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## ifm Solutions for Crusher Protection



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# ifm Solutions for Crusher Protection

## What are the challenges to monitor and protect crushers?

Today, crushing automation is already a reality in the mining industry and offers many benefits to the process, improving for example operation control using process data to increase Production performance. With predictive maintenance, it is possible to anticipate failures, avoiding thus high maintenance costs. There are several challenges, such as: wear of components, material build up, activation malfunction, fluid contamination, hydraulic system failure and others. With appropriate monitoring of the crushers, it is possible to optimize the process while improving controls and availability of the machines.

## What solutions does ifm offer?

We offer online technology to monitor the crusher's status, including:

- Predictive monitoring of the engines and drive pulleys;
- Monitoring of the crusher's structural vibration;
- Monitoring of the oil quality and the hydraulic unit components;
- Monitoring of the feeder level and outlets of the crusher;
- Sending of process data to Control or SCADA systems, IT monitoring software based on J-SON and MQTT.



### How to predictively detect mechanical failure caused by uncrushable material in the process?

With predictive monitoring it is possible to detect major failures that may occur during the crusher operation, as for example: Loose belts, gaps in the pulleys, malfunction or bearing failure, broken bushings and/or shaft. Besides these issues, additional protection is required to avoid unexpected stops due to speed reference loss, material buildup at the crusher outlet and ring beating. With the diagnostic electronic VSE from ifm we are able to monitor many variables, such as speed and temperature as well as more sensitive data such as vibration. And all this in one single hardware that comes ready to communicate both with the AT universe and IT.



### How to monitor oil contamination?

Crushers are machines that require regular oil changes in order to protect the components of their hydraulic system. Every 1,000 hours, a sample is collected for analysis in a laboratory and for quality certification. The LDP100 optical particle counter monitors the degree of purity or dirt level in hydraulic oils, pursuant to standards ISO4406 and ISO6149-2, and offers online monitoring of the particle suspended in the oil, and additionally, a second sensor will detect any higher concentration of water which could seriously affect its operation or cause damage. The LDH100 model measures relative humidity in the oil with a capacitive measurement element in the range from 0...100%. Besides relative humidity, the sensor also transmits the fluid temperature. For the crusher's smooth operation, it is critical to ensure that the oil is at a level, pressure and temperature required by the system.



### How to remotely monitor the feeder level?

The new tilt sensor was designed for heavy industry applications and can be used to monitor the high stack level of ore, coal or any other granular material. The device has a sturdy aluminum housing and a non-stick Teflon side that allows the capacitive sensor, which is remotely adjusted via IO-Link, to detect the level of the material in question without false positive.



We researched suitable technologies on the market to monitor our crushers, and we found ifm. Now we have total control over our equipment, thus avoiding unwanted stops. This increased our OEE by 1%!



Products for the solution	
ZZ0700	Tilt Sensor
VSE151	Technical Diagnostics   Ethernet/IP
VSA201	Vibration sensor for high range
TP3231	Converter for temperature sensor
TS2229	Bolt-on temperature sensor
IGW201	Speed monitoring
AL1302	IO-Link Master   PROFINET
DN4013	Power supply 24V DC 10A
PN2071	Pressure sensor for oil 250 bar
TA2415	Temperature sensor for oil
LR3000	Microwave level sensor
LDH100	Oil humidity sensor
VVB001	Vibration sensor via IO-Link
LDP100	Oil particle monitor
JN2201	Inclination sensor via IO-Link