



DDU SENSOR SYSTEM

Special Features

- Sensor system for contact-free monitoring of rotating and rigid tools
- DMS technology in rotor
- 3 measuring ranges each, for torque and feed force
- Rotor standard types and individual designs available
- Inductive transmission of measuring data and energy supply
- Different cable variants available for stator

DDU-rotor and DDU-stator constitute the sensor system for contact-free monitoring of rotating and rigid tools. In combination with the relevant measuring transducers, the system is employed with all ARTIS tool and process monitoring systems.

Mode of operation

The DDU-rotor continuously measures the torque-values acting on the tool as well as the feed forces. The transmission of the energy supply and the measurement data to the attached measuring transducer is carried out inductively via an air gap located between the rotor and the permanently installed stator.

Standard types and measuring ranges

The page **Measuring and Application Ranges** contains the technical data of the available 6 standard rotor types.

Concerning the individual design of rotors for other application conditions, exact data about the relevant machining task are required as per the checklist **Machining task of tool holder**.

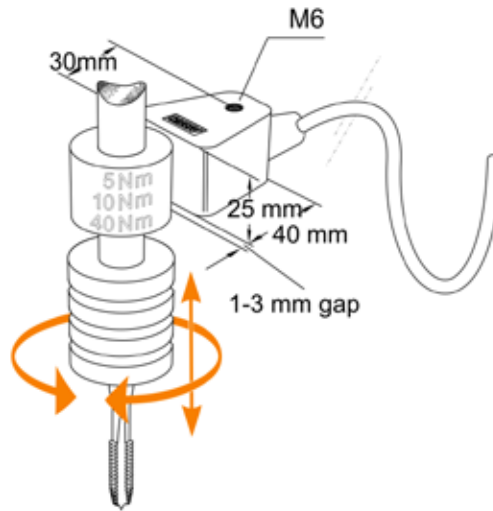
Two different cable variants are available for the DDU-stator: PUR- and ROB PUR-cable, both either with axial or sideways cable outlet.

Compatibility

- TF-01 Genior Modular Torque and Axial Force Measuring Transducer for contact-free tool monitoring
- DDU-4 measuring transducer for stand-alone-operation or use with the CTM Tool and Process Monitoring system

Component of the DDU sensor system

DDU-ROTOR



DDU-Rotor O3PZ1021001 applied to the tool holder

Summary	<p>The ARTIS tool monitoring systems Genior Modular and CTM may be equipped with devices for contact-free tool monitoring. This monitoring solution is individually tailored to the customer's requirements.</p> <p>The sensor, which is designed as a cylindrical rotor, is attached to the customer's tool holder and firmly connected to it. The monitoring system can be used for breakage monitoring of threading operations, drilling or as a quality insurance instrument for tapping. It is also suitable for monitoring rigid tools.</p>
Restrictions	<p>Hydraulic chucks and shrink chucks cannot be equipped with the rotor.</p> <p>Note: Upon applying the strain gauges the tool holder needs to endure temperatures up to 150 °C!</p>

Dimensions	Depending on the tool holder
Degree of protection	IP66/IPx7 resistant to cooling lubricants
Surface	High tenacity, protected against abrasion by chips
Temperature range	15 °C – 50 °C
Measuring range	Depending on the tool holder, 3 measuring ranges each for torque and feed force, technical clarification required!

Measuring principle	Strain gauge technology in full-bridge circuit
Resolution	9 bit, 8 bit data, 1 bit sign
Accuracy	±5 % of measuring end value
Repetitive accuracy	±2 % of measuring end value
Data transmission rate	10 ms (100 Hz)
Sampling rate	2 ms (500 Hz)
Maximum rotational speed	max. rotational speed = 5500 rpm
Conformity	CE

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Component of the DDU sensor system

DDU-ROTOR

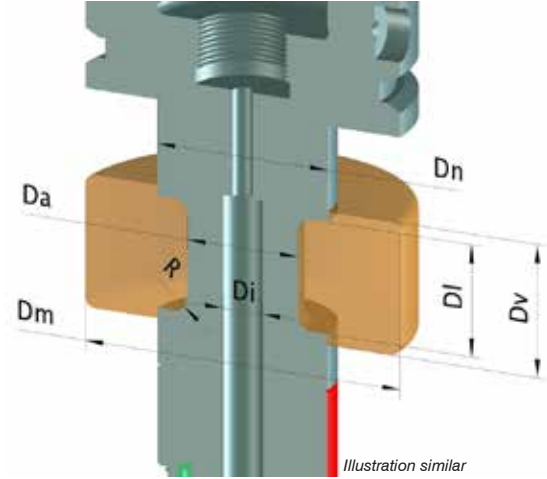
Summary

The DDU-rotor is designed uniquely to the customer's machining task.

All relevant information for technical clarification of the required measuring range and a list of available measuring ranges can be found on this sheet.

The data of the available standard types are listed below. If none of the standard types can be employed, exact data about the relevant machining task are required as per the checklist: Machining task of tool holder.

