

KiTorq Stator

Type 4541A...

Torque Evaluation Unit (Stator) for a Torque Measuring Flange

KiTorq Stator Type 4541A... for supplying power to and capturing measurement data from torque measuring units in the KiTorq System, such as the Type 4550A... rotor.

- Combinations of various rotors and stators
- High precision
- Low installation height
- Digital interface for measurement data capture and parameterization
- Freely scalable voltage and frequency outputs

Description

The KiTorq Stator Type 4541A... and KiTorq Rotor Type 455xA... make up the torque measuring flange KiTorq System. The stator supplies power to the rotor, receives and processes the measurement data, and provides voltage and frequency outputs. The outputs can be tared via the digital interface or by pressing a button. The outputs can be configured via the digital interface. This makes it possible, for instance, to use the output for measuring the torque with a different low-pass filter than a second torque output used for control purposes. It is also possible to convert the speed into a voltage signal. Different scaling factors can also be applied to different plugs.

The KiTorq Stator Type 4541A... can be used together with a rotor from the KiTorq system. Using the ordering key, the stator can be purchased individually or as a calibrated torque measurement chain, together with a Type 455xA... rotor. The standard torque evaluation unit (stator) is shipped calibrated.

Calibration of the entire measurement chain, consisting of the KiTorq Rotor and a KiTorq Stator, can be ordered using the rotor ordering key (such as the Type 4550A...).

Application

Applications for the KiTorq Stator are found in test bench engineering, such as electric motor, gear, pump, and combustion engine test stands. Special applications for the individual components of the KiTorq System can be found on their corresponding data sheets.



General Technical Data

The accuracy class is determined by the KiTorq Rotor 455xA...

Temperature influence on the zero point TK0	% FSO/10 K	0,01
Temperature influence on the nominal value TKC	% FSO/10 K	0,01
Linearity error	% FSO	0,01
Rel. standard deviation of repeatability	% FSO	0,003
Zero point stability (48 h)	% FSO	0,003
Limit frequency –3 dB	kHz	10
Operating temperature range (Rated temperature range)	°C	10 ... 60
Service temperature range	°C	0 ... 70
Storage temperature range	°C	–25 ... 80
Protection class		IP54

Technical Data

Noise Immunity (EN 61326-1, Table 2)

Electromagnetic field (AM)	V/m	10
Magnetic field	A/m	100
Electrostatic discharge (ESD)		
Contact discharge	kV	8
Air discharge	kV	4
Fast transients (burst)	kV	1
Impulse voltage (surge)	kV	1
Conducted emissions (AM)	V	10

Mechanical Shock (EN 60068-2-27)

Quantity	n	1 000
Duration	ms	3
Acceleration	m/s ²	650

Vibrational Loads in 3 Directions (EN 60068-2-6)

Frequency range	Hz	10 ... 2 000
Duration	h	2,5
Acceleration (amplitude)	m/s ²	200

Speed Measuring

Pulses/revolution		1x60
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Dimensions

