TOM-PM

New computerized monitoring system of the tightening cycle

FIAM
PEOPLE AND SOLUTIONS

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Tightening and monitoring: the intelligent simplicity

These new, effective Fiam tightening solutions represent a **practical and inexpensive monitoring system of the tightening cycle**. It is a poka-yoke system (anti-error system). They verify immediately the tightening cycle, guaranteeing the reliability of the tightening process regardless of the operator's ability. The use of these systems **accelerates the production cycles avoiding the need of post-process controls** (for example to check the number of tightened screws) ensuring as a consequence **the good quality** of the assembled product.

They include:

- Lever or push button air shut-off screwdrivers equipped with **pneumatic pick-up signal** (ported)
- New computerized monitoring unit TOM-PM (Torque Operation Monitor - Pressure Monitoring): it allows the **monitoring of the tightening cycle through the double-signal pressure** coming from the screwdrivers, subsequently converted into electric signal.

Tightening system with cycle-end comp

Be demanding

Reliability

Components long lifetime thanks to careful design and quality of the manufacturing process which results in reduced maintenance and repair costs

TOM-PM unit (Torque Operations Monitor – Pressure Monitoring) allows to discriminate during the tightening cycle **the screws that have been tightened correctly according to pre-set cycle time and number of screws to be fastened**

The system can also **identify possible assembly defects**, comparing the time elapsing between start and finish of fastening (when the clutch shuts off) and the time-window considered appropriate for the same phase

TOM-PM unit is equipped with **dual pneumatic signal** to monitor correctly the assembly cycle: a signal checks the screwdriver start, while the other checks when the clutch operates. These **two signals guarantee system operation regardless of pressure variations:** a considerable advantage in respect to other poka-yoke systems using only one pneumatic signal reading the pressure "gap" when the torque is reached. Programming of these one signal systems is time taking and not immediate. Moreover, such systems depend on the infeed pressure which is a critical feature in many production lines

Fiam screwdrivers guarantee accurate tightenings thanks to their high and tested performances accepted by in different productive fields such as electronic, household appliance industries and car components. Fiam screwdrivers guarantee **high torque repeatability on soft and hard joints**

Don't be satisfied with the maximum

Productivity

Considerable increase of the efficiency of the tightening cycle thanks to innovative systems

The operator avoids to control tightening results piece by piece, because the unit signals the outcomes by means of acoustic and visual indicators.

- **Status of the tightening operations is displayed to the operator** through visible led-lights positioned on the unit front panel:
  →Single tightening end (OK-NOK outcome)
  →Tightening cycle end (OK outcome)
- **The unit signals alarms optically** (through the led-lights supplied) **and acoustically** when the tightening or the cycle are KO

Practical functionalities **make easier the operations during the assemblies:**

- **The operator can cancel last tightening count by pressing a button on the front panel:** this feature is important in case the operator has to loose the screw (ex. required f.i. in cases where a component has mistakenly been forgotten within the tightening cycle).
- The **operator can reset the program** with the key and start a new tightening sequence
- PLC programming keypad: user friendly

Fiam screwdrivers are equipped with **quick-change chuck:** it favours **easier and safer** bit replacement; it is available upon request also for use of double insert bits

uterized monitoring

Perfection is
in your hands

Ergonomics

Optimization of the tool performances concerning ergonomics and operator safety

The practical, immediate acoustic and visual alarm systems **ease assembly operations for the operator**

TOM-PM unit is **extremely compact** allowing easy integration into the work station which will result practical and comfortable

The unit is arranged for installation of a **visual and acoustic tower light** which guarantees an easier use for operator

Screwdriver's grip is ergonomic: designed according to modern biomechanics principles paying particular attention to the features of the female hand. The grip is manufactured with an ergonomic sheath made of anti-slip material, increasing the hand grip on screwdriver, **improving the handling, thermal insulation and operator's comfort**

Extremely reduced weight of the screwdriver; they are manufactured with light alloys

Tools are designed to be hanged to suspension device (balancer) thus eliminating any effort to lift the tool

Patented silencing system: these screwdrivers are extremely noiseless, air exhaust is also controlled

