



SKF®



SKF Copperhead fault detection

Presented by SKF 1 Industrial Team

2008

SKF Mining, Mineral Processing and Cement

Services platform



Training

Mechanical

RCFA

Engineering Consultancy

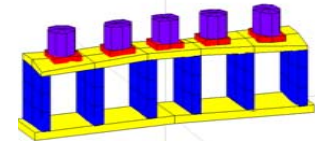
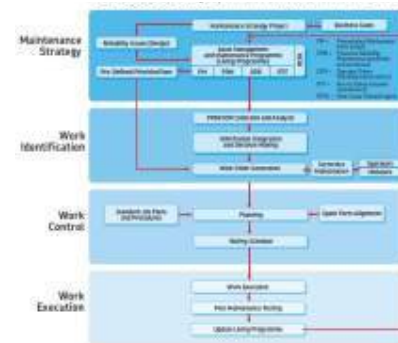
PdM

PRM

IMS



Asset Efficiency Optimization



Asset Management Services

SKF Copperhead fault detection



Machinery fault detection

- Crushers
- Conveyors
- Grinding mills
- Vertical grinding mills
- Fans
- Vibrating screens
- Hoists
- Pumps, motors, gears

Basic components



CMPT sensors

(vibration and temperature)

- Rugged, low profile design
- High shock resistance
- Permanent mounted in machine



CMPT CTU

Vibration and temperature transmitter
(Enveloping, Acceleration and Velocity)

- Early detection of vibration faults
- Two 4 to 20 mA proportional signal



CMPT DCL display / alarm module

Digital display and alarm for vibration and temperature (°C)

Each system provides optional

- Stand alone ALARM function
- Visual LED lamp for ALARM
- Internal relay contacts (48 V DC / 0.5 Amp)

Prevent unplanned downtime, reduce maintenance and repair costs, improve productivity, improve safety

New family of SKF Copperhead sensors

CMPT family of sensors

	Vibration	Temperature
CMPT 2310	100 mV/g	no
CMPT 2310T	100 mV/g	10 mV/°C
CMPT 2323	230 mV/g	no
CMPT 2323T	230 mV/g	10 mV/°C



CMPT CTU transmitter



Vibration and temperature transmitter

- Three types of vibration analysis
 - SKF Acceleration Enveloping(gE3)
 - Acceleration (g)
 - Velocity (mm/s)
- Features for monitoring low speed ($n < 40$ r/min)
- Process signals out – vibration and temperature
 - 4 to 20 mA and 0 to 10 V DC
- Front panel user configurable
- Front panel BNC
 - buffered vibration and temperature
- 24 V DC, DIN rail mounting

SKF Copperhead C series fault detection kit

Benefits

- Connectable to PLC automation systems
- Integrates vibration and temperature
- Lowest possible costs

SKF CPHD 1C kit

- (1) CMPT 2310T sensor
- (1) CMPT CTU transmitter



CMPT DCL display / alarm module



- Monitors CMPT CTU, thermocouples and Resistive Temperature Detectors (RTD)
- 7 mm digital display
 - Vibration (gE, g, mm/s, inch/s)
 - Temperature (°C, °F)
- Programmable alarm functions
 - High, Low, High-Low
 - Event lamp (red)
 - Relay contacts (48 V DC/AC, 0.5 Amp maximum)
 - Latching / Non-latching
- 4 to 20 mA output signal
- 24 V DC, DIN rail mounting

Enclosure for Copperhead kits



CPHD EC style enclosure

Painted steel with window

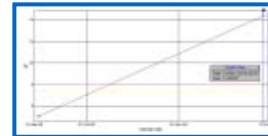
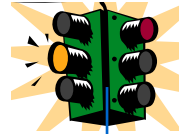
IP66 / NEMA 4

Optional stainless steel available

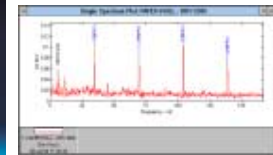
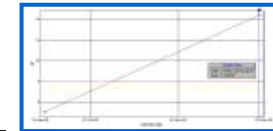
SKF Copperhead fault detection kits

Periodic Monitoring

CPHD 1B , CPHD 2B



Marlin PRO



Microlog

options

Continuous Monitoring

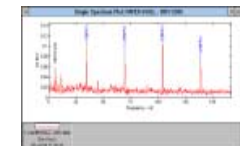
CPHD 2EC, CPHD 3ECM, ...



