

**Protect Your Machine**

**Crash**

**Vibration Overload**

**Unbalance**

**Wear**

**Better be safe. Safely be better.**

# This is what we can do for you!

With our **PulseNG** system, your machines are fully protected automatically in real time and around the clock. We are compatible with the following CNC systems: Siemens, Bosch Rexroth, Heidenhain, Fanuc, Mitsubishi ...

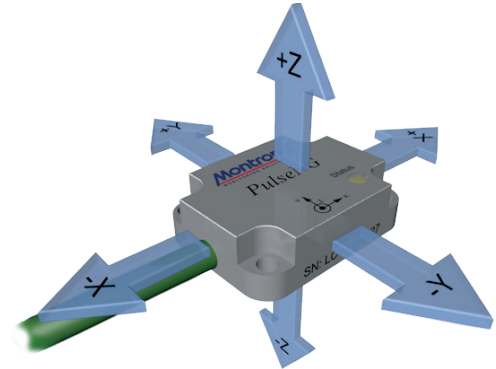
## We can detect:

- High-Speed-Impact-Crash and Low-Speed-High-Force-Crash, no matter from which direction
- Overload of vibration, force and power
- Condition of machine components (ball screw, linear guide, spindle, etc.)

## Response time $\geq 1$ ms \*

- Machine emergency stop
- NC Stop

\* Valid for basic systems! May vary depending on the configuration.



Axes of PulseNG sensor

## ■ Variable Configurations

### Basic System



(IBU-NG + **PulseNG** sensor)  
Effective protection with just one sensor

### Extension Solutions



(e.g. with MUX-NG + StrainLink Sensors + SLA-NG Amplifier + **PulseNG** Sensor + **PulseNG** M12 Sensor) Enhanced deliverables with combined physical measurements

### Application-dependent Sensor Selection

#### PulseNG

- Machine protection
- Machine diagnostics
- High-Speed-Impact-Crash



3 axes acceleration sensor

#### PulseNG M12

- Machine protection
- Machine diagnostics
- High-Speed-Impact-Crash
- Space-saving installation



