

Flying Shear Control System for metal sheet cutting lines

Flying Shear Control

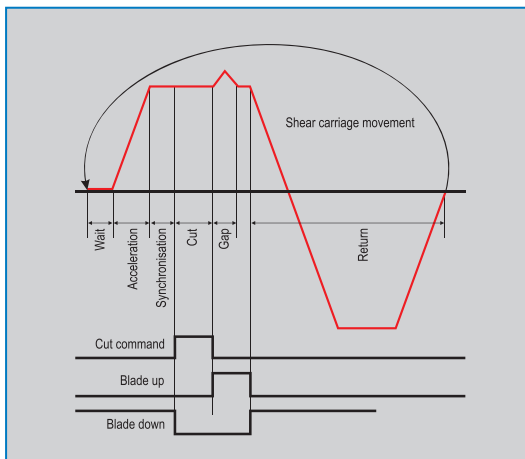
Transverse cutting lines are used to obtain sheets of the required length. These machines can be equipped with feeder systems, or with linear or rotating flying shears, depending on the type and thickness of the material to be cut.

Linear shears can attain an average production speed of up to approx. 60 m/min and a maximum cutting tolerance of 0.3...0.5 mm. The number of cuts per minute depends on the cutting length and the upstream line speed.

With the flying shear there is no need for a loop accumulator pit. This system can therefore be designed to cut sheets of up to 15 mm thick.

The blade or cutting assembly is mounted on a carriage that moves forwards, i.e. in the same direction as the sheet, and backwards.

The carriage control system measures the advancement of the sheet using a metric wheel



The Gefran linear flying shear control system is fully integrated in the Gefran-Siei Servo Drive series ARTDriveS XVy-EV.

Compared to traditional vector control inverters, servo inverters feature high bandwidth position and current regulators (125 μ s and 62.5 μ s respectively). This makes them ideal for use in highly dynamic applications.

XVy-EV drives can be used to control applications that use brushless or asynchronous motors.

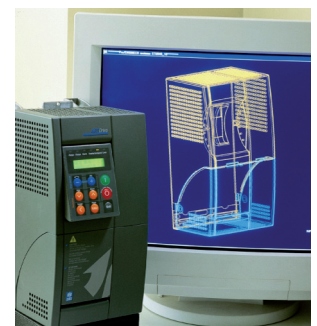
ARTDriveS



incorporating an encoder that generates a high number of pulses per revolution.

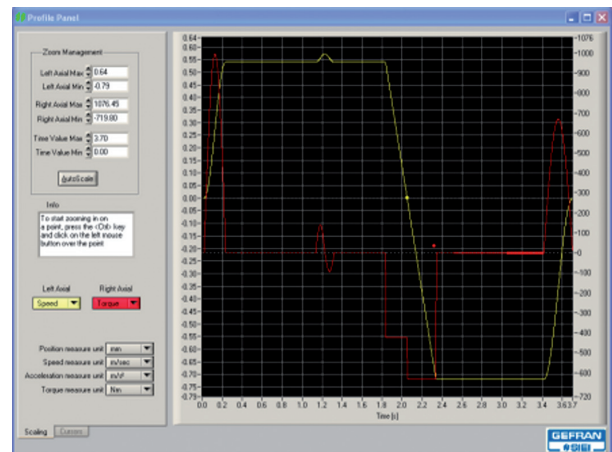
The carriage speed profile is structured as follows:

- A waiting phase in which the material slides under the carriage while it is stopped in its zero position.
- Acceleration of the carriage until reaching the speed of the material.
- Synchronisation of speed and space. When synchronisation is achieved, the control system sends the *Cut command*.
- Gap function during which the carriage is moved further forward to increase the distance between the blade and material as it advances after cutting.
- Return of the carriage to the waiting position.



Features of the Linear Flying Shear Application

- Only 2 bits are used to manage the entire cutting system via digital inputs or fieldbus (Enable and RunCmd). Extremely simple PLC sequences.
- Gap function to move the blade away from the material after cutting.
- Cyclical ramps on forward acceleration and return deceleration for reduced stress on mechanical parts.
- The cutting position can be changed with the machine running.
- Calculation of maximum line speed according to the set cutting length.
- Virtual Master function for commissioning without material.
- Control function via serial port for commissioning from PC.
- Modbus, CANbus and Devicenet communication protocol provided as standard, Profibus with the use of an optional additional card.
- Easy start-up using a single E@syDrives configurator to set the motor and inverter parameters, and the shear application.
- Simulation tool running on PC enables checking of shear performance data (line speed according to cutting length) and sizing of the motor (rated speed, rated and maximum torque) and drive.
The data acquired by the tool are also used to configure the control system during commissioning.



The Application division of Gefran S.p.A., based in Gerenzano, works closely with customers to develop the best machine control solutions to meet each specific requirement.

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