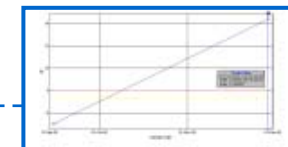
CTU Unit



Microlog



4 to 20 mA vibration
4 to 20 mA temperature

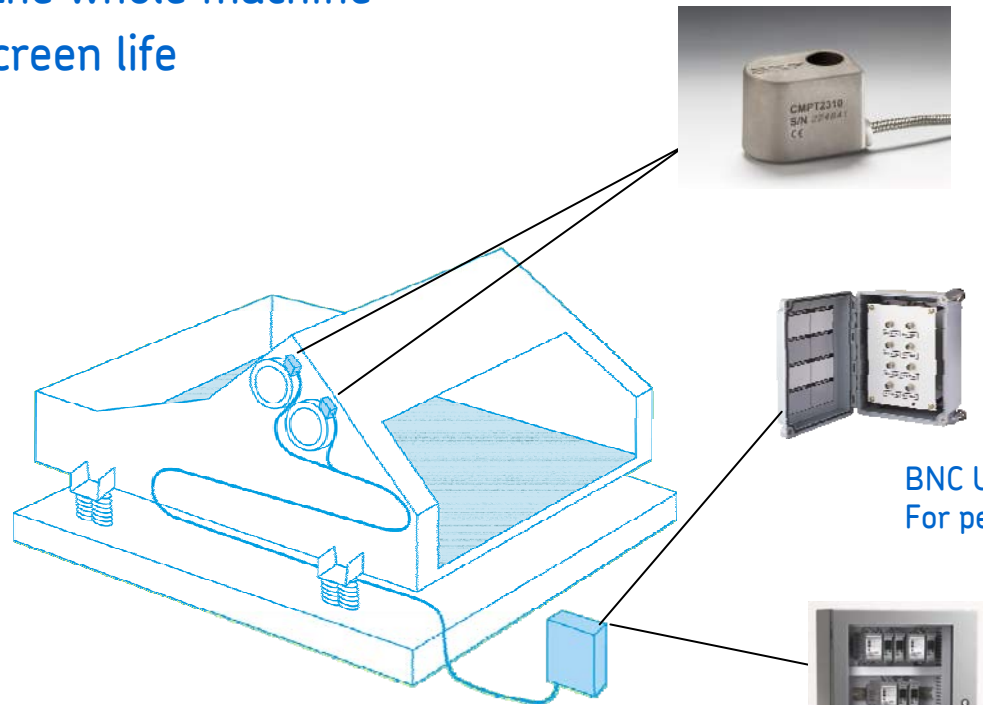


PLC / DCS

SKF Copperhead for vibrating screens

Fault detection

- Monitors the whole machine
- Extends screen life

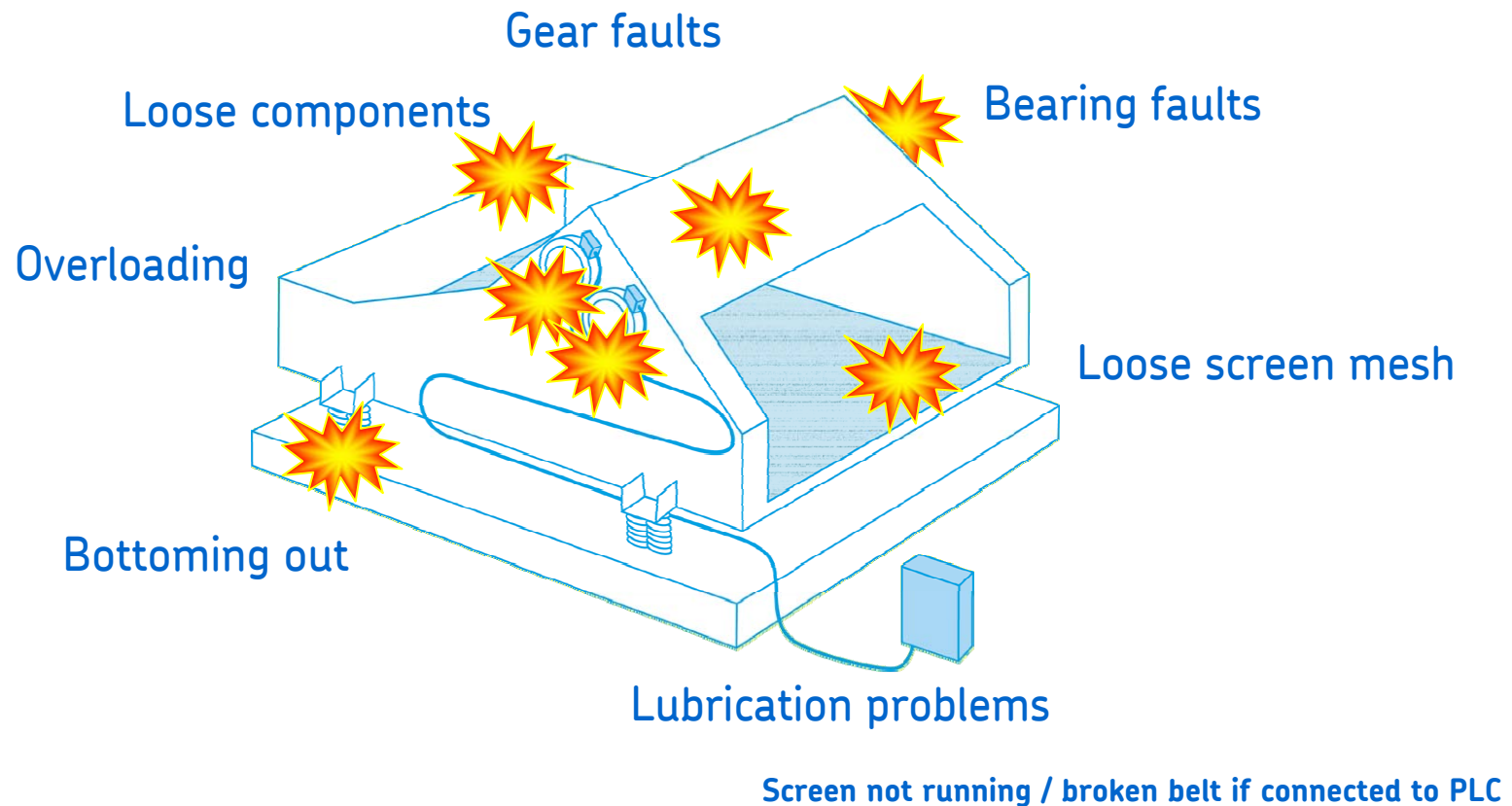


CMPT2310T sensor
(vibration and
temperature)
1 x each bearing
2 x each gearbox

BNC Unit
For periodic monitoring

CTU Unit
for continuous monitoring

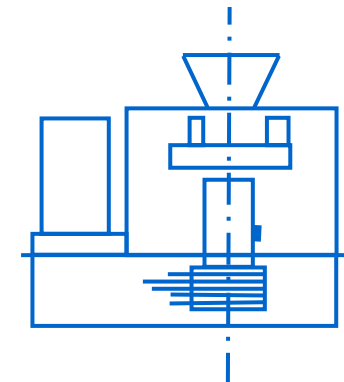
