

# Rotating Multi-Component Dynamometer HS-RCD

Type 9125A..., 5237A...

## for Cutting Force Measurement at the Rotating Tool

Rotating high-speed cutting force dynamometer HS-RCD

- Cutting force measurement at the rotating cutter
- 2-component  $F_z$ ,  $M_z$  measurement
- Up to max. 25'000 r/min
- Contactless data transmission
- Internal coolant supply
- For all common tool spindles
- Tool holder with collets
- High concentricity and balancing quality
- Complete measuring system
- CE conformity
- Extremely light-weight

### Description

The complete measuring system consists of rotor, stator, connecting cable and signal conditioner. The spindle adapter of the machine tool determines the design of the rotor.

A 2-component piezoelectric sensor and 2 charge amplifiers as well as the digital transmission electronics are incorporated in the rotor.

Transmission of the measuring signal to the stator, range switching of the charge amplifiers and the power supply are all provided by using a contactless arrangement. The stator is installed on the machine tool at a distance of 1 ... 2 mm from the rotor.

The signal conditioner is responsible for the power supply, signal transmission and control of the system. Three measuring ranges can be selected and the measurement started either manually or via the serial interface. The measuring signal is available as an analog voltage signal  $\pm 10$  Volt.

When the system is used for cutting force measurements during milling, the maximum load on the rotor must be adjusted according to the operating instructions.



### Application

Investigation of high-speed machining processes on a rotating tool on drilling and milling.

Monitoring machining forces in the case of critical tools and expensive workpieces.

### Technical Data

#### Rotor Type 9125AxxA0

Speed		r/min	max. 25'000
Measuring range	Fz1	N	-3000 ... 3000
	Fz2	N	-1000 ... 1000
	Fz3	N	-300 ... 300
Measuring range	Mz1	Nm	-50 ... 50*
	Mz2	Nm	-20 ... 20
	Mz3	Nm	-10 ... 10
Overload			20 %
Sensitivity	Range 1	Fz	mV/N $\approx 3$
		Mz	mV/Nm $\approx 185$
Linearity		%FSO	$\leq \pm 1$
Hysteresis		%FSO	$\leq 1,0$
Crosstalk	Fz→Mz	Ncm/N	$< \pm 0,05$
	Mz→Fz	N/Nm	$< \pm 0,8$
	Mb→Fz	N/Nm	$< \pm 1$
	Mb→Mz	Ncm/Nm	$< \pm 1$
Natural frequency	f <sub>0</sub> (Fz)	Hz	$\approx 5000$
	f <sub>0</sub> (Mz)	Hz	$\approx 2500$
Cut-off frequency per channel		kHz	1
Low-pass filter Type			4 pole Butterworth
Sampling rate per channel		kHz	4
Modulation technique			PCM
Resolution		bit	12
Operating temperature range		°C	0 ... 60
Degree of protection			IP-67
Tool diameter		mm	1 ... 20
Internal coolant pressure		bar max.	70
Balancing category			6,3
Weight		kg	1,5
Spindle adapter material		Steel	1.7131

\*Max. ranges apply to drilling

### Technical Data

#### Signal conditioner Type 5237Ax

Number of channels			2
Number of ranges per channel			3
Cut-off frequency per channel		kHz	1
Low-pass filter Type			4 pole Butterworth
Resolution	Range 3	Fz	mN $\approx 150$
		Mz	Ncm $\approx 0,5$
Signal output FSO		V	$\pm 10$
Input connector from rotor			1xBNC neg.
Output connector			2xBNC neg. D-Sub15
Operating temperature range		°C	0 ... 60
Supply voltage selectable		V/AC	100 ... 240 $\pm 10\%$
		%	$\pm 10$
		Hz	50 ... 60
Power consumption		VA	60
Interface (for remote control)			RS-232C D-Sub9
Dimension WxHxD		mm	450x135x248
Weight		kg	5,4





**Ordering Key**Rotating high-speed cutting  
force dynamometer HS-RCD9125A   A **Spindle adapter (integrated)**

HSK-A63	11
HSK-E63	12
HSK-A80	13
DIN 69871-AD 40	21
MAS 403 BT 40	22
ANSI B5,50-40	23
DIN 69871-AD 30	24
MAS 403 BT 30	25
ANSI B5,50-30	26
HSK-A50	31
HSK-E50	32
HSK-E40	33
HSK-A40	34

**Other adapters on request****Toolholder (integrated)**

Collet chuck DIN 6499-B32	A
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**Dynamometer**

(Rotor) separate	0
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**Measuring system complete with:**

Rotor, stator, connecting cable and signal conditioner for 19" rack mounting	1
Rotor, stator, connecting cable and signal conditioner in desktop case	2

**Included Accessories**

• Chuck key	5.210.357
• Mounting screws for stator	3.050.233
• RS-232C cable	1200A27

**Ordering example: 9125A13A2**Tested measuring system with rotating high-speed cutting  
force dynamometer with integral spindle adapter HSK-A80  
and integral collet chuck DIN 6499-B32 (without collets), sta-  
tor, connecting cable and signal conditioner in desktop case.

