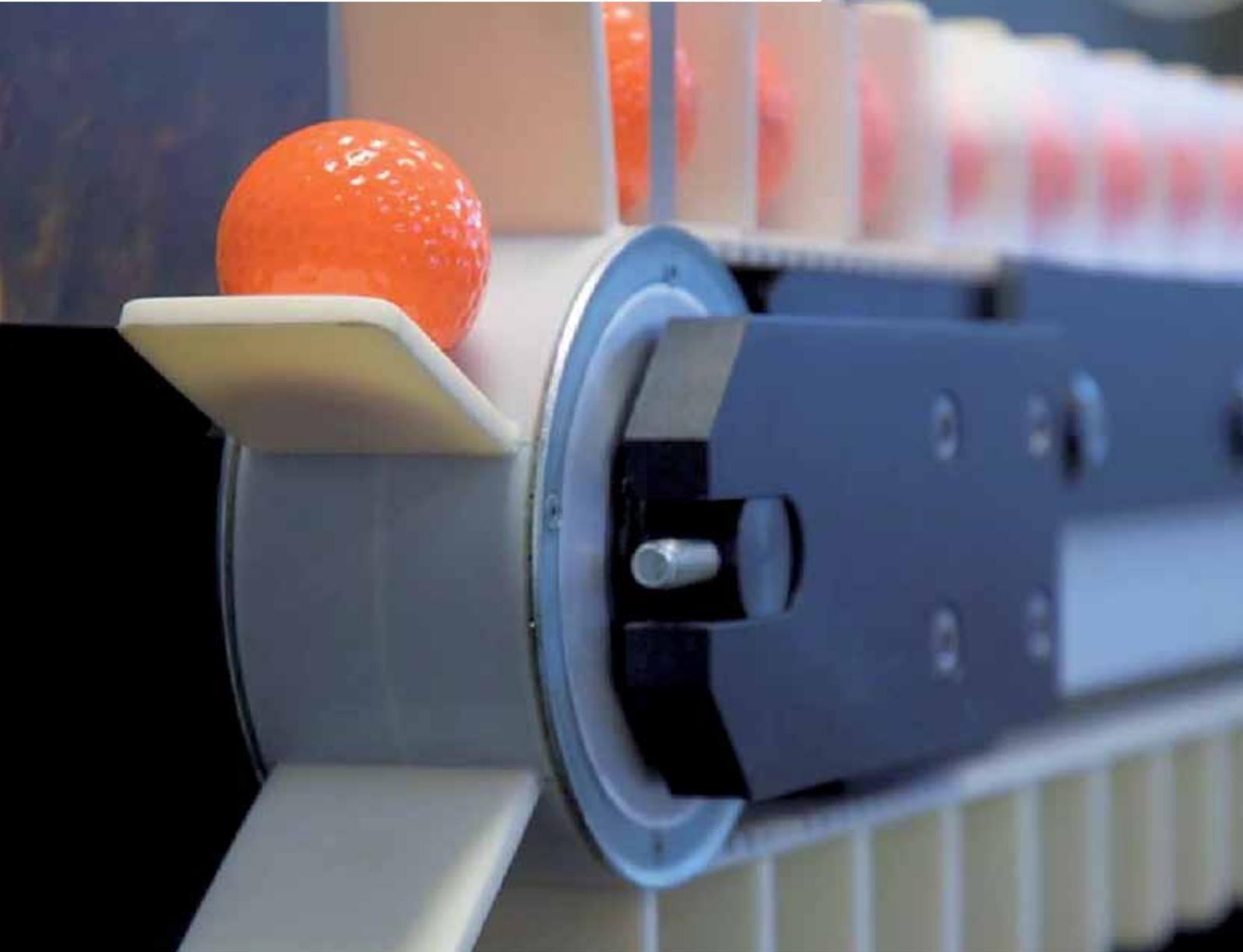


Intelligent Drivesystems, Worldwide Services



®

**Decentralised inverters
control cyclic operation
and positioning**

NORD
DRIVESYSTEMS



Decentralised inverter controls cyclic operation and positioning

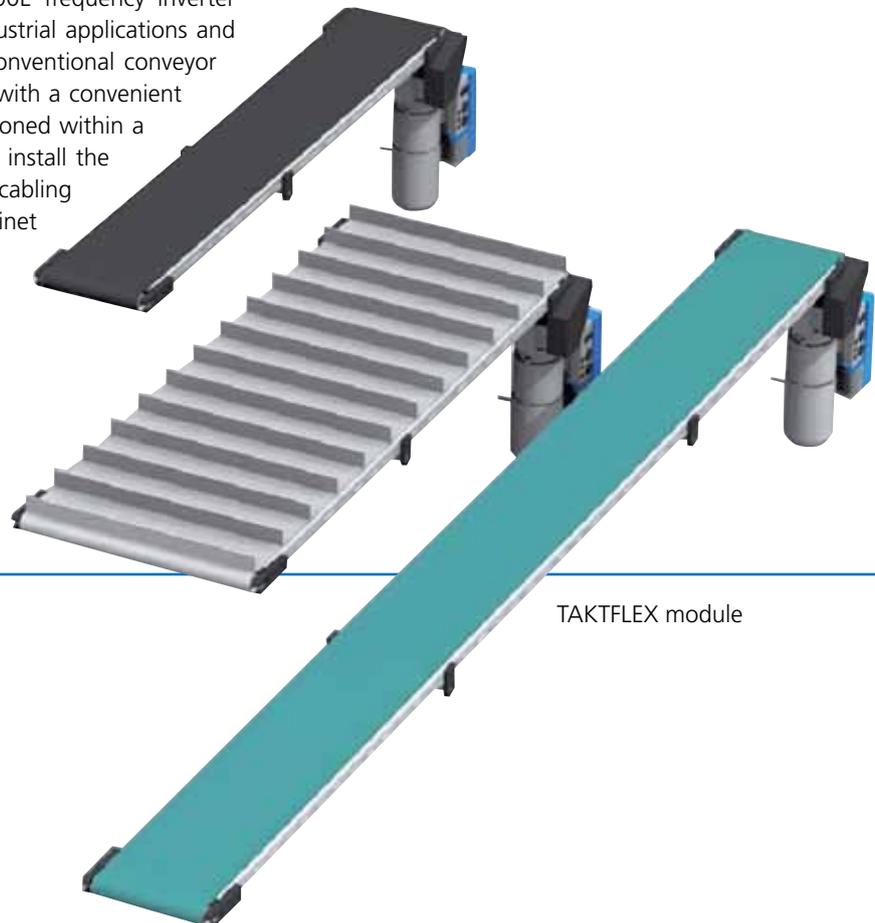
New conveyor belt systems with decentralised inverters

For the very first time, the new conveyor belt systems of inotec AP GmbH of Hesse achieve the wide range of functions for servo drive technology using decentralised inverters. Integrated drives from NORD DRIVESYSTEMS enable complex functions such as cycling, positioning and start-stop operation to be realised with cost-effective units.

Inotec AP, an innovative manufacturer of special systems for a wide range of industrial applications has developed an intelligent automation system, which is suitable for a highly varied mix of conveyor applications. On the one hand, the modular structure enables the simple adaptation of the new TAKTFLEX conveyor belt system to individual customers' requirements with regard to length, width and belt material as well as allowing short delivery times. On the other hand, the implementation of various sophisticated functions in combination with the SK 200E frequency inverter series allows an extensive selection of industrial applications and therefore distinguishes this system from conventional conveyor systems. The system is supplied complete with a convenient Siemens S7 program and can be commissioned within a very short time. End users merely need to install the power supply and bus cables. Complex cabling between a control unit in the switching cabinet and the drive unit is no longer needed, thanks to the integrated frequency inverter.