Comfortable low effort reverse button: it reduces finger fatigue

ERGOTECH

Ergotech project
Fiam optimizes the performances of its tools and offers advice and qualified training on correct use of screwdrivers

Naturally
innovative

Ecology

Innovative systems designed paying even more attention to environment safeguard

The advanced technological design of the tool's air motor permits **considerable decrease of compressed air consumption,** without affecting tool performances

Thanks to the tool's inner kinematic motions which optimize efficiency, available power is transmitted with **minimum dispersions**

Fiam tool's torque control systems operate fast **reducing working time of the screwdriver and compressed air consumption**

OIL-FREE: Fiam screwdrivers work at maximum efficiency without need of lubrication thus **eliminating oil exhaust** into working environment

Eco-contribution WEEE accomplished: Fiam fulfils its manufacturer obligations respect to the environment and without costs for the customer

Monitoring unit TOM-PM

TECHNICAL FEATURES

- The unit can be connected only to one tool at a time
- It is possible to set **1 sequence of tightening** through internal PLC
- Tightening sequence can contain **up to 999 screws**
- It is possible to **program the maximum number of tightening attempts** for KO screws
- **Automatic check of tightening time** which can be adjusted by setting the cycle time thus discriminating the different KO results
- **PLC programming keypad:** user friendly.
- **Visual indicators of the tightening status** positioned on the front panel of the unit
- **Acoustic signal:** short —> tightening **OK**, long —> tightening **KO**
- **Reset cycle or releasing pallet/jig** with key selector or PLC
- **Electric signal for "end cycle OK"** to release pallet/jig (or manual with key selector)
- **I/O Connectors** with contact to 24 Volt d.c. (max 0,5A for connection to PLC and/or to light signal systems)
- **Electric feed:** 110/220VAC, 50/60Hz
- **Extremely compact:** 230x200x130 mm
- **Weight:** 2,0 Kg.
- The unit can be connected to **lever or push button air screwdrivers featuring pneumatic** double signal (START and TORQUE ACHIEVEMENT)
- It can't be used with push to start air shut off screwdrivers

OPERATION	LED-LIGHTS ON THE TOM-PM FRONT PANEL
Tightening OK	**TIGHTENING OK:** green led-light
Tightening sequence set	**CYCLE END:** yellow led-light - **TIGHTENING OK:** green led_light
Fastening a screw already tightened	**TIGHTENING KO:** red led-light
Number of tightened screws	Counter on display
Number of tightenings KO	Counter on display
Screw stripping	**TIGHTENING KO:** red led_light, increase on counter KO and signal on display "T>T_MAX"
Releasing of the lever before the tightening is completed	Neither signal nor increase on the screw counter
Screw getting stuck; partial thread; presence of different joint among foreseen joint types (clutch operated before minimum time set)	**TIGHTENING KO:** red led-light, increase on counter KO and signal on display "T<T_MIN"
Presence of different joint among foreseen joint types (Clutch operated after maximum time set)	**TIGHTENING KO:** red led-light, increase on counter KO and signal on display "T>T_MAX"

Model	Code
Monitoring unit	685001057

Standard equipment (supplied with tool)

- Kit of pressure switches (cod. 685001058) with pneumatic hoses and electric cable length to 3,0 mt.
- Power cord
- IN connector for unit operation
- Use and maintenance manual
- Eco-friendly packaging

Accessories available upon request

- 3 colors tower-light providing the same display light signals of the unit's led-lights (supplied with 3,0 mt long cable): cod. 686000606

Models available upon request

- Customized models available. For example: models provided with tightening/untightening/cycle end features, suitable for use with autofed tightening unit NCA (see cat.) or providing tightening sequence monitoring for more screwdrivers used by only one operator. For further information please contact Fiam Technical Consultancy Service

