

**coal mill  
fire detection  
system**



**LAND**  
instruments international

**Combustion & Environmental Monitoring**

# MillWatch

Advance warning of the onset of coal mill fires through the build-up of carbon monoxide



MillWatch is a unique detection system, specifically designed to detect rapid build-up of carbon monoxide inside pulverizing coal mills. MillWatch continuously monitors the gases inside the mill, and responds very quickly to any significant increase in the levels of CO, created by the onset of a mill fire. This provides the operator with advance warning to enable preventative action to be taken before damage to the plant, or injury to personnel occurs.

**The saving in cost of repairs following a mill fire would pay for the system many times over.**

## Features and Benefits

- Protect expensive mill equipment and prevent downtime - *Advance warning system*
- Specifically designed for fire detection on coal mills - *Fast response to prevent mill damage*
- Simple installation - *Compact analyzer enclosure, probe and sample line*
- Suited to the harsh environment of the coal mill - *Robust construction*
- High erosion and corrosion resistance - *Specially designed sample probe*
- Tailored to each application - *Easily set, site-specific alarm thresholds*
- Straightforward connection to plant recording equipment - *Standard analog & discrete contact outputs*

## Advance Warning

The close monitoring of CO, as opposed to temperature sensing, provides much earlier detection of combustion and subsequent prevention of a mill fire. The system will detect changes significantly faster - in time to prevent damage.

## Alarms

Alarm threshold levels can be set to best suit the plant operating conditions. These settings can also compensate for externally introduced CO, where mills are using recycled combustion air for coal feed heating.

## Designed for Purpose

MillWatch is only used where coal is either ground or stored, so all aspects of the product - compact box, erosion resistant probe and low maintenance - exactly meet the requirements of these demanding applications.

## Blow-back Facility

The probe uses an advanced air blow-back technique to prevent blockage of the sample system. High pressure air is blown at intervals through the sample line and down the probe tube, purging all residual dust particles on the probe filter back into the mill. Blow-back can be triggered either manually or automatically at pre-set time intervals.

## How MillWatch Works

MillWatch uses an extractive sampling analyzer system. The gases surrounding the pulverized fuel are drawn out through the specially-designed sample probe. The gas is then transported via a sample line, to the cooler unit fitted inside the analyzer, which removes any moisture. The dry and cooled sample gas is then filtered to remove particulates before being directed into the measurement system.

The measurement system comprises a pair of sensors using the latest dual sensor technique. The sensors generate an electrical output in proportion to the CO level, which is converted into an analog output (4 - 20 mA).

## Dual Sensor Technology

MillWatch uses Dual Sensor Technology to give fast measurement response and high reliability. The main advantages of this technology are the reading self-check and automatic zero drift correction the analyzer performs every 30 minutes. The system is straightforward to calibrate and inexpensive to maintain and run.

## MillWatch Probe

The probe design is able to withstand the erosive conditions at the mill outlet where the measurement is made. The outer protection tube is cast from corrosion resistant material, while the sampling tip has a screw-on replaceable steel filter to protect the sample line and analyzer from dust ingress. The probe and filter are both simple to remove and replace.



## Applications

MillWatch is suitable for monitoring on both horizontal and vertical mills, typically on the outlet.