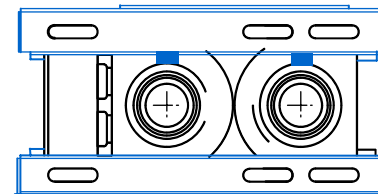
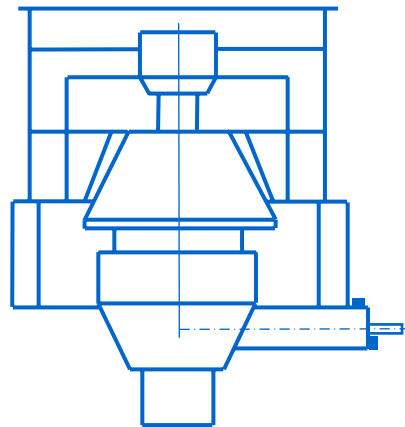
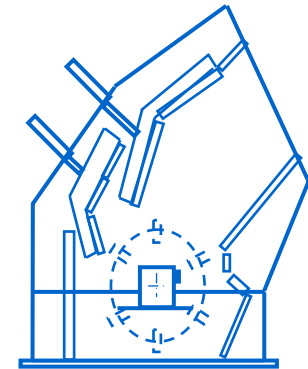
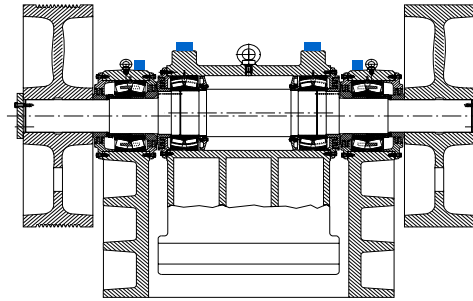
Fault detection for vibrating screens



SKF Copperhead for crushers

Monitor machinery faults to
extend machine performance

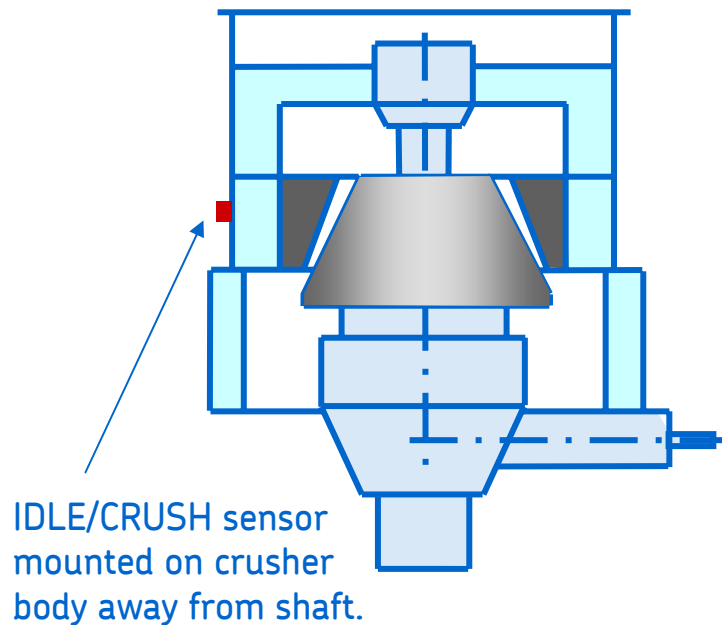
- Mechanical looseness
- Rotor unbalance
- Gear faults
- Bearing faults
- High temperature



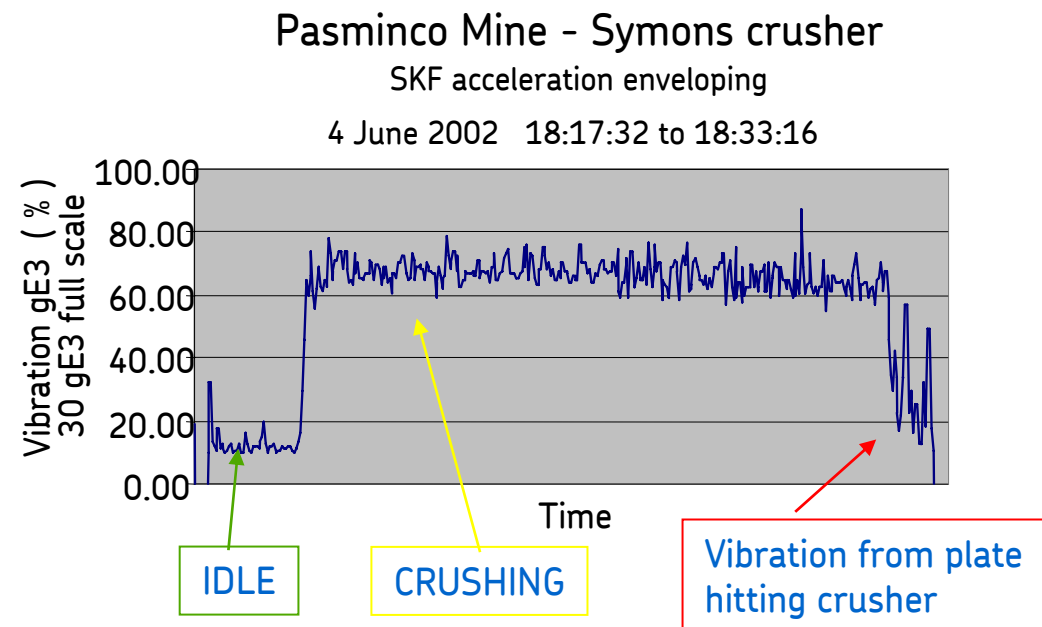
For all types and styles of crushers
Rolling and journal bearings