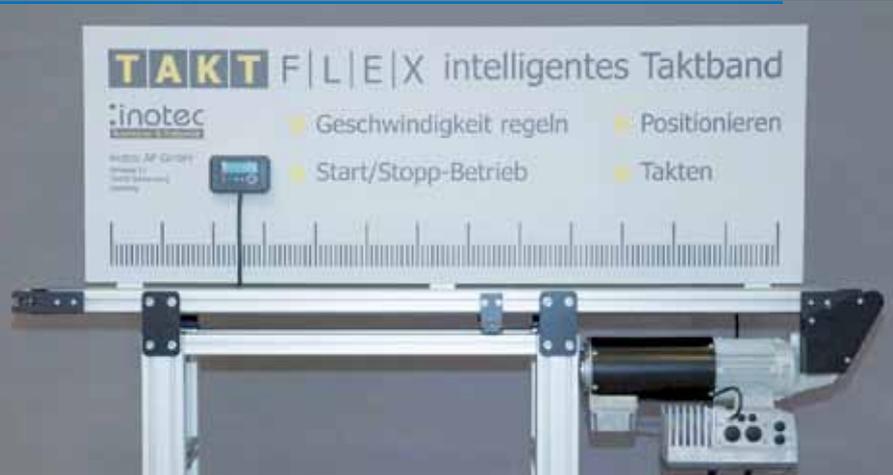
Drive technology tailored to the application

The heart of the system is the NORD drive technology. The optimum size of the drive unit is designed to cater for the special requirements of the application. Conveyor belt speeds cover a wide range from about 0.5 m/min. to 100 m/min. Because of the large overload reserves, the correspondingly powerful worm gear motor can have very lean dimensions; typical overload capacities are 200% for 3.5 sec and 150% for 60 sec. The gear motor is controlled by a suitable SK 200E series frequency inverter which is mounted directly on the terminal box and preferably controlled via Profibus DP. A control display allows the operator to select the functions necessary for the process and to change parameter values. Especially for this purpose Inotec AP has developed a Simatic S7 program, which includes all functions necessary to control the frequency inverter.



TAKTFLEX module



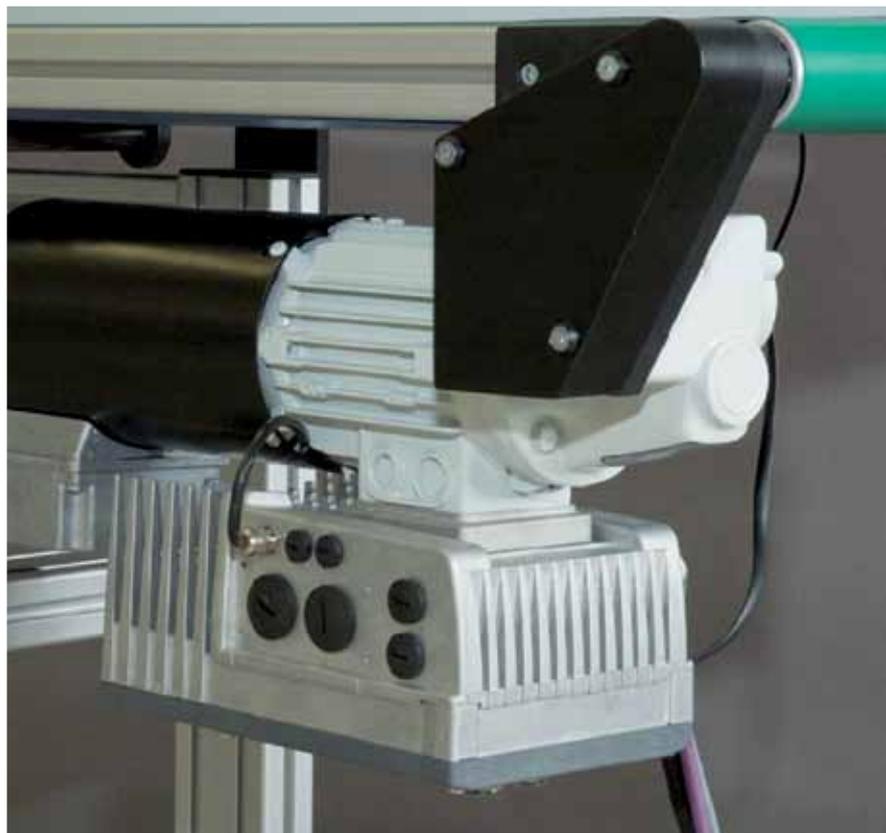
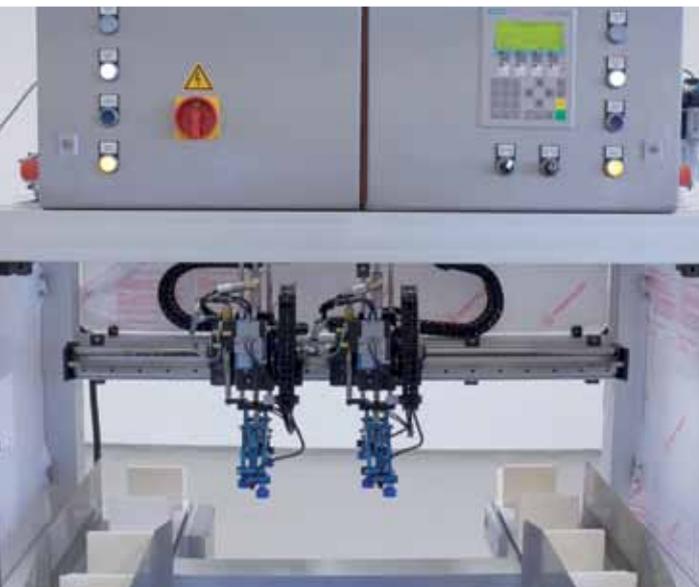