3 axes acceleration sensor

#### StrainLink250-DA

- Machine protection
- Low-Speed-High-Force-Crash



Strain gauge sensor

#### PS200-NG

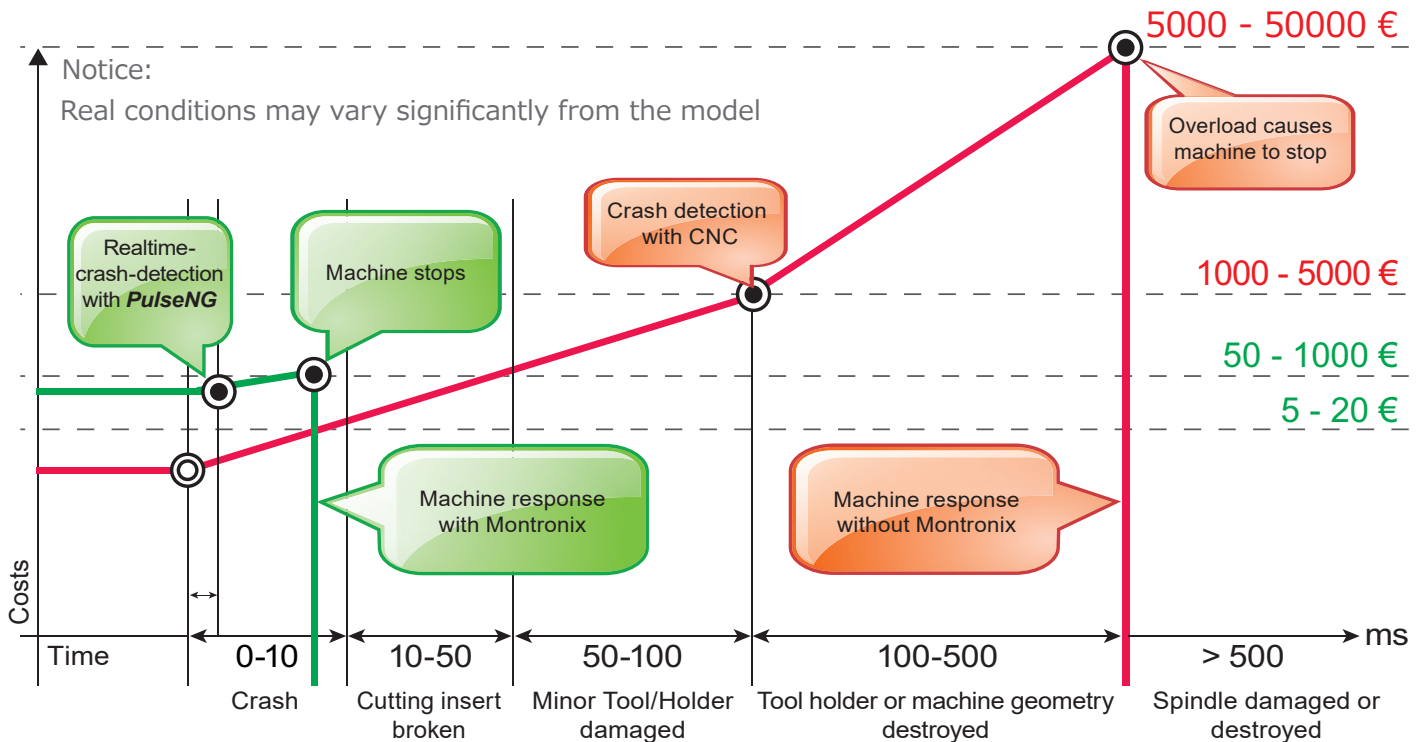
- Machine protection
- Overload



Power sensor

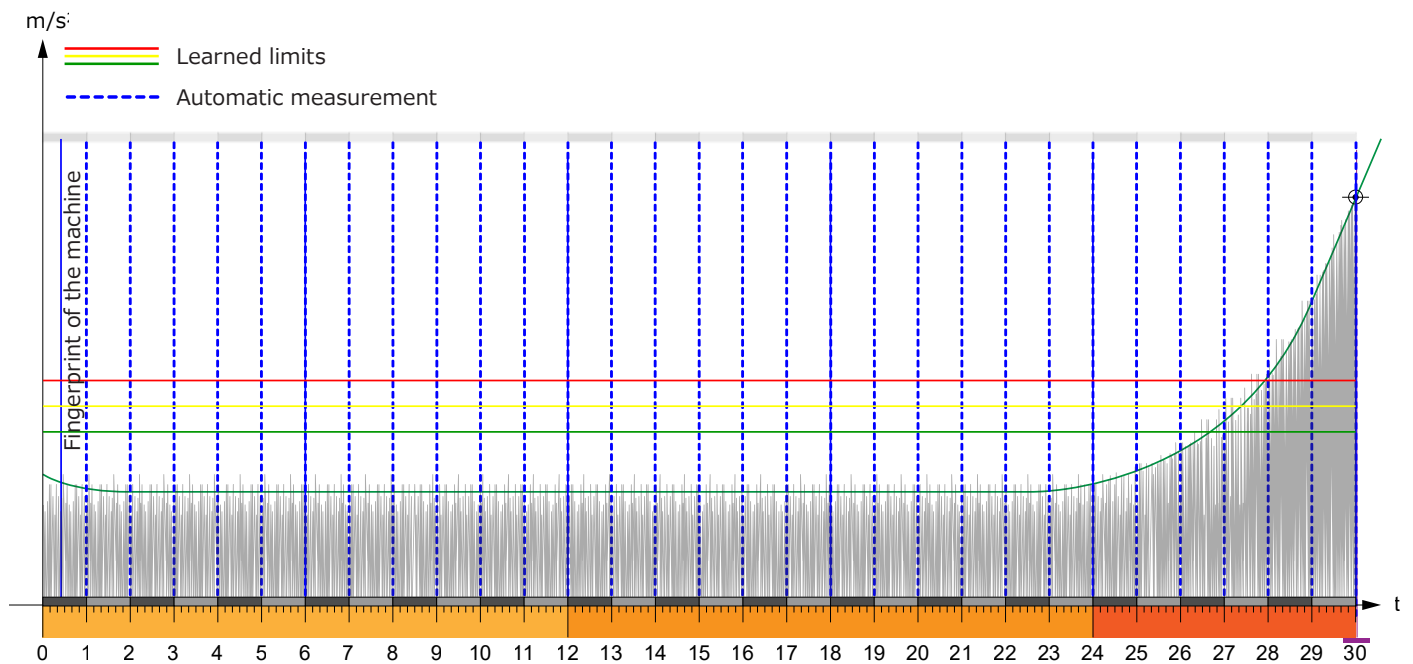
# One Product - Three Solutions

## Machine Protection



➔ Fast reaction – increased machine availability – enormous costs reduction

## Automatic Machine Condition Diagnostics – Trend Diagram



## Automated Alerts at Wear & Damages

➔ Regular automatic trend-measurements for early detection of machine wear.

# Application Examples

Equal protection in different operating conditions, **PulseNG** offers Eight Monitoring scenarios. Each scenario defines one Monitoring status. Under each scenario, Three limits can be selected and set. A typical scenarios configuration is presented below.\*

Scenario No.	Operating Status	Monitoring Task	Reaction
1	Rapid feed (G00)	Crash	Emergency stop
2	Feed (G1)	Crash & vibration overload	NC stop, feed rate adjustment
3	Tool change	Crash	Emergency stop
4	Wear measurement run	Condition of X-Axis	Automatic alert message
5	Wear measurement run	Condition of Y-Axis	Automatic alert message
6	Wear measurement run	Condition of Z-Axis	Automatic alert message
7	Wear measurement run	Spindle condition	Automatic alert message