SKF Copperhead fault detection for crushers

Optional Crusher Module (CM) for stand-alone monitoring



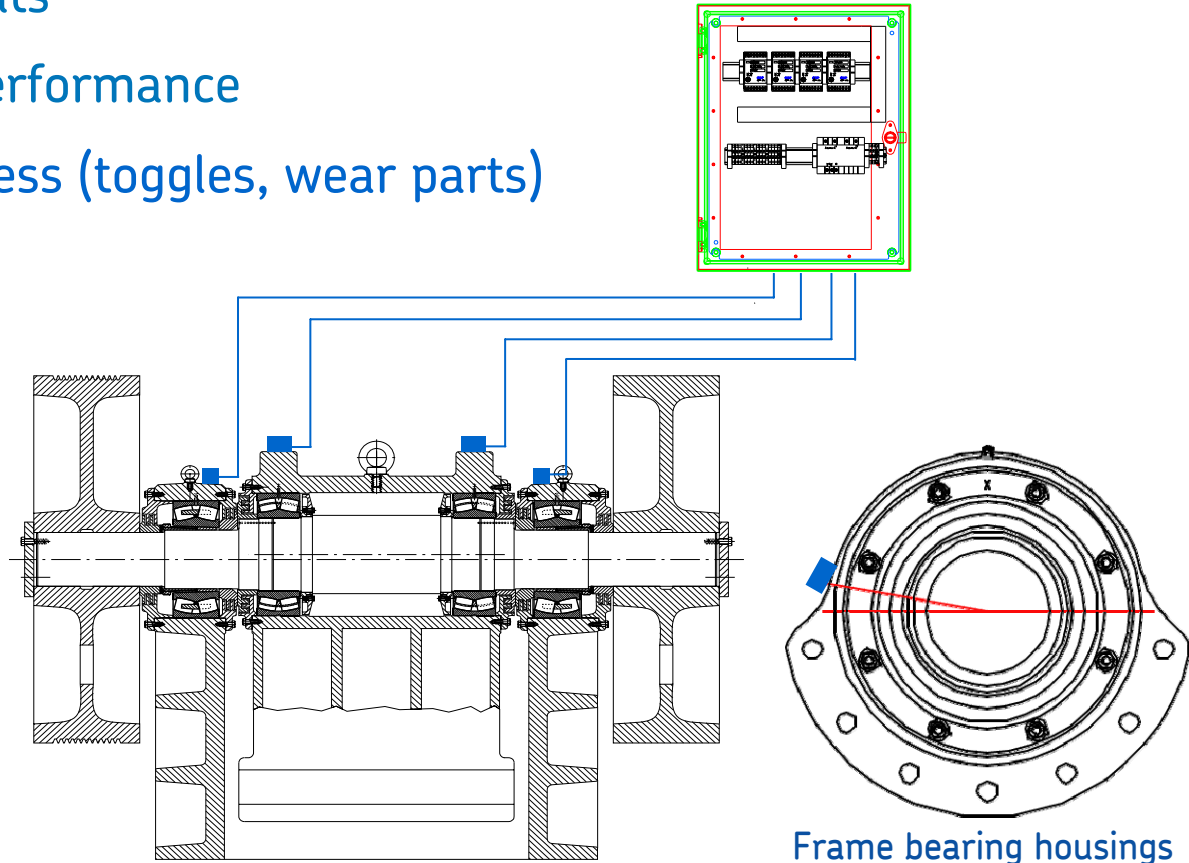
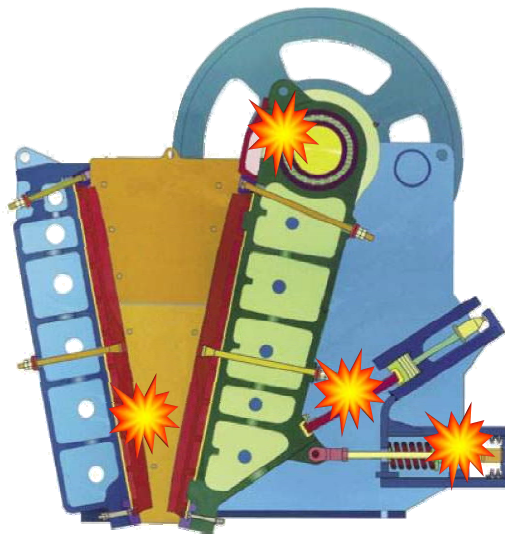
SKF Copperhead monitors for faults during IDLE mode



Example - Jaw Crushers CPHD 4EC

Monitor machinery faults
and extend machine performance

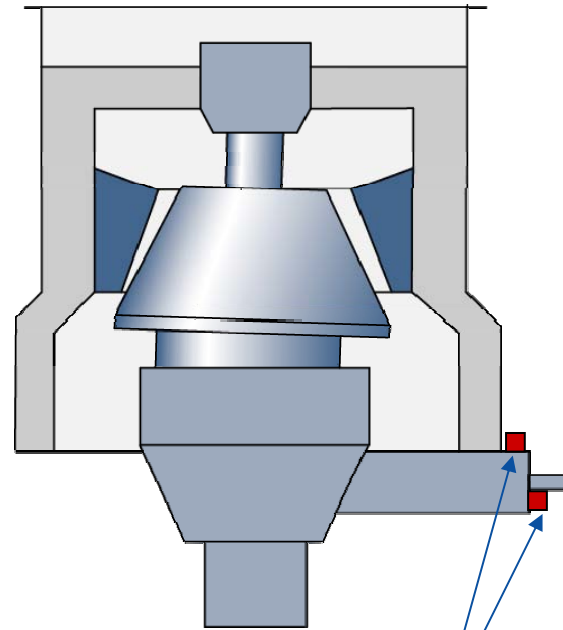
- Mechanical looseness (toggles, wear parts)
- Bearing faults
- High temperature



SKF Copperhead fault detection for cone crusher

Fault detection for pinion drives

- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature



Gearbox, motor

Vibration and temperature monitoring
CMPT2310T
(vibration and temperature)
1 x gearbox
1 x motor

