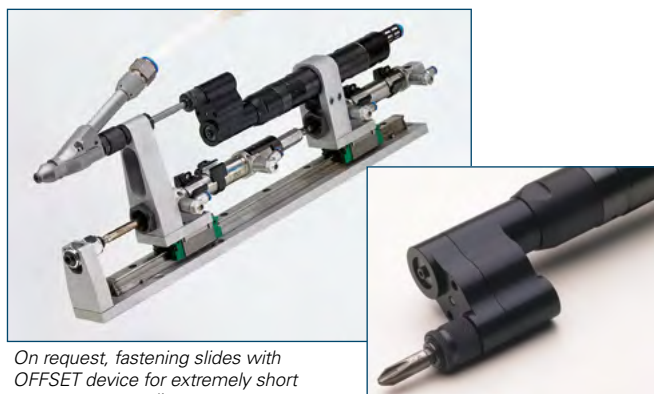
| | |
|--|---|
| Running on ball recirculating runners: | with dovetail, size 15/20 mm |
| Magnetic cylinders: | (cylinder bore Ø 20 mm, upon request Ø 25 mm) |
| Pneumatic decelerators: | ✓ |
| Limit switch position sensors: | ✓ |
| Air flow governors: | ✓ |
| Max possible nutrunner motor diameter: | 42,5 mm |
| Fastening slides can be equipped with precision sensor (with the possibility to define the accuracy of reading range): | ✓ |
| Weight (slide only): | 1,8 ÷ 2,2 Kg |

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 SL15 models. min. 51 mm for SL 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 DC-driven 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).**



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

Shielded screw transit sensor

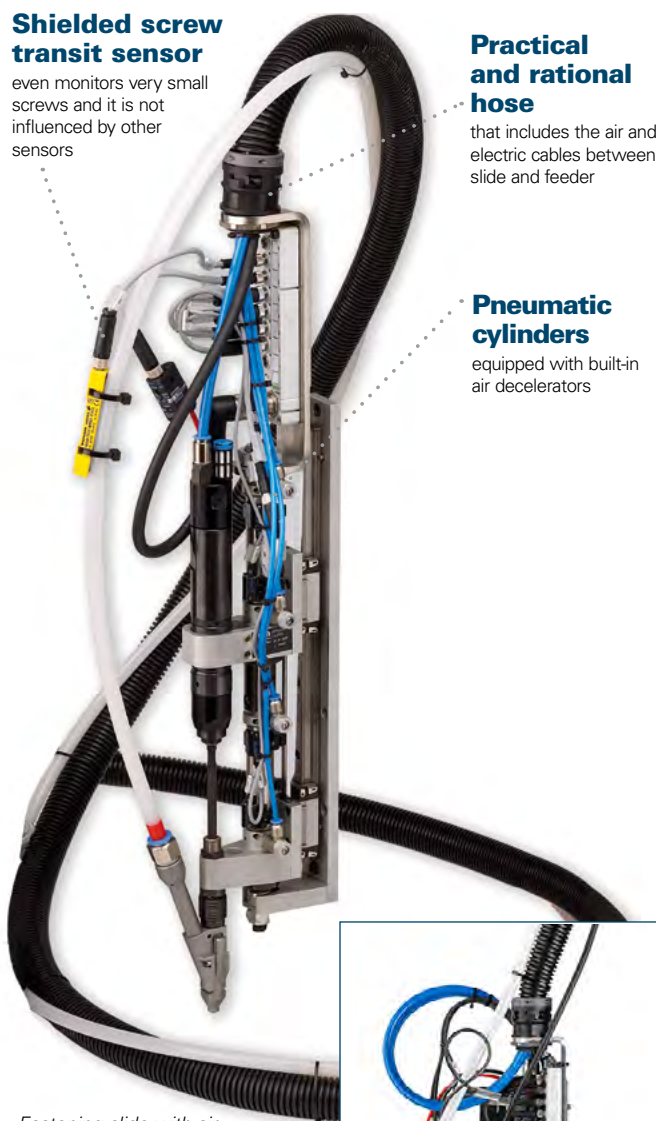
even monitors very small screws and it is not influenced by other sensors

Practical and rational hose

that includes the air and electric cables between slide and feeder

Pneumatic cylinders

equipped with built-in air decelerators



Fastening slide with air nutrunner motor



Fastenin slide with electric nutrunner motor eTensil.

SINGLE-STROKE FASTENING SLIDE

SL 15 model

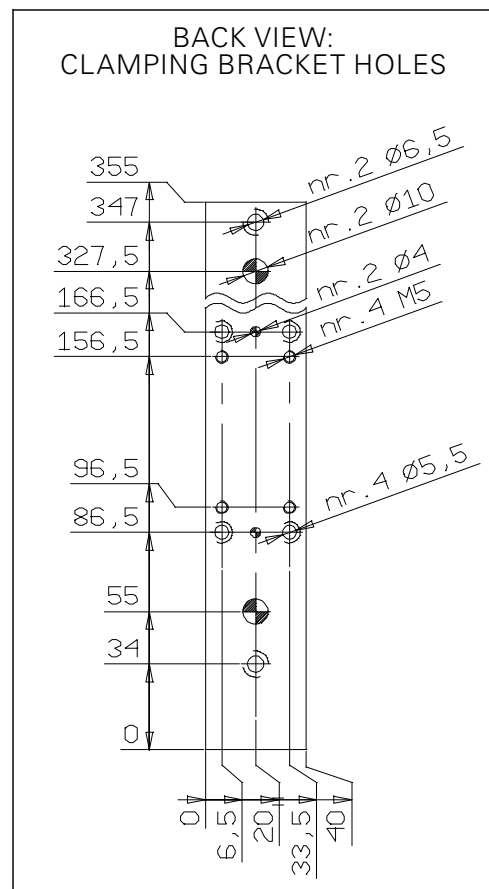
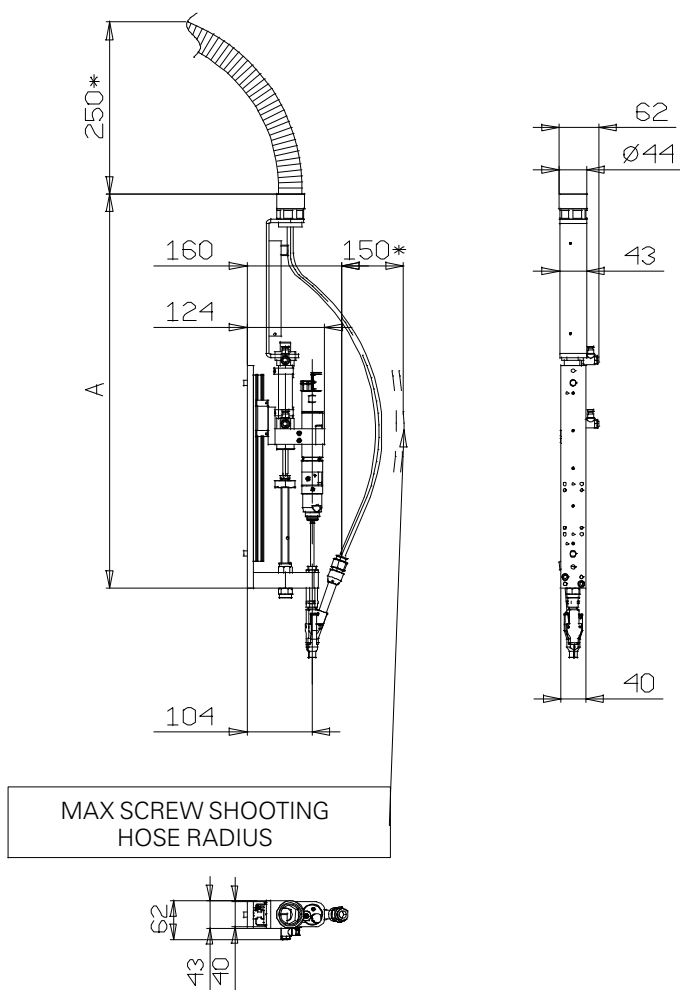
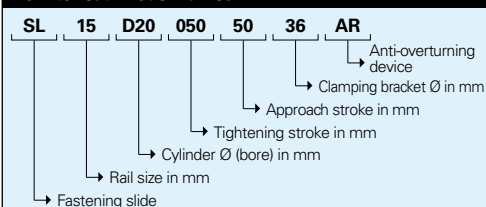
The single-stroke fastening slide stands out for the single stroke performed by its motor to reach the tightening point and then tighten. Considering compact dimensions and weight, single-stroke fastening slides are particularly suitable in situations where the approach movement is made by a robot arm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

