Frequency Converter Prevents Overloading

Speed Monitoring and Functional Safety for Conveyor Belts of Furnaces

At a Glance

- Overloading conveyor belts can cause drives to overheat and even start fires
- Continuous speed monitoring detects if the drive is overheating and triggers a complete stop of the entire conveyor system
- The KF**-UFC-Ex1.D frequency converter detects whether the speed values are above or below the set limits
- Integrated relays trigger a shutdown and alarm
- The simultaneous control of connected loading devices automatically stops the entire conveying process

The Application

Conveyor belts are typically used to transport coke, as it is used to operate furnaces in steel production. If the furnace is in the immediate vicinity of open water, the coke is unloaded directly from the ship. If not, coke is usually delivered by rail. In both cases, the coke is transported via a conveyor system or screw conveyor to be temporarily stored or fed directly into the furnace.

This can lead to the conveyor being overloaded, which is usually triggered by foreign matter or excessive loading. This can then result in the drives overheating, which is not entirely without risk given the combustible transport material.

The Goal

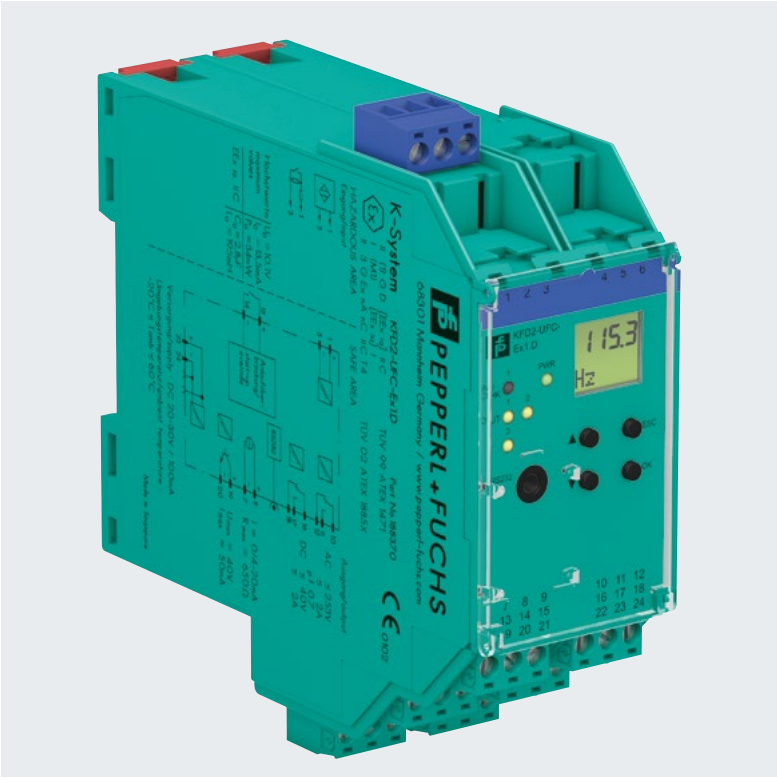
To avoid critical operating conditions, the proper functioning of screw conveyors and conveyor belts must be constantly monitored. This is usually achieved via continuous speed monitoring of the drives. If the speed falls below a certain value, the entire conveyor system is immediately stopped and an alarm signal is triggered at the same time.

This is an important safety feature of the conveyor system because a perfect speed characteristic is a clear indicator that there is no risk of fire due to the drive system overheating. Furthermore, the feature can be used to ensure the exact flow rate required to guarantee the optimal burning performance of the furnace.

The Solution

Pepperl+Fuchs offers KF**-UFC-Ex1.D series frequency converters for monitoring the drive speed of conveyor systems. These converters are capable of detecting whether the speed values are above or below the set limit values and stopping the drive from operating before a critical situation can occur due to the drive overheating and the transport material igniting.

The speed monitoring feature can be used as a manipulated variable for systems upstream of the conveyor system. For example, the screw conveyors and paddle wheels used to fill the conveyor system can be controlled. If the conveyor system malfunctions, further filling is automatically stopped.



The Benefits

KF**-UFC-Ex1.D frequency converters are ideal for monitoring the motors of conveyor systems for overloading. If the converter detects that a predefined limit value has been exceeded or not reached, the drive is automatically deactivated to prevent any further damage from occurring.

The primary function of the frequency converters is to convert a discrete input signal into a proportional and freely adjustable analog 0/4 mA to 20 mA output signal. This means they act as a signal converter and alarm trigger when a limit value is exceeded. In this case, relay outputs are activated to trigger the necessary switching operations.

The devices fit on a standard DIN mounting rail and are suitable for safety-related applications according to SIL 2 (IEC 61508/ IEC 61511). Start-up override and line fault detection ensure reliable operation. The converters are available as isolated barriers for intrinsically safe signals or as signal conditioners for signals from the safe area.