8	Wear measurement run	Condition of B-Axis	Automatic alert message

\*recommended, however individually adaptable

## ■ Text Event Recorder

MTX-PulseNG-hmi																
Index	Type	Date/Time	Unit	Scenario #	Sensor #	Sensor type	Limit #	Axes (X,Y,Z,M)	DSP	Limit type	Limit	Max	HP (Hz)	LP (Hz)	Alarm	Stop
0001	Alarm	02.02.2017 00:24:46	a [m/s²]	2	A	PulseNG	1	Module	Average	Upper	8.0 a[m/s²]	42.5 a[m]	300	600	On	On
0002	Alarm	23.01.2017 01:31:04	v [mm/s]	1	A	PulseNG	3	Module	Average	Upper	10.0 v[mm/s]	23.0 v[m]	1	50	On	On
0003	Alarm	20.01.2017 04:13:53	v [mm/s]	5	A	PulseNG	1	X axis	Average	Upper	32.5 v[mm/s]	48.9 v[m]	40	1600	On	Off
0004	Alarm	20.01.2017 04:13:53	µC	2	B	SLA-NG	2	Channel 2	Average	Upper	2.0 µC	11.8 µC	400	600	On	On
0005	Power on	18.01.2017 00:48:44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0006	Power off	10.01.2017 20:37:47	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0007	Alarm	09.01.2017 13:06:18	v [mm/s]	1	A	PulseNG	2	Module	Average	Upper	7.0 v[mm/s]	9.3 v[m]	400	600	On	Off
0008	Alarm	06.01.2017 01:45:26	µC	2	B	SLA-NG	3	Channel 1	Average	Upper	2.0 µC	12.1 µC	1	50	On	On
0009	Alarm	05.01.2017 14:13:58	v [mm/s]	6	A	PulseNG	2	Y axis	Average	Upper	32.5 v[mm/s]	52.3 v[m]	400	600	On	Off
0010	Alarm	04.01.2017 18:27:17	µC	1	B	SLA-NG	2	Channel 1	Average	Upper	6.0 µC	18.3 µC	1	50	On	On