Recommended for:

- tightening torque up to 10 Nm
- air nutrunner motors with \varnothing max 36 mm
- electric nutrunner motors

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

FASTENING SLIDES

SINGLE-STROKE FASTENING SLIDE

SL 20 model

SL 20 single stroke fastening slides with different rail track size:
20 mm

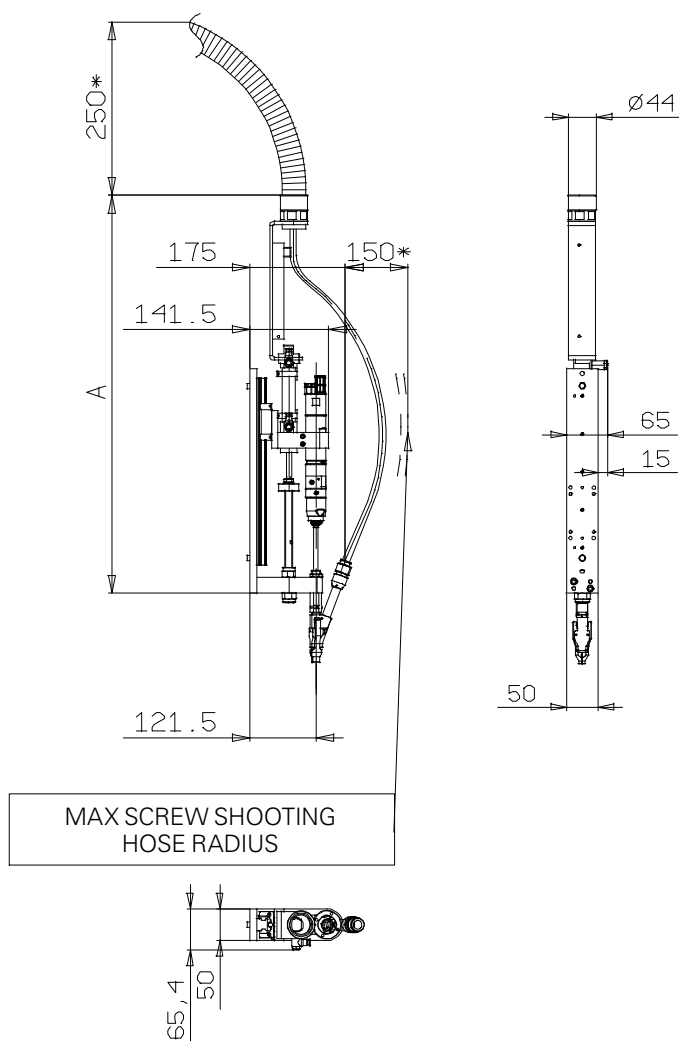
Recommended for:

- tightening torque > 10 Nm
- air nutrunner motors with \varnothing max 42,5 mm
- DC driven nutrunner motors

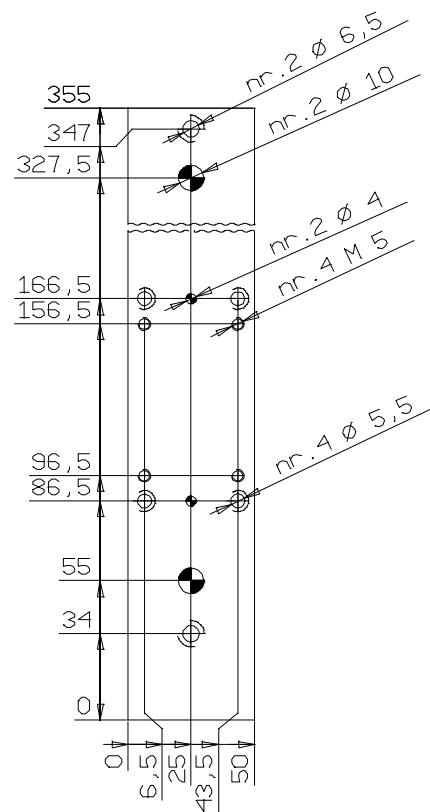
| Single-stroke fastening slide | Size (rail track size) | Tightening stroke | Cylinder \varnothing (bore) |
|----------------------------------|---------------------------|----------------------|----------------------------------|
| | mm | mm | mm |
| SL 20D25 050-00 42,5 | 20 | 50 | 25 |
| SL 20D25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

How to read model names

| SL | 15 | D20 | 050 | 50 | 36 | AR |
|-----------------|-----------------|-------------------------|-------------------------------------|-----------------------|--------------------------------------|-------------------------|
| Fastening slide | Rail size in mm | Tightening stroke in mm | Cylinder \varnothing (bore) in mm | Approach stroke in mm | Clamping bracket \varnothing in mm | Anti-overturning device |



BACK VIEW: CLAMPING BRACKET HOLES



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on our Fiam reserved area (www.fiamgroup.com)

DUAL STROKE FASTENING SLIDES

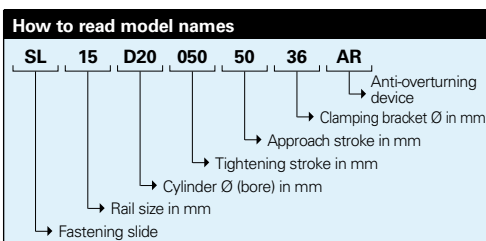
SL 15 model

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.

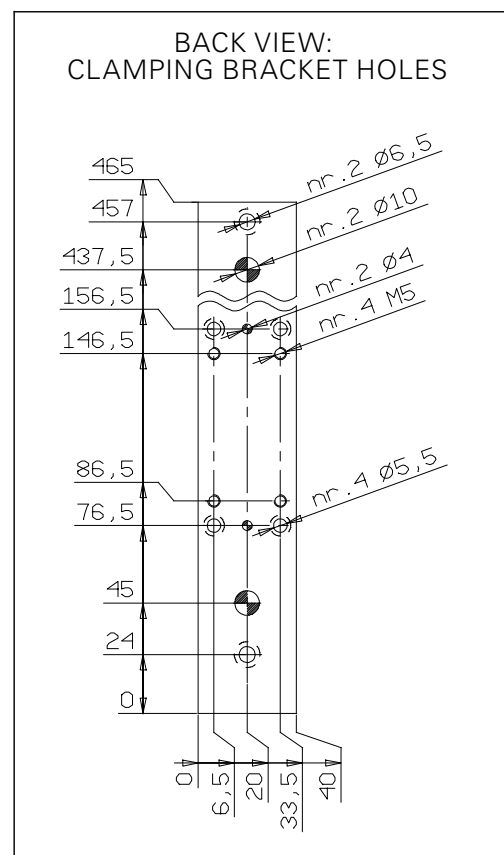
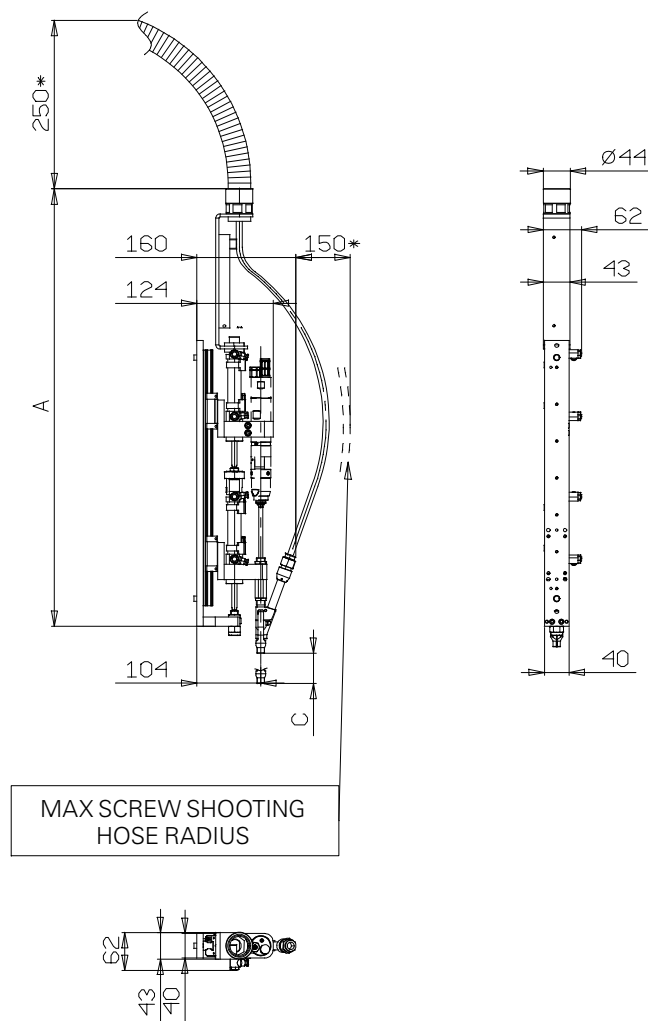
In the slide description the first number indicates the nutrunner motor stroke, while the second identifies the head approach stroke (in mm). Rail track size: 15 mm.