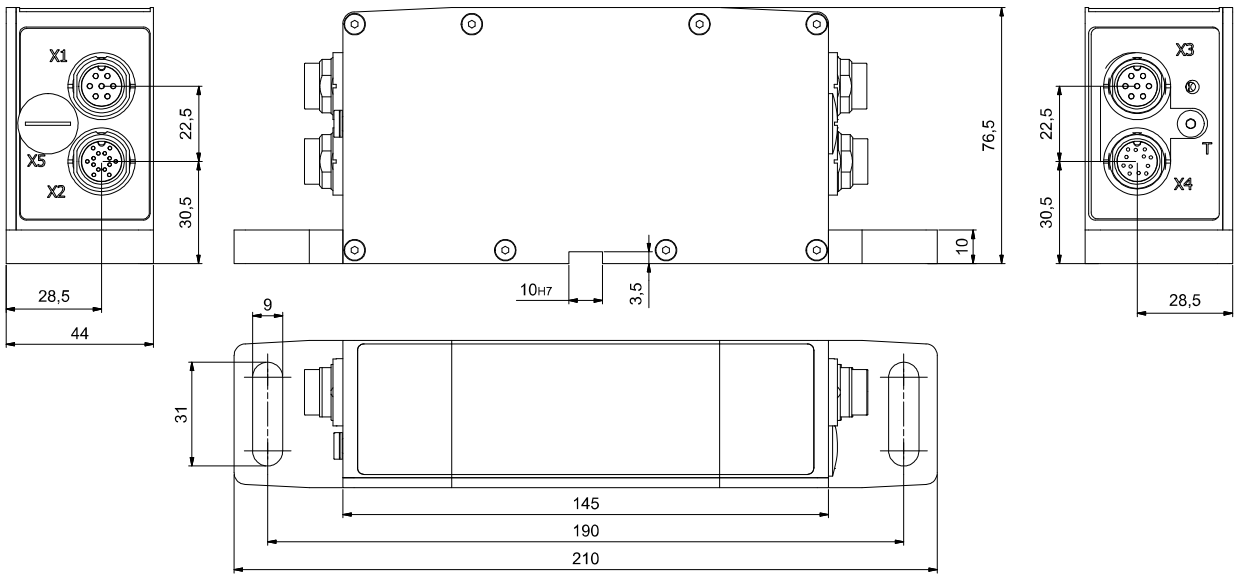
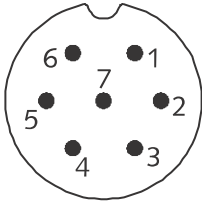


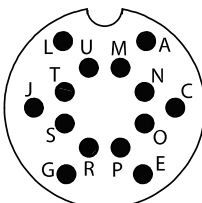
Fig. 1: Dimensions of Type 4541A... KiTorq Stator torque evaluation unit (stator) (dimensions in mm)

Electrical Connections

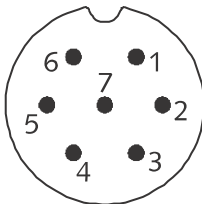
Pin Allocation of the 7 Pin Built-in Connector X1

	Function	PIN	Description
	Supply	3	+U _B
		2	GND
	Torque output	4	F _{A+}
		1	F _{A-}
		5	DGND
	100 % control (Floating input)	6	Control
		7	GND

Pin Allocation of the 14 Pin Built-in Connector X2

	Function	PIN	Description
	Speed impulse	A	Track A+
		C	Track A-
		E	Not connected
		G	Not connected
		J	Not connected
		L	Not connected
		U	Not connected
	Scaling selector switch (Floating input)		Normal (1:1) with 0 ... 2 VDC
	Scaling selector switch		Extended (1:5/1:10) with 3,5 ... 30 VDC
	Acknowledgment output	M	VDC
	Taring (Floating input)	N	Tara
	RS-232C interface	T	TXD
		R	RXD
		P	DGND

Pin Allocation of the 7 Pin Built-in Connector X3

	Function	PIN	Description
	Power supply	3	+U _B
		2	GND
	Torque output	4	U _A
		1	AGND
		5	Not connected
	100 % control (Floating input)	6	Control
		7	GND

Pin Allocation of the 12 Pin Built-in Connector X4

Function	PIN	Description		
Supply	F A	+U _B GND	18 ... 30 VDC, power consumption <20 W Ground for +U _B	
Shield	M		In the sensor, on the housing	
Torque output	C	U _A	Voltage output ±10 VDC at ±M _{Nom} at >2 kΩ 10 VDC at control signal activation R _{i,c} = 10 Ω, Output short circuit proof	Frequency output F _{A+} Frequency signal
	D	AGND	Ground for U _A	AGND Ground for F _A
Speed pulses	H	Track A	Active, TTL level	
	G		Not connected	
	J		Not connected	
Input 100 % control	K	Control	Off: 0 ... 2 VDC On: 3,5 ... 30 VDC	
RS-232C interface to the CoMo Torque	B	TXD	Serial transmission cable	
	L	RXD	Serial receiving cable	
Digital mass potential	E	DGND	Ground for speed impulses, calibration/control input and RS-232C interface, ground for F _{A+}	

