

CONTINUOUS IN-PROCESS TOOL FORCE MONITORING SYSTEM

The CS2 - DF/SF, Tool Monitor for checking of cutting force, is designed to monitor the following in real time:

- Collision
- Tool breakage
- Tool presence
- Detect the start of the cut
- Tool wear and tear

Tool Monitoring benefits can be seen with a quick return on investment by increasing machine productivity and by lowering production cost. Specially when applied in high volume production machining.

Quality

The continuous monitoring of the tool state and the precision of the measurements obtained from the Marposs Tool Monitor make it possible to improve production processes and, as a consequence, the geometry of the piece.

Versatility

The availability of various interface solutions ensures that the Marposs Tool Monitor may be integrated on all types of machine tool. Given its small size and the limited number of components to install, the device can be mounted close to the spindle or tool that is being controlled.

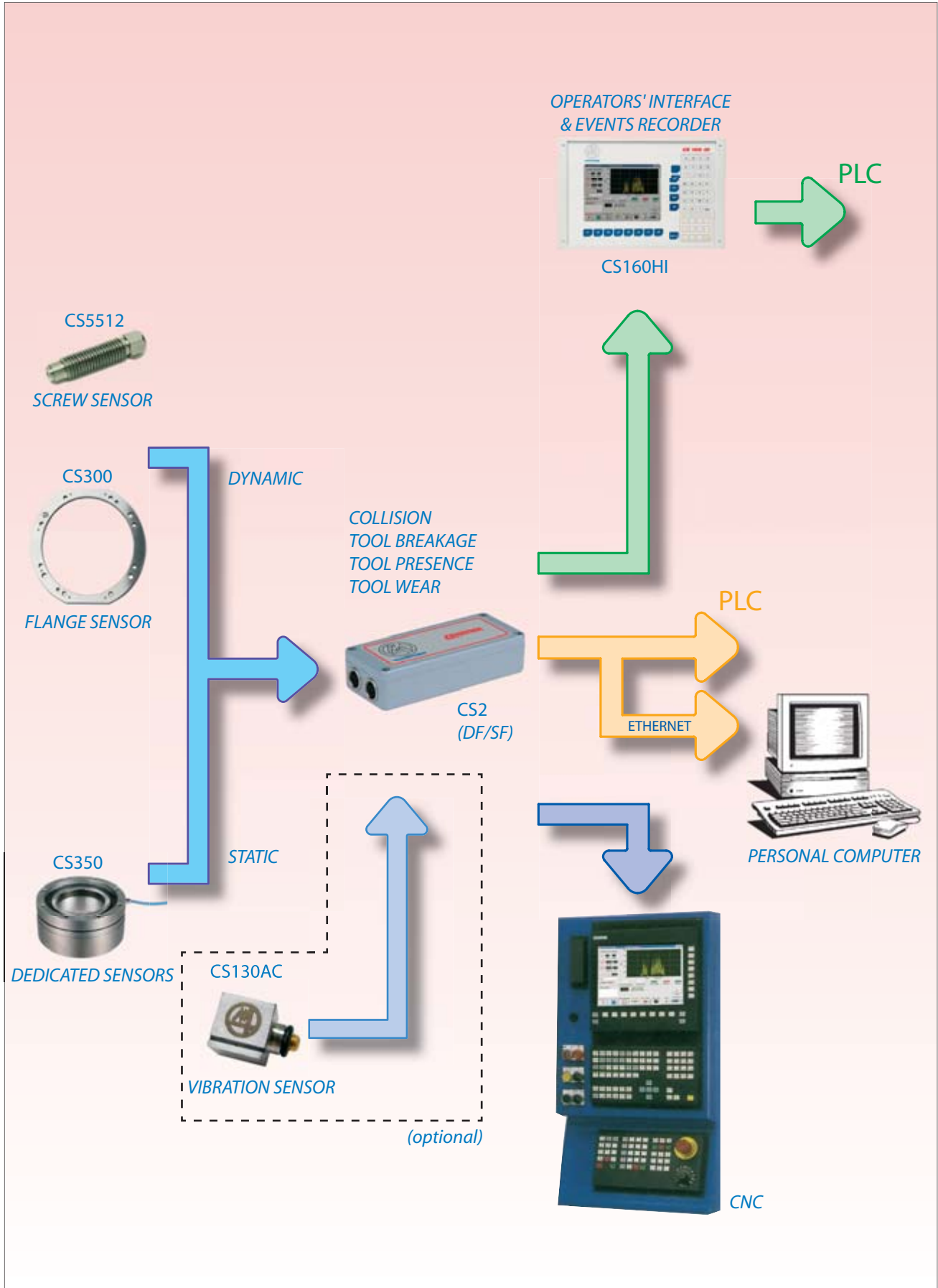
Benefits

- Reduction of dead times in the manufacturing process
- Maximum use of the tool
- Better quality of the manufactured item

Typical applications

- Drilling
- Milling
- Tapping
- Grinding
- Perforation
- Bending
- Turning
- Broaching
- Tothing
- Adaptive Control

The system



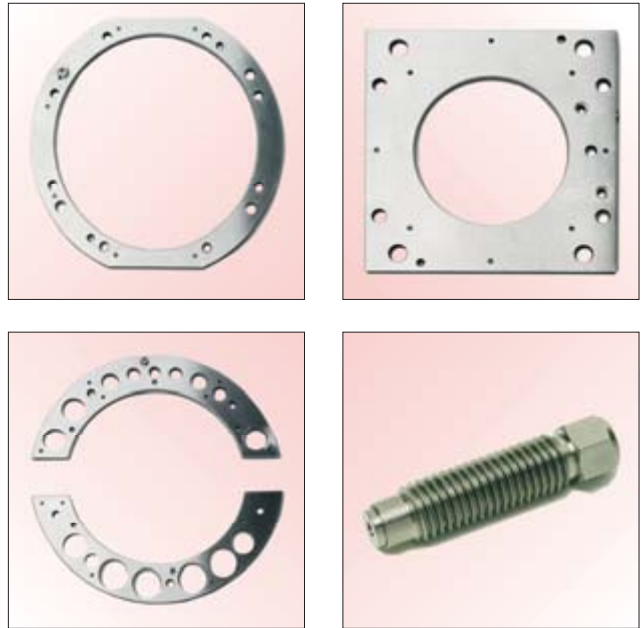
- Touch Probes
- Transmission Systems
- Laser
- Software
- Toolsetting Arms
- Tool & Process Monitoring
- Accessories

Dynamic force sensors

Marposs dynamic force sensor picks up variations in force exerted on the tool during machining. Due to its piezo-electric characteristics, the sensor is not affected by the force used to screw it on (preload).

This type of sensor is particularly suitable for controlling:

- Collision
- Tool breakage
- Detect the start of the cut
- Monitoring of milling procedures



Static force sensors

Marposs static force sensors are used whenever there is a need to control the absolute value of force exerted, specifically to:

- Monitor the cutting force in turning during lengthy production processes.
- Monitor tool wear and tear.
- Detect tool presence.
- Optimise cutting parameters used in the process.
- Monitor the force on a part between centres.
- Adaptive process control.

All Marposs force sensors can be quickly and easily installed on any type of machine tool given their small size and variety of mounting solutions.



CS130AC

The CS130AC is a compact, high precision accelerometer. Its small size makes it very easy to install without altering the vibrating mass to be controlled. It can also be mounted inside high speed spindles, motors, pumps etc.

The Marposs accelerometer is particularly suitable for monitoring vibration caused by rotating and spindle parts.



Programming and management of the CS2 - DF/SF device

The Tool Monitor is easy to program using the software provided. It may be installed directly in the Numerically Controlled System or on an external PC.