Recommended for:

- tightening torque up to 10 Nm
- air nutrunner motors with \varnothing max 36 mm
- electric nutrunner motors



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



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FASTENING SLIDES

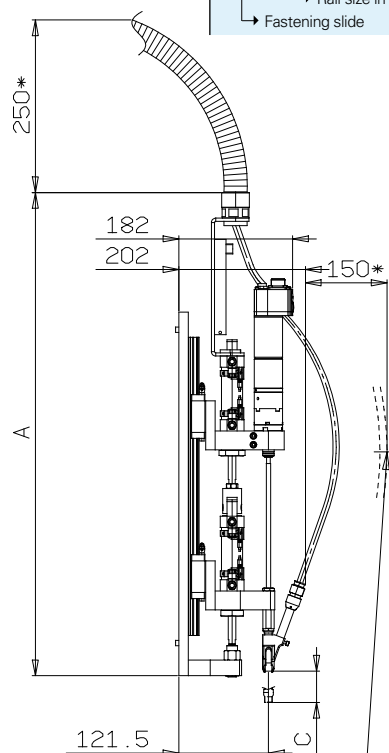
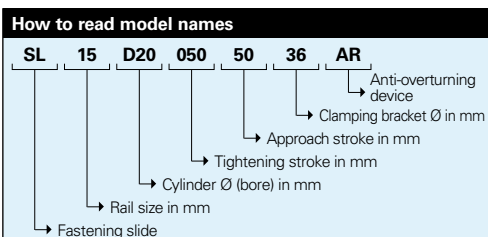
DUAL STROKE FASTENING SLIDES

SL 20 model

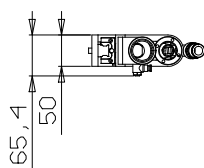
SL 20 dual-stroke slides differ in the size of their rail, which is 20 mm.

Recommended for:

- tightening torque > 10 Nm
- air nutrunner motors with \varnothing max 42,5 mm
- DC driven nutrunner motors

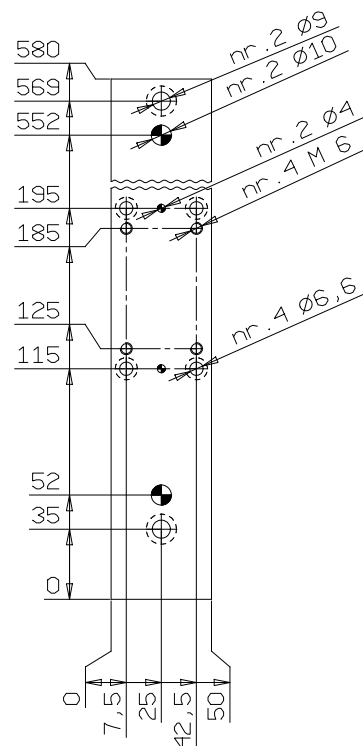


MAX SCREW SHOOTING
HOSE RADIUS



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

BACK VIEW: CLAMPING BRACKET HOLES



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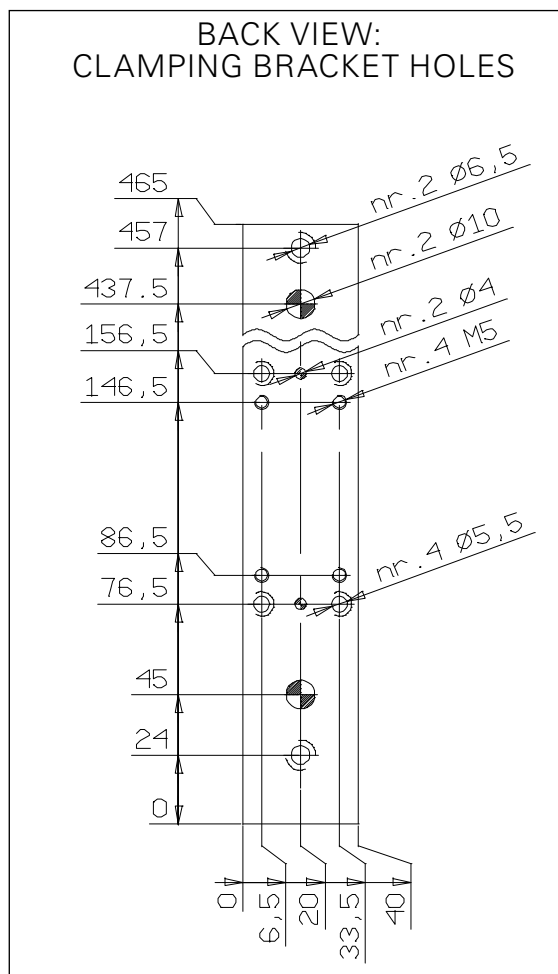
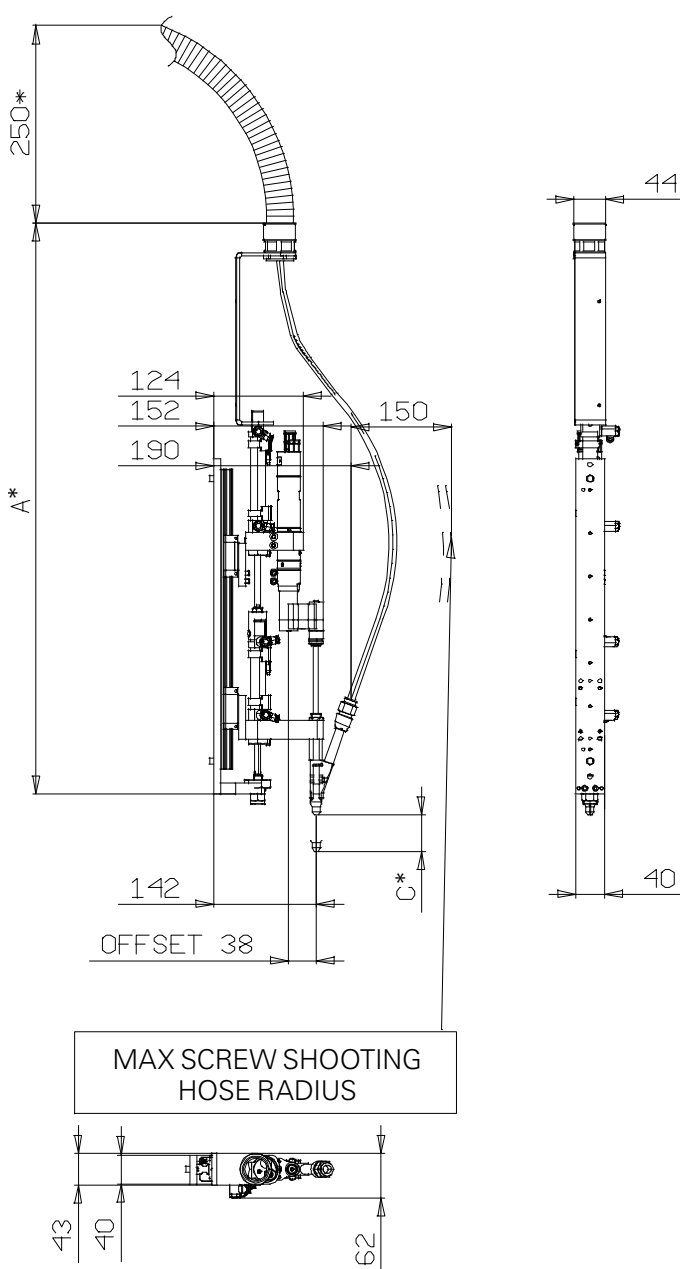
DUAL STROKE FASTENING SLIDES WITH OFFSET DEVICE

SL 15 model

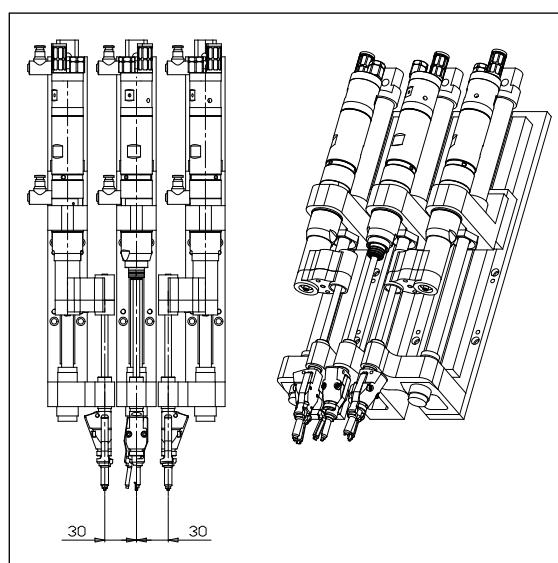
In addition to the stroke performed by the motor for the purpose of tightening, these slides feature an additional approach stroke to bring the head down to the component, as well as the offset device, which enables you to reach tightening points with very short centre-to-centre distances. Rail track size: 15 mm.