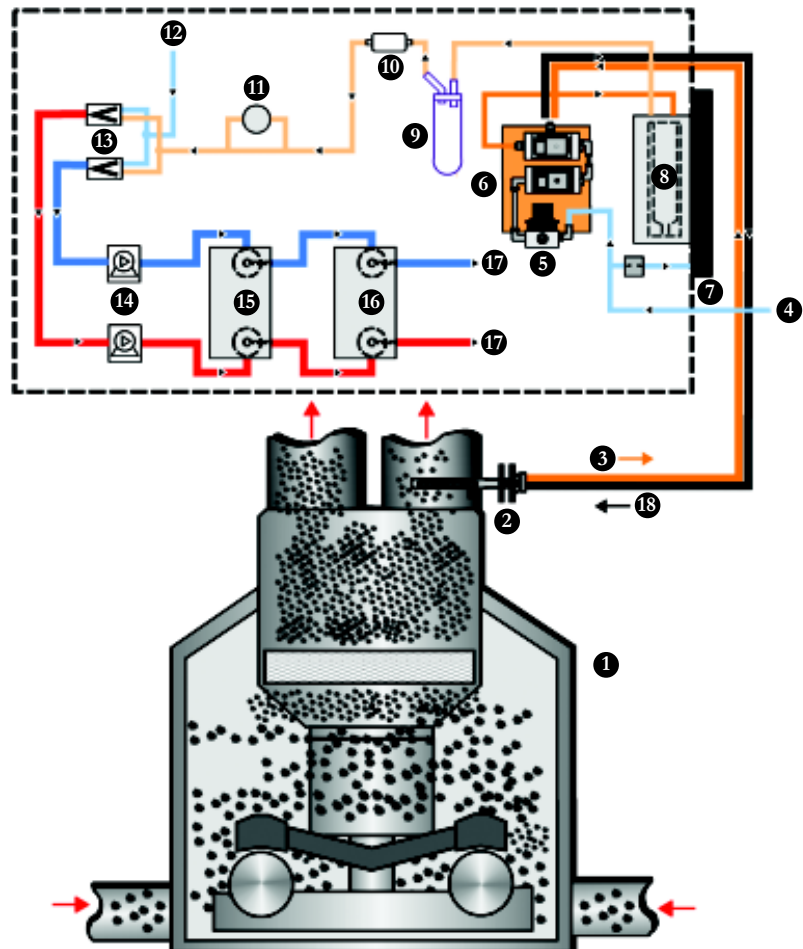
**Pulverizing Coal Mills  
Coal Bins**

**Grinding Plants  
Storage Silos**

## Key

1. PF Coal Mill
2. MillWatch Probe
3. Sample Gas to Analyzer
4. Compressed Air Inlet
5. Air Pressure Regulator
6. Blowback Unit
7. Heatsink
8. Peltier Gas Cooler Unit
9. Water Catchpot
10. Particulate Filter
11. Derived Flow Indicator
12. Air Inlet
13. Solenoid Valves
14. Sample Pumps
15. CO Sensor Unit
16. Oxygen Sensor Unit (optional)
17. Exhaust
18. Blowback Air to Probe

- Hot Sample Gas
- Cooled/Cleaned Sample Gas
- Instrument Air
- Measurement Channel #1
- Measurement Channel #2
- Blow-back Air



## Further Information

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## Specifications

### Analyzer

#### Measurement Ranges

Ranges (selectable): 0-100 up to 4 000 ppm in 50 ppm steps or  
0-100 up to 5 000 mg/m<sup>3</sup> in steps of 50 mg/m<sup>3</sup>  
Resolution: 1 ppm  
Repeatability: ±5 % of reading  
Linearity: < 2 % of range  
Zero drift: < 2 % of range per month  
Span drift: < 2 % of range per month  
Response time: < 30 secs. to T<sub>90</sub> (excluding sample line)

#### Calibration

Calibration method: Manual or Automatic\*  
2-point calibration span and zero  
Microprocessor controlled

\*NOTE: References to auto-calibration are for instruments purchased with this option

#### Display

Type: LCD (Supertwist)+ LED backlight  
Size: 60 x 16 mm / 2.4 x 0.6 in  
Parameters: 4 x 20 character dot matrix, 8 access keys

#### Indicators

Type: 2 LEDs on door panel  
Use: 'Power On' and 'System OK'

#### Outputs/Inputs

Analog output: Single, isolated current loop for CO level  
0, 2 or 4 mA to 10 or 20 mA  
Relay outputs: CO level Alarm; System OK; Calibration/Maintenance  
Relay rating: Isolated changeover S.P. 1 A @ 240 V a.c.  
or 5 A @ 240 V d.c. resistive  
Auto cal relay contacts\*: Zero, Span check/calibration  
Auto cal initiation contacts\*: For use with external contact closure

#### Environmental

System enclosure: Painted steel, sealed IP65 / NEMA 4  
Operating (ambient) temperature: 0 to +35 °C / 32 to 95 °F standard  
to -20 °C / -4 °F with optional case heater  
to + 50 °C / 122 °F with optional air conditioner

#### Compliance

EMC: Conforms to EN-50 081 & EN-50 082  
Electrical safety: Conforms to EN-61010-2

#### Power

Power supply: 83 . to 132 V a.c. or 165 to 264 V a.c., 50 - 60 Hz  
Power consumption: 300 W

#### Gas and Air requirements

Instrument air (zero calibration): 2 bar / 30 psi clean and dry, 5 l/min / 0.2 cfm  
Instrument air (cooling): 5 - 10 bar / 70 - 150 psi clean and dry, 90 l/min / 3 cfm  
Calibration gas (recommended): 2 bar / 30 psi  
20 litres (0.7 cu.ft.) per calibration approx.  
CO in N<sub>2</sub> recommended

#### Dimensions (H x W x D):

600 x 600 x 350 mm / 24 x 24 x 14 in

Weight: 53 kg / 117 lb

#### Options

Oxygen measurement: Automatic calibration  
Case heater: Air conditioner

#### Sampling System

##### Probe

Material: Mild steel with hardened outer protection tube  
Filter type: Stainless steel replaceable  
Sample gas temperature at probe: 200 °C / 392 °F maximum  
Operating pressure: 25 mbar / ±10" w.g.  
Operating length: 457 mm / 18 in  
Installation method: 3/4" / 150 lb ANSI flange with asymmetric holes  
Weight: 3.5 kg / 7.7 lb

#### Sample Line

Type: Reinforced Nylon tubing (standard)  
Length: 15 m / 50 ft standard, other lengths available

*Continuous product development may make it necessary to change these details without notice*

Land Instruments International has a comprehensive range of Combustion and Environmental Monitoring Instrumentation.

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*Approval applies to products designed and manufactured in the UK*

*Approval applies in the USA*

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