SPINDLE BEARING MONITORING FOR CNC MACHINING CENTRES

A spindle bearing does not fail overnight. It gives warning.

Long before a bearing becomes audible, its vibration pattern changes. We measure that change, compare it with your machine's learned baseline and tell your maintenance team what has changed. Across manufacturers and without writing to the CNC control.

CNC CONTROLS	ACCESS	DAMAGE TYPES ASSESSED	DATA LOCATION
SINUMERIK · TNC	**Read-only**	**5 damage patterns**	**Germany**
Siemens and Heidenhain in one view. FANUC planned.	No write function in the code. Four independent safeguards.	Outer race, inner race, rolling element, cage, unbalance.	Processing and storage in data centres in Germany.

01 How it works

• NORMAL • NOTICEABLE • WARNING • ALARM

1 Measure

Sensor on the spindle housing. The edge box on the machine reads speed and, where available, load via OPC UA.

2 Compare

The system learns the baseline of your healthy spindle. What counts is the trend over several measurements, not a single value.

3 Alert

An alert in plain language with its reasoning: which component, how urgent, what to check. No prediction to the day.

02 What we monitor

The spindle and its bearings. A vibration sensor on the spindle housing measures what the CNC control cannot supply. Analysed with envelope analysis.

Outer race	BPFO
Inner race	BPFI, with sidebands
Rolling element	BSF
Cage	FTF
Unbalance	1 × rotational frequency

Features: RMS, crest factor, kurtosis, amplitudes at the bearing frequencies. Not offered today: feed axes (in development), tool changer and coolant (planned).

03 CNC controls

Siemens SINUMERIK 840D sl, 828D, ONE	SUPPORTED
HEIDENHAIN TNC 640, TNC 620, TNC7	SUPPORTED
HEIDENHAIN iTNC 530, TNC 320	CASE BY CASE
FANUC (FOCAS)	PLANNED

No spindle speed from the control means no bearing frequencies. We check other speed sources in the introductory call.

04 Read-only. Four independent safeguards.

- **A** **No write function**
  The software contains no code that writes to a CNC control.
- **B** **Upstream block**
  Any request that would change something is blocked before it reaches the control.
- **C** **Automated checks**
  With every change, tests verify that no write path has been introduced.
- **D** **Read-only user**
  A dedicated user with read rights only on the CNC control.

05 Data security

- Outbound only, not reachable from outside
- MQTT over TLS 1.2 or higher, port 8883, otherwise 443
- Own device certificate, key generated on the box
- No NC programs, drawings or operator data
- Data centres in Germany, export and deletion
- At least 7 days of buffer, signed updates only

06 Process

20 MIN
Introductory call
Are your CNC controls a fit? If not, we tell you.

EMAIL
Preliminary check
Nameplate, software version, OPC UA options. Your IT gets the security datasheet.

ONE DAY
On site
Read-only access, measuring points, connection test. Production keeps running.

ONGOING
Pilot
Learn the baseline, alerts with reasoning, monthly report per machine.

DOWNTIME CALCULATOR

What do unplanned spindle failures cost your business each year? Use your own figures. We do not insert a savings rate.

forbachandpartners.com/en/downtime-calculator.html

YOUR CONTACT

Sascha P. Forbach

Founder, managing director and software architect

We are in market launch and are taking on our first manufacturing companies.

Phone +49 211 909 899 62
info@forbachandpartners.com
forbachandpartners.com

Graf-Adolf-Strasse 41
40210 Düsseldorf, Germany
Forbach and Partners Ltd, Paphos (Cyprus)