Recommended for:

- tightening torque up to 10 Nm
- air nutrunner motors with \varnothing max 36 mm
- electric nutrunner motors



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



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

* For the values of distances A and C, refer to the table on page 13

FASTENING SLIDES

TRIPLE-STROKE FASTENING SLIDE

SL 15 model

These single- or dual-stroke slides are equipped with an additional **anti-overturning device** which handles **screws having a total length/head diameter ratio from 1.1 to 1.5 ($1.1 < H/D < 1.5$)**.

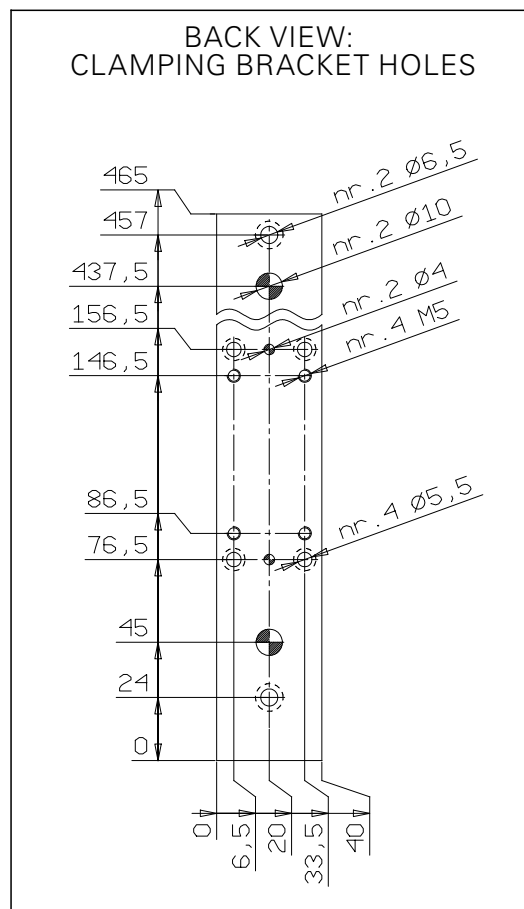
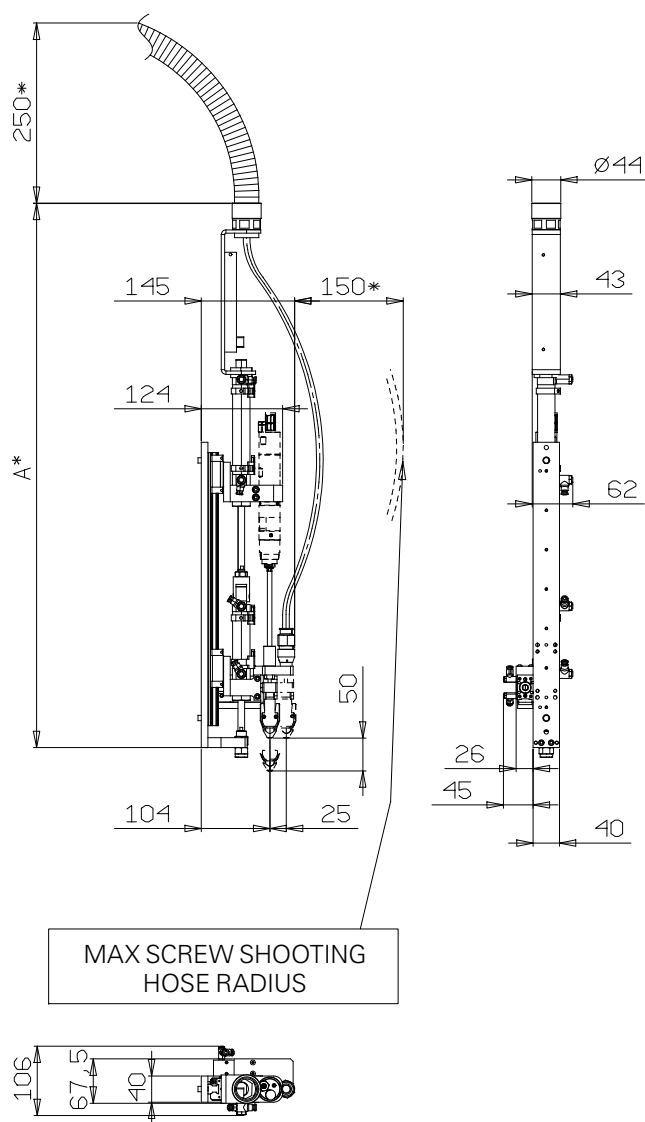
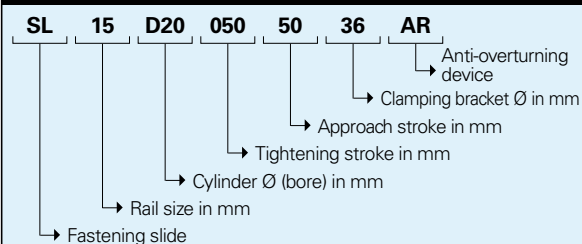
Only available with 15mm rail size.

Recommended for:

- tightening torque up to 10 Nm
- electric nutrunner motors

| Triple-stroke fastening slide | Size (rail track size) | Tightening and approach strokes | Cylinder Ø (bore) |
|-------------------------------|------------------------|---------------------------------|-------------------|
| | mm | mm | mm |
| SL 15 D20 100-50 32 AR | 15 | 100 - 50 | 20 |
| SL 15 D20 100-50 36 AR | 15 | 100 - 50 | 20 |
| SL 15 D25 100-50 32 AR | 15 | 100 - 50 | 25 |
| SL 15 D25 100-50 36 AR | 15 | 100 - 50 | 25 |

How to read model names



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

* Variable size depending on the application

SCREW-RETAINING HEADS (NOSE PIECE)



The screw-retaining heads (nose piece) are fundamental for reliable tightening, so they are designed and manufactured entirely by Fiam, based on the know-how gained over the years. They **hold the screw from the feeder and guide it correctly and safely** to allow the blade to descend to the screw and tighten it onto the component.

The benefits:

- excellent screw holding
- perfect screw driving at the tightening point
- any depth can be reached
- thanks to customized design, heads can process various screws sizes, even in embedded spots
- quick and easy assembly and disassembly

SOME AVAILABLE MODELS



WITH ANTI-OVERTURNING DEVICE

for screws with length/head diameter ratio between 1.1 (approx.) and 1.5, to prevent screw jamming



WITH HOSE

to reach embedded tightening points or inside holes



WITH FRICTION JAWS

holding and guiding the screw on the head and not on the stem: jaws do not open, allowing screw insertion into holes or in embedded spots



WITH SUPPORT OR PROTECTIVE SPACER/SPECIAL MATERIALS

to ease the positioning on the component.
Special materials and geometries to avoid damaging the component during assembly



FOR BIG SCREWS

to tighten screws up to 45 mm length



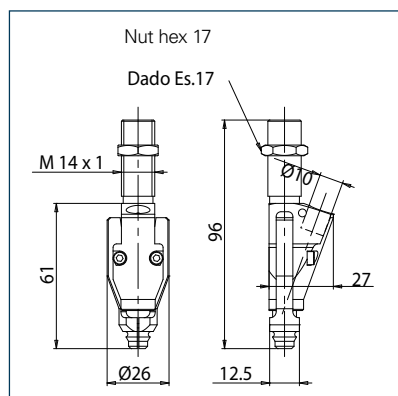
WITH ELASTIC HOSE AND MECHANICAL SCREW GRIPPING

Ensures the screw is held perfectly every time, even on embedded tightening points. Ideal for use in conjunction with robots/cobots.