Grafic EL

Text EL partial view

Export csv file

Back

Connected with Montronix\_001

Monitoring:

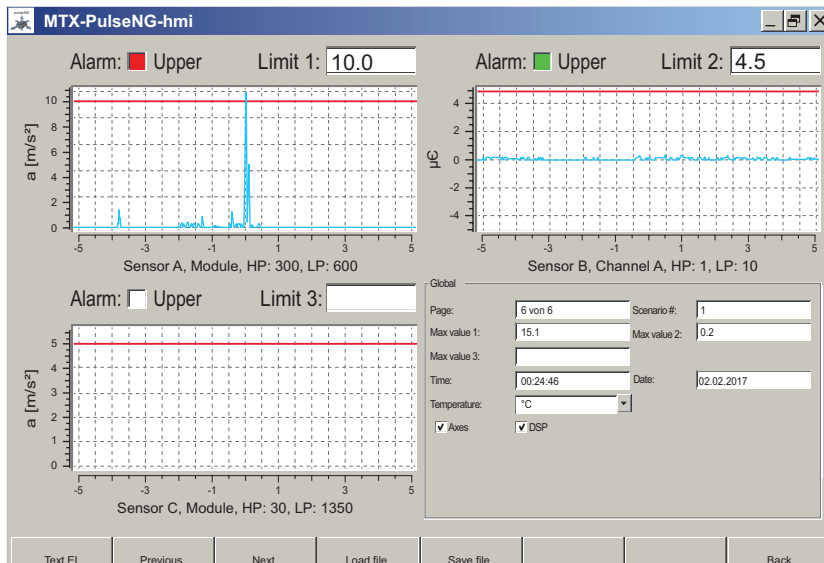
Teaching:

Scenario #: 1 / Collision

- ➔ Every limit crossing will be recorded in a ring buffer, which is not editable or erasable
- ➔ The text event recorder stored in the Monitoring hardware can save up to 4000 text events, which can be exported as a csv file
- ➔ The graphical event recorder can save up to 64 graphic events (5 seconds before and after each limit crossing) - see the following page

# Application Examples

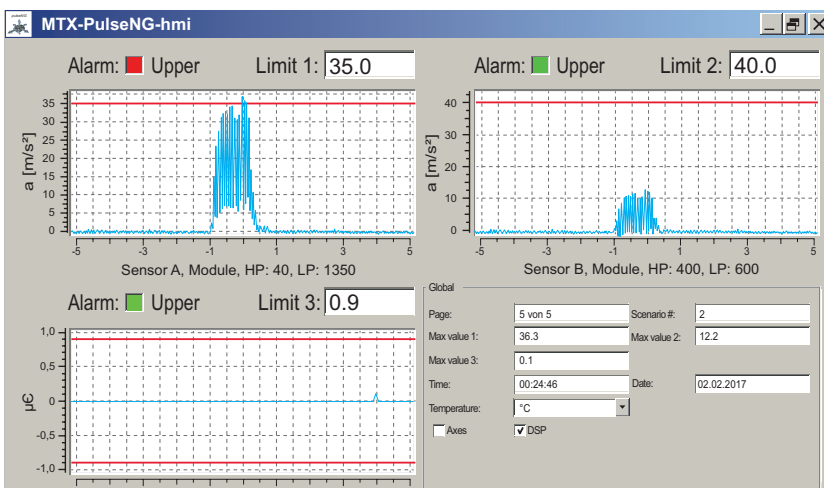
## ■ Graphical Event Recorder



### Crash

- Limit 1** High-Speed-Impact-Crash
- Limit 2** Low-Speed-High-Force-Crash
- Limit 3** Spare for customer use