Application Examples

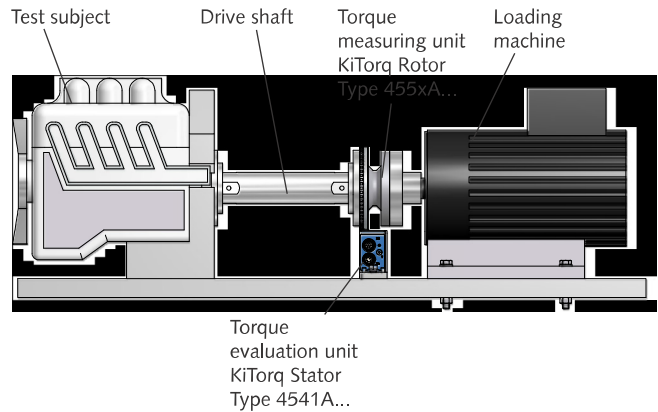


Fig. 2: Combustion engine test stand

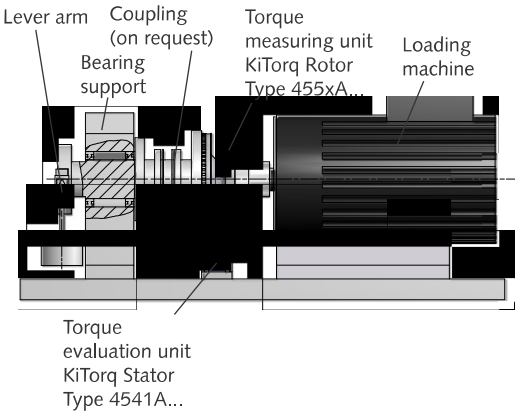


Fig. 3: Possibility for calibration

4541A_000-879e-10.13

Standard Calibration: The stator is calibrated as a standard. When a torque measurement chain with a KiTorq Rotor, the rotor and stator are calibrated to WKS 1 as a measurement chain. The measurement chain calibration is specified solely by the ordering key of the KiTorq Rotor.

- Frequency: 240 kHz \pm 120 kHz
- Analog: \pm 10 V

- Analog ± 10 V at output X4

When a second scaling factor is selected (1:5 or 1:10), both ranges are calibrated at output X4 and can be selected there.

Special Calibration: Upon request, additional calibrations can be ordered (e.g. second scaling factor, another frequency, ...).

If one of the components is replaced (e.g. with a KiTorq Rotor with a different nominal torque), then the virtual calibration values for the new measurement chain can be calculated from the individual calibration certificate for the rotor and stator.

All output settings can be changed afterward by the customer. The calibration certificates apply only to the settings at delivery, according to the order.

- **WKS 1:** Works calibration at 5 points right, 3 points left
- **WKS 2:** Works calibration at 5 points right and left, and repeat series
- **DKD:** Calibration per DIN 51309

The diagram illustrates the possible configurations for the KiTorq Stator Type 4541A... with various input parameters and their scales. The central component is labeled "KiTorq Stator Type 4541A... Possible configurations".

Frequency kHz and Scale:

Frequency kHz	Scale
240 ±120	1:1
100 ±40	1:5
10 ±5	1:10
	1:1 and 1:5
	1:1 and 1:10

Voltage V and Scale:

Voltage V	Scale
10	1:1
	1:5
	1:10
	1:1 and 1:5
	1:1 and 1:10

Frequency kHz and Voltage V Scales:

Frequency kHz	Voltage V
Scale:	Scale:
Frequency:	—

Frequency kHz and Scale (Bottom):