Model	Code	Type of screwdriver	Grip	Tightening torque on soft joint min. Nm	Tightening torque on soft joint max. Nm	Tightening torque on soft joint min. in lb	Tightening torque on soft joint max. in lb	Idle speed rpm	Starting system Type	Reversibility Type	Weight kg	Weight lb	Dimensions Ø x l x h	Air consumption l/s	Accessories Attacco	Noise level* dBA	Vibrations m/s²
15C2AL - 2CS	112509891			0,4	2,0	3.54	17.7	2000		↻	0,59	1.30	38x228	4	F 1/4''	73	< 2,5
15C3AL - 2CS	112509892			0,4	3,5	3.54	30.98	1400		↻	0,60	1.32	38x228	5,5	F 1/4''	73	< 2,5
15C4AL - 2CS	112509893			0,4	4,5	3.54	39.83	950		↻	0,60	1.32	38x228	5,5	F 1/4''	73	< 2,5
15C5AL - 2CS	112509894			0,4	5,0	3.54	44.25	650		↻	0,60	1.32	38x228	5,5	F 1/4''	73	< 2,5
15C2AP - 2CS	112509895			0,6	2,2	5.31	19.47	2200		↻	0,70	1.54	37x209x157	6	F 1/4''	71	< 2,5
15C3AP - 2CS	112509896			0,4	3,5	3.54	30.98	1400		↻	0,72	1.58	37x209x157	6	F 1/4''	71	< 2,5
15C4AP - 2CS	112509829			0,4	4,5	3.54	39.83	950		↻	0,72	1.58	37x209x157	6	F 1/4''	71	< 2,5
15C5AP - 2CS	112509830			0,4	5,0	3.54	44.25	650		↻	0,72	1.58	37x209x157	6	F 1/4''	71	< 2,5
15C2APA - 2CS	112509899			0,6	2,2	5.31	19.47	1200		↻	0,70	1.54	31x178x156	6	F 1/4''	71	< 2,5
15C3APA - 2CS	112509900			0,4	3,5	3.54	30.98	1400		↻	0,72	1.58	31x178x156	6	F 1/4''	71	< 2,5
15C4APA - 2CS	112509876			0,4	4,5	3.54	39.83	950		↻	0,72	1.58	31x178x156	6	F 1/4''	71	< 2,5
15C5APA - 2CS	112509883			0,4	5,0	3.54	44.25	650		↻	0,72	1.58	31x178x156	6	F 1/4''	71	< 2,5
15C2A30 - 2CS	112509903		30°	0,8	2,0	7	17,7	2000		↻	0,70	1.54	see cat.68	4	M 1/4''	73	< 2,5
15C3A30 - 2CS	112509904		30°	0,8	3,0	7	26,5	1400		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
15C4A30 - 2CS	112509905		30°	0,8	4,0	7	35,4	950		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
15C5A30 - 2CS	112509906		30°	0,8	5,0	7	44,2	650		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
15C2A90 - 2CS	112509907		90°	0,8	2,0	7	17,7	2000		↻	0,70	1.54	see cat.68	4	M 1/4''	73	< 2,5
15C3A90 - 2CS	112509908		90°	0,8	3,0	7	26,5	1400		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
15C4A90 - 2CS	112509909		90°	0,8	4,0	7	35,4	950		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
15C5A90 - 2CS	112509910		90°	0,8	5,0	7	44,2	650		↻	0,70	1.54	see cat.68	5,5	M 1/4''	73	< 2,5
26C4AP - 2CS	114807224			0,4	4,0	3,54	35,40	2000		↻	0,87	1,91	38x190x155	7	1/4''	73	< 2,5
26C5AP - 2CS	114807225			0,4	5,0	3,54	44,25	1300		↻	0,87	1,91	38x190x155	7	1/4''	73	< 2,5
26C8AP - 2CS	114807226			3,5	8,0	30,98	70,80	1000		↻	0,97	2,13	38x210x155	7	1/4''	73	< 2,5
26C10AP - 2CS	114807227			3,5	9,5	30,98	84,08	800		↻	0,97	2,13	38x210x155	7	1/4''	73	< 2,5
26C12AP - 2CS	114807228			3,5	12	30,98	106,20	400		↻	0,97	2,13	38x210x155	7	1/4''	73	< 2,5
26C4APA - 2CS	114807229			0,4	4,0	3,54	35,40	2000		↻	0,95	2,09	39x195x160	7	1/4''	73	< 2,5
26C5APA - 2CS	114807230			0,4	5,0	3,54	44,25	1300		↻	0,95	2,09	39x195x160	7	1/4''	73	< 2,5
26C8APA - 2CS	114807231			3,5	8,0	30,98	70,80	1000		↻	1,05	2,31	39x210x160	7	1/4''	73	< 2,5
26C10APA - 2CS	114807232			3,5	9,5	30,98	84,08	800		↻	1,05	2,31	39x210x160	7	1/4''	73	< 2,5
26C12APA - 2CS	114807233			3,5	12,0	30,98	106,20	400		↻	1,05	2,31	39x210x160	7	1/4''	73	< 2,5
AD6RA1 - 2CS	114807210		90°	2,5	6,0	22.13	53.11	1150		↻	1,20	2.645	see cat.26	10	M 3/8''	77	< 2,5
AD9RA1 - 2CS	114807094		90°	2,5	9,0	22.13	79.66	900		↻	1,20	2.645	see cat.26	10	M 3/8''	77	< 2,5
AD14RA1 - 2CS	114807129		90°	3,0	14,0	26.55	123.91	600		↻	1,40	3.086	see cat.26	10	M 3/8''	77	< 2,5
AD26RA1 - 2CS	114807086		90°	11,5	26,0	101.79	230.13	350		↻	1,45	3.196	see cat.26	10	M 3/8''	77	< 2,5
CY9RA - WP - 2CS	116509097			7,0	16,0	61,95	141,6	700		↻	1,67	3,67	46x345	10	F 1/4''	80	< 2,5
CY11RA - WP - 2CS	116509108			7,0	24,0	61,95	212,4	450		↻	1,67	3,67	46x345	10	F 1/4''	80	< 2,5
CY9PRA - WP - 2CS	116509153			7,0	16,0	61,95	141,6	700		↻	1,75	3,85	46x265x175	10	F 1/4''	80	< 2,5
CY11PRA - WP - 2CS	116509154			7,0	24,0	61,95	212,4	450		↻	1,75	3,85	46x265x175	10	F 1/4''	80	< 2,5
AG40RA - 2CS	114809914		90°	18,0	40,0	159.32	354.04	400		↻	2,05	4.520	see cat.26	13	M 3/8''	80	< 2,5
AG60RA - 2CS	114809915		90°	29,0	60,0	256.68	531.06	300		↻	2,30	5.070	see cat.26	13	M 1/2''	80	< 2,5