EVERY SCREW HAS ITS SIZE

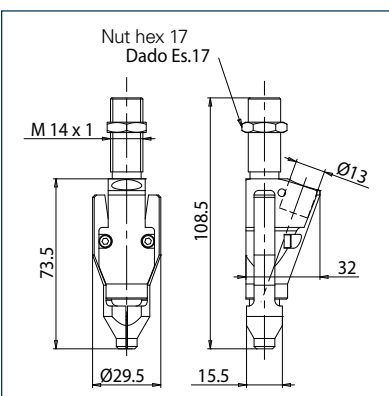
TTV - P

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



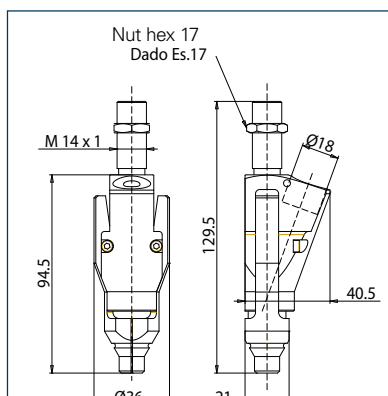
TTV - G

| 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 |



NUTRUNNER MOTORS

Fiam **nutrunner motors** are the ideal solution for many applications in different production fields. They feature a compact design, small dimensions and low weight. Specifically designed and manufactured for **industrial automation**, they can be installed in automatic assembly lines, in turntables, on multi-spindle tightening units, on fastening slides, on anthropomorphic robots. In other words, **they can assemble any type of joint in any production context**. Extremely sturdy, they guarantee constant performance over time, even when used in heavy duty conditions.



AIR NUTRUNNER MOTORS WITH AIR SHUT-OFF

Their torque control device, with automatic and immediate air shut-off, 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.

Lasting **reliable performance and excellent torque repeatability** are guaranteed **under any working conditions**, even when dealing with **low supply pressures**. With push to start or direct start with remote control.

Feature device for picking up the compressed air signal.

ELECTRIC NUTRUNNER MOTORS WITH AUTOMATIC SHUT OFF

The **eTensil series nutrunner motors** are green work tools, offering high levels of performance and reliability, designed **to fit seamlessly into any smart manufacturing operation**.

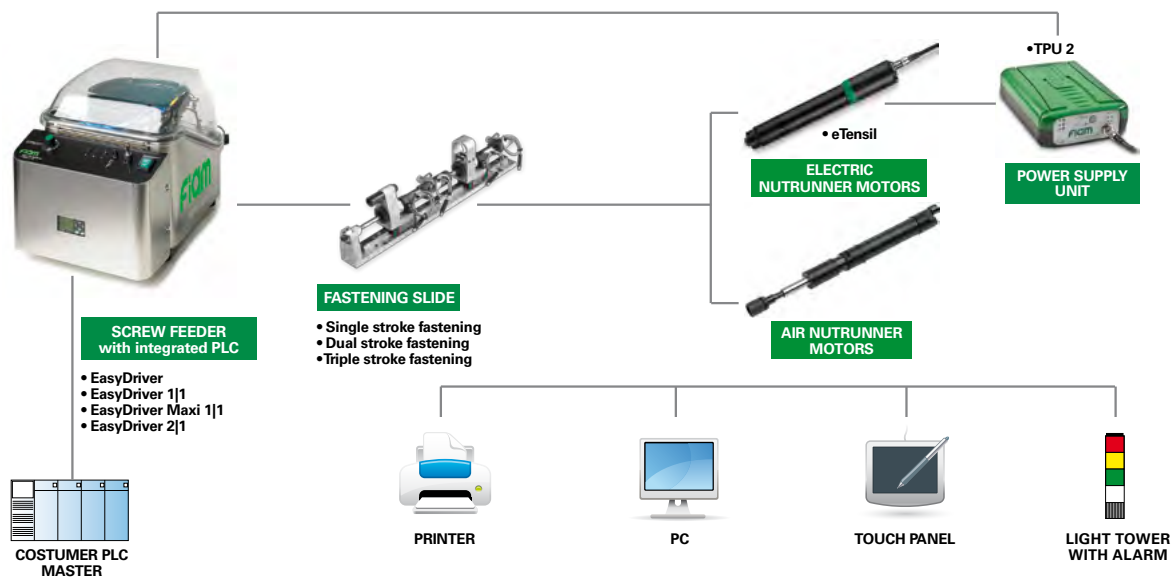
Equipped with **torque control system** that automatically cuts off the power supply and on board electronics: as a result the system is easier to use, workplace layout is tidier, and data exchange between the nutrunner motor and the power unit is faster.

Brushless motors are the avant-garde in efficient and consistent performance, due to their **high-precision mechanics**.

For further information about Fiam nutrunner motors refer to the corresponding catalogue:

- nr. 90 Air nutrunner motors
- nr. 105 eTensil electric nutrunner motors

CONFIGURATION OF AIR AND ELECTRIC NUTRUNNER MOTORS



DC DRIVEN NUTRUNNER MOTORS

MCB NUTRUNNER MOTORS

MCB DC-driven brushless nutrunner motors are entirely designed and built by Fiam. They are essential solutions for controlling, monitoring and systematically checking the assembly process, including tightening data storage (Industry 4.0) for when certified quality of the finished product is needed. They can be used on different joint types (same model for different tightening torques) and do not require maintenance.

Suitable for all industrial fields, they guarantee:

- **high resolution torque/angle parameter measurement**
- **high tightening process flexibility**
- **easy integration into productive lines, especially** for installation on single and multiple tightening units and robots
- **traceability of all tightening data**
- **lower costs thanks to a reduction in rejected parts**
- post-process checks reduction with great production benefits.

These motors can work with either INDIRECT (based on current absorption) or DIRECT control of the tightening angle/torque. **They are intended for use in conjunction with power supply and control units** with various levels of torque monitoring and control.



CURRENT CONTROL (INDIRECT CONTROL BASED ON CURRENT ABSORPTION)

The torque parameters are determined by measuring the current absorbed by the brushless motor; the angle parameters are determined by dedicated sensors.

DIRECT CONTROL (TORQUE ANGLE CONTROL)

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



For further information about nutrunner motors refer to the corresponding catalogue:

- n° 71 Hi-tech DC-driven nutrunner motors

DC DRIVEN NUTRUNNER MOTORS

POWER SUPPLY AND CONTROL UNIT

The MCB DC-driven nutrunner motors can be paired with the TCSB-E unit which, in addition to powering the motor, includes **programming and monitoring functions of each stage of the tightening cycle through the following features:**