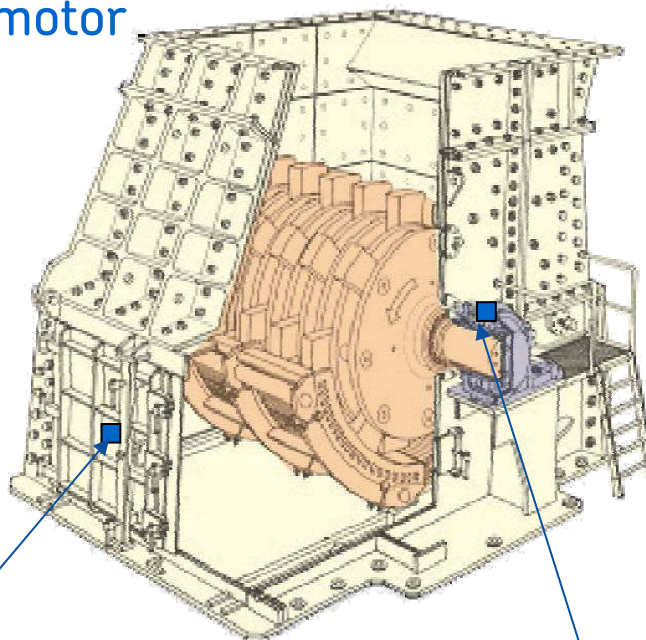


SKF Copperhead fault detection for impact crushers

Main bearings, gearbox, motor

Fault detection

- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature



CPHD 1C/10 kit to monitor overall
crusher vibrations

CPHD 1C for each bearing



CMPT2310T

SKF Copperhead fault detection for roll crusher

Fault detection for roll crusher

- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature

Periodic or continuous monitoring
Crusher module for Idle/Crushing

Vibration and temperature monitoring

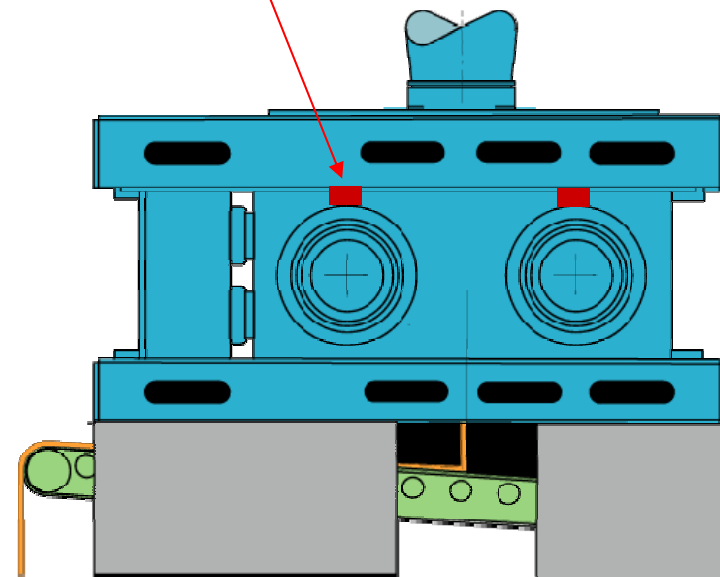
CMPT2323T sensor (n<40rpm)

(vibration and temperature)

1 x each bearing

1 or 2 x each gearbox

1 or 2 x each motor

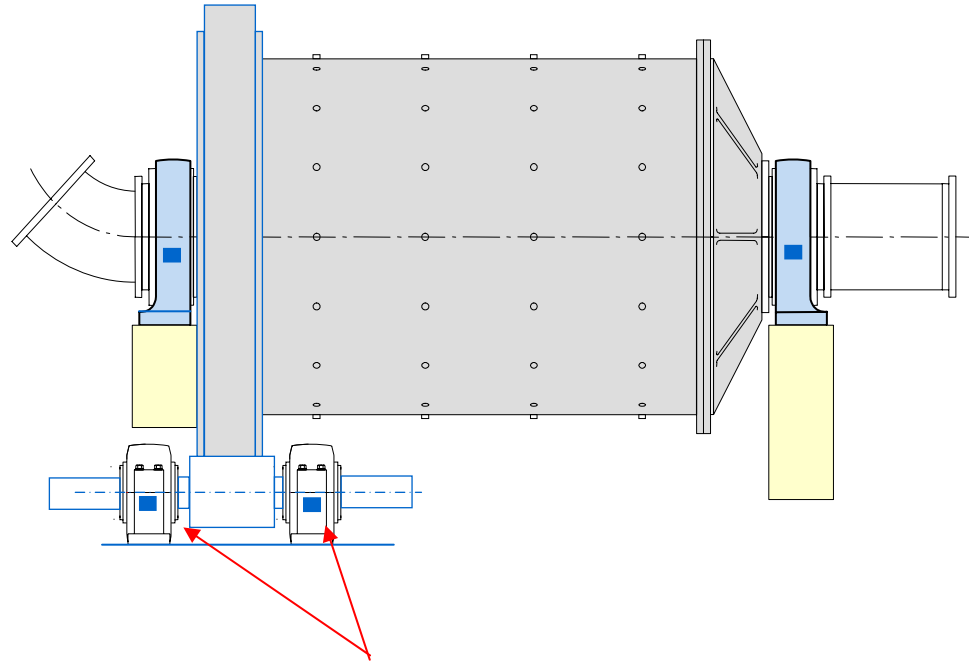


Twin and Quad roll

SKF Copperhead for pinion drives

Fault detection for pinions

- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature



Pinions, gearbox, motor

Vibration and temperature monitoring
CMPT2310T sensors
2 x pinions
1 or 2 x gearbox
1 or 2 x motor (rolling and journal bearings)

SKF Copperhead fault detection for trunnions

Fault detection for grinding mills

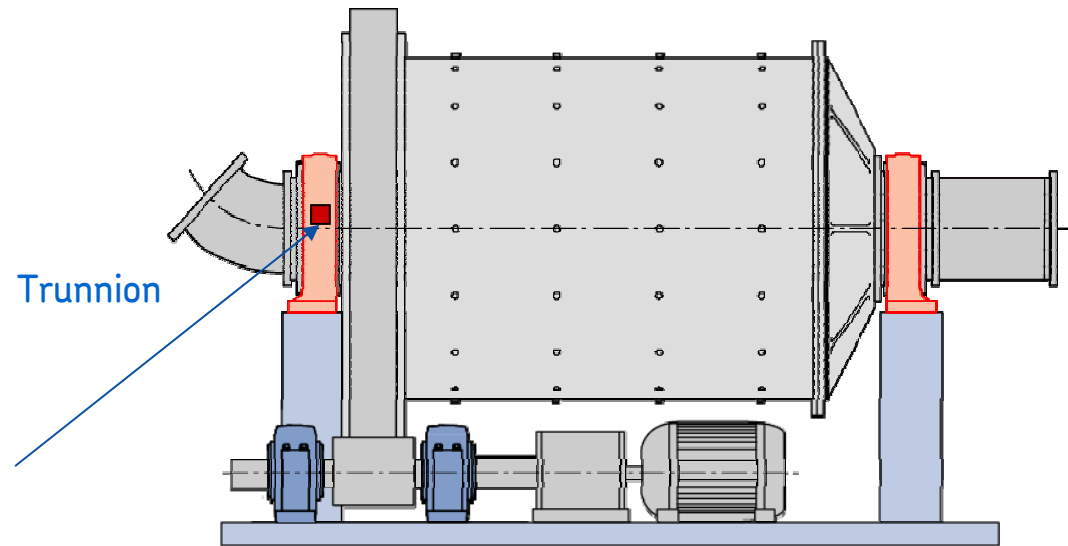
- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature



CMPT2323T



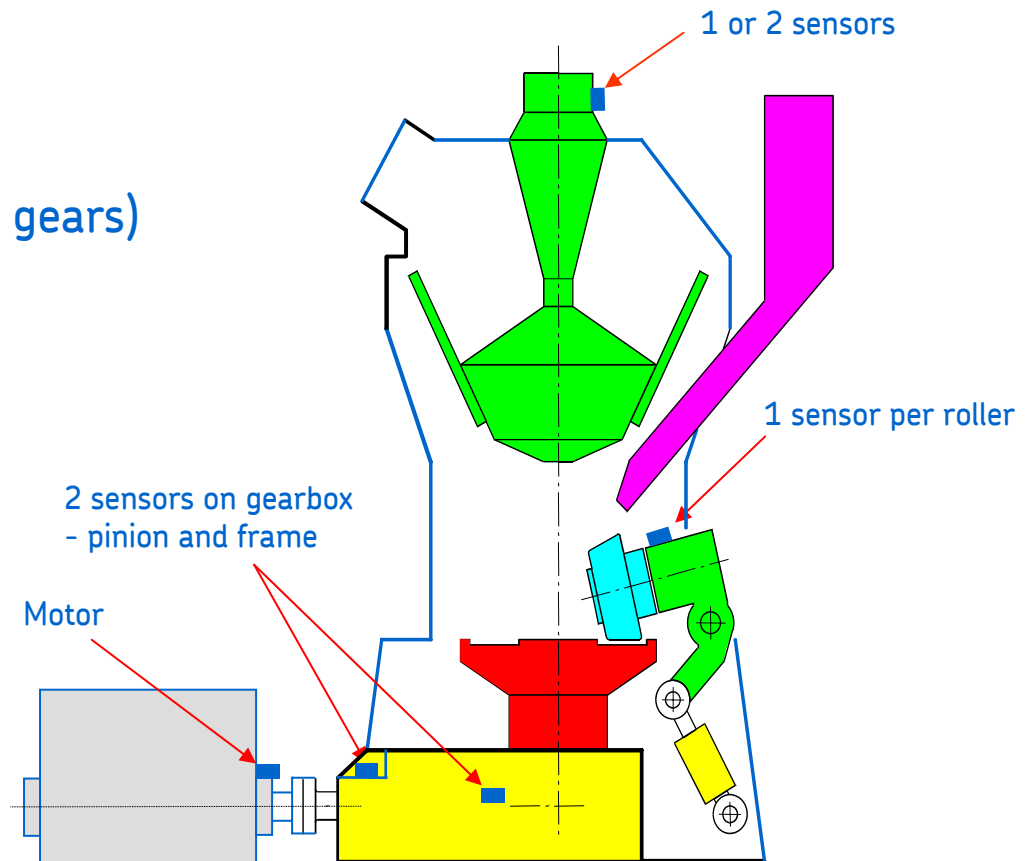
CMPT CTU transmitter set for low speed
CMPT2323T - low speed sensor