Primary operating modes of the conveyor system with fully integrated drive unit

A geared motor with directly mounted SK 205E frequency inverter and external fan controls cyclic conveyor belt operation



Sorting belt from the TAKTFLEX range



Simple parameterisation for complex control tasks

The SK 205E is commissioned with the one-off loading of standard values such as motor data. After this, the application-specific parameter values are transferred to the SK 205E via Profibus DP at each new start point. The settings for the main operating modes of the system are stored in three parameter sets. The functions necessary for normal inverter operation are activated by the selection of the corresponding parameter set. The values for "reference point run" and "on-the-fly referencing" (Reset Position) are stored in a fourth parameter set. During operation, the double function of this parameter set only requires an adaptation of individual functions as required. These adaptations are coordinated by the control unit and take place in the background, unnoticed by the user. Reference point runs are triggered by the user via the visualisation unit. In contrast, automatic referencing is activated in cyclic operation by means of a timer which is implemented in the control unit. Subsequently, cyclic operation is automatically resumed.

A well coordinated team – the control program and the drive electronics

Together, the control unit of the TAKTFLEX system and the frequency inverter form a high performance unit. The basic functions which are set in the frequency inverter parameter sets, such as positioning (absolute positioning), cyclic operation (relative positioning), start-stop operation, constant running and referencing (optionally with set-up mode or on-the-fly referencing), are activated via a control word in the same manner as enabling or selection of the direction of rotation. In addition, the position values and frequencies, or alternatively the correspondingly parameterised BUS I/O bits such as the reference run function are communicated in the process data. For further digital functions, the PLC also accesses two bits which can be parameterised in the control word of the SK 205E. For example, in order to carry out the next positioning step in cyclic operation, bit 8 is linked with the function "Sync. Position array". The system achieves ultimate flexibility through the possibility of online specification of certain parameter values such as the function

of a digital input. Thanks to this, double functions of a sensor signal (e.g. digital input 1, function "reset position" or function "reference point") can be implemented with a minimum of installation and wiring.

Versatile functions for modular conveyor systems

The SK 200E frequency inverter series includes a wide range of models, which are graded according to their performance. Even the basic model SK 295E provides a wide range of functions such as sensorless current vector control, POSICON positioning control, an integrated brake chopper and a control unit for an electromagnetic brake. In combination with individually extendable function modules, sophisticated conveyor applications can be implemented, which up to now could only be realised with expensive servo technology. The compact decentralised inverter controls the main operating modes such as speed regulation, cycling, positioning (precision ± 0.5 mm) and start-stop operation. In addition, the SK 205E allows automatic referencing of the incremental encoder used for positioning. By means of an intelligent control unit, referencing can be carried out during operation in the form of a deliberate reference run or referencing "on-the-fly" according to requirements. The frequency inverter is equipped with four freely programmable parameter sets in which the settings for the various functions can be made (positioning function, ramp times, frequencies, selection of process data, digital functions etc.). For local manual operation the frequency inverter can be fitted with a potentiometer unit or an I/O extension. The necessary modular components can either be integrated into the inverter, mounted on it, or installed in the vicinity of the inverter.



