

9400 Servo Drives



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Servo technology for efficiency and safety



**Waterproof in the truest
sense of the word:
TRESU's safety concept**

The TRESU Group's flexo printing machines give fish packaging the layer of protection they need – Lenze 9400 Servo Drives equip the machines for safe and efficient operations.

Lenze

9400 Servo Drives

Remit

- ▶ To equip a four-colour flexo printing machine with new safety functions
- ▶ To guarantee permanent machine availability
- ▶ To provide controlled stopping of all axes together on request
- ▶ To bring all drives together to a safe standstill under torque
- ▶ To restart the production process without any loss of material (paper)
- ▶ To supply a safely limited speed for cleaning the printing rolls

Solution

- ▶ Drive-based safety integrated in the 9400 Servo Drives are scalable drive-based safety functions
- ▶ Reduction in the risk of web breaks by maintaining web tension using the safe stop 2 safety function rather than the safe torque off function previously used
- ▶ Provision of safely limited speed with just one encoder system - the motor encoder
- ▶ Multi-axis grouping with a total of twelve servo axes, connected via a shared DC bus
- ▶ Axis synchronisation with electrical shaft using a virtual master value via CAN
- ▶ Ethernet connection for worldwide remote maintenance

Brief profile



- ▶ Established in 1981
- ▶ 250 employees
- ▶ www.tresu.de

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The TRESU Group specialises in flexo printing machines with added safety



The flexo printing machine is a rotating roll machine that prints and seals special packaging material. The coarse paper is printed with no more than three colours and a protective layer of lacquer is then applied to one side, increasing the paper's strength and giving it a water repellent coating. If necessary, the protective layer can also be applied on both sides which means that one less colour can be used in printing. The coated paper is then made into a folded box in a downstream machine not produced by TRESU. These boxes are mainly used on fishing boats for packaging freshly caught fish and freezing them onboard.



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Within the system, the paper web passing through all four printing units and their dozens of guide rolls reaches an ultimate length of 80 metres. During everyday machine operations, the printing rolls require routine maintenance, especially replacement of the plates. The machine has to be

brought to a complete stop to ensure safe handling. The printing rolls also have to be cleaned regularly with the system running at a limited speed.

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There are eighty metres of paper under constant tension – only a system that stops under safe control will be able to quickly restart

The printing machine's rolls, which actually print the paper, each have a processed rubber surface which serves as the printing plate. A guard is used to protect this from direct intervention by operating staff. If the machine operator opens the guard to change to a different plate or to undertake maintenance work on the rolls, what is known as a safe stop 2 (SS2) is performed on the entire machine and brings every axis to a stop in less than 2.5 seconds. Once the machine has been stopped, all axes are kept at a standstill using the safe operating stop (SOS) under torque.

To carry out a cleaning procedure, the printing rolls can now be moved at a safely limited speed (SLS) by activating an enable switch.

If retooling and fitting another plate, the corresponding roll has to be removed from the machine. The Safe Torque Off (STO) safety function on the single axis is triggered for this purpose. This safety function is triggered using a safe two-channel sensor. The machine has a number of appropriately marked buttons for initiating an emergency stop. These are connected via two channels to safe inputs of safety modules which perform a safe stop 1 (SS1) on the master when



The TRESU Group's flexo printing machine prints paper for packaging material.

activated. Once the master has stopped the entire group and gone into STO, a STO is then also triggered on all machine axes (slaves).

Before the safe stop 2 was introduced, machines had to regularly go over into STO for all maintenance or replacement work and the unit was not held under torque. To restart, the tension of the material throughout the entire machine therefore first had to be re-established. The material in the machine could then not

another approx. 10-15 minutes of lost time.

The previous design of this machine had to feature a second encoder system for secure speed measurement and a speed monitor and safety switching device for evaluation. Two mains contactors had to be fitted to safely deactivate the energy on two channels. These components are no longer needed in the new system; only one mains contactor is used.



The yellow safety module snaps into the 9400 Servo Drives with an audible click.

be used. Up to eighty metres of paper was therefore lost after every stop before effective production could resume. When all axes are brought to a controlled stop under torque using SS2, the material does not lose its tension. Not only does this avoid material having to be scrapped, it also saves between four and five minutes as the material does not have to be removed from the machine each time and production can be resumed immediately.

Furthermore, the risk of a web break was far greater with the previous solution because the paper web was always subject to increased tension when restarting the machine. Having to thread the paper back into the machine represented

Customer comments

As well as delivering increased safety for operating staff, the new drive-based safety and SS2 solution helps to directly cut costs for our customers. In terms of hardware, removing the second encoder system and reducing scrap are obvious advantages. By improving availability, we are also able to guarantee increased productivity.

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