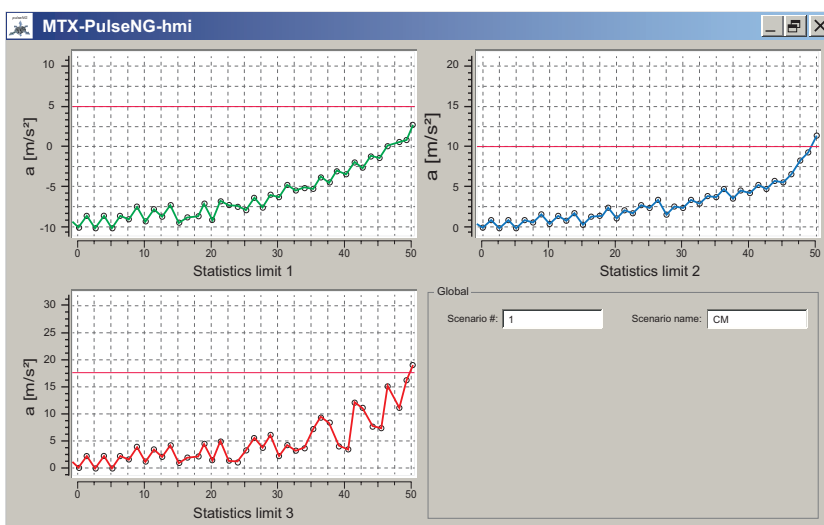
- ➔ Response time < 1 ms
- ➔ Emergency stop
- ➔ Reduce consequential damages



### Vibration Overload

- Limit 1** Vibration overload
- Limit 2** Vibration overload
- Limit 3** Force overload

- ➔ Response time < 1 ms
- ➔ NC stop, feed rate adjustment
- ➔ Limits can be set individually



Model of the health trend

### Automatic Machine Condition Diagnostics

- Limit 1** Health trend of (Statistics) longitudinal axis (x)
- Limit 2** Health trend of (Statistics) transverse axis (y)
- Limit 3** Health trend of (Statistics) vertical axis (z)

- ➔ Early detection of worn machine components
- ➔ Assist with preventive maintenance
- ➔ Automatic measurement run and alerts at wear detection



# Industry 4.0



## ■ Suitable for Industry 4.0

- We will provide the collected data over your factory-network
- For a central machine management
- For an overview of all machines' condition
- For a planable preventive maintenance
- Client/Server functionality

