## **Press Release Sensor Instruments**

March 2020

## **Frequency of Compressor Wheels**

**23 March 2020. Sensor Instruments GmbH:** The task is to measure the frequency of compressor wheels that are used in turbochargers. These wheels may reach speeds of up to 300,000 revolutions per minute. Usually these compressor wheels have about 10 blades and are made of milled aluminum. If the frequency of these compressor wheels should be determined optically it must be taken into consideration that every blade causes a signal change - which means that up to 3,000,000 switching processes must be expected per minute, resulting in a frequency of approx. 50 kHz (of the blades). Even an edge detector of type **RED-50-P** or **RED-110-P** with its maximum scan frequency of typ. 100 kHz will work up quite a "sweat" here.

ensor

Normalised evaluation of the two receiver signals and dynamic automatic laser power control allow an evaluation that to a large extent is independent of the surface. The sensor's output provides both the direct switching signal change per blade (0V/+24V) and an analog signal proportional to the frequency ( $0V \dots +10V$  or  $4mA \dots 20mA$ ) - Perfect measurement results in this high-speed application!

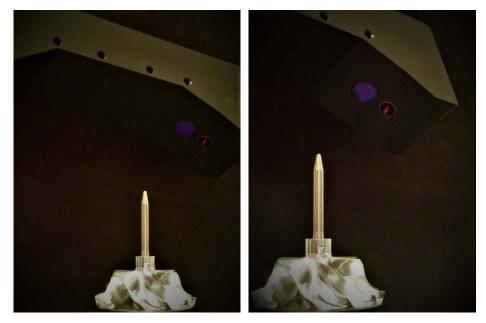


Let's make sensors more individual

Instruments



Optical frequency measurement for compressor wheels with speeds of up to 300,000 rpm



Largely surface-independent evaluation with the edge detector RED-110-P

Sensor Instruments GmbH Fel. ++49 (0) 8544-9719-0			Sensor 💥
ww.sensorinstruments.de		RED Scope V1.1	Instruments
CONNECT PARA TEACH	RECORDER SCOPE	TIME CALCULATION IS BASED ON THE CYCLE TIME IN THE DISPLAY [ms]	CLOSE
GET CYCLE TIME		delta X [ms] 14,143 delta Y [digit] 741	SIGNAL ALL
[Hz] <u>11666</u> [n	ns] 0.085717		
TRIGGER MODE	SINGLE SHOT	3750- 3500-	
RE TRIGGER VALUES [064]	10	3250-	
RIGGER LEVEL [04096]	2000	3000- 2750-	
SCAN RATE [160 000]	5	2500-	
SCAN	BREAK SCAN	2250-	
		2000-7	N   N,   V   V,
PRINT SCOPE GRAPH			$\mathbf{N} \mid \mathbf{M} \mid $
COMMENT (ADD TO PRINT) RED-110-P		1250-	MININ
DISTANCE TO THE TURBO CHARGER WHEEL: 110mm SURFACE: NICKEL ANODIZED, BRIGHT		750-	
	- 1		
		250-	
		0 13 26 38 51 64 77	90 102 115 12
		IN0	
RAM SEND	GO	OUT1-	
EE GET	STOP		
FILE			

Signal evaluation of edge detector RED-110-P with the RED-Scope Windows® software.

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