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SK 200E: integrated motor version
(Optional: field bus technology unit with M12 connections)



SK 200E - The decentralised frequency inverter series from NORD.

Thanks to defined performance gradings (SK 205E, SK 215E, SK 225E and SK 235E), unparalleled scope of functions (PI controller, encoder, Posicon etc.) as well as a comprehensive selection of accessories (I/O extensions, field bus modules, etc.) this series is ideal for a wide range of industrial applications. They are available in protection classes IP 55 and IP 66 and are therefore especially suitable for decentralised drive solutions.

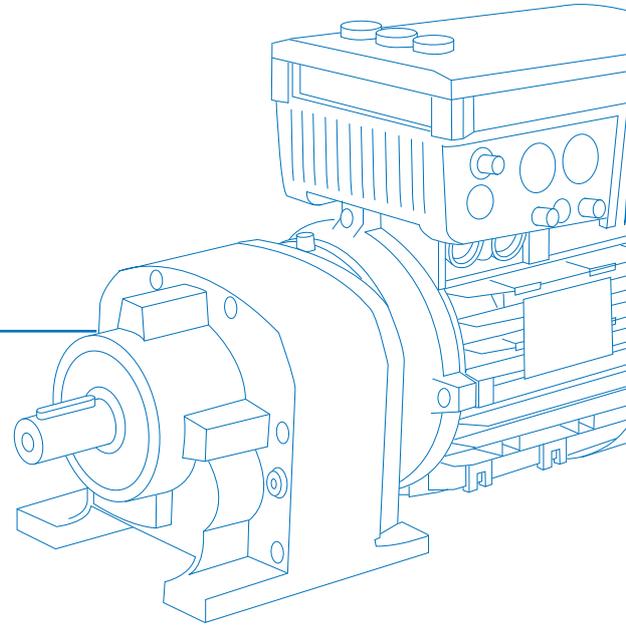
SK 200E frequency inverters are available in power ranges from 0.25 to 7.5 kW. For preference, the inverters are directly mounted on the motor terminal box of the gear motor in order to create combined, fully integrated drive units for use in the field. These robust, reliable and economic systems are suitable for extensive systems, for instance conveyors, and were specially optimised for price-sensitive market segments. The series offers a unique range of functions (including PI controller, encoders, POSICON positioning control) as well as a comprehensive range of accessories (e.g. I/O extensions and field bus modules). With a high starting torque and large overload reserves, the drive units with ISD current vector control are suitable for almost universal use.

The fully integrated drive units are mechanically robust and resistant to typical sources of interference such as fluctuations in mains voltage or rapid temperature changes. Various versions offer protection classes IP 55 and IP 66 and are therefore particularly suitable for decentralised drive solutions. The devices are especially easy to control and program. In addition to the basic SK 205E version, which includes an energy saving function, speed feedback and process controller as well as positioning functionality, other versions with "Safe Stop" and integrated AS interface can be selected (SK 215E ... SK 235E).