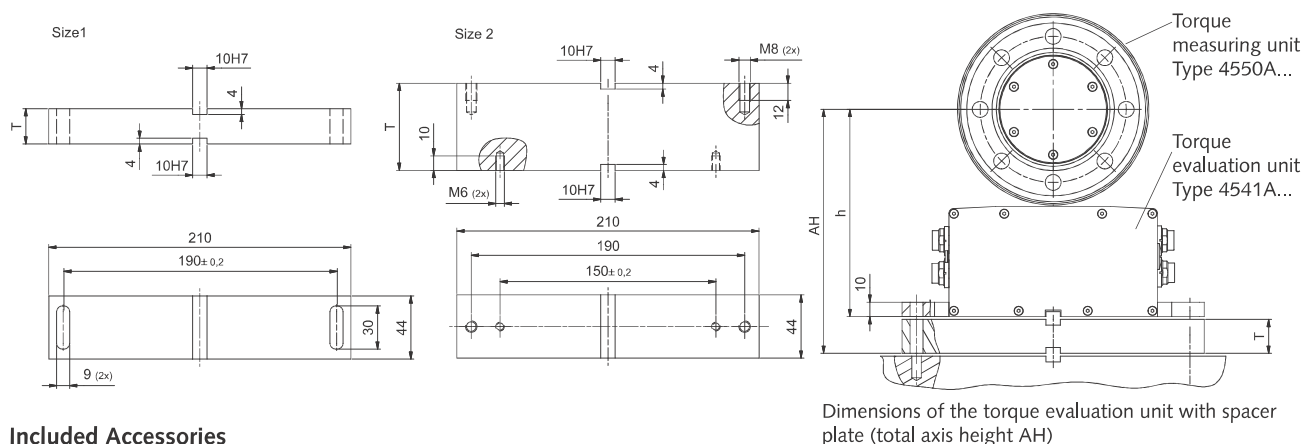
Frequency kHz	Scale
240 ±120	1:1
100 ±40	1:5
10 ±5	1:10
	1:1 and 1:5
	1:1 and 1:10

The diagram also shows connections for X1, X2, X3, and X4, indicating different input configurations.

Our calibration service DKD-K-37701 provides traceable calibrations for torque sensors from all manufacturers.

Dimensions of the spacer plate

Spacer Axis height	100 N·m/ 200 N·m h= 133 mm			Size	500 N·m/ 1 000 N·m h= 144 mm			Size	2 000 N·m/ 3 000 N·m h= 161 mm			Size	5 000 N·m h= 175,5 mm			Size
AH	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	Type KSM	T [mm]	Size	
157,5	038460	24,5	1													
167,5				036872	23,5	1										
185,5				036874	41,5	1	038460	24,5	1							
194,5	038459	61,5	2													
202,5							036874	41,5	1	039694	27	1				
204,5				036876	60,5	2										
222,5							038459	61,5	2							
226,5																
239,5										039693	64	2				
263,5																



Included Accessories

- Calibration certificate

Optional Accessories

- Connection cable, length 5 m, 7 pin – open ends
- Connection cable, length 5 m, 12 pin – open ends
- Connection cable, length 2,5 m, 12 pin – to CoMo Torque
- Connection cable, length 5 m, 14 pin – open ends
- Cable socket 7 pin (plug X1/X2)
- Cable socket 12 pin (plug X4)
- Cable socket 14 pin (plug X2)
- Spacer plate 13,5 mm, AH 157,5
- Spacer plate 24,5 mm, AH 167,5
- Spacer plate 41,5 mm, AH 185,5
- Spacer plate 60,5 mm, AH 204,5
- ControlMonitor CoMo Torque Evaluation instrument for torque sensors
- Adapter flanges (on request)
- Couplings (on request)
- SensorTool

Type/Art. No.

- KSM219710-5
- KSM124970-5
- KSM186420-2.5
- KSM385370-5
- KSM000517
- KSM000703
- KSM038290
- KSM036870
- KSM036872
- KSM036874
- KSM036876
- 4700B...
- 2305A...
- 2305A...
- 4706A

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Ordering Key

Speed

Speed measuring with
1x60 Imp./Rev.

N1

Type 4541A

Order Example:

Type 4541AN1

Torque evaluation unit Type **4541A**, speed measuring 60 impulses/revolution: **N1**