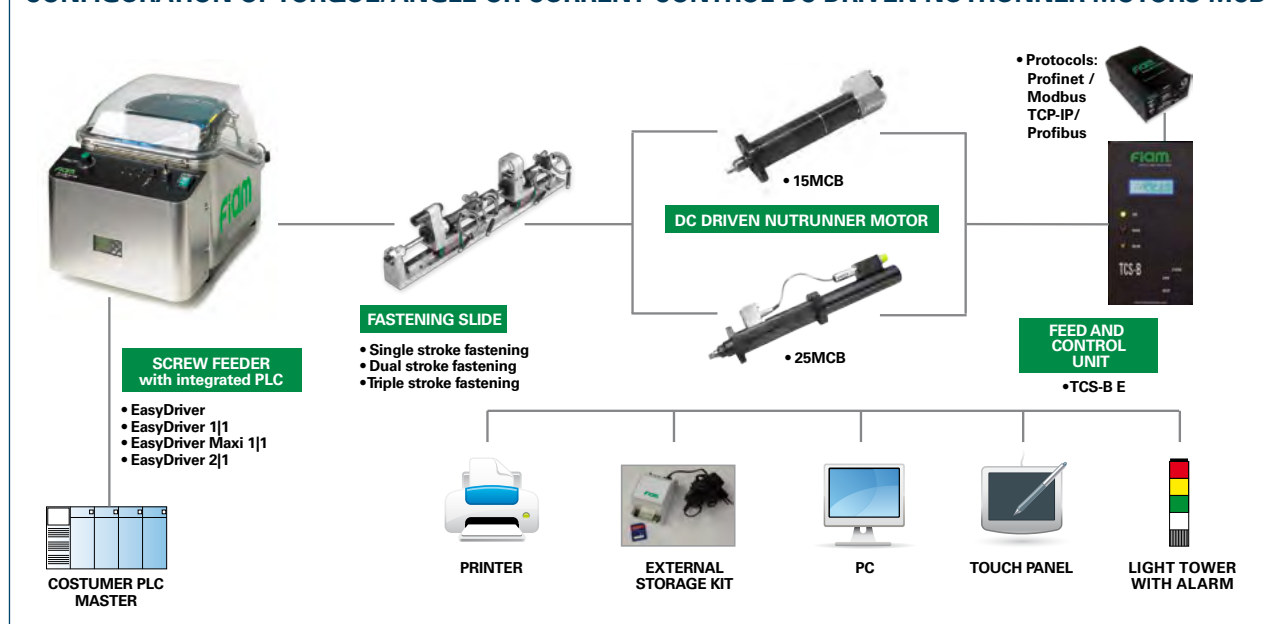


- ✓ **5 strategies to choose from:** screw drive, engagement, torque, torque/angle, angle/torque, loosening. 5 freely programmable operating modes, ensuring reliability and fast work
- ✓ **Immediate indication of outcome** through OK, NOK and RUN LEDs
- ✓ **Impressive connectivity:** 5 inputs and 5 outputs for connecting to light towers and external devices to ensure working continuity in a controlled manner.
RS232 connection for programming, diagnostics and data acquisition.
- ✓ **Software provided for simple and intuitive programming,** with clear and full instructions for setting and managing tightening strategies. The software provides for:
 - **Simple, intuitive installation** on a PC with the standard equipment supplied (RS232 cable)
 - **System configuration** through the quick guide, document "step by step" to immediately start the system
 - **System calibration:** the motors connected to this unit are on display; it is enough to select the motor connected and 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
- ✓ **Torque/angle/speed adjustment:** easy change of the parameters through pre-set grid
- ✓ **Programs storage:** programs can be saved in txt format too, exported and printed
- ✓ **Data printout:** combined with 'view/print" function available for stored programs, allows printing through serial port of a string including main information about last performed tightening strategy in real time.

DIAGNOSTIC CHECK

- ✓ **A window displays the number and type of errors detected** (temperature, feeding tension, diagnostic test, check of motor sensors, resolver, transducer and system). Effective way to control system inputs and outputs connected to PLC
- ✓ **Following checks may be carried out:** motor rotation check, analogue measurement of the supply voltage, motor feedback signals check.

CONFIGURATION OF TORQUE/ANGLE OR CURRENT CONTROL DC DRIVEN NUTRUNNER MOTORS MCB



As an alternative to the single unit, you can choose to power and check the MCB DC-driven nutrunner motors through two separate units.

DRIVER



TOD power supply unit (Tightening Operation Driver) **powers the motor** and provides the correct parameters (voltage, current, etc...) according to data pre-set in the control unit. **It controls voltage, current and temperature, earth leakage** and interruption of the earth wire. Any faults are displayed by means of LEDs and the system stops immediately.

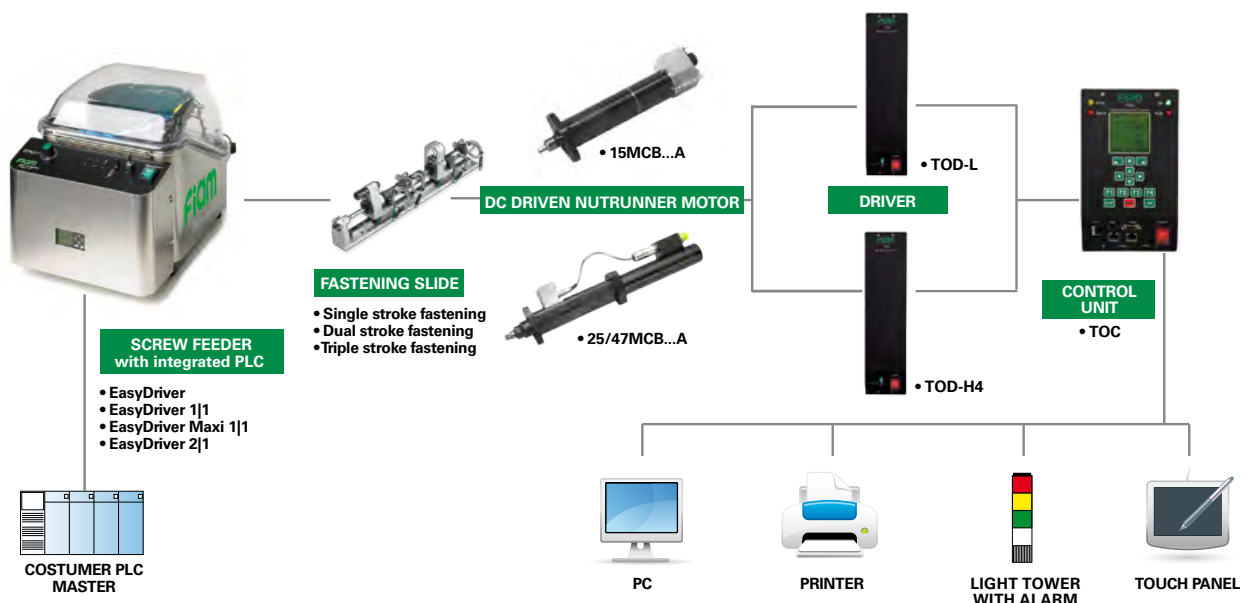
CONTROL UNIT



TOC control unit (Tightening Operations Controller) detects both **OK and NOT OK cycles besides the torque/time values which can be easily stored** (7.000 tightening for each channel). **Advanced statistics (CP, CPK, Range, Average, Sigma).** **Sets various tightening strategies** - torque, torque/angle, angle/torque, screw feeding function.

With a graphic display to show the torque/time curve.

CONFIGURATION OF TORQUE/ANGLE OR CURRENT CONTROL DC DRIVEN NUTRUNNER MOTORS MCB



DC DRIVEN NUTRUNNER MOTORS

X-PAQ NUTRUNNER MOTORS

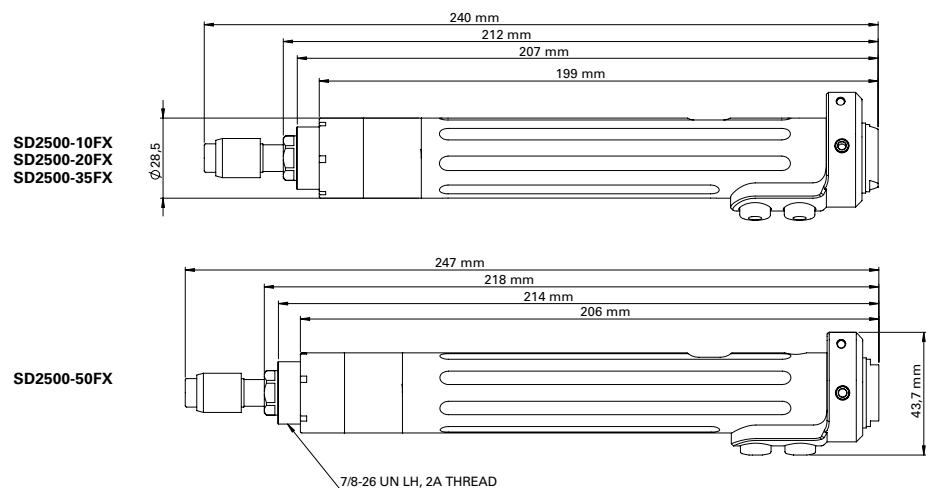


The high technology offered by X-PAQ DC-driven brushless nutrunner motors ensures various levels of torque control and monitoring to meet any tightening need, even the most complex. The X-PAQ solutions can be used in all industrial sectors from automotive to aeronautic, from domestic appliances to electromechanical and meet your every need in terms of tightening accuracy and precision as they ensure:

- **high flexibility in managing assembly processes**
- **easy integration into existing production lines**
- **traceability of all assembly job data**
- **lower costs thanks to a reduction in rejected parts.**



- Very **light and silent**, they tighten with perfect control over the tightening process, resulting in **high finished product quality**.
- **Moreover, as they do not require post-process checks**, they reduce production times and costs compared to traditional assembly systems
- **Built-in torque transducer and resolver**: ensure high resolution torque/angle parameter measurements.
- They do not require maintenance. In addition, they ensure high efficiency during the work cycle and do not pollute the work area as there are no carbon dust residues.
- The **choice of motor and its accurate programming** (angle, torque, time etc...), reduce post-process checks, greatly benefiting productivity.
- **Compact design, reduced sizes and above all weights, make them** ideal for installation on single and multiple tightening units and robots with an operating range **from 0.1 to 5.6 Nm**.
- Each system **can be programmed to perform various assembly operations** with different torque, speed, etc. parameters **so it can be used for several applications**.



