

Press Release

Cell phones connect people across the world!

Diligent hands assemble fasteners into cell phones at high speed



Robust screw presenters ensure productivity in mass production

What started off in 1983 as an 800 g Motorola device, sneeringly called "jingling bone", has embarked on an unbelievable triumphal procession around the entire globe: the cell phone. Experts meanwhile estimate there to be 4 billion mobile phone users worldwide. The market is flooded with a multitude of mobile phone models, which can do a lot more than just a phone. The Finnish giant in this sector, Nokia, is the

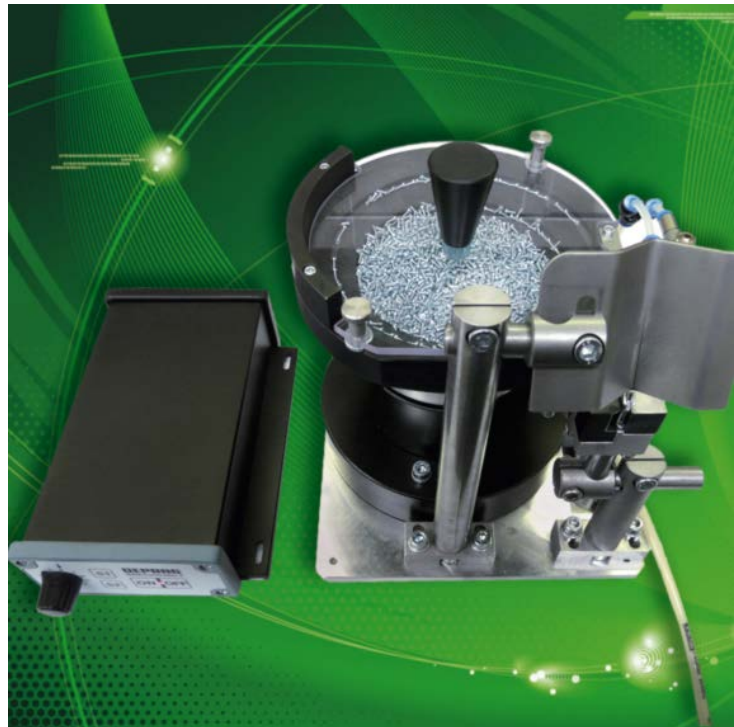
largest producer of cell phones, followed by Samsung. Today's phones weigh less than 80 g, they take photos, record and play back videos, surf the web or are navigators for drivers and pedestrians who are unfamiliar with the surroundings.

Mobile phones are produced in an industrial mass production environment. Three-shift production operation places high demands on people and material. The often-quoted maxim "time is money" demands robust, low maintenance machines, which operate smoothly, even at high cycle rates. If during screw assembly in a factory in the cell phone sector delays are caused by screw presenters, for instance as a result of jamming of the hardware in the feeding device, this jeopardizes production targets and the profit margin is not achieved. Particularly when the demands of industrial series production are very high, an extremely robust design is required. Devices with marginal guide plates and tooling are unable to support the duty cycle of the operator overextended manufacturing periods.

Recently a "distress call" from a customer in India reached DEPRAG SCHULZ GMBH & CO.: "Please supply us with functioning screw presenters!" For a project of this type, DEPRAG, being an automation expert with Head Office in Amberg/Upper Palatinate, who are renowned for quality and competency in auto feed systems, proved to be the suitable partner. DEPRAG engineers went to work and within a short period of time they developed a robust, extremely low maintenance screw presenter designed for mass production.

What is a screw presenter? When a worker screws together mobile phones at his workstation in the prescribed cycle time, not only the individual parts of the phone are supplied to him automatically via conveyor belt. He also receives the screws from the screw presenter, isolated and synchronized with the production, from where he takes them with the tip of the screwdriver. In trade jargon: he picks the presented screw with a magnetic bit or by means of vacuum finder. Then he screws it in with the industrial screwdriver, picks it and screws it in, picks it and screws it in ... always according to the manufacturing rhythm.

The screw presenter, designed by DEPRAG for mass production with small screws, looks like a small bowl. For many years DEPRAG has been a specialist for vibration drives for transporting screws, threaded rods, bolts, rivets, washers, O-rings and other small parts. This is how the Deprag screw presenter functions: an oscillating magnet underneath the feeder bowl in combination with alternating current, a spring package and a built-in controller generate micro throwing motions, which transport the material in the bowl and finally transports the screws individually to the "pick-up point" via a feed rail. A special guide plate guides the drive bit with the screwdriver accurately and securely



to the pick-up point of the screw (the screw drive). In this way secure and comfortable picking of the screw at a high mass production rate is achieved reliably and as a stable system process. This screw presenter is also the first choice for mini screws for Mobile phone manufacturing and for screws with lengths/diameters which don't allow other feeding techniques. The cycle speed can be changed with an easily operated dial, when a new employee starts his job after a shift change.