System components can also be ordered separately:

**Components**

Components	Type
Rotor	9125AxxA0
Stator	5235
Connecting cable l = 8 m	1500A37
Signal conditioner for 19" rack mounting	5237A1
Signal conditioner in desktop case	5237A2
Chuck key for 9125AxxA...	5.210.357
Mounting screws for 5235	2x3.050.233
RS-232C cable for 5237A... (l = 5 m)	1200A27

**Optional Accessories**

- Collets DIN 6499-B32-UP

**Ordering Key**

Collets DIN 6499-B32-UP

9169A

**Clamping range d**

1 ... 2 mm	02
2 ... 3 mm	03
3 ... 4 mm	04
4 ... 5 mm	05
5 ... 6 mm	06
6 ... 7 mm	07
7 ... 8 mm	08
8 ... 9 mm	09
9 ... 10 mm	10
10 ... 11 mm	11
11 ... 12 mm	12
12 ... 13 mm	13
13 ... 14 mm	14
14 ... 15 mm	15
15 ... 16 mm	16
16 ... 17 mm	17
17 ... 18 mm	18
18 ... 19 mm	19
19 ... 20 mm	20

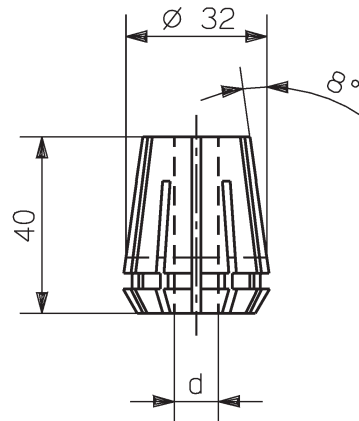


Fig. 3: Collet Type 9169A...

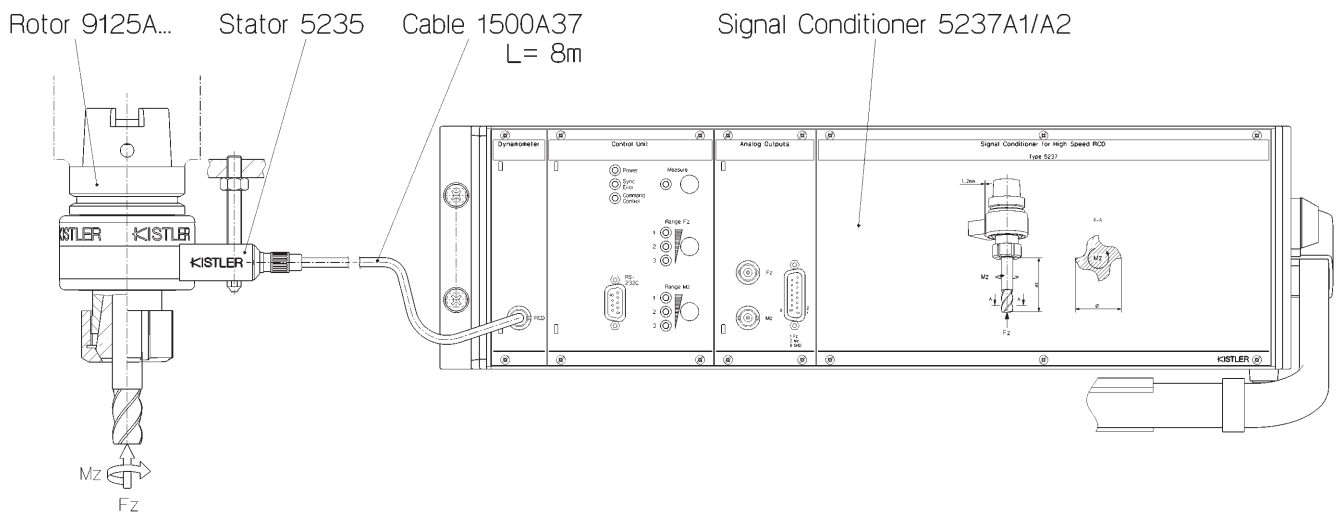


Fig. 4: Rotating High-Speed Cutting Force Measuring System 9125AxxA1/A2

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