Black box function available with memorisation and storage of events.

The screenshot displays the Marposs software interface with several key components:

- Table 1: Data Log**

	Date/Time	CH/AL	Maximum Value	Duration (ms)	Level	Duration Lev
1	2006-05-04 13:28:15	CH1 Coll	16.55 mm/s	1496 ms @ 0.00 mm/s	50 mm	
2	2006-05-04 13:28:37	CH1 Coll	32.62 mm/s	2152 ms @ 0.00 mm/s	50 mm	
3	2006-05-04 13:28:58	CH2 Coll	1.00 Ampere	2527 ms @ 1.52 Ampere	5 mm	
4	2006-05-04 13:29:31	CH2 Coll	1.00 Ampere	8 ms @ 1.52 Ampere	5 mm	
5	2006-05-04 13:29:41	CH1 Coll	12.95 mm/s	468 ms @ 0.00 mm/s	50 mm	
6	2006-05-04 13:29:49	CH1 Coll	17.95 mm/s	2363 ms @ 0.00 mm/s	50 mm	
7	2006-05-04 13:29:52	CH2 Coll	1.00 Ampere	8 ms @ 1.52 Ampere	5 mm	
8	2006-05-04 13:29:52	CH2 Coll	36.30 Ampere	22943 ms @ 1.52 Ampere	5 mm	
9	2006-05-04 13:29:53	CH2 Coll	13.00 Ampere	1409 ms @ 1.52 Ampere	5 mm	
10	2006-05-04 13:29:56	CH1 Coll	47.76 mm/s	1329 ms @ 0.00 mm/s	50 mm	
11	2006-05-04 13:29:47	CH2 Coll	11.72 Ampere	3054 ms @ 1.52 Ampere	5 mm	
12	2006-05-04 13:29:28	CH1 Coll	82.55 mm/s	2325 ms @ 0.00 mm/s	50 mm	
13	2006-05-04 13:29:12	CH2 Coll	12.00 Ampere	4882 ms @ 1.52 Ampere	5 mm	
14	2006-05-04 13:29:54	CH1 Coll	22.70 mm/s	676 ms @ 0.00 mm/s	50 mm	
15	2006-05-04 13:29:22	CH2 Coll	12.00 Ampere	376 ms @ 1.52 Ampere	5 mm	
- Table 2: Alarm Levels**

	AL1 Level	AL1 Time	AL2 Level	AL2 Time	AL3 Level	AL3 Time
1	0.00	0	0.00	0	0.00	0
2	2.00	5	15.00	5	20.00	5
3	0.00	0	0.00	0	0.00	0
4	12.00	20	5.00	300	7.25	3000
5	0.00	0	0.00	0	0.00	0
6	0.00	0	0.00	0	0.00	0
7	0.00	0	0.00	0	0.00	0
8	0.00	0	0.00	0	0.00	0
9	0.00	0	0.00	0	0.00	0
10	0.00	0	0.00	0	0.00	0
- Channel 1 Cycle Setup**

Cycle 0 Parameters
 Level: 10.00 Time: 10
 Delete Cycle

Use <TAB> to move between items.
 <Up> to move up, <Down> to move down, <Left> to move left, <Right> to move right, <Enter> to delete cycle, <Esc> to ready cycle.
- Graph**

Graph showing signal amplitude (0 to 100) over time (0 to 3 Sec./div). The signal shows a noisy, fluctuating pattern between approximately 20 and 40 units.
- Control Panel**

Enabled Max: 40 Value: 2
 Collision Alarm 1 Alarm 2 Alarm 3 AL Disabled
 Cycle: 5 A1: 70 T1: 10
 Auto OK: A2: 7 T2: 20
 Dynamic Levels: A3: 7 T3: 20
 Coll Level: 95 Coll Time: 5
 MARPOSS CS2 v1.8 CS2TH v2.1 Connected



MARPOSS
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For a full list of address locations, please consult the Marposs official website

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