SKF Copperhead for vertical mills

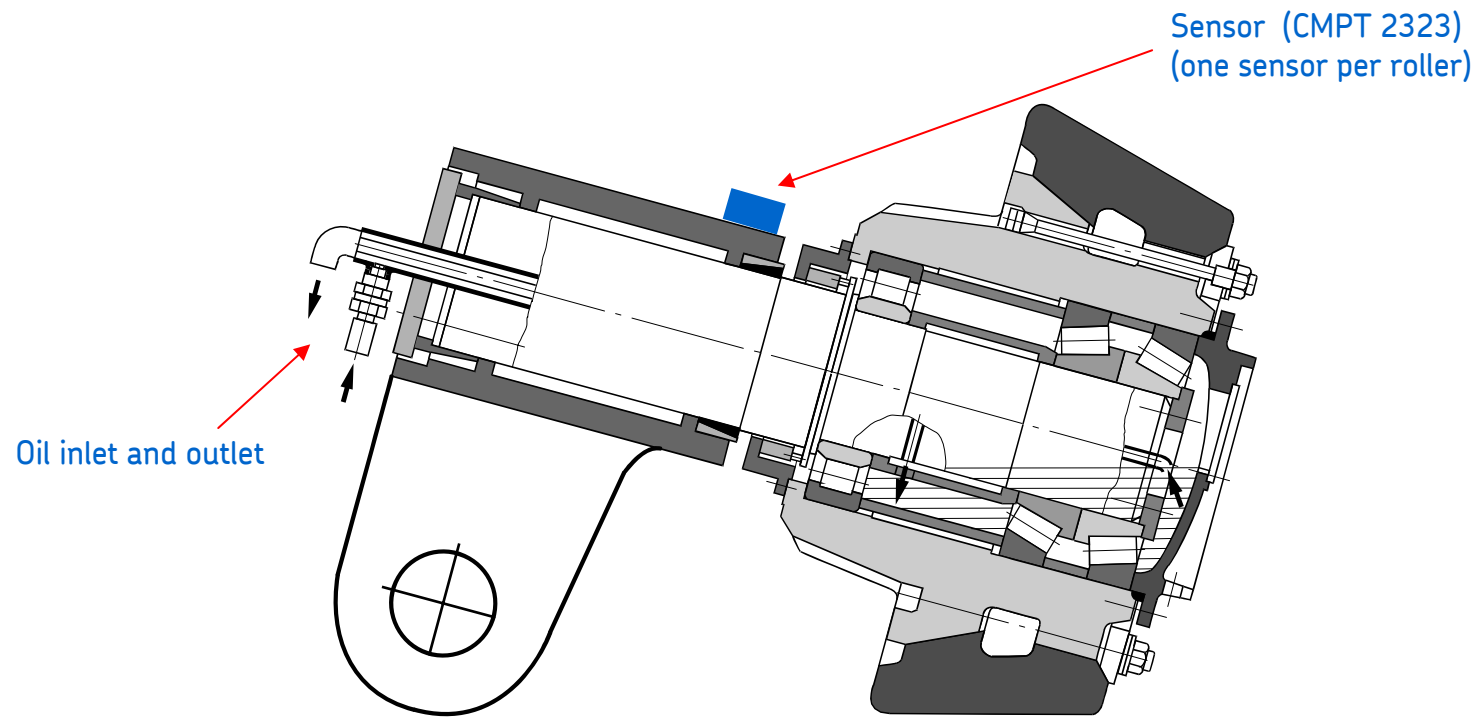
Fault detection

- Mechanical looseness
- Gear faults (except some inside gears)
- Bearing faults
- High temperature



SKF Copperhead fault detection for rollers

- Bearing faults
- Mechanical looseness

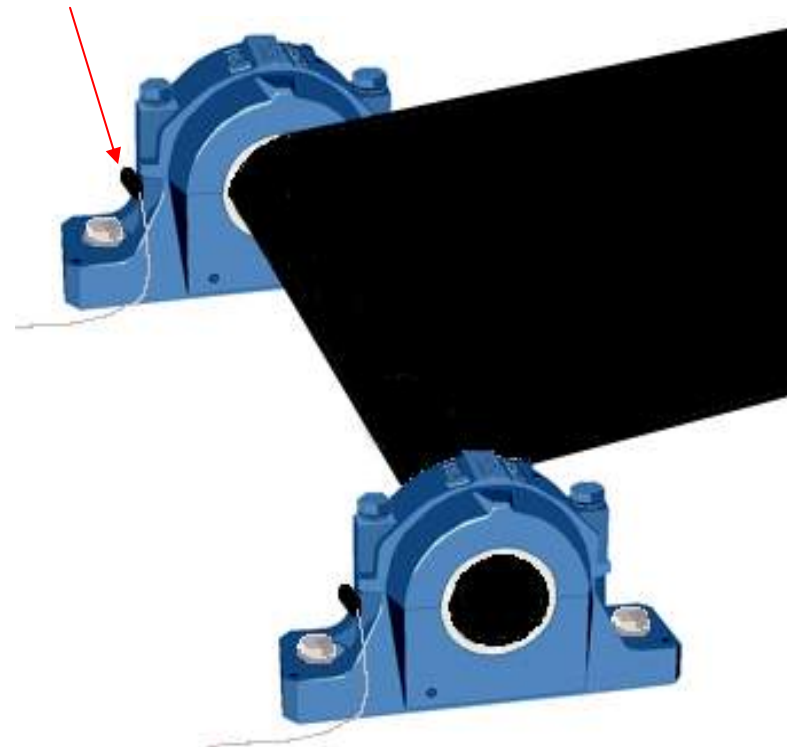


SKF Copperhead for bulk conveyors

Fault detection

- Mechanical looseness
- Bearing faults
- High temperature

CMPT 2310T sensor
(vibration and temperature)
One sensor per housing



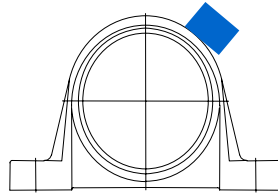
Pulleys, gearboxes & motors

SKF Copperhead for fans

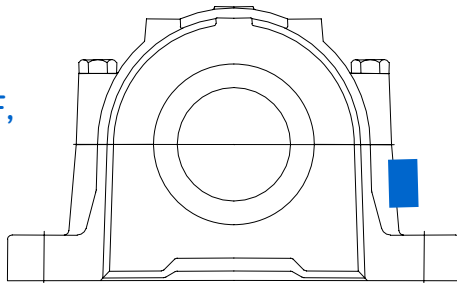
Fault detection

- Unbalance
- Mechanical looseness
- Bearing faults
- High temperature

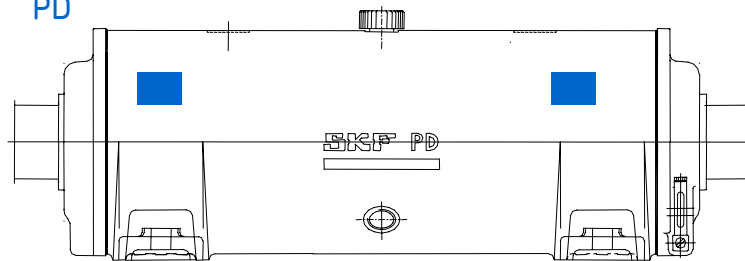
Y bearings,
ConCentra,
Unit Roller,
Pop-Release