The screw presenter operates fault-free, even under the most stringent production conditions. During development, the DEPRAG engineers focused on robustness and durability of the device and have deliberately selected a low maintenance design. If despite this, maintenance work must be performed every now and then, it can be done easily and in a user-friendly manner. Due to their compact design, multiple DEPRAG screwdriver stations can be arranged efficiently in limited workspaces.

If the required screw sizes change during production, the screw presenter is designed for quick change over. Easy to exchange components like guide rails and separator slides allow a flexible adaptation to change screw types, whether they are smaller, larger or with a different head. DEPRAG Sales Manager Jürgen Hierold: "In this way the new screw presenter becomes a long-term companion in production". The extremely robust screw presenter, re-designed for mass production, is used wherever a fully automated screw-feeding machine cannot be employed cost-effectively. Jürgen Hierold: "If required we also develop feeders tailored to the requirements of the customer's specific application".

At this year's AUTOMATICA, DEPRAG presented their new generation of screw-feeding machines, the Series 6, for full automatic screw-feeding in demanding, automated manufacturing plants. Differences in vibration speed have always been a thorn in the side of the screw feeding process. Specifically, the constantly changing level of parts in the feeder bowl with the resulting changes in mass, easily lead to speed and cycle fluctuations. This is an annoyance, which is frequently bypassed by leading technology in this sector. In the new Series 6 screw feed system, DEPRAG solves the problem in a surprisingly simple way: a sensor captures the oscillation amplitude in the feeder bowl and the Series 6 screw-feeding machine adjust the vibration itself according to the mass of parts in the bowl - independently of bowl level and temperature!

Sales Manager Jürgen Hierold emphasizes: "With the Series 6 screw-feeding machine the screw always arrives at the separation point with the same conveyance speed. This is a good example of our constant strive for innovation. The new generation of screw-feeding machines convinces with high functionality and thereby contributes towards an improvement of process reliability".

Miniaturization also places new demands on traditional screw-feeding machines. If the transport material is very small, the feeder bowl contains more individual parts, which impose a higher weight/mass ratio on the bowl. In order to achieve functionality, relatively high oscillation amplitude must be generated. The individual screw on the other hand is very small and therefore very light. Under heavy oscillation it becomes too active in the bowl and this impedes the ability of the feeds system to bring the screw to the point of separation in sequence with the assembly cycle. In this case too, automatic control of the oscillation amplitude is the ideal solution.

The Series 6 screw-feeding machine operates user-specific, i.e. it can be adapted to the individual speed of the worker. Up to ten employees can log into the device control system with a user RFID chip and the screw feed system functions at the rhythm that is saved per the individual worker. These system parameters can also be manually adjusted on the control system via the membrane keypad and LCD display.

Incorporation into an existing facility is quick and without major effort, because a number of important functions are already contained in the integrated sequence control system: it can control and monitor multiple peripheral devices like valves, level control of the feeder bowl, separator in-feed or blow feed control of the screws. This means a substantial reduction of programming costs for the customer in terms of PLC control. In addition, the standard controls include a "duty cycle simulation mode" so that the customer's series production can be simulated in long-term testing i.e. the customer-specific application cycle is emulated during system setup in the DEPRAG facility before the screw-feeding machine is delivered. In this way a high degree of reliability is guaranteed from the moment the first screw is "automatically delivered".



Besides the high-quality Series 6 screw-feeding machine and this robust durable screw presenter, DEPRAG also offers a wide range of feeder solutions for manual and automatic assembly. Whether it is a vibration drive, Oscillating rail (sword) - or centerboard design for sensitive components or a linear conveyor system, the feeder specialists will find an appropriate solution for all applications regarding automated parts feeding. And Jürgen Hierold emphasizes: "All reliable feed systems have one thing in common - they are robust and designed for mass production."

DEPRAG SCHULZ GMBH & CO. is present in more than 50 countries with 600 employees. Further competencies include screw technology, automation, air motors and pneumatic tools. With innovative assembly systems and assembly plants, the company offers flexible manufacturing solutions for manual assembly of small series up to highly automated mass production. The Head Office of DEPRAG, who has been involved in innovative solutions for plant construction for decades, is in the city of Amberg in Bavaria/Germany.

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