For further information about nutrunner motors refer to the corresponding catalogue:

- n° 104 X-PAQ tightening solutions

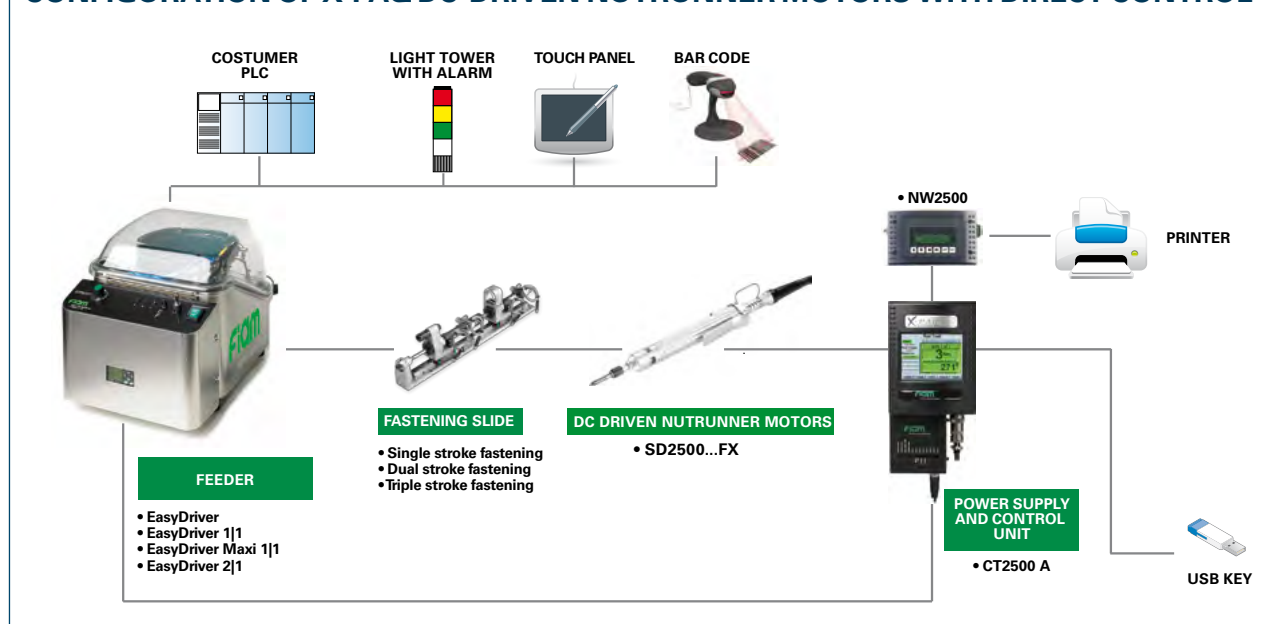
POWER SUPPLY AND CONTROL UNIT



X-PAQ DC drive nutrunner motors are coupled with the CT2500 A which, besides powering the screwdriver, performs **programming functions, with accurate control of each step of the assembly process through the following features:**

- It takes just a few taps on screen to set tightening parameters, create assembly strategies or display diagnostic messages
- Allows immediate and practical **programming, directly on the 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 for perfect control of the tightening sequences
- **There are 8 programs available for each task**, within which it is possible to set the **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)
- **Controls the tightening sequence:** the unit controls the correct pre-set tightening sequence and determines the maximum number of NOK results for each screw
- **Exports the tightening result files** through the USB port, which can also be used to backup and import/export tasks, and save tightening graphs
- **Automatically recognises the motor** and its parameters: model, serial number, number of cycles executed, calibration value, etc. to aid any maintenance work
- Provides protection with **passwords for three users**
- Provides **programmable I/O (input/output)** for process control and remote commands
- The unit is equipped with an **DEDICATED INTERFACE** designed to communicate with the screw feeder and external devices (such as the customer's Master PLC) its numerous digital I/Os. LED indicators also let you run an immediate **DIAGNOSTIC check** of the programmed outputs.

CONFIGURATION OF X-PAQ DC-DRIVEN NUTRUNNER MOTORS WITH DIRECT CONTROL



MCA TIGHTENING MODULE FOR COBOT



Why tighten with Cobots?

The MCA tightening modules pair perfectly with all collaborative robots on the market.

There is a growing use of smaller cobots on assembly lines as they are ideal for:

- **automating repetitive operations and making the best use of the operators' skills**
- **carrying out most tightening jobs automatically**
- **being quickly reprogrammed and used for different applications**, which makes them the perfect choice even for low-volume runs or for variable workflows with quick operational setup changes.

With their specific features, they also offer:

- **flexibility for process automation** as they can be programmed to work in reduced mode when a human comes within range of the robot and resume full speed as soon as the person leaves
- **great ease of programming** and very fast setup
- **increased production capacity, quality** of tightening processes and hence of the resulting end products.



MCA tightening modules for Cobots are designed entirely by Fiam and comprise:

EasyDriver SCREW FEEDING SYSTEM

The feeding system for Cobots is special and, in addition to having all the standard Easy Driver feeding system features (see page 6-9), stands out for its

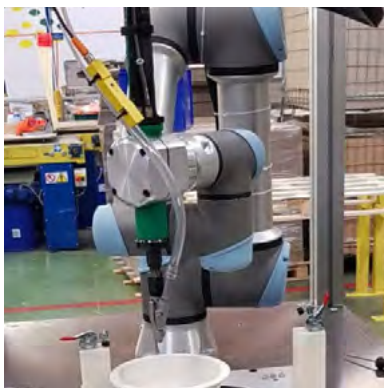
ABILITY TO COMMUNICATE WITH:

→ THE CT2500 A CONTROL UNIT

via I/O signals

→ THE COBOT

via Ethernet connection and with the **Modbus TCP/IP communication** protocol: this fieldbus enables broader and faster communication of all work-cycle-related information and digital Input and Output signals exchanged with and sent to the Cobot. It enables the Cobot to change the feeder's operating parameters.



JAM-PROOF SCREW SHOOTING

All MCA modules feature a shielded screw transit sensor that, located on the tightening head, detects when the screw passes through the hose. The Cobot feeding system features an **additional screw passage sensor** that, located under the screw selection, **checks 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 and, because it requires hardly any thrust for tightening, means this system is perfectly in line with safety requirements.

NUTRUNNER MOTOR

The nutrunner motors that can be used on Cobots - see range on page 18 - come in the following versions:

- **AIR** for torque ranges from **1 to 5 Nm**
- **ELECTRIC - ETENSIL RANGE** - for torque ranges from **0,3 to 4,5 Nm**
- **DC-DRIVEN** for torque ranges from **0.1 to 5.6 Nm**

The DC-driven solutions are X-PAQ with direct control, i.e. featuring a transducer and encoder for monitoring the torque and angle directly. Discover all their features on page 22.

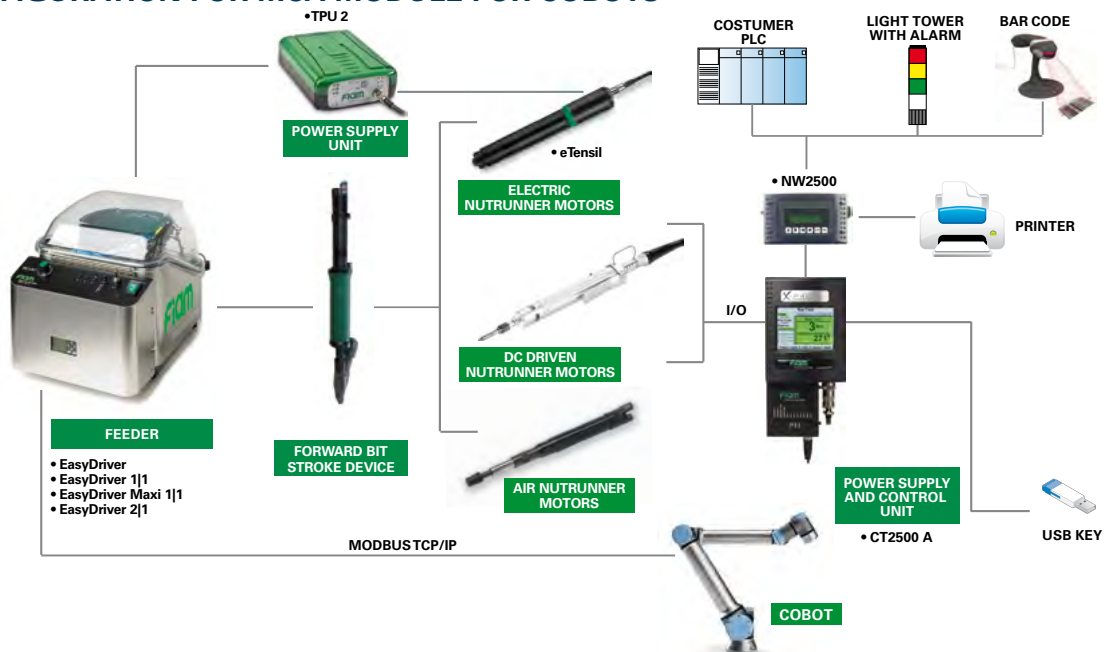
Safety front and centre

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 **screwdriver 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.