***Note:** Within the area DI no internal, mobile components or lockings screws for tool stop are admitted!



Measuring ranges and application data

Dimensions	Da	Di	DI*	Dm	Dn	Dv	R
min. in mm	20	0	21	42	20	25	2
max. in mm	80	40	21	125	100	25	3
Standard types	Da (mm)	Di (mm)	Measuring range torque (Nm)		Measuring feed force (kN)		min. Dm (mm)
Type 1	18	< 12	2/10/30		1/2/5		> 42 mm
Type 2	20	< 15	5/10/40		1/2/5		> 42 mm
Type 3	25	< 16	10/30/60		2/5/10		> 50 mm
Type 4	30	< 14	15/40/60		3/6/10		> 52 mm
Type 5	33	< 21	20/40/100		3/6/10		> 63 mm
Type 6	36	< 16	30/80/200		5/10/20		> 63 mm
Available measuring ranges	Identification no. – torque (Nm)				Identification no. – feed force (kN)		
	A – 2/10/30	E – 10/20/40	I – 15/40/60	M 30/80/200	A – 1/2/5	E – 3/8/15	
	B – 5/10/20	F – 10/30/50	J – 20/40/80		B – 1,5/3/6	F – 5/10/20	
	C – 5/10/30	G – 10/30/60	K – 20/50/80		C – 2/5/10	G – 0,5/1/2	
	D – 5/10/40	H – 15/30/60	L – 20/40/100		D – 3/6/10	H – 10/30/50	
Checklist: Machining task of tool holder	Monitoring of threading tasks				Monitoring of drilling tasks		
	Thread cutting <input type="checkbox"/> Thread forming <input type="checkbox"/>				Process data		min.
Thread Ø, e.g. M6	Process data		Material		Outer drill hole Ø (mm)		
	min.	max.	mm	Tensile strength of material	Inner Ø (counterbore only) (mm)		
Pitch			mm	N/mm ²	No. of cutting edges (pcs.)		
Spindle rotational speed			rpm		Spindle rotational speed (rpm)		
					Feed force (mm/round)		

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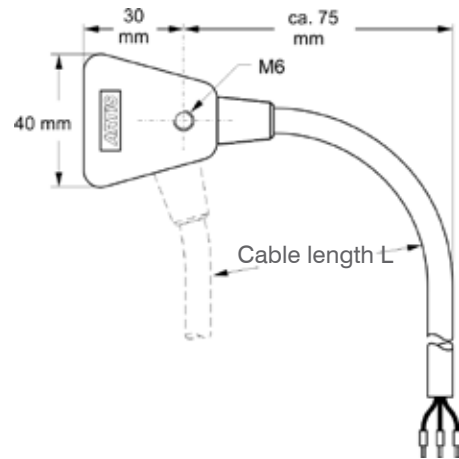
DDU-STATOR

Summary

Together with the DDU-rotor, the DDU-stator forms the sensor system for contact-free monitoring of rotating and rigid tools. It can be used in combination with the ARTIS tool and process monitoring systems Genior Modular and CTM.

The stator is installed solidly and centrally to the DDU-rotor in a distance of 1 - 3 mm. Via this air gap, the transmission of measurement data from rotor to stator is carried out contact-free (inductively). Subsequently, the stator submits the data to the connected measuring transducer (GEM TF-01 or DDU-4).

Note: Thoroughly follow the instructions in the installation manual when mounting rotor and stator!



	DDU stator O3PZ10210xx (Code-no. see specification)	
Cable	PUR-cable, gray	
Properties	Low adhesion	
	Flame-retardant (IEC 60332-1-2)	
	Oil resistant	
	Designed for up to 5 million swaying cycles in cable carriers (in dry, damp or wet surrounding at normal mechanical stress).	
Conductor construction	Extra fine wired acc. to VDE 0295, class 6/ IEC 60228 Cl.6	
Minimum bending radius	For flexible use 7,5 x outer Ø, if permanently installed 4 x outer Ø	
Diameter	8.5 mm	
Stator	PUR cable, gray	
Specification Code	Stator-G 5 m	O3PZ1021005
	Stator-G 10 m	O3PZ1021006
	Stator-S 5 m	O3PZ1021003
	Stator-S 10 m	O3PZ1021004
Dimensions	see drawing	
Degree of protection	IP67, resistant to cooling lubricants	
Temperature range	15 °C – 50 °C	
Installation	Screw on M6	

	DDU stator O3PZ10210xx (Code-no. see specification)	
Cable	ROB PUR-cable, black	
Properties	Low adhesion	
	Flame-retardant (IEC 60332-1-2)	
	<ul style="list-style-type: none"> • Mostly resistant to oil and grease • Resistant to vibration, solvents, acids, lye as well as to hydraulic fluids. • High flexibility in cold surrounding, abrasion and cut-resistant • Performs well under torsional stress ± 360 degrees/meter 	
	Extra fine wired acc. to VDE 0295, class 6/ IEC 60228 Cl.6	
Conductor construction	Extra fine wired acc. to VDE 0295, class 6/ IEC 60228 Cl.6	
Minimum bending radius	7.5 x conductor Ø	
Diameter	6.3 mm	
Stator	ROB PUR cable, black	
Specification Code	Stator-G 10 m	O3PZ1021013
	Stator-S 10 m	O3PZ1021014
Dimensions	see drawing	
Degree of protection	IP67, resistant to cooling lubricants	
Temperature range	15 °C – 50 °C	
Installation	Screw on, M6	
Conformity (PUR cable and ROB PUR cable)	CE	



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