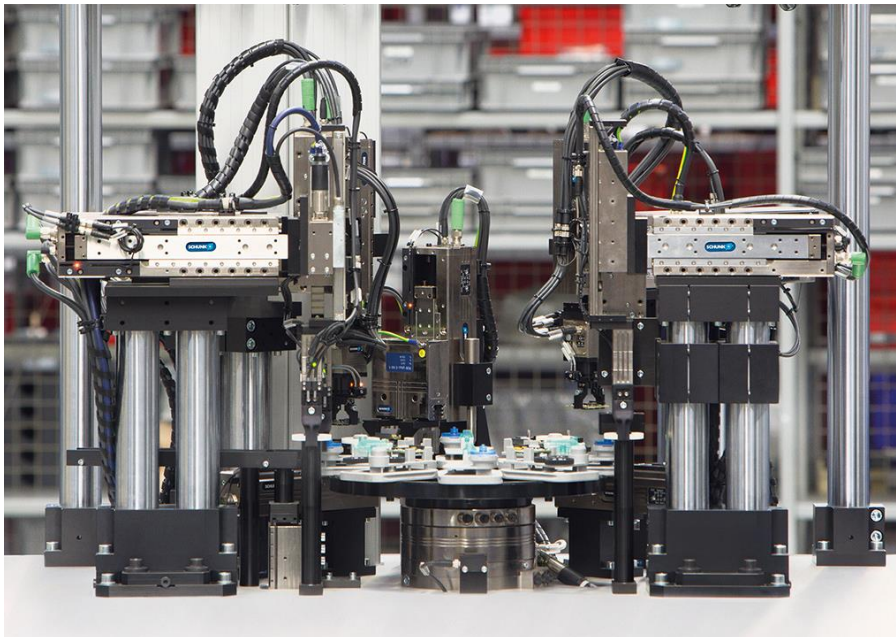


24 V Revolution in Assembly Automation

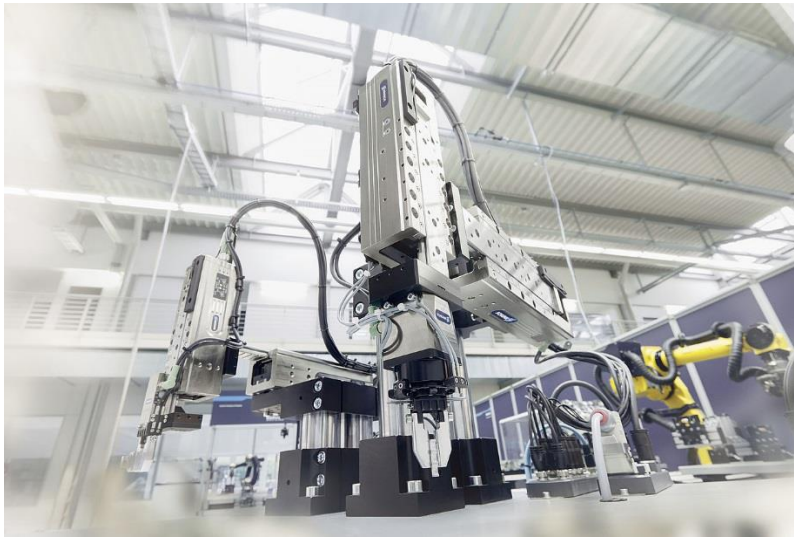
With its 24 V modular system, SCHUNK has set a new benchmark in assembly automation. For the first time, complete handling systems based on 24 V can be assembled out of grippers, rotary gripping units and linear modules without the need for motor drives. As far as the users are concerned, the technology has a great deal of potential to create fully automated cells with simple controls. The technology is becoming more and more widely used as providers bring 24 V components onto the market – from feeding technology right up to robots and safety parts.



SCHUNK ELP linear axes, SCHUNK EGS rotary gripping modules, and SCHUNK EGP grippers can be combined with efficient 24 V assembly systems. Customers benefit from 24 V technology with minimum commissioning and low maintenance costs, high energy efficiency, and low life cycle costs.

There are always components which trigger eureka moments among designers. In handling technology, the SCHUNK ELP linear axis is undoubtedly one such component. Instead of adjusting the throttle as with the pneumatic modules, or loading new sequences as with electrically controlled modules, the linear direct driven ELP simply defines the end position mechanically and regulates the speed of extension and retraction with two potentiometers. The auto-learn function takes care of the rest. Two to five strokes are enough to complete the programming. During the learning process, the maximum possible speed for the current payload is calculated. The motion profile itself is designed as a ramp, i. e. the unit automatically accelerates and slows down depending on the overall stroke. Impacts, oscillations, and uncontrolled driving at maximum speed of the module are therefore avoided. If the component

weight changes during the process, the axis automatically adjusts its movement profile within a few strokes, without requiring any operator intervention. Because the control occurs via digital I/O, the SCHUNK ELP series is compatible with all controllers and can easily replace pneumatic modules. In combination with the SCHUNK EGP grippers for small components, and SCHUNK EGS rotary gripping modules, a modular system is now available that can be used to implement complete handling solutions based on 24 V technology.



With the SCHUNK mechatronics range, entire assembly plants can be implemented based on 24 V technology.