# Universally Applicable

Machining Centers



Turning Machines



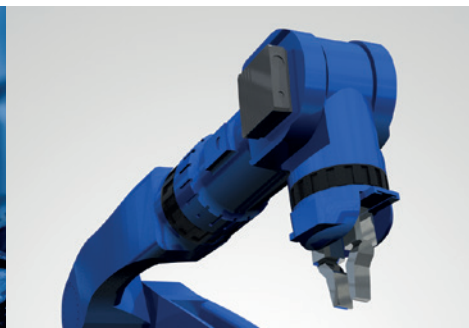
Grinding Machines



Drilling/Milling Machines



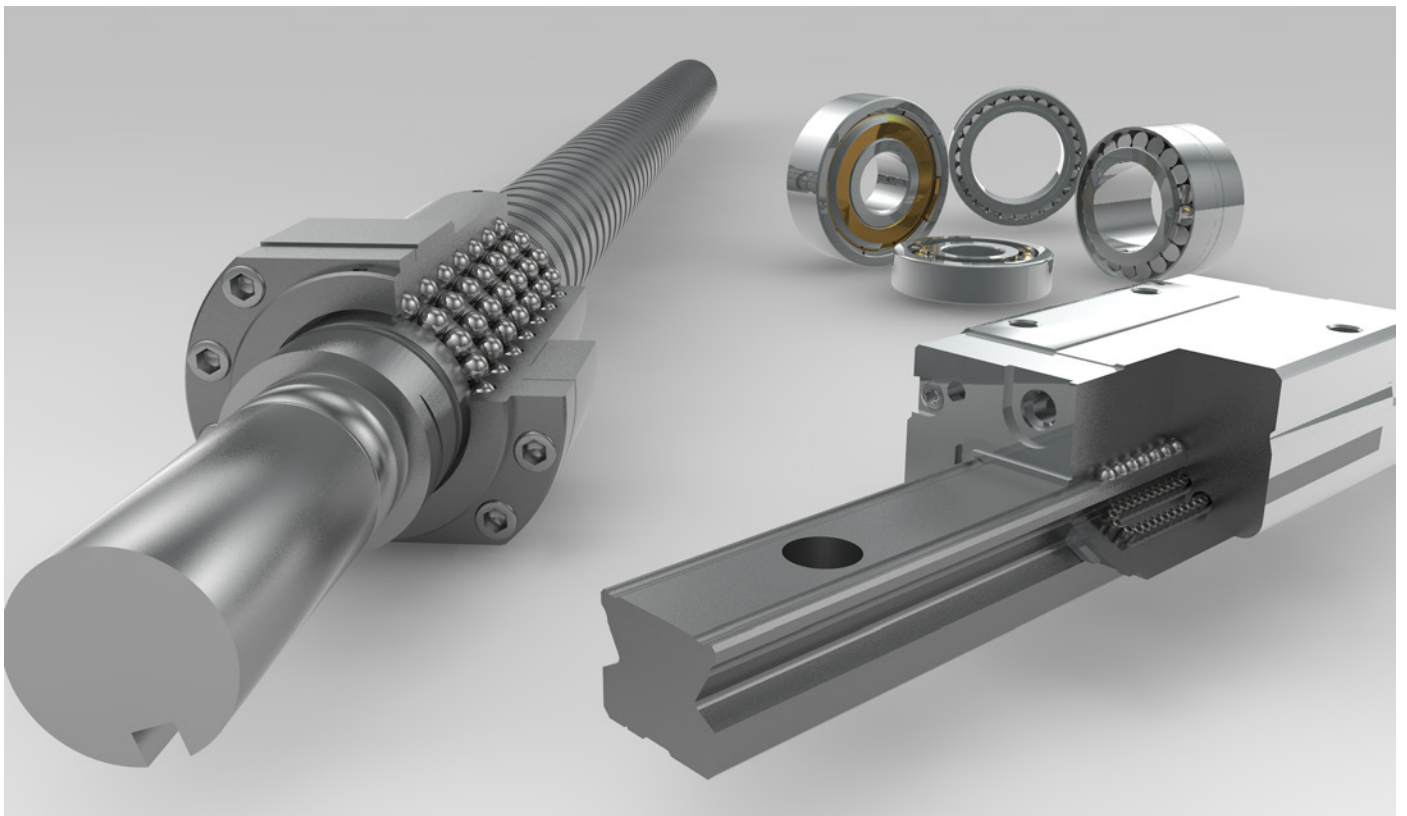
Robots



Handling Systems



Automatic Diagnostics of Machine Components



## ■ Product Properties

IBU-NG Interface	
Dimensions (HxWxD) in mm	approx. 121 x 42 x 120
Weight	approx. 370 g
Protection class	IP40
Response time	< 1 ms
Relative humidity	0 to 95 % noncondensing
Voltage supply	18-30 V DC

Attachable Components	
<i>PulseNG</i>	3 axes acceleration sensor
<i>PulseNG</i> M12	3 axes acceleration sensor
MUX-NG	Multiplexer
SLA-NG	StrainLink amplifier
StrainLink250-DA	Strain gauge sensor
PS200-NG	Power sensor / amplifier

## ■ Global Competency

Consulting from one single source, from the initial idea to a complete turn-key solution. We provide the entire workflow: Conception, installation, commissioning, training, optimization and also data for your industry 4.0!



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