CONFIGURATION FOR MCA MODULE FOR COBOTS



TIGHTENING MODULE FEATURES

MCA tightening modules with fastening slide

| Nutrunner motor options | | Tightening torque range motor, on soft joint | | Idle speed | | Type of slide that can be paired with motor family | Slide movement |
|--|-------------|--|--|-------------|--|--|--------------------|
| | Model | m | | rpm | | Version | Type |
| Air shut-off | 20MC...A | 0,4 ÷ 5 | | 650 ÷ 2700 | | SL15 | Single/Dual/Triple |
| | MCSE...A | 2,5 ÷ 10 | | 5000 ÷ 1500 | | SL15 | Single/Dual/Triple |
| | MCY...A | 7 ÷ 24 | | 550 ÷ 800 | | SL20 | Single/Dual |
| Electric eTensil with automatic shut-off | E8MC...A | 0,3 ÷ 4,5 | | 285 ÷ 2000 | | SL15 | Single/Dual/Triple |
| Electronic with current control* | 15MCB...C1 | 1 ÷ 20 | | 350 ÷ 1700 | | SL20 | Single/Dual |
| | 25MCB...C1 | 4 ÷ 50 | | 500 ÷ 1500 | | SL20 | Single/Dual |
| Electronic with torque/angle control** | 15MCB...A1 | 0,5 ÷ 20 | | 350 ÷ 1700 | | SL20 | Single/Dual |
| | 25MCB...A1 | 2 ÷ 50 | | 500 ÷ 1500 | | SL20 | Single/Dual |
| | SD2500...FX | 0,1 ÷ 5,6 | | 500 ÷ 1700 | | SL15 | Single/Dual/Triple |

* Indirect DC driven nutrunner motor (current control)

** Direct DC driven nutrunner motor (torque/angle control)

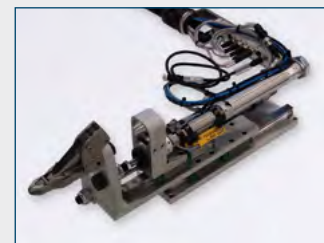
Data given in the table are meant as a guide only and are subject to change without prior notice. Torque values are given as an approximate guide only and may be affected by the softness of the type of joint, by the type and length of screw and type of accessory used. For air motors, torque values may also be affected by the supply air pressure and quantity. To ensure your air nutrunner motor performs at its peak and has a long service life, where operating conditions are particularly demanding (high number of cycles/minute and/or high torque values), we recommend using motors at a torque not exceeding 80% (approximate value) of the maximum value given in the table. Fiam cannot be held responsible for any consequences deriving from the use of the information in the table when evaluating risks in the work place over which Fiam has no control. For further information, contact the Fiam Technical Advice Department.

Standard equipment (supplied with the module)

- **Screw feeder EasyDriver**
- **With air nutrunner motors:**
 - Clutch adjustment key
 - Clutch spring
- **With eTensil nutrunner motors:**
 - Power supply unit TPU 2 with connection cable
 - Clutch spring
- **With DC driven nutrunner motors:**
 - Driver + Control Unit or
 - Feed and Control Unit
 - Kit of cables
 - Test certificate
- **4 tightening bits** (1 fitted + 3 spares)
- **Fastening slide:**
 - Complete with pneumatic fittings and supporting bracket
- **Shielded screw transit sensor**
- **Screw-retaining head** customized for the screw, completed with bush
- **Screw shooting hose**
- Operation and maintenance manual
- Eco-friendly cardboard packaging (weight kg 3)
Dimensions mm: L 600 x 450 x h 520

Accessories and models available upon request

- **FASTENING SLIDE:**
 - Models with **different approach strokes**
 - Models with analogic sensor for **depth precision control**
 - Fastening slides with transparent polycarbonate **protection** for internal view and greater operator safety
 - Special **fastening slide** for tightening points with a very close **distance to centre (20-41 mm)**
- Models with **left-only rotation air motors**
- Models with air motors for **higher torque** ranges than those given in the table
- Models with special air motors with **different speeds** and **materials** (eg. stainless steel...)
- **Supporting structures and hoppers**
Entirely designed and manufactured by Fiam, they serve to support EasyDriver feeders and their hoppers when used to meet the need for fast production rhythms. They ensure greater cleanliness and functionality of the operational layout. For the features, see page 7-8.
- For electronic solutions: system calibration/checking service directly at the customer's production lines
- Customised support column
- "Running low" device to be attached to the feeder's bowl to advise when it needs refilling with screws
- Wooden case for critical shipment: code 683050046 (11 kg of case weight)
Dimensions in mm: L650 x 500 x H 715



Fastening slide with reduced axial size: Example of bottom-up fastening slide with tube carrying hoses and cables and relevant connector set at 90°. The space taken up by this solution is 42 cm on standby and 36 cm while operating.

MCA tightening modules for COBOTS

Nutrunner motor options

| | Model | Tightening torque range of nutrunner motor on soft joint Nm | Idle speed rpm | Forward bit stroke device BIT EJECTION mm |
|--|-------------|---|----------------|---|
| Air shut-off | 20MC...A | 1 ÷ 5 | 500 ÷ 2000 | 25 ÷ 50 |
| Electric eTensil with automatic shut-off | E8MC...A | 0,3 ÷ 4,5 | 285 ÷ 2000 | 25 ÷ 50 |
| Electronic with torque/angle control** | SD2500...FX | 0,1 ÷ 5,6 | 500 ÷ 1700 | 25 ÷ 50 |

** Direct DC driven nutrunner motor (torque/angle control)

Data given in the table are meant as a guide only and are subject to change without prior notice. Torque values are given as an approximate guide only and may be affected by the softness of the type of joint, by the type and length of screw and type of accessory used. For air motors, torque values may also be affected by the supply air pressure and quantity. To ensure your air nutrunner motor performs at its peak and has a long service life, where operating conditions are particularly demanding (high number of cycles/minute and/or high torque values), we recommend using motors at a torque not exceeding 80% (approximate value) of the maximum value given in the table. Fiam cannot be held responsible for any consequences deriving from the use of the information in the table when evaluating risks in the work place over which Fiam has no control. For further information, contact the Fiam Technical Advice Department.

Standard equipment (supplied with the module for Cobot)

- **EasyDriver screw feeder specific for Cobot**
- **With air nutrunner motors:**
 - Clutch adjustment key
 - Clutch spring
- **With eTensil nutrunner motors:**
 - Power supply unit TPU 2 with connection cable
 - Clutch spring
- **With DC driven nutrunner motors:**
 - Power supply and control unit CT2500 A
 - Kit of cables
 - Test certificate
- **Two shielded screw transit sensors**
- **Screw-retaining head** customized for the screw, completed with **bush**
- **4 tightening bits** (1 fitted + 3 spares)
- **Screw shooting hose**
- Operation and maintenance manual
- Eco-friendly cardboard packaging (weight kg 3)
Dimensions mm: L 600 x 450 x h 520

Accessories and models available upon request

- **Supporting structures and hoppers**
Entirely designed and manufactured by Fiam, they serve to support EasyDriver feeders and their hoppers when used to meet the need for fast production rhythms. They ensure greater cleanliness and functionality of the operational layout. For the features, see page 7-8.
- For electronic solutions: system calibration/checking service directly at the customer's production lines
- "Running low" device to be attached to the feeder's bowl to advise when it needs refilling with screws
- Wooden case for critical shipment: code 683050046 (kg. 11 of case weight)
Dimensions mm: L 650 x 500 x h 715



REQUEST A FREE QUOTATION!

When choosing an MCA autofeed tightening module, 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 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/>

Discover how it works!



See our solutions on YouTube
click on the link within our website
www.fiamgroup.com



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