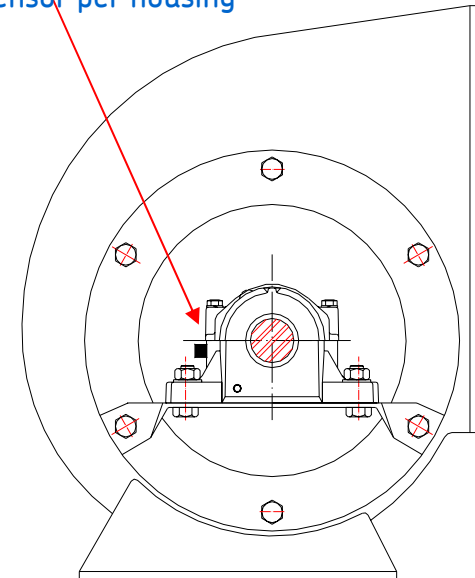
SNL, SAF,
SOFN



PD



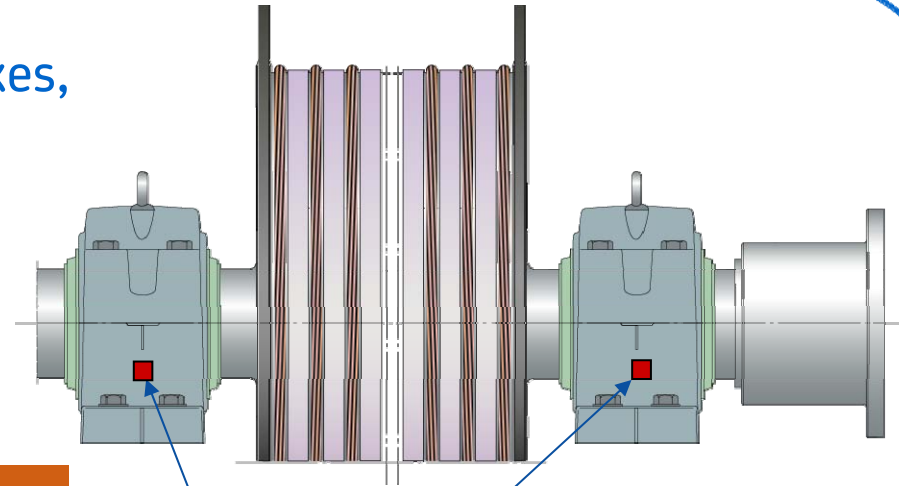
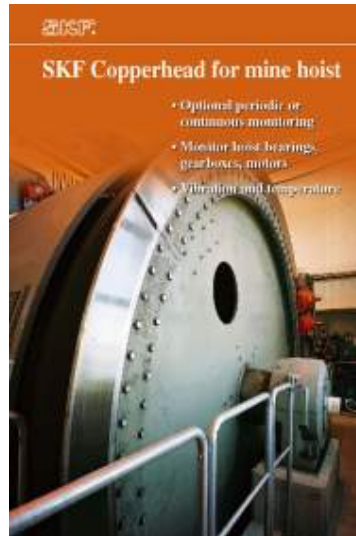
CMPT2310T sensor
(vibration and temperature)
One sensor per housing



SKF Copperhead for mine hoists

Fault detection for bearings, gearboxes, drives

- Mechanical looseness
- Gear faults
- Bearing faults
- High temperature



Vibration and temperature monitoring
CMPT2310T

(vibration and temperature)

1 x each bearing

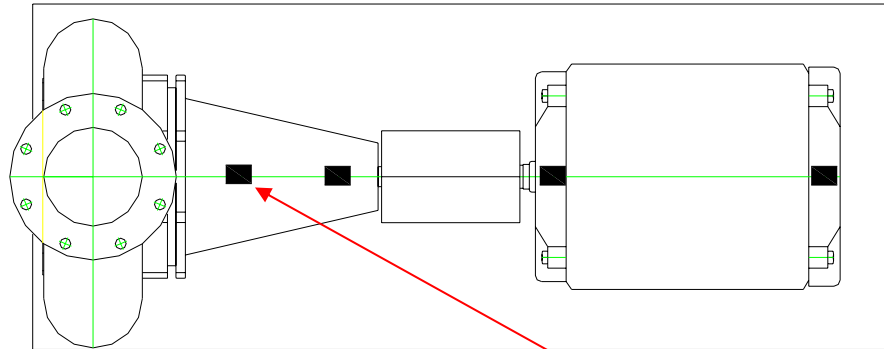
1 x each gearbox

1 x each motor

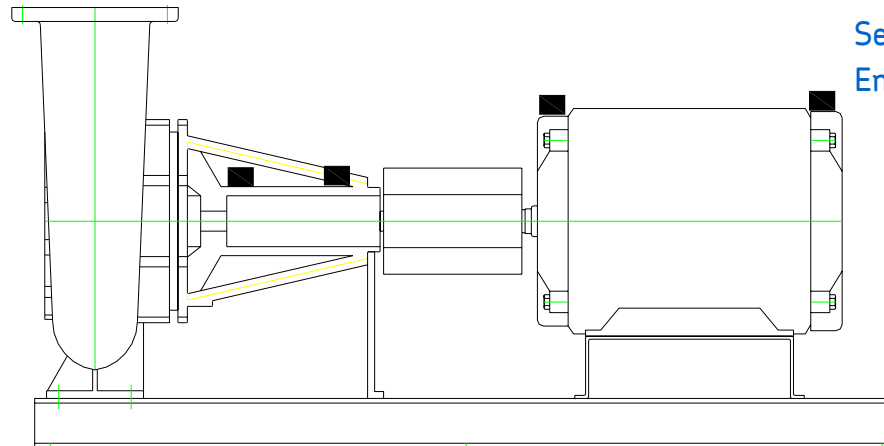


CMPT2310T

Detect pump cavitation



Mount CMPT 2310T sensor
(radially) on pump frame.



See CMPT CTU to Acceleration
Enveloping

SKF Copperhead fault detection

Features

- Rugged vibration/ temperature sensor
- Permanent mounted on machine
- Acceleration Enveloping, Acceleration, Velocity analysis
- Easy to use CTU system, PLC capable
- Stand alone system or integrated
- Pre-engineered

Benefits

- Long, reliable service
- Repeatable signals/improved safety
- Early fault detection
- Little training necessary, functional system
- Can meet individual requirements
- Easy to order

SKF resources

www.apitudexchange.com

SKF @ptitude Exchange is SKF's knowledge source for asset maintenance and reliability expertise. White papers, interactive services, tutorials, etc., are now at your fingertips. [Register](#) for FREE, and learn about [subscription options](#).

SKF Documented Solutions program (DSP)



DSP is SKF's tool to document the value and Return on Investment (ROI) for its solution.

See www.skf.com for additional solutions

SKF Copperhead fault detection

- Improve productivity and profitability
- Improve health and safety
- Improve the environment

For more information, contact your SKF Authorized Distributor,
your SKF Representative, or e-mail us at skfcopperhead@skf.com

® SKF and @ptitude are registered trademarks of the SKF Group

The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless **prior written** permission is granted.

Every care has been taken to ensure the accuracy of the information contained in this publication but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of use of the information contained herein.

© 2008 SKF Group Version 1/2/2008

SKF mining, mineral processing & cement

SKF has solutions for the
mining,
mineral processing, &
cement industry





SKF®

