

## Fastening Technology Sales Material

### Contents

1. Comparison of electrical and pneumatic screwdrivers
2. Comparison of carbon brush and brushless screwdrivers
3. Properties of electrical and pneumatic screwdrivers
4. Properties of transducerized and cordless screwdrivers
5. Comparison of the different technologies



Comparison of electrical and pneumatic screwdrivers

## ELECTRICAL SCREWDRIVER — PNEUMATIC SCREWDRIVER

	electrical	pneumatic
power consumption	✔	✘
CO2 emission	✔	✘
initial cost	✔	✘
cost of operation	✔	✘
maintenance cost	✔	✘
noise exposure	✔	✘



Model calculation:

	screws per day	pure fastening time	work days per year	air consumption m <sup>3</sup> / year	power consumption kWh / year	cost € / kWh	costs per year
pneumatic	4800	2 hours	225	3240	356,40	€0,15	€53,46
electrical	4800	2 hours	225	—	6,5	€0,15	€0,98

Comparison of carbon brush and brushless screwdrivers

**CARBON BRUSH — BRUSHLESS**

	Brushless	Carbon brush
power consumption	✓	✓
CO2 emission	✓	✓
initial cost	✓	✓
cost of operation	✓	✓
maintenance cost	✓	⊘
noise exposure	✓	⊘



When do you need a brushless screwdriver?

- working in clean rooms
- assembling sensitive or electronic products
- in ESD areas
- more than 500,000 fastened screws per year

More arguments for brushless screwdrivers:

- carbon brush development has been already stopped
- less downtimes or repairs
- the initial costs are nearly the same
- process reliability by screw counting and fastening time control

	Maintenance carbon brush	Maintenance brushless	Fastenend screws	description
1. year	—	—	500.000	2 carbon brushes are delivered with the tool
2. year	about €150,00	—	1.000.000	New motor with new carbon brushes
3. year	about €7,75	—	1.500.000	New carbon brushes
4. year	about €150,00	—	2.000.000	Again new motor

Properties of electrical and pneumatic screwdrivers

**Brushless electrical screwdrivers**

**Advantage:**

**process reliability by screw counting and fastening time control**

Speed control and soft start

Application in ESD areas

No carbon dust

230VAC versions without power supply available

**Disadvantage:**

Limited cable length (about 5m)

Maximum torque of 18Nm

Plastic housing



**Pneumatic screwdrivers**

**Advantage:**

Wide torque range 0-60Nm

Smaller overall size with higher torque

Can be used with very long hose

No heating, very robust (aluminum housing)

Can be used for other applications like drilling, grinding, etc.

**Disadvantage:**

Very high power consumption

Produces oily air

Higher noise level

No process reliability



Properties of transducerized and cordless screwdrivers

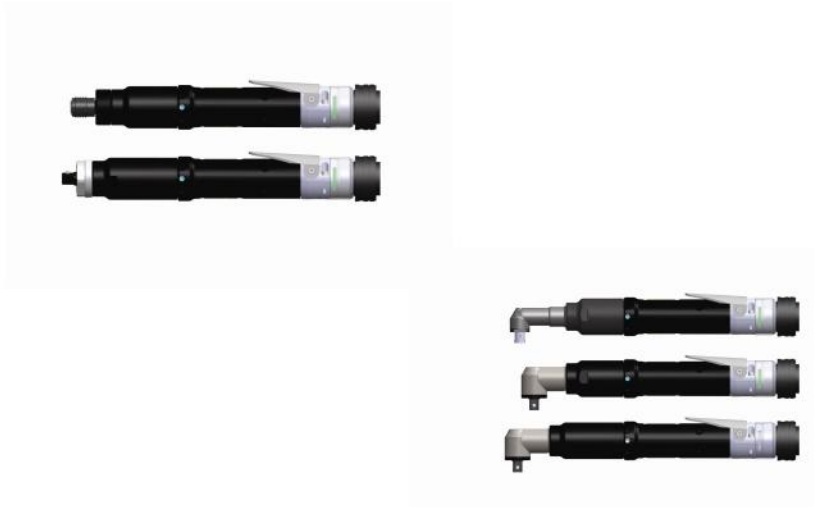
**Transducerized Screwdrivers**

**Advantage:**

- Highest accuracy 0.1% with integrated transducer
- Torque and angle control
- Data archiving
- Endless possibilities regarding fastening strategy, process control, data transmission, etc.
- Long cables over 20m and more possible

**Disadvantage:**

- Initial costs > 10.000€
- Fastening is slower
- The cables are heavy and un wieldy



**Cordless screwdrivers**

**Advantage:**

- No cable
- Maximum Torque up to 250 Nm

**Disadvantage:**

- Batteries are wear parts
- Continual battery replacment and charging



Comparison of the different technologies

Technology	Torque control	Advantage	disadvantage
electrical cordless	Mechanical clutch	convenient High accuracy High RPM 2-step fastening is not necessary	A torque tester is needed to set the torque
pneumatic	Mechanical clutch	convenient robust Wide torque range 2-step fastening is not necessary	Power consumption Noise level A torque tester is needed to set the torque
Current control	Torque is calculated by the electronic on the base of the motor current	Easy torque setting by value quiet OK/NOK examination Different torque values in one controller set-up	Complex torque calibration process Not accurate > 15% Based on the accuracy very expensive
Impulse tools	Impulse with oil impulse Impulse with electrical motor	High torque without torque reaction Very fast	Higher noise level Accuracy is not stable
Transducerized	With integrated transducer	Very accurate Easy torque setting by value Torque and angle control OK/NOK examination Data archiving Very high durability Endless control and process adaption	expensive Mostly training necessary to set up the controller