

Non-contact Temperature Measuring Device. BTM



Reliability and effectiveness are the primary factors that characterize the efficiency and profitability of a system. Continuous monitoring of the processes occurring in the system is the prerequisite for deciding whether to intervene or not.

In its function as a temperature monitoring system, the innovative BTM contributes to achieving an optimized process. The innovations are continuous analog sensing in real time as well as measurement of the temperature directly in the operating fluid instead of the coupling housing.



Example of application: Shredder drive

Technical data:

- Motor rating: 1 030 kW @ 595 rpm
- Fluid coupling: 1150 DT-L
- Shredder throughput: 40 t per hour
- Working time: 8 hours per day, 45 weeks per year

Uses for the BTM

Continuous sensing of the current temperature of the operating fluid in the Voith Turbo fluid coupling represents a new capability and offers two decisive benefits: The thermal reserves of the coupling can be better utilized and intervention in the process to achieve specific objectives is more readily accomplished. The resultant increases in productivity and the reduced number of shutdowns and the associated downtime increase the efficiency and profitability of your equipment.

Typical applications

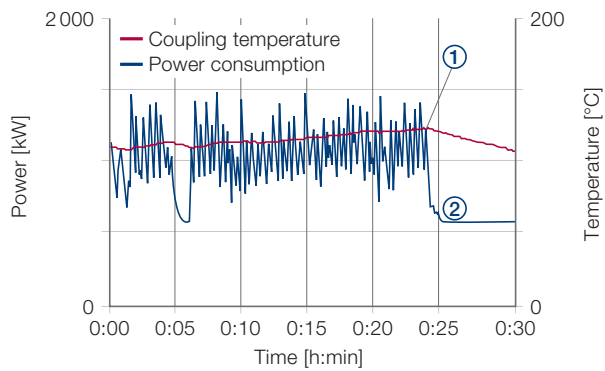
- Shredders
- Belt conveyors
- Crushers
- Marine propulsion
- Centrifuges/mixers
- Wood chipper / wood shredder
- Pulpers
- Size reduction machinery
- Mills

BTM features	Advantages	Customer benefits
<ul style="list-style-type: none"> • Direct sensing of the operating fluid's temperature 	<ul style="list-style-type: none"> • Reduced downtime • Improved operating efficiency • Lower maintenance costs • Optimized processes 	<ul style="list-style-type: none"> • High degree of system availability • Increased productivity and profitability
<ul style="list-style-type: none"> • Continuous temperature measurement 	<ul style="list-style-type: none"> • Better utilization of the fluid coupling's thermal reserves • Optimization of preventive maintenance measures 	
<ul style="list-style-type: none"> • Temperature sensing in real time 	<ul style="list-style-type: none"> • Preventive responses, e.g. reducing load in advance of an overload • Process-oriented control of infeed rate 	<ul style="list-style-type: none"> • Equipment-based load control
<ul style="list-style-type: none"> • Standardized design • Replaces conventional temperature measuring systems on fluid couplings 	<ul style="list-style-type: none"> • Suitable for retrofitting • Installs easily and quickly 	<ul style="list-style-type: none"> • Fast and easy to integrate und maintain solution • Increased profitability
<ul style="list-style-type: none"> • Standard analog 4 – 20 mA output signal • Four sensor inputs 	<ul style="list-style-type: none"> • Simple integration into existing control systems • Simultaneous monitoring of several units 	
<ul style="list-style-type: none"> • Assessment of temperature gradients 	<ul style="list-style-type: none"> • Early detection of critical process situations 	<ul style="list-style-type: none"> • Fewer production interruptions
<ul style="list-style-type: none"> • Eight freely programmable digital outputs (2 per channel) 	<ul style="list-style-type: none"> • Monitoring of freely definable temperature limits • Various signal processing possibilities 	

- 1 Shutdown of infeed equipment due to overloading (overtemperature)
- 2 Lost production (cooling phase)
- 3 BTM-"operating point", load on the drive is reduced
- 4 No production interruptions after incorporating the BTM

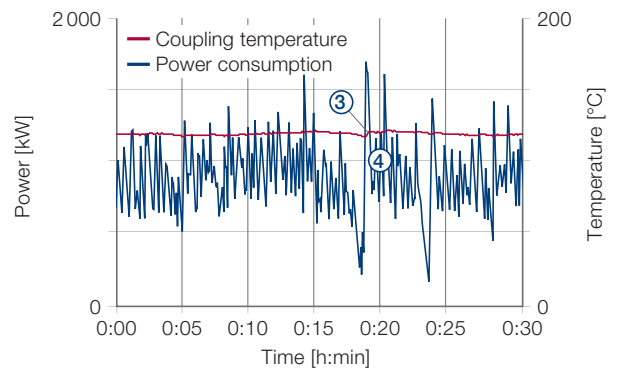
Voith Turbo fluid coupling

with conventional temperature measuring device



Voith Turbo fluid coupling

with innovative BTM temperature measuring device

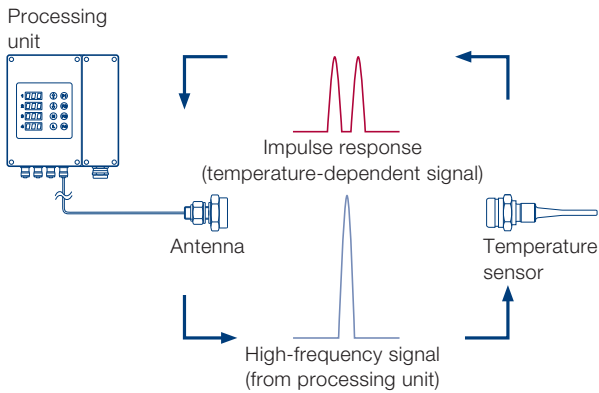


Payback calculation for a "shredder drive"

Shutdowns due to overloads	2 per week on average
Waiting period after shutdown	approx. 2 hours
Lost production due to shutdowns	160 t per week, 7 200 t per year
Lost profit (according to information from customer: 15 €/t)	2 400 € per week, 108 000 € per year
Conclusion	The BTM has paid for itself after only 2 weeks

Principle of operation

1. The processing unit transmits a high-frequency signal from the antenna.
2. The temperature sensor receives the high-frequency signal. A SAW element in the sensor converts this signal into a temperature-dependent signal and reflects it.
3. The temperature sensor senses the temperature of the operating fluid and sends a signal back to the antenna as a function of this temperature.
4. The antenna receives this signal and feeds it to the processing unit.
5. The signal received is processed in the processing unit and provided as a 4 – 20 mA output signal.



BTM components: Processing unit, antenna, temperature sensor

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Technical data – BTM

Processing unit	Measuring range	0°C...+180°C
	Measurement channels	4
	Supply voltage	24 VDC
	Degree of protection	IP65 to EN 60529
	Permissible ambient temperature	-40°C...+65°C
Approvals	CSA Certificate of Compliance No. 1968359	
Temperature sensor	Measuring range	0°C...+180°C
	Degree of protection	IP67 to EN 60529
	Permissible ambient temperature	-40°C...+100°C
Antenna	Measuring range	0°C...+180°C
	Permissible ambient temperature	-40°C...+100°C
	Degree of protection	IP67 to EN 60529
	Cable length	25 m