Legend

↻ **Reversibility:** all models are suitable for tightening and untightening operations.

Lever

Push button

- Figures shown are measured at a pressure of 6,3 bar operating pressure recommended by ISO 2787.
- Tightening torque values have been measured in accordance with ISO 5393 standard.
- Noise level has been measured in accordance with ISO 3744 and ISO 15744 standards.

* Additional factor: 3 dBA spread in method and production (ISO 15744).

- Vibrations level have been measured in accordance with ISO 8662-1 and ISO 8662-7 standards.
- Accessory drive: male square drive (ISO 1174); female hexagonal drive 1/4", 6,35 mm (ISO 1173)
- The code number must be used when ordering.

The data given in the table are indicative and can be changed without prior notice. The torque values are purely indicative and may be influenced by the softness of the type of joint, by the type and length of the screw, by the pressure and quantity of air supply, and by the type of accessory used. The values indicated for noise and vibration levels were obtained in the laboratory, performing tests that comply with the standards stated, but alone are not sufficient for calculating risks. Values measured in the single work places may be higher than those stated.
The values of actual exposure and consequent risks are specific and depend on the operator's method of work, the type of work piece and the work place, as well as the operator's time of exposure and his physical conditions. 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 all further details, please apply to the **Fiam Technical Consultancy Service.**

Standard equipment (supplied with the tool)

- Clutch adjustment key
- Additional clutch spring (except angle models and 26C 8-10-12 models)
- Hanging ring
- Use and maintenance manual
- Eco-friendly packaging

Accessories available upon request

- Bits, sockets,etc., balancers, exhaust silencers and other compressed air system accessories: (see Accessories catalogue)

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