Requirements of assembly systems are increasing

24 V technology is poised to become the third large pillar in the area of assembly automation, displacing pneumatic supply networks through which 70% of all actuators are currently supplied, and networks greater than 400 V with electrically driven actuators, which are currently widespread and make up around 30%. According to integrators, plant manufacturers, and important end customers, 24 V has a whole host of advantages compared to pneumatics in terms of modern aspects that play right into the hands of smart technology. This is due to the rapidly increasing variety in many sectors, increasingly sensitive parts, more and more price pressure, and increasing requirements in terms of energy efficiency and noise emissions. Hardly any automated system is developed for a single product anymore. Instead, as many variants as possible are produced in as short a cycle time as possible, while still allowing ample scope for future design and range modifications. Accordingly, assembly plants must be designed flexibly today. Faced with such demands, pneumatic handling quickly reaches its limits, especially when the systems need to work as quietly as possible despite specifications stipulating maximum sound levels close to 60 dB. Despite the large installed base of pneumatic

networks and components, these will not completely compensate for the strengths of 24 V technology in the long term, meaning a redistribution of the market away from pneumatics towards 24 V technology is foreseeable. SCHUNK has consciously positioned itself ahead of the transformation with components that have proven themselves for years, like the MPG-plus gripper for small components, and modern 24 V modules like the SCHUNK EGP. For the SCHUNK PGN-plus-E 24 V universal gripper, the 24 V counterpart to the megaseller PGN-plus-P, it was even possible to make it completely maintenance-free.



The smart 24 V SCHUNK ELP linear axis is now also available with an electrically activated holding brake.

Highly dynamic yet gentle

Using the SCHUNK ELP as an example, it becomes clear how big the 24 V advantage compared to the pneumatic world is. Even if users have to invest twice as much compared to pneumatic axes, the wear-free module pays for itself in the medium to long term. With 40 million cycles at a maintenance interval of 5 million cycles, the costs for wear, parts, labor, and production downtimes alone with pneumatic axes far exceed the total costs of the ELP axes. For an assembly system with 17 linear modules with a lifespan of 40 million cycles, this results in savings of around \$14,000, not including the savings for ongoing operating costs such as compressed air. The costs are amortized after just 20 million cycles. From that point on, the 24 V modules start earning money.

Added to this are design advantages, often the throttles on pneumatic modules are fully opened in order to reduce cycle time and coax the last reserves out of systems. Consequentially, the wear on the shock absorbers rapidly increases, as do costs. Larger

companies may plan fixed maintenance intervals in which all shock absorbers are replaced and recalibrated, regardless of the condition of each individual part, as an attempt to counteract unscheduled system downtimes. Nevertheless unpleasant side effects still arise, the massive vibrations in the periphery of pneumatic linear modules repeatedly also cause other components such as camera systems to require maintenance. The collateral damage in some areas is significant. This is precisely where the SCHUNK ELP comes in, it allows dynamic movements and runs smoothly into the end positions, therefore protecting the peripherals. Since the compact unit does not require hydraulic shock absorbers, commissioning and maintenance work is virtually eliminated. What's more, there is no need to worry about potential damage to your system or long downtimes due to defective shock absorbers. Furthermore, the plant design can be significantly streamlined, because valve blocks, hose systems, maintenance units, and pressurizers are no longer required. Energy chains shrink to half their previous scope, because only two 24 V circuits have to be set up for the sensor/logic system and for the actuators. The fact that the electric axis is around 20 dB quieter than its pneumatic predecessor is an added bonus.



The 24 V SCHUNK EGP gripper for small components is specially designed for assembly applications.

In order to simplify the setup of 24 V systems, the ultra-compact linear modules are also available upon request with electrically actuated holding brakes. In the event of a power failure, the brake reliably maintains the position of the linear module and prevents any unintended drop of the vertical axes into the work area. This is comparable with pneumatic module rod locks, which help prevent any damage to people, parts, and system components. The holding brake allows the STO (Safe Torque Off) safety function to be executed. The linear module can

also be stopped at full speed. The durable brake is particularly suitable for systems that are switched on and off frequently. It can be retrofitted to existing systems at any time.



The world's most compact electrical rotary gripper module SCHUNK EGS is available in sizes 25 and 40 with gripping forces of 15 N or 140 N and strokes of 3 mm or 6 mm for component weights up to 0.55 kg.

Great interest in quick program setup

Even if the selection of handling components with 24 V is still quite small, the technology's potential can be anticipated. Plant manufacturers and important end customers are meanwhile signaling great interest in a fast expansion of the 24 V program and use modules like the ELP linear axis or the EGP parallel gripper in a targeted way to reduce vibrations and noise, as actuating drives, or as assembly systems in small plants and robot cells without compressed air. According to the assessments of a renowned plant manufacturer, the topic will rapidly gain significance when companies active in handling technology start providing feeding technology right up to robots, and safety technology components on a 24 V basis. Ideally, all components should be easy to program from a central control system. In addition, autonomous functions can minimize the commissioning costs. The best example here too is the SCHUNK ELP with its auto-learn function, as soon as the system is wired the mechanic can commission the handling before the system has been programmed. Faced with the challenging time constraints on some projects, this can be a significant feature.