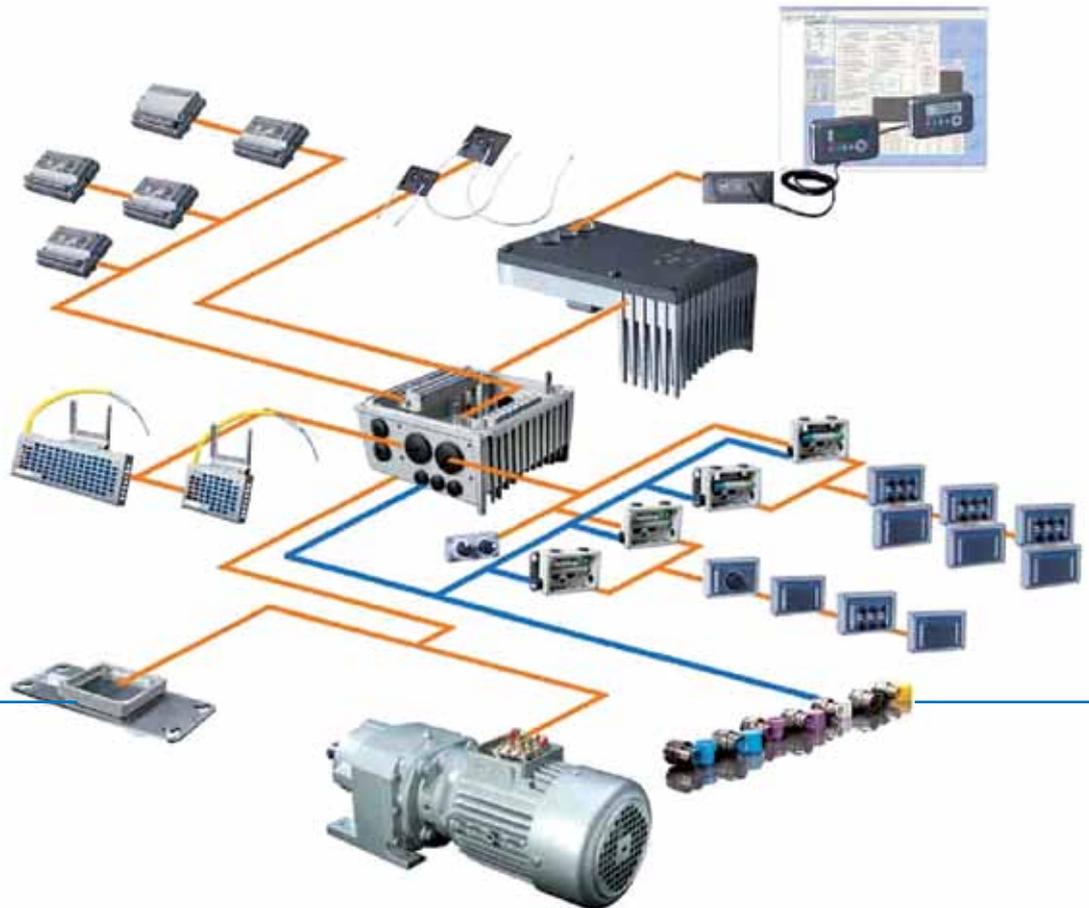
SK 200E: wall-mounted version
(Optional: system plug connectors HAN10 and M12)

Flexible communication possibilities



The SK 205E provides various control interfaces. In the simplest case, the frequency inverter can be configured for simple start-stop operation, independent of a control unit with the aid of a few DIP switches. For all other requirements, the SK 205E can be controlled via digital or analog I/Os or a wide range of field bus systems. In the most sophisticated version of the TAKTFLEX system, the frequency inverter communicates with the PLC via a Profibus DP interface.

By means of a Profibus DP gateway implemented in this interface, up to four frequency inverters can be connected to each Profibus DP module. With a possible total of 122 Profibus DP modules, up to 488 frequency inverters can be directly controlled via a single bus system.



The system, consisting of decentralised frequency inverters and modules enables cost-effective implementation of a wide range of functions as well as connection to all common field bus systems.

Getriebebau NORD - Company background

NORD DRIVESYSTEMS develops, produces and sells drive technologies, and is one of the international leaders in the industry. In addition to standard drives, NORD supplies application-specific concepts and solutions, even for special applications, for example with energy-saving drives or explosion-protected systems. NORD produces a wide variety of drive units for torques from 10 Nm to 200,000 Nm, electric motors with powers from 0.12 kW to 200 kW as well as the necessary power electronics in the form of frequency inverters and servo controllers. The company, which was founded in 1965, recently achieved a turnover of around 330 million Euro. At present it has over 35 subsidiaries around the world. The closely meshed sales and service network ensures optimum availability for short delivery times and customer-oriented services.



Company background: inotec automation & inspection technology

inotec AP GmbH was founded in 1996 in Wettenberg in the German state of Hesse. It has developed from a design provider to a manufacturer of complete systems for automation and inspection technology. From its initial staff of three, the company has grown to its present total of eleven employees in the fields of development, design, production and sales. Based on many years experience in the construction of special machinery, in addition to customised solutions inotec AP also supplies various automation products in the form of system components. The modular TAKTFLEX system now opens up the segment of series production systems. Short distances between design and production enable the company to maintain high quality and short delivery times.





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